Avoided premature mortality is one of the more commonly cited results of benefits analyses for air pollution control. However, as noted in the valuation section of this chapter, a more accurate description of the benefit of clean air is a reduction in the risk of mortality for the exposed population over many years, which results in the extension of lives (sometimes referred to as "lives saved"). Other useful metrics of the benefit of cleaner air are the number of life years that are gained through the reduction of mortal risks, and the number of years of life expectancy gained on average throughout the population. We estimated these metrics through the application of a population simulation tool – effectively, we simulated the process of gradually reducing mortality risk from air pollution across all individuals in the US 30 years old and older, starting in 1990 and continuing through 2020. In addition, we tracked the impact of these effects, held constant at the 2020 levels, for an additional 30 years, through 2050. Running the simulation beyond 2020 allows us to estimate the full effect of changes that begin in 2020, which because of the cessation lag are not fully realized until many years after the end of the study period. Comparing the estimated population in each age cohort across the two scenarios allows us to estimate gains in life-years (i.e., one additional person in a cohort for one year yields a life year gained), and summing across cohorts and years yields cumulative estimates. In addition, analysis of the changes in mortality risk among cohorts older than a specific age yields estimates of life expectancy gains at specific ages.[64]

The results of these calculations are presented in Table 5-8 below, and provide further evidence of the substantial benefits of CAAA during and after the 1990-2020 period. The first panel of the table provides estimates of life-years gained for 2020 and 2040 – these are estimates of the life-years gained only in that year of the simulation, but reflect the cumulative effect of mortality risk reductions in prior years. The next panel provides estimates of cumulative life years gained overall all years since 1990, first for the 1990-2020 period, and then for the 1990-2040 period, inclusive.

As expected, life-years gained are largest in the older cohorts, particularly cohorts 60 years and older, and they increase over time as the effect of mortality risk reduction in successive years increases survival rates among all individuals age 30 and over. By 2020, the cumulative effects indicate 22 million life-years are gained from the air pollution mortality risk reduction.

The last panel provides the life expectancy results. As early as 2010, the CAAA increased life expectancy at 30 years by 0.65 years, with somewhat smaller gains among older cohorts. By 2040, the full effect of the CAAA on life expectancy is realized, with a total gain in life expectancy of almost one year at age 30 across the entire US population.

[64] For a detailed description of the model, see the related report, *Uncertainty Analyses to Support the Second Section 812 Benefit-Cost Analysis of the Clean Air Act*, March 2010, and Industrial Economics, Inc. (2006).

TABLE 5-8. LIFE YEARS GAINED AND LIFE EXPECTANCY GAIN ESTIMATES FROM THE POPULATION SIMULATION MODEL

AGE COHORT		LIFE-YEARS GAINED IN SPECIFIC YEARS (ANNUAL)		CUMULATIVE LIFE YEARS GAINED THROUGH TARGET YEAR		LIFE EXPECTANCY GAINS (YEARS)		
START AGE	END AGE	2020	2040	2020	2040	2010	2020	2040
30	39	17,000	18,000	260,000	620,000	0.65	0.87	0.91
40	49	60,000	71,000	910,000	2,300,000	0.63	0.84	0.88
50	59	150,000	180,000	2,000,000	5,400,000	0.59	0.79	0.84
60	69	330,000	380,000	3,500,000	11,000,000	0.53	0.71	0.76
70	79	470,000	840,000	5,000,000	20,000,000	0.44	0.59	0.64
80	89	470,000	1,200,000	6,000,000	23,000,000	0.32	0.43	0.48
90	99	320,000	800,000	3,600,000	14,000,000	0.19	0.25	0.27
100+		60,000	200,000	490,000	3,100,000	0	0	0
Total		1,900,000	3,800,000	22,000,000	80,000,000			

Note: Column entries to not add to totals due to rounding. Life expectancy results are incremental period conditional life expectancy gains at the start age of the cohort.

NON-FATAL HEALTH IMPACTS

We report non-fatal health effects estimates in a similar manner to estimates of premature mortality – as a range of estimates for each quantified health endpoint, with the range dependent on the quantified uncertainties in the underlying C-R functions. The range of results for 2020 is characterized in Table 5-6 with 5th percentile, mean, and 95th percentile estimates which correspond to the primary low, central, and high estimates. All estimates are expressed as new cases avoided in 2020, with the following exceptions. Hospital admissions reflect admissions for a range of respiratory and cardiovascular diseases and these results, along with emergency room visits for respiratory disease, do not necessarily represent the avoidance of new cases of disease (i.e., air pollution may simply exacerbate an existing condition, resulting in an emergency room visit or hospital admission). Further, each admission is only counted once, regardless of the length of stay in the hospital. Minor restricted activity days, school loss days, and work loss days are expressed in terms of person-days. For instance, one "case" of a school loss day represents one person out of school for one day.

AVOIDED HEALTH EFFECTS OF AIR TOXICS

The prior discussion focuses on the effects of the 1990 CAAA on particulate matter and ozone health effects, but the Amendments also address the control of air toxics or hazardous air pollutants (HAPs). HAPs are pollutants regulated under Title III of the CAAA that can cause adverse effects to human health and ecological resources. The Amendments establish a list of HAPs to be regulated, require EPA to establish air toxic

emissions standards based on Maximum Achievable Control Technology (MACT) standards, and include a provision that requires EPA to establish more stringent air toxics standards if MACT controls do not sufficiently protect the public health against residual risks. Control of air toxics is expected to result both from these changes and from incidental control due to changes in criteria pollutant programs, such as controls on volatile organic compounds (VOCs) necessary to achieve the NAAQS for ambient tropospheric ozone.

Both the Retrospective analysis and the First Prospective analysis omitted a quantitative estimation of the benefits of reduced concentrations of air toxics, citing gaps in the toxicological database, difficulty in designing population-based epidemiological studies with sufficient power to detect health effects, limited ambient and personal exposure monitoring data, limited data to estimate exposures in some critical microenvironments, and insufficient economic research to support valuation of the types of health impacts often associated with exposure to individual air toxics. Based on a recommendation by the Council, EPA developed a case study of the benefits of CAAA controls on benzene emissions in the Houston area (USEPA, 2001).[65] The purpose of the case study was to demonstrate a methodology that could be used to generate human health benefits from CAAA controls on a single HAP in an urban setting, while highlighting key limitations and uncertainties in the process. In addition, EPA hoped to gain insight into the use of the case study methodology for characterizing benefits nationwide. The case study was not intended, however, to provide a comprehensive assessment of the benefits of benzene reductions due to the CAAA.

The case study involved calculating the reduction in the annual number of cases of leukemia due to reductions in benzene levels resulting from the 1990 CAAA through the year 2020 in the Houston metropolitan area. Benzene was selected for the case study due to the availability of human epidemiological studies linking its exposure with adverse health effects. The case study focused on Houston because of the presence of significant large benzene emitting sources, such as petroleum refineries, as well as sources more typical of other urban areas, such as gasoline refueling stations.

We conducted the case study using the same five steps used in the main 812 criteria pollutant analysis:

1. **Scenario Development**: We assessed benefits from the reduction in benzene concentrations between a *without-CAAA* scenario, which essentially freezes federal, state, and local air pollution controls at the levels of stringency and effectiveness that existed in 1990, and a *with-CAAA* scenario, which assumes that all federal, state, and local rules promulgated pursuant to, or in support of, the 1990 CAAA were implemented.

[65] A detailed report of the case study methodology and results was completed by Industrial Economics, Inc (IEc, 2009). This report can be downloaded from the following website: www.epa.gov/oar/sect812

2. **Emissions Estimation**: We estimated benzene emissions in the Houston area under both the *with-CAAA* and *without-CAAA* scenarios by extrapolating data based on expected growth in emissions-generating activities over time, adjusted for the impact of future year control assumptions under each scenario.

3. **Air Quality and Exposure Modeling**: We then applied EPA's American Meteorological Society/Regulatory Model (AERMOD) dispersion modeling system (USEPA, 2004) to convert emissions estimates to ambient benzene concentrations at the Census block group level. The AERMOD output was then run through EPA's Hazardous Air Pollutant Exposure Model, Version 6 (HAPEM6; ICF International, 2007) to generate benzene exposure concentrations for the study population at the Census tract level, which reflect average benzene concentrations likely experienced by the study population as they carry out their daily activities.

4. **Health Effects Modeling**: We next estimated avoided cases of leukemia using a life-table based risk assessment model. The life-table model assessed age-specific risks at the Census tract level, based on county-level background rates of leukemia, age-specific benzene exposure data from HAPEM6 and an epidemiological dose-response function derived from a study of occupational benzene exposures (Crump, 1994).[66] The model yielded annual age-specific Census tract-level avoided cases of leukemia (fatal and non-fatal) for each target year. We also estimated the number of cases expected to occur after the end of the study period resulting from CAAA-related benzene changes within the study period, due to lagging effects of these changes on leukemia risks.

5. **Valuation**: We then applied valuation methods from the current economic literature to assign monetary value to the avoided leukemia cases. This included valuing fatal cancers using the VSL estimate used in the primary 812 analysis (i.e., the Weibull distribution based on 26 studies) with an adjustment for medical costs associated with the period of cancer illness leading up to death (i.e., "pre-mortality morbidity").[67] We valued non-fatal cancers using two bounding estimates, a WTP value for chronic bronchitis and one from a health risk tradeoff study that provided a value for avoiding a case of non-fatal lymphoma.[68]

Table 5-9 presents our primary estimate for avoided fatal and non-fatal cases of leukemia due to CAAA-related changes in ambient benzene levels in the Houston area. It includes the number of expected annual cases avoided in each study year as well as the total cumulative avoided cases throughout the study period and the total cumulative avoided cases expected to occur after 2020, due to changes in benzene occurring within the study

[66] This study is also the basis for the Inhalation Unit Risk (IUR) published on EPA's Integrated Risk Information System (IRIS) (USEPA, 1998).

[67] This estimate was based on a value presented in EPA's Cost of Illness Handbook (USEPA, 1999) for a "typical" cancer case.

[68] The chronic bronchitis value is the same as that used in EPA's Regulatory Impact Analysis (RIA) for the PM National Ambient Air Quality Standards (NAAQS) (USEPA, 2006). The non-fatal lymphoma value was derived by using the risk-risk ratio from Magat et al. (1996) along with our primary VSL estimate.

period. It also shows the monetary value (the 1990 net present value (NPV), using a five percent discount rate) of these avoided leukemia cases.

Our results indicate that by the year 2020, the change in benzene-related population risk due to the 1990 CAAA programs would be equivalent to a total of four cases of leukemia in the Houston area, with three of those occurring in Harris County, the most densely populated county included in the analysis. We estimated two of the four cases to be fatal and two to be non-fatal. Our primary central estimate of total benefits due to CAAA-related reductions in benzene is $8.9 to 13 million (in 2006$), $8.5 million of which is due to fatal cases of leukemia, and $0.4 to 4.1 million of which is due to non-fatal cases.

In addition to the leukemia analysis, we evaluated the numbers of individuals likely to be exposed to benzene at levels exceeding EPA's chronic reference concentration (RfC) for benzene, which is based on changes in white blood cell counts, under the *with-CAAA* and *without-CAAA* scenarios. We found no individuals exposed to benzene at concentrations exceeding the RfC in either the *with-CAAA* or *without-CAAA* scenario. We also conducted illustrative analyses of exposure and risk reductions to highly exposed subpopulations in the study area, and found potentially significant individual risk reductions due to the CAAA for individuals in these groups. For instance, a back-of-the envelope calculation of residents living in homes with attached garages, who are expected to have higher benzene exposures, suggests that adding attached garage-related benefits to our primary estimate could result in an approximate doubling of our primary estimate.

The effect of the CAAA on lifetime risks of benzene-induced leukemia for Houston residents at the Census tract level is explored in Figure 5-2. The map on the left displays the distribution of leukemia risks based on benzene exposures levels expected in 2020 under the *without-CAAA* scenario. The highest risk levels (i.e., greater than one-in-one hundred thousand) occur in Harris County in the downtown Houston area (within the rings of the interstate), in the Texas City area of Galveston County where a number of refineries and chemical facilities are located and in southeastern Brazoria County, which also features major chemical manufacturing and petroleum refining facilities. The map on the right shows the distribution in the magnitude of CAAA-related risk reductions throughout the Houston area. The highest risk reductions (i.e., greater than a factor of three) coincide with the areas identified as those with the highest risks in the first map. For instance, the CAAA is expected to reduce risks significantly in the highly populated downtown Houston area, where residents are expected to have risks on the order of one-in-one hundred thousand or greater.

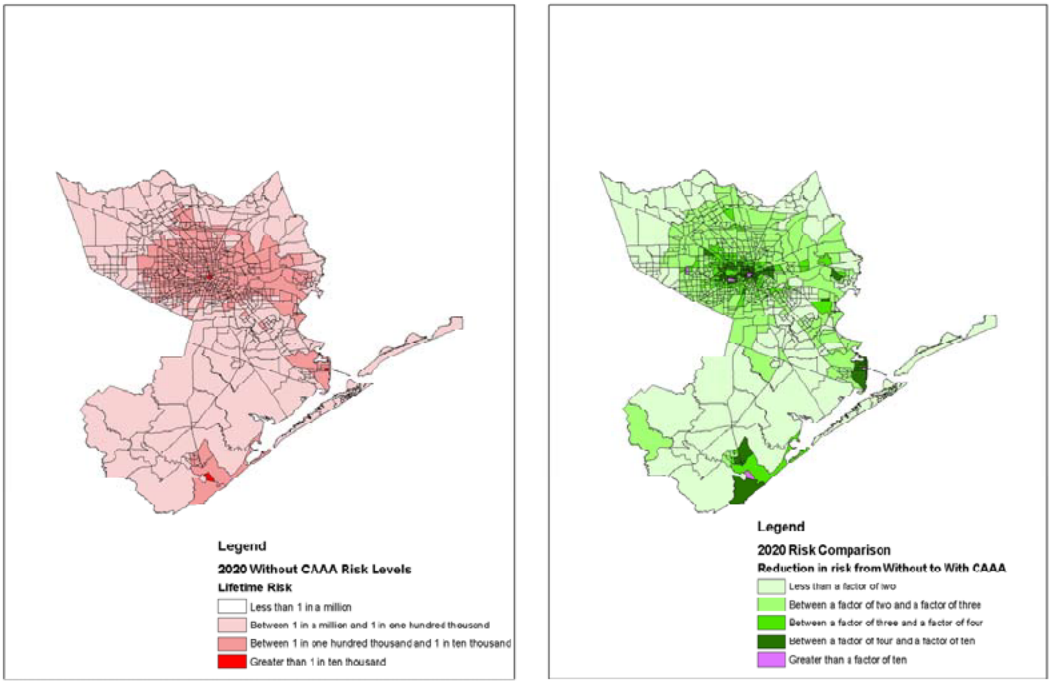
TABLE 5-9. TOTAL ANNUAL BENEFITS FOR EACH STUDY YEAR FROM CAAA-RELATED CHANGES IN BENZENE EXPOSURE IN THE HOUSTON AREA

	ANNUAL AVOIDED CASES OF LEUKEMIA			TOTAL MONETARY BENEFITS, 1990 TO 2010 (1990 NPV, MILLIONS OF 2006$, 5% DISCOUNT RATE)		
	AVOIDED FATAL CASES	AVOIDED NON-FATAL CASES	TOTAL AVOIDED CASES	BENEFITS FROM FATAL CASES OF LEUKEMIA	BENEFITS FROM NON-FATAL CASES OF LEUKEMIA	TOTAL BENEFITS
Results by Study Year						
2000	0.03	0.02	0.05	$0.12	$0.01 - 0.06	$0.13 - 0.18
2010	0.09	0.07	0.2	$0.27	$0.01 - 0.13	$0.28 - 0.40
2020	0.2	0.1	0.3	$0.31	$0.01 - 0.15	$0.32 - 0.46
Cumulative Results						
Cumulative Cases Occurring Within the Study Period	2	2	4	$6.7	$0.32 - 3.3	$7.0 - 10
Additional Cumulative Cases Occurring After 2020*	1	1	2	$1.8	$0.08 - 0.8	$1.9 - 2.6
Total Cumulative Cases	3	3	6	$8.5	$0.40 - 4.1	$8.9 - 13

* Note: These avoided cases are due to changes in benzene exposure that took place within the study period. However, the cases occurred after 2020 due to lagging effects of these changes on leukemia risks, as described in the text.

In summary, this case study demonstrates that the 1990 CAAA controls on benzene emissions are expected to result in reductions in the incidence of leukemia in the greater Houston area over the period 1990 to 2020. The case study does have some limitations, including possible underestimation of benzene emissions from large point sources (e.g., refineries), possible exclusion of unquantifiable adverse health effects of benzene (e.g., Hodgkin's and non-Hodgkin's Lymphoma), and exclusion of new programs established after the case study (e.g., Mobile Source Air Toxics Rule). However, it successfully demonstrates a methodology that can serve as a useful tool in EPA's evolving HAP benefits assessment strategy. It can provide a comprehensive assessment of the impact of benzene controls from multiple CAAA Titles on cancer incidence in an urban population, using a combination of national and local data to conduct urban-scale modeling of air quality and health impacts. Further, the life-table model allows for more careful assessment of risk changes over time at the Census tract level, incorporating local, age-specific baseline incidence data with age-specific exposure data and information on the lag between exposure changes and risk reductions.

FIGURE 5-2. EFFECT OF THE CAAA ON LIFETIME RISKS OF BENZENE-RELATED LEUKEMIA IN THE HOUSTON AREA



Determining where this approach might fit within EPA's HAP benefits assessment strategy will require additional analysis and evaluation to determine the added value of the detailed, urban-scale approach, as well as the potential pool of HAPs suitable for assessment via the damage-function approach for cancer and/or non-cancer effects.

COMPARISON OF HEALTH EFFECTS MODELING WITH FIRST PROSPECTIVE ANALYSIS

DIFFERENCES IN METHODOLOGY

In comparison with the First Prospective 812 Analysis, the Second Prospective includes a number of refinements and improvements in health benefits estimation methods.

- *Targeted Criteria Pollutant Analysis:* The Second Prospective excludes benefits of CAAA-related reductions in carbon monoxide, nitrogen oxides, and sulfur dioxide, which were included in the First Prospective, in an effort to streamline the quantitative analysis to focus on the two criteria pollutants that yield the greatest benefits – $PM_{2.5}$ and ozone.
- *New Cessation Lag Structure for PM Mortality:* The Second Prospective relies on the use of a 20-year distributed lag structure assumption for the cessation lag between changes in PM exposure and resulting changes in premature mortality. This estimate represents a shift from the First Prospective, which applied a 5-year distributed lag based on smoking cessation literature. The 20-year distributed lag is based on recommendations from the Council HES, is derived from air pollution literature and attempts to more closely reflect the disease processes that occur from PM exposure.[69]
- *New C-R Function for PM Mortality:* The First Prospective relied upon a C-R function derived from the most recently published ACS cohort study at the time (Pope et al., 1995). Since this time, additional follow-up has occurred for both the ACS and Six Cities cohort studies. In addition, new evidence has emerged on the ACS study results that suggest that this estimate is potentially underestimated. Our new primary C-R function mean is based on the follow-up literature, specifically the Pope et al. (2002) update of the ACS cohort and the Laden et al. (2006) update of the Six Cities cohort. Our new C-R function also reflects the results of an expert elicitation study, which allowed experts to incorporate multiple sources of uncertainty in the C-R function and to adjust the C-R function estimates to account for known biases.
- *Ozone Mortality Benefits Estimates:* The Second Prospective includes ozone-related premature mortality. This additional endpoint, which was not included in the First Prospective, was added because of advances that have occurred in the epidemiological literature that provide consistent evidence for this health endpoint.[70]

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[69] Science Advisory Board (2004). *Advisory on Plans for Health Effects Analysis in the Analytical Plan for EPA's Second Prospective Analysis—Benefits and Costs of the Clean Air Act, 1990-2020: Advisory by the Health Effects Subcommittee of the Advisory Council on Clean Air Compliance Analysis*. EPA-SAB-COUNCIL-ADV-04-002.

[70] As noted earlier, a key recommendation of NRC (2008) was that ozone mortality estimates from available epidemiological studies represent a separate and additive effect to those from PM/mortality epidemiological studies.

- *New Health Benefits Modeling Program:* The Second Prospective relies on EPA's BenMAP health benefits modeling program. Key advantages of the updated model are ease of use, allowing us to more readily perform multiple sensitivity tests; updated population and baseline incidence estimates; new C-R function options; and the ability to perform integrated exposure analysis using the eVNA method described earlier.
- *Air Toxics Case Study:* The Second Prospective includes the results of a case study demonstrating a methodology for assessing health benefits from a single hazardous air pollutant.

DIFFERENCES IN HEALTH EFFECTS MODELING RESULTS

The health effects estimates for the Second Prospective are much larger than the estimates EPA developed for the First Prospective. The 2020 estimates are new to the Second Prospective, but the comparable mean estimate of health benefits in 2000 and 2010 for the First Prospective were $71 billion in 2000 and $110 billion in 2010, in 1990$[71] - if updated to 2006$, these estimates would be $110 billion in 2000 and $170 billion in 2010. The Second Prospective results are larger by roughly a factor of 10. There are four key reasons we have identified for the increase in benefits:

1. ***Scenario differences*:** The *with-CAAA* scenario, especially for the 2010 target year, includes new rules with substantial additional pollutant reductions that were not included in the comparable First Prospective scenario, such as the Clean Air Interstate Rule (CAIR).
2. ***Improved air quality models*:** The First Prospective relied on the Regional Acid Deposition Model/Regional Particulate Model (RADM/RPM) for PM and deposition estimates in the eastern U.S., the Regulatory Modeling System for Aerosols and Acid Deposition (REMSAD) for PM estimates in the western U.S., and the Urban Airshed Model (versions V and IV) at various regional and urban scales to generate ozone estimates. The Second Prospective relies on the integrated CMAQ modeling tool, which reflects substantial improvements in air quality modeling, provides more comprehensive spatial coverage, and achieves improved model performance.
3. ***Better, more comprehensive exposure estimates*:** The First Prospective relied on first generation exposure extrapolation tools to generate monitor-adjusted exposure estimates away from monitors. Since then, the monitor network, availability of speciated data, and the performance of speciated exposure estimation tools have improved substantially.
4. ***Updated dose-response estimates***: Since 1999, some concentration response functions have been updated, most notably the PM-premature mortality C/R function, whose central estimate of the mortality impact of fine PM has nearly doubled. In

[71] See The Benefits and Costs of the Clean Air Act 1990 to 2010, USEPA Office of Air and Radiation and Office of Policy, EPA-410-R-99-001, November 1999.

addition, health effects research has addressed endpoints that were not covered in the First Prospective, including premature mortality associated with ozone exposure.

Although the Agency has not yet conducted a rigorous quantitative analysis to assess the impact of these methodology and data improvements, and the differences in study design between the first and Second Prospective made such an analysis difficult to perform, the impact of most of these factors is to increase the estimates of benefits, in some cases very substantially.

UNCERTAINTY IN HEALTH BENEFITS ESTIMATES

A number of important assumptions and uncertainties in the health benefits analysis may influence the estimate of monetary benefits presented in this study. In this section of the chapter, we first discuss several quantitative sensitivity analyses undertaken to characterize the impact of key assumptions on the ultimate health benefits estimates. We then conclude with a qualitative discussion of the impact of both quantified and unquantified sources of uncertainty.

QUANTITATIVE SENSITIVITY TESTS

We performed three quantitative sensitivity tests to estimate the impact of alternate assumptions on our overall benefits estimates due to avoided premature mortality, the largest contributor to our overall health benefits estimates. The three focal areas for sensitivity analysis were: (1) the C-R function estimate; (2) the PM/mortality cessation lag structure; and (3) the mortality valuation estimate (including both the VSL and the discount rate). These are influential assumptions in our analysis and those for which plausible alternative quantitative estimates are available. Table 5-10 below provides the results of these sensitivity analyses.

Concentration-Response Function

Our monetized estimate of the benefits of reducing premature mortality from CAAA-related pollution reductions is based on a single primary estimate C-R function for each of the criteria pollutants included in our analysis, $PM_{2.5}$ and ozone. This selection is associated with uncertainty related to potential across-study variation. That is, different published studies of the same pollutant/health effect relationship often do not report identical findings; in some instances, the differences are substantial. These differences can arise from differences in factors such as study design, random sampling for subject populations, or modeling choices, such as inclusion of potential confounders.

In order to estimate the effect of across-study variation on our CAAA-related mortality benefits from reductions in $PM_{2.5}$ and ozone, we performed a sensitivity analysis on the C-R functions selected. For $PM_{2.5}$, our primary estimate is based on a Weibull distribution of C-R coefficients with a mean of 1.06 percent decrease in annual all-cause mortality per 1 $\mu g/m^3$ and an interquartile range bracketed by the Pope et al. (2002) ACS estimate (0.55 percent) on the low end and the Six Cities Laden et al. (2006) extended follow-up estimate (1.5 percent) at the high end. We conducted a sensitivity analysis by

first substituting the primary C-R distribution with alternative C-R functions, one based on the Pope et al. (2002) ACS study, one based on the Laden et al. (2006) Six Cities cohort study as well as the C-R distributions provided by each of the 12 experts included in the PM/mortality expert elicitation study.

For ozone, our primary estimate consists of a pooled estimate of six studies, three based on the NMMAPS database (Schwartz, 2005; Bell et al., 2004; Huang et al., 2005) and three meta-analyses (Ito et al., 2005; Levy et al., 2005; Bell et al., 2005). We conducted a sensitivity analysis by substitute this primary C-R function with the C-R functions reported in each of these six individual studies, and separately for the Jerrett et al. (2009) cohort study.

As shown in Table 5-10, substituting alternate PM C-R functions results in total mortality benefits estimates that range from between 81 percent lower up to 78 percent higher than the primary estimate. Substituting alternative ozone C-R function does not affect the total mortality benefits estimate, since ozone does not contribute significantly to this estimate. However, the C-R function selection does affect the ozone mortality estimates, ranging from 63 percent lower up to 66 percent higher than the primary estimate for ozone mortality incidence. As expected, the Jerrett et al. study yields estimates higher than the primary pooled estimate. Cohort studies measure the effects of cumulative exposure and so should reasonably yield higher estimates than the comparably parameterized time-series study - but within the range of underlying six studies, albeit at the high end of that range.

PM/Mortality Cessation Lag

The timing of the cessation lag between PM exposure and mortality remains uncertain. Our primary monetized estimate of PM/mortality benefits assumes a 20-year distributed lag (30 percent of the mortality reductions occur in the first year, 50 percent occur equally in years two through five, and the remaining 20 percent occur equally in years six through 20). We tested the sensitivity of this assumption by calculating monetized mortality benefits based on alternative cessation lag structures. We selected two alternative lag structures – a 5-year distributed lag (which was employed in the First Prospective) and a smooth function (which assumes an exponential decay model and is based on an analysis by Roosli et al., 2005; see Chapter 6 of *Uncertainty Analyses to Support the Second Section 812 Benefit-Cost Analysis of the Clean Air Act* for further details). We also calculated benefits assuming no cessation lag. Application of alternative cessation lag structures had a smaller impact on the benefits estimates than the C-R function, resulting in benefits estimates that range from 22 percent lower up to 16 percent higher than the primary estimate.

Mortality Valuation

We apply a VSL value to reductions in premature mortality based on a Weibull distribution of 26 study estimates. The literature on VSL is extensive, and studies have measured VSL using different methodological approaches (e.g., revealed versus stated preference) on a variety of study populations (e.g., workers versus a general population

sample) in a variety of different risk contexts (e.g., fatal workplace accidents versus mortality risk from disease). In addition, several meta-analyses of the literature have been conducted in an attempt to synthesize the literature. As a result, there are many options for alternative VSL estimates. We selected several alternative VSL estimates derived from the literature for sensitivity testing, including two estimates from a meta-analysis by Viscusi and Aldy (2003), an estimate used in past EPA regulatory analyses in the form of a normal distribution, and an estimate from a wage-risk study by Viscusi (2004). VSL did not affect the benefits results to the same degree as the C-R function, with alternative monetized benefits ranging from 21 percent lower to approximately equivalent to our primary estimate.

TABLE 5-10. RESULTS OF QUANTITATIVE SENSITIVITY TESTS

FACTOR	STRATEGY FOR SENSITIVITY ANALYSIS	RANGE OF PERCENT CHANGES FROM MEAN PRIMARY MORTALITY BENEFITS ESTIMATE[1]
PM C-R Function	Alternative C-R functions - two from empirical literature (Pope et al., 2002 and Laden et al., 2006) and 12 subjective estimates from the expert elicitation study	-81% to 78%, Based on most extreme estimates from PM expert elicitation study. Rest of alternatives range from -41% to 40%.
Ozone C-R Function	Alternative C-R functions - three from NMMAPS-based studies, three meta-analyses, and the Jerrett et al. (2009) cohort long-term exposure study	0% for total mortality benefits. -63% to 66% For ozone-related mortality.
PM/Mortality Cessation Lag	Alternative lag structures - one step function and one smooth function (based on an exponential decay function)	-22% to 16%
VSL	Alternative VSL estimates	-21% to 0%
Discount Rate	Alternative discount rates	-6% to 6%

[1] All values in the table represent the percent change from the mean primary estimate. Percent change estimates to not vary by target year.

Our primary monetized benefits estimate of avoided premature mortality also assumes a discount rate of five percent. We tested the sensitivity of our primary results by substituting alternative discount rates of three and seven percent.[72] This assumption has a small effect on the benefits estimates; applying a discount rate of seven percent results in

[72] Alternative discount rates of three and seven percent are recommended in U.S. Environmental Protection Agency (2000). *Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, September.

benefits that are 6 percent lower than the default and applying a three percent discount rate results in a benefits estimate 6 percent higher than the default.

QUALITATIVE ANALYSIS OF KEY FACTORS CONTRIBUTING TO UNCERTAINTY

In addition to the uncertainties outlined above, we identified several other areas of uncertainty related to our health benefits analysis that we did not address quantitatively. This includes sources of uncertainty in our estimation of avoided mortality, not related to across-study variation; application of C-R functions for national benefits estimation; projection of population and baseline incidence rates; and health valuation.

Table 5-11 provides a summary of the key uncertainties related to the Second Prospective health effects modeling analysis. The first column provides a brief description of each key assumption made in the analysis. The second column indicates the direction of the potential bias with respect to the overall net benefits estimate. The third indicates the magnitude of the impact of the potential bias on the net benefits. The Project Team assigns a classification of "potentially major" if a plausible alternative assumption or approach could influence the overall monetary benefit estimate by approximately five percent or more. If an alternative assumption or approach is likely to change the total benefit estimate by less than five percent, the Project Team assigns a classification of "probably minor."[73] This assessment is intended to provide readers with a sense for the quantitative impact on the net benefits estimate if an alternate assumption to that selected by the Project Team were to be implemented. Finally, the fourth column provides our level of confidence in the selected assumption, based on our assessment of the available body of evidence. That is, based on the given available evidence, how certain we are that the selected assumption is the most plausible of the alternatives. The Project Team uses the following four qualitative categories to express the degree of confidence in the chosen assumption:

- "High" – the current evidence is plentiful and strongly supports the selected assumption;
- "Medium" – some evidence exists to support the assumption, but data gaps are present; and
- "Low" – there are limited data to support the selected assumption.
- The Project Team uses "N/A" to indicate that the data was so limited that it was excluded from the analysis entirely.

[73] If the quantitative magnitude of the assumption's effect on the net benefits cannot be assessed, the Project Team indicates that this is "Unknown."

TABLE 5-11. KEY UNCERTAINTIES ASSOCIATED WITH HUMAN HEALTH EFFECTS MODELING

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
UNCERTAINTIES RELATED TO PREMATURE MORTALITY BENEFITS ESTIMATES			
Analysis assumes a causal relationship between PM exposure and premature mortality based on strong epidemiological evidence of a PM/mortality association. However, epidemiological evidence alone cannot establish this causal link.	Overestimate	Potentially major. PM/mortality effects are the largest contributor to the net benefits estimate. If the PM/mortality relationship is not causal, it would lead to a significant overestimation of net benefits.	High. The assumption of causality is suggested by the epidemiologic and toxicological evidence and is consistent with current practice in the development of a best estimate of air pollution-related health benefits. At this time, we can identify no basis to support a conclusion that such an assumption results in a known or suspected overestimation bias.
Analysis assumes a causal relationship between ozone exposure and premature mortality based on strong epidemiological and experimental evidence of an ozone/mortality association.	Overestimate	Probably minor. Ozone mortality effects are a large contributor to the net benefits estimate, but total monetized ozone mortality benefits remain less than five percent of total net benefits. If the ozone mortality relationship is not causal, it would lead to an overestimation of net benefits.	Medium. Several epidemiological studies provide strong evidence for associations between ozone and mortality. This data is supported by human and animal experimental studies that provide suggestive evidence for plausible mechanisms. Overall, the evidence is highly suggestive, but additional research is needed to more fully establish underlying mechanisms.

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
It is possible that the PM/mortality relationship is modified by socioeconomic status (SES).	Unable to determine based on current information. Consideration of both the Pope and Laden studies avoids the possible underestimation effect from the ACS cohort, owing to the demographics of that study population, and the possible overestimation bias associated with the more limited geographic scope of the Six Cities cohort.	Potentially major. Sensitivity analyses reported in this chapter indicate the high sensitivity of benefits results to the choice of the PM/mortality C/R function.	Medium. Studies have found effect modification of the PM/mortality effect by SES, as assessed through education attainment (Krewski et al., 2000). However, this effect is likely to affect only the Pope et al. estimate. Our inclusion of both the Pope et al. and Laden et al. (which does includes a more diverse population) helps account for the possible significance of this uncertainty.
Exposure misclassification due to reliance on ambient monitoring data to estimate $PM_{2.5}$ exposures rather than measuring personal exposures.	Underestimate. Concentrations measured at central site monitors may not accurately reflect exposure experienced by the population due to variation in ambient concentrations over space within a geographic area, incomplete penetration of ambient pollution into homes and workplaces, patterns of population activity and indoor sources that can contribute significantly to individual $PM_{2.5}$ exposures. Reducing exposure error can result in stronger associations between pollutants and health effects than generally observed in studies having less exposure detail.	Potentially major. Recent analyses reported in Krewski et al. (2009) demonstrate the relatively significant effect that this source of uncertainty can have on effect estimates.	High. The results from Krewski et al. (2009) and Jerrett et al. (2005) suggest that exposure error may underestimate effect estimates (PM ISA).

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
Exclusion of C-R functions from short-term exposure studies in PM mortality calculations.	Underestimate	Potentially major. PM/mortality is the top contributor to the net benefits estimate. If short-term functions contribute substantially to the overall PM-related mortality estimate, then the net benefits could be underestimated.	Medium. Long-term PM exposure studies likely capture a large part of the impact of short-term peak exposure on mortality; however, the extent of overlap between the two study types is unclear.
Assumption that PM-related mortality occurs over a period of 20 years following the critical PM exposure. Analysis assumes that 30% of mortality reductions in the first year, 50% over years 2 to 5, and 20% over the years 6 to 20 after the reduction in $PM_{2.5}$	Unable to determine based on current information	Potentially major. PM/mortality is the largest contributor to monetary benefits. Our quantitative sensitivity analysis indicated that alternative plausible cessation lag structures could alter the benefits estimate between 25% lower to 13% higher than the primary estimate.	Medium. Recent epidemiological studies (e.g., Schwartz, 2008) have shown that the majority of the risk occurs within 2 years of reduced exposure. However, our default lag assumes 43% of mortality reductions would occur within the first 2 years. The evidence directly informing the cessation lag structure is somewhat limited, but the current lag is supported by the Council HES.
Assumption of a linear, no-threshold model for PM and ozone mortality	Overestimate	Probably minor. Although consideration for alternative model forms (Krewski et al., 2009) does suggest that different models can impact risk estimates to a certain extent, generally this appears to be a moderate source of overall uncertainty.	High. The current scientific literature does not support a population-based threshold, which consistently shows effects down to the lowest measureable levels. If a threshold does exist, it is likely below the range of concentrations of regulatory interest.

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
Mortality health impact did not include pollutants other than PM or ozone.	Unable to determine based on current information	Probably minor. If other criteria pollutants correlated with PM contribute to mortality, that effect may be captured in the PM estimate. This uncertainty does make it difficult to disaggregate avoided mortality benefits by pollutant.	High. PM and ozone are the two pollutants most strongly linked to mortality in the epidemiological literature. It is likely that we've captured the majority of mortality benefits due to criteria pollutants in our analysis.
Pooling with equal weights of ozone mortality incidence estimates to present a primary estimate.	Unable to determine based on current information	Probably minor. Pooling with equal weights provides a central estimate of ozone mortality benefits, but it is not clear that the six ozone mortality incidence studies should be combined in this manner. Relying on a particular single study or another combination of studies may result in significantly different estimated benefits from ozone reductions. However, ozone-related avoided mortality benefits are a minor contributor to total monetized benefits.	Medium. All six studies are associated with different strengths and limitation. No single study has emerged as solely suitable to support a primary estimate. Therefore, a pooled estimate provides a central estimate of the available literature.

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
No cessation lag was used for ozone mortality.	Overestimate	Probably minor. If there is a time lag between changes in ozone exposure and the total realization of changes in health effects then benefits occurring in the future should be discounted. The use of no lag assumes that all mortality benefits are realized in the year of the exposure change and therefore no discounting occurs. This may lead to an overestimate of benefits.	High. Due to the use of short-term studies of ozone mortality, use of a no lag structure is appropriate and supported by the Council HES.
UNCERTAINTIES RELATED TO APPLICATION OF C-R FUNCTIONS			
Application of C-R relationships only to those subpopulations matching the original study population.	Underestimate	Probably minor. The C-R functions for several health endpoints (including PM-related premature mortality) were applied only to subgroups of the U.S. population (e.g. adults 30+) and thus may underestimate the whole population benefits of reductions in pollutant exposures. However, the background incidence rates for these age groups are likely low and therefore would not contribute many additional cases.	High. The baseline mortality and morbidity rates for PM-related health effects are significantly lower in those under the age of 30 (other than neonates).

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
Application of regionally derived C-R estimates to entire U.S.	Unable to determine based on current information	Probably minor. This is likely to affect morbidity estimates rather than mortality, as mortality estimates are based on studies that include multiple cities. Since morbidity is not as large of a contributor to overall benefits, this is not likely to have a large impact on net benefits.	Medium. The differences in the expected changes in health effects calculated using different underlying studies can be large. If differences reflect real regional variation, applying individual C-R functions throughout the U.S. could result in considerable uncertainty in health effect estimates.
UNCERTAINTIES RELATED TO HEALTH VALUATION			
Use of a Value-of-a-Statistical-Life (VSL) estimate based on a Weibull distribution of 26 studies	Unable to determine based on current information	Potentially major. Mortality valuation generally dominates monetized benefits.	Medium. The VSL used in this analysis is based on 26 labor market and stated preference studies published between 1974 and 1991. Although there are many more recent studies, including meta-analyses, sensitivity analyses reported above suggest that these alternative sources generate results that are close to the estimates used in the analysis.
Use of cost of illness (COI) estimates to value some morbidity endpoints	Underestimate	Probably minor. Mortality valuation generally dominates monetized benefits; therefore specific estimates used to generate morbidity benefits likely would not have a large impact on net benefits.	Low. Morbidity benefits such as hospital admissions and heart attacks are calculated using COI estimates, which some studies have shown are generally half as much as WTP to avoid the illness. However, WTP estimate are currently not available for all health endpoints.

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
Benefits transfer for mortality risk valuation, including differences in age, income degree of risk aversion, the nature of the risk, and treatment of latency between mortality risks presented by PM/ozone and the risks evaluated in the available economic studies.	Unable to determine based on currently available information	Potentially major. The mortality valuation step is clearly a critical element in the net benefits estimate, so any uncertainties can have a large effect.	Medium. Information on the combined effect of these known biases is relatively sparse, and it is therefore difficult to assess the overall effect of multiple biases that work in opposite directions. However, our VSL estimate is based on a distribution of the results of 26 individual studies, which cover a range of characteristics.
Inability to value some quantifiable morbidity endpoints, such as impaired lung function.	Underestimate	Probably minor. Reductions in lung function are a well-established effect, based on clinical evaluations of the impact of air pollutants on human health, and the effect would be pervasive, affecting virtually every exposed individual. However, the lack of a clear symptomatic presentation of the effect, however, could limit individual WTP to avoid lung function decrements.	Low. There currently is no evidence to determine the monetary value of the benefits of avoided lung function reductions.

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
UNCERTAINTIES IN FORECASTED DATA SUPPORTING HEALTH EFFECTS ESTIMATES			
Uncertainty in projecting baseline incidence rates	Both	Probably minor. The magnitude varies with the health endpoint. Mortality baseline incidence is at the county level and projected for 5-year increments. Morbidity baseline incidence has varying spatial resolution for year 2000 only.	Medium. The county-level baseline incidence and population estimates were obtained from databases where the relative degree of uncertainty is low. The baseline data for other endpoints are not location specific (e.g., those taken from studies) and therefore may not accurately represent the actual location-specific rates.
Income growth adjustments	Both	Potentially major. Income growth increases willingness-to-pay valuation estimates, including mortality, over time.	Medium It is difficult to forecast future income growth, owing to unpredictability of future business and employment cycles. These can have a substantial effect on short term growth rate projections, although over longer periods economic growth rates have tended to converge. The use of data from AEO 2005, however, omits the effect of the most recent economic downturn.

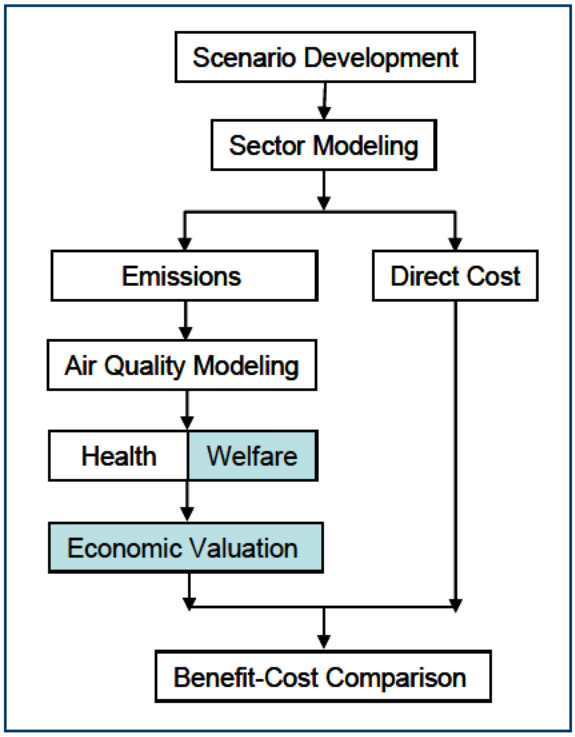
POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
Population projections	Both	Probably minor. The demographics of population forecasting are relatively well-established, however migration estimates are quite uncertain, particularly for specific locations. Overall, we believe that population projections are not likely to vary more than 5 percent at the national level.	Medium. Population projections cannot adequately account for future population migration due to catastrophic events. Projected population and demographics may not well represent future-year population and demographics.
OTHER UNCERTAINTIES			
Variation in effect estimates reflecting differences in $PM_{2.5}$ composition	Unable to determine based on current information	Unable to determine based on current information	Medium. Epidemiology studies examining regional differences in $PM_{2.5}$-related health effects have found differences in the magnitude of those effects. While these may be the result of factors other than composition (e.g., different degrees of exposure misclassification), composition remains one potential explanatory factor.
Very limited quantification of health effects associated with exposure to air toxics.	Underestimate	Probably minor. Studies have found air toxics cancer risks to be orders of magnitude lower than those of criteria pollutants.	N/A Current data and methods are insufficient to develop (and value) national quantitative estimates of the health effects of these pollutants.

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS ESTIMATE	MAGNITUDE OF IMPACT ON NET BENFITS ESTIMATE	DEGREE OF CONFIDENCE
CAAA fugitive dust controls implemented in PM non-attainment areas would reduce lead exposures by reducing the re-entrainment of lead particles emitted prior to 1990. This analysis does not estimate these benefits.	Underestimate	Probably minor. The health and economic benefits of reducing lead exposure can be substantial (e.g., see section 812 Retrospective Study Report to Congress). However, most additional fugitive dust controls implemented under the *with-CAAA* scenario (e.g., unpaved road dust suppression, agricultural tilling controls, etc.) tend to be applied in relatively low population areas.	N/A

CHAPTER 6 - ECOLOGICAL AND OTHER WELFARE BENEFITS

OVERVIEW OF APPROACH

Air pollution has important impacts not only on human health, but on a wide range of ecological and environmental resources. Clean Air Act provisions are designed to be protective of human health and the environment, but as a practical matter, because human health impacts are more readily quantified, many of EPA's air pollution analyses have focused much more on human health than on ecological health, aesthetic effects, or natural resource productivity. In general, as science and economics have provided greater insights into the effects of anthropogenic stressors on ecological systems, pursuit of environmental programs targeted on reductions of damage to the environment have become more common. For example, as we noted in the First Prospective, the original motivation for Title IV of the CAAA was addressing the effects of acid rain on ecological resources – it was only after passage that it became clear that these provisions also provide very large human health benefits.



In this chapter, we provide quantitative results for the effects of air pollution on ecological health and natural resources where the science and economic base is strongest, including the lake acidification effects that motivated Title IV, as well as a broad qualitative characterization of effects that are more difficult to quantify. The first portion of this chapter involves taking a broad view of pollutants controlled under the CAAA and their documented effects on ecological systems, both as individual pollutants and, to the extent possible, as one component in multiple-stressor effects on ecosystems and their components. We organize our analysis in terms of major pollutant classes and by the level of biological organization at which impacts are measured (e.g., regional ecosystem, local ecosystem, community, population, organism, etc.). We used a similar strategy in the First Prospective, which has been updated here to reflect new scientific literature published since 1999, but we also supplement the literature review with a new mapping

of air pollutant stressors relative to ecological systems that are most sensitive to those stressors – for example, we relate atmospheric deposition of nitrogen to estuarine systems that have been classified as sensitive to marginal nitrogen inputs.

The second portion of the chapter presents the results of a wide range of analyses that quantitatively characterize specific effects of air pollution on ecological systems, as well as other effects on natural and human systems that contribute to economic welfare. We provide quantitative estimates of the benefits of the 1990 CAAA for the following effects:

- Enhanced forest and agricultural plant growth associated with reduced exposure to tropospheric ozone, on a national scale;
- Enhanced visibility in recreational and residential settings associated with reduced particulate matter concentrations, also on a national scale;
- Reduced damage to certain building and structural materials associated with reduced exposure to corrosive air pollutants, such as acid deposition, on a national scale;
- Acidification of freshwater bodies and impairment of timber growth associated with atmospheric nitrogen and sulfur deposition, for a case study area in New York's Adirondack region.

The categories of effects ultimately chosen for quantitative assessment here are necessarily limited by available methods and data. The scope is largely consistent with the recommendations of the Ecological Effects Subcommittee (EES) of the Council, which supported EPA's plans for qualitative characterization of the ecological effects of CAA-related air pollutants, an expanded literature review, national analyses where possible, and a quantitative, ecosystem-level case study of ecological service benefits. As scientific understanding and impact assessment methods grow more comprehensive, however, we expect that the focus of subsequent analyses will continue to broaden, and also yield greater insight on which effects that can be avoided by air pollution controls have the greatest potential ecological and/or economic value.

Because the breadth and complexity of air pollutant-ecosystem interactions do not allow for comprehensive quantitative analysis of all the ecological benefits of the CAAA, we stress the importance of continued consideration of those impacts not valued in this report in policy decision-making and in further technical research. Judging from the geographic breadth and magnitude of the relatively modest subset of impacts that we find sufficiently well-understood to quantify and monetize, it is apparent that the economic benefits of the CAAA's reduction of air pollution impacts on ecosystems are substantial.

QUALITATIVE CHARACTERIZATION OF EFFECTS

The First Prospective summarized available information on the ecological effects of criteria pollutants and hazardous air pollutants regulated under the 1990 Clean Air Act Amendments. In this Second Prospective analysis we expand that effort, updating the

literature review to reflect published and peer-reviewed research that has become available since the development of the 1999 analysis, through 2008. As data limitations prevent the quantitative assessment of all potential ecological benefits, the goal of this effort is to provide a broad characterization of the range of effects of major air pollutants on ecological endpoints.

Ecosystem impacts can be organized by the pollutants of concern and by the level of biological organization at which impacts are directly measured. We address both dimensions of categorization in this overview. Table 6-1 summarizes the major pollutants of concern, and the documented acute and long-term ecological impacts associated with them.

The following discussion provides more specific information on ecological effects of each pollutant class, including information on sources, sensitive ecosystems, and summary tables of effects organized by level of biological organization.

ACIDIC DEPOSITION

The predominant chemicals associated with acidic precipitation are sulfuric and nitric acid (H_2SO_4 and HNO_3). These strong mineral acids are formed from sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in the atmosphere. Sulfur compounds are emitted from anthropogenic sources in the form of SO_2 and, to a lesser extent, primary sulfates, principally from coal and residual-oil combustion and a few industrial processes. The principal anthropogenic source of NO_x emissions is fuel combustion. In the atmosphere, SO_2 and NO_x are converted to sulfates and nitrates, transported over long distances, and deposited over large areas downwind of urban areas or point sources.

TABLE 6-1. CLASSES OF POLLUTANTS AND ECOLOGICAL EFFECTS

POLLUTANT CLASS	MAJOR POLLUTANTS AND PRECURSORS	ACUTE EFFECTS	LONG-TERM EFFECTS
Acidic deposition	Sulfuric acid, nitric acid Precursors: Sulfur dioxide, nitrogen oxides	Direct toxic effects to plant leaves and aquatic organisms.	Progressive deterioration of soil quality due to nutrient leaching. Forest health decline. Acidification of surface waters. Reduction in acid neutralizing capacity in lakes and streams. Enhancement of bioavailability of toxic metals (aluminum) to aquatic biota.
Nitrogen Deposition	Nitrogen compounds (*e.g.*, nitrogen oxides)		Nitrogen saturation of terrestrial ecosystems, causing nutrient imbalances and reduced forest health. Soil and water acidification. Reduction in acid neutralizing capacity in lakes and streams. Progressive nitrogen enrichment of coastal estuaries causing eutrophication. Changes in the global nitrogen cycle.
Ozone	Tropospheric ozone Precursors: Nitrogen oxides and volatile organic compounds (VOCs)	Direct toxic effects to plants.	Alterations of ecosystem wide patterns of energy flow and nutrient cycling; community changes.
Hazardous Air Pollutants (HAPs)	Mercury, dioxins	Direct toxic effects to animals.	Conservation of mercury and dioxins in biogeochemical cycles and accumulation in the food chain. Sublethal impacts.

Acidification of ecosystems has been shown to cause direct toxic effects on sensitive organisms as well as long-term changes in ecosystem structure and function. The effects of acidification can be seen at all levels of biological organization in both terrestrial and aquatic ecosystems. Adverse effects in terrestrial ecosystems include acutely toxic impacts of acids on terrestrial plants and, more commonly, chronic acidification of terrestrial ecosystems leading to nutrient deficiencies in soils, aluminum mobilization, and decreased health and biological productivity of forests. These effects can lead to changes in individual plant survival, as well as changes in forest populations and communities.

In aquatic ecosystems, acidification-induced effects are mediated by changes in water chemistry including reductions in Acid Neutralizing Capacity[74] (ANC) and increased availability of aluminum (Al^{3+}), which in turn can cause increased mortality in sensitive species, changes in community composition, and changes in nutrient cycling and energy flows. Acidic deposition has resulted in increased acidity in surface waters, especially in areas where acid buffering capacity of soils is reduced and nitrate and sulfate have

[74] Acid Neutralizing Capacity (ANC) is a measure of overall buffering capacity of a solution or surface waterbody. A well-buffered system will resist rapid changes in pH, while a poorly buffered system responds quickly to changes in pH. Reductions in ANC put waterbodies at risk of acidification due to this inability to buffer excess H^+ ions.

leached from upland areas. While many fish species are acid-sensitive, the main lethal agent is the increase in dissolved aluminum that occurs with falling pH levels.

Acid-sensitive ecosystems include those with high acidic deposition and low acid neutralizing capacity. Many of these ecosystems occur downwind of emission sources, often in mountainous areas where soils are thin and poorly buffered. High elevation sites are also more vulnerable because mountain fog is often more acidic than rain.

Table 6-2 provides a summary of the potential ecological effects of acidification.

NITROGEN DEPOSITION

Along with its role in acidification of ecosystems, nitrogen deposition also affects nitrogen biogeochemistry, which in turn affects the health of forest and coastal ecosystems. Nitrogen is a naturally occurring element, and is essential to both plant and animal life, but combustion processes cause this nitrogen to be "fixed" – that is, converted from the unreactive N_2 form to a reactive form such as nitrate (NO_3) or ammonia (NH_3). The availability of reactive nitrogen limits plant growth in many terrestrial ecosystems and is generally the limiting nutrient in marine and coastal waters as well.

By 1990, human activities had more than doubled the amount of reactive nitrogen available annually to living organisms. At present, more than 50 percent of the annual global reactive nitrogen emissions are generated directly or indirectly by human activities. Ammonia emissions to the atmosphere occur largely via volatilization from animal wastes. Anthropogenic nitrogen oxide (NO_x) emissions to the atmosphere are generally a result of fossil fuel combustion, with electric power generation and automobiles as the largest two sources.

Because most terrestrial and coastal ecosystems are nitrogen limited, increased supply of nitrogen in terrestrial systems can stimulate uptake by plants and microorganisms, and increase biological productivity. Moderate levels of nitrogen input can have a "fertilizing" effect, similar to the application of nitrogen fertilizer frequently used in timber production or agriculture. In the long run, however, chronic nitrogen deposition adversely affects organisms, communities, and biogeochemical cycles of watersheds and coastal waters. Biogeochemical cycles change when the nutrient balance is disrupted by excess nitrogen because nitrogen is an important nutrient in biological systems.

TABLE 6-2. EFFECTS OF ACIDIFICATION ON NATURAL SYSTEMS AT VARIOUS LEVELS OF ORGANIZATION

SPATIAL SCALE	TYPE OF INTERACTION	EXAMPLES OF EFFECTS	
		FOREST ECOSYSTEMS	STREAMS AND LAKES
Molecular and cellular	Chemical and biochemical processes	Damages to epidermal layers and cells of plants through deposition of acids; alteration of stomatal activity.	Decreases in pH and increases in aluminum ions cause pathological changes in structure of gill tissue in fish.
Organism	Direct physiological response	In trees, increased loss of nutrients via foliar leaching.	Hydrogen and aluminum ions in the water column impair regulation of body ions.
	Indirect effects: Acidification can indirectly affect response to altered environmental factors or alterations of the organism's ability to cope with other kinds of stress.	Cation depletion in the soil causes nutrient deficiencies in plants. Concentrations of aluminum ions in soils can reach phytotoxic levels. Increased sensitivity to other stress factors including pathogens and frost. In birds, possible calcium limitation and growth reduction.	Aluminum ions in the water column can be toxic to many aquatic organisms through impairment of gill regulation.
Population	Change of population characteristics like productivity or mortality rates.	Decrease of biological productivity of sensitive organisms. Selection for less sensitive organisms. Microevolution of resistance.	Decrease of biological productivity and increased mortality of sensitive organisms. Selection for less sensitive organisms. Microevolution of resistance.
Community	Changes of community structure and competitive patterns.	Alteration of competitive patterns. Selective advantage for acid-resistant species. Loss of acid sensitive species and organisms. Decrease in productivity. Decrease of species richness and diversity. Decline in Sugar Maple and red spruce in Eastern U.S. and Canadian forests.	Alteration of competitive patterns. Selective advantage for acid-resistant species. Loss of acid sensitive species and organisms. Decrease in productivity. Decrease in species richness and diversity.
Local Ecosystem (e.g., landscape element)	Changes in nutrient cycle, hydrological cycle, and energy flow of lakes, wetlands, forests, grasslands, etc.	Progressive depletion of nutrient cations in the soil. Increase in the concentration of mobile aluminum ions in the soil.	Acidification of lakes and streams. Decrease in acid neutralizing capacity. Persistent acidic conditions in lakes and streams in some regions, despite reduction in sulfate deposition.
Regional Ecosystem (e.g., watershed)	Biogeochemical cycles within a watershed. Region-wide alterations of biodiversity.	Leaching of sulfate, nitrate, aluminum, and calcium to streams and lakes. Change in sulfur and nitrogen biogeochemistry in northeastern forests.	Regional acidification of aquatic systems due to high deposition rates and nitrogen saturation of terrestrial ecosystems and increased nitrate leaching to surface waters. Persistent acidic conditions in lakes and streams in some regions, despite reduction in sulfate deposition.

Because fresh waters are generally not nitrogen limited, the addition of nitrogen does not lead to excessive eutrophication as it does in coastal waters. Coastal waters are an extraordinarily important natural resource, providing spawning grounds/nurseries for fish and shellfish, foraging and breeding habitat for birds, and generally contributing greatly to the productivity of the marine environment. Critical to the health of coastal waters is an appropriate balance of nutrients. If present in mild or moderate quantities, nitrogen enrichment of coastal waters can cause moderate increases in productivity, leading to neutral or positive changes in the ecosystem. However, because coastal waters are generally nitrogen limited, too much nitrogen leads to excess production of algae, decreasing water clarity and reducing concentrations of dissolved oxygen, a situation referred to as eutrophication.

Table 6-3 summarizes the potential effects of nitrogen deposition on ecosystem structure and function.

TROPOSPHERIC OZONE

Ozone is a secondary pollutant formed through the oxidation of volatile organic compounds (VOCs) in the presence of oxides of nitrogen. Ozone is one of the most powerful oxidants known but its impacts have been little studied in faunal species. The limited available research has shown a variety of pulmonary impacts to specific mammalian and avian species. In contrast, ozone's impacts on plants are much better understood. Documented effects on forest trees include visible foliar damage, decreased chlorophyll content, accelerated leaf senescence, decreased photosynthesis, increased respiration, altered carbon allocation, water balance changes, and damage to epicuticular wax. These can lead to changes in canopy structure, carbon allocation, productivity, and fitness of trees.

Ozone sensitivity of plants varies between species, with evergreen species tending to be less sensitive to ozone than deciduous species, and with most individual deciduous trees being less sensitive than most annual plants. However, there are exceptions to this broad ranking scheme, and there can be variability not only between species but even between clones of some trees and within cultivars. Life stage also matters: in general, mature deciduous trees tend to be more sensitive than seedlings, while the reverse is more typical for evergreen trees.

TABLE 6-3. EFFECTS OF NITROGEN DEPOSITION ON NATURAL SYSTEMS AT VARIOUS LEVELS OF ORGANIZATION

SPATIAL SCALE	TYPE OF INTERACTION	EXAMPLES OF EFFECTS	
		FOREST ECOSYSTEMS	ESTUARINE ECOSYSTEMS
Molecular and cellular	Chemical and biochemical processes.	Increased uptake of nitrogen by plants and microorganisms. With chronic exposure, reduced stomatal activity and photosynthesis in some species.	Increased assimilation of nitrogen by marine plants, macroalgae, and microorganisms.
Organism	Direct physiological response.	Increases in leaf size of terrestrial plants. Increase in foliar nitrogen concentration in major canopy trees. Change in carbon allocation to various plant tissues.	Increase in algal growth.
	Indirect effects: Response to altered environmental factors or alterations of the organism's ability to cope with other kinds of stress.	Decreased resistance to biotic and abiotic stress factors including pathogens, insects, and frost. Disruption of plant-symbiont relationships with mycorrhizal fungi.	Injuries to marine fauna through depletion of oxygen in the water column. Loss of physical habitat due to increased macroalgal biomass and loss of seagrass beds. Injury and habitat loss through increased shading by macroalgae.
Population	Change of population characteristics like productivity or mortality rates.	Increase in biological productivity and growth rates of some species. Increase in pathogens.	Increase in algal and macroalgal biomass.
Community	Changes of community structure and competitive patterns.	Alteration of competitive patterns. Selective advantage for fast growing species and organisms that efficiently use additional nitrogen. Loss of species adapted to nitrogen-poor or acidic environments. Increase in weedy species or parasites.	Excessive algal growth. Changes in species composition with increase in algal and macroalgal species and decrease or loss of seagrass beds. Loss of species sensitive to low oxygen conditions.
Local Ecosystem (e.g., landscape element)	Changes in nutrient cycle, hydrological cycle, and energy flow of lakes, wetlands, forests, grasslands, etc.	Changes in the nitrogen cycle. Progressive nitrogen saturation. Mobilization of nitrate and aluminum in soils. Loss of calcium and magnesium from soil. Change in organic matter decomposition rate.	Changes in the nitrogen cycle. Increased algal growth leading to depletion of oxygen, increased shading of seagrasses. Reduced water clarity and dissolved oxygen levels.

SPATIAL SCALE	TYPE OF INTERACTION	EXAMPLES OF EFFECTS	
		FOREST ECOSYSTEMS	ESTUARINE ECOSYSTEMS
Regional Ecosystem (e.g., watershed)	Changes in biogeochemical cycles within a watershed. Region-wide alterations of biodiversity.	Leaching of nitrate and aluminum from terrestrial sites to streams and lakes. Acidification of soils and waterbodies. Increased emission of greenhouse gases from soils to atmosphere. Change in nutrient turnover and soil formation rates.	Additional input of nitrogen from nitrogen-saturated terrestrial sites within the watershed. Regional decline in water quality in waterbodies draining large watersheds (e.g. Chesapeake Bay). Changes in the regional-scale nitrogen cycle.
Global Ecological System	Changes in global biogeochemical cycles; increased availability of reactive nitrogen to plants.	Increased input of reactive nitrogen; loss of soil nutrients. Nitrogen saturation and leaching throughout forests in northeastern United States and Western Europe. Acidification of surface waters.	Greatly increased transfer of nitrogen to coastal ecosystems; change in structure and function of estuarine and nearshore systems.

Impacts to plant communities may occur as a result of ozone exposure, although such effects have not been studied as extensively due to ecosystem complexity and the long timeframes involved. Experiments with an early successional plant community found that ozone reduced vegetative cover, vertical density, species richness, and evenness relative to the control, although differences were less pronounced in a drought year. Other observed community level effects include reduced competitive ability of sensitive species, changed soil microbial communities, and altered species composition and relative abundance.

Table 6-4 summarizes the potential effects of ozone exposure on ecosystems.

HAZARDOUS AIR POLLUTANTS

Hazardous air pollutants (HAPs) are a general category of toxic substances covered under Title III of the Clean Air Act, which lists 189 HAPs. Of these 189 substances, the best understood in terms of the potential for adverse ecological impacts include mercury, polychlorinated biphenyls (PCBs), dioxins, and dichlorodiphenyl-trichloroethane (DDT). The use of PCBs and DDT was effectively illegal in the United States prior to 1990 (EPA 1992), and there are currently no plans for additional CAAA regulations of these compounds (Federal Register Unified Agenda 1998). With respect to mercury and dioxins, regulatory actions have reduced, but have not eliminated, anthropogenic emissions. This section discusses environmental effects associated with these two HAPs.

TABLE 6-4. EFFECTS OF OZONE ON NATURAL SYSTEMS AT VARIOUS LEVELS OF ORGANIZATION

SPATIAL SCALE	TYPE OF INTERACTION	EXAMPLES OF EFFECTS
Molecular and cellular	Chemical and biochemical processes.	Oxidation of enzymes of plants, generation of toxic reactive oxygen species (hydroxyl radicals). Disruption of the membrane potential. Reduced photosynthesis and nitrogen fixation. Increased apoptosis.
Organism	Direct physiological response.	Visible foliar damage, premature needle senescence, altered carbon allocation, and reduced growth rates.
	Indirect effects: Response to altered environmental factors or alterations of the organism's ability to cope with other kinds of stress.	Increased sensitivity to biotic and abiotic stress factors such as pathogens and frost. Disruption of plant-symbiont relationship (mychorrhizae), and symbionts.
Population	Change of population characteristics like productivity or mortality rates.	Reduced biological productivity and reproductive success. Selection for less sensitive organisms. Potential for microevolution for ozone resistance.
Community	Changes of community structure and competitive patterns.	Alteration of competitive patterns. Loss of ozone sensitive species and organisms leading to reduced species richness and evenness. Reduction in productivity. Changes in microbial species composition in soils.
Local Ecosystem (e.g., landscape element)	Changes in nutrient cycle, hydrological cycle, and energy flow of lakes, wetlands, forests, grasslands, etc.	Alteration of ecosystem-wide patterns of energy flow and nutrient cycling (e.g., via alterations in litter quantity, litter nutrient content, and degradation rates; also via changing carbon fluxes to soils and carbon sequestration in soils).
Regional Ecosystem (e.g., watershed)	Biogeochemical cycles within a watershed. Region-wide alterations of biodiversity.	Potential for region-wide phytotoxicological impacts and reductions in net primary production.

Mercury

Mercury (Hg) is a toxic element found ubiquitously throughout the environment. About 50-80 percent of total emissions originate from anthropogenic sources, including fossil fuel combustion, leaks from industrial activities, and the disposal or incineration of wastes.

Mercury is generally released in its elemental and inorganic forms. However, it can undergo various transformations in the environment, and its chemical form determines not only its environmental fate but also its potency as a toxicant. From a biological perspective, the most hazardous form of mercury is methylmercury both because of its

bioaccumulation and biomagnification potential, and also because organic forms of mercury (including methylmercury) are the most toxic. Adverse effects on wildlife include neurotoxicity as well as reproductive, behavioral, and developmental effects. These types of effects have been observed in laboratory studies of mammals, birds, fish, and aquatic invertebrates. While species sensitivity varies, within a species the early life stages are generally the most sensitive.

Dioxins

Polychlorinated dibenzo-p-dioxins (PCDDs) are a group of 75 organochlorine compounds, often referred to as dioxins. Although dioxins can be produced through natural events such as forest fires and volcanic eruptions, most environmental inputs are anthropogenic in origin. EPA categorizes dioxin sources into five broad groups: combustion; metals smelting, refining, and processing sources; chemical manufacturing; biological and photochemical processes; and reservoir sources (for example urban runoff).

Dioxins and related compounds are thought to exert most of their toxic effects through interaction with the aryl hydrocarbon receptor (AhR). In laboratory studies, particularly of rodents, some dioxins have been shown to cause reproductive toxicity, neurotoxicity, immune suppression, increased inflammatory responses, and cancer. Fish are among the most sensitive species to the effects of dioxin, and early life stages are the most vulnerable. The risk that dioxins pose to other wildlife is difficult to assess because both laboratory and field studies are few.

Dioxins are extremely stable chemicals with a persistence that is measured in decades. Dioxins are subject to photochemical degradation, but since the penetration of light into soils and many natural water bodies is limited, this degradation is slow. Because of dioxins' toxicity and persistence, their presence is likely to be an issue of concern for decades.

DISTRIBUTION OF AIR POLLUTANTS IN SENSITIVE ECOSYSTEMS OF THE UNITED STATES

This section describes the spatial and temporal trends of air pollutants regulated by the CAAA, highlighting their distribution against sensitive ecosystems across the United States. This information provides useful context regarding the geographic distribution of potential ecological benefits of the CAAA, particularly for the ecological endpoints described above for which data are not available to quantify impacts.

The maps presented illustrate changes in forecast pollutant levels under the current, baseline scenario (with the CAAA) as compared to the counterfactual scenario (without the CAAA). The three pollutant classes considered are: acidic deposition, nitrogen deposition, and tropospheric ozone. Data are not available to map the distribution of HAPs. The pollutant exposure maps presented in this discussion were created using data from the Community Multiscale Air Quality Modeling System (CMAQ) Version 4.6,

which estimates tropospheric ozone concentrations as well as deposition in kilograms per hectare for acidic deposition and total nitrogen.[75]

ACIDIC DEPOSITION

As described in the previous section, ecosystem sensitivity to acid deposition occurs in areas with low ANC. High elevation sites tend to be more vulnerable because of thin, poorly buffered soils coinciding with acidic deposition from rain, snow, and fog. Acid-sensitive areas in the U.S. include the southern Blue Ridge Mountains of eastern Tennessee, western North Carolina and northern Georgia; the mid Appalachian Region of eastern West Virginia, western Virginia and central Pennsylvania; New York's Catskill and Adirondack Mountains; the Green Mountains of Vermont; the White Mountains of New Hampshire, and areas of the Upper Midwest (Wisconsin and Michigan).[76] Montane areas in the Adirondacks, Northern New England, and the Appalachian region have experienced acidification of surface waters and soils, as well as forest decline.

Figure 6-1 presents acidic deposition from 1990 through 2020 for both *with-* and *without-CAAA* scenarios. Acid deposition estimates are expressed as equivalents per hectare (eq/ha).[77] Under both regulatory scenarios, acidic deposition is highest in western Pennsylvania, southern Ohio and Indiana, western West Virginia, and northern Kentucky. Without the CAAA, acidic deposition in these areas increases over time. Further, acidic deposition increases over time in the areas surrounding these hotpots. By 2020, significant portions of the Northeast, Midwest, and South are projected to have elevated levels of acidic deposition. Hotspots also exist in eastern Texas and southern Louisiana.

As shown in the right column of Figure 6-1, with the CAAA acidic deposition levels lessen in and around the areas with the highest acidic deposition. By 2020, elevated acidic deposition levels are primarily limited to much smaller areas in the Midwest, Northeast, and Gulf Coast.

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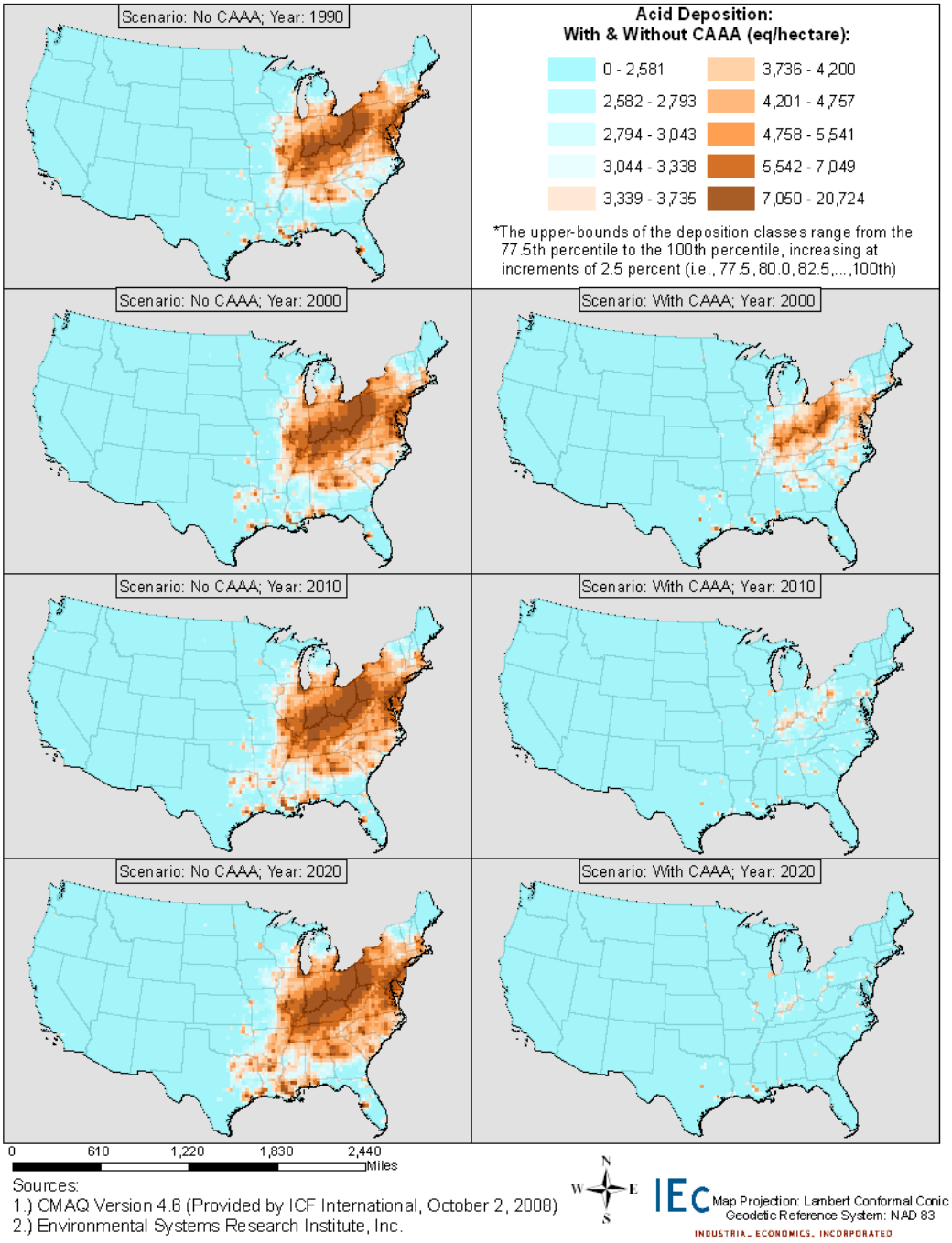
[75] The CMAQ tool is described in more detail in Chapter 4 of this document.

[76] U.S. Environmental Protection Agency (EPA). October 2003. *Response of surface water chemistry to the Clean Air Act Amendments of 1990.* EPA 620/R-03/001.

[77] Acid deposition is calculated using the hydrogen deposition derived from both sulfur and nitrogen deposition as described in: U.S. Department of Agriculture, Forest Service, Rocky Mountain Region. January 2000. Screening Methodology for Calculating ANC Change to High Elevation Lakes: User's Guide. The deposition estimates in Figures 6-2 and 6-3 include combined wet and dry deposition for the stated years as estimated by the CMAQ modeling system version 4.6. These modeled estimates are not calibrated with monitored deposition data such as the National Atmospheric Deposition Program (NADP) data

FIGURE 6-1. COMBINED NO_X AND SO_X DEPOSITION ESTIMATES FOR 1990, 2000, 2010, AND 2020 WITH AND WITHOUT THE CAAA



Sources:
1.) CMAQ Version 4.6 (Provided by ICF International, October 2, 2008)
2.) Environmental Systems Research Institute, Inc.

NITROGEN DEPOSITION

Atmospheric nitrogen deposition is highest in the northeastern and eastern central regions of the U.S. Elevated nitrogen deposition in the western and southern United States is limited to areas in the vicinity of large nitrogen sources (e.g., livestock production areas), high-elevation areas on which cloud droplet deposition may contribute substantial nitrogen inputs, and urban areas with relatively high levels of NOx emissions.

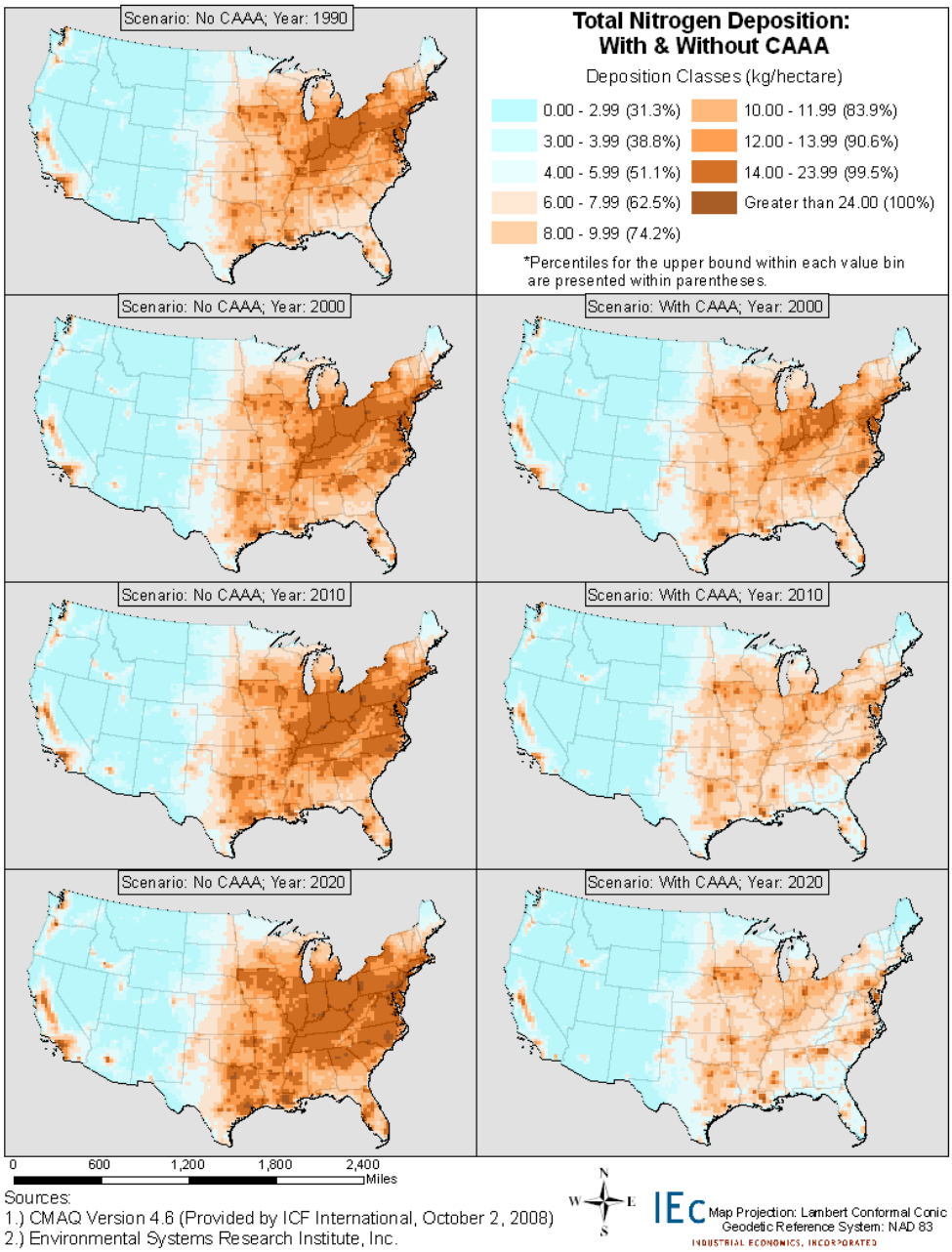
Figure 6-2 presents total nitrogen deposition from years 1990 through 2020 for both the *with-CAAA* and *without-CAAA* scenarios. In general, total nitrogen deposition is less than 24 kg/hectare in the conterminous U.S. for each year and regulatory scenario presented. However, "hot spots" exist across the U.S. where meteorological conditions and/or high nitrogen emissions contribute to relatively high deposition rates. Two particularly significant hot spots for nitrogen deposition are located in southern Louisiana and eastern North Carolina. Total nitrogen deposition is estimated to increase in both hot spots over time regardless of the regulatory scenario. Outside of the two hot spots, total nitrogen deposition is highest without the CAAA in the Ohio River Valley (i.e., western Pennsylvania, southern Ohio and Indiana, western West Virginia, and northern Kentucky). Over time, the total nitrogen deposition increases around the Ohio River Valley without the CAAA and decreases slightly with the CAAA. Outside of the Ohio River Valley, nitrogen deposition with the CAAA decreases slightly over time in the eastern U.S. In the western U.S., total nitrogen deposition with the CAAA remains relatively constant over time.

Estuarine areas in the Northeast are less susceptible to injury from nitrogen loading than estuaries in other parts of the country due to the rapid flushing characteristics of estuaries in this region. Estuaries along the Southeastern Coast, Gulf Coast, and Southern California Coast experience the greatest reduction in total nitrogen deposition. Total nitrogen deposition along the West Coast, with the exception of southern California, is relatively low in the absence of the CAAA.

TROPOSPHERIC OZONE

Areas within the U.S. with elevated tropospheric ozone levels include the Northeast, mid-Atlantic, Midwest, and California. Combined ozone concentrations are reported for the May through September period as ozone levels tend to increase during the spring and summer. Figure 6-3 presents combined cumulative ozone season (W126) values for the May through September period for both the *with-CAAA* and *without-CAAA* scenarios. The W126 metric is a weighted sum of hourly concentrations observed between 8 a.m. and 8 p.m. where hourly weights are a function of the hourly ozone concentration observed.

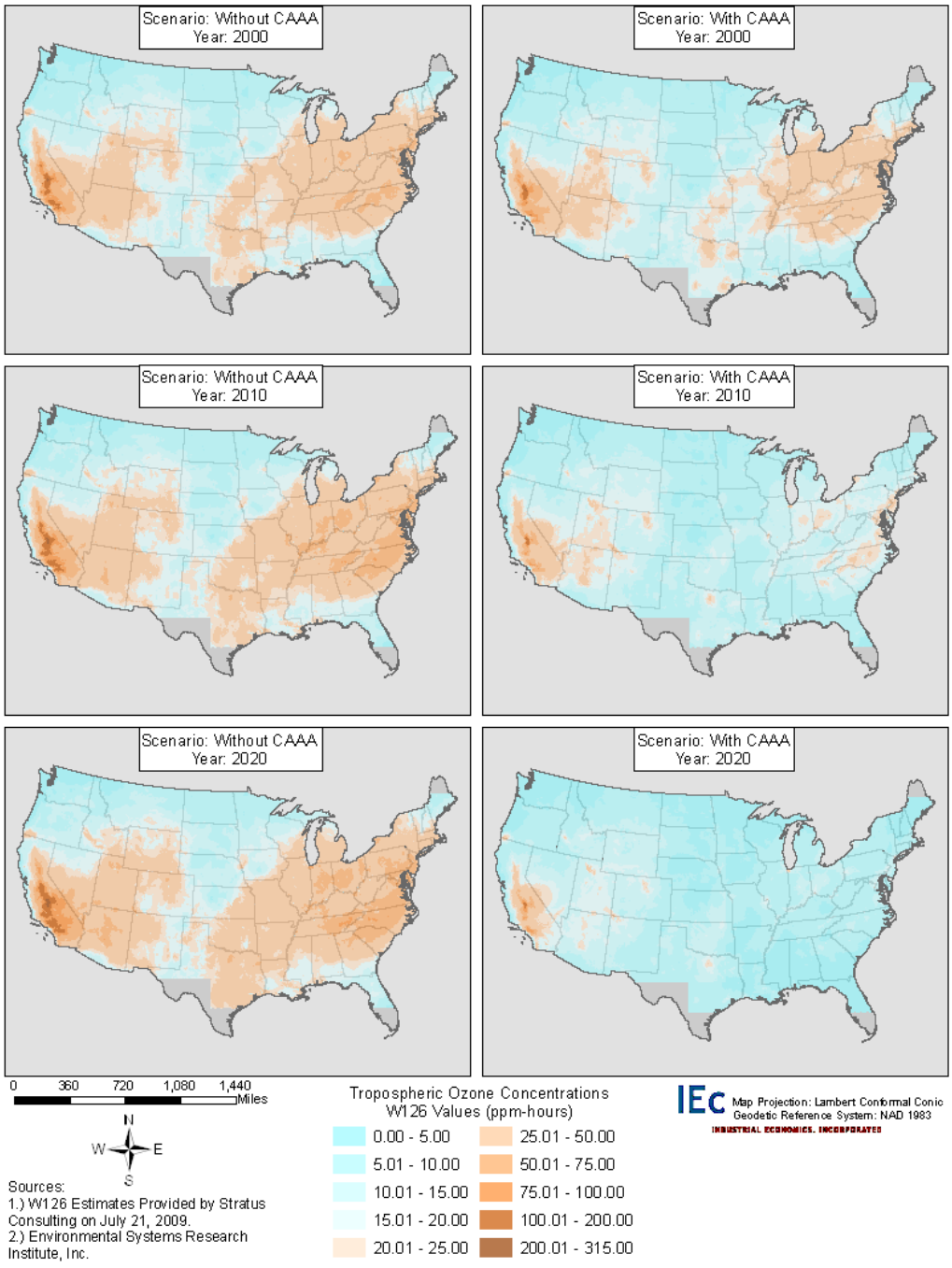
FIGURE 6-2. TOTAL NITROGEN DEPOSITION ESTIMATES FOR 1990, 2000, 2010, AND 2020 WITH AND WITHOUT THE CAAA[78,79]



[78] Value bins for nitrogen deposition taken from: Rea, A., J. Lynch, R. White, G. Tennant, J. Phelan and N. Possiel. 2009. Critical Loads as a Policy Tool: Highlights of the NOx/SOx Secondary National Ambient Air Quality Standard Review. Slide 6: Nationwide Total Reactive Nitrogen Deposition (2002). Available online at: http://nadp.sws.uiuc.edu/meetings/fall2009/post/session4.html.

[79] Percentiles are calculated using the combined nitrogen deposition data for all years and scenarios presented in the map.

FIGURE 6-3. W126 CUMULATIVE TROPOSPHERIC OZONE SEASON MEASURES FOR 2000, 2010, AND 2020 WITH AND WITHOUT THE CAAA



In general, tropospheric ozone concentrations increase over time without the CAAA and decrease over time with the CAAA. Elevated ozone concentrations are present in California, mid-Atlantic states, and Corn Belt states in 2000 both with and without the CAAA; ozone concentrations are, however, slightly less with the CAAA in 2000. In 2000, ozone hot spots are present in southern California, central Ohio, portions of Virginia, North Carolina, and South Carolina, and western Tennessee. Without the CAAA, these hot spots grow in size and magnitude. Under the *with-CAAA* scenario, the hot spots decrease in size and magnitude. By 2020, the combined W126 values for nearly the entire conterminous U.S. (outside of California) are less than 15 ppm-hours. Tropospheric ozone concentrations within the California hot spot are reduced to 25 to 75 ppm-hours.[80]

As noted in the previous section, elevated tropospheric ozone levels may negatively affect plants in a number of ways, including reducing plant photosynthesis and increasing leaf senescence leading to reduced plant growth and productivity. Given the potential effects of elevated tropospheric ozone concentrations on plant growth, forested and cropland areas across the U.S. are considered particularly sensitive to the effects of elevated tropospheric ozone. It follows that these same areas also stand to benefit the most from reduced tropospheric ozone concentrations due to the implementation of the CAAA. In particular, forested ecosystems in the San Bernardino and Sierra Nevada Mountains of California have suffered ecological damages attributed to elevated ozone levels. Forests in the southern portions of the Midwest and Northeast regions and the Southeast region (except the southernmost areas where ozone concentrations are relatively low without the CAAA) are also expected to benefit from reductions in tropospheric ozone due to the implementation of the CAAA. In addition, crops in California are expected to benefit the most from the implementation of the CAAA. The cropland areas in California are located almost entirely within the tropospheric ozone hot spot. Other cropland areas expected to benefit from reduced tropospheric ozone concentrations associated with the implementation of the CAAA include the Corn Belt region, the southern portion of the Midwest region, the Mississippi Valley, Texas, and Oklahoma.

QUANTIFIED RESULTS: NATIONAL ESTIMATES

AGRICULTURE AND FOREST PRODUCTIVITY EFFECTS

A significant body of literature exists addressing the effects of tropospheric ozone on plants, including commercial tree species and agricultural crops, as noted in the previous section. In general, elevated levels of tropospheric ozone have been shown to reduce

[80] Within the California hot spot, the modeled CMAQ ozone concentration estimates were low compared to the ozone monitoring data. This may have resulted in the eVNA analysis overestimating future ozone concentrations. This overestimate is expected to have occurred in this region for both the *with-CAAA* and *without-CAAA* scenarios, however, and therefore the effect on the difference in ozone concentrations between the two scenarios is uncertain.

overall plant health and growth by reducing photosynthesis and altering carbon allocation. Methods and data also exist to estimate the magnitude of plant growth reductions due to elevated tropospheric ozone levels, based on laboratory studies that developed exposure-response functions describing the functional relationship between plant yield and ozone exposure for a variety of plant species.[81] Applying exposure-response functions, this analysis estimates yield losses in agricultural crops and commercial tree species under the counterfactual, *without-CAAA* scenario relative to the baseline, *with-CAAA* scenario. Relative yield losses (i.e., reductions in crop and tree yield under the counterfactual scenario relative to the baseline scenario) measure the amount crop and tree yields would be reduced in the absence of CAAA regulations, and therefore, indicate a benefit of the CAAA.[82]

Table 6-5 provides a summary of estimated relative yield losses by crop/forest type and year. Relative yield losses indicate a benefit of the CAAA; the larger the relative yield loss without the CAAA, the greater the crop or tree yield with the CAAA. In addition, Figures 6-4 and 6-5 provides maps of the crop-subregion-specific and tree-region-specific relative yield losses for two representative species: potatoes and softwood trees. The results presented generally follow the temporal and spatial pattern of ozone concentration reductions attributable to the CAAA, as outlined in Chapter 4, with reductions in tropospheric ozone concentrations being greatest along the East Coast, particularly the Southeast, in the Midwest (within the Ohio River Valley), and in California. Several other factors also affect yield changes in crops and trees, including sensitivity to ozone, geographic distribution, growing period length, and the specific time of year the growing period occurs. Potatoes and softwoods, as indicated in Table 6-5, suffer relatively larger changes in growth than some other species in our analysis, and yield losses tend to increase over time as differences in ozone concentrations increase between the *with-CAAA* and *without-CAAA* scenarios. Across all crops, the largest relative yield losses for both crops and trees occur in the Southeast, frequently in Virginia, North Carolina, South Carolina, and Tennessee.

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[81] See, for example, E.H. Lee and W.E. Hogsett. 1996. Methodology for Calculating Inputs for Ozone Secondary Standard Benefits Analysis: Part II. Prepared for the U.S. EPA, Office of Air Quality Planning and Standards, Air Quality Strategies and Standards Division. The application of laboratory-derived functions is less preferable than functions developed from field studies. However, the laboratory-derived functions frequently provide the best available information regarding the relationship between ozone exposure and crop or tree growth. The exposure-response functions applied in this report have been used in other EPA studies, such as: USEPA. July 2007. Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical information. EPA-452/R-07-007.

[82] Relative yield losses are estimated instead of relative yield gains because the baseline (with CAAA) scenario in this analysis defines current conditions, whereas the counterfactual (no CAAA) scenario defines a change in current conditions. The models applied in this analysis forecast changes in yield relative to current conditions (i.e., relative to the baseline scenario).

TABLE 6-5. MINIMUM, MAXIMUM, AND AVERAGE ANNUAL RELATIVE YIELD LOSSES ACROSS ALL FASOM SUBREGIONS FOR CROPS AND ALL FASOM REGIONS FOR TREES BY YEAR (2000, 2010, 2020)

CROP/FOREST TYPE	2000			2010			2020		
	MINIMUM	MAXIMUM	AVERAGE	MINIMUM	MAXIMUM	AVERAGE	MINIMUM	MAXIMUM	AVERAGE
Barley	0.00%	0.02%	0.01%	0.00%	0.06%	0.02%	0.00%	0.07%	0.02%
Corn	0.00%	1.12%	0.18%	0.00%	3.07%	0.44%	0.00%	3.45%	0.56%
Cotton	0.00%	6.60%	1.15%	0.00%	16.67%	3.00%	0.00%	20.31%	3.81%
Oranges	0.00%	1.95%	0.09%	0.00%	4.68%	0.25%	0.00%	7.87%	0.43%
Potato	0.00%	6.17%	1.76%	0.00%	17.54%	4.99%	0.00%	20.80%	6.50%
Rice	-0.08%	0.14%	0.00%	0.00%	1.03%	0.11%	0.00%	1.66%	0.18%
Sorghum	0.00%	0.87%	0.14%	0.00%	2.17%	0.35%	0.00%	2.65%	0.47%
Soybean	0.00%	3.60%	1.24%	-0.55%	11.73%	3.07%	0.00%	12.74%	4.26%
Processing Tomatoes	0.00%	1.82%	0.31%	0.00%	5.54%	0.96%	0.00%	8.21%	1.47%
Spring Wheat	0.00%	1.50%	0.06%	0.00%	3.67%	0.15%	0.00%	6.98%	0.28%
Winter Wheat	0.00%	6.53%	1.00%	0.00%	18.23%	2.49%	0.00%	19.23%	3.29%
Hardwood Forests	1.60%	7.16%	5.06%	4.20%	19.12%	13.86%	6.61%	23.04%	16.68%
Softwood Forests	0.06%	3.85%	1.77%	0.25%	10.49%	4.88%	0.42%	12.27%	6.11%

Note: Negative relative yield losses indicate yield reductions with the CAAA. For example, the minimum estimate for soybeans in 2010 reflects an estimated relative yield loss of -0.55 percent. The negative relative yield loss is due to reductions in W126 ozone metric values under the counterfactual, no CAAA scenario in Florida in September of 2010 (the growing period for soybeans in Florida is roughly mid-July through September). In other words, ozone exposure is greater under the with-CAAA scenario for that month and region and, therefore, a net increase in soybean yield occurs assuming a rollback of the CAAA. Ozone concentrations are lower under the baseline, with CAAA scenario in Florida for all other months in 2010.

FIGURE 6-4. RELATIVE ANNUAL YIELD LOSSES IN POTATOES UNDER THE COUNTERFACTUAL (NO CAAA) SCENARIO BY FASOM SUBREGION AND YEAR BASED ON SUBREGIONAL-SPECIFIC OZONE CONCENTRATIONS AND GROWING PERIODS

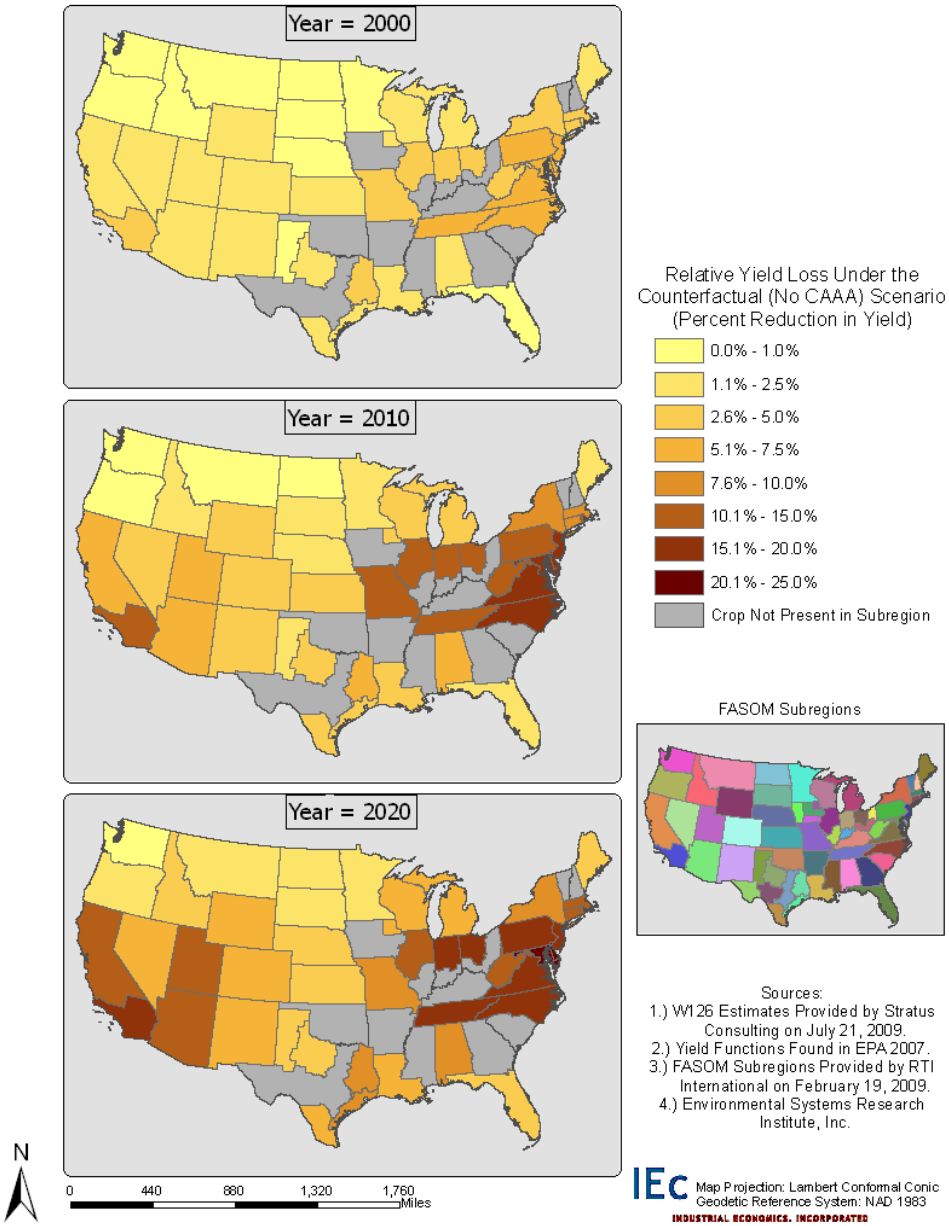
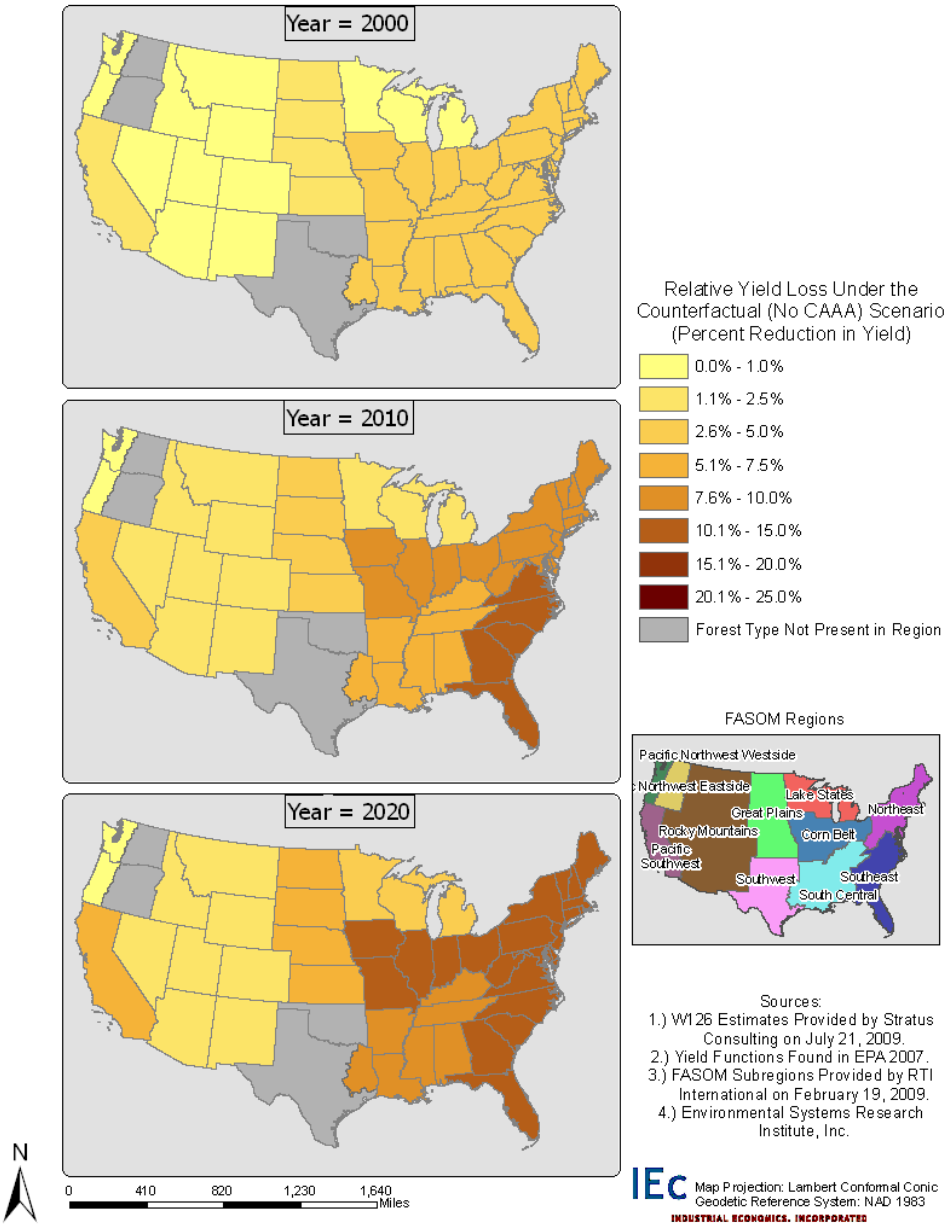


FIGURE 6-5. RELATIVE ANNUAL YIELD LOSSES IN SOFTWOOD FOREST TYPES UNDER THE COUNTERFACTUAL (NO CAAA) SCENARIO BY FASOM REGION AND YEAR BASED ON REGIONAL-SPECIFIC OZONE CONCENTRATIONS AND GROWING PERIODS



Commercial timber and agriculture operations generally manage their land to maximize profits. As such, changes in crop yields between the baseline and counterfactual scenarios may affect the distribution of commercial species planted; for example, landowners may shift production towards plants that are less sensitive to elevated ozone concentrations under the counterfactual scenario. This may occur at the individual plant level, replacing one crop or tree species for another with a higher growth rate; or, it may occur at the community level, converting agricultural lands to timberlands, or vice versa, to adjust for combined yield losses to agricultural crops and commercial tree species.

Changes in the distribution and yield of crop and tree species may in turn affect the supply of and demand for agricultural crops and commercial tree species, resulting in changes in the welfare of consumers and within agricultural and timber sectors of the economy. To quantify this economic benefit of cleaner air, we used the Forest and Agriculture Sector Optimization Model (FASOM). FASOM development was funded by EPA's Climate Economics Branch (CEB) and other EPA, U.S. government, and non-governmental funders over several decades as a partial equilibrium tool to evaluate the welfare and market impacts of public policies affecting agriculture and forestry. The model simulates biophysical and economic processes affecting land management and land allocation decisions over time to potentially competing agriculture and forest activities. Although the latest version of FASOM was developed to evaluate climate and biofuels policies, the model is capable of assessing a broad range of factors that might affect plant growth; for this project, we worked with the model's developers to develop input files to characterize the impact of ozone on plant and tree growth at a regional and crop-specific level, using the exposure-response results described above.[83]

Although FASOM has been widely applied to agricultural sector analysis and has been peer reviewed in many contexts, it has not to date been subject to a validation exercise comparing the model results for an historical period to historical data for that period.[84] As a result, the performance of the model in forecasting future agricultural sector effects, such as those estimated for this study, has not yet been assessed. Two other potential limitations may pertain in EPA's application of FASOM for this study. First, FASOM adopts a model simulation approach which assumes perfect foresight by economic actors in the agricultural sector. A perfect foresight assumption may be of concern for some

[83] Note that we performed two runs of the FASOM model, one where the response to ozone for those crop/region combinations without specific individual concentration-response functions are assumed to be zero, and a second where impacts on crop/region combinations without specific concentration-response functions were set to the values used in adjacent regions and/or proxy crops where possible (for example, soft white wheat was used for barley and sugarbeets; tomatoes for processing were used for potatoes; soybeans for fresh tomatoes; corn for fresh tomatoes if there is not a value for soybeans; etc.). We found that the difference in the overall national results between these two runs was negligible, however. As a result, in this chapter we report the results from the run that applies proxy crop/region concentration-response functions. Note further that the version of FASOM used for this analysis is the version current as of July 21, 2010.

[84] See, for example, a review commissioned by USEPA for its application of FASOM to support regulatory analysis of renewable fuels standards, concluded in July of 2010 and available at the following web site (accessed November 26, 2010): http://www.epa.gov/otaq/fuels/renewablefuels/regulations.htm

long-term analyses, but is likely to be less problematic for this study because our time horizon extends only to 2020. Furthermore, USDA projections of commodity prices and outputs also extend nearly to 2020, and FASOM's projections for their base case agree well with the USDA projections. As a result, the effect of perfect foresight on model outcomes in the present study is reduced.[85] A second potential limitation of FASOM is its approach to estimating the sensitivity of imports to changes in domestic prices. Although FASOM is not a full international model, it does incorporate an import elasticity estimate for the largest and most important commodity crops. This allows the model to capture, for example, increases in agricultural imports to the US under a scenario in which domestic crop prices are projected to rise. For a number of minor crops, traded in very small quantities, however, FASOM holds imports fixed. The effect of this factor on our results is not clear, but we estimate that a more flexible import sector for these much less important crops would have only a minor effect on our estimates of the net benefits of reducing ozone exposure for US crops. We expect the directional bias of holding minor crop imports fixed, while small, would be to slightly reduce our estimates of the net welfare benefit of reducing ozone exposure, and thereby improving productivity, of domestic agricultural crops.

The economic welfare results of the FASOM modeling are presented in Table 6-6. FASOM generates total welfare estimates for the agricultural and forest sectors for each of our scenarios, for each target year, reflecting the sum of total consumer and producer surplus derived from agriculture and forest production. In general, higher ozone concentrations in the *without-CAAA* scenario lead to reduced agricultural and forest productivity, raising prices for these products, which in turn increases producer surplus but reduces consumer surplus by a larger amount. As a result, FASOM estimates the net welfare benefits of the CAAA to be approximately $1 billion in 2000, $5.5 billion in 2010, and $10.7 billion in 2020, increasing over time as the differences in ozone concentrations grows.[86]

[85] Perfect foresight is a basic assumption of the modeling approach on which FASOM is based. Structuring the model based on perfect foresight rather than a myopic (recursive) approach allows an expanded array of policy simulations and potential insights, which is the main purpose of this type of model.

[86] Note that the year 2000 in FASOM represents average annual activity over the 5-year period from 2000 to 2004; 2010 represents 2010 through 2014; and 2020 represents 2020 through 2024. Values provided for ozone impacts in 2000, 2010, and 2020 were applied to the 2000, 2010, and 2020 model periods in FASOM, respectively. The results presented here do not includes losses Canada and the rest of the world; for example, in 2020, higher US prices in the without-CAAA scenario result in additional consumer surplus losses to non-US consumers of $1.7 billion in the forest sector and $3.3 billion in the agricultural sector.

TABLE 6-6. SUMMARY OF FASOM RESULTS: TOTAL CONSUMER AND PRODUCER SURPLUS VALUES FOR THE AGRICULTURAL AND FOREST SECTORS

VARIABLE	MODEL RUN	2000	2010	2020
Annual Welfare, US Forest Sector	With Clean Air Act ($ billion)	$637	$877	$1426
	Without Clean Air Act ($ billion)	$636	$875	$1426
	Damage Estimate ($ billion)	**$1.5**	**$1.7**	**$0**
	Percent change	0.24%	0.20%	0%
Annual Welfare, US Agriculture Sector	With Clean Air Act ($ billion)	$1706	$1831	$1916
	Without Clean Air Act ($ billion)	$1706	$1828	$1905
	Damage Estimate ($ billion)	**–$0.5**	**$3.8**	**$10.6**
	Percent change	-0.03%	0.21%	0.55%
Annual Welfare, Forest and Agriculture Sector Combined	With Clean Air Act ($ billion)	$2343	$2708	$3341
	Without Clean Air Act ($ billion)	$2242	$2703	$3331
	Damage Estimate ($ billion)	**$1.0**	**$5.5**	**$10.7**
	Percent change	0.05%	0.20%	0.32%

Notes:

1. Results are expressed in year 2006 dollars.

In general, FASOM forecasts a relative shift towards forestry and away from agriculture under the *without-CAAA* scenario, indicating that the net impacts of the ozone effects on forests and agriculture would make forestry relatively more profitable than in the baseline compared with agriculture, resulting in a shift in land use. The model forecasts a sizable increase in cropland in the *without-CAAA* scenario, however there is an even greater decline in pasture as the returns to crop production rise relative to livestock production with higher crop prices.

As noted above, the model suggests that the damages attributed to higher ozone concentrations indicate that producers gain in many cases, while consumers are always substantially worse off with the ozone impacts reducing productivity. The reason that producers often are better off is that most forest and agricultural products have relatively inelastic demands, which means that a general decline in productivity will tend to increase prices by more than the reduction in quantity, increasing revenue and often profits as well. In general, FASOM attributes large price increases in response to the reductions in productivity for these inelastic products, and production declines in the *without-CAAA* scenario for most agricultural commodities, with larger declines in general for those products experiencing larger ozone impacts, and also sizable reductions in exports.

FASOM also is capable of modeling land-use changes in response to the higher ozone concentrations in the *without-CAAA* scenario. The model indicates changes in major land use categories at the national level over time under the ozone impacts scenario, which is leading to a net increase in forest of about 6.1 million acres by the 2020 model period and an increase in cropland of 7.6 million acres by 2020 in response to the productivity declines. At the same time, the model indicates that cropland pasture (high-quality land that is suitable for cropland but is being used as pasture) and pasture (lower-quality land that is not suitable for growing crops without improvement) decline by a total of 12.7 million acres and Conservation Reserve Program (CRP) land decreases by about 1 million acres. The crop experiencing the largest reduction in acreage is soybeans, while there is an increase in wheat acreage and a number of smaller shifts between alternative crops.

VISIBILITY

Air pollution impairs visibility in both residential and recreational settings, and an individual's willingness to pay (WTP) to avoid reductions in visibility differs in these two settings. Benefits of residential visibility relate to the impact of visibility changes on an individual's daily life (e.g., at home, at work, and while engaged in routine recreational activities). Benefits of recreational visibility relate to the impact of visibility changes manifested at parks and wilderness areas that are expected to be experienced by recreational visitors. For the purposes of this analysis, recreational visibility improvements are defined as those that occur specifically in federal Class I areas, and residential visibility improvements are those that occur within the boundaries of Census Metropolitan Statistical Areas (MSAs).

We calculate household WTP for improvements in both residential and recreational visibility. We base our calculations on simulations of future visibility conditions at the 36-km grid-cell level, as estimated by EPA's Community Multiscale Air Quality (CMAQ) model. The relationship between a household's WTP and changes in visibility is derived from a number of contingent valuation (CV) studies published in the peer-reviewed economics literature. The approach we apply to estimate the benefit of improvements in recreational visibility is consistent with methods EPA has used in analyses conducted since EPA's First Prospective analysis was completed. In particular, this chapter relies heavily on research completed for the PM NAAQS RIA (U.S. EPA, 2006) for the recreational visibility analysis. Our estimate of the benefit of residential visibility is consistent with methods applied in past analyses as well, but in previous reviews the Council had expressed concerns about residential visibility estimates based on WTP estimates from the McClelland et al. (1991) study. As a result, our estimates in this chapter rely on a new "benefits transfer" estimate of WTP derived from other published sources of residential visibility WTP.

According to the CMAQ simulations, the CAAA has had and will continue to have a substantial effect on visibility in both residential and recreational settings. The visibility data used in this analysis is annual mean visibility data, by county, measured in deciviews.[87] Figure 6-6 depicts the change in visibility (measured in deciviews) over the 30-year time frame, from 1990 to 2020, along the *with-CAAA* scenario. This map shows that, overall, changes in visibility due to the CAAA are greater in the eastern U.S. than the western U.S. Additionally, the largest changes in visibility occur in the Midwestern states. The county level data presented here are the basis for the residential visibility improvements we present below.

Figure 6-7 summarizes trends in visibility at the 13 most-visited U.S. National Parks. Visibility estimates (measured in deciviews) are provided for each of the seven core CAAA scenarios. Note that deciviews are inversely related to visual range, such that a decrease in deciviews implies an increase in visual range (i.e., improved visibility). Conversely, an increase in deciviews implies a decrease in visual range (i.e., decreased visibility). The figure illustrates that the CAAA greatly affects visibility at National Parks – over the 1990 to 2020 period, visibility markedly improves with the CAAA, and markedly declines without the CAAA. Particularly large differences in visibility between the *with-CAAA* and *without-CAAA* scenarios are seen at Great Smoky Mountains National Park, which is the most visited park in the U.S. Note that six of the 13 parks listed in Figure 6-7 are not included in the primary monetized recreational visibility estimates presented later in this chapter, because they were not included in the park regions studied in the underlying economic valuation study. The six parks not included are in the northern part of the country, and include Mount Rainier, Olympic, Glacier, Yellowstone, Grand Teton, and Acadia.

[87] The data was aggregated from the 36-km grid-cell level to the county level using the BenMAP version 3.0.15 "Air Quality Grid Aggregation" algorithm. The fourth quarter data is corrected for a missing day (the CMAQ runs modeled 364 days, omitting December 31) by reweighting the mean to account for the missing day.

FIGURE 6-6. ESTIMATED CHANGE IN VISIBILITY FOR WITH-CAAA SCENARIO, 1990 TO 2020

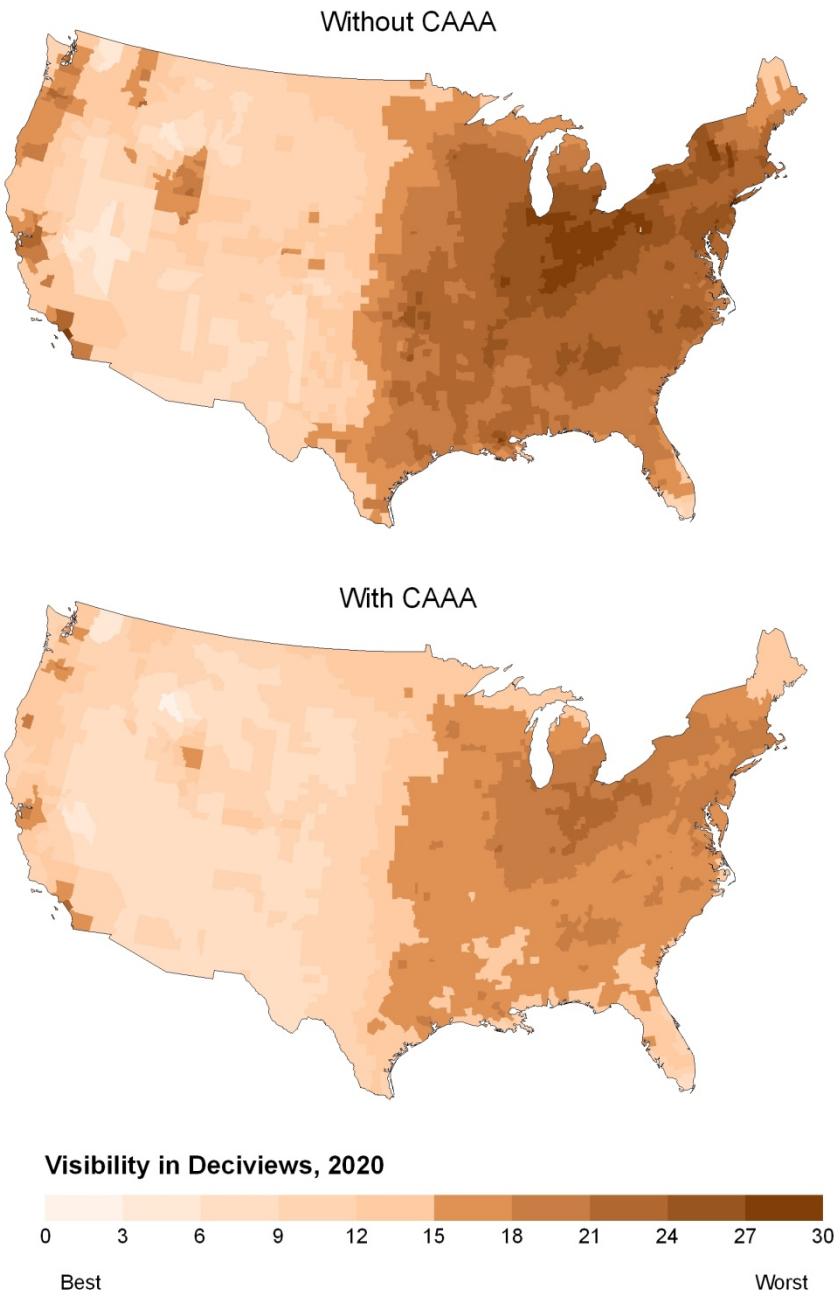
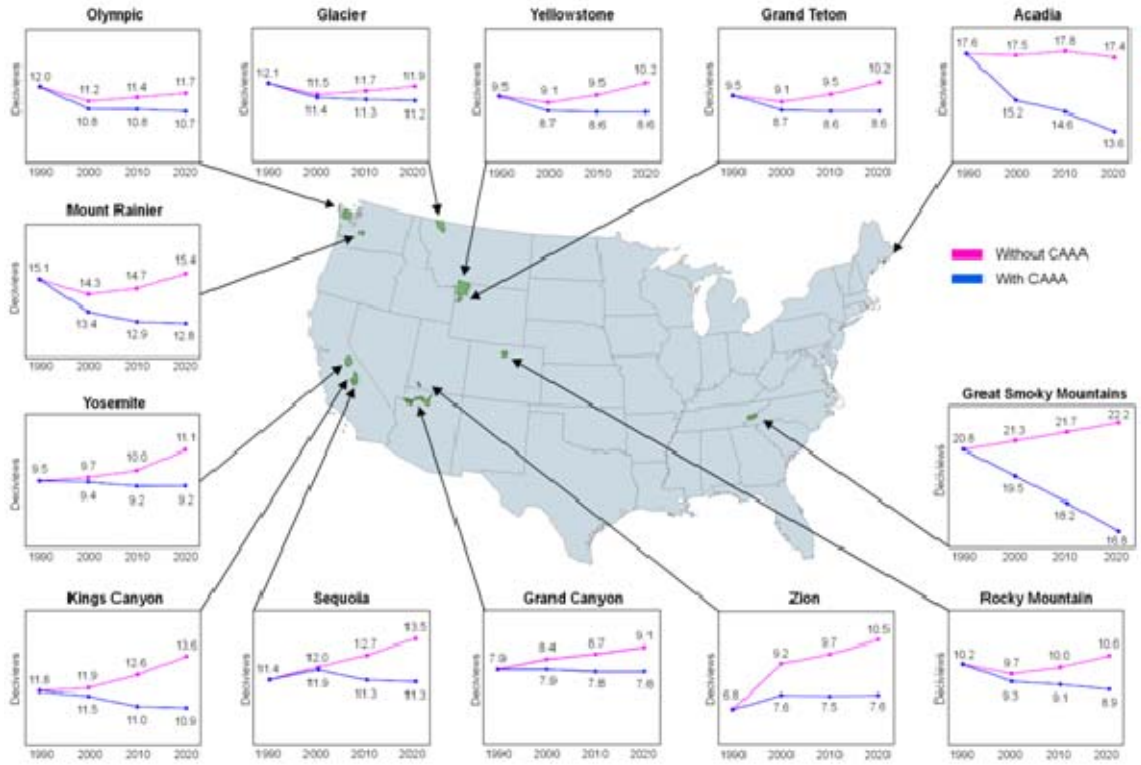


FIGURE 6-7. VISIBILITY TRENDS FOR THE 13 MOST-VISITED U.S. NATIONAL PARKS



Only one existing study provides defensible monetary estimates of the value of recreational visibility (Chestnut and Rowe, 1990b; 1990c). Although the Chestnut and Rowe study is unpublished, it was originally developed as part of the National Acid Precipitation Assessment Program (NAPAP) and, therefore, has been subject to peer-review as part of that program. The Chestnut and Rowe study measures the demand for visibility in Class I areas managed by the National Park Service (NPS) in three broad regions of the country: California, the Southwest, and the Southeast. Respondents in five states were asked about their WTP to protect national parks or NPS-managed wilderness areas within a particular region. The survey used photographs reflecting different visibility levels in the specified recreational areas. The visibility levels in these photographs were later converted to deciviews for the current analysis. The three regions assessed in the study cover 86 of the 156 Class I areas in the United States. Given that national parks and wilderness areas exhibit unique characteristics, it is not clear whether the WTP estimate obtained from the Chestnut and Rowe study can be transferred to other national parks and wilderness areas, without introducing additional uncertainty. As a

result, for the primary estimate, we value only those recreational benefits in the areas that were directly analyzed in the original Chestnut and Rowe study.

In the First Prospective analysis, we omitted the results of the benefits estimate for residential visibility from the primary benefits estimate due to technical concerns about the methodology of the study upon which our original calculations were based (McClelland et al., 1991).[88] There exists a wide range of published, peer-reviewed literature, however, that supports a non-zero value for residential visibility. As a result, we have revised our methodology for valuing residential visibility, and now include these benefits in our overall primary visibility benefits estimate.

For valuing residential visibility improvements, we rely upon a benefits transfer approach that draws upon information from the published Brookshire (1979), Loehman (1984) and Tolley (1986) studies. Each of the studies used provides estimates of household WTP to improve visibility conditions from a status quo visual range to an improved visual range. While uncertainty exists regarding the precision of these older, stated-preference residential valuation studies, we believe their results support the argument that individuals have a non-zero value for residential visibility improvements. The implied annual per-household WTP estimates from these study, for a hypothetical 10-percent improvement, ranges from $14 to $145, with a mean of $69 and median of $53. It is not surprising that such a range of values exists, as the areas of the country covered feature different landscapes and vistas, populations and prevailing visibility conditions.

Fortunately, the three recommended studies provide primary visibility values for a variety of cities throughout the United States: Atlanta, Boston, Chicago, Denver, Los Angeles, Mobile, San Francisco, and Washington D.C. We assign each of the 359 MSAs in the contiguous U.S. a value based on geographic proximity to one of the eight study cities, with two exceptions: 1) We apply the Loehman et al. (1984) value only to the six San Francisco Bay area MSAs, because the study is unique among the three in the manner in which visibility changes were described to respondents (i.e., a distribution of days versus average conditions), and 2) Values associated with Denver are not assigned on the basis of proximity but are instead assigned only to MSAs which meet an elevation range threshold of 1500 meters within the MSA, because one would expect that residents of Denver, with a dramatic view of the Rocky Mountains that is rarely obstructed by trees, would have a greater interest in protecting visibility than a city without a dramatic skyline or nearby mountains.[89]

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[88] Council review of early drafts of the First Prospective analysis noted that the McClelland et al. (1991) study may not incorporate two potentially important adjustments. First, their study does not account for the "warm glow" effect, in which respondents may provide higher willingness to pay estimates simply because they favor "good causes" such as environmental improvement. Second, while the study accounts for non-response bias, it may not employ the best available methods. As a result of these concerns, a prior Council recommended that residential visibility be omitted from the overall primary benefits estimate in the First Prospective.

[89] The geographic proximity assignment is preserved for the Los Angeles and Riverside MSAs although these MSAs meet the elevation range threshold of 1500 meters. The assignment is preserved because Los Angeles is one of the study cities and

The primary estimate of benefits of recreational and residential visibility improvements is provided in Table 6-7. The primary estimate for recreational visibility only includes benefits in the original study regions (i.e., California, the Southwest, and the Southeast). The primary estimate for residential visibility includes benefits in all MSAs. In general, benefits to visibility increase over time as visibility improves due to the CAAA. Benefits to residential visibility are approximately three times as large as benefits to recreational visibility.

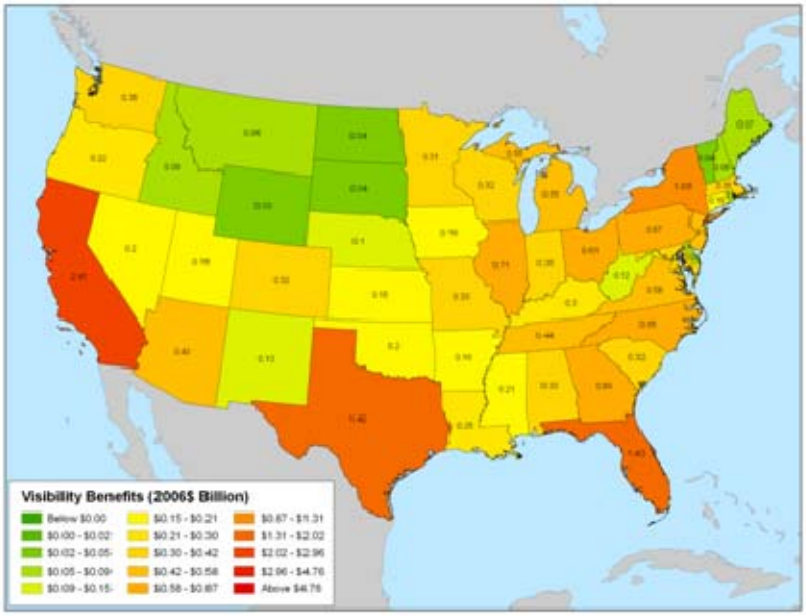
TABLE 6-7. PRIMARY ESTIMATE OF BENEFITS TO VISIBILITY (BILLION 2006$)

	2000 BENEFITS	2010 BENEFITS	2020 BENEFITS
Recreational Benefits	$3.3	$8.6	$19
Residential Benefits	$11	$25	$48
Total Benefits	$14	$34	$67

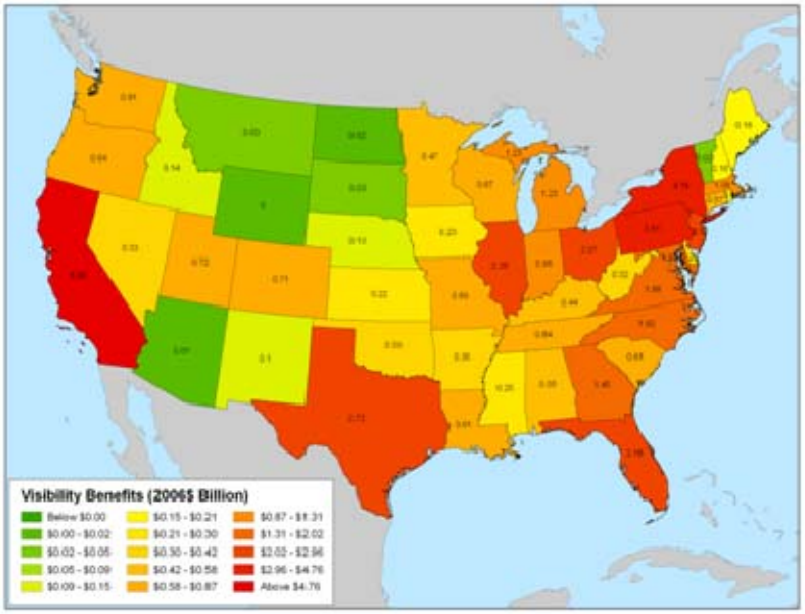
In Figures 6-8a and 6-8b below, we map the primary 2020 estimate of benefits of recreational and residential visibility improvement by state. Overall, the spatial pattern of benefits is similar for recreational and residential visibility. Recreational visibility benefits are driven by population and park location, within the original study regions of Chestnut and Rowe (1990a). These regions are California, the Southwest (Arizona, Nevada, Utah, Colorado, and New Mexico), and the Southeast (Delaware, Maryland, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Florida, and Mississippi). Households express WTP for visibility improvements in Class I areas located in-region as well as out-of-region. For this reason, there may be high recreational benefits in a state that has no Class I areas. Although household WTP is higher for in-region parks, this effect seems to be dominated by the effect of population. For example, less populated states such as New Mexico and Utah with Class I areas have low benefits to recreational visibility, while more populated states such as New York without Class I areas have high recreational visibility benefits.

also because Los Angeles has a particular set of location-specific characteristics that set it apart from Denver. As a conservative measure, Riverside MSA is also assigned to the Los Angeles study area because a significant portion of Riverside County itself is located in the South Coast Air Quality Management District, and therefore is considered by at least some measures to be part of the same regulated airshed as Los Angeles.

FIGURE 6-8A. PRIMARY ESTIMATE OF RECREATIONAL VISIBILITY BENEFITS IN 2020 (BILLION 2006$)



IGURE 6-8B. PRIMARY ESTIMATE OF RESIDENTIAL VISIBILITY BENEFITS IN 2020 (BILLION 2006$)



Residential visibility benefits are driven by population and visibility improvements. Overall, benefits are greater in the East. This is due in part to greater population levels as well as greater visibility improvements. Benefits are also very high in California due to the state's large population and visibility improvements, especially in and around Los Angeles and San Francisco. Residential visibility is also dependent upon the WTP value applied. Much of the West uses the WTP value for Denver, which is highest WTP value being widely applied. Yet, the West still has lower overall benefits to residential visibility.[90] This impact shows that the effect of population and visibility improvement dominates the effect of the WTP value applied.

MATERIALS DAMAGE

Since the mid-19th century air pollution has been suspected of accelerating the degradation of natural and man-made materials that are exposed to the outdoor environment. Concern over the effect of pollutants on materials has mainly been directed towards the economic consequences of damage to materials used in construction, but aesthetic damage to historic buildings and monuments is also a concern. Wet and dry acidic deposition, alone or combined with other air pollutants, contribute to the increased rate of materials damage. Acidic deposition has been shown to have an effect on materials including zinc/galvanized steel and other metal, carbonate stone (as monuments and building facings), and surface coatings (paints) (NAPAP, 1991).

Metal structures are usually coated by alkaline corrosion product layers and thus are subject to increased corrosion by acidic deposition. In addition, research has demonstrated that iron, copper, and aluminum based products are subject to increased corrosion due to pollution, in particular SO_2 (NAPAP, 1991), that acidic deposition accelerates the rate of erosion of carbonate stone (marble and limestone), and that acidic deposition has numerous negative effects on painted wood and, in general, increases the weathering rate. This analysis focuses on quantifying the impact of sulfur dioxide deposition on exterior building and infrastructural materials including carbonate stone, galvanized steel, carbon steel, and painted wood, as outlined Table 6-8 below.

[90] The WTP value for San Francisco is higher than Denver, but the San Francisco value is not applied to other MSA's.

TABLE 6-8. MATERIALS DAMAGE EFFECTS

POLLUTANT	QUANTIFIED EFFECTS—DAMAGE TO:	UNQUANTIFIED EFFECTS[a]—DAMAGE TO:
Sulfur oxides	Infrastructural materials - galvanized and painted carbon steel Commercial buildings - carbonate stone, metal, and painted wood surfaces Residential buildings - carbonate stone, metal, and painted wood surfaces	Monuments - carbonate stone and metal Structural aesthetics Automotive finishes - painted metal
Hydrogen ion and nitrogen oxides		Infrastructural materials - galvanized and painted carbon steel Zinc-based metal products, such as galvanized steel Commercial and residential buildings - carbonate stone, metal, and wood surfaces Monuments - carbonate stone and metal Structural aesthetics Automotive finishes - painted metal
Carbon dioxide		Zinc-based metal products, such as galvanized steel
Formaldehyde		Zinc-based metal products, such as galvanized steel
Particulate matter		Household cleanliness (i.e., household soiling)
Ozone		Rubber products (e.g., tires)

a The categorization of unquantified effects is not exhaustive.

This analysis applies the Air Pollution Emissions Experiments and Policy (APEEP) analysis model, described in Muller and Mendelsohn (2007, 2009), to link SO_2 emissions to ambient SO_2 levels. Using emission inputs, the air quality model in APEEP forecasts seasonal and annual average county concentrations for SO_2, amongst other pollutants.[91] As reported in Muller and Mendelsohn (2007) and detailed in the supporting online material for that publication, APEEP's air quality modeling has been statistically tested and calibrated against the predictions generated by the Community Multi-scale Air Quality Model (CMAQ), using 1996 emissions data and a CMAQ run for 1996

[91] The Project Team considered using the CMAQ SO2 air quality results directly, but the decision to implement the materials damage approach described here came too late to cost-effectively recover the relevant ambient SO2 estimates from the original CMAQ runs. The overall magnitude of the monetizable materials damage benefits is such a small part of the overall benefits of the CAAA that the impact of using APEEP's air quality tool rather than CMAQ on the overall benefits estimates is likely to be very small.

conditions. Muller and Mendelsohn (2007) also report comparisons of APEEP's results with available monitor data for this period. The results for the SO_2 air quality component used in these materials damage calculations appear to suggest good agreement for APEEP for concentrations near the mean, but APEEP appears to overpredict SO_2 concentrations for high-end concentrations. Overall, however, it is important to note that APEEP is designed to be a fast-running alternative to CMAQ for use in an integrated assessment model – the air quality component of APEEP is a statistical representation of relations that are accomplished in a far more sophisticated manner in CMAQ.

The remaining general steps in the process of estimating materials damage effects are as follows:

- **Develop a national inventory of sensitive materials**. A key piece of information needed to apply the appropriate materials damage concentration-response functions is the existing materials inventories. This analysis estimates the inventory of four exterior building and infrastructural materials in each county in the lower 48 states, including carbonate stone, galvanized steel, carbon steel, and painted wood surfaces.
- **Derive concentration-response functions that relate material mass loss to ambient SO_2.** Dose-response functions for man-made materials damages are obtained from two sources; the NAPAP studies (Atteraas, Haagenrud, 1982; Haynie, 1986) and from the International Cooperative Programme on Effects on Materials (ICP, 1998).
- **Estimate the value of lost materials.** Materials damage is valued as the cost of future materials maintenance activities. The accelerated rate of materials decay due to pollution exposure increases the frequency of regularly scheduled future maintenance activities. The change in the present value of the maintenance schedules extending into the future constitutes the monetary impact of an emission change on materials damage.

Table 6-9 summarizes the benefits of reduced materials damage attributed to CAAA programs in 2000, 2010, and 2020. Benefits are given by EPA region. Although the total benefits are relatively small compared to other categories of effect, the benefits of CAAA programs to materials damage increase over time as we would expect. The spatial distribution of the benefits is primarily owing to the distribution of the materials inventory and SO_2 exposure. The effect of SO_2 exposure is a more important driver of results than the inventory. For example, the benefits in Region 5 are approximately twice as large as those in any other EPA region. This is due to the significant decrease in SO_2 exposure associated with the CAAA in this region.

TABLE 6-9. BENEFITS OF REDUCED MATERIALS DAMAGE DUE TO CAAA PROGRAMS

EPA REGION	VALUATION (THOUSAND 2006$)		
	2000	2010	2020
1: CT, ME, MA, NH, RI, VT	$720	$2,100	$2,100
2: NY, NY	$9,000	$10,000	$12,000
3: DE, DC, MD, PA, VA, WV	$9,400	$19,000	$23,000
4: AL, FL, GA, KY, MS, NC, SC, TN	$8,400	$16,000	$21,000
5: IL, IN, MI, MN, OH, WI	$26,000	$38,000	$38,000
6: AR, LA, NM, OK, TX	$2,200	$4,000	$7,300
7: IA, KS, MO, NE	$2,000	$1,600	$1,600
8: CO, MT, ND, SD, UT, WY	$400	$570	$730
9: AZ, CA, NV	-$100	$490	$640
10: ID, OR, WA	$340	$510	$560
Total	**$58,000**	**$93,000**	**$110,000**

Notes: Results are rounded to two significant figures. Totals may not sum due to rounding.

ADIRONDACK CASE STUDY RESULTS

The Project Team was encouraged to consider case study analysis of a set of ecological effects for which national analyses might not be feasible, owing to lack of available data or methods. EPA chose to conduct a case study in the Adirondack region of New York State, focusing on two ecological service flows that provide benefits in terms of both ecosystem health and economic terms: (1) acidification of surface waters and (2) reduced yields of commercial timber. The Adirondack region of New York may exhibit the most severe ecological impacts from acidic deposition of any region in North America – acid deposition is the main cause of both of the effects we studied.[92] Adirondack Park is a State Park comprising 5,821,183 acres of State and privately owned land in upstate New York and is nearly a 100 by 100 mile box of land, intersecting fourteen counties. The Park was created in 1892 through an amendment to the State constitution, with the purpose of forest and natural resource conservation. Federal programs addressing air pollution have been particularly beneficial to the region as, due to its location downwind of the highly industrialized Ohio River Valley, most of the acid deposition in the region originates from out of state. In addition to its status as a region of particular sensitivity to lake acidification and with some existing research on the effects of air pollutants on forest

[92] Driscoll, Charles T. et al. May 2003. Chemical Response of Lakes in the Adirondack Region of New York to Declines in Acidic Deposition. Environmental Science and Technology 37(10): 2036-2042.

growth, the Adirondack Region was selected as a setting for this case study due to the existence of a regional economic random utility model describing recreational fishing behavior.

Lake Acidification in the Adirondacks

Surface waters, such as lakes and streams, may be the most susceptible systems to acidic deposition as they collect acidic precipitation not only from direct deposition on their surfaces but also in the form of runoff from their entire watershed. Acid accumulates in surface waters via three main pathways:

- precipitation, or wet deposition, in which pollutants are dissolved in rain or snow;
- dry deposition, or direct deposition of gases and particles on surfaces; and
- cloud-water deposition, involving material dissolved in cloud droplets and deposited on vegetation.[93]

As acids accumulate, ecosystems gradually lose the ability to buffer them, resulting in changes to ecosystem structure and function. Acidification of the surface water affects the trophic structure of water contributing to declines in the abundance of zooplankton, macroinvertebrates, and fish.[94]

The ecological service flow affected by lake acidification that is most amenable to economic analysis is recreational fishing. Extensive research exists focused on both the effects of lake acidification on fisheries and on individuals' willingness to pay to avoid reductions in the quality or quantity of recreational fishing opportunities. This analysis employs the following general steps to quantify the benefits of reduced lake acidification on recreational fishing in the Adirondacks. A conceptual model depicting the analytic steps in terms of inputs, outputs, and ecological and economic models is provided in Figure 6-9.

- **Forecast lake acidification levels consistent with the *with-CAAA* and *without-CAAA* scenarios.** EPA generated estimates of acidic deposition at a 36-kilometer grid cell level across the Adirondack region using the CMAQ model. We then implemented an ecological model, the Model of Acidification of Groundwater in Catchments (MAGIC), to simulate the transport of the acidic deposition through the hydrological and terrestrial ecosystems and forecast acidification levels in a subset of Adirondack lakes.
- **Extrapolate results of the ecological model within the Adirondacks region.** We developed a random effects model to explain the relationship between acidification of lakes and their specific site characteristics.

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[93] The U.S. National Acid Precipitation Assessment Program. 1991. Integrated Assessment Report. The NAPAP Office of the Director, Washington, DC.

[94] Driscoll, Charles T. et. al. March 2001. Acidic Deposition in the Northeastern United States: Sources and Inputs, Ecosystem Effects, and Management Strategies. BioScience 51(3): 180-198.

- **Apply ANC thresholds to classify lakes as either "fishable" or "impaired".** Fishable lakes are those for which water quality is not deteriorated to an extent which limits recreational fishing. Impaired lakes' water quality is deteriorated so as to reduce fish populations and preclude recreational fishing. Lakes are defined as either fishable or impaired based on identified ANC thresholds. As uncertainty exists regarding the ANC threshold at which effects are experienced, this analysis considers three separate thresholds below which lakes are considered impaired.
- **Apply an economic random utility model (RUM) to quantify economic benefits of the CAAA in terms of recreational fishing in the Adirondack region.** We employ a RUM that was developed to account for fishing site choices made by recreational fishers based on attributes of sites specifically in the Adirondack region. The difference in economic welfare values between the value of fishable (i.e., not impaired) lakes in the *with-CAAA* scenario and the *without-CAAA* scenario represents the benefits to recreational fishing in the Adirondack region associated with the CAAA.

FIGURE 6-9. CONCEPTUAL APPROACH TO ESTIMATING THE ECONOMIC BENEFITS OF REDUCED ACIDIFICATION ON ADIRONDACK LAKES

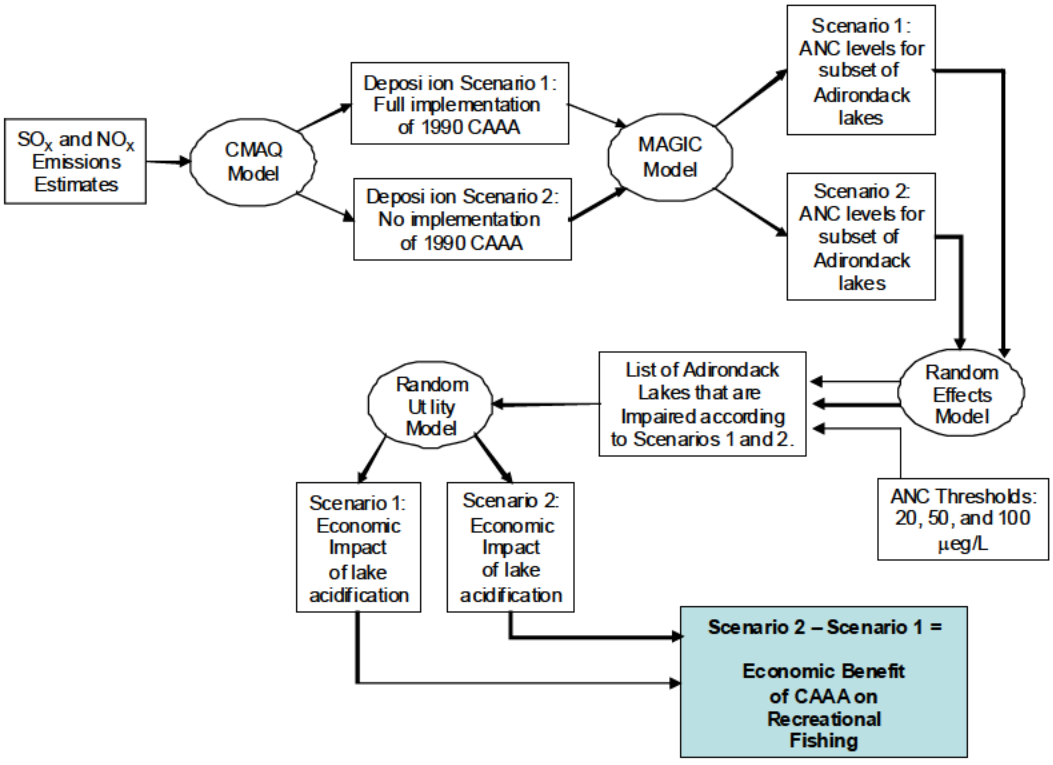


Table 6-10 summarizes the results of this analysis. Present value cumulative benefits are provided for 2000, 2010, and 2020, assuming a five percent discount rate. Single year undiscounted benefits are also given for each year. Undiscounted single year benefits

increase over time but the benefits do not follow any particular trend across alternative threshold assumptions. It should be noted that benefits in each year and under each threshold assumption reflect a different subset of lakes. Therefore, benefits are not expected to follow any particular trend across years or threshold assumptions.

Table 6-10 SUMMARY OF ANNUAL AND CUMULATIVE ESTIMATED BENEFITS TO RECREATIONAL FISHING IN THE ADIRONDACK REGION (MILLION 2006$)

YEAR	ANC THRESHOLD ASSUMPTION FOR DEFINING "FISHABLE" LAKES	ADIRONDACK REGION	
		SINGLE YEAR UNDISCOUNTED	CUMULATIVE FIVE PERCENT DISCOUNT RATE
2000	20	$7	$62
	50	$7	$57
	100	$5	$44
2010	20	$8	$143
	50	$8	$132
	100	$6	$101
2020	20	$9	$197
	50	$8	$182
	100	$6	$136

Note:
1) Cumulative benefits in year 2000 are the cumulative benefits to recreational fishing of implementing the CAAA from 1990 to 2000. Similarly, cumulative benefits in 2010 are cumulative from 1990 to 2010 and cumulative benefits in 2020 are cumulative from 1990 to 2020. The single year undiscounted benefits are the benefits to recreation fishing of implementing CAAA in that year (2000, 2010, or 2020).
2) Benefits in this case study are evaluated from 1990 (the year of the passage of the CAAA) to 2050 (the forecast horizon for the lake ANC levels with and without the CAAA). The benefits in this table are presented for years 2000, 2010, and 2020, however, to be consistent with the benefits as calculated in the broader cost-benefit analysis of the CAAA.

Commercial Timber in the Adirondacks

Reductions in NO_x and SO_x emissions due to the implementation of the CAAA are also believed to reduce forest soil acidity. Reductions in soil acidity have been shown by scientists to increase tree growth and improve overall forest health. Such changes in forest growth and health would have a positive effect on the timber industry within Adirondack Park, potentially increasing the frequency and/or the volume of timber harvests.

Quantifying the magnitude of these benefits requires a function to translate varying levels of soil acidity into corresponding tree growth productivity. Unfortunately, species-specific dose-response functions relating soil acidity levels with changes in tree growth in Adirondack Park are not available. Our analysis instead characterized the existing timber industry in Adirondack Park in terms of the types of tree species present, wood products harvested, extent of timber harvest activities, and the overall value of timber harvests

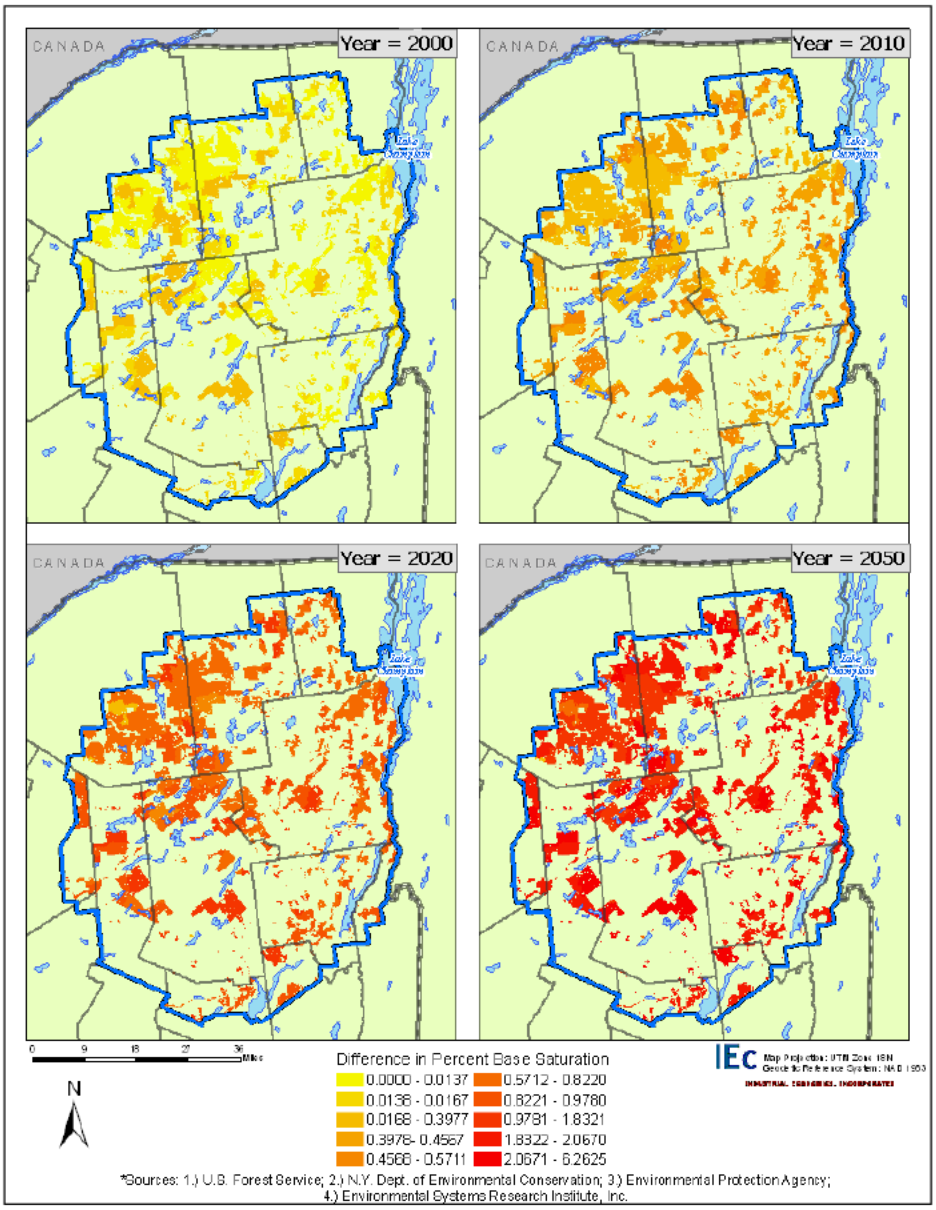
within the Park. We then estimated changes in percent base saturation (a measure of soil acidity) due to the implementation of the CAAA across the Park from 1990 to 2050, focusing on soil acidity differences in areas subject to commercial timber activity. Specifically, changes in percent base saturation levels in timber harvest areas were mapped in relation to potential changes in the growth and health of tree species present in these areas and the likely effects of altered tree growth and health on timber harvest rates and volumes. In addition, we provide some perspective on the potential order of magnitude of benefits of the CAAA on the timber industry in the Adirondacks, summarizing existing, relevant research.

We used estimates of soil percent base saturation levels for 1990, 2000, 2010, 2020, and 2050 with and without the CAAA to characterize the effect on Adirondack forests.[95] Percent base saturation is the proportion of cation exchange sites (exchange sites are areas on soil particles where ions may be adsorbed) occupied by basic cations (Ca^{2+}, Mg^{2+}, K^{+}, and Na^{+}). These basic cations buffer the soil by inhibiting the adsorption of H^{+} ions. Thus, percent base saturation is a measure of the soil's buffering capacity. High percent base saturation levels indicate large buffering capacity and low soil acidity levels, while low percent base saturation levels indicate the converse. Percent base saturation point estimates were generated using the same Model of Acidification of Groundwater in Catchments (MAGIC) as used in the lake acidification analysis described above.

Figure 6-10 presents differences in percent base saturation levels with and without the CAAA specifically within the timber harvest areas of the Park by year. There is a clear temporal trend in the difference in percent base saturation levels with and without the CAAA. Specifically, differences between percent base saturation levels with the CAAA as compared to without the CAAA increase in each year in the analysis. However, there is little spatial variability in percent base saturation differences within individual years. The lack of spatial variability becomes more pronounced as time goes on, so that by 2050 the difference in percent base saturation is between 2.07 and 6.26 percent in almost all forested resource management areas in the Park. The lack of spatial variability makes sense given the relatively small geographic scope considered in this analysis. The minor spatial variation in percent base saturation differences exhibited in 2000 and 2010 is most likely related to microhabitat factors (i.e., different soil types and differing precipitation levels).

[95] While the timeframe for this Second Prospective analysis of the CAAA is through 2020, this case study reports benefits through 2050 as we expect that reductions in emissions that occur in 2020 will continue to provide benefits to recreational fishing through this time frame.

FIGURE 6-10. DIFFERENCES IN PERCENT BASE SATURATION VALUES WITH AND WITHOUT THE CAAA IN FORESTED RESOURCE MANAGEMENT AREAS IN ADIRONDACK PARK [96,97]



[96] The differences between percent base saturation levels with the CAAA and without the CAAA are presented rather than absolute percent base saturation levels for each scenario to highlight the changes in percent base saturation attributable to the implementation of the CAAA.

[97] The ten ranges of difference in percent base saturation values presented in Exhibit 5-8 are equal to the 10th, 20th, ..., and 100th percentiles for the combined distribution of difference in percent base saturation values across all years in the analysis (2000, 2010, 2020, and 2050).

Also of importance to this analysis is the magnitude of the increase in percent base saturation levels in relation to specific forest types within resource management areas. We focused on six forest types (sugar maple/beech/yellow birch, red maple/upland, spruce/fir, eastern hemlock, eastern white pine, and paper birch) that are prevalent in the Park relative to other forest types and contain tree species of commercial value. Table 6-11 presents the area-weighted mean increase in percent base saturation levels in these forest types per year. Of the forest types of interest, the paper birch forest type experiences the greatest increase in percent base saturation due to the CAAA, followed by the eastern hemlock and the sugar maple/beech/yellow birch forest types.

TABLE 6-11. AREA-WEIGHTED MEAN DIFFERENCES IN PERCENT BASE SATURATION VALUES WITH AND WITHOUT THE CAAA IN FOREST TYPES OF INTEREST

FOREST TYPE	AREA-WEIGHTED DIFFERENCE IN PERCENT BASE SATURATION			
	2000	2010	2020	2050
Sugar Maple/Beech/Yellow Birch	0.023	0.414	0.820	1.899
Red Maple/Upland	0.025	0.377	0.758	1.755
Spruce/Fir	0.028	0.361	0.736	1.702
Eastern Hemlock	0.028	0.413	0.827	1.908
Eastern White Pine	0.018	0.419	0.814	1.882
Paper Birch	0.018	0.457	0.891	2.069
Other Forest Types	0.015	0.429	0.829	1.918

The area-weighted increase in percent base saturation levels in sugar maple/beech/yellow birch forests is in line with increases in percent base saturation levels in other forest types in Adirondack Park. This is an important point given the prevalence of sugar maple in this forest type, and the fact that sugar maple is an economically important tree species in the Park. Although dose-response functions, which would allow for estimates of growth increases in sugar maples due to increased base saturation levels, do not exist, several studies have estimated changes in sugar maple growth due to increases in soil acidity stemming from elevated nitrogen and/or sulfur deposition.[98] Changes in harvest volumes comparable to those seen in those existing studies might lead to annual wood harvest

[98] For example, Duchesne et al. (2002) found that sugar maple basal area growth rates were reduced by 17 percent, on average, in forest stands exhibiting decreasing basal area growth rates over time (declining stands) compared to sugar maple basal area growth rates in stands exhibiting increasing basal area growth rates over time (healthy stands). In addition McLaughlin (1998) found that the health of hardwood stands on shallow, poorly buffered soils similar to those found in Adirondack Park declined during the 1990s due to decreasing pH and base saturation levels and increased aluminum ion concentrations.

benefits of roughly $1 million to $1.5 million annually, based on the total stumpage values for sugar maple pulpwood/chip wood we estimate for the region.[99] Whether sugar maple growth rate changes would mirror those reported in either of these studies, however, is uncertain due to the lack of an established functional relationship. Nonetheless, we expect that all tree species in the Park would benefit, in terms of increased stand growth and vigor, from increased percent base saturation levels. In some cases, increases in growth may allow for both more frequent and larger timber harvests (i.e., more frequent timber harvests removing larger volumes of wood). Improved forest health may also provide the added benefit of increasing the resiliency of forest stands and limiting damage caused by disturbance events.

UNCERTAINTY IN ECOLOGICAL AND OTHER WELFARE BENEFITS

As noted above, limitations in the available methods and data mean that the benefits assessment in this report does not represent a comprehensive estimate of the economic benefits of the CAAA. Moreover, the potential magnitude of long-term economic impacts of ecological damages mitigated by the CAAA suggests that great care must be taken to consider those ecosystem impacts that are not quantified here. Significant future analytical work and basic ecological and economic research is needed to build a sufficient base of knowledge and data to support an adequate assessment of ecological benefits. For the current analysis, this incomplete coverage of effects represents the greatest source of uncertainty in the ecological assessment. This and other key uncertainties are summarized in Table 6-12 below.

In general, our analysis focuses on more acute and readily observable effects. Chronic ecological effects of air pollutants, on the other hand, may be poorly understood, difficult to observe, or difficult to discern from other influences on dynamic ecosystems. Disruptions that may seem inconsequential in the short-term, however, can have hidden, long-term effects through a series of interrelationships that can be difficult or impossible to observe, quantify, and model. This factor suggests that many of our qualitative and quantitative results may underestimate the overall, long-term effects of pollutants on ecological systems and resources.

[99] We estimated stumpage values of commonly harvested species in the Adirondack Region by applying average stumpage values to the pulpwood and wood chip and roundwood log harvest volume estimates. The average stumpage value for pulpwood and wood chips is estimated to be $3 per ton; while, the average stumpage value for roundwood logs is estimated to be $150 per thousand board-feet (MBF). Using these estimates, the annual harvest value of pulpwood and wood chips is estimated to be approximately $5.4 million, and the annual harvest value of roundwood logs is estimated to be $15 million.

TABLE 6-12. KEY UNCERTAINTIES ASSOCIATED WITH ECOLOGICAL EFFECTS ESTIMATION

POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS	LIKELY SIGNIFICANCE RELATIVE TO KEY UNCERTAINTIES ON NET BENEFITS ESTIMATE*
Incomplete coverage of ecological effects identified in existing literature, including the inability to adequately discern the role of air pollution in multiple stressor effects on ecosystems. Examples of categories of potential ecological effects for which benefits are not quantified include: reduced eutrophication of estuaries, reduced acidification of soils, reduced bioaccumulation of mercury and dioxins in the food chain.	Underestimate	Potentially major. The extent of unquantified and unmonetized benefits is largely unknown, but the available evidence suggests the impact of air pollutants on ecological systems may be widespread and significant.
Incomplete geographic scope of recreational fishing benefits associated with reduced lake acidification analysis due to case study approach.	Underestimate	Probably minor. As a case study limited to the Adirondack region of New York State, the estimated benefits to recreational fishing reflect only a portion of the overall benefits of reduced acidification on this service flow, but based on the magnitude of effects in the Adirondacks the national estimate is nonetheless likely be less than five percent of total benefits.
Incomplete assessment of long-term bioaccumulative and persistent effects of air pollutants.	Underestimate	Potentially major. Little is currently known about the longer-term effects associated with the accumulation of toxins in ecosystems. What is known suggests the potential for major impacts. Future research into the potential for threshold effects is necessary to establish the ultimate significance of this factor.
Omission of the effects of nitrogen deposition as a nutrient with beneficial effects.	Overestimate	Probably minor. Although nitrogen does have beneficial effects as a nutrient in a wide range of ecological systems, nitrogen in excess also has significant and in some cases persistent detrimental effects that are also not adequately reflected in the analysis.

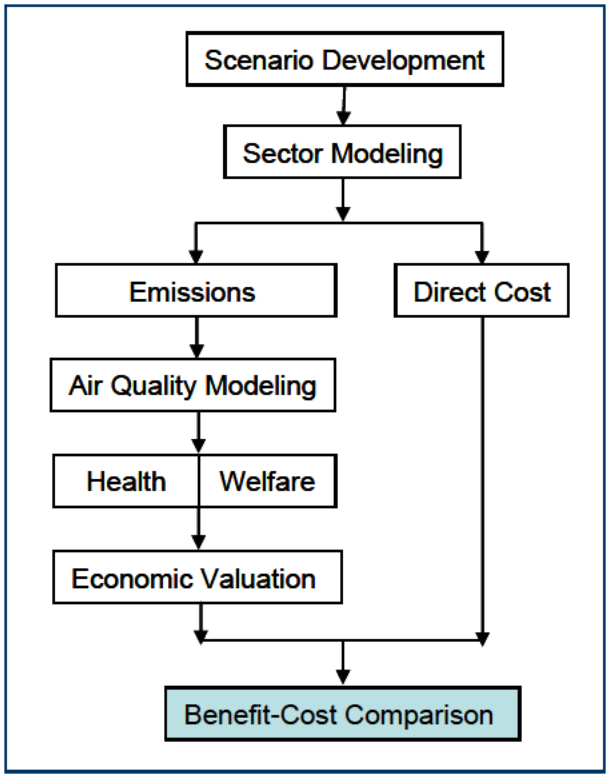
POTENTIAL SOURCE OF ERROR	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS	LIKELY SIGNIFICANCE RELATIVE TO KEY UNCERTAINTIES ON NET BENEFITS ESTIMATE*
Use of CMAQ model to estimate air pollutant deposition levels.	Unable to determine. As part of a performance evaluation of CMAQ, EPA compared model predictions for some forms of deposition relevant to this analysis (wet SO2, NOx and ammonium) to observed deposition data).** The evaluation indicated that CMAQ overpredicted some forms of deposition and underpredicted others. The relative accuracy of the model's predictions varied seasonally and geographically.	Probably minor. The Adirondack lake acidification analysis uses deposition estimates as inputs, but they are calibrated to lake-level monitoring data, and the monetized benefits estimates for that component are a small part of the overall net benefits. We also use the CMAQ deposition estimates to generate maps that highlight the relative distribution of deposition for various air pollutants across the U.S. With respect to net impacts, the extent to which the forms of deposition and geographic areas that are overpredicted in the model are offset by those that are underpredicted is unknown.

* The classification of each potential source of error reflects the best judgment of the section 812 Project Team. The Project Team assigns a classification of "potentially major" if a plausible alternative assumption or approach could influence the overall monetary benefit estimate by approximately five percent or more; if an alternative assumption or approach is likely to change the total benefit estimate by less than five percent, the Project Team assigns a classification of "probably minor."

** See U.S. EPA, Office of Air Quality Planning and Standards, Emissions Analysis and Monitoring Division, Air Quality Modeling Group. CMAQ Model Performance Evaluation Report for 2001: Updated March 2005. CAIR Docket OAR-2005-0053-2149.

CHAPTER 7 - COMPARISON OF BENEFITS AND COSTS

In this chapter we present our summary of the primary estimates of monetized benefits of the CAAA from 1990 to 2020, compare the benefits estimates with the corresponding costs, and explore some of the major sources of uncertainty in the benefits estimates, including a summary of outcomes using alternative assumptions from those employed in the primary analysis.



The overall conclusion of our analysis is that the benefits of the CAAA *substantially* exceed its costs. Furthermore, the results of the uncertainty analysis imply that it is extremely unlikely that the monetized benefits of the CAAA over the 1990 to 2020 period could be less than its costs. The central benefits estimate exceeds costs by a factor of more than 30 to one, whether we are looking at annual or present value measures. By our measures, the programs associated with the 1990 Clean Air Act Amendments have been, and will likely continue to be, a very good investment.

AGGREGATING BENEFIT ESTIMATES

Our primary estimates of the monetized economic benefits for the 1990 to 2020 period derive from two types of analyses: (1) the analysis of changes in human health effects associated with reduced exposures to criteria pollutants and the valuation of these changes, summarized and described in Chapter 5; and (2) the analysis of monetized ecological and other welfare benefits (e.g., visibility), described in Chapter 6.[100] We measure the benefits and present the results from these analyses in slightly different ways,

[100] Note that the direct costs were aggregated in Chapter 3.

in part because they derive from different tools. The main differences have to do with the manner in which we conduct uncertainty analyses, as outlined below.

Although there are some differences in these two types of benefits analysis, in both cases we generate annual estimates of benefits that result from a single set of emissions and air quality modeling scenarios for the three target years of the study: 2000, 2010, and 2020. The consistent use of scenarios across all the benefit and cost analyses allows us to aggregate and directly compare monetized benefits estimates to the estimates of costs incurred in the target years. In some cases, we need to apply a discount rate to compare benefits to costs; for example, we model the effect of particulate matter on premature mortality to occur over a period of twenty years from the time of exposure, even though the costs to achieve that benefit are incurred at the time of the initial exposure change. In this case, we have accounted for the incidence of premature mortality over the assumed lag period, and discounted the valuation of this effect back to the target year. Some ecological effects, such as the effects of acid deposition on Adirondack lakes, also occur with a lag – again, we use a discounting procedure to standardize the benefits results for these estimates.

The annual estimates for the three target years also provide an indication of the trend in benefits we project will accrue over the 30-year study period. To generate a cumulative measure of benefits over the full 30-year period, however, we must make an assumption about the level of benefits that would be realized in the years between the target years. We interpolate these values, assuming a trend in benefits accrual that roughly matches the trend in emission reductions for PM precursors. Basing our estimate of the benefits trajectory on PM precursor reductions acknowledges that the majority of monetized benefits, including health and visibility, are attributable to reductions in ambient particulate matter.

The distribution of estimates we generate for the monetized benefits of human health effects incorporates both the quantified uncertainty associated with each of the health effect estimates and the quantified uncertainty associated with the corresponding economic valuation strategy. Quantitative estimates of uncertainties in earlier steps of the analysis (i.e., emissions and air quality changes) could not be developed adequately and are therefore not applied in the present study. As a result, the range of estimates for monetized benefits presented in this chapter, from the primary low estimate to the primary high estimate, is narrower than would be expected with a complete accounting of the uncertainties in all analytical components.[101]

In the health benefits analyses we estimate, for each endpoint-pollutant combination, distributions of values for both the key parameter of the concentration-response function and the valuation coefficients. We combine these distributions by using a computerized,

[101] The characterization of the uncertainty surrounding economic valuation is discussed in detail in Industrial Economics, Inc., *Uncertainty Analyses to Support the Second Section 812 Prospective Benefit-Cost Analysis of the Clean Air Act: Draft Report*, prepared for Office of Air and Radiation, US Environmental Protection Agency, April 2010.

statistical aggregation technique to estimate the mean of the monetized benefit estimate for each endpoint-pollutant combination and to characterize the uncertainty surrounding each estimate.[102]

The ecological and welfare results are not currently amenable to the same type of uncertainty analysis. The modeling procedures for estimating the effects of sulfur and nitrogen deposition in acidifying lakes, the effects of ozone in reducing timber and agricultural production, and the effects of particulate matter on visibility are all subject to uncertainty, but they require substantial resources simply to develop single point estimates. We describe key uncertainties in these estimation procedures qualitatively in Chapter 6, with some limited sensitivity analyses also presented to characterize the effect of key assumptions. The sources of uncertainty in these estimates, however, cannot as easily be disaggregated among physical effects modeling and valuation components, and they have not been assessed with the BenMAP model used for health benefits uncertainty analysis. As a result, we cannot reliably develop an aggregate estimate of the uncertainty in the sum of health and welfare benefits estimates.

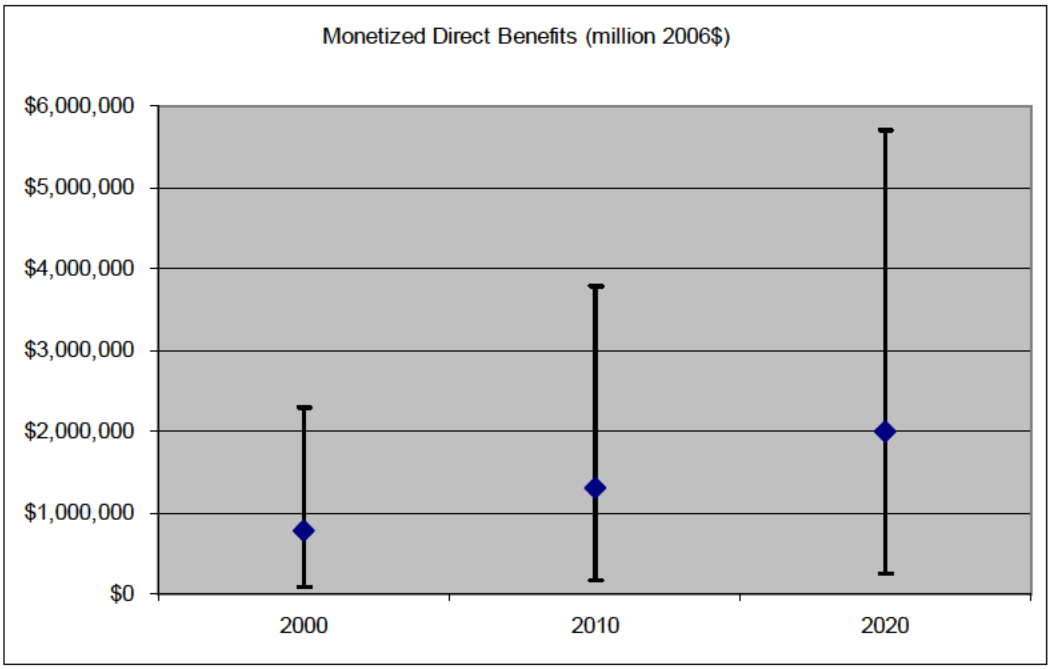
ANNUAL BENEFITS ESTIMATES

We present the results of our aggregation of primary annual health benefits estimates for the CAAA in Figure 7-1 below. The figure provides a characterization of both the primary central estimate and the range of values generated by the aggregation procedure described above, for each of the three target years of the analysis (2000, 2010, and 2020). The Primary High estimate corresponds to the 95th percentile value from the health benefits aggregation, and the Primary Low estimate corresponds to the 5th percentile value. The total benefits estimates are substantial; for example, the Primary Central estimate in 2020 is $2.0 trillion.

Table 7-1 shows the detailed breakdown of benefits estimates for 2000, 2010, and 2020. As shown in the table, $1.7 trillion of the $2.0 trillion total benefit estimate in 2020, or 85 percent, is attributable to reductions in premature mortality associated with reductions in ambient particulate matter. The remaining benefits are roughly equally divided among three broad categories of benefits: avoided premature mortality associated with ozone exposure; avoided morbidity, the largest component of which is avoided acute myocardial infarctions and avoided chronic bronchitis; and avoided ecological and other welfare benefits, the largest component of which is improved visibility. Because of the aggregation procedure used, and because we round all intermediate results to two significant digits for presentation purposes, the columns of Table 7-1 may not sum to the total estimate presented in the last row.

[102] The statistical aggregation technique applied is commonly referred to as Monte Carlo analysis. The technique involves many re-calculations of results, using different combinations of input parameters each time. For each calculation, values from each input parameter's statistical distribution are selected at random to ensure that the calculation does not always result in extreme values, or rely solely on low end or solely on high end input parameters. The aggregate distribution more accurately reflects a reasonable likelihood of the joint occurrence of multiple input parameters.

FIGURE 7-1. ANNUAL MONETIZED BENEFITS IN 2000, 2010 AND 2020



Examination of the emissions and aggregate exposure estimates suggests that most of these benefits can be attributed to air quality improvements that result from CAAA implementation, relative to conditions as they were in 1990, before the CAAA, rather than from avoiding degradation of air quality that might have occurred without the CAAA. For example, we estimate that emissions of NO_x, SO_2, and VOCs, three of the most important PM and ozone precursors, would have grown just over 20 percent from 1990 to 2020 in the *without-CAAA* scenario, which corresponds to an annual growth rate of about 0.65 percent. We also estimate that $PM_{2\,5}$ emissions would have grown somewhat slower, at 0.5 percent annually, without the CAAA. Reductions along the with-CAAA scenario over the same period, however, were more than 60 percent for SO_2 and NO_x, a reduction of roughly 3 percent per year, and were roughly 45 percent for VOCs, a reduction of about 2 percent per year. As a result, about 75 percent of the difference in emissions that we estimate would occur by 2020 between the *with-CAAA* and *without-CAAA* scenario can be attributed to reductions in emissions relative to those in 1990.

TABLE 7-1. SUMMARY OF MEAN PRIMARY ANNUAL BENEFITS RESULTS

BENEFIT CATEGORY	ANNUAL MONETIZED BENEFITS (MILLION 2006$) BY TARGET YEAR			NOTES
	2000	2010	2020	
Health Effects				
PM Mortality PM Morbidity Ozone Mortality Ozone Morbidity	$710,000 $27,000 $10,000 $420	$1,200,000 $46,000 $33,000 $1,300	$1,700,000 $68,000 $55,000 $2,100	- PM mortality estimates based on Weibull distribution derived from Pope et. al (2002) and Laden et al., 2006. - Ozone mortality estimates based on pooled function
Subtotal Health Effects	$750,000	$1,300,000	$1,900,000	
Visibility				
Recreational Residential	$3,300 $11,000	$8,600 $25,000	$19,000 $48,000	Recreational visibility only includes benefits in the regions analyzed in Chestnut and Rowe, 1990 (i.e., California, the Southwest, and the Southeast).
Subtotal Visibility	$14,000	$34,000	$67,000	
Agricultural and Forest Productivity	$1,000	$5,500	$11,000	
Materials Damage	$58	$93	$110	
Ecological	$6.9	$7.5	$8.2	Reduced lake acidification benefits to recreational fishing.
Total: all categories	$770,000	$1,300,000	$2,000,000	

Note: See Chapters 5 and 6 of this report for detailed results summaries. Values presented are means from results reported as distributions. Estimates presented with two significant figures.

$PM_{2.5}$ exposure estimates also support the conclusion that more of the benefit in 2020 can be attributed to air quality improvements from implementing CAAA programs than to preventing degradation in air quality that might have resulted in the *without-CAAA* case. Although we did not estimate 1990 air quality using the CMAQ/MATS system described in Chapter 4, and the $PM_{2.5}$ monitor network was very sparse in 1990, there was an extensive PM_{10} monitor network at that time. Using PM_{10} monitor data and regional $PM_{2.5}/PM_{10}$ ratio estimates from the 1996 Particulate Matter Criteria Document, we estimated population weighted average exposure to $PM_{2.5}$ in 1990 of 19.0 $\mu g/m^3$. In addition, using the CMAQ/MATS system, we estimate population-weighted average exposure to $PM_{2.5}$ along the *without-CAAA* scenario is about 17 $\mu g/m^3$ in 2000, and increases to 17.7 $\mu g/m^3$ and 19.2 $\mu g/m^3$ in 2010 and 2020. Along the *with-CAAA* scenario, population weighted average exposure to $PM_{2.5}$ is 12.2 $\mu g/m^3$ in 2000, and declines to 10.9 $\mu g/m^3$ in 2010, and 10.5 $\mu g/m^3$ in 2020. In the *without-CAAA* scenario some improvements in air quality occurred from 1990 to 2000 as a result of the

continuing effect of the pre-1990 Clean Air Act requirements already on the books, but after 2000 the *without-CAAA* scenario shows deterioration of air quality through 2020.

As shown in Table 7-2, there is considerable uncertainty in the estimates of health benefits. As described above, the health benefit uncertainty analysis is based on underlying statistical uncertainties in the concentration-response and valuation coefficients. The low estimates are approximately an order of magnitude less than the central estimate; the high estimate is three times the central estimate. Uncertainty analyses for non-health benefits were not developed, but as they constitute only about five percent of the central estimate, their contribution to the overall uncertainty in benefits estimates is likely to be proportionately small.

TABLE 7-2. DISTRIBUTION OF PRIMARY ANNUAL BENEFITS RESULTS FOR 2020

BENEFIT CATEGORY	PRIMARY ANNUAL MONETIZED BENEFITS FOR 2020 (MILLION 2006$)			NOTES
	LOW	CENTRAL	HIGH	
Health Effects				
PM Mortality	$170,000	$1,700,000	$5,300,000	Low and high are 5th and 95th percentile estimates from health benefits uncertainty analysis
PM Morbidity	$17,000	$68,000	$190,000	
Ozone Mortality	$3,200	$55,000	$170,000	
Ozone Morbidity	$780	$2,100	$3,600	
Subtotal Health Effects	$190,000	$1,900,000	$5,700,000	
Visibility				
Recreational	$19,000			Only central estimates were developed
Residential	$48,000			
Subtotal Visibility	$67,000			
Agricultural and Forest Productivity	$11,000			
Materials Damage	$110			Only central estimates were developed
Ecological	$8.2			Reduced lake acidification benefits to recreational fishing
Total: all categories	$2,000,000			

Note: See Chapters 5 and 6 of this report for detailed results summaries. Estimates presented with two significant figures; as a result, columns may not add to totals or subtotals.

AGGREGATE MONETIZED BENEFITS

As discussed earlier in this chapter, we interpolate benefit estimates between target years and then aggregate the resulting annual estimates across the entire 1990 to 2020 period of the study to yield a present discounted value of total aggregate benefits for the period. In this section we present the results of the aggregation.

In Table 7-3 we present the mean estimate from the aggregation procedure, along with the Primary Low (i.e., 5th percentile of the distribution) and Primary High (i.e., 95th percentile of the distribution) estimates, for all provisions we assessed. Aggregating the stream of monetized benefits across years involved discounting the stream of monetized benefits estimated for each year to the 1990 present value using a five percent discount rate.

TABLE 7-3. PRESENT VALUE OF MONETIZED BENEFITS OF THE CAAA

	PRESENT VALUE (MILLIONS 2006$)		
	PRIMARY LOW	PRIMARY CENTRAL	PRIMARY HIGH
All Provisions, 1990 to 2020	$1,400,000	$12,000,000	$35,000,000

Note: Values presented in this table are in millions of 2006$, discounted to 1990 using a 5 percent discount rate.

COMPARISON OF BENEFITS AND COSTS

Table 7-4 presents summary quantitative results for the prospective assessment, with costs disaggregated by emissions source category and benefits disaggregated by type. We present annual, Primary Central estimate results for each of the three target years of the analysis, with all dollar figures expressed as inflation-adjusted 2006 dollars. The final columns provide net present value estimates for costs and benefits from 1990 to 2020, discounted to 1990 at five percent. The results indicate that the Primary Central estimate of benefits clearly exceeds the costs of the CAAA, for each of the target years and for the cumulative estimates of present value over the 1990 to 2020 period.

As Table 7-4 indicates, a very high percentage of the benefits is attributable to reduced premature mortality associated with reductions in ambient particulate matter and ozone. The CAAA achieves ambient PM reductions through a wide range of provisions controlling emissions of both gaseous precursors of PM that form particles in the atmosphere (sulfur dioxide and nitrogen oxides as well as, to a lesser extent, organic constituents) and directly emitted PM (i.e., dust particles). Because the effects of these constituents on ambient PM are nonlinear, and because some precursor pollutants interact with each other in ways which influence the total concentration of particulates in the atmosphere, separating the effects of individual pollutants on the change in ambient PM would require many iterations of our air quality modeling system. Even with such a tool, the interactive effects of pollutants are complex – as a result the marginal impact of any particular pollutant is dependent on the levels of other pollutants as well. These factors make it difficult to reliably link specific costs to specific aggregate benefits for the pollutant source-specific components of the CAAA (e.g., electric utilities or additional local controls).

TABLE 7-4. SUMMARY OF QUANTIFIED PRIMARY CENTRAL ESTIMATE BENEFIT AND COSTS (ESTIMATES IN MILLION 2006$)

COST OR BENEFIT CATEGORY	ANNUAL ESTIMATES			PRESENT VALUE
	2000	2010	2020	
Costs:				
Electric Utilities	$1,400	$6,600	$10,000	$49,000
Industrial Point Sources	$3,100	$5,200	$5,100	$43,000
Onroad Vehicles and Fuels	$14,000	$26,000	$28,000	$220,000
Nonroad Engines and Fuels	$300	$360	$1,200	$4,500
Area Sources	$660	$690	$770	$7,600
Local Controls to Meet NAAQS	$0	$14,000	$20,000	$53,000
Total Costs	$20,000	$53,000	$65,000	$380,000
Monetized Benefits:				
Avoided Mortality	$720,000	$1,200,000	$1,800,000	$11,000,000
Avoided Morbidity	$27,000	$47,000	$70,000	$410,000
Ecological and Welfare Effects	$15,000	$39,000	$78,000	$310,000
Total Benefits	$770,000	$1,300,000	$2,000,000	$12,000,000

Table 7-5 provides the results of our more detailed comparison of primary benefits estimates to primary cost estimates. In the top half of the table we show both annual and present value estimates. The cost estimates presented in the table reflect estimates presented in Chapter 3. The monetized benefits indicate both the Primary Central estimate (the mean) from our statistical aggregation procedure and the Primary Low and Primary High estimates (5th and 95th percentile values, respectively). In the bottom half of the table we present three alternative methods for comparing benefits to costs. "Net benefits" reflect estimates of monetized benefits less costs. The table also notes the benefit/cost ratios implied by the benefit ranges, and our estimates of the costs per premature mortality avoided.

The results in Table 7-5 make it abundantly clear that the benefits of the CAAA exceed its costs by a wide margin, making the CAAA a very good investment. Our estimates rely on a particular set of data, models and assumptions we believe are most appropriate at this time. It is possible that another set of data, models, or assumptions might yield different estimates of benefits, costs, and benefit-cost comparisons. Nonetheless, the very wide margin between estimated benefits and costs, and the results of the uncertainty analysis, suggest that it is extremely unlikely that the monetized benefits of the CAAA over the 1990 to 2020 period reasonably could be less than its costs, under any alternative set of assumptions we can conceive. The central benefits estimate exceeds costs by a factor of more than 30 to one, whether we are looking at annual or present value measures, and the high estimate exceeds costs by roughly 90 to one.

TABLE 7-5. SUMMARY COMPARISON OF BENEFITS AND COSTS

	ANNUAL ESTIMATES			PRESENT VALUE ESTIMATE
	2000	2010	2020	1990-2020
Monetized Direct Costs (millions 2006$):				
Low [a]				
Central	$20,000	$53,000	$65,000	$380,000
High [a]				
Monetized Direct Benefits (millions 2006$):				
Low[b]	$90,000	$160,000	$250,000	$1,400,000
Central	$770,000	$1,300,000	$2,000,000	$12,000,000
High[b]	$2,300,000	$3,800,000	$5,700,000	$35,000,000
Net Benefits (millions 2006$):				
Low	$70,000	$110,000	$190,000	$1,000,000
Central	$750,000	$1,200,000	$1,900,000	$12,000,000
High	$2,300,000	$3,700,000	$5,600,000	$35,000,000
Benefit/Cost Ratio:				
Low[c]	5/1	3/1	4/1	4/1
Central	39/1	25/1	31/1	32/1
High[c]	115/1	72/1	88/1	92/1
Costs per Premature Mortality Avoided (2006$):				
Central	$180,000	$330,000	$280,000	Not estimated

[a] The cost estimates for this analysis are based on assumptions about future changes in factors such as consumption patterns, input costs, and technological innovation. We recognize that these assumptions introduce significant uncertainty into the cost results; however the degree of uncertainty or bias associated with many of the key factors cannot be reliably quantified. Thus, we are unable to present specific low and high cost estimates.

[b] Low and high benefits estimates based on primary results and correspond to 5th and 95th percentile results from statistical uncertainty analysis, incorporating uncertainties in physical effects and valuation steps of benefits analysis. Other significant sources of uncertainty not reflected include the value of unquantified or unmonetized benefits that are not captured in the primary estimates and uncertainties in emissions and air quality modeling.

[c] The low benefit/cost ratio reflects the ratio of the low benefits estimate to the central costs estimate, while the high ratio reflects the ratio of the high benefits estimate to the central costs estimate.

It is also clear from Table 7-5 that costs for criteria pollutant programs grow more quickly than benefits at the beginning of the CAAA compliance period, from 2000 to 2010, and that benefits grow more quickly at the end of the period, from 2010 to 2020. This is consistent with the general statement that investments in clean air tend to involve upfront costs and benefits that accrue over time. The present value estimates in Table 7-5 show, however, that the total aggregated value of benefits far exceeds the costs – by our measures, therefore, the programs associated with the 1990 Clean Air Act Amendments have been, and will likely continue to be, a very good investment.

As indicated in the table, the low estimate of net benefits for the year 2020 is positive (i.e., benefits exceed costs) and of significant magnitude - $190 billion. Our uncertainty modeling therefore indicates that the likelihood that the cost estimates of $65 billion in 2020 could exceed the benefits estimates is much less than five percent.

OVERVIEW OF UNCERTAINTY ANALYSES

Completion of a study of this breadth and complexity has required EPA to directly confront the role of uncertainty in the key analytic outcomes of the study. While the previous section establishes that the primary estimates of benefits of air pollution control greatly exceed the primary estimates of costs of CAAA compliance, it is nonetheless important to evaluate the extent to which alternative models, assumptions about scenarios, and key parameter choices might affect both benefits and costs. Cognizant of advice to the Agency from the National Research Council,[103] the Project Team developed a three step approach to uncertainty analysis:

1. Identify important sources of uncertainty in each analytical element, starting with emissions profile development. At the end of each of the preceding chapters, we provide a table of key uncertainties and our assessment of the direction and potential magnitude of the impact of this uncertainty on the key analytic output of the study, the monetized net benefits of the CAAA.
2. Quantify parameter and model uncertainty quantitatively where possible by using alternative assumptions or models to estimate intermediate and/or overall net benefit results. In addition, explore options for assessing scenario uncertainty that propagate through the complete analytic chain.
3. Compare the results from these quantitative analyses to the primary results, to inform the degree of confidence in the primary analytic results and to help identify new research directions to address or reduce uncertain and influential components of the analysis.

In the remainder of this section we review each of these three components of our uncertainty analysis.[104]

IDENTIFYING IMPORTANT SOURCES OF UNCERTAINTY

Within each of the summary uncertainty tables in the prior chapters the Project Team has distinguished sources of uncertainty that could have a potentially major impact on the overall net benefits estimate presented in this chapter, based either on quantitative analyses or, where quantitative assessments are unavailable or infeasible, the judgment of Project Team analysts. Potentially major factors are those for which a plausible alternative assumption or approach could influence the overall benefit or cost estimate by

[103] See National Research Council (2002), *Estimating the Public Health Benefits of Proposed Air Pollution Regulations*, The National Academies Press, Washington, DC, in particular Chapter 5, titled: "Uncertainty."

[104] For a more thorough description of the methods and results of these uncertainty analyses see the accompanying *report Uncertainty Analyses to Support the Second Section 812 Benefit-Cost Analysis of the Clean Air Act*, March 2009.

five percent or more. We identify a total of 13 potentially major sources of uncertainty in Chapters 2 through 6; these are listed in Table 7-6 below.

TABLE 7-6. POTENTIALLY MAJOR SOURCES OF UNCERTAINTY FOR ESTIMATING THE COSTS AND BENEFITS OF THE CAAA

POTENTIAL SOURCE OF ERROR	ANALYTIC STEP	DIRECTION OF POTENTIAL BIAS FOR NET BENEFITS
Estimated emissions rates under the counterfactual *Without-CAAA* scenario	Emissions	Under-estimate
Estimated economic growth - a key driver of total emissions - under both scenarios	Emissions	Unable to determine
Forecast of the final form and compliance with EPA's revisions of the vacated Clean Air Mercury Rule and the remanded Clean Air Interstate Rule	Emissions	Unable to determine
Secondary organic aerosol (SOA) chemistry	Air Quality Modeling	Under-estimate
Inability to conclusively state that PM mortality outcome is causal based on epidemiology	Health Effects	Over-estimate
Effect of socioeconomic status on mortality from PM exposure	Health Effects	Unable to determine
Attribution of exposure to PM in epidemiology studies based on monitor data	Health Effects	Under-estimate
Omission of short-term effects of PM exposure on mortality	Health Effects	Under-estimate
Timing of reduction in mortality risk after exposure is reduced (cessation lag)	Health Effects	Unable to determine
Source of mortality risk valuation includes many older studies	Valuation	Unable to determine
Scenario of mortal risk in available valuation studies is generally different from that presented by air pollution	Valuation	Unable to determine
Valuation of risk avoidance can change over time and as income increases	Valuation	Unable to determine
Incomplete coverage of ecological effects of air pollutants, including omission of several short-term and virtually all long-term bioaccumulative and persistent effects.	Ecological	Under-estimate

* The classification of each potential source of error reflects the best judgment of the section 812 Project Team. The Project Team assigns a classification of "potentially major" if a plausible alternative assumption or approach could influence the overall monetary benefit estimate by approximately five percent or more. See tables at the end of Chapters 2 through 6 above for more information.

Perhaps not surprisingly, the key emissions estimation uncertainties involve forecasting errors, particularly related to estimating future economic and regulatory activity as well as estimating behavior under the counterfactual *without-CAAA* scenario. A key cost estimation uncertainty involves estimating NAAQS compliance, particularly when currently known emissions reductions measures are not sufficient to achieve full compliance with the standard in the future. However, in order for any uncertainty to be considered "major" the impact would need to be of a magnitude of approximately $100

billion to affect net benefits estimates by as much as five percent. In our judgment, while there are several factors that could affect direct cost estimates by a significant percentage, no cost estimation uncertainty has the potential to either more than double our current total cost estimate of $65 billion, or to reduce the cost estimate to $0 or less, which is the magnitude that would be required to constitute five percent of the net benefit estimate.

Several uncertainties that affect benefits estimates, however, could have an impact of $100 billion or greater on the net benefits estimates. Both health effects and valuation uncertainties center on estimation of the impact of air pollutants on mortal risk and the valuation of that health endpoint. The key ecological uncertainty involves identifying what is missing from our necessarily limited quantified ecological benefits. Only one potentially major factor was identified for the air quality modeling step – this may be the result of our inability to apply alternative quantitative air quality modeling tools in this already resource-intensive step in the analytic chain. It is worth noting, however, that as a whole the air quality modeling process very likely contributes a greater than 5 percent uncertainty, of indeterminate direction, to the overall uncertainty in benefits estimates. In addition, the AQMS highlighted uncertainties introduced by the *ex post* adjustment of some primary PM emissions estimates and the procedure used to re-calibrate the CMAQ air quality to account for this emissions adjustment. Although we argue that the overall effect of this source of uncertainty on the net benefits is probably minor (see Table 4-10 in Chapter 4), in some locations ambient PM from primary PM emissions can be more important than secondarily formed fine particles. Overall, we believe that our application of the MATS monitor calibration procedure, which provides a speciated calibration to ensure better agreement between air quality modeling results and comparable monitor data, provides the best agreement possible between our air quality simulation results and monitored values. In the end, however, there is no way to validate the counterfactual, *without-CAAA* scenario estimates.

Examination of the last column of Table 7-6 suggests a limited ability to estimate the joint effect of these factors on the direction of potential bias for net benefits. Seven of the factors listed have an indeterminate direction of effect; five yield a potential underestimate of net benefits; and one results in a potential overestimate of net benefits. The large number of factors with an indeterminate direction imply that the direction of the net effect of all factors taken together remains unclear, but the relative confidence that the PM exposure-mortality concentration-response function is causal, based on weight-of-evidence, that being the only uncertainty that yields a potential overestimate, suggests that our primary results may be more likely to understate net benefits than overstate them.

A comparison of the qualitative uncertainty tables from the First and Second Prospective studies indicates that significant advancements over the First Prospective include the use of improved monitoring data for $PM_{2.5}$, an improved understanding and treatment of atmospheric chemistry and the composition of $PM_{2.5}$ emissions, and the use of longer-term simulations with integrated modeling of criteria pollutants using CMAQ rather than a collection of separate air quality models.

QUANTIFYING MODEL, PARAMETER, AND SCENARIO UNCERTAINTY

The benefits values presented in this report are subject to a number of uncertainties related to data limitations, analytical choices related to models and input parameters, difficulties predicting future scenarios, and other factors. As noted above, among the most significant model uncertainties is the extensive list of benefits categories, mostly in the ecological area, for which we currently lack the data and/or tools to quantify and monetize benefits. These categories are implicitly treated as having zero value though in reality they may include physical benefits that have a positive economic value. Examples of potentially important, but unquantified ecological effects include nitrogen deposition, non-ozone effects on forest and agriculture vegetation, effects of HAPs on ecological structure and function, and synergistic effects associated with exposures to mixtures of pollutants and interactions of the effects of conventional pollutants such as ozone with climate change. The unquantified and unmonetized benefits thus represent an important underestimation bias in the summary benefit results.

The uncertainties in our quantified and monetized primary benefits estimates that are most likely to significantly influence the primary benefit results are those affecting the largest benefit category: the estimation and valuation of reductions in premature mortality due to decreases in $PM_{2.5}$. Three key uncertainties affecting economic estimates of avoided PM mortality include: (1) the C-R function estimate; (2) the PM/mortality cessation lag structure; and (3) the mortality valuation estimate. These are influential assumptions in our analysis and those for which plausible alternative quantitative estimates are available. The companion Second Prospective Section 812 report, *Uncertainty Analyses to Support the Second Section 812 Benefit-Cost Analysis of the Clean Air Act*, presents detailed quantitative analyses of the sensitivity of benefits results to these and other factors.

Table 7-7 presents a tabular summary of the results of the full range of uncertainty analyses for both costs and benefits, and Figure 7-2 presents a graphical illustration of the impacts of effect of alternative assumptions and models on the central estimate and distribution of monetized avoided mortality benefits, the primary contributor to monetized benefits.

COST UNCERTAINTIES

Table 7-7 shows that the impact of our alternative assumptions about mobile source cost parameters, learning curves, and unidentified local control costs each have relatively modest impacts on total costs, while the I&M failure rate and learning curve assumptions have a slightly larger impact on total costs.[105] In addition, the assumptions underlying our primary cost estimates tend to be conservative; most of the alternatives decrease total compliance costs and none increase costs more than about three percent.

[105] The estimate of the impact on total costs is derived from the relative contribution of the affected cost sector to the overall costs of compliance, assuming all other sectors are unaffected.

TABLE 7-7. QUANTITATIVE ANALYSES OF UNCERTAINTY IN THE 812 SECOND PROSPECTIVE ANALYSIS

FACTOR AND LOCATION OF UNCERTAINTY ANALYSIS DISCUSSION IN THIS REPORT (WHERE APPLICABLE)	TYPE OF UNCERTAINTY EVALUATED	ALTERNATIVE ASSUMPTIONS	IMPACT OF ALTERNATIVE ASSUMPTIONS ON 2020 PRIMARY ESTIMATE
UNCERTAINTIES RELATED TO COST ESTIMATES			
Unidentified controls (Chapter 3)	Parameter	Alternate assumption about the threshold for, and cost of, applying unidentified local controls to achieve NAAQS compliance ($10,000/ton).	-18% of local control costs; **-2.1% of total costs**
I&M program vehicle failure rates(Chapter 3)	Parameter	Alternative assumption about failure rates for I&M program testing based on NRC (2001).	-11% to -14% for mobile source costs; **-6% to -7.6% of total costs**
Learning curve assumptions (Chapter 3)	Parameter	Alternate assumptions about the learning rate (5 and 20%)	**-6.0% to 3.2% of total costs**
Fleet composition and fuel efficiency (Chapter 3)	Scenario	Alternate assumption about future fleet composition and fuel efficiency using AEO 2008.	-0.2% to -3.6% for mobile source costs; **-0.1% to -2.0% of total costs**
UNCERTAINTIES RELATED TO BENEFITS ESTIMATES			
Alternate C-R function for PM (Chapter 5)	Parameter	Alternative C-R functions - two from empirical literature (Pope et al., 2002 and Laden et al., 2006) and 12 subjective estimates from the expert elicitation study	-84% to 79%, Based on most extreme estimates from PM EE study. Rest of alternatives range from -43% to 41%
Emissions from EGU sources (Chapter 2)	Scenario	Use continuous emissions monitoring (CEM) data in place of Integrated Planning Model (IPM) results, coupled with alternative counterfactual consistent with CEM approach.	+50% in 2000 Due almost entirely to the impact of the alternative *without-CAAA* scenario.
PM/Mortality Cessation lag (Chapter 5)	Model and parameter	Alternative lag structures - one step function and a series of smooth functions (based on an exponential decay). Smooth functions in some cases also require change in C-R coefficient.	-25% to 13% when using primary C-R function. -48 to 47% when also changing C-R function.
Value of Statistical Life (Chapter 5)	Parameter	Alternative VSL estimates	-22% to 0%
Discount rates	Parameter	Alternate discount rates (5% and 7%)	-6% to 6%
Alternate C-R function for ozone (Chapter 5)	Parameter	Alternative C-R functions - three from NMMAPS-based studies, three from meta-analyses, and one from Jerrett et al. cohort study.	0% for total mortality benefits. -63% to 66% For ozone-related mortality.

FACTOR AND LOCATION OF UNCERTAINTY ANALYSIS DISCUSSION IN THIS REPORT (WHERE APPLICABLE)	TYPE OF UNCERTAINTY EVALUATED	ALTERNATIVE ASSUMPTIONS	IMPACT OF ALTERNATIVE ASSUMPTIONS ON 2020 PRIMARY ESTIMATE
Emissions changes by emitting sector	Scenario	Altering each sector-specific emissions by 10 percent	$/ton marginal benefit for proportional EGU sector reductions is about 3 times that for nonroad and on-road sectors, and 50% higher than that for area and non-EGU point source sectors.
Differential toxicity of PM components	Parameter	Potential alternative estimates of toxicity for specific PM components	N/A. No quantitative sensitivity analysis performed due to significant data gaps.
Dynamic population modeling (Chapter 5)	Model	Incorporation of dynamic population estimates to calculate life years gained and changes in life expectancy	N/A. Life years gained and changes in life expectancy are supplemental estimates of PM/mortality effects and cannot be directly compared to the primary estimate.

A further overarching issue with our direct cost methodology is that, for EGU modeling and for some components of the ozone NAAQS compliance cost assessment, the method employed assumes specific optimizing behavior by polluters. In particular, the IPM model used for EGU compliance cost assessment assumes a forward looking approach and may incorporate only limited available information on real-world constraints on optimizing behavior such as long-term fuel supply contracts. If polluters do not optimize in the manner assumed in these models, the direct costs may under-estimate the true costs of compliance. For other emitting sectors, where optimization approaches were not feasible, the potential for under-estimation from this factor does not apply.

A potential issue in considering the uncertainty in cost estimates is our inability to adequately consider the effects of the CAAA on the quality of goods overall. Our method emphasizes that the CAAA does increase the cost of products, and we attempt to hold the quality of products constant in the process. In reality it is likely that the CAAA affects both price and quality of products. One of the more straightforward examples is that motor-vehicle emission controls may reduce performance, though at the same time those controls can increase fuel economy. Other examples include substitution of other devices for charcoal lighting fluid, reformulation of VOC emitting paints, and other product changes that may have altered the quality of those products to consumers. As discussed briefly in Chapter 3, however, the CAAA could also change quality in ways that benefit consumers, but which we do not capture in our estimates – for example, low VOC paint

contributes not only to lower ambient ozone levels, but also reduces consumer exposure to VOCs in enclosed indoor environments. Unfortunately, it is very difficult to quantify the effect of this factor on our overall cost and net benefit estimates.

BENEFIT UNCERTAINTIES

On the benefits side, Table 7-7 and Figure 7-2 show that the most influential assumptions affecting benefits are the choice of the C-R function, the cessation lag model for the accrual of benefits, and the VSL distribution. While the two most extreme results from EPA's Expert Elicitation (EE) study imply substantial effects of C-R choice (about 80 percent in either direction) most of the alternatives from the EE study and the published epidemiological studies suggest effects on benefits of about 40 percent or less in either direction. By themselves, longer cessation lag alternatives can reduce monetized benefits by as much as a 25 percent and if coupled with a change in the C-R function, by close to half; however, the Council Health Effects Subcommittee advised that much of the risk reduction benefits from $PM_{2.5}$ controls are more likely to accrue sooner rather than later. Accelerating benefits increases benefits by about 13 percent when maintaining the same C-R function, but could increase them by as much as half when using a smooth function based on the Laden Six Cities follow-up effect estimate. VSL distribution choices in one case produce the same central estimate; in others they reduce VSL between 7 and 22 percent.

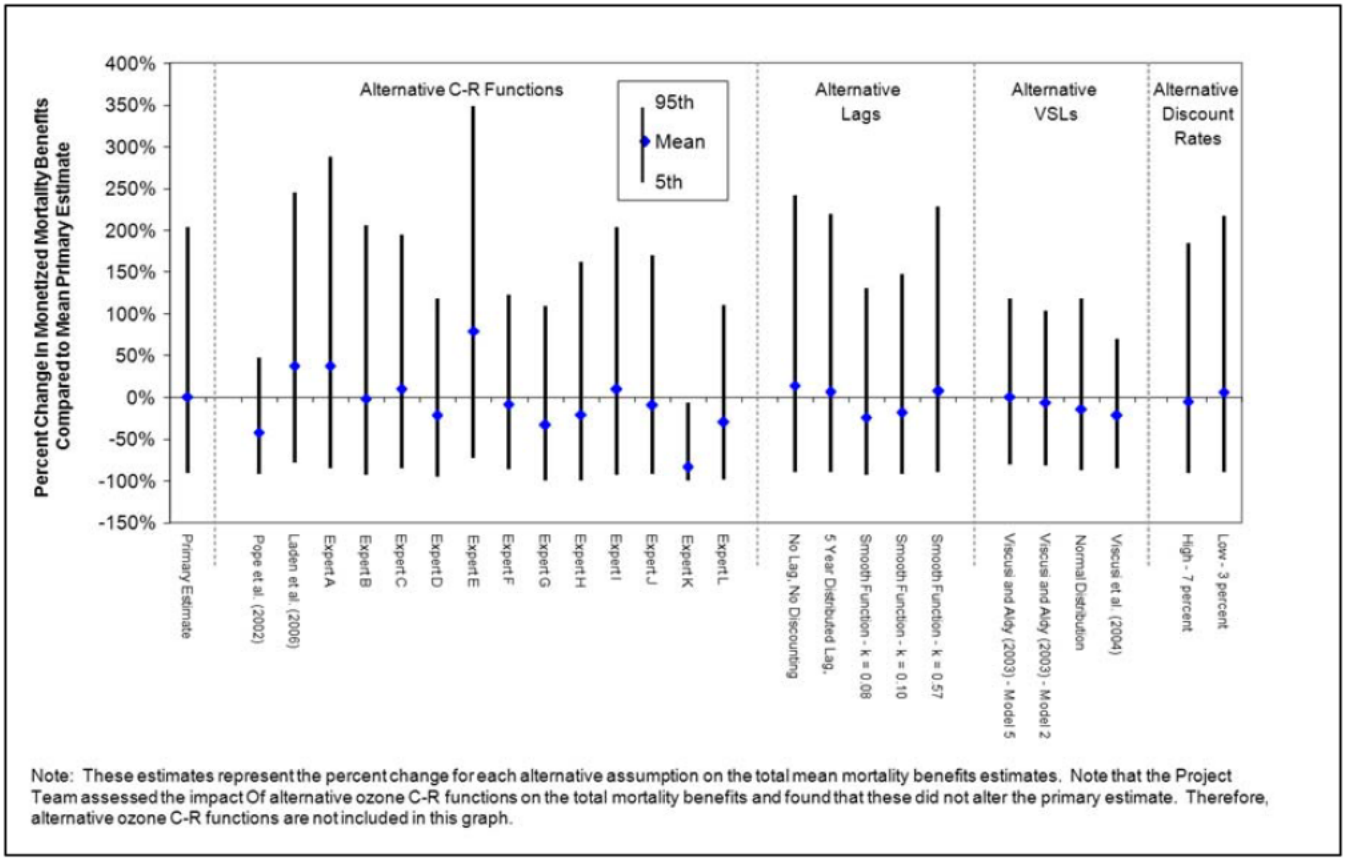
A review of the box plots in Figure 7-2 for the factors that have the greatest potential to change the central estimate shows that most of the alternatives do not have a dramatic effect on the spread of uncertainty. Some alternatives suggest the high end of the distribution could be lower, including all of the alternative VSL distributions, which give less weight to higher VSL values than the 26-study Weibull. On the other hand, only a few alternatives (from EPA's particulate matter expert elicitation study) significantly extend the upper end and hardly any extend the lower end, suggesting our primary estimate is unlikely to understate greatly the uncertainty in avoided mortality benefits. In all these cases, however, we are unable to develop a probabilistic representation of uncertainty in the emissions and air quality modeling steps; incorporating uncertainty in these factors would certainly increase the spread between the Primary Low and Primary High estimates.

LESSONS LEARNED AND NEW RESEARCH DIRECTIONS

Many of the factors contributing to uncertainty in these estimates are the result of scientific unknowns that might be addressed through additional research. Identification of research directions to address current unknowns can serve an important function - in the First Prospective, for example, we identified eight high priority research directions, six of which were addressed in the Second Prospective.[106]

[106] The six were: improved emissions inventories and inventory management tools (see Chapter 2 for a description of the improvements in the 2002 NEI, and the AirControlNET tool used to estimate emissions reductions necessary for NAAQS compliance); improved tools for assessing the full range of social costs associated with regulation, including the tax-interaction effect (see Chapter 8 of this document for a description of the economic modeling tool EMPAX-CGE); a more

FIGURE 7-2. SUMMARY OF QUANTITATIVE ANALYSIS OF UNCERTAINTY IN MONETIZED MORTALITY BENEFITS ESTIMATES



Note: These estimates represent the percent change for each alternative assumption on the total mean mortality benefits estimates. Note that the Project Team assessed the impact Of alternative ozone C-R functions on the total mortality benefits and found that these did not alter the primary estimate. Therefore, alternative ozone C-R functions are not included in this graph.

The key lessons learned in this analysis lead directly to new research directions to inform future assessments, assessments which include both Regulatory Impact Analyses of specific rules and broader, policy-oriented documents such as this Second Prospective. The key insight from this analysis is that rules that target precursors of fine particulate matter are likely to be very cost-effective. Costs per ton of PM control are similar or less than previously estimated, and benefits per ton emitted of these precursors are much larger than previously thought or estimated in the First Prospective. There are three key reasons for the large increase in benefits per ton of PM precursor emitted, involving advances in our understanding of: 1. PM species emissions, 2. the fate of these emissions as estimated by integrated national-scale air quality modeling systems, and 3. the implications of fine particulate air quality for premature mortality.

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geographically comprehensive air quality monitoring network, particularly for fine particulate matter (see discussion of the MATS procedure in Chapter 4 of this document); development of integrated air quality modeling tools based on an open, consistent model architecture (see Chapter 4 for a description of the CMAQ system); increased basic and targeted research on the health effects of air pollution, especially particulate matter (see Chapter 5 for multiple examples of recent work that was applied in this analysis); continued efforts to assess the cancer and noncancer effects of air toxics exposure (see discussion of the air toxics case study in Chapter 5).

In addition, the results of the study also provide evidence of the significant benefits of avoiding mortality associated with ozone exposure, avoiding degradation of visibility in residential and recreational settings, and avoiding significant chronic and acute morbidity, including chronic bronchitis and acute myocardial infarction. The last two of these monetized benefits categories were shown, by themselves, nearly to equal the full costs of all provisions of the CAAA. There also remain large categories of health and ecological benefits for which we have no quantified or monetized benefit estimates. For example, although there is an established literature linking air pollutant exposure with increased risk of cerebrovascular accidents (stroke), as well as a literature on the medical costs of this condition, that category of effect is not yet included in our estimates of the health benefits of reducing air pollutant exposure.

Insights gleaned from completing this study suggest the following eight areas to be the highest priority research needs:

- ***Improving cost analyses for rules that are technology-forcing***. The overall cost analysis in Chapter 3 is characterized by complete coverage of the costs of many rules, but the Project Team acknowledges that in some cases, particularly involving compliance with tighter future NAAQS standards, application of the suite of known, cost-effective current pollutant control measures are not sufficient to achieve compliance in all locations. This shortcoming remains one of the important focal points for compliance cost research within the Agency. One possible direction that the Agency is considering is analysis of historical data on the cost and penetration rates of new emissions control technologies, particularly those for NAAQS compliance, which could provide insights on the process, cost, timing, and potential limits of induced innovation.
- ***Continuing efforts to incorporate a broader range of market benefits in economy-wide modeling of the impacts of regulation***. The results of Chapter 8 indicate that there are significant benefits to economic growth when we consider the labor force and health expenditure implications of cleaner air. Our demonstration of the importance of incorporating benefits-side effects in macro-economic modeling efforts, however, does not incorporate all possible market effects of cleaner air. For example, increased agricultural and forest productivity might feasibly be incorporated in the model we employed. Ultimately, it will also be important to develop new methods to characterize the large nonmarket benefits of cleaner air in these models, including most importantly the welfare enhancements (as opposed to simply the market implications) associated with reductions in premature mortality.
- ***Understanding synergies and antagonistic effects of climate change in realizing benefits, as well as for understanding co-benefits of greenhouse gas (GHG) control policies***. Consideration of climate change was outside the scope of this Second Prospective effort, but designing effective and efficient regulatory mechanisms for GHG emissions control has rapidly become an important priority for the Agency. The methods, data, and results of this study are important for

modeling co-benefits of GHG control policies, as many policies targeted at GHG reductions also reduce other, conventional pollutants, and those benefits are realized sooner than the generally long-term benefits of GHG policies. In addition, climate change likely alters the benefits achieved by conventional pollutant policies, as for example increases in mean temperature as well as increases the frequency of extreme temperature events creates conditions conducive to ozone formation. Both areas are important for further research.

- ***Developing probabilistic representation of emissions and air quality to support uncertainty analysis***. As noted earlier in this chapter, a major shortcoming of existing quantitative characterizations of uncertainty in benefits and costs of the CAAA is the inability to integrate uncertainties in emissions and air quality modeling steps. Two areas of research deserve further attention: 1. Developing more nimble tools for assessing the air quality implications of emissions control policies, or updating those that exist; 2. Developing probabilistic characterizations of key parameters that contribute to overall uncertainty in emissions and air quality analyses. Pursuit of the latter initiative will likely require application of expert elicitation, either formal or informal, to make progress.
- ***Understanding the potential for differential toxicity to play a role in benefits of control programs and, by extension, policy priorities.*** The issue of species-specific particulate matter toxicity remains very complex, involving the effects of mixtures and synergies of species that are not currently well understood. It is nonetheless important to understand the extent to which rules targeted at specific PM species might yield similar benefits as rules targeting total PM mass.
- ***Continuing to pursue evidence of the real-world public health impact of specific air quality actions.*** Sometimes referred to as *accountability analyses*, tracking the real-world instances of rapid air quality changes, either improvements or reductions in air quality, can yield important corroborating evidence of the effects found in epidemiology studies. As we found in our uncertainty analyses supporting the Second Prospective, these natural experiments also provide insights for the nature of cessation lags, and might be useful in better understanding species-specific toxicity.
- ***Expanding coverage of ecological benefits.*** There are potentially large ecological benefits of air pollution control that are not currently quantified. Some of the most important categories of unquantified effects include nitrogen deposition effects on estuarine areas, sulfur deposition effects on vegetation and other aspects of terrestrial systems, and long-term effects of air toxics. Perhaps equally important, but much more subtle, are the long-term effects of a wide range of air pollutants on ecosystem structure and function. Even potentially beneficial effects of pollutants, such as deposition of the nutrient nitrogen in terrestrial and even actively managed farms and forests, might have longer-term

detrimental effects on nutrient cycling and species selection that are currently poorly understood.

- ***Expanding coverage of health benefits.*** Great effort has been expended to better characterize the full range of health implications of air pollution. Despite this effort, it is still difficult to quantify the link between air pollution and stroke, and it is also difficult to assess the incremental effects of gaseous pollutant exposures, in part because there are only a limited set of studies that characterize the individual contributions of multiple pollutant exposures on health outcomes. While the Agency has developed robust benefits analyses for programs that control individual gaseous pollutants, such as carbon monoxide, it remains difficult to incorporate these effects in multi-pollutant models that include PM, ozone, and other gaseous pollutants typically present in many settings in the U.S.

The results of this Second Prospective study clearly provide strong evidence that the nation's investment in clean air has been a wise and cost-effective policy. Continued effort is needed to ensure that air pollution policies are pursued in the most cost-effective manner possible. Pursuit of these research goals should continue to enhance our ability to provide accurate and timely assessments of the costs and benefits of all provision authorized under the Clean Air Act and its Amendments.

CHAPTER 8 - COMPUTABLE GENERAL EQUILIBRIUM ANALYSIS

The 1990 Clean Air Act Amendments (CAAA) represent a significant change in Federal air pollution policy affecting virtually every sector of the U.S. economy, including industry as well as individual households. The cost and benefit estimates presented in the previous chapters reflect the direct impacts of the CAAA in terms of industry's and households' direct compliance expenditures and the value of the direct human health, visibility, ecological, and other benefits associated with CAAA-related improvements in air quality. The cost-benefit information is central to EPA's analysis of the Amendments, but policymakers and the public are also interested in the impact of CAAA programs on overall economic performance. Therefore, to supplement the direct cost and benefit estimates presented in the previous chapter, the Project Team applied an economy-wide computable general equilibrium (CGE) analysis of the Amendments and estimated the effect of the CAAA on U.S. gross domestic product and other macroeconomic measures. The Project Team performed this analysis with the Economic Model for Policy Analysis (EMPAX-CGE), a CGE model employed by EPA for several previous analyses of CAAA regulations, including the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$, the 8-hour Ozone NAAQS, and the Clean Air Interstate Rule.

The Project Team's CGE analysis for the Second Prospective represents a major step forward in EPA's application of CGE models in the context of air pollution policy. Unlike previous CGE analyses that focused exclusively on the macroeconomic impacts of compliance expenditures, the Second Prospective incorporates impacts related to both CAAA costs and some categories of benefits into EMPAX-CGE, to the extent feasible. Because both the costs and benefits of CAAA regulations may affect the size and composition of the U.S. economy, the Project Team's approach provides a more comprehensive and balanced view of the macroeconomic impacts of air pollution policy than previous assessments. To illustrate the extent to which including labor force and medical expenditure impacts in EMPAX-CGE affects model results, we applied the model in two ways: one model run that reflects only the costs of the CAAA (the cost-only case) and a second model run that reflects both the costs and a subset of the total benefits of the Amendments (the labor force-adjusted case).

This chapter presents the CGE analysis in four sections. In the first section, we provide an overview of EMPAX-CGE, describing the model's overall structure and highlighting the sectoral and geographic resolution of the model. The second section describes the development of the cost- and labor force and health expenditure benefit-side inputs for the analysis and documents how these inputs were incorporated into EMPAX-CGE. The third section presents the results of our analysis, both in aggregate and by industry. To

conclude the chapter, we discuss the major uncertainties of the analysis and their implications for results.

EMPAX-CGE[107]

EMPAX-CGE is a multi-industry, multi-region computable general equilibrium model of the U.S. economy. Below we describe the main features of the typical CGE model, followed by a more detailed overview of the structure and functionality of EMPAX-CGE.

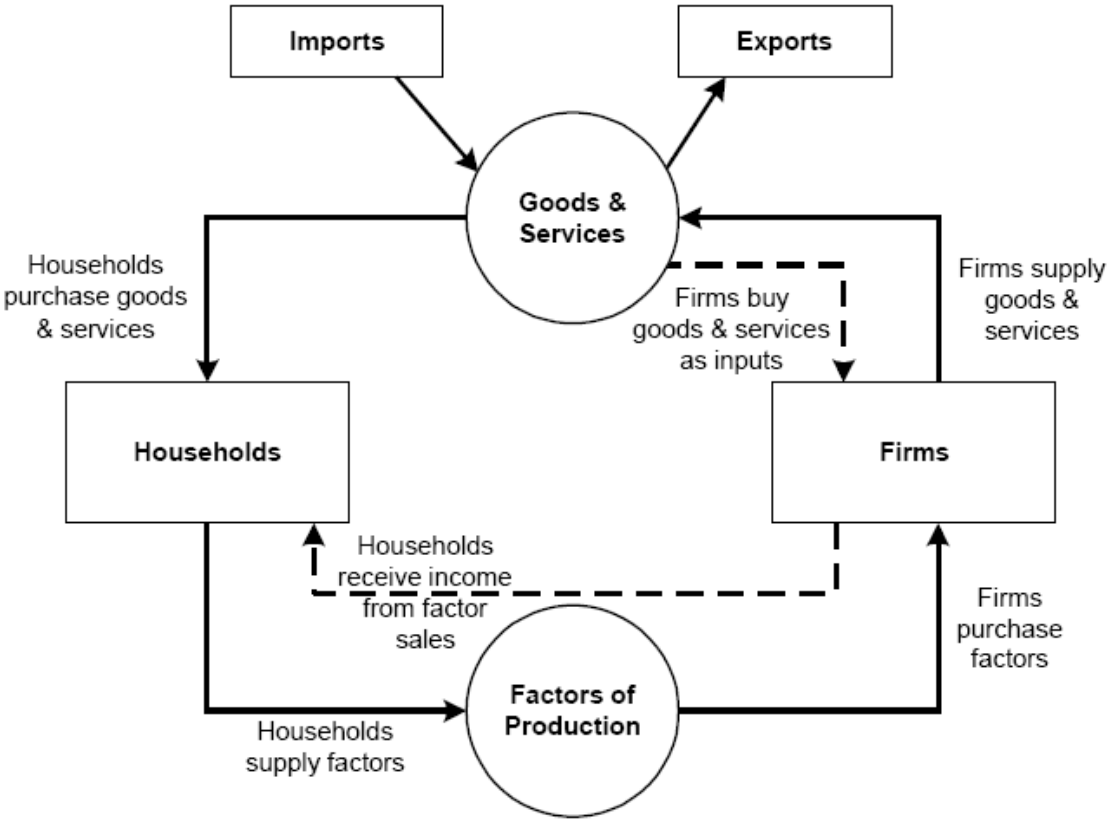
OVERVIEW OF CGE MODELING

CGE models simulate the flow of commodities and factors of production (i.e., labor, capital, and natural resources) among producers and households to assess how a change in policy or an economic shock affects the size and composition of the economy. As shown in Figure 8-1, households in CGE models own factors of production (capital, labor, and natural resources) that they supply to firms in exchange for wages and other forms of income. Firms use these factors in conjunction with intermediate inputs purchased from other industries to produce goods and services, which are sold to other industries as well as consumers. Goods and services can also be exported, and imported goods can be purchased from other countries.

In modeling the circular flow of the economy depicted in Figure 8-1, CGE models capture behavioral changes among households and firms in response to changes in prices. At the producer level, CGE models simulate the substitution of inputs as the price of one input, such as steel or labor, rises relative to the price of other inputs. This allows the simulation of producer behavior in CGE models using minimization of the cost of production as an objective, consistent with the behavior of firms in the real economy. Similarly, as the price of one good rises relative to the prices of other products and services, CGEs model the process whereby households consume less of the more expensive good and more of other goods. Related to households' substitution between different goods, CGE models also simulate household substitution between labor and leisure as real wages change. Because the productive capacity of the economy is dependent, in part, on labor supply, the labor-leisure tradeoff is critical in determining the size of the economy.

[107] The description of CGE models, in general, and EMPAX-CGE included in this section is based on RTI (2008).

FIGURE 8-1. CGE MODEL SCHEMATIC



Source: RTI International, EMPAX-CGE Model Documentation, prepared for U.S. EPA Office of Air Quality Planning and Standards, March 2008.

The general equilibrium component of CGE modeling requires a comprehensive market coverage in which all sectors in the economy are in balance and all economic flows are accounted for. Establishing equilibrium conditions requires that every commodity that is produced must be purchased by firms or consumers within the United States or exported to foreign consumers. The requirement for all markets to be in equilibrium during the time period of the model simulation is a simplifying assumption of the model, but is nonetheless a condition which, over time, is consistent with production in the actual economy. Prices of these goods reflect all costs of production. Households receive payments for their productive factors and transfers from the government (not shown in Figure 8-1), and this income must equal consumer expenditures and savings. In aggregate, all markets must clear, meaning that supplies of commodities and factors must equal demand, and the income of each household must equal its factor endowments plus any net transfers received. An important implication of this market clearing assumption is that CGE models assume that the economy is at full employment (i.e., there is no involuntary unemployment). Therefore, CGE models do not typically provide insights into the unemployment impacts of policy changes.

OVERVIEW OF EMPAX-CGE

Similar to other CGE models, EMPAX-CGE is structured to represent the complex interactions between consumers and producers in the real economy. To model these interactions, EMPAX-CGE performs thousands of calculations with the objective of maximizing household utility (well-being) while simultaneously maximizing firm profits. While complex, these calculations are a simplified representation of the real economy. The behavior of households and firms is inherently multi-faceted and dependent on a range of factors, many of which are not well understood. To model this behavior, EMPAX-CGE uses a simplified, hierarchical representation of household and firm decision-making that reduces the behavior of households and firms to a limited number of structured decisions. For example, as shown in Figure 8-2, the first decision for the household sector in EMPAX-CGE is the optimization of consumption and leisure. To model this decision, EMPAX-CGE assumes that households are free to allocate their time between labor and leisure to maximize their welfare. Time that households do not devote to leisure represents household labor supplied to producers. Therefore, in effect, the leisure-consumption decision also represents a tradeoff between leisure and labor force participation. After the consumption-leisure decision, EMPAX-CGE simulates household consumption as a series of hierarchical decisions involving consumption goods and transportation.

EMPAX-CGE also models *firm* behavior as a series of hierarchical decisions. Similar to EMPAX-CGE's treatment of households, this hierarchical structure represents a simplification of how firms decide which inputs to use in the production of goods and services. As illustrated in Figure 8-3, the first tier of this decision hierarchy is a choice between: (1) an indeterminate mix of capital, labor, and energy and (2) goods and services produced by other industries, such as steel or computer equipment. Producers then optimize among capital, labor, and energy.

Consistent with simplifying household and firm decision-making into the structured frameworks depicted in Figures 8-2 and 8-3, EMPAX also uses a simplified representation of the overall structure of the economy. Firms in the U.S. are scattered across thousands of industries and produce countless goods and services. Modeling each of these sectors individually within an economy-wide model, however, is not feasible due to data and computational processing constraints. To address this issue, EMPAX-CGE aggregates the economy into 35 distinct industries, as listed in Table 8-1. The industry classifications included in EMPAX-CGE were defined so as to maximize the level of sectoral detail among energy-intensive and manufacturing industries. EMPAX-CGE also separates the electricity industry into fossil fuel generation and non-fossil generation, which is important for assessing the impacts of policies that affect only fossil fuel-fired electricity, such as air pollutant regulations.

FIGURE 8-2. EMPAX-CGE DECISION HIERARCHY FOR HOUSEHOLDS

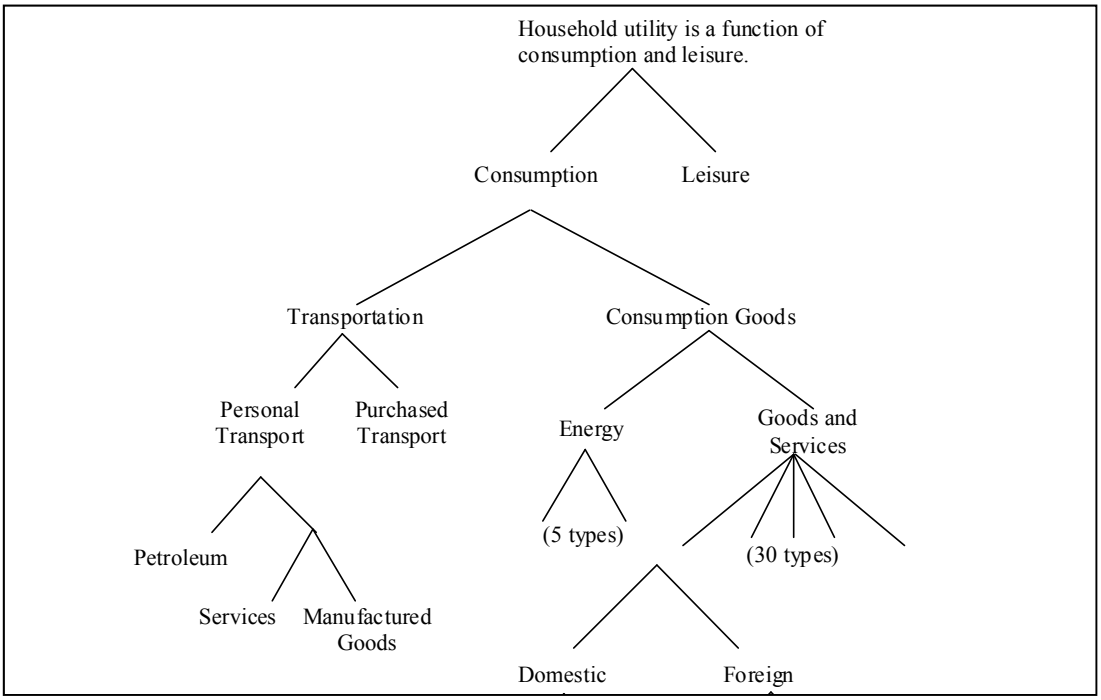
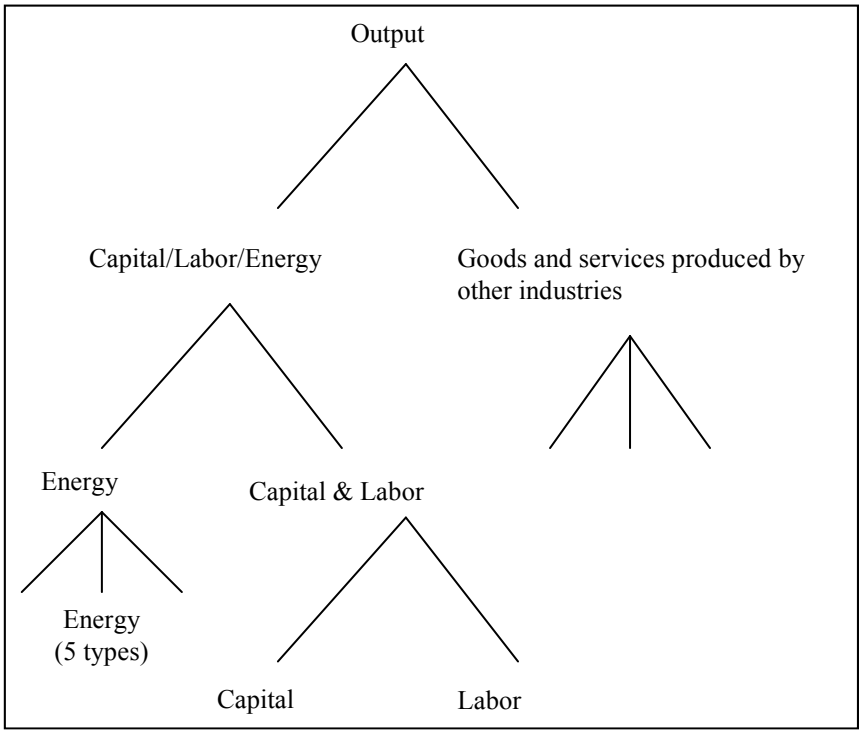


FIGURE 8-3. EMPAX-CGE NESTED STRUCTURE FOR PRODUCERS



EMPAX-CGE is also designed to reflect regional differences in the overall structure of the economy. Because the availability and cost of different production inputs, such as labor and energy, vary across different regions of the U.S., the response of a given industry to changes in policy may vary by region. To account for this effect, EMPAX-CGE models each industry separately in five different regions, as shown in Figure 8-4. The specification of the five economic regions included in the model is based, as closely as possible, on the structure of the electricity market regions defined by the North American Electric Reliability Council (NERC). [108]

TABLE 8-1. INDUSTRIES IN EMPAX-CGE

EMPAX Industry	North American Industry Classification System (NAICS)
Energy	
Coal	2121
Crude oil[a]	211111, 4861
Electricity (*fossil and nonfossil*)	2211
Natural gas	211112, 2212, 4862
Petroleum refining [b]	324, 48691
General	
Agriculture	11
Mining (w/o coal, crude, gas)	21
Construction	23
Manufacturing	
Food products	311
Textiles and apparel	313, 314, 315, 316
Lumber	321
Paper and allied	322
Printing	323
Chemicals	325
Plastic and rubber	326
Glass	3272
Cement	3273
Other minerals	3271, 3274, 3279
Iron and steel	3311, 3312
Aluminum	3313
Other primary metals	3314, 3316
Fabricated metal products	332

[108] Economic data and information on non-electricity energy markets are generally available only at the state level, which necessitates an approximation of the NERC regions that follows state boundaries.

Manufacturing equipment	333
Computers & communication equipment	334
Electronic equipment	335
Transportation equipment	336
Miscellaneous remaining	312, 337, 339
Services	
Wholesale & retail trade	42, 44, 45
Transportation [c]	481-488
Information	51
Finance and real estate	52, 54
Business/professional	53, 55, 56
Education (w/public)	61
Health care (w/public)	62
Other services	71, 72, 81, 92

[a] Although NAICS 211111 covers both crude oil and gas extraction, the gas component of this sector is addressed in the natural gas energy sector.

[b] EMPAX-CGE reports output for the petroleum refining industry based on the delivered price of petroleum products. This reflects the value of pipeline transport.

[c] Transportation does not include NAICS 4862 (natural gas distribution), which is part of the natural gas industry.

FIGURE 8-4. EMPAX-CGE REGIONS

EMPAX-CGE assumes that households have perfect foresight of future changes in policy and maximize utility over the full time horizon of the model. To adjust to future policy changes, households may alter their decisions about labor force participation and modify their consumption patterns in terms of their overall level of consumption and the mix of goods and services they choose to consume. This is in contrast to static CGEs, which model the economy without regard for time (i.e., they effectively model the economy for a single time period).

EMPAX-CGE contains four representative households in each model region, classified by income. These household income groups are:

- $0 to $14,999,
- $15,000 to $29,999,
- $30,000 to $49,999, and
- $50,000 and above.

These representative households are assumed to possess certain factors of production including labor, capital, natural resources, and land inputs to agricultural production. Factor prices are equal to the marginal revenue received by firms from employing an additional unit of labor or capital, and households allocate income from sales of these productive factors to purchases of consumption goods to maximize welfare.

The outputs generated by EMPAX-CGE include GDP, consumption, and an economic welfare measure known as Hicksian equivalent variation (EV). EV is based on the concept of willingness-to-pay, which is the maximum amount a household would pay for a particular good or service (including leisure), given its budget constraint. Willingness to pay reflects the value or welfare that a household derives from the consumption of a good or service. For a given policy scenario, the change in EV represents the additional money that a household would require (at original prices and income) to make it as well off with the new policy as it was under baseline conditions; this amount is "equivalent" to the change in utility the household derives from consumption and leisure time. It is important to note, however, that EMPAX-CGE's estimation of EV captures welfare associated with market goods and services but does not capture non-market effects. As a result, the measure would not reflect some categories of household welfare that are important to our cost-benefit analysis, such as avoided pain and suffering associated with health effects incidence, improvements in visibility, and changes in service flows that derive from well functioning ecological resources.

The baseline values for the outputs generated by EMPAX-CGE are adapted from the economic forecast in the Department of Energy's *Annual Energy Outlook 2007*. These baseline values represent the U.S. economy under the *with-CAAA* scenario for the Second Prospective.[109]

[109] As noted in Chapter 2, the emissions projections for the Second Prospective are based on the economic forecast from *Annual Energy Outlook (AEO) 2005*, not *AEO 2007*. The *AEO 2007* forecast, however, is similar to that in *AEO 2005*. For the year 2020, the *AEO 2007* GDP forecast is approximately 3 percent lower than the projection from *AEO 2005*.

DEVELOPMENT OF MODEL INPUTS

The Project Team estimated the macroeconomic impacts of the CAAA as the difference between (1) the EMPAX-CGE reference case projections, which represent the *with-CAAA* scenario, and (2) EMPAX-CGE projections for the *without-CAAA* scenario. To conduct the model runs for the *without-CAAA* scenario, the Project Team developed model inputs related to both the costs and benefits of the Amendments. To assess the difference in costs associated with CAAA compliance, we estimated CAAA-related compliance expenditures by industry and EMPAX region. Based on these estimates, the Project Team reduced the cost of production for affected industries from the baseline costs of production to develop industry-wide cost structures for the *without-CAAA* scenario. The "cost-only" runs therefore estimate the loss in economic productivity associated with CAAA compliance costs.

As noted above, however, the CAAA also yields benefits that result in potentially substantial changes in economic production as well. The benefit-side inputs developed by the Project Team include (1) medical expenditures associated with pollution-related illness, (2) the change in workers' time endowment due to pollution-related mortality, and (3) the change in workers' time endowment due to pollution-related morbidity. The Project Team incorporated changes in medical expenditures into EMPAX-CGE as changes in household expenditure patterns. To incorporate changes in the amount of time workers can devote to labor or to leisure in the model, we first estimated how health effects and mortality estimated in Chapter 5 would affect the exposed population's ability to supply labor to firms. Estimates of lost work time associated with morbidity have been estimated in prior work or are available from BenMAP.[110] Next, we assumed that pollution-related illness and mortality among the labor force reduce workers' overall time endowment (labor and leisure) in proportion to the effect on labor supply. That is, if air pollution would reduce labor supply by *x* percent in 2020, the Project Team assumed that the overall time endowment of workers would also decline by *x* percent in 2020.

We did not attempt to incorporate time endowment effects for people outside the formal economy (e.g., retirees, students, homemakers) into EMPAX-CGE. While the "non-working" population is clearly affected by air pollution, and those effects are likely to influence the level and composition of economic activity, the structure of EMPAX-CGE is not conducive to assessing how these populations affect the economy. The results presented in this chapter therefore likely underestimate the macroeconomic impacts resulting from CAAA-related improvements in public health.

Below we describe the Project Team's approach for generating the EMPAX-CGE inputs related to the costs and benefits of the CAAA. As noted above, the Project Team used these inputs to conduct two analyses of CAAA-related macroeconomic impacts; the first reflects only the costs of the CAAA (the cost-only case), while the second reflects both the costs and selected human health benefits of the Amendments (the labor force-adjusted case).

[110] For example, Cropper and Krupnick (1999) estimate income losses resulting from chronic bronchitis and acute myocardial infarction. Based on these estimates, we calculated the lost work time per case associated with each of these endpoints.

COST INPUTS

To assess the macroeconomic impacts of CAAA-related costs, the Project Team incorporated CAAA compliance expenditures by industry and region into EMPAX-CGE. Similar to other CGE models, EMPAX-CGE is an expenditure-based model and therefore requires expenditure-based inputs to represent the costs of the Amendments. CAAA compliance expenditures, however, are not always the equivalent of the direct costs of the Amendments presented in Chapter 3. While the direct costs of the CAAA reflect the value of the capital, labor, and other resources necessary for CAAA compliance, compliance expenditures simply represent the financial resources exchanged for CAAA compliance. For example, the direct costs of the Amendments do not include taxes, because such payments represent transfers rather than resources expended to control air pollutant emissions. In contrast, CAAA compliance expenditures *include* transfers because they represent an exchange of financial resources from one party (e.g., a firm) to another (e.g., the government) that can affect the choices made by firms.

To estimate the compliance expenditures associated with the Amendments, the Project Team made three adjustments to the direct cost estimates presented in Chapter 3:

1. ***Inclusion of fuel excise taxes:*** The Project Team included fuel excise taxes in the compliance expenditure estimates developed for the EMPAX-CGE analysis. Excise taxes were excluded from the direct cost estimates presented in Chapter 3 because such taxes are transfers.

2. ***Industry-specific discount rates:*** Unlike the direct cost estimates presented in Chapter 3, which reflect a 5 percent social discount rate, the compliance expenditures presented in this chapter reflect the private discount rates of affected industries. For each industry, we estimated the private discount rate based on the industry-specific weighted average cost of capital as reported in Ibbotson Associates' *Cost of Capital Yearbook.*[111]

3. ***Exclusion of motorist waiting time from cost estimates for inspection and maintenance programs:*** The direct cost estimates for motor vehicle inspection and maintenance (I&M) programs in Chapter 3 reflect the value of motorist waiting time. Although waiting time represents a welfare loss to society, this cost is not incurred as an expenditure. Because CGEs are expenditure-based models, we exclude motorist waiting time from the cost-side inputs incorporated into EMPAX-CGE. The exclusion of motorist waiting time is unlikely to significantly affect the results of the CGE analysis, as these costs represent only 18 percent of direct CAAA costs associated with I&M programs and less than 5 percent of direct costs for the entire on-road sector.

Based on these adjustments, we developed the compliance expenditure estimates presented in Table 8-2. For comparison, the exhibit also includes the direct cost estimates summarized in Chapter 3. As indicated in the exhibit, the estimated CAAA compliance

[111] Ibbotson Associates, *Cost of Capital Yearbook*, 1997 through 2006 editions.

expenditures in 2010 are approximately $2.0 billion greater than the Project Team's direct cost estimates for 2010. In 2020, the difference between the two increases to $3.0 billion. The estimates in Exhibit 8-6 also show that the distribution of compliance expenditures across source categories is similar to the distribution of direct costs.[112]

TABLE 8-2. SUMMARY OF ANNUAL CAAA COMPLIANCE EXPENDITURES AND DIRECT COSTS (MILLIONS OF 2006$)

SOURCE CATEGORY	2010		2020	
	COMPLIANCE EXPENDITURES (USED FOR EMPAX ANALYSIS)	DIRECT COSTS	COMPLIANCE EXPENDITURES (USED FOR EMPAX ANALYSIS)	DIRECT COSTS
Electric Generating Units	$8,470	$6,640	$13,000	$10,400
On-road Sources	$24,800	$25,800	$27,200	$28,300
Non-road Sources	$750	$359	$1,620	$1,150
Industrial Point Sources	$5,580	$5,180	$5,600	$5,140
Area Sources	$693	$693	$768	$767
Local Controls (Identified)	$5,590	$5,250	$6,790	$6,180
Unidentified Local Controls	$9,020	$9,020	$13,500	$13,500
TOTAL	$54,900	$52,900	$68,500	$65,500

[112] In most of EPA's recent EMPAX applications to air pollution rules, only a small portion of total costs have been accounted for by expenditures in the household sector. In this application, however, a large portion of total compliance costs, particularly for mobile source fuels rules, involve increased expenditures by the household sector. For this reason, the Project Team gave special consideration to the treatment of these costs. Estimated household compliance expenditures associated with petroleum products are implemented as price adjustments to reflect higher motor vehicle fuel prices. The petroleum price adjustment is calculated to match compliance expenditures related to household transportation fuel use. For other transportation compliance expenditures, the household utility function is adjusted to require additional expenditures to achieve a given utility level. These adjustments reflect the additional automotive inspections, maintenance, and technologies purchased by households to comply with the Clean Air Act. Other unidentified household compliance costs not related to transportation (e.g. non-road related local controls) are treated as lump-sum reductions to household income.

BENEFIT INPUTS

As noted above, the Project Team's analysis of the macroeconomic impacts of CAAA-related health improvements focuses on three specific effects: (1) the change in the household time endowment from pollution-related mortality impacts, (2) the change in the household time endowment from pollution-related morbidity, and (3) the change in medical expenditures associated with pollution-related morbidity. The Project Team incorporated these effects into the without-CAAA EMPAX-CGE model runs to estimate the size and composition of the economy in the absence of the Amendments. The methods employed to quantify these effects and convert them into useable inputs for EMPAX-CGE are described below.

Mortality-related Labor Force Impacts

The Project Team incorporated pollution-related mortality impacts into EMPAX-CGE as a percentage change in the time available to workers for labor and leisure activities (i.e., their time endowment). In estimating this percentage change, the Project Team focused on the dynamic population effects of premature mortality from particulate matter (PM) exposure. While ozone also leads to premature mortality, the benefits results in Chapter 5 show that reductions in ambient PM concentrations are responsible for approximately 98 percent of the avoided cases of premature mortality associated with the Amendments in both 2010 and 2020. Because of the dominant effect of PM on mortality (relative to ozone) and the lack of tools available to examine the dynamic population effects of PM and ozone in an integrated fashion, the Project Team focused the mortality component of the EMPAX-CGE analysis on changes in PM-related mortality.

The mortality-related inputs developed by the Project Team reflect the dynamic effects of PM mortality on the population over time. When PM concentrations change, the resulting population impact grows over time, as the change in population for any given year reflects changes in the incidence of PM-related mortality from prior years. For example, if PM concentrations are reduced permanently in 2015, the population (and the size of the labor force) in 2017 will reflect avoided cases of premature mortality in 2015, 2016, and 2017. Over time, this dynamic effect leads to a significant number of life years saved as the reduction in pollution-related risk is applied to successively larger populations each year (due to previous years' improvements in air quality).

To capture these dynamic effects, the Project Team used a spreadsheet-based dynamic population simulation model described in Chapter 5.[113] The model was designed to track the effect of alternative assumptions about the mortality effects of $PM_{2.5}$ on the U.S. population, but may also be used to assess how changes in $PM_{2.5}$ concentrations lead to changes in the population over time. The tool incorporates detailed life table data for historical years, by age, gender, and cause of death, obtained from the Census Bureau and the Centers for Disease Control. It also incorporates Census mortality and population projections for future years, again by age and gender, using the projected death and birth

[113] For a detailed description of the model, see the related report, *Uncertainty Analyses to Support the Second Section 812 Benefit-Cost Analysis of the Clean Air Act*, March 2010, and Industrial Economics, Inc. (2006).

rates that underlie the Census Bureau's published population projections. For a given model scenario, the model simulates the U.S. population by single year age group and gender for each year through 2050.

To estimate changes in the labor force with the population simulation model, the Project Team employed the following three-step approach:

1. ***CAAA-related change in population:*** First, the Project Team entered changes in $PM_{2.5}$ concentrations into the population simulation model based on the air quality modeling analysis described in Chapter 4. Netting the model results from baseline (*with-CAAA*) population projections, the Project Team estimated PM-related changes in population by gender and single-year age group for both the 2010 and 2020 target years (and for every other year in the model time horizon). These changes represent the estimated difference in population between the *with-CAAA* and *without-CAAA* scenarios.
2. ***CAAA-related change in the labor force:*** To estimate the change in the labor force associated with the CAAA, the Project Team applied age- and gender-specific labor force participation rates from the Bureau of Labor Statistics to the changes in population estimated in Step 1.
3. ***Percent Change in Labor Force:*** The Project Team estimated the percent change in the labor force associated with pollution-related mortality by dividing the total labor force changes estimated in Step 2 by baseline (with-CAAA) projections of the total labor force. As indicated above, the Project Team assumes that this percent change applies to the full time endowment (labor and leisure time) for the labor force.

Morbidity-related Labor Force Impacts

Similar to pollution-related mortality, pollution-related morbidity was incorporated into EMPAX-CGE as a percent change in the labor and leisure time available to workers. Unlike the Project Team's PM-based approach for mortality, the approach for morbidity accounts for both PM- and ozone-related impacts. The literature for the various PM and ozone endpoints examined use several different metrics for quantifying labor force impacts. To standardize these estimates, we converted the values obtained from the literature to the number of work days lost per case, by endpoint. We then applied these values to the yearly changes in the number of cases for each endpoint to estimate the total work days lost for any given year. These values reflect the labor force participation rate among those individuals afflicted by each health effect. Because the time endowment in EMPAX-CGE measures time on an annual basis, we converted the estimated number of work days lost to lost work years, based on an assumed work year of 235 work days.[114] To express work years lost as a percent change in the labor force, we divided the estimated work years lost for each target year by the projected size of the labor force. The resulting value represents the percent change in workers' labor time.

[114] This estimate is consistent with that used in Jorgenson et al. (2004).

As suggested above, estimating the number of work days lost per case for each endpoint is a key step in the Project Team's methodology. Table 8-3 summarizes these endpoint values for both PM and ozone. With the exception of chronic bronchitis and acute myocardial infarction (AMI), the estimates presented in Table 8-3 were applied to the annual change in incidence for each endpoint (i.e., the change in the number of new cases per year), as the duration of disease for most endpoints is no more than several weeks. Chronic bronchitis and AMI, however, affect individuals over multi-year time horizons. We therefore apply the work loss day estimates for these endpoints to changes in the prevalence of each disease (i.e., the change in the number of people with the disease, relative to the baseline).

Medical Expenditures

To estimate the medical expenditures associated with changes in PM and ozone concentrations, the Project Team relied upon cost-of-illness estimates from the published literature. Table 8-4 presents the annual medical expenditures per case for those endpoints for which medical expenditure data were available. We applied the estimates presented in the table to the respective annual changes in incidence for each endpoint, except for chronic bronchitis and AMI. For these two endpoints, we applied the values from Table 8-4 to estimated changes in prevalence.

Summary of Benefit-Related Inputs

Table 8-5 summarizes the estimated changes in the labor force (i.e., the worker time endowment) associated with the Amendments for the 2010 and 2020 target years. Using the estimates in the table, the Project Team modified the time endowment for each model household included in EMPAX-CGE. The estimates in the table suggest that the U.S. labor force would be 0.34 percent smaller in 2010 and 0.57 percent smaller in 2020 if the Amendments had not been enacted. PM mortality effects would make up more than half of this reduction. Among morbidity endpoints, AMI and chronic bronchitis would have the most significant effect. The labor force impact of ozone pollution would represent less than five percent of the reduction in the labor force for each target year.

Table 8-6 presents the estimated change in pollution-related medical expenditures associated with the Amendments. As indicated in the table, the Project Team estimates that medical expenditures related to air pollution would be approximately $12.9 billion higher in 2010 and $21 billion higher in 2020 in the absence of the Amendments. Similar to the labor force effects summarized in Table 8-5, PM-related morbidity, AMI in particular, represents most of the estimated change in pollution-related medical expenditures.

TABLE 8-3. WORK DAYS LOST PER CASE, BY MORBIDITY ENDPOINT[1]

PM[2]		
Acute Myocardial Infarction[3]	Age <25: N/A Age 25-34: 17.7 days Age 35-44: 14.5 days	Age 45-54: 23.7 days Age 55-65: 137.0 days Age>65: 0 days
Chronic Bronchitis[3]	Age <25: N/A Age 25-34: 50.3 days Age 35-44: 42.2 days	Age 45-54: 55.5 days Age 55-65: 73.5 days Age >65: 0 days
Hospital Admissions, Cardiovascular[4]	Age 0-14: N/A Age 15-44: 18.3 days	Age 45-64: 17.9 days Age >64: 7.0 days
Hospital Admissions, Respiratory[4]	Age 0-14: N/A Age 15-44: 30.7 days	Age 45-64: 30.1 days Age >64: 7.5 days
Emergency Room Visits, Respiratory[5]	Average across all age groups: 0.2 days	
Work Loss Days	Average among working age population: 1 day	
Ozone[6]		
School Loss Days[7]	Average across all age groups: 0.7 days	
Worker Productivity	Not applicable[8]	
Hospital Admissions, Respiratory[9,10]	Age <2: 0 days Age >64: 7.5 days	
Emergency Room Visits, Respiratory[5]	Average across all age groups: 0.2 days	

Notes:

N/A indicates that the underlying C-R function does not provide incidence estimates for that age group.

1. Except for chronic bronchitis and acute myocardial infarction, the number of work days lost is applied to the change in annual incidence. For chronic bronchitis and acute myocardial infarction, the work days lost presented in this table are applied to annual changes in the prevalence of each disease.
2. We did not generate separate work loss day estimates for the following PM health endpoints discussed in Chapter 5: acute bronchitis, acute respiratory symptoms, asthma exacerbation, lower respiratory symptoms, and upper respiratory symptoms. The lost work days associated with these endpoints are already reflected in the work loss day endpoint included in this table.
3. Derived from Cropper and Krupnick (1999).
4. Agency for Healthcare Research and Quality (2000), as cited in BenMAP user's guide, Abt Associates (2008).
5. We assume that each E.R. visit equals one day of lost work time per worker affected. The estimate of 0.2 days per case reflects the percentage of cases realized by the working-age population, the ratio of workdays to total days in a year (235/365), and the percent of the working-age population in the labor force.
6. We did not estimate the number of work days lost per case of acute respiratory symptoms associated with ozone exposure.
7. Derived from Abt Associates (2008). Note that 0.7 is the estimated average work loss days per school loss day, incorporating work-force participation rates for caregivers.
8. The benefits analysis presented in Chapter 5 does not estimate the number of cases for the worker productivity endpoint. Instead, worker productivity is estimated as the change in income associated with changes in ozone concentrations. We estimated the work days lost per dollar of income lost based on the average daily wages of outdoor workers.
9. Derived from Abt Associates (2008).
10. The dose-response function for ozone-related respiratory hospital admissions does not cover populations older than two years old and younger than 65. For this endpoint we do not address potential caregiver time lost for incidence in either cohort.

TABLE 8-4. ANNUAL MEDICAL EXPENDITURES PER CASE, BY MORBIDITY ENDPOINT (2006$)[1]

	2010	2020
PM[2]		
Acute Myocardial Infarction[3]	$17,600	$17,300
Chronic Bronchitis[4]	$715	$810
Emergency Room Visits, Respiratory[5]	$369	
Hospital Admissions, Cardiovascular[6]	$27,400	
Hospital Admissions, Respiratory[6]	$21,000	
Ozone[7]		
Emergency Room Visits, Respiratory[5]	$369	
Hospital Admissions, Respiratory[6]	$16,400	$17,100

Notes:

1. Except for chronic bronchitis and acute myocardial infarction, medical expenditures per case are applied to the change in annual incidence. For chronic bronchitis and acute myocardial infarction, medical expenditures per case are applied to the annual changes in the prevalence of each disease, to generate an annual rather than lifetime estimate of costs for these chronic diseases.
2. Medical expenditure estimates for the following PM morbidity endpoints were not readily available: acute bronchitis, acute respiratory symptoms, asthma exacerbation, lower respiratory symptoms, upper respiratory symptoms, and work loss days.
3. Derived from Wittels et al. (1990) and Russell et al. (1998), both as cited in Abt Associates (2008).
4. Cropper and Krupnick (1999).
5. We assume that each E.R. visit equals one day of lost work time per worker affected. The estimate of 0.2 days per case reflects the percentage of cases realized by the working-age population, the ratio of workdays to total days in a year (235/365), and the percent of the working-age population in the labor force.
6. Agency for Healthcare Research and Quality (2000), as cited in Abt Associates (2008).
7. Medical expenditure estimates for the following ozone morbidity endpoints were not readily available: minor restricted activity days, school loss days, and outdoor worker productivity.

TABLE 8-5. ANNUAL CHANGE IN LABOR FORCE DUE TO CAAA-RELATED CHANGES IN AIR QUALITY (PERCENT CHANGE IN WORKER TIME ENDOWMENT)

	2010	2020
Pollution-related Change in Worker Time Endowment	**0.34%**	**0.57%**
PM Mortality Subtotal	***0.18%***	***0.31%***
PM Morbidity Subtotal	***0.15%***	***0.25%***
Acute Myocardial Infarction	0.06%	0.09%
Chronic Bronchitis	0.05%	0.11%
Emergency Room Visits, Respiratory	<0.01%	<0.01%
Hospital Admissions, Cardiovascular	<0.01%	<0.01%
Hospital Admissions, Respiratory	<0.01%	<0.01%
Work Loss Days	0.04%	0.05%
Ozone Morbidity Subtotal	***0.01%***	***0.02%***
Emergency Room Visits, Respiratory	<0.01%	<0.01%
Hospital Admissions, Respiratory	<0.01%	<0.01%
Acute Respiratory Symptoms	<0.01%	<0.01%
School Loss Days	0.01%	0.01%
Worker Productivity	<0.01%	0.01%

TABLE 8-6. CAAA-RELATED CHANGES IN ANNUAL MEDICAL EXPENDITURES (MILLION 2006$)

	2010	2020
Pollution-related Change in Medical Expenditures	**$11,900**	**$19,600**
PM Morbidity Subtotal	***$11,600***	***$19,000***
Acute Myocardial Infarction	$9,500	$15,500
Chronic Bronchitis	$375	$919
Emergency Room Visits, Respiratory	$29	$39
Hospital Admissions, Cardiovascular	$1,228	$1,900
Hospital Admissions, Respiratory	$467	$683
Ozone Morbidity Subtotal	***$310***	***$580***
Emergency Room Visits, Respiratory	$2	$4
Hospital Admissions, Respiratory	$311	$575

EMPAX-CGE MODEL RESULTS

Using the inputs summarized in the previous section, the Project Team estimated the macroeconomic impacts of the Amendments under both the cost-only case and the labor force-adjusted case. As described above, the former captures the general equilibrium effects of CAAA compliance expenditures, whereas the latter accounts for the impacts of

these expenditures as well as the labor force and medical expenditure impacts associated with the Amendments. We present the results of both analyses below.

MACROECONOMIC IMPACTS OF CAAA COMPLIANCE EXPENDITURES

Table 8-7 summarizes the results of the EMPAX-CGE cost-only model run. As the results in the table indicate, the Project Team estimates that the compliance expenditures associated with the Amendments will reduce GDP and consumption by approximately 0.5 percent in 2010 and 2020, relative to the without-CAAA scenario. The total estimated GDP reduction of $79 billion in 2010 and $110 billion in 2020 are 50 to 70 percent larger than the total primary cost estimates of $53 billion in 2010 and $65 billion in 2020. The difference is attributable to secondary effects of compliance costs on the overall economy, a large portion of which are likely the result of increases in energy prices, which has broad effects on overall production. Another factor is that investment in pollution control capital can divert capital from the purpose of enhancing long-term productivity within the industrial sector.

The percent reduction in equivalent variation is smaller than the corresponding reductions in GDP and consumption, at approximately 0.4 percent for both target years. This disconnect between the percent reduction in EV and the reductions in GDP and consumption suggests that, under the *with-CAAA* scenario, households allocate a greater share of their time endowment to leisure (and less to labor) than under the *without-CAAA* scenario. This increase in leisure partially offsets the welfare loss associated with reduced consumption.

TABLE 8-7. SUMMARY OF ANNUAL MACROECONOMIC IMPACTS: COST-ONLY CASE[1]

VARIABLE	MODEL RUN	2010	2015	2020
GDP	With Clean Air Act ($ billion)	$15,027	$17,338	$20,202
	Without Clean Air Act ($ billion)	$15,106	$17,430	$20,312
	Change ($ billion)	−$79	-$93	−$110
	% change	−0.52%	-0.53%	−0.54%
Consumption	With Clean Air Act ($ billion)	$10,969	$12,699	$14,881
	Without Clean Air Act ($ billion)	$11,023	$12,761	$14,956
	Change ($ billion)	−$54	-$62	−$75
	% change	−0.49%	-0.49%	−0.50%
Hicksian EV (annual)	Change ($ billion)	−$54	-$62	−$75
	% change	−0.38%	-0.38%	−0.39%

Notes:

1. Results are expressed in year 2006 dollars.

Figure 8-5 presents the percent change in output by industry as estimated by EMPAX-CGE for the year 2020. The values in the table are typically highest among those

industries with the most significant CAAA compliance expenditures relative to baseline industry revenue. For example, the electricity industry accounts for approximately 20 percent of CAAA compliance expenditures (approximately $14 billion, or 3.3 percent of benchmark electricity revenue); as a result, EMPAX-CGE estimates that output from the electricity industry declines by just less than 4 percent under the *with-CAAA* scenario relative to a U.S. economy without Clean Air Act programs. Because the power industry is the largest consumer of coal in the U.S., the reduction in output from the electricity industry also results in the secondary effect of reducing coal output by approximately 1.5 percent. The electricity industry's CAAA compliance expenditures also leads to higher electricity prices that prompt energy-intensive industries to switch to other energy sources (e.g., natural gas and oil) and/or seek energy efficiency improvements in their production process. In addition, because of CAAA requirements for cleaner (more expensive) fuels, petroleum sector output is projected to decline approximately 1.5 percent. The results in Figure 8-5 also suggest that the other minerals sector experiences the largest reduction in output, in proportional terms, among all industries (over 5 percent). This reflects the industry's high compliance expenditures relative to its size and the industry's energy-intensive production processes.

The industry-level results presented in Figure 8-5 also reflect the extent to which economic activity associated with CAAA compliance, such as new purchases of environmental protection goods and services, may partially offset the output losses associated with CAAA compliance expenditures. As a result of the CAAA, the demand for environmental protection goods and services will be higher relative to a U.S. economy without the Amendments.

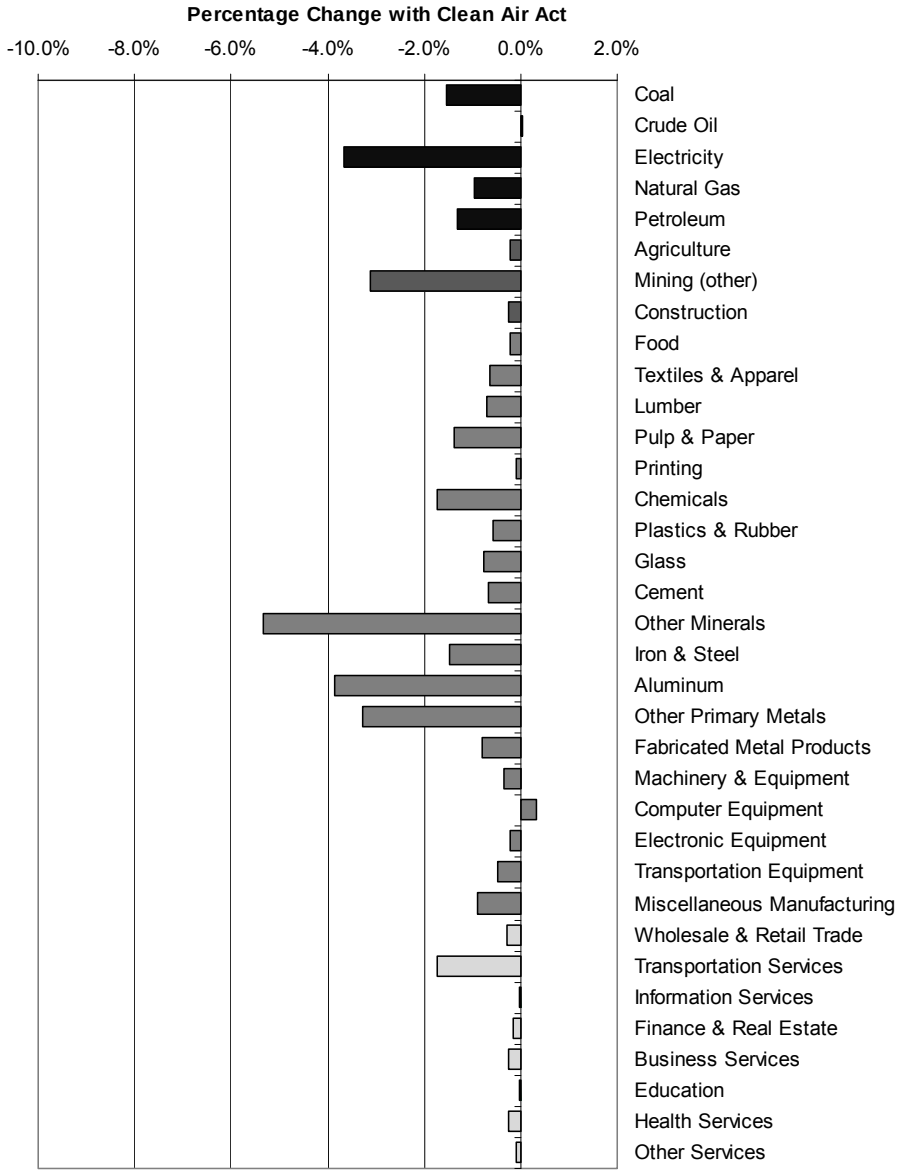
MACROECONOMIC IMPACTS OF CAAA COMPLIANCE EXPENDITURES AND HUMAN HEALTH BENEFITS

Building upon the results presented above, Table 8-8 summarizes the results of the EMPAX-CGE analysis for the labor force-adjusted case, which captures the full CAAA compliance expenditures as well as the labor force and medical expenditure benefits of the Amendments. The results presented in the table suggest that over time, the positive macroeconomic impacts of CAAA-related labor force and medical expenditure impacts slightly outweigh the negative macroeconomic effects of CAAA compliance costs. [115] For 2010, the results for the labor force-adjusted case show a reduction in GDP and consumption relative to the *without-CAAA* scenario, but the corresponding changes become positive in 2020. This largely reflects the rapid growth in the CAAA labor force effect between 2010 and 2020 (67 percent) relative to the growth in CAAA compliance expenditures (25 percent). We expect the CAAA-related labor force effect to grow more quickly than CAAA compliance expenditures during this period because, unlike compliance expenditures, the labor force effect is cumulative for the health endpoints with the most significant effect on the size of the labor force (i.e., premature mortality,

[115] The EMPAX model results do not isolate the impact of the labor force effect on GDP or the impact of changes in medical expenditures, as the two were modeled simultaneously.

chronic bronchitis, and AMI). In addition, the mortality effect is delayed relative to the time costs are incurred to reduce exposures because of the impact of the cessation lag.[116]

FIGURE 8-5. PERCENT CHANGE IN INDUSTRY OUTPUT IN 2020: COST-ONLY CASE



[116] Note that results for the labor force-adjusted case for years after 2020 indicate that the beneficial effects on the economy grow over time, through 2030, from $5 billion in 2020 to $14 billion in 2025 to $24 billion in 2030. EMPAX results for 2030, however, are considered less reliable because of the greater uncertainty in forecasting GDP and industry-level productivity 20 years into the future.

TABLE 8-8. SUMMARY OF ANNUAL MACROECONOMIC IMPACTS: LABOR FORCE-ADJUSTED CASE[1]

VARIABLE	MODEL RUN	2010	2015	2020
GDP	With Clean Air Act ($ billion)	$15,027	$17,338	$20,202
	Without Clean Air Act ($ billion)	$15,059	$17,350	$20,197
	Change ($ billion)	−$32	-$12	$5
	% change	−0.21%	-0.07%	0.02%
Consumption	With Clean Air Act ($ billion)	$10,969	$12,699	$14,881
	Without Clean Air Act ($ billion)	$10,972	$12,696	$14,876
	Change ($ billion)	−$3	$3	$5
	% change	−0.03%	0.02%	0.03%
Hicksian EV (annual)	Change ($ billion)	$11	$22	$29
	% change	0.08%	0.13%	0.15%

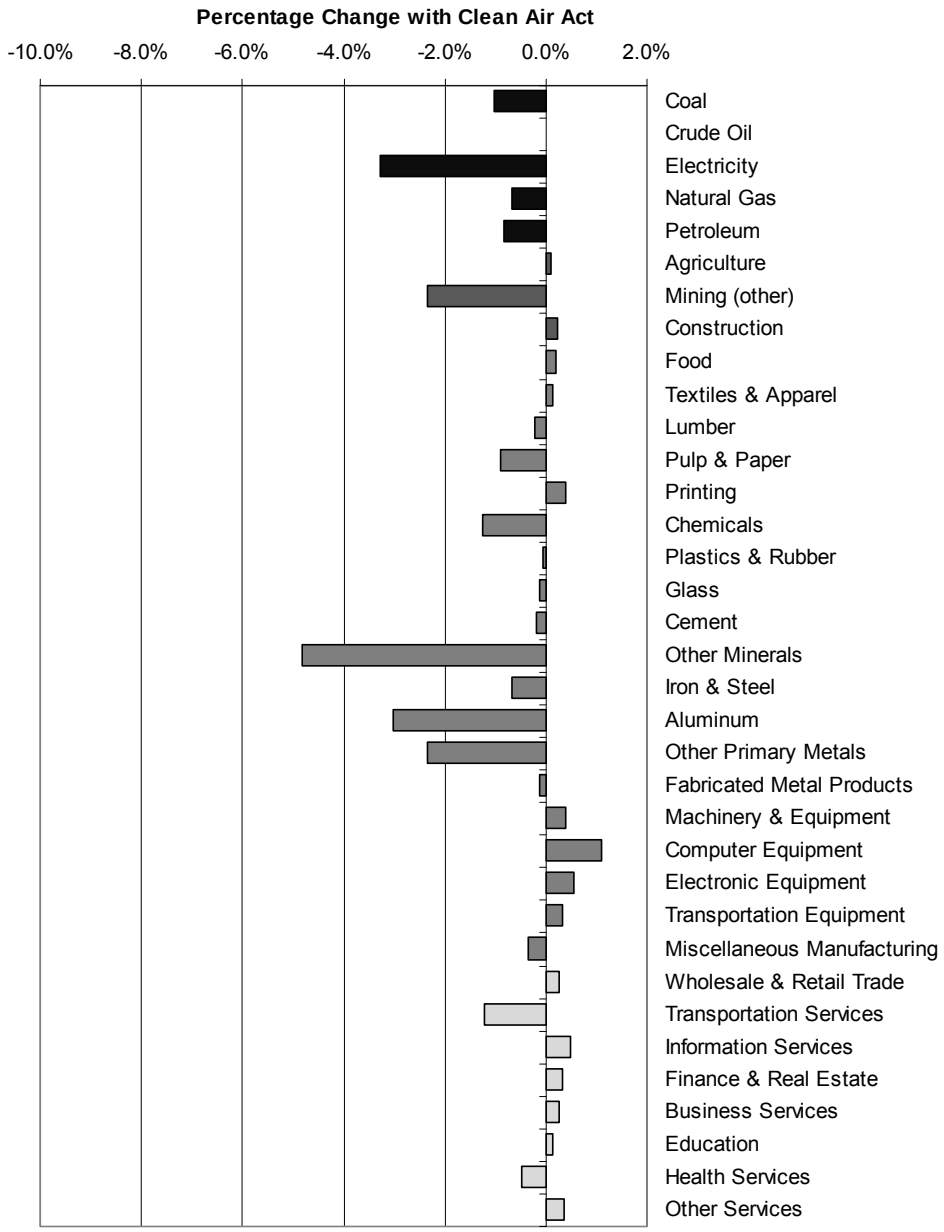
Notes:

1. Results are expressed in year 2006 dollars.

The results in Table 8-8 also suggest that the Amendments lead to an increase in household welfare, measured as the change in EV, under the labor force-adjusted case for both the 2010 and 2020 target years. The projected 0.8 percent *increase* in welfare for 2010 stands in contrast to the projected 0.21 percent *reduction* in GDP for that year and the 0.03 percent reduction in consumption. The fact that welfare rises while economic output declines indicates that, under the *with-CAAA* scenario, households allocate a greater share of their time endowment to leisure (and less to labor) than under the *without-CAAA* scenario. This reallocation of household time also occurs under the cost-only case, but it only partially offsets the negative welfare impact of reduced consumption. Under the labor force-adjusted case, the increase in leisure more than offsets the welfare loss associated with reduced consumption.

Figure 8-6 presents, by industry, the estimated percent change in output in 2020 for the labor force-adjusted case. The results in the figure indicate that, when labor force and medical expenditure impacts are accounted for, the CAAA leads to increased output for many industries and a decline in output for others. Consistent with the cost-only results, output in the computer equipment industry increases. The other sectors projected to experience an increase in output include many industries that tend to be labor-intensive and would benefit from a larger labor pool, such as most service industries. Output for health services declines, however, due to the reduction in health services demand associated with CAAA-related health improvements. Most of the other industries experiencing a reduction in output are either energy producers (e.g., electricity) or industries with energy-intensive production processes (e.g., iron and steel).

FIGURE 8-6. PERCENT CHANGE IN INDUSTRY OUTPUT IN 2020: LABOR FORCE-ADJUSTED CASE



The results presented in Table 8-8 and Figure 8-6 show that the conclusions drawn from macroeconomic analyses of air pollution policy depend significantly on whether such analyses capture both the costs and at least some of the benefits of air policy. While the results of the EMPAX-CGE cost-only case suggest that the CAAA reduces the output of the U.S. economy by approximately 0.5 percent each year, the labor force-adjusted case shows that analyzing benefits in conjunction with costs can either reduce the magnitude or change the sign of model results. Therefore, general equilibrium analyses that

examine cost-side macroeconomic impacts but ignore or overlook the impacts of policy-related labor force and health improvements may yield incomplete results that misinform policymakers and the public. The analysis presented in this chapter illustrates the feasibility of avoiding this outcome by examining both the costs and (a portion of the) benefits of air policy in a general equilibrium framework. It is important to note, however, that assessing expenditure-based output impacts should not replace the current practice of estimating the welfare (i.e., willingness-to-pay) benefits of avoided health effects. Unlike willingness-to-pay estimates, the results of CGE models do not reflect the non-market value that people place on avoided adverse health impacts. The outputs of such models represent a supplement to willingness-to-pay estimates rather than a substitute for such estimates.

Further work is needed, however, to reflect a much broader set of benefits in CGE models. As noted earlier, the results in this chapter are designed to supplement, but not replace, the more complete primary estimates of benefits and costs. The CGE model represents flows of products, labor, and capital between and among producers and consumers, but it excludes improvements in well-being due to enhanced longevity and health, except to the extent that these increase time available for labor and leisure among the workforce and reduce some medical costs. As a result, the vast majority of monetized benefits, many but not all of which represent benefits that are not traded in markets, cannot currently be reflected in a CGE model. This is the main reason that the beneficial results to the economy estimated in this chapter are substantially smaller than the primary estimate of benefits based on willingness to pay estimates. It is nonetheless important to realize that even the partial set of benefits-related impacts that are reflected in this chapter (i.e., labor force and medical expenditure impacts) more than compensate for the market costs we estimate to achieve CAAA compliance.

ANALYTIC LIMITATIONS

While the analysis presented in this chapter provides a reasonable approximation of the macroeconomic impacts of the CAAA, we note the following limitations:

- ***Exclusion of labor force and leisure effects for individuals outside the formal economy:*** Given the uncertainty surrounding the macroeconomic impacts of retirees, children, and other populations who do not participate in formal labor markets and the fact that CGE models are ill-suited to address these uncertainties, the inputs developed by the Project Team for this analysis did not reflect changes in the time endowment for these individuals. To the extent that people outside formal labor markets contribute to the economy, we may underestimate the positive macroeconomic impacts of the Amendments.
- ***Exclusion of ozone mortality***: As described in the methods section, our analysis captures PM-related changes in mortality but does not account for mortality impacts from ozone exposure. Therefore, we likely underestimate the positive macroeconomic impacts of the Amendments.

- ***Exclusion of nonmarket and some market benefits:*** Our assessment of the macroeconomic impacts of the Amendments also excludes several other CAAA-related benefits that may improve economic performance or consumer welfare, such as visibility improvements, productivity enhancements in the agriculture and forestry sectors, reduced materials damage, and reduced pain and suffering from pollution-related illness. Because we do not capture these effects, we very likely underestimate the positive macroeconomic impacts of the Amendments.
- ***Assumption of separable benefits categories:*** Our modeling assumes labor supply and environmental quality are separable components of the utility function for households. This separability does not always hold, however; for example, cleaner air may encourage leisure activities such as birding and fishing, making air quality a complement to leisure. Prior work suggests that assuming separability may affect benefits by up to 30 percent in some cases.[117]
- ***Perfect foresight:*** EMPAX-CGE assumes that households have perfect foresight of future changes in policy and modify their current economic behavior accordingly. In reality, households often have imperfect information of future policy changes. Whether the assumption of perfect foresight leads to overestimation or underestimation of impacts is uncertain.
- ***EMPAX-CGE parameter uncertainty***: Similar to other CGE models, EMPAX-CGE requires the specification of several model parameters (e.g., elasticity values). Although the model relies upon credible values from the literature, the range of published estimates for many parameters varies widely across studies. It is uncertain whether the parameters included in EMPAX lead to overestimation or underestimation of impacts.

[117] We are grateful to the SAB Council for sharing this observation. For further information, see, for example, J.C. Carbone and V.K. Smith. 2008. Evaluating policy interventions with general equilibrium externalities. J. Public Econ. 92:1254-1274.

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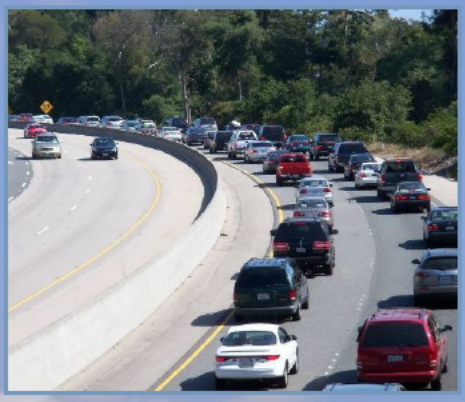
The Benefits and Costs of the Clean Air Act from 1990 to 2020



U.S. Environmental Protection Agency
Office of Air and Radiation
March 2011

SUMMARY REPORT

Acknowledgements

The study was led by staff from the US Environmental Protection Agency Office of Air and Radiation, with support provided, under contract to EPA, by the organizations participating on the Study Team.

The full integrated report and this summary report were reviewed by the EPA Science Advisory Board's Advisory Council on Clean Air Compliance Analysis (hereafter the Council) and its three technical subcommittees. The individual detailed reports that focus on each of the key analytical components of the overall study were also reviewed by the Council and/or one or more relevant subcommittees.

The study was greatly improved by the ideas and expertise of the individuals and firms participating on the Study Team, and by the rigorous and thoughtful expert review by the external review panels. However, responsibility for the study's results, the analytical decisions leading to those results, the interpretations reported herein, and the recommendations made for future efforts, rests with the Environmental Protection Agency.

Study Team

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Stratus Consulting
Sonoma Technologies

Study Review Panels

Advisory Council on Clean Air Compliance Analysis
Air Quality Modeling Subcommittee
Health Effects Subcommittee
Ecological Effects Subcommittee

For further information

This document is an abridged version of a longer report which evaluates the benefits and costs of programs implemented pursuant to the 1990 Clean Air Act Amendments. The longer report in turn summarizes and integrates a series of technical reports documenting particular analytical tasks, such as estimation of compliance cost and projection of air quality changes. Data presented in this summary report are documented in the full integrated report and/or the supporting technical analyses.

Electronic copies of this summary report, the full integrated report, and all publicly available supporting technical documents can be downloaded at: *http://www.epa.gov/oar/sect812/prospective2.html*

Paper copies of this summary report can be obtained by submitting a request indicating the number of copies required to: *CAAA.Benefit-Cost-Study@epa.gov*

For information about the technical aspects of the study, contact Jim DeMocker, Senior Policy Analyst, Office of Air and Radiation, US EPA at *democker.jim@epa.gov*

For information about the peer review of the study, contact Stephanie Sanzone, Designated Federal Official for the Council at *sanzone.stephanie@epa.gov*

Summary of Findings and Recommendations

Findings

This study evaluates the benefits and costs of programs implemented pursuant to the 1990 Clean Air Act Amendments, relative to a hypothetical baseline which assumes control programs established under the 1970 Clean Air Act and 1977 Amendments stayed fixed at their 1990 levels of scope and stringency. The study applies the framework and principles of benefit-cost analysis to estimate significant beneficial and costly effects of these programs, express these effects where feasible and appropriate in dollar value terms to facilitate comparison of disparate effects, and then calculate the overall net economic benefits (benefits minus costs) of the changes in Clean Air Act-related programs resulting from the 1990 Amendments.

- Based on the scenarios analyzed in this study, ***the costs of public and private efforts to meet 1990 Clean Air Act Amendment requirements*** rise throughout the 1990 to 2020 period of the study, and ***are expected to reach an annual value of about $65 billion by 2020.***[1]

- ***Though costly, these efforts are projected to yield substantial air quality improvements*** which lead to significant reductions in air pollution-related premature death and illness, improved economic welfare of Americans, and better environmental conditions. ***The economic value of these improvements is estimated to reach almost $2 trillion for the year 2020***, a value which vastly exceeds the cost of efforts to comply with the requirements of the 1990 Clean Air Act Amendments.

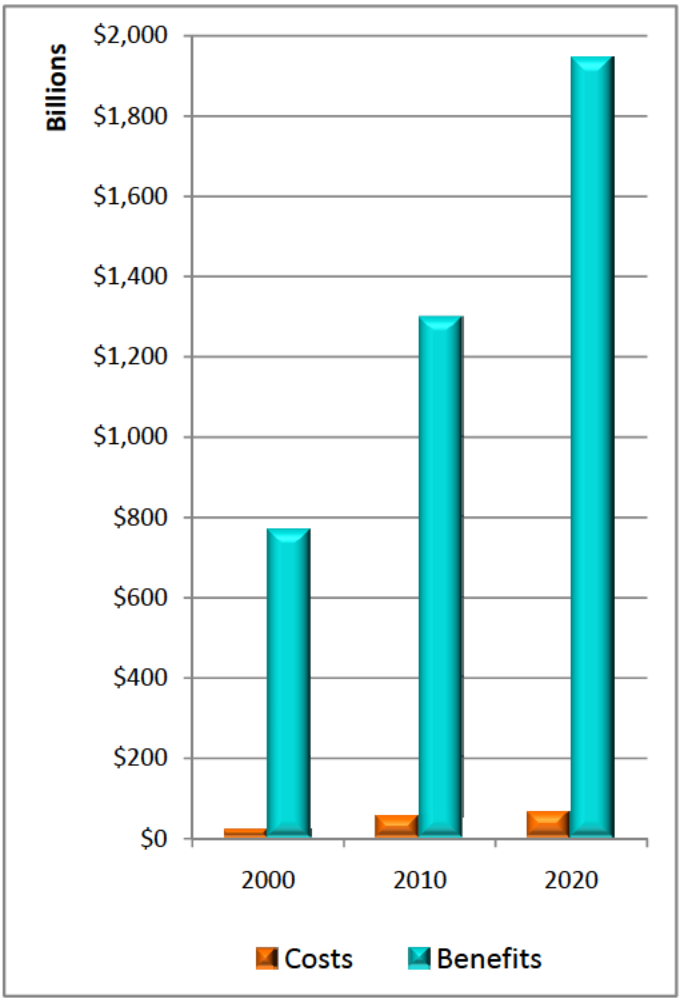

Exhibit 1. Primary Central Estimates of direct benefits and direct costs for the 2000, 2010, and 2020 study target years. (In billions of 2006 dollars). The graph shows the extent to which benefits exceed costs throughout the study period.

[1] Because of inflation, the value of a US dollar varies from year to year. In this study, dollars are defined according to the value they held in the year 2006.

- ***The extent to which estimated benefits exceed estimated costs*** and an in-depth analysis of uncertainties ***indicate that it is extremely unlikely the costs of 1990 Clean Air Act Amendment programs would exceed their benefits under any reasonable combination of alternative assumptions or methods identified during this study***. Even if one were to adopt the extreme assumption that air pollution has no effect on premature mortality –or that avoiding such effects has no value—the benefits of reduced non-fatal health effects and visibility improvements alone are more than twice the total cost of compliance with 1990 Clean Air Act Amendment requirements.

- Economy-wide modeling was also conducted to estimate the effect of the 1990 Amendments on overall U.S. economic growth and the economic welfare of American households. ***When some of the beneficial economic effects of clean air programs were incorporated along with the costs of these programs, economy-wide modeling projected net overall improvements in economic growth and welfare.*** These improvements are projected to occur because cleaner air leads to better health and productivity for American workers as well as savings on medical expenses for air pollution-related health problems. The beneficial economic effects of these two improvements more than offset the costly effects across the economy of expenditures for pollution control.

- ***The most significant known human health effects from exposure to air pollution are associated with exposures to fine particles[2] and ground-level ozone pollution***. Many of these effects could be quantified for this study; but other health effects of fine particles and ozone, health effects associated with other air pollutants, and most air pollution-related environmental effects could be quantified only partially, if at all. Future improvements in the scientific and economic information needed to quantify these effects would be expected to further increase the estimated benefits of clean air programs.

[2] Particle pollution, also known as "particulate matter" or PM, is a term used to describe a broad class of extremely small solid particles and liquid droplets suspended in the air. Particle pollution can include one or more different chemical components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles has been linked to their potential for causing health problems since it is easier for smaller particles to bypass protective mechanisms in the nose and throat and enter deeply into the lungs. The number which sometimes follows the term PM refers to the aerodynamic diameter of particles expressed in units of microns (millionths of a meter); so PM2.5, for example, refers to a mixture of aerosol particles which are less than or equal to 2.5 microns. EPA classifies particle pollution into two main categories: (1) "inhalable coarse particles" such as those often seen near roadways and dusty industrial activities, which are larger than 2.5 microns but smaller than 10 microns, and (2) "fine particles" such as those found in smoke and haze, which are 2.5 microns and smaller. The terms PM2.5 and "fine particles" therefore refer to the same fraction of particle pollution.

Recommendations

The findings of this study have potentially significant implications for policy, programs, and research related to air pollution in the U.S. The recommendations presented below focus on research needs and the expansion and refinement of future studies.

- Clean Air Act programs address a wide variety of air pollutants beyond the fine particle and ozone pollution which emerged as the primary focus of this study's quantitative results. The data and modeling tools needed to estimate the health and environmental consequences of these other pollutants, however, are limited. ***There is an ongoing need for investment in research to improve the coverage of potentially important effects in benefit-cost studies of air pollution control programs.*** Additional research is also needed to reduce uncertainties in the estimates of effects already incorporated in benefit-cost studies, especially relatively significant effects such as those associated with fine particle- and ozone-related premature mortality and the economic value of avoiding those outcomes.

- Programs to reduce key Clean Air Act pollutants through national ambient concentration standards such as those for fine particles and ozone, programs to address air pollutants with more localized affects such as toxic compounds and heavy metals, and programs and policies which reduce emissions of greenhouse gases may impose various requirements on a given source of emissions. ***Future air pollution program assessments would be more useful to policymakers and the public if they were designed to provide insights on the combined effects of programs to address these different categories of air pollution.***

- Typical macroeconomic modeling tools and practices tend to focus on assessment of effects across the economy of compliance expenditures while ignoring the economy-wide benefits of cleaner air. ***Consideration should be given to improving macroeconomic modeling of major environmental programs so their benefits as well as their costs are reflected in projections of how these programs affect the overall economy and the economic welfare of American households.***

About this Report

This report is the third in a series of EPA studies which estimate and compare the benefits and costs of the Clean Air Act and related programs.

The first report was called the Retrospective Study, and was published in 1997. This first study estimated the benefits and costs through 1990 of programs implemented pursuant to the 1970 Clean Air Act and the 1977 Amendments, and included an analysis of the benefits and costs of phasing out leaded gasoline.

The second report was called the First Prospective Study. Published in 1999, it evaluated the incremental benefits and costs of the 1990 Clean Air Act Amendments and associated programs through the year 2010, relative to controls in place as of 1990. In addition to evaluating the effects on human health, the economy, and the environment of Titles I through V of the Amendments,[3] the First Prospective Study analyzed the benefits and costs of phasing out stratospheric ozone depleting chemicals such as chlorofluorocarbons (CFCs) under Title VI.

The current report is called the Second Prospective Study. This new study updates and expands the First Prospective Study by using new and better data and modeling tools. The new study also looks further out into the future by evaluating the costs and benefits of 1990 Clean Air Act Amendment programs through the year 2020.

CLEAN AIR ACT SEC. 312. ECONOMIC IMPACT ANALYSES (as amended, in part):

(a) The Administrator…shall conduct a comprehensive analysis of the impact of this Act on the public health, economy, and environment of the United States…

(b) In describing the benefits of a standard described in subsection (a), the Administrator shall consider all of the economic, public health, and environmental benefits of efforts to comply with such standard… The Administrator shall assess how benefits are measured in order to assure that damage to human health and the environment is more accurately measured and taken into account…

(c) [T]he Administrator shall consider the effects…on employment, productivity, cost of living, economic growth, and the overall economy of the United States.

(e) [T]he Administrator…shall appoint an Advisory Council on Clean Air Compliance Analysis of…recognized experts in the fields of the health and environmental effects of air pollution, economic analysis, environmental sciences, and such other fields that the Administrator determines to be appropriate.

(g) The Council shall-

(1) review the data to be used for any analysis required under this section and make recommendations to the Administrator on the use of such data;

(2) review the methodology used to analyze such data and make recommendations to the Administrator on the use of such methodology; and

(3) prior to the issuance of a report…review the findings of such report, and make recommendations to the Administrator concerning the validity and utility of such findings.

Exhibit 2. Clean Air Act Section 312 statutory language (abridged) as amended by Section 812 of the 1990 Amendments. The text of the law defines Congress' direction to EPA regarding the scope and review of these studies.

[3] The Clean Air Act is comprised of a number of statutory titles. Title I requires attainment of national air quality standards for designated pollutants such as ozone, Title II focuses on mobile source control programs, Title III addresses hazardous air pollutants, Title IV establishes programs to address acid deposition and related effects, Title V establishes permitting requirements, and Title VI focuses on protection of the stratospheric ozone layer.

The Second Prospective Study focuses on evaluating the significant changes made over the last decade in the implementation of Titles I through IV. Readers interested in benefit and cost information related to Title V (permits) and Title VI (stratospheric ozone protection) are referred to the First Prospective Study and subsequent EPA Regulatory Impact Analyses.

The effects of the 1990 Clean Air Act Amendments estimated herein reflect actions and partnerships across multiple levels of government, private organizations, households, and individuals. This combined effort involves federal standard setting and implementation, state and local programs to meet federal standards, and expenditures by private entities to achieve the requisite emissions reductions.

Goals and Objectives of the Study

During the legislative efforts leading up to enactment of the 1990 Clean Air Act Amendments, members of Congress working on the Act's reauthorization made it clear they wanted more and better information from EPA about the economic, health, and environmental effects of air pollution control programs. To ensure this improved information was available to support future policymaking, Congress added statutory language which required EPA to conduct periodic studies to evaluate the benefits and costs of the Clean Air Act itself. Enhanced credibility and continual improvement in data and methods were promoted by requiring that the design, implementation, and results of each study would be reviewed by a multidisciplinary panel of outside experts.

To meet Congress' goals for the third study in this series of Clean Air Act benefit-cost analyses, EPA defined a central objective and three supplementary objectives. Consistent with the central objectives defined for the two preceding studies, the current study was designed to estimate the direct[4] costs and direct benefits of the Clean Air Act as a whole, including the major federal, state, and local programs implemented to meet its requirements. The present study focuses on estimating the incremental effects of the 1990 Amendments in particular, and covers the period from 1990 –when these most recent Amendments were passed—through the year 2020.

A second, subsidiary objective of the study was to gauge the economy-wide effects of the 1990 Clean Air Act programs, including evaluation of the Act's effects on the overall growth of the U.S. economy and the economic well-being of American households.

[4] In this study, "direct" costs or benefits refer to first-order economic effects of pollution control programs. For example, the expenditure of funds to purchase, install, and operate pollution control equipment is considered a direct cost of a pollution control program. Similarly, the reduction in risk of a pollution-related health effect is a direct benefit of the reduction in emissions achieved by the use of that equipment. Indirect effects are those which emerge as consequences of the direct effect, such as the higher cost of producing steel if the direct cost to an electric utility of installing pollution control equipment leads to an increase in electricity prices paid by a steel plant. An example of an indirect benefit is the improvement in worker productivity achieved when the direct benefit of avoiding pollution-related illness helps workers avoid sick days. The present study focuses on evaluation of direct benefits and costs but also, to a limited extent, assesses indirect effects through economy-wide modeling.

EPA also sought, as a third objective, to be as comprehensive as possible –subject to practical limitations imposed by budget and information constraints—by considering a wide range of human health, human welfare (i.e., quality of life), and ecological effects. While some of these effects may contribute only minimally, if at all, to the quantitative estimates of benefits and costs generated for this study, looking at a broad range of effects was intended to ensure that (a) effects of concern to various stakeholders were included and (b) EPA and outside researchers could obtain additional insights about any deficiencies in the scope and quality of current information.

A fourth and final objective of the current study was to assess its limitations and uncertainties to identify opportunities for improving data and methods, and to explore the need for refining the scope and design of future air pollution benefit-cost studies. External peer review by the outside experts serving on the Council was a critical aspect of efforts to meet this objective, as well as the other objectives of this study.

Study Design

The current study is similar to the previous two in its fundamental design. To isolate the effects of Clean Air Act programs, the study configures and compares two alternative states of the world: one with the 1990 Clean Air Act Amendments, and one which assumes the 1990 Amendments were not passed.

In particular, the first scenario was built to reflect the actual history of post-1990 Clean Air Act implementation, including known programs already established, and future programs and control strategies anticipated in the later years of the study period. This scenario was called the "with 1990 Clean Air Act Amendments scenario," or *With-CAAA* case for short, and it represents a world of lower emissions but higher costs following enactment of the 1990 Clean Air Act Amendments. The *With-CAAA* case is represented by the lower line in Exhibit 3, which depicts a not-to-scale schematic illustrating the scenarios analyzed.

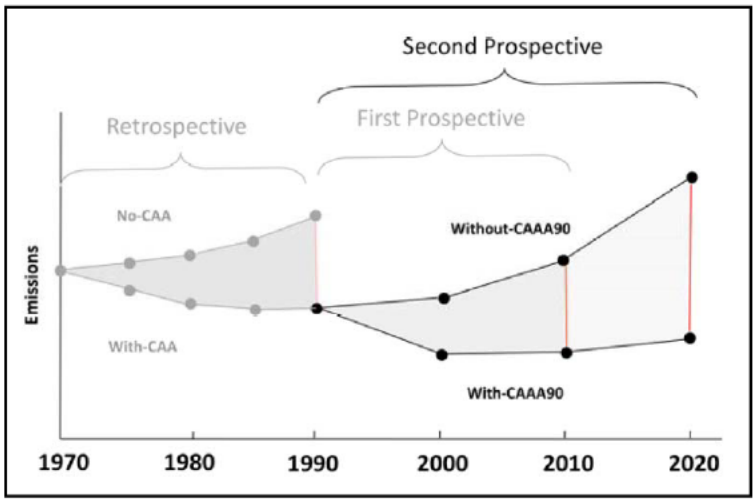

Exhibit 3. Second Prospective Study scenarios conceptual schematic. This exhibit is a schematic depiction of the scenarios to illustrate their timing and conceptual foundations. The differences in emissions between studies and between years are not to scale and should not be viewed as a comparison of emission reductions achieved between studies or between years.

The second, contrasting scenario reflects a hypothetical world which assumes federal Clean Air Act and related programs were frozen as of November 1990, the month the Amendments were signed into law. Therefore, 1990 serves as the "base year" of the analysis when the two

scenarios are initially set as equal but then begin to diverge. The counterfactual scenario was called the "without 1990 Clean Air Act Amendments scenario," or *Without-CAAA* case. The hypothetical *Without-CAAA* case is represented in Exhibit 3 by the upper 1990 to 2020 trend line showing the higher emissions which would result if standards stayed fixed but the economy and the population of the U.S. grew over the 1990 to 2020 period.

Once they were configured, the *With-CAAA* and *Without-CAAA* scenarios were processed through a series of economic and physical effects models, and their differences were estimated and compared. Specifically, each scenario was analyzed using a sequence of models to estimate what pollution control measures were (or might be) taken by government, private industry, and individuals; and what the effects of those measures might be in terms of economic and environmental change. The sequence of modeling steps followed to analyze the two scenarios is shown in Exhibit 4. Detailed descriptions of each analytical step –including the particular data, models, and methodologies used and their attendant uncertainties—are provided in the full integrated report and supporting technical documents.

One consequence of this sequential modeling approach is that the scenarios were defined early in the study. As such, this study reflects a particular snapshot in time with respect to known and anticipated control programs, especially those incorporated in the *With-CAAA* scenario. Several important programs, however, have been initiated or revised since the analytical scenarios were locked for the study in late 2005. For example, the *With-CAAA* scenario reflects the Clean Air Interstate Rule (CAIR) which had been recently promulgated when the scenarios were set, but this rule is now being replaced by a different rule designed to address the problem of long-range atmospheric transport of air pollution. Information about the estimated benefits and costs of recent rules is available in the relevant EPA Regulatory Impact Analyses.

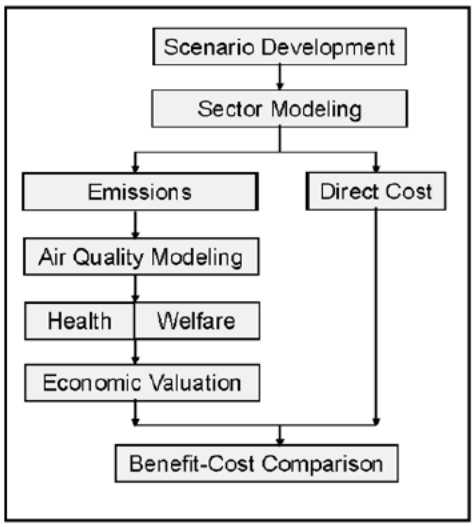

Exhibit 4. Analytical sequence of the Second Prospective Study. This flowchart shows the order of the major analytical steps followed to conduct the study.

To ensure high-quality, credible results, the study used the best available data and state-of-the-art modeling tools and methodologies. Most important, the design of the study, many of the intermediate methodological choices and findings, and the final results and their interpretation were all reviewed by the Council and its three technical subcommittees. The specialized expert review of the emissions and air quality, human health effects, and ecological effects study components by the three technical subcommittees complemented and supported the Council's broad expertise, which included substantial expertise in economics.

Primary Results

Direct Cost

Compared to the baseline scenario without the 1990 Clean Air Act Amendments and related programs, the *With-CAAA* scenario adds controls across five major categories of emission sources. All significant emissions sources are assigned to one of these five major source categories. Two of these categories cover stationary point sources of emissions, two cover mobile sources, and the fifth category covers smaller sources dispersed over wide areas. The categories are:

1. **Electricity generating units** (e.g., coal-fired power plants)
2. **Non-utility industrial sources** (e.g., industrial boilers, cement kilns)
3. **Onroad vehicles and fuel** (e.g., cars, buses, trucks)
4. **Nonroad vehicles and fuel** (e.g., aircraft, construction equipment)
5. **Area sources** (e.g., wildfires, construction dust, dry cleaners)

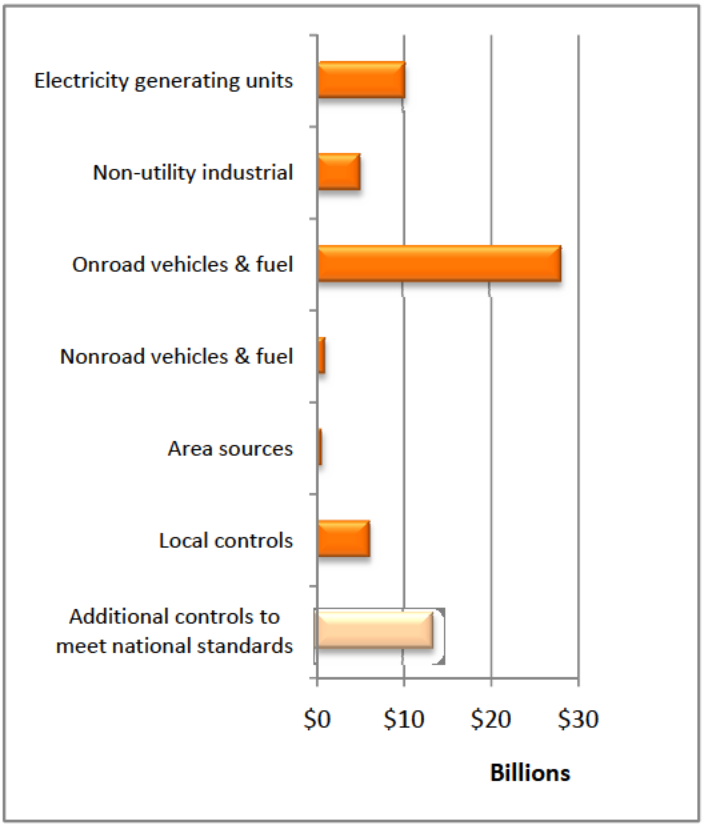

Exhibit 5. Year 2020 direct cost of compliance by source category. (In billions of year 2006 value dollars). The first five darker orange bars show how compliance costs compare for the five major categories of emissions source. Additional controls applied to these five source categories at the local level for the purposes of meeting air quality standards are shown by the sixth darker orange bar. The seventh, lighter orange bar also reflects additional local controls but these are shown separately because their costs are significantly more uncertain.

The costs incurred to reduce emissions from these sources under the 1990 Clean Air Act Amendments are estimated to rise steadily throughout the 1990 to 2020 study period. By 2020, the study target year when differences between the *With-CAAA* and *Without-CAAA* scenarios are at their greatest, additional annual compliance expenditures are estimated to be about $65 billion (in year 2006 value dollars).

As shown in Exhibit 5, these incremental costs of compliance did not fall evenly across the five major source categories. Almost half of the year 2020 direct costs are to meet requirements for onroad vehicles and the fuels used to operate them. About 40% of the $28 billion in onroad expenditures is to meet fuel composition requirements and the rest is incurred to meet tailpipe standards and implement vehicle inspection and maintenance programs.

Electric utilities account for the second largest area of expenditure, with costs in the year 2020 equal to a little over $10 billion. The programs leading to the bulk of these expenditures include the Title IV acid rain sulfur dioxide allowance trading program, the Clean Air Interstate Rule, programs targeted at reducing nitrogen oxide emissions (e.g., the NOx SIP Call), and controls required to meet the national ambient air quality standards for fine particles and ozone.

Implementation of federal and regional control programs to meet the national fine particle and ozone standards accounts for much of the cost incurred by the five major emissions source categories. However, for many local areas, emissions reductions achieved by these programs are not sufficient to reach attainment with national air quality standards. Under the Clean Air Act, these local areas are required to implement additional controls tailored to their particular needs and opportunities for the further emission reductions needed to improve air quality and attain the national standards. Expenditures for local controls which could be identified as both suitable for a given location and cost-effective to implement were estimated to reach about $6 billion by 2020.

By the year 2020, reaching the 8-hour National Ambient Air Quality Standard (NAAQS) for ozone in some locations appears to be a significant challenge. Some of these locations are assumed under the *With-CAAA* scenario to apply all controls identified as technologically feasible and cost-effective for their location yet still show modeled ozone concentrations higher than the 8-hour national standard. The *With-CAAA* scenario therefore assumes additional emissions reductions are achieved using "unidentified controls" of unknown cost and/or technological availability and applicability. Since the particular control strategies for each of these locations cannot currently be identified, their costs are highly uncertain. The *With-CAAA* scenario assumes that the additional emissions reductions achieved by unidentified controls will cost $15,000 per ton. The $15,000 per ton assumed value could turn out to be too high or too low depending on local circumstances and the prospects for near-term improvements in control technologies and cost, although there is some evidence that local areas would be reluctant to implement measures that cost more than $15,000 per ton. The total incremental cost of these additional local controls using unidentified technologies is estimated to be $13 billion. Given the relatively high level of uncertainty in this component of Clean Air Act program compliance costs, it is reported as a subtotal separate from the identified control measures subtotal of $52 billion.

Emissions Reductions

The controls applied across the major categories of emissions sources under the *With-CAAA* scenario achieve substantial reductions in emissions contributing to ambient concentrations of fine particles, ozone, and other air pollutants. As shown in Exhibit 5, the total costs of control from some sectors – such as electricity generating units and onroad vehicles and fuels—were high relative to other source categories, but these sources also achieved the greatest reductions in emissions. For example, onroad vehicles and fuel represent 46% of total control costs in 2020 but they also contribute 41% of the year 2020 reduction in total NO_X emissions. The full range of emissions reductions estimated under the *With-CAAA* case and the breakdown by source category are described in the full report, but the overall

reductions in pollutants which contribute most to changes in fine particles and ozone are highlighted in Exhibit 6.

In addition to directly-emitted fine particles,[5] three other pollutants designated for control under the Clean Air Act contribute to increases in ambient concentrations of fine particles through secondary formation and transport in the atmosphere.[6] For example, gaseous sulfur dioxide can be transformed in the atmosphere to particulate sulfates. Volatile organic compounds (VOCs) and nitrogen oxides are also key pollutants contributing to the formation of ground-level ozone.

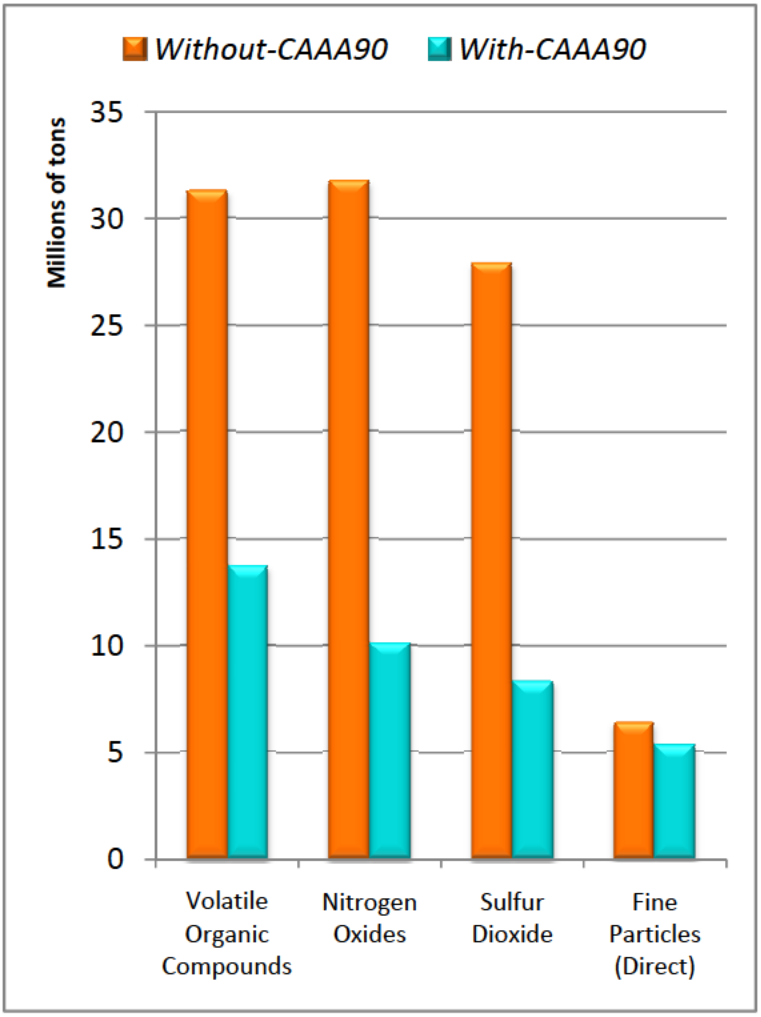

Exhibit 6. Year 2020 key pollutant emissions under the *With-CAAA* and *Without-CAAA* scenarios. (In millions of short tons). The difference in height between the orange and blue bars for each pollutant shows the estimated reduction in that pollutant achieved by 1990 Clean Air Act Amendment programs.

The estimated *With-CAAA* scenario emissions reductions depicted in Exhibit 6 are large because they reflect both absolute reductions relative to 1990 base year conditions and avoided increases in emissions which result under the *Without-CAAA* case when standards stay fixed at 1990 levels but economic activity increases from 1990 to 2020. Approximately 75 percent of the 2020 emissions reductions are attributable to improvements relative to 1990, while the remaining 25 percent is attributable to avoiding increases in emissions that could result if Clean Air Act standards stay fixed while population and economic activity grow.

[5] Fine particle pollution already in a solid or liquid aerosol state at the point of emission from a tailpipe or construction site is commonly referred to as "directly emitted fine particles," or sometimes "primary particles." In contrast, fine particles which form in the atmosphere later from gaseous precursors, such as sulfur dioxide, are referred to as "secondary fine particles."

[6] In recent years the importance of ammonia in secondary formation of fine particle air pollution has become clearer. However, unlike the other pollutants shown in Exhibit 6, ammonia is not currently a designated air pollutant under the Clean Air Act, and there are no explicitly assumed differences in control requirements for ammonia between the *With-CAAA* and *Without-CAAA* scenarios.

Most of the reduction in volatile organic compounds is achieved by controls on evaporative emissions from area sources such as household solvents, controls on vehicle and nonroad engine tailpipe and evaporative emissions, and controls on non-utility industrial sources.

For nitrogen oxide emissions, all five major source categories achieve emissions reductions under the *With-CAAA* scenario; but the most substantial contributions to lower emissions are attributable to tailpipe standards for onroad vehicles and reductions achieved by utilities subject to cap-and-trade programs and/or the Clean Air Interstate Rule. Requirements related to the national standards for fine particles also reduce nitrogen oxides emissions.

Electricity generating units such as coal-fired power plants are the source category which achieves the most significant reductions in sulfur dioxide emissions, accounting for about 75 percent of the total reduction projected in 2020. Cap-and-trade programs, the Clean Air Interstate Rule, and other control programs implemented pursuant to the national fine particle standards account for most of the estimated difference in sulfur dioxide emissions between the *With-CAAA* and *Without-CAAA* scenarios.

About 40 percent of the year 2020 reduction in directly-emitted fine particles is achieved by controls on area sources such as construction dust and residential woodstoves. Reductions from utilities and from nonroad and onroad sources also contribute toward meeting the requirements of the national ambient air quality standards for fine particles.

Air Quality Improvements

The substantial reductions in emissions which contribute to ambient concentrations of ozone and fine particles lead to significant differences in modeled air quality conditions under the *With-CAAA* and *Without-CAAA* scenarios. Air quality modeling results for all pollutants and all target years analyzed in this study are available in the full report, though the estimated change in fine particle concentrations is highlighted here because reductions in exposure to this pollutant are responsible for the vast majority of benefits which could be evaluated in economic terms for this study.

Exhibit 7 shows that reductions in fine particle concentrations by 2020 are large and widespread, as demonstrated by the pervasive blue colors indicating improvement in air quality. The most significant reductions occur in California and the Eastern U.S., especially the Ohio Valley region, primarily due to sulfur reductions from electric utilities and industrial facilities combined with mobile source reductions concentrated around heavily-populated metropolitan areas. Because these areas had relatively high fine particle concentrations in the 1990 base year, the modeling results imply that 1990 Clean Air Act Amendment programs were effective in targeting high emissions sources in and around locations where improvements in air quality would benefit the greatest number of people. There are a few locations in the West where fine particle concentrations are estimated to be slightly higher in 2020 under the *With-CAAA* scenario due to localized effects related to electrical generating unit dispatch or fuel choice. These localized disbenefits, shown by the isolated spots of orange color in Exhibit 7, are negligible

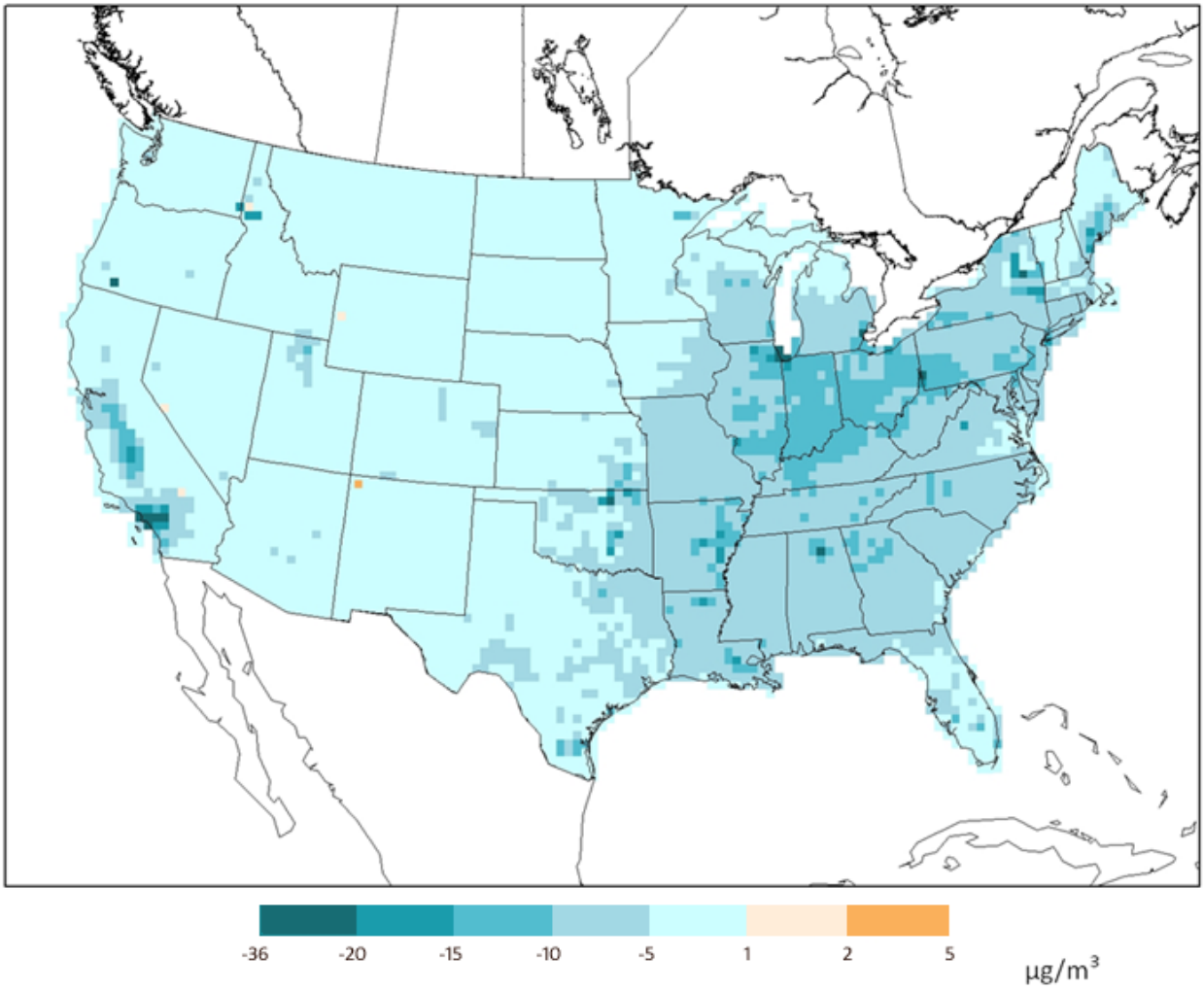

Exhibit 7. Difference in annual average fine particle (PM2.5) concentrations between the *With-CAAA* and *Without-CAAA* scenarios: *With-CAAA* minus *Without-CAAA* for 2020. (In micrograms per cubic meter). The map shows the change in concentrations of fine particles in the atmosphere achieved by 1990 Clean Air Act Amendment programs. The darker the blue color, the greater the improvement in air quality. The few spots of orange on the map are isolated locations where the air quality model projected slightly higher fine particle concentrations under the *With-CAAA* scenario than under the *Without-CAAA* scenario.

compared to the large and widespread overall reductions in fine particle pollution under the *With-CAAA* case.

Ozone concentrations are also significantly lower overall under the *With-CAAA* scenario relative to the *Without-CAAA* scenario. As shown by maps provided in the full report, the patterns of air quality improvements for ozone are similar to those observed for fine particles with widespread regional improvements across the East and improvements in the West occurring predominantly in areas influenced by Southern California population centers.

Health Improvements

The steady improvements in air quality estimated under the *With-CAAA* case from 1990 to 2020 period lead to increasing health and environmental benefits over the entire study period. By 2020, the differences in air quality and human health outcomes between the *With-CAAA* and *Without-CAAA* scenarios are considerable.

Fine Particle and Ozone Pollution

The largest reductions in fine particle concentrations are achieved in areas with relatively poor air quality and/or high population density (see Exhibit 7). This result is due in large part to the effective design of federal, state, and local programs aimed at meeting ambient air quality standards in ways which maximize public health improvements. The effectiveness of these programs in achieving well- targeted reductions in exposure means that the differences in health outcomes between the *With-CAAA* and *Without-CAAA* scenarios are substantial, even dramatic.

For example, as early as 2000, annual average exposures[7] to

Health Effect Reductions (PM2.5 & Ozone Only)	Pollutant(s)	Year 2010	Year 2020
PM2.5 Adult Mortality	PM	160,000	230,000
PM2.5 Infant Mortality	PM	230	280
Ozone Mortality	Ozone	4,300	7,100
Chronic Bronchitis	PM	54,000	75,000
Acute Bronchitis	PM	130,000	180,000
Acute Myocardial Infarction	PM	130,000	200,000
Asthma Exacerbation	PM	1,700,000	2,400,000
Hospital Admissions	PM, Ozone	86,000	135,000
Emergency Room Visits	PM, Ozone	86,000	120,000
Restricted Activity Days	PM, Ozone	84,000,000	110,000,000
School Loss Days	Ozone	3,200,000	5,400,000
Lost Work Days	PM	13,000,000	17,000,000

Exhibit 8. Differences in key health effects outcomes associated with fine particles (PM2.5) and ozone between the *With-CAAA* and *Without-CAAA* scenarios for the 2010 and 2020 study target years. (In number of cases avoided, rounded to 2 significant digits). The table shows the reductions in risk of various air pollution-related health effects achieved by 1990 Clean Air Act Amendment programs, with each risk change expressed as the equivalent number of incidences avoided across the exposed population.

[7] "Average exposure" in this case refers to "population-weighted annual average exposure," which is calculated by dividing the total population exposure over the course of a year by the total number of people in the exposed population. This measure provides a helpful summary indicator of overall exposures and exposure changes, in this case across all people living in the 48 states; though people living in particular locations may experience much higher or much lower exposures or exposure changes than people in other locations. To illustrate, consider a population of three people where two people experience a change in exposure from 30 to 10 micrograms per cubic meter ($\mu g/m^3$), and a third person's exposure change is from 25 to 20 $\mu g/m^3$. The change in population-weighted average exposure would be (20+20+5) divided by 3 = 15 $\mu g/m^3$. While the 15 $\mu g/m^3$ change provides a

fine particles among the U.S. population are lower by an average of 5 micrograms per cubic meter under the *With-CAAA* scenario. By 2020, the average exposure difference between the scenarios increases to an estimated 9 micrograms per cubic meter, all as a result of programs related to the 1990 Clean Air Act Amendments. This 9 microgram per cubic meter reduction is tantamount to cutting exposures almost in half, because the population average exposure for 2020 under the *Without-CAAA* scenario is slightly higher than 19 micrograms per cubic meter.[8]

The large reduction in risk of premature mortality associated with fine particles is the most significant outcome among those listed in Exhibit 8. Ozone health studies also indicate there is a separate, additive contribution to reduced premature mortality risk from this pollutant beyond the premature mortality effect associated with fine particle exposures. This study's estimates for these incidence reductions are based on a strong and extensive foundation of peer-reviewed epidemiological literature. The methodologies used to apply these epidemiological studies to the estimation of reduction in population risks from fine particle and ozone exposure have also been extensively peer-reviewed.

In addition to reductions in incidences of premature mortality,[9] reductions in exposure to fine particles and ozone are also estimated to achieve major reductions in serious diseases such as chronic bronchitis and acute myocardial infarction, as well as fewer hospital admissions, emergency room visits, lost work days, and lost school days.

Hazardous Air Pollutants

Controls on emissions of hazardous air pollutants, including heavy metals and toxic gases, are known to reduce adverse health effects, though data and tools to quantify the full extent of the reductions in health risks from these pollutants are limited. A case study assessing the effects of the 1990 Clean Air Act Amendments in reducing benzene emissions and exposures in the Houston area was conducted as part of this study. The study found a significant cancer-reducing benefit overall in the region, but also found that 1990 Clean Air Act Amendment programs led to the most substantial reductions in those areas with the highest baseline cancer risks. These results are described in detail in the full report and in a separate technical report documenting the Houston benzene case study.

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useful measure of the shift in overall population exposure, it may obscure the fact that the third individual experienced a significantly smaller improvement and is left with a significantly higher residual exposure.

[8] For perspective, this level of population-wide annual average fine particle exposure is about the same as that experienced by people living in Los Angeles in the year 2000. (See Text Box 4-1 of the full report.)

[9] The term "incidence" is not intended to represent premature mortality of a particular known individual, but rather small reductions in risk experienced by many people that sum to an aggregate change in population risk numerically equivalent to one avoided premature mortality.

Other Clean Air Act Pollutants

Reductions in ambient concentrations of other Clean Air Act pollutants such as carbon monoxide also confer health benefits, though many of these benefits are difficult to quantify for various reasons. For example, in the case of carbon monoxide, available health studies are not well suited to isolating the incremental contribution of carbon monoxide reductions to improved health when significant reductions in other pollutants, such as fine particles, are modeled at the same time. Furthermore, health effects of some pollutants can be quantified in physical terms but economic studies supporting valuation of the changes in physical outcomes are unavailable. Whether the limits on quantification of these other criteria pollutant[10] effects emerge at the physical effect or economic valuation step, the result is that these effects are not reflected in the primary estimates of health improvements presented in this report.

Other Benefits to People and the Environment

Beyond the direct health benefits of Clean Air Act programs, a variety of other improvements to human well-being and ecological health are assessed in this study. Efforts to evaluate these other "non-health" effects were motivated by the study's goal of providing insights on the full range of outcomes which may affect people and the environment, including those which might either be important to particular stakeholders or warrant further research to support more or better quantitative treatment in future studies.

The first step in this study's assessment of non-health effects was a literature survey to identify ecological effects of Clean Air Act-related pollution reductions at various levels of biological organization (e.g., ecosystem, community, individual, cellular). The range of potentially relevant effects found in this literature review is described in the full report and supporting technical documents. Based on the results of this broad assessment, the analysis was then narrowed to focus on those ecological and human health effects for which economic valuation information was available and could be applied. This narrowing of focus served the principal goal of the study,

Quantified Human Welfare and Ecological Effects	Pollutant(s)
Visibility in residential areas (metropolitan areas)	PM, Ozone
Visibility in recreational areas (large parks in three regions)	PM, Ozone
Commercial timber (commercially important tree species)	PM, Ozone
Agriculture (commercially important crops)	Ozone
Recreational fishing (Adirondacks)	Acid Deposition
Materials damage (a few acid-sensitive materials)	Sulfur Oxides

Exhibit 9. Ecological and welfare effects included in primary estimates of benefits. For each effect in the table, the limited geographic range or the subset of effects included in the primary results is listed in parentheses.

[10] There are six Clean Air Act "criteria pollutants" for which national ambient air quality standards are established: particulate matter, ozone, carbon monoxide, sulfur dioxide, nitrogen oxides, and lead (Pb).

which was to evaluate the various health, economic, and environmental effects of the Clean Air Act using comparable measures of value. In the end, only a very limited number of non-health effects could be included in the primary estimate of benefits, and these quantified and monetized ecological and welfare effects are listed in Exhibit 9.

In addition to limitations in the range of effects included in the primary results, several of the included effects were subject to limitations in geographic coverage or the number of commodities or ecosystems covered. The limited scope of quantified effects or limited geographic coverage for each effect is described in Exhibit 9. For example, available data and modeling tools supported assessment of the effects of changes in ozone exposure only for select, commercially important crops and tree species; and other effects such as changes in recreational fishing opportunities due to acidic deposition could only be addressed through case study examinations not suitable for extrapolation to other areas of the country. This study is therefore subject to the same persistent limitations in data and methods for evaluating potentially important ecological and human welfare outcomes which have impaired other benefit-cost studies of air pollution control programs. The consequence is ongoing uncertainty about the potential magnitude of these effects relative to the human health effects which can be more readily evaluated in terms of physical outcomes and changes in economic value.

Visibility

Based on measurable economic value, improvements in visibility emerged as one of the most significant non-health effects of better air quality under the *With-CAAA* scenario. A new methodology was applied to estimate the economic value of visibility improvements in metropolitan areas, and the effect of this new approach was to expand the number of locations where visibility improvements could be valued in economic terms. The significance of the results obtained using this new methodology highlights the importance of improved visibility for enhanced quality of life.

There are two types of visibility improvement benefits estimated in this study: recreational visibility and residential visibility. Recreational visibility benefits reflect the values people assign to reductions in obscuring haze and resulting improvements in scenic views at important U.S. recreational areas, such as the Grand Canyon and other federal "Class I" areas.[11] Residential visibility benefits capture the value people assign to improved visibility where they live.

The differences in air pollution-related visibility impairment under the *With-CAAA* and *Without-CAAA* scenarios used to estimate both recreational and residential visibility benefits are shown in Exhibit 10. While benefits are estimated for all target years of the study, Exhibit 10 contrasts the county-level visibility conditions under the *With-CAAA* case relative to the *Without-CAAA* case for the year 2020. Visibility impairment is measured in Deciviews, which is a rating scale aimed at measuring and then valuing perceptible changes in visibility. In Exhibit 10, the darker the color, the greater the impairment

[11] Under the Clean Air Act, a "Class I" area is one in which visibility is protected more stringently than under the national ambient air quality standards. Class I areas include national parks, wilderness areas, monuments, and other areas of special national and cultural significance.

in visibility; so the lighter orange areas in the lower *With-CAAA* map indicate improved visibility resulting from 1990 Clean Air Act Amendment programs.

Previously established methods were used to estimate visibility improvements at federal Class I areas across the U.S. Because of limitations in the applicability of available economic valuation studies, however, the primary estimate of benefits presented herein includes only 86 parks and recreational areas in California, the Southeast, and the Southwest. The total value of visibility improvements at these 86 Class I areas is estimated to reach $19 billion by the year 2020.

Applying the new methodology supporting expanded coverage of U.S. metropolitan areas, residential visibility benefits are estimated to reach $49 billion in 2020, a number which is significant but consistent with the substantial improvements in visibility across major population centers. The $67 billion combined total for residential and recreational visibility benefits in the year 2020 slightly exceeds the entire $65 billion estimated cost of 1990 Clean Air Act compliance for that year.

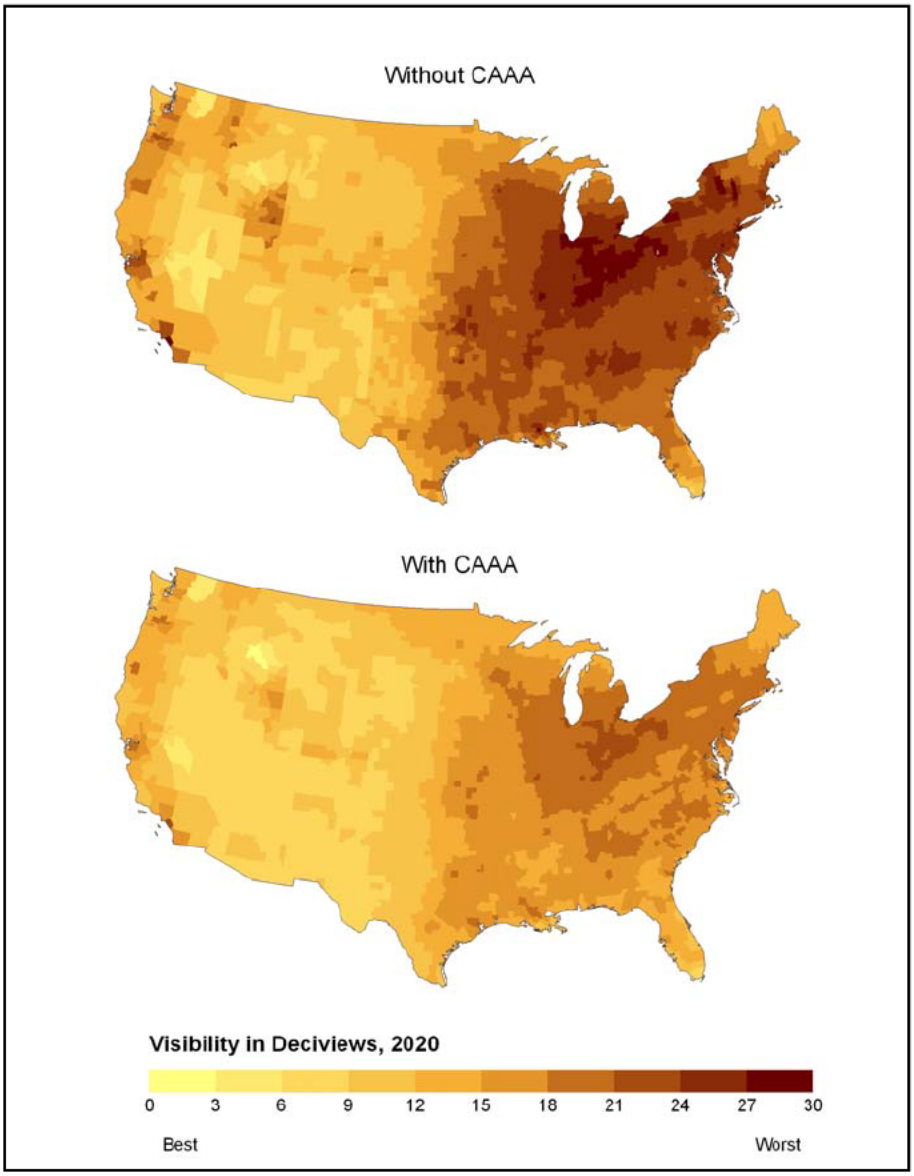

Exhibit 10. Visibility conditions at the county level under the *With-CAAA* and *Without-CAAA* scenarios for 2020. (In Deciviews). The maps show visibility conditions under each scenario with lighter colors indicating better visibility.

Comparison of Direct Costs and Direct Benefits

The final step in the benefit-cost analysis conducted for this study was to express the various health, welfare, and environmental benefits of 1990 Clean Air Act Amendment programs in dollar values so the benefits could be compared to the dollar-based estimates of control costs. As illustrated in Exhibit 11, comparison of the central estimates for benefit and costs supports a conclusion that programs related to the 1990 Clean Air Act Amendments are expected to yield benefits which vastly exceed their costs.

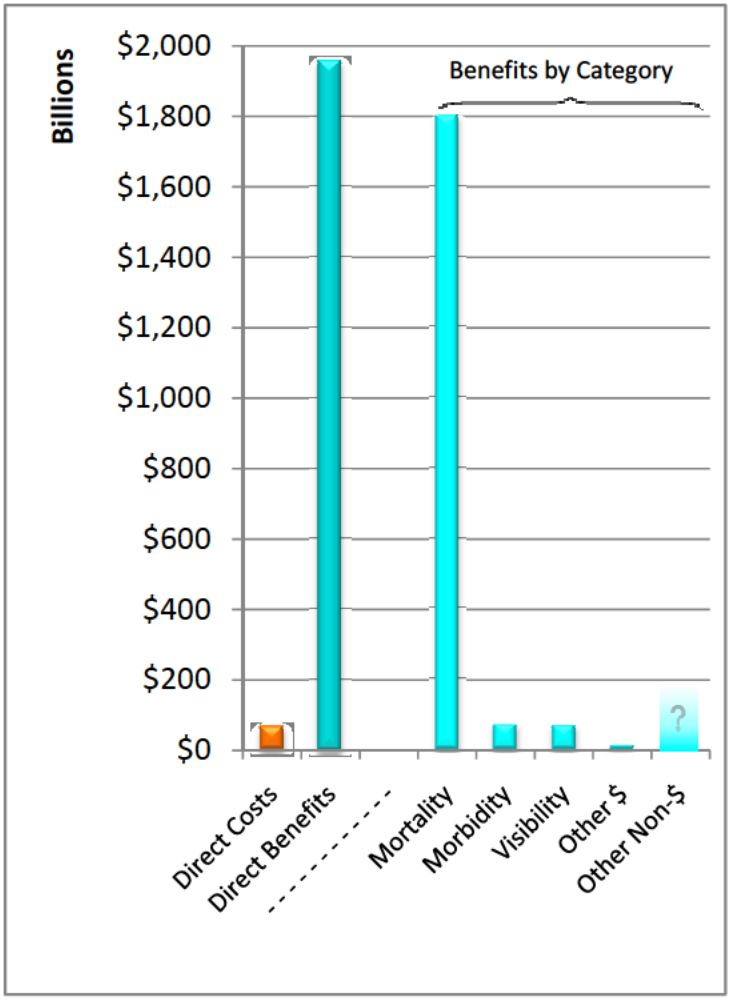

Exhibit 11. Year 2020 Primary Central Estimates of direct costs and direct benefits with breakdown of benefits by effect category. (In billions of year 2006 dollars). The two leftmost bars show the extent to which total benefits exceed total costs, and the bars to the right provide the breakdown of benefits by category of effect. The third bar shows the extent to which mortality reduction benefits exceed all other effects, including total costs. The Other Non-$ bar to the right is intended to emphasize the extensive benefit endpoints which could not be monetized, and the question mark indicates the potential value of these effects is unknown.

EPA is confident that this finding of positive net benefits of 1990 Clean Air Act Amendment programs is robust for several reasons. First, the benefits of improved morbidity and improved visibility alone are more than twice the estimated cost of compliance with 1990 Clean Air Act Amendment requirements; so even if one chose to ignore the substantial reductions in mortality risk achieved by these programs or assigned them a value of zero, benefits would still be projected to exceed costs. Second, many beneficial outcomes involving human health or environmental improvement could not be expressed in terms of economic values because the scientific and economic studies to support such valuations remain inadequate or unavailable. If methods were available to quantify these omitted effects, the estimate of net benefits would further increase. Some components of cost are also subject to uncertainty or omission, but cost uncertainties are comparatively minor in number and significance relative to uncertainties on the benefit side of the ledger. Finally, the in-depth assessment of key uncertainties described in the full report indicates that the chances are

extremely small that uncertainties in the analysis could lead to a scenario in which costs exceed benefits.

Those who nevertheless find that uncertainties and other limitations of benefit-cost analysis render these results less than satisfactory for obtaining policy insights may prefer to use other paradigms for measuring, comparing, and evaluating the outcomes projected by this study. For example, it is possible to avoid assigning uncertain dollar-based values to changes in risk of premature mortality and, instead, compare the costs of Clean Air Act programs with the projected number of avoided incidences of premature mortality or illness. The full report for this study and the supporting technical documents provide details about the estimated benefits achieved in terms of physical outcomes as well as the estimated economic value of those outcomes, and these detailed results can be used to support alternative assessments of value.

One example of an alternative paradigm for assessing and comparing the value of premature mortality risk reductions achieved by the 1990 Clean Air Act Amendment programs is to divide compliance costs for a given year by the number of incidences of avoided premature mortality

Estimating and Valuing Reductions in Risk of Premature Mortality

Exposure to some forms of air pollution increase a person's chances of experiencing an illness they would not otherwise have experienced, or dying earlier than would otherwise have been expected. For the fine particle pollution which dominates the outcome of this benefit-cost study, changes in health risk differ among individuals based on factors such as age and initial health status. For example, individuals who have already experienced stroke or heart disease may experience a different loss in future life expectancy due to increased exposure to fine particle pollution than others in the population might experience. This variability in risk from a given change in pollution exposure means that different individuals experience different shifts in their "survival curve" which, in the air pollution context, represents the expectations an individual may have for additional years of life as different ages are reached. This variability among different segments of the population complicates efforts to estimate the overall change in risk experienced by the population as a whole following implementation of programs such as those associated with the Clean Air Act.

Moreover, a further complication arises in the context of benefit-cost analyses aimed at gauging the value to society of the reductions in premature mortality risks achieved by these programs. In addition to variability in how different individuals' survival curves shift when fine particle pollution is reduced, different individuals may also assign different values to a given shift in their survival curve. The extents to which people may assign different economic values to mortality risk reductions based on age, initial health status, or the source or nature of the risk (e.g., voluntary versus involuntary, sudden versus protracted) are significant uncertainties.

In the absence of sufficient scientific and economic data and tools for capturing the variability within the population in both the reduction in risk and the value individuals assign to such risk reduction, the estimates for both the population-wide risk change and the overall value to society of the aggregate risk change are uncertain. While the methods used for this study are state-of-the-art and consistent with other recent analyses, the key uncertainties which nevertheless persist in estimating the magnitude and value of changes in mortality risk due to air pollution are discussed and evaluated in detail in this study's full report and in the technical reports on health effects and on uncertainty which accompany this study.

projected to result from that year's emissions reductions. The result of this calculation for *With-CAAA* emission reductions achieved in the year 2020 is about $280,000 per avoided incidence of premature mortality. This and similar calculations, however, must be interpreted cautiously because cost-effectiveness comparisons typically divide costs by an effectiveness measure for a single beneficial outcome. Using the current example, comparing costs only to reductions in incidences of premature mortality may result in a failure to account for other potentially important benefits such as improved ecosystem protection.

While this study provides data supporting various approaches for evaluating Clean Air Act program outcomes, a central objective of the study was to estimate the net economic benefit (i.e., quantified direct benefits minus quantified direct cost) of differences between the *With-CAAA* and *Without-CAAA* scenarios. The separate totals for benefits and costs were reported earlier based on rounding to two significant digits to avoid creating an undue impression of precision in the estimates. The specific outcomes for the year 2020 are direct costs of $65 billion and direct benefits of $2,000 billion (i.e., $2 trillion). Prior to rounding to two significant digits for reporting purposes, the benefit estimate is $1,951 billion. Subtracting the $65 billion in direct costs from $1,951 billion in direct benefits results in a net benefit estimate of $1,886 billion, which resolves to a two significant digit estimate of $1,900 billion (in year 2006 value dollars).

Comparison of First Prospective Study and Second Prospective Study benefit estimates for the year 2010.

The previous study in this series of reports, the First Prospective Study, was published in 1999. Since then, significant improvements have been made in air pollution-related benefit-cost analysis data and methods, especially those associated with fine particles and ground-level ozone pollutants which are the focus of the present study. Insights about the significance of these methodological changes can be gained by comparing the results of the current study with those of the previous study for the year 2010, a key target year common to both analyses.

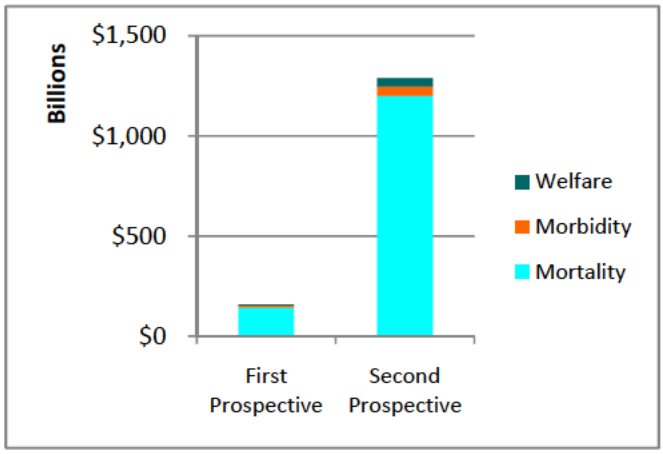

Exhibit 12. Comparison of 2010 Benefits from First and Second Prospective Studies. (In billions of year 2006 dollars)

As shown in Exhibit 12, benefits estimates for all three main categories of effect are significantly higher for the current study. There are several reasons these differences are so significant. Some of the difference results from the addition of several new and important control programs implemented since 1999, including the Clean Air Interstate Rule and major programs to reduce onroad and nonroad emissions. Welfare and morbidity effects are also higher because of the addition of new endpoints, such as improvements in residential visibility and reductions in acute myocardial infarctions. Air quality models have also been significantly improved since 1999, allowing analysis of fine particle species such as secondary organic aerosols which had been omitted in the First Prospective Study. The most influential change, however, appears to result from updates over the last decade in the epidemiological studies which provide estimates of changes in population risk of premature mortality associated with exposure to fine particles.

Avoiding incidences of premature mortality, especially those associated with exposure to fine particles, contributes the vast majority of the direct benefits of 1990 Clean Air Act programs measured in dollar value terms, as shown in Exhibit 11. There are two principal reasons mortality effects dominate the estimated differences in value between the *With-CAAA* and *Without-CAAA* cases. First, the differences in air quality, human exposure, and resulting risk of premature mortality between the two scenarios are substantial. Second, these changes in risk of premature mortality are estimated to have significant economic value, as measured by studies that assess what people are willing to pay to reduce such risks.

The methods used in this study for valuing reductions in risk of premature mortality are consistent with the methods used in the two prior studies in this series, with prevailing default values described in longstanding EPA economic guidelines, and with recent EPA Regulatory Impact Analyses. In addition to being consistent with current EPA policy and longstanding EPA practice, the valuation estimates used are close to estimates emerging in recent literature. Nevertheless, assigning appropriate value to premature mortality risk reductions achieved through air pollution control remains a significant challenge as described in the text box entitled *Estimating and Valuing Reductions in Risk of Premature Mortality* and in this study's full report and supporting technical documents.

Other categories of benefits presented in Exhibit 11 include total morbidity effects, visibility improvements, other welfare and ecological effects which could be expressed in terms of dollar values, and other welfare and ecological effects which were not quantified and monetized in the primary estimates of benefits for this study. This last category of benefits is presented as a question mark in Exhibit 11 to emphasize that the potential contribution to total benefits of these unquantified effects is simply unknown, but could conceivably be substantial.

Economy-Wide Effects

The main results of this study are the direct benefits of 1990 Clean Air Act programs relative to the direct costs of those programs. However, some public policy programs have such significant economic effects that they can influence the levels and patterns of activity across the larger economy, and it can be important to assess these broader economic consequences. The differences between the *With-CAAA* and *Without-CAAA* scenarios modeled in this study were expected to manifest these types of large, "spillover" effects on important sectors of the economy due, for example, to the potential effects of higher electricity prices under the *With-CAAA* case on sectors which are major consumers of electricity. Therefore, a macroeconomic model of the overall economy was configured and run to estimate how the size and structure of the economy might be different under the two scenarios analyzed. In addition to estimating changes in overall growth of the economy as measured by Gross Domestic Product (GDP),

the macroeconomic model provided estimates of the change in "equivalent variation (EV)"[12] a measure of the economic welfare of individuals or households.

Two macroeconomic model runs were conducted. The first model run evaluated the effect on the overall economy of just the additional cost of air pollution controls under the *With-CAAA* case relative to the *Without-CAAA* case. The second model run incorporated these higher compliance costs but also added in some of the beneficial effects of cleaner air under the *With-CAAA* case; specifically, improvements in labor force participation and productivity, and savings on costs of treating air pollution-related illnesses.

While the key outcomes of changes in overall economic growth and in household economic welfare are presented in this summary report, the full set of modeling results, including the changes in output from each of the economic sectors covered by the macroeconomic model, are presented in the full report and supporting technical document.

Macroeconomic Model Run A: Compliance Costs Only

The first macroeconomic model run followed the customary practice of altering only cost-side effects, in this case the effects of diverting significant resources toward air pollution control and away from other potential economic uses of those resources. In particular, the macroeconomic model was configured to assess the effects of larger investments in air pollution control under the *With-CAAA* scenario on prices and quantities of goods and services produced and consumed by different sectors, including households and various categories of industrial activity.

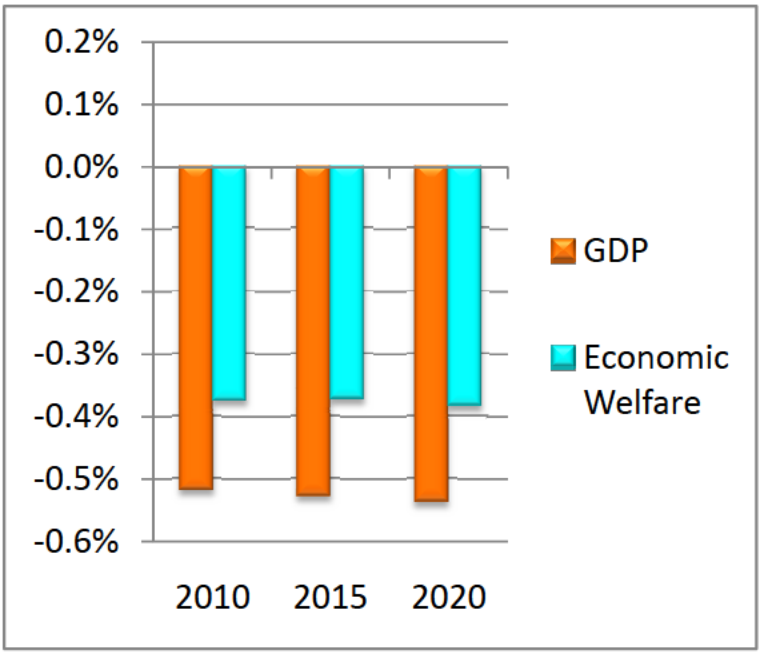

Exhibit 13. Differences in "Cost Only" model projections of GDP and economic welfare between the *With-CAAA* and *Without-CAAA* scenarios. For the set of economy-wide model runs which excluded beneficial effects of clean air, the orange bars indicate that economic growth as measured by Gross Domestic Product is lower throughout the study period. The blue bars indicate that the measure of economic welfare generated by the economy-wide model is also lower through the end of the study's reference period.

[12] "Equivalent variation" is an economic term for the amount of money someone would pay to avoid a change in prices or other market conditions which affect their economic well-being. In the present context, it provides a measure of the total value that people participating in the formal economy would assign to changes in markets for goods and services, including their own labor, associated with implementation of the 1990 Clean Air Act Amendments. Important limitations in this measure of welfare are described in the text box entitled *Measuring "Economic Welfare."*

The key overall results of the "Cost Only" run are shown in Exhibit 13. These key effects include both changes in overall 2010 to 2020 economic growth resulting from the investments made in Clean Air Act programs between 1990 and 2020, and the effect of changes in growth and sector-specific activity on the economic welfare of households. The results for the "Cost Only" run show that economic growth is about 0.54% lower in the year 2020 under the *With-CAAA* scenario than under the *Without-CAAA* scenario, mostly due to the effects of higher energy costs on various sectors of the economy. The macroeconomic model's measure of household economic welfare in 2020 is lower under the *With-CAAA* scenario by about 0.39%. The household welfare change is smaller than the reduction in GDP due to adjustments made by households which offset the adverse effect of reductions in household consumption of goods and services. The dollar equivalent of this 0.39% reduction in household economic welfare is about $75 billion.

The implication of the "Cost Only" macroeconomic modeling is that 1990 Clean Air Act programs both shrank the economy relative to what it would have been without these programs, and caused the average household to incur a small decrease in economic well-being, though there are important limitations in the macroeconomic model's measure of household economic welfare. (See the text box entitled *Defining "Economic Welfare."*)

However, in reality, effective air pollution control programs do not simply impose costs on the economy. They also improve air quality, which in turn affects the health and productivity of workers, reduces household medical expenditures for air pollution-related health problems, and protects the quality of the environment on which economic activity and growth depend.

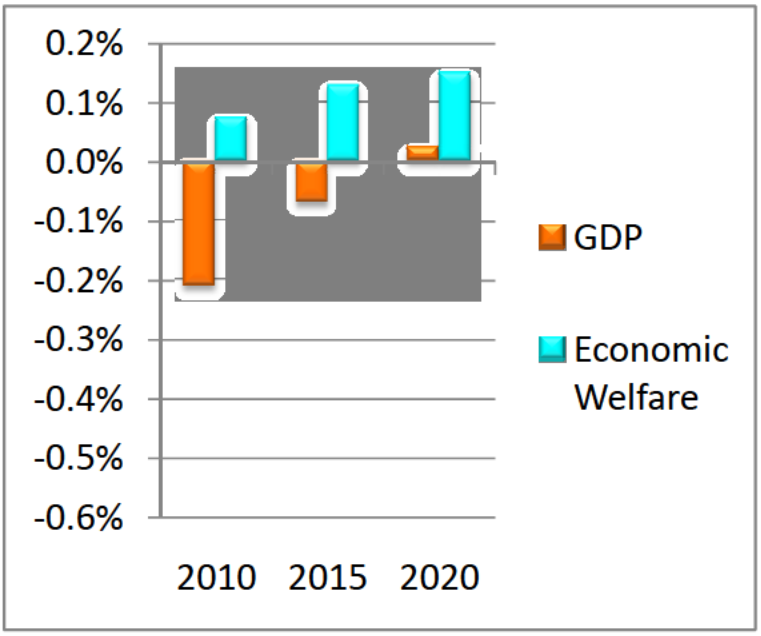

Exhibit 14. Differences in "Labor Force-Adjusted" model projections of GDP and economic welfare between the *With-CAAA* and *Without-CAAA* scenarios. A comparison of this chart with the preceding one (Exhibit 13) shows the significant changes in economy-wide modeling which occurred when just two of the beneficial effects of clean air were incorporated. Economic growth as depicted by the orange bars is initially lower but by the end of the study period 1990 Clean Air Act Amendment programs lead to higher overall growth in the economy. The blue bars indicate growing improvement in the measure of household economic welfare, a result which occurs because of the two beneficial effects of cleaner air and the fact that welfare is not determined by economic growth alone. Including more of the beneficial effects of cleaner air would likely result in even greater improvements in economic growth and household economic welfare.

Macroeconomic Model Run B: Adding Labor Force Improvements and Avoided Medical Costs

This study, for the first time, attempts to capture the broader economic effect of at least some of the benefits along with all of the estimated direct costs of 1990 Clean Air Act Amendment

programs. This was accomplished by adjusting the macroeconomic model's inputs and configuration to reflect some of the reductions in lost work days resulting from health improvements modeled in the health effect analysis. In addition to these labor productivity improvements achieved by reducing lost work days, the "Labor Force-Adjusted" model runs were configured to include the savings in medical expenditures implied by improved health outcomes projected under the *With-CAAA* scenario.

Exhibit 14 shows the results for the "Labor Force-Adjusted" macroeconomic modeling of the *With-CAAA* and *Without-CAAA* scenarios, and the results are very different from those obtained from the "Cost Only" model runs. By capturing some of the benefit-side effects, GDP eventually improves overall, and the measure of household economic welfare change is positive throughout the modeled period. Compared to the 0.54% reduction in GDP for the year 2020 under the "Cost Only" run, GDP is higher by 0.02%. Household economic welfare is also higher, reflecting a 2020 welfare improvement of 0.15% rather than a 0.39% reduction under the "Cost Only" method. The 0.15% welfare improvement for households under the "Labor Force-Adjusted" method is equivalent to about $29 billion for the year 2020. This estimate of welfare improvement is much smaller than that estimated in the main benefit-cost calculations because it excludes almost all of the value of mortality risk reduction, most of which cannot yet be incorporated in the type of economy-wide model used here.

Measuring "Economic Welfare"

The formal, measured economy –as represented in this study's economy-wide model–captures many aspects of the welfare of households, such as wages earned and the cost of goods and services. However economic models do not capture everything which affects people's welfare. For example, economic models do not capture the full costs of adverse health effects from air pollution. They may capture what people spend for preventive measures or medical costs, but they don't effectively capture the value people assign to avoiding the pain and suffering, inconvenience, or many other costs of being afflicted. Therefore, economic welfare as measured in a model of the overall economy provides only a limited measure of the changes which affect quality of life. For this reason, the principal focus of the present study is to estimate the direct benefits of air quality improvements using more complete, "willingness to pay" measures of economic value and comparing those direct benefits to the direct costs of regulatory compliance. Both measures of welfare change, however, provide potentially useful insights about the economic and welfare consequences of Clean Air Act programs.

Uncertainties

Benefit-cost studies of environmental programs are often highly complex, involve limited or uncertain scientific and economic data, and rely on models and other tools to simulate real world processes such as the atmospheric dispersion, transformation, and transport of air pollutants. Furthermore, external factors and conditions –such as rates of technology change or shifts in geographic patterns of economic activity—may also influence estimates of the benefits and costs of air pollution control programs. To meet the analytical challenges posed by these complexities and uncertainties, this study applied the best

available data and modeling tools, and used an extensive three-step approach to identify uncertainties and assess how they might influence the study's results.

For each major analytical step, beginning with development of emissions inventories and continuing through economic valuation of effects, potentially significant sources of uncertainty in the benefit and cost estimates were identified. Each "source of potential error" was evaluated to assess the direction and potential magnitude of its influence on the study's results. For some factors, alternative data or models were available which could be used to measure uncertainty in quantitative terms. Using quantitative methods where they were available –and analyst judgment where they were not—sources of potential error were classified as major or minor depending on whether reasonable shifts in their value could change the study's overall estimate of net benefits by more or less than five percent.

On the cost side, a number of uncertainties were identified, including cost components which are known to exist but could not be quantified, and cost components which were included but involve uncertain factors. As an example of an omitted effect, this study does not attempt to quantify the effect of clean air programs on the quality or features of affected products, such as the surface adhesion properties of paint reformulated to reduce emissions of volatile organic compounds. On the other hand, potential beneficial effects of product reformulation or redesign were also excluded. Staying with the example of paint reformulation, the study also omits the benefit of reducing indoor exposures to volatile organic compounds which are toxic.

Among the cost components which could be quantified, key uncertainties include the costs incurred by areas projected to need emissions reductions beyond those achievable by known cost-effective control measures, the effects on compliance cost of increasing industry experience with a given technology (i.e., "learning effects") as well as the effects of more fundamental technology change, and estimates of the percentage of vehicles failing to meet vehicle inspection and maintenance (I&M) requirements. In the end, however, none of the identified uncertainties on the cost side were classified as major. This is because total benefits exceed total costs by such a large margin that even doubling the total cost estimate would change the study's estimate of net benefits by less than five percent.

The list of effects on the benefit side which were only partially quantified, or entirely omitted, is far more extensive. Uncounted benefits include most hazardous air pollutant effects and virtually all effects of Clean Air Act programs on ecosystems, including ecosystems services which improve human welfare and quality of life, such as enhanced recreational experiences resulting from healthier forests. A variety of known or suspected human health effects associated with fine particle, ozone, or other Clean Air Act criteria pollutants were also excluded from this study's quantitative results due to limitations in health effects data, economic valuation information, or both.

There were also many more uncertainties identified for quantified benefits than for quantified costs. The complete list of uncertainties identified on the benefit side is available in the full report, but the three which emerged as the most significant were related to the estimated change in premature mortality risk resulting from fine particle exposure, the choice of model for estimating the timing of

premature mortality risk changes following a change in fine particle exposure,[13] and the estimated economic value of reducing premature mortality risk from air pollution. All three of these factors, along with eleven others associated with benefits estimation, were found to meet the study's criterion for defining a major uncertainty.

In the third step of the three-step uncertainty analysis, the effects of several of the most important quantifiable uncertainties were assessed using simulation modeling techniques. The results provide useful insights about which uncertain factors are most important and how the results of the study might be interpreted given the combined effect of these uncertainties. The detailed results of the simulation modeling and other uncertainty tests, along with discussion of the insights gained, are available in the full report and the supporting technical report on uncertainty analysis. In essence, the results suggest that it is extremely unlikely the costs of 1990 Clean Air Act Amendment programs would exceed their benefits under any reasonable combination of alternative assumptions or methods which could be identified. Even if one were to adopt the extreme assumption that fine particle and ozone pollution have no effect on premature mortality risk –or that such risk reductions occur but they have no value— the benefits of reduced non-fatal health effects and improved visibility alone add up to $137 billion for the year 2020, an amount which is more than twice the estimated $65 billion cost to comply with all 1990 Clean Air Act Amendment requirements in that year.

Conclusions

The objectives of this study included estimation of the incremental direct benefits and costs of the 1990 Clean Air Act Amendments, evaluation of economy-wide effects, assessment of a broad range of effects with potential significance for stakeholders and researchers, and consideration of the implications of study limitations and uncertainties for research and the design of future studies. Considering these objectives and the results obtained, EPA reaches the following conclusions.

1. ***The direct benefits of the 1990 Clean Air Act Amendments and associated programs significantly exceed their direct costs, which means economic welfare and quality of life for Americans were improved by passage of the 1990 Amendments and implementation of programs to meet their requirements.*** The wide margin by which benefits exceed costs combined with extensive uncertainty analysis suggest it is very unlikely this result would be reversed by any reasonable combination of alternative assumptions which could have been adopted in this study.

[13] "Cessation lag" is the technical term used to describe the delay between the change in air pollution exposure and the resulting change in health outcomes. Models for cessation lag which assume that a substantial proportion of the risk reduction occurs many years after the air quality improvement can lead to significantly lower estimates for the economic value of that improvement. Conversely, cessation lag models which assume most or all of the risk reduction occurs shortly after the air quality change can result in higher benefit estimates.

2. ***The broader economy is also improved overall by the 1990 Clean Air Act Amendments and related programs.*** While virtually all the costs of these programs could be incorporated, only two beneficial effects of cleaner air could be captured in the economy-wide model: improvements in worker productivity due to improved health, and savings on costs of medical care for some pollution-related health problems. Nevertheless, these two beneficial effects alone more than offset the economy-wide costs of investing in air pollution controls as both overall economic growth and the measurable economic welfare of American households are shown to be improved by the 1990 Clean Air Act Amendments.

3. ***Persistent uncertainties and limitations in available data and methods mean that some elements of cost and many human health, human welfare, and ecological effects cannot be fully and effectively captured in benefit-cost studies of air pollution control programs.*** The relatively comprehensive scope of the present study and its extensive uncertainty analysis highlight these deficiencies and demonstrate the need for ongoing investments in scientific and economic research to improve estimates of clean air program benefits and costs.

4. ***After designing, implementing, and evaluating the results of the current study, the Project Team identified several potential improvements worth considering for future analytical efforts.*** As described in the next section, future evaluation of Clean Air Act programs might be improved through scenarios analysis or an expanded analytical framework capable of evaluating criteria pollutant, hazardous air pollutant, and climate change pollutants in an integrated manner.

Looking Ahead

Beyond the intrinsic value of the present study with respect to its defined goals and objectives, there are at least two additional potential uses for this study. First, the methods or results of the study may contribute directly to other research. Second, the lessons learned from this study may provide insights which help improve the design of future studies and methods development efforts.

Additional direct uses for the present study

Energy externalities

The methods and results of the First Prospective Study were used by the National Academy of Sciences to support its analysis of energy externalities (see National Research Council, *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*, June 2010).[14] The current, Second Prospective Study could provide significantly improved information in support of future efforts to estimate the criteria pollutant-related externalities associated with energy production and use.

[14] Available at http://www.nap.edu/openbook.php?record_id=12794

Data, methods, and modeling tools

The Council and its technical subcommittees provided effective and rigorous evaluation of the data and methods used in the present study. EPA and other federal agencies, states and local agencies, and other researchers may find the methods developed and/or evaluated herein to be useful for their work. For example, the macroeconomic modeling techniques used to account for beneficial as well as costly effects of pollution control could be further refined and adapted to improve the modeling of economy-wide effects of other environmental programs.

Improving future studies

Redesigning analytical frameworks

Some of the limitations in the information this and other current studies provide to policymakers and the public can be addressed by redesigning the scope and frameworks for analysis to better capture important interactions among pollution control programs. It may be especially useful to explore building an analytical framework that evaluates criteria pollutant control programs in conjunction with programs to address climate change. An approach which focuses on analyzing broad scenarios, rather than small incremental differences in individual programs, may provide more useful insights into the ways such programs interact, capturing important effects of one program which influence the costs or effectiveness of other programs. For example, under a scenario involving unchecked greenhouse gas emissions it is reasonable to anticipate an atmosphere prone to more and worse extreme temperature days. An increase in extreme temperature days may lead to more code red[15] air quality alerts for ozone. Ozone air quality alerts may in turn lead to a reduction in outdoor activity, which may lead to greater use of indoor air conditioning. As people increase their use of air conditioners, the resulting increase in demand for electricity may lead to higher fine particle emissions from electricity generating units. A scenarios analysis approach might also support more realistic modeling of other external trends and conditions which influence a program's cost and prospects for success. Examples of factors which could be treated in a more realistic and consistent manner include patterns of economic growth, rates of technological development, patterns and intensity of fuel use, changes in atmospheric conditions, and population behavioral responses to air pollution and to measures taken to control it.

Value of Information analysis

Formal Value of Information (VOI) analysis has rarely been applied in evaluations of air pollution control programs. VOI principles are sometimes followed informally in the design and implementation of studies, as they were for the present study. However, more formal exercises aimed at assessing the policy and analytical implications of uncertainties in key variables could help guide priority-setting for research, analytical design, and efforts to improve data and methods.

[15] Code red days are those classified under the Air Quality Index (AQI) as "unhealthy." For ozone code red days EPA recommends that sensitive groups avoid, and everyone else should limit, prolonged or heavy outdoor exertion. For more information about the AQI, go to http://www.epa.gov/airnow/aqi_brochure_08-09.pdf.

Ex ante versus *ex post* evaluations of data and modeling tools

Data and modeling tools could also be improved by more extensive evaluation of the validity of existing data and the performance of current models. Though not all data and modeling tools can be evaluated in this manner, formal data and model validation exercises based on comparisons of *ex ante* projections and *ex post* outcomes (e.g., comparing projections from current air quality models against air quality monitoring data) could improve the accuracy and reliability of future air pollution program benefit-cost studies.

Improved sharing of data and methods development

Sharing of data among researchers usually leads to significant improvements in the quality and usefulness of information. Formal collaborations among researchers to develop improved analytical methods could also significantly improve the quality of air pollution program benefit-cost analysis. For example, the Council panel which reviewed the initial analytical blueprint for the present study recommended the Agency consider organizing "Learning Laboratories" focused on addressing particularly important analytical challenges through a public-private collaborative process aimed at developing and vetting new methods and assumptions. The current Council panel also proposes more extensive release to the public of underlying data for use and improvement by other researchers. Both initiatives could lead to significant improvements in air pollution program evaluations.

Beyond the existing Clean Air Act

The statutory language defining the parameters for the present study limited its scope to evaluation of the effects of the existing Clean Air Act. However, since the Clean Air Act was last amended in 1990, the science and economics of air pollution control have progressed significantly. For example, much has been learned in recent years about the role ammonia plays in formation of the secondary particles which dominate this study's estimates of direct benefits. Future air pollution control program evaluations could be expanded to consider pollutants not currently addressed by Clean Air Act programs so the potential value of addressing such pollutants is clarified for policymakers and the public.

Cheaper, faster, better

Benefit-cost analyses of air pollution control programs are enormously complicated exercises, usually requiring operation of a long chain of highly complex models with numerous, large data sets. The substantial time and resource costs of the modeling systems used in the present study precluded the multiple model system runs that could provide policy-useful results disaggregated by pollutant, program element, and/or location. EPA continues to engage in and support model development efforts aimed at reducing the time and resources required to evaluate air pollution control program effects, while maintaining the high standards for scientific and economic rigor expected of EPA analysis. Achieving further gains in data quality and model speed and performance, and improving linkages between models in the analytical sequence, will require significant ongoing investment in model development. However, the results of this study demonstrate that the effects of 1990 Clean Air Act programs on public

health, the environment, and the economy are considerable, so improving Agency capabilities to conduct such analyses would appear to be a sound investment.

Frequently Asked Questions

Can the results of this study be added to the Retrospective Study to get a full picture of the benefits and costs of clean air programs since the 1970 Act?

The Retrospective Study evaluates the benefits and costs of the 1970 Clean Air Act and its 1977 Amendments up through the year 1990. The current Second Prospective Study evaluates the incremental effect of the 1990 amendments, using a baseline which reflects continuation after 1990 of only those programs in place when the 1990 Amendments were passed (see Exhibit 3 above). The results of the two studies, therefore, are at least conceptually additive. However, any attempt to add the benefits and costs estimated by these two studies would confront at least two significant challenges. First, the Retrospective Study used data and modeling tools significantly different from those applied in the current study. If the Retrospective Study were done again using current data and modeling tools, the resulting estimates of benefits and costs would be significantly different. Second, neither study provides information about the post-1990 effects of 1970 and 1977 Clean Air Act programs, except to the extent they are directly superseded by 1990 Amendment requirements and programs.

What about the benefits of reductions in hazardous air pollutants achieved by Title III? Are those counted?

The costs of complying with Title III Maximum Achievable Control Technology (MACT) standards for hazardous air pollutants are included in the primary estimates. These MACT standards achieved reductions in volatile organic compounds and other emissions beyond the reductions achieved by programs under other Clean Air Act titles. Therefore, while the incremental effects of Title III programs on criteria pollutant emissions are captured, the benefits of reductions in the direct toxic effects of hazardous air pollutants across the country are not captured. Pursuant to the study's goal to assess a broad range of potentially important effects, a case study evaluating both the costs and benefits of reduced exposures to benzene achieved by the 1990 Clean Air Act in the Houston area was conducted. A central purpose of the case study was to explore the specific data and model deficiencies which currently preclude effective quantification of hazardous air pollutant reduction benefits, perhaps providing insights to guide future research and development efforts. The benzene case study is available as a supporting technical document for the Second Prospective Study.

Isn't it likely other actions would have been taken at the federal, state, local or even private levels to address the problem of worsening air pollution if the 1990 Clean Air Act Amendments hadn't been enacted? So isn't the study giving too much credit to the Clean Air Act for all the air quality improvements since 1990?

The projected air quality conditions under the *Without-CAAA* scenario are significantly worse than projected under the *With-CAAA* case. As a result, it does seem likely actions would have been taken through other federal programs, state/local regulations, and/or voluntary private actions to protect air quality. The extent and character of the alternative actions which might have been pursued, however, are unknown. Such measures would have also imposed costs, perhaps similar to those estimated herein and attributed to the 1990 Clean Air Act Amendments. Since it is a matter of speculation what actions may have been taken in the absence of the 1990 Amendments, the present study is designed to show the difference between a world with and a world without all the federal, state, and local programs implemented after passage of the amendments. As such, this study is best interpreted as capturing the value of the full range of public and private actions taken to improve air quality to levels consistent with overarching federal law. Significant credit is due to EPA's state and local partners, and to private firms and individuals, for the air quality improvements and resulting net benefits estimated by this study.

Does this study predict what will happen in particular locations, especially whether a given county or state or air quality management district will or won't attain federal air quality standards in the future?

This study focuses on analyzing differences in air quality between one particular, assumed pathway for implementation of the Clean Air Act as amended in 1990 versus a hypothetical, counterfactual state of the world without the 1990 Amendments. As such, though the study applies several models which have high levels of spatial detail and are used for attainment demonstrations, the study focuses on estimating potential differences in air quality between two constructed scenarios over a period of decades and across the 48 contiguous states. It therefore does not provide the analyses of location-specific meteorological data, control measures, and consecutive year air quality change used to determine attainment with air quality standards. Nevertheless, the study does provide insights on the overall magnitude of 1990 Clean Air Act Amendments compliance costs and the substantial benefits achieved by the measures taken.

The significant benefits estimated for 1990 Clean Air Act Amendment-related programs can be traced to the large differences between actual air quality conditions reflected in the With-CAAA *case and the much poorer air quality conditions projected under the counterfactual* Without-CAAA *case. Are those poor air quality conditions under the counterfactual scenario realistic?*

While the *With-CAAA* air quality conditions are anchored to actual air quality monitor data, the air quality conditions under the hypothetical *Without-CAAA* scenario cannot be observed and therefore the credibility of those projected conditions is harder to establish. Comparisons to historical conditions can be helpful, but in this case such comparisons are confounded for the fine particle pollution which dominates this study's results because the particle size fractions monitored through the years changed. Nevertheless, data were available for a few time periods and locations where both fine ($PM_{2.5}$) and coarse particle fractions –PM_{10} and/or Total Suspended Particles (TSP)—were monitored. These data showed that projections for *Without-CAAA* air quality in three of the four U.S. cities examined were reasonably consistent with historical monitored air quality during the 1980 to 1990 period prior to

passage of the 1990 Clean Air Act Amendments, suggesting that *Without-CAAA* air quality conditions are severe but plausible. For example, despite a significant deterioration in Los Angeles air quality under the *Without-CAAA* scenario, the projected annual average PM2.5 concentration for 2020 of 35.5 micrograms per cubic meter is slightly less than Los Angeles' estimated 1980 annual average PM2.5 concentration of 38.5 micrograms per cubic meter. Details of these comparisons are available in the full report (see text box 4-1).

Some of EPA's previous analyses of particular rules included an assumption that there was no mortality-related benefit from reducing exposure to fine particle pollution once concentrations fell below some threshold level. Does this study apply a threshold assumption?

In a limited number of past analyses of individual rulemakings, EPA did impose an assumption that there was no further benefit to reducing fine particle exposures once concentrations to which people were exposed fell below 10 micrograms per cubic meter. However, based on a subsequent re-assessment of the scientific literature and consultation with the public and outside experts, EPA returned to the earlier practice of estimating benefits down to the lowest measured fine particle concentrations without imposing an assumed threshold. This is the same approach used in the first two reports in this series: the Retrospective Study and the First Prospective Study. EPA nevertheless believes there is a distinction which can be made between exposure changes which occur above versus below the fine particle concentrations measured in the health studies used to estimate benefits. Although a health study's lowest measured level (LML) is not viewed as a threshold, EPA's confidence in benefit estimates is higher for the portion of the risk change which occurs at or above the LML of a health study used to estimate benefits. For the fine particle-related premature mortality benefits presented herein, two health studies were applied. The LML of the Laden et al. (2006) study is 10 micrograms per cubic meter, and 91 percent of the mortality risk reduction benefit presented in this analysis occurs at or above this concentration. Similarly, the corresponding numbers for the Pope et al. (2002) study are 7.5 micrograms per cubic meter and 98 percent of the estimated mortality reduction benefit. Given that the vast majority of the present study's mortality risk reduction occurs at or above the LMLs of the underlying health studies, EPA's confidence in the estimates of the fine particle-related premature mortality benefits presented herein is particularly high.

The Second Prospective Study results are dominated by the benefits of reducing overall exposures to fine particles. But there are several different species of fine particles, including sulfates and nitrates, and there is some evidence they aren't all equally toxic. Why didn't the study evaluate the possibility that some species of fine particles are more toxic than others?

As a practical matter, the mix of particle species making up total fine particle mass does not change much between the *With-CAAA* and *Without-CAAA* scenarios. Therefore, the results presented herein would not be very sensitive to even strong assumptions about potential differences in the toxicity of particle species. Furthermore, scientific evidence establishing the potential differential toxicity of particle species is still considered by EPA to be insufficient to support effective analysis of the potential consequences if specific species of fine particles are found to manifest different degrees of toxicity. Available epidemiological studies supporting the association between fine particle exposure and health

effects such as premature mortality are based on aggregate measures of fine particle exposure. Assuming one particular species is more toxic requires adjustments to the known or presumed toxicity of all other particle species, including potentially critical interaction effects among them. Absent adjustments to maintain coherence, the set of differentiated, species-specific concentration-response functions developed for analytical purposes may be inconsistent with the underlying health studies. While notional species-specific risk coefficients might theoretically be constructed, EPA believes that unfounded and inconsistent species-specific risk functions would be highly uncertain and could be biased, leading to analytical results which may be significantly more misleading than informative. There is ongoing research on the issue of potential differential toxicity of fine particles and EPA looks forward to improvements in the scientific information available to address this question.

Is it plausible that clean air programs are responsible for yielding benefits equal in value to $6,000 per person, a figure which is about 6-7% of projected mean personal income in 2020?

It is true that this study's direct benefit results imply a very substantial gain in value to people living in the United States, especially from reductions in risk of fine particle-related premature mortality. The difference in health outcomes with and without 1990 Clean Air Act Amendment programs may be so great that the customary measures used to translate small, marginal changes in health outcomes to dollar values may misestimate the economic value of the non-marginal changes in health outcomes between the two scenarios analyzed. This issue warrants further consideration. Nevertheless, there is an important difference between the value people may assign to improved health and what it costs them to acquire it. It is not the case that Americans had to spend $6,000 per person per year for the cleaner air achieved by 1990 Clean Air Act Amendment programs. Instead, as shown by the direct cost results of this study, the costs to society of implementing these programs only reach about $190 per person by 2020, the study year when the incremental costs are highest. The $6,000 figure is a dollar-based value for the welfare improvement people enjoyed by avoiding the poor air quality conditions projected under the *Without-CAAA* scenario, and is not an estimate of what people actually had to pay for the improvements in health, welfare, and environmental conditions achieved by 1990 Clean Air Act Amendment programs.

Why doesn't this study include the costs and benefits of climate change programs?

When EPA defined the scope of the study in 2001, there were no Clean Air Act standards in place which specifically address greenhouse gas emissions, nor were there any Agency plans at that time to set such standards in the future. Furthermore, the final specification of scenarios to be analyzed was made in 2005, two years before the 2007 Supreme Court ruling that greenhouse gases are pollutants covered by the Clean Air Act. Although not included within the scope of this study, EPA has conducted numerous other studies assessing the environmental and economic effects of proposed climate change programs. In the future, EPA expects to conduct and/or encourage studies which more effectively integrate evaluations of climate change policy options with evaluations of ongoing and future Clean Air Act programs.

# # #

01268-EPA-5582

Diane Thompson/DC/USEPA/US
03/01/2011 05:10 PM

To Richard Windsor, Bob Perciasepe
cc Aaron Dickerson, Daniel Kanninen
bcc
Subject Fw: March messaging -- education

FYI

****
Diane E. Thompson
Chief of Staff
U. S. Environmental Protection Agency
202-564-6999
----- Forwarded by Diane Thompson/DC/USEPA/US on 03/01/2011 05:10 PM -----

From: "Lu, Chris" <(b) (6)
To: "Lu, Chris" <(b) (6) "Smith, Elizabeth S." <(b) (6) "Greenawalt, Andrei" <(b) (6) "Phadke, Shilpa" <(b) (6) "McCarthy, Nell" < "Milakofsky, Ben" <(b) (6) "Maisel, Chad P." <(b) (6)
Date: 03/01/2011 05:07 PM
Subject: March messaging -- education
Sent by: "Maisel, Chad P." <(b) (6)

Chiefs of Staff:

Please see attached a memo from Tom Gavin outlining education messaging opportunities for the month of March. The same memo has been sent to your communications teams.

We are asking members of the Cabinet and agency heads to participate in amplification events over the course of the month.

Please let us know if you have any questions.

–Cabinet Affairs

From: Gavin, Tom
Sent: Tuesday, March 01, 2011 4:59 PM
To: Gavin, Tom
Cc: Maisel, Chad P.; Paulsen, Joe
Subject: March messaging -- education

Comms team –

Attached is a memo that walks through the March messaging and the opportunities there from a message perspective. We'd like to arrange for as many amplification events as we can – and we're including an hour of targeted radio or a satellite round-robin as an event.

We're going to follow a similar approach to rolling out each week as we did the past few, with a preview call on Friday to advance the next week's activities including any Cabinet pieces. So be sure to let us know by COB on Thursday what you have cooking for the next week.

If you have questions, call or email.

Please treat this as a confidential document. It is a pre-decisional working document.

Thanks.

Tom Gavin
Special Assistant to the President
Director, Cabinet Communications
(b) (6)
(b) (6)

Ex.5 - Deliberative

2011 03 01 Education Month framing for Cabinet.docx

01268-EPA-5583

Bob Sussman/DC/USEPA/US
03/01/2011 05:33 PM

To Richard Windsor, Bob Perciasepe
cc
bcc
Subject Endangerment

Will be providing to OIG

Robert M. Sussman
Senior Policy Counsel to the Administrator
Office of the Administrator
(202)-564-7397
US Environmental Protection Agency
----- Forwarded by Bob Sussman/DC/USEPA/US on 03/01/2011 05:32 PM -----

From: "Fitzpatrick, Michael A." <(b) (6)
To: Bob Sussman/DC/USEPA/US@EPA
Date: 03/01/2011 05:02 PM
Subject:

Bob –

Ex.5 - Deliberative

Ex.5 - Deliberative

[redacted]

Michael.

Michael Fitzpatrick
Associate Administrator
Office of Information and Regulatory Affairs
Office of Management and Budget
1650 Pennsylvania Ave., NW
Washington, DC 20503
Office: (b) (6)
Govt. Cell: (b) (6)

01268-EPA-5584

Richard Windsor/DC/USEPA/US
03/01/2011 05:39 PM

To Bob Sussman, Bob Perciasepe
cc
bcc
Subject Re: Endangerment

Good. Thanks.
Bob Sussman

----- Original Message -----
From: Bob Sussman
Sent: 03/01/2011 05:33 PM EST
To: Richard Windsor; Bob Perciasepe
Subject: Endangerment
Will be providing to OIG

Robert M. Sussman
Senior Policy Counsel to the Administrator
Office of the Administrator
(202)-564-7397
US Environmental Protection Agency
----- Forwarded by Bob Sussman/DC/USEPA/US on 03/01/2011 05:32 PM -----

From: "Fitzpatrick, Michael A." <[redacted] (b) (6)
To: Bob Sussman/DC/USEPA/US@EPA
Date: 03/01/2011 05:02 PM
Subject:

Bob –

[redacted] Ex.5 - Deliberative

Ex.5 - Deliberative

[redacted]

Michael.

Michael Fitzpatrick
Associate Administrator
Office of Information and Regulatory Affairs
Office of Management and Budget
1650 Pennsylvania Ave., NW
Washington, DC 20503
Office: (b) (6)
Govt. Cell: (b) (6)

01268-EPA-5585

Seth Oster/DC/USEPA/US
03/01/2011 09:47 PM

To Richard Windsor, Bob Perciasepe, Diane Thompson, David McIntosh, Bob Sussman, Scott Fulton, Lisa Garcia, Bicky Corman, Michael Goo, Arvin Ganesan, Janet Woodka
cc Adora Andy, Brendan Gilfillan, "Betsaida Alcantara", Stephanie Owens, Dru Ealons
bcc
Subject Fw: WH Blog post

Heather blogged today on our Clean Air Act Benefits report. It's below.

Seth

Seth Oster
Associate Administrator
Office of External Affairs and Environmental Education
Environmental Protection Agency
(202) 564-1918
oster.seth@epa.gov

-----Forwarded by Seth Oster/DC/USEPA/US on 03/01/2011 09:46PM -----
To: Seth Oster/DC/USEPA/US@EPA, Stephanie Owens/DC/USEPA/US@EPA
From: "Salzman, Amelia S." <(b) (6)>
Date: 03/01/2011 08:53PM
Subject: WH Blog post

http://www.whitehouse.gov/blog/2011/03/01/clean-air-act-protecting-our-families-and-air-we-breathe

The White House BlogThe Clean Air Act: Protecting Our Families and the Air We Breathe

Posted by Heather Zichal on March 01, 2011 at 06:00 PM EST

Today, the Environmental Protection Agency (EPA) released a

report estimating the economic, environmental and health benefits of the Clean Air Act over the period 1990 to 2020. This report, which is designed to provide Congress and the public with comprehensive, updated, and peer-reviewed information on the Act's costs and benefits, reaches a clear conclusion: the Clean Air Act has been an

incredible investment for America.

According to the study, the direct benefits of the Clean Air Act - in the form of cleaner air and healthier, more productive Americans - are estimated to reach nearly $2 trillion in the year 2020, exceeding the costs by a factor of

more than 30 to one. But this report also reminds us that the common sense provisions under the Clean Air Act are about more than economics – they are ultimately about the health of our families.

According to the report, in 2010 alone, the reductions in fine particle and ozone pollution from the Clean Air Act prevented more than:

• 160,000 premature deaths• 130,000 heart attacks• 13 million lost work days• 1.7 million asthma attacks
This report puts to rest the old argument that we can't have a healthy economy and a healthy environment – and serves as an important reminder of the need to protect the Clean Air Act from attacks. For decades, it has brought cleaner air to our children and avoided billions in health care costs. And we need a strong Act to protect our children's children for decades to come.

Heather Zichal is Deputy Assistant to the President for Energy and Climate Change

01268-EPA-5586

Richard Windsor/DC/USEPA/US
03/02/2011 07:01 PM

To "Nancy Sutley"
cc
bcc
Subject Fw: The Hill: EPA administrator pokes fun at Fox News for becoming carbon-neutra

Brendan Gilfillan

----- Original Message -----
From: Brendan Gilfillan
Sent: 03/02/2011 06:25 PM EST
To: Brendan Gilfillan
Cc: Adora Andy; Alisha Johnson; Arvin Ganesan; Barbara Bennett; Betsaida Alcantara; Bob Perciasepe; David McIntosh; Diane Thompson; Dru Ealons; Seth Oster <oster.seth@epa.gov>; Richard Windsor; Stephanie Owens
Subject: The Hill: EPA administrator pokes fun at Fox News for becoming carbon-neutra

EPA administrator pokes fun at Fox News for becoming carbon-neutral

By Andrew Restuccia - 03/02/11 05:19 PM ET

Environmental Protection Agency Administrator Lisa Jackson had a little fun Wednesday with Fox News, whose parent-company **announced this week** that it is carbon-neutral.

Despite assertions by Republicans and many Fox News commentators that climate regulations will destroy the economy, Jackson said the effort by News Corp. to become carbon-neutral shows that reducing greenhouse gas emissions is "good for business."

“I do believe that this is good for business, good for our future,” Jackson said at a Senate Environment and Public Works Committee hearing on the agency's fiscal year 2012 budget request.

To make her point, Jackson laid out News Corp.'s efforts to reduce its carbon footprint in detail.

The company is “carbon neutral across their global operations and their projects pay for themselves in less than two years on average, and there are lighting retrofits and PC shutdowns, systemic changes like moving to video conferencing and carbon footprinting,” Jackson said.

Jackson came under fire from Republicans on the committee Wednesday, who argued that efforts to regulate greenhouse gas emissions will impose major burdens on industry and kill jobs. But committee Chairwoman Barbara Boxer (D-Calif.) countered that the regulations are essential for protecting human health.

Brendan Gilfillan EPA Chief Jackson Urges U.S. Lawm... 03/02/2011 06:24:08 PM

From: Brendan Gilfillan/DC/USEPA/US
To: Richard Windsor/DC/USEPA/US@EPA, Bob Perciasepe/DC/USEPA/US@EPA, Diane Thompson/DC/USEPA/US@EPA, Seth Oster <oster.seth@epa.gov>, Adora Andy/DC/USEPA/US@EPA, Betsaida Alcantara/DC/USEPA/US@EPA, David McIntosh/DC/USEPA/US@EPA, Alisha Johnson/DC/USEPA/US@EPA, David McIntosh/DC/USEPA/US@EPA, Arvin Ganesan/DC/USEPA/US@EPA, Barbara Bennett/DC/USEPA/US@EPA, Stephanie Owens/DC/USEPA/US@EPA, Dru Ealons/DC/USEPA/US@EPA
Date: 03/02/2011 06:24 PM
Subject: Bloomberg: EPA Chief Jackson Urges U.S. Lawmaker Not to Slash Her Agency's Funding

EPA Chief Jackson Urges U.S. Lawmaker Not to Slash Her Agency's Funding

By Kim Chipman and Jim Snyder - Mar 2, 2011 5:15 PM ET

Environmental Protection Agency Administrator Lisa Jackson urged U.S. senators not to cut her agency's budget as lawmakers prepared to offer legislation taking away the EPA's power to regulate greenhouse gases.

Republicans in the House of Representatives have proposed cutting EPA funding about 30 percent, or $3 billion, almost double a budget reduction of $1.3 billion proposed last month by President Barack Obama.

"If Congress slashed EPA's funding, concentrations of harmful pollution would increase from current levels," Jackson told the Senate Environment and Public Works Committee today. "The result would be more asthma attacks, more missed school and work days, more heart attacks, more cancer cases, more premature deaths."

The budget fight is intertwined with an effort by Republicans and some Democrats to strip the EPA of its power to regulate emissions blamed for climate change. Backers of this effort say the agency's greenhouse-gas rules for industrial polluters will cost jobs and harm the economy. Jackson has said Obama would veto any attempt to stop the regulations that took effect Jan. 2.

Legislation sponsored by House Energy and Commerce Committee Chairman Fred Upton, a Michigan Republican, and Senator James Inhofe of Oklahoma, will be introduced as early as tomorrow, Inhofe said during the hearing today.

"This bill puts Congress in charge of deciding our nation's climate-change policy, not EPA bureaucrats," said Inhofe, the ranking Republican on the Senate environment committee.

Vehicle Agreement

The bill would prohibit the EPA from regulating greenhouse gases emitted from buildings such as factories and power plants, while allowing a previous agreement the administration reached

with automakers to cut vehicle tailpipe emissions.

Two former Democratic House committee chairmen, Representatives Collin Peterson of Minnesota and Nick Rahall of West Virginia, said they are likely to support the Upton-Inhofe measure.

“EPA is out of control, and we have to send them a message,” said Peterson, who headed the Agriculture Committee until Republicans won control of the House in the November elections, in an interview today.

Rahall, former chairman of the House Natural Resources panel, said a draft of the Upton-Inhofe bill is “very favorable” and that he is “exploring very seriously” supporting the measure.

“It seems like the right message and it’s in line with legislation I’ve already supported,” Rahall said. He has backed a bill to delay EPA regulation for two years, legislation being pushed by Democratic Senator Jay Rockefeller of West Virginia.

Rockefeller’s bill probably has a better chance to pass Congress, given concerns in the Senate over permanently blocking EPA regulation, Rahall said in an interview.

01268-EPA-5587

Lisa Garcia/DC/USEPA/US
03/04/2011 11:28 AM

To "Richard Windsor", "Scott Fulton", "Seth Oster", "Adora Andy", "Michelle DePass"
cc "Tseming Yang"
bcc
Subject Fw: FYI: An Advance Copy of Press release from Catarina de Albuquerque on Human rights and water in US

See attached press release from UN Human Rights Council.
The release discusses The US failure to deliver safe drinking water and sanitary services to poor/tribal communities.
Dept of State press office will contact Seth's office to coordinate response.

Although Tseming and I in a meeting this morning, tried to highlight many good points that this Administration is working on (effort to bring clean drinking water to tribes, EJ commitments..) The press conf will start at noon..

Tseming Yang

----- Original Message -----
From: Tseming Yang
Sent: 03/03/2011 05:58 PM EST
To: Peter Ford; Jessica Scott; David Gravallese; Carlos Evans; Lisa Garcia; CarolAnn Siciliano; Wendel Askew; Steve Wolfson; Steven Neugeboren
Subject: Fw: FYI: An Advance Copy of Press release from Catarina de Albuquerque
Steve W - Jessica is out on Friday. Is there somebody in CCILO who can go to the briefing for OGC?

* * * *
Tseming Yang
Deputy General Counsel
Environmental Protection Agency
Ariel Rios North, Mail Code 2310A
1200 Pennsylvania Ave, Washington, DC 20460
Direct: (202) 564-0023, e: yang.tseming@epa.gov

----- Forwarded by Tseming Yang/DC/USEPA/US on 03/03/2011 05:56 PM -----

From: Sasha Koo-Oshima/DC/USEPA/US
To: Mike Shapiro/DC/USEPA/US@EPA, Tseming Yang/DC/USEPA/US@EPA
Date: 03/03/2011 05:44 PM
Subject: FYI: An Advance Copy of Press release from Catarina de Albuquerque

Mike and Tseming:

FYI - advance report from Catarina de Albuquerque of which DOS may raise concerns.

Best regards,
Sasha

From: Nossel, Suzanne F
Sent: Thursday, March 03, 2011 3:27 PM
To: Sibilla, Christopher A; Lane, Gerda; 'Thomas.Swegle@usdoj.gov'; 'PAaron@usbr.gov'; 'Maeve.McKean@hhs.gov'; (b) (6) (b) (6) (b) (6) 'Rebecca.Thompson@cdc.hhs.gov'; Volk,

Richard(EGAT/ENV/ENR); 'tenicka.boyd@usich.gov'; Galindo, David R; Milton, Kathleen M; 'Koo-Oshima.Sasha@epamail.epa.gov'; Salzberg, Aaron A (OES); Sullivan, David B
Cc: Bame, David J; Levine, Joanne; Ostermeier, Amy A; Lapenn, Jessica; Saltzman, Amy J
Subject: Re: Advance Copy of Press release from Catarina de Albuquerque

Ex.5 - Deliberative

From: Sibilla, Christopher A
Sent: Thursday, March 03, 2011 03:17 PM
To: Lane, Gerda; 'Thomas.Swegle@usdoj.gov' <Thomas.Swegle@usdoj.gov>; 'Aaron, Patricia (Patti)' <PAaron@usbr.gov>; 'McKean, Maeve (OS/OGHA)' <Maeve.McKean@hhs.gov>; (b) (6) < (b) (6) 'Busby, Scott W.' (b) (6) >; (b) (6) < (b) (6) 'Rebecca.Thompson@cdc.hhs.gov' <Rebecca.Thompson@cdc.hhs.gov>; Volk, Richard(EGAT/ENV/ENR); 'tenicka.boyd@usich.gov' <tenicka.boyd@usich.gov>; Galindo, David R; Milton, Kathleen M; 'Koo-Oshima.Sasha@epamail.epa.gov' <Koo-Oshima.Sasha@epamail.epa.gov>; Salzberg, Aaron A (OES); Sullivan, David B
Cc: Bame, David J; Levine, Joanne; Ostermeier, Amy A; Lapenn, Jessica; Nossel, Suzanne F; Saltzman, Amy J
Subject: RE: Advance Copy of Press release from Catarina de Albuquerque

Ex.5 - Deliberative

This email is UNCLASSIFIED.

From: Lane, Gerda
Sent: Thursday, March 03, 2011 9:31 AM
To: Lane, Gerda; 'Thomas.Swegle@usdoj.gov'; 'Aaron, Patricia (Patti)'; 'McKean, Maeve (OS/OGHA)'; (b) (6) 'Busby, Scott W.'; (b) (6) 'Rebecca.Thompson@cdc.hhs.gov'; Volk, Richard(EGAT/ENV/ENR); 'tenicka.boyd@usich.gov'; Galindo, David R; Milton, Kathleen M; 'Koo-Oshima.Sasha@epamail.epa.gov'; Salzberg, Aaron A (OES); Sibilla, Christopher A; Sullivan, David B
Cc: Bame, David J; Levine, Joanne; Ostermeier, Amy A; Lapenn, Jessica; Nossel, Suzanne F; Saltzman, Amy J
Subject: Advance Copy of Press release from Catarina de Albuquerque

Good morning,
In advance of tomorrows de-brief at the Department of State, IE Catarina de Albuquerque has provided us with a courtesy copy of her press release (attached).

Regards,

Gerda

This email is UNCLASSIFIED.

0303 press statement US mission 03 03 2011 9AM.docx

Catarina de Albuquerque, UN Independent Expert on the right to water and sanitation: Mission to the United States of America from 22 February to 4 March 2011

On 4 March 2011, she conveyed to the U.S. Government her preliminary reflections on her visit. Later that day, she held a press conference in Washington, DC at the United Nations Information Center. She opened the press conference with some preliminary remarks on the visit. The press statement is set out below.

****

"The test of our progress is not whether we add more to the abundance of those who have much; it is whether we provide enough for those who have too little." (Franklin Delano Roosevelt)

I. Introduction

I undertook an official mission to the United States, at the invitation of the Government, from 22 February to 4 March 2011. I wish to thank the U.S. Department of State for coordinating the visit. Additionally, I wish to thank the representatives of the following federal government agencies, who met with me: the Department of Justice; the Department of Interior; the Environmental Protection Agency (EPA); the U.S. Agency for International Development (USAID); the Department of Health and Human Services, including the Center for Disease Control (CDC); the White House Council on Environmental Quality; the Department of Agriculture; and the Interagency Council on Homelessness. I had the honour to participate in a hearing convened by the U.S. Congressional Tom Lantos Human Rights Commission on the right to water.

During my mission I visited Washington, DC; Boston and Falmouth, Massachusetts; Sacramento, Redding, including the Winnemen Wintu tribe, Seville, California and other communities in the San Joaquin Valley; and Edmonston, Maryland. In each of these locations, I had the occasion to meet with state and local authorities. I wish to thank them also for their time and engagement with me.

I convened seven public hearings in the various locations I visited and I had the honour of receiving personal testimony from all across the United States – including from West Virginia, Alabama, Puerto Rico, Michigan and Alaska. I especially wish to thank all those individuals who travelled long distances to share their stories with me. Numerous other testimonies were submitted to me in writing reflecting the experiences of other individuals and communities from other regions of the U.S.

I was particularly struck by the vibrant and active engagement by civil society working on human rights, water and sanitation issues in the preparation of, as well as during, the mission. I am especially grateful for their initiative to connect me with affected communities and victims. I wish to extend a special word of thanks to all those who shared their personal, and sometime tragic, stories with me.

II. General Remarks

On 28 July 2010, the United Nations General Assembly recognized the right to water and sanitation. On 30 September 2010, the United Nations Human Rights Council affirmed, by consensus, the right and further specified that the right is derived from the right to an adequate standard of living. I wish to acknowledge that the United States joined this global consensus, which represents a political commitment to the realization of the right to water and sanitation. I am encouraged by this, and call on the U.S. to ratify the international human rights treaties that consecrate this right (International Covenant on Economic, Social and Cultural Rights; Convention on the Elimination of all forms of Discrimination against Women; Convention on the Rights of the Child; Convention on the Rights of Persons with Disabilities; and the Optional Protocols thereto).

The human right to water and sanitation entitles everyone to water and sanitation that is available, accessible, affordable, acceptable and safe without discrimination. The legal framework governing access to water and sanitation in the United States is a complex amalgam of federal and state statutes and common law principles. This multi-tiered system coupled with an array of variances available to states and private actors make generalizations about the U.S. legal framework's capacity to reflect access to safe drinking water and sanitation as a human right particularly difficult. Nevertheless, in the absence of a federally recognized right to safe drinking water and sanitation, there are no legal barriers preventing individual states from adopting their own legislation recognizing such a right. The states of Massachusetts and Pennsylvania have already recognized a right to water (though not to sanitation) in their constitutions. I also learned that in California a bill package has just been introduced in the state Assembly that recognizes the human right to water. I welcome such initiatives and call on other states to do likewise.

III. Challenges to realizing the right to water and sanitation

In the U.S., roughly 85 per cent of the population receives water from a utility and 15 per cent rely on private water systems. There are over 53,000 rural water utilities, 90 per cent of which serve communities of 10,000 people or less. There are also nationwide an estimated 154,000 drinking water systems. These figures highlight the fragmentation of the sector, which presents enormous challenges when trying to regulate, monitor and find solutions for universal access.

There are ever increasing demands for water: for agriculture, for industry, for recreation, as well as for the realization of the human right to water and sanitation. The effects of climate change exacerbate these competing demands. I call on the Government to adopt clear legal standards to give priority to water for personal and domestic uses to enable the realization of the human right to water and sanitation for all.

Annually, an estimated $50 billon goes into maintaining water and sanitation infrastructure, of which consumers finance 90 per cent and state and federal resources finance 10 per cent. This notwithstanding, the Environmental Protection Agency estimates that over the next 20 years $200 to $400 billion dollars will be required to ensure the sustainability of water and wastewater systems. In a time of scarce financial resources, the U.S. needs to ensure that available funding, including the loans and grants provided through the Safe Water and Clean Water State Revolving Funds, are not just used to subsidize systems but in the first instance benefits individuals, who are in the most precarious situations.

I will now address five issues of particular concern, namely: 1) non-discrimination, 2) affordability, 3) quality/safety, 4) indigenous peoples and 5) official development assistance.

1. Non-discrimination

Human rights require a focus on the most vulnerable, those who are most often excluded from progress. Often, these people are the most difficult to reach, but this cannot be a justification for neglecting them – on the contrary. Human rights require that there be universal access. Hence, merely addressing formal or direct discrimination will not ensure substantive equality. To eliminate discrimination in practice, special attention must be paid to groups of individuals, who suffer historical or persistent prejudice instead of merely comparing the formal treatment of individuals in similar situations.

The International Covenant on Civil and Political Rights, to which the U.S. is a State Party, determines that all persons are equal and that the law shall prohibit any discrimination and guarantee to all persons equal and effective protection against discrimination on any ground such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.

From my observations, the U.S. has achieved significant gains in eliminating formal or direct discrimination in law. Nevertheless, I am concerned that several laws, policies and practices, while appearing neutral at face value, have a disproportionate impact on the enjoyment of human rights by certain groups. For example, a study by Massachusetts Global Action examined the racial impact of water pricing and shut-off policies of the Boston Water and Sewer Commission and found that every 1 per cent increase in the city ward's percentage of people of colour, the number of threatened cut offs increases by 4 per cent.

I met Catherine from Alabama, who described a situation of an African-American woman, with a disabled child, who was threatened with arrest for not maintaining her septic systems according to relevant standards. The cost to replace the septic system was higher than her annual income of $12,000, and she did not have any possibilities to access funding. Furthermore, poor, disadvantaged, minority and indigenous communities are often unable to access federal, state and local funding sources due to technical, managerial and financial capacity requirements, among others. This is the case for communities from the rural South to the San Joaquin Valley to the Appalachian region.

The U.S. has made important strides in eliminating many forms of discrimination. It must, however, do more to ensure that not only de jure but also de facto discrimination is eliminated regarding access to water and sanitation.

2. Affordability

Another element of the human right to water and sanitation is affordability, meaning that access to water and sanitation must not compromise the ability to pay for other essential needs guaranteed by other human rights such as the rights to food, housing, education and health.

The EPA has elaborated voluntary affordability guidelines, suggesting that a maximum of 2 per cent of household income should be allocated to water services. I visited Tulare County, the poorest in California and where the majority of the population are people of colour. Here I met Gloria, who explained that her community suffers from drinking water contaminated by nitrates and arsenic. This means that besides paying for the regular water bill, families are forced to purchase bottled water to ensure safe and clean water for drinking and cooking. Hence, in total, households like Gloria's are devoting approximately 18 per cent of their income to water and sanitation.[1] Those households either unable to afford alternative solutions or forced to make difficult trade offs fall into a protection gap.

[1]The average income for a family of four in Tulare County is $16,000 a year. The yearly water bill is around $960 and households are spending an additional $1000 a year on bottled water. Furthermore, the sewage bill also represents roughly between $800 to $1000 a year.

From my observations, the EPA guidelines are not being adhered to and I call on the Government to adopt a mandatory federal standard on affordability in conformity with human rights.

I had the opportunity to meet people and visit sites where water and sewer services are inadequate and where the costs of traditional infrastructure solutions of public water and sewer pipes and treatment plants are increasingly expensive. I met with 93-year-old Francis in Falmouth, Massachusetts, who has lived there since 1962. The surrounding bays and estuaries in Falmouth are increasingly contaminated with nitrates, and a centralized sewage system is being proposed as a solution. Should a centralized system be put in place, Francis as well as other individuals would be required to pay an estimated $50,000 to $60,000 out-of-pocket to connect. In Falmouth, however, the median annual income for over 60 per cent of the residents is approximately $20,000 a year. Falmouth is emblematic of situations occurring all around the country. Repairing aging infrastructure in cities and building new water and sewer systems in rural areas in traditional ways is increasingly untenable. It is incumbent upon federal, state and local governments to consider innovative solutions being promoted by many experts and organizations in the country in order to ensure sustainable systems that are affordable for the community.

3. Quality / Safety

Water and sanitation have to be safe. Water must not pose a threat to human health. Sanitation facilities must be hygienically and technically safe to use, namely preventing human, animal and insect contact with human excreta. Sanitation facilities must further ensure access to safe water for hand washing.

As a part of the mission, I examined the situation of the homeless with regard to access to water and sanitation. Up to 3.5 million people experience homelessness in the United States every year. In some U.S. cities, homelessness is being increasingly criminalized. Local statutes prohibiting public urination and defecation, while facially constitutional are often discriminatory in their effects. Such discrimination often occurs because such statutes are enforced against homeless individuals, who often have no access to public restrooms and are given no alternatives.

In Sacramento, California I visited a community of homeless people. I was honoured to meet Tim, who called himself the “sanitation technician” for this community. He engineered a sanitation system that consists of seat with a two-layered plastic bag underneath. Every week Tim collects the bags full of human waste, which vary in weight between 130 to 230 pounds, and hauls them on his bicycle a few miles to a local public restroom. Once a toilet becomes available, he empties the bags’ contents; packs the plastic bags with leftover residue inside a third plastic bag; ties it securely and disposes of them in the garbage; and then he sanitizes his hands with water and lemon. Tim has said that even though this job is difficult and horrible, he does it for the community, especially the women, to “re-humanize” themselves. I find this situation utterly unacceptable, an affront to human dignity and an egregious violation of human rights that must be stopped. The Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, which is legally binding on the U.S., obliges the prevention of all forms of cruel, inhuman or degrading treatment. An immediate, interim solution is to ensure access to restrooms facilities in public places, including during the night.

Tulare County in California faces many drinking water quality violations. I met Simona from Seville, California, who has been drinking water from her private well for the past 38 years. Only two years ago when the University of California at Davis offered free water quality testing of the well, did she discover that the water was contaminated with nitrates and bacteria, and was advised to stop drinking and cooking with the water. It is unclear when the well became contaminated, but Simona expressed serious concerns about the health impacts of drinking this water for so many decades. The Safe Drinking Water Act sets maximum levels for contaminants in drinking water and its sources. These

standards apply to every public water system in the United States, which is monitored by the EPA. Private wells, however, fall outside the scope of the existing regulations and 46 million people rely upon water whose quality is unknown. As a first step, a proposal for consideration by the Government is to provide public education and information about water quality in the languages spoken by the local community – particularly in areas vulnerable to water contamination – and make water quality testing available at affordable prices.

In addition, I received worrying testimony regarding lead contamination of water in Washington, DC as well as Nestlé water bottling operations threatening the availability and quality of groundwater from communities in Mecosta, Michigan to Fryeburg, Maine to McCloud, California. I am also concerned about the lack of regulations on bottled water quality.

4. Indigenous Peoples

There are roughly 2.7 million American Indians, including Alaskan and Hawaiian Natives, living in the U.S. The vast majority of these belong to one of 565 recognized tribes. Nevertheless, many more belong to federally unrecognized tribes. In California alone there are over 300,000 American Indians that are federally unrecognized as tribes. Many American Indian communities lack access to safe drinking water and basic sanitation in disproportionate numbers. Thirteen per cent of American Indian households do not have access to safe water and/or wastewater disposal. In non-native households, this number is 0.6 per cent.[2]

Like others, I warmly welcome the decision by the United States to lend its support for the UN Declaration on the Rights of Indigenous Peoples. This is a positive step, whereby the U.S. joined global consensus. In this context I recall that in human rights terms, tribal existence and identity do not depend on federal recognition or acknowledgment of the tribe.

I visited the Winnemen Wintu in Redding, California, where this federally unrecognized tribe faces challenges in accessing safe drinking water and sanitation. Furthermore, they have been unable to exercise the right to maintain their distinctive spiritual relationship with their traditionally used waters. Legal action to change the status of unrecognized and terminated tribes is necessary to enable all American Indians to gain the respect, privileges, religious freedom, and land and water rights to which they are entitled.

5. Official Development Assistance

The Senator Paul Simon Water for the Poor Act sets U.S. foreign appropriations policy for the water sector. It is the first instance where U.S. water policy reflects the normative content of the human right to water, which I warmly welcome. The Act establishes as the policy of the United States that foreign aid for water and sanitation will "further ensure affordability and equity in the provision of access to safe water and sanitation for the very poor."

I am concerned about the implementation of the Act, particularly regarding criteria used to identify recipient countries, to target poor communities, and to decide on funding envelopes. USAID acknowledged difficulties in reaching the poorest of the poor, and the need for greater policy guidance in this regard. I note that USAID is in the process of developing a strategy and criteria to target countries and communities in greatest need. In this context, I call on the Department of State/USAID to ensure that funding of water and sanitation projects reach those most in need, are guided by the

[2] U.S. Tribal Water Access Partnership, Infrastructure Task Force Access Subgroup, "Meeting the Access Goal: Strategies for Increasing Access to Safe Drinking Water and Wastewater Treatment to American Indian and Alaska Native Homes" (2008): *www.ncai.org/ncai*

normative content of the right to water and sanitation and draw attention to my recent report on the Millennium Development Goals (UN Doc. A/65/254).

IV. Conclusions

With the introduction of centralized water and sanitation systems in the 19th century, the U.S. achieved enormous public health gains through the 20th century, resulting in the vast majority of people living in the United States acquiring access to clean and safe drinking water and sanitation. Aging and deteriorating water and sanitation infrastructure forces the question of whether 19th and 20th century technology – appropriate at the time – will carry the U.S. into the 21st century. Estimates indicate an annual $4 to $6 billion funding gap for infrastructure in the sector. Funding is a critical element, but is insufficient. The United States needs to develop a national water policy and plan of action guided by the normative content of the right to water and sanitation.

The United States is the richest country in the world, and more attention is required to ensure targeting of policies and programmes to reach the hidden and poorest segments of the population. Problems of discrimination in U.S. water and sanitation services may intensify in the coming years with climate change and competing demands for ever scarce water resources. Ensuring the right to water and sanitation for all requires a paradigm shift – new designs and approaches that promote human rights, that are affordable and that create more value in terms of public health improvements, community development, and global ecosystem protection. A holistic, systems approach is required, whereby the water sector is not viewed in isolation from the agricultural, chemical, industrial and energy sectors. Accordingly, a stronger regulatory system should be put in place to prevent pollution of surface water and groundwater, and to ensure affordability.

Such a paradigm shift for the water and sanitation sector entails policy changes, including support for research, pilot projects, incentives and regulatory reform; changes in engineering practices, such as integrated water management (e.g., wastewater, storm water, recycled water) and decentralized systems; and community education and empowerment.

* * *

Catarina de Albuquerque is a Portuguese lawyer currently working as a senior legal adviser at the Office for Documentation and Comparative Law (an independent institution under the Portuguese Prosecutor General's Office) in the area of human rights. She holds a DES in international relations with a specialization in international law from the Graduate Institute of International Studies in Geneva. She was appointed as Independent Expert in September 2008 and took up her functions in November 2008.

Learn more about the Independent Expert's mandate and work, log on to: http://www2.ohchr.org/english/issues/water/iexpert/index.htm

For more information and media requests, please contact Yoonie Kim (Tel.: 011 41 79 752 0483 / e-mail: ykim@ohchr.org) or write to iewater@ohchr.org

01268-EPA-5588

Jose Lozano/DC/USEPA/US
03/04/2011 11:41 AM

To Richard Windsor
cc
bcc
Subject Fw: ASAP ACTION: WH -- March messaging / education

[redacted] Ex.5 - Deliberative

Adora Andy Pls see below. [redacted] Ex.5 - Deliberative 03/04/2011 11:08:59 AM

From: Adora Andy/DC/USEPA/US
Date: 03/04/2011 11:08 AM
Subject: ASAP ACTION: WH -- March messaging / education

Pls see below.
[redacted] Ex.5 - Deliberative

From: "Gavin, Tom" [redacted] (b) (6)
Sent: 03/04/2011 10:42 AM EST
To: "Gavin, Tom" <[redacted] (b) (6)
Cc: "Maisel, Chad P." <[redacted] (b) (6) "Paulsen, Joe" <[redacted] (b) (6)
Subject: Need your input -- March messaging / education

Checking back. If you haven't sent in your plans (even if tentative) for Educate month, please do so this afternoon. The original framing memo is attached, as are the updated options for you tied to i3, turnaround/school improvement efforts, and Promise Neighborhoods. We need to provide POTUS with a sketch of the Cabinet amplification pieces tonight.

Please copy Joe (CC'd above) with anything.

Thanks.

From: Gavin, Tom
Sent: Thursday, March 03, 2011 3:16 PM
To: Gavin, Tom
Cc: Maisel, Chad P.; Paulsen, Joe
Subject: UPDATE: March messaging -- education

Some new options for you for Educate month. As I mentioned in the memo on Monday, there are some opportunities to mirror events that POTUS will be doing throughout the month with stops at schools that

have received i3, Promise Neighborhood, and Turnaround funds. Education spent some time compiling the attached lists that give you a brief look at schools which could plug into travel you already have set on the books or would make good trips in and of themselves.

There are ties to various agency missions throughout these lists, so please don't think that "My agency doesn't have anything to do with education." We all have something to do with education, and we should take advantage of the opportunities to drive this contrast message as the backdrop to other discussions happening in Washington right now. Also, another important note: many of these recipients are in rural areas and, packaged together, would be an excellent opportunity for us to showcase our efforts for rural America.

Descriptions of the three programs are copied below.

Please let Joe Paulsen, copied above, and me know of any travel plans that you may have for next week, or things you may be considering for the month. We want to make sure that we don't have a slew of people targeting the same event opportunity.

Thanks.

Tom

PROGRAM DESCRIPTIONS

i3 (INVESTING IN INNOVATION): 49 winning applicants for $650 million. The i3 fund supports local efforts to start or expand research-based innovative programs that help close the achievement gap and improve outcomes for high-need students. Winners, a cross-section of school districts, nonprofits and institutions of higher education, received anywhere from $50 million to $5 million and represented. All 49 winners were required to and successfully secured a 20 percent private-sector match of their federal award: http://www.ed.gov/blog/2010/10/conference-call-with-education-grantmakers-2/ . The list and a description of these 49 winning applicants can be found at: http://www2.ed.gov/programs/innovation/2010/i3hra-list.pdf. A map of where the winners are located can be found here: http://www.data.ed.gov/grants/investing-in-innovation/highest-rated

TURNAROUND PROGRAM (SCHOOL IMPROVEMENT GRANT): This year we awarded $3.5 billion to begin turning around the nation's lowest performing schools (the bottom 5000 or 5%). Based on data from 44 states, 730 schools are using the money to turnaround schools. 23% are in rural areas. While it's too early to see results, schools are doing remarkable work -- replacing a principal, extending the school day, improving teacher evaluation systems and even, replacing teaching staff (21% are implementing the turnaround model which requires that teaching staff be replaced). Arne has visited several schools that demonstrate that turnarounds are possible like George C. Hall Elementary in Mobile, Alabama: http://www.ed.gov/blog/2010/08/a-new-turnaround-strategy/ and Sterling Elementary in Charlotte, NC -- http://www.charlotteobserver.com/2010/12/22/1927050/guzman-honored-as-principal-of.html.

PROMISE NEIGHBORHOODS: In September, 21 communities were awarded first-year Promise Neighborhood planning grants. Grantees include a diverse set of communities in major metropolitan areas, small and medium-size cities, rural areas, and one Indian reservation. Awards totaled $10 million, allotting each grantee up to $500,000 to address the challenges faced by students living in communities of concentrated poverty through services from early learning to college and career and programs to

improve the health, safety, and stability of neighborhoods, and boost family engagement in student learning (similar to Harlem Children's Zone). 339 communities submitted applications. The FY2011 budget included requested $210 million, including $200 million to support implementation of Promise Neighborhood projects and $10 million for planning grants for new communities.
http://www.ed.gov/category/program/promise-neighborhoods

From: Gavin, Tom
Sent: Tuesday, March 01, 2011 4:59 PM
To: Gavin, Tom
Cc: Maisel, Chad P.; Paulsen, Joe
Subject: March messaging -- education

Comms team –

Attached is a memo that walks through the March messaging and the opportunities there from a message perspective. We'd like to arrange for as many amplification events as we can – and we're including an hour of targeted radio or a satellite round-robin as an event.

We're going to follow a similar approach to rolling out each week as we did the past few, with a preview call on Friday to advance the next week's activities including any Cabinet pieces. So be sure to let us know by COB on Thursday what you have cooking for the next week.

If you have questions, call or email.

Please treat this as a confidential document. It is a pre-decisional working document.

Thanks.

Tom Gavin
Special Assistant to the President
Director, Cabinet Communications
(b) (6)
(b) (6)

Ex.5 - Deliberative

i3 Cabinet visit options.docx School Improvement Cabinet visit options.docx 2011 03 01 Education Month framing for Cabinet.docx

01268-EPA-5589

Barbara Bennett/DC/USEPA/US
03/04/2011 01:30 PM

To Richard Windsor, Bob Perciasepe, David McIntosh, Seth Oster, Diane Thompson, Arvin Ganesan
cc
bcc
Subject Fw: EPA CR funding

[redacted] Ex.5 - Deliberative

Barbara J. Bennett
Chief Financial Officer
U.S. EPA
202-564-1151

----- Forwarded by Barbara Bennett/DC/USEPA/US on 03/04/2011 01:26 PM -----

From: "Hickey, Mike" [redacted] (b) (6) >
To: Barbara Bennett/DC/USEPA/US@EPA
Date: 03/04/2011 01:09 PM
Subject: FW: EPA CR funding

Barb,

[redacted] Ex.5 - Deliberative

----- Original Message -----

From: Ericsson, Sally C.
To: 'windsor.richard@epamail.epa.gov' <windsor.richard@epamail.epa.gov>
Cc: 'Perciasepe.Bob@epamail.epa.gov' <Perciasepe.Bob@epamail.epa.gov>
Sent: Fri Mar 04 12:59:47 2011
Subject: EPA CR funding

Lisa,

As you know, last night Jack went to the Hill with a list of potential savings totaling $6.5 billion. The list included a range of programs government-wide -- including some from EPA -- which reflected reductions that were either included in the FY 2011 or the FY 2012 Budget or both.

Ex.5 - Deliberative

If you want to discuss, please let me know.

Thanks.

Sally

P.S.

Ex.5 - Deliberative

01268-EPA-5590

Bob Perciasepe/DC/USEPA/US
03/04/2011 02:06 PM

To Barbara Bennett
cc Arvin Ganesan, David McIntosh, Diane Thompson, Richard Windsor, Seth Oster
bcc
Subject Re: Fw: EPA CR funding

Barb:

Call me.

Bob Perciasepe
Deputy Administrator

(o) +1 202 564 4711
(c) + (b) (6)

Barbara Bennett Ex.5 - Deliberative 03/04/2011 01:30:17 PM

From: Barbara Bennett/DC/USEPA/US
To: Richard Windsor/DC/USEPA/US@EPA, Bob Perciasepe/DC/USEPA/US@EPA, David McIntosh/DC/USEPA/US@EPA, Seth Oster/DC/USEPA/US@EPA, Diane Thompson/DC/USEPA/US@EPA, Arvin Ganesan/DC/USEPA/US@EPA
Date: 03/04/2011 01:30 PM
Subject: Fw: EPA CR funding

Ex.5 - Deliberative

Barbara J. Bennett
Chief Financial Officer
U.S. EPA
202-564-1151

----- Forwarded by Barbara Bennett/DC/USEPA/US on 03/04/2011 01:26 PM -----

From: "Hickey, Mike" (b) (6) >
To: Barbara Bennett/DC/USEPA/US@EPA
Date: 03/04/2011 01:09 PM
Subject: FW: EPA CR funding

Barb,

----- Original Message -----
From: Ericsson, Sally C.
To: 'windsor.richard@epamail.epa.gov' <windsor.richard@epamail.epa.gov>
Cc: 'Perciasepe.Bob@epamail.epa.gov' <Perciasepe.Bob@epamail.epa.gov>
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If you want to discuss, please let me know.

Thanks.

Sally

P.S. [redacted] Ex.5 - Deliberative

01268-EPA-5591

"Sutley, Nancy H."
<(b) (6)
ov>
03/04/2011 05:50 PM

To "(b) (6)" "(b) (6)" "'delonnie.henry@sd.mil'", "(b) (6)'", "(b) (6)" "(b) (6)", "(b) (6)" "(b) (6)" "'abedinH@state.gov'", Richard Windsor, "'annie.bradley@usdoj.gov'", "(b) (6)", "'Eric.shinseki@va.gov'", "'darcyje@conus.army.mil'", "'arnekrc@ed.gov'", "(b) (6)" "'tfg75@do.treas.gov'", "'martha.johnson@gsa.gov'", "'charles.bolden@nasa.gov'", "'adrienne.thomas@nara.gov'", "'TDKILGORE@tva.gov'", "'Dee.Williams@opm.gov'", "'Michael.J.Astrue@ssa.gov'", "'patrick.r.donahoe@usps.gov'", "'cloughw@si.edu'"

cc "'rcox@achp.gov'", "'cturner@cftc.gov'", "'larryjm@ucia.gov'", "'wanderson@cns.gov'", "'jim.williams@csosa.gov'", "'chris.cummiskey@dhs.gov'", "'fstephens@doc.gov'", "'ashton.carter@osd.mil'", "'daniel.poneman@hq.doe.gov'", "'rhea_suh@ios.doi.gov'", "'lee.j.lofthus@usdoj.gov'", "'Hayes.Charlotte@dol.gov'", "'kennedypf@state.gov'", "'kathryn.thomson@dot.gov'", "'winona.varnon@ed.gov'", Craig Hooks, "'michael.cushing@exim.gov'", "'smiths@fca.gov'", "'glenda.patrick@ferc.gov'", "'paula.hayes@fhfa.gov'", "'sstampone@flra.gov'", "'lcrook@fmc.gov'", "'mmccord@fmshrc.gov'", "'eharrington@ftc.gov'", "'steve.leeds@gsa.gov'", "'ned.holland@hhs.gov'", "'estelle.b.richman@hud.gov'", "'dscarbrough@imls.gov'", "'schehltp@mcc.gov'", "'cjones@mmc.gov'", "'mark.sprouse@nara.gov'", "'olga.m.dominguez@nasa.gov'", "'mquigley@ncd.gov'", "'marcel.acosta@ncpc.gov'", "'edwardsk@arts.gov'", "'bmaynes@neh.gov'", "'kathleen.james@nlrb.gov'", "'king@nmb.gov'", "'kathryn.greene@nrc.gov'", "'jburt@nsf.gov'", "'diodato@nwtrb.gov'", "'lpaul@opic.gov'", "'tina.mcguire@opm.gov'", "'rloeb@oshrc.gov'", "'davis.patricia@pbgc.gov'", "'jpimpedly@peacecorps.gov'", "'henry.valiulis@rrb.gov'", "'David.Robbins@sba.gov'", "'ruizd@sec.gov'", "'BechtNa@si.edu'", "'michael.gallagher@ssa.gov'", "'dhubbard@sss.gov'", "'aaray@tva.gov'", "'joellen.darcy@us.army.mil'", "'dluten@usaid.gov'", "'anna.brown@csb.gov'", "'robin.heard@osec.usda.gov'", "'cdepaola@usip.gov'", "'samuel.m.pulcrano@usps.gov'", "'dan.tangherlini@do.treas.gov'", "'chum@ustda.gov'", "'jim.sullivan@va.gov'", "Moore, Michelle", "Garvey, William S."

bcc

Subject Implementing Instructions: Climate Change Adaptation Planning

Dear Friends and Colleagues –

On October 5, 2009, President Obama signed Executive Order (E.O.) 13514, Federal Leadership in Environmental, Energy, and Economic Performance. The purpose of the Executive Order is to establish an integrated strategy toward sustainability in the Federal Government. As part of that effort, Federal agencies must evaluate climate change risks and vulnerabilities to manage the effects of climate change

on agency operations and mission.

In accordance with Section 5(b) of E.O. 13514, I am issuing the *Instructions for Implementing Climate Change Adaptation Planning* , which can be found here. These instructions provide direction to Federal agencies on integrating climate change adaption into Federal agency planning, operations, policies, and programs. These instructions will assist Federal agencies in ensuring that resources are invested wisely and services and operations remain effective in light of climate change risks.

The instructions reflect that adaptation planning should occur within the existing agency management framework and budget. Agencies are expected to implement these instructions as part of complying with the E.O. 13514. The Council on Environmental Quality will provide agencies with assistance in meeting the requirements of the instructions.

Thank you for your continued support and efforts to ensure the Federal Government leads by example. If you have any questions regarding the instructions, please contact Michelle Moore, the Federal Environmental Executive, at (b) (6) or (b) (6)

Sincerely,

Nancy H. Sutley
Chair
Council on Environmental Quality

01268-EPA-5592

Richard Windsor/DC/USEPA/US
03/06/2011 09:20 AM

To "Bill Daley", "Nancy-Ann M. DeParle", "Nancy-Ann DeParle"
cc "Chris Lu"
bcc
Subject Re: EPA led efforts re Brazil

Sorry - here is the Attachment
Richard Windsor

----- Original Message -----
From: Richard Windsor
Sent: 03/06/2011 08:47 AM EST
To: "Bill Daley" <(b) (6) "Nancy-Ann M. DeParle" <(b) (6) "Nancy-Ann DeParle" <(b) (6)
Cc: "Chris Lu" <(b) (6)
Subject: EPA led efforts re Brazil

Bill and Nancy,

Thanks for the time to catch up. Bill - knock 'em dead on the morning shows today. Nancy - will follow up on power plant idea this week.

Ex.5 - Deliberative

[redacted]

Lisa

01268-EPA-5593

Richard Windsor/DC/USEPA/US
03/07/2011 10:20 AM

To "Stephanie Cutter", "Chris Lu"
cc
bcc
Subject Fw: Google Alert - EPA Lisa jackson

This is mostly wishful thinking but a good example of some of the policy chatter out there.

------Original Message------
From: Google Alerts
To: Lisa At Home
Subject: Google Alert - EPA Lisa jackson
Sent: Mar 7, 2011 9:56 AM

News 1 new result for EPA Lisa jackson In Budget Battle, GOP May Choose to Protect EPA Climate Funds After All Reuters By Elizabeth McGowan at SolveClimate By Elizabeth McGowan WASHINGTON– During this tenuous time when dozens of House Republicans and coal-state Democrats continue to castigate her agency as evil incarnate, EPA Administrator Lisa Jackson seems to be ... See all stories on this topic » This as-it-happens Google Alert is brought to you by Google. Remove this alert. Create another alert. Manage your alerts.

01268-EPA-5594

Nancy Stoner/DC/USEPA/US
03/07/2011 07:42 PM

To Richard Windsor, Bob Perciasepe, Bob Sussman, Michael Goo, Scott Fulton, Avi Garbow, Seth Oster, Betsaida Alcantara, Arvin Ganesan, Lawrence Elworth
cc
bcc
Subject Fw: Interagency Review of Joint EPA/Corps Guidance on CWA Jurisdiction

All,

Ex.5 - Deliberative

Nancy

----- Forwarded by Nancy Stoner/DC/USEPA/US on 03/07/2011 07:31 PM -----

From: "Laity, Jim" <(b) (6)v>
To: "Laity, Jim" <J(b) (6)v>, "'Fay_Iudicello@ios.doi.gov'" <Fay_Iudicello@ios.doi.gov>, "'Strylowski, John A'" <John_Strylowski@ios.doi.gov>, "'tchoe@doc.gov'" <tchoe@doc.gov>, "'McDonald, Christina'" <Christina.Mcdonald@dhs.gov>, "'Miller, Edmund, Mr, OSD-ATL'" <Edmund.Miller@osd.mil>, "'Maresca, Charles A.'" <Charles.Maresca@sba.gov>, "'Katrina Johnson,'" <kmc@obpa.usda.gov>, "'Camille.Mittelholtz@dot.gov'" <Camille.Mittelholtz@dot.gov>, "'Kohl, Elizabeth'" <Elizabeth.Kohl@hq.doe.gov>, "'ann.miles@ferc.gov'" <ann.miles@ferc.gov>, "'JPizarchik@osmre.gov'" <'JPizarchik@osmre.gov'>, "'gowens@osmre.gov'" <'gowens@osmre.gov'>, "Gormsen, Eric T (SMO)" <Eric.T.Gormsen@usdoj.gov>, "'Mathew, Asha'" <amathew@doc.gov>, "Mumbach, Michael" <Michael.Mumbach@dhs.gov>, "Dennis, Kia" <Kia.Dennis@sba.gov>, "Smith, Odin" <OSmith@doc.gov>, "Jones, Kevin R (OLP)" <Kevin.R.Jones@usdoj.gov>, "Hinchman, Robert (SMO)" <Robert.Hinchman@usdoj.gov>, "Feeney, Megan" <Megan_Feeney@ios.doi.gov>
Cc: Gregory Peck/DC/USEPA/US@EPA, Nancy Stoner/DC/USEPA/US@EPA, "Fitzpatrick, Michael A." <(b) (6) "Mancini, Dominic J." <(b) (6) "Boots, Michael J." <(b) (6) "Carson1, Jonathan" <(b) (6) "Peterson, Jeffrey W." <(b) (6) "Levinson, Arik" <(b) (6) "Zichal, Heather R." <(b) (6) "Aldy, Joseph E." <(b) (6) gov>, "Stebbins, Michael J." <(b) (6) v>, "'Gaffney-Smith, Margaret E'" <Meg.E.Gaffney-Smith@usace.army.mil>, 'Chip Smith' <chip.smith1@us.army.mil>, "'craig.schmauder@us.army.mil'" <'craig.schmauder@us.army.mil'>, Brian Frazer/DC/USEPA/US@EPA, "Ebner, Eugene M." <(b) (6) "Sharp, Emily L." <(b) (6) "Comisky, Nicole E." <(b) (6) "Miller, Kimberly A." <(b) (6) "Reilly, Meg" <(b) (6) "Bhowmik, Rachana"

< (b) (6) "Furman, Jason L." < (b) (6)
"Patel, Manisha" < (b) (6) "Salt, Terrence C SES CIV USA ASA CW"
< (b) (6) "Wood, Lance D HQ02" <Lance.D.Wood@usace.army.mil>, Karyn
Wendelowski/DC/USEPA/US@EPA, "Mancini, Dominic J." < (b) (6)
"Fitzpatrick, Michael A." < (b) (6) David
Evans/DC/USEPA/US@EPA
Date: 03/07/2011 04:28 PM
Subject: RE: Interagency Review of Joint EPA/Corps Guidance on CWA Jurisdiction

Interagency Reviewers:

(b) (5)

Jim Laity
OIRA Desk Officer for USACE/USEPA Office of Water
(b) (6)

From: Laity, Jim
Sent: Monday, December 20, 2010 7:27 PM
To: 'Fay_Iudicello@ios.doi.gov'; 'Strylowski, John A'; 'tchoe@doc.gov'; 'McDonald, Christina'; 'Miller,

Edmund, Mr, OSD-ATL'; Maresca, Charles A.; Katrina Johnson,; 'Camille.Mittelholtz@dot.gov'; 'Kohl, Elizabeth'; 'ann.miles@ferc.gov'; 'john.cruden@usdoj.gov; 'Russell.Young@usdoj.gov; 'JPizarchik@osmre.gov'; 'gowens@osmre.gov'
Cc: 'Peck.gregory@epa.gov'; stoner.nancy@epa.gov; Fitzpatrick, Michael A.; Mancini, Dominic J.; Boots, Michael J.; Carson, Jon; Peterson, Jeffrey W.; Levinson, Arik; Zichal, Heather R.; Aldy, Joseph E.; Stebbins, Michael J.; Gaffney-Smith, Margaret E; 'rock.salt@us.army.mil'; 'Chip Smith'; 'craig.schmauder@us.army.mil'; Frazer.Brian@epamail.epa.gov; Ebner, Eugene M.; Sharp, Emily L.; Comisky, Nicole E.; Miller, Kimberly A.; Reilly, Meg
Subject: Interagency Review of Joint EPA/Corps Guidance on CWA Jurisdiction

Interagency Reviewers: (b) (5) [redacted]

[redacted]

[redacted]

Jim Laity
OMB/OIRA Desk Officer for CWA

Ex.5 - Deliberative

(b) (6) [redacted] WOUS Guidance 7 March 2011 version clean.docx

01268-EPA-5595

Richard Windsor/DC/USEPA/US
03/09/2011 02:16 PM

To "Stephanie Cutter", "Nancy-Ann M. DeParle", "Nancy Sutley", "Heather Zichal"
cc
bcc
Subject Fw: Southern Company

David McIntosh

----- Original Message -----
From: David McIntosh
Sent: 03/09/2011 02:14 PM EST
To: Richard Windsor; Diane Thompson; Bob Perciasepe; Michael Goo; Bicky Corman; Seth Oster; Scott Fulton; Bob Sussman; Arvin Ganesan
Subject: Southern Company

Last night, Southern Company hosted a dinner for market analysts. At the dinner, Southern executives expressed their recognition that Clean Air Act rules affecting utilities will likely go into affect more-or-less on their current schedule -- which is more quickly than Southern had until recently conceded they would -- and that Southern will, as a consequence plan to retire some of its oldest and least efficient coal-fired power plants. The comments are getting a lot of play among market analysts and are being taken as a significant signal.

01268-EPA-5596

Richard Windsor/DC/USEPA/US
03/11/2011 09:23 AM

To "Stephanie Cutter"
cc
bcc
Subject Fw: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

Know you are swamped but just wanted to remind you that I have a hearing before Whitfield/Shimkus committee today. [redacted] Ex.5 - Deliberative

---

From: David McIntosh
Sent: 03/11/2011 08:08 AM EST
To: windsor.richard@epa.gov
Subject: Fw: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

[redacted] Ex.5 - Deliberative

From: David McIntosh
Sent: 03/11/2011 08:06 AM EST
To: David McIntosh
Subject: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

This E&E Daily story was sent to you by: mcintosh.david@epa.gov

Personal message:

An E&E Publishing Service

POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA *(Friday, March 11, 2011)*

Elana Schor and Sarah Abruzzese, E&E reporters

House Republicans' move to join the two most politically volatile threads in the Washington, D.C., energy debate -- gas prices and U.S. EPA rules -- sparked Democratic charges of deception yesterday and silence so far from the Obama administration.

Speaker John Boehner (R-Ohio) amplified the GOP gambit as he laid out a new project, dubbed the American Energy Initiative, calling for more domestic fossil-fuel production, new nuclear power plants and an end to EPA's authority over greenhouse gases. While the Republican message had percolated all week, Boehner's decision to spotlight the anti-EPA bill now sailing through the House Energy and Commerce Committee gave the gas-price charge a far broader platform.

The administration's offshore oil-production policies and regulation of greenhouse gases, Boehner said yesterday, represent a systematic hit to economic growth. "If the White House has its way -- and the EPA imposes a backdoor national energy tax -- gas prices will only go higher," the Ohioan told reporters.

Energy and Commerce Chairman Fred Upton (R-Mich.) began invoking the effect of EPA emissions rules on fuel prices earlier this week, citing cost estimates from a 2009 study of the now-defunct House climate change bill (*E&E Daily* , March 9). But Democrats were still perplexed by the

elevation of that argument, with several accusing the GOP of stretching the boundaries of logic to serve its political goals.

"If they could fool people into believing there's a connection, I think they would gain some political mileage, but it's all deceptive," said Rep. Henry Waxman of California, the Energy and Commerce panel's top Democrat and a chief author of that 2009 climate bill. "There's no connection to EPA regulating greenhouse gases for certain stationary sources by requiring them to be more efficient and the price of gasoline."

In fact, Waxman added, large-scale emitters are more likely to reduce their fuel consumption in response to the EPA regulations, saving industry more money. Another senior Energy and Commerce Democrat, Rep. Jay Inslee of Washington, raised similar points by billing the emissions rules as "incentives for industry to make investments" in efficiency -- with no direct effect on gas prices.

"We're locked into higher oil prices, and the only way to get off of it is finding efficiencies," Inslee said in an interview.

As for Republicans' chances of scoring politically with their new strategy, Inslee quipped: "You can repeal the Clean Air Act. You can't repeal the First Law of Thermodynamics. You can't repeal the law of supply and demand. ... People realize there are much bigger forces on gas prices than the Republican caucus."

Senate Environment and Public Works Chairwoman Barbara Boxer (D-Calif.) appeared nonplussed upon hearing about the Republican strategy.

"They're ignoring the political upheaval in the Middle East and the fact that we're not moving fast enough to alternative fuels and clean vehicles," she said. Of the 2009 study employed by House Republicans, she added: "It's funny that they're blaming a law that didn't pass for high gas prices."

Yet the rhetoric was not confined to the House side of the Capitol. The ranking Republican on Boxer's panel, Sen. James Inhofe of Oklahoma, delivered a floor speech blaming the White House for rising gas prices and dismissing the impact of recent unrest in the Middle East.

"[A] lot of people are saying that the gas prices that are going up are a result partially of what's happening over there," Inhofe said. "That isn't the real problem. The real problem is a political problem."

Several Democrats, however, found problems with the factual basis of the relationship between gas prices and greenhouse gas emissions limits that would apply to refineries and power plants starting in 2012. Rep. Emanuel Cleaver (D-Mo.), for one, termed the argument "bizarre."

"It reminds me of somebody who ate a hamburger and then ends up catching pneumonia and then says, 'Hamburgers cause pneumonia,'" Cleaver said.

EPA did not respond to requests for comment last night.

Refiners' avowals

In addition to the 2009 study of the House-passed climate bill, Energy and Commerce aides pointed to testimony and supportive letters from refiners who hailed Upton's plan to revoke EPA power over greenhouse gases under the Clean Air Act.

"Every credible economic analysis that has been performed shows that Americans will pay higher prices at the pump and that the refining sector, its high-paying jobs and our nation's energy security will suffer as a direct result of EPA's action," Valero Energy Corp. CEO Bill Klesse wrote in a Wednesday letter to Upton.

Rep. Ed Whitfield (R-Ky.), who chairs the House Energy and Power Subcommittee, cited such testimony as the reason the Republicans are pushing for legislative changes.

In some cases, Whitfield said there is not even technology available to deal with new EPA mandates. "The additional costs that they would have to go through and investments they would have to be making to try to start complying would increase the price of gasoline," he said.

Another letter of support from 16 trade associations, including the National Petrochemical and Refiners Association and the U.S. Chamber of Commerce, praised the economic benefits of restricting EPA regulations but did not specifically address gas prices.

However, in recent testimony before the Energy and Commerce Committee, a top executive at Arkansas-based refiner Lion Oil Co. directly linked the EPA regulations to higher gas prices. New fuel-efficiency standards for vehicles drove up costs for his industry by reducing demand, Lion Vice President Steve Cousins told House members last month, and legislation blocking EPA's greenhouse gas rules would be "necessary to protect consumers, farmers and truckers from higher gasoline and diesel fuel prices," he said.

Rep. Ed. Markey (D-Mass.), the co-sponsor of the climate change bill that passed the House two years ago, said flatly, "the EPA has not done anything to increase gas prices."

That's a point Whitfield acknowledged as well.

"I'm not saying it's contributing to it right now, because the regulations haven't been finalized but we're talking down the road," he said.
Markey dismissed the GOP argument as a distraction from larger issues like the unrest in the Middle East, which is influencing American energy prices.
"Instead of focusing on Gaddafi and the other Middle East dictators, they have decided just to use it as a way of engaging in partisan political finger pointing, and I just think they have no credibility," Markey said.
Click here to read Valero's letter to Upton.
Click here to read the multi-association letter to Upton and Whitfield.
Reporters Jean Chemnick, Katie Howell, Jeremy P. Jacobs, Hannah Northey and John McArdle contributed.

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www.eenews net

01268-EPA-5597

"Cutter, Stephanie"
<[redacted] (b) (6)
03/11/2011 09:34 AM

To Richard Windsor
cc
bcc
Subject RE: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

Here are some general points, which you are already good on. What time are you testifying? I can send you POTUS statement shortly – [redacted] Ex.5 - Deliberative

GENERAL POINTS

- [redacted] Ex.5 - Deliberative

From: Windsor.Richard@epamail.epa.gov [mailto:Windsor.Richard@epamail.epa.gov]
Sent: Friday, March 11, 2011 9:23 AM
To: Cutter, Stephanie
Subject: Fw: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

Know you are swamped but just wanted to remind you that I have a hearing before Whitfield/Shimkus committee

today. [redacted] Ex.5 - Deliberative

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Sent: 03/11/2011 08:08 AM EST
To: windsor.richard@epa.gov
Subject: Fw: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

[redacted] Ex.5 - Deliberative

From: David McIntosh
Sent: 03/11/2011 08:06 AM EST
To: David McIntosh
Subject: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

This E&E Daily story was sent to you by: mcintosh.david@epa.gov

Personal message:

An E&E Publishing Service

POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA *(Friday, March 11, 2011)*

Elana Schor and Sarah Abruzzese, E&E reporters

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Speaker John Boehner (R-Ohio) amplified the GOP gambit as he laid out a new project, dubbed the American Energy Initiative, calling for more domestic fossil-fuel production, new nuclear power plants and an end to EPA's authority over greenhouse gases. While the Republican message had percolated all week, Boehner's decision to spotlight the anti-EPA bill now sailing through the House Energy and Commerce Committee gave the gas-price charge a far broader platform.

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"If they could fool people into believing there's a connection, I think they would gain some political mileage, but it's all deceptive," said Rep. Henry Waxman of California, the Energy and Commerce panel's top Democrat and a chief author of that 2009 climate bill. "There's no connection to EPA regulating greenhouse gases for certain stationary sources by requiring them to be more efficient and the price of gasoline."

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As for Republicans' chances of scoring politically with their new strategy, Inslee quipped: "You can repeal the Clean Air Act. You can't repeal the First Law of Thermodynamics. You can't repeal the aw of supply and demand. ... People realize there are much bigger forces on gas prices than the Republican caucus."
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Click here to read the multi-association letter to Upton and Whitfield.
Reporters Jean Chemnick, Katie Howell, Jeremy P. Jacobs, Hannah Northey and John McArdle contributed.

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01268-EPA-5598

Richard Windsor/DC/USEPA/US
03/11/2011 09:41 AM

To "Cutter, Stephanie"
cc
bcc
Subject Re: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

Hearing begins at 10. So I sure don't want to scoop him. Its likely the hearing will still be going on at 11.

From: "Cutter, Stephanie" [(b) (6)]
Sent: 03/11/2011 09:34 AM EST
To: Richard Windsor
Subject: RE: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

Here are some general points, which you are already good on. What time are you testifying? I can send you POTUS statement shortly – [Ex.5 - Deliberative]

GENERAL POINTS

- [Ex.5 - Deliberative]

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Sent: Friday, March 11, 2011 9:23 AM
To: Cutter, Stephanie
Subject: Fw: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

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---

From: David McIntosh
Sent: 03/11/2011 08:08 AM EST
To: windsor.richard@epa.gov
Subject: Fw: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

[redacted] Ex.5 - Deliberative

From: David McIntosh
Sent: 03/11/2011 08:06 AM EST
To: David McIntosh
Subject: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

This E&E Daily story was sent to you by: mcintosh.david@epa.gov

Personal message:

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Elana Schor and Sarah Abruzzese, E&E reporters

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Richard Windsor/DC/USEPA/US
03/11/2011 09:42 AM

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01268-EPA-5602

David McIntosh/DC/USEPA/US
03/11/2011 09:44 AM

To Richard Windsor
cc
bcc
Subject Re: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

(b) (5) [redacted]

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Sent: 03/11/2011 09:42 AM EST
To: "David McIntosh" <mcintosh.david@epa.gov>
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- Ex.5 - Deliberative [redacted]
- [redacted]

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To: Cutter, Stephanie
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Sent: 03/11/2011 08:06 AM EST
To: David McIntosh
Subject: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

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Personal message:

An E&E Publishing Service

POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA *(Friday, March 11, 2011)*

Elana Schor and Sarah Abruzzese, E&E reporters

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In fact, Waxman added, large-scale emitters are more likely to reduce their fuel consumption in response to the EPA regulations, saving industry more money. Another senior Energy and Commerce Democrat, Rep. Jay Inslee of Washington, raised similar points by billing the emissions rules as "incentives for industry to make investments" in efficiency -- with no direct effect on gas prices.

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Richard Windsor/DC/USEPA/US
03/11/2011 09:49 AM

To "Cutter, Stephanie"
cc
bcc
Subject Re: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

[redacted] Ex.5 - Deliberative

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Sent: 03/11/2011 09:44 AM EST
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Subject: Re: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

Ok.

From: Windsor.Richard@epamail.epa.gov <Windsor.Richard@epamail.epa.gov>
To: Cutter, Stephanie
Sent: Fri Mar 11 09:41:53 2011
Subject: Re: From E&E Daily -- POLITICS: Democrats cry foul over GOP's attempts to tie fuel prices to EPA

Hearing begins at 10. So I sure don't want to scoop him. Its likely the hearing will still be going on at 11.

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03/11/2011 09:49 AM

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Aaron Dickerson/DC/USEPA/US
03/11/2011 10:36 PM

To "Lisa Jackson"
cc Eric Wachter
bcc
Subject Fw: Letter Re: Toxics Rule on Behalf Several Members of the Clean Energy Group

---

From: "Michael Bradley" [mbradley@mjbradley.com]
Sent: 03/12/2011 03:00 AM GMT
To: LisaP Jackson
Cc: (b) (6) Gina McCarthy; (b) (6) (b) (6) Joseph Goffman; Aaron Dickerson; (b) (6) (b) (6)
Subject: Letter Re: Toxics Rule on Behalf Several Members of the Clean Energy Group

Administrator Jackson,

Several of the Clean Energy Group's Clean Air Policy Initiative companies met with Cass Sunstein on March 4th to discuss the compa
proposed Toxics Rule next week, please find attached a letter sent on behalf of Avista Corporation, Calpine Corporation, Constellatio
letter outlines some of the key points these companies raised during that meeting. Please let me know if you have any questions.

Thank you,

Michael Bradley

MJB Letter to Lisa Jackson March 11 2011.pdf

M. J. Bradley & Associates LLC

47 Junction Square Drive
Concord, MA 01742
Tel: 978-369-5533
Fax: 978-369-7712

March 11, 2011

EPA Administrator Lisa Jackson
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Ave
Washington, DC 20460

Dear Administrator Jackson,

Several of the Clean Energy Group's Clean Air Policy Initiative companies met with Cass Sunstein on March 4th to discuss the companies' perspectives on the Utility Air Toxics Rule ("Toxics Rule"). On behalf of Avista Corporation, Calpine Corporation, Constellation Energy, Exelon Corporation, Public Service Enterprise Group, Inc., and Seattle City Light, I wanted to take this opportunity to share with you some of the points these companies raised during that meeting as you work to finalize the proposal next week. As we have expressed to you, our companies support EPA's development of the Toxics Rule consistent with the requirements of the Clean Air Act, which requires EPA to develop standards for hazardous air pollutants. Based on the data collected by the Agency, we anticipate that the proposal will be consistent with President Obama's Executive Order, Improving Regulation and Regulatory Review. As described below, we expect that the proposal will protect public health, welfare, safety, and the environment while promoting economic growth, innovation, competitiveness, and job creation and without compromising the reliability of our electric system. These benefits should far outweigh the capital investments companies will make to comply with the Toxics Rule.

The proposed Toxics Rule must provide the necessary regulatory certainty.
It is essential that EPA's proposal on March 16th provide the industry sufficient certainty that will facilitate the necessary planning and investment. A proposal that does not appear to be legally durable or that presents too many options for comment will not provide the regulatory certainty our industry needs to start planning for compliance with the final rule. While generators will not undertake significant capital expenditures in advance of a final rule, companies are likely to begin planning and initiate pre-engineering steps. The associated costs that can be undertaken before the rule is final are not onerous, and prudent generators can expend these funds as part of developing an integrated environmental compliance strategy. This advance planning will also allow companies to better control costs and establish a cost-effective schedule for constructing and installing any necessary control technologies. Thus, while some companies may argue for additional time, those requests will be unnecessary if companies can begin to prepare for compliance now.

Additionally, the annual capacity planning auctions in both the PJM Interconnection RTO and the ISO-New England RTO are scheduled for May 6 and June 6, 2011, respectively, for the 2014-2015 planning year. Thus, companies will need to offer their capacity into the reliability markets based on the March proposal. Having a proposal that clearly sets forth the standards that EPA expects to finalize will be essential for generation companies participating in these markets.

The electric sector is well on its way to complying with the Toxics Rule.
Our industry has experience installing the necessary control technologies. About 60 percent (178 GW) of the nation's coal fleet has already installed flue gas desulfurization ("scrubber") controls - the most capital intensive equipment potentially required by the rule. Scrubbers are highly effective at controlling SO_2 emissions as well as

acid gases. Additionally, less resource and time intensive technologies are available to be quickly deployed, offering the electric generating industry the flexibility it needs to comply with the Toxics Rule. For example, direct sorbent injection (DSI) and dry scrubbing technology installation times are approximately 12 and 24 months, respectively.

Thus, we believe our industry can take cost effective steps to ensure compliance with the Toxics Rule in the three years allowed by the Clean Air Act. However, if there are specific instances where a company, despite its best efforts, needs additional time, EPA has the authority to grant up to a one-year extension on a case by case basis. As noted above, however, timely compliance will require some companies to take steps to start planning *prior* to the finalization of the rule. Indeed, many of our companies have already started this process.

Compliance with the Toxics Rule will not compromise the reliability of the electric system.
We also believe that the industry can comply with the Toxics Rule requirements without compromising the reliability of the electric system. The U.S. bulk power system, at an aggregate level, has adequate spare capacity to absorb potential coal plant retirements. The U.S. electric sector is expected to have more than 100 GW of surplus generating capacity over target reserve margins (one of several important indicators of electric system reliability).[1] This surplus is almost three times the 25 to 40 GW of retirements projected by industry analysts. Moreover, companies are already making retirement decisions regardless of what EPA proposes in the Toxics Rule because fundamental economics related to lower demand and lower natural gas prices are already challenging many of the coal-fired power plants that are most likely to retire.

Further, the electric industry has a proven track record of adding additional generating capacity and transmission solutions when and where needed and of coordinating effectively to address reliability concerns. In the three years between 2001 and 2003, the electric industry built over 160 GW of new generation—about four times what analysts project will retire over the next five years. Existing gas units also have significant untapped power production potential, which can be utilized during off peak periods without constructing new generation. This less utilized capacity can assist in managing the power plant outages required to install pollution control systems. For example, natural gas facilities in the Midwest and Southeast have significant potential to increase their output with average capacity factors of only 20 percent. These are the regions that are likely to see the most coal retirements.

If there are specific local reliability concerns, state and federal regulators have an array of tools to moderate impacts on the electric system, where necessary. Tools that have been deployed successfully in the past include reliability-must-run contracts, adjusting unit maintenance schedules, signing up additional interruptible supply contracts, and coordinating closely with neighboring power systems to maximize power purchases. In addition, assorted risk management procedures under the Clean Air Act, the Federal Power Act, and other statutes provide EPA, DOE, FERC, and the President tools to respond to potential impacts on electricity system reliability.

The benefits associated with the Toxics Rule will far outweigh the costs.
An additional concern we are hearing from others in the industry is that compliance with the Toxics Rule will result in significant costs to the industry and ratepayers. While compliance with the Toxics Rule will require capital investment by the industry, these investments occur over a period of years. Associated costs are manageable and will be far outweighed by the benefits that will result from the rules. It is also important to recognize that the U.S. electricity industry is one of the most capital intensive industries in the U.S. Thus, the investments required by the Toxics Rule must be viewed in light of the investments routinely made by our industry. In competitive markets, these investments are included in companies' energy and capacity bids. Thus,

[1] M. J. Bradley & Associates, LLC and Analysis Group. 2010. *Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability*. Available at:
http://www.mjbradley.com/documents/MJBAandAnalysisGroupReliabilityReportAugust2010.pdf.

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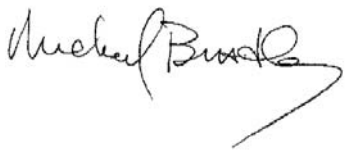
In addition to the clear public health benefits, the economic benefits are important to recognize. First, CERES recently released a report based on analysis by researchers at the Political Economy Research Institute at the University of Massachusetts, Amherst. Based on recent estimates that the power sector will invest almost $200 billion in capital improvements over the next five years, the report estimates that the total employment created by these capital investments will be 1.46 million jobs, or about 290,000 jobs on average in each of the next five years. Installing modern pollution controls and building new power plants will create a wide array of skilled, high-paying installation, construction, and professional jobs, in addition to jobs at companies that manufacture pollution controls and other required construction and maintenance equipment.

Additionally, the regional transport of emissions is a concern for many of our companies because of our operations in downwind nonattainment areas. A co-benefit of the Toxics Rule is that the installation of controls will reduce PM emissions. Bringing areas into attainment with the PM standard will eliminate an economic barrier that currently exists in regions where industrial facilities and power plants are required to obtain emission offsets in order to build new facilities or expand operations. This barrier discourages development due to the increased permitting and financial obligations compared to facilities operating in upwind attainment areas.

Regulatory tools that can minimize costs and spur innovations.
That being said, there are regulatory tools EPA can use to further minimize costs and spur innovation. For example, the final Industrial, Commercial, and Institutional (ICI) Boiler NESHAP allows averaging across multiple units at a facility. This flexibility allows companies to evaluate if there are more cost-effective compliance options that ensure the entire facility complies with the applicable standards but allows one unit within a facility to slightly over comply and another unit to remain slightly above the standard. Averaging across units within a facility can also spur innovation because it can drive a company to identify ways to achieve additional reduction than required at certain units.

To conclude, during the past 18 months, we appreciate the transparency and engagement by EPA with stakeholders in developing the proposed Toxics Rule. Based on that engagement, we anticipate a reasonable and straight forward proposal, and we expect the proposal to be one for which a 60 day comment period will be sufficient especially given the court deadlines EPA is facing for finalizing the rule as well as the need for regulatory certainty for the industry. We look forward to providing comments on the proposal during this comment period.

Sincerely,



Michael Bradley on behalf of Avista Corporation, Calpine Corporation, Constellation Energy, Exelon Corporation, Public Service Enterprise Group, Inc., and Seattle City Light

cc: Cass Sunstein, Administrator, Office of Information and Regulatory Affairs
Nancy Sutley, Chair, Council on Environmental Quality
Gary Guzy, Deputy Director, Council on Environmental Quality
Gina McCarthy, Assistant Administrator, EPA's Office of Air and Radiation
Joe Goffman, Senior Counsel to the Assistant Administrator, EPA's Office of Air and Radiation

01268-EPA-5606

Richard Windsor/DC/USEPA/US
03/12/2011 06:50 AM

To "David McIntosh", "Bob Perciasepe", "Arvin Ganesan", "Seth Oster"
cc "Michael Goo"
bcc
Subject Fw: Letter Re: Toxics Rule on Behalf Several Members of the Clean Energy Group

---

From: Aaron Dickerson
Sent: 03/11/2011 10:36 PM EST
To: "Lisa Jackson" <windsor richard@epa.gov>
Cc: Eric Wachter
Subject: Fw: Letter Re: Toxics Rule on Behalf Several Members of the Clean Energy Group

---

From: "Michael Bradley" [mbradley@mjbradley.com]
Sent: 03/12/2011 03:00 AM GMT
To: LisaP Jackson
Cc: (b) (6) Gina McCarthy; (b) (6) (b) (6) Joseph Goffman; Aaron Dickerson; (b) (6) (b) (6)
Subject: Letter Re: Toxics Rule on Behalf Several Members of the Clean Energy Group

Administrator Jackson,

Several of the Clean Energy Group's Clean Air Policy Initiative companies met with Cass Sunstein on March 4th to discuss the compa proposed Toxics Rule next week, please find attached a letter sent on behalf of Avista Corporation, Calpine Corporation, Constellatio letter outlines some of the key points these companies raised during that meeting. Please let me know if you have any questions.

Thank you,

Michael Bradley

MJB Letter to Lisa Jackson March 11 2011.pdf

M. J. Bradley & Associates LLC

47 Junction Square Drive
Concord, MA 01742
Tel: 978-369-5533
Fax: 978-369-7712

March 11, 2011

EPA Administrator Lisa Jackson
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Ave
Washington, DC 20460

Dear Administrator Jackson,

Several of the Clean Energy Group's Clean Air Policy Initiative companies met with Cass Sunstein on March 4th to discuss the companies' perspectives on the Utility Air Toxics Rule ("Toxics Rule"). On behalf of Avista Corporation, Calpine Corporation, Constellation Energy, Exelon Corporation, Public Service Enterprise Group, Inc., and Seattle City Light, I wanted to take this opportunity to share with you some of the points these companies raised during that meeting as you work to finalize the proposal next week. As we have expressed to you, our companies support EPA's development of the Toxics Rule consistent with the requirements of the Clean Air Act, which requires EPA to develop standards for hazardous air pollutants. Based on the data collected by the Agency, we anticipate that the proposal will be consistent with President Obama's Executive Order, Improving Regulation and Regulatory Review. As described below, we expect that the proposal will protect public health, welfare, safety, and the environment while promoting economic growth, innovation, competitiveness, and job creation and without compromising the reliability of our electric system. These benefits should far outweigh the capital investments companies will make to comply with the Toxics Rule.

The proposed Toxics Rule must provide the necessary regulatory certainty.
It is essential that EPA's proposal on March 16th provide the industry sufficient certainty that will facilitate the necessary planning and investment. A proposal that does not appear to be legally durable or that presents too many options for comment will not provide the regulatory certainty our industry needs to start planning for compliance with the final rule. While generators will not undertake significant capital expenditures in advance of a final rule, companies are likely to begin planning and initiate pre-engineering steps. The associated costs that can be undertaken before the rule is final are not onerous, and prudent generators can expend these funds as part of developing an integrated environmental compliance strategy. This advance planning will also allow companies to better control costs and establish a cost-effective schedule for constructing and installing any necessary control technologies. Thus, while some companies may argue for additional time, those requests will be unnecessary if companies can begin to prepare for compliance now.

Additionally, the annual capacity planning auctions in both the PJM Interconnection RTO and the ISO-New England RTO are scheduled for May 6 and June 6, 2011, respectively, for the 2014-2015 planning year. Thus, companies will need to offer their capacity into the reliability markets based on the March proposal. Having a proposal that clearly sets forth the standards that EPA expects to finalize will be essential for generation companies participating in these markets.

The electric sector is well on its way to complying with the Toxics Rule.
Our industry has experience installing the necessary control technologies. About 60 percent (178 GW) of the nation's coal fleet has already installed flue gas desulfurization ("scrubber") controls - the most capital intensive equipment potentially required by the rule. Scrubbers are highly effective at controlling SO_2 emissions as well as

acid gases. Additionally, less resource and time intensive technologies are available to be quickly deployed, offering the electric generating industry the flexibility it needs to comply with the Toxics Rule. For example, direct sorbent injection (DSI) and dry scrubbing technology installation times are approximately 12 and 24 months, respectively.

Thus, we believe our industry can take cost effective steps to ensure compliance with the Toxics Rule in the three years allowed by the Clean Air Act. However, if there are specific instances where a company, despite its best efforts, needs additional time, EPA has the authority to grant up to a one-year extension on a case by case basis. As noted above, however, timely compliance will require some companies to take steps to start planning *prior* to the finalization of the rule. Indeed, many of our companies have already started this process.

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We also believe that the industry can comply with the Toxics Rule requirements without compromising the reliability of the electric system. The U.S. bulk power system, at an aggregate level, has adequate spare capacity to absorb potential coal plant retirements. The U.S. electric sector is expected to have more than 100 GW of surplus generating capacity over target reserve margins (one of several important indicators of electric system reliability).[1] This surplus is almost three times the 25 to 40 GW of retirements projected by industry analysts. Moreover, companies are already making retirement decisions regardless of what EPA proposes in the Toxics Rule because fundamental economics related to lower demand and lower natural gas prices are already challenging many of the coal-fired power plants that are most likely to retire.

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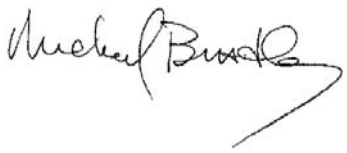

Michael Bradley on behalf of Avista Corporation, Calpine Corporation, Constellation Energy, Exelon Corporation, Public Service Enterprise Group, Inc., and Seattle City Light

cc: Cass Sunstein, Administrator, Office of Information and Regulatory Affairs
Nancy Sutley, Chair, Council on Environmental Quality
Gary Guzy, Deputy Director, Council on Environmental Quality
Gina McCarthy, Assistant Administrator, EPA's Office of Air and Radiation
Joe Goffman, Senior Counsel to the Assistant Administrator, EPA's Office of Air and Radiation

01268-EPA-5607

Bob Sussman/DC/USEPA/US
03/15/2011 07:28 PM

To Richard Windsor, Diane Thompson, Bob Perciasepe
cc Arvin Ganesan
bcc
Subject Fw: Fracking Deputies Meeting

Here's what CEQ is asking for.

Robert M. Sussman
Senior Policy Counsel to the Administrator
Office of the Administrator
(202)-564-7397
US Environmental Protection Agency
----- Forwarded by Bob Sussman/DC/USEPA/US on 03/15/2011 07:26 PM -----

From: "Bordoff, Jason E." <(b) (6)
To: "Bordoff, Jason E." <(b) (6) "Sutley, Nancy H." <(b) (6) "Zichal, Heather R." <(b) (6) "Keohane, Nathaniel" <(b) (6) "Sweetnam, Glen E." <(b) (6) Bob Perciasepe/DC/USEPA/US@EPA, Bob Sussman/DC/USEPA/US@EPA, "'david_hayes@ios.doi.gov'" <david_hayes@ios.doi.gov>, "Utech, Dan G." <(b) (6) "'Smith, Christopher A'" <Chris.Smith@hq.doe.gov>, "'Daniel.Poneman@hq.doe.gov'" <Daniel.Poneman@hq.doe.gov>, "Hernandez, Philip M." <(b) (6) "Ramos, Paola" <Paola_Ramos@ceq.eop.gov>, "'Barbara_Diehl@ios.doi.gov'" <Barbara_Diehl@ios.doi.gov>, "Anderson, Margot" <Margot.Anderson@hq.doe.gov>
Cc: "Lew, Shoshana M. (WHO)" <(b) (6) "'Elizabeth_Klein@ios.doi.gov'" <Elizabeth_Klein@ios.doi.gov>, "McConville, Drew" <(b) (6)
Date: 03/15/2011 06:55 PM
Subject: Fracking Deputies Meeting

Thanks for joining for today's discussion on safe shale development. Ex.5 - Deliberative

Jason E. Bordoff
Associate Director for Energy and Climate Change
White House Council on Environmental Quality
p: (b) (6) | f: 202.456.2710 | (b) (6)

01268-EPA-5608

Gina McCarthy/DC/USEPA/US

03/15/2011 11:16 PM

To Richard Windsor, perciasepe.bob, McIntosh.David, Michael Goo
cc Fulton.Scott
bcc
Subject Fw: edits on coordination language

[redacted] Ex.5 - Deliberative

[redacted]

----- Forwarded by Gina McCarthy/DC/USEPA/US on 03/15/2011 11:08 PM -----

From: Gina McCarthy/DC/USEPA/US
To: Fulton.Scott@EPA.GOV
Cc: Joseph Goffman/DC/USEPA/US@EPA, Tsirigotis.Peter@EPA.GOV
Date: 03/15/2011 11:04 PM
Subject: Fw: edits on coordination language

Scott - Cass has taken a look at the language we inserted into the document re: coordination and has suggested the underlined changes [redacted] Ex.5 - Deliberative [redacted]

----- Forwarded by Gina McCarthy/DC/USEPA/US on 03/15/2011 11:01 PM -----

From: Peter Tsirigotis/RTP/USEPA/US
To: "Gina McCarthy" <McCarthy.Gina@epamail.epa.gov>
Date: 03/15/2011 10:59 PM
Subject: Fw: edits on coordination language

From: "Higgins, Cortney" [redacted] (b) (6)
Sent: 03/15/2011 10:49 PM AST
To: Peter Tsirigotis
Subject: edits on coordination language

Just a few edits, attached. Give me a call if you have questions.

[redacted] Ex.5 - Deliberative

coordination language_2.docx

01268-EPA-5610

Scott Fulton/DC/USEPA/US
03/16/2011 07:52 AM

To "Richard Windsor"
cc
bcc
Subject Fw: edits on coordination language

[redacted] Ex.5 - Deliberative

[redacted] Ex.5 -
Joseph Goffman

----- Original Message -----
From: Joseph Goffman
Sent: 03/16/2011 12:45 AM EDT
To: Scott Fulton
Cc: "Fulton Scott" <Fulton.Scott@EPA.GOV>; Gina McCarthy; "Tsirigotis Peter" <Tsirigotis.Peter@EPA.GOV>
Subject: Re: edits on coordination language

[redacted] Ex.5 - Deliberative

Thanks

[redacted] Ex.5 - Deliberative
Utility Toxics coordination language_2.docx

Joseph Goffman
Senior Counsel to the Assistant Administrator
Office of Air and Radiation
US Environmental Protection Agency
202 564 3201

Scott Fulton Probably ok, but I need to check with m... 03/15/2011 11:14:21 PM

From: Scott Fulton/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA, "Fulton Scott" <Fulton.Scott@EPA.GOV>
Cc: Joseph Goffman/DC/USEPA/US@EPA, "Tsirigotis Peter" <Tsirigotis.Peter@EPA.GOV>
Date: 03/15/2011 11:14 PM
Subject: Re: edits on coordination language

Ex.5 - Deliberative

From: Gina McCarthy
Sent: 03/15/2011 11:04 PM EDT
To: Fulton.Scott@EPA.GOV
Cc: Joseph Goffman; Tsirigotis.Peter@EPA.GOV
Subject: Fw: edits on coordination language

Scott - (b) (5)

----- Forwarded by Gina McCarthy/DC/USEPA/US on 03/15/2011 11:01 PM -----

From: Peter Tsirigotis/RTP/USEPA/US
To: "Gina McCarthy" <McCarthy.Gina@epamail.epa.gov>
Date: 03/15/2011 10:59 PM
Subject: Fw: edits on coordination language

From: "Higgins, Cortney" [(b) (6)
Sent: 03/15/2011 10:49 PM AST
To: Peter Tsirigotis
Subject: edits on coordination language

(b) (5)

01268-EPA-5611

David McIntosh/DC/USEPA/US
03/16/2011 10:52 AM

To Richard Windsor
cc Seth Oster, Adora Andy, Brendan Gilfillan, Arvin Ganesan, Laura Vaught
bcc
Subject Fw: White House slams Senate GOP measure to block climate rules

----- Forwarded by David McIntosh/DC/USEPA/US on 03/16/2011 10:51 AM -----

From: "Papa, Jim" <(b) (6)
To: "Repko, Mary Frances" <Mary.Frances.Repko@mail.house.gov>, "Freedhoff, Michal" <Michal.Freedhoff@mail.house.gov>, "Duncan, Jeff" <Jeff.Duncan@mail.house.gov>, "Wayland, Karen" <Karen.Wayland@mail.house.gov>, "Dotson, Greg" <Greg.Dotson@mail.house.gov>, "Wilson, Denise R." <(b) (6) "Cheatham, Melissa Bez" <Melissa.Cheatham@mail.house.gov>, Laura Vaught/DC/USEPA/US@EPA, "Unruh-Cohen, Ana" <Ana.UnruhCohen@mail.house.gov>
Cc: "Teitz, Alexandra" <Alexandra.Teitz@mail.house.gov>, Arvin Ganesan/DC/USEPA/US@EPA, "Utech, Dan G." <(b) (6) David McIntosh/DC/USEPA/US@EPA, "Baran, Jeff" <Jeff.Baran@mail.house.gov>, "Maher, Jessica A." <(b) (6)
Date: 03/16/2011 10:51 AM
Subject: White House slams Senate GOP measure to block climate rules

Hey guys - Just wanted to flag this.

http://thehill.com/blogs/e2-wire/677-e2-wire/149839-white-house-slams-senate-gop-amendment-to-block-climate-rules

White House slams Senate GOP measure to block climate rules
By Ben Geman - 03/16/11 06:48 AM ET

The White House is bashing a proposed Senate GOP amendment to small business legislation that would nullify the Environmental Protection Agency's power to regulate greenhouse gases.

"This amendment rolls back the Clean Air Act and harms Americans' health by taking away our ability to decrease air pollution," Clark Stevens, a White House spokesman, said in a statement Tuesday night.

He adds:

"Instead of holding big polluters accountable, this amendment overrules public health experts and scientists. Finally, at a time when America's families are struggling with the cost of gasoline, the amendment would undercut fuel efficiency standards that will save Americans money at the pump while also decreasing our reliance on foreign oil."

The White House decision to weigh in directly on the amendment signifies the stakes of the escalating Republican-led effort to crush a major part of the Obama administration's environmental agenda.

Minority Leader Mitch McConnell (R-Ky.) is seeking to attach Sen. James Inhofe's (R-Okla.) bill that would kill EPA climate rules to pending legislation that would reauthorize key small business programs.

The same block-EPA bill cleared the House Energy and Commerce Committee Tuesday afternoon.

McConnell's amendment – which needs 60 votes to pass – may come up for a vote as soon as Wednesday, although the plans remained fluid and unclear Tuesday night. Check out our Tuesday posts about the amendment here, here and here.

Majority Leader Harry Reid (D-Nev.) said Tuesday he would allow a vote on the measure, paving the way for a faster-than-anticipated climate showdown in the Senate.

The amendment faces major hurdles to passage, but it would be a tough vote for politically vulnerable centrist Democrats and moderate Republicans. Inhofe's bill has 43 co-sponsors, including one Democrat thus far: Sen. Joe Manchin (D-W.Va.).

A majority vote for the amendment would be a political setback for advocates of EPA's efforts to curb emissions, even if it fell short of the 60 needed for adoption.

McConnell said in the Capitol Tuesday afternoon that he is "optimistic that there will be bipartisan support" for the measure.

But Sen. Jay Rockefeller (D-W.Va.) entered the fray Tuesday night by offering his less-aggressive plan to block EPA as an amendment to the small business bill as well.

His plan would delay EPA's regulations for stationary sources like power plants and refineries for two years, while preserving the agency's authority to regulate greenhouse gases.

His plan could sap some Democratic support for the GOP-led amendment.

Republicans announced their plan to amend the small business bill Tuesday, pouncing on the recent rise in gasoline prices and alleging that killing climate rules EPA has begun phasing in would help stem increases.

"Gas prices are soaring again. And every time this happens, we're reminded that there are a lot of policies that we've been following, which exacerbate the problem," McConnell said in the Capitol, calling Inhofe's bill "the best solution that I've seen."

But opponents of plans to block EPA rules are increasingly pushing back against claims that thwarting the regulations would help stop rising gasoline prices.

For instance, they have been circulating an analysis by the independent fact-checking group PolitiFact that labeled the gas price claim "false."

01268-EPA-5612

Richard Windsor/DC/USEPA/US
03/16/2011 11:01 AM

To "David McIntosh", "Arvin Ganesan"
cc
bcc
Subject Fw: White House slams Senate GOP measure to block climate rules

For Boxer et al
David McIntosh

----- Original Message -----
From: David McIntosh
Sent: 03/16/2011 10:52 AM EDT
To: Richard Windsor
Cc: Seth Oster; Adora Andy; Brendan Gilfillan; Arvin Ganesan; Laura Vaught
Subject: Fw: White House slams Senate GOP measure to block climate rules

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From: "Papa, Jim" <(b) (6)
To: "Repko, Mary Frances" <Mary.Frances.Repko@mail.house.gov>, "Freedhoff, Michal" <Michal.Freedhoff@mail.house.gov>, "Duncan, Jeff" <Jeff.Duncan@mail.house.gov>, "Wayland, Karen" <Karen.Wayland@mail.house.gov>, "Dotson, Greg" <Greg.Dotson@mail.house.gov>, "Wilson, Denise R." <(b) (6) "Cheatham, Melissa Bez" <Melissa.Cheatham@mail.house.gov>, Laura Vaught/DC/USEPA/US@EPA, "Unruh-Cohen, Ana" <Ana.UnruhCohen@mail.house.gov>
Cc: "Teitz, Alexandra" <Alexandra.Teitz@mail.house.gov>, Arvin Ganesan/DC/USEPA/US@EPA, "Utech, Dan G." <(b) (6) David McIntosh/DC/USEPA/US@EPA, "Baran, Jeff" <Jeff.Baran@mail.house.gov>, "Maher, Jessica A." <(b) (6)
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McConnell's amendment – which needs 60 votes to pass – may come up for a vote as soon as Wednesday, although the plans remained fluid and unclear Tuesday night. Check out our Tuesday posts about the amendment here, here and here.

Majority Leader Harry Reid (D-Nev.) said Tuesday he would allow a vote on the measure, paving the way for a faster-than-anticipated climate showdown in the Senate.

The amendment faces major hurdles to passage, but it would be a tough vote for politically vulnerable centrist Democrats and moderate Republicans. Inhofe's bill has 43 co-sponsors, including one Democrat thus far: Sen. Joe Manchin (D-W.Va.).

A majority vote for the amendment would be a political setback for advocates of EPA's efforts to curb emissions, even if it fell short of the 60 needed for adoption.

McConnell said in the Capitol Tuesday afternoon that he is "optimistic that there will be bipartisan support" for the measure.

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His plan could sap some Democratic support for the GOP-led amendment.

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"Gas prices are soaring again. And every time this happens, we're reminded that there are a lot of policies that we've been following, which exacerbate the problem," McConnell said in the Capitol, calling Inhofe's bill "the best solution that I've seen."

But opponents of plans to block EPA rules are increasingly pushing back against claims that thwarting the regulations would help stop rising gasoline prices.

For instance, they have been circulating an analysis by the independent fact-checking group PolitiFact that labeled the gas price claim "false."

01268-EPA-5613

David McIntosh/DC/USEPA/US
03/16/2011 11:03 AM

To Richard Windsor
cc "Arvin Ganesan"
bcc
Subject Re: Fw: White House slams Senate GOP measure to block climate rules

Yes I've sent it to Bettina

Richard Windsor For Boxer et al ----- Original Messa... 03/16/2011 11:01:34 AM

From: Richard Windsor/DC/USEPA/US
To: "David McIntosh" <mcintosh.david@epa.gov>, "Arvin Ganesan" <ganesan.arvin@epa.gov>
Date: 03/16/2011 11:01 AM
Subject: Fw: White House slams Senate GOP measure to block climate rules

For Boxer et al
David McIntosh

----- Original Message -----
From: David McIntosh
Sent: 03/16/2011 10:52 AM EDT
To: Richard Windsor
Cc: Seth Oster; Adora Andy; Brendan Gilfillan; Arvin Ganesan; Laura Vaught
Subject: Fw: White House slams Senate GOP measure to block climate rules

----- Forwarded by David McIntosh/DC/USEPA/US on 03/16/2011 10:51 AM -----

From: "Papa, Jim" <(b) (6)
To: "Repko, Mary Frances" <Mary.Frances.Repko@mail.house.gov>, "Freedhoff, Michal" <Michal.Freedhoff@mail.house.gov>, "Duncan, Jeff" <Jeff.Duncan@mail.house.gov>, "Wayland, Karen" <Karen.Wayland@mail.house.gov>, "Dotson, Greg" <Greg.Dotson@mail.house.gov>, "Wilson, Denise R." <(b) (6) "Cheatham, Melissa Bez" <Melissa.Cheatham@mail.house.gov>, Laura Vaught/DC/USEPA/US@EPA, "Unruh-Cohen, Ana" <Ana.UnruhCohen@mail.house.gov>
Cc: "Teitz, Alexandra" <Alexandra.Teitz@mail.house.gov>, Arvin Ganesan/DC/USEPA/US@EPA, "Utech, Dan G." <(b) (6) David McIntosh/DC/USEPA/US@EPA, "Baran, Jeff" <Jeff.Baran@mail.house.gov>, "Maher, Jessica A." <(b) (6)
Date: 03/16/2011 10:51 AM
Subject: White House slams Senate GOP measure to block climate rules

Hey guys - Just wanted to flag this.

http://thehill.com/blogs/e2-wire/677-e2-wire/149839-white-house-slams-senate-gop-amendment-to-block-climate-rules

White House slams Senate GOP measure to block climate rules
By Ben Geman - 03/16/11 06:48 AM ET

The White House is bashing a proposed Senate GOP amendment to small business legislation that would nullify the Environmental Protection Agency's power to regulate greenhouse gases.

"This amendment rolls back the Clean Air Act and harms Americans' health by taking away our ability to decrease air pollution," Clark Stevens, a White

House spokesman, said in a statement Tuesday night.

He adds:

"Instead of holding big polluters accountable, this amendment overrules public health experts and scientists. Finally, at a time when America's families are struggling with the cost of gasoline, the amendment would undercut fuel efficiency standards that will save Americans money at the pump while also decreasing our reliance on foreign oil."

The White House decision to weigh in directly on the amendment signifies the stakes of the escalating Republican-led effort to crush a major part of the Obama administration's environmental agenda.

Minority Leader Mitch McConnell (R-Ky.) is seeking to attach Sen. James Inhofe's (R-Okla.) bill that would kill EPA climate rules to pending legislation that would reauthorize key small business programs.

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For instance, they have been circulating an analysis by the independent fact-checking group PolitiFact that labeled the gas price claim “false.”

01268-EPA-5614

Seth Oster/DC/USEPA/US
03/16/2011 07:33 PM

To Richard Windsor
cc
bcc
Subject Fw: Removing Mercury and Other Toxics From the Air We Breathe

Seth Oster
Associate Administrator
Office of External Affairs and Environmental Education
Environmental Protection Agency
(202) 564-1918
oster.seth@epa.gov

----- Forwarded by Seth Oster/DC/USEPA/US on 03/16/2011 07:33 PM -----

From: "Greenawalt, Andrei" <[redacted] (b) (6)
To: Daniel Kanninen/DC/USEPA/US@EPA, Seth Oster/DC/USEPA/US@EPA
Cc: "Sabochik, Katelyn" <Katelyn_Sabochik@who.eop.gov>
Date: 03/16/2011 07:00 PM
Subject: FW: Removing Mercury and Other Toxics From the Air We Breathe

[redacted] Ex.5 - Deliberative

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From: The White House [mailto:info@messages.whitehouse.gov]
Sent: Wednesday, March 16, 2011 6:38 PM
To: Greenawalt, Andrei
Subject: Removing Mercury and Other Toxics From the Air We Breathe

Wednesday, March 16, 2011

Today, EPA Administrator Lisa Jackson announced proposed Mercury and Air Toxics Standards - commonsense goals for reducing harmful pollution in the air we breathe that can save lives, prevent illnesses and promote the creation of new jobs.

We want to be sure you saw this blog post from EPA Administrator Lisa Jackson on WhiteHouse.gov.

Tomorrow at 10:55 a.m. EST Administrator Jackson will be hosting a special live Open for Questions discussion on this important issue.

Tune into WhiteHouse.gov/live to watch live and submit your questions on Facebook.

Removing Mercury and Other Toxics From the Air We Breathe
By EPA Administrator Lisa P. Jackson

This week, the EPA proposed Mercury and Air Toxics Standards, a Clean Air Act protection that sets the first-ever national safeguards to limit power plant releases of mercury, arsenic, chromium, nickel and acid gases into the air we breathe.

America's power plants are the source of half of the mercury emissions, half of the acid gases, and a quarter of all toxic metal pollution in the U.S, and almost half of America's coal plants lack advanced pollution controls. Instead of operating without set limits for these pollutants – which are linked to costly and often fatal health threats like asthma, cancer and developmental disorders – American power plants will install widely available, American made pollution control technology to cut emissions.

Setting commonsense goals for reducing harmful pollution in the air we breathe can save lives, prevent illnesses and promote the creation of new jobs. We're confident in these expectations for the Mercury and Air Toxics Standards because this has been the history of Clean Air Act protections for the last forty years.

In 2010 alone, protections in the Clean Air Act prevented 160,000 premature deaths and 170,000 hospital visits. Cleaner air has meant trillions of dollars in benefits to our nation – not only through fewer medical bills, but by keeping our kids in school and our workers on the job. The Clean Air Act has also helped create jobs. As of 2008 the environmental technology industry – which develops, manufactures and maintains the tools that help keep our air clean – employed more than 1.7 million Americans.

The Mercury and Air Toxics Standards build on this decades-long success. Once the standards are in place, widespread use of existing pollution control technology will prevent an estimated 17,000 premature deaths and 11,000 heart attacks each year. These safeguards will also protect against 120,000 incidents of childhood asthma symptoms and ensure 11,000 fewer cases of acute bronchitis in children each year, making this is one of the largest steps forward in protecting our kids from toxic air pollution in a generation.

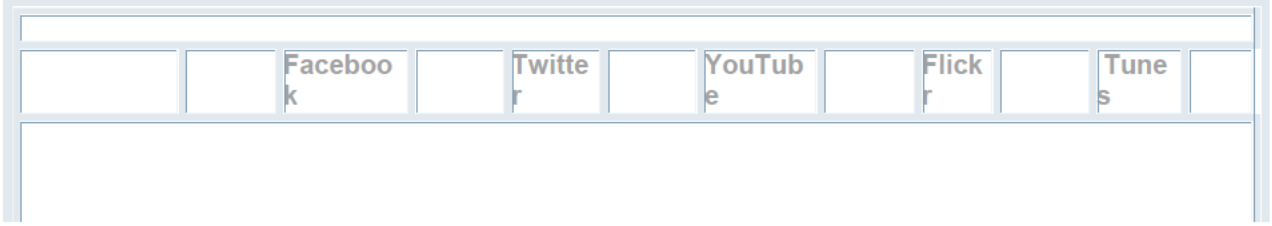
Implementing these proposed standards is also expected to create jobs. The Mercury and Air Toxics Standards will increase demand for pollution control technology that is already being produced by American companies. And new workers will be needed to install, operate and maintain pollution control technology. We estimate these first-ever standards will support 31,000 construction jobs and 9,000 long-term utility jobs.

The Mercury and Air Toxics Standards will also be beneficial to American utilities. Setting clear standards alleviates 20 years of uncertainty, and opens a long-awaited path for investments in multi-pollution reduction planning, energy efficiency and clean technology. It will level the playing field, closing loopholes for big polluters and putting our cleanest power generators at a competitive advantage. Consistent with the President's Executive Order, EPA is ensuring flexibility, cost effectiveness and robust public comment before finalizing the standards.

The Mercury and Air Toxics Standards represent a milestone in the Clean Air Act's already unprecedented record of defending the health of American families. At the EPA, we are eager to work with the American people through the coming public comment period, so that we can craft safeguards that best protect our health and strengthen our economy.

Get Updates

Sign up for the Energy and Environment Agenda



01268-EPA-5615

Bob Sussman/DC/USEPA/US
03/18/2011 02:58 PM

To Richard Windsor, Bob Perciasepe
cc Seth Oster, Arvin Ganesan, Diane Thompson, Betsaida Alcantara
bcc
Subject Fw: Submission of Agency Activities and Timelines on Shale Gas Extraction

Per CEQ's request, we submitted this morning the attached cross-agency overview of ongoing and anticipated initiatives on shale gas extraction..

----- Forwarded by Bob Sussman/DC/USEPA/US on 03/18/2011 02:55 PM -----

From: Ann Codrington/DC/USEPA/US
To: "Bordoff, Jason E." <(b) (6)
Cc: "McConville, Drew" <(b) (6) Cynthia Dougherty/DC/USEPA/US@EPA, Mike Shapiro/DC/USEPA/US@EPA, Bob Sussman/DC/USEPA/US@EPA, Nancy Stoner/DC/USEPA/US@EPA, Ronald Bergman/DC/USEPA/US@EPA
Date: 03/18/2011 11:15 AM
Subject: Re: Submission of Agency Activities and Timelines

Attached is overview you requested.

Ex.5 - Deliberative
Activities Summary.xlsx

Ann Codrington
U.S. Environmental Protection Agency
Acting Director, Drinking Water Protection Division
Office of Ground Water and Drinking Water
Room 2160A EPA East Building
Mailcode 4606M
Phone: 202-564-4688

Bob Sussman Jason -- we're putting the finishing touc... 03/17/2011 08:19:26 PM

From: Bob Sussman/DC/USEPA/US
To: "Bordoff, Jason E." <(b) (6)
Cc: "McConville, Drew" <(b) (6) Cynthia Dougherty/DC/USEPA/US@EPA, Ann Codrington/DC/USEPA/US@EPA, Mike Shapiro/DC/USEPA/US@EPA
Date: 03/17/2011 08:19 PM
Subject: Submission of Agency Activities and Timelines

(b) (5)

Thanks.

Robert M. Sussman
Senior Policy Counsel to the Administrator
Office of the Administrator
(202)-564-7397
US Environmental Protection Agency

01268-EPA-5616

Diane Thompson/DC/USEPA/US
03/18/2011 04:55 PM

To Richard Windsor, Bob Perciasepe
cc Aaron Dickerson, Daniel Kanninen
bcc
Subject Fw: Talking Points: Domestic Response to Japan

FYI

[redacted] Ex.5 - Deliberative

DT

****
Diane E. Thompson
Chief of Staff
U. S. Environmental Protection Agency
202-564-6999
----- Forwarded by Diane Thompson/DC/USEPA/US on 03/18/2011 04:53 PM -----

From: "Maisel, Chad P." <[redacted] (b) (6)
To: "Lu, Chris" <[redacted] (b) (6) "Smith, Elizabeth S." <[redacted] (b) (6) "Greenawalt, Andrei" <[redacted] (b) (6) "Phadke, Shilpa" <[redacted] (b) (6) "McCarthy, Nell" <[redacted] "Milakofsky, Ben" <[redacted] (b) (6) "Maisel, Chad P." <[redacted] (b) (6)
Date: 03/18/2011 02:40 PM
Subject: Talking Points: Domestic Response to Japan

Chiefs of Staff and WH Liaisons:

Please see the below talking points on the domestic response to the situation in Japan.

Have a good weekend.

–Cabinet Affairs

Domestic Response to Japan TPs

- [redacted] Ex.5 - Deliberative

Ex.5 - Deliberative

[redacted]

01268-EPA-5617

Richard Windsor/DC/USEPA/US
03/18/2011 04:56 PM

To Diane Thompson, "Bob Perciasepe"
cc
bcc
Subject Re: Talking Points: Domestic Response to Japan

Landed.
Diane Thompson

----- Original Message -----
From: Diane Thompson
Sent: 03/18/2011 04:55 PM EDT
To: Richard Windsor; Bob Perciasepe
Cc: Aaron Dickerson; Daniel Kanninen
Subject: Fw: Talking Points: Domestic Response to Japan

FYI

[redacted] Ex.5 - Deliberative

DT

****
Diane E. Thompson
Chief of Staff
U. S. Environmental Protection Agency
202-564-6999
----- Forwarded by Diane Thompson/DC/USEPA/US on 03/18/2011 04:53 PM -----

From: "Maisel, Chad P." <[redacted] (b) (6)
To: "Lu, Chris" <[redacted] (b) (6) "Smith, Elizabeth S." <[redacted] (b) (6) "Greenawalt, Andrei" <[redacted] (b) (6) "Phadke, Shilpa" <[redacted] (b) (6) "McCarthy, Nell" <[redacted] "Milakofsky, Ben" <[redacted] (b) (6) "Maisel, Chad P." <[redacted] (b) (6)
Date: 03/18/2011 02:40 PM
Subject: Talking Points: Domestic Response to Japan

Chiefs of Staff and WH Liaisons:

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–Cabinet Affairs

Domestic Response to Japan TPs

- [redacted] Ex.5 - Deliberative

- Ex.5 - Deliberative

- Ex.5 - Deliberative [redacted]

01268-EPA-5618

Bob Perciasepe/DC/USEPA/US
03/18/2011 05:12 PM

To Richard Windsor, Diane Thompson, "Bob Perciasepe"
cc
bcc
Subject Re: Talking Points: Domestic Response to Japan

Diane

[redacted] Ex.5 - Deliberative

.
Bob Perciasepe
Deputy Administrator
(o)202 564 4711
(c) [redacted] (b) (6)
Richard Windsor

----- Original Message -----
From: Richard Windsor
Sent: 03/18/2011 04:56 PM EDT
To: Diane Thompson; "Bob Perciasepe" <perciasepe.bob@epa.gov>
Subject: Re: Talking Points: Domestic Response to Japan

Landed.
Diane Thompson

----- Original Message -----
From: Diane Thompson
Sent: 03/18/2011 04:55 PM EDT
To: Richard Windsor; Bob Perciasepe
Cc: Aaron Dickerson; Daniel Kanninen
Subject: Fw: Talking Points: Domestic Response to Japan

FYI

[redacted] Ex.5 - Deliberative on.

DT

****
Diane E. Thompson
Chief of Staff
U. S. Environmental Protection Agency
202-564-6999
----- Forwarded by Diane Thompson/DC/USEPA/US on 03/18/2011 04:53 PM -----

From: "Maisel, Chad P." <[redacted] (b) (6)
To: "Lu, Chris" <[redacted] (b) (6) "Smith, Elizabeth S." <[redacted] (b) (6) "Greenawalt, Andrei" <[redacted] (b) (6) "Phadke, Shilpa" <[redacted] (b) (6) "McCarthy, Nell" <[redacted] "Milakofsky, Ben" <[redacted] (b) (6) "Maisel, Chad P." <[redacted] (b) (6)
Date: 03/18/2011 02:40 PM

Subject: Talking Points: Domestic Response to Japan

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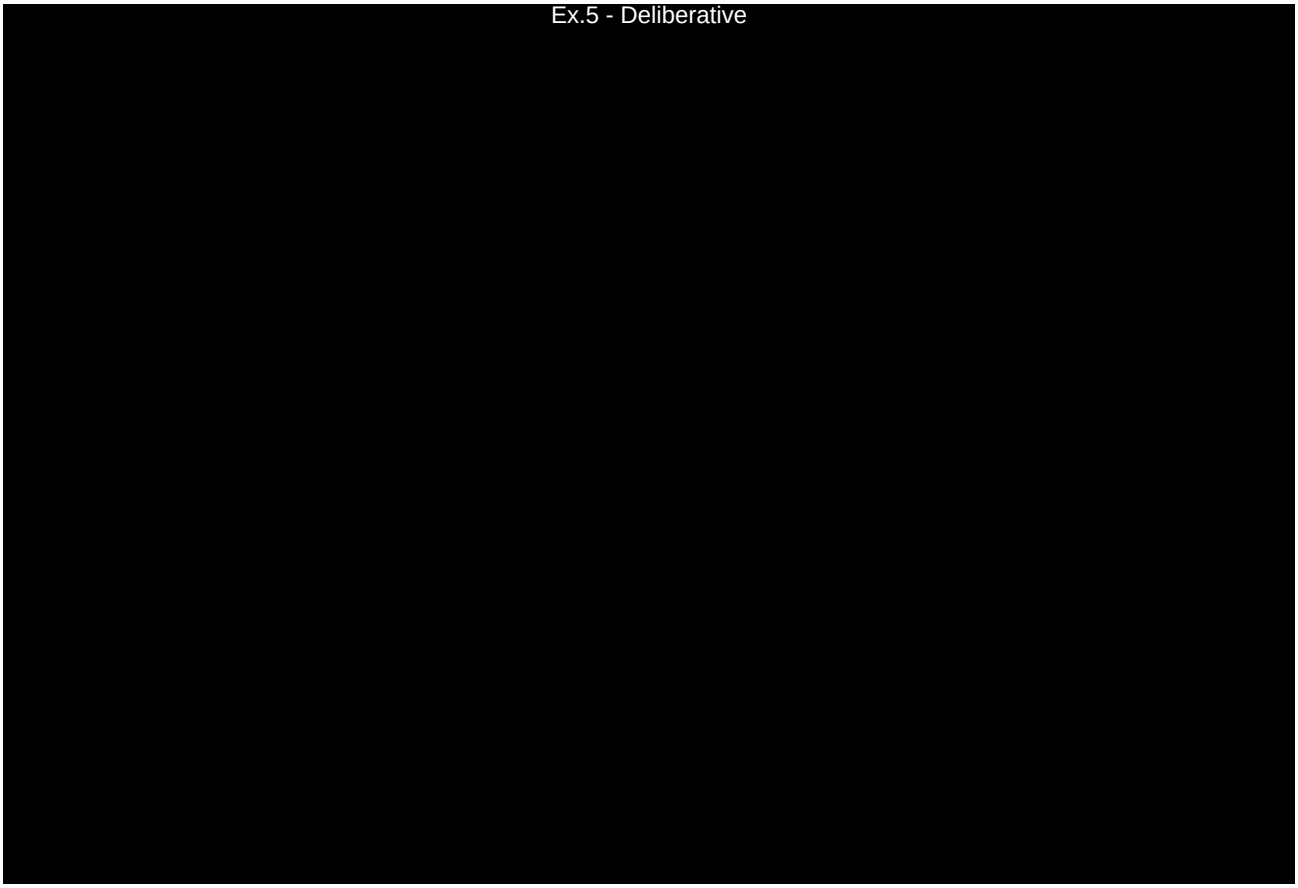
Domestic Response to Japan TPs

Ex.5 - Deliberative

[redacted]


Ex.5 - Deliberative

01268-EPA-5619

Michelle DePass/DC/USEPA/US
03/19/2011 01:37 PM

To "EPA"
cc
bcc
Subject Fw: Joint Statement by President Rousseff and President Obama

Ex.5 - Deliberative

[redacted]

[redacted]

Michelle DePass
Assistant Administrator
Office of International and Tribal Affairs
202-564-6600

From: Shalini Vajjhala
Sent: 03/19/2011 01:29 PM EDT
To: Michelle DePass
Subject: Fw: Joint Statement by President Rousseff and President Obama

---

From: "Phadke, Shilpa" [(b) (6)]
Sent: 03/19/2011 01:27 PM AST
To: Shalini Vajjhala
Subject: Fw: Joint Statement by President Rousseff and President Obama

---

From: White House Press Office <noreply@messages.whitehouse.gov>
To: Phadke, Shilpa
Sent: Sat Mar 19 12:22:01 2011
Subject: Joint Statement by President Rousseff and President Obama

THE WHITE HOUSE
Office of the Press Secretary

FOR IMMEDIATE RELEASE

March 19, 2011

Joint Statement by President Rousseff and President Obama

At the invitation of President Dilma Rousseff, the President of the United States of America, Barack Obama, paid a State Visit to Brazil on March 19, 20 and 21, 2011.

BRAZIL AND THE UNITED STATES AS GLOBAL PARTNERS

Noting the interdependence among peace, security and development, President Rousseff and President Obama reaffirmed their desire to build a just and inclusive world order, which promotes democracy, human rights and social justice.

Recognizing the need of reforming international institutions to reflect the current political and economic realities, the two leaders welcomed the designation of the G20 as the premier forum for coordinating economic policy, and efforts to reform the governance of international financial institutions. The Presidents agreed that just as other international organizations have had to change to be more responsive to the challenges of the 21st century, the United Nations Security Council also needs to reform, and expressed their support for a modest expansion of the Security Council that improves its effectiveness and efficiency, as well as its representation. President Obama expressed appreciation for Brazil's aspiration to become a permanent member of the Security Council, and acknowledged its assumption of global responsibilities. The two leaders agreed to continued consultation and cooperation between the two countries to achieve the vision outlined in the UN Charter of a more peaceful and secure world.

They highlighted the maturity and depth of the relationship between Brazil and the United States, which is based on shared values and principles and characterized by the ties of friendship that have brought their multicultural nations closer throughout their histories as independent States.

They decided to elevate to the Presidential level the major dialogues between the two countries, including the Global Partnership Dialogue, the Economic and Finance Dialogue, and the Strategic Energy Dialogue. The leaders directed the ministers involved to convene and report to them regularly.

Economy, Trade, Investment, G20 and Doha Round

The Presidents stressed the mutual benefits created by greater economic, financial and commercial cooperation. While recognizing the high quality and diversification of trade

between Brazil and the United States, they emphasized the importance of building on, deepening, and broadening that relationship. They acknowledged the great potential of reciprocal investments, particularly in the areas of infrastructure, energy and high technology.

They underscored the relevant work of the Economic Partnership Dialogue, the Bilateral Consultative Mechanism on trade policy, and the Commercial Dialogue. They also highlighted the importance of enhanced private sector engagement, through both the VI CEO Forum meeting and the launching of the Business Summit, which were held in the context of this presidential visit and welcomed with interest their contributions and recommendations.

The leaders welcomed a series of important agreements reached today, including an Agreement on Trade and Economic Cooperation; and an Agreement on Air Transportation and an associated Memorandum of Consultations on Air Transportation. They also expressed their expectation about the entry into force of the Agreement on Maritime Transport and of the Tax Information Exchange Agreement in the near future.

The Presidents noted that good regulatory practices and improved regulatory cooperation can contribute to competitiveness and the economic well-being of both Brazil and the United States, such as the initiatives being considered by the Consumer Product Safety Commission (CPSC) and the National Institute of Standards and Technology (NIST) with the Instituto Nacional de Metrologia, Normalização e Qualidade Industrial (INMETRO).

Considering that Brazil will host the 2014 FIFA World Cup and the 2016 Olympic and Paralympic Games, and recalling the US experience in organizing events of this magnitude and the interest of the US Government in sharing this experience with Brazil, the leaders welcomed the signing of the Memorandum of Understanding on Major Global Sporting Events, aimed at intensifying bilateral cooperation, particularly on infrastructure, safety, and security.

The Presidents reiterated the importance of consolidating the G20 and its role in coordinating actions for international economic cooperation, including encouraging the adoption of policies needed to avoid large economic and financial imbalances.

Building on the strong cooperation achieved in coordinating the global response to the global economic crisis through the G20, the Presidents decided to formalize a Brazil-US Economic and Financial Dialogue. The dialogue will seek to coordinate positions on global economic policy and find opportunities for greater bilateral economic cooperation. They also recommended that the senior officials in charge of the G20 in both countries, including Finance Ministers and the Sherpas, continue to conduct

regular consultation on the topics of the group's agenda, as a means to enhance bilateral coordination.

They reaffirmed the imperative to modernize the international financial institutions in a way that reflects the changes in the world economy and moves towards global financial stability, sustainable development and poverty reduction.

In relation to the G20 discussions about volatility in agricultural commodities' prices, they recognized the need for greater transparency in commodity markets, and for improved regulation of financial mechanisms that affect pricing. They recommended caution when considering measures that could distort the operation of commodity markets.

The Presidents reaffirmed their strong commitment to bring the WTO Doha Round to a successful, ambitious, comprehensive and balanced conclusion. Pursuant to the conclusion from the Seoul G20 Summit, they directed their negotiators to intensify and expand their direct engagement to complete the negotiations, building on the progress made to date. They agreed that a successful conclusion of the Doha Development Agenda negotiations could increase the credibility and legitimacy of the multilateral trading system and could play a useful role in spurring global economic growth, particularly in creating jobs.

Energy, Environment, Climate Change and Sustainable Development

The Heads of State agreed that the two countries have converging interests in energy-related matters, including in oil, natural gas, biofuels and other renewables. President Obama stated that the United States seeks to be a Strategic Energy Partner of Brazil. They praised the Working Group on Energy and the Memorandum of Understanding to Advance the Cooperation on Biofuels and decided that their work will be carried out under the umbrella of a bilateral Strategic Energy Dialogue.

They supported the progress achieved under the Memorandum of Understanding to Advance the Cooperation on Biofuels, particularly in relation to cooperation in third countries. They welcomed the participation of the Organization of American States (OAS) and the Inter-American Development Bank in such trilateral cooperation. They underscored the importance of mobilizing public and private research institutions in the two countries to intensify cooperation in developing innovative technologies to produce advanced biofuels, and committed to enhance the bilateral and multilateral dialogue on sustainable production and use of bioenergy.

The Presidents took note, with satisfaction, of the launching, under the Memorandum of Understanding to Advance the Cooperation on Biofuels, of the Partnership for the

Development of Biofuels for Aviation, which provides for coordination in establishing common standards and specifications, and strives to facilitate bilateral cooperation by convening experts from research institutions, academia, and the private sector.

They welcomed the strengthening of the collaboration on environment and climate change, including under the Common Agenda on Environment and the Memorandum of Understanding on Cooperation Regarding Climate Change, and agreed to include in the Common Agenda a discussion on the concept of green economy.

They agreed on the importance of a green economy in the context of sustainable development as a means for generating economic growth, creating decent jobs, eradicating poverty and protecting the environment. In this sense, they agreed to initiate a dialogue on a joint initiative on urban sustainability cooperation which will serve as a platform for actions addressing the challenges and opportunities of developing urban infrastructure that promotes sustainable development with concrete economic, social and environmental benefits.

They expressed their satisfaction with the conclusion, in September 2010, of the Tropical Forest Conservation Act, which provides for converting foreign debt into credits for the conservation of tropical forests.

They underscored the importance of the Energy and Climate Partnership of the Americas (ECPA) and recognized the relevance of the project "Sustainable Urban Planning and Energy Efficient Construction for Low-Income Areas of the Americas". Brazil conveyed its intention to host an ECPA Ministerial Meeting in the future.

The Heads of State reiterated their satisfaction with the Cancun agreements at the 16th Conference of the Parties of the United Nations Framework Convention on Climate Change. They affirmed their commitment to the implementation of outcomes of the Cancun Meeting and to enhance efforts in anticipation of a successful outcome in Durban, South Africa.

They reiterated the importance of the United Nations Conference on Sustainable Development (Rio+20), which will be held in Rio de Janeiro, in 2012, and committed to work closely together to ensure its success.

Democracy, Human Rights, Racial Equality and Social Inclusion

The leaders stressed the shared commitment to promote and protect human rights and to support the consolidation of democracy around the world. In keeping with the Inter-American Democratic Charter, they reaffirmed that democracy is essential to political, economic, and social development. They reiterated that the values of liberty,

equality, and social justice are intrinsic to democracy, and that the promotion and protection of human rights is a basic prerequisite for the existence of a democratic society.

They agreed that Brazil's experience in constructing a successful model of democratic development could be useful to countries in the process of building their own democracies and addressing historic social inequities. In this regard, President Obama applauded Brazil's success in fashioning policies and programs to fight poverty, inequality, and marginalization. President Rousseff welcomed the possibility of enhancing international cooperation activities by replicating Brazilian best practices in social development.

The Presidents decided to work closely to enhance global food security. They highlighted the importance of the Global Agriculture and Food Security Program as an innovative multilateral mechanism to finance country-led agriculture plans. President Rousseff emphasized Brazil's willingness to provide leadership on international food issues, including at the Food and Agriculture Organization (FAO).

The Presidents welcomed the achievements of the 2008 Joint Action Plan to Eliminate Racial and Ethnic Discrimination and Promote Equality, encompassing issues pertaining to justice and public safety, labor relations, health, education and environmental fairness, with the engagement of the civil society and the private sector in combating discrimination.

They stressed that human rights violations of children and adolescents will not be tolerated by the two countries and that the recognition and empowerment of women is a priority of both governments. They noted with satisfaction the progress under the Memorandum of Understanding for the Advancement of Women, and pledged to enhance cooperation in gender issues both bilaterally and multilaterally. In this context, they highlighted the project "Women and Science."

They agreed to cooperate in advancing democracy, human rights and freedom for all people bilaterally and through the United Nations and other multilateral fora, including ensuring respect for human rights in the context of the democratic movements and transitions; strengthening the UN Human Rights Council as recently demonstrated in the case of the creation of the Commission of Inquiry on Libya; promoting respect for the human rights of lesbian, gay, bisexual and transgender individuals through the establishment of a Special Rapporteur at the OAS; and improving the conduct of free and fair elections regionally and globally, including through the promotion of human rights in the context of elections and increasing their accessibility to disabled persons.

They reaffirmed their commitment to transparency and accountability in government as key elements in strengthening democracy, including good governance and corruption

prevention, and promoting and protecting human rights, and committed to launch a Brazil-US Anti-Corruption Dialogue to facilitate closer cooperation in international efforts to combat corruption. They recalled their commitment to the G20 Anti-Corruption Action Plan and welcomed their role as co-chairs of a global initiative to advance open government, building on the commitments President Obama called for at the United Nations General Assembly last September.

Education, Health and Culture

The Heads of State directed the creation of a dialogue on education and research, within the appropriate Ministerial mechanism, to review the existing bilateral cooperation programs and propose an action plan aimed at improving and expanding them. They emphasized, in particular, the importance of enhanced exchanges in both directions for students engaged in the study of science, health, technology, engineering, computer science, and math and agreed on the need to increase the availability of scholarships, at the undergraduate and graduate levels.

They recommended enhancing the links between educational institutions from both countries, and decided to strengthen bilateral partnerships through, among others, the Fulbright Foundation, the Fund for the Improvement of Postsecondary Education and the National Science Foundation, Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), and encourage additional contributions by the private sector in both countries to foster bilateral cooperation on education.

President Obama noted, with satisfaction, the Brazilian interest in implementing a broad program for distance learning of English, ranging from teachers' education to projects aimed at training professionals and other service providers for the 2014 World Cup and the 2016 Olympics.

The Heads of States recognized the positive results of the III Meeting of the Working Group on Health. They praised the wide-ranging action plan being prepared on topics that are pertinent to public health in both countries.

They highlighted the importance of culture as a factor for bringing nations closer together. They decided to enhance bilateral cooperation on culture and to review the existing initiatives, under the appropriate Ministerial mechanism, to encourage the exchange of collections, exhibits and educational programs between cultural institutions.

Science, Technology, Innovation and Space Cooperation

The Presidents affirmed that innovation and investment in science and technology, and associated human capital are keys to sustained economic growth and competitiveness. They expressed their support for the work of the Joint Commission for Scientific and Technological Cooperation, and praised the results of the Innovation Summits. They encouraged further communication between these initiatives.

President Rousseff welcomed the emphasis the U.S. National Space Policy has placed on international cooperation and expressed her wish to expand the dialogue with the United States bearing in mind the guidelines of the Brazilian space policies, aimed at technological capacity building and the commercial use of infrastructure and technology.

In this context, they welcomed the signing of a new bilateral Framework Agreement on Cooperation in the Peaceful Uses of Outer Space and expressed their desire to commence negotiations of a new agreement to protect launching operation technologies.

Furthermore, they affirmed the commitment of their countries to security in space and decided to initiate a dialogue in that area. They also instructed the appropriate agencies in the two countries to discuss the establishment of a Brazil – United States. Working Group on satellite-based earth observations, environmental monitoring, precipitation measurement, and natural disaster mitigation and response that would facilitate future dialogue and cooperation in these fields.

Defense, Disarmament, Nonproliferation and Peaceful Uses of Nuclear Energy

The Presidents recalled the progress achieved on defense issues in 2010, with the signing of the Defense Cooperation Framework Agreement and, more recently, the General Security of Military Information Agreement (GSOMIA). They committed to undertake efforts to follow up on the established dialogue in this area, primarily on new opportunities for cooperation.

They recognized the importance of enhanced regional disaster relief and crisis management coordination efforts and took note of the proposal presented to the IX Conference of Defense Ministers of the Americas for coordinated military support for civilian disaster response in the Americas.

They reaffirmed both countries' commitments on disarmament, nuclear non-proliferation, and the peaceful uses of nuclear energy, with a view to achieving the peace and security of a world without nuclear weapons. In this regard, the Presidents welcomed the opportunity to build on the successes of the recent Nuclear Security

Summit, the VII Non-Proliferation Treaty Review Conference and the ratification of the New START Treaty between the United States and Russia. They also decided on the need to bring into force the Comprehensive Test Ban Treaty, start negotiations on a Fissile Material Treaty, and to achieve a successful Biological Weapons Convention Review Conference in December 2011 and underscored the importance of compliance with and full implementation of all disarmament and non-proliferation related international obligations, including relevant UN Security Council and IAEA resolutions calling for countries to demonstrate the exclusively peaceful nature of their nuclear programs.

They noted, with satisfaction, that the Plan of Action on Energy Cooperation includes nuclear energy, focusing on the following aspects: probabilistic risk assessment, reactor life sustainability, development of human resources, licensing, management of serious accidents, emergency response, prevention, and combustion efficiency.

The leaders agreed to strengthen the dialogue and bilateral and multilateral cooperation on nuclear security and the peaceful uses of nuclear energy. In this context, they decided to commence talks on Brazilian participation in the "Partnership for Nuclear Security" (PNS), which could provide support for experts from both countries in activities related to research and development and to training and education in the areas of physical protection of installations and nuclear security and took note of Brazil's interest in joining the United States to support the International Atomic Energy Agency "Peaceful Uses Initiative" (PUI), a campaign launched last year to foster nuclear applications in the developing world for human health, food security, water management, and infrastructure. The Leaders also proposed to explore cooperation on a regional Center for Excellence that would serve as a forum for sharing information, best practices and training in partnership with relevant multilateral organizations, and noted the intention of the two governments to pursue a Memorandum of Understanding on the Megaports Initiative to prevent illicit trafficking in nuclear and other radioactive materials.

Communities Abroad

The Presidents noted with satisfaction the growing ties between the peoples of both countries and directed the Bilateral Consular Dialogue to consider measures to facilitate travel for business, educational and tourist purposes.

They agreed to enhance the dialogue on the implementation, both in Brazil and in the United States, of the 1980 Hague Convention on Civil Aspects of International Child Abduction.

Cooperation in Third Countries

The Presidents highlighted the significant role of trilateral cooperation with Least Developed Countries on the priority and cross-cutting aspects of the global partnership between the two largest democracies in the Americas.

They expressed their satisfaction with the projects that have been carried out within the scope of the Memorandum of Understanding on the Implementation of Technical Cooperation Activities in Third Countries, particularly in Haiti, in other countries of Latin America and the Caribbean, and in Africa.

They also welcomed an expanded Brazil – U.S. partnership to build research development and regulatory capacity in East and West Africa to encourage innovation, support science-based transparent regulation, and facilitate clear pathways to agricultural biotechnology, while protecting the public and the environment.

They expressed the interest of both countries in strengthening their dialogue to promote the Decent Work Agenda, with a view to developing projects in cooperation with the International Labor Organization (ILO) and share Brazilian best practices in combating child labor especially in Africa. They welcomed the progress in the negotiations of a joint project for technical cooperation between Brazil, the United States, Haiti and the ILO, to prevent child labor and generate income for vulnerable workers in Caribbean country.

Haiti

The Heads of State highlighted the importance of having a second round of voting in Haiti, in accordance with popular demand expressed at the voting polls and the election calendar released by the Provisional Electoral Board. In this context, they recognized the important support of the Organization of American States (OAS) and the OAS-Caribbean Community (CARICOM) Mission of Election Observers on organizing the elections. They reiterated their commitment to maintain the stability, to strengthen democratic institutions, and to the long-term development of Haiti. They underscored the importance of the timely delivery on the pledges made by the international community in supporting the reconstruction of Haiti, and the role played by the Interim Haiti Reconstruction Committee (IHRC) and the United Nations Stabilization Mission in Haiti (MINUSTAH).

They reaffirmed the commitment of both countries to an approach that could link the stabilization work carried out by MINUSTAH to the support for Haiti's political and institutional strengthening and social and economic development.

OAS, Summit of the Americas, MERCOSUL and UNASUL

The Presidents reiterated the commitment of both countries to the OAS and welcomed the efforts that have been made towards making it more transparent and efficient, capable of addressing the challenges of the 21st century, and thus being able to meet the expectation of its member states. They underscored the importance of the Summit of the Americas as a regional coordination body at the highest level. They stressed the need to promote better coordination among the Summit of the Americas, the OAS and the other bodies of the inter-American system, with the aim of providing greater cohesion to regional efforts and of strengthening the synergies among the institutions of the Americas.

The leaders affirmed the valuable contributions towards democracy, peace, cooperation, security and development made by regional and sub-regional integration efforts and agreements, including the Union of South American Nations (UNASUL) and the Southern Cone Market (MERCOSUL), and noted the value of dialogue between UNASUL and the United States.

A SHARED VISION OF THE FUTURE

President Rousseff and President Obama expressed their satisfaction with the status of the relationship between Brazil and the United States as global partners, fully committed to establishing an international world order that is more democratic, fair and sustainable. In this context, the Brazilian President accepted an invitation to visit the United States in the second half of 2011.

###

01268-EPA-5620

Richard Windsor/DC/USEPA/US
03/19/2011 02:30 PM

To Michelle DePass
cc
bcc
Subject Re: Joint Statement by President Rousseff and President Obama

Ex.5 - Deliberative

[redacted]

From: Michelle DePass
Sent: 03/19/2011 01:37 PM EDT
To: Richard Windsor
Subject: Fw: Joint Statement by President Rousseff and President Obama

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[redacted]

[redacted]

Michelle DePass
Assistant Administrator
Office of International and Tribal Affairs
202-564-6600

From: Shalini Vajjhala
Sent: 03/19/2011 01:29 PM EDT
To: Michelle DePass
Subject: Fw: Joint Statement by President Rousseff and President Obama

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Subject: Fw: Joint Statement by President Rousseff and President Obama

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From: White House Press Office <noreply@messages.whitehouse.gov>
To: Phadke, Shilpa
Sent: Sat Mar 19 12:22:01 2011
Subject: Joint Statement by President Rousseff and President Obama

THE WHITE HOUSE
Office of the Press Secretary

FOR IMMEDIATE RELEASE
March 19, 2011

Joint Statement by President Rousseff and President Obama

At the invitation of President Dilma Rousseff, the President of the United States of America, Barack Obama, paid a State Visit to Brazil on March 19, 20 and 21, 2011.

BRAZIL AND THE UNITED STATES AS GLOBAL PARTNERS

Noting the interdependence among peace, security and development, President Rousseff and President Obama reaffirmed their desire to build a just and inclusive world order, which promotes democracy, human rights and social justice.

Recognizing the need of reforming international institutions to reflect the current political and economic realities, the two leaders welcomed the designation of the G20 as the premier forum for coordinating economic policy, and efforts to reform the governance of international financial institutions. The Presidents agreed that just as other international organizations have had to change to be more responsive to the challenges of the 21st century, the United Nations Security Council also needs to reform, and expressed their support for a modest expansion of the Security Council that improves its effectiveness and efficiency, as well as its representation. President Obama expressed appreciation for Brazil's aspiration to become a permanent member of the Security Council, and acknowledged its assumption of global responsibilities. The two leaders agreed to continued consultation and cooperation between the two countries to achieve the vision outlined in the UN Charter of a more peaceful and secure world.

They highlighted the maturity and depth of the relationship between Brazil and the United States, which is based on shared values and principles and characterized by the ties of friendship that have brought their multicultural nations closer throughout their histories as independent States.

They decided to elevate to the Presidential level the major dialogues between the two

countries, including the Global Partnership Dialogue, the Economic and Finance Dialogue, and the Strategic Energy Dialogue. The leaders directed the ministers involved to convene and report to them regularly.

Economy, Trade, Investment, G20 and Doha Round

The Presidents stressed the mutual benefits created by greater economic, financial and commercial cooperation. While recognizing the high quality and diversification of trade between Brazil and the United States, they emphasized the importance of building on, deepening, and broadening that relationship. They acknowledged the great potential of reciprocal investments, particularly in the areas of infrastructure, energy and high technology.

They underscored the relevant work of the Economic Partnership Dialogue, the Bilateral Consultative Mechanism on trade policy, and the Commercial Dialogue. They also highlighted the importance of enhanced private sector engagement, through both the VI CEO Forum meeting and the launching of the Business Summit, which were held in the context of this presidential visit and welcomed with interest their contributions and recommendations.

The leaders welcomed a series of important agreements reached today, including an Agreement on Trade and Economic Cooperation; and an Agreement on Air Transportation and an associated Memorandum of Consultations on Air Transportation. They also expressed their expectation about the entry into force of the Agreement on Maritime Transport and of the Tax Information Exchange Agreement in the near future.

The Presidents noted that good regulatory practices and improved regulatory cooperation can contribute to competitiveness and the economic well-being of both Brazil and the United States, such as the initiatives being considered by the Consumer Product Safety Commission (CPSC) and the National Institute of Standards and Technology (NIST) with the Instituto Nacional de Metrologia, Normalização e Qualidade Industrial (INMETRO).

Considering that Brazil will host the 2014 FIFA World Cup and the 2016 Olympic and Paralympic Games, and recalling the US experience in organizing events of this magnitude and the interest of the US Government in sharing this experience with Brazil, the leaders welcomed the signing of the Memorandum of Understanding on Major Global Sporting Events, aimed at intensifying bilateral cooperation, particularly on infrastructure, safety, and security.

The Presidents reiterated the importance of consolidating the G20 and its role in

coordinating actions for international economic cooperation, including encouraging the adoption of policies needed to avoid large economic and financial imbalances.

Building on the strong cooperation achieved in coordinating the global response to the global economic crisis through the G20, the Presidents decided to formalize a Brazil-US Economic and Financial Dialogue. The dialogue will seek to coordinate positions on global economic policy and find opportunities for greater bilateral economic cooperation. They also recommended that the senior officials in charge of the G20 in both countries, including Finance Ministers and the Sherpas, continue to conduct regular consultation on the topics of the group's agenda, as a means to enhance bilateral coordination.

They reaffirmed the imperative to modernize the international financial institutions in a way that reflects the changes in the world economy and moves towards global financial stability, sustainable development and poverty reduction.

In relation to the G20 discussions about volatility in agricultural commodities' prices, they recognized the need for greater transparency in commodity markets, and for improved regulation of financial mechanisms that affect pricing. They recommended caution when considering measures that could distort the operation of commodity markets.

The Presidents reaffirmed their strong commitment to bring the WTO Doha Round to a successful, ambitious, comprehensive and balanced conclusion. Pursuant to the conclusion from the Seoul G20 Summit, they directed their negotiators to intensify and expand their direct engagement to complete the negotiations, building on the progress made to date. They agreed that a successful conclusion of the Doha Development Agenda negotiations could increase the credibility and legitimacy of the multilateral trading system and could play a useful role in spurring global economic growth, particularly in creating jobs.

Energy, Environment, Climate Change and Sustainable Development

The Heads of State agreed that the two countries have converging interests in energy-related matters, including in oil, natural gas, biofuels and other renewables. President Obama stated that the United States seeks to be a Strategic Energy Partner of Brazil. They praised the Working Group on Energy and the Memorandum of Understanding to Advance the Cooperation on Biofuels and decided that their work will be carried out under the umbrella of a bilateral Strategic Energy Dialogue.

They supported the progress achieved under the Memorandum of Understanding to Advance the Cooperation on Biofuels, particularly in relation to cooperation in third

countries. They welcomed the participation of the Organization of American States (OAS) and the Inter-American Development Bank in such trilateral cooperation. They underscored the importance of mobilizing public and private research institutions in the two countries to intensify cooperation in developing innovative technologies to produce advanced biofuels, and committed to enhance the bilateral and multilateral dialogue on sustainable production and use of bioenergy.

The Presidents took note, with satisfaction, of the launching, under the Memorandum of Understanding to Advance the Cooperation on Biofuels, of the Partnership for the Development of Biofuels for Aviation, which provides for coordination in establishing common standards and specifications, and strives to facilitate bilateral cooperation by convening experts from research institutions, academia, and the private sector.

They welcomed the strengthening of the collaboration on environment and climate change, including under the Common Agenda on Environment and the Memorandum of Understanding on Cooperation Regarding Climate Change, and agreed to include in the Common Agenda a discussion on the concept of green economy.

They agreed on the importance of a green economy in the context of sustainable development as a means for generating economic growth, creating decent jobs, eradicating poverty and protecting the environment. In this sense, they agreed to initiate a dialogue on a joint initiative on urban sustainability cooperation which will serve as a platform for actions addressing the challenges and opportunities of developing urban infrastructure that promotes sustainable development with concrete economic, social and environmental benefits.

They expressed their satisfaction with the conclusion, in September 2010, of the Tropical Forest Conservation Act, which provides for converting foreign debt into credits for the conservation of tropical forests.

They underscored the importance of the Energy and Climate Partnership of the Americas (ECPA) and recognized the relevance of the project "Sustainable Urban Planning and Energy Efficient Construction for Low-Income Areas of the Americas". Brazil conveyed its intention to host an ECPA Ministerial Meeting in the future.

The Heads of State reiterated their satisfaction with the Cancun agreements at the 16th Conference of the Parties of the United Nations Framework Convention on Climate Change. They affirmed their commitment to the implementation of outcomes of the Cancun Meeting and to enhance efforts in anticipation of a successful outcome in Durban, South Africa.

They reiterated the importance of the United Nations Conference on Sustainable Development (Rio+20), which will be held in Rio de Janeiro, in 2012, and committed to

work closely together to ensure its success.

Democracy, Human Rights, Racial Equality and Social Inclusion

The leaders stressed the shared commitment to promote and protect human rights and to support the consolidation of democracy around the world. In keeping with the Inter-American Democratic Charter, they reaffirmed that democracy is essential to political, economic, and social development. They reiterated that the values of liberty, equality, and social justice are intrinsic to democracy, and that the promotion and protection of human rights is a basic prerequisite for the existence of a democratic society.

They agreed that Brazil's experience in constructing a successful model of democratic development could be useful to countries in the process of building their own democracies and addressing historic social inequities. In this regard, President Obama applauded Brazil's success in fashioning policies and programs to fight poverty, inequality, and marginalization. President Rousseff welcomed the possibility of enhancing international cooperation activities by replicating Brazilian best practices in social development.

The Presidents decided to work closely to enhance global food security. They highlighted the importance of the Global Agriculture and Food Security Program as an innovative multilateral mechanism to finance country-led agriculture plans. President Rousseff emphasized Brazil's willingness to provide leadership on international food issues, including at the Food and Agriculture Organization (FAO).

The Presidents welcomed the achievements of the 2008 Joint Action Plan to Eliminate Racial and Ethnic Discrimination and Promote Equality, encompassing issues pertaining to justice and public safety, labor relations, health, education and environmental fairness, with the engagement of the civil society and the private sector in combating discrimination.

They stressed that human rights violations of children and adolescents will not be tolerated by the two countries and that the recognition and empowerment of women is a priority of both governments. They noted with satisfaction the progress under the Memorandum of Understanding for the Advancement of Women, and pledged to enhance cooperation in gender issues both bilaterally and multilaterally. In this context, they highlighted the project "Women and Science."

They agreed to cooperate in advancing democracy, human rights and freedom for all people bilaterally and through the United Nations and other multilateral fora, including ensuring respect for human rights in the context of the democratic movements and

transitions; strengthening the UN Human Rights Council as recently demonstrated in the case of the creation of the Commission of Inquiry on Libya; promoting respect for the human rights of lesbian, gay, bisexual and transgender individuals through the establishment of a Special Rapporteur at the OAS; and improving the conduct of free and fair elections regionally and globally, including through the promotion of human rights in the context of elections and increasing their accessibility to disabled persons.

They reaffirmed their commitment to transparency and accountability in government as key elements in strengthening democracy, including good governance and corruption prevention, and promoting and protecting human rights, and committed to launch a Brazil-US Anti-Corruption Dialogue to facilitate closer cooperation in international efforts to combat corruption. They recalled their commitment to the G20 Anti-Corruption Action Plan and welcomed their role as co-chairs of a global initiative to advance open government, building on the commitments President Obama called for at the United Nations General Assembly last September.

Education, Health and Culture

The Heads of State directed the creation of a dialogue on education and research, within the appropriate Ministerial mechanism, to review the existing bilateral cooperation programs and propose an action plan aimed at improving and expanding them. They emphasized, in particular, the importance of enhanced exchanges in both directions for students engaged in the study of science, health, technology, engineering, computer science, and math and agreed on the need to increase the availability of scholarships, at the undergraduate and graduate levels.

They recommended enhancing the links between educational institutions from both countries, and decided to strengthen bilateral partnerships through, among others, the Fulbright Foundation, the Fund for the Improvement of Postsecondary Education and the National Science Foundation, Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), and encourage additional contributions by the private sector in both countries to foster bilateral cooperation on education.

President Obama noted, with satisfaction, the Brazilian interest in implementing a broad program for distance learning of English, ranging from teachers' education to projects aimed at training professionals and other service providers for the 2014 World Cup and the 2016 Olympics.

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They highlighted the importance of culture as a factor for bringing nations closer together. They decided to enhance bilateral cooperation on culture and to review the existing initiatives, under the appropriate Ministerial mechanism, to encourage the exchange of collections, exhibits and educational programs between cultural institutions.

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President Rousseff welcomed the emphasis the U.S. National Space Policy has placed on international cooperation and expressed her wish to expand the dialogue with the United States bearing in mind the guidelines of the Brazilian space policies, aimed at technological capacity building and the commercial use of infrastructure and technology.

In this context, they welcomed the signing of a new bilateral Framework Agreement on Cooperation in the Peaceful Uses of Outer Space and expressed their desire to commence negotiations of a new agreement to protect launching operation technologies.

Furthermore, they affirmed the commitment of their countries to security in space and decided to initiate a dialogue in that area. They also instructed the appropriate agencies in the two countries to discuss the establishment of a Brazil – United States. Working Group on satellite-based earth observations, environmental monitoring, precipitation measurement, and natural disaster mitigation and response that would facilitate future dialogue and cooperation in these fields.

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They reaffirmed both countries' commitments on disarmament, nuclear non-proliferation, and the peaceful uses of nuclear energy, with a view to achieving the peace and security of a world without nuclear weapons. In this regard, the Presidents welcomed the opportunity to build on the successes of the recent Nuclear Security Summit, the VII Non-Proliferation Treaty Review Conference and the ratification of the New START Treaty between the United States and Russia. They also decided on the need to bring into force the Comprehensive Test Ban Treaty, start negotiations on a Fissile Material Treaty, and to achieve a successful Biological Weapons Convention Review Conference in December 2011 and underscored the importance of compliance with and full implementation of all disarmament and non-proliferation related international obligations, including relevant UN Security Council and IAEA resolutions calling for countries to demonstrate the exclusively peaceful nature of their nuclear programs.

They noted, with satisfaction, that the Plan of Action on Energy Cooperation includes nuclear energy, focusing on the following aspects: probabilistic risk assessment, reactor life sustainability, development of human resources, licensing, management of serious accidents, emergency response, prevention, and combustion efficiency.

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Cooperation in Third Countries

The Presidents highlighted the significant role of trilateral cooperation with Least Developed Countries on the priority and cross-cutting aspects of the global partnership between the two largest democracies in the Americas.

They expressed their satisfaction with the projects that have been carried out within the scope of the Memorandum of Understanding on the Implementation of Technical Cooperation Activities in Third Countries, particularly in Haiti, in other countries of Latin America and the Caribbean, and in Africa.

They also welcomed an expanded Brazil – U.S. partnership to build research development and regulatory capacity in East and West Africa to encourage innovation, support science-based transparent regulation, and facilitate clear pathways to agricultural biotechnology, while protecting the public and the environment.

They expressed the interest of both countries in strengthening their dialogue to promote the Decent Work Agenda, with a view to developing projects in cooperation with the International Labor Organization (ILO) and share Brazilian best practices in combating child labor especially in Africa. They welcomed the progress in the negotiations of a joint project for technical cooperation between Brazil, the United States, Haiti and the ILO, to prevent child labor and generate income for vulnerable workers in Caribbean country.

Haiti

The Heads of State highlighted the importance of having a second round of voting in Haiti, in accordance with popular demand expressed at the voting polls and the election calendar released by the Provisional Electoral Board. In this context, they recognized the important support of the Organization of American States (OAS) and the OAS-Caribbean Community (CARICOM) Mission of Election Observers on organizing the elections. They reiterated their commitment to maintain the stability, to strengthen democratic institutions, and to the long-term development of Haiti. They underscored

the importance of the timely delivery on the pledges made by the international community in supporting the reconstruction of Haiti, and the role played by the Interim Haiti Reconstruction Committee (IHRC) and the United Nations Stabilization Mission in Haiti (MINUSTAH).

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The leaders affirmed the valuable contributions towards democracy, peace, cooperation, security and development made by regional and sub-regional integration efforts and agreements, including the Union of South American Nations (UNASUL) and the Southern Cone Market (MERCOSUL), and noted the value of dialogue between UNASUL and the United States.

A SHARED VISION OF THE FUTURE

President Rousseff and President Obama expressed their satisfaction with the status of the relationship between Brazil and the United States as global partners, fully committed to establishing an international world order that is more democratic, fair and sustainable. In this context, the Brazilian President accepted an invitation to visit the United States in the second half of 2011.

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Unsubscribe

The White House · 1600 Pennsylvania Avenue, NW · Washington DC 20500 · 202-456-1111

01268-EPA-5621

Michelle DePass/DC/USEPA/US
03/19/2011 02:45 PM

To Richard Windsor
cc
bcc
Subject Re: Joint Statement by President Rousseff and President Obama

Good-been tracking ur movements via a elaborate web of staff and blackberrys :)

Good, we like SEPPIR -without them the EJ work would not be happening.

Ex.5 - Deliberative

See u soon!
Michelle DePass
Assistant Administrator
Office of International and Tribal Affairs
202-564-6600

From: Richard Windsor
Sent: 03/19/2011 02:30 PM EDT
To: Michelle DePass
Subject: Re: Joint Statement by President Rousseff and President Obama

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THE WHITE HOUSE
Office of the Press Secretary

FOR IMMEDIATE RELEASE
March 19, 2011

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challenges of the 21st century, the United Nations Security Council also needs to reform, and expressed their support for a modest expansion of the Security Council that improves its effectiveness and efficiency, as well as its representation. President Obama expressed appreciation for Brazil's aspiration to become a permanent member of the Security Council, and acknowledged its assumption of global responsibilities. The two leaders agreed to continued consultation and cooperation between the two countries to achieve the vision outlined in the UN Charter of a more peaceful and secure world.

They highlighted the maturity and depth of the relationship between Brazil and the United States, which is based on shared values and principles and characterized by the ties of friendship that have brought their multicultural nations closer throughout their histories as independent States.

They decided to elevate to the Presidential level the major dialogues between the two countries, including the Global Partnership Dialogue, the Economic and Finance Dialogue, and the Strategic Energy Dialogue. The leaders directed the ministers involved to convene and report to them regularly.

Economy, Trade, Investment, G20 and Doha Round

The Presidents stressed the mutual benefits created by greater economic, financial and commercial cooperation. While recognizing the high quality and diversification of trade between Brazil and the United States, they emphasized the importance of building on, deepening, and broadening that relationship. They acknowledged the great potential of reciprocal investments, particularly in the areas of infrastructure, energy and high technology.

They underscored the relevant work of the Economic Partnership Dialogue, the Bilateral Consultative Mechanism on trade policy, and the Commercial Dialogue. They also highlighted the importance of enhanced private sector engagement, through both the VI CEO Forum meeting and the launching of the Business Summit, which were held in the context of this presidential visit and welcomed with interest their contributions and recommendations.

The leaders welcomed a series of important agreements reached today, including an Agreement on Trade and Economic Cooperation; and an Agreement on Air Transportation and an associated Memorandum of Consultations on Air Transportation. They also expressed their expectation about the entry into force of the Agreement on Maritime Transport and of the Tax Information Exchange Agreement in the near future.

The Presidents noted that good regulatory practices and improved regulatory

cooperation can contribute to competitiveness and the economic well-being of both Brazil and the United States, such as the initiatives being considered by the Consumer Product Safety Commission (CPSC) and the National Institute of Standards and Technology (NIST) with the Instituto Nacional de Metrologia, Normalização e Qualidade Industrial (INMETRO).

Considering that Brazil will host the 2014 FIFA World Cup and the 2016 Olympic and Paralympic Games, and recalling the US experience in organizing events of this magnitude and the interest of the US Government in sharing this experience with Brazil, the leaders welcomed the signing of the Memorandum of Understanding on Major Global Sporting Events, aimed at intensifying bilateral cooperation, particularly on infrastructure, safety, and security.

The Presidents reiterated the importance of consolidating the G20 and its role in coordinating actions for international economic cooperation, including encouraging the adoption of policies needed to avoid large economic and financial imbalances.

Building on the strong cooperation achieved in coordinating the global response to the global economic crisis through the G20, the Presidents decided to formalize a Brazil-US Economic and Financial Dialogue. The dialogue will seek to coordinate positions on global economic policy and find opportunities for greater bilateral economic cooperation. They also recommended that the senior officials in charge of the G20 in both countries, including Finance Ministers and the Sherpas, continue to conduct regular consultation on the topics of the group's agenda, as a means to enhance bilateral coordination.

They reaffirmed the imperative to modernize the international financial institutions in a way that reflects the changes in the world economy and moves towards global financial stability, sustainable development and poverty reduction.

In relation to the G20 discussions about volatility in agricultural commodities' prices, they recognized the need for greater transparency in commodity markets, and for improved regulation of financial mechanisms that affect pricing. They recommended caution when considering measures that could distort the operation of commodity markets.

The Presidents reaffirmed their strong commitment to bring the WTO Doha Round to a successful, ambitious, comprehensive and balanced conclusion. Pursuant to the conclusion from the Seoul G20 Summit, they directed their negotiators to intensify and expand their direct engagement to complete the negotiations, building on the progress made to date. They agreed that a successful conclusion of the Doha Development Agenda negotiations could increase the credibility and legitimacy of the multilateral trading system and could play a useful role in spurring global economic growth,

particularly in creating jobs.

Energy, Environment, Climate Change and Sustainable Development

The Heads of State agreed that the two countries have converging interests in energy-related matters, including in oil, natural gas, biofuels and other renewables. President Obama stated that the United States seeks to be a Strategic Energy Partner of Brazil. They praised the Working Group on Energy and the Memorandum of Understanding to Advance the Cooperation on Biofuels and decided that their work will be carried out under the umbrella of a bilateral Strategic Energy Dialogue.

They supported the progress achieved under the Memorandum of Understanding to Advance the Cooperation on Biofuels, particularly in relation to cooperation in third countries. They welcomed the participation of the Organization of American States (OAS) and the Inter-American Development Bank in such trilateral cooperation. They underscored the importance of mobilizing public and private research institutions in the two countries to intensify cooperation in developing innovative technologies to produce advanced biofuels, and committed to enhance the bilateral and multilateral dialogue on sustainable production and use of bioenergy.

The Presidents took note, with satisfaction, of the launching, under the Memorandum of Understanding to Advance the Cooperation on Biofuels, of the Partnership for the Development of Biofuels for Aviation, which provides for coordination in establishing common standards and specifications, and strives to facilitate bilateral cooperation by convening experts from research institutions, academia, and the private sector.

They welcomed the strengthening of the collaboration on environment and climate change, including under the Common Agenda on Environment and the Memorandum of Understanding on Cooperation Regarding Climate Change, and agreed to include in the Common Agenda a discussion on the concept of green economy.

They agreed on the importance of a green economy in the context of sustainable development as a means for generating economic growth, creating decent jobs, eradicating poverty and protecting the environment. In this sense, they agreed to initiate a dialogue on a joint initiative on urban sustainability cooperation which will serve as a platform for actions addressing the challenges and opportunities of developing urban infrastructure that promotes sustainable development with concrete economic, social and environmental benefits.

They expressed their satisfaction with the conclusion, in September 2010, of the Tropical Forest Conservation Act, which provides for converting foreign debt into credits for the conservation of tropical forests.

They underscored the importance of the Energy and Climate Partnership of the Americas (ECPA) and recognized the relevance of the project "Sustainable Urban Planning and Energy Efficient Construction for Low-Income Areas of the Americas". Brazil conveyed its intention to host an ECPA Ministerial Meeting in the future.

The Heads of State reiterated their satisfaction with the Cancun agreements at the 16th Conference of the Parties of the United Nations Framework Convention on Climate Change. They affirmed their commitment to the implementation of outcomes of the Cancun Meeting and to enhance efforts in anticipation of a successful outcome in Durban, South Africa.

They reiterated the importance of the United Nations Conference on Sustainable Development (Rio+20), which will be held in Rio de Janeiro, in 2012, and committed to work closely together to ensure its success.

Democracy, Human Rights, Racial Equality and Social Inclusion

The leaders stressed the shared commitment to promote and protect human rights and to support the consolidation of democracy around the world. In keeping with the Inter-American Democratic Charter, they reaffirmed that democracy is essential to political, economic, and social development. They reiterated that the values of liberty, equality, and social justice are intrinsic to democracy, and that the promotion and protection of human rights is a basic prerequisite for the existence of a democratic society.

They agreed that Brazil's experience in constructing a successful model of democratic development could be useful to countries in the process of building their own democracies and addressing historic social inequities. In this regard, President Obama applauded Brazil's success in fashioning policies and programs to fight poverty, inequality, and marginalization. President Rousseff welcomed the possibility of enhancing international cooperation activities by replicating Brazilian best practices in social development.

The Presidents decided to work closely to enhance global food security. They highlighted the importance of the Global Agriculture and Food Security Program as an innovative multilateral mechanism to finance country-led agriculture plans. President Rousseff emphasized Brazil's willingness to provide leadership on international food issues, including at the Food and Agriculture Organization (FAO).

The Presidents welcomed the achievements of the 2008 Joint Action Plan to Eliminate Racial and Ethnic Discrimination and Promote Equality, encompassing issues

pertaining to justice and public safety, labor relations, health, education and environmental fairness, with the engagement of the civil society and the private sector in combating discrimination.

They stressed that human rights violations of children and adolescents will not be tolerated by the two countries and that the recognition and empowerment of women is a priority of both governments. They noted with satisfaction the progress under the Memorandum of Understanding for the Advancement of Women, and pledged to enhance cooperation in gender issues both bilaterally and multilaterally. In this context, they highlighted the project "Women and Science."

They agreed to cooperate in advancing democracy, human rights and freedom for all people bilaterally and through the United Nations and other multilateral fora, including ensuring respect for human rights in the context of the democratic movements and transitions; strengthening the UN Human Rights Council as recently demonstrated in the case of the creation of the Commission of Inquiry on Libya; promoting respect for the human rights of lesbian, gay, bisexual and transgender individuals through the establishment of a Special Rapporteur at the OAS; and improving the conduct of free and fair elections regionally and globally, including through the promotion of human rights in the context of elections and increasing their accessibility to disabled persons.

They reaffirmed their commitment to transparency and accountability in government as key elements in strengthening democracy, including good governance and corruption prevention, and promoting and protecting human rights, and committed to launch a Brazil-US Anti-Corruption Dialogue to facilitate closer cooperation in international efforts to combat corruption. They recalled their commitment to the G20 Anti-Corruption Action Plan and welcomed their role as co-chairs of a global initiative to advance open government, building on the commitments President Obama called for at the United Nations General Assembly last September.

Education, Health and Culture

The Heads of State directed the creation of a dialogue on education and research, within the appropriate Ministerial mechanism, to review the existing bilateral cooperation programs and propose an action plan aimed at improving and expanding them. They emphasized, in particular, the importance of enhanced exchanges in both directions for students engaged in the study of science, health, technology, engineering, computer science, and math and agreed on the need to increase the availability of scholarships, at the undergraduate and graduate levels.

They recommended enhancing the links between educational institutions from both countries, and decided to strengthen bilateral partnerships through, among others, the

Fulbright Foundation, the Fund for the Improvement of Postsecondary Education and the National Science Foundation, Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), and encourage additional contributions by the private sector in both countries to foster bilateral cooperation on education.

President Obama noted, with satisfaction, the Brazilian interest in implementing a broad program for distance learning of English, ranging from teachers' education to projects aimed at training professionals and other service providers for the 2014 World Cup and the 2016 Olympics.

The Heads of States recognized the positive results of the III Meeting of the Working Group on Health. They praised the wide-ranging action plan being prepared on topics that are pertinent to public health in both countries.

They highlighted the importance of culture as a factor for bringing nations closer together. They decided to enhance bilateral cooperation on culture and to review the existing initiatives, under the appropriate Ministerial mechanism, to encourage the exchange of collections, exhibits and educational programs between cultural institutions.

Science, Technology, Innovation and Space Cooperation

The Presidents affirmed that innovation and investment in science and technology, and associated human capital are keys to sustained economic growth and competitiveness. They expressed their support for the work of the Joint Commission for Scientific and Technological Cooperation, and praised the results of the Innovation Summits. They encouraged further communication between these initiatives.

President Rousseff welcomed the emphasis the U.S. National Space Policy has placed on international cooperation and expressed her wish to expand the dialogue with the United States bearing in mind the guidelines of the Brazilian space policies, aimed at technological capacity building and the commercial use of infrastructure and technology.

In this context, they welcomed the signing of a new bilateral Framework Agreement on Cooperation in the Peaceful Uses of Outer Space and expressed their desire to commence negotiations of a new agreement to protect launching operation technologies.

Furthermore, they affirmed the commitment of their countries to security in space and decided to initiate a dialogue in that area. They also instructed the appropriate agencies

in the two countries to discuss the establishment of a Brazil – United States. Working Group on satellite-based earth observations, environmental monitoring, precipitation measurement, and natural disaster mitigation and response that would facilitate future dialogue and cooperation in these fields.

Defense, Disarmament, Nonproliferation and Peaceful Uses of Nuclear Energy

The Presidents recalled the progress achieved on defense issues in 2010, with the signing of the Defense Cooperation Framework Agreement and, more recently, the General Security of Military Information Agreement (GSOMIA). They committed to undertake efforts to follow up on the established dialogue in this area, primarily on new opportunities for cooperation.

They recognized the importance of enhanced regional disaster relief and crisis management coordination efforts and took note of the proposal presented to the IX Conference of Defense Ministers of the Americas for coordinated military support for civilian disaster response in the Americas.

They reaffirmed both countries' commitments on disarmament, nuclear non-proliferation, and the peaceful uses of nuclear energy, with a view to achieving the peace and security of a world without nuclear weapons. In this regard, the Presidents welcomed the opportunity to build on the successes of the recent Nuclear Security Summit, the VII Non-Proliferation Treaty Review Conference and the ratification of the New START Treaty between the United States and Russia. They also decided on the need to bring into force the Comprehensive Test Ban Treaty, start negotiations on a Fissile Material Treaty, and to achieve a successful Biological Weapons Convention Review Conference in December 2011 and underscored the importance of compliance with and full implementation of all disarmament and non-proliferation related international obligations, including relevant UN Security Council and IAEA resolutions calling for countries to demonstrate the exclusively peaceful nature of their nuclear programs.

They noted, with satisfaction, that the Plan of Action on Energy Cooperation includes nuclear energy, focusing on the following aspects: probabilistic risk assessment, reactor life sustainability, development of human resources, licensing, management of serious accidents, emergency response, prevention, and combustion efficiency.

The leaders agreed to strengthen the dialogue and bilateral and multilateral cooperation on nuclear security and the peaceful uses of nuclear energy. In this context, they decided to commence talks on Brazilian participation in the "Partnership for Nuclear Security" (PNS), which could provide support for experts from both countries in activities related to research and development and to training and education in the

areas of physical protection of installations and nuclear security and took note of Brazil's interest in joining the United States to support the International Atomic Energy Agency "Peaceful Uses Initiative" (PUI), a campaign launched last year to foster nuclear applications in the developing world for human health, food security, water management, and infrastructure. The Leaders also proposed to explore cooperation on a regional Center for Excellence that would serve as a forum for sharing information, best practices and training in partnership with relevant multilateral organizations, and noted the intention of the two governments to pursue a Memorandum of Understanding on the Megaports Initiative to prevent illicit trafficking in nuclear and other radioactive materials.

Communities Abroad

The Presidents noted with satisfaction the growing ties between the peoples of both countries and directed the Bilateral Consular Dialogue to consider measures to facilitate travel for business, educational and tourist purposes.

They agreed to enhance the dialogue on the implementation, both in Brazil and in the United States, of the 1980 Hague Convention on Civil Aspects of International Child Abduction.

Cooperation in Third Countries

The Presidents highlighted the significant role of trilateral cooperation with Least Developed Countries on the priority and cross-cutting aspects of the global partnership between the two largest democracies in the Americas.

They expressed their satisfaction with the projects that have been carried out within the scope of the Memorandum of Understanding on the Implementation of Technical Cooperation Activities in Third Countries, particularly in Haiti, in other countries of Latin America and the Caribbean, and in Africa.

They also welcomed an expanded Brazil – U.S. partnership to build research development and regulatory capacity in East and West Africa to encourage innovation, support science-based transparent regulation, and facilitate clear pathways to agricultural biotechnology, while protecting the public and the environment.

They expressed the interest of both countries in strengthening their dialogue to promote the Decent Work Agenda, with a view to developing projects in cooperation with the International Labor Organization (ILO) and share Brazilian best practices in combating child labor especially in Africa. They welcomed the progress in the negotiations of a

joint project for technical cooperation between Brazil, the United States, Haiti and the ILO, to prevent child labor and generate income for vulnerable workers in Caribbean country.

Haiti

The Heads of State highlighted the importance of having a second round of voting in Haiti, in accordance with popular demand expressed at the voting polls and the election calendar released by the Provisional Electoral Board. In this context, they recognized the important support of the Organization of American States (OAS) and the OAS-Caribbean Community (CARICOM) Mission of Election Observers on organizing the elections. They reiterated their commitment to maintain the stability, to strengthen democratic institutions, and to the long-term development of Haiti. They underscored the importance of the timely delivery on the pledges made by the international community in supporting the reconstruction of Haiti, and the role played by the Interim Haiti Reconstruction Committee (IHRC) and the United Nations Stabilization Mission in Haiti (MINUSTAH).

They reaffirmed the commitment of both countries to an approach that could link the stabilization work carried out by MINUSTAH to the support for Haiti's political and institutional strengthening and social and economic development.

OAS, Summit of the Americas, MERCOSUL and UNASUL

The Presidents reiterated the commitment of both countries to the OAS and welcomed the efforts that have been made towards making it more transparent and efficient, capable of addressing the challenges of the 21st century, and thus being able to meet the expectation of its member states. They underscored the importance of the Summit of the Americas as a regional coordination body at the highest level. They stressed the need to promote better coordination among the Summit of the Americas, the OAS and the other bodies of the inter-American system, with the aim of providing greater cohesion to regional efforts and of strengthening the synergies among the institutions of the Americas.

The leaders affirmed the valuable contributions towards democracy, peace, cooperation, security and development made by regional and sub-regional integration efforts and agreements, including the Union of South American Nations (UNASUL) and the Southern Cone Market (MERCOSUL), and noted the value of dialogue between UNASUL and the United States.

A SHARED VISION OF THE FUTURE

President Rousseff and President Obama expressed their satisfaction with the status of the relationship between Brazil and the United States as global partners, fully committed to establishing an international world order that is more democratic, fair and sustainable. In this context, the Brazilian President accepted an invitation to visit the United States in the second half of 2011.

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01268-EPA-5622

Richard Windsor/DC/USEPA/US
03/21/2011 10:13 AM

To "Diane Thompson"
cc
bcc
Subject Fw: Implementing Instructions: Climate Change Adaptation Planning

Who is lead here?

From: "Sutley, Nancy H." (b) (6)
Sent: 03/04/2011 05:50 PM EST
To: "(b) (6) <(b) (6) "(b) (6) <(b) (6) "'delonnie henry@sd.mil'" <delonnie.henry@sd mil>; "(b) (6) <(b) (6) "(b) (6) <(b) (6) "(b) (6) <(b) (6) "(b) (6) <(b) (6) "(b) (6) <(b) (6) "(b) (6) <(b) (6) "'abedinH@state.gov'" <abedinH@state.gov>; Richard Windsor; "'annie.bradley@usdoj.gov'" <annie.bradley@usdoj.gov>; "(b) (6) <(b) (6) "'Eric.shinseki@va.gov'" <Eric.shinseki@va.gov>; "'darcyje@conus.army mil'" <darcyje@conus.army mil>; "'arnekrc@ed.gov'" <arnekrc@ed.gov>; "(b) (6) <(b) (6) "(b) (6) <(b) (6) "'martha.johnson@gsa.gov'" <martha.johnson@gsa.gov>; "'charles.bolden@nasa.gov'" <charles.bolden@nasa.gov>; "'adrienne.thomas@nara.gov'" <adrienne.thomas@nara.gov>; "'TDKILGORE@tva.gov'" <TDKILGORE@tva.gov>; "'Dee.Williams@opm.gov'" <Dee.Williams@opm.gov>; "'Michael.J.Astrue@ssa.gov'" <Michael.J.Astrue@ssa.gov>; "'patrick r.donahoe@usps.gov'" <patrick.r.donahoe@usps.gov>; "'cloughw@si.edu'" <cloughw@si.edu>
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"'samuel.m.pulcrano@usps.gov'" <samuel m.pulcrano@usps.gov>; "'dan.tangherlini@do.treas.gov'" <dan.tangherlini@do.treas.gov>; "(b) (6) < (b) (6) "'jim.sullivan@va.gov'" <jim.sullivan@va.gov>; "Moore, Michelle" < (b) (6) "Garvey, William S." < (b) (6)

Subject: Implementing Instructions: Climate Change Adaptation Planning

01268-EPA-5623

Diane Thompson/DC/USEPA/US
03/21/2011 10:24 AM

To Richard Windsor
cc Daniel Kanninen
bcc
Subject Re: Fw: Implementing Instructions: Climate Change Adaptation Planning

Craig Hooks is cc'd as well as the Fed Env Exec so I am assuming this is federal government planning, and the lead is with Craig and OARM. Not sure I can go further without the rest of the email.

****
Diane E. Thompson
Chief of Staff
U. S. Environmental Protection Agency
202-564-6999

Richard Windsor Who is lead here? ----- Original Messa... 03/21/2011 10:13:59 AM

From: Richard Windsor/DC/USEPA/US
To: "Diane Thompson" <thompson.diane@epa.gov>
Date: 03/21/2011 10:13 AM
Subject: Fw: Implementing Instructions: Climate Change Adaptation Planning

Who is lead here?

From: "Sutley, Nancy H." (b) (6)
Sent: 03/04/2011 05:50 PM EST
To: "(b) (6) <(b) (6) "(b) (6) <(b) (6) "'delonnie henry@sd.mil'" <delonnie.henry@sd mil>; "(b) (6) <(b) (6) "(b) (6) <(b) (6) "(b) (6) <(b) (6) "(b) (6) <(b) (6) "(b) (6) <(b) (6) "'abedinH@state.gov'" <abedinH@state.gov>; Richard Windsor; "'annie.bradley@usdoj.gov'" <annie.bradley@usdoj.gov>; "(b) (6) <(b) (6) "'Eric.shinseki@va.gov'" <Eric.shinseki@va.gov>; "'darcyje@conus.army mil'" <darcyje@conus.army mil>; "'arnekrc@ed.gov'" <arnekrc@ed.gov>; "(b) (6) <(b) (6) "(b) (6) <(b) (6) "'martha.johnson@gsa.gov'" <martha.johnson@gsa.gov>; "'charles.bolden@nasa.gov'" <charles.bolden@nasa.gov>; "'adrienne.thomas@nara.gov'" <adrienne.thomas@nara.gov>; "'TDKILGORE@tva.gov'" <TDKILGORE@tva.gov>; "'Dee.Williams@opm.gov'" <Dee.Williams@opm.gov>; "'Michael.J.Astrue@ssa.gov'" <Michael.J.Astrue@ssa.gov>; "'patrick r.donahoe@usps.gov'" <patrick.r.donahoe@usps.gov>; "'cloughw@si.edu'" <cloughw@si.edu>
Cc: "'rcox@achp.gov'" <rcox@achp.gov>; "'cturner@cftc.gov'" <cturner@cftc.gov>; "'larryjm@ucia.gov'" <larryjm@ucia.gov>; "'wanderson@cns.gov'" <wanderson@cns.gov>; "'jim.williams@csosa.gov'" <jim.williams@csosa.gov>; "'chris.cummiskey@dhs.gov'" <chris.cummiskey@dhs.gov>; "'fstephens@doc.gov'" <fstephens@doc.gov>; "'ashton.carter@osd.mil'" <ashton.carter@osd mil>; "'daniel.poneman@hq.doe.gov'" <daniel.poneman@hq.doe.gov>; "'rhea_suh@ios.doi.gov'" <rhea_suh@ios.doi.gov>; "'lee.j.lofthus@usdoj.gov'" <lee.j.lofthus@usdoj.gov>; "'Hayes.Charlotte@dol.gov'" <Hayes.Charlotte@dol.gov>; "'kennedypf@state.gov'" <kennedypf@state.gov>; "'kathryn.thomson@dot.gov'" <kathryn.thomson@dot.gov>; "'winona.varnon@ed.gov'" <winona.varnon@ed.gov>; Craig Hooks; "'michael.cushing@exim.gov'" <michael.cushing@exim.gov>; "'smiths@fca.gov'" <smiths@fca.gov>; "'glenda.patrick@ferc.gov'" <glenda.patrick@ferc.gov>; "'paula hayes@fhfa.gov'" <paula hayes@fhfa.gov>; "'sstampone@flra.gov'" <sstampone@flra.gov>; "'lcrook@fmc.gov'" <lcrook@fmc.gov>; "'mmccord@fmshrc.gov'" <mmccord@fmshrc.gov>;

"'eharrington@ftc.gov'" <eharrington@ftc.gov>; "'steve.leeds@gsa.gov'" <steve.leeds@gsa.gov>; "'ned.holland@hhs.gov'" <ned.holland@hhs.gov>; "'estelle.b richman@hud.gov'" <estelle.b richman@hud.gov>; "'dscarbrough@imls.gov'" <dscarbrough@imls.gov>; "'schehltp@mcc.gov'" <schehltp@mcc.gov>; "'cjones@mmc.gov'" <cjones@mmc.gov>; "'mark.sprouse@nara.gov'" <mark.sprouse@nara.gov>; "'olga.m.dominguez@nasa.gov'" <olga.m.dominguez@nasa.gov>; "'mquigley@ncd.gov'" <mquigley@ncd.gov>; "'marcel.acosta@ncpc.gov'" <marcel.acosta@ncpc.gov>; "'edwardsk@arts.gov'" <edwardsk@arts.gov>; "'bmaynes@neh.gov'" <bmaynes@neh.gov>; "'kathleen.james@nlrb.gov'" <kathleen.james@nlrb.gov>; "'king@nmb.gov'" <king@nmb.gov>; "'kathryn.greene@nrc.gov'" <kathryn.greene@nrc.gov>; "'jburt@nsf.gov'" <jburt@nsf.gov>; "'diodato@nwtrb.gov'" <diodato@nwtrb.gov>; "'lpaul@opic.gov'" <lpaul@opic.gov>; "'tina mcguire@opm.gov'" <tina mcguire@opm.gov>; "'rloeb@oshrc.gov'" <rloeb@oshrc.gov>; "'davis.patricia@pbgc.gov'" <davis.patricia@pbgc.gov>; "'jpimpedly@peacecorps.gov'" <jpimpedly@peacecorps.gov>; "'henry.valiulis@rrb.gov'" <henry.valiulis@rrb.gov>; "'David.Robbins@sba.gov'" <David.Robbins@sba.gov>; "'ruizd@sec.gov'" <ruizd@sec.gov>; "'BechtNa@si.edu'" <BechtNa@si.edu>; "'michael.gallagher@ssa.gov'" <michael.gallagher@ssa.gov>; "'dhubbard@sss.gov'" <dhubbard@sss.gov>; "'aaray@tva.gov'" <aaray@tva.gov>; "'joellen.darcy@us.army.mil'" <joellen.darcy@us.army.mil>; "'dluten@usaid.gov'" <dluten@usaid.gov>; "'anna.brown@csb.gov'" <anna.brown@csb.gov>; "'robin.heard@osec.usda.gov'" <robin heard@osec.usda.gov>; "'cdepaola@usip.gov'" <cdepaola@usip.gov>; "'samuel.m.pulcrano@usps.gov'" <samuel m.pulcrano@usps.gov>; "'dan.tangherlini@do.treas.gov'" <dan.tangherlini@do.treas.gov>; "(b) (6) <(b) (6) "'jim.sullivan@va.gov'" <jim.sullivan@va.gov>; "Moore, Michelle" <(b) (6) "Garvey, William S." <(b) (6)

Subject: Implementing Instructions: Climate Change Adaptation Planning

01268-EPA-5624

Richard Windsor/DC/USEPA/US
03/21/2011 05:20 PM

To Diane Thompson
cc
bcc
Subject Re: Fw: Implementing Instructions: Climate Change Adaptation Planning

No need. Unless you want it.
Diane Thompson

----- Original Message -----
From: Diane Thompson
Sent: 03/21/2011 10:24 AM EDT
To: Richard Windsor
Cc: Daniel Kanninen
Subject: Re: Fw: Implementing Instructions: Climate Change Adaptation Planning

Craig Hooks is cc'd as well as the Fed Env Exec so I am assuming this is federal government planning, and the lead is with Craig and OARM. Not sure I can go further without the rest of the email.

****
Diane E. Thompson
Chief of Staff
U. S. Environmental Protection Agency
202-564-6999

Richard Windsor Who is lead here? ----- Original Messa... 03/21/2011 10:13:59 AM

From: Richard Windsor/DC/USEPA/US
To: "Diane Thompson" <thompson.diane@epa.gov>
Date: 03/21/2011 10:13 AM
Subject: Fw: Implementing Instructions: Climate Change Adaptation Planning

Who is lead here?

From: "Sutley, Nancy H." [redacted]
Sent: 03/04/2011 05:50 PM EST
To: "[redacted]" <[redacted]>; "[redacted]" <[redacted]> '"delonnie henry@sd.mil"' <delonnie.henry@sd mil>; "[redacted]" <[redacted]>; "[redacted]" <[redacted]>; "[redacted]" <[redacted]>; "[redacted]" <[redacted]> '"abedinH@state.gov"' <abedinH@state.gov>; Richard Windsor; '"annie.bradley@usdoj.gov"' <annie.bradley@usdoj.gov>; "[redacted]" <[redacted]> '"Eric.shinseki@va.gov"' <Eric.shinseki@va.gov>; '"darcyje@conus.army mil"' <darcyje@conus.army mil>; '"arnekrc@ed.gov"' <arnekrc@ed.gov>; "[redacted]" <[redacted]> "[redacted]" <[redacted]> '"martha.johnson@gsa.gov"' <martha.johnson@gsa.gov>; '"charles.bolden@nasa.gov"' <charles.bolden@nasa.gov>; '"adrienne.thomas@nara.gov"' <adrienne.thomas@nara.gov>; '"TDKILGORE@tva.gov"' <TDKILGORE@tva.gov>; '"Dee.Williams@opm.gov"' <Dee.Williams@opm.gov>; '"Michael.J.Astrue@ssa.gov"' <Michael.J.Astrue@ssa.gov>; '"patrick r.donahoe@usps.gov"' <patrick.r.donahoe@usps.gov>; '"cloughw@si.edu"' <cloughw@si.edu>
Cc: '"rcox@achp.gov"' <rcox@achp.gov>; '"cturner@cftc.gov"' <cturner@cftc.gov>; '"larryjm@ucia.gov"' <larryjm@ucia.gov>; '"wanderson@cns.gov"' <wanderson@cns.gov>; '"jim.williams@csosa.gov"'

<jim.williams@csosa.gov>; "'chris.cummiskey@dhs.gov'" <chris.cummiskey@dhs.gov>; "'fstephens@doc.gov'" <fstephens@doc.gov>; "'ashton.carter@osd.mil'" <ashton.carter@osd mil>; "'daniel.poneman@hq.doe.gov'" <daniel.poneman@hq.doe.gov>; "'rhea_suh@ios.doi.gov'" <rhea_suh@ios.doi.gov>; "'lee.j.lofthus@usdoj.gov'" <lee.j.lofthus@usdoj.gov>; "'Hayes.Charlotte@dol.gov'" <Hayes.Charlotte@dol.gov>; "'kennedypf@state.gov'" <kennedypf@state.gov>; "'kathryn.thomson@dot.gov'" <kathryn.thomson@dot.gov>; "'winona.varnon@ed.gov'" <winona.varnon@ed.gov>; Craig Hooks; "'michael.cushing@exim.gov'" <michael.cushing@exim.gov>; "'smiths@fca.gov'" <smiths@fca.gov>; "'glenda.patrick@ferc.gov'" <glenda.patrick@ferc.gov>; "'paula hayes@fhfa.gov'" <paula hayes@fhfa.gov>; "'sstampone@flra.gov'" <sstampone@flra.gov>; "'lcrook@fmc.gov'" <lcrook@fmc.gov>; "'mmccord@fmshrc.gov'" <mmccord@fmshrc.gov>; "'eharrington@ftc.gov'" <eharrington@ftc.gov>; "'steve.leeds@gsa.gov'" <steve.leeds@gsa.gov>; "'ned.holland@hhs.gov'" <ned.holland@hhs.gov>; "'estelle.b richman@hud.gov'" <estelle.b richman@hud.gov>; "'dscarbrough@imls.gov'" <dscarbrough@imls.gov>; "'schehltp@mcc.gov'" <schehltp@mcc.gov>; "'cjones@mmc.gov'" <cjones@mmc.gov>; "'mark.sprouse@nara.gov'" <mark.sprouse@nara.gov>; "'olga.m.dominguez@nasa.gov'" <olga.m.dominguez@nasa.gov>; "'mquigley@ncd.gov'" <mquigley@ncd.gov>; "'marcel.acosta@ncpc.gov'" <marcel.acosta@ncpc.gov>; "'edwardsk@arts.gov'" <edwardsk@arts.gov>; "'bmaynes@neh.gov'" <bmaynes@neh.gov>; "'kathleen.james@nlrb.gov'" <kathleen.james@nlrb.gov>; "'king@nmb.gov'" <king@nmb.gov>; "'kathryn.greene@nrc.gov'" <kathryn.greene@nrc.gov>; "'jburt@nsf.gov'" <jburt@nsf.gov>; "'diodato@nwtrb.gov'" <diodato@nwtrb.gov>; "'lpaul@opic.gov'" <lpaul@opic.gov>; "'tina mcguire@opm.gov'" <tina mcguire@opm.gov>; "'rloeb@oshrc.gov'" <rloeb@oshrc.gov>; "'davis.patricia@pbgc.gov'" <davis.patricia@pbgc.gov>; "'jpimpedly@peacecorps.gov'" <jpimpedly@peacecorps.gov>; "'henry.valiulis@rrb.gov'" <henry.valiulis@rrb.gov>; "'David.Robbins@sba.gov'" <David.Robbins@sba.gov>; "'ruizd@sec.gov'" <ruizd@sec.gov>; "'BechtNa@si.edu'" <BechtNa@si.edu>; "'michael.gallagher@ssa.gov'" <michael.gallagher@ssa.gov>; "'dhubbard@sss.gov'" <dhubbard@sss.gov>; "'aaray@tva.gov'" <aaray@tva.gov>; "'joellen.darcy@us.army.mil'" <joellen.darcy@us.army.mil>; "'dluten@usaid.gov'" <dluten@usaid.gov>; "'anna.brown@csb.gov'" <anna.brown@csb.gov>; "'robin.heard@osec.usda.gov'" <robin heard@osec.usda.gov>; "'cdepaola@usip.gov'" <cdepaola@usip.gov>; "'samuel.m.pulcrano@usps.gov'" <samuel m.pulcrano@usps.gov>; "'dan.tangherlini@do.treas.gov'" <dan.tangherlini@do.treas.gov>; "'chum@ustda.gov'" <chum@ustda.gov>; "'jim.sullivan@va.gov'" <jim.sullivan@va.gov>; "Moore, Michelle" <(b) (6) "Garvey, William S." <(b) (6)

Subject: Implementing Instructions: Climate Change Adaptation Planning

01268-EPA-5625

Bob Sussman/DC/USEPA/US
03/24/2011 06:56 PM

To Richard Windsor
cc Bob Perciasepe, Diane Thompson, Seth Oster
bcc
Subject Fw: Ruckelshaus, Whitman in Washington Post

A nice boost.

Robert M. Sussman
Senior Policy Counsel to the Administrator
Office of the Administrator
(202)-564-7397
US Environmental Protection Agency
----- Forwarded by Bob Sussman/DC/USEPA/US on 03/24/2011 06:55 PM -----

From: Bob Perciasepe/DC/USEPA/US
To: richinnes@merid.org
Cc: "Amelia S. Salzman" <(b) (6)> Bob Sussman/DC/USEPA/US@EPA, Gina McCarthy/DC/USEPA/US@EPA, Nancy Stoner/DC/USEPA/US@EPA, Rob Brenner/DC/USEPA/US@EPA, Seth Oster/DC/USEPA/US@EPA
Date: 03/24/2011 06:37 PM
Subject: Re: Ruckelshaus, Whitman in Washington Post

Wow !!

Thanks for sharing Rich.

Bob Perciasepe
Deputy Administrator

(o) +1 202 564 4711
(c) +1 (b) (6)

-----Rich Innes <richinnes@merid.org> wrote: -----
To: Bob Sussman/DC/USEPA/US@EPA, Nancy Stoner/DC/USEPA/US@EPA, Bob Perciasepe/DC/USEPA/US@EPA, Rob Brenner/DC/USEPA/US@EPA, Seth Oster/DC/USEPA/US@EPA, "Amy Salzman (b) (6) <(b) (6)>
From: Rich Innes <richinnes@merid.org>
Date: 03/24/2011 06:24PM
Cc: Gina McCarthy/DC/USEPA/US@EPA
Subject: Ruckelshaus, Whitman in Washington Post

FYI I just learned that Washington Post is planning to publish a piece tomorrow (Friday) on the Oped page by former Administrators Ruckelshaus and Whitman, pasted below.

All my best,

Rich Innes
Conservation Strategies, LLC
Senior Fellow, Meridian Institute
1920 L St NW
Suite 500
Washington DC 20036
P 202-354-6457
F 202-354-6441
Cell: (b) (6)
Richinnes@merid.org

Undoing 40 years of green gains
by William D. Ruckelshaus and Christine Todd Whitman
How soon we forget.

In 1970, speaking from badly polluted Los Angeles, Bob Hope cracked, "I don't trust air I can't see." Most Americans could
see too much of their air. So they demanded that Congress and the president do something about it.

Today the agency President Richard Nixon created in response to the public outcry over visible air pollution and flammable
rivers is under siege. The Senate is poised to vote on a bill that would, for the first time, "disapprove" of a scientifically
based finding, in this case that greenhouse gases endanger public health and welfare. This finding was extensively reviewed
by officials in the administrations of presidents George W. Bush and Barack Obama. It was finalized by the Environmental Protection
Agency in response to a 2007 Supreme Court decision that greenhouse gases fit within the Clean Air Act definition of air pollutants.

As former administrators of the EPA, we have observed firsthand rapid changes in scientific knowledge concerning the dangers
posed by particular pollutants, including lead additives in gasoline, benzene and the impact of contaminants on our drinking-water
supply. In each of these cases, the authority of our major environmental statutes was essential to protect public health and
the most vulnerable members of our society from these hazards, even in the face of remaining scientific debate.

Earlier this year, the House of Representatives approved a bill that would cut the EPA's budget by nearly a third and in certain
areas impede its ability to pursue meaningful protections of our air and water.

The EPA was created out of recognition that pollution - largely an unwanted side effect of an increasingly industrialized
society - needed to be controlled or America's public health and environment would continue to

deteriorate. The public called
on our national government to step in and halt what the states could not or would not do.

As the EPA was being established, Congress passed the Clean Air Act in a burst of nonpartisan agreement: 73 to 0 in the Senate
and 374 to 1 in the House.

During the 1970s, many other laws were passed to deal with air and water pollution, drinking-water contamination, radiation,
solid waste, pesticides and toxic substances. Sixteen major pieces of legislation were enacted to address aspects of industrial,
municipal or human activity that were threatening public health or the environment. Most were passed by a Democrat-controlled
Congress and signed into law by a Republican president, and the votes were seldom close.

The EPA was charged with administering these laws, but often it was handed highly technical standards to be achieved with
inadequate resources in unrealistic time frames. In other words, mission impossible. The agency did the best it could with
the scientific knowledge and human resources at its disposal. Inevitably, some mistakes were made. Enormous progress was also
made.
The air across our country is appreciably cleaner and healthier as a result of EPA regulation of trucks, buses, automobiles
and large industrial sources of air pollution. There are three times the number of cars on the roads today than in 1970, yet
they put out a small fraction of the pollution. The results are cleaner air and healthier Americans.

Likewise, American waterways have shown marked improvement. Lakes and rivers across the nation have shifted from being public
health threats to being sources of drinking water as well as places for fishing and other forms of recreation. Lake Erie was
declared dead in 1970 but today supports a multimillion-dollar fishery.

Amid the virulent attacks on the EPA driven by concern about overregulation, it is easy to forget how far we have come in
the past 40 years. We should take heart from all this progress and not, as some in Congress have suggested, seek to tear down
the agency that the president and Congress created to protect America's health and environment.

It has taken four decades to put in place the infrastructure to ensure that pollution is controlled through limitations on
corporate, municipal and individual conduct. Those of us who have served in the agency are sure of one thing: Dismantling
that infrastructure today would ensure that a new one would have to be created tomorrow at great expense and at great sacrifice
to America's public health and environment. The American public will not long stand for an end to regulations that have protected
their health and quality of life.

Our country needs today what it needed in 1970: a strong, self-confident, scientifically driven, transparent, fair and responsible
EPA. Congress should help America achieve that. It should do so not with lowered sights but lowered voices that will result
in an EPA fully capable of helping fashion a prosperous, healthy America whose environment continues to improve.

William D. Ruckelshaus was administrator of the Environmental Protection Agency from 1970 to 1973 and 1983 to 1985. Christine
Todd Whitman, a former Republican governor of New Jersey, was EPA administrator from 2001 to 2003.

01268-EPA-5626

Gina McCarthy/DC/USEPA/US

03/25/2011 01:50 PM

To Richard Windsor
cc Sussman.bob, perciasepe.bob, Thompson.Diane, McIntosh.David, Michael Goo, Fulton.Scott
bcc
Subject Fw: Meeting with ANGA on April 7th

I wanted to share the WH meeting invitation below that was sent to my assistant this week so you can consider who best should represent the agency. I assume I was invited to cover the EPA/CAA regs but I realize there is more of interest to EPA that that.

----- Forwarded by Gina McCarthy/DC/USEPA/US on 03/25/2011 01:39 PM -----

From: Cindy Huang/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA
Date: 03/25/2011 01:23 PM
Subject: Fw: Meeting with ANGA on April 7th

Here you go, from Heather Zichal's assistant.

Cindy Huang
(202) 564-7404

----- Forwarded by Cindy Huang/DC/USEPA/US on 03/25/2011 01:22 PM -----

From: "Hernandez, Philip M." <(b) (6)
To: "Ramos, Paola" <(b) (6)>, "Jones, Lisa M." <(b) (6) "'Diehl, Barbara'" <Barbara_Diehl@ios.doi.gov>, "'Calhoun, Dianne'" <dianne_calhoun@ios.doi.gov>, Cindy Huang/DC/USEPA/US@EPA
Date: 03/18/2011 05:30 PM
Subject: Meeting with ANGA on April 7th

All –
In response to a request from ANGA, the DPC's energy and climate team is helping coordinate a meeting on Thursday, April 7th with senior administration officials. In attendance will be 30 CEOs from Natural Gas Companies across the U.S. ANGA has requested participation from the following participants (see manifest below) to speak to a wide variety of issues re natural gas policy. White House COS Bill Daley will likely kick off the meeting. We thought it would then be easiest to just convene everyone together in a panel. More details to follow on an agenda / specific issues to cover, but I wanted to get this on the radar screen for you all / your bosses. Please let me know ASAP if you will not be able to attend. Thanks!
= = = = =
What: Event with American Natural Gas Alliance and Natural Gas CEOs
Date: April 7th, 2011
Time: 3:30pm-4:30pm
Location: South Court Auditorium, Eisenhower Executive Office Building
Format: Each person on the panel will speak for approximately 5 minutes on their area of expertise (e.g., energy priorities, CAA / EPA regs, leasing on public lands, etc.) This will be followed by a Q&A session.

Manifest:

- **Heather Zichal, DPC/OECC**
- **Nancy Sutley, CEQ**
- **Cass Sunstein, OMB/OIRA**
- **Gina McCarthy, EPA**
- **David Hayes, DOI**

01268-EPA-5627

Richard Windsor/DC/USEPA/US
03/25/2011 02:08 PM

To Gina McCarthy
cc "Bob Sussman", "Bob Perciasepe", "Diane Thompson", "David McIntosh", Michael Goo, "Scott Fulton"
bcc
Subject Re: Meeting with ANGA on April 7th

Intereting timing. It seems to me it should be you and Nancy Stoner. Bob P is fine too. I'd like Goo or Sussman to participate as well.
Gina McCarthy

----- Original Message -----
From: Gina McCarthy
Sent: 03/25/2011 01:50 PM EDT
To: Richard Windsor
Cc: Sussman.bob@EPA.GOV; perciasepe.bob@epa.gov; Thompson.Diane@EPA.GOV; McIntosh.David@EPA.GOV; Michael Goo; Fulton.Scott@EPA.GOV
Subject: Fw: Meeting with ANGA on April 7th

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From: Cindy Huang/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA
Date: 03/25/2011 01:23 PM
Subject: Fw: Meeting with ANGA on April 7th

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Cindy Huang
(202) 564-7404

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From: "Hernandez, Philip M." <(b) (6)
To: "Ramos, Paola" <(b) (6) v>, "Jones, Lisa M." <(b) (6) v>, "'Diehl, Barbara'" <Barbara_Diehl@ios.doi.gov>, "'Calhoun, Dianne'" <dianne_calhoun@ios.doi.gov>, Cindy Huang/DC/USEPA/US@EPA
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- **Nancy Sutley, CEQ**
- **Cass Sunstein, OMB/OIRA**
- **Gina McCarthy, EPA**
- **David Hayes, DOI**

01268-EPA-5628

Gina McCarthy/DC/USEPA/US

03/25/2011 03:32 PM

To Richard Windsor

cc "Scott Fulton", "David McIntosh", Michael Goo, "Bob Perciasepe", "Bob Sussman", "Diane Thompson"

bcc

Subject Re: Meeting with ANGA on April 7th

Administrator - [redacted] Ex.5 - Deliberative [redacted]

[redacted]

Richard Windsor Intereting timing. It seems to me it sho... 03/25/2011 02:08:36 PM

From: Richard Windsor/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA
Cc: "Bob Sussman" <Sussman.bob@epa.gov>, "Bob Perciasepe" <perciasepe.bob@epa.gov>, "Diane Thompson" <thompson.diane@epa.gov>, "David McIntosh" <mcintosh.david@epa.gov>, Michael Goo/DC/USEPA/US@EPA, "Scott Fulton" <Fulton.Scott@epa.gov>
Date: 03/25/2011 02:08 PM
Subject: Re: Meeting with ANGA on April 7th

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Cindy Huang
(202) 564-7404

----- Forwarded by Cindy Huang/DC/USEPA/US on 03/25/2011 01:22 PM -----

From: "Hernandez, Philip M." <(b) (6)
To: "Ramos, Paola" <(b) (6) "Jones, Lisa M." <(b) (6) "'Diehl, Barbara'" <Barbara_Diehl@ios.doi.gov>, "'Calhoun, Dianne'" <dianne_calhoun@ios.doi.gov>, Cindy Huang/DC/USEPA/US@EPA
Date: 03/18/2011 05:30 PM
Subject: Meeting with ANGA on April 7th

All –
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What: Event with American Natural Gas Alliance and Natural Gas CEOs
Date: April 7th, 2011
Time: 3:30pm-4:30pm
Location: South Court Auditorium, Eisenhower Executive Office Building
Format: Each person on the panel will speak for approximately 5 minutes on their area of expertise (e.g., energy priorities, CAA / EPA regs, leasing on public lands, etc.) This will be followed by a Q&A session.

Manifest:

- **Heather Zichal, DPC/OECC**
- **Nancy Sutley, CEQ**
- **Cass Sunstein, OMB/OIRA**
- **Gina McCarthy, EPA**
- **David Hayes, DOI**

01268-EPA-5629

David McIntosh/DC/USEPA/US
03/25/2011 06:43 PM

To Richard Windsor
cc
bcc
Subject Re: Meeting with ANGA on April 7th

[redacted] Ex.5 - Deliberative

Gina McCarthy Administrator - [redacted] Ex.5 - Deliberative 03/25/2011 03:32:05 PM

From: Gina McCarthy/DC/USEPA/US
To: Richard Windsor/DC/USEPA/US@EPA
Cc: "Scott Fulton" <Fulton.Scott@epa.gov>, "David McIntosh" <mcintosh.david@epa.gov>, Michael Goo/DC/USEPA/US@EPA, "Bob Perciasepe" <perciasepe.bob@epa.gov>, "Bob Sussman" <Sussman.bob@epa.gov>, "Diane Thompson" <thompson.diane@epa.gov>
Date: 03/25/2011 03:32 PM
Subject: Re: Meeting with ANGA on April 7th

Administrator - [redacted] Ex.5 - Deliberative

[redacted]

[redacted]

From: Richard Windsor/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA
Cc: "Bob Sussman" <Sussman.bob@epa.gov>, "Bob Perciasepe" <perciasepe.bob@epa.gov>, "Diane Thompson" <thompson.diane@epa.gov>, "David McIntosh" <mcintosh.david@epa.gov>, Michael Goo/DC/USEPA/US@EPA, "Scott Fulton" <Fulton.Scott@epa.gov>
Date: 03/25/2011 02:08 PM
Subject: Re: Meeting with ANGA on April 7th

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From: Gina McCarthy

Sent: 03/25/2011 01:50 PM EDT

To: Richard Windsor

Cc: Sussman.bob@EPA.GOV; perciasepe.bob@epa.gov; Thompson.Diane@EPA.GOV; McIntosh.David@EPA.GOV; Michael Goo; Fulton.Scott@EPA.GOV

Subject: Fw: Meeting with ANGA on April 7th

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01268-EPA-5630

Richard Windsor/DC/USEPA/US
03/25/2011 09:36 PM

To Gina McCarthy
cc "Scott Fulton", "David McIntosh", Michael Goo, "Bob Perciasepe", "Bob Sussman", "Diane Thompson"
bcc
Subject Re: Meeting with ANGA on April 7th

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- **Gina McCarthy, EPA**
- **David Hayes, DOI**

01268-EPA-5631

Gina McCarthy/DC/USEPA/US

03/25/2011 09:56 PM

To Richard Windsor

cc "Scott Fulton", "David McIntosh", Michael Goo, "Bob Perciasepe", "Bob Sussman", "Diane Thompson"

bcc

Subject Re: Meeting with ANGA on April 7th

[redacted]
Ex.5 - Deliberative
[redacted]

[redacted]

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01268-EPA-5632

Richard Windsor/DC/USEPA/US
03/25/2011 09:56 PM

To Gina McCarthy
cc "Scott Fulton", "David McIntosh", Michael Goo, "Bob Perciasepe", "Bob Sussman", "Diane Thompson"
bcc
Subject Re: Meeting with ANGA on April 7th

[redacted] Ex.5 - Deliberative

Gina McCarthy

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Sent: 03/25/2011 09:56 PM EDT
To: Richard Windsor
Cc: "Scott Fulton" <Fulton.Scott@EPA.GOV>; "David McIntosh" <McIntosh.David@EPA.GOV>; Michael Goo; "Bob Perciasepe" <perciasepe.bob@epa.gov>; "Bob Sussman" <Sussman.bob@EPA.GOV>; "Diane Thompson" <Thompson.Diane@EPA.GOV>
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- **Gina McCarthy, EPA**
- **David Hayes, DOI**

01268-EPA-5633

Gina McCarthy/DC/USEPA/US

03/25/2011 10:11 PM

To Richard Windsor

cc "Scott Fulton", "David McIntosh", Michael Goo, "Bob Perciasepe", "Bob Sussman", "Diane Thompson"

bcc

Subject Re: Meeting with ANGA on April 7th

Will do.
Richard Windsor

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From: Richard Windsor
Sent: 03/25/2011 09:56 PM EDT
To: Gina McCarthy
Cc: "Scott Fulton" <Fulton.Scott@epa.gov>; "David McIntosh" <mcintosh.david@epa.gov>; Michael Goo; "Bob Perciasepe" <perciasepe.bob@epa.gov>; "Bob Sussman" <Sussman.bob@epa.gov>; "Diane Thompson" <thompson.diane@epa.gov>
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01268-EPA-5634

Bob Sussman/DC/USEPA/US
03/26/2011 10:22 AM

To Richard Windsor, Gina McCarthy
cc "Scott Fulton", "David McIntosh", Michael Goo, "Bob Perciasepe", "Bob Sussman", "Diane Thomspon"
bcc
Subject Re: Meeting with ANGA on April 7th

[redacted] Ex.5 - Deliberative

Richard Windsor

----- Original Message -----
From: Richard Windsor
Sent: 03/25/2011 09:36 PM EDT
To: Gina McCarthy
Cc: "Scott Fulton" <Fulton.Scott@epa.gov>; "David McIntosh" <mcintosh.david@epa.gov>; Michael Goo; "Bob Perciasepe" <perciasepe.bob@epa.gov>; "Bob Sussman" <Sussman.bob@epa.gov>; "Diane Thompson" <thompson.diane@epa.gov>
Subject: Re: Meeting with ANGA on April 7th

[redacted] Ex.5 - Deliberative

Gina McCarthy

----- Original Message -----
From: Gina McCarthy
Sent: 03/25/2011 03:32 PM EDT
To: Richard Windsor
Cc: "Scott Fulton" <Fulton.Scott@epa.gov>; "David McIntosh" <mcintosh.david@epa.gov>; Michael Goo; "Bob Perciasepe" <perciasepe.bob@epa.gov>; "Bob Sussman" <Sussman.bob@epa.gov>; "Diane Thompson" <thompson.diane@epa.gov>
Subject: Re: Meeting with ANGA on April 7th

[redacted] Ex.5 - Deliberative

[redacted]

Richard Windsor Intereting timing. It seems to me it sho... 03/25/2011 02:08:36 PM

From: Richard Windsor/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA
Cc: "Bob Sussman" <Sussman.bob@epa.gov>, "Bob Perciasepe" <perciasepe.bob@epa.gov>, "Diane Thompson" <thompson.diane@epa.gov>, "David McIntosh" <mcintosh.david@epa.gov>, Michael Goo/DC/USEPA/US@EPA, "Scott Fulton" <Fulton.Scott@epa.gov>
Date: 03/25/2011 02:08 PM
Subject: Re: Meeting with ANGA on April 7th

Intereting timing. It seems to me it should be you and Nancy Stoner. Bob P is fine too. I'd like Goo or Sussman to participate as well.

Gina McCarthy

----- Original Message -----
From: Gina McCarthy
Sent: 03/25/2011 01:50 PM EDT
To: Richard Windsor
Cc: Sussman.bob@EPA.GOV; perciasepe.bob@epa.gov; Thompson.Diane@EPA.GOV; McIntosh.David@EPA.GOV; Michael Goo; Fulton.Scott@EPA.GOV
Subject: Fw: Meeting with ANGA on April 7th

I wanted to share the WH meeting invitation below that was sent to my assistant this week so you can consider who best should represent the agency. I assume I was invited to cover the EPA/CAA regs but I realize there is more of interest to EPA that that.

----- Forwarded by Gina McCarthy/DC/USEPA/US on 03/25/2011 01:39 PM -----

From: Cindy Huang/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA
Date: 03/25/2011 01:23 PM
Subject: Fw: Meeting with ANGA on April 7th

Here you go, from Heather Zichal's assistant.

Cindy Huang
(202) 564-7404

----- Forwarded by Cindy Huang/DC/USEPA/US on 03/25/2011 01:22 PM -----

From: "Hernandez, Philip M." <(b) (6)
To: "Ramos, Paola" <(b) (6) "Jones, Lisa M." <(b) (6) "'Diehl, Barbara'" <Barbara_Diehl@ios.doi.gov>, "'Calhoun, Dianne'" <dianne_calhoun@ios.doi.gov>, Cindy Huang/DC/USEPA/US@EPA
Date: 03/18/2011 05:30 PM
Subject: Meeting with ANGA on April 7th

All –
In response to a request from ANGA, the DPC's energy and climate team is helping coordinate a meeting on Thursday, April 7th with senior administration officials. In attendance will be 30 CEOs from Natural Gas Companies across the U.S. ANGA has requested participation from the following participants (see manifest below) to speak to a wide variety of issues re natural gas policy. White House COS Bill Daley will likely kick off the meeting. We thought it would then be easiest to just convene everyone together in a panel. More details to follow on an agenda / specific issues to cover, but I wanted to get this on the radar screen for you all / your bosses. Please let me know ASAP if you will not be able to attend. Thanks!
= = = = =
What: Event with American Natural Gas Alliance and Natural Gas CEOs
Date: April 7th, 2011
Time: 3:30pm-4:30pm
Location: South Court Auditorium, Eisenhower Executive Office Building
Format: Each person on the panel will speak for approximately 5 minutes on their area of expertise (e.g., energy priorities, CAA / EPA regs, leasing on public lands, etc.) This will be followed by a Q&A session.

Manifest:

- **Heather Zichal, DPC/OECC**

- **Nancy Sutley, CEQ**
- **Cass Sunstein, OMB/OIRA**
- **Gina McCarthy, EPA**
- **David Hayes, DOI**

01268-EPA-5635

Richard Windsor/DC/USEPA/US
03/28/2011 01:45 PM

To "Sutley, Nancy H.", melody_c._barnes, pschiliro, "Zichal, Heather R."
cc
bcc
Subject FYI - new LCV polling released today

Enviro poll: Battleground-state voters want EPA calling the shots on climate

By Ben Geman - 03/28/11 10:45 AM ET

Almost two-thirds of voters in three presidential battleground states — Ohio, Michigan and Pennsylvania — want the Environmental Protection Agency to set greenhouse gas standards for industrial facilities, according to a green group poll released ahead of Senate votes on whether to strip EPA's authority.

The poll released Monday was commissioned by the League of Conservation Voters and is part of a wider political battle over climate rules — one that's perilous for Democrats facing potentially tough reelection battles next year in those states and others.

"Three in five (63%) voters in the three Midwestern states say they trust the EPA more than Congress to decide whether there should be new standards for carbon pollution," states a summary of the poll, conducted by Hart Research Associates.

It notes that roughly the same percentage — 64 percent — support EPA setting new standards that limit carbon pollution from power plants and other industrial facilities.
"By large margins, voters of all political parties trust the EPA more than they trust Congress. Democrats trust the EPA over Congress by 77% to 11%, independent voters do so by 63% to 12%, and Republicans by 48% to 28%," adds the memo by Democratic pollster Geoff Garin.

The Senate is **slated to vote this week** on a GOP amendment to small-business legislation that would nullify EPA's authority, as well as less aggressive Democratic amendments to limit EPA while preserving its power to impose emissions rules.

One of those measures, sponsored by Sen. Jay Rockefeller (D-W.Va.), would delay EPA rules for two years. Voters in Ohio, Michigan and Pennsylvania don't like that plan either, according to the poll, which finds that 62 percent say Congress should not block EPA for two years, while 31 percent support such action.

Several Democrats in the three states could face tough reelection battles

next year. Sen. Sherrod Brown (D-Ohio) opposes the GOP plan to strip EPA's authority, but has **signaled his concern** with EPA's rules and recently **left the door open** to backing the Rockefeller measure.

His seat is in the "lean Democratic" column, according to **The Hill's race ratings**. Two other Senate Democrats from the three states polled — Debbie Stabenow (Mich.) and Bob Casey Jr. (Pa.) — hold seats that are likely to remain in Democratic hands, according to The Hill's ratings.

The poll of 1,501 voters was conducted between Feb. 18 and 22, according to Hart Research Associates.

Protecting EPA's authority is a top priority for green groups following the collapse of climate legislation in the Senate last year.

"What this poll demonstrates is that the public trusts the EPA to do its job to protect public health and limit dangerous pollution and does not want Congress to stand in the way of necessary safeguards," said League of Conservation Voters President Gene Karpinski in statement. "Americans want scientists at the EPA, not politicians in Congress, to determine air pollution limits."

01268-EPA-5636

David McIntosh/DC/USEPA/US
03/29/2011 07:19 AM

To Richard Windsor, Seth Oster
cc
bcc
Subject Fw: Re: URGENT -- Blueprint

FYI

-----Forwarded by David McIntosh/DC/USEPA/US on 03/29/2011 07:18AM -----
To: Bob Perciasepe/DC/USEPA/US@EPA
From: David McIntosh/DC/USEPA/US
Date: 03/29/2011 07:18AM
Cc: Bob Sussman/DC/USEPA/US@EPA, Gina McCarthy/DC/USEPA/US@EPA, Michael Goo/DC/USEPA/US@EPA
Subject: Re: URGENT -- Blueprint

Ex.5 - Deliberative

DOMESTIC RESOURCES

- Ex.5 - Deliberative

Ex.5 - Deliberative

[redacted]

-----Bob Perciasepe/DC/USEPA/US wrote: -----
To: David McIntosh/DC/USEPA/US@EPA, Bob Sussman/DC/USEPA/US@EPA, Michael Goo/DC/USEPA/US@EPA, Gina McCarthy/DC/USEPA/US@EPA
From: Bob Perciasepe/DC/USEPA/US
Date: 03/28/2011 09:48PM
Subject: URGENT -- Blueprint
(See attached file: International Initiatives - clean copy.docx)

All:

Ex.5 - Deliberative

Bob Perciasepe
Deputy Administrator

(o) +1 202 564 4711
(c) +1 (b) (6)

-----Forwarded by Bob Perciasepe/DC/USEPA/US on 03/28/2011 09:39PM -----
To: Bob Perciasepe/DC/USEPA/US@EPA
From: "Zichal, Heather R." <(b) (6)
Date: 03/28/2011 08:53PM
Cc: "Lew, Shoshana M. (WHO)" <(b) (6)
Subject: Blueprint
(See attached file: CES Blueprint chapter -- Clean.docx)
(See attached file: International Initiatives - clean copy.docx)
(See attached file: Domestic resources - Post-Round 2 Adjudicated.docx)
(See attached file: Leading by Example - Post-Round 2 Adjudicated.docx)
(See attached file: Transportation sector -- clean copy.docx)
(See attached file: Energy Efficiency R10.docx)
(See attached file: Clean Energy RD -- clean.docx)

Bob -

Our apologies for the confusion here on the distribution list. will make a priority to incorporate your edits.

Thanks

Ex.5 - Deliberative

- CES Blueprint chapter -- Clean.docx - International Initiatives - clean copy.docx -

Ex.5 - Deliberative

Domestic resources - Post-Round 2 Adjudicated.docx - Leading by Example - Post-Round 2

Ex.5 - Deliberative

Adjudicated.docx - Transportation sector -- clean copy.docx - Energy Efficiency R10.docx
- Clean Energy RD -- clean.docx

01268-EPA-5637

Richard Windsor/DC/USEPA/US
03/29/2011 08:21 AM

To David McIntosh
cc Bob Perciasepe, Bob Sussman, Gina McCarthy, Google Alerts
bcc
Subject Re: Fw: Re: URGENT -- Blueprint

[redacted] Ex.5 - Deliberative

David McIntosh From: David McIntosh/DC/USEPA/US... 03/29/2011 07:19:09 AM

From: David McIntosh/DC/USEPA/US
To: Richard Windsor/DC/USEPA/US@EPA, Seth Oster/DC/USEPA/US@EPA
Date: 03/29/2011 07:19 AM
Subject: Fw: Re: URGENT -- Blueprint

FYI

-----Forwarded by David McIntosh/DC/USEPA/US on 03/29/2011 07:18AM -----
To: Bob Perciasepe/DC/USEPA/US@EPA
From: David McIntosh/DC/USEPA/US
Date: 03/29/2011 07:18AM
Cc: Bob Sussman/DC/USEPA/US@EPA, Gina McCarthy/DC/USEPA/US@EPA, Michael Goo/DC/USEPA/US@EPA
Subject: Re: URGENT -- Blueprint

[redacted] Ex.5 - Deliberative

DOMESTIC RESOURCES

- [redacted] Ex.5 - Deliberative

Ex.5 - Deliberative

[redacted]

-----Bob Perciasepe/DC/USEPA/US wrote: -----
To: David McIntosh/DC/USEPA/US@EPA, Bob Sussman/DC/USEPA/US@EPA, Michael Goo/DC/USEPA/US@EPA, Gina McCarthy/DC/USEPA/US@EPA
From: Bob Perciasepe/DC/USEPA/US
Date: 03/28/2011 09:48PM
Subject: URGENT -- Blueprint
(See attached file: International Initiatives - clean copy.docx)

All:

Ex.5 - Deliberative

[redacted]

Bob Perciasepe

Deputy Administrator

(o) +1 202 564 4711
(c) +1 (b) (6)

-----Forwarded by Bob Perciasepe/DC/USEPA/US on 03/28/2011 09:39PM -----
To: Bob Perciasepe/DC/USEPA/US@EPA
From: "Zichal, Heather R." <(b) (6)
Date: 03/28/2011 08:53PM
Cc: "Lew, Shoshana M. (WHO)" <(b) (6)
Subject: Blueprint
(See attached file: CES Blueprint chapter -- Clean.docx)
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(See attached file: Transportation sector -- clean copy.docx)
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(See attached file: Clean Energy RD -- clean.docx)

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Thanks

Ex.5 - Deliberative

CES Blueprint chapter -- Clean.docx International Initiatives - clean copy.docx

Ex.5 - Deliberative

Domestic resources - Post-Round 2 Adjudicated.docx Leading by Example - Post-Round 2 Adjudicated.docx

Ex.5 - Deliberative

Transportation sector -- clean copy.docx Energy Efficiency R10.docx Clean Energy RD -- clean.docx

01268-EPA-5638

"DeParle, Nancy-Ann" <[redacted] (b) (6)
03/29/2011 08:29 AM

To Richard Windsor
cc
bcc
Subject FW: Bloomberg: Power Generators Must Protect Fish Under U.S. EPA Rules for Cooling Water

[redacted] Ex.5 - Deliberative

Thanks
N-A

-----Original Message-----
From: Stevens, Clark
Sent: Tuesday, March 29, 2011 6:28 AM
To: DeParle, Nancy-Ann; Cutter, Stephanie; Zichal, Heather R.
Subject: FW: Bloomberg: Power Generators Must Protect Fish Under U.S. EPA Rules for Cooling Water

The only two who wrote yesterday on cooling tower are Bloomberg (below) and Dow Jones.

-----Original Message-----
From: Alcantara.Betsaida@epamail.epa.gov [mailto:Alcantara.Betsaida@epamail.epa.gov]
Sent: Tuesday, March 29, 2011 6:25 AM
To: Reilly, Meg
Cc: Stevens, Clark; Seth Oster; Brendan Gilfillan
Subject: Bloomberg: Power Generators Must Protect Fish Under U.S. EPA Rules for Cooling Water

Here's bloomberg story.

Power Generators Must Protect Fish Under U.S. EPA Rules for Cooling Water

By Kim Chipman - Mar 29, 2011 12:00 AM GMT-0400

Power plants and factories face U.S. rules aimed at preventing fish from being sucked into cooling-water systems, helping anglers and costing industry $384 million a year, the Environmental Protection Agency said.

The Obama administration’s proposal issued yesterday under the Clean Water Act will affect more than 1,200 facilities and save billions of aquatic organisms, including 615 million fish and shellfish a year, the agency said in an e-mailed statement.

The EPA is complying with a court order to issue rules for plants and factories that withdraw water from rivers or lakes to cool machinery. The standards will give existing facilities options to meet the requirements and reduce the number of fish killed when pinned against screens covering intake pipes. The EPA said it will work to improve its proposal through public suggestions.

“The input we receive will make certain that we end up with a flexible and

effective rule to protect the health of our waters and ecosystems," Nancy Stoner, the acting assistant administrator for the EPA Office of Water, said in the statement.

The public has 90 days to comment, according to the EPA. The agency must take final action by July 27, 2012.

The Natural Resources Defense Council and Riverkeeper, two environmental groups, said the EPA rule shifts the issue to the states and won't stop plants from killing billions of fish.

"Instead of moving toward modernizing America's power plants and protecting our water resources, the draft rule moves us backwards," Steve Fleischli, a senior attorney in the water program at the New York-based NRDC, said yesterday in a statement. "EPA has chosen the path of least resistance by caving into industry pressure and punting this issue to state agencies."

Entergy Concerns

Companies such as Entergy Corp. (ETR), owner of coal-fired and nuclear-generated power plants, had said they were worried the EPA would require plants to take an overly strict approach to installing technology aimed at complying with the rule.

The EPA said yesterday that existing facilities will have flexibility in determining what controls to use.

Operators using more than 2 million gallons a day must limit the number fish killed, or reduce the velocity of water pulled into cooling systems, which would let fish swim away, the agency said. A facility drawing in at least 125 million gallons a day must develop "site-specific" controls, the EPA said.

Plants that add electrical generation at an existing site would be required to install technology equivalent to a "closed-cycle" system that reuses water. A closed cycle typically refers to cooling towers, according to the EPA.

Closed-Cycle Systems

Closed-cycle cooling for new units would cost about $14.7 million a year, according to the agency. The cost to a household electric bill once the rule has been in place for several years would average less than $2 a year, the EPA said.

The EPA has been criticized by industry groups and Republican lawmakers who said the agency is burdening businesses with overly stringent and costly rules.

New Orleans-based Entergy said last month that it was worried the EPA rule would force it to to spend $1.2 billion building two cooling towers at its plant along the Hudson River north of Manhattan.

Representative Fred Upton, a Michigan Republican, in December had said the EPA's cooling water rule might cost utilities as much as $300 million per site for coal-fired power plants and as much as $1 billion for nuclear-powered generators, exceeding the agency's projections.

The EPA said about 1,260 industrial operations will be covered by the rule, including 670 power plants and about 590 factories.

----- Original Message -----
From: "Reilly, Meg" [(b) (6)
Sent: 03/28/2011 05:05 PM AST
To: Betsaida Alcantara
Cc: "Stevens, Clark" <(b) (6)
Subject: RE: FW: Comments on press release

Thanks so much.

-----Original Message-----
From: Alcantara.Betsaida@epamail.epa.gov [
mailto:Alcantara.Betsaida@epamail.epa.gov]
Sent: Monday, March 28, 2011 4:44 PM
To: Reilly, Meg
Cc: Stevens, Clark
Subject: Re: FW: Comments on press release

this addition looks good. here's updated with your edits and addition.
We;re ready to go as soon as the rule is signed.

Thank you

(See attached file: 316b Final Press Release.docx)

From: "Reilly, Meg" <(b) (6)
To: Betsaida Alcantara/DC/USEPA/US@EPA
Cc: "Stevens, Clark" <(b) (6)
Date: 03/28/2011 04:34 PM
Subject: FW: Comments on press release

Hi Betsaida,

Ex.5 - Deliberative

01268-EPA-5639

Richard Windsor/DC/USEPA/US
03/29/2011 08:32 AM

To "Nancy-Ann M. DeParle"
cc
bcc
Subject Re: Bloomberg: Power Generators Must Protect Fish Under U.S. EPA Rules for Cooling Water

[redacted] Ex.5 - Deliberative

----- Original Message -----
From: "DeParle, Nancy-Ann" [redacted] (b) (6)
Sent: 03/29/2011 08:29 AM AST
To: Richard Windsor
Subject: FW: Bloomberg: Power Generators Must Protect Fish Under U.S. EPA Rules for Cooling Water

[redacted] Ex.5 - Deliberative

Thanks
N-A

-----Original Message-----
From: Stevens, Clark
Sent: Tuesday, March 29, 2011 6:28 AM
To: DeParle, Nancy-Ann; Cutter, Stephanie; Zichal, Heather R.
Subject: FW: Bloomberg: Power Generators Must Protect Fish Under U.S. EPA Rules for Cooling Water

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From: Alcantara.Betsaida@epamail.epa.gov [mailto:Alcantara.Betsaida@epamail.epa.gov]
Sent: Tuesday, March 29, 2011 6:25 AM
To: Reilly, Meg
Cc: Stevens, Clark; Seth Oster; Brendan Gilfillan
Subject: Bloomberg: Power Generators Must Protect Fish Under U.S. EPA Rules for Cooling Water

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From: "Reilly, Meg" [(b) (6)
Sent: 03/28/2011 05:05 PM AST
To: Betsaida Alcantara
Cc: "Stevens, Clark" <(b) (6)
Subject: RE: FW: Comments on press release

Thanks so much.

-----Original Message-----
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mailto:Alcantara.Betsaida@epamail.epa.gov]
Sent: Monday, March 28, 2011 4:44 PM
To: Reilly, Meg
Cc: Stevens, Clark
Subject: Re: FW: Comments on press release

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(See attached file: 316b Final Press Release.docx)

From: "Reilly, Meg" <(b) (6)
To: Betsaida Alcantara/DC/USEPA/US@EPA
Cc: "Stevens, Clark" <(b) (6)
Date: 03/28/2011 04:34 PM
Subject: FW: Comments on press release

Hi Betsaida,

Ex.5 - Deliberative

01268-EPA-5640

Diane Thompson/DC/USEPA/US
03/29/2011 02:30 PM

To "Richard Windsor", "Bob Perciasepe"
cc "Aaron Dickerson", "Seth Oster", "Dan Kanninen"
bcc
Subject Fw: Energy month messaging guidance

FYI

From: "Maisel, Chad P." [redacted]
Sent: 03/29/2011 01:19 PM AST
To: "Lu, Chris" <[redacted] "Smith, Elizabeth S." <[redacted] "Greenawalt, Andrei" <[redacted] "Phadke, Shilpa" <[redacted] "McCarthy, Nell" <[redacted] "Milakofsky, Ben" <[redacted] "Maisel, Chad P." <[redacted]
Subject: Energy month messaging guidance

Cabinet Chiefs of Staff:

Please see attached guidance for April messaging. It asks for information from your agencies and provides background and talking points. Tom Gavin sent this to your communications staff earlier this week.

Let us know if you have questions.

[redacted] Ex.5 - Deliberative

–Cabinet Affairs 2011 03 27 Cabinet energy guidance.docx

01268-EPA-5641

Richard Windsor/DC/USEPA/US
03/29/2011 05:14 PM

To Seth Oster, Heidi Ellis
cc
bcc
Subject Fw: Energy month messaging guidance

Ex.5 - Deliberative

----- Forwarded by Richard Windsor/DC/USEPA/US on 03/29/2011 05:14 PM -----

From: Diane Thompson/DC/USEPA/US
To: "Richard Windsor" <Windsor.Richard@epamail.epa.gov>, "Bob Perciasepe" <perciasepe.bob@epa.gov>
Cc: "Aaron Dickerson" <dickerson.aaron@epa.gov>, "Seth Oster" <oster.seth@epa.gov>, "Dan Kanninen" <kanninen.daniel@epa.gov>
Date: 03/29/2011 02:30 PM
Subject: Fw: Energy month messaging guidance

FYI

From: "Maisel, Chad P." (b) (6)
Sent: 03/29/2011 01:19 PM AST
To: "Lu, Chris" <(b) (6) "Smith, Elizabeth S." <(b) (6) "Greenawalt, Andrei" <(b) (6) "Phadke, Shilpa" <(b) (6) "McCarthy, Nell" <(b) (6) "Milakofsky, Ben" <(b) (6) "Maisel, Chad P." <(b) (6)
Subject: Energy month messaging guidance

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Ex.5 - Deliberative

–Cabinet Affairs 2011 03 27 Cabinet energy guidance.docx

01268-EPA-5642

Richard Windsor/DC/USEPA/US
03/29/2011 06:04 PM

To "Nancy-Ann DeParle"
cc
bcc
Subject Fw: Final Bloomberg: EPA Proposes Water Rules for Power Plants to Protect Fish and Dow Jones:

FYI...Exelon quotes below.
Betsaida Alcantara

----- Original Message -----
From: Betsaida Alcantara
Sent: 03/29/2011 05:56 PM EDT
To: Richard Windsor; Janet Woodka
Cc: Bob Sussman; Nancy Stoner; Adora Andy; Arvin Ganesan; Bob Perciasepe; David McIntosh; Dru Ealons; "Judith Enck" <enck.judith@epa.gov>; "gilfillan brendan" <gilfillan.brendan@epa.gov>; "Daniel Kanninen" <Kanninen.Daniel@epa.gov>; Sarah Pallone; Scott Fulton; Seth Oster; Stephanie Owens; "Diane Thompson" <thompson.diane@epa.gov>; "Lisa Jackson" <windsor.richard@epa.gov>; Michael Goo
Subject: Final Bloomberg: EPA Proposes Water Rules for Power Plants to Protect Fish and Dow Jones:
Final bloomberg story with comments from exelon and others

Power Plants Face EPA Cooling-Water Rules to Protect Fish (2)
2011-03-29 21:38:49.316 GMT

(Updates with comment from Exelon in seventh paragraph.)

By Kim Chipman
March 29 (Bloomberg) -- Utilities such as Entergy Corp. face U.S. rules aimed at preventing fish from being sucked into cooling-water systems and costing industry $384 million a year, the Environmental Protection Agency said.
The Obama administration's proposal introduced yesterday will affect more than 1,200 facilities and save billions of aquatic organisms, including 615 million fish and shellfish a year, the agency said in an e-mailed statement.
The EPA rule, part of a court settlement with environmental groups, will cover power plants and factories that pull water from rivers or lakes to cool machines. Existing facilities will work with states to determine how to meet the requirements while new units will have to use closed-cycle cooling, a system that draws less water and ensnares fewer fish.
"The EPA's approach is likely to minimize the industry's cost of compliance," Hugh Wynne, an analyst at Sanford Bernstein & Co. in New York, wrote today in a report to clients.
The EPA's pending proposal under the Clean Water Act had been singled out by energy companies, industry groups and Republican lawmakers as a regulation that may burden electric utilities and cause some coal-fired power plants to shut down.
Representative Fred Upton, a Michigan Republican, in December said the rule might cost utilities as much as $300

million per site for coal-fired plants and as much as $1 billion for nuclear generators, exceeding the EPA's projections.
Exelon Corp., owner of the most U.S. nuclear plants, said today the EPA's proposed standard doesn't require existing plants to build costly cooling towers.

Exelon 'Encouraged'

"Exelon is encouraged that the rule doesn't mandate cooling towers as a 'one-size-fits-all' technology and allows consideration of site-specific factors, as well as costs and benefits for some of the rule's requirements," the Chicago-based company said today in a statement.
Exelon rejected claims from some companies that the EPA rule, along with proposed limits on air toxins from coal-fired power plants, will be detrimental to business.
"Rumors of a train wreck caused by new EPA regulations are simply false," Joseph Dominguez, senior vice president of federal regulatory affairs, public policy and communications, said today in a statement. "EPA has done a good job listening to the industry and moving the ball forward."
The Edison Electric Institute, a Washington-based trade group representing the utility industry, criticized the plan, arguing that the agency will have states following guidelines that favor closed-cycle cooling technology, such as towers.

Higher Costs

"EPA's proposal could result in premature plant retirements, capacity shortfalls and higher costs for customers," the group said today in a statement.
Entergy, a New Orleans-based owner of coal-fired and nuclear power plants, had said the cooling-water rule may force it to spend $1.2 billion building two cooling towers at its Indian Point plant on the Hudson River north of New York City.
The EPA said installing closed-cycle cooling for new units would cost about $14.7 million a year. The cost to a household electric bill once the rule has been in place for several years would average less than $2 a year, according to the EPA.
Entergy is reviewing the proposal and has no comment, said Alex Schott, a spokesman.
The agency said it will work to improve its proposal through outside suggestions.

Public Comments

"The input we receive will make certain that we end up with a flexible and effective rule to protect the health of our waters and ecosystems," said Nancy Stoner, acting assistant administrator for the EPA Office of Water, in the statement.
The public has 90 days to comment and the agency must take final action by July 27, 2012, according to the EPA.
The rule will cover about 1,260 industrial operations, including 670 power plants and about 590 factories, according to the agency.
Two environmental groups, the Natural Resources Defense

Council and Riverkeeper, criticized the EPA for shifting the matter to the states. The proposal won't stop plants from harming billions of fish that get pinned against screens covering water intake pipes, according to the organizations.
"Instead of moving toward modernizing America's power plants and protecting our water resources, the draft rule moves us backwards," Steve Fleischli, a senior attorney in the water program at the New York-based NRDC, said yesterday in a statement. "EPA has chosen the path of least resistance by caving into industry pressure and punting this issue to state agencies."

Fish Kills Limited

Existing facilities using more than 2 million gallons of water a day must limit the number fish killed, or slow the pace of water pulled into cooling systems, which lets fish swim away. A facility drawing in at least 125 million gallons a day must develop "site-specific" controls, the EPA said.
Plants that add electrical generation at an existing site would be required to install technology equivalent to a "closed-cycle" system that reuses water. A closed cycle typically refers to cooling towers, according to the EPA.
The EPA's proposal follows rules issued in 2004 by President George W. Bush's EPA. Those standards, the first national cooling water rules for existing plants, were suspended by the EPA three years later amid litigation. The Bush rules didn't require a "closed cycle" cooling tower approach the agency had previously mandated for new plants.
Some plants, such as Entergy's Indian Point, use "once through" systems, which take in water directly and then spew it back out at higher temperatures.
Bush's EPA said closed-cycle systems would be unduly expensive and that other technologies would achieve close to the same results.
In a victory for industry, the Supreme Court ruled in 2009 that the EPA may balance business costs against benefits in deciding whether to impose the new requirements on power plants, overturning a lower court decision.
Betsaida Alcantara

----- Original Message -----
From: Betsaida Alcantara
Sent: 03/28/2011 08:22 PM EDT
To: Richard Windsor; Janet Woodka
Cc: Bob Sussman; Nancy Stoner; Adora Andy; Arvin Ganesan; Bob Perciasepe; David McIntosh; Dru Ealons; "Judith Enck" <enck.judith@epa.gov>; "gilfillan brendan" <gilfillan.brendan@epa.gov>; "Daniel Kanninen" <Kanninen.Daniel@epa.gov>; Sarah Pallone; Scott Fulton; Seth Oster; Stephanie Owens; "Diane Thompson" <thompson.diane@epa.gov>; "Lisa Jackson" <windsor.richard@epa.gov>; Michael Goo
Subject: Bloomberg: EPA Proposes Water Rules for Power Plants to Protect Fish and Dow Jones:
These wire stories will be updated in the morning with more info.

Bloomberg: EPA Proposes Water Rules for Power Plants to Protect Fish (1)
2011-03-28 22:46:14.256 GMT

By Kim Chipman
March 28 (Bloomberg) -- The U.S. Environmental Protection Agency said it proposed water standards aimed at protecting millions of fish drawn each year into cooling water systems at more than 1,200 power plants and factories.
The rules proposed under the federal Clean Water Act will save about 615 million fish and shellfish a year at an annual cost to industry of $384 million, the EPA said today in an e-mailed statement.
The agency is complying with a court order to issue rules for industrial facilities that withdraw water from rivers or lakes to cool machinery. The standards will give companies two options to meet the requirements and reduce the number of fish killed when pinned against screens covering intake pipes. The EPA said it will review public comments when crafting the rule. “The input we receive will make certain that we end up with a flexible and effective rule to protect the health of our waters and ecosystems,” Nancy Stoner, the acting assistant administrator for the EPA Office of Water, said in a statement.
The EPA has been criticized by industry groups and Republican lawmakers who said the agency is burdening businesses with overly stringent and costly rules.
Representative Fred Upton, a Michigan Republican, in December had said the EPA’s rule might affect more than 400 power plants and cost as much as $300 million per site for coal-fired utilities and as much as $1 billion for nuclear-powered generators, exceeding the agency’s projections.
The EPA said about 1,260 industrial operations will be covered by the rule, including 670 power plants and about 590 factories.

Dow Jones: EPA Proposes Regulations For Water Intake At Power Plants, Factories

By Ryan Tracy, OF DOW JONES NEWSWIRES

WASHINGTON -(Dow Jones)- The Environmental Protection Agency Monday proposed new regulations affecting power plants and factories that use water for cooling as part of their operations.

The proposed rule, which is designed to protect fish, would impact an estimated 1,260 facilities in the U.S. and could require upgrades at many of them. Power plants, food processors, and manufacturers of paper, chemicals, and steel are among the industries most likely to be impacted by the rules, EPA said.

The rule would require plants to show their water intake systems are killing less than a set number of fish and shellfish, which can die when they get sucked into an intake system or trapped against a screen where the facilities draws in water.

Alternatively, the facilities would be allowed to reduce the velocity of their water intakes to a level that EPA says would allow most fish to swim away safely.

Existing plants that add electrical generation capacity would be required to use so-called closed-cycle cooling, or a technology that has an equal impact on aquatic life. In contrast to "once-through" cooling systems, closed-cycle cooling systems recycle water in order to withdraw less from an outside water body.

Large facilities that withdraw more than 125 million gallons of water per day would be required to conduct studies on how their water intake system is impacting aquatic life so that regulators can assess each of them on a site-by- site basis. EPA will soon begin accepting public comment on the rules and must finalize them by July 2012.

-By Ryan Tracy, Dow Jones Newswires; 202-862-9245; ryan.tracy@dowjones.com
Richard Windsor

----- Original Message -----
From: Richard Windsor
Sent: 03/28/2011 05:59 PM EDT
To: Betsaida Alcantara; Janet Woodka
Cc: Bob Sussman; Nancy Stoner; Adora Andy; Arvin Ganesan; Bob Perciasepe; David McIntosh; Dru Ealons; "Judith Enck" <enck.judith@epa.gov>; "gilfillan brendan" <gilfillan.brendan@epa.gov>; "Daniel Kanninen" <Kanninen.Daniel@epa.gov>; Sarah Pallone; Scott Fulton; Seth Oster; Stephanie Owens; "Diane Thompson" <thompson.diane@epa.gov>; "Lisa Jackson" <windsor.richard@epa.gov>; Michael Goo
Subject: Re: 316b Press Release is out

Tx all
Betsaida Alcantara

----- Original Message -----
From: Betsaida Alcantara
Sent: 03/28/2011 05:58 PM EDT
To: Janet Woodka
Cc: Bob Sussman; Nancy Stoner; Adora Andy; Arvin Ganesan; Bob Perciasepe; David McIntosh; Dru Ealons; enck.judith@epa.gov; gilfillan.brendan@epa.gov; kanninen.daniel@epa.gov; Sarah Pallone; Scott Fulton; Seth Oster; Stephanie Owens; thompson.diane@epa.gov; windsor.richard@epa.gov; Michael Goo
Subject: 316b Press Release is out

Here are all the final materials, internal and external.

[attachment "032811 - Final Press Release 316b.docx" deleted by Richard Windsor/DC/USEPA/US]
[attachment "032811 - Topline Messages 316b.docx" deleted by Richard Windsor/DC/USEPA/US]
[attachment "032811 - Internal Qs and As 316b.doc" deleted by Richard Windsor/DC/USEPA/US]
[attachment "032811 - External Qs and As 316b.doc" deleted by Richard Windsor/DC/USEPA/US]

01268-EPA-5643

Seth Oster/DC/USEPA/US
03/30/2011 09:35 AM

To Richard Windsor
cc Adora Andy, Brendan Gilfillan, Alisha Johnson
bcc
Subject Energy Speech -- Today's fact sheet

Seth Oster
Associate Administrator
Office of External Affairs and Environmental Education
Environmental Protection Agency
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oster.seth@epa.gov

----- Forwarded by Seth Oster/DC/USEPA/US on 03/30/2011 09:35 AM -----

From: "Gavin, Tom" <(b) (6)
To: undisclosed-recipients:;
Date: 03/30/2011 09:13 AM
Subject: Today's fact sheet

In case you missed it this morning, we put this fact sheet out early on the rollout today.

THE WHITE HOUSE
Office of the Press Secretary

FOR IMMEDIATE RELEASE
March 30, 2011

FACT SHEET: America's Energy Security

Rising prices at the pump affect everybody – workers and farmers; truck drivers and restaurant owners. Businesses see it impact their bottom line. Families feel the pinch when they fill up their tank. For Americans already struggling to get by, it makes life that much harder. That's why we need to make ourselves more secure and control our energy future by harnessing all of the resources that we have available and embracing a diverse energy portfolio. With an ultimate goal of reducing our dependence on oil, in the near term we must responsibly develop and produce oil and gas at home, while at the same time leveraging cleaner, alternative fuels and increasing efficiency. And beyond our efforts to reduce our dependence on oil, we must focus on expanding cleaner sources of electricity – keeping America on the cutting edge of clean energy technology so that we can build a 21st century clean energy economy and win the future.

Reducing oil imports

In 2008, America imported 11 million barrels of oil a day. By 2025 – a little over a decade from now – we will have cut that by one-third.

- **Expanding Safe and Responsible Domestic Oil and Gas Development and Production:**

  - **Implementing critical safety reforms:** In response to the *Deepwater Horizon* oil spill in the Gulf of Mexico, the Obama Administration has launched rigorous and comprehensive environmental and safety reforms to ensure the responsible development of offshore oil and gas resources.

  - **Identifying underdeveloped resources:** The President asked the Department of the Interior (DOI) to issue a report on the status of unused oil and gas leases. That report showed that 57 percent of all leased onshore acres and 70 percent of offshore leased acres are inactive – meaning that they are neither being explored or developed.
  - **Developing incentives for expedited development and production:** DOI is developing incentives for expedited development of oil and gas production from existing and future leases. For its offshore leasing program, the DOI has already begun to employ incentives, including the shortening of some lease terms to encourage earlier development, and requiring drilling to begin before an extension can be granted on a lease. DOI is also evaluating the potential use of graduated royalty rate structures, such as those adopted by the State of Texas, to encourage more rapid production.

- **Securing Access to Diverse and Reliable Sources of Energy:** The U.S. is acting in the international arena to moderate global oil demand and secure additional supplies of liquid fuels and clean energy. We are working with our international partners to increase natural gas supplies, replace oil with natural gas in power generation, and increase responsible oil production in a manner that ensures safety . We are also increasing sustainable bioenergy production, building a new international framework for nuclear energy, and promoting energy efficiency.

- **Developing Alternatives to Oil, Including Biofuels and Natural Gas:** Some of our most effective opportunities to enhance our energy security can be found in our own backyard. We are committed to finding better and smarter ways to use these abundant energy resources. That means:

  - **Expanding biofuels markets and commercializing new biofuels technologies:** Corn ethanol is already making a significant contribution to reducing our oil dependence, but increasing market share will require

overcoming infrastructure challenges and commercializing promising cellulosic and advanced biofuels technologies. To help achieve this goal, the Administration has set a goal of breaking ground on at least four commercial-scale cellulosic or advanced bio-refineries over the next two years. And as we do all of these things, we will look for ways to reform our biofuels incentives to make sure they meet today's biofuels challenges and save taxpayers money.

- **Encouraging responsible development practices for natural gas:** The Administration is committed to the use of this important domestic resource, but we must ensure it is developed safely and responsibly. To that end the Administration is focused on increasing transparency about the use of fracking chemicals, working with state regulators to offer technical assistance, and launching a new initiative to tap experts in industry, the environmental community and states to develop recommendations for shale extraction practices that will ensure the protection of public health and the environment.

- **Cutting Costs at the Pump with More Efficient Cars and Trucks:** The Administration is building on recent investments in advanced vehicles, fuel, technologies, high speed rail, and public transit:

  - **Setting historic new fuel economy standards:** Standards for model years 2012-16 will raise average fuel economy to 35.5 miles per gallon by 2016, and save 1.8 billion barrels of oil over the lifetime of the vehicles covered. In July, the Administration will also finalize the first-ever national fuel economy and greenhouse gas emission standards for commercial trucks, vans and buses built in 2014 - 2018. These standards will cut oil use and promote the development and deployment of alternative fuels, including natural gas. The Administration is also developing the next generation of fuel economy and greenhouse gas emission standards for passenger vehicles 2017-2025 and expects to announce the proposal in September 2011.

  - **Paving the way for advanced vehicles:** The President has set an ambitious goal of putting 1 million electric vehicles on the road by 2015. To help us get there, the President's FY 2012 Budget proposes a redesigned $7500 tax credit for consumers, competitive grants for communities that encourage the adoption of electric vehicles, and funding for R&D to drive innovation in advanced battery technology. At the same time, the President is calling on Congress to move forward with policies that can help unlock the promise of natural gas vehicles.

- **Leading by Example With the Federal Fleet.** The Federal government operates more than 600,000 fleet vehicles. We have already doubled the number of hybrid vehicles in the federal fleet. Today, the President is calling for administrative

action directing agencies to ensure that by 2015, all new vehicles they purchase will be alternative-fuel vehicles, including hybrid and electric vehicles.

Innovating Our Way to a Clean Energy Future

Charting a path towards cleaner sources of electricity and greater energy efficiency, and remaining on the cutting edge of clean energy technology.

- **Creating Markets for Clean Energy:** To move capital off of the sidelines and into the clean energy economy – creating jobs in the process – we need to give businesses and entrepreneurs a clear signal that there will be a market for clean energy innovation. That's why the Administration is committed to pursuing a Clean Energy Standard (CES), an ambitious but achievable goal of generating 80 percent of the Nation's electricity from clean energy sources by 2035 – including renewable energy sources like wind, solar, biomass, and hydropower; nuclear power; efficient natural gas; and clean coal.

- **Cutting Energy Bills through More Efficient Homes and Buildings:** Our homes, businesses and factories consume over 70 percent of the energy we use. By making smart investments in energy efficiency in the residential, commercial, and industrial sectors, we can improve U.S. competitiveness and protect our environment, while saving consumers money on electricity bills. That is why the Administration is on track to weatherize 600,000 low-income homes through Recovery Act investments, and why we remain committed to a series of policies that increase efficiency across sectors – including a HOMESTAR program to help homeowners finance retrofits, a "Better Buildings Initiative" to make commercial facilities 20 percent more efficient by 2020, and steps to promote industrial energy efficiency.

- **Staying on the Cutting Edge through Clean Energy Research and Development:** Through the Advanced Research Project Agency-Energy (ARPA-E) program, we have invested in over 100 cutting-edge projects in areas ranging from smart grid technology, to carbon capture, to battery technology for electric vehicles. Past Budgets funded three "Energy Innovation Hubs" that explore building efficiency, fuel from sunlight, and nuclear reactor modeling and simulation. The FY 2012 Budget request more than doubles funding for ARPA-E and doubles the number of Hubs to include new Hubs that will advance smart grid technology, critical materials research, as well as batteries and energy storage.

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01268-EPA-5644

Seth Oster/DC/USEPA/US
03/30/2011 11:01 AM

To: Richard Windsor, Diane Thompson, David McIntosh, Adora Andy, Brendan Gilfillan, Betsaida Alcantara, Bob Perciasepe, Michael Goo, Bicky Corman, Bob Sussman, Scott Fulton, Lisa Garcia, Arvin Ganesan, Sarah Pallone, Janet Woodka, Daniel Kanninen, Gina McCarthy, Barbara Bennett, Stephanie Owens, Dru Ealons, Jose Lozano, Heidi Ellis, Michael Moats, Vicki Ekstrom
cc
bcc
Subject: POTUS Speech -- EMBARGOED: A Secure Energy Future--As Prepared for Delivery

President's speech is now out.

Seth Oster
Associate Administrator
Office of External Affairs and Environmental Education
Environmental Protection Agency
(202) 564-1918
oster.seth@epa.gov

----- Forwarded by Seth Oster/DC/USEPA/US on 03/30/2011 10:59 AM -----

From: "Gavin, Tom" <(b) (6)
To: Adora Andy/DC/USEPA/US@EPA, "Chan, Stephanie" <Stephanie.Chan@oc.usda.gov>, "Chris Mather (Chris.Mather@oc.usda.gov)" <Chris.Mather@oc.usda.gov>, "dan.leistikow@hq.doe.gov" <dan.leistikow@hq.doe.gov>, "DeJong, Justin" <Justin.DeJong@oc.usda.gov>, "'fillichio.carl@dol.gov'" <fillichio.carl@dol.gov>, "jill.zuckman@dot.gov" <jill.zuckman@dot.gov>, "justin.nisly@dot.gov" <justin.nisly@dot.gov>, "Kendra Barkoff (Kendra_Barkoff@ios.doi.gov)" <Kendra_Barkoff@ios.doi.gov>, "Matt Lee-Ashley (Matt_Lee-Ashley@ios.doi.gov)" <Matt_Lee-Ashley@ios.doi.gov>, "Montoya, Jordan" <Jordan_Montoya@ios.doi.gov>, Seth Oster/DC/USEPA/US@EPA, "'roberts.david@dol.gov'" <roberts.david@dol.gov>, "Stephanie Mueller (Stephanie.Mueller@hq.doe.gov)" <Stephanie.Mueller@hq.doe.gov>, "Stevens, Clark" <(b) (6) "Reynolds, Tom" <Tom.Reynolds@hq.doe.gov>, "'zapata.jaime@dol.gov'" <zapata.jaime@dol.gov>
Date: 03/30/2011 10:58 AM
Subject: FW: EMBARGOED: A Secure Energy Future--As Prepared for Delivery

Just went out ---

From: White House Press Office [mailto:noreply@messages.whitehouse.gov]
Sent: Wednesday, March 30, 2011 10:58 AM
To: Gavin, Tom
Subject: EMBARGOED: A Secure Energy Future--As Prepared for Delivery

THE WHITE HOUSE
Office of the Press Secretary

EMBARGOED UNTIL DELIVERY

March 30, 2011

Remarks of President Barack Obama—As Prepared for Delivery
A Secure Energy Future
Georgetown University
March 30, 2011

As Prepared for Delivery—

We meet here at a tumultuous time for the world. In a matter of months, we've seen regimes toppled and democracy take root across North Africa and the Middle East. We've witnessed a terrible earthquake, catastrophic tsunami and nuclear emergency batter a strong ally and the world's third largest economy. And we've led an international effort in Libya to prevent a massacre and maintain stability throughout the broader region.

As Americans, we are heartbroken by the lives that have been lost as a result of these events. We are moved by the thirst for freedom in many nations, as well as the strength and perseverance of the Japanese people. And of course, it's natural to feel anxious about what all this means for us.

One area of particular concern has been the cost and security of our energy. In an economy that relies on oil, rising prices at the pump affect everybody – workers and farmers; truck drivers and restaurant owners. Businesses see it hurt their bottom line. Families feel the pinch when they fill up their tank. For Americans already struggling to get by, it makes life that much harder.

But here's the thing – we've been down this road before. Remember, it was just three years ago that gas prices topped $4 a gallon. Working folks haven't forgotten that. It hit a lot of people pretty hard. But it was also the height of political season, so you had a lot of slogans and gimmicks and outraged politicians waving three-point-plans for two-dollar gas – when none of it would really do anything to solve the problem. Imagine that in Washington.

The truth is, of course, was that all these gimmicks didn't make a bit of difference. When gas prices finally fell, it was mostly because the global recession led to less demand for oil. Now that the economy is recovering, demand is back up. Add the turmoil in the Middle East, and it's not surprising oil prices are higher. And every time the price of a barrel of oil on the world market rises by $10, a gallon of gas goes up by about 25 cents.

The point is, the ups and downs in gas prices are usually temporary. When you look at the long-term trends, though, there will be more ups than downs. That's because countries like India and China are growing at a rapid clip. And as two billion more

people start consuming more goods, and driving more cars, and using more energy, it's certain that demand will go up a lot faster than supply.

So here's the bottom line – there are no quick fixes. And we will keep on being a victim to shifts in the oil market until we get serious about a long-term policy for secure, affordable energy.

We've known about the dangers of our oil dependence for decades. Presidents and politicians of every stripe have promised energy independence, but that promise has so far gone unmet. I've pledged to reduce America's dependence on oil too, and I'm proud of the historic progress we've made over the last two years towards that goal. But we've also run into the same political gridlock and inertia that's held us back for decades.

That has to change.

We cannot keep going from shock to trance on the issue of energy security, rushing to propose action when gas prices rise, then hitting the snooze button when they fall again. The United States of America cannot afford to bet our long-term prosperity and security on a resource that will eventually run out. Not anymore. Not when the cost to our economy, our country, and our planet is so high. Not when your generation needs us to get this right.

It is time to do what we can to secure our energy future.

So today, I'm setting a new goal: one that is reasonable, achievable, and necessary. When I was elected to this office, America imported 11 million barrels of oil a day. By a little more than a decade from now, we will have cut that by one-third.

I set this goal knowing that imported oil will remain an important part of our energy portfolio for quite some time. And when it comes to the oil we import from other nations, we can partner with neighbors like Canada, Mexico, and Brazil, which recently discovered significant new oil reserves, and with whom we can share American technology and know-how.

But our best opportunities to enhance our energy security can be found in our own backyard. And we boast one critical, renewable resource the rest of the world cannot match: American ingenuity.

To make ourselves more secure – to control our energy future – we will need to harness that ingenuity. It is a task that won't be finished by the end of my presidency, or even the next. But if we continue the work that we have already begun over the last two years, we won't just spark new jobs, industries and innovations; we will leave your

generation and future generations a country that is safer, healthier, and more prosperous.

Today, my Administration is releasing a Blueprint for A Secure Energy Future that outlines the comprehensive national energy policy we've pursued since the day I took office. And here at Georgetown, I'd like to talk in broad strokes about how we will secure that future.

Meeting this new goal of cutting our oil dependence depends largely on two things: finding and producing more oil at home, and reducing our dependence on oil with cleaner alternative fuels and greater efficiency.

This begins by continuing to increase America's oil supply. Last year, American oil production reached its highest level since 2003. And for the first time in more than a decade, oil we imported accounted for less than half the liquid fuel we consumed.

To keep reducing that reliance on imports, my Administration is encouraging offshore oil exploration and production – as long as it's safe and responsible. I don't think anyone's forgotten that we're not even a year removed from the largest oil spill in our history. I know the people of the Gulf Coast haven't. What we learned from that disaster helped us put in place smarter standards of safety and responsibility – for example, if you're going to drill in deepwater, you've got to prove that you can actually contain an underwater spill. That's just common sense.

Today, we're working to expedite new drilling permits for companies that meet these standards. Since they were put in place, we've approved 39 new shallow water permits; and we've approved an additional 7 deepwater permits in recent weeks. When it comes to drilling onshore, my Administration approved more than two permits last year for every new well that the industry started to drill. So any claim that my Administration is responsible for gas prices because we've "shut down" oil production might make for a useful political sound bite – but it doesn't track with reality.

In fact, we are pushing the oil industry to take advantage of the opportunities they already have. Right now, the industry holds tens of millions of acres of leases where it's not producing a drop – sitting on supplies of American energy just waiting to be tapped. That's why part of our plan is to provide new and better incentives that promote rapid, responsible development of these resources. We're also exploring and assessing new frontiers for oil and gas development from Alaska to the Mid- and South Atlantic. Because producing more oil in America can help lower oil prices, create jobs, and enhance our energy security.

But let's be honest – it's not the long-term solution to our energy challenge. America holds only about two percent of the world's proven oil reserves. And even if we drilled

every drop of oil out of every one of those reserves, it still wouldn't be enough to meet our long-term needs.

All of this means one thing: the only way for America's energy supply to be truly secure is by permanently reducing our dependence on oil. We have to find ways to boost our efficiency so that we use less oil. We have to discover and produce cleaner, renewable sources of energy with less of the carbon pollution that threatens our climate. And we have to do it quickly.

In terms of new sources of energy, we have a few different options. The first is natural gas. As I mentioned earlier, recent innovations have given us the opportunity to tap large reserves – perhaps a century's worth – in the shale under our feet. Now, we have to make sure we're doing it safely, without polluting our water supply. And that's why I'm asking my Energy Secretary, Steven Chu, to work with other agencies, the natural gas industry, states, and environmental experts to improve the safety of this process. I don't know if you've heard, but he's got a Nobel Prize for physics, after all. He likes to tinker on this stuff in his garage on the weekend.

But the potential here is enormous. It's actually an area of broad bipartisan agreement. Last year, more than 150 Members of Congress from both sides of the aisle proposed legislation providing incentives to use clean-burning natural gas in our vehicles instead of oil. They were even joined by T. Boone Pickens, a businessman who made his fortune on oil. So I ask them to keep at it and pass a bill that helps us achieve this goal.

Another substitute for oil that holds tremendous promise is renewable biofuels – not just ethanol, but biofuels made from things like switchgrass, wood chips, and biomass.

If anyone doubts the potential of these fuels, consider Brazil. Already, more than half – half – of Brazil's vehicles can run on biofuels. And just last week, our Air Force used an advanced biofuel blend to fly an F-22 Raptor faster than the speed of sound. In fact, the Air Force is aiming to get half of its domestic jet fuel from alternative sources by 2016. And I'm directing the Navy and the Departments of Energy and Agriculture to work with the private sector to create advanced biofuels that can power not just fighter jets, but trucks and commercial airliners.

So there's no reason we shouldn't be using these renewable fuels throughout America. That's why we're investing in things like fueling stations and research into the next generation of biofuels. Over the next two years, we'll help entrepreneurs break ground on four next-generation biorefineries – each with a capacity of more than 20 million gallons per year. And going forward, we should look for ways to reform biofuels incentives to make sure they meet today's challenges and save taxpayers money.

As we replace oil with fuels like natural gas and biofuels, we can also reduce our

dependence by making cars and trucks that use less oil in the first place. After all, 70 percent of our petroleum consumption goes to transportation. And so does the second biggest chunk of most families' budgets. That's why one of the best ways to make our economy less dependent on oil and save folks more money is simply to make our transportation more efficient.

Last year, we established a groundbreaking national fuel efficiency standard for cars and trucks. Our cars will get better gas mileage, saving 1.8 billion barrels of oil over the life of the program. Our consumers will save money from fewer trips to the pump – $3,000 on average over time. And our automakers will build more innovative products. Right now, there are even cars rolling off assembly lines in Detroit with combustion engines that can get more than 50 miles per gallon.

Going forward, we'll continue working with automakers, autoworkers and states to ensure that the high-quality, fuel-efficient cars and trucks of tomorrow are built right here in America. This summer, we'll propose the first-ever fuel efficiency standard for heavy-duty trucks. And this fall, we'll announce the next round of fuel standards for cars that builds on what we've done.

To achieve our oil goal, the federal government will lead by example. The fleet of cars and trucks we use in the federal government is one of the largest in the country. That's why we've already doubled the number of alternative vehicles in the federal fleet, and that's why, today, I am directing agencies to purchase 100% alternative fuel, hybrid, or electric vehicles by 2015. And going forward, we'll partner with private companies that want to upgrade their large fleets.

We've also made historic investments in high-speed rail and mass transit, because part of making our transportation sector cleaner and more efficient involves offering Americans – urban, suburban, and rural – the choice to be mobile without having to get in a car and pay for gas.

Still, there are few breakthroughs as promising for increasing fuel efficiency and reducing our dependence on oil as electric vehicles. Soon after I took office, I set a goal to have one million electric vehicles on our roads by 2015. We've created incentives for American companies to develop these vehicles, and for Americans who want to buy them. New manufacturing plants are opening over the next few years. And a modest, $2 billion investment in competitive grants for companies to develop the next generation of batteries for these cars has jumpstarted a big new American industry. Soon, America will be home to 40 percent of global manufacturing capacity for these batteries. And that means jobs. But to make sure we stay on the road to this goal, we need to do more – by offering more powerful incentives to consumers, and by rewarding the communities that pave the way for adoption of these vehicles.

Now, the thing about electric cars is that, well, they run on electricity. And even if we reduce our oil dependency, a smart, comprehensive energy policy requires that we change the way we generate electricity in America – so that it's cleaner, safer, and healthier. And by the way – we also know that ushering in a clean energy economy has the potential to create an untold number of new jobs and new businesses – jobs that we want right here in America.

Part of this change comes from wasting less energy. Today, our homes and businesses consume 40 percent of the energy we use, costing us billions in energy bills. Manufacturers that require large amounts of energy to make their products are challenged by rising energy costs. That's why we've proposed new programs to help Americans upgrade their homes and businesses and plants with new, energy-efficient building materials like lighting, windows, heating and cooling – investments that will save consumers and business owners tens of billions of dollars a year, free up money for investment and hiring, and create jobs for workers and contractors.

And just like the fuels we use, we also have to find cleaner, renewable sources of electricity. Today, about two-fifths of our electricity comes from clean energy sources. But I know that we can do better than that. In fact, I think that with the right incentives in place, we can double it. That's why, in my State of the Union Address, I called for a new Clean Energy Standard for America: by 2035, 80 percent of our electricity will come from an array of clean energy sources, from renewables like wind and solar to efficient natural gas to clean coal and nuclear power.

Now, in light of ongoing events in Japan, I want to say another word about nuclear power. America gets one-fifth of our electricity from nuclear energy. It has important potential for increasing our electricity without adding carbon dioxide to the atmosphere. But I'm determined to ensure that it's safe. That's why I've requested a comprehensive safety review by the Nuclear Regulatory Commission to make sure that all of our existing nuclear energy facilities are safe. We'll incorporate those conclusions and lessons from Japan in designing and building the next generation of plants. And my Administration is leading global discussions towards a new international framework in which all countries operate their nuclear plants without spreading dangerous nuclear materials and technology.

A Clean Energy Standard will broaden the scope of clean energy investment by giving cutting-edge companies the certainty they need to invest in America. In the 1980s, America was home to more than 80 percent of the world's wind capacity, and 90 percent of its solar capacity. We owned the clean energy economy. But today, China has the most wind capacity. Germany has the most solar. Both invest more than we do in clean energy. Other countries are exporting technology we pioneered and chasing the jobs that come with it because they know that the countries that lead the 21st century clean energy economy will be the countries that lead the 21st century global economy.

I want America to be that nation. I want America to win the future.

A Clean Energy Standard will help drive private investment. But government funding will be critical too. Over the past two years, the historic investments we've made in clean and renewable energy research and technology have helped private sector companies grow and hire hundreds of thousands of new workers. I've visited gleaming new solar arrays among the largest in the world, tested an electric vehicle fresh off the assembly line, and toured once-shuttered factories where they're building advanced wind blades as long as a 747 and the towers to support them. I've seen the scientists searching for that next big energy breakthrough. And none of this would have happened without government support.

Now, in light of our tight fiscal situation, it's fair to ask how we'll pay for all of it. As we debate our national priorities and our budget in Congress, we have to make tough choices. We'll have to cut what we don't need to invest in what we do need. Unfortunately, some want to cut these critical investments in clean energy. They want to cut our research and development into new technologies. They're even shortchanging the resources necessary to promptly issue new permits for offshore drilling. These cuts would eliminate thousands of private sector jobs, terminate scientists and engineers, and end fellowships for researchers, graduate students and other talent we desperately need for the 21st century.

See, we are already paying a price for our inaction. Every time we fill up at the pump; every time we lose a job or a business to countries that invest more than we do in clean energy; when it comes to our air, our water, and the climate change that threatens the planet you'll inherit – we are already paying that price. These are the costs we're already bearing. And if we do nothing, that price will only go up.

At a moment like this, sacrificing these investments would weaken our energy security and make us more dependent on oil, not less. That's not a game plan to win the future. That's a vision to keep us mired in the past. And I will not accept that outcome for the United States of America.

I want to close by speaking directly to the people who will be writing America's next great chapter – the students gathered here today.

The issue of energy independence is one that America has been talking about since before your parents were your age. On top of that, you go to school in a town that, for a long time, has suffered from a chronic unwillingness to come together and make tough choices. Because of all this, you'd be forgiven for thinking that maybe there isn't much we can do to rise to our challenges.

But everything I have seen and experienced with your generation convinces me otherwise. I believe it is precisely because you have come of age in a time of rapid and sometimes unsettling change – born into a world with fewer walls, educated in an era of information, tempered by war and economic turmoil – that you believe, as deeply as any of our generations, that America can change for the better.

We need that. We need you to dream big. We need you to summon that same spirit of unbridled optimism, that bold willingness to tackle tough challenges and see those challenges through that led previous generations to rise to greatness – to save democracy, to touch the moon, to connect the world with our own science and imagination.

That is what America is capable of. And it is that very history that teaches us that all of our challenges – all of them – are within our power to solve.

I don't want to leave this challenge for future presidents. I don't want to leave it for my children. And I do not want to leave it for yours. Solving it will take time and effort. It will require our brightest scientists, our most creative companies, and, most importantly, all of us – Democrats, Republicans, and everyone in between – to do our part. But with confidence – in America, in ourselves, and in one another – I know it is a challenge we will solve.

Thank you. God Bless You, and God Bless the United States of America.

###

01268-EPA-5645

Bob Sussman/DC/USEPA/US
03/30/2011 11:19 AM

To Seth Oster

cc Adora Andy, Arvin Ganesan, Barbara Bennett, Betsaida Alcantara, Bicky Corman, Bob Perciasepe, Brendan Gilfillan, Daniel Kanninen, David McIntosh, Diane Thompson, Dru Ealons, Gina McCarthy, Heidi Ellis, Janet Woodka, Jose Lozano, Lisa Garcia, Michael Goo, Michael Moats, Richard Windsor, Sarah Pallone, Scott Fulton, Stephanie Owens, Vicki Ekstrom

bcc

Subject Re: POTUS Speech -- EMBARGOED: A Secure Energy Future--As Prepared for Delivery

Ex.5 - Deliberative

Robert M. Sussman
Senior Policy Counsel to the Administrator
Office of the Administrator
(202)-564-7397
US Environmental Protection Agency

Seth Oster President's speech is now out. Seth O... 03/30/2011 11:01:12 AM

From: Seth Oster/DC/USEPA/US
To: Richard Windsor/DC/USEPA/US@EPA, Diane Thompson/DC/USEPA/US@EPA, David McIntosh/DC/USEPA/US@EPA, Adora Andy/DC/USEPA/US@EPA, Brendan Gilfillan/DC/USEPA/US@EPA, Betsaida Alcantara/DC/USEPA/US@EPA, Bob Perciasepe/DC/USEPA/US@EPA, Michael Goo/DC/USEPA/US@EPA, Bicky Corman/DC/USEPA/US@EPA, Bob Sussman/DC/USEPA/US@EPA, Scott Fulton/DC/USEPA/US@EPA, Lisa Garcia/DC/USEPA/US@EPA, Arvin Ganesan/DC/USEPA/US@EPA, Sarah Pallone/DC/USEPA/US@EPA, Janet Woodka/DC/USEPA/US@EPA, Daniel Kanninen/DC/USEPA/US@EPA, Gina McCarthy/DC/USEPA/US@EPA, Barbara Bennett/DC/USEPA/US@EPA, Stephanie Owens/DC/USEPA/US@EPA, Dru Ealons/DC/USEPA/US@EPA, Jose Lozano/DC/USEPA/US@EPA, Heidi Ellis/DC/USEPA/US@EPA, Michael Moats/DC/USEPA/US@EPA, Vicki Ekstrom/DC/USEPA/US@EPA
Date: 03/30/2011 11:01 AM
Subject: POTUS Speech -- EMBARGOED: A Secure Energy Future--As Prepared for Delivery

President's speech is now out.

Seth Oster
Associate Administrator
Office of External Affairs and Environmental Education
Environmental Protection Agency
(202) 564-1918
oster.seth@epa.gov

----- Forwarded by Seth Oster/DC/USEPA/US on 03/30/2011 10:59 AM -----

From: "Gavin, Tom" <(b) (6)
To: Adora Andy/DC/USEPA/US@EPA, "Chan, Stephanie" <Stephanie.Chan@oc.usda.gov>, "Chris Mather (Chris.Mather@oc.usda.gov)" <Chris.Mather@oc.usda.gov>, "dan.leistikow@hq.doe.gov" <dan.leistikow@hq.doe.gov>, "DeJong, Justin" <Justin.DeJong@oc.usda.gov>, "'fillichio.carl@dol.gov'" <fillichio.carl@dol.gov>, "jill.zuckman@dot.gov" <jill.zuckman@dot.gov>, "justin.nisly@dot.gov" <justin.nisly@dot.gov>, "Kendra Barkoff (Kendra_Barkoff@ios.doi.gov)"

<Kendra_Barkoff@ios.doi.gov>, "Matt Lee-Ashley (Matt_Lee-Ashley@ios.doi.gov)" <Matt_Lee-Ashley@ios.doi.gov>, "Montoya, Jordan" <Jordan_Montoya@ios.doi.gov>, Seth Oster/DC/USEPA/US@EPA, "'roberts.david@dol.gov'" <roberts.david@dol.gov>, "Stephanie Mueller (Stephanie.Mueller@hq.doe.gov)" <Stephanie.Mueller@hq.doe.gov>, "Stevens, Clark" <[redacted] (b) (6) [redacted] "Reynolds, Tom" <Tom.Reynolds@hq.doe.gov>, "'zapata.jaime@dol.gov'" <zapata.jaime@dol.gov>
Date: 03/30/2011 10:58 AM
Subject: FW: EMBARGOED: A Secure Energy Future--As Prepared for Delivery

Just went out ---

From: White House Press Office [mailto:noreply@messages.whitehouse.gov]
Sent: Wednesday, March 30, 2011 10:58 AM
To: Gavin, Tom
Subject: EMBARGOED: A Secure Energy Future--As Prepared for Delivery

THE WHITE HOUSE
Office of the Press Secretary

EMBARGOED UNTIL DELIVERY
March 30, 2011

Remarks of President Barack Obama — As Prepared for Delivery
A Secure Energy Future
Georgetown University
March 30, 2011

As Prepared for Delivery —

We meet here at a tumultuous time for the world. In a matter of months, we've seen regimes toppled and democracy take root across North Africa and the Middle East. We've witnessed a terrible earthquake, catastrophic tsunami and nuclear emergency batter a strong ally and the world's third largest economy. And we've led an international effort in Libya to prevent a massacre and maintain stability throughout the broader region.

As Americans, we are heartbroken by the lives that have been lost as a result of these events. We are moved by the thirst for freedom in many nations, as well as the strength and perseverance of the Japanese people. And of course, it's natural to feel anxious about what all this means for us.

One area of particular concern has been the cost and security of our energy. In an economy that relies on oil, rising prices at the pump affect everybody – workers and farmers; truck drivers and restaurant owners. Businesses see it hurt their bottom line. Families feel the pinch when they fill up their tank. For Americans already struggling to get by, it makes life that much harder.

But here's the thing – we've been down this road before. Remember, it was just three years ago that gas prices topped $4 a gallon. Working folks haven't forgotten that. It hit a lot of people pretty hard. But it was also the height of political season, so you had a lot of slogans and gimmicks and outraged politicians waving three-point-plans for two-dollar gas – when none of it would really do anything to solve the problem. Imagine that in Washington.

The truth is, of course, was that all these gimmicks didn't make a bit of difference. When gas prices finally fell, it was mostly because the global recession led to less demand for oil. Now that the economy is recovering, demand is back up. Add the turmoil in the Middle East, and it's not surprising oil prices are higher. And every time the price of a barrel of oil on the world market rises by $10, a gallon of gas goes up by about 25 cents.

The point is, the ups and downs in gas prices are usually temporary. When you look at the long-term trends, though, there will be more ups than downs. That's because countries like India and China are growing at a rapid clip. And as two billion more people start consuming more goods, and driving more cars, and using more energy, it's certain that demand will go up a lot faster than supply.

So here's the bottom line – there are no quick fixes. And we will keep on being a victim to shifts in the oil market until we get serious about a long-term policy for secure, affordable energy.

We've known about the dangers of our oil dependence for decades. Presidents and politicians of every stripe have promised energy independence, but that promise has so far gone unmet. I've pledged to reduce America's dependence on oil too, and I'm proud of the historic progress we've made over the last two years towards that goal. But we've also run into the same political gridlock and inertia that's held us back for decades.

That has to change.

We cannot keep going from shock to trance on the issue of energy security, rushing to propose action when gas prices rise, then hitting the snooze button when they fall again. The United States of America cannot afford to bet our long-term prosperity and security on a resource that will eventually run out. Not anymore. Not when the cost to our economy, our country, and our planet is so high. Not when your generation needs us to get this right.

It is time to do what we can to secure our energy future.

So today, I'm setting a new goal: one that is reasonable, achievable, and necessary. When I was elected to this office, America imported 11 million barrels of oil a day. By a little more than a decade from now, we will have cut that by one-third.

I set this goal knowing that imported oil will remain an important part of our energy portfolio for quite some time. And when it comes to the oil we import from other nations, we can partner with neighbors like Canada, Mexico, and Brazil, which recently discovered significant new oil reserves, and with whom we can share American technology and know-how.

But our best opportunities to enhance our energy security can be found in our own backyard. And we boast one critical, renewable resource the rest of the world cannot match: American ingenuity.

To make ourselves more secure – to control our energy future – we will need to harness that ingenuity. It is a task that won't be finished by the end of my presidency, or even the next. But if we continue the work that we have already begun over the last two years, we won't just spark new jobs, industries and innovations; we will leave your generation and future generations a country that is safer, healthier, and more prosperous.

Today, my Administration is releasing a Blueprint for A Secure Energy Future that outlines the comprehensive national energy policy we've pursued since the day I took office. And here at Georgetown, I'd like to talk in broad strokes about how we will secure that future.

Meeting this new goal of cutting our oil dependence depends largely on two things: finding and producing more oil at home, and reducing our dependence on oil with cleaner alternative fuels and greater efficiency.

This begins by continuing to increase America's oil supply. Last year, American oil production reached its highest level since 2003. And for the first time in more than a decade, oil we imported accounted for less than half the liquid fuel we consumed.

To keep reducing that reliance on imports, my Administration is encouraging offshore oil exploration and production – as long as it's safe and responsible. I don't think anyone's forgotten that we're not even a year removed from the largest oil spill in our history. I know the people of the Gulf Coast haven't. What we learned from that disaster helped us put in place smarter standards of safety and responsibility – for example, if you're going to drill in deepwater, you've got to prove that you can actually contain an underwater spill. That's just common sense.

Today, we're working to expedite new drilling permits for companies that meet these

standards. Since they were put in place, we've approved 39 new shallow water permits; and we've approved an additional 7 deepwater permits in recent weeks. When it comes to drilling onshore, my Administration approved more than two permits last year for every new well that the industry started to drill. So any claim that my Administration is responsible for gas prices because we've "shut down" oil production might make for a useful political sound bite – but it doesn't track with reality.

In fact, we are pushing the oil industry to take advantage of the opportunities they already have. Right now, the industry holds tens of millions of acres of leases where it's not producing a drop – sitting on supplies of American energy just waiting to be tapped. That's why part of our plan is to provide new and better incentives that promote rapid, responsible development of these resources. We're also exploring and assessing new frontiers for oil and gas development from Alaska to the Mid- and South Atlantic. Because producing more oil in America can help lower oil prices, create jobs, and enhance our energy security.

But let's be honest – it's not the long-term solution to our energy challenge. America holds only about two percent of the world's proven oil reserves. And even if we drilled every drop of oil out of every one of those reserves, it still wouldn't be enough to meet our long-term needs.

All of this means one thing: the only way for America's energy supply to be truly secure is by permanently reducing our dependence on oil. We have to find ways to boost our efficiency so that we use less oil. We have to discover and produce cleaner, renewable sources of energy with less of the carbon pollution that threatens our climate. And we have to do it quickly.

In terms of new sources of energy, we have a few different options. The first is natural gas. As I mentioned earlier, recent innovations have given us the opportunity to tap large reserves – perhaps a century's worth – in the shale under our feet. Now, we have to make sure we're doing it safely, without polluting our water supply. And that's why I'm asking my Energy Secretary, Steven Chu, to work with other agencies, the natural gas industry, states, and environmental experts to improve the safety of this process. I don't know if you've heard, but he's got a Nobel Prize for physics, after all. He likes to tinker on this stuff in his garage on the weekend.

But the potential here is enormous. It's actually an area of broad bipartisan agreement. Last year, more than 150 Members of Congress from both sides of the aisle proposed legislation providing incentives to use clean-burning natural gas in our vehicles instead of oil. They were even joined by T. Boone Pickens, a businessman who made his fortune on oil. So I ask them to keep at it and pass a bill that helps us achieve this goal.

Another substitute for oil that holds tremendous promise is renewable biofuels – not

just ethanol, but biofuels made from things like switchgrass, wood chips, and biomass.

If anyone doubts the potential of these fuels, consider Brazil. Already, more than half – half – of Brazil's vehicles can run on biofuels. And just last week, our Air Force used an advanced biofuel blend to fly an F-22 Raptor faster than the speed of sound. In fact, the Air Force is aiming to get half of its domestic jet fuel from alternative sources by 2016. And I'm directing the Navy and the Departments of Energy and Agriculture to work with the private sector to create advanced biofuels that can power not just fighter jets, but trucks and commercial airliners.

So there's no reason we shouldn't be using these renewable fuels throughout America. That's why we're investing in things like fueling stations and research into the next generation of biofuels. Over the next two years, we'll help entrepreneurs break ground on four next-generation biorefineries – each with a capacity of more than 20 million gallons per year. And going forward, we should look for ways to reform biofuels incentives to make sure they meet today's challenges and save taxpayers money.

As we replace oil with fuels like natural gas and biofuels, we can also reduce our dependence by making cars and trucks that use less oil in the first place. After all, 70 percent of our petroleum consumption goes to transportation. And so does the second biggest chunk of most families' budgets. That's why one of the best ways to make our economy less dependent on oil and save folks more money is simply to make our transportation more efficient.

Last year, we established a groundbreaking national fuel efficiency standard for cars and trucks. Our cars will get better gas mileage, saving 1.8 billion barrels of oil over the life of the program. Our consumers will save money from fewer trips to the pump – $3,000 on average over time. And our automakers will build more innovative products. Right now, there are even cars rolling off assembly lines in Detroit with combustion engines that can get more than 50 miles per gallon.

Going forward, we'll continue working with automakers, autoworkers and states to ensure that the high-quality, fuel-efficient cars and trucks of tomorrow are built right here in America. This summer, we'll propose the first-ever fuel efficiency standard for heavy-duty trucks. And this fall, we'll announce the next round of fuel standards for cars that builds on what we've done.

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power. America gets one-fifth of our electricity from nuclear energy. It has important potential for increasing our electricity without adding carbon dioxide to the atmosphere. But I'm determined to ensure that it's safe. That's why I've requested a comprehensive safety review by the Nuclear Regulatory Commission to make sure that all of our existing nuclear energy facilities are safe. We'll incorporate those conclusions and lessons from Japan in designing and building the next generation of plants. And my Administration is leading global discussions towards a new international framework in which all countries operate their nuclear plants without spreading dangerous nuclear materials and technology.

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See, we are already paying a price for our inaction. Every time we fill up at the pump; every time we lose a job or a business to countries that invest more than we do in clean

energy; when it comes to our air, our water, and the climate change that threatens the planet you'll inherit – we are already paying that price. These are the costs we're already bearing. And if we do nothing, that price will only go up.

At a moment like this, sacrificing these investments would weaken our energy security and make us more dependent on oil, not less. That's not a game plan to win the future. That's a vision to keep us mired in the past. And I will not accept that outcome for the United States of America.

I want to close by speaking directly to the people who will be writing America's next great chapter – the students gathered here today.

The issue of energy independence is one that America has been talking about since before your parents were your age. On top of that, you go to school in a town that, for a long time, has suffered from a chronic unwillingness to come together and make tough choices. Because of all this, you'd be forgiven for thinking that maybe there isn't much we can do to rise to our challenges.

But everything I have seen and experienced with your generation convinces me otherwise. I believe it is precisely because you have come of age in a time of rapid and sometimes unsettling change – born into a world with fewer walls, educated in an era of information, tempered by war and economic turmoil – that you believe, as deeply as any of our generations, that America can change for the better.

We need that. We need you to dream big. We need you to summon that same spirit of unbridled optimism, that bold willingness to tackle tough challenges and see those challenges through that led previous generations to rise to greatness – to save democracy, to touch the moon, to connect the world with our own science and imagination.

That is what America is capable of. And it is that very history that teaches us that all of our challenges – all of them – are within our power to solve.

I don't want to leave this challenge for future presidents. I don't want to leave it for my children. And I do not want to leave it for yours. Solving it will take time and effort. It will require our brightest scientists, our most creative companies, and, most importantly, all of us – Democrats, Republicans, and everyone in between – to do our part. But with confidence – in America, in ourselves, and in one another – I know it is a challenge we will solve.

Thank you. God Bless You, and God Bless the United States of America.

###

01268-EPA-5646

Richard Windsor/DC/USEPA/US
03/30/2011 11:22 AM

To "Diane Thompson", "Seth Oster"
cc
bcc
Subject Fw: POTUS Speech -- EMBARGOED: A Secure Energy Future--As Prepared for Delivery

[redacted]
Seth Oster

----- Original Message -----
From: Seth Oster
Sent: 03/30/2011 11:01 AM EDT
To: Richard Windsor; Diane Thompson; David McIntosh; Adora Andy; Brendan Gilfillan; Betsaida Alcantara; Bob Perciasepe; Michael Goo; Bicky Corman; Bob Sussman; Scott Fulton; Lisa Garcia; Arvin Ganesan; Sarah Pallone; Janet Woodka; Daniel Kanninen; Gina McCarthy; Barbara Bennett; Stephanie Owens; Dru Ealons; Jose Lozano; Heidi Ellis; Michael Moats; Vicki Ekstrom
Subject: POTUS Speech -- EMBARGOED: A Secure Energy Future--As Prepared for Delivery
President's speech is now out.

Seth Oster
Associate Administrator
Office of External Affairs and Environmental Education
Environmental Protection Agency
(202) 564-1918
oster.seth@epa.gov

----- Forwarded by Seth Oster/DC/USEPA/US on 03/30/2011 10:59 AM -----

From: "Gavin, Tom" <[redacted]
To: Adora Andy/DC/USEPA/US@EPA, "Chan, Stephanie" <Stephanie.Chan@oc.usda.gov>, "Chris Mather (Chris.Mather@oc.usda.gov)" <Chris.Mather@oc.usda.gov>, "dan.leistikow@hq.doe.gov" <dan.leistikow@hq.doe.gov>, "DeJong, Justin" <Justin.DeJong@oc.usda.gov>, "'fillichio.carl@dol.gov'" <fillichio.carl@dol.gov>, "jill.zuckman@dot.gov" <jill.zuckman@dot.gov>, "justin.nisly@dot.gov" <justin.nisly@dot.gov>, "Kendra Barkoff (Kendra_Barkoff@ios.doi.gov)" <Kendra_Barkoff@ios.doi.gov>, "Matt Lee-Ashley (Matt_Lee-Ashley@ios.doi.gov)" <Matt_Lee-Ashley@ios.doi.gov>, "Montoya, Jordan" <Jordan_Montoya@ios.doi.gov>, Seth Oster/DC/USEPA/US@EPA, "'roberts.david@dol.gov'" <roberts.david@dol.gov>, "Stephanie Mueller (Stephanie.Mueller@hq.doe.gov)" <Stephanie.Mueller@hq.doe.gov>, "Stevens, Clark" <[redacted] "Reynolds, Tom" <Tom.Reynolds@hq.doe.gov>, "'zapata.jaime@dol.gov'" <zapata.jaime@dol.gov>
Date: 03/30/2011 10:58 AM
Subject: FW: EMBARGOED: A Secure Energy Future--As Prepared for Delivery

Just went out ---

From: White House Press Office [mailto:noreply@messages.whitehouse.gov]
Sent: Wednesday, March 30, 2011 10:58 AM
To: Gavin, Tom
Subject: EMBARGOED: A Secure Energy Future--As Prepared for Delivery

THE WHITE HOUSE
Office of the Press Secretary

EMBARGOED UNTIL DELIVERY
March 30, 2011

Remarks of President Barack Obama—As Prepared for Delivery
A Secure Energy Future
Georgetown University
March 30, 2011

As Prepared for Delivery—

We meet here at a tumultuous time for the world. In a matter of months, we've seen regimes toppled and democracy take root across North Africa and the Middle East. We've witnessed a terrible earthquake, catastrophic tsunami and nuclear emergency batter a strong ally and the world's third largest economy. And we've led an international effort in Libya to prevent a massacre and maintain stability throughout the broader region.

As Americans, we are heartbroken by the lives that have been lost as a result of these events. We are moved by the thirst for freedom in many nations, as well as the strength and perseverance of the Japanese people. And of course, it's natural to feel anxious about what all this means for us.

One area of particular concern has been the cost and security of our energy. In an economy that relies on oil, rising prices at the pump affect everybody – workers and farmers; truck drivers and restaurant owners. Businesses see it hurt their bottom line. Families feel the pinch when they fill up their tank. For Americans already struggling to get by, it makes life that much harder.

But here's the thing – we've been down this road before. Remember, it was just three years ago that gas prices topped $4 a gallon. Working folks haven't forgotten that. It hit a lot of people pretty hard. But it was also the height of political season, so you had a lot of slogans and gimmicks and outraged politicians waving three-point-plans for two-dollar gas – when none of it would really do anything to solve the problem. Imagine that in Washington.

The truth is, of course, was that all these gimmicks didn't make a bit of difference. When gas prices finally fell, it was mostly because the global recession led to less demand for oil. Now that the economy is recovering, demand is back up. Add the turmoil in the Middle East, and it's not surprising oil prices are higher. And every time the price of a barrel of oil on the world market rises by $10, a gallon of gas goes up by

about 25 cents.

The point is, the ups and downs in gas prices are usually temporary. When you look at the long-term trends, though, there will be more ups than downs. That's because countries like India and China are growing at a rapid clip. And as two billion more people start consuming more goods, and driving more cars, and using more energy, it's certain that demand will go up a lot faster than supply.

So here's the bottom line – there are no quick fixes. And we will keep on being a victim to shifts in the oil market until we get serious about a long-term policy for secure, affordable energy.

We've known about the dangers of our oil dependence for decades. Presidents and politicians of every stripe have promised energy independence, but that promise has so far gone unmet. I've pledged to reduce America's dependence on oil too, and I'm proud of the historic progress we've made over the last two years towards that goal. But we've also run into the same political gridlock and inertia that's held us back for decades.

That has to change.

We cannot keep going from shock to trance on the issue of energy security, rushing to propose action when gas prices rise, then hitting the snooze button when they fall again. The United States of America cannot afford to bet our long-term prosperity and security on a resource that will eventually run out. Not anymore. Not when the cost to our economy, our country, and our planet is so high. Not when your generation needs us to get this right.

It is time to do what we can to secure our energy future.

So today, I'm setting a new goal: one that is reasonable, achievable, and necessary. When I was elected to this office, America imported 11 million barrels of oil a day. By a little more than a decade from now, we will have cut that by one-third.

I set this goal knowing that imported oil will remain an important part of our energy portfolio for quite some time. And when it comes to the oil we import from other nations, we can partner with neighbors like Canada, Mexico, and Brazil, which recently discovered significant new oil reserves, and with whom we can share American technology and know-how.

But our best opportunities to enhance our energy security can be found in our own backyard. And we boast one critical, renewable resource the rest of the world cannot match: American ingenuity.

To make ourselves more secure – to control our energy future – we will need to harness that ingenuity. It is a task that won't be finished by the end of my presidency, or even the next. But if we continue the work that we have already begun over the last two years, we won't just spark new jobs, industries and innovations; we will leave your generation and future generations a country that is safer, healthier, and more prosperous.

Today, my Administration is releasing a Blueprint for A Secure Energy Future that outlines the comprehensive national energy policy we've pursued since the day I took office. And here at Georgetown, I'd like to talk in broad strokes about how we will secure that future.

Meeting this new goal of cutting our oil dependence depends largely on two things: finding and producing more oil at home, and reducing our dependence on oil with cleaner alternative fuels and greater efficiency.

This begins by continuing to increase America's oil supply. Last year, American oil production reached its highest level since 2003. And for the first time in more than a decade, oil we imported accounted for less than half the liquid fuel we consumed.

To keep reducing that reliance on imports, my Administration is encouraging offshore oil exploration and production – as long as it's safe and responsible. I don't think anyone's forgotten that we're not even a year removed from the largest oil spill in our history. I know the people of the Gulf Coast haven't. What we learned from that disaster helped us put in place smarter standards of safety and responsibility – for example, if you're going to drill in deepwater, you've got to prove that you can actually contain an underwater spill. That's just common sense.

Today, we're working to expedite new drilling permits for companies that meet these standards. Since they were put in place, we've approved 39 new shallow water permits; and we've approved an additional 7 deepwater permits in recent weeks. When it comes to drilling onshore, my Administration approved more than two permits last year for every new well that the industry started to drill. So any claim that my Administration is responsible for gas prices because we've "shut down" oil production might make for a useful political sound bite – but it doesn't track with reality.

In fact, we are pushing the oil industry to take advantage of the opportunities they already have. Right now, the industry holds tens of millions of acres of leases where it's not producing a drop – sitting on supplies of American energy just waiting to be tapped. That's why part of our plan is to provide new and better incentives that promote rapid, responsible development of these resources. We're also exploring and assessing new frontiers for oil and gas development from Alaska to the Mid- and South

Atlantic. Because producing more oil in America can help lower oil prices, create jobs, and enhance our energy security.

But let's be honest – it's not the long-term solution to our energy challenge. America holds only about two percent of the world's proven oil reserves. And even if we drilled every drop of oil out of every one of those reserves, it still wouldn't be enough to meet our long-term needs.

All of this means one thing: the only way for America's energy supply to be truly secure is by permanently reducing our dependence on oil. We have to find ways to boost our efficiency so that we use less oil. We have to discover and produce cleaner, renewable sources of energy with less of the carbon pollution that threatens our climate. And we have to do it quickly.

In terms of new sources of energy, we have a few different options. The first is natural gas. As I mentioned earlier, recent innovations have given us the opportunity to tap large reserves – perhaps a century's worth – in the shale under our feet. Now, we have to make sure we're doing it safely, without polluting our water supply. And that's why I'm asking my Energy Secretary, Steven Chu, to work with other agencies, the natural gas industry, states, and environmental experts to improve the safety of this process. I don't know if you've heard, but he's got a Nobel Prize for physics, after all. He likes to tinker on this stuff in his garage on the weekend.

But the potential here is enormous. It's actually an area of broad bipartisan agreement. Last year, more than 150 Members of Congress from both sides of the aisle proposed legislation providing incentives to use clean-burning natural gas in our vehicles instead of oil. They were even joined by T. Boone Pickens, a businessman who made his fortune on oil. So I ask them to keep at it and pass a bill that helps us achieve this goal.

Another substitute for oil that holds tremendous promise is renewable biofuels – not just ethanol, but biofuels made from things like switchgrass, wood chips, and biomass.

If anyone doubts the potential of these fuels, consider Brazil. Already, more than half – half – of Brazil's vehicles can run on biofuels. And just last week, our Air Force used an advanced biofuel blend to fly an F-22 Raptor faster than the speed of sound. In fact, the Air Force is aiming to get half of its domestic jet fuel from alternative sources by 2016. And I'm directing the Navy and the Departments of Energy and Agriculture to work with the private sector to create advanced biofuels that can power not just fighter jets, but trucks and commercial airliners.

So there's no reason we shouldn't be using these renewable fuels throughout America. That's why we're investing in things like fueling stations and research into the next generation of biofuels. Over the next two years, we'll help entrepreneurs break ground

on four next-generation biorefineries – each with a capacity of more than 20 million gallons per year. And going forward, we should look for ways to reform biofuels incentives to make sure they meet today's challenges and save taxpayers money.

As we replace oil with fuels like natural gas and biofuels, we can also reduce our dependence by making cars and trucks that use less oil in the first place. After all, 70 percent of our petroleum consumption goes to transportation. And so does the second biggest chunk of most families' budgets. That's why one of the best ways to make our economy less dependent on oil and save folks more money is simply to make our transportation more efficient.

Last year, we established a groundbreaking national fuel efficiency standard for cars and trucks. Our cars will get better gas mileage, saving 1.8 billion barrels of oil over the life of the program. Our consumers will save money from fewer trips to the pump – $3,000 on average over time. And our automakers will build more innovative products. Right now, there are even cars rolling off assembly lines in Detroit with combustion engines that can get more than 50 miles per gallon.

Going forward, we'll continue working with automakers, autoworkers and states to ensure that the high-quality, fuel-efficient cars and trucks of tomorrow are built right here in America. This summer, we'll propose the first-ever fuel efficiency standard for heavy-duty trucks. And this fall, we'll announce the next round of fuel standards for cars that builds on what we've done.

To achieve our oil goal, the federal government will lead by example. The fleet of cars and trucks we use in the federal government is one of the largest in the country. That's why we've already doubled the number of alternative vehicles in the federal fleet, and that's why, today, I am directing agencies to purchase 100% alternative fuel, hybrid, or electric vehicles by 2015. And going forward, we'll partner with private companies that want to upgrade their large fleets.

We've also made historic investments in high-speed rail and mass transit, because part of making our transportation sector cleaner and more efficient involves offering Americans – urban, suburban, and rural – the choice to be mobile without having to get in a car and pay for gas.

Still, there are few breakthroughs as promising for increasing fuel efficiency and reducing our dependence on oil as electric vehicles. Soon after I took office, I set a goal to have one million electric vehicles on our roads by 2015. We've created incentives for American companies to develop these vehicles, and for Americans who want to buy them. New manufacturing plants are opening over the next few years. And a modest, $2 billion investment in competitive grants for companies to develop the next generation of batteries for these cars has jumpstarted a big new American industry.

Soon, America will be home to 40 percent of global manufacturing capacity for these batteries. And that means jobs. But to make sure we stay on the road to this goal, we need to do more – by offering more powerful incentives to consumers, and by rewarding the communities that pave the way for adoption of these vehicles.

Now, the thing about electric cars is that, well, they run on electricity. And even if we reduce our oil dependency, a smart, comprehensive energy policy requires that we change the way we generate electricity in America – so that it's cleaner, safer, and healthier. And by the way – we also know that ushering in a clean energy economy has the potential to create an untold number of new jobs and new businesses – jobs that we want right here in America.

Part of this change comes from wasting less energy. Today, our homes and businesses consume 40 percent of the energy we use, costing us billions in energy bills. Manufacturers that require large amounts of energy to make their products are challenged by rising energy costs. That's why we've proposed new programs to help Americans upgrade their homes and businesses and plants with new, energy-efficient building materials like lighting, windows, heating and cooling – investments that will save consumers and business owners tens of billions of dollars a year, free up money for investment and hiring, and create jobs for workers and contractors.

And just like the fuels we use, we also have to find cleaner, renewable sources of electricity. Today, about two-fifths of our electricity comes from clean energy sources. But I know that we can do better than that. In fact, I think that with the right incentives in place, we can double it. That's why, in my State of the Union Address, I called for a new Clean Energy Standard for America: by 2035, 80 percent of our electricity will come from an array of clean energy sources, from renewables like wind and solar to efficient natural gas to clean coal and nuclear power.

Now, in light of ongoing events in Japan, I want to say another word about nuclear power. America gets one-fifth of our electricity from nuclear energy. It has important potential for increasing our electricity without adding carbon dioxide to the atmosphere. But I'm determined to ensure that it's safe. That's why I've requested a comprehensive safety review by the Nuclear Regulatory Commission to make sure that all of our existing nuclear energy facilities are safe. We'll incorporate those conclusions and lessons from Japan in designing and building the next generation of plants. And my Administration is leading global discussions towards a new international framework in which all countries operate their nuclear plants without spreading dangerous nuclear materials and technology.

A Clean Energy Standard will broaden the scope of clean energy investment by giving cutting-edge companies the certainty they need to invest in America. In the 1980s, America was home to more than 80 percent of the world's wind capacity, and 90

percent of its solar capacity. We owned the clean energy economy. But today, China has the most wind capacity. Germany has the most solar. Both invest more than we do in clean energy. Other countries are exporting technology we pioneered and chasing the jobs that come with it because they know that the countries that lead the 21st century clean energy economy will be the countries that lead the 21st century global economy.

I want America to be that nation. I want America to win the future.

A Clean Energy Standard will help drive private investment. But government funding will be critical too. Over the past two years, the historic investments we've made in clean and renewable energy research and technology have helped private sector companies grow and hire hundreds of thousands of new workers. I've visited gleaming new solar arrays among the largest in the world, tested an electric vehicle fresh off the assembly line, and toured once-shuttered factories where they're building advanced wind blades as long as a 747 and the towers to support them. I've seen the scientists searching for that next big energy breakthrough. And none of this would have happened without government support.

Now, in light of our tight fiscal situation, it's fair to ask how we'll pay for all of it. As we debate our national priorities and our budget in Congress, we have to make tough choices. We'll have to cut what we don't need to invest in what we do need. Unfortunately, some want to cut these critical investments in clean energy. They want to cut our research and development into new technologies. They're even shortchanging the resources necessary to promptly issue new permits for offshore drilling. These cuts would eliminate thousands of private sector jobs, terminate scientists and engineers, and end fellowships for researchers, graduate students and other talent we desperately need for the 21st century.

See, we are already paying a price for our inaction. Every time we fill up at the pump; every time we lose a job or a business to countries that invest more than we do in clean energy; when it comes to our air, our water, and the climate change that threatens the planet you'll inherit – we are already paying that price. These are the costs we're already bearing. And if we do nothing, that price will only go up.

At a moment like this, sacrificing these investments would weaken our energy security and make us more dependent on oil, not less. That's not a game plan to win the future. That's a vision to keep us mired in the past. And I will not accept that outcome for the United States of America.

I want to close by speaking directly to the people who will be writing America's next great chapter – the students gathered here today.

The issue of energy independence is one that America has been talking about since

before your parents were your age. On top of that, you go to school in a town that, for a long time, has suffered from a chronic unwillingness to come together and make tough choices. Because of all this, you'd be forgiven for thinking that maybe there isn't much we can do to rise to our challenges.

But everything I have seen and experienced with your generation convinces me otherwise. I believe it is precisely because you have come of age in a time of rapid and sometimes unsettling change – born into a world with fewer walls, educated in an era of information, tempered by war and economic turmoil – that you believe, as deeply as any of our generations, that America can change for the better.

We need that. We need you to dream big. We need you to summon that same spirit of unbridled optimism, that bold willingness to tackle tough challenges and see those challenges through that led previous generations to rise to greatness – to save democracy, to touch the moon, to connect the world with our own science and imagination.

That is what America is capable of. And it is that very history that teaches us that all of our challenges – all of them – are within our power to solve.

I don't want to leave this challenge for future presidents. I don't want to leave it for my children. And I do not want to leave it for yours. Solving it will take time and effort. It will require our brightest scientists, our most creative companies, and, most importantly, all of us – Democrats, Republicans, and everyone in between – to do our part. But with confidence – in America, in ourselves, and in one another – I know it is a challenge we will solve.

Thank you. God Bless You, and God Bless the United States of America.

###

01268-EPA-5647

Bob Perciasepe/DC/USEPA/US
04/01/2011 11:22 AM

To Gina McCarthy
cc "Scott Fulton", "David McIntosh", Michael Goo, "Bob Perciasepe", Richard Windsor, "Bob Sussman", "Diane Thompson"
bcc
Subject Re: Meeting with ANGA on April 7th

Gina:

I will do this with you. I will be the "panelist" from EPA.
Let's get together before we go.

Bob Perciasepe
Deputy Administrator

(o) +1 202 564 4711
(c) +1 (b) (6)

Gina McCarthy Will do. ----- Original Message ----- 03/25/2011 10:11:26 PM

From: Gina McCarthy/DC/USEPA/US
To: Richard Windsor/DC/USEPA/US@EPA
Cc: "Scott Fulton" <Fulton.Scott@EPA.GOV>, "David McIntosh" <McIntosh.David@EPA.GOV>, Michael Goo/DC/USEPA/US@EPA, "Bob Perciasepe" <perciasepe.bob@epa.gov>, "Bob Sussman" <Sussman.bob@EPA.GOV>, "Diane Thompson" <Thompson.Diane@EPA.GOV>
Date: 03/25/2011 10:11 PM
Subject: Re: Meeting with ANGA on April 7th

Will do.

Richard Windsor

----- Original Message -----
From: Richard Windsor
Sent: 03/25/2011 09:56 PM EDT
To: Gina McCarthy
Cc: "Scott Fulton" <Fulton.Scott@epa.gov>; "David McIntosh" <mcintosh.david@epa.gov>; Michael Goo; "Bob Perciasepe" <perciasepe.bob@epa.gov>; "Bob Sussman" <Sussman.bob@epa.gov>; "Diane Thompson" <thompson.diane@epa.gov>
Subject: Re: Meeting with ANGA on April 7th

Ex.5 - Deliberative

Gina McCarthy

----- Original Message -----
From: Gina McCarthy
Sent: 03/25/2011 09:56 PM EDT
To: Richard Windsor
Cc: "Scott Fulton" <Fulton.Scott@EPA.GOV>; "David McIntosh" <McIntosh.David@EPA.GOV>; Michael Goo; "Bob Perciasepe" <perciasepe.bob@epa.gov>; "Bob Sussman" <Sussman.bob@EPA.GOV>; "Diane Thompson" <Thompson.Diane@EPA.GOV>

Subject: Re: Meeting with ANGA on April 7th

Ex.5 - Deliberative

[redacted]

Richard Windsor

----- Original Message -----
From: Richard Windsor
Sent: 03/25/2011 09:36 PM EDT
To: Gina McCarthy
Cc: "Scott Fulton" <Fulton.Scott@epa.gov>; "David McIntosh" <mcintosh.david@epa.gov>; Michael Goo; "Bob Perciasepe" <perciasepe.bob@epa.gov>; "Bob Sussman" <Sussman.bob@epa.gov>; "Diane Thompson" <thompson.diane@epa.gov>
Subject: Re: Meeting with ANGA on April 7th

Ex.5 - Deliberative

[redacted]

Gina McCarthy

----- Original Message -----
From: Gina McCarthy
Sent: 03/25/2011 03:32 PM EDT
To: Richard Windsor
Cc: "Scott Fulton" <Fulton.Scott@epa.gov>; "David McIntosh" <mcintosh.david@epa.gov>; Michael Goo; "Bob Perciasepe" <perciasepe.bob@epa.gov>; "Bob Sussman" <Sussman.bob@epa.gov>; "Diane Thompson" <thompson.diane@epa.gov>
Subject: Re: Meeting with ANGA on April 7th

Ex.5 - Deliberative

[redacted]

Richard Windsor Intereting timing. It seems to me it sho... 03/25/2011 02:08:36 PM

From: Richard Windsor/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA
Cc: "Bob Sussman" <Sussman.bob@epa.gov>, "Bob Perciasepe" <perciasepe.bob@epa.gov>, "Diane Thompson" <thompson.diane@epa.gov>, "David McIntosh" <mcintosh.david@epa.gov>, Michael Goo/DC/USEPA/US@EPA, "Scott Fulton" <Fulton.Scott@epa.gov>
Date: 03/25/2011 02:08 PM
Subject: Re: Meeting with ANGA on April 7th

Intereting timing. It seems to me it should be you and Nancy Stoner. Bob P is fine too. I'd like Goo or Sussman to participate as well.

Gina McCarthy

----- Original Message -----
From: Gina McCarthy
Sent: 03/25/2011 01:50 PM EDT
To: Richard Windsor

Cc: Sussman.bob@EPA.GOV; perciasepe.bob@epa.gov; Thompson.Diane@EPA.GOV; McIntosh.David@EPA.GOV; Michael Goo; Fulton.Scott@EPA.GOV
Subject: Fw: Meeting with ANGA on April 7th

I wanted to share the WH meeting invitation below that was sent to my assistant this week so you can consider who best should represent the agency. I assume I was invited to cover the EPA/CAA regs but I realize there is more of interest to EPA that that.

----- Forwarded by Gina McCarthy/DC/USEPA/US on 03/25/2011 01:39 PM -----

From: Cindy Huang/DC/USEPA/US
To: Gina McCarthy/DC/USEPA/US@EPA
Date: 03/25/2011 01:23 PM
Subject: Fw: Meeting with ANGA on April 7th

Here you go, from Heather Zichal's assistant.

Cindy Huang
(202) 564-7404

----- Forwarded by Cindy Huang/DC/USEPA/US on 03/25/2011 01:22 PM -----

From: "Hernandez, Philip M." <(b) (6)
To: "Ramos, Paola" <(b) (6) v>, "Jones, Lisa M." <L(b) (6) "'Diehl, Barbara'" <Barbara_Diehl@ios.doi.gov>, "'Calhoun, Dianne'" <dianne_calhoun@ios.doi.gov>, Cindy Huang/DC/USEPA/US@EPA
Date: 03/18/2011 05:30 PM
Subject: Meeting with ANGA on April 7th

All –
In response to a request from ANGA, the DPC's energy and climate team is helping coordinate a meeting on Thursday, April 7th with senior administration officials. In attendance will be 30 CEOs from Natural Gas Companies across the U.S. ANGA has requested participation from the following participants (see manifest below) to speak to a wide variety of issues re natural gas policy. White House COS Bill Daley will likely kick off the meeting. We thought it would then be easiest to just convene everyone together in a panel. More details to follow on an agenda / specific issues to cover, but I wanted to get this on the radar screen for you all / your bosses. Please let me know ASAP if you will not be able to attend. Thanks!
= = = = =
What: Event with American Natural Gas Alliance and Natural Gas CEOs
Date: April 7th, 2011
Time: 3:30pm-4:30pm
Location: South Court Auditorium, Eisenhower Executive Office Building
Format: Each person on the panel will speak for approximately 5 minutes on their area of expertise (e.g., energy priorities, CAA / EPA regs, leasing on public lands, etc.) This will be followed by a Q&A session.

Manifest:

- **Heather Zichal, DPC/OECC**
- **Nancy Sutley, CEQ**
- **Cass Sunstein, OMB/OIRA**
- **Gina McCarthy, EPA**

- **David Hayes, DOI**

01268-EPA-5648

Seth Oster/DC/USEPA/US
04/01/2011 01:28 PM

To Richard Windsor, Bob Perciasepe
cc
bcc
Subject Fw: Ruckelshaus letter in WSJ, hilarious

In case you didn't see this, the attachment is Ruckelshaua' response to the WSJ's hit on him and Whitman.

Seth Oster
Associate Administrator
Office of External Affairs and Environmental Education
Environmental Protection Agency
(202) 564-1918
oster.seth@epa.gov

----- Forwarded by Seth Oster/DC/USEPA/US on 03/31/2011 01:23 PM -----

From: Rich Innes <richinnes@merid.org>
To: Bob Perciasepe/DC/USEPA/US@EPA, Rob Brenner/DC/USEPA/US@EPA, Joseph Goffman/DC/USEPA/US@EPA, Nancy Stoner/DC/USEPA/US@EPA, Seth Oster/DC/USEPA/US@EPA, "Amy Salzman [redacted] "Erika Feller 2010 [redacted] John Ehrmann <JEhrmann@merid.org>, "Timothy J. Mealey" <TMealey@merid.org>, Laura Cantral <LCantral@merid.org>, Michael Lesnick <MLesnick@merid.org>, Barbara Stinson <IMCEANOTES-Barbara+20Stinson_Meridian+40@merid.local>, "Jeff Peterson CEQ [redacted] "bergman@uwyo.edu" <bergman@uwyo.edu>, "m.kern@wsu.edu" <m.kern@wsu.edu>, Mary Gade [redacted]
Cc: Arvin Ganesan/DC/USEPA/US@EPA
Date: 03/31/2011 01:17 PM
Subject: Ruckelshaus letter in WSJ, hilarious

So after Bill Ruckelshaus and Christie Whitman had their op ed piece run in the Post last Friday, the Wall Street Journal editorialized in favor of the Inhofe amendment on GHG authority under the CAA.

In the piece below, they refer to Bill and the Governor as “disinterred”. Bill’s response, printed today in the WSJ and attached, is just priceless.

A little respite from the assaults…

Rich Innes
Senior Fellow, Meridian Institute
1920 L St NW, suite 500
Washington DC 20036
(P) 202-354-6457
(F) 202-354-6441
[redacted]

The Senate's EPA Showdown

Democrats face a moment of truth on regulatory cap and trade.

The Environmental Protection Agency debate lands in the Senate this week, amid the makings of a left-right coalition to mitigate the agency's abuses. Few other votes this year could do more to help the private economy—but only if enough Democrats are willing to buck the White House.

This moment arrived unexpectedly, with Majority Leader Harry Reid opening a small business bill to amendments. Republican leader Mitch McConnell promptly introduced a rider to strip the EPA of the carbon regulation authority that the Obama Administration has given itself. Two weeks ago, Mr. Reid pulled the bill from the floor once it became clear Mr. McConnell might have the 13 Democrats he needs to clear 60.

The votes are now due as soon as tomorrow, and Mr. Reid is trying to attract 41 Democrats with a rival amendment from Senate Finance Chairman Max Baucus. The Baucus plan is a political veneer that would exempt some farms and businesses from the EPA maw but at the cost of endorsing everything else. The question for Democrats is whether their loyalties to President Obama and EPA chief Lisa Jackson trump the larger economic good, not to mention constituents already facing far higher energy costs.

The story of how we arrived at this pass begins in 1999, when Clinton EPA chief Carol Browner floated the idea that carbon dioxide could be regulated as a pollutant under the 1970 Clean Air Act and its later amendments. The Bush Administration rejected Ms. Browner's theory, in part because Congress kept rejecting statutory language to that effect.

Several states and green groups sued, and the question reached the Supreme Court in 2006. With *Massachusetts v. EPA* , a 5-4 majority broadly rewrote the definition of "pollutant," but it also narrowly held that "EPA *no doubt* has significant latitude as to the manner, timing, content, and coordination of its regulations" (our emphasis). In other words, the Court created new powers via judicial invention but left their use to the discretion of the executive branch.

The Obama Administration moved to exploit this power by threatening that the EPA would make a carbon "endangerment finding" if Congress didn't pass a climate bill. This threat was potent for the simple reason that the Clean Air Act's intrusive command-and-control systems were never written or meant to address an emission as ubiquitous as carbon dioxide. It's like trying to perform surgery with a butter knife, and Mr. Obama hoped that the pain would force industry to beg for cap and tax. The EPA went ahead with its endangerment ruling, but cap and trade failed in the Senate last year anyway.

The EPA now claims its carbon regulation is compelled by the Supreme Court, as if Congress can't change the law, as well as by "science," as if Congress is a potted plant. Someone even disinterred former Republican EPA Administrators William Ruckelshaus

and Christine Todd Whitman to claim in the Washington Post last week that Congress would somehow be voting against "environmental progress."

But a vote for the McConnell amendment, which would permanently bar the EPA from regulating carbon unless Congress passed new legislation, is justified on democratic prerogatives alone. Whatever one's views of *Massachusetts v. EPA* or climate science, no elected representative has ever voted on an EPA plan that has often involved the unilateral redrafting of plain-letter law.

A vote to overrule the EPA is also needed to remove the regulatory uncertainty hanging over the economy. This harm is already apparent in energy, where the EPA is trying to drive coal-fired power out of existence. The core electricity generation that the country needs to meet future demand is not being built, and it won't be until the EPA is bridled. This same dynamic is also chilling the natural gas boom in the Northeast, and it is making U.S. energy-intensive industries less competitive world-wide.

As the EPA screws tighten, the costs will be passed along to consumers, with the same damage as a tax increase but none of the revenues. Eventually, the EPA plan will appreciably lower the U.S. standard of living. Hardest hit will be the middle-American regions that rely on coal or heavy industry, though the EPA bulldozer will run over small businesses too. The Clean Air Act, once the carbon doomsday machine has been activated, won't merely apply to "major" sources of emissions like power plants or factories. Its reach will include schools, farms, hospitals, restaurants, basically any large building.

Which brings us to this week's Senate votes. Democrats to watch will be Sherrod Brown (Ohio), Bob Casey (Pennsylvania), Tim Johnson (South Dakota), Tom Carper (Delaware), Mary Landrieu (Louisiana), Kent Conrad (North Dakota), Amy Klobuchar (Minnesota), Claire McCaskill (Missouri), Jim Webb (Virginia), Ben Nelson (Nebraska), Carl Levin and Debbie Stabenow (Michigan) and John Rockefeller and Joe Manchin (West Virginia). All of them have been publicly critical of the EPA, and, not incidentally, most of them face a tough re-election.

The White House and Mr. Reid will offer phony alternatives to keep 41 Democrats in the corral. The Baucus amendment is the classic Beltway trick of trying to provide political cover while not solving the problem. Mr. Rockefeller is sponsoring a two-year delay before the EPA rules take effect, but that will merely defer the problem.

The McConnell amendment is one of the best proposals for growth and job creation to make it onto the Senate docket in years. If Mr. Obama is intent on defending the EPA's regulatory assault, then the least Senate Democrats can do is force him to defend his choices himself.


WDR WSJ Letter to the Editor.pdf

OPINION

REVIEW & OUTLOOK

Blinking on Fan and Fred

Democrats like to paint House Republicans as "extreme" ideologues held captive by the Tea Party. But after reviewing the House GOP's new plan to reform the housing market, we wish the Tea Party had grabbed a few more hostages.

On Tuesday Republicans on the House Financial Services Committee introduced eight bills to reform Fannie Mae and Freddie Mac, the government-created mortgage giants at the heart of the financial crisis. These toxic twins have already gobbled up $156 billion of taxpayer money. But not one of the eight bills would shut down Fannie or Freddie—even on a delayed fuse.

You could argue that the House GOP has rolled out a less aggressive reform plan than one of the options recently floated by Treasury Secretary Timothy Geithner. Yes, the same Secretary Geithner who quietly gave Fan and Fred own outright are a key source of risk. But remember that the much larger potential liabilities are all of the mortgages owned by others but guaranteed by Fan and Fred, and therefore by taxpayers. Fan and Fred could continue issuing those guarantees indefinitely.

> Republicans miss a chance to put the toxic twins out of business.

Californian Ed Royce's bill would abolish Fan and Fred's affordable housing goals. Former Fannie Mae executive Ed Pinto has shown how increases in these goals mandated by the Clinton and Bush Administrations led to catastrophic declines in the quality of underwriting at the companies. Mr. Royce said this week that as a result Fan and Fred had purchased more than $1 trillion in "junk loans" from the likes of Countrywide Financial, and his bill would also reduce taxpayer risk.

A third bill, by Texan Randy Neugebauer, would direct federal regulators to slowly raise the fees Fan and Fred charge to guarantee

LETTERS TO THE EDITOR

Medicare Gives Good Results, Is Relatively Easy to Use

Regarding your editorial "Forced Into Medicare" (March 24): Is Medicare second rate? Surely you jest! Medicare does its job better than any private insurer in the U.S. The overhead for Medicare is minuscule in comparison to any private insurer, and it covers beneficiaries without half the bureaucratic rigamarole of the private sector. The first line of development for reasoned standards for care and for quality assessment of carriers comes from Medicare, not from the private side.

As a vascular surgeon who has about 55% of his patients covered by Medicare and Medicaid, I would rather deal with the government than with almost any of the private carriers, especially when it comes to pre-authorization. Prior to 1993 physicians who chose not to participate in Medicare were permitted to establish fees and to bill patients directly for their services. In such cases, patients were reimbursed by Medicare at the Medicare price, and the physician chose whether to bill for any balance remaining between the fee requested and the fee specified by Medicare. Most patients found such trust given to a valued physician was not misplaced.

The consequence, of course, has been government price control with all its attendant market distortions. These include geographic and specialty maldistribution of physicians, astonishing and progressive cost shifting to private-sector payers and, perhaps most bewildering, ing my premiums escalate 15% to 20% per year compounded, paying "retail" for preventive care not covered by my insurance policy unless I could negotiate a deal with the provider, usually by paying cash up front, and never quite getting to my $4,500 deductible, I can tell you that the only good thing about reaching the age of 65 was being admitted to that "rickety government health plan known as Medicare."

While it lasts, and I am sure it will not last for long, I am going to enjoy its benefits: low premiums, a low deductible, better coverage and having someone else to negotiate with an inefficient, opaque and rapacious medical-service industry that fears competition more than government. It's simply too

Malden, Mass. doesn't work.

FRANK ROBINETTE
Bristol, Tenn.

Col. Sable states in his

Your Report of My Burial Is Exaggerated

In your March 28 editorial "The Senate's EPA Showdown," in favor of shackling the Environmental Protection Agency, you refer to me and Christie Whitman as "disinterred." I had to check that morning to ensure that you were not right. As I am nearing the end of my eighth decade on earth, I make it a practice to check my status every day. As Mark Twain pointed out, "The rumors of my death have been greatly exaggerated."

The continuation of my breathing at this late date may be due to the protections afforded by the 1970 Clean Air Act and the EPA's diligence in enforcing the act's mandates.

WILLIAM D. RUCKELSHAUS
Washington

Mr. Ruckelshaus was EPA administrator from 1970-73 and from 1983-85.

Look in the Mirror, Don't Blame China

Sen. Sherrod Brown's letter of March 25 is a perfect example of how to blame the other guy, in this case, China, for our own problems. American federal government policies dwarf those of China when it comes to hindering U.S. manufacturing exports.

U.S. corporate taxes and regulatory costs are among the highest in the world, as are tort liability costs. Sen. Brown must be joking when he accuses China of currency manipulation at a time when the Federal Reserve is flooding the world with dollars. His party has enacted a record-breaking deficit spending binge for three years that depends to a large extent on China to finance by buying U.S. debt. Show a little gratitude, senator, or at least stop posturing.

ROGER F. JONES
Broomall, Pa.

It is the "radicals," to use Gov. Brown's pejorative, who are trying to reverse these baleful trends a la New Jersey, Wisconsin and Florida. By Gov. Brown's reasoning, Texas must be beyond comprehension. Was that famous radical Thomas Jefferson correct when he said, if he did, that every generation needs a new revolution? California's is long overdue. Unfortunately, Sacramento is too mainstream to begin it.

P. THOMAS WOLF
Costa Mesa, Calif.

Letters intended for publication should be addressed to: The Editor, 1211 Avenue of the Americas, New York, NY 10036, or emailed to wsj.ltrs@wsj.com. Please include your city and state. All letters are subject to editing, and unpublished letters can be neither acknowledged nor returned.

se it makes no attempt
ify them. The FCC has
iction over radio and
roadcasters, so such a
cable stations or news-
ferent disclosure stan-
edia.

ie FCC takes the better
would conveniently put
ion on the books in the
election—in time to chill
s to political groups. The
be independent, but Dem-
3-2 majority among com-
e Obama Administration
sparency rules.

Julius Genachowski said
nfirmation hearings that he
e FCC to implement such re-
ch as the Fairness Doctrine.
silent on this proposal, while
nocratic Commissioners have
edia Access Project petition.
Michael Copps says the FCC
e the authority I believe it al-
s" to impose the new rules.
me FCC that last year dictated
ules that Congress had also re-
blicans can't stop the FCC from
kdoor restrictions on speech,
clear that partisan rule-making
e its funding.

01268-EPA-5649

David McIntosh/DC/USEPA/US
04/05/2011 09:15 PM

To "Richard Windsor"
cc
bcc
Subject Fw: Rush Transcript - Sen. Reid's closing remarks

See below. Ah. OK.

From: "Miller, Chris (Reid)" [Chris_Miller@reid.senate.gov]
Sent: 04/05/2011 07:37 PM AST
To: "'greg.dotson@mail house.gov'" <greg.dotson@mail.house.gov>; "'Mary.Frances.Repko@mail house.gov'" <Mary.Frances.Repko@mail house.gov>; David McIntosh; "[redacted] (b) (6)" <[redacted] (b) (6)
Subject: Fw: Rush Transcript - Sen. Reid's closing remarks

Sent from my BlackBerry Wireless Handheld

From: Palmer, Irma (DPCC) [mailto:Irma_Palmer@dpcc.senate.gov]
Sent: Tuesday, April 05, 2011 07:35 PM
Subject: Rush Transcript - Sen. Reid's closing remarks

Rush Transcript – Sen. Reid's closing remarks

Mr. Reid: ask unanimous

consent that at 1:00 a.m. wednesday, april 6, the senate resume consideration of s. 493 and the pending amendments be set asondes senator reid or his designee be recognized to call

the following amendments: baucus 236, stabenow 277, rockefeller 215, coburn 217, coburn 223, coburn 273, inouye 286. That the pending sanders amendment 207 be modified with the changes at the desk, the senate then proceed it a period

of debate until 4:00 p.m. with the time equally divided between the two leaders or their designees, votes to the votes listed blow, baucus, stabenow, rockefeller 216, mcconnell 183, coburn 187, inouye, coburn 273. That there be no amendments prior to the votes and the motion to reconsider be made and laid on the table, all after the first vote be 10 minutes in duration, the amendments be subject to a 60-vote threshold for adoption. That

upon the disposition of coburn amendment 273, amendment number 184 and 217 offered by senator coburn be agreed to, and that no amendments be in order to the coburn amendments 184 and 217 prior to their adoption, and all of the above occurring with no intervening action or debate.

The Presiding Officer: is there objection?
without objection, so ordered.

Mr. Reid: mr. President, i appreciate everyone's patience in regard to getting this consent agreement. None of these votes are going to be easy, but they're votes that are necessary. Mr. president, i would also say in relation to the statement made by my friend from colorado -- i forgot who is the senior senator between the senator in the chair -- the junior senator

from colorado, the statement that he made, we're doing our very best to work something out on the c.r. that will fund the government until the end of this fiscal year. As has been reported in the press, i had a meeting with the

speaker tonight at 4:00. We're still negotiating in good faith. we're not that far apart. And hopefully we can work something out. It's something we should be able to do, and certainly we're trying. As we speak you our people are working on this.

so i want everyone to know that the government is not going to be shut down -- yet. There's still air in the tire, at least we still have some miles to travel. I hope we have enough air in the tire to get us where we need to go. I ask unanimous consent that the "help" committing discharged from consideration -- further consideration of s. 129 and the senate proceed to its consideration.

The Presiding Officer: the clerk will report.

The Clerk: senate resolution 129, honoring the 29 coal miners who per arabed in the explosion at upper big branch mine in mt mt. Call, west virginia.

The Presiding Officer: without objection, the 0 committee is disarnled and the senate will proceed to the measure.

Mr. Reid: i further ask that the resolution be agreed to, the preamble be agreed to, the motion to reconsider be laid on the

table, there be in intervening action or debate and any statements relating to this matter be placed in the record at the appropriate place as if given.

The Presiding Officer: without objection.

Mr. Reid: i would note the absence of a quorum.

The Presiding Officer: the clerk will call the roll.

http://srs1.senate.gov/log/

Irma l. Palmer
Senate majority leader harry reid/dpcc - press assistant
(202) 224-2939

01268-EPA-5650

Bob Sussman/DC/USEPA/US
04/07/2011 07:01 AM

To "Seth Oster", "Richard Windsor", "Bob Perciasepe", "David McIntosh", "Heidi Ellis"
cc
bcc
Subject Fw: CWA discussion tomorrow

It looks llke there will be a short principals-level discussion of the WOUS rollout at today's green cabinet meeting. We may want some time with the administrator this morning to prepare.

From: "Boots, Michael J." [(b) (6)
Sent: 04/06/2011 09:30 PM AST
To: Bob Sussman; Nancy Stoner
Cc: Diane Thompson
Subject: CWA discussion tomorrow

Bob and Nancy –

I wanted to give you all a heads-up about a discussion that will be happening tomorrow related to the CWA guidance.

Ex.5 - Deliberative

Ex.5 - Deliberative

Please let me know if you have any questions.

Thanks,
Mike

Michael Boots
Chief of Staff
White House Council on Environmental Quality
730 Jackson Place NW
Washington, DC 20530
Main Line: (b) (6)
Direct: (b) (6)

Ex.5 - Deliberative

2011 04 06 Waters of the U S Rollout Plan.docx

01268-EPA-5651

Heidi Ellis/DC/USEPA/US
04/07/2011 08:19 AM

To "Lisa"
cc
bcc
Subject Fw: CWA discussion tomorrow

Not sure you'll have enough time for this depending on when you get in.

_____

Heidi M. Ellis
Director of Scheduling
Office of the Administrator | US EPA
Phone: 202-564-3204
Cell: (b) (6)
Fax: 202-501-1480

From: Bob Sussman
Sent: 04/07/2011 07:01 AM EDT
To: Seth Oster; Richard Windsor; Bob Perciasepe; David McIntosh; Heidi Ellis
Subject: Fw: CWA discussion tomorrow

It looks llke there will be a short principals-level discussion of the WOUS rollout at today's green cabinet meeting. We may want some time with the administrator this morning to prepare.

From: "Boots, Michael J." [(b) (6)
Sent: 04/06/2011 09:30 PM AST
To: Bob Sussman; Nancy Stoner
Cc: Diane Thompson
Subject: CWA discussion tomorrow

Bob and Nancy –

Ex.5 - Deliberative

[redacted]

Ex.5 - Deliberative

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Thanks,
Mike

Michael Boots
Chief of Staff
White House Council on Environmental Quality
730 Jackson Place NW
Washington, DC 20530
Main Line: (b) (6)
Direct: (b) (6)

Ex.5 - Deliberative

2011 04 06 Waters of the U S Rollout Plan.docx

01268-EPA-5652

Bob Perciasepe/DC/USEPA/US
04/12/2011 09:55 PM

To "Richard Windsor", "Paul Anastas", "Mike Flynn", "Lee Veal"
cc
bcc
Subject Fw: Policies/Authorities for Domestic Radiological Response

Information related to monitoring responsibilities.

Radiological.
Bob Perciasepe
Deputy Administrator
(o)202 564 4711
(c) (b) (6)

From: "Reed, Richard A." [(b) (6)
Sent: 04/12/2011 09:28 PM AST
To: "Holdren, John P." <(b) (6) "Kroloff, Noah" <Noah.Kroloff@dhs.gov>; "Sutley, Nancy H." <(b) (6) Bob Perciasepe; Jane Lubchenco <Jane.Lubchenco@noaa.gov>; "'john.p.currier@uscg.mil'" <john.p.currier@uscg.mil>
Subject: FW: Policies/Authorities for Domestic Radiological Response

All,
Attached is the annex we discussed this evening.

From: Kamoie, Brian E.
To: Avery, Heidi E.; Bahar, Michael; Bentz, Julie A.; Reed, Richard A.; Kern, Dab
Sent: Mon Mar 14 13:11:15 2011
Subject: Policies/Authorities for Domestic Radiological Response
Starting point for authorities/policies for domestic radiological response is the National Response Framework Nuclear/Radiological Incident Annex (attached). Cites relevant guiding laws and roles/responsibilities. Was updated June 2008. Worth quick review to answer lion's share of authorities/roles/responsibilities questions and to set up further analysis.

nrf_Ex.5 - Deliberative.pdf

01268-EPA-5653

Diane Thompson/DC/USEPA/US
04/13/2011 01:59 PM

To "Richard Windsor", "Bob Perciasepe", "Barbara Bennett"
cc "Aaron Dickerson", "Dan Kanninen"
bcc
Subject Fw: Talking Points on FY 2011 Budget

FYI

From: "Maisel, Chad P." [redacted (b) (6)]
Sent: 04/13/2011 11:57 AM AST
To: "Maisel, Chad P." <[redacted (b) (6)]
Subject: Talking Points on FY 2011 Budget

Chiefs of Staff:

[redacted (b) (5)]

Thank you.

–Cabinet Affairs

[redacted Ex.5 - Deliberative]

CR Deal TPs 04 12 11.pdf

01268-EPA-5654

Scott Fulton/DC/USEPA/US
04/15/2011 09:14 AM

To "Richard Windsor"
cc "Diane Thompson", "Michael Goo", "Bob Sussman", "Seth Oster", "David McIntosh"
bcc
Subject Fw: endangerment

(b) (5)
Avi Garbow

----- Original Message -----
From: Avi Garbow
Sent: 04/15/2011 09:09 AM EDT
To: Scott Fulton
Subject: Fw: endangerment
(b) (5)

Avi

Avi Garbow
Deputy General Counsel
U.S. Environmental Protection Agency
(202) 564-1917
----- Forwarded by Avi Garbow/DC/USEPA/US on 04/15/2011 09:09 AM -----

From: Bob Sussman/DC/USEPA/US
To: Scott Fulton/DC/USEPA/US@EPA, Avi Garbow/DC/USEPA/US@EPA, Gina McCarthy/DC/USEPA/US@EPA, Joseph Goffman/DC/USEPA/US@EPA
Date: 03/01/2011 05:23 PM
Subject: endangerment

Robert M. Sussman
Senior Policy Counsel to the Administrator
Office of the Administrator
(202)-564-7397
US Environmental Protection Agency
----- Forwarded by Bob Sussman/DC/USEPA/US on 03/01/2011 05:24 PM -----

From: "Fitzpatrick, Michael A." <(b) (6)
To: Bob Sussman/DC/USEPA/US@EPA
Date: 03/01/2011 05:02 PM
Subject:

Bob –

Ex.5 - Deliberative

Ex.5 - Deliberative

[redacted]

Michael.

Michael Fitzpatrick
Associate Administrator
Office of Information and Regulatory Affairs
Office of Management and Budget
1650 Pennsylvania Ave., NW
Washington, DC 20503
Office: (b) (6)
Govt. Cell: (b) (6)

01268-EPA-5655

Richard Windsor/DC/USEPA/US
04/15/2011 09:46 AM

To "Jack Lew"
cc "Cass Sunstein", "Scott Fulton", pbansal
bcc
Subject Fw: endangerment

Jack,

(b) (5) [redacted]

Lisa
Scott Fulton

----- Original Message -----
From: Scott Fulton
Sent: 04/15/2011 09:14 AM EDT
To: Richard Windsor
Cc: "Diane Thompson" <thompson.diane@epa.gov>; Michael Goo; Bob Sussman; Seth Oster; David McIntosh
Subject: Fw: endangerment

(b) (5) [redacted]
Avi Garbow

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From: Avi Garbow
Sent: 04/15/2011 09:09 AM EDT
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Subject: Fw: endangerment

(b) (5) [redacted]

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Ex.5 - Deliberative

Michael.

Michael Fitzpatrick
Associate Administrator
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Office of Management and Budget
1650 Pennsylvania Ave., NW
Washington, DC 20503
Office: (b) (6)
Govt. Cell: (b) (6)

01268-EPA-5656

"Cutter, Stephanie"
<(b) (6)
04/15/2011 09:47 AM

To Richard Windsor
cc Seth Oster
bcc
Subject great article on TVA

Really nicely done.

T.V.A. to Close 18 Coal-Fired Generators and Curb Pollution

By FELICITY BARRINGER
Published: April 15, 2011

In a sweeping legal settlement, the Tennessee Valley Authority has agreed for the first time to reduce its overall capacity to generate coal-fired electricity, promising to close 18 of its coal-burning generators over the next six years while spending $3 billion to $5 billion on pollution controls on any remaining units that use coal.

The accord, announced Thursday by the Environmental Protection Agency, will bring about one of the most significant cuts in coal-fired power generation by any utility that relies heavily on coal in its fuel mix. The closings will eliminate 16 percent of the authority's coal-fired capacity, and the accord holds out the prospect that some or all of another 18 units will shut down as well, for a total loss of as much as a third of the authority's coal-burning capacity.

By the end of 2017, the utility's emissions of nitrogen oxides, a crucial component in smog and ground-level ozone, will be reduced by at least 69 percent, and sulfur dioxide emissions will be cut by 67 percent, the E.P.A. said, compared with 2008 levels. Sulfur dioxide can react with other compounds to form ultrafine particles, which are associated with heart and lung disease.

The actions dictated in the sweeping 120-page settlement, reached with four states and three environmental groups that sued the T.V.A. over air pollution, signal a fundamental shift for an agency that was created during the Depression to bring electricity to rural America In the 1960s and '70s, it became one of the largest users of coal in the utility industry. Coal makes up more than half of the fuel that the utility burns to generate electricity for nine million people.

Emissions from coal-fired plants have been implicated in respiratory illness, acid rain and, most recently, climate change. "This agreement will save lives and prevent billions of dollars in health costs," the E.P.A. quoted its administrator, Lisa P. Jackson, as saying.

The agency estimated that the actions would avoid at least 1,200 premature deaths and prevent hundreds of cases of bronchitis and nonfatal heart attacks, as well as 21,000 asthma attacks.

Roy Cooper, the attorney general of North Carolina, which originally sued the T.V.A. in 2002 to rein in its pollution, said in an interview, "This is what we wanted - a broad-based agreement for the reduction of pollution from all its plants."

"It's been a long time coming," Mr. Cooper said. Alabama, Tennessee and Kentucky were also part of the settlement.

Besides a commitment to shutter 18 coal-fired generating units, the utility said that the additional 18 units being scrutinized, representing 4,600 megawatts of capacity, would be retrofitted with pollution controls, closed or reconfigured to burn a renewable fuel like wood or crop waste.

Beyond the health impact of coal plant emissions in recent decades, there have been significant environmental changes in places like Great Smoky Mountains National Park, which straddles North Carolina and Tennessee. Since the 1970s, pollution-related haze has greatly reduced visibility - although there have been improvements in recent years - and the chemical pollutants brought to earth by raindrops have sickened some plants and shrubs.

In a statement, Tom Kilgore, the T.V.A.'s president, said the authority was moving to diversify its energy portfolio. "A variety of electricity sources, rather than heavy reliance on any single source, reduces the long-term risks and helps keep costs steady and predictable," he said.

The organizations that intervened in the states' case were the National Parks Conservation Association, Our Children's Earth Foundation and the Sierra Club. Mary Anne Hitte, the director of the Sierra Club's "Beyond Coal" campaign, called the settlement "a game changer for how we power our homes and businesses in the Southeast."

01268-EPA-5657

Richard Windsor/DC/USEPA/US
04/15/2011 12:34 PM

To "Cutter, Stephanie"
cc
bcc
Subject Re: great article on TVA

Tx!

From: "Cutter, Stephanie" [(b) (6)
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Cc: Seth Oster
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In a statement, Tom Kilgore, the T.V.A.'s president, said the authority was moving to diversify its energy portfolio. "A variety of electricity sources, rather than heavy reliance on any single source, reduces the long-term risks and helps keep costs steady and predictable," he said.

The organizations that intervened in the states' case were the National Parks Conservation Association, Our Children's Earth Foundation and the Sierra Club. Mary Anne Hitte, the director of the Sierra Club's "Beyond Coal" campaign, called the settlement "a game changer for how we power our homes and businesses in the Southeast."

01268-EPA-5658

Scott Fulton/DC/USEPA/US
04/15/2011 07:29 PM

To Windsor.Richard, "Bob Perciasepe", "Bob Sussman", "Seth Oster", "Diane Thompson", "David McIntosh"
cc
bcc
Subject Fw: OMB's views on the application of OMB's Peer Review Bulletin and Information Quality Guidelines to EPA's Technical Support Document for the EPA Endangerment Finding.

Fyi, this worked through. [redacted] Ex.5 - Deliberative [redacted] . Cheers, Scott

---

From: "Bansal, Preeta D." [redacted] (b) (6)
Sent: 04/15/2011 06:15 PM AST
To: Scott Fulton
Subject: FW: OMB's views on the application of OMB's Peer Review Bulletin and Information Quality Guidelines to EPA's Technical Support Document for the EPA Endangerment Finding.

FYI also.

Preeta D. Bansal
OMB General Counsel and Senior Policy Advisor
395-5044

From: Aitken, Steven D.
Sent: Friday, April 15, 2011 6:12 PM
To: 'Elkins.Arthur@epamail.epa.gov'
Cc: 'Najjum.Wade@epamail.epa.gov'
Subject: OMB's views on the application of OMB's Peer Review Bulletin and Information Quality Guidelines to EPA's Technical Support Document for the EPA Endangerment Finding.

[redacted] Ex.5 - Deliberative [redacted]

[redacted]

Ex.5 - Deliberative

[redacted]

Ex.5 - Deliberative

Thank you.

-- Steve

Steven D. Aitken
Deputy General Counsel
Office of Management and Budget
(202) 395-4728

-----Original Message-----

From: Najjum.Wade@epamail.epa.gov [mailto:Najjum.Wade@epamail.epa.gov]

Sent: Wednesday, February 23, 2011 2:05 PM
To: Aitken, Steven D.
Subject: EPA OIG Review of GHG Endangerment Finding process

Mr. Aitken,

Ex.5 - Deliberative

Ex.5 - Deliberative

[redacted]

If I can be of help, please let me know. I can be reached at (b) (6).

VR

Wade T. Najjum
Assistant Inspector General for Program Evaluation

----- Message from "Aitken, Steven D." (b) (6) v> on Fri, 18 Feb 2011 15:08:02 -0500 -----

To: "'Lavenburg.Andrew@epamail.epa.gov'" <Lavenburg.Andrew@epamail.epa.gov>
cc: "Luczynski,
Subject: Andrew

Andrew --

This is a follow-up to the OMB responses that Kimberley sent to you in September (see below and attached).

Ex.5 - Deliberative

[redacted]

Ex.5 - Deliberative

[redacted]

[redacted]

[redacted]

Thank you very much for your consideration of our request. If you would like to discuss this further, please call me.

-- Steve

Steven D. Aitken
Deputy General Counsel
Office of Management and Budget
(202) 395-4728

From: Luczynski, Kimberley S.
Sent: Friday, September 10, 2010 2:00 PM
To: Lavenburg.Andrew@epamail.epa.gov
Cc: Aitken, Steven D.
Subject: RE: EPA Office of Inspector General request for input regarding OMB information quality and peer review guidelines

Andrew,

Thank you for the opportunity to respond to your questions. Attached are responses from OMB staff.

Kimberley S. Luczynski
Assistant General Counsel
Office of Management and Budget
725 17th St. NW
Washington, DC 20503
(202) 395-7870 (direct)

(202) 395-3108 (fax)

From: Lavenburg.Andrew@epamail.epa.gov [mailto:Lavenburg.Andrew@epamail.epa.gov]
Sent: Wednesday, August 11, 2010 1:51 PM
To: Luczynski, Kimberley S.
Cc: Beusse.Rick@epamail.epa.gov; Hatfield.Jim@epamail.epa.gov; Chuong.Bao@epamail.epa.gov; Manibusan.John@epamail.epa.gov
Subject: EPA Office of Inspector General request for input regarding OMB information quality and peer review guidelines

Ms. Luczynski,

Ex.5 - Deliberative

[redacted]

If you have any questions or concerns about our request, please feel free to contact me.

Best Regards,

Andrew Lavenburg
Social Scientist
U.S. EPA-OIG
Mail Drop N283-01
Research Triangle Park, NC 27711
phone: 919-541-1871
fax: 919-541-2504
e-mail: lavenburg.andrew@epa.gov

attachments (2)

Ex.5 - Deliberative

EPA OIG responses - Peer Review and Information Quality.pdf