THE WHITE HOUSE

Washington

December 15, 2009

MEMORANDUM FOR THE PRESIDENT

FROM THE VICE PRESIDENT

SUBJECT: Progress Report: The Transformation to A Clean Energy Economy

I'm pleased to report that the administration is laying the foundation for a clean energy economy that will create a new generation of jobs, reduce dependence on oil and enhance national security. Through the Recovery Act and more effective use of programs already in existence, the administration is taking the critical steps to transform the United States into a global clean energy leader.

The energy components of the Recovery Act represent the largest single investment in clean energy in American history and are leveraging private investment and fostering American innovation and ingenuity. The Recovery Act investments of $80 billion for clean energy will produce as much as $150 billion in clean energy projects.[1] Existing investment programs could produce up to $90 billion in additional clean energy projects.[2] These investments are designed to accelerate investment in clean energy projects and pull private investment off the sidelines. They are jumpstarting a major transformation of our energy system including unprecedented growth in the generation of renewable sources of energy, enhanced manufacturing capacity for clean energy technology, advanced vehicle and fuel technologies, and a bigger, better, smarter electric grid.

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[1] This includes Recovery Act appropriations across all government agencies. It includes appropriations, federal loans, and tax incentives.

[2] This figure represents the estimated project value if all the existing authority for the DOE loan guarantee program is used. The estimate includes Title 17 loan guarantee authority for energy efficiency, renewable energy ($18.5 billion), fossil energy ($8 billion) and nuclear ($20.5 billion for both reactors and front-end), and Section 136 Advanced Vehicle Technology Manufacturing loans ($25 billion). Typically, projects require a minimum 20% equity share.

Renewable Energy

Recovery Act investments in renewable generation and advanced energy manufacturing of $23 billion will likely create 253,000 jobs and leverage over $43 billion in additional investment that could support up to 469,000 more jobs,[3] putting us on track to meet the goal of doubling our renewable energy generation, including solar, wind and geothermal, in just 3 years.

By the end of next year we will have made commitments to support more than 15 GW of new wind, solar and geothermal and other renewable energy—enough renewable energy to power 4-5 million homes per year. According to New Energy Finance, there are more and greater private investments in wind than would have been possible without Recovery Act funding.[4]

At the same time, we are increasing our capacity to make the wind turbines, solar panels and other renewable energy components here in America. Recovery Act investments of up to $2.3 billion for advanced energy manufacturing facilities will likely generate 17,000 jobs. This investment will be matched by as much as $5.4 billion in private sector funding likely supporting up to 41,000 additional jobs and up to two hundred advanced energy manufacturing projects, including solar, wind, and biomass, putting us on track to double our capacity to manufacture these components by 2012.[5]

For too long, there have been too many obstacles to siting renewables generation projects on federal lands. Nine federal agencies with authority over the siting process on federal lands have signed an MOU to designate a lead agency to run point on all federal authorizations and streamline process. The agencies estimate that this will cut permit times by up to a third.

To cut red tape, and speed approval of project applications, the Department of Interior has set up renewable energy coordinating offices and support teams across the West. Already, DOI has fast-tracked 30 renewable energy projects on federal lands, projects that will create thousands of jobs by December 2010. For solar, DOI is maximizing opportunities for new generation by setting aside over one thousand square miles of public lands for potential solar energy development. To tap abundant offshore wind resources, DOI has established a program in coordination with the Federal Energy Regulatory Commission to grant leases, easements, and rights-of-way for renewable energy projects on the Outer Continental Shelf.

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[3] All of the job estimates used in this document correspond to jobs that last for one year. Of course, some jobs could last longer – in this case the number of distinct jobs would be reduced proportionately. For example, a project that employs one person for two years would count as creating two jobs. The estimate is based on $23.4 billion in federal funds and $43.3 billion in leveraged funds.

[4] Denise Bode, American Wind Energy Association. Industry has made it clear that the grant program has been the key to unlocking financing for wind in recent months. As reported in E&E Daily: At the AWEA Finance & Investment Workshop on October 14th, John Eber, managing director of energy investments at J.P. Morgan Capital Corp., said wind developers can attract debt backing of 40 to 50 percent of total project costs without a federal grant. The grant lets projects get built with 70 to 80 percent support from debt.

[5] The job estimate is based on projections from Treasury of a reduction of $1.6 billion in federal receipts and $3.8 billion in leveraged funds.

Renewable Energy	Where we were on January 1, 2009	Where we are headed by 2012
Gigawatts of renewable energy	27.8 GW	Meet or exceed 55.6 GW
Renewable Manufacturing Capacity	6 GW	Meet or exceed 12 GW

Vehicles and Fuels of the Future

The Federal Government, partnering with industry, has already committed to invest up to $16 billion in projects that will transform the transportation sector, including plug-in hybrids, all-electric vehicles and the infrastructure needed to power them, as well as new clean fuels. Over the next six years, three new electric vehicle plants—the first ever in the U.S.—and 30 new battery and other electric vehicle manufacturing plants will be fully operational.[6] These plants will have capacity to produce 250,000 electric drive cars and batteries to power 500,000 plug-in hybrid electric vehicles. We are also building the infrastructure to support these vehicles including construction of more than 10,000 charging locations in more than twelve cities.

At the same time, Recovery Act investments will provide the next generation of biofuels—clean, renewable and domestically-produced fuel to power our vehicles. The federal Renewable Fuels Standard requires biofuels production to grow from 9 billion gallons now to 36 billion gallons in 2022, with 21 billion gallons to come from advanced biofuels. Over $600 million in Recovery Act grants —expected to be matched more than dollar for dollar by private funds — along with Federal loan guarantees, will support 19 pilot, demonstration, and commercial-scale bio-refineries.[7] These facilities will convert various forms of biomass into fuels and chemicals that otherwise would be produced from oil, while creating jobs and raising farm incomes in rural communities across the U.S. Before these investments, the development of an advanced biofuels industry was at a virtual standstill as numerous facilities at the pilot stage had faltered during the economic downturn as credit markets tightened.

[6] Before the Recovery Act, there was no factory that produced electric cars at scale (more than 1,000 vehicles a year). Two advanced battery component factories were located in Noblesville, ID and San Carlos, CA.

[7] The over $600 million investment for biorefineries includes up to $564M of DOE Recovery Act grants and a $54.5M loan guarantee from USDA, both announced on December 4, 2009.

Vehicles of the Future	Where we were on January 1, 2009	Where we are headed by 2015
Number of electric vehicle factories in the US	0	3 factories
Advanced Battery Manufacturing Capacity	Negligible	Enough advanced battery manufacturing capacity to support 500,000 Plug-in Hybrid Electric Vehicles a year
Number of Advanced Battery and electric drive component factories in the US	2	30 factories
EV Charging Locations	Less than 500	More than 10,000
Number of Advanced Biofuel Refineries	0 commercial scale refineries	19 pilot, demonstration, and commercial scale refineries by 2012
Average Fleet Fuel Economy	25.1 mpg Uncertainty around three national standards	27.3 mpg by end of 2010 Proposed harmonized standards of 35.5 mpg by 2016

Grid Modernization

The transition to a clean energy economy will result in a transformation not only in how we produce and transport energy, but in how we use it. It will result in a future in which smart appliances can make decisions about when to turn on and off and consumers can program their homes to use energy most efficiently. It will result in a grid that can detect outages before they happen, and re-route power where it is needed. The $4 billion in Recovery Act smart grid investments will likely result in 43,000 new jobs, and be matched more than one-to-one by private sector funding that could support up to 61,000 additional jobs on smart grid projects that will reduce cost, increase reliability and give consumers more choice and control over their energy use.[8] An analysis by EPRI estimates that the implementation of smart grid technologies could reduce electricity usage by more than 4% by 2030. That would mean annual utility bill savings of $20.4 billion for businesses and consumers around the country. It will also help add renewable energy resources to the grid, and give consumers more information and control over their energy use.

[8] The job estimate is based on $4 billion in federal funds and $5.7 billion in leveraged funds.

With Recovery Act funds we will invest, along with industry, in the installation of 18 million smart meters (more than double the number of smart meters currently in service) which should allow homeowners to monitor energy use by the month, week, or even hour. By 2015, we expect a combination of public and private investment to produce 40 million smart meters. Along with industry, we are also funding the installation of 877 sensors on the electric transmission system to improve reliability and security. This is five and half times the 160 sensors in place when we took office and will provide visibility across the entire U.S. transmission system.

Smart Grid	Where we were on January 1, 2009	Where we are headed by 2013
Homes with Smart Meters	8 million	26 million by 2013, headed to 40 million by 2015
Sensors installed to monitor grid conditions	160 sensors installed Incomplete grid coverage	877 sensors installed Visibility across the entire U.S. transmission system[9]

Energy Efficiency

The Administration is making the largest single investment in home energy efficiency in U.S history. We are on track to weatherize the homes of half a million low income Americans through retrofits by the end of next year. Over the next several years, federal investments will help millions of American families cut their utility bills by making their homes and appliances more energy efficient. The Recovery Act expanded tax credits for energy efficiency upgrades to cover 30% of the cost up to $1,500. (For example, for a $1,600 investment to improve the insulation of a home's roof, a homeowner will receive a $480 tax credit, and could save up to $150 on utility bills each year.) Under the Recovery Act, DOE has also launched an innovative new effort called "Retrofit Ramp Up" that, together with Recovery Through Retrofit, will simplify and reduce the cost of home retrofits by funding pioneering programs that reach whole neighborhoods and towns. For low-income families that are hit hardest by high utility bills, the $5 billion Weatherization Assistance Program from the Recovery Act is providing funding and technical assistance to local agencies to perform home energy audit and weatherization services, to increase efficiency and reduce energy costs.

We are also setting long overdue standards for everyday appliances like refrigerators, microwaves and washer/dryers. About two dozen standards will be finalized over the next few years. We are setting an average of six standards per year, compared to just one per year when we took office. The combined

[9] Coverage includes the North American high voltage transmission system.

annual savings of these standards is expected to total up to 4% of total US energy consumption in 2030 and carbon dioxide emission reductions equivalent to the output of 30 coal fired power plants.

Energy Efficiency	Where we were on January 1, 2009	Where we are headed by 2012
Home Energy Efficiency Retrofits	100,000 per year	1 million[10]
Average Number of Appliance Standards set per year	1 per year (2001-2008)	6 per year (2009-2012)

Carbon Capture

We will lead the world in clean coal technology. With Recovery Act funding and existing loan guarantee authority, we are investing over $10 billion in CCS projects, which will secure at least an additional $4 billion in private funds to produce $14 billion of public-private investment in clean coal technology. These investments will support carbon capture facilities of a sufficient scale that, once demonstrated, can be replicated and deployed into commercial practice within the electric power industry.

Carbon Capture	Where we were on January 1, 2009	Where we are headed by 2015
Number of commercial scale power plants operating with large CCS facilities	0	5
Tons of carbon dioxide sequestered per year	Negligible	Over 12 million tons per year[11]

Nuclear Power

By the end of our first two years in office, we will have provided conditional commitments for loan guarantees for two nuclear power operators to add three to four new nuclear reactors. No new construction permits have been issued for U.S. commercial nuclear power plants since the 1970s.

[10] This will be a result of public and private investment.
[11] Based on projects proposed to DOE for sequestration facilities at both industrial facilities and power plants.

Nuclear Power	Where we were on January 1, 2009	Where we are headed by 2011
Number of new nuclear plants	No new construction permits since the 1970s	Loan guarantees conditionally committed to two nuclear facilities for 3 - 4 new reactors in total

Science and Innovation

Science and technology must provide the foundation for the clean energy economy. We are restoring US leadership in science and technology so we can lead the global competition in clean technology innovation. In 2010, our budget includes $12.6 billion in funding for key science agencies to support advanced research and development at our national labs and universities. In addition, using $400 million in Recovery Act funds we have started the Advanced Research Projects Agency - Energy (ARPA-E) that invests in targeted projects to accelerate the pace of innovation to make advanced energy technologies like energy storage and biofuels dramatically more effective and affordable. This investment includes funds for some of the most advanced research in wind, solar, and geothermal technologies to make these clean sources of energy more efficient and easier to store and transport.

Substantially increasing the share of electricity from wind and solar resources and effectively managing a fleet of electric vehicles will necessitate a transformation of our electric grid. In addition, power outages on today's grid cost Americans $150 billion per year. Our investments in science and technology position us to make dramatic leaps in energy storage technology such as research at MIT for batteries that store enough power for a whole neighborhood at less than a tenth of their current cost. This kind of breakthrough would allow us to increase the reliability of the grid, harness the full potential of our abundant renewable resources and use them to power our homes and cars.

Currently, 95% of the fuel that powers our cars, trucks, trains and planes comes from oil. Over half of this fuel is imported from overseas and it is the source of over one-third of America's carbon emissions. Even as we deploy the first generation of advanced biofuel facilities to produce fuel here in America, we are also investing in technologies that, if successful, would make biofuels several times cheaper, cleaner and more sustainable. We are also investing in cutting edge technologies to produce gasoline directly from sunlight. If successful, these new technologies could transform transportation.

Science and Innovation	Where we were on January 1, 2009	Where we are headed by 2012
Advanced Research Projects Agency – Energy	$0	$400 million (Recovery Act) Up to 100 high-risk, high reward advanced energy technology research projects