U.S. Stakeholder Meeting for 2010 Activities under the Montreal Protocol

January 29, 2010

Hosted by:
Department of State & Environmental Protection Agency

AGENDA

Welcome and Introductions	*Drusilla Hufford*
Implementing the Montreal Protocol	*Brian McLean*

Hydrofluorocarbons (HFCs)

■ Benefits of Phasing Down HFCs	*Cindy Newberg*
■ Outcome of 2009 HFC Negotiations	*John Thompson*
■ Science Update	*Stephen Montzka*
■ Path Forward	*Daniel Reifsnyder*
■ Discussion	*Moderated by Daniel Reifsnyder*

Ozone Depleting Substance (ODS) Destruction

■ Outcome of 2009 Discussions	*Tom Land*
■ Path Forward	*Daniel Reifsnyder*
■ Discussion	*Moderated by Daniel Reifsnyder*

2010 U.S. EPA Montreal Protocol Awards

- Honoring Achievements in:
  - Ozone Layer Protection
  - Climate Protection
  - Human Health Protection through Sun Safety
- Nominations Due: March 1st
- Ceremony: Fall 2010
- More information at: http://epa.gov/ozone/awards/

Implementing the Montreal Protocol

- Clean Air Act Successes
- Benefits of New HCFC Regulations
  - 2010 HCFC Allocation Rule
  - Pre-Charged Appliance Rule

Benefits of Phasing Down HFCs

North American Proposal

Preliminary Benefits Estimates

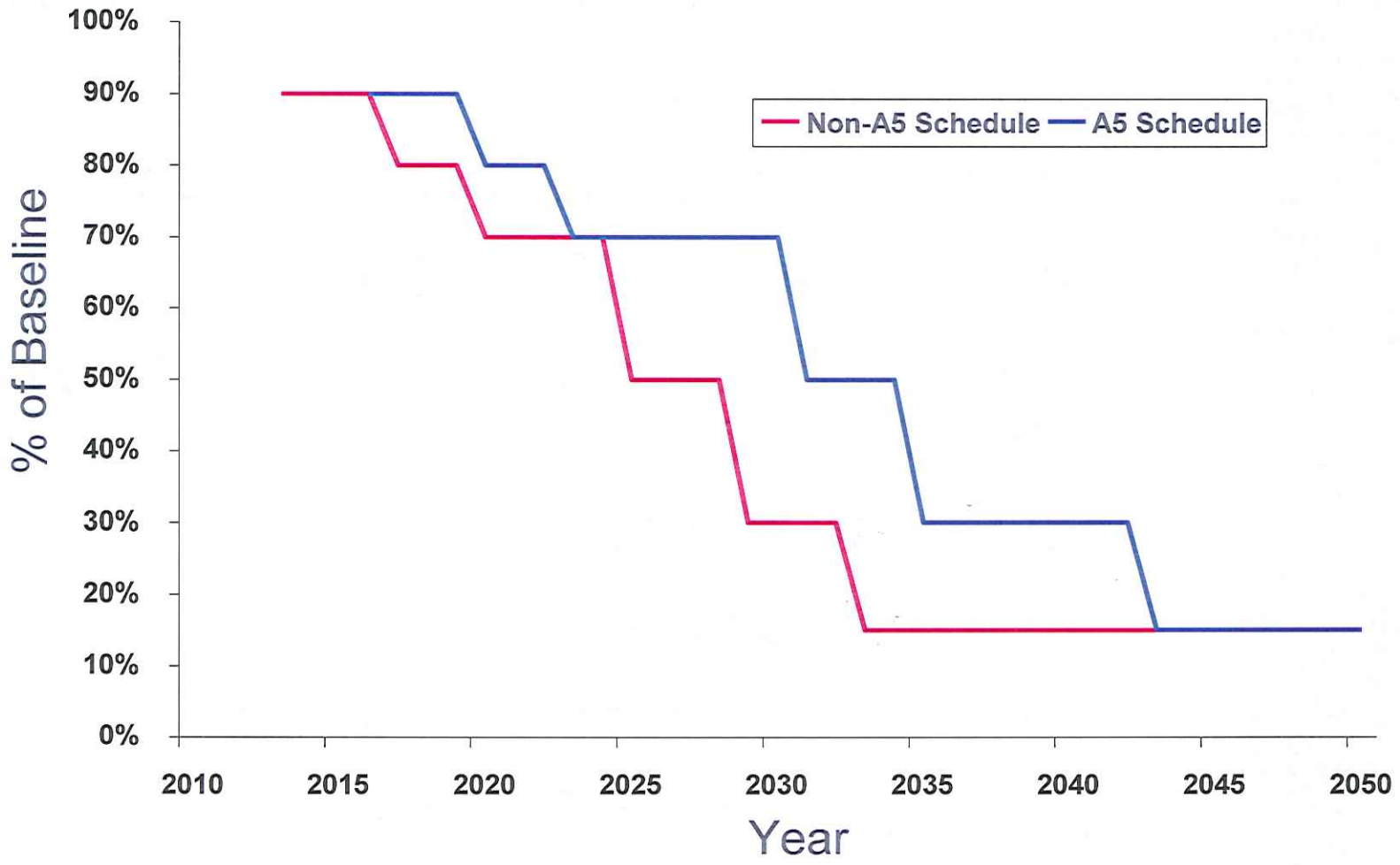
- North American Proposal uses controls similar to those for ODS
- Assumes Article 5 and Non-Article 5 Parties agree and comply
- Global HFC reductions:
  - Approx. 88,000 to 96,000 MMTCO_2eq
- U.S. HFC reductions:
  - Approx. 14,600 MMTCO_2eq

North American Proposal

Production and Consumption Controls

- Global Coverage
- Baseline Formula: HCFCs + HFCs
- Baseline Years: 2004 ~ 2006
- 20 HFCs (including 'HFOs') covered by control obligations
- Final Freeze Plateaus
  - 15% of Baseline
  - 2033 for Non-Article 5 Parties
  - 2043 for Article 5 Parties

North American Proposal HFC Consumption Schedule - Graph



North American Proposal HFC Consumption Schedule - Table

Non-Article 5 Parties		Article 5 Parties	
Year	**Cap** (% of Baseline)	**Year**	**Cap** (% of Baseline)
2013	90%	2016	90%
2017	80%	2020	80%
2020	70%	2023	70%
2025	50%	2031	50%
2029	30%	2035	30%
2033	15%	2043	15%

Comparison of HFC Proposals

HFC Proposals	Mauritius & Micronesia	North America
Coverage	*Developed Countries*	*Developed & Developing Countries*
Production & Consumption	*Yes*	
Products Containing	*Not Covered*	
Baseline Formula	*HFCs Only*	*HCFCs + HFCs*
Floor and Ceiling	*No*	
Baseline Years	*2004 ~ 2006*	
Chemicals Covered	*18 HFCs*	*20 HFCs (includes 'HFOs')*
Phase Down Start Date	*2012*	*2013*
Final Freeze Levels	*10% of Baseline*	*15% of Baseline*
Final Freeze Dates	*2030*	*2033 / 2043*
Phase Down Mechanism	*Reduction Steps*	
Banking / Offsets	*No*	
HFC-23 Destruction Required	*Yes: 99.0% Efficiency*	*Yes: 99.9% Efficiency*

Hydrofluorocarbons (HFCs)

Outcomes of the 2009 HFC Negotiations

Protocol Amendment Proposals

- Mauritius and Micronesia
  - Submit April 2009 (6 months prior to MOP)
  - Phasedown - 10% plateau in 2030 developed countries
  - Baseline based on HFC consumption
  - HFC-23 control
- North American Proposal
  - Submit September 2009 (changes to M&M proposal)
  - Phasedown – 15% plateau – developed and developing
  - HFC and HCFC baseline
  - HFC-23 control

Issues and Concerns Raised

- Not enough time to consider North American Proposal
- Not enough information on alternatives
- Timing not right before Copenhagen COP
- HCFCs – just accelerated phaseout and cost issues haven't been worked out
- HFC-23 Issues
- Scope – only want in UNFCCC & Kyoto

2010 Meeting of the Parties

- HFC Amendment Discussed – Mixed Reaction
- Strong Supporters
  - Small Island States
  - Japan, New Zealand, EU, Canada, Mexico
  - Numerous African countries
- Strong Opposition
  - China, India
  - Argentina, Brazil
  - Saudi Arabia, Kuwait

Path Forward

- OEWG (June) and MOP (October) in 2010
- Amendment could be considered again this year
- Process of Education continues – feasibility, alternative, how implement
- Work though HCFC-related issues
- Climate discussions continue
- HFC-23
  - CDM Projects
  - Large fraction HFC-23 uncontrolled in A5 countries

Recent increases in global HFC-23 emissions

Steve Montzka
Earth System Research Laboratory
NOAA, USA

Co-authors:

L. Kuijpers [2], M.O. Battle [3], M. Aydin [4], K. Verhulst [4], E.S. Saltzman [4], and D. Fahey [1]

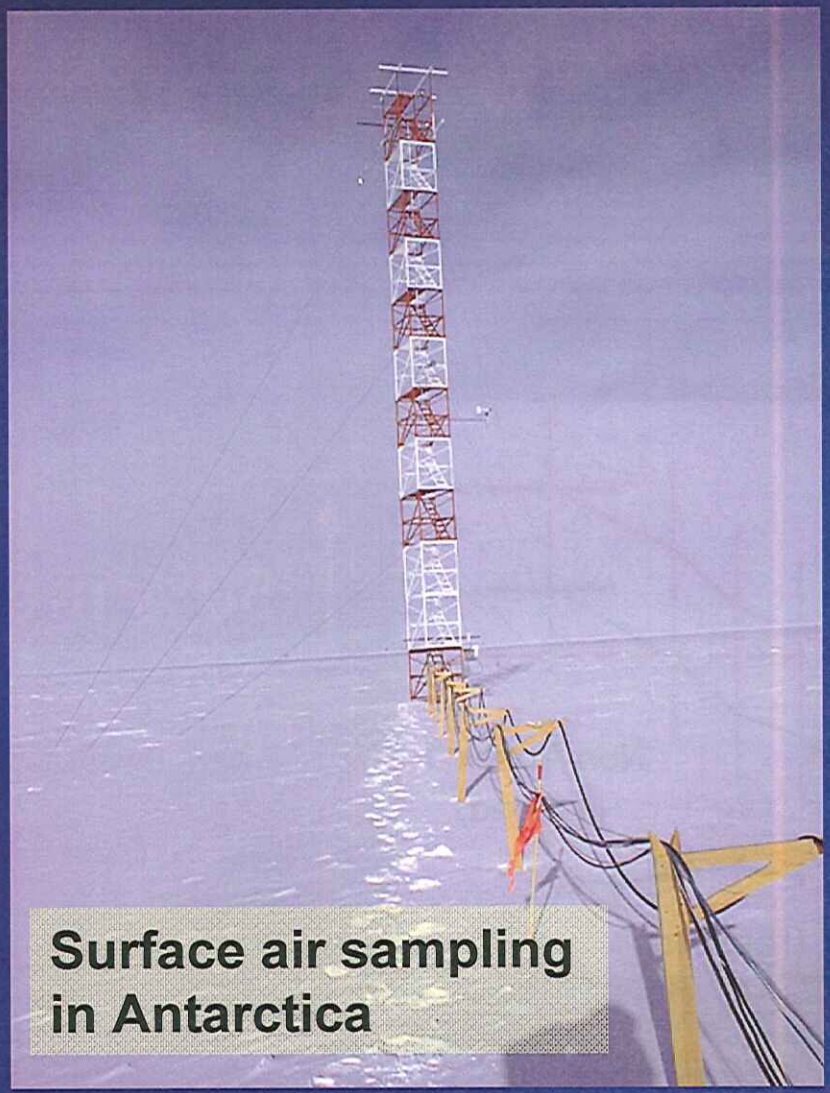
[1] NOAA/ESRL, USA
[2] Technical University Eindhoven, Netherlands
[3] Bowdoin College, USA
[4] Univ. of California Irvine, USA

Acknowledgements:

M. McFarland, B. Miller, L. Miller, and other scientists at NOAA, CIRES (Univ. of Colorado), Scripps (Univ. of California), Princeton, and Penn State.

published in Geophysical Research Letters, 29 Jan 2010

Samples of air were collected in 2001, 2005 and 2009 from:

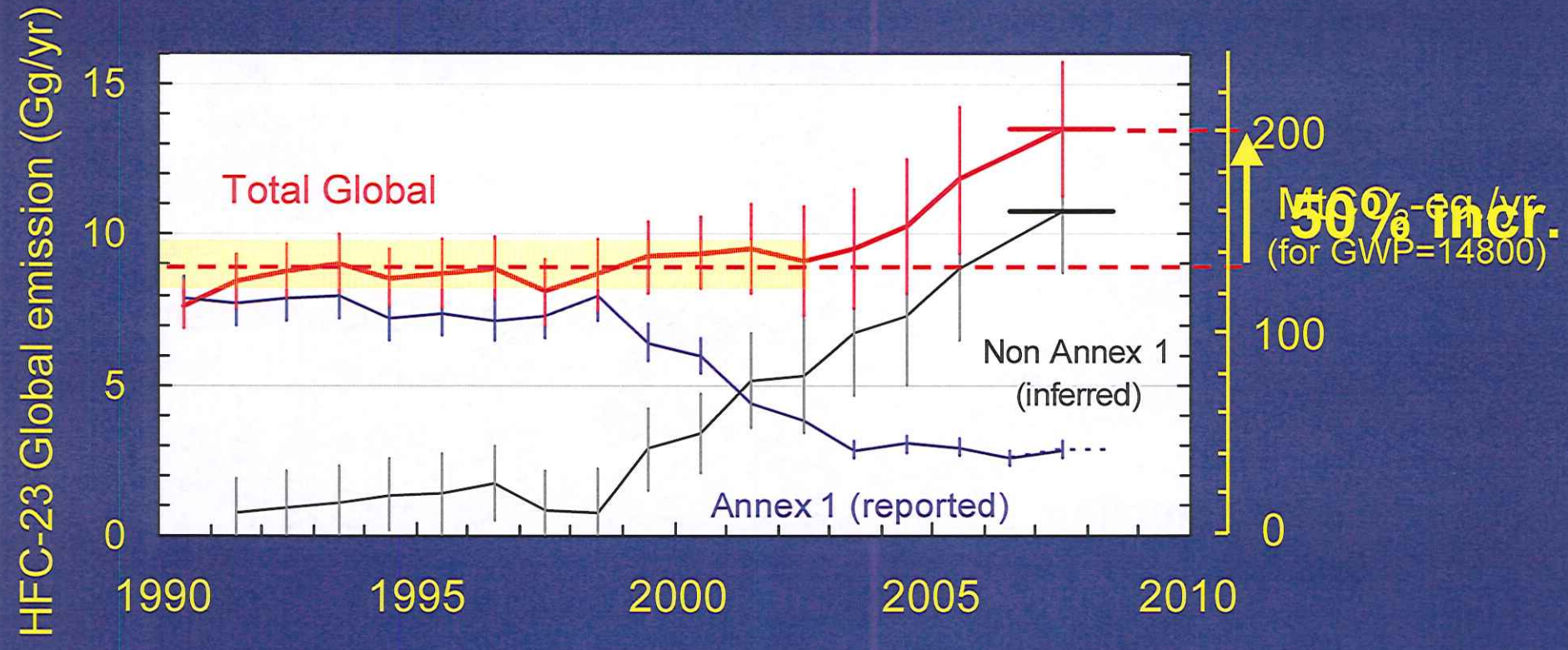


Surface air sampling in Antarctica

-extracting air from within the Antarctic snow pack…

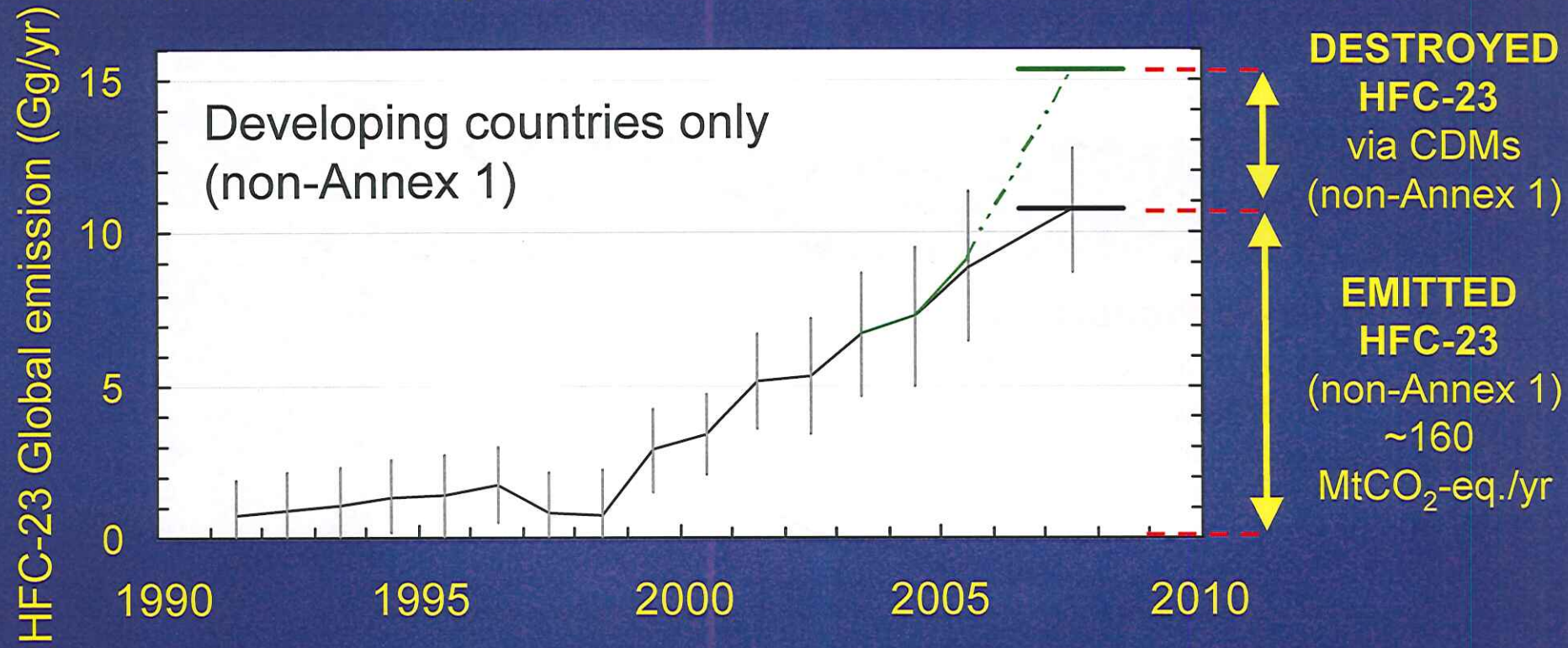
Derived HFC-23 emission:

- *Global increases (~50%)*
  …but decreases from Annex 1 (reported to UNFCCC)
- *Imply increasing emissions from non-Annex 1*

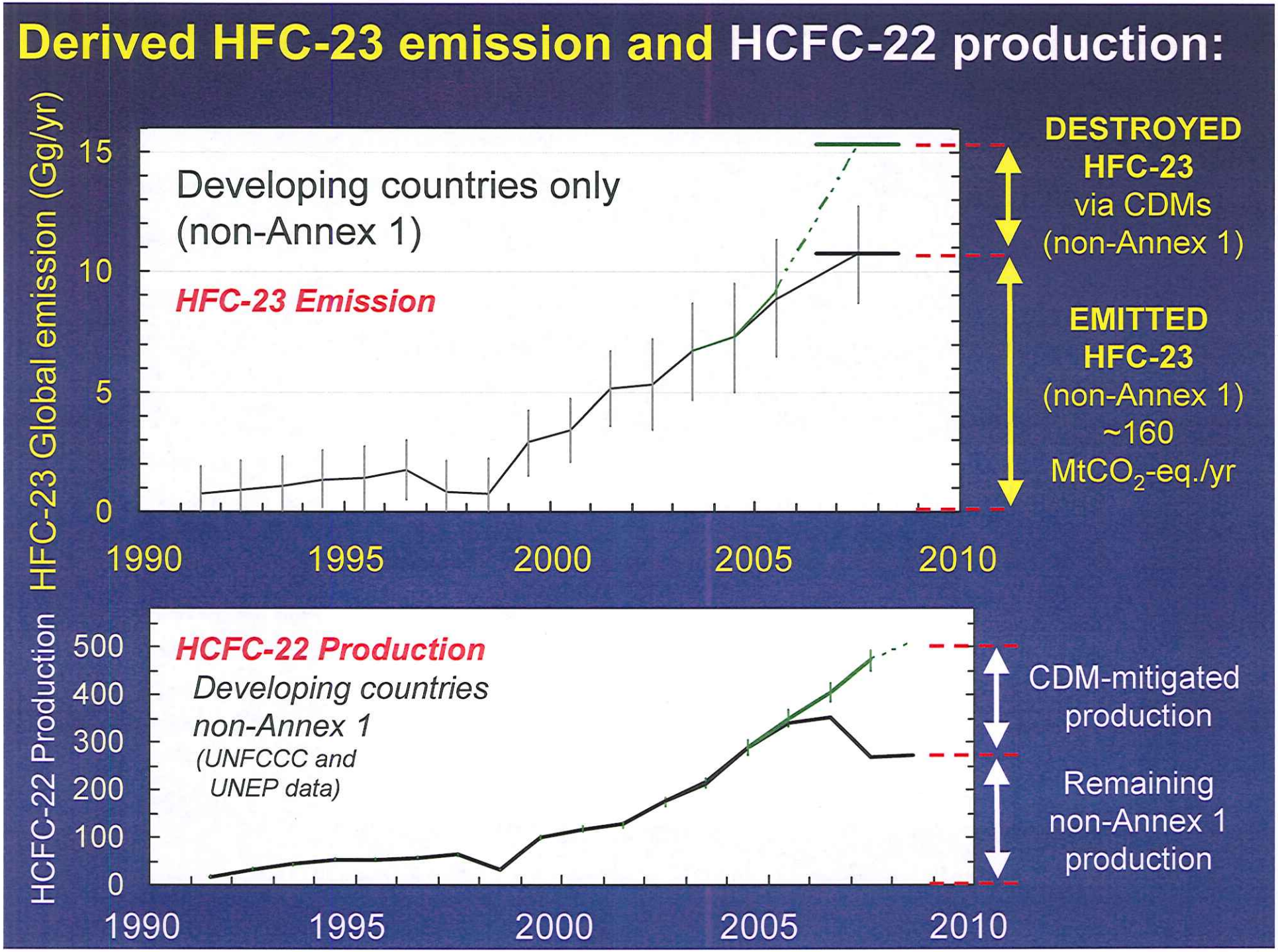


Derived HFC-23 emission:

- *Global increases (~50%)*
  …but decreases from Annex 1 (reported to UNFCCC)
- *Imply increasing emissions from non-Annex 1*
  → *even as some HFC-23 was destroyed in non-Annex 1 countries by Clean Development Mechanism projects (~100 $MtCO_2$-eq./yr in '07-'08;* ***worth ~$1 billion/yr****)*

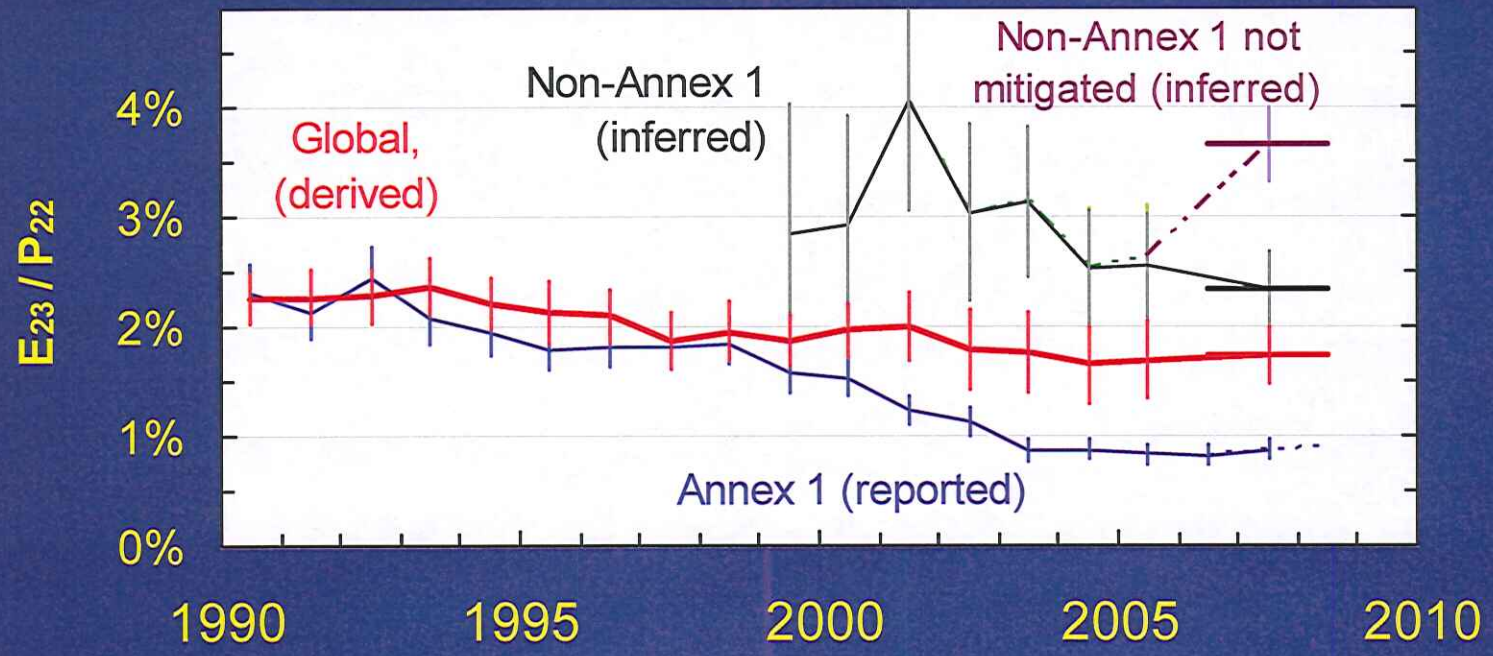


Derived HFC-23 emission and HCFC-22 production:



HFC-23 Emission relative to HCFC-22 Production:

- *overall emission yield of HFC-23 has decreased*
- *a stronger decrease is reported by Annex 1 countries*
- *the implied yield in non-Annex 1 countries is higher*
  - → *especially for non-Annex 1 production not covered by CDM projects*

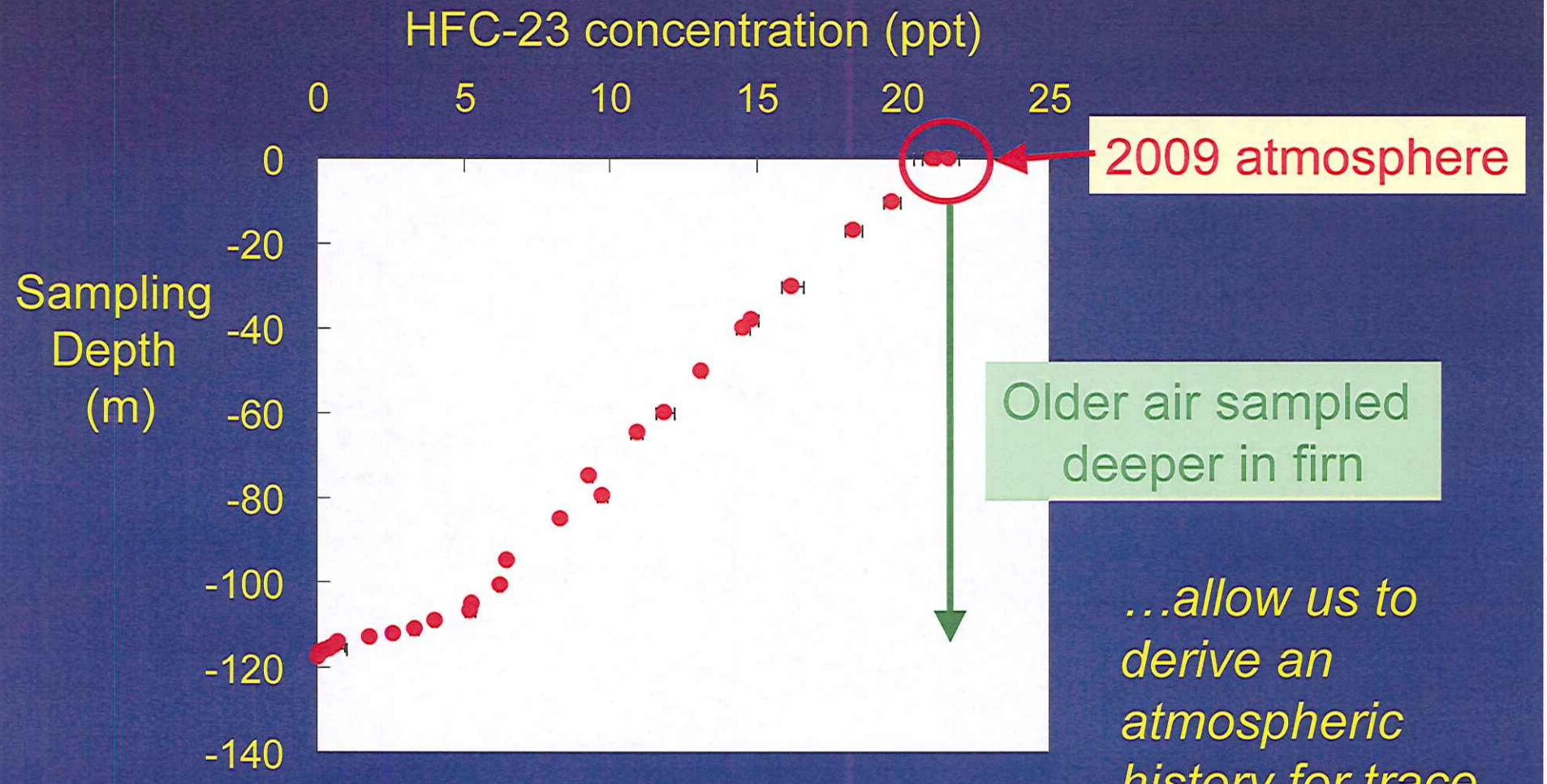


Conclusions:

- *Our observations indicate a 50% increase in global HFC-23 emissions since the early 2000s*
- *This increase can be attributed to developing countries*
- *The increase in developing country HFC-23 emissions is coincident with increases their HCFC-22 production*
- *CDM projects covered less than 50% of HCFC-22 production in 2007 in developing countries*
- *The overall yield of HFC-23 per HCFC-22 produced has decreased over time, but appears quite high in developing country production facilities not covered by CDM projects*
- *Global HFC-23 emissions augmented the climate influence of HCFC-22 during 2006-2008 by about 33%*

End

Measurements of HFC-23 from air trapped in snow:



Sampled in Jan 2009

…allow us to derive an atmospheric history for trace gases

Path Forward

Discussion

AGENDA

Welcome and Introductions	*Drusilla Hufford*
Implementing the Montreal Protocol	*Brian McLean*

Hydrofluorocarbons (HFCs)

■ Benefits of Phasing Down HFCs	*Cindy Newberg*
■ Outcome of 2009 HFC Negotiations	*John Thompson*
■ Science Update	*Stephen Montzka*
■ Path Forward	*Daniel Reifsnyder*
■ Discussion	*Moderated by Daniel Reifsnyder*

Ozone Depleting Substance (ODS) Destruction

■ Outcome of 2009 Discussions	*Tom Land*
■ Path Forward	*Daniel Reifsnyder*
■ Discussion	*Moderated by Daniel Reifsnyder*

Ozone Depleting Substance (ODS) Destruction

Outcomes of the 2009 ODS Destruction Discussions

ReCap Potential Benefits of ODS Destruction

- Accessible Banks of CFCs Globally
  - 280,000 tonnes CFCs *(SROC 2005)*
    - *3 $GtCO_2$*
  - *450,000 tonnes CFCs (RTOC 2006)*
    - *5 $GtCO_2$*
  - 245,000 tonnes CFCs = Low effort *(TEAP 2009)*
    - *2.5 GtCO2 = Low effort CFC banks*
  - 425 tonnes CFCs = Medium effort *(TEAP 2009)*
    - *4.5 GtCO2 = Medium effort CFC banks*

Decision XXI/2

1. One-day seminar margins of 2010 OEWG
2. ExCom continue considering pilot projects
3. TEAP review destruction technologies
4. ExCom measure climate benefits of projects
5. ExCom deliberate on special facility
6. Call for Parties and others to contribute to MLF
7. ExCom report on project status; for 2011 OEWG describe developing a national strategy

Table 2-2: Screened-In Technologies and Their Applicability

	Applicability		
Technology	Foams CFCs	CFCs	Halons
Cement Kilns	P	Y	P
Liquid Injection Incineration	X	Y	Y
Gaseous/Fume Oxidation	X	Y	Y
Municipal Solid Waste Incineration	Y	X	X
Reactor Cracking	X	Y	P
Rotary Kiln Incineration	Y	Y	Y
Argon Plasma Arc	X	Y	Y
AC Plasma	X	P	P
CO_2 Plasma	X	P	P
Inductively Coupled Radio Frequency Plasma	X	Y	Y
Microwave Plasma	X	Y	P
Nitrogen Plasma Arc	X	Y	P
Gas Phase Catalytic Dehalogenation	X	Y	P
Gas Phase Chemical Reduction	X	P	P
Solvated Electron Decomposition	X	P	P
Superheated Steam Reactor	X	Y	P

Where:

- Y (Yes) = Technology demonstrated on this category of ODS
- P (High Potential) = Technology not demonstrated specifically on this category of ODS, but considered likely to be applicable based on evidence of destruction of other substances (*i.e.*, refractory halogenated organics), and on professional judgement
- X = not applicable

XXI/2: Environmentally sound management of banks of ozone-depleting substances

Recalling Decision XX/7 which called for further study on the size and scope of banks of ozone-depleting substances and requesting the Multilateral Fund to initiate pilot projects on destruction with a view to developing practical data and experience,

Understanding that any such projects approved under the Multilateral Fund would be implemented consistent with national laws and international agreements related to wastes,

Noting the significant climate change and ozone layer benefits associated with destroying many types of ozone-depleting substances;

1. *To request* the Ozone Secretariat to host a one-day seminar on the margins of the 30th meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on the topic of how to identify and mobilize funds, including funds additional to those being provided under the Multilateral Fund, for ozone-depleting substance destruction, and *further requests* the Ozone Secretariat to invite the Multilateral Fund and the Global Environment Facility to consider co-coordinating this effort, and to invite other relevant institutions to attend the seminar;

2. *To request* the Executive Committee to continue its consideration of further pilot projects in Article 5 Parties pursuant to decision XX/7, and in that context, to consider the costs of a one-time window within its current destruction activities to address the export and environmentally sound disposal of assembled banks of ozone-depleting substances in low-volume-consuming countries that are not usable in the Party of origin;

3. *To request* the Technology and Economic Assessment Panel to review those destruction technologies identified in its 2002 report as having a high potential, and any other technologies, and to report back to the 30th meeting of the Open-ended Working Group on these technologies and their commercial and technical availability;

4. *To agree* that the Executive Committee of the Multilateral Fund should develop and implement, as expeditiously as possible, a methodology to verify the climate benefits and costs associated with Multilateral Fund projects to destroy banks of ozone-depleting substances, and should make such information publicly available on a project-level basis;

5. *To request* the Executive Committee to continue its deliberations on a special facility and to report on these deliberations, including possible options for such a facility as appropriate, to the 30th meeting of the Open-ended Working Group as an agenda item.

6. *To call upon* Parties, and institutions not traditionally contributing to the financial mechanism, to consider making additional support available to the Multilateral Fund for destruction of ozone-depleting substances, if they are in a position to do so;

7. *To request* the Executive Committee to report annually on the results of destruction projects to the Meeting of the Parties, and to request the Technology and Economic Assessment Panel, based on this, and other available information, to suggest to the thirty-first meeting of the Open-ended Working Group components designed to help Parties of diverse size and with diverse wastes to develop national and/or regional strategic approaches to address the environmentally sound disposal of the banks of ozone-depleting substances that are present in their countries and/or regions. In addition, this information should be available to the Technology and Economic Assessment Panel and the Parties to inform the consideration of the financial implications for the Multilateral Fund and other funding sources of addressing the destruction of ozone-depleting-substance banks;

Path Forward

Discussion

Montreal Protocol U.S. Stakeholder Meeting

- Thank You

U.S. EPA Montreal Protocol Awards:
http://epa.gov/ozone/awards/