

US EPA ARCHIVE DOCUMENT

# Introduction and Context for Coarse PM STAR Grants Final Progress Review

Tim Watkins

Deputy National Program Director  
Air Climate and Energy Research  
Office of Research and Development

March 18, 2013



# ORD Research Provides the Foundation for EPA's Decision-Making



## ***Air research has significant regulatory benefits & impacts***

- PM NAAQS protect public health
  - OMB: account for ~80% of all benefits attributable to regulation
  - OMB: \$120 to \$183 billion annual savings for years 1992-2002(emergency room visits / hospitalizations, lost workdays, premature deaths)
- ORD science reduces uncertainty and strengthens confidence in the NAAQS
- ORD science provides the models and tools needed to implement the NAAQS

# Regulatory Background for Coarse PM



- January 2006 – EPA proposed to revise the 24-hour PM<sub>10</sub> NAAQS to a standard based on a qualified PM<sub>10-2.5</sub> indicator
  - Qualified so as to include PM<sub>10-2.5</sub> that was dominated by resuspended dust from high-density traffic on paved roads and by PM generated by industrial and construction sources, and to exclude PM<sub>10-2.5</sub> dominated by rural windblown dust or by PM generated from agricultural or mining sources
- October 2006 – EPA issued final rule retaining 24-hour PM<sub>10</sub>
  - Available evidence was not sufficient to support a qualified PM<sub>10-2.5</sub> indicator
  - Important uncertainties remained, including the impact of PM<sub>10-2.5</sub> composition on thoracic coarse particle toxicity, an issue raised by stakeholder groups in the context of the relative toxicity of thoracic coarse particles from urban versus rural environments
  - Based on the lack of evidence about coarse particles in rural areas, and after considering public comments, EPA took a cautious approach and retained existing 24-hour PM<sub>10</sub> standard to protect people in all areas of the country
  - EPA also finalized a new FRM for PM<sub>10-2.5</sub> to facilitate gathering scientific data to support future reviews of the PM NAAQS

**RFA Issued  
July 2006**

# Objectives of RFA



- Improve understanding of the type and severity of health outcomes associated with PM10-2.5
- Improve understanding of at-risk populations
- Characterize and compare influence of mass, composition, source characteristics and exposure estimates in different locations on differences in health outcomes, including comparisons of rural and urban areas
- Characterize composition and variability of PM10-2.5 in towns, cities or metropolitan areas, including comparisons of rural and urban areas

# Building Sustainability and Systems Thinking into EPA Research

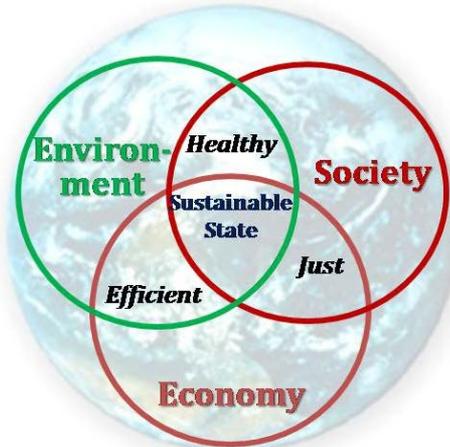
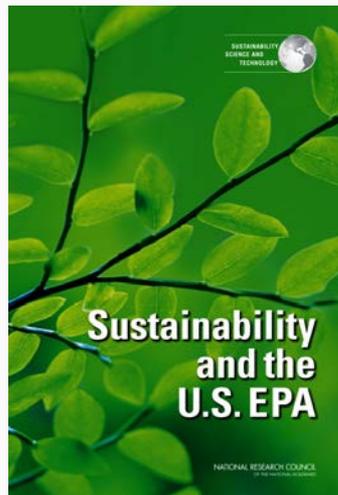


## Previous ORD Research Programs

<b>Air</b>	Global
Drinking Water	Water Quality
Human Health	Ecosystems
Mercury	Land
Homeland Security	Human Health Risk Assmt
Endocrine Disruptors	Safe Pesticides/Products
Sustainability	Computational Toxicology



## New ORD Research Programs



# Earth Systems



**Air**  
Ambient Air Quality  
Pollutant Deposition

**Climate**  
Changes in:  
Temperature · Extremes  
Precipitation · Sea Level

Exposures to and Effects on:

**Ecosystems · Watersheds**  
**Human Health and Communities**

**Responses**  
Mitigation  
Prevention  
Adaptation

**Social Factors**  
Population · Public Health · Economy  
Technology · Transportation · Behavior  
Water/Food Supply · Land Use Change

**Responses**  
Mitigation  
Prevention  
Adaptation

**Energy**  
Emissions of Air  
Pollutants  
and Other Environmental  
Stressors

# Human Systems

# ACE Strategic Vision



ACE Topic	Near Term Targeted Research		Long Term Mission Driven Research	
	Objective	Examples	Objective	Examples
Climate Impacts, Mitigation, and Adaptation	Address climate impacts on air quality and human and ecosystem health	<ul style="list-style-type: none"> <li>Assess impacts of climate change on future ozone and PM concentrations</li> <li>Identify subpopulations vulnerable to impacts of climate change</li> <li>Identify impacts of climate change on TMDLs</li> </ul>	Credible models and tools to inform sustainable policies, decisions, and responses to climate change	<ul style="list-style-type: none"> <li>Tool to evaluate policy decisions that simultaneously achieve air quality, ecosystem conservation, and climate change mitigation goals (GLIMPSE)</li> <li>Integrated Climate and Land Use Scenarios (ICLUS)</li> </ul>
Emissions and Measurements	Develop and evaluate regulatory methods for source and ambient air monitoring	<ul style="list-style-type: none"> <li>Federal Reference Methods for NAAQS</li> <li>Source compliance methods</li> </ul>	Change the paradigm for air pollution monitoring	<ul style="list-style-type: none"> <li>Apps and Sensors</li> <li>Satellites</li> <li>Low cost fence line monitoring</li> </ul>
Modeling and Decision Support Tools	Develop and evaluate local, regional, and hemispheric air quality modeling tools	<ul style="list-style-type: none"> <li>CMAQ</li> <li>Local Scale Dispersion Models (LIDEA)</li> <li>Hemispheric-CMAQ</li> </ul>	Develop and evaluate models to integrate multimedia processes and systems	Integrated air quality and hydrological models for nitrogen
NAAQS and Multipollutant	Inform NAAQS Reviews	<ul style="list-style-type: none"> <li>Assess impacts of Ozone on cardiovascular disease</li> <li>Assess impact of exposure to air pollutants on susceptible subpopulations</li> </ul>	Develop approaches to assess multipollutant exposures and the resulting human and ecological effects of air pollutant mixtures	<ul style="list-style-type: none"> <li>Assess health effects of mixtures</li> <li>Multipollutant exposure metrics</li> <li>Near source multipollutant studies</li> <li>Genetic/Epigenetic, omics</li> <li>MOA of Toxicity pathways</li> </ul>
Sustainable Energy Evaluation	Evaluate environmental impacts of energy technology	<ul style="list-style-type: none"> <li>Assess environmental impacts of oil and gas extraction</li> <li>Assess human health impacts of biofuels</li> </ul>	Inform policies protecting human and ecosystem health in an evolving energy landscape	Apply systems modeling (MARKAL) to generate emissions from alternative future energy scenarios and evaluate potential environmental impacts

# Looking Forward



- PM NAAQS (December 14, 2012)
  - Coarse particles continued to be addressed by retaining the 24hr PM<sub>10</sub> NAAQS of 150  $\mu\text{g}/\text{m}^3$
- Looking for the results from these PM Coarse grants to
  - Move the science forward
  - Inform future PM NAAQS Reviews
- Synthesis of Results
  - ACE document(s)
  - Integrated Science Assessment (ISA)