Sustainable Energy and Air Quality Planning for the Northeast US

Application of a Multi-Pollutant Policy Analysis Framework to New York State

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NESCAUM NESCCAF

Acknowledgements

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- NYSERDA
- NY DEC

Presentation Outline

- Motivation for proposal and Multi-P planning in the Northeast
- Overview of project: objectives, scope, tasks, and deliverables
- Discuss potential cross-fertilization with EPA pilot activities for NYDEC (e.g., RTI, UNC)

Motivation for developing a multi-pollutant analytical framework

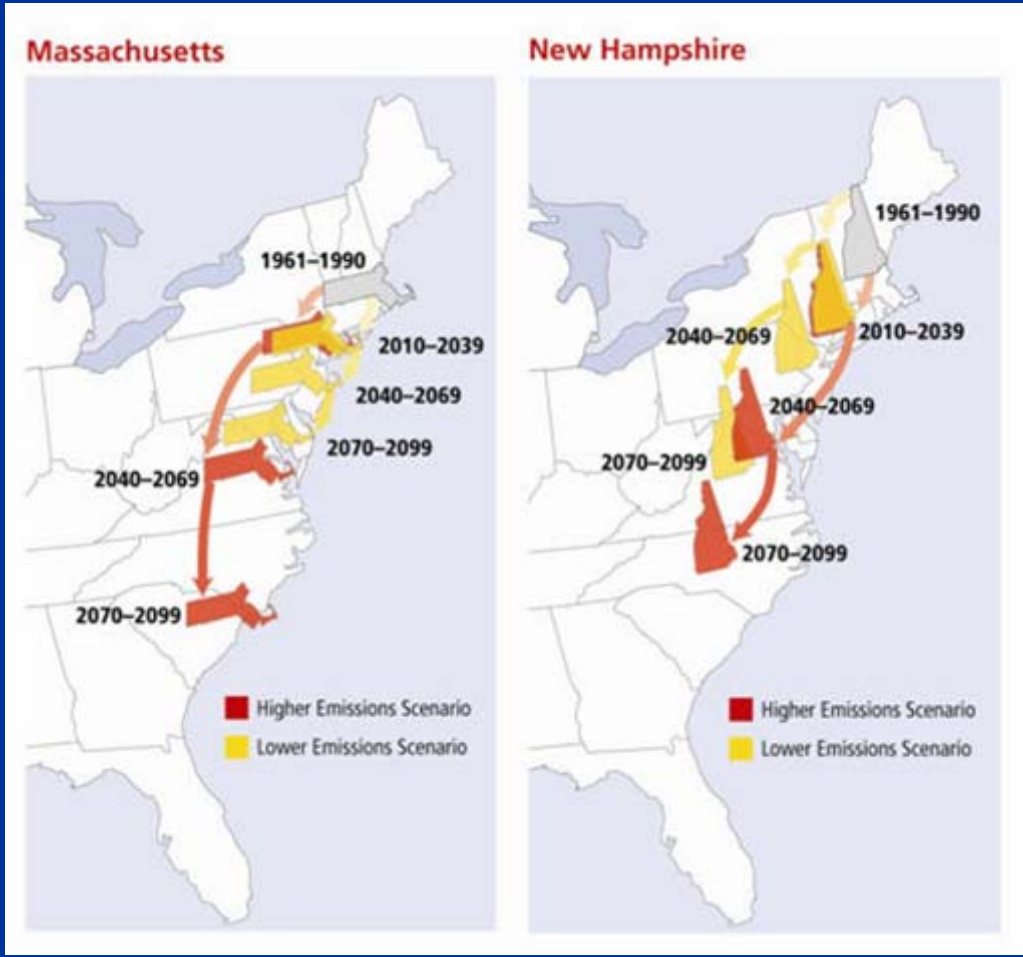
(or, what are the challenges to and opportunities for sustainable air quality management?)

Observed Climate Change Impacts in the Northeast U.S.

- More frequent extreme-heat days (maximum temperatures greater than 90°F)
- A longer growing season
- Earlier leaf and bloom dates for plants
- Shifts in the mating cycles of frogs to earlier in the year
- Earlier migration of Atlantic salmon in northeastern rivers
- An increase in heavy rainfall events
- Earlier breakup of winter ice on lakes and rivers
- Earlier spring snowmelt resulting in earlier high spring river flows
- Less precipitation falling as snow and more as rain
- Rising sea surface temperatures and sea level
- Reduced snowpack and increased snow density

[UCS Northeast Climate Impacts Assessment]

Climate Change in the Northeast

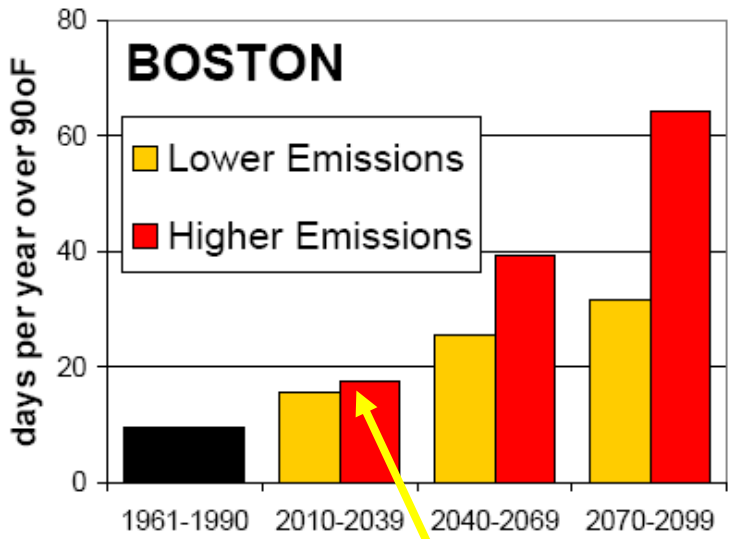


Alternative energy pathways can make a difference in our future climate change "commitment"

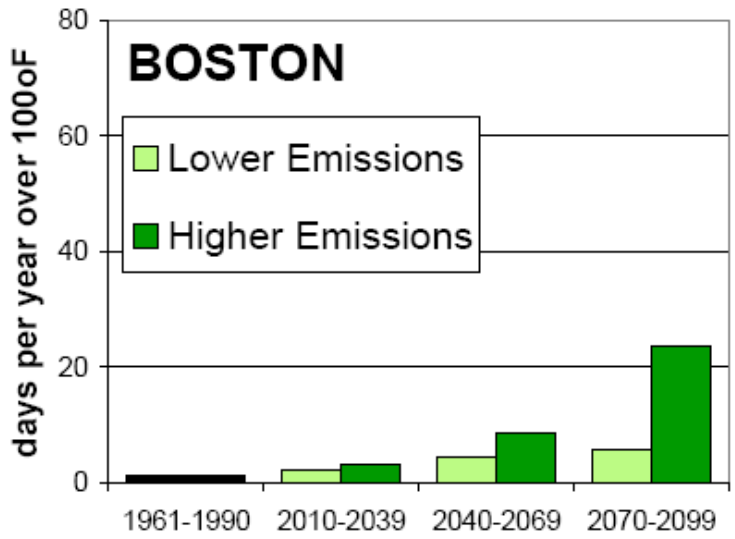
Source: UCS NECIA

Climate Change in the Northeast

>90°F



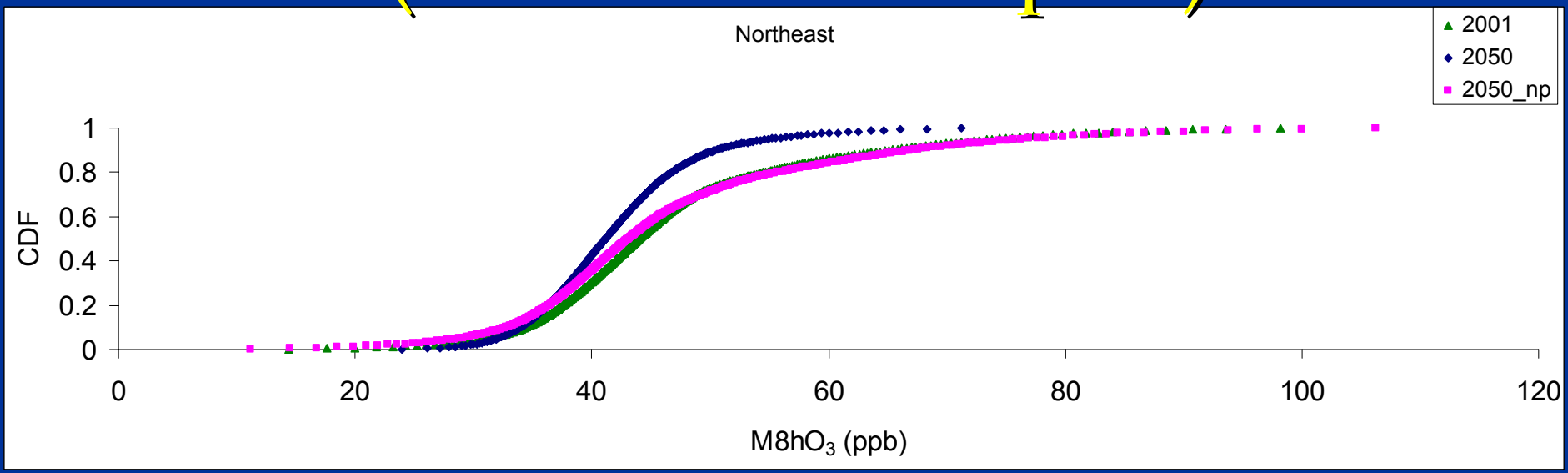
>100°F

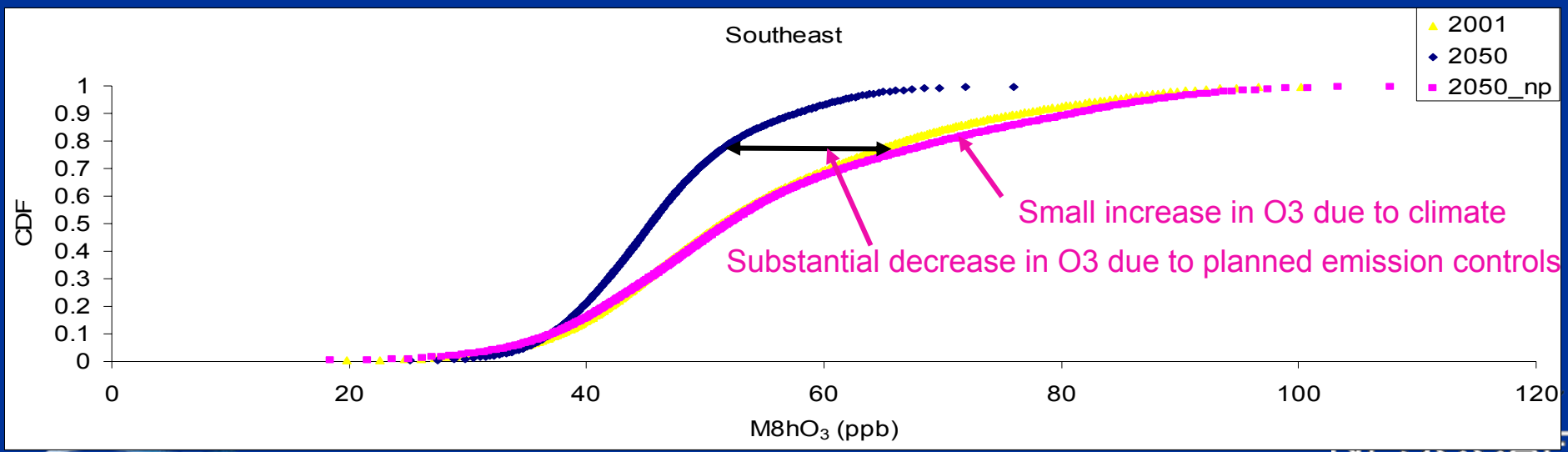


Difference between attainment and nonattainment??

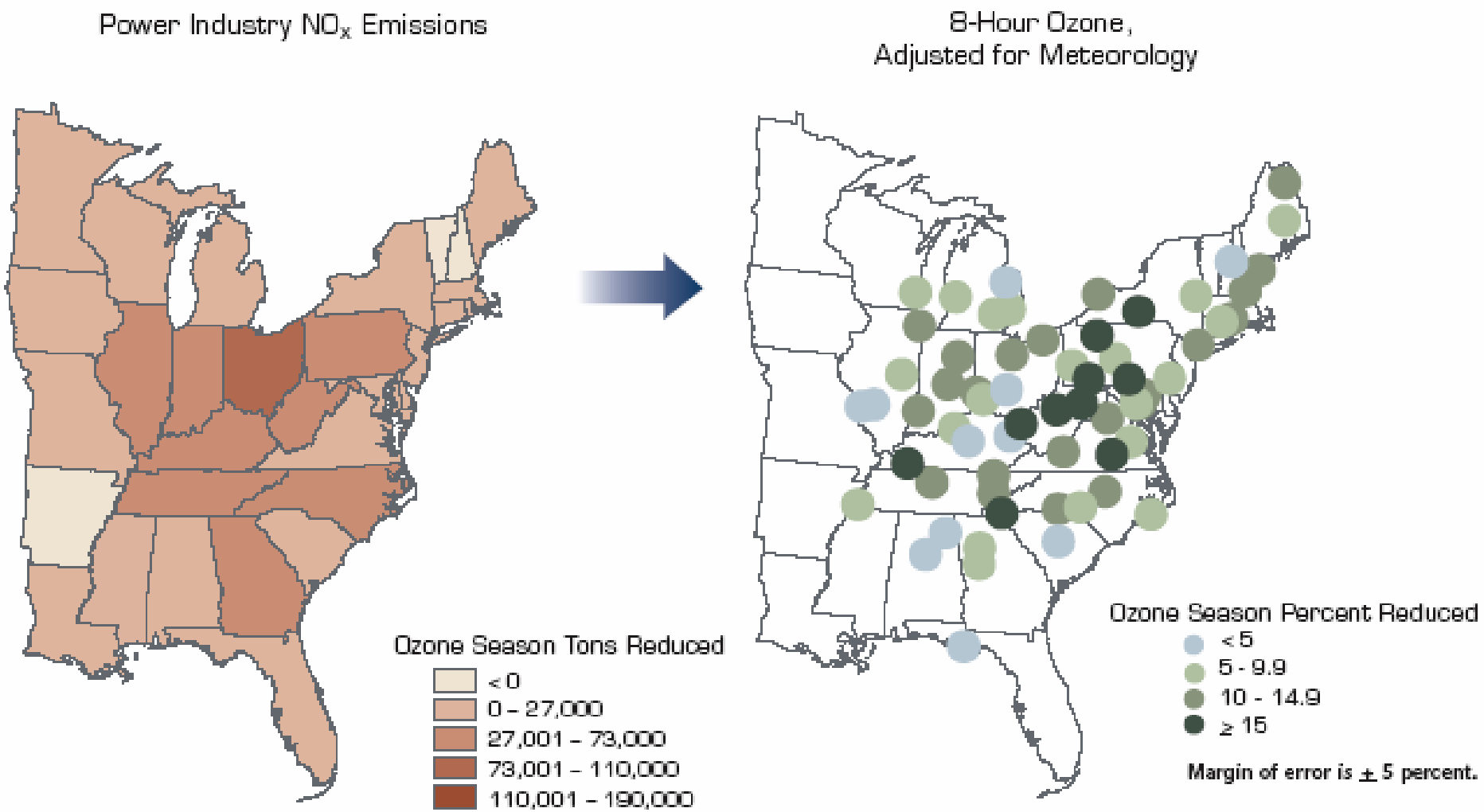
Source: UCS NECIA

Climate and Air Quality Links (Link 1 - The Impact)





Reductions in Ozone Season Power Industry NO_x Emissions and 8-Hour Ozone, 2002 versus 2004

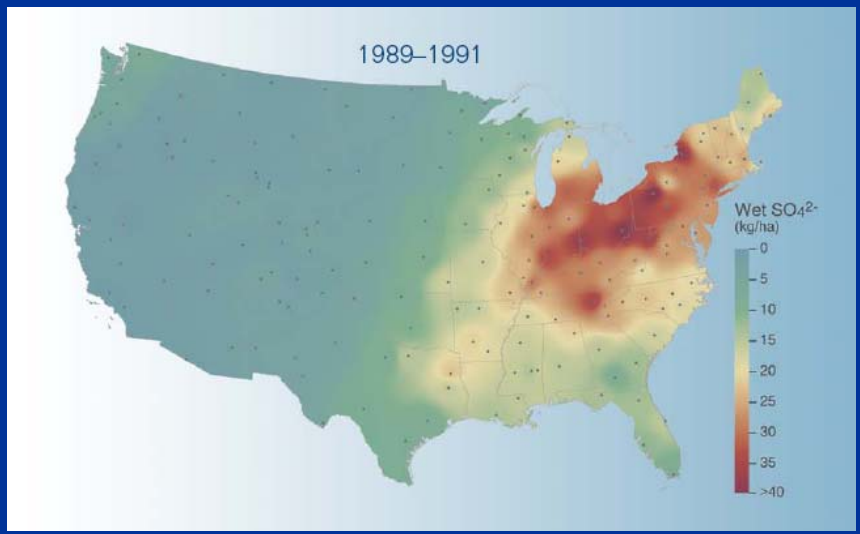


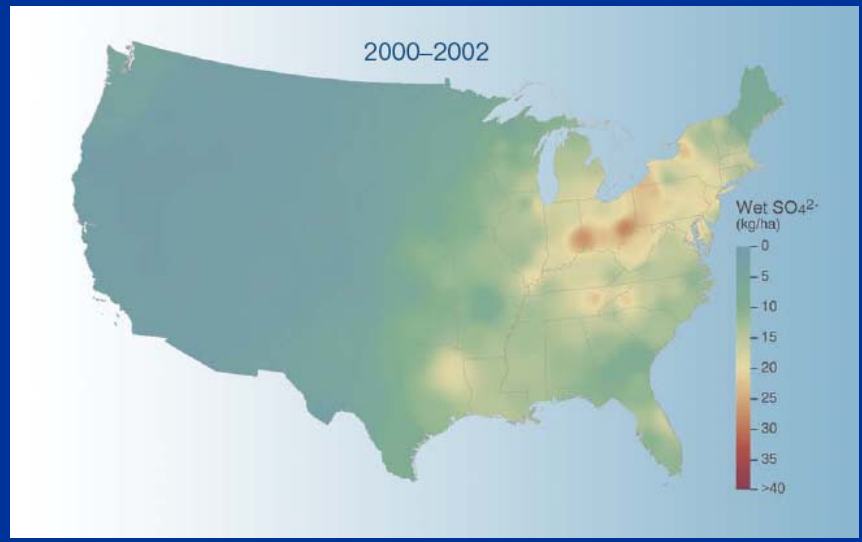
Source: EPA

Notes:

- Darker states show larger NO_x reductions.
- Arkansas (268 tons), New Hampshire (611 tons), and Vermont (16 tons) show small increases in ozone season emissions from 2002 to 2004.

Acid Deposition



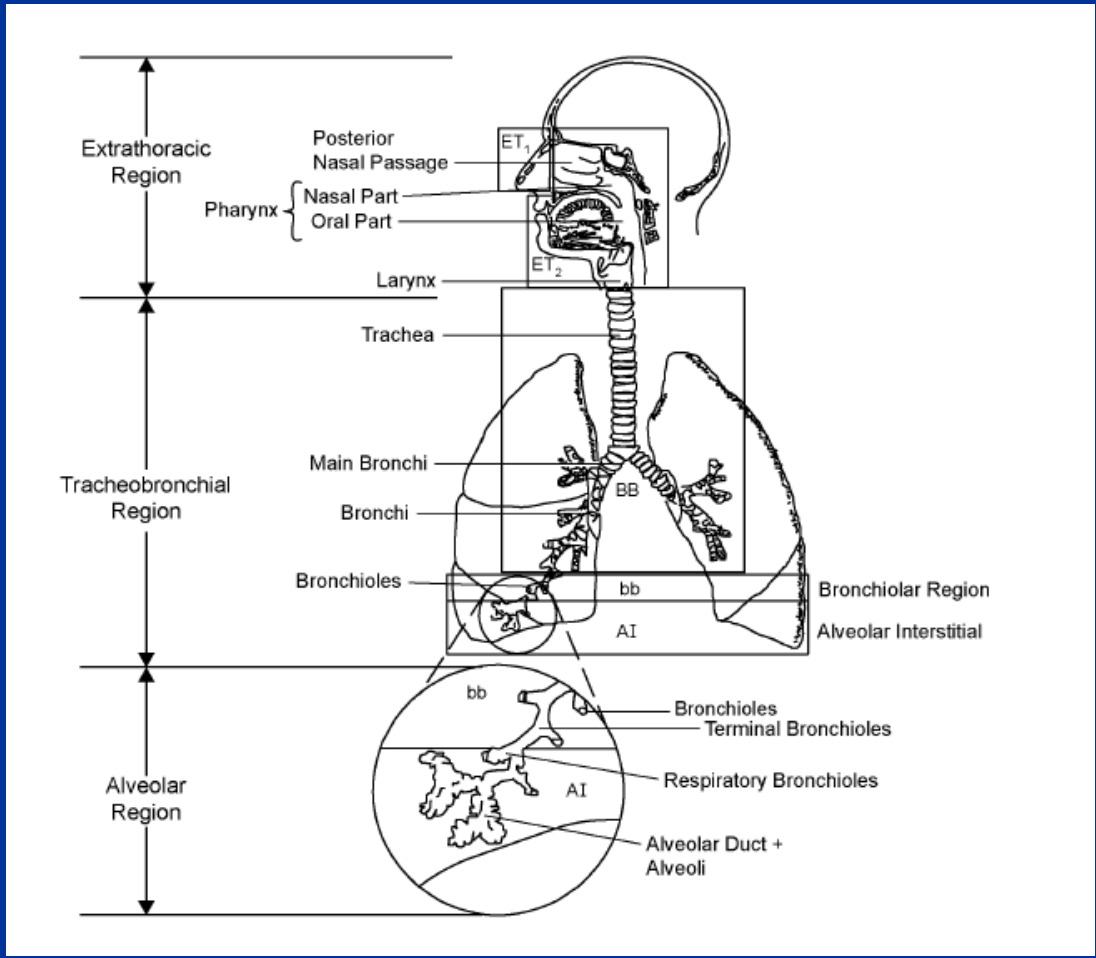


Before Title IV

After Title IV

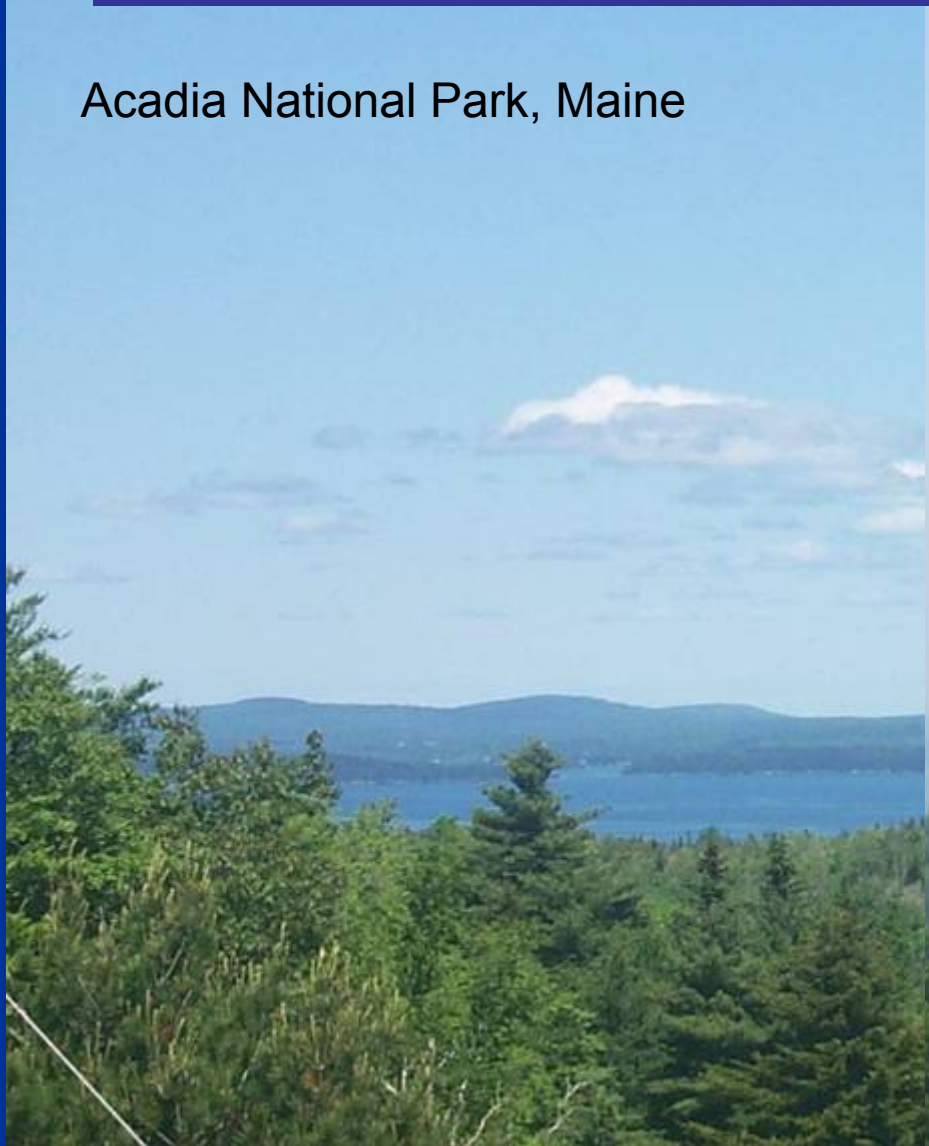
Source: NAPAP, 2005

Fine Particles and Health

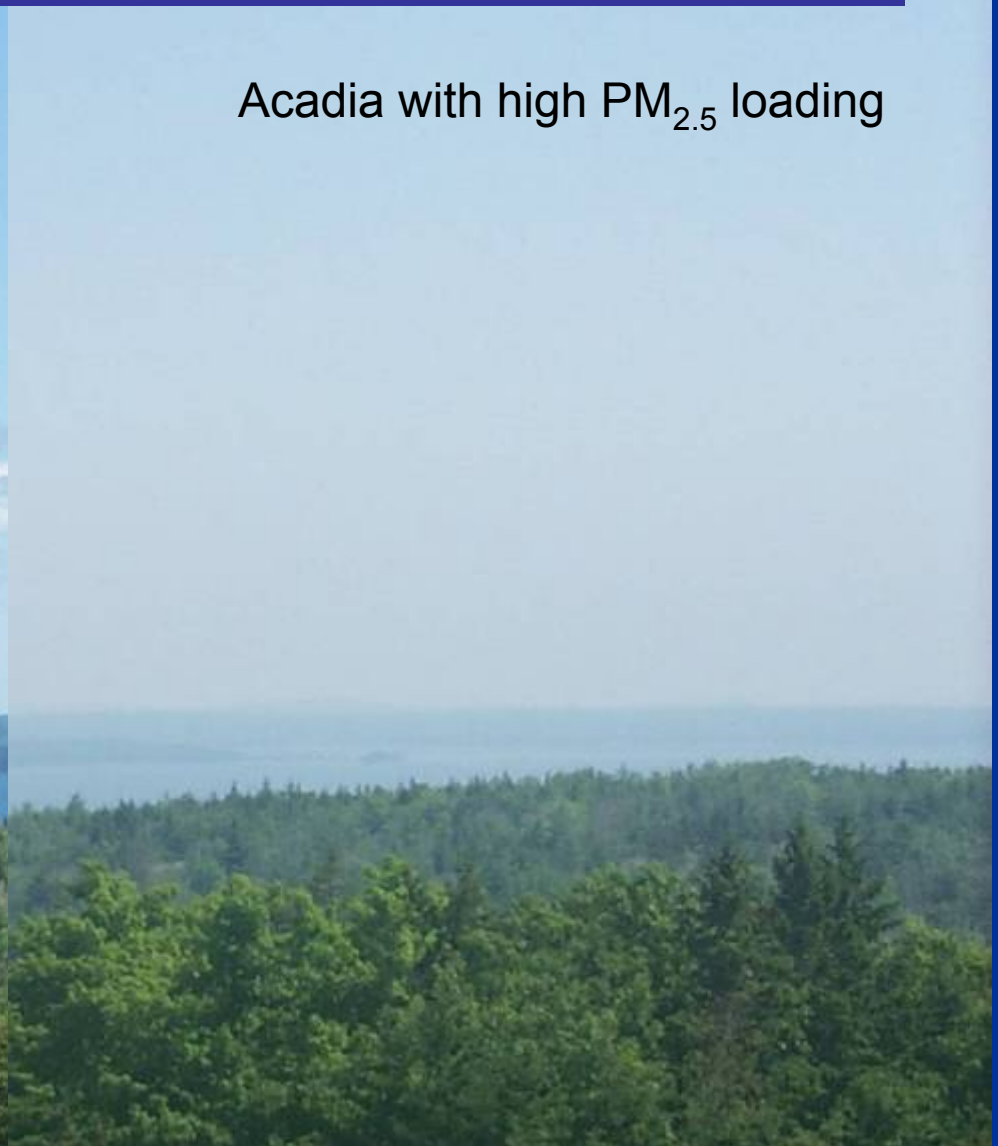


Fine Particles and Visibility

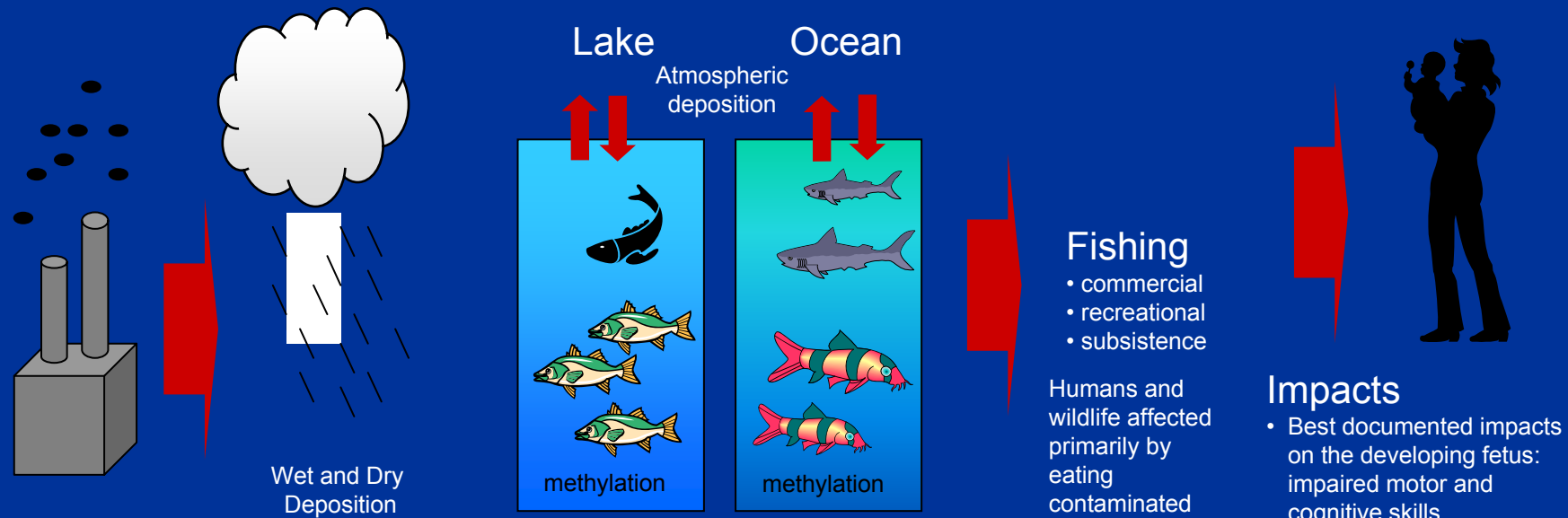
Acadia National Park, Maine



Acadia with high $PM_{2.5}$ loading



Mercury Emissions Contribute to Exposure to Mercury



Emissions and Speciation → **Atmospheric Transport and Deposition** → **Ecosystem Transport, Methylation, and Bioaccumulation** → **Consumption Patters** → **Human Exposure**

- The primary pathway of human exposure to mercury in the U.S. is through eating contaminated fish.
- Power plants emit approximately 48 tons of mercury and are the largest source of mercury emissions in the U.S. (approximately 41%).

Diesel/Black Carbon

Climate and Air Quality Links (Link 2 - The Opportunity)

A Low Carbon Future Could Mean…

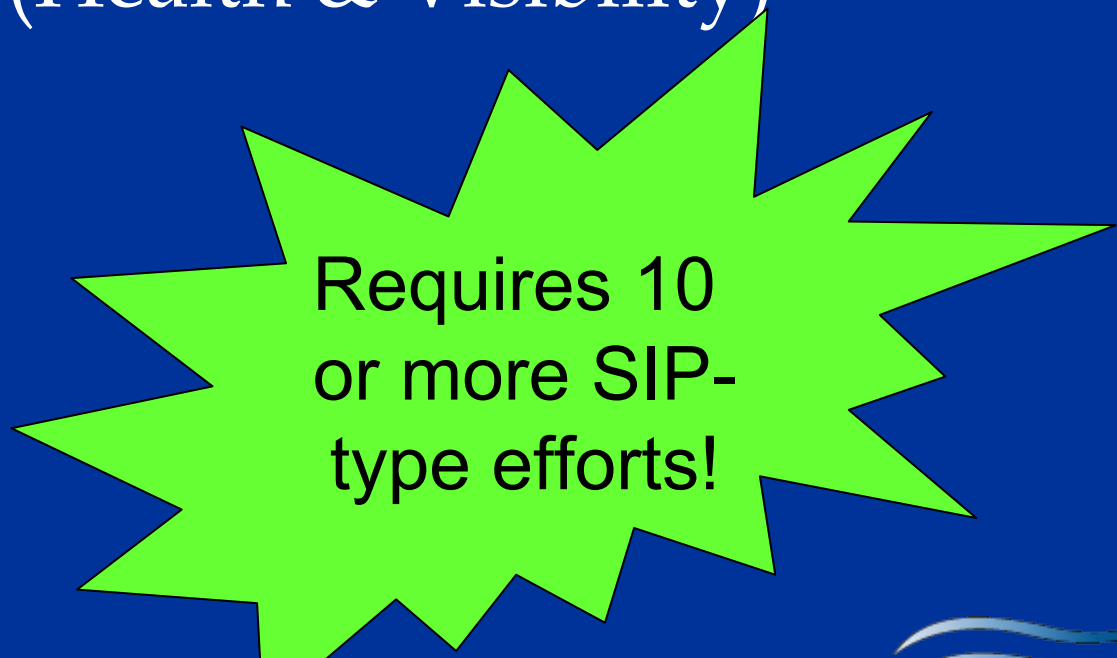
- Low NOx future
- Low SO_2 future
- Low Hg and other toxic metals future
- Low Diesel/Black Carbon future

…A more sustainable Future

Multi-Pollutant Air Quality Planning

Air Quality Management Issues

- Acid Deposition
- Mercury Deposition
- Fine Particles (Health & Visibility)
- Ozone
- Air Toxics
- Climate

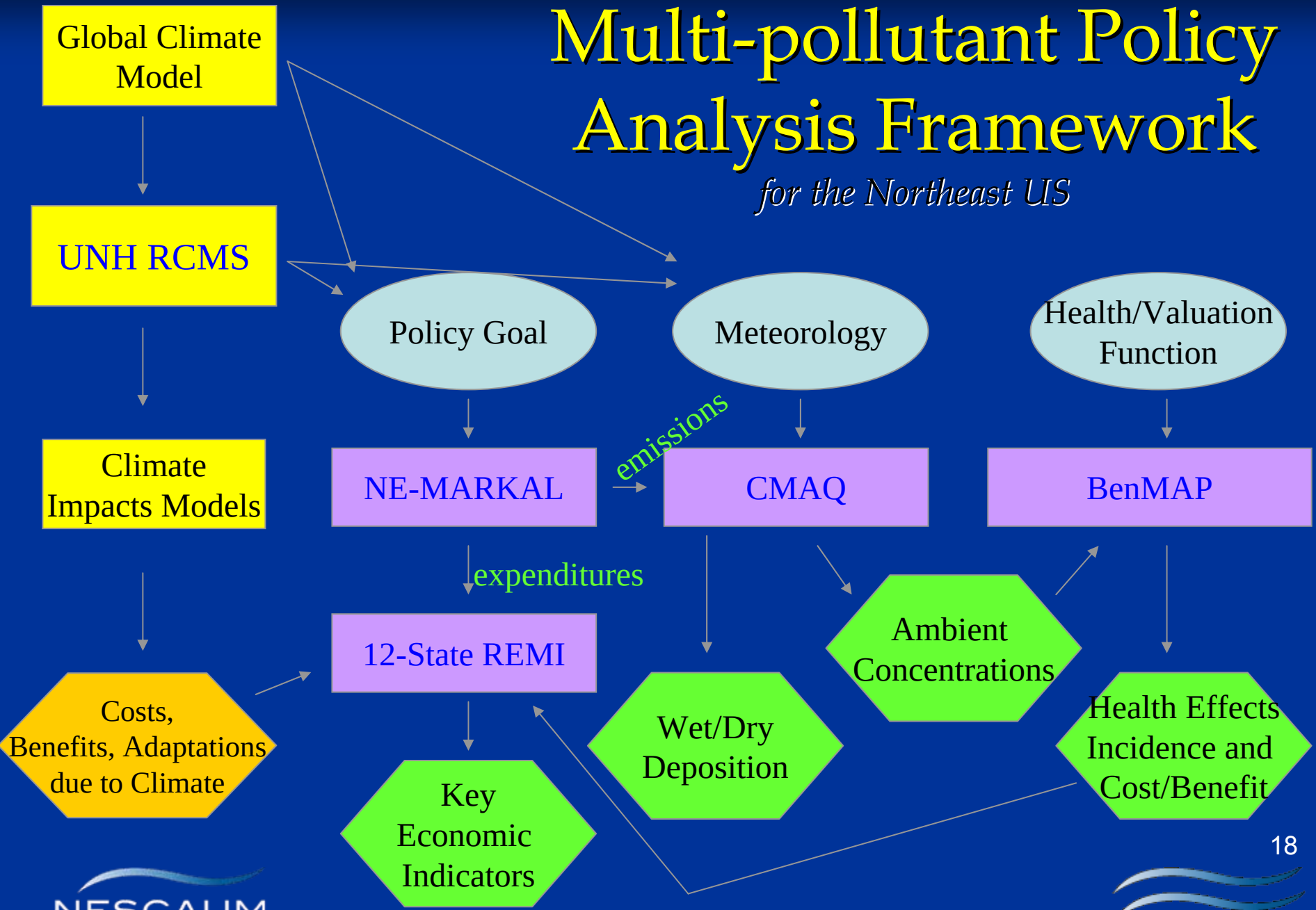


Multi-Pollutant Planning

- June 2007: Clean Air Act Advisory Committee recommended that governments adopt a comprehensive statewide air quality planning process and move from a single to a multiple pollutant approach in managing air quality
- Northeast States seek to balance climate change and energy work with criteria pollutants and toxics work; looking for ways to analyze and make integrated policy decisions.

Multi-pollutant Policy Analysis Framework

for the Northeast US



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Celebrating 40 Years in Support of Clean Air for the Northeast

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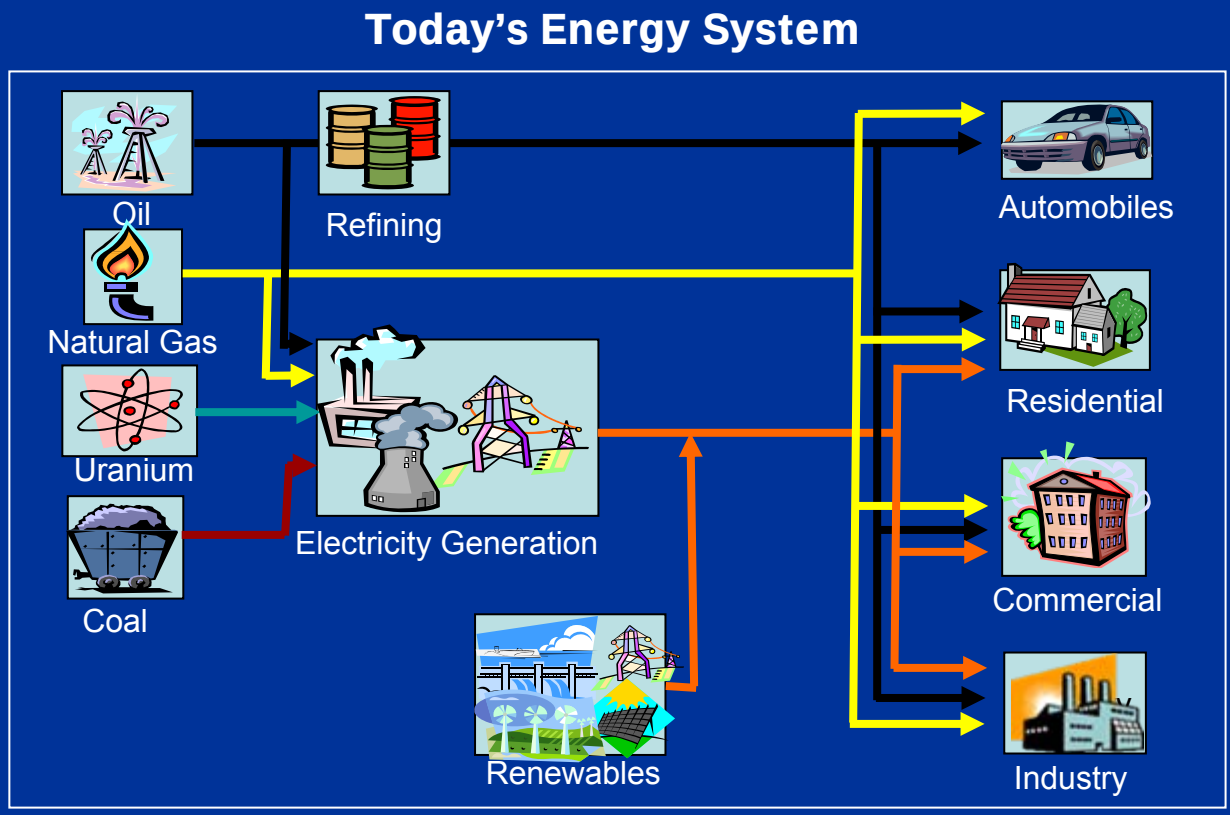
NE-MARKAL: Links Energy and Air Quality



Air Pollution

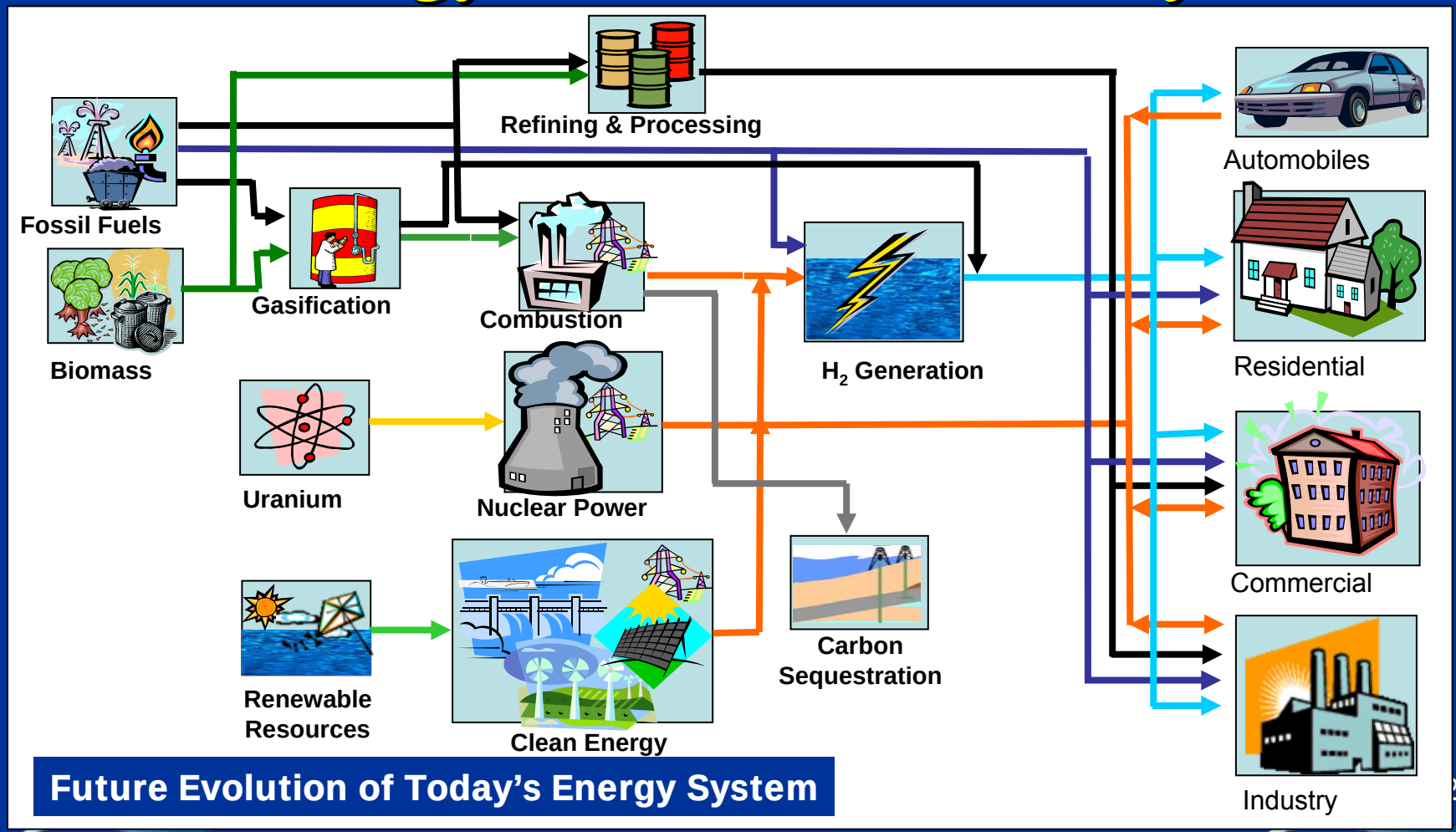
Contribution to anthropogenic emissions:

NOx ~ 95%
SOx ~ 89%
CO ~ 95%
Hg ~ 87%
CO_2 ~94%

Air Quality Concerns:
Ozone
PM2.5
Acid deposition
Toxics

Source: EPA ORD

NE-MARKAL: Projects future Energy AND Air Quality



Project Overview

(What are the project objectives, scope, tasks, and deliverables?)

Project Goals:

- To identify a suite of strategies that will simultaneously be able to make significant progress toward ozone, PM, mercury, acid deposition, and climate goals
- To use NESCAUM's Multi-pollutant Policy Analysis Framework (MPAF) to develop a solid basis for these strategies from the perspectives of the economy, technological evolution, the environment, and other public health endpoints

Scope

- In order to keep this potentially unwieldy project manageable, we will limit it to examining options that can be represented in the existing framework relatively easily
- Very important to identify priority areas UP FRONT and then keep to those areas of identified importance

Caveats on MPAF Approach

- This is just one set of tools. While expansive in its coverage, it will not provide perfect representation of all sectors and technologies.
- This is not a forecast tool. MPAF is used for policy analysis, not to predict the future!
- This is an iterative process that informs (not supplants) SIP, climate and energy planning.

Tasks

- Identify environmental targets
- Identify key strategies
- Represent goals and strategies in MPAF, and document reference scenario and assumptions
- MPAF Analysis (Iterative process: NE-MARKAL → CMAQ)
- Final Report
- Technology Transfer
- Public Outreach

Project Policy Objectives

- Build institutional capacity at NYDEC to use MPAF
  - Identify policy challenges and capacity building needs, host workshop and document results
- Work with NYDEC as it works in a multi-p mode and identifies/addresses cross-sector pollutant interactions and trade-offs
  - Iterative and coordinated process -- strategies must be identified, tailored and refined
- Serve as model for replication in broader NE
  - Assist with NYSERDA on outreach activities: work with PAC/present at EMEP, outreach to EPA, NACAA. OTC, MARAMA, and academic audiences, publish in peer-reviewed literature

Project Status

- 18 month project with April 1 start date.
- Held initial meetings and calls with NYDEC and NYSERDA
- Established Project Advisory Committee: first meeting July 11
- Developing preliminary draft of environmental targets and key strategies

Data Needs/Possible Interaction with EPA

- Key aspect from an economic perspective:
  - Cost of control options
- Key aspect from a multi-P perspective:
  - Multi-P emission factors
  - Inventory calibration
- Could RTI or UNC or EPA help us with these issues?

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Thank You!

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