Section 812 Second Prospective Air Quality Modeling

AQMS Review
February 19, 2010

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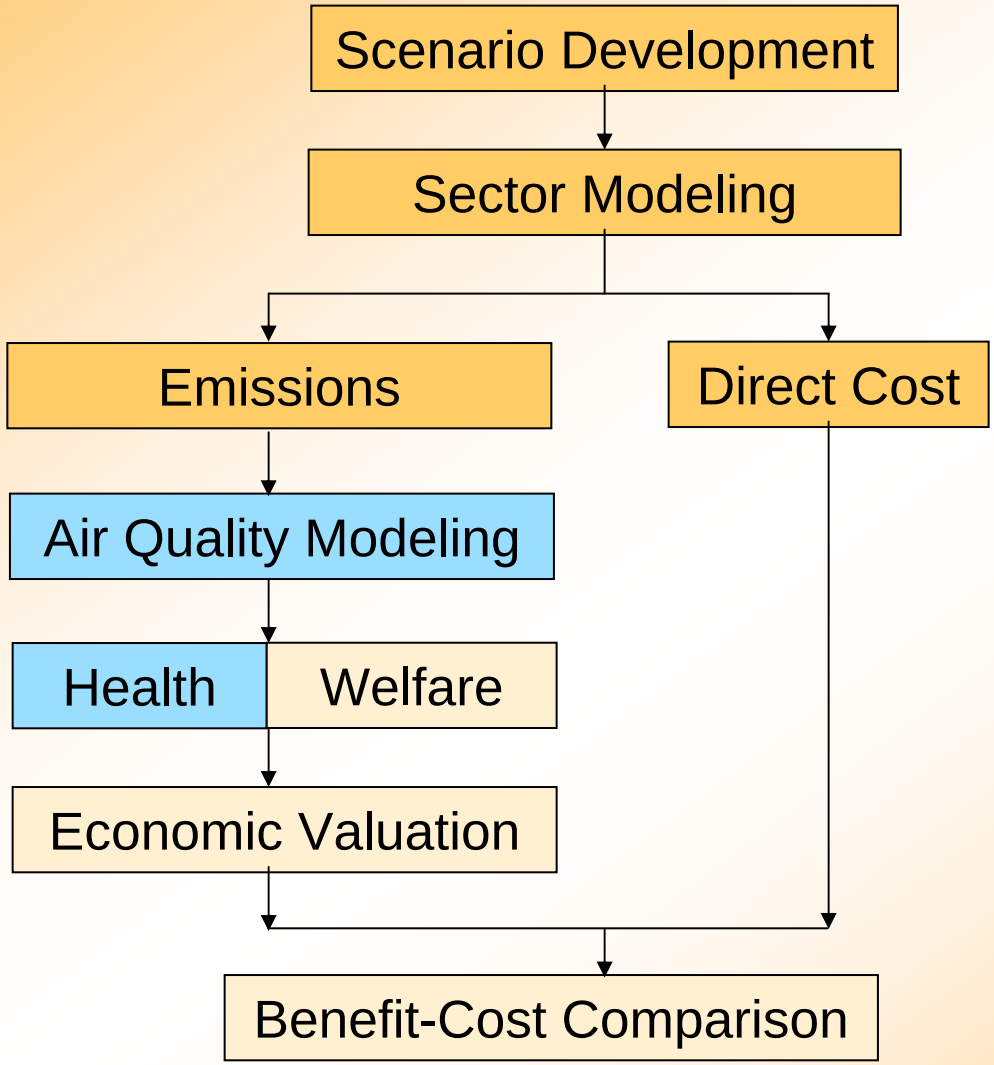
Project Team Present

- Jim Neumann, Industrial Economics
- Jim Wilson, Pechan
- Leland Deck, Stratus
- Sharon Douglas, ICF International
  - CMAQ preparation and results
  - AMET-based model performance evaluation
- Jim DeMocker, EPA
  - Status of overall study
  - Diagnostic comparison of 1st vs 2nd Prospective



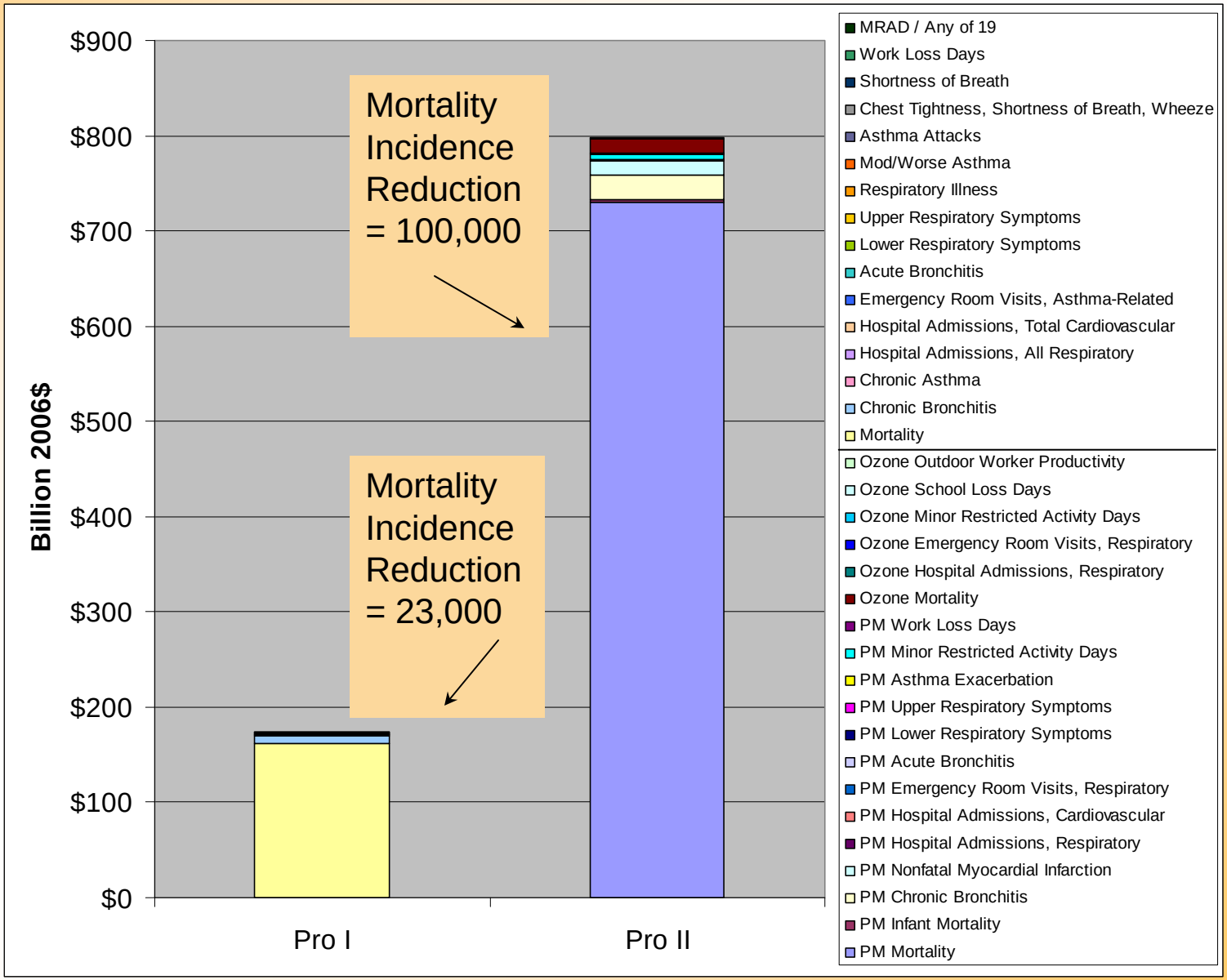
Scenarios:
Core
Hi Econ Growth
Lo Econ Growth
Marginal Changes

Supplemental Analyses:

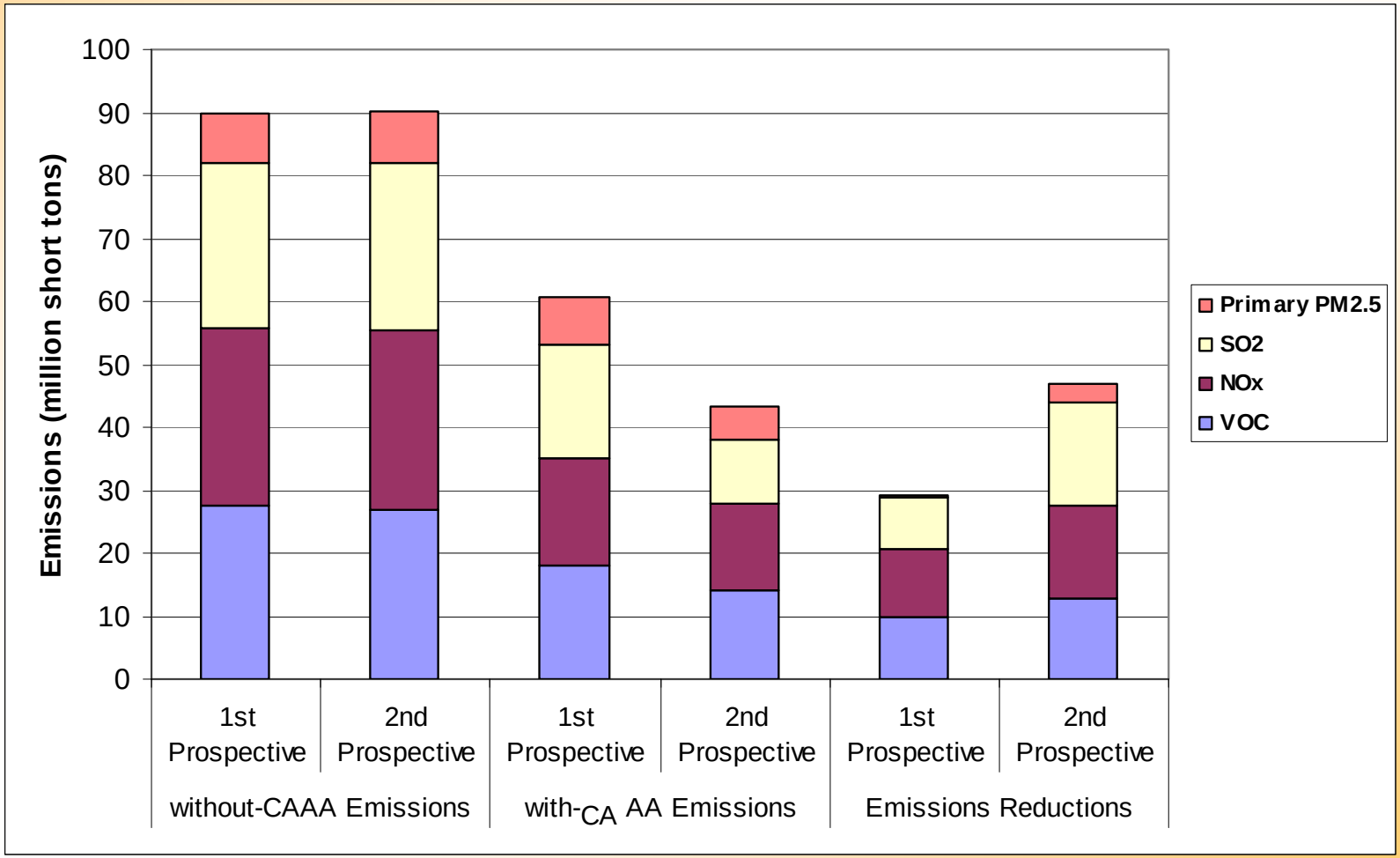
- HAP case study
- Eco lit review
- Eco case study
- ~~Title VI reanalysis~~
- Uncertainty
- CGE modeling

Final | *Draft Final* | *In Progress*

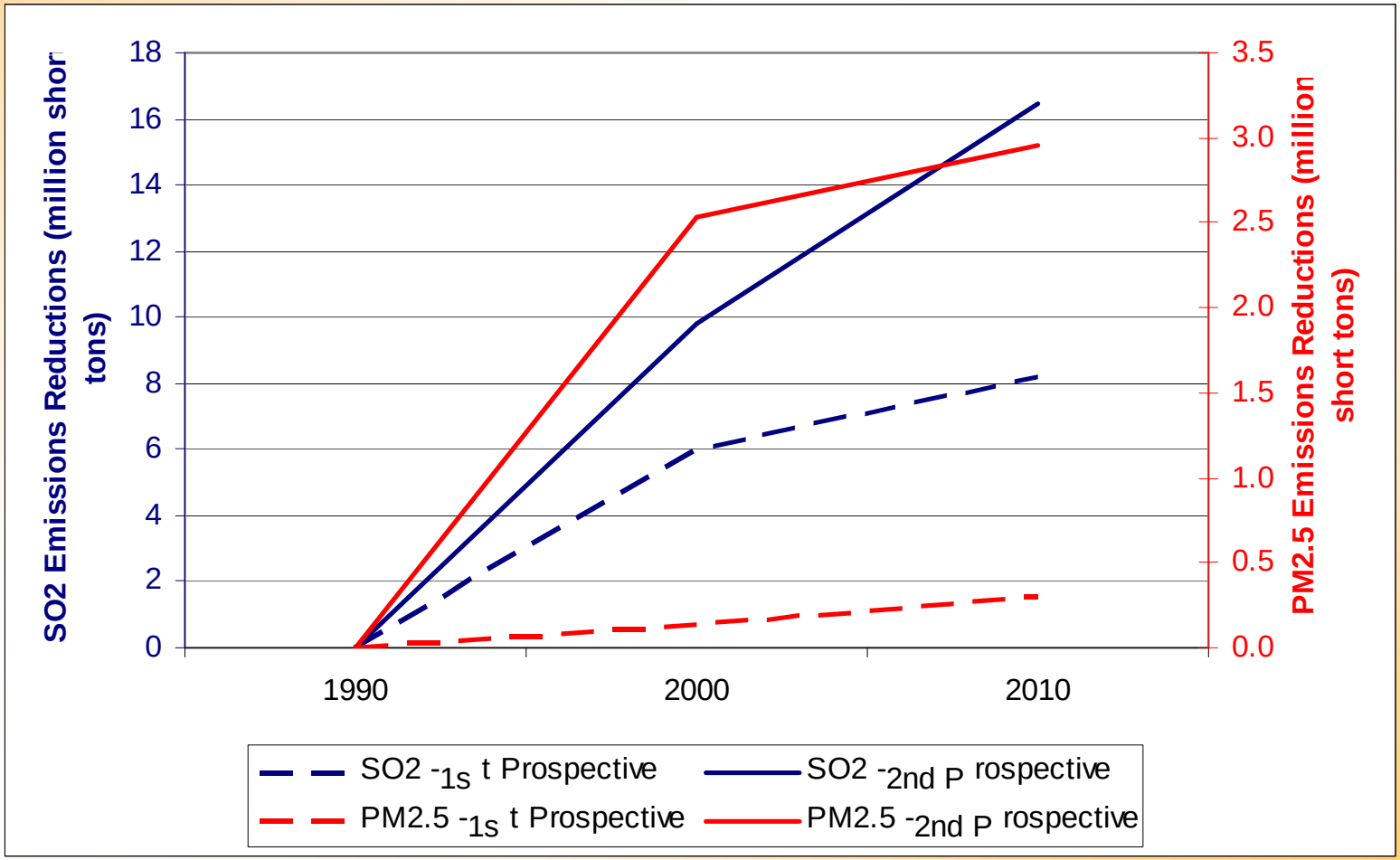
Pro I vs Pro II Monetized 2010 Health Benefits By Health Endpoint – Billions of 2006$



First vs Second Prospective 2010 Emissions and Emissions Reductions [excluding CO and PM_{10}]



Trends in 1st vs 2nd Prospective Emissions Reductions – SO_2 and Primary $PM_{2.5}$



Second Prospective Emissions
1990 & 2010 Primary $PM_{2.5}$ by Sector

Sector	1990	2010 *without-CAAA*	2010 *with-CAAA*	2010 Reduction	2010 % Reduction
EGU	357,674	704,443	515,115	189,328	27%
Non-EGU Point	1,299,259	1,651,644	393,943	1,257,701	76%
Nonpoint	5,255,977	5,366,784	4,054,177	1,312,607	24%
Nonroad	283,960	297,466	184,593	112,873	38%
On-Road Vehicle	321,852	169,690	93,621	76,069	45%

Potential Adjustment to Primary PM2.5 Ambient Contribution

- Retrofitting condensibles in 1990 NEI significantly increased 1990 baseline inventories
- May also reflect other artifacts of using 1990 NEI for without-CAAA90
- If further evaluation shows adjustment warranted…
- Consider roll-back of primary PM2.5 contribution
  - Adjust county-level inventories
    - Non-EGU
    - Construction component of Nonpoint
  - Roll back primary PM2.5
    - Assume linear contribution of primary PM2.5 to ambient
    - Assume primary PM2.5 not interactive with other species
  - Re-run MATS
  - Re-run BenMAP

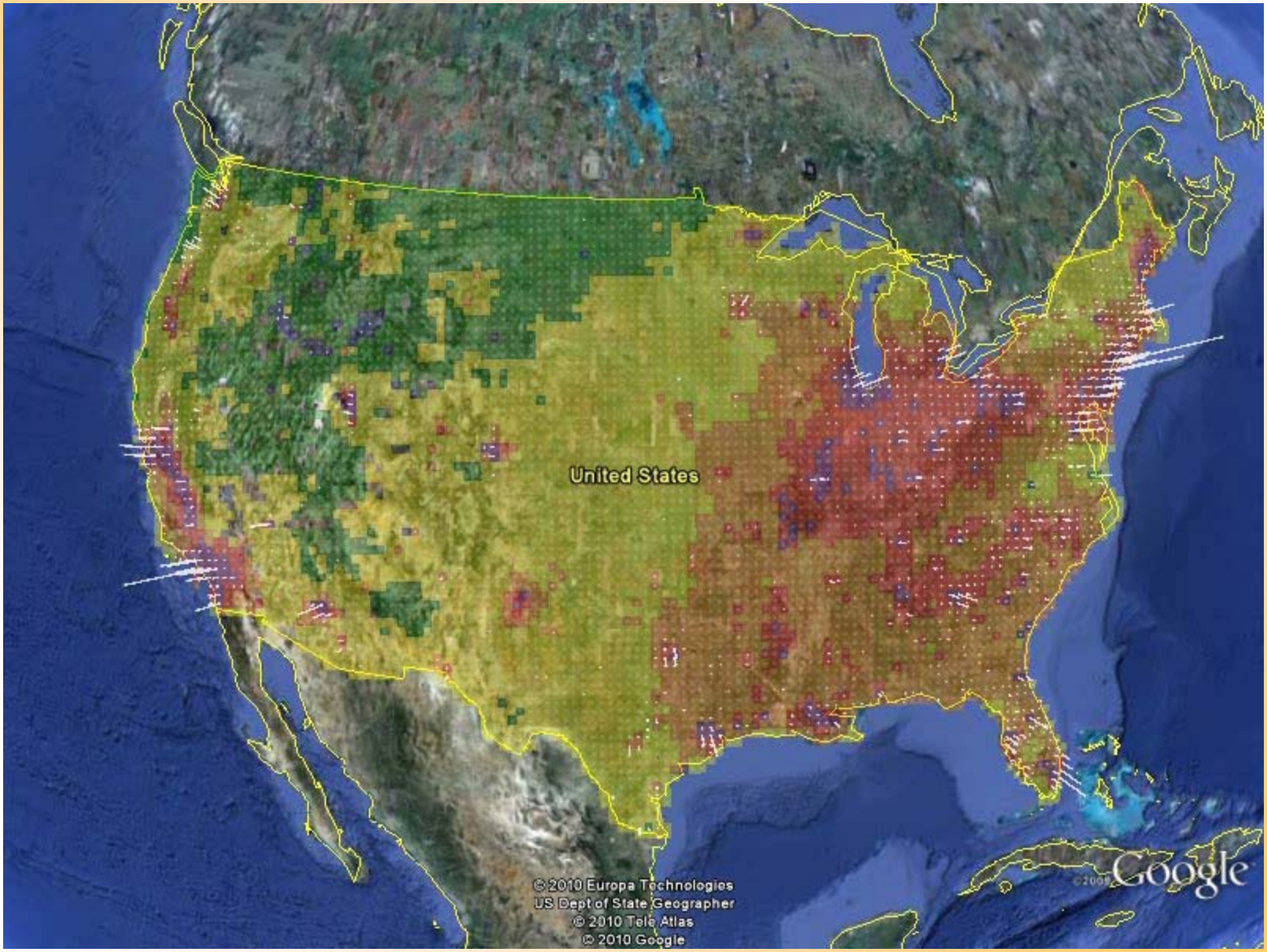
1st vs 2nd Prospective Air Quality Modeling

- Loss of Pro I grid-level data precludes full and effective comparative analysis of Pro I vs Pro II
- Project Team's Assessment
  - Differences in models, model configuration may be factors
    - Grid resolution, simulation period, met data, baseline concentrations
    - More complete coverage of particle species may be key
  - Core model formulation changes probably don't contribute significantly to differences
    - Chemistry, advection schemes
  - Monitor interpolation method to estimate baseline concentrations between monitors is also countervailing
    - Pro II (MATS) narrows modeled concentration changes relative to Pro I method (eVNA)
  - Richness of baseline PM2.5 monitor data may be a major factor
    - Pro I relied on cross estimation from PM10
    - Pro II employed much more extensive and valid PM2.5 monitor data

Key Factors Driving Differences

- Scenario Changes ↑
  - CAIR, CAVR, CAND, HDDV, Tier II, etc in Pro II
- Emissions ↑
  - Greater reductions in direct PM2.5 and precursor emissions
    - But adjustments may be needed ↓?
  - Reductions apparently better targeted to population
- Air Quality Modeling ↑
  - Improved AQM captures previously omitted species
  - PM2.5 monitor data replaced PM10 cross estimation
- Concentration-Response Function for PM Mortality ↔
  - Move from Pope et al (1995) to Pope et al (2002)
  - Note: now moving to higher PM mortality function so ↑
- Morbidity Endpoints ↑
  - Addition of acute myocardial infarction (AMI)

Google Earth visualization of results
2010 PM2.5 ambient reductions vs population



Next Steps

- Ecological Effects Subcommittee
  - March 9-10 review
- Health Effects Subcommittee
  - March 2 teleconference follow-up to December 15-16 review
- Complete remaining analytical work, draft overall report
- Council
  - May 4-5 review