

Utah Winter Air Pollution Problems and Solutions

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Wintertime PM in Utah



- Utah's mountain valleys and wintertime temperature inversions provide ideal conditions for the formation of fine particulate.
- PM_{2.5} Concentrations build as temperature inversions persist.
- Utah will need to develop State Implementation Plans to meet revised federal Health Standards for PM_{2.5}

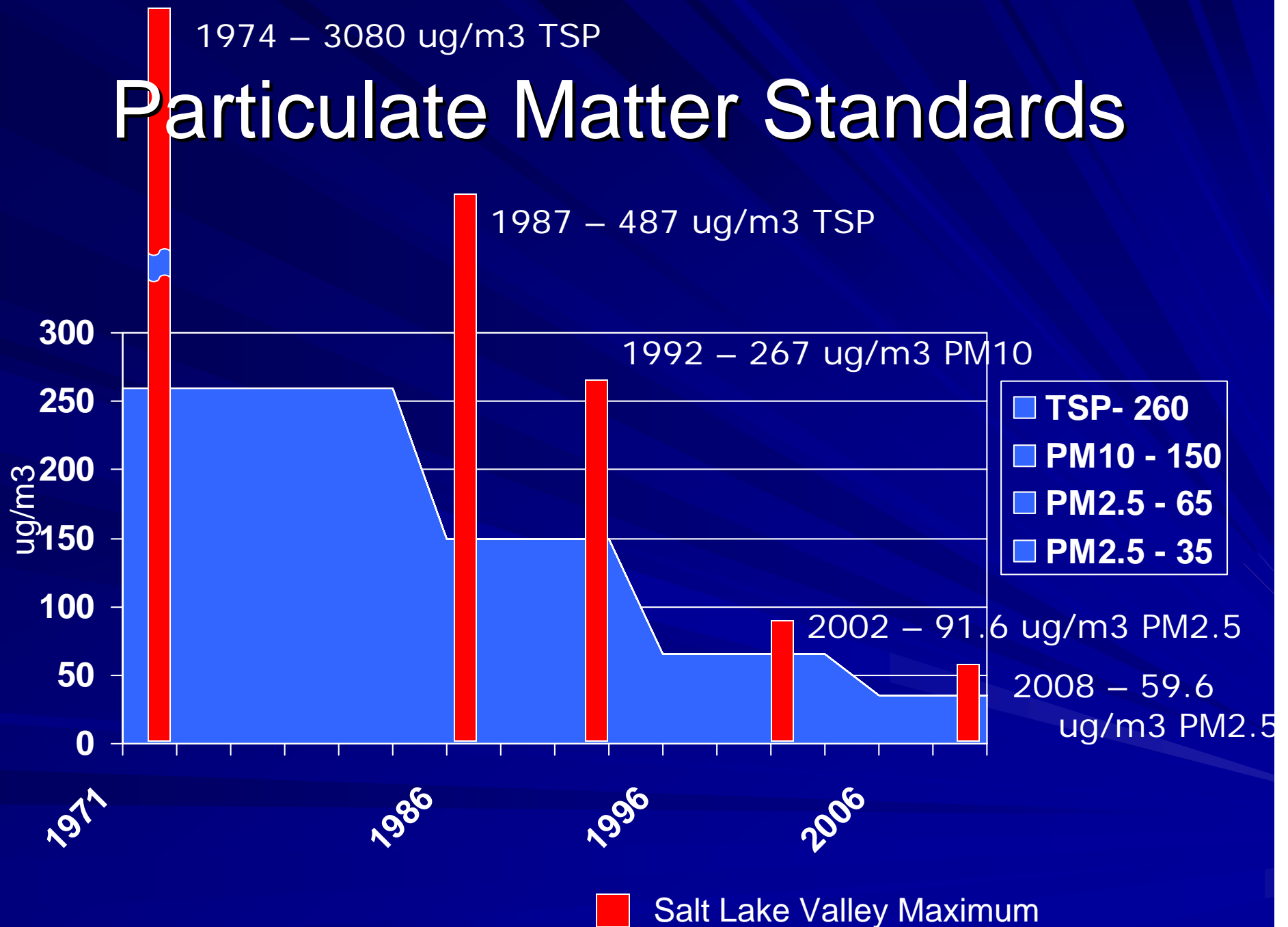
Background

- The Clean Air Act identifies 6 criteria pollutants (CO, Lead, NO₂, Ozone, Particulate Matter, SO₂)
- Establishes National Ambient Air Quality Standards (NAAQS) for each in order to protect public health
- UDAQ monitors the air to determine whether or not Utah is meeting these standards

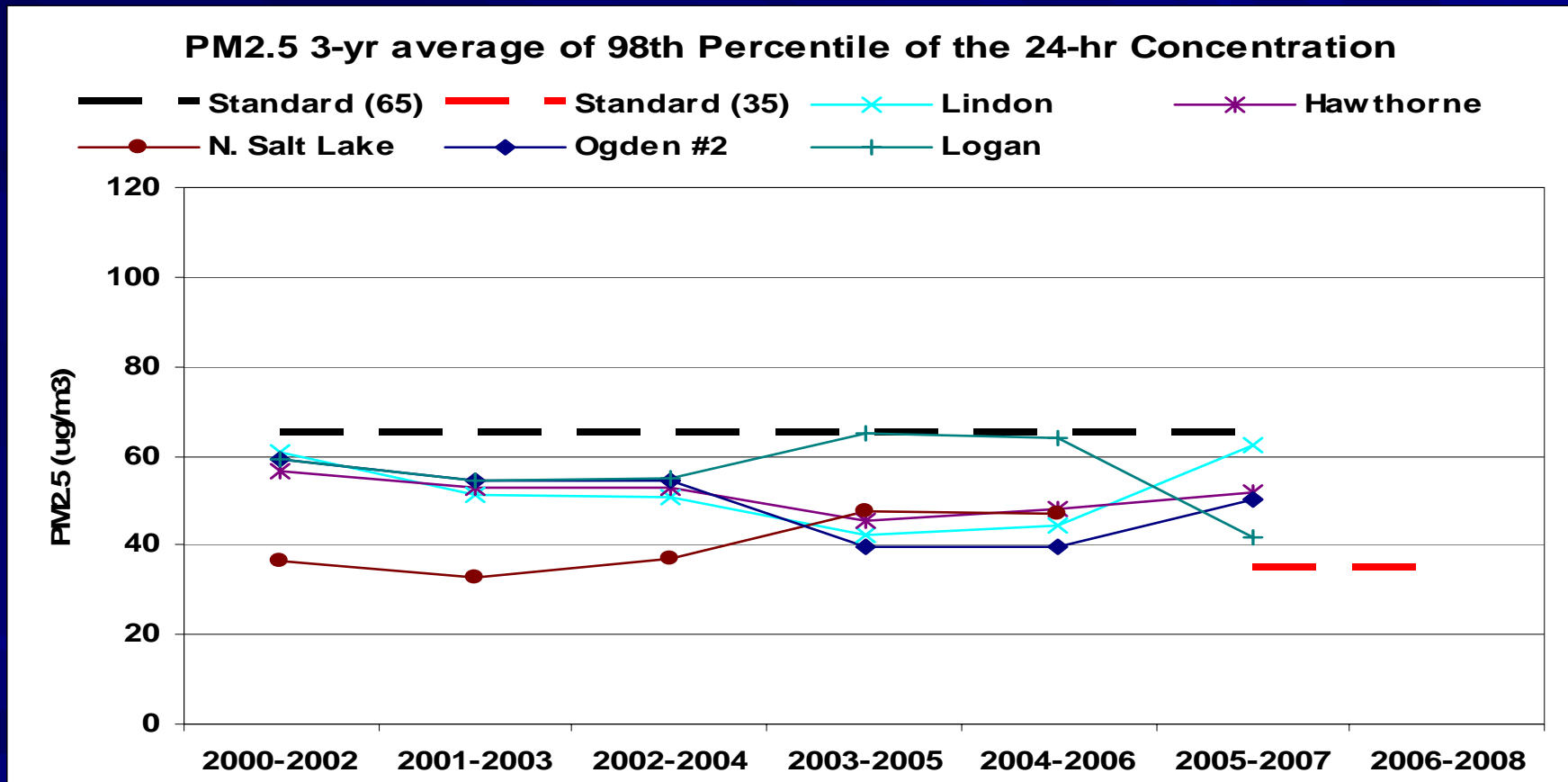
PM2.5 in Utah

- Most of Utah's Wintertime Particulate is Fine Particulate, or PM2.5
- Most of Utah's PM2.5 is "Secondary" PM
- This Wintertime Smog develops in, and is trapped by, mountain valleys and temperature inversions

Particulate Matter Standards



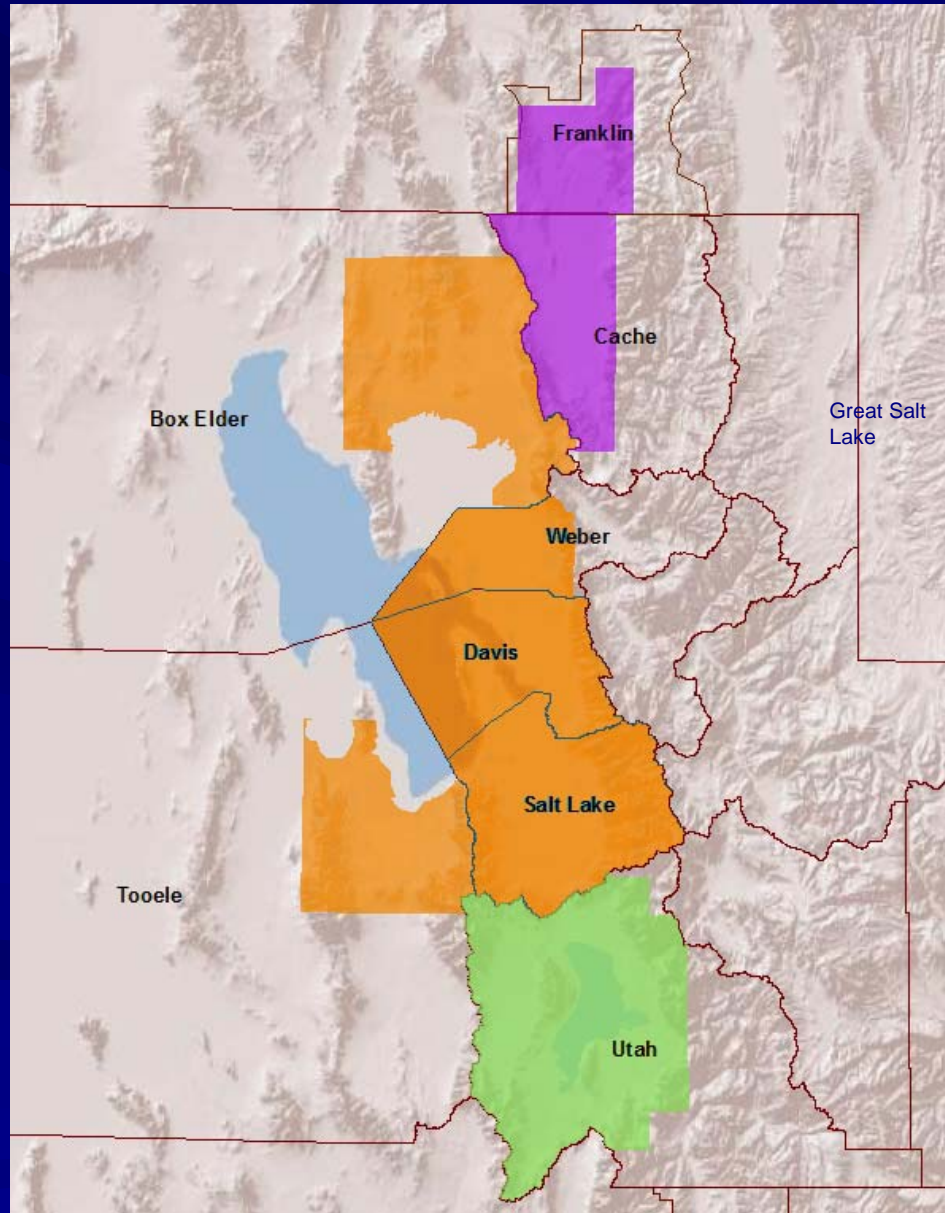
Monitored levels of PM2.5



Timeline

- The Clean Air Act lays out a 5-year process from revision of the standard to completion of a State Implementation Plan (SIP)
- The First 2 years are used to define the area boundaries
 - Year 1: The State makes a recommendation to EPA
 - Year 2: The EPA makes the final designations
- The next 3 years are used to develop the SIP

PM2.5 Area Designations



Current Status

- EPA has not published its findings in the Federal Register, meaning:
 - there is still no effective date, and
 - none of the clocks are ticking just yet, giving UDAQ more time to develop and implement strategies to reduce pollution
 - SIP will be due 3 years after the effective date
- Even though the clocks are not ticking, UDAQ has been working on a PM_{2.5} SIP

State Implementation Plan

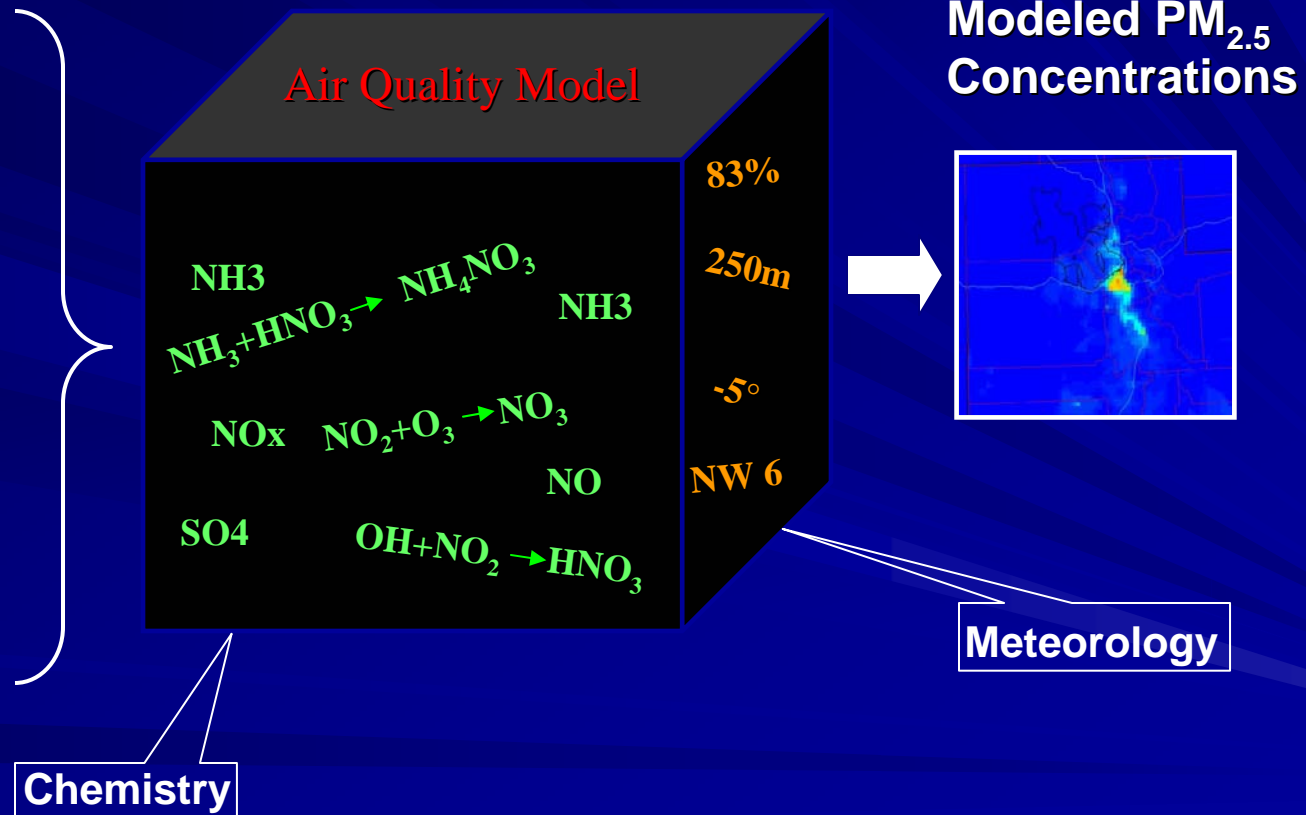
- Essentially a 3-year process
- Basic Project Phases include:
 - **Model Validation**
 - Includes Episode Selection, Inventories, Meteorological Data
 - **Control Strategy Testing / Development**
 - Sensitivity runs to Identify Targets
 - Identification of Possible Controls
 - Projection Inventories are tested in the model
 - **Administrative**
 - SIP writing & processing
 - Emission Limits
 - Technical Documentation
 - Associated Rulemakings

Early SIP Work

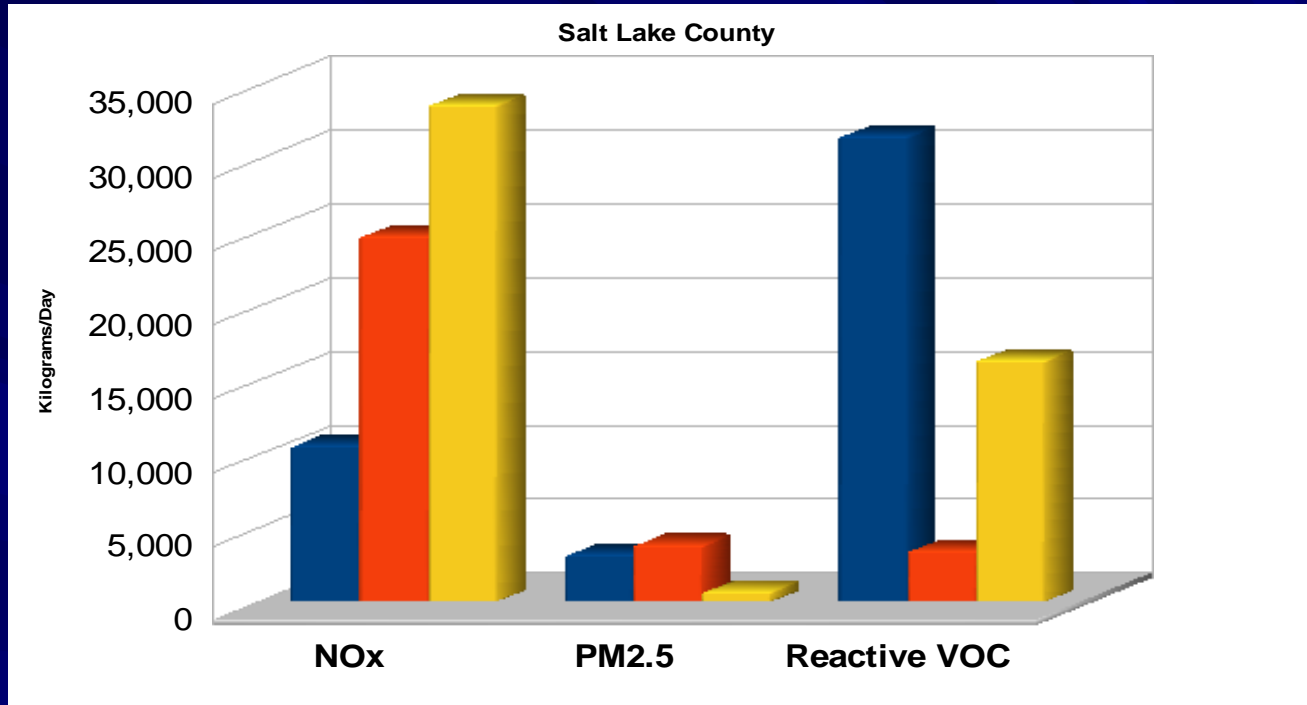
- Phase I – Model Validation
- Work is already underway to develop the Air Quality Model used to support the SIP
 - Modeling Domain includes most of Northern Utah
 - Simulates the chemical and physical processes important to PM_{2.5} (and ozone) formation
 - Will ultimately be the tool for evaluating the effectiveness of possible control strategies

Must replicate the complex chemistry of winter-time Fine Particulate (PM_{2.5}) Formation

Emissions



Winter Emissions Inventory

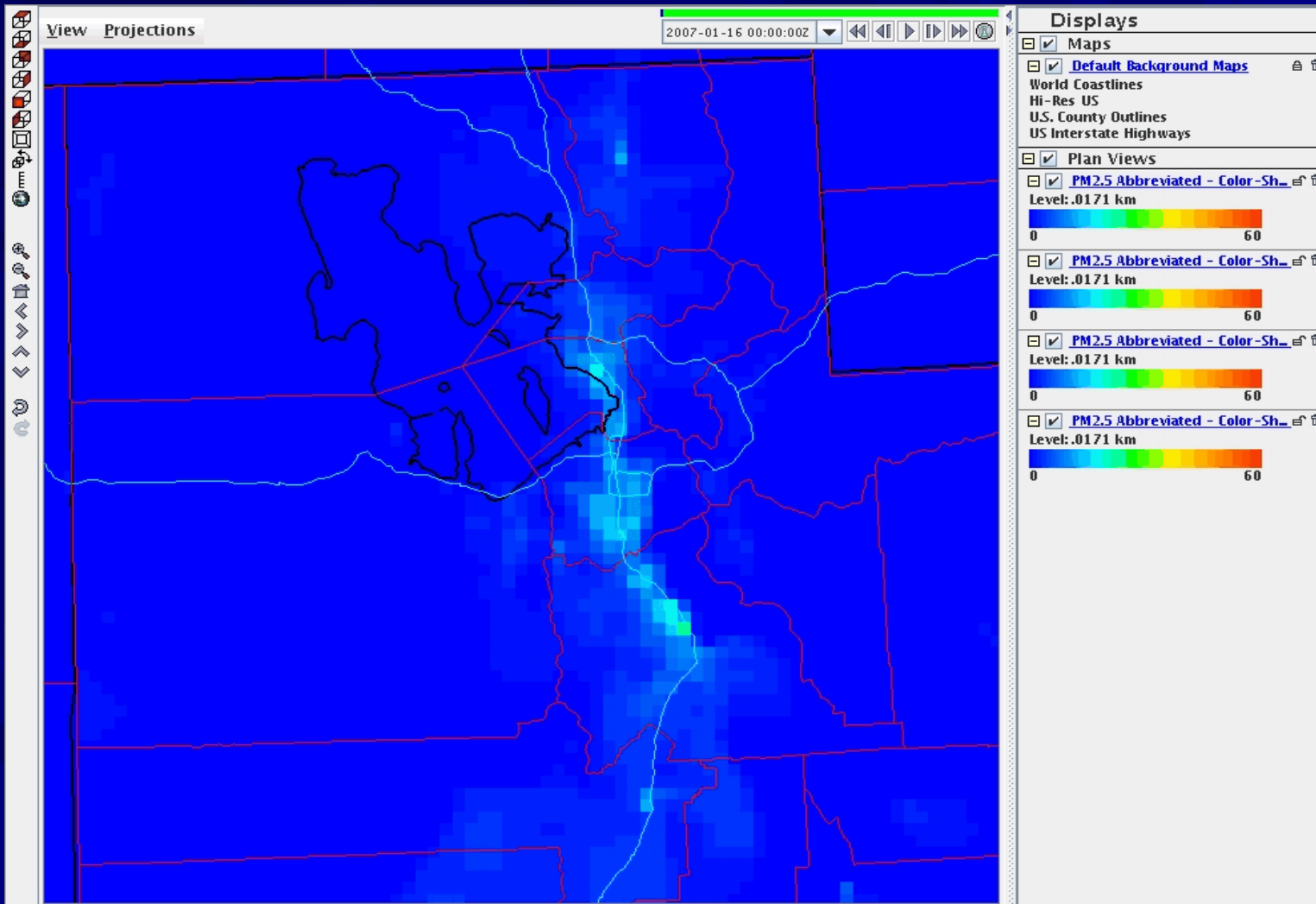


- Categories of Sources include Mobile (cars), Point (industry), and Area (urban activity.)
- Not only PM2.5 emissions, but also precursor emissions that become chemically altered during winter inversions to form more particulate
- Some of these precursor gasses are also important to summertime ozone formation

CMAQ-MODEL.ORG



Community Multiscale Air Quality



Work in the Coming Years

- Control strategies will be evaluated for all sectors within the airshed
 - PM2.5 and the precursors that form PM2.5 (NO_x, SO₂, VOC) from point sources will be considered
 - Controls on area sources such as wood burning and fugitive dust will be considered
 - Mobile sources will be evaluated for various I/M strategies (including on-board diagnostics (OBD) and diesel)

- Modeled Attainment Demonstration
 - Shows that control strategies are sufficient to meet the standards