

Emissions Inventory Overview

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OTC Committees Meeting
Baltimore, MD
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Outline

1. Update on Modeling Inventory
2. Analysis of 2007 CAMD Emissions
3. EGU Projections

1. Modeling Inventory

- Years
 - 2007 – Model performance
 - 2013 – PM2.5
 - 2017 & 2020 – Ozone
- Pollutants:
 - NO_x, SO₂, VOC, PM2.5, PM10, CO, Ammonia

2007 Status and Schedule

- All sectors complete except:
 - **Nonroad (M/A/R)** – September
 - **Onroad Mobile** – TBD

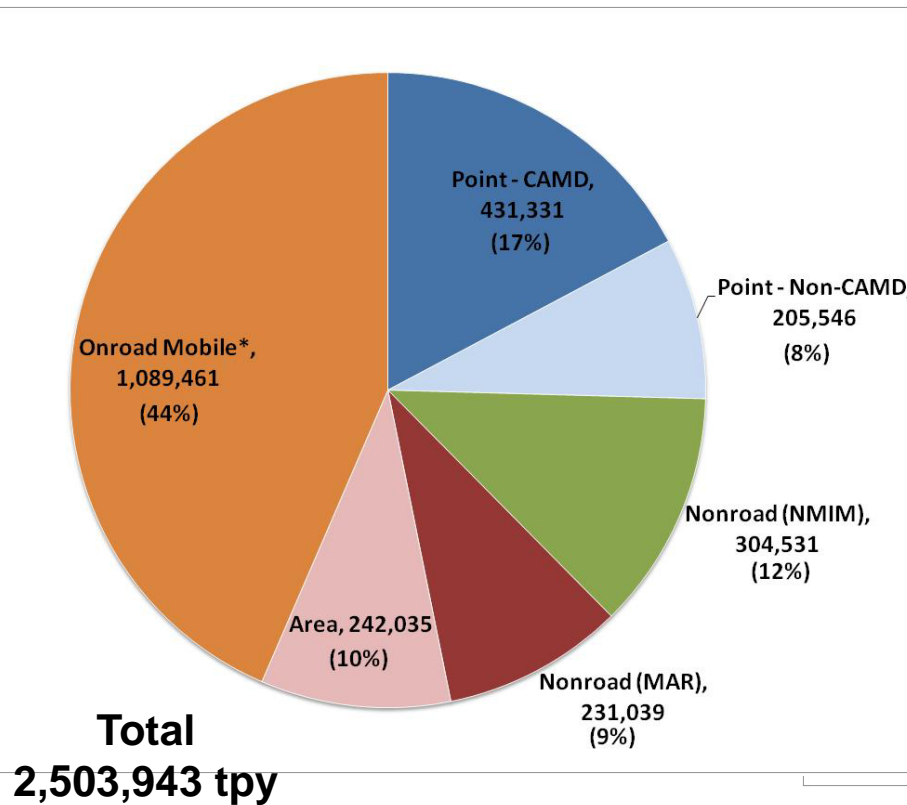
Future Years Status and Schedule

- **Nonroad:** Final in September
- **Non-EGU Point & Area Sources:** Stakeholder review early October
- **EGU Point:** Probably mid-2011
- **Onroad Mobile:** TBD

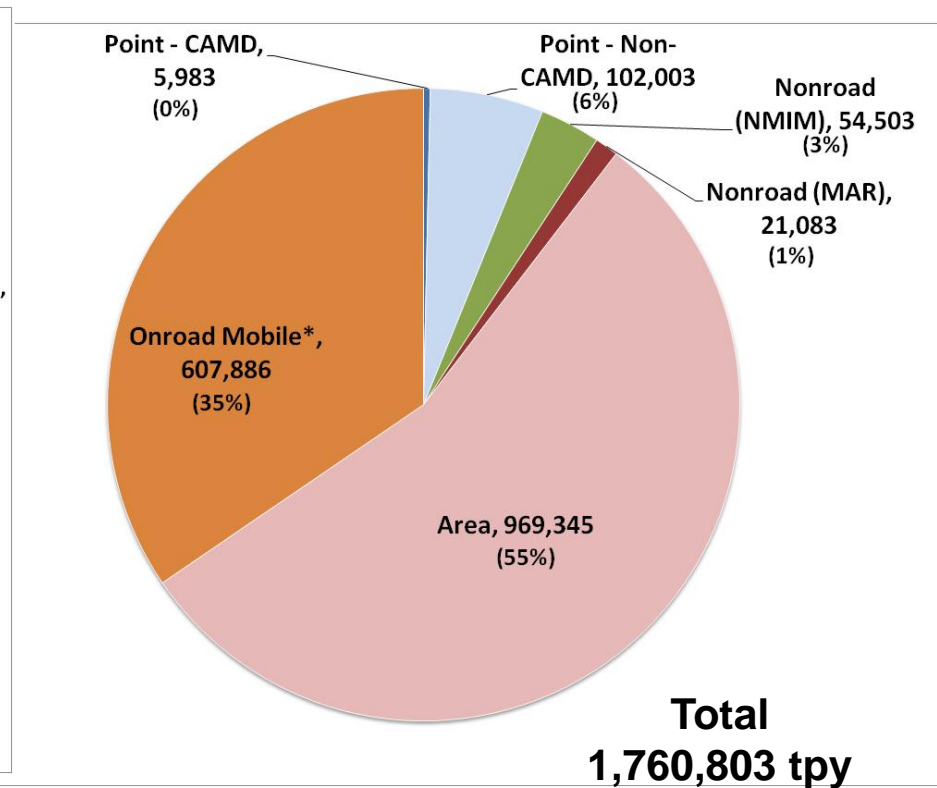
2007* Annual Emissions by Inventory Sector

*Onroad Mobile Estimates are interpolated 2007 emissions using MOBILE6.2

NOx



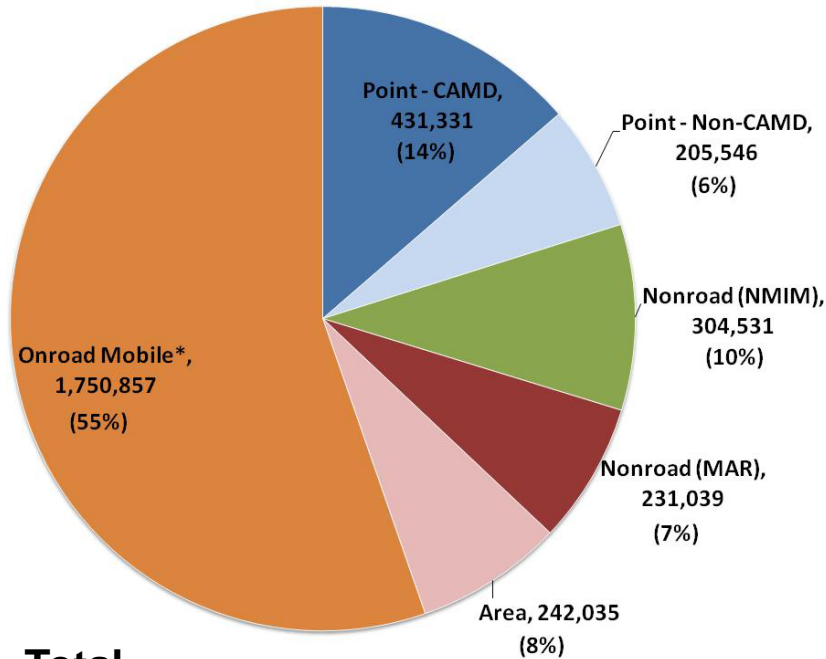
VOC



2007* Annual Emissions by Inventory Sector

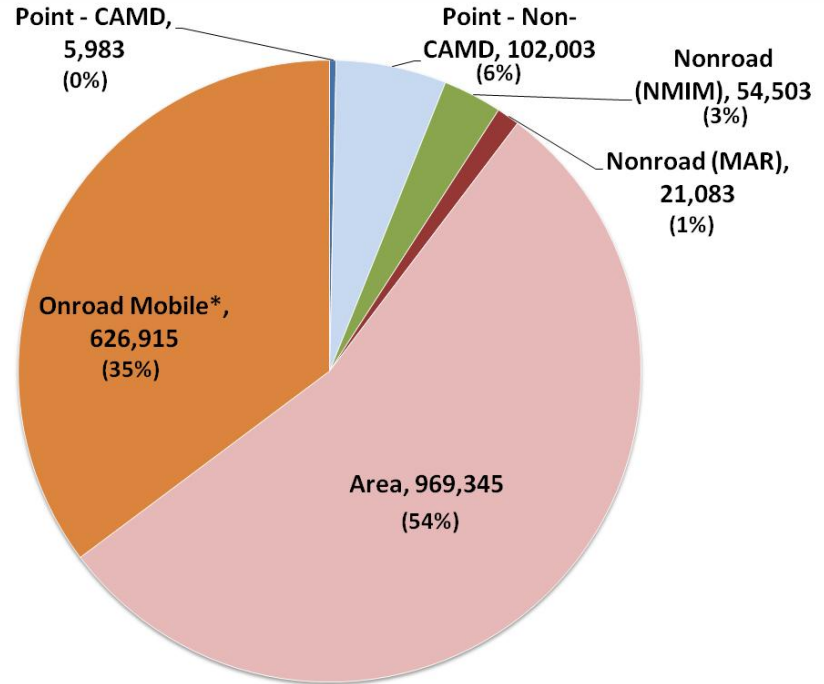
*Onroad Mobile Estimates are interpolated 2007 emissions using MOBILE6.2 and MOVES Adjustment Factors

NOx



Total
3,165,340 tpy

VOC



Total
1,779,832 tpy

Basis of Growth Projections

- **Stationary Sources**
 - State Knowledge
 - Population Forecast
 - Business Activity Forecast
 - 2010 EIA Annual Energy Outlook
- **Mobile Sources**
 - EPA Models (NONROAD, MOVES)

Where to Find the Inventories

- MARAMA's website:

www.marama.org/technical-center/emissions-inventory/projects-overview

- For more information contact
 - Patrick Davis (pdavis@marama.org) and
 - Julie McDill (jmcwill@marama.org)

2. Analysis of 2007 Emissions from Sources Reporting to EPA's Cap and Trade Programs

Report prepared for MARAMA

By Ed Sabo, MACTEC, and

Greg Stella, Alpine Geophysics

Scope and Results

- 2007 emissions reported to EPA's Clean Air Markets Division
- In 2007, these large units emitted
 - 92% of point source SO₂ in the region
 - 68% of point source NO_x in the region
- **Analysis shows significant variability in daily and hourly emissions in ozone season.**

Describe the Sources

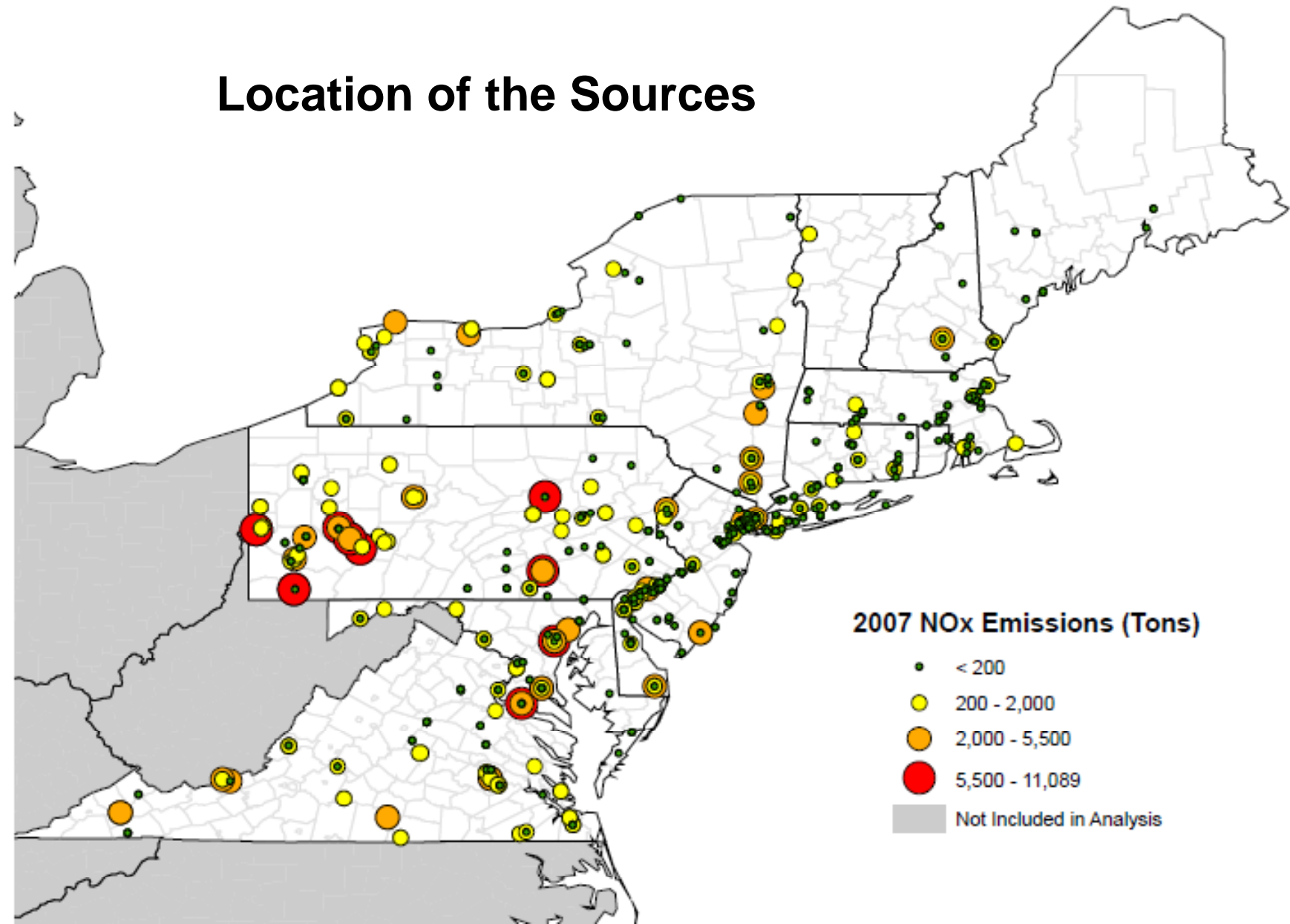
NOx Budget Program
Acid Rain Program

Three classes of units

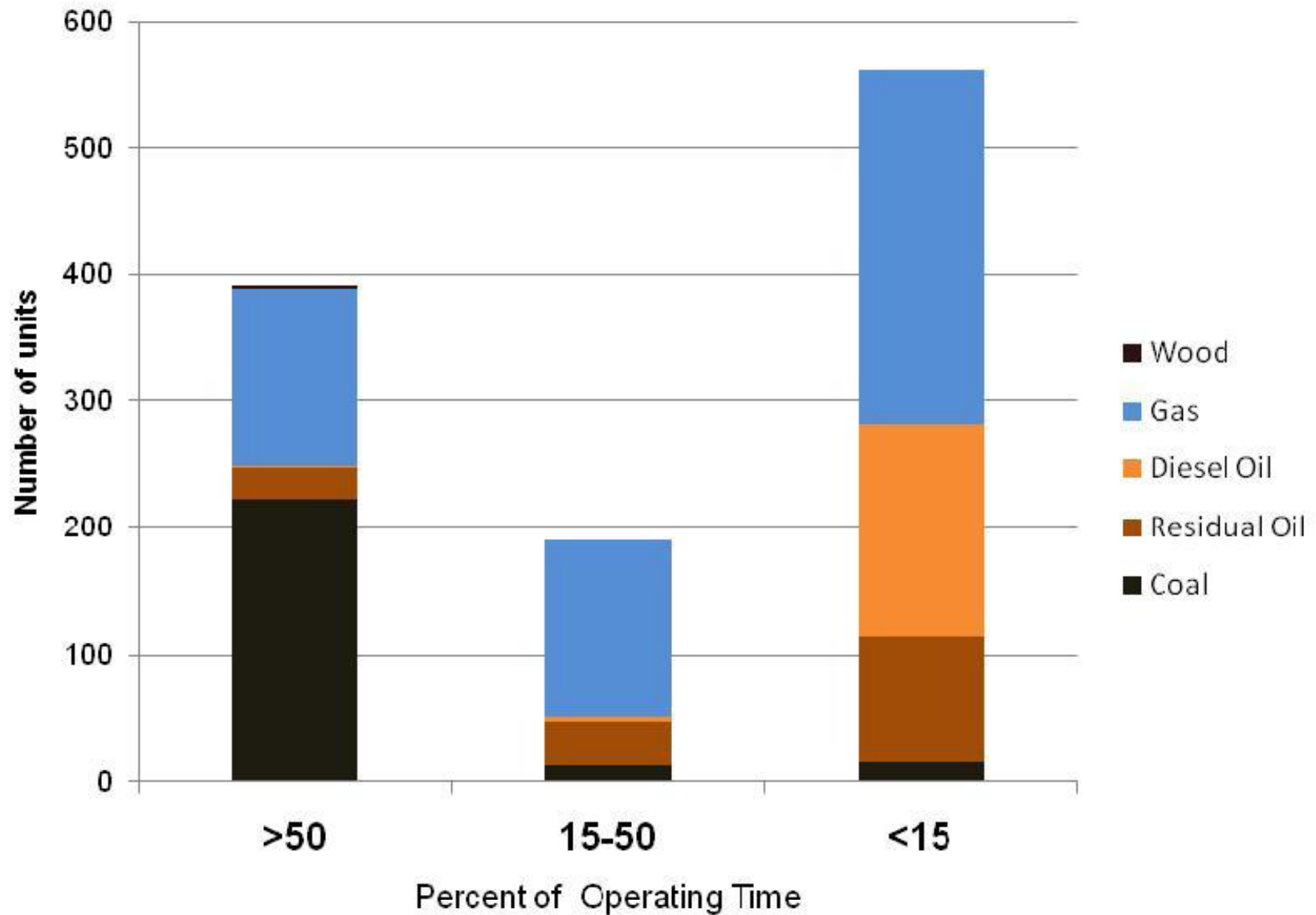
- Classified units into three categories
 - **Operating more than 50% of the time**
 - **Operating 15% to 50% of the time**
 - **Operating less than 15% of the time**
- Units reporting less than the full year were classified based on the percent of reported time

2007 Annual NOx Emissions from CAMD Sources

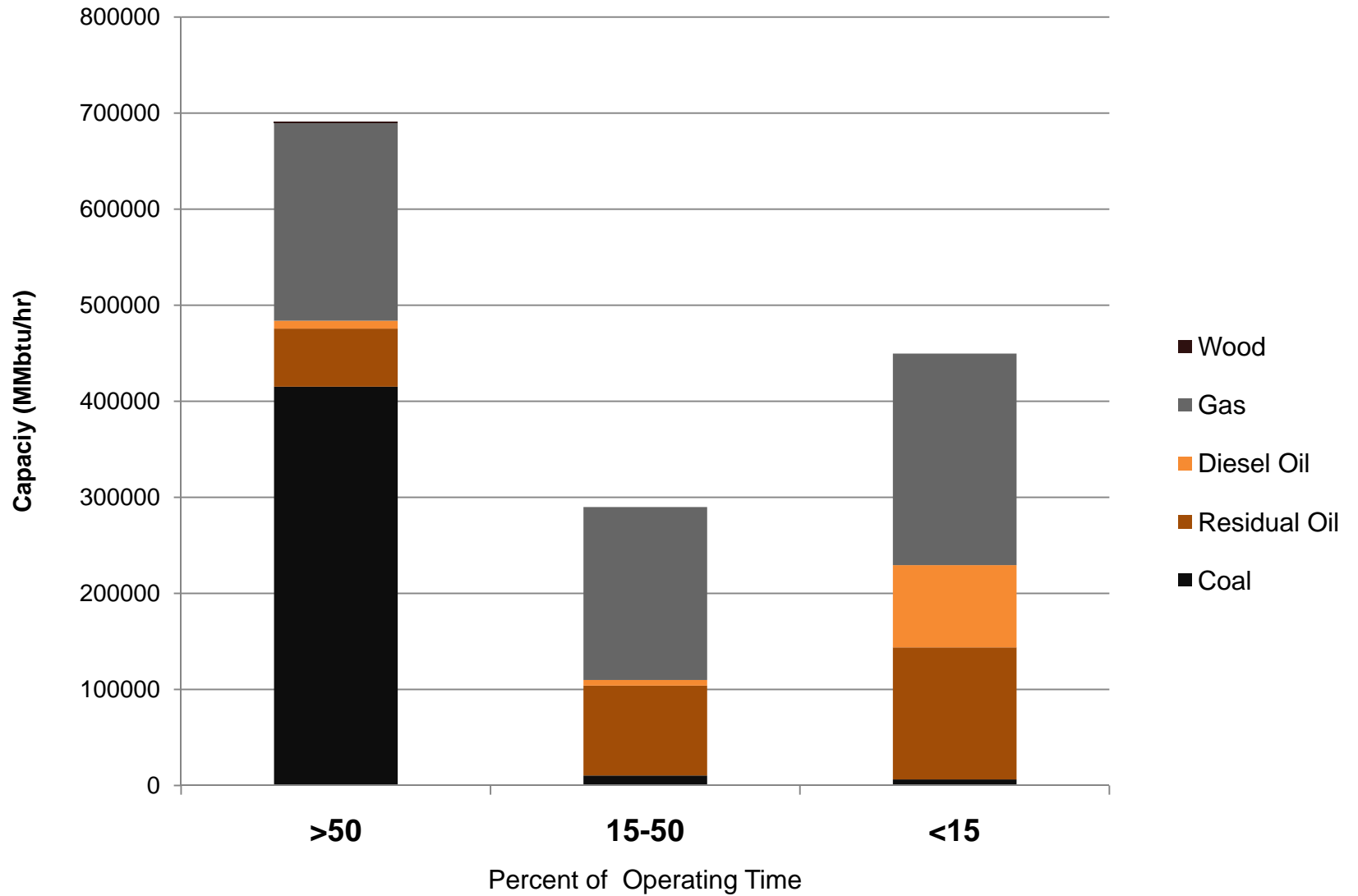
Location of the Sources



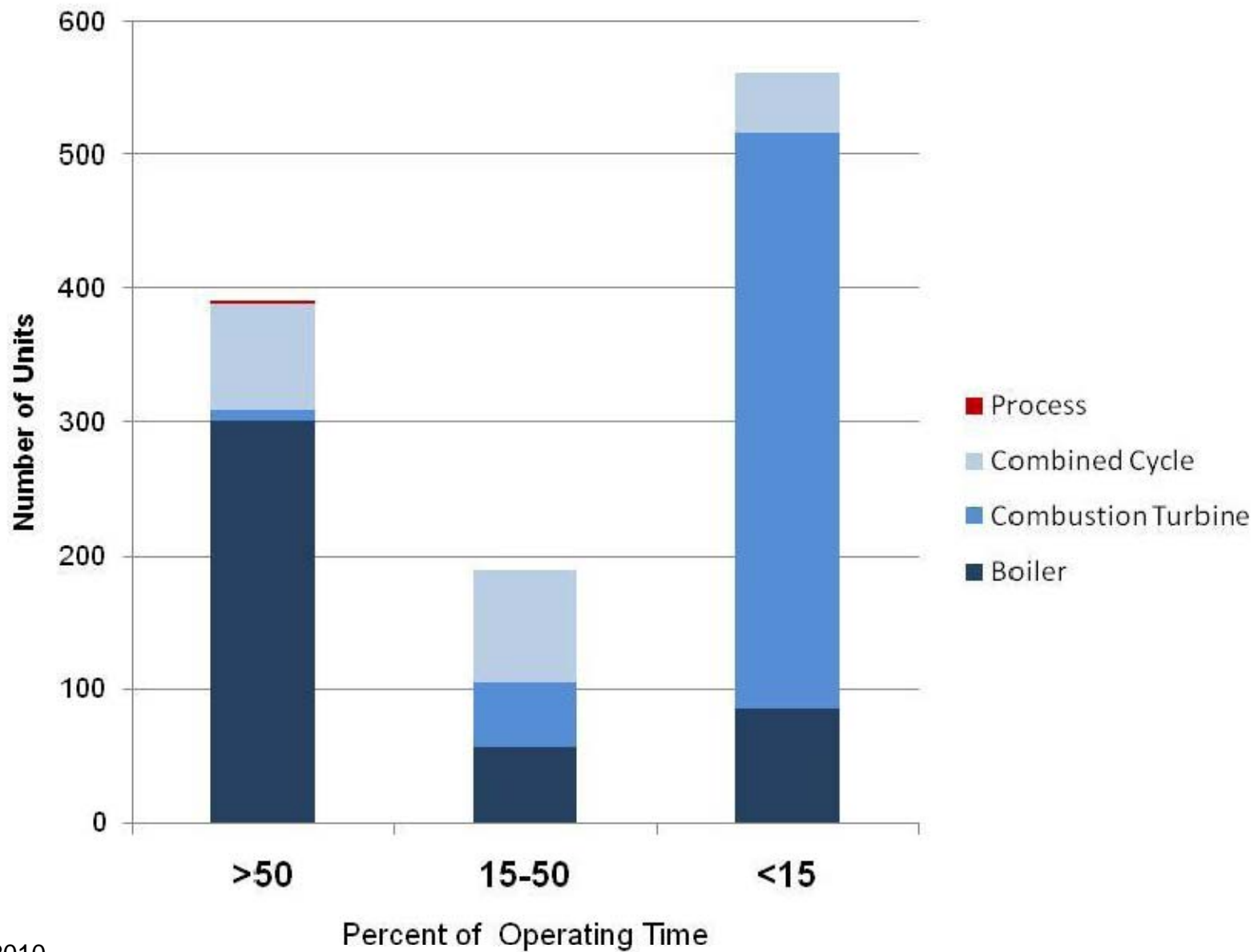
Number of Units by % Operating Time and Fuel Type



Capacity by % Operating Time and Fuel Type

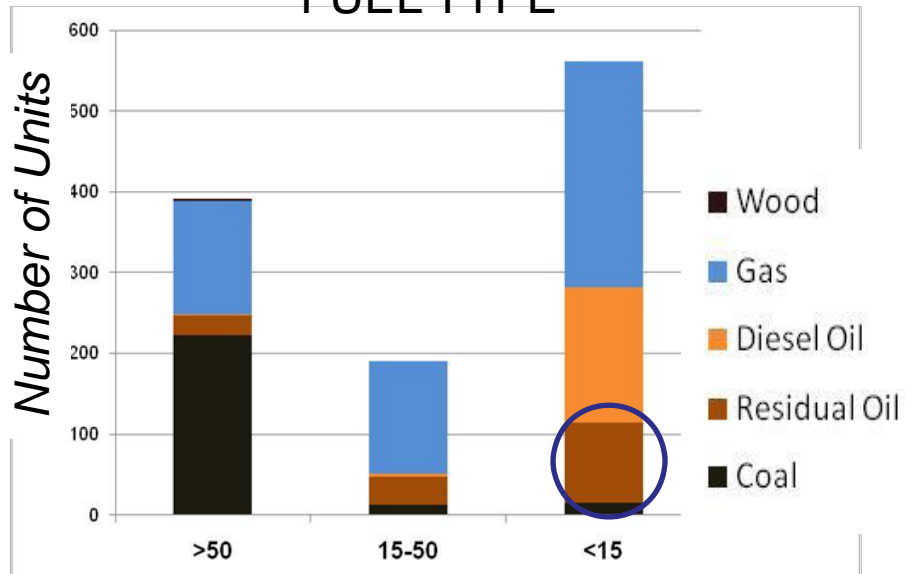


Number of Units by % Operating Time and Unit Type

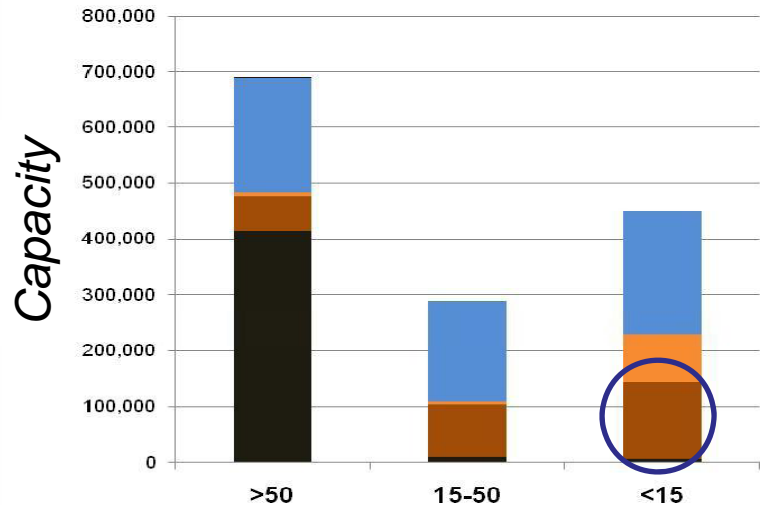
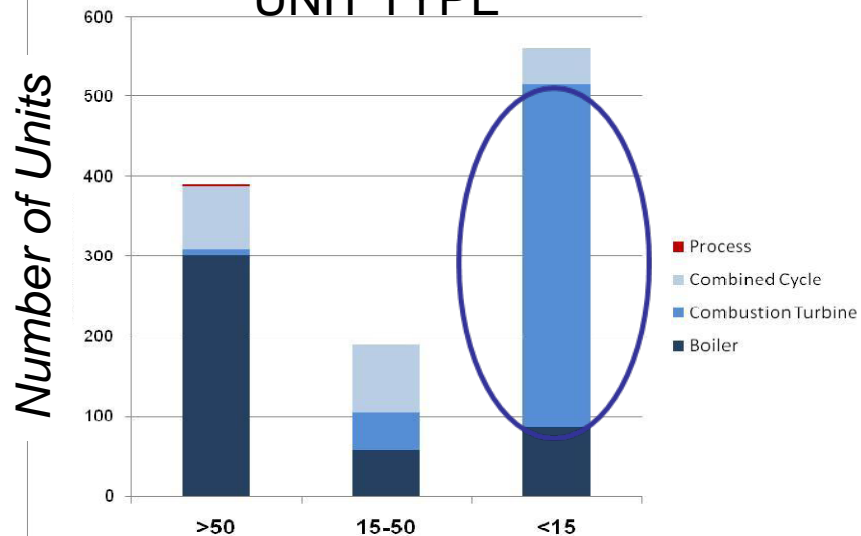


Unit characterization

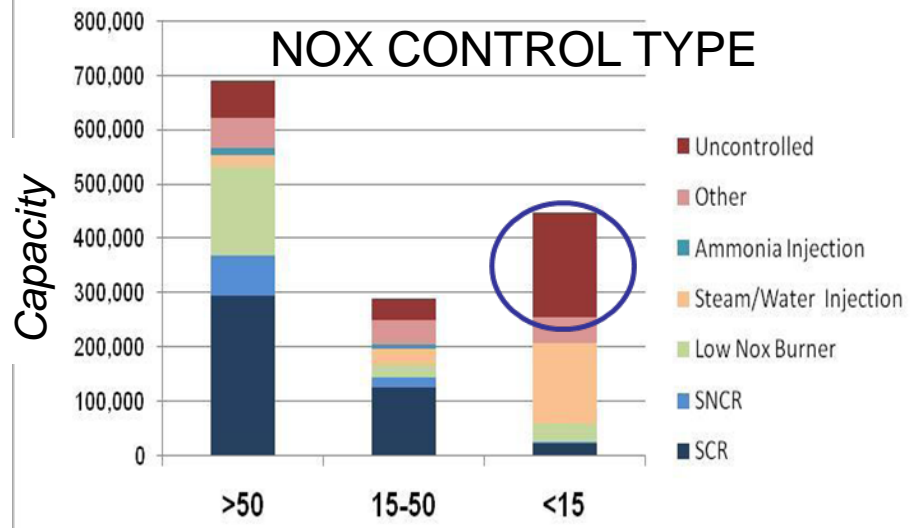
FUEL TYPE



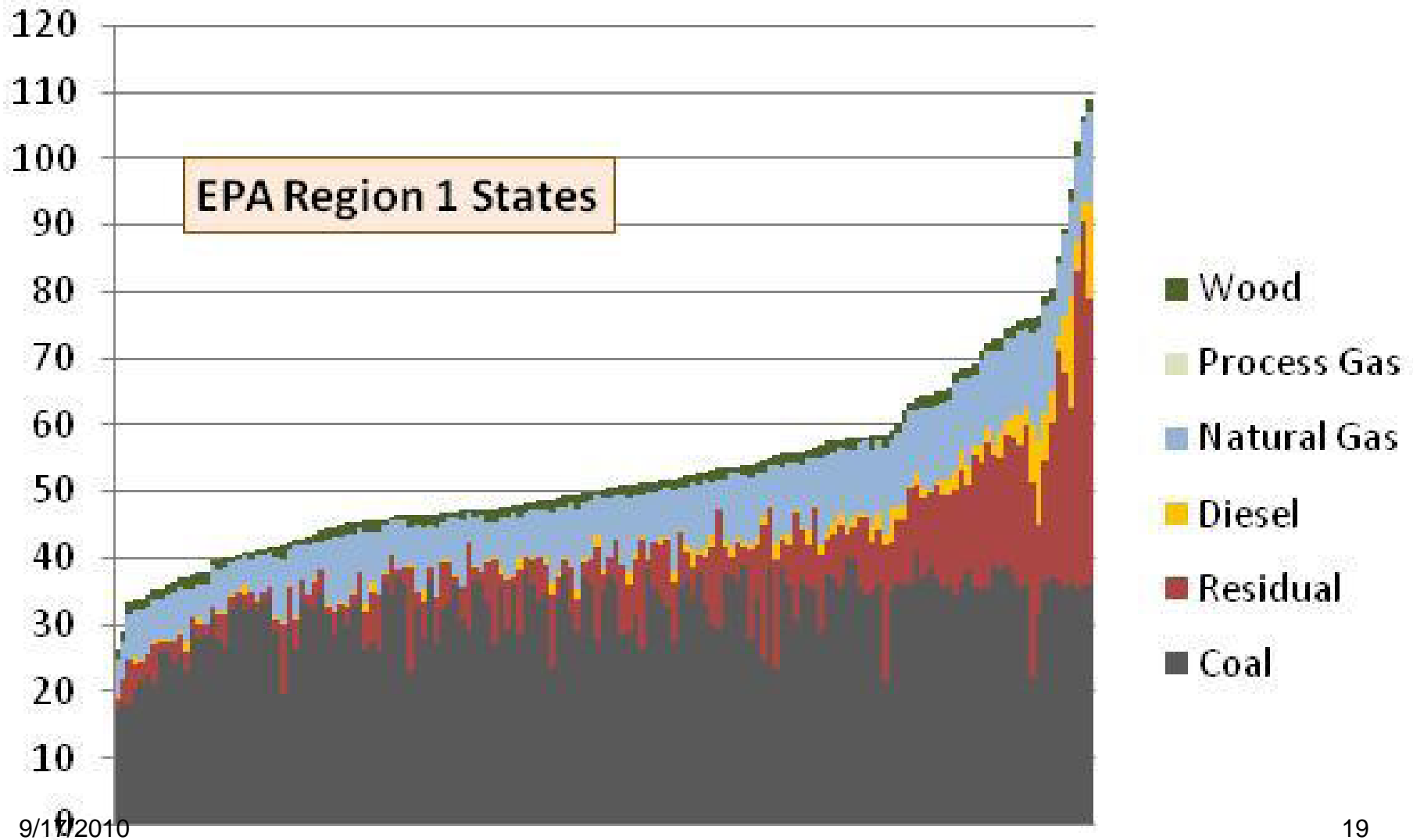
UNIT TYPE



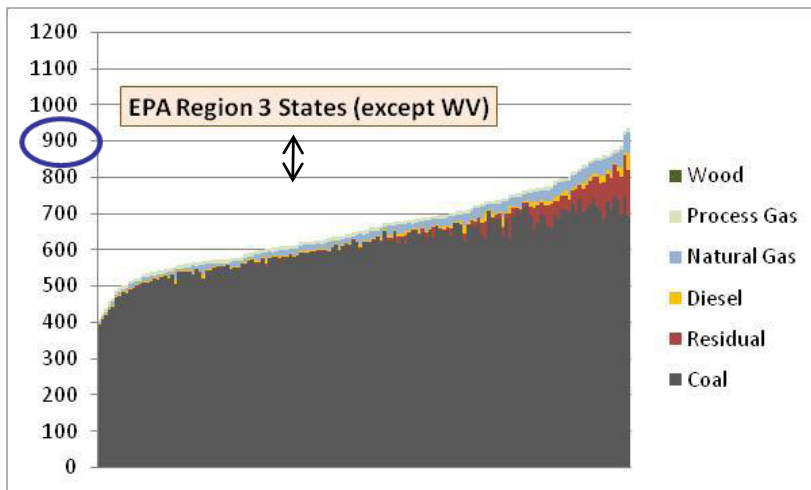
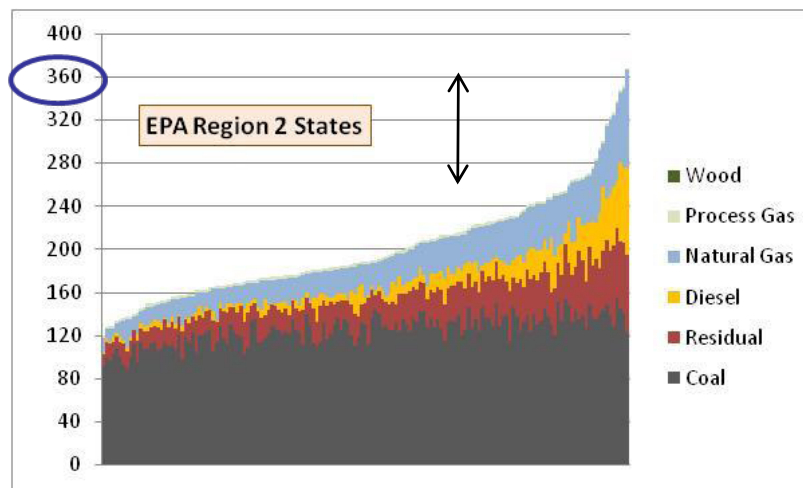
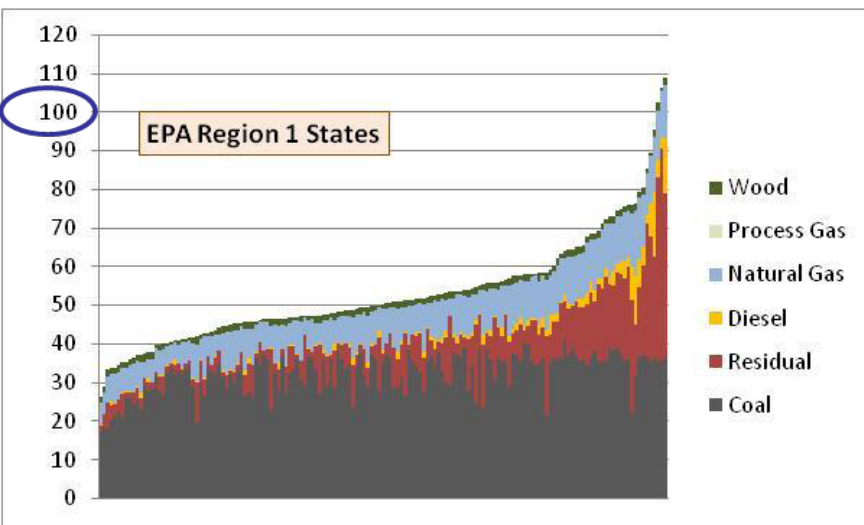
NOX CONTROL TYPE



Regional Emissions by Fuel



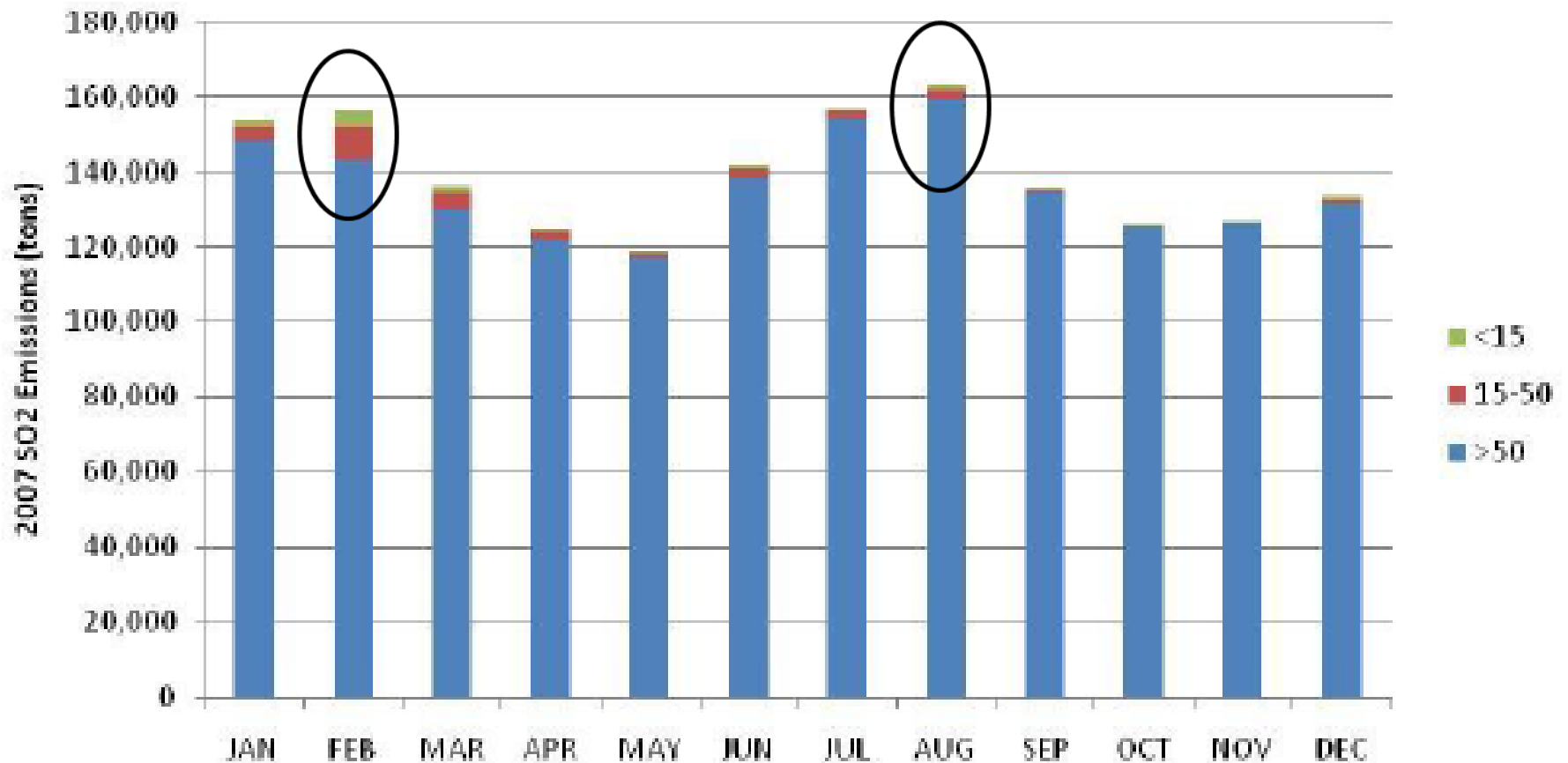
Variability by EPA Region



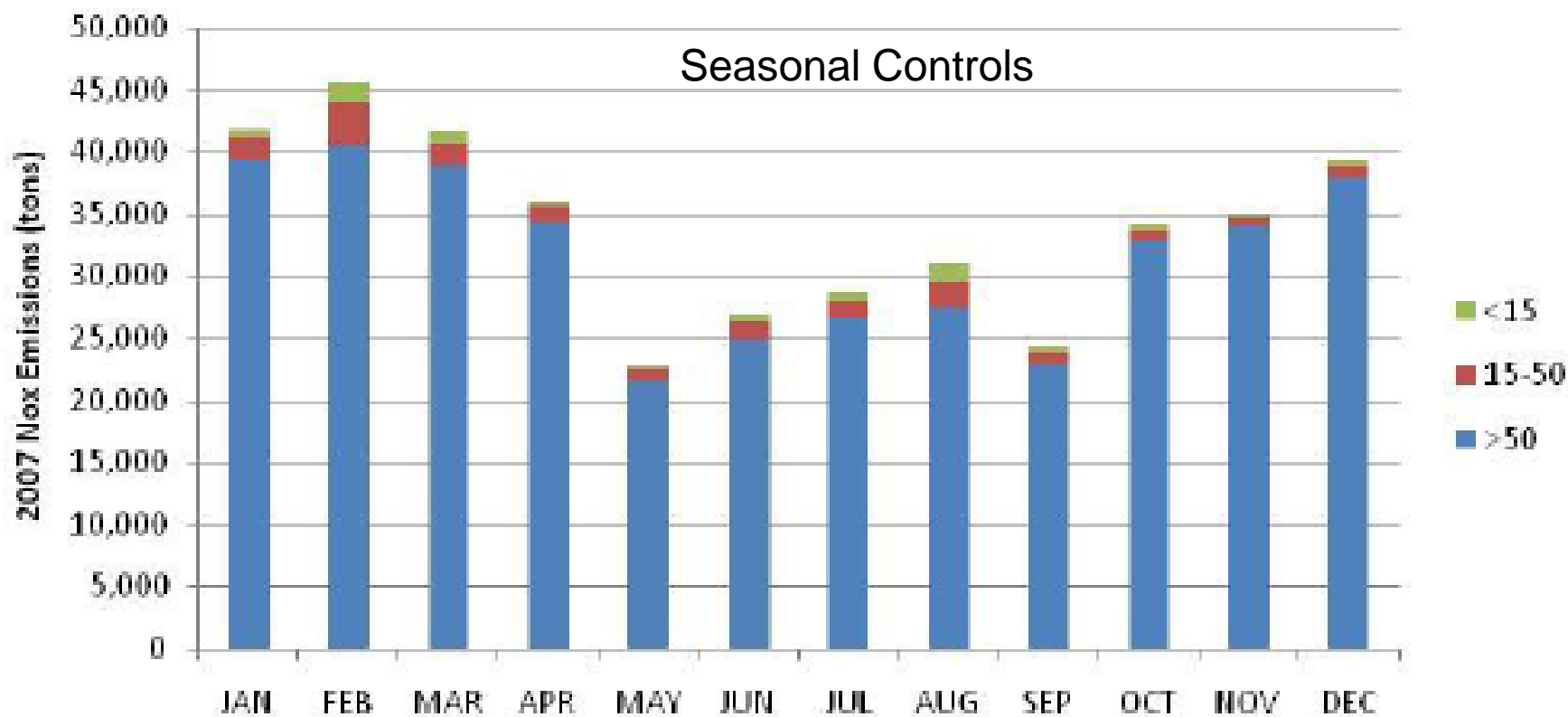
Variability:
Greater amount in Region 3
Larger % in Regions 1 & 2

Variability by Month

2007 SO2 Emissions by % Operating Time and Month

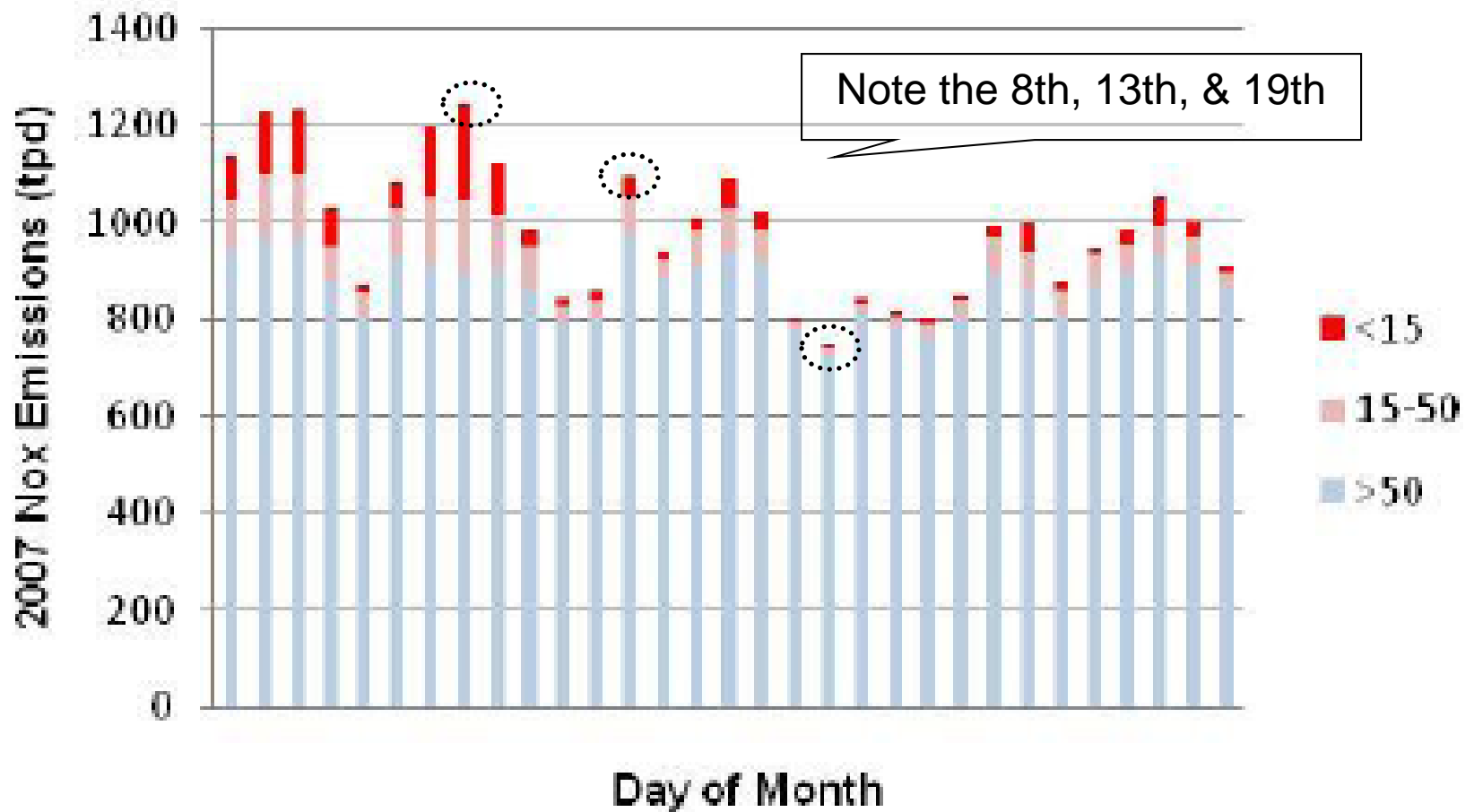


2007 Nox Emissions by % Operating Time and Month

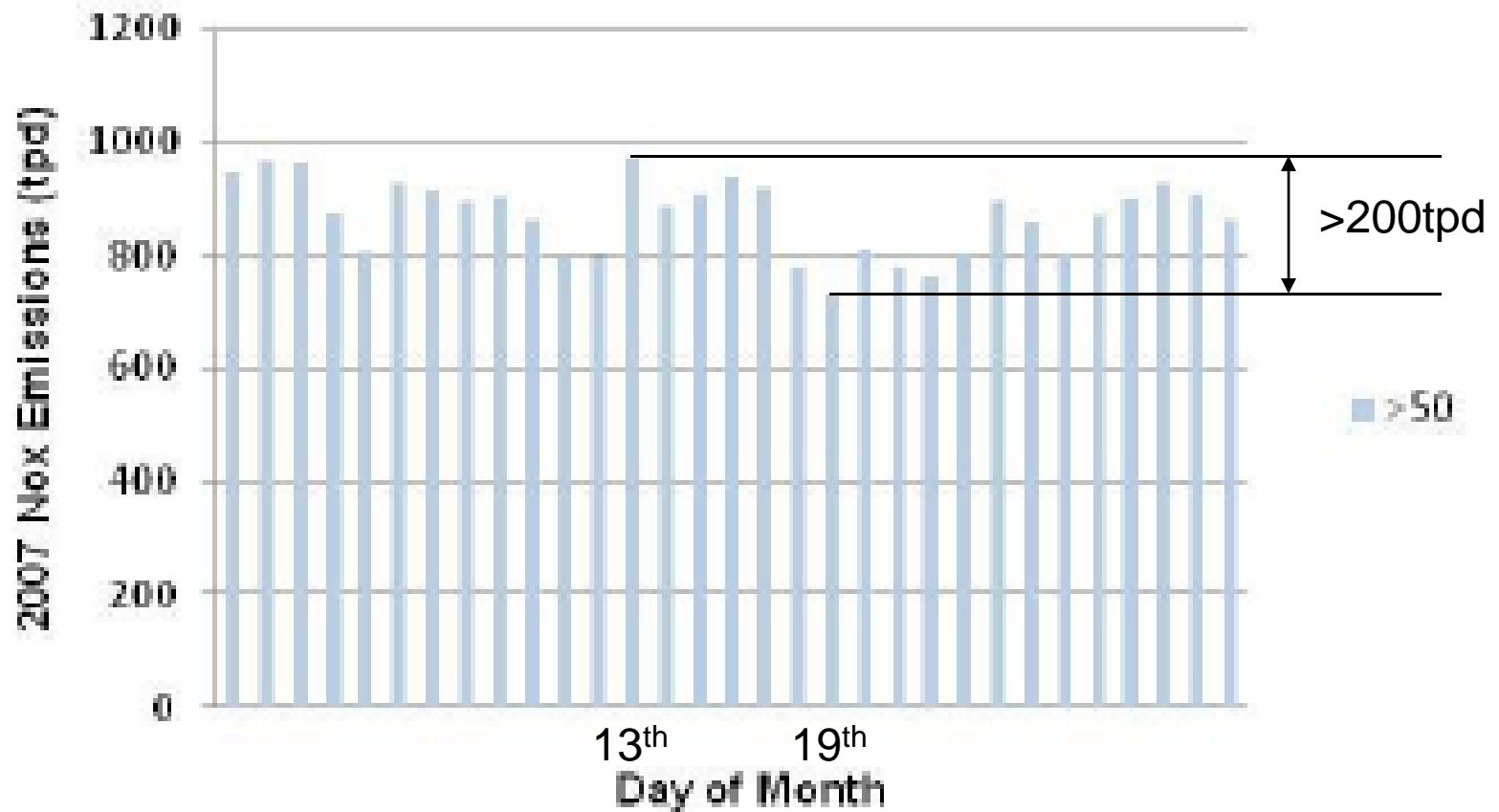


Daily Variability

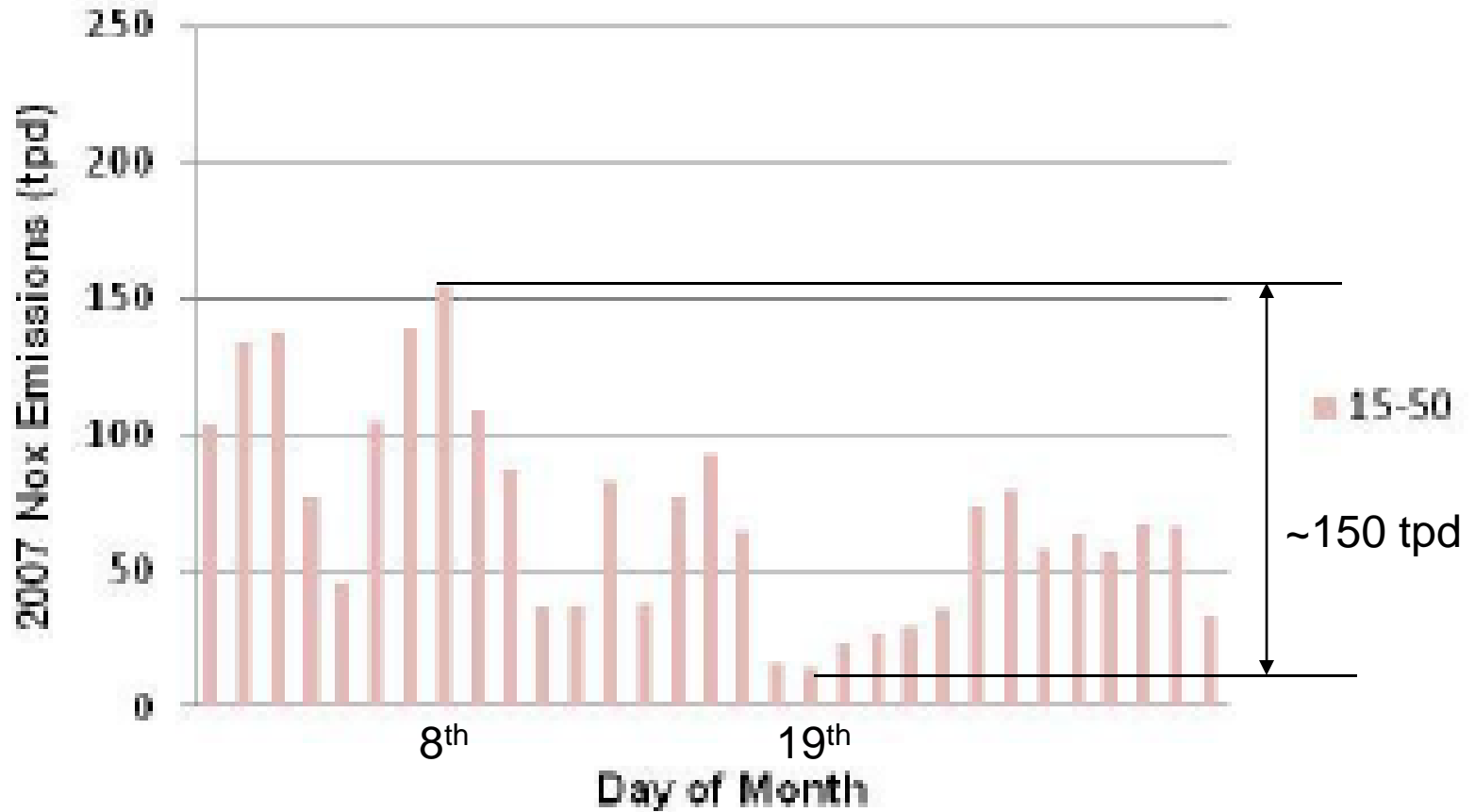
Aug 2007 NOx by % Operating Time



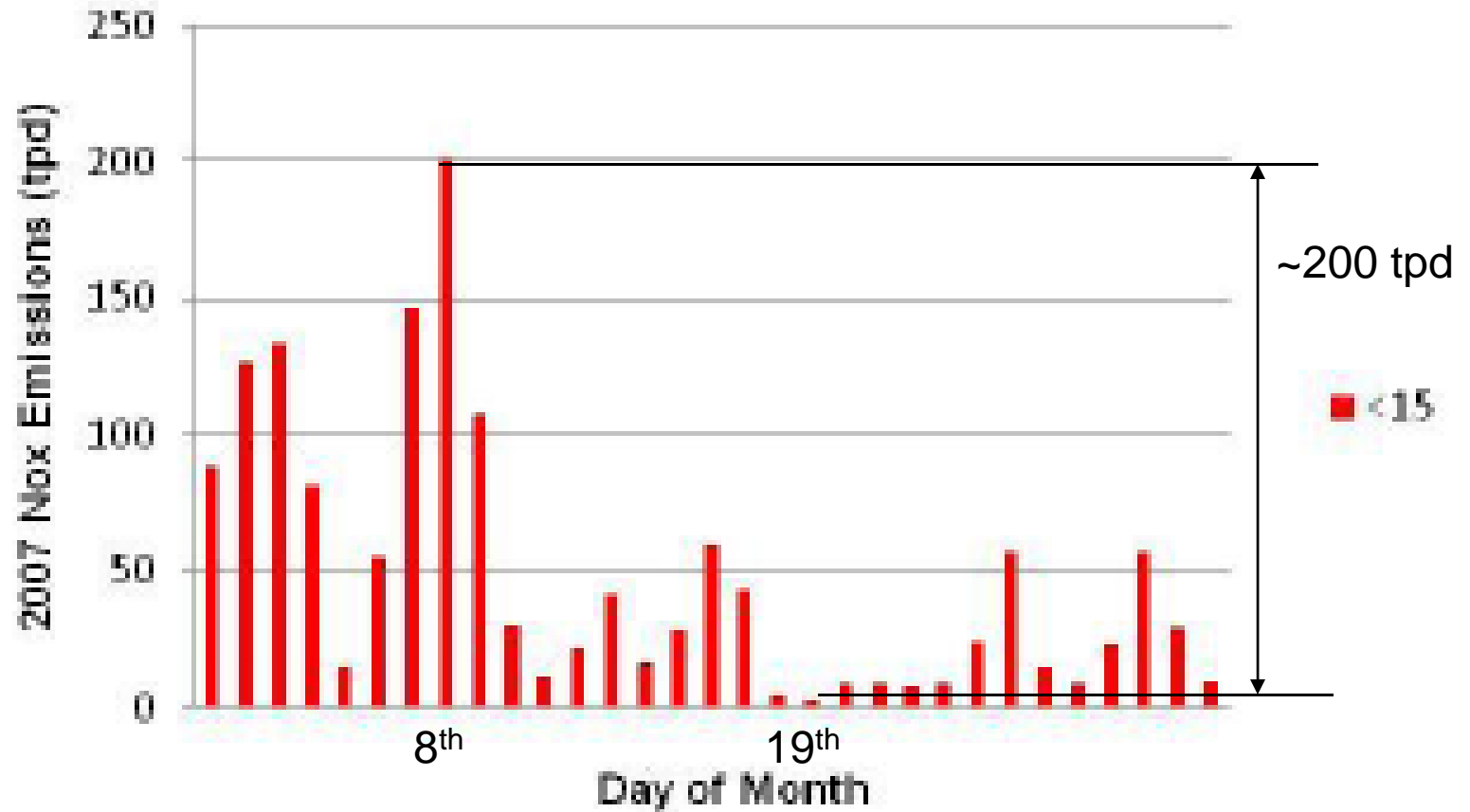
August Daily Nox from >50% Bin



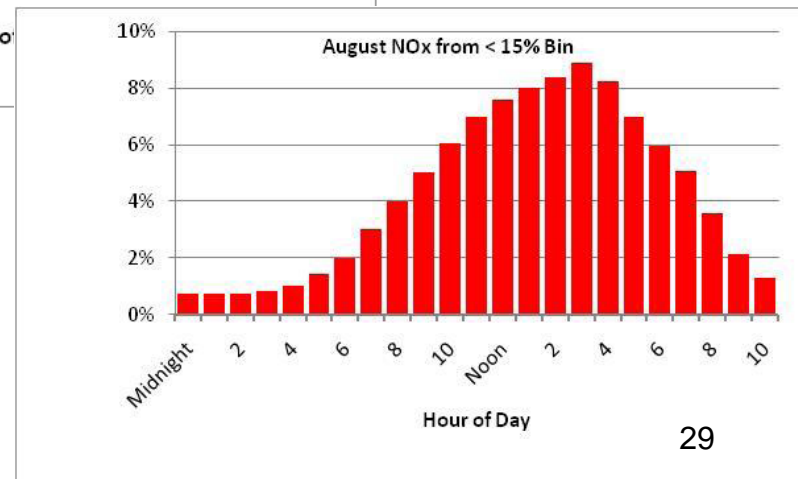
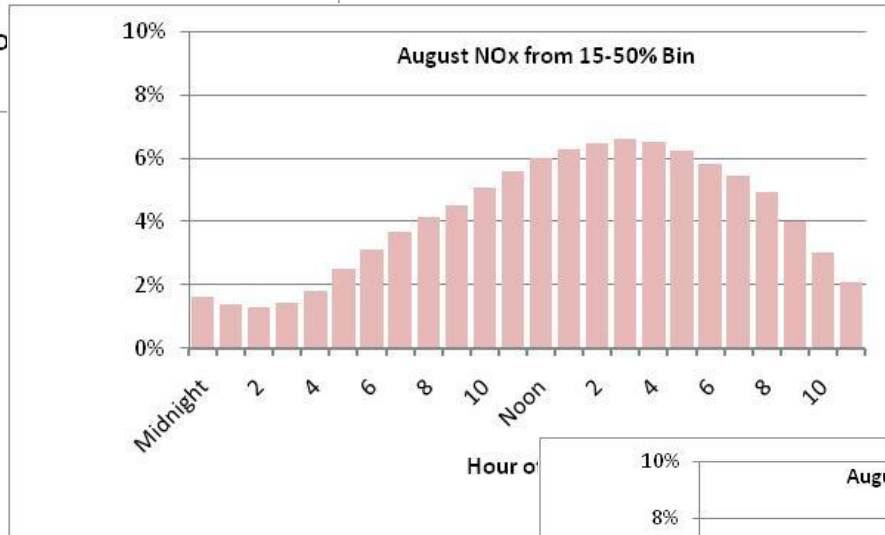
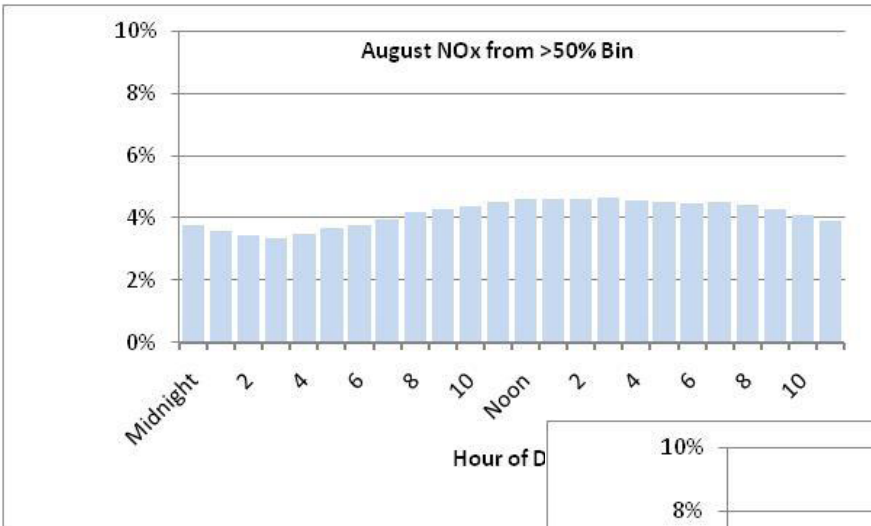
August Daily Nox from 15-50% Bin



August Daily Nox from <15% Bin



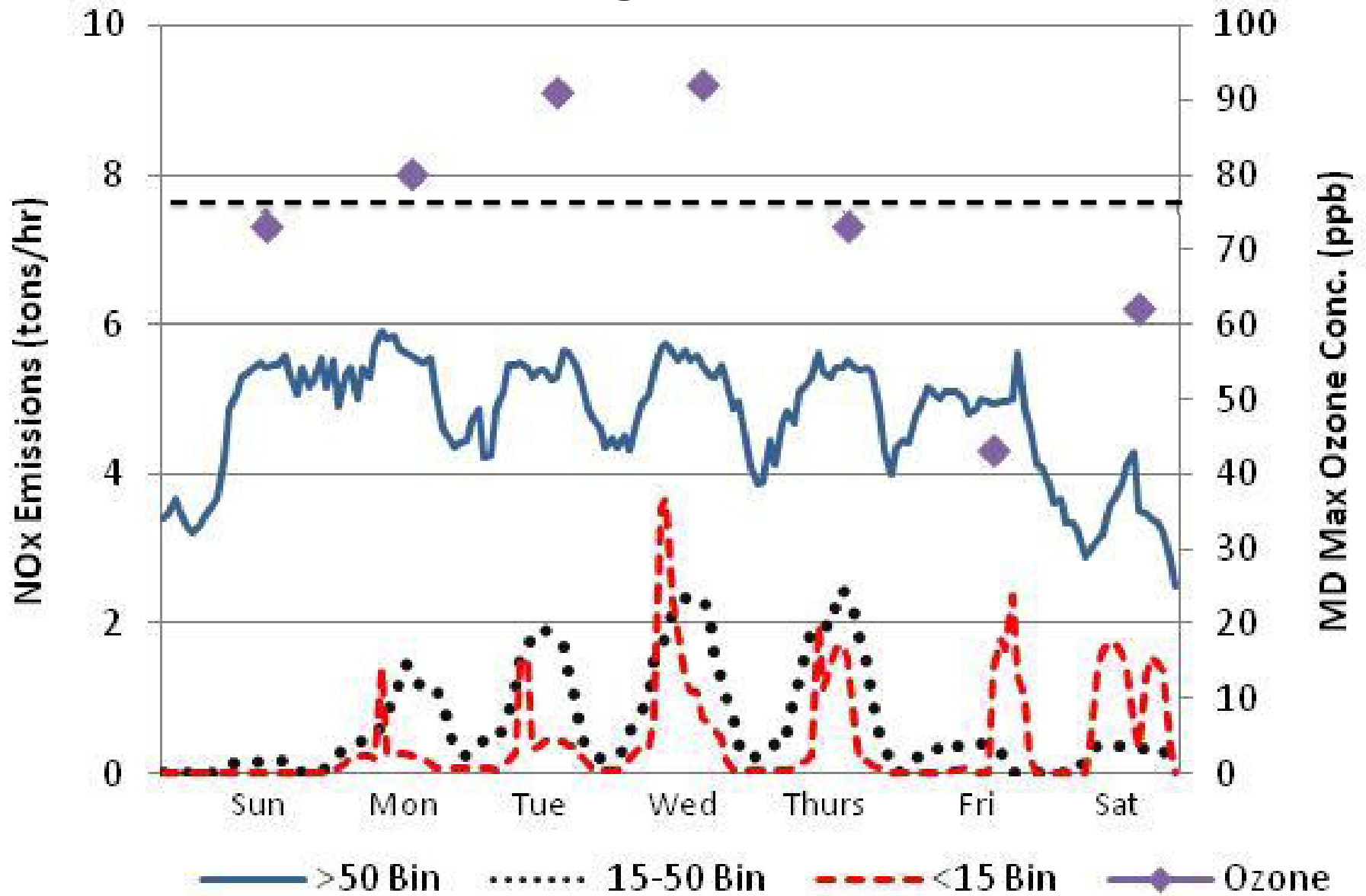
Average % Variability by Time of Day



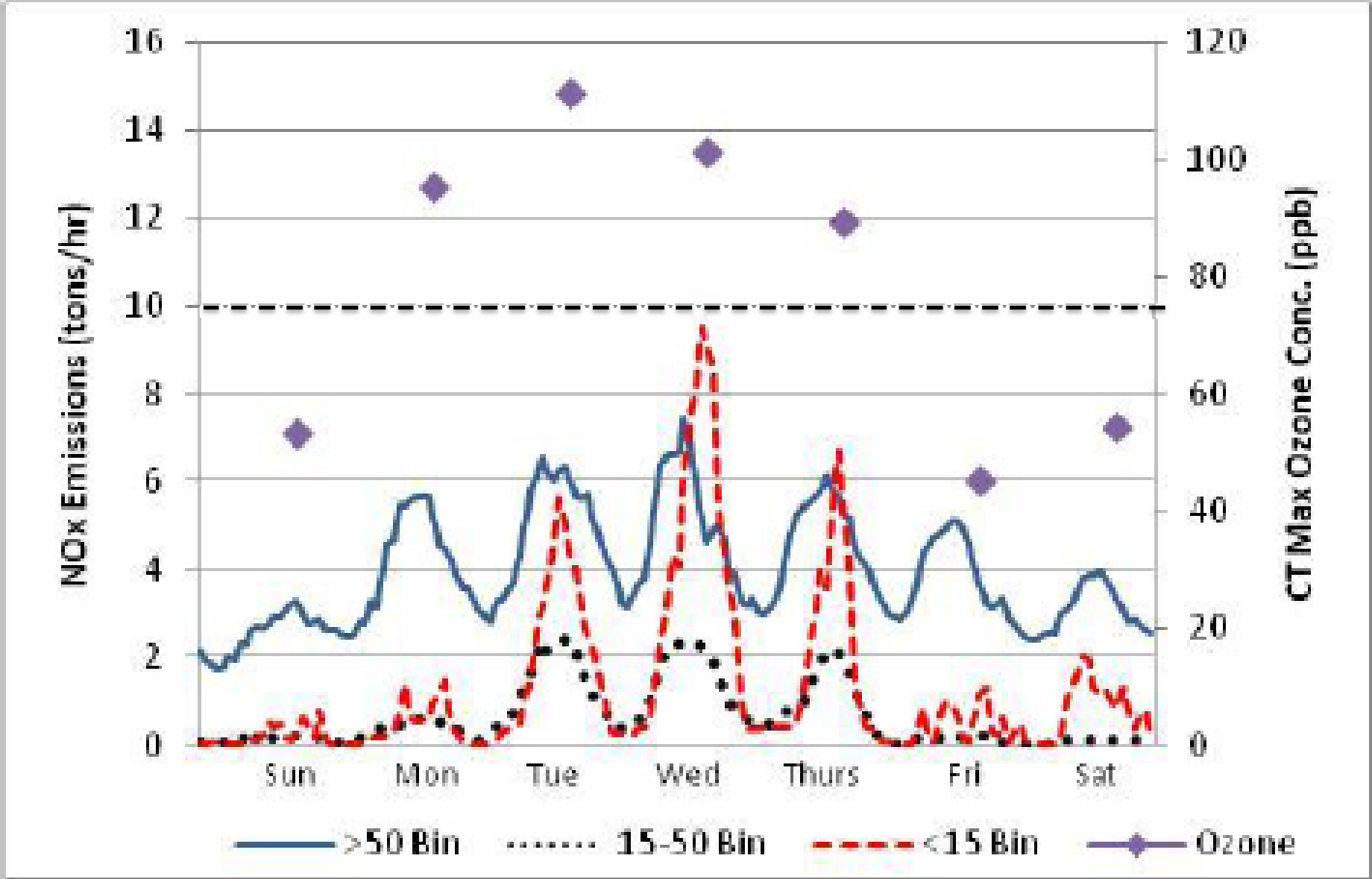
June 24-30, 2007

- Widespread ozone exceedances
 - Tuesday, June 26 peak:
 - 119 ppb in PA,
 - 111 ppb in CT,
 - 93 ppb in ME,
 - 91 ppb in MD
- Relative emissions from 15% sources
 - Up to 49% of total hourly emissions in MD
 - Greatest contribution of 3 bins in NY area

Baltimore-Washington: June 24-30, 2007



NY/Connecticut: June 24-30, 2007



Conclusions

- **Analysis shows significant variability in daily and hourly emissions in the ozone season.**
- **All three EPA regions have significant variability due to residual oil use.**
- **Both base load and peaking units vary significantly.**
- **Attention is needed to uncontrolled units and seasonal, daily, and hourly controls.**
- **Other factors (e.g., transport) important.**

5. EGU Forecasting

Developing alternative to IPM

ERTAC

- Eastern Regional Technical Advisory Committee
 - NE, Mid-Atlantic, SE, and Lake Michigan area
 - States, Industry, & Regional Organizations
- **PURPOSE:** Develop methodology to create EGU future year emissions inventories

Four Subcommittees

Implementation:

Mark Janssen, LADCO & Scott Edick, MI

Growth:

Bob Lopez, WI & Laura Crowder, WV

Data Tracking: Wendy Jacobs, CT

Renewables & Conservation Program:

Danny Wong, NJ & Laura Boothe, NC

Goals

- EPA Involved
- Conservative predictions of activity
- Transparent
- Inexpensive
- Rely on actual 2007 data
- Flexible

How will it work?

- Starting point: 2007 CEM data by region
 - number of operating hours ordered from peak days down
- States provide known changes by year
 - new units, controls, etc.
- Project growth by NERC region by fuel type
 - Use Dept. of Energy Annual Energy Outlook
 - Modify to reflect 2007 weather
 - Consider energy efficiency
 - Base and Peak demand

How will it work?

- Allocate growth to units based on NERC regional growth
 - Demand allocated beyond capacity in an “Excess Demand Pool”
 - Assign Excess Demand to other units using 2007 allocation ordering
- Policy checks – Caps met? (Transport and GHG)
- Growth beyond regional capacity handled manually

Attributes of Results

- **Regionally stable:**
 - No big shifts between states unless reflected in growth rates.
- **Temporally should look like base year:**
 - Use 2007 allocation order and temporal patterns.
- **Transparent:**
 - Can answer “why” questions by unit.
- **Inexpensive:**
 - Open source software and a community of users.
Can be rerun as necessary.

Next Steps

- September/October, 2010:
 - Contractors write the programs
 - Initiate database Q/A by states to ensure unit inclusion
 - State ID of new/retired units
- November, 2010:
 - Contractors briefed on needed data manipulations and functionalities within the programming
- February/March, 2011:
 - Alpha version available for review.

Questions?