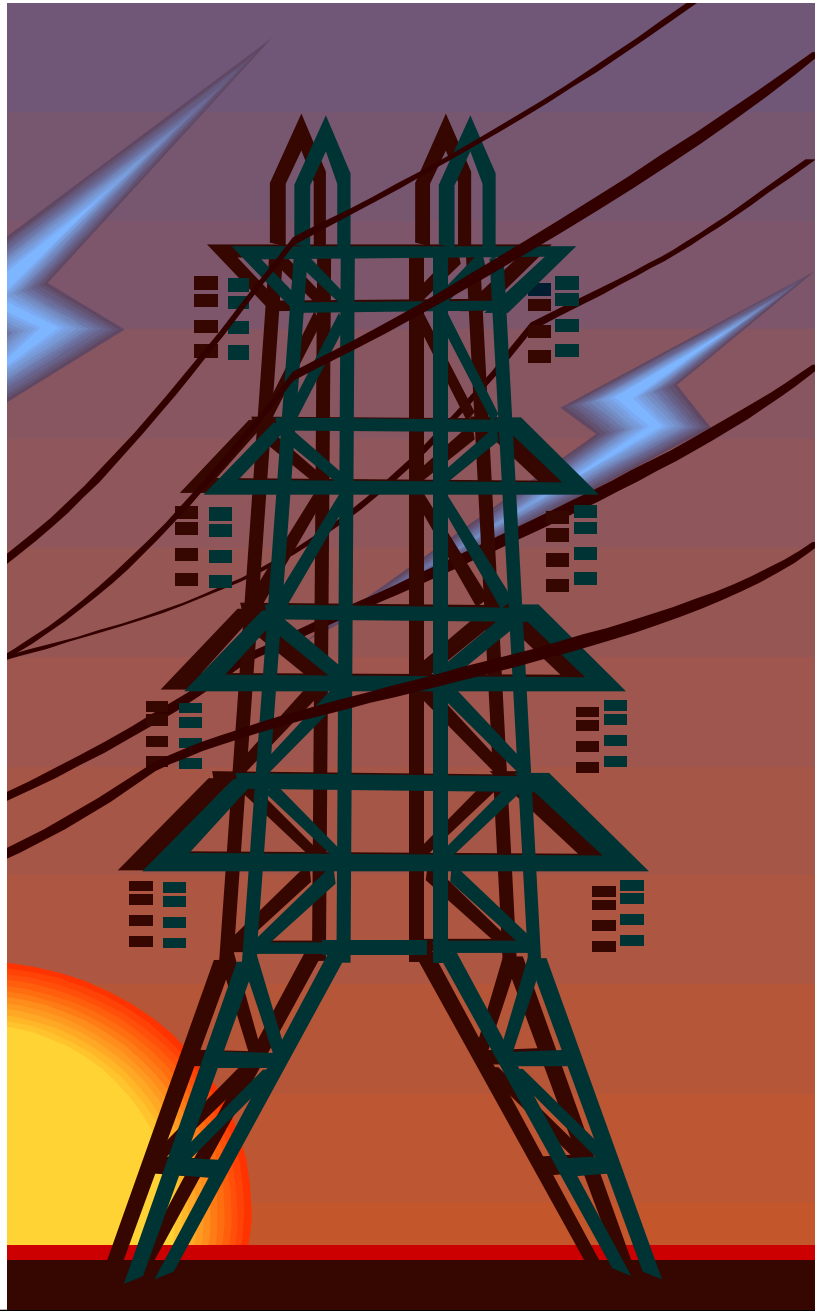


US EPA ARCHIVE DOCUMENT

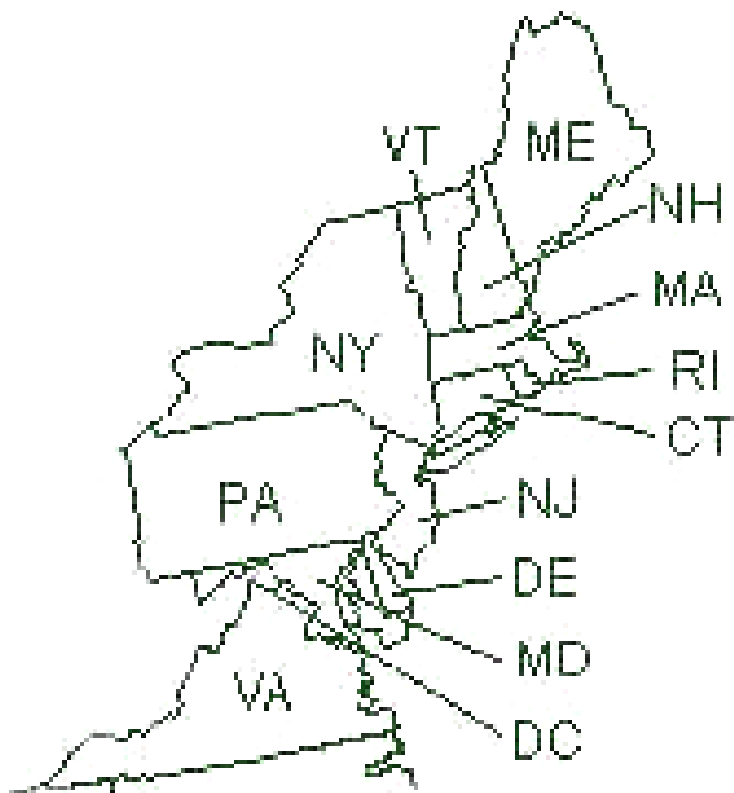


# **High Electric Demand Day (HEDD) Strategy**

**Tonalee Key  
NJ DEP  
April 12, 2007**

# Context

- Work undertaken by air quality planning programs in some states in the OTC
- State Implementation Planning (SIP) process for meeting the National Ambient Air Quality Standards
- States currently working on 3 major SIPs:
  - 8-Hour Ozone
  - PM<sub>2.5</sub>
  - Regional Haze



- Multi-state organization created under the Clean Air Act
- Develops and implements regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic regions

# What We Learned

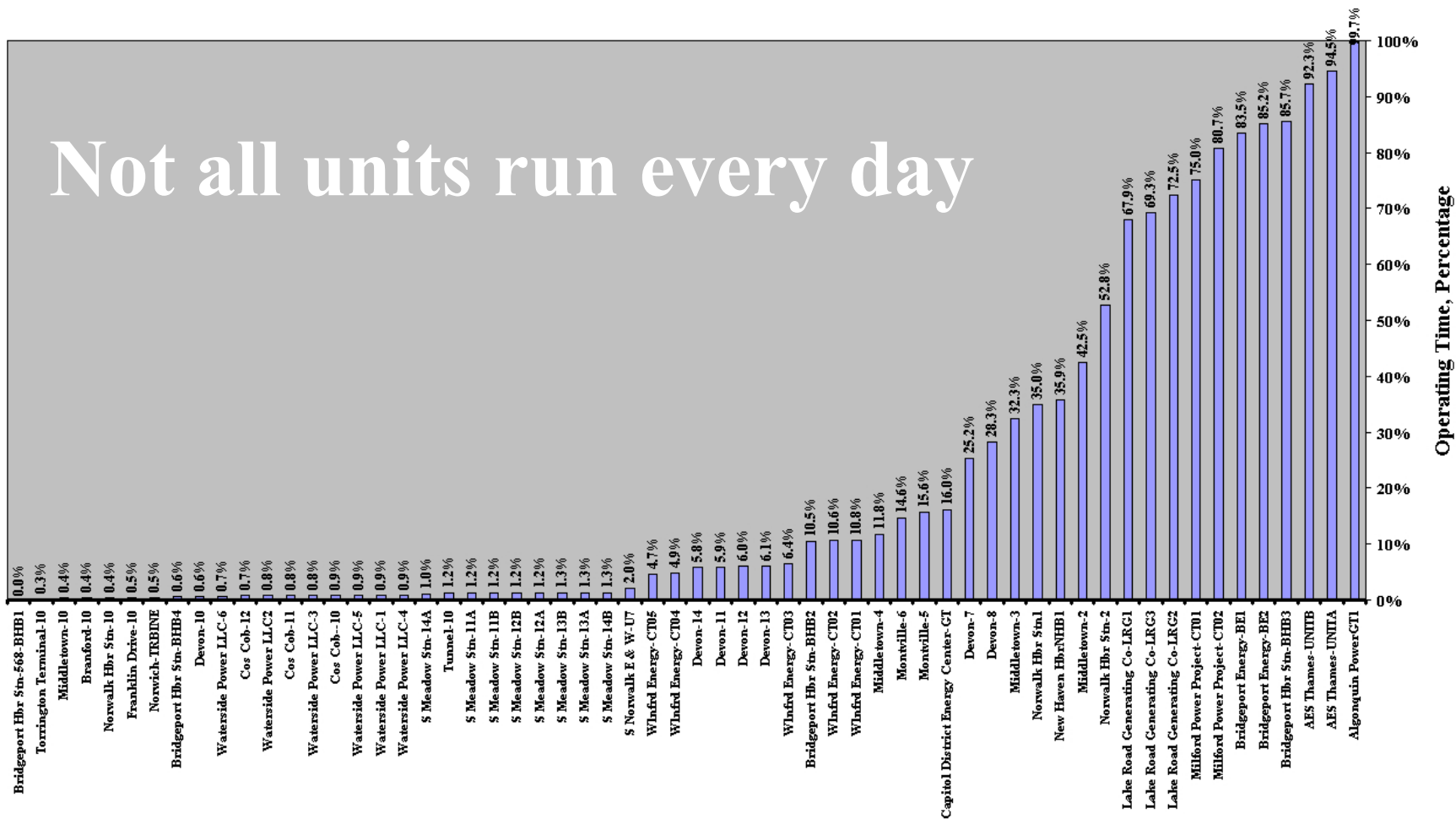
- **Emissions** from Electric Generating Units (EGUs) are **higher on high electric demand days**
- This results in **poorer air quality** on some of the **highest ozone exceedance days**

# **What EGUs Contribute the Most Emissions on HEDDs?**

# **The Mix of Generating Units Varies by Day and Region**

# CT Electric Generating Utility Average Percent Operating Time 2002-2005 Ozone Seasons

Not all units run every day

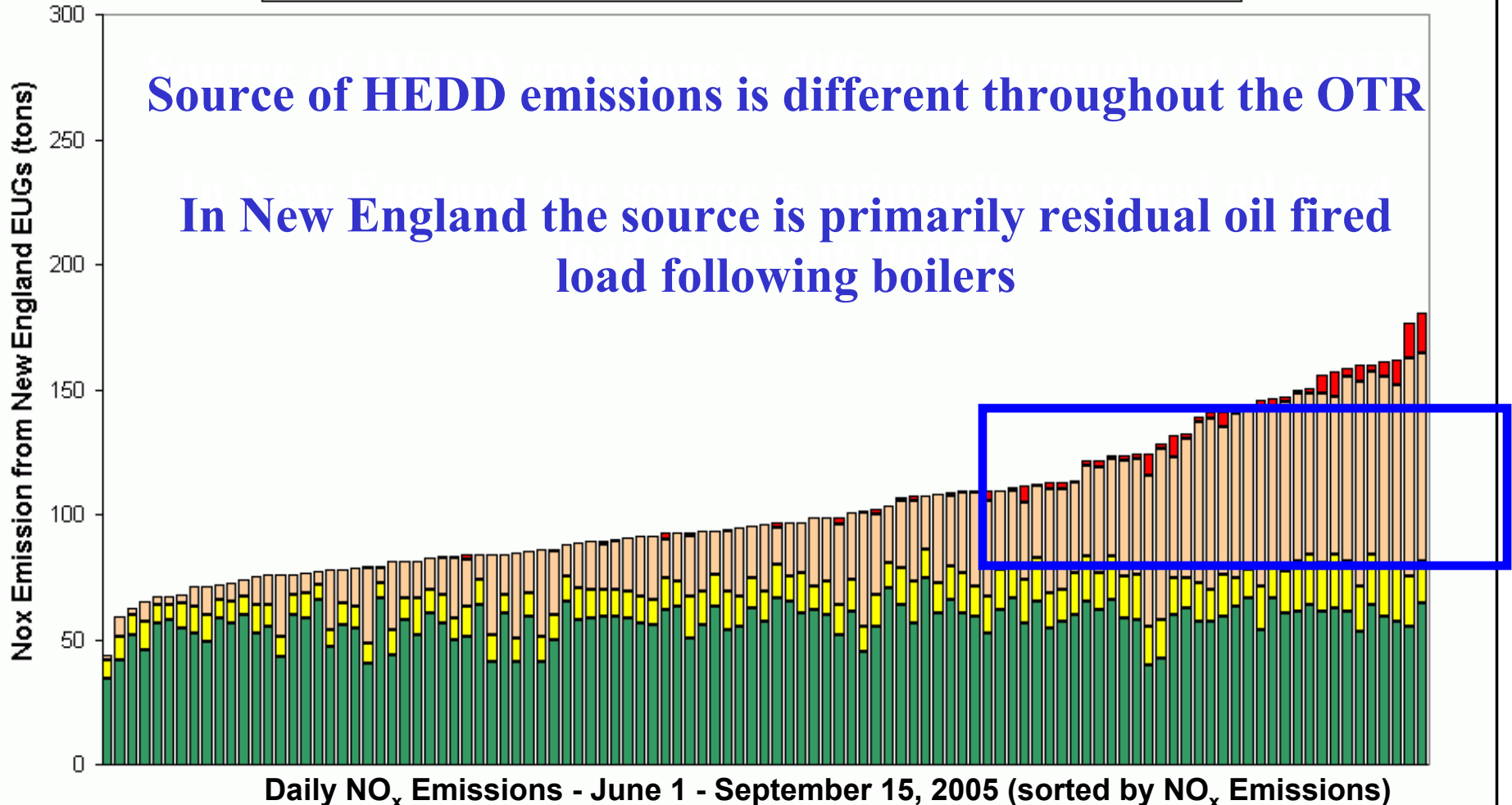


Fuel Types Comprising the Daily NO<sub>x</sub> Emissions  
sorted by NO<sub>x</sub> Mass from New England EGUs  
June 1, 2005 - September 15, 2005

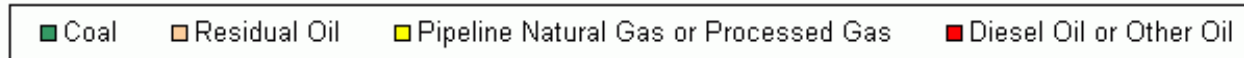
Coal Pipeline Natural Gas or Processed Gas Residual Oil Diesel or Other Oil

Source of HEDD emissions is different throughout the OTR

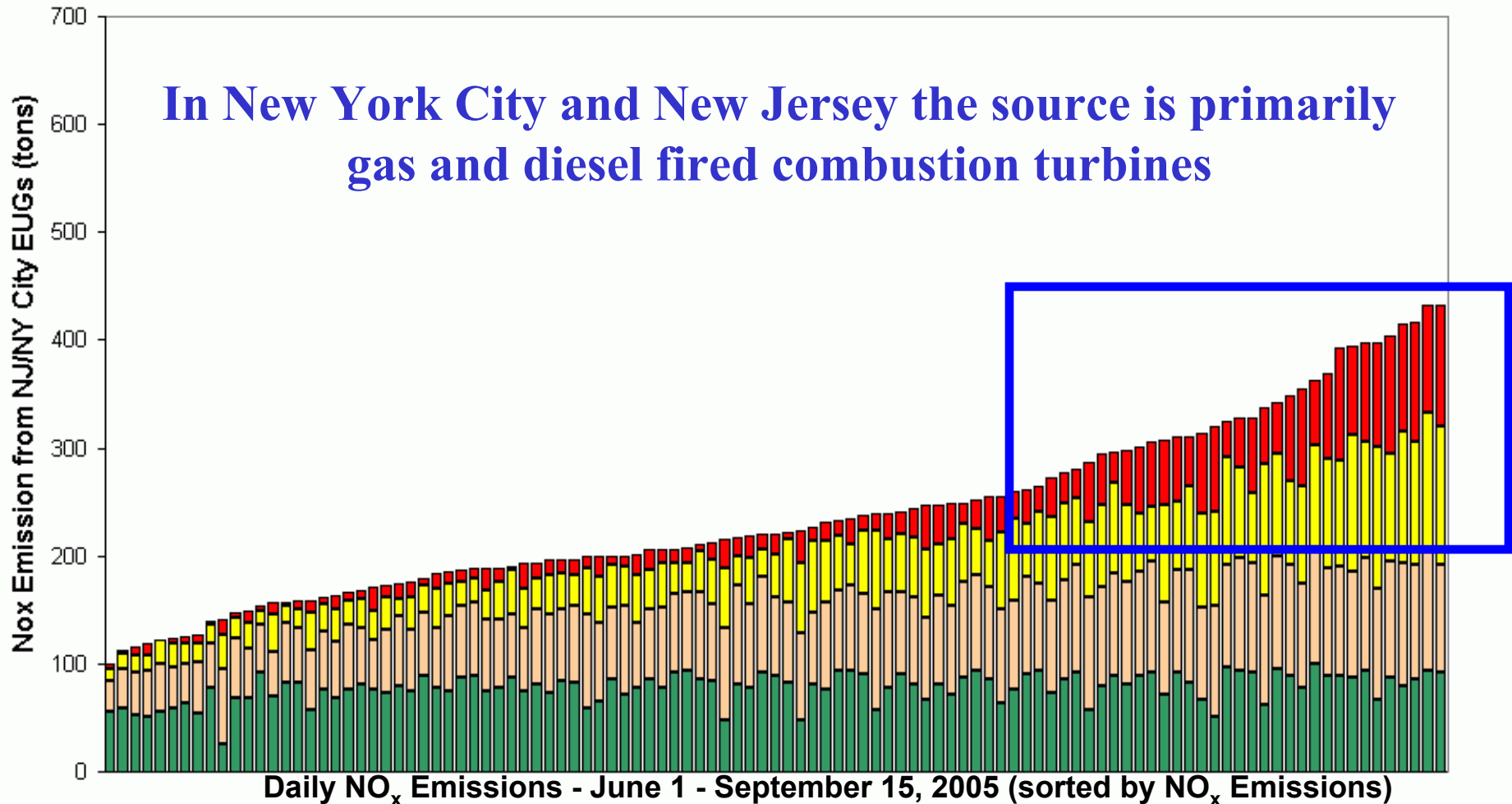
In New England the source is primarily residual oil fired  
load following boilers



Fuel Types Comprising the Daily Nox Emissions  
sorted by Nox Mass from NY City and NJ EGUs  
June 1, 2005 - September 15, 2005

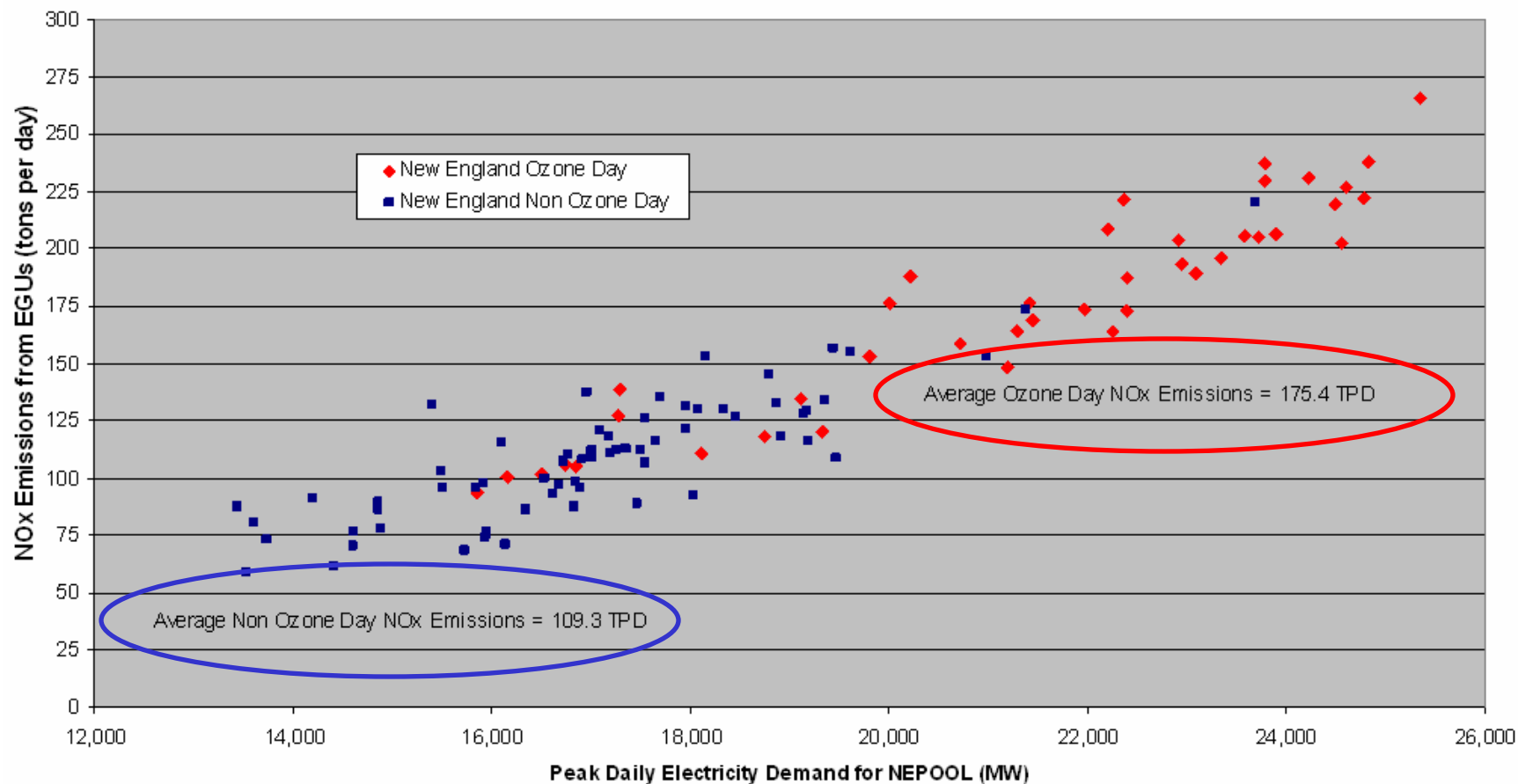


**In New York City and New Jersey the source is primarily gas and diesel fired combustion turbines**

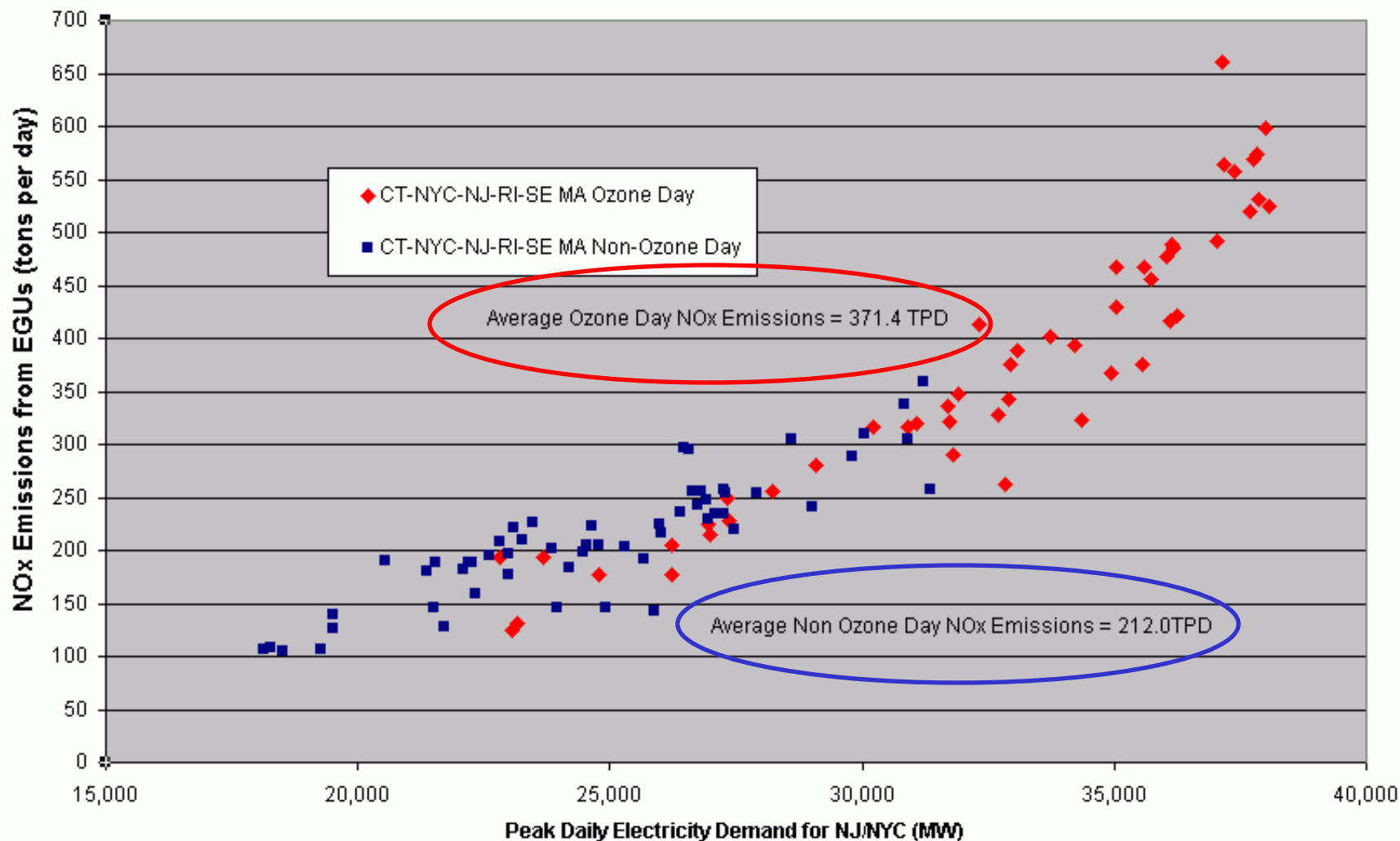


# **How Does this Affect Air Quality?**

Daily NO<sub>x</sub> Emissions from EGUs vs. Peak Daily Electricity Demand  
(June 1, 2002 - September 15, 2002)

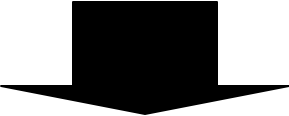


**Daily NO<sub>x</sub> Emissions from EGUs vs. Peak Daily Electricity Demand  
(June 1, 2002 - September 15, 2002)**



# Baseload EGUs Getting Cleaner But Emissions on HEDD Remain High

| NO <sub>x</sub> Emissions (TPD) |          |  |     |                          |           |
|---------------------------------|----------|--|-----|--------------------------|-----------|
| Typical Summer Day              |          |  |     | High Electric Demand Day |           |
| 8/7/2002                        | 6/4/2005 |  | Δ   | 8/12/2002                | 7/26/2005 |
| 992                             |          |  | 623 | 1615                     |           |
|                                 | 551      |  | 798 |                          | 1349      |

  
Baseload units  
are getting  
cleaner

  
Delta getting larger--  
HEDD units have a more  
profound effect

# What We Are Doing About It?

- Almost year long stakeholder process
- Accomplishments:
  - Definition of HEDD unit
  - Established a short term (2009) emission reduction goal
  - States committed to make reductions (MOU)
- Still to address:
  - HEDD trigger
  - Long term reductions

# State Reduction Responsibility

| State | NO <sub>x</sub><br>(tons per day) | Percent<br>Reduction from<br>HEDD Units |
|-------|-----------------------------------|-----------------------------------------|
| CT    | 11.7                              | 25%                                     |
| DE    | 7.3                               | 20%                                     |
| MD    | 23.5                              | 32%                                     |
| NJ    | 19.8                              | 28%                                     |
| NY    | 50.8                              | 27%                                     |
| PA    | 21.8                              | 32%                                     |
| Total | 134.9                             |                                         |

# Meeting the Short Term HEDD Reduction Responsibility

States can meet responsibility by a variety of actions:

- Implementing/increasing commitment to energy efficiency demand response, and/or renewable programs
- Implementing rules to reduce emissions from distributed generation sources
- States assign part or all of tonnage reduction responsibility to generators
  - Generators devise a plan to achieve reductions.

# Generator Reduction Plans

Can include:

- Control HEDD units
- Control other EGUs (targeted)
- Implement energy efficiency demand response, and/or renewable programs (targeted)
- Implement innovative peak day reduction strategies
- Target load pockets served by the peaking units
- Work with ISO on targeting their commercial DR\* programs
- Work with ISO on structure of capacity market for incentives to install clean generation

\* DR programs to be load reduction programs or clean load shift programs; cannot shift to use of 'dirty' DG

# **Energy Efficiency & Renewable Energy**

**Most efficient avenue - if you do not need the energy in the first place it eliminates a multitude of issues**

- States and/or generators can sponsor EE/RE programs
- Discussions with EPA have presented avenues to incorporate EE/RE efforts into the SIP
- EPA working with states to develop a simplified method to quantify benefits

# **EPA TRUM Analysis of 2010 NO<sub>x</sub> Reductions Resulting from EE Programs on HEDD in OTC**

**Assuming 1.5% Cumulative Load Reductions in All States**

**7.7\***

| <b>State</b> | <b>Load Reduction<br/>MWh per day</b> | <b>NO<sub>x</sub> Reduction<br/>Tons per day</b> |
|--------------|---------------------------------------|--------------------------------------------------|
| Connecticut  | 1,497                                 | 1.20                                             |
| Delaware     | 1,438                                 | 1.25                                             |
| Maryland     | 2,181                                 | 4.32                                             |
| New Jersey   | 6,394                                 | 6.44                                             |
| New York     | 6,180                                 | 5.85                                             |
| Pennsylvania | 6,720                                 | 5.35                                             |

More detailed analysis can be performed on a state by state basis that utilizes more refined local information.

**\* Dispatch Analysis of August 2, 2006 NO<sub>x</sub> Reductions with load constraints factored in for Southwest Connecticut. (Analysis by RSG Inc.)**

# **New Jersey Clean Energy Program Energy Efficiency & Renewable Energy Results**

|             | <b>Electric Energy<br/>Efficiency</b> | <b>Natural Gas<br/>Energy<br/>Efficiency</b> | <b>Solar<br/>Renewable<br/>Energy</b> | <b>Class I<br/>Renewable<br/>Energy</b> |
|-------------|---------------------------------------|----------------------------------------------|---------------------------------------|-----------------------------------------|
|             | <b>MWh</b>                            | <b>Dtherm</b>                                | <b>MW</b>                             | <b>MW</b>                               |
| <b>2003</b> | <b>285,576</b>                        | <b>408,583</b>                               | <b>1.7</b>                            | <b>76</b>                               |
| <b>2004</b> | <b>328,912</b>                        | <b>432,758</b>                               | <b>2.1</b>                            | <b>3.7</b>                              |
| <b>2005</b> | <b>382,845</b>                        | <b>617,261</b>                               | <b>5.5</b>                            | <b>14.9</b>                             |

# **For More Information on the HEDD Strategy**

<http://www.otcair.org/document.asp?fview=meeting>