Projecting Emissions from Electric Generation: The ERTAC Alternative

NACAA Membership Meeting
Baltimore, MD
September, 2013

Eastern Regional Technical Advisory Committee (ERTAC)

ERTAC convenes ad-hoc groups to solve specific inventory problems

Collaboration:

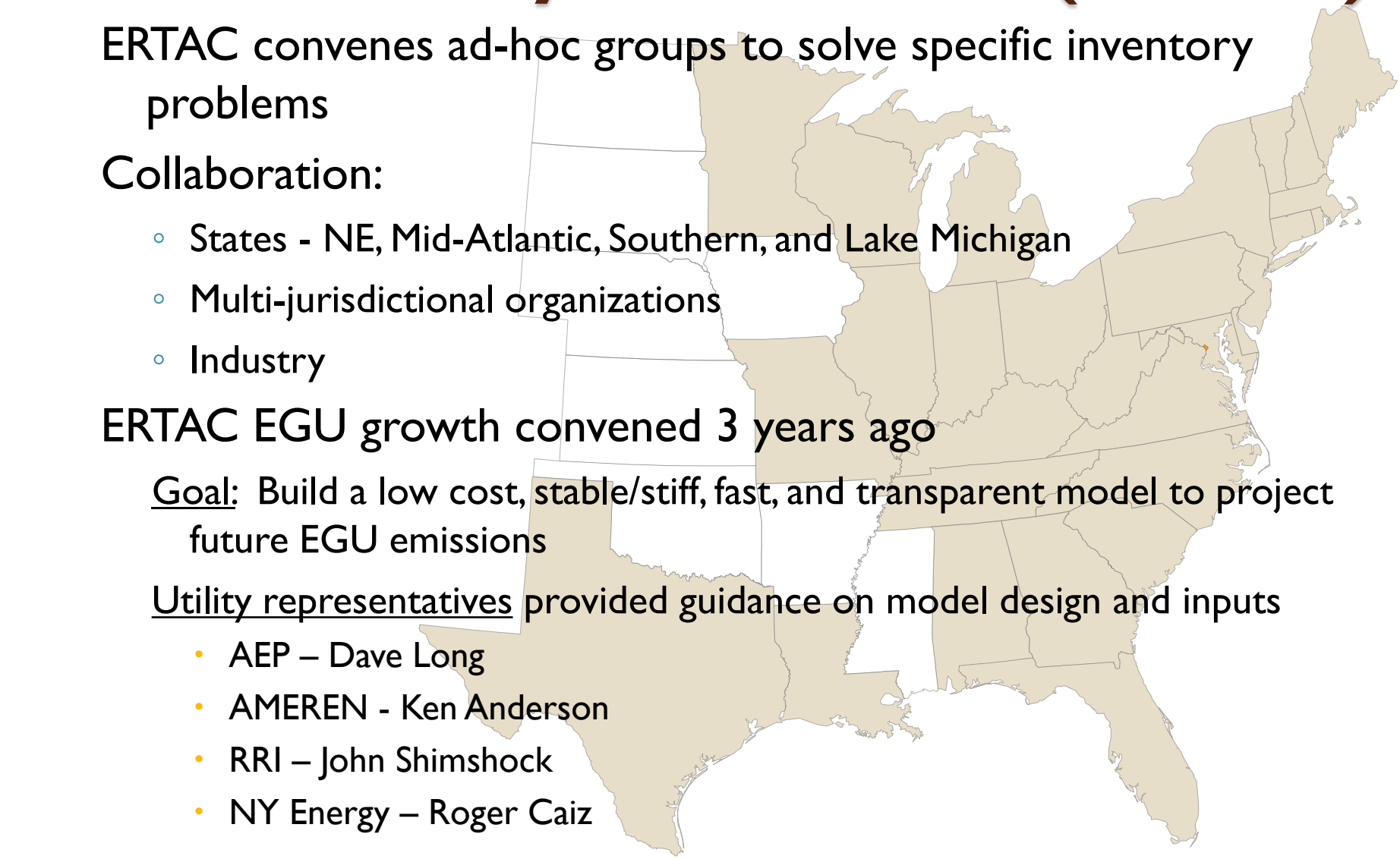
- States - NE, Mid-Atlantic, Southern, and Lake Michigan
- Multi-jurisdictional organizations
- Industry

ERTAC EGU growth convened 3 years ago

Goal: Build a low cost, stable/stiff, fast, and transparent model to project future EGU emissions

Utility representatives provided guidance on model design and inputs

- AEP – Dave Long
- AMEREN - Ken Anderson
- RRI – John Shimshock
- NY Energy – Roger Caiz



ERTAC EGU Subcommittees & Co-Chairs

Committee Co-chairs

Laura Mae Crowder, WV DEP

Bob Lopez, WI DNR

Danny Wong, NJ DEP

Subcommittees and Leads

Implementation/Doris McLeod VA, Mark Janssen, LADCO

Create logic for software

Growth/Bob Lopez, WI & Laura Mae Crowder, WV

Regional specific growth rates for peak and off peak

Renewables & Conservation Programs/Danny Wong, NJ

Characterize programs not already included in growth factors

Data Tracking/Wendy Jacobs, CT

Improve default data to reflect state specific information

Attributes of ERTAC Projection Tool

- Region specific growth rates for peak/off-peak
- Unit-specific fossil fuels (e.g., coal, gas, oil)
  - RE/EE and nuclear considered in growth factors
- Calculates future hourly estimates on unit-specific basis.
- Tests hourly reserve capacity.
- Quickly evaluates various scenarios (e.g., unit retirements, demand growth, fuel switching, and control measures)
- Data intensive – depends on state-supplied data.

Attributes - continued

- Code is not proprietary; available at no cost.
- Currently, states in MW, NE, and SE regions are running the model.
- Additionally, the following organizations are (or will) be testing:
  - EPA/CAMD
  - Texas

How does it work?

Starting point: Base Year CEM data by region

States provide info: new units, controls & other changes

- **Regional Lead** coordinate state review of model and inputs
- **State Lead** QA their state files
- Review input & output to provide guidance
- If future year (FY) emission goals are not met with known controls, states select the strategy to meet the goal

Regional growth rates

- Base – Department of Energy (EIA) Annual Energy Outlook (AEO)
- Peak – North American Electric Reliability Corporation (NERC)

Future hourly estimates based on base year activity

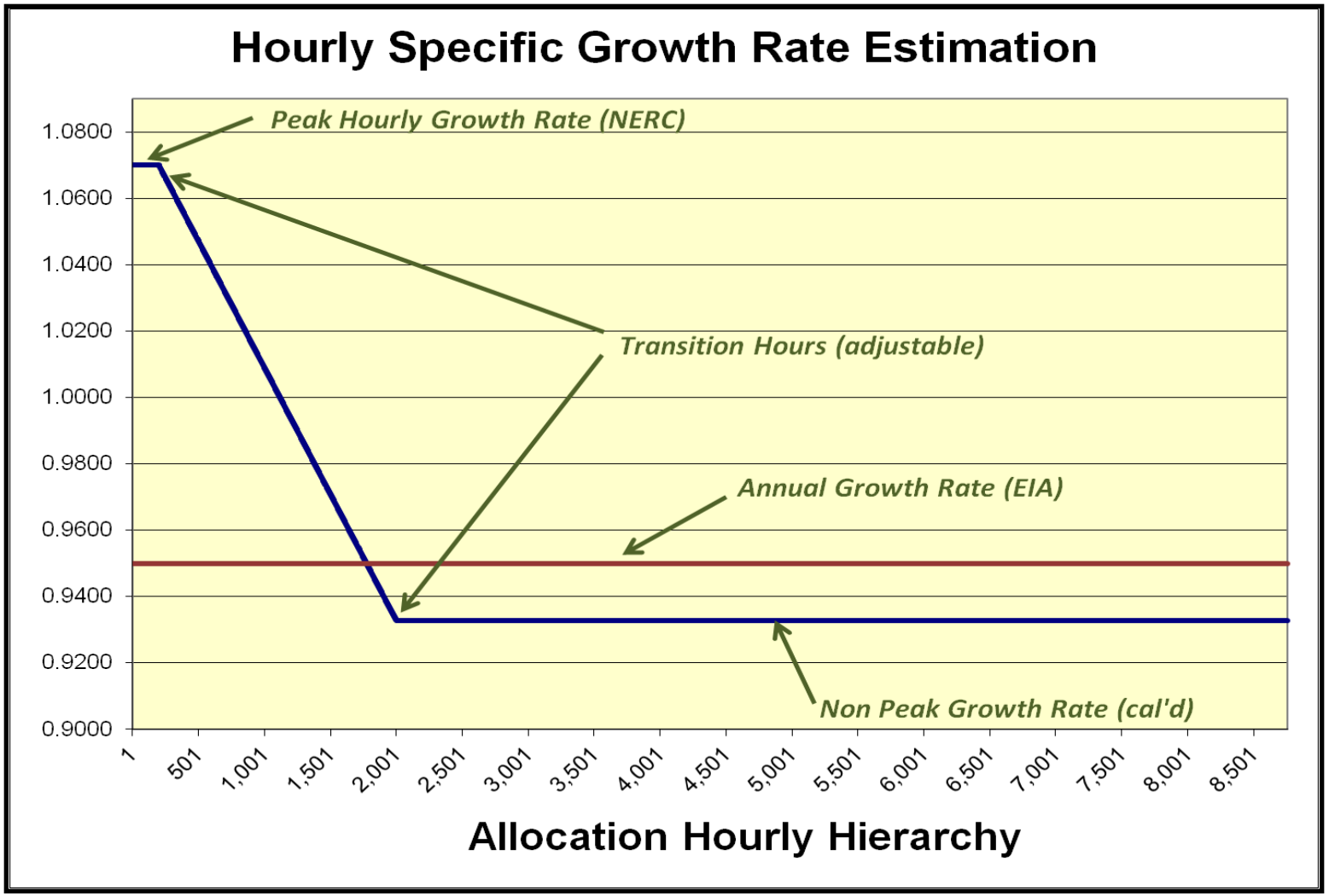
- Temporal profile matches meteorology

Future hourly estimates based on base year activity

- Temporal profile matches meteorology

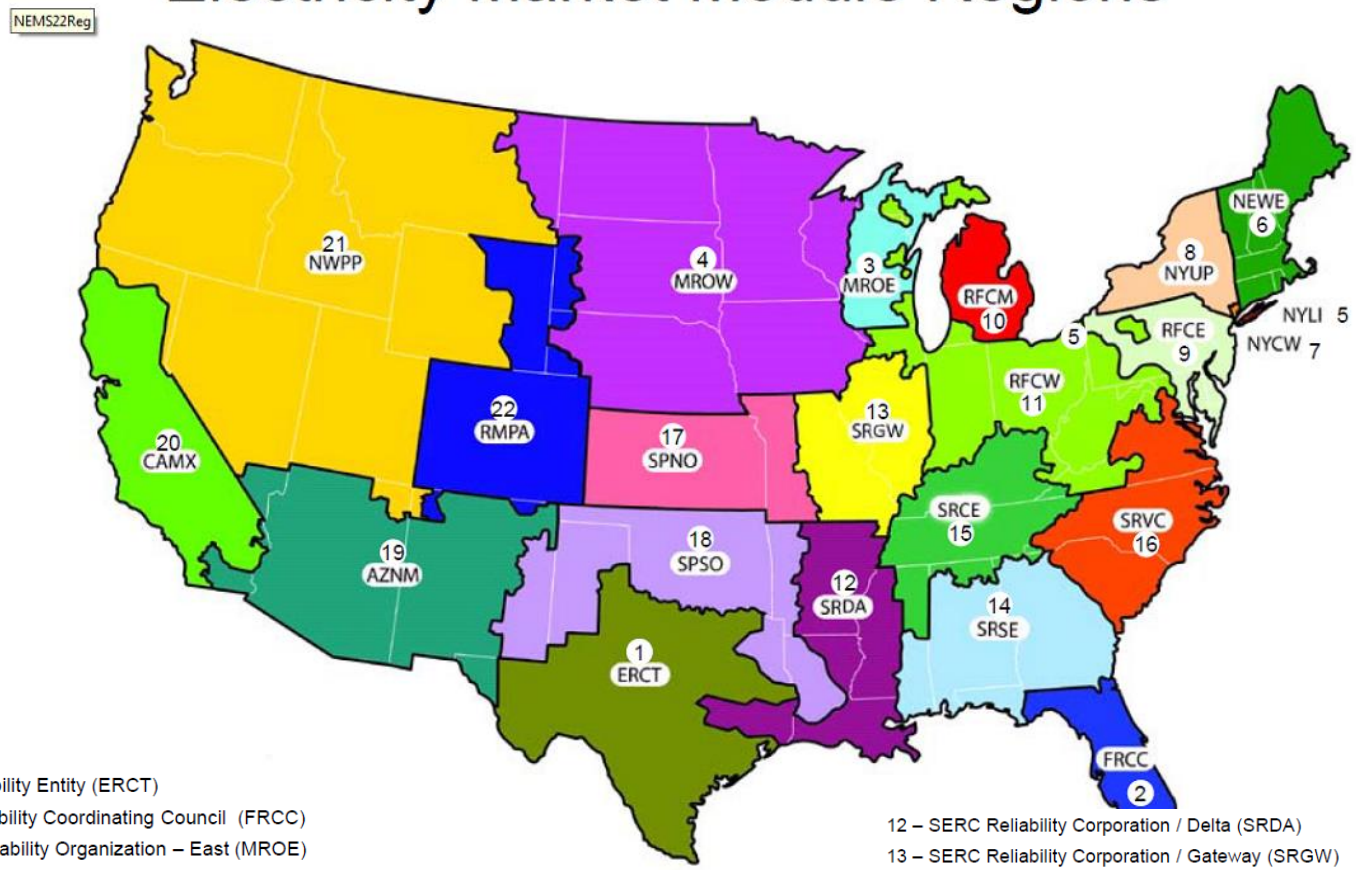
Growth Rates (GR)

- Peak GR = 1.07
- Annual GR = 0.95
- Transition hours of 200 & 2,000
- Non Peak GR = 0.9328 (calculated)



EIA EMM(NEMS) Map – 2011, 2012, 2013
& Update to ERTAC Core Regions - 2013

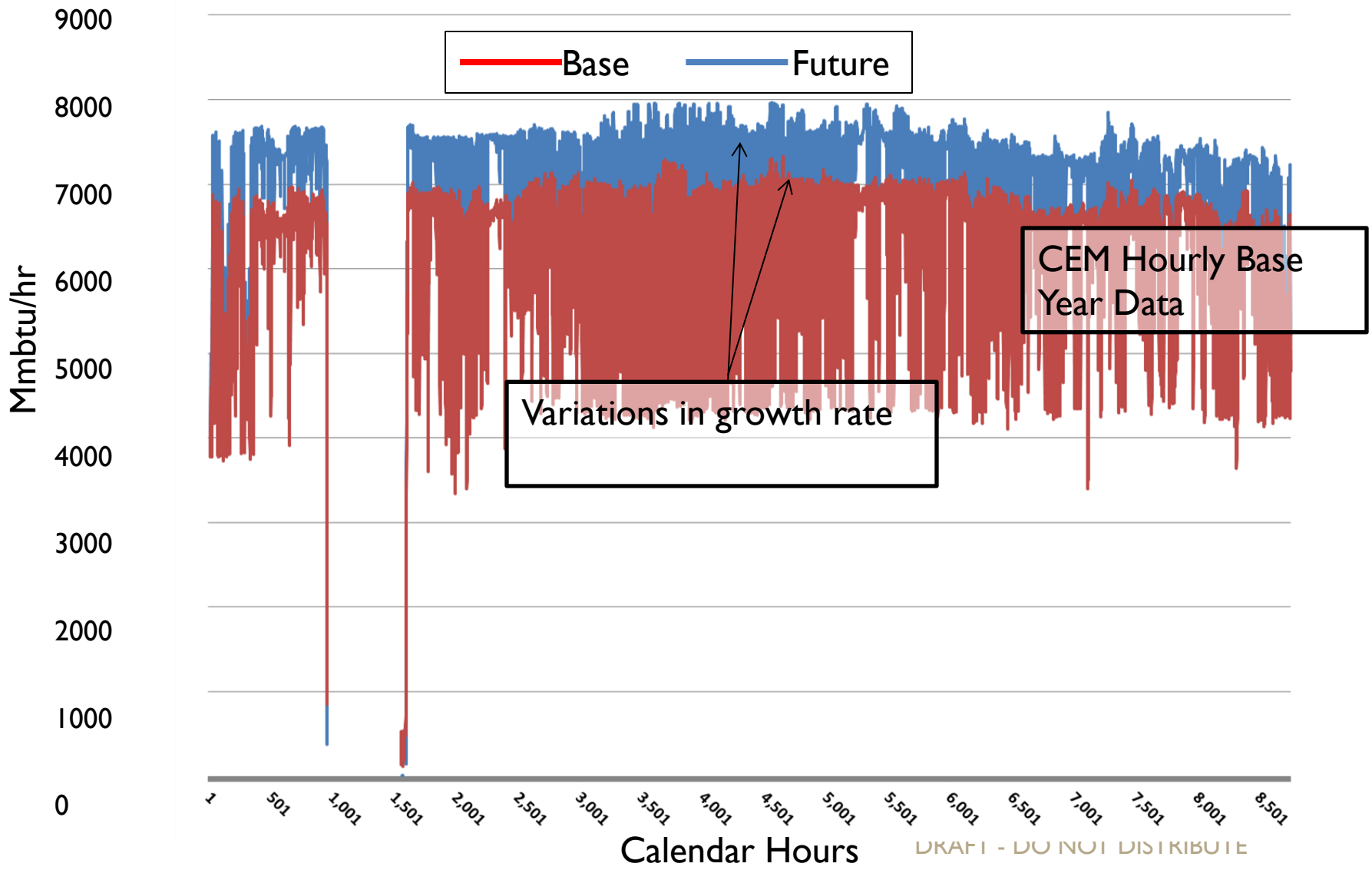
Electricity Market Module Regions



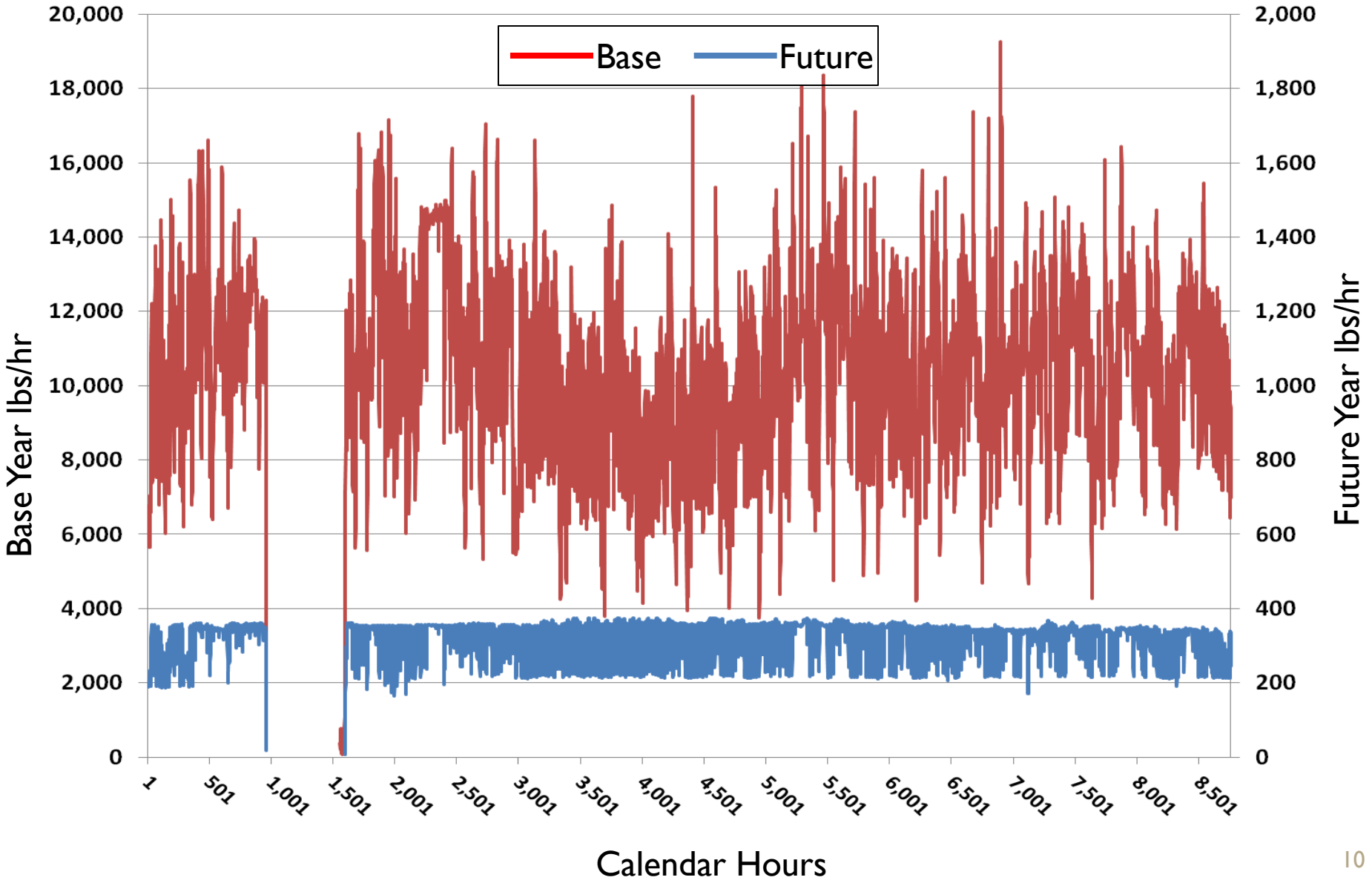
1 – Texas Reliability Entity (ERCT)
2 – Florida Reliability Coordinating Council (FRCC)
3 – Midwest Reliability Organization – East (MROE)
4 – Midwest Reliability Organization – West (MROW)
5 – Northeast Power Coordinating Council / Northeast (NEWE)
6 – Northeast Power Coordinating Council / NYC – Westchester (NYCS)
7 – Northeast Power Coordinating Council / Long Island (NYLI)
8 – Northeast Power Coordinating Council / Upstate New York (NYUP)
9 – Reliability First Corporation/ East (RFCE)
10 – Reliability First Corporation/Michigan (RFCM)
11 – Reliability First Corporation/West (RFCW)

12 – SERC Reliability Corporation / Delta (SRDA)
13 – SERC Reliability Corporation / Gateway (SRGW)
14 – SERC Reliability Corporation / Southeastern (SRSE)
15 – SERC Reliability Corporation / Central (SRCE)
16 – SERC Reliability Corporation / Virginia-Carolina (SRVC)
17 – Southwest Power Pool Regional Entity / North (SPNO)
18 – Southwest Power Pool Regional Entity / South (SPSO)
19 – Western Electricity Coordinating Council / Southwest (AZNM)
20 – Western Electricity Coordinating Council / California (CAMX)
21 – Western Electricity Coordinating Council / Northwest Power Pool Area (NWPP)
22 – Western Electricity Coordinating Council / Rockies (RMPA)

Unit Level Example: Coal Fired Existing Unit, 800 MW



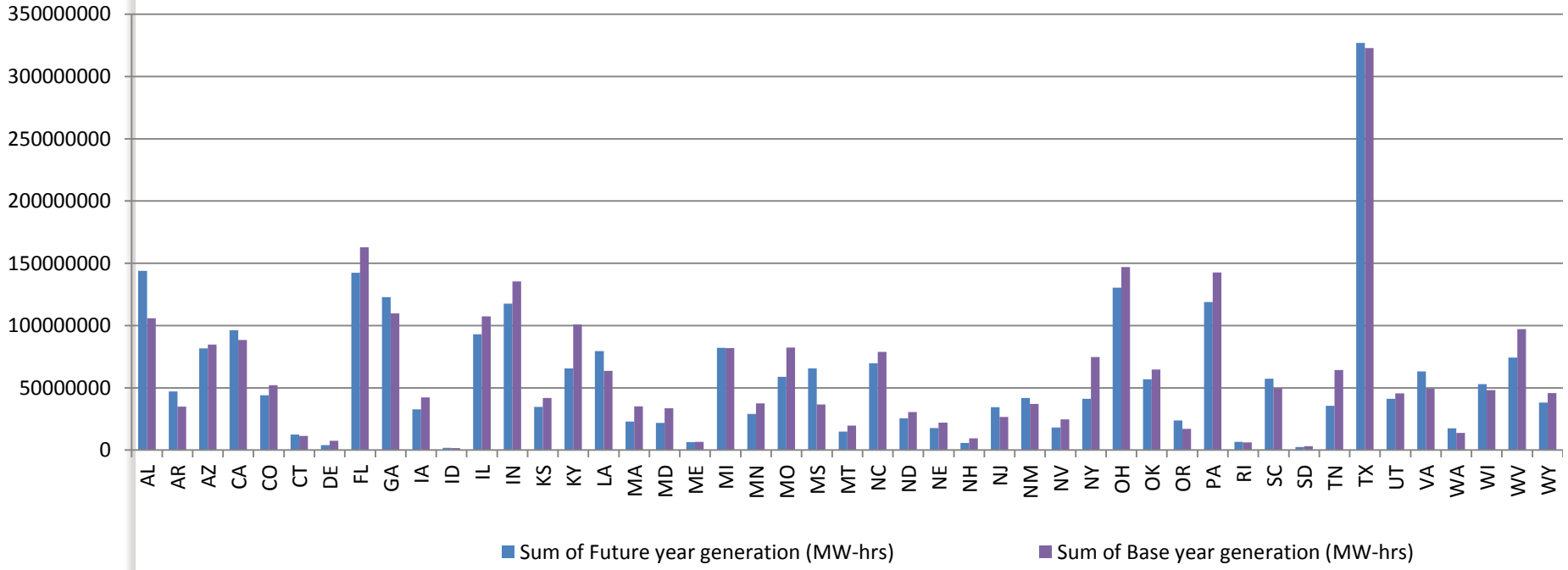
Unit Level Example: Coal Fired Existing Unit, 800 MW – SO2 Control



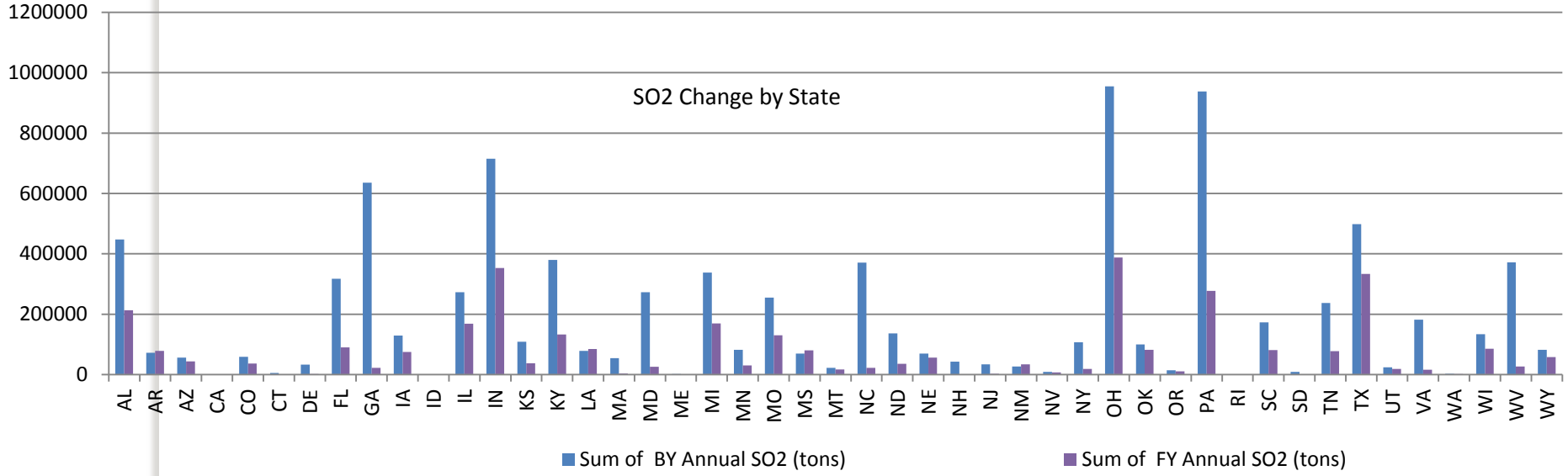
Project Status

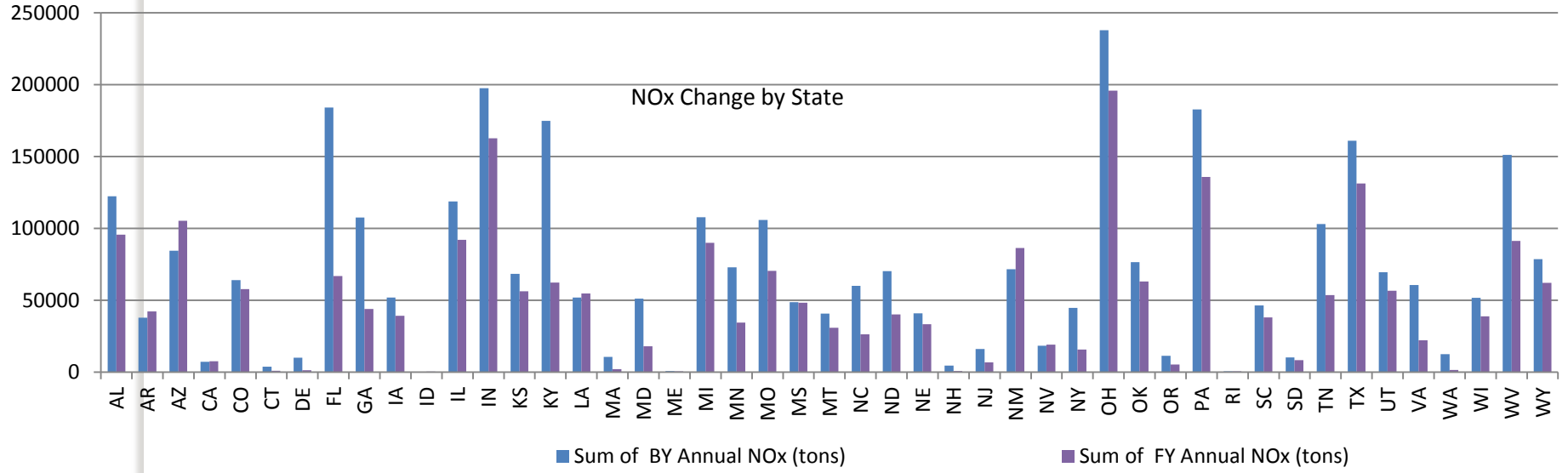
- Completed run with 2007 & 2011 base years and 2013 AEO growth rates.
- Code complete to convert ERTAC EGU output to SMOKE inputs
- OTC is using ERTAC EGU V1.7 projection to 2018 & 2020 in CMAQ modeling.

ERTAC Version 1.6 2007/2018 generation by state



ERTAC Version 1.6 2007/2018 Emissions by State





Benefits of Using the ERTAC Projection Tool

- Conservative predictions
  - No big swings in generation
  - No unexpected unit shutdowns
- Inputs are completely transparent
- Software is not proprietary
- Output files are hourly and reflect base year meteorology
- Quickly evaluates various scenarios
  - Regional and fuel modularity
  - Can test retirements, fuel switches, growth, and controls

Next Steps for ERTAC

- Planned activities:
  - Compare to IPM
  - Conduct sensitivity tests:
    - High/low gas and coal assumptions
    - MATS
    - Aggressive unit shut-downs
- Provide continued support, documentation, and training to other states and stakeholders.
- Documentation at:

  ertac.us/egu

  http://marama.org/2013-ertac-egu-forecasting-tool-documentation