Environmental Dispatch

Harvard Electric Policy Group
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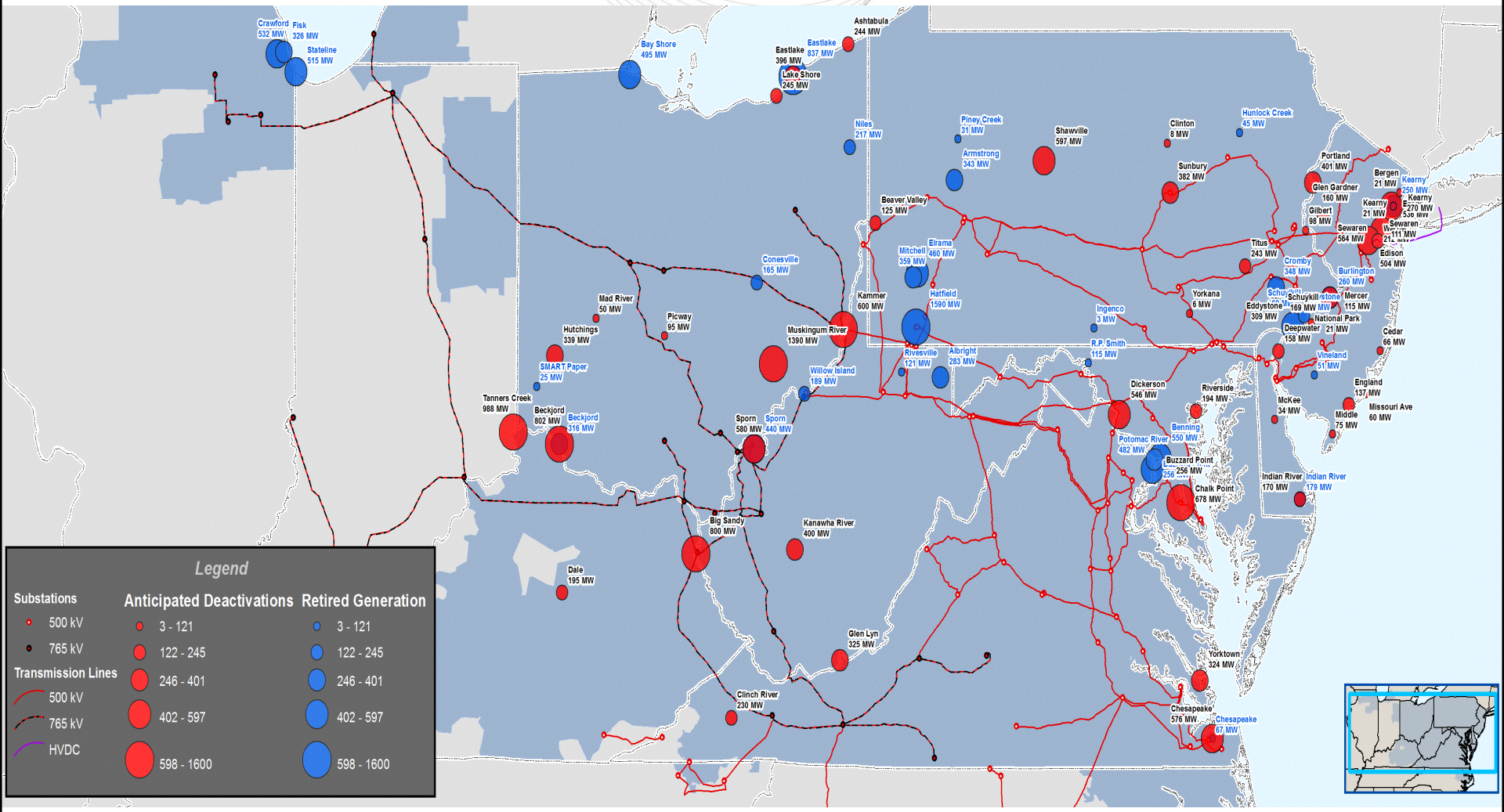
Mercury and Air Toxins Standard (MATS)

- Coal and oil-fired units
- Limits on heavy metal and acid gas emissions
  - Mercury, arsenic, chromium, nickel, acid gases
- Significant generation retirements in PJM

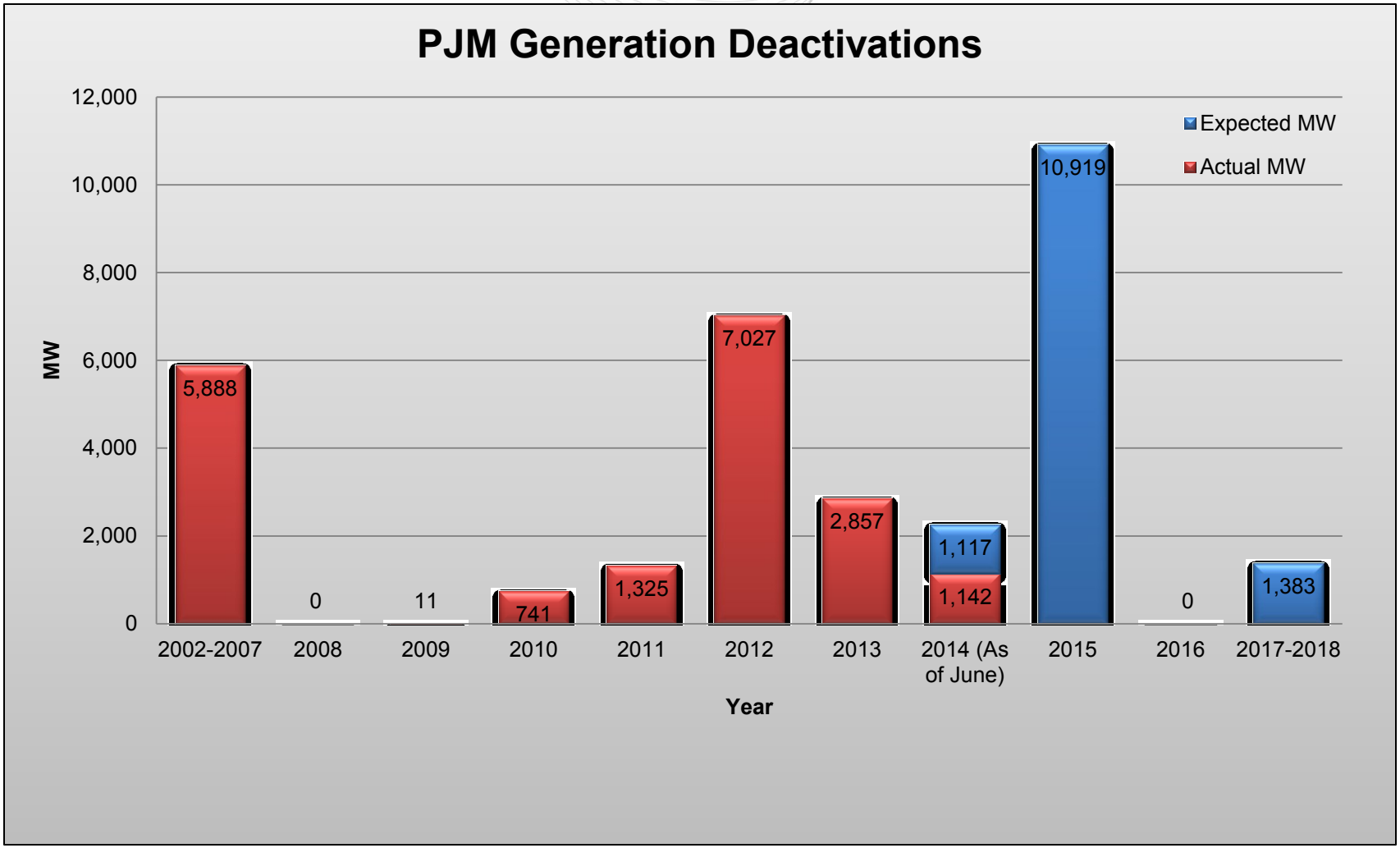
Sections 111(d) and 111(b)

- State-based limitations on emissions
- EPA to provide guidance

Generator Deactivations

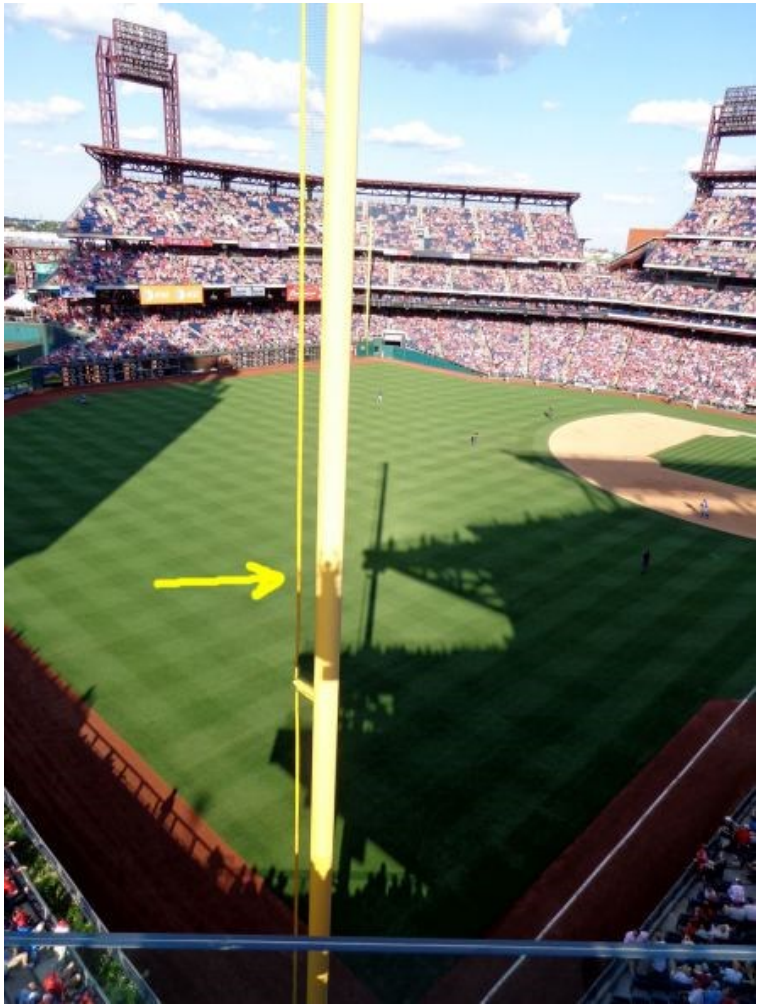


Generator Deactivations



What are my options?

- One foul pole
  - *Operate where we are today*
  - Environmental issues are largely managed by asset owners
- Not good from a reliability/markets perspective
  - Critical information is not transparent to the RTO
  - Inefficient utilization of assets
  - Market prices suffer



What are my options?

- The other foul pole
  - *Flip the problem on its head*
  - Collect emissions curves from generation assets
  - Impose emissions constraints at the unit, state and RTO-levels
    - Resolution of 111(d) plans will likely drive this
  - Tradeoff between production cost and emissions tonnage at a region level
  - Minimize emissions tonnage?
    - At what expense?

Grid Impacts

- Additional retirements
- Further decline of system inertia
- Allow for infrastructure changes

Revenue Shifts

- Shift of energy market revenues to capacity and grid services
- Flexibility likely becomes king

Cost-benefit?
Societal Impacts?

- What's realistic
  - Better data gathering and utilization by the RTO
    - Situational awareness for system operators and tools
  - Use the capability we have…for now.
    - Emissions adders on resource offers
    - Broader use of environmental opportunity cost adders to run-time limited units
      - Resorting directly to run-time limitations is not effective
      - Current methodology may be too complex which limits usefulness
  - Paradigm shift needs to occur over time.

Questions?