Water Issues Facing Electric Generation in the Basin

WRA Fall Conference – November 7, 2012

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Overview

- Electric Generation Changes in the Delaware River Basin
- Reasons for Recent Changes
- Potential Effects of Those Changes on the Basin
- Water Use Characteristics of Electric Generation
- Climate Change Factors
- Holistic Management of Water Resources in the Basin

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Electric Generation Changes in the Basin

- Retirements of generating units have occurred in the Basin

- Exelon Generation Company, LLC retirements:
  - Cromby Generating Station, Phoenixville, PA, 188 MW
    - Unit 1 (coal) online in 1954, retired May 31, 2011
    - Unit 2 (oil/gas) online in 1960, retired December 31, 2011
  - Eddystone Generation Station, Eddystone, PA 354 MW
    - Units 1 and 2 (coal) online in 1960, retired May 31, 2011 and May 31, 2012, respectively
    - Units 3 and 4 (oil/gas) remain in operation

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Electric Generation Changes in the Basin

- Anticipated Retirements of Other Facilities:
- GenOn projected facility retirements:
  - Portland Generating Station (coal) to close by January 2015
  - Titus Generating Station (coal) to close by April 2015

Photo credit: GenOn Energy

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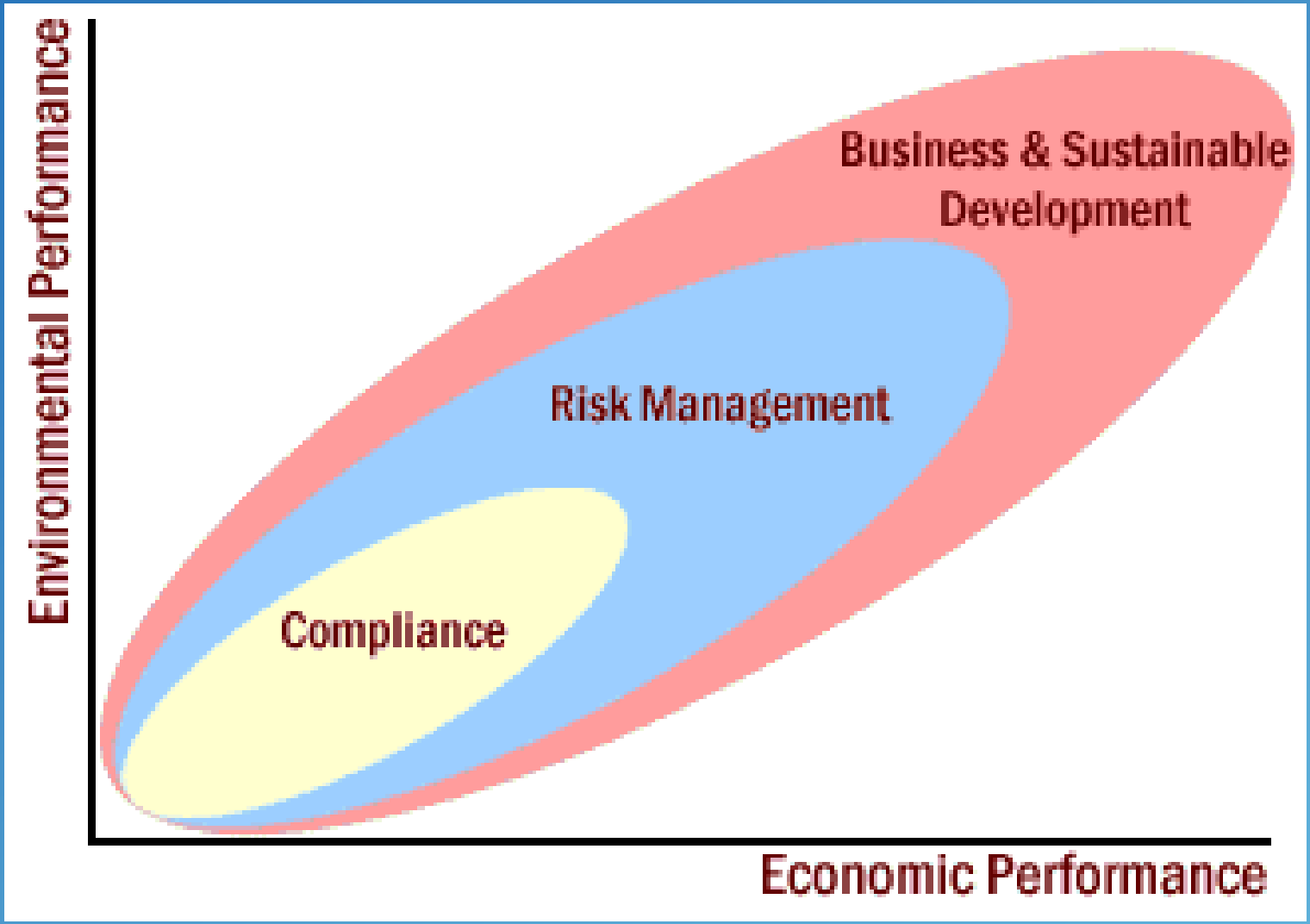
Various Reasons for Retirement



Source: International Institute for Sustainable Development

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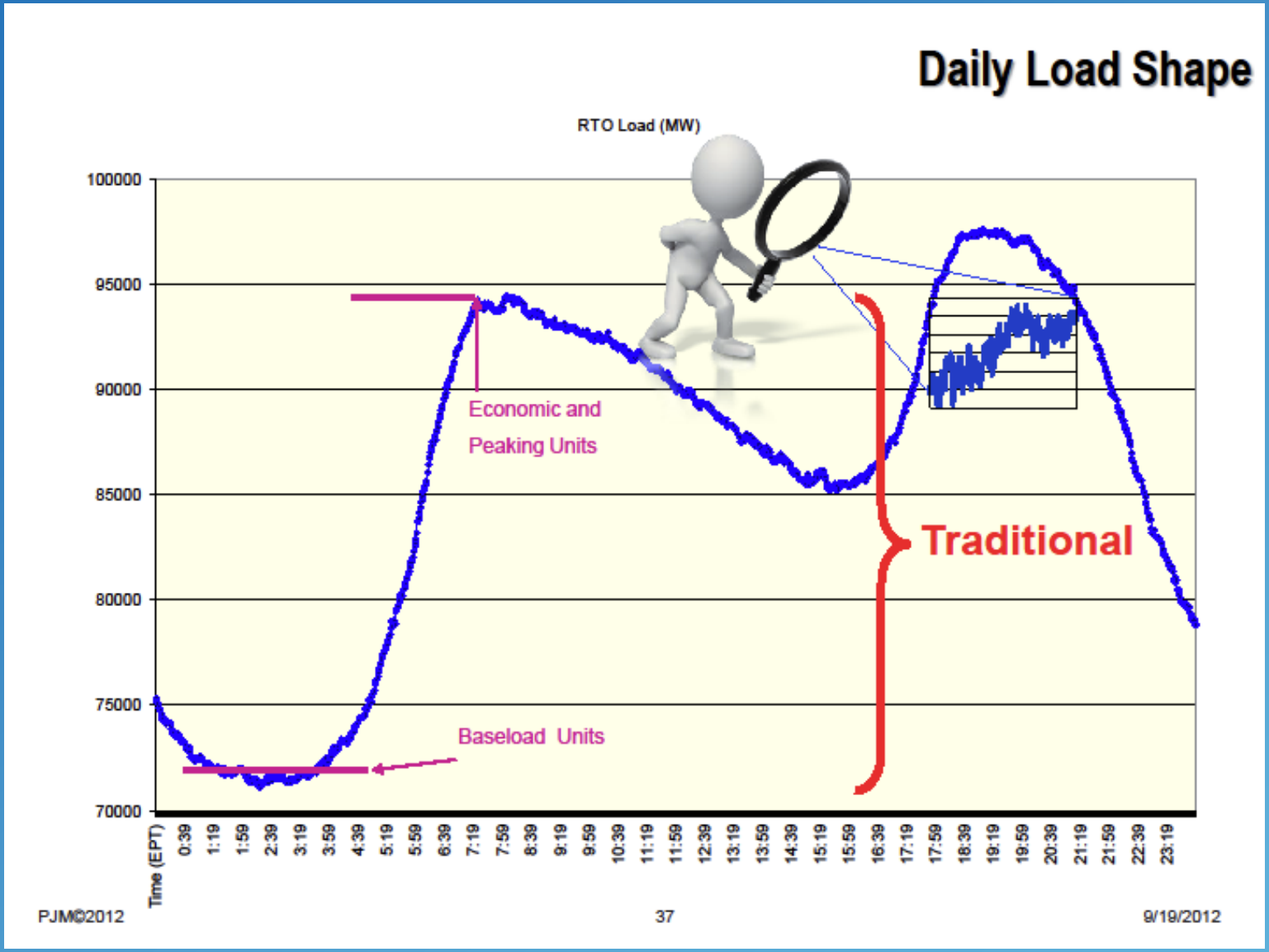
Various Reasons for Retirement



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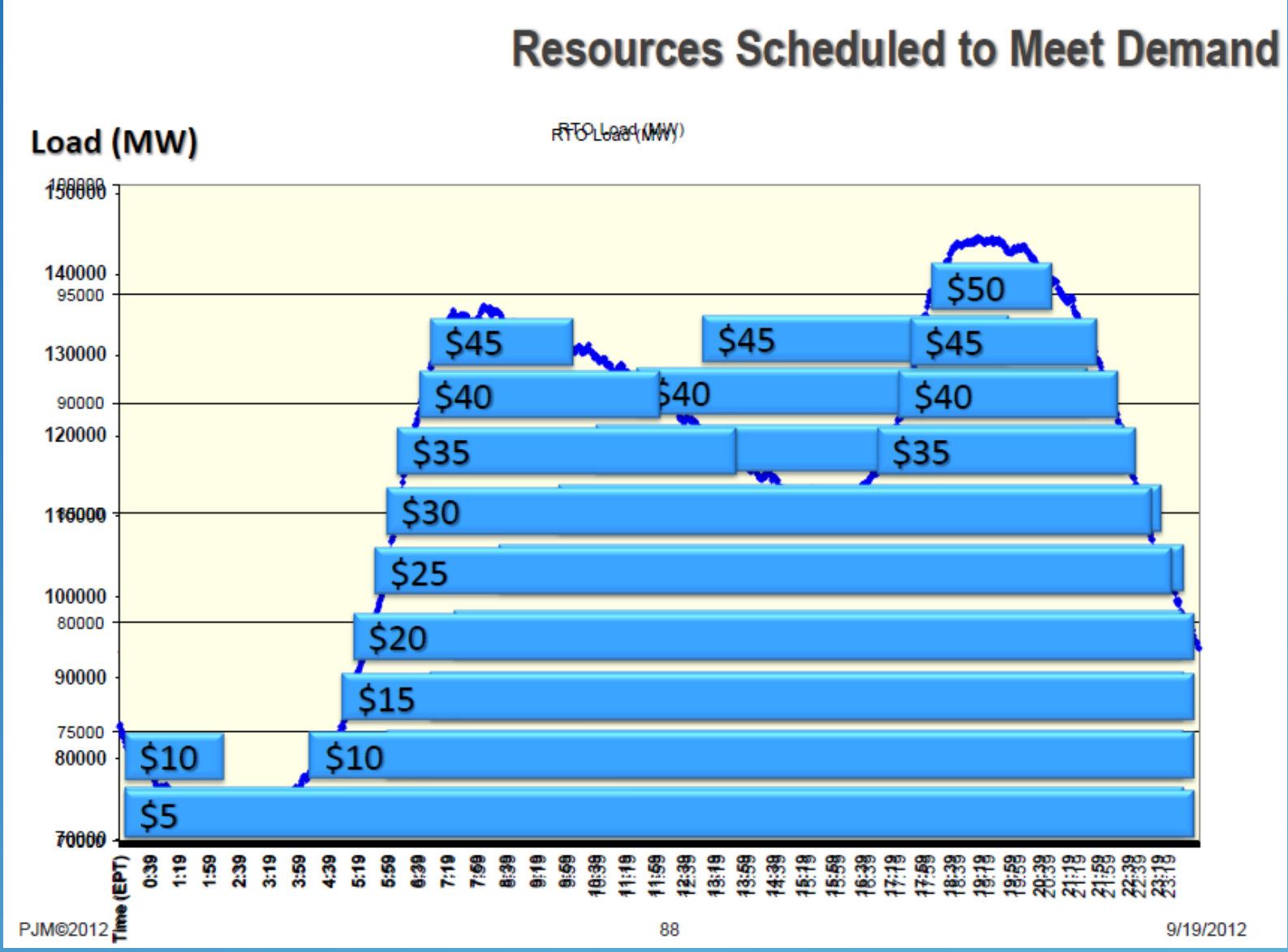

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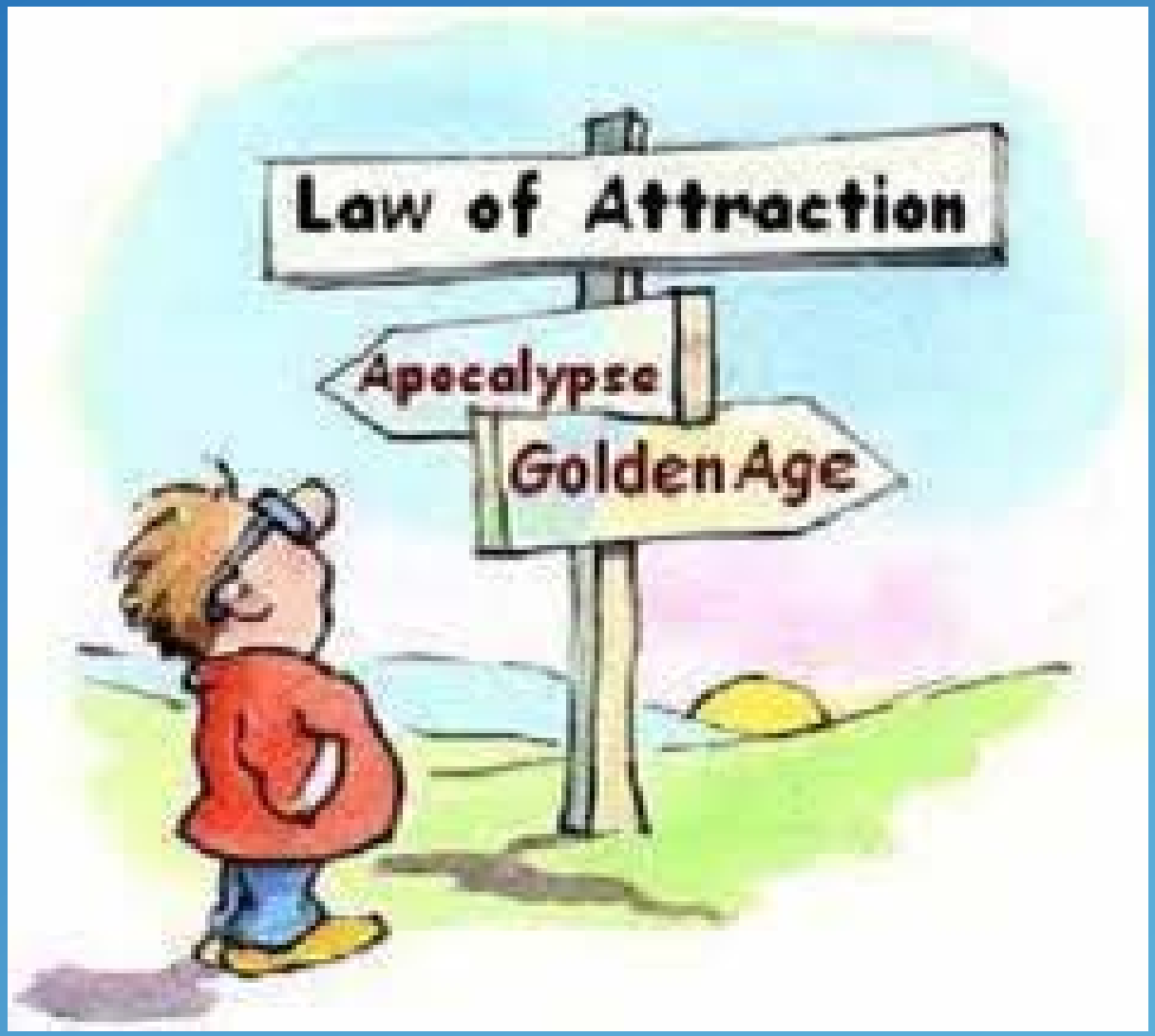
Convergence of Environmental Regulations



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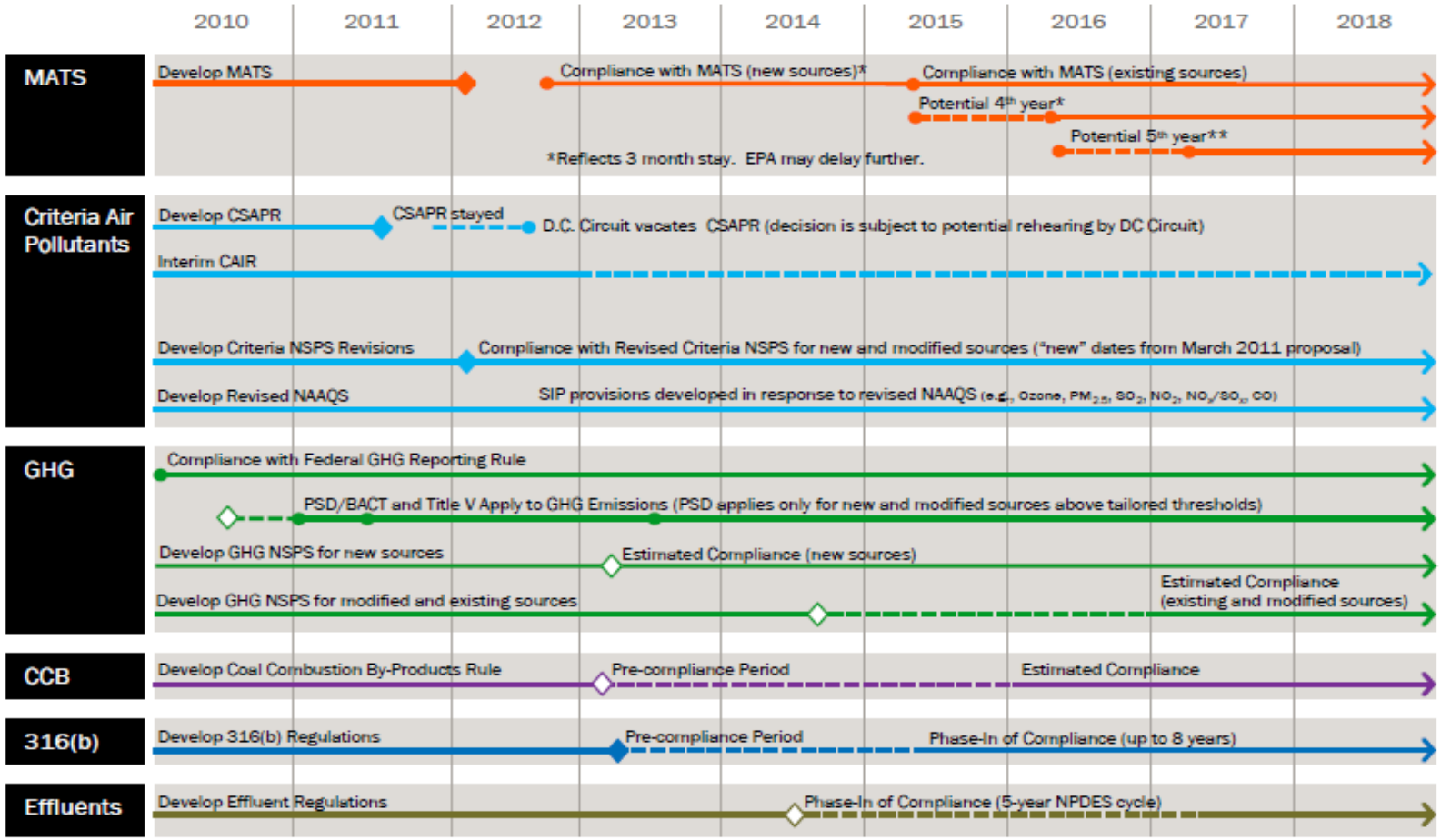
Future of Environmental Regulations

EPA Regulatory Roadmap for the Electric Sector



*Sec. 112(i)(3)(B) authorizes EPA/states to provide up to one additional year to comply with standards if necessary for the installation of controls.
** Enforcement discretion for reliability critical units per EPA's December 2011 memorandum.

MJB & A

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◆ Final Rule (publication date or court deadline)
◇ Final Rule (estimate; no deadline)

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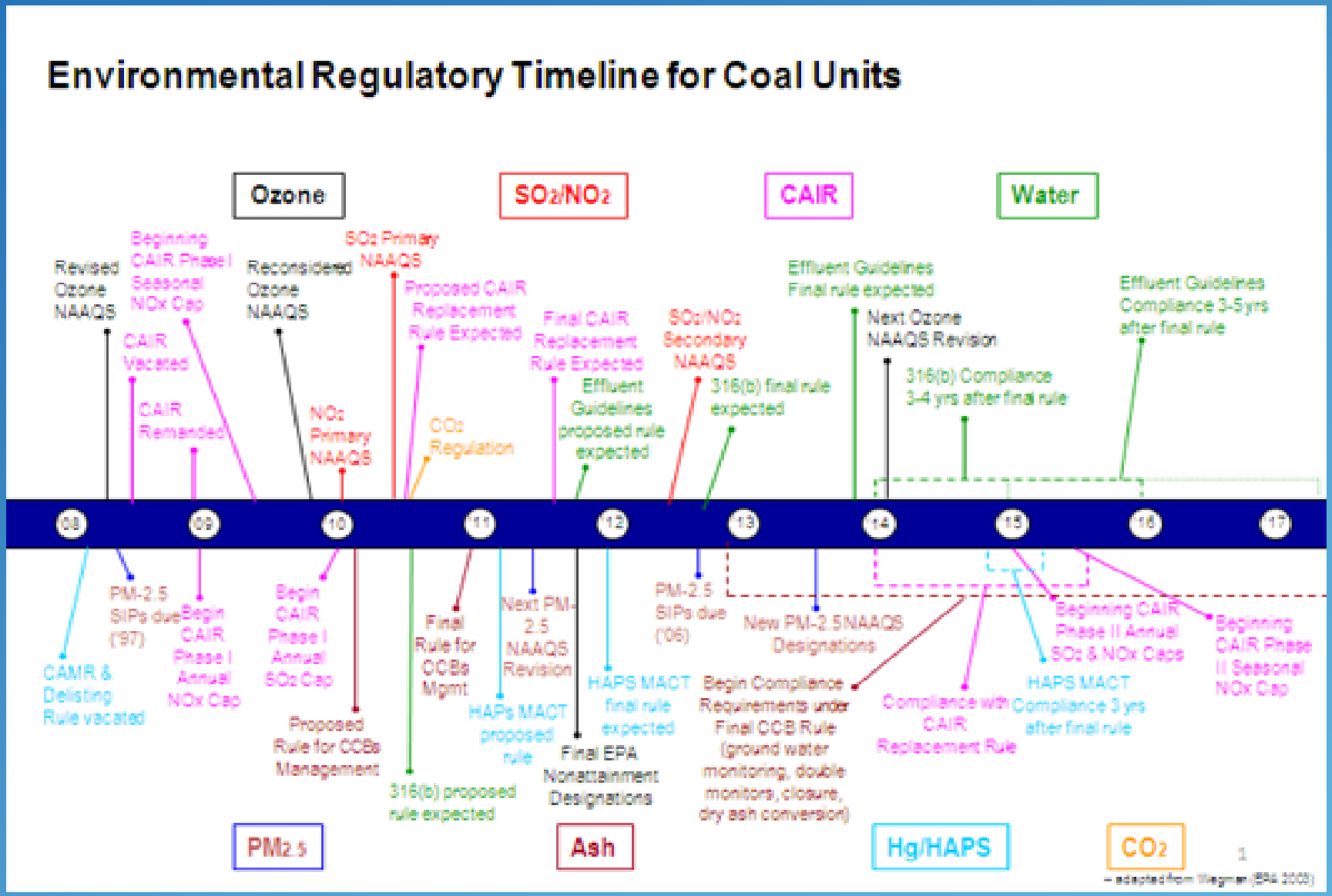
Future of Environmental Regulations



Source: Wabash Valley Power Association

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Retirement Impacts on the Basin

- Changes in consumptive water use
- Reduced thermal discharges
- Reduced effluent loadings

Photo credit: American Water Resources Association

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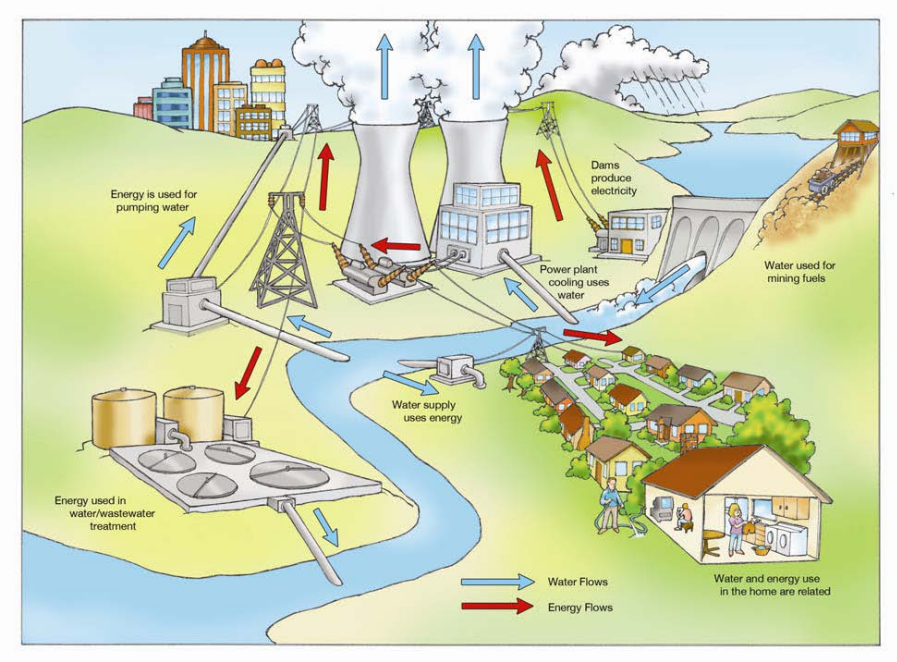
Aspects of Water Use in the Basin

- Variety of industries in the watershed – electric generation, pharmaceutical, chemical manufacturers, water suppliers, etc.
- Important balancing act between managing the needs of the users in the watershed as well as the ecosystem requirements of the watershed
- Water withdrawals do not necessarily mean that all of the water is consumptively used



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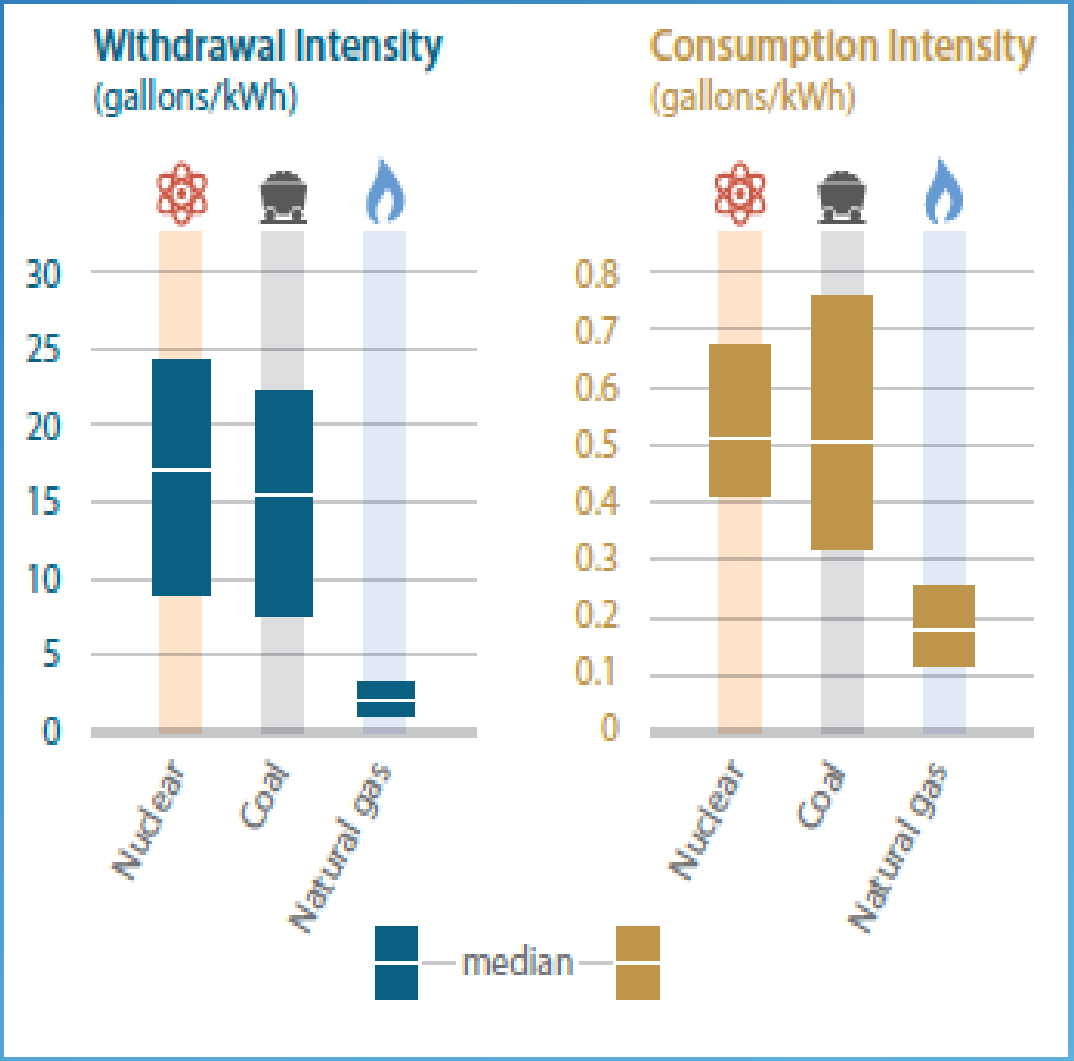
Exelon 2011 Water Use Intensity

Total Use - 130 megaliters/GWh; Consumptive Use - 2 megaliters/GWh.

- As reported in the 2011 Carbon Disclosure Project



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Differences in Water Use Among Generation Types

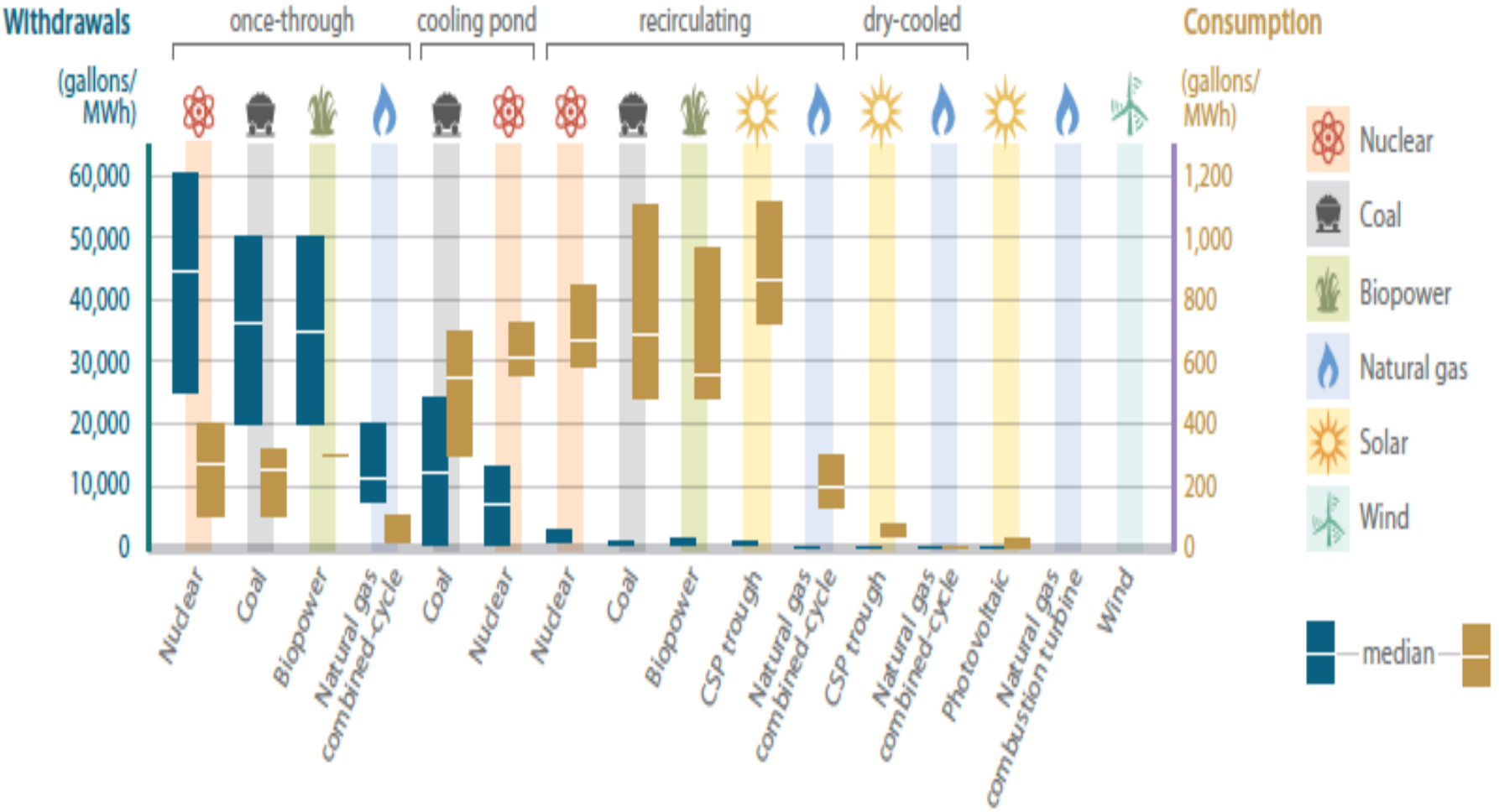

Photo credit: 2011 Carbon Disclosure Project Report

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Exelon Water Use in the Basin

- Exelon water usage across the fleet:
  - Typical usage is approximately 43.6 billion gallons per day (bgd)
  - Of this water, 99.42% is returned to the watershed
  - This results in a consumptive use of approximately 0.58%

- Exelon water usage in the Delaware River Basin:
  - 0.046 billion meters cubed per year consumptive (~ 33.292 mgd)
  - 0.96 billion meters cubed per year non-consumptive (~ 694.809 mgd)

- Long-term Sustainable Water Use is Important to the Basin
  - Utilization of best management practices (BMPs)
  - LEED strategies and buildings
  - Increase groundwater infiltration, reduce impervious cover and decrease stormwater runoff
  - Innovative techniques and technologies

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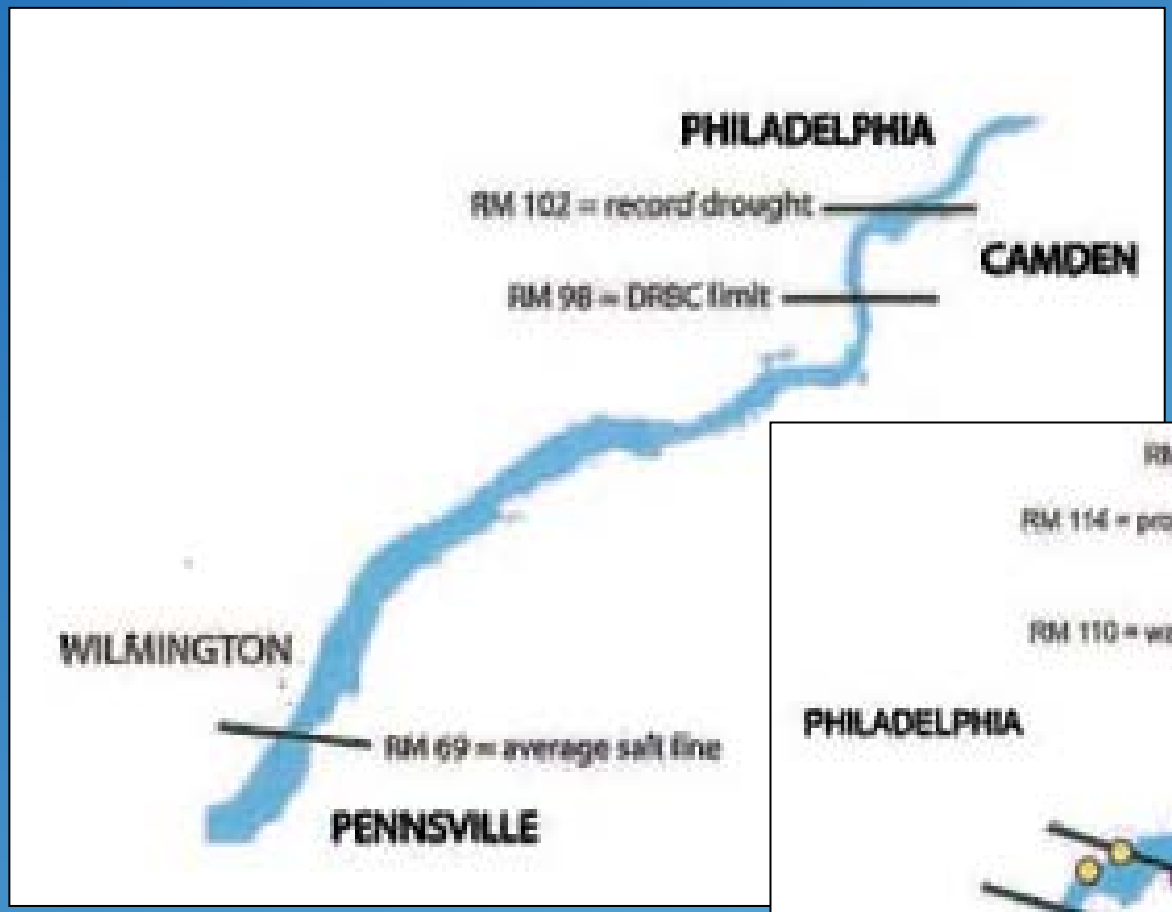
Potential Concerns Surrounding Climate Change

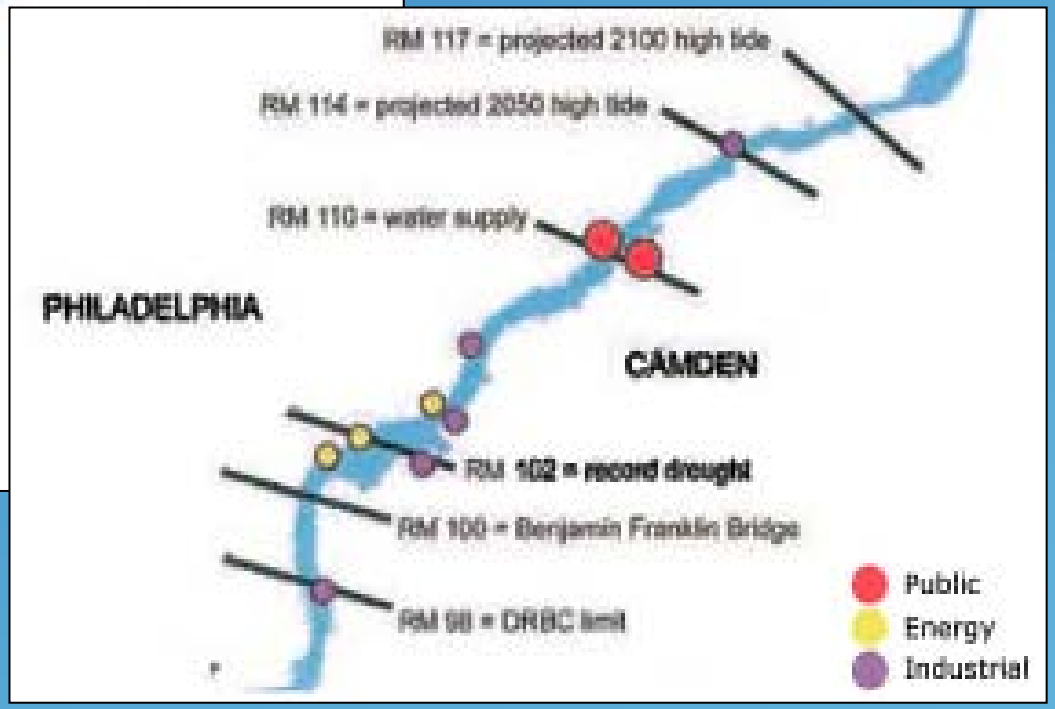
- Climate change has the potential to impact water aspects within the Delaware River Basin
  - More frequent and severe storms, more frequent floods and droughts

- This will pose challenges for managing water resources in the Basin given inconsistent meteorological factors

- Management of the water resources will become even more important given the potential for salinity changes and increased pollutant loadings during times of drought (concentration factor) and floods (TSS, etc.)

Potential Concerns Surrounding Climate Change





Source: Climate Change: Impacts and Responses in the Delaware River Basin. Prepared for the DRBC by City Planning 702 Urban Design Studio UPenn, 2008.

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Adaptive Management

•Given the uncertainty with climate change and the potential for changing characteristics of both water availability and water quality in the Basin in the future, adaptive management will be necessary to ensure that resources are sufficient to meet the needs of the varied users of the watershed.

•We will need to consider new technologies and techniques in the application of water resource management.