

# Analysis of Alternative Mercury Control Strategies

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Energy Information Administration

March 4, 2005

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- Web page: <http://www.eia.doe.gov>
- The mercury control strategies report is available at: [http://www.eia.doe.gov/oiaf/servicerpt/mercury/pdf/sroiaf\(2005\)01.pdf](http://www.eia.doe.gov/oiaf/servicerpt/mercury/pdf/sroiaf(2005)01.pdf)

# Analysis Request

- Report responds to a September 14, 2004, request from Senators Inhofe and Voinovich to analyze the impacts of different mercury control strategies, including:
  - EPA's proposed cap and trade system
  - EPA's proposed mercury MACT system
  - 90-percent MACT for all plant and coal types
- Senators requested that only commercially demonstrated mercury removal technologies could be used.
- All cases assume EPA's proposed CAIR rule for NO<sub>x</sub> and SO<sub>2</sub>

# Three Hg Removal Strategies Analyzed

- EPA Cap and Trade System
  - 2010 – 2017 Phase I Cap unspecified but assumed to be 34 tons
  - 2018 and beyond Phase II Cap of 15 tons
  - \$35,000 per pound mercury safety valve
- EPA MACT

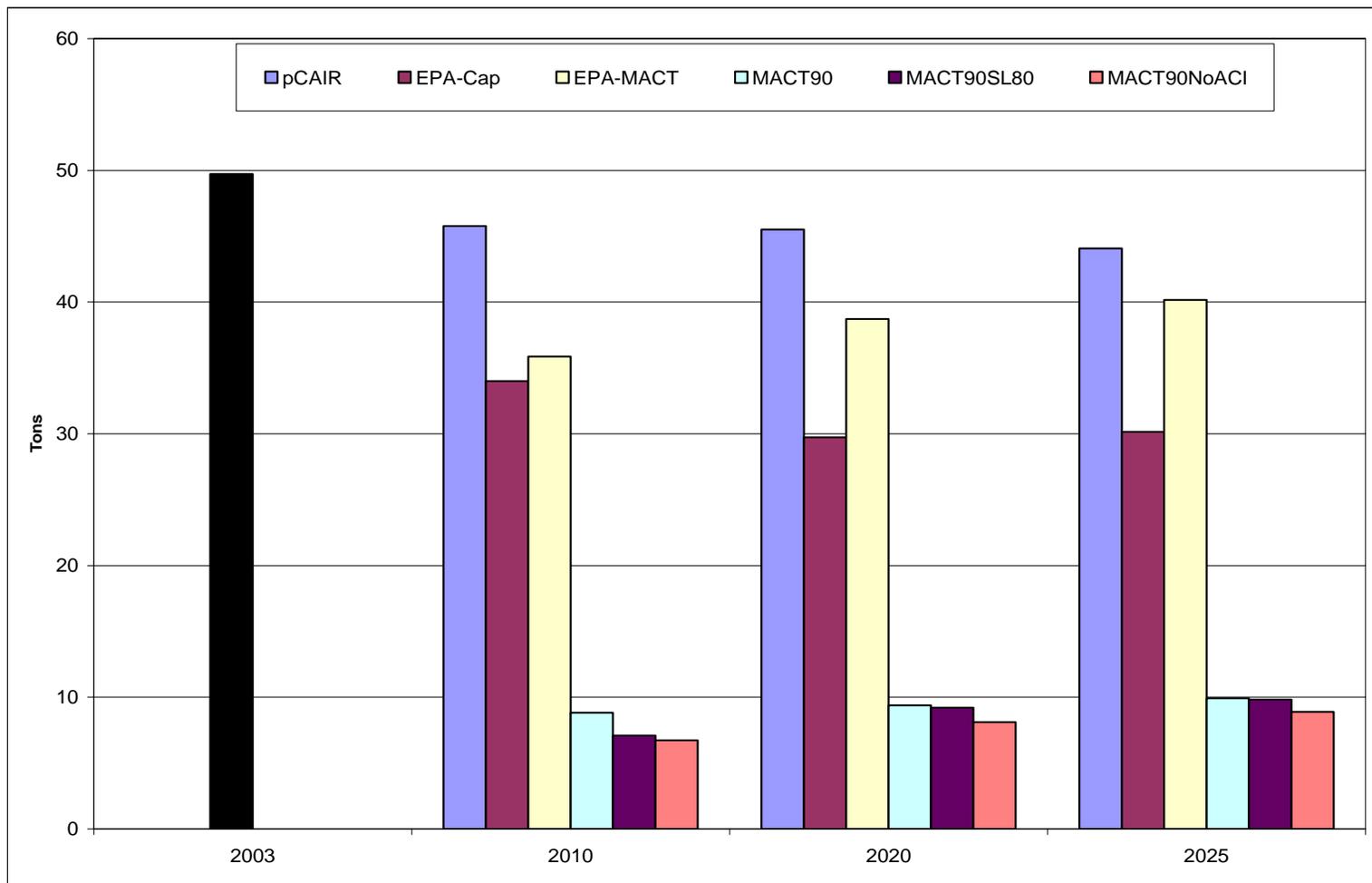
| Coal type      | Existing unit limits (lb/trillion Btu or lb/million MWh) | New unit limits (lb/million MWh) |
|----------------|----------------------------------------------------------|----------------------------------|
| Bituminous     | 2.0 or 21                                                | 6.0                              |
| Sub-bituminous | 5.8 or 61                                                | 20                               |
| Lignite        | 9.2 or 98                                                | 62                               |
| Coal refuse    | 0.38 or 4.1                                              | 1.1                              |
| IGCC           | 19 or 200                                                | 20                               |

- 90% MACT

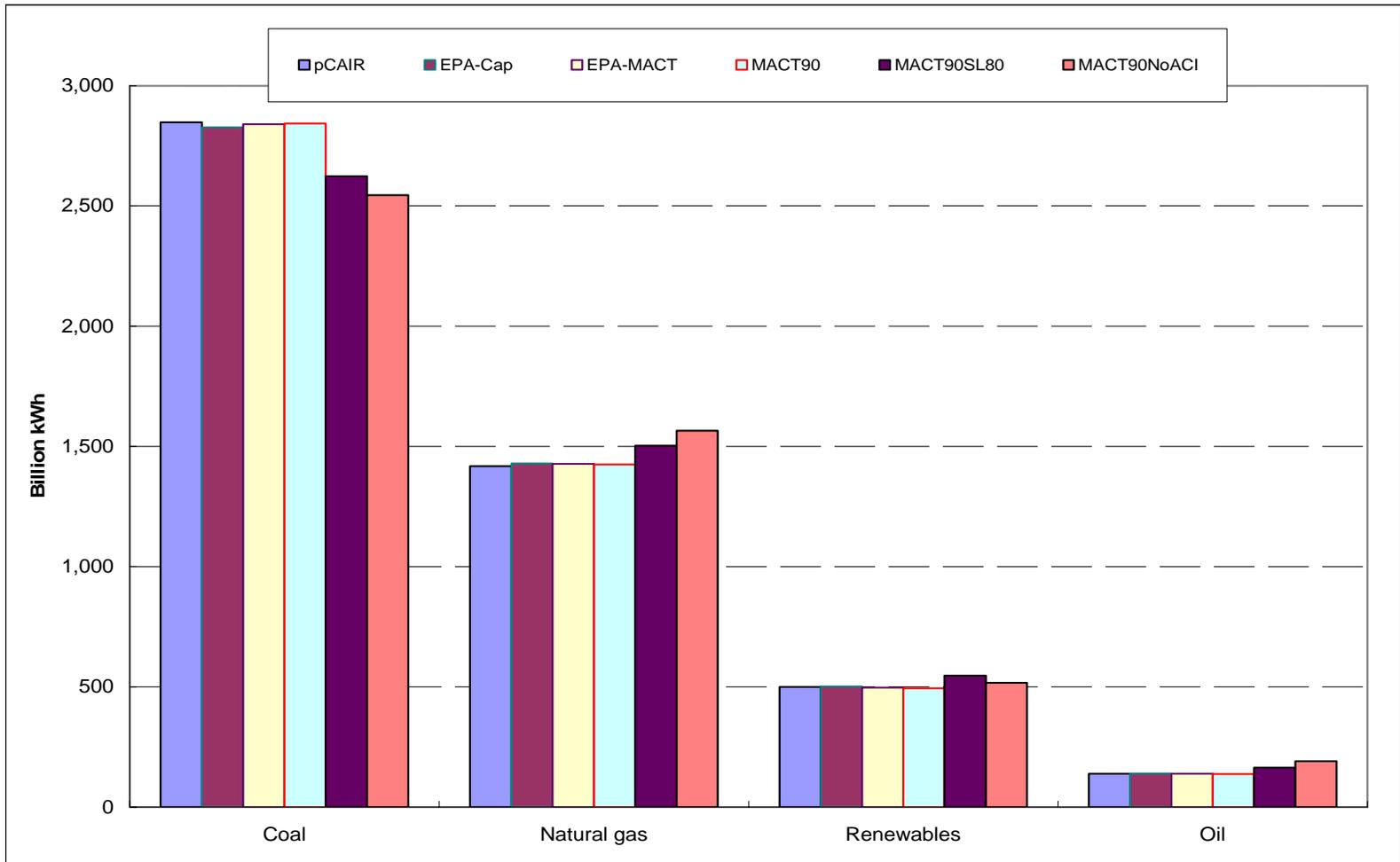
# Analysis Cases

| Case Mnemonic                | Description                                                                                                                                                                                      |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| pCAIR                        | AEO2005 Reference case plus NO <sub>x</sub> and SO <sub>2</sub> emission caps from the proposed Clean Air Interstate Rule (CAIR).                                                                |
| <b>Mercury Control Cases</b> |                                                                                                                                                                                                  |
| EPA-Cap                      | pCAIR plus EPA's proposed 15-ton cap and trade program for mercury.                                                                                                                              |
| EPA-MACT                     | pCAIR plus EPA's proposed MACT standard for mercury taking effect in 2008.                                                                                                                       |
| MACT90                       | pCAIR plus a 90-percent MACT for mercury taking effect in 2008 with ACI available and able to achieve up to 90-percent removal for all coals.                                                    |
| MACT90SL80                   | pCAIR plus a 90-percent MACT for mercury taking effect in 2008, where it is assumed that the maximum achievable mercury removal for plants using sub-bituminous and lignite coals is 80 percent. |
| MACT90NoACI                  | pCAIR plus a 90-percent MACT for mercury taking effect in 2008, where it is assumed that ACI technology is not available through 2025.                                                           |

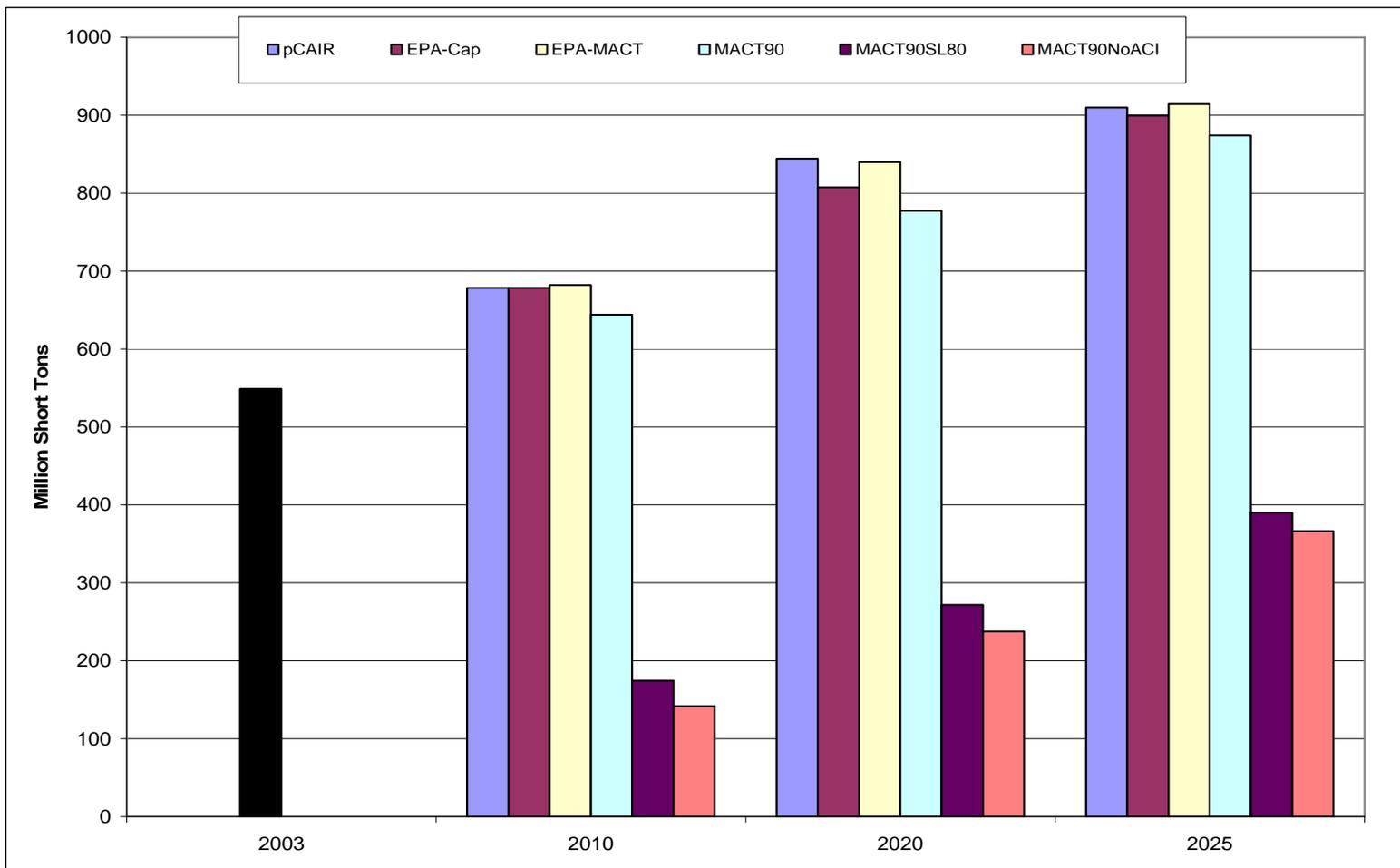
# Mercury Emissions



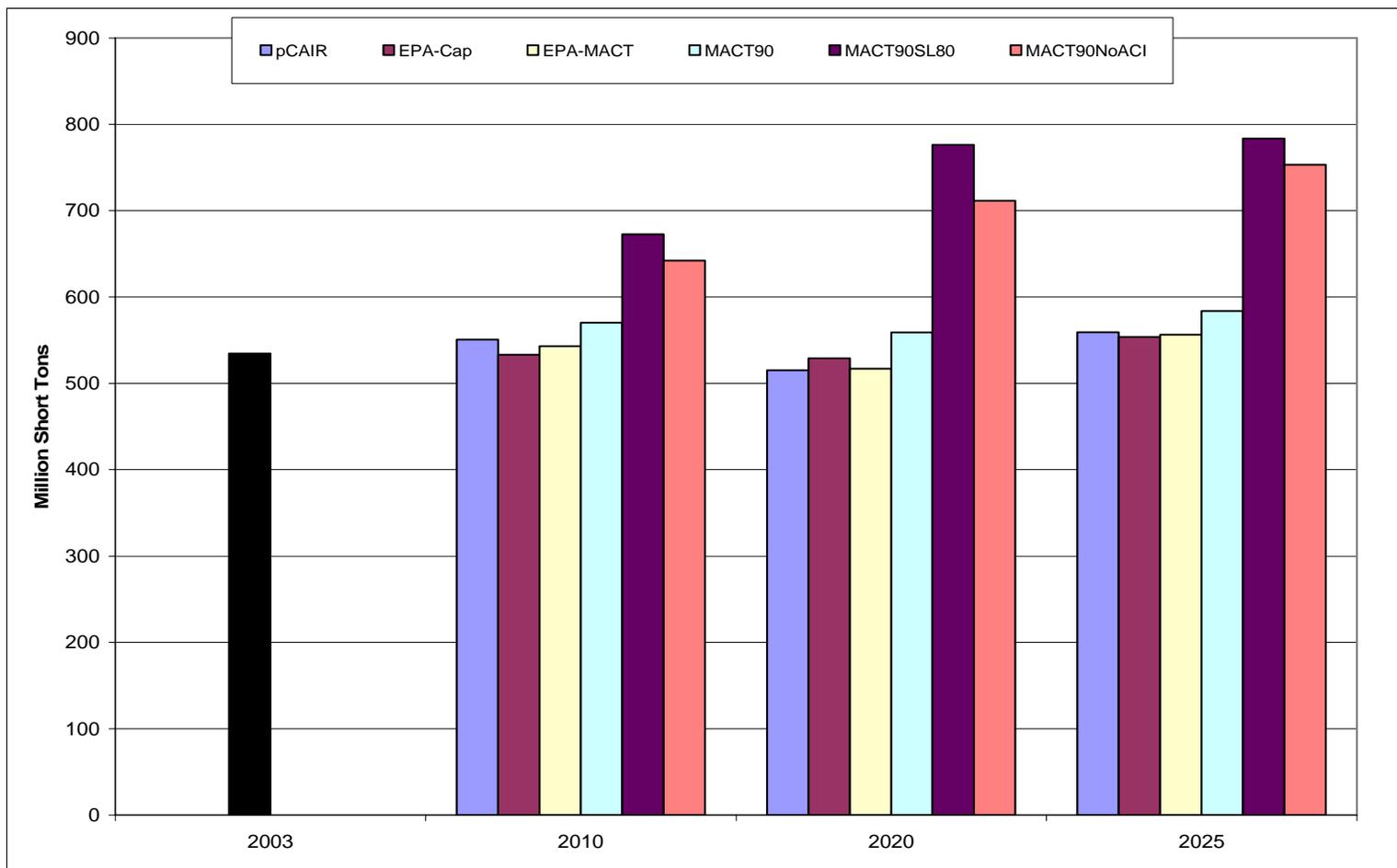
# Generation by Fuel, 2025



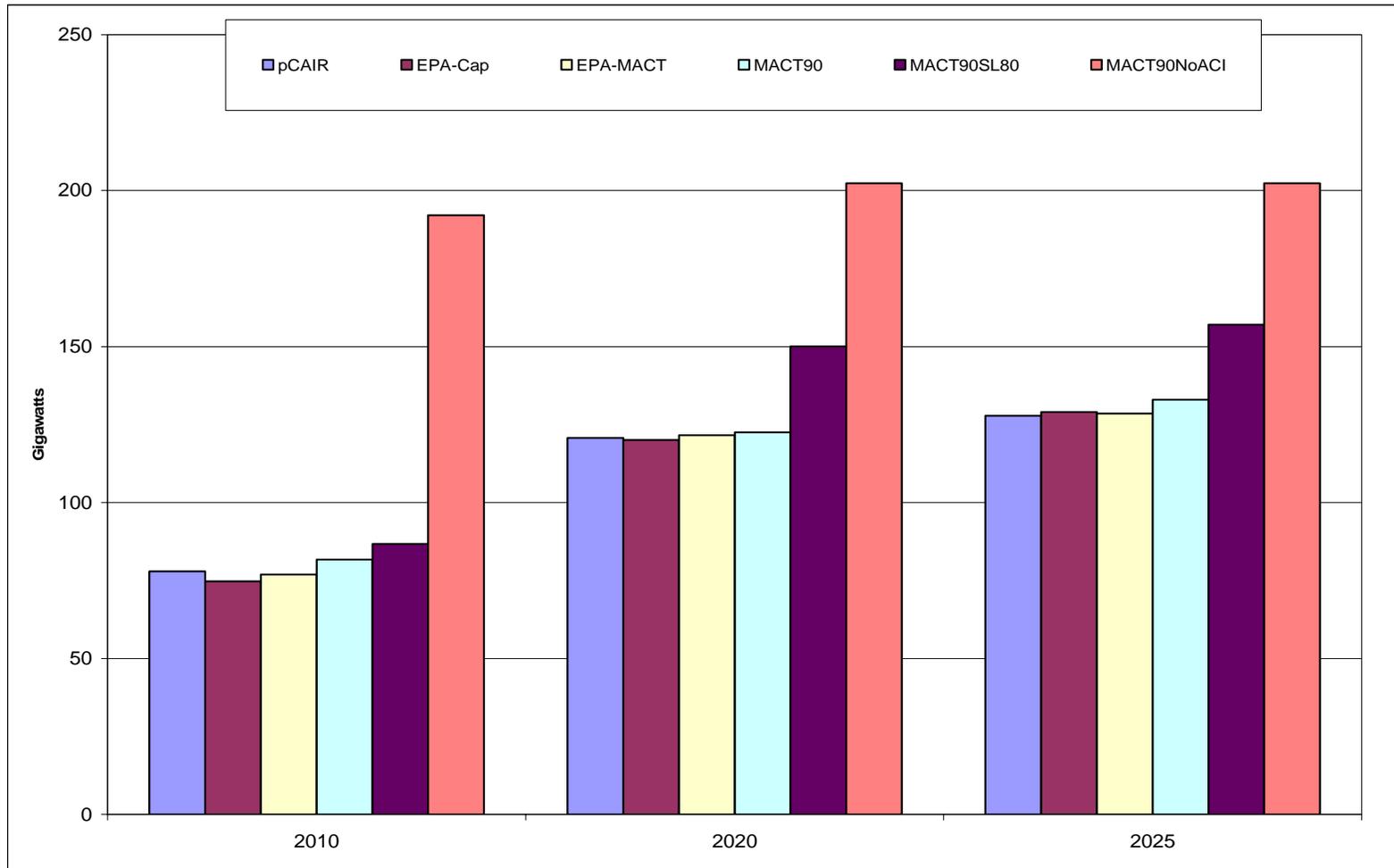
# Western Coal Production



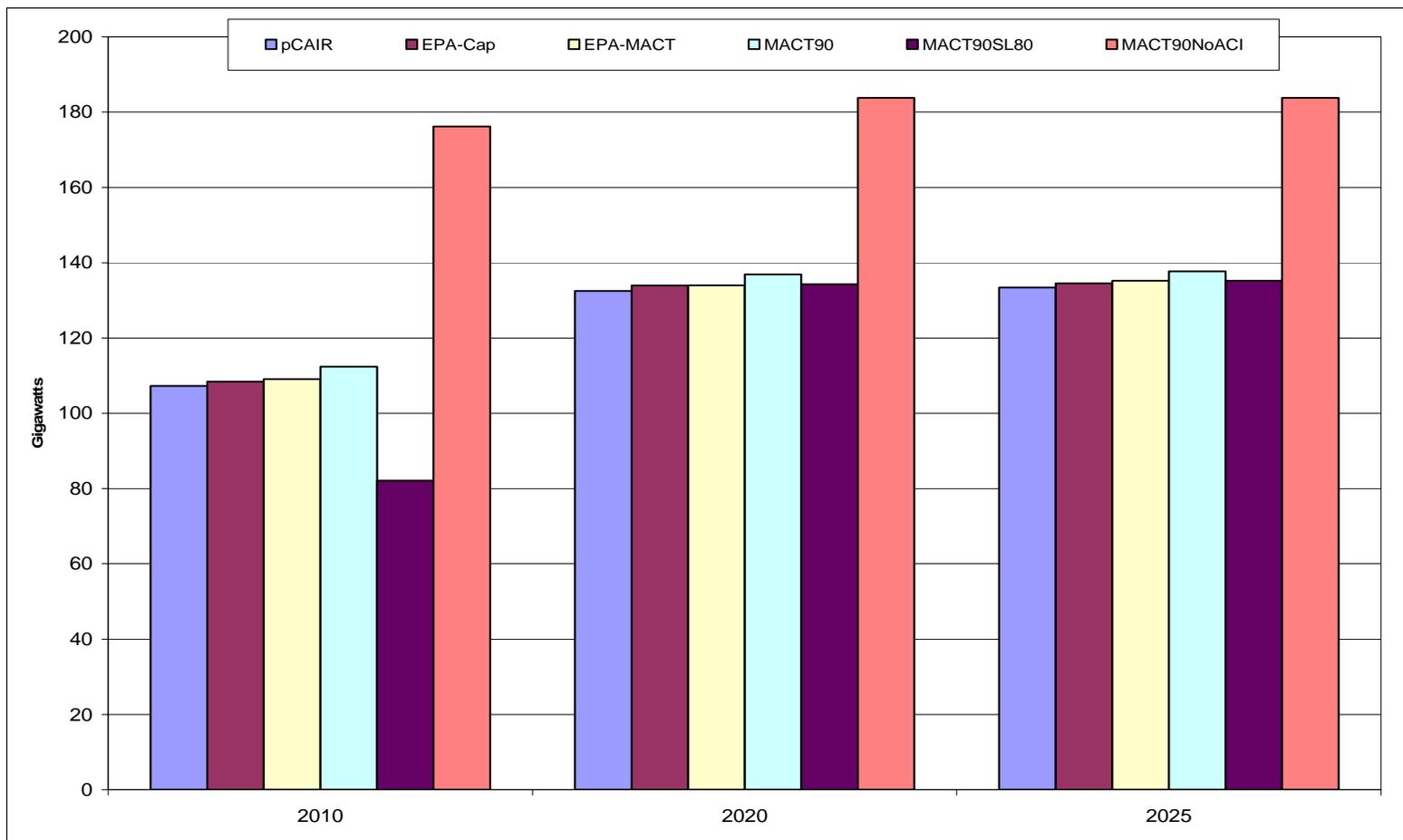
# Appalachian and Interior Coal Production



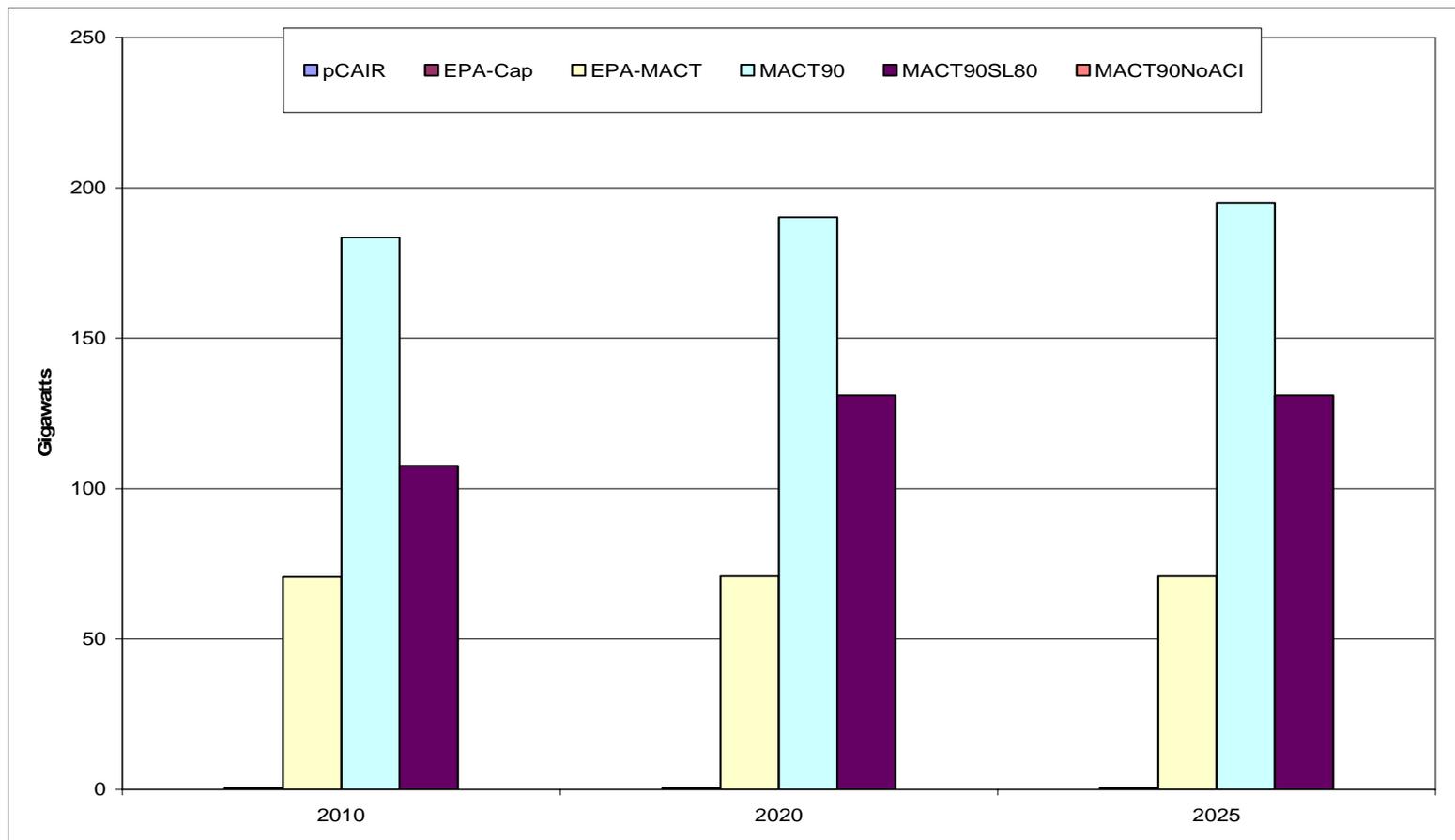
# SO<sub>2</sub> Scrubber Retrofits



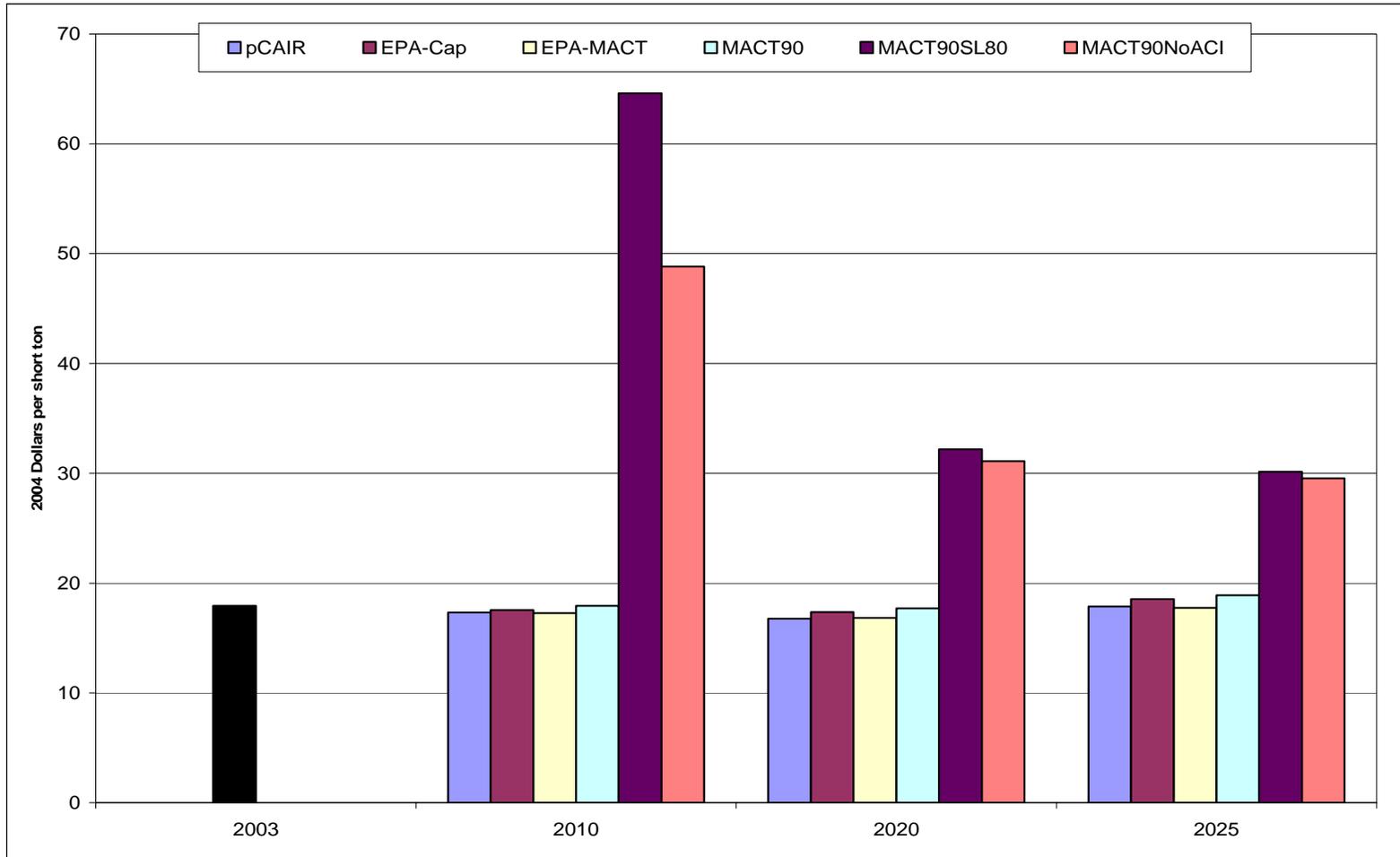
# NO<sub>x</sub> Selective Catalytic Reduction Retrofits



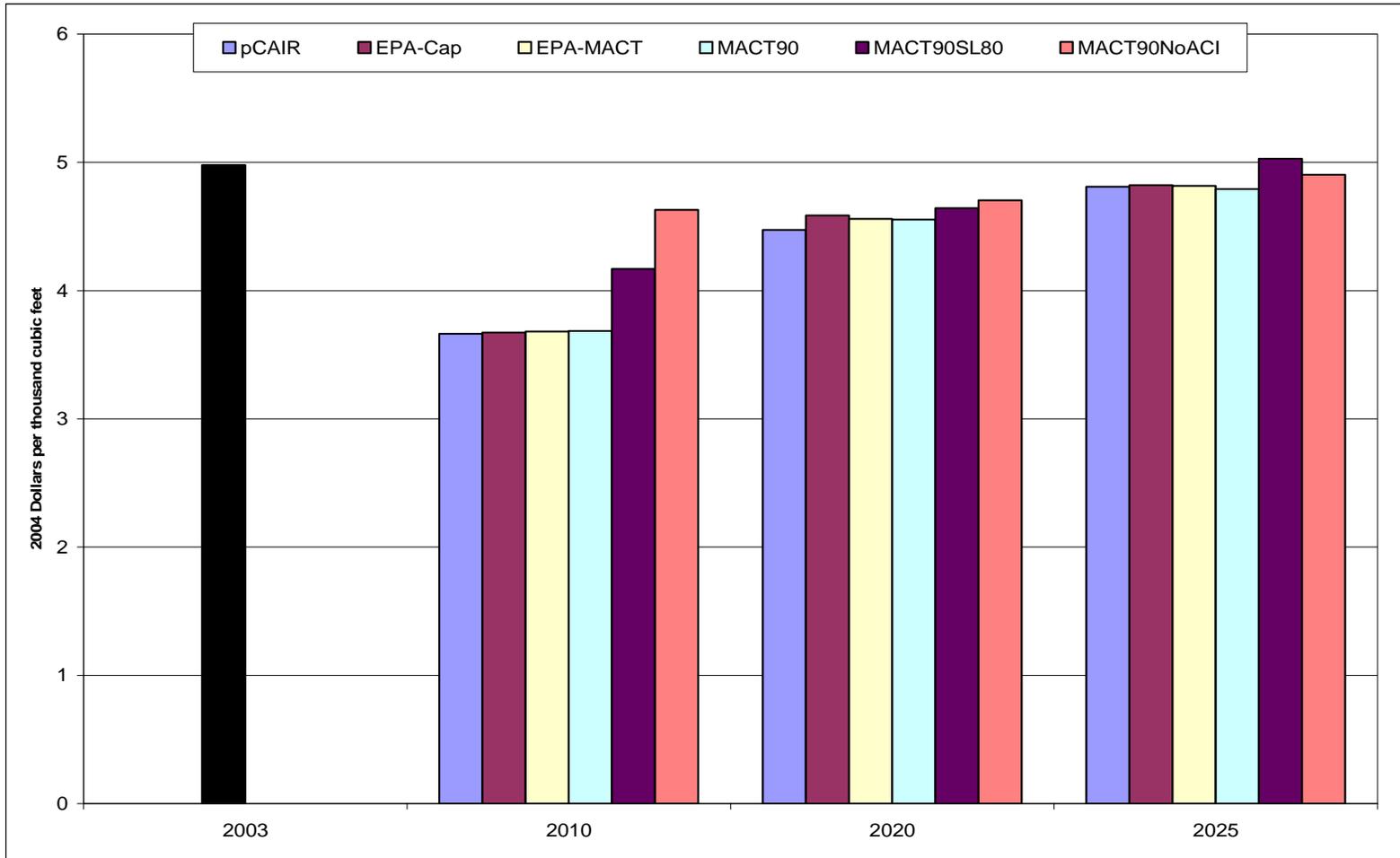
# Supplemental Fabric Filter with Activated Carbon Injection



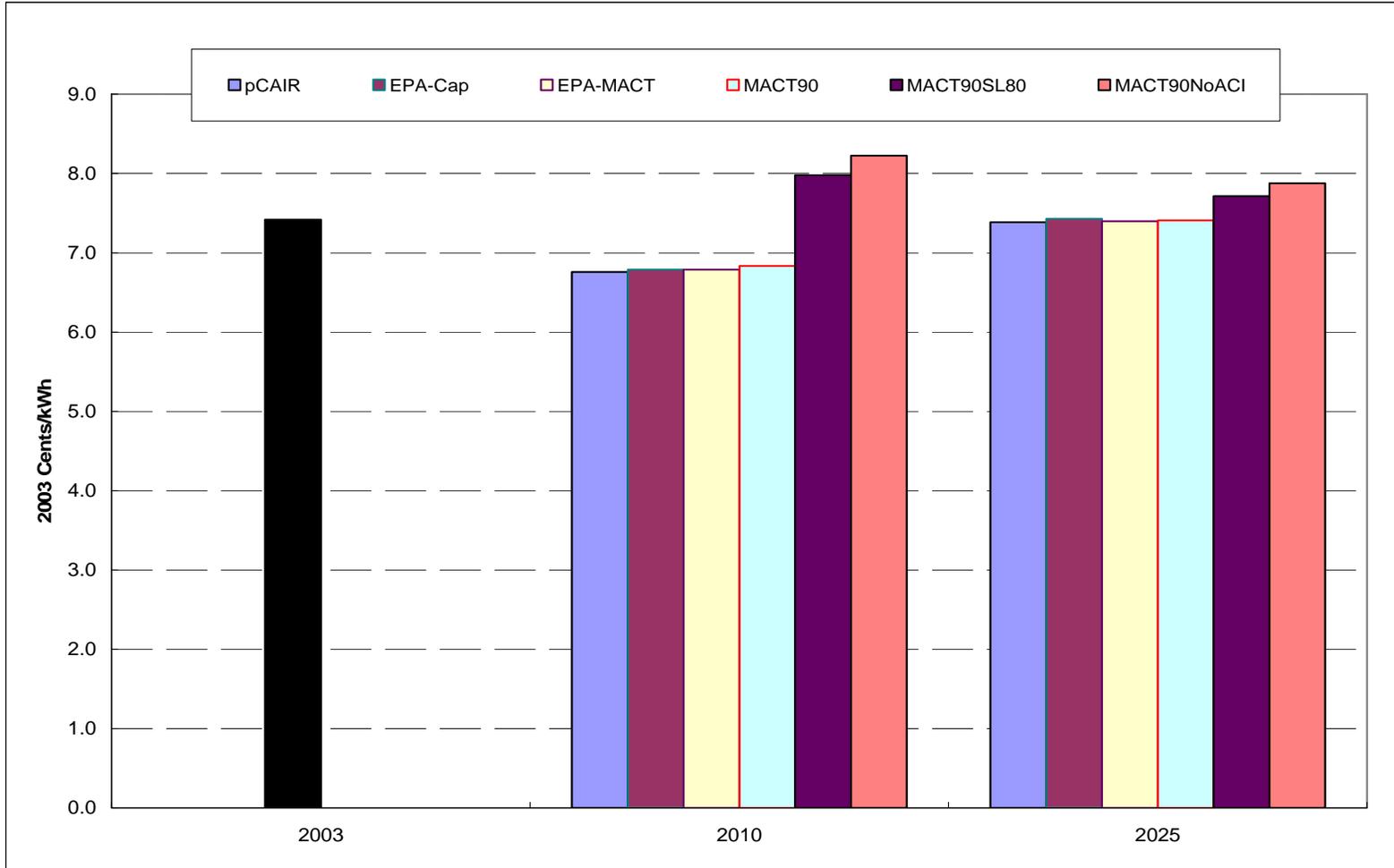
# Coal Minemouth Prices



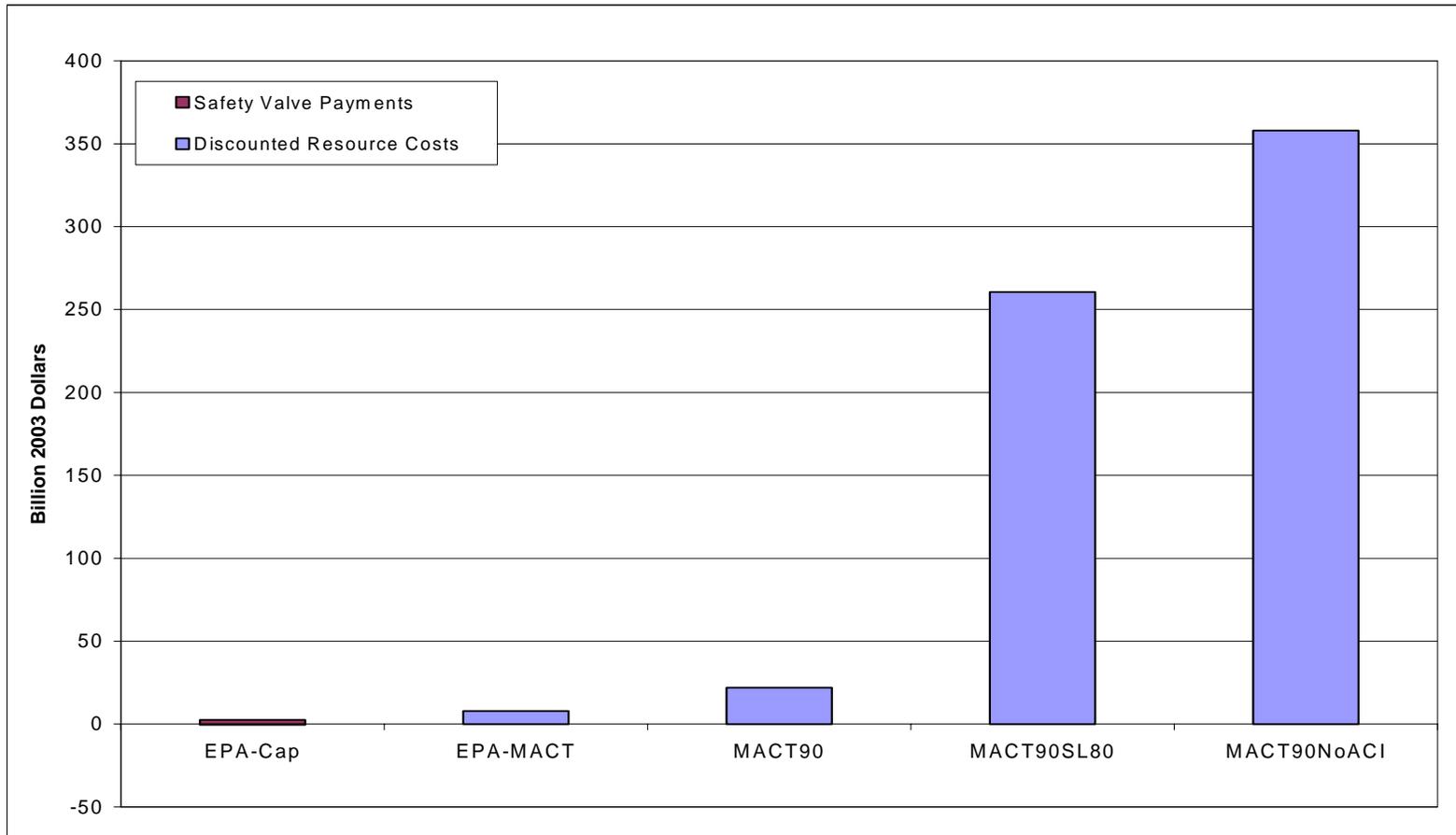
# Natural Gas Wellhead Prices



# Electricity Prices



# Discounted Resource Costs and Safety Valve Payments



# Conclusions

- Mercury emissions range from 8.9 to 40.2 tons in Hg control cases.
- Little fuel switching projected in response to EPA-Cap or EPA-MACT strategies.
- Impact of 90% MACT depends on performance and commercial availability of Hg removal technologies such as ACI.
- 90% MACT could lead to lower uses of coal and increased use of natural gas and renewables if ACI is not available.
- Near-term impacts of 2008 90% MACT without commercialized Hg removal technologies could be large.