



Price and Emission Impacts of Accelerated Power Plant Retirements

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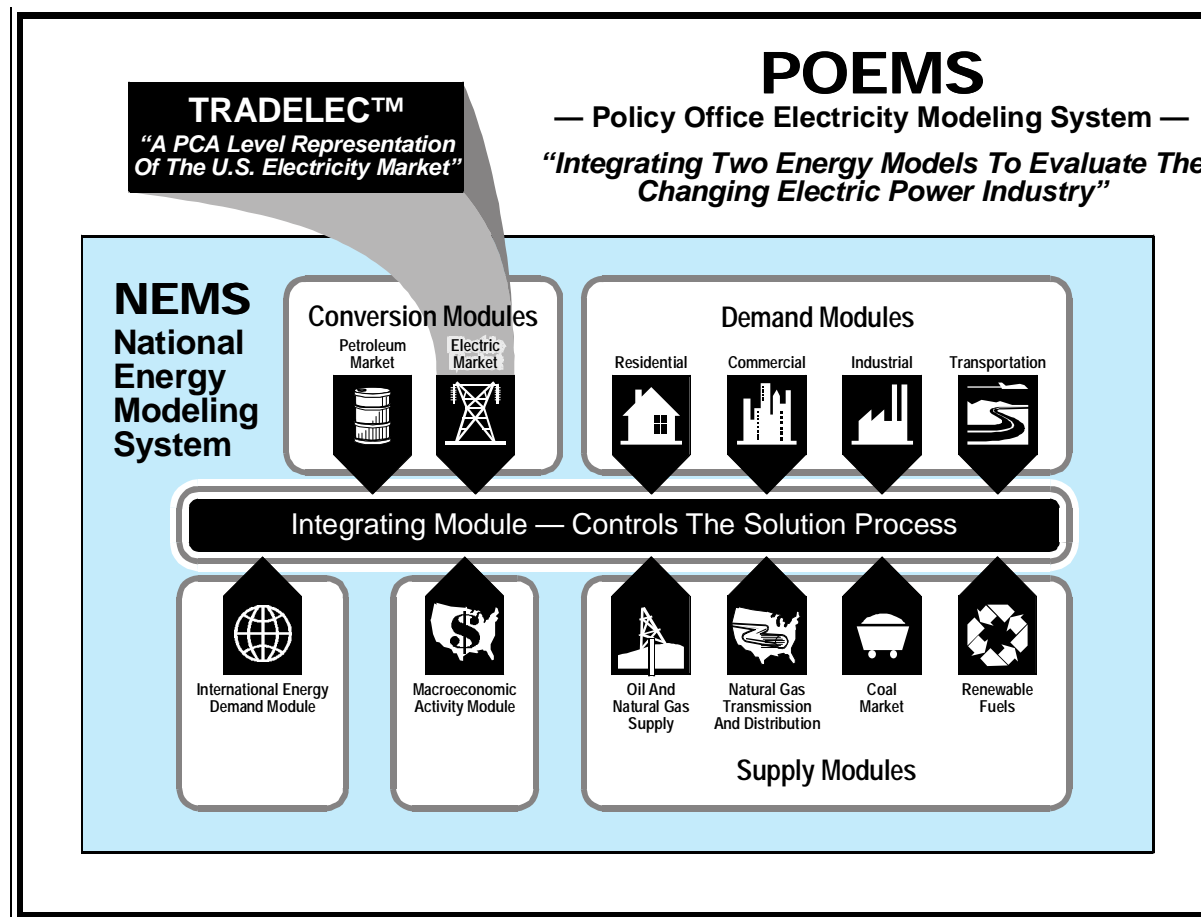


Introduction

- **Three scenarios were developed to test the hypothesis that carbon emissions from electricity production can be reduced to 1990 levels by replacing coal-fired generation with gas-fired generation.**
 - ◆ **Retail Competition Case (Baseline)**
 - ◆ **Forced Retirements Cases**
 - ◆ **New Emission Standards Case**
- **Focus on electricity prices and carbon emissions**

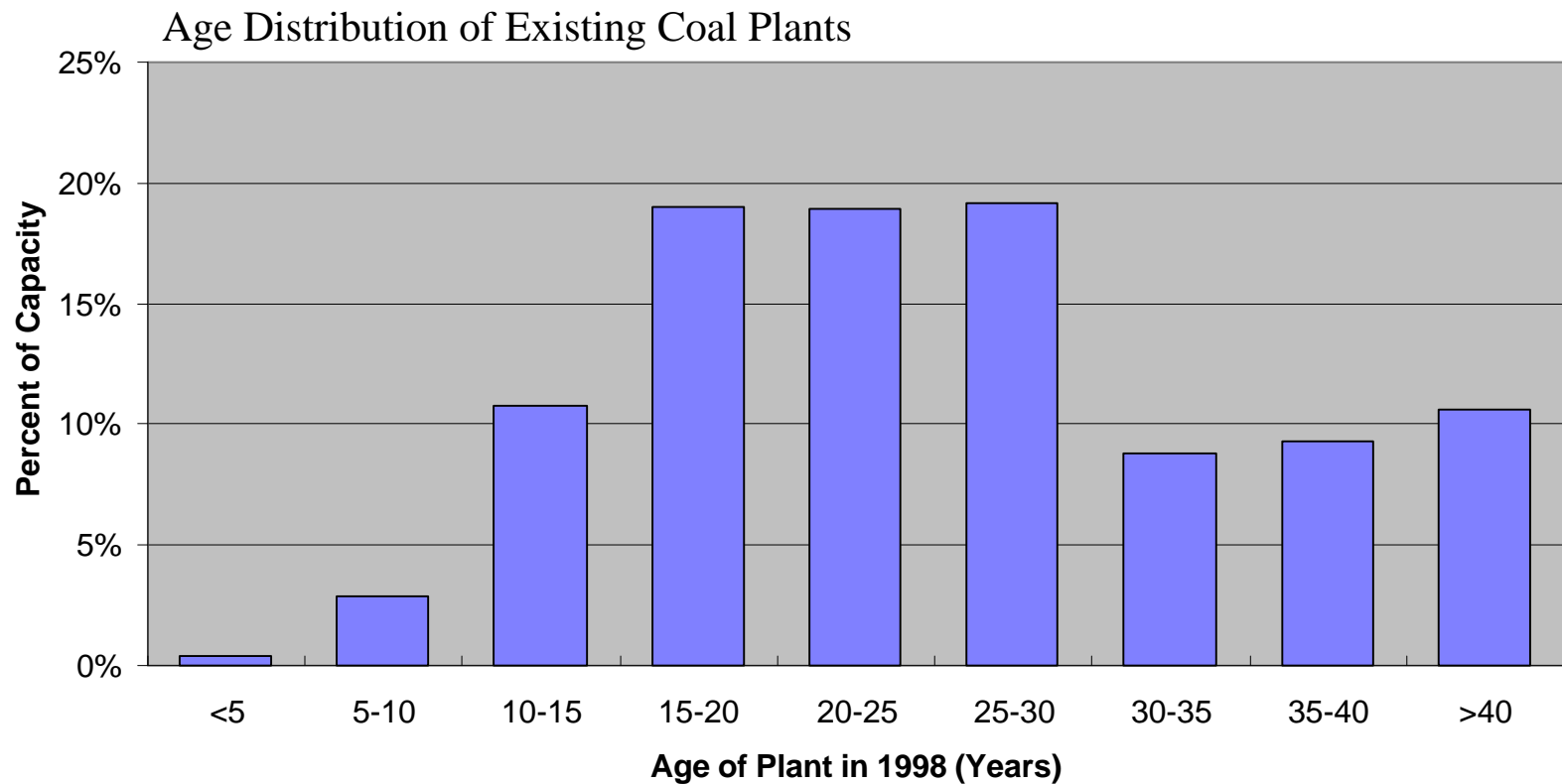
Introduction

- For the analysis, we used the Policy Office Electricity Policy Modeling System (POEMS)



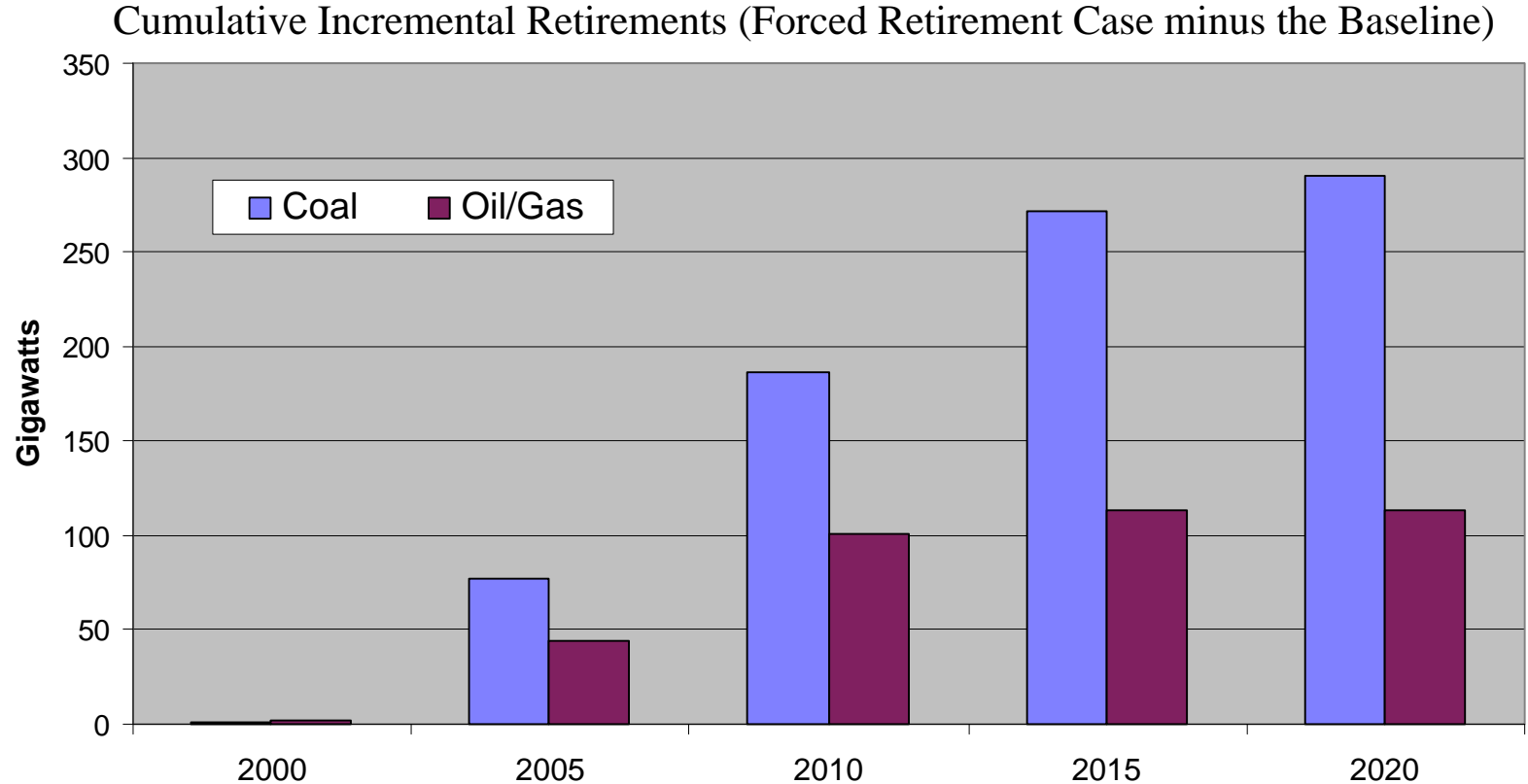
Distribution of Existing Coal Plants by Age

- Roughly a third of existing coal capacity is already 30 years old and by 2020 almost all will be older than 30.



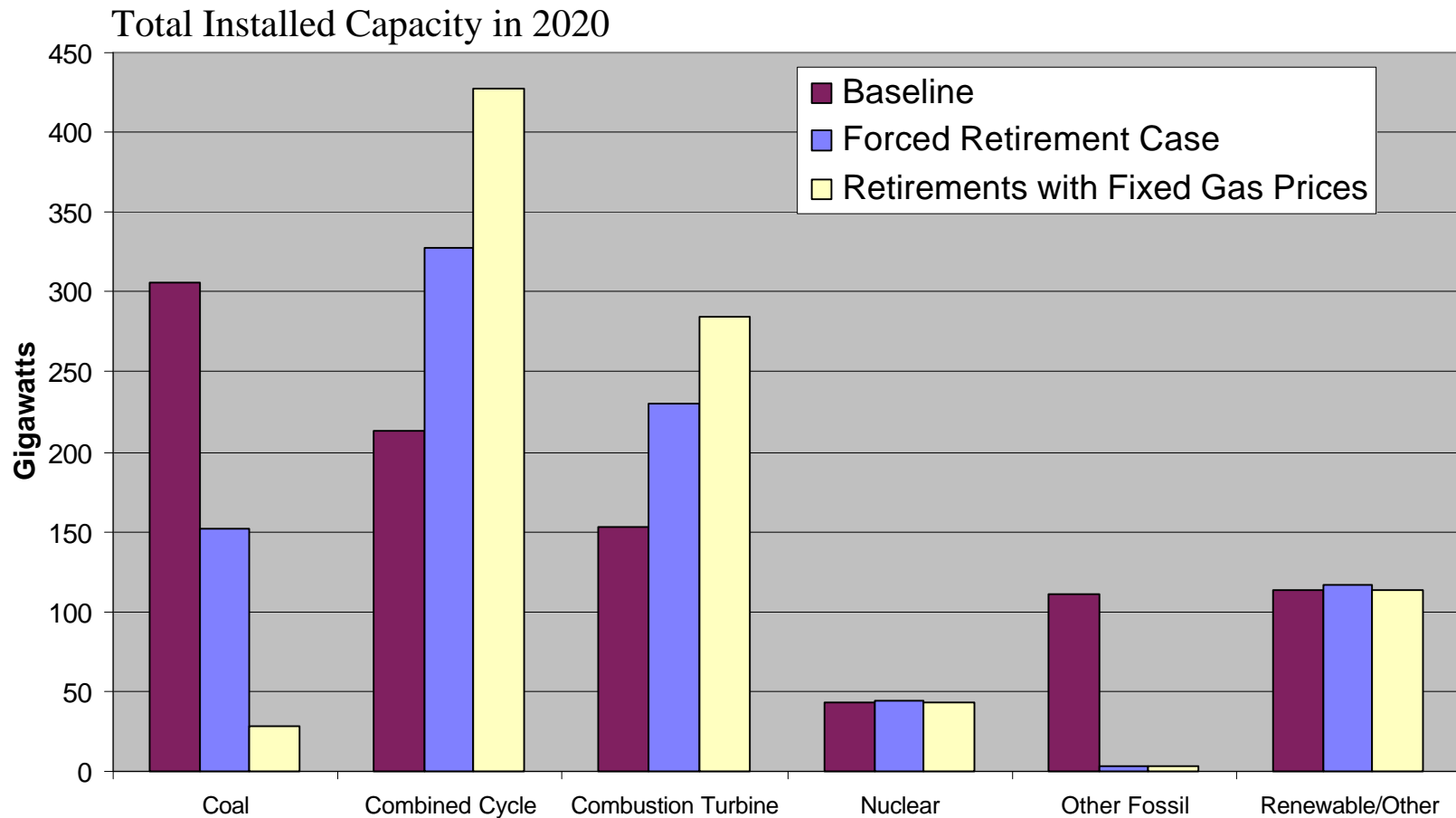
Additional Retirements

- When all fossil steam generation plants are forced to retire as they reach 30 years of age (with a phase-in period), an additional 290 GW of coal and 110 GW of oil/gas steam plants will have retired by 2020.



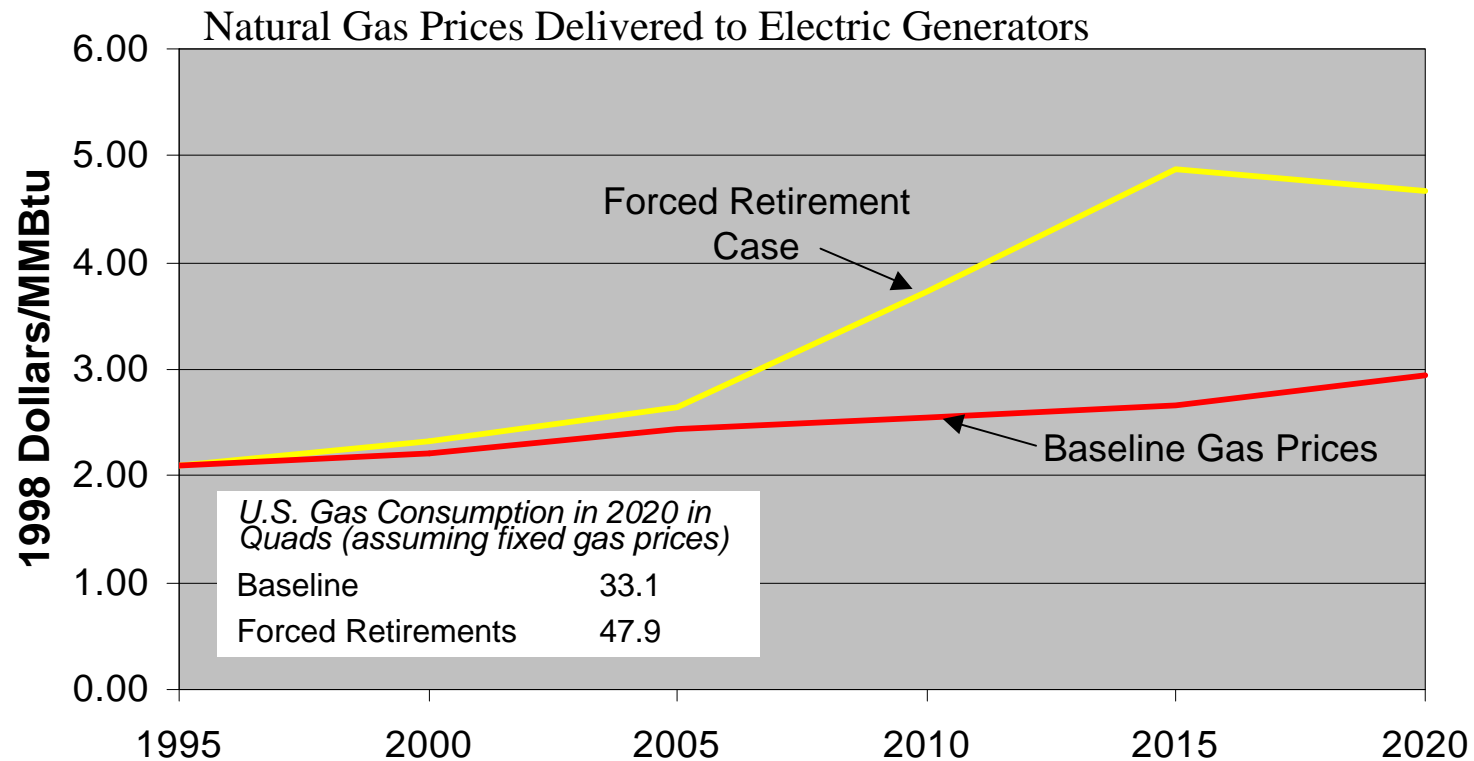
Total Installed Capacity

- Retired capacity is replaced primarily with gas-fired combined cycles and combustion turbines, especially if gas prices are assumed to remain moderate.



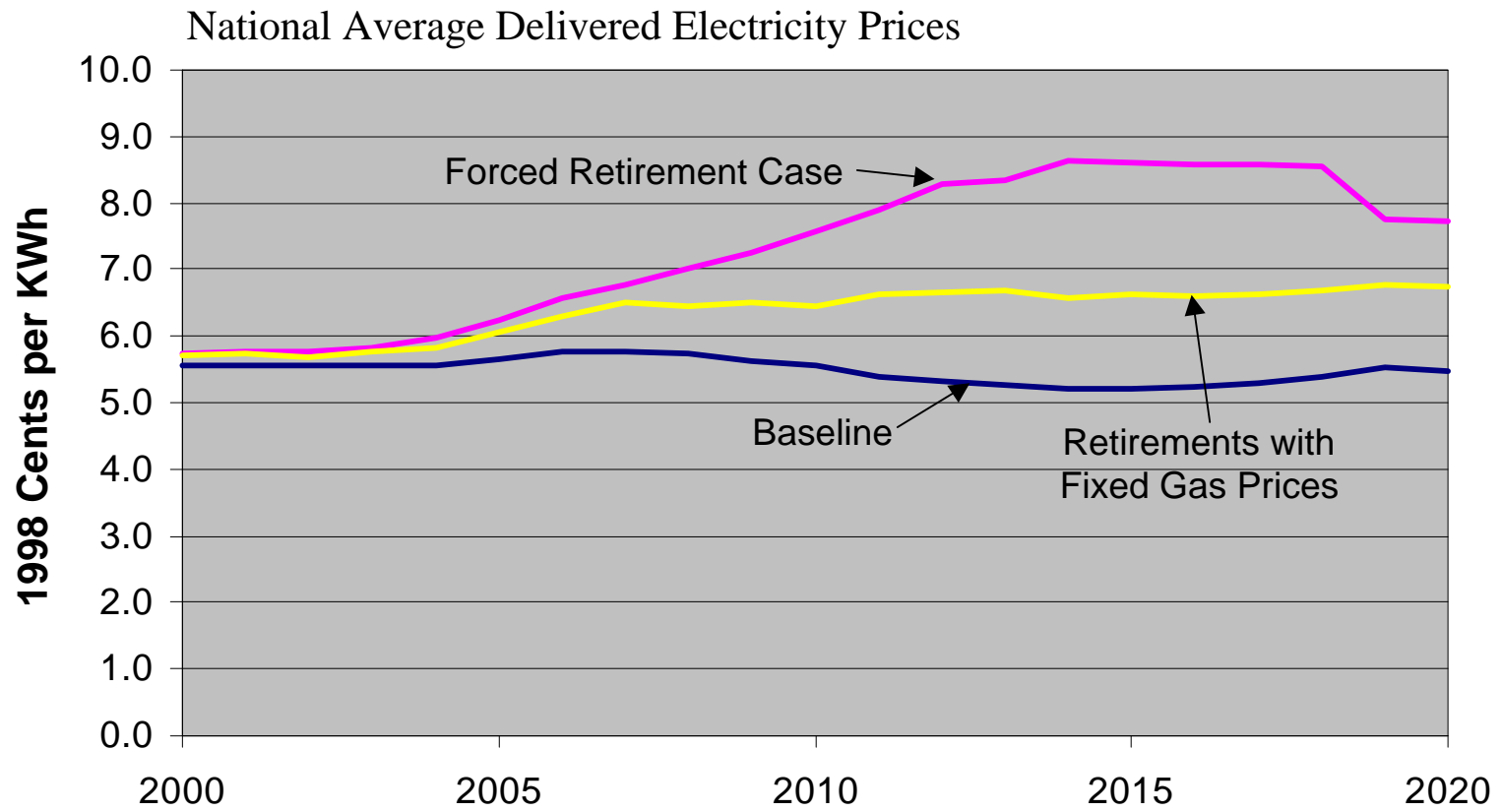
Natural Gas Prices

- In the Forced Retirement Case, a dramatic increase in gas-fired generation puts upward pressure on the natural gas price.



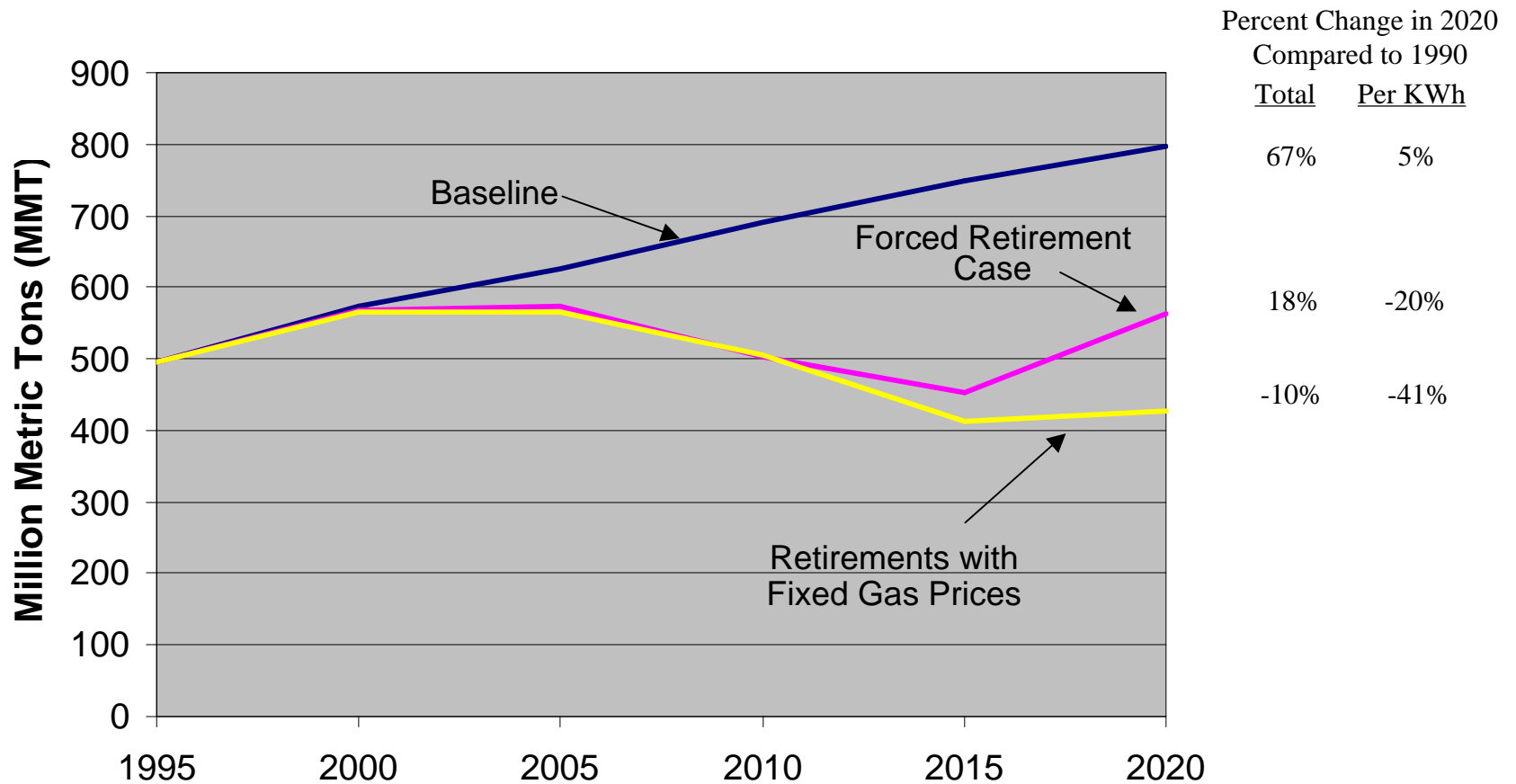
Electricity Prices

- Electricity prices are projected to be significantly higher with forced retirements (although the impact is not as great if gas prices are assumed to be unaffected).



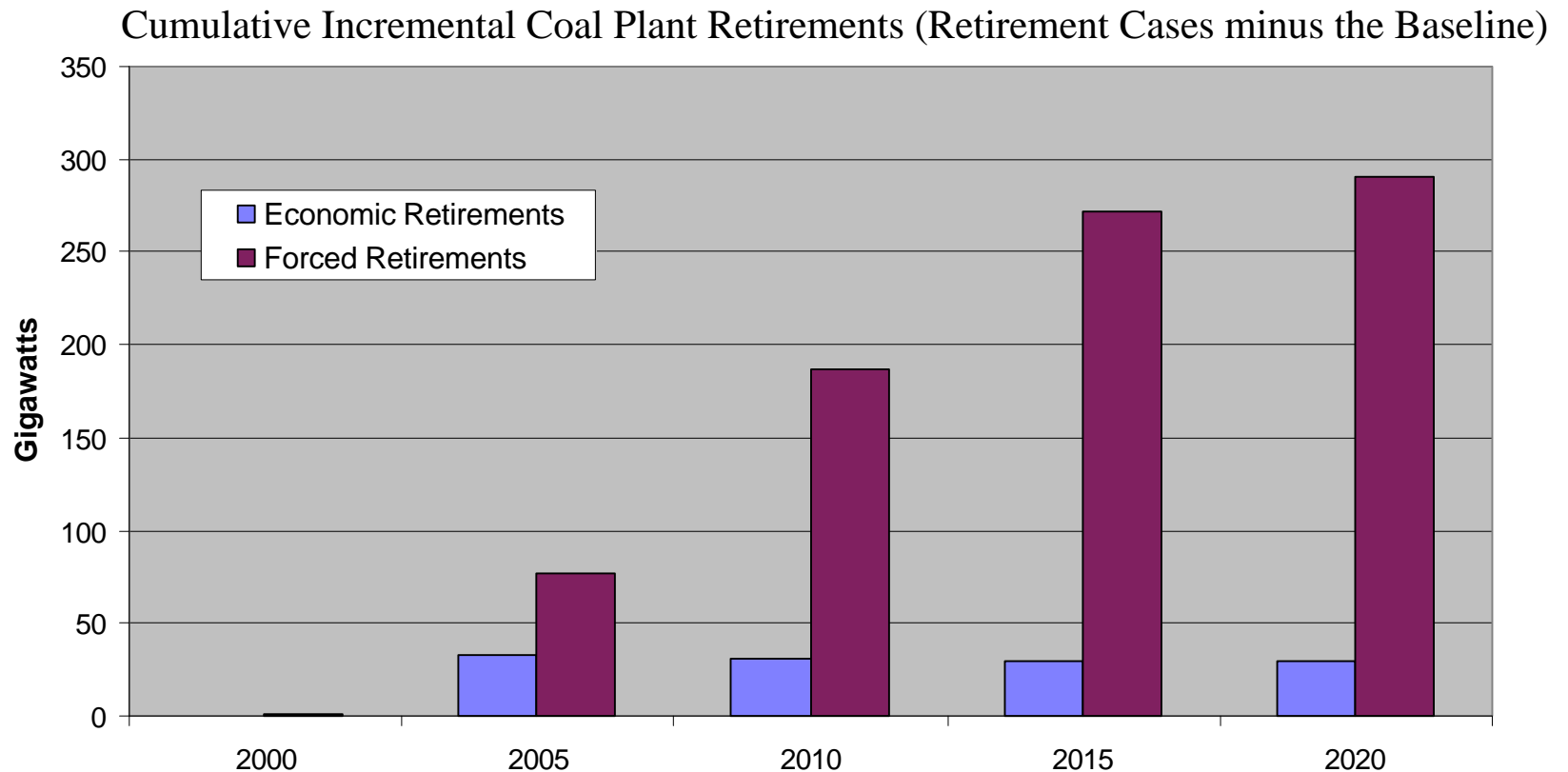
Carbon Emissions

- The retirement of existing coal and oil/gas steam capacity at 30 years of age could reduce carbon emissions to below the 1990 level, if there is no significant impact on natural gas prices.



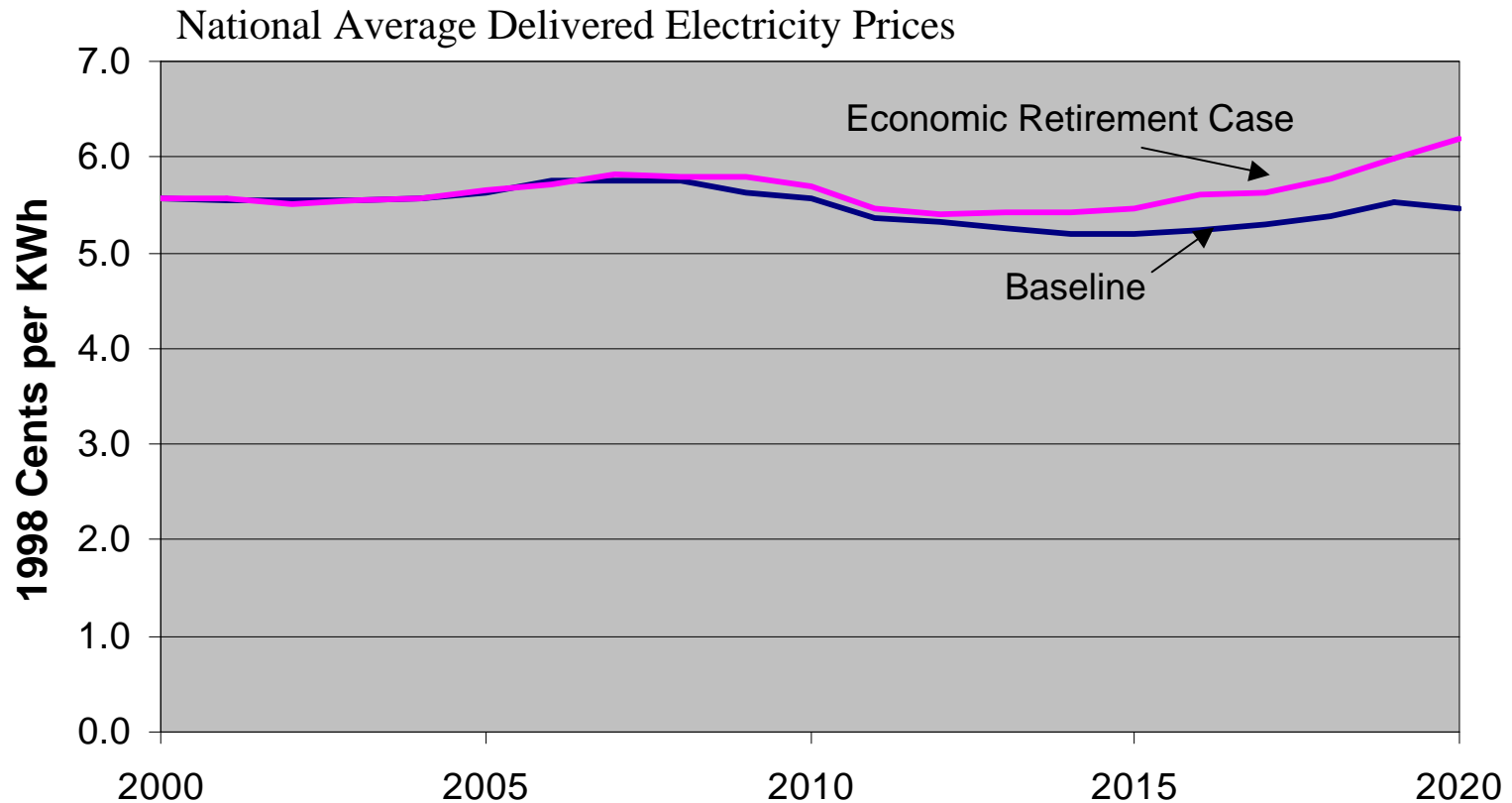
Economic Retirements

- If coal plants when they reach the age of 30 are required to meet emissions levels of new plants, a small fraction of them are projected to retire because the retrofit costs are prohibitive.



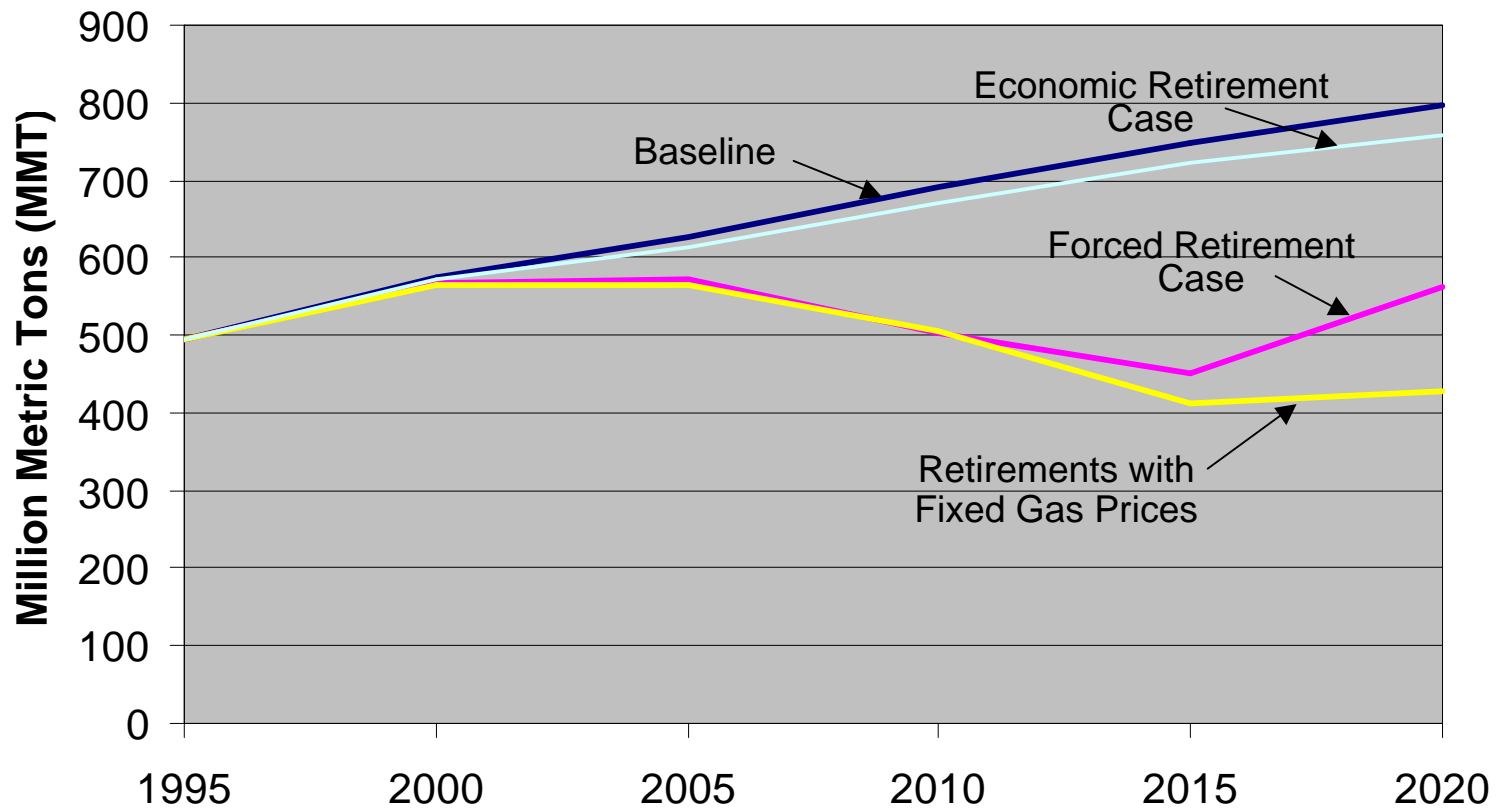
Electricity Prices

- The impact of the economic retirements on electricity prices is projected to be relatively modest in the near term, rising to 13 percent increase by 2020.



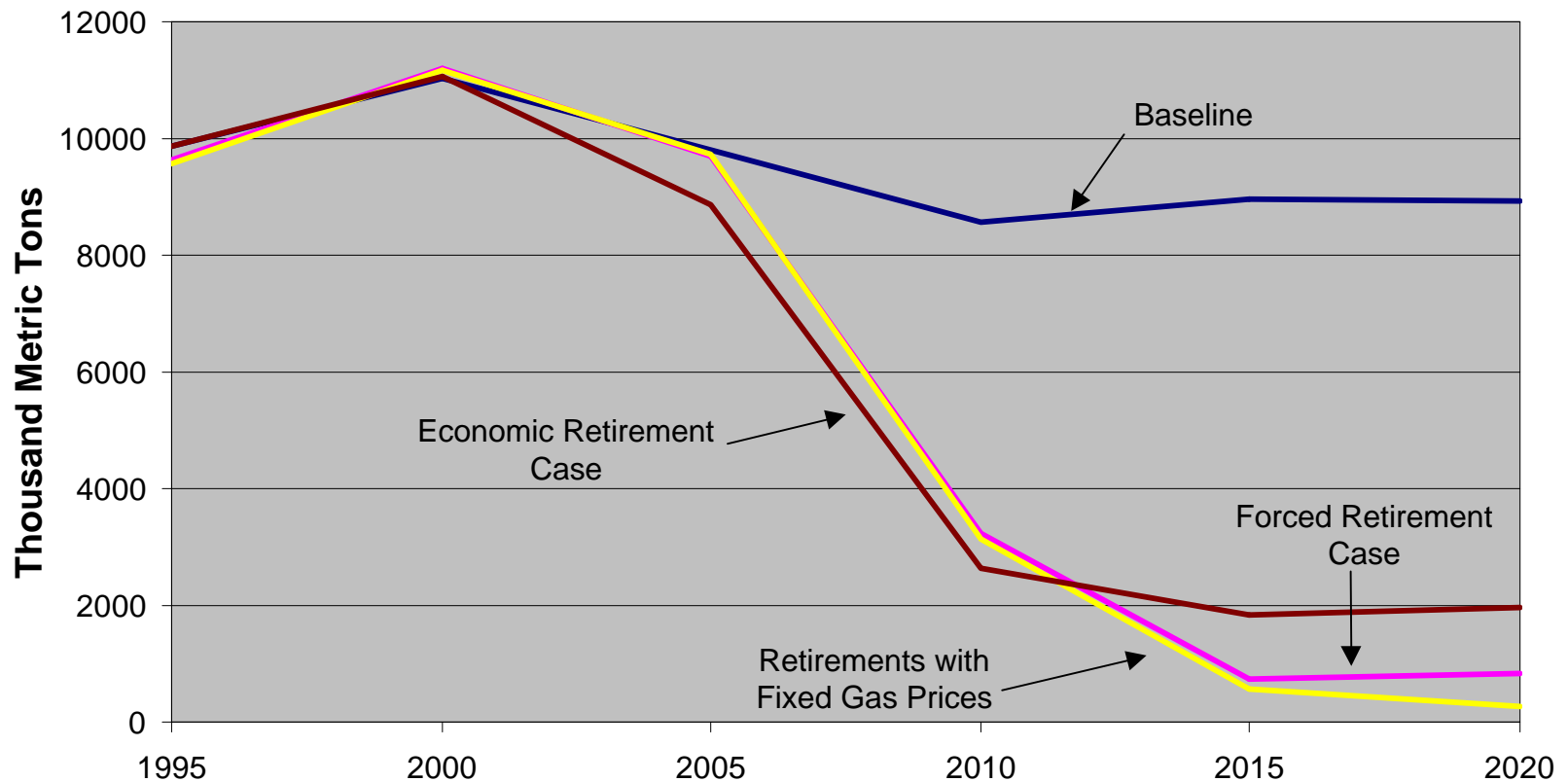
Carbon Emissions

- The carbon savings from requiring existing plants to meet new plant emission levels is relatively small.



SO₂ Emissions

- The CAAA SO₂ emissions cap of 8.9 million tons is no longer binding once such a large portion of existing coal plants have been retired or the existing stock has installed scrubbers to meet new emission standards.



Conclusion

- **A policy to force retirements of older coal plants significantly reduces carbon emissions;**
- **But leads to large increases in electricity prices.**
- **A policy requiring existing plants to meet emission levels of new plants has less of an economic penalty and is effective at reducing emissions of NO_x and SO₂, but not carbon.**