EPA
United States
Environmental Protection
Agency

EPA IRA Power Sector Impacts

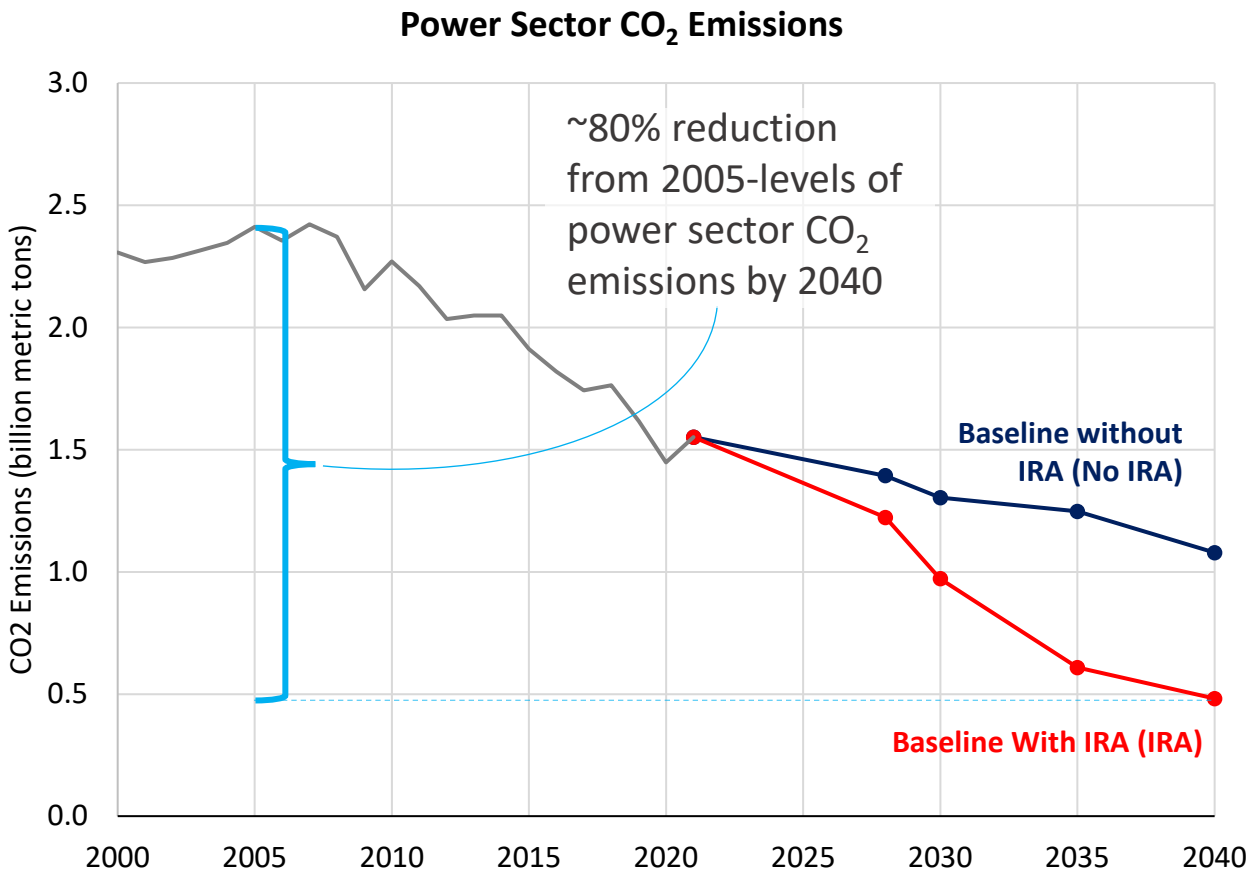
Future Generation: Exploring the New Baseline for Electricity in the Presence of the Inflation Reduction Act

February 15, 2023

Cara Marcy

Introduction

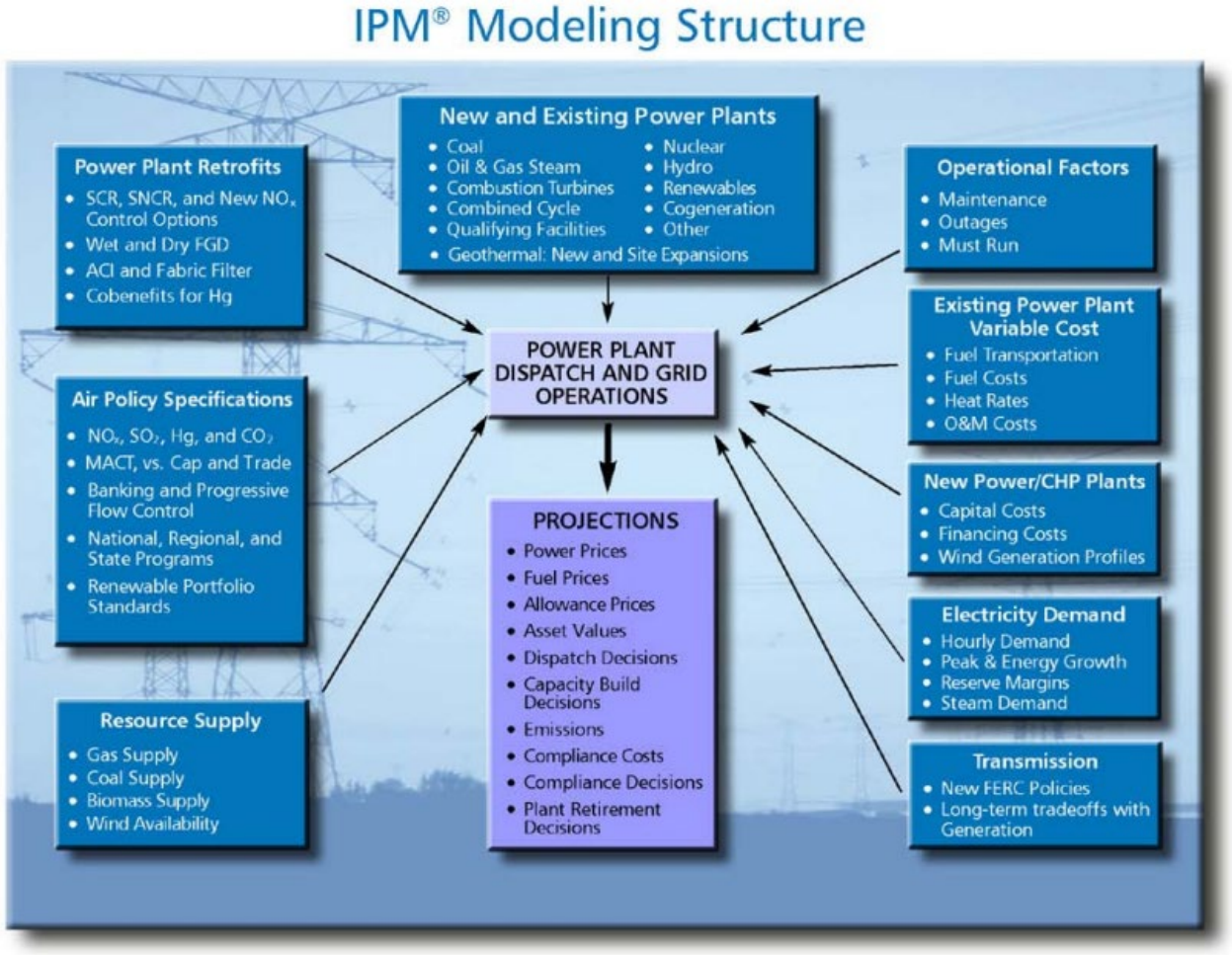
- IRA is expected to greatly drive down power sector CO_2 emission in the coming decades
- EPA modeling of IRA impacts show major growth in clean and renewable technologies, driven by tax credit incentives, resulting in decreases in fossil fuel use
- Modeling results presented today are used to establish EPA's power sector baseline and are useful in informing EPA regulatory actions
- Ongoing analyses examine use of more advanced technology assumptions



Note: Results from the Baseline with IRA are pending publication.
Results from the Baseline without IRA can be found here:
www.epa.gov/power-sector-modeling/pre-ira-2022-reference-case

Integrated Planning Model Framework

- IPM is a long-term dynamic linear programming model of the U.S. power sector that aims to meets energy and peak demand at lowest cost over the projection period subject to constraints including:
  - Transmission constraints
  - Fuel markets
  - Resource supply
  - Emissions limits
- IPM is populated with information related to operating units, planned builds, and planned retirements and is able to:
  - add new capacity,
  - retrofit or retire existing capacity, and
  - alter dispatch in order to meet demand over the projection period at the lowest cost



Note: Documentation for EPA's Power Sector Modeling Platform v6 using IPM can be found here: www.epa.gov/power-sector-modeling/documentation-pre-ira-2022-reference-case

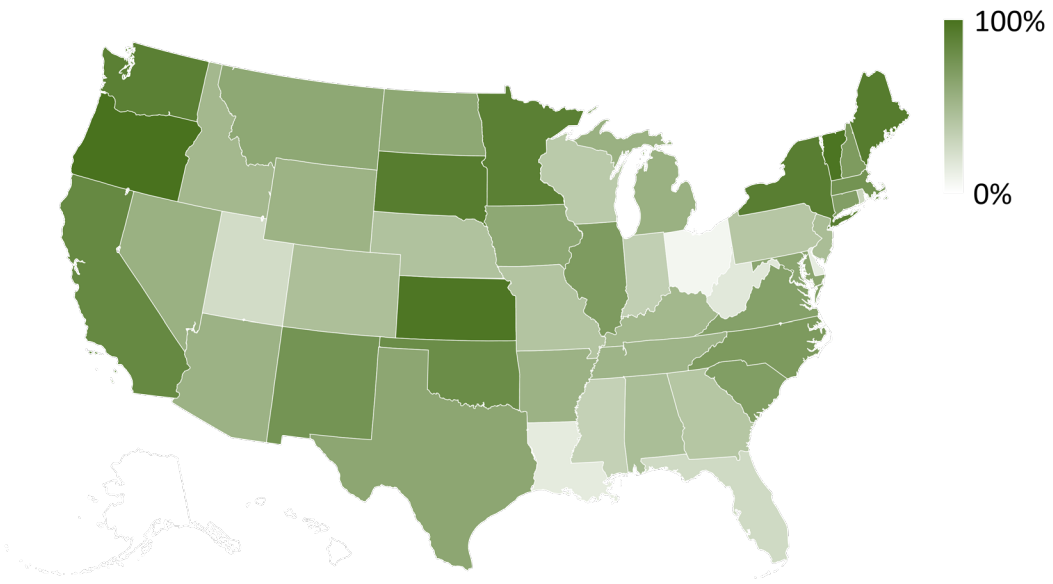
Recent Updates to IPM

- IRA provisions now modeled include:
  - Clean Electricity Investment and Production Tax Credits (48E, 45Y)
  - Advanced Manufacturing Production Credit (45X)
  - Carbon Capture & Sequestration Tax Credit (45Q)
  - Existing Nuclear Tax Credit (45U)
  - Clean Hydrogen Fuels (45V)
- Other model updates include:
  - Updated plant file with announced retirements for coal
  - Updated natural gas supply curves
  - Added incremental demand (above AEO projections) from electrification expected in response to previously finalized vehicle standards
- The baseline scenario in this presentation does not include non-power-sector impacts from IRA, e.g., demand-side impacts

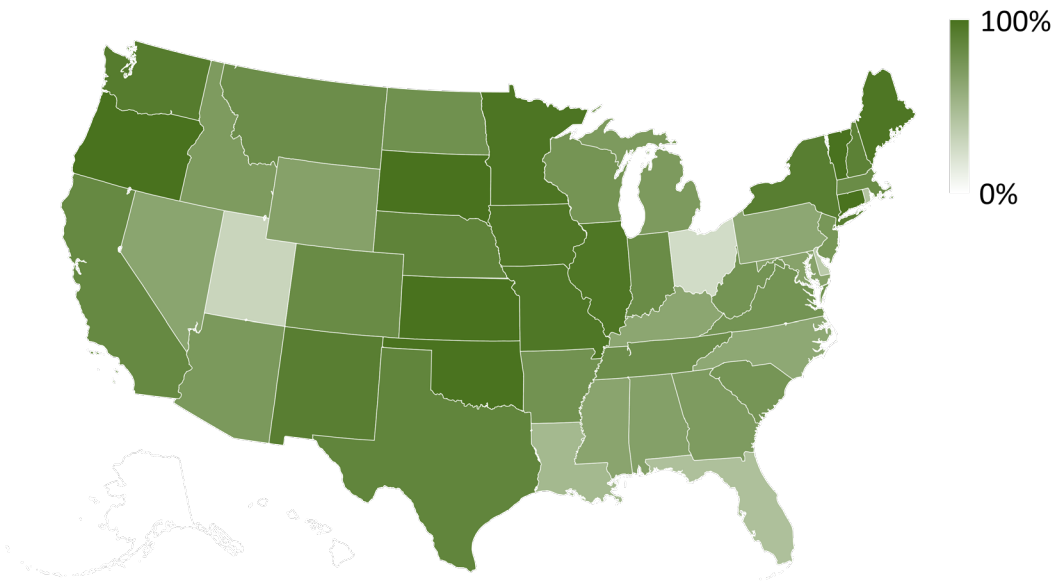
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Clean Electricity Generation

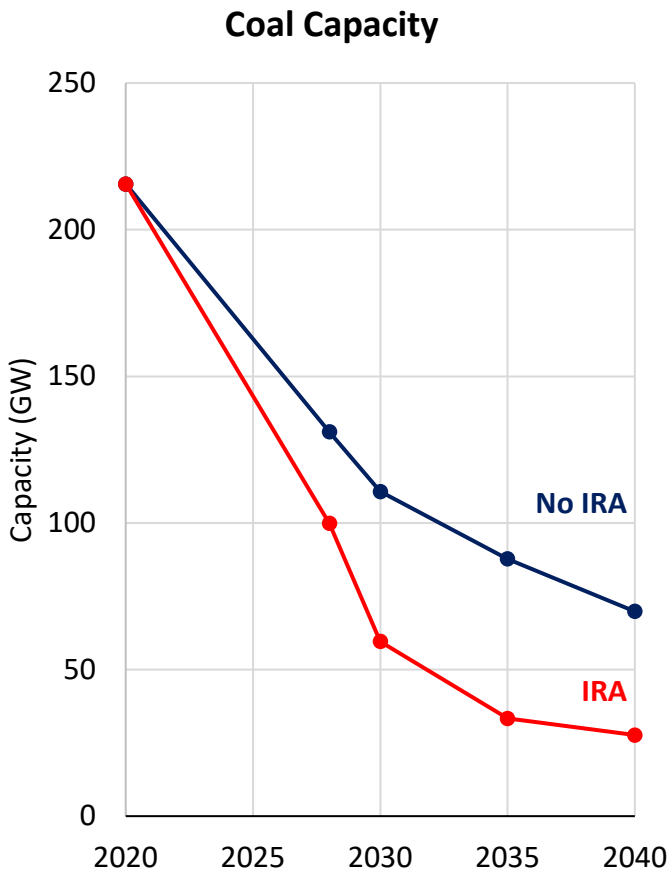
Clean Electricity Share of Generation by State in 2040 in Baseline without IRA

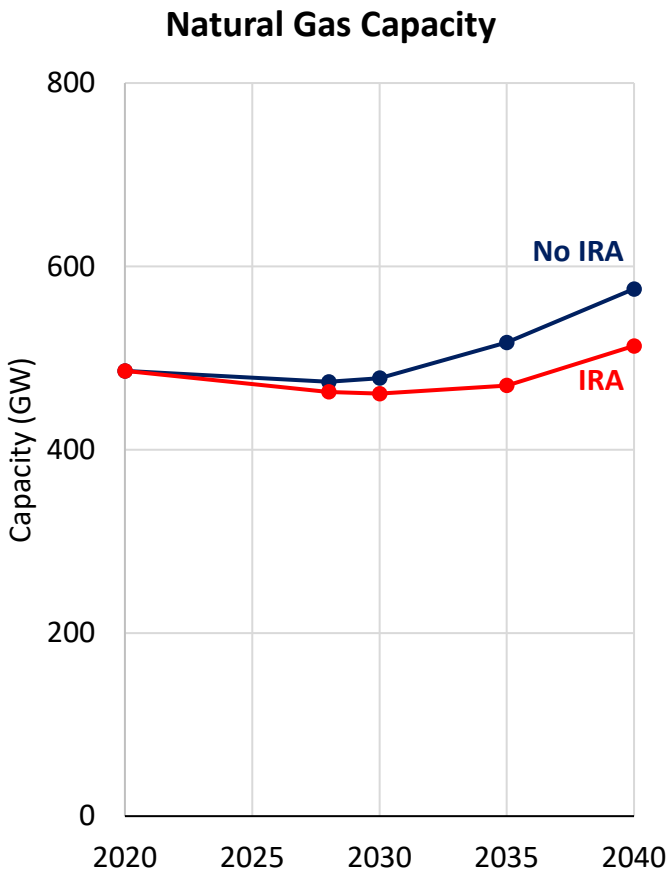


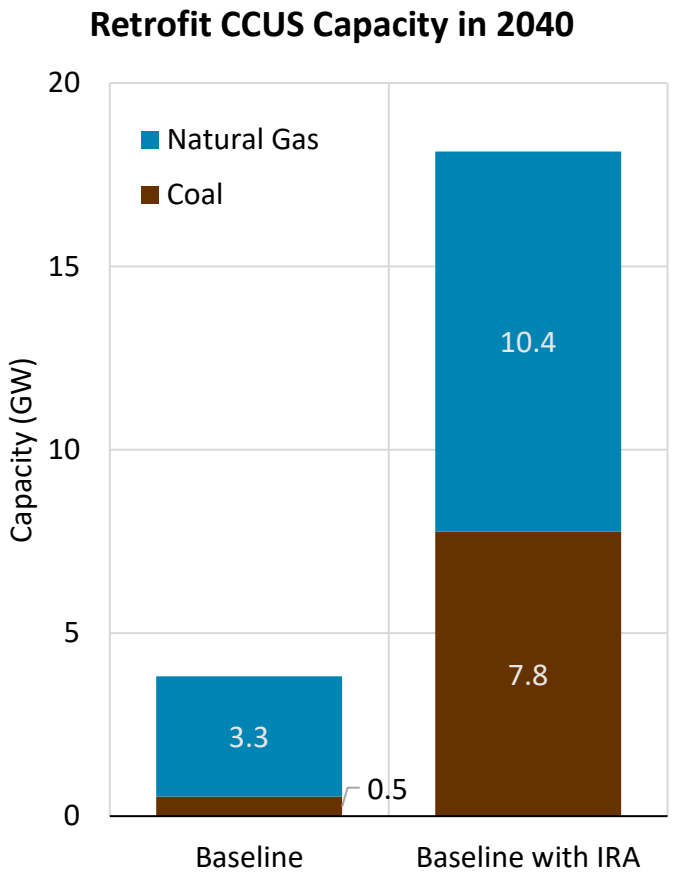
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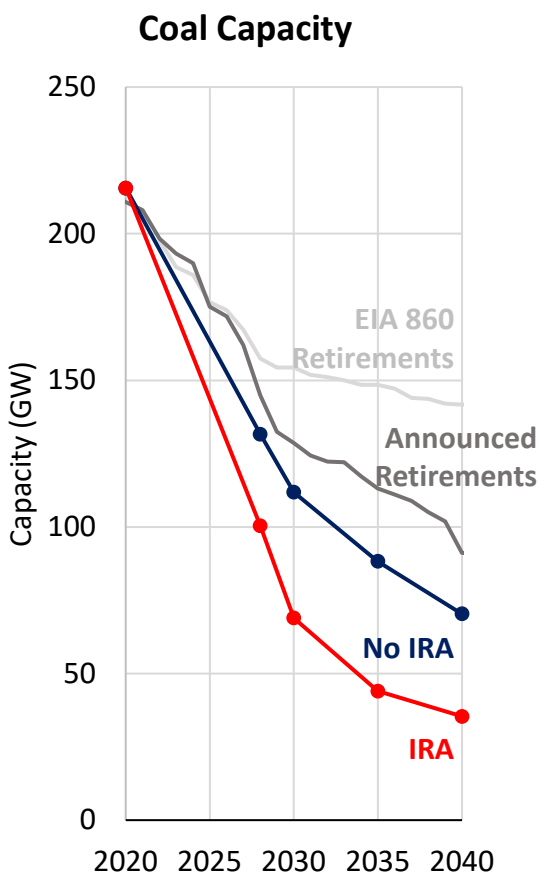
Coal and Natural Gas Capacity

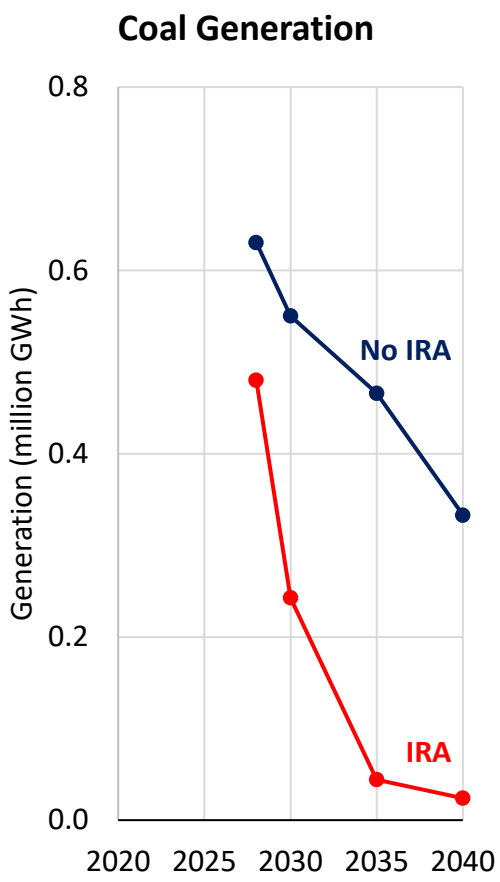


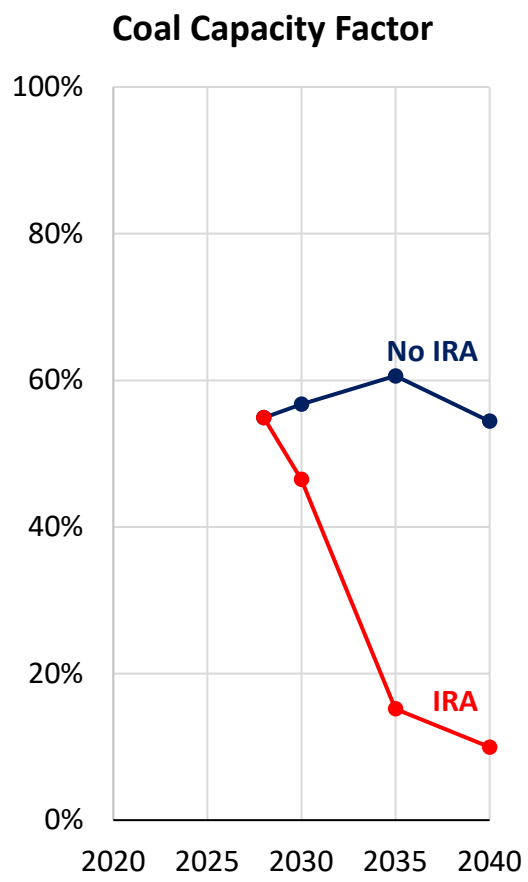


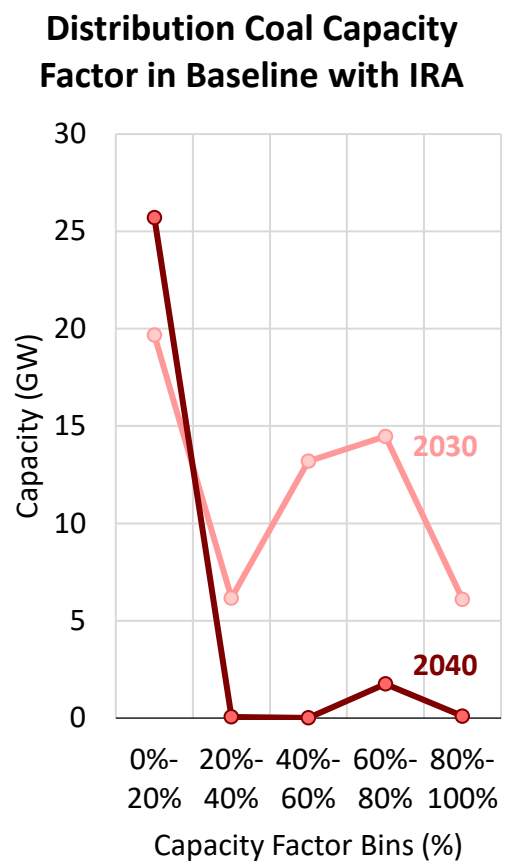


Coal Deeper Dive





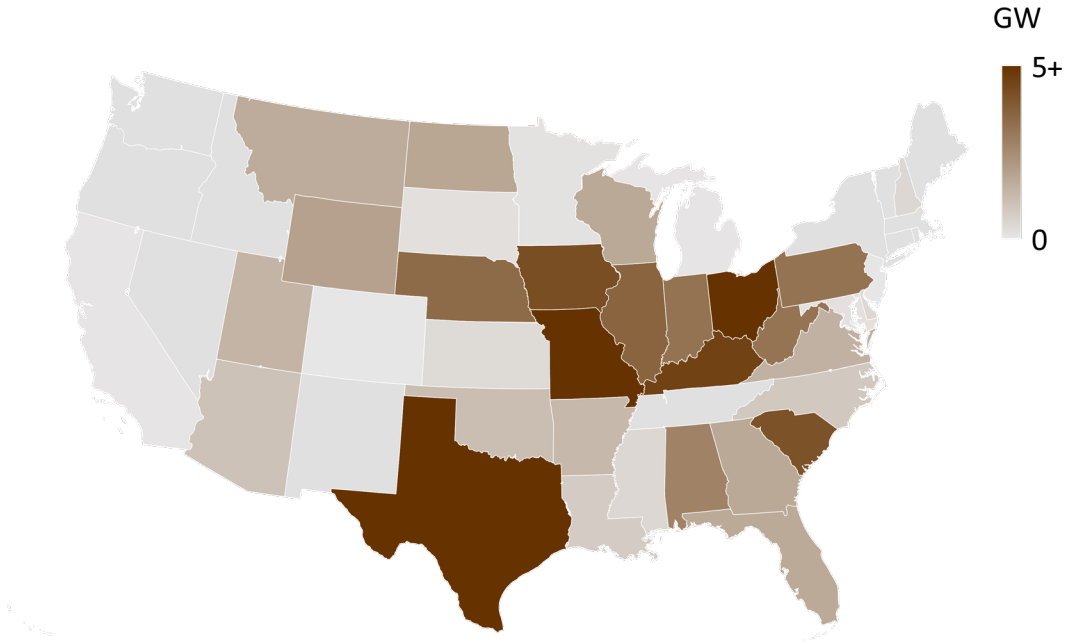




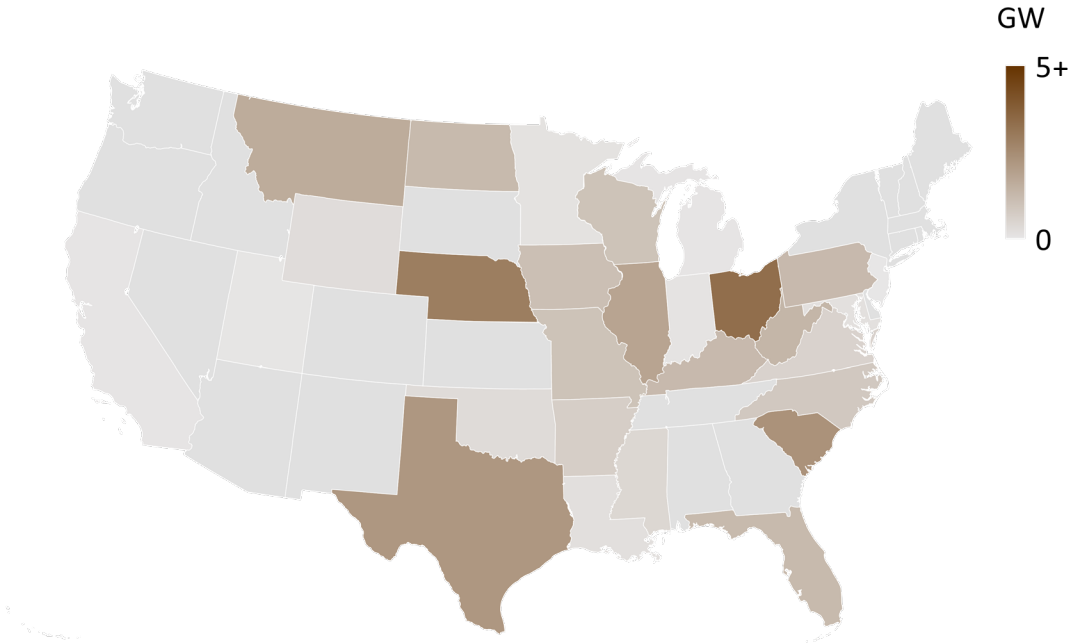
Note: EPA's National Electric Energy Data System (NEEDS) can be found here: www.epa.gov/power-sector-modeling/national-electric-energy-data-system-needs

Coal Regional Results

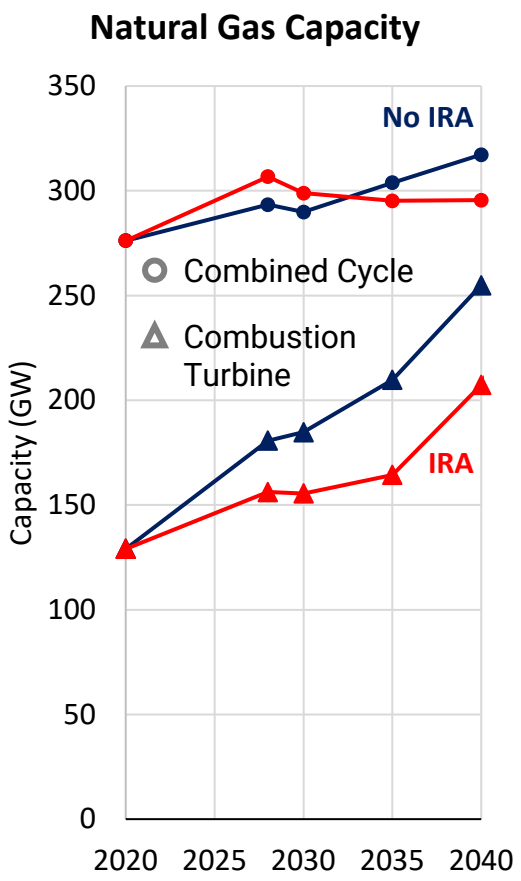
Operating Coal Capacity by State in 2040 in Baseline without IRA

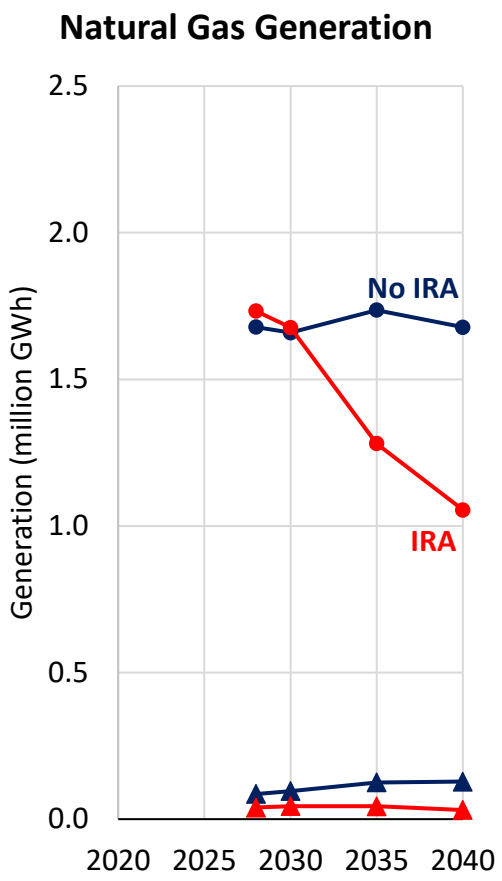


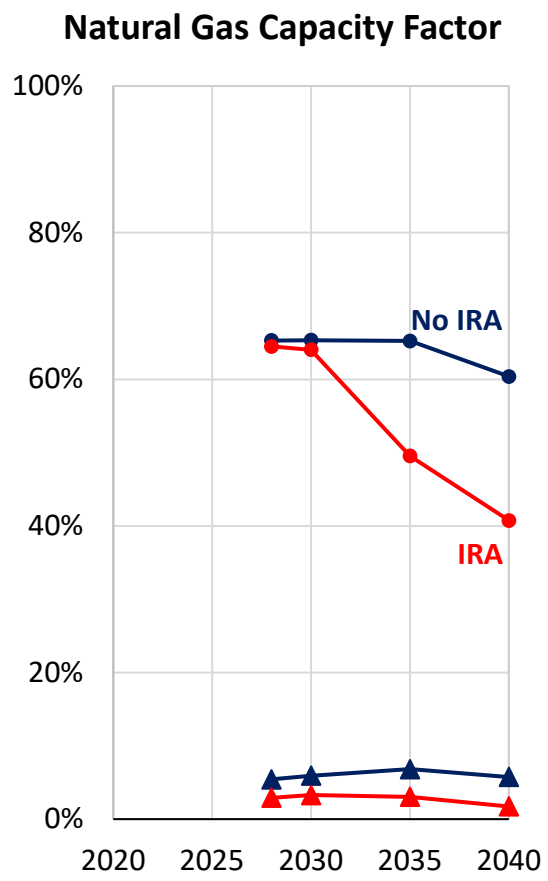
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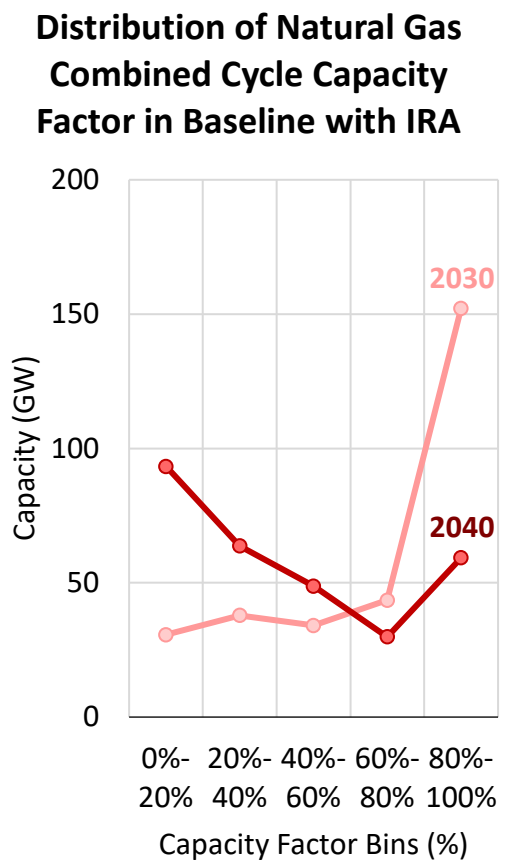


Natural Gas Deeper Dive



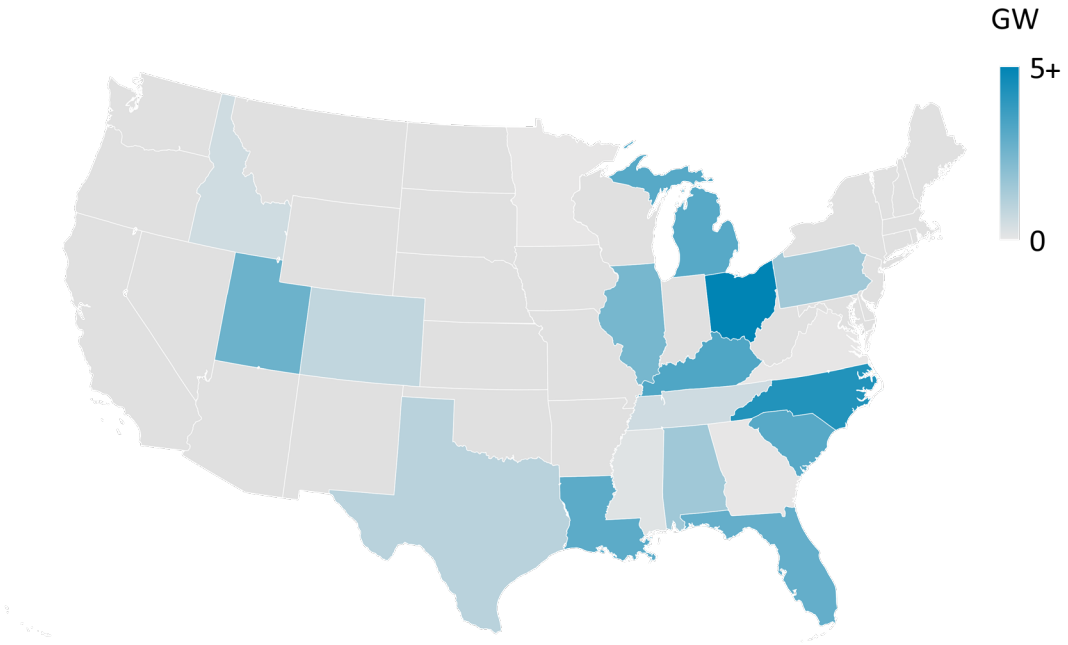




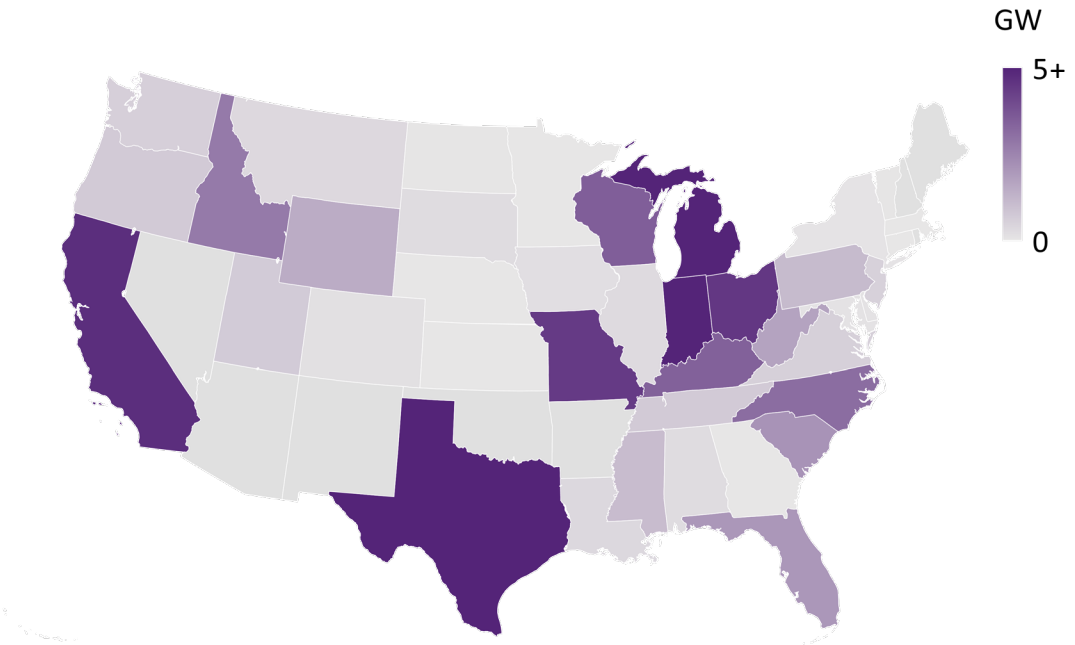


Natural Gas Regional Results

New Natural Gas Combined Cycle Capacity by State in 2040 in Baseline with IRA



New Natural Gas Combustion Turbine Capacity by State in 2040 in Baseline with IRA



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Conclusions

- Initial modeling results show an 80% reduction from 2005 levels of power sector CO_2 emissions by 2040, compared to a 55% reduction pre-IRA
- Tax credits for renewables, storage, nuclear, and CCS lead to increases in generation from low and zero emitting generation resources
- These lower emitting technologies reduce the need for fossil fuel resources, both in terms of capacity and in generation
- EPA will continue assessing the potential role of advanced technology assumptions in modeling potential impacts of the IRA, including:
  - Rapid electrification growth
  - Improved RE technology manufacturing and costs
  - Improved energy storage costs and durations
  - Delivered hydrogen fuel prices