



Modeled Effects of the Inflation Reduction Act of 2022

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Key Power Sector Provisions from Inflation Reduction Act

- Long-term extensions of production tax credit (PTC) for producing renewable electricity and investment tax credit (ITC) for building clean electricity projects
- Transition to technology-neutral incentive structure, based on emissions rate, after 2024
- Base rate of \$5/MWh (PTC) and 6% (ITC)
- Layered bonus structure includes:
 - 5X bonus for meeting prevailing wage and apprenticeship requirements
 - 10% (PTC) or 10 pp increase (ITC) for projects located in energy communities
 - 10% (PTC) or 10 pp increase (ITC) for projects meeting domestic content criteria



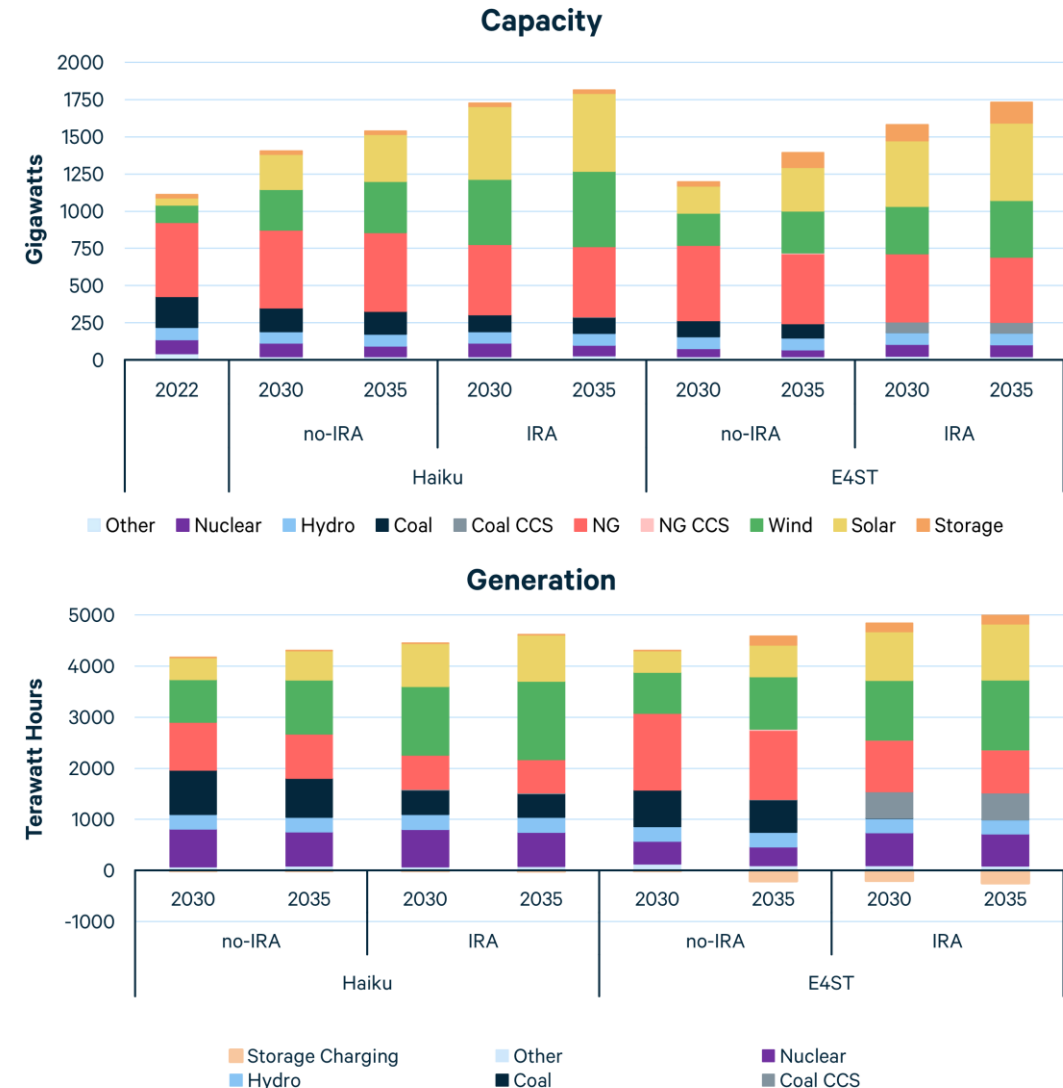
Key Power Sector Provisions from Inflation Reduction Act

- PTC for existing nuclear generation, tied to market conditions
- 45Q credit for carbon capture increased to \$85/ton
- Direct pay for tax-exempt entities, enhanced transferability of credits for others



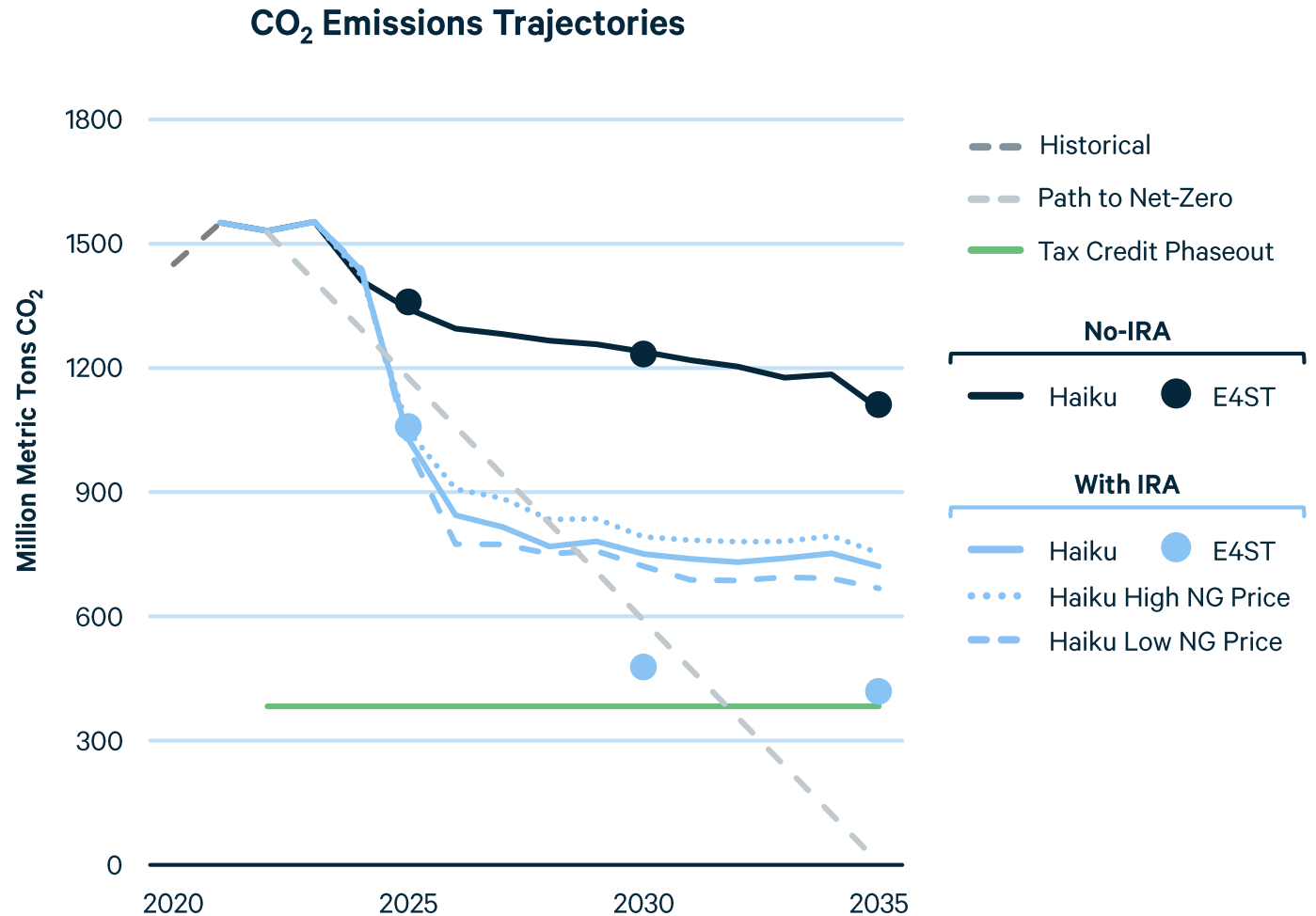
IRA Tax Incentives Favor New Builds and Use of Renewable and Low-Emitting Capacity

- RFF operates two detailed power sector models: **Haiku** and **E4ST**
- Under the IRA, both models build solar and wind capacity at rates well above historical maxima
- CCS retrofits of coal are projected to be economically viable under 45Q incentives
- E4ST models a higher capacity factor for solar & wind than Haiku

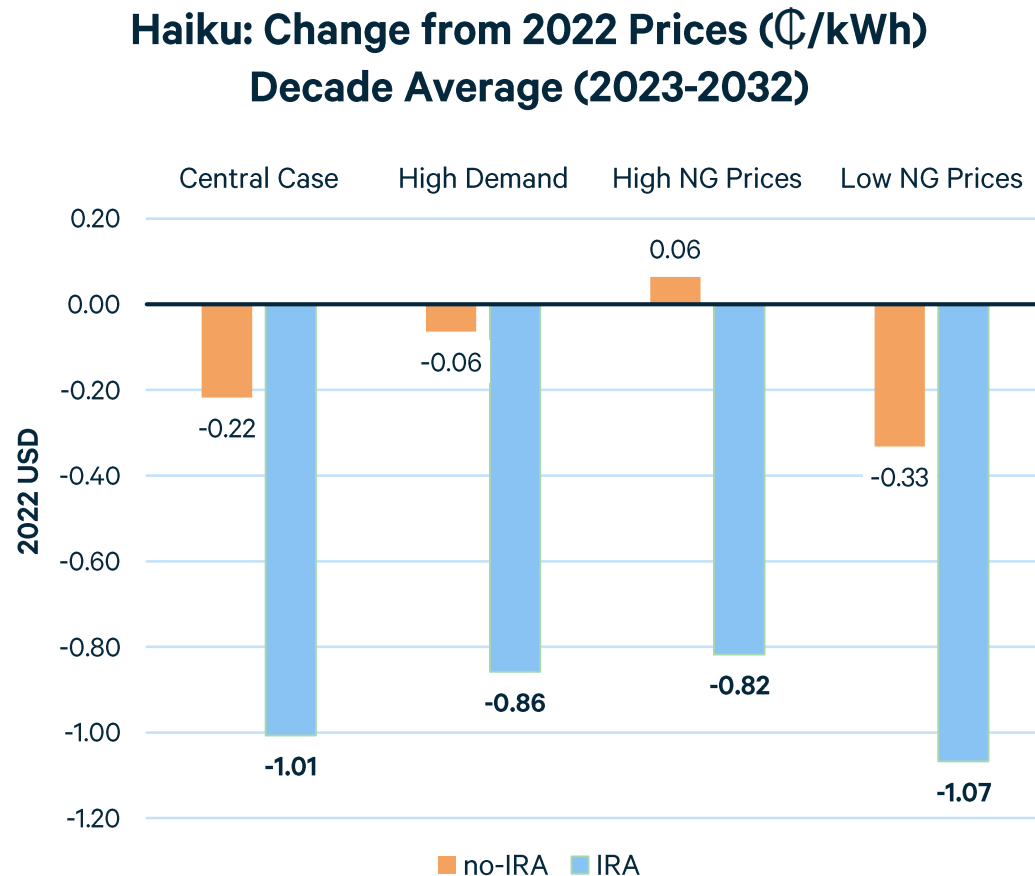


Projected Power Sector Emissions

- Both models indicate substantial CO₂ reductions compared to No-IRA baseline
- Emissions remain above the threshold for phaseout of the IRA tax credits through 2035, fall short of Biden net-zero goal
- E4ST sees greater emission reductions due to its CCS buildout



Retail Electricity Prices are Projected to Decline from 2022 Levels

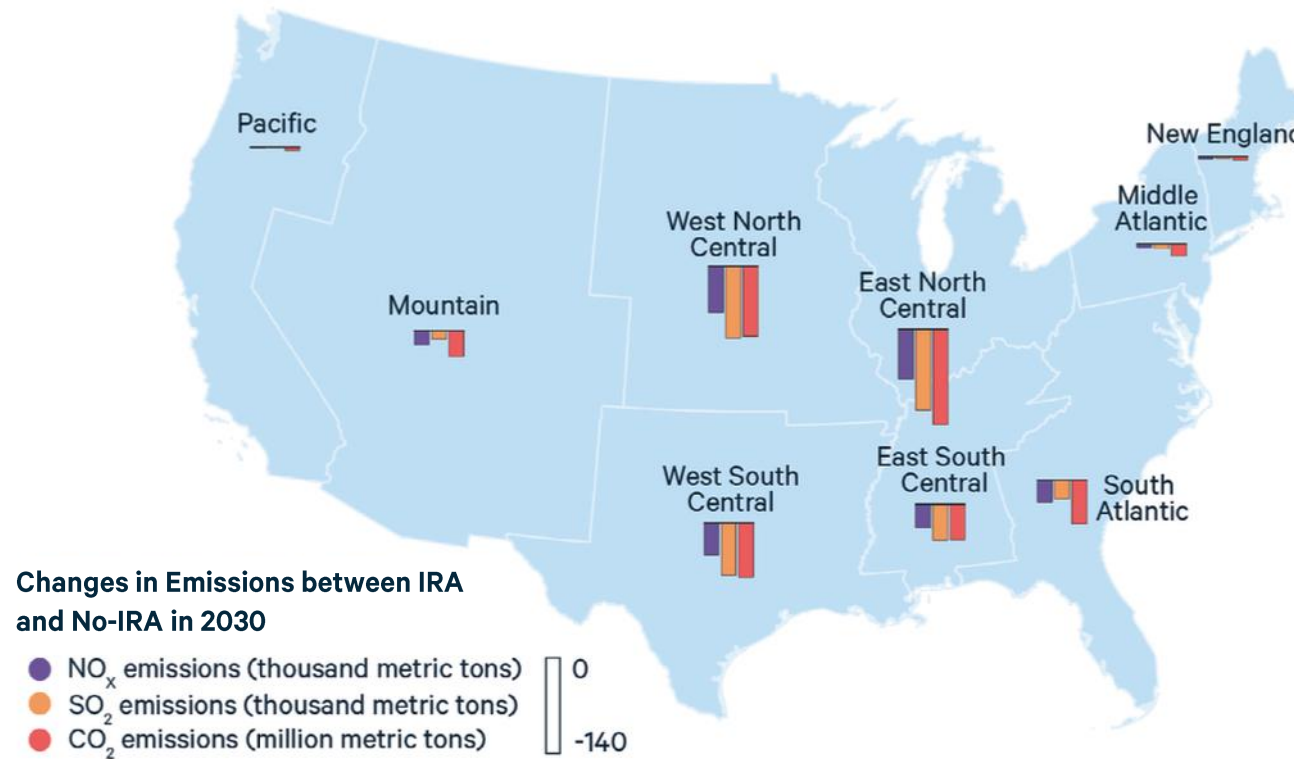


- Tax incentives for clean electricity are passed through to consumers in the form of lower retail rates
- Prices decline from approximately 12 ¢/KWh in 2022 (AEO)



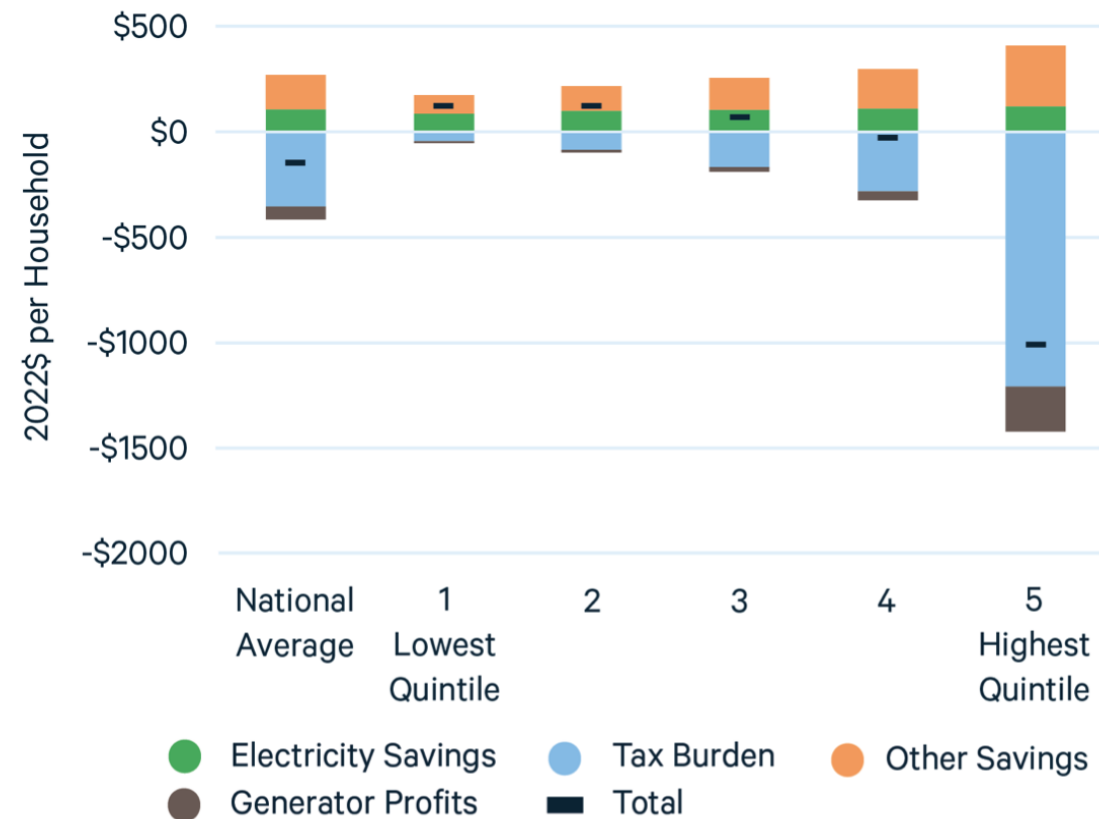
Baseline Air Quality is Improved under the IRA

Regional Emissions Changes in 2030



The IRA is Paid for Through a Progressive Tax Shift

The Distribution of Changes in Ratepayer and Taxpayer Costs in 2030



Conclusions

- The IRA provides a market environment that strongly favors the deployment of new clean electricity generation
- Updated baseline expectations suggest substantially greater clean electricity generation with associated reductions in emissions and widespread air quality improvements
- The tax incentives reduce retail electricity prices, encouraging electrification in other sectors, but by themselves are not projected to decarbonize the power sector by 2035
- Real world conditions not represented in the models are important sources of uncertainty that will require ongoing work to characterize



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RFF Operates Two Detailed Power Sector Models: Haiku and E4ST

Both Haiku and the *Engineering, Economic and Environmental Electricity Simulation Tool* (E4ST):

- Represent the decisions of market participants and system operators in the context of existing policies
- Project effects of new policies on generator construction, retirement, and operation in future years
- Calculate emissions of multiple gases and effects on air to estimate mortality and other health effects

E4ST has a detailed transmission system model of US & Canada with linear approximation of physics-based flows

Haiku estimates capacity investment and retirement with 26-year perfect foresight and solves rapidly



Both Haiku and E4ST have been used extensively to inform federal and subnational policies

Haiku

- Federal Policy
 - Cofiring Standards
 - Carbon Taxes, Clean Energy Standards, and Tax Credits
 - CEPP
- Subnational Policy
 - State Policy Options to Price Carbon
 - RGGI
 - VA, CA, etc.
- Academic work
 - Linking Emissions Programs
 - Designing Carbon Markets
 - Production Incentives in Carbon Markets

E4ST

- RD&D funding
- State policies (e.g. 25 states and NY)
- Clean electricity standards
- Transmission expansion
- DOE proposals to prevent coal and/or nuclear retirements
- Vehicle electrification
- NG price, nuclear life, CO2 pricing, and electricity demand
- Biomass co-firing with coal
- Improved modeling methods

