NERA

# Economic Impacts of Repealing Technology-Neutral Tax Credits

Prepared for Clean Energy Buyers Association (CEBA)

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# Introduction

- NERA Economic Consulting (NERA) was engaged by the Clean Buyers Energy Association (CEBA) to examine the impacts of technology-neutral tax incentives, including macro-economic impacts and delivered electricity prices to residential and other ratepayers. The technology-neutral tax incentives analyzed in this study include the §45Y production tax credit (PTC) or the §48E investment tax credit (ITC) to incentivize clean energy investments across various generating technologies. The PTC and ITC incentives analyzed include the bonus credits for the prevailing wage and apprenticeship requirements but do not include the bonus credits that relate to domestic content requirements, or for projects located in energy communities.*
- To evaluate the impacts of the technology-neutral tax incentives, NERA has used $N_{ew}$ERA state-level macro-economic model and electricity rate model.
- The delivered electricity price impacts are estimated are for select states under two electricity market outlooks: (i) An electricity market outlook with incremental electricity demand from growth in data centers and technology-neutral tax incentives; and (ii) An electricity market outlook with incremental electricity demand from growth in data centers in the absence of technology-neutral tax incentives.
- The following slides detail the electricity market modeling approach, scenarios that were evaluated, the key inputs to those scenarios, key results on delivered electricity prices and additional information about the $N_{ew}$ERA model. It is our understanding that these results will be used by CEBA to inform key stakeholder discussions on the technology-neutral tax incentives.

* See previous study: https://cebuyers.org/wp-content/uploads/2025/02/CEBA_Electricity-Price-Impacts-of-Technology-Neutral-Tax-Incentives-With-Incremental-Electricity-Demand-From-Data-Centers_February-2025.pdf

# NERA's Modeling Framework and Delivered Electricity Price Estimation Approach

## The study scenarios are not intended to model any specific regulation.

- **Transmission Capacity:** The study does not model endogenous transmission line expansions.
- **Tax Incentives:** The study considers the §45Y production tax credit (PTC) and the §48E investment tax credit (ITC) to be technology-neutral, without additional credits applied for domestic content or facilities location in energy communities.
- **Policy Modeling:** The scenarios presented are not designed to model specific policies, and the resulting electricity price impacts may vary based on different model inputs and assumptions. The macroeconomic impacts does not incorporate funding source for the tax incentives.
- **Capacity Additions:** The modeling does not incorporate real-world siting or technology-specific constraints (for e.g., the availability of gas turbine technology) that might exist with respect to building new generating capacity. The model builds generating capacity in regions where it deems it to be economically feasible while satisfying electricity market and regulatory constraints.

# 1 Overview of the Modeling Approach

# NERA's Modeling Framework and Delivered Electricity Price Estimation Approach

## Impacts were estimated using a state-level macroeconomic model with a detailed electricity dispatch model and a state-level rate model.

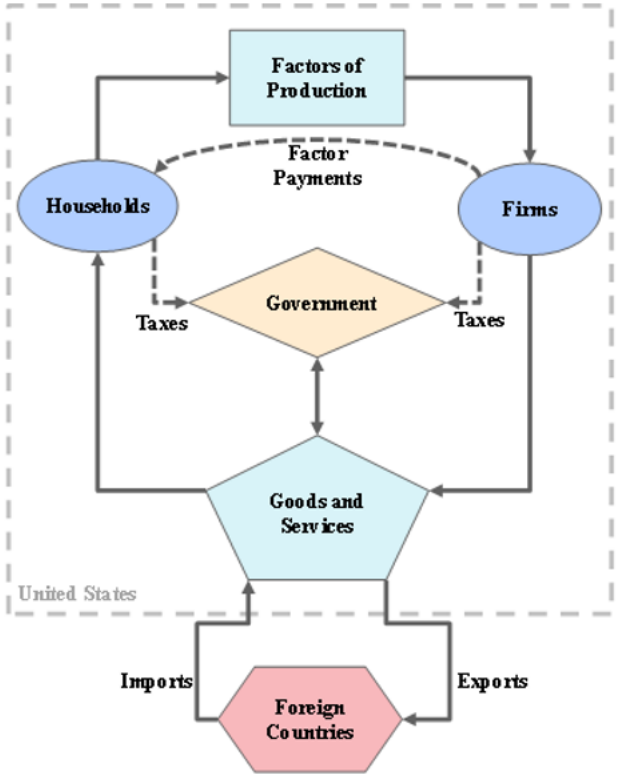
- NERA used NewERA energy-economy modeling framework that includes a state-level top-down macroeconomic model linked with a detailed bottom-up electricity dispatch model. A state-level rate model is used electricity price impacts.
- The inputs for the $N_{ew}$ERA macroeconomic and electric sector models are drawn from EIA's AEO 2023 publication.
- The incremental demand from deployment of data centers were based on a 2024 EPRI study.[1]
- The technology-neutral tax incentives are generally consistent with EIA's modeling assumptions and applied to the capital and the operating costs of qualifying generating units.
- The macroeconomic model, simulates all key economic interactions in the U.S. economy, including those among industries, households, and the government while the electricity sector model projects least-cost dispatch decisions for the various generating units, regional fuel, electricity, capacity and permit prices.
- The modeling framework produces integrated projections of the energy and macroeconomic impacts, with demand response, of a scenario with the technology-neutral tax incentives compared to a scenario that excludes these incentives.
- The electricity system outputs from $N_{ew}$ERA serve as inputs to NERA's state-level rate model. The state-level rate model produces delivered electricity price by rate-payer class (residential, commercial, industrial) based on electricity market type in the state (competitive vs. cost-of-service).

[1] EPRI, Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption, May 28, 2024, available at https://www.epri.com/research/products/3002028905

# $N_{ew}$ERA Macroeconomic Model

## The NewERA macroeconomic model is a forward-looking, dynamic, computable general equilibrium model.

- The $N_{ew}$ERA macroeconomic model captures the flow of goods and factors of production within the economy.
- Households in the model supply factors of production (e.g., labor and capital) to firms who in turn provide households with payments for the factors of production.
- Firm output is produced from a combination of production factors and intermediate inputs of goods and services supplied by other sectors of the economy (both domestic and foreign).
- Each firm's final output is either consumed within the U.S. or exported abroad.
- The government agent receives taxes from both households and firms, contributes to the production of goods and services, and purchases goods and services.
- The model solves for a state of equilibrium, whereby demand for goods and services equals their supply, and investments are optimized for the long term
- The model is solved for periods from 2023 to 2044 in 3-year time steps and includes 12 economic sectors. [1]
- The model outputs demand, supply and prices of all goods and services, and trade effects along with gross regional or state product, aggregate consumption, sectoral output and investment levels.




[1] Coal mining (COL), Natural gas distribution (GAS), Petroleum refining (OIL), Crude oil production (CRU), Electricity (ELE), Agriculture (AGR), Commercial transportation other than trucking (TRN), Commercial trucking (TRK), Energy-intensive sectors (EIS), Motor vehicle manufacturing (M_V), Other manufacturing sectors (MAN) and Services (SRV).

# $N_{ew}$ERA Electricity Sector Model

## The NewERA electricity sector model is a bottom-up dispatch and capacity expansion model.

- The $N_{ew}$ERA electricity sector model is a bottom-up dispatch and capacity expansion model with unit-level information on generating units in 63 U.S. regions (and 11 Canadian regions) with regional demand and capacity requirement representation.
- The model produces a least-cost projection of market activity, satisfying demand and all other constraints (emission limits, transmission limits, fuel availability and regulations) over the model time horizon, projecting unit-level generation and investment decisions, regional fuel and electricity prices.
- Electricity generators are represented at the unit-level (with over 17,000 generating units in the U.S. represented in the model) along with unit-level characteristics such as capacity, utilization, outages, emission rates and technology costs.
- The model can retire units if they cannot remain profitable, build new generating capacity to meet increasing electricity demand and reserve margin requirements. The operation of existing units by the model depends on the policies in place, electricity demand and operating costs (particularly energy prices).
- The model is solved for periods from 2023 to 2044 in 3-year time steps.

# State-Level Delivered Electricity Rate Model

## The rate model is a bottom-up construct that estimates ratepayer-specific delivered electricity price by state

- The rate model uses regional model outputs from the NewERA electricity sector model aggregated to state-level outputs to calculate delivered electricity sector prices.
- The delivered electricity prices in the rate model are estimated based on type of electricity market structure in state and the input components based on the type of structure
  - **Cost-of-Service (COS):** The input components include the incremental cost to serve load (operating plus investment costs), renewable energy credit (REC) costs as well as a return on equity.
  - **Competitive:** The input components include the wholesale, capacity and REC costs.
- Additionally, the calculation of delivered electricity prices for both types of market structure includes transmission losses and a rate-payer specific transmission and distribution (T&D) margin.
- The state-specific delivered electricity prices by ratepayer is calculated as a weighted average estimate based on the share of COS vs. competitive market share for the state.

# Overview of the Key Modeling Assumptions

# Overview of Technology-Neutral Tax Incentives

## The technology-neutral tax incentives are broadly consistent with the U.S. EIA's AEO 2023 modeling assumptions

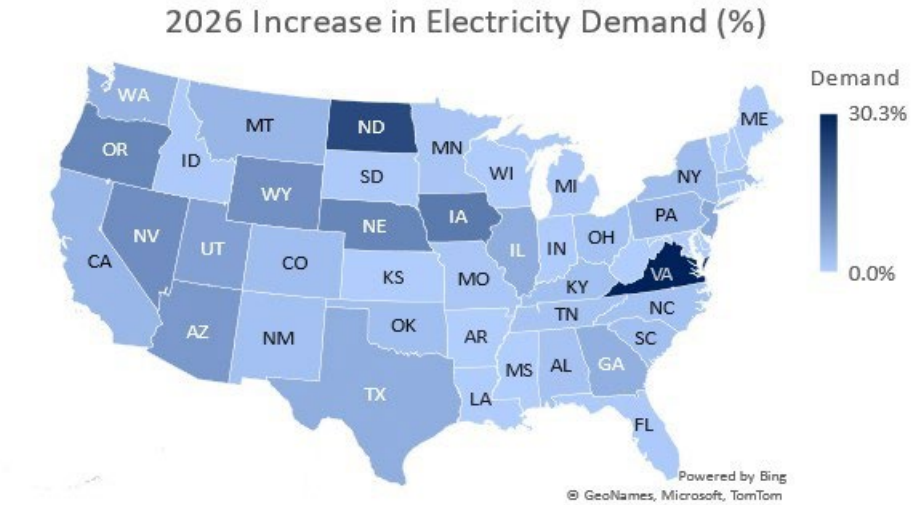
- For this study, two types of tax incentives are incorporated: §45Y production tax credit (PTC) and the §48E investment tax credit (ITC) to model the impact of the tax incentives on renewable technologies.
- The ITC was assumed to apply to capital-intensive technologies while the PTC was assumed to apply to other technologies. [1]
  - The PTC was applied to new solar PV, solar PV with storage, onshore wind, onshore wind with storage projects
  - The ITC was applied to new biomass, geothermal, hydroelectric, solar thermal, offshore wind and new nuclear
- The full value of the credit assumed to apply until 2033, 75% in 2034, 50% in 2035 and zero thereafter
- Additionally, the §45U zero-emission nuclear PTC was applied to existing nuclear resources with the full value of the credit assumed to apply from 2024 to 2032 and zero thereafter
- All technologies were assumed to be eligible for the base credit plus the bonus credits for prevailing wage and apprenticeship requirements.
- It was assumed that none of the technologies would be eligible for the bonus credits from meeting domestic content requirements (except for offshore wind) and bonus credits for location in energy communities.

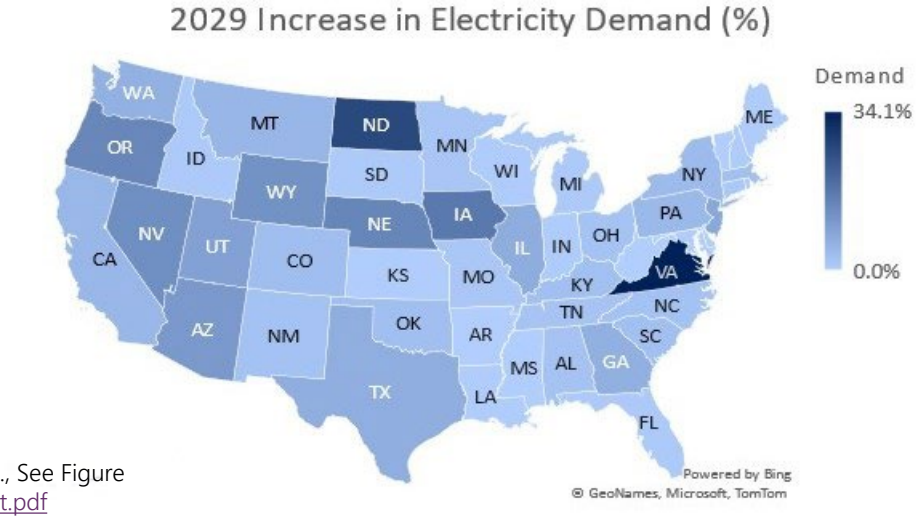
[1] U.S. EIA, AEO2023 Issues in Focus: Inflation Reduction Act Cases in the AEO2023, March 2023, available at https://www.eia.gov/outlooks/aeo/IIF_IRA/pdf/IRA_IIF.pdf;
U.S. EIA, Assumptions to the Annual Energy Outlook 2023: Renewable Fuels Module, March 2023, available at https://www.eia.gov/outlooks/aeo/assumptions/pdf/RFM_Assumptions.pdf

# Incremental Electricity Demand from Data Center Growth

## The incremental demand from data center growth have varying impacts on the regional electricity demand.

- NERA's assumption for the incremental demand from growth in data centers for this study are based on the Moderate Growth scenario in the 2024 EPRI study which uses a survey approach of expert assessment to forecast future demand.[1]
  - The EPRI study projects state level electricity consumption from U.S. data centers from 2023-2030 to grow at an average annual growth rate of 5% with incremental demand of about 179 TWh and 205 TWh in 2026 and 2029.
  - Moderate Growth scenario in the 2024 EPRI study is at the lower end of the academic and industry future projections of annual energy use by date centers.[2]
- The incremental electricity demand was assumed to be spread equally across all 8,760 hours in a year assuming the data centers run continuously consistent with their operations. Regional peak demand is increased by the average hourly incremental demand in a year.
- The U.S.-wide increase in total electricity demand (with the incremental demand from data center growth) is 4.3% (2026) and 4.8% (2029).



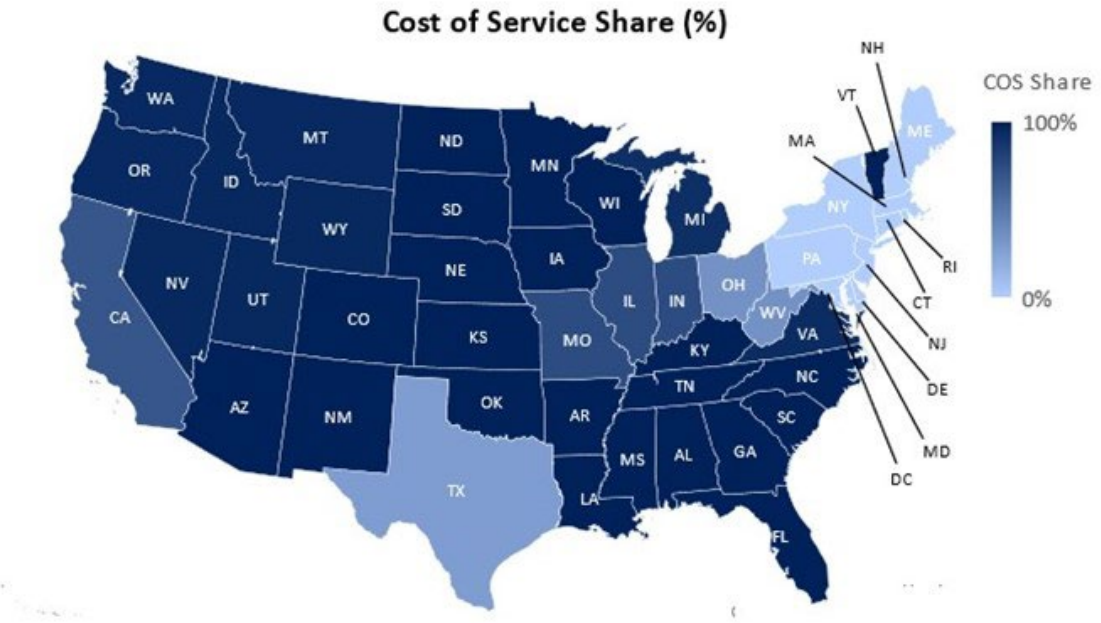

[1] EPRI, Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption, May 28, 2024, available at https://www.epri.com/research/products/3002028905

[2] Berkeley Lab, Energy Analysis & Environmental Impacts Division, 2023 United States Data Center Energy Usage Report, December 2024., See Figure 1.1., pg. 12, available at https://eta-publications.lbl.gov/sites/default/files/2024-12/lbnl-2024-united-states-data-center-energy-usage-report.pdf

# Electricity Market Structure Assumptions

## State-level electricity market structure are either cost-of-service and/or competitive.

- The electricity market structure of each individual state can be either cost-of-service and/or competitive.
- The share of demand (or generation) of cost-of-service or competitiv is based on EIA's AEO 2023 modeling assumptions.[1]
- Each state is located in a broader electricity market that is bigger thai the state in general. The state-level market impacts will be influenced by neighboring state impacts.
- Most of the states in the U.S. have either a fully cost-of-service or partial cost-of-service electricity market structure.
- States with a fully competitive electricity market structure are primaril concentrated in the Northeast.




[1] U.S. EIA, Assumptions to the Annual Energy Outlook 2023: Electricity Market Module, March 2023, available at https://www.eia.gov/outlooks/aeo/assumptions/pdf/EMM_Assumptions.pdf

# Overview of Scenarios Analyzed

# Scenarios Analyzed for Impacts from Tax Incentives

Two scenarios were analyzed for the study to assess the impacts of the technology-neutral tax incentives.

| Scenario | Electricity Demand | Technology-Neutral Tax Incentives |
|---|---|---|
| 1. With Tax Incentives | Electricity demand from data centers | Includes technology-neutral tax incentives |
| 2. Without Tax Incentives | Electricity demand from data centers | Excludes technology-neutral tax incentives ("repealing technology-neutral tax credits") |

- The study evaluated two scenarios with and without different technology-neutral tax incentives for solar, solar with storage, solar thermal, onshore and offshore wind, geothermal, biomass, hydroelectric, and existing and new nuclear generating technologies.
- Both scenarios include incremental electricity demand from data centers.
- The technology-neutral tax incentives were applied to the eligible technologies in the scenario. The incentives have the effect of reducing the capital costs of the clean energy technologies.
- The macro-economic and electricity price impacts for this study are presented for two representative years (2026 and 2029).

# 4 Summary of Electricity Price Impacts

# Repealing Technology-Neutral Tax Credits Raises Energy Costs and Burdens the Economy

- Absence of Energy Credits Creates Significant Dependence on Conventional Energy Sources to Meet Demand
  - This model assumes no constraints on gas infrastructure or availability of equipment (such as gas turbines) – a modeling assumption that masks near-term critical supply chain challenges.
  - Gas turbine manufacturers are already struggling to meet surging demand with long delays.*
- Significant Dependence on Conventional Energy Sources Drives Up Electricity Prices, Directly Harming Households and Businesses: The increase in natural gas demand drives up gas prices, which cascades into higher electricity costs across the economy.
  - **Households and businesses are forced to respond** by cutting back on output, including reducing electricity consumption.
  - Higher energy costs hit energy-intensive sectors (EIS) especially hard. Iron and steel, chemicals, cement, aluminum, and non-ferrous metals face steep cost burdens that **threaten their competitiveness and viability**. Even less energy-intensive sectors, such as petroleum refining and agriculture, face mounting pressure as energy-related costs rise.

- *Gas turbine manufacturers struggling to meet surging demand from data centers – report, March 24, 2025. By Zachary Skidmore. https://www.datacenterdynamics.com/en/news/gas-turbine-manufacturers-struggling-to-meet-surging-demand-from-data-centers-report/*

***Note:*** *Job impacts in the NewERA model are measured as "job-equivalents." The number of annual job-equivalents equals total labor income change divided by the average annual income per job. This does not represent a projection of the numbers of workers that may need to change jobs and/or be unemployed, as some or all of the loss in labor income could take the form of lower wages and be spread across workers who remain employed.*

# Repealing Techology-Neutral Tax Credits Raises Energy Costs and Burdens the Economy

- **Results of Inflated Energy Prices Halt Economic Growth:** As commercial and industrial activity declines, demand for labor and capital falls, leading to wage losses, declining household income, and shrinking investment.
- Households are hit on multiple fronts: rising utility bills, reduced employment, and falling incomes constrain consumer spending and overall economic resilience.
- The combined effect is shrinking of the economy in many states: declines, household financial strain intensifies, and output contracts in key industries, with potential job losses. The scale and severity of these impacts vary by state but are significant and far-reaching.
- **Conclusion**: Without American Energy Credits the system is restricted to traditional energy sources making energy more costly to meet the demand and acts as a drag on the economy and stokes inflation.

***Note:*** *The results from the NewERA electricity sector model are for broader regions known as power pools which are then disaggregated to state level results using a mapping of electricity demand from the power pools to individual states. The energy-intensive sectors represented in NewERA include pulp and paper, chemicals, glass, cement, iron and steel, alumina, aluminum, and mining.*

*Higher energy costs disproportionately impact energy using economic sectors. Energy-intensive sectors such as iron and steel production, chemicals, cement, aluminous and other non-ferrous metals all are impacted by higher cost the most. The EIS sector includes these energy-intensive manufacturing industries.*

*Other sectors, petroleum refinery and agricultural, are relatively less energy intensive than the EIS sector, but also faces energy cost burden depending on the intensity of energy usages.*

# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Grand Canyon State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.2% increase to households and 4.7% increase to businesses
- **Higher Electricity Prices:** 12.7% increase to households and 17.0% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $340 loss in household income
  - $0.93 billion decrease in state GDP
  - 6,700 lost jobs

**Natural Gas Prices:**
2026: 0.6% (Res.), 1.4% (C&I)
2029: 2.1% (Res.), 4.7% (C&I)

**Electricity Prices:**
2026: 10.5% (Res.), 14.6% (C&I)
2029: 14.9% (Res.), 19.9% (C&I)

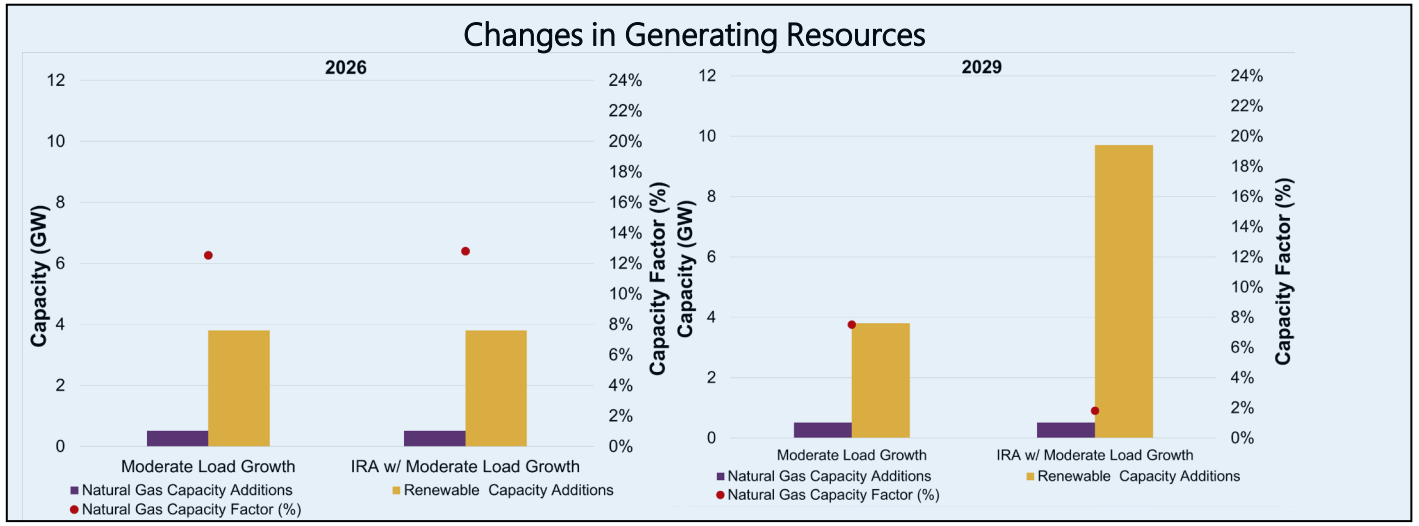
**Production Loss for Energy-Intensive Sectors:**
2026: ~0.00%
2029: 0.39%

**Full-time Equivalent Job Losses:**
2026: 2,400
2029: 7,400

**GDP Loss:**
2026: $0.68 billion
2029: $0.86 billion

**Household Income Loss:**
2026: $310
2029: $310

**Agriculture Output Loss:**
2026: ~0.00%
2029: 0.14%




# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Golden State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.3% increase to households and 3.5% increase to businesses
- **Higher Electricity Prices:** 7.2% increase to households and 8.5% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $350 loss in household income
  - $4.78 billion decrease in state GDP
  - 44,200 lost jobs

**Natural Gas Prices:**
2026: 0.6% (Res.), 1.0% (C&I)
2029: 2.2% (Res.), 3.4% (C&I)

**Electricity Prices:**
2026: 5.8% (Res.), 7.1% (C&I)
2029: 10.2% (Res.), 12.2% (C&I)

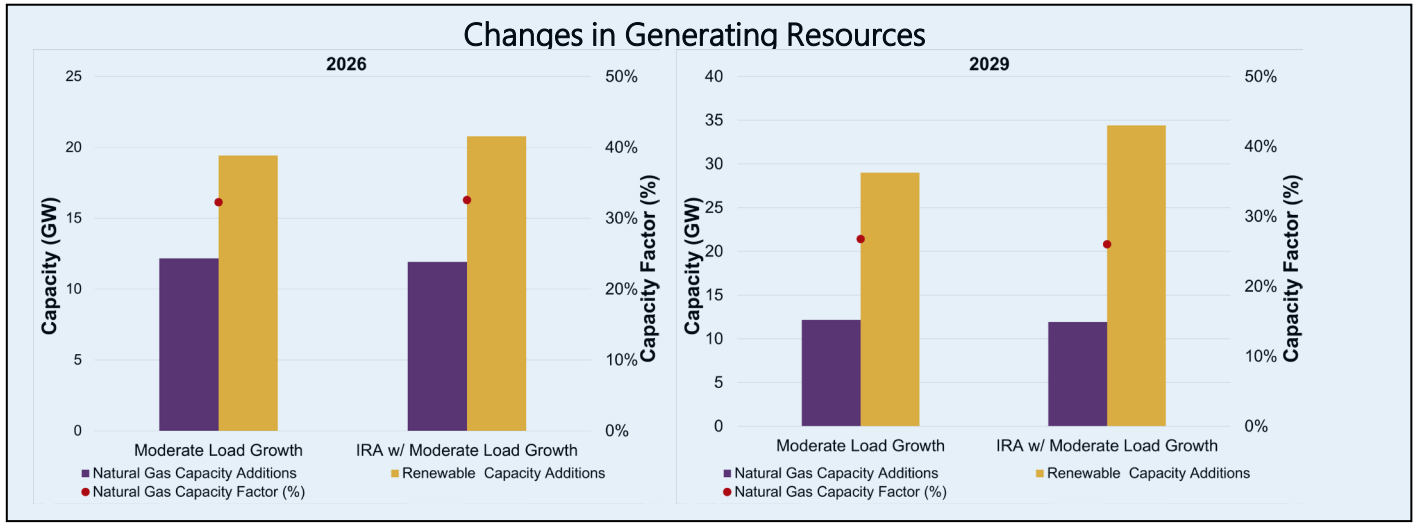
**Production Loss for Energy-Intensive Sectors:**
2026: 0.32%
2029: 0.38%

**Full-time Equivalent Job Losses:**
2026: 39,900
2029: 35,000

**GDP Loss:**
2026: $5.2 billion
2029: $2.9 billion

**Household Income Loss:**
2026: $250
2029: $340

**Agriculture Output Loss:**
2026: 0.25%
2029: 0.07%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Centennial State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 3.5% increase to householdsand 4.6% increase to businesses
- **Higher Electricity Prices:** 4.7% increase to households and 5.6% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - –$190 loss in household income
  - –$0.17 billion decrease in state GDP
  - –1,950 lost jobs

**Natural Gas Prices:**
2026: 1.0% (Res.), 1.3% (C&I)
2029: 3.4% (Res.), 4.5% (C&I)

**Electricity Prices:**
2026: 0.8% (Res.), 1.5% (C&I)
2029: 4.9% (Res.), 5.7% (C&I)

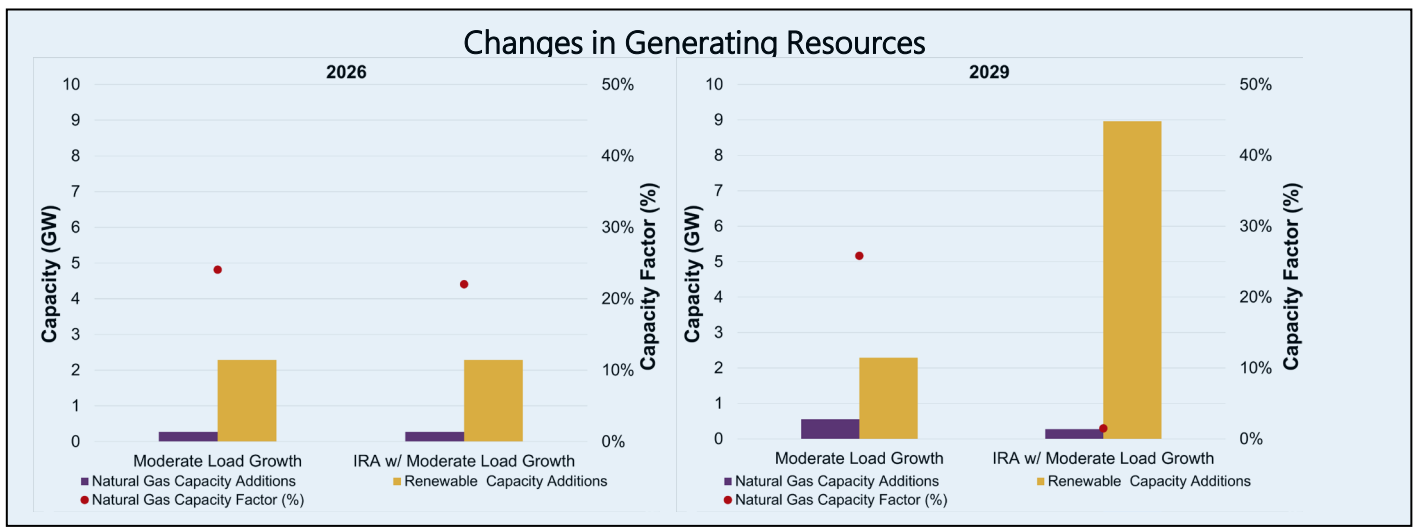
**Production Loss for Energy-Intensive Sectors:**
2026: 0.21%
2029: 1.32%

**Full-time Equivalent Job Losses:**
2026: 100
2029: 860

**GDP Loss:**
2026: $0.05 billion
2029: ~0 billion

**Household Income Loss:**
2026: $240
2029: $210

**Agriculture Output Loss:**
2026: 0.08%
2029: 0.27%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Hawkeye State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 3.7% increase to households and 5.4% increase to businesses
- **Higher Electricity Prices:** 5.3% increase to households and 6.3% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $370 loss in household income
  - $0.59 billion decrease in state GDP
  - 5,000 lost jobs

**Natural Gas Prices:**
2026: 1.3% (Res.), 2.0% (C&I)
2029: 3.7% (Res.), 5.5% (C&I)

**Electricity Prices:**
2026: 5.7% (Res.), 7.3% (C&I)
2029: 5.7% (Res.), 7.1% (C&I)

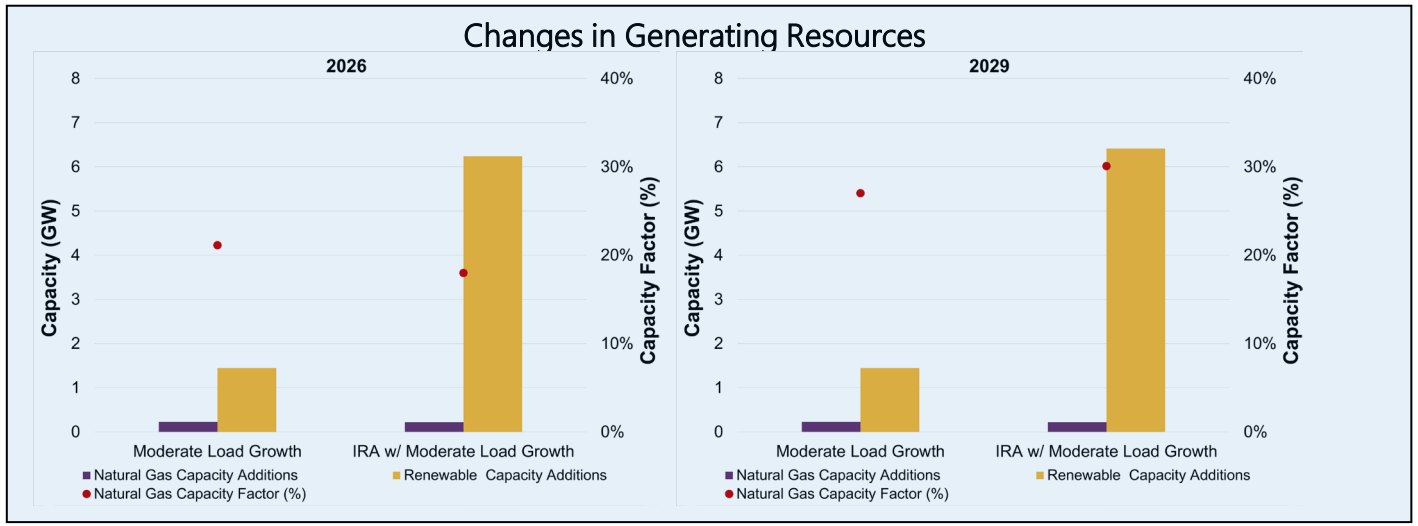
**Production Loss for Energy-Intensive Sectors:**
2026: 0.54%
2029: 0.77%

**Full-time Equivalent Job Losses:**
2026: 4,750
2029: 3,630

**GDP Loss:**
2026: $0.54 billion
2029: $0.44 billion

**Household Income Loss:**
2026: $270
2029: $320

**Agriculture Output Loss:**
2026: 0.28%
2029: ~0.00%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Sunflower State**

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## 2026-2032 Averages

- **Higher Natural Gas Prices:** 3% increase to households and 5.5% increase to businesses
- **Higher Electricity Prices:** 14.3% increase to households and 16.7% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $420 loss in household income
  - $0.60 billion decrease in state GDP
  - 5,250 lost jobs

**Natural Gas Prices:**
2026: 0.7% (Res.), 1.6% (C&I)
2029: 2.9% (Res.), 5.4% (C&I)

**GDP Loss:**
2026: $0.25 billion
2029: $0.86 billion

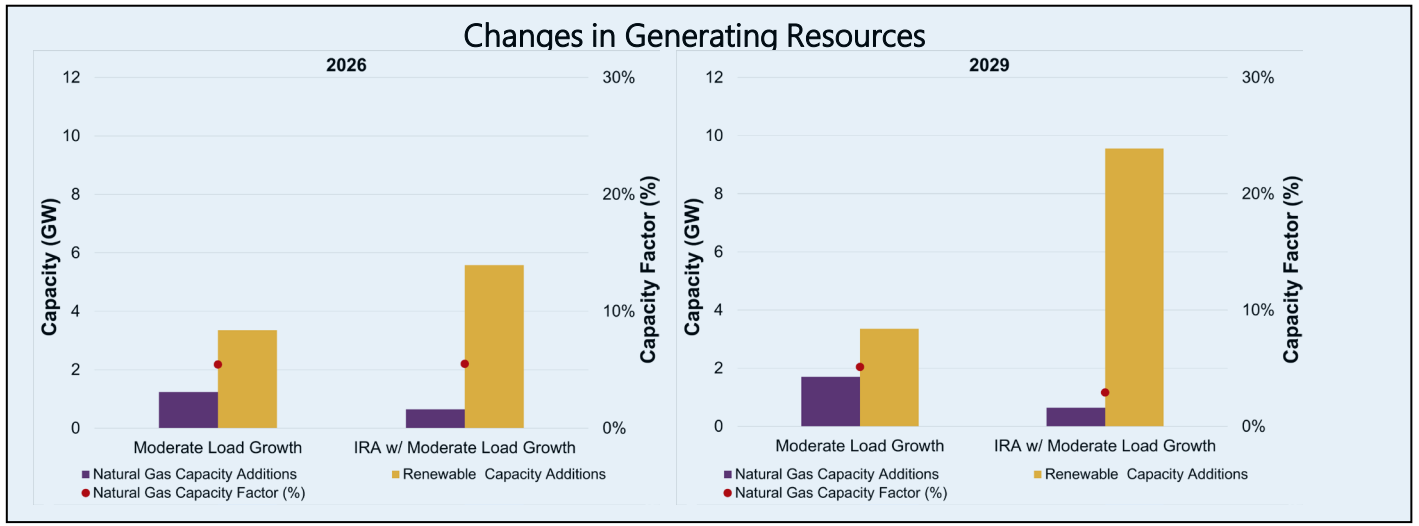
**Electricity Prices:**
2026: 13.1% (Res.), 15.2% (C&I)
2029: 15.4% (Res.), 18.2% (C&I)

**Household Income Loss:**
2026: $360
2029: $360

**Production Loss for Energy-Intensive Sectors:**
2026: 0.22%
2029: 0.97%

**Agriculture Output Loss:**
2026: -1.44%
2029: 1.06%

**Full-time Equivalent Job Losses:**
2026: 1,990
2029: 8,670



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Pine Tree State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 3.7% increase to households and 5.4% increase to businesses
- **Higher Electricity Prices:** 20% increase to households and 19.3% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $110 loss in household income
  - $0.06 billion decrease in state GDP
  - 750 lost jobs

**Natural Gas Prices:**
2026: 0.8% (Res.), 1.2% (C&I)
2029: 2.0% (Res.), 3.2% (C&I)

**Electricity Prices:**
2026: 18% (Res.), 16.8% (C&I)
2029: 19.5% (Res.), 18.4% (C&I)

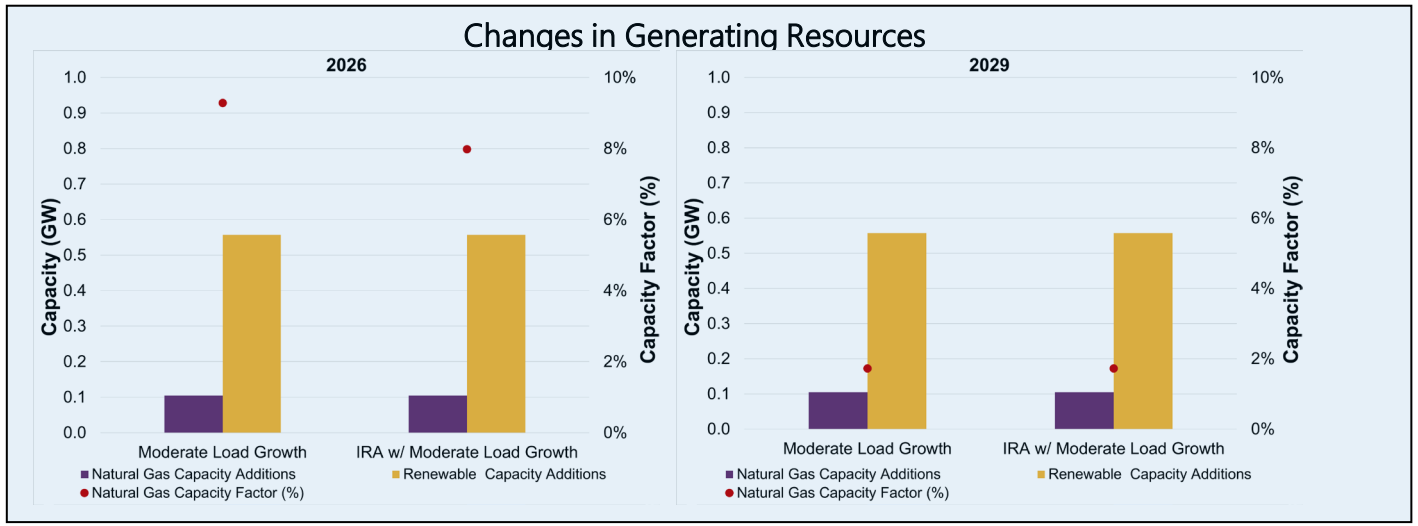
**Production Loss for Energy-Intensive Sectors:**
2026: 0.12%
2029: 0.16%

**Full-time Equivalent Job Losses:**
2026: 150
2029: 20

**GDP Loss:**
2026: $0.01 billion
2029: ~0 billion

**Household Income Loss:**
2026: $50
2029: $90

**Agriculture Output Loss:**
2026: ~0%
2029: ~0%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Tar Heel State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.5% increase to households and 4.4% increase to businesses
- **Higher Electricity Prices:** 13% increase to households and 20.3% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $240 loss in household income
  - $0.64 billion decrease in state GDP
  - 2,790 lost jobs

**Natural Gas Prices:**
2026: 0.9% (Res.), 1.6% (C&I)
2029: 2.5% (Res.), 4.5% (C&I)

**GDP Loss:**
2026: $0.56 billion
2029: $0.70 billion

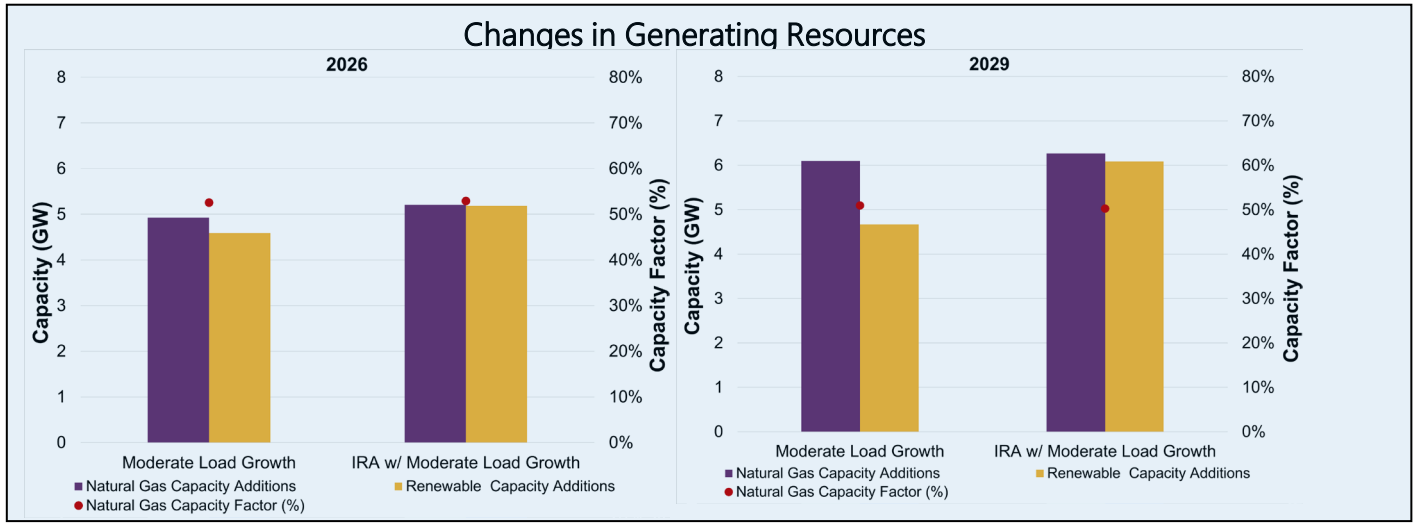
**Electricity Prices:**
2026: 13.9% (Res.), 21.7% (C&I)
2029: 14.0% (Res.), 21.7% (C&I)

**Household Income Loss:**
2026: $170
2029: $190

**Production Loss for Energy-Intensive Sectors:**
2026: ~0%
2029: 0.16%

**Agriculture Output Loss:**
2026: ~0%
2029: 0.17%

**Full-time Equivalent Job Losses:**
2026: 2,580
2029: 4,920



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Cornhusker State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 3.4% increase to households and 5.3% increase to businesses
- **Higher Electricity Prices:** 15.5% increase to households and 18.1% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $374 loss in household income
  - $0.43 billion decrease in state GDP
  - 4,180 lost jobs

**Natural Gas Prices:**
2026: 0.9% (Res.), 1.6% (C&I)
2029: 3.2% (Res.), 5.1% (C&I)

**Electricity Prices:**
2026: 12.7% (Res.), 15.7% (C&I)
2029: 16.8% (Res.), 19.2% (C&I)

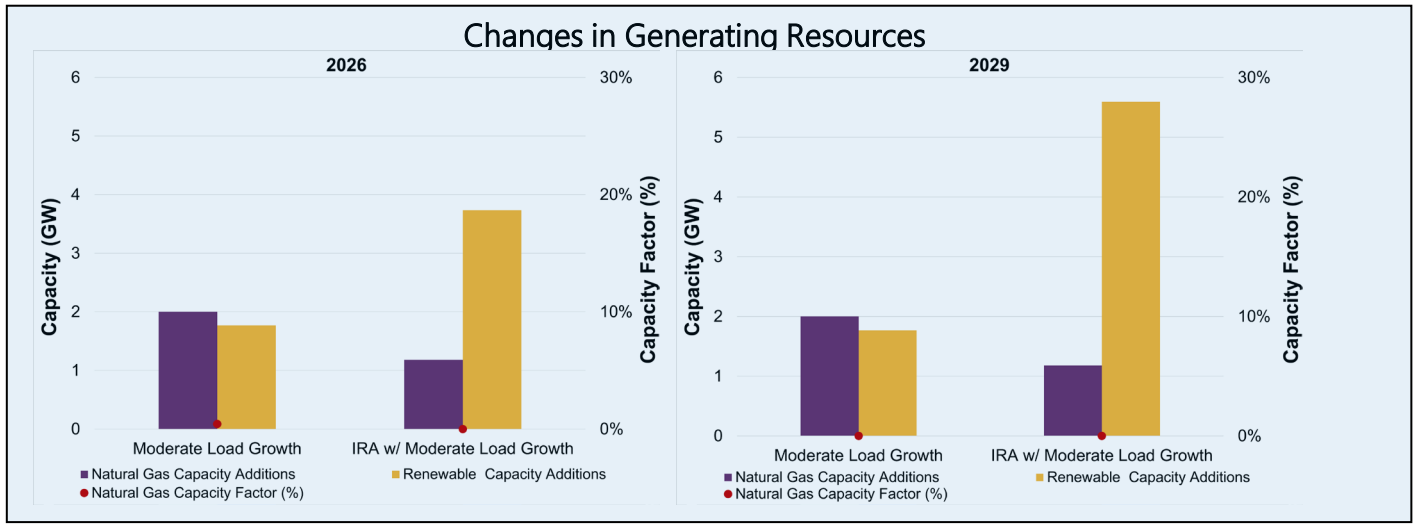
**Production Loss for Energy-Intensive Sectors:**
2026: 0.41%
2029: 1.85%

**Full-time Equivalent Job Losses:**
2026: 280
2029: 7,260

**GDP Loss:**
2026: $0.10 billion
2029: $0.66 billion

**Household Income Loss:**
2026: $350
2029: $290

**Agriculture Output Loss:**
2026: -1.41%
2029: 1.19%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Silver State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 3% increase to households and 4.4% increase to businesses
- **Higher Electricity Prices:** 7.3% increase to households and 10.1% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $270 loss in household income
  - $0.32 billion decrease in state GDP
  - 2,090 lost jobs

**Natural Gas Prices:**
2026: 0.9% (Res.), 1.3% (C&I)
2029: 2.9% (Res.), 4.2% (C&I)

**Electricity Prices:**
2026: 4.5% (Res.), 7.1% (C&I)
2029: 7.1% (Res.), 10.0% (C&I)

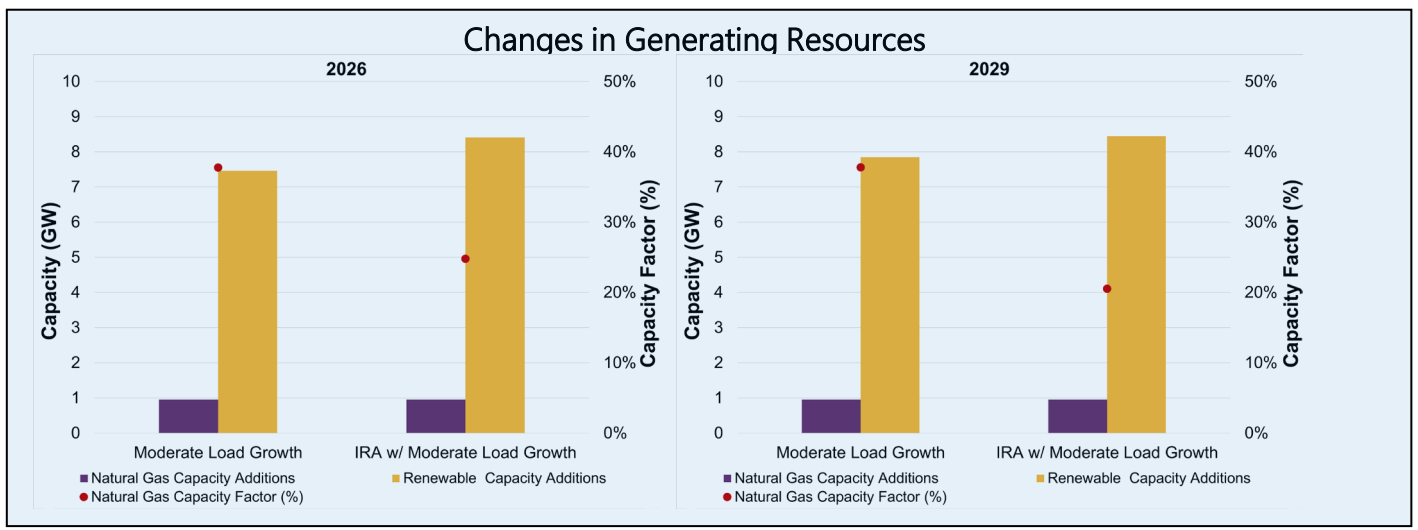
**Production Loss for Energy-Intensive Sectors:**
2026: ~0.00%
2029: 2.04%

**Full-time Equivalent Job Losses:**
2026: 1,030
2029: 2,870

**GDP Loss:**
2026: $0.13 billion
2029: $0.33 billion

**Household Income Loss:**
2026: $250
2029: $240

**Agriculture Output Loss:**
2026: ~0.00%
2029: 0.52%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Granite State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2% increase to households and 2.9% increase to businesses
- **Higher Electricity Prices:** 3.5% increase to households and 3.6% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $250 loss in household income
  - $0.16 billion decrease in state GDP
  - 1,980 lost jobs

**Natural Gas Prices:**
2026: 0.7% (Res.), 1.0% (C&I)
2029: 2.0% (Res.), 2.9% (C&I)

**GDP Loss:**
2026: $0.17 billion
2029: $0.14 billion

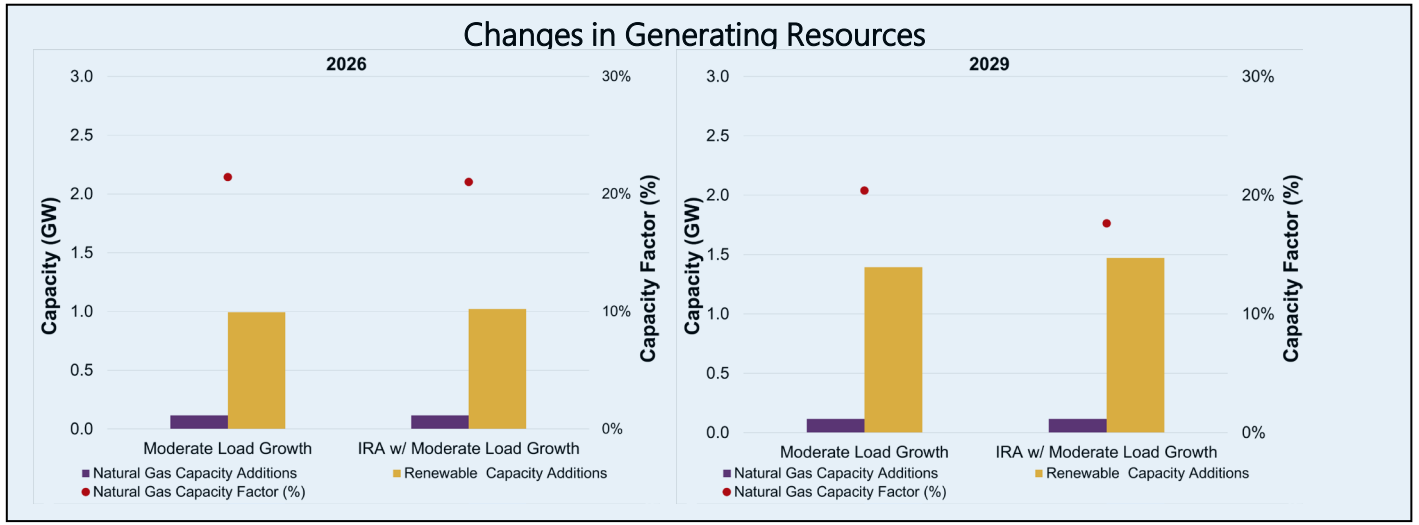
**Electricity Prices:**
2026: 2.2% (Res.), 2.3% (C&I)
2029: 3.2% (Res.), 2.9% (C&I)

**Household Income Loss:**
2026: $160
2029: $200

**Production Loss for Energy-Intensive Sectors:**
2026: 0.28%
2029: 0.42%

**Agriculture Output Loss:**
2026: 2.16%
2029: 3.62%

**Full-time Equivalent Job Losses:**
2026: 1,860
2029: 2,030



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Garden State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.9% increase to households and 3.3% increase to businesses
- **Higher Electricity Prices:** 13.3% increase to households and 18.1% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $1,040 loss in household income
  - $3.24 billion decrease in state GDP
  - 22,180 lost jobs

**Natural Gas Prices:**
2026: 0.7% (Res.), 0.8% (C&I)
2029: 2.8% (Res.), 3.2% (C&I)

**Electricity Prices:**
2026: 13.6% (Res.), 18.3% (C&I)
2029: 12.1% (Res.), 16.4% (C&I)

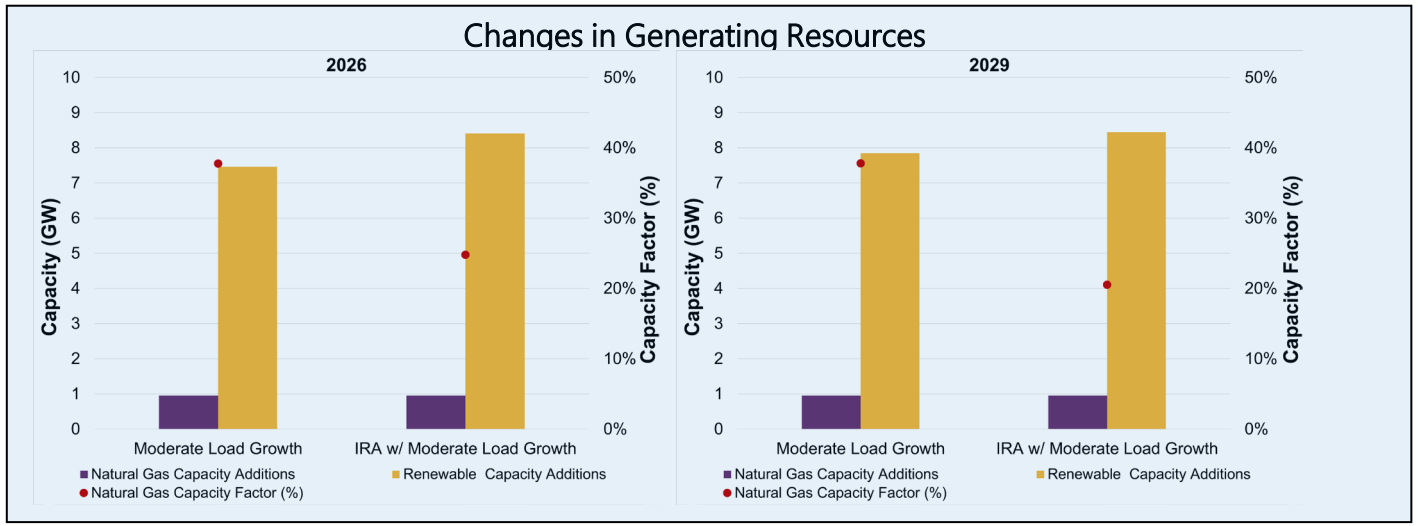
**Production Loss for Energy-Intensive Sectors:**
2026: 0.39%
2029: -0.68%

**Full-time Equivalent Job Losses:**
2026: 32,800
2029: 11,780

**GDP Loss:**
2026: $4.29 billion
2029: $1.86 billion

**Household Income Loss:**
2026: $870
2029: $1,080

**Agriculture Output Loss:**
2026: 4.23%
2029: 1.39%




# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Empire State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.3% increase to households and 3.8% increase to businesses
- **Higher Electricity Prices:** 6.5% increase to households and 7.9% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - –$650 loss in household income
  - –$3.45 billion decrease in state GDP
  - –20,300 lost jobs

**Natural Gas Prices:**
2026: 0.6% (Res.), 1.1% (C&I)
2029: 2.2% (Res.), 3.7% (C&I)

**GDP Loss:**
2026: $3.4 billion
2029: $2.67 billion

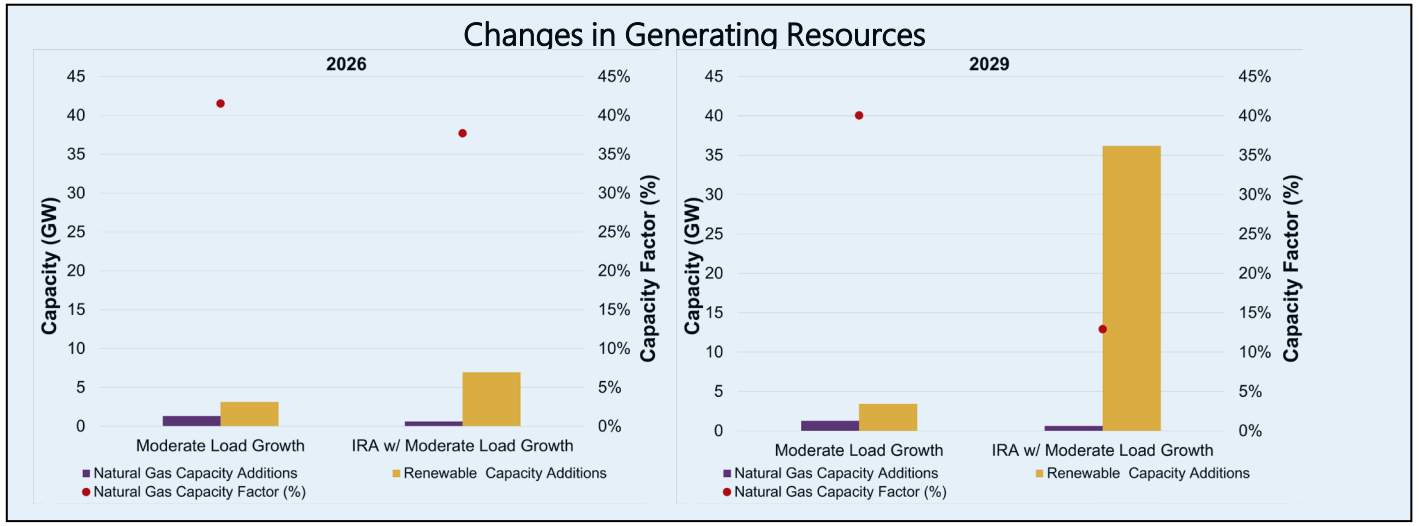
**Electricity Prices:**
2026: 2.5% (Res.), 3.1% (C&I)
2029: 8.3% (Res.), 10.2% (C&I)

**Household Income Loss:**
2026: $540
2029: $630

**Production Loss for Energy-Intensive Sectors:**
2026: 0.02%
2029: 0.11%

**Agriculture Output Loss:**
2026: 0.67%
2029: 1.76%

**Full-time Equivalent Job Losses:**
2026: 16,180
2029: 17,020



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Buckeye State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 3.1% increase to households and 4.5% increase to businesses
- **Higher Electricity Prices:** 6.3% increase to households and 9.5% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $80 loss in household income
  - $1.83 billion decrease in state GDP
  - 5,890 lost jobs

**Natural Gas Prices:**
2026: 0.9% (Res.), 1.3% (C&I)
2029: 3.0% (Res.), 4.4% (C&I)

**GDP Loss:**
2026: $1.7 billion
2029: $1.35 billion

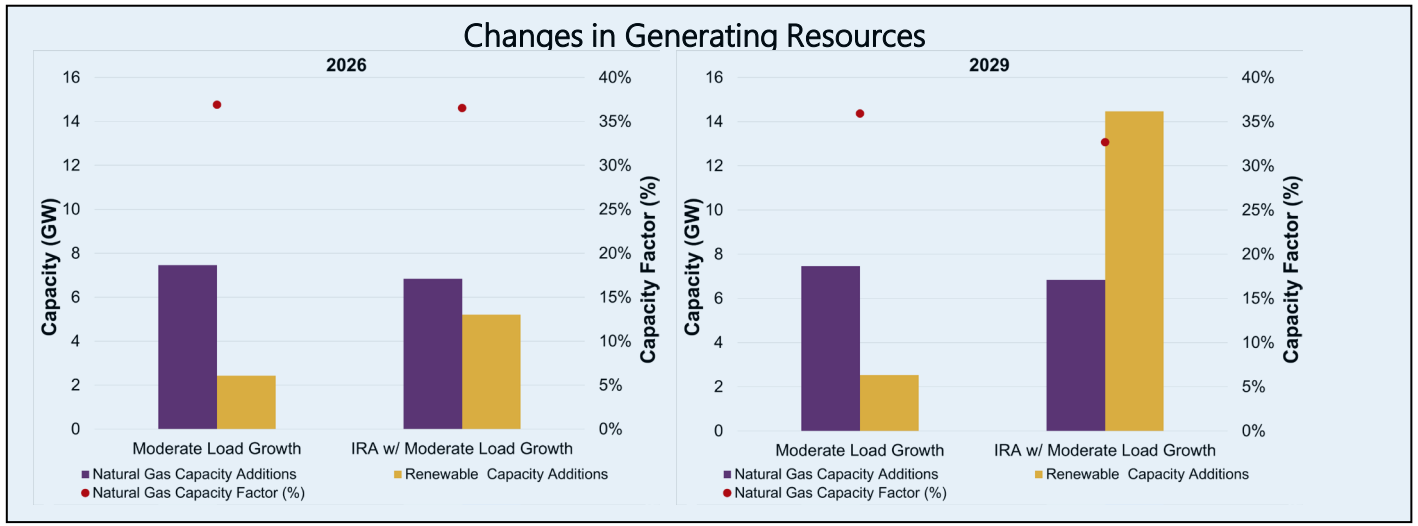
**Electricity Prices:**
2026: 4.7% (Res.), 8.1% (C&I)
2029: 6.6% (Res.), 9.4% (C&I)

**Household Income Loss:**
2026: $90
2029: $70

**Production Loss for Energy-Intensive Sectors:**
2026: 0.25%
2029: 0.47%

**Agriculture Output Loss:**
2026: 0.22%
2029: 1.07%

**Full-time Equivalent Job Losses:**
2026: 4,210
2029: 5,650



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Beaver State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 3.2% increase to households and 5.1% increase to businesses
- **Higher Electricity Prices:** 4% increase to households and 5.2% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $230 loss in household income
  - $0.25 billion decrease in state GDP
  - 1,910 lost jobs

**Natural Gas Prices:**
2026: 1.2% (Res.), 2.0% (C&I)
2029: 3.1% (Res.), 5.1% (C&I)

**Electricity Prices:**
2026: 1.3% (Res.), 2.5% (C&I)
2029: 4.4% (Res.), 5.6% (C&I)

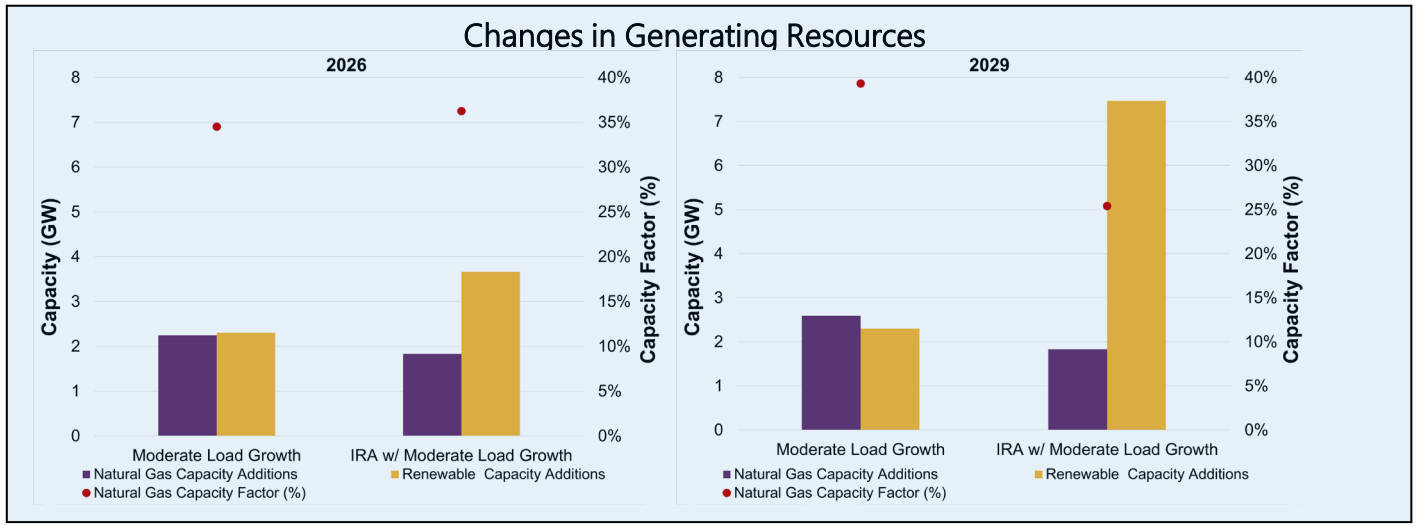
**Production Loss for Energy-Intensive Sectors:**
2026: ~0%
2029: 0.37%

**Full-time Equivalent Job Losses:**
2026: 2,130
2029: 3,180

**GDP Loss:**
2026: $0.01 billion
2029: $0.30 billion

**Household Income Loss:**
2026: $170
2029: $170

**Agriculture Output Loss:**
2026: -0.27%
2029: 0.05%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Keystone State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.6% increase to households and 3.3% increase to businesses
- **Higher Electricity Prices:** 6.3% increase to households and 10% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $30 loss in household income
  - $0.74 billion decrease in state GDP
  - 6,680 lost jobs

**Natural Gas Prices:**
2026: 0.7% (Res.), 0.9% (C&I)
2029: 2.4% (Res.), 3.1% (C&I)

**GDP Loss:**
2026: $0.62 billion
2029: $0.36 billion

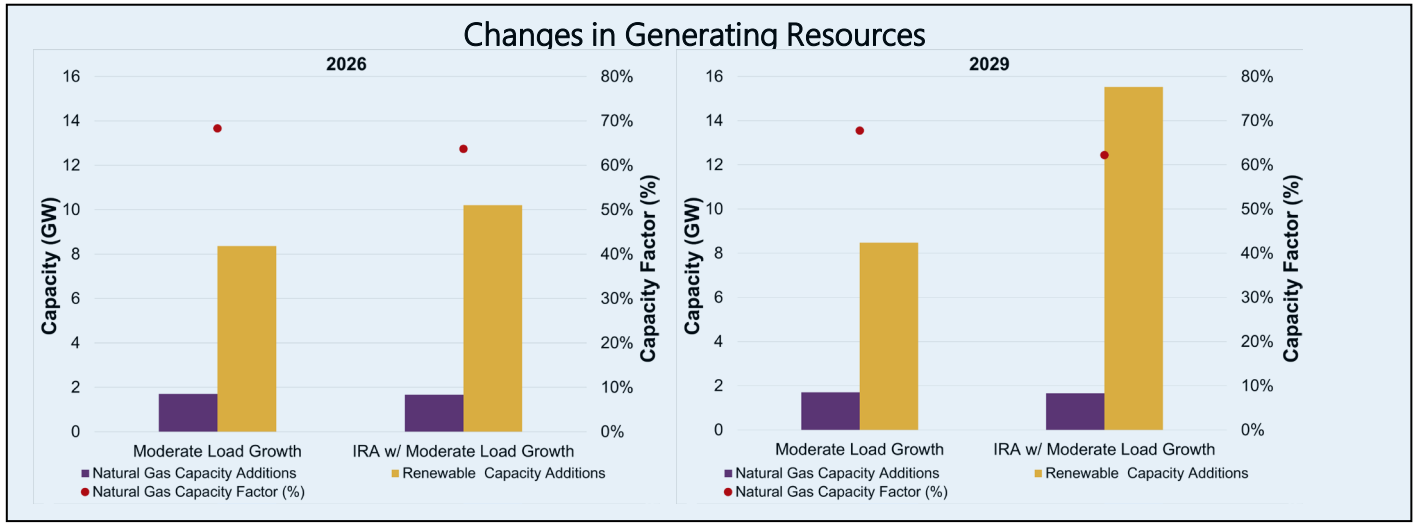
**Electricity Prices:**
2026: 3.8% (Res.), 6.3% (C&I)
2029: 6.6% (Res.), 10.9% (C&I)

**Household Income Loss:**
2026: $120
2029: $70

**Production Loss for Energy-Intensive Sectors:**
2026: 0.65%
2029: 0.46%

**Agriculture Output Loss:**
2026: 3.95%
2029: 4.47%

**Full-time Equivalent Job Losses:**
2026: 16,380
2029: 3,610



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Ocean State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.1% increase to households and 2.8% increase to businesses
- **Higher Electricity Prices:** 8% increase to households and 10.4% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $430 loss in household income
  - $0.21 billion decrease in state GDP
  - 1,860 lost jobs

**Natural Gas Prices:**
2026: 0.7% (Res.), 0.9% (C&I)
2029: 2.0% (Res.), 2.8% (C&I)

**Electricity Prices:**
2026: 7.2% (Res.), 9.5% (C&I)
2029: 9.4% (Res.), 11.9% (C&I)

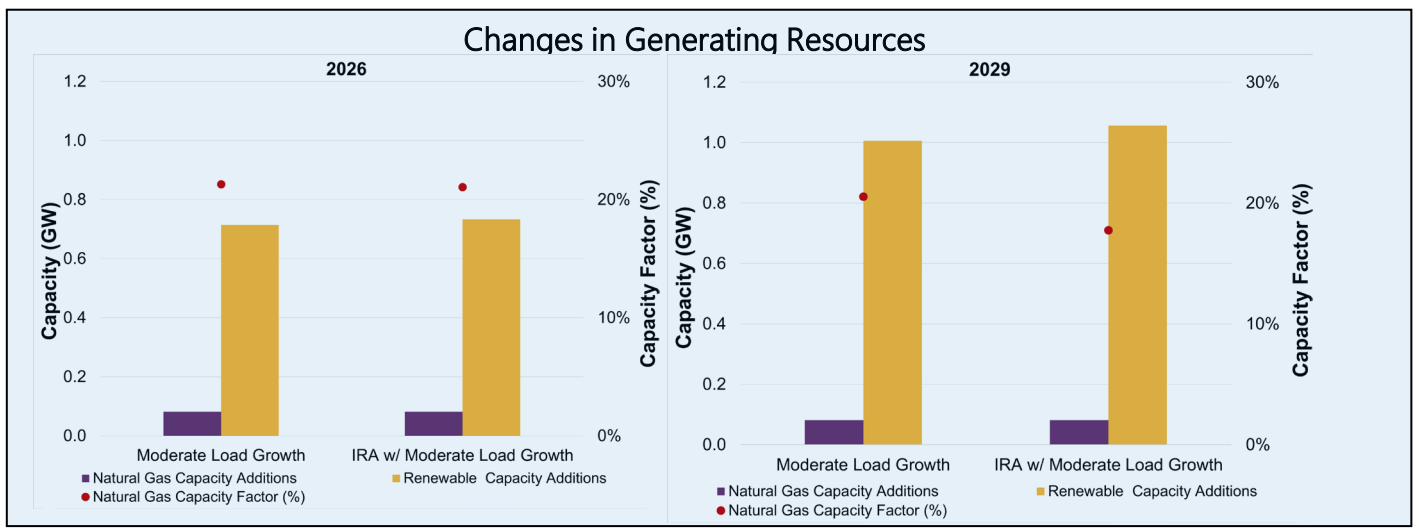
**Production Loss for Energy-Intensive Sectors:**
2026: 0.67%
2029: 0.31%

**Full-time Equivalent Job Losses:**
2026: 2,980
2029: 540

**GDP Loss:**
2026: $0.31 billion
2029: $0.07 billion

**Household Income Loss:**
2026: $270
2029: $448

**Agriculture Output Loss:**
2026: 2.98%
2029: 2.0%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Palmetto State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.4% increase to households and 5.2% increase to businesses
- **Higher Electricity Prices:** 11.5% increase to households and 17.1% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $370 loss in household income
  - $0.62 billion decrease in state GDP
  - 4,860 lost jobs

**Natural Gas Prices:**
2026: 0.8% (Res.), 1.9% (C&I)
2029: 2.5% (Res.), 5.4% (C&I)

**Electricity Prices:**
2026: 11.8% (Res.), 17.9% (C&I)
2029: 11.2% (Res.), 17.5% (C&I)

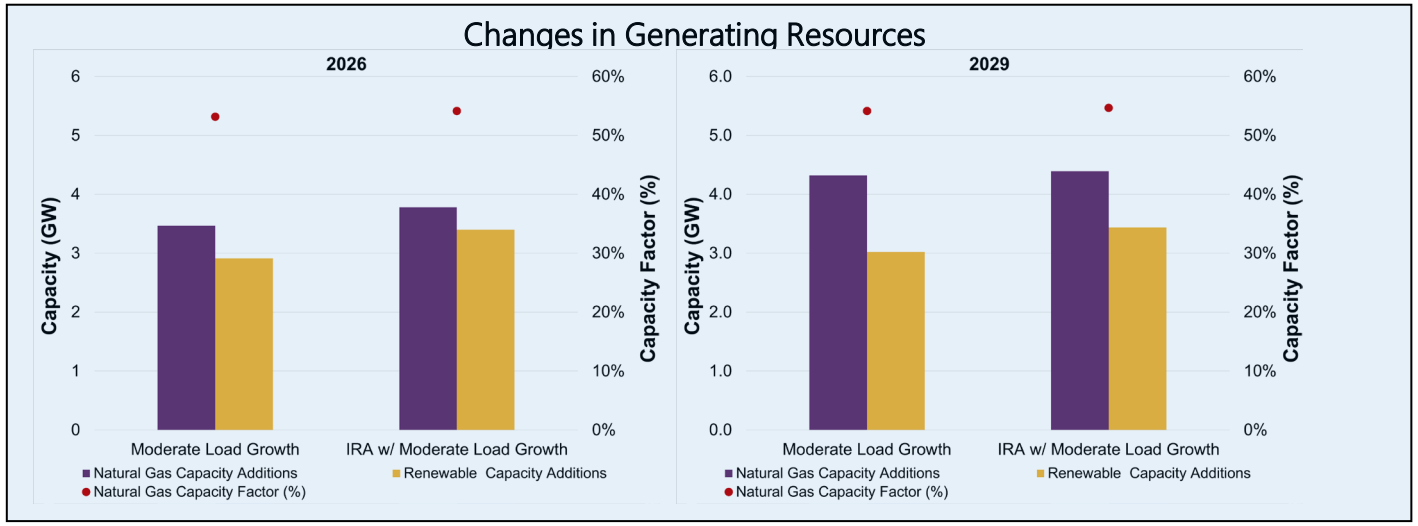
**Production Loss for Energy-Intensive Sectors:**
2026: 0.14%
2029: 0.14%

**Full-time Equivalent Job Losses:**
2026: 5,040
2029: 1,910

**GDP Loss:**
2026: $0.59 billion
2029: $0.42 billion

**Household Income Loss:**
2026: $280
2029: $330

**Agriculture Output Loss:**
2026: 3.09%
2029: 0.56%



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Old Dominion State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.3% increase to households and 4.1% increase to businesses
- **Higher Electricity Prices:** 8% increase to households and 11.8% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $350 loss in household income
  - $1.34 billion decrease in state GDP
  - 4,280 lost jobs

**Natural Gas Prices:**
2026: 0.6% (Res.), 1.1% (C&I)
2029: 2.1% (Res.), 4.1% (C&I)

**GDP Loss:**
2026: $1.16 billion
2029: $1.03 billion

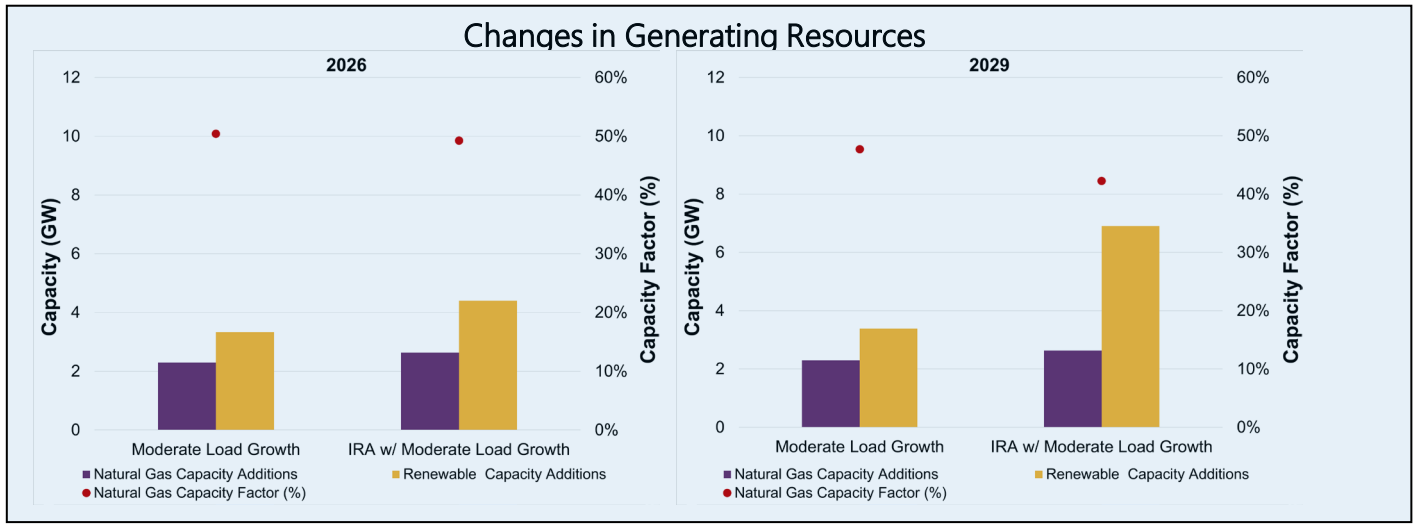
**Electricity Prices:**
2026: 5.8% (Res.), 9.2% (C&I)
2029: 8.7% (Res.), 12.7% (C&I)

**Household Income Loss:**
2026: $290
2029: $330

**Production Loss for Energy-Intensive Sectors:**
2026: 0.25%
2029: 0.51%

**Agriculture Output Loss:**
2026: 0.38%
2029: 1.01%

**Full-time Equivalent Job Losses:**
2026: 4,530
2029: 2,180



# Negative Impacts of Repealing Tech-Neutral Tax Credits in the **Green Mountain State**

## 2026-2032 Averages

- **Higher Natural Gas Prices:** 2.4% increase to households and 5.3% increase to businesses
- **Higher Electricity Prices:** 7.7% increase to households and 9.4% increase to businesses
- **Shrinking of Economy:** Higher natural gas and electricity prices result in:
  - $290 loss in household income
  - $0.08 billion decrease in state GDP
  - 820 lost jobs

**Natural Gas Prices:**
2026: 0.8% (Res.), 2.0% (C&I)
2029: 2.4% (Res.), 5.4% (C&I)

**Electricity Prices:**
2026: 6.0% (Res.), 7.6% (C&I)
2029: 8.7% (Res.), 10.4% (C&I)

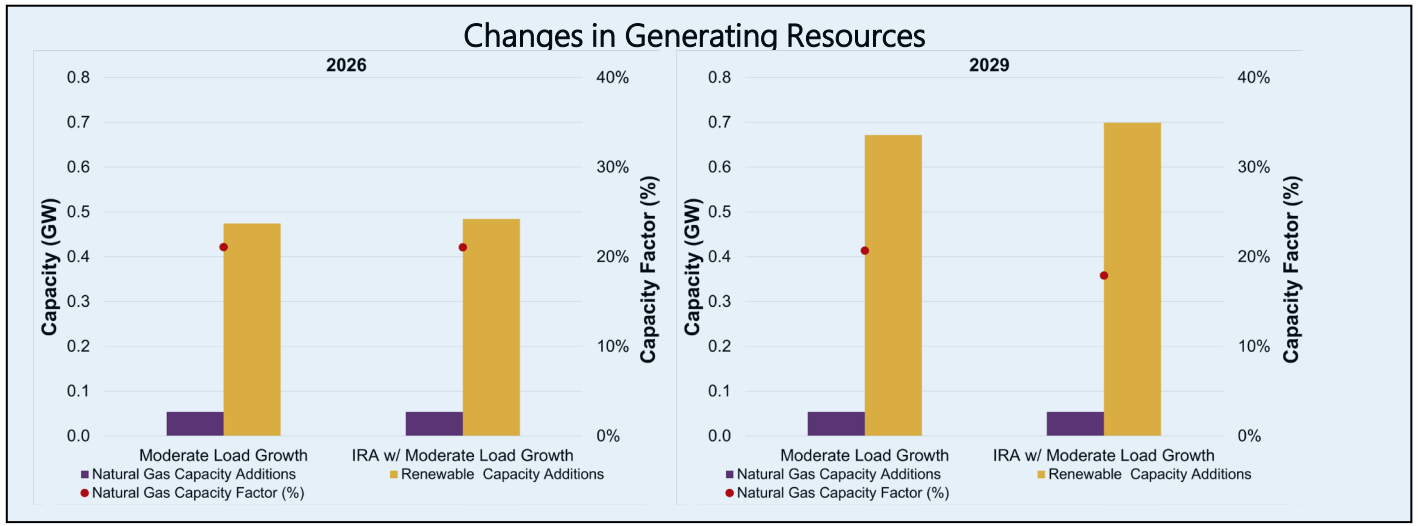
**Production Loss for Energy-Intensive Sectors:**
2026: 0.25%
2029: 0.35%

**Full-time Equivalent Job Losses:**
2026: 680
2029: 720

**GDP Loss:**
2026: $0.07 billion
2029: $0.07 billion

**Household Income Loss:**
2026: $210
2029: $250

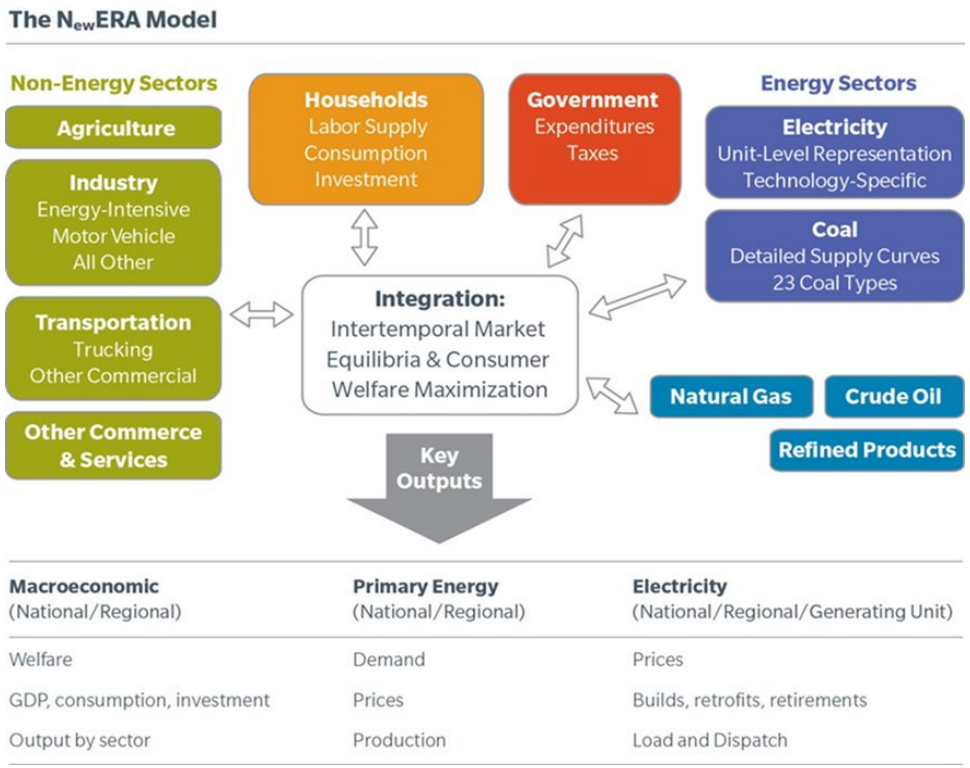
**Agriculture Output Loss:**
2026: 0.98%
2029: 1.37%



# Appendix:
# Additional Results
# About the $N_{ew}$ERA Model
# Technology-Neutral Tax Incentives

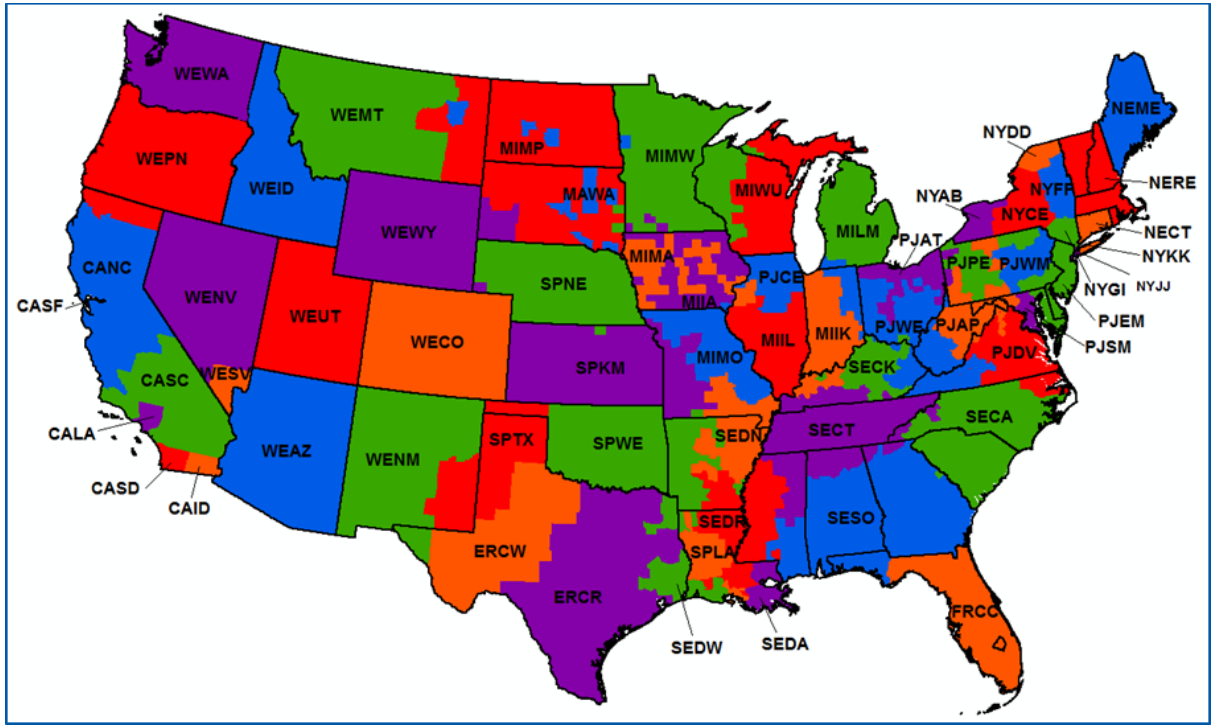
# NewERA Modeling Framework: Overview and Model Solution

- Energy-economy modeling framework that integrates a bottom-up representation of the U.S. electricity sector with a top-down dynamic CGE model.
- The CGE model simulates all key economic interactions in the U.S. economy, including those among industries, households, and the government.
- In the model, industries and households maximize profits and utility, respectively, with foresight about future economic conditions.
- The model is based on the circular flow of goods, services, and payments in the economy and is based around the decisions of a representative household that characterizes the economic behavior of an average consumer.
  - Households provide labor and capital to businesses, taxes to the government, and savings to the financial markets, while also consuming goods and services and receiving government subsidies.
- The economic sectors in the model, in aggregate, account for all the production and commercial activities of the economy.
  - Each economic sector uses labor, capital, energy resources, other sector's outputs, and imported inputs to produce their own specific category of goods or services.
- The model also incorporates the government which collects revenues from taxes imposed on labor and capital which are are used to pay for government services
- The model solves for equilibrium such that demand for goods and services equals their supply, and investments are optimized for the long term.



# NewERA Electricity Sector Model: Overview and Model Solution

- Bottom-up dispatch and capacity expansion model
  - Unit-level information on generating units in 63 U.S. regions
  - Detailed coal supply curves by coal type
  - Regional electricity demand and capacity requirements
- Least-cost projection of market activity
  - Satisfies demand and all other constraints over model time horizon
  - Projects unit-level generation and investment decisions and regional fuel and electricity prices
- Data sources
  - Model calibrated to U.S. Energy Information Administration's *AEO 2023*
  - Other electricity sector data from EIA, EPA, NERC, and LBNL.
- Required to meet many electricity market and regulatory constraints
  - Regional demand, reserve capacity requirements, fuel availability, forced retrofits, RPS or emissions regulations
  - Flexible to a variety of user-specified constraints, from unit-specific actions to market-wide regulations
- Finds the least-cost way to satisfy all constraints
  - Uses perfect foresight of market conditions
  - Chooses investments and operation of units to minimize present value of costs over the entire model period



# State-Level Delivered Electricity Rate Model

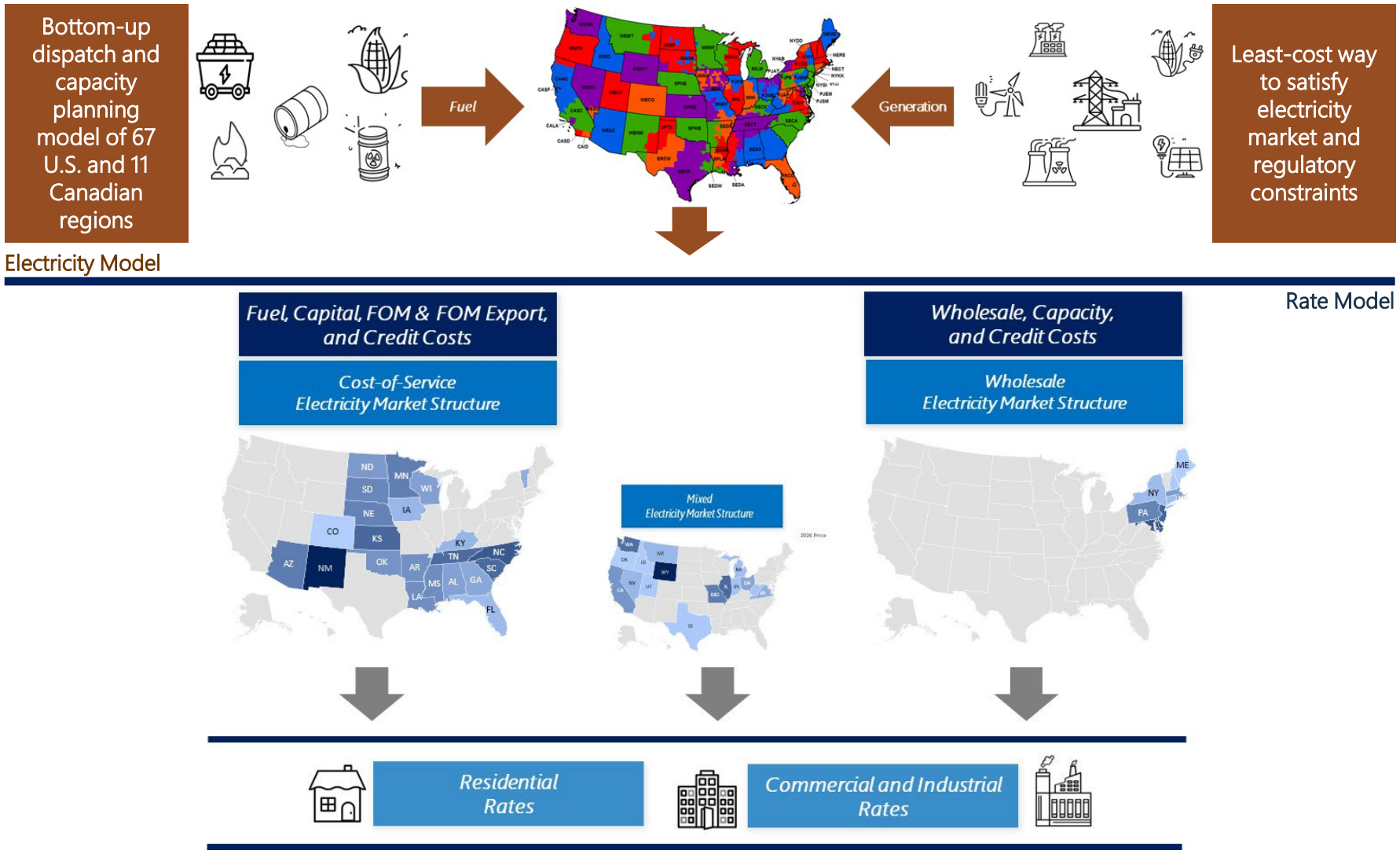
- NERA's rate model uses regional model outputs from its electricity model to calculate delivered electricity sector prices.
- The regional model outputs are aggregated to the state level using a mapping of the model's regions to individual states.
- The inputs to the rate model includes wholesale, capacity and renewable energy credit (REC) prices, cost of service and electricity sales.
- The delivered electricity prices are calculated in the rate model based on the electricity market structure applicable in each state
  - In a **competitive** market, electricity prices are set through an auction process where power generators submit bids for the price, they are willing to sell electricity, and the price is set by the last generator needed to met demand at a given time
    - The delivered electricity price is based on the wholesale energy, capacity and renewable energy credit (REC) costs plus a T&D margin
      - **Wholesale** energy costs represent the costs of operating the marginal electricity generator in the electricity market region
      - **Capacity** costs represent the costs associated with ensuring enough generating capacity is available to meet both the expected peak demand plus an additional reserve margin in the electricity market region
      - **Credit** costs represent the cost of procuring RECs to meet the RPS requirements of the state(s) that are in the electricity market region

# State-Level Delivered Electricity Rate Model (2)

- In a **cost-of-service (COS)** market, electricity prices are set based on the total costs to serve load
  - The delivered electricity price is based on the cost of service (operating and investment costs of the generating resources in the market region) plus a T&D margin. The cost-of-service components include the fuel costs, capital costs, fixed and variable operating and maintenance (O&M) costs, net exports and credit costs.
    - **Fuel** costs represent the delivered fuel costs for the generating resources in the electricity market region
    - **Capital** costs represent the costs to build new generating resources in the electricity market region
    - **FOM+VOM** costs represent the sum of the fixed and non-fuel variable O&M for the generating resources in the electricity market region
    - **Export** costs represent the net costs of exporting power from the electricity market region. The costs to serve load is lower with higher electricity exports as the revenue earned from exports can be used to offset fixed operating costs in the electricity market region
    - **Credit** costs represent the cost of procuring RECs to meet the RPS requirements of the state(s) that are in the electricity market region

- The T&D margin is estimated as the difference between the historical actual 2023 delivered price and the wholesale price in 2023 projected by its electricity model. The T&D margin for each ratepayer class is assumed to remain unchanged in outlooks with and without the technology-neutral tax incentives.
- For each state, the delivered price for each state (and for each future model year) is calculated assuming that it is wholly competitive and wholly COS and then these prices are weighted by the competitive/COS shares for the state.
  - For example, if a state is 95% COS, the delivered price = 95%*COS delivered price + 5%*Competitive delivered price

# Rate Estimation Methodology Illustration



# Technology-Neutral Tax Incentives Modeled

## §45Y Production Tax Credit (PTC)

- **Base Credit:** 0.3 cents/kWh, adjusted annually for inflation.
- **Bonus Credit:** Increases to 1.5 cents/kWh if all projects meet prevailing wage and apprenticeship requirements.
- **Phaseout:** No phaseout is assumed after 2032.

## §48E Investment Tax Credit (ITC)

- **Base Credit:** 6%
- **Bonus Credit:** Increases to 30% if all renewable projects meet prevailing wage and apprenticeship (PWA) requirements.
- **Additional Credits:**
    - Onshore and offshore wind projects qualifies for a 10% additional credit by meeting domestic content requirements.

# Technology-Neutral Tax Incentives Modeled

| Energy Type | Incentive Type | Duration | Rate | Availability |
|---|---|---|---|---|
| Standalone Solar | Production Tax Credit (PTC) | First 10 years of operation | 1.5 cents/kWh | N/A |
| Solar with Storage | Production Tax Credit (PTC) | First 10 years of operation | 1.5 cents/kWh | N/A |
| Solar Thermal | Investment Tax Credit (ITC) | N/A | 30% | N/A |
| Onshore Wind | Production Tax Credit (PTC) | First 10 years of operation | 1.5 cents/kWh | N/A |
| Offshore Wind | Investment Tax Credit (ITC) | N/A | 40% (10% additional domestic content bonus) | N/A |
| Geothermal | Investment Tax Credit (ITC) | N/A | 30% | Starting in the 2025 online year |
| Biomass | Production Tax Credit (PTC) | First 10 years of operation | 1.5 cents/kWh | Starting in the 2025 online year |
| Hydroelectric | Investment Tax Credit (ITC) | N/A | 30% | Starting in the 2025 online year |
| Nuclear (Existing) | Production Tax Credit (PTC) | 2024 to 2032 | Base Value: 0.3 cents/kWh (increased to 1.5 cents/kWh with labor | N/A |
| Nuclear (New) | Production Tax Credit (PTC) | N/A | Base Value: 0.3 cents/kWh (increased to 1.5 cents/kWh with labor | No phaseout after 2032 |

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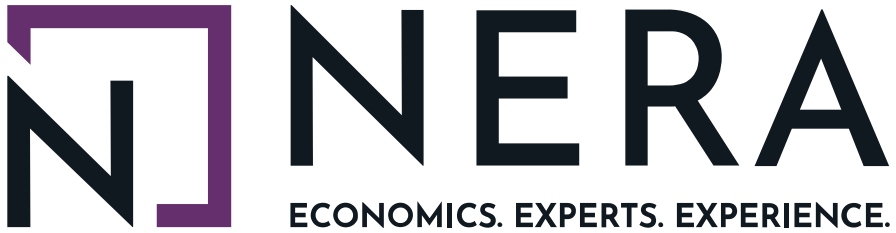
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