

NARUC  Winter  

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Policy Summit

# **Committee on Energy Resources and the Environment (ERE)**

**Business Meeting**

**11:15 am**

NARUC  Winter  
Policy Summit

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Introductions - Hon. Jehmal Hudson, Chair, Virginia State Corporation Commission

Presentation: Modeling the Impacts of EPA's Proposed Power Plant Rules Under Section 111(d) of the Clean Air Act

Moderator: Hon. Stacey Paradis, Illinois

Presenter: Amanda Levin, Director Policy Analysis, Natural Resources Defense Council

Mary Kilmarx Award Presentation - Hon. Charlotte Mitchell, North Carolina

Resolutions - Hon. Jehmal Hudson, Virginia

DOE's Resources and Assistance for State Energy Offices and Regulators (RASOR) - Lisa Schwartz, Lawrence Berkeley National Lab

Center for Partnerships in Innovation Update - Jeff Loiter, Center for Partnerships & Innovation, NARUC



# EPA's Proposed Carbon Pollution Standards

Modeling & Analysis of the Rules

February 2024


# EPA's Carbon Pollution Standards: Background

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- EPA proposed carbon pollution standards for certain fossil-fuel-fired power plants on May 2023 under Section 111 of the Clean Air Act.
- These standards cover existing coal-fired units, certain existing combined cycle gas-fired units, and new gas-fired units.
- The standards are based on “inside-the-fenceline” technologies, which serve as the basis for emission rate limits.
- EPA designed the standards using sub-categories. Large, long-lived, and/or baseload facilities face the most stringent standards; more infrequently run or shorter-lived facilities may be subject to less stringent emission rate limits.

# Assessing the Impacts of EPA's Proposed Standards

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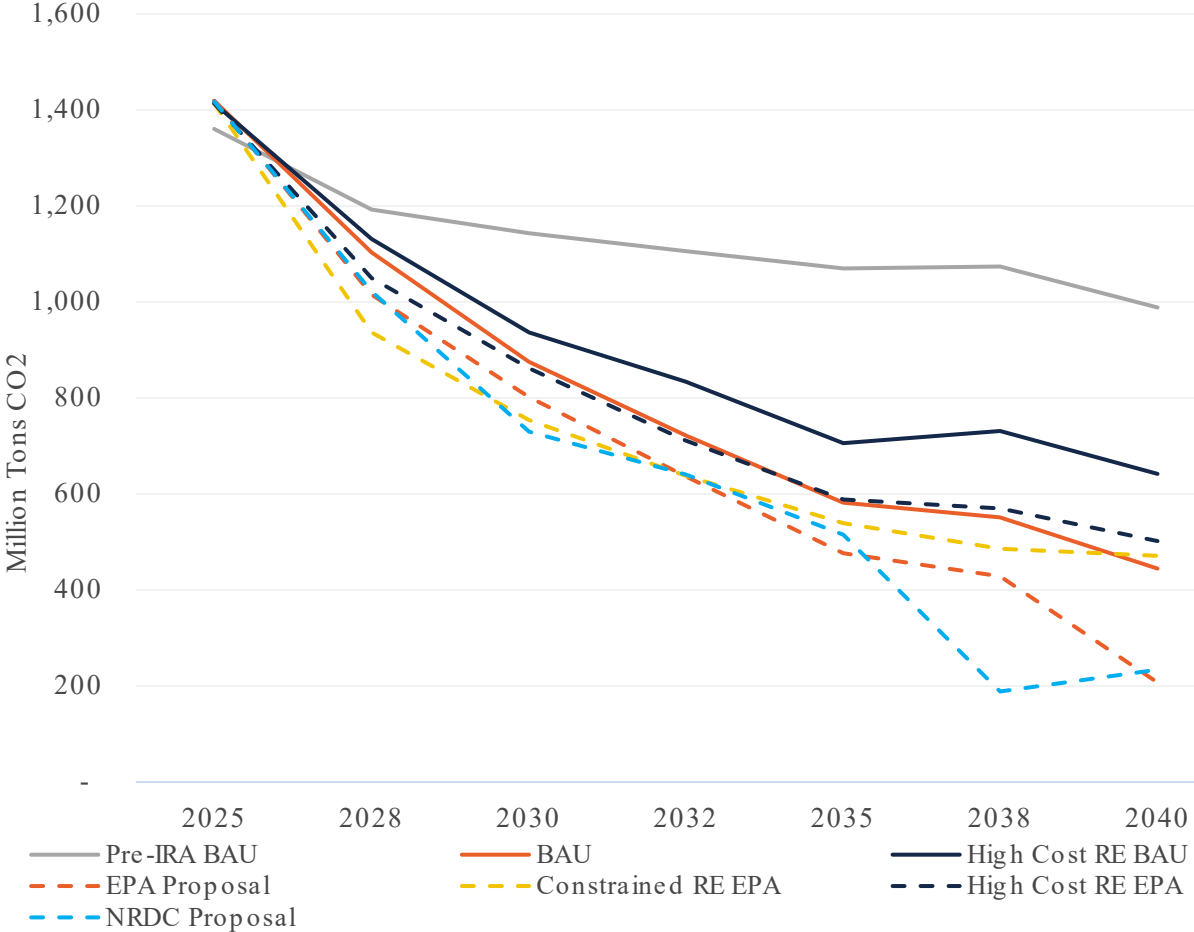
- Modeling of these 111(d) and (b) standards has been completed by EPA, the Electric Power Research Institute (EPRI), and NRDC.
  - Analyses have assessed the impact of these standards under reference assumptions, as well as sensitivity cases adjusting gas prices, technological deployment rates, future technology costs, and energy demand.
  - Generally, modeling shows that these rules have modest impacts on costs, emissions, and capacity and generation outcomes.
  - Modeling projects significant changes to the future power grid –with or without these standards.
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# Sample Modeling of EPA's Carbon Pollution Standards

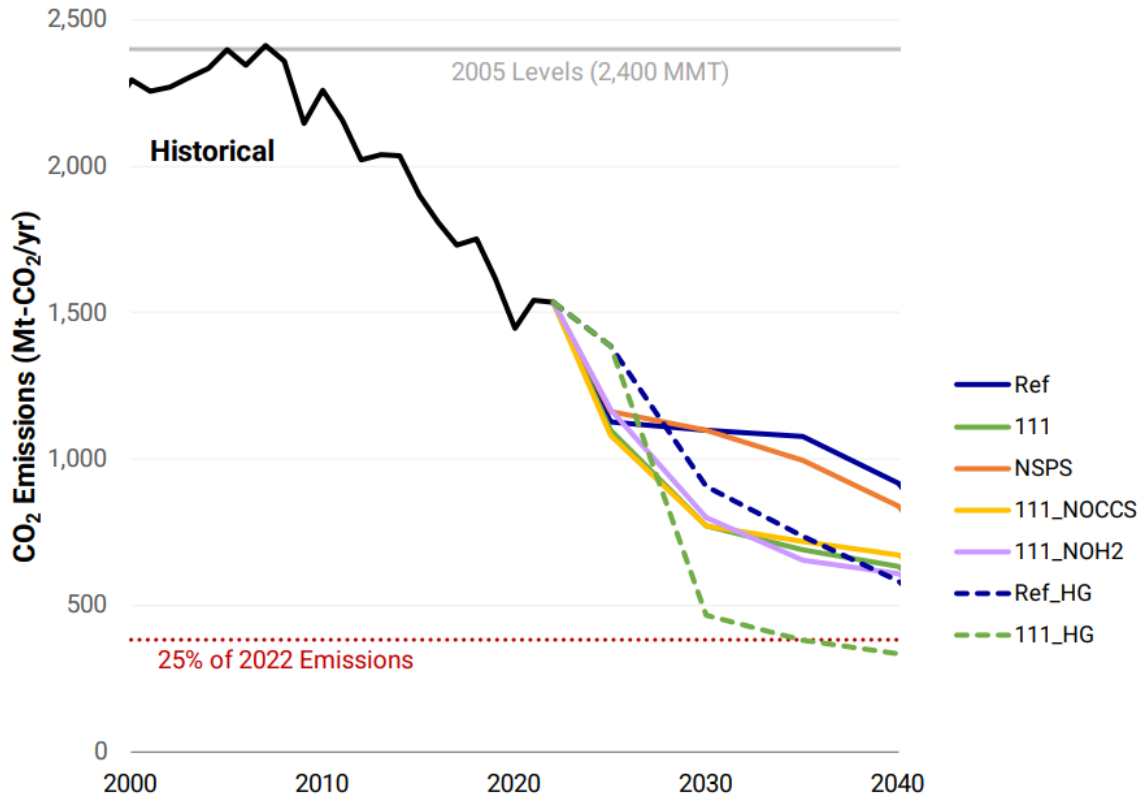
		EPA Modeling	NRDC Modeling	EPRI Modeling
EPA's May Proposal		☑	☑	☑
Design Sensitivities	No Existing Gas Standard	☑	☑	
	Strengthened 111(d) and (b)		☑	
	NSPS Only	☑		☑
Other Sensitivities	Higher Gas Prices	☑		☑
	Higher Energy Demand		☑	
	Higher RE Prices		☑	
	Constrained RE & Transmission Deployment		☑	
	Constrained CCS Deployment			☑
	Constrained H2 Deployment			☑

# Pollution Standards Ensure CO2 Reductions in the Long Term

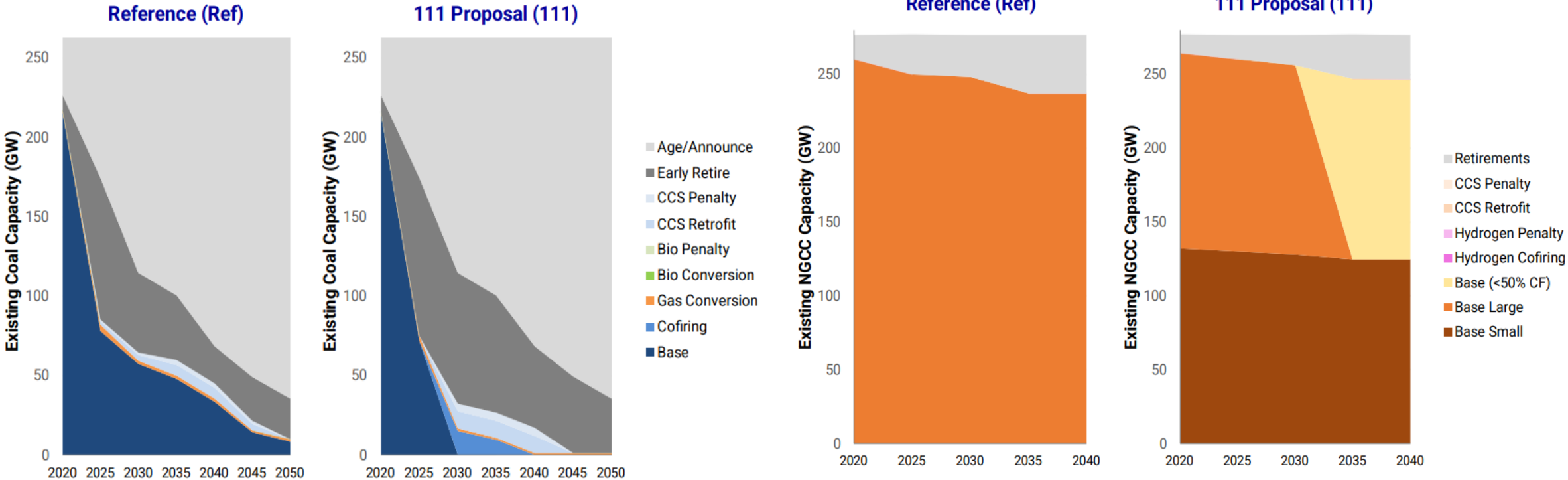
NRDC Modeling of Power Plant Standards



EPRI Modeling of Power Plant Standards



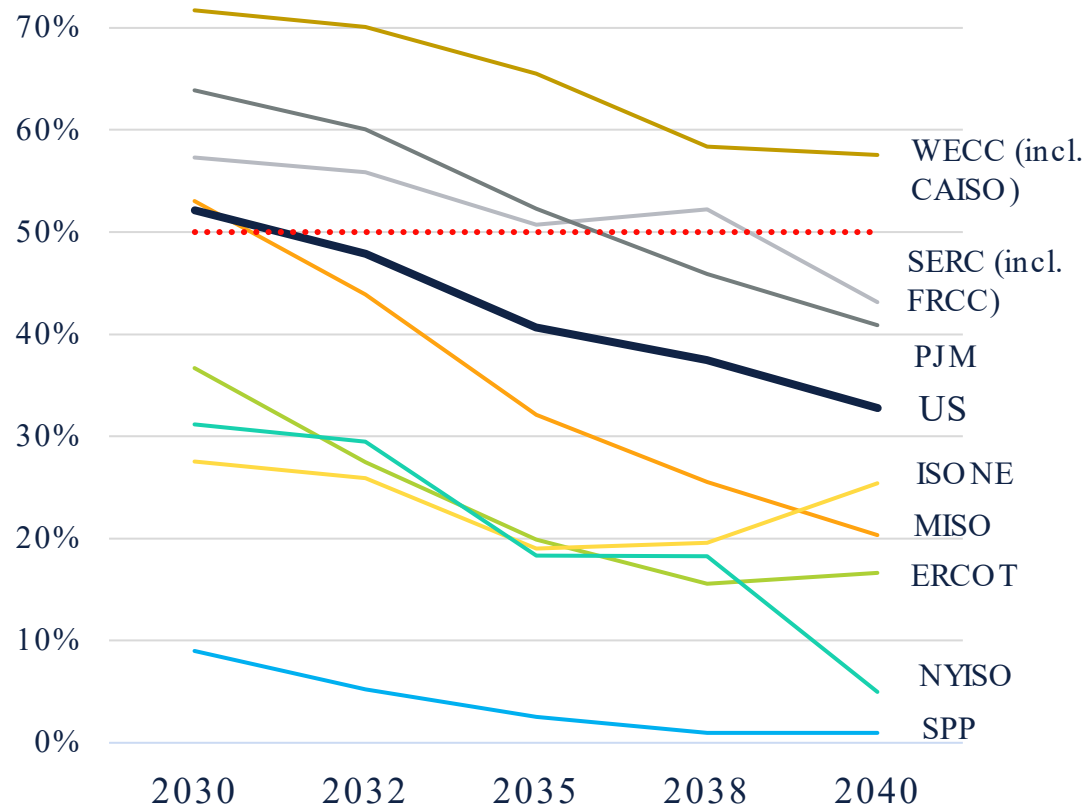
# The Standards May Impact Existing Units Differently Depending on Fuel



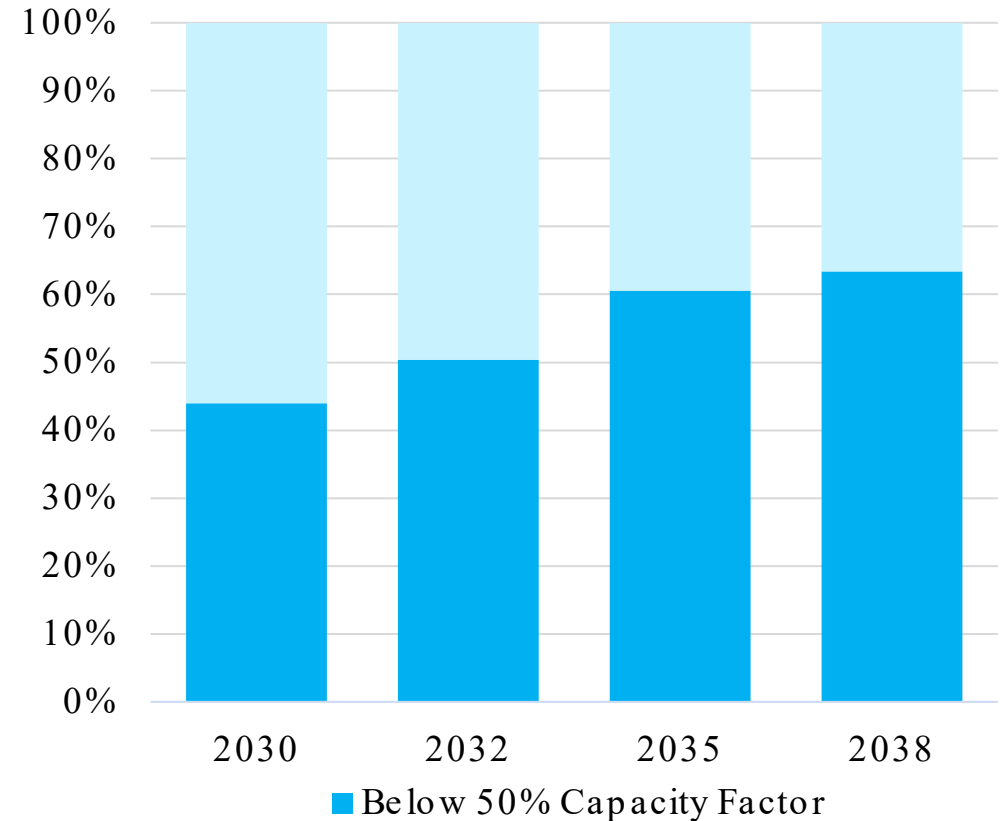
# The Proposal is Incremental

The power sector is expected to change significantly, irrespective of this rule.

Existing NCGG Capacity Factors under BAU

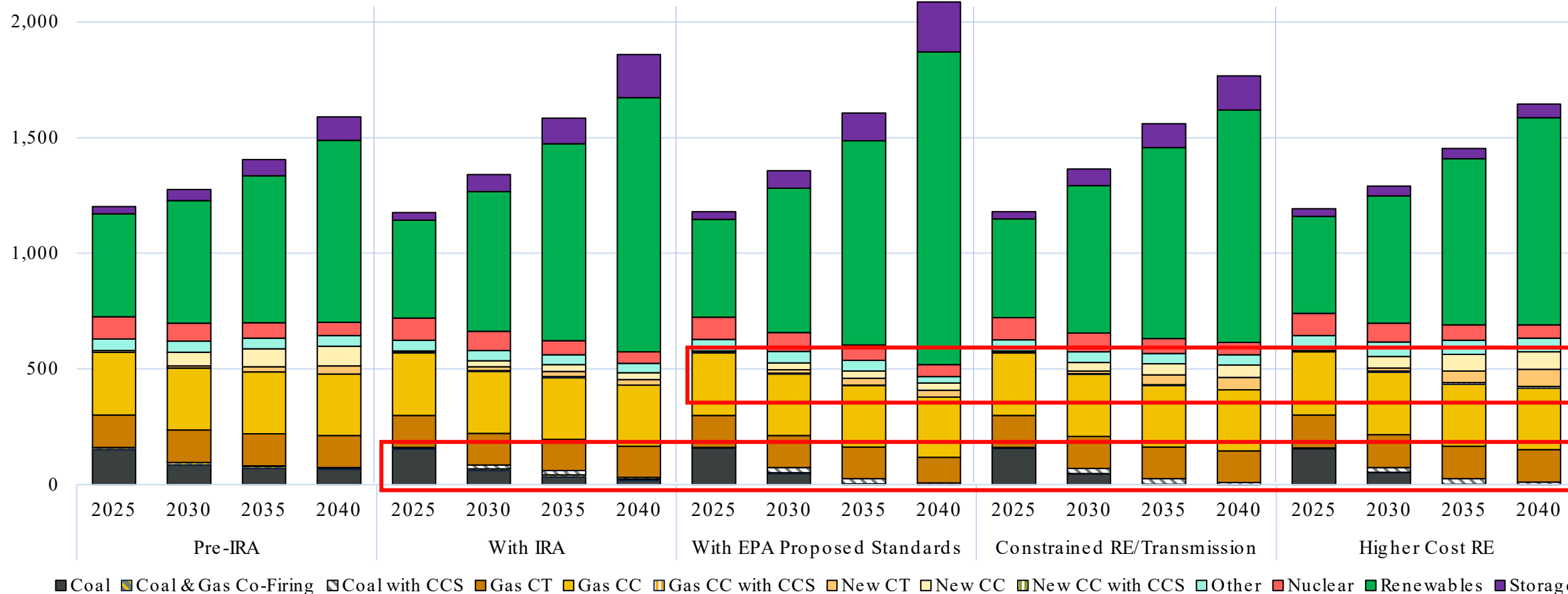


NGCC Capacity Operating <50% under BAU



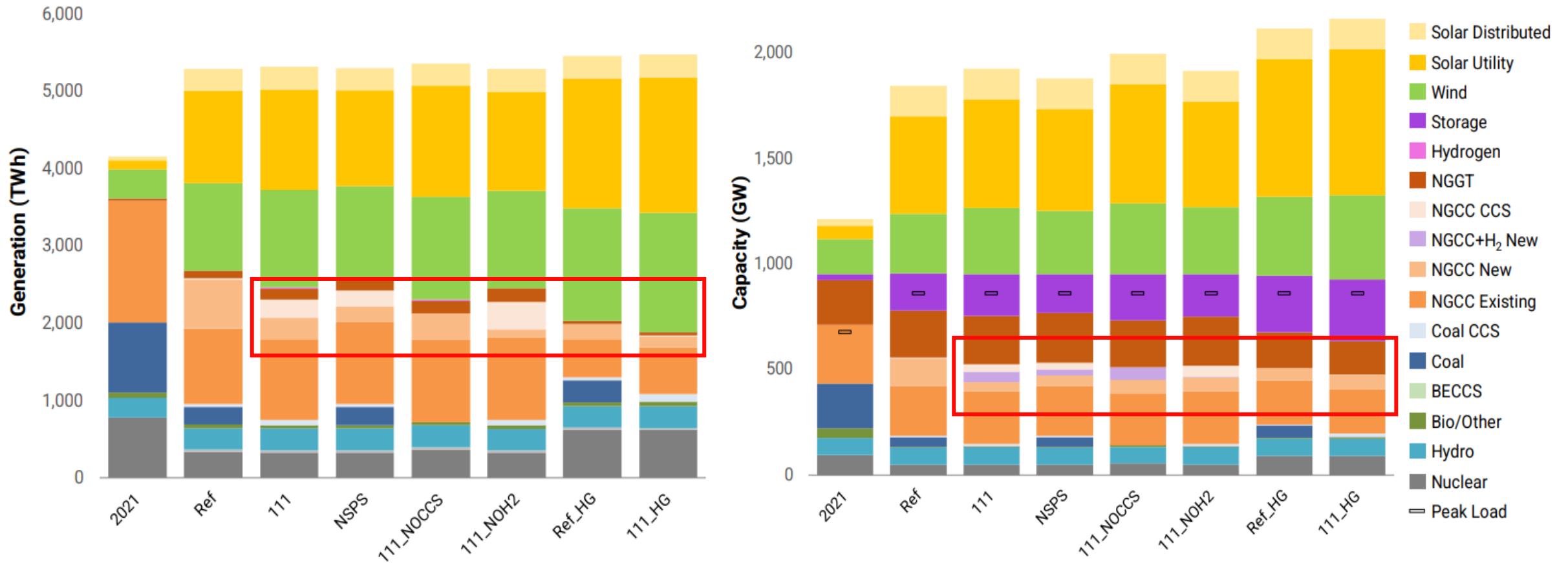
# Future Capacity Mix Will Depend on Available Technology

Capacity (GW) Across NRDC Modeling Scenarios



# Future Capacity Mix Will Depend on Available Technology

## Capacity and Generation Across EPRI's Modeling Scenarios in 2040



## Standards Projected to Have Modest to No Impact on Customers

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- EPA: Net power sector compliance costs of \$11 billion (NPV) through 2042, with annualized costs of \$840 million.
  - 2030 retail rate impacts from rule vary by region from -1% to 8% (average 2%)
  - 2035 retail rate impacts from rule vary by region from -1% to 4% (average 0%)
  - 2040 retail rate impacts from rule vary by region from -1% to 2% (average 0%)
- EPRI: Net costs are \$8 billion (NPV) through 2050.
  - Equal to an average abatement cost of \$10/ton CO<sub>2</sub> through 2050.
- NRDC: Net costs are negative \$3 billion through 2042, with a slightly positive NPV out through 2050. Annual cost impacts are generally minimal, but vary between positive and negative over the years.

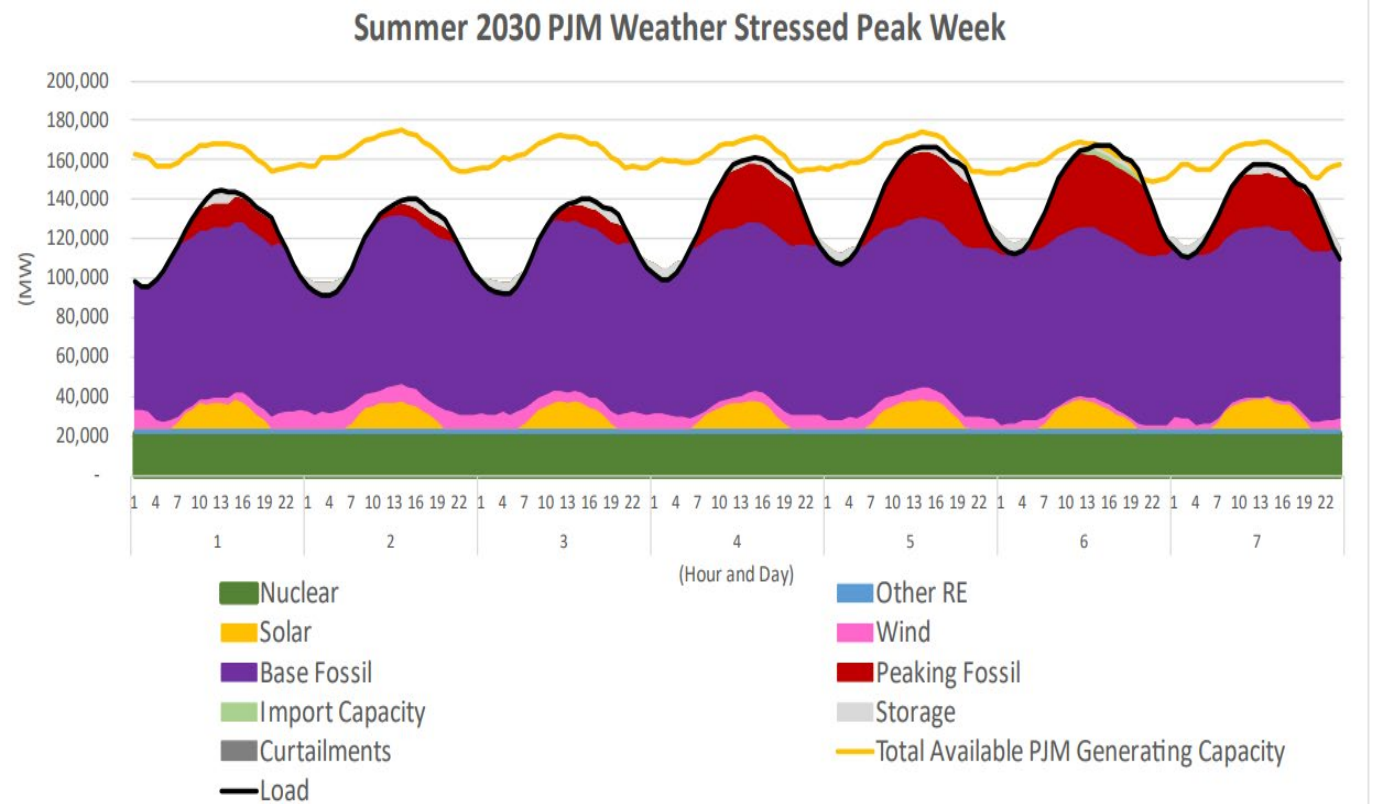
# The Proposal is Designed to Accommodate Reliability

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- Multiple sub-categories, with the most stringent standards only applied to long-lived coal plants and certain baseload gas units.
- Use of averaging.
- Long lead times.
- State plan flexibilities and variances for RULOF (Remaining Useful Life and Other Factors).
- Use of increments of progress and milestones.


# Case Study: Assessing Reliability Under Weather Stress in PJM

- Follow-up assessment by ICF based on IPM modeling of EPA proposal.
- Examined winter and summer peak weeks in 2030, 2035, and 2040.
- “Weather stress” scenario reflects simultaneous impact of a one-in-ten-year weather extreme on load and one-in-ten-year poor RE availability.
- PJM had sufficient capacity to meet demand in all hours.
- Only a small fraction (nine of >300 hours) would require PJM to rely on either imports or use DR resources.



# Grid Planners and Utilities have Tools and Authority To Address any Reliability Challenges

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- Modify capacity accreditation methodologies so grid operators can accurately measure reliability as the resource mix changes.
  - Undertake common-sense interconnection reform so new resources can get online quickly.
  - Bolster transmission planning and prioritize interregional transmission.
  - Explore tools to deploy advanced transmission technologies.
  - Ensure all resources that can provide energy and ancillary services can participate and be compensated for these services.
  - Work to increase participation of demand response and battery storage resources.
  - Develop hybrid resource market participation models.
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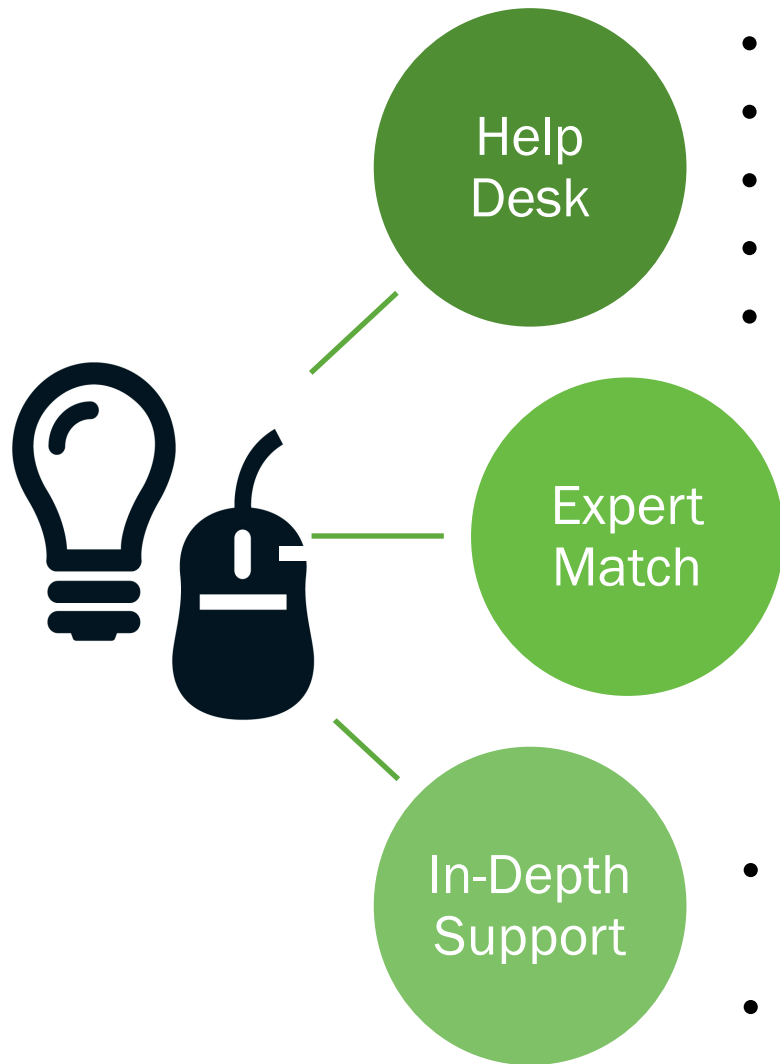
# **2023 Mary Kilmarx Award Presentation**

Hon. Charlotte Mitchell - Chair, North Carolina Utilities  
Commission; Vice-chair, Committee on Energy Resources and  
the Environment

# **DOE's Resources and Assistance for State Energy Offices and Regulators (RASOR)**

Lisa Schwartz, Lawrence Berkeley National Lab

# Multi-Modal TA Opportunities



- Online intake form w/ rolling screening
  - Connect to PM\* within 2 business day to clarify request
  - Connect to an SME\*\* within 5 business days
  - SME provides up to 4 person-hours of support
  - Intake form and support available starting **March 2024**
- Online intake form w/ rolling review
  - Connect to PM within 2 business day to clarify request
  - Connect to an SME within 5 business days
  - SME provides up to 80 person-hours of support
  - Intake form available **March 2024** with TA starting in **April**
- Detailed application form w/ planned 9-month work cycle by Labs & DOE, with limited opportunity for mid-cycle review
  - Team of SMEs provide 80+ person-hours of support
  - Detailed application due **June 2024** with TA starting in **August**

# **NARUC Center for Partnerships & Innovation Update**

Jeff Loiter, CPI Technical Director

**Committee Meetings will resume  
at 1:45 p.m.**

**Check App for sessions and room  
names**

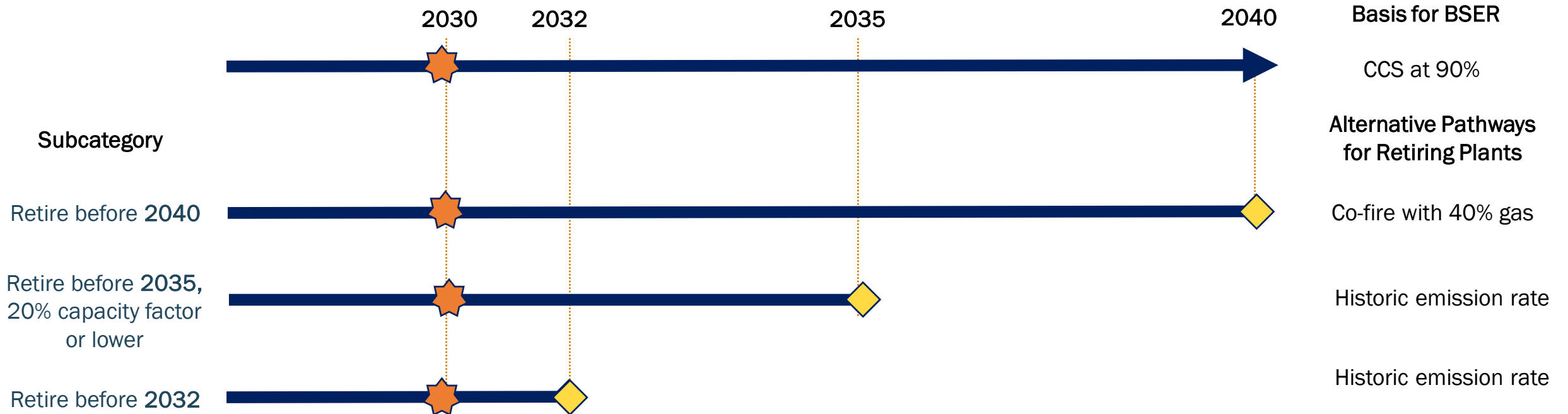
# Appendix Slides

# EPA's Proposal: Existing Coal

**Highlights:** BSER based on CCS, plus three alternative pathways for retiring plants




## Key

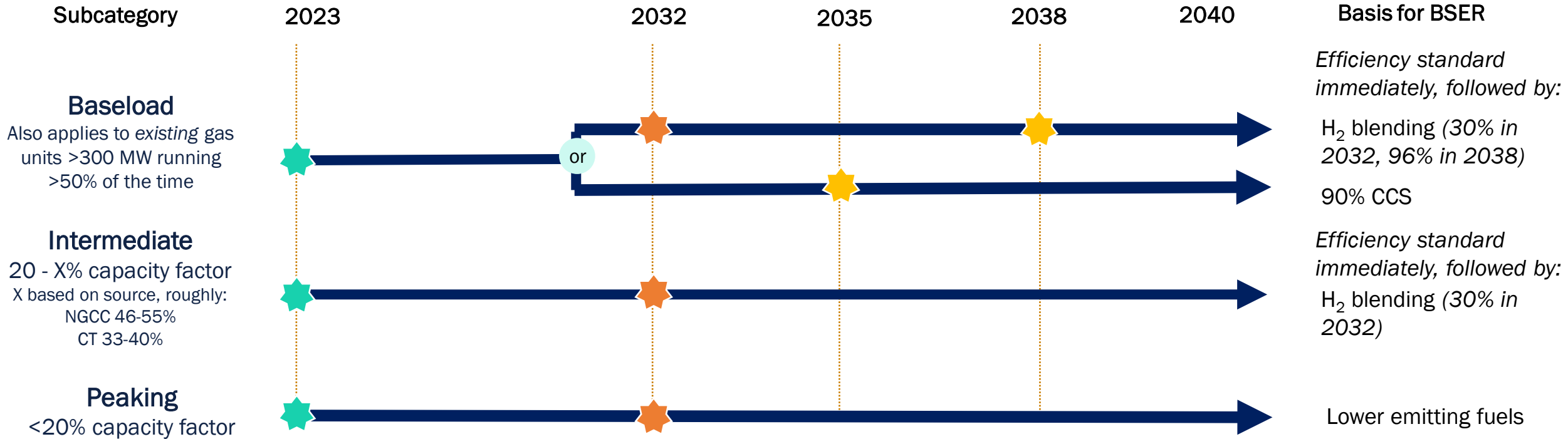
- ◆ Latest retirement date
- ★ Proposed compliance deadline



# EPA's Proposal: Existing & New Gas

**Highlights:** three subcategories, based on operation profile (capacity factor)

**Key**  
   Proposed compliance deadline



# EPA's Carbon Pollution Standards: The Climate Case

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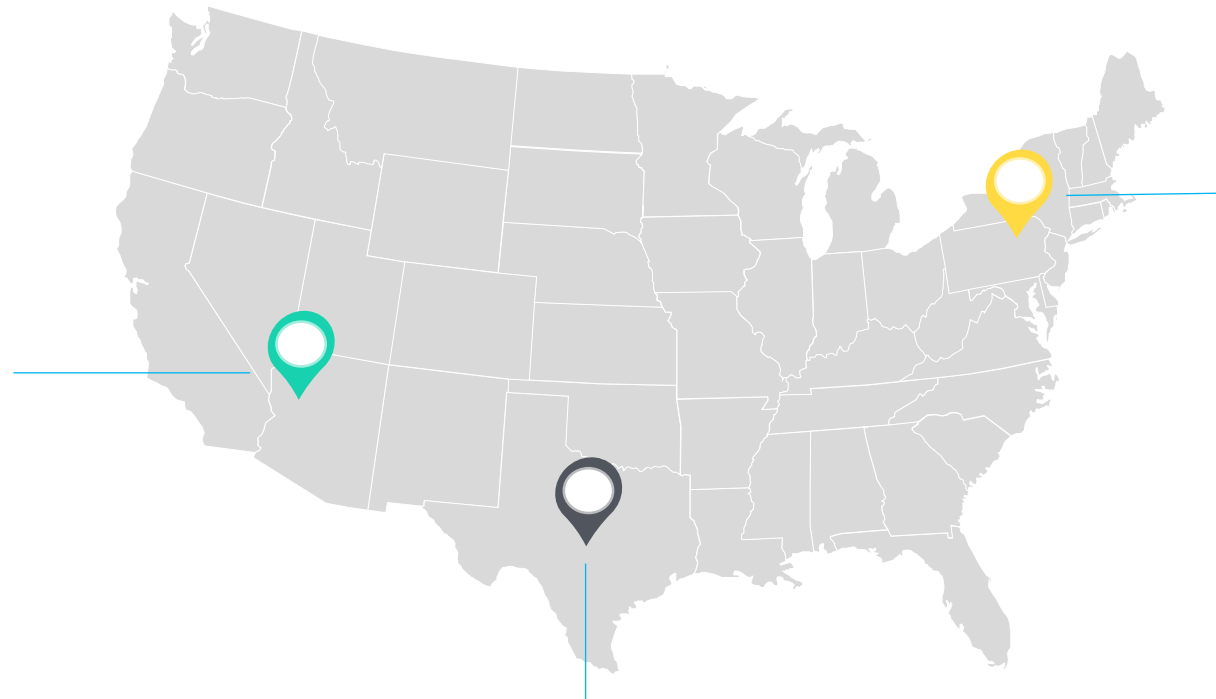
- Climate change is a threat to system reliability, with fossil generation increasingly challenged by extreme weather.
- The electricity sector is key to decarbonizing the U.S. economy over the next three decades.
- Fossil-fired power plants are the largest industrial source of climate pollution in the U.S.
- The power sector is already transitioning towards cleaner energy, bolstered by federal and state-level action, such as the Inflation Reduction Act.

# Reliability: The Power of Averaging

EPA's proposed carbon pollution standards for existing gas power plants would apply only to large plants running at annual capacity factors higher than 50%. Annual averaging of capacity factors provides significant flexibility to these plants to ramp output to meet operational needs while still staying below proposed thresholds for pollution standard coverage.

## Summer Extreme Heat (2023)

- Parts of the U.S. experienced 30 to 40 days of sustained above-average temperatures in late June and July.
- An existing gas plant could run at 100% capacity factor during all peak hours of those 40 days (from 4-7pm), 80% for the remainder of all hours during those days, and 46% the rest of the year and remain under the proposed 50% capacity factor threshold.



## Polar Vortex (2014)

- This event spanned the northeastern and north central U.S. and lasted roughly 6 days (January 3 through 8, varying by region).
- If an existing gas plant ran at 100% capacity factor for the duration of this event, it could still run over 49% capacity factor for the remainder of the year and stay below the proposed 50% capacity factor threshold.

## Winter Storm Uri (2021)

- This storm, in addition to two others spanning 11 days (February 10 – 20, 2021) across the south central U.S., had large effects on the Texas grid.
- If an existing gas plant been called on to run for this entire 11-day period at 82% capacity factor, it could run at 49% capacity factor for the remainder of the year and still fall below the proposed 50% capacity factor threshold.

# EPA's Modeling of the Standard

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- EPA's Integrated Proposal: 111(b) and (d) as proposed. All three standards (existing coal, existing gas, and new gas) are modeled, with existing gas plant coverage matching the FAQ methodology.
- Sensitivity:
  - LNG Update (Higher Gas Price)
- EPA's Regulatory Impact Analysis: 111(b) and (d) for existing coal as proposed. Existing gas not modeled in the RIA IPM analysis; it is assessed separately, outside of power sector modeling.

# NRDC's Modeling of the Standards

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- EPA's Integrated Proposal: 111(b) and (d) as proposed. All three standards (existing coal, existing gas, and new gas) are modeled, with existing gas plant coverage matching the FAQ methodology.
- NRDC Alternative Proposal: NRDC's recommendations, focusing on accelerating and consolidating the existing coal standard, consolidating and expanding the existing gas standard, and accelerating and strengthening the new gas standard.
- Sensitivities:
  - No Existing Gas Standard
  - Constrained Renewable & Transmission Deployment
  - High Cost Renewables
  - High Load Growth

# EPRI's Modeling of the Standards

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- EPA's Integrated Proposal: 111(b) and (d) as proposed. All three standards (existing coal, existing gas, and new gas) are modeled, with existing gas plant coverage matching the FAQ methodology.
- New Source Performance Standard: 111(b) as proposed. No 111(d) standards.
- Sensitivities:
  - Higher Gas Prices
  - Constraints on Carbon Capture and Sequestration (CCS) Deployment
  - Constraints on Hydrogen (H<sub>2</sub>) Deployment

# EPRI Assumptions: Gas Prices

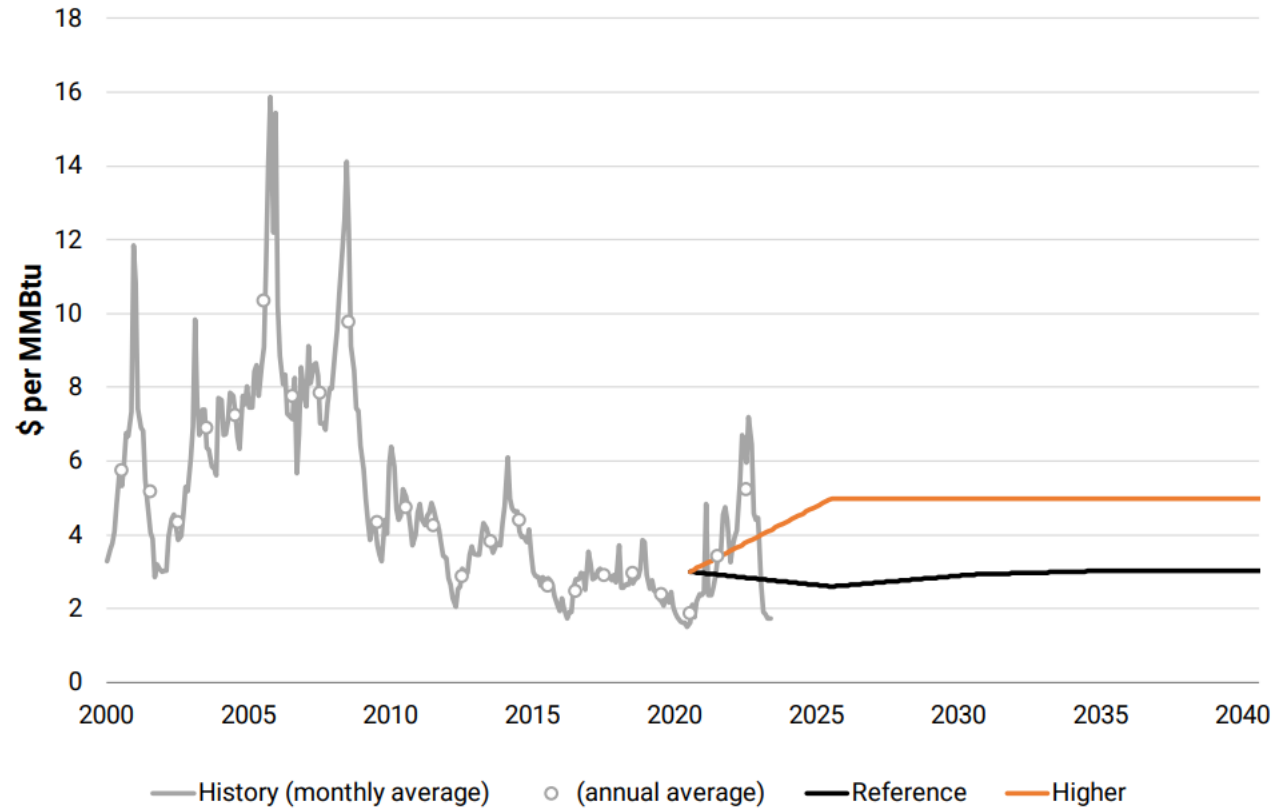
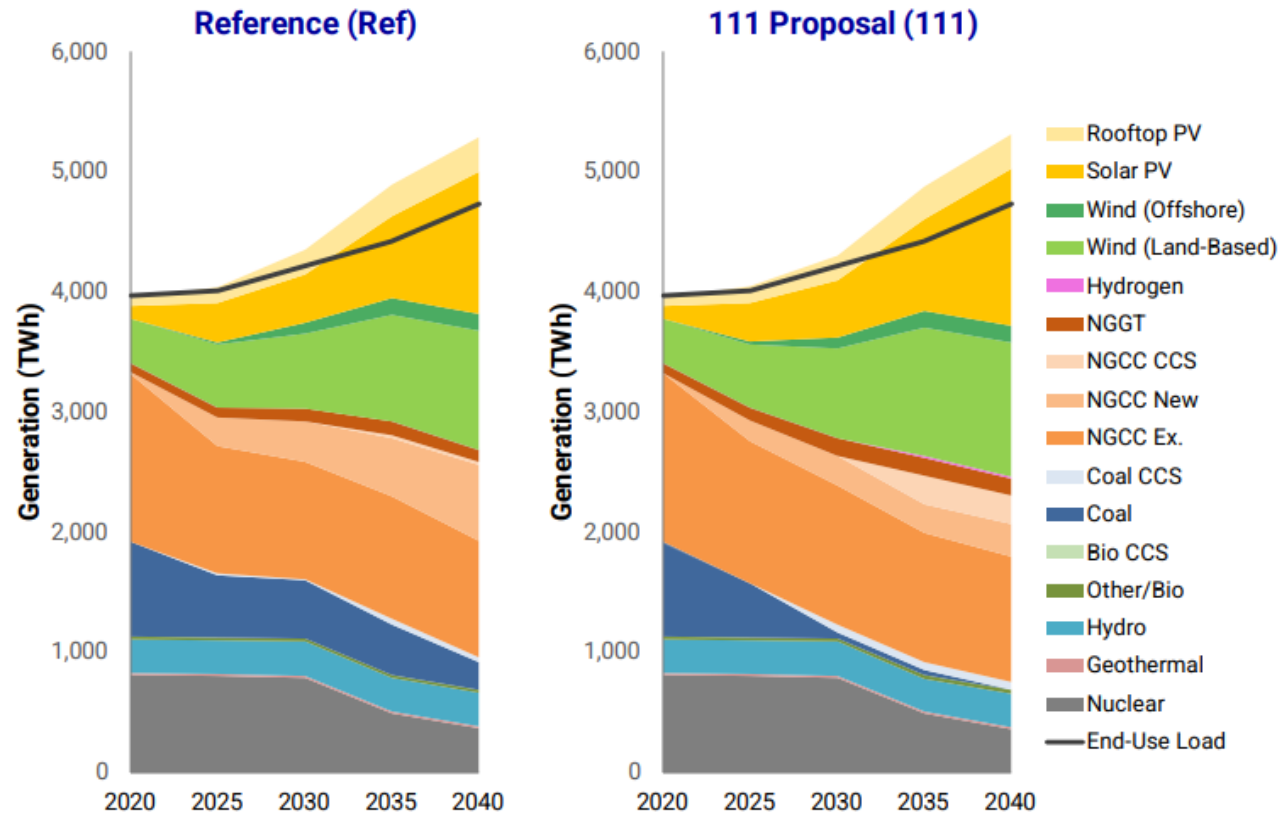
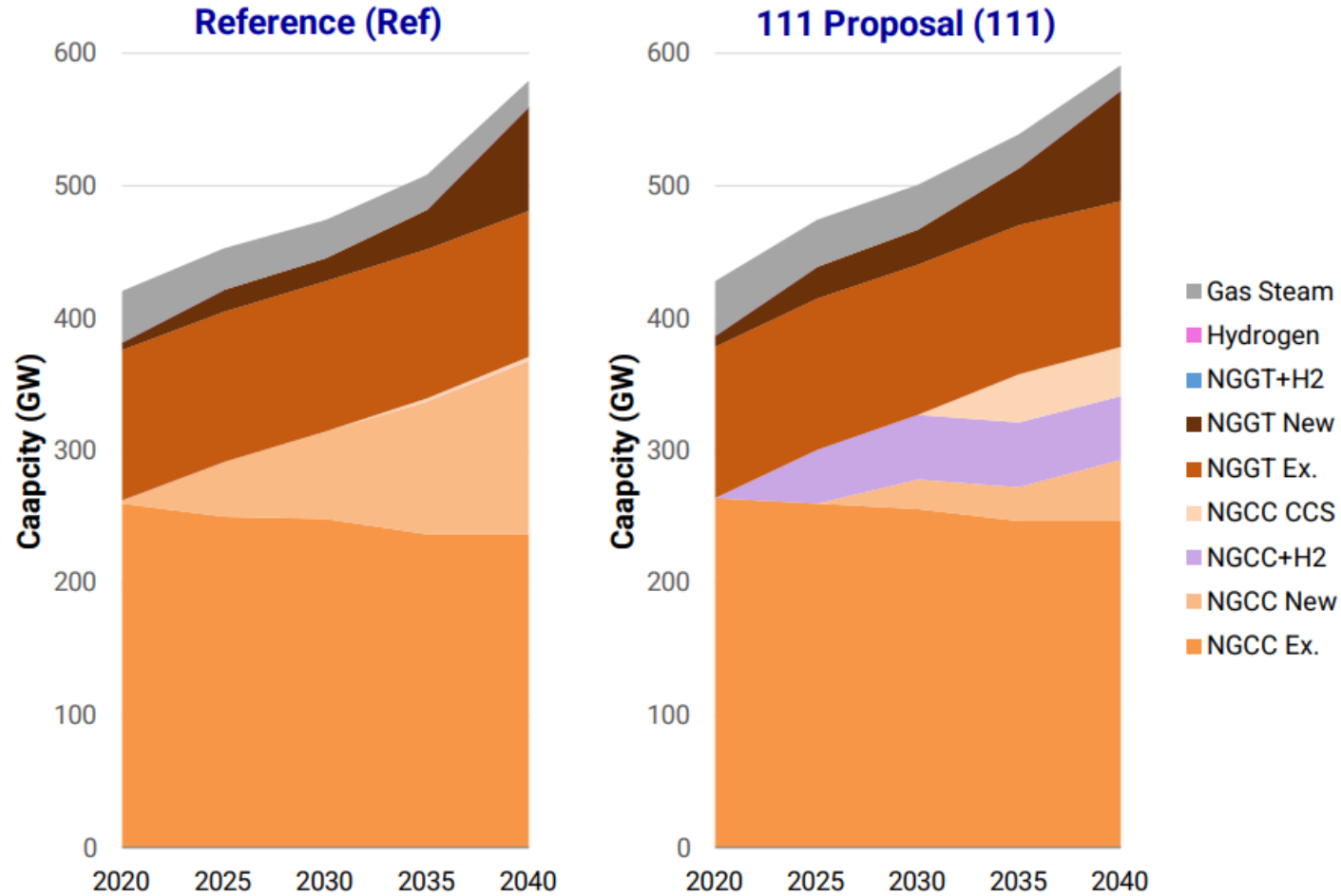


Figure 3. Historical and projected natural gas prices. Prices delivered to the power sector are expressed in real 2015 dollar terms.

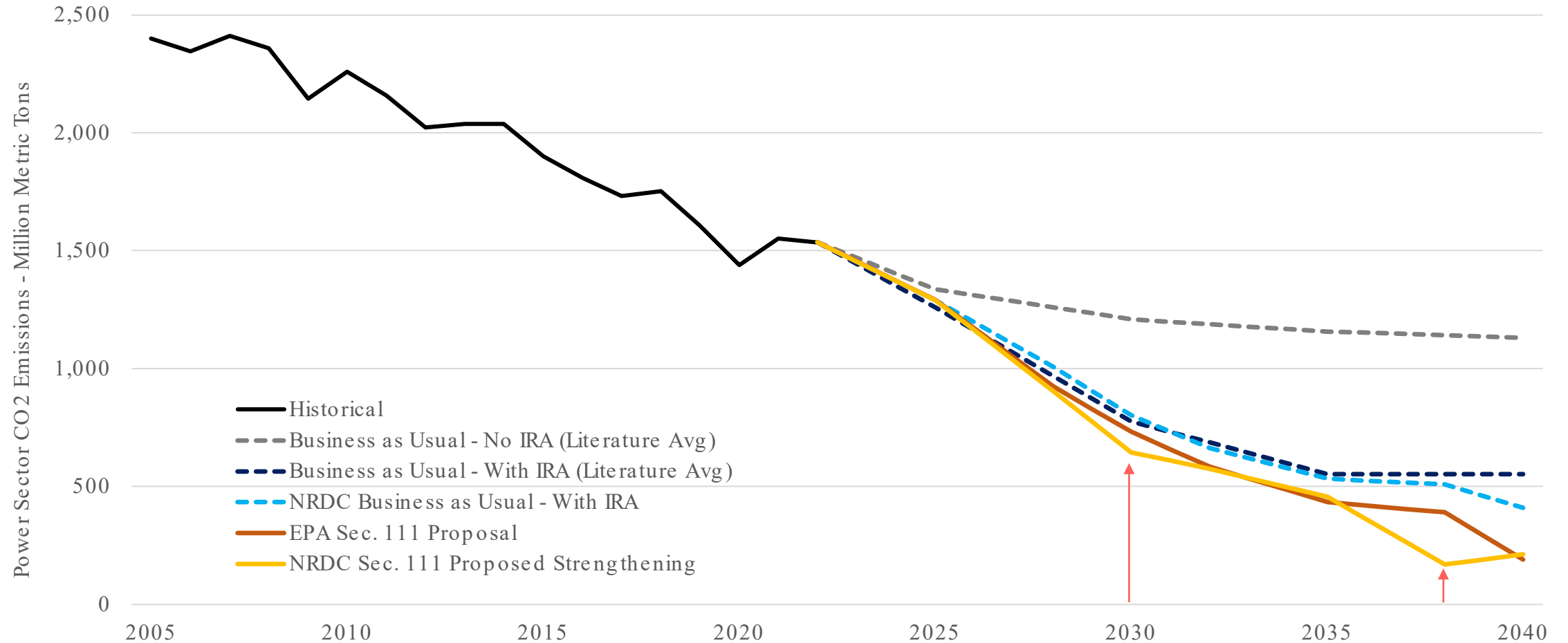
# ERPI Generation Mix



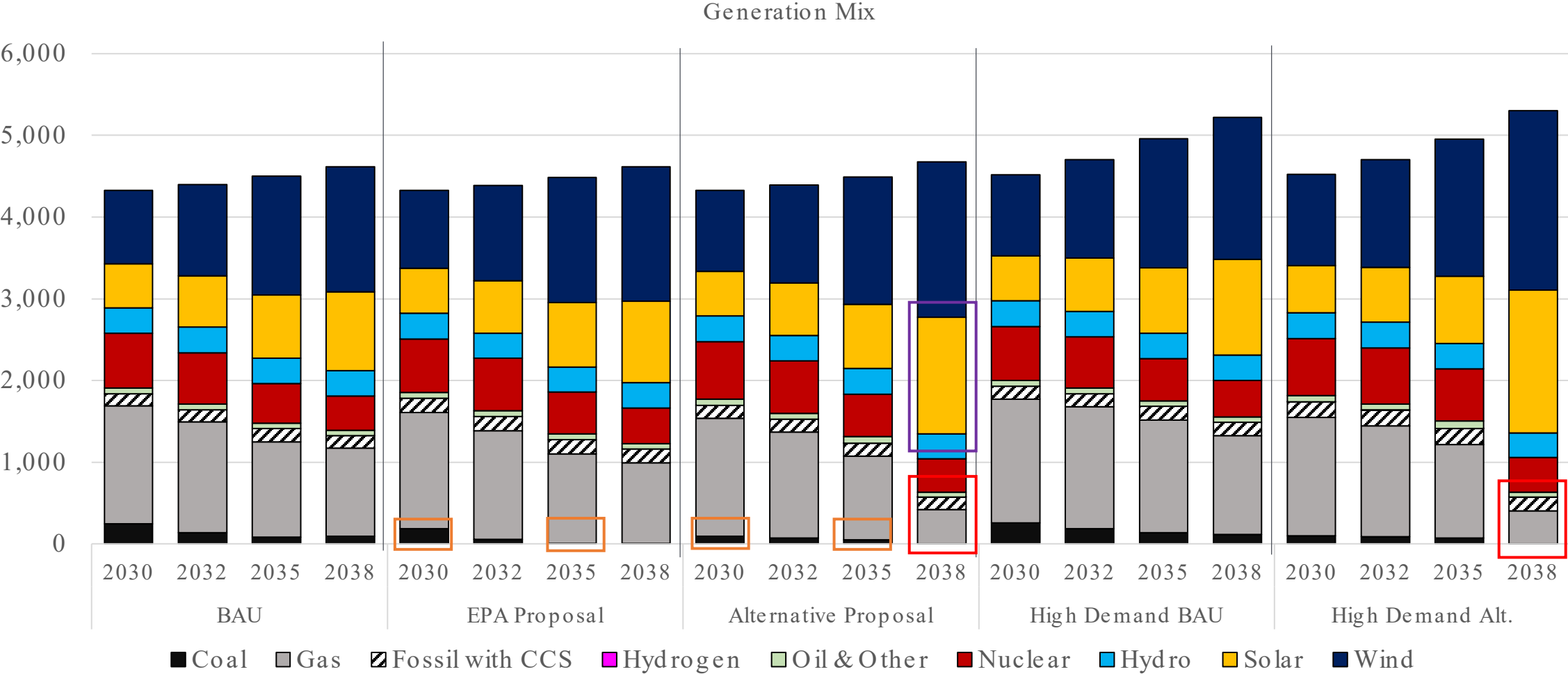
# EPRI Impact on New Gas



# Carbon Emissions Outcomes: Post-Proposal



# Generation Outcomes



# Capacity Outcomes

