

When Coal is the Goal

Environmental Policy and Energy Markets

PRESENTED TO



PRESENTED BY

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THE **Brattle** GROUP

America First Energy Plan

- “For too long, we’ve been held back by burdensome regulations on our energy industry. President Trump is committed to eliminating harmful and unnecessary policies such as the Climate Action Plan and the Waters of the U.S. rule.”
- “..committed to clean coal technology, and to reviving America’s coal industry, which has been hurting for too long”
- “..lower costs for hardworking Americans and maximize the use of American resources, freeing us from dependence on foreign oil”
- “..embrace the shale oil and gas revolution to bring jobs and prosperity to millions of Americans”
- “We will use the revenues from energy production to rebuild our roads, schools, bridges and public infrastructure.”

From Independence to Dominance

President Trump, June 29, 2017:

We are a top producer of petroleum and the number-one producer of natural gas. We have so much more than we ever thought possible. We are really in the driving seat. And you know what? We don't want to let other countries take away our sovereignty and tell us what to do and how to do it. That's not going to happen. With these incredible resources, my administration will seek not only American energy independence that we've been looking for so long, but American energy dominance.

And we're going to be an exporter – exporter. We will be dominant. We will export American energy all over the world, all around the globe. These energy exports will create countless jobs for our people, and provide true energy security to our friends, partners, and allies all across the globe.

But this full potential can only be realized when government promotes energy development....

Some Actions Taken

Congressional Review Act

- Overturned Stream Protection Rule, regulating coal waste from mining

Executive actions to review, revise or revoke proposed or recently finalized rules

- Canceled requirement for reporting methane emissions
- Lifted freeze on new coal leases on public lands
- Federal royalty relief on coal, oil and gas (cancelling revised rules)
- Review and “elimination” of Waters of the U.S. (WOTUS) rule
- Review and “re-evaluation” of Clean Power Plan
- Review of rule limiting methane emissions at new oil and gas drilling sites
- Review of offshore drilling policies and regulations
- Withdrew from Paris Accord

Proposed Rulemakings

- 9/28/17 DOE NOPR to FERC to promote “resilience” in jurisdictional wholesale electricity markets
- 10/10/17 Clean Power Plan repeal (replacement TBD)

Supply Oriented Policy: “More is Better”

Obama Era Environmental Regulations = Barriers

Remove Barriers = More Production = Greater Prosperity

To project outcomes, economists mind both P’s and Qs (prices and quantities)

- Expanding supply without other changes reduces prices (more Q_s lower P)
- Expanding supply (lowering price) of substitute can reduce quantity demand
- Expanding supplies of all competing energy types (“All of the Above” policy)
 - Will likely lead to more overall energy use, but
 - Does not necessarily lead to more consumption of any particular energy form

Reviving Coal?

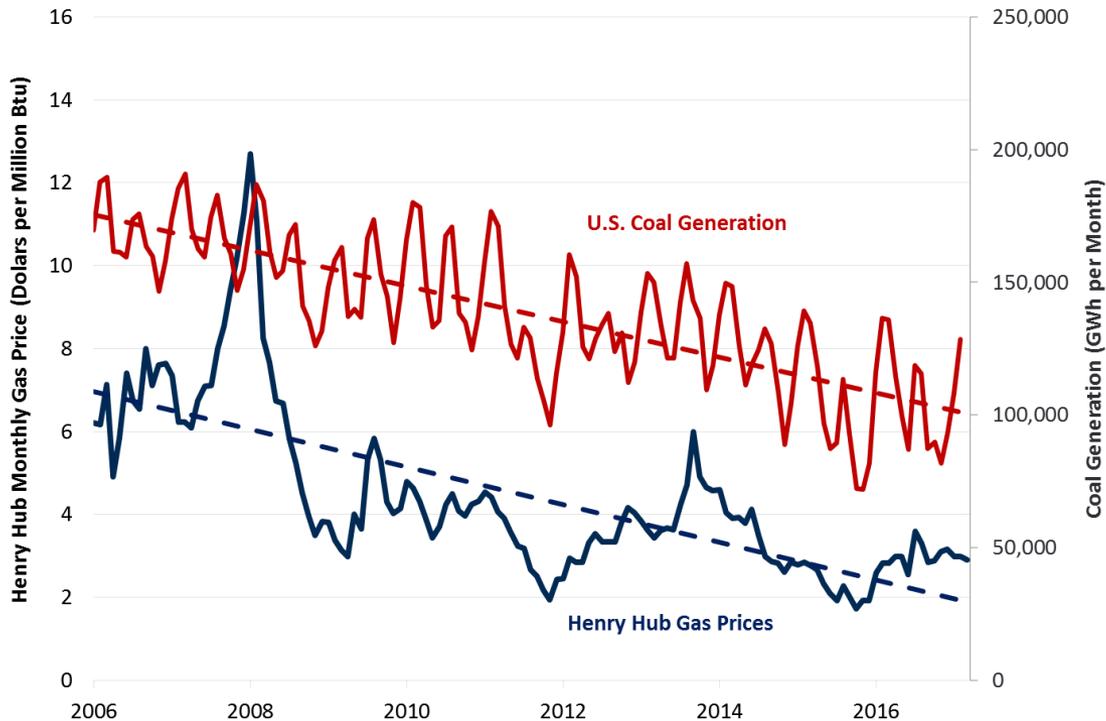
One objective is to increase coal production and mining employment

- Since 2008, coal production has declined—was it EPA’s “War on Coal”?
 - Coal generation declined primarily from lower natural gas prices
 - Coal capacity retirements encouraged by EPA regulations (*e.g.*, MATS)
- Coal for generation usually about 90% of U.S. production
- Most coal tonnage is mined in the West while most employment exists in the East
 - Almost 30 tons/employee-hour in western surface mines
 - Generally 2-5 tons/employee-hour in eastern underground mines

Will policy increase coal production & employment in concert with meeting other objectives?

Will the FERC “resiliency” rulemaking help coal?

Coal Demand and Natural Gas Price



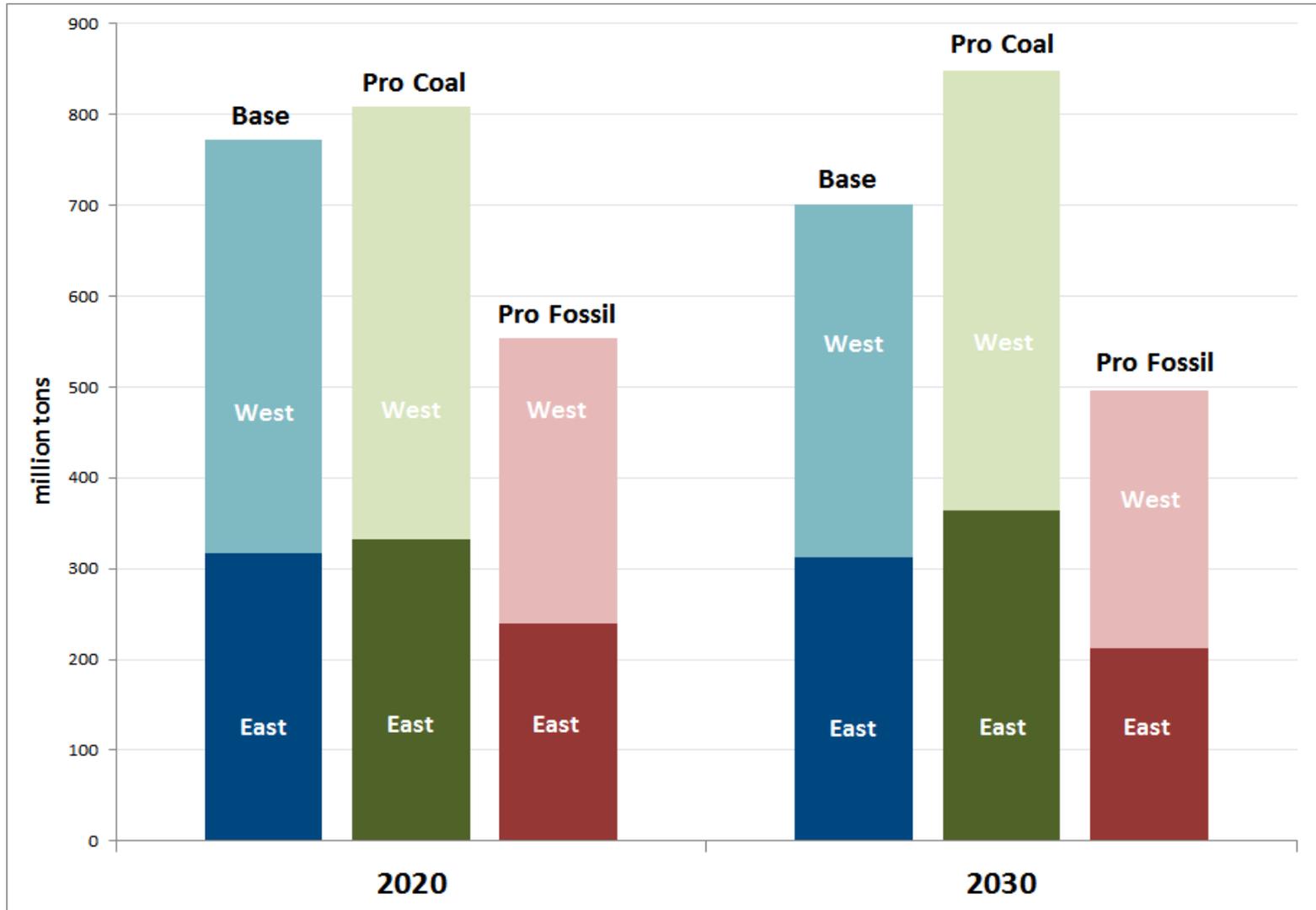
Source: EIA

- 2016 gas prices of about \$2/mmBtu pushed coal demand down
- 2017 gas prices rebound to about \$3/mmBtu reviving coal generation
- Coal unit retirements still continue, confirming that capacity and generation don't always move in the same direction

Policy Cases Examined

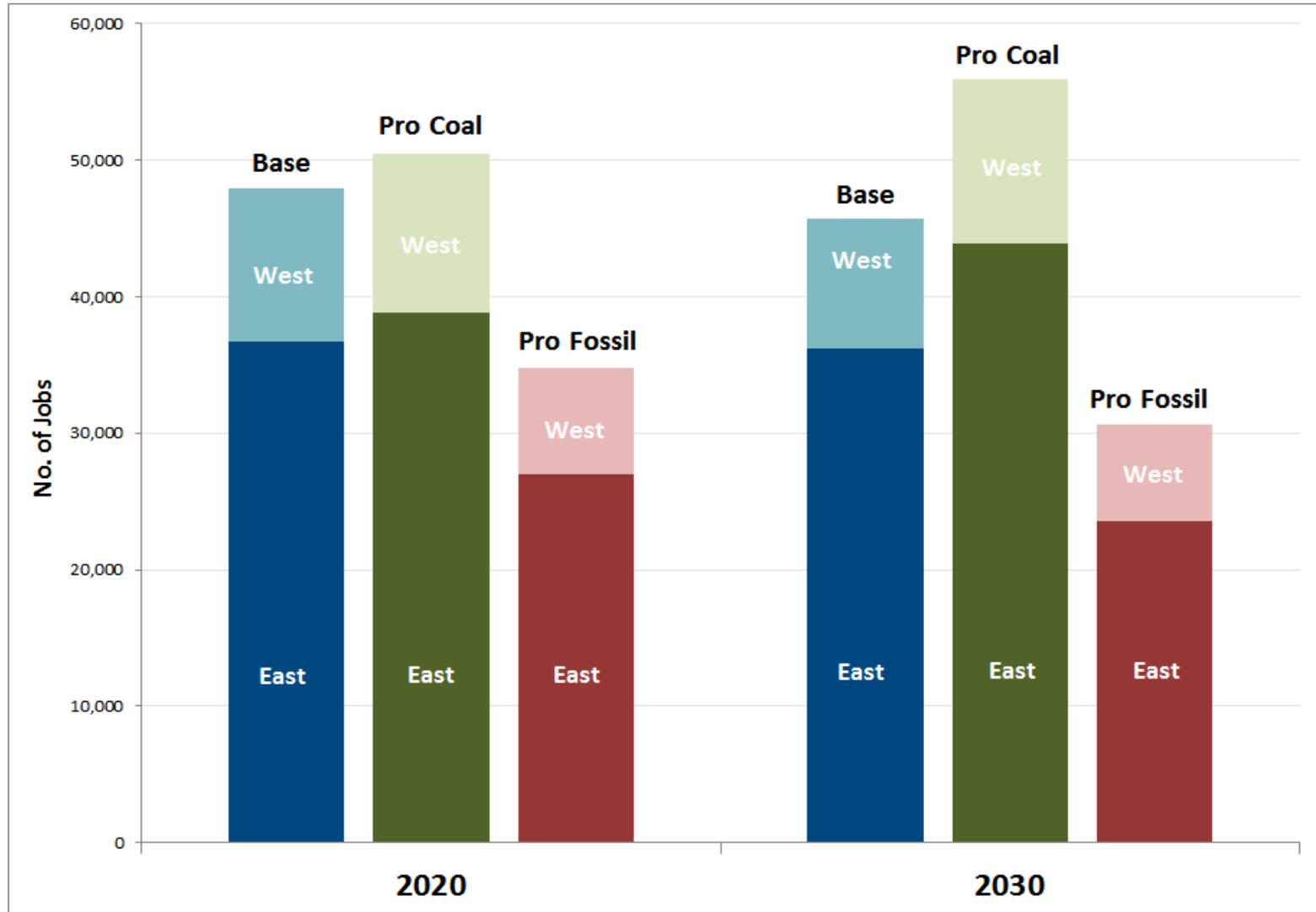
- **Base Case** (pre-election outlook) implements the Clean Power Plan (CPP)
- **Pro Coal Case**
 - Removes the CPP
 - Assumes much higher growth rate of industrial electricity demand to reflect expanded domestic manufacturing via trade policy
 - Reduces delivered coal costs (-5% in 2020, -10% in 2030) to reflect expanded leasing, reduced royalties, fewer environmental rules, etc.
- **Pro Fossil Case** includes “Pro Coal” elements and assumes significantly expanded oil/gas development in U.S.—“All of the Above” case
 - EIA AEO “High Oil and Gas Resource and Technology Case” expands supply and holds natural gas prices to around \$3 (vs. \$5+)

Coal Production Effect



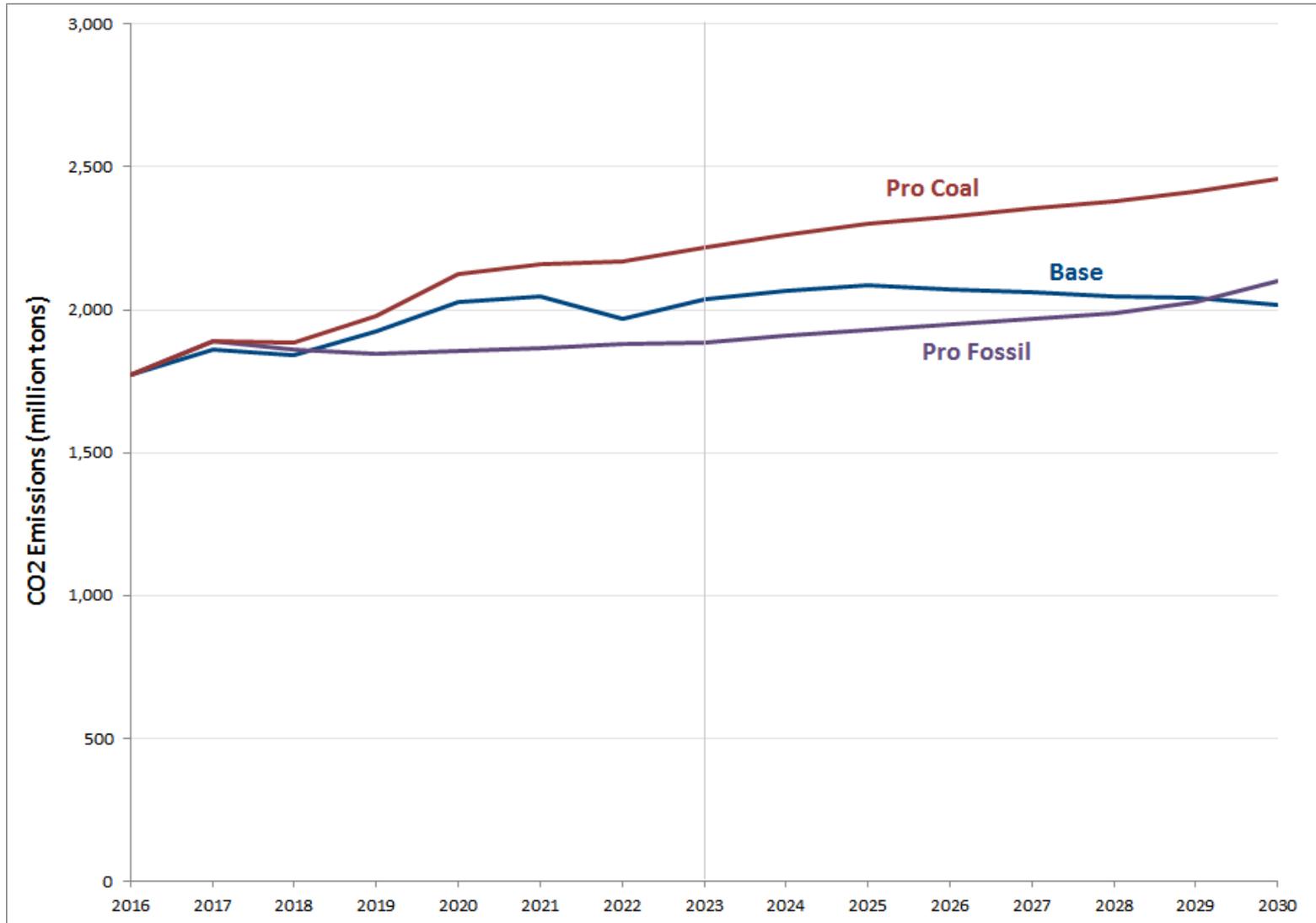
Note: Only coal production from generation demand shown

Coal Mining Jobs Effect



Note: Only mining jobs from generation demand shown

U.S. Electric Sector CO₂ Emissions



Supply-Side “All of the Above”

- Simultaneously removing barriers (CPP on coal, limits on oil/gas extraction) and promoting additional improvements in oil/gas extraction productivity will continue to favor gas in the market for generation fuel
 - The pro-coal elements can modestly increase domestic coal consumption, production and employment
 - Expanding development of oil and gas resources will reduce natural gas prices and reduce coal output
 - Lower natural gas prices could help keep CO₂ emissions below the CPP scenario
- Relief for coal producers may be difficult with expanded gas production because resulting low gas prices hurt coal even with pro coal policy. Can trade policy stimulate coal demand?
 - Enhanced exports of coal?
 - Limited markets without clear policy options for expansion
 - Increased LNG exports to help keep natural gas prices from falling?
 - U.S. manufacturers and other gas consumers will object
 - Tariffs on imported solar panels?
 - Unlikely to help coal but likely to reduce overall solar industry employment

DOE “Resilience” NOPR

FERC to discourage premature merchant coal and nuclear retirements

Applies only in ISO/RTO regions with capacity markets

Rule would compensate baseload units that remain in the market

- Set “cost of service” rates for units that hold 90-day fuel supply
- Tariff structure not specified, but appears to compensate full embedded costs

If successful at stemming premature retirements:

- Would keep nuclear plants running
- May or may not encourage additional output from coal generators, depending how tariff is structured
 - If subsidy is based on generation output, coal consumption increases (along with energy market distortion)
 - If subsidy is structured to maintain availability, plant life could be extended but with little additional generation output

Amount of necessary subsidy and the resulting coal generation output depend on level of future natural gas price

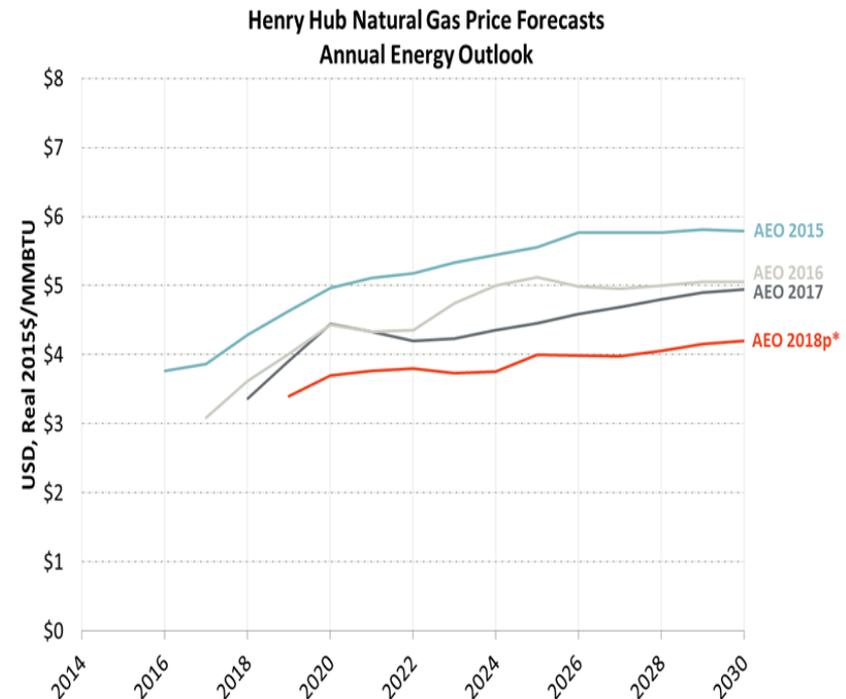
Some Observations

Overall Coal and Nuclear Retirements:

- Less than 20% of coal fleet and 5% of nuclear fleet retired 2002–2016
- Another 5% of coal fleet and 7% of nuclear fleet plans to retire by 2020
- Additional merchant coal could decide to retire depending on market conditions

The proposed rule mostly impacts PJM

- Despite having the most coal and nuclear retirements (GW) since 2002...
 - PJM currently has the highest proportion of coal and nuclear capacity (%)
 - The rule could impact nearly 50 GW of merchant coal (mostly in PJM)
- Potentially an additional 8 GW of regulated coal in RTOs, if sold to merchants
- Natural gas price forecasts continue to decline (see chart)
- The cost of the financial support for affected coal plants could be several billion \$/year



Sources:

EIA AEO 2015, EIA AEO 2016, EIA AEO 2017, BLS CPI.

* The Brattle Group estimates from "Annual Energy Outlook 2018: Preliminary Results for Electricity, Coal, Nuclear, and Renewables," EIA.

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Note:

The views expressed in this presentation are strictly those of the presenter and do not necessarily state or reflect the views of *The Brattle Group, Inc.*

Mr. Marc Chupka is a principal at The Brattle Group with over 25 years of public and private sector experience analyzing energy markets and regulation and assisting energy clients and counsel in a broad span of commercial analysis, regulatory proceedings, and litigation support. His recent work has focused on litigation in Clean Air Act matters, the analysis of clean energy policy design and impacts, utility integrated resource planning, electricity and fuel procurement policies, and contract evaluation and litigation.

Mr. Chupka formerly served as the Acting Assistant Secretary for Policy and International Affairs at the U.S. Department of Energy, and was the Associate Director for Air, Energy and Transportation at the White House Office for Environmental Policy.

About The Brattle Group

The Brattle Group provides consulting and expert testimony in economics, finance, and regulation to corporations, law firms, and governmental agencies worldwide.

We combine in-depth industry experience and rigorous analyses to help clients answer complex economic and financial questions in litigation and regulation, develop strategies for changing markets, and make critical business decisions.

Our services to the electric power industry include:

- Climate Change Policy and Planning
- Cost of Capital
- Demand Forecasting Methodology
- Demand Response and Energy Efficiency
- Electricity Market Modeling
- Energy Asset Valuation
- Energy Contract Litigation
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- Fuel and Power Procurement
- Incentive Regulation
- Rate Design and Cost Allocation
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Appendix: Analysis Framework

Brattle Xpand model of the U.S. electric generation sector:

- Includes all generating units in 48 States
- Regional markets represented through flow limits
- Non-chronological dispatch over 40 load tranches
- Optimal capacity expansion and retirement to meet reliability criteria
- Projects CO₂ emissions and represents Clean Power Plan implementation
- Coupled to coal supply and employment data
 - Tracks geographic origin of coal consumed
 - Use 2015 regional labor productivity (tons/employee) to derive jobs

These are preliminary results intended to illustrate the relative effects of assumed policy and market changes 2020 – 2030

- Not fully calibrated to recent observations
- Cases are “what-if” scenarios, not formal projections of policy impacts
- Focus on relative rather than absolute impacts