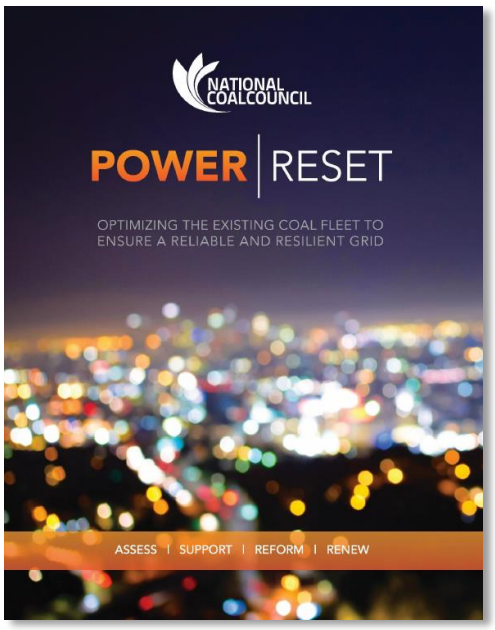


Secretary Perry's Request

"… develop a white paper assessing opportunities to optimize the existing U.S. coal-fueled power plant fleet to ensure a reliable and resilient electricity system."

Key Questions to Address

~ What actions can be undertaken to optimize the U.S. coal-fueled power plant fleet so it can continue to provide reliable, resilient, affordable power as part of a diverse electric generation mix?

~ What unique benefits does coal provide?

Strategic Objective

The existing U.S. coal fleet offers unique benefits in the nation's interests that must be valued or it will continue to erode.

Principal Findings

- The existing U.S. coal fleet possessed reliable and resilient attributes that support a stable, diverse energy portfolio.
- The coal fleet's ability to dispatch power when needed provides flexibility in meeting fluctuations in demand not met by intermittent renewable energy.
- Approximately 24% of U.S. coal generation capacity was retired between 2005 and 2017.
- Data on coal plant retirements do not capture all market dynamics prompting plants to retire … may be underestimating loss of critical generating/grid stabilization resources.
- Coal generation capacity is likely to continue to decrease barring a proactive initiative to assess and compensate the existing fleet for its value.
- Greater transparency is needed in the comparative analysis of fuel resource options.
- Opportunities exist to streamline, re-evaluate and amend regulatory/legislative measures to enable the U.S. coal fleet to operate more efficiently.
- Wholesale electricity market reform is needed to equitably value resilience as well as reliability.
- Many technology options are available to improve the competitiveness of the existing U.S. coal fleet.

Qualitative Comparison of Grid Reliability and Resilience Attributes by Fuel Type

Attribute	Coal	Natural Gas	Wind/Solar	Nuclear	Demand Response
Dispatchability	✓	✓		✓	
Inertia	✓	✓	✓(wind)	✓	
Frequency Response	✓	✓	✓[3]		
Contingency Reserves	✓	✓			✓
Reactive Power	✓	✓		✓	
Ramp Capability	✓	✓			✓
Black Start		✓			
Resource Availability	✓	✓		✓	
On-Site Fuel Supply	✓			✓	✓
Reduced Exposure to Single Point of Disruption	✓		✓	✓	✓
Price Stability	✓		✓	✓	✓

Source: PA Consulting

Principal Recommendations

ASSESS the value of the coal fleet.

Steps must be undertaken to ensure that the reliable and resilient attributes of U.S. coal generation are acknowledged and that the nation's existing coal fleet is equitably compensated for the services it provides. Firm, dispatchable power must remain a sustained part of the nation's fuel mix; targeted minimum levels for key fuel sources should be strongly considered.

SUPPORT efforts to retain continued operation of the existing coal fleet.

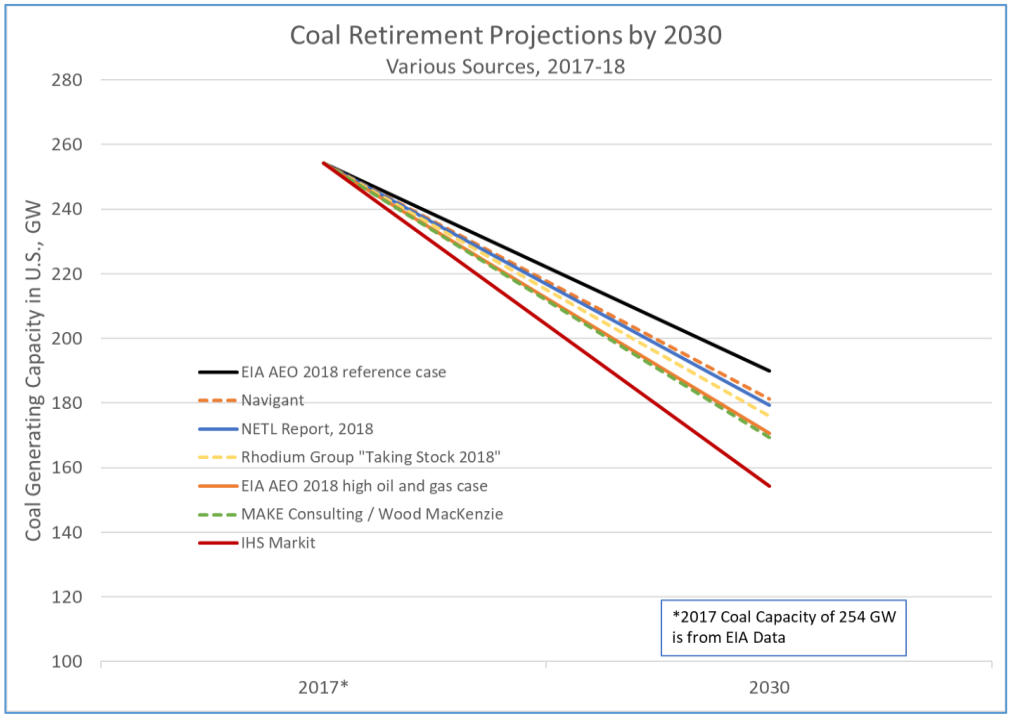
By ensuring compensation for all the attributes of the existing coal fleet, put an end to the precipitous retirement of dispatchable coal. This can provide an opportunity to assess future power demand scenarios and the ability of various energy resources to realistically, reliably and resiliently meet those needs. Economic and regulatory support are needed to stem the tide of plant retirements and ensure the sustainability of a diverse energy portfolio.

REFORM the regulatory environment.

The efficiency, environmental performance and cost-competitiveness of the existing U.S. coal fleet can be enhanced with reforms to various regulatory mandates. Environmentally permitted investments should be afforded the opportunity to recoup value over their useful life and enable the power grid to take full advantage of existing resources. Just compensation is warranted should that opportunity be denied.

RENEW investment in coal generation.

Optimizing existing coal fleet assets requires a targeted Research Development, Demonstration & Deployment (RDD&D) program focused on increasing the efficiency, flexibility and competitiveness of the fleet. Public funding and support mechanisms, complemented by public-private partnerships will ensure grid reliability, dispatch effectiveness and power system resilience.



Actions to Optimize the Existing U.S. Coal Fleet

ASSESS the value of the coal fleet.

- Establish a uniform definition of grid resilience.
- Assess the fuel security of ISOs/RTOs.
- Establish quantitative metrics against which to evaluate grid resilience.
- Evaluate the experience of other nations regarding the value of firm, dispatchable power and challenges associated with intermittent renewable energy deployment.

SUPPORT efforts to retain continued operation of the existing coal fleet.

- Provide appropriate economic and regulatory incentives to stem the tide of plant retirements.
- Establish an environment that values and compensates diversity.
- Support mechanisms to immediately compensate the U.S. coal fleet for the essential services it provides.

REFORM the regulatory environment.

Policy Reforms

- Reform New Source Review rules.
- Reform the Public Utilities Regulatory Policies Act of 1978.
- Revise the 2015 Coal Combustion Residuals ruling.
- Support changes to Effluent Limitation Guidelines establishing wastewater treatment standards.
- Advance CO_2 storage laws and regulations on Federal and tribal lands.
- Engage EPA as it progresses the Affordable Clean Energy plan.

Market Reforms

- Support FERC capacity market reform initiatives.
- Support FERC initiatives to refine ISO/RTO price formation.
- Support FERC efforts to establish and enforce standards for essential reliability services.
- Support efforts by ISOs/RTOs to conduct assessments evaluating fuel security and resilience.

Tax Reforms

- Support legislative initiatives to provide temporary tax credits to cover a portion of plant O&M expenses.
- Support legislative initiatives that would complement and further incentivize utilization of the 45Q tax credit for existing coal plants, including Master Limited Partnerships and Private Activity Bonds.
- Support changes to the 48A tax credit.

RENEW investment in coal generation.

- Support the development and deployment of the following technologies.
  - Advanced coal mining and processing technologies.
  - Coal beneficiation technologies, including coal washing and upgrading.
  - Retrofitting and repowering technologies.
  - Energy storage technologies.
  - Advanced air emissions control system technologies.
  - Water effluent technologies.
  - Carbon capture technologies/projects, including retrofitted demonstrations at commercial scale.
  - Rare earth element extraction from coal and coal byproducts.
  - Advance new markets for coal such as coal conversion and carbon engineered products.
  - Technologies identified in the CURC-EPRI Roadmap that enhance the efficiency and cost-competitiveness of the existing coal fleet.
- Promote education and awareness about the water-energy nexus.
- Promote initiatives to enhance transparency about the inherent costs and benefits associated with all energy resources.

https://www.nationalcoalcouncil.org/page-NCC-Studies.html