



Power Reset

Optimizing the Existing U.S. Coal Fleet to
Ensure a Reliable & Resilient Power Grid

Janet Gellici, National Coal Council

NCC Webcast ~ October 1, 2018

ASSESS | SUPPORT | REFORM | RENEW



Secretary Perry's Request

Formal request April 7, 2018 charging National Coal Council to:

... assess "opportunities to optimize the existing U.S. coal-fueled power plant fleet to ensure a reliable and resilient electricity system."

Key question to address:

"What actions can be taken 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, and what unique benefits does coal provide?"



The Secretary of Energy
Washington, DC 20585

April 07, 2018

Mr. Greg Workman
Chairman, National Coal Council
Dominion Generation
120 Tredegar Street, DC3
Richmond, Virginia 23219

Dear Mr. Workman:

I am writing today to charge the National Coal Council (NCC) to 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.

The white paper should focus on drivers governing the evolution of the existing fleet and its attributes; outlooks on the future U.S. generation mix considering regional drivers, anticipated capacity additions, and retirements; characteristics of a reliable and resilient electricity system; and opportunities for the existing coal-fueled fleet to enhance the said characteristics. The white paper should examine policy, market, and technological aspects influencing the ability of coal-fueled plants to uniquely enable a reliable and resilient electricity system. The key questions for this white paper to address are *"What actions can be taken 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, and what unique benefits does coal provide?"*

I ask that the white paper be completed no later than September 30, 2018.

Upon receiving this request and establishing your internal working groups, please advise me of your schedule for completing the white paper. The Department looks forward to working with you on this effort.

Sincerely,

Rick Perry
Rick Perry



Report Leadership

- **Report Chairs**

- Glen Kellow, President & CEO
Peabody
- Paul Sukut, CEO & General Manager
Basin Electric Power Cooperative
- Matt Rose, Executive Chairman
Burlington Northern Santa Fe

- **Co-chair Representatives**

- Holly Krutka, VP Coal Generation & Emissions Technologies
Peabody
- Matthew Greek, Sr. VP Research, Development & Technology
Basin Electric Power Cooperative
- George Duggan, Vice President Coal Marketing
BNSF Railway



Report Leads

- **Chapter Leads**

- Paul Bailey, American Coalition for Clean Coal Electricity
- Michelle Bloodworth, American Coalition for Clean Coal Electricity
- Janet Gellici, National Coal Council
- Sheila Glesmann, Emission Strategies, Inc.
- Matthew Greek, Basin Electric Power Coop
- Holly Krutka, Peabody
- Connie Senior, Vice President Technology, ADA-ES

- **Principal Editors**

- Holly Krutka, Peabody
- Janet Gellici, National Coal Council



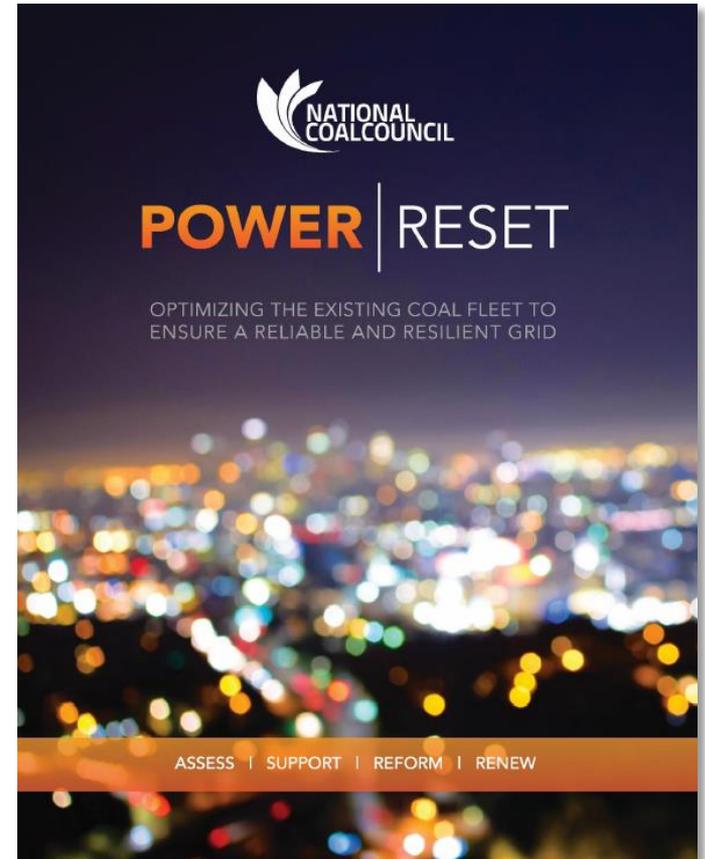
Principal Contributing Authors, Managers, Reviewers

- Shannon Angielski, Carbon Utilization Research Council
- Richard Axelbaum, Consortium for Clean Coal, Washington University (St. Louis)
- Paul Bailey, ACCCE
- Shannon Maher Banaga, Esq., TECO Energy
- Roger Bezdek, MISI
- Lisa Bradley, Haley & Aldrich
- Charlie Bullinger, Great River Energy
- Frank Burke, Independent Consultant
- Michelle Bloodworth, ACCCE
- Kipp Coddington, University of Wyoming
- Don Collins, Western Research Institute
- Dan Connell, Consol Energy
- Katherine Dombrowski, Trimeric Corporation
- Jeffrey Eppink, Enegis
- Janet Gellici, National Coal Council
- Sheila Glesmann, Emissions Strategies, Inc.
- Danny Gray, Charah Solutions
- Matthew Greek, Basin Electric Power Cooperative
- Mike Holmes, Lignite Energy Council
- Susan Jackson, Santee Cooper
- Kim Johnson, GEN2, LLC
- Holly Krutka, Peabody
- Heath Lovell, Alliance Coal
- Shaun Mann, Tri-State Generation & Transmission
- Charlie McNeil, NexGen Resources
- Michael Nasi, Jackson Walker, LLP
- Ron Oster, Peabody
- Fred Palmer, The Heartland Institute
- Christopher Romans, Mitsubishi Heavy Industries America
- John Schultes, New Steel International
- Connie Senior, ADA-ES
- Sharon Sjostrom, P.E., Advanced Emissions Solutions
- Charles Snavely, State of Kentucky
- Scott Stallard, Atonix Digital



Power Reset

Optimizing the Existing Coal Fleet to Ensure a Reliable and Resilient Power Grid

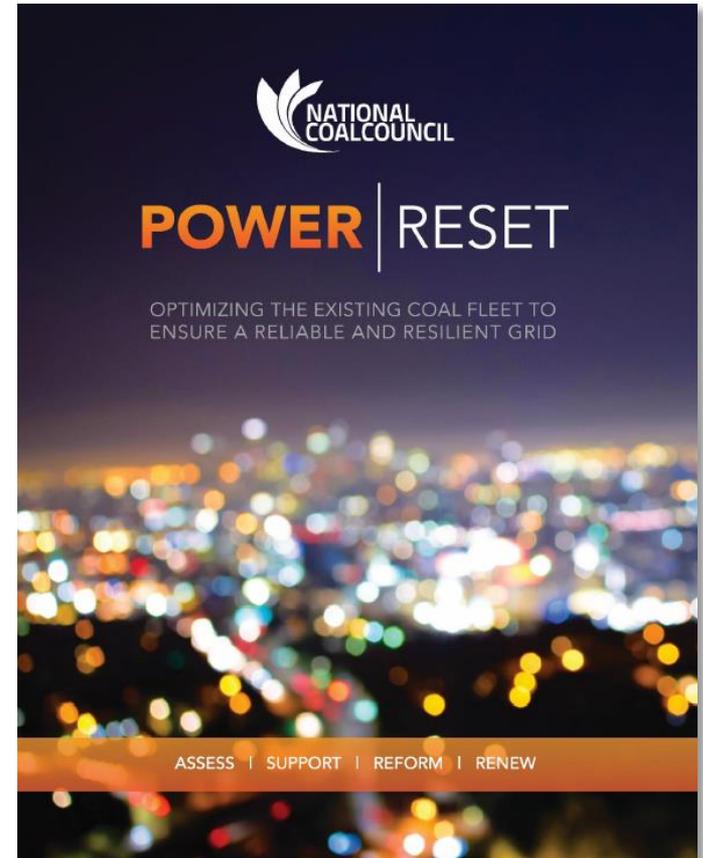


ASSESS | SUPPORT | REFORM | RENEW



The Report

- **What We Considered**
 - Coal's Unique Role in the U.S. Energy Portfolio
 - Outlook for Coal Generation
 - Measures to Optimize Diversity & Resiliency



ASSESS | SUPPORT | REFORM | RENEW



Key Findings

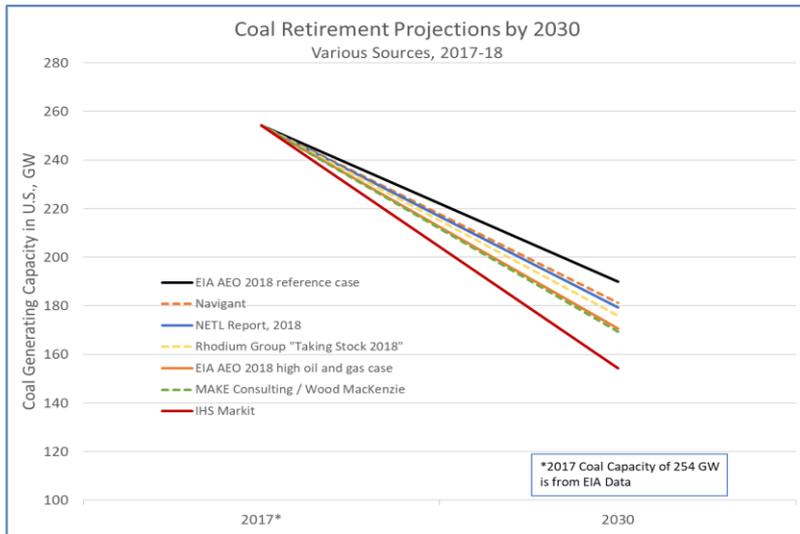
Coal's Unique Role

- The existing **U.S. coal fleet** provides reliable and resilient power foundation ... **supports a stable, diversified** 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.
- **U.S. national and economic security interests** are supported by the abundance of domestic coal resources ... coal fleet provides affordable, reliable electricity for residential and industrial consumers.
- **Low-cost electricity** enhances the nation's competitiveness in international markets.
- Approximately **24%** of U.S. coal-fired generating **capacity retired** between 2005 and 2017.

Resilience is "... the ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover from such an event."

Federal Energy Regulatory Commission

Key Findings Outlook for Coal Generation



- U.S. **power fleet** is experiencing significant and rapid changes, presenting **challenges to forecasting the outlook** for power generation.
- 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.
- **Regulations, staffing constraints and societal pressures** hamper efforts to preserve and optimize the existing fleet.
- Coal-fired generating capacity likely to **continue to decrease barring a proactive initiative** to assess and take action to compensate the existing coal fleet for the value it provides.
- **Greater transparency** is needed in the comparative analysis of fuel resource options.



Key Findings

Optimize Diversity & Resiliency

- Opportunities exist to streamline, re-evaluate and **amend regulatory and legislative measures** to enable the U.S. existing coal fleet to operate more efficiently and effectively.
- Wholesale **electricity market reform** is needed to equitably value resilience as well reliability attributes.
- Many **technology options** are available to improve the competitiveness of the existing U.S. coal fleet.

Project Name	Capital Cost	B/C Ratio	B/C Ratio Rank
Circulating Water Pump Refurbishment	Low	High	1
Sootblowing Steam Source	Low	High	2
Coal Mill Inerting Source	Low	High	3
Add Condensate Polishing	Medium	High	4
HP/IP/LP Turbine Upgrade	High	High	5
Coal Mills Replacement	High	High	6
Boiler Feed Pump Refurbishment	Low	Moderate	7
Helper Cooling Tower Replacement & Pumps	Medium	Moderate	8
Replace Flame Scanners	Low	Moderate	9
VFD's for Forced Draft Fans	Medium	Low	11
Air Heater Overhaul	Medium	Low	10
Replace Air Preheat Coils	Low	Low	12
VFD's for Induced Draft Fans	Medium	Low	13
Alternate Air Heater Overhaul	Medium	Low	14
Alternate Air Preheat Coils Modification	Medium	Low	15



Recommendations Key Strategic Objectives

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

National Coal Council advocates a 4-step approach:

- **ASSESS** the value of the coal fleet
- **SUPPORT** efforts to retain continued operation of the existing coal fleet
- **REFORM** the regulatory environment
- **RENEW** investment in coal generation

ASSESS | SUPPORT | REFORM | RENEW

- **ASSESS | SUPPORT | REFORM | RENEW**
 - 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.



Recommendation SUPPORT

- **ASSESS | SUPPORT | REFORM | RENEW**
 - 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.



Recommendation REFORM

- ASSESS | SUPPORT | **REFORM** | RENEW
 - **Policy:** NSR, PURPA, CCR, ELG, CO2 storage on federal lands, engage on the Affordable Clean Energy plan
 - **Market:** FERC capacity reform initiatives, ISO/RTO price formation, standards for essential reliability services, fuel security and resilience assessments
 - **Taxes:** O&M expenses for coal plants, 45Q support, 48Q



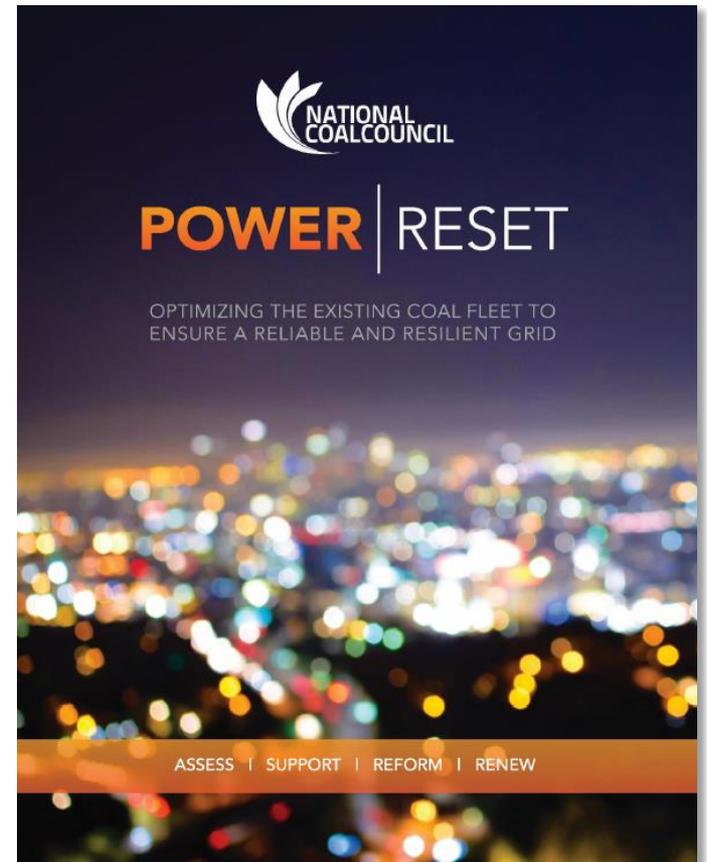
Recommendation **RENEW**

- **ASSESS | SUPPORT | REFORM | RENEW**
 - Support the development and deployment of advanced coal technologies that enhance the competitiveness, efficiency and environmental performance 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 U.S. energy resources



Power Reset

Optimizing the Existing Coal Fleet to Ensure a Reliable and Resilient Power Grid



www.NationalCoalCouncil.org

ASSESS | SUPPORT | REFORM | RENEW