



Securing Coal's Future

Recommendations in Support of Coal's Vital Role

**Janet Gellici, CEO, National Coal Council
Lignite Energy Council
2019 Annual Meeting
April 24th, 2019 – Bismarck, ND**



Advisors to the U.S. Secretary of Energy

**NCC is a Federal Advisory Committee
organized under Federal Advisory Committee Act (FACA) legislation**

**The National Coal Council
provides advice and recommendations
to the Secretary of Energy
on general policy matters
relating to coal and the coal industry.**

Celebrating 35 years – 1984 | 2019

Members

**Appointed by Secretary of Energy to serve 2-year terms
Limited to 125-150 members representing a broad spectrum of coal interests**



Body of Work

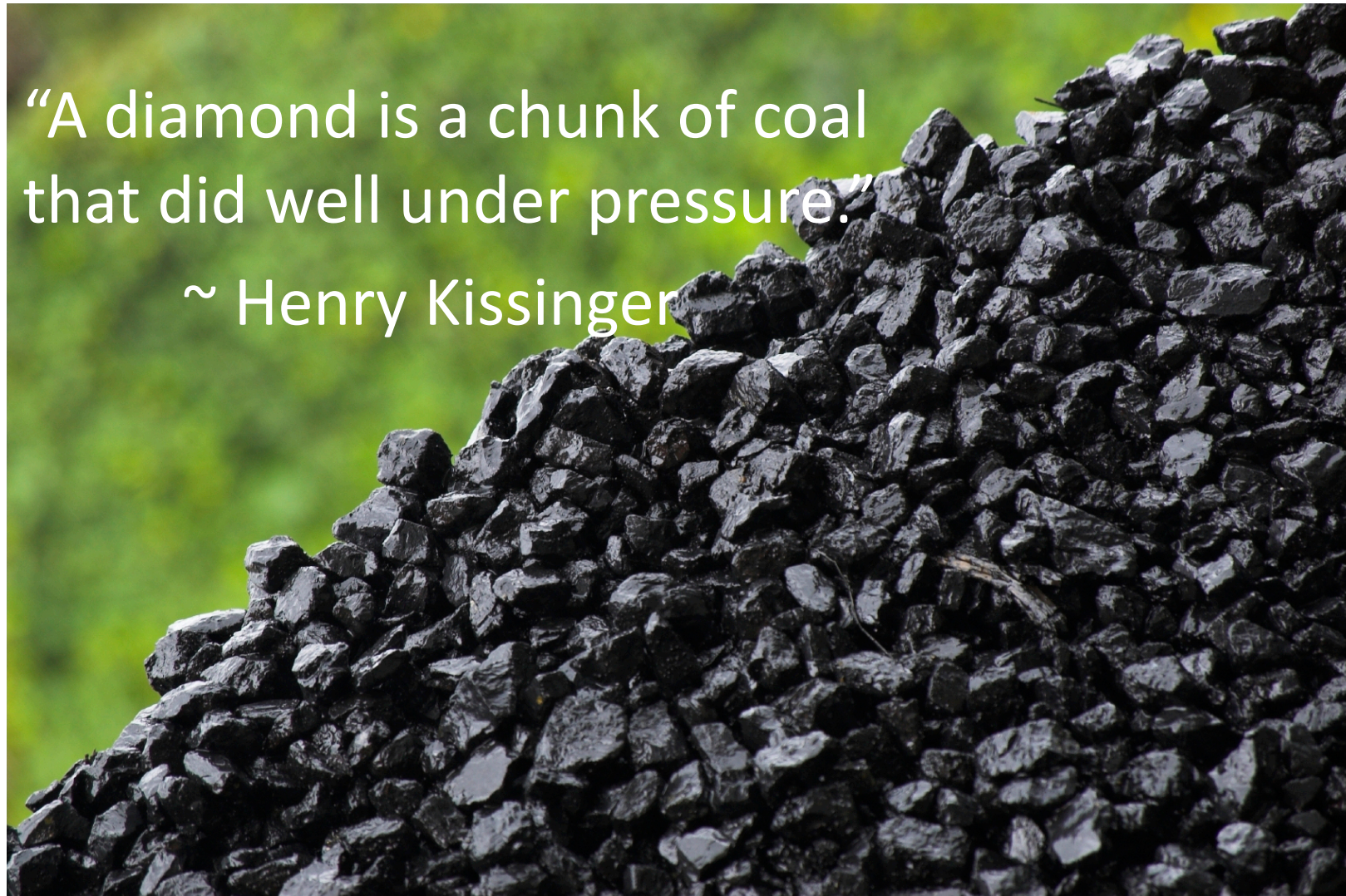
Reports

~ 35 reports prepared by NCC members at no cost to DOE

Extensive Range of Report Topics:

Carbon Management
Clean Coal Technologies
Coal & Coal Technology Exports
Coal Conversion
Utility Deregulation
Climate & Clean Air Regulations
Enhancing Coal's Image
Building New Coal Plants

Industrial Coal Use
CCUS for EOR
Value of Existing Coal Fleet
Advancing CCS Technologies
Policy Parity for CCS
CO₂ Utilization
Advancing U.S. Coal Exports
Power Reset: Existing Coal Fleet





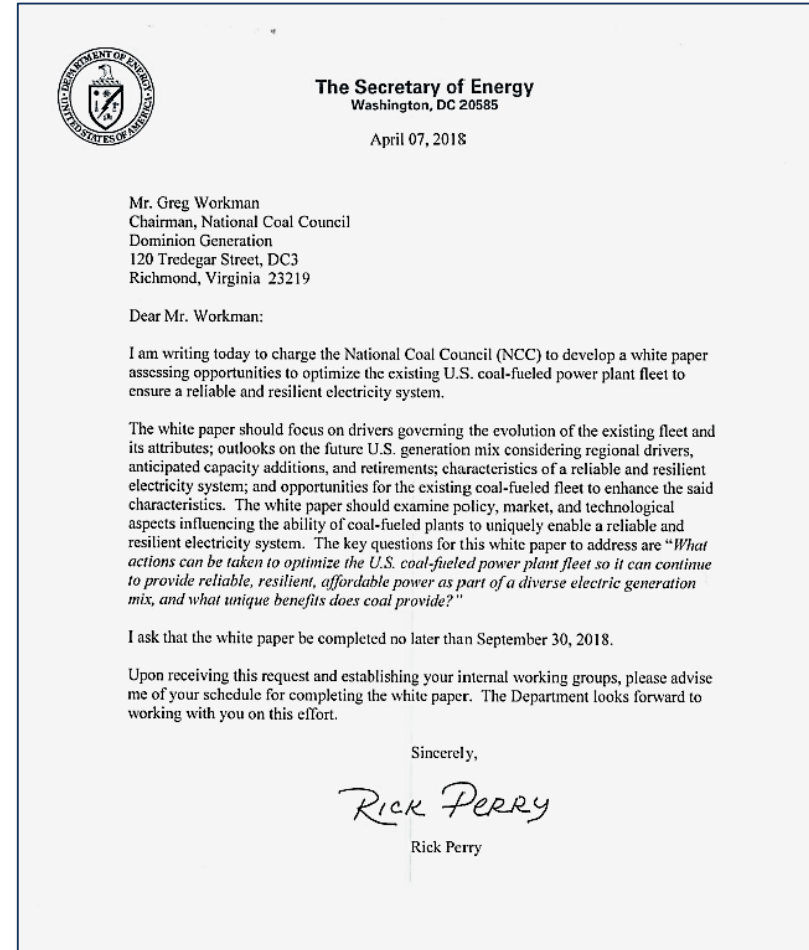
Power Reset Report Secretary Perry's Request

**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.”***

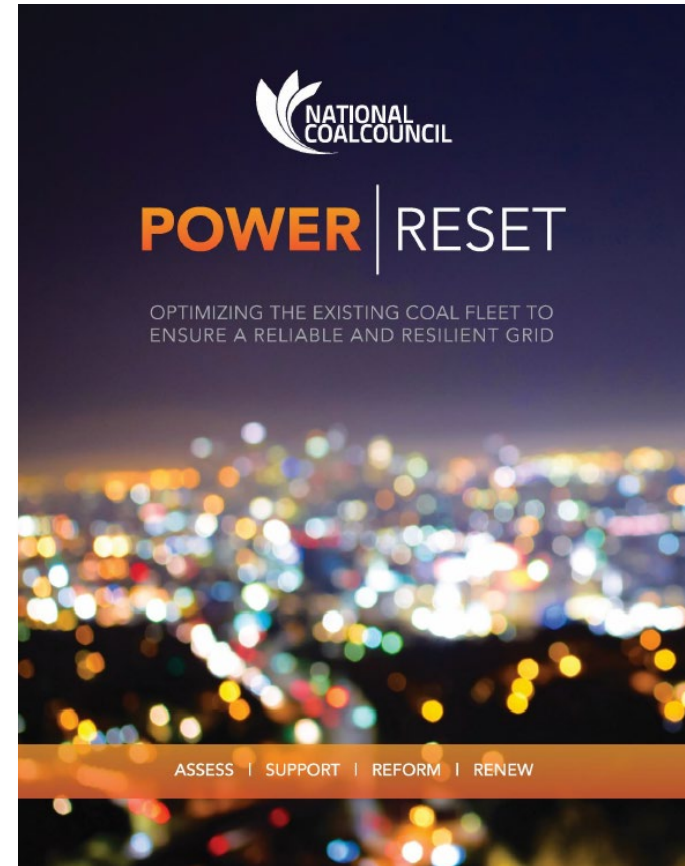
Key question to address:

***“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?”***



What We Considered

- Coal’s Unique Role in the U.S. Energy Portfolio
- Outlook for Coal Generation
- Measures to Optimize Diversity & Resiliency

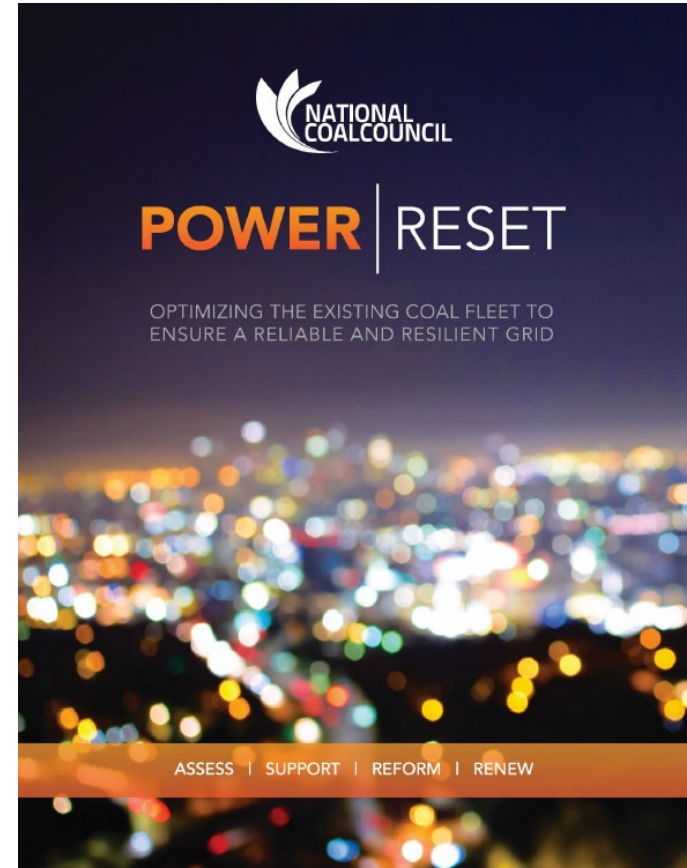


ASSESS | SUPPORT | REFORM | RENEW



Power Reset

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



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.



Coal's Unique Role Reliable & Resilient

Reliable & Resilient Attributes

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	✓		✓	✓	✓

- A diverse generation portfolio is critical to maintaining a reliable and resilient grid.
- Coal excels in:
 - Fuel security/assurance
 - Resource availability
 - Price stability
 - Dispatchability

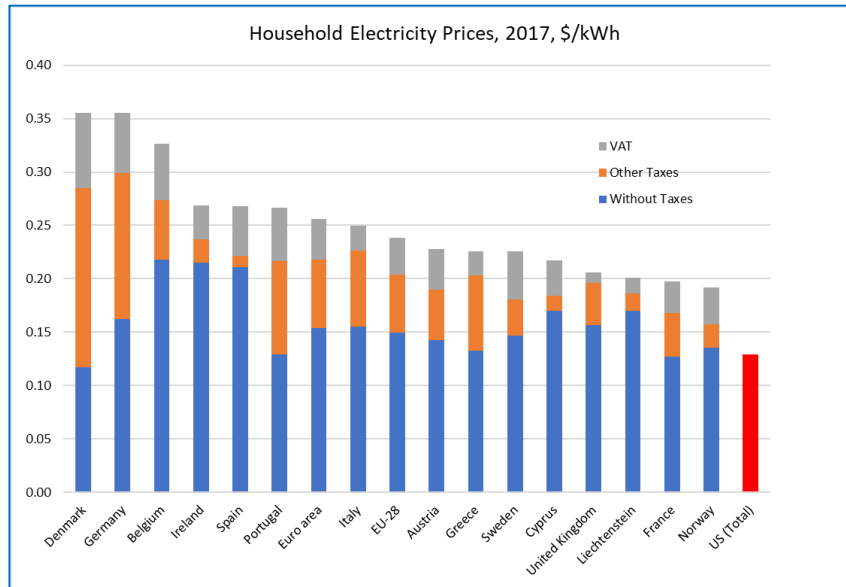
Coal's Unique Role Dispatchable

Intermittent electricity is [electrical energy](#) that is not continuously available due to external factors that cannot be controlled, produced by [electricity generating](#) sources that vary in their conditions on a fairly short time scale. Sources of intermittent electricity include [solar power](#), [wind power](#), [tidal power](#), and [wave power](#). Because of this varying electrical generation these sources are considered [non-dispatchable](#), meaning that their electrical output cannot be used at any given time to meet societies fluctuating electricity demands.

The costs of backstopping intermittent energy sources:

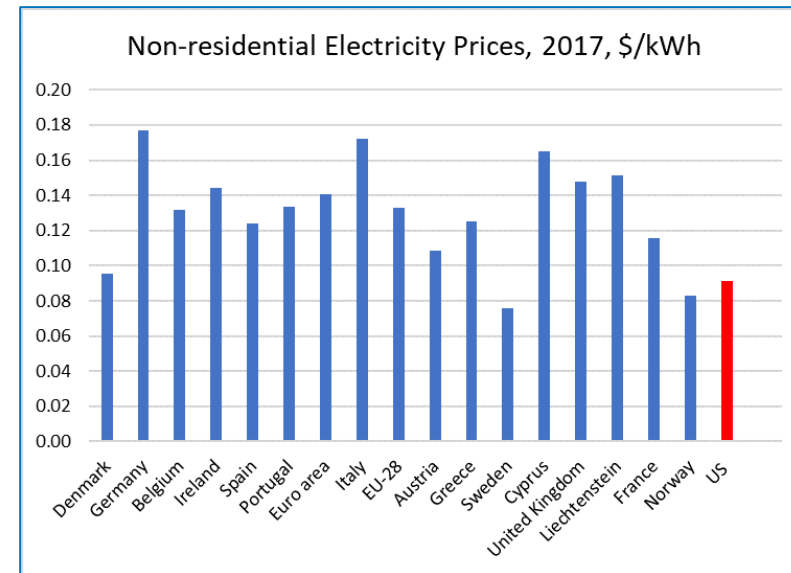
- Lower net generation
- Lower capacity factor
- Less revenue
- Lower efficiency
- Reduced plant life

Coal's Unique Role Economics



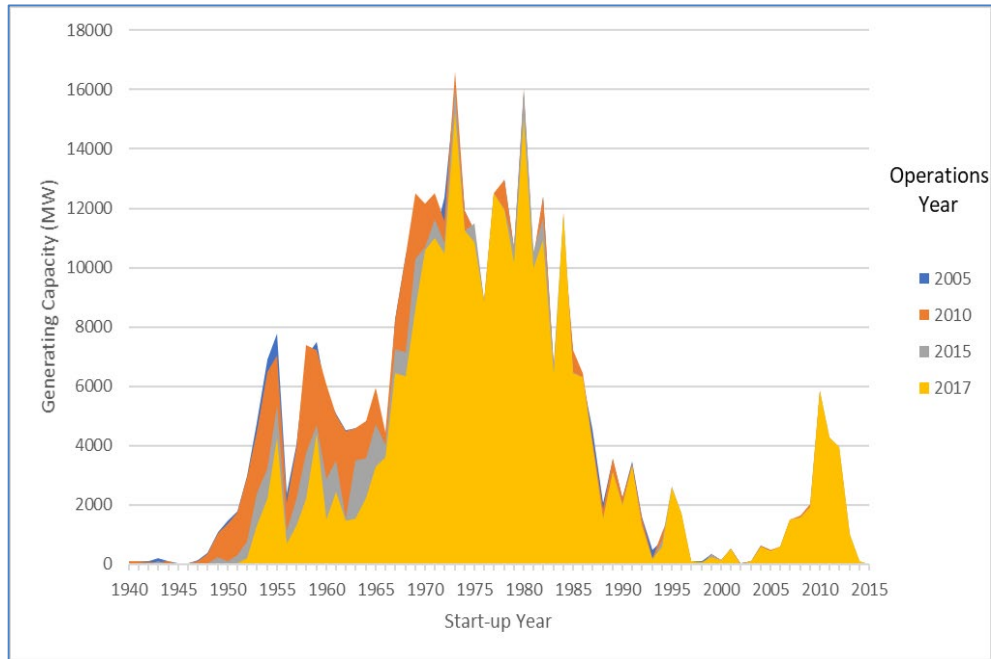
Residential Electricity Rates

Non-residential Electricity Prices



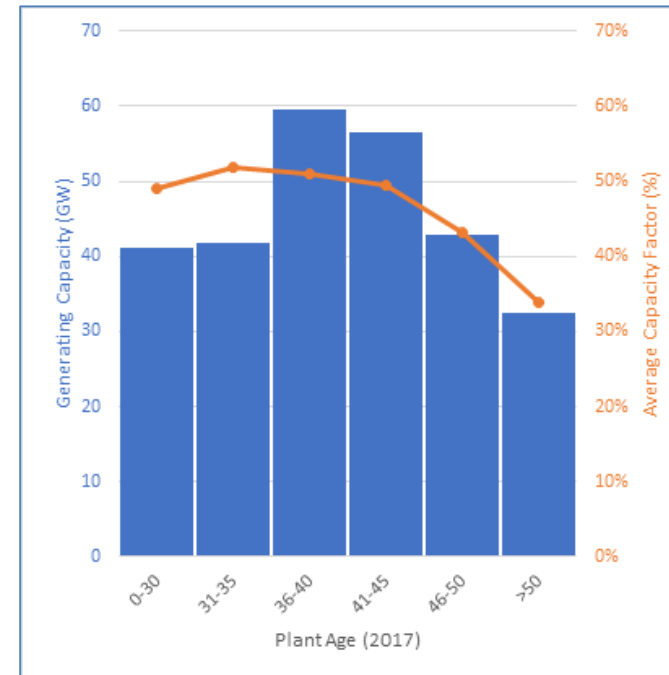
- **ASSESS | SUPPORT | REFORM | RENEW**
 - Provide appropriate economic and regulatory incentives to stem the tide of plant retirements.
 - Establish an environment that values and compensates diversity.
 - Support mechanisms to immediately compensate the U.S. coal fleet for the essential services it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

Today's Coal Fleet



Start-up Year & New Generating Capacity

U.S. Coal Fleet Age in 2017

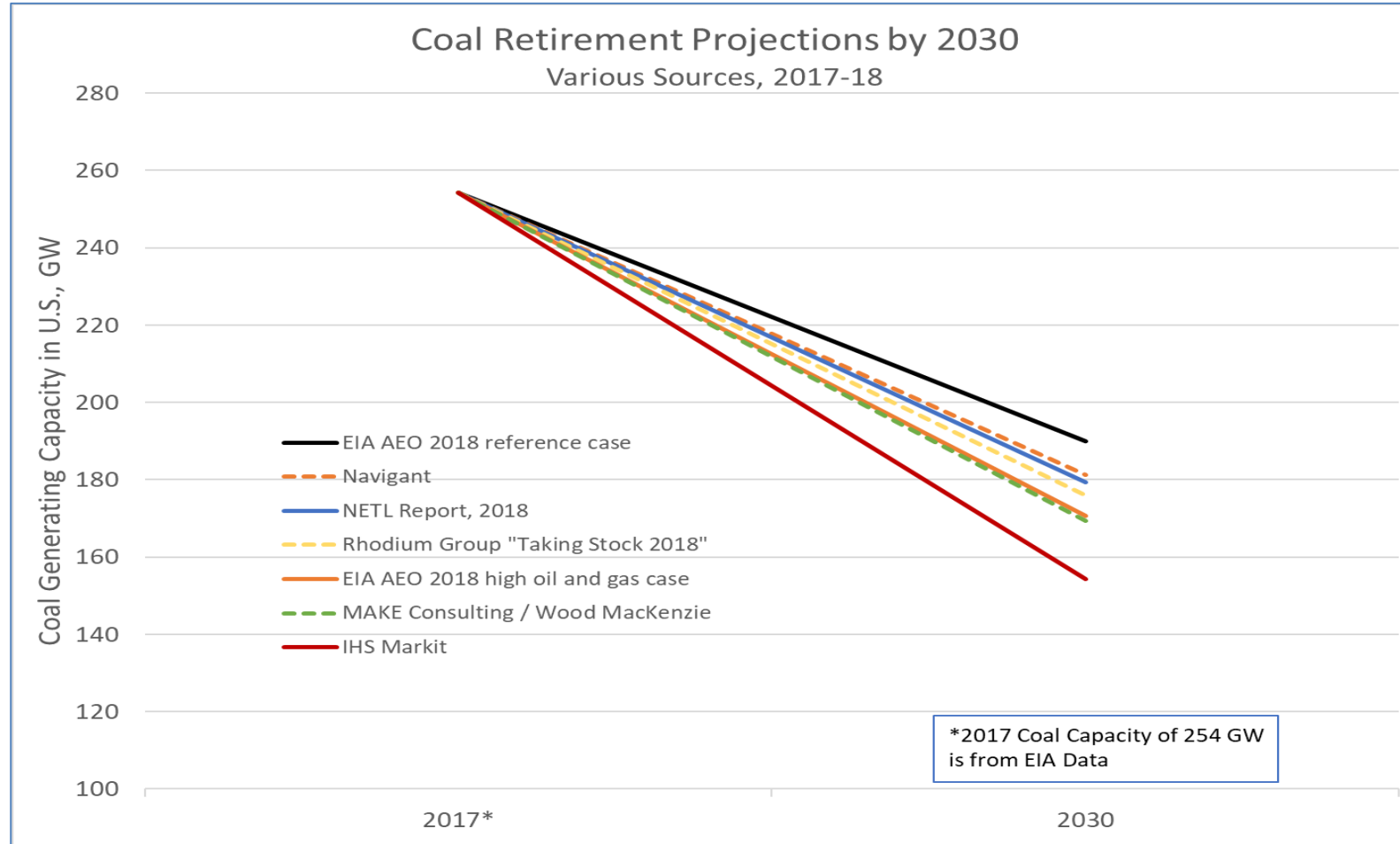




Coal Retirement Contributing Factors

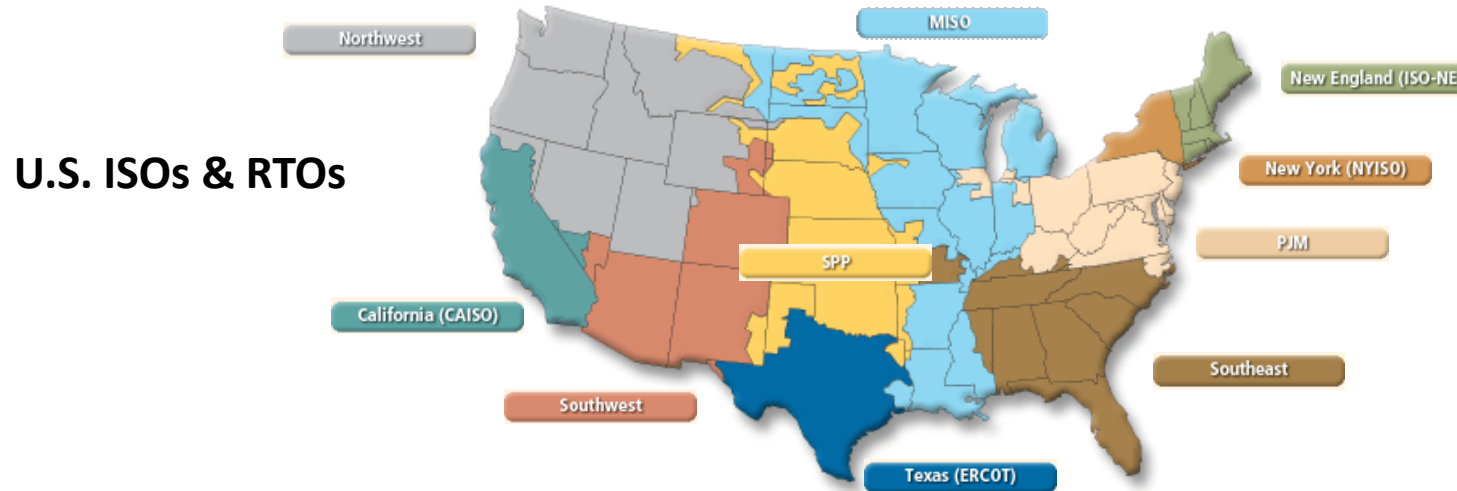
- Shale Gale: natural gas prices - \$7/MMBtu (2003-2008) vs. \$3.20/MMBtu (2012-2016)
- IRE Subsidies: 2010-2016 IRE's share of subsidies increased from 42% to 45%; coal subsidies increased from 2% to 8%.
- Environmental Regulations: MATS, CWA, NSR, CCR, ELG.
- State Energy Policies: RPS, EERS.
- Aging Infrastructure
- Technology R&D Support: No existing fleet funding for nearly 10 years.
- Societal Pressures: Divestitures, anti-coal advocacy, coal infrastructure opposition, coal project financing proscriptions

Outlook for Coal Generation



- **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

Optimize Diversity & Resiliency Market Considerations



- Federal Energy Regulatory Commission Action
 - Price Formation
 - Essential Reliability Services
 - Capacity Market Reforms
 - Forward Resiliency Market
 - Demand Response Compensation Reform

- **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
 - Advance public-private partnerships to accelerate advanced coal technology deployment
 - Promote initiatives to enhance transparency about the inherent costs and benefits associated with all U.S. energy resources



Optimize Diversity & Resiliency Technology Considerations

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

- CCUS could play a critical role in reducing coal plant retirements.
- Retrofit options would need improved operational economics, either through reduced costs for CCUS and/or increased revenue from CO₂ sales.
- More projects are needed to achieve technical advances.
- Multiple CCUS technologies would spur competition.
- Government support is essential for demonstration of new CCUS technologies at commercial scale.



The Secretary of Energy
Washington, DC 20585

August 31, 2018

Mr. Deck Slone
Chairman, The National Coal Council
1000 Independence Avenue SW, Room 4G-036
Washington, DC 20585

Dear Chairman Slone:

I am writing today to request the National Coal Council (NCC) develop a white paper assessing opportunities to enhance the use of U.S. coal beyond power markets.

The white paper should focus on new markets for “coal to products” including coal conversion (coal to liquids, coal to gas, coal to chemicals); carbon engineered products (value-added non-Btu products); rare earth elements; coal combustion products, methanol; biotechnology approaches (agriculture, liquid fuels); and beneficiated coal for non-power uses, among others.

The key questions to be addressed include:

- What significant market-scale opportunities exist for new markets for coal?
- What are the economic, energy security, trade, and other issues the U.S. faces now that can be addressed with new markets for coal?
- Considering the current uses for coal overseas (syngas, chemicals, synthetic oil, transportation fuels, etc.), where and how are these markets operating today and what is the outlook for these markets going forward?
- What has been the domestic history of coal utilization and what can be learned from past successes/failures in coal utilization?
- How can domestic markets for utilization (other than for CO₂) be developed similar to those underway in other countries?

The white paper should be managed under the auspices of the Executive Advisory Board within the NCC. I ask that the white paper be completed no later than April 12, 2019.

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 in this effort.

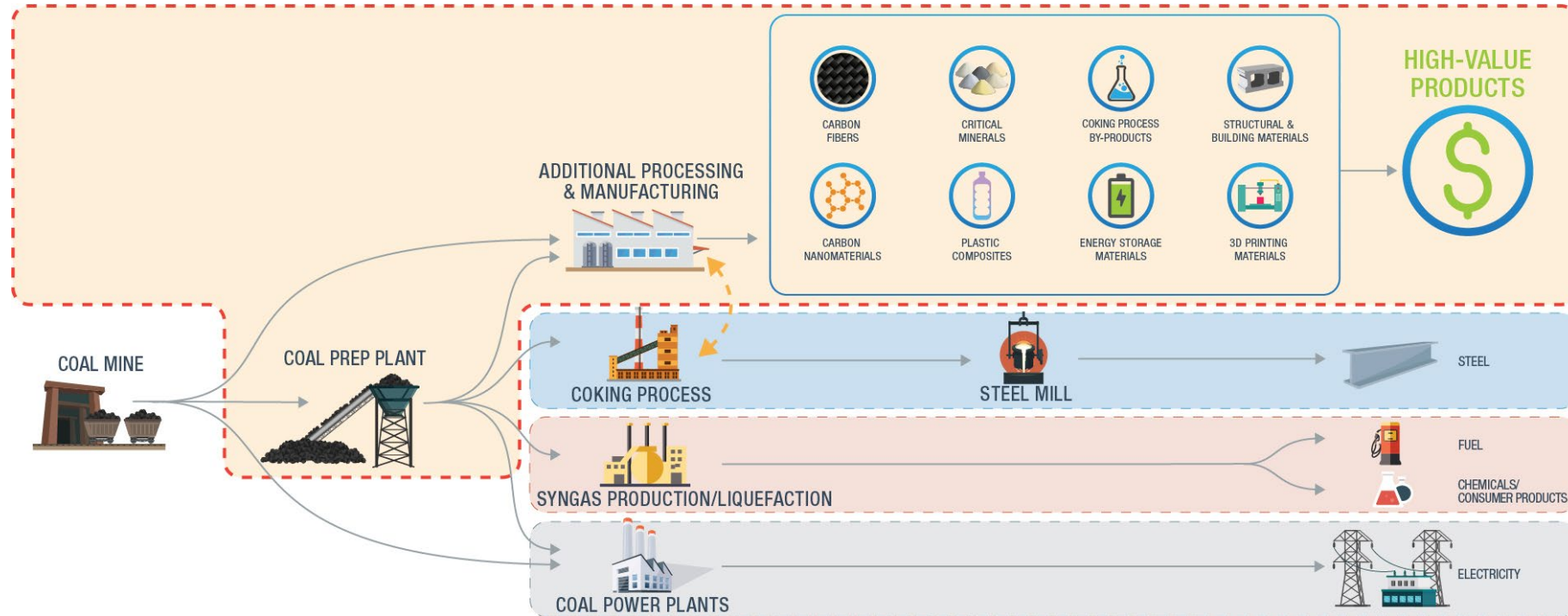
Sincerely,

Rick Perry

Rick Perry



Coal in a New Carbon Age



Country	Million Tonnes	Share
U.S	258,709	25.0%
Russia	160,364	15.5%
Australia	144,918	14.0%
China	139,919	13.5%
India	97,728	9.4%
Germany	36,100	3.5%
Ukraine	34,375	3.3%
Poland	25,811	2.5%
Kazakhstan	25,605	2.5%
Indonesia	22,598	2.2%
Other	88,885	8.6%
Total	1,035,012	100.0%

Source: BP Statistical Review of World Energy, June 2017

Global Coal Reserves



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