Carbon Management Approaches

*CCUS & Beyond*

CARBON MANAGEMENT TECHNOLOGY CONFERENCE

JULY 16, 2019 – HOUSTON, TEXAS

JANET GELLICI, CEO, NATIONAL COAL COUNCIL
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
Limited to 125-150 members representing a broad spectrum of coal interests
Body of Work

Reports
~ 40 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
Building New Coal Plants
Industrial Coal Use

CCUS for EOR
Value of Existing Coal Fleet
Fossil Forward: CCS Technologies
Policy Parity for CCS
CO₂ Utilization
Advancing U.S. Coal Exports
Power Reset: Existing Coal Fleet
Coal in a New Carbon Age
1998-2019
15 reports prepared by NCC addressing carbon management

- Enhance Efficiency
- New Source Review
- R&D Portfolio of Technology Options
- Portfolio of CO$_2$ Storage & Use Options
- DOE-Industry & International Partnerships
- Projects, Projects, Projects
- Financial Incentives
- CCUS Critical
A History of Engagement
Formal request April 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?”
Report Focus & Recommendations

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

REFORM the regulatory environment.

- **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
Policy Reforms

• New Source Review
• PURPA Reform
• Coal Combustion Residuals
• Effluent Limitation Guidelines
• Land Use Policies on CCUS
• Engage with EPA
“... EPA’s new approach to its NSR rules presents a significant regulatory barrier to projects at existing sources that would otherwise be undertaken to improve availability and efficiency. This barrier can be expected not only to prevent significant gains in generating capacity at existing units, but also to actively reduce availability of these units by preventing needed maintenance ... this barrier also can be expected to inhibit development of more efficient generating technologies ...”

*Increasing Electricity Availability From Coal-Fired Generation in the Near-Term – NCC May 2001*
“Under PURPA enacted by Congress to address the energy shortage in the 70s, utilities are required to purchase power from ‘qualified facilities’ (QFs) … [FERC] continues to grant QF status to all renewable QFs of 20 MW or less … (and) allows large renewable QF projects, such as wind and solar, to be split up into 20 MW projects to be granted QF status requiring utilities to purchase the power produced whether needed or not at … typically higher rates than market rates.”

Leveling the Playing Field – NCC November 2015
“The [EPA 2015 CCR] rules set standards for existing CCR impoundments and require closure of ash ponds ... The rule may drive units to retire as the compliance costs become prohibitive, adding to the cost of generation, or their disposal facility is forced to close, and the alternative are too expensive.”

“The Clean Water Act directs EPA to establish effluent limitation guidelines and standards (ELGs) to control discharges of pollutants to surface waters ... The ELGs add the possibility of adding a wastewater treatment module to the FGD discharge stream ...”

Power Reset – NCC October 2018
“Several plants in the existing coal fleet are either located on federal and/or tribal lands, or have reasonable proximate access to the same ... the facilities could potentially benefit if the relevant authorities enacted CO$_2$ storage laws and regulations for these resources.”

*Power Reset* – NCC October 2018
Policy Reforms

- New Source Review
- PURPA Reform
- Coal Combustion Residuals
- Effluent Limitation Guidelines
- Land Use Policies on CCUS
- Engage with EPA
Tax Reforms

Tax Credits
- O&M Tax Credit
- 45Q Implementation
- 48A Investment Tax Credit
## Coal Power Plant Efficiency Audit Results

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Capital Cost</th>
<th>B/C Ratio</th>
<th>B/C Ratio Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulating Water Pump Refurbishment</td>
<td>Low</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td>Sootblowing Steam Source</td>
<td>Low</td>
<td>High</td>
<td>2</td>
</tr>
<tr>
<td>Coal Mill Inerting Source</td>
<td>Low</td>
<td>High</td>
<td>3</td>
</tr>
<tr>
<td>Add Condensate Polishing</td>
<td>Medium</td>
<td>High</td>
<td>4</td>
</tr>
<tr>
<td>HP/IP/LP Turbine Upgrade</td>
<td>High</td>
<td>High</td>
<td>5</td>
</tr>
<tr>
<td>Coal Mills Replacement</td>
<td>High</td>
<td>High</td>
<td>6</td>
</tr>
<tr>
<td>Boiler Feed Pump Refurbishment</td>
<td>Low</td>
<td>Moderate</td>
<td>7</td>
</tr>
<tr>
<td>Helper Cooling Tower Replacement &amp; Pumps</td>
<td>Medium</td>
<td>Moderate</td>
<td>8</td>
</tr>
<tr>
<td>Replace Flame Scanners</td>
<td>Low</td>
<td>Moderate</td>
<td>9</td>
</tr>
<tr>
<td>VFD’s for Forced Draft Fans</td>
<td>Medium</td>
<td>Low</td>
<td>11</td>
</tr>
<tr>
<td>Air Heater Overhaul</td>
<td>Medium</td>
<td>Low</td>
<td>10</td>
</tr>
<tr>
<td>Replace Air Preheat Coils</td>
<td>Low</td>
<td>Low</td>
<td>12</td>
</tr>
<tr>
<td>VFD’s for Induced Draft Fans</td>
<td>Medium</td>
<td>Low</td>
<td>13</td>
</tr>
<tr>
<td>Alternate Air Heater Overhaul</td>
<td>Medium</td>
<td>Low</td>
<td>14</td>
</tr>
<tr>
<td>Alternate Air Preheat Coils Modification</td>
<td>Medium</td>
<td>Low</td>
<td>15</td>
</tr>
</tbody>
</table>
“A diamond is a chunk of coal that did well under pressure.”

~ Henry Kissinger
Dear Chairman Stone:

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-fuel 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-to-Products
Market Sectors
Environmental Benefits of Coal-to-Products
Coal-to-Products Report
Recommendations

• Establish a focused R&D program on coal-to-products.

• Accelerate research-to-commercial deployment in coal-to-products market sectors.

• Incentivize private sector investment in coal-to-products production and manufacturing sectors.
“Achieving global climate objectives will require a portfolio of approaches that balance economic realities, energy security and environmental aspirations. The most impactful action the U.S. can employ to reduce CO\textsubscript{2} emissions is to incentivize the rapid deployment of CCUS technologies.”

\textit{CO\textsubscript{2} Building Blocks: Assessing CO\textsubscript{2} Utilization Options – NCC August 2016}
“The Apollo project was a great achievement. It showed that this country could do what it wanted to do technologically if devoted enough time and effort and resources to it. I think we could do lots of things today technologically if there were the political will, and there was political will to go to the moon.”

Mark Bloom