

## **Net-Negative CO2 Coal Baseload Power**

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### **The Current Situation**

There is increasingly consensus among governments and business that climate change concerns must be addressed and the Administration has adopted very aggressive GHG reduction goals. Whether it is thought these Administration goals are appropriate, or not, these goals are actually not that different than the goals of many U.S.-allied countries. It is a near certainty that we will see policies implemented moving the U.S. toward these goals.

There are multiple implementation paths toward these goals: One path leads the country aggressively toward an “all renewable world”. Such a path includes a phase-out of fossil fuels, compromises the nation’s reliable baseload generation capacity, and would economically hollow out coal communities. A recent independent study estimated the infrastructure costs of such a transition in the U.S. to be \$4.5 trillion.

An alternative path puts the focus on addressing climate change concerns with technology and relies on an “all of the above” approach. This approach recognizes the benefits of fossil fuels, renewables, AND nuclear power generation. Such an approach seeks to reduce the amount carbon emissions rather than eliminating particular fuel types. Perhaps ironically, it is this alternative path—the path which includes coal—that gives the Administration the best shot at achieving their stated climate goals. An “all of the above” approach is a lower cost path, protects needed baseload generation, and mitigates the negative economic impacts on coal communities.

### **The Opportunity**

A reality is, the burden of proof that an “all of the above” technology-based path is the better path rests heavily on the coal sector and its allies. If we can’t prove the viability of this path (not just talk about it), policy momentum will attempt to lead society down the “all renewable” path—at great expense and with questionable progress.

If the Administration’s ambitions to incentivize renewables, an expanded grid, battery technology, and electric vehicles—which are supported by many in Congress—become incorporated into a near-term, trillion-dollar plus infrastructure bill or climate-type legislation a few years from now, we need to ensure that such legislation also makes a substantial federal investment in the technology that would enable U.S. coal plants to become NET-NEGATIVE CO2 emitters.

If we seize the political opportunity, we can show that coal can be a meaningful part of addressing climate change concerns. Right now, too many people see fossil fuels as the root of the problem without acknowledging their value.

## **The Technology**

A coal powered plant with net-negative CO<sub>2</sub> emissions is a coal plant that uses coal and biomass, likely in the form of pelletized wood, as fuel to generate electricity AND has carbon, capture, utilization and storage (CCUS) on the backend.

“Net-negative emissions” are possible in this way. When biomass grows it consumes CO<sub>2</sub>. So, if there is a coal plant that uses, for example, 20% biomass and 80% coal as fuel, the fuel input stream already has a negative CO<sub>2</sub> footprint when it reaches the incoming plant gate. If the plant is equipped with 90%+ carbon capture on its back-end, any CO<sub>2</sub> lost to the atmosphere is more than made up for by the negative CO<sub>2</sub> footprint of the biomass fraction of the fuel. As a result, the plant’s CO<sub>2</sub> emissions are net-negative.

In fact, coal with biomass co-fueling is the only scalable, baseload power technology that can operate with “net-negative” carbon emissions. Nuclear is “net-zero” baseload power technology. Solar and wind are “net-zero” but intermittent and rely heavily on natural gas plants to back them up. The technology required to put bring a net-negative coal-fired power online exists today. While it does require substantial site-specific engineering design work to retrofit an existing coal plant to use a blended coal/biomass fuel, it is practical to do so, if adequate financial incentives are in place.

## **Progress on the Proposal**

Recognizing these facts, and working with several of the major coal producers and allies in Congress, a framework for a financial incentive program has been developed. Legislative language is far along in the drafting process. Rep. McKinley (D-WV), in his leadership role of the House Coal Caucus, is making significant efforts build House support for this proposal. Conversations in the Senate are equally encouraging and we are optimistic about having bipartisan support.

## **Net-Negative CO<sub>2</sub> Baseload Power Program**

The program structure is driven predominantly from a commercial and policymaker viewpoint (as contrasted with a technology and innovation viewpoint that is often used to structure traditional federal R&D programs). The program is designed to support “rapid” modernization of existing plants.

One purpose of the program is to keep coal plants in the communities where they are currently located, which of course translates to new construction jobs as well as preserved coal mining jobs and plant operating positions in those communities. It also helps maintain the coal supply chain jobs and economic benefits.

The proposed program would place \$30B in a dedicated trust through a one-time appropriation. A trust creates the federal financial certainty necessary to motivate private sector co-investment toward long-lived, power plant assets. It avoids the uncertainties of the annual appropriation cycle.

While, \$30B is a sizable investment, in the context of trillion dollar plus infrastructure bills and the scale of the climate challenge, it is manageable. The program would be managed by DOE. While up to the Department to determine the management details, it only seems logical that given its expertise NETL in Morgantown would play a significant role.

The program would make available to coal power plant owners (e.g., investor-owned utilities, independent power producers, municipalities, and rural electric gencos) a series of financial incentives to retrofit or replace existing coal plants. These would include: front-end grants for Concept Studies; once a site-specific concept study demonstrates a project's merit, federal cost-sharing for Project Development Activities, such as engineering design, permitting, and legal work, would be available.

Further, a basket- of financial incentives would be provided at the point of Final Investment Decision to start construction comprising: capital cost buy-downs; partial loan, completion, and performance guarantees; operating incentives (e.g., contracts for differences); tax incentives (e.g., Q45). Importantly, the program would have built-in protections to right-size incentives (i.e., adequate incentives to help give projects a high probability of success, but not oversized such that the plant owner is enriched).

### **What Can You Do?**

- 1) Reach out to members of Congress wherever you have relationships—not just the WV delegation.
- 2) Drive home the key messages in every venue where you have the opportunity:
  - Point out that: A Net-Negative CO<sub>2</sub> Baseload Power Program (for coal) must be part of any infrastructure or climate-related legislation that incentivizes other low-carbon infrastructure such as renewables.
  - Educate them on the fact that: Reducing economy-wide GHG emissions, sufficiently to address climate change concerns, would require U.S. and global electrification (transportation, industrial, and buildings sectors) on an unprecedented scale and we need ALL low-carbon electricity generation options on the table.
  - Convey that: The Administration's "net-zero" goals are unattainable without "net-negative" technologies that preserve affordable, reliable baseload power.
  - State the fact that: Coal with biomass co-firing is the only scalable, baseload power technology that can operate with net-negative carbon emissions.
  - Remind them that: Climate change is a global challenge. Developing economies, like China and India, will not turn their backs on coal and their own economic development. THEY HAVE STATED SO AND THEIR ACTIONS PROVE THEY MEAN WHAT THEY SAY. If the Administration is sincere in its aspiration to lead THE WORLD IN GHG REDUCTIONS, the U.S. should commercialize net-negative CO<sub>2</sub> coal technology and export it to the world. In doing so, we will be creating American jobs and addressing global environmental improvement at the same time.
- 3) Formulating legislation is a process, your input is not just welcome, it's invited.

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