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### CONSOL Energy's Advanced PFBC Power Plant Project

\* Coal mine waste-derived fuel \* 90+% CO<sub>2</sub> Capture \* Net Carbon Negative via BECCS \*

CONSOL's Advanced PFBC Project was developed in response to the U.S. Department of Energy's (DOE) Coal FIRST program. The Coal FIRST initiative is a multi-phase program that will lead to development of the coal plant of the future - providing secure, stable, and reliable power with near-zero emissions, and including carbon dioxide (CO<sub>2</sub>) capture and utilization/storage. Coal FIRST plants are capable of *flexible* operations to meet the needs of the grid; use *innovative* and cutting-edge components that improve efficiency and reduce emissions; provide *resilient* power; are *small* and modular compared to today's conventional utility-scale plants; and will *transform* how coal technologies are designed and manufactured. The program will lead to the design of an advanced coal-based power plant that can be commercially viable in the U.S. power generation market of the future, has the potential to be demonstrated in the next 5-10 years, and can begin achieving market penetration by 2030. CONSOL's Advanced PFBC project has successfully advanced through phases 1 & 2 of DOE's competitive process (Conceptual Design and Pre-FEED), and its core technology was identified as a priority for stage 3 (Design Development & FEED) funding. In October 2020, CONSOL's phase 3 application was selected for funding. Work on this phase of the project began in January 2021, and will continue through mid-2023.

The CONSOL Energy Advanced PFBC project will be an ~300 MW(net), carbon-negative power plant utilizing waste coal slurry derived from CONSOL's Pennsylvania Mining Complex (PAMC) in Greene County as the primary fuel, supplemented with biomass for BECCS (bioenergy with carbon capture and storage) integration. Key aspects of the project include:

- PFBC technology is well-established, with 6 commercial plants developed internationally, with more than 200 combined years of operating experience.
- CONSOL and its partners' experience with PFBC includes construction and operation of a dedicated 1 MW Process Test Facility at CONSOL's former R&D facility to demonstrate feasibility for this application.
- The proposed plant will support a reduced environmental impact, including:
  - Using waste coal as primary fuel limits environmental liabilities associated with waste coal storage facilities
  - Co-firing with up to 10% biomass, facilitates CO<sub>2</sub> capture, and promotes net-neutral/net-negative CO<sub>2</sub> emissions via BECCS
  - Achieving near-zero levels of regulated emissions, including SO<sub>x</sub>, NO<sub>x</sub>, mercury, and particulate matter
  - Reducing water consumption and zero liquid discharge (ZLD)
  - Pursuit of beneficial reuse opportunities for mineral matter separated from the waste coal and ash produced by the power plant
  - Evaluation of multiple options for CO<sub>2</sub> disposition, including on-site geologic storage and integration into a larger regional CCUS deployment network
- Project capital and operational costs for the Advanced PFBC plant are expected to be favorable based on modular construction, high-efficiency operation, and exceptionally low total fuel costs enabled by the use of waste coal.
- Schedules for design, construction and commissioning for the Advanced PFBC plant are expected to be streamlined by the existing level of PFBC engineering and design, as well as the modular plant design and construction.
- Project economics are also well-supported by potential tax credits, loan guarantees, accelerated depreciation schedules, and direct offsets to existing expenses related to electricity and slurry management.
- Phase 3 of the project is expected to contribute to the understanding of CO<sub>2</sub> storage and utilization opportunities in southwestern PA, which is a region that has great potential for CCUS deployment but that has not been extensively characterized for CO<sub>2</sub> storage and infrastructure implementation.