

Dear Colleague,

We are pleased to announce that Lawrence Berkeley National Laboratory has released a new report, “Advanced Coal-Wind Hybrid: Economic Analysis,” in support of a Western Interstate Energy Board project which was funded by the U.S. Department of Energy.

This scoping study explores the economic and technical feasibility of combining wind farms with advanced coal generation facilities and operating them as a single generation complex in the Western U.S. The key questions examined are whether an advanced coal-wind hybrid (ACWH) facility provides sufficient advantages through improvements to the utilization of transmission lines and the capability to firm up variable wind generation for delivery to load centers to compete effectively with other supply-side alternatives in terms of project economics and emissions footprint. The study was conducted by an Analysis Team that consists of staff from the Lawrence Berkeley National Laboratory (LBNL), National Energy Technology Laboratory (NETL), National Renewable Energy Laboratory (NREL), and Western Interstate Energy Board (WIEB).

We conducted a screening level analysis of ACWH generation options located in Wyoming that would supply electricity to load centers in California, Arizona or Nevada. In terms of approach, we first reviewed and analyzed several different ACWH configurations in order to establish a preferred ACWH option. Second, we analyzed the net benefits of a hybrid configuration for this preferred ACWH option by comparing it with a benchmark advanced coal and wind non-hybrid facility. Third, we then compared the levelized cost of electricity delivered to the load center for the preferred ACWH option with other competing hybrid and non-hybrid options, which includes generation, transmission, and emission allowance costs. We adjust the levelized cost estimates to take into account the effect of differences in firm capacity, integration costs incurred by variable generation resources (e.g. wind) and the effect of incorporating a fuel production or a syngas storage facility in the ACWH configuration.

The major findings of this study are:

- Adding a fuel (syncrude or synthetic natural gas) production or syngas storage facility to the ACWH configuration lowers its levelized cost of electricity by improving its utilization.
- The net benefits of configuring wind and advanced coal in a hybrid project instead of operating them in a stand-alone manner at a remote location are positive but modest. This suggests that the savings in transmission, wind integration, and wind resource adequacy costs (which are the primary benefits of the hybrid configuration) somewhat outweigh the increased fixed costs per unit of power generation and fuel production, given the lower utilization factor of the power generation and fuel production units in the ACWH configuration.
- Under our base case assumptions, the preferred ACWH option is quite competitive with other generation technologies and has a relatively low emission footprint (i.e., about 7% and 15% of the CO<sub>2</sub> emitted per unit of electricity produced by conventional coal and natural gas plants respectively). The relative competitiveness of the ACWH option depends primarily on assumptions regarding natural gas and fuel prices and capital costs

of generation technologies. The ACWH option is competitive under moderate to high natural gas and emission allowance prices.

- Several major caveats need to be considered in interpreting the results of this scoping study. First, there is limited empirical basis for the estimates of the costs of an advanced coal plant since they have not yet been commercially built. If the actual costs of these plants are significantly higher than our assumed cost values, the results of our screening level analysis would change significantly. Second, there are many technical, environmental, and regulatory issues surrounding large-scale carbon capture and sequestration which have not been resolved yet and could affect the feasibility of the ACWH option. Third, our screening level analysis does not fully account for the impacts and interaction of large new generation projects with existing utility systems that are typically accounted for as part of a resource planning and capacity expansion modeling effort. Our results suggest that a more detailed economic analysis of an ACWH project may be worthwhile.

The report may be downloaded from the following website:

LBNL Electricity Markets and Policy Group: <http://eetd.lbl.gov/ea/EMS/rplan-pubs.html>  
Western Interstate Energy Board: [http://www.westgov.org/wieb/reports/board/12-04-08LBNL\\_CWHReport.pdf](http://www.westgov.org/wieb/reports/board/12-04-08LBNL_CWHReport.pdf)

Please contact Amol Phadke of LBNL ([AAPhadke@lbl.gov](mailto:AAPhadke@lbl.gov)) or Doug Larson of the Western Interstate Energy Board ([dlarson@westgov.org](mailto:dlarson@westgov.org)) for more information on the study.

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