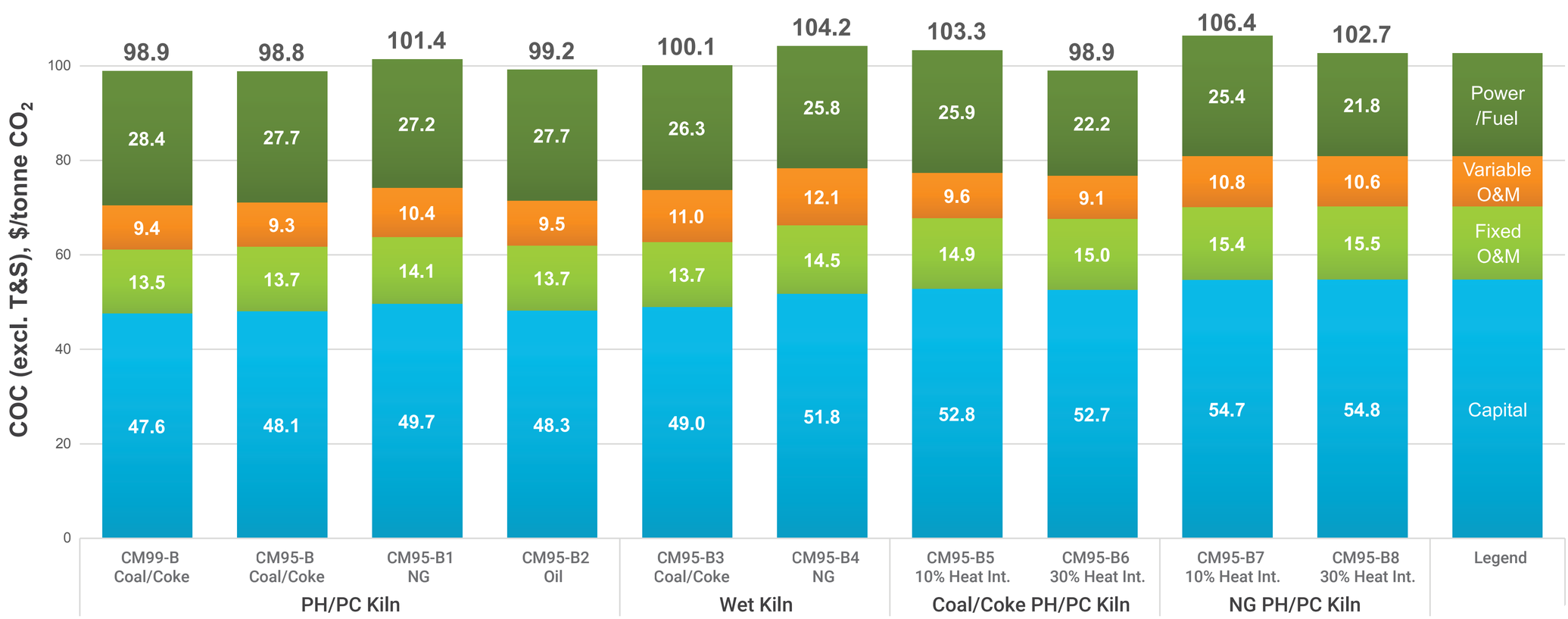
Decarbonizing Cement Production: Analysis of Carbon Capture Retrofits for Cement

NETL built upon baseline studies for carbon capture for power generation and collaborated with the Portland Cement Association to establish a benchmark for the performance and cost of applying 95% CO_2 capture to cement plants.



Cost of CO_2 capture results by cement kiln and fuel type for 95–99% CO_2 capture before applying financial/tax incentives and excluding CO_2 transport and storage costs.

In 2020, U.S. cement production emitted ~69 million tonnes of CO_2, which was 1.5% of total domestic CO_2 emissions. Options to decarbonize cement include alternative fuels, alternative technologies that replace traditional Portland cement in concrete, and post-combustion CO_2 capture of kiln exhaust gas, the most near-term path to cement decarbonization.

NETL utilized its process modeling and cost estimation capabilities to develop a baseline study to characterize the cost and performance impacts of applying solvent-based CO_2 capture to cement production. The study included a range of cement kiln types and firing of a range of fuels.

- Characterization of the cement kilns was informed through collaboration with the Portland Cement Association.
- Results showed that the cost of CO_2 captured could range from $98.8 to $106.4/tonne before any tax or financial incentives.
- The baseline study helps program and policy leaders to inform technology status, highlight pathways to deployment, set programmatic targets, and shape R&D programs.

DOE PROGRAM

Point Source Carbon Capture

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