DIVE BRIEF

Reuse of coal plants can cut small modular nuclear reactor development costs by 35%: report

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Wind blows pollution from a coal burning power plant. DWalker44 via Getty Images

Dive Brief:

- Nearly one-fourth of the current U.S. coal-fired fleet is scheduled to retire by 2029, providing opportunities to site advanced nuclear plants, specifically small modular reactors, or SMRs, a Washington, D.C. think tank says in a recent report.
- The reactors can reuse coal plant electrical equipment and steam-cycle components that, combined with reuse of transmission and administrative buildings, can reduce SMR construction costs by 17% to 35%, according to John Jacobs and Lesley Jantarasami, authors of “Can Advanced Nuclear Repower Coal Country?” released this month by the Bipartisan Policy Center.
- The Nuclear Regulatory Commission’s certification in January of NuScale Power’s SMR design, the country’s first such federal

approval, “pushes the technology closer to maturity,” the report said.

Dive Insight:

The report says 80% of evaluated coal plants have the “basic characteristics” needed to be repowered by an SMR, according to a Department of Energy study analyzing coal plants recently retired and those soon to be. Nuclear reactors and coal power plants both provide dispatchable energy “24/7 regardless of weather conditions, time of day or the season,” it said.

“Renewables have a vital and substantial role to play in a decarbonized energy grid,” the report said. “Yet, it is essential to complement their variability with the construction of firm power capable of filling the gaps and maintaining reliability.”

Other benefits highlighted by the report are SMRs’ flexible power output levels that allow developers to match the output of a retiring coal plant and capacity restrictions of equipment, unlike the fixed capacity of traditional nuclear plants. And SMRs require small areas, making its footprint suitable for replacing a retiring coal plant, according to the report.

Re-using coal plant sites could also have labor force advantages, with 77% of jobs transferable to nuclear plants with no new workforce licensing requirements, the report said.

SMRs can reuse coal plant transmission infrastructure, reducing SMR construction costs and avoiding some permitting challenges. And the reactors can reuse coal plant electrical equipment and

steam-cycle components that, combined with reuse of transmission and administrative buildings, can reduce SMR construction costs by 17% to 35%, according to the report.

The issue of shifting coal sites to nuclear energy production has been around for a while. The U.S. Department of Energy issued a report in September saying hundreds of coal sites could be converted to nuclear power plants that would add jobs, increase economic benefits and improve environmental conditions.

Coal is responsible for the largest share of CO_2 emissions from the energy sector, making its phase-out key to tackling climate change, according to the International Energy Agency.

Backers of nuclear energy say the coal-to-nuclear transition will add clean electricity to the grid, helping the U.S. reach its net-zero emissions goals by 2050.

Opponents say SMR manufacturing is notorious for cost overruns and delays at a time when climate change demands immediate attention. Critics also say the money earmarked for advanced reactors can better be spent on renewable energy such as wind, solar and battery storage.

The Bipartisan Policy Center report cites several challenges, such as NRC licensing and “technological infancy” that create uncertainties for SMR construction timelines and 23% of coal plant jobs require extensive retraining or licensing to transfer to a nuclear plant, including operators, senior managers, and technicians.

The report also says coal plant equipment reuse may be limited because coal plants have several, smaller units with less capacity than what's needed for an SMR.