The vanishing nuclear industry

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Could nuclear power make a significant contribution to decarbonizing the U.S. energy system over the next three or four decades? That is the question asked by four current and former researchers from Carnegie Mellon University's Department of Engineering and Public Policy (EPP). Their answer: probably not.

In a paper, "U.S. nuclear power: The vanishing low-carbon wedge," just published in the *Proceedings of the National Academy of Science* (*PNAS*), the team examined the current U.S. nuclear fleet, which is made up of large light water nuclear reactors (LWRs). While for three decades, approximately 20% of U.S. power generation has come from these LWRs, these plants are ageing, and the cost of maintaining and updating them along with competition from low cost natural gas, makes them less and less competitive in today's power markets.

In place of these LWRs, the team asked whether advanced reactor designs might play a significant role in U.S. energy markets in the next few decades. They concluded that they probably would not. Then, the team examined the viability of developing and deploying a fleet of factory manufactured smaller light water reactors, known as small modular reactors (SMRs). The team examined several ways in which a large enough market might be developed to support such an SMR industry, including using them to back up wind and solar and desalinate water, produce heat for industrial processes, or serve military bases. Again, given the current market and policy environments, they concluded that the prospects for this occurrence do not look good.

In the article's conclusion, the team writes, "It should be a source of profound concern for all who care about climate change that, for entirely predictable and resolvable reasons, the United States appears set to virtually lose nuclear power, and thus a wedge of reliable and low-carbon energy, over the next few decades."

More information: M. Granger Morgan el al., "US nuclear power: The vanishing low-carbon wedge," *PNAS* (2018). www.pnas.org/cgi/doi/10.1073/pnas.1804655115

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