Study of NuScale Power data suggests small modular reactors likely to produce more waste than larger reactors

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A pair of researchers from Stanford University working with a colleague at the University of British Columbia has found that small, modular nuclear reactors (SMRs) may produce more toxic waste per unit of

electricity generated than larger, more mainstream nuclear reactors. In their paper published in *Proceedings of the National Academy of Sciences*, Lindsay Kralla, Rodney Ewing and Allison Macfarlane describe their analyses of data provided by NuScale Power, an entity tasked with designing smaller and cheaper nuclear power plants, and the models they created to show how much toxic waste would be produced by such plants.

As researchers continue to look for alternatives to fossil fuels to provide global power needs, some still promote the use of nuclear reactors. Some have even suggested that building small, modular reactors would allow for faster plant installations, which, they claim, would be cheaper to build, as well. But little mention has been made regarding the amount and types of nuclear waste associated with such plants.

As the researchers note, designs for SMRs typically call for different cooling methods than those used in the large plants. Instead of using water, they call for using gas or molten salt. This change, they note, adds a degree of inefficiency to the process, which leads to more waste.

To learn more about the amount of waste likely to be produced by SMRs, the researchers obtained publicly available data from NuScale Power and after analyzing it, created three models designed to show how much waste three different designs would create. They then compared the results to data from a conventional nuclear power plant. They found that SMR designs could increase the amount of short-lived low and intermediate levels of waste by up to 35 times per unit of power generated, compared to conventional plants. They also found that SMR designs would produce up to 30 times more long-lived waste per unit of power generated. They conclude that SMRs perform worse when accounting for all of the metrics involved in waste production, compared to traditional plants.

More information: Nuclear waste from small modular reactors, *Proceedings of the National Academy of Sciences* (2022). DOI: 10.1073/pnas.2111833119