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EXCLUSIVE

# Microsoft Targets Nuclear to Power AI Operations

The tech company aims to expedite the nuclear regulatory process using AI

By [Jennifer Hiller](#) [Follow](#)

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Microsoft **MSFT** **0.83%** ▲ is betting nuclear power can help sate its massive electricity needs as it ventures further into artificial intelligence and supercomputing.

The technology industry's thirst for power is enormous. A single new data center can use as much electricity as hundreds of thousands of homes. Artificial intelligence requires even more computing power.

Nuclear power is carbon-free and, unlike renewables, provides round-the-clock electricity. But it faces significant hurdles to getting built, including the daunting and expensive U.S. nuclear regulatory process for project developers.

In a twist, Microsoft is experimenting with generative artificial intelligence to see if AI could help streamline the approval process, according to Microsoft executives.

The generative AI experiments tap in to Microsoft's investment in OpenAI, creator of the viral chatbot ChatGPT. For the past six months, a team of Microsoft employees have been training a large language model with U.S. nuclear regulatory and licensing documents, hoping to expedite the paperwork required for such approvals, which can take years and cost hundreds of millions of dollars.

Power demand is growing globally at the same time as a range of industries is trying to shift away from fossil fuels, said Michelle Patron, Microsoft's senior director of sustainability policy.

"If we're going to do that carbon-free, we're going to need all the tools in the tool kit," she said.

Nuclear power is broadly seeing a surge of popular interest, including at COP28, the United Nations' annual climate conference in Dubai, where the U.S. was among a group of countries pledging to triple global nuclear power generation by 2050.

The reality for nuclear power is that output continues to slide globally as plant closures outpace openings, and no Western country has started construction of newly designed, smaller modular reactors, or SMRs, which many consider the future of the industry.



The site of a new Microsoft data center in Mount Pleasant, Wis. PHOTO: MARK HERTZBERG/ZUMA PRESS

Generation dropped 4% last year and nuclear's share of the global electricity market is at the lowest point in four decades, around 9.2%, according to the latest World Nuclear Industry Status Report released last week.

In the U.S., nuclear power in the past decade has had a hard time competing against cheaper options. The cost of building renewable-energy projects has fallen and the shale boom dropped fuel costs for natural-gas-fired power plants.

While solar and wind deals remain the primary way for companies to buy clean energy, they can't provide round-the-clock power. More companies want to add other kinds of clean generation on local or regional grids that can provide steady power.

Google executives said they would consider signing a power-purchase agreement, traditionally used to help finance new wind and solar projects, with the developer of a SMR. Some cryptocurrency miners, too, say they want to be

among the first customers of SMRs to power their data campuses. Microsoft founder Bill Gates is among several tech billionaires backing SMR developers.

Microsoft posted a job opening this fall for a nuclear-power expert to help it integrate SMRs into its electricity planning. It is also buying power from existing nuclear plants.



Constellation CEO Joseph Dominguez calls the matchup between data centers and nuclear power 'peanut butter and jelly.' PHOTO: AARON M. SPRECHER/BLOOMBERG NEWS

Constellation Energy, the nation's largest owner of nuclear plants, in June agreed to sell nuclear power to Microsoft for a data center in Virginia when wind and solar aren't available. It gives Microsoft price certainty and power generation available "second to second," said Joseph Dominguez, chief executive of Constellation. He calls the matchup between data centers and nuclear power "peanut butter and jelly."

Constellation projects that because of the emergence of AI, new demand for power for data centers could be five or six times what will be needed

for charging electric vehicles.

Google doesn't have a power-purchase agreement with an existing nuclear plant but would consider one with an SMR, said Maud Texier, Google's global director of clean energy and decarbonization development. All of its purchase agreements are for new projects, known as "additionality."

"I do think nuclear, especially advanced nuclear, is making a lot of progress," said Texier, who compares the cost of nuclear projects to where wind and solar were 15 years ago. "Cost decline is going to be a function of deployment," she said.

The costly permitting and construction process remains a primary hurdle for SMRs in Western countries.

In the U.S., so far just one SMR developer, NuScale Power, has had its design approved by the Nuclear Regulatory Commission. The process cost NuScale

around \$500 million and its 12,000-page application had around two million pages of support materials.

Plans for NuScale's first commercial project collapsed last month when a group of utilities in the Mountain West couldn't get enough members to sign up.

The NRC has a strategic plan for AI, "including ongoing efforts to better understand how AI is being considered for use domestically and overseas," spokesman Scott Burnell said. The agency plans to host an international meeting on AI early next year, he added.



NuScale, a developer of smaller modular reactors, received the Nuclear Regulatory Commission's approval for its design. PHOTO: TOMASZ WIKTOR/SHUTTERSTOCK

Microsoft is working on its tests to speed the process using AI with Terra Praxis, a nonprofit that promotes the reuse of old coal plants as potential sites for new, smaller-scale reactors. Microsoft employees provide the coding; Terra Praxis supplies nuclear regulatory expertise.

AI could cut by as much as 90% the amount of human hours spent getting a new nuclear-power plant approved, said Eric Ingersoll, founding director and co-CEO of Terra Praxis. He added that AI could help speed up environmental permitting for renewables developers, too.

To train AI on regulatory filings, the team at Microsoft and Terra Praxis are breaking the documents into smaller chunks.

"What we're doing here is training a [large language model] on very specific highly structured documents to produce another highly structured document

almost identical to previous documents,” Ingersoll said. “We’re not getting the kind of wacky answers where the AI is hallucinating.”

Kirsty Gogan, founding director and co-CEO at Terra Praxis, said the idea is to automate routine work and leave specialized regulators and developers to work on “issues that need to be resolved by people, not robots,” she said.

“We’re really excited about the game-changing potential for AI in this space,” said Microsoft’s Patron.

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