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Advancing Nuclear Energy: The Role of Advanced Technologies in a Changing Political and Regulatory Landscape

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Nuclear energy has long been a significant source of reliable, clean energy within the United States. In 2021 alone, nuclear energy accounted for approximately 20 percent of electricity generated in the country and 50 percent of its carbon-free electricity. And while some sources of carbon-free generation are necessarily intermittent, nuclear generation has a high-capacity factor, capable of running at all hours of the day.

At the same time, numerous public and private stakeholders are working toward net-zero emissions by 2050. For example, many states have enacted legislation establishing strict carbon-reduction goals. As of 2022, at least 13 states require some portion of their economy to achieve net-zero emissions by 2050. While there has been no corresponding federal legislative action establishing national carbon policy, President Joe Biden has in Executive Order H.R. 14057 directed federal agencies to move in specific and significant ways to reduce carbon within specific timelines. Additionally, many large commercial entities have also committed to achieving net-zero or reduced-carbon goals in the relatively near future. But, complicating matters, some predictive modeling of energy demand shows a tripling of global energy power consumption by 2050, driven by factors including expected shifts away from fossil fuel use for transportation, heating, and industrial processes like steelmaking.

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