

A new era for nuclear energy post Inflation Reduction Act

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Nuclear power has been pushing electrons onto the U.S. energy grid since 1957, with little fanfare touting its steadfast reliability and carbon free attributes. However, with increasing focus on decarbonization initiatives and an influx of public and private-sector investments, nuclear energy is sharing the stage with wind, solar, and other low-carbon projects as an indispensable asset in the fight against climate change.

Beyond the environmental benefits, and given the accelerating pace of coal plant retirements, many rural and exurban energy communities are hopeful that nuclear can provide economic support to affected communities because next-generation reactors are practically “drop in” replacements for those facilities.

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Nuclear energy offers a little something for everyone and is being embraced across the political spectrum. All of this, coupled with the recent passage of the Inflation Reduction Act of 2022 (IRA), points to a new era of significant growth and investment for the nuclear industry.

The only source of carbon-free baseload power

Nuclear power has a strong, but largely unacknowledged, climate track record. In fact, most people are unaware that the current fleet of nuclear power reactors in the United States generates half of our nation’s carbon-free electricity. Moreover, nuclear plants provide “baseload” power, meaning they operate continuously and are an ideal complement to “intermittent” sources of carbon-free electricity, such as wind and solar.

According to the latest data from the U.S. Energy Information Administration, in September 2022, nuclear energy facilities had an average capacity factor of more than 93 percent, compared to approximately 27 percent for wind and solar.

These crucial attributes have gone largely unheralded over the last several decades. Indeed, except in certain proactive states with meaningful “zero emissions credit” or similar programs, these features remain uncompensated in competitive electricity markets in the United States. However, the IRA ushered in a new paradigm in which nuclear is squarely recognized as part of the carbon-free energy taxonomy.

The IRA may spur significant investment in the nuclear industry

The IRA contains several key provisions that reinforce a broad spectrum of new and existing activities in the nuclear industry. In addition to providing new production tax credits for existing nuclear plants (which will bolster the economic case for license renewals and continued operation for those facilities), the IRA also delivers numerous *technology-neutral* credits aimed at low- or zero-carbon energy sources, including nuclear.

These include credits focused on the production of clean hydrogen (which can be generated by nuclear reactors — sometimes called “pink hydrogen”) and clean electricity (including future new-build nuclear power projects), as well as investments in clean energy (for which certain nuclear facilities will qualify).

Importantly, the IRA provides for *transferability* of nuclear-related tax credits. Historically, tax equity markets for project financing have been virtually nonexistent in the nuclear sector for various reasons. However, these new provisions in the IRA will facilitate the monetization of tax credits and could be truly transformative for investments in the nuclear industry.

ESG considerations may amplify nuclear investments

Many investors and companies are increasingly incorporating ESG (environmental, social, and governance) considerations into their business and investment decisions. These are largely “bottom-up” decisions that are not driven by any particular government policy or legal requirement. A recent report (<https://bit.ly/3Y8HB6l>) by the Center for ESG and Sustainability, in partnership with Columbia University’s International Research Institute for Climate and Society, emphasizes that the nuclear industry is a very high performer when viewed through an ESG lens.

As noted in the report, nuclear power is efficient and reliable and can deliver consistent baseload power with relatively stable pricing due to long-term fuel supply contracts. On the environmental performance front, nuclear power's energy density and "best-in-class" performance concerning lifecycle land use are already well known. Nuclear power has essentially no carbon emissions at the point of generation, low water consumption, and a proven ability to safely store waste. Simply put, the authors conclude that nuclear power is a "critical backbone of the nation's baseload electricity supply" and is uniquely positioned to confront the "energy trilemma" of reliability, affordability, and sustainability in an ESG-friendly fashion.

PLEASE in my backyard!

Over the last two decades, nearly 1,000 coal plants have been retired in the United States. And that trend is expected to continue — and likely accelerate — in the coming years. These shutdowns can be devastating to the local economies where these plants are located. However, multiple studies have shown that nuclear facilities may be "drop-in" replacements for retiring coal plants. See "DOE Report Finds Hundreds of Retiring Coal Plant Sites Could Convert to Nuclear," Office of Nuclear Energy, U.S. Department of Energy, Sept. 13, 2022 (<https://bit.ly/3uC4d1x>).

For example, coal plants and small modular reactors (SMRs) have similar facility footprints and energy outputs. In contrast, a wind farm requires 170 times more acreage than a nuclear plant to generate the same amount of electricity. Likewise, nuclear facilities can leverage existing craft workforces (such as carpenters, plumbers, painters, and electricians at the existing power plant), which, in turn, can minimize closure impacts and allow communities to retain local tax contributions. With all of this, it is not surprising that many communities are proactively volunteering to host new nuclear reactors.

For example, in concert with bipartisan legislation repealing the nuclear moratorium in Wyoming (a bipartisan trend sweeping across many other states), several communities facing coal plant retirements actively lobbied to host a new advanced reactor. Following a systematic site selection process, Kemmerer, Wyoming, was chosen for the project. However, the communities that were not initially selected are now welcoming a "second chance" to host a nuclear plant after the project sponsors announced the possibility of several more deployments in the next decade. "Wyoming towns welcome second chance to land nuclear plant," Casper Star-Tribune, Nov. 11, 2022, updated Dec. 16, 2022 (<https://bit.ly/3hhgIfZ>).

Historically, large industrial and energy projects have been synonymous with local community opposition — "Not In My Backyard!" But, nuclear deployments are now garnering the opposite: robust community support and competitive pursuit of new projects.

Not your father's 'nuclear renaissance'

Most U.S. power reactors were built during the 1970s and 1980s, but deployments slowed thereafter. In the early 2000s, many industry observers projected a nuclear revival based on various incentives

and subsidies in the Energy Policy Act of 2005 (EPAct) and the high cost of fossil fuels. But that revival never came to fruition, largely due to market forces and the availability of cheap natural gas. Naysayers may cite the failed "nuclear renaissance" of the early 2000s to cast doubt on the likelihood of significant growth in the nuclear industry in the wake of the IRA.

However, the global landscape for nuclear power heading into 2023 is far more favorable than it was two decades ago. Recent policy initiatives, including significant nuclear-friendly provisions in the IRA, arguably provide far greater incentives for institutional investment in the nuclear industry compared to the EPAct.

As noted above, the transferability of tax credits may open up entirely new avenues for project finance. Likewise, private sector decarbonization pronouncements and a growing focus on ESG considerations may bolster a new era of investment in renewable energy and low carbon projects, including investment in nuclear projects, *independent* of government policy.

Likewise, the ability of nuclear plant owners and operators — both new and existing — to leverage additional revenue streams through generation of "pink hydrogen" significantly improves overall project economics.

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These numerous, overlapping, and multifaceted financial, social, and structural supports differentiate the current outlook for nuclear power from the "nuclear renaissance" of yesteryear and point to a stronger likelihood that an era of significant growth in the nuclear industry will come to fruition, providing meaningful environmental and economic benefits.

Hurdles remain

The Biden administration is aiming to cut greenhouse gas emissions in half (from 2005 levels) by 2030 and to net zero by 2050. However, these goals are unrealistic unless the United States can quickly deploy a significant amount of new clean-energy infrastructure to replace fossil fuel generation. Consistent with these objectives, a recent survey of Chief Nuclear Officers (<https://bit.ly/3Pf4tNu>) found that they planned to deploy roughly 300 new SMRs in the United States in the next few decades.

However, the U.S. Nuclear Regulatory Commission (NRC) must prepare an Environmental Impact Statement (EIS) to comply with the National Environmental Policy Act (NEPA) before

issuing a license for each project. The White House's Council on Environmental Quality has reported (<https://bit.ly/3hlm21M>) that the average NRC EIS takes nearly four years to complete — not including litigation, which is frequently used as a further obstruction tactic by project opponents.

Unless policymakers and regulators can implement reforms to streamline the required NEPA reviews, it is unclear how 300 new

carbon-free nuclear plants could achieve regulatory approvals at the pace needed to meet the administration's objectives.

Overall, there are many reasons for optimism about a modern nuclear revival. And the IRA has supercharged the pathway to investment in existing and new nuclear projects. However, there remain practical hurdles that could derail recent momentum unless reform-minded policymakers take responsible actions to modernize the permitting process for carbon-free energy.

About the authors



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