

CLIENT ALERT

Nuclear Energy – Growth and Transactional Opportunities

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Nuclear energy generation is enduring and expanding on several fronts, which has raised the likelihood of [Another Nuclear Renaissance](#). Over the last few years, and picking up steam in 2024, nuclear energy is having a moment. This moment is being driven by the need for baseload resources, high-load growth, efforts to decarbonize the grid, government policies that support nuclear energy, and bipartisan political support. While challenges remain and there are no guarantees that this renaissance will fare better than the last one, in this client alert we discuss some of the leading technologies and ancillary areas of the nuclear power market, both new and old, that underlie many of the opportunities in this sector.

1. Small Modular Reactors

Small Modular Reactors (“SMRs”) have the potential to play a key role in the development of the next generation of nuclear power. SMRs are generally defined as reactors with a power output of 300 megawatts or less – compared to the typical 1,000-megawatt output of traditional reactors. Given SMRs’ ability to have small physical footprints, reduced capital costs, and relative ease of siting, SMRs may provide a near-term path forward for resource-intensive industries with carbon-free, 24/7 power needs.¹ Light water-cooled SMRs, which can take the form of pressurized water reactors or boiling water reactors, may see deployment as early as the late 2020s.² Other, nontraditional coolant SMRs, such as those that deploy liquid metals, salts, and gases are also in development with anticipated future deployment. With the potential to provide baseload generation without having the footprint of a full-scale nuclear plant, SMRs have been supported by a suite of programs at the Department of Energy (“DOE”), such as the Advanced Reactor Demonstration Project, which has a history of bipartisan legislative support.

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2. Existing Reactors in the United States

There are currently 94 nuclear reactors in 54 nuclear power plants in 28 states.³ On April 29, 2024, Waynesboro, GA saw the latest reactor begin commercial operation.⁴ This recent commercialization is the exception to the rule. Over 90% of American plants in operation are over 30 years old.⁵ In 2023, nuclear plants provided 18.6% of the nation's electricity, nearly equal to wind (10.2%), hydro (5.7%), and solar (3.9%) combined.⁶

Because of the critical role these plants play in addressing increasing load and constrained supply options, many of these plants are scheduled to continue operation for decades more. An initial license and renewal allow an operator to use a reactor for up to 60 years. The Nuclear Regulatory Commission ("NRC") has renewed the licenses of 94 commercial nuclear reactors, including many that have since ceased operations.⁷ Beginning in 2022, the NRC began offering "subsequent license renewals" that can extend operation from 60 to 80 years.⁸ It can be more cost-effective to extend the life of existing plants rather than to build new ones. Nonetheless, the costs of extending a one-gigawatt reactor's life by 10 years could cost anywhere between one-half to one billion dollars.⁹ There are many governmental programs to support the existing nuclear reactor fleet, including a new production tax credit pursuant to the Inflation Reduction Act.¹⁰

3. Converting Coal Plants to Nuclear Plants

Converting coal plants to nuclear plants may be one of the next frontiers for nuclear energy. Coal plants, either decommissioned projects or projects near closure, offer existing interconnection capacity, site control, and other advantages that make the site appealing for developers of other types of resources, including nuclear power. The DOE recently concluded that choosing to develop a nuclear plant at a retired coal plant could save 35% of construction costs.¹¹ Construction is often the most unpredictable and greatest expense in developing a new nuclear plant. Considering that shuttering coal plants has significant economic impact on the surrounding community, stakeholders are interested in the coal-to-nuclear conversation.

4. Repowering Nuclear Plants

Shut-down nuclear plants offer even more savings to operators looking to provide nuclear energy compared to other options. Palisades Nuclear Plant in Covert, MI ceased operations in May 2022. On March 27, 2024, the DOE announced a conditional commitment of up to \$1.52 billion for a loan guarantee to restore Palisades Nuclear Plant and have it resume operation until at least 2051, subject to NRC licensing.¹² Palisades is on the path to becoming the first restarted nuclear power plant in American history. With repowering would come thousands of high-paying jobs, zero-emission energy, other regional benefits, and a model for repowering other decommissioned plants around the country. This could be a potential growth area for the nuclear industry.

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5. Traditional “Full-Scale” Projects

In addition to SMRs, advances have been made in traditional reactor designs that have a typical output capacity of one gigawatt. Westinghouse Electric Company’s AP1000 is the leading example, with the NRC approving the original design in 2005. The AP1000 aims to improve passive safety features in a pressurized water reactor with lower capital costs overall. America’s newest reactor in Georgia, mentioned above, is an AP1000. Sanmen Nuclear Power Station in Zhejiang, China became the first plant to achieve criticality with an AP1000 design in June 2018.¹³ Poland is moving forward with its first nuclear power plant utilizing AP1000 reactors, scheduled to enter commercial operations in 2033.¹⁴

6. Nuclear Fusion

Nuclear fusion has the potential to unlock unprecedented amounts of energy generation with few negative externalities, offering virtually limitless, clean power with no long-lasting radioactive waste.¹⁵ For the last 30 years, a common refrain has been that fusion is “a decade away,” and the question now is whether advances in fusion technology will make commercial applications a reality. The Fusion Industry Association tabulates \$6 billion in investment up to the middle of 2023 and 25 companies that are aiming to deliver fusion-generated power before 2035.¹⁶ Moreover, U.S. nuclear fusion company Helion Energy recently entered into an agreement with Microsoft to provide approximately 50 megawatts or more via nuclear fusion, with the project slated to come online and begin ramping up by 2028.¹⁷

7. Complementary Infrastructure

The expansion of nuclear energy infrastructure will be a necessary component beyond reactors, encompassing a comprehensive ecosystem of support services and transmission needs. Thus, prospective investors should consider the entire life cycle of nuclear fuel when deciding to invest. This life cycle involves sophisticated production processes, secure storage solutions, and advanced technologies to manage and possibly even reprocess spent fuel. Additionally, the market for ancillary services, such as maintenance, safety inspections, and waste management, is well positioned to grow with the expansion of nuclear power.

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- 1 <https://www.energy.gov/ne/advanced-small-modular-reactors-smrs>.
 - 2 <https://www.iaea.org/topics/water-cooled-reactors>.
 - 3 <https://www.eia.gov/tools/faqs/faq.php?id=207&t=21>.
 - 4 <https://www.georgiapower.com/company/news-hub/press-releases/vogtle-unit-4-enters-commercial-operation.html>.
 - 5 <https://www.iea.org/reports/nuclear-power-in-a-clean-energy-system>.
 - 6 <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>.
 - 7 <https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-reactor-license-renewal.html>
 - 8 <https://www.nrc.gov/reactors/operating/licensing/renewal/subsequent-license-renewal.html>.
 - 9 <https://www.iea.org/reports/nuclear-power-in-a-clean-energy-system>.
 - 10 <https://www.energy.gov/ne/articles/inflation-reduction-act-keeps-momentum-building-nuclear-power>.
 - 11 <https://www.energy.gov/ne/articles/8-things-know-about-converting-coal-plants-nuclear-power>.
 - 12 <https://www.energy.gov/lpo/articles/lpo-announces-conditional-commitment-holtec-palisades-finance-restoration-and>.
 - 13 <https://www.world-nuclear-news.org/NN-Chinese-AP1000s-pass-commissioning-milestones-2206184.html>.
 - 14 <https://www.world-nuclear-news.org/Articles/Connection-to-grid-requested-for-Poland-s-first-pl>.
 - 15 <https://www.iaea.org/newscenter/news/what-is-nuclear-fusion>.
 - 16 <https://www.fusionindustryassociation.org/wp-content/uploads/2023/07/FIA%E2%80%93FINAL.pdf>.
 - 17 <https://www.reuters.com/technology/microsoft-buy-power-nuclear-fusion-company-helion-2023-05-10/>.