# Underground nuclear reactors set to revolutionise power supply for data centres by 2029



A transformative shift in energy production could soon redefine how data centres—vital infrastructures for today’s digital landscape—source their power. Deep Fission, a pioneering nuclear energy company, has partnered with Endeavour Energy, an organisation committed to sustainable infrastructure, to develop a groundbreaking approach involving subterranean small modular reactors (SMRs). This collaboration aims to produce two gigawatts of nuclear power, specifically designed to meet the surging energy demands of data-intensive industries while promising to keep carbon emissions at zero.

The ambitious plan involves burying these reactors approximately one mile underground, utilising geological advantages to enhance safety and significantly cut costs. Elizabeth Muller, co-founder and CEO of Deep Fission, claims that this method could enable them to provide continuous zero-carbon power at a remarkably low cost of 5-7 cents per kilowatt-hour. This cost competitiveness is crucial as global digital consumption continues to escalate, with data centres responsible for a substantial portion of the energy consumed—much of it deriving from less sustainable, fossil-fuel sources.

Deep Fission's innovative reactor design differs considerably from traditional SMR technologies. By situating the reactors underground, the company can avoid the large containment structures typically needed for above-ground facilities, thus streamlining construction and operational expenses. Additionally, the reactors can harness the Earth's natural pressure and temperature to further enhance safety measures, creating an environment that is less prone to leaks or accidents. This design philosophy has garnered over 40 patents, representing a significant investment in research and development aimed at optimising energy density and safety standards.

The implications of shifting towards nuclear energy are profound, particularly as the world still heavily relies on prevalent renewable sources like wind and solar power, which are often dependent on weather conditions. Nuclear energy offers a constant power supply, essential for data centres that demand uninterrupted electricity. Given that nuclear power contributed over 19% of the United States' electricity in 2024 while representing less than 8% of its total operational capacity, it serves as a reliable solution for contemporary energy needs, especially in light of growing concerns over sustainability and air pollution.

Communities stand to benefit considerably from this partnership as well. Pollution stemming from traditional energy sources has dire health implications, including increased incidences of heart disease and respiratory issues. By reducing reliance on fossil fuels, the initiative could usher in a new era of cleaner air, fostering healthier environments for residents.

The strategic alliance between Deep Fission and Endeavour Energy marks a significant milestone in the race towards cleaner energy, with the first underground reactors anticipated to be operational by 2029. This timeline aligns with the urgent need for sustainable solutions that can keep pace with the rapid expansion of the digital economy, while simultaneously addressing environmental concerns.

In the meantime, electricity consumers can explore their own clean energy pathways. Initiatives like energy efficiency programs and residential solar installations can provide substantial savings and contribute to sustainability efforts. As this innovative technology develops, it will likely redefine not just energy consumption but also how society approaches the intersections of technology, sustainability, and health.

As nuclear energy continues to evolve, the potential for integrating advanced safety measures and lowering costs presents exciting prospects for the industry's future. With the impending arrival of underground nuclear technology, a new chapter opens, promising to reshape energy landscapes and enhance the viability of data centres worldwide.

#### Reference Map

1. Paragraphs 1, 2, 3, 4, 5, 6, 7.
2. Paragraph 1, 2, 3, 4.
3. Paragraph 5, 6.
4. Paragraph 3, 4.
5. Paragraph 2, 3, 6.
6. Paragraph 7.
7. Paragraph 4.

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

1. <https://www.thecooldown.com/green-tech/deep-fission-nuclear-energy-data-centers-ground/> - Please view link - unable to able to access data
2. <https://deepfission.com/deep-fission-and-endeavour-partner-to-speed-delivery-of-low-cost-nuclear-power-for-hyperscalers/> - Deep Fission and Endeavour Energy have announced a strategic partnership to co-develop 2 gigawatts of nuclear energy to power Endeavour's expanding global portfolio of data centers. The first reactors are expected to be operational in 2029. Deep Fission's innovative technology involves placing small modular reactors (SMRs) approximately one mile underground, leveraging natural geological advantages for enhanced safety and reduced costs. This approach aims to deliver zero-carbon continuous power at a cost of 5-7 cents per kilowatt-hour, addressing the growing energy demands of data-intensive industries while promoting sustainable infrastructure.
3. <https://www.world-nuclear-news.org/articles/deep-fission-and-endeavour-announce-strategic-partnership> - Deep Fission and Endeavour Energy have committed to co-develop 2 gigawatts of nuclear energy to power Endeavour's expanding portfolio of data centers, with the first reactors expected to be operational in 2029. Deep Fission's approach involves placing 15 MWe pressurized water reactors about one mile underground in a 30-inch borehole, eliminating the need for large pressure vessels and containment structures. This design significantly reduces costs while enhancing safety, sustainability, and operational efficiency, marking a transformative step in integrating clean energy into electricity-demanding industries.
4. <https://www.endeavourii.com/deepfission> - Endeavour and Deep Fission are partnering to scale low-cost, inherently safe nuclear power for data center applications. Deep Fission's pioneering small modular reactor (SMR) capsules dramatically reduce costs and safety concerns while delivering a breakthrough in energy density. The reactors are designed for underground placement approximately one mile beneath the surface, utilizing natural geological features for containment and pressure management. This collaboration aims to drive the rapid commercialization of advanced nuclear reactors, providing a solid foundation for sustainable infrastructure in the data center industry.
5. <https://datacentremagazine.com/data-centres/advancing-nuclear-power-in-the-global-data-centre-industry> - Deep Fission's approach differs markedly from traditional small modular reactor (SMR) designs by placing units approximately one mile underground. It leverages natural geological features for containment and pressure management. As a result, the company has secured over 40 patents for its technology, reflecting significant investment in research and development across safety, efficiency, and deployment methodologies. These power density advantages are particularly relevant for the data center sector, with each installation capable of delivering more than 100 megawatts (MW) within a quarter-acre footprint.
6. <https://www.power-eng.com/nuclear/smrs/california-startup-strikes-deal-with-data-center-customer-to-deploy-underground-smrs/> - California-based startup Deep Fission has reached an agreement to help power Endeavour Energy’s expanding data center portfolio using underground small modular reactors (SMRs). The companies have committed to co-developing 2 gigawatts (GW) of nuclear energy to power Endeavour’s edge data centers, with the first reactors expected to be operational in 2029. Deep Fission's reactor design is based on the widely deployed pressurized water reactor (PWR), operating at the same pressure and core temperature as a standard PWR, but uniquely configured for underground placement.
7. <https://www2.deloitte.com/us/en/insights/industry/power-and-utilities/nuclear-energy-powering-data-centers.html> - Nuclear energy presents a potential solution for meeting some of the growing electricity demands of data centers, with its reliable and clean energy profile. It provided over 19% of the United States’ electricity in 2024, despite representing less than 8% of the nation’s total operating capacity. Nuclear power plants provide firm baseload power, operating 24/7 regardless of weather conditions, which is crucial for data centers requiring uninterrupted operations. Additionally, nuclear fuel boasts a high energy density, minimizing fuel storage requirements and reducing transportation needs.