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# Nuclear Fission: Present Status, Challenges and Advanced Reactors

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Electricity is the foundation of modern society. New technologies such as electrified vehicles, AI, data centers, and cryptocurrency are driving electricity demand at a rate far exceeding the supply. A mix of energy sources is needed to meet this demand. While renewable energy sources like solar and wind are fast growing, nuclear energy offers unique features that make it a crucial part of the solution. Small Modular Reactors (SMRs) and Microreactors represent an emerging class of nuclear reactors designed for construction on a smaller scale compared to traditional reactors, with current designs capable of generating 50 - 450 MWe and 1 - 25 MWe, respectively. These reactors are highly adaptable and offer numerous advantages for various applications, including data centers, especially when land use and the cost of transmission infrastructure place other energy sources at a disadvantage. Enhanced safety features, such as passive cooling systems and below-ground construction, further bolster their safety profile. Additionally, their smaller size and modularity make them ideal for integration with data centers and microgrid, ensuring a stable and reliable power source, thereby reducing dependence on traditional energy grids and enhancing sustainability. A surge in investment and development in nuclear power production is being observed not only in the USA but also internationally. This talk will begin with a brief review of the history of nuclear power centered on light water reactors, introduce the concept of advanced reactors, and survey the current demands from data centers for microreactors.

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