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SMR Current Status: Development Needs and Global Perspectives

Defined as nuclear reactors with a power output up to 300 megawatts electrical (MWe) by the International Atomic Energy Agency (IAEA) and targeted for multipurpose applications, small modular reactors (SMRs) have been recognized as a very promising, clean, affordable, and sustainable energy source by many countries. At present, more than 80 SMRs are under design, development, demonstration, deployment, and beyond (4D+) phases worldwide. This study focuses on the current world status of SMRs and focuses on the necessary developments to accelerate the process of adopting SMRs as a major energy source globally. SMRs are not a new concept, but they do represent a new vision for older concepts if the challenges inherent within them are mitigated with strategic and realistic solution approaches. The major challenges for SMRs 4D+ are: (a) qualifying the advanced fuel-to-reactor design; (b) supporting rapid scaled/prototypic experimentations; (c) maintaining local and global codes and standards, supply chain issues, and regulations; (d) ensuring innovative but effective strategic and legislative commitments for the cradle-to-grave nuclear fuel cycle and transportation, and (f) mitigating financial and environmental risks. These challenges can be mitigated with a synergistic solution approach among the various stakeholders: industry, academia, research, government, and international entities.

Country OR International Organization

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