

Small nuclear reactors get traction

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Context: India's efforts to integrate into the manufacturing value chain of Small Modular Reactors (SMRs) are showing positive outcomes, with several private players reportedly expressing interest in deploying these reactors at their own facilities.

Background:

The momentum for SMRs comes at a time when the global nuclear power industry is experiencing a significant decline in output, with its share falling to the lowest level in nearly forty years. This decline is attributed to various factors, including shifts in national policies, economic viability challenges, safety concerns, and the rapid expansion of renewable energy sources.

About Small Modular Reactors (SMRs)

- SMRs are compact reactors that generate between 30 to 300 MWe of power per unit.
- They are recognized not only for producing baseload power but also as a more carbon-neutral alternative among renewable energy sources.
- Designed for efficient manufacturing, SMRs have their systems and components built in controlled factory environments, which are then transported directly to the installation site.
- This approach minimizes construction timelines and reduces project costs—two significant challenges associated with traditional large reactor projects.
- SMRs also offer deployment advantages, such as a smaller Emergency Planning Zone (the area surrounding the project site) and a passive safety system, making them relatively safer than larger reactor projects.

Additional Information

- SMRs are increasingly regarded as vital for maintaining nuclear energy's commercial competitiveness in the future.
- India aims to establish itself as a leader in this small reactor segment, not only to support its commitment to a clean energy transition but also to promote SMRs as a technology-driven component of its foreign policy.
- These reactors are crucial for providing baseload power, which grants grid operators greater operational flexibility. When deployed collectively, SMRs can generate a substantial amount of electricity, addressing the need for more baseload power to counterbalance the variability of renewable energy output.
- While thermal generation is significant, nuclear energy presents a more carbon-neutral option for baseload generation.
- Although India's civil nuclear program has gradually increased reactor sizes from the earlier

220 MWe reactors to the latest 700 MWe Pressurized Heavy Water Reactors (PHWRs), the country retains a competitive edge in producing and operating small reactors.

- In the civil nuclear sector, New Delhi is advocating for SMRs as a promising technology that can contribute to industrial decarbonization and is actively promoting its potential leadership role in the dissemination of this technology.

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