Five Indigenous Small Modular Reactors (SMRs)

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Why in News?

Government unveiled Nuclear Energy Mission roadmap to reach 100 GW by 2047, with five indigenous Small Modular Reactors planned by 2033.

Bhabha Atomic Research Centre (BARC) – It is developing 3 indigenous reactor technologies.

- **Bharat Small Modular Reactor (BSMR-200)** – 220 MW capacity.
- **SMR-55** – 55 MW capacity.
- **High Temperature Gas Cooled Reactor (HTGCR)** – up to 5 MW thermal capacity, designed for **hydrogen production** via thermochemical processes (e.g., copper-chlorine cycle).

SHANTI Act, 2025

- **Private Participation –** Opens nuclear sector to private companies for generation and research.
- **Indigenous Technology –** Encourages domestic development of advanced reactors.
- **Regulation –** Grants statutory status to **Atomic Energy Regulatory Board (AERB)**, strengthening independence, oversight, and enforcement powers.

Safety and Waste Management

- **Design Principles –** Multiple safety layers, redundancy, diversity, defence-in-depth.
- **Oversight –** Rigorous reviews by **NPCIL** (Nuclear Power Corporation of India Limited) and **AERB** (Atomic Energy Regulatory Board).
- **Waste Management –** Governed by Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 and AERB safety codes. Waste

segregated, treated, stored in engineered containment, continuously monitored.

Reference

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