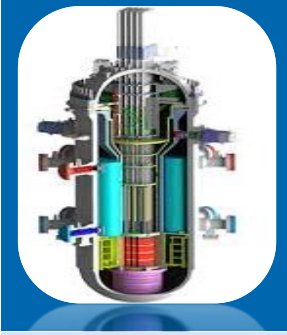
India Smart Utility Week 2025

20th Mar 2025

New Delhi, India

Arnada Prasad Samal

General Manager
Nuclear Cell
NTPC Ltd



NUCLEAR RENAISSANCE AND THE ROLE OF SMR IN NET ZERO POWER SYSTEMS


NTPC Koldam

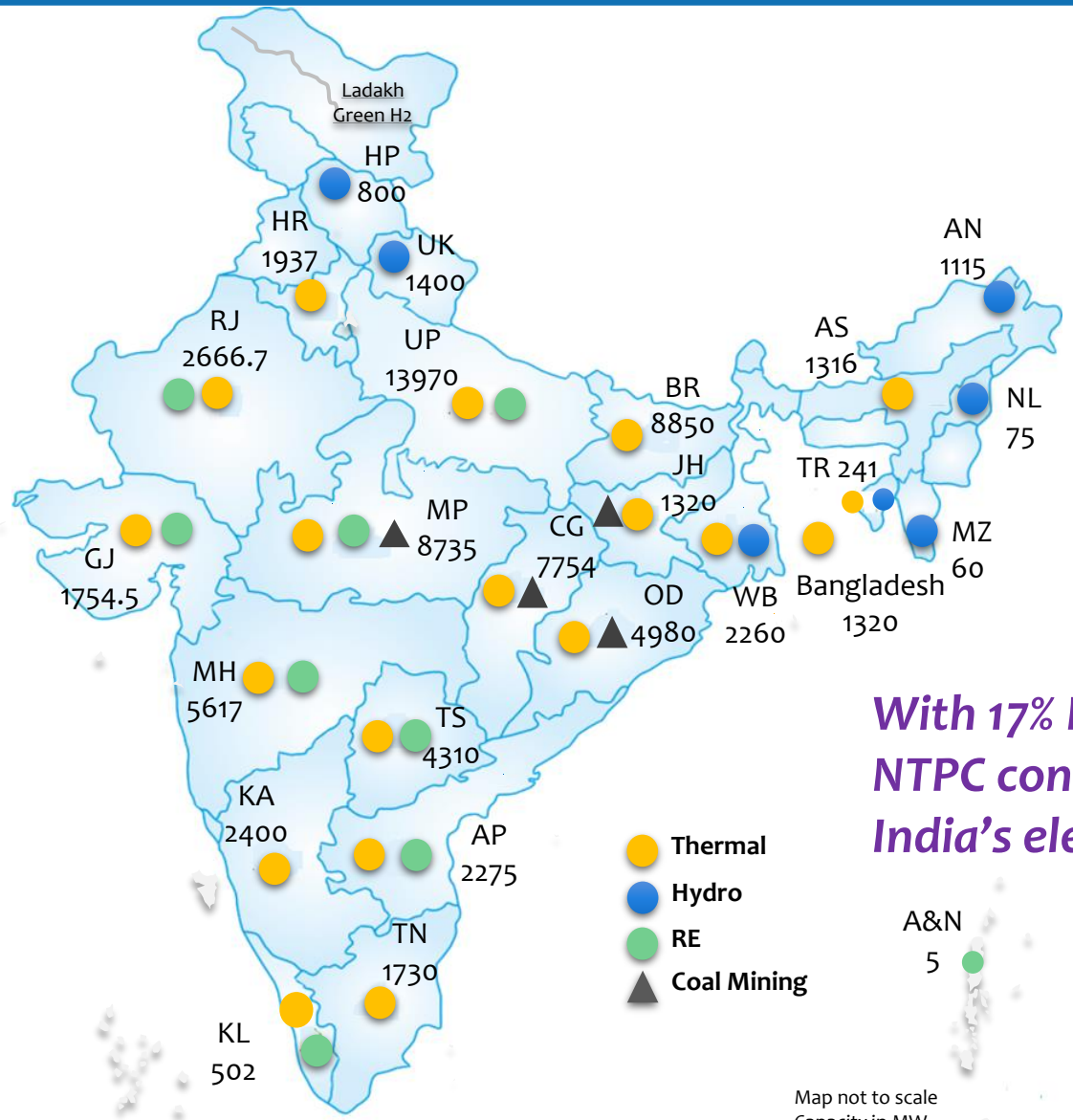

NTPC Kayamkulam

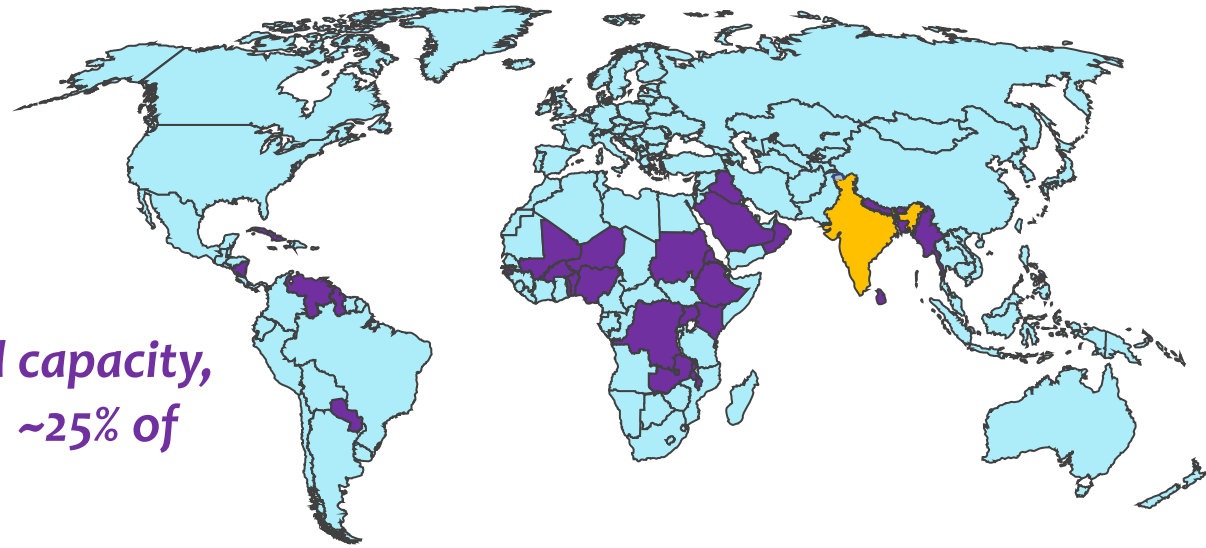

NTPC Rojmal

Transition to cleaner, more sustainable energy solutions for net-zero power systems aims to mitigate the impact of traditional energy sources on the environment.

Lighting every 4th bulb in India since last 25 years

77,393 MW	Capacity under Operation [94 Stations]	**30,146 MW**	Capacity under Construction [44 Projects]	**45 MMTPA**	Coal Mining Capacity [6 Mines]
30 Companies	10 Subsidiaries 20 Joint Ventures	**17000+**	Employees





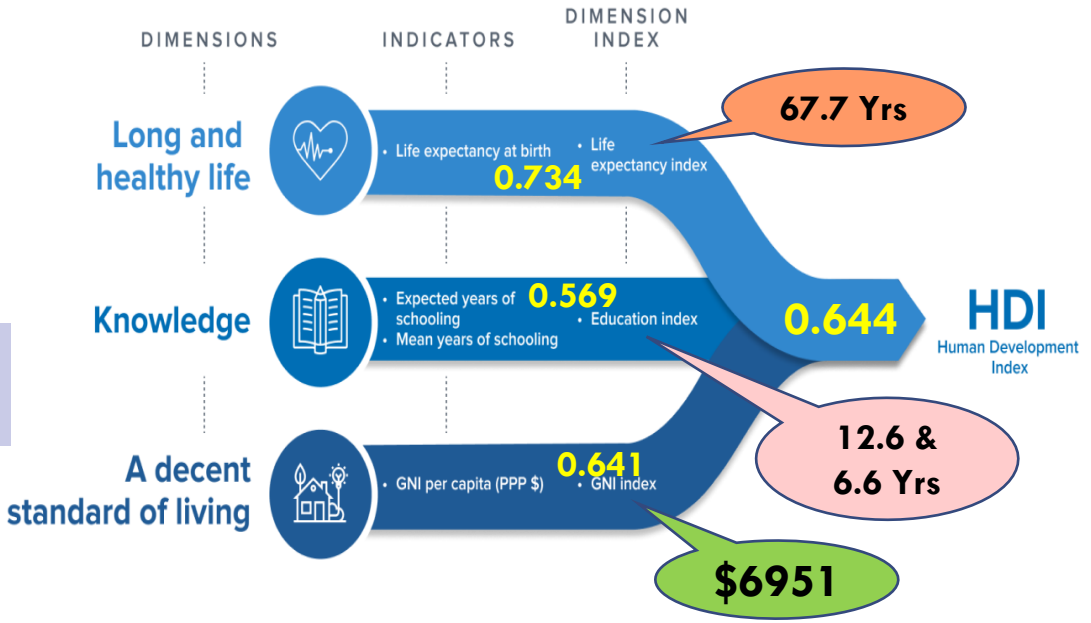
With 17% Installed capacity, NTPC contributes ~25% of India's electricity

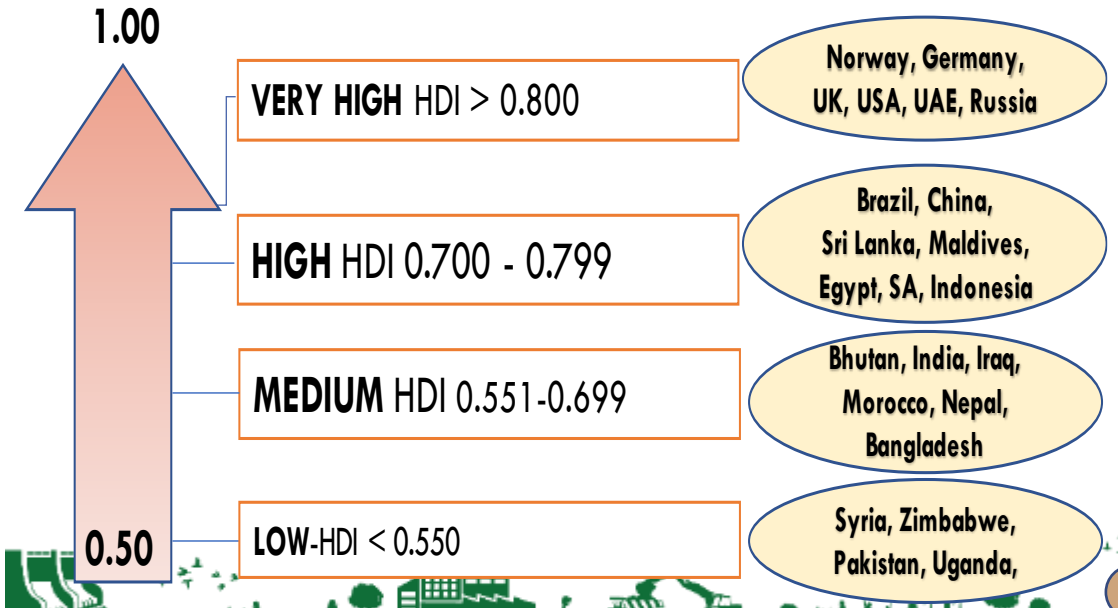
International Proj 1.72 GW (incl 0.4 GW Solar)
Long term O&M in GT plants in Bangladesh
PMC in ISA member countries 6555 MW

VIKSIT BHARAT @ 2047

Make India a $30 Trillion developed economy by 2047, coinciding with 100 years of independence

India under Medium Category & Ranks 134 / 193





What it means

For an assumed stabilized population of 1.5 billion, India needs at least **31 GJ per capita** to reach **High HDI (0.7)**

Viksit Bharat @ 2047

Installed Capacity (GW)		
Source	**Present**	**2047**
Coal	218	140
Oil & Gas	25	25
Nuclear	8	100
Hydro	52	175
Solar	46	885
Wind	83	620
Other RES	11	140
Total	443	~2100

Source: Based on data from IESS 2047 Net Zero, CEA Dashboard, NITI Aayog, Ministry of statistics & programme implementation

Per capita Annual consumption (kWh)

India / World average

Energy 7055 (~21000)

Electricity 1255 (~3800)

INDIAN CIVIL NUCLEAR SECTOR

First Unit Tarapur#1 160 MW in Oct'1969
Over last 56 years, Capacity added ~ 8 GW

Description	Nuclear Capacity (GW)
Installed (Current)	8.2
Construction	7.3
Sanctioned	7.0
Exp by 2031	~ 22.4
Projection for 2047	**100 (Viksit Bharat)**
Balance Capacity	**77.6**

Emphasize need to have multiple utilities to accelerate nuclear capacity

BUDGET 2025-26

Promotion of Nuclear

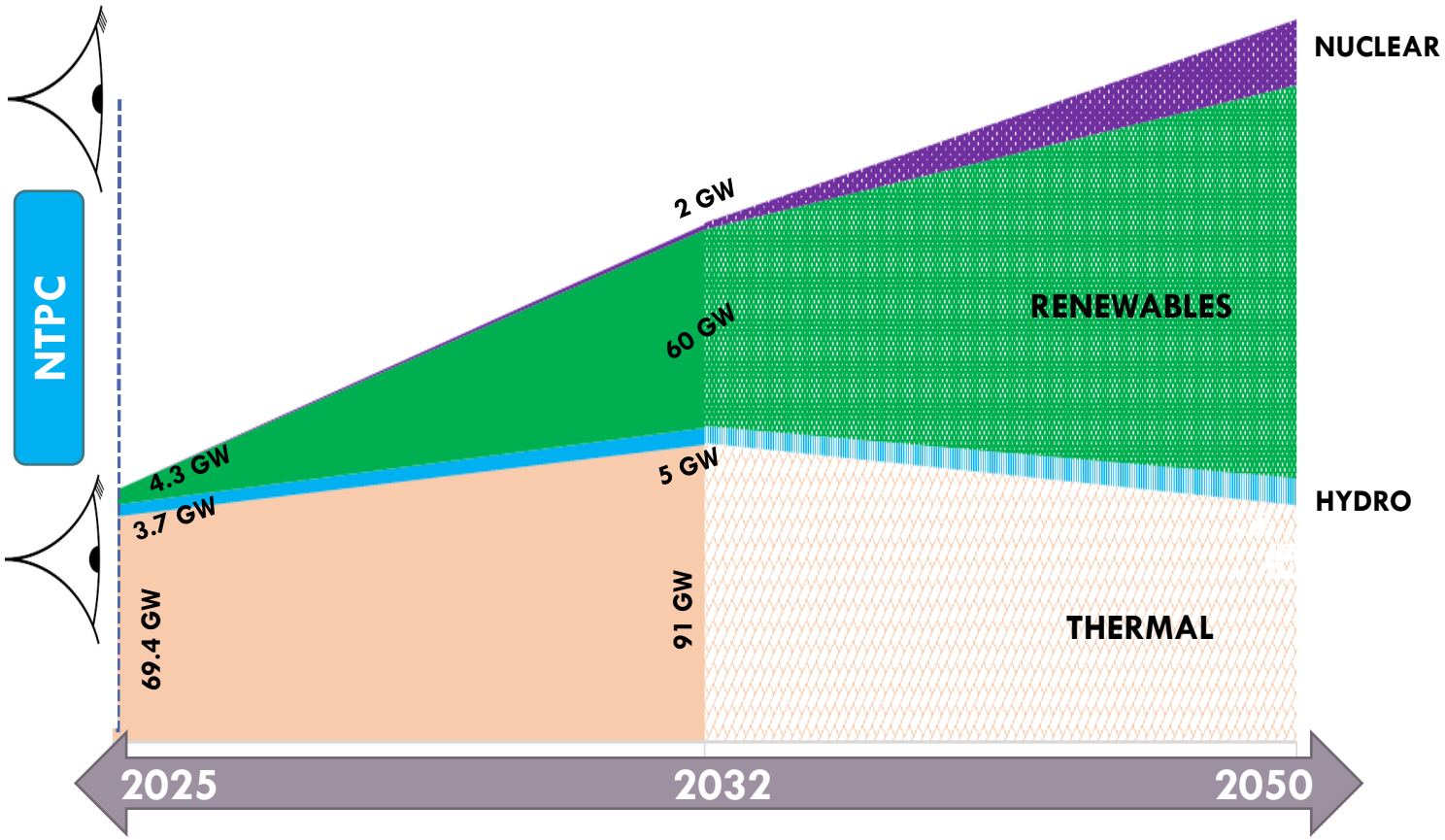
- Nuclear Capacity target 100 GW by 2047
- Nuclear Energy Mission for SMR
- 5 Indigenous SMRs operational by 2033
- Outlay of 20,000 crore

Target in next 24 years:
*~ **78 GW Capacity***
*~ **17 Lac Crores investment,** Along with resources such as **land, water, fuel, & competent workforce**!*

NTPC CLEAN ENERGY PLAN

Fossil Energy Major >>>>> **Green Energy Major**

77+ GW **130+ GW**

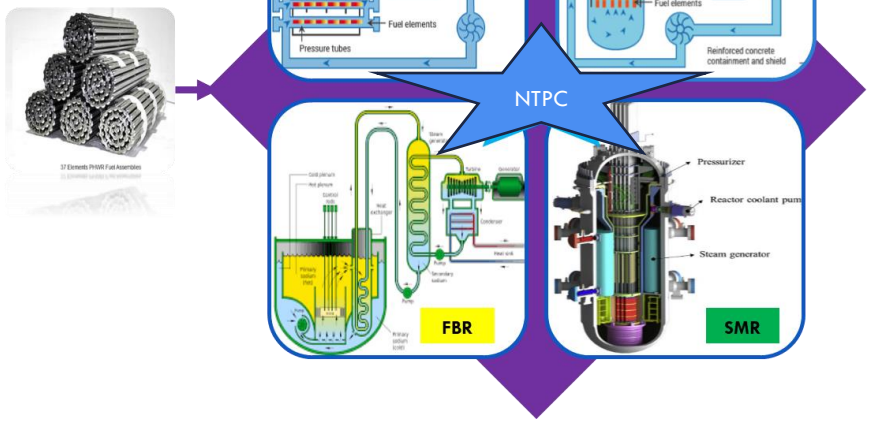


ANU SHAKTI VIDHYUT NIGAM LIMITED
(Joint venture of NPCIL & NTPC)

&

NTPC PARMANU URJA NIGAM LIMITED
(Wholly Owned Subsidiary of NTPC)

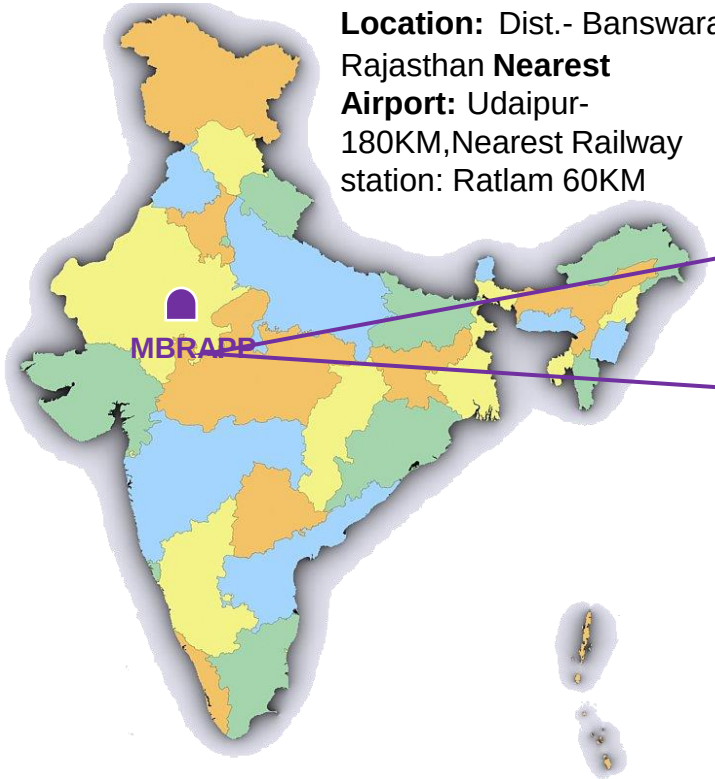
NUCLEAR ENERGY



ASHVINI & MBRAPP (MAHI BANSWARA RAJASTHAN ATOMIC POWER PROJECT)

ASHVINI- Anu Shakti Vidhyut Nigam Limited, joint venture company of NPCIL (51%) & NTPC (50%)

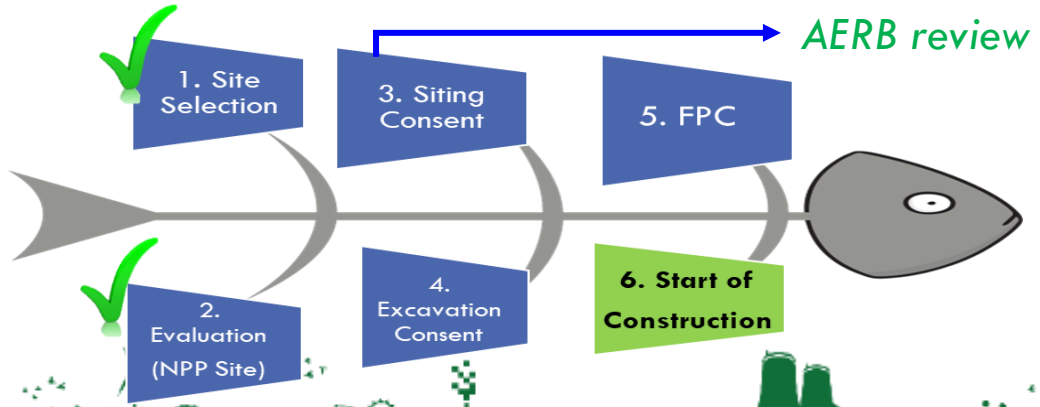
11TH Sept'24 GoI accorded approval for ASHVINI to build, own & operate nuclear power plants along with transfer of MBRAPP



Location: Dist.- Banswara, Rajasthan **Nearest Airport:** Udaipur-180KM,Nearest Railway station: Ratlam 60KM

- 4 X 700 MW PHWR based NPP
- Land Plant: 602.72 Hectares & Township: 57.43 Ha acquired.
- EIA has been completed and **EC clearance expected shortly.**
- Water allocation from Mahi Bajaj Sagar dam - Rajasthan state Government (MoU 28th Sep 2016)
- **Siting Investigation studies**
  - Studies completed & Review of findings by regulator completed.
- **Investigations for Excavation**
  - Report submissions & review in progress.
- **Milestone Timelines**

Zero Date (FPC) : Mar'26 **First Approach to Criticality (FAC) : Sep'31**



NTPC PARMANU URJA NIGAM LIMITED

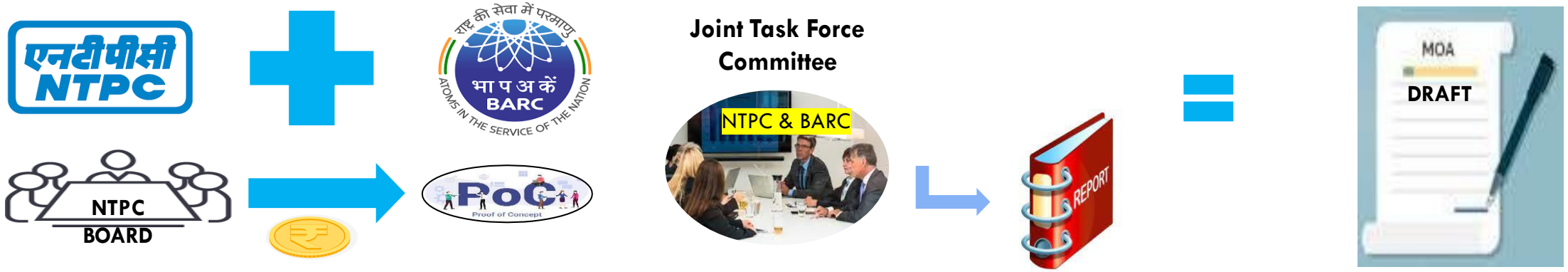
A Wholly Owned subsidiary of NTPC constituted to take forward NTPCs nuclear business

Formation of NPUNL, A Wholly Owned Subsidiary for nuclear business

NPUNL, by its articles of association, empowers GoI to constitute and reconstitute its Board of Directors, as per existing Atomic Energy Act.

NPUNL, shall seek approval of GoI to ***Build, Own & Operate*** *nuclear power plants.*

NTPC SMR development till date & way forward



NTPC

- **BSR**
  - ***ASHVINI (JV Company of NTPC & NPCIL) can take up deployment of Bharat Small Reactors.***
  - *GoI has approved (a) ASHVINI to build, Own & Operate NPP with transfer of MBRAPP*
- **BSMR**
  - ***NTPC intends to take it forward with BARC for development & deployment of BSMR.***
  - *NTPC has association with BARC for capability development.*
- **ADOPTION OF SMR**
  - *NTPC (with experience in successful indigenization of supercritical technology), willing to take up adoption & indigenization of SMR*

CHALLENGES & WAYFORWARD

Policy improvisations

- Atomic Energy Act
- Civil Liability for Nuclear Damage (CLND) Act

Capability development

- Lack of pool of skilled manpower needed for the upcoming project quantum

Public awareness for acceptance

- Public acceptance & nuclear phobia
- Misinformation among public on safety & consequences of any miss happenings.

Commercial regulations and incentives

- Competitive tariff regulations and National Nuclear Roadmap in line with RE

Other areas of concerns

- Capital intensive
- High gestation
- Sustainable supply chain
- Availability of sites : Land & water

Comprehensive Nuclear Roadmap for meeting 100 GW Capacity by 2047

Thank You