



SRLDC (Grid-India)

welcomes the delegates of BIMSTEC member countries



16th Sep 2026

Southern Regional Despatch Centre (SRLDC), Bengaluru

**Presented by: Anusha Baruah
DGM (System Operation)**

Indian Grid - Amongst the World's Largest & Complex systems



Source: GO15

Single Synchronous National Grid

Electricity Generation

Electricity Consumption

3 Installed Generation Capacity

Transmission System

Solar Generation

4 Wind Generation

5 Pumped Storage Installed Capacity

6 Hydro Generation

Source: IEA World Energy Outlook 2024 &

<https://www.irena.org/Data/View-data-by-topic/Capacity-and-Generation/Country-Rankings>

Dimensions of the Indian Power System

~551 GW

generation capacity

3.2 million km²

area footprint

> 6.00 TWh

daily energy met

270 GW+

peak demand

1.4 Billion+

people served

4.5 GW+

international exchanges

5,06,000 ckm+

EHV transmission

200 TWh+

annual market trades

~292 GW

renewables

(incl. ~52 GW large Hydro)

15

HVDCs

3

power exchanges

6000+

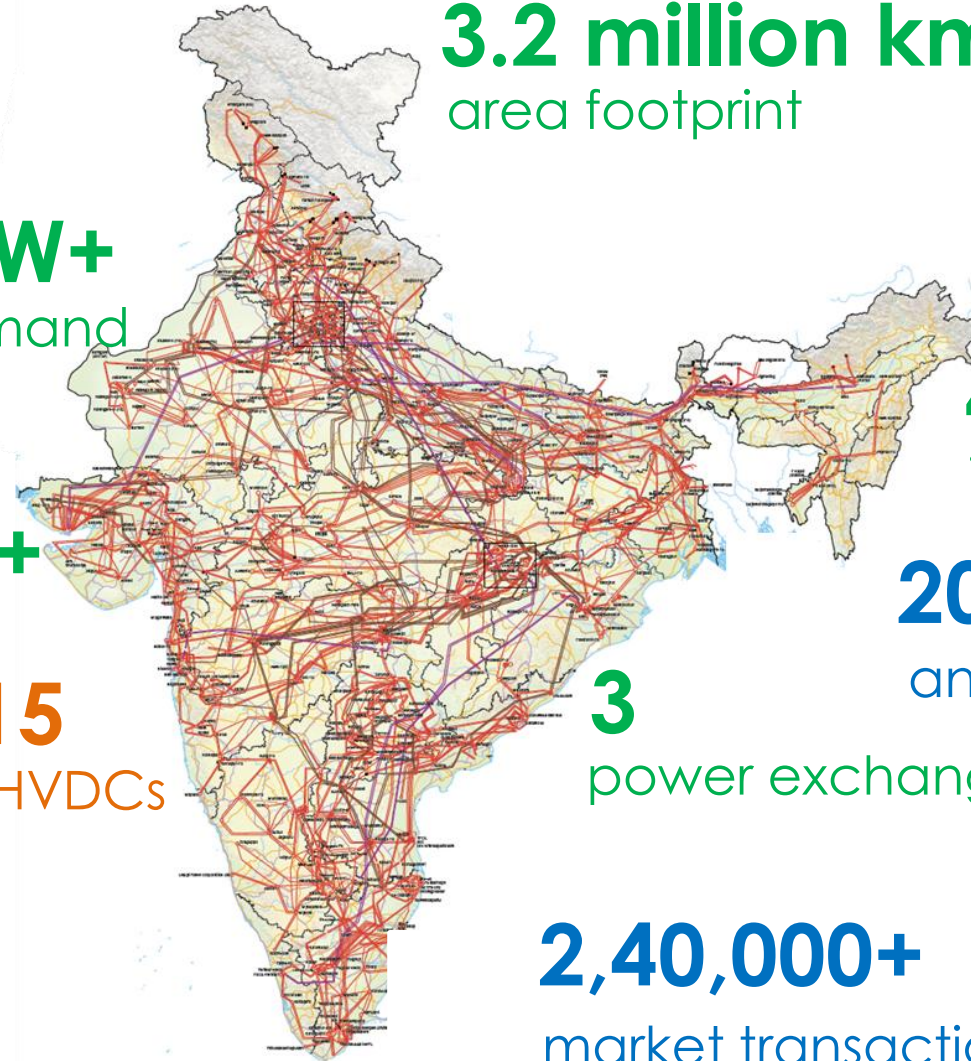
market participants

~ 120 GW

inter-regional capacity

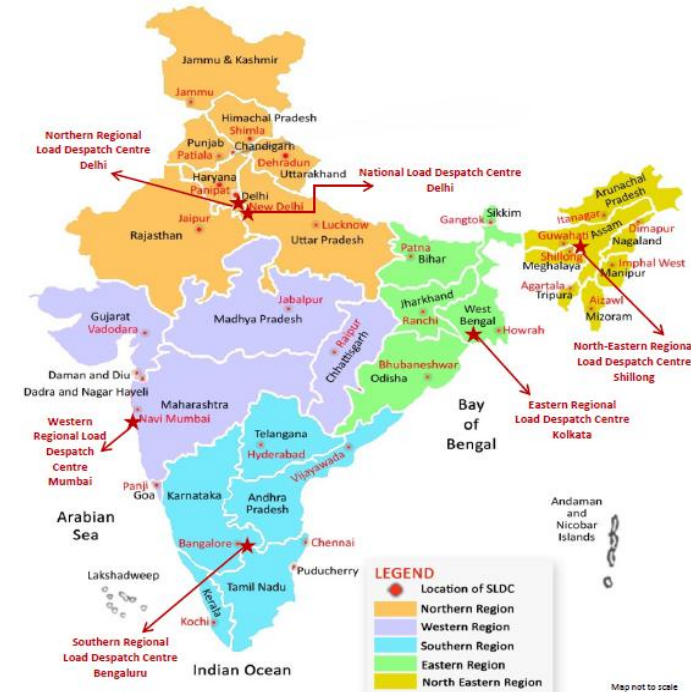
2,40,000+

market transactions



Indian Power Sector - Institutional framework

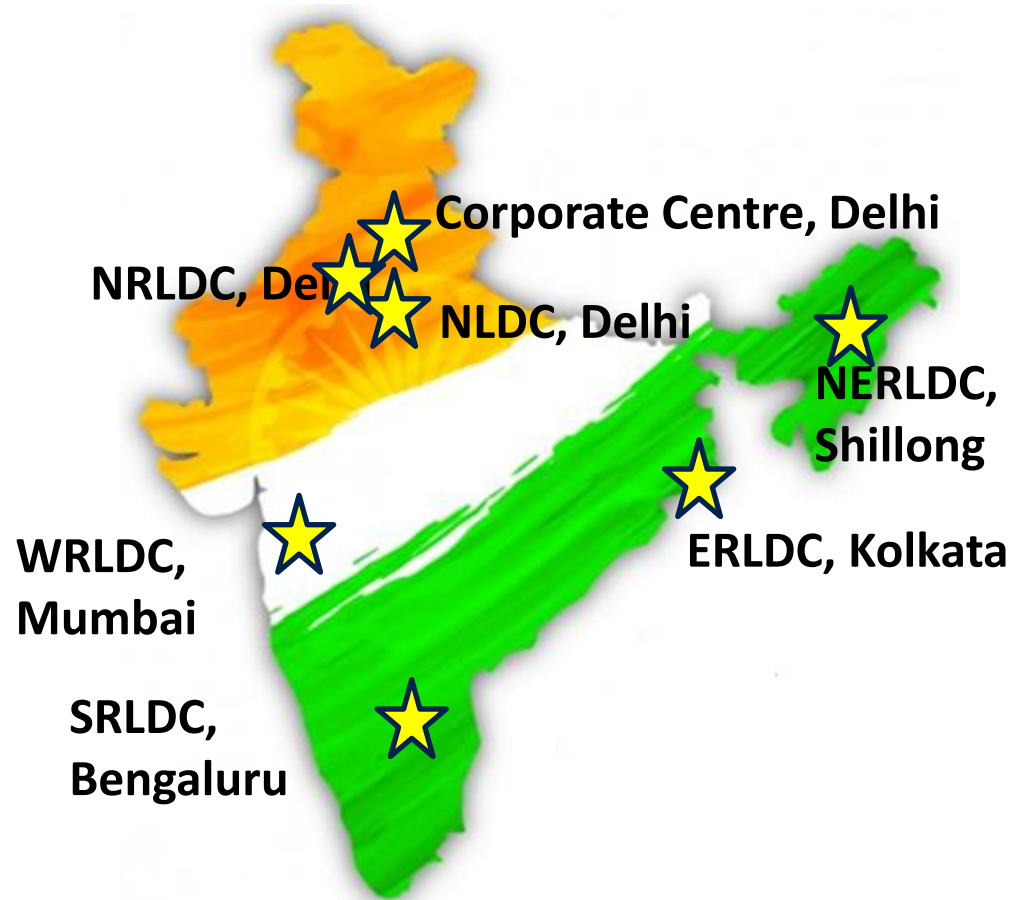
Role	Responsible Entity		
Policy Making	Central Government	State Governments	
Planning & Standards	Central Electricity Authority	Bureau of Energy Efficiency	
Regulations & Adjudication	Central Electricity Regulatory Commission	State Electricity Regulatory Commission	Appellate Tribunal for Electricity
System Operators	National Load Despatch Centre	Regional Load Despatch Centres	
	Part of Grid Controller of India (Grid-India)		State Load Despatch Centres
Generation	Inter-State Generating Stations	State Owned Generating Stations	Independent Power Producers and Captive Power Producers
Transmission	Inter-State Transmission System (Central Transmission Utility of India Ltd. – CTUIL for planning)	State Owned Transmission System	Private Sector Players
Distribution	State Owned Distribution Licensee	Private Sector Distribution Licensee	
Markets	Trading Licensee	Power Exchange	OTC Platforms
Registry	National Open Access Registry, Green Open Access Registry, Renewable Energy Certificate Registry, Energy Saving Certificate Registry, Indian Carbon Market Registry		
Coordination Forums	Regional Power Committee	Forum of Regulators	Forum of Load Despatchers



~ 3000 system operators
across LDCs

~ 700 system operators in
real time operations 24x7

Grid Controller of India - The National Grid Operator



6 Control Centres (1-NLDC, 5-RLDCs) ensure integrated operation of National Grid, 24X7

- Electricity Act, 2003 Sec 26 – 29
- National Electricity Policy, 2005 Sec 5.3.7
- Gazette Noti. 19.12.2016 - Independent Government Company under Ministry of Power since Jan 2017
- A Central PSE under Companies Act, 2013
- Discharging Mission Critical Statutory Functions of National Importance

**Integrated and
Reliable
operation of
National Grid**

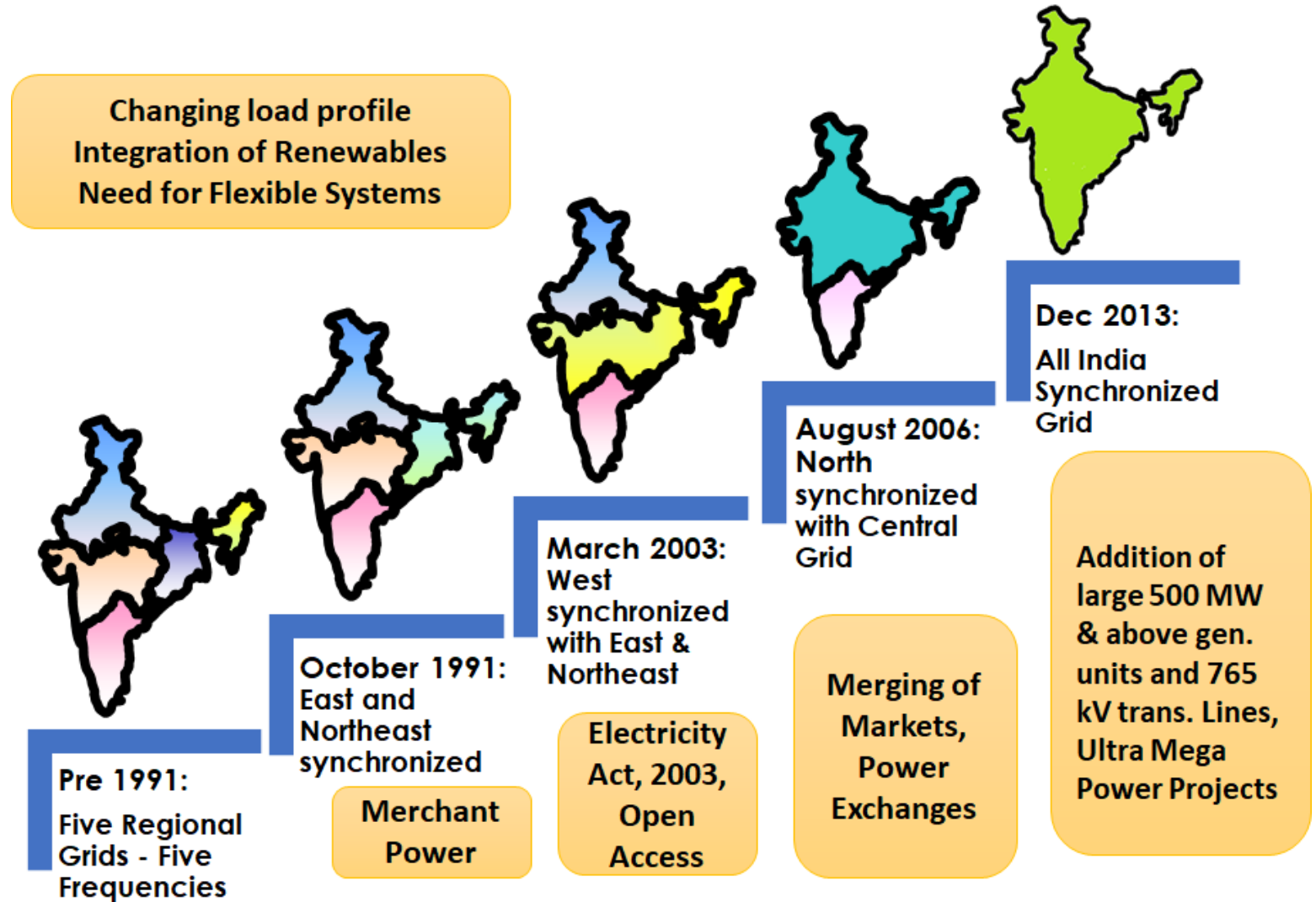
**Fair & neutral
Market
Operation**

**Knowledge
based statutory
organization**

**Regulated and
Profit neutral
business model**

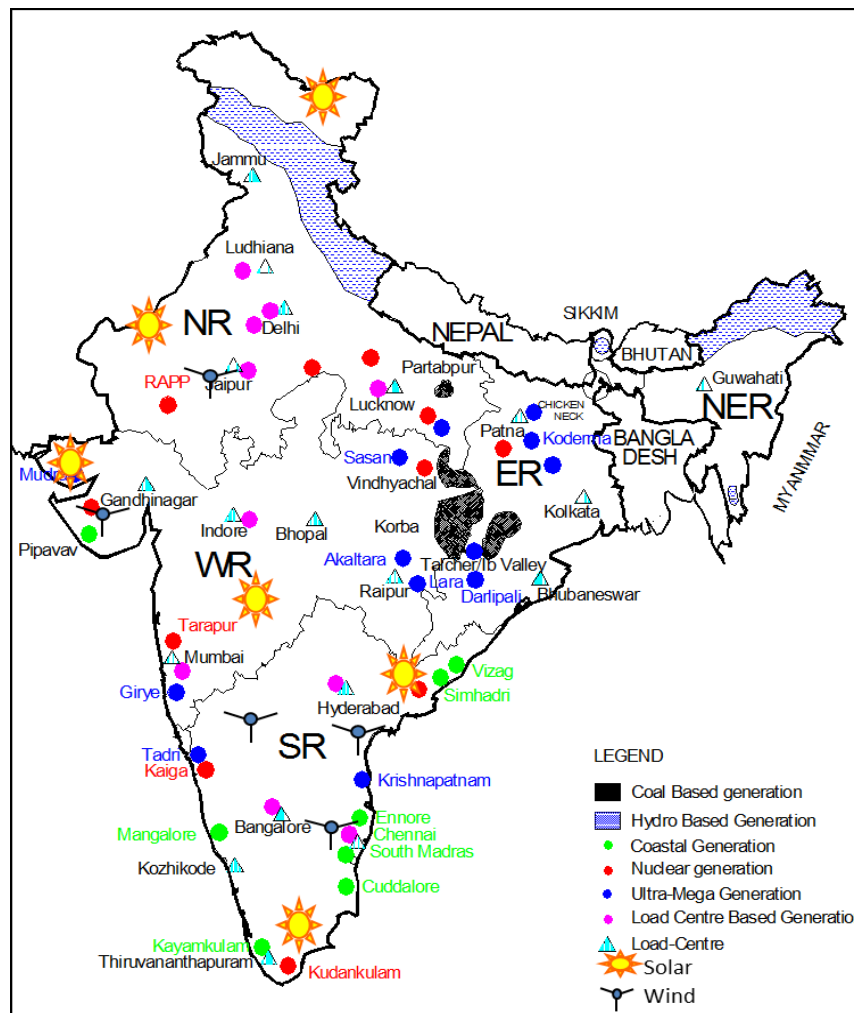
**Financial and
Functional
Autonomy**

Evolution of Grid

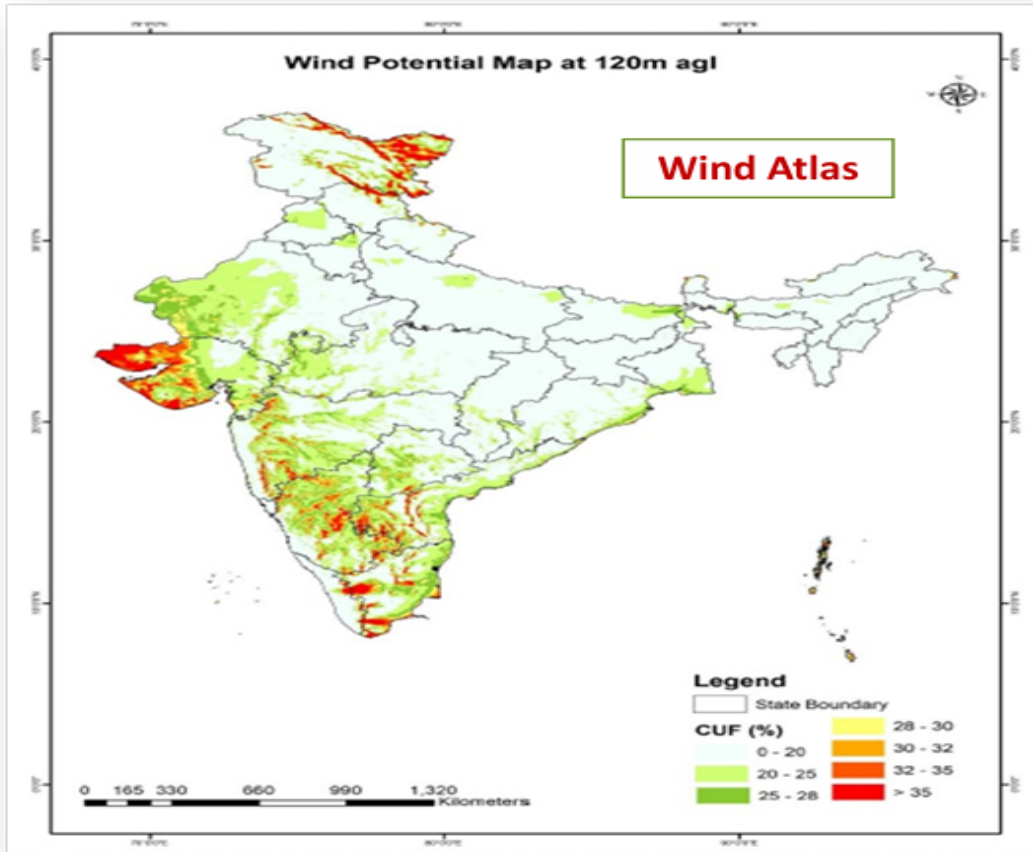


Resource Spread across India

- Hydro – North-Eastern & Northern India; Coal - Central India
- Renewables – Northern, Western and Southern India



Wind Power Potential



Offshore Wind



- **Estimated potential:** ~302 GW at 100 m, ~700 GW at 120 m ,~ 1150 GW at 150m Height (↑) => Wind Speed(↑)
- **Off-shore Wind Potential ~ 70 GW** (coast of Gujarat & Tamil Nadu)
- **Commercially viable sites** with CUF>30% → 214 GW; CUF>35% → 57 GW
- **Current Installed Capacity** (June 2026): ~57 GW (less than one-fifth of potential)
- **Huge wind potential in the country** – Needs to be prioritized for maintaining a balanced energy mix

Source: India's Wind Potential Atlas Report, NIWE
<https://maps.niwe.res.in/media/150m-report.pdf>

Solar Power Potential

The nationwide irradiance distribution is shown in **Figure 8**.

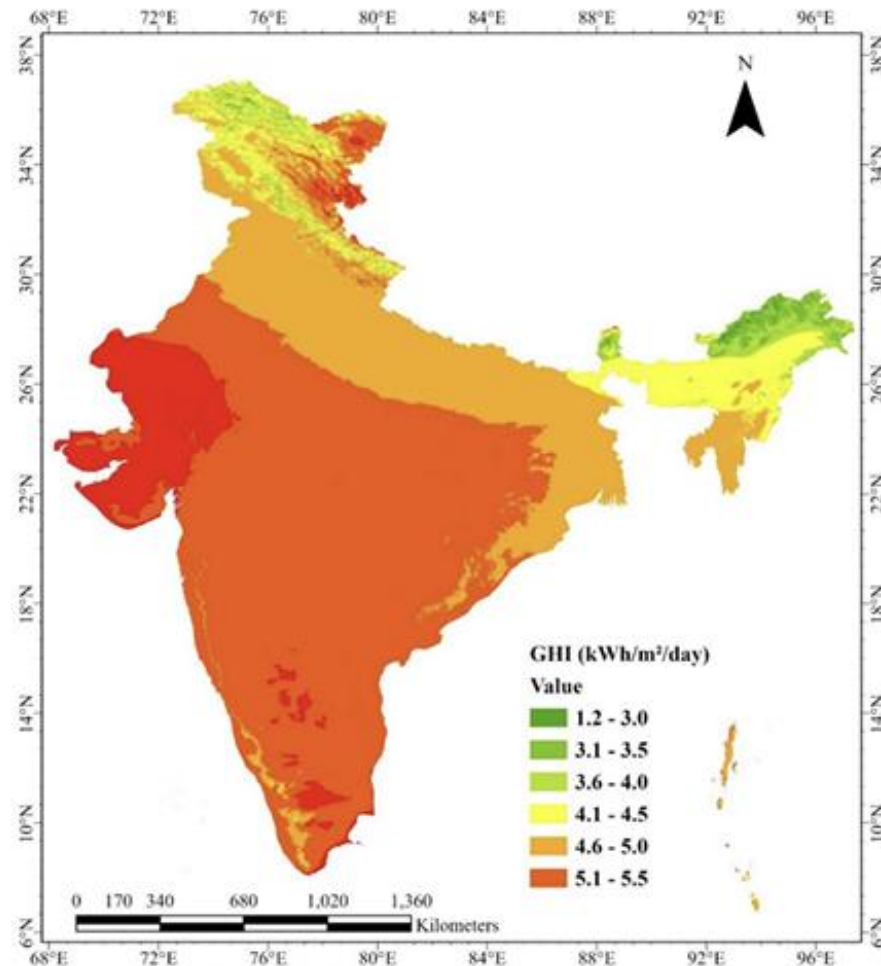


Figure 8: Solar irradiance map (GHI) of India²⁴

²⁴ World Bank Group (2019). Global Solar Atlas. <https://globalsolaratlas.info>.



India's Advantage



Aims for 500 GW of non-fossil capacity by 2030



300+ sunny days per year



Large tracts of underutilized land

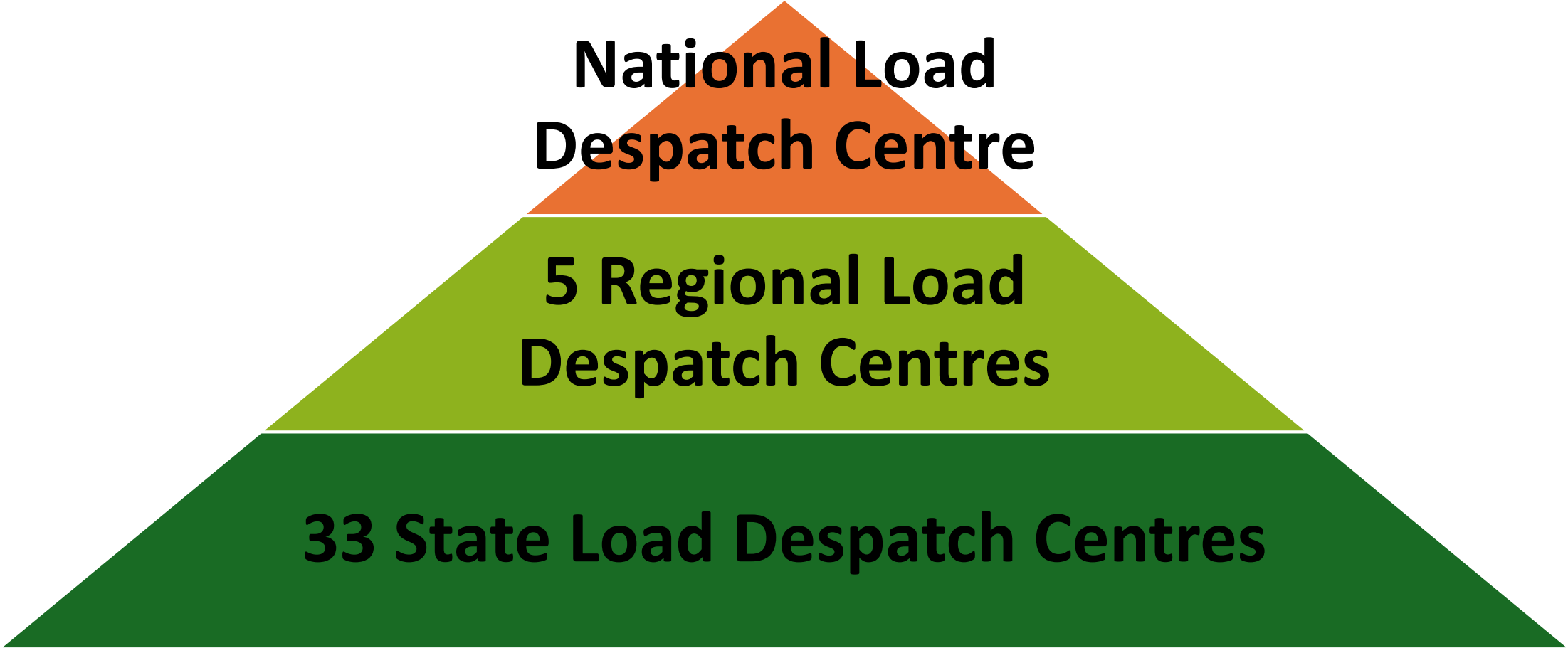


Rapidly falling solar costs



Strong International Leadership: International Solar Alliance

Multi-tiered & Multi-lateral Coordinated System Operation



**National Load
Despatch Centre**

**5 Regional Load
Despatch Centres**

33 State Load Despatch Centres



Reliability

Operations Planning,
Transfer Capability, Reserves



Secure Real Time Operation
Forecasting, Scheduling,
Imbalances, Optimization,
Ancillary Services



Wholesale Electricity Markets

OTC markets, Power
Exchanges.



Pool Account Administration

Deviation, SCED, Reactive
Power, Congestion



Data Analytics

Operational Feedback, Policy
Advocacy, Big Data Analytics



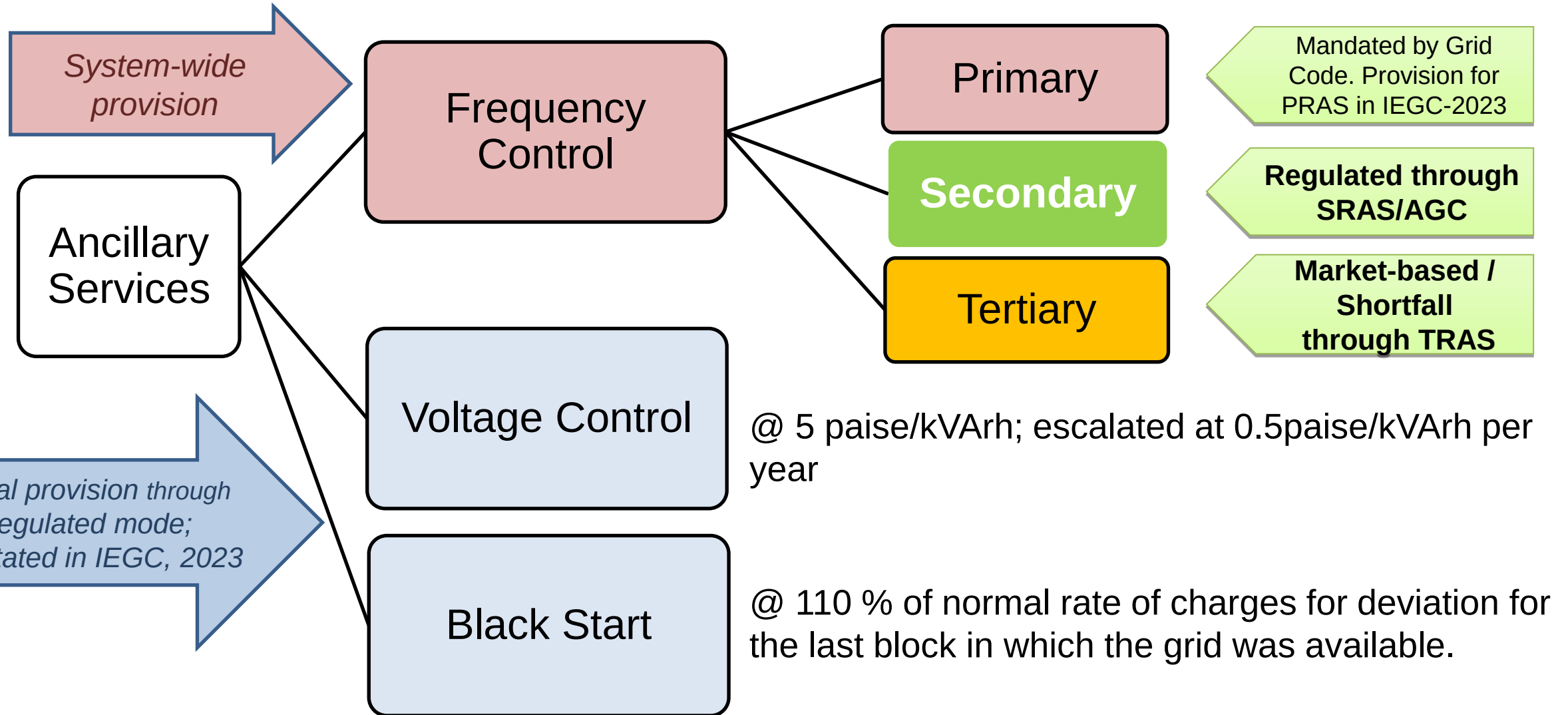
Capacity Building

System Operators basic and
specialist level certification

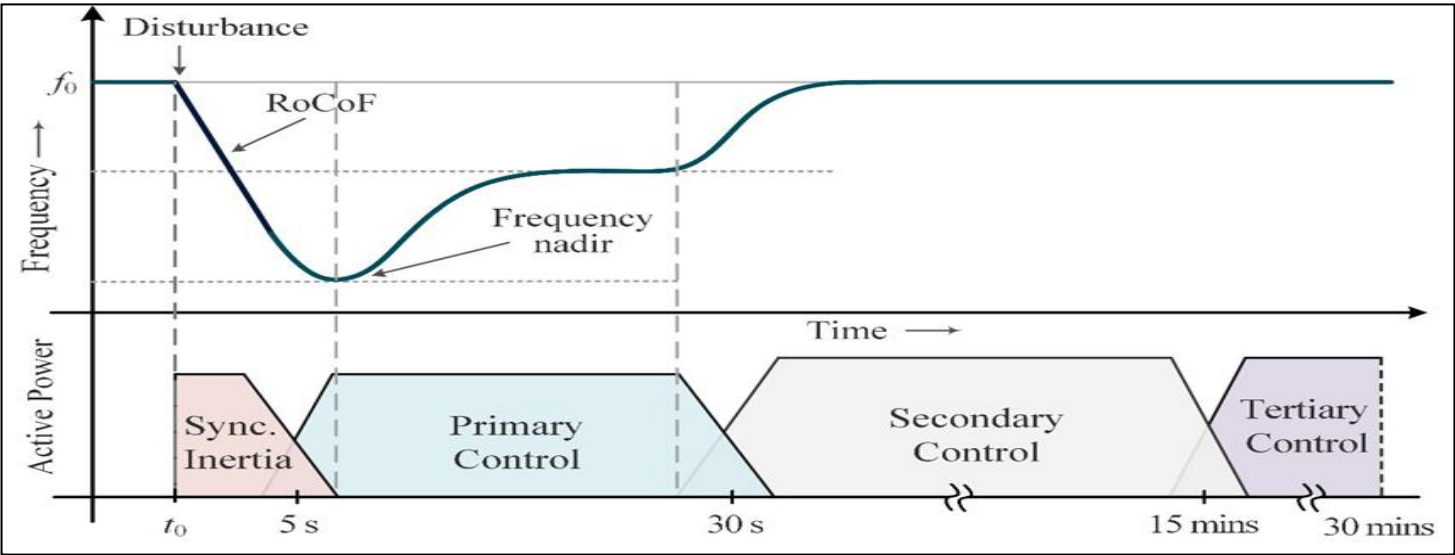
Ancillary Services

- **Ancillary services consist of “value-added services” required for**
 - Maintaining generation and load balance (frequency control)
 - Maintaining voltage and reactive power support (voltage control)
 - Emergency preparedness (system restart & stability control)
- **Necessary for maintaining power quality, reliability and security of the grid**
- **Ancillary services can be provided by**
 - Generators
 - Distribution Utilities
 - Transmission operators
 - Other entities : Energy Storage, Demand Response
- **Ancillary services despatched by system operator**
 - Maintaining generation reserves and reactive power support
 - Need to define, measure and pay for services (regulated/market)

Ancillary Services in India - Classification



Frequency Control Ancillary Services



Reserve	Start of activation	Full Availability/ deployment	Ability to sustain the full deployment
Primary Response	Immediately as soon as frequency crosses dead band	Within 45 sec	5 min
Secondary Reserve Ancillary Service (SRAS)	Within 30 seconds after the receipt of AGC signal	Within 15 Min	30 min or till replaced by Tertiary Reserves
Tertiary Reserve Ancillary Service (TRAS)	Within 15 minutes of dispatch instruction from NLDC/RLDC		60 min

Monitoring



SCADA

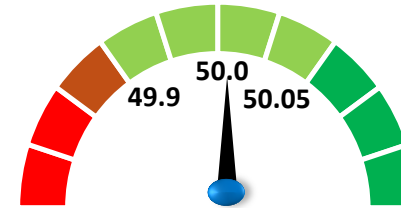


PMU

Warnings



Transfer Capability

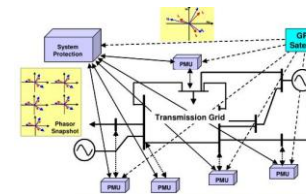


Frequency limits

Defense Mechanisms

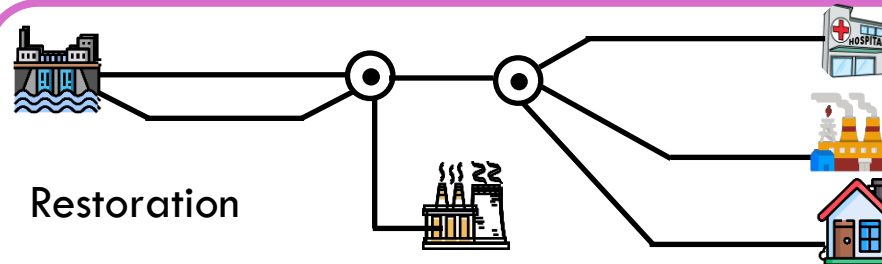


UFR, df/dt



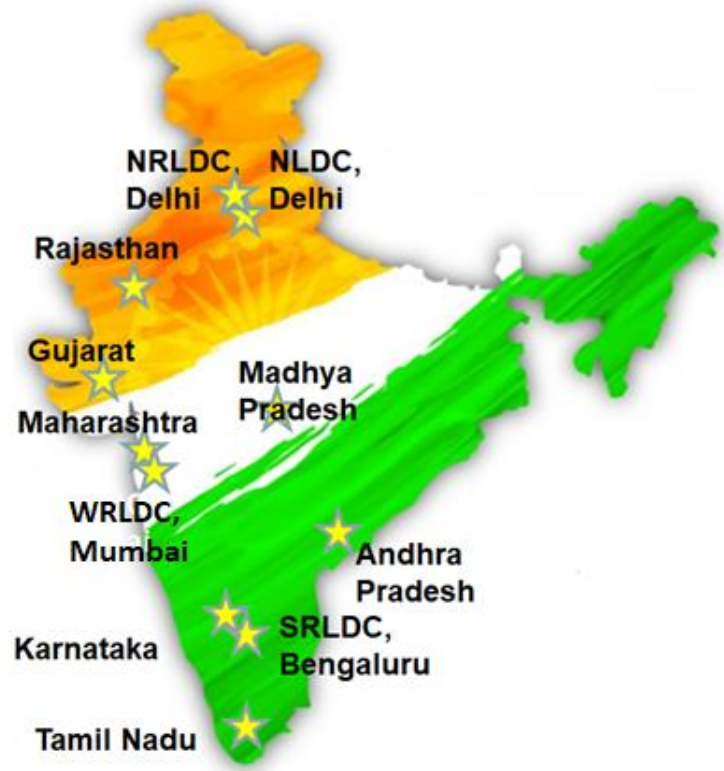
SPS

Crisis Management



Restoration

Renewable Energy Management Centres



- 11 Nos. REMCs (State/Regional/National) co-located with Load Despatch Centres
- 62.5 GW renewables being monitored from 654 nos. pooling stations pan-India

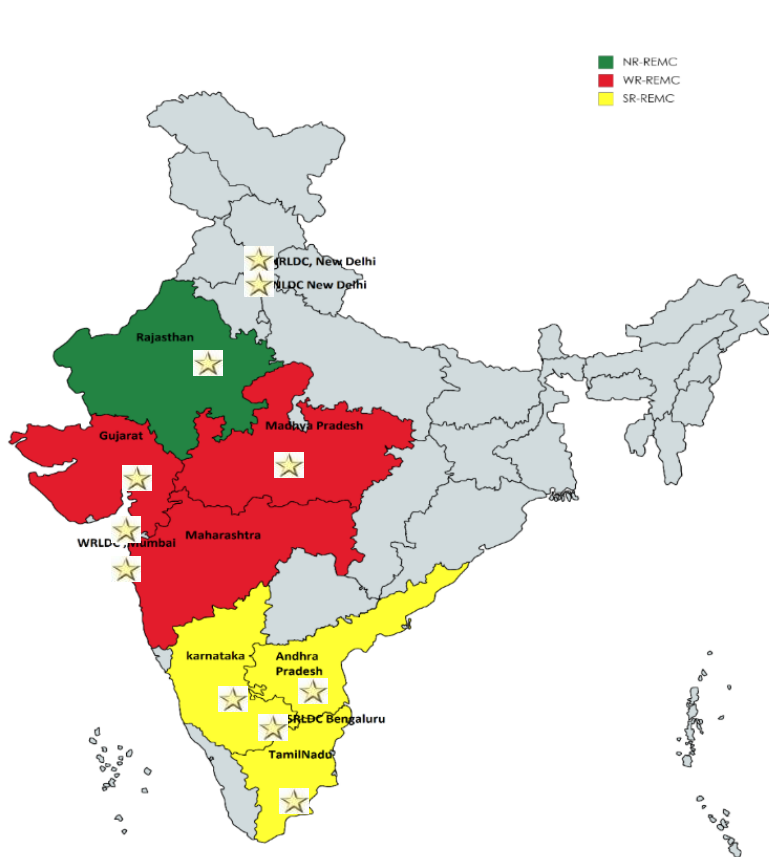
Forecasting,
Scheduling and
Imbalance
Handling



Situational
Awareness – Real
Time Monitoring

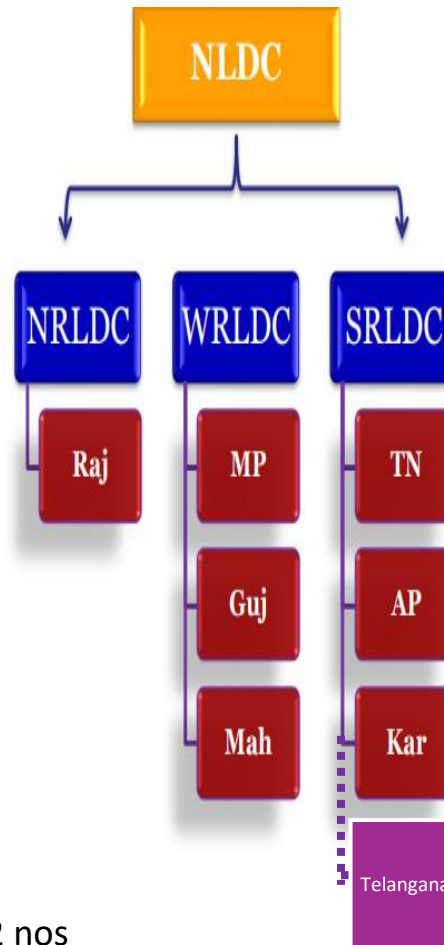


Integration with other processes and systems in
RLDCs and NLDC



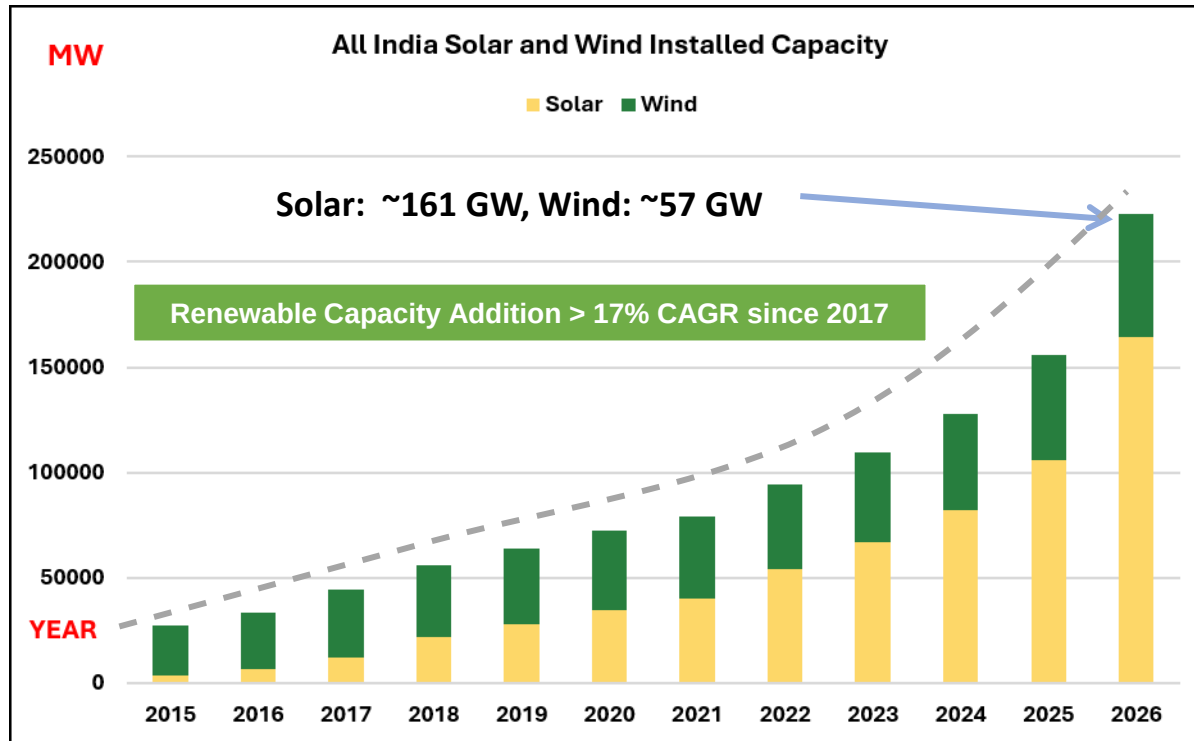
Approved REMC with available fund – 2 nos

- Andaman & Nicobar
- Telangana



- Dedicated control centres for managing renewables
- Co-located with LDCs at 11 locations
- Intra day, day-ahead and week ahead basis forecasting
- Dedicated scheduling platform for RE generation for day ahead and intra day scheduling.
- RE Schedule Integration with existing scheduling tool
- Real time tracking of generation from RE sources
- SCADA data integration with state & National REMC and respective LDC

India's Journey with Renewables

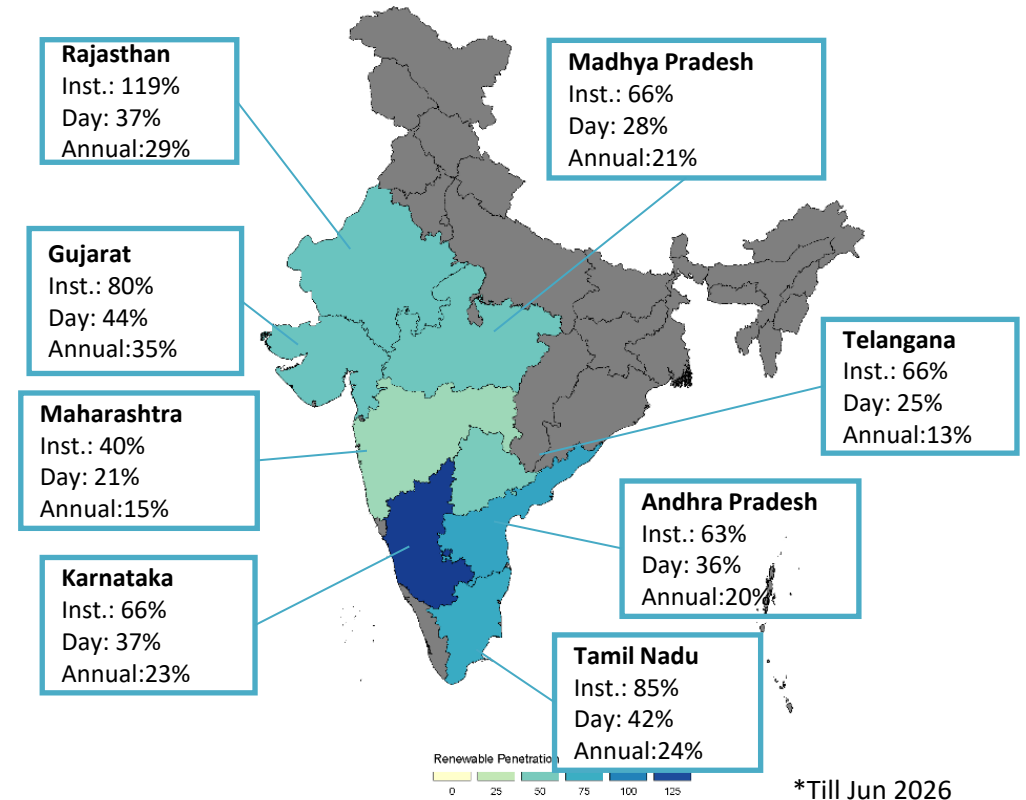


Source: CEA Installed Capacity Report
[Installed Capacity Report - Central Electricity Authority](#)

Highest All India Instantaneous VRE (Solar + Wind) penetration of ~42.8% (103.7 GW) recorded - 13-07-2026

Highest All India Instantaneous RE (Solar + Wind + Hydro) penetration of ~52% (~126 GW) recorded – 13-07-26

Maximum Wind + Solar penetration in instantaneous MW and energy (day/year) terms – FY 2026-27



500 GW non-fossil capacity by 2030
Including ~293 GW Solar & ~100 GW Wind

Transnational Interconnections



India – Bhutan

- 400 kV, 220 kV and 132 kV synchronous interconnections
- **Transaction:** Both Export/import



India – Nepal

400 kV, 132 kV, 33 kV & 11 kV interconnections

Transaction: Both Import/Export



India – Bangladesh

- 400 kV 2xD/C with HVDC back to back. 132 kV D/C with radial connection.
- 400 kV dedicated D/C to Bangladesh
- **Transaction:** Export from India

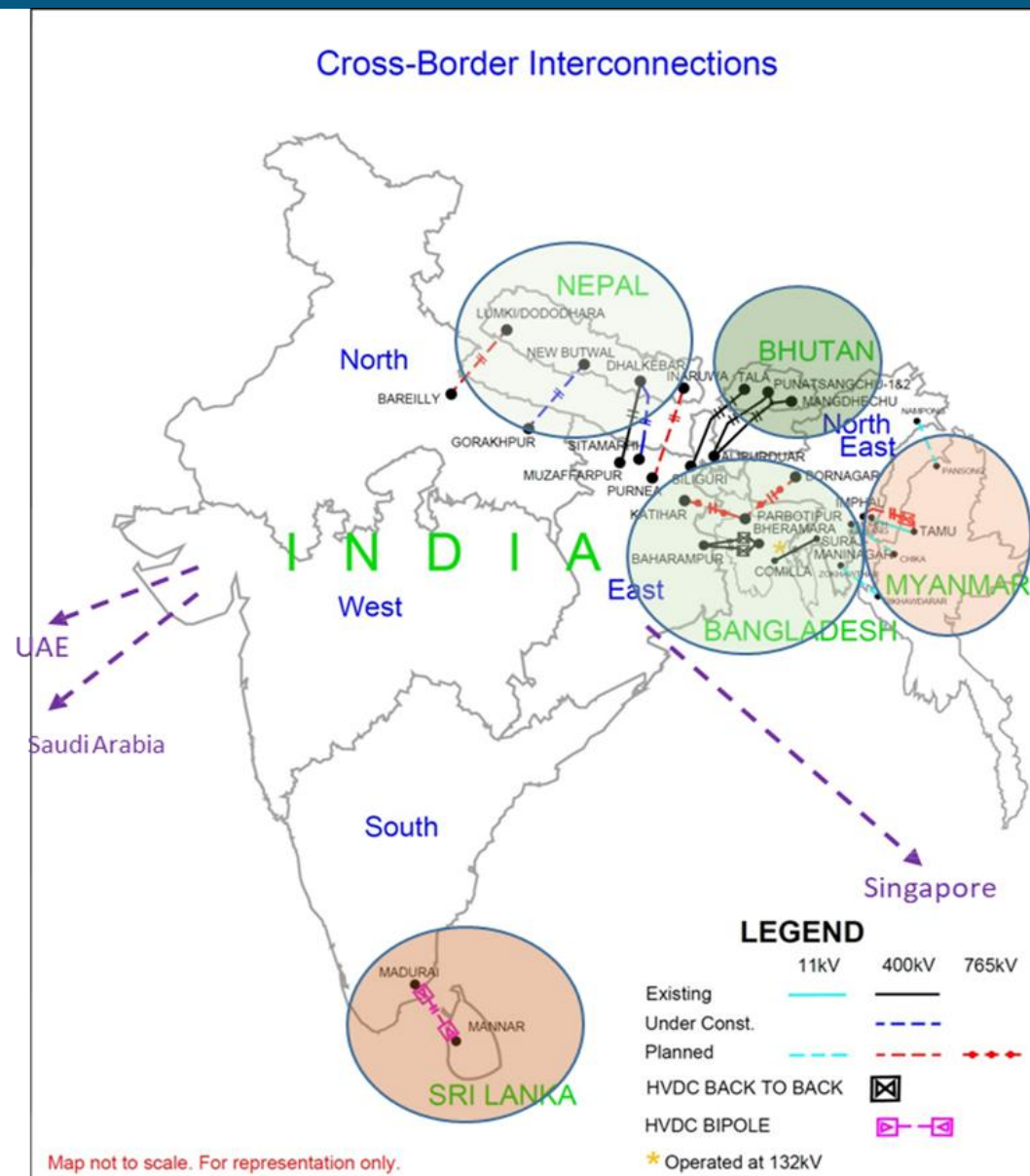


India – Myanmar

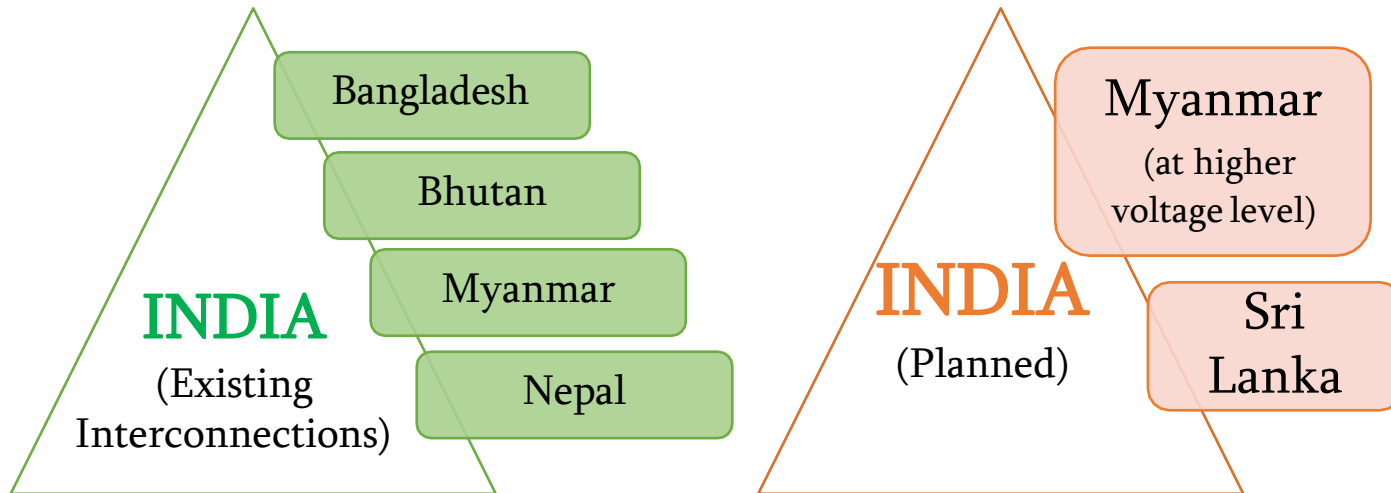
- 11 kV radial interconnection
- **Transaction:** Export from India

Under feasibility studies/discussion

- Sri Lanka, Saudi Arabia, UAE, Singapore



Cross Border Interconnections



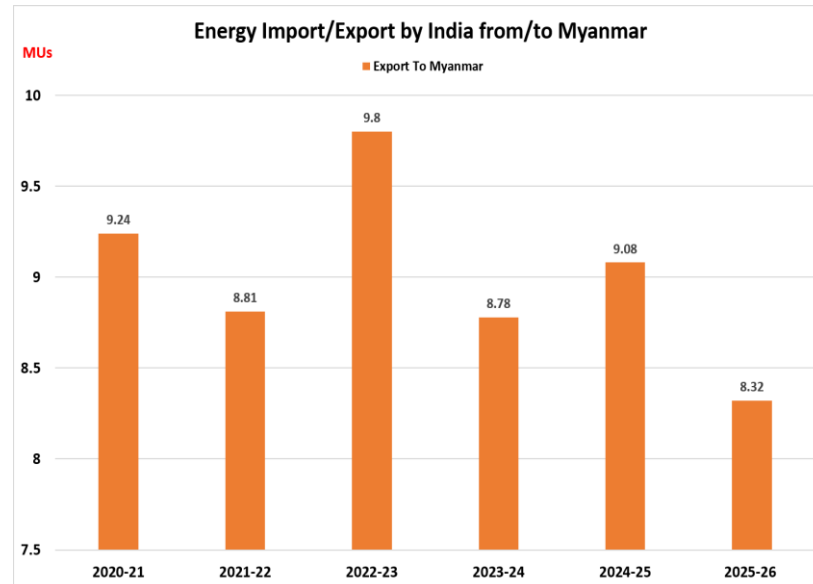
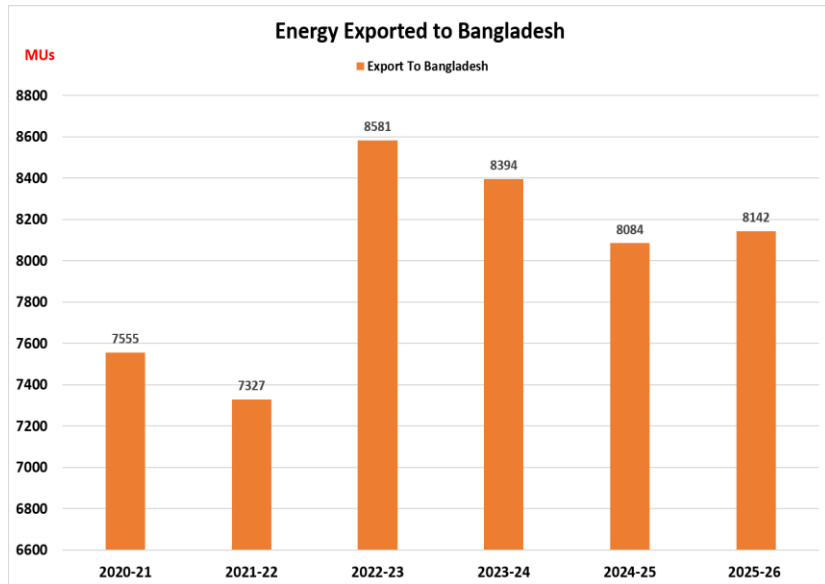
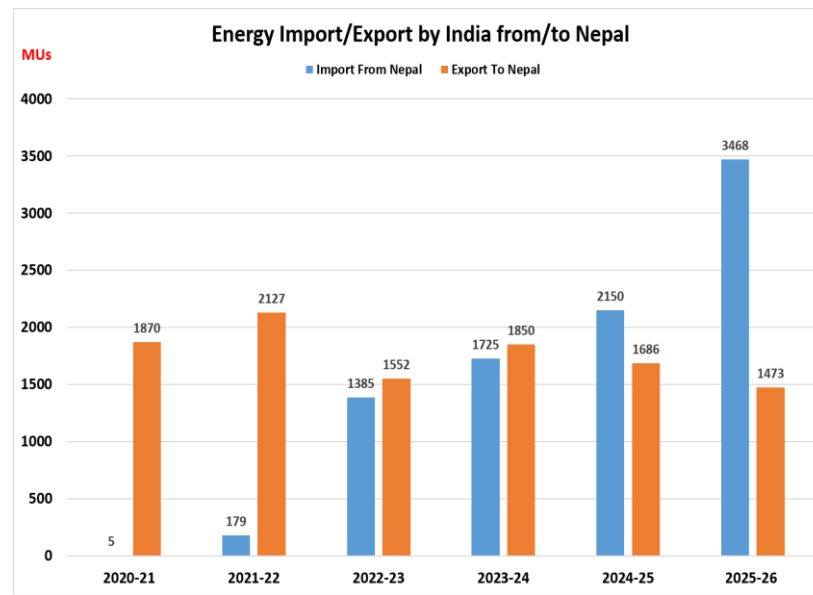
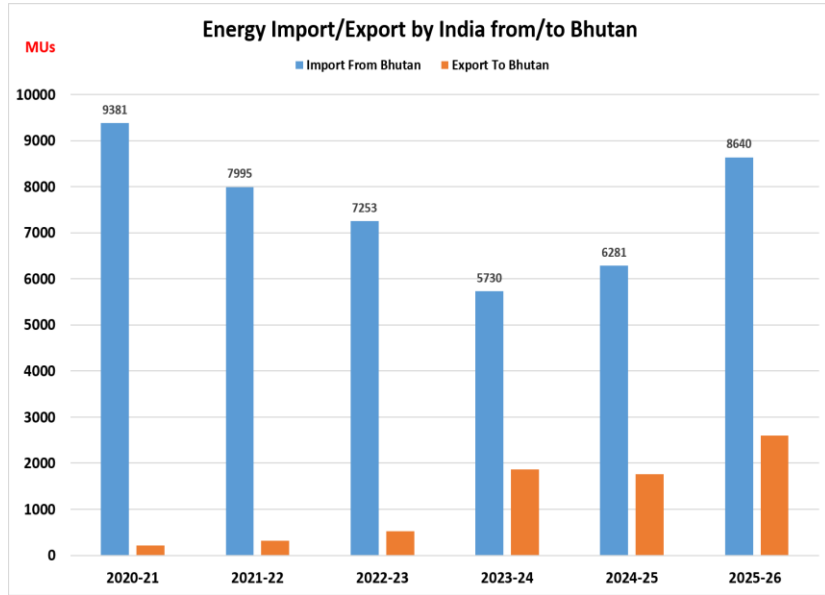
All fig in MW

Under feasibility studies/discussion

- Saudi Arabia
- UAE
- Singapore

Interconnection	Existing	Under implementation (by FY27)	Planned (2030-31)	Total
India – Bangladesh	1,160	0	1,000	2,160
India – Bhutan	7,560	0	0	7,560
India – Myanmar	3	0	504	507
India – Nepal	1,600	8,100	5,350	15,050
India – Sri Lanka	0	0	500	500
Total	10323	8100	7354	25773

Cross Border exchanges



Participation in Indian energy markets –including power exchanges

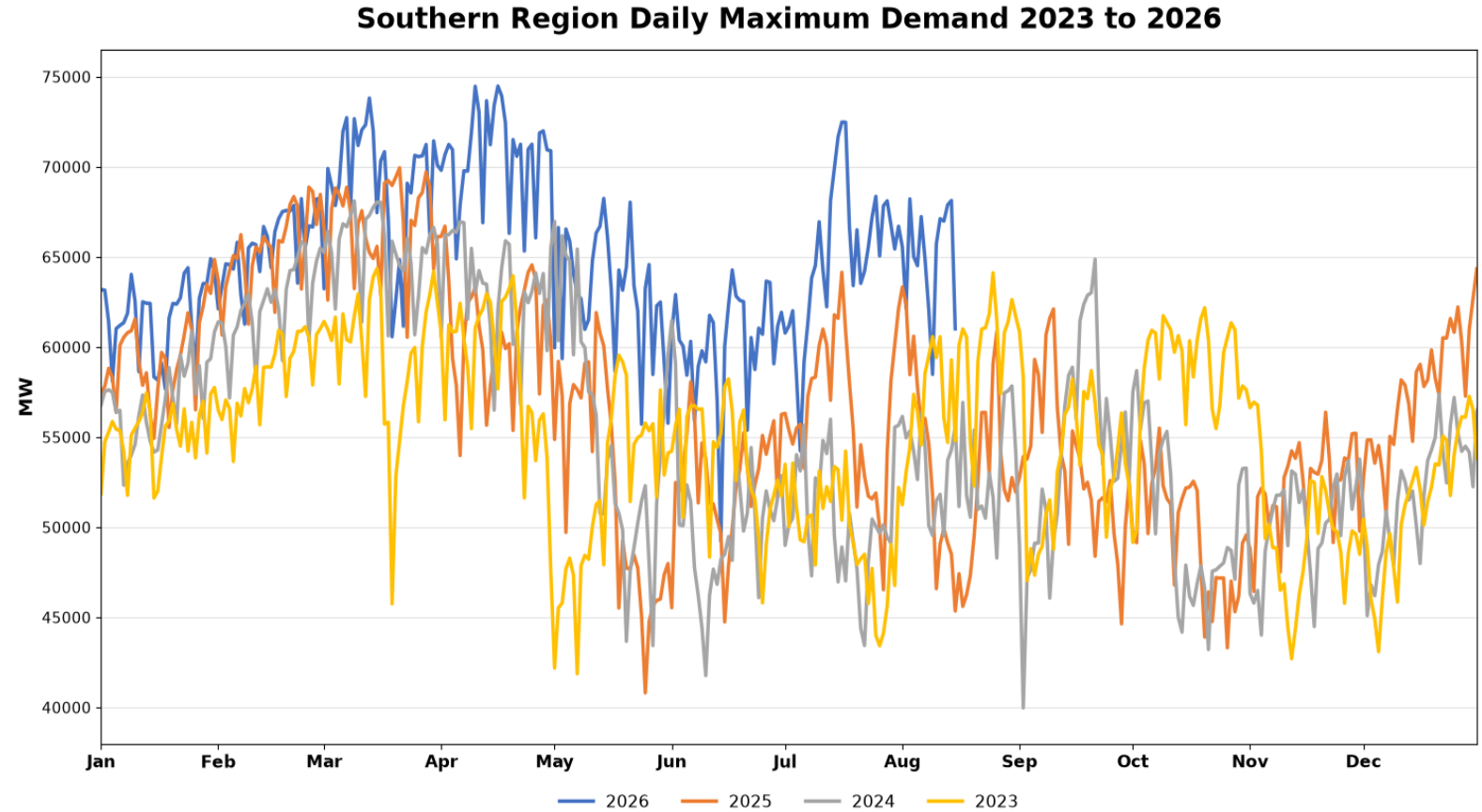
Harnessing diversity in load and generation patterns

Help in balancing renewable-rich systems

Cooperation during exigencies

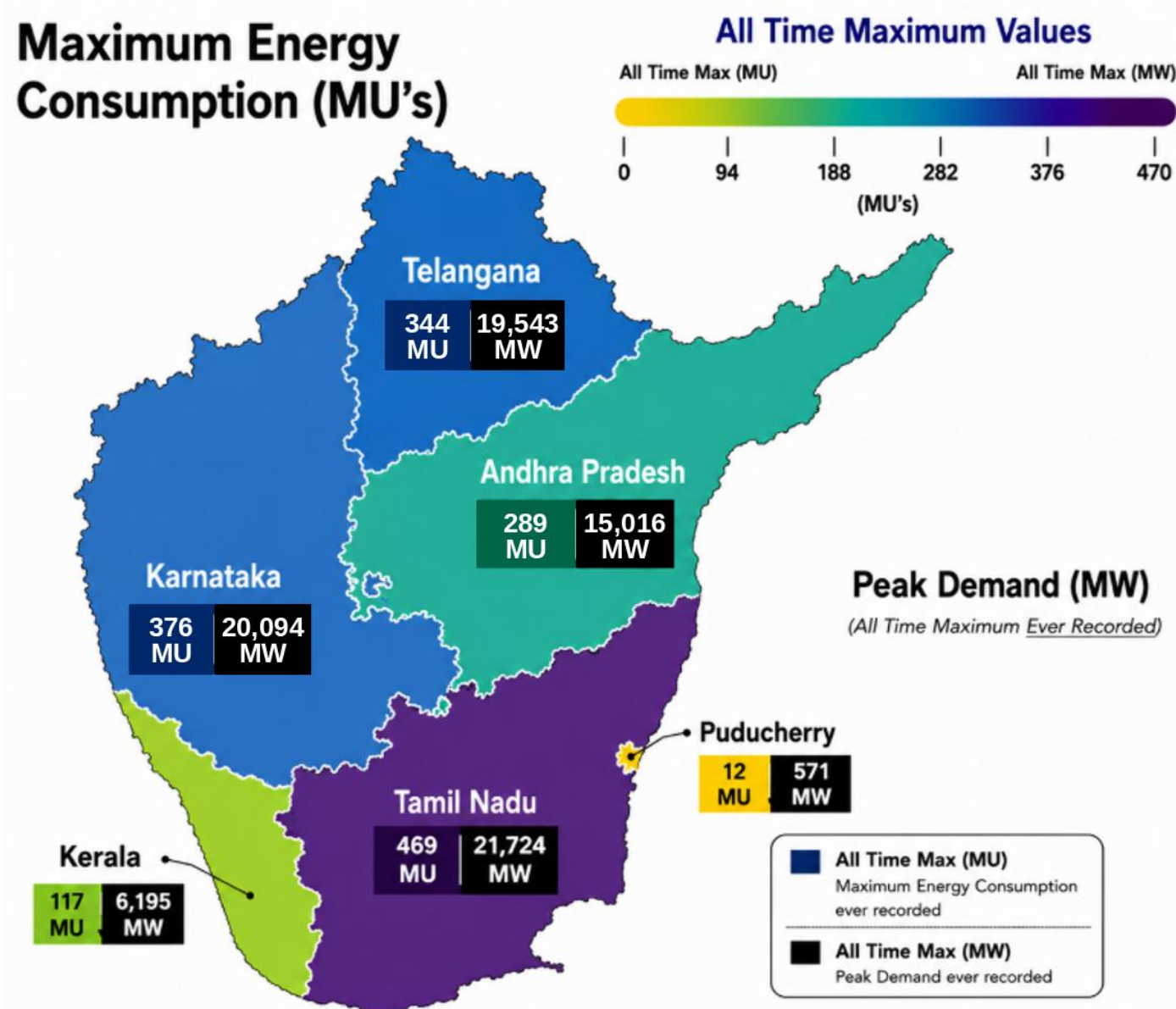
Southern Region – Demand Scenario

Installed Capacity (MW) (source :CEA)			
	Jul 2025	Jul 2026	% Change
Hydro	13127	13676	4%
Thermal	59075	61783	5%
RE/Others	63250	73481	16%
Nuclear	3320	3320	-
Total	138772	152260	10%



- SR Peak demand met on 11-09-2026 (14:47 Hrs) : **76746 MW**
- SR Max Consumption met on 16-04-2026 : **1533 MU**

SR Energy Particulars



Southern Region Overview

UNIQUENESS OF SR GRID



Upcoming Pumped Storage : 6950 MW

Upper Sileru(AP)	: 9x150 MW
Sharavathy(KA)	: 8x250 MW
Kundah.(TN)	: 4x125 MW
Chitravathi(AP)	: 2X250 MW
Saundatti(KA)	: 1600 MW
Gandikota(AP)	: 1000 MW

2nd Highest RE Installed Capacity among Regions in country

73.5 GW (RES excluding Large Hydro)

Lift Irrigation – 9 GW

TS – 7.5 GW (Kaleswaram – 5.7 GW) , KA – 1.3 GW , AP – 0.2 GW

Pumped Hydro Storage - 3680 MW

Greenko Pinnapuram (1680 MW), Kadamparai (4X100 MW) in TN

TS - N'Sgr (700 MW) & Srisaillam (900 MW)

HVDC Pugalur-Thrissur

320kV, 2000 MW, First VSC HVDC in India.

1000 MW Units

2x1000 MW units in operation at Kudankulam

In 1902 - Shivanasamudra Generating plant 42 MW Commissioned

Thank You