

India's Energy Overview

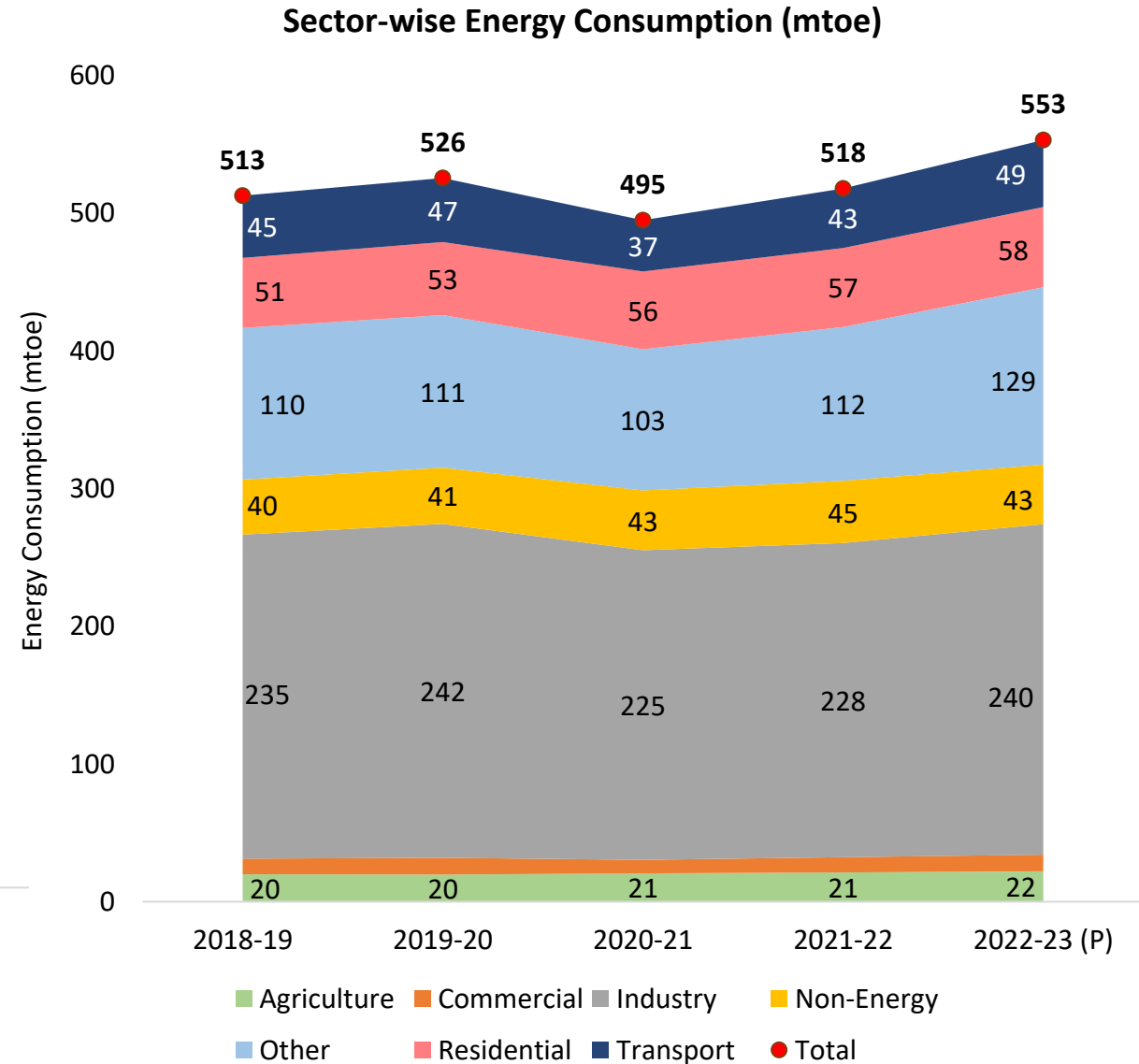
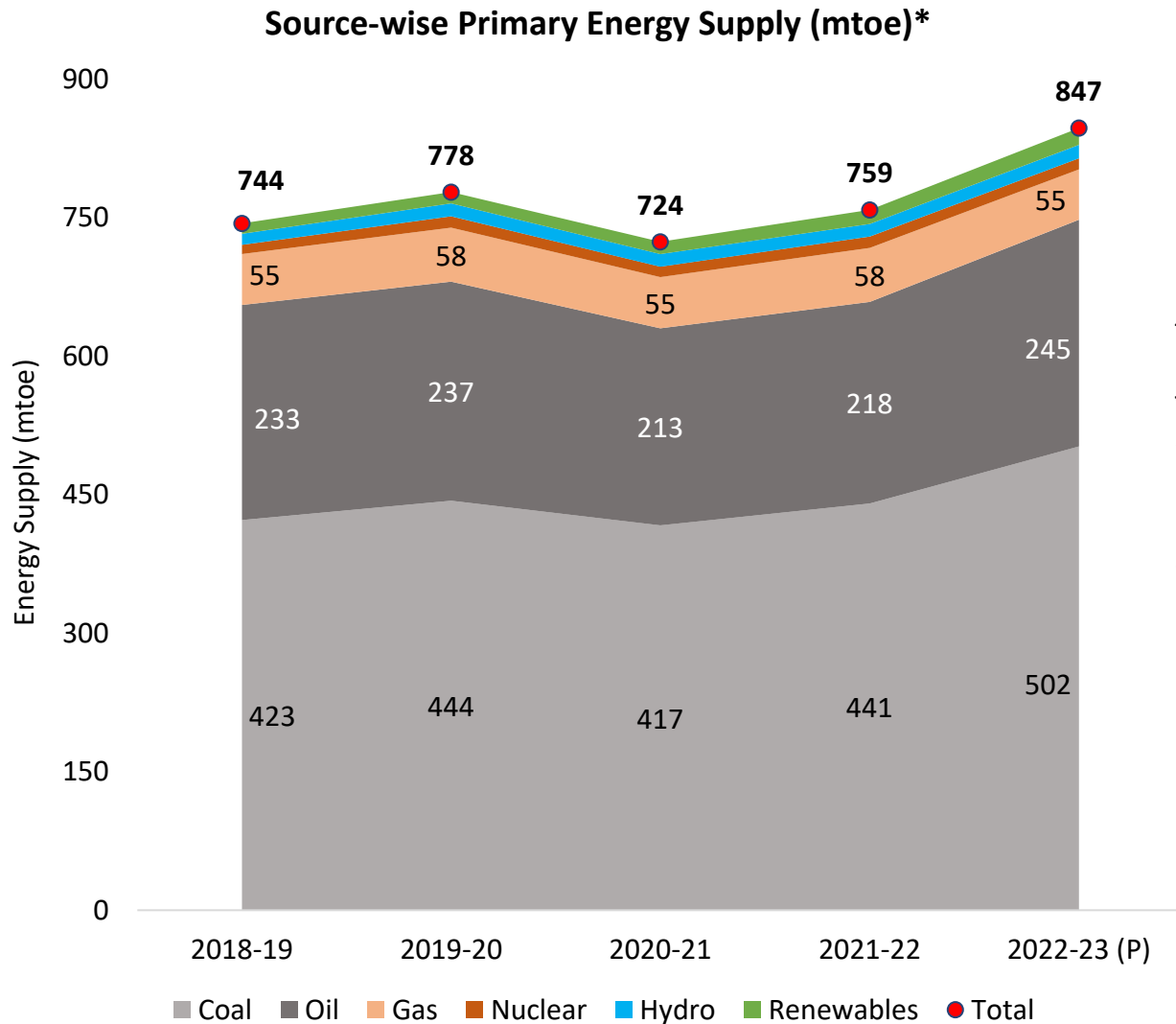
October 2024



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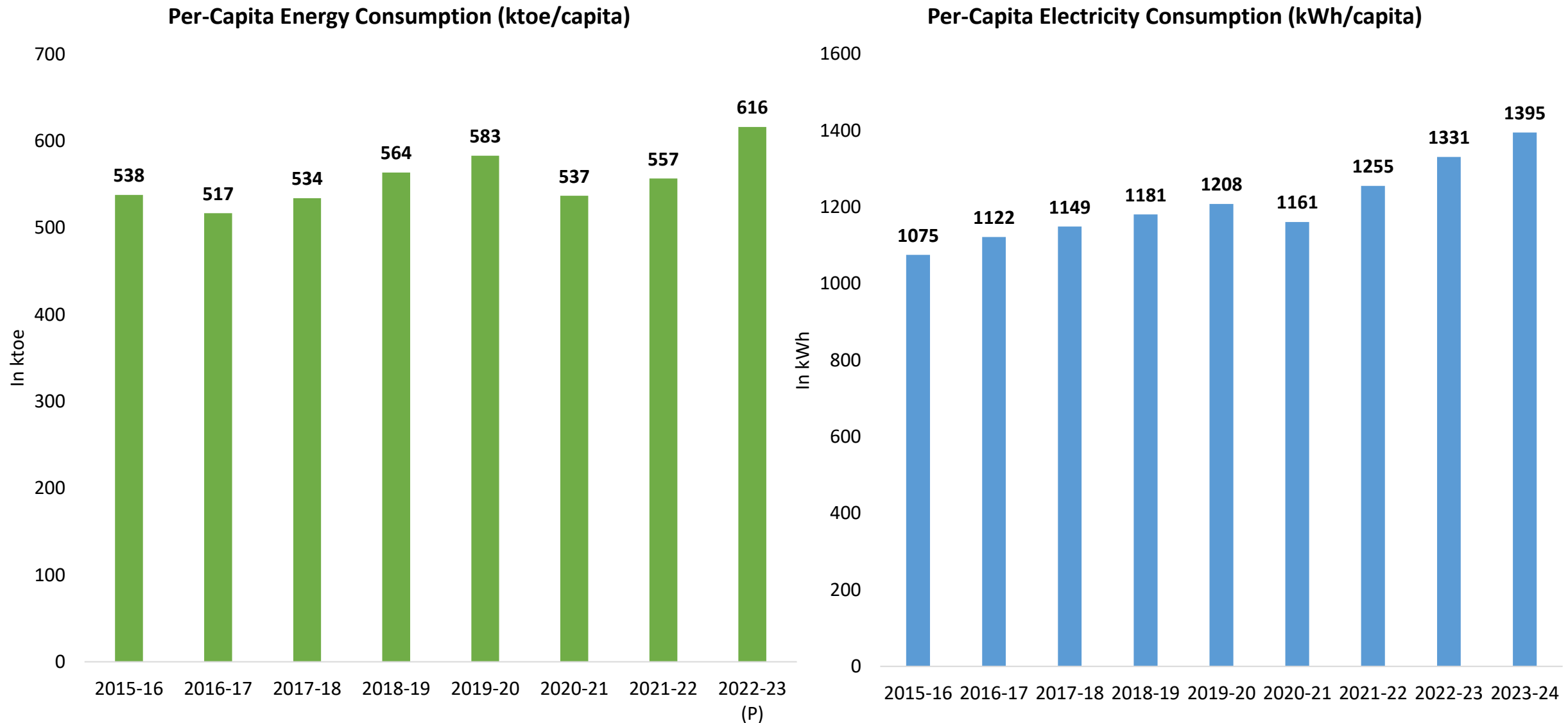
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Primary Energy Mix* in India



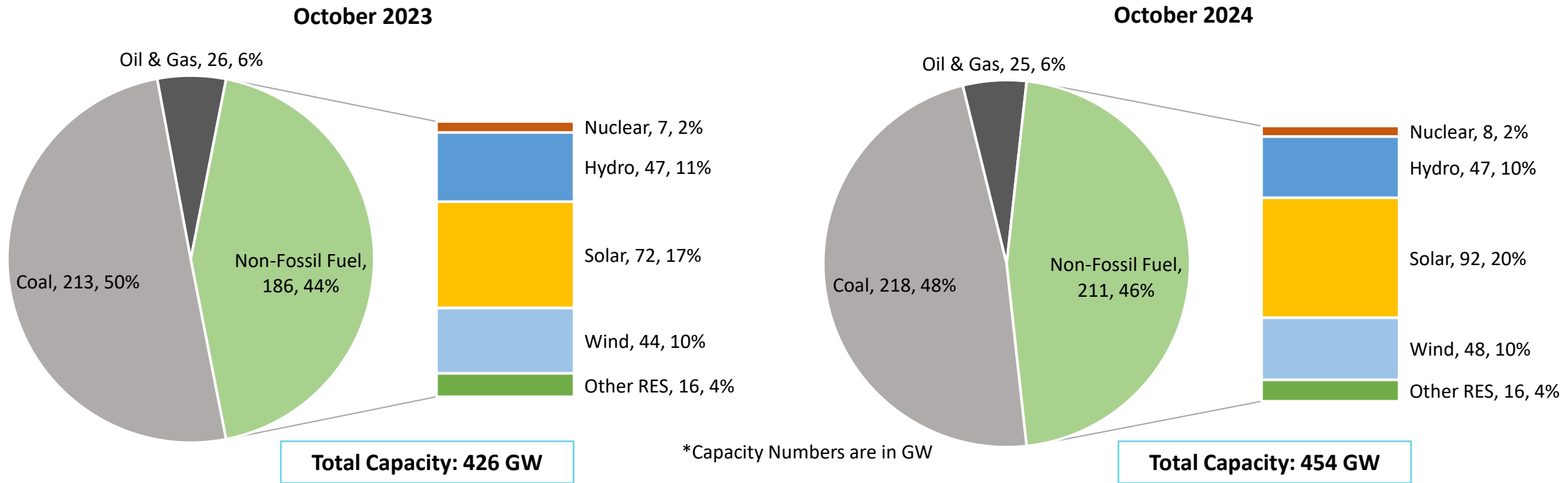
*Excluding biofuels, waste, and other non-commercial source of energy

Per-Capita Energy and Electricity Consumption



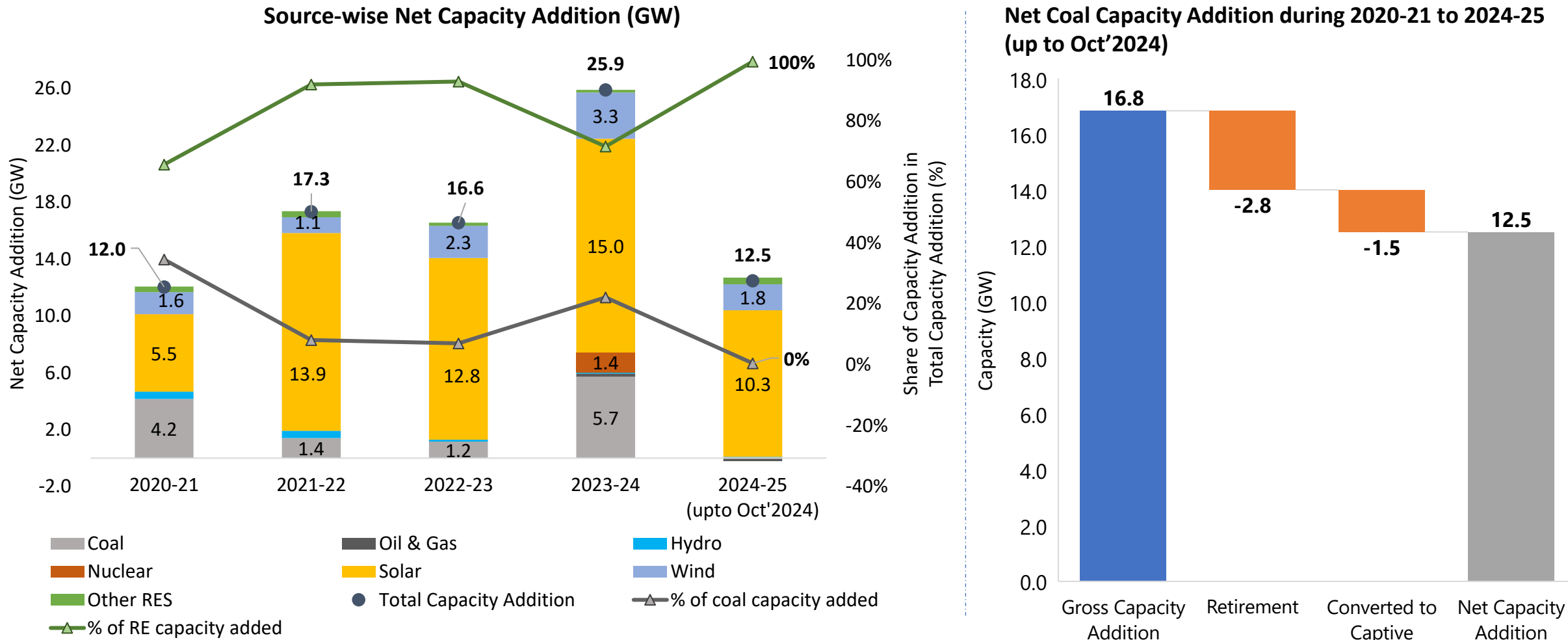
Note: Per Capita energy consumption is calculated on energy supply basis.

India's Electricity Capacity Mix (Utility-scale)



- India's electricity generating capacity is 454 GW as on Oct'2024 [coal 218 GW (48%), solar 92 GW (20%), wind 48 GW (10%), and hydro 47 (10%)].
- As on Oct'2024, the share of non-fossil-based electricity capacity is 46% against the set target of 50% non-fossil capacity by 2030.
- As on Oct'2024, India's renewable energy capacity (including large hydro) stood at 203 GW out of 454 GW.

India's Electricity Capacity Addition in last 5 years



- A total of 70.5 GW of generation capacity has been added in RE (Hydro, solar, wind, and other RES) over the past 5 years (2020-21 to 2024-25), whereas the net coal capacity addition during the same period was 12.5 GW, mostly in the central sector.

State-wise Solar Capacity

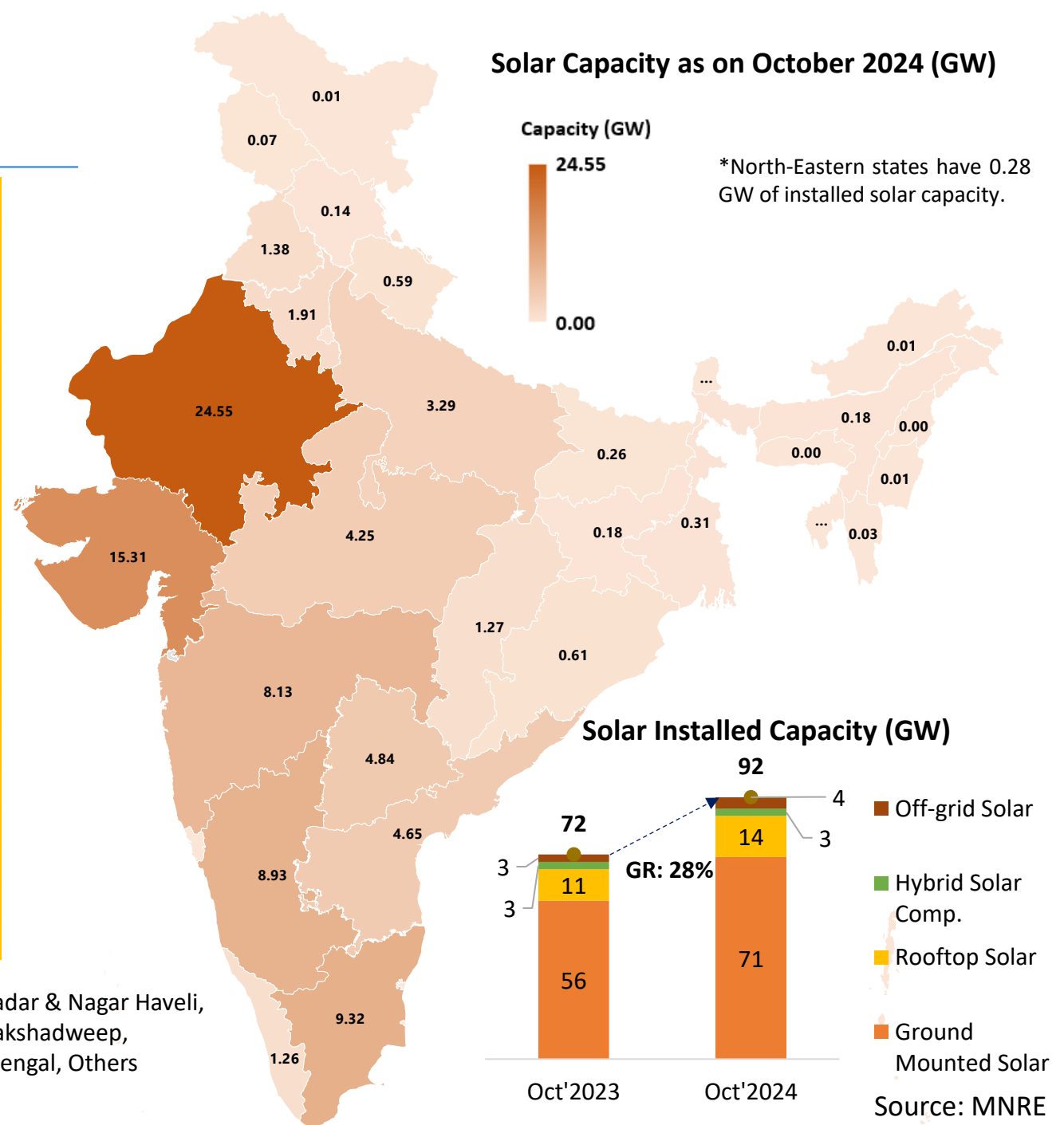
as on October 2024

State-wise installed capacity of Solar Power (GW)

States	Ground Mounted	Rooftop	Solar Component in Hybrid	Off Grid	Total Solar Power
Rajasthan	20.47	1.29	1.98	0.81	24.55
Gujarat	10.22	4.34	0.65	0.09	15.31
Tamil Nadu	8.46	0.79	0.00	0.07	9.32
Karnataka	8.26	0.63	0.00	0.04	8.93
Maharashtra	4.75	2.65	0.00	0.73	8.13
Telangana	4.36	0.47	0.00	0.01	4.84
Andhra Pradesh	4.34	0.22	0.00	0.09	4.65
Madhya Pradesh	3.72	0.42	0.00	0.10	4.25
Uttar Pradesh	2.70	0.27	0.00	0.32	3.29
Haryana	0.27	0.72	0.00	0.92	1.91
Punjab	0.89	0.41	0.00	0.08	1.38
Chhattisgarh	0.78	0.10	0.00	0.39	1.27
Kerala	0.32	0.91	0.00	0.02	1.26
Odisha	0.51	0.06	0.00	0.04	0.61
Others	1.00	1.14	0.00	0.28	2.43
All India	71.05	14.45	2.63	3.99	92.12

Others include- Andaman & Nicobar, Arunachal Pradesh, Assam, Bihar, Chandigarh, Dadar & Nagar Haveli, Daman & Diu, Delhi, Goa, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Ladakh, Lakshadweep, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Puducherry, Sikkim, Tripura, West Bengal, Others

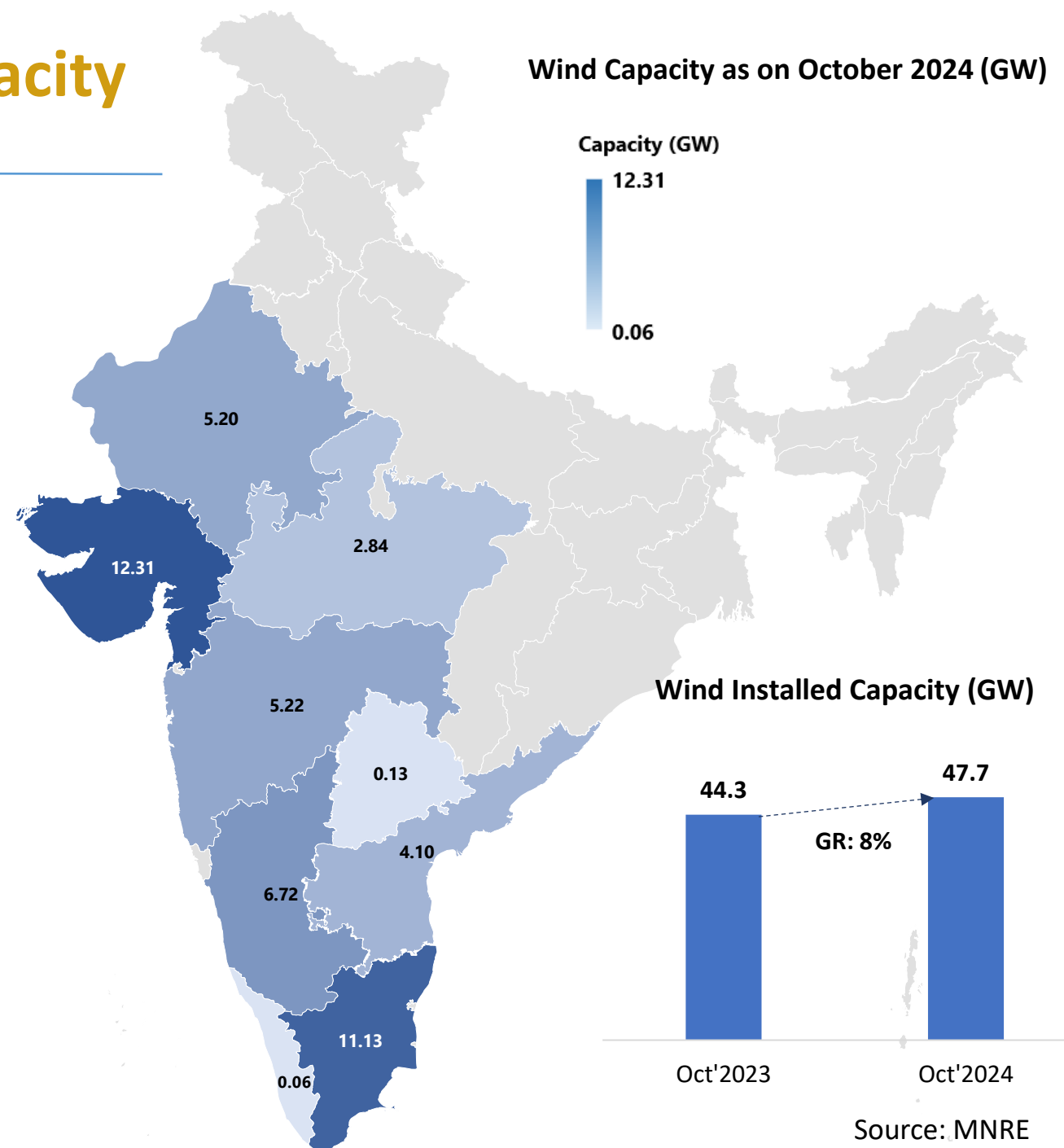
Solar Capacity as on October 2024 (GW)



State-wise Wind Onshore Capacity

as on October 2024

State-wise installed capacity of Wind (Onshore) Power	
States	Installed Capacity (GW)
Gujarat	12.31
Tamil Nadu	11.13
Karnataka	6.72
Maharashtra	5.22
Rajasthan	5.20
Andhra Pradesh	4.10
Madhya Pradesh	2.84
Telangana	0.13
Kerala	0.06
India Total	47.72



RE Potential and Installed Capacity (1/2)

RE potential in the state

Wind Onshore (at 150m agl) and Offshore Potential

Solar Potential

Renewable Energy Potential (all sources incl. large Hydro)

State Potential (GW)

0.0 284.3

State Potential (GW)

0.9 142.3

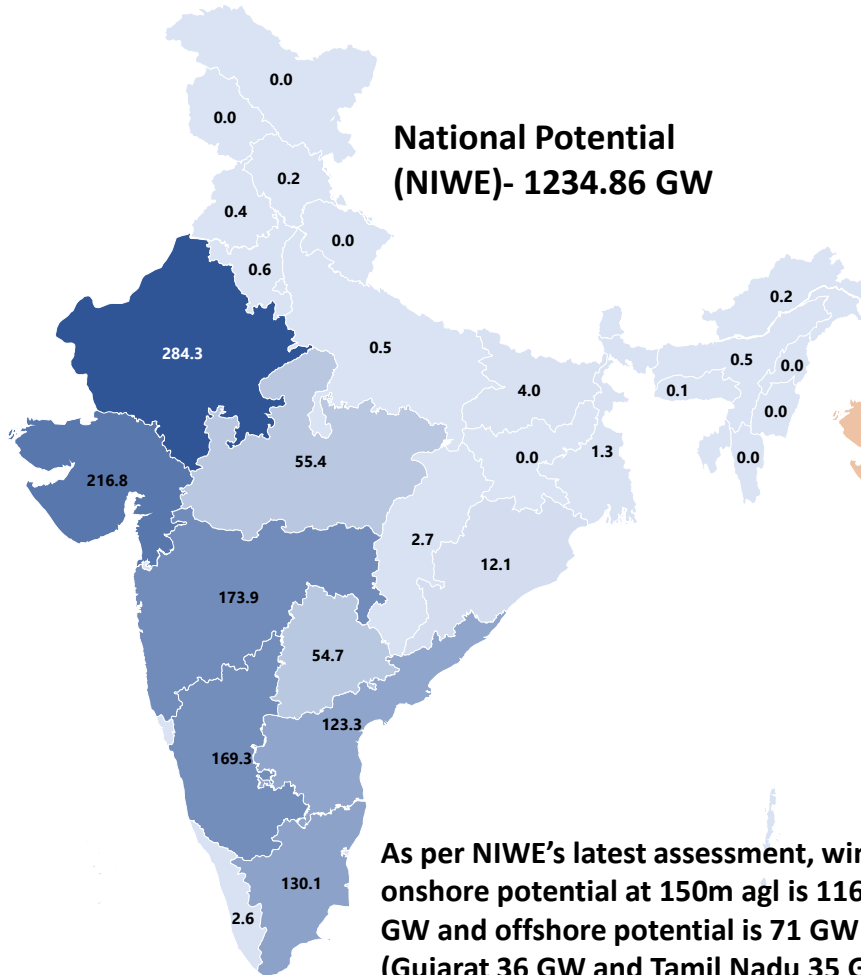
Potential (GW)

0 428

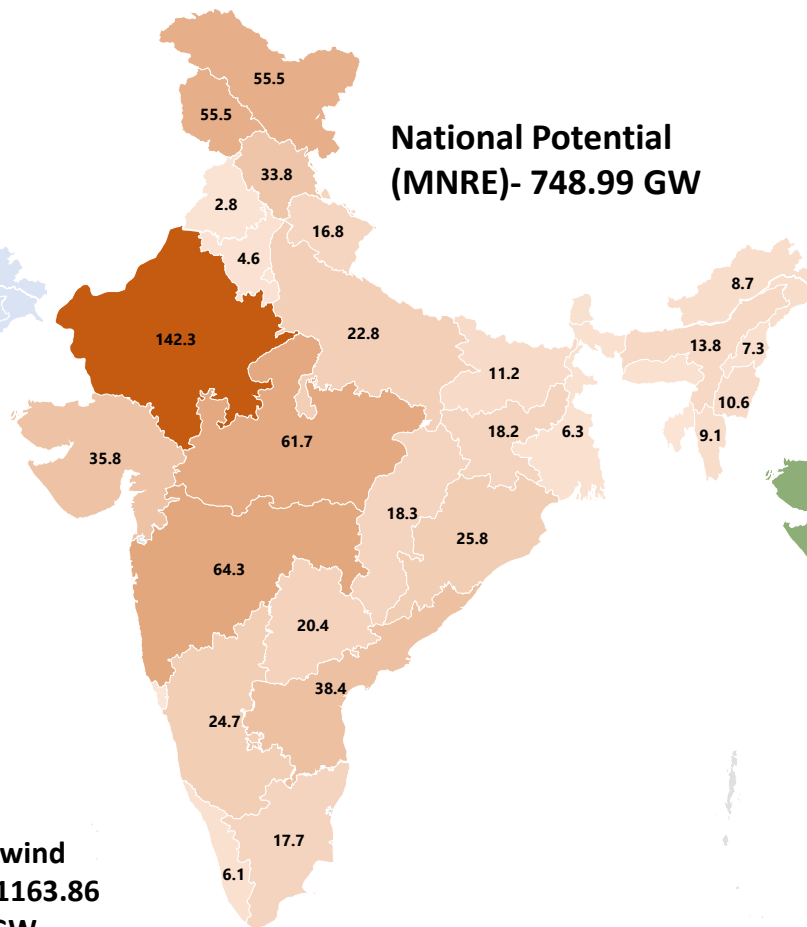
National Potential (NIWE)- 1234.86 GW

National Potential (MNRE)- 748.99 GW

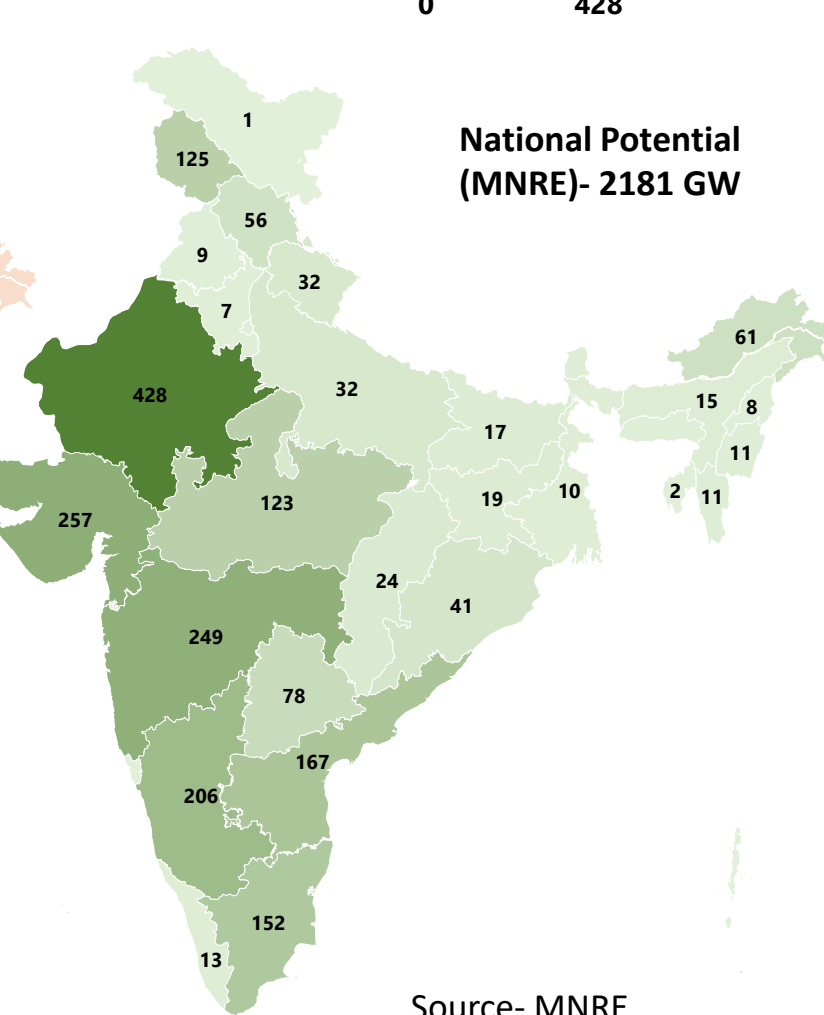
National Potential (MNRE)- 2181 GW



As per NIWE's latest assessment, wind onshore potential at 150m agl is 1163.86 GW and offshore potential is 71 GW (Gujarat 36 GW and Tamil Nadu 35 GW).

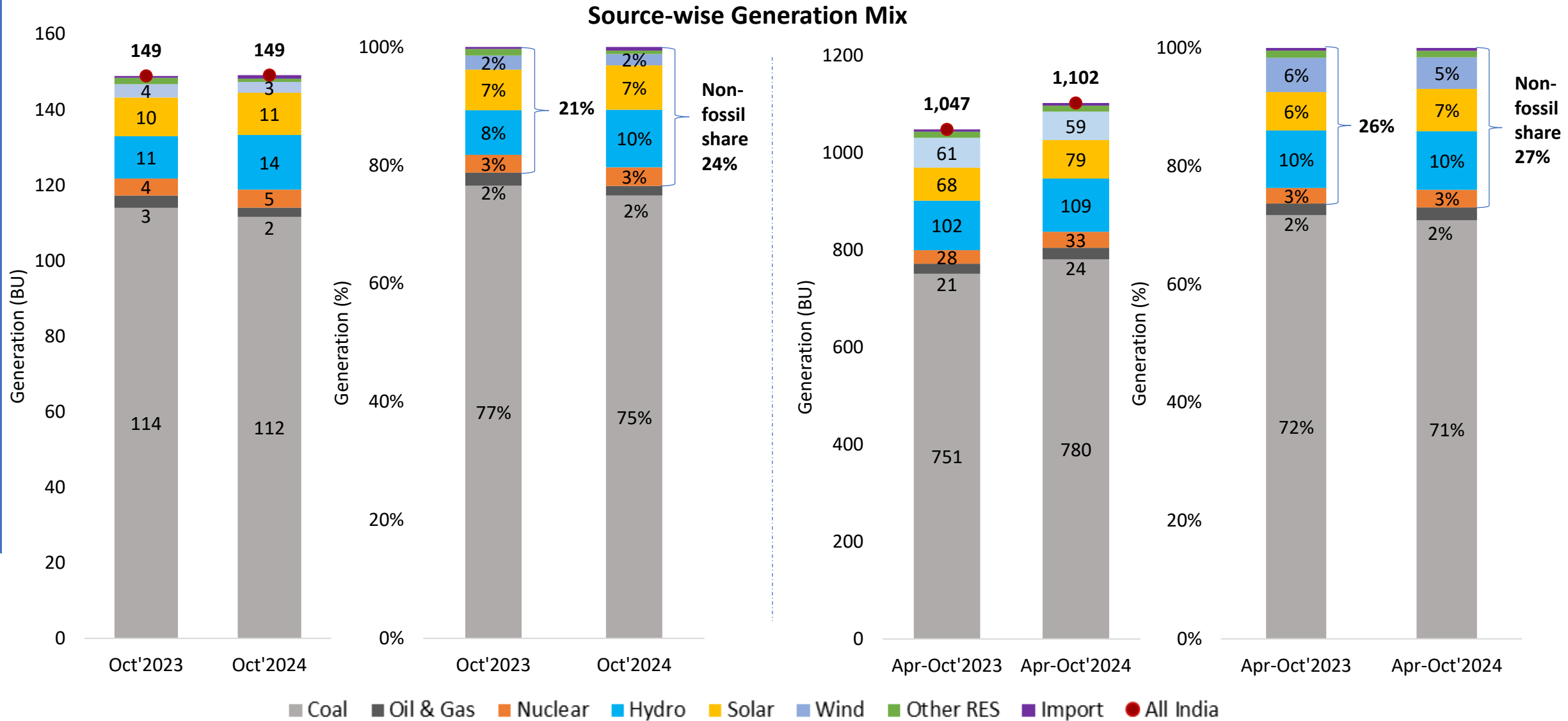


Market potential for SPV rooftop is 124 GW.



Source- MNRE

India's Electricity Generation Mix

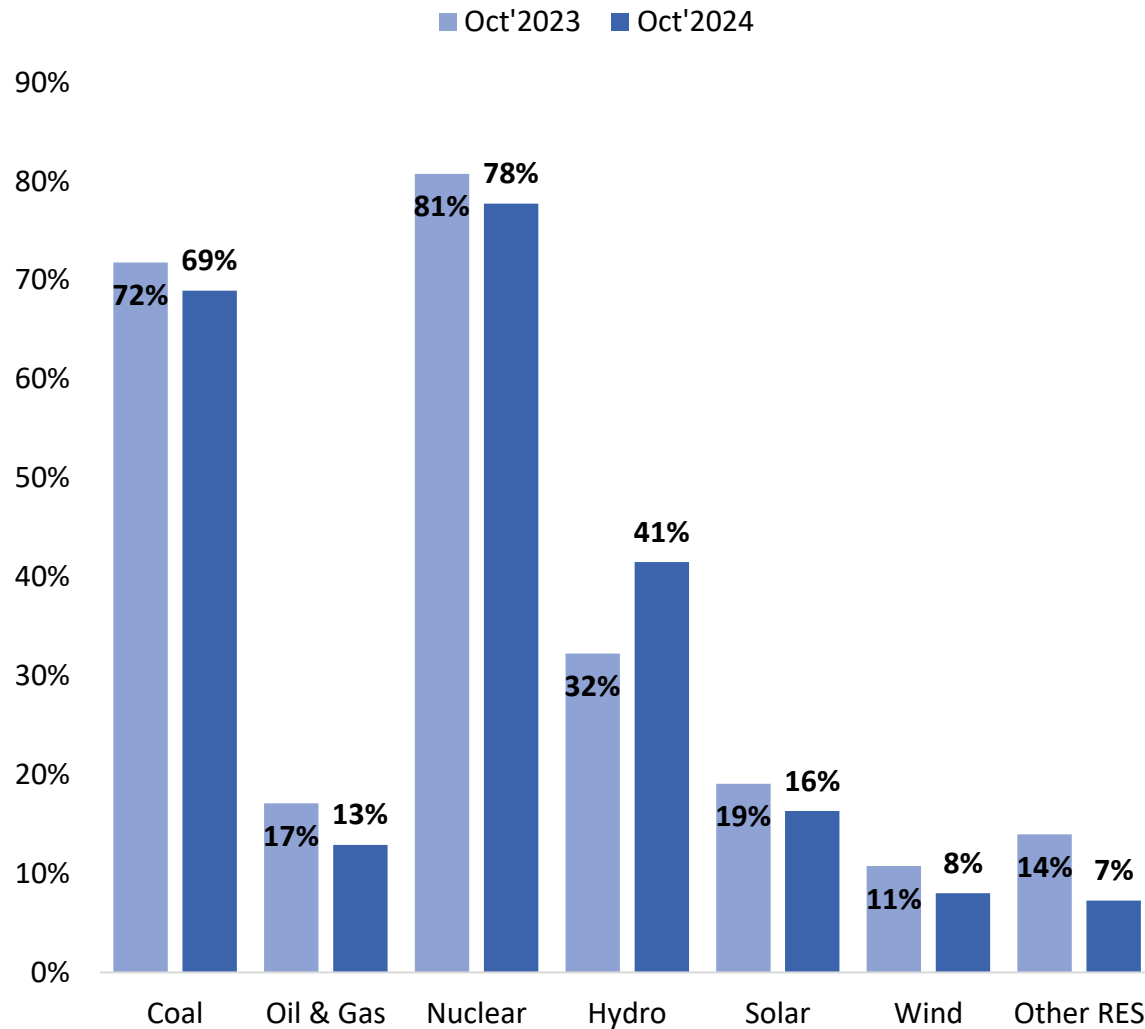


NOTE: The generation data for October'2024 is provisional.

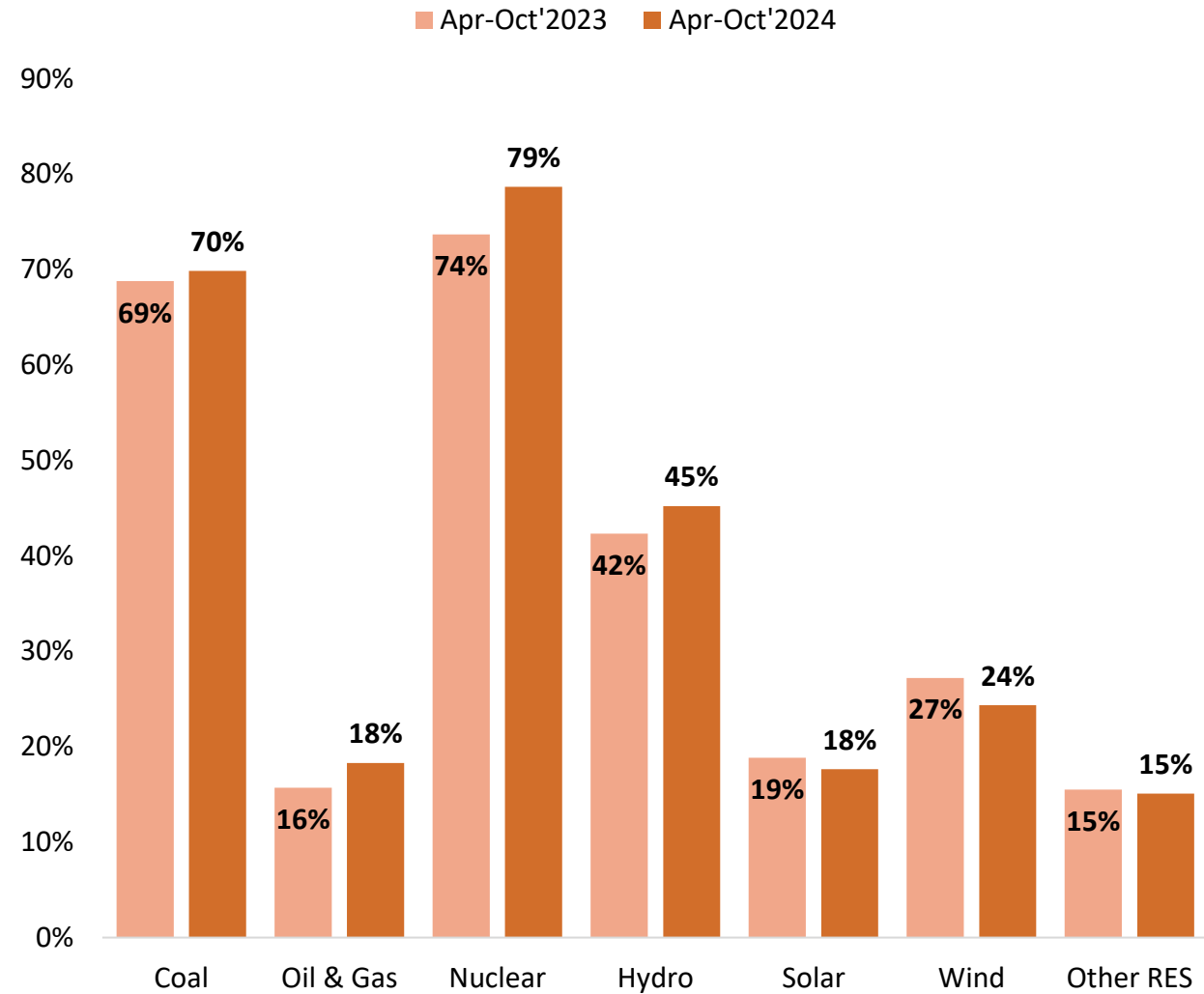
Source: CEA

Source-wise PLF/CUF

Source-wise PLF/ CUF in October (%)



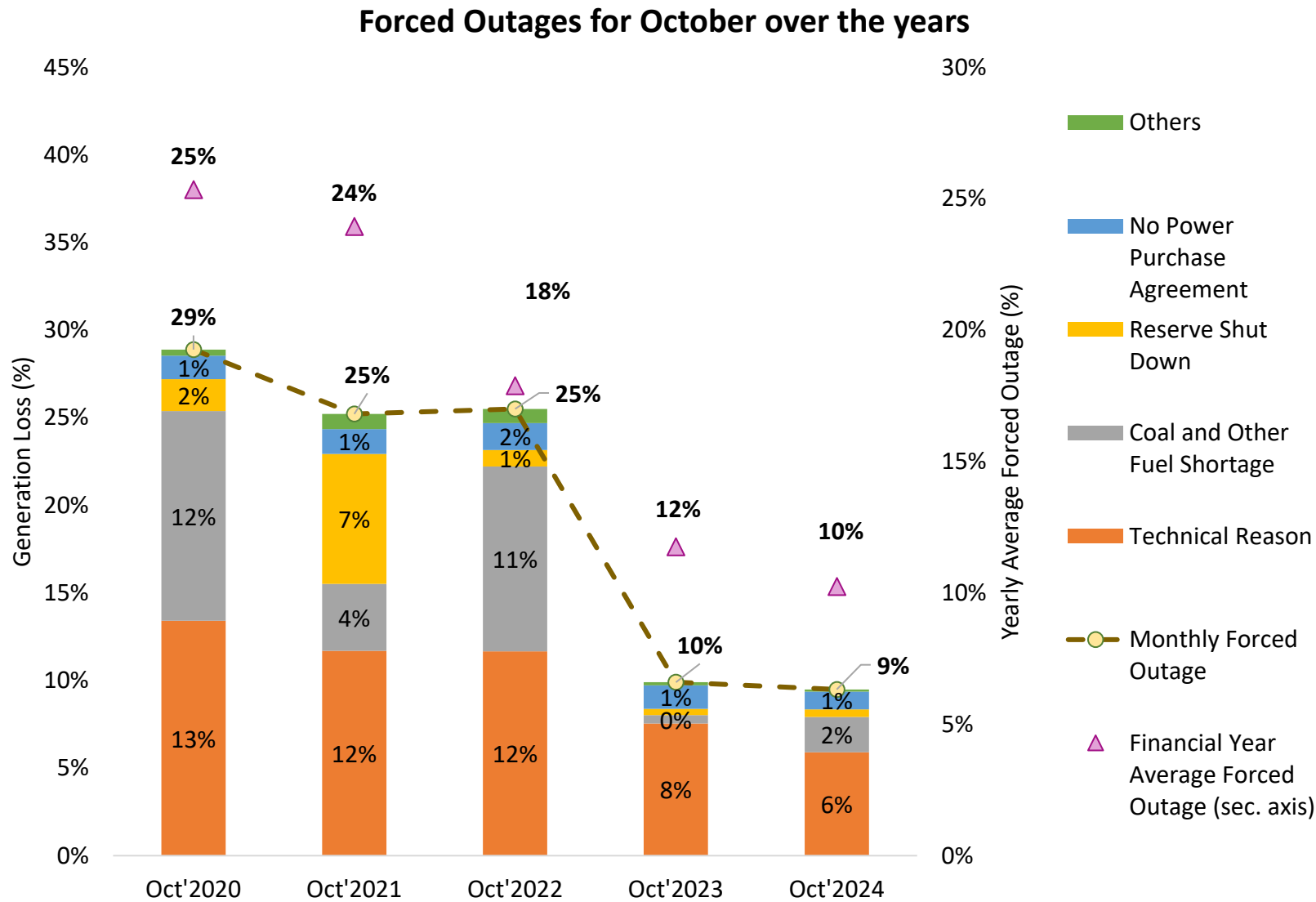
Source-wise PLF/ CUF Comparison (%)



NOTE: The PLF/CUF data is based on provisional generation for October'2024.

Source: CEA & MNRE

Thermal Generation Loss and Reasons for Forced Outages



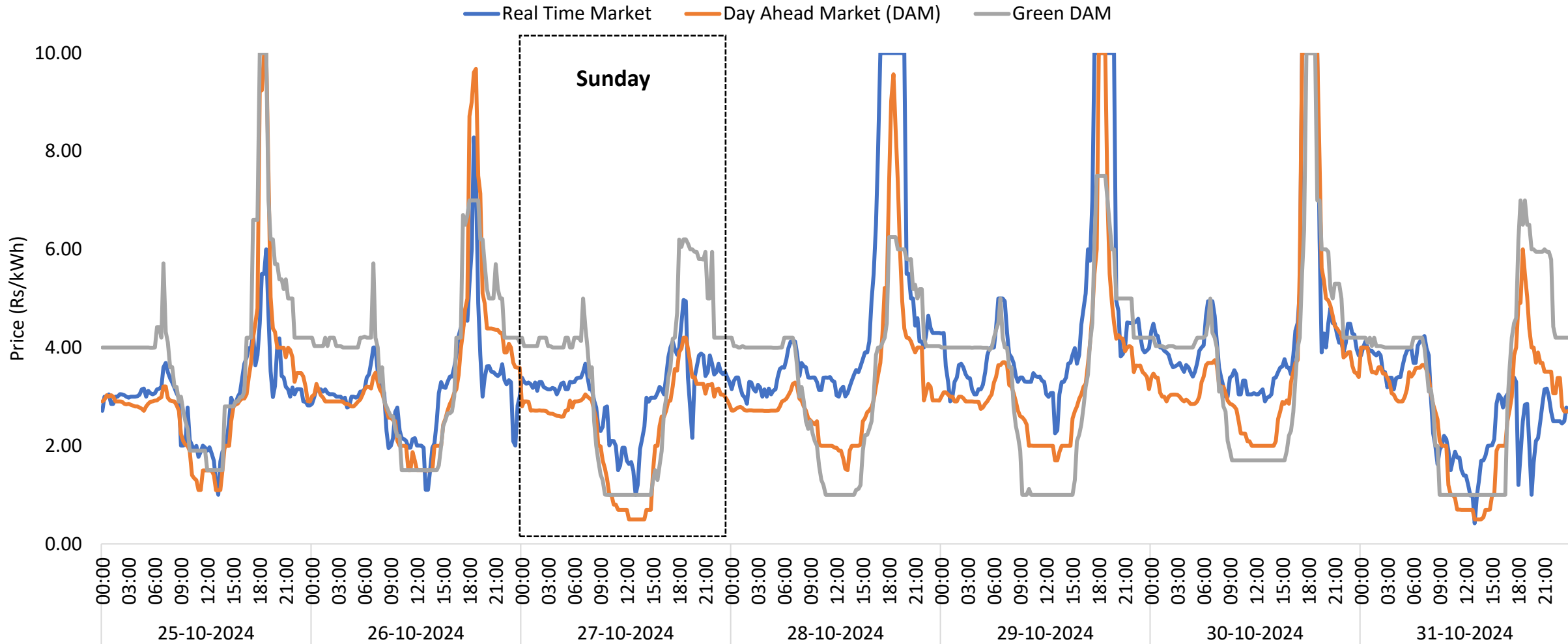
Year/ Month		Average Forced Outage Share
Yearly	FY 2022-23	18%
	FY 2023-24	12%
	FY 2024-25 (up to Oct'2024)	10%
Monthly	Oct'2022	25%
	Oct'2023	10%
	Oct'2024	9%

Thermal includes only Coal and Lignite Plants.

Source: ICED

Indian Electricity Exchange (IEX) Market Snapshot

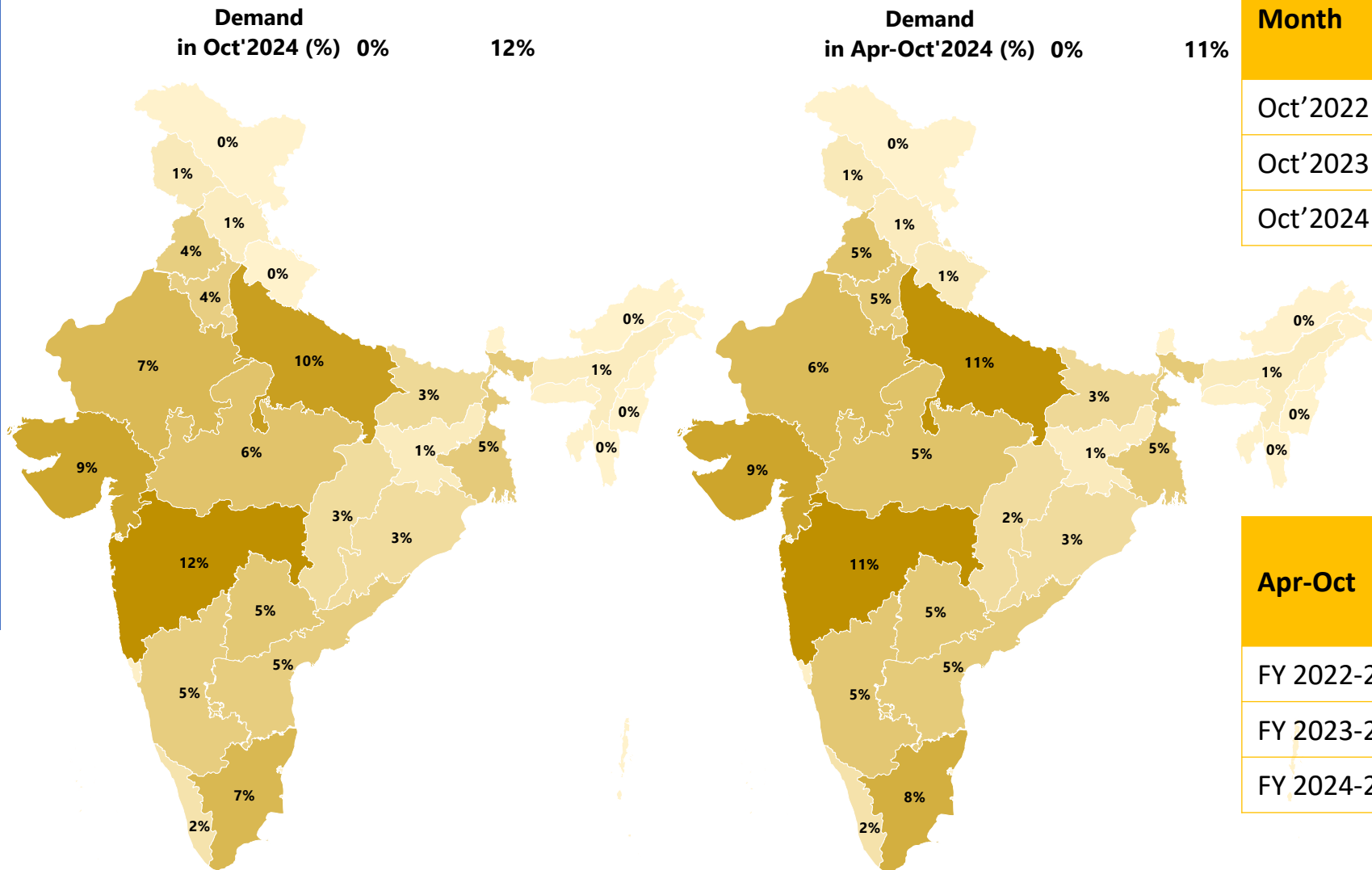
Market Clearing Prices of last 7 days of October 2024



In April 2023, CERC revised the price ceiling from ₹12/kWh to ₹10/kWh in the power exchange market.

National and State level Electricity Demand

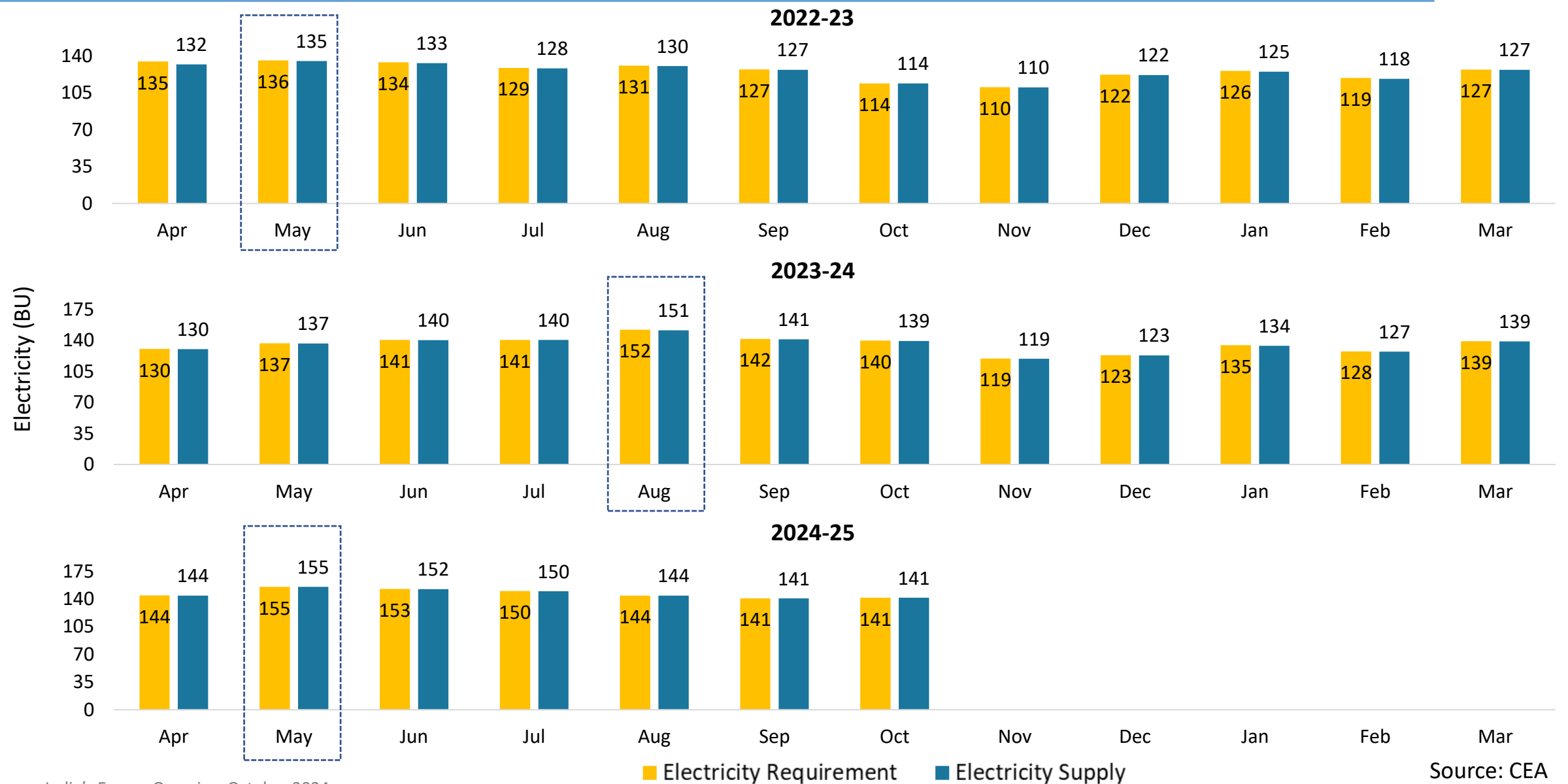
State-level Electricity Demand as a percent of National Demand (%)



Month	Electricity Demand (BU)	Electricity Supply (BU)	Gap (BU) (+/-)
Oct'2022	114	114	0.1
Oct'2023	140	139	0.4
Oct'2024	141	141	0.0

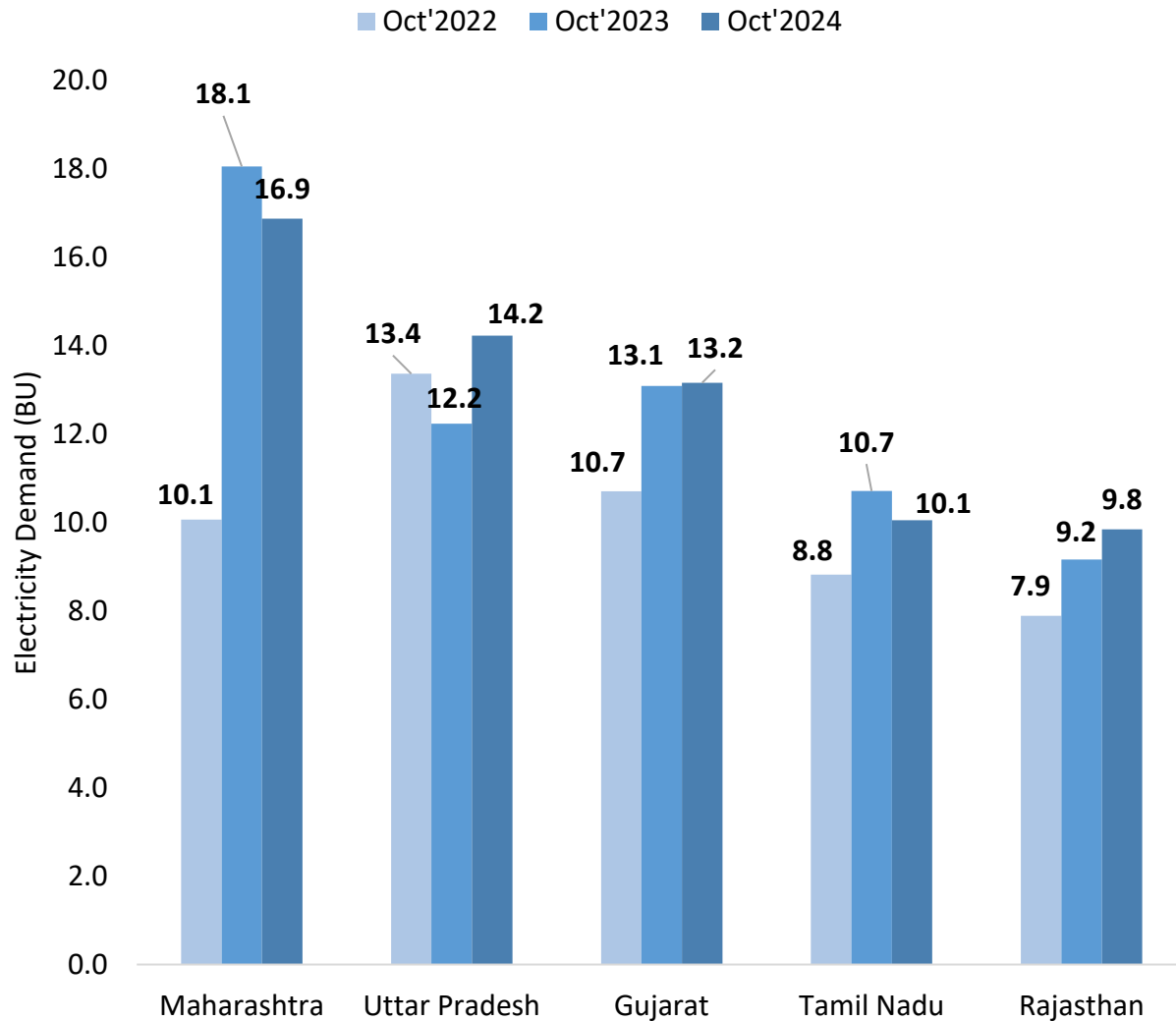
Apr-Oct	Electricity Demand (BU)	Electricity Supply (BU)	Gap (BU) (+/-)
FY 2022-23	905	900	5
FY 2023-24	982	979	3
FY 2024-25	1029	1028	1

India's Monthly Electricity Requirement and Supply

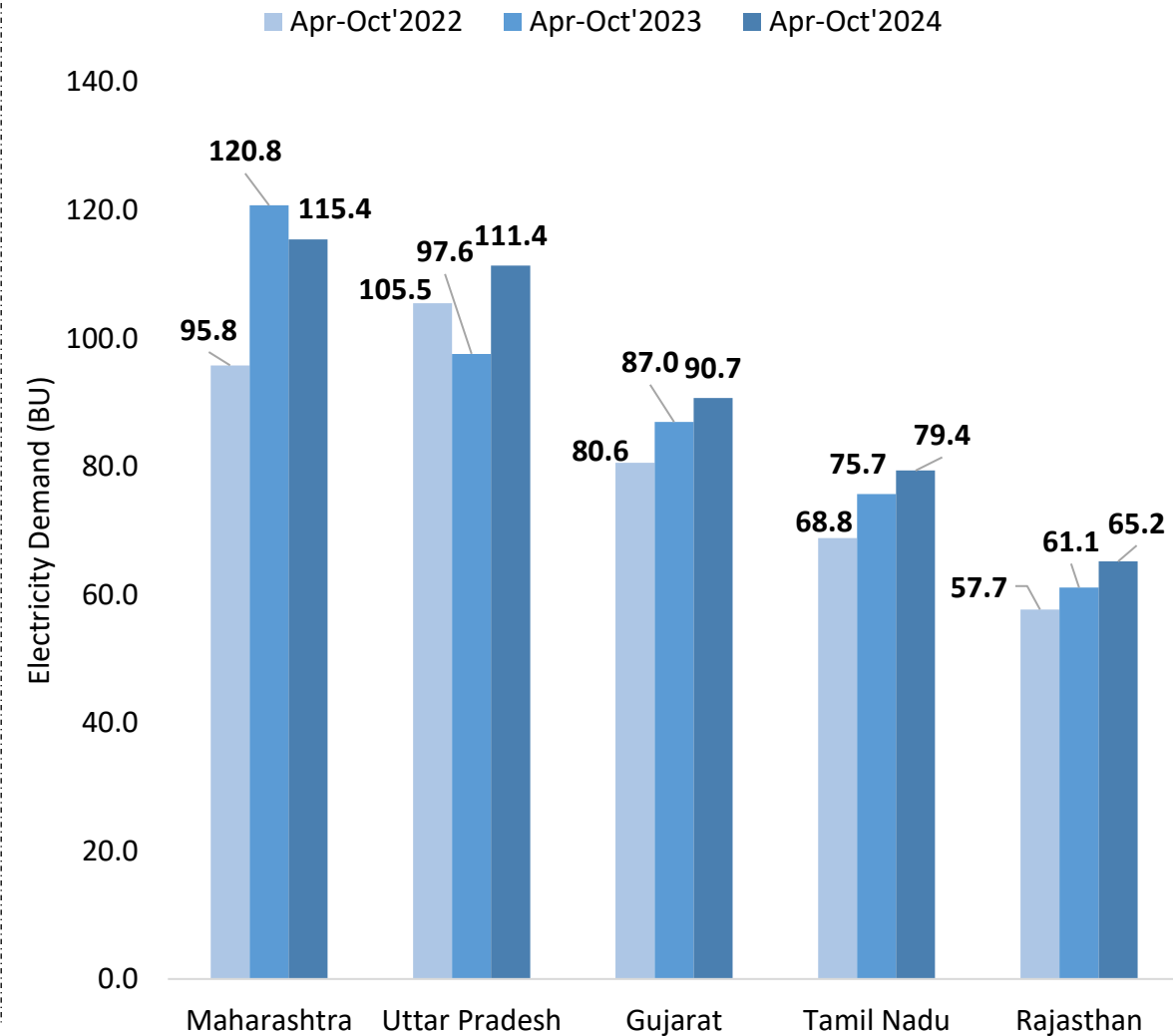


Monthly Electricity Demand of the top 5 states

States with Highest Electricity Demand in October (BU)



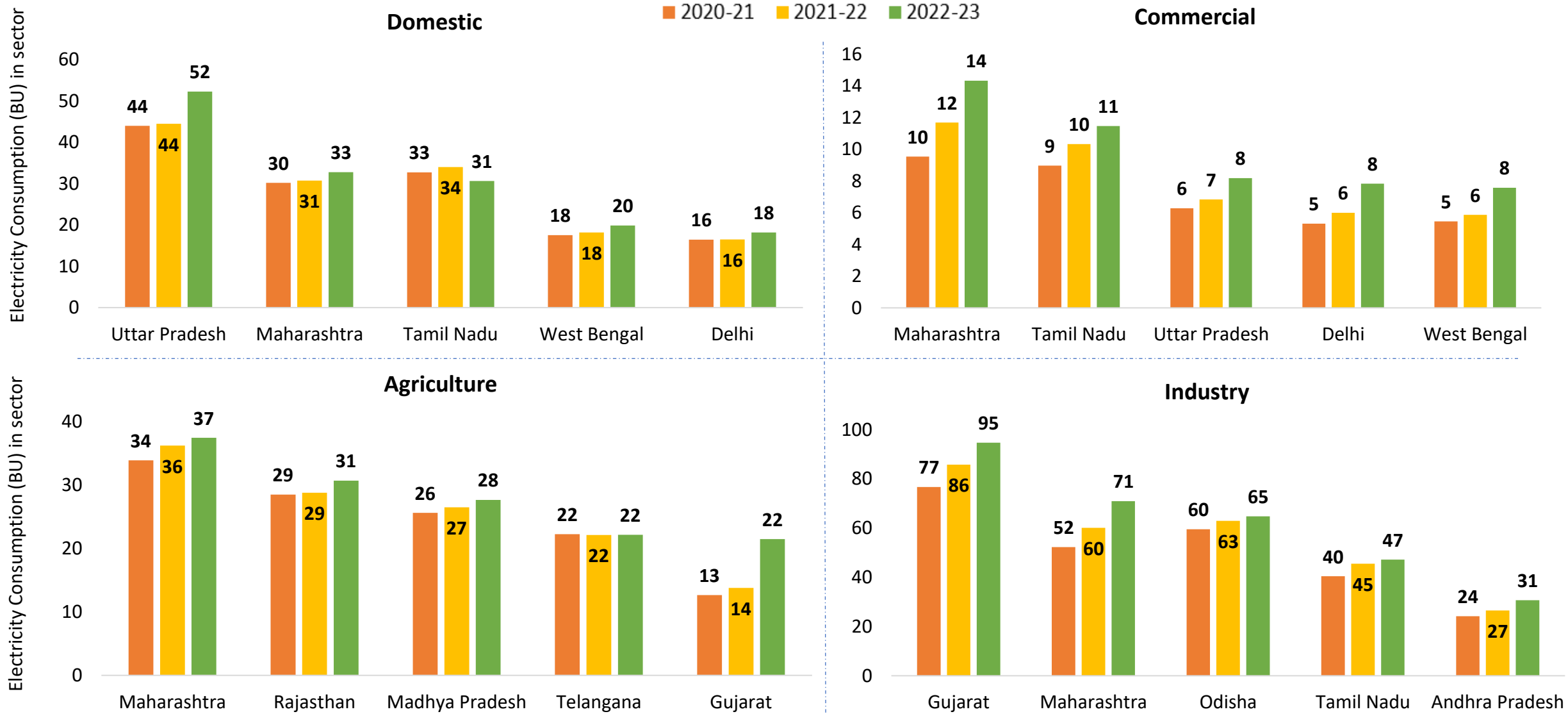
States with Highest Electricity Demand (BU)



Note: The electricity demand data for October'24 is Provisional.

Source: CEA

Electricity Consumer-category wise top 5 States

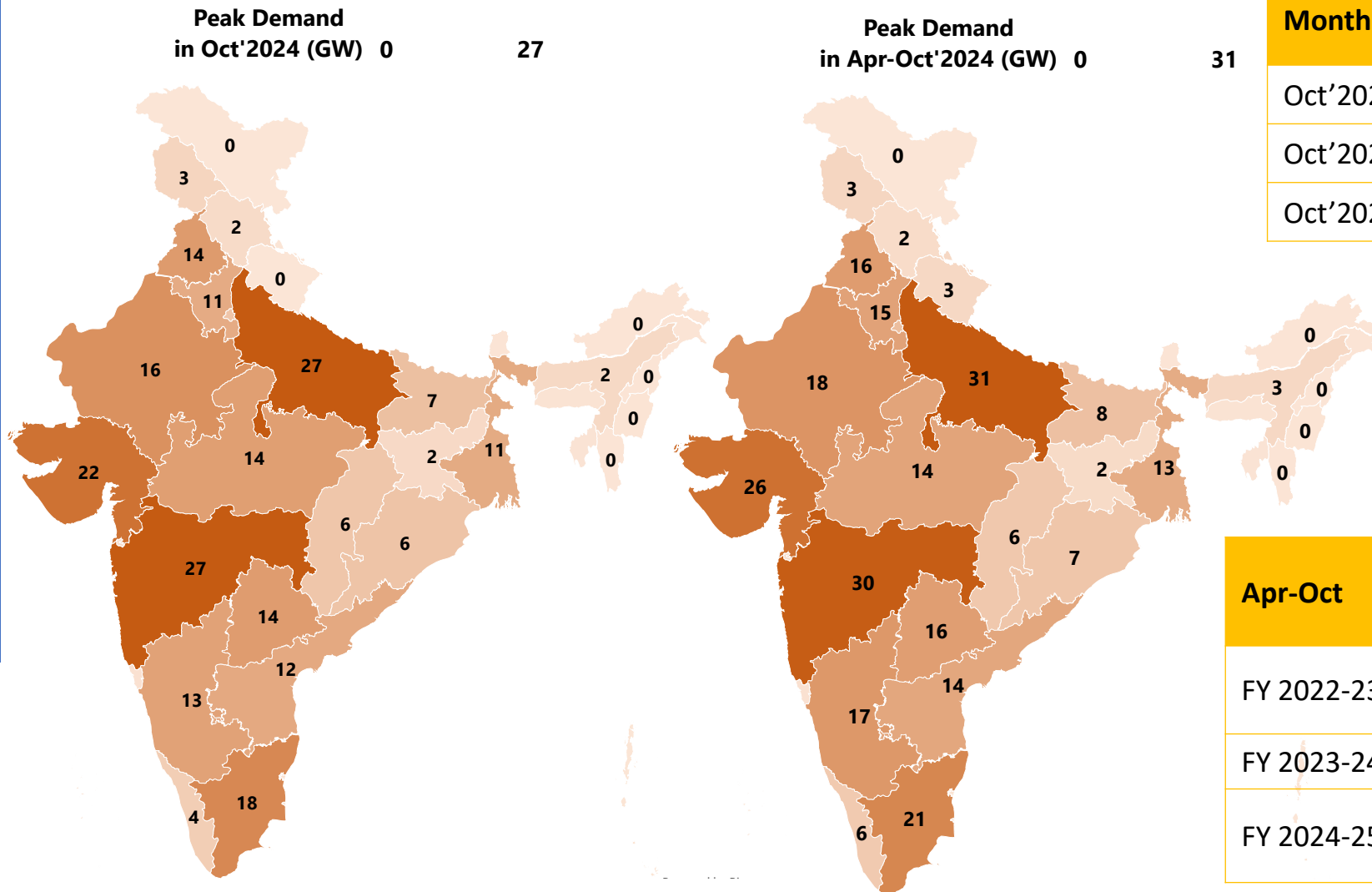


NOTE: Top 5 States under consumer-categories are selected on the basis of 2022-23

Source: CEA

National and State level Peak Electricity Demand

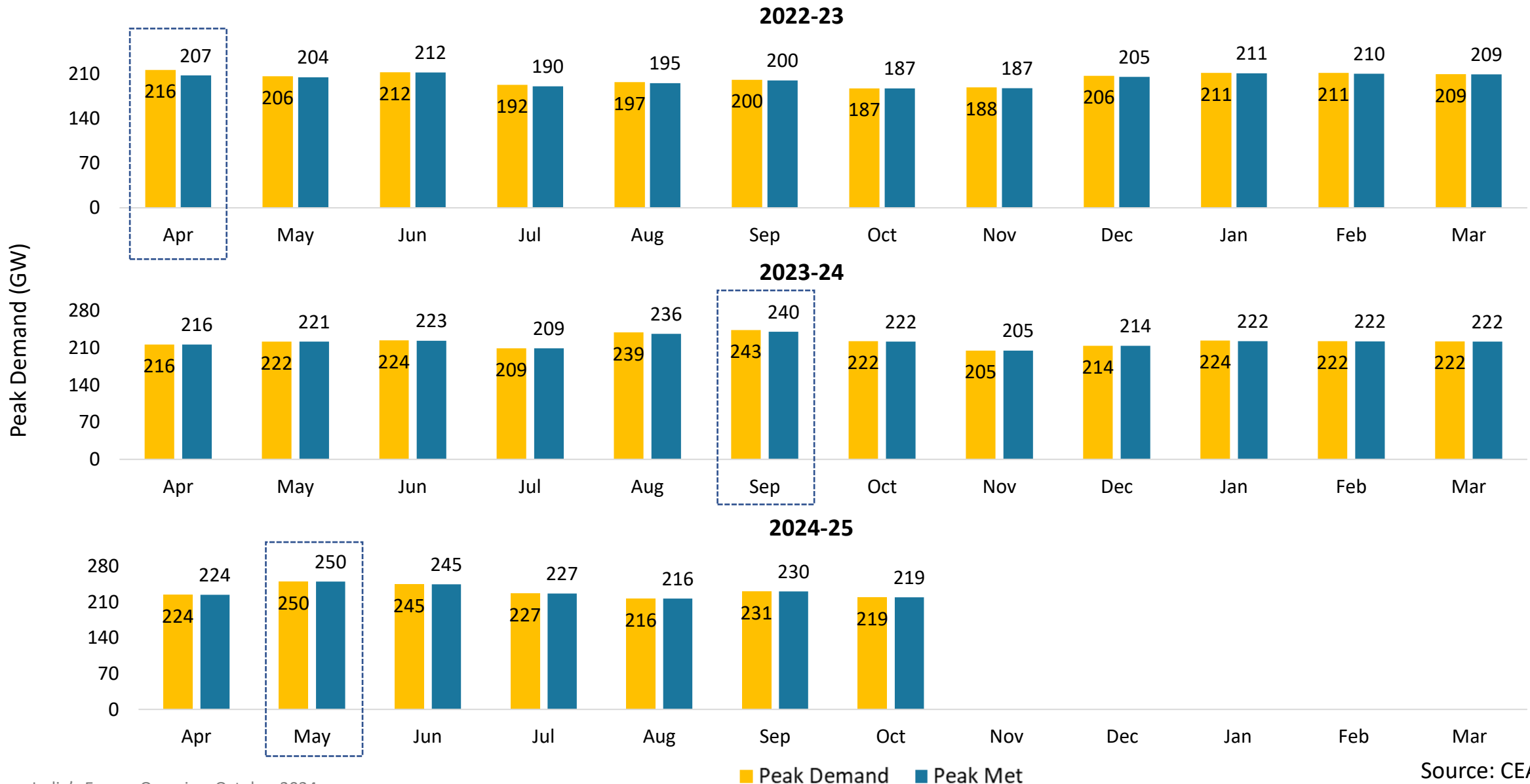
State-level Peak Electricity Demand (GW)



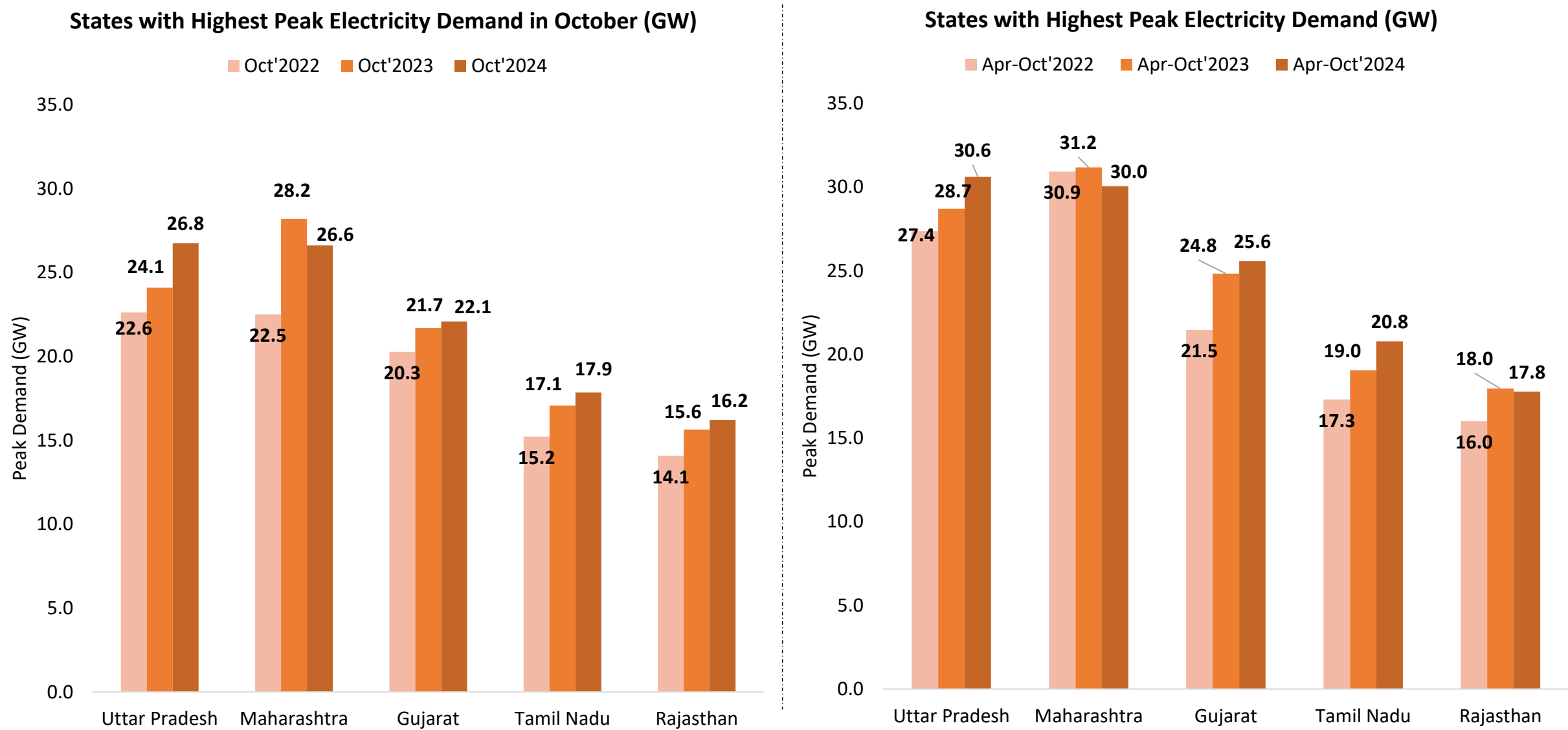
Month	Peak Demand (GW)	Peak Supply (GW)	Gap(GW) (+/-)
Oct'2022	187	187	0.1
Oct'2023	222	222	0.6
Oct'2024	219	219	0.0

Apr-Oct	Peak Demand (GW)	Peak Supply (GW)	Gap (GW) (+/-)
FY 2022-23	216	207	8.7
FY 2023-24	243	240	3.3
FY 2024-25	250	250	0.0

India's Monthly Peak Electricity Demand and Supply



Monthly Peak Electricity Demand of the top 5 states

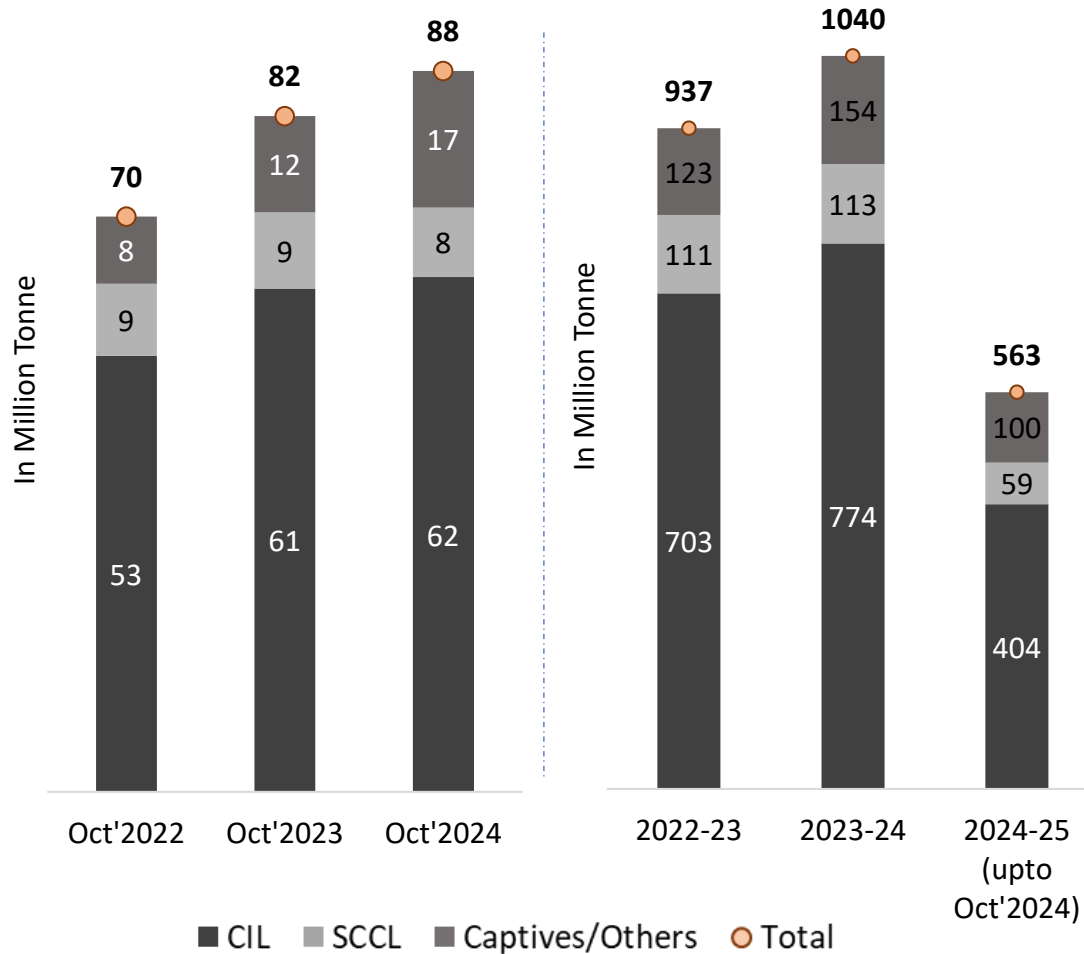


Note: The peak electricity demand data for October'24 is Provisional.

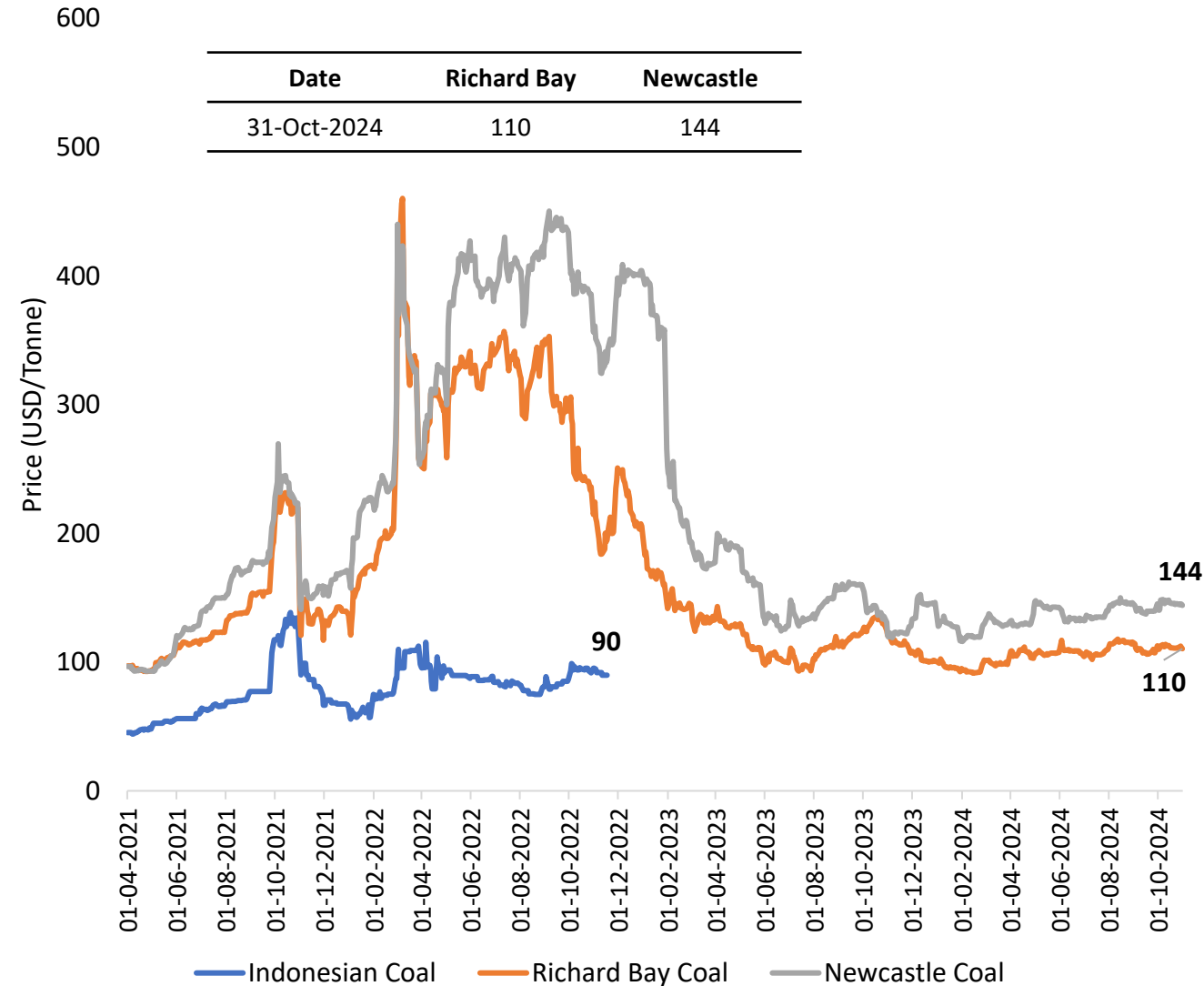
Source: CEA

Monthly Coal Statistics

Monthly/ Annual Coal (incl. Lignite) Production (in Million Tonnes)



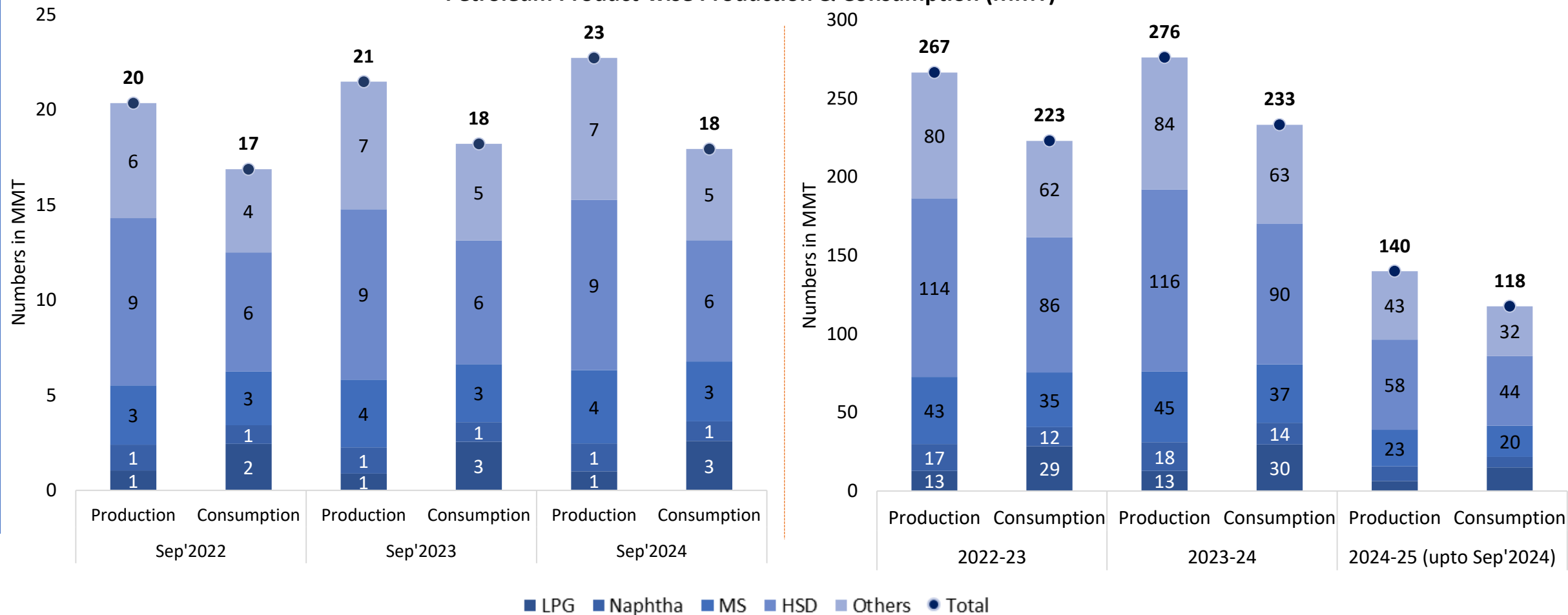
International Coal Prices



Source: Ministry of Coal

Petroleum Products Market Scenario (1/3)

Petroleum Product-wise Production & Consumption (MMT)



Others include ATF, SKO, LDO, Lubes, FO, LSHS, Bitumen, pet coke, and others.

Abbreviations: ATF- Aviation Turbine Fuel, FO- Furnace Oil, HSD- High-Speed Diesel, LDO- Light Diesel Oil, MS- Motor Spirit (Petrol), SKO- Superior Kerosene Oil, LSHS- Low Sulphur Heavy Stock, LPG- Liquefied Petroleum Gas, MMT- Million Metric Tonne

Petroleum Products Market Scenario (2/3)

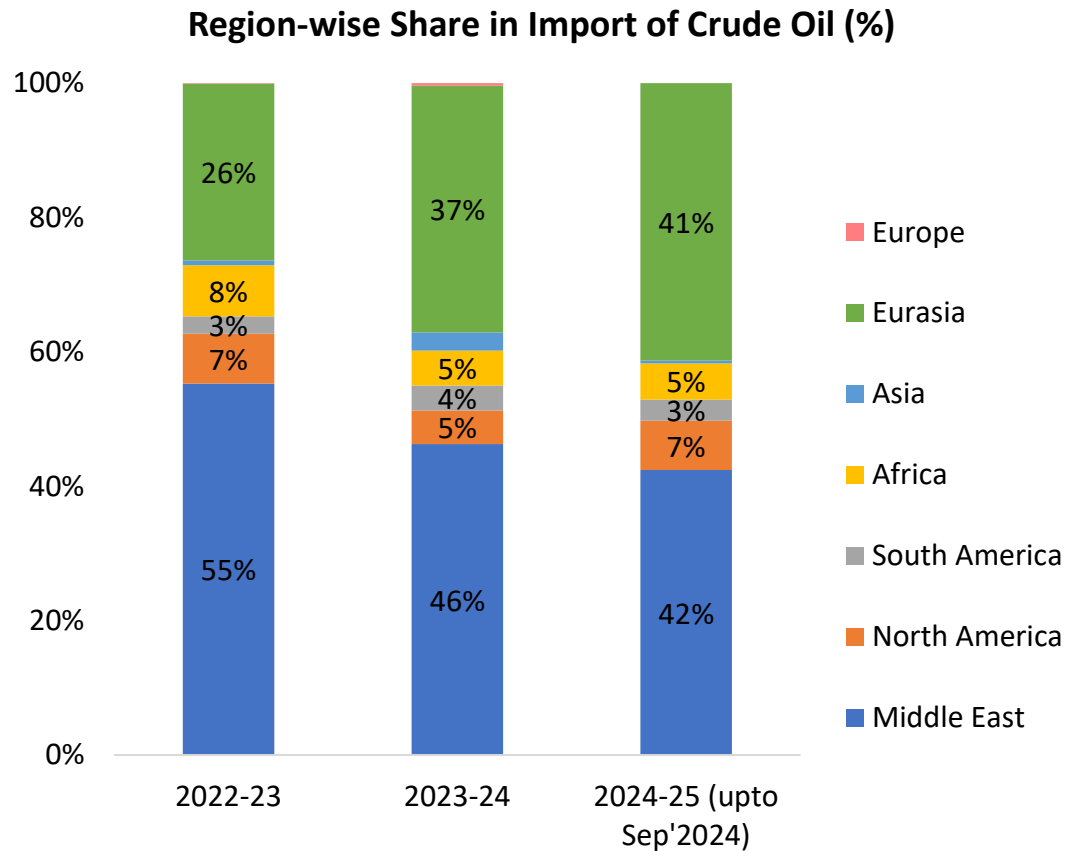
Import/Export of Crude Oil and Petroleum Products ('000 Tonnes)							
Petroleum Products	Import/ Export	Monthly			Yearly		
		Sep'22	Sep'23	Sep'24	2022-23	2023-24	2024-25 (upto Sep'2024)
Crude Oil	Import	16772	17502	18557	232700	234262	120425
	Export	0	0	0	0	0	0
	Net Import	16772	17502	18557	232700	234262	120425
LPG	Import	1448	1620	1640	18335	18514	9816
	Export	40	40	41	540	525	263
	Net Import	1408	1580	1599	17796	17989	9553
Diesel	Import	2	5	4	322	42	21
	Export	2689	2326	2694	28494	28204	12958
	Net Import	-2687	-2321	-2689	-28172	-28162	-12938
Petrol	Import	190	151	64	1069	717	235
	Export	672	993	1245	13127	13472	7182
	Net Import	-482	-842	-1181	-12058	-12755	-6948
Others	Import	1521	2286	2466	24871	29419	15696
	Export	1588	1459	2506	18854	20391	11297
	Net Import	-66	827	-40	6017	9029	4398

*Others include ATF, Naphtha, SKO, LDO, Lubes, FO, LSHS, Bitumen, pet coke, and others.

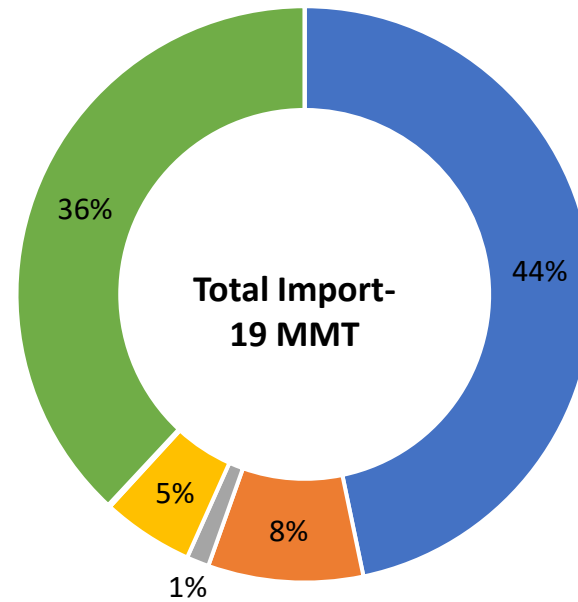
NOTE: The data is available latest up to September'2024

Source: PPAC

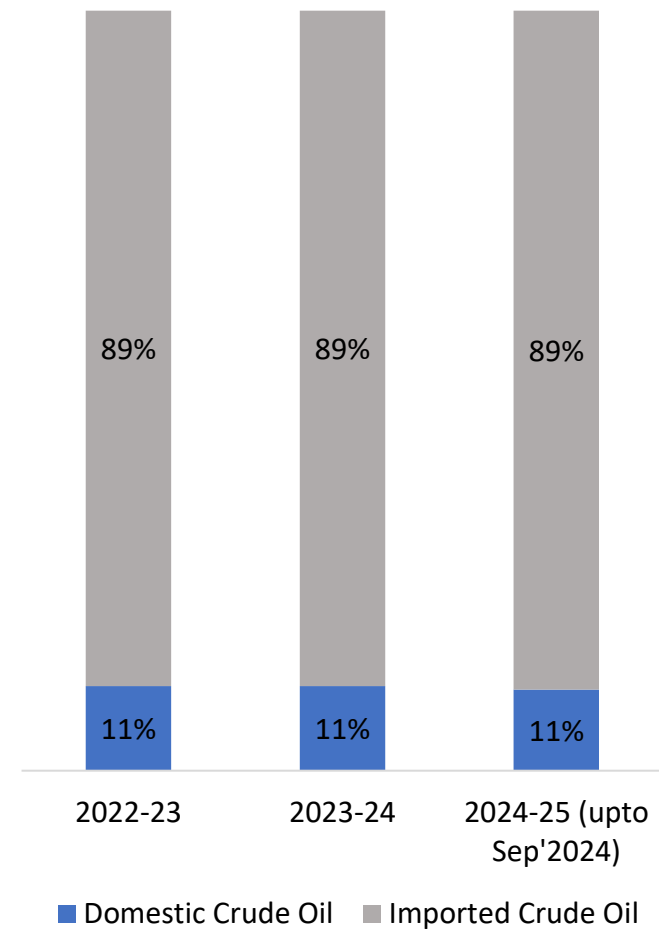
Petroleum Products Market Scenario (3/3)



Regional share of Imported Crude oil in September 2024 (P)



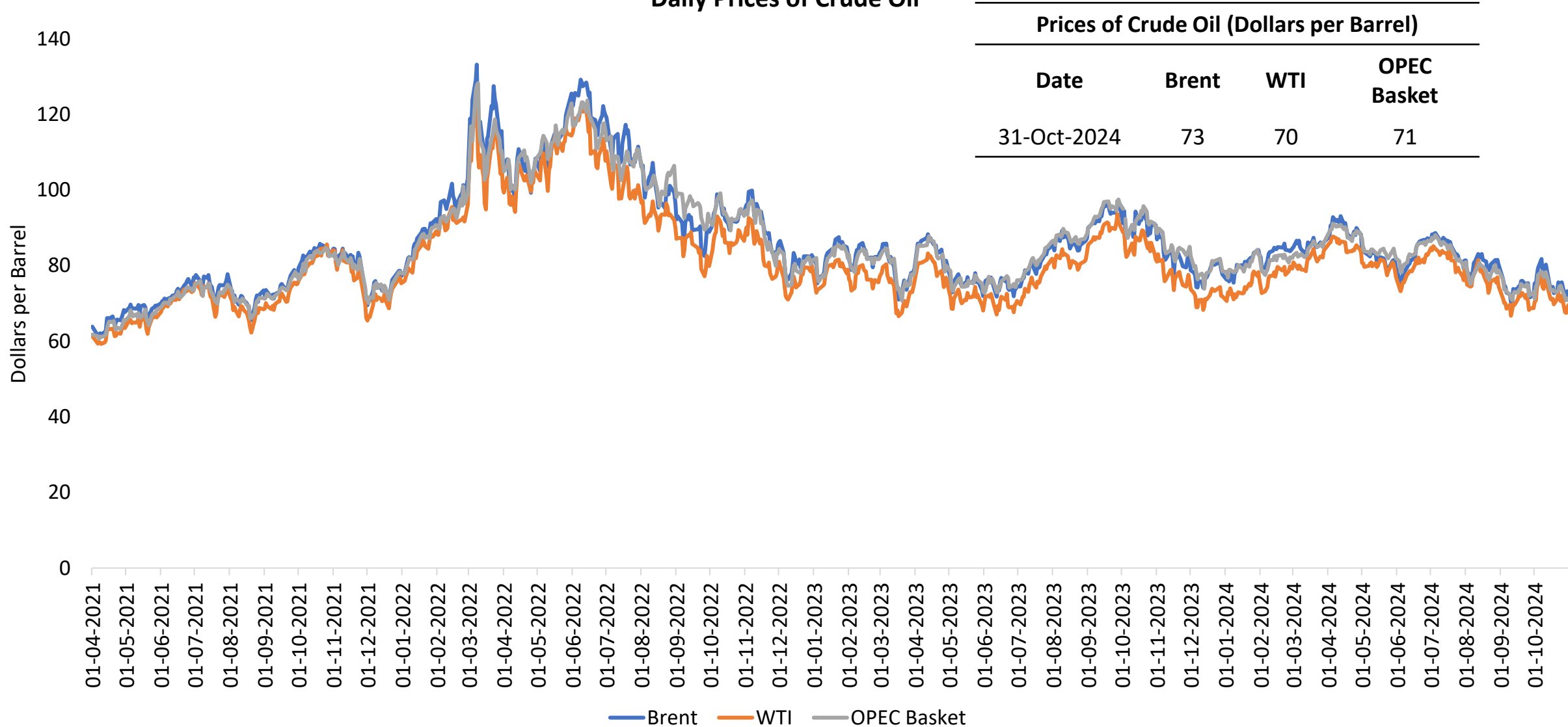
Domestic and Imported Crude Oil share in India (%)



Total Import of Crude Oil (MMT)			
Total Import	2022-23	2023-24	2024-25 (up to Sep'2024)
Crude Oil	233	234	120

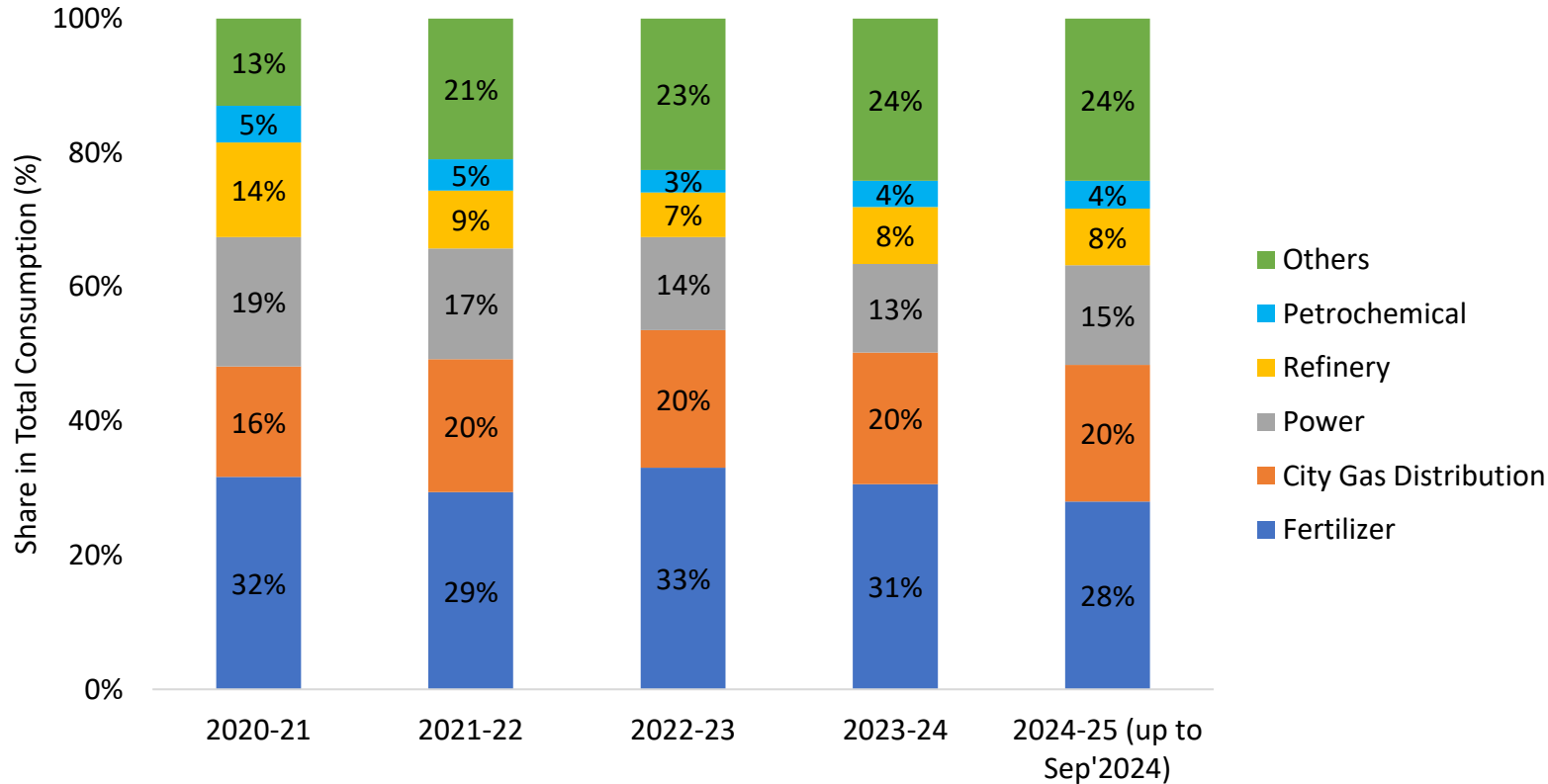
Daily Prices of Crude Oil

Daily Prices of Crude Oil

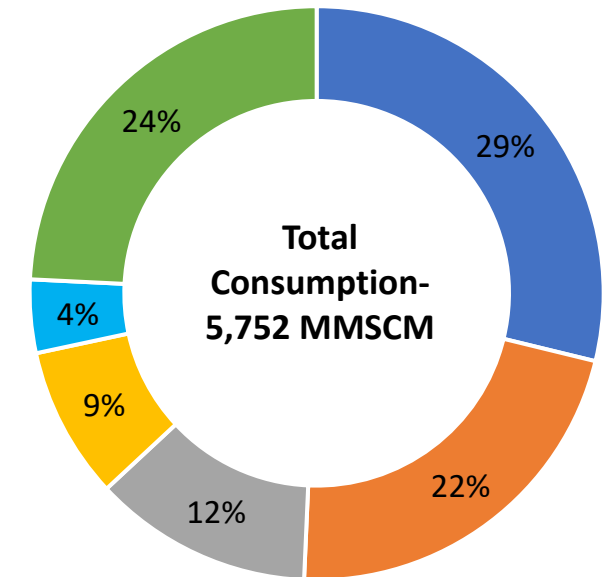


Gas Market Scenario (1/2)

Sector-wise Share in Natural Gas Consumption



Sector-wise share in Natural Gas Consumption in September 2024

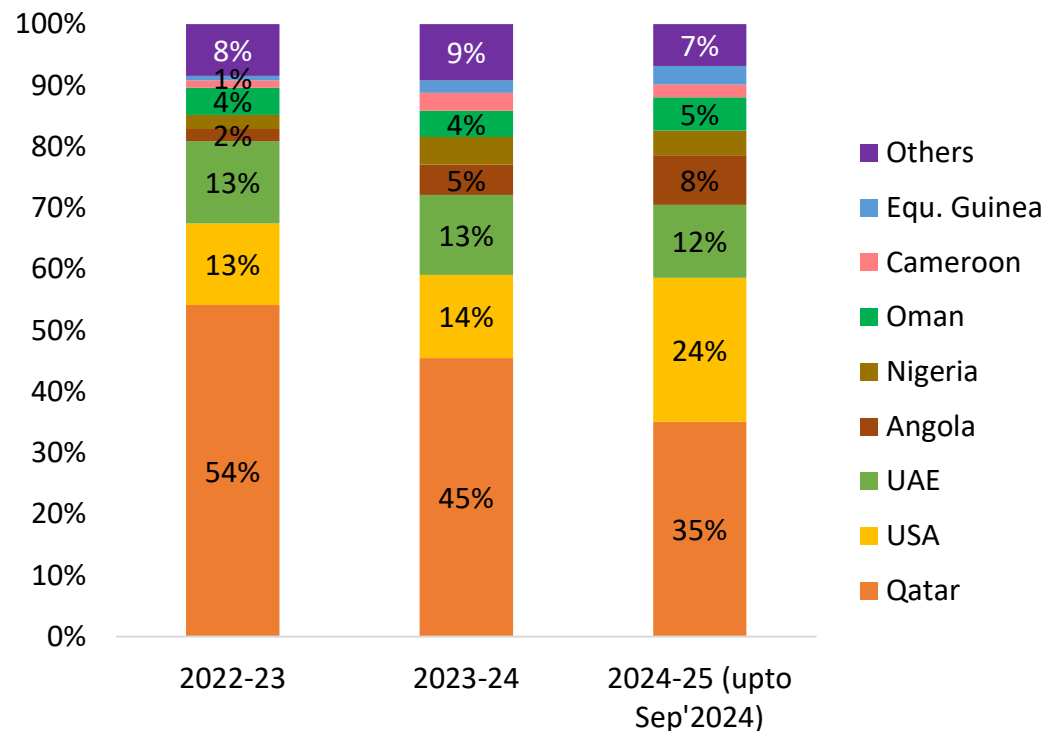


Others include- Internal Combustion of Pipeline System, Industrial, Sponge iron/steel, LPG shrinkage, Manufacturing, Agriculture (tea plantation), Others

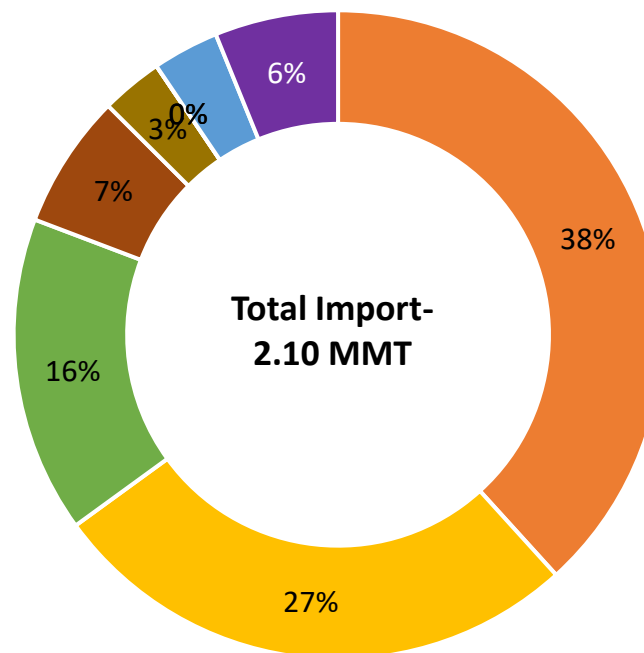
Total Consumption of Natural Gas (NG) (MMSCM)					
Total Consumption	2020-21	2021-22	2022-23	2023-24	2024-25 (up to Sep'2024)
NG	56,116	61,491	58,702	68,759	36,635

Gas Market Scenario (2/2)

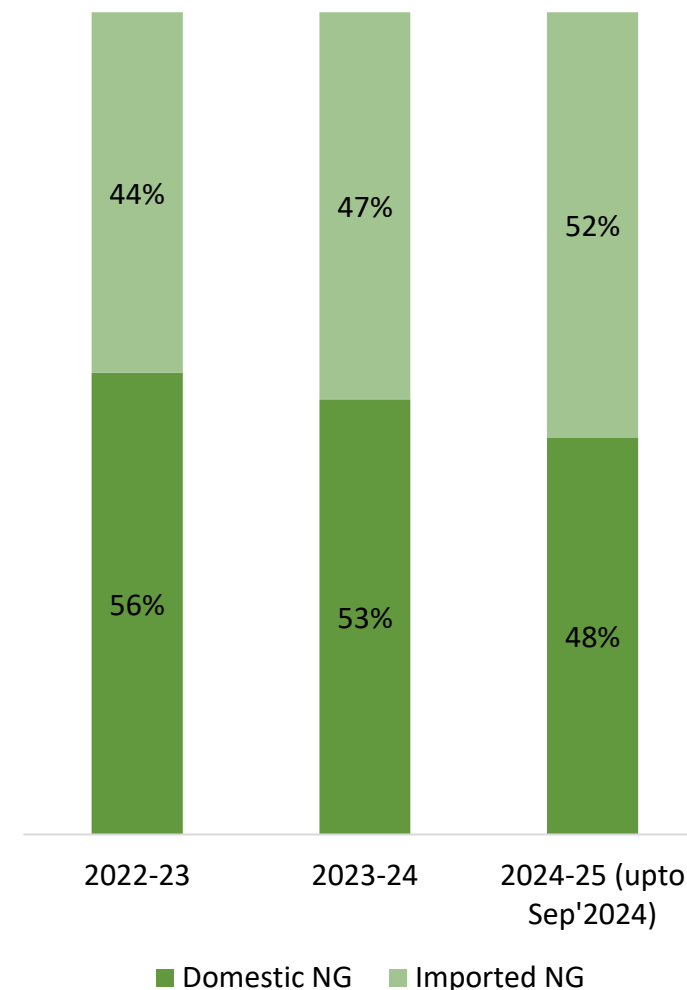
Region-wise Share in Import of LNG (%)



Country Share of Imported LNG in September'2024



Domestic and Imported Natural Gas share in India (%)



Others include- Trinidad, Cameroon, Egypt, France, Algeria, Belgium, Indonesia, Turkey, Russia, Spain, Malaysia, Brunei, Netherlands, Norway, and others.

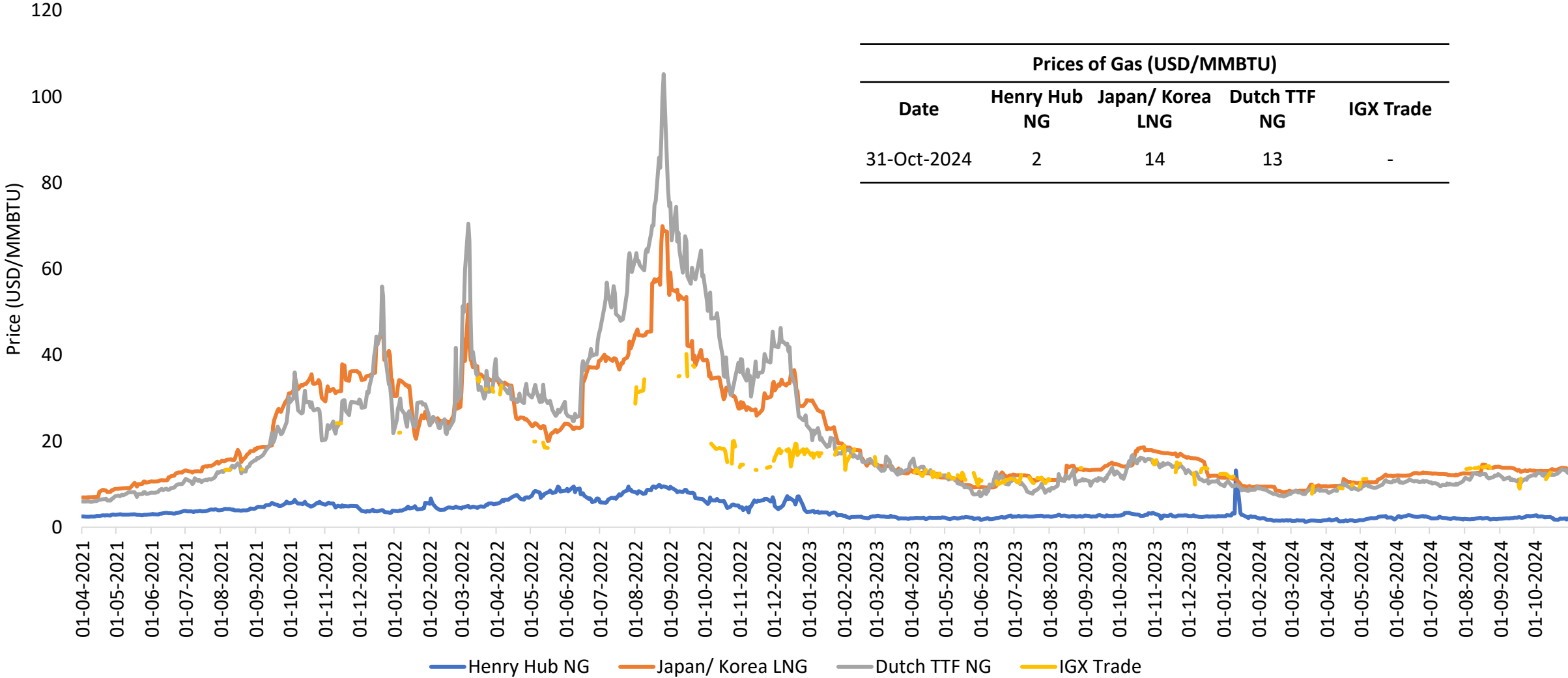
Total Import of Liquefied Natural Gas (LNG) (MMT)			
Total Import	2022-23	2023-24	2024-25 (up to Sep'2024)
LNG	19.85	24.00	13.96

NOTE: The data is based on the latest available information.

Source: MoCI and PPAC

Daily Prices of Gas

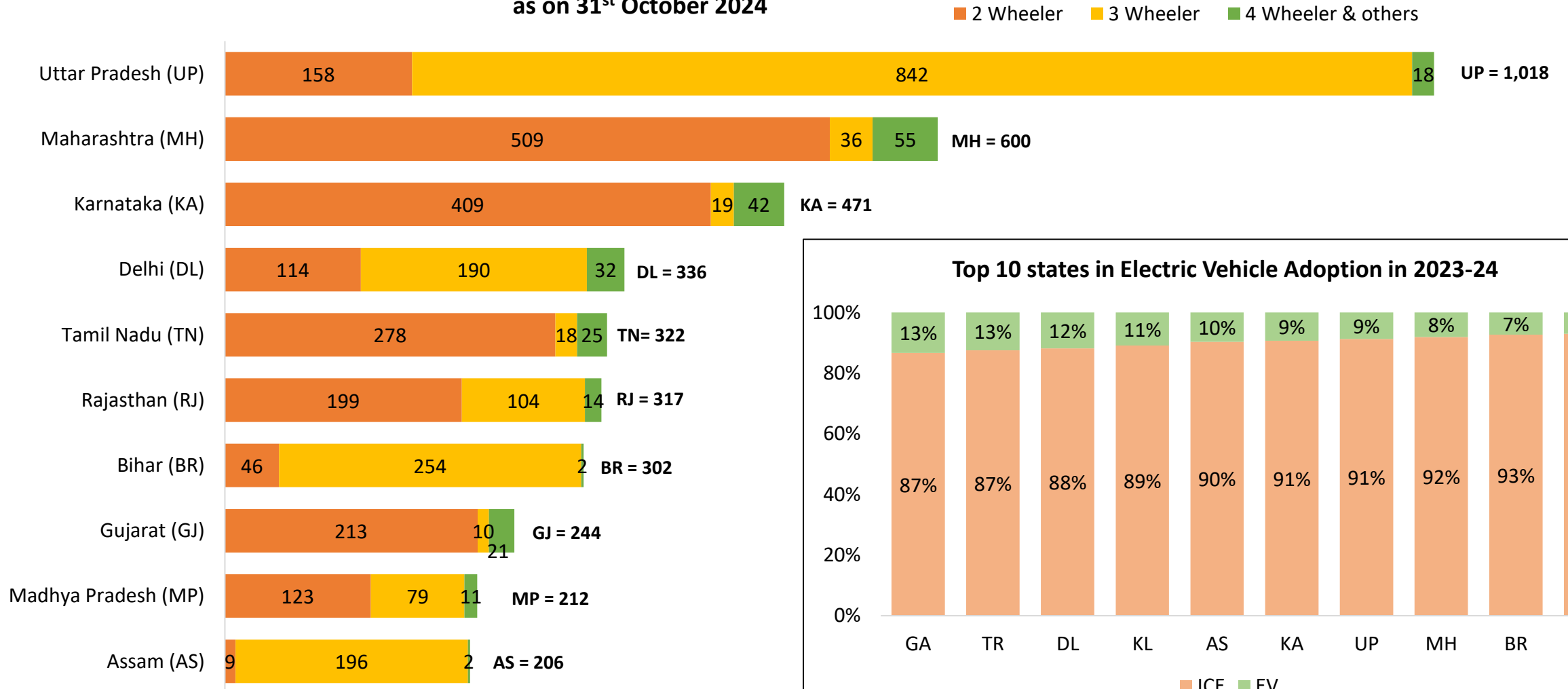
Gas Daily Market Price



Prices of Gas (USD/MMBTU)				
Date	Henry Hub NG	Japan/ Korea LNG	Dutch TTF NG	IGX Trade
31-Oct-2024	2	14	13	-

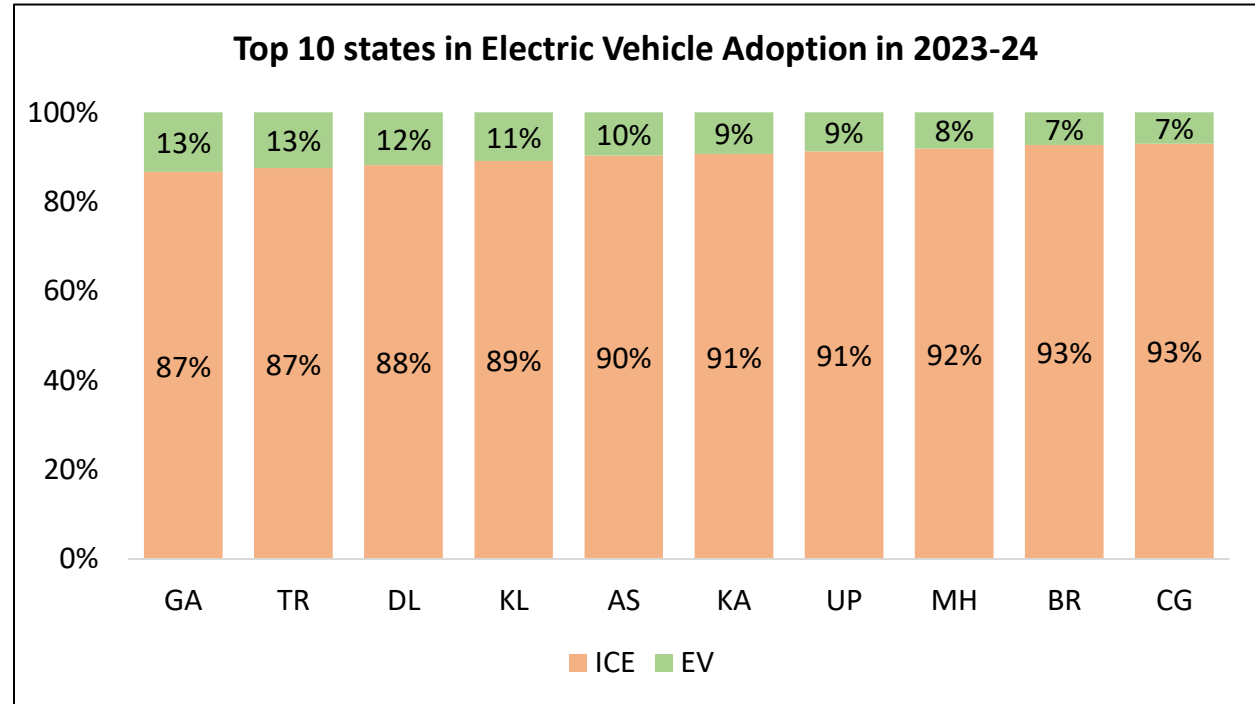
Status of Electric Mobility in India

**Top 10 States for Electric Vehicles (in Thousands)
as on 31st October 2024**



2 Wheeler 3 Wheeler 4 Wheeler & others

Top 10 states in Electric Vehicle Adoption in 2023-24



NOTE: GA- Goa, TR- Tripura, CG- Chhattisgarh, KL- Kerala

Source: VAHAN Dashboard

Recent Interventions to promote Renewable Energy

Solar

Under the [PLI scheme](#), the GOI has announced INR 19,500 crores to incentivize the manufacturing of domestic solar PV modules.

[PM-Surya Ghar: Muft Bijli Yojana](#) released with a total outlay of Rs. 75,021 crore for installing rooftop solar (RTS) for one crore households. The scheme provides a CFA of Rs 30,000 for a 1 kW RTS system, Rs 60,000 for a 2kW RTS system, and Rs 78,000 for a 3kW RTS system.

The [inter-state transmission charges](#) are waived for 25 years for the projects being commissioned before 30th June 2025.

The [updated RPO](#) compliance supports solar integration of up to 33.57% of the electricity purchased by DISCOMs/states till the year 2029-30.

[PM KUSUM scheme](#) has been extended till Mar'26 to install pump sets up to 15 HP in selected areas.

Wind

[Reverse auctions have been scrapped](#) for wind projects. A traditional two-part (technical and financial) bid system has been put in place.

To support [off-shore wind](#), SECI will invite bids for up to 4GW to set up offshore wind plants off the coast of Tamil Nadu and Gujarat.

The ISTS charges are waived for 25 years for the [onshore projects](#) being commissioned before 30th June 2025 and for [off-shore projects](#) on or before 31st December 2032.

The [updated RPO](#) compliance supports WIND integration of up to 6.94% of the electricity purchased by DISCOMs/states till the year 2029-30.

The [National Repowering & Life Extension Policy for Wind Power Projects- 2023](#), for wind power projects is released for the optimum utilization of wind energy resources by maximizing energy (kWh) yield per sq. km of the wind project areas.

The GOI has decided to invite bids for 50 GW of RE annually, which includes up to [10 GW of wind](#) capacity.

Energy Storage

Ministry of Power has released the [guidelines for the development of PSP](#) with the target of 26.7 GW of PSP and 47.2 GW of BESS to integrate with RE capacity till 2032.

[PLI scheme](#) unveiled for setting up 50 GWh ACC battery storage with an outlay of ₹18,100 crores.

Under the [Waste Management Rules 2022](#), the disposal of waste batteries in landfills and incineration is prohibited and the recycling of waste batteries is made mandatory.

[CERC](#), under RRAS regulation, has allowed the use of energy storage in secondary and tertiary ancillary support.

[The Energy Storage Obligation](#) of DISCOMs is pegged at 4.0% up to 2029-30.

Under the aegis of MNRE, SECI has successfully commissioned [India's largest BESS plant, featuring a 40 MW/120 MWh](#) BESS alongside a solar PV plant with a installed capacity of 152 MWh, located in Rajnandgaon, Chhattisgarh.

Green Hydrogen (H₂)

[National Green Hydrogen Mission](#) (NGHM) was approved by the Cabinet in January 2023. The mission aims to meet the target of 5 million metric tonnes of green hydrogen production by 2030. The initial outlay for the Mission will be INR 19,744 crores.

MNRE has released the scheme guidelines for the implementation of pilot projects for the use of Green Hydrogen in the [shipping](#), [steel](#), and [transport](#) sectors under the NGHM.

MOP has extended the [waiver of ISTS charges](#) from 30th June 2025 to 31st December 2030.

Indian Railways to run [35 Hydrogen trains under "Hydrogen for Heritage"](#) at an estimated cost of ₹ 80 crores per train and ground infrastructure of ₹ 70 crores per route on various heritage/hill routes.

Jindal Stainless Ltd., in collaboration with Hygenco commissioned [India's 1st green hydrogen plant in the stainless steel sector](#) at Hisar, Haryana, which aims to reduce CO₂ emission by 2,700 metric tonnes per annum.

Key Highlights or Announcements of October 2024

- The Ministry of Power has released the “[draft Guidelines for Installation and Operation of Battery Swapping and Charging Stations 2024](#)”. The main objective of the guidelines are to promote swapping of batteries as an alternate method of powering electric vehicles, battery as a service, and to develop a battery swapping ecosystem.
- The Ministry of New and Renewable Energy has issued operational guidelines for implementing the '[Innovative Projects](#)' and '[Service Charge](#)' components under the PM-Surya Ghar: Muft Bijli Yojana.
 - The Innovative Projects component, with an allocation of ₹500 crore, is designed to encourage advancements in rooftop solar technologies, business models, and integration techniques.
 - The Service Charge component has been allocated ₹657 crore to cover service-related expenses for implementing various scheme components. A key feature of the scheme is the Central Financial Assistance (CFA) provided to residential consumers through the National Portal.
- Government of Andhra Pradesh has unveiled the “[Andhra Pradesh Integrated Clean Energy Policy, 2024](#)” for attracting clean energy investments. This policy aims to add over 160 GW of renewable energy capacity, with a potential to attract investments worth ₹10,00,000 Crores, thereby generating an estimated employment for 7,50,000, both direct and indirect. The policy will propel Andhra Pradesh to become a clean energy hub and contribute towards self-economic reliance.

Key Highlights or Announcements of October 2024

- The Central Electricity Authority has released [National Electricity Plan \(Volume-II: Transmission\)](#) in October 2024. The key highlights of the plan are:
 - Addition of 1,91,474 ckm of transmission lines, 12,74,185 MVA transformation capacity, and 33 GW of HVDC bi-pole links from 2022-23 to 2031-32 (220 kV+ voltage).
 - The inter-regional transmission capacity is planned to increase from the present level of 119 GW to 143 GW by 2027 and 168 GW by 2032.
 - Focus in new technology adoption in transmission sector like hybrid substations, monopole structures, insulated cross arms, dynamic line rating, high-performance conductors, and upgrading to maximum operating voltage to 1200 kV AC, and skill development in the sector .
 - Investment opportunity of Rs 9.15 lakh crore is projected in the transmission sector by 2032.
- The [Ministry of New and Renewable Energy has approved three pilot projects for utilising green hydrogen in steel production](#), providing a total financial support of ₹347 crore under the National Green Hydrogen Mission. The sanctioned projects are:
 - Matrix Gas and Renewables Ltd (in collaboration with Gensol Engineering Ltd, IIT Bhubaneswar, and Metsol AB, Sweden) for a pilot plant with a capacity of 50 tons per day (TPD).
 - Simplex Castings Ltd (in partnership with BSBK Pvt. Ltd., Ten Eight Investment, and IIT Bhilai) for a pilot plant with a capacity of 40 TPD.
 - Steel Authority of India Ltd (SAIL), Ranchi, with a plant capacity of 3,200 TPD.



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