

India's Energy Overview

January 2024

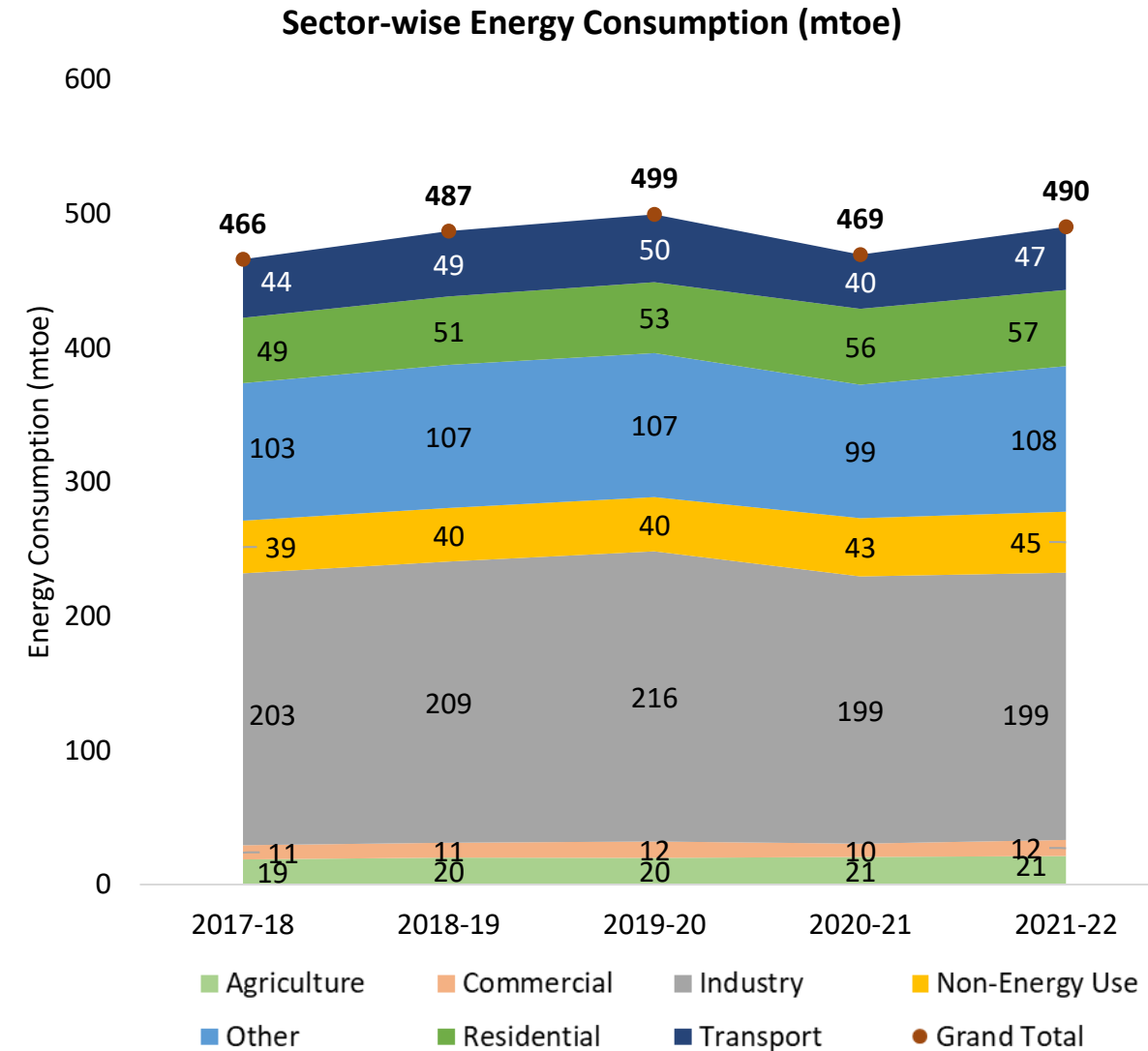
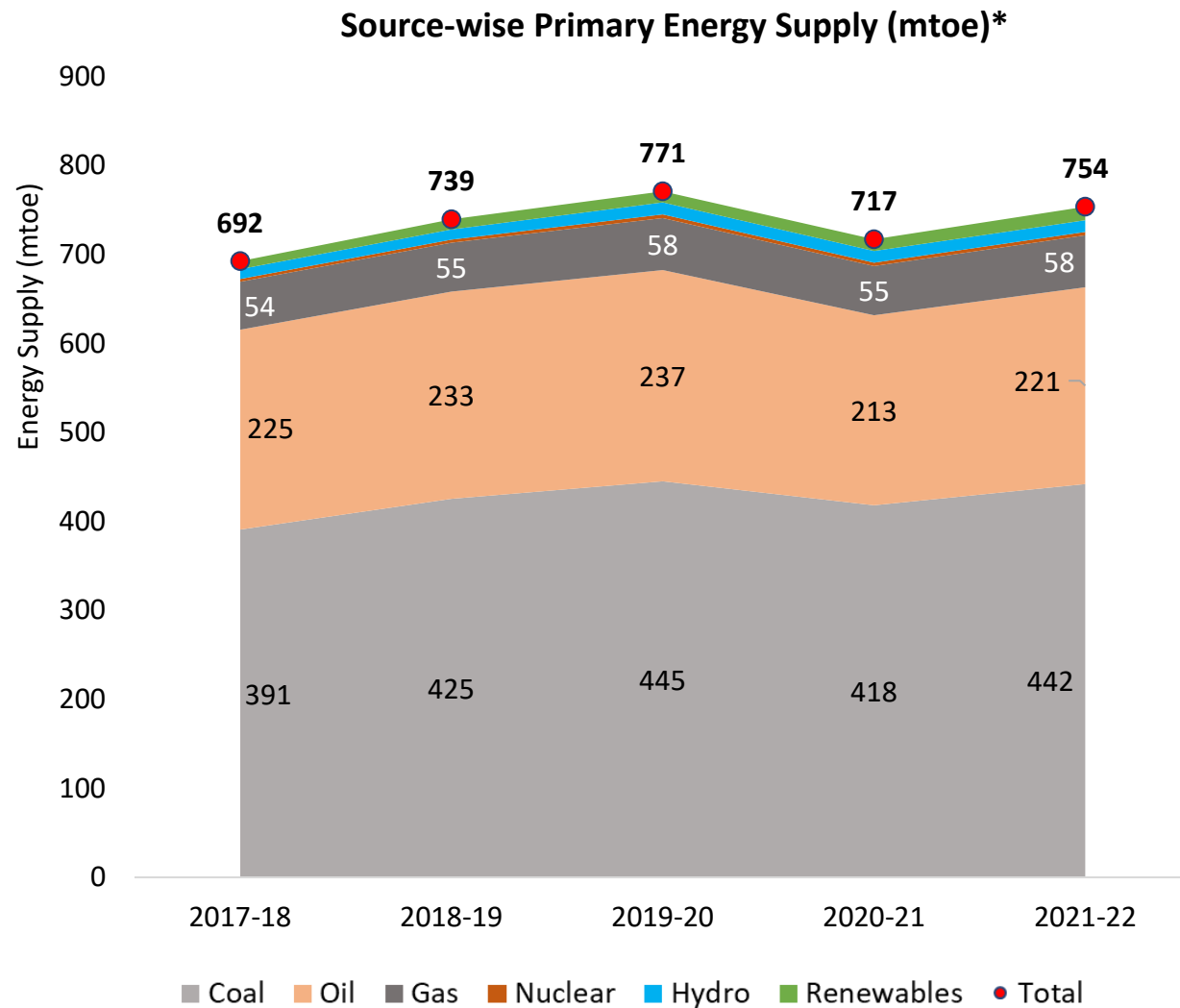


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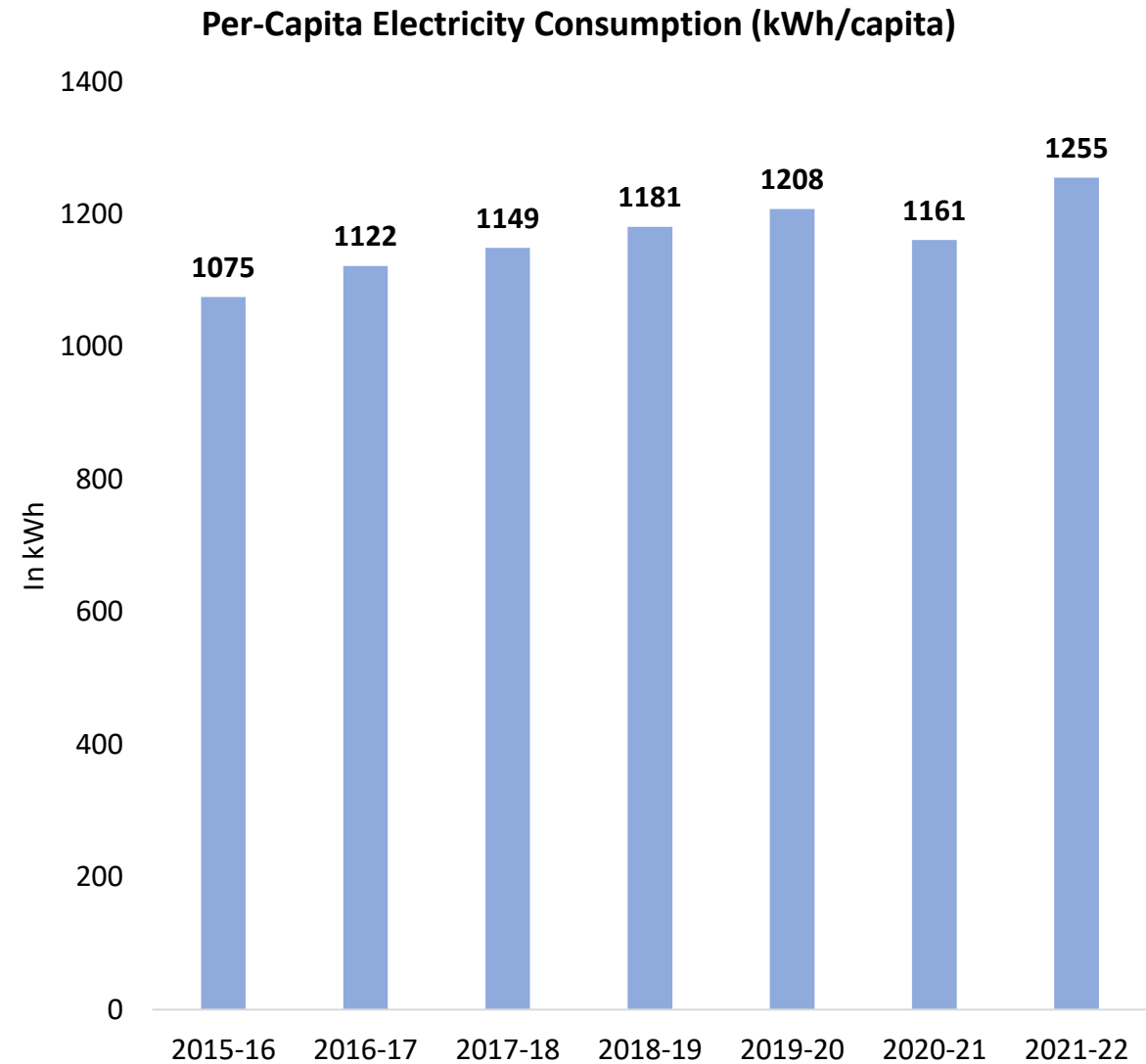
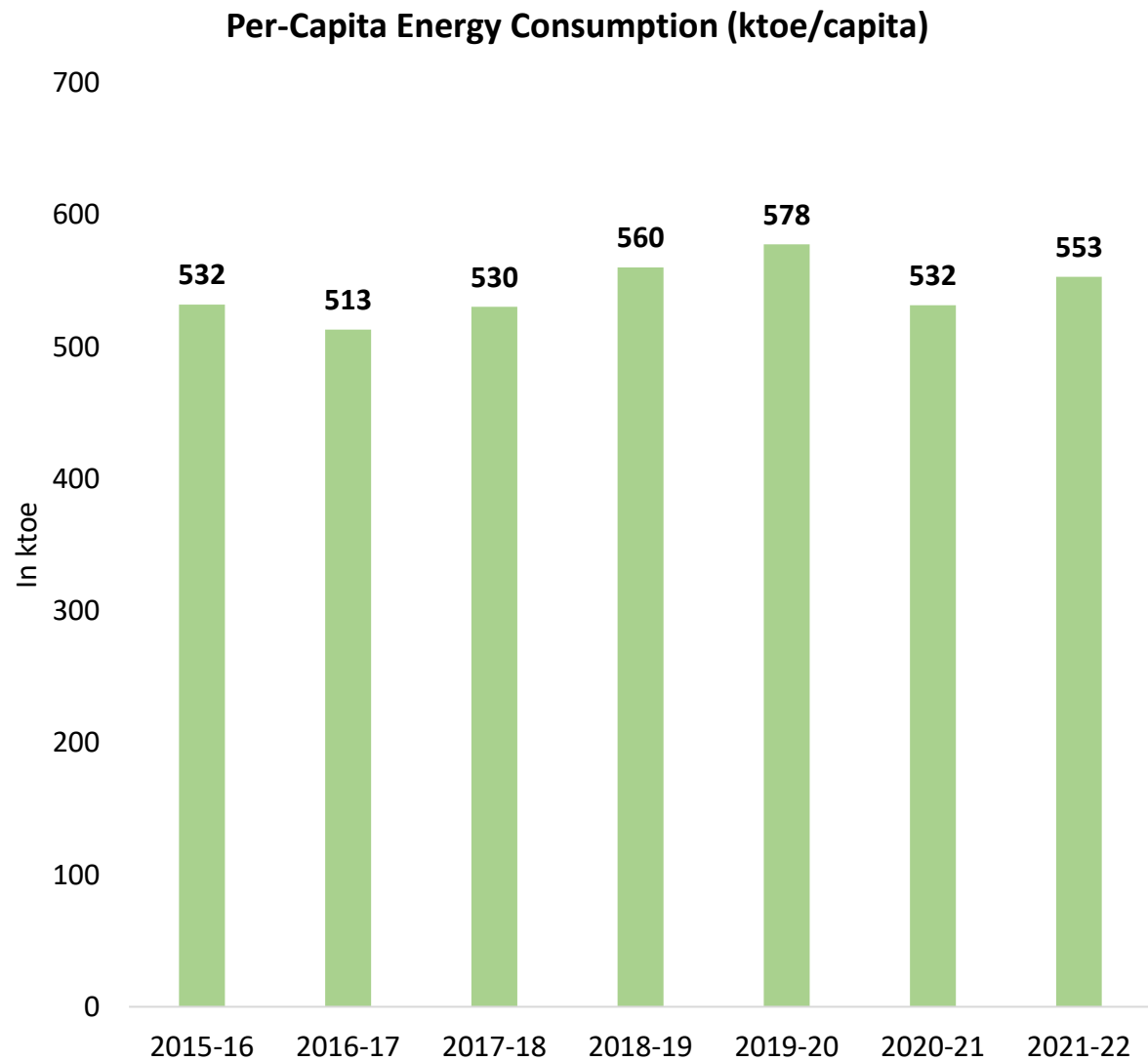
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Primary Energy Mix* in India

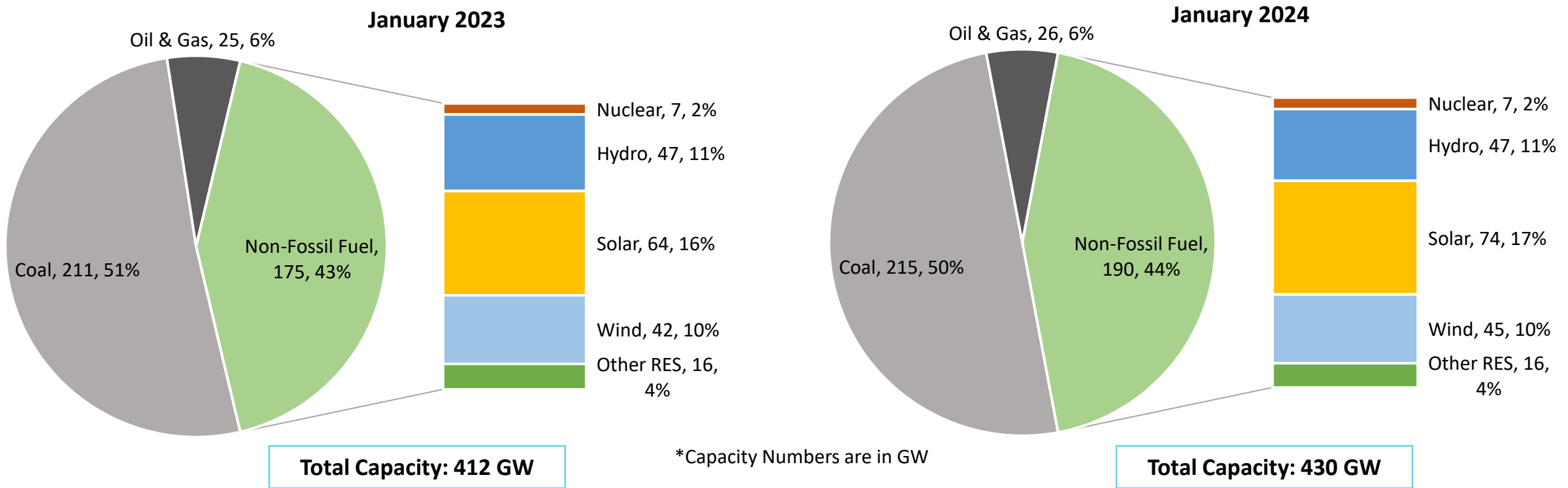


*Excluding biofuels, waste, and other non-commercial source of energy

Per-Capita Energy and Electricity Consumption

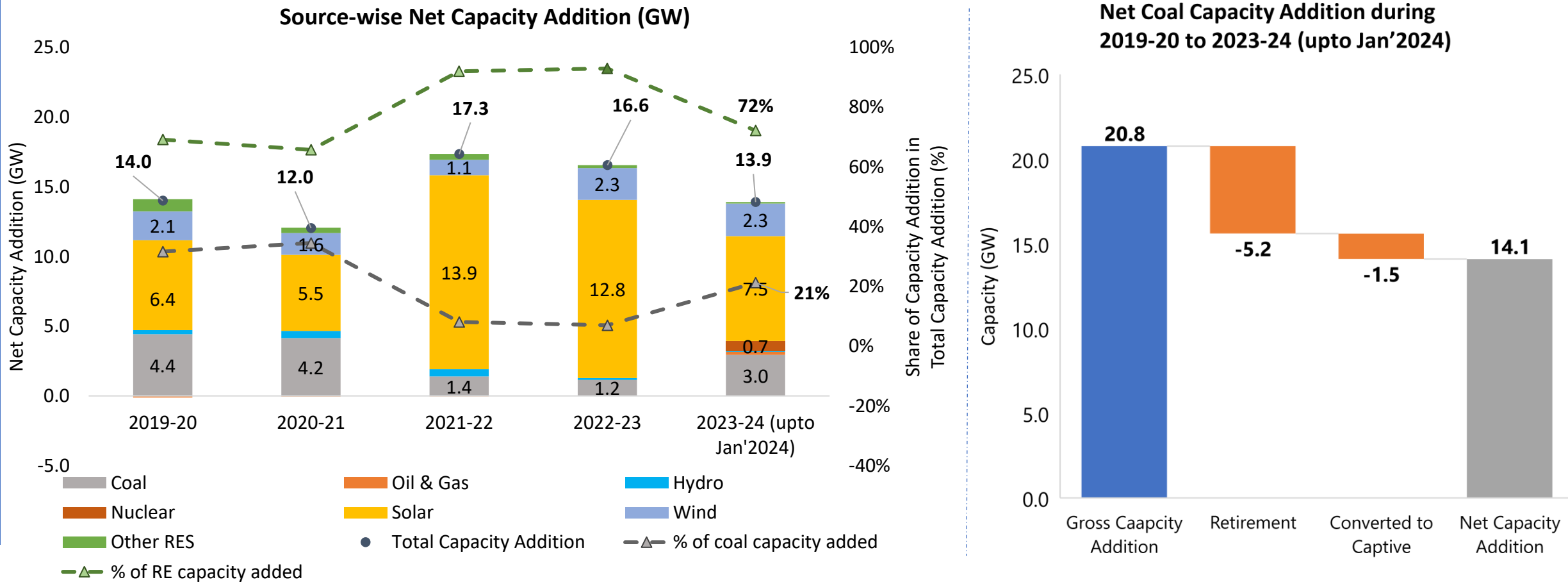


India's Electricity Capacity Mix (Utility-scale)



- India's electricity generating capacity is 430 GW as on Jan'2024 [coal 215 GW (50%), solar 74 GW (17%), hydro 47 GW (11%), and wind 45 (10%)].
- As on Jan'2024, the share of non-fossil-based electricity capacity is 44% against the set target of 50% non-fossil capacity by 2030.
- As on Jan'2024, India's renewable energy capacity (including large hydro) stood at 182 GW out of 430 GW.

India's Electricity Capacity Addition in last 5 years



- A total of 59 GW of generation capacity has been added in RE (Hydro, solar, wind, and other RES) over the past 5 years, whereas the net coal capacity addition during the same period was 14 GW, mostly in the central sector.
- The share of RE addition in total capacity has shown an increasing trend (from 69% in 2019-20 to 93% in 2022-23).

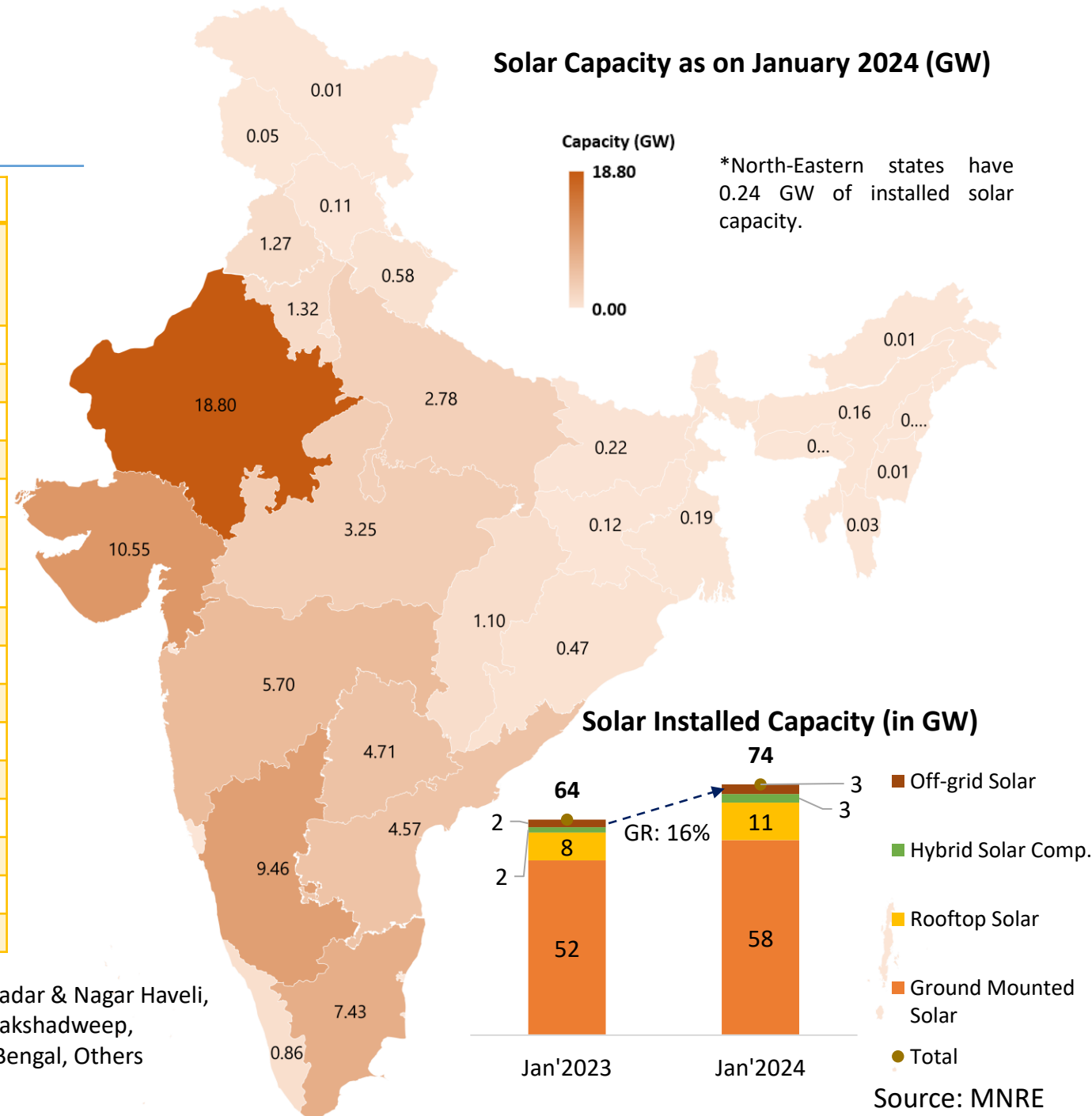
State-wise Solar Capacity

as on January 2024

State-wise installed capacity of Solar Power (GW)					
States	Ground Mounted	Rooftop	Solar Component in Hybrid	Off Grid	Total Solar Power
Rajasthan	15.20	1.00	1.98	0.62	18.80
Gujarat	7.01	2.90	0.59	0.05	10.55
Karnataka	7.87	1.56	0.00	0.03	9.46
Tamil Nadu	6.91	0.45	0.00	0.07	7.43
Maharashtra	3.68	1.72	0.00	0.31	5.70
Telangana	4.36	0.34	0.00	0.01	4.71
Andhra Pradesh	4.30	0.18	0.00	0.09	4.57
Madhya Pradesh	2.85	0.30	0.00	0.10	3.25
Uttar Pradesh	2.30	0.27	0.00	0.22	2.78
Haryana	0.27	0.49	0.00	0.57	1.32
Punjab	0.89	0.30	0.00	0.08	1.27
Chhattisgarh	0.64	0.07	0.00	0.39	1.10
Kerala	0.32	0.51	0.00	0.02	0.86
Uttarakhand	0.30	0.26	0.00	0.01	0.58
Others	0.93	0.74	0.00	0.27	1.94
All India	57.82	11.08	2.57	2.84	74.31

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

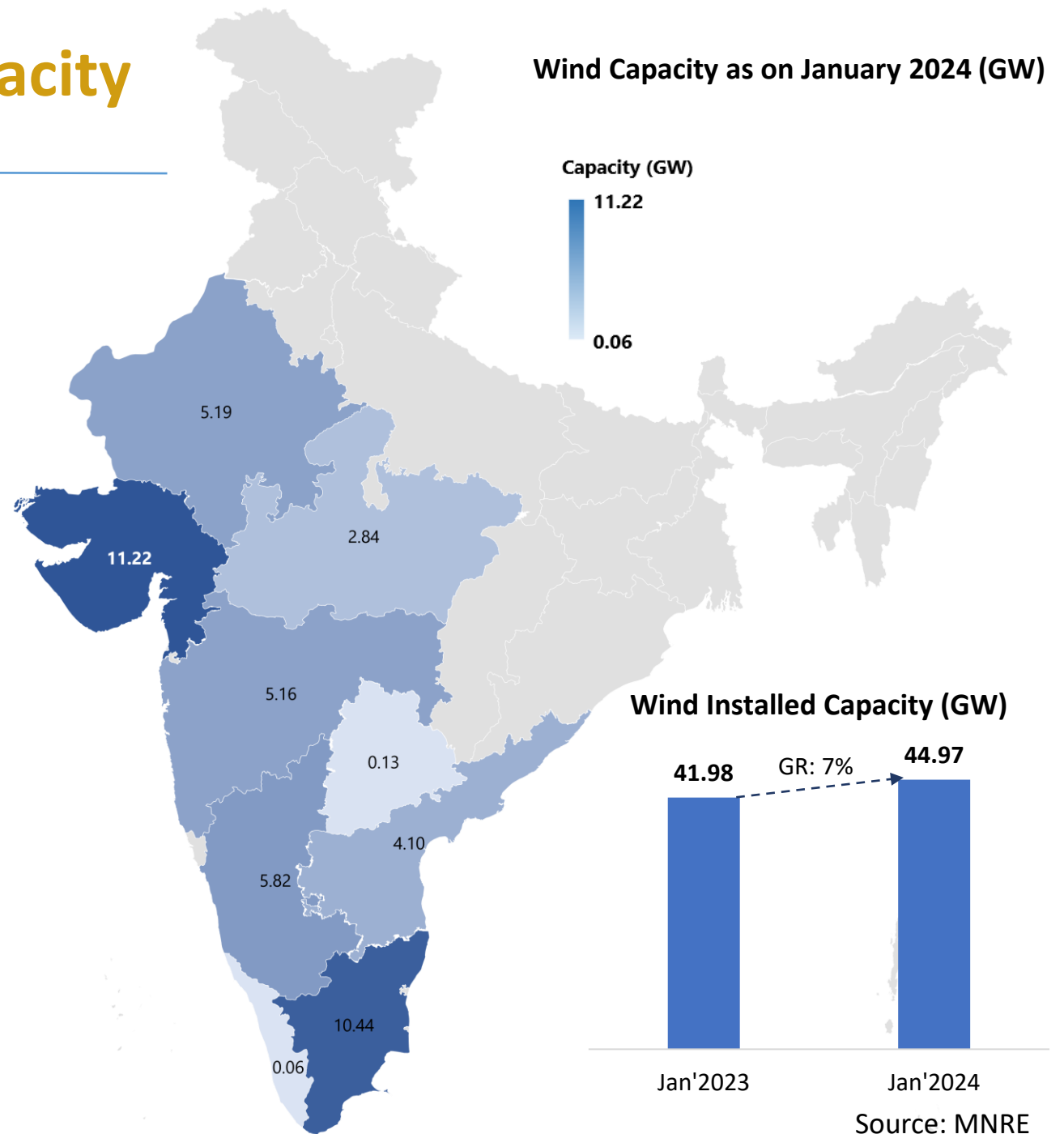
Solar Capacity as on January 2024 (GW)



State-wise Wind Onshore Capacity

as on January 2024

State-wise installed capacity of Wind (Onshore) Power	
States	Installed Capacity (GW)
Gujarat	11.22
Tamil Nadu	10.44
Karnataka	5.82
Rajasthan	5.19
Maharashtra	5.16
Andhra Pradesh	4.10
Madhya Pradesh	2.84
Telangana	0.13
Kerala	0.06
India Total	44.97

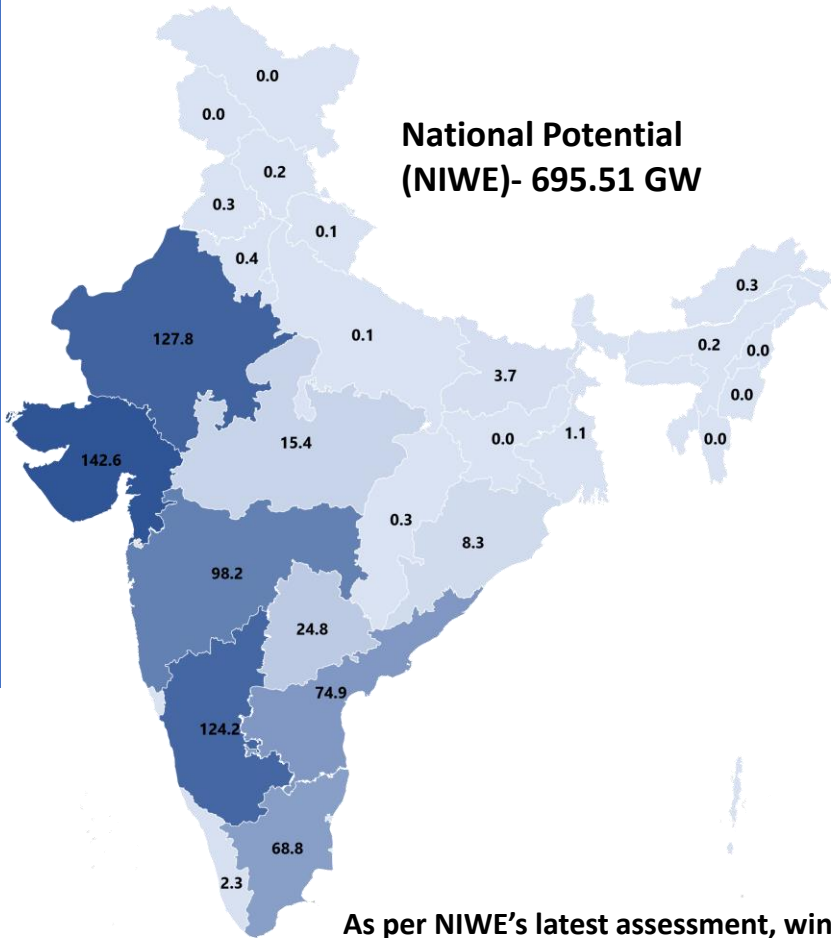


RE Potential and Installed Capacity (1/2)

RE potential in the state

Wind Onshore Potential at 120m agl

State Potential (GW) 0.0 142.6

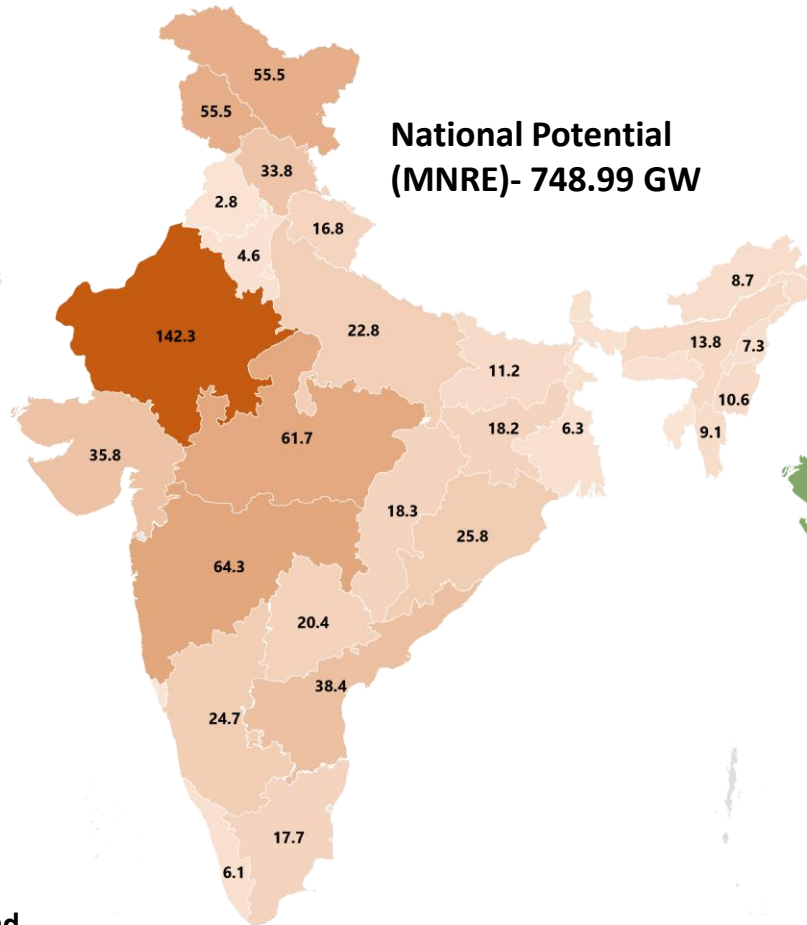


National Potential (NIWE)- 695.51 GW

As per NIWE's latest assessment, wind potential at 150m agl is 1164 GW.

Solar Potential

State Potential (GW) 0.9 142.3

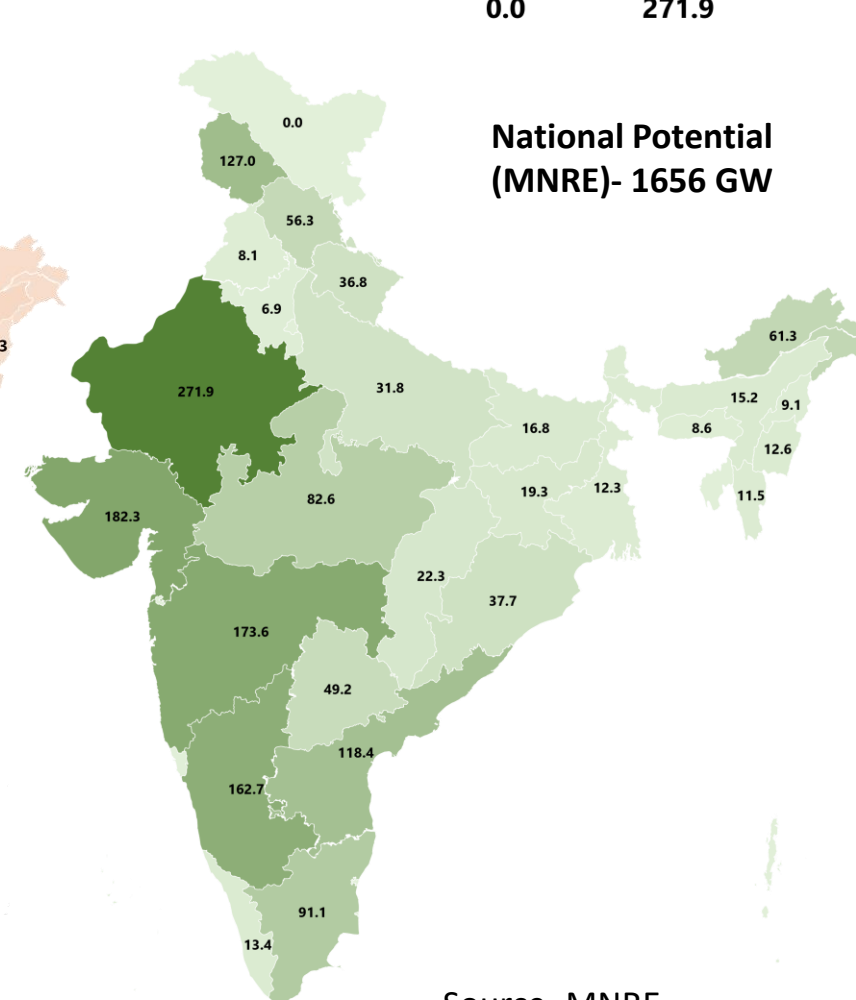


National Potential (MNRE)- 748.99 GW

Market potential for SPV rooftop is 124 GW.

Renewable Energy Potential (all sources including large Hydro)

State Potential (GW) 0.0 271.9

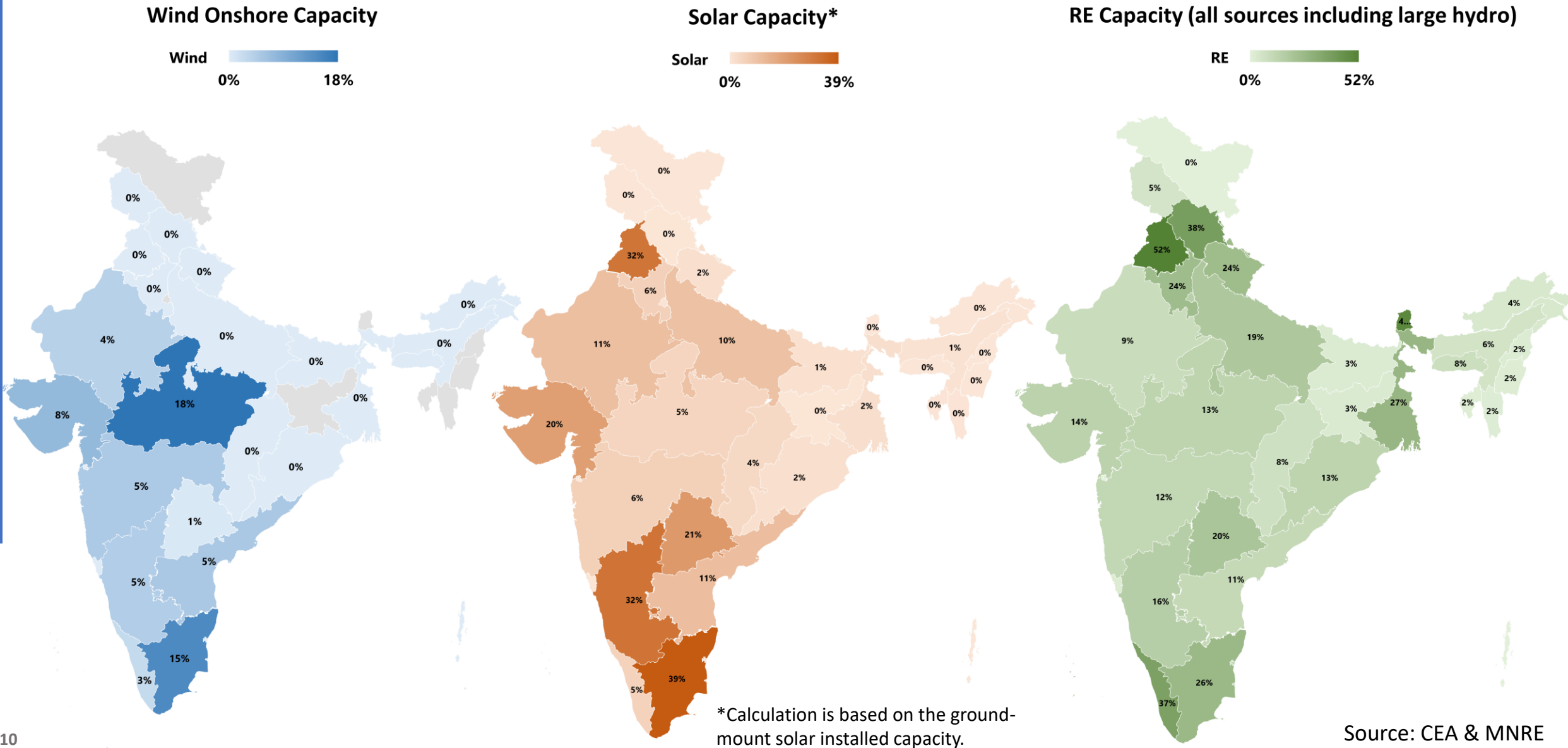


National Potential (MNRE)- 1656 GW

Source- MNRE

RE Potential and Installed Capacity (2/2)

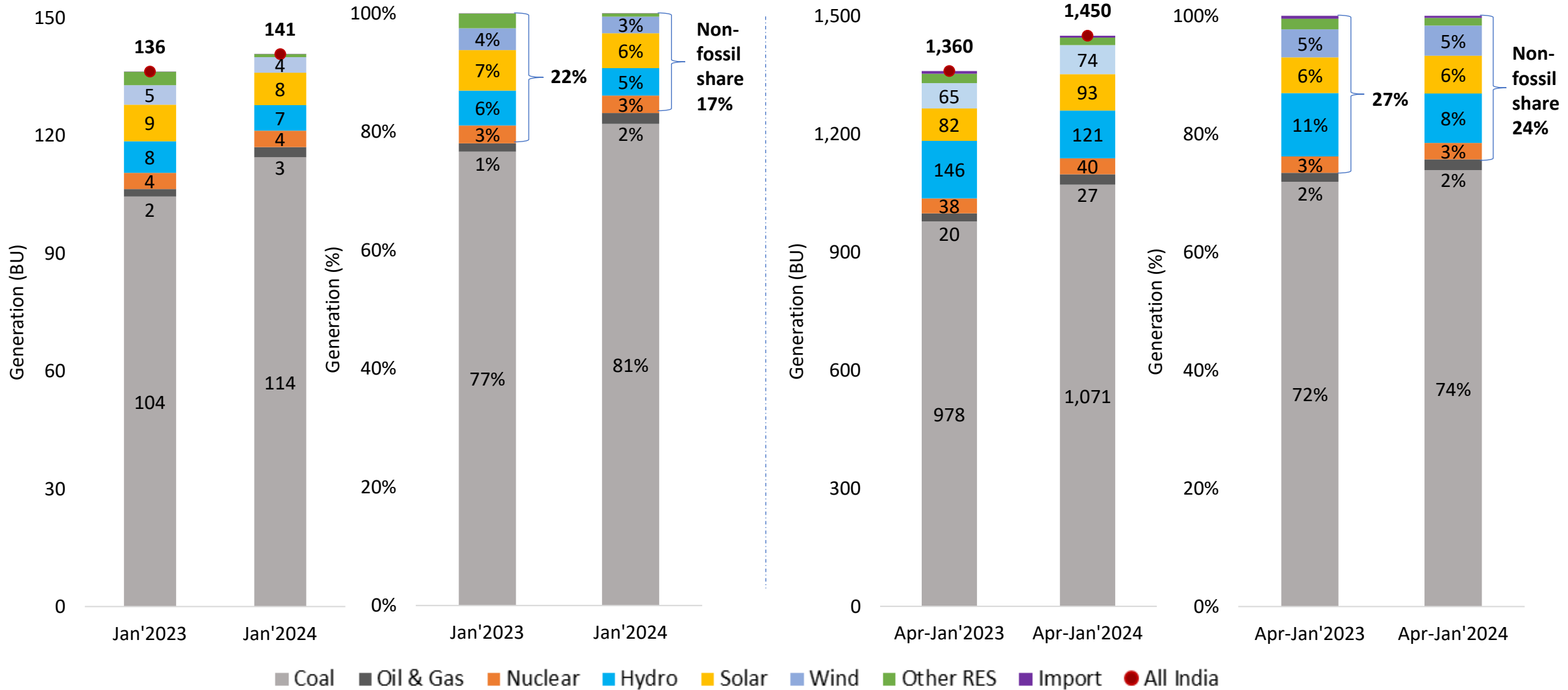
RE Installed capacity as a Percentage of the total resource potential in the state as on January 2024



Source: CEA & MNRE

India's Electricity Generation Mix

Source-wise Generation Mix

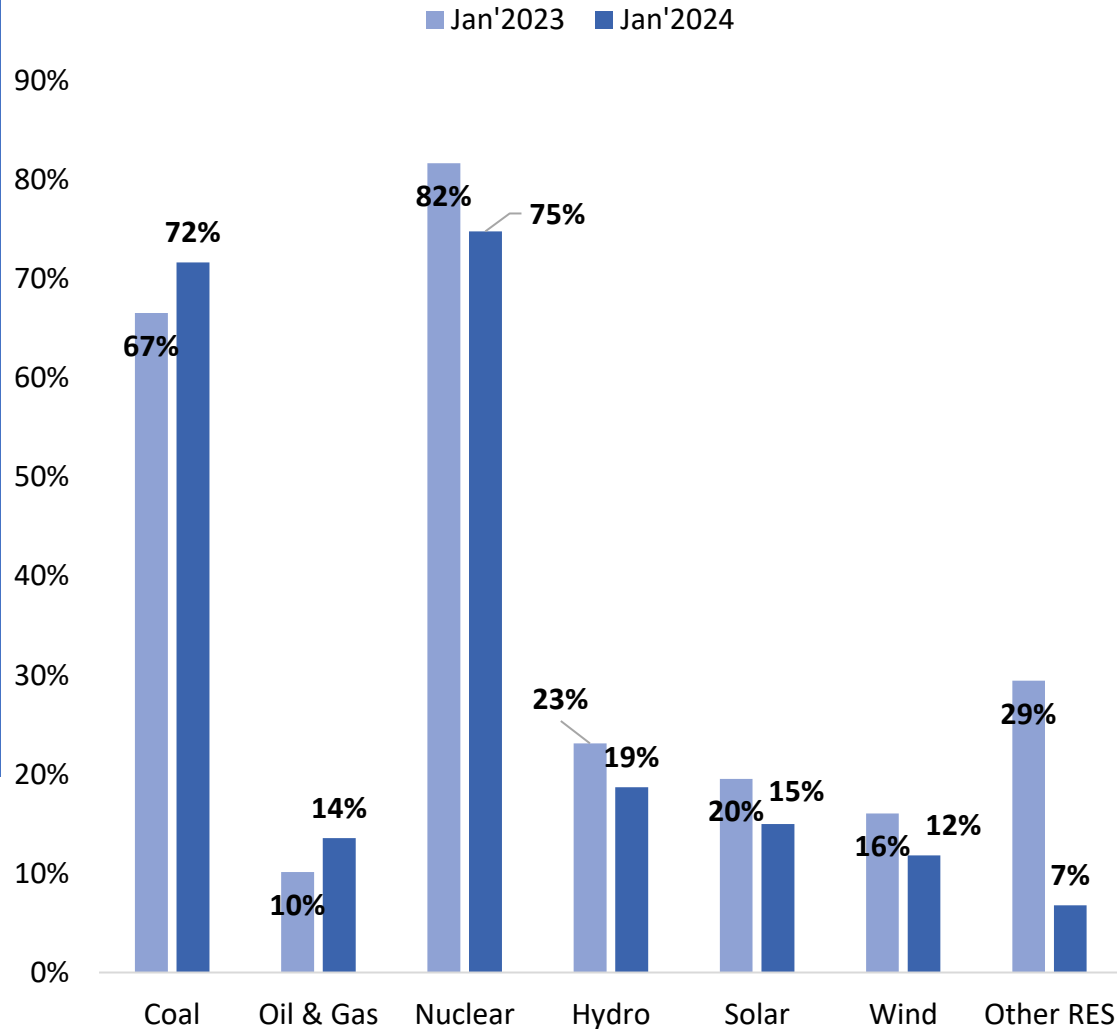


NOTE: The generation data for Jan'2024 is provisional.

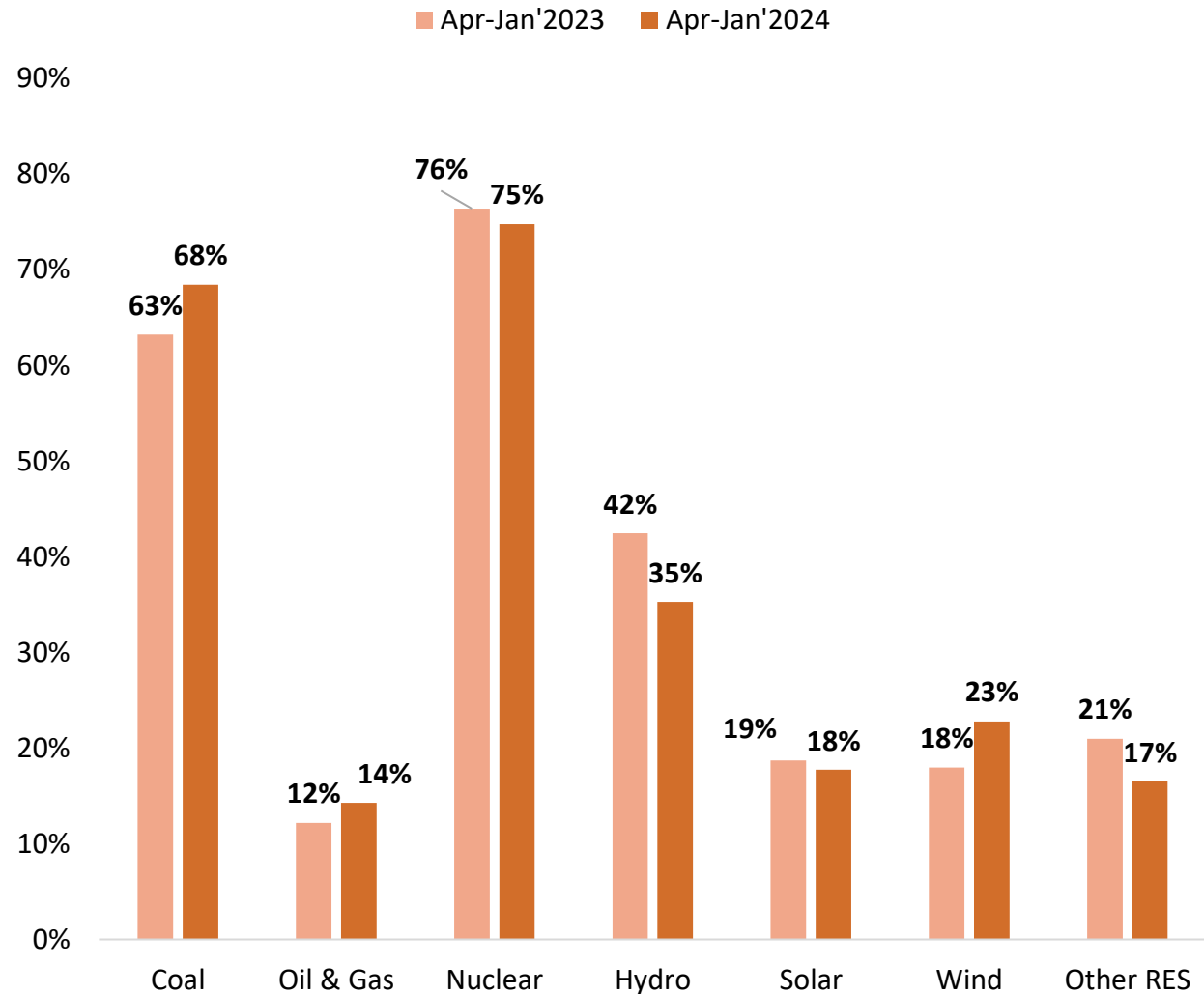
Source: CEA

Source-wise PLF/CUF

Source-wise PLF/ CUF in January (%)



Source-wise PLF/ CUF Comparison (%)

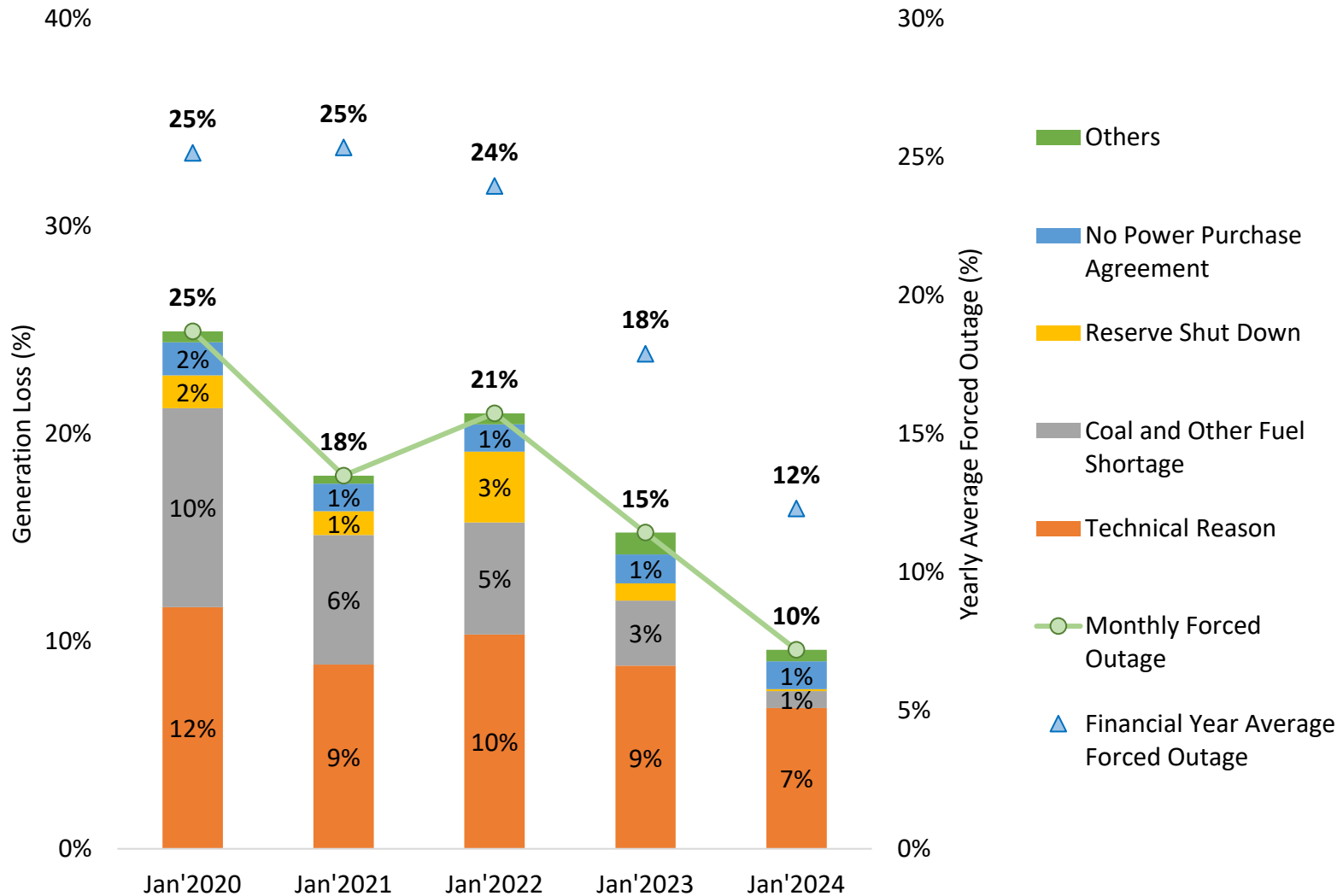


NOTE: The PLF/CUF data is based on provisional generation for Jan'2024.

Source: CEA & MNRE

Thermal Generation Loss and Reasons for Forced Outages

Forced Outages for January over the years



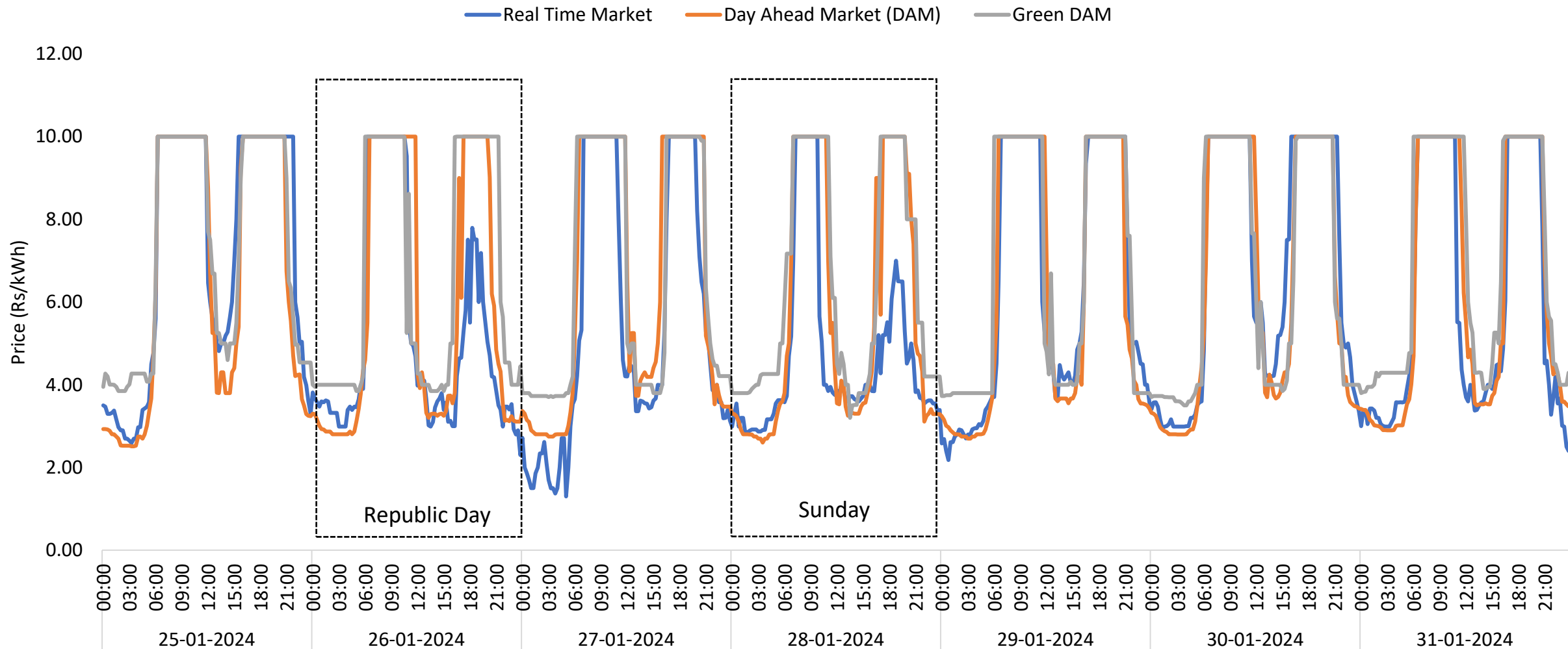
Year/ Month		Average Forced Outage Share
Yearly	FY 2021-22	24%
	FY 2022-23	18%
	FY 2023-24 (up to Jan'2024)	12%
Monthly	Jan'2022	21%
	Jan'2023	15%
	Jan'2024	10%

Thermal includes only Coal and Lignite Plants.

Source: ICED

Indian Electricity Exchange (IEX) Market Snapshot

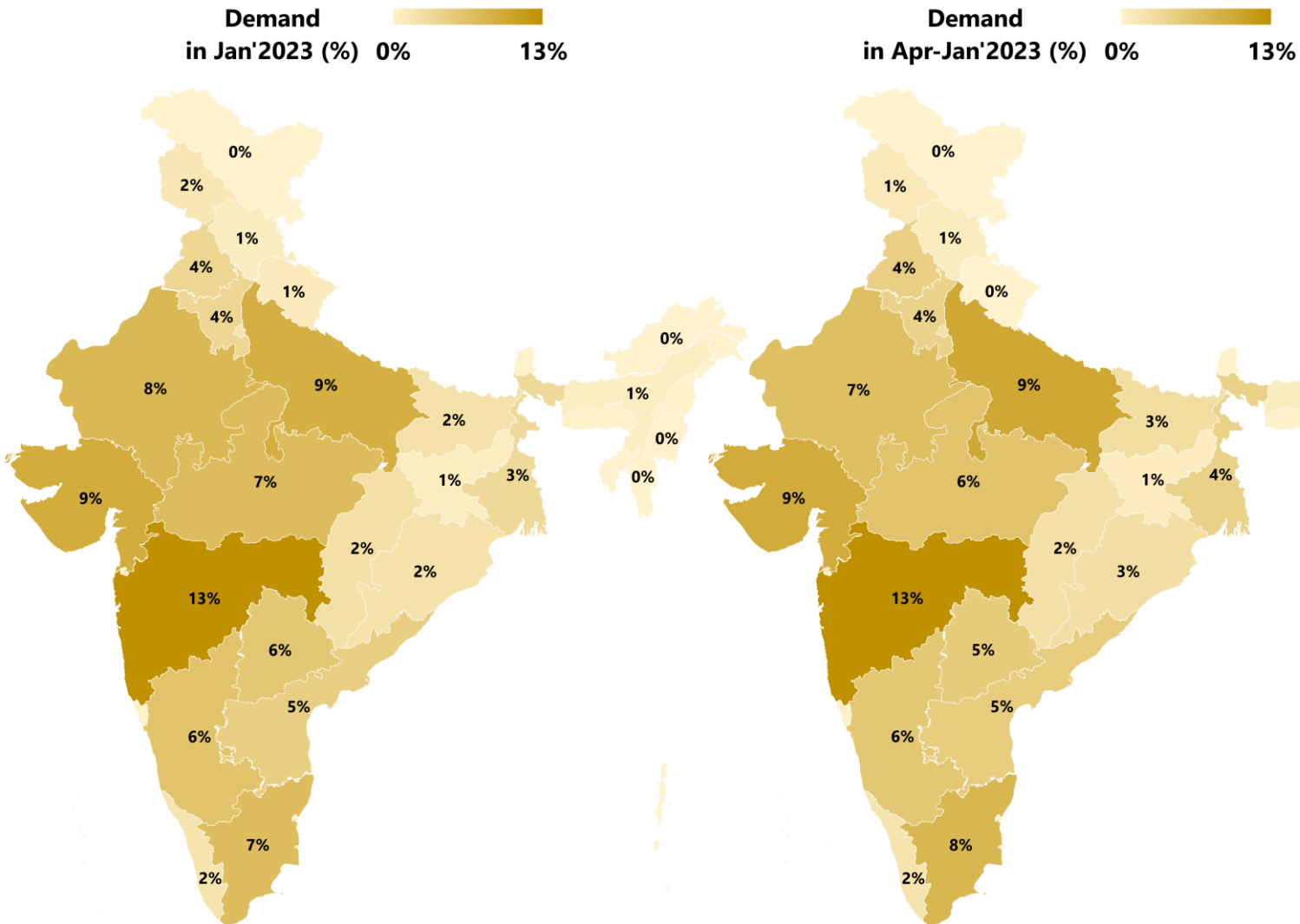
Market Clearing Prices of last 7 days of January 2024



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) (+/-)
Jan'2022	112	112	0.3
Jan'2023	127	126	0.8
Jan'2024	134	133	0.5

Apr-Jan	Electricity Demand (BU)	Electricity Supply (BU)	Gap (BU) (+/-)
FY 2021-22	1142	1138	5
FY 2022-23	1266	1259	7
FY 2023-24	1359	1355	4

NOTE: The demand represented above includes intra state T&D losses.

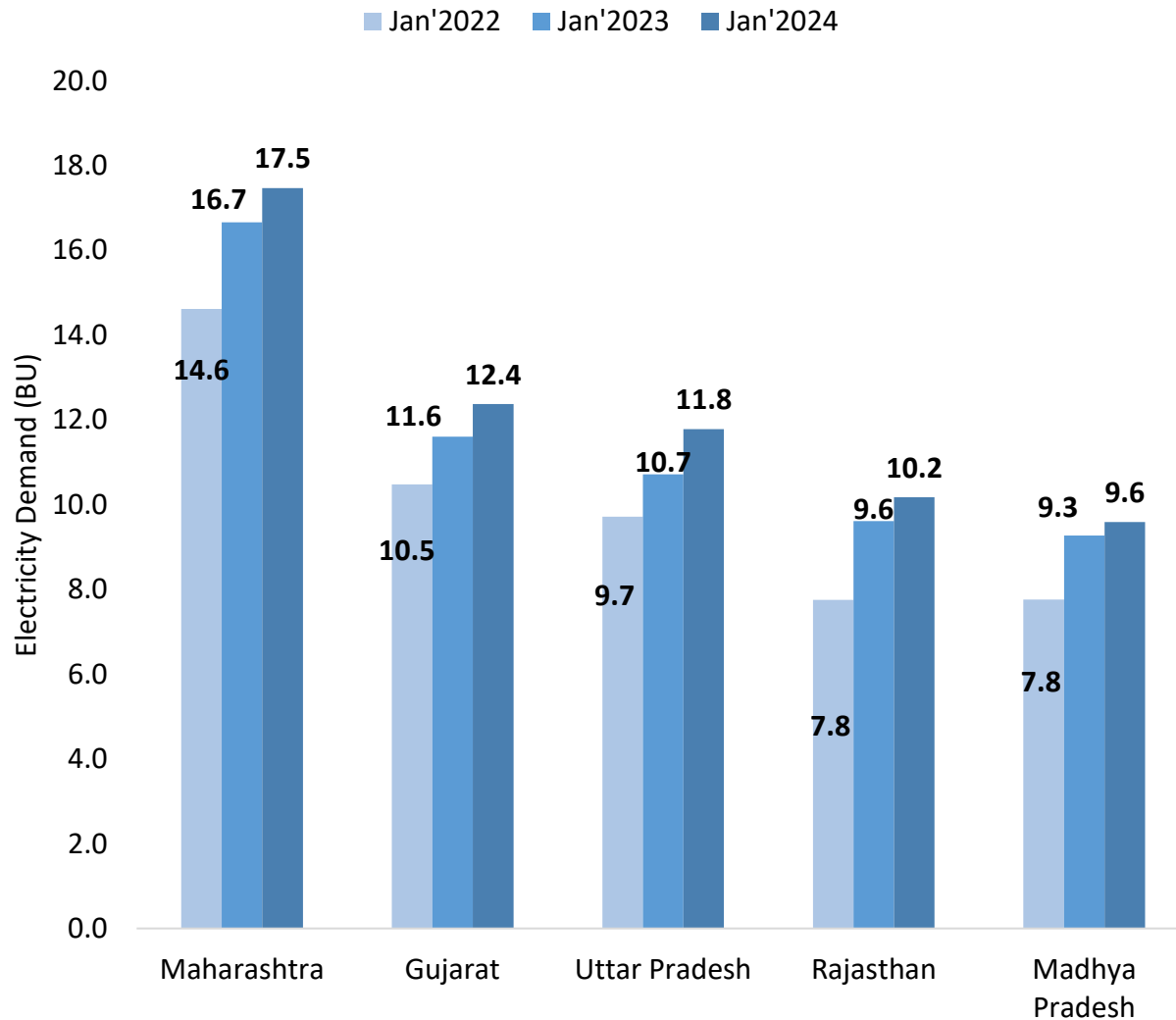
Source: CEA

India's Monthly Electricity Requirement and Supply

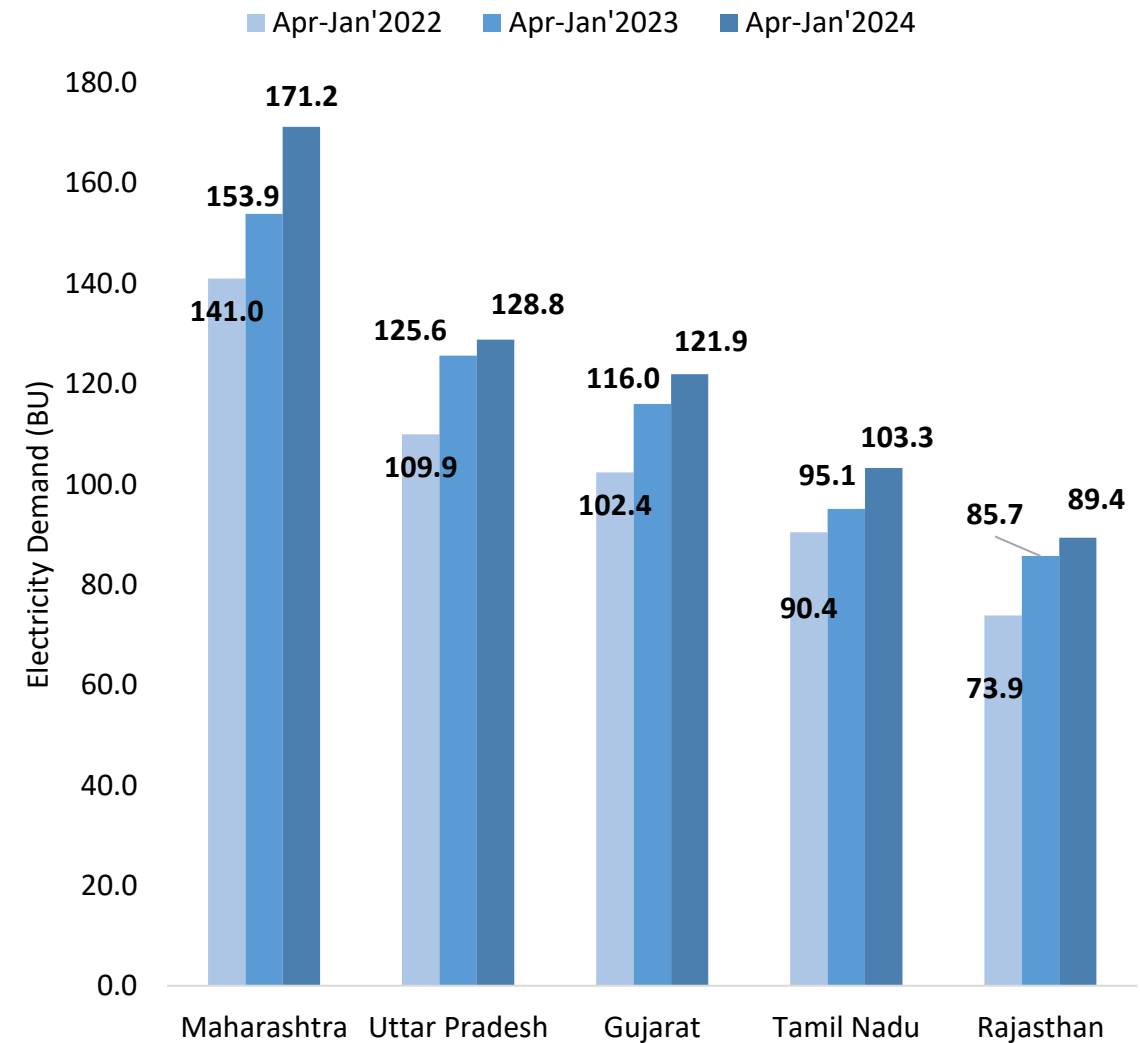


Monthly Electricity Demand of the top 5 states

States with Highest Electricity Demand in January (BU)

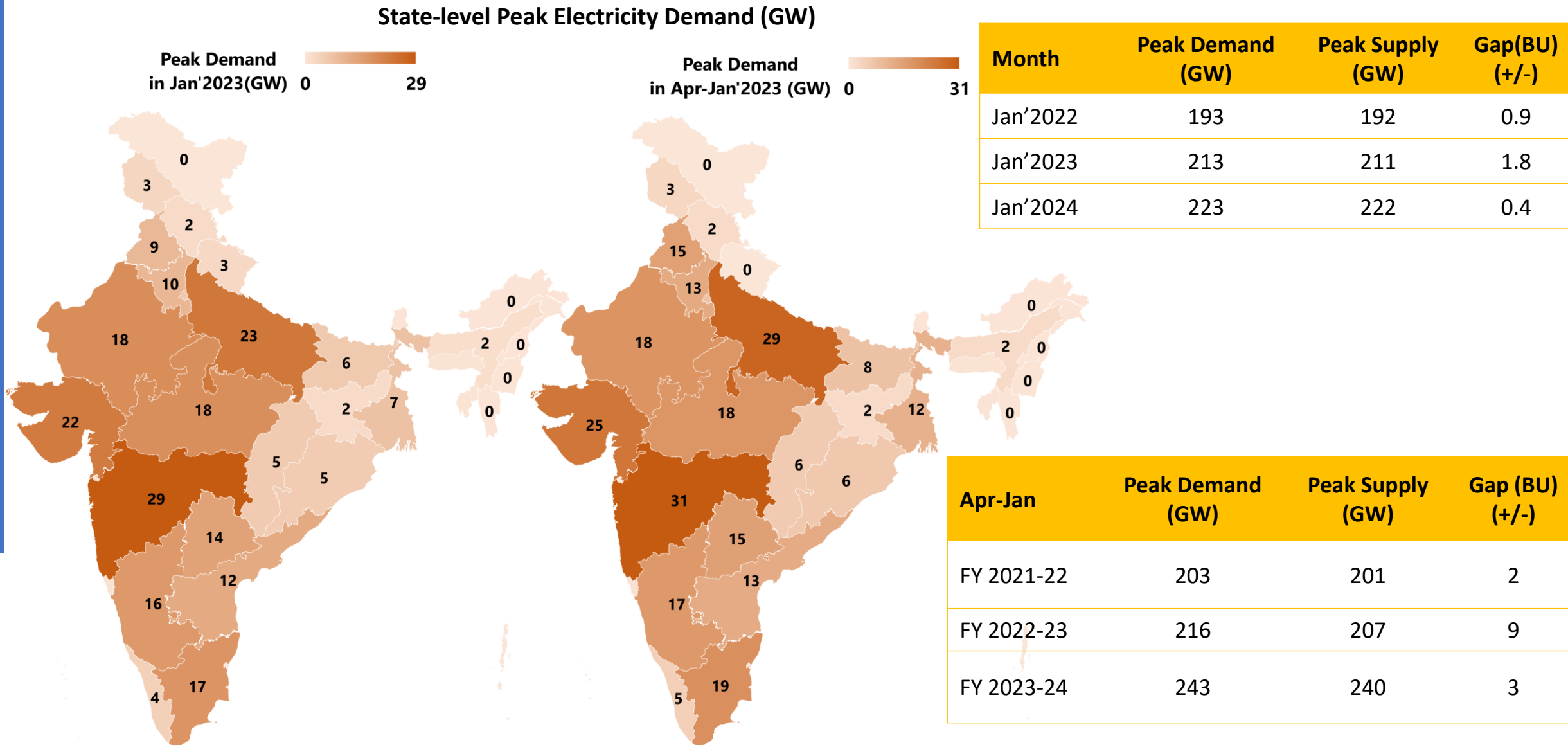


States with Highest Electricity Demand (BU)



Source: CEA

National and State level Peak Electricity Demand

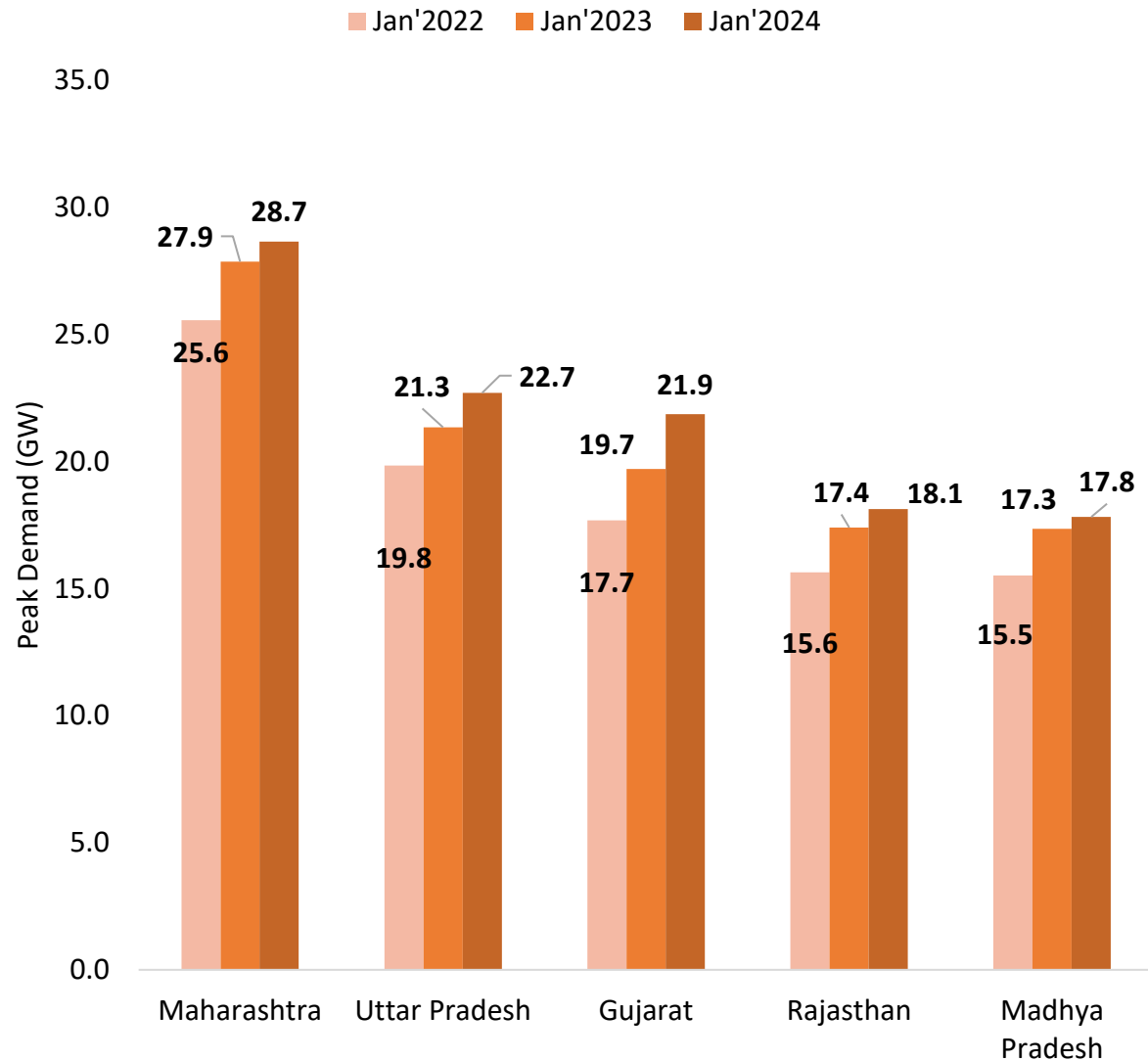


India's Monthly Peak Electricity Demand and Supply

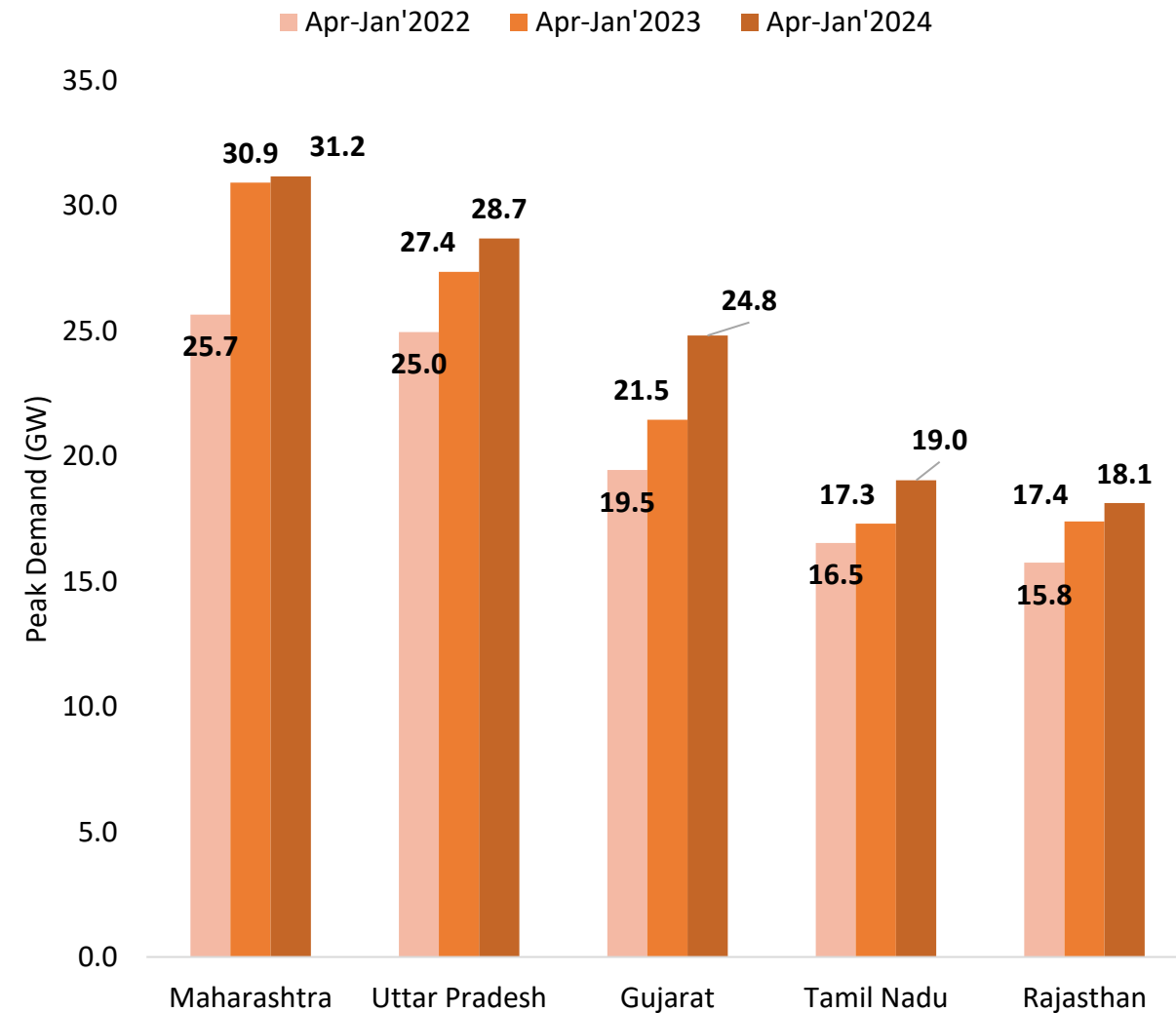


Monthly Peak Electricity Demand of the top 5 states

States with Highest Peak Electricity Demand in January (GW)



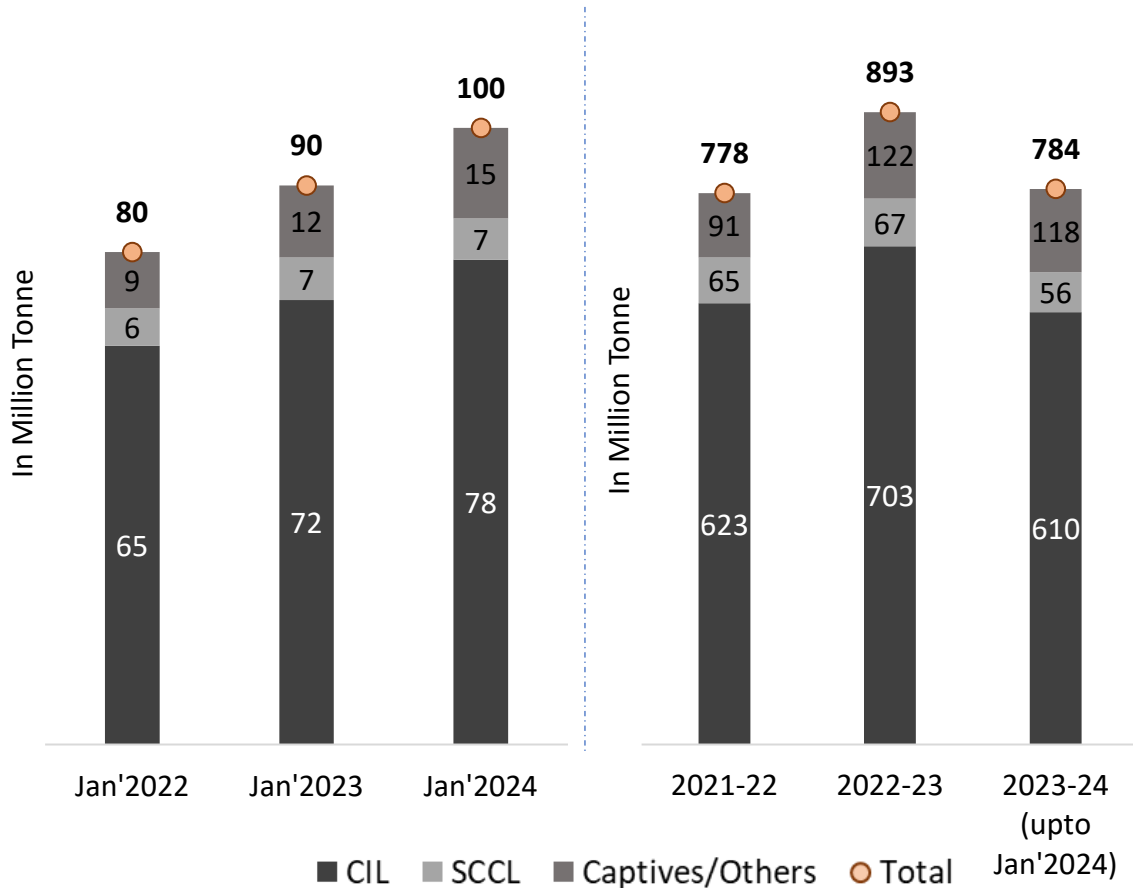
States with Highest Peak Electricity Demand (GW)



Source: CEA

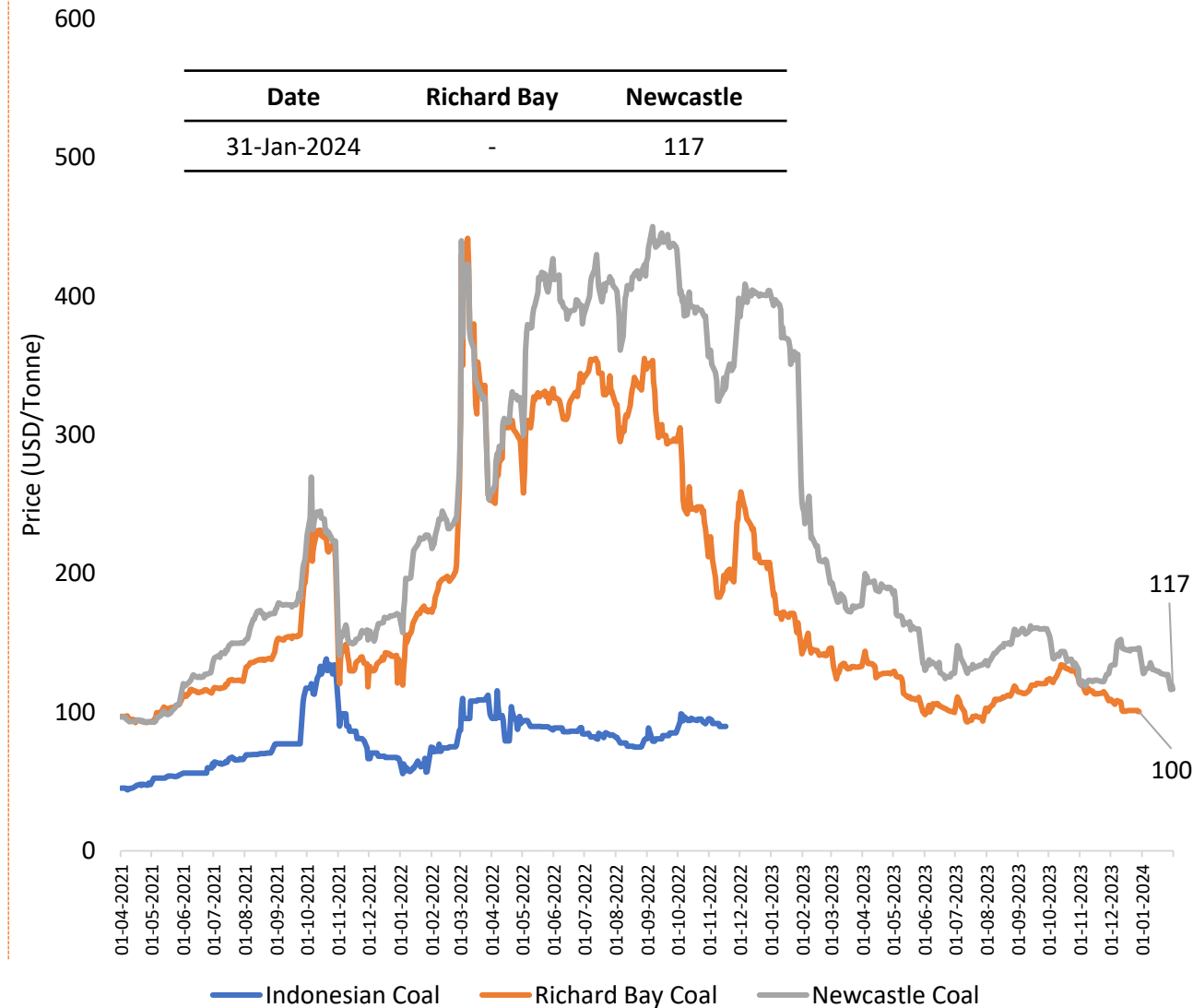
Monthly Coal Statistics

Monthly/ Annual Coal Production (in Million Tonnes)



India's coal production increased in Jan'2024 (100 MT) by 10% as compared to Jan'2023.

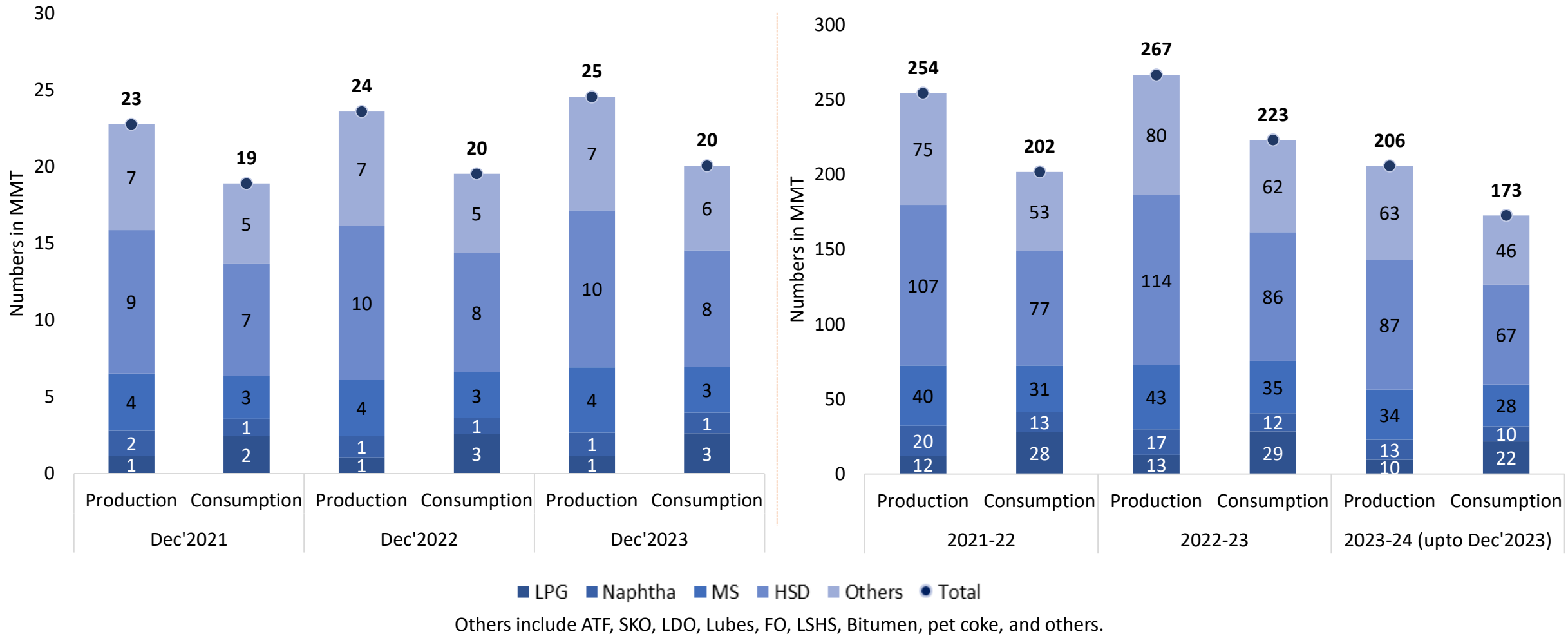
International Coal Prices



Source: Ministry of Coal

Petroleum Products Market Scenario (1/3)

Petroleum Product-wise Production & Consumption (MMT)



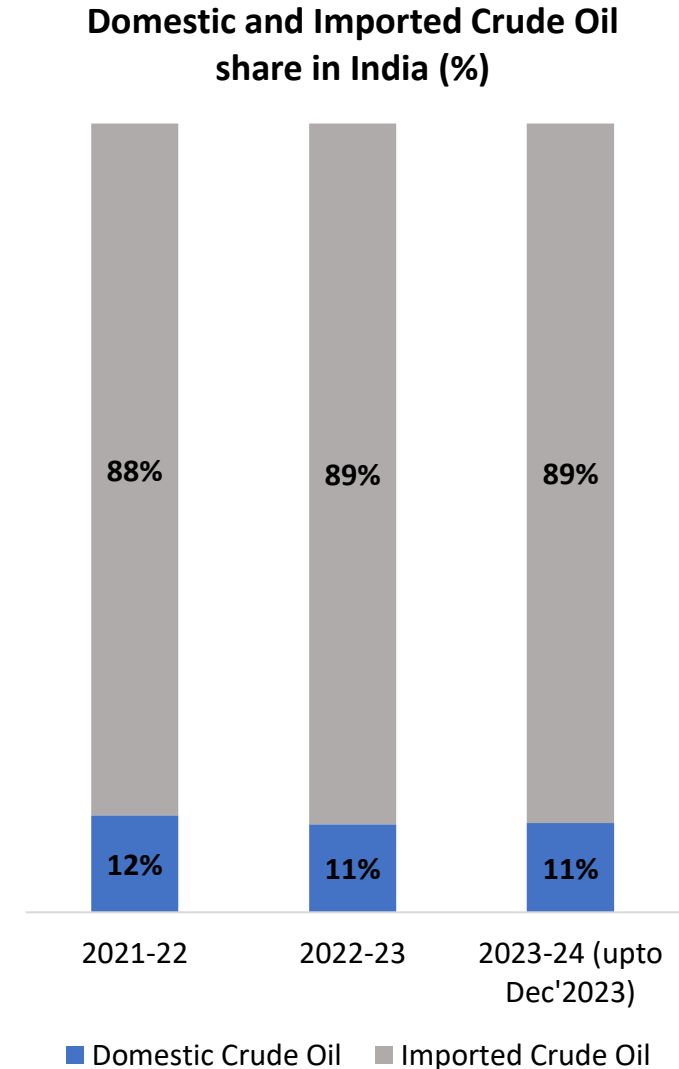
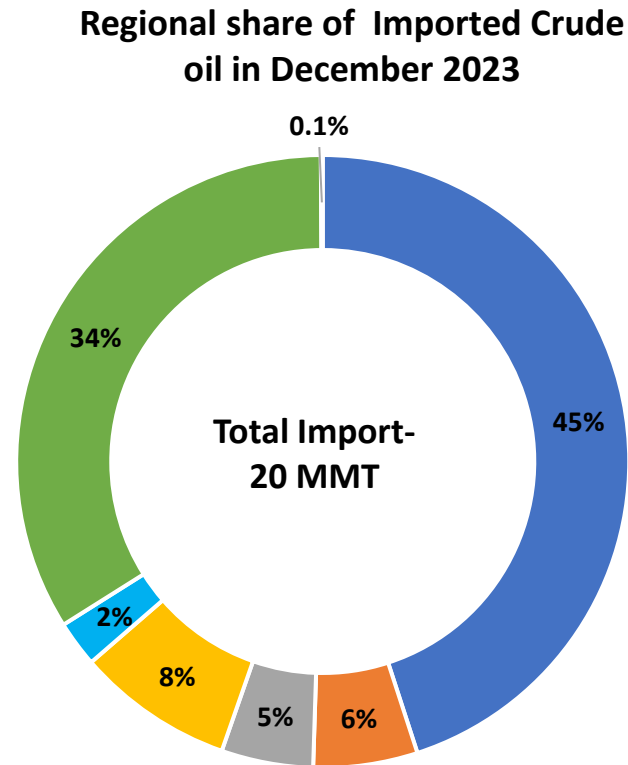
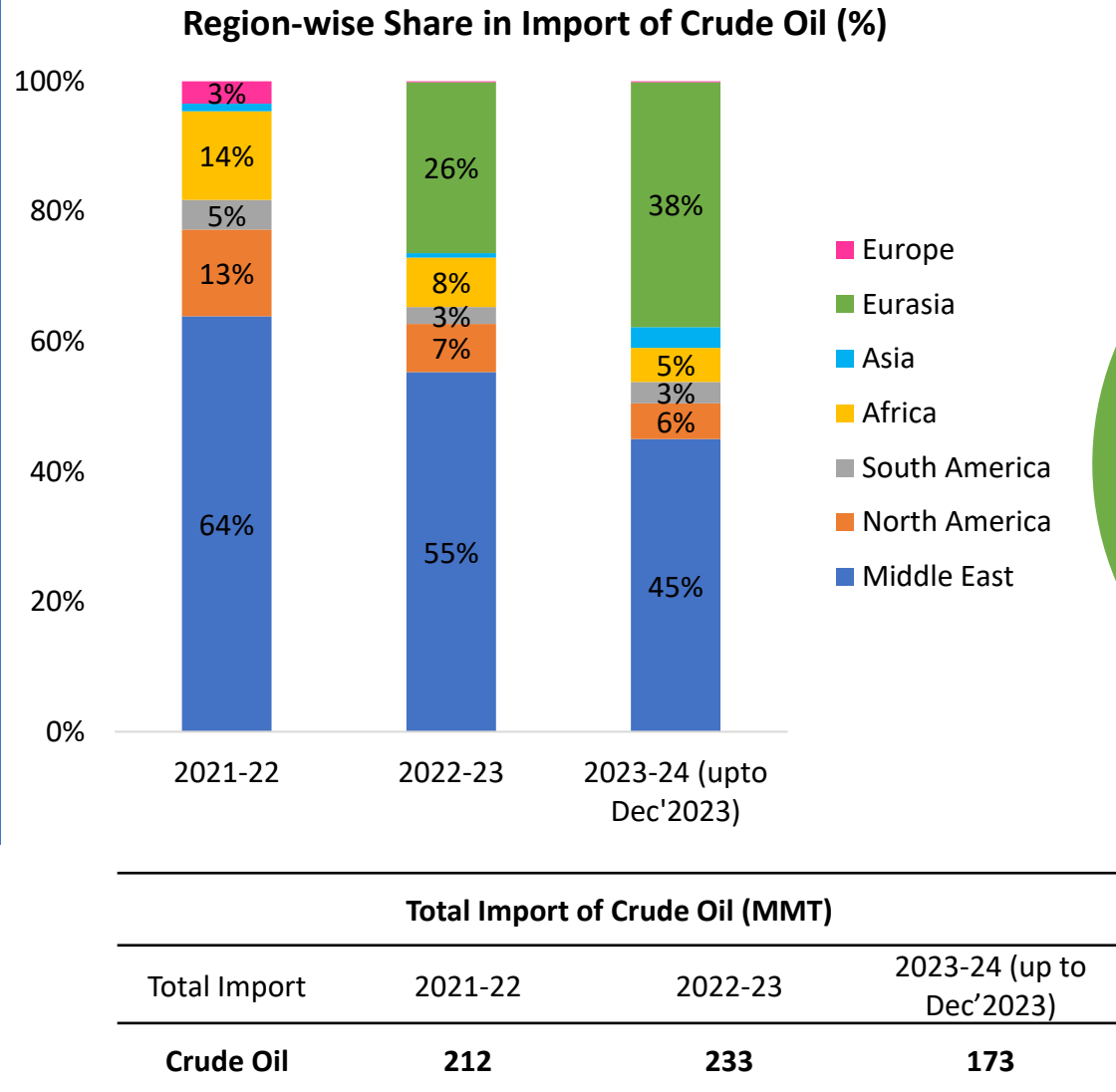
Abbreviations: ATF- Aviation Turbine Fuel, FO- Furnace Oil, HSD- High-Speed Diesel, LDO- Light Diesel Oil, MS- Motor Spirit (Petrol), SKO- Superior Kerosene Oil, LSHS- Low Sulphur Heavy Stock, LPG- Liquefied Petroleum Gas, MMT- Million Metric Tonne

Petroleum Products Market Scenario (2/3)

Import/Export of Crude Oil and Petroleum Products ('000 Tonnes)							
Petroleum Products	Import/ Export	Monthly			Yearly		
		Dec'21	Dec'22	Dec'23	2021-22	2022-23	2023-24 (upto Dec'2023)
Crude Oil	Import	19648	19618	19832	212382	232700	172935
	Export	0	0	0	0	0	0
	Net Import	19648	19618	19832	212382	232700	172935
LPG	Import	1650	1718	1564	17043	18335	13522
	Export	50	45	45	513	540	387
	Net Import	1600	1673	1518	16530	17796	13135
Diesel	Import	4	13	5	43	322	29
	Export	3057	2413	2841	32407	28494	21339
	Net Import	-3053	-2399	-2836	-32364	-28172	-21310
Petrol	Import	0	120	0	671	1069	717
	Export	1374	1242	1193	13482	13127	9893
	Net Import	-1374	-1122	-1193	-12812	-12058	-9176
Others	Import	2659	2199	2317	21259	24871	21733
	Export	1495	1998	1759	16352	18854	15005
	Net Import	1164	201	558	4907	6017	6728

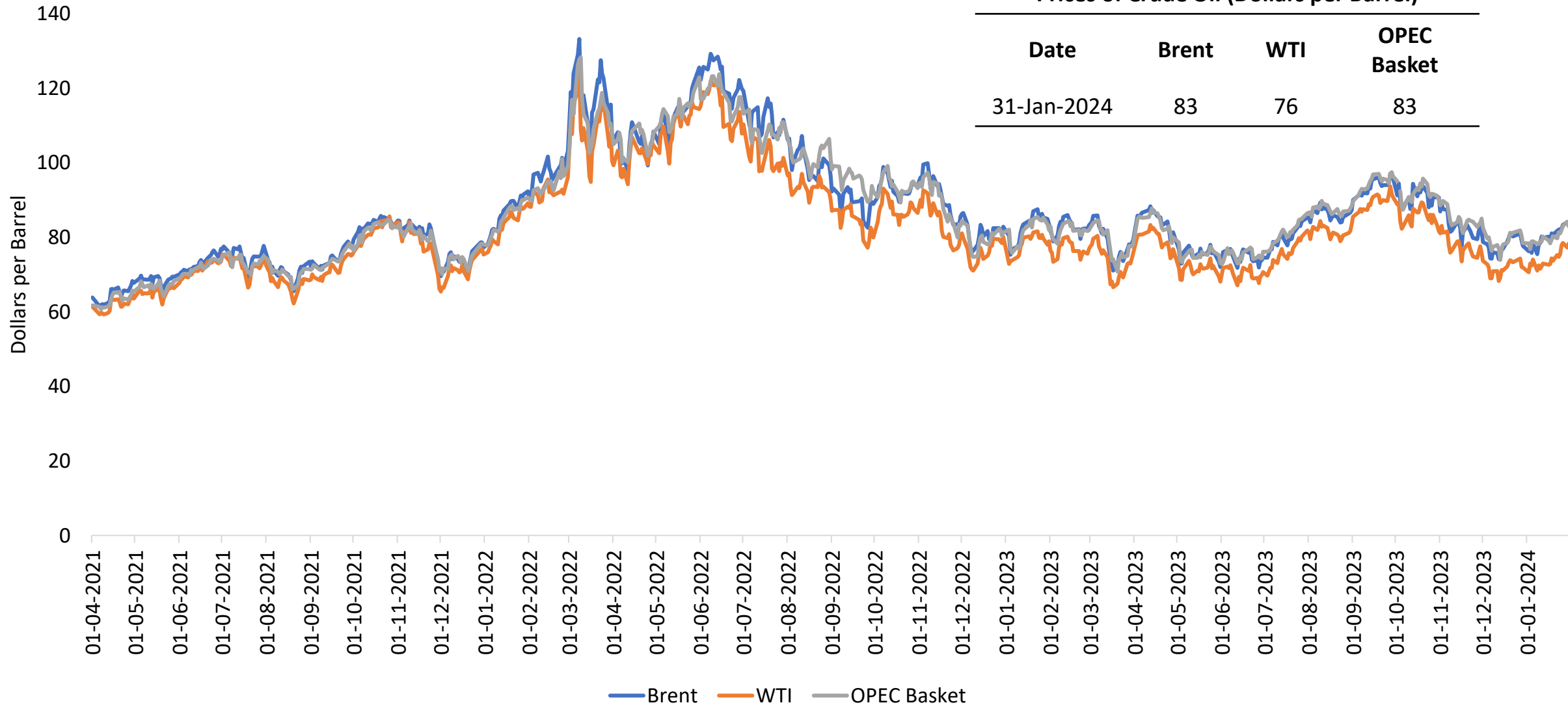
*Others include ATF, Naphtha, SKO, LDO, Lubes, FO, LSHS, Bitumen, pet coke, and others.

Petroleum Products Market Scenario (3/3)



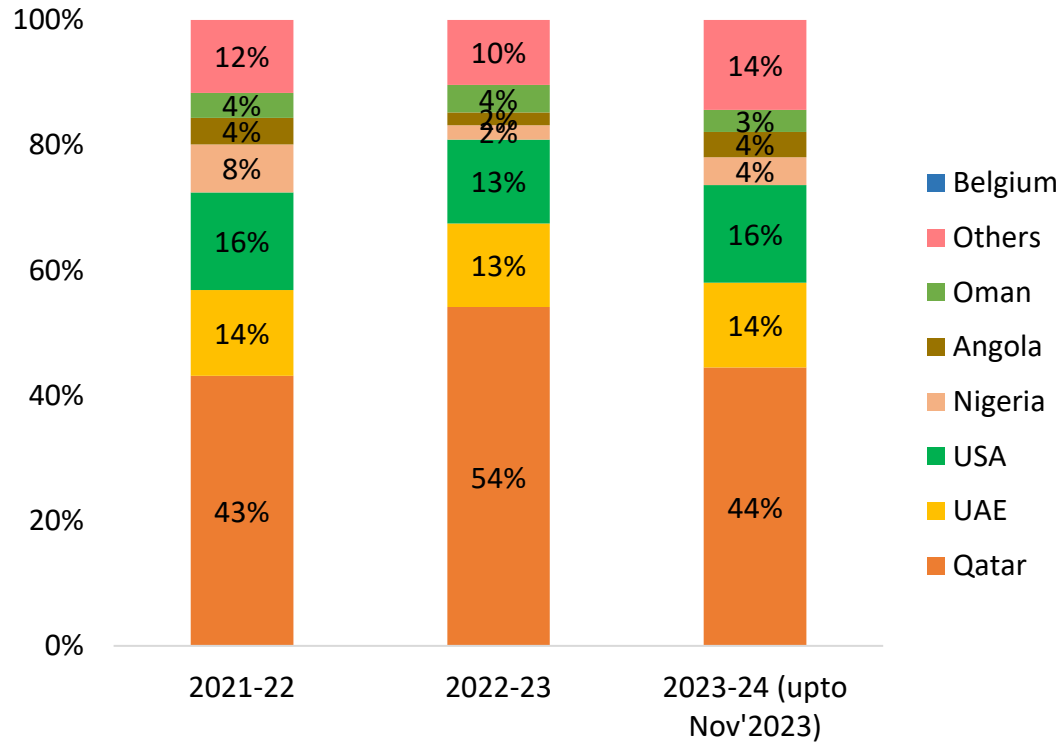
Daily Prices of Crude Oil

Daily Prices of Crude Oil

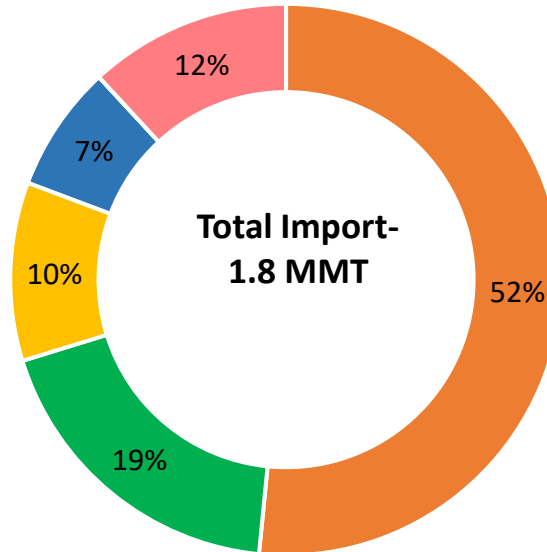


Gas Market Scenario

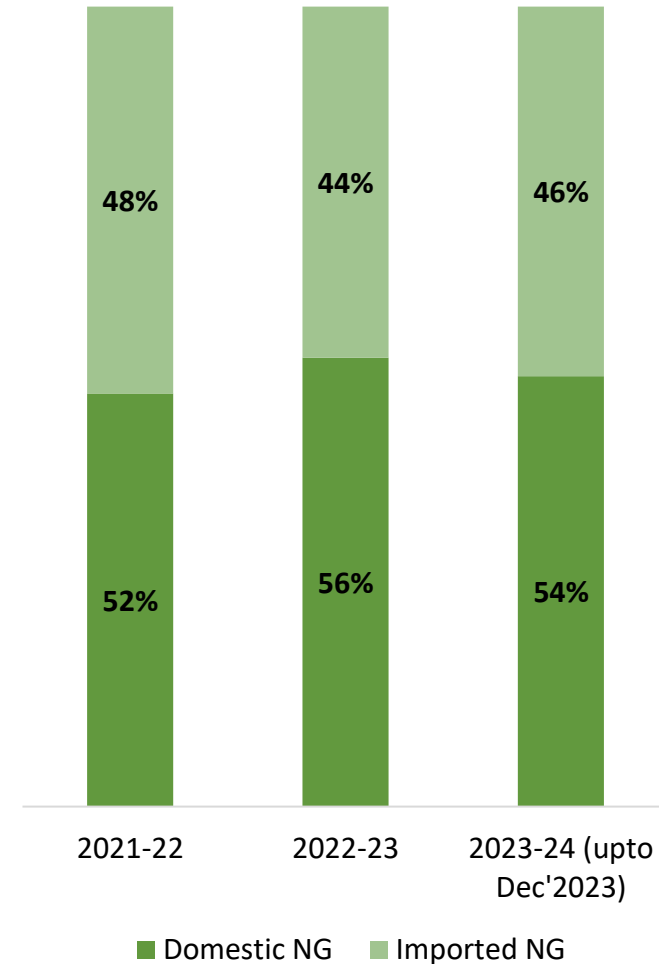
Region-wise Share in Import of LNG (%)



Country Share of Imported LNG in November 2023



Domestic and Imported Natural Gas share in India (%)



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

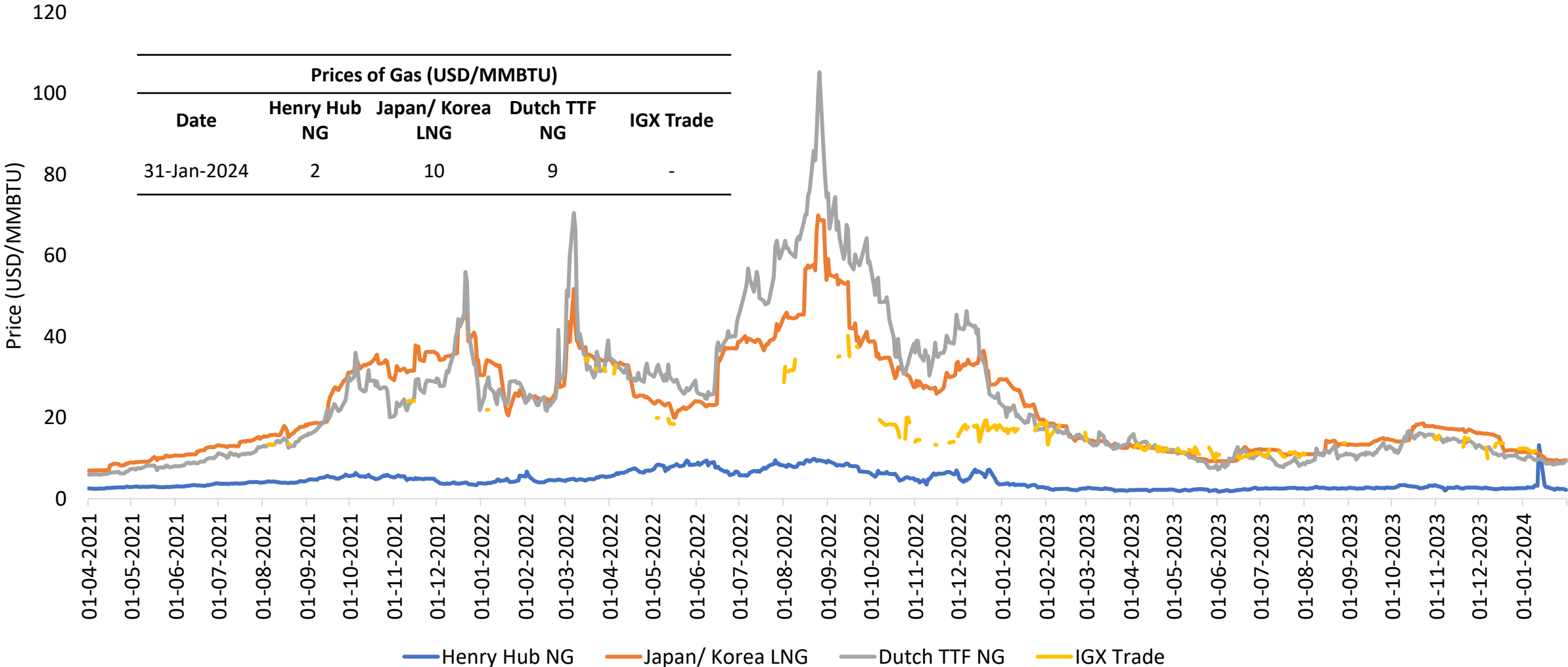
Total Import of Liquefied Natural Gas (LNG) (MMT)			
Total Import	2021-22	2022-23	2023-24 (upto Dec'2023)
LNG	23.42	19.85	17.28

NOTE: The data is latest available

Source: MoCI and PPAC

Daily Prices of Gas

Gas Daily Market Price



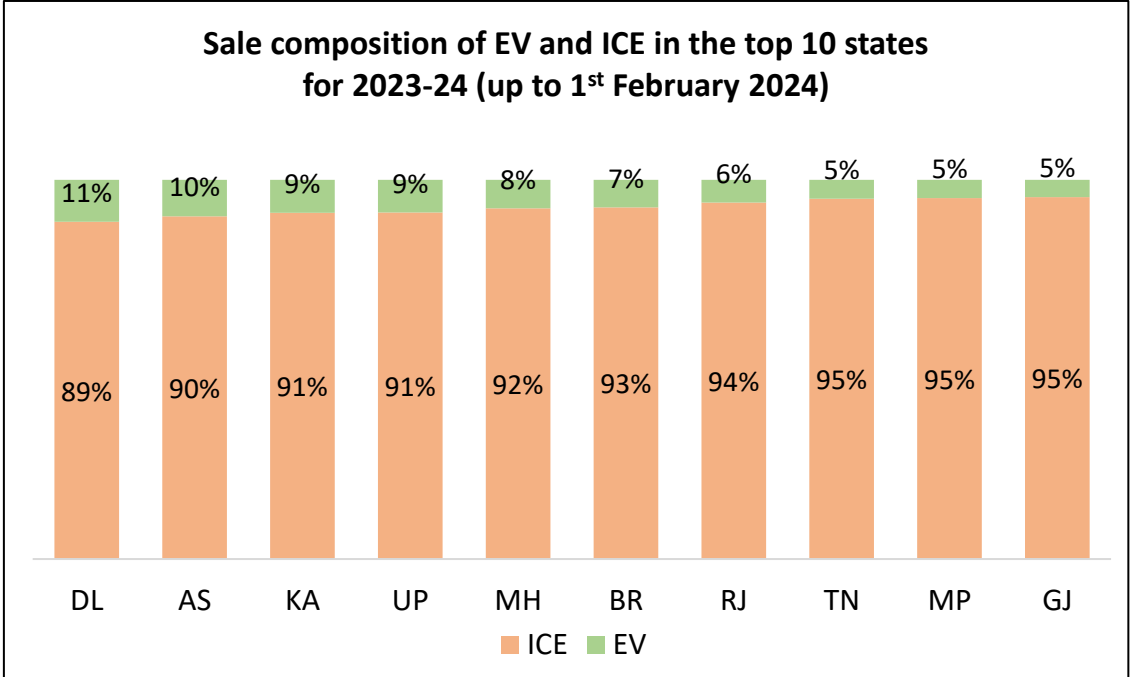
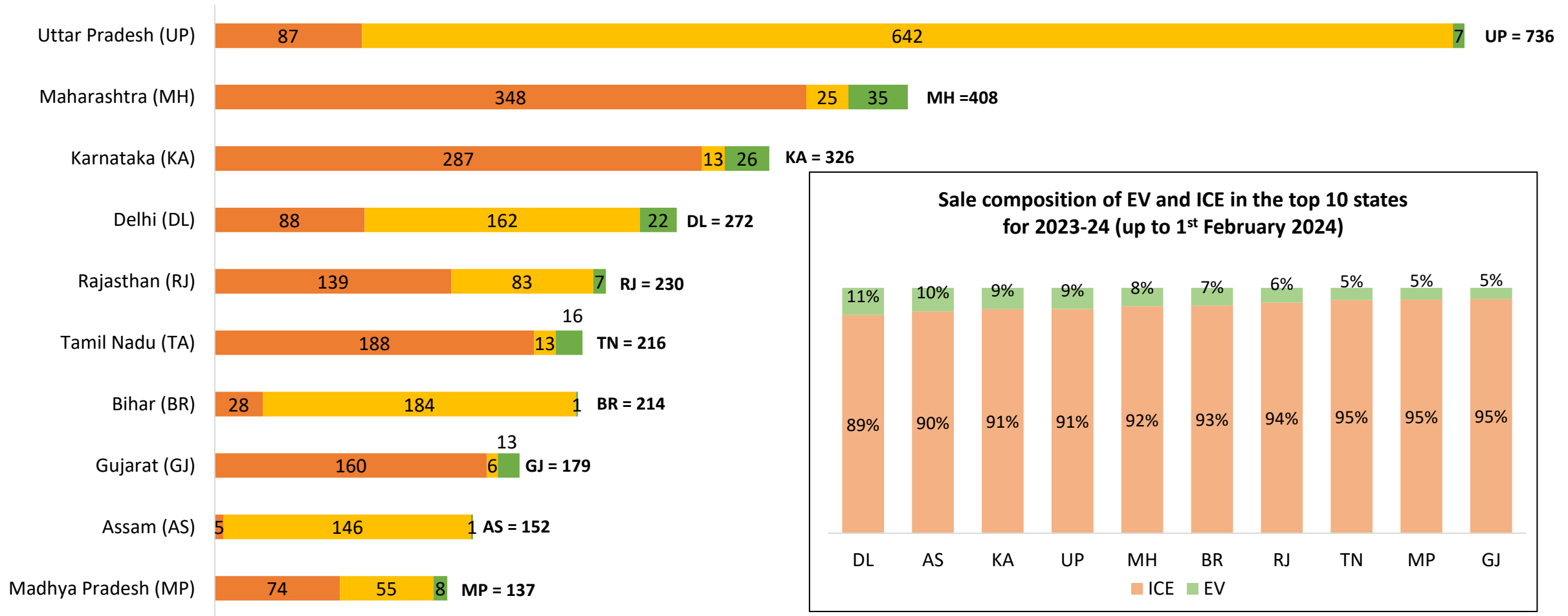
Prices of Gas (USD/MMBTU)				
Date	Henry Hub NG	Japan/ Korea LNG	Dutch TTF NG	IGX Trade
31-Jan-2024	2	10	9	-

Henry Hub NG Japan/ Korea LNG Dutch TTF NG IGX Trade

MMBTU- Million Metric British Thermal Unit

Status of Electric Mobility in India

**Top 10 States for Electric Vehicles (in Thousands)
as on 1st February 2024**



■ 2 Wheeler
 ■ 3 Wheeler
 ■ 4 Wheeler & others

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.

[CFA/ subsidy](#) is available for residential solar rooftop projects up to 10kW.

CFA is applicable under [RTS Phase II](#) for residential consumers in rural areas under the VNM arrangement up to 3kW.

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.

[Approved List of Models and Manufacturers](#) abeyance till 31 March 2024. MNRE has reduced the application fee by 80% and the inspection fee by 70%.

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 [draft National Repowering Policy](#) 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.

The [pilot projects](#) are:

- i. 1.4 MW SPV Project with 1.4 MWh BESS in Lakshadweep.
- ii. 50 MWp SPV Project with 20 MW/50 MWh BESS in Phyang, Ladakh
- iii. 100 MW SPV Project with 40 MW/120 MWh BESS in Chhattisgarh.

Green Hydrogen (H₂)

[National Green Hydrogen Mission](#) 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.

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

MNRE has proposed using [green H₂ in Direct Reduced Iron \(DRI\) production](#) by partly replacing natural gas with H₂ in gas-based DRI plants.

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.

The pilot projects are-

- i. 25kW AC hydrogen grid at NETRA that includes a 500kW PEM electrolyzer
- ii. 5MW PEM electrolyzer at NTPC Vindhyachal.

Key Highlights or Announcements of January 2024

- The Ministry of New and Renewable Energy (MNRE) has unveiled a [New Solar Power Scheme for Particularly Vulnerable Tribal Groups \(PVTG\) under Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan \(JANMAN\)](#) from 2023-24 to 2025-26. The scheme will cover the electrification of 1 lakh un-electrified households in PVTG areas of 18 states. A total outlay of 515 crores is allocated till 2025-26. The funds for implementing the scheme will be met from the development action plan for scheduled tribes allocation of MNRE.
- MNRE has [revised Central Financial Assistance \(CFA\) for residential solar rooftop projects](#) installed under Phase II of the solar rooftop solar programme. The CFA has been increased upto Rs. 18,000/kW for general category states and Rs. 20,000/kW for special category states.
- The MNRE has [released comprehensive guidelines for the Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan \(PM KUSUM\) scheme](#). All three components of the scheme aim to add solar capacity of about 34,800 MW by March 2026 with a total Central Financial support of Rs 34,422 crore. The scheme consists of three components:
 - Component-A: Setting up of 10,000 MW of Decentralized Ground/ Stilt Mounted Grid Connected Solar or other Renewable Energy Power Plants by the farmers on their land
 - Component-B: Installation of 14 Lakh Stand-alone Solar Agriculture Pumps
 - Component-C: Solarisation of 35 Lakh Grid Connected Agriculture Pumps including Feeder Level Solarization.
- MNRE has released the Guidelines for Implementation of Strategic Interventions for Green Hydrogen Transition (SIGHT) Programme Component-II of the National Green Hydrogen Mission:
 - [Incentive for Procurement of Green Ammonia Production \(under Mode-2A\)](#): The incentive will be Rs. 8.82/kg of Green Ammonia in the first year of production and supply, Rs. 7.06/kg during the second year of production and supply, and Rs. 5.30/kg during the third year of production and supply.
 - [Incentive for Procurement of Green Hydrogen Production \(under Mode-2B\)](#): The incentive will be Rs. 50/kg of Green Hydrogen in the first year of production and supply, Rs. 40/kg during the second year of production and supply and Rs. 30/kg during the third year of production and supply.

Key Highlights or Announcements of January 2024

- The Ministry of Power has released the [Electricity \(Amendment\) Rules 2024](#). The noteworthy changes are:
 - The generating companies, captive generating plants, energy storage systems, or consumers with a load exceeding 25 MW (for ISTS) and 10 MW (for InSTS) no longer need a license under the Act for establishing, operating, or maintaining a DTL to connect to the grid.
 - The formula used for the calculation of the Wheeling Charge is the ratio of Annual Revenue Requirement towards wheeling to the quantum of Energy wheeled during the year. The appropriate commission may determine wheeling charges at different voltage levels, separately, following the above formula.
 - For consumers availing of short-term open access or temporary GNA, the charge for using the state transmission utility network will not exceed 110% of the charges imposed on a long-term basis or a general network basis.
 - The additional surcharge levied on any open access consumers shall not be more than the per unit fixed cost of power purchase of the relevant DISCOMs.



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