

India's Energy Overview

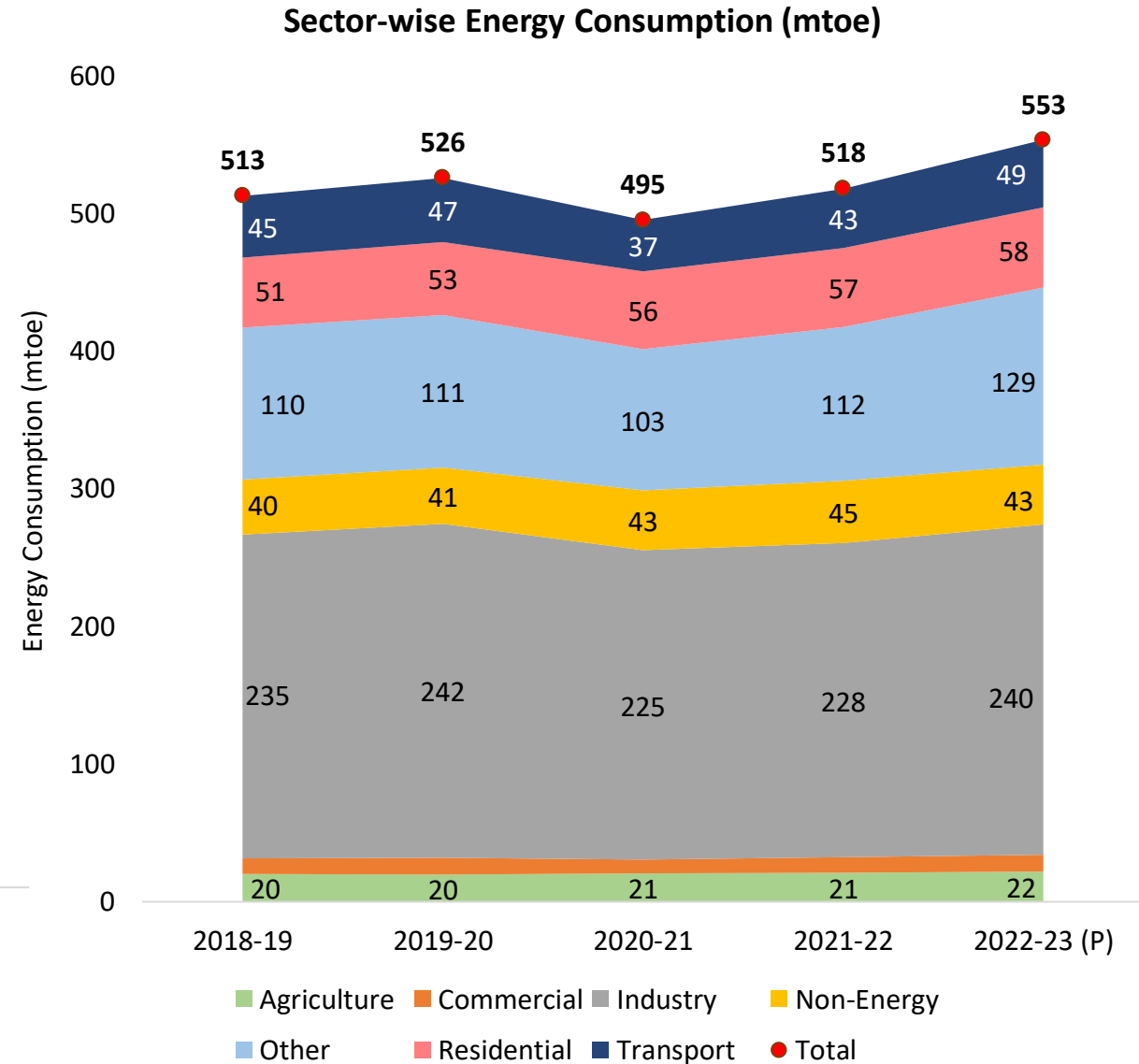
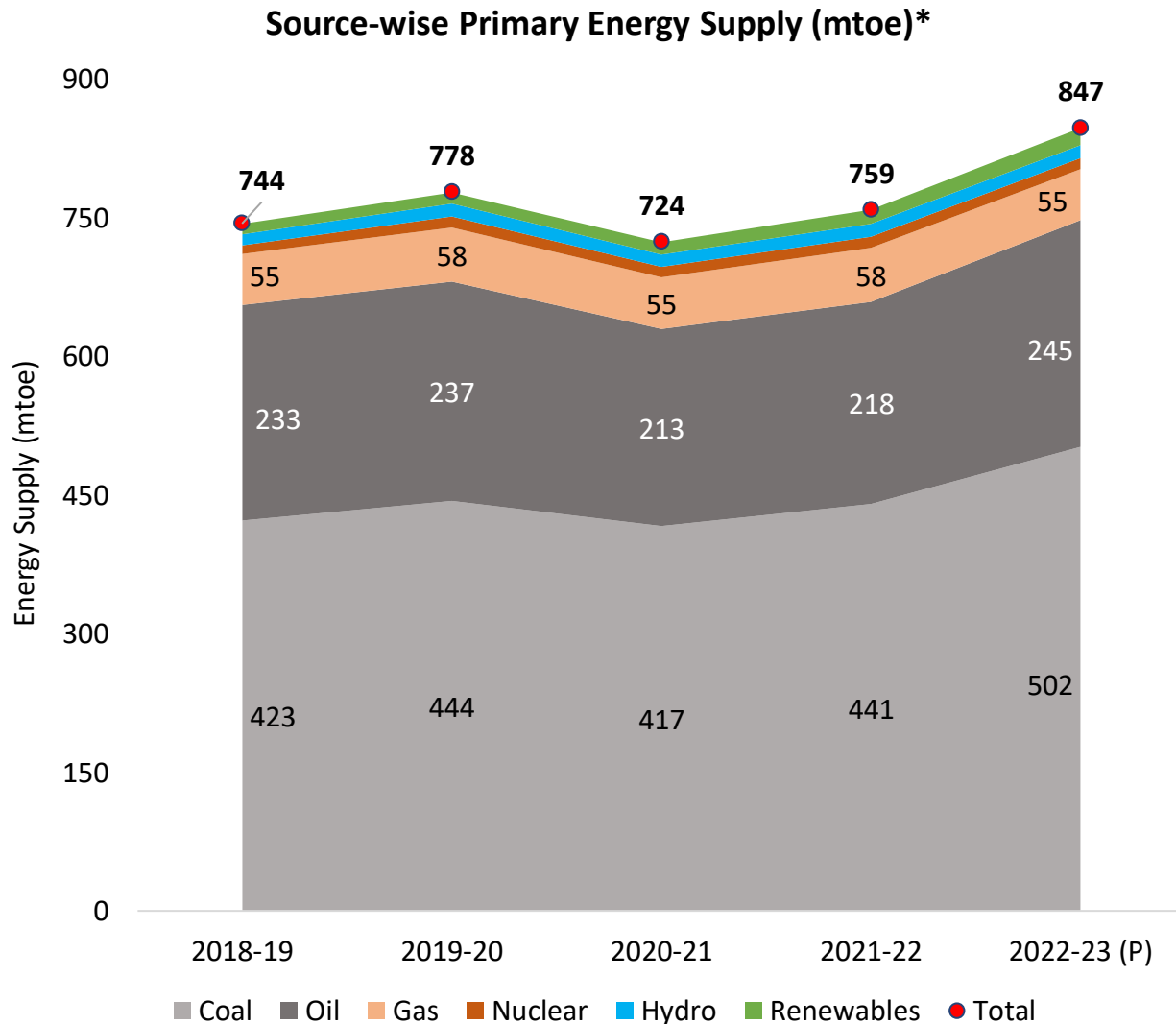
March 2024



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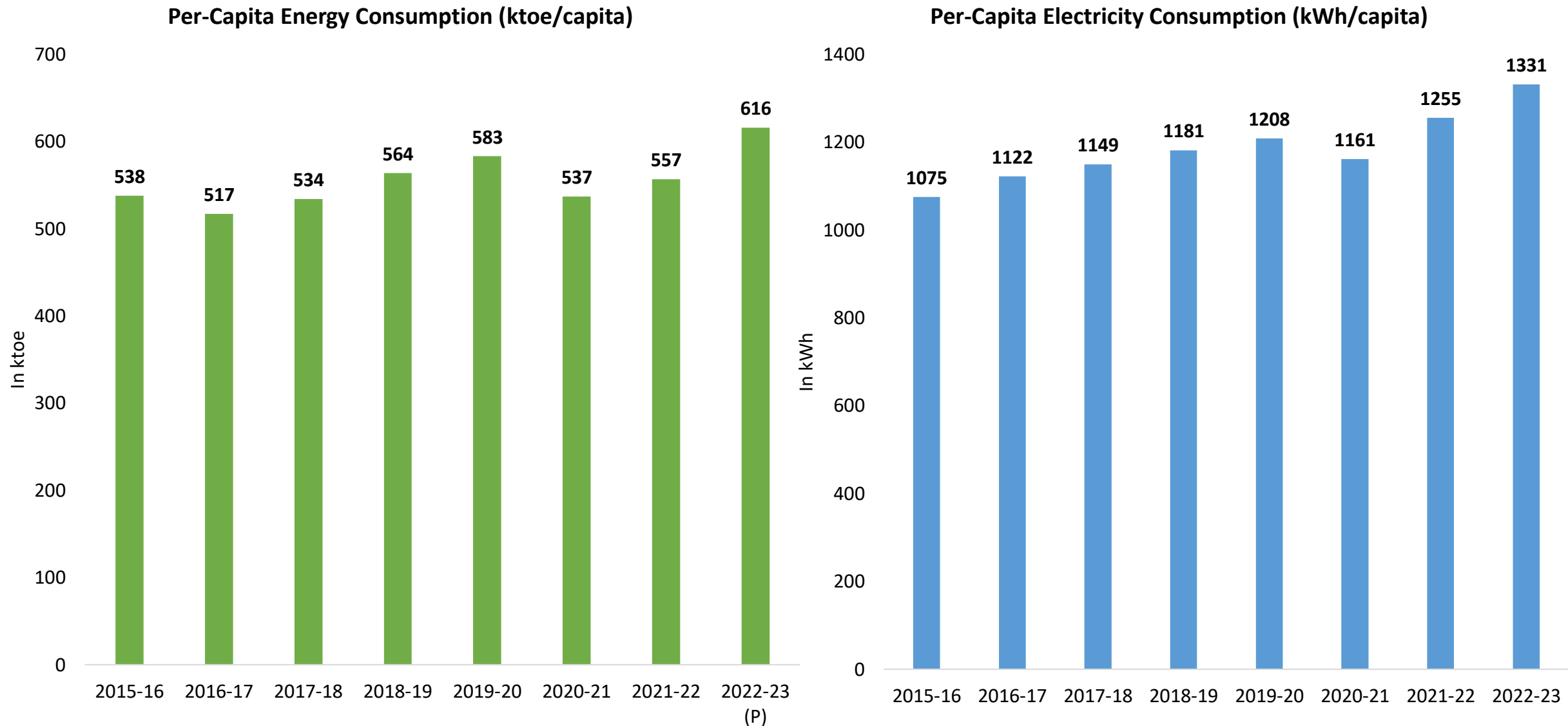
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Primary Energy Mix* in India



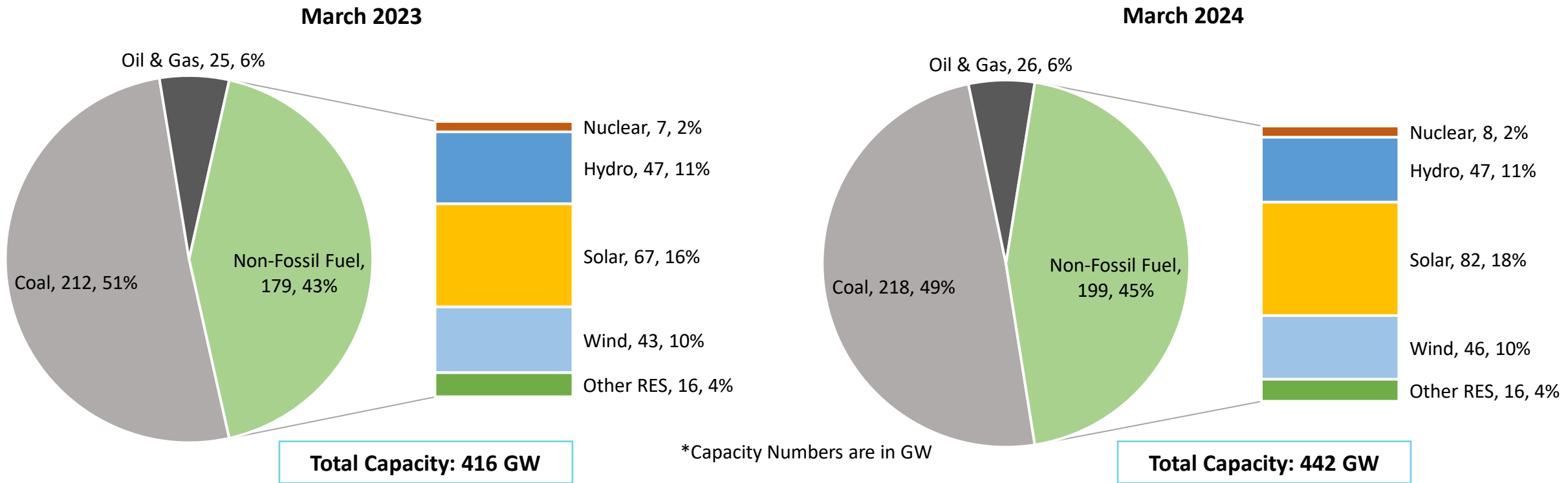
*Excluding biofuels, waste, and other non-commercial source of energy

Per-Capita Energy and Electricity Consumption



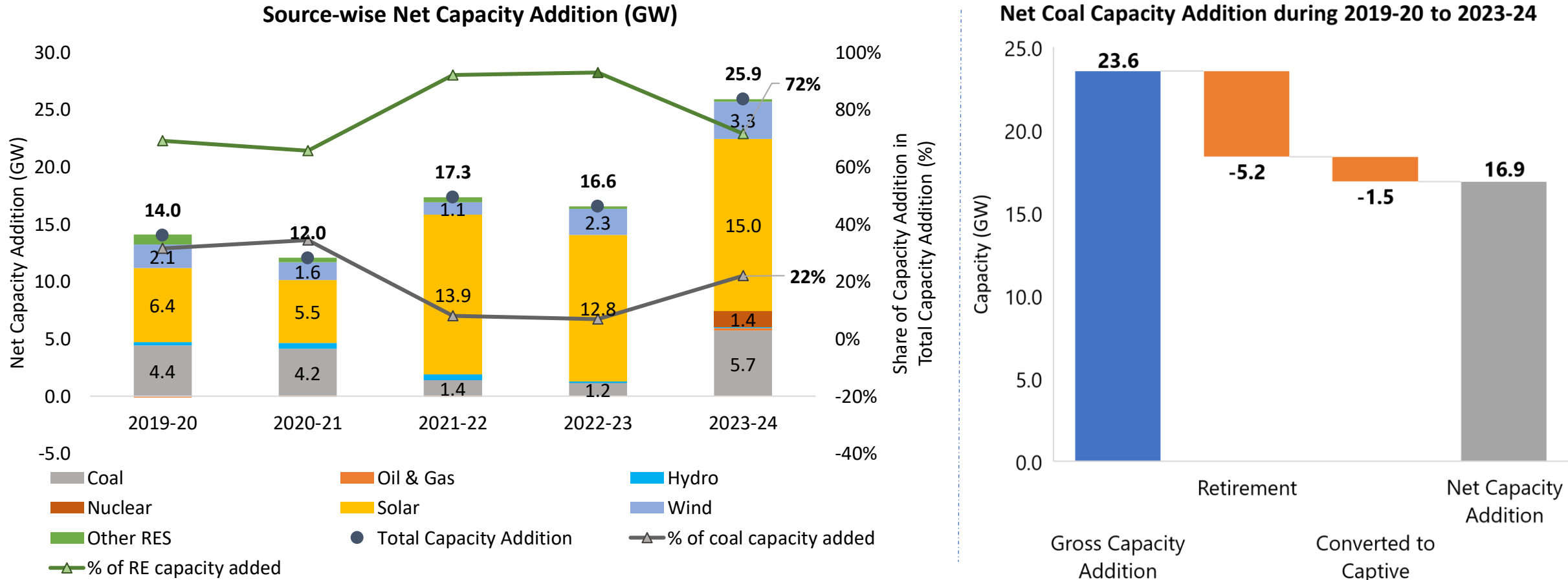
Note: Per Capita energy consumption is calculated on energy supply basis.

India's Electricity Capacity Mix (Utility-scale)



- India's electricity generating capacity is 442 GW as on Mar'2024 [coal 218 GW (49%), solar 82 GW (18%), hydro 47 GW (11%), and wind 46 (10%)].
- As on Mar'2024, the share of non-fossil-based electricity capacity is 45% against the set target of 50% non-fossil capacity by 2030.
- As on Mar'2024, India's renewable energy capacity (including large hydro) stood at 191 GW out of 442 GW.

India's Electricity Capacity Addition in last 5 years



- A total of 68 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 17 GW, mostly in the central sector.

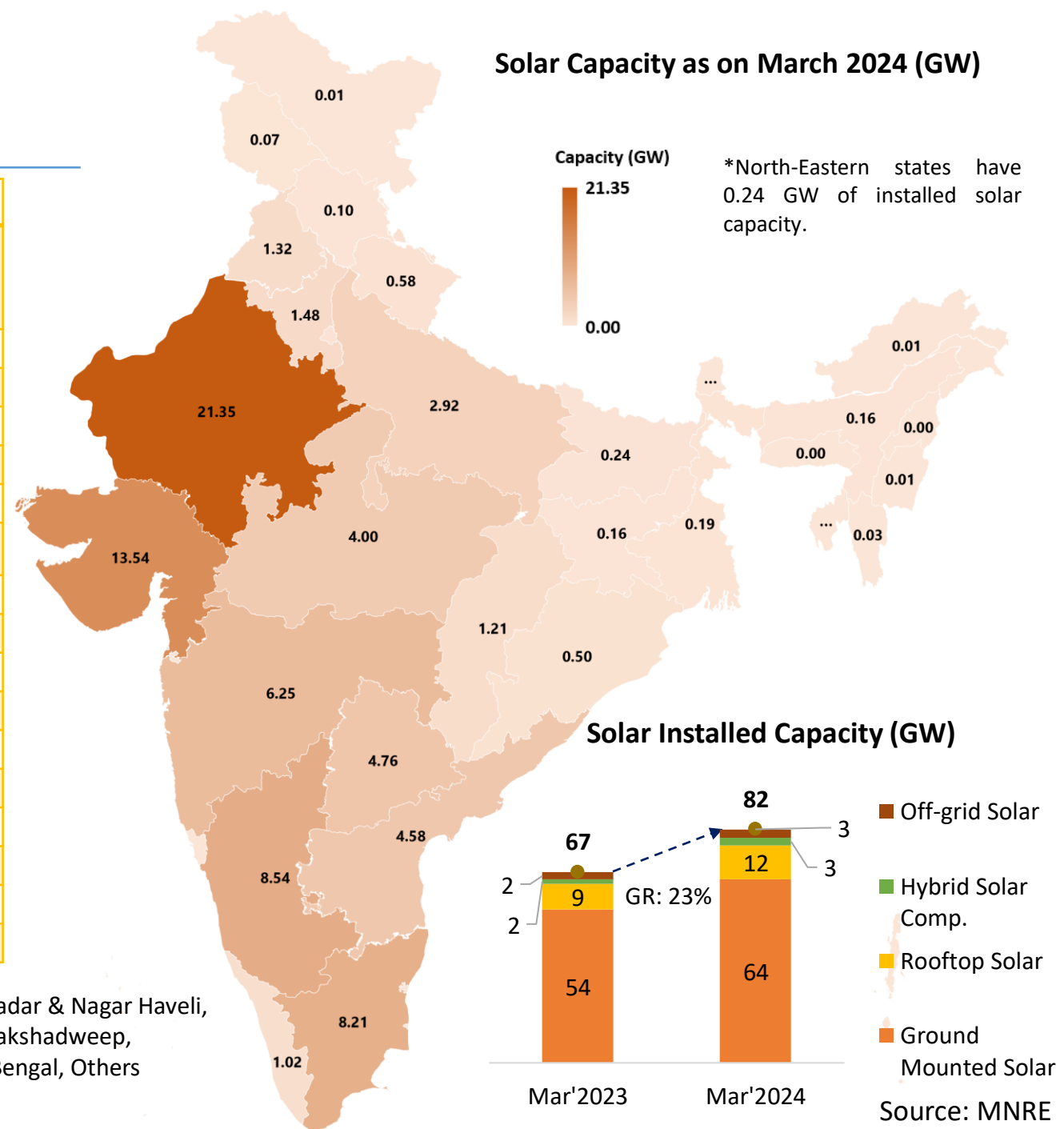
State-wise Solar Capacity

as on March 2024

State-wise installed capacity of Solar Power (GW)					
States	Ground Mounted	Rooftop	Solar Component in Hybrid	Off Grid	Total Solar Power
Rajasthan	17.55	1.15	1.98	0.66	21.35
Gujarat	9.44	3.46	0.59	0.06	13.54
Karnataka	7.92	0.59	0.00	0.03	8.54
Tamil Nadu	7.55	0.60	0.00	0.07	8.21
Maharashtra	3.85	2.07	0.00	0.33	6.25
Telangana	4.36	0.39	0.00	0.01	4.76
Andhra Pradesh	4.30	0.20	0.00	0.09	4.58
Madhya Pradesh	3.55	0.35	0.00	0.10	4.00
Uttar Pradesh	2.44	0.27	0.00	0.22	2.92
Haryana	0.27	0.59	0.00	0.62	1.48
Punjab	0.89	0.36	0.00	0.08	1.32
Chhattisgarh	0.75	0.08	0.00	0.39	1.21
Kerala	0.32	0.68	0.00	0.02	1.02
Uttarakhand	0.30	0.26	0.00	0.01	0.58
Others	0.94	0.84	0.00	0.27	2.05
All India	64.42	11.87	2.57	2.96	81.81

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

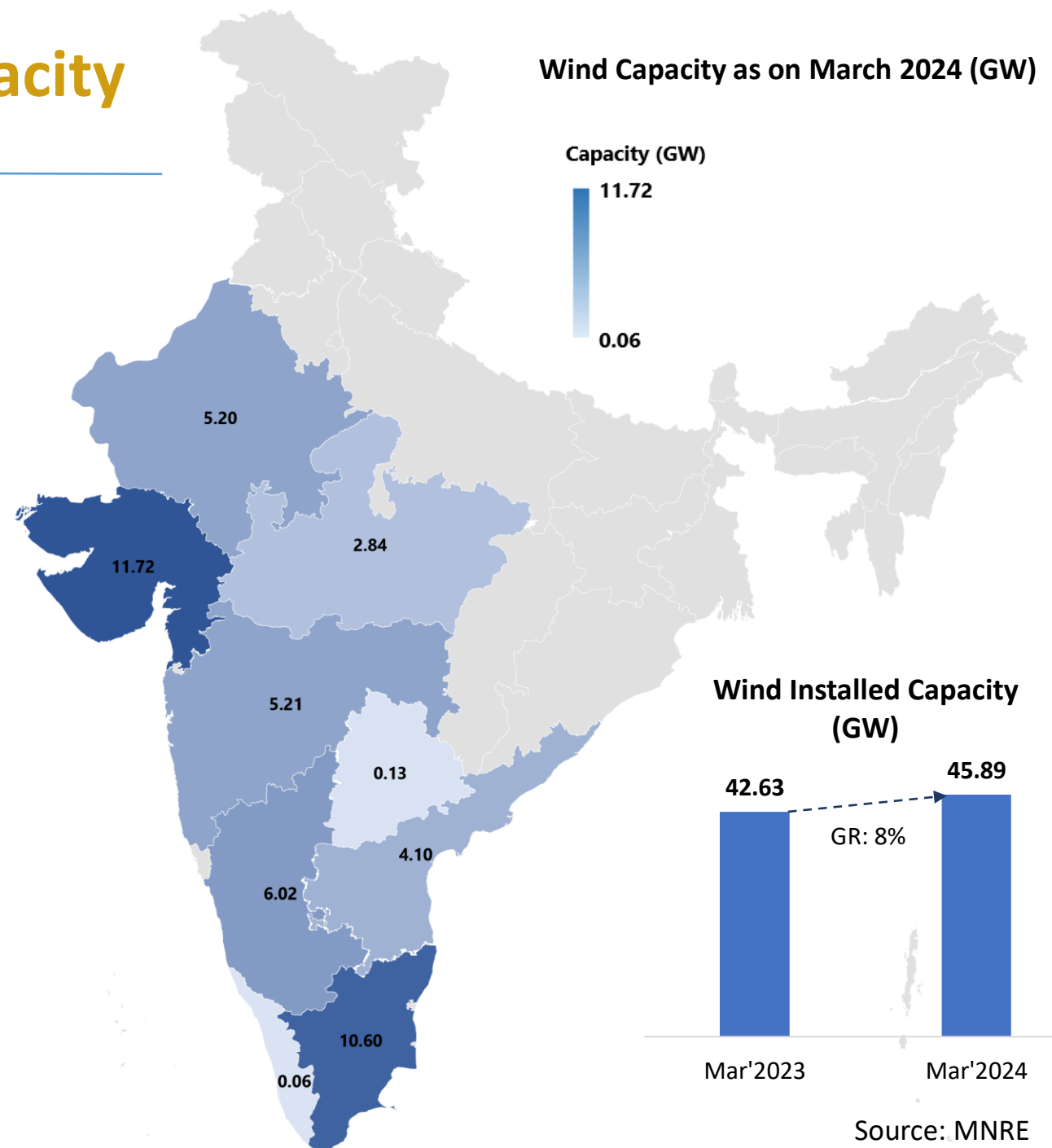
Solar Capacity as on March 2024 (GW)



State-wise Wind Onshore Capacity

as on March 2024


State-wise installed capacity of Wind (Onshore) Power	
States	Installed Capacity (GW)
Gujarat	11.72
Tamil Nadu	10.60
Karnataka	6.02
Maharashtra	5.21
Rajasthan	5.20
Andhra Pradesh	4.10
Madhya Pradesh	2.84
Telangana	0.13
Kerala	0.06
India Total	45.89

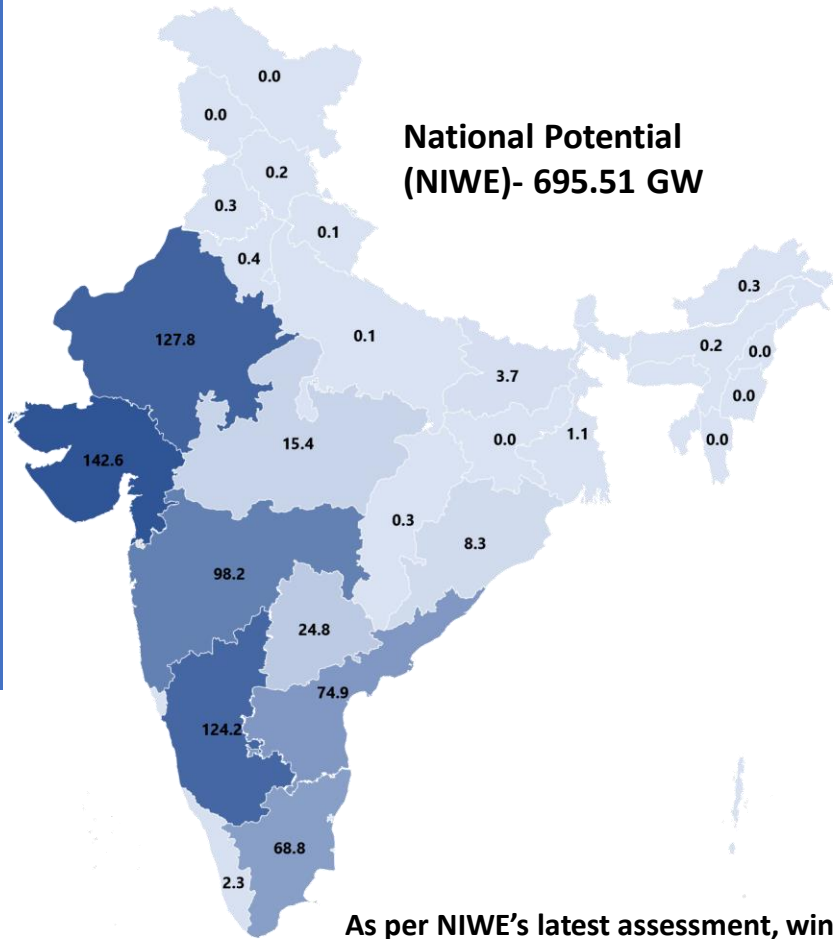


RE Potential and Installed Capacity (1/2)

RE potential in the state

Wind Onshore Potential at 120m agl


State Potential (GW)  0.0 142.6

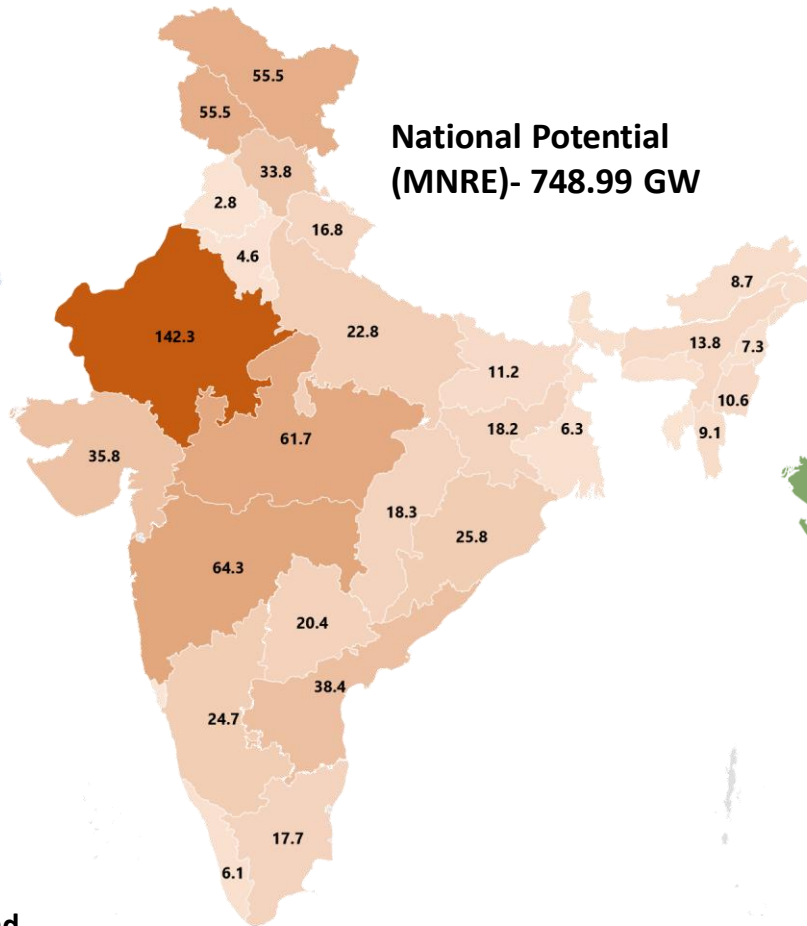


National Potential (NIWE)- 695.51 GW

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

Solar Potential


State Potential (GW)  0.9 142.3

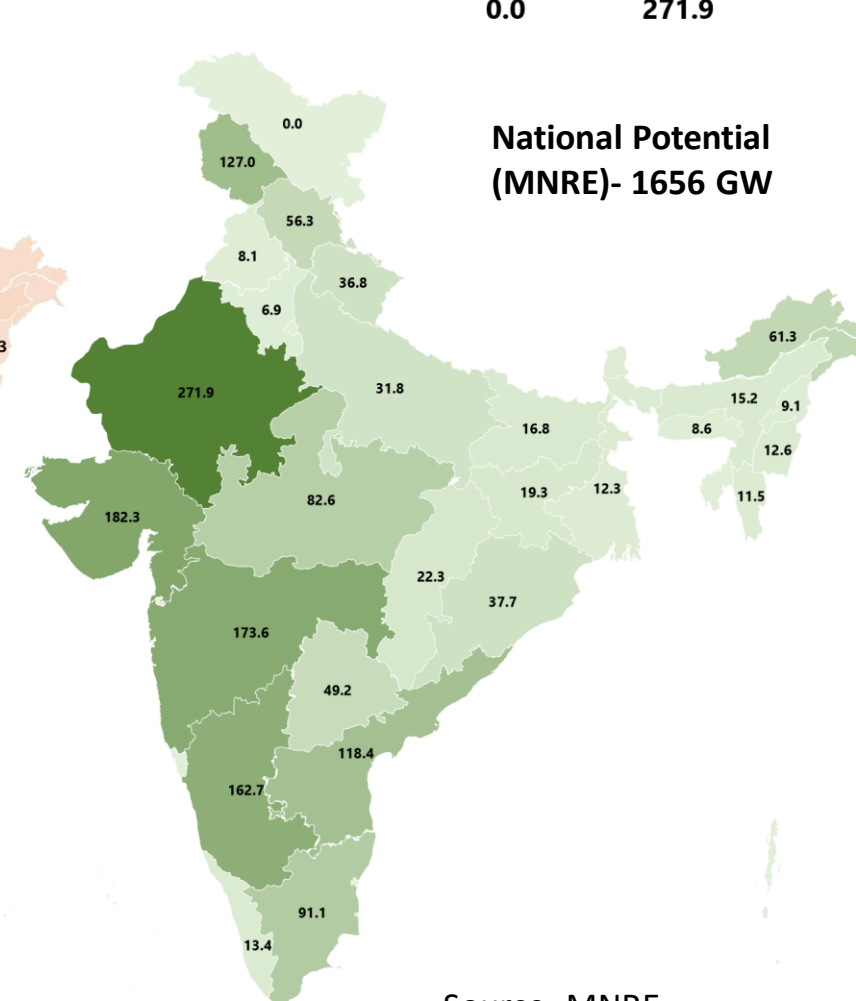


National Potential (MNRE)- 748.99 GW

Market potential for SPV rooftop is 124 GW.

Renewable Energy Potential (all sources including large Hydro)

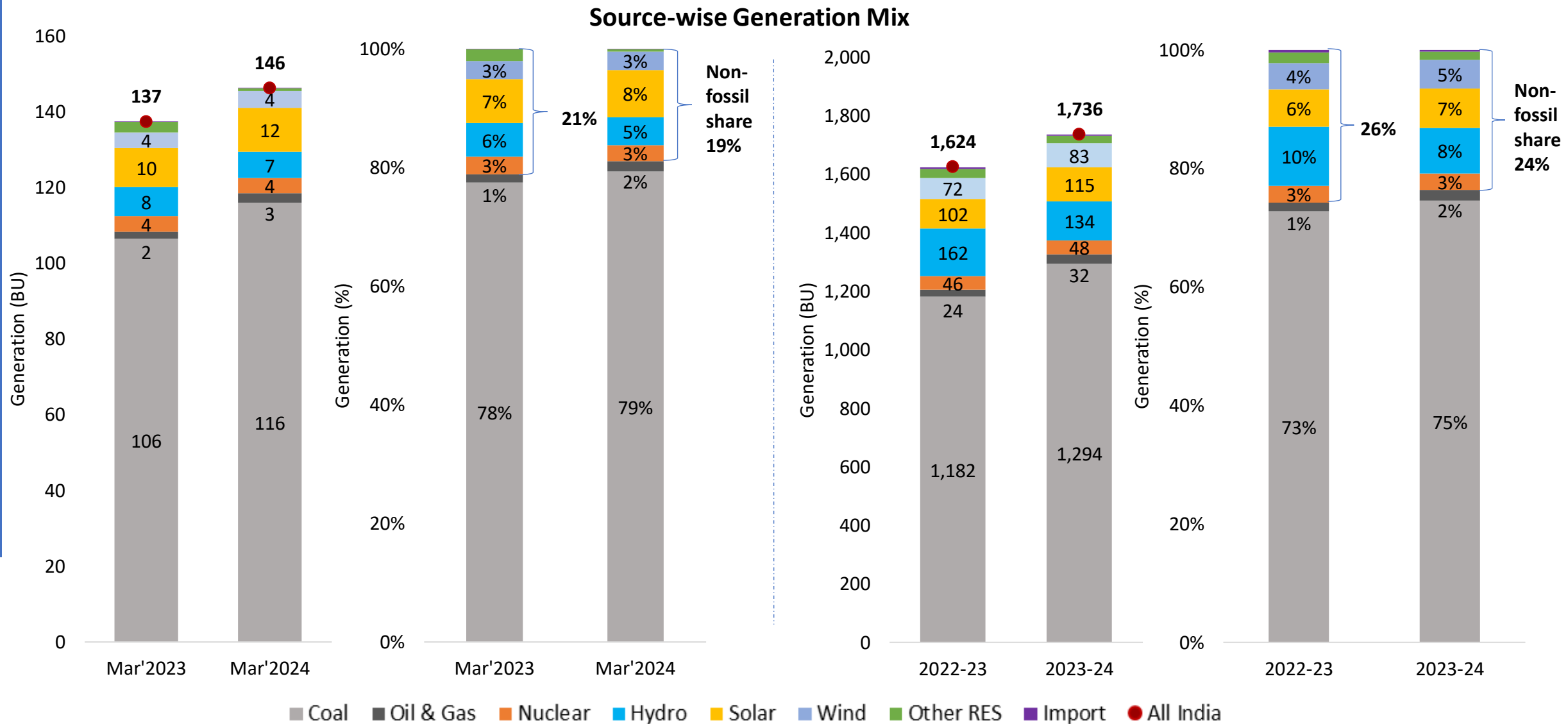
State Potential (GW)  0.0 271.9



National Potential (MNRE)- 1656 GW

Source- MNRE

India's Electricity Generation Mix

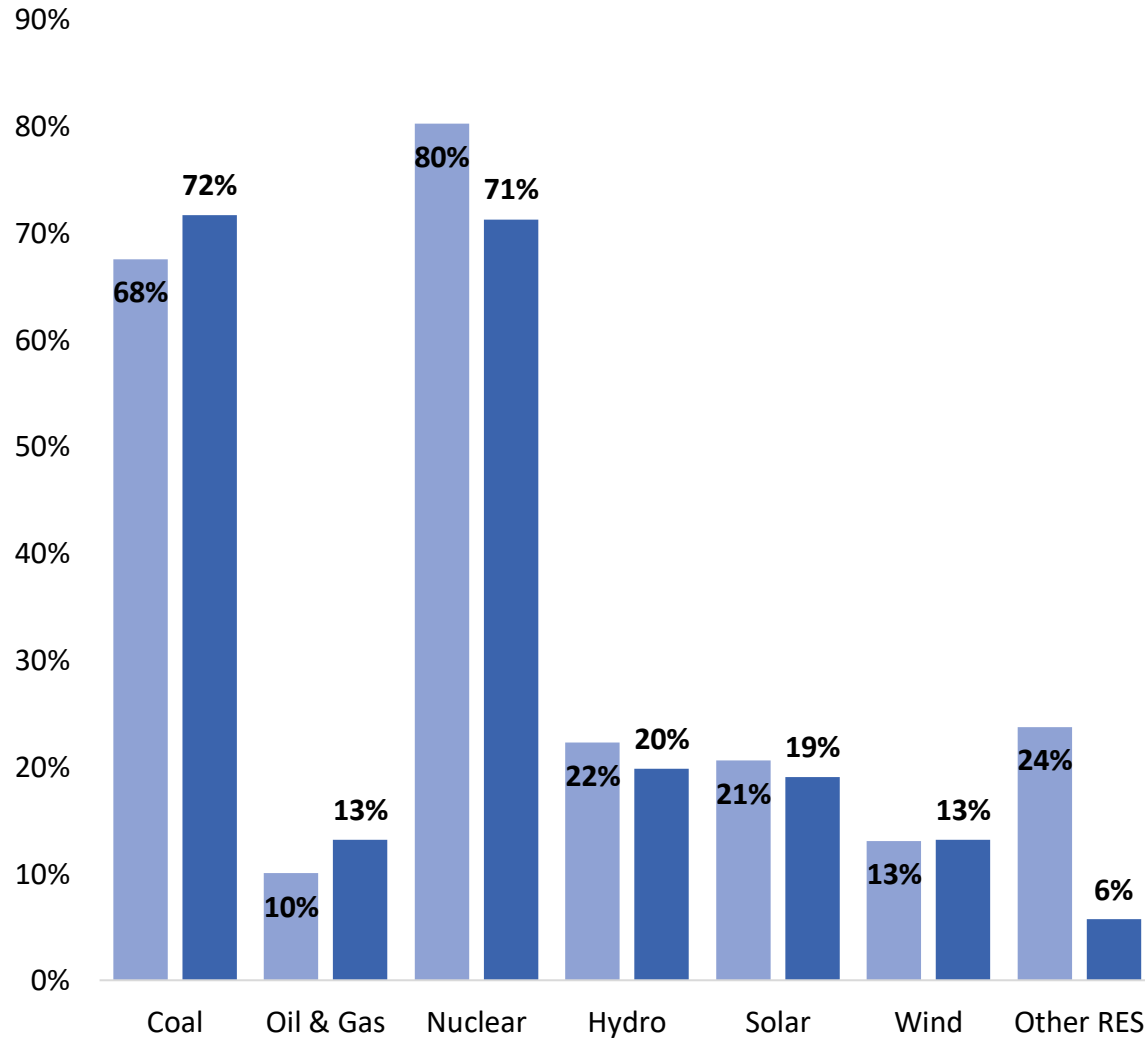


NOTE: The generation data for Mar'2024 is provisional.

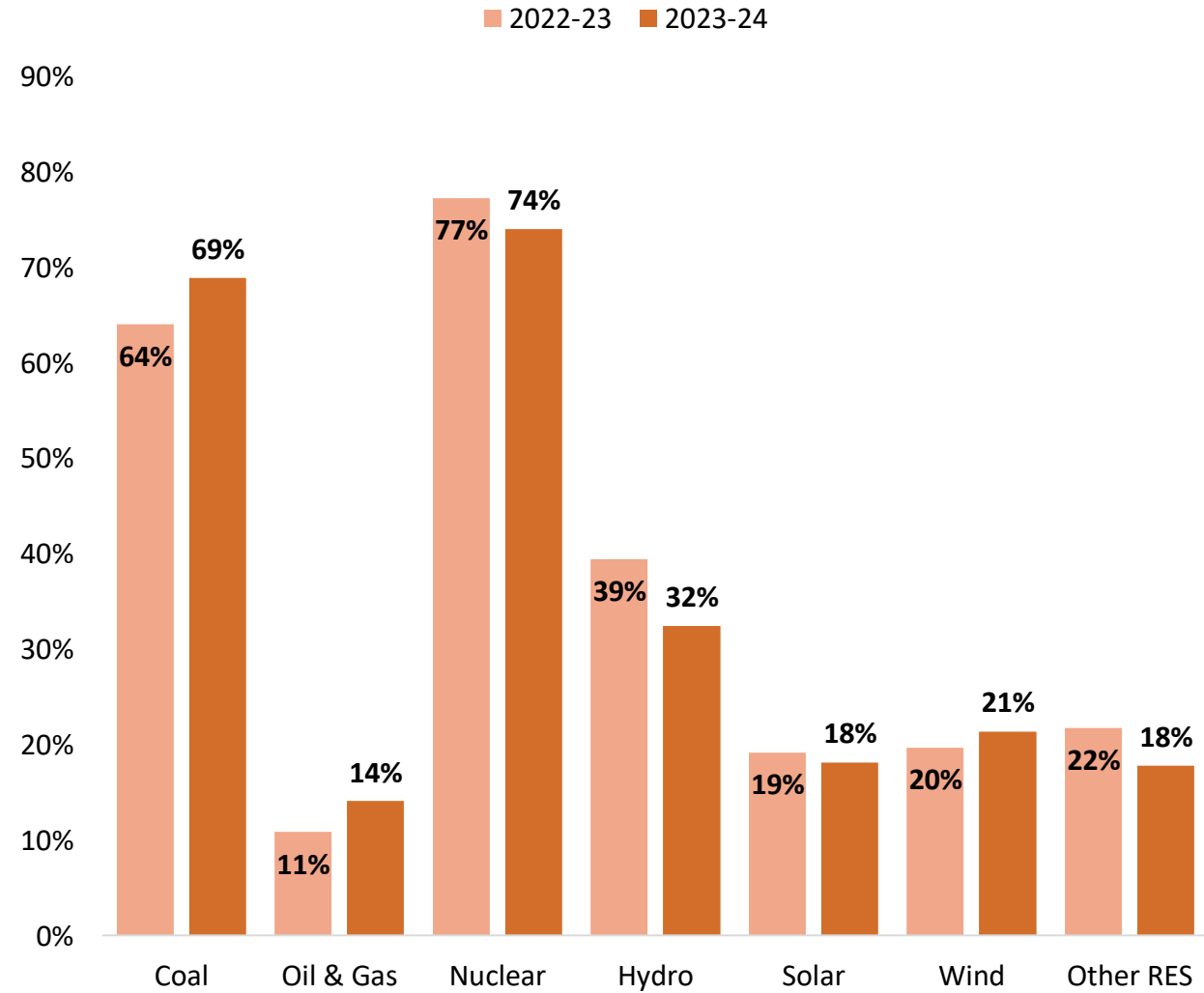
Source: CEA

Source-wise PLF/CUF

Source-wise PLF/ CUF in March (%)



Source-wise PLF/ CUF Comparison (%)

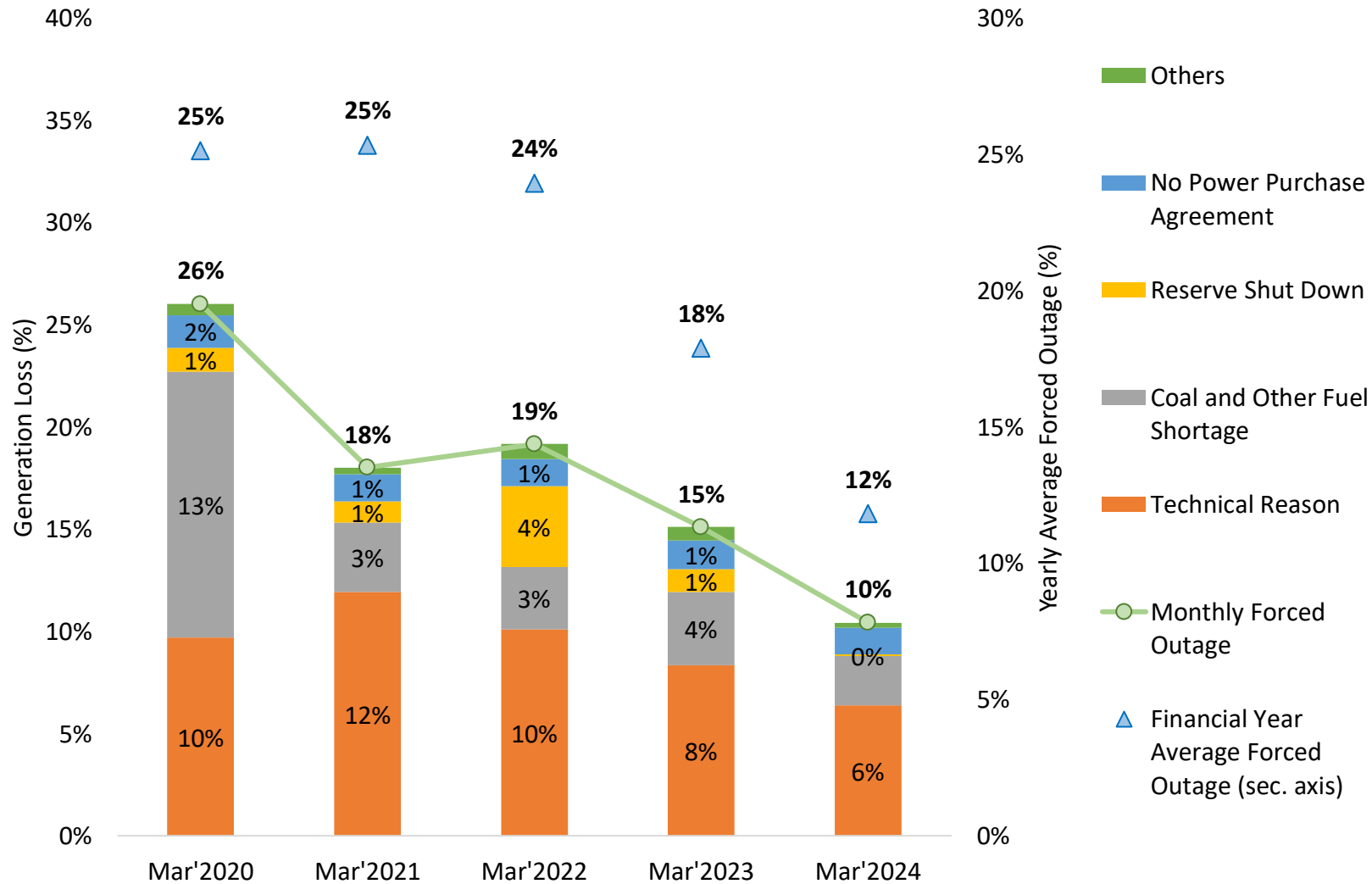


NOTE: The PLF/CUF data is based on provisional generation for Mar'2024.

Source: CEA & MNRE

Thermal Generation Loss and Reasons for Forced Outages

Forced Outages for March over the years



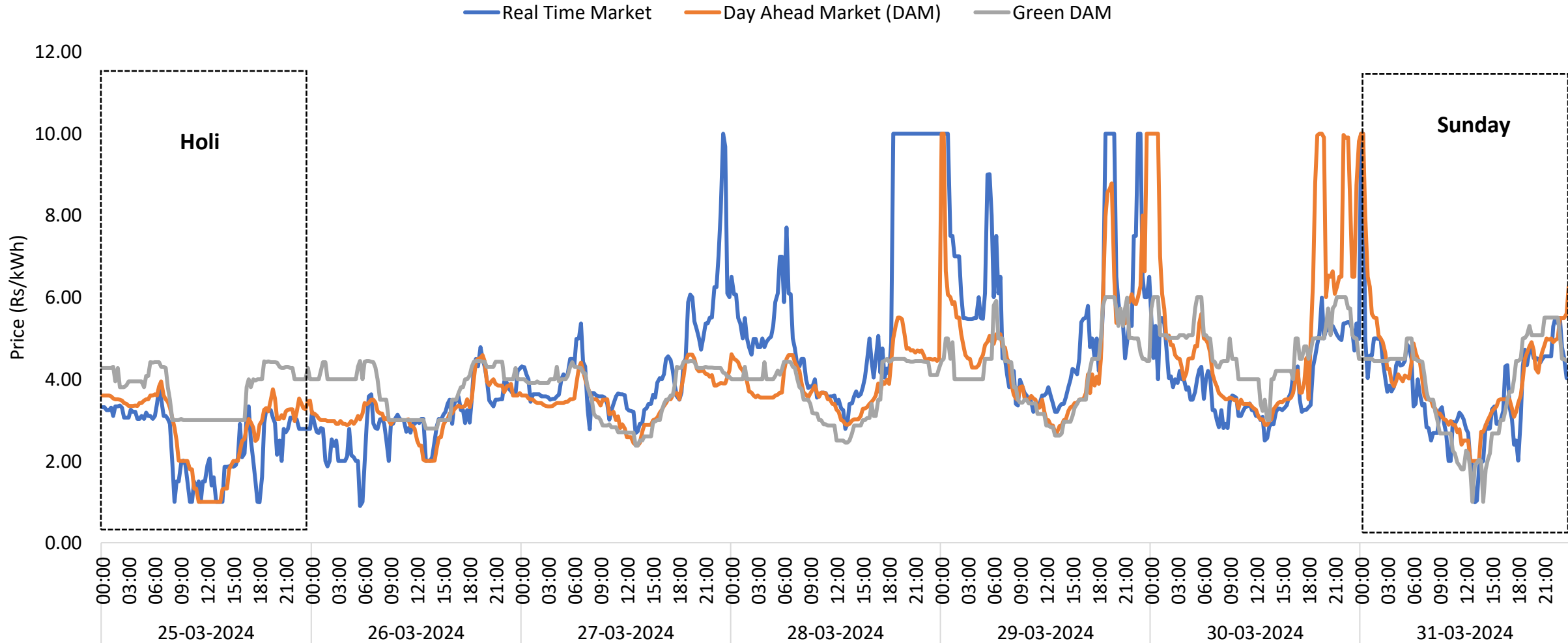
Year/ Month		Average Forced Outage Share
Yearly	FY 2021-22	24%
	FY 2022-23	18%
	FY 2023-24	12%
Monthly	Mar'2022	19%
	Mar'2023	15%
	Mar'2024	10%

Thermal includes only Coal and Lignite Plants.

Source: ICED

Indian Electricity Exchange (IEX) Market Snapshot

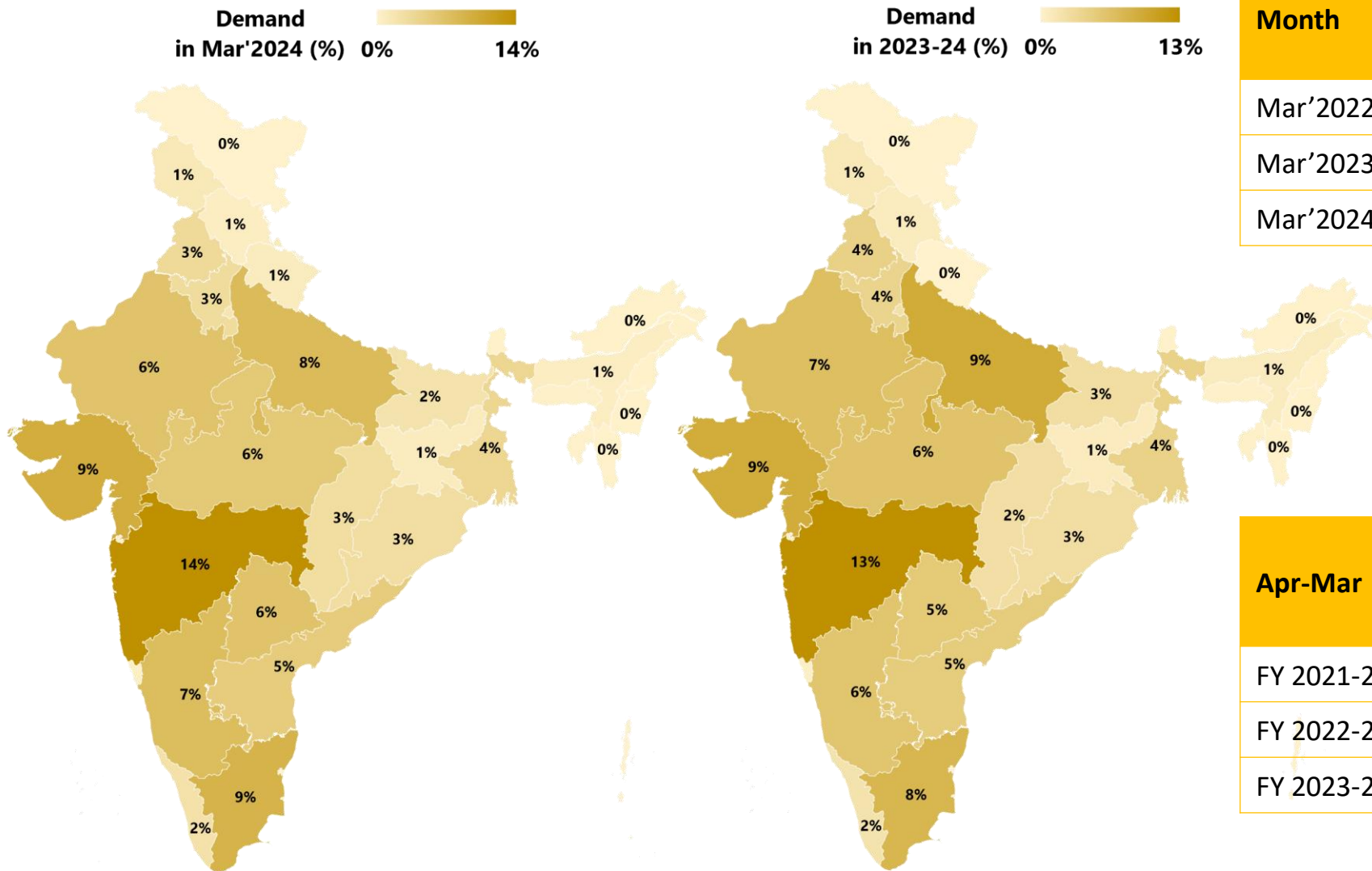
Market Clearing Prices of last 7 days of March 2024



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) (+/-)
Mar'2022	129	128	0.7
Mar'2023	128	128	0.2
Mar'2024	139	139	0.1

Apr-Mar	Electricity Demand (BU)	Electricity Supply (BU)	Gap (BU) (+/-)
FY 2021-22	1380	1374	6
FY 2022-23	1513	1506	8
FY 2023-24	1627	1623	4

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

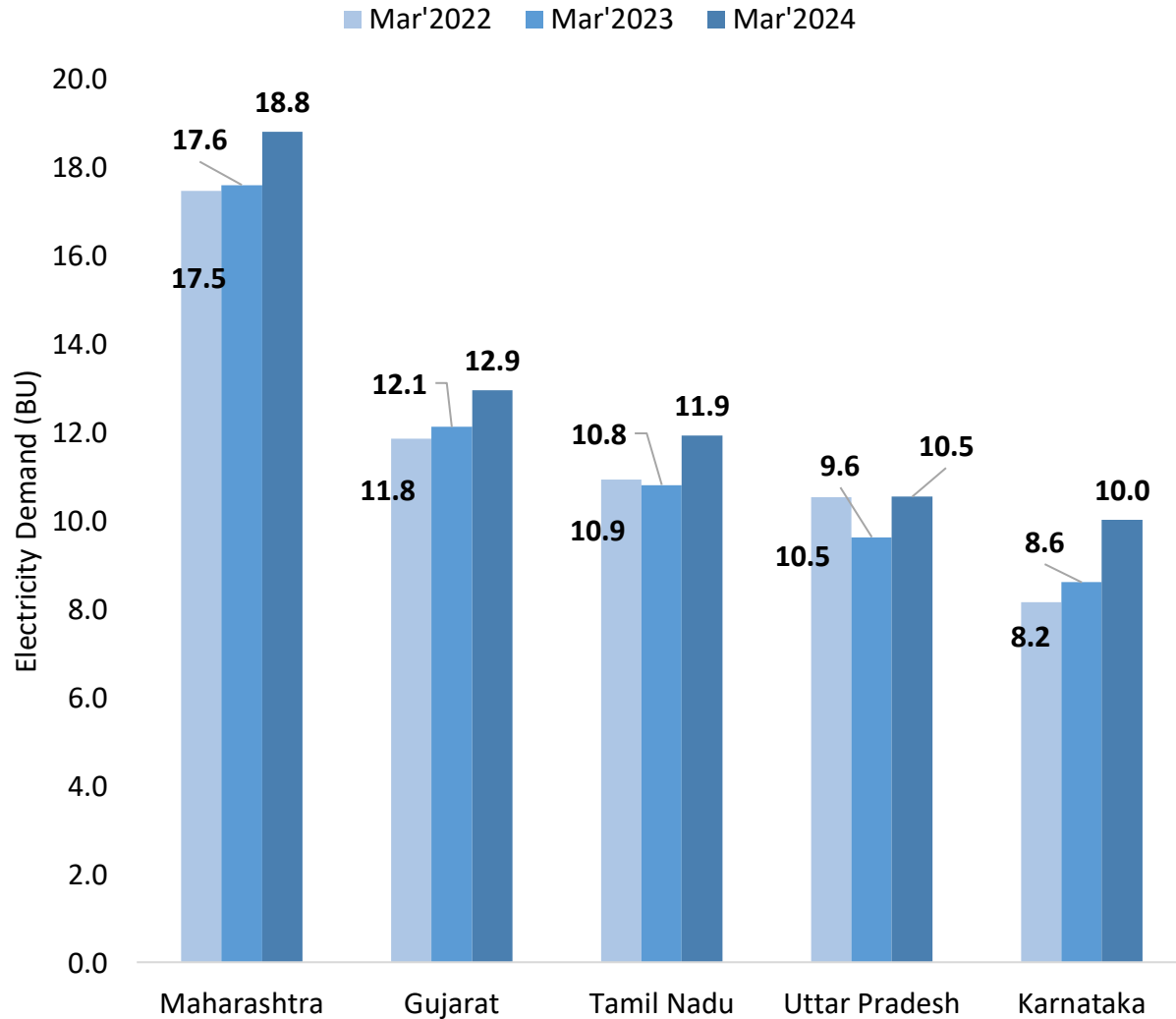
Source: CEA

India's Monthly Electricity Requirement and Supply

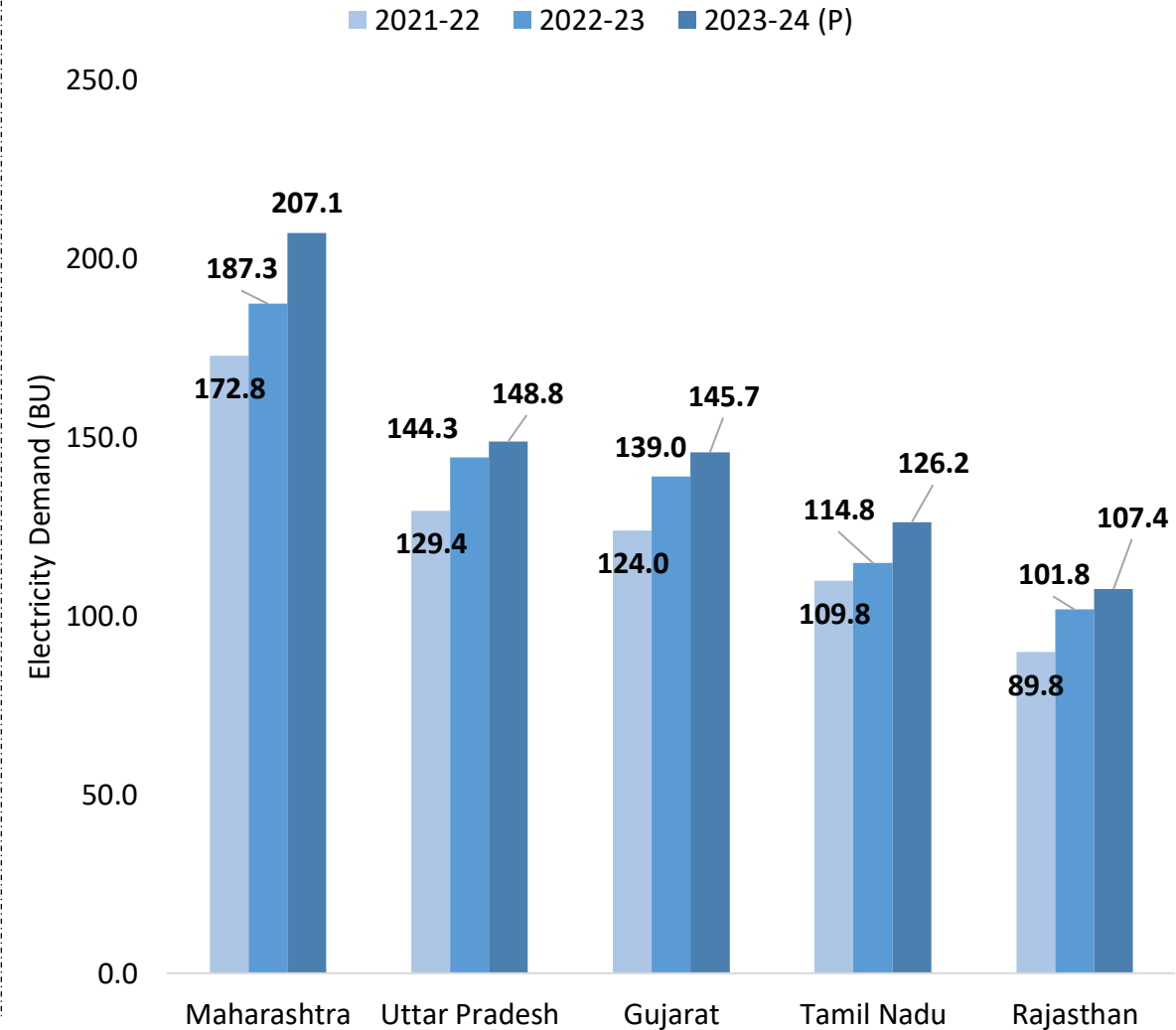


Monthly Electricity Demand of the top 5 states

States with Highest Electricity Demand in March (BU)



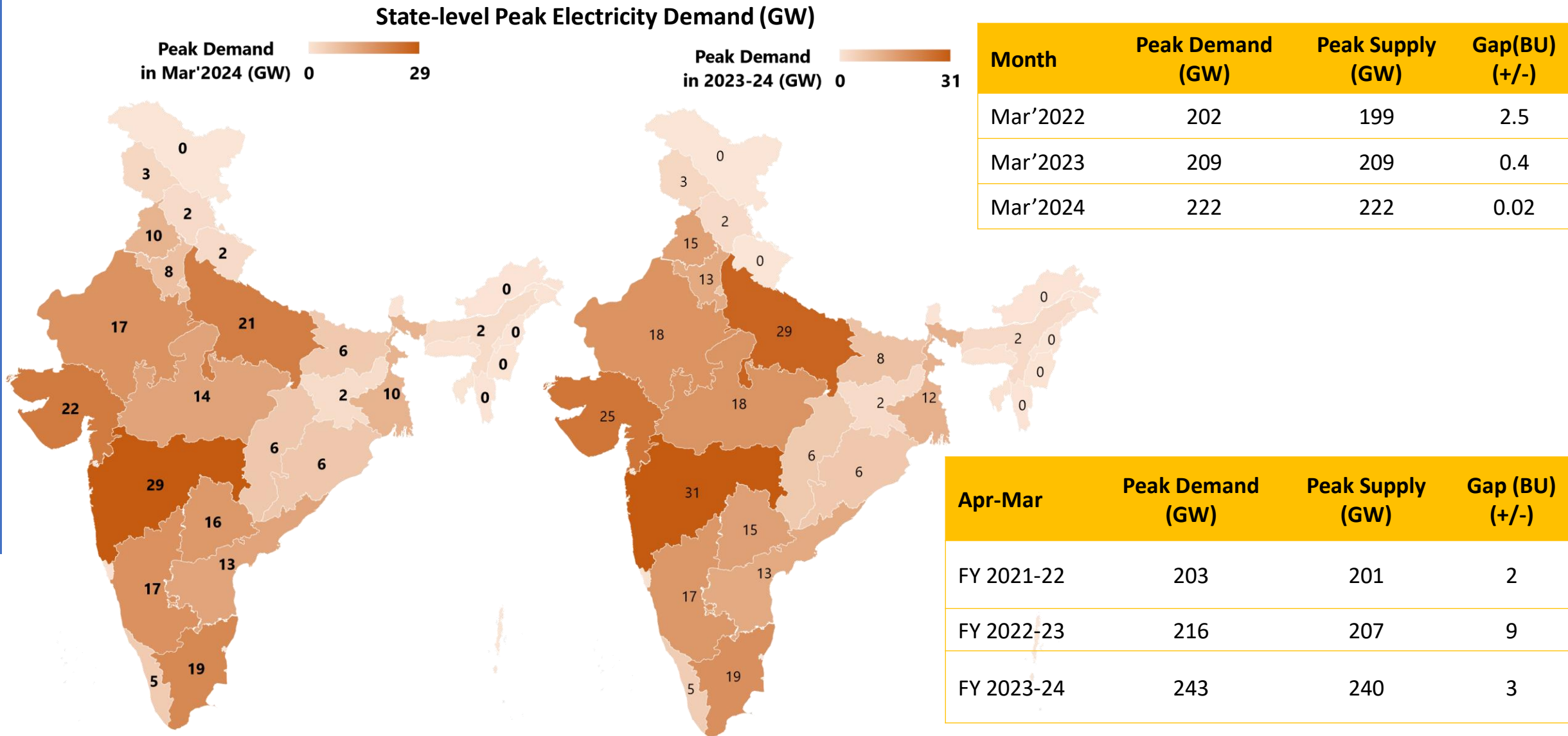
States with Highest Electricity Demand (BU)



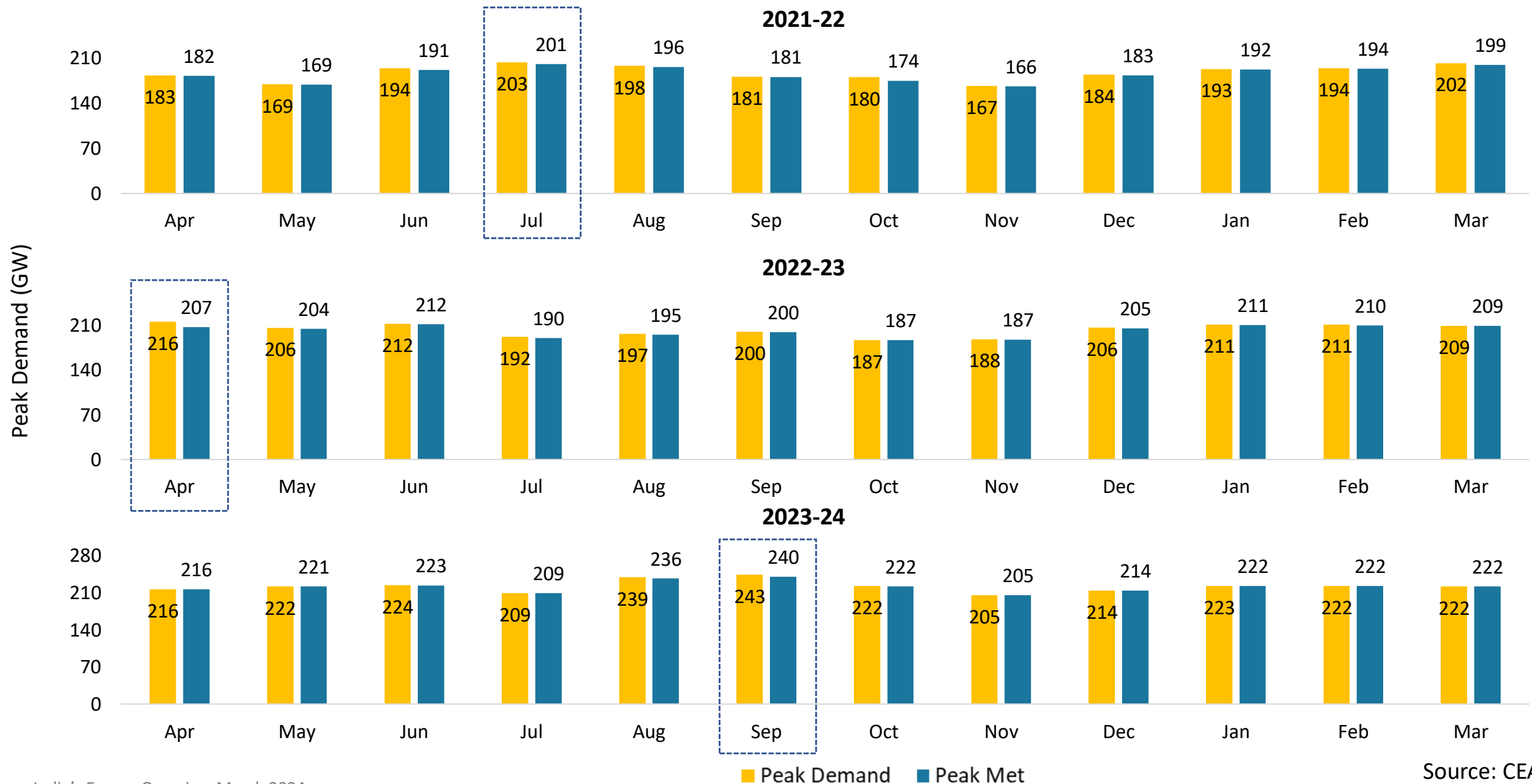
Note: P is Provisional

Source: CEA

National and State level Peak Electricity Demand

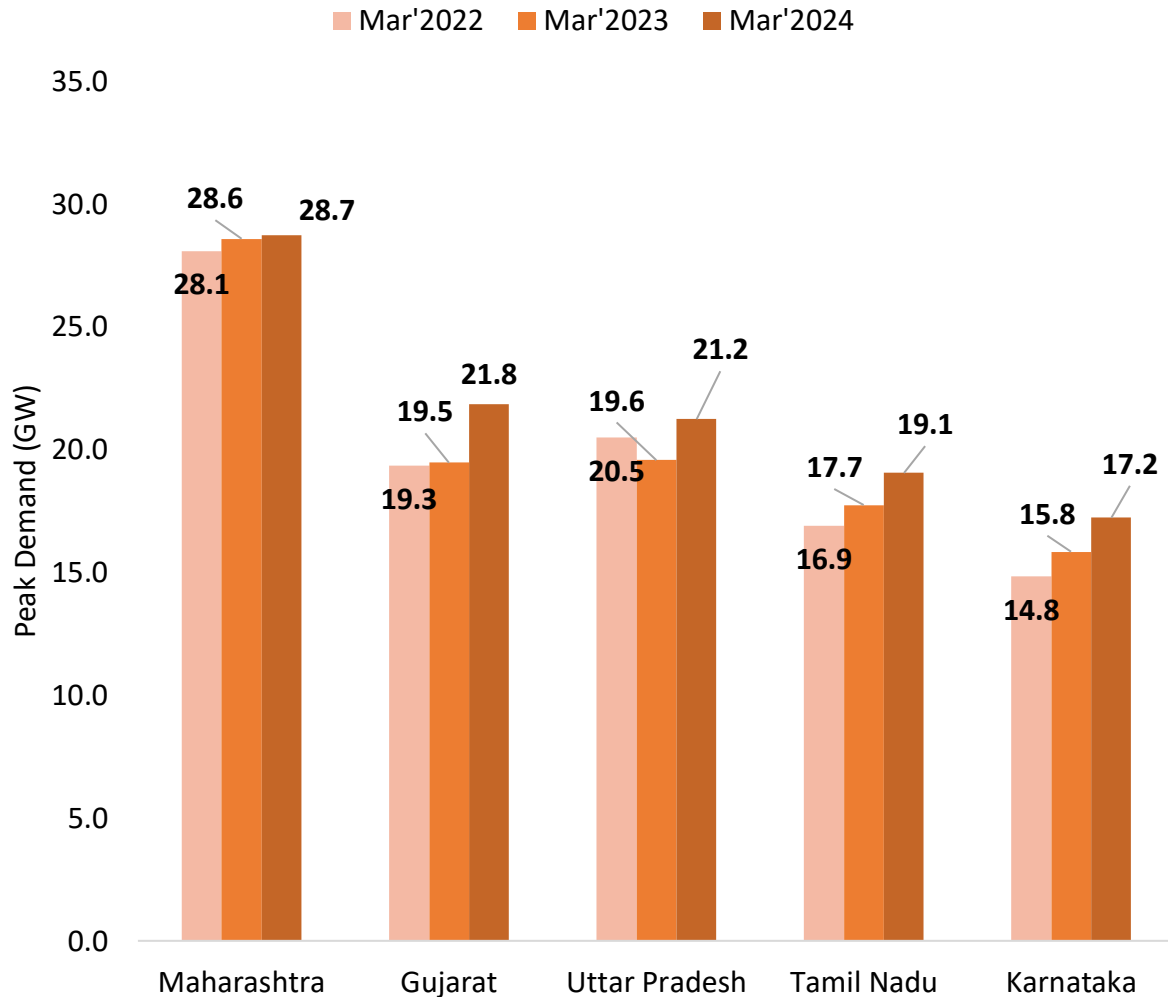


India's Monthly Peak Electricity Demand and Supply

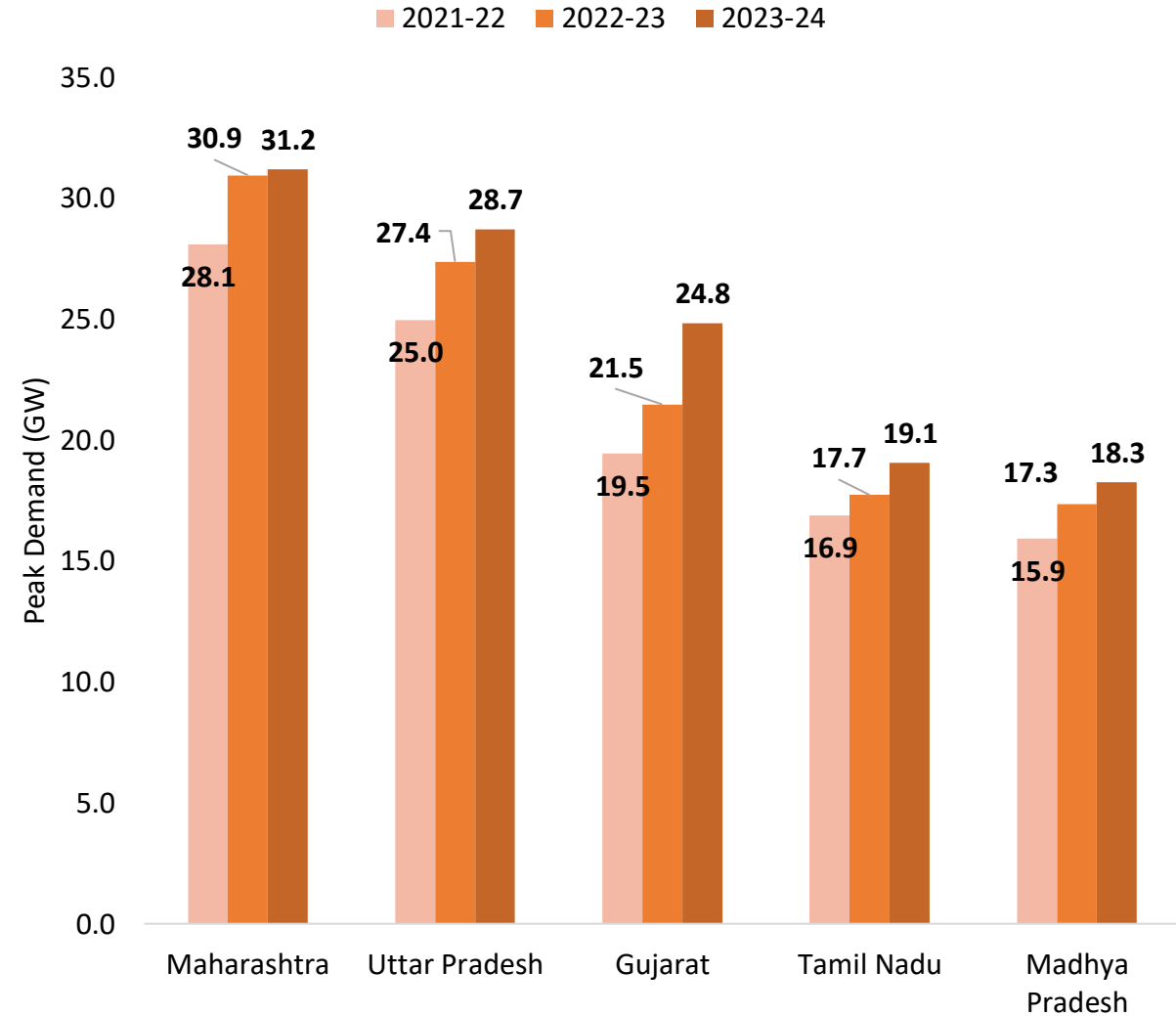


Monthly Peak Electricity Demand of the top 5 states

States with Highest Peak Electricity Demand in March (GW)

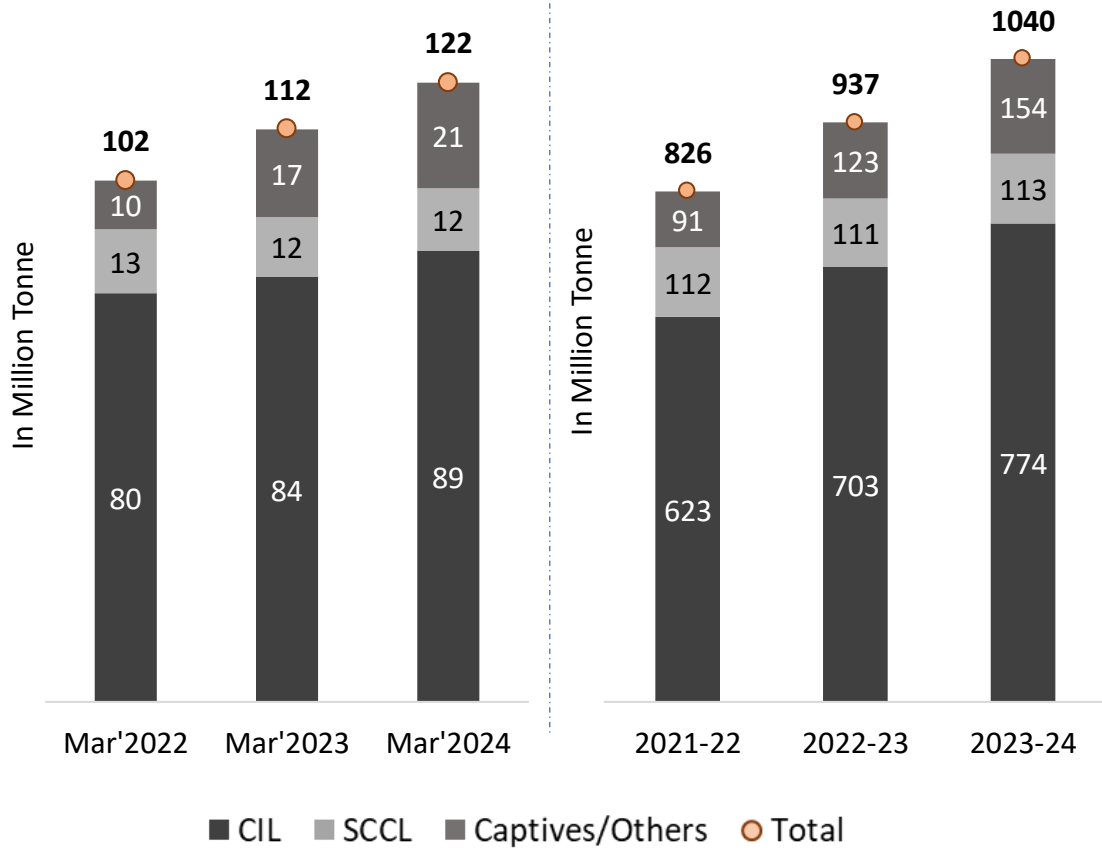


States with Highest Peak Electricity Demand (GW)



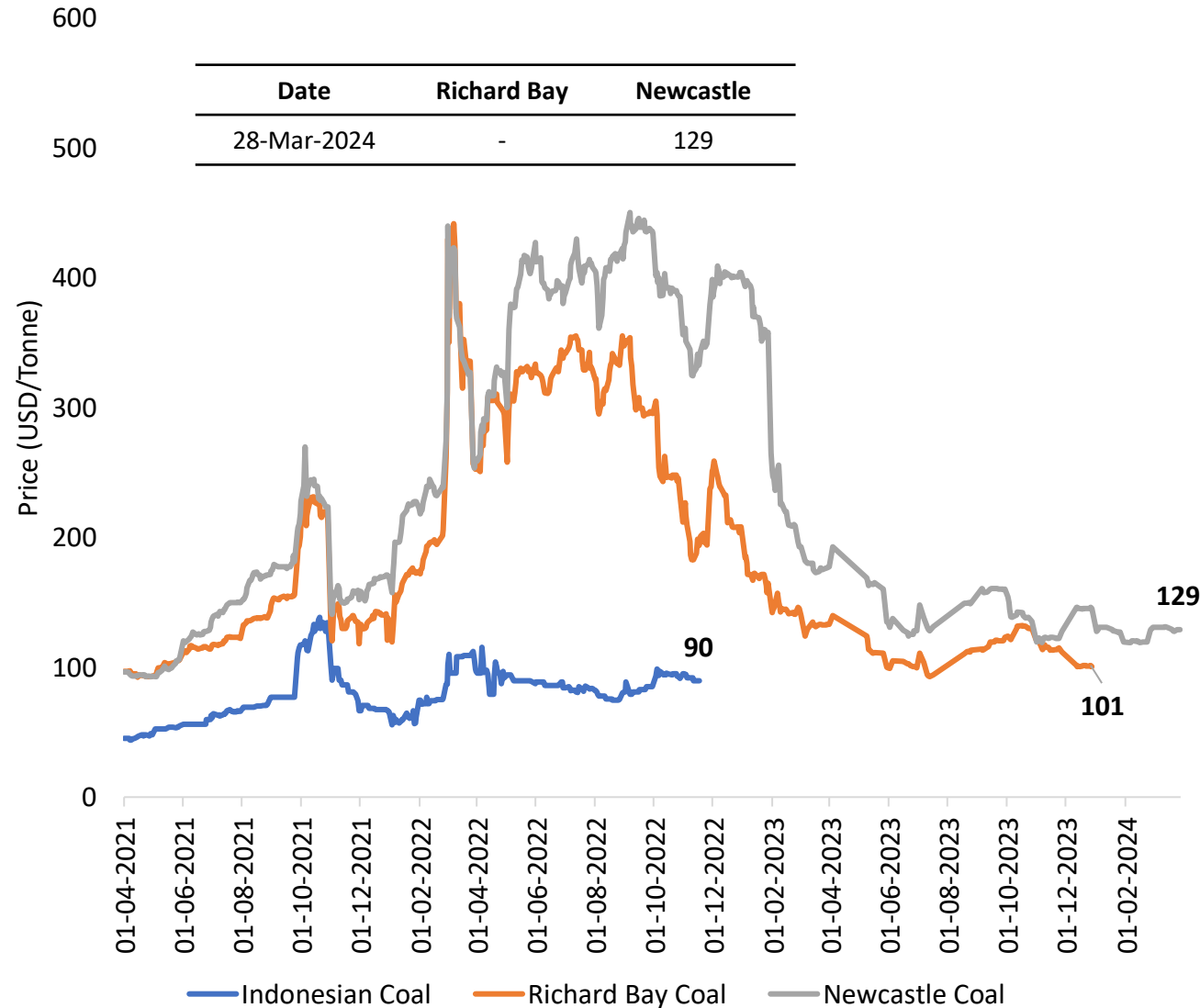
Monthly Coal Statistics

Monthly/ Annual Coal Production (in Million Tonnes)



India's coal production increased in Mar'2024 (122 MT) by 8% as compared to Mar'2023 (112 MT).

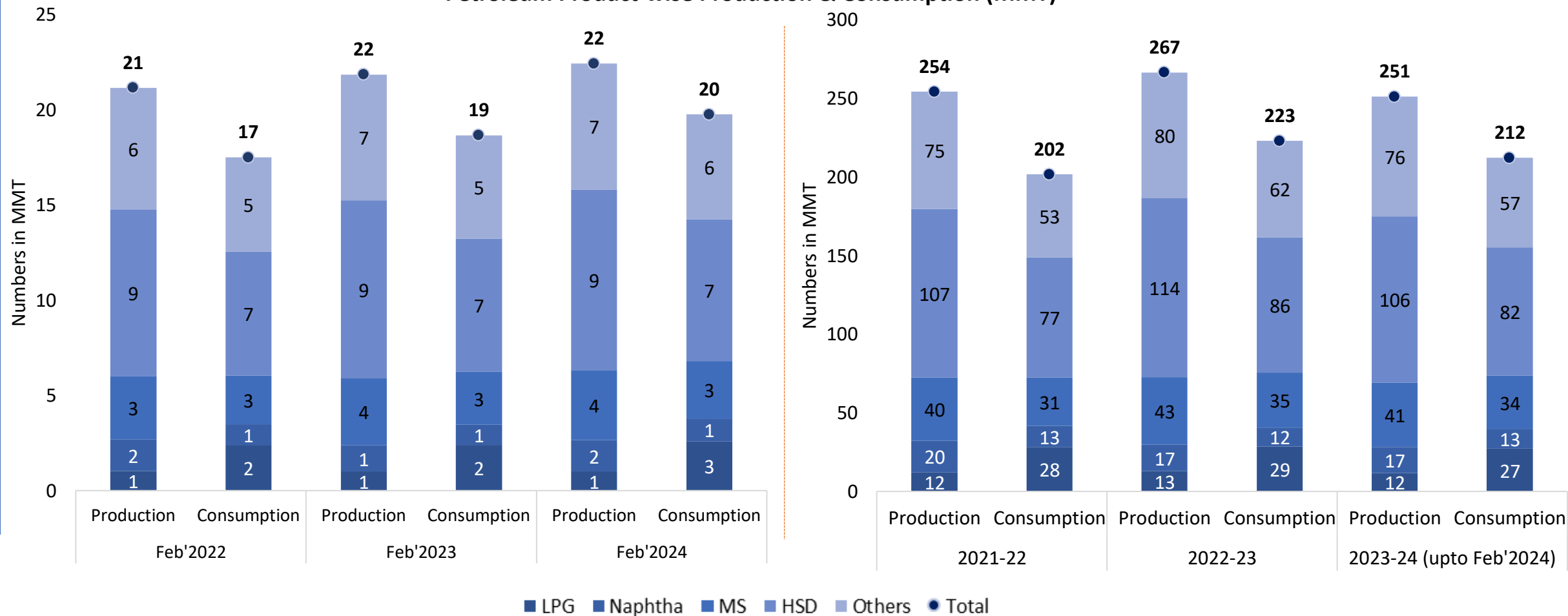
International Coal Prices



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)

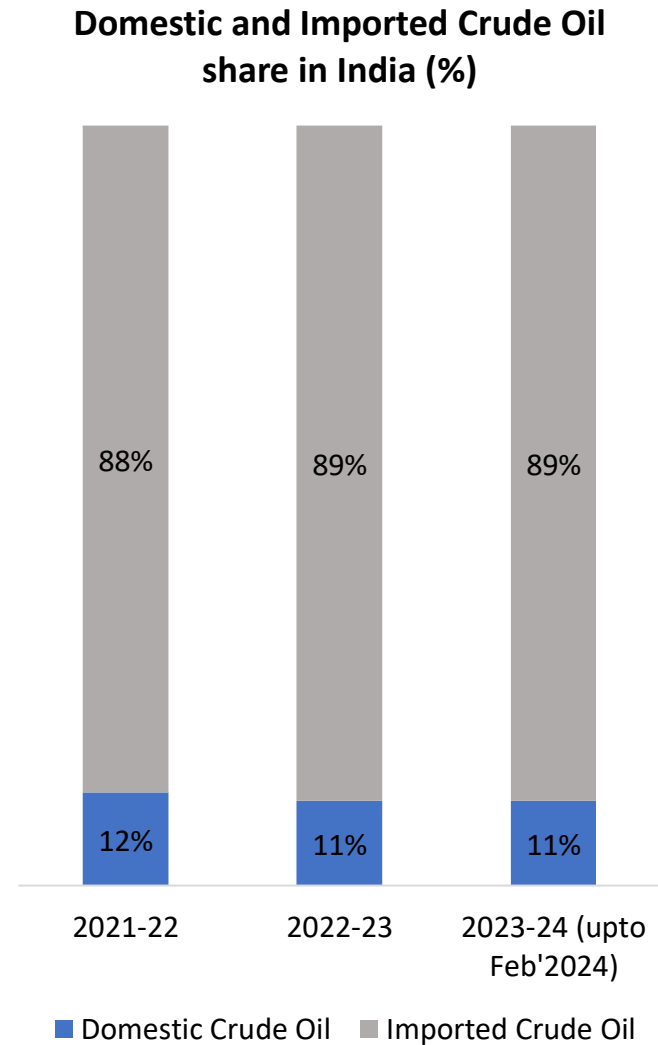
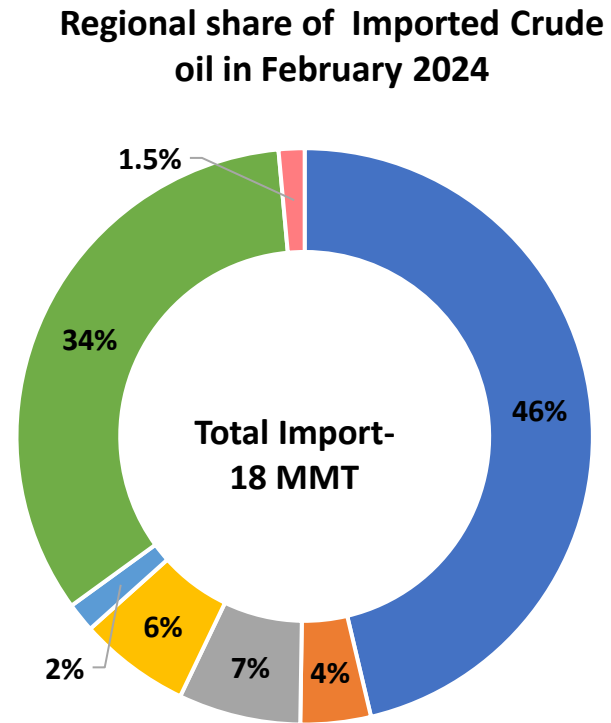
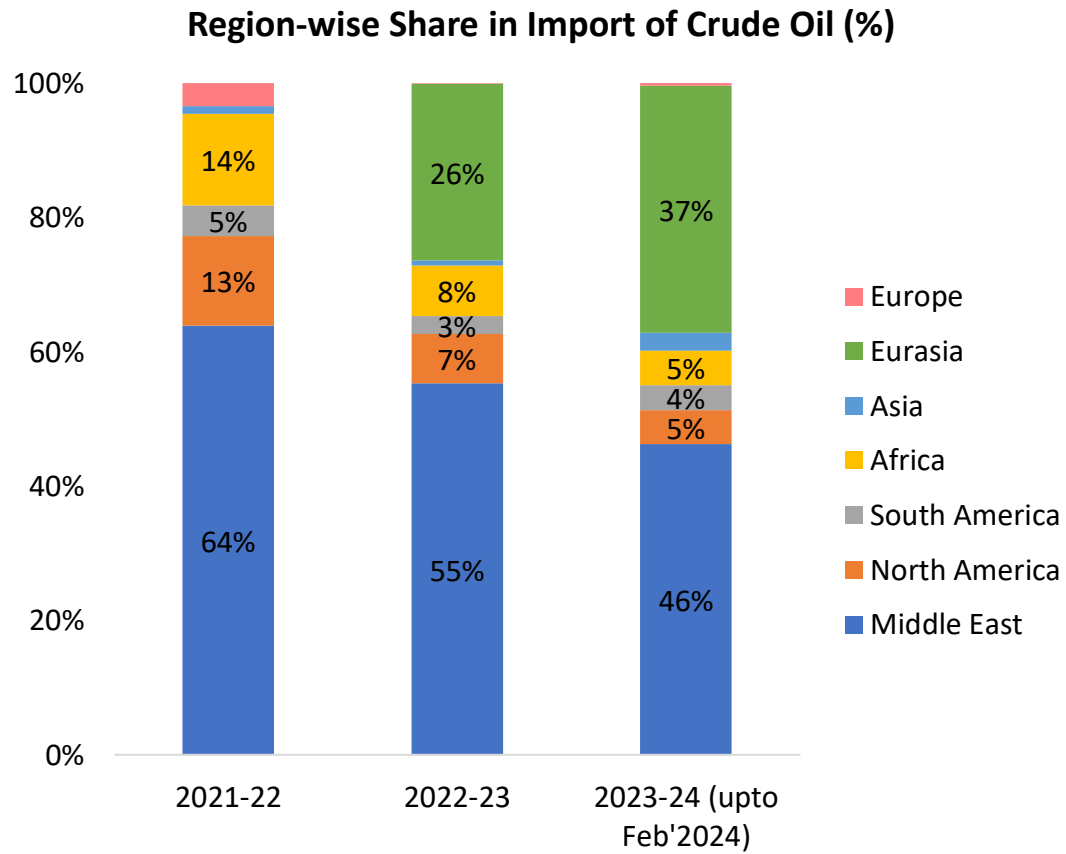
Import/Export of Crude Oil and Petroleum Products ('000 Tonnes)							
Petroleum Products	Import/ Export	Monthly			Yearly		
		Feb'22	Feb'23	Feb'24	2021-22	2022-23	2023-24 (up to Feb'2024)
Crude Oil	Import	17589	19285	18016	212382	232700	212581
	Export	0	0	0	0	0	0
	Net Import	17589	19285	18016	212382	232700	212581
LPG	Import	1249	1647	1735	17043	18335	16872
	Export	45	43	45	513	540	477
	Net Import	1204	1604	1691	16530	17796	16394
Diesel	Import	5	10	4	43	322	34
	Export	2415	2151	2399	32407	28494	25760
	Net Import	-2409	-2141	-2395	-32364	-28172	-25725
Petrol	Import	0	0	0	671	1069	717
	Export	1217	1379	1256	13482	13127	12123
	Net Import	-1217	-1379	-1256	-12812	-12058	-11406
Others	Import	1944	2062	2302	21259	24871	26153
	Export	1178	1485	1616	16352	18854	18417
	Net Import	766	576	685	4907	6017	7736

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

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

Source: PPAC

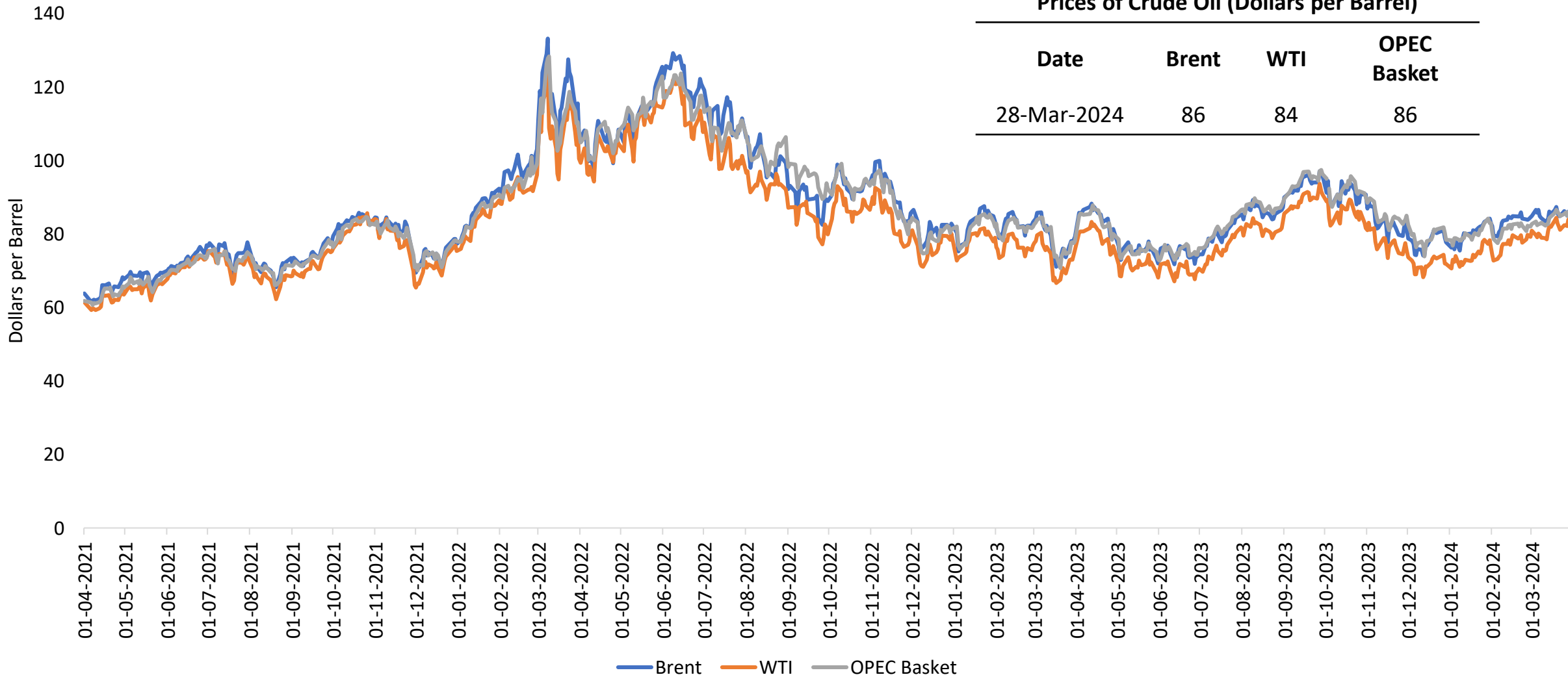
Petroleum Products Market Scenario (3/3)



Total Import of Crude Oil (MMT)			
Total Import	2021-22	2022-23	2023-24 (up to Feb'2024)
Crude Oil	212	233	213

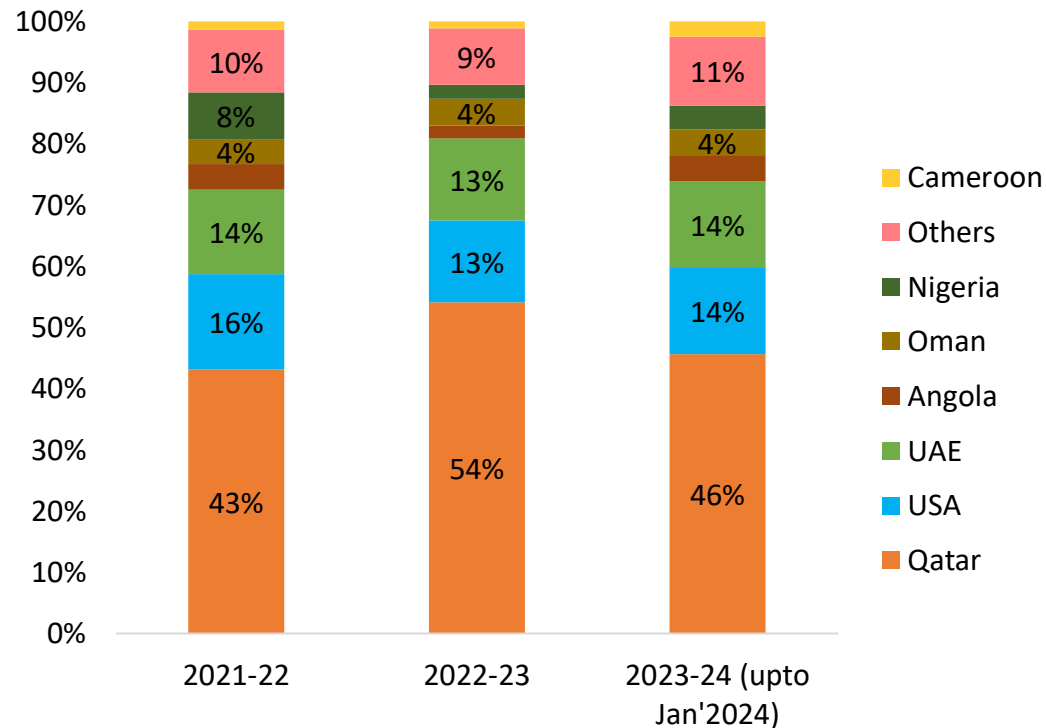
Daily Prices of Crude Oil

Daily Prices of Crude Oil

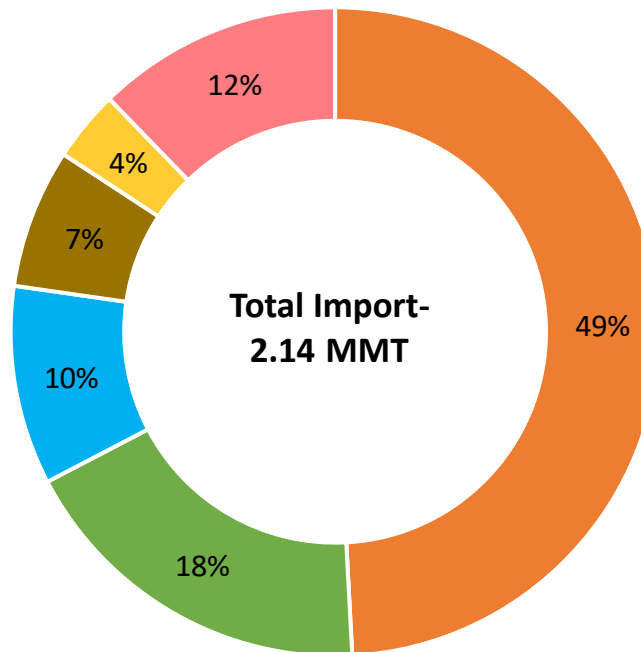


Gas Market Scenario

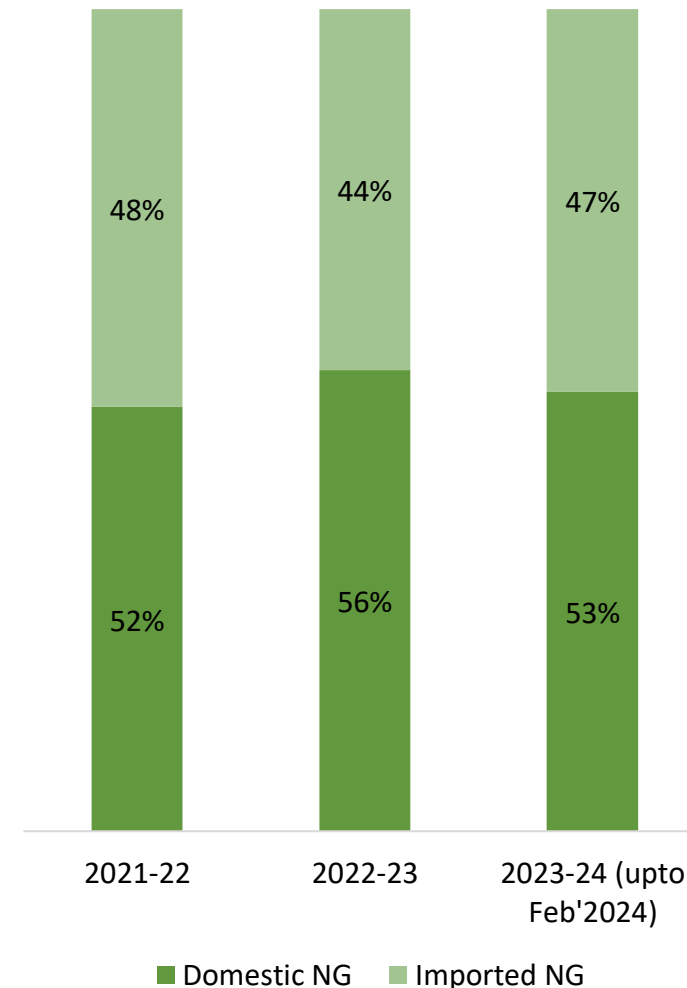
Region-wise Share in Import of LNG (%)



Country Share of Imported LNG in January'2024



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.

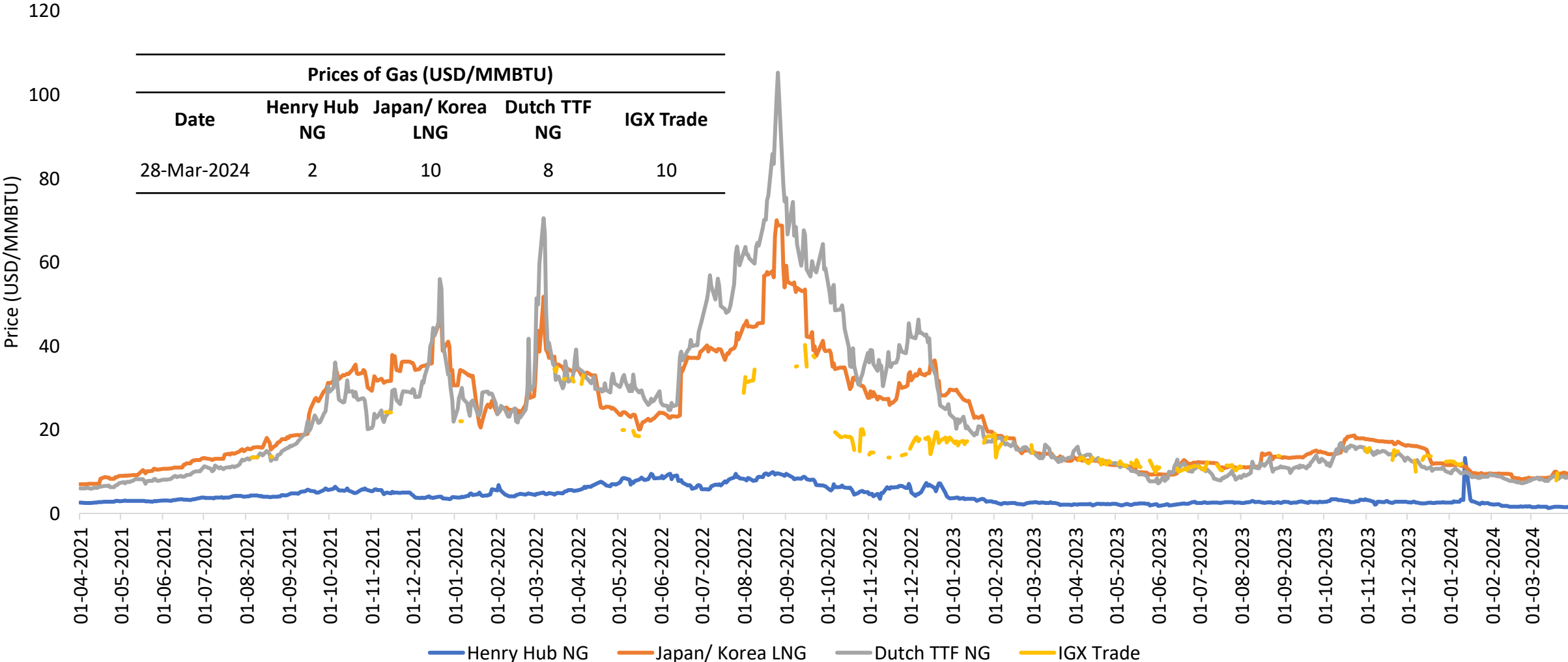
Total Import of Liquefied Natural Gas (LNG) (MMT)			
Total Import	2021-22	2022-23	2023-24 (upto Feb'2024)
LNG	23.42	19.85	21.43

NOTE: The data is latest available

Source: MoCI and PPAC

Daily Prices of Gas

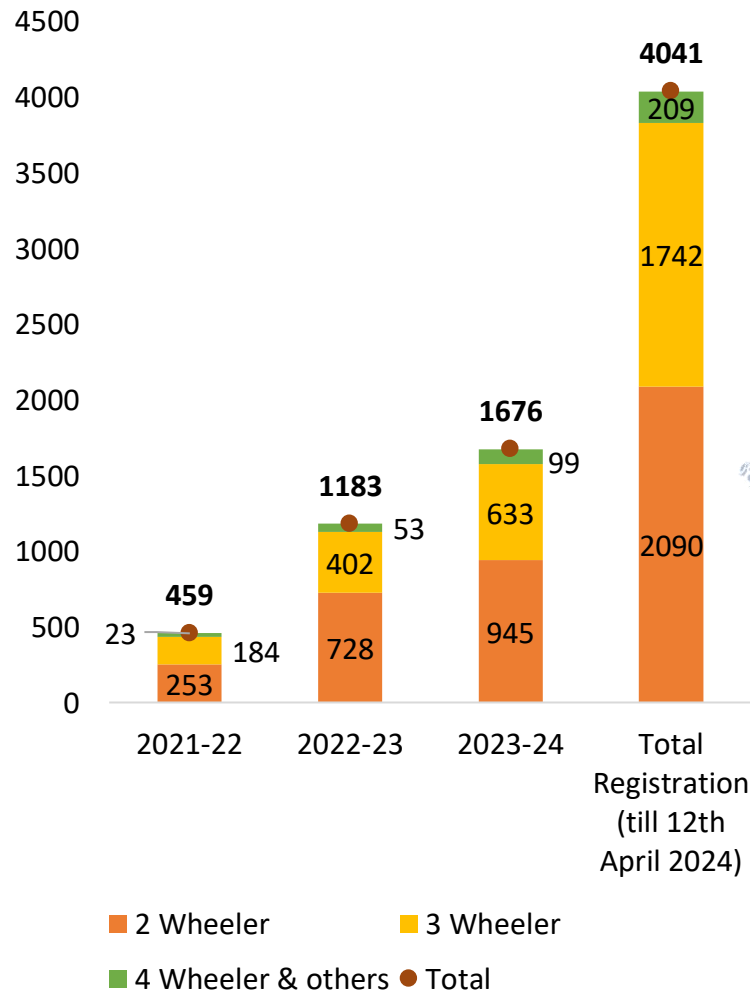
Gas Daily Market Price



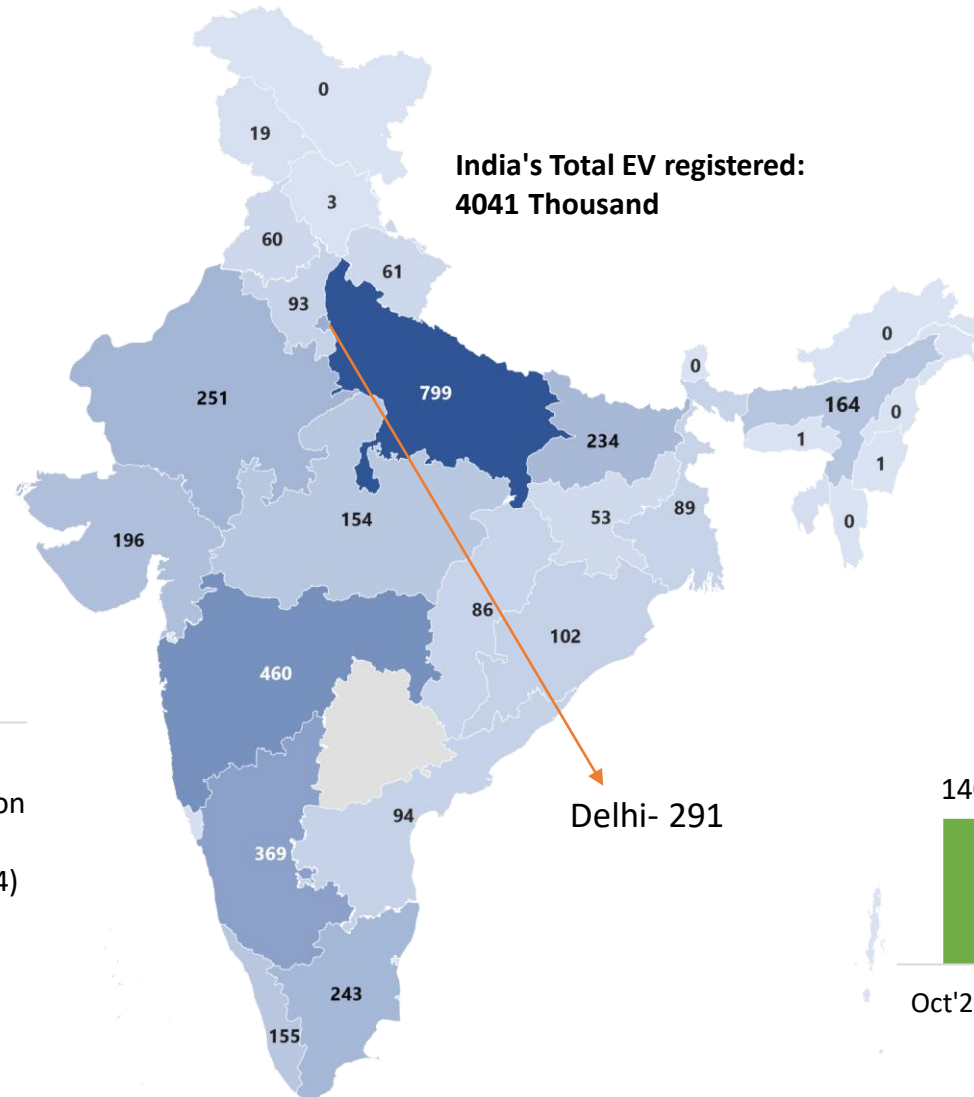
Prices of Gas (USD/MMBTU)				
Date	Henry Hub NG	Japan/ Korea LNG	Dutch TTF NG	IGX Trade
28-Mar-2024	2	10	8	10

Status of Electric Mobility in India

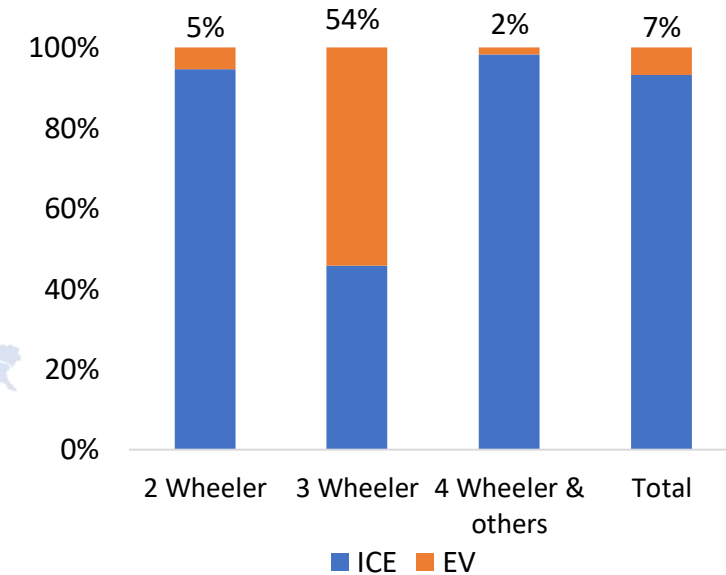
National EV registration (in Thousands)



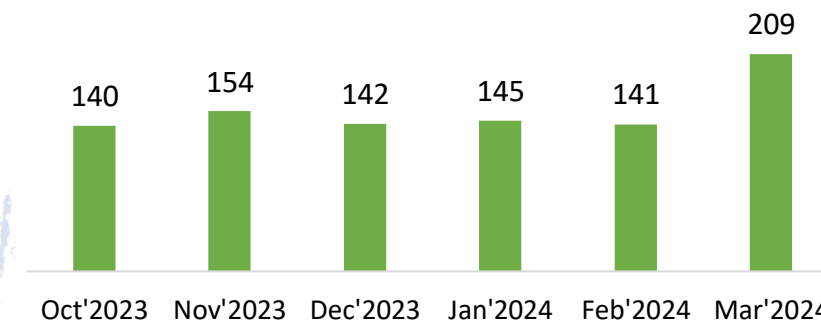
Cumulative State-wise EV registration as on 12th April 2024 (in Thousands)



EV and ICE sale composition in 2023-24



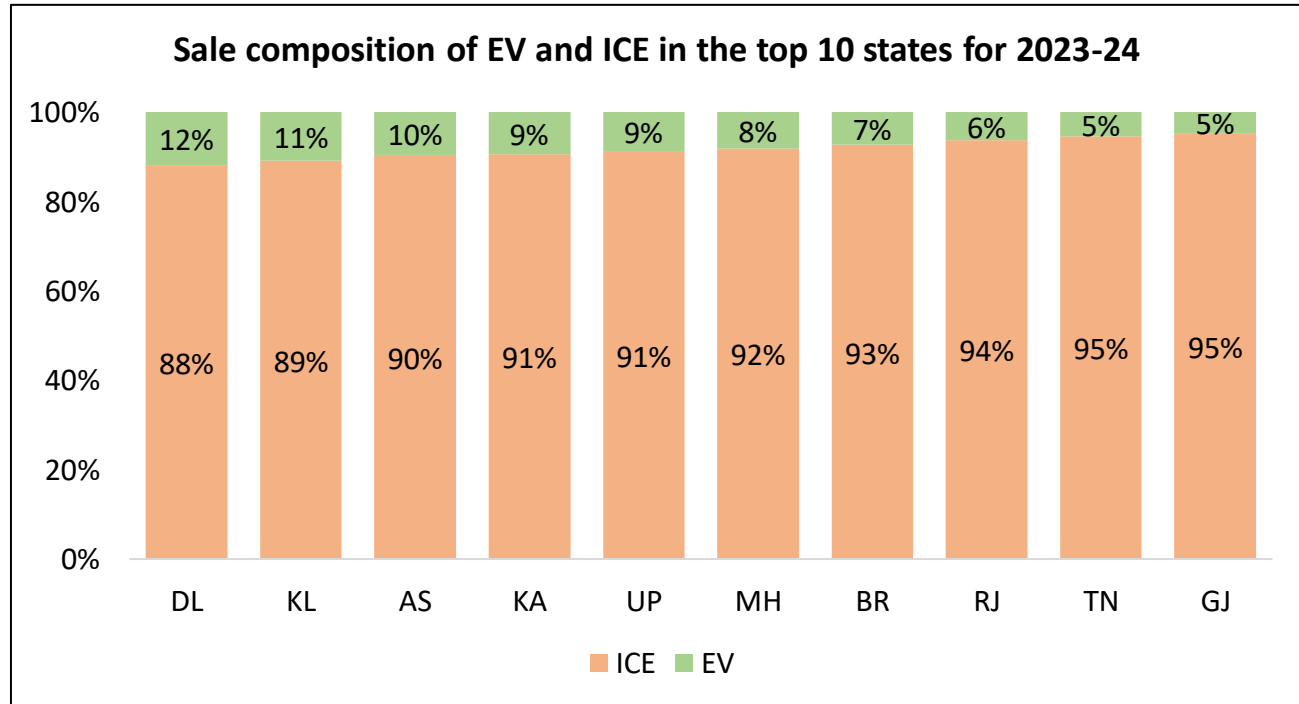
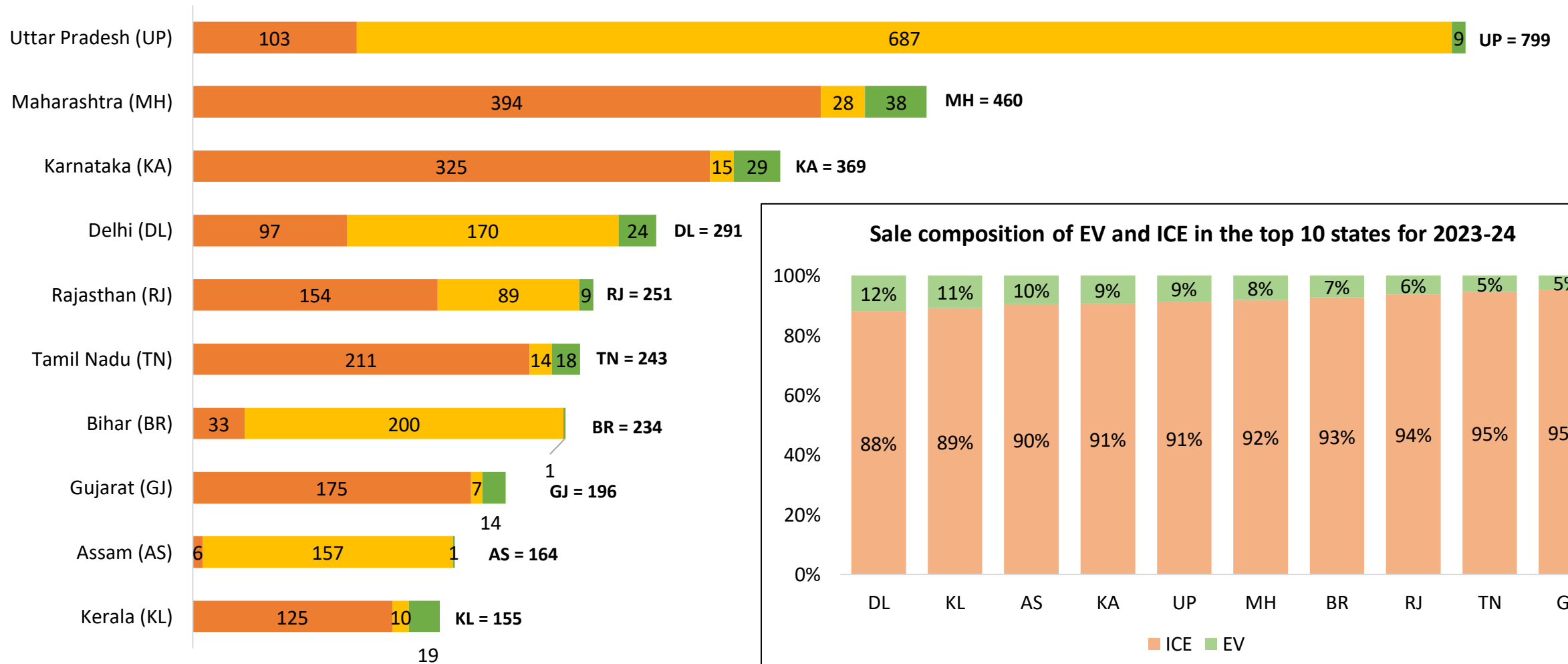
Provisional Monthly EV registered (in Thousands)



Source: VAHAN Dashboard

Status of Electric Mobility in India

**Top 10 States for Electric Vehicles (in Thousands)
as on 12th April 2024**



2 Wheeler 3 Wheeler 4 Wheeler & others

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 March 2024

- The Ministry of Power has [extended its timeline from March 2024 to June 2024 for blending of imported coal to 6%](#) for all the central, state-generating companies, and IPPs to meet the anticipated increase in peak demand during summer season (Apr'24-Jun'24).
- The Ministry of New and Renewable Energy (MNRE) has released the scheme guidelines for the implementation of the [strategic interventions for green hydrogen transition programme- Component I: incentive scheme for electrolyser manufacturing tranche II, research and development, and skilling, up-skilling and re-skilling](#) scheme under the National Green Hydrogen Mission.
- The Ministry of New and Renewable Energy has released the [scheme guidelines for setting up Hydrogen Hubs in India under the National Green Hydrogen Mission](#). It's target is to establish at least two green hydrogen hubs by 2025-26 with a budgetary outlay of Rs 200 crores.
- The Ministry of Heavy Industries has released the [Electric Mobility Promotion Scheme \(EMPS\) 2024](#) with an outlay of Rs 500 crore, proposed to be implemented over a period of 4 months, from 1st April 2024 to 31st July 2024, aimed at fostering the faster adoption of electric 2Ws and 3Ws.
- The Ministry of Power has notified the [Electricity \(Third Amendment\) Rules, 2024](#), making a 3-year cycle for uniform renewable energy tariffs for the central pool.
- Ministry of Environment, Forest, and Climate Change unveiled the [E-Waste \(Management\) Amendment Rules, 2024](#) on 8th March 2024. The key amendments include:
 - The CPCB will formulate guidelines for imposing and collecting environmental compensation from producers and entities involved in battery refurbishment and recycling in cases of non-compliance with the rules.
 - Relaxation of timelines for filing the returns by a manufacturers, producers, refurbishers, or recyclers of electrical and electronic equipment, components, or consumables parts or spares, extended up to nine months
 - The CPCB will set the highest and lowest prices for the exchange of Extended Producer Responsibility (EPR) certificates, with the highest being equal to 100% and the lowest being to 30% of the environmental compensation for the non-fulfillment of EPR obligations.

Key Highlights or Announcements of March 2024

- On March 15th 2024, the Ministry of Heavy Industries released the scheme to [Promote Manufacturing of Electric Passenger Cars in India \(SPMEPCI\)](#), which aims to attract investments from global EV manufacturers and position India as a manufacturing hub for e-vehicles. The key highlights include:
 - The approved applicants will set up manufacturing facilities in India with a minimum investment of Rs. 4,150 crore for manufacturing of e-4W.
 - Minimum domestic value addition of 25% within 3 years and 50% within 5 years.
 - EV passenger cars (e-4W) can initially be imported with a minimum cost, insurance, and freight value of USD 35,000, at a duty rate of 15% for a period of 5 years. The maximum number of e-4W allowed to be imported at the reduced duty rate shall be capped at 8,000 per year.
- Uttar Pradesh cabinet has released the final [Uttar Pradesh Green Hydrogen Policy- 2024](#) in March 2024 setting a target of one million metric tonnes per annum production of green hydrogen by 2028. The main objectives of the policy are:
 - To create 1.20 lakhs job by 2028
 - The green hydrogen projects will provide capital subsidy of 10% to 30% depending on the geographical area of investment.
 - 100% waiver on transmission & wheeling charges, cross-subsidy & additional subsidy, electricity duty for 10 years.
 - Government/revenue land will be provided on lease at Re. 1 per acre for government PSUs for setting up green hydrogen projects, and investors from the private sector can lease the land at Rs 15,000 per acre per year for 30 years.
 - Rs. 50 crores will be assigned to establish 2 Center for Excellence to reduce the product cost of green hydrogen.
- Haryana state government has released the draft [Haryana Green Hydrogen Policy 2024](#). The policy aims to make Haryana a leader on Green Hydrogen and its derivatives ecosystem in the country, with a production target of 250 kilo tonnes per annum green hydrogen by 2030, electrolyser manufacturing capacity of 2GW and associated components driving de-carbonization across the industries, enhancing energy security and encouraging exports.
- Delhi government released the [Delhi Solar Energy Policy 2023](#) on 14th March 2024, with at target of 4500 MW of installed solar capacity which shall include 750 MW of rooftop solar within the state and around 3750 MW of utility scale solar from outside the State.



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