

India's Energy Overview

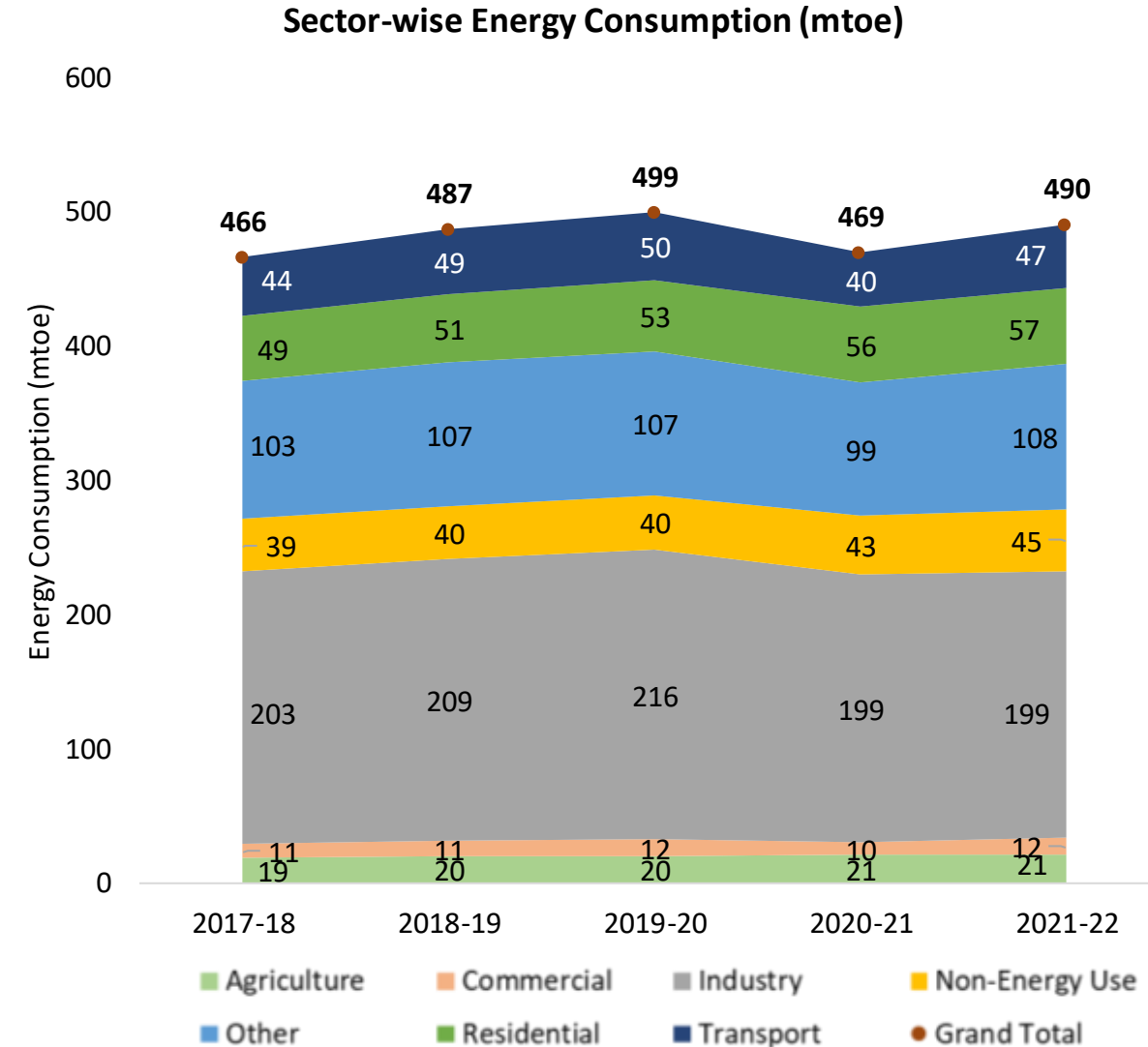
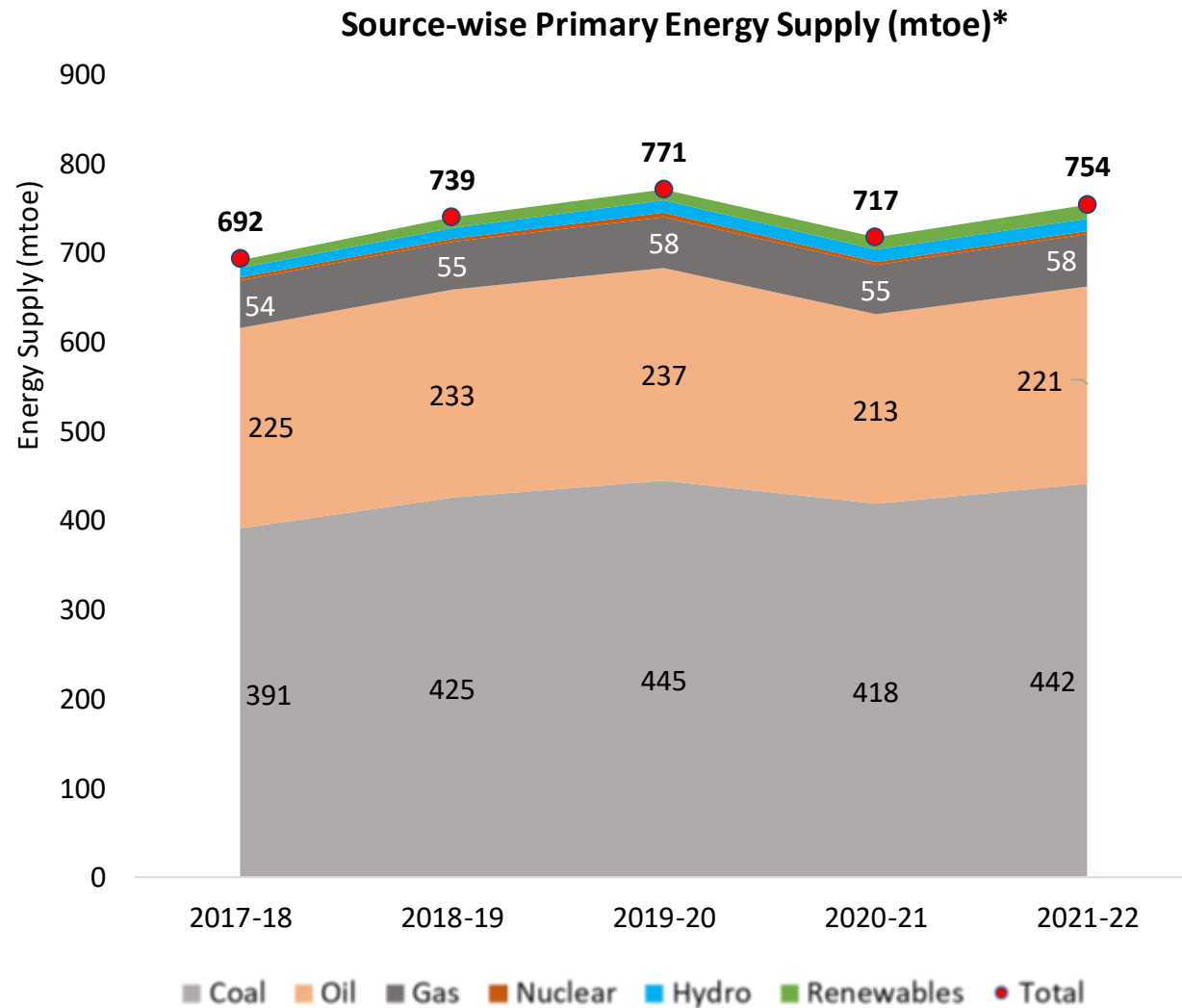
February 2024



Contents

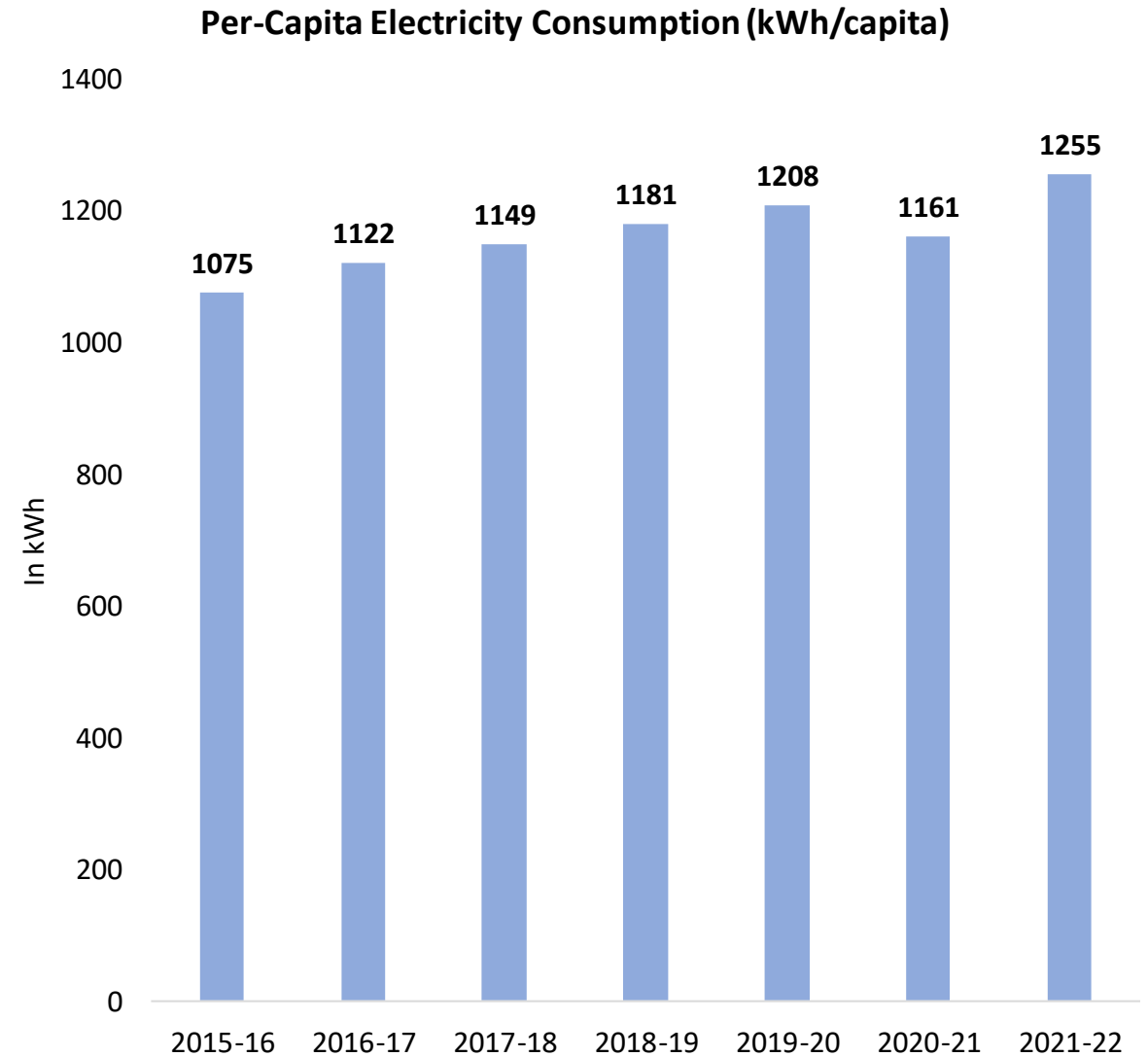
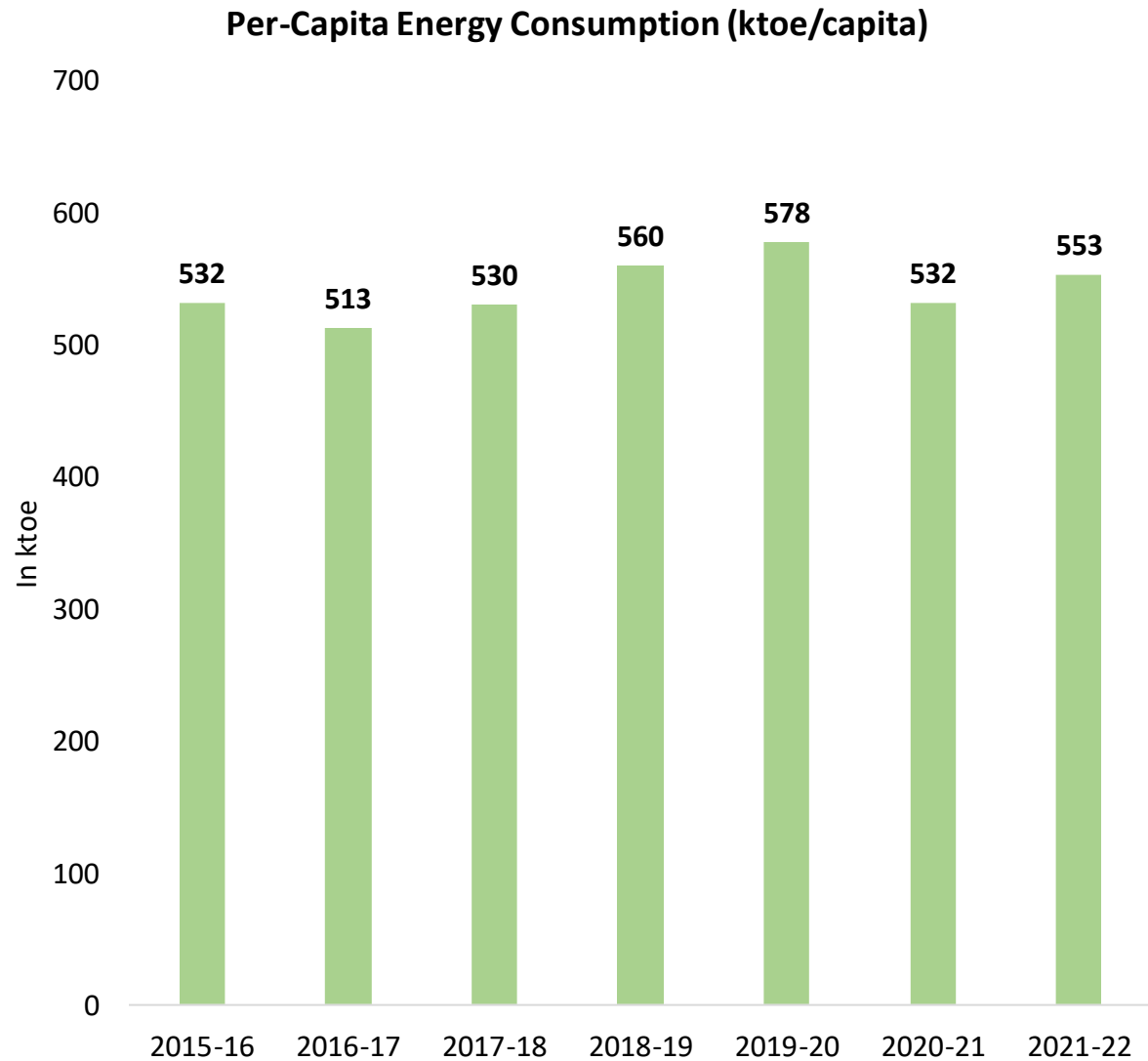
1. Primary Energy Mix for 2021-22
2. Per-Capita Energy and Electricity Consumption
3. India's Electricity Capacity Mix (Utility-scale)
4. India's Electricity Addition in last 5 years
5. State-wise Solar Installed Capacity
6. State-wise Wind Installed Capacity
7. RE Potential and Installed Capacity
8. India's Electricity Generation Mix
9. Source-wise PLF/ CUF
10. Thermal Generation Loss and Reasons for Forced Outages
11. Indian Electricity Exchange (IEX) Market Snapshot
12. National and State-level Electricity Demand
13. India's Monthly Electricity Requirement and Supply
14. Monthly Electricity Demand for the top 5 states
15. National and State-level Peak Electricity Demand
16. India's Monthly Peak Electricity Demand and Supply
17. Monthly Peak Electricity Demand for the top 5 states
18. Monthly Coal Statistics
19. Petroleum Products Market Scenario
20. Daily Prices of Crude Oil
21. Gas Market Scenario
22. Daily Prices of Gas
23. Status of Electric Mobility in India
24. Recent Interventions to Promote Renewable Energy
25. Key Highlights or Announcements of February 2024

Primary Energy Mix* in India

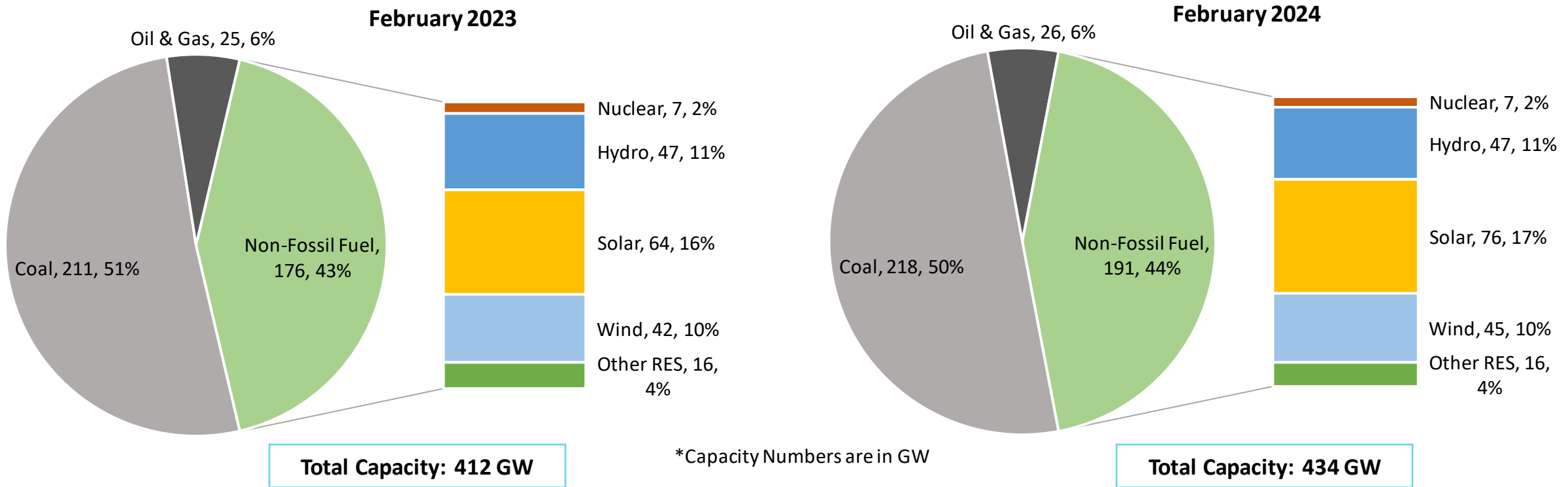


*Excluding biofuels, waste, and other non-commercial source of energy

Per-Capita Energy and Electricity Consumption

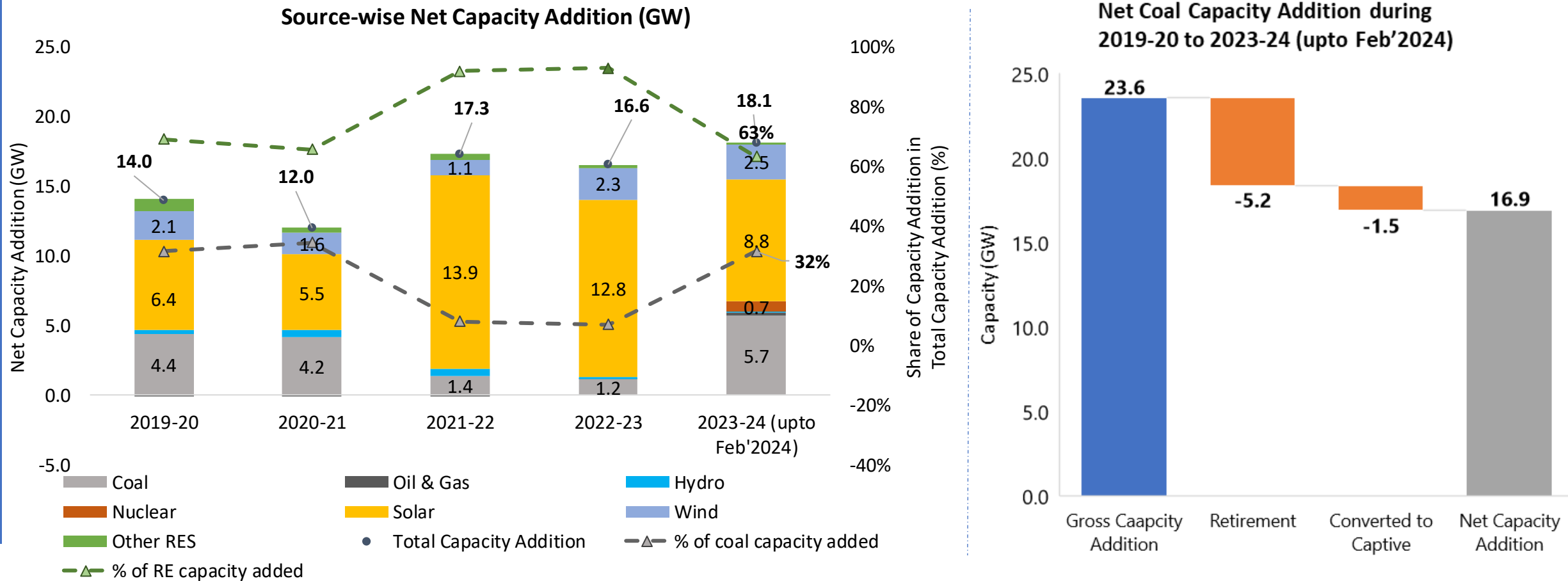


India's Electricity Capacity Mix (Utility-scale)



- India's electricity generating capacity is 434 GW as on Feb'2024 [coal 218 GW (50%), solar 76 GW (17%), hydro 47 GW (11%), and wind 45 (10%)].
- As on Feb'2024, the share of non-fossil-based electricity capacity is 44% against the set target of 50% non-fossil capacity by 2030.
- As on Feb'2024, India's renewable energy capacity (including large hydro) stood at 183 GW out of 434 GW.

India's Electricity Capacity Addition in last 5 years



- A total of 61 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.

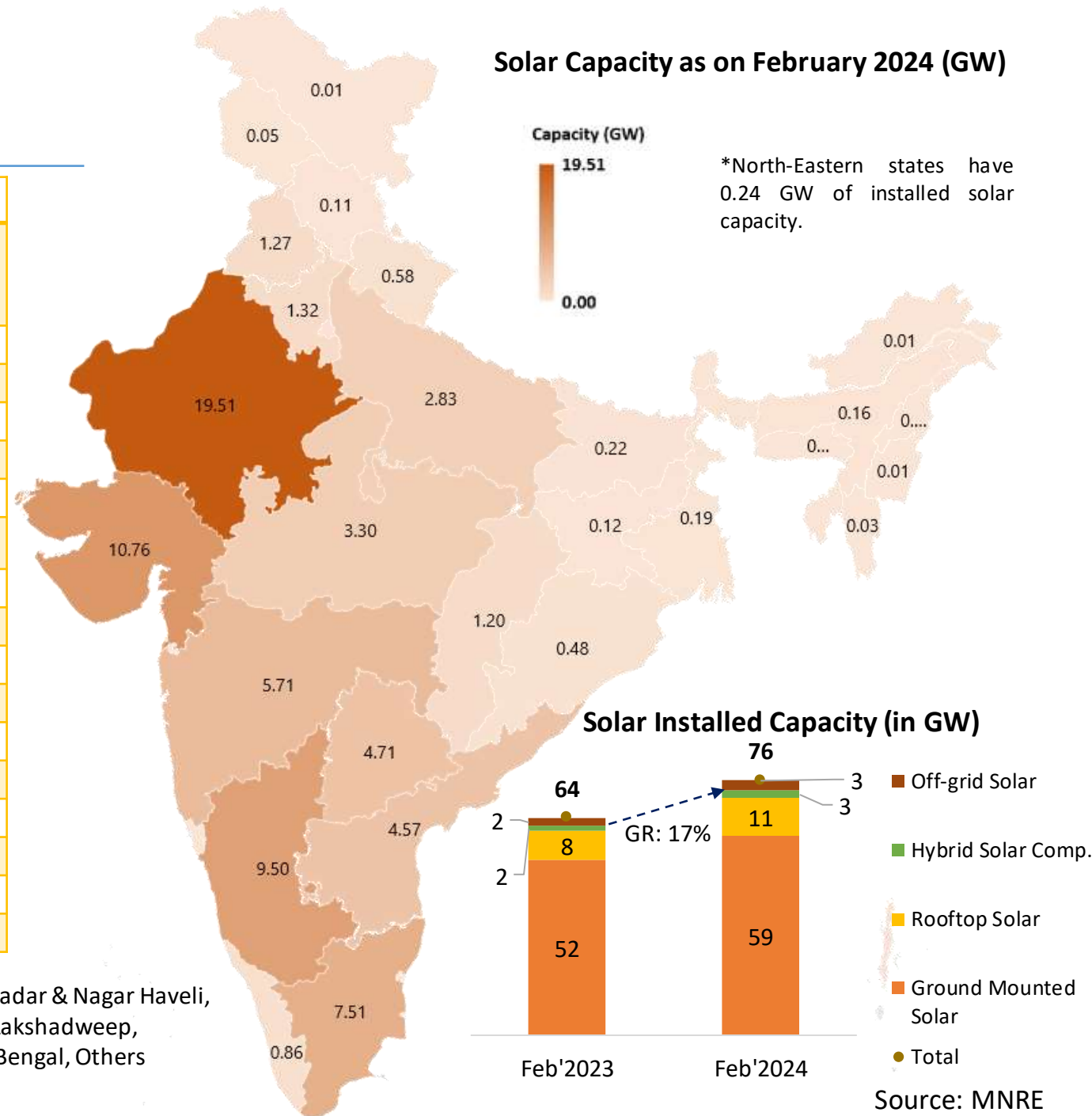
State-wise Solar Capacity

as on February 2024

State-wise installed capacity of Solar Power (GW)					
States	Ground Mounted	Rooftop	Solar Component in Hybrid	Off Grid	Total Solar Power
Rajasthan	15.91	1.00	1.98	0.62	19.51
Gujarat	7.22	2.90	0.59	0.05	10.76
Karnataka	7.91	1.56	0.00	0.03	9.50
Tamil Nadu	6.99	0.45	0.00	0.07	7.51
Maharashtra	3.68	1.72	0.00	0.32	5.71
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	2.90	0.30	0.00	0.10	3.30
Uttar Pradesh	2.35	0.27	0.00	0.22	2.83
Haryana	0.27	0.49	0.00	0.57	1.32
Punjab	0.89	0.30	0.00	0.08	1.27
Chhattisgarh	0.75	0.07	0.00	0.39	1.20
Kerala	0.32	0.51	0.00	0.02	0.86
Uttarakhand	0.30	0.26	0.00	0.01	0.58
Others	0.94	0.74	0.00	0.27	1.95
All India	59.07	11.08	2.57	2.85	75.58

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 February 2024 (GW)

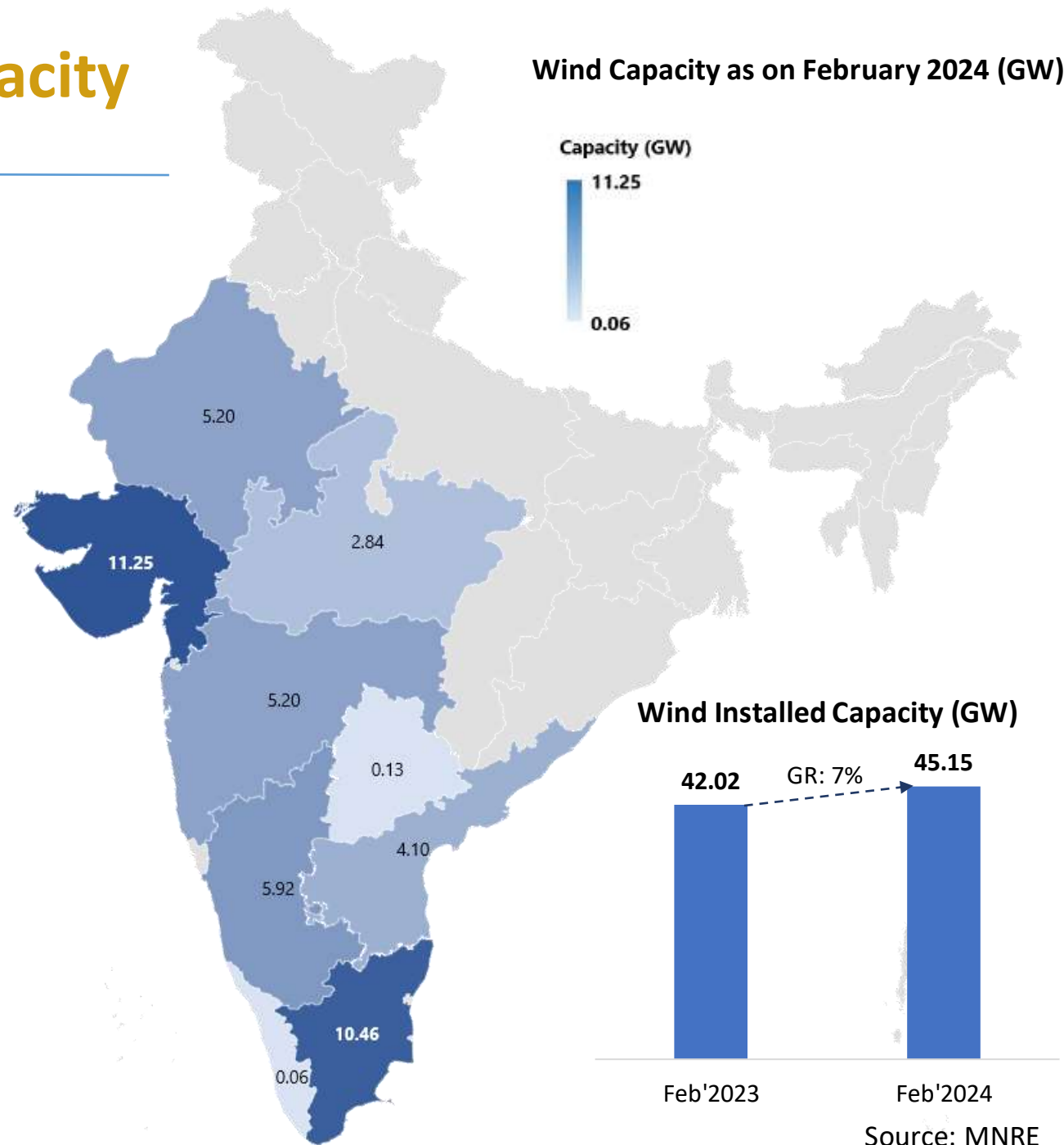


*North-Eastern states have 0.24 GW of installed solar capacity.

State-wise Wind Onshore Capacity

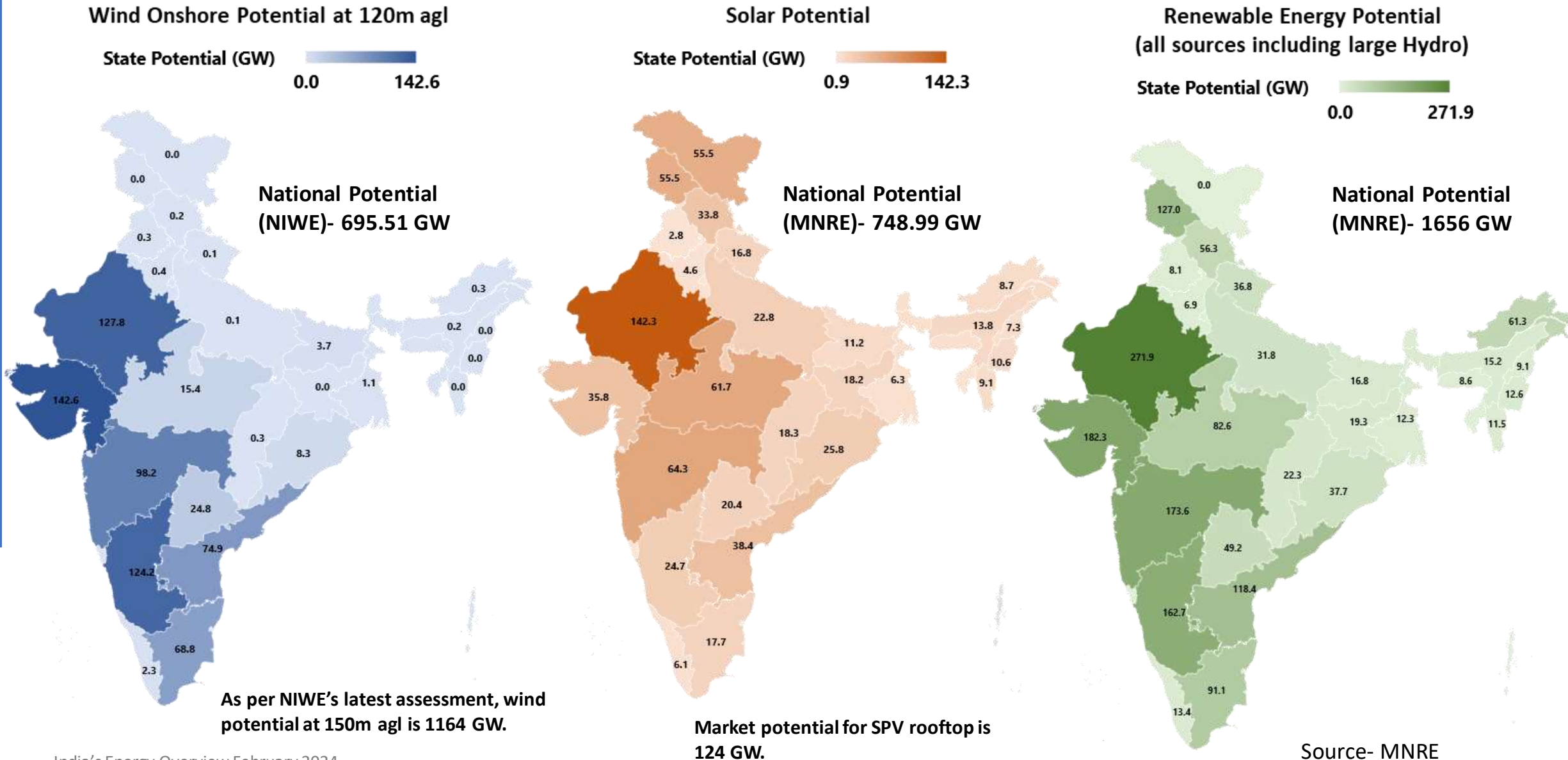
as on February 2024

State-wise installed capacity of Wind (Onshore) Power	
States	Installed Capacity (GW)
Gujarat	11.25
Tamil Nadu	10.46
Karnataka	5.92
Rajasthan	5.20
Maharashtra	5.20
Andhra Pradesh	4.10
Madhya Pradesh	2.84
Telangana	0.13
Kerala	0.06
India Total	45.15



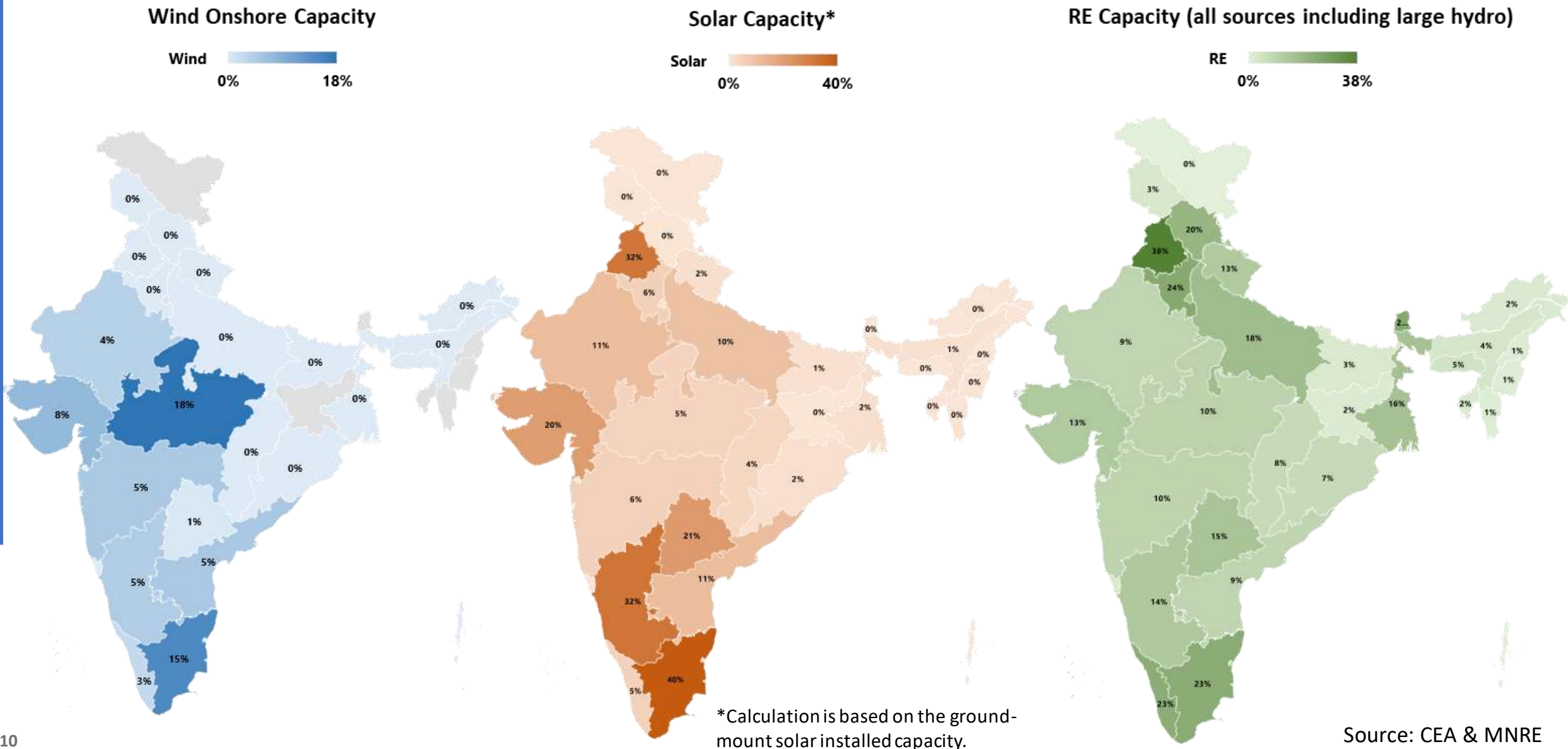
RE Potential and Installed Capacity (1/2)

RE potential in the state

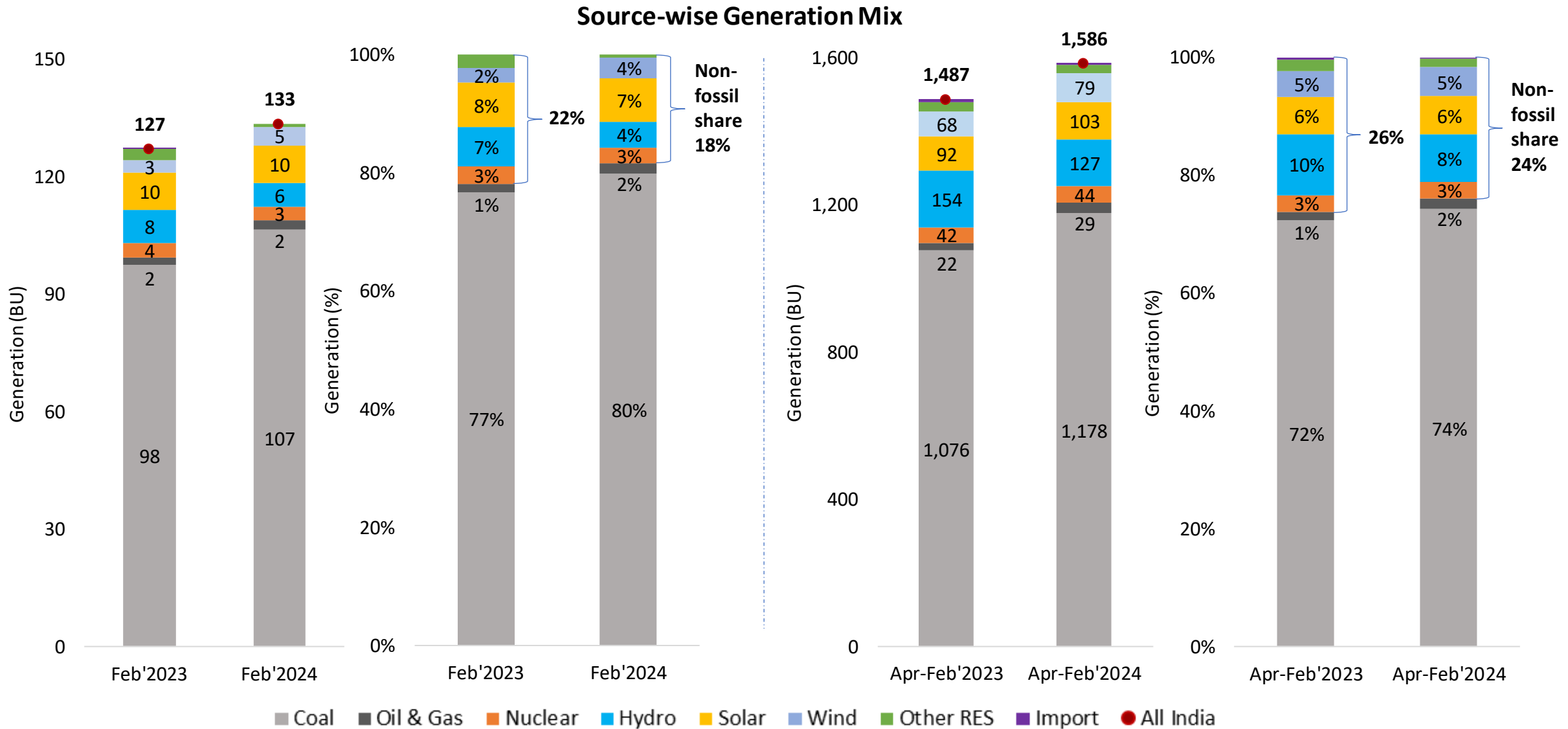


RE Potential and Installed Capacity (2/2)

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



India's Electricity Generation Mix

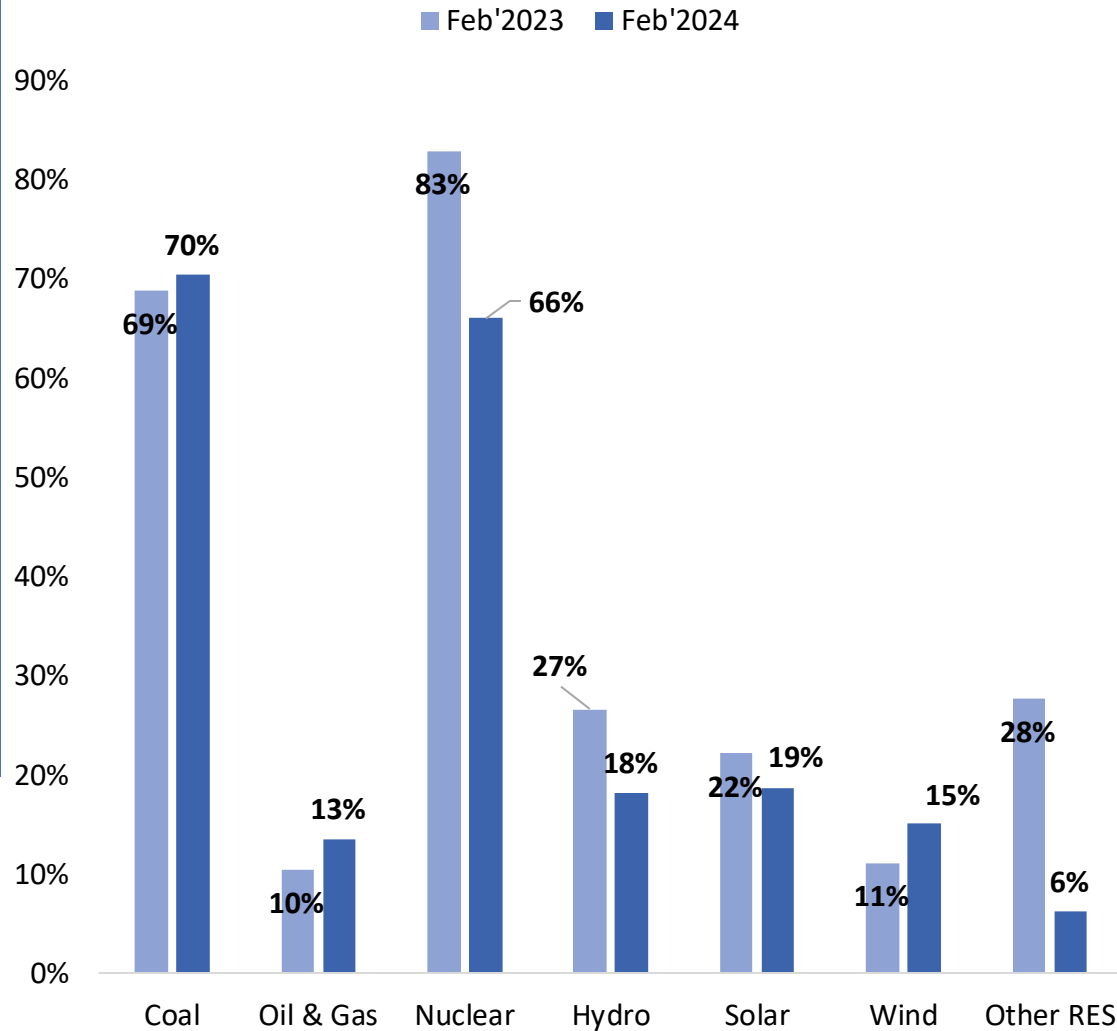


NOTE: The generation data for Feb'2024 is provisional.

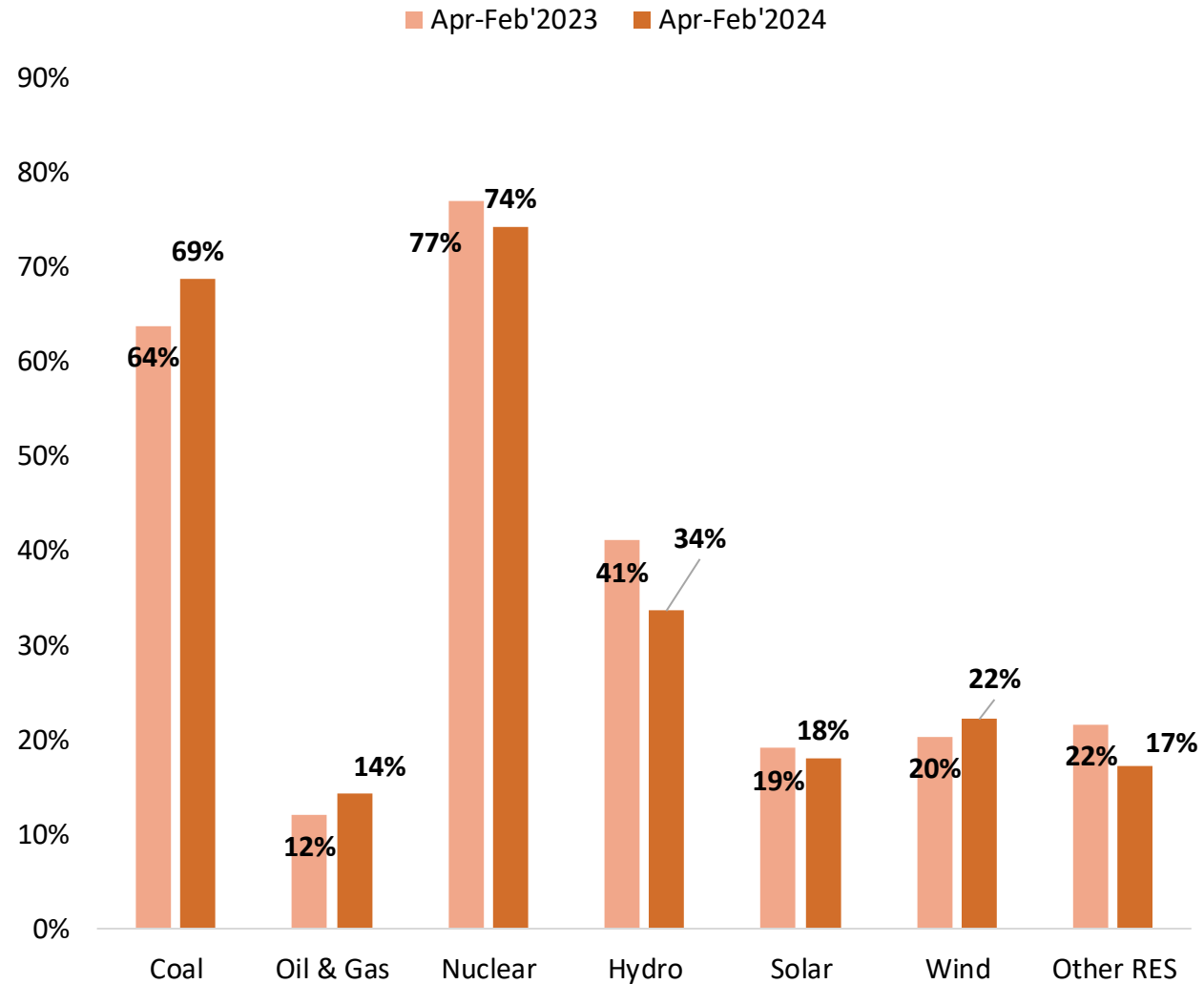
Source: CEA

Source-wise PLF/CUF

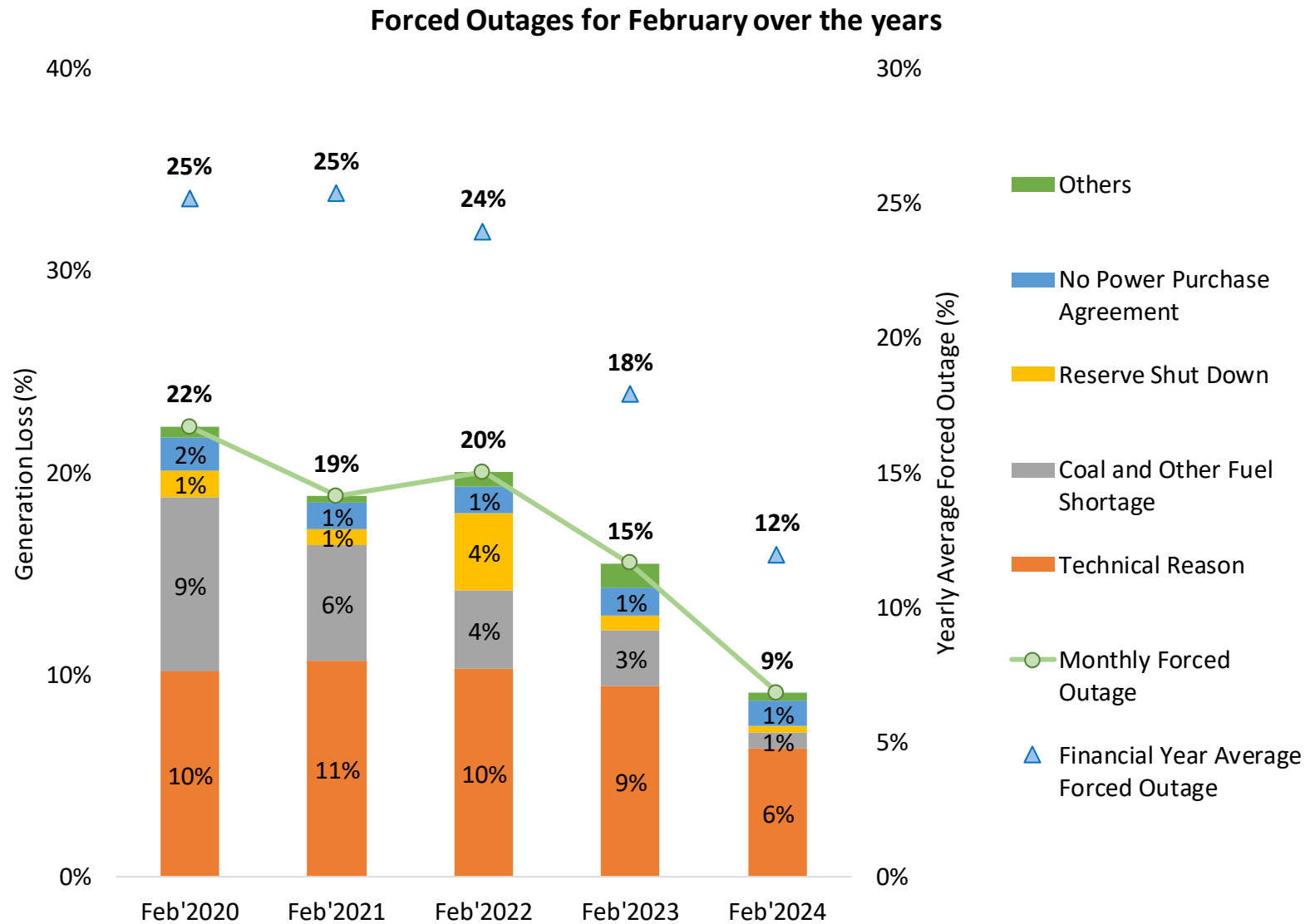
Source-wise PLF/ CUF in February (%)



Source-wise PLF/ CUF Comparison (%)



Thermal Generation Loss and Reasons for Forced Outages



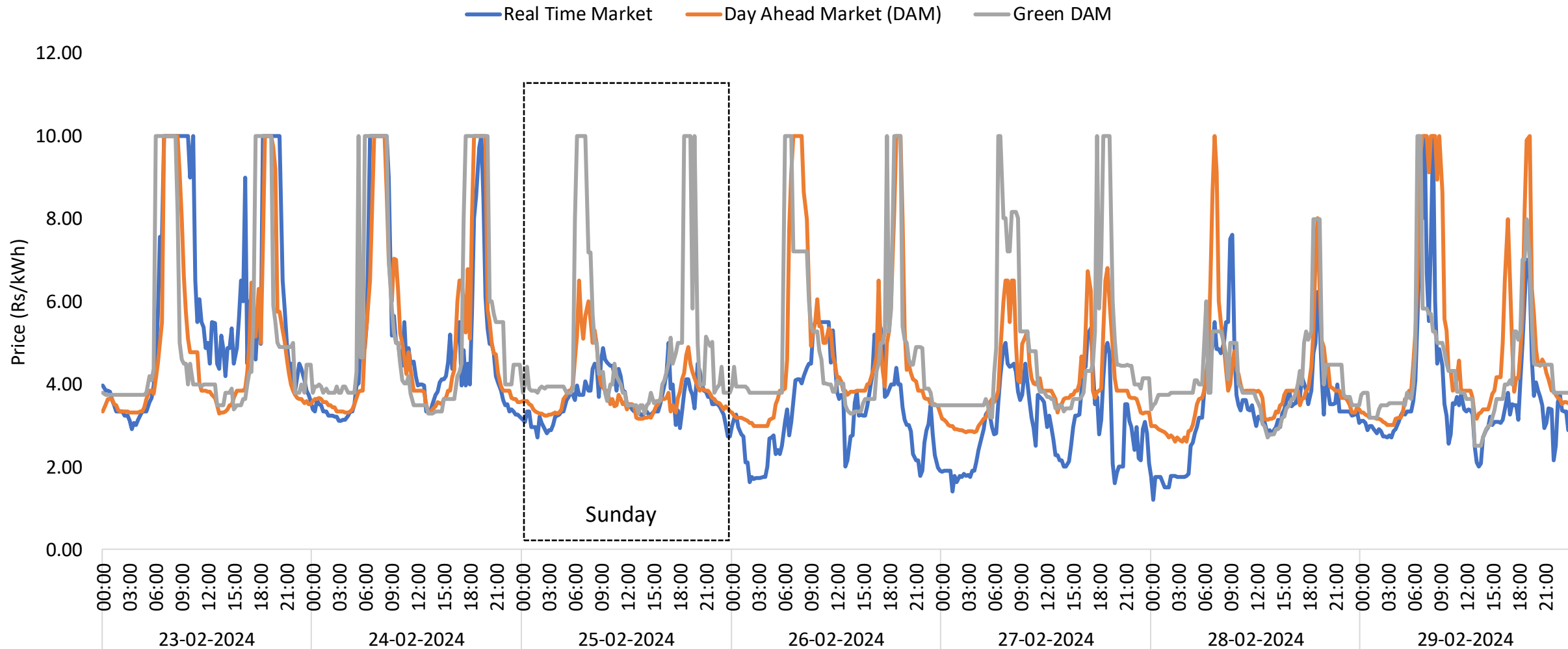
Year/ Month		Average Forced Outage Share
Yearly	FY 2021-22	24%
	FY 2022-23	18%
	FY 2023-24 (up to Feb'2024)	12%
Monthly	Feb'2022	20%
	Feb'2023	15%
	Feb'2024	9%

Thermal includes only Coal and Lignite Plants.

Source: ICED

Indian Electricity Exchange (IEX) Market Snapshot

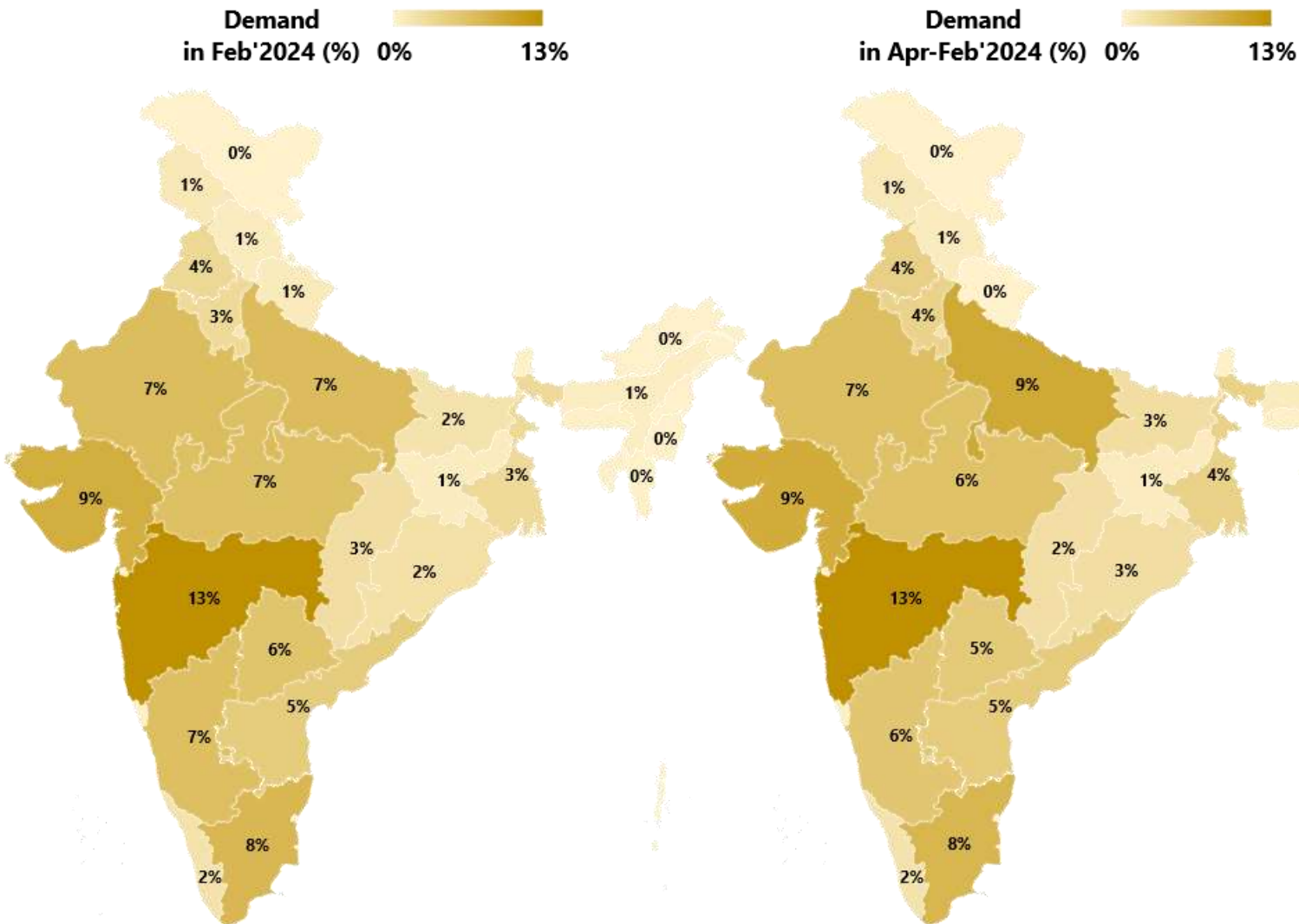
Market Clearing Prices of last 7 days of February 2024



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) (+/-)
Feb'2022	108	108	0.3
Feb'2023	119	118	0.5
Feb'2024	127	127	0.2

Apr-Feb	Electricity Demand (BU)	Electricity Supply (BU)	Gap (BU) (+/-)
FY 2021-22	1251	1246	5
FY 2022-23	1385	1378	7
FY 2023-24	1487	1483	4

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

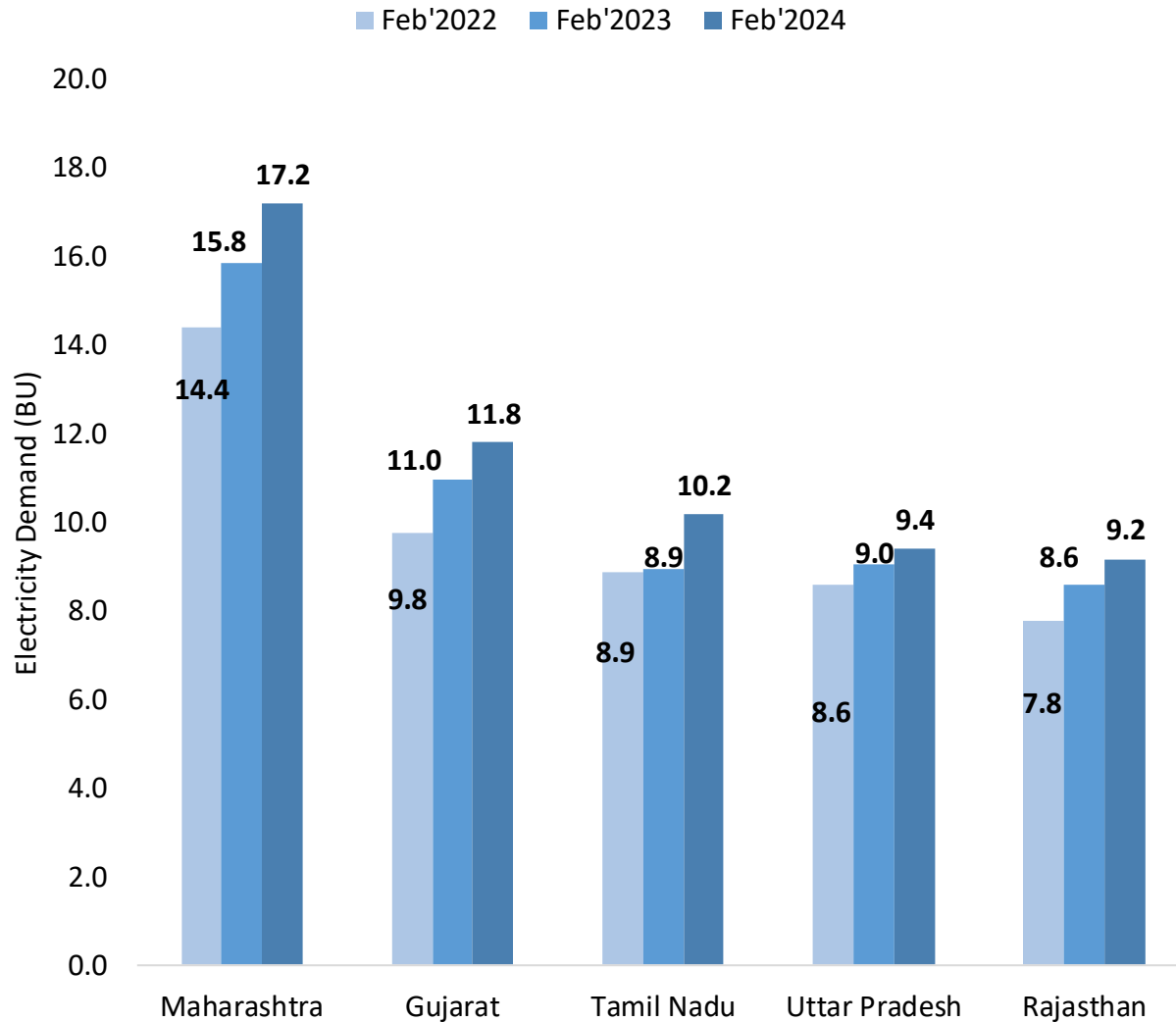
Source: CEA

India's Monthly Electricity Requirement and Supply

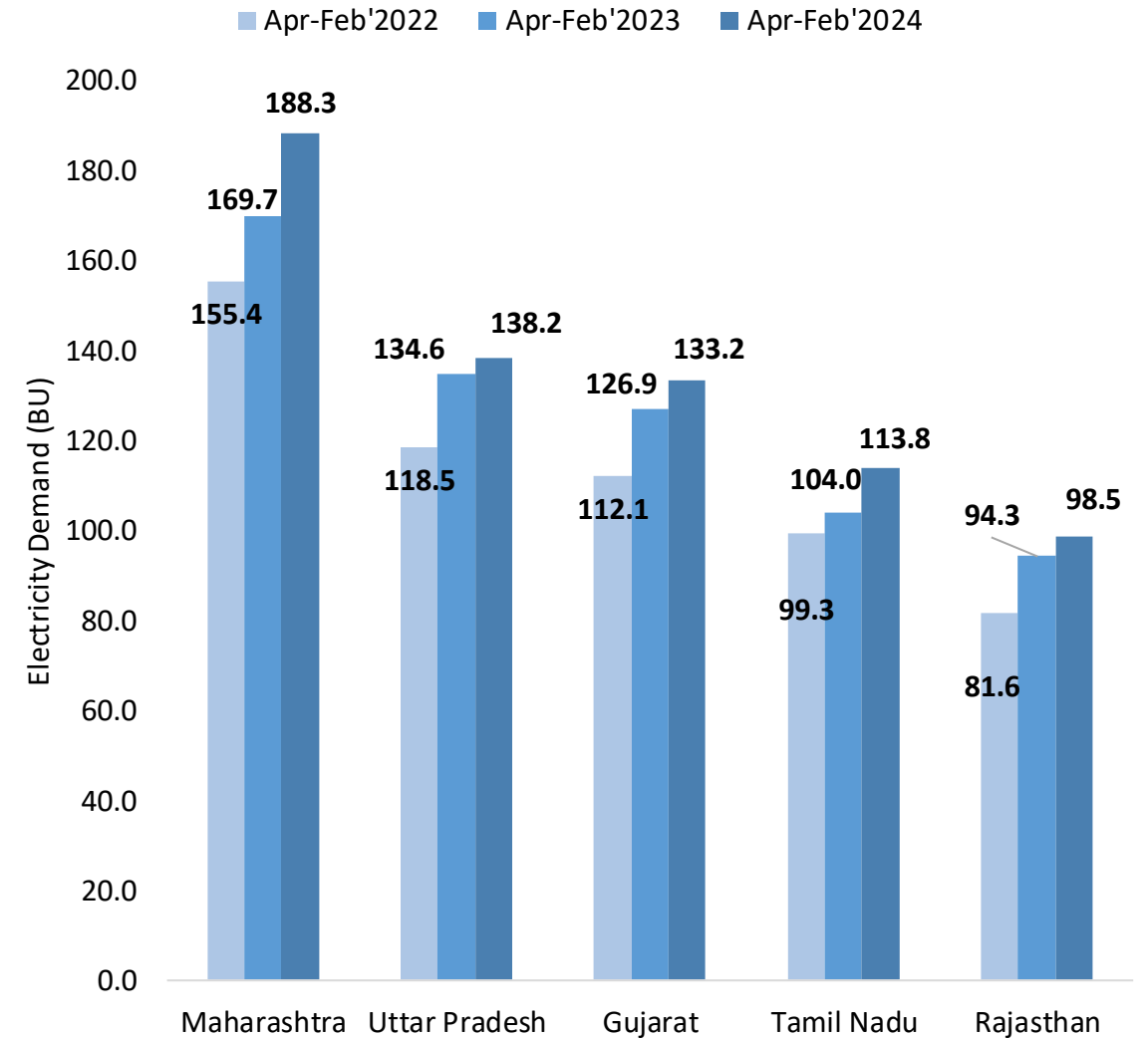


Monthly Electricity Demand of the top 5 states

States with Highest Electricity Demand in February (BU)

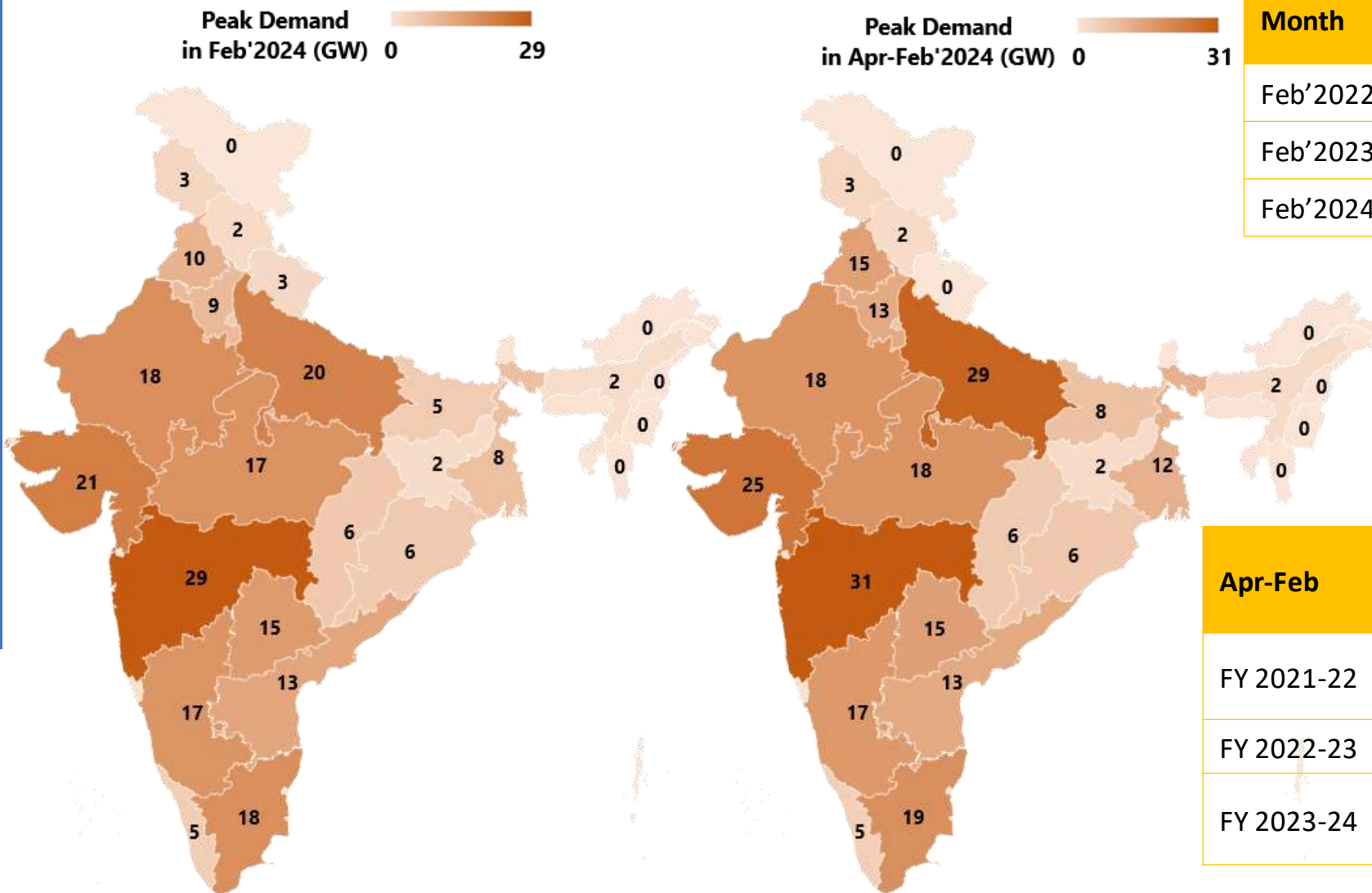


States with Highest Electricity Demand (BU)



National and State level Peak Electricity Demand

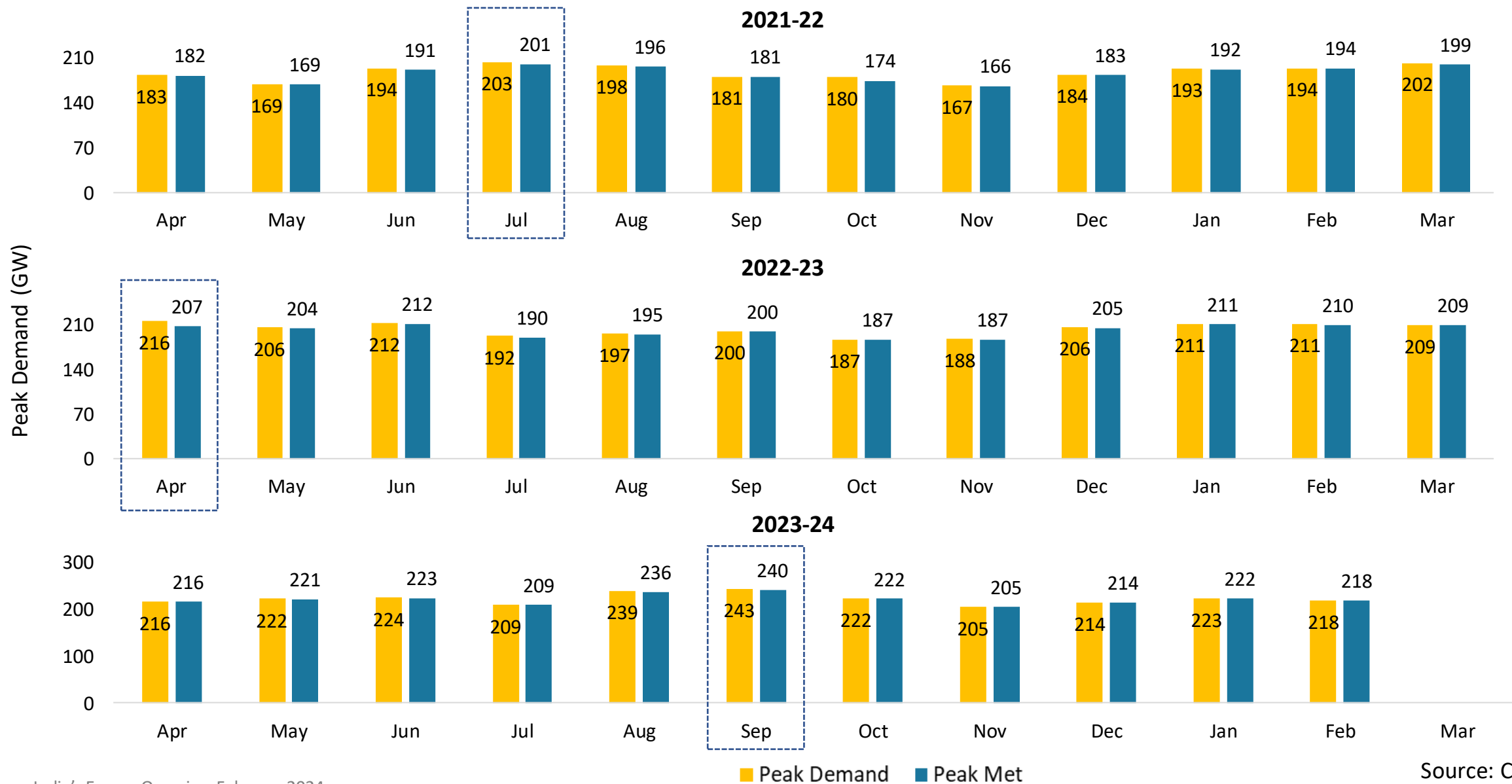
State-level Peak Electricity Demand (GW)



Month	Peak Demand (GW)	Peak Supply (GW)	Gap(BU) (+/-)
Feb'2022	194	194	0.3
Feb'2023	211	210	1.4
Feb'2024	218	218	0.1

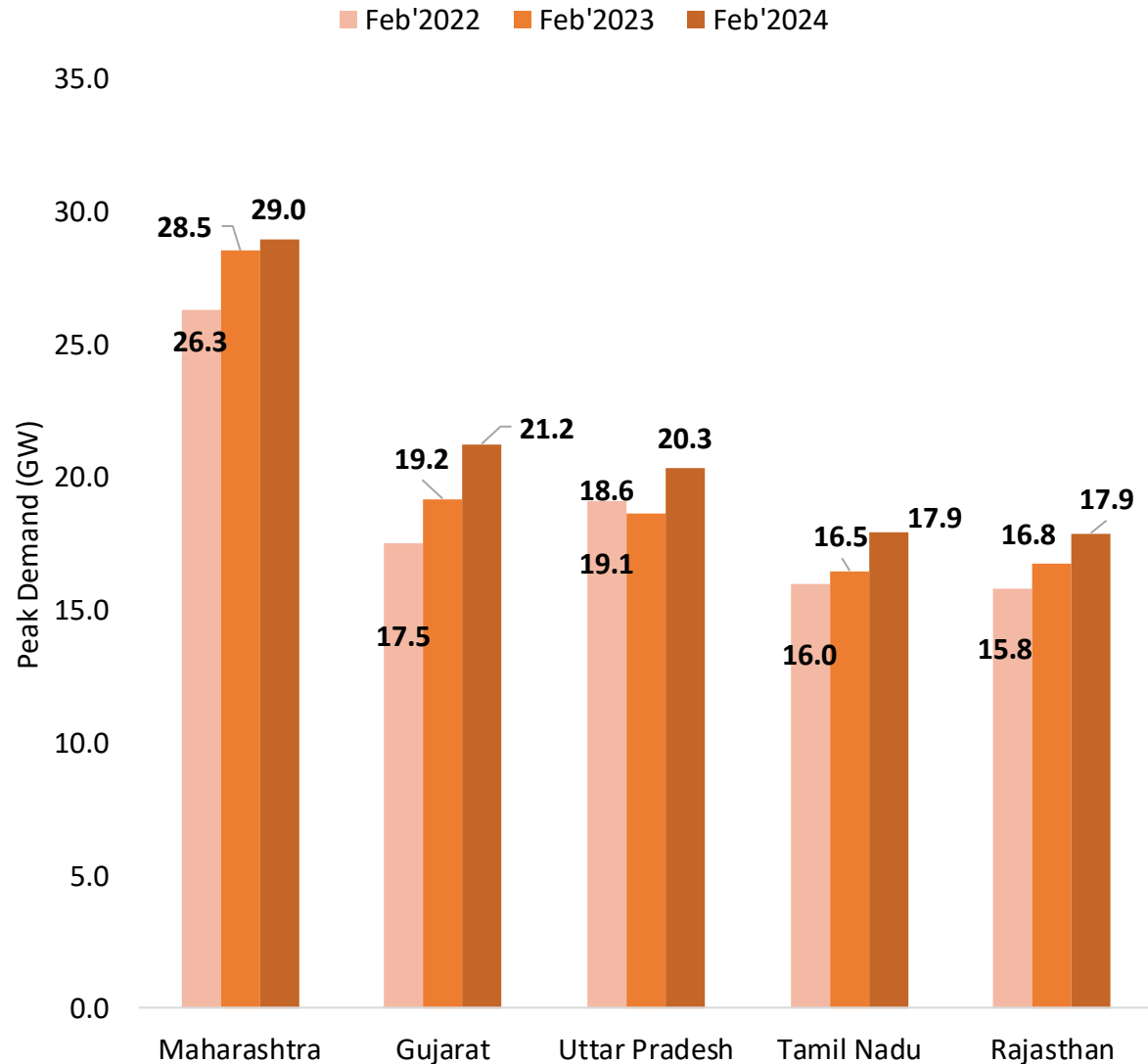
Apr-Feb	Peak Demand (GW)	Peak Supply (GW)	Gap (BU) (+/-)
FY 2021-22	203	201	2
FY 2022-23	216	207	9
FY 2023-24	243	240	3

India's Monthly Peak Electricity Demand and Supply

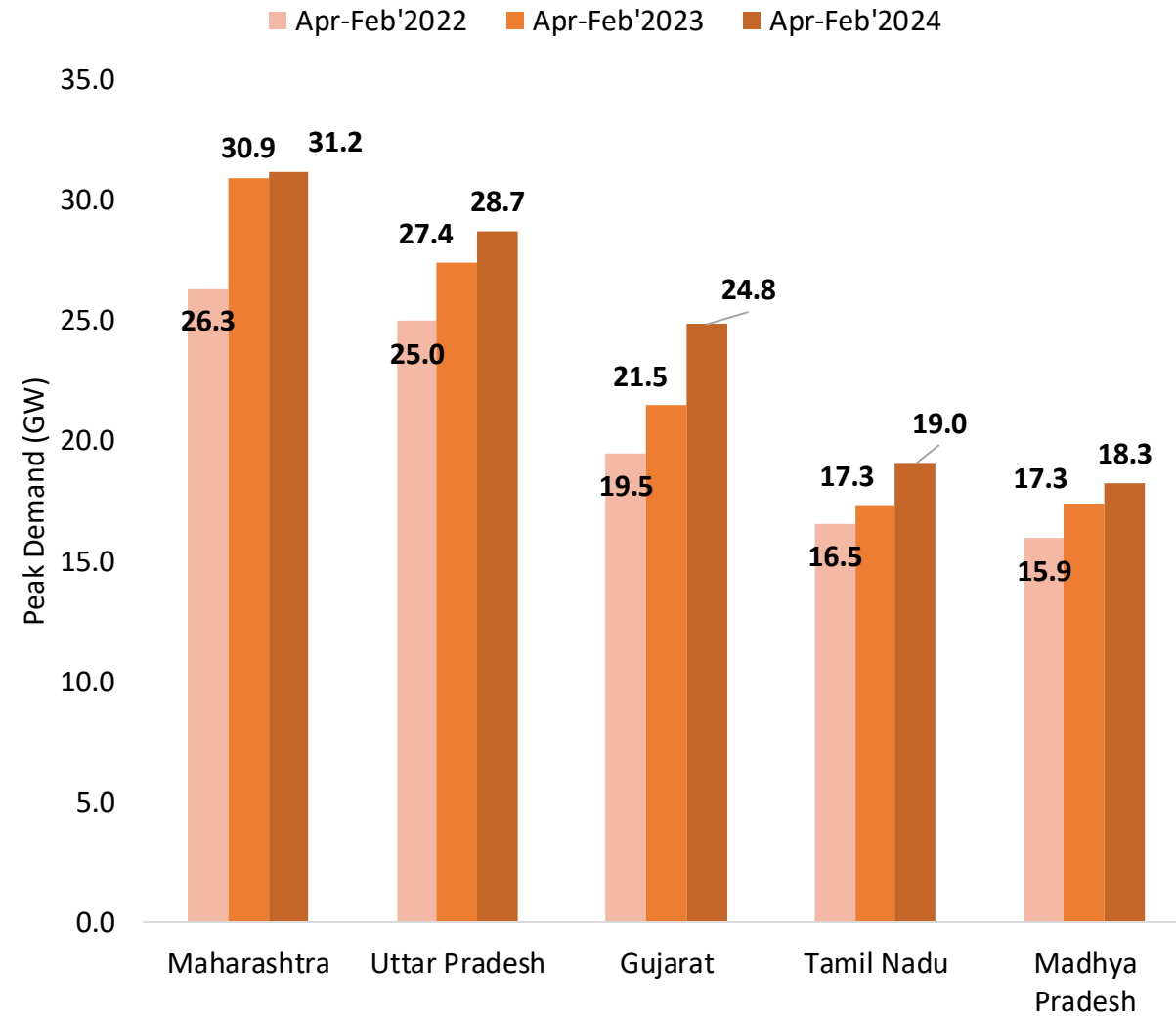


Monthly Peak Electricity Demand of the top 5 states

States with Highest Peak Electricity Demand in February (GW)



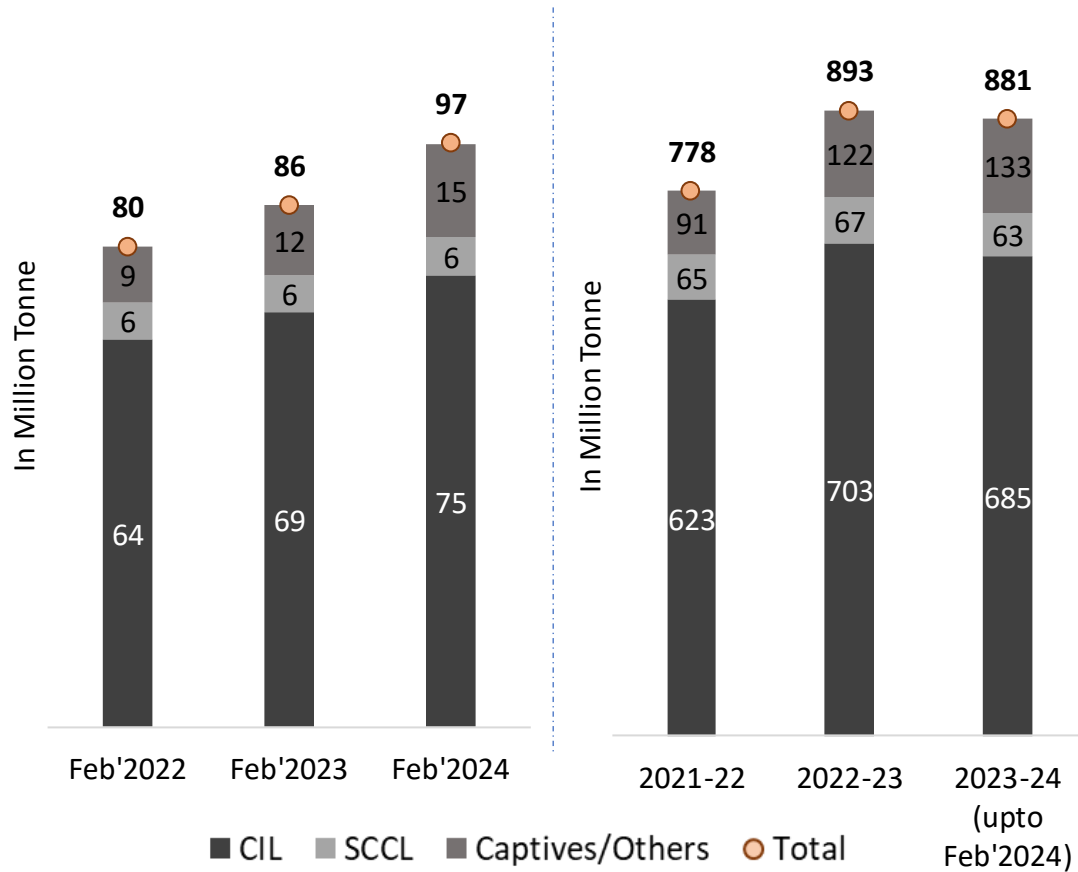
States with Highest Peak Electricity Demand (GW)



Source: CEA

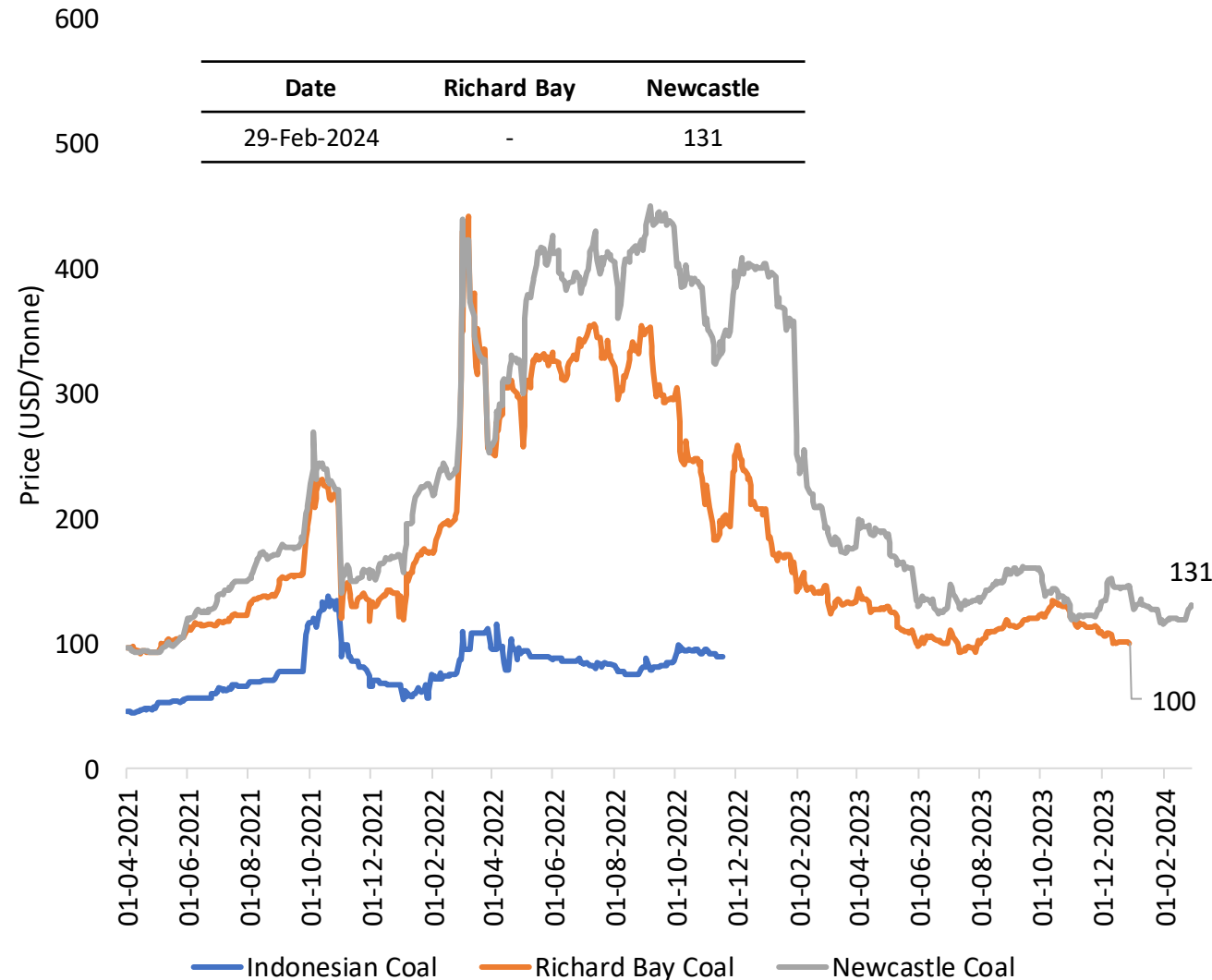
Monthly Coal Statistics

Monthly/ Annual Coal Production (in Million Tonnes)



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

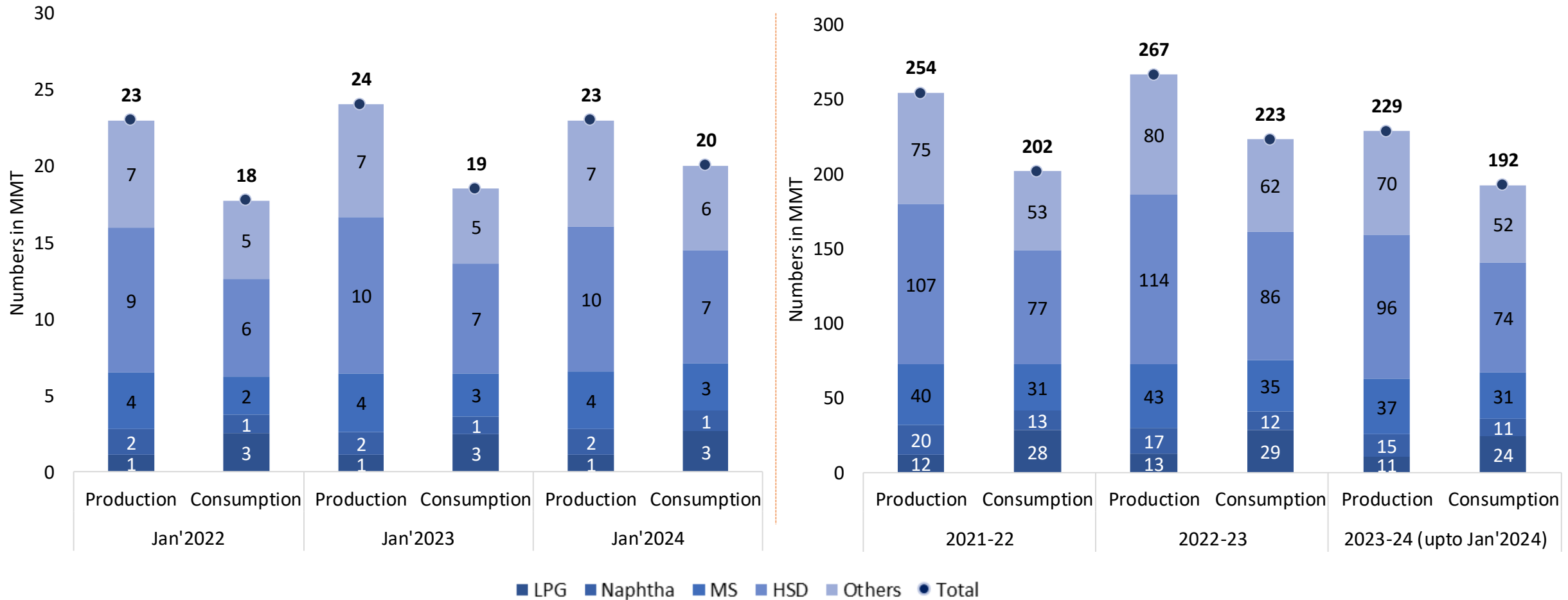
International Coal Prices



Source: Ministry of Coal

Petroleum Products Market Scenario (1/3)

Petroleum Product-wise Production & Consumption (MMT)



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)

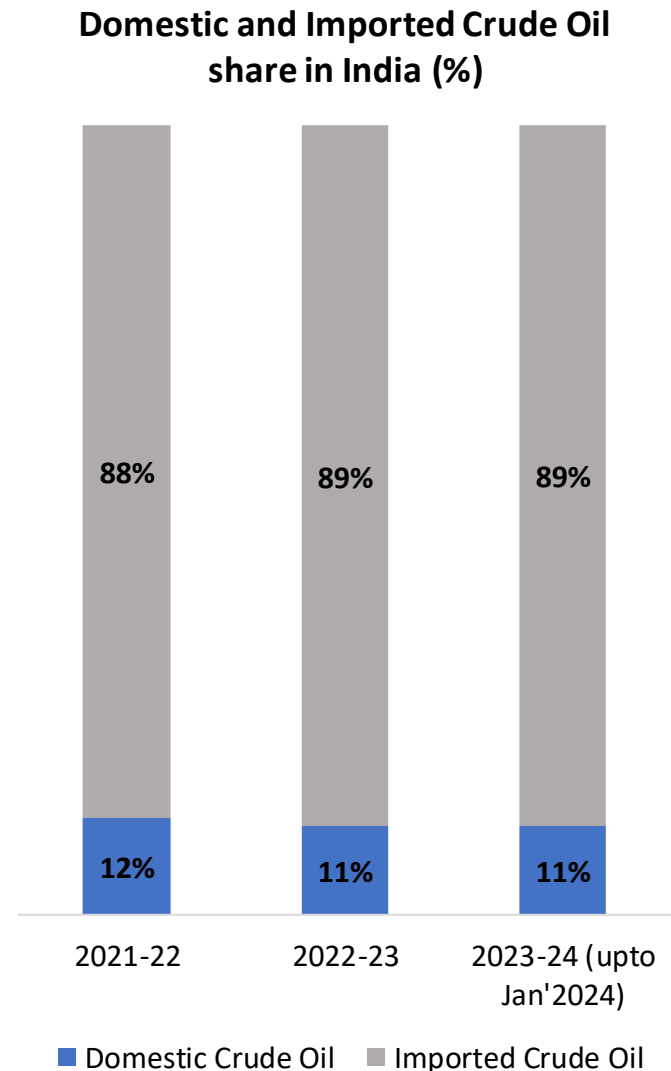
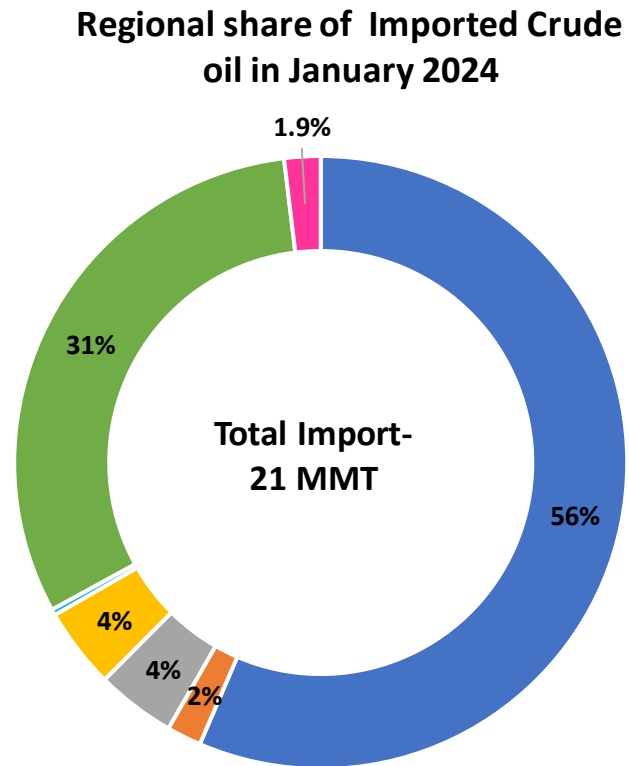
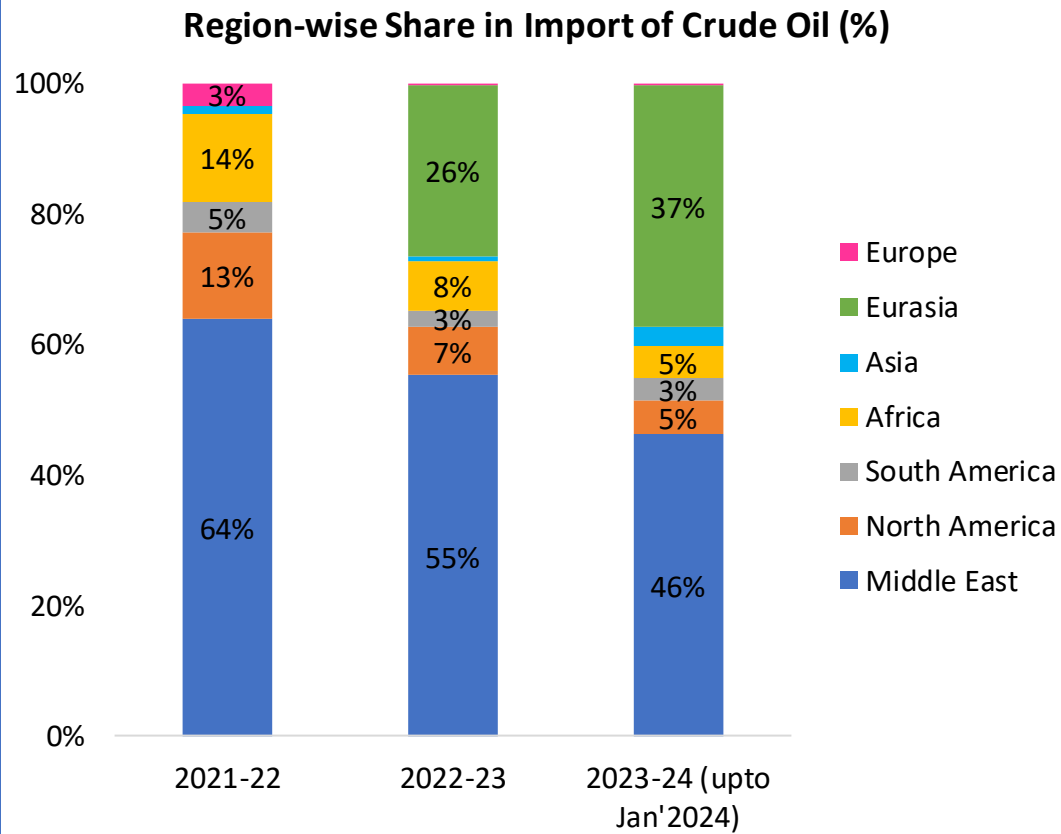
Import/Export of Crude Oil and Petroleum Products ('000 Tonnes)							
Petroleum Products	Import/Export	Monthly			Yearly		
		Jan'22	Jan'23	Jan'24	2021-22	2022-23	2023-24 (up to Jan'2024)
Crude Oil	Import	19254	20229	21387	212382	232700	194157
	Export	0	0	0	0	0	0
	Net Import	19254	20229	21387	212382	232700	194157
LPG	Import	1388	1709	1614	17043	18335	15136
	Export	49	48	45	513	540	432
	Net Import	1339	1661	1569	16530	17796	14704
Diesel	Import	3	5	5	43	322	34
	Export	2578	1991	2022	32407	28494	23361
	Net Import	-2575	-1986	-2017	-32364	-28172	-23327
Petrol	Import	0	0	0	671	1069	717
	Export	1082	1165	974	13482	13127	10868
	Net Import	-1082	-1165	-974	-12812	-12058	-10150
Others	Import	2128	2069	2351	21259	24871	24089
	Export	1362	1297	1796	16352	18854	16801
	Net Import	766	771	555	4907	6017	7288

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

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

Source: PPAC

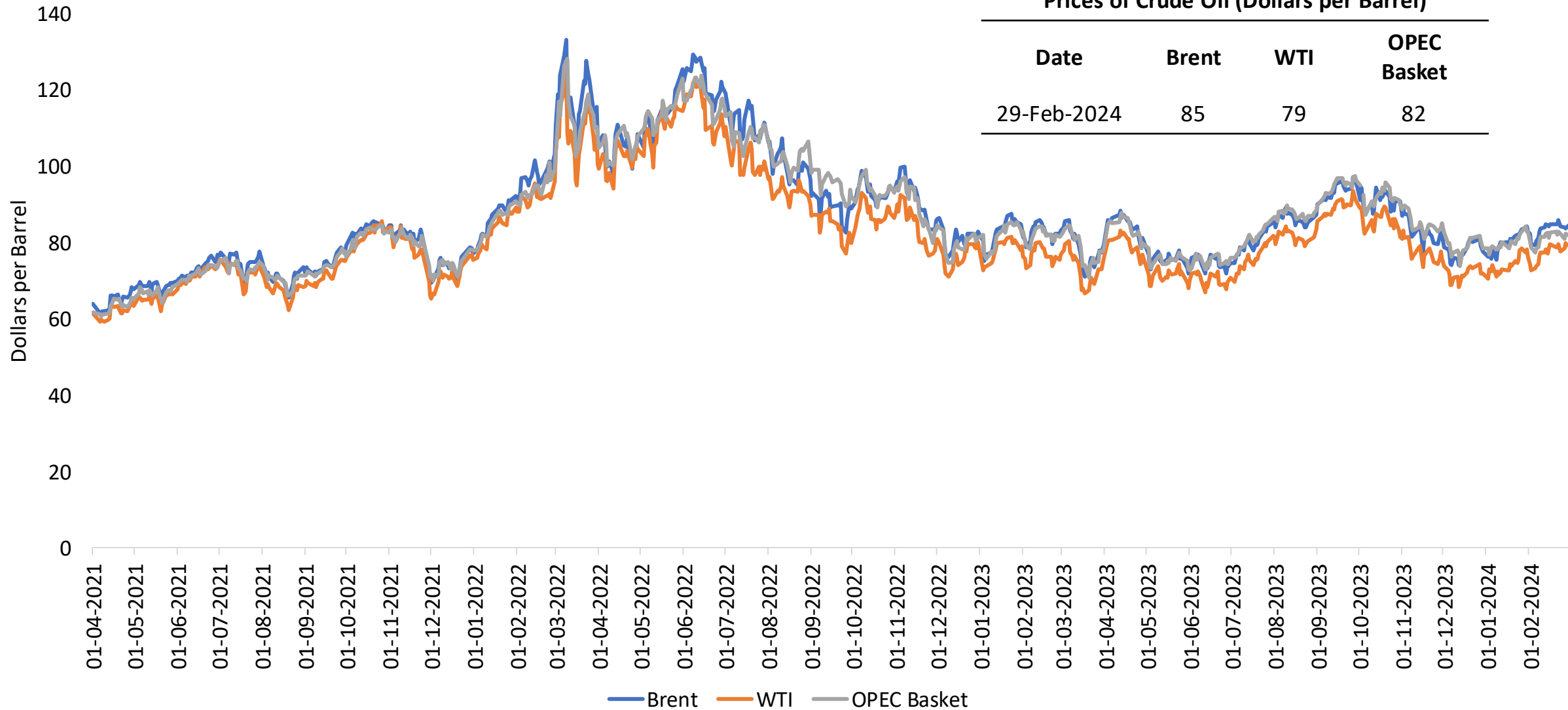
Petroleum Products Market Scenario (3/3)



Total Import of Crude Oil (MMT)			
Total Import	2021-22	2022-23	2023-24 (up to Jan'2024)
Crude Oil	212	233	194

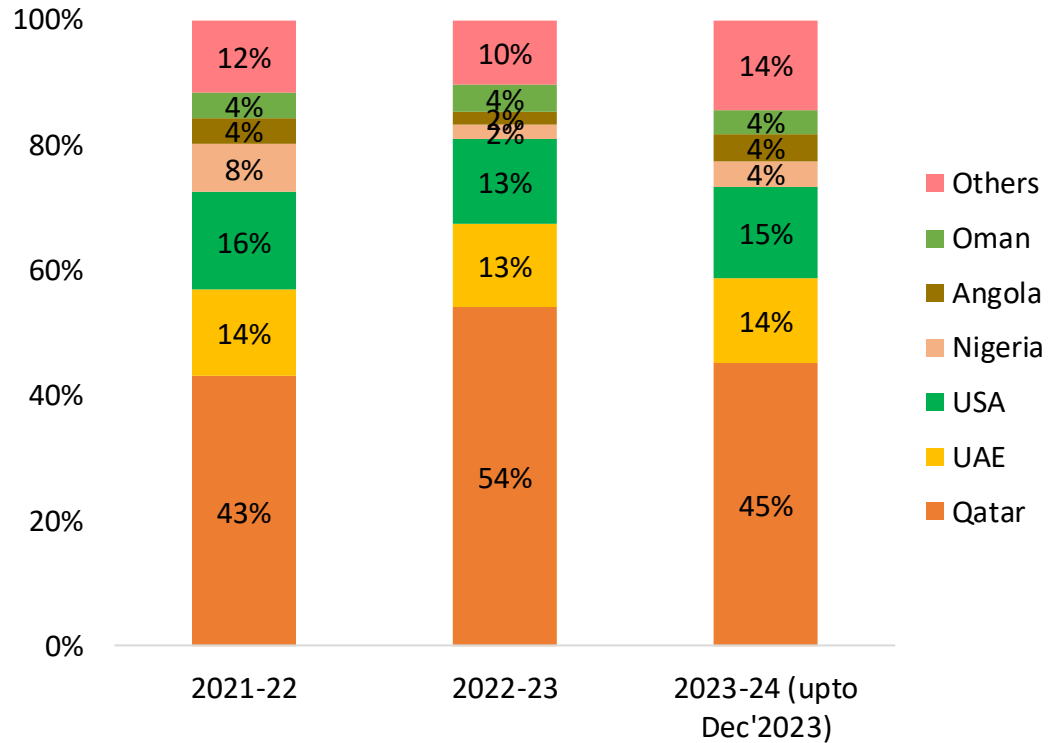
Daily Prices of Crude Oil

Daily Prices of Crude Oil

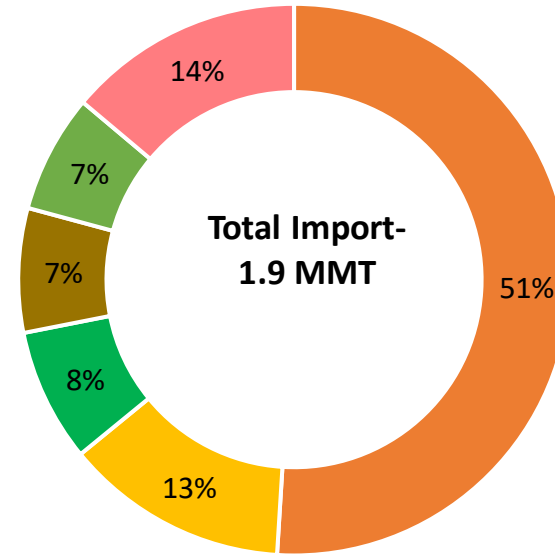


Gas Market Scenario

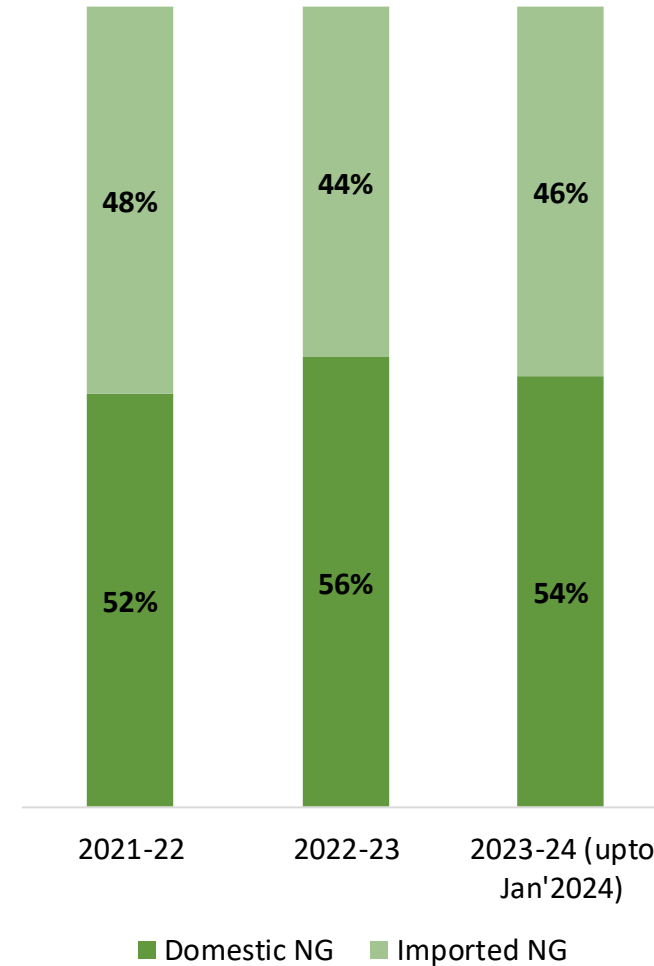
Region-wise Share in Import of LNG (%)



Country Share of Imported LNG in December 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.

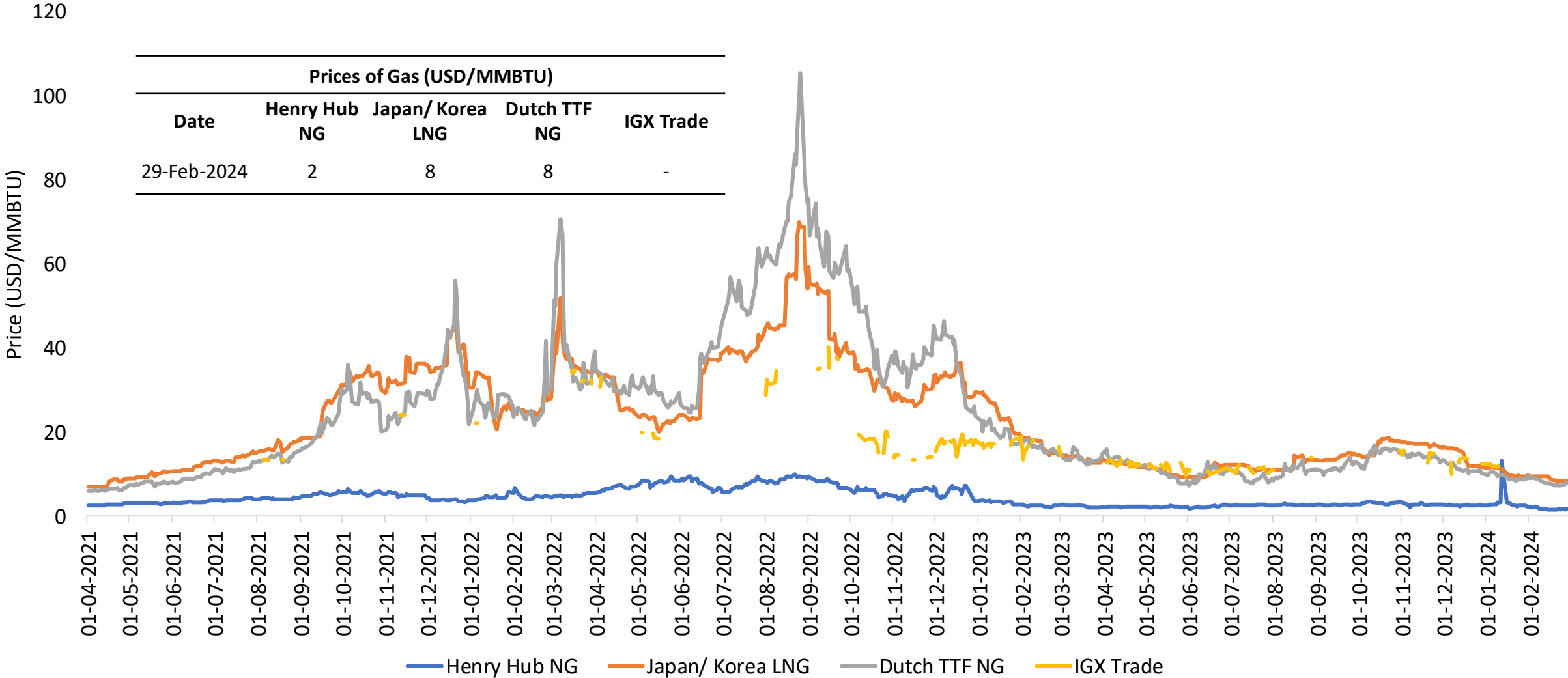
Total Import of Liquefied Natural Gas (LNG) (MMT)			
Total Import	2021-22	2022-23	2023-24 (upto Jan'2024)
LNG	23.42	19.85	19.24

NOTE: The data is latest available

Source: MoCI and PPAC

Daily Prices of Gas

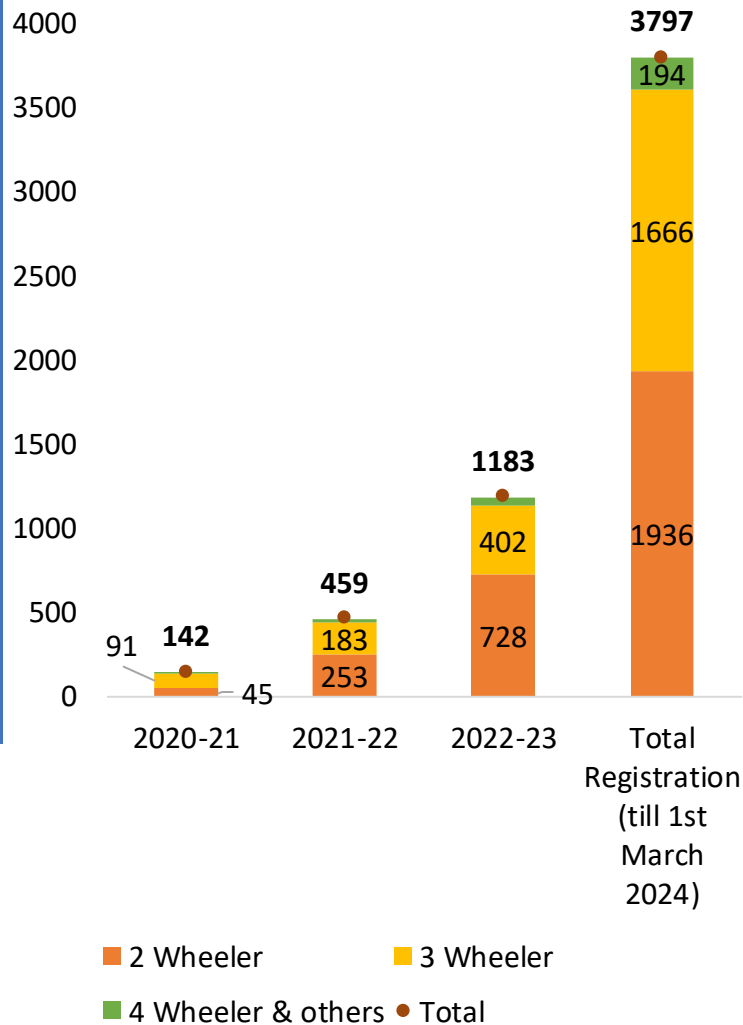
Gas Daily Market Price



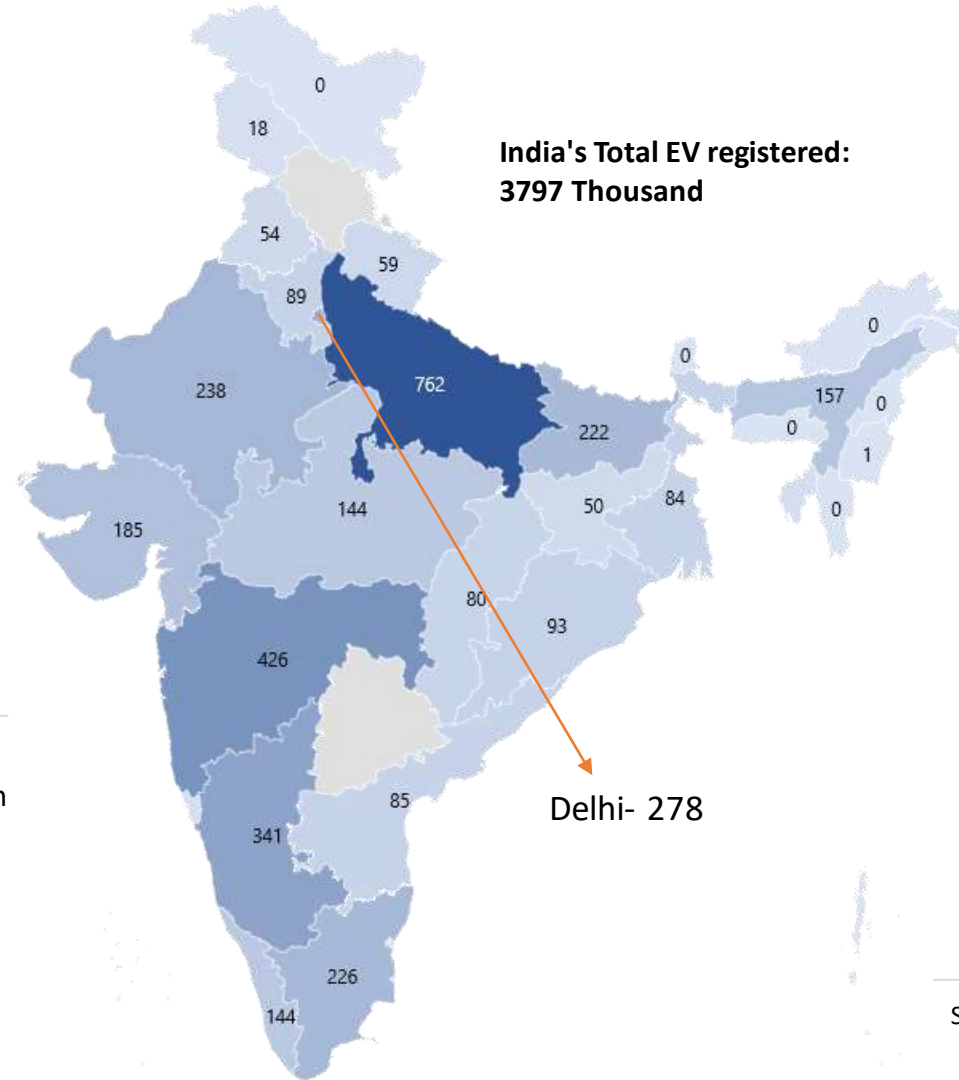
MMBTU- Million Metric British Thermal Unit

Status of Electric Mobility in India

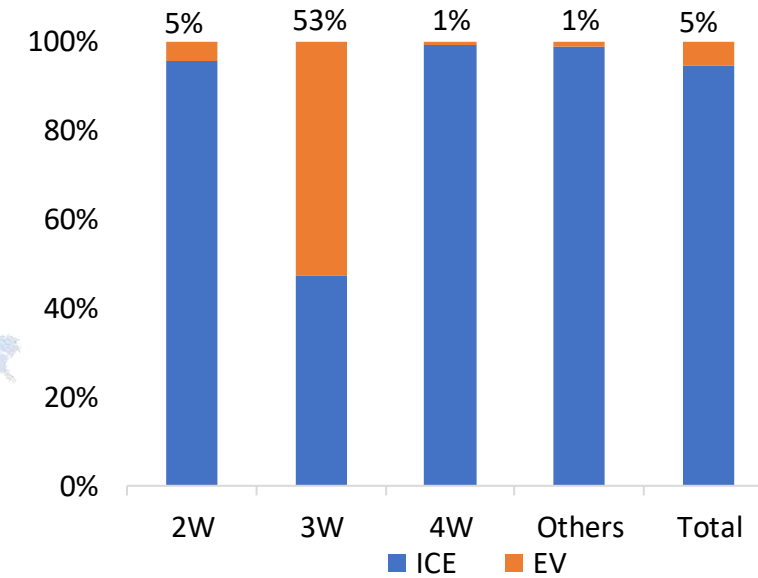
National EV registration (in Thousands)



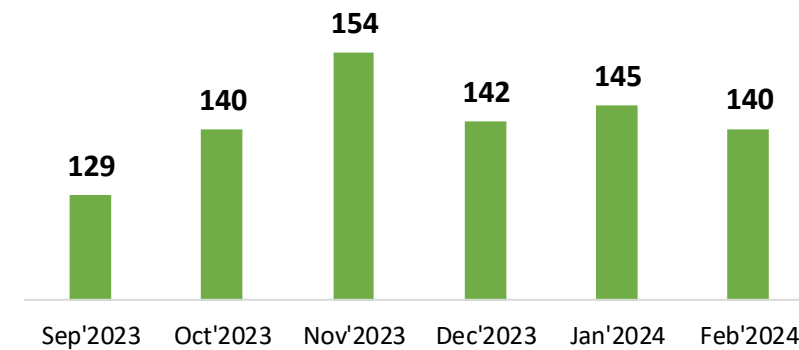
Cumulative State-wise EV registration as on 1st March 2024 (in Thousands)



EV and ICE sale composition in 2022-23



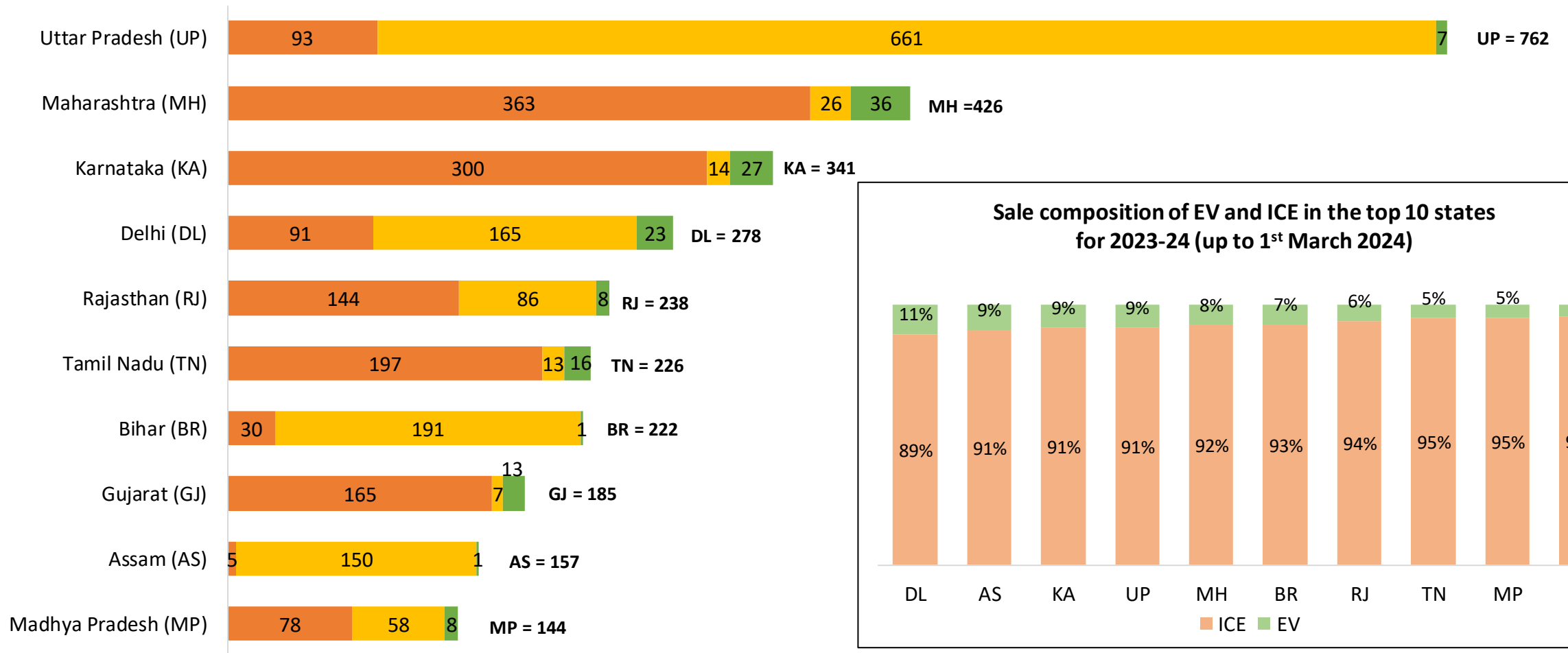
Provisional Monthly EV registered (in Thousands)



Source: VAHAN Dashboard

Status of Electric Mobility in India

**Top 10 States for Electric Vehicles (in Thousands)
as on 1st March 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.

[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 February 2024

- The Ministry of New and Renewable Energy (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 National Green Hydrogen Mission (NGHM).
- The Ministry of Petroleum and Natural Gas has released the scheme for providing [financial assistance to the Compressed Bio Gas \(CBG\) producers for procurement of biomass aggregation machinery](#) to support the collection of biomass with a total financial outlay of Rs 564.75 crore for the period of 2023-24 to 2026-27.
- The MNRE has sanctioned the project '[Green Energy Corridor \(GEC\) Phase II](#)' will facilitate the evacuation of power from renewable energy (RE) power project comprising 13 GW capacity along with 12 GWh Battery Energy Storage System (BESS) in Ladakh.
- Prime Minister Shri Narendra Modi approved [PM-Surya Ghar: Muft Bijli Yojana](#) on 13th February 2024 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 Ministry of Environment, Forest and Climate Change (MoEFCC) has notified the [methodology for the calculation of Green Credit](#) aiming to promote tree plantation and enhance green cover across the nation. The Forest Department of every State and Union territory shall identify degraded land parcels (5 hectares and above), including open forest and scrubland, wasteland, and catchment areas, under their administrative control and management, which shall be made available for tree plantation to promote activities for increasing the green cover across the country for generation of Green Credit.
- The Ministry of Power notified the [Electricity \(Late Payment Surcharge and Related Matters\) \(Amendment\) Rules, 2024](#) to ensure optimum utilization of available power generating capacity. The key amendments are:
 - Surplus power utilization: Generators must now offer surplus power in the power exchange, or forfeit fixed charges for that capacity.
 - Price cap on surplus power: Surplus power cannot be sold above 120% of energy charge + transmission charge in the power exchange.
 - Faster grid access restoration: Distribution companies facing payment defaults can get quicker access restoration upon settling dues.

Key Highlights or Announcements of February 2024

- The Ministry of Power has notified the [Electricity \(Rights of Consumers\) Amendment Rules, 2024](#). The key amendments are:
 - The amendments further shorten the timeline for obtaining new electricity connections, making the process more efficient.
 - Consumers in the Resident Welfare Association now have the freedom to choose their connection type, along with separate billing for common areas and backup generators in residential societies.
 - Distribution companies are now required to install check meters to verify electricity consumption in case of consumer complaints, ensuring transparency and accountability.
 - The rules simplify the process of setting up rooftop solar installations, promoting renewable energy adoption. Provisions include exemptions for technical feasibility studies for systems up to 10 kW capacity and a reduced timeline for larger systems.
 - Consumers can now obtain separate electricity connections specifically for charging their Electric Vehicles (EVs), supporting the transition to sustainable transportation.
- SECI has released the request for selection of [electrolyser manufacturers for setting up manufacturing capacities for electrolysers](#) and [green hydrogen producers for setting up production facilities for green hydrogen](#) in India under Strategic Interventions for Green Hydrogen Transition (SIGHT) Scheme (Tranche-I)
- Ministry of Heavy Industries have [extended the tenure of the Production Linked Incentive \(PLI\) scheme for Automobile and Auto Components by one year](#) and incentive will be provided for determined sales for a total of five consecutive financial years, starting from the financial year 2023-24 to 2027-28 and disbursement of incentive will take place in the following financial year.



VASUDHA
FOUNDATION
Green ways for a good earth!

Vasudha Foundation

CISRS House, 14 Jangpura B, Mathura Road,
New Delhi - 110014, India
Tel/fax: + 91-11-2437-3680



Visit us at <http://www.vasudha-foundation.org/>

For more information about Vasudha Foundation, email us at
info@vasudhaindia.org