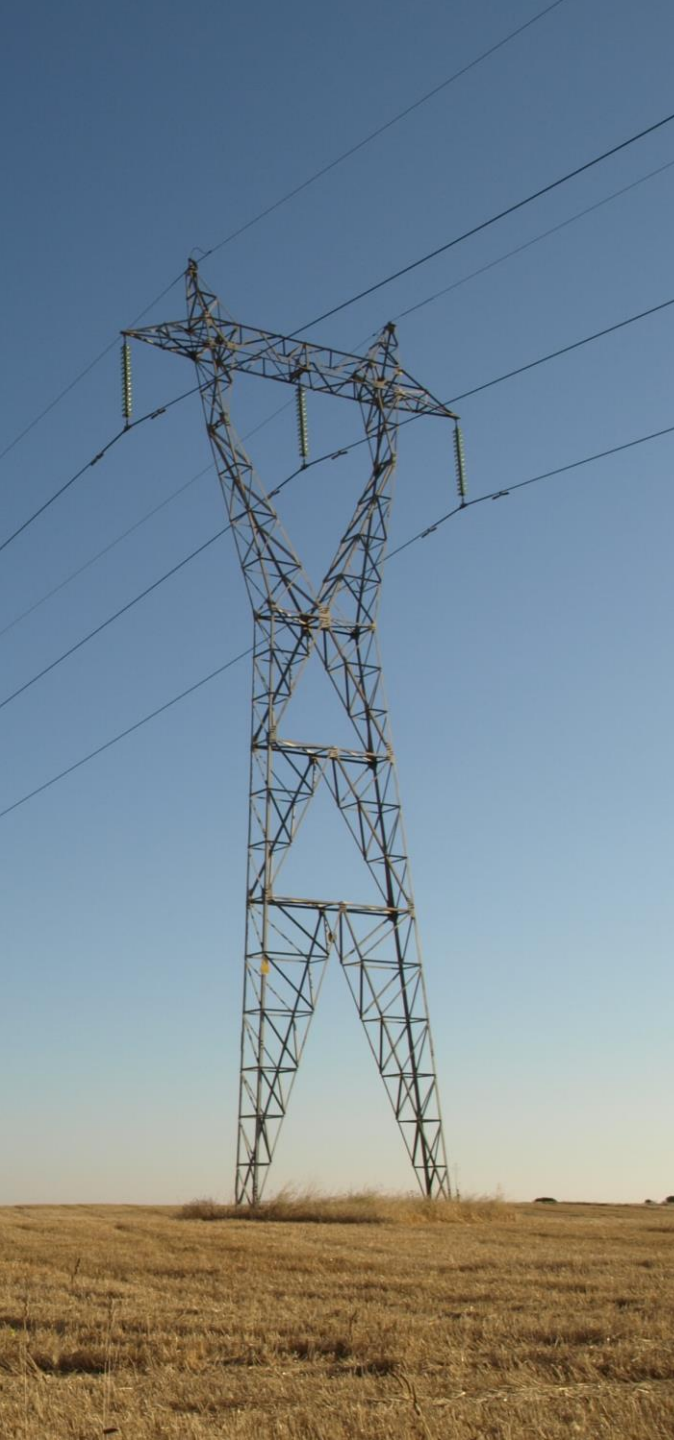


India's Energy Overview

SEPTEMBER 2022



VASUDHA
FOUNDATION
Green ways for a good earth!



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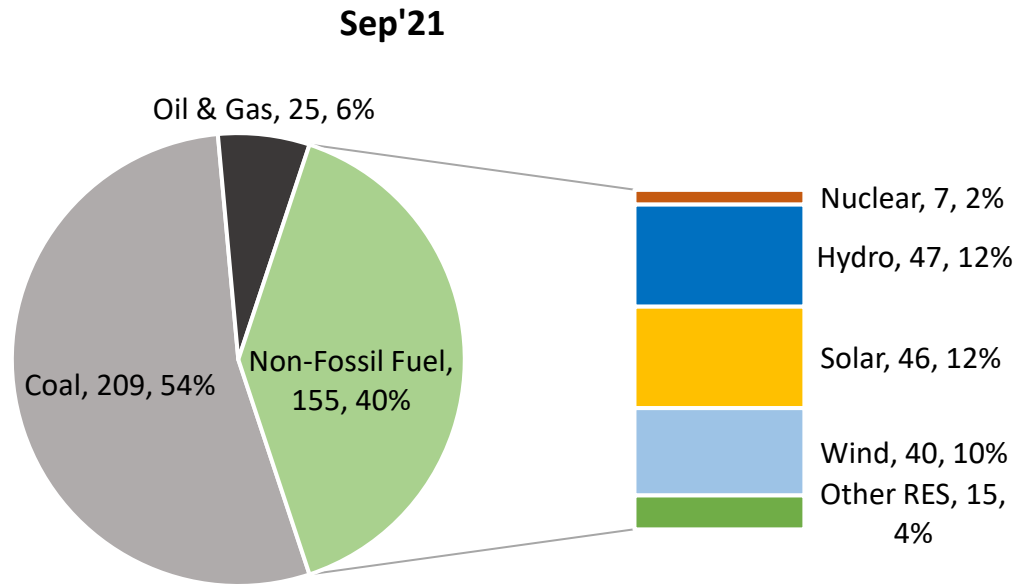
Recent Interventions to promote Renewable Energy



Key Highlights or Announcements of September'22

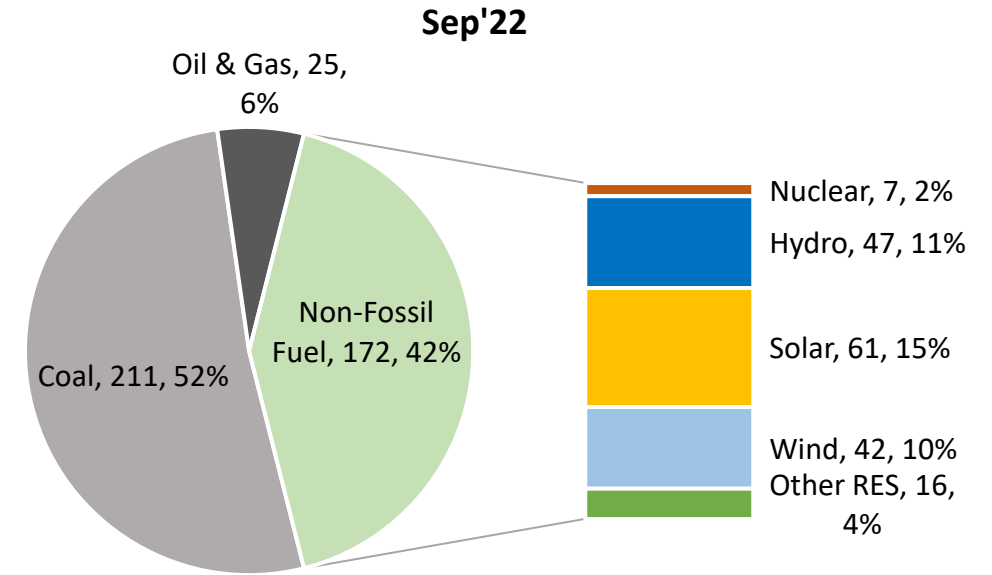


India's Electricity Capacity Mix (1/2)



Total Capacity: 389 GW

*Capacity Numbers are in GW

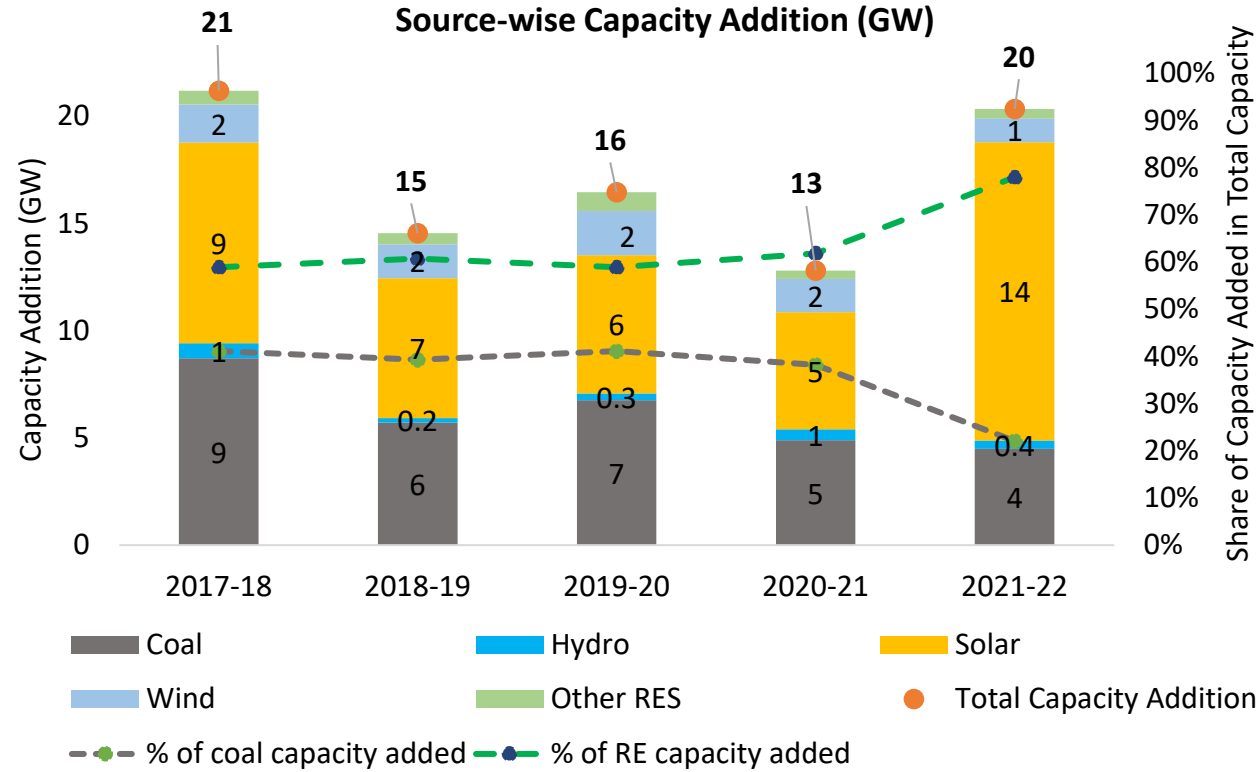


Total Capacity: 408 GW

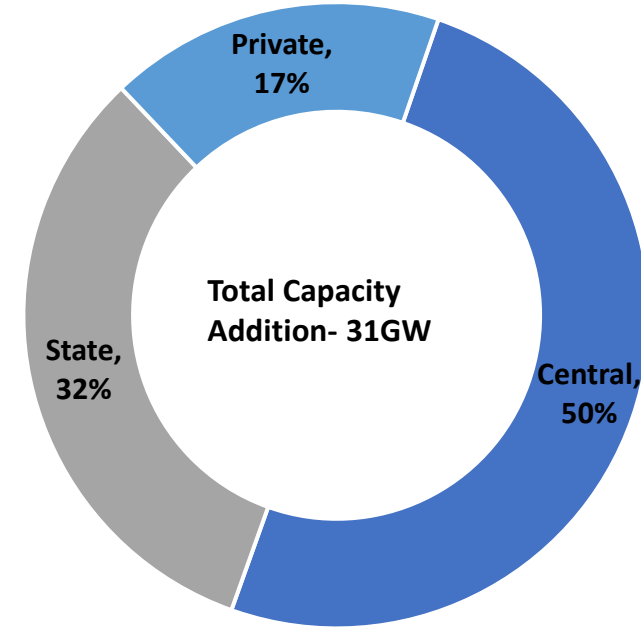
- India's electricity generating capacity is 408 GW as on Sep'22. Major contributors to the capacity are coal 211 GW (52%), solar 61 GW (15%), hydro 47 GW (11%), and wind 42 GW (10%).
- Non-fossil fuel's generating capacity has increased from 155 GW to 172 GW since Sep'21, a jump of 11%. Major capacity addition was in solar technology followed by wind.
- As on Sep'22, India's renewable energy capacity (including large hydro) stood at 165 GW.



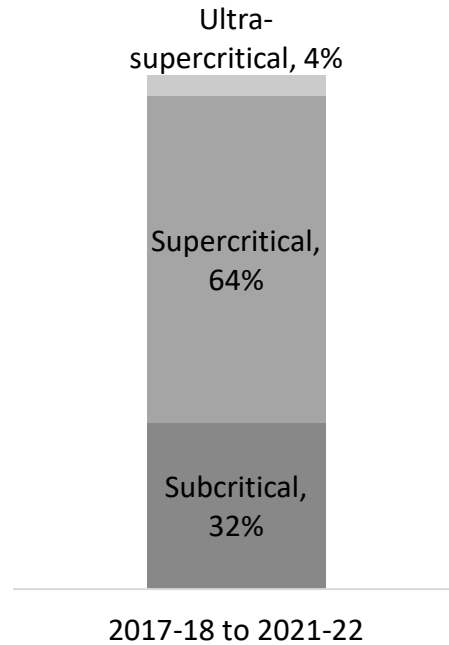
Source-wise Capacity Addition in last 5 years (2/2)



Sectoral Coal Capacity Addition for the last 5 years (2017-18 to 2021-22)



Technology type

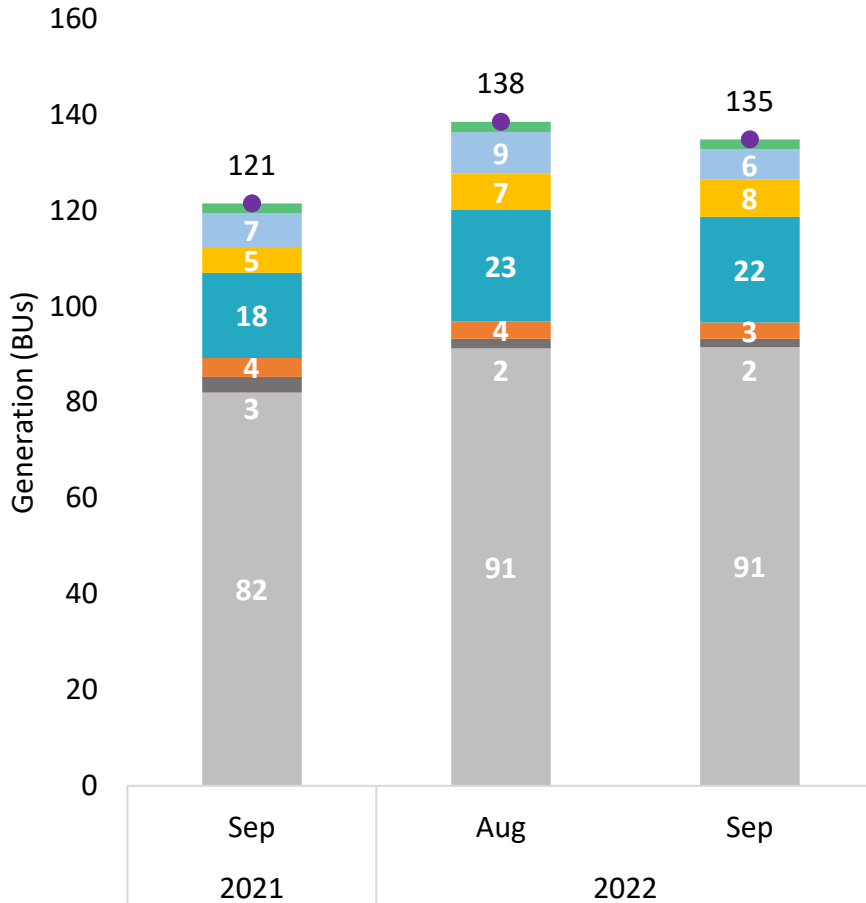


- A total of 55 GW of generation capacity has been added in RE (Hydro, solar, wind, and other) over the past 5 years, whereas the coal capacity addition during the same period was 31 GW, mostly in central sector (50%).
- The share of RE addition in total capacity addition is increasing over the years (from 59% in 2017 to 78% in 2022).
- Since Apr'17, there has been no capacity addition in nuclear power.

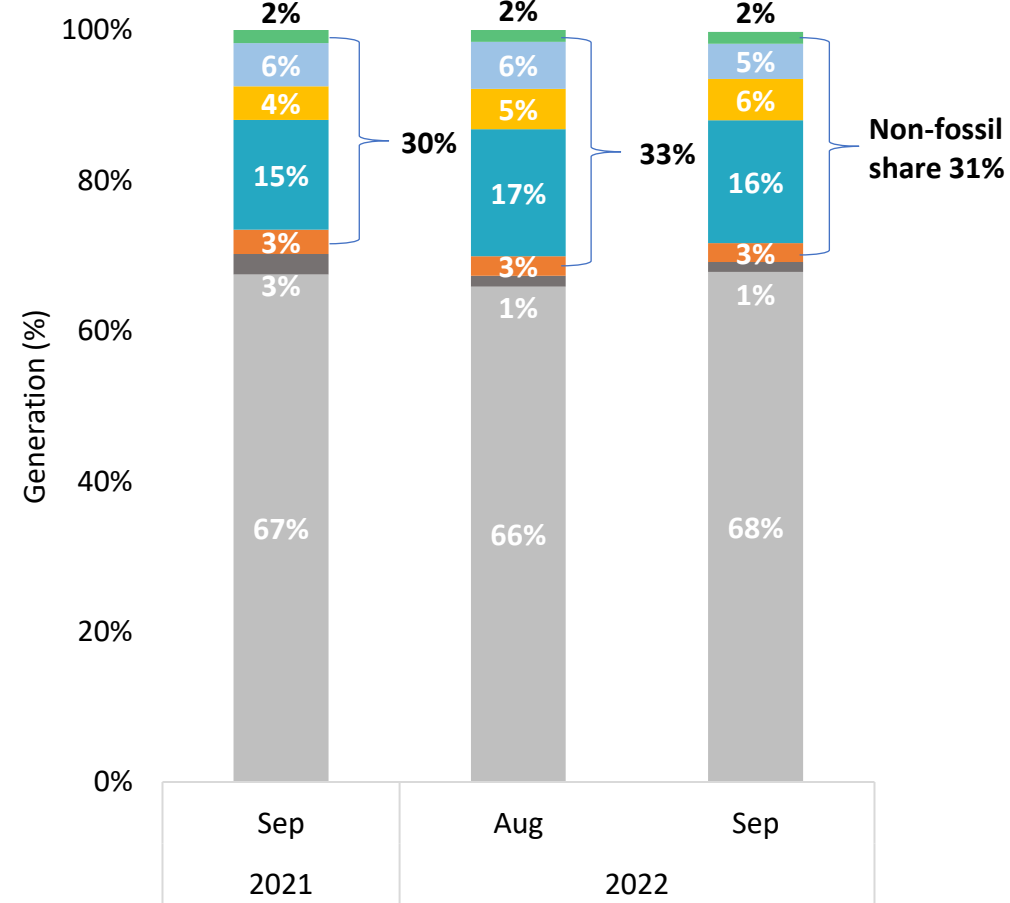


India's Electricity Generation Mix

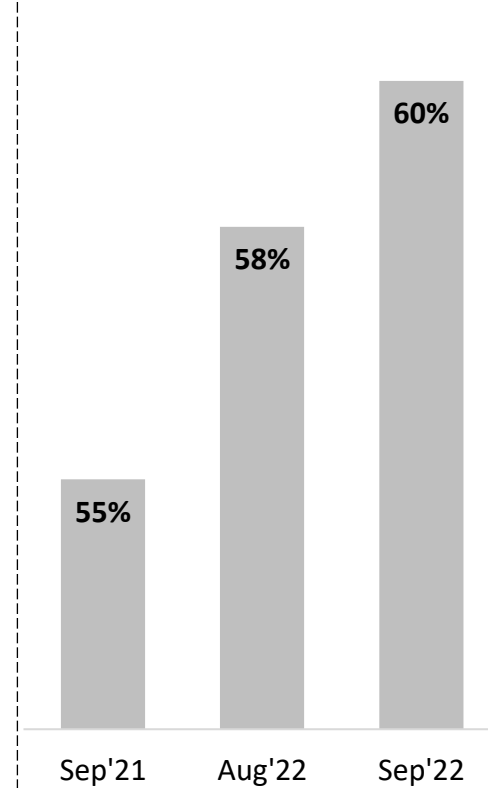
Source-wise Generation Mix (BU)



Source-wise Generation Mix (%)



Average monthly PLF of coal plants (%)



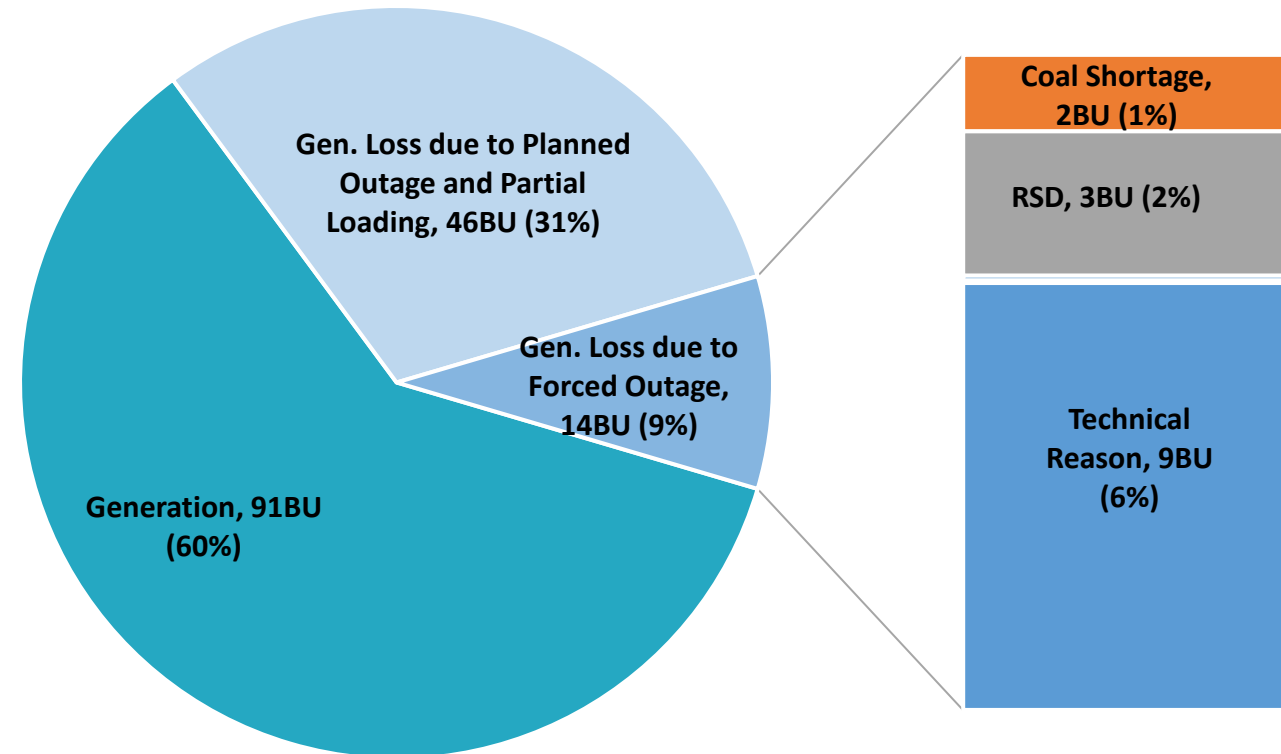
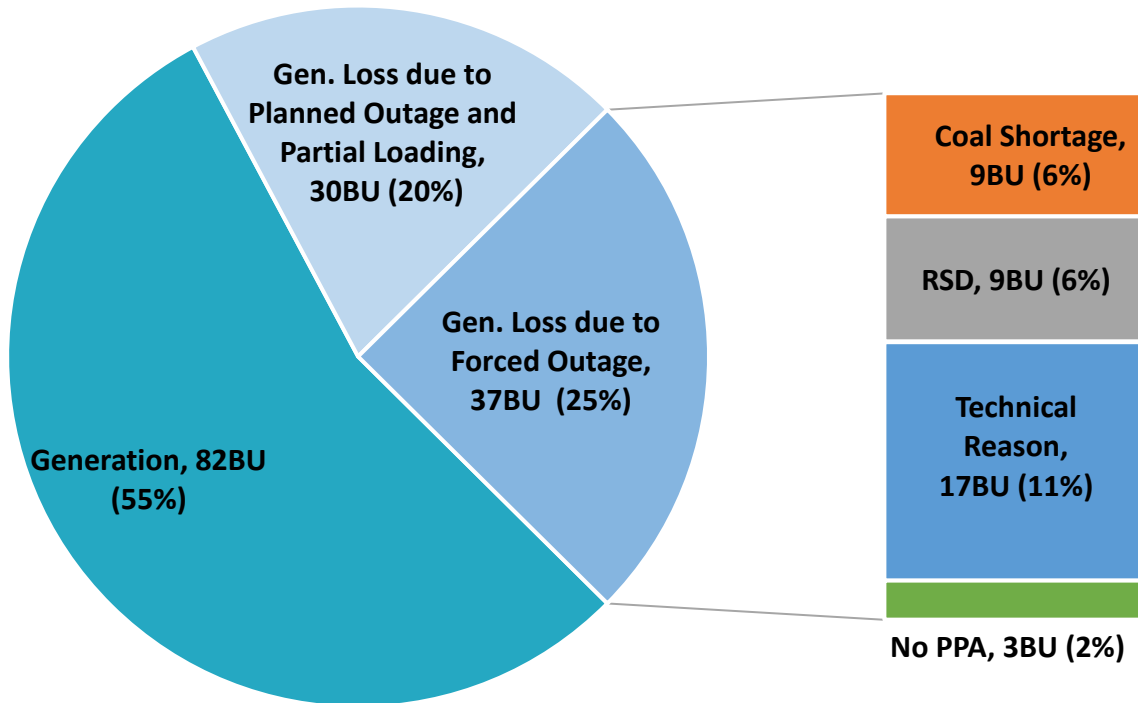
Coal
 Oil & Gas
 Nuclear
 Hydro
 Solar
 Wind
 Other RES
 All India



Coal Generation Loss and Reasons for Forced Outages

Sep'21

Sep'22

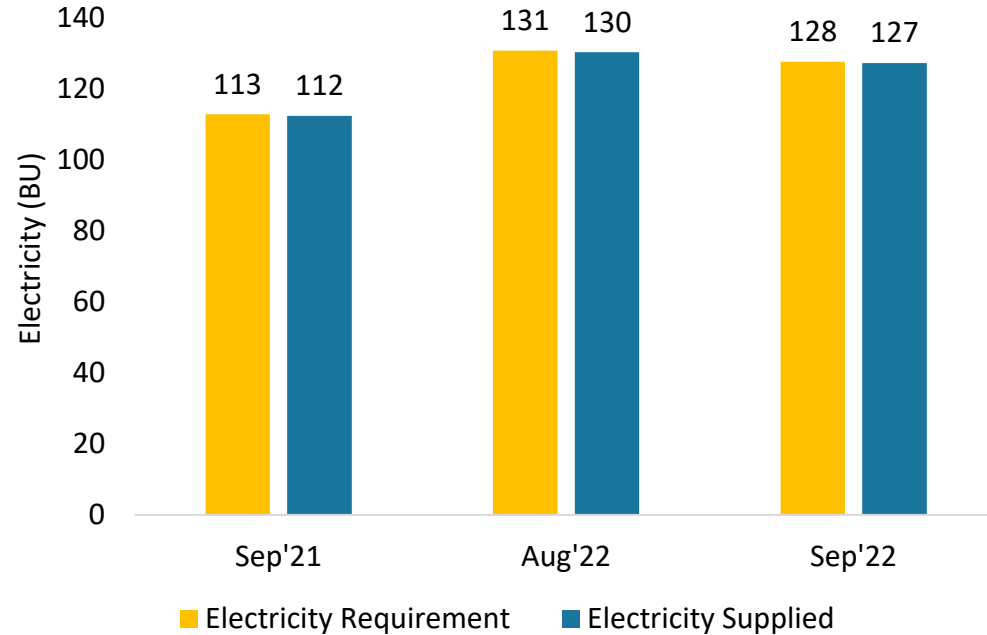


Generation and Generation Loss in BU

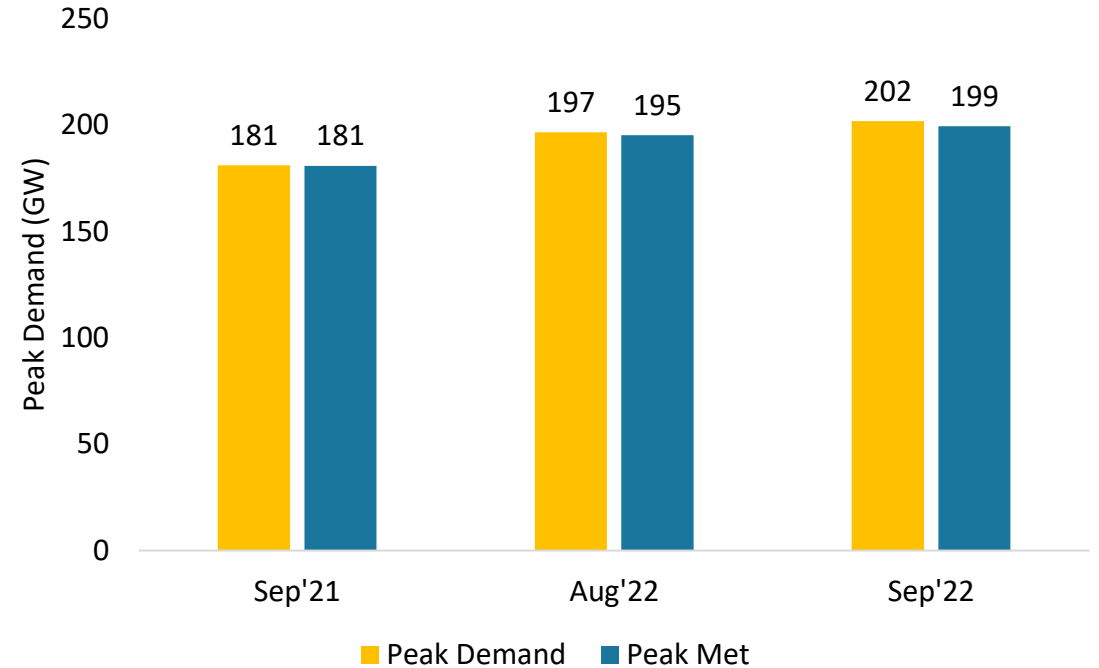


India's Electricity Demand & Supply Position

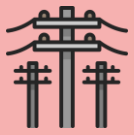
Electricity Supply Position



Peak Demand Position

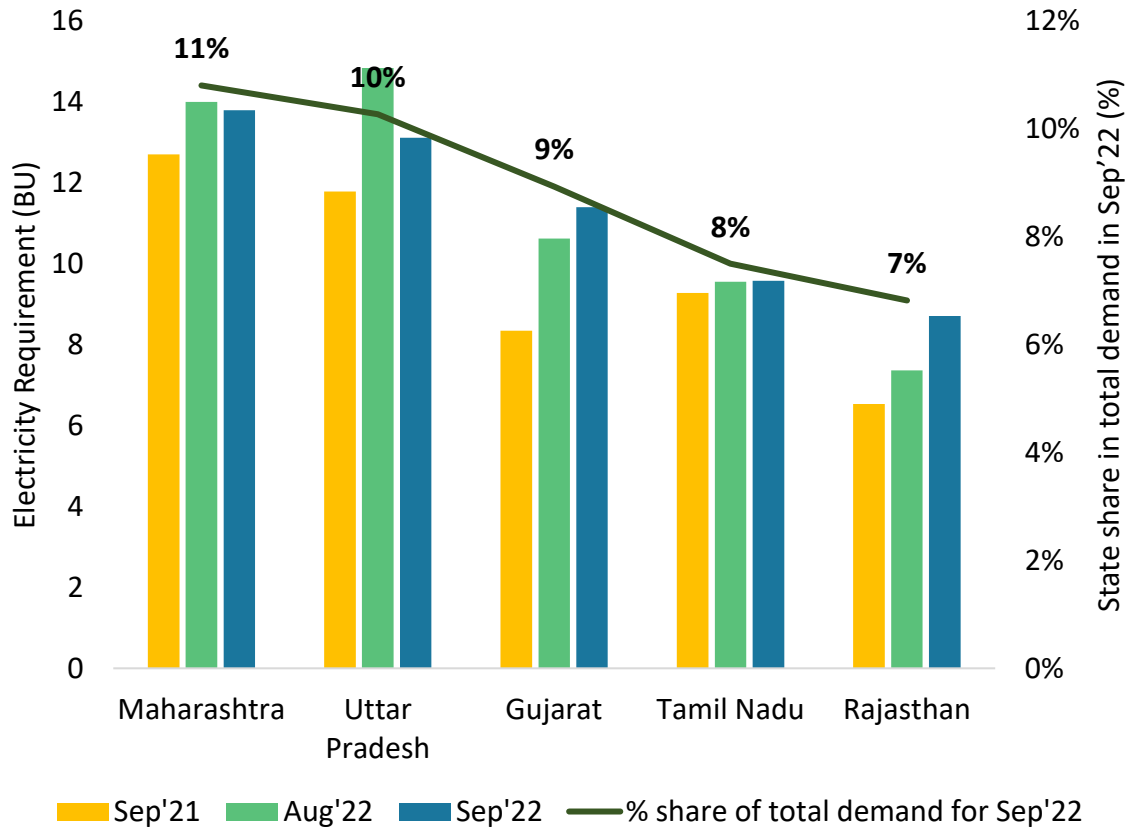


- National electricity demand in Sep'22 increased by 13%, compared to the demand in Sep'21.
- The peak demand deficit in Sep'22 has increased from 0.2% (Sep'21) to 1.1%.
- National peak electricity demand in Sep'22 has increased by 11% as compared to the peak demand in Sep'21.

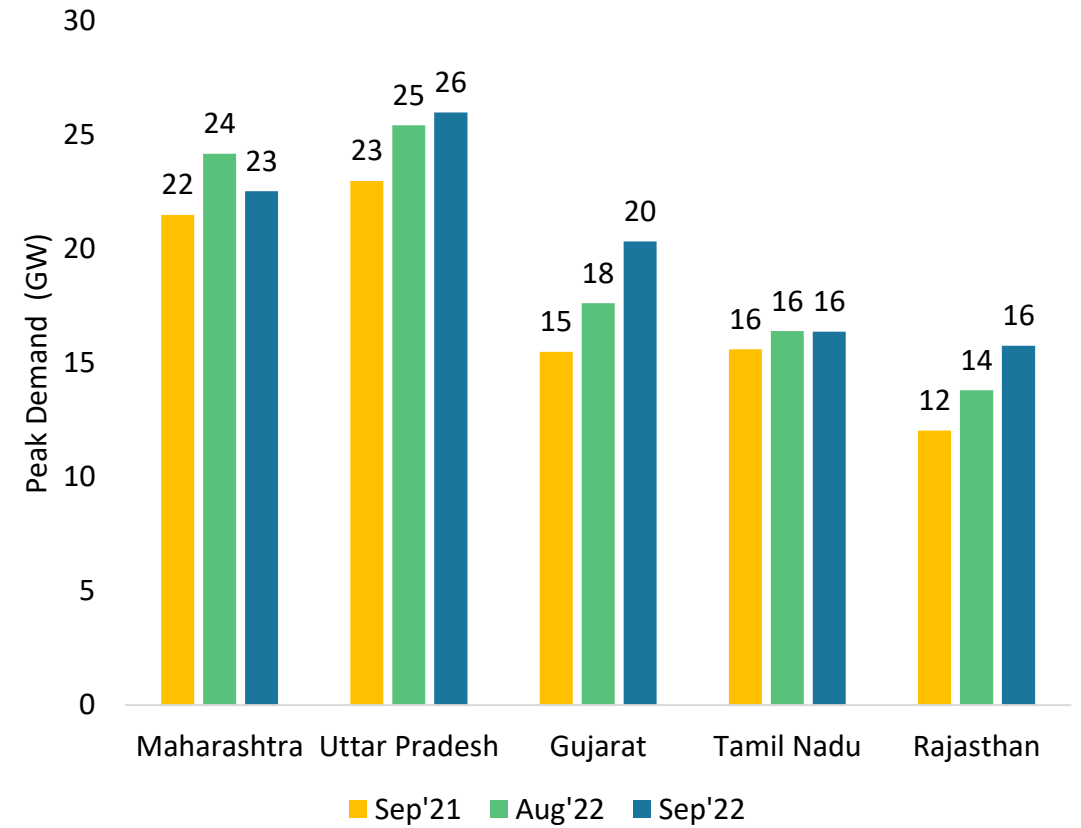


Monthly Electricity Demand of the top 5 states (1/3)

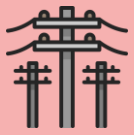
States with Highest Monthly Electricity Requirement



Monthly Peak Demand of top 5 states



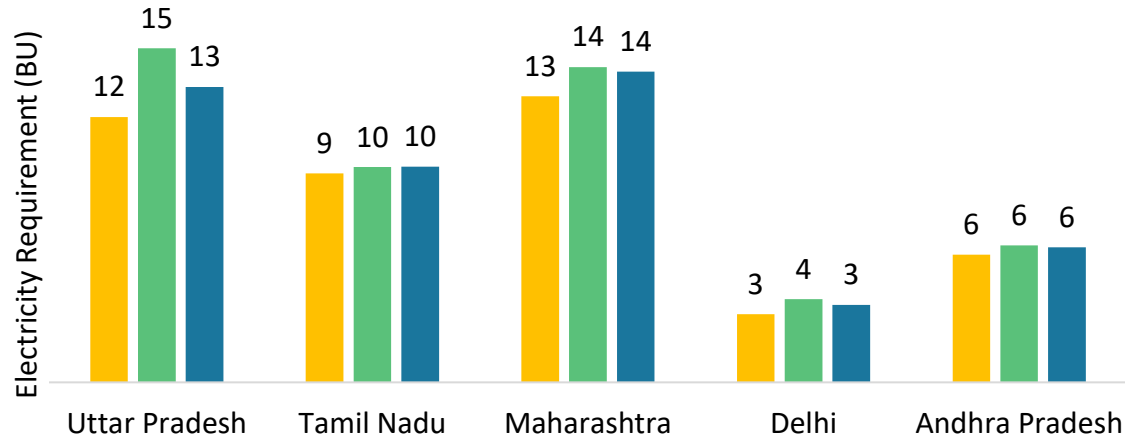
The top 5 states collectively account for a 44% share of India's total electricity requirement (128 BU).



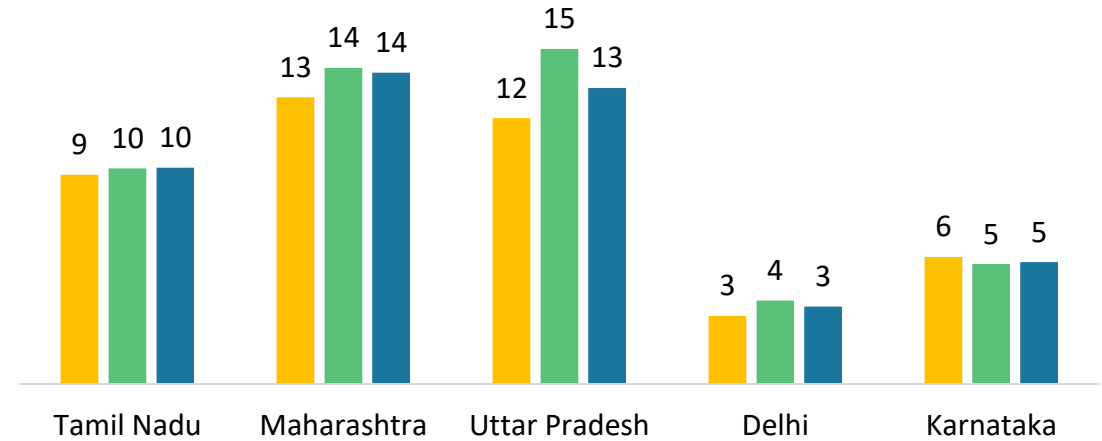
Monthly Electricity Demand of the top 5 states (2/3)

States have been selected on the basis highest electricity consumption in the sector

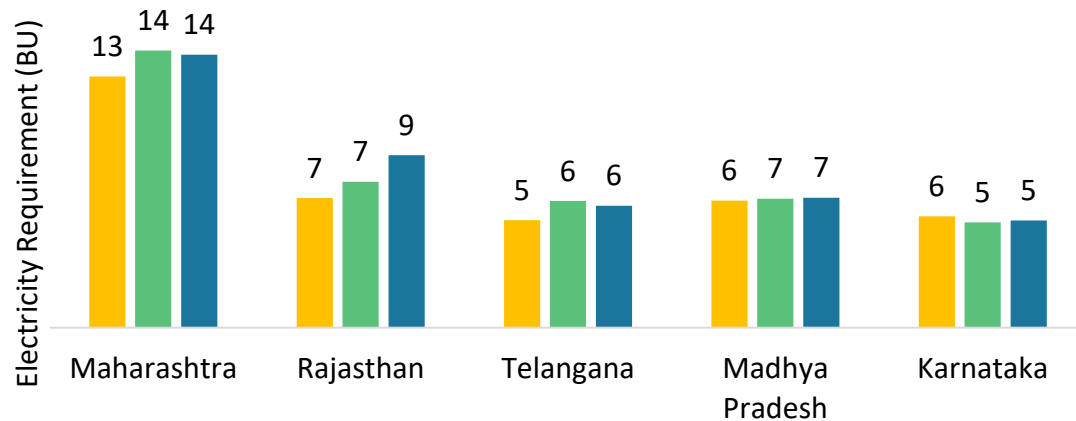
In Domestic Sector



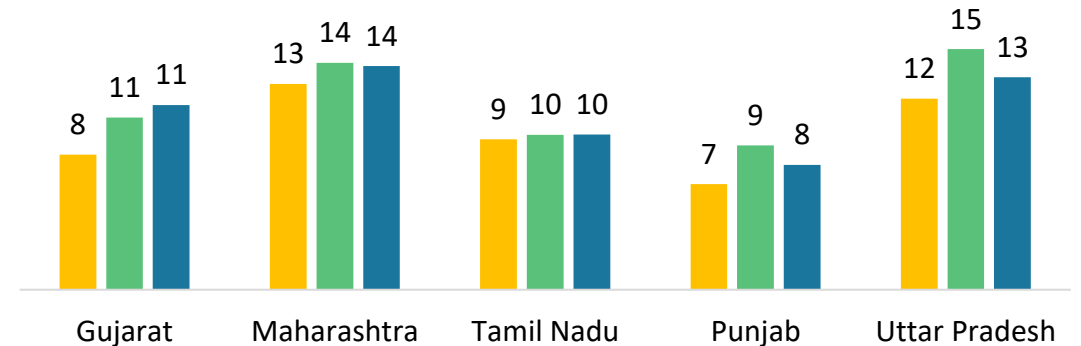
In Commercial Sector



In Agricultural Sector



In Industrial Sector

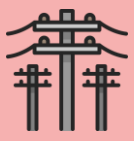


■ Sep'21 ■ Aug'22 ■ Sep'22

Sources: CEA and POSOCO

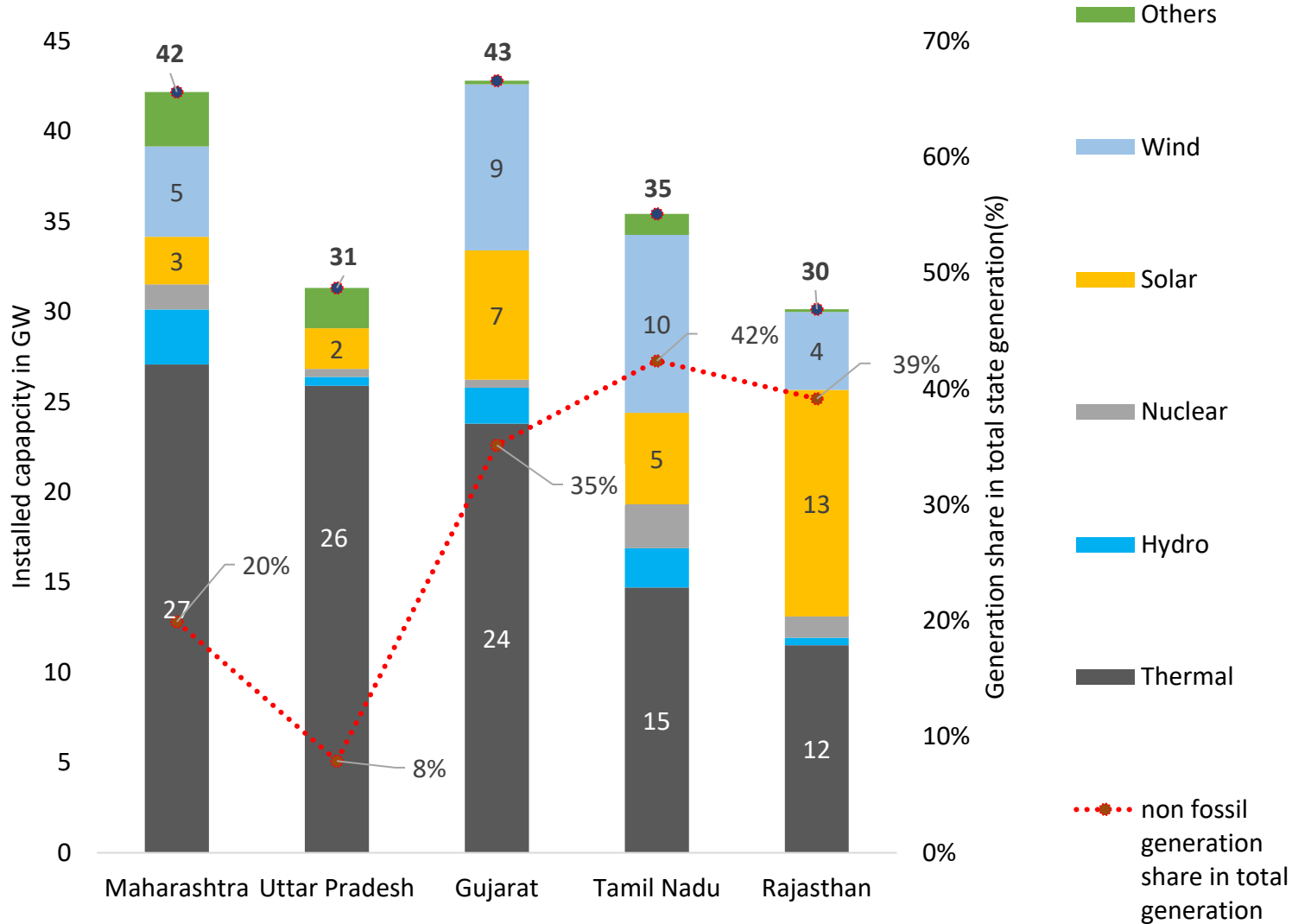
Notes: 1. Top 5 states under sectors are selected based on trued-up sectoral electricity sales in FY20 mentioned in the state tariff orders. However, the numbers presented in the graphs are total monthly electricity sale as sector specific monthly electricity consumption numbers are not available for current financial year.

2. Sep'22 numbers are provisional.

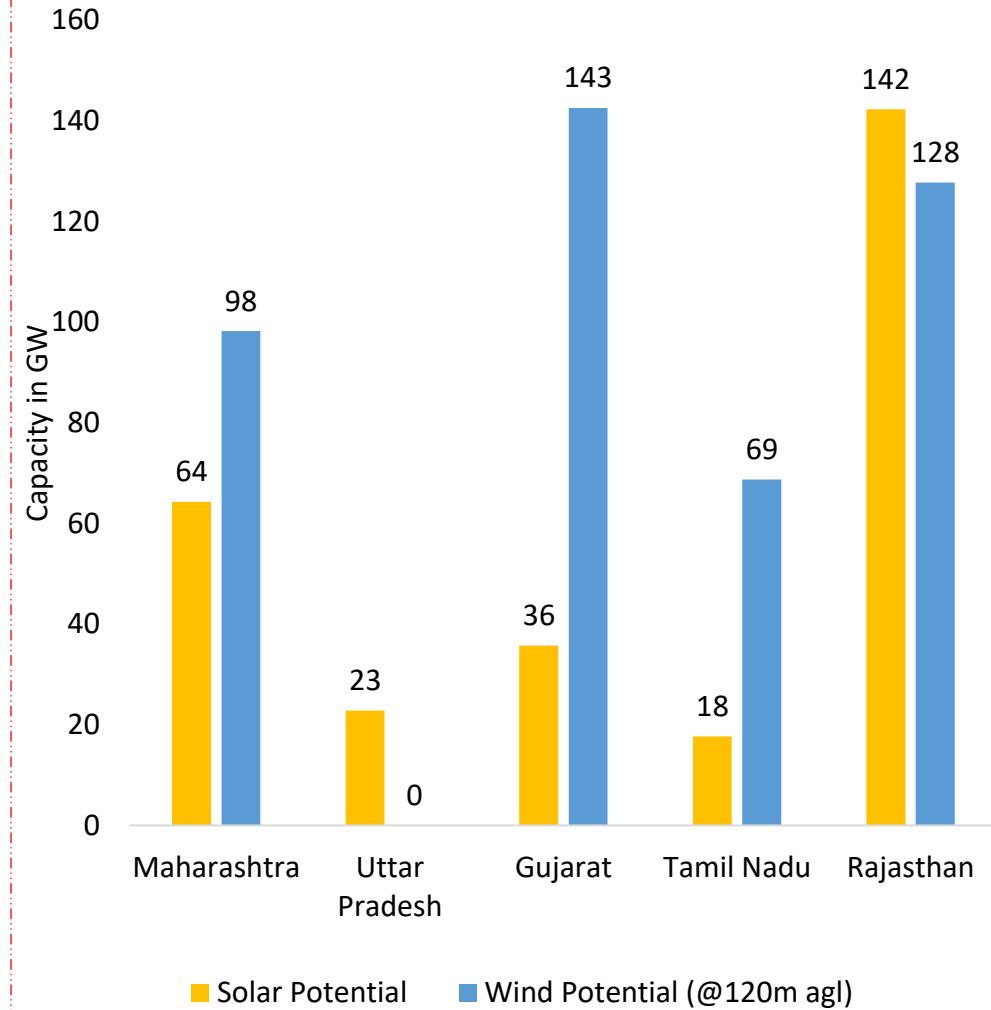


Highest Electricity Demanding States: Energy sources and RE potential (3/3)

State Sources and Generation Share



RE Resource potential in State



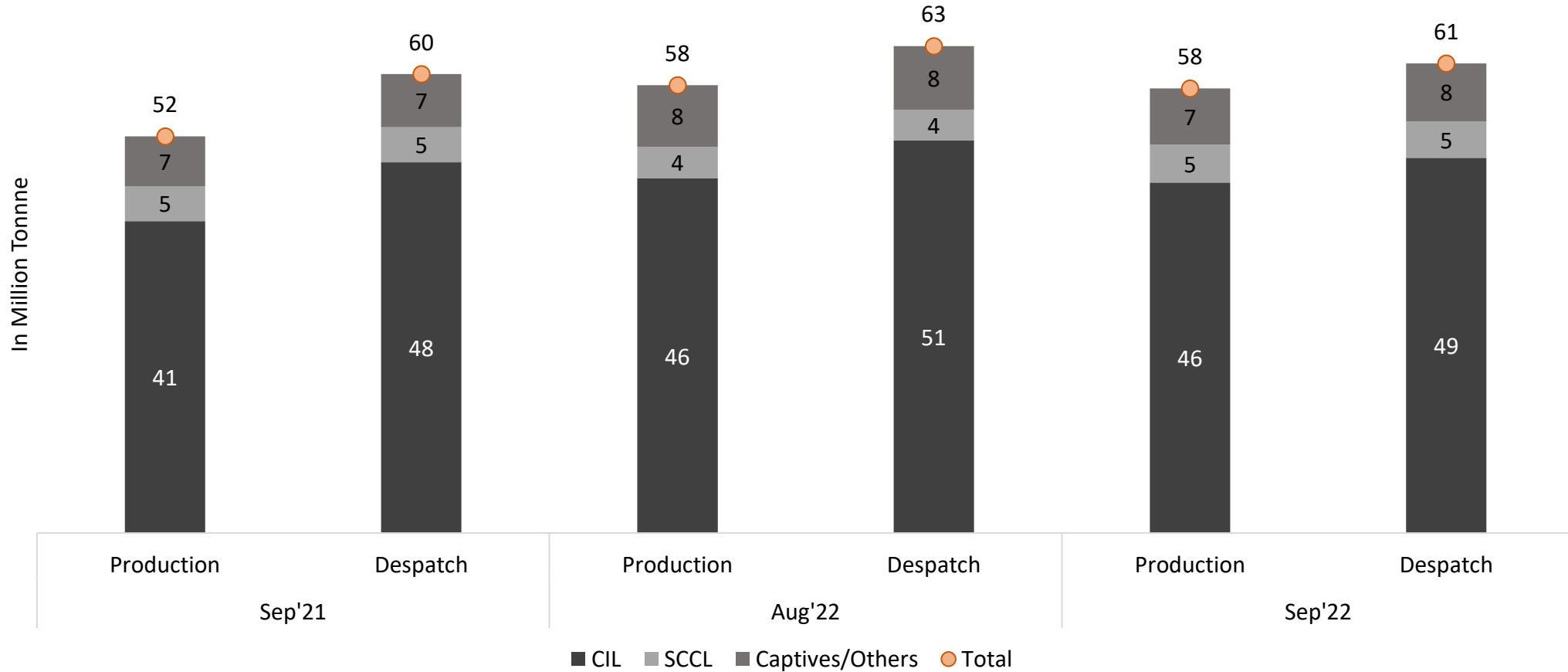
Sources: CEA, MoSPI

Note: The capacity and generation share in the state are based on the plant geographical location and do not represent the actual state contracts/power procurement.





Monthly Coal Statistics

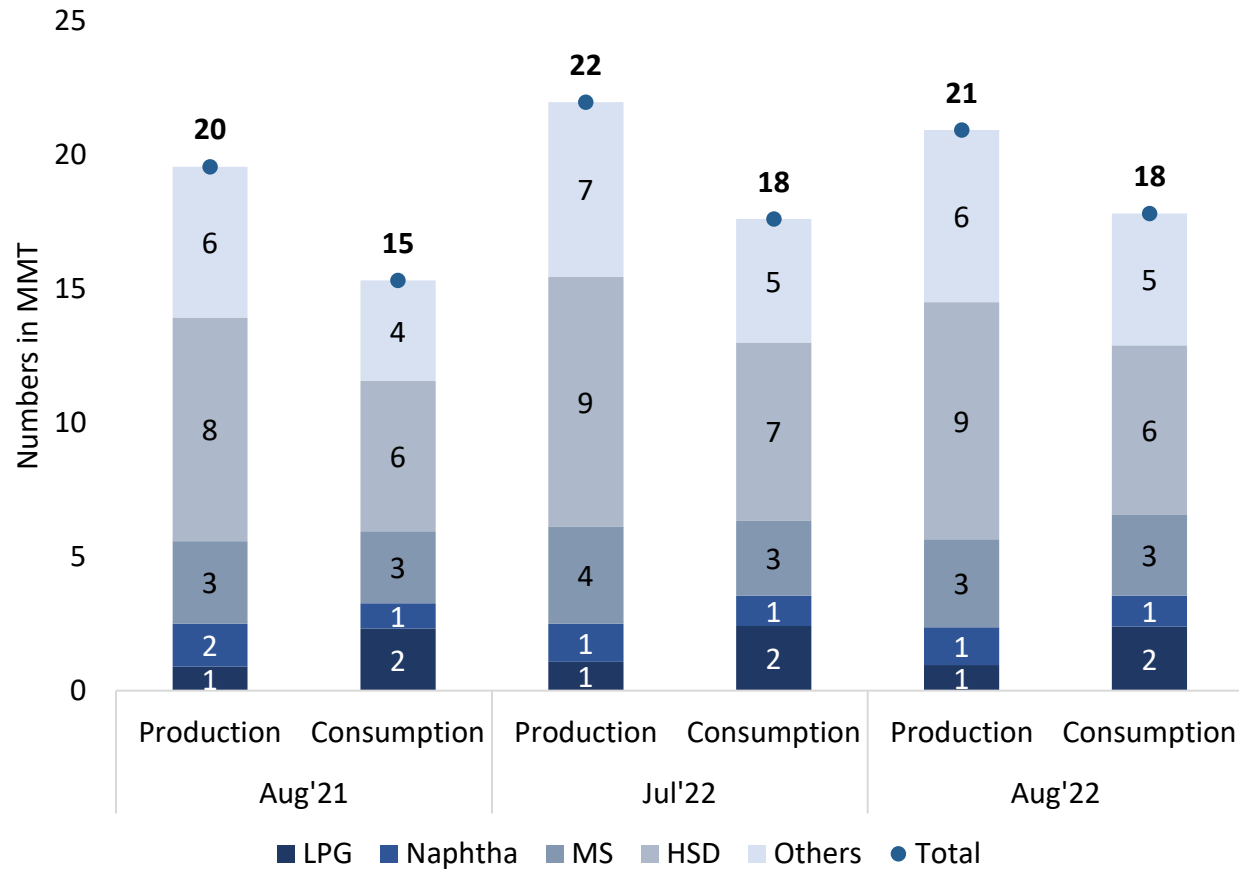


- ❖ India's coal production increased in Sep'22 (58 MT) by 12% as compared to Sep'21 (52MT). Similarly, the coal despatch increased by 2% in September this year as compared to Sep'21.



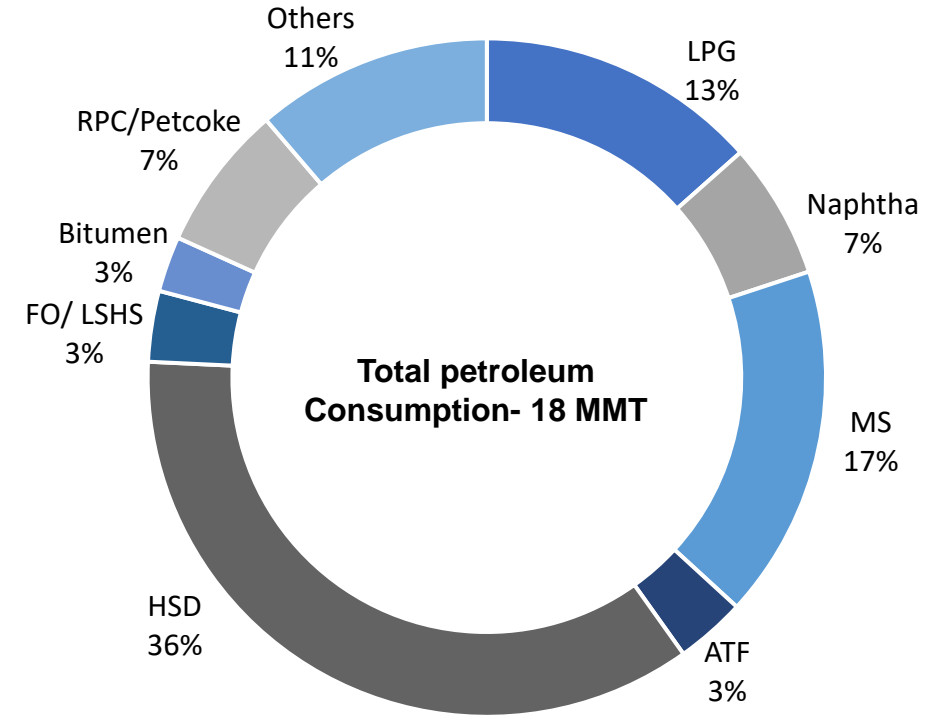
Monthly Petroleum Products Market Scenario (1/2)

Petroleum Product-wise Production & Consumption (MMT)



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

Consumption share of Petroleum Products in August'22



Others include SKO, LDO, Lubes, and Others

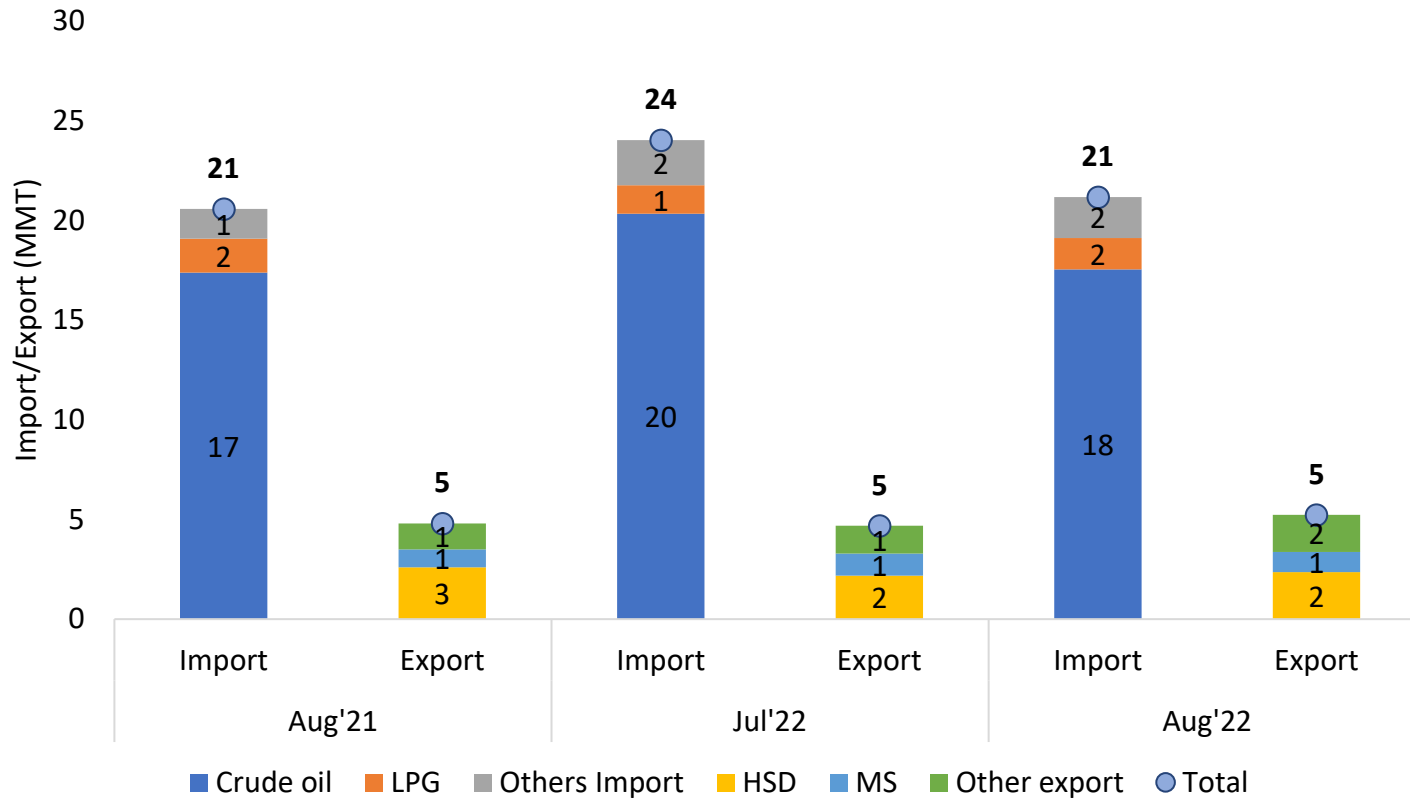
Abbreviations

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



Monthly Petroleum Products Market Scenario (2/2)

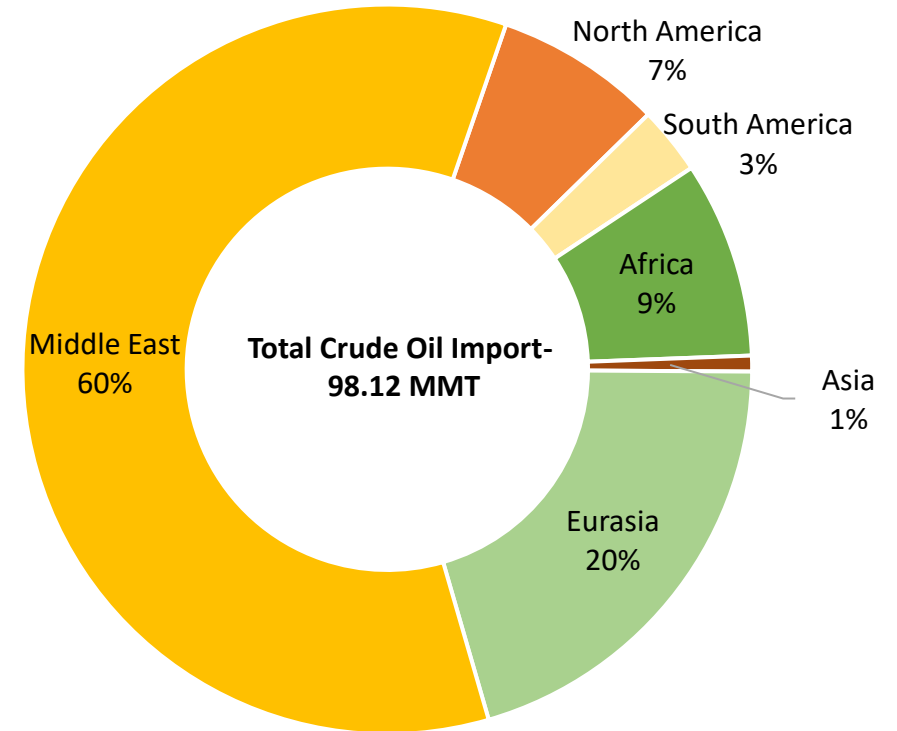
Petroleum Product-wise Import and Export



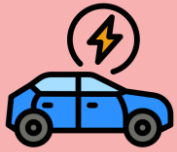
*Other Imports include Naphtha, MS, ATF, SKO, HSD, LDO, Lubes, FO, Bitumen, pet coke, and Others.

*Other Exports include LPG, Naphtha, ATF, SKO, Lubes, FO, Bitumen, pet coke, and Others.

Country Wise Share in Import of Crude Oil during April-August 2022

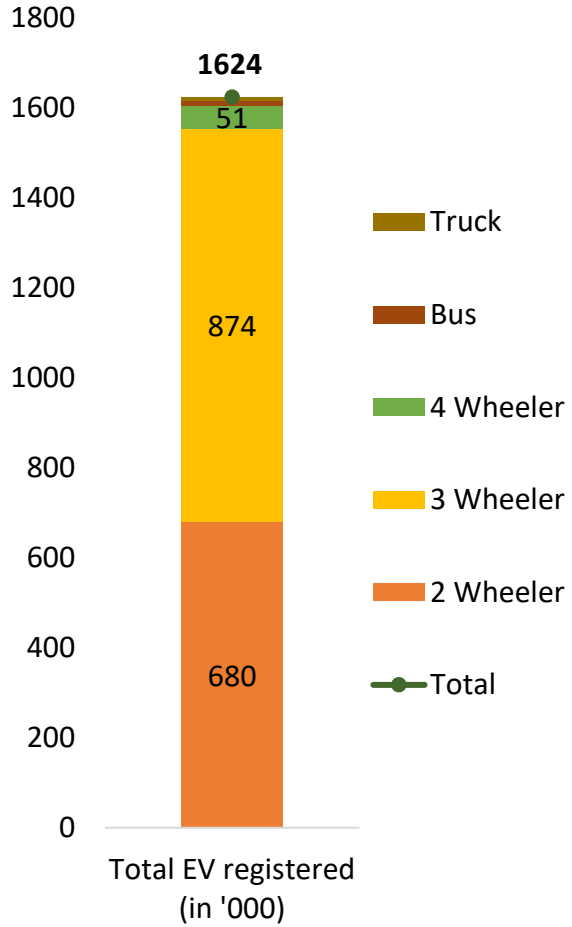


- Crude oil imports increased by 0.9% and 17% during Aug'22 and Apr-Aug'22 respectively as compared to the corresponding period of the previous year
- Crude oil imports from OPEC countries decreased to 63.6% of total imports during Apr-Aug'22 as compared to 70.6% during Apr-Aug'21.

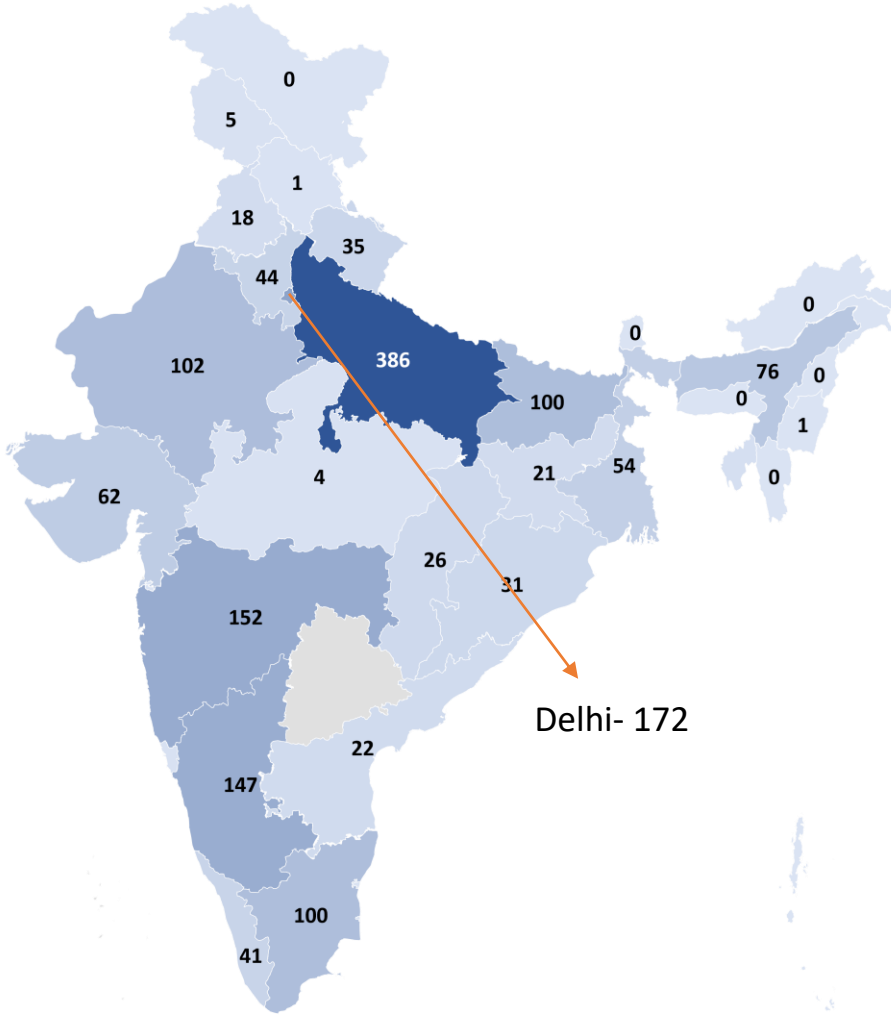


Status of Electric Vehicles in India

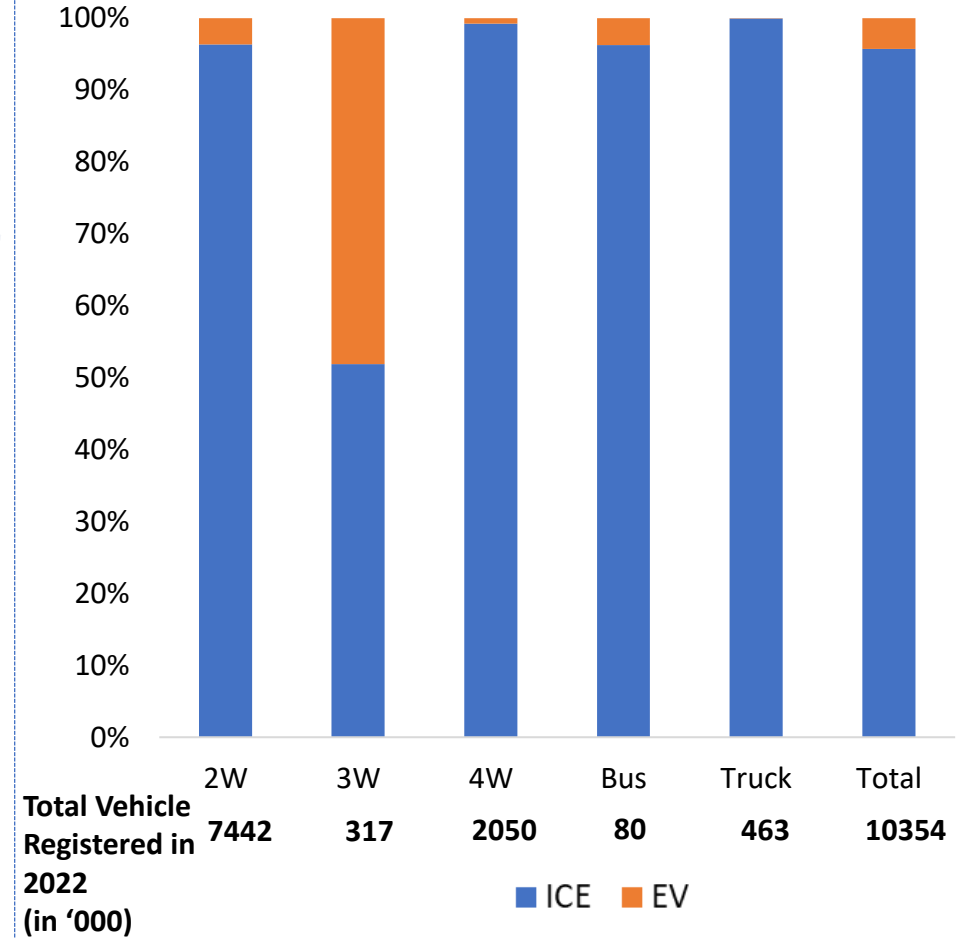
Total EV registered so far



Total EV Registered in State (in '000)



EV and ICE sales composition in year 2022



Sources: Vahan Dashboard (13th October 2022)

1. Details of Telangana are not available on the Vahan dashboard
2. EV: Electric Vehicle, ICE: Internal Combustion engine vehicle





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 from the projects' commissioning before 30th June 2025.

The [updated RPO](#) compliance supports solar integration 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

To support [off-shore wind](#), SECI will bid out 4GW to set up an offshore plant on the coasts of Tamil Nadu and Gujarat.

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

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

BESS

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

Under the [Waste Management Rule 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](#) is 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)

The Hon'ble PM launched the [National Hydrogen Mission](#) to meet the target of 5 million tonnes of green hydrogen production by 2030.

MOP has released the [Green Hydrogen Policy](#) under which the inter-state transmission charges are waived for 25 years of the projects commissioning before 30th June 2025.

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

The pilot projects are*-

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

NOTE: We have tried to compile only the major interventions (last 2 years), however, a number of initiatives have been taken to support decarbonization.

PLI: Production Linked Incentive, CFA: Central Finance Assistance, VNM: Virtual Net Metering, ACC: Advanced Chemistry Cell, OIL: Oil India Limited, RPO: Renewable Purchase Obligation

*Vasudha Foundation Event on Green Hydrogen in India: Prospects and Opportunities, held on 11th October 2022.



Key Highlights or Announcements of September'22

1. Central Electricity Authority (CEA) published the [draft National Electricity Plan \(NEP\) 2022](#), which includes a review for the period 2017-22, detailed capacity addition requirements, and capacity projections during the years 2022-27 and 2027-32. The main highlights are:
 - The projected electricity requirement and peak electricity demand are estimated to be 2538 BU and 363 GW for the year 2031-32 respectively.
 - The projected installed capacity would be 866 GW (comprising 68% non-fossil and 32% fossil share) by the end of 2031-32.
 - Apart from the under-construction coal-based capacity of 25 GW, an additional capacity of 17 GW to 28 GW (under different scenarios) would be required to support the electricity requirements of 2031-32.
2. The Hon'ble PM has approved MNRE's proposal for the implementation of the PLI Scheme (Tranche II) with an outlay of INR 19,500 crores for achieving the Giga Watt (GW) scale solar PV manufacturing capacity in India. Expected outcomes are:
 - Installation of 65 GW per annum manufacturing capacity of fully and partially integrated, solar PV modules.
 - A direct investment of around INR 94,000 crores.
 - Direct employment of about 1,95,000 and indirect employment of around 7,80,000 persons.
 - Import substitution of approximately INR 1.37 lakh crore. [PIB Press](#)



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