# THE 34th CLEAN COAL DAY INTERNATIONAL SYMPOSIUM

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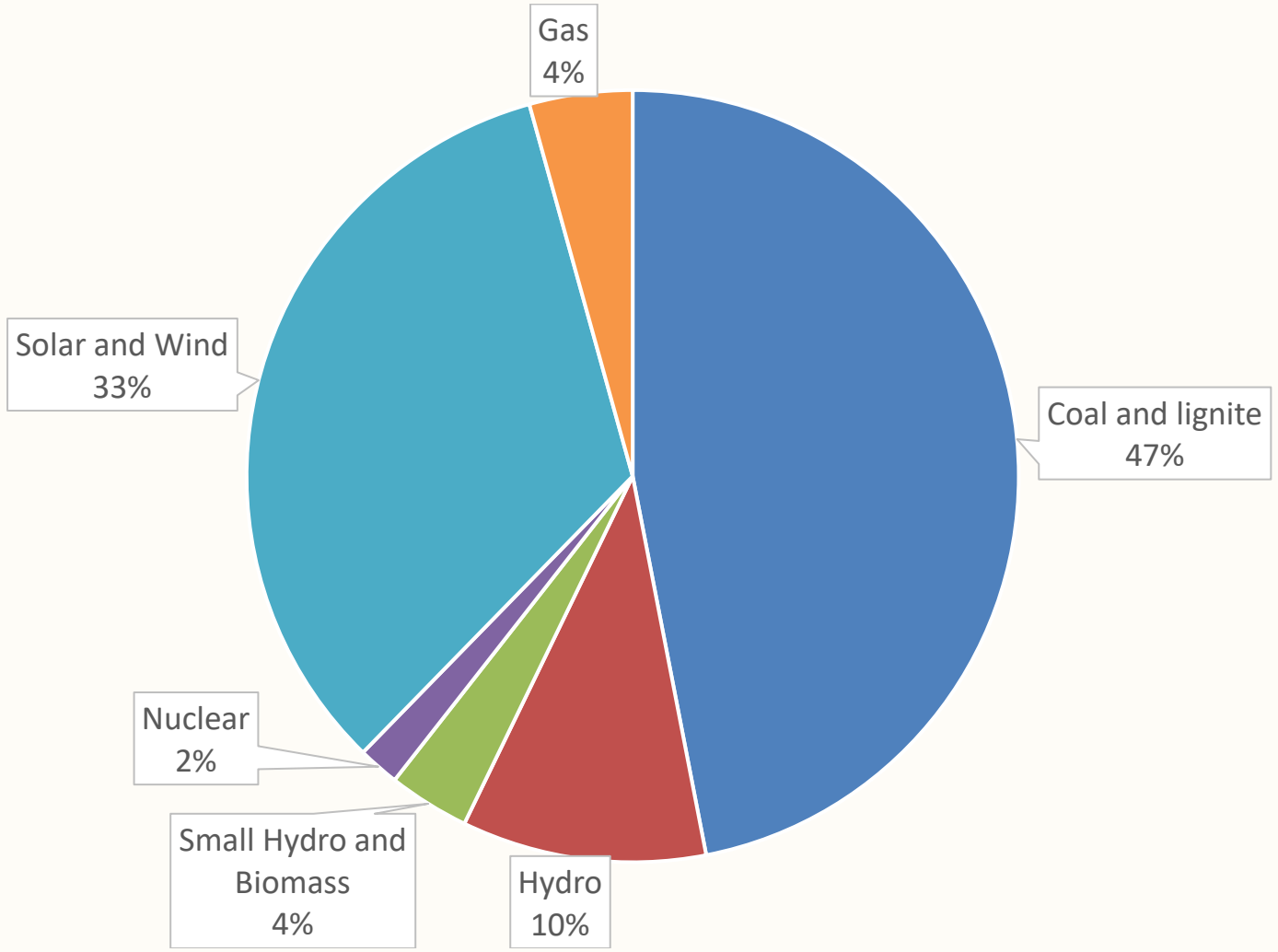
# INSTALLED CAPACITY AND GENERATION

| Fuel Type | Year,2024-25 | | | |
|---|---|---|---|---|
| | Installed capacity | | Generation | |
| | GW | (%) | MU | (%) |
| Coal and lignite | 218.99 | 46.95 | 1,331,925 | 73.53 |
| Hydro | 47.73 | 10.23 | 148,497 | 8.20 |
| Small Hydro and Biomass | 15.84 | 3.40 | 15,307 | 0.85 |
| Nuclear | 8.08 | 1.73 | 56,656 | 3.13 |
| Solar and Wind | 155.68 | 33.38 | 227,497 | 12.56 |
| Gas | 20.13 | 4.32 | 31,477 | 1.74 |
| Total | 466 | | 1811359 | |

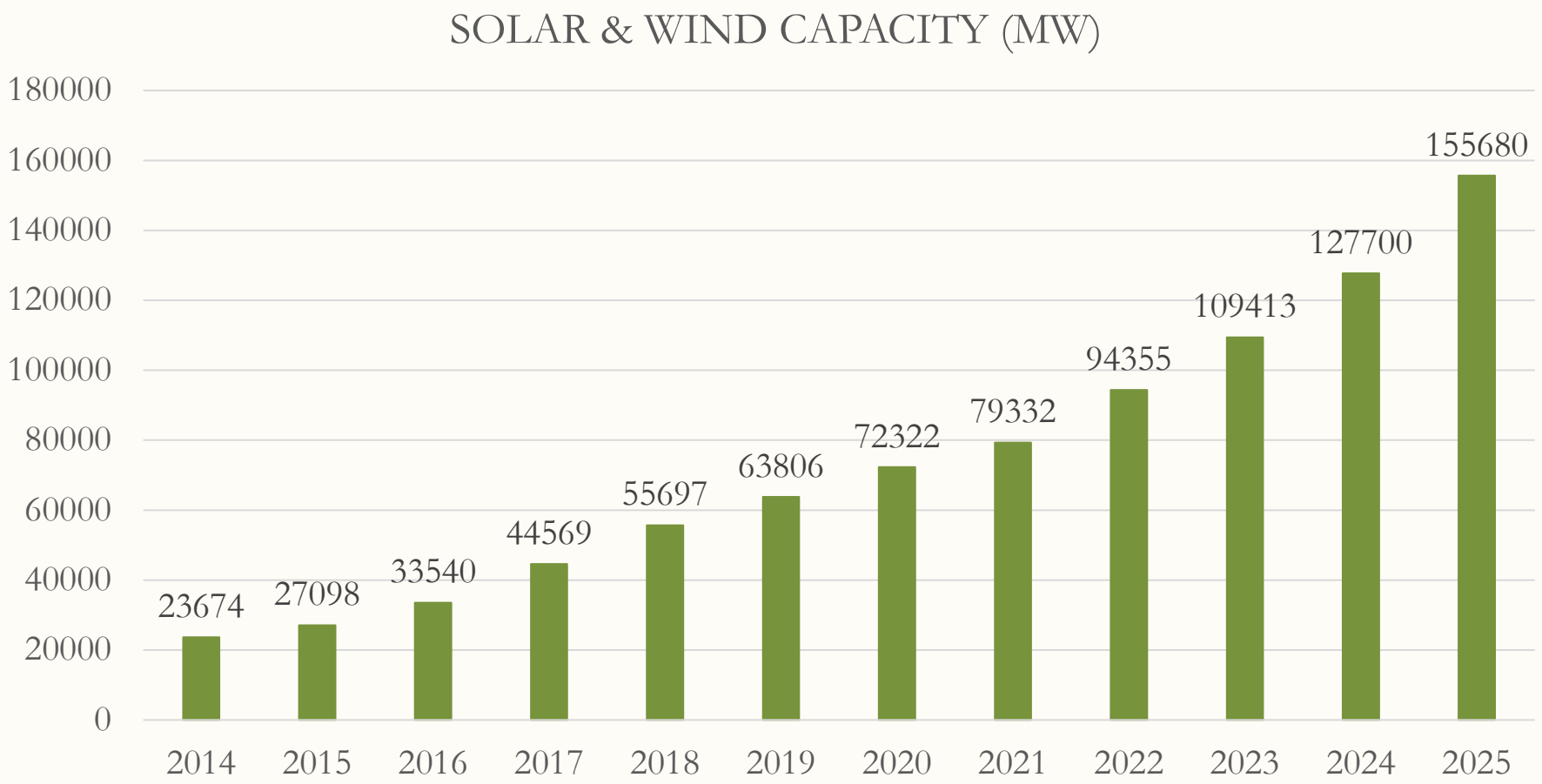
Non-fossil: 227 GW 49 (%)

Non-fossil: 447957 MU 25 (%)

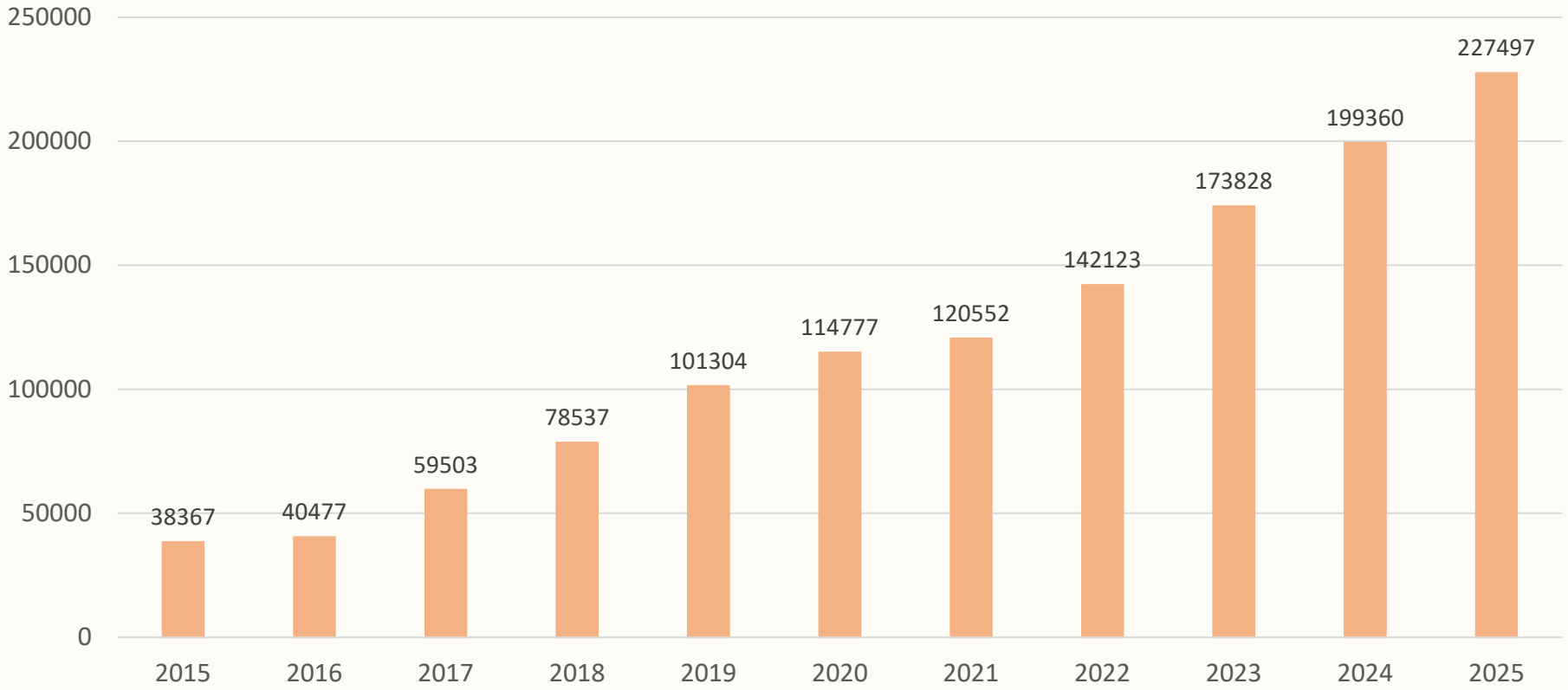
# INSTALLED CAPACITY AND GENERATION



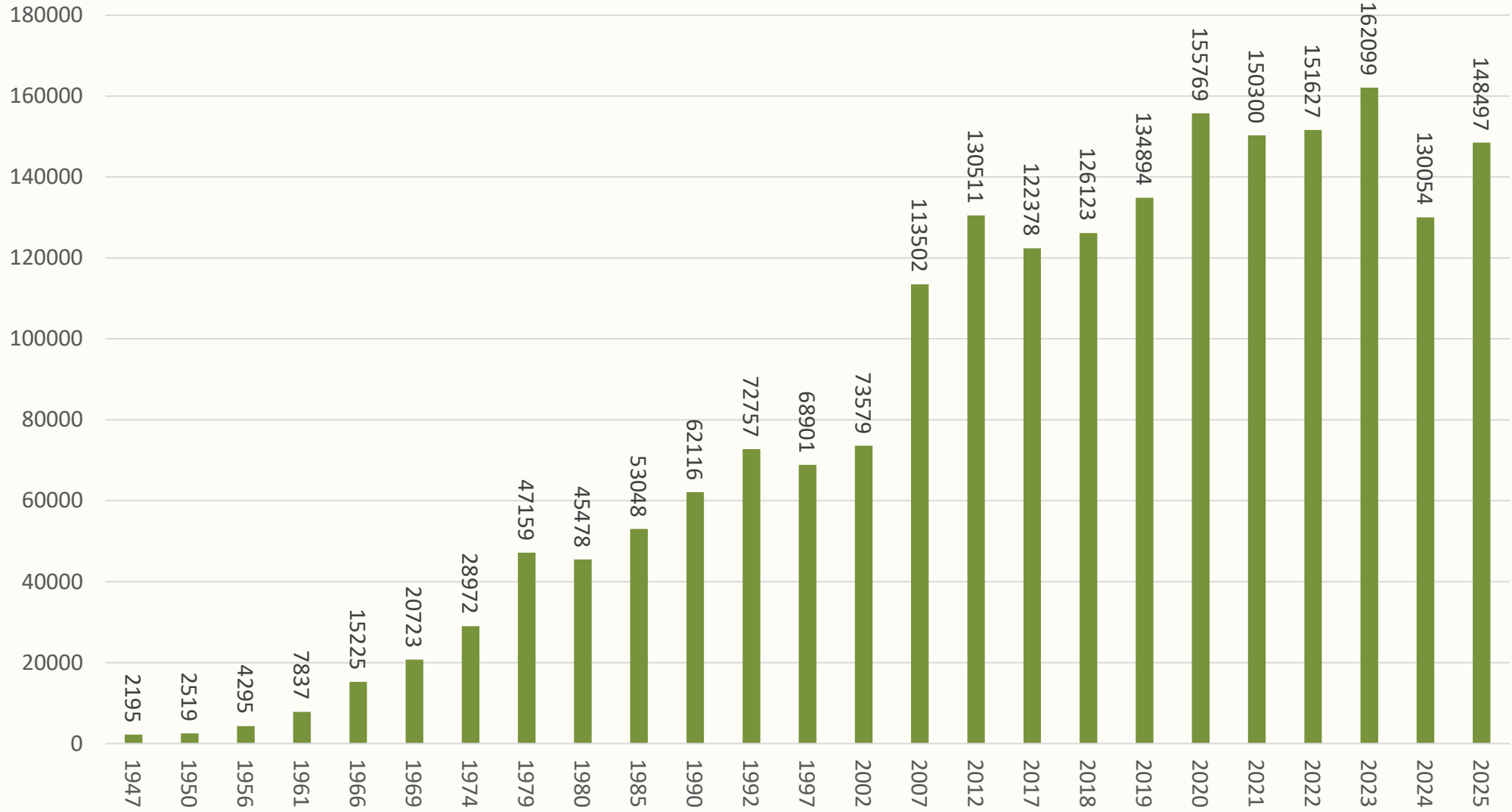
# GROWTH OF SOLAR & WIND INSTALLED CAPACITY



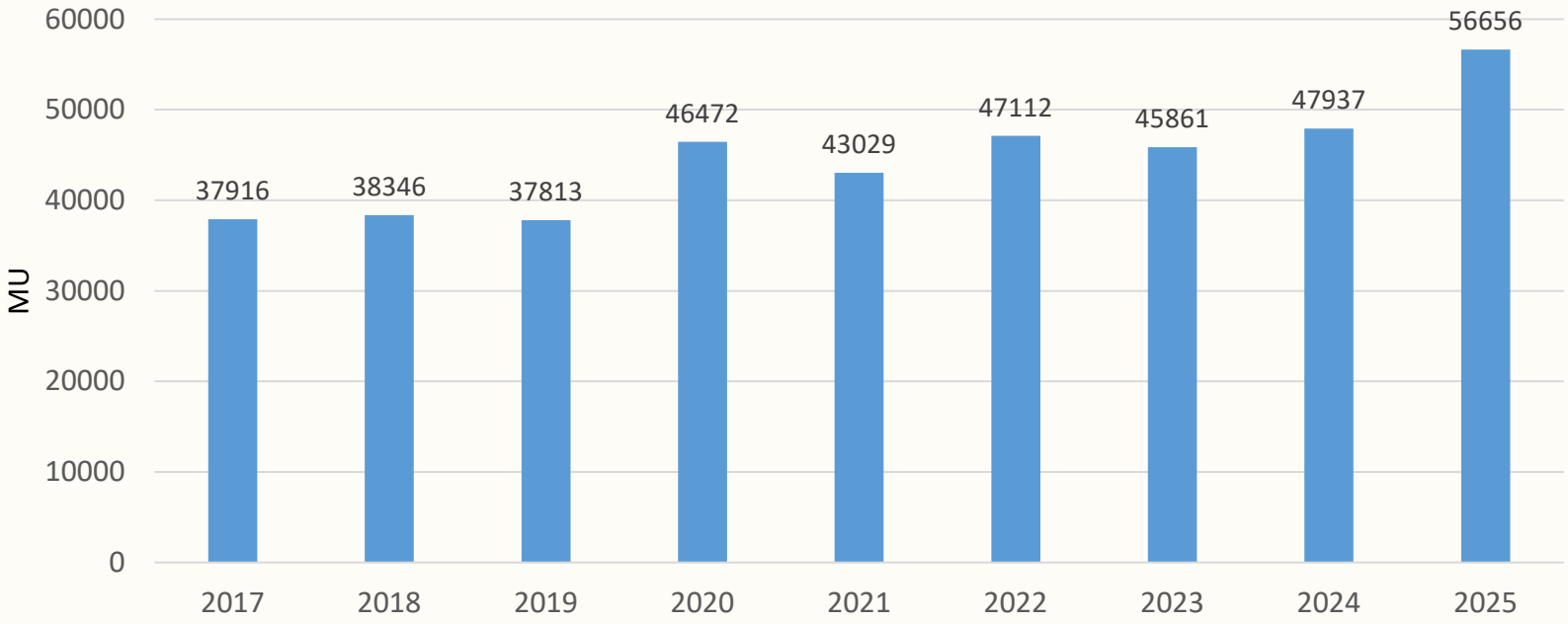
# GROWTH OF SOLAR & WIND GENERATION (MU)



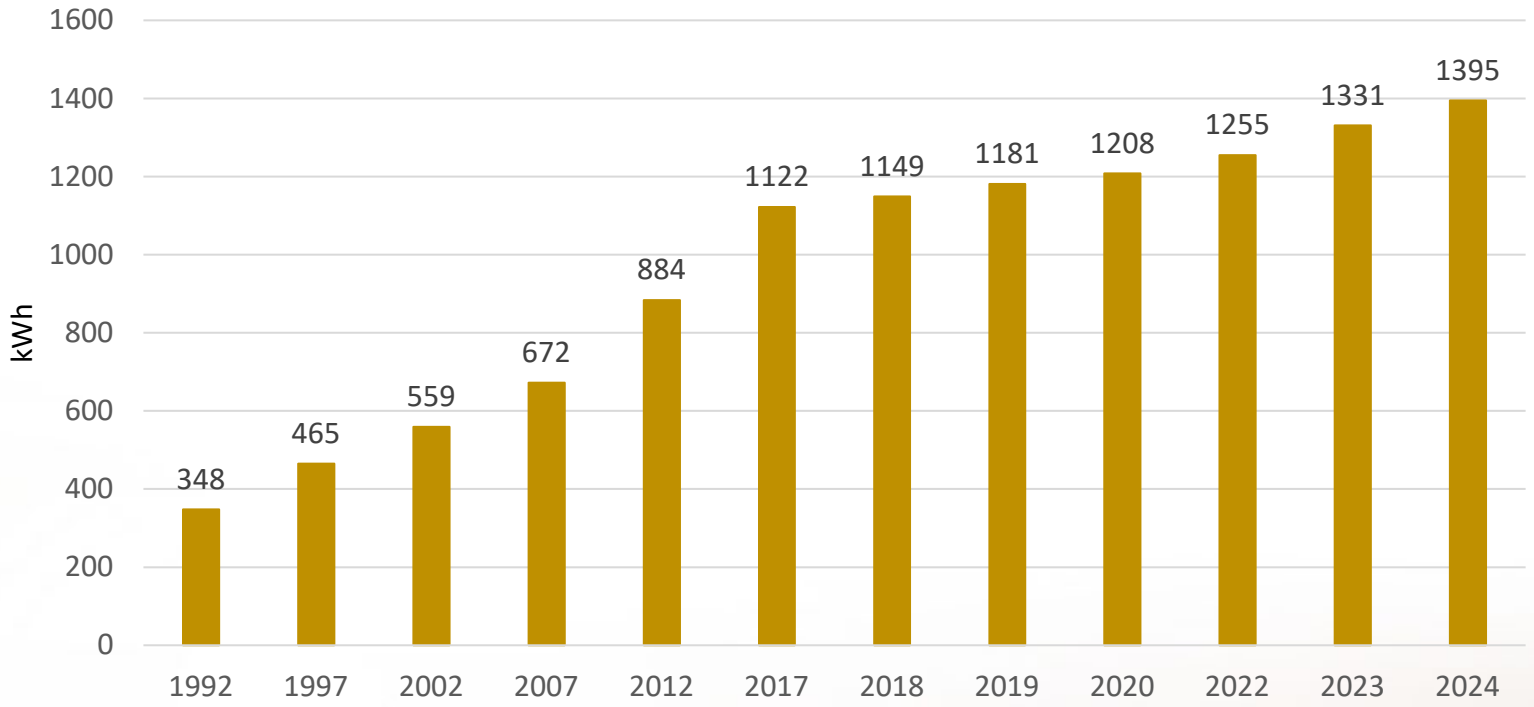
# GROWTH OF HYDRO GENERATION (MU)



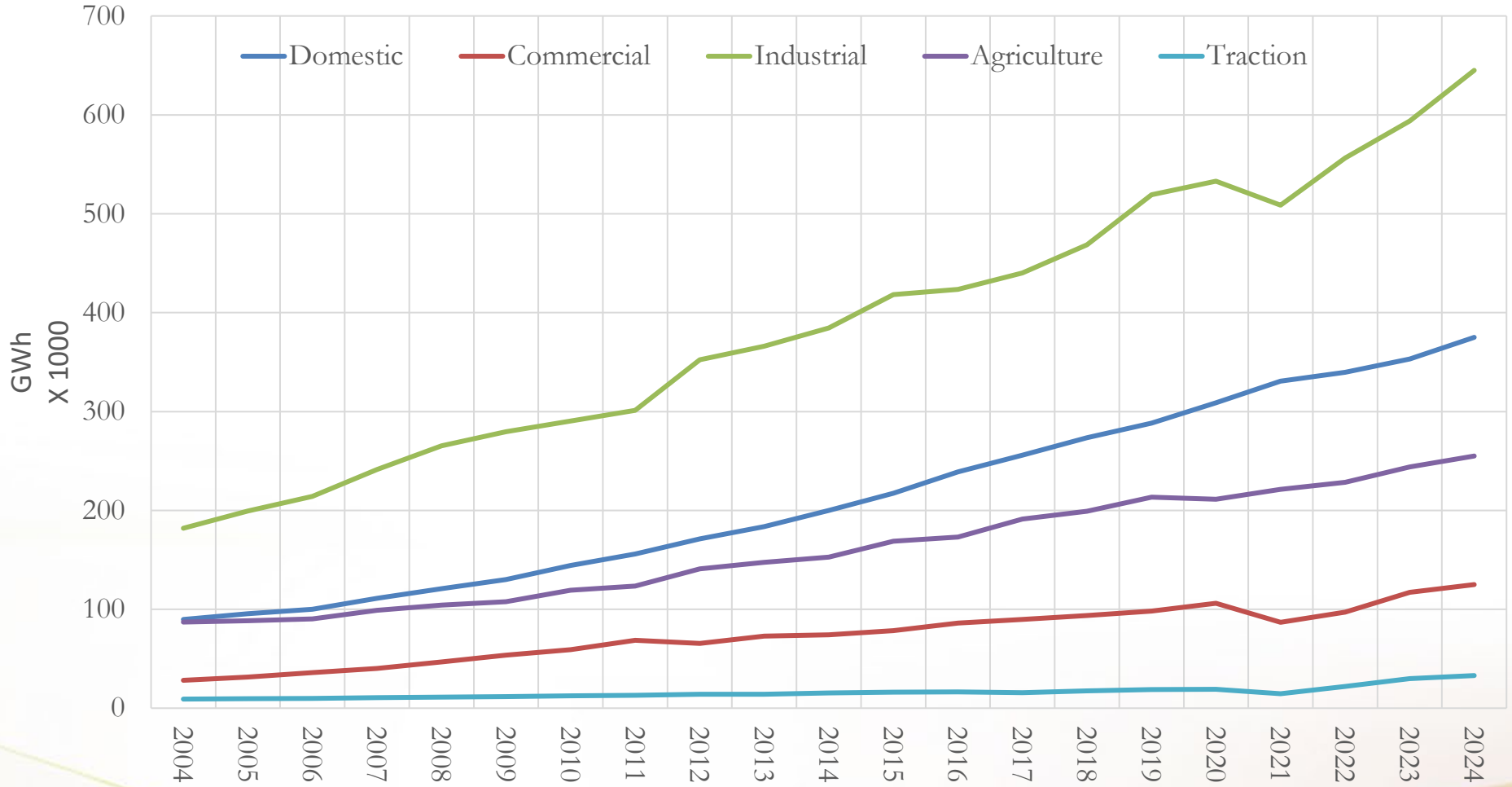
# GROWTH OF NUCLEAR GENERATION (MU)



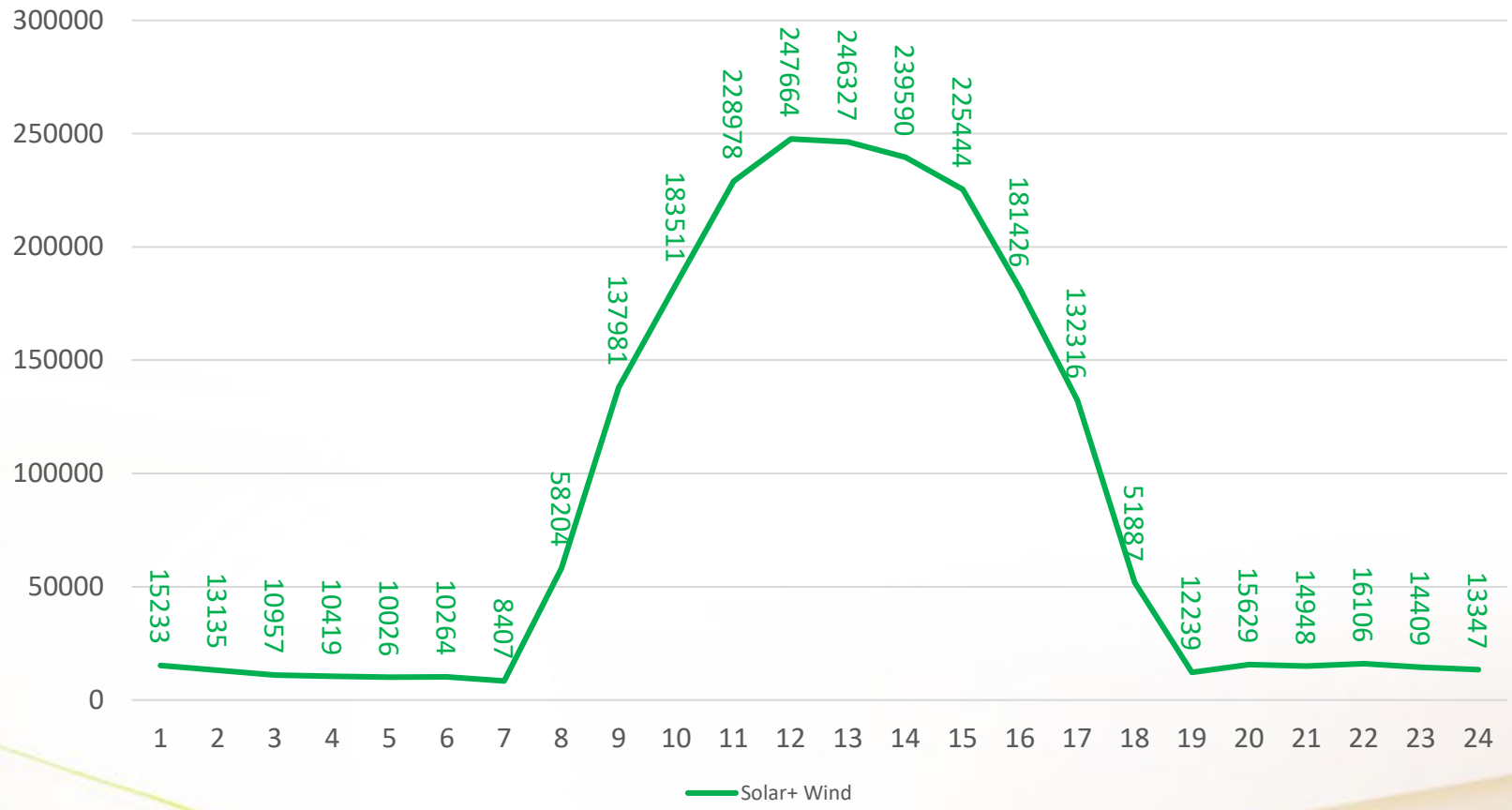
# PER CAPITA CONSUMPTION OF ELECTRICITY



# ENERGY CONSUMPTION TREND

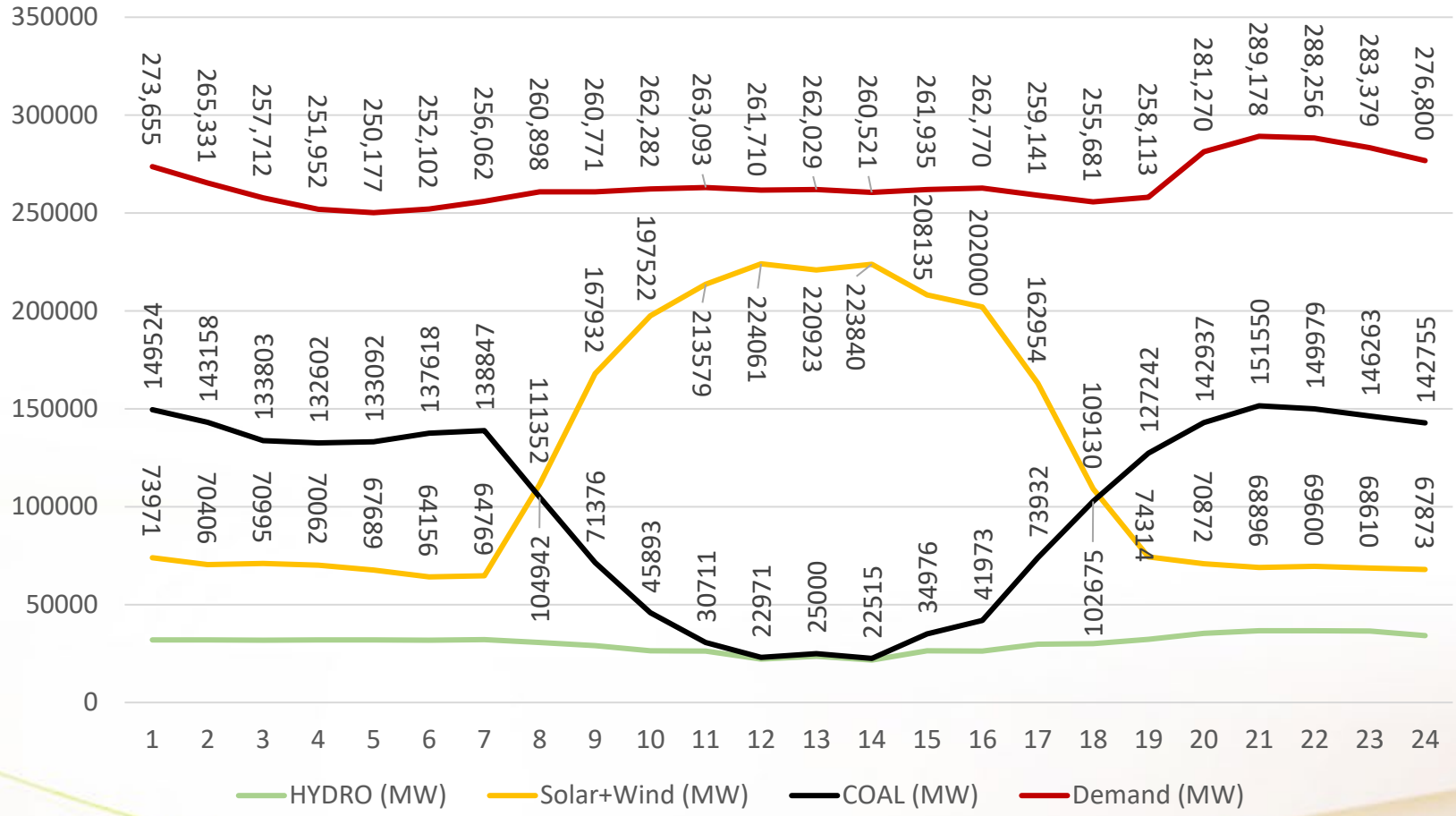


# SOLAR & WIND GENERATION 2030




**500 GW RES by 2029-30**

# DEMAND Vs GENERATION 2030



# ROADMAP FOR RENEWABLE INTEGRATION IN YEAR, 2030

- CEA **(Flexible operation of coal based thermal power generating units) Regulations, 2023** notified on 30th January, 2023.
- A report on Flexibilisation of coal fired Thermal Power Plants – A Roadmap for achieving **40%Technical Minimum Load** has been prepared, published and widely circulated in 2023.
- Phasing plan for achieving 40% upto year 2030 for T**echnical Minimum Load has been notified in Gazette in Dec,2023**
- 40% low load study- successfully completed at Ukai, Sagardighi, Dadri, Mauda, Maithon , DSTPS , Raichur and Ramagundem.
- The BESS capacity of 22876 MW will be required in 2029-30 TPPs operate at 40% MTL and 2-shift mode
- The requirement of BESS capacity will be increased to 32475 MW, operate at 40% MTL without 2-shift operation.

# PROMOTING MARKETS AND COMPETITIONS

1) Increasing electrolyser manufacturing capacity several fold by 2030 to become a global leader.

2) India envisages becoming a leading exporter of Green Hydrogen (GH) and Green Ammonia (GA) by 2030.

3) Encourage adoption of green hydrogen and green ammonia in hard to abate sectors, and ensuring availability of low-cost green electricity for green hydrogen.

4) Promote co-firing of green ammonia in thermal power plants (TPPs).

5) Green Ammonia/hydrogen firing in exiting GT which will run during non-solar period for grid balancing

# HYDRO ELECTRIC PROJECTS

| | Capacity (MW) |
|---|---|
| POTENTIAL | 133410 |
| OPERATIONAL | 43182 |
| UNDER CONSTRUCTION | 13464 |
| UNDER PIPILINE PROJECTS | 23099 |

# PUMPED STORAGE PROJECTS

| | Capacity (MW) |
|---|---|
| POTENTIAL | 214266 |
| OPERATIONAL | 6446 |
| UNDER CONSTRUCTION | 12350 |
| UNDER PIPILINE PROJECTS | 5720 |

# NDC TARGET AND CURRENT RES CAPACITY

- As per Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC), India has committed, inter alia, to achieve approximately 50% of its cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030.

- Non-fossil capacity has been increasing and India has achieved approximately 50% of cumulative electric power installed capacity from non-fossil fuel-based energy resources about 5 years ahead of schedule.

- As on 31.07.2025, installed generation capacity is about 490 GW, comprising of 50.3% (246.3 GW) from non-fossil resources and 49.7 % (243.7 GW) from Fossil resources.

- Further, Government is also working towards achieving 500 GW of installed electricity generation capacity from non-fossil resources by 2030.

- The installed non-fossil capacity is about 246.3 GW (as on 31st July, 2025). Additional 175 GW non-fossil capacity is under construction and 60 GW of RE capacity is under tendering.

# NDC TARGET AND CURRENT RES CAPACITY

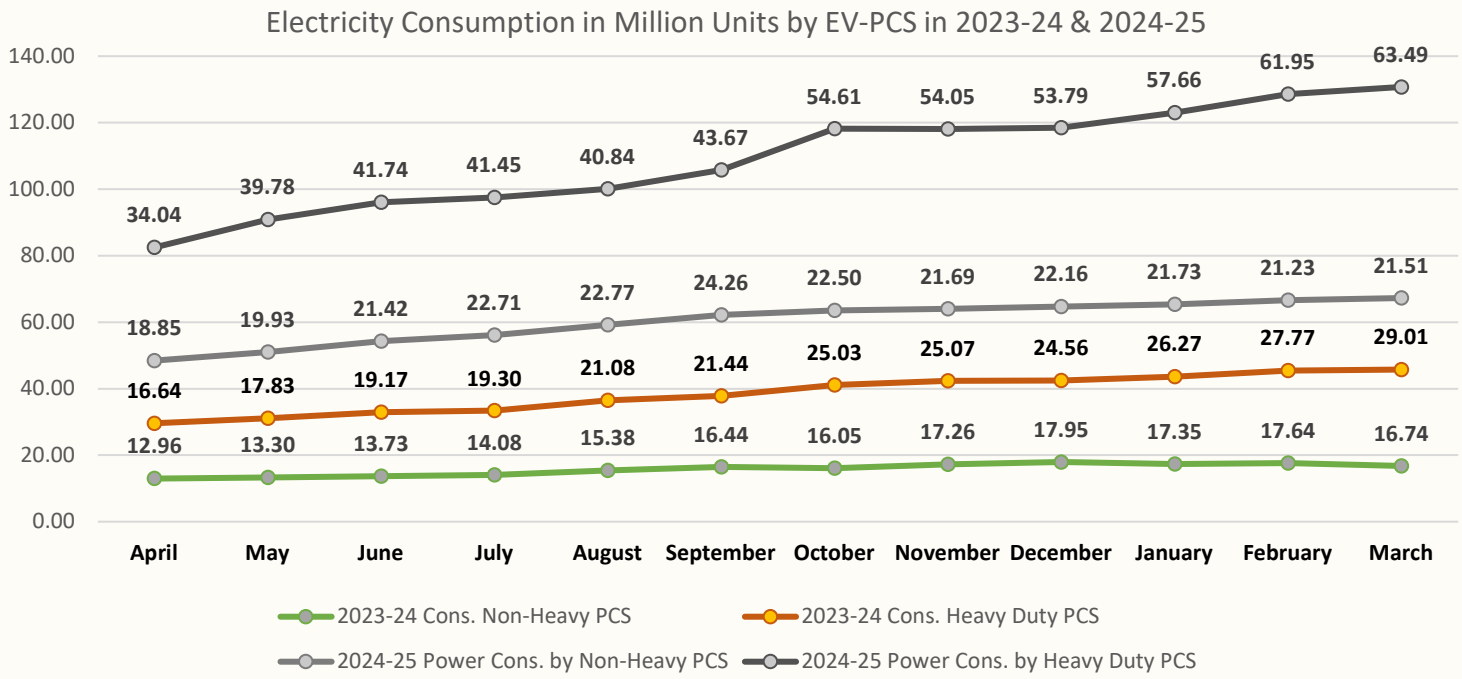
- The Yearly capacity addition from solar and wind are increasing and the said capacity addition during last three years are as tabulated below:

| | 2022-23 | 2023-24 | 2024-25 |
|---|---|---|---|
| Solar (MW) | 12783.8 | 15033.24 | 23832.87 |
| Wind (MW) | 2275.55 | 3253.38 | 4151.31 |

- Further, the total electricity generation from RES is also increasing and the said generation during last two years are as tabulated below:

| FY | 2023-24 | 2024-25 |
|---|---|---|
| RES Generation (BU) | **360** | **404** |

# ELECTRICTITY CONSUMPTION BY EV-PCS
## (incl. Heavy Duty for e-bus etc.)



# STRATEGIC ENERGY TRANSITION

- **National Mission on use of Biomass in coal based thermal power plant**: The objective of the mission is to increase the level of co-firing from present 5-7% to higher levels. Initiated R&D activity in boiler design to handle the higher amount of silica, alkalis in the biomass pellets. To look into the constraints in supply chain of biomass pellets/ agro- residue and other regulatory issues in biomass co-firing. As of 31.07.2025, 71 coal-based TPPs have co-fired approximately 29.78 lakh metric tonnes of biomass pellets, including 22.25 lakh metric tonnes in 11 NCR plants, leading to an estimated 3.57 million tonnes reduction in CO2 emissions across the country.

- **National Hydrogen Mission**: The Mission aims to support the government in meeting its climate targets and focus deeply on the generation of green hydrogen which is extracted from clean and green power sources and enable its commercial viability.

# STRATEGIC ENERGY TRANSITION

**Energy Efficiency:** Bureau of Energy Efficiency (BEE) has launched 'Perform, Achieve and Trade' (PAT) scheme under the National Mission for Enhanced Energy Efficiency. It aims to make the industrial sector energy efficient. The scheme has set energy efficiency targets for industries. Those that fail to achieve targets will have to pay penalty. To improve the energy efficiency in Thermal Power Plants (TPPs), the TPPs have been included under the PAT scheme.

**Capacity addition through more efficient technologies like Super-critical/ Ultra Super-critical Thermal Units:**

In order to increase the efficiency of coal-based power generation, to reduce CO2 emissions and also to conserve coal, MoP had issued directions on 13.11.2009, promoting capacity addition through more efficient technologies like Super- critical Thermal Units. These units emit less CO2 per unit of electricity generated compared to the sub-critical Units. Further, MoP has also planned to set up a highly efficient 800 MW Advance Ultra Supercritical (AUSC) thermal power plant.

# STRATEGIC ENERGY TRANSITION

**Capacity Addition from non-fossil Energy Source:**
The Government of India has set a Nationally Determined Contribution (NDC) target to achieve 50% of cumulative electric power installed capacity from non- fossil fuel-based energy resources by 2030.

**Implementation of Carbon Capture, Utilization & Storage (CCUS) technology:**
At present, CCUS technology is in a nascent stage globally. NTPC has recently commissioned a pilot project of 10 Metric Tonnes Per Day (TPD) Carbon Dioxide (CO2)-to-Methanol conversion plant at NTPC Vindhyachal in Madhya Pradesh, with annual capacity of 6,000 Metric Tonnes (MT).

**National Mission for CCUS:** India is in the process of developing a National CCUS Mission to help achieve its net-zero goals by providing financial incentives, funding for research and development, and establishing a roadmap for CCUS technologies and infrastructure. Led by a core working group including the Ministry of Power, NITI Aayog, and the Office of the Principal Scientific Adviser to the PMO

Thank you

# ANTICIPATED GENERATION CAPACITY (GW)

| FUEL TYPE | 2030 | 2032 | 2047 |
|---|---|---|---|
| FOSSIL FUEL | 277 | 285 | 250 |
| NUCLEAR | 15 | 20 | 54 |
| HYDRO | 59 | 67 | 98 |
| PSP | 19 | 27 | 116 |
| SOLAR | 293 | 365 | 1191 |
| WIND | 100 | 122 | 436 |
| BIOMASS | 15 | 16 | 23 |
| TOTAL CAPACITY | 777 | 900 | 2168 |

•**Higher Efficiency:**

•AUSC technology boasts an efficiency of around 46%, compared to the ~38% of subcritical and ~41-42% of supercritical plants.

•**Lower Emissions:**

•This advanced technology reduces coal consumption and CO2 emissions by approximately 11% compared to supercritical plants.

•**Indigenous Development:**

•A major focus has been on developing indigenous technologies for AUSC, with a consortium of BHEL, IGCAR, and NTPC leading the way.

Projects and Development

•**<u>Korba, Chhattisgarh</u> Project:**

•The first 800 MW AUSC technology demonstration plant is planned for Korba, Chhattisgarh, in collaboration with NTPC and BHEL.