



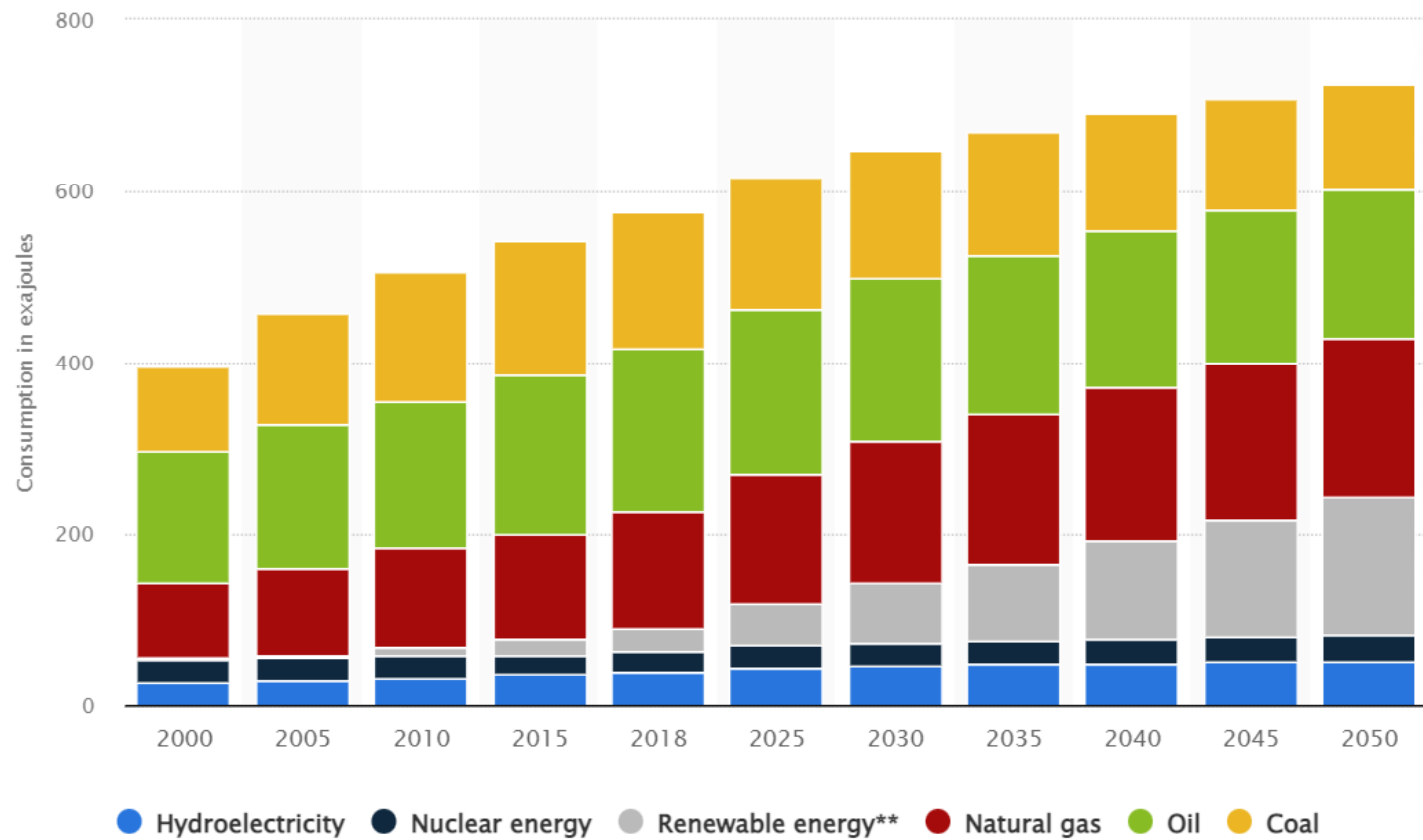
Renewable Energy Transition

*Pankaj Batra,
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Project Director, SARI/EI at IRADe*



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Energy Consumption worldwide from 2000 till 2018 and forecast till 2050 (courtesy Statista 2022)



Renewable Energy Potential (courtesy UNDP/WEC and NREL)

- In 2000, the **United Nations Development Programme**, UN Department of Economic and Social Affairs, and **World Energy Council** published an estimate of the potential **solar energy** that could be used by humans each year that took into account factors such as insolation, cloud cover, and the land that is usable by humans. The estimate found that solar energy has a global potential of 1,600 to 49,800 exajoules (4.4×10^{14} to 1.4×10^{16} kWh) per year.
- IN 2017, **NREL** estimated total global **wind generation potential** of 560 PWh for terrestrial wind and 315 PWh for offshore wind (total about 3180 exajoules).

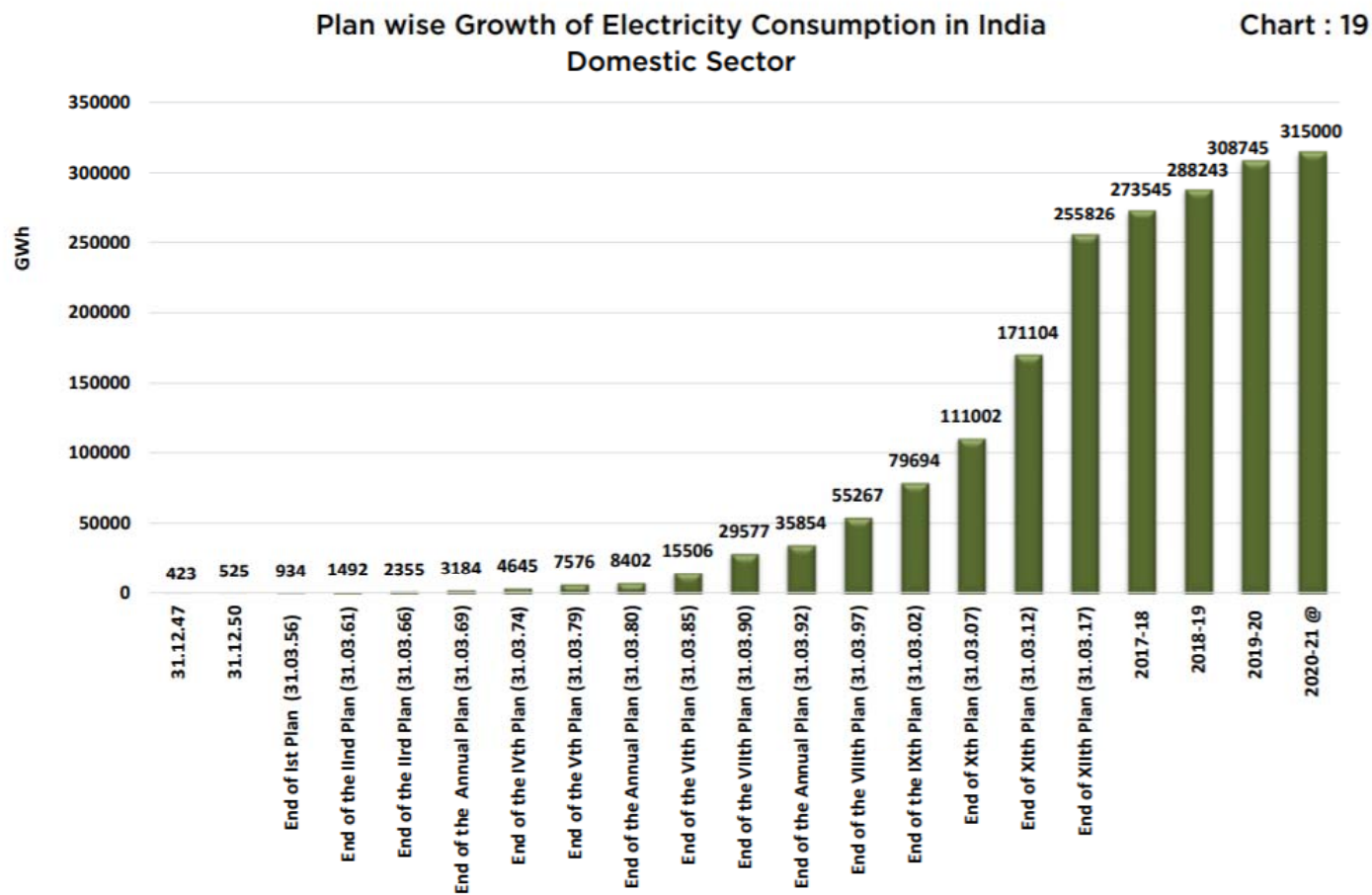
Global Renewable Energy Potential (courtesy UNDP/WEC and NREL)



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- IN 2017, **NREL** estimated total global **wind generation potential** of 560 PWh for terrestrial wind and 315 PWh for offshore wind (total about 3180 exajoules).



Energy Consumption India from 1947 till 2020-21(courtesy CEA)



India Renewable Energy Potential (courtesy MNRE)



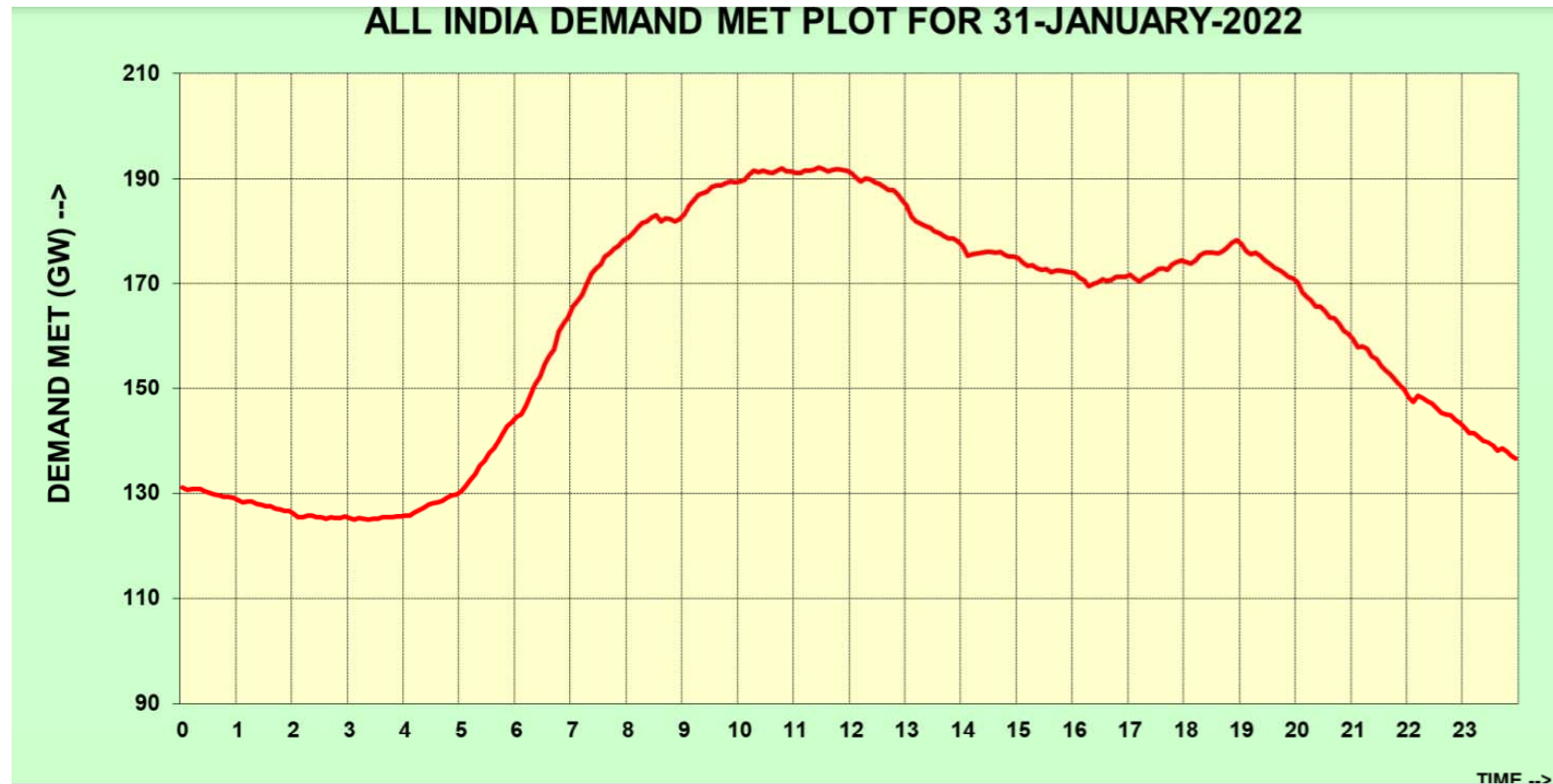
- India is endowed with vast solar energy potential. About 5,000 trillion kWh energy per year.



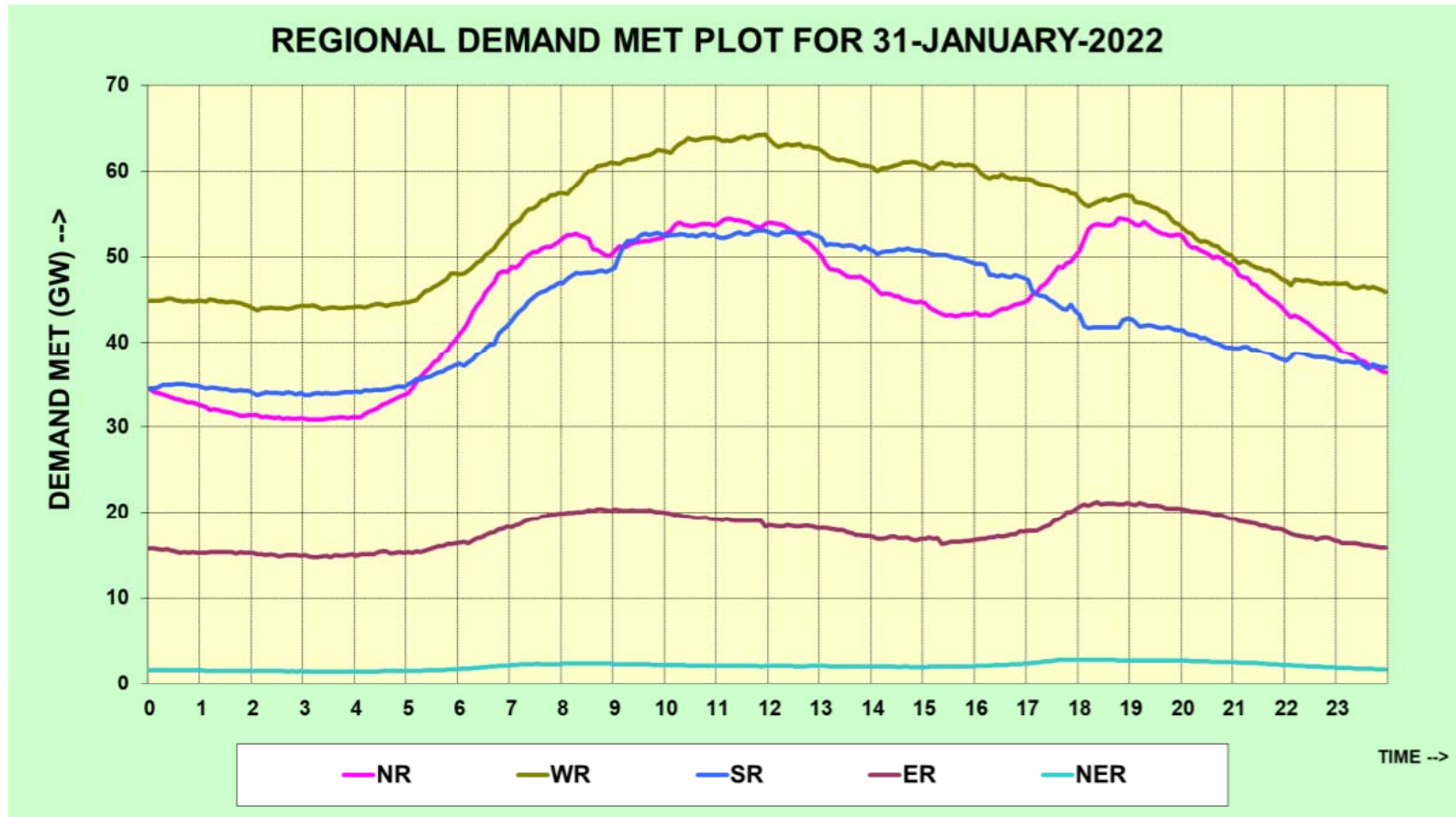
- India has a high wind energy potential — 302 GW at 100 metres hub height and 695 GW at 120 metres. K Balaraman, director general, National Institute of Wind Energy (NIWE) says that all this potential is commercially realisable.
- Considering a Capacity Utilization Factor (CUF) of 20% on an all India basis, this equates to 530 billion kWh per year for 100 metres hub height and 1217 billion kWh for 120 meters hub height.



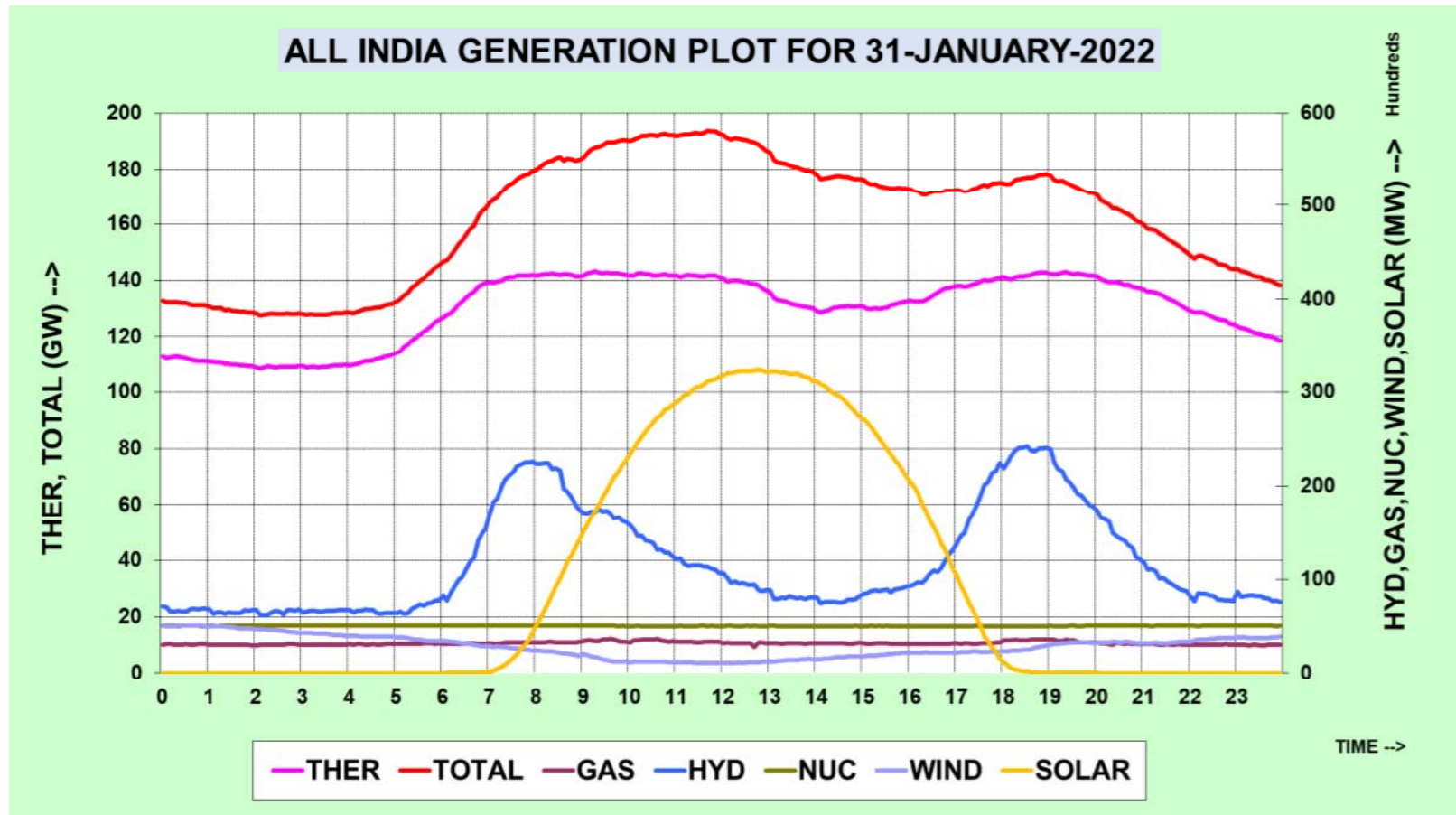
Challenges in harnessing Renewable Energy Potential (Courtesy POSOCO)



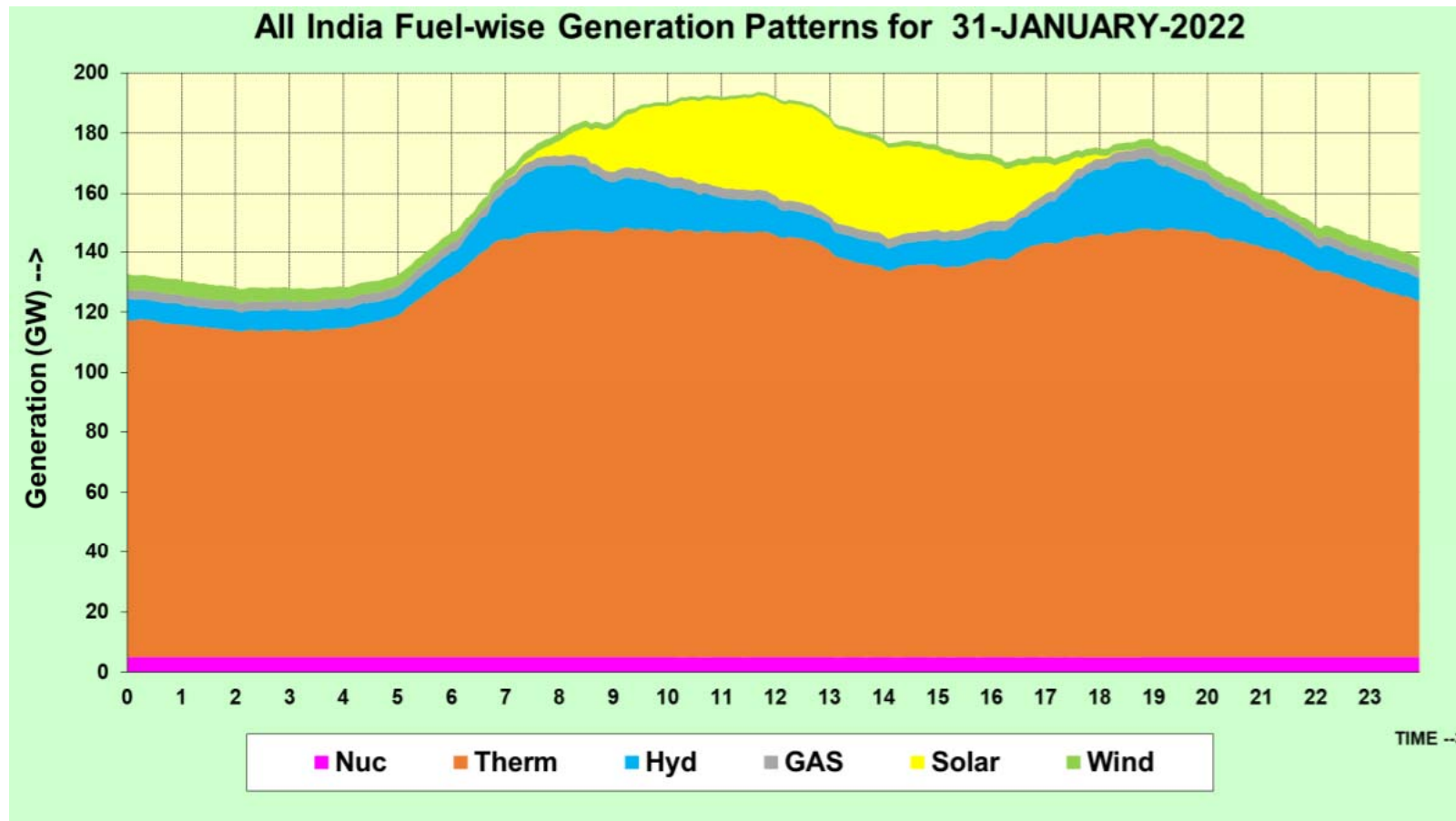
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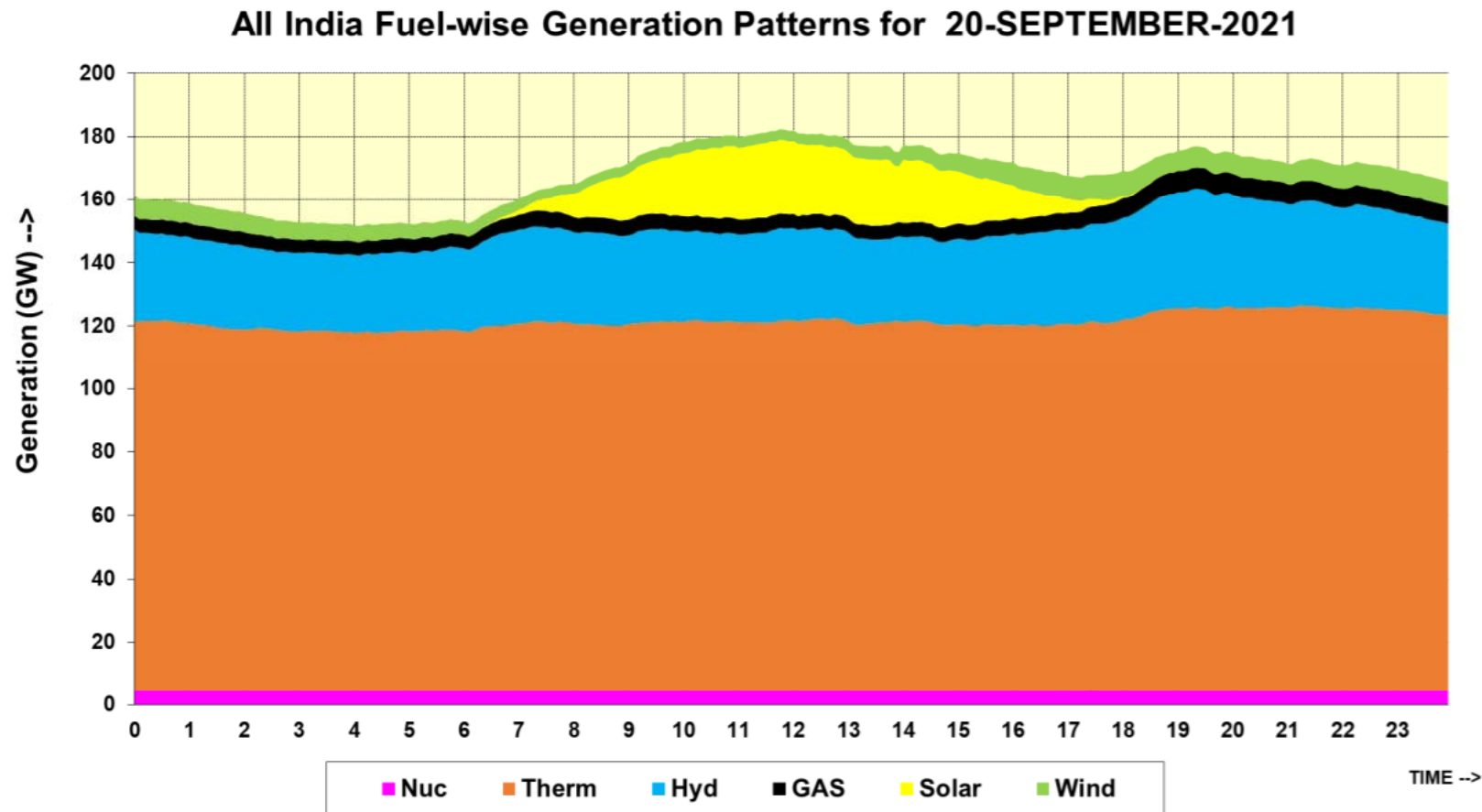


Challenges in harnessing Renewable Energy Potential (Courtesy POSOCO)



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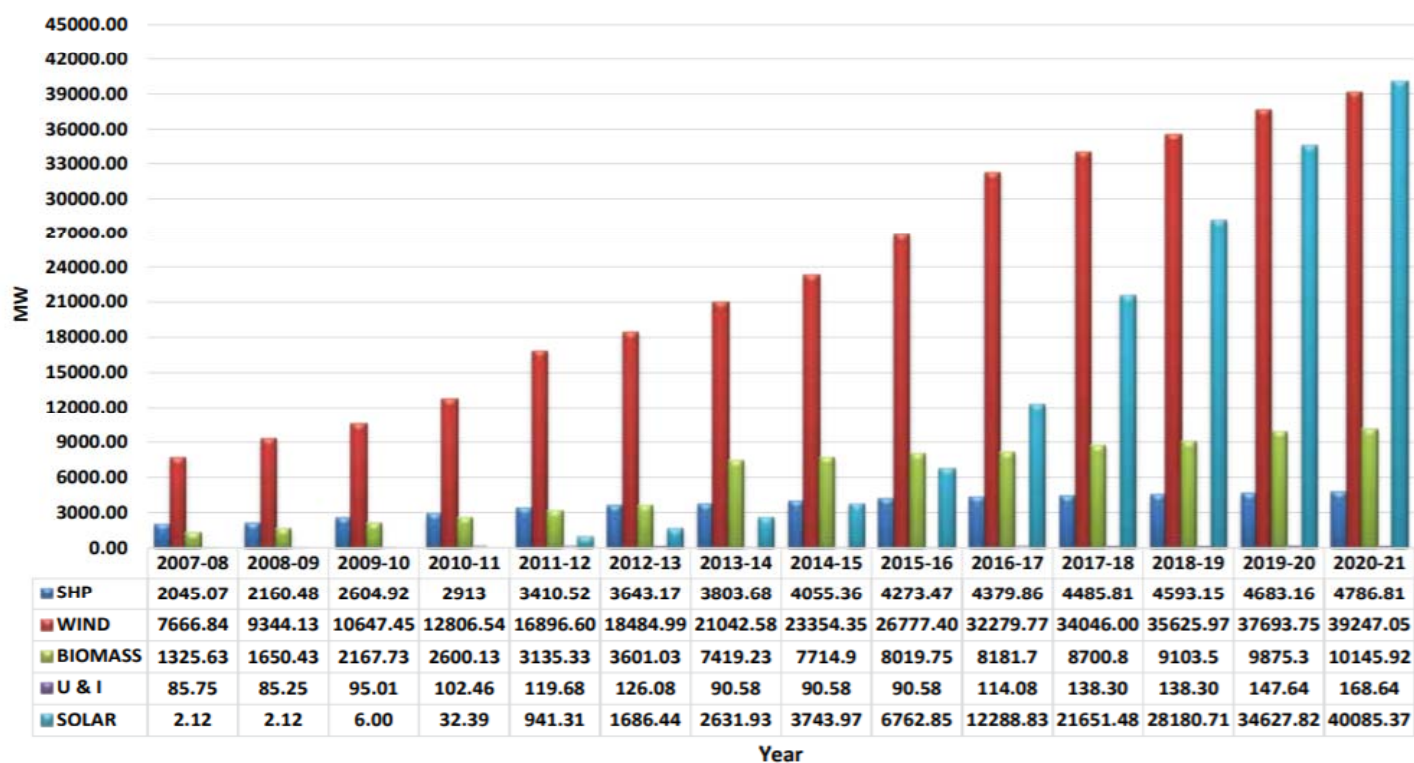


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Challenges in harnessing Renewable Energy Potential (Courtesy CEA)

Mode wise/ Year wise Growth of Installed Capacity of R.E.S.
during last 14 years

Chart : 8B

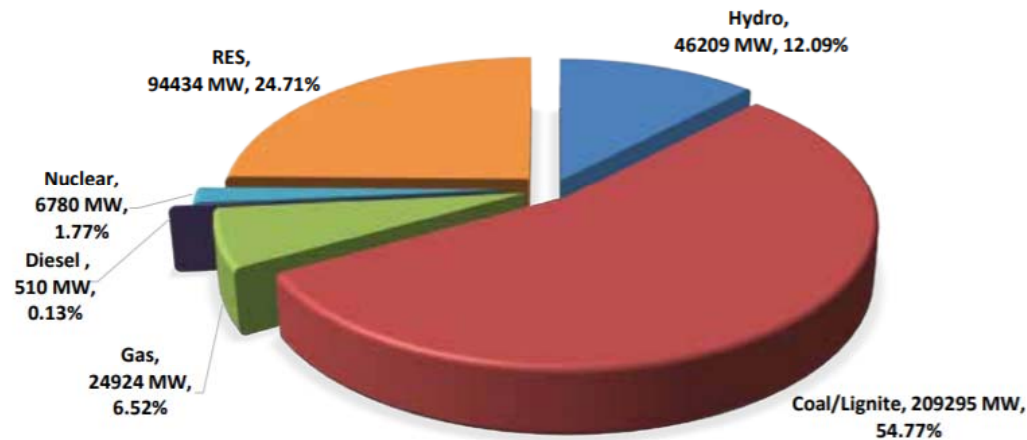


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Challenges in harnessing Renewable Energy Potential (Courtesy CEA)

ALL INDIA INSTALLED CAPACITY
(UTILITIES)
(As on 31.03.2021)

Pie Chart : 9



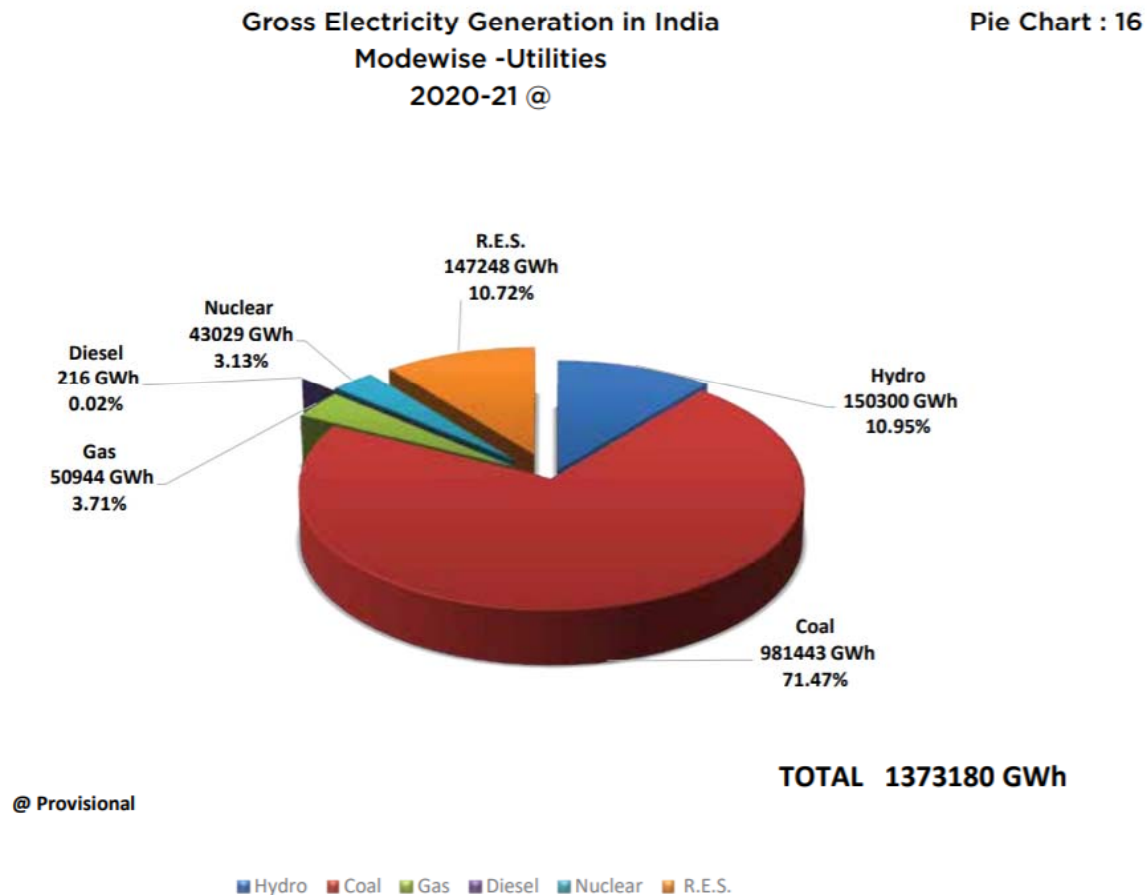
Total = 382151 MW

■ Hydro ■ Coal/Lignite ■ Gas ■ Diesel ■ Nuclear ■ RES



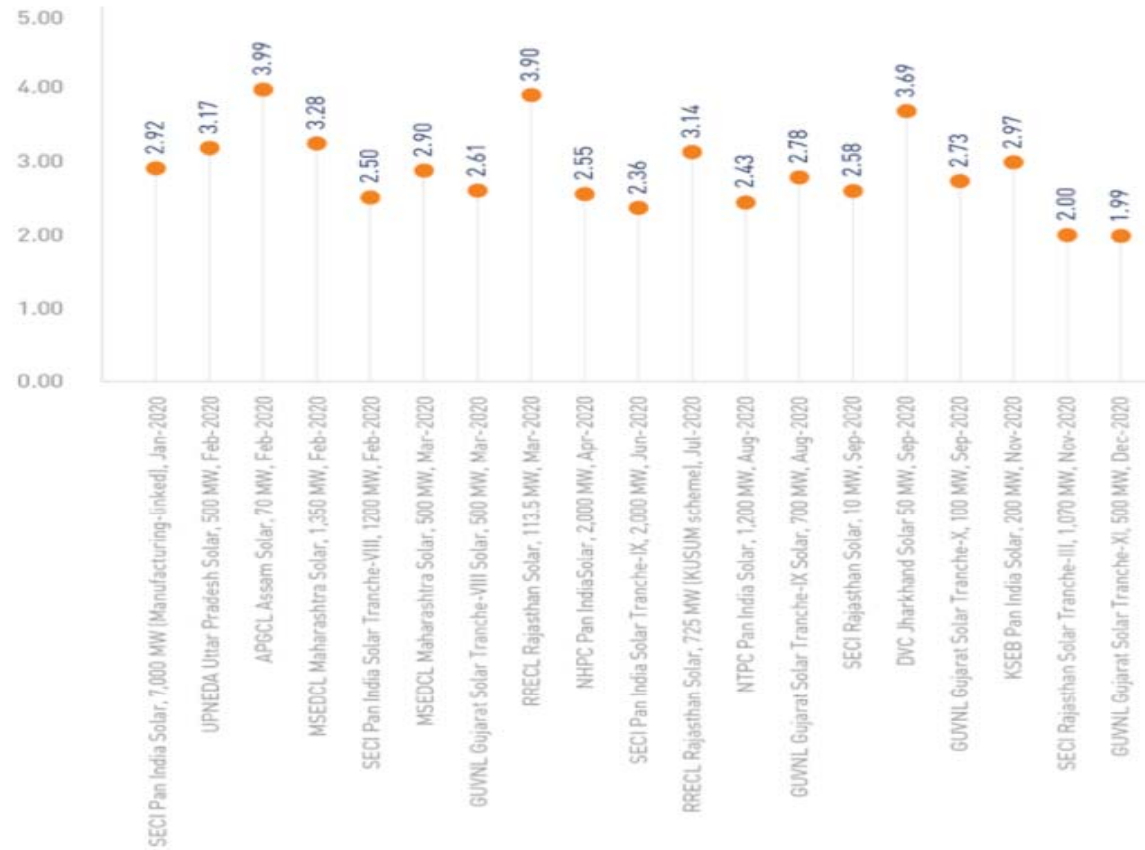
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Challenges in harnessing Renewable Energy Potential (Courtesy CEA)



Solar Tariffs 2020 (Courtesy Bridge to India)

Figure 1: Solar tariffs in 2020, INR/ kWh



Wind Tariffs

- Latest Wind tariff discovered was Rs. 2.69/2.70 per unit in September 2021 for (SECI) 1200 megawatt (MW) tranche XI tender.
- Auctions conducted in Gujarat on December 21 discovered a record low tariff of Rs 2.43 a unit.

THANK YOU



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