Enabling investments to inch closer to 24/7 renewable energy for industries in India

ASIA CLEAN ENERGY FORUM 2025

Empowering the Future: Clean Energy Innovations, Regional Cooperation and Integration, and Financing Solutions

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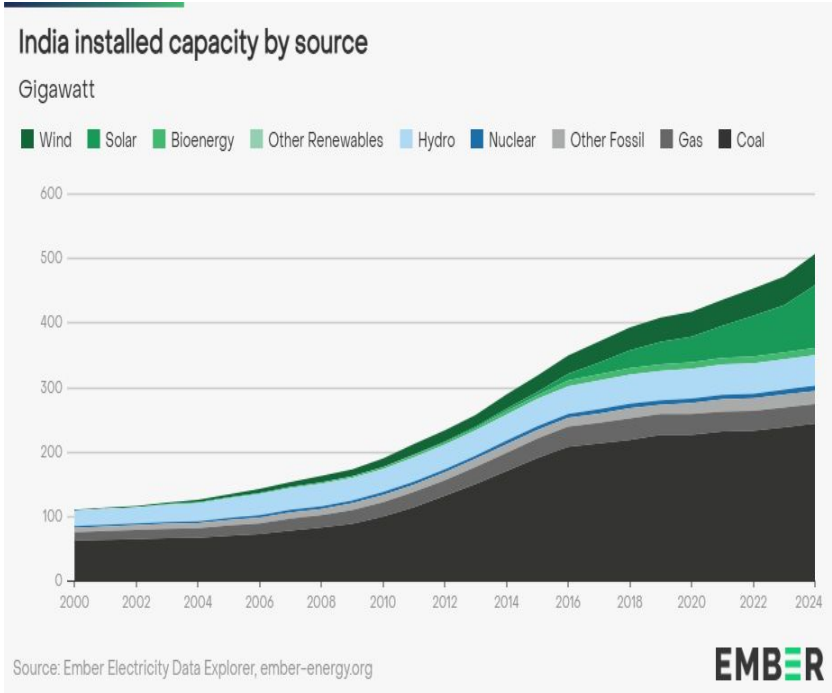
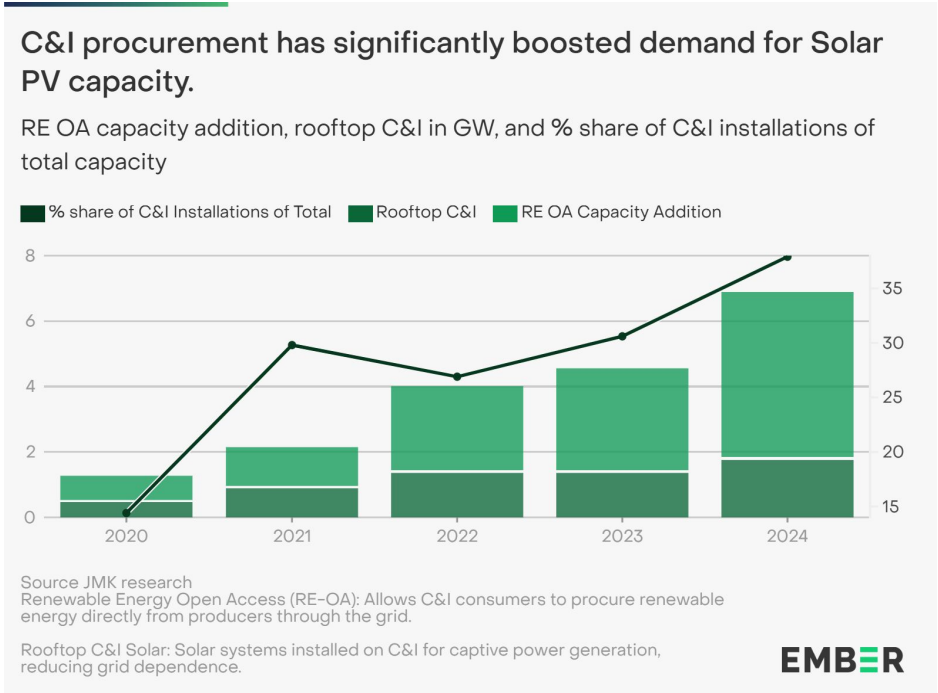
EMBER

Brief overview of RE procurement by corporates

Insights and outlook

C&I procurement is a key RE growth driver in India

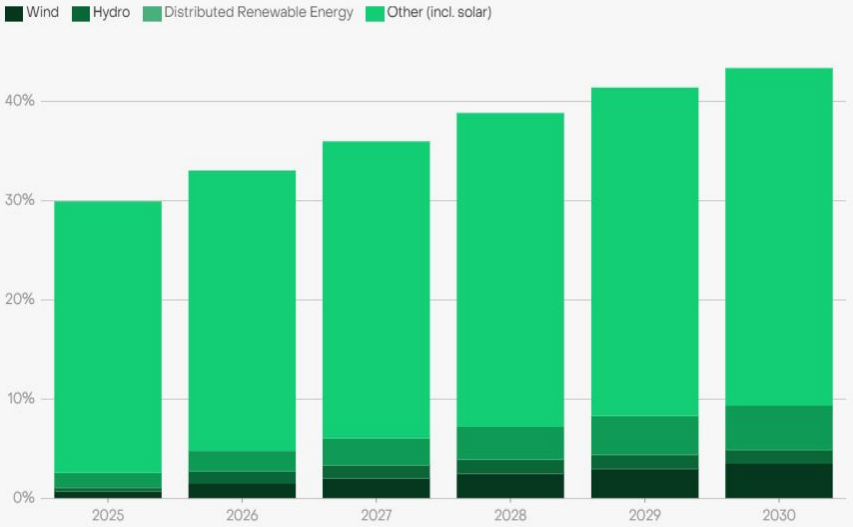




Policy support and cost advantages have fueled growth

Indian industries are mandated to replace more than 40% of captive power with renewables by 2030

Share of captive power mix as mandated under the RPO



Source: RPO guidelines by Ministry of Power, India
RPO stands for Renewable Purchase Obligation. Distributed Renewable Energy includes projects of up to 10 MW

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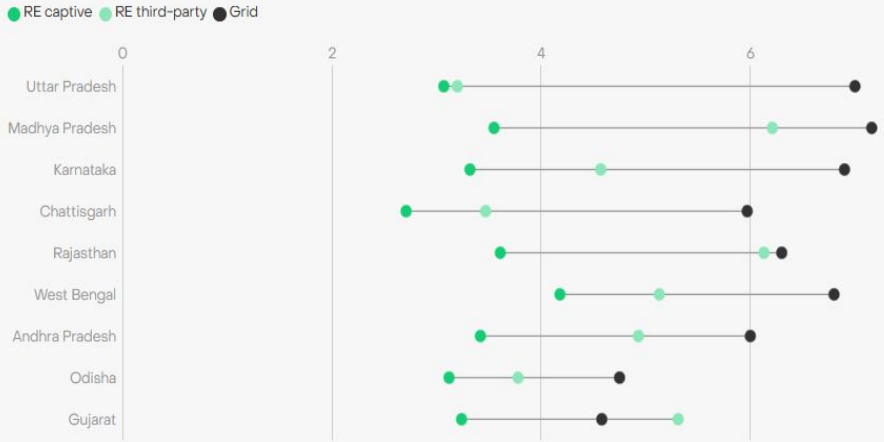
Procuring renewable power via open access mechanisms is cheaper than grid power for industries in most Indian states

Landed RE versus grid tariffs for industries across various states, in Rs./kWh

States ordered by biggest difference in grid vs open access prices



Source: Based on states' latest tariff orders available up to November 2024. · Grid tariff considers only the variable component, and excludes fixed charges.
Open access allows consumers to procure power privately from generators using the common grid. Renewable energy (RE) tariffs here refer to solar power priced at Rs. 2.5/kWh plus state-wise applicable open access charges.

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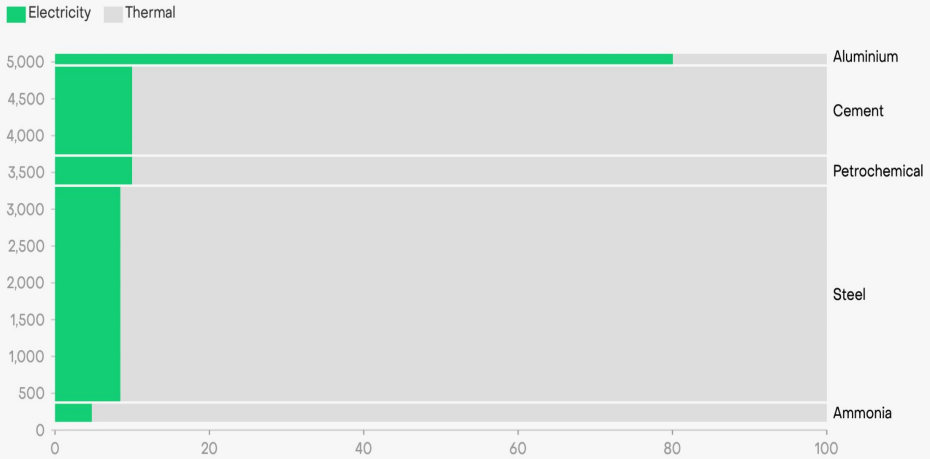
+ ESG commitments or subscription to RE100 charter

RE growth potential in the industrial sector remains strong

Electricity use varies widely across India's industrial sectors

Electricity as a share of total energy consumed (%) in 2022
Height of the bars show total energy consumption by sector in petajoules (PJ)



Source: Ember's analysis of thermal and electricity energy inputs for various industrial sectors for 2022 (latest year with data availability) ·
Electricity includes power requirement from heating technologies like electric arc furnaces for steel making

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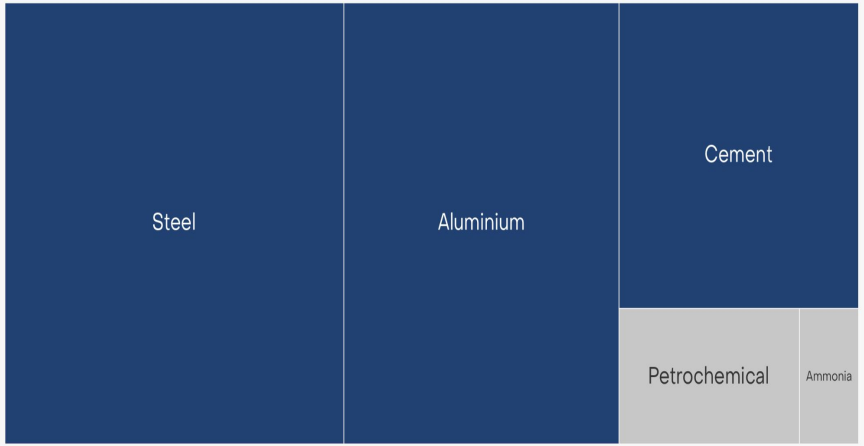
91% of India's 'heavy' industry electricity use comes from steel, aluminium and cement sectors

Electricity consumption (TWh) by sector in 2022



Source: Ember's estimates based on electricity consumption data for various industrial sectors for 2022 (latest year with data availability) ·
Electricity consumption includes power requirement from heating technologies like electric arc furnaces for steel making

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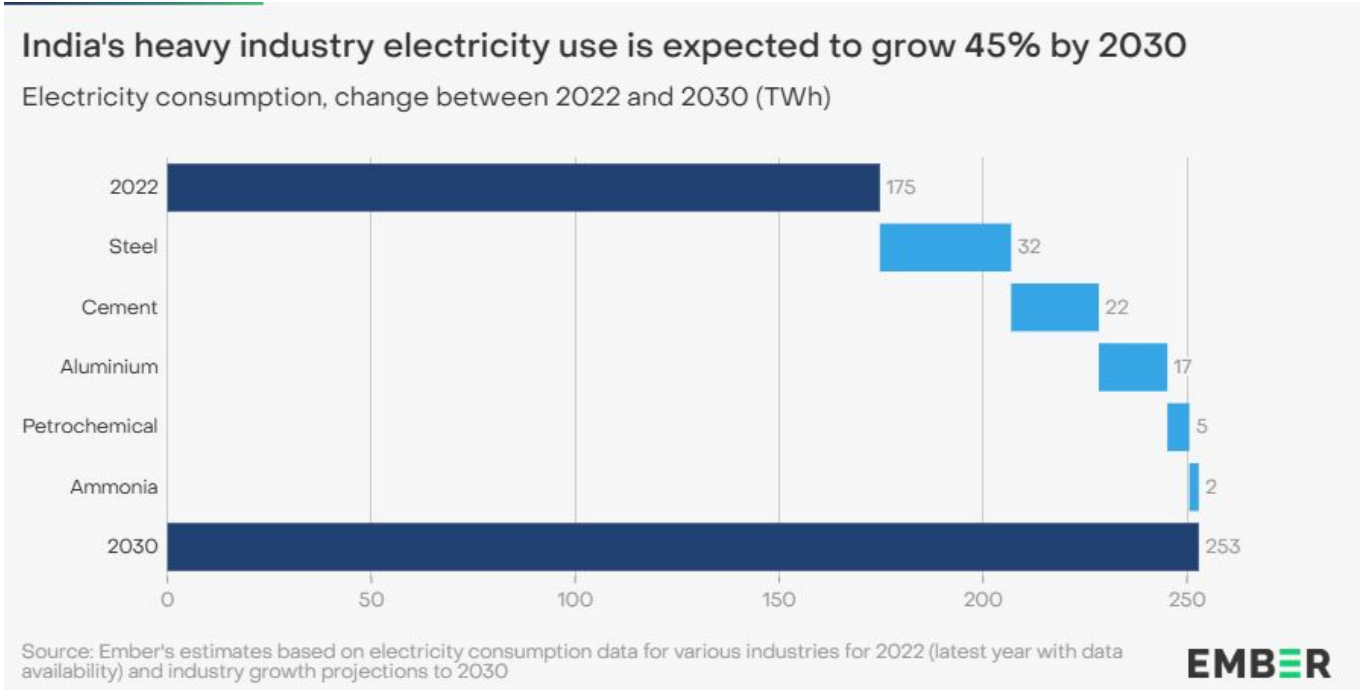
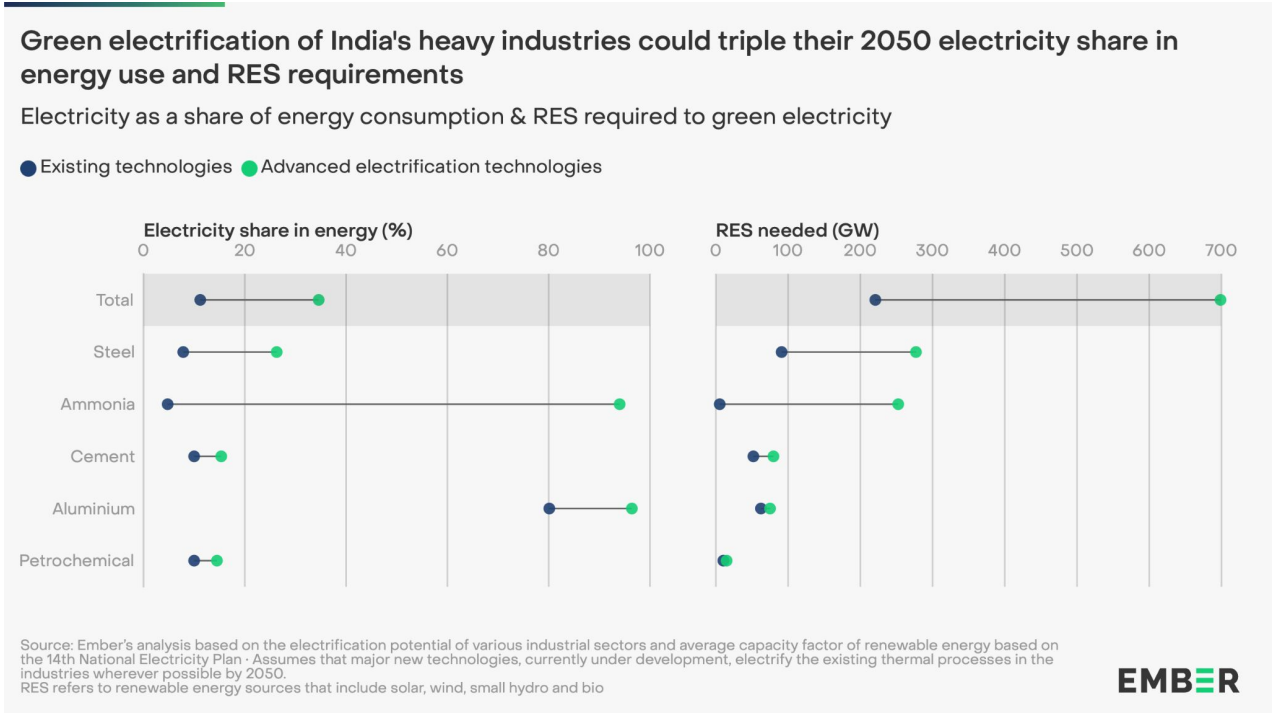
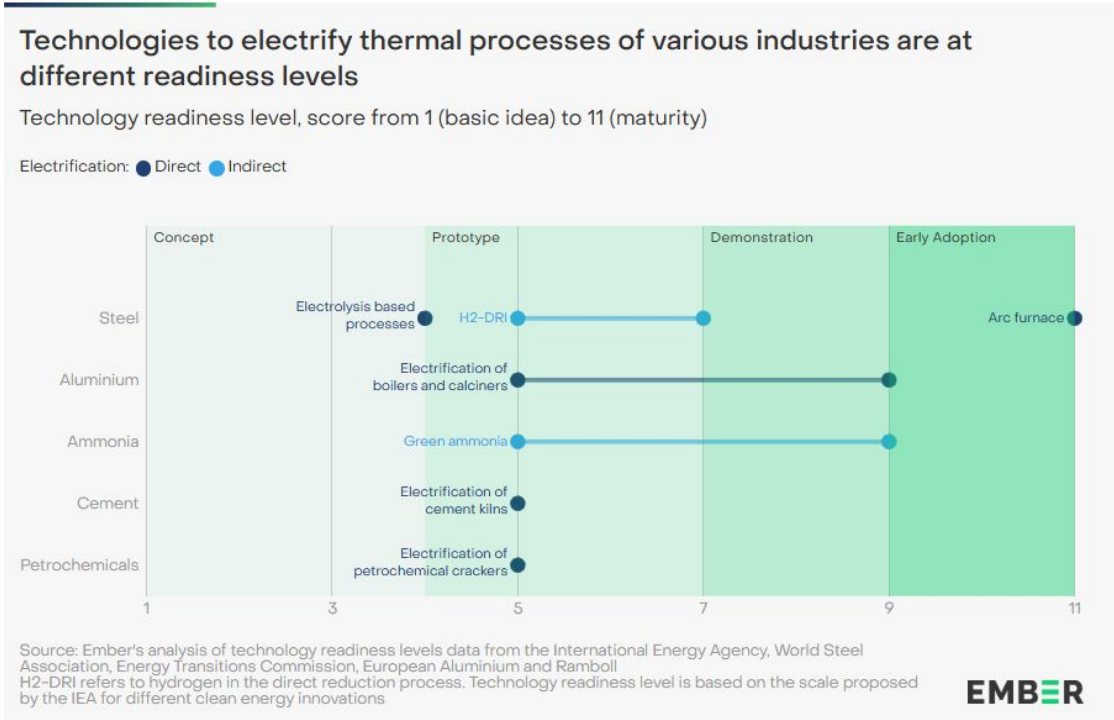
RE growth potential in the industrial sector remains strong



Electrification will add 3X more power demand for industrial sector



Electrification: The way forward?

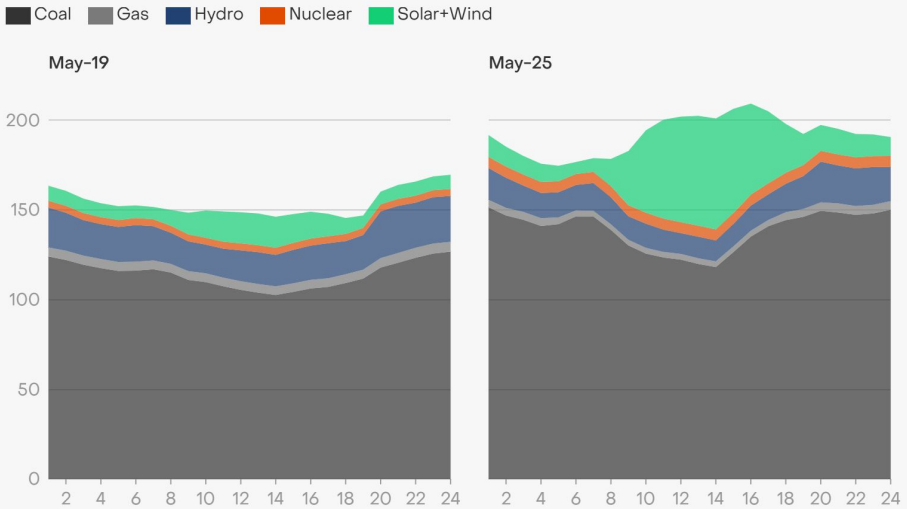


Increasing RE share in electricity consumption need storage investments

Storage is key to unlocking further solar growth

The duck curve waddles in with increasing solar penetration

Hourly source-wise generation (GW) for a typical day in May 2019 and May 2025



Source: MERIT INDIA

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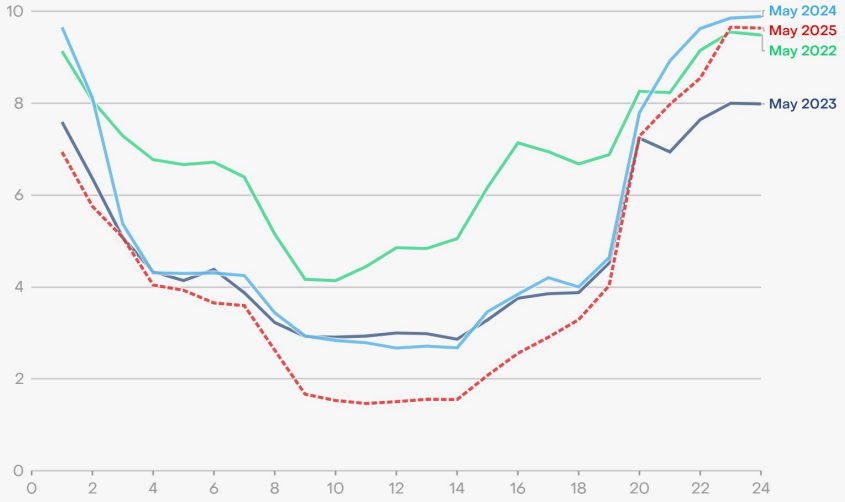
Power exchanges are witnessing a widening midday price dip driven by surplus solar generation

Average market clearing price in ₹/kWh for the month of May from 2022–2025



Source: Indian Energy Exchange (IEX) - Day Ahead Market

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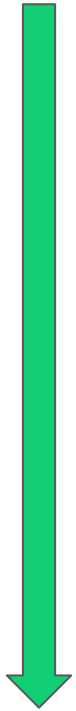
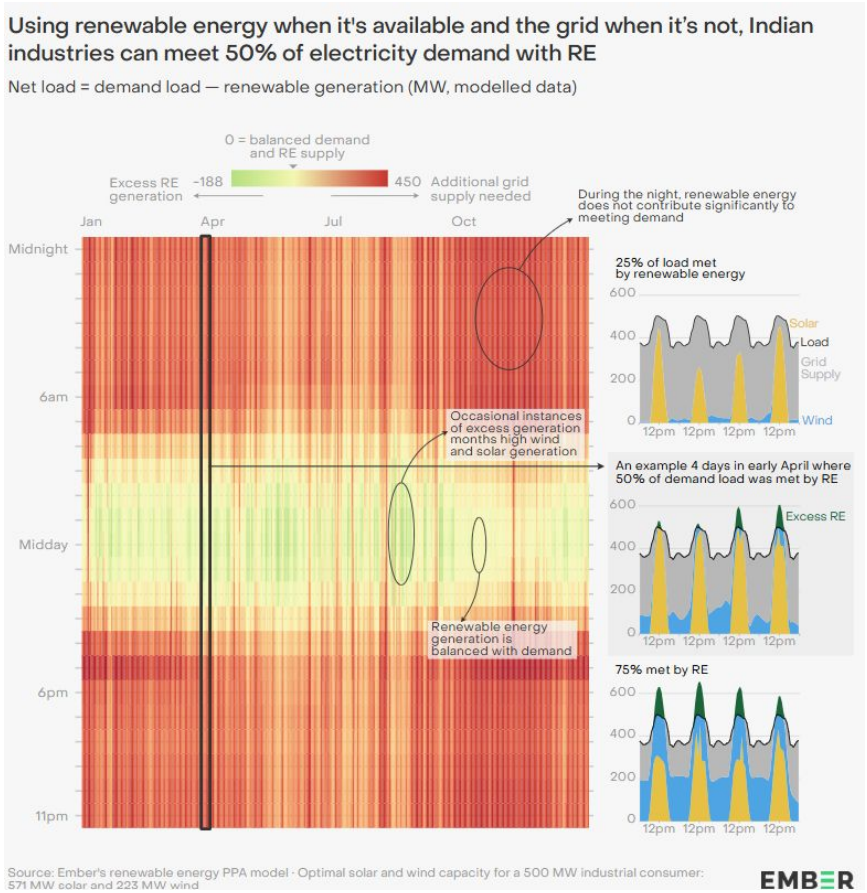
As the level RE procurement increases—from 50% to 24/7 RE-costs, balancing complexity, and the risks increase significantly

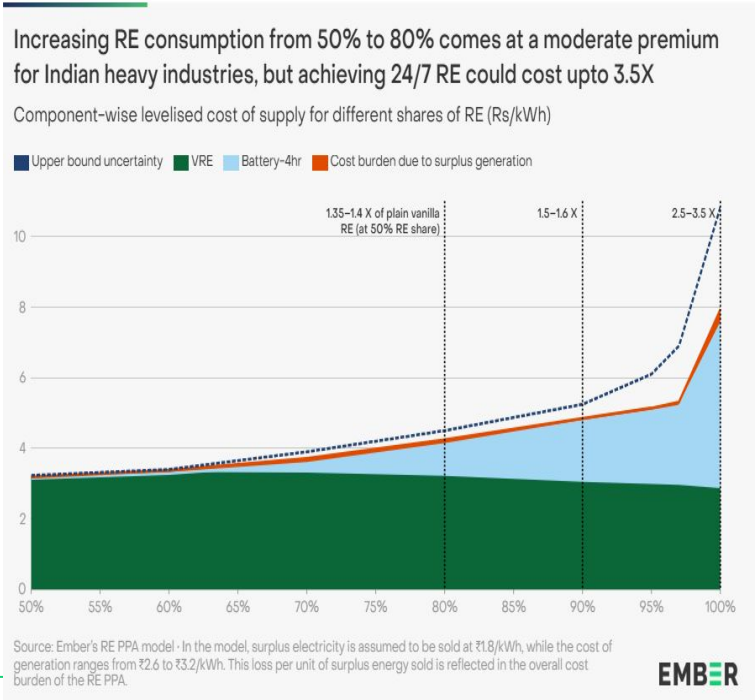


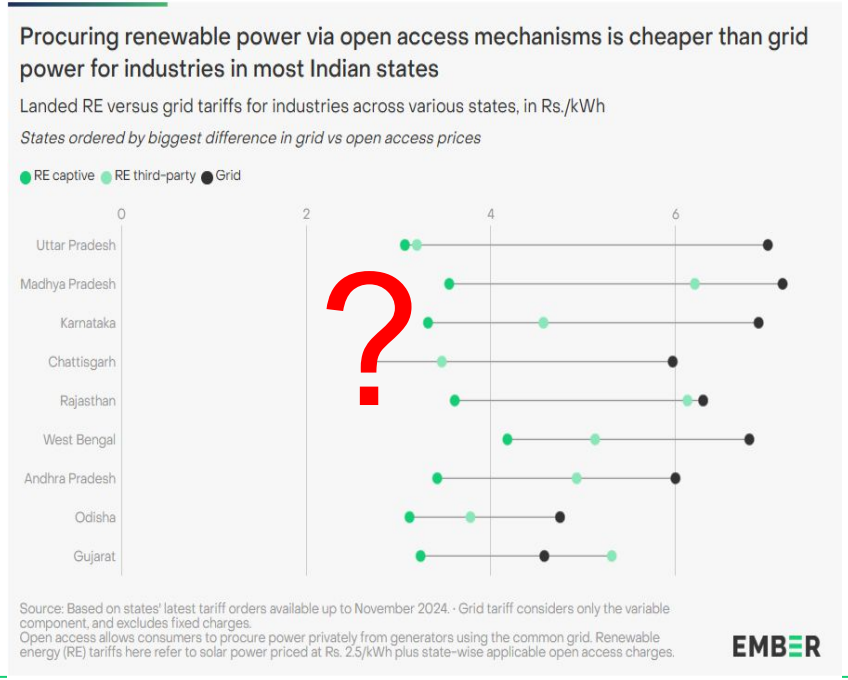
RE Procurement Level	Cost Competitiveness	Supply Matching	Risk / Complexity	Procurement Strategy Needed
50% RE	Competitive prices	Partial matching (daylight hours)	Low–Moderate	Solar
				Wind
80% RE	Moderate premium (~10–20%)	Better matching (still gaps at night)	Moderate	Sola r++
				Wind--
				Storage (BESS)
				Excess generation
100% / 24/7 RE	Challenging & expensive Very high premium	Full matching (hourly basis)	High – Complex	Solar++++
				Wind ----
				Storage (BESS)++++
				Excess generation+++++

Moving from plain vanilla to 24/7 RE: Supply Matching gets complex

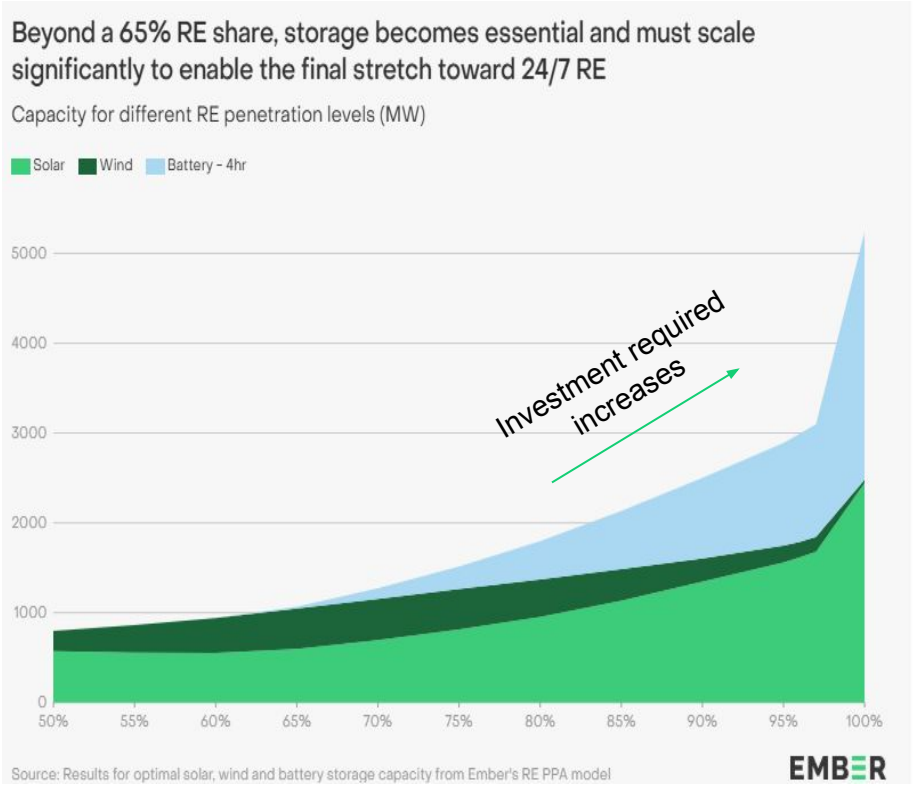


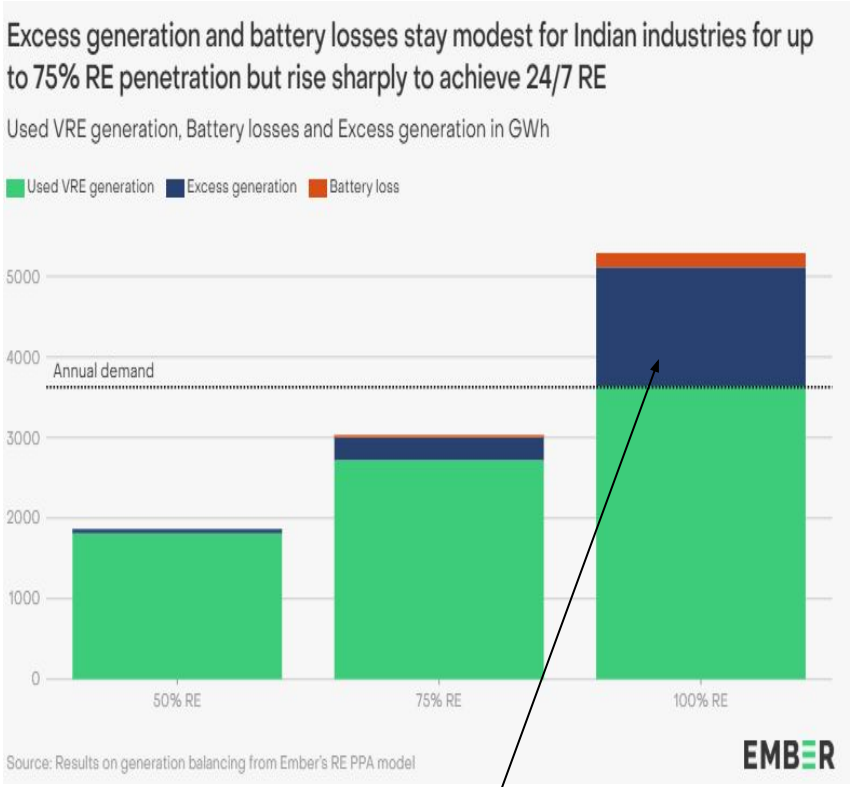
Moving from plain vanilla to 24/7 RE: Cost Competitiveness will be an issue





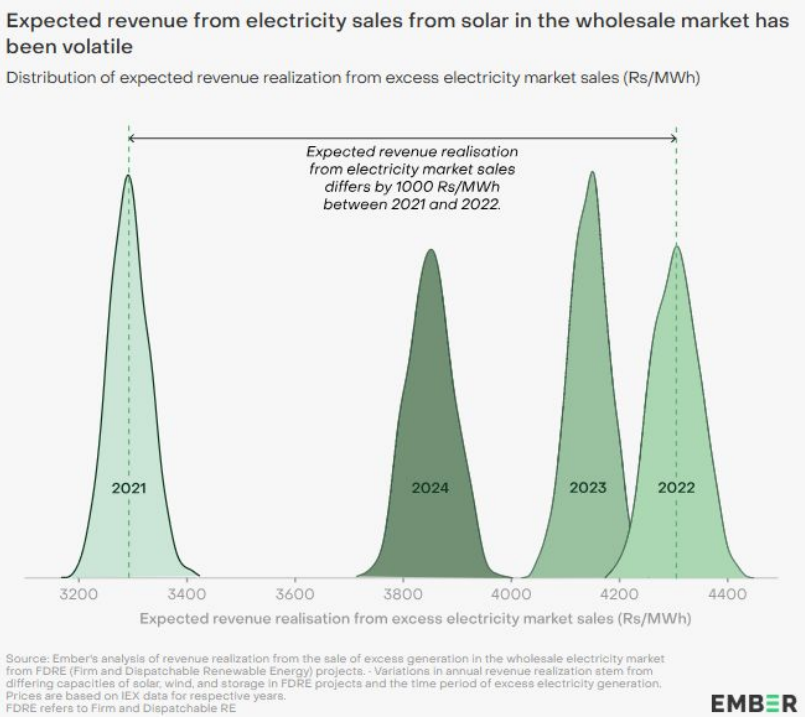
Moving from plain vanilla to 24/7 RE: More investment with uncertainty in revenue

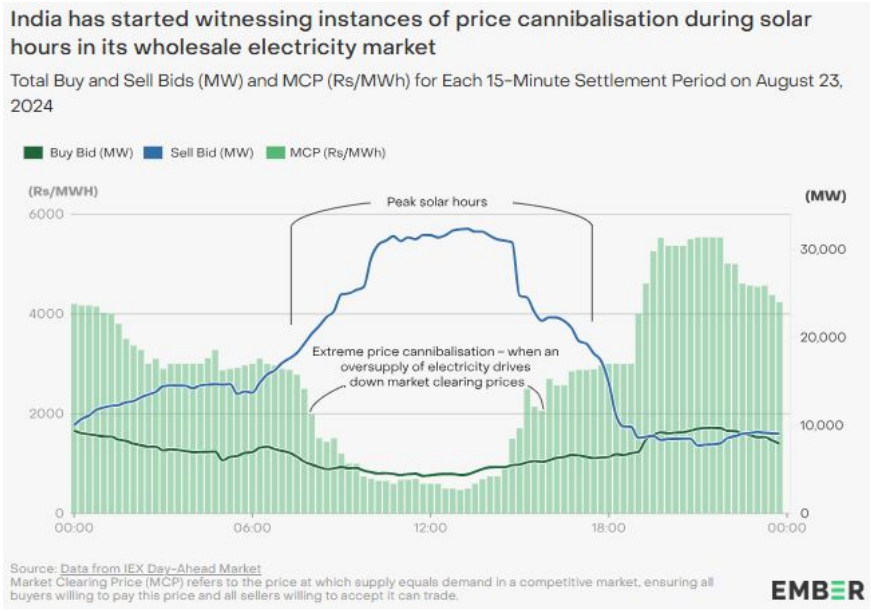




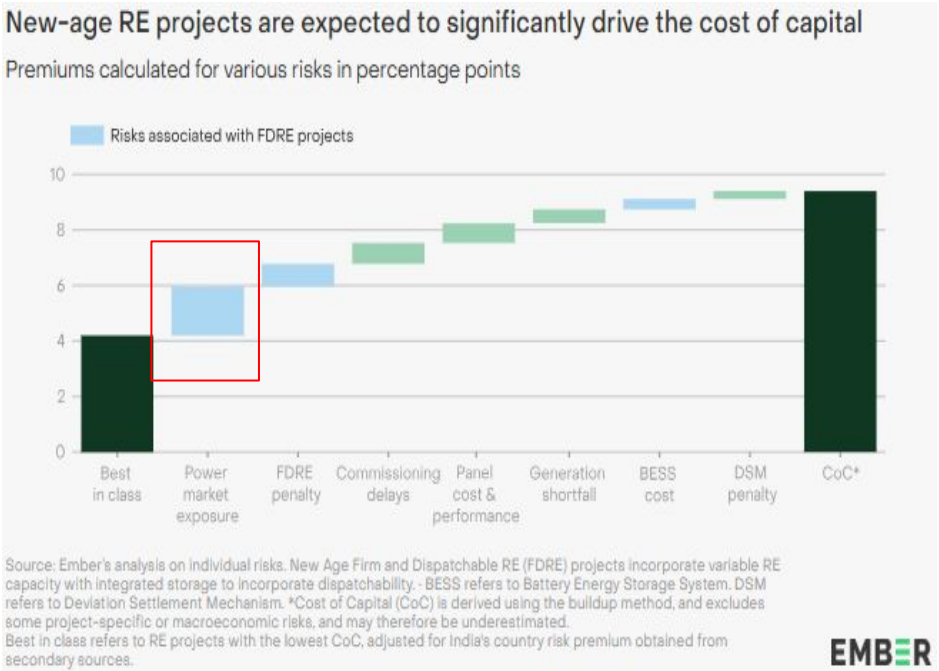
Revenue realization from sale of excess generation becomes important to the project

Moving from plain vanilla to 24/7 RE: Market exposure risk has to be better understood through modelling





Moving from plain vanilla to 24/7 RE: Dispactable RE projects are riskier



The way forward

- Better tools to
  - estimate the risk of such projects
  - Help identify the “optimal” capacity mix of projects
- More pilots for corporate 24/7 PPA

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