CEEW
THE COUNCIL
Centre for Energy Finance

CEEW-CEF Market Handbook 2023-24 (Annual issue)

2 May 2024

Image: iStock

CEEW-CEF Market Handbook

India is undergoing an energy transition from fossil-based to clean energy. Evidence-based decision-making can accelerate the process.

CEEW Centre For Energy Finance's Market Handbook aims to help key investors, executives and policymakers with evidence-based decision-making by:

- Identifying and analysing trends critical to India's energy transition
- Presenting data-backed evidence based on the most relevant indicators
- Connecting the dots and presenting a short-term market outlook

The handbook attempts to comment and answer on some critical questions such as:

1. What is India's generation capacity and energy mix?
2. What are the key trends in renewable energy (RE) tariffs?
3. What is the current situation of the discom payment delay situation?
4. How have the power market reforms progressed?
5. What are key trends in the electric vehicles (EV) and energy storage markets?

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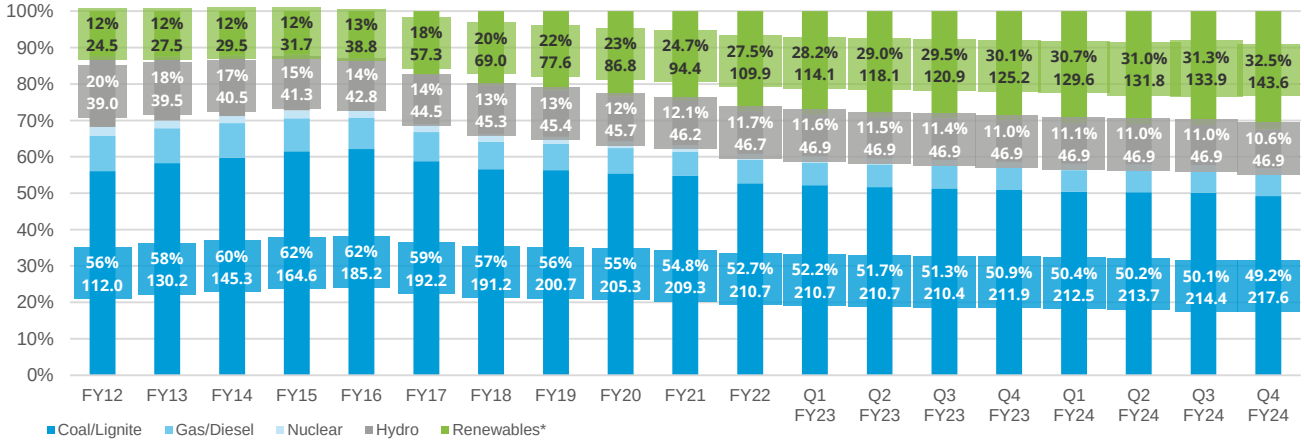
Contents

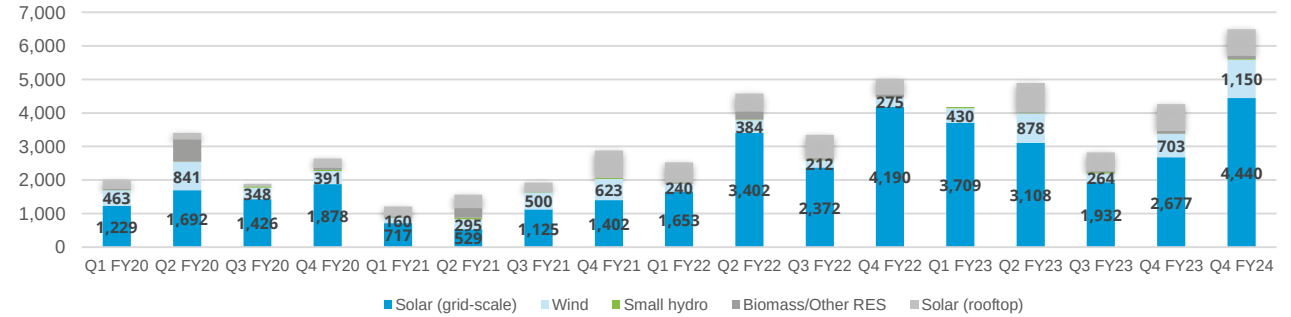
Generation capacity: share of coal/lignite in total installed capacity falls below 50% in FY24; 1.4 GW of nuclear capacity addition in FY24

Installed capacity mix (GW)



Source: *Central Electricity Authority (CEA). * Includes solar rooftop capacity (11869.63 MW as of March 2024).*

RE capacity addition (MW)



Source: *Ministry of New and Renewable Energy (MNRE).*

Takeaways & Outlook

In FY24, a net power generation capacity of 25.9 GW was added (vs 16.6 GW in FY23). It was primarily dominated by renewable energy (RE) (18.5 GW, 71.3%), followed by coal/lignite (5.7 GW, 22.1%) and nuclear (1.4 GW, 5.4%). For the first time since FY17, nuclear capacity was added in FY24.

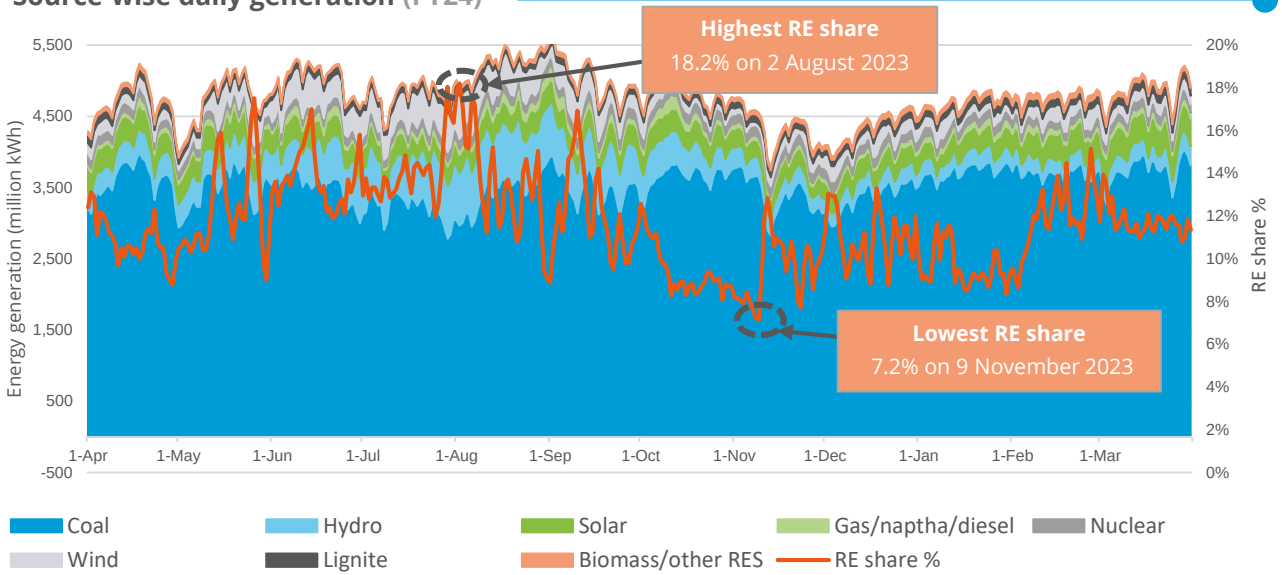
In RE, solar (grid-scale and rooftop) continued to dominate RE capacity addition, accounting for 15 GW (81.3%) (vs 12.8 GW in FY23). Wind capacity addition in FY24 stood at 3.3 GW (17.6%) (vs 2.3 GW in FY23). The share of small hydro and bio-power stood at 0.3% and 0.8%, respectively.

In FY24, the total installed capacity reached 442 GW, of which 143.6 GW (32.5%) came from RE, and 46.9 GW (10.6%) came from hydro. Coal capacity in the installed capacity mix dropped below 50% (217.6 GW, 49.2%) in FY24.

As of 31 December 2023, 87.5 GW of RE capacity is under construction, comprising 54.8 GW of solar, 19.2 GW of wind and 13.2 GW of hybrid capacity, among others.

Energy mix: share of RE in the generation mix stood at 11.7% in FY24; share of coal/lignite was up in FY24 compared to FY23

Source-wise daily generation (FY24)



RE share snapshot

	FY22		FY23		FY24	
	RE share %	Day	RE share %	Day	RE share %	Day
Highest	19.2%	08 August 2021	21.3%	22 May 2022	18.2%	2 August 2023
Lowest	7.0%	23 December 2021	7.5%	30 August 2022	7.2%	9 November 2023
Average (daily)	10.8%	NA	11.8%	NA	11.7%	NA

Source: POSOCO. *Note:* RE technologies include solar, wind, biomass, waste-to-energy and small hydro and do not include rooftop solar and large hydro (>25 MW) generation.

Takeaways & Outlook

Total electricity generation was up by 10.4% in FY24 compared to FY23. Contributing factors included lower-than-expected rainfall in August 2023 and October 2023, hot weather conditions and above normal temperatures in November 2023, and severe cold days with below-normal temperatures during the winter months in North India.

- **Q1:** Up by 5.8%
- **Q2:** Up by 14.7%
- **Q3:** Up by 13.5%
- **Q4:** Up by 7.8%
- **Total FY24:** Up by 10.4%

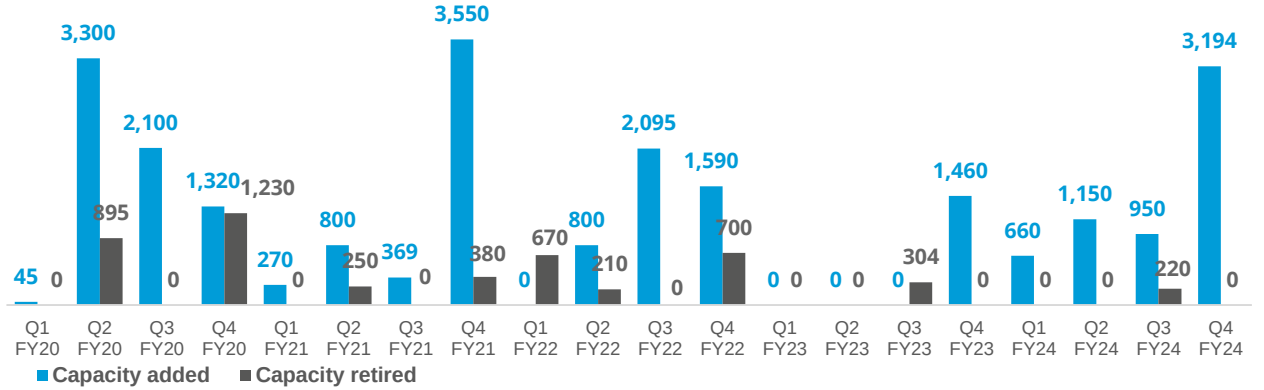
Overall RE generation in FY24 increased by 9.5%, large hydro generation sharply fell by 16.3%, whereas coal/lignite generation grew significantly by 14.0% (versus FY23).

From an average daily generation perspective, **coal/lignite share increased, whereas RE and hydro share declined in FY24 compared to FY23**.

- **RE:** Share down from 11.8% to 11.7%
- **Hydro:** Share down from 11.0% to 8.3%
- **RE+Hydro:** Share down from 22.8% to 20.0%
- **Coal/lignite:** Share up from 73.1% to 75.4%

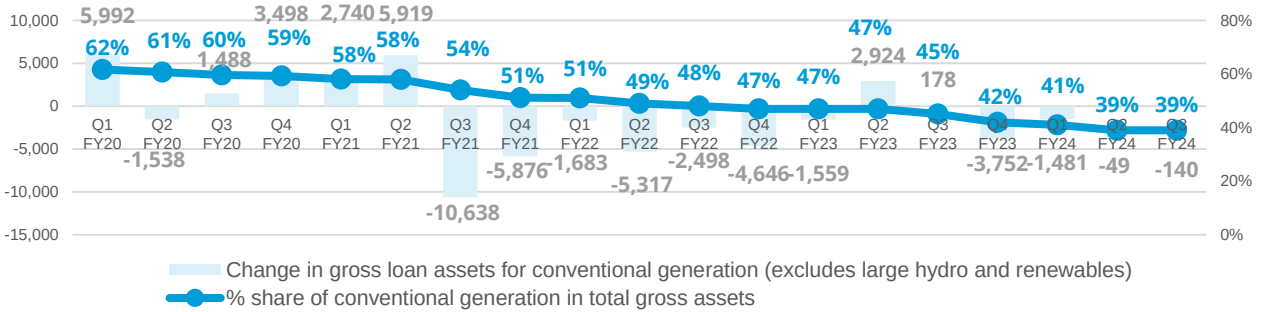
Coal phase-out: net coal capacity addition increased ~4x in FY24 compared to FY23; share of conventional generation in PFC/REC's loan book declined to 39%

Coal capacity added versus retired (MW)



Source: CEA.

Coal financing by Power Finance Corporation (PFC)/ Rural Electrification Corporation (REC) (INR crore)



Source: PFC investor presentations; figures are derived from the same. Note: Sector-wise PFC loan asset data break-up is unavailable for Q4 FY23.

Takeaways & Outlook

In FY24, 5,954 MW of new coal capacity was added, and 220 MW was retired. The net capacity addition (5,734 MW) increased by ~4x (vs FY23). As per CEA, 29.4 GW of thermal power projects are currently under construction, as of February 2024. Of this, 46.4% (13.7 GW) would be added to the central sector, 48.1% (14.8 GW) to the state sector and remaining 0.05% (1.6 GW) to the private sector.

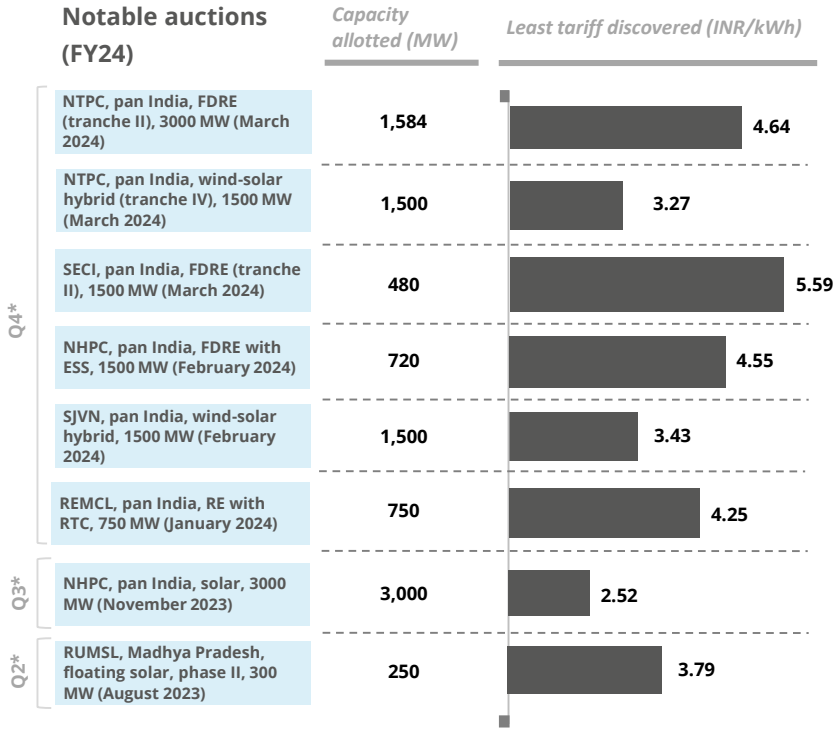
PFC/REC, India's largest power sector financiers, continues to reduce its exposure to conventional power generation. **The share of conventional generation** in PFC/REC's loan book **continued to trend downward** and declined to **39% in Q3 FY24 from 45% in Q3 FY23.** The share of **transmission and distribution (T&D)** and **RE generation (including large hydro)** projects continued to increase. They accounted for ~**47% (INR 2,14,915 crore) and ~11.9% (INR 54,268 crore)** of the total loan book as of Q3 FY24 vs ~44% (INR 1,73,769 crore) and ~10.1% (INR 39,634 crore) in Q3 FY23, respectively.

However, a gradual increase (~17% in every quarter vs same quarter previous fiscal) in **PFC/REC's overall gross loan assets has been recorded** in the first three quarters of FY24.

RE auctions and tenders: 40.56 GW RE capacity auctioned in FY24; ~95% of bidding trajectory target achieved

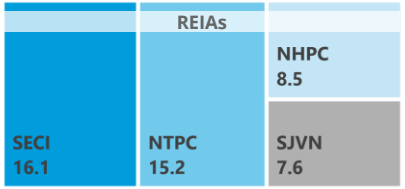
40.56 GW

RE auctions concluded in FY24

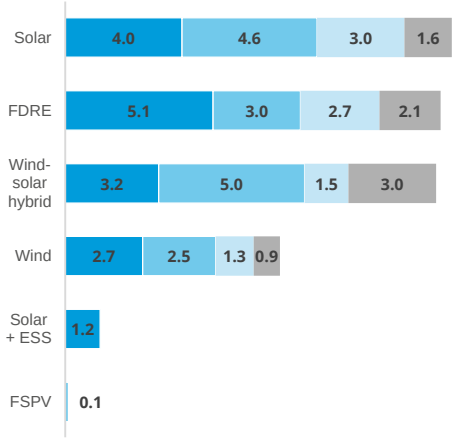


47.5 GW#

RE tenders announced in FY24



Technology-wise REIA tenders announced in GW



Takeaways & Outlook

Auctioned RE capacity stood at 40.56 GW in FY24, of which plain vanilla solar and vanilla wind stood at 24.36 GW (60%) and 1.25 GW (3%), respectively. **14.95 GW (37%)** of auctioned capacity was under **innovative power procurement formats. Tenders with storage components** stood at **8.16 GW (20%)**. RE auctioned capacity in FY24 witnessed a ~3x increase vs FY23.

The auctioned capacity in Q1, Q2 and Q3 was moderate; however, Q4 of FY24 witnessed a jump of ~106% in tender conclusion.

- **Q4 FY24: 18.66 GW**
- **Q3 FY24: 8.84 GW**
- **Q2 FY24: 5.41 GW**
- **Q1 FY24: 7.65 GW**

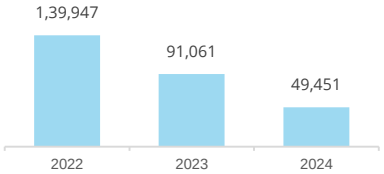
In FY24, the designated **renewable energy implementing agencies (REIAs)** announced 47.5 GW (out of 50 GW) capacity of RE tenders, of which vanilla solar and wind stood at 28% and 15% respectively. **Innovative procurement formats** stood at **57%.** With this, REIAs met ~95% of the bidding trajectory target, and ~74% (7.35 GW) of the target (10 GW) for wind tenders. **27.0 GW (46.9%) of the bids converted into successful auctions** in the same year.

Source: SECI and state renewable agencies.

*SECI = Solar Energy Corporation of India; RUMSL = Rewa Ultra Mega Solar Limited; REMCL = Railway Energy Management Company Ltd; SJVN = Satluj Jal Vidyut Nigam; NHPC = National Hydroelectric Power Corporation; FSPV = Floating solar PV. *Only the least tariff auctions and unique auctions have been covered. #Excluding standalone storage tenders. Note: Bids issued = tenders announced.*

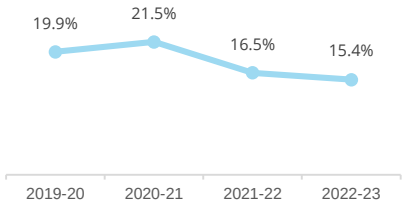
Discom payables: legacy dues of discoms to generating companies reduced to INR 49,451 crore from INR 91,061 crore

Legacy dues by discoms to power producers (INR crore)



Source: PRAAPTI portal (based on voluntary disclosures from power producers; PIB Press Release.

Overall AT&C losses (%)



Source: Integrated rating and ranking of power distribution utilities.

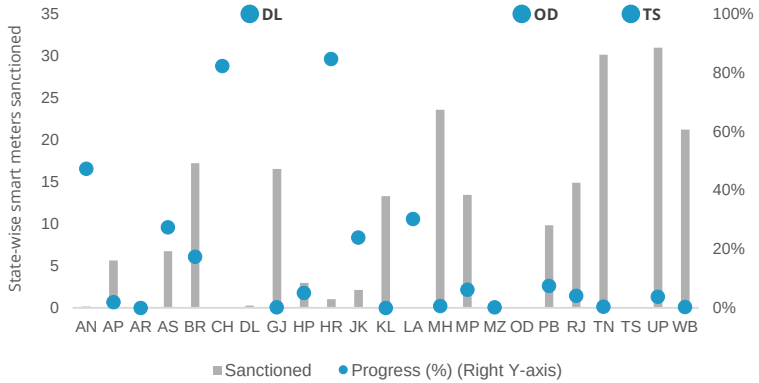
Smart, DT & Feeder meters installed vs sanctioned (as of FY24)

4.8%
Smart consumer meters
of 22,22,64,571 sanctioned

0.5%
DT meters
of 52,65,011 sanctioned

7.0%
Feeder meters
of 1,83,316 sanctioned

State-wise smarts meters installed vs sanctioned (as of FY24)



Source: CEEW-CEF compilation based on National Smart Grid Mission, MoP

Takeaways & Outlook

As of January 2024, legacy dues# of discoms to generating companies reduced to INR 49,451 crore from INR 91,061 crore in 2022. All current dues of generating companies are up-to-date as of 31 January, 2024.

As per the performance of the power utilities report 2022-23, pan-India **AT&C losses stood at 15.4%** vs 16.5% in 2021-22. 12 utilities (out of 53) received A+ grading in FY23.

Under the **RDSS scheme**, 10.67 million prepaid smart consumer meters, 0.03 million smart DT meters and 0.01 million smart feeder meters have been installed across 28 states/UTs.

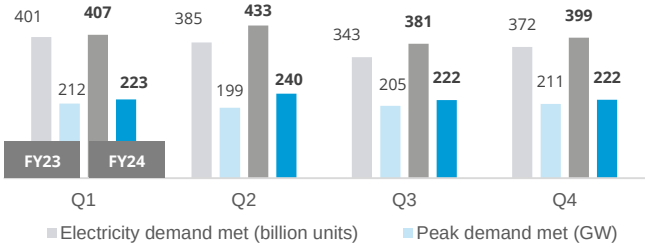
Among the states/UTs, Delhi, Odisha and Telengana have achieved 100% of their sanctioned smart meters installation. Arunachal Pradesh, Chhattisgarh, Goa, Jharkhand, Manipur, Meghalaya, Nagaland, Puducherry, Sikkim, Tripura, and Uttarakhand are yet to record progress in installing smart meters.

Reforms-based and results-linked, revamped distribution sector scheme (RDSS), approved in June 2021, aims to **reduce AT&C losses at pan-India levels to 12-15% by 2024-25, reduce ACS-ARR gap to zero by 2024-25, and develop institutional capabilities for modern discoms.**

Note: #Legacy dues are already past their due date and remain partially or completely unpaid. Current dues are partially or completely unpaid but are still within their respective due dates.

Power markets: traded volumes crossed 100 BU mark on IEX; PAT Cycle–II concluded

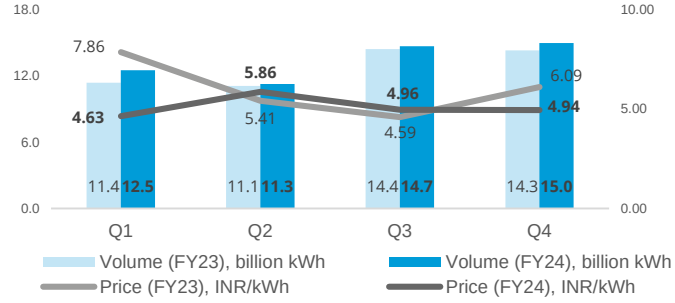
Power supply position (peak and electricity demand)



Source: CEA.

Quarterly peak power demand in FY24 consistently surpassed FY23 and FY22 levels; it was above the 200 GW mark in all quarters due to a higher number of heatwaves days and below-average rainfall. In terms of average electricity demand met in FY24, there was an uptick of 7.9% vs that of FY23.

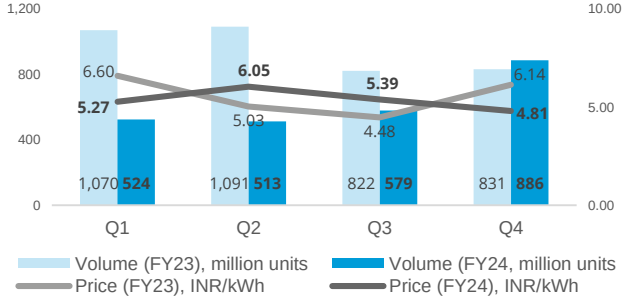
Day-ahead spot market snapshot (IEX)



Source: IEX.

Day-ahead market (DAM) achieved 53.4 billion kWh volume in FY24, registering a growth of 4.3% (vs FY23) due to lower prices. The average market clearing price (MCP) stood at INR 5.24/ kWh in FY24, 12.0% lower than in FY23 due to better supply scenario.

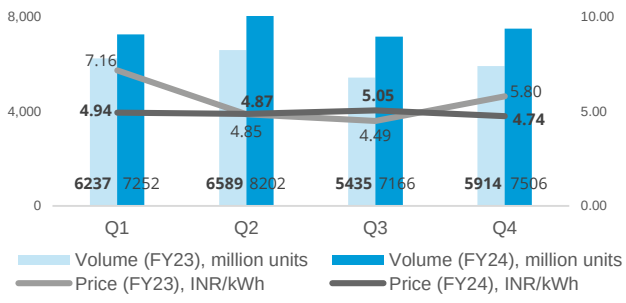
Green day ahead market snapshot (IEX)



Source: Indian Energy Exchange (IEX).

Green day-ahead market (GDAM) achieved 2,502 million kWh traded volume in FY24 vs 3,814 million kWh in FY23. March 2024 recorded FY24's highest number of participants in this segment, standing at 244.

Real-time market snapshot (IEX)



Source: IEX.

In FY23, the **real-time market (RTM)** traded 30,125 million kWh, registering a 24.6% growth in FY24 (vs FY23). Since its inception, discoms have been tapping into the RTM to efficiently balance the power demand and supply in real time.

Takeaways & Outlook

Peak power demand continued to rise in FY24. It reached a **new high of 240 GW in Q2 FY23** and consistently surpassed the 200 GW mark in all quarters. In energy terms, the average monthly electricity demand (met) saw an uptick of 7.9% in FY24 (versus FY23).

In February 2024, Ministry of Power **amended the Electricity (Late Payment Surcharge and Related Matters) Rules of 2022**, mandating the sale of un-requisitioned surplus power on exchanges. This will lead to supply side liquidity and discovery of competitive prices on the exchange.

In FY24, **IEX achieved a trade volume of 110 billion units**, crossing the 100 BU mark for the first time since its inception.

In FY24, **7.53 million RECs were traded**, recording a 26% increase vs FY23.

The trading of energy saving certificates (ESCerts) under PAT Cycle-II concluded in October 2023, with a total of 13.2 lakh ESCerts being traded during this cycle. The trading of **ESCerts under PAT Cycle-III** is scheduled to start **from April 09, 2024**.

Policy and regulatory developments: fresh push to rooftop solar segment via PM – Surya Ghar: Muft Bijli Yojana; ALMM list reimposed w.e.f 1 April 2024

JSERC issued Green Energy Open Access Regulations, 2024

- In January 2024, Jharkhand Electricity Regulatory Commission released its green energy open access regulation, in line with MoP's Green Energy Open Access Regulations, 2022.
- Consumer's load requirement is reduced to 100 kW.
- Additional surcharge will not be applicable if a consumer is paying the fixed charges.
- A 100% Banking facility will be available on a monthly basis to captive consumers on payment of 10% of banked energy as banking charges.

MNRE issued incentive schemes for GH2 and GNH3 production and supply (under Mode 2A and Mode 2B)

- In January 2024, MNRE notified the incentive scheme for green ammonia (GNH3) production under Mode 2A of SIGHT programme component –II with a direct incentive in INR/kg for three years.
- Under Mode 2B for green hydrogen (GH2), a direct incentive in INR/kg for three years will be provided.

GERC issued Green Energy Open Access Regulations, 2024

- In February 2024, Gujarat Electricity Regulatory Commission released its green energy open access regulation
- Consumer's load requirement is reduced to 100 kW.
- Additional surcharge will not be applicable if a consumer is paying the fixed charges.
- At least 30% of the total monthly consumption from DISCOM can be banked.

MNRE issued a scheme guideline for setting up hydrogen hubs in India

- In March 2024, MNRE issued scheme guidelines for setting up green hydrogen hubs.
- The hub should have a capacity of at least 100,000 MTPA and at least two such hubs to be set up by FY26.
- Budgetary outlay for the scheme is INR 200 crore for the development of core infrastructure.

MNRE launched the *PM – Surya Ghar: Muft Bijli Yojana*

- In March 2024. *PM – Surya Ghar: Muft Bijli Yojana*, with a total financial outlay of INR 75,021 crore, was launched.
- Under this, a target of installing rooftop solar systems on one crore households has been set.
- The incentive categories are based on rooftop system capacity. Beyond 3 kW, no incentives will be provided.

ALMM for solar PV modules come into effect from 1 April 2024

- In March 2024, MNRE released an order to reimpose ALMM for solar PV modules with effect from 1 April 2024.
- Additionally, MNRE updated the ALMM list with an enlisted capacity of 33,994 MW in February 2024.
- Later in March 2024, MNRE updated the ALMM list to increase the enlisted capacity to 37,694 MW.

Takeaways & Outlook

Various announcements in FY24 presented positive policy signals for the **renewable energy and energy storage sector.**

In April 2023, the MNRE issued a **50 GW RE bidding trajectory** per year till FY28. In July 2023**, guidelines for the tariff-based competitive bidding process for power procurement** of wind-solar, solar and wind projects were revised.

In April 2023, the MoP issued the **guidelines to promote the development of pumped storage projects** (PSPs). Later, in August 2023, MoP, to have 24×7 dispatchable RE power, i.e., RE-RTC (round-the-clock RE), released a framework to promote ESS.

In addition, MNRE amended the ALMM norms on module threshold efficiency; the minimum module efficiency for **utility-scale projects, rooftop solar projects and solar lighting should be 20.0%, 19.5% and 19.0%**, respectively.

On the GH2 front, MNRE issued the final R&D roadmap for the GH2 ecosystem in India and issued GH2 guidelines for pilot projects in the shipping and steel sector under NGHM.

Source: CEEW-CEF Compilation.
**ALMM = Approved List of Models and Manufacturers.*

Renewable energy finance: overall market concentration in RE auctions increased in FY24 compared to FY23; new InvIT Sustainable Energy Infra Trust set up by Mahindra Group & Ontario Teachers

Notable deals (FY24)

March 2024

Equity Investment

Target: Grasim Industries
Investor: International Finance Corporation
Amount: ~INR 1,252.9 crore (USD 150 million)

February 2024

Acquisition

Target: Renew Power (300 MW, solar)
Acquirer: Indi Grid
Amount: ~INR 1,562.1 crore (USD 187 million)

January 2024

Equity Investment

Target: Sustainable Energy Infra Trust (SEIT)
Investor: Asian Infrastructure Investment Bank (AIIB)
Amount: ~INR 487.8 crore (USD 58.4 million)

December 2023

Equity investment

Target: Sterling and Wilson
Investor: Qualified institutions placement (QIP) route
Amount: INR 1,500 crore (~USD 180.5 million)

August 2023

Acquisition

Target: Virescent Renewable Energy Trust
Investor: IndiGrid
Amount: INR 4,000 crore (~USD 484 million)

April 2023

Equity investment

Target: Avaada Energy
Acquirer: : Brookfield
Amount: INR 8,200 crore (~USD 1 billion)

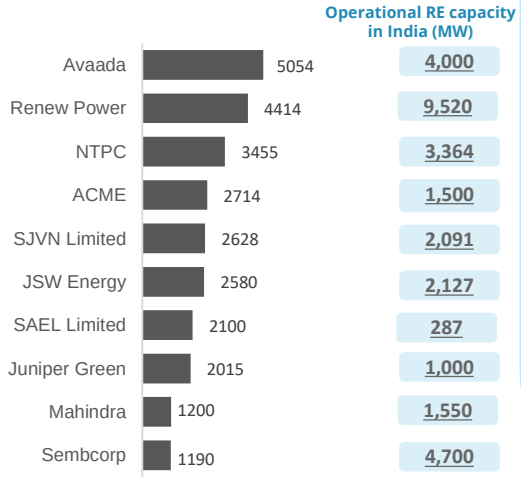
Source: CEEW-CEF Compilation.

76% Q4 FY24 **67%** FY24

Market concentration in auctioned RE capacity

Note: Market concentration is calculated as the ratio of the top five RE capacities awarded to the total RE capacity auctioned.

Developer-wise* RE capacity auctioned during FY24 (40,534 MW)



*Source: CEEW-CEF Compilation. *Note: Includes only top 10 developers in terms of auctioned capacity. **Including hydro capacity.*

Takeaways & Outlook

In FY24, 40.56 GW of RE capacity was auctioned. Private players like Avaada and Renew Power were among the top developers to capture the RE auctions market in FY24. NTPC and SJVN were among the top public sector undertakings (PSUs) to win capacities.

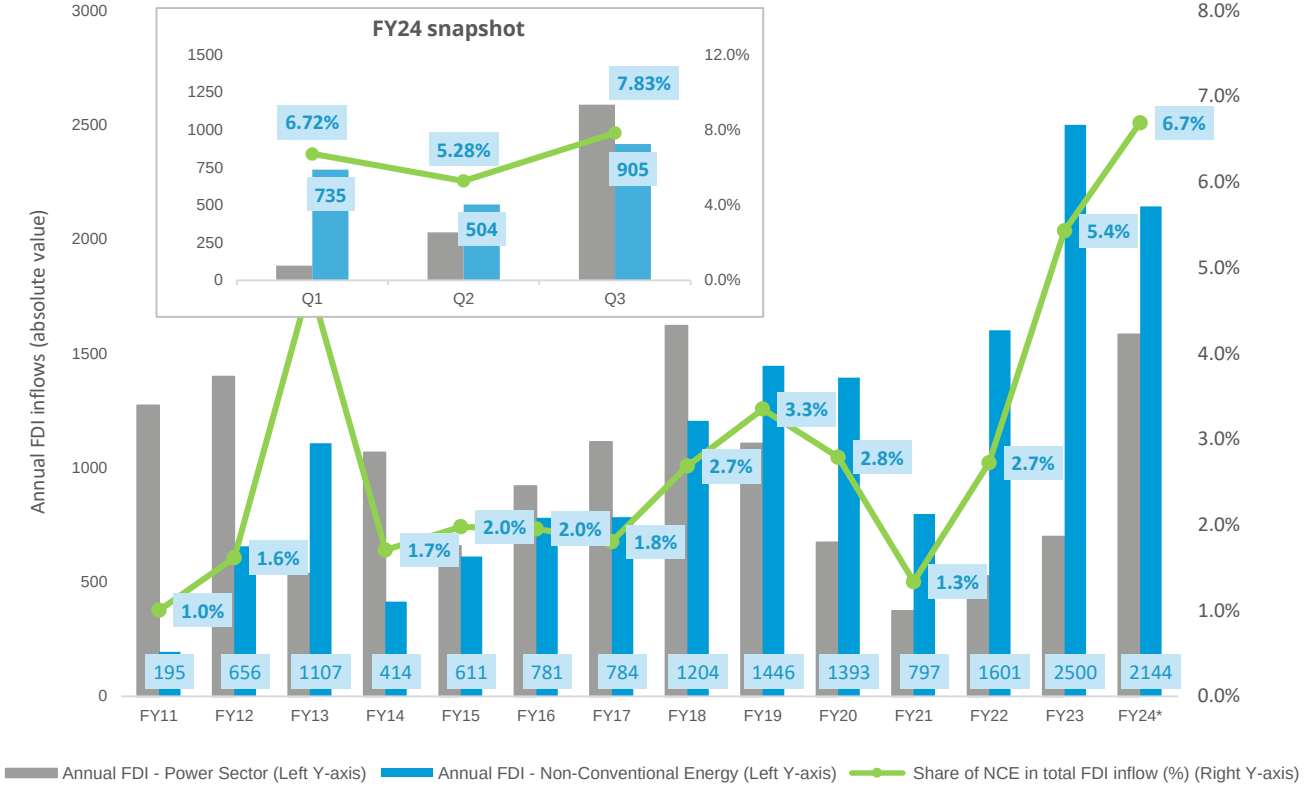
The market concentration saw an increase in FY24 to 67% (vs 50% in FY23), with a diverse set of public and private sector developers participating in the auctions (a total of 40 in FY23).

In FY24, the deal activity primarily consisted of debt and equity investments, along with investments through the qualified institutions placement (QIP) route.

Mahindra Group and Ontario Teachers' Pension Plan Board, through their associates have co-sponsored **Sustainable Energy Infra Trust (SEIT), an infrastructure investment trust (InvIT)**, holding assets in the RE space in January 2024. SEIT has raised primary capital of **INR 1,365 crore (USD 165 million) as a part of their initial offer** which was subscribed by Indian and global investors such as Asian Infrastructure Investment Bank (AIIB).

Renewable energy finance: non-conventional energy FDI flows of over USD 2 billion for second year running

Foreign direct investment in India (USD million)



Takeaways & outlook

Under the extant foreign direct investment (FDI) policy of the Government of India, **FDI in the renewable or non-conventional energy (RE) and power sectors is permitted up to 100% under the automatic route.**

Annual FDI addition in RE as of Q3 FY24 amounted to USD 2.1 billion. In both FY23 and FY24*, annual FDI addition remained above 2 billion levels.

Post FY 21, FDI in RE sector saw a steep increase, amounting to **USD ~7 billion till FY 23,** with the **percentage share of RE sector in annual FDI inflow in FY23 growing to ~5x of its value in FY21.**

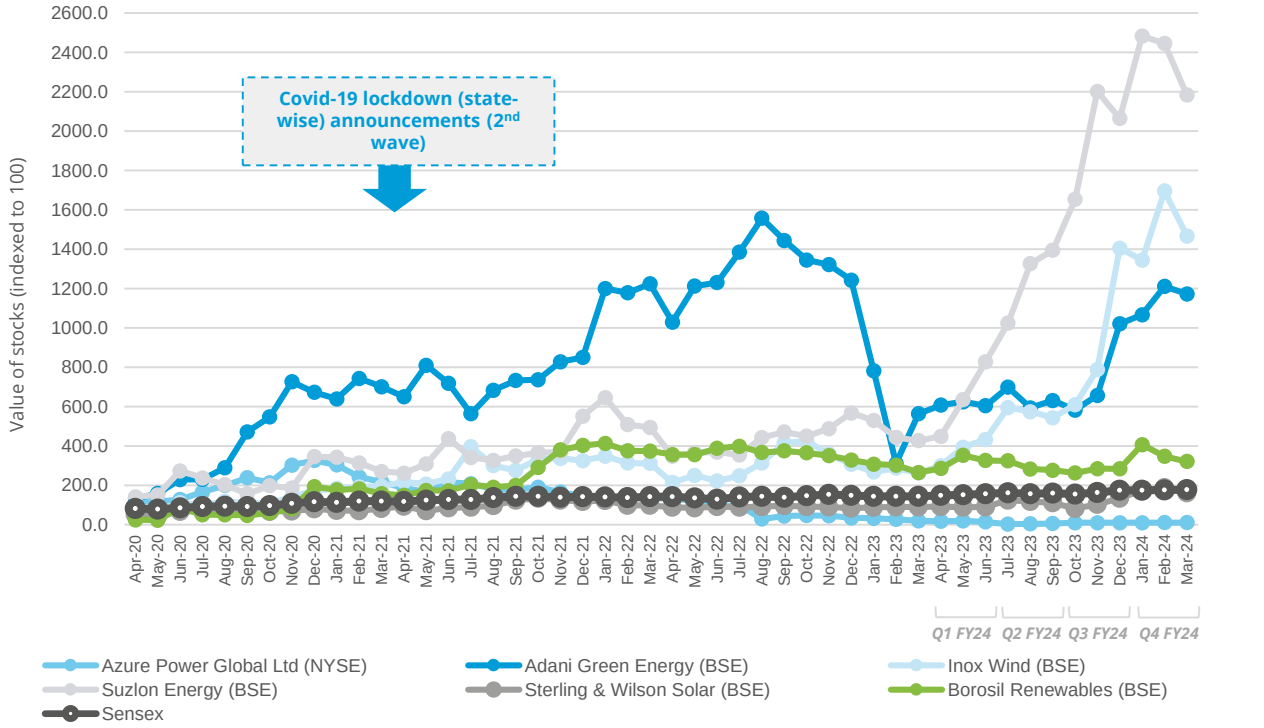
RE share of total FDI is on a continuous upswing **over the last 4 years, growing from a low of 1.3 % to 6.7 % in FY 24.**

FDI in the power sector saw an increase over RE in Q3 of FY24, for the first time since FY20 amounting to USD ~1.2 billion.

Source: *Department for Promotion of Industry and Internal Trade. (DPIIT)*
Note: *Non-conventional energy (NCE) = Renewable energy; *As of December 2023.*

Renewable energy finance: most RE stocks trended upwards throughout FY24

Change in key renewable energy stock prices (indexed to 100)



Source: Money Control.
Note: Share prices are the last traded value in each month.

Takeaways & Outlook

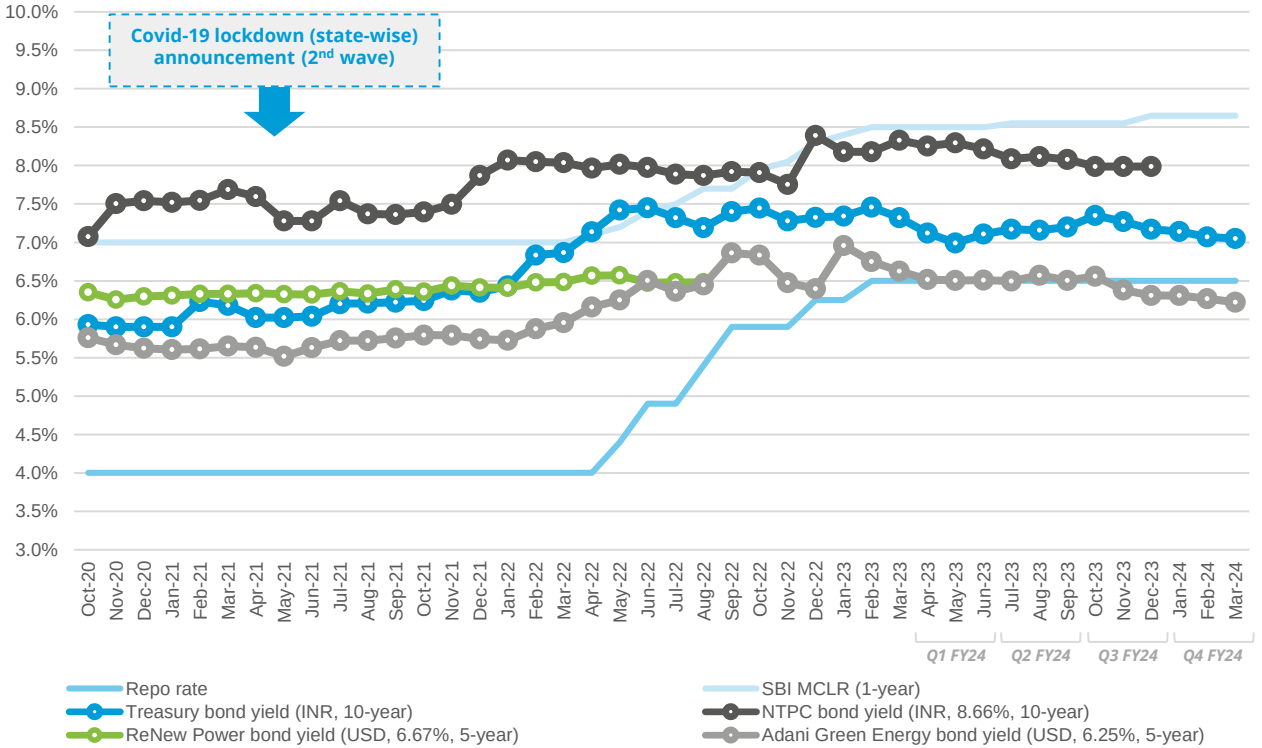
In FY24, **most of the listed RE stocks trended upwards**, barring a few troughs. Except Azure Power, all RE stocks recorded a positive growth at the end of FY24 (vs FY23). The market (Sensex) also saw steady growth throughout the year.

The share price of RE developer **Adani Green Energy saw an increase of 108%** in March 2024 (vs March 2023). In the case of **Sterling and Wilson Solar, the share price was up by 79%** in March 2024 (vs March 2023). **The share price of Borosil Renewables,** which holds a near monopoly position in India's solar panel glass manufacturing, **was up by 21% in March 2024** (vs March 2023).

The wind developer–manufacturers **Inox Wind and Suzlon Energy recorded sharp increases,** with a growth of 459% and 411% respectively in March 2024 (vs March 2023). These positive signals followed the removal of the e-reverse auction mechanism for wind energy projects and the announcement of the national wind repowering policy by MNRE earlier in 2023. However, in the latest wind tender announced by SJVN, e-reverse auction mechanism has been reinstated.

Renewable energy finance: INR 20,000 crore worth of sovereign green bonds auctioned in FY24, repo rate pegged at 6.5%

Bond yields* and key financial rates



Source: *Reserve Bank of India, State Bank of India, Trading Economics, Money Control and BondEvalue.*
Note: *Bond prices are the last traded value in each month; * Current yield.*

Takeaways & Outlook

In the second half of FY24, Reserve Bank of India (RBI) conducted **four sovereign green bond (SGrB) auctions worth INR 20,000 crore**. The SGrB offerings were (a) **5-year** (New SGrB 2028), (b) **10-year** (New SGrB 2033) and (c) **30-year** (New SGrB 2054 and 7.37% SGrB 2054). Apart from the 7.37% GOI SGrB 2054, all other offerings' coupon rates were yield-based which after auctions came out to be 7.25%, 7.24% and 7.37%, respectively. All the SGrB offerings were oversubscribed.

In January 2024, **State Bank of India raised USD 250 million through the issuance of green bonds**. This floating rate green bond, issued under SBI's USD 10 billion medium-term note programme, will mature on 29 December, 2028.

In FY24, **the repo rate remained pegged at 6.5%. The SBI MCLR (1-year) rate was increased by 50 basis points twice in FY24**, from 8.5% April 2024 to 8.65% in March 2024.

Key bond yields, including the **10-year treasury and Adani Green's 5-year bond yields, fluctuated throughout the year** and remained on a downward trend since October 2023.

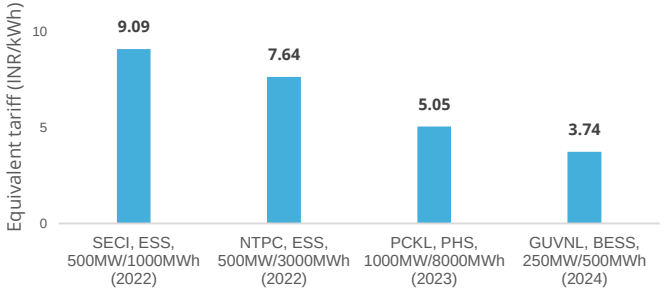
Energy storage: a significant drop in standalone ESS tariff discovery; 20 new tenders with energy storage announced in FY24; eight auctions with ESS concluded in FY24

Latest ESS tenders: announced

Project location & tender issue date	Application & technology	Details
Pan India (SECI) March 2024	1200 MW solar with 600MW/1200MWh ESS	RFS released in Q4 FY24
Pan India (MSEDCL) March 2024	1000 MW, PHS	RFS released in Q4 FY24
Pan India (SJVN) March 2024	600 MW, FDRE-II with greenshoe option of 600 MW	RFS released in Q4 FY24
Pan India (GRIDCO) March 2024	500 MW with 2500 MWh ESS	RFS released in Q4 FY24
Pan India (GUVNL) March 2024	250 MW/500 MWh BESS phase-III	RFS released in Q4 FY24
Pan India (SECI) November 2023	1000 MW, RE with ESS (FDRE-V)	RFS released in Q3 FY24
Pan India (MPPMCL) October 2023	500 MW, PHS	RFS released in Q3 FY24
Madhya Pradesh (RUMSL) October 2023	400 MW, FDRE with 600 MW solar	RFS released in Q3 FY24

Source: SECI and other REIAs, state bidding agencies. RfS = request for selection; ESS = energy storage system.

Standalone ESS tenders: concluded



Source: SECI, NTPC and state bidding agencies.

GUVNL's standalone energy storage tender

GUVNL's 250 MW/500 MWh BESS tender concluded

- The total auctioned capacity was 250 MW/500 MWh. Two bidders, Gensol (70*2 hour) and IndiGrid (180*2 hour), emerged as the winners at INR 4,48,996/MW/month and INR 4,49,996/MW/month, respectively.
- The storage facility will be utilised "on demand" basis in the peak and off-peak hours.
- The project will be on a BOO basis.
- The battery energy storage purchase agreement (BESPA) shall be valid for a period of 12 years from the commissioning date of the project.
- Charging and discharging of the BESS system will be under the scope of GUVNL.

Source: CEEW-CEF compilation based on GUVNL RfS document.

Takeaways & Outlook

FY24 emerged as an outstanding year for the energy storage sector. Overall, **20 new tenders, including firm and dispatchable RE** (FDRE), **RE RTC** (with or without ESS), **and standalone energy storage tenders,** were announced in FY24.

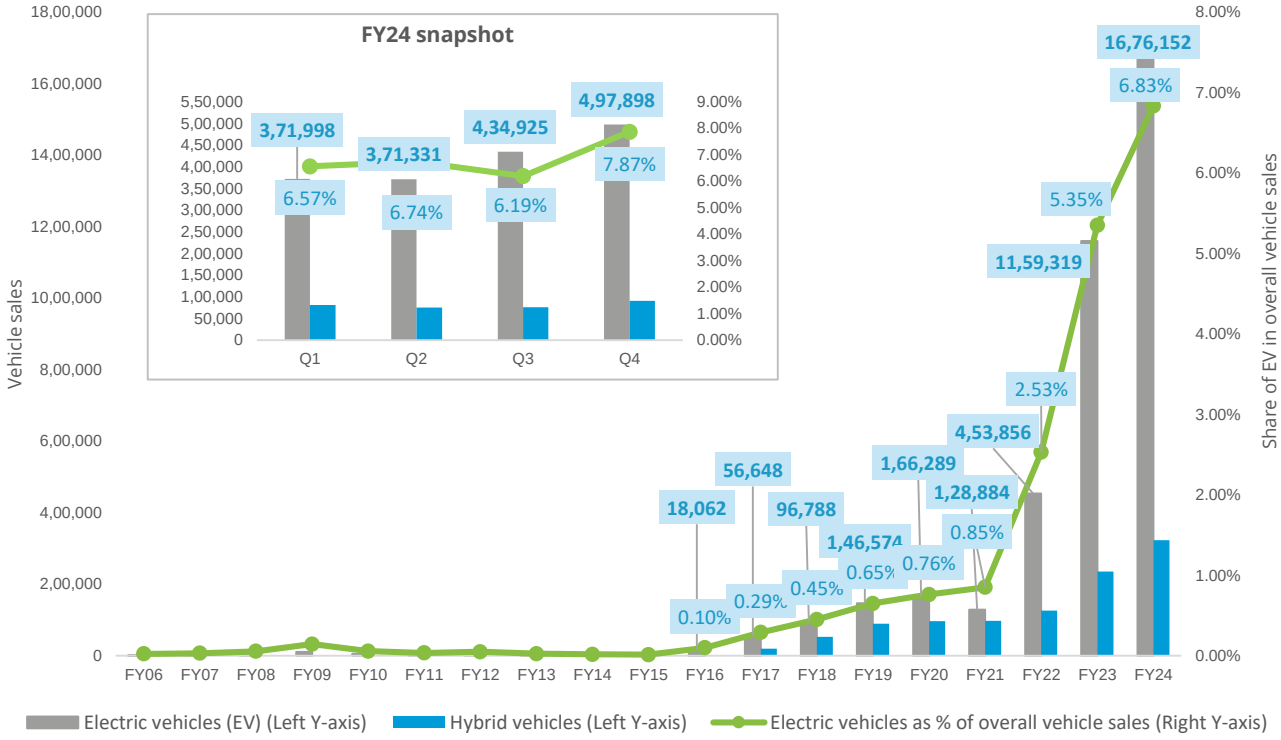
In Q4 FY24, **GUVNL concluded** the auction for a **250MW/500MWh standalone BESS tender** at **a significantly lower tariff** in its category (SECI's 500MW/1000MWh auction in 2022). Three REIAs, **SECI** (1500 MW), **NHPC** (1500 MW), and **NTPC** (3000 MW) concluded FDRE tenders (one each). **Overall, eight auctions,** including FDRE, wind–solar hybrid with ESS, solar with ESS, and standalone energy storage, were concluded in FY24.

In February 2024, the structure to operationalise the viability gap funding (VGF) scheme (announced in the Union Budget FY24) for the development of BESS with a capacity of 4 GWh **was finalised.** In addition, **various sites in RE-rich states were discussed as potential locations for the deployment of BESS.**

On the PHS front, 48 projects with a capacity of ~61 GW are at various stages of development.

Electric mobility: 16 lakh EVs sold in FY24, FAME – II budget enhanced by INR 1,500 crore, new scheme for electric mobility promotion announced

Electric vehicle sales in India



Takeaways & Outlook

In FY24, EV sales continued to grow by ~45% (compared to FY23), and it crossed the two lakh mark for monthly sales in March 2024. More than three lakh EVs were sold in each quarter of FY24, with Q4 FY24 registering 4.97 lakh EV sales.

In February 2024, the Ministry of Heavy Industries (MHI) enhanced the **budget outlay for the FAME-II scheme**, from INR 10,000 crore to **INR 11,500 crore.**

In March 2024, the MHI announced the **Electric Mobility Promotion Scheme 2024 with a budget outlay of INR 500 crore.** This limited fund scheme would be valid for four months (till 31 July, 2024) and support the e-2w and e-3w (including cargo) segments.

OEMs with the highest EV sales* in FY24 were:

- **2W:** Ola Electric (3,26,443), TVS Motors (1,82,942) and Ather (1,08,872)
- **3W:** YC Electric Vehicle (42,754), Mahindra and Mahindra (31,924) and Saera Electric (30,124)
- **4W**:** Tata Motors (63,807), MG Motors (11,510) and Mahindra (6,063)

Source: Vahan Sewa dashboard (includes only registered vehicles, unregistered vehicles include low-speed vehicles (< 25 km/hr), e-rickshaws (three-wheelers) and electric two-wheelers), Electric Mobility Dashboard (2023), CEEW Centre for Energy Finance. Based on sales data up to Q4 FY24; **4W represents Light motor vehicles and Light passenger vehicles.*

Thank you

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Annexure I: Green bond issuances

Date	Company	Size (USD million)	Sector	Coupon rate (%)	Rating	Tenor (Years)	Purpose
March 2022	**Greenko**	750	Energy storage	5.50%	Ba1 (Moody's)	3	Refinance existing debt and fund the capital expenditures at asset level
January 2022	**ReNew Power**	400	Solar and wind	4.50%	BB- (Fitch)	5.25	Refinance existing debt and fund capital expenditure
September 2021	**Adani Green Energy**	750	Solar and wind	4.375%	Ba3 (Moody's)	3	Fund equity portion of capital expenditure for under-construction projects
August 2021	**Azure Power**	414	Solar	3.575%	Not available	5	Refinance existing higher cost green bond debt
July 2021	**Acme Solar**	334	Solar	4.70%	Not available	5	Refinancing of existing debt
July 2021	**Vector Green Energy**	165	Solar	6.49%	AAA (CRISIL, India Ratings)	3	Refinance existing high-cost debt of solar projects
May 2021	**JSW Hydro**	707	Hydro	4.50%	BB+ (EXP) (Fitch)	10	Repayment of existing green project-related rupee-denominated debt
April 2021	**ReNew Power**	585	Solar and wind	4.50%	BB- (Fitch)	7.25	Refinancing of existing debt
March 2021	**Greenko**	940	Solar and wind	3.85%	BB (Fitch)	5	Redemption of previous fund raise
March 2021	**Hero Future Energies**	363	Solar and wind	4.25%	BB- (Fitch)	6	Refinancing of existing debt
February 2021	**ReNew Power**	460	Solar and wind	4.00%	BB- (Fitch)	6	Refinancing of existing debt
February 2021	**Continuum Green Energy**	561	Solar and wind	4.50%	BB+ (Fitch)	6	Refinancing of existing debt

Source: Climate Bonds Initiative and company press releases.

Annexure I: Green bond issuances

Date	Company	Size (USD million)	Sector	Coupon rate (%)	Rating	Tenor (Years)	Purpose
October 2020	**CLP Wind Farms**	40	Wind	Not available	AA (India Ratings)	2 to 3	Refinancing of existing debt
October 2020	**ReNew Power**	325	Solar and wind	5.375%	BB- (Fitch)	3.5	Refinancing high-cost local debt
January 2020	**ReNew Power**	450	Solar and wind	5.875%	BB-/Stable (Fitch)	5	Refinancing of maturing debt
October 2019	**Adani Green Energy**	362.5	Solar and wind	4.625%	BBB- (Fitch)	20	Repaying foreign currency loans and rupee borrowings
September 2019	**ReNew Power**	90	Solar and wind	6.67%	BB (Fitch)	4.5	Refinancing of existing debt
September 2019	**Greenko**	85	Solar and wind	5.95%	BB- (Fitch)	6.75	Refinancing of existing debt
September 2019	**Azure power**	350	Solar	5.65%	BB (Fitch)	5	Refinancing of existing debt
September 2019	**ReNew Power**	300	Solar and wind	6.45%	Ba2 (Moody's)	5	Capacity expansion and repaying high cost debt
August 2019	**Greenko**	85	Solar and wind	6.25%	Ba1 (Moody's)	3.5	Refinancing of solar and wind projects
August 2019	**Greenko**	350	Solar and wind	6.25%	Ba1 (Moody's)	3.5	Refinancing of solar and wind projects
July 2019	**Greenko**	450	Solar and wind	5.95%	BB (Fitch)	7	Refinancing of solar and wind projects
July 2019	**Greenko**	500	Solar and wind	5.55%	BB (Fitch)	5.5	Refinancing of solar and wind projects

Source: Climate Bonds Initiative and company press releases.

100.1%

FAME-II target met

As of FY24

Note: *Target of selling 1,562,090 EVs (2W, 3W, 4W and buses) under FAME-II scheme by FY24.*

731

Number of EV OEMs in India

As of FY24

234

Total FAME II approved models

As of FY24

Recent electric vehicle launches

Kinetic Green Zulu

Price: INR 94,990 onwards
Range: 104 km
Battery capacity: 2.27kwh Lithium-ion

Mahindra E-Alfa Super

Price: INR 1,61,000 onwards
Range: 96 km
Battery capacity: 140 Ah lead-acid battery

Volton Bajrangi Mover

Price: INR 99,999 onwards
Range: 50-60 km with full load
Battery capacity: 36Ah/48 V LiFePo4

Volvo C40 Recharge

Price: INR 61,25,000 onwards
Range: 530 km
Battery capacity: 78 kWh Lithium-ion

EV penetration

In FY24

5.41%

2W sold were EV

54.27%

3W sold were EV

16,76,152

EVs sold

In FY24

26

States and UTs notified EV policies

As of FY24

For more updates visit [CEEW-CEF Electric Mobility Dashboard]

Source: Vahan Sewa dashboard, CEEW Centre for Energy Finance Electric Mobility dashboard, Department of Heavy Industries, CEA.

About us: Impacting sustainable development at scale with data, integrated analysis, and strategic outreach

TRANSFORMATIONS

- Low-carbon Economy
- Energy Transitions
- Power Markets
- Industrial Sustainability
- Sustainable Livelihoods

QUALITY OF LIFE

- Clean Air
- Sustainable Water
- Sustainable Food Systems
- Sustainable Cooling
- Sustainable Mobility

ENABLERS

- Sustainable Finance
- Technology Futures
- Circular Economy
- Climate Resilience
- International Cooperation

SPECIAL INITIATIVES

- CEEW Centre for Energy Finance
- Powering Livelihoods
- Emerging Economies
- UP State Office

250+
Multidisciplinary team

380+
Peer-reviewed publications

190+
Instances of increased data transparency

540+
Roundtables & conferences

20+
Indian states engaged

130+
Bilateral & multilateral initiatives promoted

Build evidence

Consistent, reliable, and up to date monitoring & analysis of clean energy markets – investment, payment schedules, market trends, etc.

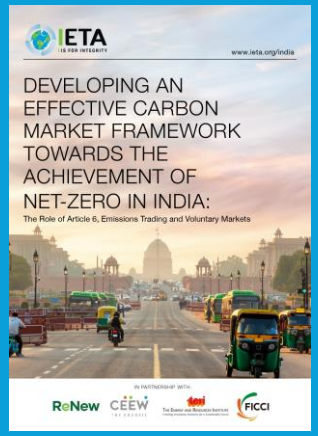
Create coherence

Periodic convening of multi-stakeholder groups to deliberate on market activities in clean energy

Design solutions

Design and feasibility pilots of fit-for-purpose business models & financial solutions for clean energy solutions

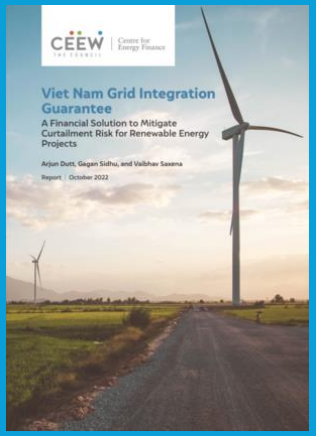
Our recent publications, dashboards and tools



Developing An Effective Carbon Market Framework Towards The Achievement Of Net-Zero In India

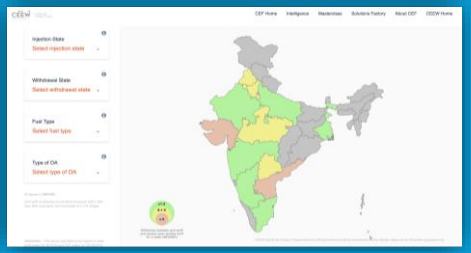
Greening India's Automotive Sector

Mobilizing Investment For Clean Energy In India



Viet Nam Grid Integration Guarantee

India Renewables Dashboard



Open Access Tool

Electric Mobility Dashboard