

CEEW-CEF Market Handbook Q3 2022-23

7 February 2023



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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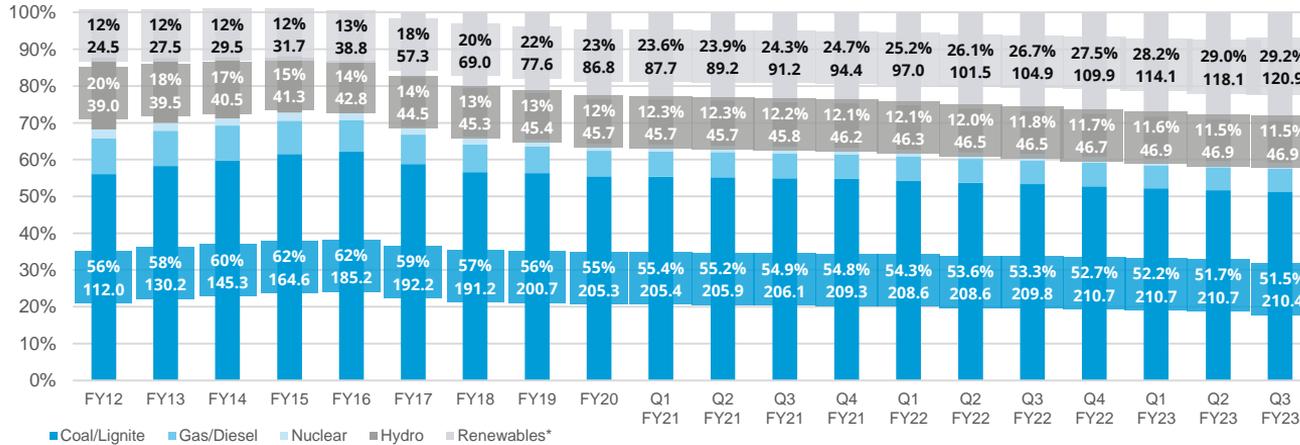
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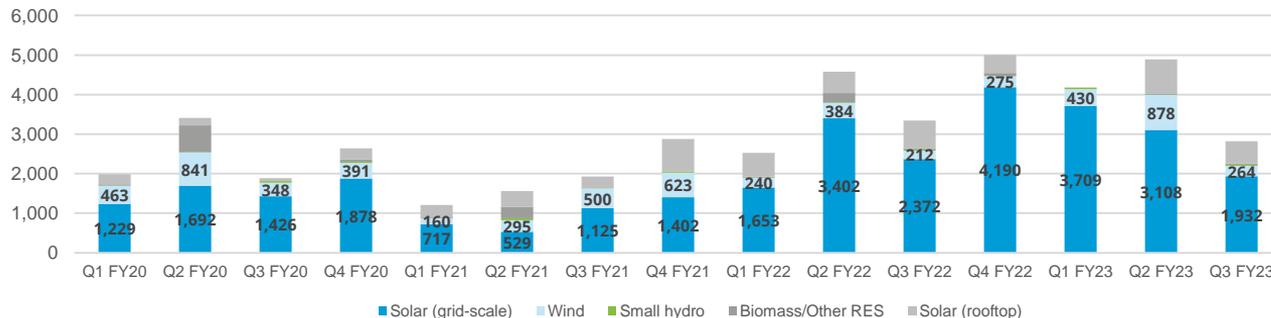
Generation capacity: net generation capacity addition dominated by RE; total installed capacity stood at 410 GW

Installed capacity mix (GW)



Source: Central Electricity Authority (CEA). * Includes solar rooftop capacity (8077.1 MW as of December 2022).

RE capacity addition (MW)



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

Takeaways & Outlook

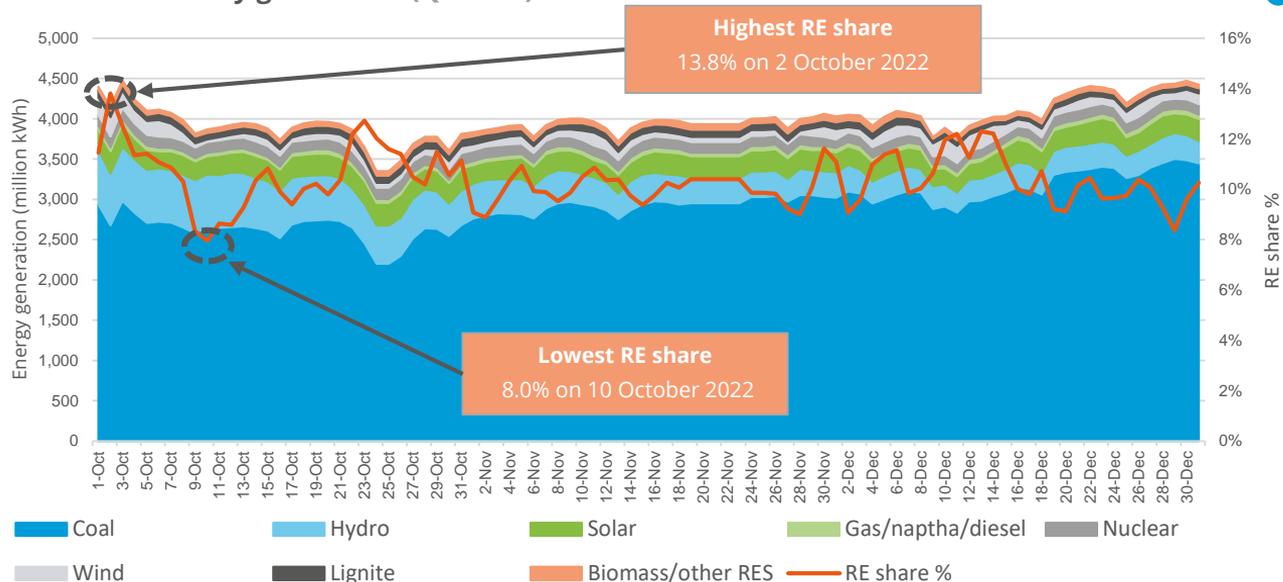
In Q3 FY23, a net generation capacity of 2.5 GW was added (vs 4.5 GW in Q3 FY22). The total net capacity addition comprised renewable energy (RE) (2.8 GW), diesel-based (26.8 MW) capacity addition and retirement of coal-based (304 MW) capacity. No new hydropower capacity was added in this quarter.

In RE, solar (grid-scale and rooftop) continued to dominate capacity addition, accounting for 2,489 MW (88.3%) (vs 2,372 MW in Q3 FY22) of total RE addition. Wind capacity addition stood at 264 MW (9.4%) in Q3 FY23 (vs 212 MW in Q3 FY22). Small hydro (36 MW) and biopower (31 MW) contributed 1.3% and 1.1%, respectively.

In Q3 FY23, the total installed RE capacity reached 120.9 GW, with 63.3 GW of solar, 41.9 GW of wind and 10.7 GW of biopower capacity.

In total, 2.4 GW of RE capacity was auctioned in Q3 FY23. Grid-scale solar PV auctions stood at 500 MW and wind at 600 MW. Auctions for 255 MW of wind-solar hybrid and 300 MW of floating solar PV were also concluded.

Source-wise daily generation (Q3 FY23)



RE share snapshot

	Q3 FY21		Q3 FY22		Q3 FY23	
	RE share	Day	RE share	Day	RE share	Day
Highest	12.4%	27 November 2020	12.6%	18 October 2021	13.8%	2 October 2022
Lowest	6.5%	29 October 2020	7.0%	23 December 2021	8.0%	10 October 2022
Average (Daily)	9.0%	NA	9.1%	NA	10.4%	NA

Takeaways & Outlook

The total power generation increased by **10.0%** in Q3 FY23 (367 billion kWh) compared to Q3 FY22 (333 billion kWh) but **reduced by 9.2%** in comparison to Q2 FY23 (404 billion kWh).

- **October: Up by 3.4%**
- **November: Up by 14.6%**
- **December: Up by 13.7%**
- **Total Q3 FY23: Up by 10.0%**

In Q3 FY23, **RE generation increased by 25.9%** vs the same quarter in the previous fiscal year (Q3 FY22). Coal/lignite-based generation was up by 10.5% and hydro by 3.4% for the same period.

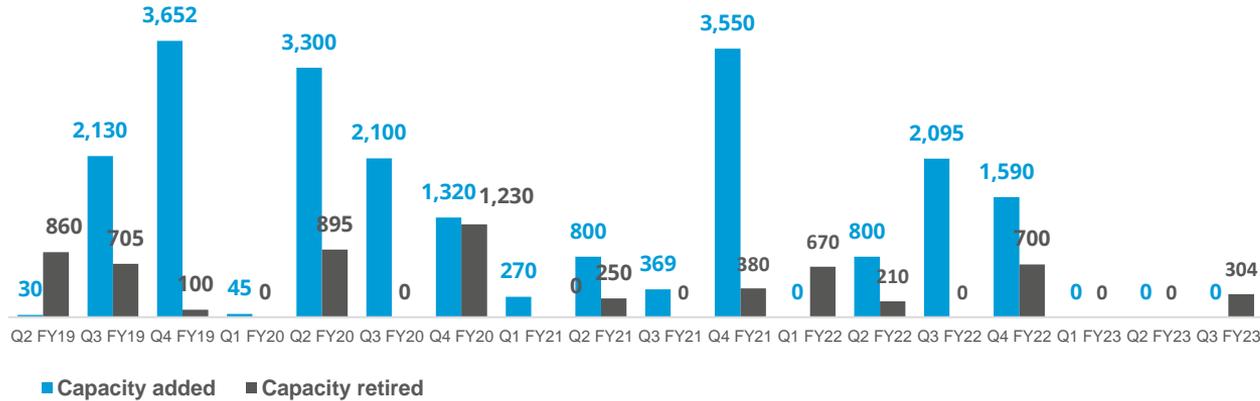
From an average daily generation perspective, **the share of RE and coal/lignite increased, whereas hydro share declined in Q3 FY23 compared to Q3 FY22.**

- **RE:** Share up from 9.1% to 10.4%
- **Hydro:** Share down from 11.0% to 10.3%
- **RE + Hydro:** Share up from 20.0% to 20.6%
- **Coal/lignite:** Share up from 74.5% to 74.9%

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.

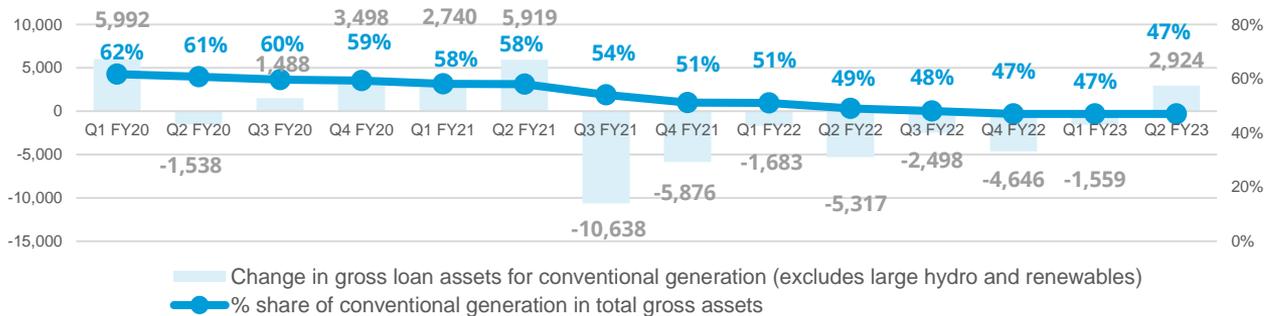
Coal phase-out: no new coal capacity was added in Q3 FY23; the share of conventional generation in the PFC/REC loan book remained at 47% in Q2 FY23

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 Q3 FY23.

Takeaways & Outlook

No new coal capacity was added for the third consecutive quarter, whereas 304 MW of coal capacity was retired from the state and central sector (Obra thermal power plant (TPP) (Unit-7) of UPRVUNL and Durgapur TPP (U-4) of Damodar Valley Corporation).

PFC/REC, which has financed most of the under-construction thermal power projects, has reduced its exposure to coal-based power generation. The share of conventional generation in PFC/REC's loan book continues to trend downward and has declined from 49% in Q2 FY22 to 47% in Q2 FY23.

To compensate, PFC/REC has shifted its focus to transmission and distribution (T&D) and RE generation projects (including large hydro). This accounts for around 42% (INR 1,59,673 crore) and 10.1% (INR 37,982 crore) of its total loan book as of Q2 FY23 vs 40% (INR 1,49,904 crore) and 10.0% (INR 37,240 crore) in Q2 FY22, respectively.

RE auctions: MSEDCL's solar and non-solar generating hour bid concluded; NTPC concluded its first standalone ESS bid

Notable auctions	Capacity allotted (MW)	Least tariff discovered (INR/kWh)
MSEDCL, Maharashtra, RE with storage, 250 MW (December 2022)	250 (RE)	9.0
NTPC, pan India, ESS, 500 MW/3000 MWh (December 2022)	500 (ESS)	NA
MSEDCL, Maharashtra, solar, phase IX, 500 MW (December 2022)	500	2.90
SECI, pan India, wind, tranche XIII, 1200 MW (December 2022)	600	2.90
TPDDL, pan India, wind-solar hybrid, 255 MW (December 2022)	255	3.0
RUMSL, Madhya Pradesh, floating solar, phase II, 300 MW (November 2022)	300	3.69
RUMSL, Madhya Pradesh, wind-solar hybrid, 750 MW (September 2022)	750	3.03
SECI, Rajasthan, BESS, 500 MW/1000 MWh (August 2022)	500 (BESS)	NA
GUVNL, Gujarat, wind, phase III, 500 MW (July 2022)	500	2.84

Bid spotlight: MSEDCL, Maharashtra, RE with storage, 250 MW

Tariff and winner

- **Tariff discovered:** 9.0 INR/kWh (non-solar generation hours)
- **Winners:** Ayana Renewable, NTPC

Key provisions

- **Project location:** Pan India; The energy generation components of the project may be multi-located and may inject power through multiple Interconnection points.
- The storage capacity installed shall be equal to 50% of the contracted capacity of the project.
- Power off-take: MSEDCL will buy the entire generation during solar hours and a minimum of two hours off-take period during non-solar hours.

Comments

- MSEDCL has fixed the tariff for solar generation hours at INR 2.42/ kWh.
- Solar, wind, hydro/ hydro pumped storage plants or their combination, along with any commercially established energy storage technology, are eligible for this project.
- The annual CUF declared at the time of signing the PPA should be at least 19%.

Takeaways & Outlook

RE auctioned capacity stood at 2.36 GW in Q3 FY23 and was dominated by State bidding agencies such as RUMSL's 300 MW floating solar, MSEDCL's 500 MW solar and 250 MW RE with storage auctions. SECI awarded 600 MW out of its 1200 MW wind tranche-XIII tender. NTPC concluded its 500 MW/ 3000 MWh BESS storage tender.

Q3 FY23 was a bit slower in total auctioned capacity terms. However, this quarter stood out in terms of innovative auctions. In the total auction mix, 53% came from innovative technologies (floating solar, wind-solar hybrid and energy storage), 26% from wind technology and 21% from solar technology.

- Q3 FY23 2.36 GW
- Q2 FY23: 3.51 GW
- Q1 FY23: 3.15 GW
- Q4 FY22: 1.84 GW

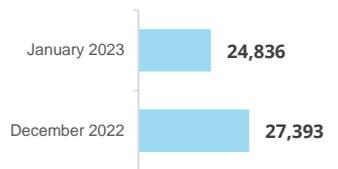
The lowest discovered solar tariff in Q3 FY23 (MSEDCL phase IX) was up by ~16% compared to the previous quarter (GUVNL phase XVI). Whereas, for wind, the lowest discovered tariff in Q3 FY23 (SECI tranche XIII) was marginally up by ~0.3% compared to Q1 FY23 (SECI tranche XII).

Source: SECI and state renewable agencies.

SECI = Solar Energy Corporation of India; GUVNL = Gujarat Urja Vikas Nigam Limited; RUMSL = Rewa Ultra Mega Solar Limited; MSEDCL = Maharashtra State Electricity Distribution Co. Ltd.; TPDDL = Tata Power Delhi Distribution Limited; BESS = Battery Energy Storage System; PPA = Power Purchase Agreement.

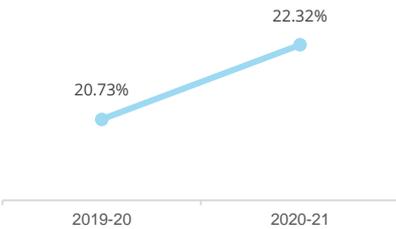
Discom payables: discoms in Karnataka, Rajasthan, Haryana, Madhya Pradesh, and Uttar Pradesh topped the MoP's latest quarterly performance assessment

Amount overdue by discoms to power producers (INR crore)



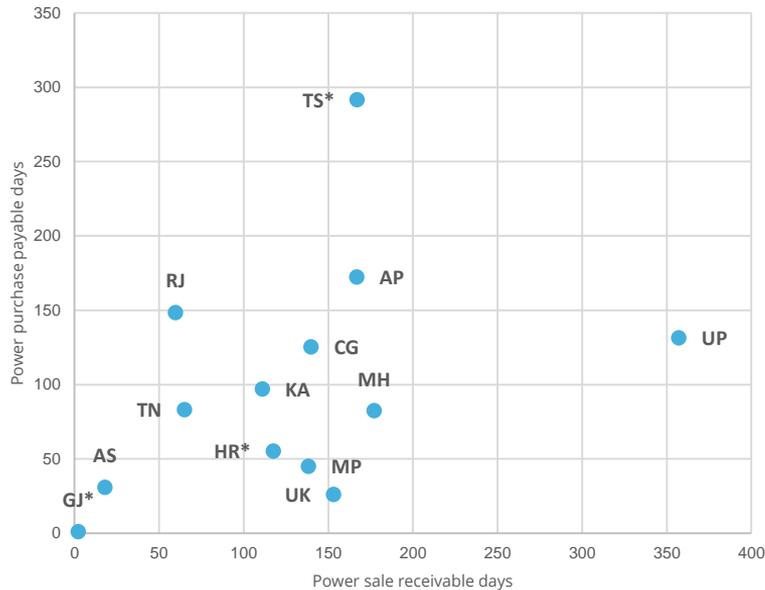
Source: PRAAPTI portal (based on voluntary disclosures from power producers). Note: Data for Q2 FY23, Q3 FY23 (except December) is unavailable as PRAAPTI portal was under upgradation.

Overall AT&C losses (%)



Source: Report on performance of power utilities.

Discom payable and receivable days for RE-rich states



Source: UDAY portal (based on data disclosed by discoms as of 31 March 2022).

*Data not available for these states; values derived from 2019-20/ 2020-21 financial reports.

Takeaways & Outlook

In December 2022, discoms overdue amount to power producers stood at INR 27,393 crore.

According to the Ministry of Power's (MoP) Ujwal Discom Assurance Yojana (UDAY) platform, discoms in Karnataka, Rajasthan, Haryana, Madhya Pradesh, and Uttar Pradesh topped the latest quarterly performance assessment**.

Under the RDSS scheme, 173 million prepaid smart meters, 5 million DT meters and 0.2 million feeder meters have been sanctioned across 23 states (40 discoms with a total approved cost of INR 1,15,493 crore.

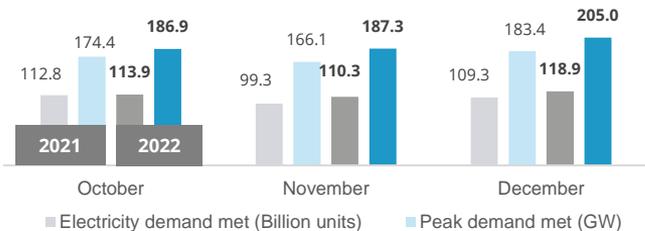
As per the performance of the power utilities report 2020-21, pan-India AT&C losses stood at 22.32%. As reported on the UDAY portal, the ACS-ARR gap stood at INR 0.54/unit as of December 2022.

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.**

**As of September 2022.

Power markets: Q3 FY23 witnessed a hike in peak power demand; October witnessed the highest single-day participants in GTAM

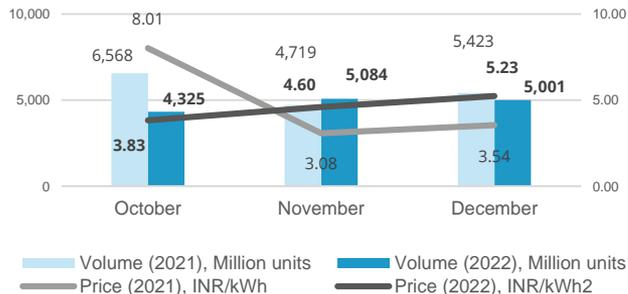
Power supply position (Peak and electricity demand)



Source: CEA.

Peak demand met in Q3 FY23 increased compared to Q2 FY23 with the onset of winters leading to the use of heating appliances. In terms of electricity demand met, there was an uptick of 6.8% vs that of Q3 FY22.

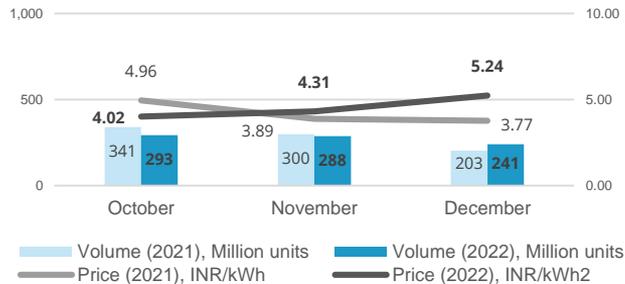
Day-ahead spot market snapshot (IEX)



Source: IEX.

Continued high spot coal prices and supply-side constraints led to the higher average clearing price in the day-ahead market (DAM). However, the MCP has declined compared to Q2 FY23 but remained on the higher side compared to Q2 FY22 (except October 2021).

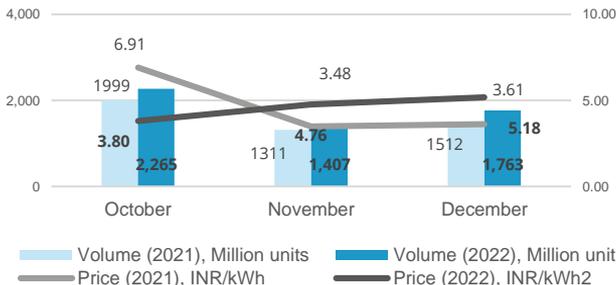
Green term-ahead market* snapshot (IEX)



Source: Indian Energy Exchange (IEX). *Day-ahead contingency.

Volumes traded in the green term-ahead market (GTAM) remained flat in Q3 FY23 (vs Q3 FY22). It witnessed the highest number of single-day participants at 621 on 9 October 2022. MCP has declined compared to Q2 FY23 levels.

Real-time market snapshot (IEX)



Source: IEX.

Real-time market (RTM) achieved a cumulative trade of 5435 MU in Q3 FY23, increasing 13% compared to Q3 FY22. Increasing volumes indicate the growing reliance of discoms and industries on RTM to achieve demand-supply balancing in real time efficiently.

Takeaways & Outlook

After a slight dip in peak power demand (met) in the previous quarter, in Q3 FY23, it reached a high of 205.0 GW in December 2022 (vs 183.4 GW in December 2021) with the onset of the winter season and cold waves in later part of December 2022. In energy terms, the average monthly electricity demand (met) saw an uptick of 6.8% in Q3 FY23 (vs Q3 FY22).

In October 2022, the Central Electricity Regulatory Commission (CERC) invited stakeholders' comments and suggestions on the power market pricing staff paper. CERC also extended the duration to cap the price range of MCP at INR 12/kWh till December 2022.

In Q3 FY23, 0.49 million solar and 0.24 million non-solar RECs were traded at an average price of INR 1.0/kWh on IEX. In contrast, in Q2 FY23, 0.99 million solar RECs and 0.92 million non-solar RECs were traded at an average price of INR 1.033/kWh and INR 1.0/kWh on IEX, respectively.

Policy and regulatory developments: MNRE issued the draft repowering policy for wind projects and the National Bioenergy Programme with a budget outlay of INR 858 crore

MNRE issued draft repowering policy for wind power projects

- In October 2022, [MNRE](#) notified the draft repowering policy for wind power projects.
- It includes wind turbines (WT) of rated capacity below 2 MW, WTs that have completed their design life.
- Additional power can be sold to the incumbent discom(s) or through open access.
- To incentivise, an enhanced RPO multiplier will be provided to the repowered project.

MNRE notified the National Bioenergy Programme (phase I)

- In November 2022, [National Bioenergy Programme](#) (phase I: FY2022 – FY2026) was approved with three sub-schemes: waste-to-energy, biomass, and biogas.
- The Programme is recommended to be implemented in two phases, and the budget outlay for phase I is INR 858 crore.

HERC and PSERC notified RPO trajectory

- In Q3 FY23, [HERC](#) (FY30) and [PSERC](#) (FY30) notified their renewable purchase obligation (RPO) trajectory following the RPO trajectory notification by the MoP in the previous quarter.
- It has three categories, Wind RPO, hydro purchase obligation, other RPO and energy storage obligation.
- Wind RPO shall be met by projects commissioned after 31 March 2022, and the energy consumed over and above 7% from projects commissioned till 31 March 2022.

8th Revision of ALMM list - 1

- In October 2022, MNRE notified [revision – VIII](#) of ALMM list – 1 to include 75 manufacturers with a cumulative capacity of 20,156 MW.
- ITI Limited with 30 MW, Goldi Sun with 1037 MW, SunField Energy with 29 MW, SASA Energy with 91 MW, and SUNBOND Energy with 93 MW are some new entrants.

Odisha released renewable energy policy, 2022

- In November 2022, [Odisha's energy department](#) notified the Odisha Renewable Energy Policy, 2022.
- It includes large and small hydro, ground-mounted, rooftop, floating, and canal-top solar, wind, biomass, energy storage, waste-to-energy and green hydrogen/ green ammonia projects.
- The policy provides exemption on electricity duty, cross-subsidy surcharges, wheeling charges and state transmission charges, among others, to open access to consumers. It also provides a banking facility on a monthly basis.

Rooftop Solar Program Phase II extended till March 2026

- [MNRE](#) has announced an extension of the timeline for the rooftop solar programme Phase-II till 31st March 2026.
- It was first launched on 8 March 2019 with a total central financial support of INR 11,814 crore.

Takeaways & Outlook

In October 2022, MNRE issued the draft repowering policy for wind projects. The estimated repowering potential is ~25 GW. **The projects repowered under this policy will have an enhanced RPO multiplier.**

Considering the significant impact of the COVID-19 pandemic and other implementation challenges, **the rooftop solar program phase II is extended till March 2028** and is expected to achieve 4000 MW of rooftop installed capacity.

In October 2022, UPNEDA released the draft green hydrogen policy. One of the key targets is to achieve 20% of green hydrogen blending in the total hydrogen consumption of the state by 2028.

In addition, the [anti-dumping](#) probe regarding solar cells, whether or not assembled imported from China, Vietnam and Thailand, was terminated in November 2022.

In the electric vehicle (EV) segment, Uttar Pradesh notified an updated EV policy in October 2022; with this, 21 Indian states have announced their EV policies.

Renewable energy finance: market concentration in RE auctions saw an uptick in Q3 FY23; green hydrogen company Hygenco received an INR 210 crore investment

Notable deals (Q3 FY23)



78%

Q3 FY23 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 Q3 FY23 (2,358 MW)



Takeaways & Outlook

In Q3 FY23, 2.4 GW of RE capacity was auctioned. In the private sector, developers such as Greenko, Tata Power, O2 Power, and Scatec (which entered the Indian market in 2021) emerged as winners. Among public sector undertakings (PSU), NTPC and SJVN continued to emerge as winning bidders.

Market concentration saw an uptick in Q3 FY23 to 78% (vs 57% in Q2 FY23 and 76% in Q3 FY22), with a decline in the diversity of private sector developers participating in the auctions (a total of 9 in Q3 FY23).

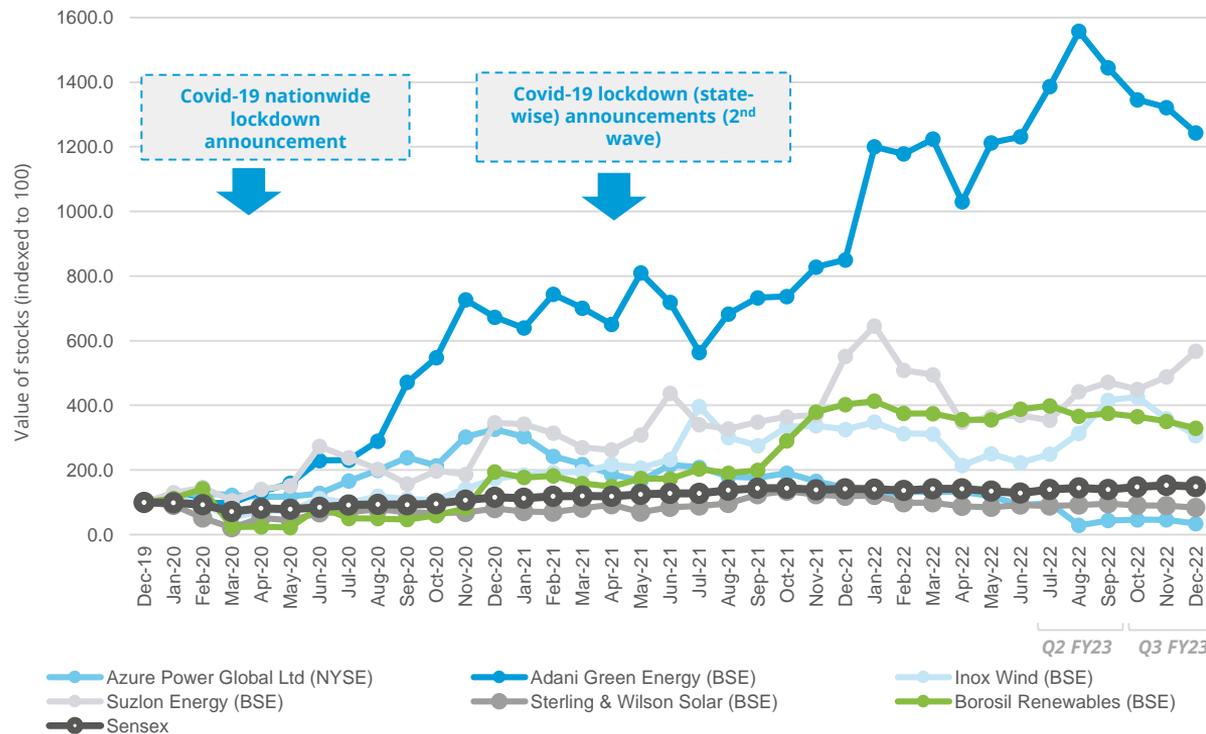
In Q3 FY23, the deal activity primarily consisted of debt and equity investments in solar manufacturing, RE project development, green hydrogen and electric mobility sector. Waaree Energies will utilise the received investment to expand its solar manufacturing capacity.

In addition, Jakson Green has signed a memorandum of understanding (MOU) with the government of Rajasthan to invest INR 22,400 crore in setting up the green hydrogen and green ammonia project. Sembcorp Green Infra Limited has signed an agreement to acquire Vector Green Energy.

Source: CEEW-CEF Compilation.

Source: CEEW-CEF Compilation. *Note: Includes all the developers in terms of auctioned capacity. **Including hydro capacity.

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



Takeaways & Outlook

In Q3 FY23, most listed RE stocks (except Suzlon Energy) trended downwards, whereas the Sensex was up by 7% in December 2022 (vs September 2022).

The share price of RE developer **Adani Green Energy** was down by 14%, and that of **Sterling and Wilson** was down by 13% as of December 2022 (vs September 2022).

The share price of wind developer–manufacturers **Inox Wind** was down by 26%, whereas **Suzlon Energy's** share price was up by 20% in December 2022 (vs September 2022). In October 2022, Suzlon announced Q2 FY23 results with a consolidated net profit of INR 56.47 crore and its INR 1,200 crore rights issue (October 2022) was oversubscribed by 1.8 times.

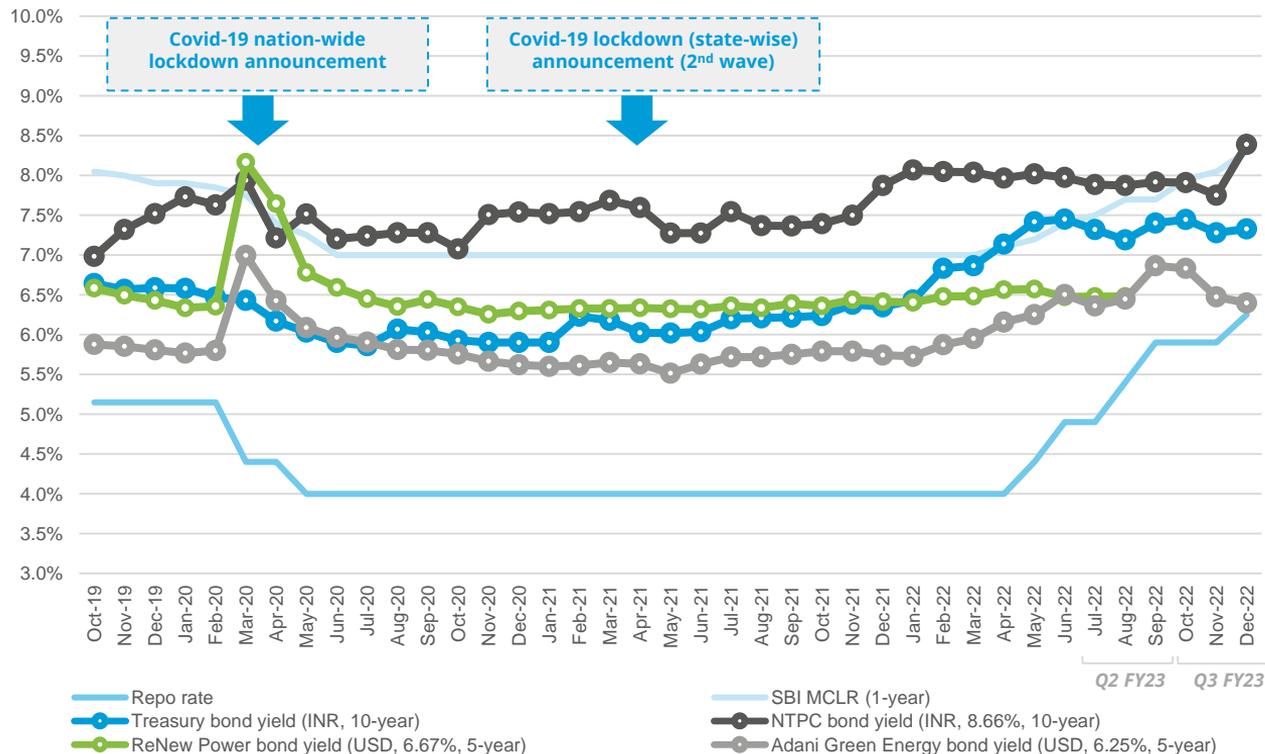
The share price of **Borosil Renewables**, which holds a near monopoly position in India's solar panel glass manufacturing, was down by 12% at the end of Q3 FY23 (vs Q2 FY23).

Source: Money Control.

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

Renewable energy finance: MoF approved the sovereign green bonds framework; another hike in the repo rate this quarter

Bond yields* and key financial rates



Takeaways & Outlook

In November 2022, the **Ministry of Finance (MoF)** approved India's **sovereign green bonds framework**. The core components of the framework are around the **use of proceeds, project evaluation and selection, management of proceeds and reporting**. In the previous quarter, the Government of India announced its plans to borrow INR 16,000 crores (USD 1.94 billion) through **sovereign green bonds (SGrBs)** in the second half of the fiscal year 2022-23.

In December 2022, the **Reserve Bank of India (RBI)** increased the **policy repo rate from 5.9% to 6.25%**. In the previous quarter, the policy repo rate was increased twice.

Key bond yields in India, including the 10-year treasury bond yield, slightly fluctuated over the quarter after witnessing a continued uptick in the previous quarter.

Source: Reserve Bank of India, State Bank of India, Trading Economics, Money Control and BondValue.

Note: Bond prices are the last traded value in each month; * Current yield.

NTPC's 500 MW/3000 MWh Energy Storage System (ESS)

NTPC's 500 MW/3000 MWh ESS (December 2022), Pan India.

- In January 2022, NTPC Renewable Energy Limited announced a tender to meet its ESS requirement to complement wind/solar for RE RTC (round-the-clock) generation profile.
- The conversion loss (CL) of the energy storage projects shall not be more than 25%, and the minimum annual availability of the project should be 95%.
- In terms of round-trip efficiency, a minimum round-trip efficiency of 75% for each charging-discharging cycle is expected.
- In December 2022, Greenko won the entire capacity of 3000 MWh ESS. Greenko proposed using pumped hydro energy storage (PHES) technology for this project.
- The bid price was quoted at INR 2.79 million (USD 33,985) per MWh per year.

Source: NTPC RfS document.

India's recent energy storage tenders

Project location & tender issue date	Application & technology	Details
Pan India (AEML), December 2022	1500 MW, RE RTC	RfS released in Q3 FY23
Pan India (SECI), November 2022	1200 MW, Wind Solar Hybrid with ESS (Tranche VI)	RfS released in Q3 FY23
Pan India (SECI), September 2022	2250 MW, RE with storage (RTC III)	RfS released in Q2 FY23; deadline extended
Gujarat (GUVNL), August 2022	500 MW/1000 MWh standalone BESS phase - I	RfS released in Q2 FY23; deadline extended
Maharashtra (MSEDCL), August 2022	250 MW RE with BESS	RfS released in Q2 FY23; deadline extended
Gujarat (GUVNL), June 2022	500 MW RE/250 MWh ESS phase XV	RfS released in Q1 FY23; deadline extended
Rajasthan (NTPC), April 2022	250 MW/500 MWh BESS	RfS released in Q1 FY23

Source: SECI and state renewable agencies. RfS = request for selection; AEML = Adani Electricity Mumbai Ltd.

Takeaways & Outlook

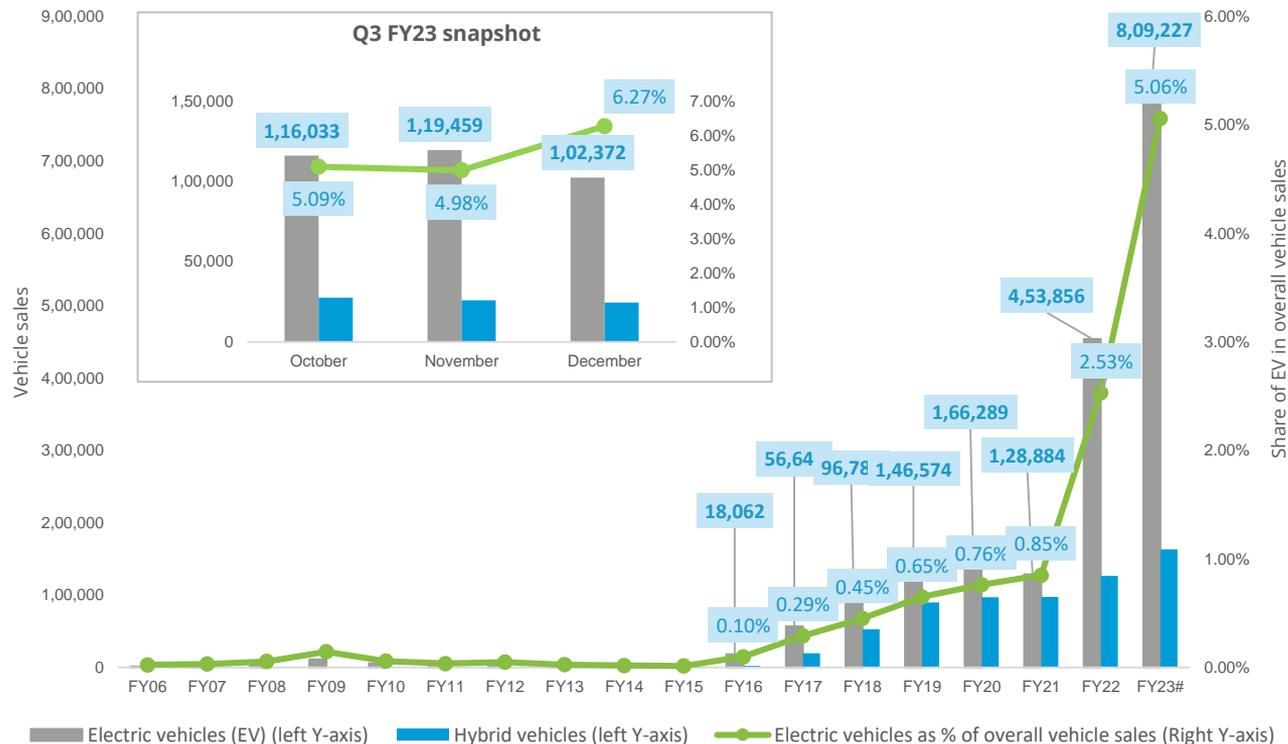
Two new energy storage tenders were announced in Q3 FY23. This includes SECI's pan India 1200 MW wind-solar with ESS (tranche VI) and AEML's 1500 MW RE RTC tenders, whereas deadlines for multiple ESS tenders announced in the previous quarters have been extended.

However, NTPC Renewable Energy's 500 MW/ 3000 MWh BESS tender and MSEDCL's 250 MW RE with storage were concluded in this quarter.

Greenko quoted INR 2.79 million (USD 33,985) per MWh per year to win the NTPC Renewable Energy tender. NTPC and Ayana Renewables quoted INR 9.0/kWh for non-solar generation hours to win the MSEDCL'S tender.

Electric mobility: EV sales increased by 30% in Q3 FY23 vs Q2 FY23; the share of EV in overall vehicle sales stood at 5.36%

Electric vehicle sales in India



Takeaways & Outlook

EV sales continued to grow in Q3 FY23, with an increase of 30% compared to Q2 FY23 and a gain of 156% compared to the same quarter in the previous fiscal year. EV sales were above one lakh in all three months of this quarter. For Q3 FY23, the share of EVs in overall vehicles sale stood at 5.36%.

Ministry of Heavy Industries (MHI), w.e.f. October 2022, decided to implement an application programming interface (API) to ensure fulfilment of minimum local value addition criteria from 2W EV original equipment manufacturers (OEMs).

In addition, in November 2022, MHI released the guidelines on the testing parameter of EVs incentivised under FAME-II and PLI schemes.

OEMs with the highest EV sales* in Q3 FY23 were:

- **2W:** Ola Electric (50,036), Okinawa (29,286) and Ampere (26,735)
- **3W:** YC Electric Vehicle (8,594), Saera Electric (5,830), Mahindra REVA Electric Vehicles (4,991)
- **4W**:** Tata Motors (9,100), MG Motors (1,609) and Hyundai Motors (263)

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 (2021), CEEW Centre for Energy Finance. #As of Q3 FY23; * Based on sales data up to Q3 FY23; **4W represents Light motor vehicles and Light passenger vehicles.

Thank you

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Date	Company	Size (USD million)	Sector	Coupon rate (%)	Rating	Tenor (Years)	Purpose
March 2022	Avaada Energy	192	Solar	6.75	AAA (CRISIL, India Ratings)	3	Refinancing of existing debt
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

Source: Climate Bonds Initiative and company press releases.

Date	Company	Size (USD million)	Sector	Coupon rate (%)	Rating	Tenor (Years)	Purpose
February 2021	Continuum Green Energy	561	Solar and wind	4.50%	BB+ (Fitch)	6	Refinancing of existing debt
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

Source: Climate Bonds Initiative and company press releases.

53.90%

FAME-II target met

As of Q3 FY23

Note: Target of selling 1,562,000 EVs (2W, 3W, 4W and buses) under FAME-II scheme by FY22.

540

Number of EV OEMs in India

As of Q3 FY23

135

Total FAME II approved models

As of Q3 FY23

Recent electric vehicle launches



Baaz Bikes

Price: INR 35,000 onwards

Range: 100 km

Battery capacity: -



BYD Atto 3

Price: INR 30,00,000 onwards

Range: 420 km

Battery capacity: 60.48 kWh



iVOOMi S1 240

Price: INR 1,21,000 onwards

Range: 240 km

Battery capacity: 4.2 kWh



HOP Oxo

Price: INR 3,25,000 onwards

Range: 68 km

Battery capacity: 4.5 kWh Lithium-ion

EV penetration

In Q3 FY23

4.63%

2W sold were EV

52.23%

3W sold were EV

337,924

EVs sold

in Q3 FY23

21

States notified EV policies

As of Q3 FY23

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



Build evidence

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

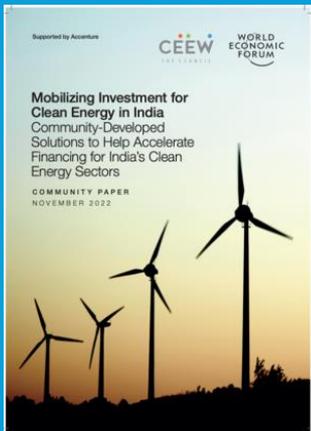
Create coherence

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



Mobilizing Investment For Clean Energy In India



Viet Nam Grid Integration Guarantee



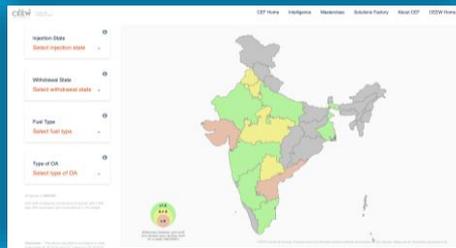
Making India A Leader in Solar Manufacturing



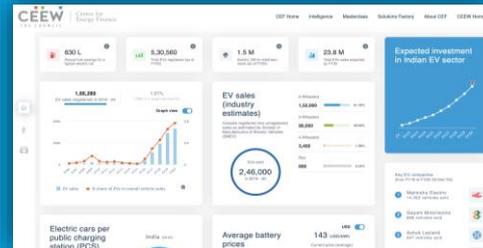
How have India's RE Policies Impacted its Solar and Wind Projects



India Renewables Dashboard



Open Access Tool



Electric Mobility Dashboard