

Utility-scale Renewable Energy Tendering Trends in India

Intense investor interest results in a record 69GW
of capacity issued yet some obstacles remain

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Key Findings

A record 69+ gigawatts (GW) of renewable energy tenders were issued in fiscal year (FY) 2024, easily surpassing the government-mandated target of 50GW.

Of all awarded tenders in FY2024, about 25% were from the Solar Energy Corporation of India (SECI). However, the rising prominence of other tendering agencies underlines the strength of India's renewable energy tendering ecosystem.

In two years, solar tariffs have increased marginally by ~8.5%, from an average of Rs2.3-2.4 per kilowatt-hour (kWh) to Rs2.5-2.6 per kWh, despite a ~57% fall in module prices in the same period.

From FY2020-24, the share of hybrid renewable energy tenders increased from 16% to 43%.



Executive Summary

Large-scale renewable energy projects in India have been generating interest from both domestic and international players of late. After a slump in activity between 2019 and 2022 due to global price shocks and supply-chain issues brought on by the COVID-19 pandemic and Russia's invasion of Ukraine, the utility-scale market has rebounded and gone from strength to strength.

In FY2023, bidding for utility-scale renewable energy projects outstripped the government's ambitious target of 50GW with a record 69GW bids. The primary reasons were the large-scale potential for market growth, central government support in terms of targets and regulatory frameworks, and higher operating margins.

Of the total awarded tenders in FY2024, only about a quarter are from SECI. State-level tendering authorities will play an equally important role in the utility-scale renewable energy landscape.

However, transferring that laudable figure from paper to power production still faces significant and persistent challenges in the form of 40% import duties and the requirement to purchase locally manufactured components. These initiatives, while worthy, mask the reality that local manufacturers still cannot compete on price with imports or satisfy increasing domestic demand, adding unnecessary costs and time to renewable energy projects.

Meanwhile, the government is considering reinstating reverse auctions for wind projects, which were suspended after unviable tariffs led to their cancellation. Government vacillation on this issue only creates uncertainty among market stakeholders.

Even though module prices have fallen sharply since August 2022, this trend has not translated to discovered solar tariffs in India. The reason for this is the double barrier to solar imports in the form of basic custom duties (BCD) and the approved list of models and manufacturers (ALMM).

This report examines the status of the tendering process and analyses, in detail, trends in the preceding years, their successes and setbacks, the key players and new entrants, and innovations.

Innovations include India's first large-scale offshore wind tender totalling 4GW, issued in early 2024, with a 500MW concentrated "solar + thermal storage" tender to follow in early 2025. In addition, there has been an exponential rise in ESS tender issuance for energy storage projects, which will form a crucial part of India's renewable energy infrastructure.

There remains some degree of risk aversion to new technologies among developers. However, the success of large-scale, pan-India projects awarded to market leaders, some with international backing, will showcase the potential of these new technologies to the broader renewable energy market.

The ability to replicate successful tender types and introduce novel tender designs will define the trajectory of utility-scale renewable energy tendering in India. SECI's offshore wind and concentrated solar tenders will unlock their market potential, which will, in turn, be crucial for India to reach its renewable energy target of 500GW by 2030.

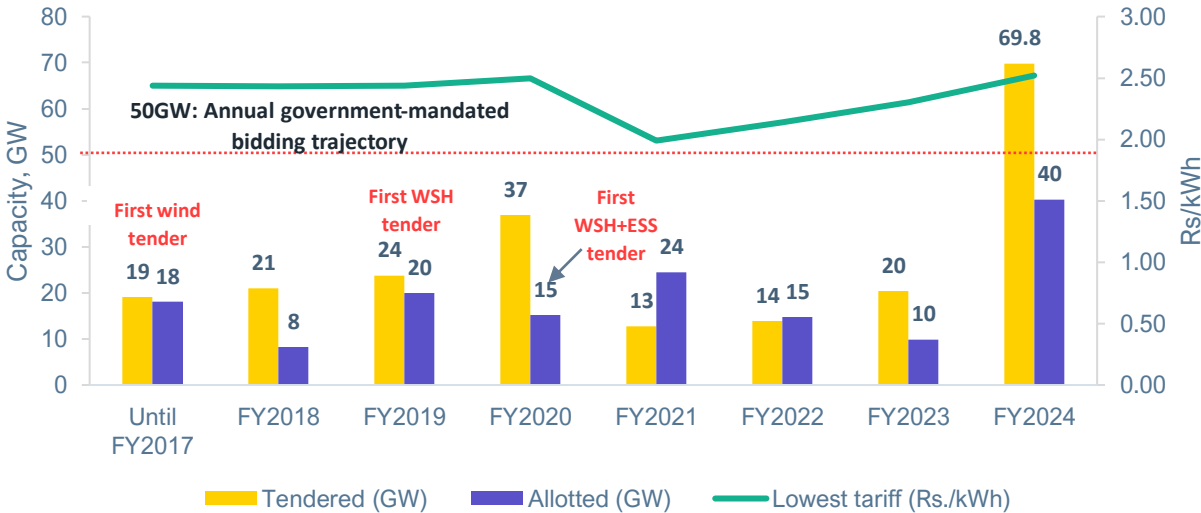
Renewable Energy Tender Issuance Trajectory in India

The growth of the renewable energy sector in India has been driven by utility-scale tendering via reverse auctions. Until 2016, tendering authorities only issued solar tenders. That year, wind tendering began in India with the first wind auction conducted by the Solar Energy Corporation of India (SECI). In 2018, SECI issued the first Wind Solar Hybrid (WSH) tender of 1,200MW. SECI later introduced Energy Storage Systems (ESS) in the renewable energy tendering landscape, issuing its first peak power supply tender in 2019.

Post 2019, renewable energy tendering in India has experienced a minor slump, partly due to the COVID-19 pandemic and supply-chain constraints. In March 2023, the government issued the annual bidding trajectory for renewable energy to attain its 500GW non-fossil fuel capacity target by 2030. The bidding trajectory mandated at least 50GW of renewable energy tenders to be issued for the financial year (FY) 2024.¹ However, this target was easily surpassed with a record 69GW+ of tenders issued.

In addition, 22GW+ of standalone ESS (ESS projects without renewable energy components) tenders were also issued in the calendar year 2023. Of this, Pumped Hydro Storage (PHS) projects accounted for about 20GW. Easing supply-chain constraints led to a fall in solar module prices, which was another critical factor in this upsurge in renewable energy tender issuance.

Figure 1: Utility-scale renewable energy tender issuance trajectory in India



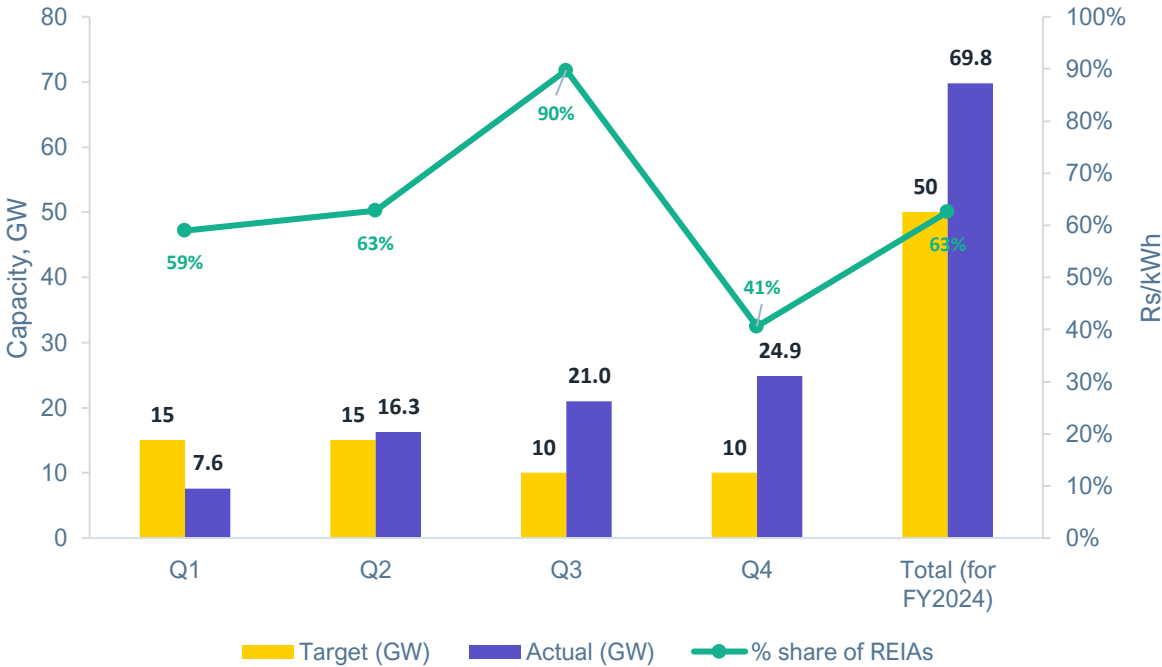
Source: JMK Research
 Note: Only utility-scale project development renewable energy tenders are included. Standalone ESS and PH tenders are not included.

¹ Ministry of New and Renewable Energy (MNRE). [Bidding Trajectory for Renewable Energy Projects](#). March 2023.

In addition to providing a tendering trajectory, the government selected four renewable energy implementing agencies (REIAs) to establish a well-defined pathway for its tender issuance goals.² The Ministry of New and Renewable Energy (MNRE) selected SECI, the National Thermal Power Corporation (NTPC), Satluj Jal Vidyut Nigam (SJVN) and the National Hydroelectric Power Company (NHPC) with mandated FY2024 renewable energy issuance targets of 15GW, 15GW, 10GW and 10GW respectively, to implement its annual 50GW trajectory.

The annual bidding trajectory includes quarterly targets. The first two quarters of each financial year must have at least 15GW of renewable energy tender issuance, and the target for the following two quarters is 10GW each. While the tender issuance in Q1 FY2024 was a little slow, it picked up in the subsequent quarters to surpass the overall target of 50GW. The contribution of tendering agencies, apart from REIAs, was essential in surpassing the national target.

Figure 2: Government-mandated bidding trajectory and status (FY2024)



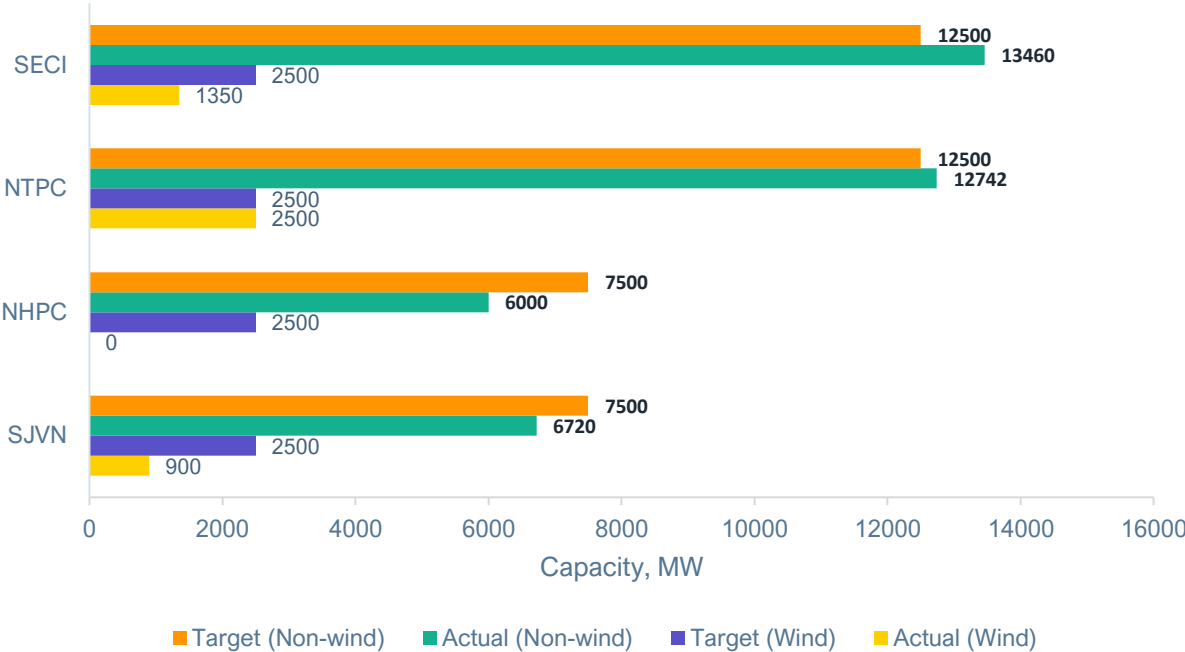
Source: JMK Research
 Note: REIAs consist of NTPC, NHPC, SECI and SJVN.
 Only utility-scale project development renewable energy tenders are included. Standalone ESS and PH tenders are not included.

With 69GW+ tendering in FY2024, India easily surpassed the overall national target of 50GW. However, the four REIAs initially selected by the MNRE to execute the bidding plan failed to hit their respective marks, especially in the wind sector. Against the 10GW and 40GW targets for FY2024, the

² MNRE. [REIAs-wise bidding calendar for FY 2023-24](#). April 2023.

REIAs cumulatively issued tenders of 4.75GW (47.5% of target) and 38.92GW (97.3%) for the wind and non-wind sectors, respectively.

Figure 3: REIA bidding targets and status (FY2024)



Source: JMK Research

Of the four REIAs, only one (NTPC) achieved its 2,500MW wind target. NHPC, on the other hand, did not issue any wind tenders in FY2024 despite the MNRE’s allocation of 2,500MW. Market stakeholders cite a shortage of suitable wind sites and land allocation issues as significant challenges to the issuance of new wind tenders. Additionally, the underwhelming performance of REIAs in issuing wind tenders underlines the declining importance of, and demand for, standard wind tenders (which only include one renewable energy component, such as solar or wind).

New Renewable Energy Tender Issuance Analysis

Energy offtakers’ preference for a less intermittent and improved profile of renewable energy output has increased considerably. From FY2020-24, the share of hybrid renewable energy tenders (with or without storage) rose from 16% to 43%.

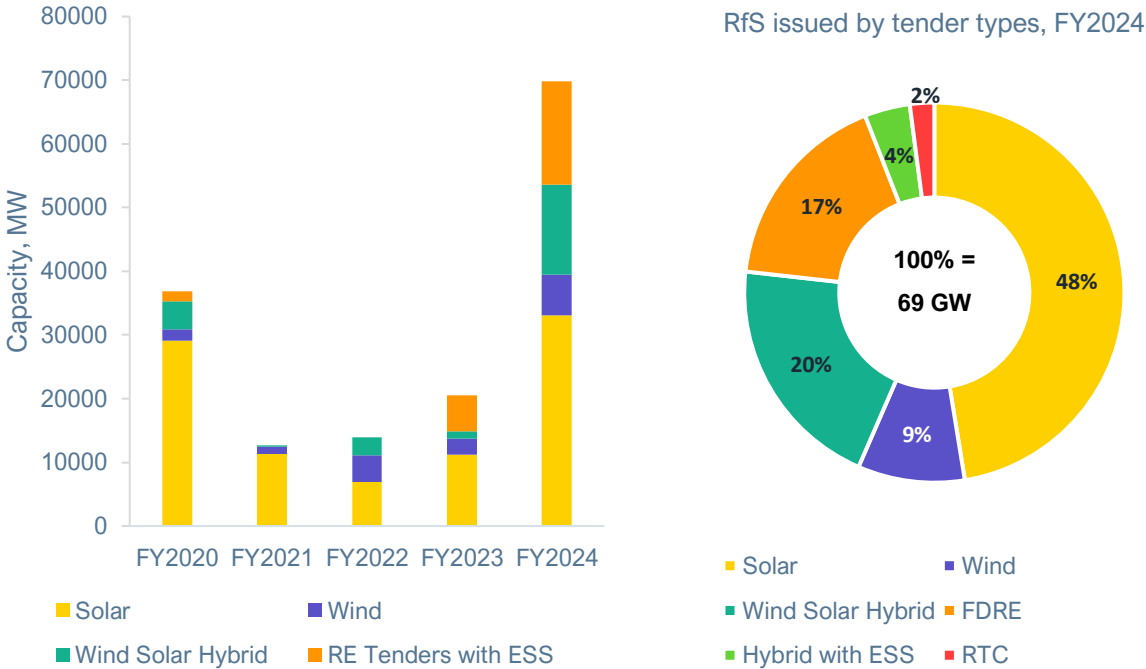
In FY2024, solar and wind tenders comprised more than half (57%) of the renewable energy tenders issued in India. The remainder are wind-solar hybrid and renewable energy combined with energy storage systems (ESS). These “renewable energy + ESS” projects also include several tender types based on their end-use application, such as round-the-clock (RTC), peak power supply, and firm and

dispatchable renewable energy (FDRE). The emergence of FDRE in FY2024 dictates the recent surge of the “renewable energy + ESS” tender segment.

Initial “renewable energy + ESS” tenders, such as RTC and peak power supply, experienced offtake risks, leading to lengthy delays in concluding the auction process. Tendering authorities had to address any tender design issues in light of state DISCOMs’ hesitance to sign long-term offtake agreements for this emerging technology.

Under FDRE tenders, even before bidding commences, the tendering authority already has a verbal power sale agreement (PSA) with the energy offtaker, generally the state DISCOMs. Hence, delays in signing offtake agreements with state DISCOMs will be significantly reduced in future.

Figure 4: Renewable energy tender issuance trajectory, by tender type



Source: JMK Research
 Only utility-scale project development renewable energy tenders are included. Standalone ESS and PH tenders are not included.

Standalone Storage: Apart from this, standalone ESS projects have grown exponentially. In 2023 alone, about 22GW of standalone ESS tenders, including pumped hydro storage (PHS), were issued.

Grid-scale PHS tender issuance capacity in 2023 was about 19GW, a meteoric rise compared with prior years when no ESS tenders were specified for PHS. Rewa Ultra Mega Solar Ltd (RUMSL) issued the largest-ever ESS tender in June 2023 for 16.4GW across 14 sites in Madhya Pradesh.

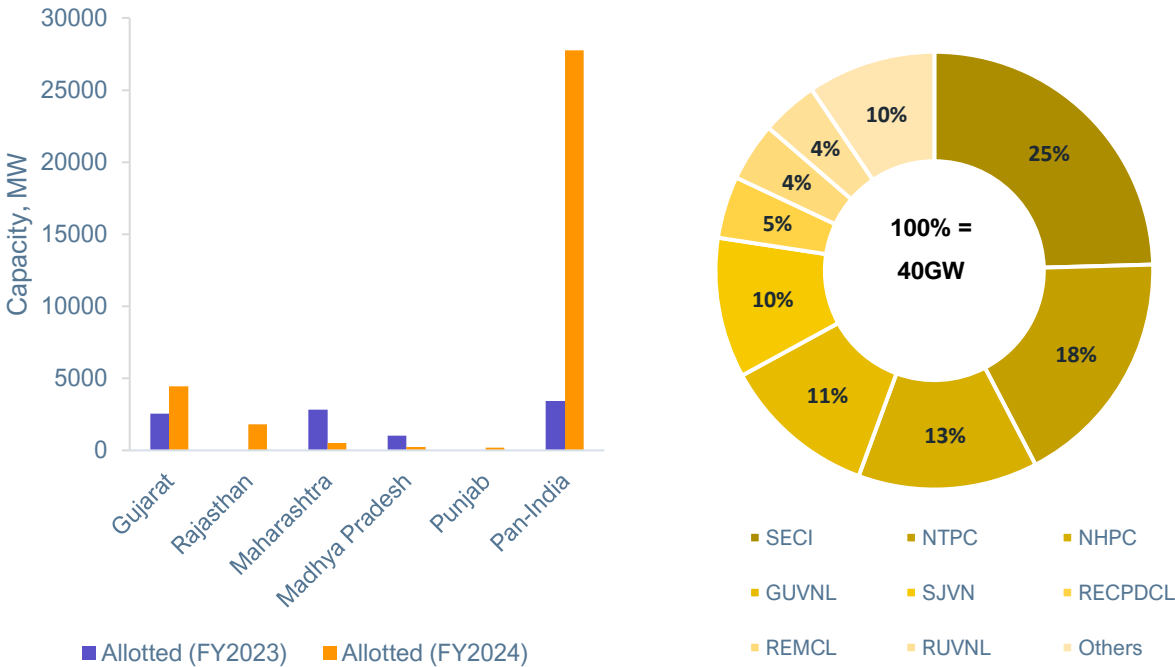
Standalone ESS empowers its offtakers with enhanced flexibility to utilise ESS for myriad applications, including energy shifting and frequency regulation. In most standalone ESS projects,

charging energy will likely come from a renewable energy source. Hence, the growth of standalone ESS tendering in tandem with renewable energy can strengthen India’s renewable energy landscape.

Pan-India Tenders Dominate FY2024

For about 80% of the tenders awarded (and auctions concluded) in FY2024, location is not a constraint. Developers have the flexibility to set up anywhere in India with Inter-State Transmission System (ISTS) connectivity to facilitate power delivery. The remaining awarded projects were state tenders from Gujarat, Rajasthan, Maharashtra, Madhya Pradesh and Punjab, with location constraints to build capacity intrastate.

Figure 5: Renewable energy tenders awarded, by state and authority (FY2024)



Source: JMK Research

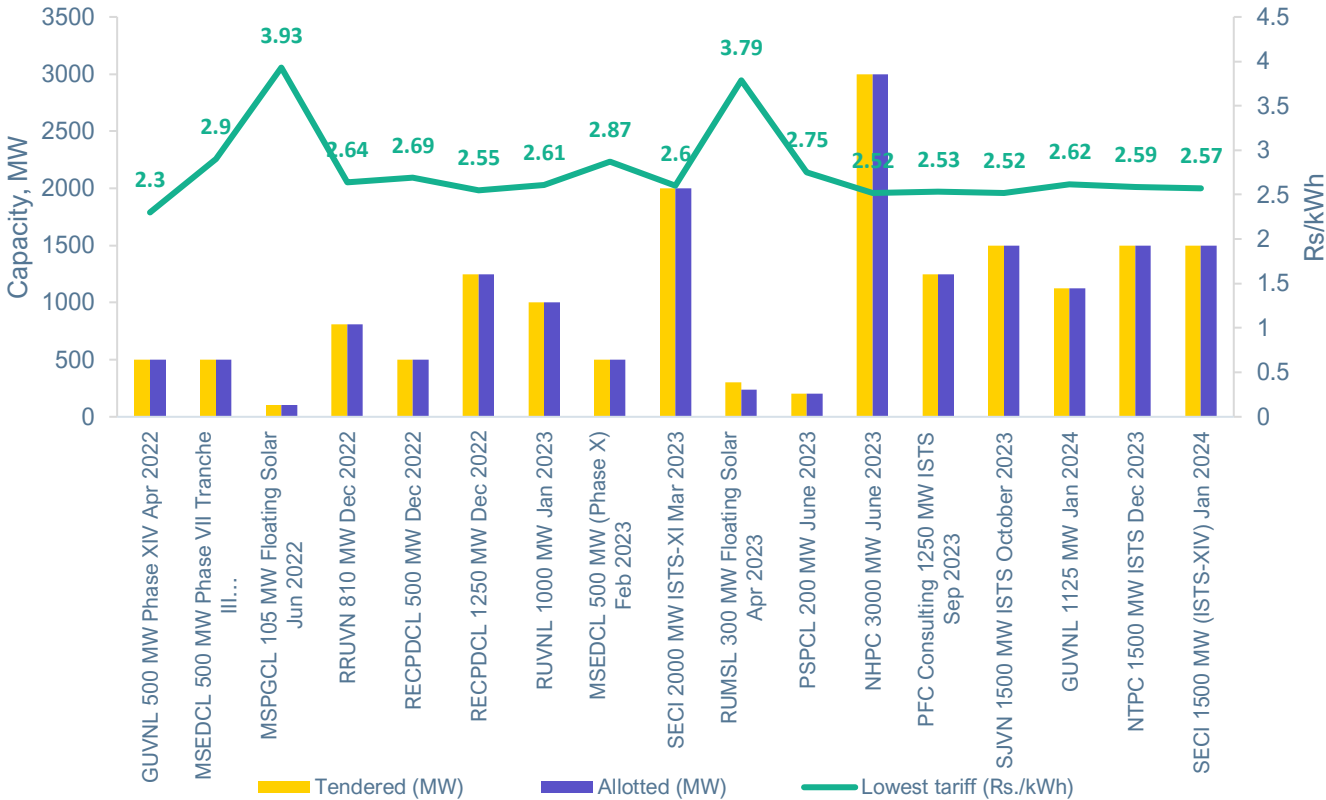
Of the total awarded tenders in FY2024, only about a quarter are from SECI. The rising prominence of other tendering agencies underlines the strength of India’s renewable energy tendering ecosystem. The top five tendering agencies, including the four REIAs and Gujarat Urja Vikas Nigam Ltd (GUVNL), account for more than three-quarters of India’s entire tender allotment. In FY2023 and FY2024, there were three new entrants: PFC Consulting, Rajasthan Vidyut Urja Nigam Ltd (RVUNL) and Calcutta Electric Supply Corporation (CESC).

Tariff Trends in Tender Auctions

In the 2010s, utility-scale solar tariffs followed a consistent deflationary trend, in line with falling solar module prices. From 2010 to 2020, the lowest winning (also known as L1) tariff for utility-scale solar tenders declined from Rs10.95 per kilowatt-hour (kWh) to Rs1.99/kWh respectively. The latter, a record yet to be surpassed, was achieved under a GUVNL tender.

However, since 2020, solar tariffs have increased marginally from an average band of Rs2.3-2.4/kWh to Rs2.5-2.6/kWh (an increase of ~8.5%). In FY2023 and FY2024, solar tariffs stayed mainly in the range of Rs2.5-2.6/kWh. Due to considerably higher capital and maintenance cost requirements, floating solar has much higher tariffs (Figure 6).

Figure 6: Major utility-scale solar auctions (April 2022-March 2024)



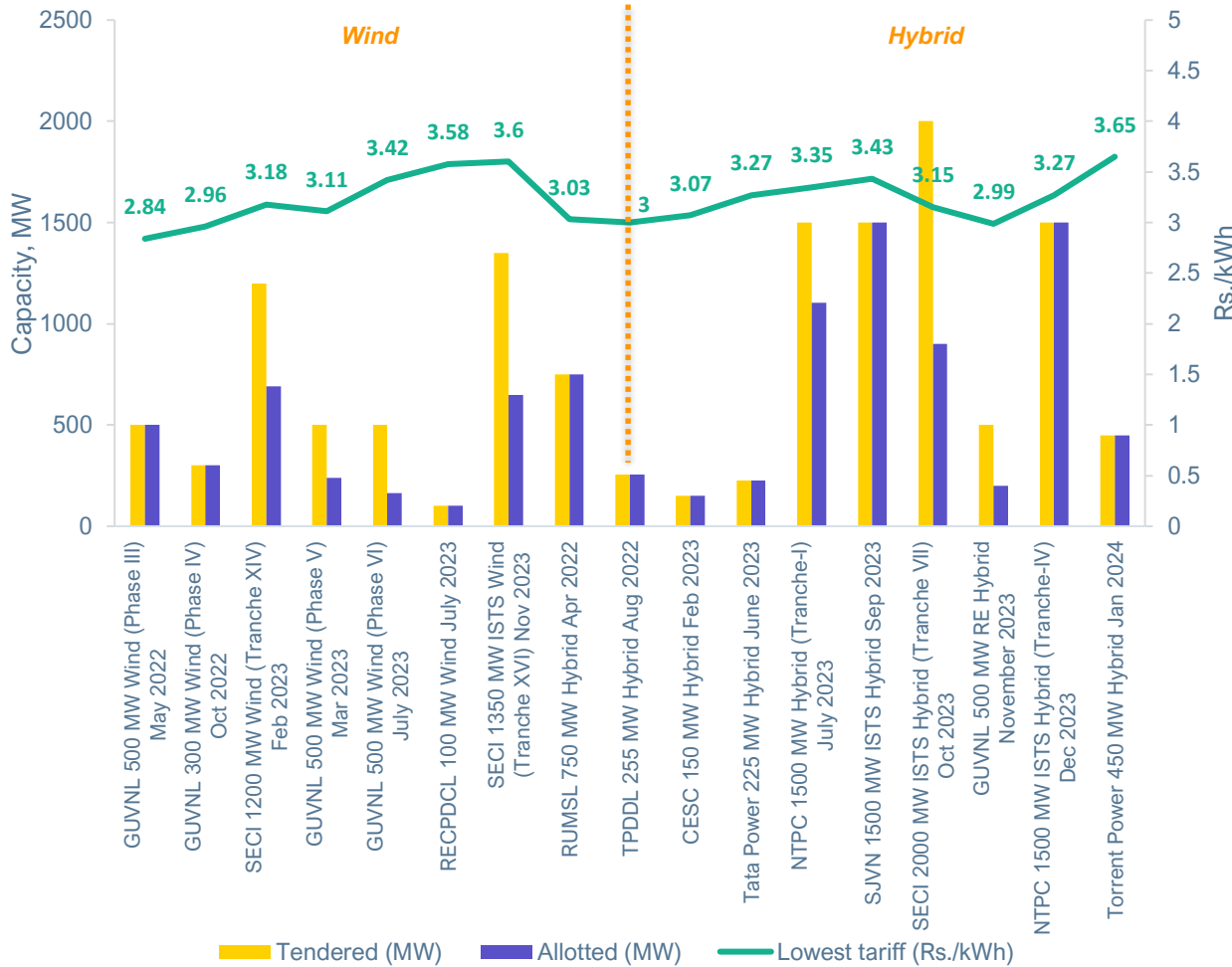
Source: JMK Research

The marginal increase in solar tariffs post-2020 was driven by an upsurge in solar module prices and other supply-chain/logistical constraints, partly induced by the COVID-19 pandemic. Since August 2022, easing supply-chain constraints and declining raw material manufacturing costs have led to a sharp fall in solar module prices. The March 2024 per Watt-peak (Wp) price of a mono passivation

emitter rear contact (PERC) module in the global market was US\$11.5, less than half of its August 2022 value.

The decline in solar module prices since August 2022 has not yet flowed to lower solar tariffs. The primary reason is the double barrier to solar imports in the form of basic custom duties (BCD) and the approved list of models and manufacturers (ALMM). After the imposition of ALMM for utility-scale solar projects, developers must procure domestically produced solar modules, which are pricier than their global counterparts. Even when the government exempted ALMM (during FY2024), a hefty 40% BCD on solar module imports kept procurement costs equally high.

Figure 7: Major utility-scale wind and hybrid auctions (April 2022-March 2024)



Source: JMK Research

Wind sector power tariffs have risen steadily since 2022. The tariff in the latest wind allotment by GUVNL was Rs.3.42/kWh, 20% higher than the Rs.2.84/kWh awarded in July 2022. Market

stakeholders cite the removal of reverse auctions for wind tenders in 2022 as the key contributing factor to this trend. However, given the undersubscription and higher tariff in recent wind bids, the MNRE is considering bringing back reverse auctions for the sector.³

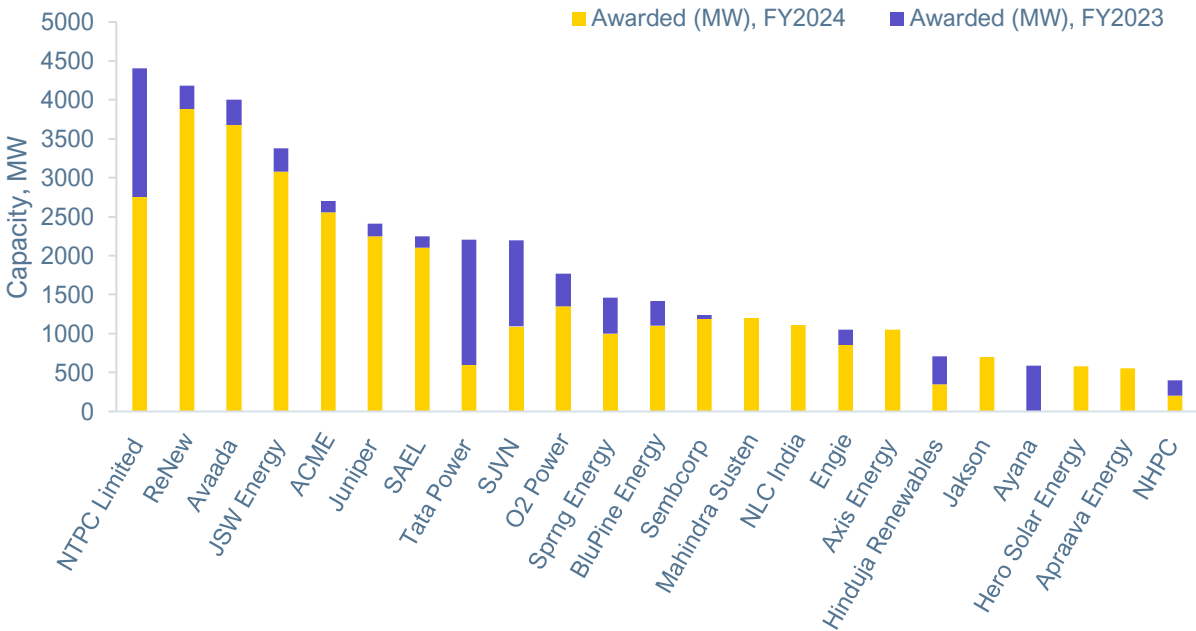
Wind-solar hybrid (WSH) tariffs are affected by concurrent trends from the solar and wind sectors. Like solar, the lowest-ever WSH tariff in India, Rs2.41/kWh, was achieved in a December 2020 allotment. The recent upturn in wind and solar tariffs has also affected WSH tariffs. Hence, the WSH tariff in FY2023-24 has stayed above the threshold of Rs3/kWh.

In that time, developers have become more risk-averse and less aggressive in bidding for renewable energy tenders, especially for wind projects. This followed the cancellation or stagnation of some prominent tenders due to unviable tariffs.

Key Players

From April 2022 to March 2024, 17 developers were awarded a cumulative capacity of more than 1GW in utility-scale renewable energy auctions. Remarkably, each of the leading five developers was allotted more than 2.5GW. NTPC won the largest quantum of 4,405MW. The other developers in the top five are ReNew, Avaada, JSW Energy and ACME. Among these, JSW Energy is a relatively new entrant in the renewable energy tendering landscape, having secured its first auction win in FY2021.

Figure 8: Leading developers in utility-scale auctions (April 2022-March 2024)



Source: Relevant tendering authorities, JMK Research

³ The Hindu. [Reverse bidding comes back as wind tariffs rise in auctions](#). 29 February 2024.

From April 2022 to March 2024, NTPC, JSW Energy and Juniper Green were the leading developers (by capacity awarded) in their respective renewable energy segments of solar, wind and hybrid.

As is evident from the capacities won, some players, such as Juniper Green, are pivoting towards hybrid from standard renewable energy projects. The hybrid capacity won by Juniper Green is more than triple the capacity awarded to it in either solar or wind. Some pure wind players, such as Sembcorp, are also shifting their focus to wind-solar hybrid tenders.

Others, such as ReNew and ACME, have shifted their focus to ESS tenders. From April 2022 to March 2024, “renewable energy + ESS” accounted for about 55% and 34% of the entire renewable energy capacity awarded to ACME and ReNew, respectively.

New Entrants: From April 2022 to March 2024, more than 10 new developers entered the utility-scale renewable energy market in India. BluPine Energy, backed by global equity investment firm Actis, has made the most substantial impact among the new entrants.

Other prominent new entrants with >300MW awarded capacity are Axis Energy (backed by Brookfield Corporation), former independent power producer (IPP) Apraava Energy and Sunsure Energy, a leading commercial and industrial financier.

BrightNight, a US-based IPP, announced in 2023 that it would invest US\$1 billion in India in the next five years.⁴ In February 2024, by winning 120MW capacity in NHPC’s 1,500MW FDRE tender, BrightNight entered the country’s utility-scale renewable energy market.

Outlook and Expectations

Since the introduction of hybrid tenders in 2018, renewable energy tendering has witnessed a strong shift in momentum from solar and wind to hybrid and “renewable energy + ESS”. The emphasis on output power quality will continue to strengthen in the coming years. The reinstatement of reverse auctions in the wind sector, ALMM flip-flops and the introduction of novel tender types are also changing the dynamics of the renewable energy industry.

Reinstatement of Reverse Auctions for Wind

After stopping reverse auctions for wind tenders in January 2023, the government is reportedly considering reinstating them. The bidding method is being reviewed to address the undersubscription and higher tariff discovery in recent wind tender allocations.

However, market stakeholders believe that reinstating reverse auctions will have a limited impact on the sector, with a high probability of policy reversal. They claim that reverse auctions lead to

⁴ The Hindu. [US co, BrightNight Power, to put up 7GW of hybrid renewable plants in India](#). September 2023.

artificially low project tariffs and unfair concentration of wind projects in a few states, ultimately putting undue pressure on manufacturers and developers, and diminishing their overall returns.

ALMM Implementation may cause Supply Crunch

The MNRE has deferred the implementation date of ALMM multiple times since its introduction in August 2021. On 9 February 2024, the MNRE notified that ALMM would apply from April 2024, except for captive open-access projects.⁵ However, just a few days later, on 15 February, it rescinded this order and kept it under abeyance until further notice, increasing uncertainty and keeping market stakeholders in limbo.⁶ On 29 March, the government finally declared that ALMM would come into effect on 1 April 2024.⁷

Along with BCD, ALMM is one of the key reasons for the sustained inflation in solar tariffs despite the plummeting costs of solar modules.

As of April 2024, India had about 68GW and 8GW of module and cell nameplate capacities, respectively. However, actual production is much lower, with only about 17GW of module shipments by Indian manufacturers in 2023. Until domestic manufacturing can fully support solar project development in India, there should be no fixed import barrier such as ALMM. In the meantime, developers will work to establish and secure solar supply chains with domestic manufacturers.

Introduction of New Renewable Energy Tender Types

In February 2024, SECI issued India's first GW-scale offshore wind tender of 4GW. Bids will be invited in four blocks of 1GW each, and the projects will be set up along the coast of Tamil Nadu.⁸ Additionally, SECI will issue a 500MW "concentrated solar + thermal storage" tender by early 2025.⁹

The introduction of new tender types sparks innovation and market interest in the renewable energy sector at large. These initial projects, under the guidance of SECI, will showcase the potential of "concentrated solar + thermal storage" and offshore wind to market stakeholders. Their successful execution will lead to the wide-scale replication of these novel tender designs, further aiding the country in achieving its 2030 renewable energy and emission reduction targets.

⁵ MNRE. [Approved Models and Manufacturers of Solar Photovoltaic Modules \(Requirements for Compulsory Registration\) Order, 2019 – reg.](#) February 2024.

⁶ Ibid.

⁷ MNRE. [Approved Models and Manufacturers of Solar Photovoltaic Modules \(Requirements for Compulsory Registration\) Order, 2019 – reg.](#) March 2024.

⁸ MNRE. [Government invites bids for Development of 4 GW Offshore Wind Energy Projects off the coast of Tamil Nadu.](#) February 2024.

⁹ Economic Times. [SECI to issue tender for 500-MW concentrated solar-thermal power project.](#) 4 March 2024.

Conclusion

The Indian government's directive last year to invite cumulative renewable energy bids of more than 50GW in a financial year, which initially seemed ambitious, was quickly surpassed in FY2024. The surge in tendering is a testament to tendering authorities' efforts to continuously improve tender design and, with it, market conditions. Market stakeholders believe that annual tendering capacity will again cross the national target of 50GW in FY2025. At the same time, allotment will also accelerate as the auction of unawarded tenders from FY2024 concludes in FY2025.

There is strong investor interest in the Indian utility-scale renewable energy market. The primary reasons are the large-scale potential for market growth, central government support in terms of targets and regulatory frameworks, and higher operating margins.

State-level tendering authorities will continue to play an equally important role in the utility-scale renewable energy landscape. Gujarat-based GUVNL has already established itself as a leading tendering entity in India. Similarly, the rising prominence of other state-level entities, such as Rajasthan-based RUVNL, underlines the vibrancy of the renewable energy tendering ecosystem.

Even though wind installations have increased in previous years, the sector's long-term outlook continues to be of concern. Undersubscriptions and declining industry interest have marred wind tenders in the past few years. In addition, the tendering process is in flux, with the government yet to finalise the methodology.

Renewable energy tariffs have increased by 8-10% across technologies in FY2023-24. However, with the long-awaited clarity on ALMM and the development of the domestic PV manufacturing ecosystem, it is highly likely that tariffs will again slump.

Developers are building their presence and knowledge base in varied renewable energy technologies, such as solar, wind, hybrid and ESS. By doing this, they will be able to address and successfully implement any prospective renewable energy solutions in the future.

Energy storage, either in combination with renewable energy or standalone, will be a crucial part of renewable energy infrastructure. This is evident from the exponential rise of ESS tender issuance in recent years. In 2023, more than 35GW of ESS tenders (including standalone and pump hydro storage) were issued in India.

The ability to replicate successful tender types and introduce novel tender designs to address differing applications will define the trajectory of utility-scale renewable energy tendering in India. SECI's offshore wind and concentrated solar tenders will unlock their market potential, which will, in turn, be crucial for India to reach its renewable energy target of 500GW by 2030.

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The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends, and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable, and profitable energy economy. www.ieefa.org

About JMK Research & Analytics

JMK Research & Analytics provides research and advisory services to Indian and international clients across renewable energy, electric mobility and the battery storage market. www.jmkresearch.com

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