IPO Note

November 10, 2022

Inox Green Energy Services Limited

HDFC securities
Click. Invest. Grow.
20 YEARS

Issue Snapshot:
Issue Open: Nov 11 – Nov 15, 2022

Price Band: Rs. 61 – 65

*Issue Size: 113,846,154 eq sh (Fresh issue of Rs 370 cr + Offer for sale of Rs 370 cr)

Reservation for:
QIB atleast 75% eq sh
Non-Institutional upto 15% eq sh
((including 1/3rd for applications between Rs.2 lakhs to Rs.10 lakhs))
Retail upto 10% eq sh

Face Value: Rs 10

Book value: Rs 33.83 (June 30, 2022)

Bid size: - 230 equity shares and in multiples thereof

100% Book built Issue

Capital Structure:
Pre Issue Equity: Rs. 235.02 cr
*Post issue Equity: Rs. 291.94 cr

Listing: BSE & NSE

Book Running Lead Managers: Edelweiss Financial Services Ltd, DAM Capital Advisors Ltd, Equirus Capital Private Ltd, IDBI Capital Markets & Securities Ltd, Systematix Corporate Services Ltd
Sponsor Bank: ICICI Bank Ltd and HDFC Bank Ltd

Registrar to issue: Link Intime India Private Limited

Shareholding Pattern

Shareholding Pattern	Pre issue %	Post issue %
Promoter and Promoter Group	93.84	56.04
Public	6.16	43.96
Total	100.0	100.0

*=assuming issue subscribed at higher band
Source for this Note: RHP

Background & Operations:
Inox Green Energy Service Ltd (Inox Green) is one of the major wind power operation and maintenance ("O&M") service providers within India. The Company is engaged in the business of providing long-term O&M services for wind farm projects, specifically the provision of O&M services for wind turbine generators ("WTGs") and the common infrastructure facilities on the wind farm which support the evacuation of power from such WTGs. It has stable annual income owing to the long-term O&M contracts that it enters into with its customers. It is a subsidiary of Inox Wind Limited ("IWL"). Its subsidiaries are engaged in the business of power generation through renewable sources of energy with Nani Virani Wind Energy Private Limited being the only subsidiary which has commenced power generation.

Inox Green enjoys synergistic benefits as a subsidiary of IWL, which is principally engaged in the business of manufacturing WTGs and providing turnkey solutions by supplying WTGs and offering a variety of services including wind resource assessment, site acquisition, infrastructure development, EPC of WTGs, and, through its Company, providing long-term O&M services for wind power projects. Pursuant to an exclusivity agreement between IWL and Inox Green, it provide exclusive O&M services for all WTGs sold by IWL through the entry of long-term O&M contracts between the WTG purchaser and itself for terms which typically range between five to 20 years. As of June 30, 2022, IWL had entered into binding contracts for the supply of 2 MW capacity WTGs with an aggregate capacity of 964 MW. Further, IWL had also received letters of intent, which are non-binding and which therefore may not lead to execution of any form of binding contract, for its new 3.3 MW capacity WTGs with an aggregate capacity of 524.7 MW.

As of June 30, 2022, Inox Green's O&M services portfolio consisted of an aggregate 2,792 MW of wind farm capacity and 1,396 WTGs. In general, its comprehensive O&M contracts cover the provision of O&M services to both WTGs installed on a wind farm and the common infrastructure facilities, such as electrical substations and transmission lines, which support the wind farm; its common infrastructure O&M contracts relate only to the provision of O&M services on the common infrastructure facilities. Effective from December 31, 2021, its EPC business was transferred to a different subsidiary of IWL.

Objects of Issue:
The Offer comprises of the Fresh Issue by Inox Green and the Offer for Sale by Inox Wind Limited, the Selling Shareholder.

Offer for Sale
The Selling Shareholder is offering Equity Shares aggregating up to Rs. 3,700 million in the Offer for Sale. The Selling Shareholder will be entitled to the proceeds of the Offer for Sale, after deducting its portion of the Offer related expenses and relevant taxes thereon. Inox Green will not receive any proceeds from the Offer for Sale.

The Objects of the Fresh Issue
The net proceeds of the Fresh Issue, i.e., gross proceeds of the Fresh Issue less the Offer expenses apportioned to Inox Green ("Net Proceeds") are proposed to be utilised in the following manner:

- Repayment and/ or pre-payment, in full or part, of certain borrowings availed by the Company including redemption of Secured NCDs in full; and
- General corporate purposes.

In addition to the aforementioned Objects, Inox Green will receive the benefits of listing of its Equity Shares on the Stock Exchanges.

Requirement of funds and utilisation of Net Proceeds

The Net Proceeds are proposed to be used in accordance with the details provided in the following table:

Sr. No	Particulars	Amount which will be financed from Net Proceeds (mn)
1	Repayment and/ or pre-payment, in full or part, of certain borrowings availed by the Company including redemption of Secured NCDs in full	2600
2	General corporate purposes	*

Competitive Strengths

Strong and diverse existing portfolio base: As of June 30, 2022, Inox Green's portfolio of O&M contracts (consisting of both comprehensive O&M contracts and common infrastructure O&M contracts) covered an aggregate of 2,792 MW of wind projects spread across eight wind-resource rich states in India with an average remaining project life of more than 20 years. The counterparties to its O&M contracts feature a mix of independent power producers ("IPP") (approximately 72%), public sector undertakings ("PSU") (approximately 14%) and corporates (approximately 14%), as on June 30, 2022. Further, certain individual wind project sites which it has developed in collaboration with IWL has significant capacity to support the installation of additional WTGs which will further grow its portfolio base. In addition, with the transition from the feed-in tariff regime to the auction based regime having had a few years to bed in, there will be an increase in the number of WTG installations in the coming years as compared to the suboptimal number of WTG installations for the past few years which will further expand the portfolio base.

Established track record, favourable national policy support and visibility for future growth: Inox Green has an established track record in the wind energy O&M industry of more than nine years due in large part to the synergistic relationship it shares with its parent company, IWL, which commenced operations in the wind energy space in the financial year ended March 31, 2010. As set out on in the graph below, its operating portfolio of O&M contracts (both comprehensive O&M contracts and common infrastructure O&M contracts) has grown at a compound annual growth rate of approximately 40.16% in the past nine years since its commencement of operations.

India is the third largest energy consuming country in the world and has become one of the largest sources of energy demand growth globally. In its recent India Energy Outlook 2021 report published in February 2021, the IEA predicts that by 2040, India could add 900 GW of wind and solar capacity. Therefore, the growth prospects of the wind sector in India are promising with capacity additions of 17-20 GW expected over the next five years (i.e., between fiscal years 2023 to 2027) which would entail investments of approximately Rs.1.4 trillion over the period. As a result of this, the demand for O&M services is expected to be in the range of Rs.170 to 210 billion by fiscal year 2026 (Source: CRISIL Report). IWL's wind energy extraction technology and access to wind sites coupled with strong industry growth prospects enable Inox Green, through its exclusive arrangement with IWL, to provide O&M services for the WTGs they manufacture and to forecast a steady growth in its O&M business over the coming years.

Reliable cash flow supported by long-term O&M contracts with high credit quality counterparties: Inox Green enter into long-term O&M contracts with its customers which range from five to 20 years (in which the first two to three years of O&M services are generally provided for free for IWL supplied WTGs) with a renewal option provided in most cases. Such contracts provide it with full revenue visibility as the price for its O&M services is pre-determined for each year of the contract. Moreover, as O&M services are critical for the functioning of WTGs, there exists a low risk of non-payment from its customers who in any event are large IPPs, PSUs and corporates. As of June 30, 2022, Inox Green has not encountered any payment defaults from its customers. Its ability to maintain and renew its O&M contracts throughout the useful lifecycle of each WTG is further secured given its experience and expertise in servicing the

proprietary components which make up the WTGs manufactured by IWL as well as the common infrastructure facilities developed by IWL.

Supported and promoted by parent company, IWL: Inox Green's parent company, IWL, together with its group companies, is one of India's notable WTGs manufacturers which provides wind energy turnkey solutions across India. Its service offerings include wind resource assessment, wind site acquisition, infrastructure development, EPC and it has an installed capacity of approximately 2,792 MW as of June 30, 2022. Its parent also has exclusive licenses and agreements in place to manufacture WTGs in India using WTG technology developed by American Superconductor Corporation ("AMSC"), a NASDAQ listed company, and is backed by a management team with extensive experience in the renewable energy sector. It benefits from a synergistic relationship with its parent pursuant to an exclusivity agreement which enables it to provide O&M services to all customers who purchase WTGs from its parent company during the relevant warranty period as part of a "one-stop shop" / turnkey solution and who, after such period, often retain it to continue providing O&M services due to its expertise in operating and maintaining.

Furthermore, the Company's parent has an order book with notable customers. Its Promoter, IWL's order book currently consists of executed binding contracts and letters of intent which are non-binding and which therefore may not lead to execution of any form of binding contract. As of June 30, 2022, IWL had entered into binding contracts for the supply of 2 MW capacity WTGs with aggregate capacity of 964 MW. Further, IWL had also received letters of intent, which are non-binding and which therefore may not lead to execution of any form of binding contract, for its new 3.3 MW capacity WTGs with an aggregate capacity of 524.7 MW. Inox Green is a member of the Inox GFL Group, which principally operates in the speciality chemicals and renewable energy sectors and has historical connections with the wider Inox Group which commenced operations in 1923. The Inox GFL Group includes three publicly listed companies, namely Gujarat Fluorochemicals Limited ("GFL"), Inox Wind Energy Limited and IWL. The Inox GFL brand and generally, Inox, are recognized in India and that it's long operating history and business relationships instil confidence in its customers who prefer dependable and established service providers for capital intensive and long-term projects such as wind farms.

Established supply chain in place. Inox Green has an established relationship with its suppliers for the parts, components and tools it requires in its provision of O&M services. As part of its synergistic relationship with IWL, it is able to obtain proprietary components and spare parts for the IWL manufactured WTGs directly from IWL and as for the other tools and parts it employs, it has an established network of external suppliers.

Strong and experienced management team*:* As of June 30, 2022, Inox Green has a team of 401 employees which include managers who have extensive experience in the O&M of WTGs and in the wind industry generally. Its senior managers in charge of, among others, project management, business development, customer relationship management, project coordination, wind farm management, testing of turbines and process improvement are well educated in the fields of engineering, design and business management and has an average of more than 10 years of experience in their respective fields and considerable experience in the wind energy industry.

Business Strategy:

Exploring opportunities to expand portfolio and scale operations: In addition to growing portfolio through the entry of new long-term O&M contracts with customers who purchase IWL's WTGs, Inox green plans to expand its portfolio to also provide O&M services for WTGs which are not manufactured by IWL. It intends to do this by leveraging on both it and its parent company's existing customer base who use both IWL's WTGs as well as WTGs manufactured by other wind OEMs and adopting a targeted approach to win contracts for the provision of fleet-wide O&M services for all WTGs in their portfolio (manufactured by IWL or otherwise) on the basis of its competitive strengths and the cost savings which this entails.

Inox Green plans also include the recovery of contracts for the provision of WTG O&M services (which is part of its comprehensive O&M contracts and amounts to an aggregate of 1,964MW in wind power capacity) from a few large IPPs which had previously entered into comprehensive O&M contracts with it but has recently opted to internalise their WTG O&M services. It also intends to continue looking for opportunities to strategically acquire the O&M portfolios of other wind OEMs, especially smaller scale wind OEMs or third party and independent service providers which is currently unable to compete effectively, to further grow its portfolio base. In order to meet the demands of an expanded portfolio and increased scale of operations, Inox Green intends to hire and train more staff as well as add to its existing pool of experienced managers.

Transitioning to an asset-light model with minimal capital expenditure which will result in higher EBITDA and profit margins: Under current business model, Inox Green develops common infrastructure facilities such as pooling substations and transmission lines and has incurred significant capital expenditure in doing so. This was partly as a result of successful project bids which required it to develop such infrastructure prior to securing investors to establish wind farms on a plug-and-play basis. While most of the Company's common infrastructure capacity is currently utilized by such investors, there still exists some unutilized capacity for the installation of WTGs as of June 30, 2022, which it intends to fill. While such capital expenditure is expected to continue in the short-term as a result of ongoing

prior commitments, Inox Green intends to transition to an asset light model with minimal capital expenditure by, among others, reducing such project bids and investments into the wind power assets of its subsidiaries.

Continuing and enhancing focus on predictive maintenance over reactive maintenance: Inox Green focus its efforts on practicing predictive maintenance in order to avoid the negative impacts of reactive maintenance such as downtime stemming from the need to effect major service, repairs or overhaul which translates into lost power generation and revenue for its customers. Major components of WTGs such as nacelles, turbines, generators, hydraulics and various electronic systems require constant and diligent monitoring to ensure they operate as efficiently as possible in order to deliver a high yield of power generation for its customers. Ensuring high performance of the WTGs and common infrastructure facilities translates into higher revenues for the customers and a favourable impression of the Company which in turn increases the likelihood of its customers renewing its existing O&M contracts or entering into new O&M contracts. Using predictive maintenance, Inox Green is able to accurately forecast potential component failures before they occur based on both live and historical data and take steps to repair or replace such components. This enables it to reduce its operational costs by reducing the wear and tear of the equipment and components in the system.

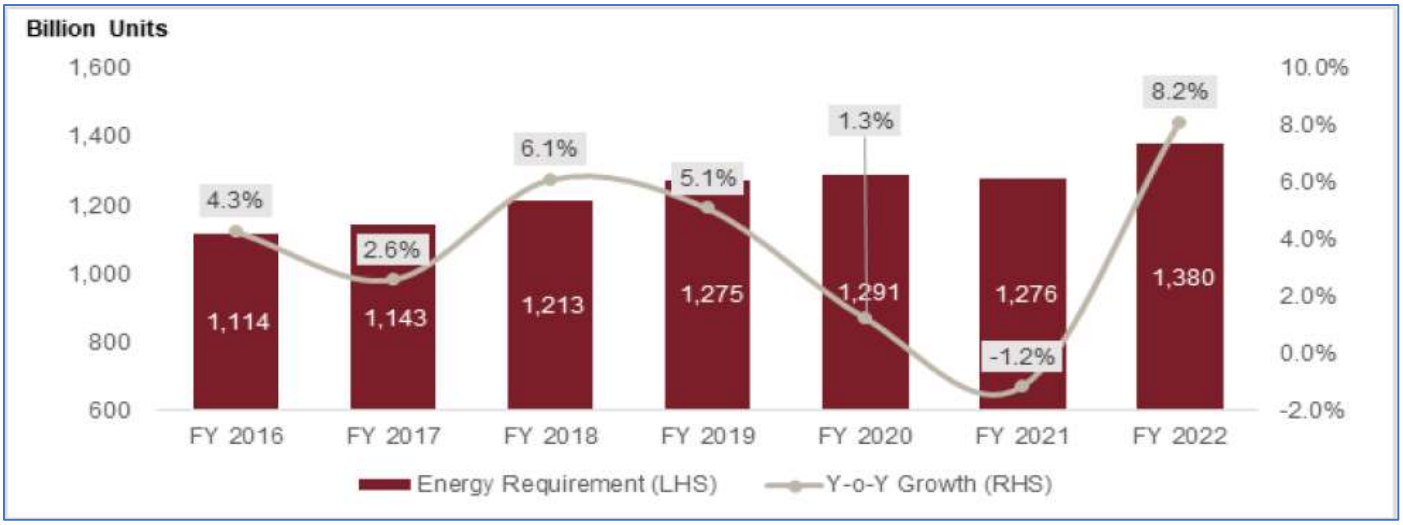
Provide analytics and asset performance forecast services: Inox Green is keen adopters of new technologies to assist it in the provision of its O&M services which ultimately helps clients in optimizing the use of their WTG assets. To this end, it employs the use of various software technologies such as AMSC's proprietary Supervisory Control and Data Acquisition system ("wtSCADA") to monitor 250 WTG parameters. With the data collected, the Company is able to provide its customers with up-to-date analytical data on the performance of their WTGs which can inform future performance of the assets.

Industry:

Demand and Supply Review of the Indian power sector

The total installed generation capacity at the end of July 2022 was 404 GW, of which approximately 97 GW of capacity was added from fiscals 2016 onwards. Coal and lignite-based installed power generation capacity has maintained its dominant position over the years and accounts for approximately 52% as of July 2022. However, renewable energy installations (including large hydroelectric projects) have reached approximately 161 GW capacity as on July 2022, compared with 25 GW as on March 2012 (Source: MNRE), constituting approximately 40% of total installed generation capacity as of date. In particular, this growth has been led by solar power, which grew at breakneck speed to approximately 58 GW from 0.9 GW over the same period. The Electricity Act, 2003 coupled with competitive bidding for power procurement, implemented in 2006, encouraged the participation of private players who had announced large capacity additions. Moreover, the strong government thrust on renewable energy coupled with reducing tariffs (with falling capital costs and improving efficiency) also supported renewable energy capacity additions. Tepid rise in demand growth coupled with rising supply led to a drop in power deficit.

Trend in energy requirement

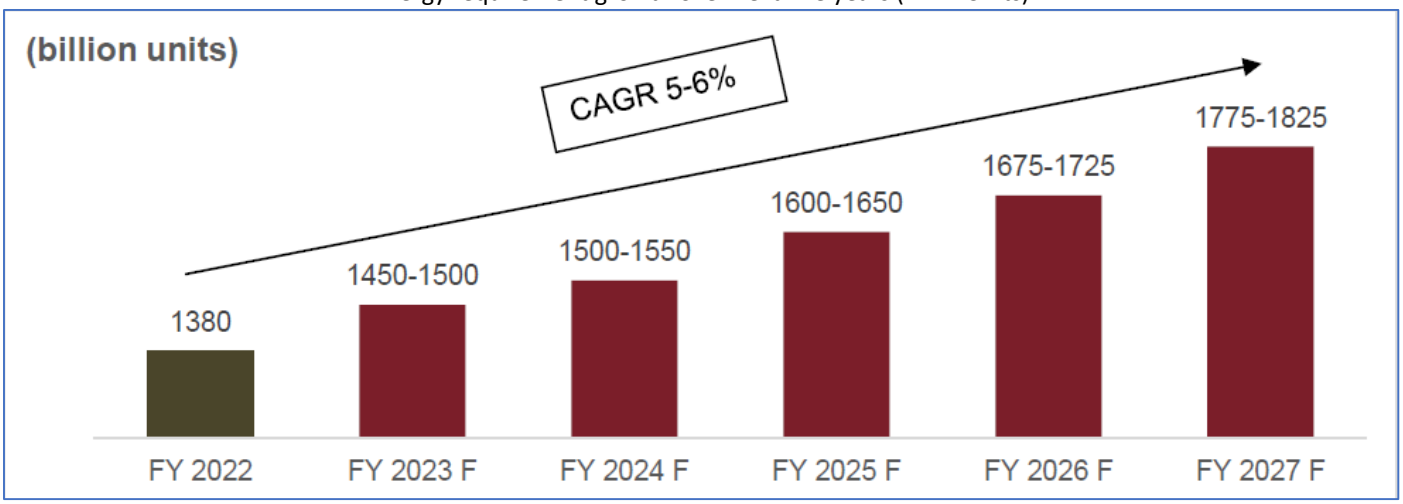


The growth stood at 4.3% during fiscal 2016 and 2.6% in fiscal 2017 owing to slowdown in manufacturing activity. It improved to 6.1% in fiscal 2018, mainly driven by rising electrical connections under the rural electrification and SAUBHAGYA schemes. Power demand growth was subdued at 1.3% on-year in fiscal 2020 owing to a slowing economy, with an extended monsoon till October 2019 further dampening demand. The extended monsoon resulted in lower cooling demand from domestic consumers as well as reducing irrigation demand from agricultural consumers. Demand recovered slightly in January-February 2020 with the onset of summer, but the pandemic downed the shutters on economic activity in March 2020, thereby pulling power demand growth into negative territory.

Power demand posted a decline of (1.0-2.0) % in fiscal 2021. Economic growth made a healthy comeback in fiscal 2022 coupled with a low base effect as well as Government spending on infrastructure. Consequently, power demand returned to positive territory during fiscal 2022, growing at 8.2%. Power demand surged in Q1 of fiscal 2023 due to severe heat wave and continued momentum in economic activity, thus registering a 18.6% on-year growth in the quarter. Subsequently, demand is expected to gradually pick up on the back of healthy recovery in economic growth, expansion in reach via strengthening of T&D infrastructure, and improved power quality, thereby registering a 5.0-6.0% CAGR over fiscals 2023 to 2027.

Demand and Supply Outlook

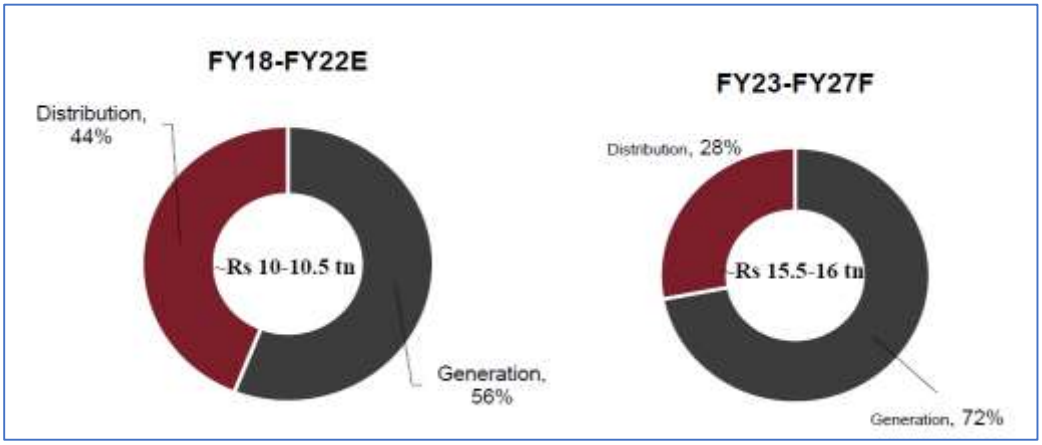
Energy requirement growth over next five years (in Bn Units)



CRISIL Research expects energy requirement to grow at 5-6% CAGR over fiscals 2022 to 2027, due to healthy economic growth and expansion of the power footprint. Power demand which was expected to bounce back in Q1 of fiscal 2022, was impacted by the second wave of COVID-19 infections which resulted in partial lockdowns in major states over April-May 2021. Infection rates began subsiding in June-July 2021 due to which industrial and economic activities went back to normal in various regions of the country. Later, a less severe third wave was caused by the Omicron variant, which translated to a power demand growth of 3.8% on-year in Q4 of fiscal 2022. Overall power demand during fiscal 2022 grew at 8.2%. Q1 of fiscal 2023 saw a surge in power demand resulting from the severe heat wave in the country. This along with the continued momentum in economic activity resulted in an on-year power demand growth of 18.6% in Q1 of fiscal 2023, despite high base of Q1 of fiscal 2022. Going forward, demand is to be driven by industries due to improving utilisation levels and kick-start of the capex cycle in key sectors owing to buoyant customer sentiment. Commercial power demand is also projected to improve as offices and educational institutes resume operations, albeit in a hybrid scenario. Therefore, power demand growth is estimated to rise 6-6.5% on-year in fiscal 2023, over a high base.

Investments in power sector

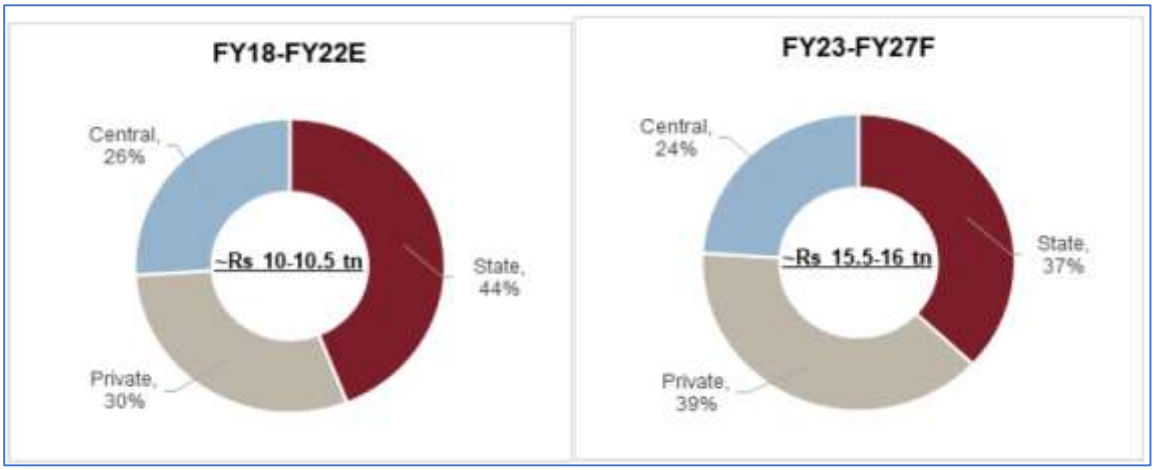
Share of investments across power sector value chain



Investments for the generation sector are estimated to increase from approximately 56% to approximately 72%, majorly due to renewable energy capacity additions, and conventional capacity additions led by coal accounting for 70-75% of conventional capacities. Investments for the distribution sector are expected to increase due to reforms and RDSS (Revamped Distribution Sector Scheme)

envisaged from fiscals 2023 to 2027. CRISIL Research projects investments of Rs.15.5-16 trillion over the next five years. Share of investments in generation are expected to increase, resulting in a fall of share for the distribution segment over the next five fiscals.

Sector-wise break-up of total investments



The share of private sector in overall power sector investments during fiscals 2023 to 2027 is expected to increase to 39% as against 30% over the past five years. This can be attributed to large renewable capacity additions, which are majorly financed by private investors. The share of central sector would decrease marginally to 24% over fiscals 2023 to 2027, as compared to 26% over the previous five years. Despite there being a growth in investment in absolute terms, share of central investments will decline due to doubling of private investments and increase in state investments due to RDSS. State sector's share will account of more than 35% of power investments, led by RDSS, along with moderate investments in the generation segment.

Wind power market

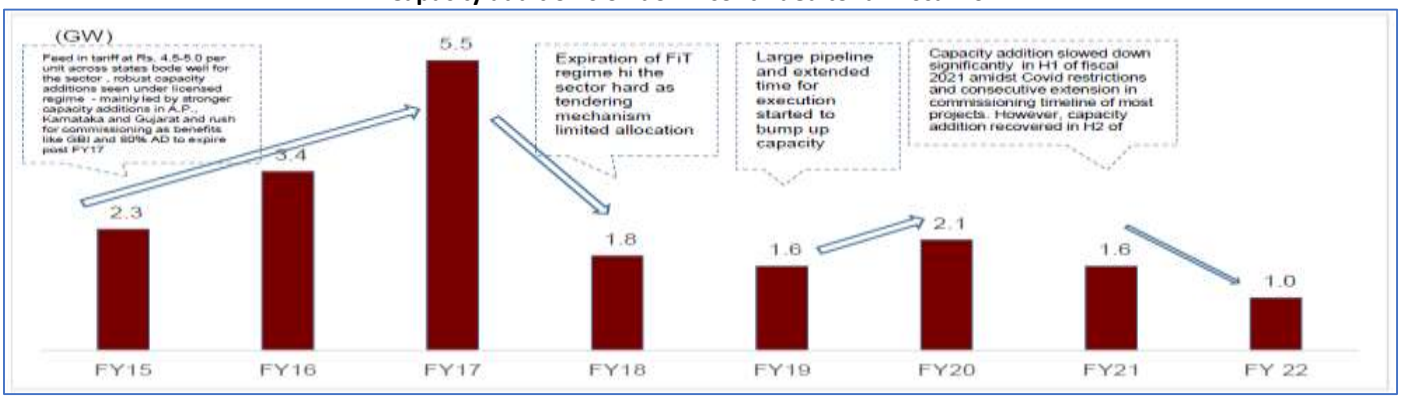
Rise of Wind Energy Power in India (Government support and other key factors)

Reverse e-auction: In February 2017, the Government had conducted the first reverse e-auction for wind power, which led to tariffs falling to Rs.3.46 per unit. This was in fact 17.0% lower than the lowest wind feed-in tariff ("**FiT**") of Rs.4.16 per unit in the state of Tamil Nadu. With such sharp drop in tariffs, several State Discoms like Gujarat, Andhra Pradesh, Rajasthan and Karnataka expressed their unwillingness to buy power under the FiT regime even for approved and under-construction projects as PPAs were not signed.

Accelerated Depreciation: The Government has halved the accelerated depreciation benefit (40.0% from project commissioning post-March 2017). This, coupled with competitive bidding, reduces the prospects of higher returns for accelerated depreciation-based players, which has led to a shift in investment focus to other avenues.

Review of overall grid connected wind energy capacity additions (2016-22) Second wave of COVID-19 led restrictions delayed capacity addition in fiscal 2022 As per CRISIL Research, pandemic led constraints on construction related activities impacted capacity addition in fiscal 2022. While India added approximately 1 GW of wind energy capacity during fiscal 2022, capacity additions nevertheless declined in fiscal 2022 owing to surge in commodity prices, supply chain disruptions, and challenges in acquiring locations in windy regions, leading to issues of project viability. Additions were weak when also compared with historical long-term trends.

Capacity addition slowdown continued to fall fiscal 2022



In fiscal 2021, approximately 1,553 MW was added, lower than the approximately 2,068 MW added during fiscal 2020. This comes on the back of a pickup in additions in fiscal 2020 from subdued fiscals 2019 and 2018, post the FiT regime change. Capacity additions had picked up by 31.0% y-o-y in fiscal 2020 compared to the 1,580 MW and 1,766 MW added in fiscals 2019 and 2018, respectively.

This increase in fiscal 2020 was largely attributed to the commissioning of delayed projects under SECI Tranche I, II and III as well as state auctions of Tamil Nadu, Maharashtra and Gujarat.

However, the sector continues to face severe delays, grappling with several execution challenges on the ground. Post 2017, SECI has allocated approximately 121 GW of inter-state transmission system (ISTS) connected wind capacities of which approximately 6.5 GW (31%) has been commissioned and approximately 3 GW cancelled. With commissioning timelines of 18-24 months, capacities are now lined up for commissioning from fiscal 2023 onwards. Fiscal 2023 faces new challenges such as locating land in windy areas, monsoon-related disruptions, surge in prices for cement (4% on-year) and steel (21% on-year). However, momentum is expected to pick up in the second half of fiscal 2023 when commodity prices are expected to stabilize.

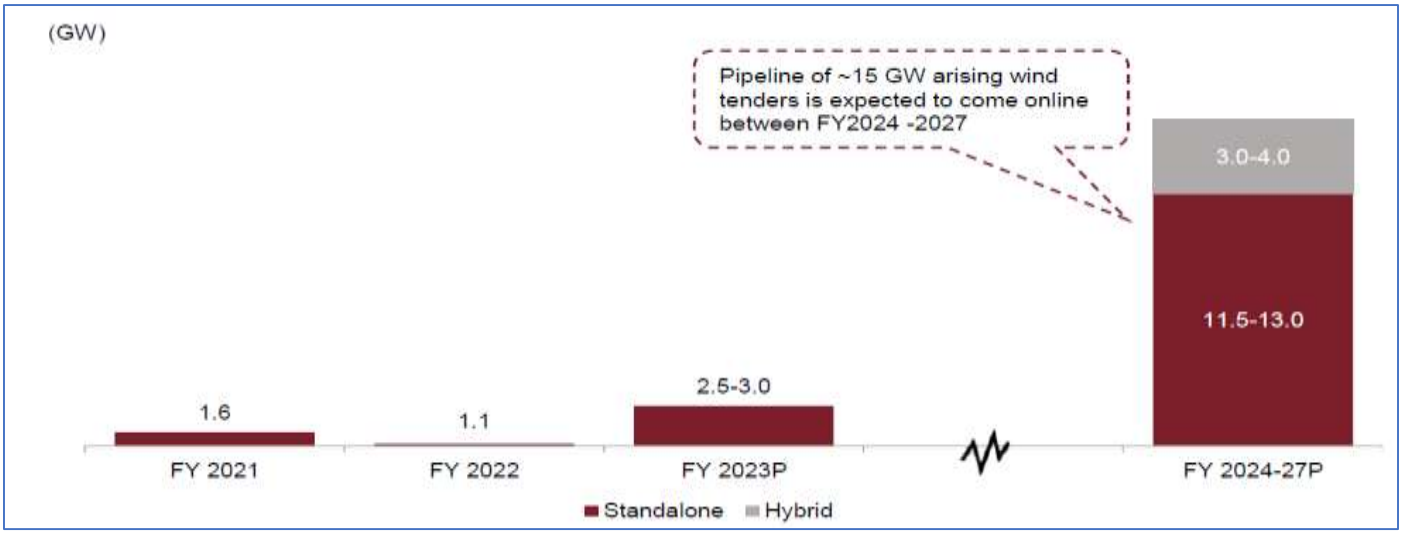
OEM-wise market shares for wind capacity addition (till fiscal 2022)

According to the Directory Indian Wind Power 2022, Suzlon had the maximum number of turbines supplied accounting for 9,169 turbines followed by Siemens Gamesa, Vestas Wind and Inox Wind. Out of the total 36,538 turbines in fiscal 2022, 17,290 turbines were supplied by players that are currently inactive. These turbines pose an opportunity for the O&M service providers as the players in the current market especially the OEMs, which hold the largest share of the O&M services in Indian market. The typical O&M contract period is 2+8 or 2+10 or 2+12 years with initial two years of free service with the purchase of equipment. Therefore, most of the turbines supplied by the now inactive players will require renewal of such contracts or newer contracts. The O&M contracts are structured mostly for 2+8 or 2+10 years to incorporate the price escalation of the services over the years. Post the tenor the contracts are then renewed for another 8 to 15 years. If the contracts are done for more than 15 years, there are clauses to renegotiate the service cost in between the term.

Outlook of wind energy capacity additions in India (fiscal 2023 –2027)

Capacity addition to witness moderate growth over the next five years CRISIL Research expects capacity additions to grow, albeit at a slow pace over the next 5 years mostly driven by the allotment of central transmission utility connected capacities. However, the previous change in the bidding mechanism has caused the entire industry to slow down due to a significant fall in tariffs, where both bid response and profitability for OEMs has dropped. Extended project timelines alongside non-availability of grid and land related challenges would be impacting installations.

Wind capacity addition outlook



CRISIL Research expects capacity additions of 17-20 GW over the next five years (fiscals 2023-2027) entailing investments of approximately Rs.1.4 trillion over the period. Lower interest rate remains a key driver for capacity additions in the near term. Approximately 19 GW in the pipeline is expected to be commissioned by fiscal 2027 factoring in delay due to cost escalation, evacuation infrastructure, etc. Owing to a 60 GW target by 2022 and a healthy pipeline build-up for the same, fiscal 2023 could witness approximately twice the capacity additions, as compared to fiscal 2022. Additionally, the removal of tariff ceiling has removed the execution hurdles, resulting in faster commissioning of pipeline projects.

Capacity additions over the long term will be driven by increased hybrid tenders coupled with storage, Central Government (SECI) allocations under relatively stronger off takers like SECI and PTC India Ltd. (formerly Power Trading Corporation of India Limited) (PTC), which also reduces risk as compared to direct exposure to State Discoms. State auctioning, on the other hand, has slowed as several have instead signed power sale agreements with PTC and SECI for procurement of wind power to help fulfil their non-RPO targets.

Mounting challenges have led to a slowdown in additions for wind

Additions have been slow since fiscal 2018 where authorities took time to release competitive bidding guidelines and establish a mechanism. Thereafter, auctions gradually took place with only four state auctions so far i.e. by Gujarat (awarded 500 MW wind in Q3 of fiscal 2018), Tamil Nadu (500 MW in August 2017), Maharashtra (500 MW in Q4 of fiscal 2018) and Gujarat (1,000 MW but only 203 MW allocated in Q1 of fiscal 2020). A shift to a competitive bidding mechanism in the wind energy sector has caused a slowdown in capacity additions as participants are yet to adjust. Tariffs had fallen from a range of Rs.4.0-4.5 per unit, under the FiT regime to Rs.2.4-2.6 per unit range under competitive bidding mechanism, later correcting to the Rs.2.8-3.0 per unit mark (low returns even at this tariff). Such low realizations remain unviable for the entire value chain at current capital costs of Rs.7.0-7.2 crores per MW.

Existing pipeline continues to face bottlenecks

Capacity additions remained weak with approximately 1,100 MW installations witnessed during fiscal 2022 owing to the second wave of the pandemic. Fiscal 2021 had also witnessed a reversal of the slowdown in capacity additions seen over fiscals 2018 and 2019, with approximately 1.5 GW of additions in the year.

There remain almost 10 tranches of SECI led wind only allocations which have been auctioned but are currently under construction. Most of the capacities were expected to come online over fiscals 2021-2022. However, they continue to face bottlenecks in the form of delay in receiving regulatory approvals, delays in grid evacuation, land acquisition, transmission LTA, etc.

As a result, only approximately 1.1 GW was added in fiscal 2022 considering the lockdown in most parts of the country during Q1 of fiscal 2022. Moreover, MNRE has announced a two and half month extension for projects which have scheduled commissioning date on a case-to-case basis due to monsoon and supply chain disruptions. However, with approximately 69% of capacity in pipeline, capacity additions are expected to bounce back in fiscal 2023.

Key technological advancements/innovation and trends in O&M services

Predictive maintenance versus reactive maintenance

Major components such as nacelles, turbines, generators, hydraulics, and electronics require constant monitoring to ensure smooth operability. Traditionally, reactive maintenance was carried out when the equipment had shown severe operational faults or complete failure or during scheduled maintenances. The failure or reactive maintenance resulted in longer shutdowns and low availability of the generators.

On the contrary, predictive maintenance accurately forecasts the component failures before they occur based on historical data. This is a critical service in wind generation as it addresses the issues associated with reactive maintenance as described above. Furthermore, the proactive maintenance reduces the operational cost by reducing the wear and tear of the equipment in the system. As a result of implementation of predictive maintenance techniques replacements and major repairs in the wind energy have declined considerably over the past years. Therefore, more and more developers are going for predictive maintenance as compared to reactive and scheduled maintenance.

The disadvantage of solely relying on historical data is that some of the assets will be flagged for maintenance despite being functionally sound and performing well. This drives the maintenance cost of the assets in good operational conditions. Hence it needs another layer of technological intervention that segregates, analyses and prioritize the activities. Thus, minimize the unwanted spends on maintenance of assets that are in healthy condition. Artificial intelligence ("**AI**") and Internet of Things enablement can solve this purpose and lead to cost savings especially in the case of power plants having assets spread across large areas. For instance, in large solar parks predictive maintenance using AI can lead to significant saving of inspection and maintenance planning of the assets. Moreover, it also aids capacity planning and addition over the years. In case of distribution networks, precision mapping of the assets leads to proper identification and location of the assets in the network for maintenance and addition of the consumers.

Condition monitoring

A key element of the predictive maintenance suite, condition monitoring is used to monitor the health of the turbine and related electrical systems. Its purpose is to predict maintenance issues so site operators can conduct repairs and replacements only when needed to avoid unnecessary and costly up-tower jobs. Although the intent is to cut time and cost from O&M tasks, condition monitoring systems have become rather detailed in accumulating and analyzing data and hence can become expensive. The system can

supply the failure rate of the turbine and related equipment for up to 20 years along with simulations to predict the future failures thereby reducing the costs considerably by avoiding major replacements.

Impact of technology implementation on O&M services

Technology driven solutions are constantly evolving and are being deployed across the sector. For instance the implementation of AI-based predictive analytics solutions can help analyze real-time operational data at scale, identify any underperformance, and recognize failures using machine learning. The most advanced implementation of technology across wind energy includes digital twin. Digital twin is a virtual representation of the actual asset for remote interaction by the trained professional. Digital twin minimizes the need of human team diagnosing the faults, instead engineers can analyze and identify problems remotely. Thus saving the efforts of personnel to specific instances. Applications such as demand response management, hybrid energy storage systems, vehicle-to-grid, virtual power plant, etc. are being tested across the clean energy sector involving implementation of new technologies. Machine learning ("**ML**") and AI can also be applied to recognize patterns, predict faults and highlight important variables that could otherwise be missed.

Review of O&M services market for wind energy in India (fiscals 2016-2022)

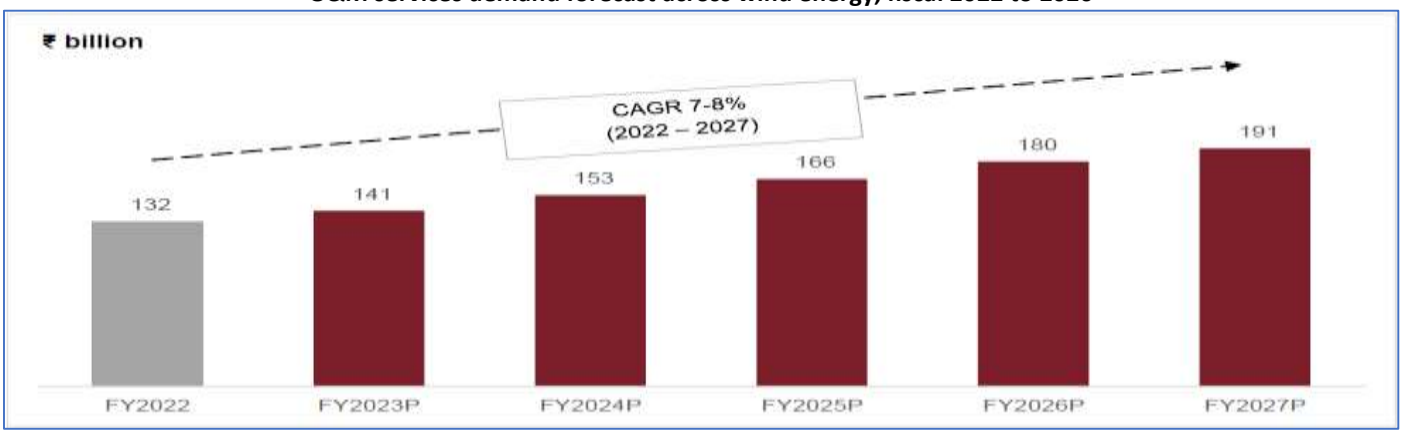
O&M services for wind energy is dominated by the equipment manufacturers in the country. A typical wind turbine O&M cost ranges from Rs. 2,500-3,500/kW of capacity. The type of services offered as a part of O&M contracts include:

- Supply of equipment
- Large equipment supply
- Sundry or small equipment supply
- Consumables
- Repair services
- Regular repair and maintenance
- Major repair or overhaul
- Equipment replacement

The wind energy market grew at a healthy rate with capacity additions picking up pace in fiscal 2020 after a low in 2019 on account of the FiT regime change. This has also positively impacted the demand of O&M services which grew from Rs.84 billion in 2016 to more than Rs.130 billion in 2022. Capacity additions declined in fiscal 2021 due to COVID-19 pandemic led lockdowns and mobility restrictions. However, this might have positively impacted the remote monitoring capabilities and technological implementation across the wind energy sector.

Outlook on potential of O&M services market for wind energy in India (Fiscals 2022-2026)

O&M services demand forecast across wind energy, fiscal 2022 to 2026



CRISIL Research expects the wind capacity addition to be in the range of 17-20 GW during the forecast period thereby taking the total installed capacity over 50 GW. The growth is likely to be on account of hybrid capacity allocation along with an existing pipeline of 10-11 GW for pureplay wind. As a result of this, the demand for O&M services is expected to be in the range of Rs.170-210 billion by fiscal 2026.

Opportunities for wind energy O&M service providers

Wind-solar hybrid segment

New opportunities have emerged in the wind sector in India with SECI coming up with newer kinds of project tenders in the form of hybrid, round-the-clock, and peak power supply projects. Although the exact split of wind vs solar for hybrid projects is based on developer choice and technical design, they tend to have a higher share of solar energy due to lower capital costs and ease of

installation. In order to be considered a hybrid project, at least 33.0% of the project must consist of and use a secondary technology. As such and in order to maintain the cost effectiveness of the project, 33.0% of the rated power capacity of hybrid projects typically consists of wind energy. Similarly, RTC and peak power supply projects also generate substantial demand for wind capacity addition as developers require a good mix of sources (solar, wind and/or energy storage) to get maximum possible efficiency.

So far SECI has auctioned 3,600 MW hybrid tenders, under ISTS Tranches I, II, and III of which approximately 2,800 MW were allocated. Similarly, 1,200 MW peak power supply and 400 MW of RTC tender has been allocated with 2,500 MW RTC tender in the pipeline. As per industry interaction, these new tenders combined are expected to add 1-1.5 GW wind capacity. Thus, offering new areas for O&M service providers to utilize their existing capabilities for maintaining larger and hybrid capacity.

Aging capacity

Wind turbines are expected to lose 1.0-1.5% of their output per year thereby requiring consistence optimization, service and upgrades. In India, Tamil Nadu has the oldest wind energy capacity which requires the repowering of turbines. Repowering refers to replacement of a high number of old and smaller turbines with newer high capacity and larger turbines. This increases the efficiency of the system and further reduces the generation losses.

The aged fleet also boosts the need for condition-based monitoring pre and post repowering. There is already a policy in place for the repowering of turbines by the Ministry of New and Renewable Energy. Moreover, compared to a new project, repowering would cost less, since existing land and infrastructure are being used. It also reduces the risks associated with worn out assets. Thus, aged assets and repowering poses a great opportunity for O&M service providers.

Until fiscal 2002, wind generation accounted for 1,666.8 MW of installed capacity, with Tamil Nadu having more than 50.0% of this capacity. This capacity had an average service life of 15 years and sizes well below 1 MW. These turbines, if replaced with modern day turbines, could easily derive 30.0% or more CUF from the current 10.0-14.0% CUF. Furthermore, the capacity additions post 2002 involved low-capacity turbines below 1 MW which are or can become eligible for repowering thereby increasing the overall opportunity of repowering of turbines. States like Gujarat, Andhra, Karnataka, and Tamil Nadu have come up (or are under advisement) with policies for the repowering of wind turbines. However, repowering policies do not address key concerns such as model, mandatory repowering and incentivization. Therefore, the repowering scheme has seen low traction/activity till date. Moreover, the capacity or turbines supplied by the inactive OEM players accounted for more than 9 GW or 14,633 turbines. These accounted for 41.0% of the cumulative capacity by the end of fiscal 2021 thereby posing an opportunity for the O&M service providers in the country.

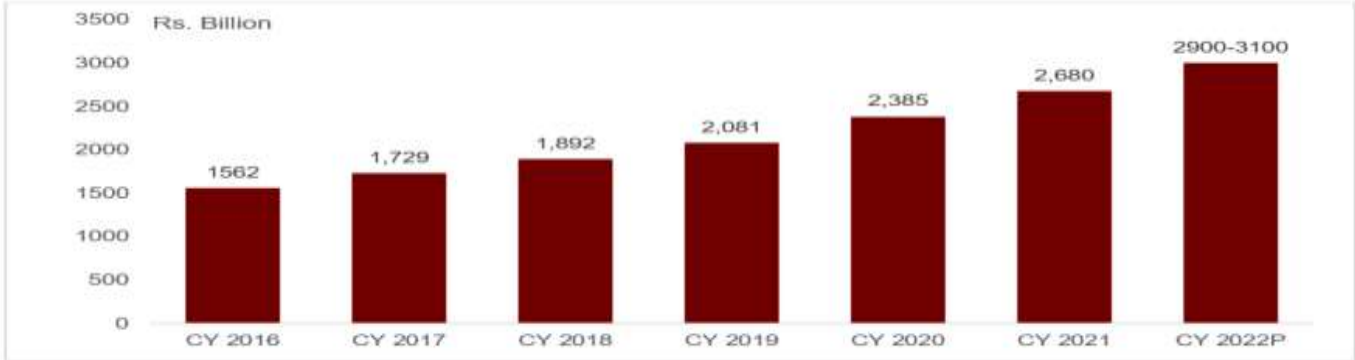
Solar segment

Wind O&M service providers utilize various techniques for continuous monitoring of the assets. These techniques or technologies can be implemented on other renewable generation assets such as solar or battery systems. In the case of hybrid or RTC systems the monitoring, diagnostics, etc. such services can be employed. While the services relating to hydraulics or mechanical parts can be implemented if required. Furthermore, technological driven basic solutions for forecasting and scheduling involving the implementation of AI and ML are common to various sources of generation in the renewable energy space. Hence, wind O&M service providers can enter the solar segment with the help of hybrid capacities and further develop a specific service suite for it. Along with this, large OEMs offering O&M services for wind can utilize their presence and supply chains to target solar capacities as well.

Global demand for O&M service for renewable energy

Wind energy generation is likely to reach 938 GW of the installed capacity by 2022 globally. Wind generation O&M service demand is likely to follow the same trend to reach Rs.2,900-3,100 billion by 2022. Compared to solar photovoltaics (PV), the maintenance cost of the wind generators is higher due to continuous wear and tear of the movable parts resulting in higher replacement of equipment.

Wind O&M service demand, 2016-2022



Source: Global Wind Energy Council, National Renewable Energy Laboratory, CRISIL Research

Key players and business model adopted: Global vs India

Global O&M service market for RE consists of ISPs offering similar services as OEMs. Easy availability of spare and availability of trained professional has resulted in increasing the ISPs contribution in the service market. Furthermore, OEMs operating the global market offer package deals along with the equipment acquisition. These package offerings include discounted upgrades for equipment covered under the scheme, warranty for the system, and easy availability of replacements.

ISPs usually perform affiliated services and third-party services. Affiliated services are performed with authorization from the OEMs resulting in the leveraging of supply channels and customers of the OEMs, while third party services are performed on assets regardless of OEM. Affiliated services are performed pre and post warranty period; third party services are usually availed after warranty period. On the contrary, in India, OEMs dominate the O&M service market due to lack of the abovementioned factors and limited number of ISPs present in the market. Moreover, due to the control over the infrastructure, OEMs have an upper hand in the market and are likely to remain in the same position for the coming years.

Key Concerns

- Inox Green is currently entirely dependent on Inox Wind Limited, it's Promoter for its business and if they were to choose another service provider for operation and maintenance services of their wind turbine generators, its business, financial condition and prospects may be adversely affected.
- Inox Green has entered into a business transfer agreement by which it divested its erection, procurement and commissioning business to one of the subsidiaries of its Promoter, Resco Global Wind Services Private Limited ("BTA"), which imposes certain contractual obligations on the Company.
- Inox Green along with certain entities have provided security in form of pari-passu charge on its movable fixed assets, guarantees and a shortfall undertaking against the term loan facilities availed by Resco Global Wind Services Private Limited ("Resco"), and failure by Resco to repay such loan facilities, could have an adverse effect on the business, results of operation and financial condition.
- The sale of services may decrease in the future.
- The renewal rate of service contracts may decrease in the future and customers may move from comprehensive O&M contracts to common infrastructure O&M contracts.
- Orders in Promoter, Inox Wind Limited's order book may be delayed, modified or cancelled, and letters of intent may be withdrawn or may not translate to confirmed orders.
- There are outstanding legal proceedings involving Inox Green Subsidiaries, Directors, Promoter and its Group Companies.
- Adverse change in credit ratings assigned to Inox Green may affect its ability to raise funds for future capital requirements.
- The demand for wind power projects and consequently its services is dependent on the cost of wind generated electricity compared to electricity generated from other sources.
- The Company has availed an unsecured inter corporate loan from its Promoter, which may be recalled on demand.
- Inox Green has entered into related party transactions under which it is required to pay rent, interest and royalty to the concerned related party. It may continue to enter into such related party transactions in the future.
- An action by regulatory or statutory authorities against Promoter or Group Companies in relation to their wind power projects or pooling sub-stations could have an adverse impact on operation and maintenance ("O&M") services provided by the Company for the relevant wind power project and in turn on its business, revenue from operations and financial condition.
- The coronavirus pandemic ("COVID-19") could have a significant adverse effect on the business and operations.
- Technology failures or advancements could disrupt the operations.
- The demand for services is primarily dependent on the demand for electricity.
- Inox Green is dependent on external suppliers for spares and components.

- The Company may be liable for penalties and other liabilities under its operation and maintenance contracts in case of any deficiencies in the services provided by it.
- It is subject to the risk of additional costs because of an increase in the prices of spares and components.
- Inox Green has incurred significant indebtedness and may be unable to service its debt obligations in a timely manner or comply with various financial and other covenants and other terms and conditions of its financing agreements.
- Rely heavily on the 'Inox GFL' brand name for business, the dilution of which could adversely affect the business.
- Inox Green may be unable to effectively manage its future growth and expansion.
- The operation of wind energy projects has faced opposition from local communities and other parties in the past and there can be no assurance that its operations will not encounter similar opposition in the future.
- The wind energy industry is highly competitive, which could limit ability to grow.
- Promoter holds Equity Shares in the Company and is therefore interested in the Company's performance in addition to reimbursement of expenses incurred or benefits and its distributions as a shareholder.
- Depend on the skills and experience of senior management team, Key Managerial Personnel and employees with technical expertise for its business and future growth.
- Any failure or delay in the transportation and logistics arrangements entered into by Inox Green could have a material adverse effect on its business and operations.
- The viability and level of wind energy generation is dependent on wind patterns, which are not constant and vary over time and may be subject to increasing extreme weather conditions due to climate change.
- Disruptions affecting Inox Green operations could have a material adverse effect on its business.
- Operations could be adversely affected by strikes, work stoppages or increased wage demands by employees or any other kind of disputes with its employees.
- Inox Green may be unable to protect its intellectual property or knowhow from third party infringement and it may inadvertently infringe the intellectual property rights of others.
- There are certain defaults/ delay in payment of statutory dues by it. Any further default/ delay in payment of statutory dues may attract financial penalties from the respective government authorities and in turn may have a material adverse impact on financial condition and cash flows.
- A change in, or elimination of, government initiatives and incentives relating to renewable energy sources, and in particular to wind energy, may have a material adverse effect on the demand for wind energy thereby affecting the business.
- Inox Green may be unable to obtain, maintain or renew requisite statutory and regulatory permits and approvals for its business operations.
- Compliance with and changes in safety, health, employment and environmental laws and regulations may adversely affect the operations.
- Business is substantially affected by prevailing economic, political and other prevailing conditions in emerging markets.
- Financial instability in other countries may cause increased volatility in Indian financial markets.
- If inflation rises in India, increased costs may result in a decline in profits.

Profit & Loss

Particulars (Rs in million)	Q1FY23	FY22	FY21	FY20
Revenue from operations				
Revenue from operations	617.9	1721.7	1722.5	1653.2
Other Income	13.8	180.7	140.4	68.5
Total Income	**631.6**	**1902.3**	**1862.9**	**1721.6**
Total Expenditure	**442.3**	**899.7**	**900.3**	**770.5**
O&M and Common infrastructure facility expense	182.0	483.0	539.0	560.5
Purchases of stock-in-trade	159.3	222.0	0.0	0.0
Changes in inventories	0.0	-77.7	0.0	0.0
Employee Benefits Expenses	59.3	216.6	188.0	182.3
Other expenses	41.8	55.8	173.3	27.7
PBIDT	**189.3**	**1002.6**	**962.6**	**951.1**
Interest	179.9	548.0	605.3	529.8
PBDT	**9.4**	**454.6**	**357.3**	**421.3**
Depreciation and amortization	165.2	501.7	490.8	396.1
PBT	**-155.9**	**-47.1**	**-133.5**	**25.3**
Share of restated profit / (loss) of associates / joint ventures	0.0	0.0	-189.9	2.4
Tax (incl. DT & FBT)	**-40.0**	**2.5**	**-46.1**	**10.9**
Deferred tax	-40.0	2.5	-46.1	10.9
PAT	**-115.8**	**-49.5**	**-277.3**	**16.8**
EPS (Rs.)	-0.5	0.3	-2.3	0.2
Face Value	10	10	10	10
OPM (%)	28.4	47.7	47.7	53.4
PATM (%)	-18.7	-2.9	-16.1	1.0

Balance Sheet

Particulars (Rs in million) As at	Q1FY23	FY22	FY21	FY20
Non-current assets				
Property, plant and equipment	9,939.9	9,529.8	7,645.0	7,722.3
Capital work-in-progress	1,055.0	1,328.3	2,510.0	262.7
Intangible assets	0.1	0.1	0.2	36.9
Financial assets				
Investments	0.0	325.1	325.1	695.5
Other non-current financial assets	4,947.4	5,095.8	4,734.1	4,106.3
Deferred tax assets (net)	1,284.6	1,246.1	989.4	602.1
Income-tax assets (net)	181.1	164.1	134.5	278.5
Other non-current assets	81.6	86.0	148.3	330.3
Total non-current assets	**17,489.7**	**17,775.3**	**16,486.5**	**14,034.5**
Current assets				
Inventories	210.4	213.8	3,549.8	3,594.8
Financial assets				
Other investments	0.0	0.0	0.0	28.6
Trade receivables	585.9	680.5	2,232.0	2,498.6
Cash and cash equivalents	92.3	447.2	1,202.3	33.2
Bank balances other than above	462.4	656.5	92.8	145.7
Loans	355.2	311.5	87.9	78.9
Other current financial assets	493.2	222.2	403.2	422.7
Assets classified as held for sale	325.1	0.0	0.0	0.0
Other current assets	1,263.3	899.6	2,873.5	2,561.7
Total current assets	**3,787.7**	**3,431.2**	**10,441.4**	**9,364.1**
Total assets	**21,277.4**	**21,206.5**	**26,928.0**	**23,398.6**
EQUITY & LIABILITIES				
Equity				
Equity share capital	2,350.2	2,350.2	1,286.2	1,162.1
Equity component of compound financial instrument	0.0	0.0	329.0	329.0
Other equity	5,599.8	5,716.2	-1,185.6	-525.0
Non-controlling interest	0.0	0.0	0.0	-0.7
Total equity	**7,950.0**	**8,066.3**	**429.6**	**965.4**
Liabilities				
Non-current Liabilities				

Financial Liabilities				
Borrowings	2,976.3	3,194.5	3,491.9	3,024.3
Other financial liabilities	0.0	0.0	48.0	117.6
Provisions	20.3	21.9	20.1	19.1
Other non-current liabilities	2,365.4	2,385.6	584.2	460.9
Total non-current liabilities	**5,362.0**	**5,602.1**	**4,144.2**	**3,621.9**
Current liabilities				
Financial liabilities				
Borrowings	6,122.8	5,847.2	10,618.4	7,824.9
Trade payables				
total outstanding dues of micro enterprises and small enterprises	0.0	0.0	6.7	6.2
total outstanding dues of creditors other than micro enterprises and small enterprises	945.1	802.6	5,185.8	4,102.8
Other financial liabilities	218.7	182.8	3,000.1	3,646.9
Provisions	0.9	0.9	4.7	4.1
Other Current Liabilities	677.8	704.6	3,538.5	3,225.2
Current tax liabilities	0.0	0.0	0.0	1.1
Total current liabilities	**7,965.5**	**7,538.1**	**22,354.2**	**18,811.3**
Total liabilities	**13,327.5**	**13,140.1**	**26,498.3**	**22,433.2**
Total equity and liabilities	**21,277.4**	**21,206.5**	**26,928.0**	**23,398.6**

Source: RHP