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Energetica India talks to Mr. Kailash Tarachandani, CEO, Inox Wind Limited on India's wind energy sector, investment returns in wind farms and learns more about Inox's 2MW DFIG 100 rotor dia Wind Turbine Generators.

**ENERGETICA INDIA: What kind of financial returns can an investor expect from wind farms in India; in current times?**

MR. KAILASH TARACHANDANI: The Government of India is targeting an installed wind generating capacity of 60,000 MW by 2022 from the current capacity of 23,000 MW. To meet its targets, the government has introduced several fiscal and regulatory incentives like reintroduction of Accelerated Depreciation benefits and reintroduction of Generation Based Incentives. As per Reserve Bank of India's notification released in April 2015, bank loans up to Rs.150 mn per borrower for installation of wind mills will be classified under Priority Sector Lending. The state governments are also providing incentives like attractive Preferential Tariffs for wind power over and above the central government's sops to attract investments in wind energy. Several states like Rajasthan, Madhya Pradesh, Gujarat, Andhra Pradesh, Telangana, Maharashtra and Karnataka have provided preferential tariff over and above MNRE's GBI of Rs. 0.5 per kilowatt-hour to attract investments. The regulatory impetus that the government is providing has improved the viability of investments in the wind sector leading to strong demand from all categories of investors. With improved technology, WTGs that offer higher energy yields, incentives and attractive tariffs, investors can expect Internal Rate of Returns (IRRs) in excess of 20% from wind farms.

**ENERGETICA INDIA: How important is wind forecasting for wind farms in India?**



**Mr. Kailash Tarachandani**  
CEO, Inox Wind Limited

**What are the challenges being faced by wind developers to work along with the policy of wind forecasting and how is Inox able to help here?**

MR. KAILASH TARACHANDANI: Wind is generally intermittent and variable with the season, type of terrain, time of day and height above the ground. Therefore, wind resource evaluation and accurate forecasting of wind power density is a critical element in planning and operations of wind farms and projecting wind turbine performance at a given site especially in low wind resource locations such as those in India. Inaccurate data can affect project viability and stability of the grid. Inox Wind has carried out meso-scale mapping pan India to identify potential sites suitable for wind farms. The company has installed wind masts across windy states in India for

continuous wind data monitoring. Based on detailed wind resource assessment, a significant land bank has been acquired by the company. Besides in-house wind resource assessment, generation estimates and wind data analysis are also duly verified by world renowned wind assessment consultants. Inox Wind provides turnkey solutions for wind farm projects. These services include wind resource assessment, site acquisition, infrastructure development, erection and commissioning, and also long term operations and maintenance of wind power projects. The company acquires land after detailed wind resource assessment of sites. Inox Wind is amongst the largest land bank owners in Gujarat, Rajasthan, and Madhya Pradesh. The company has sufficient land bank as of June 2015 for the installation of an aggregate capacity of more than 4,500 MW. It intends to develop this land bank for customers as part of its turnkey model for wind farm development and is focusing on increasing land bank in existing states as well as new states like Andhra Pradesh.

**ENERGETICA INDIA: What kind of growth do you expect in India's wind energy sector over the next 3-5 years?**

MR. KAILASH TARACHANDANI: The Government of India is laying unprecedented thrust on the development of renewable sources of energy to provide for the long term energy security of the nation and to meet its commitment of preserving the environment. In seven years, the government of India plans to almost triple the installed wind generat-



ing capacity in the country. The government is targeting an installed wind generating capacity of 60,000 MW by 2022 from the current capacity of 23,000 MW, implying a CAGR of 15% in the installed wind capacity of the nation. According to CRISIL, wind capacity additions in India in FY16 and FY17 are expected to be 3.5 GW and 4.1 GW respectively, up from 2.3 GW in FY15. To meet its targets, the government has introduced several regulatory and supporting policies like reintroduction of Accelerated Depreciation benefits, reintroduction of Generation Based Incentives, and inclusion of Wind power projects as CSR activity and doubling of the National Clean Energy cess. The state governments are also providing incentives like attractive Preferential Tariffs for wind power over and above the central government's sops to attract investments in wind energy. Further, the potential introduction of measures like the 10% Renewable Generator Obligation (RGO) is expected to unleash unprecedented growth in the sector.

**ENERGETICA INDIA: Which are the most favorable wind destinations in India?**

Mr. Kailash Tarachandani: The National Institute of Wind Energy (NIWE) has assessed India's wind power potential to be 302 GW. Based on potential, the most favorable wind destinations in India are Gujarat, Karnataka, Andhra Pradesh, Maharashtra, Madhya Pradesh, and Rajasthan.

**ENERGETICA INDIA: What kind of expectations do you have from India's National Wind Energy Mission?**

Mr. Kailash Tarachandani: Given the current installed wind generating capacity in India and the assessed wind power potential of the country, the mission would aim to tap the vast wind energy resources that remain untapped across parts of the country. Stricter implementation of the Renewable Purchase Obligation would lead to a significant increase in the demand for wind power and RPO should be a part of the mission. Faster execution of The Green Corridor enabling more wind energy to be added to the grid and strengthening of the grid should also be an area of priority. Finally consistent policies to incentivize investments in the sector should be part of the National Wind Energy Mission.

**ENERGETICA INDIA: Can you please share more details on Inox's 2MW DFIG 100 rotor dia Wind Turbine Generators?**

Mr. Kailash Tarachandani: Inox Wind's product is the WT 2000 DF, which is a 2 MW Wind Turbine Generator (WTG) with a three blade rotor that can be produced with various rotor diameters and hub heights. We currently produce the WT 2000 DF 93.3 meter rotor diameter WTG with hub height of 80 meters and WT 2000 DF 100 meter rotor diameter WTG with a hub height of 92 meters. We will also be launching the WT 2000 DF 113 meter rotor diameter WTG with hub heights of 100 meters and 110 meters in this fiscal year. The prototype for the 113 meter turbine has already been erected. The Inox Wind 2 MW turbine is designed by AMSC; Austria a wholly owned subsidiary of USA based American Super Conductor Corporation (AMSC), a leading energy technology company and a global leader in alternative energy solutions. More than 9000 turbines (15 GW) based on AMSC technology is successfully operating across the globe. AMSC has more than 14 licensees across the globe and has designed turbines from 600KW to 10 MW.

Some of their licensees were amongst the top 10 wind turbine suppliers/manufacturers globally. Inox Wind's 2 MW WTGs have been designed specifically for the Indian climate and developed after due assessment of wind site qualities and conditions across low wind resource locations such as those in India. Our WTGs offer superior power curves with low cut-in speeds of 3 meters per second and rated wind speeds of 11.50 meters per second, which improves power generation as compared with WTGs with lower hub height and smaller rotor diameter. Inox WTGs generate anywhere between 6%-18% more power vis-a-vis other WTGs available across the nation. The WT 2000

DF is equipped with a double-fed induction generator (DFIG) and advanced power electronics with a view to ensuring that the generator works with high efficiency over the entire speed range. The DFIG offers increased power output and reduced reactive losses. An advanced Electronic Control System (ECS) and other technological enhancements in our WTGs, such as employing capacitor banks rather than batteries, offer increased machine up time. To reduce maintenance requirements, our WTGs use a patented integrated drive train, which incorporates a combined rotor shaft and gear box, so as to decrease turbine weight and the number of moving parts. Inox Wind turbines are type certified by TUV SUD according to "The guidelines for Certification of Wind Turbines issued by Germanischer Lloyd" and are duly enlisted in the Main List of Models and Manufacturers of wind turbines by the National Institute Of Wind Energy. They are designed to operate in a variety of climatic conditions and are installed at an extremely competitive capital and operational cost. The major components for the WTGs are sourced from reputed global suppliers to ensure high efficiency and reliability of turbines.

The 100 rotor dia WTG has one of the highest swept areas that make it ideally suited to maximize returns, especially in low wind areas. Inox Wind's 100 Meter Rotor was recently recertified by TUV SUD to have a higher energy yield of 6% than previous WT 100 model and offers a 21% higher energy yield than the 93 meter rotor. The 113 meter rotor WTG in turn offers a 20% higher energy yield than the 100 rotor dia and a 42% higher energy yield than the 93 rotor dia. The Inox technology edge provides more efficient power curves, improved up-times, reduced operations and maintenance, lower energy cost, and higher return on investment ◀◀