

Nested in the leeward side of the mighty Western Ghats, in the surprisingly well-developed industrial hub of Maharashtra Industrial Development Corporation (MIDC) Baramati, is Kenersys India's manufacturing facility.

Kenersys is part of the Kalyani Group, one of India's leading industrial houses with stakes in four sectors - engineering steel; automotive and non-automotive components and equipment; renewable energy and infrastructure; and speciality chemicals. The portfolio of Kenersys' wind turbines is pivoted around the singularly unique concept of what the company calls the Synerdrive™ technology.

ABOUT SYNERDRIVE™

Synerdrive is the Kenersys synergetic drive train technology that combines the advantages of improved distributed drive train architecture with the electrical

design features of direct drive turbines. The advantage this combination provides for highly reliable on-shore turbines with a conservative mechanical drive train and a unique electrical architecture is that it fulfills all modern grid requirements and harsh grid conditions.

GRIDSHAPER™, a part of Synerdrive, is a unique full conversion system, providing a perfect decoupling from the grid, perfect grid integration and stable power output. This leads to turbines fulfilling perfectly all relevant grid codes worldwide.

Such a system provides distinct technology advantages:

- **Improved efficiency in partial load operation:** Single converters can be switched off to operate the system close to rated power with reduced losses.
- **By combining robust active thyristor rectifiers up the nacelle and a 2-quadrant IGBT converter for full power conversion** (down the tower), the system is optimized for high reliability and advanced grid

compliance, at reduced costs.

● **Fully integrated converter hardware and software** improves analysis and failure search via the CASCADA system. This greatly reduces service activities on site while saving on costs.

OTHER TECHNOLOGY INNOVATIONS

Along with GRIDSHAPER™, another unique component of the Kenersys technology value chain is COOLRIDE™, a sophisticated cooling circuit that combines the mechanical and electrical drive cooling with the cooling of power electronics.

A highly efficient cooling system, Coolride combines ambient air and water cooling for gearbox oil, generator (oil-to-water heat exchanger), and rectifier unit. Since the cooling air is not in direct contact with nacelle internals, with the ambient air taken from outside

RIDING ON A TECHNOLOGY EDGE

SYNERDRIVE™ COULD BE KENERSYS' BIG



and directly blown out, the system provides a very high degree of corrosion resistance. Noise emissions are minimized, maximizing efficiency with 3 fan motors on 2 rotation speeds providing 7 speeds. Optimized cooling is also provided for the pitch system through the arrangement of pitch motors outside the hub.

Internal Supply Unit™ (ISU) is another Kenersys technology. ISU is a small power conversion system that supplies the turbine with constant voltage and frequency. The system keeps the turbine in an "island mode" for a quick restart after a production stop after grid shut-down. Below 'cut-in' wind speed and above 'cut-out' wind speed, ISU provides a constant power supply. External power demand and costs are reduced. ISU decouples the internals from grid influences and protects the turbine electronics from electric grid loads.

CASCADA™ is the Kenersys wind turbine supervision and control system that has set a new standard with a cascade of possibilities in monitoring, remote control and data integration of wind turbine systems. CASCADA provides the following distinct technology advantages:

- Control and visualization in one system

- Applicable in a large number of control hardware solutions

- Smooth data integration via SQL Database

- Individually customizable reports, alarms and availability calculations

- Individual access via web browser to access via home PC, mobile phone or PDA

- Serves, all important communication protocols such as IEC 61400-25 and OPC

Kenersys' **COLD CLIMATE APP™** provides special applications to not only withstand cold weather situations of down to -40 °C, but can also be operated down to -30 °C ambient temperature.

On the Kenersys technology edge, **Mr Kailash Tarachandani, CEO, KENERSYS India Pvt Ltd** says, "Our turbines have an advanced power conversion system with an improved electrical architecture. This is very important from the perspective of the grid system we have in India. Our ISU is a patented technology that no other player can offer. The ISU keeps the turbine in 'live mode' – irrespective of grid disturbances. Our climate control system can operate even in deserts where temperatures can soar to 50°C+, such as

THE KENERSYS TECHNOLOGY EDGE

- Variable speed turbines
- Synchronous generator with full power conversion
- Pitch drive mounted outside the hub for better heat dissipation
- Electrically activated individual pitch control system
- Closed loop water cooling system
- Reactive power exported to the grid
- Auxiliary Supply Unit (ASU) that supplies constant voltage to all major components; reduces fatigue load on turbine and minimizes downtime

in Rajasthan and Gujarat. With the water cooled system, dust is kept out and this provides for a safer, more weather resilient system, even under the harshest weather conditions. No competitor can provide these assurances."

THE ROAD AHEAD

Today, the company's manufacturing facility in Baramati has the capacity to crank out 100 to 150 MW of capacity annually. The company's target is to reach 400 MW in the next two years. For these plans, the company's current manufacturing facility seems to be good enough. Depending on how the market in India grows over the next few years, Kenersys may look into the possibility of an expansion – possibility around the same site. Says Mr Tarachandani, "India is a unique market where a company has to supply the right technology, as well as provide the right turnkey service. Kenersys is promoted by an Indian business conglomerate; while at the same time, has technologies that are highly advanced and international. This is our edge."

Saptarshi R. Dutta

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