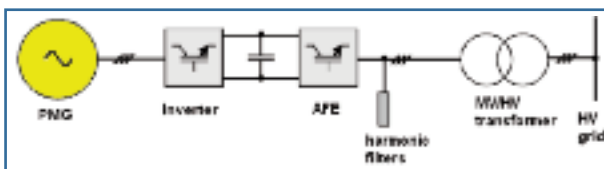




**Ansaldo Sistemi Industriali**  
RESULTS TO THE POWER OF THREE

## DIRECT DRIVE PERMANENT MAGNET GENERATORS

Ansaldo Sistemi Industriali Spa is proud to present its electrical solution for wind power plants. Our the permanent magnet generator can be connected to a LV or MV inverter. This is an innovative electric system that guarantees high efficiency, precise torque control, ease of installation and reduced maintenance.

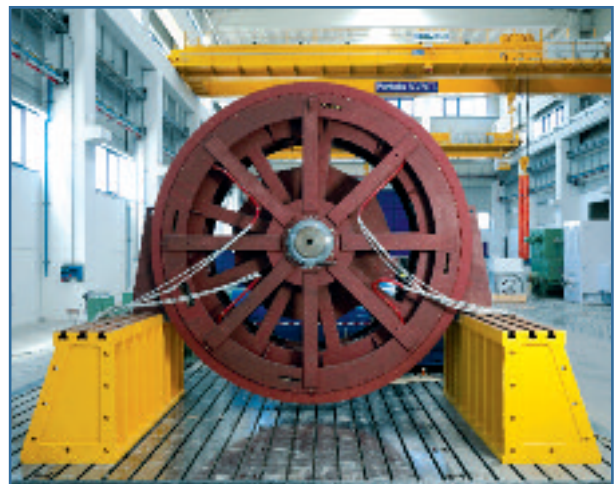


Our PM generator introduces a new concept: rotor and stator modularity, allowing a near-fault-tolerant construction: this system has no gears and should a stator failure occur, the operator can quickly activate production restart with reduced power by isolating the corresponding parallel segment.

In this partial power condition, the system can run indefinitely. Later, when convenient, the replacement of the damaged sector can be performed with extremely limited logistic requirements, no impact on production, and reduced spare parts needs.

The stator can operate without extracting the entire rotor. Our direct drive modular wind generator has the following components:

- stainless steel encapsulated NdFeB PMs. This makes it particular adapt for offshore wind farms, which are gaining increasing interest..
- small VPI stator sectors. These are the key to reduced maintenance costs and maximum performance



### Full Load Tested in our factory

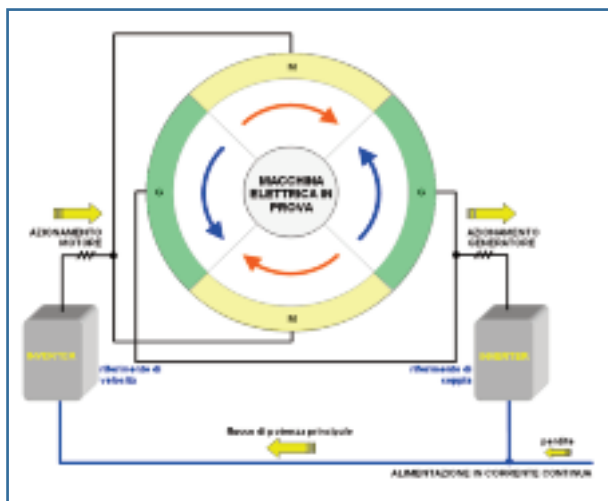
Using an innovative inner back-to-back configuration, our generator is full load tested. Full load testing our machines reduces risks of problems occurring in the field.

The customer is provided with a full written report on the generator's performance.

Since the torque values are extremely high, to reach the full load testing an inner back-to-back configuration requires two converters: half of the machine is operated as a motor and the symmetrical remaining side as a generator.

In this way, apart from the system losses, the main power flows through a common DC bus.

Thus the machine rotates but no additional external load or driving motor are required.

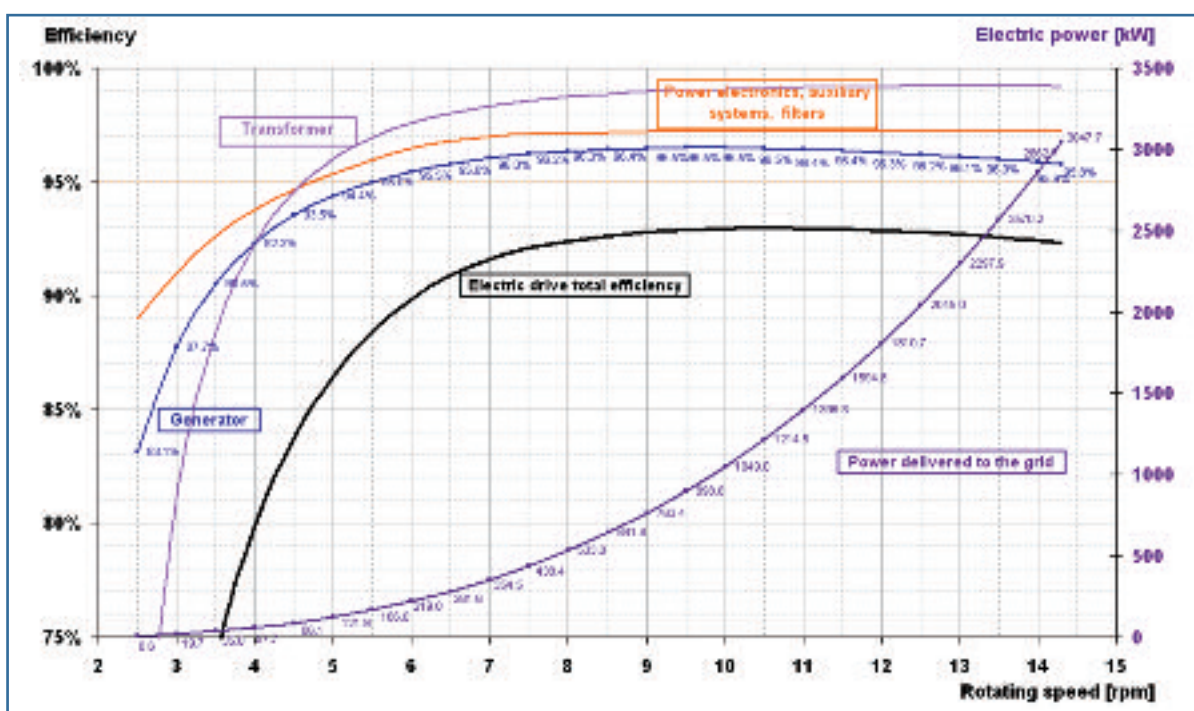


### The high performance of our solution

Wide speed range wind turbines using frequency converter technology offer high performance in terms of efficiency and reliability needed to meet the challenge of energy production.

Our MV variable frequency converter solution is based on Active Front End Converter technology (AFE) which has already been used in the wind sector to help solve problems in connection with the grid.

The AFE converter is the ideal solution for reliable, stable connection to the high voltage grids because its features provide reduced harmonics emission, short-circuit capability (passing a transient without loss of duty) and reactive power control at the same time.



It must also be remarked that the AFE is a four quadrant converter, allowing reverse power flow. This feature can be useful when a wind turbine not capable of self starting must be put into operation.



For low voltage solutions, ASI can boast of its wholly owned subsidiary Answer Drives srl, specialized in Low Voltage Drives, whose experience is based on inverters manufactured for heavy industry. Our low voltage inverters have been used in numerous installations all over the world owing to their reliability and efficiency.

From a technical point of view, our electrical solutions identify the right balance between weight, performance and cost in order to provide the market with an innovative product at a price that will help guarantee an economic return on investment.

