

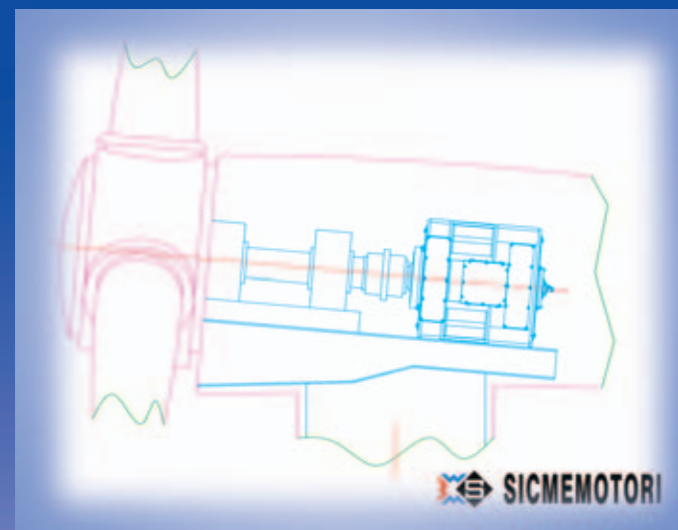
SICME ENERGY

General features of SICMEMOTORI permanent magnet synchronous generators

- **Rotor**
Generally composed of a ring of low loss magnetic laminations, with special housing for inserting permanent magnets, this is shrunk-on a hub, which in turn is shrunk-onto the shaft.
- **Permanent magnets**
Neodimium-Iron-Boron (Nd-Fe-B) type; specific features are decided during the generator design, in relationship to the particular performance required by the project.
- **Stator**
This consists of a series of suitably pressed low loss magnetic laminations. The stator winding is housed on slots positioned inside. The number of poles varies according to the project specification.
- **Stator winding**
This is made of copper wire, insulated with special materials with high resistance to dielectric solicitation caused by voltage peaks due to the inverter control. All insulators and impregnating materials are class H (even if temperature rises are always limited to Class F). High voltage insulation technology is utilised, to ensure long lifetime.



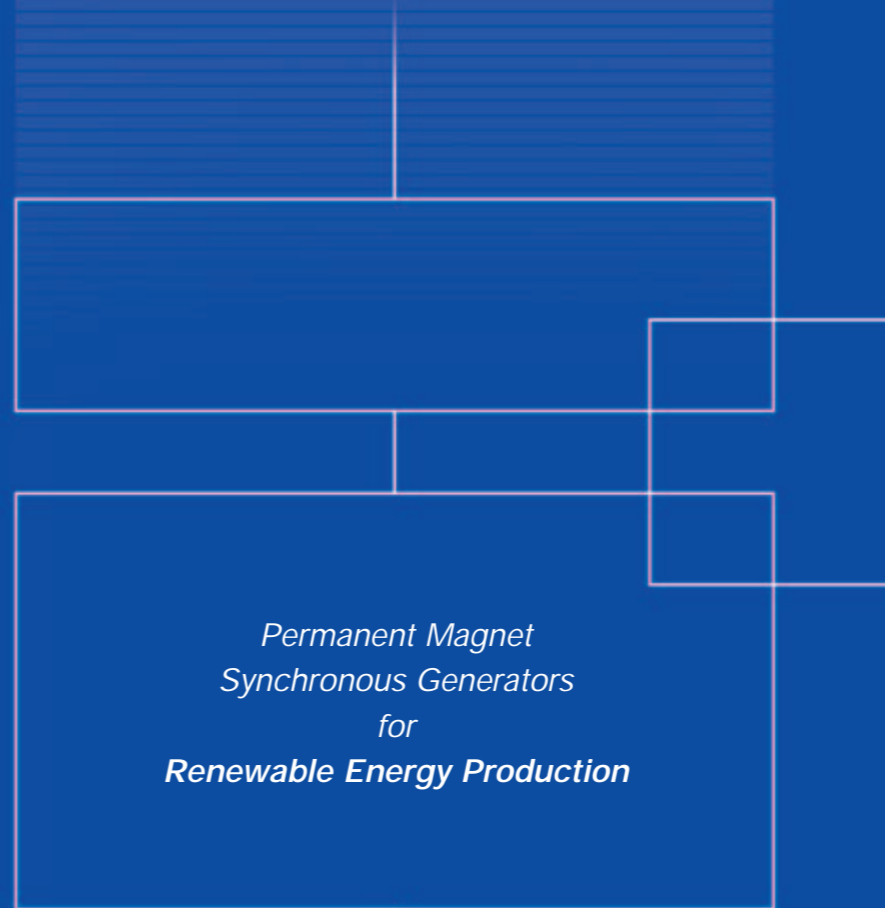
All other parts such as frame, bearings, shaft, end shields, etc. are defined together with the Customer in relation to its necessity; also, other items such as cooling type (natural, water, etc.), degree of protection, accessories to protect the generator, etc., commonly decided.
Generators are always manufactured according to IEC 60034-1 Standards



Revamping

The highly innovative product adopted by SICMEMOTORI can be easily integrated into existing plants, without the need to make large scale modifications to the mechanical structures.
This can be appreciated particularly if out-of-date plants need to be updated. SICMEMOTORI'S products enable easy upgrade of sites using the most advanced technology available on the market today.

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CUSTOMISED SOLUTIONS FOR ALL CUSTOMERS AND EVERY APPLICATION WITHIN THE FIELD OF RENEWABLE ENERGY PRODUCTION

SICMEMOTORI have developed specific multi-polar synchronous generators for renewable energy production using state-of-the-art technology of Permanent Magnets.

The focus of SICMEMOTORI is orientated towards high-tech solutions, not yet developed by existing players in this market. These new high tech solutions are acknowledged and accepted for the advantages they can guarantee in terms of:

- Efficiency,
- Reliability,
- Faster return of investment.



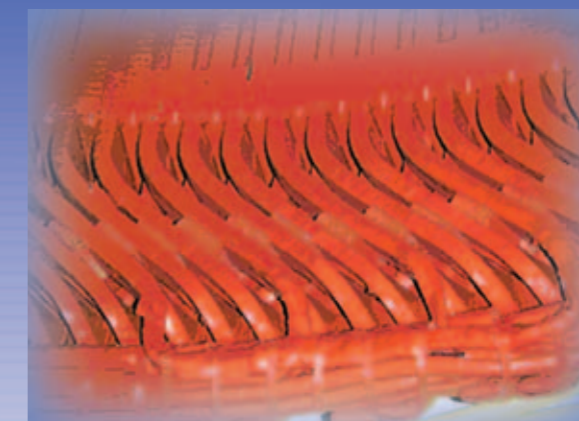
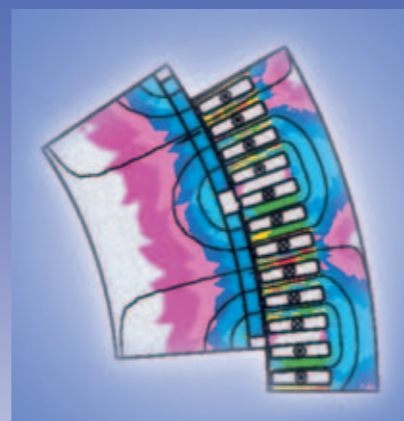
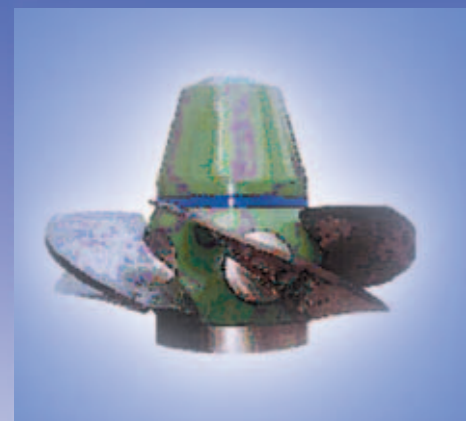
In particular, SICMEMOTORI is developing the following technical solutions:

- Low speed, with direct coupling (direct-drive)
- Low speed, hybrid.

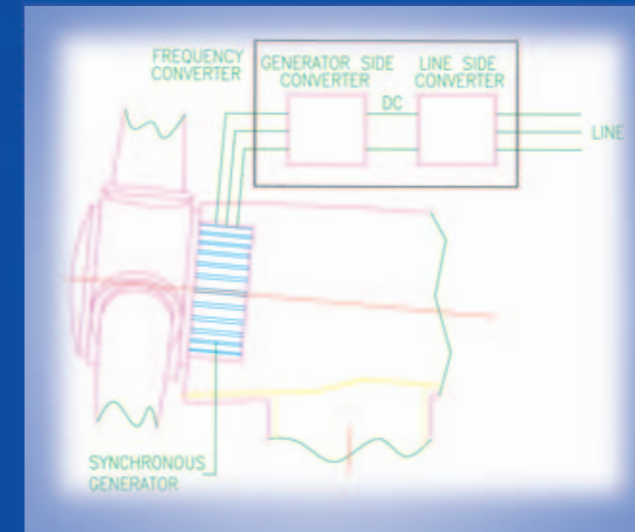
Whichever technical solution is required by the Customer, SICMEMOTORI can guarantee:

- Utilisation of the most advanced software for thermal, electromagnetic and structural computer simulation (FEM method);
- Absolute knowledge of most advanced insulating materials, technical insulation and impregnating procedures for electric machines for very heavy duties;
- Utilisation of new sintered Nd-Fe-B permanent magnets, to obtain the highest specific generating power;

- A modern and fully equipped workshop with all necessary tools to manufacture prototypes and serial productions;
- Suitable hoisting systems (40 ton crane);
- A new and modern testing room enabling all tests to be carried out in order to approve prototypes (no load tests, full load tests, heating tests, etc.) or for the serial production, up to 1500kW;
- Qualified 24/7 technical assistance through the SICMESERVICE department.



Low speed, with direct coupling (direct-drive)



In the direct coupling solution (commonly known as "Direct-drive"), the blades of the wind generator, or the rotor of the hydraulic turbine are directly connected to the electric generator, thus obtaining a very compact integrated system. The SICMEMOTORI solution guarantees free access to the inner parts of the generator enabling easy maintenance. Absence of any kind of gearbox enormously simplifies the transmission chain, eliminating the necessity of lubrication and of oil replacement (together with all problems linked to the elimination of exhaust oils, in contrast with the concept of "clean energy" typical of these systems) This also drastically reduces problems due to vibrations and teeth wear.

- Very high efficiency at all rotational speeds
- Simple and robust
- Maintenance free
- Faster return of investment

Low speed, hybrid

In this configuration the electric generator is integrated with a single stage gearbox, which is directly coupled to the blades of the wind generator, or to the rotor of the hydraulic turbine. In this case, the SICMEMOTORI solution guarantees free access to the inner parts of the generator for easy maintenance.

Very low maintenance, due to simple single-stage gearbox, and less exhaust oil to eliminate. Smaller electric generator dimensions.

- High efficiency at all rotational speeds
- Simple and robust
- Reduced maintenance
- Smaller space requirement

