ENERGY TECHNOLOGIES

ELECTRIC VEHICLES

- Traction systems
- Analysis of the impact of electric vehicles on electrical grids
- Analysis of new business models for electric vehicles
- Definition of specifications for electric vehicle charging stations
- Design and development of chargers and V2G/V2H systems for electric vehicles, based on proprietary protocols and standards (CHAdEMO)
- Battery chargers: Lithium-ion, Ni-MH and VRLA
- Battery management systems

PHOTOVOLTAIC SOLAR ENERGY

- PV installation integration into the low voltage grid
- PV inverters connected or disconnected from the grid with storage
- PV panel simulator
- PV trackers

SOLAR THERMAL ENERGY

- Solar collectors using transparent insulation materials
- High temperature solar concentration plants
- Thermal storage in solar concentration plants

MICRO-GRIDS

- Design of small energy generation systems
- Management of storage systems
- Management and smart control

SUSTAINABILITY IN EQUIPMENT DESIGN

- Energy assessment of operating process equipment involving machinery
- Assessment of the product and process energy strategy
- Minimization of the environmental impact of consumption and emissions during the entire life cycle
- Design that takes into account packaging and transport (DFMA)
- Energy harvesting

ENERGY MANAGEMENT

- High voltage transport (HVDC systems)
- Management and quality of electricity supply
- Energy demand management and optimization
- Application of artificial intelligence techniques
- Development of management software
- Energy efficiency in lighting
- Energy sector regulation studies

SMART GRIDS

- Monitoring systems for advanced maintenance strategies
- Safety and quality of electricity supply
- Energy efficiency

WIND POWER

- Wind turbine technology (turbine control, mini wind turbines, etc.)
- Wind power grid integration
- Offshore wind power stations
- Offshore wind energy transmission systems, multi-terminal HVDC
- Harmonic filters for wind farms
- Control of interactive converters in the grid
**THERMAL ENERGY**
- Heat exchangers (radiators, condensers and evaporators, burners)
- Storage of heat by liquids and using phase change materials
- Bioclimatic architecture

**HYDROELECTRIC POWER**
- Assessment of hydroelectric power generation units by means of their dynamic behaviour
- Studies of fluid-structure interaction problems, simulating the vibration of real turbines

**ENVIRONMENTAL TECHNOLOGIES**

**ENVIRONMENTAL POLLUTION CONTROL**
- Aquatic and terrestrial ecotoxicology
- Environmental toxicology (processes, products and waters)

**NOISE MANAGEMENT**
- Control of noise emission
- Environmental noise
- Acoustic quality in construction
- Acoustic impact of infrastructure

**WATER MANAGEMENT**
- Water systems automation
- Quality measuring and monitoring
- Advanced water purification treatments water reuse and recycling

**HYDROMETEOROLOGICAL FORECASTING MODELS AND EARLY WARNINGS**
- Development of tools and solutions based on hydrological and meteorological models for the water cycle
- Early warning systems for flood risk and water resources management
- Hydrometeorological DSS for water resources and the water cycle management optimisation
- Hydrometeorological forecasts and warnings for weather exposed activities

**MARINE**
- Oceanographic instrumentation
- Construction and installation of cabled and autonomous underwater observatories
- Evaluation and monitoring of species of high economic value. Underwater acoustics

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