

SMART GRID

SMARTNESS IS ALL AROUND.
WE ADD INTELLIGENCE
TO THE GRID.



STATE OF THE ART
IN TECHNOLOGY



THE COMPANY

Over 30 years of experience in power electronic applied to several industrial applications, from energy conversion systems to innovative solutions for physic laboratories.

PHILOSOPHY

Providing winning solutions for being eco-sustainable, efficient and reliable.

MISSION

Generate and distibute energy demonstrating respect for the environment.



EEI. AN HISTORY OF EXCELLENCE

The experience gained over the years in collaboration with leading international manufacturers allowed EEI to stand for a leading position in the sector of drive and control systems, operating with competence, quality and expertise in various fields.

The ability to combine the best electronic technology with competent design skill and a deep knowledge of production processes enable EEI to supply the best solutions to its Customers.

EEI developed the best skills in the areas in which it worked: a competent engineering, high flexibility and attention to high efficiency and energy saving solutions.





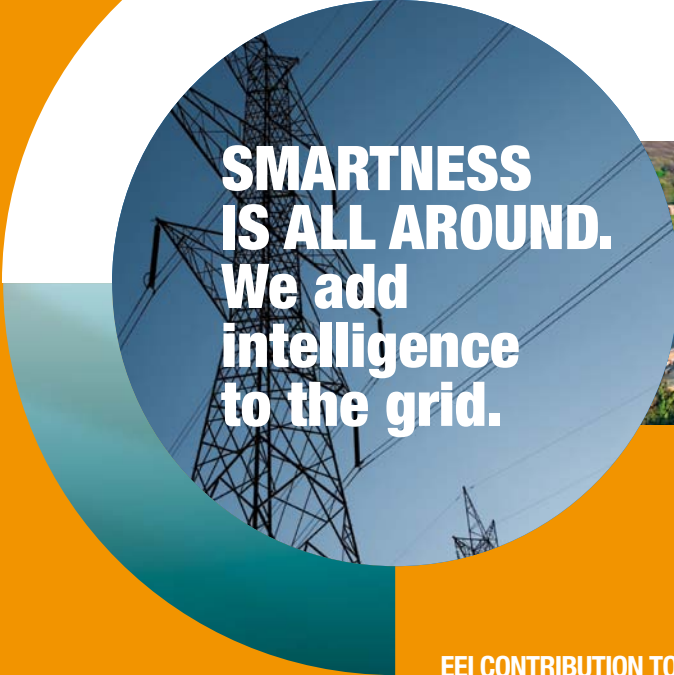
SMART GRID

In recent years, the “Smart Grid” is developing as an innovative concept in the management of energy flows. In a “Smart Grid” is possible to deal effectively with energy Users and Producers:

- Final domestic Users
- Industrial Users
- Programmable energy sources
- Non-programmable energy sources
- Storage systems

Smart Grid is a promising concept that requires equipment characterized by a high technological level and by the capability to adapt to many different situations.

The great flexibility and skills acquired allow EEL to provide to the Customer the best solutions available.



EEL CONTRIBUTION TO THE SMART GRID

EEL design and manufactures a full range of converters and complete solutions necessary to achieve the goal of a smarter grid and a better and more efficient use of energetic sources.

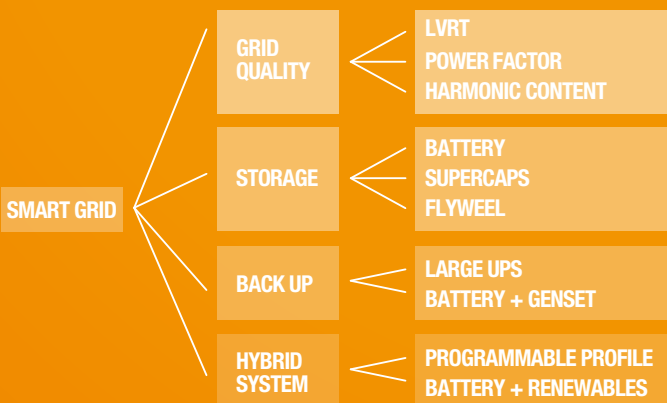
Typical EEL products for Smart Grid are:

- Converters for conventional and renewable energy production
- Hybrid systems with multiple energy sources and end users
- Systems for grid quality improvement
- Harmonics and power factor correction

OFF-GRID

The EEL off-grid systems are excellent to use in those applications where the main electrical grid is weak or absent and it is important to ensure continuity of electrical service with a good grid quality:

- Mountain refuges
- Hospitals
- Isolated Villages
- Telecommunication stations
- Oil & Gas Stations
- Water pumps in rural areas



PRODUCTS

EEL STORAGE SYSTEM

EEL Storage System are designed to work in parallel with the main electrical grid, performing a wide range of important function with the aim of improve the availability and the quality of the electrical power supply, reducing the costs for the power supply itself.

Main functions of the Storage System are:

- Peak-shaving and load-levelling
- Power supply in case of grid failure
- Management of unbalanced loads
- Management of active and reactive power

EEL equipment includes converters for the management of different type of storage units:

- Sodium/Li Battery
- SMES
- Hydraulic pumping station
- Supercaps
- Diesel genset

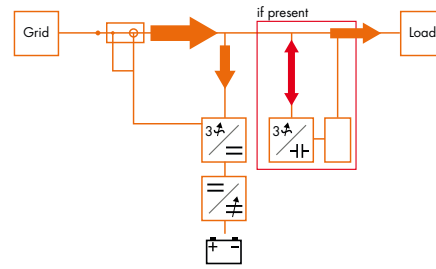
HARMONICS AND POWER FACTOR CORRECTION

Improve energy quality means also avoid the intake of disturbs as flickering and harmonics generated mainly by rotating machines.

The equipment manufactured by EEL consist in an Active Filter composed by an High Frequency Grid Conditioning Converter for:

- Power factor correction
- Flickering compensation
- Harmonic compensation
- LVRT function

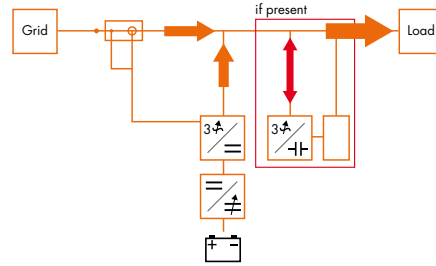
EEL systems for active filtering can be included in the EEL's Storage Systems, expanding their capabilities onto a complete solution for Energy Quality.



Case 1:

Grid available and $P_{grid} > P_{load}$

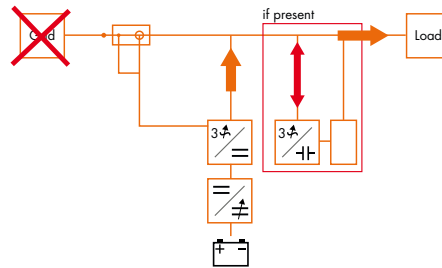
Part of the energy is used for batteries charging. If present, the compensator perform THD(I) and PF correction.



Case 2:

Grid available and $P_{grid} < P_{load}$

Part of the energy required comes from the batteries. If present, the compensator perform THD(I) and PF correction.



Case 3:

Grid not available, P_{load} from batteries.

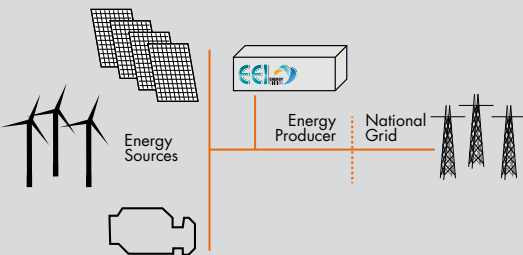
When the grid is on again, EEL device is able to re-synchronize with it.



APPLICATIONS

SMART GRID – FOR ENERGY PRODUCERS

Thanks to its experience in the production of static converter for energy application, EEL design and manufactures Storage Systems specifically thought for energy Producers.

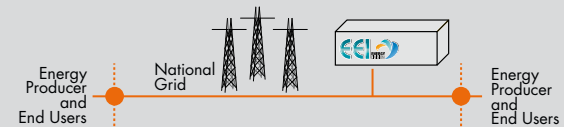


Functions of EEL Storage System applied to Energy Production:

- Possibility of predictable production profile
- Improvement of output energy quality
- Power Factor correction
- Low Voltage Ride Through (LVRT)
- Management of output voltage and grid frequency
- Harmonic content reduction
- Upgrade of existing power plant to new grid codes

SMART GRID – FOR UTILITIES

Utilities can benefit the use of EEL Storage System, achieving the goal of an increased grid availability and an improvement of supplied energy quality.



Functions of EEL Storage System applied to Energy Distributors and Utilities are:

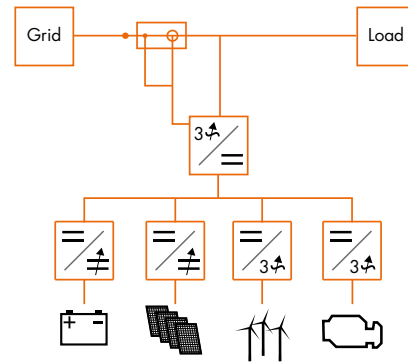
- Grid back-up
- Peak-shaving and load-levelling
- Improvement of grid quality
- Correction of unbalanced phase
- Power Factor correction
- Harmonic content reduction

INVERTERS FOR HYBRID SYSTEMS

EEl Storage Systems can be integrated with converters for many alternative energetic sources that might be available in a factory or in a power plant (PV power plants, CHP, gensets...).

With these hybrid systems it is possible to better manage the energy flows and energy production:

- Energy producers will be able to improve the quality and value of their production generating energy with a predictable production profile.
- End-users will be able to optimize the supply of electricity and take advantage of a more efficient use of energy production facilities present in the company.



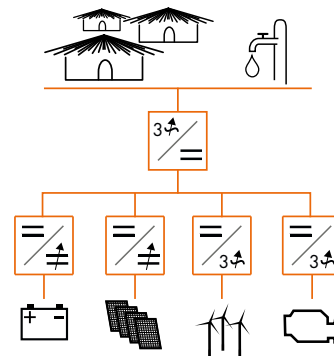
INVERTERS FOR OFF-GRID SYSTEMS

The request of systems for the power supply of isolated Users or rural electrification through solutions that make large use of renewable energy coupled to battery packs is constantly increasing.

EEl systems are particularly effective in the case of isolated grids with a minimum required power of 10kW. Users can be both three-phase or single phase type.

All Off-Grid Systems manufactured by EEl are designed to integrate with each other many different energy sources, such as:

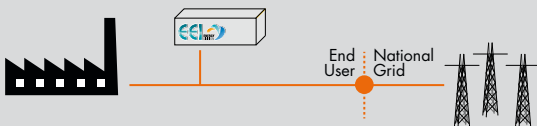
- Batteries or other storage units
- Renewable energy and non-renewable
- Diesel Generators



SMART GRID – FOR INDUSTRIES

A secure supply of energy and a reduction of fixed cost is nowadays a key factor for Companies and end Users.

EEl Energy Storage System enable companies to achieve both goals, by reducing the peak absorption in electric power supply and acting as a UPS in case of weak grids.



Functions of EEl Storage System for Industrial Applications:

- Peak-shaving and load-levelling
- Power Supply in case of grid failure
- Management of unbalanced loads
- Management of active and reactive power
- LVRT Function

TELECOM

Since its inception, EEl has acquired the know-how in the building of electrical panels operating in unfavorable working conditions, thanks to its experience in ropeway and mining sector. EEl designs and manufactures hybrid renewable-diesel-battery power converters to be used in telecommunications stations and in other similar applications. The solutions EEl are characterized by:

- Output Power from 10kW
- Maximum flexibility in the design phase
- High reliability
- Easy maintenance

RURAL ELECTRIFICATION

Ensuring access to safe drinking water and electricity for people living in rural areas of many developing countries represents to EEl an ethical commitment and a technological challenge at the same time.

The equipment for rural electrification have to meet critical features to ensure proper operation and provide an opportunity for substantial improvement of living conditions:

- Integration with storage systems
- Integration with renewable energy sources
- Management of highly unbalanced grid
- Extremely low maintenance
- High reliability

INDUSTRIAL EQUIPMENT AND ENERGY APPLICATIONS



MARINE POWER EQUIPMENT

RENEWABLE ENERGY

INDUSTRIAL EQUIPMENT



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