



Hybrid Mini Power Plants

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Hybrid Mini Power Plants

Hybrid Mini Power Plants (HMPP) are **Distributed Generation** power plants that combines different energy sources.

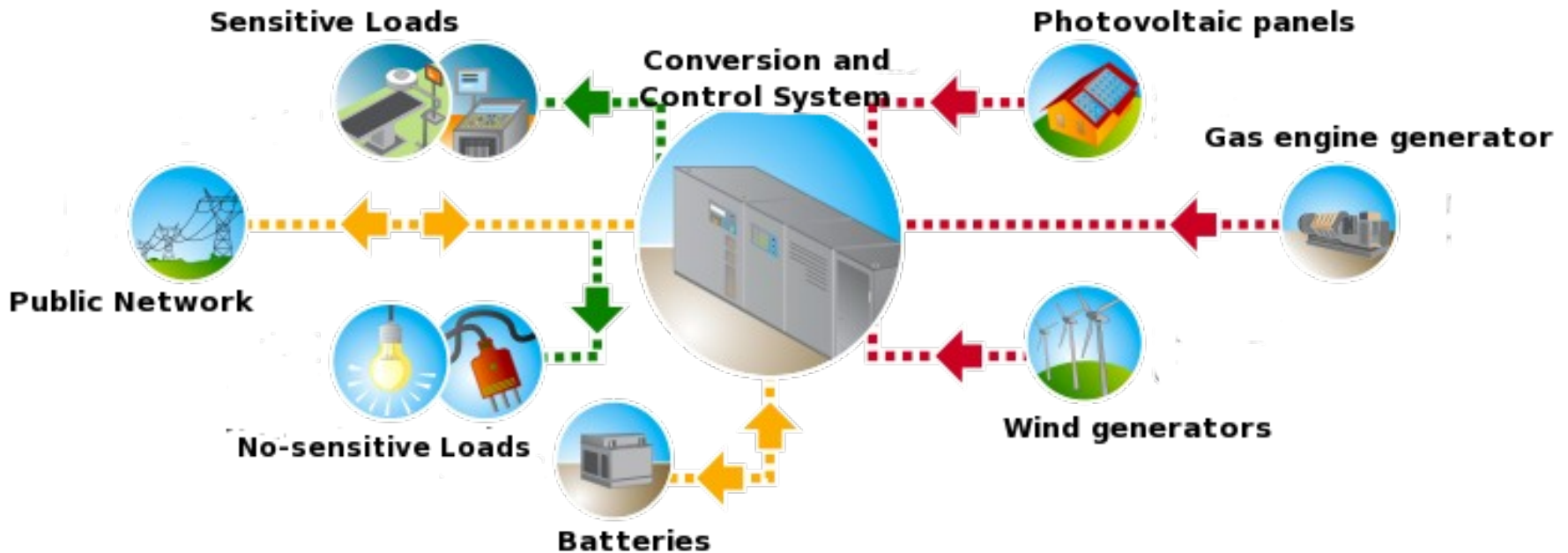
These sources can be either renewable or fossil energy sources (e.g. gas engines).

The use of more than one energy source allows a **higher stability** of the power supply. Moreover, the complementary profile of solar irradiance and wind speed has brought to an increasing interest in wind-solar power generation systems

The use of a fossil energy source combined with an **energy storage device** (e.g. batteries) allows to provide more power network services including the stand-alone operation mode and UPS services.

Hybrid Mini Power Plants

Hybrid power plant configuration

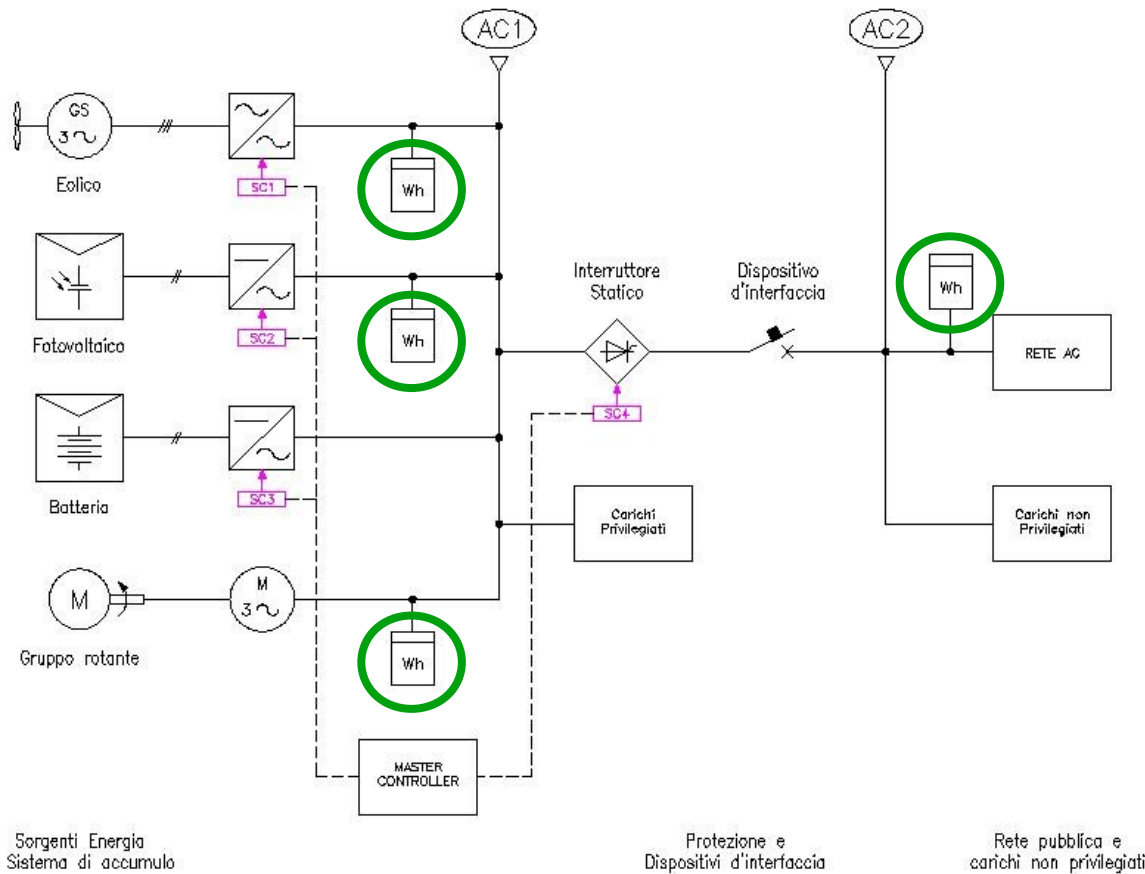


Hybrid Mini Power Plants: Configurations

Hybrid Mini Power Plants (HMPP) can present two electrical configurations:

1. Connection of power sources on the AC side
2. Connection of power sources on the DC side

Hybrid Mini Power Plants: AC Connection

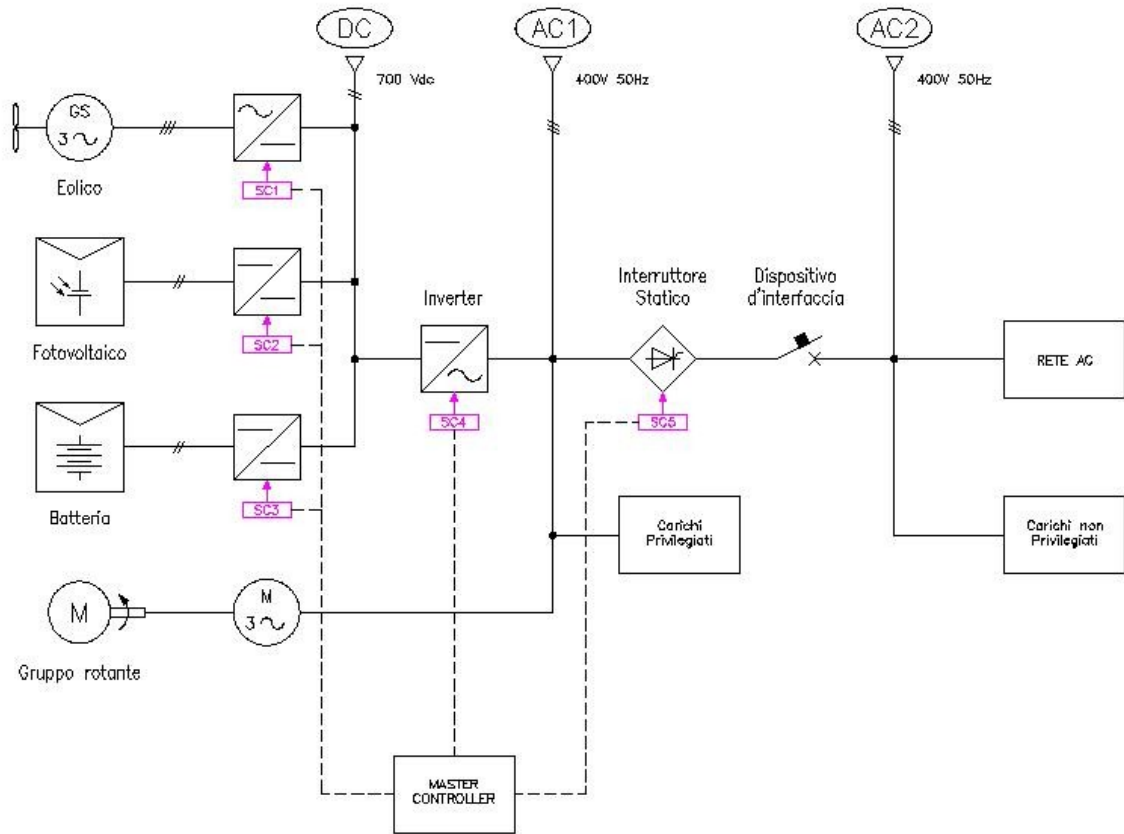


✓ Best for plants that are permanently grid connected.

✓ This configuration optimise energy bonus.

✗ Less global efficiency

Hybrid Mini Power Plants: DC Connection



Best for plants that work in stand alone mode or with a weak grid connection



More efficient (only one grid side inverter)



No energy bonus measurement

Sorgenti Energia + Sistema di accumulo

Protezione e Dispositivi d'interfaccia

Rete pubblica e carichi non privilegiati

Conversion and Control Systems

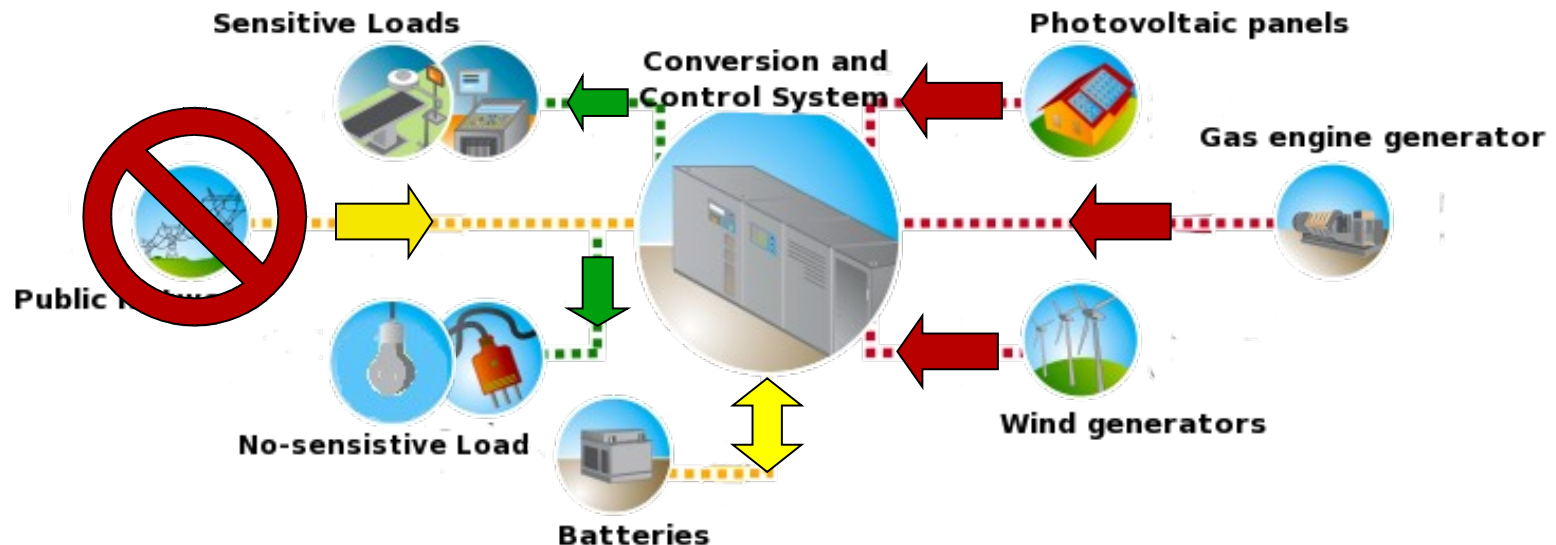
The presence of an innovative **Conversion and Control Systems** allows to:

- Have the **maximum exploiting** of renewable source.
- Reduce the **start&stop of ICE generator** (if it is present)
- Improve the **ICE generator efficiency**, avoiding low power generation conditions
- Use the **energy storage system** to adapt the load and generation power

Conversion and Control Systems

The presence of static switching on grid side allows a **fast transition from grid connected to stand-alone operation mode** if a black-out event occurs.

In this way the power feeding of sensitive loads is guaranteed and the Hybrid power plants acting as an **UPS**.

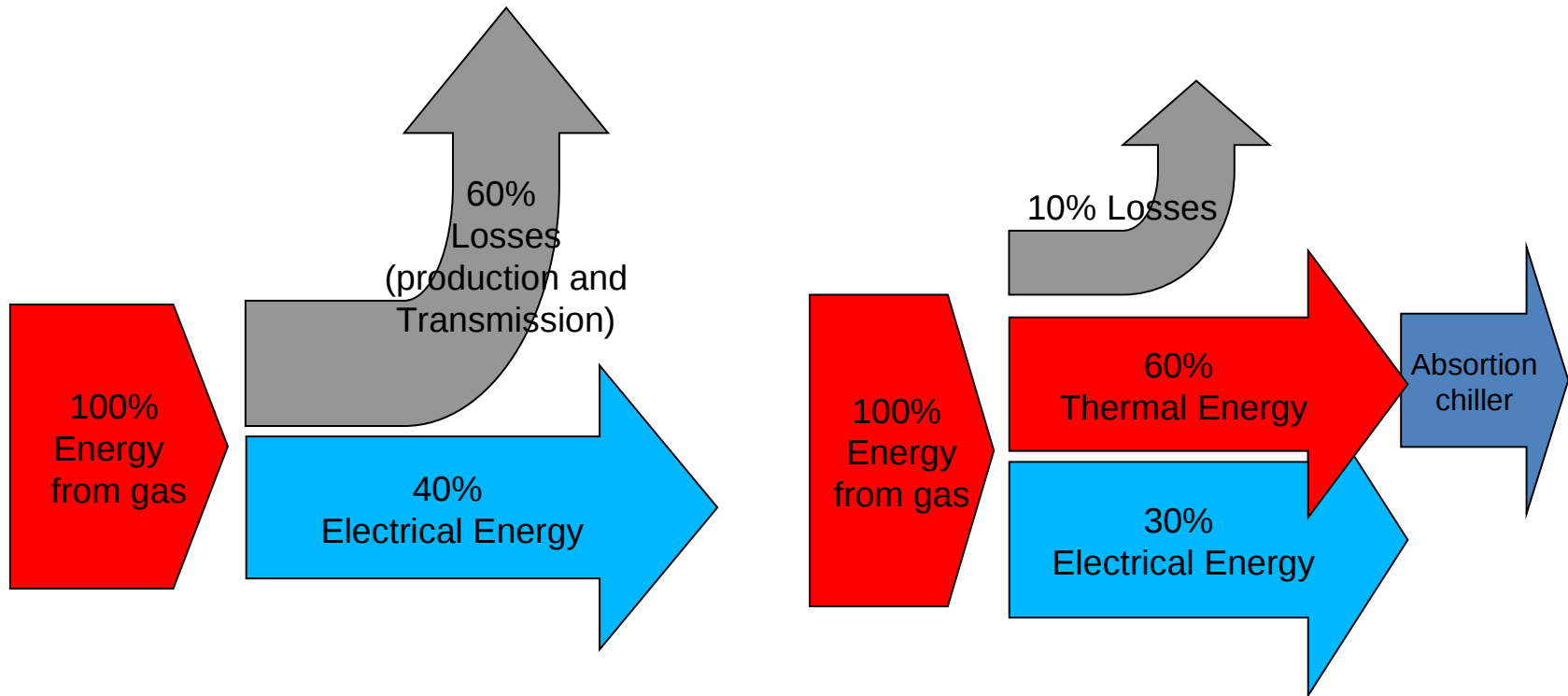


Conversion and Control Systems: ICE

Using a **intelligent control** of the **ICE generator**, it is possible to:

- Start the generator using either the public grid or the batteries (**black start**)
- Excite the induction machine **without dedicated capacitors**
- Correct the **power factor** of the loads
- Help the local network during the **transition in stand alone operating mode**
- Change the power production according the **thermal request**.
- Control the thermal energy to integrate an air conditioner unit (e.g absorption chiller)

Cogeneration



Conversion and Control Systems: Energy Storage

The presence of an **Energy Storage Systems** in a Hybrid Power Plants is necessary for **stand-alone operation mode** (e.g. for plants that operates in isolated locations or with a weak electrical network) either to store the exceed production of electrical energy from renewable sources or to supply fast load transitions.

Energy Storage Systems can be also used in Hybrid Power Plants **permanently grid connected to improve the generated power quality avoiding fast changing of electrical power production** typical of the renewable sources like wind or sun.

This characteristic should be an indispensable requirement of new GD plants inserted in a smart grid scenario.

Conversion and Control Systems: energy storage

An intelligent control of the **Energy Storage Systems** allows to implement **new functions**:

- **Net metering** optimisation
- **Peak shaving** (generating during high remunerative time slots)
- **Reactive power compensation**
- **Public grid Reactive power control** (in smart grid)

Elvi Group Hybrid Power Plants



ELVI provide Hybrid Mini Power Plants “turnkey”.



ILB Helios ITALIA



Tozzi Nord
wind turbines



ELVI

Impianti Industriali e sistemi di automazione



Elvi Group

Hybrid Power Plants



The **Elvi** Group **Conversion and Control System** use certified Static converter (according DK-5940)

ELVI UNIVERSAL QCC DC : 30kW, 55kW, 100kW

ELVI UNIVERSAL QCC AC : 30kW, 55kW

The modular design allow to select the **different power sources configuration** (e.g. wind+gas+batteries, solar+gas+batteries, only wind and solar, etc.)

ILB Helios PV Modules



Single crystal PV Modules

- ILB Helios Serie EW 165 - 180W
- ILB Helios Serie NA 165 - 180W
- ILB Helios Serie ILB 165 - 175W e 220 - 235W

Polycrystalline PV Modules

- ILB Helios Serie EW 165 - 180W
- ILB Helios Serie NA 170 - 280W
- ILB Helios Serie ILB 200 - 270W



ILB Helios - Reference in Avila - Spain
South side installation 5,8 MWp on fixed structure 175 W Panels

NEW Single and Polycrystalline PV Modules

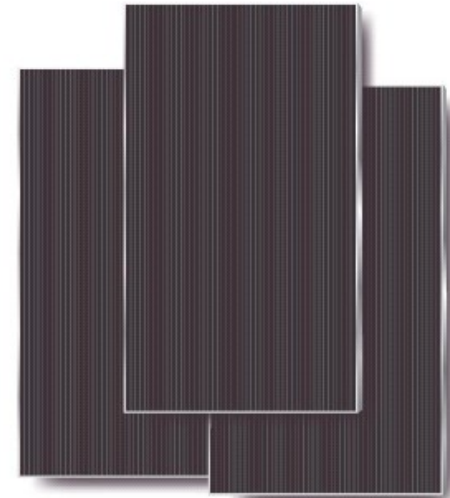
- ILB Ensol da 160 a 295 W

ILB Helios PV Modules



Thin-film PV Modules

- ILB Helios Serie TF 50 - 60 W



Sun tracking system

- ILB Helios Track 55 and 250



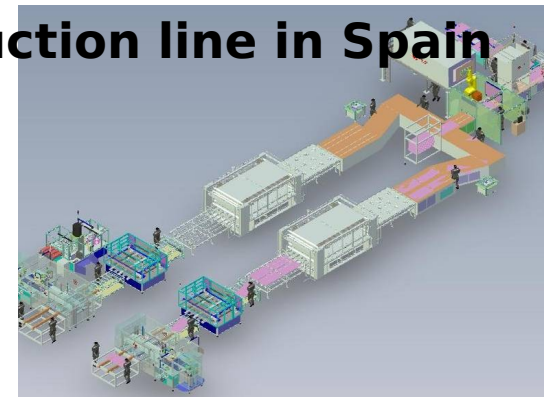
ILB Helios Group



- IBL Integrierte Beschaffungslogistik AG Switzerland
- ILB Helios Spain S.A Spain
- ILB Helios AG Switzerland
- ILB International Logistikbetriebe AG Switzerland
- GIS Global Industrial Supply Co. Ltd. China
- ILB Helios Italia S.r.l. Italy



New ILB-Ensol 45 MW production line in Spain



Thank you

www.mcmenergylab.com

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www.ilb-helios-group.ch