

# Eco-friendly UPS testing center

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**A**BB's center of UPS excellence (Newave SA) was founded in Ticino, Switzerland in 1993 to market innovative UPS technology. From the very start, the company not only developed eco-friendly UPS products (Newave has been a trendsetter in terms of modular and transformer-less UPSs), but also knew how to go green on the product line. The company strived to adapt eco-friendly operations and sustainable practices in all aspects of their production process. Eco-friendly industrial practices were also top-priority when the testing center for UPS was put in place.

The ABB UPS test center is named the GREEN (Generating Recycled Ecological Energy Network) test bay and is an advanced testing center for medium-sized and large UPS systems. It provides customers with performance testing, interoperability and efficiency of ABB's UPSs under various conditions. The facility can test individual UPS modules and the complete power systems—including large UPS units, such as the Conceptpower DPA 500.

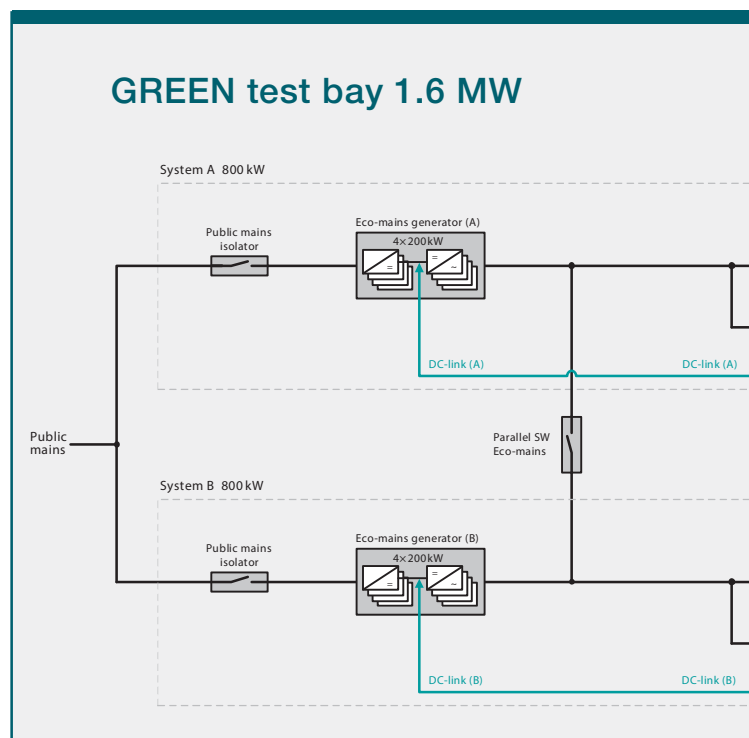
The GREEN test bay – designed and built entirely in-house at ABB in Quartino – recycles some 91 percent of the energy used during a UPS test. Often, test facilities waste this energy by turning it into

heat, however here it is used:

- in production, for the final test of high power UPSs (>300 kW)
- for executing Factory Acceptance Tests (FAT) with customers.

## Functioning principle

Instead of being powered directly from the public mains, the UPS under test is supplied by the Eco-mains. The Eco-mains generator takes 91 percent of the energy



from the Eco-load through the DC-link (recycled energy) and only 9 percent from the public mains.

The Eco-load is an active power converter able to re-inject energy back into the system, once it has been converted from AC to DC. This is more beneficial than having a traditional resistor load that merely turns the energy into heat thereby wasting it.

### How it works

The GREEN test bay comprises two identical parts (System A and System B) that work separately or in parallel. Each part is rated at 800 kW. Each test bay can test a UPS system up to 800 kW. When configured in parallel, the GREEN test bay becomes one single test bay able to test UPS systems up to 1.6 MW.

The function of the Eco-mains generator is to combine the energy taken from the public mains with the recycled energy coming from the Eco-load. The Eco-mains generator comprises four special stand-

alone UPS systems - namely, four Power-Wave 33, 200 kW devices with modified hardware and software.

A battery simulator provides DC voltage to the UPS under test to simulate backup batteries during mains failure tests. When the Eco-mains is disconnected from the input of the UPS under test, the UPS automatically goes into battery mode, taking its power from the battery simulator. The battery simulator includes an AC to DC converter (rectifier and booster), and a transformer that lowers the voltage and provides galvanic isolation.

The Eco-load is made out of a modular parallel system of active power converters (rectifiers). Up to 40 modules can be turned on or off according to the actual need. This rectifier system normally acts as a linear load (resistor), so that the UPS under test sees a resistive load. If needed, the Eco-load is also able to modify its power factor (adjustable) and/or to connect an additional non-linear load. This is used for special tests upon request.

### Advantages and benefits

- Significantly lower power consumption
  - smaller electricity bill
  - less energy wasted; factory is more environmentally friendly
  - no plant overload when testing high power UPSs
- Capability to test UPS systems up to 1.6 MW
- Flexible testing (more tests possible)
  - load is easily adjusted (free scale)
  - adjustable input voltage
  - frequency sweeps possible
  - variable load power factor
  - prepared for non-linear load testing
- Simple and safe control of the test bay

