

# Battery zero-emission generators

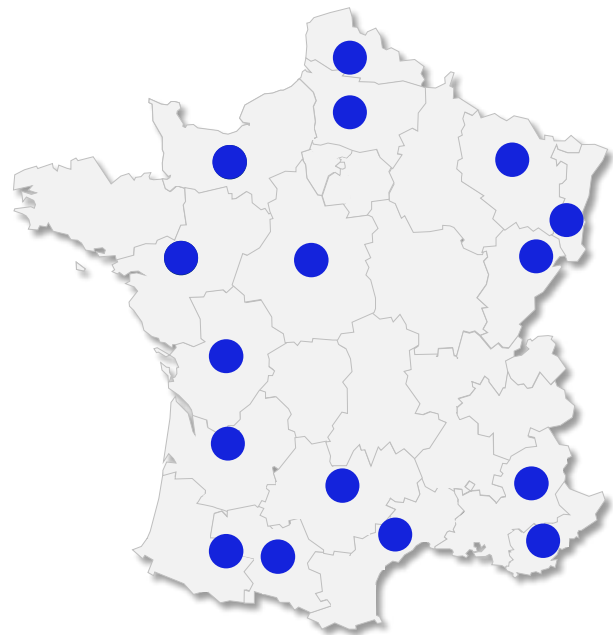
ENEDIS

# Battery zero-emission generators

Enedis est le service public de la transition écologique, un service public du XXI<sup>e</sup> siècle proche des Français. Enedis construit avec les territoires la nouvelle France électrique au service d'un futur plus durable. Cette nouvelle France électrique place l'électricité comme l'énergie de la transition écologique et le réseau de distribution comme son moteur.

## An experiment for the ecological transition of the regions

With a goal of carbon neutrality by 2050, Enedis is fully committed to reducing its direct CO<sub>2</sub> emissions. Essential to the quality of service for customers, the generators are deployed by Enedis when they are the best alternative to ensure power supply continuity is maintained for customers in the event of disconnection due to an incident or to carry out work on the distribution grid. Working with many industrial partners, the company has been experimenting with alternative and low-carbon solutions for certain uses.



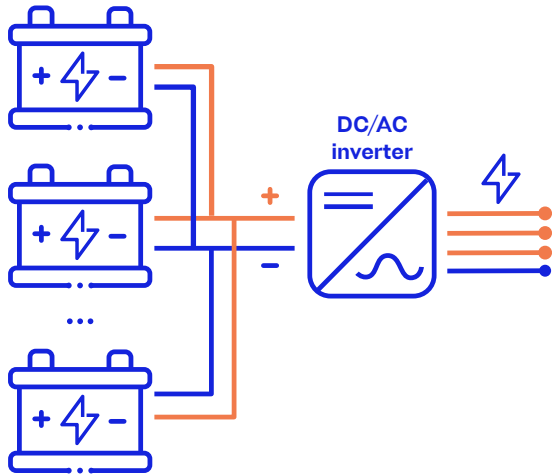
Map of Enedis experiments with battery generating sets



Experiments are being carried out between 2022 and 2024 in at least 15 regions of France to assess the replacement of conventional generator sets with battery technologies. Other technologies (such as hydrogen fuel cells) were also tested in other regions of France.

These experiments took place in different configurations, in summer and winter, since the generation and consumption on the grid varies depending on the time of the year.

The aim of this experimental phase is to enable Enedis to identify technologies appropriate to its needs, in different work configurations, in various regions and with a wide range of technical partners.



## How does a battery zero emission generator set work?

A battery zero emission generator set is designed to replace the solutions currently in use. The generator sets tested by Enedis have a power of between 60 and 400 kW, their dimensions can vary from one model to another but overall represent a container that can be transported by lorry to a worksite.

- **60 kW zero emission generator set**, with 3 hours of autonomy at maximum power: 3 m long x 2.4 m wide and 2.6 m high. This equipment is mounted on a lorry.
- **160 kW zero emission generator set**, with 3 hours of autonomy at maximum power: 4.5 m long x 2.2 m wide x 2.2 m high, with a weight of 8 tonnes. This equipment is designed to be transported and lifted by the Enedis logistics chain.
- **400 kW zero emission generator set**, with 2 hours of autonomy at maximum power: 12 m long x 2.6 m wide x 3.8 m high. This equipment is designed to remain permanently on a 26-ton lorry.

At the core of a battery zero emission generator set is a set of batteries (Li-ion or Nickel-sodium depending on the model) that is containerised and can be moved from site to site. These batteries are linked to inverters that convert direct current into alternating current or vice versa as required. The entire system can be managed and supervised using an auxiliary switchboard equipped with a computer and a communication system.

The battery zero-emission generator, which can be recharged from renewable energy sources, can provide a temporary power supply to customers during disconnections for work or incidents on the electricity grid.

During these maintenance phases, it also has the advantage of being compatible with decentralised means of generation which may be present and in operation.

## The benefits of battery zero-emission generators

The experiments carried out by Enedis will define the place of battery technology in the industrialisation of zero-emission generators.

In the search for alternatives to its conventional generator sets, Enedis is looking for solutions that are industrially relevant, acceptable to the public and appropriate to current operational needs.

The main objective of a battery zero-emission generator is to perform the same functions as a diesel generator set while providing environmental benefits.

**It has the following advantages for use as part of Enedis' worksites:**

- 100% removal of direct CO2 emissions compared to a diesel generator set
- Decrease in noise pollution
- Elimination of unpleasant odours
- Decrease in vibration levels
- No smoke emission.

## How is the battery recycled?

The issue of recycling batteries and the impact over their entire lifecycle (from manufacture to waste processing) is now central to the choice of technologies.

A battery undergoes a strict monitored recycling process: once stripped of its casing and electronics, the battery is crushed in order to separate the different materials. Metal parts are melted, with a view to reuse. According to the Institute for Sustainable Futures in Sydney, manufacturers are able to recycle 60% by weight of batteries.

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Enedis is a public service company, operator of the electricity grid.

It develops, operates and modernises the electricity grid, and manages the associated data.

It carries out connections, 24 hour breakdown service, meter readings and all technical maintenance.

Acting on behalf of local authorities and grid owners, it is independent of the energy suppliers who are responsible for the sale and management of electricity supply contracts.

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