

# SAFETY ANALYSIS OF ELECTROCHEMICAL STORAGE SYSTEMS BY MEANS OF SAFETY REVIEW AND OPEN-FIELD TESTS

**Innovations and Benefits** - In addition to characterization tests and life tests of storage systems, the know-how and facilities/equipment for carrying out safety studies (fire and explosion risk) of stationary and automotive storage systems, are available at ENEA. In particular, the FARO plant is available to carry out fire and explosion tests in conditions of abuse and fire resistance tests, with the testing of the extinguishing agents required by the technical specifications of the products. The tests can be performed under different charging conditions. The laboratory is also equipped with a climatic chamber for abuse tests. Preliminary to the open-field tests, all the information necessary to carry out a Safety Review of the accumulation system is acquired, as starting point for the application of the formal Risk Assessment techniques.

**Uses** - Safety studies for customized electric energy storage systems for industry, service, civil and electromobility.

## Past and Present Activities -

- Safety studies on high temperature lithium-ion and sodium storage systems financed by the Ministry of Economic Development (MISE);
- Risk analysis;
- Collaborations with university institutions and with the National Fire Brigade.



Top: the FARO system for the open-field tests of fire, explosion and fire extinction.

Bottom left: tests conducted in the FARO plant on Lithium-ion systems: short-circuit test and overvoltage test on a 18 kg system; end of the fire spread test carried out on 4 cells of 400 g.

**Characteristics:** CUSTOM

CUSTOM Thanks to its flexibility, the service can be adjusted to different needs and contexts