



## Hydrogen - A Competitive Energy Storage Medium To Enable the Large Scale Integration of Renewable Energies

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# MYRTE Mission hYdrogen & Renewable for the inTegration on the Electrical grid

### Overall Objectives and Budget

The objective of the project is to test "full-scale" the coupling of a solar power plant to a hydrogen energy storage system. This project aims at showcasing the proprietary technology developed through support from the H2E program by OSEO. Combining the solar power production with hydrogen, MYRTE adds value to a plentiful local resource, the sun, and solves the constraint of intermittence related to the injection of fluctuating renewable energy in the relatively weak electricity island network.

**MYRTE demonstrates Hydrogen Energy Storage Technology in the first real field application at this scale.**

### Technical Barriers and Targets

The barriers lie in:

- the design, deployment and operation of a 2\*100 kW fuel cell unit, a 40 Nm<sup>3</sup>/h electrolyser and the related gas storage,
- obtaining building and operation permits,
- obtaining permit for grid connection.

### Technical Accomplishments / Progress / Results

The MYRTE demonstration project, based in Corsica island and started in 2009, has achieved its first phase by end 2011.

Located in Ajaccio this demonstration platform implements a photovoltaic power plant of 560 kWc connected to a hydrogen chain consisting of an electrolyser of 10 Nm<sup>3</sup>/h, tanks of hydrogen and oxygen respectively of 1400 Nm<sup>3</sup> and 700 Nm<sup>3</sup> and a fuel cell of 100 kW.



MYRTE demonstration platform

This « hydrogen battery », directly connected to the Corsica electricity grid thus enables smoothing of the photovoltaic panels electricity production. The electricity supplied is fed to the 15 kV island grid, at different times of the day depending on the grid needs.

This project has demonstrated how permitting all aspects of such facilities should be managed. To be noted that the facility is located in a protected environment.

### Future Work

Early in 2013, in a second phase, the power of the hydrogen system should double to reach : fuel cell total power : 150 kW; electrolyser total flow rate: 23 Nm<sup>3</sup>/h. To this goal, a Greenergy Box™ will be installed. This unique system includes, in a single 20ft container, both electrolysis and fuel cell functions.

The third phase consists in carrying on the operation of the platform MYRTE. Operations have started and will continue. Optimisation of operating procedures and improvement in reliability are the key drivers.

### Conclusions and Major Findings

This innovative process of energy storage finds concrete and immediate applications: it constitutes a solution for areas where access to electricity is difficult (lack of electricity line, remote sites). It is particularly adapted to the island context.

It also targets markets of energy storage to enhance the integration of the renewable energies into the grid, the reliability of the national grid and the decentralized energy management such as micro districts.

### Project Overview

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Financing institutions: FEDER, French State, CTC (Corsica regional authorities)
- 1<sup>st</sup> phase: mid 2009 / end 2011 - 2<sup>d</sup> phase: beginning 2012 / mid 2013  
3<sup>d</sup> phase: mid 2013 / end 2015
- <http://www.areva.com/FR/actualites-9153/energies-renouvelables-areva-inaugure-en-corse-une-pla-teforme-de-stockage-d-energie.html>  
<http://myrte.univ-corse.fr/>



Electrolysis and fuel cell – inside the Energy conversion building