



Renewable energies



## HYDROGEN ENERGY SUPPLY FOR VANOISE NATIONAL PARK

**PowiDian, a start-up spin-off Airbus Defence & Space, has developed a Smart Autonomous Green Energy Stations – SAGES– in the Refuge du Palet in Vanoise National Park (French Alps), which create a revolutionary experience for hikers in June 2015: thanks to this hydrogen energy storage, visitors have an unlimited access to electricity from a renewable source, whatever the weather conditions. It is a world premiere.**

The system connects photovoltaic solar panels to converters, which ensures a daily energy supply via a short-term battery storage, while long-term energy is provided by a hydrogen storage system.

Five kilograms of hydrogen are therefore produced and stored during the closed season and will be usable as an additional energy reserve throughout the open season. All of the equipment are controlled automatically by an intelligent control module and a GSM supervision module is able to also remotely monitor all of the system's indicators, to anticipate any possible maintenance actions.

The installation of the refuge's SAGES station constitute a qualitative leap, for this 47 beds property, open to the public in extreme environmental conditions.

Previously, the caretakers of the refuge operated a diesel generator to provide all the power they need. They used to consume about 200 liters of fuel per season. The thermal generator ran every days to recharge the batteries, powered by some photovoltaic

solar panels too. This situation led three main issues:

- 1- Significant noise and olfactory nuisances, in addition to greenhouse gas emissions.
- 2- Diesel supplying by helicopter or off-road vehicle.
- 3- Limitation of the energy consumption to the strict minimum: the caretakers could use briefly their own Internet box, however their business useful tool, and were sometime to refuse the hikers to recharge their electronic devices (cameras, GPS, smartphones, etc.).

The energy demand of the clients growing every year, the caretakers had no choice but run again and again the thermal generator.

The SAGES solution gave the refuge the possibility to produce all the power it needs for its own operations. Today, the caretakers can communicate freely, can equip themselves with a satellite phone – important for the security- and can acquire modern catering equipment to offer quality of services to their customers. And hikers can now recharge all their electronic devices without any constraint.

In addition to the reduction of greenhouse gases emissions and noise and olfactory nuisances, the SAGES station contribute to the development of a business activity, environmentally friendly, directly linked to the biodiversity of the Nationals Parks.

And to quote Nicolas, the refuge caretaker, "all this comfort and security thanks to the sun and water!"

The SAGES solution is an energy station that can use any type of renewable energy sources (wind, sun, geothermal...) and different storage technologies including lithium-ion batteries, for short term storage, or an integrated hydrogen chain providing unlimited long term storage. The overflow of energy powers an electrolyser, producing hydrogen. This gas will be stored in bottles, or in composite tanks, or in metal hydride material. When the primary renewable energy is lacking, a fuel cell use the stored hydrogen to produce the electricity.

What makes SAGES a single solution is its very high reliability, its lifetime exceeding 15 years and its maximum ease to operate (maintenance required only once a year for the whole installation).



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