



The modern SDEM headquarters in Vannes, France, features over 800 m² of roof-mounted solar panels, plus two small wind turbines.

France's first smart grid-ready office building

The Kergrid project is validating the reliability and cost benefits of local green energy production and storage

With 261 municipalities, the Brittany region in northern France produces only 10% of the energy it consumes. During peak consumption periods the electric grid regularly experiences saturation that can cause damage to the transmission network or interruptions in power generation capability. To address these challenges, the regional council has established the Breton Electric Pact, founded on three pillars: to control electricity demand, improve security of supply, and massively deploy renewable energy.

In this spirit, the region's energy union, SDEM, is entrusting Schneider Electric with the design and implementation of a unique experiment. 'We are a region very aware of the problems of saving energy', explains Henri Le Breton, President of SDEM. 'So we decided to construct a smart building that will be able to reduce its demand on the grid during peak periods, especially in winter.'

Named 'Kergrid', the new 3,300 square metre SDEM headquarters in Vannes will be equipped with an electrical energy storage system (EES) linked to onsite renewable electricity generation and controlled by an energy management system. It will be the first demonstrator prototype in France of a smart grid-ready office building.

The Kergrid project anticipates the deregulation of the electricity market in 2015, helping validate a solution adaptable to other commercial buildings. It will also make a strong case for the resale of stored electricity, for which there is currently no regulatory framework. 'In France, companies and individuals have the right to generate electricity, but it must be for their own use, or injected immediately into the network', notes Le Breton. 'We would like to see this legislation evolve and will demonstrate the relevance of stored energy in helping reduce the risk of grid blackouts.'

'We decided to construct a smart building that will be able to reduce its demand on the grid during peak periods.'

*Henri Le Breton,
President, SDEM*

Intelligent control of green energy

The Kergrid building's 850 square meters of roof-mounted photovoltaic panels produce up to 126 kW of electrical power. Additionally, two small wind turbines are each capable of producing 2.5 kW. Energy is stored in the EESS, which features power conversion technology from Schneider Electric and Li-Ion battery technology from Saft. Its 56 kWh capacity can supply the building's entire energy needs for up to two hours.

'Small streams make big rivers', says Marc Aubry, CEO of SDEM. 'A single building that is capable of temporarily "disappearing" from the grid is not much. But if tomorrow all commercial buildings have this capability, then it becomes very relevant.'

At the heart of the solution is a power management system from Schneider Electric that controls the flow of energy between the energy distribution grid, local solar energy production, energy storage in batteries, the charging of electric vehicles, and, of course, building consumption. The project also integrates a building management system that monitors and controls lighting, heating, cooling, and ventilation. An automated low voltage electrical switchboard enables intelligent load shedding when required.

Running on a cloud-based platform, StruxureWare™ Energy Operation software provides the building manager access to detailed analysis and reporting of energy generation, consumption, costs, and savings.

Energy flexibility in action

By connecting the system to the Breton electrical grid, SDEM will participate in actions that will



A Schneider Electric technician analyses the performance of the integrated power conversion and battery storage system.



SDEM president Henri Le Breton (left) and CEO Marc Aubry explain their vision for a sustainable, energy-independent Brittany.

strengthen the grid and increase electricity availability. During peak consumption periods the system will automatically arbitrate between selling stored energy to the grid or auto-consuming it to supply the building.

The ability to store renewable energy onsite enables self-consumption to be maximized and participation in demand response programs to be optimized. It is also one of the safest ways for the smart grid to integrate more renewable energy sources.

An award-winning strategy

During the Smart Grid Paris conference in 2013, the Kergrid project was awarded a trophy that recognized its vision and innovations for optimizing energy performance using renewable electricity production and storage. 'We are particularly pleased with this trophy [which] confirms the relevance of the Kergrid project [and] and its objective to develop technologies that can be reproduced on a larger scale', declares Le Breton.

By helping define the tertiary building of tomorrow the project is also suggesting a new way for grid operators to take advantage of the energy flexibility of emerging customer 'microgrids'. Further, the solution gives building managers the information-based tools needed to encourage energy efficiency and optimize utility contracts. Le Breton concludes, 'Sustainable development must be achieved at the local level with local governance. This is the goal of the experiment.'

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Marc Aubry,
CEO, SDEM



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