A pumped storage power station

By storing water during periods of low consumption, Pumped Storage Power Stations provide an almost instantly accessible energy reserve to meet high demand.

Six of France's 150 hydorelectric stations are what is known as Pumped Storage Power Stations. The most recent is Grand'Maison. Its function is not to provide the majority of the electricity supply (this is done by conventional or nuclear plants) but to regulate the electricity network. Electricity consumption can vary on a seasonal basis (winter consumption is two times greater than summer consumption), on a weekly basis (weekend peaks), or on a daily basis (peaks lasting a few hours).

In order to meet demand there must be a way of immediately producing what is consumed. However, nuclear power plants produce a constant amount of electricity which cannot be varied. Pumped storage power plants can absorb the surplus eletricity they generate during periods of low consumption and make up for shortages during peak periods. The rapidity with which they can be brought into action means they provide a power reserve that is available almost instantaneously (their maximum output is twice that of a 900MW nuclear reactor).

Energy is transferred from one place to another using the 400kV national and international network which links nucleur, conventional hydroelectric and pumped storage power stations together. When pumped storage plants operate the either produce power or absorb excess electricity. As it is not possible to store energy, water is pumped from a lower reservoir to an elevated reservoir to provide a water reserve.

As a result of pumping during periods of low consumption (during nights, weekends, the spring and early summer), the water can be used 4 or 5 times before it is returned to the river. EDF is thus able to transfer energy from periods of low consumption to periods of high consumption cost-effectively.