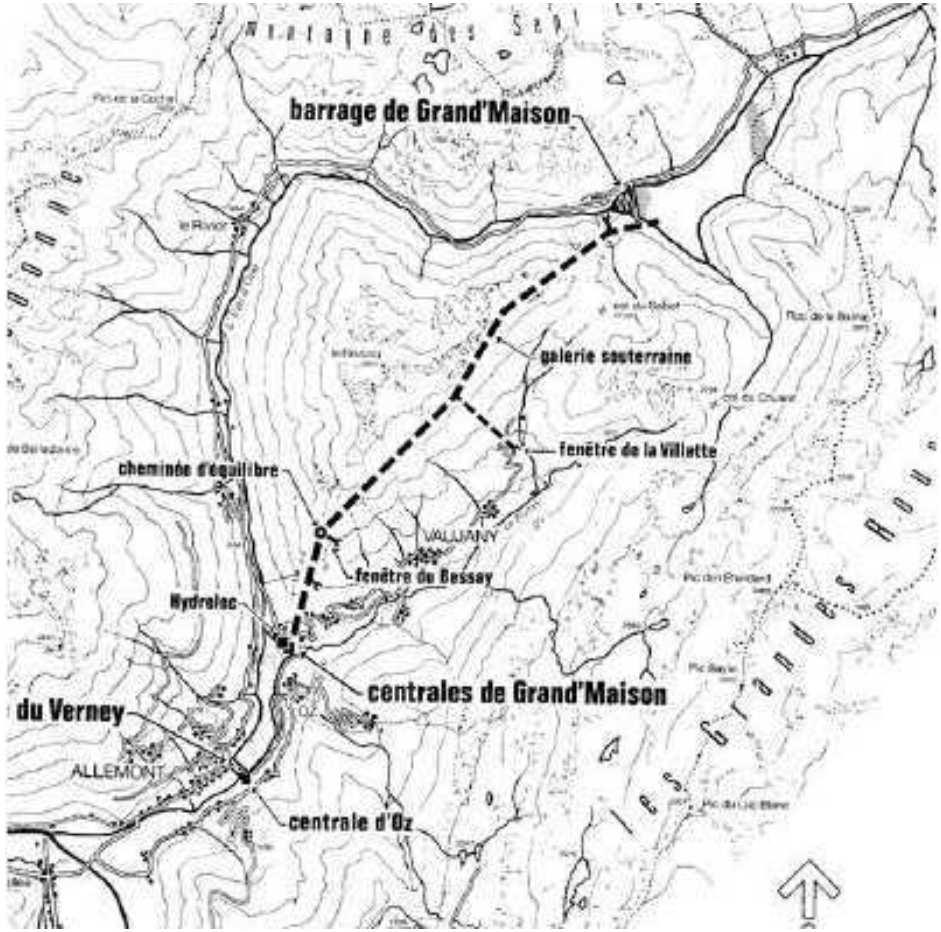
A STEP plant: Grand Maison



a

The principle: two dams with 900 m difference in altitude. The reversible turbines can be used for electricity storage. Global efficiency: 70%.

The two lakes

The principle: two dams with 900 m differrence in altitude. The reversible turbines can be used for electricity storage. Global efficiency: 70%.

The two lakes

The higher dam is at 1700m, and contains 160 Mm^3.

The lower (Verney) is at 800 m, and contains about 16 Mm^3.

The power of the turbines is 1.8 Gw.

What is the amount of energy available?

An estimate: $10^{10}\ kg \times 900\ m \times 9.82 m/s^2 \simeq 10^{14}\ J \simeq 25\ GWh$

which is the dayly production of a nuclear plant. As the turbine power is only 1.8 Gw, it can provide energy for 12 hours of peak production. It is generally filled during week-ends. The overall efficency (nuke to user) is 69%.

The cost was 5GF in 1985, probably about 1.5GEuros in 2010

These “STEPS” cannot be sufficient to compensate for the intermittency of others renewables. More: they are not very interesting fot EDF, because now they have to pay twice the royalties to RTE (the EU obliges to have different compagnies for the electricity transport)!