WP4.4

Var MCA alternatives description

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Summary

SHORT DESCRIPTION
This document contains the description of the MCA application to the river Var. The lower valley of the Var river had 16 dams, built in the 1980's. Several recently collapsed, for hydromorphological reasons apparently. Should the local authority decide to dismantle all of the remaining dams?

Document Control

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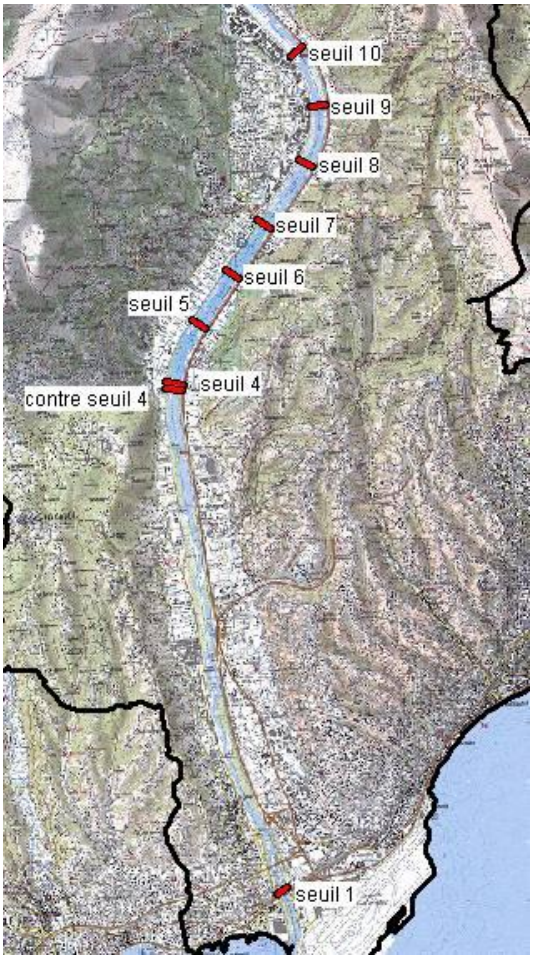
Introduction

The SAGE from the Var department and GERES co-drive the working group "consultation and hydropower."

On the river Var, in the part of the plain, a series of sills originally built to moderate the effects of floods, is equipped with micro-hydropower plants (built in the years 1983, 1984).
Over the years, these small dams (high 50 cm to 4 m) slowed the transport of sediments. Upstream dams, silts deposited tend to limit water exchange between the aquifer and the river and to increase the flooding risks. Also, some works, too old, would be threatened in case of flooding (such as 1994) as they may collapse. Therefore one of the main objectives is to diminish the risk of flood. These sills will be lowered in the goal that the river returns to its natural functioning and flood transports sediments unhindered.
Three stations on the sill 8th, 9th and 10th must be removed (the station from sill 10th is inoperative due to silting).



The operator, Var energy, German group, had an operating permit that ends by the prefecture. This operator is seeking, with the hydropower group, another hydropower alternative that does not unhindered sediments transport.

Few decisions as lowering sills have been already taken by the prefecture. Therefore, various alternatives need to be tested to take in consideration all stakeholders issues and opinions.

Alternatives description

The territory leads a SAGE with environmental requirements on the one hand, and a situation in which the energy peninsula development solutions for green electricity produced locally are encouraged on the other.

SESAMO is used to show the balance between economic and ecological components in various scenarios / options:

1. ALTERNATIVE 1: Maintenance of sills equipped with power plants (current case and not maintainable)
2. ALTERNATIVE 2: Removal of all sills and power plants (desired solution by the objectives of SAGE) – except n° 16.
3. ALTERNATIVE 3: Development of new facilities - new power plants technology: airbag sill on the total width of the river (solution studied by the operator).
4. ALTERNATIVE 4 : Development of new facilities – new power plant technology: airbag sill on a partial width of the river (solution studied by the operator)

MCA tree

Unlike using a SESAMO in the assumption of the creation of a single power plant, where it seeks what is the flow taken the most appropriate with the environment balance, the Var itself has specific aspects:

There're several power plants installed. Therefore, to run the software we add the heights and flow rates to rationalize as if we had only one power plant.

Sill 4th, Var, France
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In this case, the sills 8th and 9th: Height: 4.93 m and 4.96 m for a power of 2515 kWh and 2484 kWh for one turbine flow of 52 m^3 / s.

The SESAMO tree in the case of the Var is built similarly to other trees but also has some specificity.

Six Identical criteria are:

Criteria Energy production with 3 indicators:

1. annual energy produced (G€) ;
2. production in Lower Var valley compared with local consumption (in all the Alpes Maritimes territory) (%)
3. production in Lower Var valley compared with hydropower departmental production (%)

Criteria Economy related to HP production with 2 indicators:

1. financial outcomes HP producer level (*direct incomes from the sale of hydroelectricity*) (G€)
2. economy regional level (*indirect incomes, taxes from the sale of hydroelectricity*) (G€)

Criteria River ecosystem is divided into 3 sub criteria (qualitative):

1. **Sub criteria Hydro morphology** with **2 indicators**: continuity in solid transports and possibility for the river to move trough its all width
2. **Sub criteria Ecological continuity** with 3 indicators : "eels upstream migration ", "fish upstream migration" and "fish downstream migration"
3. **Sub criteria Avifauna (Natura 2000 objectives)**

NB Indicator "benthic macro invertebrate" doesn't seem pertinent.

Plant 3, after destruction of sill number 3 by the 1994's flood, Var, France
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The criteria specific to the Var pilot case study are:

1. **Criteria Tourism with 1 indicator** (qualitative): **Scientific tourism** (school, university...)

2. **Criteria other uses with 1 indicator** (qualitative**): Drinkable Water intake upstre**am of the sill. If the sill is removed, the drinking water intake must be ensured deeper or further upstream, although the use of that water intake is exceptional.

Criteria security of the river bed, with 2 indicators

1. **Maintenance cost** (G€)
2. **Issues impacted during an exceptional event = a hundred-year flood** (qualitative)

Fish ladder sill 4th, Var, France
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