WP5 Pilot & Demonstration Projects
Demo-5 : Small Flex

Cécile Münch
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## Context

### Small hydro Production & Potential

<table>
<thead>
<tr>
<th>Power</th>
<th>Production 2013</th>
<th>Potential 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>OFEN</em></td>
<td><em>RPC waiting list</em></td>
</tr>
<tr>
<td>P &lt; 300 kW</td>
<td>≈310 GWh 9%</td>
<td>≈85 GWh 8%</td>
</tr>
<tr>
<td>300kW &lt; P &lt; 1 MW</td>
<td>526 GWh 14%</td>
<td>≈190 GWh 17%</td>
</tr>
<tr>
<td>1 MW &lt; P &lt; 10 MW</td>
<td>2’817 GWh 77%</td>
<td>≈845 GWh 75%</td>
</tr>
<tr>
<td>Total</td>
<td>≈3’653 GWh</td>
<td>≈1’120 GWh</td>
</tr>
</tbody>
</table>

*In 2016, 42 new commissioning of SHPs with a total installed power of 50 MW*

*Newsletter PCH 2017*
Sccer SoE Strategy for Small Hydro

- **P < 1MW**
  - Technological innovations to improve robustness, reduce costs and harvest new potential.

- **1 MW < P < 10 MW**
  - Scientific support to facilitate new projects and assess the possibility for SHP to provide ancillary services whilst remaining eco-compatible.
A demonstrator for small hydro, why?

Apply the outcome of recent research by SCCER-SoE partners to pilot facilities with the aim of providing operational flexibility to SHP owners.

- How can intra-day, intra-week or intra-monthly storage be added to a given scheme?
- What are the consequences of enlarging the operational range of the machines?
- How can be the added-value of meteorological forecast in terms of power generation and prediction of sediment inflows?
- How are the consequences of a more flexible operation to the downstream river reach, in terms of hydropeaking consequences and river morphology?
Demo-5: 1st Case Study

KW Rhone Oberwald (under construction)
Demo-5 : KW Gletsch-Oberwald

Run-of-the-river power plant

Net head : 288 mCE
Installed discharge : 5.7 m³/s
Installed capacity : 14 MW
Mean gross capacity : 4.68 MW

Commissioning : end of 2017

2 Pelton turbines with 6 injectors
Demonstrator for SHP SmallFLEX

Task 1. Water storage potential? 
EPFL LCH

Task 2. Hydraulic Machines flexibility? 
HES SO, EPFL LMH & PVE

Task 3. Added Value of Flow & sediments forecasts in Gletsch? 
WSL

Task 4. Ecological impacts? 
EAWAG

Task 5. Business model of a flexible SHP? 
FMV

What is the flexibility potential of the Gletsch-Oberwald SHP?
Demonstrator for SHP SmallFLEX

Status of the project: submitted for financial support in June 2017.

Expected results:
The methods developed in this project may be applicable to affect positively several hundred high-head plants with no or little storage, resulting in an annual revenue increase of 5-10% from increased value of the winter production. A small increase in energy production (<5%) is foreseen, due to an improved use of excess waters at high-altitude intakes above the residual discharge releases.

First insights in our project: 4 posters 😊