WP5 Pilot & Demonstration Projects
Demo-5 : Small Hydropower Plant

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Context

Small hydro production - 2013

- $P < 300\, \text{kW}$: $\approx 310\, \text{GWh}$
- $300\, \text{kW} < P < 1\, \text{MW}$: 526 GWh
- $1\, \text{MW} < P < 10\, \text{MW}$: 2'817 GWh
- **Total**: $\approx 3'653\, \text{GWh}$

*Source: OFEN 2013*

- Approximately 10% of hydroelectricity production

Annual Conference 2015 - Future of Swiss small HydroPower plants – C. Münch
Context

Small hydro potential - 2015

P < 300 kW  \approx 85 \text{ GWh}
300kW < P < 1 MW  \approx 190 \text{ GWh}
1 MW < P < 10 MW  \approx 845 \text{ GWh}
Total*  \approx 1'120 \text{ GWh}

*Source KEV list Positive answers 2015
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

Small Hydro Potential

- 25%
- 75%
Objective of a demonstrator for small hydro

Apply the outcome of recent research by SCCER-SoE partners to pilot facilities with the aim of providing operational flexibility to SHP owners. The results will be publicly presented and used as a benchmark for the SHP sector.

- 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
(En construction)
Demo-5 : KW Gletsch-Oberwald

Run-of-river power plant

- Installed discharge: 5.7 m³/s
- Residual discharge: 200 l/s
- September: 750 l/s
- Total head: 295 m
- Net head: 288 m
- Installed capacity: 14 MW
- Annual production: 41 GWh
- Mean gross capacity: 4.68 MW
- Investment: 65 Mio. CHF
- Production cost: ≈ 10 ct/KWh

1. Zugangsstollen Fassung
   Galerie d’accès à la prise d’eau
2. Installationsplätze Gletsch
   Place de chantier de Gletsch
3. Wasserfassung
   Prise d’eau
4. Triebwasserstollen
   Centrale souterraine
5. Zentrale unterirdisch
   Centrale souterraine
6. Rückgabestollen
   Galerie en charge
7. Zugangsstollen Zentrale
   Galerie d’accès à la centrale
8. Installationsplatz St. Niklaus
   Place de chantier de St. Niklaus
9. Umweltmassnahmen
   Mesures de compensation environnementale
10. Materialaufbereitung Kieswerk
    Valorisation des matériaux à la gravière
11. Ablagerung Grie
    Dépôt des matériaux
Demonstrator for SHP

- Water storage potential? EPFL, HES SO, ...
- Long-term ecological impacts? EAWAG, ...
- What are the flexibility limits of the Gletsch-Oberwald SHP?
- Hydraulic machines flexibility? HES SO, EPFL, ...
- Added Value of Flow & sediments forecasts in Gletsch? WSL, EPFL, ...
- ...
Demo-5 : KW Gletsch-Oberwald

- Storage / buffer
  - Volume vs. purpose
  - Aeration
  - Transients

- Equipement
  - Head range
  - Efficiency
  - Stability
  - Fatigue

- Forecasting
  - Water & Sediments
    - Per season
    - Per time span

- Env. Impacts
  - RoR
  - With Flex
Site visit – Gletsch-Oberwald SHP