SCCER SoE

SWISS COMPETENCE CENTER for ENERGY RESEARCH
SUPPLY of ELECTRICITY

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

Cécile Münch

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In cooperation with the CTI

Energy
Swiss Competence Centers for Energy Research

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Commission for Technology and Innovation CTI

Context

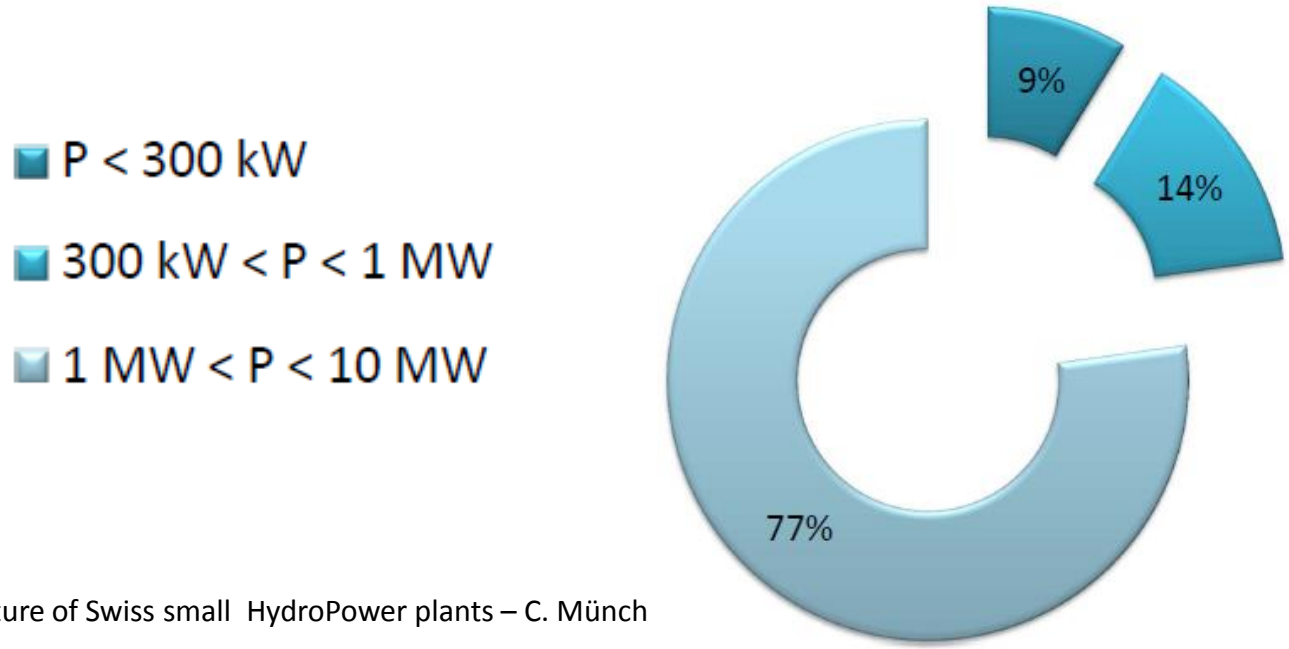
Small hydro production - 2013

P < 300 kW	*≈310 GWh*
300kW < P < 1 MW	526 GWh
1 MW < P < 10 MW	2'817 GWh
Total*	**≈3'653 GWh**

*Source OFEN 2013

≈ 10 %

of hydroelectricity production



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

Context

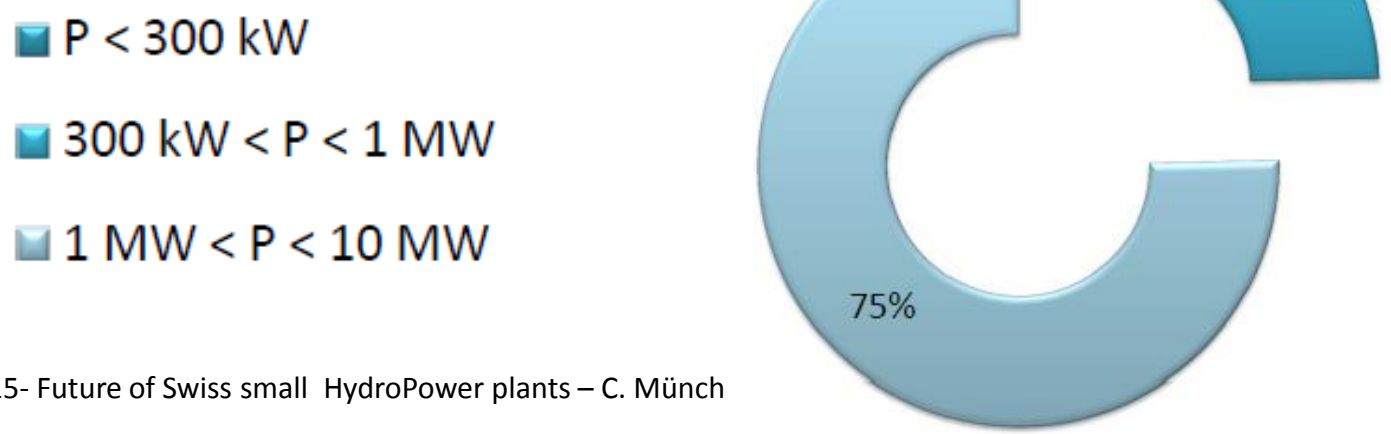
Small hydro potential - 2015

P < 300 kW	*≈85 GWh*
300kW < P < 1 MW	*≈190 GWh*
1 MW < P < 10 MW	*≈845 GWh*
Total*	***≈1'120 GWh***

≈ 45 %

of hydroelectricity potential

*Source KEV list Positive answers 2015



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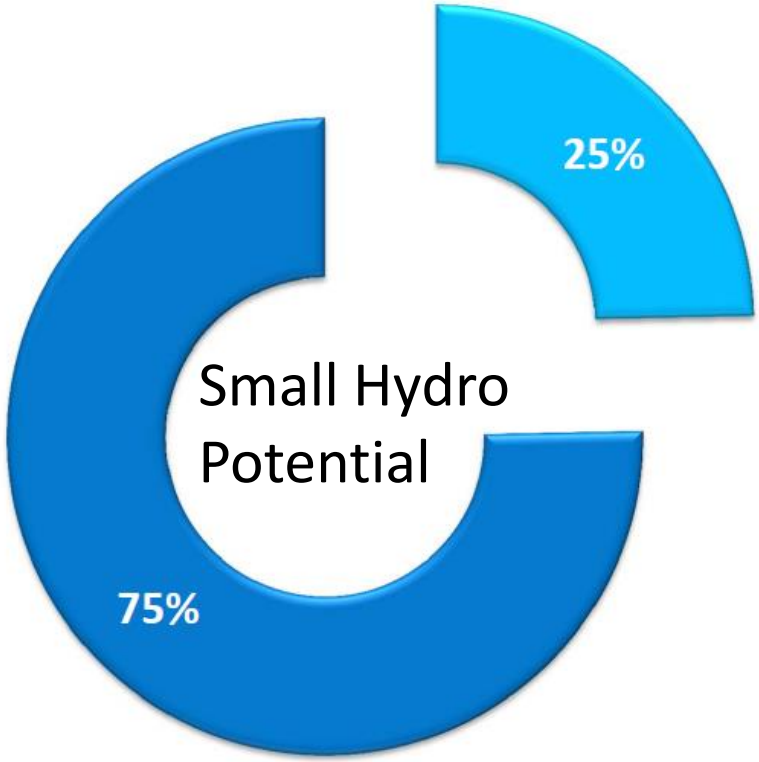
Sccer SoE Strategy for Small Hydro



- P < 1MW

Technological innovations to improve robustness, reduce costs and harvest new potential.

- 1 MW < P < 10 MW

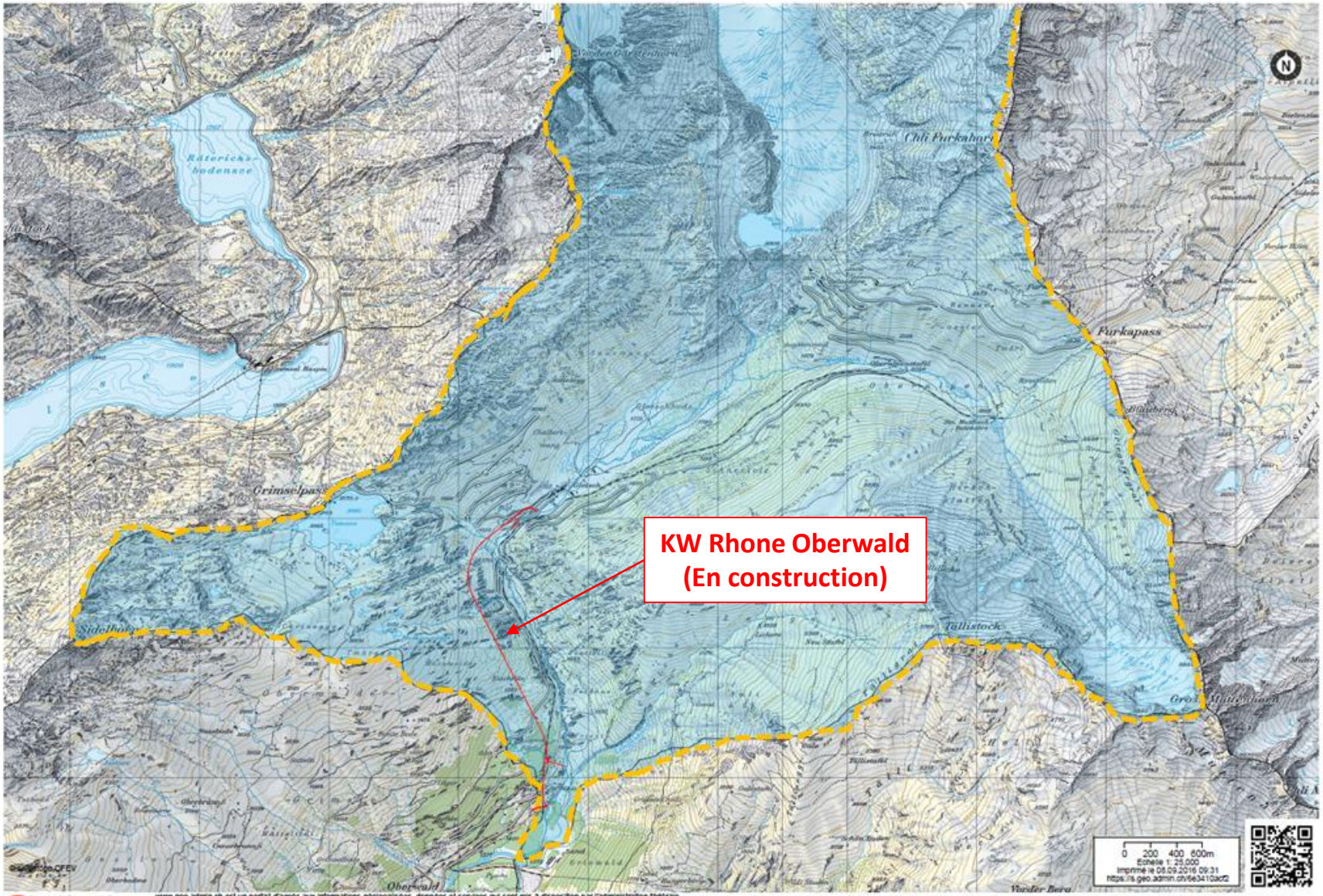
Scientific support to facilitate new projects and assess the possibility for SHP to provide ancillary services whilst remaining eco-compatible

Objective of a demonstrator for small hydro

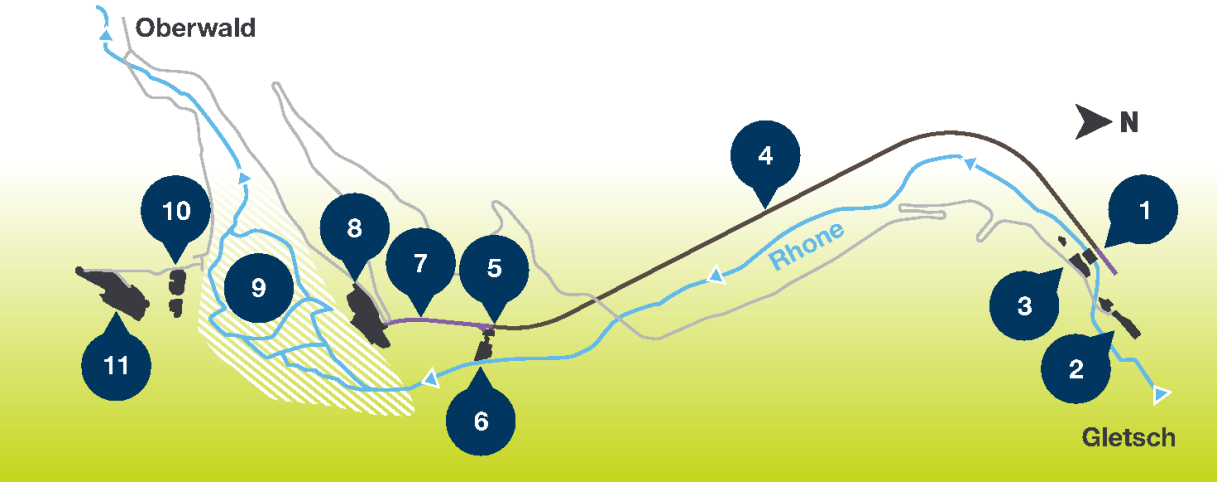
Apply the outcome of recent research by SCCER-SoE partners to pilot facilities with the aim of providing operational flexibility to SHP owners. The results will be publicly presented and used as a benchmark for the SHP sector.

- 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



Demo-5 : KW Gletsch-Oberwald

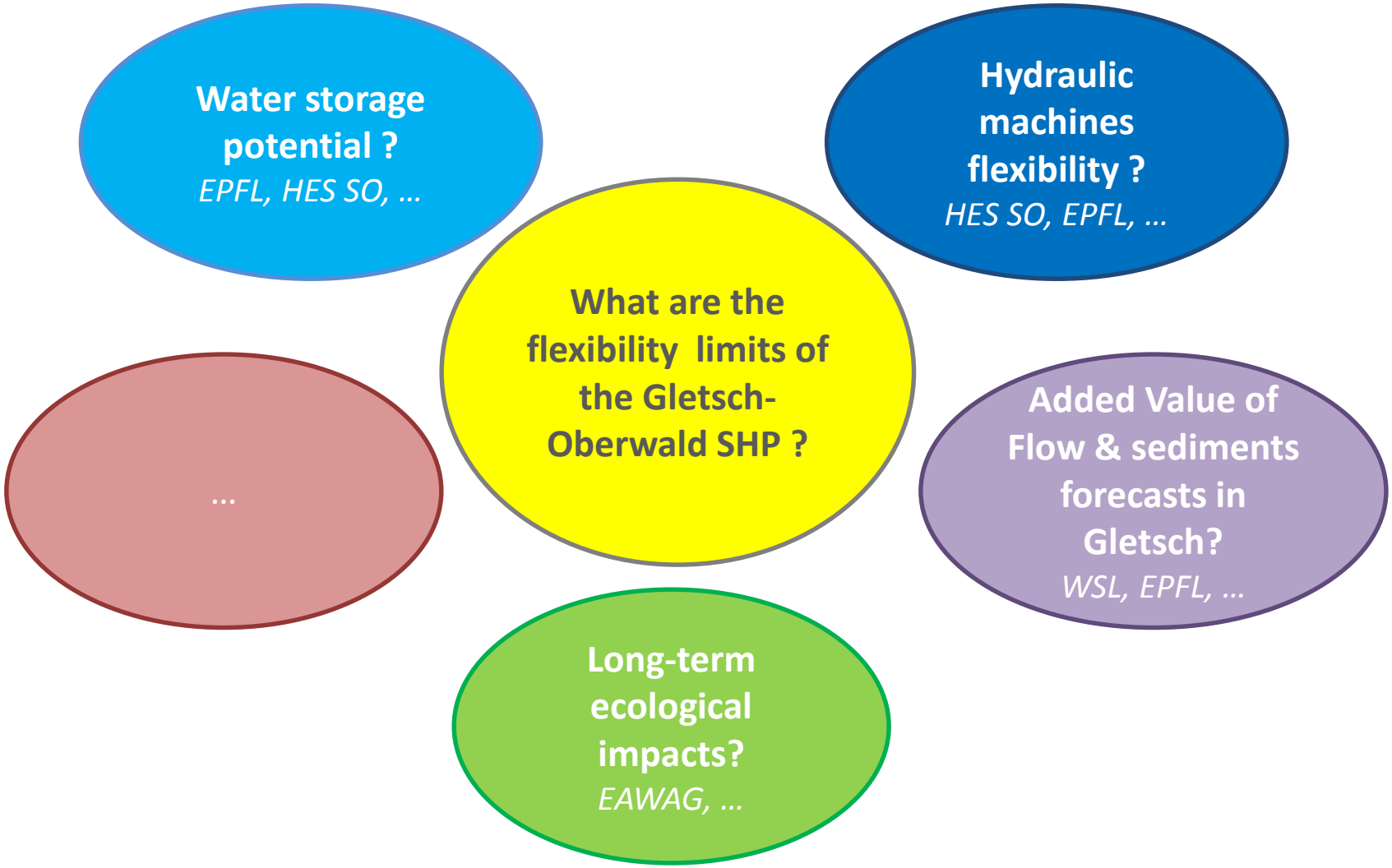


1. **Zugangstollen Fassung**
   Galerie d'accès à la prise d'eau
2. **Installastionsplätze Gletsch**
   Place de chantier de Gletsch
3. **Wasserfassung**
   Prise d'eau
4. **Triebwasserstollen**
   Centrale souterraine
5. **Zentrale unterirdisch**
   Centrale souterraine
6. **Rückgabestollen**
   Galerie 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

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

Demonstrator for SHP



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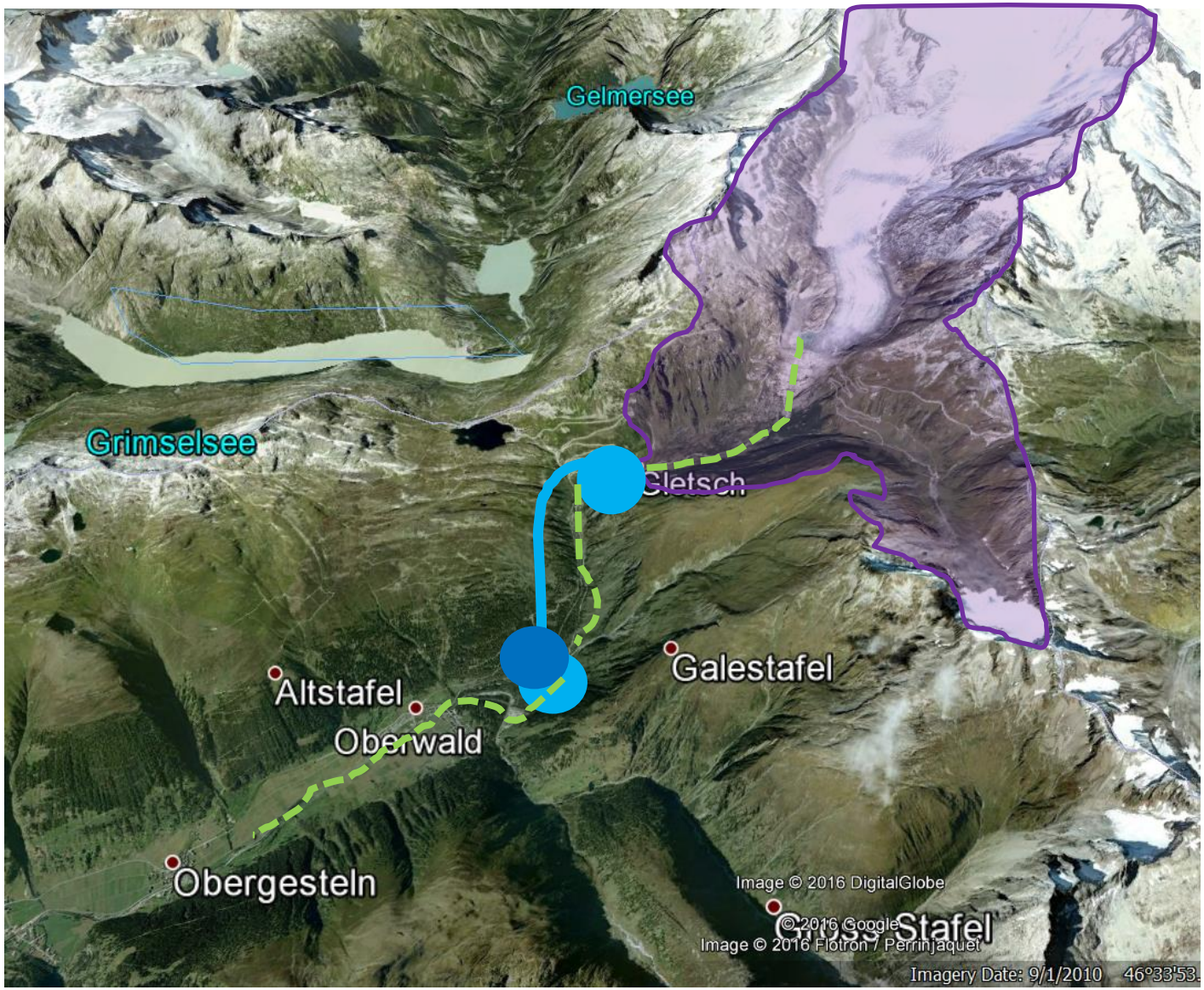

Storage / buffer
- Volume vs. purpose
- Aeration
- Transients

Equipement
- Head range
- Efficiency
- Stability
- Fatigue

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

Env. Impacts
- RoR
- With Flex

Site visit – Gletsch-Oberwald SHP