



SWISS COMPETENCE CENTER for ENERGY RESEARCH  
SUPPLY of ELECTRICITY

# WP3 Innovation Agenda

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September 13<sup>th</sup> , 2018

In cooperation with the CTI

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**Energy**

Swiss Competence Centers for Energy Research

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Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Swiss Confederation

Commission for Technology and Innovation CTI

## Task 3.1 Innovative technologies

### Key areas of research

#### HYDROELECTRICITY

Enhance the flexibility of large and small Hydropower plants

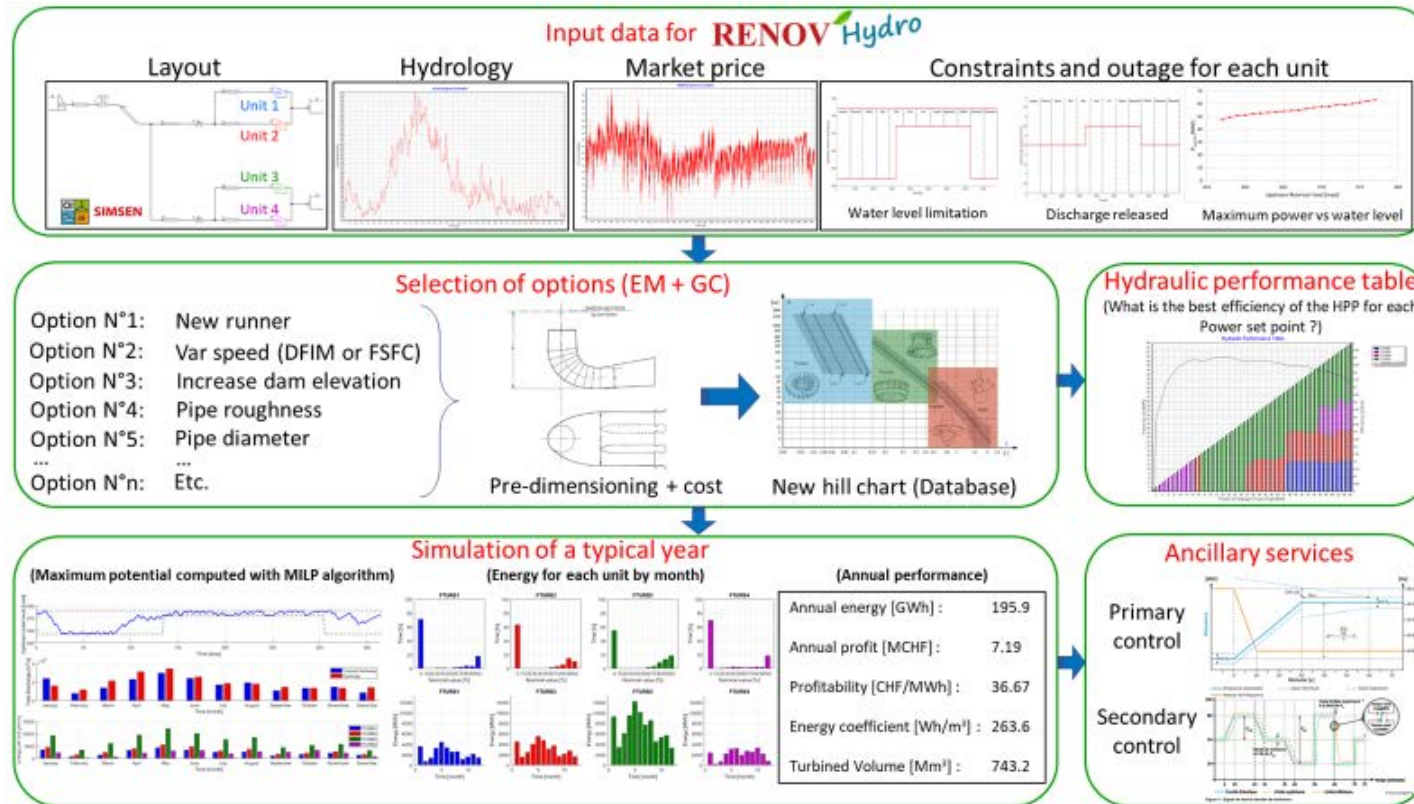
Harvest the potential of existing infrastructures

#### GEO- ENERGIES

Control seismic risk

# Task 3.1 Innovative technologies

## LARGE HYDRO



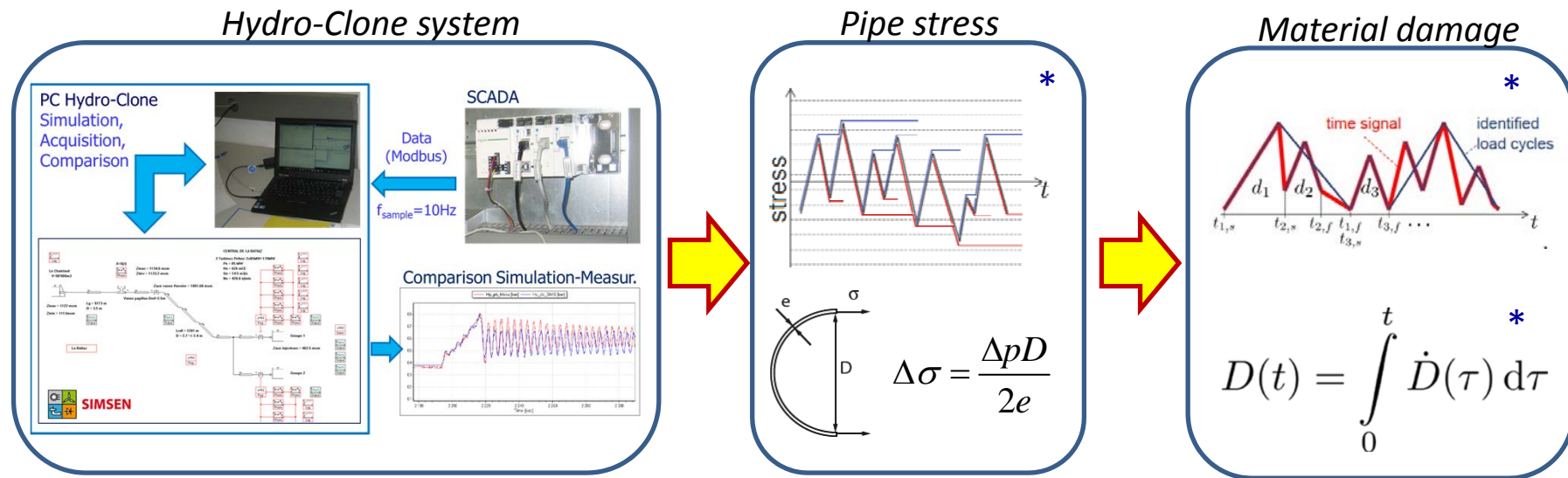
See poster  
C. Landry et. al



# Task 3.1 Innovative technologies

## LARGE HYDRO

Innosuisse project 28112.1 PFIW-IW : Penstock fatigue monitoring



\* Weber et al., IAHR WG 2013

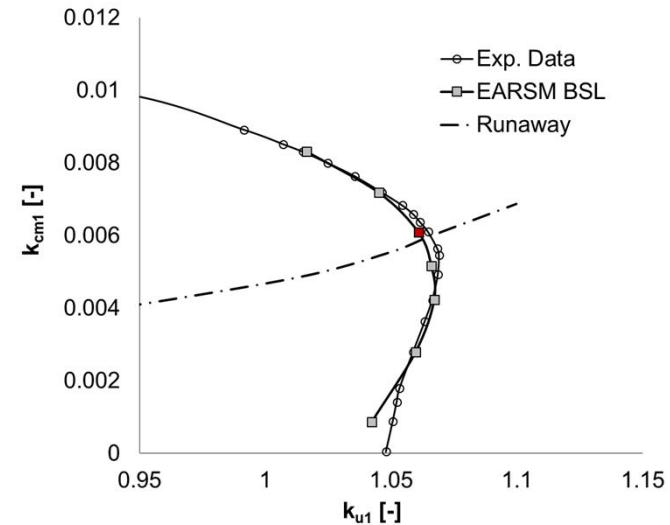
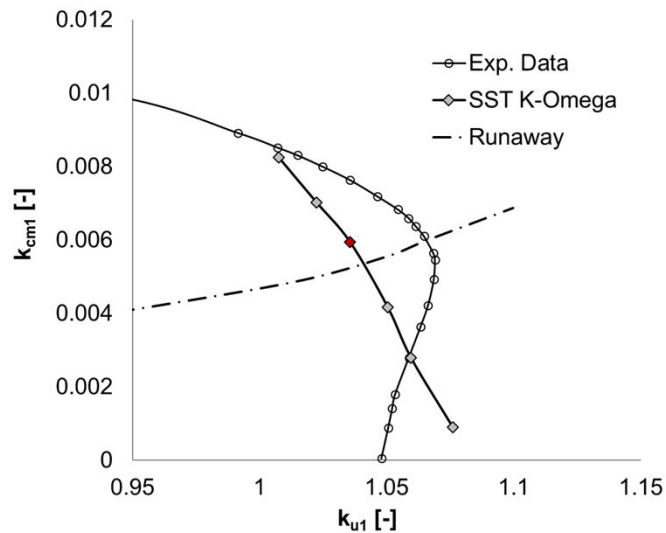
See presentation of S. Rey-Mermet, 16h today !



# Task 3.1 Innovative technologies

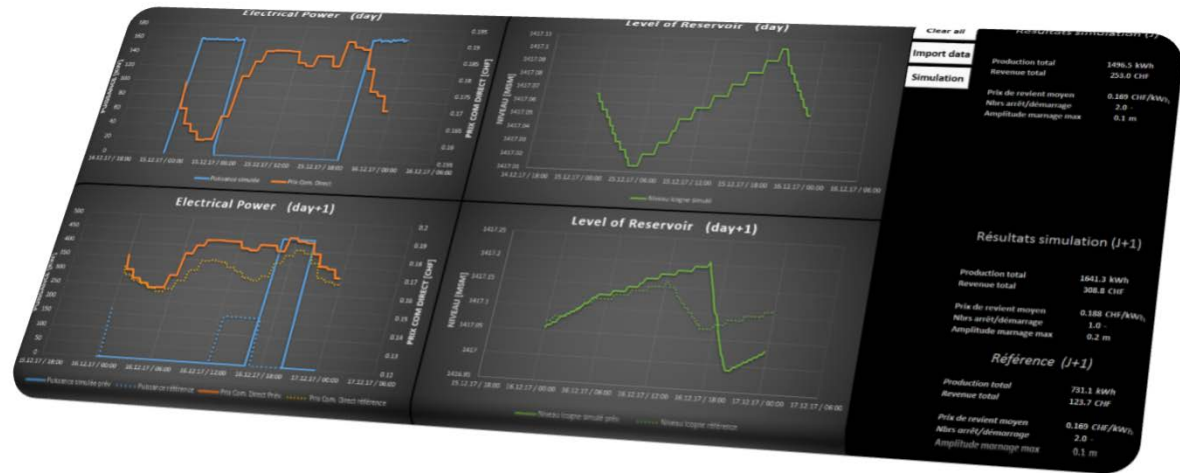
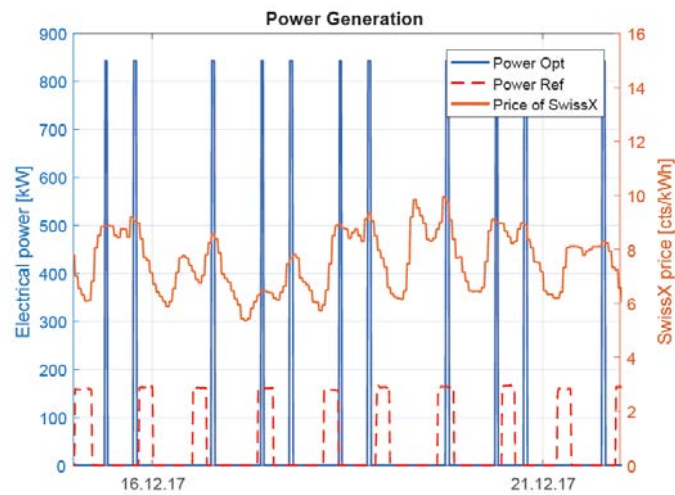
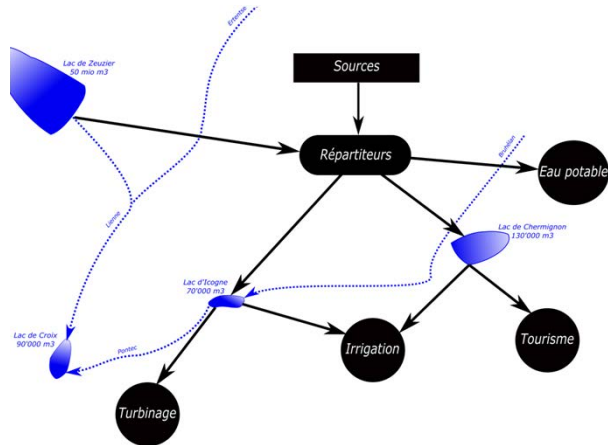
## LARGE HYDRO

- Development of turbulence models able to better capture turbine instability
- New models can be applied to
  - investigate flow phenomena and increase understanding of instabilities
  - support turbine-design phase before experimental testing



# Task 3.1 Innovative technologies

## SMALL HYDRO




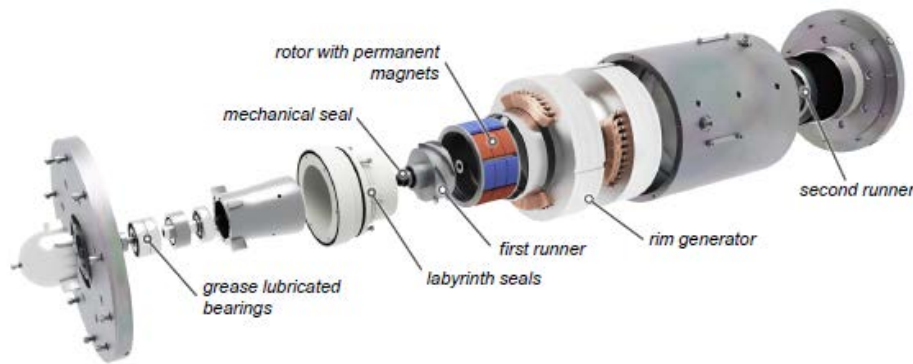
➔ See poster : J. Schmid et al.

# Task 3.1 Innovative technologies

## SMALL HYDRO

*Innosuisse Duo Turbo project*  
 2018 : First product and Pilot sites

 Schweizerische Eidgenossenschaft  
 Confédération suisse  
 Confederazione Svizzera  
 Confederaziun svizra  
 Swiss Confederation  
**Innosuisse – Swiss Innovation Agency**



**Savièse**  
 Net head = 125 m  
 Average discharge = 10 l/s  
 Estimated production = 26 MWh/a  
 Commissioning in **september 2018**

**Médières**  
 Net head = 175 m  
 Average discharge = 4 l/s  
 Estimated production = 18 MWh/a  
 Commissioning in **december 2018**



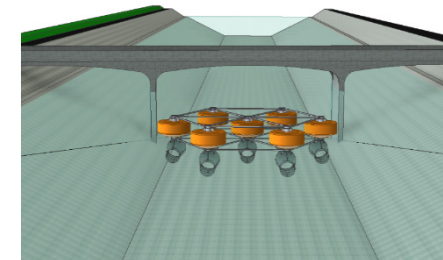
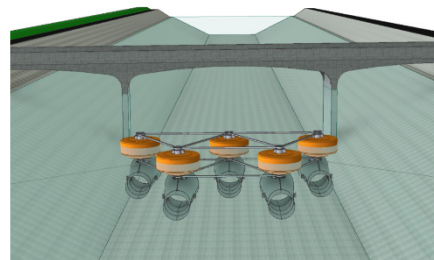
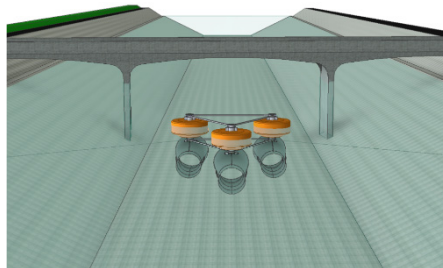
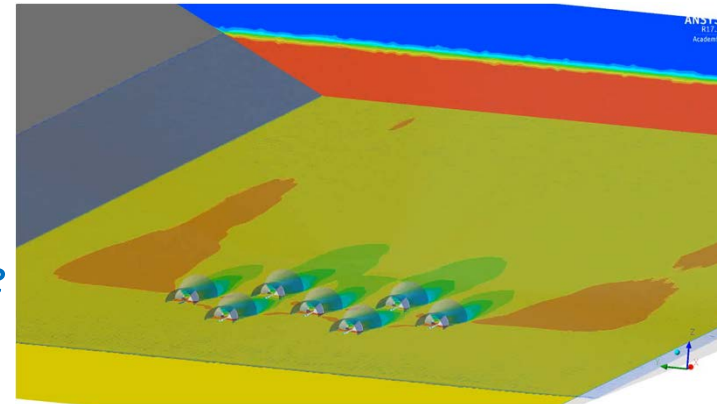
 See poster : D. Biner et al.

# Task 3.1 Innovative technologies

## SMALL HYDRO

### Hydrokinetic turbine farm

- Farm configuration options
- Cost estimation
- CFD prediction of the farm performance



➔ See posters : O. Pacot et al.

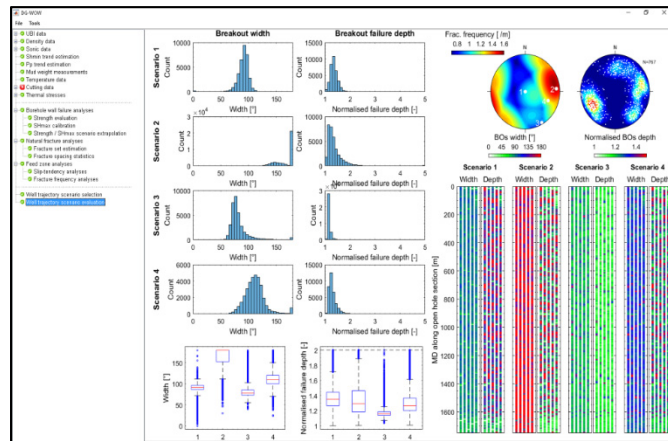


# Task 3.1 Innovative technologies

## GEO ENERGIES – Optimize access to geothermal resources

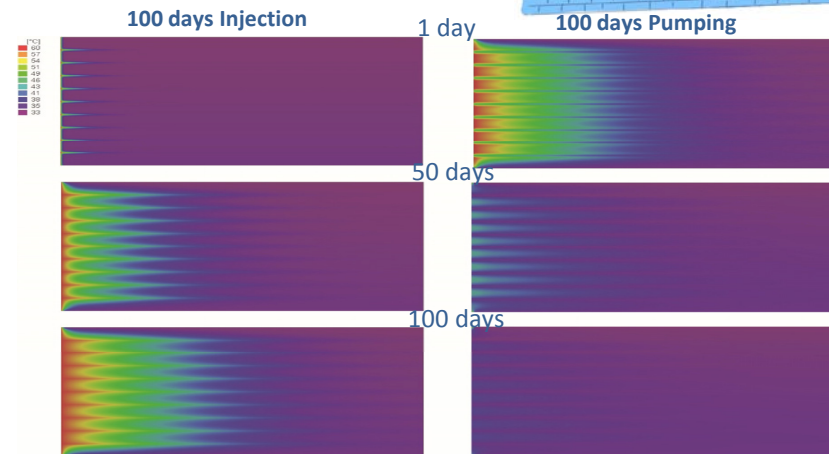
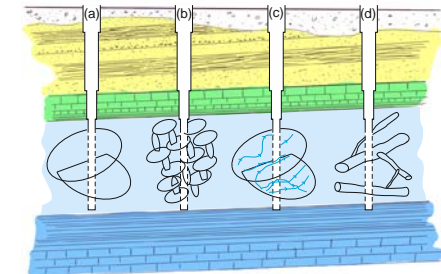
### DG-WOW

- Evaluate parameters affecting well stability
- Optimize well trajectory for well stability



### Heatstore

- Develop well testing protocol and guideline for heat storage project



➔ See posters :  
**Dahrabou et al. : Calibration of borehole failure models using inverse problem methods**  
**Ruegg et al. : Data acquisition and numerical modeling for a thermally induced breakout experiment**

➔ See poster and presentation :  
**Sohrabi and Valley ( Fri 10:00am): Thermo-hydraulic well testing for characterization and management of heat storage projects**  
**Sohrabi and Valley (poster) : Thermo-hydraulic testing of fractured rock mass for heat storage projects**

# Task 3.1 Innovative technologies

## GEO ENERGIES– Boreholes Stability Issues in Ultra-Deep Geothermal Production

- High pressure and temperature triaxial device to simulate in-situ conditions for a Gotthard granite at 8 km depth.



- Improve assessment of material strength to evaluate stability due stress and temperature redistribution.

 See poster: A. Salazar et al.

