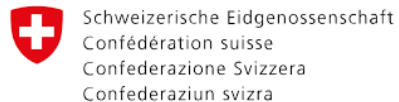




Opportunities in drinking water networks in Switzerland

1st of July 2021



Office fédéral de l'énergie OFEN

IEA TCP HYDROPOWER - Annex XVI - Online Workshop



FOWA
Forschungsfonds Wasser
Fonds de recherche pour l'eau



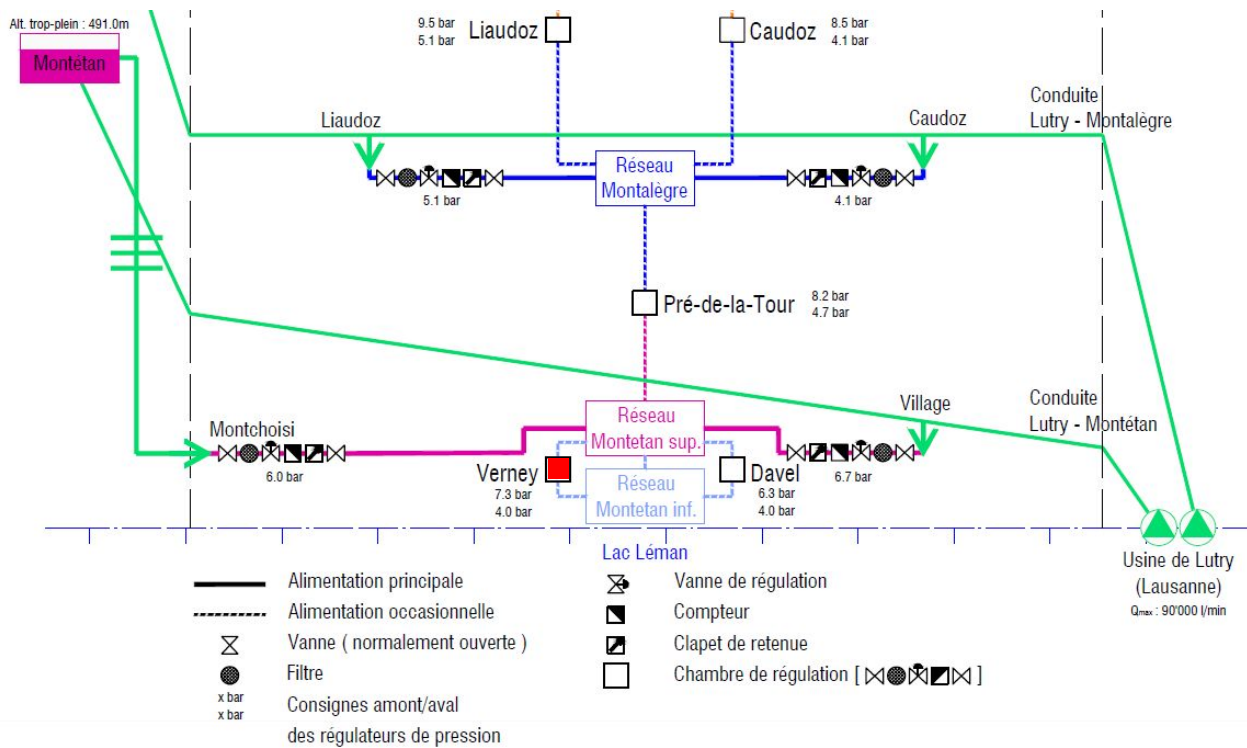
The setting

- A municipality in Switzerland, Pully, is revising the pressure management of its water distribution network. Two new pressure areas will be introduced in the system, by closing connections and creating new pressure reduction chambers.
- This setting created an opportunity to install in one of the new chambers a micro-turbine.

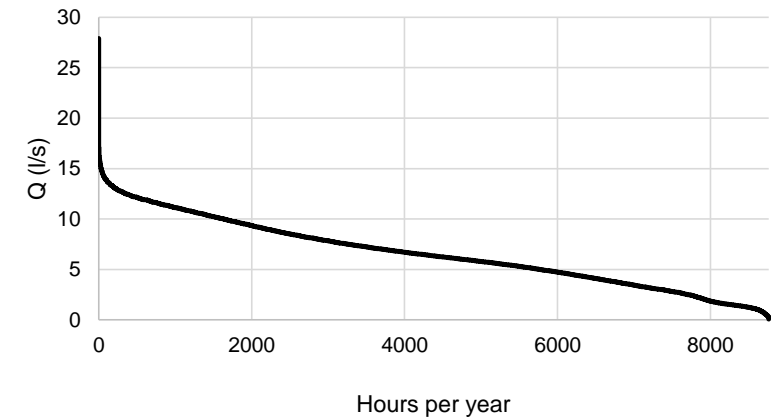


The potential

• The Verney chamber



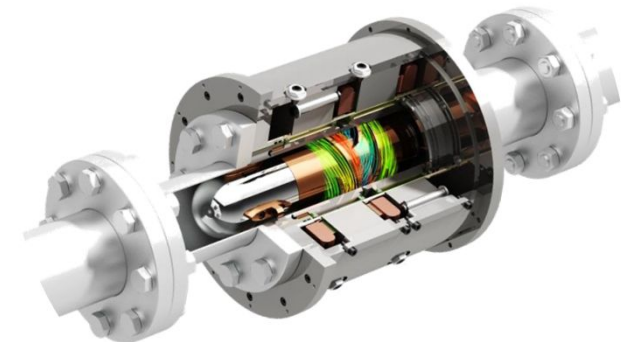
Head: expected 33 m



Hydraulic potential : 16.7 MWh/year

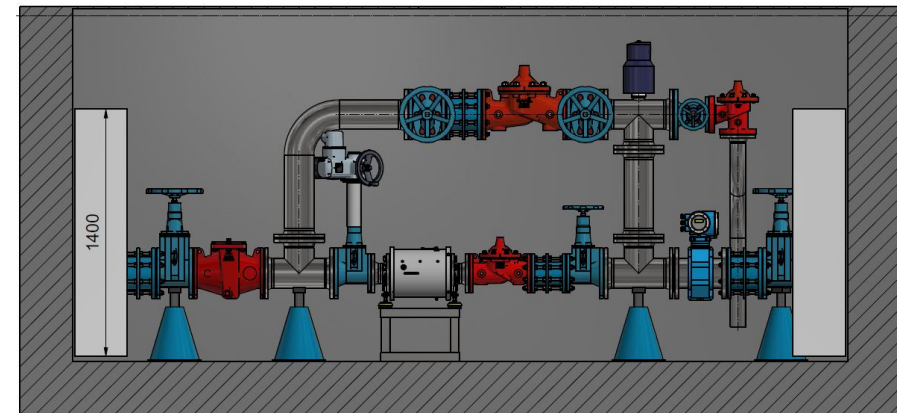
The opportunity

- The DuoTurbo micro-turbine was developed by the HES-SO Valais//Wallis and EPFL-LMH for a power range between 5 and 25 kW
- Created specifically for drinking water facilities
- So far, it has been installed in two pilot sites downstream water tanks
- Pully provides an opportunity to develop its integration **within the network**



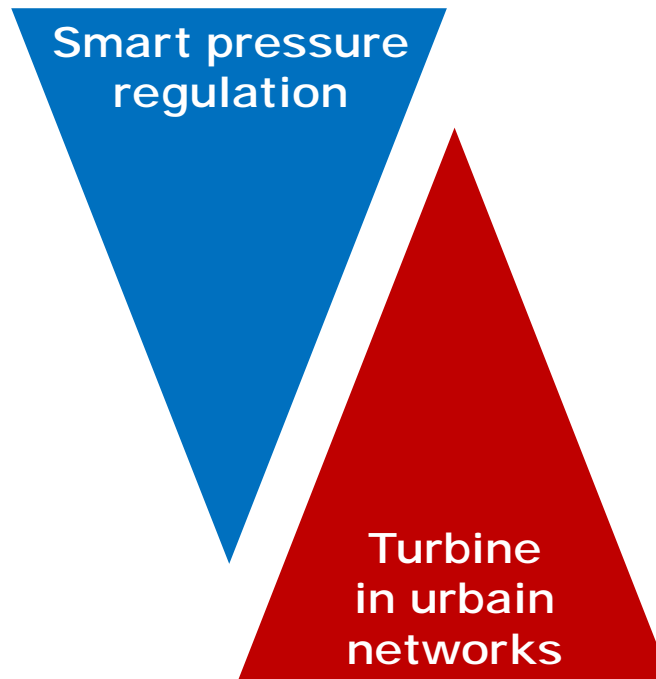
The opportunity

- For its integration in the network, the management of the operation points and of the control valves must be exhaustively studied
- The transient modes must also be studied:
 - The turbine should be "transparent" to the network
 - The turbine must physically resist the overpressures created by other equipment
- Opportunity to create a smart node in the network



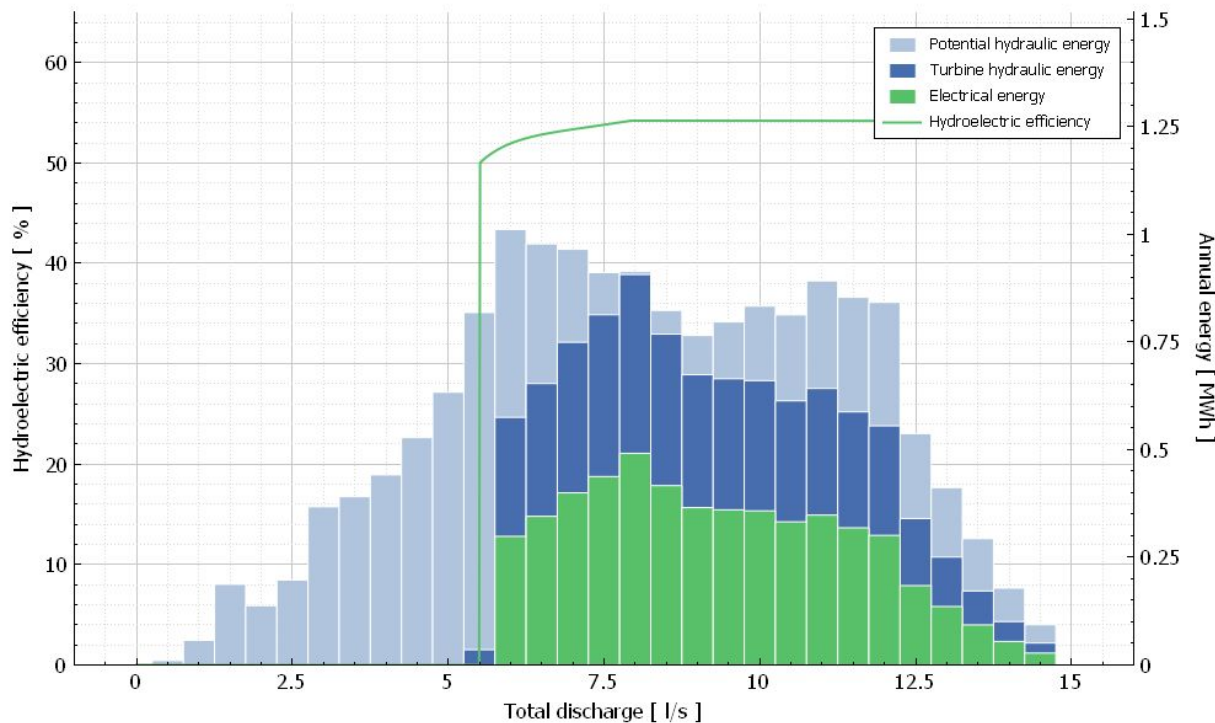
The project

- The research project TUNE is ongoing with two parallel objectives:
 - Development of network control functions
 - Smart response to accidental modes for a more robust and less oversized network
 - Reduce leak anomalies
 - Improve water quality
- Development of the DuoTurbo for distribution networks
- Development of the control modes for turbine and associated valves
- Test the integration of the solution into the network: resistance of the turbine, stability of the network, exceptional situations



The project

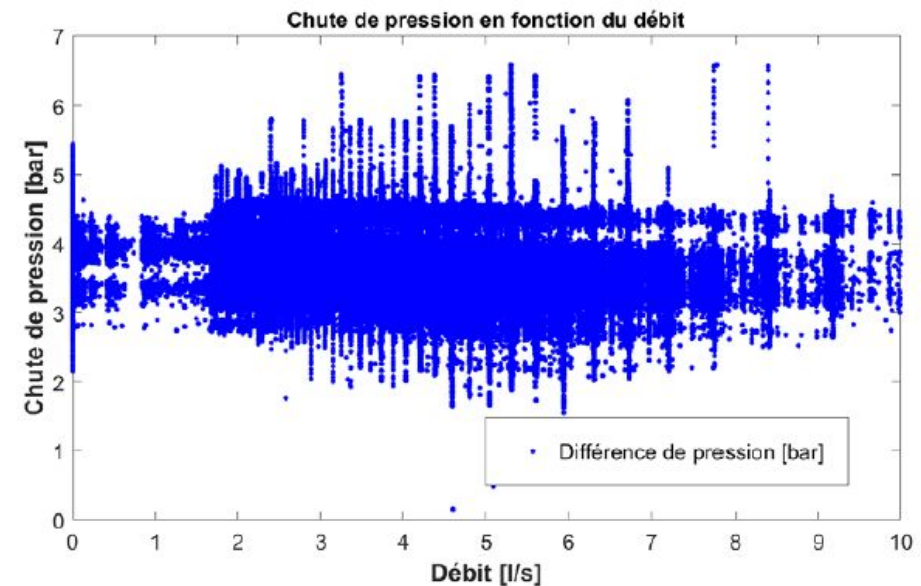
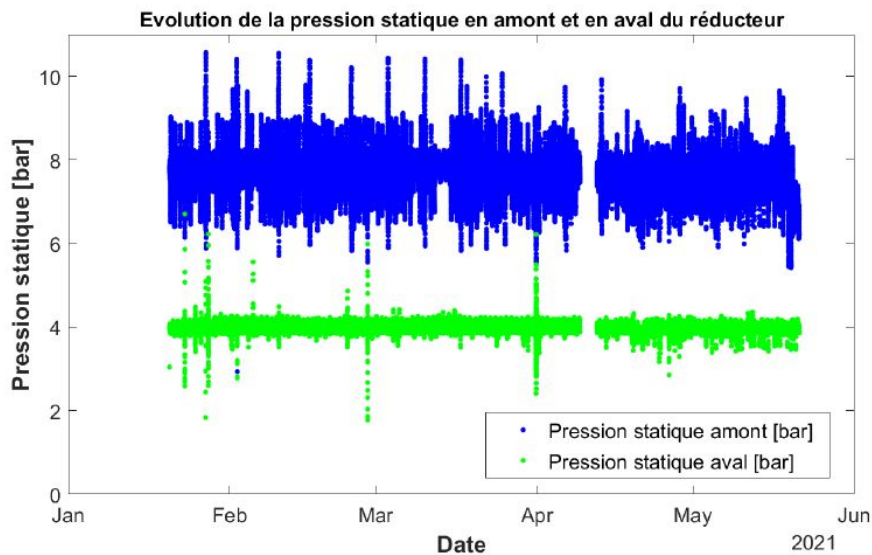
- With the current DuoTurbo design and with the theoretical site conditions, the efficiency is of 54%



- To maximize the energy production, the turbine-node is set as a priority during day-time hours, by management of the valve's downstream pressure settings
- During the night-time, different pressure settings will prioritize the other parallel chamber, to avoid water stagnation

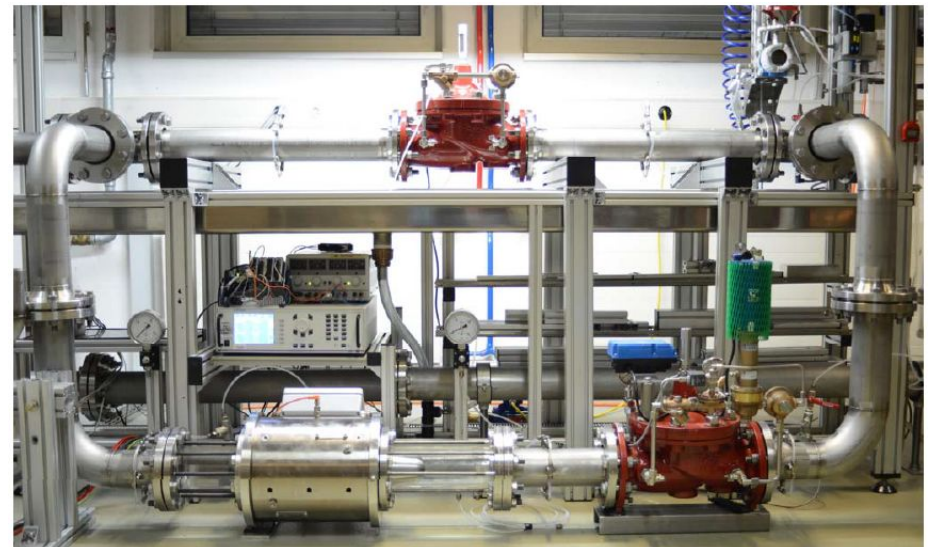
The project

- To access the real conditions to expect in the future chamber, measurements are currently ongoing in the already built parallel chamber Davel



The next steps

- Laboratory experiments in the HES-SO Valais//Wallis test rig
- Numerical simulations of the unsteady conditions
- Installation in the Verney chamber autumn 2021
- Follow up of the pilot site



Thank you for your attention!

irene.samora@bg-21.com

BG

LA NATURE
POUR PARTENAIRE,
L'INTELLIGENCE
COLLECTIVE
POUR RESSOURCE

www.bg-21.com