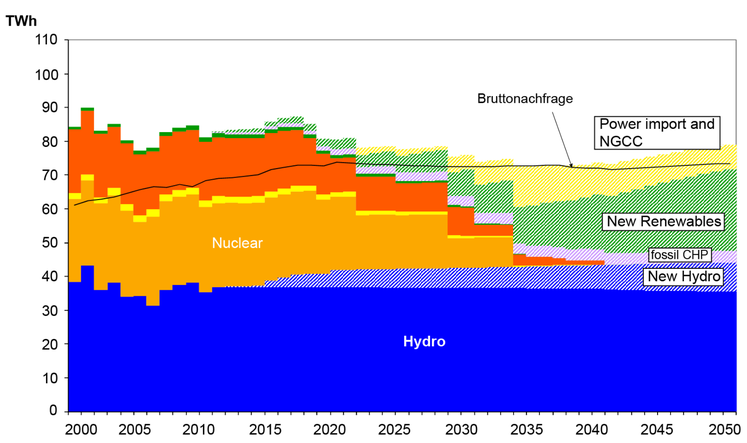
NRP 70 Electricity supply

Joint project: Sustainable decentralized power generation

*Integration of sustainable **M**ulti-**E**nergy-hub **S**ystems at neighborhood scale -**IMES**-*

Overview

Swiss energy strategy 2050

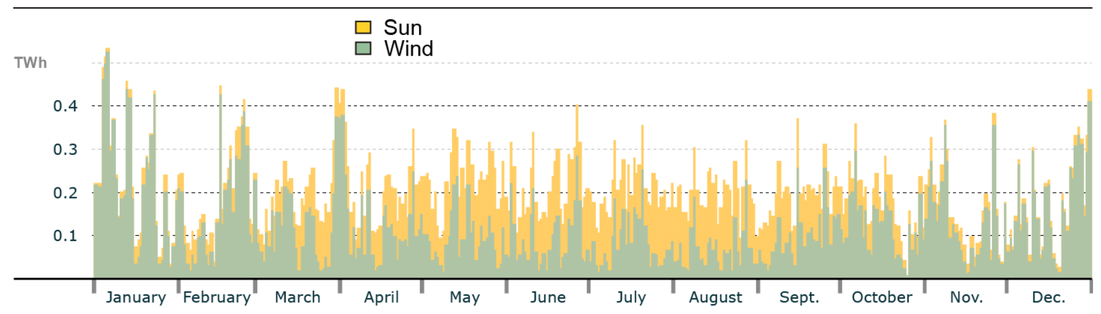


Needs to implement the "Energy Strategy 2050":

→Stabilization of electricity demand thanks to improved efficiency and reduced energy consumptions, particularly in buildings

→Increase of the renewable-based electricity production

Daily electricity from renewables



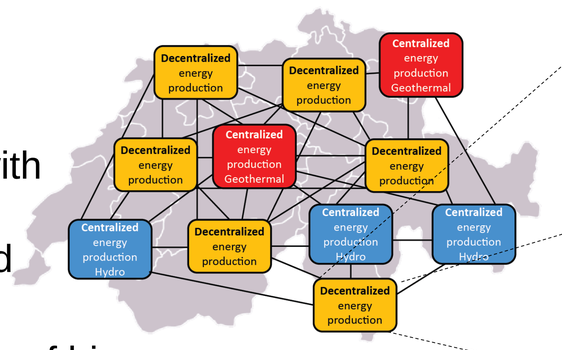
Challenges:

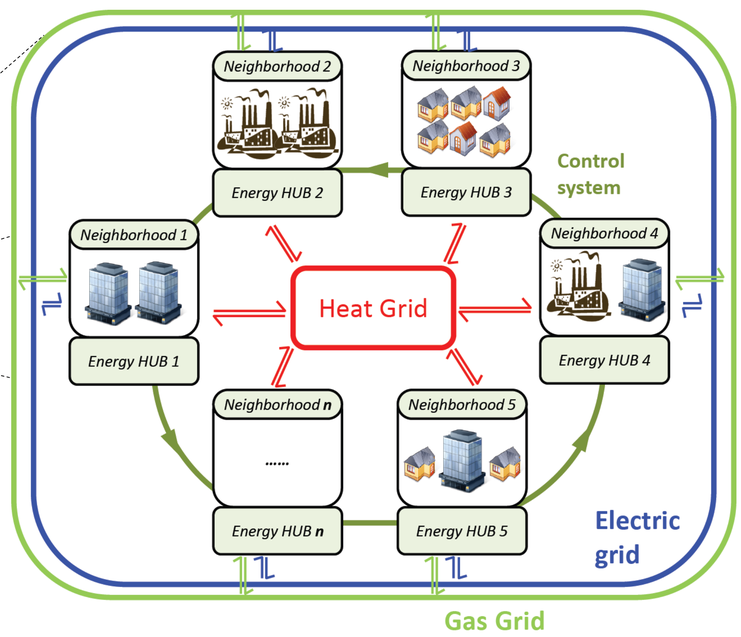
- Transient nature of both loads and renewable energy generation
- System stability and daily/seasonal load balance
- Electricity price competitiveness

Integration of renewables in decentralized systems in Switzerland at neighborhood scale

Renewables integrated with gas-based decentralized power production and storage are a promising solution:

- Balancing excess power production with energy storage
- Efficiently co-generating electricity and heat thus reducing CO_2 emissions
- Easing the transition toward larger use of biogas
- Limiting the cost increase by combining complementary production and demand
- Enhancing social acceptance of the energy turnaround through minimization of the plant footprint.





Partners

- **Alstom Power**
- **Amstein+Walthert**
- **Zurich City**
- **EWZ**
- **VSG**

Project goal

The project will provide a comprehensive simulation approach for decentralized power production which tackles at the same time technical, economic and social issues. An optimization methodology will be developed and guidelines for deployment of DPP provided.

Synergies

- Tight collaboration with NRP70 **AFEM** project
- IMES results as guidelines for **ReMaP** ETHZ flagship project
- **SCCER**: efficiency, energy storage and electricity supply

Subprojects

IMES BP	IMES TEC	IMES SC	IMES ECO	IMES SE
Building: Demand, renewable potential and technology integration	**Technology**: Technical assessment and performance prediction	**Grid**: Integration and system control	**Economy**: Economic and market evaluation	**Social:** Acceptability and social issues
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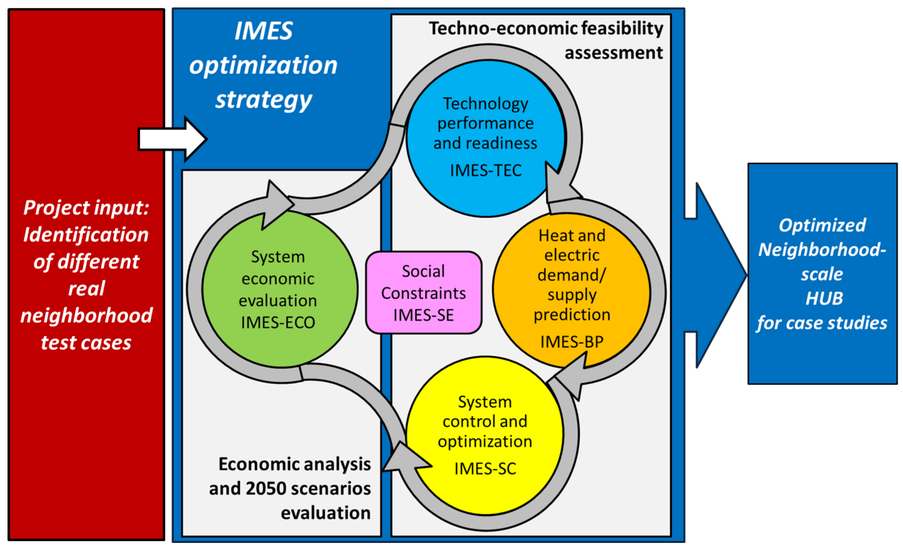

Preliminary test cases

- Zurich Altstetten
- Zernez
- Solothurn
- *Zurich Uniquarter*
- *Zurich Empa*

Energy Turnaround

- IMES will set up a **unique research collaborative project**: all main issues tackled at the same time; renewables, micro-cogeneration and power-to-gas will be investigated in detail with a **holistic tool.**
- IMES will clearly determine the role of distributed energy generation in forthcoming years for energy production in Switzerland.
- IMES will actively involve important industrial players facilitating the deployment of decentralized power production in Switzerland.
- Decision and policy makers will be helped in finding solutions for market designs and support schemes for RES while maintaining a limited energy cost and a high grid reliability.
- **Swiss community** will know the costs and the social issues linked to decentralized power production.
- IMES will serve as a **seed project** for further research initiatives.

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