

SÉMINAIRE ÉNERGIE – ENVIRONNEMENT
Conférences 2023 - 2024

Flexibility aware planning of multi-energy districts.

Binod Koirala
Empa

Jeudi 23 mai à 17h15

**Uni Carl Vogt – Salle 1 (rez-de-chaussée)
66 bd Carl-Vogt, 1205 Genève**

Conférence en présentiel suivie d'un apéritif

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L'orateur

Dr. Koirala leads a multi-energy systems group and an energy system design cluster at Empa's Urban Energy System Lab. His research focuses on techno-economic, environmental, and socio-institutional issues of energy system transformation and sustainability transition from district to transnational scale.

He has more than 15 years of experience developing and valorizing methods for modeling and optimising the integrated energy system on various tempo-spatial scales at renowned European research institutes. At Empa (CH), TNO (NL), UTwente (NL), TU Delft (NL), Institute for Research of Technology (ES), and Fraunhofer ISE/IWES (DE), he was involved in many international projects.

He is experienced in various leadership roles and responsibilities and has excellent project management, acquisition, and networking skills. Dr. Koirala studied renewable energy management at the University of Freiburg and holds an Erasmus Mundus Joint Doctorate in Sustainable Energy Technologies and Strategies from TU Delft, KTH, and Comillas Pontifical University.

La conférence

The future energy districts are expected to have an increasing level of integration between different energy carriers. Different sectors such as power, heating and cooling as well as transport will be coupled through conversion and storage technologies.

This presentation will first provide a general introduction to the Urban energy system lab and its activities. Based on the lab's inhouse EhubX optimization tool analysis, this presentation covers the flexibility assessment of conversion and storage technologies (e-mobility, power hydrogen to power, data centers etc.) in multi-energy districts.

To demonstrate e-mobility flexibility, an e-mobility module is developed and integrated into the EhubX optimization tool. The optimal operation of electric vehicles is a function of the overall multi-energy system boundary conditions given by the available supply and demand and the set objectives to minimize costs and CO₂ emissions. Using a hypothetical case study based on the City of Chur, the effect of e-mobility on supply and demand-side flexibility in the multi-energy district is demonstrated. The flexibility assessment of the Power to hydrogen to Power (P2H2P) system is based on the data from the world's first autarkic multi-family house in Brütten. The flexibility assessment of the edge data center is based on the Eco-Qube pilot in the NEST building of Empa campus.