

# SEKTOKOP NET: CROSS-SECTOR AND COUPLED OPERATION OF ELECTRICITY, HEAT AND GAS NETWORKS

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## Introduction

The share of local energy sources is rapidly increasing together with the growing implementation of renewable and/or volatile energy sources (e.g. wind, photovoltaic, geothermal, biogas, etc.). Nevertheless, low electricity prices and expiring subsidies result in challenging economic operation of renewable energy sources (RES). Hence, further implementation of RES could face an uncertain future in the current energy economic environment. Innovative operating concepts are therefore needed in order to ensure operation and expansion of generation, conversion and storage capacities based on RES also in future.

Energy sector coupling could be an economically viable solution in order to ensure the continuation of RES implementation and operation. The concept opens up market segments for new energy services and products by coupling electricity, heating/cooling and gas sectors. Both technical and economical experience and knowledge regarding coupled operation of different grid infrastructures are lacking.

Thus, the project SektoKop Net elaborates:

- The technical and organizational requirements for implementing coordinated operating strategies for coupled electricity, heat and gas grids in the supply area of Energie Burgenland AG
- The economic participation options under competitive conditions for different plant operators (existing and new RES, P2H and P2G plants).

## Methodology

Possible synergetic operations are elaborated based on surveys of technical and organizational operation requirements of the different infrastructure areas. Power to heat (P2H), power to gas (P2G) and a combination of both technologies are suggested as possible sector couplings within the project.

The potential benefits of sector coupling between electricity and heat grids are evaluated by implementing the P2H concept. An overview of the model utilized for simulations is given in figure 1. A windfarm is connected to the district heating grid through a heat pump. The heat pump has the possibility to buy electricity either from the windfarm or directly from the power grid, and can generate heat which it supplies to the district heating grid.

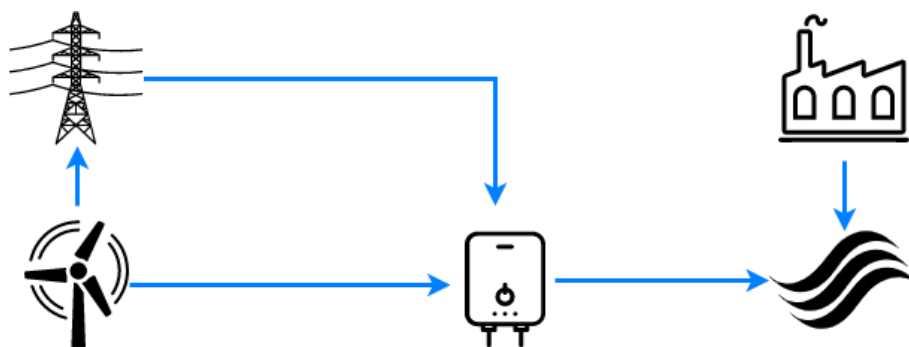


Figure 1: Implementation of P2H concept, source: TU Wien [1] [2] [3] [4] [5]

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## Results

The project results are presented as a "catalogue of requirements for the organizational coupling of energy systems across energy carriers" utilized by the involved project partners as a decision-making basis regarding the further development of products and services in the field of efficient sector coupling. Furthermore, the results will be accessible for political decision makers (e.g. the regulatory authority and ministries).

The preliminary results related to the implementation of P2H in the supply area of Energie Burgenland are presented in figure 2. The possibility to sell electricity to a heat pump increases windmill revenue. Furthermore, district heating grid costs are significantly reduced due to heat supplied from the heat pump. Thus, by implementing P2H technology, significant monetary benefits can be achieved.

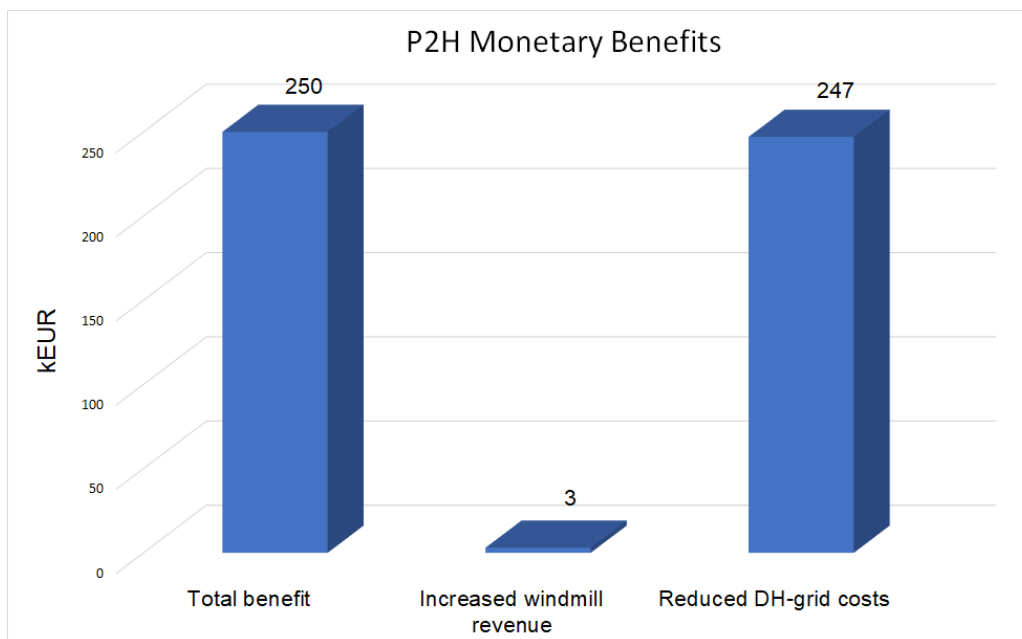


Figure 2: Monetary benefits resulting from P2H implementation in the supply area of Energie Burgenland, source: TU Wien

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