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RENOWAVE
DECARBONIZATION OF THE BUILDINGSTOCK

District scale simulation for supporting decarbonizing plans

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Description

- Context

In energy planning of districts, it is often unclear what energy supply options are available and what influence different technology options have, including demand reduction through energy renovation.

- Method

Thus, the use of a simulation and optimization tools is explored in the planning process of a specific case study in Switzerland. With the use of Sympheny, a new planning and optimization software, a district in Dinhard was analyzed. Four different scenarios were developed and annual life cycle costs (LCC) as well as CO2 emissions, were proposed. Scenario 0; Scenario 1.1 (demand reduction); Scenario 1.2 (incl. renovation costs); Scenario 2 (technical costraints; no demand reduction); Scenario 3.1 (no contraints; with demand reduction; without costs), Scenario 3.2 (no constrains, incl. renovation costs)

- Results

The results of the respective scenarios are categorized and compared according to CO2 emissions and LCC. It becomes clear that for CO2 emissions, there is a large reduction potential (up to 90%) with different LCC.

- Next steps

➡ Workshops with different stakeholders are planned.

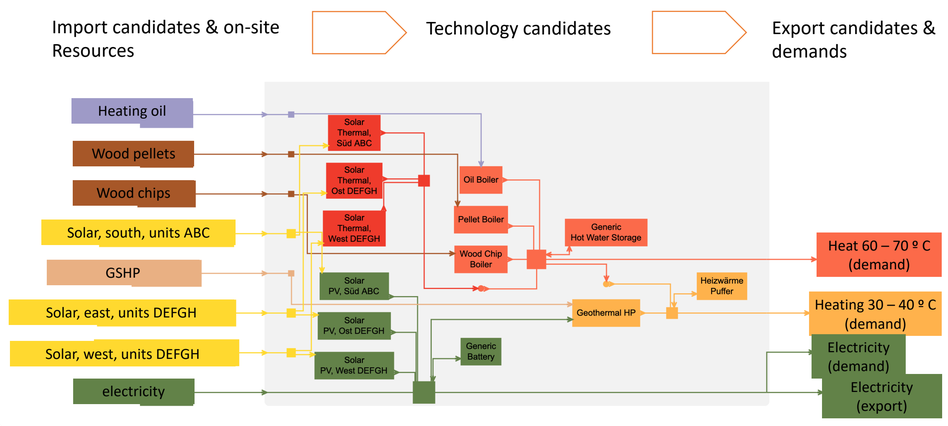
➡ Further development of solutions for district is planned.

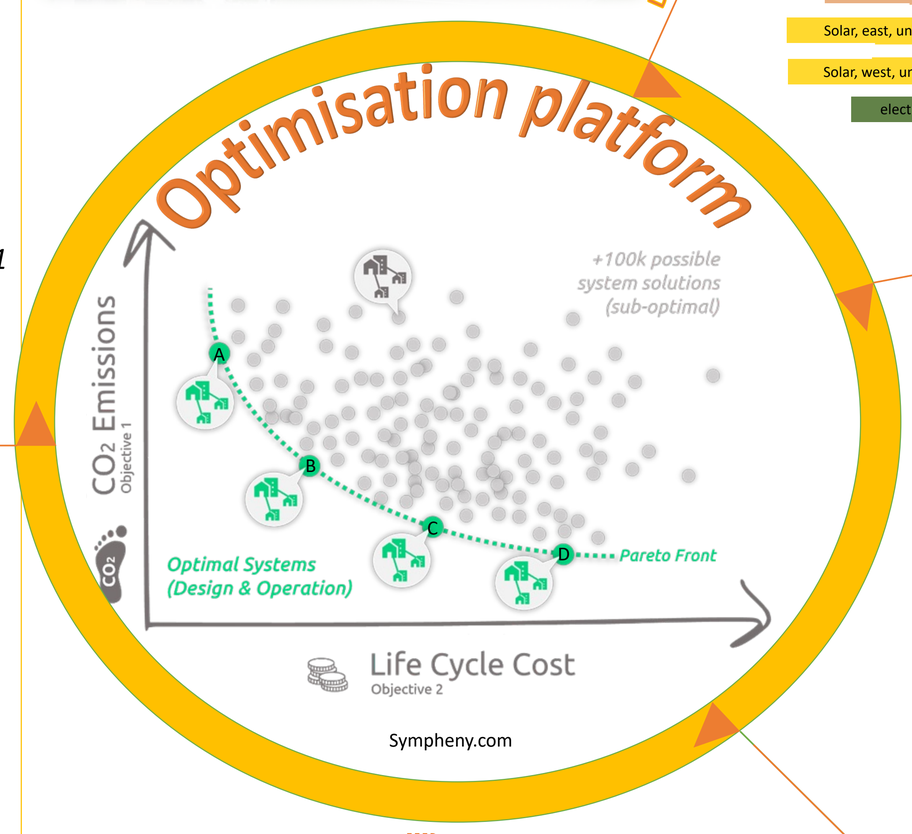
➡ Financing situation needs more detailed analysis.

➡ More districts will be modelled and analyzed.

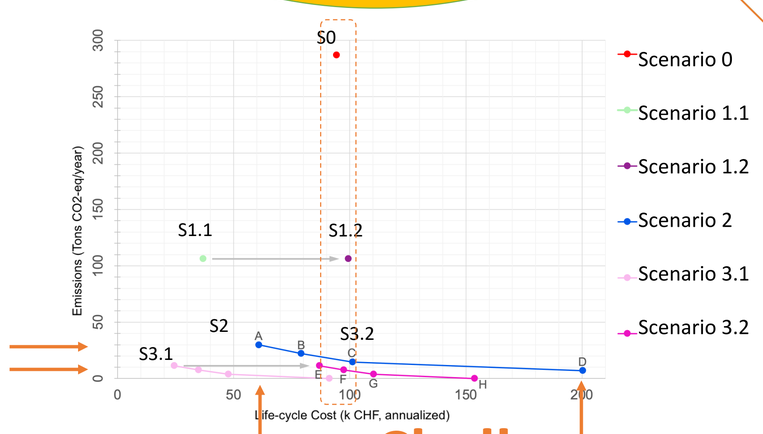
➡ A business model is proposed for Sympheny to expand services and platform features.

Develop scenarios

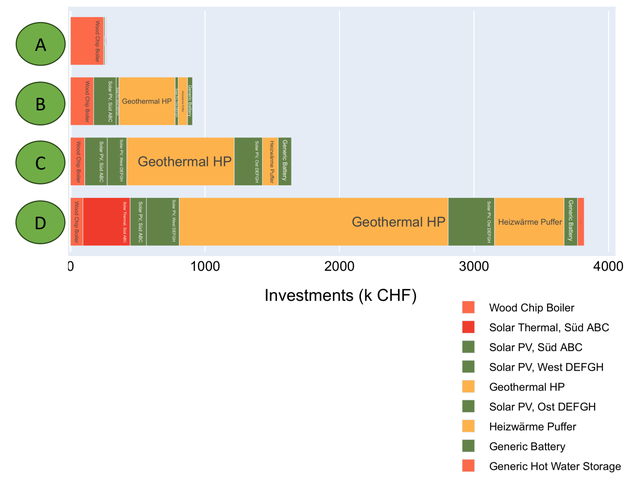


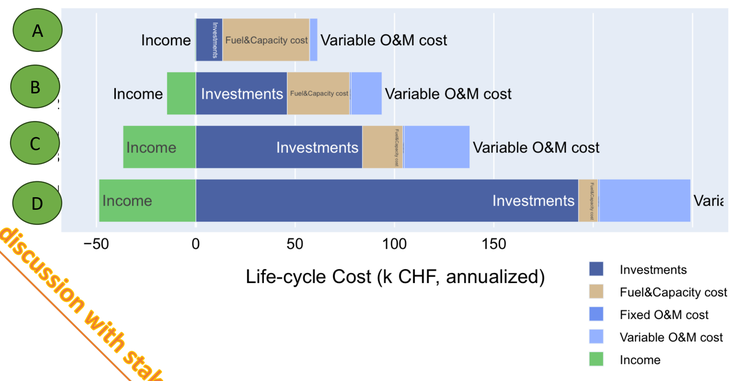


Pathway for transition



Lifecycle costs LCC





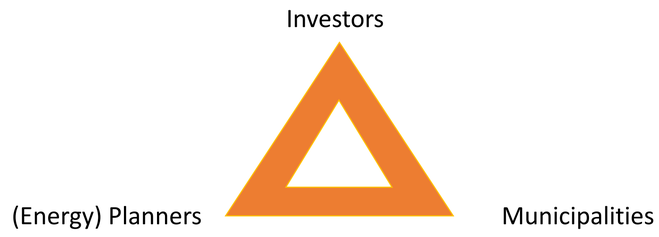
Scenario discussion with stakeholders

Added-Value

- *The case study showcases the use of building performance optimization in a real case*
  - A new approach combines energy planning elements as well as renovation scenarios in one process.
  - *A compilation of several scenarios was carried out, compared, and categorized according to CO_2 emissions and life cycle costs (LCC) to evaluate which energy supply solution is most suitable for the settlement.*
  - *By combining BPS with energy supply optimization in one workflow the investors are better informed for their decarbonizing plans. This involves both, strategic investments into the building envelope and into the energy supply system (and fuel decisions).*
- *The results will be useful to further improve the dialogue among and between different stakeholders*
  - *The first scenario S0 (as built), served exclusively to illustrate the current state of the settlement to obtain a comparative value with the other scenarios. Scenario 1 (S1.1 without, S1.2 with renovation costs), on the other hand, was intended to illustrate how the CO2 emissions of the settlement would change if only the heat demand were reduced by means of a building envelope renovation.*
  - *In scenario 2, technical optimization measures were included. In contrast to scenario 1, the aim of this scenario was to optimize the settlement purely based on technical measures, which mainly concerned heat generation.*
  - *In scenario 3 (S3.1 without, S3.2 with renovation costs) a complete energy renovation of the settlement was simulated, including costs.*
- *The results will be useful to further improve the software and communication platform*

Challenges

- *Different feedback from building owners*
  - Concept of LCC unclear
  - Individual financing horizons
  - Building renovation strategies and costs
- *The results are to be discussed also with other stakeholders like*
  - planners
  - financing institutions
  - municipality representatives
  - etc.
- *Can Sympheny be developed as a communication platform?*



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