

Thesis

Use cases for digital modelling and planning tools in the development of neighbourhood energy systems



Initial Situation

The mobility and energy transition is key to achieving climate protection targets. Urban areas have high potential for renewable energies and sector coupling due to their energy requirements and infrastructure density. Numerous solutions exist, from PV systems and heat pumps to sharing services and virtual power plants. In practice urban neighbourhoods have so far failed to live up to their pioneering role. Obstacles are (1) *decision-making* between competing solutions against the background of local conditions, (2) a lack of strategic perspective on sector coupling due to increasing *decentralization* and (3) *conflicting objectives* between ecological, economic and social targets, e.g. the shift from environmental impacts due to CO₂ emissions from operation to resource requirements in the production of energy technologies. These challenges are addressed in the *adjust* research project with a digital tool that is intended to support the participatory and multi-criteria planning of post-fossil and multi-sectoral energy and mobility in the neighbourhood using the example of Herne.

Objective

The aim of this thesis is to define use cases for a digital tool for participatory modelling and planning of neighbourhood energy systems. To this end, target groups and the benefits of the tool are to be identified. From this, it is necessary to derive requirements for the necessary functional scope, data or key figures and to describe these systematically.



Figure 1: Schematic representation of a possible structure of the "adjust" tool.

Procedure

- Selection of a methodology for use case analysis and description
- Identification and systematization of use cases (in particular target groups and functional scopes) by analysing comparable tools and literature research
- Supplementing the use cases by means of expert interviews with stakeholders in Herne
- Selection and description of the use cases both linguistically (e.g. via user journeys) and visually (e.g. via mock-ups)
- Validation of results in participatory formats

What you bring along

- Interest in sustainability topics
- Prior knowledge of the technologies and challenges of the energy transition
- Structured and systematic way of thinking and working
- Experience in certain methods. (e.g. literature research, use case analysis, expert interviews)

If you have any questions, feedback or interest, please contact:

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