

# Thesis

## Development of technology portfolios for sustainable energies in future neighbourhoods using the example of the city of Herne



### 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 CO<sub>2</sub> 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 identify, describe and classify possible energy technologies (generation, storage, flexibilization) for an exemplary neighbourhood in Herne. Special focus will be placed on the technological, economic and sustainability-related key figures of the technologies under consideration. Neighbourhood-dependent characteristics will also be addressed to be able to adapt technology indicators depending on the different characteristics of the neighbourhood under investigation.

## Procedure

- Knowledge-based definition of the key figures to be collected and criteria for selecting relevant energy technologies
- Detailed description of the selected technologies in the portfolio
- Research of the required data via literature research and, if necessary, manufacturer interviews, considering neighbourhood-dependent data
- Structuring the data and storing it in a suitable form for further processing
- Application of the portfolio to an example neighbourhood

## 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 the field of sustainability assessment of technologies as well as data structuring and preparation is helpful

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

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