

# Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



## Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners ([Examencommissie-BK@tudelft.nl](mailto:Examencommissie-BK@tudelft.nl)), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Jan Gaard Eggink
Student number	4492986

Studio		
Name / Theme	Urban Metabolism and Climate	
Main mentor	Alex Wandl	Chair of Environmental Technology and Design
Second mentor	Claudiu Forgaci	Chair of Urban Design
Argumentation of choice of the studio	<p>The energy transition currently underway in Germany, will not be successful, according to modeling. To fully grasp this transition, the current flows and the system of the energy sector has to be researched. This can only be done the systemic design framework. This model and methods were presented by the studio, and that is why the choice for the studio of Urban Metabolism and Climate was made. In this studio, a data driven base was created on which a bold alternate future could be projected.</p> <p>The goal of the research is to create a climate resilient Ruhr area. This will be done using the energy transition as an incentive for development, looking aside from the goals set in the energy transition to the specific peri-urban area of the Ruhr area and at its consequential problems. For this to happen, the current energy system relating to the Ruhr area needs to made clear before it can be made climate resilient and can function as a katalysator for a new way of life.</p>	

Graduation project	
Title of the graduation project	Recharged Ruhr – From a fossil fuel devour to a renewable energy power
Goal	
Location:	Ruhr area, Germany
The posed problem,	The Ruhr area, experiencing socio-economic shifts as consequence of de-industrialization is undergoing an energy

	<p>transition - which goals will probably not be met according to modeling - next to the spatial pressure from the energy transition the Ruhr area is facing spatial pressure from climate change. These problems are not tackled in an integrated way, and do not use the specific peri-urban structure potentials of the Ruhr.</p>
<p>research questions and</p>	<p>Main research question: How can a spatial development vision &amp; strategy for a climate resilient Ruhr area based on the specific peri-urban condition of the Ruhr lead to fulfillment for the now too limited energy transition?</p> <p>Sub research questions:</p> <ul style="list-style-type: none"> <li>- What is the specific peri-urban structure of the Ruhr and how does that relate to energy (production and consumption)?</li> <li>- How does a peri-urban area designed on the maximalisation of energy consumption &amp; production look like and what does that result in when applied to the Ruhr area?</li> <li>- How can a transition to a climate resilient region lead to an adaptable energy system and what does that spatially mean for the Ruhr?</li> <li>- What are the exact goals and possible synergies for the energy transition in the Ruhr area and what is the most desired spatial outcome of this transition?</li> <li>- How can sustainable energy landscapes be implemented in a peri-urban area, while facing multiple barriers, and eventually facilitate the transition to a climate resilient Ruhr?</li> <li>- How can a transition from a heavy industrialized region towards a climate resilient region</li> </ul>

	be successfully realized while facing an uncertain future?
design assignment in which these result.	To create, by investigating, comparing and evaluating, a vision for a climate resilient Ruhr, that is based on the specific peri-urban characteristics, and which eventually will lead to a successful energy transition in the Ruhr area.
<b>Process</b>	
<b>Method description</b>	
<p>The following methods will be used in this thesis:</p> <p>Literature review - Read and review scientific papers and reports. The aim, reached by reading and reviewing, is to create a theoretical understanding of the topic chosen in the sub-research questions.</p> <p>Policy analysis - Collect, compare and review policy documents. The aim is to create an understanding of current and future policies.</p> <p>Stakeholder analysis - Compile a list of stakeholders in the region, with the aim of creating a better understanding of actors in certain sectors or processes.</p> <p>Site visit - Visiting several sites in the Ruhr area to create a feeling of (opinions from residents on) the geographical features. The main aim is to observe, describe and conclude on the geographical characteristics, how they are perceived and how they shape life.</p> <p>Morphological analysis - The aim is to understand characteristics of the landscape that humans have changed, their construction and their functions in their relationship with each other.</p> <p>Physiological analysis - The aim is to understand the physiological processes (transport and transportations of matter and energy) within the metabolism of the chosen urban system.</p> <p>Energy potential mapping - The aim of this method is to visualize the potential of energy production and consumption based on the quantity, quality and location of demand and supply.</p> <p>Mapping - The aim of this method is to visualize certain observations and connect or reflect on them through different scales.</p> <p>Design exploration - This method is about investigating, comparing and reflecting on possibilities in a certain context, on a certain topic. The aim is to create new knowledge, through design.</p>	

## Literature and general practical preference

[The literature (theories or research data) and general practical experience/precedent you intend to consult.]

## Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The topic of my graduation topic is that of – currently insufficient - energy transition in a peri-urban area and how that could possibly be altered to become a sufficient energy transition that leads to a climate resilient region. The topic of the studio is Urban Metabolism and Climate, where flows (energy, in my thesis) in an urbanized region are researched. Furthermore, the end goal is to create a climate resilient region, which has a direct link with the climate component of my studio. In my master track Urbanism, the implications of the climate crisis and the following energy transition always have played a key role. Development could not happen without it being a sustainable development, the element of circularity was risen on several occasions and the main element of my master track, urbanism, in my opinion is sustainability. That relates to the Dutch side of the masterprogramme, working on a multi-disciplinary way to create integrated – and preferably sustainable – solutions for our surroundings.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

The societal relevance of my graduation project is constructed around the transformation that the region is currently experiencing. Due to the de-industrialization, there are several socio-economic problems arising, such as polarization. Next to that, as a consequence of the specific peri-urban structure, there are several social problems.

This research aims to lead to region to a climate resilient region, using energy democracy. If successful, the social aspect of climate resilience and energy democracy will have successfully reversed polarization and strengthened the social networks in the region.

This thesis aims to address several knowledge gaps. The first one is implementing Energy landscape as a means to fulfill the energy transition while, simultaneously facilitating space for other sectors like urbanization and climate change. This thesis will offer insights in the potential and limitations of implementing energy landscapes with a dual goal.

The second knowledge gap is about the designed peri-urban area in relation to maximum energy production and consumption. The link between urban characteristics and energy p. and c. is derived from literature. However, on the design of area in relation to maximum energy production and consumption, no

literature exists. This thesis will offer insights in the potential and limitations of the outcome of this design exploration.

Lastly, this thesis will offer insights in how a transition to a region with an adaptive energy system can be expanded to a transition to a climate resilient region.