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), 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	Kim Sinnige
Student number	4970519

Studio		
Name / Theme	Architectural Engineering / Harvest	
Main mentor	Mo Smit	Design
Second mentor	Jos de Krieger	Research
Third mentor	Paddy Tomesen	Building Technology
Argumentation of choice of the studio	Architectural Engineering offers a flexible, down to earth program that focuses on solving current and urgent problems.	

Graduation project	
Title of the graduation project	Zero Waste to Energy Spatial intervention to address overcapacity of Waste-To-Energy plants in the Netherlands
Goal	
Location:	Amsterdam Westpoort
The posed problem,	For years the Netherlands has been importing waste to remediate an overcapacity of its 12 Waste-to-Energy (WTE) plants. These infrastructures provide heat and energy to its cities, and depend on a steady supply of waste in a linear economic model. As we transition to a circular economy, this system is increasingly problematic, and in need of adaptation. The country's largest WTE plant is located in one of its most ambitious cities; Amsterdam. The city is one of the first in the world to commit itself to becoming fully circular by 2050 by incorporating Kate Raworth's *Doughnut model* into its municipal vision. We therefore explore what this space, as a legacy of the old economy, can mean for the circular city of the future.
research questions and	Which architectural interventions can facilitate the transformation of AEB Amsterdam into a future-proof closed-loop waste management facility that helps Amsterdam achieve it's doughnut economy municipal vision by 2050? Sub-questions: 1. What does it mean to future-proof an industrial complex, and what is the role of architecture within this? 2. What does a closed-loop waste management facility look like, and what is the role of architecture within this?

	3. How can we fit this transformation temporally into the specified timeframe?
design assignment in which these result.	The final design intervention is an urban campsite and chapel, appropriating part of the incinerator identified as becoming redundant. Integrating a spiritual layer into an otherwise monofunctional industrial zone, this intervention should act as a 'gateway' development at the site, to activate citizens during the transition period, and catalyze the further development of the site. These interventions strive to reframe society's relationship with its resources, by inviting the public to the site for unexpected reasons, where they can reflect on and reconciliate with the "back-end" of their lifestyles. Creating spaces which hope to encourage cultural shift and behavioral change.

Process

Method description

The project aims to answer the research question through scenario-based planning. First establishing a framework in which these interventions may take place, through thematic research. This is done by pairing a quantitative approach (Material Flow Analysis) with more traditional qualitative research approaches (literature review and site analysis). Conceptual contextual research and research by design then develop the interventions, ensuring that they respond programmatically and spatially to their physical, social and temporal contexts. By zooming in on one particular moment of the transition, an elaborated scenario, design and narrative can be produced.

Due to the Covid 19 pandemic site visits and interviews are replaced by alternatives. Information is instead gathered through social media, youtube, and contact persons.

Literature and general practical preference

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3. AEB Amsterdam. (2016). *Jaarverslag 2015*. Amsterdam: AEB Amsterdam.
4. AEB Amsterdam. (2018). *Jaarverslag 2017*. Amsterdam: AEB Amsterdam.
5. AEB Amsterdam. (2020). *Resultaten emissiemetingen AEB BEC - 2e Sessie 2020*. Amsterdam: AEB Amsterdam B.V.
6. AEB Amsterdam Grondstoffen- en energiebedrijf. (2014). *AEB Amsterdam Slakopwerkingsinstallatie*. [online video] Available at: https://www.youtube.com/watch?v=H5eXvkR2ObM&ab_channel=AEBAmsterdamGrondstoffen-enenergiebedrijf
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8. Aouini, I. et al., (2014). *Pilot plant studies for CO2 capture from waste incinerator flue gas using MEA based solvent.* Oil & Gas Science and Technology - Revue de l IFP, 69, 1091-1104.
9. AT5. (2020). *Biomassacentrale AEB bijna klaar, verzet groeit*. [online video] Available at: https://www.youtube.com/watch?v=Tj3P03dRNEU&t=182s&ab_channel=AT5
10. AT5. (2020). *Topdrukte bij AEB door coronacrisis*. [online video] Available at: https://www.youtube.com/watch?v=MF90gfCaVj0&ab_channel=AT5
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14. Doughnut Economics Action Lab (DEAL). (2020). *The Amsterdam City Doughnut: a tool for transformative action.* Amsterdam: Gemeente Amsterdam.
15. Fanning, A. L., O'Neill, D. W., Hickel, J., & Roux, N. (2021, November 18). *The social shortfall and ecological overshoot of nations*. Nature Sustainability, 1-16.
16. Gemeente Amsterdam. (2021). *Bevolkingsprognose 2021-2050: minder sterke groei*. Amsterdam: onderzoek en statistiek.
17. Government of the Netherlands. (2018). *Accelerating the transition to a circular economy*. Available at: https://www.government.nl/topics/circular-economy/accelerating-the-transition-to-a-circular-economy
18. Groenestijn, J. v. (2018). *Biorefinery concepts for Amsterdam Metropolitan Region*. Wageningen: Wageningen University & Biobased Research.
19. Lysias Advies. (2020). *De Stilte Voor Het Stilleggen: de oorzaken en leerpunten van het stilleggen van vier verbrandingslijnen door AEB in de zomer van 2019*. Amsterdam: Municipality of Amsterdam.
20. Minguez, R. e. (2021). *Fostering Education for Circular Economy through Life Cycle Thinking*. In A. Petrillo, Product Life Cycle - Opportunities for Digital and Sustainable Transformation (pp. 96-116). Naples: IntechOpen.
21. NH Nieuws (2016). *161124 NH Leeft AEB Amsterdam*. [online video] Available at: https://www.youtube.com/watch?v=-zkIq9CJgmo&ab_channel=NHNieuws
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24. Port of Amsterdam. (2019). *Jaarverslag 2018*. Amsterdam: Port of Amsterdam.
25. Raworth, K. (2017). *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*. London: Penguin Random House.
26. Ruijs, T. (2019). *The Amsterdam Heat Guide.* Amsterdam: Ruimte en Duurzaamheid, Municipality of Amsterdam.
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Reflection

My graduation topic falls comfortably into the scope of the *Harvest* track under the chair of Architectural Engineering. This is not only because of its location in Amsterdam Westpoort, but largely because of its connection to urban metabolism. Waste management, and particularly the study of flows and circular systems are important themes within the track. The project feels highly relevant because architecture, as an intersectional and diverse discipline, is a field with great potential to tackle the complex problems associated with the transition to a circular economy. This is because systems thinking is a central part of the new economic model, and architecture has the capacity to combine and create dialogue between many scales and disciplines simultaneously.

Ultimately the project explores the role of architecture in maintaining and adding value in a transitioning system. It strives to be exemplary. The coming decades will be critical in determining how we respond to the threat of climate change and resource depletion. Transformative, innovative and regenerative architecture projects can offer inspiration for systemic transformation and pathways to a thriving planet and society.