# 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 | Valerie Erd |
| Student number | 4450884 |

| **Studio** | | |
|---|---|---|
| Name / Theme | Theme 2 - Energy Transition | |
| Main mentor | Henk Visscher | Housing Quality and Process Innovation |
| Second mentor | Erwin Mlecnik | Housing Management |
| Argumentation of choice of the studio | My research pertains to the usage of Bio-based building materials for insulation of existing housing stock, to decrease energy use and increase circularity in the AEC industry. | |

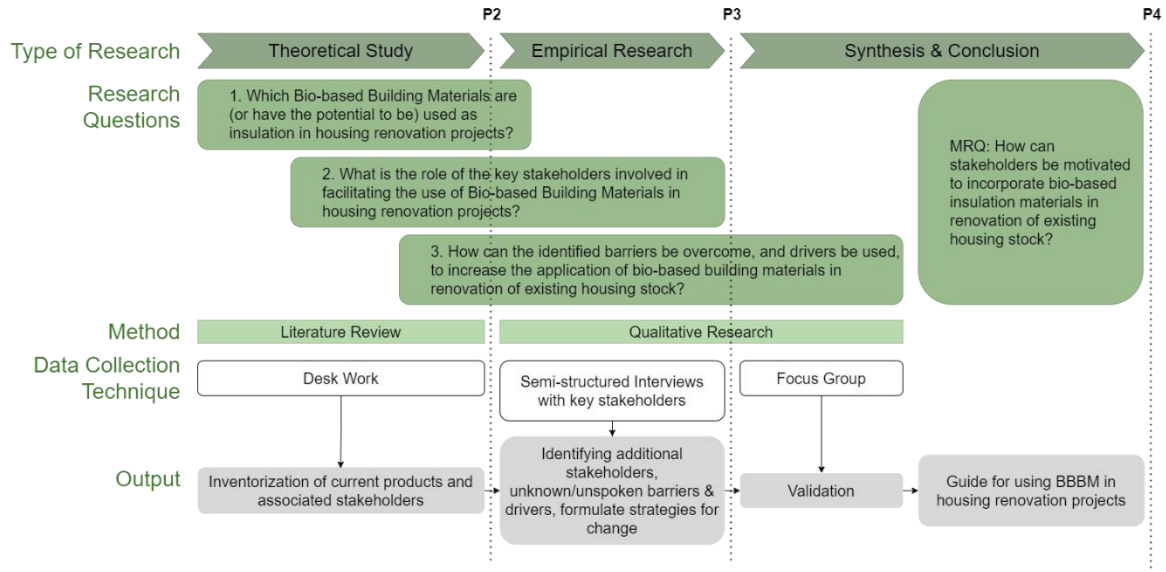
| **Graduation project** | |
|---|---|
| Title of the graduation project | Motivating stakeholders to incorporate bio-based building materials in renovation of existing housing stock |
| **Goal** | |
| Location: | Netherlands |
| The posed problem, | In 2022 the built environment was responsible for 12% of all greenhouse gasses in the Netherlands. In order to achieve the goals described in the European Climate Pact and the Klimaatakkoord, energy use needs to be decreased, existing facilities need to be optimized, heat insulation needs to be improved, renewable energy generation needs to be provided and we need to switch to fossil-gas-free and efficient appliances. Additionally, circular building has become increasingly important in recent years. |
| research questions and | MRQ: How can stakeholders be motivated to incorporate bio-based insulation materials in renovation of existing housing stock?<br>SRQ1: Which Bio-based Building Materials are (or have the potential to be) used as insulation in housing renovation projects? |

| | |
|---|---|
| | SRQ2: What is the role of the key stakeholders involved in facilitating the use of Bio-based Building Materials in housing renovation projects?<br><br>SRQ3: How can the identified barriers be overcome, and drivers be used, to increase the application of bio-based building materials in renovation of existing housing stock? |
| design assignment in which these result. | In current literature, a lot is known about the barriers and drivers for using BBBM, however, little is still known about how to overcome the barriers, or how to apply these drivers. As a result, this research could provide guidance on how to achieve the use of BBIM in housing renovation projects. |

## Process

### Method description

This research is a combination of literature and qualitative research. It is built up consecutively of literature research, then semi-structured interviews and lastly a focus group (see framework below).




### Literature and general practical references

For my thesis I plan to analyze literature on the subjects of

- Bio-based insulation materials (BBIM)
- The role of key stakeholders in housing renovation projects
- Facilitating change in renovation processes.

Literature on BBIM can mainly be found in policy documents and in documents from material producers and green initiatives. For information on key stakeholders I aim to

take information from Winch, 2010, a book we used for one of the MBE courses, and from snowballing from a contact person at The Green Village. As for facilitating change, I will mainly look to Rogers' Diffusion of Innovation as a basis, from there looking at the practical application of his theory.

## 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 project connects to MBE and MSc AUBS by looking at the AEC industry and how to facilitate change. In MBE we learn how to facilitate projects from an overview standpoint. We learn how to bring different stakeholders and different viewpoints together, especially for larger groups and larger projects. We have learned aspects from policy making and financial issues, but what I have mainly learned is how to communicate with other stakeholders in order to solve a common issue. With regard to my project, this issue is formulated by the necessity for an energy transition in the built environment.

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

   The issue of the energy transition concerns a lot of parties, e.g. policy makers, contractors, producers (such as farmers), housing associations, home-owners (or renters), etc. This project is an attempt to bring those stakeholders together, to reach a common goal. The Netherlands aim to reduce greenhouse gases in the built environment, which can be achieved by decreasing energy use, optimising existing facilities, improving heat insulation, providing renewable energy generation and using or switching to fossil-gas-free and efficient appliances. By using Bio-based building materials (BBBM), greenhouse gases may be reduced by multiple stakeholders. It has potential to decrease emissions during its growth, the production into building material, and most BBBM are circular, in that they can be returned to nature at the end of their life. In current literature, a lot is known about the barriers and drivers for using BBBM, however, little is still known about how to overcome the barriers, or how to apply these drivers. The aim of my thesis is to expand knowledge on the subject of bio-based insulation materials and how to implement them in future renovation projects of existing housing stock.