Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: Architecture

Personal information	
Name	Jan Zawadzki
Student number	5998344

Studio		
Name / Theme	Explore Lab	
Main mentor	Roel van de Pas	Architecture
Second mentor	Rufus van den Ban	Building Technology
Third Mentor (Research)	Thaleia Konstantinou	Architectural Engineering
Argumentation of choice of the studio	Explore Lab studio enables an independent choice of the topic, site and research theme, as well as individual approach in work scheduling and teambuilding. My graduation idea did not fit fully into any other studios, and I value in depth experimentation and exploration that Explore Lab offers. I am also used to working in an independent way (which does not mean "alone") from my previous educational experiences, and would like to strengthen those abilities further.	

Graduation project	
Title of the graduation project	**The Tenements New Clothes.** A system approach for bio-based revival and futureproofing of Polish inter-war masonry housing.

Goal	
Location:	Warsaw. Praga Południe. 

	
The posed problem	There is a row of masonry townhouses incredibly similar to each other, along the Grochowska street in my neighborhood in Warsaw. They fit into a common type of inter-war tenement housing typology, which stays largely neglected and in need of urgent refurbishment and futureproofing action. I see the potential for a systematic and scaled solution, improving the lives of many people. Environmentally responsible design requires renewable, low embodied carbon strategies, while the current conservative practice in Poland lacks knowledge and willingness to evolve. Oftentimes in the whole refurbishment process, the original user is overlooked.
Research questions	Main Question: • How to integrate bio-based solutions in masonry building retrofitting, while considering both technical requirements and user preferences? Sub-Questions – Technicalities, User-Centric Design, Knowledge Dissemination: • What are the technical requirements while futureproofing masonry buildings? • What are the user needs and priorities in transition towards biobased futureproofing? • How can an accessible knowledge base of biobased refurbishment strategies help advance their adoption rate? Design Question: • How can a futureproof design be adapted to other buildings of shared typology?
Design assignment in which the questions result.	First, a guidebook of biogenic materials and strategies suitable for refurbishment of masonry tenement housing will be developed, that will serve me during the design process as a set of principles and building blocks. Such a guidebook could also be useful for homeowners, developers, and other designers working on similar projects. Next, the design project will focus on one of the buildings from a row along Grochowska street in Warsaw. It will include a deep adaptive revival of the whole residential

tenement building with additional functions serving a wider community. The design will include the context of neighboring buildings facades, the street and courtyards, as the main scalable design approach would be a system that could be adapted to the whole row of buildings and similar typologies in other cities.

Process

Method description

Literature research formed the foundation of my work. It included academic papers, reports, guidebooks, professional publications, online video content, and other sources. I remained cautious about biases and private interests, particularly in non-academic materials.
For bio-based materials and solutions in Poland and Eastern Europe, I reviewed academic and published works on established and emerging technologies. This research also provided insights into user priorities for refurbishment practices and analysed accounts from individuals whose spaces were improved with bio-based materials. It highlighted what people value in future-proofing, focusing on their short- and long-term needs.

Market research formed the basis for the catalogue. I explored what's available in the current setting and what might gain market viability soon.
The metrics and parameters for the catalogue were defined first through research on what's important in refurbishment practice and what do occupants care about, and secondly based on existing similar catalogues. Those are filled for each entry in the catalogue, and include: Embodied Energy [MJ/kg], Global Warming Potential A1-A3 [kg CO2eq/kg], Thermal Conductivity [W/mK], Fire Rating, etc.
My general interests lay in cataloguing, curation, and data analysis for further use in design process. Initial data collection started early, but with more data and knowledge coming through the research, it was refined towards the final version.

In support of literature research, I interviewed familiar researchers and practitioners, as well as municipality board members specialising in urban, architecture design and biogenic materials for construction. Interviews helped to contrast research with a local reality, especially regarding adoption rate of biobased materials, sources of funding or lack of action from homeowners and the city itself. All of them gave insights which helped refine the outcome of the research for the target audience and define which bio-based solutions have less or more ground for success specifically in my design project. Interviews were thoroughly planned, with a set of questions

prepared beforehand. Permission for paraphrasing gained answers in publication was granted by interviewees.

Literature and general practical references

The basis of my position as a designer comes from climate science research advances and user participation theories. Much of my current knowledge on the urgency for change in the Architecture Engineering and Construction sector comes from publications like the IPCC report on Buildings, Reduction Roadmap by EFFEKT, Ramboll reports and Dark Matter Labs essays, among some others. Writings of Giancarlo de Carlo and "Beyond the Current" research done by TU Delft shaped my interest and care towards user participation in inclusion in the design process.

There is an existing research project in works (NEEST Warsaw) regarding the same urban block with subject tenement houses that I focus on. As their goals are close to mine, regarding homeowners education on refurbishment and climate adaptation, I contacted them and scheduled meetings to share information and potentially collaborate on the issue.

Resources similar to the one I develop exist in the context of USA, Nordic or some western European countries, providing useful information on refurbishment practices and biobased materials, though rarely combining the two (Unboxing Carbon by Henning Larsen or the Material Pyramid). While information found on manufacturers websites can be too technical for a homeowner in search of general information. Currently the existing resources available for laypeople can be divided into two groups in my opinion. The first one provides useful guidance on general refurbishment or energy retrofit options for various types of buildings, however, focusing on the logistic and financial side. Examples include tips on seeking funding, or types of interventions that will make the retrofit more financially attractive as an investment (Some Polish renovation guidebooks by "Fundacja Poszanowania Energii"). Those guides can be useful, but they do not introduce technical aspects, leaving them to, hopefully, competent designers or contractors, meaning that homeowners may not be able to differentiate between good and bad practice. Another group includes guides that do provide more technical information and useful knowledge about refurbishment and building science, also regarding masonry buildings. Information on possible interventions, insulation and moisture management challenges can be found easily and in accessible form. However, on the material side and thus specific construction possibilities, it is almost impossible to find any information about biogenic alternatives to traditional conservative practice dominated by oil-based styrofoam or mineral wool. Polish homeowners considering retrofitting, will simply not be introduced to renewable, low embodied carbon strategies while looking for information.

Practical References:

"Unboxing Carbon" by "Henning Larsen":
https://henninglarsen.com/projects/unboxing-carbon
"Material Pyramid" by "CINARK": https://www.materialepyramiden.dk/
Practice and Theoretical works of "Lacaton & Vassal" studio:
https://www.lacatonvassal.com/

Reuse projects by "BETA office": https://beta-office.com/work/
Row houses redesigns by "fala atelier": https://falaatelier.com/

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Reflection

The outcomes of the research could be directly used as a basis or starting point in my design proposal, as it aims to search for a system for future-proofing of inter-war period townhouses, especially along Grochowska Street in Warsaw, using bio-based technologies. In my design as an initial idea, I would like to experiment with the systematic approach and mass customisation possibilities for those buildings’ revival and futureproofing. I will focus on 1-3 of the neighbouring buildings to implement differentiating strategies in terms of their scope, aesthetic qualities and general spectrum of feasibility of the proposal. This would show the envisioned variety of end results coming out of the same set of rules and parts. In a way showing also my fascination with how complexity can emerge from quite a simple set of criteria. My design and research aims are highly influenced by current research endeavors at TU

Delft Architecture faculty, especially by the Architectural Engineering and Technology department on climate responsible architecture and actual solutions for the industry. I think with many colleagues I met along the way here; I share finding the meaning of my work in focusing on how to improve what's already built and prepare the building industry for upcoming challenges with climate adaptation and reducing its strain on our planet.

The research and design outcomes that I imagine have the potential to fill out the knowledge/ information/ data gap that exists in the Polish renovation practice about readily available and promising bio-based solutions in renovation or adaptive reuse. It could help make bio-based options more approachable and trustworthy from conservative designers' and homeowners' perspectives. Depending on the form of the publication, it could also serve as a helpful resource for students. Moreover, it can, by a large amount, be applied also to newly built bio-based architecture, which broadens the scope of potential influence.

The design project can serve as an example of how the specific type of Polish tenement townhouses can be refurbished and futureproofed on a scale larger than just one building. As the buildings are so similar in their typology, and are numerous, one proposal designed with a system approach can be translated easily to all of them, contributing to scaled reduction of their environmental impact, and most importantly, improvement of many people's lives, often energy impoverished or marginalized by the society.