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	**Puji Nata Djaja**
Student number	5020379

Studio		
Name / Theme	Building Technology Graduation Studio / Climate & Energy	
Main mentor	Prof. Regina Bokel	Climate & Energy
Second mentor	Alejandro Prieto	Façade & Product
Argumentation of choice of the studio	"I want you to act as if the house is on fire, because it is." That quote from Greta Thunberg resonated with me so well. Yet I have lived with air-conditioner my whole life and I couldn't foresee living without one, especially in the summers where I come from. Then I heard about Dr Ben Bronsema and his invention of Earth, Wind, and Fire (EWF) system sounded like 'the answer' that hit home. I wanted to see how effective EWF is in where I come from, hence the choice of the studio.	

Graduation project	
Title of the graduation project	Naturally Tokyo: Found in Translation A case study of Dutch Earth, Wind, and Fire system integration and optimization in an Office Building in Tokyo
Goal	
Location:	Tokyo, Japan
The posed problem,	Tokyo, being the largest built-up area in the world, is the capital city of a country still 87.4% depending on fossil fuel, in which almost entirely is imported from other countries. Furthermore, buildings account for more than 70% of CO2 emissions in Tokyo, with 30.2% from the residential sector and 45% from the commercial sector. With Tokyo's goals to reduce 30% and 38% of greenhouse gas emission and energy consumption respectively by 2030, real action and innovation in converting to renewables are indispensable.

	Therefore, a sustainable alternative to the conventional air-conditioning system in office buildings could be the most effective solution.
research questions and	Is the Dutch Earth, Wind and Fire system (EWF), in place of the existing air-conditioning system, an efficient energy-retrofitting method to achieve energy-neutrality in an office building in Tokyo without compromising thermal comfort of users?
design assignment in which these result	Integration of Dutch EWF into an office building in Tokyo

In order to answer the main research question, the following sub-questions have been proposed. For a better understanding, they have been grouped into 3 categories:

Site context

- How does the climate of Tokyo impose challenges in achieving thermal comfort throughout the year?

Office buildings in Tokyo

- What are the typologies of office buildings in Tokyo and their air-conditioning systems?
- What is the energy consumption of office buildings in Tokyo and what are the applicable regulations related to it?

EWF system & its integration

- What are the elements of EWF and how are they a sustainable alternative to the existing air-conditioning system?
- What are the criteria for EWF integration into an existing building?
- How effective is the proposed EWF design in comparison to the existing air-conditioning system in terms of energy consumption and thermal comfort?

As this is a pioneer study that takes the Dutch EWF to be used elsewhere, this time in Tokyo, the focus is to see how EWF works in a different climate than the intended, and how the system can be optimized (when necessary) to the different climate of Tokyo.

Process

Method description

Following the structure of the above-mentioned research objectives, the research methodology for this paper will be classified into 3: literature research, EWF-integration design, and assessment & optimization. See Figure 1 Thesis Structure below.

Alongside Literature research, the choice of case study building will also be explored, and the decision to be made by P2. The final design will be developed before P5 after several processes of assessment and optimization.

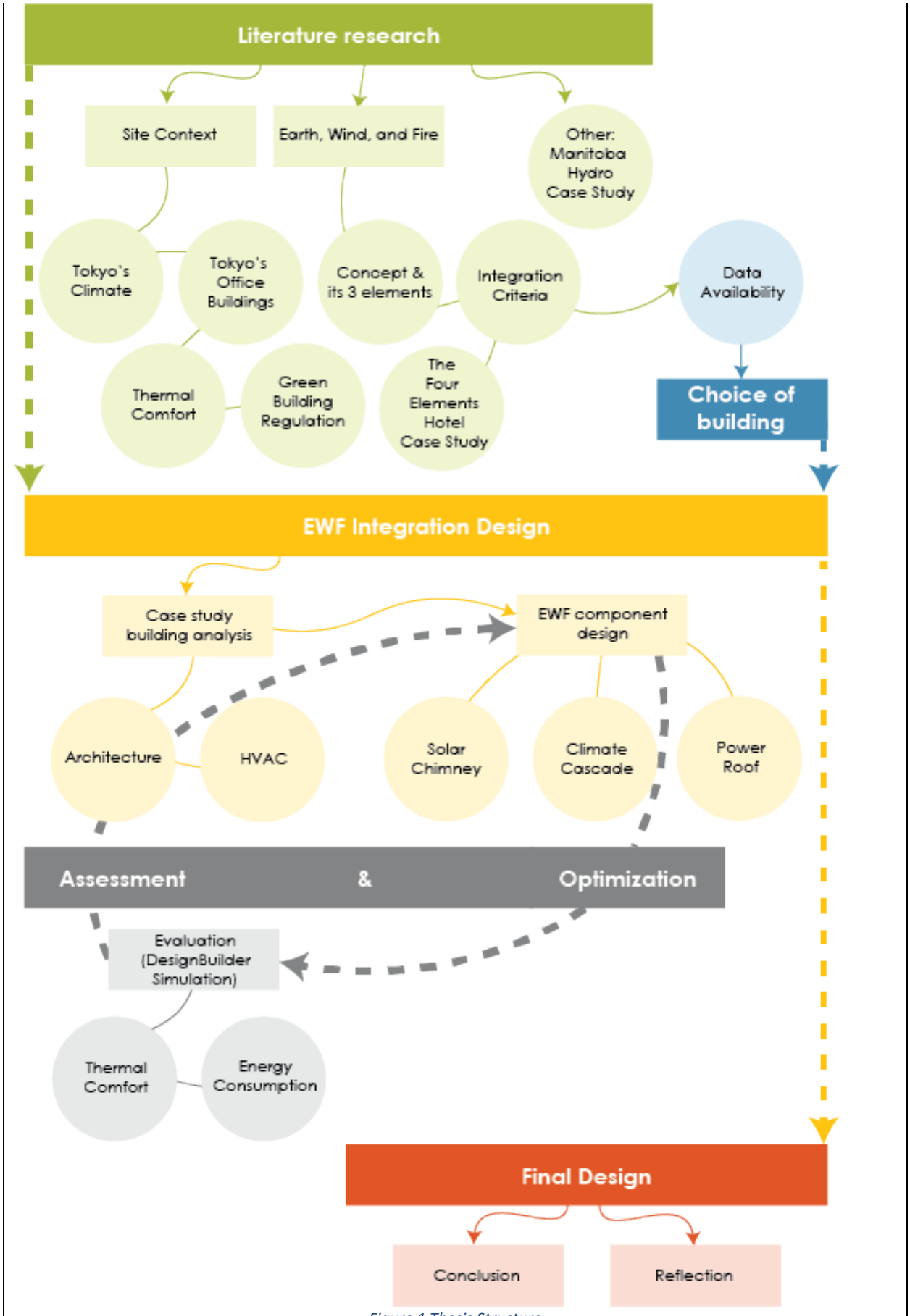

Figure 1 Thesis Structure

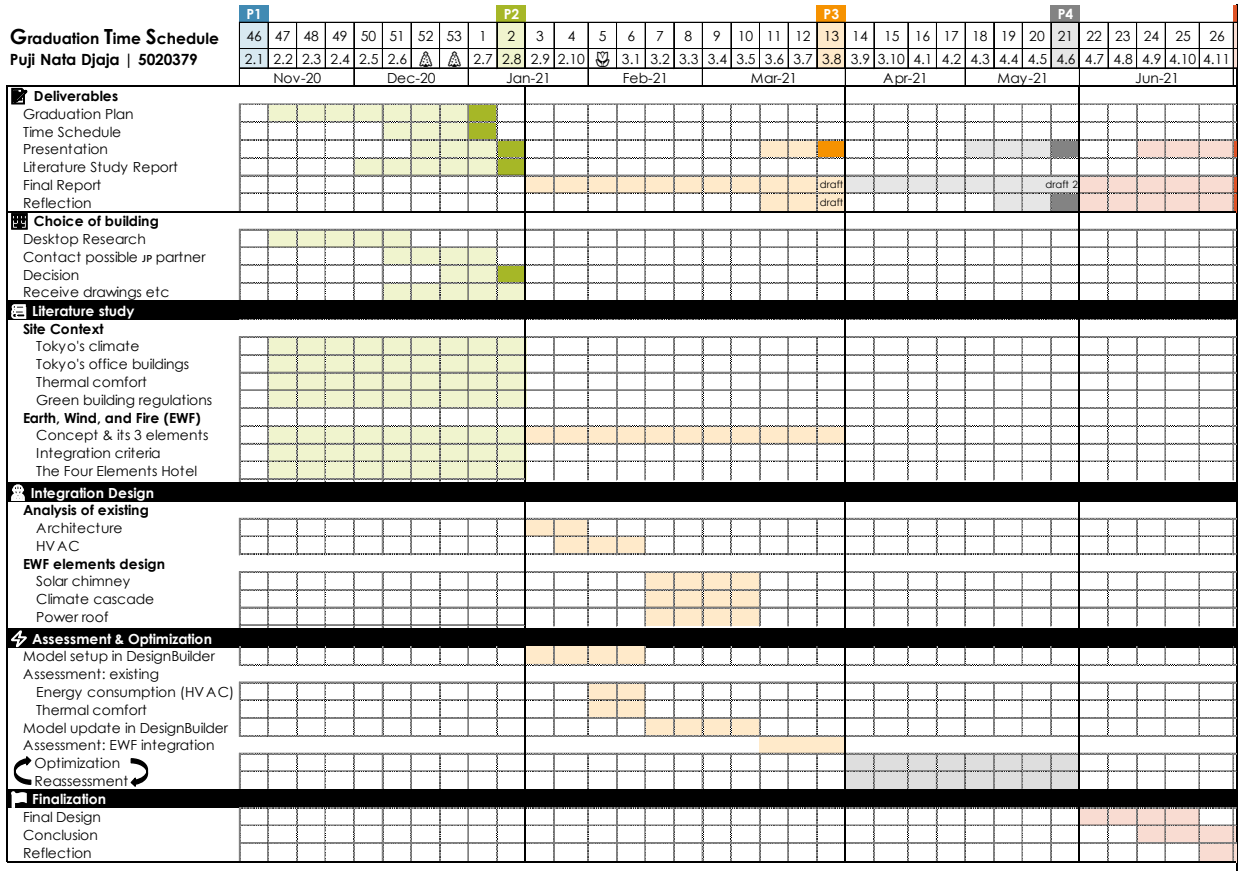

Figure 2 Graduation Time Schedule

Literature and general practical preference

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