P4 REFLECTION

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The Solar Mountain
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The Why Factory's research design studio operates on the exchange of collective work and individual project. Implementing from the studio's common framework, The Blockmaker, the studio's research explores the notion of what make a housing block? Through data to design approach and parametric software thinking, the Blockmaker is a research software that allows one to generate multiple design solutions by transforming mass, reconfiguration of programs, accessibilities, porosity and generating options for façade and structure responsively to a climate condition.

My research question speculates on a scenario where a housing block would be self-sufficient with solar energy. How would it look like? How would it performs for power generation and at the same time generate better housing qualities for views, daylight and terraces? Can it create better qualities for a dwelling? In this studio, we add one parameter to observe the changes in our design intervention. In my case, for a block to be self-sufficient with solar panels, a parameter of energy demands with solar panel surfaces would be a primary aspect to consider. However, to make a housing block, it requires multiple parameters of housing qualities to finalise an optimised design decision.

Aspect 1:

the relationship between research and design

With this generative research question, I have to construct a series of analytical research on solar technology and housing qualities. How much surface area of solar panels required to reach the electricity demands of the inhabitants in the block? What would be a suitable design that would yields energy while providing sufficient amount of daylight, terraces and views for the residents?

To achieve that, I have to construct a series of mass studies on several parameters. First, I developed a mass by studying its annual solar radiation its received on different directions of surfaces from North, South, East and West. Moreover, later I start to analyse those masses with different qualities such as distant to terraces, views qualities and daylight. These studies allow me to evaluation different design iterations that providing me with data to make a decision and further develop the design.

Therefore, this method of produce multiple iterations of design open up new possibilities of design outcomes and allows architects to compare and contrast their advantages and downsides.

Aspect 2:
the relationship between the theme of the studio and the subject/case study chosen by the student within this framework (location/object)

Theoretically, the Blockmaker is an open software that users can input parameters or choose a specific location on a map to construct a site boundary as well as its geographic information such as climate, sun path, solar radiation, and temperature, population density per m2 and its electricity demands. Therefore, with this flexibility in consideration, the design methodology could be applied to any location and would generate different design outcomes.

For this research, the location is set in Barcelona, Spain with a research boundary of 100 by 100 by 100 meters. Within this given footprint of 10,000 m2, the essential problem is to a suitable amount of programs between housing quality and energy production.

In this research, I realised that I have a potential to generate energy to other neighbour blocks. However, the essential problem is to arrange a suitable amount of programs between housing and energy production. Because the higher the amount of energy the block produces, the lesser the housing qualities it will be. Therefore, my framework is to find an optimised solution for views, daylight, and housing conformability while generating enough energy to be self-sufficient.

Aspect 3:
the relationship between the methodical line of approach of the graduation lab and the method chosen by the student in this framework

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The design methodology of the studio is to create a series of iterations that would yield the different possibilities of design outcomes. Each design decision will break down into topics and explored multiple variations before making a design decision. These decisions are made based on data, research and spatial quality. This methodology has constructed a critical framework working on this project. The process of iterations might occur in a loop of various modifications before the design execution. The advantage of this process of design is that it allows me to widen my perspective to take consideration in many aspects before making design execution. Indeed, the project is a negotiation between the future scenario to be self-sufficient with solar energy and housing qualities. It is a paradoxical task between scenario and housing qualities in which make this project and studio quite challenging.

Moreover, considering the comfortability of the housing block with solar panels, how to use building technology and to reduce the energy demands for building by improving the natural ventilation using the advantageous of solar panel façade that

generates heat convection. Even though the Why Factory design approach is quite open, through the process of selection and generate iterations of possibilities, at some point our human intuition to make a choice is also an important part of the design process. Therefore, by making a plan, section, elevation and rendering perspectives would also help the process of selection as it would be able to illustrate the spatial quality we seek.

Aspect 4:
the relationship between the project and the wider social context

Collectively, The Blockmaker has touched many aspects of architecture design and practice. First, it is questioned the possibility of software approach in architecture practice and how it could help architects to design and to make a decision.Second, the blockmaker generates designs that emerge from a set of parameters in which allows for design comparability. By embracing the interrelations between multiple parameters, it allows the design to be proactive and responding to changes.

Furthermore, my research investigates on the solar technology of generic, semi-transparent and coloured solar panel and its efficiency in energy production. With the current situation where a solar power farm is required an enormous amount of land to produce electricity for the community, the project is proposing an alternative solution to integrate solar panels with building components that could be able to power more than one city's blocks. I envision designing a solar energy self-sufficient block challenging the notion of green architecture and implementing the beauty of solar panels into our dwelling where maximising daylight, views and housing comfort.