

Final reflection report

HOT TOWN!

SUMMER IN THE CITY

A research into the relation between Rotterdam's South socially deprived neighbourhoods and the urban heat island

By

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1 Research scope

The scope is to apply environmental justice theory on the Dutch neighbourhood scale and urban heat island mitigating and adapting solutions in an integrated urban design. In order to build the theoretical framework mainly international research on environmental justice in English written reports and papers are used. The context of such research is different from the Netherlands since, for example, income inequality is more severe and the scale of social deprived neighbourhoods is bigger in the United States. This thesis is not judgemental on the scale of environmental justice but rather tries to apply the concept of environmental justice within a Dutch context to discover its applicability. Scope of the urban design is to integrate urban heat island mitigating and adapting design solutions in a wider neighbourhood context of social deprivation and other climate related issues.

2 Relevance

The graduation project is relevant for the academic field for four reasons:

Firstly the graduation project connects to the graduation studio of urban metabolism. This studio analyses and visualizes materials and energy flows of the city. Subsequently subdivided by; demographics, air, water, food, biota, mobility, cargo, building materials, waste and energy. The graduation project connects to the topic of energy and water. As urban heat island theory is based upon incoming energy by solar radiation and anthropogenic activities and design solutions will connect to energy and water.

Secondly while environmental justice is an international known concept applying it to a Dutch context of urban heat island is new. A deeper insight will be presented on how researchers link the two and what kind of social and spatial indicators are used.

Thirdly by using similar spatial social and spatial indicators to map environmental justice gives a deeper understanding of such concept. This opens up a discussion of environmental justice in the Dutch context.

Finally the research is relevant for the urban design discipline concerned with climate adapting design solutions. The graduation project implements existing solutions in the context of a pre-war neighbourhood where room is sparse. These lessons learned are valuable for design assignment with a similar framework.

3 Reflection

The relationship between research and design

The phenomenon of the urban heat island is something one can separable study and research with attention for the urban fabric but little related to social components. This graduation thesis shows how the relationship between the research and design is embedded within the study of both urban and population characteristics. Firstly the factors that influence the urban heat island are the lack of vegetation, the use of paved and impermeable surfaces, the configuration of buildings and high building mass and low reflective of used materials. Such factors are part of the urban language the urban designer has to his disposal. Secondly the population and social characteristics of a neighbourhood in terms of demographics and social issues are defining factors whether the urban heat island is an issue of environmental justice. Such a issue would be a theme for the urban designer to address.

The graduation research shows that within the context of the Netherlands the urban heat island is an emerging phenomenon and makes a case for the existence of environmental justice. However one could still question its severity. As such when proposing urban design principles and intervention that would mitigate and adapt to the urban heat island and at the same time improve a neighbourhood liveability and functioning in broader terms. Therefor the graduation thesis took a broader look at the neighbourhood. As such the design principles are linked to both the urban heat island and other issues and opportunities.

The relationship between the theme of the graduation lab and the subject/case study chosen by the student within this framework (location/object)

The graduation lab of smart cities and urban metabolism is connected with the understanding of the metabolism of urban environments, the relationship to landscape systems theory, and the performance of different elements, infrastructure and systems, in reality to the spatial quality, environmental sustainability and social wellbeing of future cities. The flow of materials and energy are analysed subdivided by; demographics, air, water, food, biota, mobility, cargo, building materials, waste and energy.

The urban heat island is related to this because it's all about energy. The city by warms up due to the sun's energy and anthropogenic activities. This increases the temperature of the city surface and air temperature compared to its rural surroundings. There is plenty of research on the urban heat island and how through design the negative effect can be mitigated or adapted. But the graduation thesis is also about social wellbeing. Since literature suggests that their remains a limited understanding of the effects of urban heat island connected to social-economic and environmental justice dimensions like poverty, inequality and opportunity.. The graduation thesis deals with this issue by researching the relation between Rotterdam's socially deprived neighbourhoods and the urban heat island.

The relationship between the methodical line of approach of the graduation lab and the method chosen by the student in this framework.

The urban designer deals with the complex reality of the city through research and design. The methodological line of approach is one of designing through the layers and the visualization of flows of energy and materials. The chosen methodological line is one of methodological triangulation as it tries to conduct research by using both quantitative and qualitative research methods. As a result of this method quantitative data could be verified by qualitative and vice versa from which design interventions were proposed.

The relationship between the project and the wider social context

The relationship of the master thesis and the wider social context is translated through the concept of environmental justice in relation to the urban heat island. The urban heat island is recognized as a hazard that potentially can harm city dwellers. A distinction is made that city dwellers with lower income living in socially deprived neighbourhoods are more exposed and more vulnerable to high surface temperatures. Such an issue is proclaimed as an issue of environmental justice and opens a broader societal discussion. The wide encompassing trends of climate change and an increase of inequality due to the current political economic reality of both neoliberalism and globalisation, disproportionate exposure by environmental hazard to lower income groups within the city needs a political answer on a regional and local level. (RIVM), R. v. V. e. M. (2012). GGD-richtlijn medische mileukunde.

During the course of the thesis choosing a research location took considerable time. In first instance the aim was to conduct a research for a city within Europe. This was refrained because lack of data availability and ease of traveling. A travel to Warsaw learned that, while there is research on the urban heat island, the city is considered as quite egalitarian. Therefore a disproportionate distribution of the urban heat island among lower income groups was not expected to be found.

Therefore Rotterdam was chosen as a research location as two of the three mentors already did research on Rotterdam regarding the urban heat island. This would indicate more knowledge and data to build upon and the city is easy to travel to.

4 Process reflection

Main issue of this thesis in terms of process is the choice of a clear research aim and methodology on the level of a city district. During the P2 presentation and in the thesis plan it was somewhat unclear what part of Rotterdam the thesis was about to address. Not knowing the location was not a problem, but rather not knowing what research methods the thesis would use when the location was found. As a result the thesis moved back and forth in analysing the city on the scale of the building block and the city district. However this should not have been a problem if closer attention was given to different research method to either analyse the city on district scale, neighbourhood or block level in an earlier stage. When the choice for a city district or part was made it would be easier to apply research methods for each scale level. However there was quite a good guess that the thesis would address on of thee three pre-war exapansion area. As such picking up the book 'Transformatie strategieën voor verouderde stadswijken' in an earlier stage would prove beneficial as it gives leads for sources on theoretical background and methods. Therefore with hindsight the used analyse method of networks and density according to Berghauser Pont and Haupt and assessing public spaces would have been conducted across multiple neighbourhoods for the city district Feijenoord. Especially the work by Berghauser Pont and Haupt provides for a clear categorization of building typologies according to ground and floor space index. When used a fuller picture could be given of how different urban typologies preformed in regard to the urban heat island or what difference there could be found among building blocks of similar typology.