USING SUSTAINABLE INFRASTRUCTURE TO CONNECT BROAD AND LOCAL NEEDS AND ASPIRATIONS IN THE POST-WAR NEIGHBOURHOOD MOERWIJK

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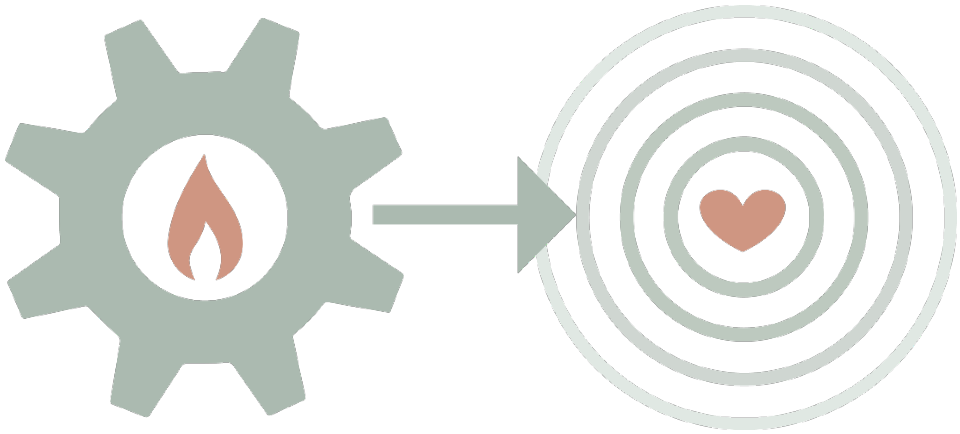

Abstract

Technology has become indirect and stripped down, the costs of sustainable transformation lie heavy on agency-lacking and marginalised people and the post-war neighbourhood is a spatial cluster where these problems converge. This paper aims to deliver the foundation for a spatial program of requirements in the public and collective space of Moerwijk that connects broad needs such as sustainable transformations with local needs and aspirations, resulting in community participation and empowerment. Through empathic fieldwork and literature study, broad and local needs and aspirations, and positions of participation and empowerment of local organisations and relevant case-studies are researched. Finally, several guiding conclusions are formulated..

Keywords: ***Sustainable Infrastructure, Energy-transition, Participation, Empowerment, Community needs, Heat distribution Network, High Thermal Energy Storage, Neighbourhood transformation, Public space, Post-war Neighbourhood, Moerwijk***

I. INTRODUCTION

Through the years, technology has become increasingly distanced from human activity. Functions have become separated in favour of optimal performance, and its related infrastructure is organised on a large, abstract scale. At the same time, the implementation of sustainable technology and infrastructure are high on the agenda of governments and municipalities, but come with a cost for local communities in financial, practical and spatial terms, especially for agency lacking and marginalised communities.

Post-war neighbourhoods are important clusters where these problems converge. As of today, many of such neighbourhoods deal with social and economic challenges The housing stock is characterised by standardized flats and porticos, often with a low energetic performance and owned by social housing corporations, who decide over big renovation and transformation plans. Nationally, 550.000 households are in energy-poverty, of which three-quarters live in social housing (TNO, 2021).

Moerwijk is one of those typical post-war neighbourhoods and one of the most impoverished areas in The Hague. Two-thirds (7819 units) of the housing stock is owned by social housing corporations, more than half of the houses have low energy labels (≤ C) (Allecijfers, 2023) and only 1 in 4 people is employed (Gemeente Den Haag, n.d.-b). A regional heat distribution pipeline is constructed through important axes of the neighbourhood. The project is planned top-down through some of the most impoverished neighbourhoods of The Hague, and its large scale leaves little room for resident input, leading to mixed reactions.

The question arises how these much-needed sustainable transformations, such as district-heating networks and electric infrastructure can be used as a driver to answer to the needs of local communities that lack agency and financial means. What public/collective problems can connect the broad need and aspiration of sustainability with the needs and aspirations of the local community, and contribute to their empowerment and aspirations?

The goal of this paper is to help guide the development of a spatial and functional program for the public and collective space in Moerwijk that deals with these topics. The resulting program will be used as a foundation for a more elaborated design proposal.

1.1. Research questions

The following research questions have been formulated:

What public/collective program of requirements answers to both local and broad trends, needs and aspirations in Moerwijk, creating synergies between sustainable technology and the local community and resulting in participation and empowerment?

- *What are local needs and aspirations in Moerwijk?*
- *What are broader needs and aspirations and what form do these take within Moerwijk?*
- *What are the positions of participation and empowerment of local organisations and relevant case studies?*

II. METHODOLOGY

2.1. Local needs and aspirations

To find out local needs and aspirations, fieldwork research is conducted. A model for empathy in design is adapted describing a loop of four stages: (1) Discovery, (2) Immersion, (3) Connection, (4) Disconnection (Kouprie & Visser, 2009).

Through this fieldwork, contact is made with the context and local community (1). By immersing myself through extensive visits and conversations (2) I gain better understanding of local needs and aspirations and can empathize with the local community (3). Finally, I detach myself from the local community and context and synthesize the findings along with the other findings into a coherent program of requirements or design proposal. The loop can be repeated multiple times and can be used to attain feedback on proposals.

The fieldwork consists of multiple visits with local community members and organisations. This involves interviews, event participation, observations during visits and a lot of personal communication. To protect the privacy of the people I have spoken to, they will be referred to with an anonymous identifier.

Figure 1. The four stages of Empathy in Design (Kouprie & Visser, 2009).

2.2. Drivers of Change

To find out about the local consequences of sustainable transformations in public and collective space and to find out other relevant themes and their specifics to integrate into a program of requirements, literature study is conducted. The studied literature includes official reports and documentation from the national and local government and publications from established statistics agencies, such as CBS and UWV. The findings will be connected to the results of the fieldwork.

2.3. Positions on participation and empowerment

To better position my proposal within a scientific framework of participation and empowerment, and to map the existing levels of these parameters within Moerwijk, a study is conducted to position local organizations and some relevant case-studies within a scientific framework.

The degree of participation can be defined as a ladder with eight steps: (1) manipulation, (2) therapy, (3) informing, (4) consultation, (5) placation, (6) partnership, (7) delegated power and (8) citizen control (Arnstein, 1969)(See appendix I). The higher on the ladder, the higher the degree of participation can be considered.

Therapy and manipulation focus on educating and curing individuals, having no real participation. Informing, consultation and placation can be considered as a form of tokenism, where individuals can hear or be heard but have no actual power to change the status quo. With partnership, delegated power and citizen control, individuals can make trade-offs or have a majority position in the decision-making process, making them the highest ranks of the participation ladder.

The amount of empowerment can be measured in relation to the scale and context in which the empowerment takes place. We can define five consecutive levels: (1) individual empowerment, (2) embedded empowerment, (3) mediated empowerment, (4) socio-political empowerment and (5) political empowerment (Rocha, 1997)(See appendix II). With each increasing level, the scale of the empowered community increases, beginning at the individual and ending with large groups within society through political action.

Both ladders have been used to create the framework shown in Figure 1. An extra value has been added to both participation and empowerment: No participation and no empowerment. These signify a lack of participation or empowerment, maintaining the status quo.

In total, 10 local organisations in Moerwijk and 6 relevant case studies will be positioned within this framework through analysis of organisational structure and daily affairs through documentation, site visits and interviews. A list with a brief description of each case can be found in Appendix I.

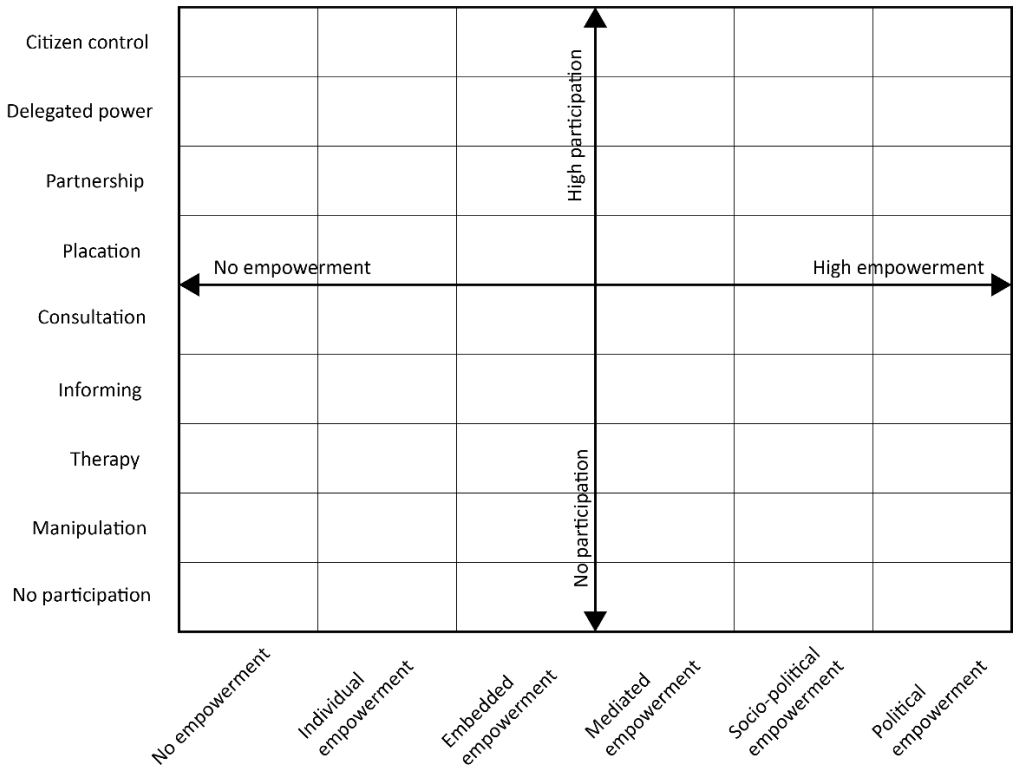

Figure 2. Comparative framework using the ladders of empowerment and participation

III. RESULTS

3.1. Local needs and aspirations

To get an understanding of the needs and aspirations that are relevant to the local community in Moerwijk, I have immersed myself in their context, following the four steps of empathy in design.

The discovery started by joining the Thesis Hub of The Hague Southwest, that aims to connect academic efforts with the local community. Through the Thesis Hub, I got in contact with key-figures that enabled me to expand my network.

Then came immersion in Moerwijk. The results of this section come from extended fieldwork, involving visits and a lot of personal communication. To protect the privacy of the people I spoke to, conversations will be referred to with anonymous identifiers.

In total, I paid 10 visits to the neighbourhood at different times of the day, on different days of the week and to different locations. I visited 10+ organisations, where I planted 10 fruit trees, shelled 7 bags of brussel sprouts, helped to cook and serve 45 people a healthy and affordable meal, supported 7 persons during a course on internet and browsing, spoke with 12 young social work interns, attended the evening prayer at the mosque, and I made contact with more than 50 people. It allowed me to connect with people in the neighbourhood, and to understand their wishes and challenges better.

The results of this paper have been synthesized in the detachment phase that followed, allowing me to distance myself from their daily reality and view their statements in a larger picture.

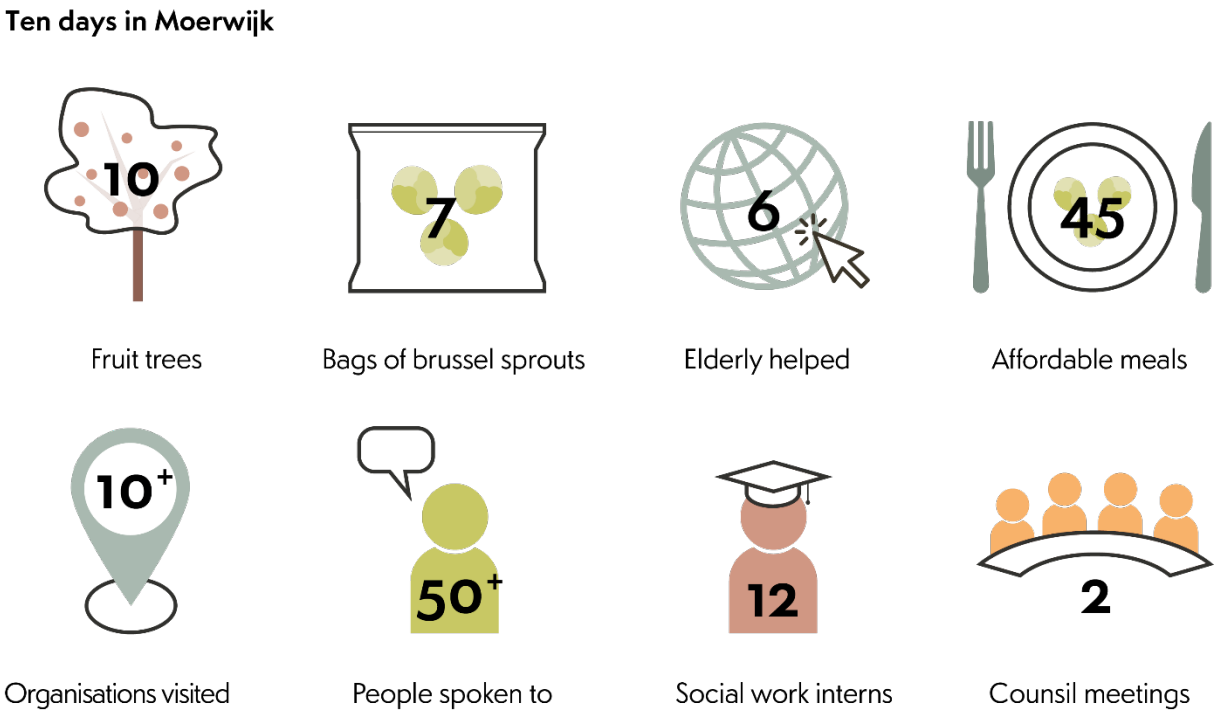

Figure 3. Summary of the fieldwork in Moerwijk. I spend a total of 10 days in the neighbourhood, participating in various activities, speaking to 50+ people, visiting 10+ organisations and presenting my work to relevant stakeholders in counsil meetings.

Figure 4. Local residents aspire for and struggle with maintaining independence.

3.1.A Teaching people how to fish

"Don't give the people a fish, give them a fishing rod."[1] It is a sentiment that resonates with a lot of residents. In multiple conversations, people have spoken about their personal struggle to maintain their independence during hardships, as organisations and instances exert control over primary aspects of someone's life.[2] From my observations in the neighbourhood, there seem to be two main reactions to such a struggle: fighting and freezing. When a person fights, they grow distrustful of organisations and instances, declining their help. This is often accompanied by a resentment towards the opportunities or laziness of others. A sense of pride for their independence remains, but their problems are too extensive to solve alone. When a person freezes, they are pacified by the amounts of stress and powerlessness they experience because of complex struggles and solutions, pushing them into further dependence on external support.. What remains is frustration because external parties are often unable to provide in their immediate needs, but neither are they themselves.

In either case, the critique on well-meaning organisations and instances is the limiting and undignified manner in which they attempt to help the person in need. The given programs relieve peoples immediate basic needs, but it's both a temporary and a one-size-fits-all solution.

"I wish to be the instrument of my own, not of other men's acts of will. (...) to be moved by reasons, by conscious purposes, which are my own, not by causes which affect me, as it were, from outside."

-Berlin, I. (1969). Two concepts of liberty. Four Essays On Liberty (p. 142). Oxford University Press.

An underlying thought behind these solutions seems to be a liberal concept of freedom, where the focus is the elimination of obstacles. However, freedom can also be looked at as a presence of reason or purpose to act (Carter, 2022). In this case, the relief of primary needs without creating purpose and perspective creates less reason for change. The resulting structural dependency creates undignified situations. To help people become independent, the void of purpose needs to be filled. This includes teaching them how to fish, in custom programs, connecting to personal needs and interests.

[1] Resident A, personal communication, dec 5, 2023
[2] Resident D, personal communication, nov 21, 2023; Resident E, personal communication, nov 23, 2023; Resident A, B & C, personal communication dec 5, 2023

Figure 5. The top-three google searches and first articles about Moerwijk reveal its stigmatization

3.2.B. Removing the stigma, exposing the strengths

"I tell people I am from The Hague, not from Moerwijk"[3] two local residents and volunteers tell me. Moerwijk has gotten special attention from media, organisations and instances in recent years regarding its poor quality of housing, work and life. The first three Google suggestions: *"Moerwijk deprived area"*, *"Moerwijk poorest neighbourhood"*, and *"Moerwijk criminality"* reveal the general image that the district has attained. These statements are confirmed by the regional deal that was established by of the local and national government for the southwest of The Hague in 2019. The possibilities for funding led to a surge of local initiatives, participative processes and professional and educational research and projects. Since then, residents grew tired and distrustful of questionnaires, surveys and input. Especially since they feel a lot of their input did not get much follow-up, or lead to visible results. "You can explain your ideas to me, I think, 'okay, but what does it matter?' Resident H tells me (personal communication, nov 29, 2023).

Different levels of engagement with the neighbourhood create different impressions. On negative aspects, residents tell about humid and unhomely houses, poverty, rats, litter, nuisance and poor relations with others.[4] Considering my own impression as an outsider walking through the neighbourhood, it is the litter, car-scattered streets, neglected and underused spaces and monotonous housing projects that shape an image. For passer-by's along the main roads, it is the stretched apartment blocks inches away from the busy street.

However, I also found out there are a lot of strengths within the neighbourhood. Moerwijk holds many initiatives and organisations motivated to improve living conditions and bring people together. There are multiple existing and planned locations where creative, culinary, technical, entrepreneurial, artisanal, green and sustainable skills are taught and practised. More often than not, these locations are hidden away in impermeable buildings, remote corners and cater to a limited group of people. These strengths can help to destigmatize Moerwijk, but more collaboration and visibility needs to be established for them to be truly present and accessible for passer-by's, visitors and residents of the area.

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[3] Resident F & G, personal communication, nov 23, 2023

[4] Resident D & Volunteer I, personal communication, nov 21, 2023; Resident E, personal communication, nov 23, 2023; resident A, B & C, personal communication, dec 5, 2023

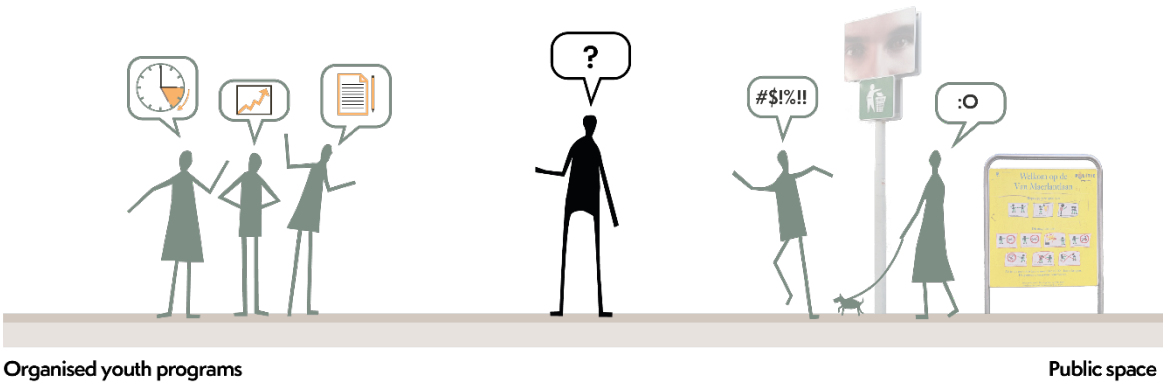

Figure 6. Young people in Moerwijk are caught between the high expectations from organised youth programs and the discouraging signs and reactions in public spaces.

3.1.C. A place where youth can exist

"There is no place where the youth can just be" resident H told me (personal communication, nov 29, 2023). Young people are underrepresented in public space and local organisations. The results show that the blade cuts two ways: the youth is rowdy and difficult to reach, their elders are intolerant, easily intimidated and don't take their needs and opinions seriously.

Local organisations have too much expectations, unattractive programs and low availability for youth. The mere two young people visiting the youth hub were outnumbered 1 to 6 by young social work interns when I visited, the hub is only open for recreation between 15.00 and 17.00h and I have heard of instances were young people wanting to hang out there were encouraged to be silent or to do something useful such as joining homework support.[5] The two teenagers had left unnoticed.

In public space, the youth is resented for their behaviour and seen as a nuisance. People I spoke with mention feelings of intimidation, rowdiness, a lack of responsibility, litter, stationary cars in dark streets and the use of nitrous-oxide.[6] All the playgrounds in the area have large signs with discouraging rules for teens and young adults. They are designed for children. Ultimately, there are little to no public spaces where they are allowed or tolerated to hang out.

[5] Resident H, personal communication, nov 29, 2023
[6] Resident D, personal communication, nov 21, 2023; Resident H, Entrepeneur J & K, nov 29, 2023; Social work interns, personal communication, dec 7, 2023

Figure 7. Local residents generally do not feel much need to engage with the topic of sustainability.

3.1.E. Sustainability engagement

"By involving people, it's important to realize there are thinkers and doers"[7] a sustainability advocate tells me, signifying that the affinity and engagement with a topic such as sustainability varies per resident. Thinkers have intrinsic motivation to engage with the topic, and can be involved for the long term. Doers are more reluctant, but don't mind to participate in organised activities, especially if there are other incentives to join.

From my observations, the community seems rather reluctant to engage with sustainability. "The people here are poor, they can't even spell energy-transition"[8] a resident tells me. People have more pressing matters on their mind and feel that sustainability is something that is decided top-down, and forced upon the area without much regard for local consequences. The construction of the WarmtelinQ heat district pipeline, also known as "de smeerpijp" confirms this feeling. A plan pushed through by the province, disturbing the serenity of the green pedestrian axis with large scale construction.

From conversations with sustainable organisations, incentives for joining can be (free) services, financial advantages, social and cultural programs and educational opportunities.[9] In this way, sustainability becomes a means to answer to needs of people, rather than a goal in itself.

[7] Representative Duurzaam Den Haag, personal communication, dec 11, 2023.
[8] Resident D, personal communication, nov 21, 2023
[9] Representative Geloven in Groen, personal communication, dec 9, 2023; Representative Duurzaam Den Haag, personal communication, dec 11, 2023.

3.2. Broader needs and aspirations

In addition to understanding the needs and aspirations of the people in Moerwijk better, it is important to get a more precise overview of broader societal needs and aspirations. These agendas are often implemented top-down by the national and local government.Spatial and technological implications of these broader topics are mapped within the context of Moerwijk, allowing to use their spatial and functional impact in developing strategic spatial programs.

Besides sustainable technology and the energy transition, work and demographics are also included, as fieldwork revealed them to be relevant in relation to the local context.

3.2.A. The energy transition

As part of the Paris agreement made of 2015, the Netherlands has agreed to reduce their carbon emissions with 49% compared with 1990 by 2030 to halt the effects of climate change. The resulting national climate agreement has increased this amount to 55%. For the built environment, this entails a reduction of 3,4 Mton in emissions. The reduction in the built environment includes sustainable transformation of 1.5 million existing homes, and a reduction of 1 Mton emissions in utility buildings within 7 years (Rijksvoverheid, 2019). Half of the national emissions in the built environment are coming from the use of gas for heating, warm water and cooking (Gemeente Den Haag, 2022).

To answer to these global and national goals, municipalities such as The Hague set up plans for transitioning their building stock to sustainable energy and heating sources. More specifically in Moerwijk, The Hague has set the ambition to transform it into a heat district neighbourhood before 2030. There is much to be done, as 58% of the housing stock has an energy-label of C and lower (AlleCijfers, 2023), indicating an annual fossil energy-use higher than 190 kWh/m2 (art. 2.1 lid 3. Regeling energieprestatie gebouwen). Three transformations are necessary in the built environment to realise this goal:

1. Reducing the energy and heat demand through insulation, LEDs and economical appliances
2. Switching fossil gas supply, infrastructure and use with electricity & geothermal/waste heat
3. Setting up local energy production and storage systems

3.2.A.I Energy and heat demand

Nine out of ten dwellings in Moerwijk are apartments (AlleCijfers, 2023). For average households that live in small apartments, a comparison is made between gas usage and district heating usage in the table below. What becomes clear, is that by changing the heat source, energy demand is not reduced. If anything, the energy demand becomes higher. The price of energy supplied by district heating cannot exceed the price of an equivalent in gas by law (art. 5 lid 2a. Warmtewet). However, as district heating also requires users to pay an annual fee for the connection set, and as electricity use increases due to usage for electrical cooking, the costs of district heating might turn out to be higher than gas.

Other measures will be needed to reduce the demand and price. These include low temperature heating systems with heat pumps, improved insulation, local and affordable energy production, storage and control of production and supply by non-profit organisations, such as community-based cooperations.

Average small fossil apartment		**Average small fossil-free apartment**	
Type of use	*Energy usage*	*Type of use*	*Energy usage*
Gas for heating	5814 kWh (646 m^3)	District heat for heating	6667 kWh (24 GJ)
Gas for water and cooking	2376 kWh (264 m^3)	District heat for warm water	1667 kWh (6 GJ)
Electricity for lighting and appliances	2210 kWh	Electricity for cooking, lighting and appliances	3100 kWh
Total	10400 kWh	**Total**	11434 kWh

Figure 8: average energy demand for households living in apartments with district heat for heating and warm water, and electricity for cooking, appliances and lightning. Source: Mileucentraal, 2019; Jacobs, 2022

3.2.A.II Infrastructure for district heating

For Moerwijk, the infrastructure of sustainable district heating are mapped and analysed. The various elements of district heating infrastructure are shown in the figure below.

A plausible heat source for Moerwijk is WarmtelinQ. A regional district heating system supplying waste heat from the fossil industry in the port of Rotterdam. The main distribution line of this network is being constructed through Moerwijk between 2023 and 2025 (WarmtelinQ, n.d.).

Because this network could also supply a larger area in the southwest of The Hague, a heat transfer station of 1600 m2 could be installed to supply heat to 35.000-50.000 houses. This station should be in proximity to the coupling piece of the WarmtelinQ pipeline, situated at the crossing of the Middachtenweg and the Ulenpasstraat (Gemeente Den Haag, 2023).

The placement of distribution pipes is most efficient along central axes and vegetated strips that are seen often in post-war neighbourhoods such as Moerwijk. These areas are best accessible and require the least amount of pipes and excavation work. The construction process causes cleared areas, stripped trees, sound and circulation nuisance. However, there is also a potential to redevelop these often unused areas into better public and green spaces.

For existing buildings, a delivery temperature of 70 °C is preferred, as this does not require the replacement of radiators and works effectively with lesser insulation (Gemeente Den Haag, 2020). The 100-120 °C heat supplied by WarmtelinQ is high enough to realise this. However, low temperature systems result in lower emissions, more availability of local sources and reduced energy demand (EnergielinQ, 2020). Therefore, infrastructure should be prepared for lower temperatures in the future and for new construction.

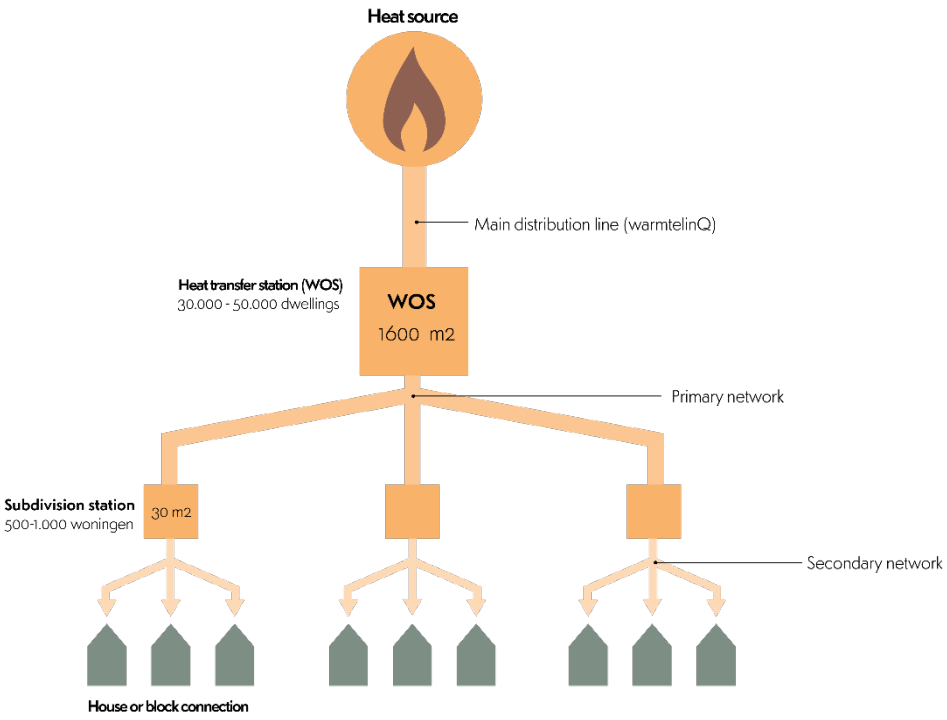

Figure 9: infrastructural components of a district heating network. Source: NPLW, 2023; Eneco, 2020; Urban Development representative, personal communication, dec 11, 2023

3.2.A.III Infrastructure for electricity

A shown in figure 8, household energy use increases due to electrical cooking. As we are transitioning to more sustainable energy sources, our energy supply gets increasingly electrified, as solar and wind sources produce electricity. The increased electricity supply and demand puts pressure on the current capacity of our infrastructure, that in turn needs extra cables and transformer stations. For this paper, we focus on local electric infrastructure.

A study shows that 10.000 households with electric cars and solar panels, connected to district heating need 10 - 40 additional medium to low voltage converter stations consisting of 10-35 m^2 each (Netbeheerder Nederland, 2019). As Moerwijk counts 10.450 households, this amount is indicative for this district.

The neighbourhood has a lot of portico flats with flat roofs suitable for solar panels. As shown in figure 10, the maximum potential energy production in Moerwijk is 42.000.000 kWh, resulting in roughly 4000 kWh energy per household when divided equally. This would be enough to provide residents with electricity for cooking, lighting and appliances (see figure 10).

As the electricity network reaches the limits of its capacity, another solution lies in the realisation of energy storage. Storage also functions as a buffer between the gap in supply and demand, as the electricity demand is highest in the mornings and evenings, and supply peaks in the afternoon. A battery can not only store locally produced energy, but also take free electricity from the net when it is overloaded, providing cheap energy for the local community. The high-thermal energy storage system CESAR, shown in figure 12 offers a fossil-free solution.

Total roof area	350.000 m^2
Max. potential solar panels	140.000 panels
Max. potential energy production	42.000.000 kWh / year

Figure 10: Maximum potential for solar energy production on roofs in Moerwijk.
Sources: Dakprofijt, n.d.; Milieucentraal, n.d.; Consumentenbond, 2022.; RIVM, 2018.

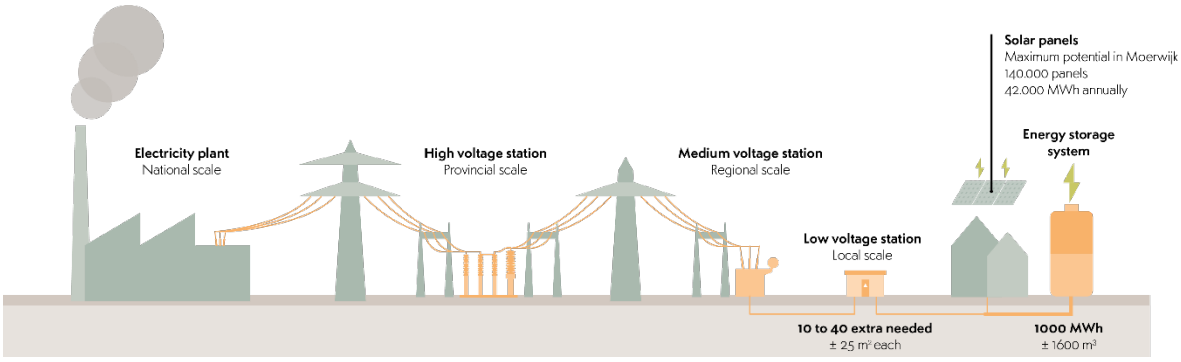

Figure 11: The electricity nets need 10 to 40 additional medium to low voltage stations per 10.000 households to keep up with increased local energy production and usage.

Spatially, the battery includes a large closed volume and a technical space. The table below shows different size options and their storage capacity. In its largest capacity, it would be able to sustain all 10.450 households for four days in their heat and warm water demand when fully charged.

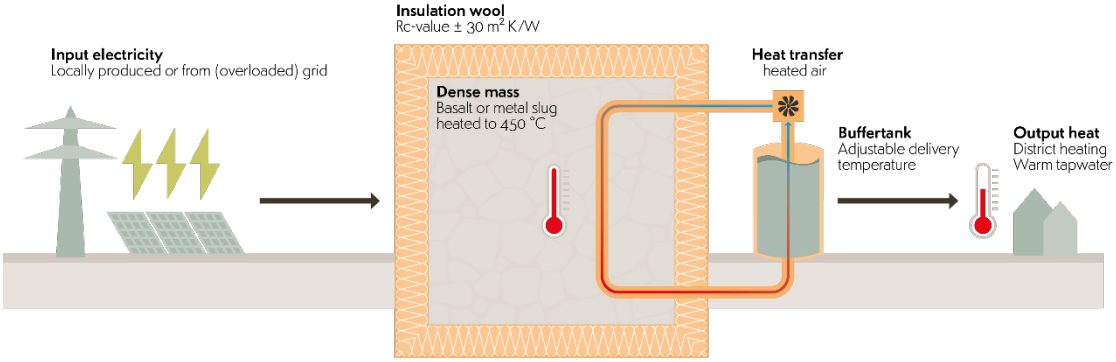

Figure 12: CESAR high thermal energy storage system. The system consists of an insulated mass of metal-slug or stone material. Supplied electricity heats this mass to 450 °C, which then can be stored multiple months. To extract energy from the system, a buffer tank is heated to the preferred temperature, providing heat for heating and warm water.

Capacity [kWh]	Volume [m^3]	Efficiency [%]	Cost [€]
100.000	400	70	400.000
250.000	1000	70	875.000
400.000	1600	75	1.200.000
600.000	2400	80	1.620.000
1.000.000	4000	90	2.500.000

Figure 13: Table with specifications for the CESAR high thermal energy storage system. Efficiency increases with a larger capacity and more compact volume. Adapted from: CESAR, n.d.

3.2.B. Demographic trends

Moerwijk counts 21282 inhabitants. In the past ten years, the population has become increasingly young and diverse, resulting in an average age of 36,5 (compared to 39,2 in The Hague) and a 79% share of people with varying migration backgrounds. A quarter of the native residents has left the neighbourhood in this timeframe (Gemeente Den Haag, n.d.-a).

The neighbourhood has low amounts of people 65 and above (11.2%), and relatively high numbers of young people aged 0-19 years (15%). Moerwijk also has relatively high amounts of single person (54,3%) and single parent (12,9%) households (Gemeente Den Haag, n.d. -a).

The allocation of the cheapest housing stock owned by corporations to people with a declaration of urgency explain a part of these demographic trends. Such declaration is given to people with severe financial or health problems, separated parents with children and before 2017 also to status holders. Since two thirds of the housing stock in Moerwijk is owned by corporations and a houses in Moerwijk have one of the lowest average WOZ-values within The Hague (€204.000) (AlleCijfers, 2023), migrant families, vulnerable persons and single parents with children are assigned apartments in the neighbourhood.

By 2030, the population of Moerwijk is prognosed to grow and stabilize to about 24.000 people (Gemeente Den Haag, 2023a). This increase is likely due to new housing projects in the neighbourhood. The municipality has set the goal to assign 30% of new housing projects to social rent, 20% to middle segment rent and 20% to cheap owner-occupied housing, leaving the remaining 30% for the middle and high free sector (Gemeente Den Haag, 2020). Ultimately, this will bring more affluent residents into the neighbourhood.

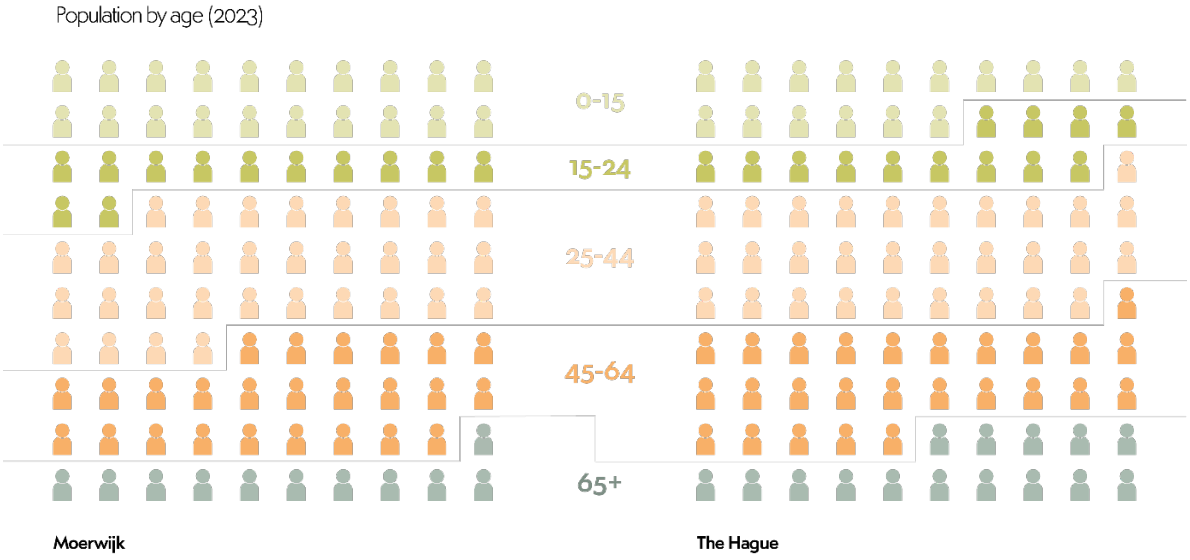

Figure 14: Moerwijk is a relatively young neighbourhood. It has more people aged between 0-44 and less people 65 and older, compared to The Hague.

3.2.C. The work supply and demand

In recent years, the Dutch job-market has come under increased tension, with job offers exceeding the amount job seekers. In 2022, the number reached a record 142 job offers per 100 job seekers. At the same time, the amount of national unemployment is at an all-time low (CBS, 2023b). The demand for work is higher than the supply of workers.

There are national and regional shortages in sectors as ICT, pedagogy, care, public administration & safety and engineering (UWV, 2023). There are 78.000 vacant positions for jobs that deal with sustainable transition of the built environment and energy systems. Most demanded jobs include ICT, various engineering, plumbing and carpentry positions (UWV, 2023; UWV 2022a).

While national unemployment is low, Moerwijk deals with high numbers of unemployment. Only one in five people aged 15-75 have a job and most residents have low education and incomes (71% and 50% respectively) (Gemeente Den Haag, n.d.). Locals that do work, work mostly in construction, business services, logistics, sales and horeca and governments (Gemeente Den Haag, n.d.-b).Youths also have a disadvantaged employment position, with 6% of youths up to 23 years having no start qualification and not following education (BRP & DUO, 2018).

The amount of unemployment combined with the high demand for work brings potential, especially for young people that have long futures ahead of themselves.

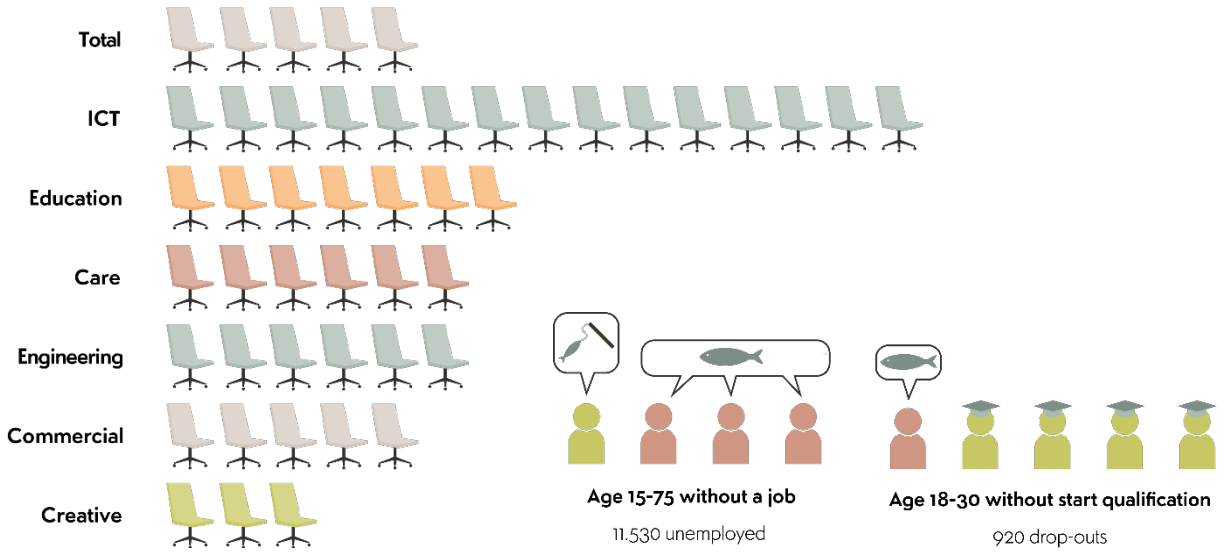

Figure 15: There are 5 open positions per job-seeking person in the Haaglanden region. In Moerwijk, one in four people aged 15-75 is unemployed, and one in five young people aged 18-30 has no start qualification and is not pursuing education.

3.3. Positions on participation and empowerment

Using the framework shown in chapter 2.2., analysis of various projects and organisations will determine their position within the matrix. Two categories are analysed: (1) local organisations and (2) external projects. For a brief description of each project on relevant aspects, see appendix I.

In the table below, a quick analysis of each project on degree of citizen involvement in the organisations management and source funding is given. For its management, a distinction is made in three categories:

- External (E): Non-local individuals with little to no personal local investment
- Community-invested (CI): Non-local with personal local investment
- Community-based t (CB): Local residents with a high personal local investment

Finally, each project is assigned a degree of participation and empowerment which will be used to place each project on the matrix.

Name	Management	Funding	Participation	Empowerment
Block-33	Professionals (CI)	Public	Consultation	Mediated
Buurtkamer de Luyk	Active residents (CB)	Public	Delegated power	Socio-political
Buurttuin Moerwijk	Active residents (CB)	Public + private	Citizen control	Individual
Duurzaam Den Haag	Professionals (E)	Public + private	Partnership	Socio-political
Foodbank Moerwijk	Professionals (E)	Private	None	None
Geloven in Groen	Professionals (CB)	Public	Delegated power	Mediated
Moerwijk Cooperatie	Professionals (CI)	Public + private	Delegated power	Socio-political
Participatiekeuken	Professionals (CI)	Public + private	None	Mediated
Public Library Moerwijk	Professionals (CI)	Public	None	Embedded
Wijkz servicepoint XL	Professionals (E)	Public	Therapy	Individual
Eco-Village Boekel	Professionals (CB)	Public + private	Citizen control	Socio-political
Heat-transition plan Multatulibuurt	Professionals (E)	Public	Consultation	Embedded
Hofbogen design proposal	Professionals (E)	Public	Consultation	None
Pink pipes Berlin	Professionals (E)	Public	None	None
Pipe-bay Strijp-S	Professionals (E)	Private	None	None
Schalkwijk commons	Professionals (E)	Public	Consultation	Socio-political

Figure 16: table showing management, funding and the degree of participation and empowerment of all case-studies and local organisations. Professional management has been split up in three categories, with increasing local investment: External (E), Community-invested (CI) and Community-based

Many organisations have either external (E) or community-invested (CI) management, meaning that local residents often have limited power in these organisations.

Half of the local organisations have a high level of local participation, involving community members and assigning them a large amount of organisational responsibility and freedom. The other half has low levels of participation, leaving community members to participate in their concepts as mere users, without much space to take up their own initiatives.

The degree of empowerment for local projects is even lower, with less than a third of the projects offering empowerment to transform themselves into capable actors helping to overcome community-broad challenges. The other seven organisations focus mainly on improving the emotional or physical state of the individual by giving them temporary support, rigid expert instructions or teaching them how to navigate the existing context with more efficiency. These forms of empowerment do not help the local community to stand on their own feet, keeping them dependent on external support and maintaining the status quo of collective struggle.

The external projects show a lower degree of participation, using resident meetings to inform and consult local residents of plans and designs, without having much power to influence them. Two projects have a particularly high degree of empowerment. One coming from a cooperation of active (future) local residents building their own sustainable town, turning themselves into a capable actor. The other from a design firm that uses consultation to create an integral strategy that improves many local aspects. In the matrix below, the degrees of participation and empowerment are visualised for each individual case.

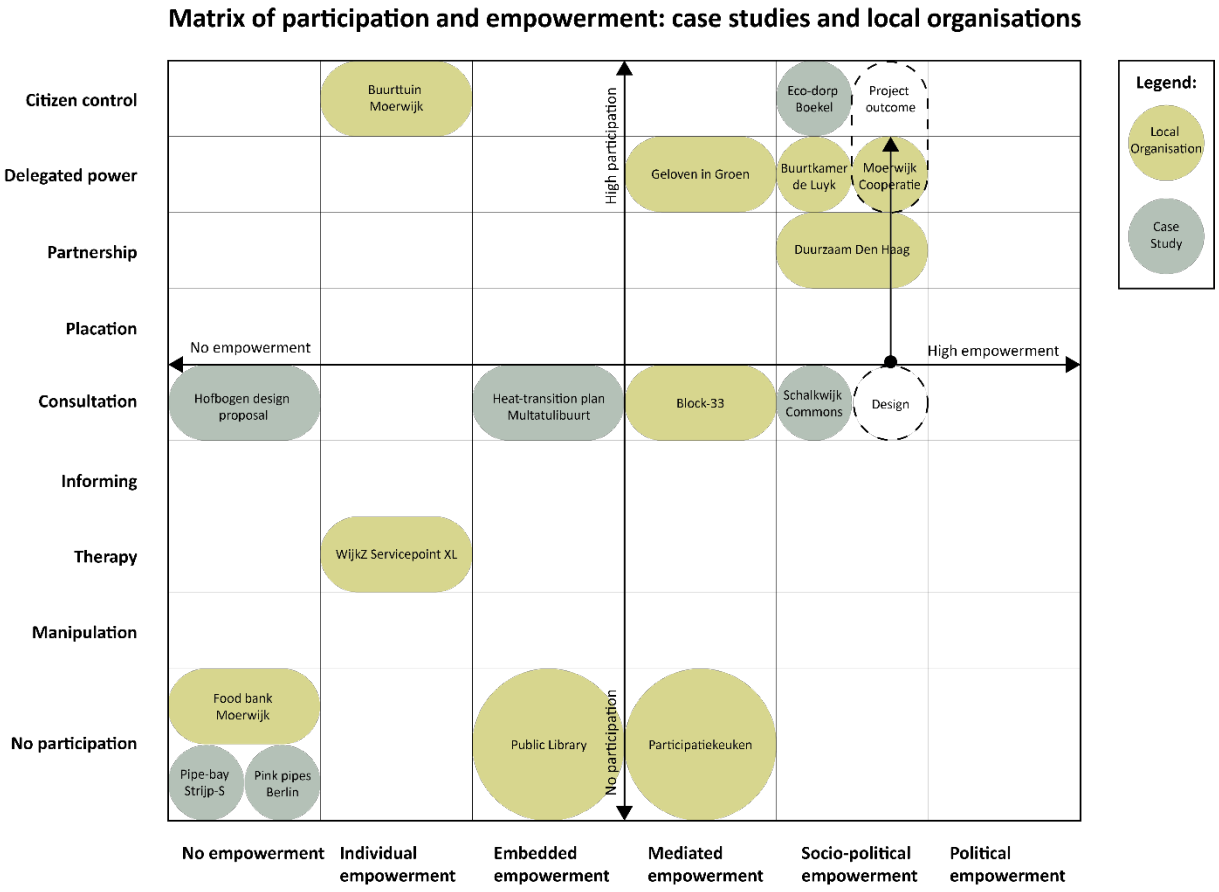

Figure 17: table showing management, funding and the degree of participation and empowerment of all cases

IV. DISCUSSION AND REFLECTION

The scope of this research is sustainable transformation of a typical post-war neighbourhood in relation to the needs and aspirations of the local community.

These neighbourhoods often show similarities in their spatial layout, building stock, socio-economic challenges and therefore have similar potentials and weaknesses. They are abundant in Western-Europe: The Netherlands alone counts 1800 post-war neighbourhoods. Before 2030, there are huge challenges to bring down carbon emissions in the built environment and there are big improvements possible in these districts. Therefore, results of this research can prove relevant within similar contexts.

However, as a large part of the fieldwork is concerned with personal communication and context-specific information within the scope of Moerwijk, general applicability should be critically assessed.

However, the applied research methods, especially those of empathy in design are valuable in and beyond the post-war neighbourhood scope because they expand the skill set of the architect/designer in the social field, with the aim to better and more sensitively answer to the needs and aspirations of users. In the light of political polarization, growing socio-economic inequalities and complex global challenges, these skills and methods can help to create equally distributed societal value, and support bases for much-required agendas, such as the battle against climate change.

The fieldwork methodology has also brought difficulties regarding the balance between immersion and detachment. By being very much immersed in the local community, and understanding their needs it also becomes difficult to envision change without displeasing anyone. Too much emotional investment can become a weak point later in the process. I felt great amounts of pressure and responsibility to live up to the opinions, expectations and wishes of local community members, disabling me to synthesize the findings into a coherent whole. Detaching oneself becomes difficult as it evokes fear for disappointment. To regain my abilities, extended detachment after immersion and connection proved useful in seeing the bigger picture, synthesizing the findings and to attain the boldness to envision changes that exceed the individual scale. When these methods are applied in further research and projects, the importance of the detachment phase should be considered from the start to reduce these difficulties.

CONCLUSIONS

5.1 Local needs and aspirations

From the fieldwork came four important conclusions that inform a program of requirements:

People are in need of and struggle with maintaining and regaining independence. Instead of giving them fish, as many charitable organisations in the neighbourhood do, we should teach them how to fish. In doing so, the focus should be on creating purpose and reason to act and decide, rather than simply removing the obstacles.

Teenagers and young adults have little to no space where they can be themselves. Programs and organisations for this group have high expectations, and little space for freedom. They are discouraged to use public spaces, as other residents are quickly disturbed and intimidated by them, leaving few designated spaces for them. New programs should have fewer expectations, more availability and there should be more public spaces where youth can hang out without causing disturbance.

Moerwijk has been stigmatized through the special attention it has gotten on its poor living, working and housing conditions. Residents grew tired and distrustful of resulting “participatory” initiatives and projects that they experience get little to no follow up. The strengths of Moerwijk, informal gatherings, looking after each other and the practice and education of creative, culinary, technical, entrepreneurial, artisanal, green and sustainable skills are hidden in impermeable buildings, remote corners and have limited reach. Exposing these strengths, making them present, accessible and visible can help shape an improved impression for passer-by’s, visitors and residents and contribute to destigmatisation

Many residents are reluctant to engage with the topic of sustainability, because it is experienced as a professionalised top-down agenda with little care for local effects. To engage people with this matter, incentives need to exceed the dry matter, and include social, spatial and financial benefits. Additionally, engagement should be accessible and without obligation. In this way, people can decide on a level of involvement that suits them.

5.2 Drivers of change

The national government and the municipality are required to decrease carbon emissions. This entails sustainable transformation of the built environment and energy-systems. In the case of Moerwijk, new district heating infrastructure and improved electric infrastructure are needed. There is a potential to redevelop areas along this infrastructure with improved public space and programs.

The infrastructure of district heating includes a 1600 m2 heat transfer station near the coupling piece of WarmtelinQ, distribution pipes along central axes and vegetated strips and at least one subdivision station of 25m2 in each of Moerwijk’s five districts.

Electricity use and production will go up in the future. The neighbourhood has a maximum potential of 140.000 solar panels on roofs, producing 42.000.000 kWh annually. To adapt the electric infrastructure, each of the five districts in Moerwijk needs at least one 35 m2 low to medium voltage transformer station. To use local energy production to strengthen the neighbourhood financially, and close gaps between supply and demand, at least one energy storage system is needed. The largest (4000 m3) variant of the CESAR-system is fossil-free, and most cost- and energy efficient.

Moerwijk's population is relatively young and diverse. A lot of vulnerable groups settle in the neighbourhood and employment and educational levels are very low. Many youths drop out of school before gaining start qualifications. At the same time, there is a high demand for workforces in sectors as ICT, pedagogy, care, public administration & safety and engineering. Needed work for sustainable transformations include ICT, various engineering, plumbing and carpentry positions. Combined with existing and added skills and educational opportunities in the neighbourhood, the high supply of Moerwijk could be matched with the high demand of workforce, helping people to find employment within a large range of sectors and interests.

5.3. Positions on participation and empowerment

A great deal of local organisations and relevant case studies have low degrees of participations and/or empowerment. Community participants are heard or consulted but ultimately have little power over decisions and budgets. Help and education is given through forms of therapy and patriarchal models with a clear distinction between the professional and the student. Often, it is focussed on improving the conditions for individuals within a current context of struggle, maintaining the status quo. In some cases, community members gain the ability to take matters in their own hands but often support focusses on temporary solutions and alleviating immediate needs. The majority of management positions in the neighbourhood are filled with community-invested professionals. While they have grown roots and thus have stakes in the neighbourhood, community members have more immediate stakes as it includes their own living environment, and should be moved to higher positions within such organisations.

To empower a community in overcoming their collective struggle, an integral approach to different challenges is needed. The goal is to activate and organise communities and their members in capable actors that are able to take matters in their own hands and transforming the status quo. This comes down to a level of socio-political empowerment.

In setting up such a project, a participatory level of consultation and placation can provide a fruitful basis for higher levels of participation, where community members have power to control funding, organise their own initiatives within a set up framework or even have full managerial power.

A professional, community-oriented organisation such as the neighbourhood cooperation that is already set up can play an important role in realising these levels of participation and empowerment. It can organise funding and help to professionalise initiatives and work. New models for funding, a higher community reach and community-based delegated and managerial power are needed to succeed.

5.4 Proceedings

Because this research has the aim to provide useful input to further develop a public/collective spatial programs that connects broad and local needs, a few important conclusions are formulated. These form the basis for developing said program.

Specific information about sustainable technology proved mainly useful when it lead to clear spatial requirements. The value of the local needs research proved especially useful in determining a relevant local target group – young people. Statistics about work and demographics confirmed that this target group is abundant and have challenges with education and employment. At the same time, there is a big potential to connect the supply of (potential) workforce with the high demand. This relates to the general aspiration of the community is to learn how to fish themselves instead of being handed fish. Research into local organisations and case-studies confirmed this. Often, the focus is on eliminating obstacles and providing help of temporary value, maintaining the status quo. The focus should be giving purpose and reasons to act, resulting in empowerment.

The main research question was:

What public/collective program of requirements answers to both local and broad trends, needs and aspirations in Moerwijk, creating synergies between sustainable technology and the local community and resulting in participation and empowerment?

To answer this, the following points are formulated to guide the development of said program:

- The local community aspires to be taught how to fish. Instead of eliminating obstacles and providing temporary help, the focus should be on giving reason and purpose for self-development, resulting in empowerment. This aspiration relates strongly to the high national demand for work, resulting in a large potential for improved employment possibilities.

- Young people have limited public/collective spaces, are overrepresented in Moerwijk and statistically show low employment and education prospects. By giving them space and relating to their interests, they can be reached and helped in their self-development.

- Locally, the broader need for sustainable transformations requires multiple extra transformer stations, district heating substations and pipelines to be constructed. Service stations have the potential to frame space for public programs, and pipelines follow the vegetated strips along central axes in the neighbourhood, resulting in a big potential for spatial redevelopment in central locations along this infrastructure.

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APPENDIX I

Organisation	Description
Block-33	Youth hub offering courses and workshops, homework and entrepreneurship support and recreational space with ping-pong, foosball and video-games. Limited opening times and possibility to use recreational space.
Buurtkamer de Luyk	Walk-in neighbourhood living room and programs organised by residents and alternating organisations, leaving space for ideas and initiatives. Focus on improving liveability, upbringing, social cohesion and local engagement.
Buurttuin Moerwijk	Neighbourhood vegetable garden led by local resident. Limited amount of local visibility and involvement. Food produce is given to volunteers, visitors and donated to care centre
Duurzaam Den Haag	Organisation offering individual and community support and events on different scales of sustainability. Focus on energy reduction and production, green and food and setting up community-based coaches, teams and cooperations to continue these topics.
Foodbank Moerwijk	National organisation of volunteers that provide people under a set budget for food and clothing a weekly pre-assembled package of food products. Soon changing into a store-concept where receivers can assemble their own packages at another location.
Geloven in Groen	Setting up a network of religious communities on the topic of sustainability through triannual social events hosted at alternating prayer houses. Focus on reducing energy use and adding green around houses of prayer whilst creating awareness and behavioural change.
Moerwijk Cooperatie	Local resident company and platform focussed on local initiatives, citizen engagement and existing strengths. Professional organisation of local jobs, volunteering work and welfare compensation. Free to join for local residents. Annual contribution is voluntary.
Participatie keuken	Professional kitchen and event space that organises various events around food preparation and consumption. Focus on affordability and social interactions. Also includes exterior table and seating under overhang that can be used freely 24/7 .
Public Library Moerwijk	Local branch of national public library. Small space with flexible workspaces, bookshelves, free-of-charge coffee, WIFI, small open workshop space and usable laptops. Focus on activities for children and workshops/support with digital matters.
Wijkz servicepoint XL	Neighbourhood centre offering advice, information, help, activities and volunteering positions. Support on a wide range of topics including finance and administration and wellbeing. Focus on individual help, professional referral and support.
Eco-Village Boekel	(Future) resident cooperation developing a sustainable town with 36 dwellings, public facilities, workspaces and their own food and energy supply. Focus on meeting all 17 Sustainable Development Goals defined by the UN.
Heat-transition plan Multatulibuurt	Plan for sustainable transition of heat supply for local buildings. Residents are consulted through walk-in meetings for insights, opportunities and concerns. Focus on developing an integral plan for the renovation of public space, sewage infrastructure and sustainable heating.
Hofbogen design proposal	Design entry for the tender of redeveloping of a decommissioned railway bridge into a public space. The proposal combines public space with a cascading district heating system along the railway. Resident are consulted in meetings to finalize the winning design.
Pink pipes Berlin	Drainage pipes for construction sites are designed as public landmark in Berlin. The engineering company Pollems painted them pink as a researcher suggested that kids prefer it. The modular piping system is supported on transportable columns and has playful bends to manage temperature expansion.
Pipe-bay Strijp-S	The decommissioned pipe bay of an old Philips factory district was transformed into public space and pedestrian circulation route. Planters, borders, paving and a panorama point have are added. Commissioned by a real-estate development company and executed by professional design agencies.
Schalkwijk commons	Strategic design to improve a post-war area in Haarlem. The integral plan builds on local strengths to create sustainable and attractive housing, public space, businesses, communities and green by transforming existing buildings and infrastructure. The process included extensive consultation with local organisations and residents

Figure 18: table with a brief description for each of the local organisations and case-studies

Matrix of participation and empowerment: case studies and local organisations