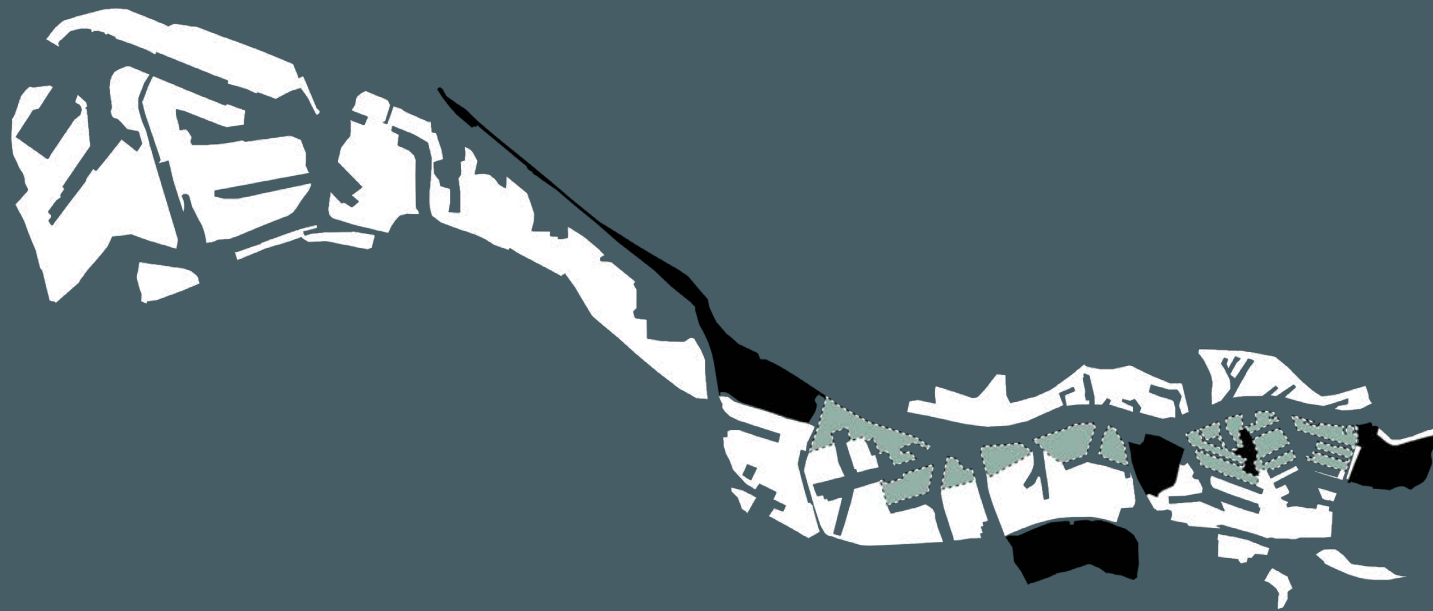


PORT ARCHIPELAGO

From isolation to inclusive living alongside hydrogen energy
in the Port of Rotterdam



Preface

The project R&D Spatial Strategies for the Global Metropolis is the third design studio of the Master's program of the faculty of Architecture and the Built Environment at the TU Delft. The main objective of this project was to shape and design a spatial vision and strategy for a transition community situated in a chosen region that is impacted by the energy transition in the Netherlands.

For readers that are interested in the technical background of the energy transition and a general background in the port of Rotterdam, we refer them to chapter 1. In chapter 2, the research framework is presented where we highlight the research questions and the conceptual framework that are used in shaping our vision and strategy. For those interested in the urban analysis of the port of Rotterdam, we forward you to chapter 3. For readers interested in our vision, Chapter 4 presents the Archipelago vision of the port of Rotterdam. In chapter 5, people can find the strategic implications and key projects that are necessary for the implementation of the archipelago vision in the port of Rotterdam. Chapter 6 summarizes all the research and answers the research questions before reflecting on the ethics and the sustainable development goals. Lastly, each group member gives a brief reflection on their personal development and the valuable lessons learned from working in a intercultural design team.

A special thank you goes out to our mentors Luisa Calabrese, Rodrigo Cardoso, and later in the project Jonathan Subendran, for their valuable insights and guidance throughout the project. Their feedback and patience during the consultation sessions was valuable for shaping our vision and strategy. Furthermore a special thank you goes out to Roberto Rocco and Julia Goncalves, who provided inspiring background lectures and helped the team in shaping the outline of this report.

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Concept drawing of the port transition

Abstract

Port Archipelago

: From isolation to inclusive living alongside hydrogen energy in the Port of Rotterdam

The goal to reach carbon zero by 2050 is pushing the Port of Rotterdam rapidly replace fossil fuel with hydrogen. The transition entails many spatial, environmental and economic changes that impact some neighborhoods more than others; in particular five neighborhoods (Rozenburg, Pernis, Heijplaat, Hoogvliet North and Old Charlois) in and surrounding the port. These already disadvantaged neighborhoods will face more burdens than benefits if the transition, and the gentrification that will follow, is left without intervention. This study investigates how the energy transition towards hydrogen can be guided to ensure a just socio-economic and spatial transformation for these existing harbor neighborhoods. Through a research-by-design study, a vision is created from the perspective of the selected transition community (harbor neighborhoods), supported by qualitative and quantitative research methods. Subsequently, a strategy is developed that takes into account the relevant stakeholders and policies necessary to implement the vision. The vision is explained in more detail in the latter part of the report, substantiated by a timeline and its related spatial strategies comprised of four key projects. The vision of Port Archipelago construed on four guiding themes (energy, housing, connectivity and amenities) successfully accommodates the needs of existing communities and helps them adapt to the social and spatial changes triggered by the hydrogen transition. Urban metabolism and spatial justice are weaved into the vision to fairly distribute the benefits and burdens of the gentrification that is likely to occur in the port. Spatially, the vision will enable the transition community to sustain their identities and everyday lives while at the same time embracing the spatial and environmental transformations of the port. Lastly, the Port Archipelago vision will lead to a successful community regeneration by providing opportunities for the harbor neighborhoods to build the capacity to act as active stakeholders in new settings and interact with newcomers of the port.

Keywords:

Port of Rotterdam, Spatial justice, Urban metabolism, Gentrification, Transition community

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I. Introduction

- 1.1 It's 5 to 12!
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1.1 It's 5 to 12!

The need for a change

The energy transition is in full swing. The consequences of climate change are slowly becoming a very palpable reality and governments and industries can no longer ignore the implications they will have. The Dutch government pledges to be climate neutral in 2050 (Ministerie van Algemene Zaken, 2024). In 2030 we want to have 27% of our energy demand be derived from renewable sources, which is currently mostly been filled by wind farms and solar panels. However, according to our own government, we will not be able to reach this goal set by ourselves, pushing the deadline for this 27% to 2035 (Planbureau voor de Leefomgeving, 2024). The question remains whether this will be reached.

As long as The Netherlands is part of the European Union, we also have a responsibility to follow the agreements we have made with other EU countries. The EU had as goal for 2020 to use renewable energy sources for 20% of our energy demand. The Netherlands missed this goal by 6% (Jetten, 2022) and is well on its way to miss the next EU goal of 42,5% renewables in the energy budget by 2030 (European Commission, n.d.). The time to act is now, The Netherlands has a spatially great position in Europe, with the North Sea close by, on which several new wind farms have been planned (Ministerie VROM, 2024). We need to get our own energy transition started, or be left behind in a country where nearly every place has a too high degree of air pollution (Milieu Defensie, 2021).

However, as with all things, good intentions for a cleaner future can have negative side effects. Locations that were previously not as attractive due to heavy industry or high pollution, may become attractive again. This attractiveness will eventually be translated into higher house and land prices, putting the original communities at risk.

This begs the question, who is this transition for? Original residents that have lived with the bads all these years, will be unable to enjoy the goods once the energy transition has translated itself spatially. Since this translation has not happened yet, there is still a chance to prevent the displacement of communities. The energy transition is still trying to find its footing and now is the moment to throw everyone's hat in the ring to make sure their voice is being heard.

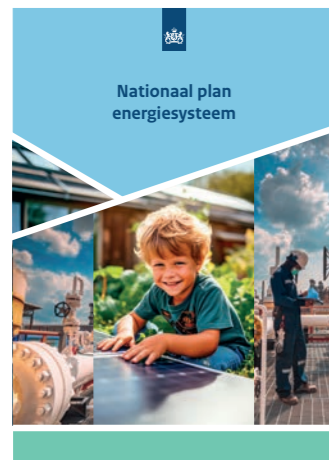


1.2 The road to carbon-free energy

The Netherlands' ambition towards renewable energy

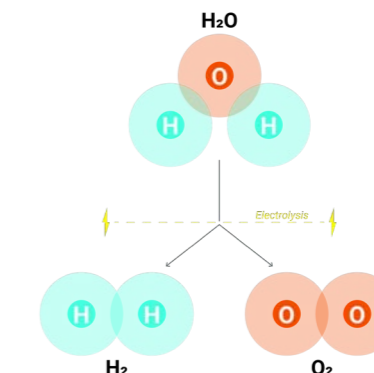
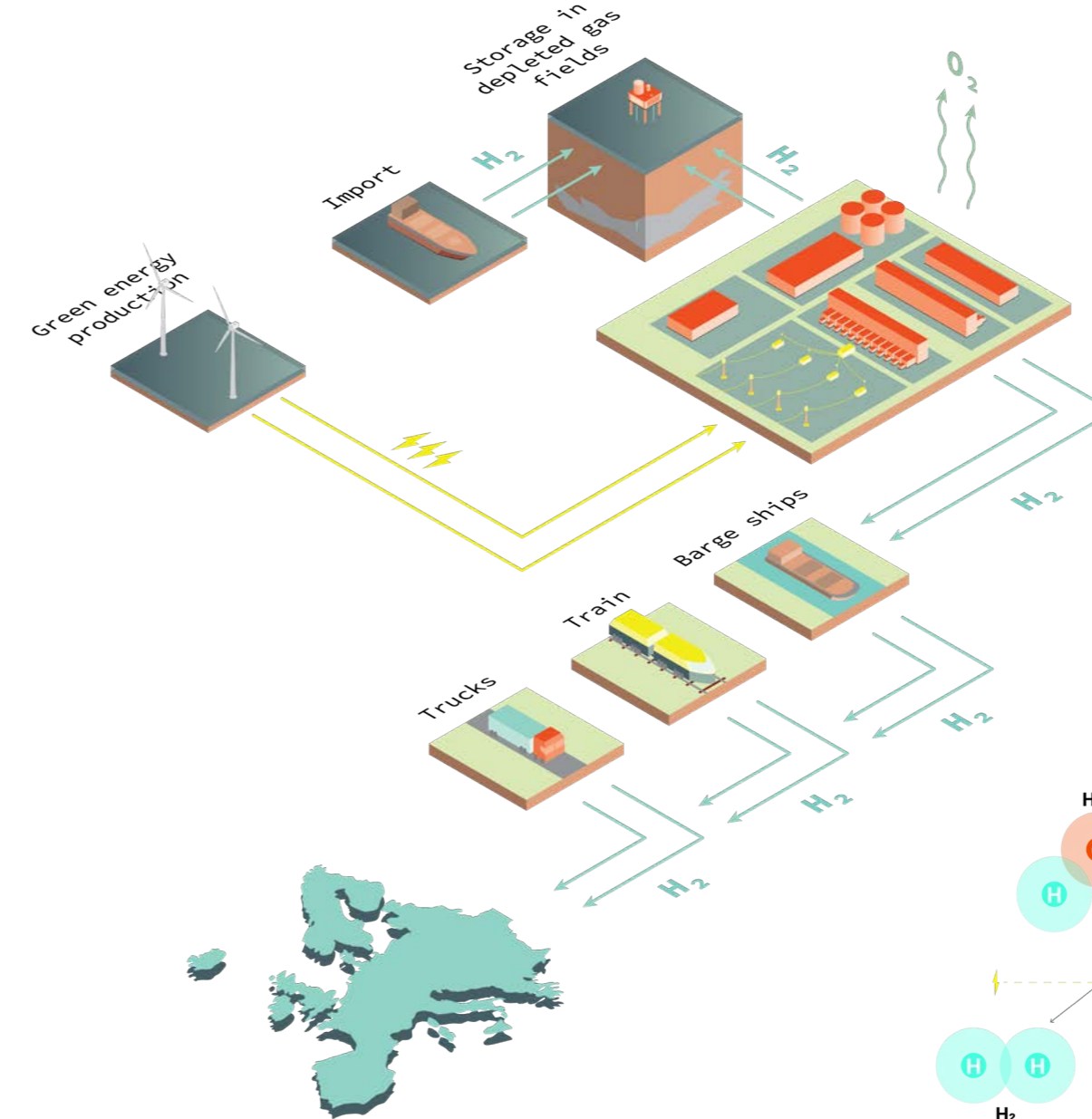
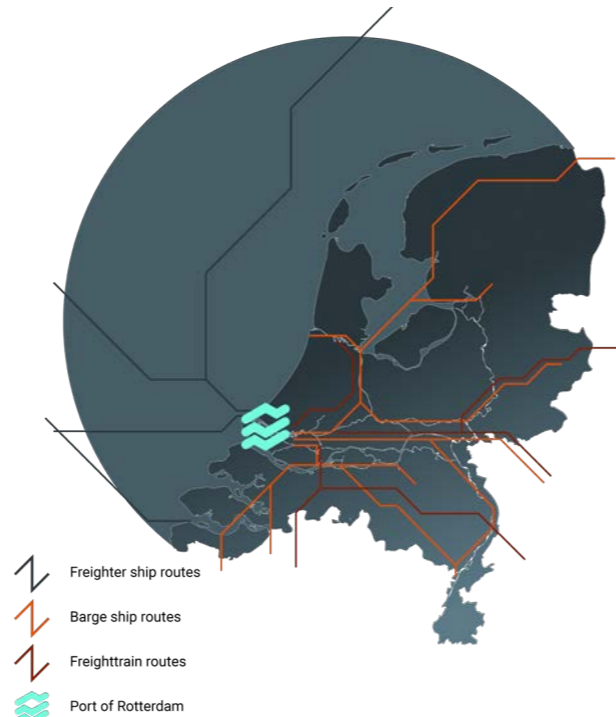
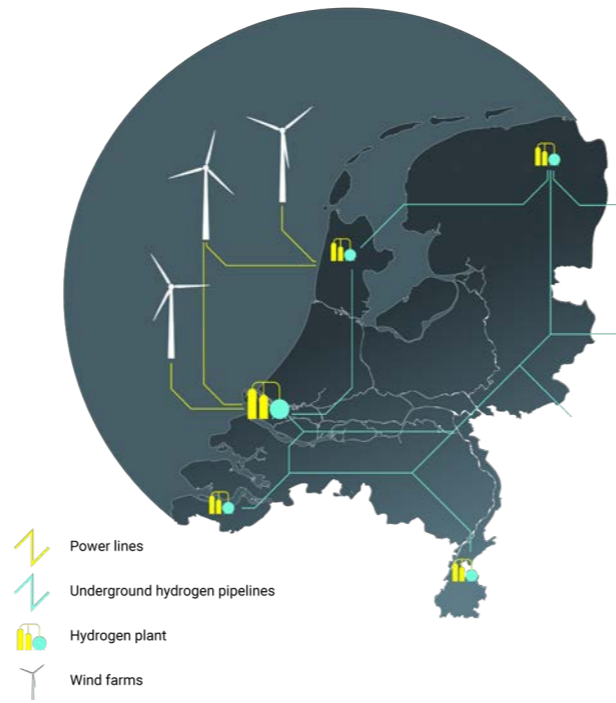
In 2015 the Netherlands entered the Paris Climate Agreement, along 195 other countries. In this agreement, the world decided it was time for concrete climate action and limiting the temperature increase of the planet to 1,5 degrees Celsius compared to pre-industrial levels (European Union, 2016). In 2024, we passed this number. However, the ultimate limit was set to 2 degrees, so we do still have a chance to fulfill the promise to our future generations. Reducing carbon emissions is key in this goal, and thus moving away from carbon based energy sources, both in industry, as in our day to day energy needs.

The Netherlands' ambition for the energy transition is to use only renewable energy sources by 2050 and thus be climate neutral by that time (Ministerie van Algemene Zaken, 2024). The first milestone is to increase the renewable energy portion of our energy demand to 27% by 2030. In 2023, renewable energy counted for 17% of our total energy usage.



Currently, the Netherlands is focused mostly on wind and solar farms, with wind making up 31% of our renewable energy, and solar 24%. Stating 'The wind does not always blow and the sun does not always shine', the government is also looking into new nuclear power plants to increase its carbon-free energy usage (Ministerie van Economische Zaken en Klimaat, 2023).

This transition is not only a matter of new energy sources, but also of adapting our current energy grid to fit the needs of these new sources, such as hydrogen gas, which the Dutch government is also more and more involved in (Ministerie van Economische Zaken en Klimaat, 2025). The location of the Port of Rotterdam allows for great transport possibilities and a possible link to the new wind farms at the North Sea (Expertteam Energiesysteem 2050, 2023).



1.3 The Hydrogen Transition

The chemistry of hydrogen

Hydrogen (H₂) is the product of the electrolysis of water, or splitting the H₂O atom into H₂ and O₂ by running electricity through it. This electrolysis creates hydrogen as a clear gas which, when ignited, releases energy and creates water as byproduct. This makes it useful as a way to store or carry energy, much like conventional fossil fuels. Much unlike conventional fossil fuels however, it does not produce any pollution or carbon emissions. And this absence of emissions is what gives it great potential in the transition to a carbon emission-free future.

The transition towards hydrogen-powered energy

While the Dutch government is investing into hydrogen, it is still in its infancy. There is currently no government legislation for hydrogen as a fuel source (Ministerie van Economische Zaken en Klimaat, 2025), only guidelines that ensure the safety of its production and storage. This means that the hydrogen industry is in many cases not allowed to explore the full capabilities of hydrogen as a renewable energy source and carrier.

Still, experts say that hydrogen has an important place in the energy transition (Kovač et al., 2021). The technology has rapidly advanced in the last decades, and more funding and research could make this a viable alternative to fossil fuels as a portable fuel source.

The Port of Rotterdam wants to be the frontrunner of this hydrogen transition, starting several projects in the harbor to create, store, and transport hydrogen (Port of Rotterdam, n.d.). The production of hydrogen will be done through large scale electrolyzers. The close proximity to the wind farms on the North Sea could also mean that this production can use renewable energy, making the produced hydrogen 100% emission-free.

1.4 The Laboratory of Transitions

History of the Port of Rotterdam

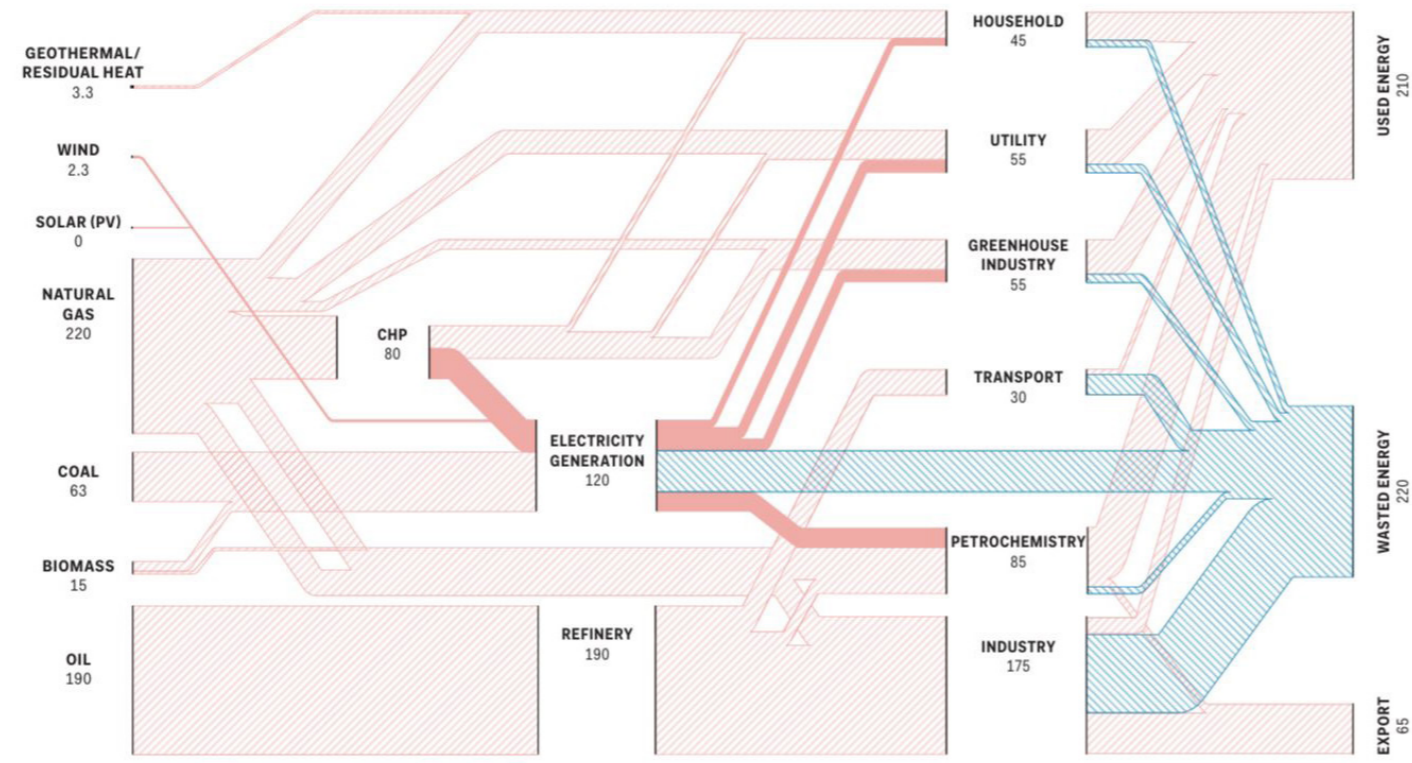
The port of Rotterdam started out as a small fishing village situated at the northern part of the Maas river. Once the industrial revolution marked a new era, the port made use of its location to become the main supplier of resources for industries in the hinterland. Once the 'Nieuwe Waterweg', the canal that creates a connection with the city of Rotterdam and the North Sea, the port started to grow immensely as it had now a free entrance to other economies in the world. The port became a main transit hub for the rest of the world, especially for fossil fuels and oils that later gave the port of Rotterdam the name 'the energy port of Europe'. Since then, the area has been serving 500 million consumers in Europe through road and rail transport, and the extensive river network.

The question of space
It is known that the port of Rotterdam plays an important role as supplier for industries in the hinterland, but also within the South Holland regions the port plays an important role, supplying energy to the city, which has been growing since the port started to grow into the energy hub of Western Europe, but also greenhouse horticulture industries in the Westland region rely heavily on the fossil fuels stored in the port. Furthermore, the port is located in the estuary of the Maas and Rhine river, which requires space for watermanagement systems to regulate water levels in the polder system, that is connected to agriculture and natural reserves.



Rotterdam as the largest supply port for fossil fuels (Sijmons, 2014).

The port as supplier for other regions and industries (Sijmons, 2014).



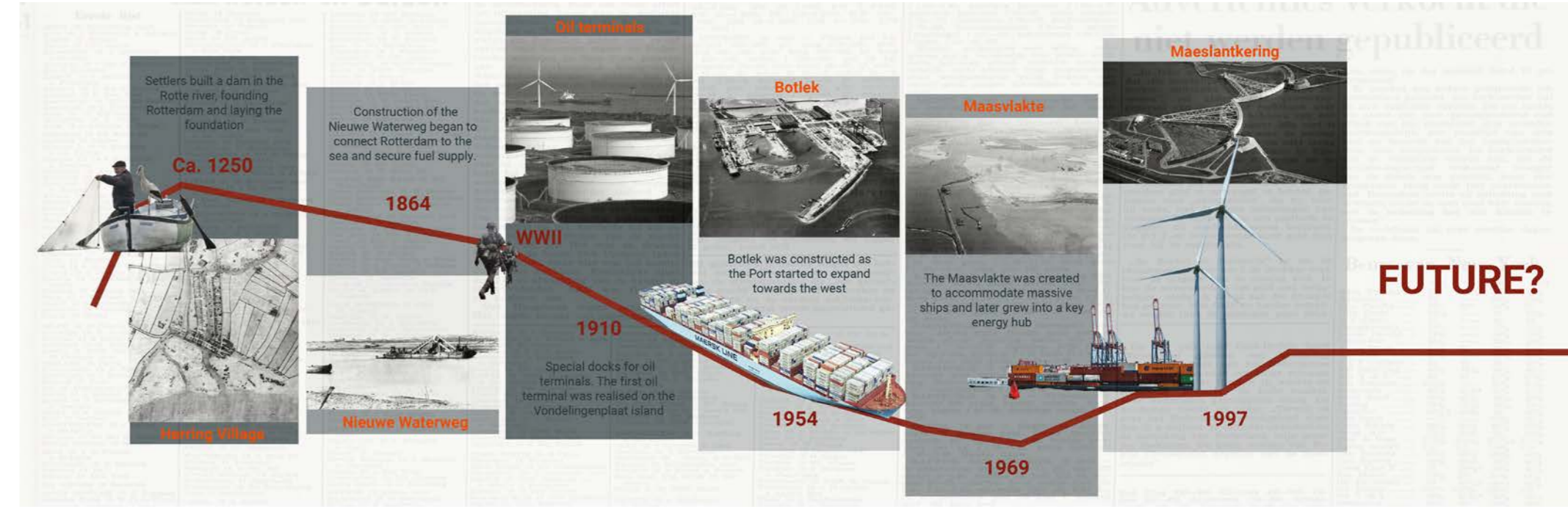
Current energy management of the port, still relying heavily on fossil fuels (Sijmons, 2014).

The transition port

Over centuries, major events helped to shape the port of Rotterdam to the global transit hub we know now. What started as a small fishing village supplying other villages North of the river. The port is shaped by major infrastructure projects that helped the port to become a global hub for trade. It first started out with the development of the 'Maasbridges' in the 1870s, that created a connection with the villages and the cities south of the Maas river. Around the same time, the industrial revolution was in full effect which created a higher energy demand from the industries in Limburg and the Ruhr area in Germany. Quickly after, the construction began for the 'Nieuwe Waterweg' to make the connection with the sea to realize the supply of fuels. It was then decided by the

municipality to dedicate special docks for oil terminals, and constructions started after the second World War. The first oil terminal was realised on the Vondelingenplaat island, where currently the Shell oil terminal is manifested. Later on the second island, called the Botlek was constructed as the port started to expand towards the west. Due to globalization, the port of Rotterdam started to emerge as a key port in the world economy and more space was required for huge container ships and oil tankers to dock in the port. The national government decided to create a new artificially constructed area in the port, called the Maasvlakte, to ensure that huge ships were able to dock and unload their goods. The Maasvlakte area later became also an extensive energy hub where power plants situated and wind mills started to emerge. It raises the question about what the future of the port looks like. In his

book 'Energy & Space', Dirk Sijmons argues how the shift towards renewable energy is a sensitive topic (Sijmons, 2017). In his book, Sijmons outlined all the strategies that could be implemented for renewables but determines that implementing these requires substantially more space compared to fossil fuel alternatives. Especially in the port of Rotterdam where space is limited, and industries and the city are relying heavily on fossil fuels, it becomes a major point of discussion. In his book Landscape and Energy, Sijmons argues that the first step is to drastically decrease the consumption of energy by industries and residents to proceed with renewable energy production. But what will the economic costs be for the port if less consumption will result in a less powerful economic position of the port?



Rotterdam is a port of many transitions, what once started as a herring fishing port became one of the biggest and most modern transit hubs in the world.

FUTURE?

1.4 The Laboratory of Transitions

A brief look of the alienscape

The industrial structures in Port of Rotterdam are gigantic and incomprehensible to the human eye. The scale is so surreal that one loses the sense of distance and speed in the port. Without an automobile, one would be quickly drained—both physically and psychologically, by the overwhelming infrastructures and seemingly endless fields of refineries and shipping yards. However, in the middle of these alienscape lies residential enclaves surrounded by buffer greens. They are the oasis inside the port, occasionally peeking out towards the chimneys and enormous ships nearby.



Green connections with in the background industrial activity

Living in the port

Industrial activity in the port

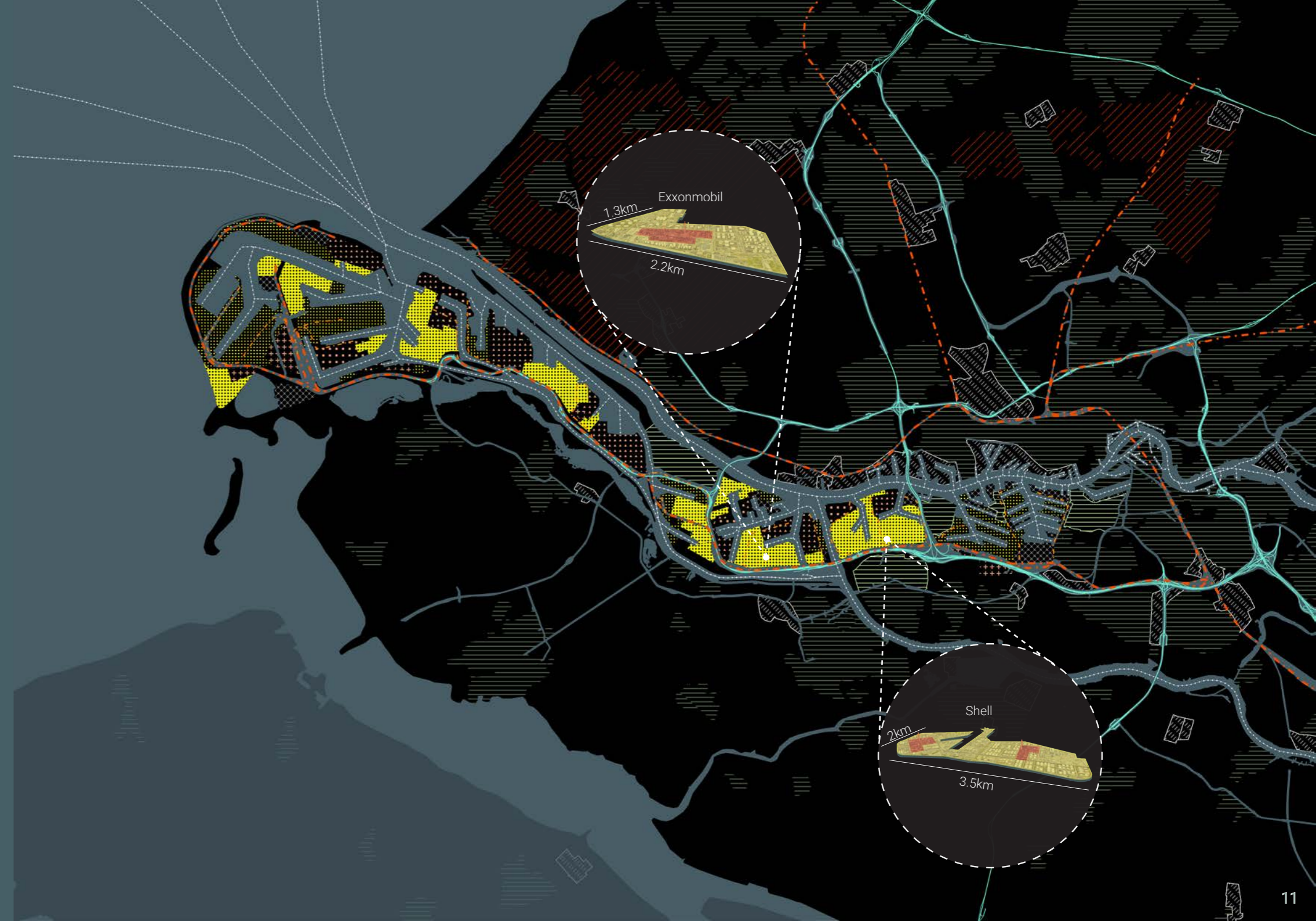
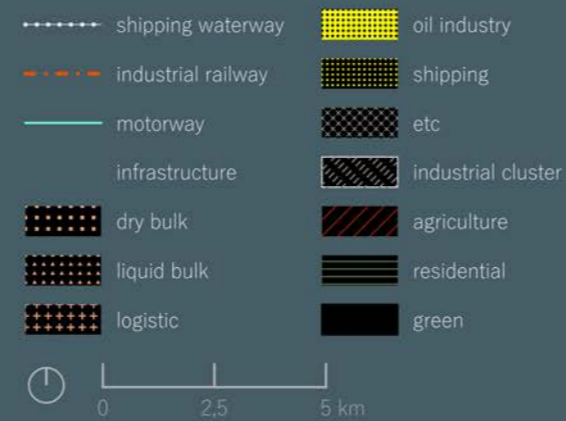


1.4 The Laboratory of Transitions

Current lay out of the port

Shipping and fossil fuel industries are the main tenants of the Port of Rotterdam. To satisfy the goal of becoming carbon zero by 2050, the plots where refineries and oil tanks currently reside must be reprogrammed for renewable energies, namely hydrogen facilities. A large portion land used by existing refineries is only for storage, as the case of Exxonmobil and Shell clearly illustrates. The cylindrical tanks standing above ground in groups form the alien landscape that is unique to the port. But how will hydrogen change this landscape? How will all these lands be reprogrammed?

Current industries and storage area



1.5 A change is Coming

The implications of hydrogen in the port

The Port of Rotterdam Authorities have already planned several hydrogen facilities to be built in the coming years. Electrolyzers are located in Maaskvlakt, where connection to offshore electricity grid generated from windpower will be most convenient.

Terminals for hydrogen and ammonia are also planned in the western part of the port. As PoR plans to import most of the demanded hydrogen from overseas, there is a large possibility that more terminals will be built. Development of technology to efficiently store hydrogen is integral to determining the amount of space it will consume: if technologies such as underground storage in empty gas fields become feasible, the port will be ample with spaces that can be given back to the public.

Hydrogen plans for the port



1.5 A change is Coming

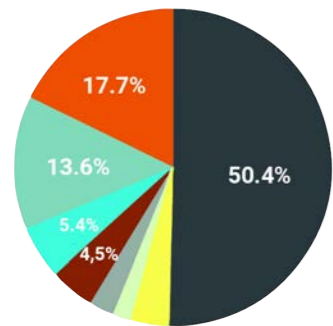
Pollution in the port

The port is the most polluted area of the Netherlands, because to the heavy industry. Even though residents are living in close vicinity and sometimes do not recognize how polluted the area is, data shows that the port of Rotterdam offers residence to some of the biggest polluters of the country. The biggest polluters are the energy producers and the fossil fuel industries who are located in the oil terminals.

Due to heavy industrial activity, the soil became very contaminated, which is also enforced by the harbor located in the estuary of the Rhine and Maas river. Polluting industries are located upstream as well in the Dordrecht and . Moreover due to extensive use of parcels the salinaztion in the soil is high in and surrounding the port area, also due to heavy agricultural use.

Lastly, the port has an extensive infrastructure network of high and railways, causing noise pollution. A future of a port as a transit hub for hydrogen could lead to potentially more noise pollution due to heavy traffic or more frequent rail transport.

Nevertheless, once the hydrogen transition is fully operational, polluting industries adapt to more environmental friendly energy sources and pollute less, while other spatial uses could slowly improve the soil quality over time. The port becomes more suitable for living!



- Energy
- Waste
- Chemicals
- Food processing
- Refinery
- Constr. Materials
- Basic metals
- Other

Pie Chart of most polluting sectors in the port of Rotterdam

To be freed from pollutions

- Businesses
- Highways
- Industry
- Rural
- Salination
- residential
- Regional roads
- Industrial areas

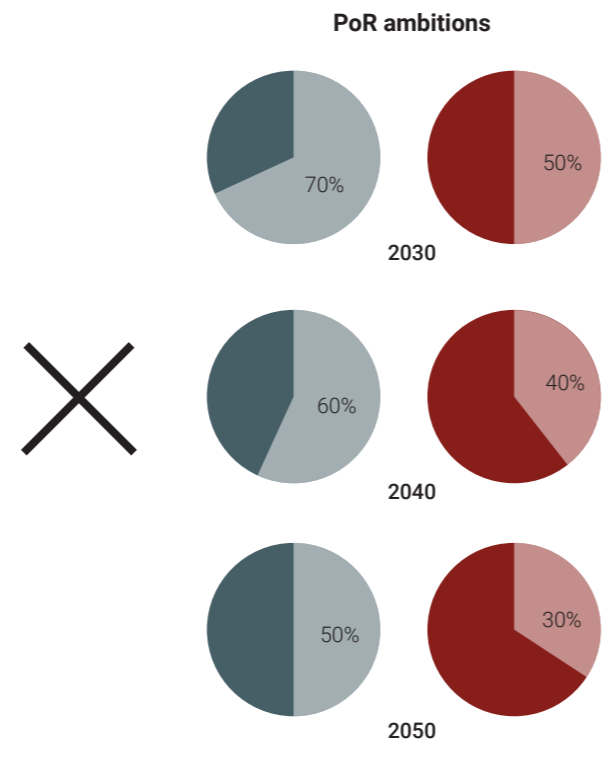
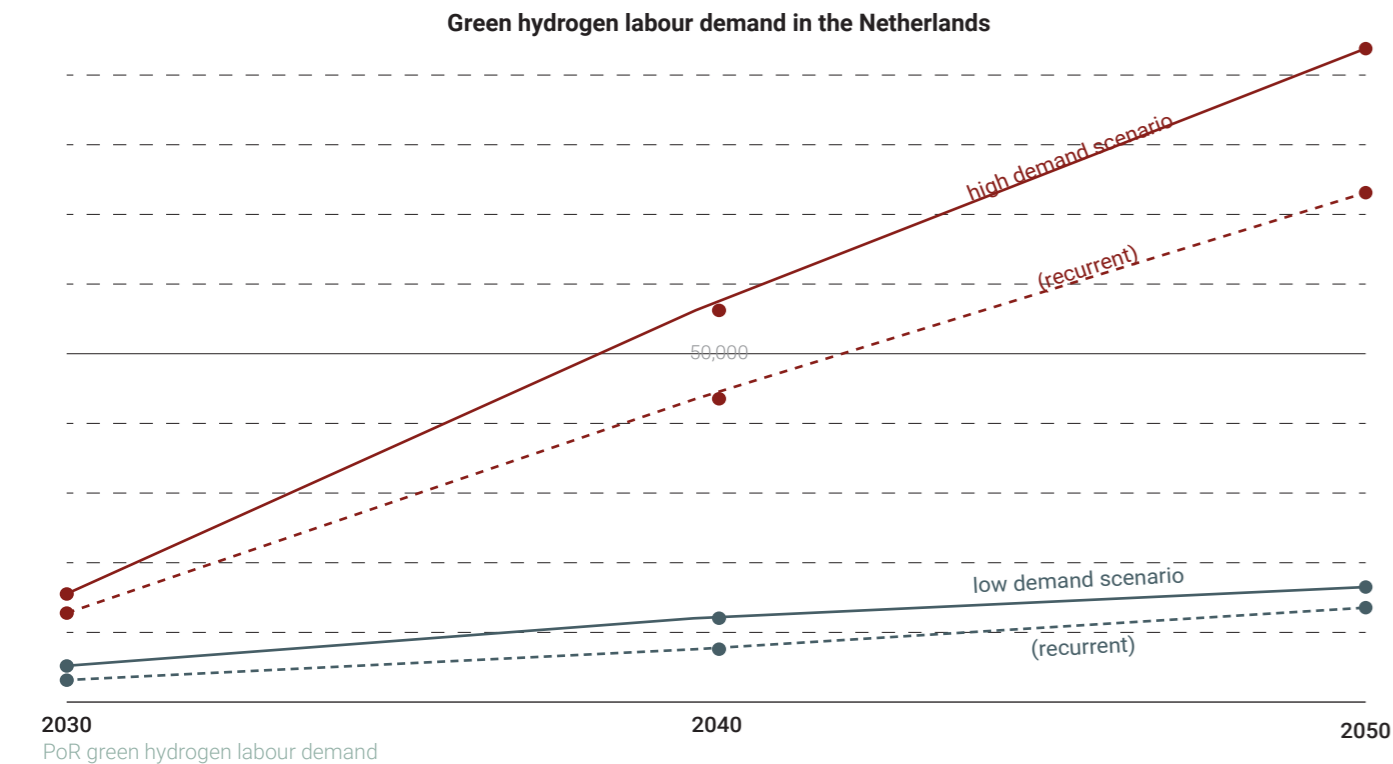


1.5 A change is Coming

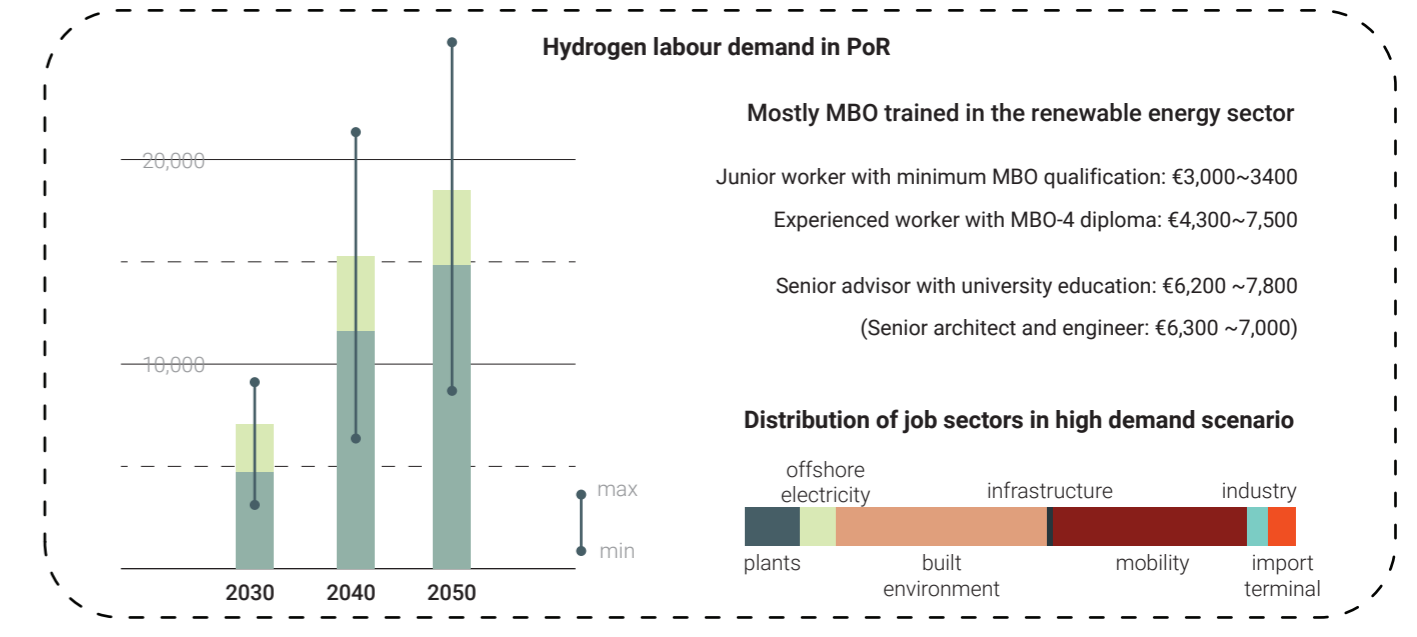
Influx of new workers & job opportunities caused by the hydrogen shift

The Netherlands' ambition is to handle 30% of European hydrogen in a high-demand scenario: a very ambitious goal. Nevertheless, it implies many new jobs will be created thanks to the investments in the new sector. By 2050, somewhere between 16,400~92,600 jobs are expected to be created in the Netherlands. But exactly how much of them will be located in the Port of Rotterdam?

The wide gap between the estimated number depends on how hydrogen-dependent the Netherlands will become in 2050 by when they should meet the goal of climate neutrality. The low-demand scenario assumes on a 'Regional governance' model, where hydrogen consumption is mostly domestic, and the high-demand scenario is based on a 'International governance' model where the Netherlands becomes a very significant player in the European hydrogen market as mentioned above.



Blue hydrogen labour demand
(additional +10%)



Therefore, the scenario for Rotterdam must also differ depending on the models. Currently, the Port of Rotterdam's ambition is to handle 50% of the whole of the Netherlands by 2050. However, this ambition would only be feasible in a low-demand scenario, as in a high-demand one all the ports and industrial areas of the Netherlands would receive intensive investments. In a low-demand scenario, the Port of Rotterdam would likely be the "biggest hand" of the Dutch hydrogen market, as it will be more likely investments will be concentrated in Rotterdam where hydrogen infrastructures are already built. Therefore, we multiplied different percentages depending on the low and high scenarios to come to a number of 8,200~27,780 new workers by 2050.

And this is only for green hydrogen. If one takes into account the impact of blue hydrogen during 2030~2040, the number should be even more. Majority of these new jobs require technical MBO qualifications, which are already in short supply in the Netherlands. Therefore, the salaries offered for these jobs are expected to rise and attract workers from all over the country, and even from outside the Netherlands. The sector of jobs green hydrogen will have impact on are also diverse: from offshore electricity to the existing built environment in the city of Rotterdam. Annually 1,000~6,000 one-off labor demand is produced, for which temporary workers will be induced to live around the port for a couple of years.

1.5 A change is coming

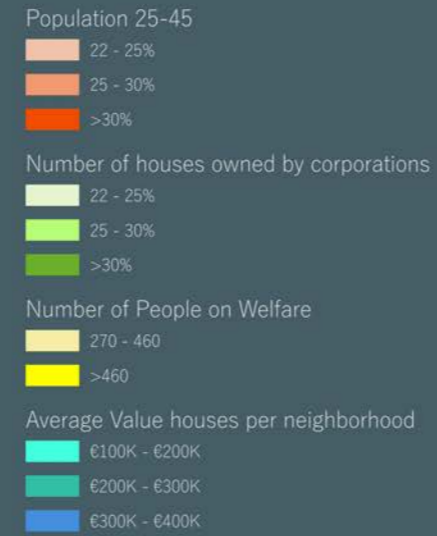
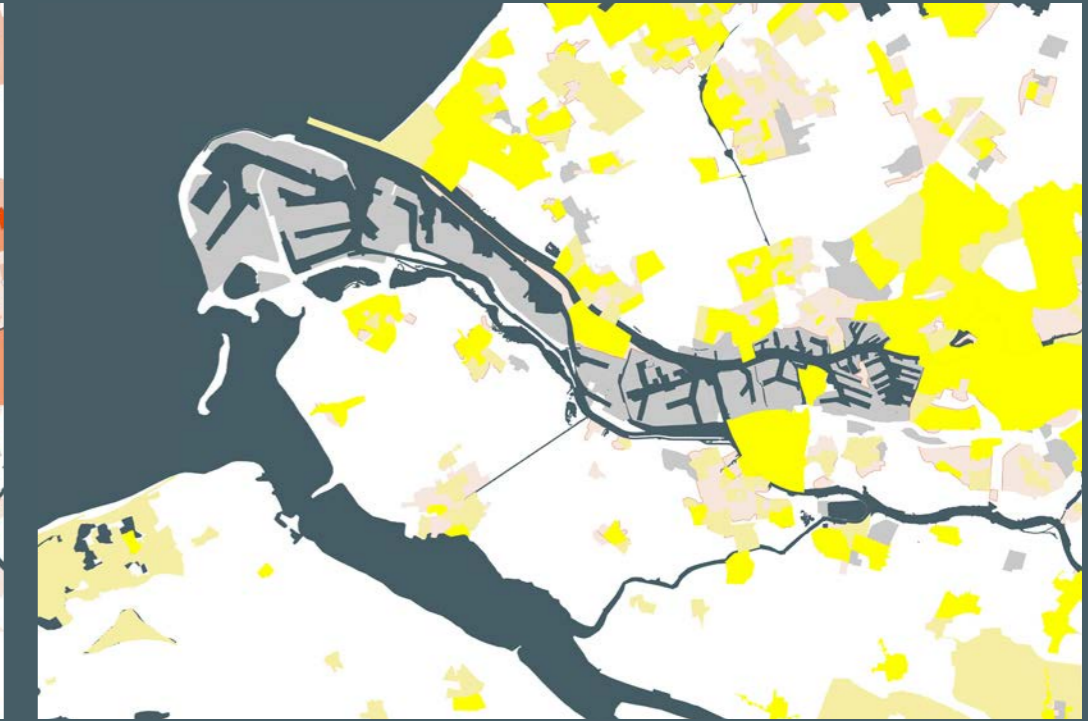
Influx of new workers & job opportunities caused by the hydrogen shift

1.6 Who is Affected?

Vulnerable communities

To locate the communities that are most prone to the negative effects of the hydrogen transition, a socio-spatial analysis is conducted. Four thematic maps are chosen where categories that suggest potential for gentrification is high. The layers that are used are: High of demographic aged 25-45 years old, low average housing value, large number of people on welfare and a high proportion of houses owned by corporations per neighborhood.

Who is affected?



1.6 Who is Affected?

The Five Key Areas

Overlaying the four layers of these social-spatial maps, five neighborhoods are highlighted where all of these layers overlap, which suggest high vulnerability to gentrification. These neighborhoods are Rozenburg, Pernis, Heijplaat, Hoogvliet-Noord and Oud-Charlois-Carnisse.

Transition community

- green
- greenhouse
- industrial
- residential
- community
- buildings



Spatial changes

Hydrogen production needs less space than fossil fuel refineries

Hydrogen storage is no longer visible, it's moved offshore

With more local production and offshore storage, the petroleum harbor now needs fewer ships

As fossil fuel infrastructure shrinks, space in the port opens

'Space for whom?'

Environmental changes

Hydrogen energy replaces fossil processes and results in significantly cleaner air

Cleaner production processes lower the risk of soil and water contamination

With fewer heavy operations and less traffic, noise pollution in the port area decreases

Hydrogen makes the port cleaner, quieter, and healthier

'Clean air for whom?'

Job changes

Thousands of new job opportunities in the port

More consumer power in the service sector

Opportunity to implement reskilling or education initiatives

The energy transition creates a wide range of new jobs requiring new skills and new people

'New jobs for whom?'

We're not against change.

We're against being changed without having a say

New spaces for new people... or for us too?

When the port opens up, give something back to the people who lived beside it

We deserve to stay and breathe too

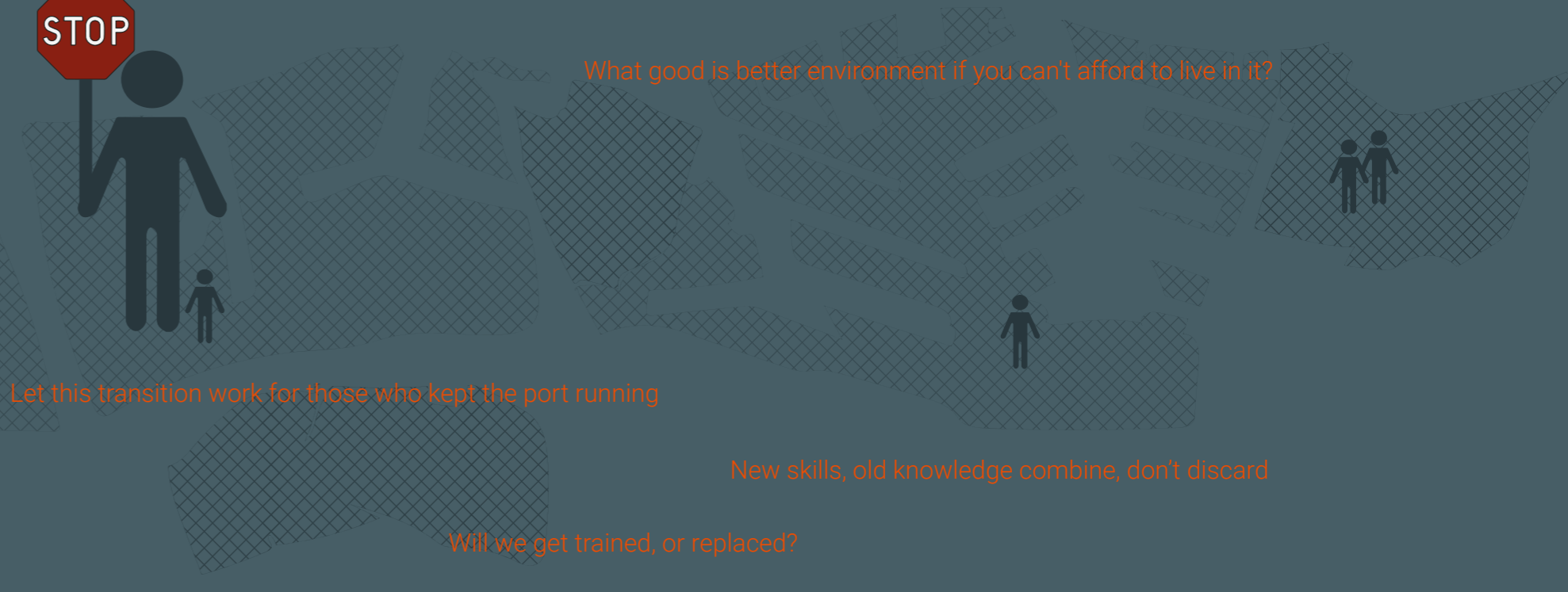
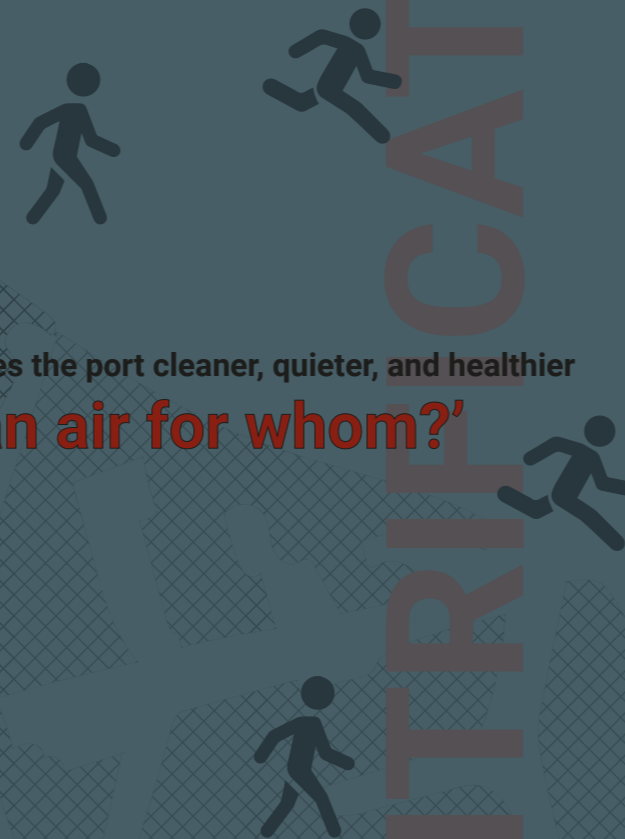
What good is better environment if you can't afford to live in it?

Let this transition work for those who kept the port running

New skills, old knowledge combine, don't discard

Will we get trained, or replaced?

DECENTRALIZATION
CENTRALIZATION
GENTRIFICATION



II. Research Framework

2.1 Problem Statement

2.2 Research Questions

2.3 Objectives & Scope

2.4 Theoretical Framework

2.5 Conceptual Framework

2.6 Methodology

2.1 Problem Statement

Rotterdam was one of the first harbours to introduce itself as an energy port, with big corporations like Shell and Exxonmobil that have refineries and storage fields situated in the port. The Port of Rotterdam and the Dutch Government want the Port to maintain its status as a regional energy hub by becoming a leader in the energy transition. Plans are being made to shift from fossil fuel industries to renewable hydrogen energy that will likely have a social and spatial impact on the port of Rotterdam. The shift calls for a large influx of new workers-somewhere between 10,000 to 30,000 in number until 2050-who are more skilled in the renewable energy sector. These new workers, which will be a mix of MBO technicians and WO workers in R&D, are sure to bring forth a wave of gentrification in the outskirts of Rotterdam. On the other hand, the switch to hydrogen energy could have positive impacts on the liveability and the socio-economic development of the port. The development of hydrogen technology will rid the port with pollutants and will free spaces that can be reclaimed by the public. Hand in hand with this spatial reconfiguration, gentrification can also be steered to be more inclusive and just. This research aims to translate the socio-economic and spatial developments of the Rotterdam port into a vision and spatial strategy for the community of existing harbour neighbourhoods located inside or in proximity of the port for them to commit and benefit from the energy transition.

2.2 Research Questions

Main research question

“How can the energy transition in the Port of Rotterdam be guided to ensure a just socio-economic and spatial transformation for the existing harbour neighbourhoods?”

Sub questions

- Which new jobs will emerge due to the energy transition and how will the demand for new settlements impact the harbour neighbourhoods?
- What neighbourhoods are most exposed to the danger of gentrification, and what impact does it have on the transition community?
- What are the spatial implications of the hydrogen-powered port of Rotterdam for the transition community?
- What spatial configuration are needed for the existing neighborhoods to thrive during and after the transition?
- How can the transition community be included in the hydrogen value chain that will attract a new profile of workers?

2.3 Research Objectives & Scope

Objectives

The main goal of this design project is to visualise the possible impact of the energy transition in an industrial area that is heavily relying on fossil fuels, and how it speeds up the process of gentrification on these existing neighborhoods. There is still this taboo that an energy transition on this scale is very costly and that it has negative impacts on existing communities. Furthermore, there is a general view that these neighborhoods have little to no leverage to be actively involved in an energy transition as such, therefore putting the blame on governments and multinational companies.

Scope

The project solely focuses on the transformation of the Rotterdam Port area and hydrogen energy, and how this transition makes the port a more liveable environment and more prone to gentrification. We specifically chose the port of Rotterdam as the impact of such a transition is really big and comes with many complexities, therefore strengthen our case and applicable to other regions in Groningen and Zeeland as well, where is being experimented with the application of hydrogen in industrial ports and the implication on the built environment.

2.4 Methodology

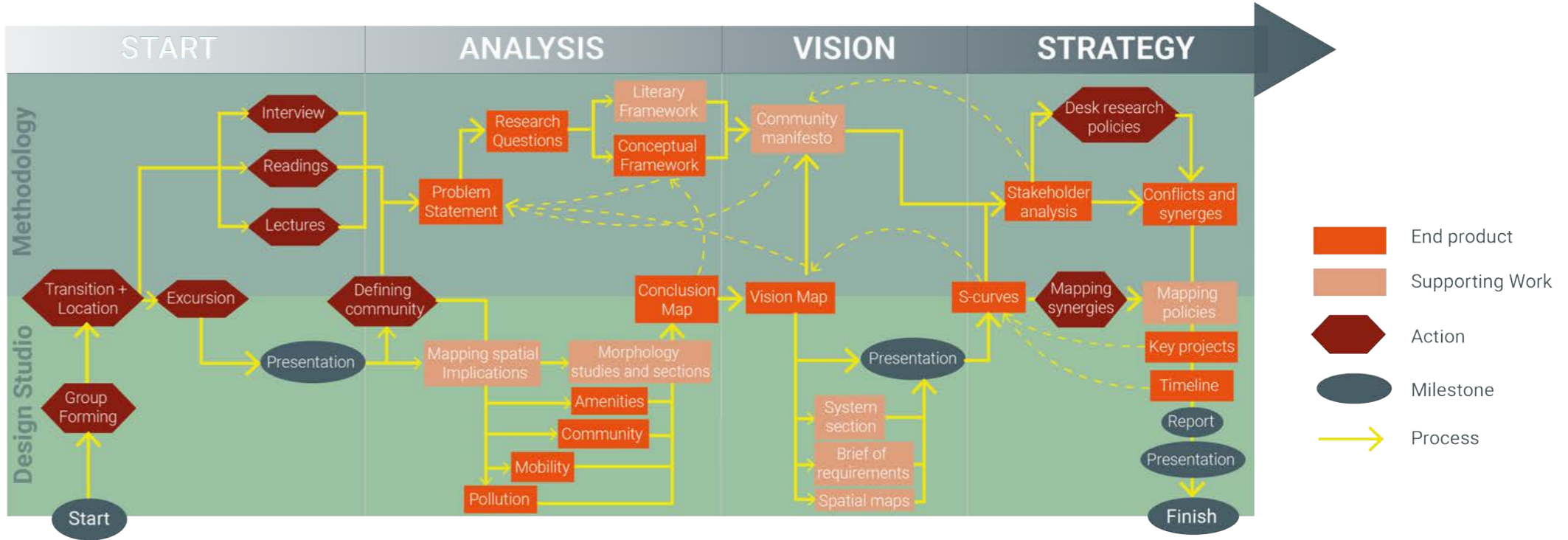
For the project, a inductive research approach is applied, where the group derived their research from existing scientific reports and projects. In the initial stage, key activities are made, and the first milestone was the presentation about the fieldwork, where the group decided on the transition community. The presentation was followed by an urban analysis where the group first started by mapping while working in parallel on the theoretical framework, writing the problem statement, research question and making the first draft of the conceptual framework.

Vision

During the mapping process, the group identified four main themes that were derived from the conclusion map, linking it back to the conceptual framework and the problem statement of our transition community and urban analysis. The vision statement was written based on our idea of making the port an archipelago that connects these isolated islands, through applying the two main concepts of urban metabolism and spatial justice. This has been concluded in the mid-term presentation, which is the second milestone of the project.

Strategy

After the mid-term presentation and receiving the feedback from the tutors, the group then started on the strategical application of the archipelago, working on identifying the key stakeholders and policies through an extensive stakeholder analysis. These have been translated and visualised in key projects that we can directly link through 4 stages in the timeline. The timeline is the final product in our storyline, which is then presented in the final presentation, while the whole project is explained in detail through a research report.



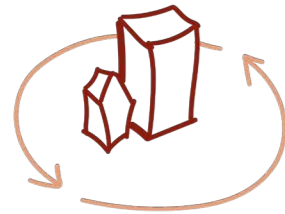
Methodological framework

2.5 Theoretical Framework

Urban metabolism

Karl Marx was the first to introduce the concept of space having a metabolism similar to that of a living organism (Zhang, 2013). Describing the exchanges between human and nature, he placed it in the framework of his theories on class inequality, which also heavily relate to spatial justice, showing the interconnectedness of the two concepts. Later Wolman (1965) brought up the concept again to describe the inability of a system to deal with certain pollutants which accumulate when resources are in short supply and the system has no way to absorb the effects. The concept of urban metabolism also addresses these problems that can arise due to an imbalance of flows of resources. Especially cities can be prone to this. Urban climates place a lot of pressure on the landscape due to the high demand of the system, which can lead to unsustainable use of resources.

One of the challenges of the concept of urban metabolism, is the inability to measure the sustainability of the system (Zhang, 2013). Only through analysis of spatial aspects over the course of a longer timeframe can give insight in the flows that dictate the sustainability of the system. This report will discuss these spatial aspects of the urban metabolism of our system and attempt to link them to the trends of the past decades that have played a role in the port area.

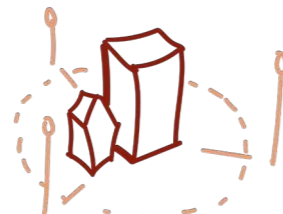


Spatial justice

While the way we view justice has greatly varied in the time humanity has existed, the concept has existed for just as long. As Ralph (1950) puts it, justice has the key to determine acceptability; what is acceptable in certain situations and what do we deem as not acceptable. This extends to an urban context, where the allocation of goods may be considered as unjust, marginalizing communities through deliberate policy or ignorance thereof.

This can be explained through the two sides of spatial justice; distributive and procedural justice (Rocco et al., 2021). Distributive justice can be understood as the fair allocation and distribution of public goods. Procedural justice focuses more on the structural creation of goods through policy and lawmaking. These are two sides of the same coin that are both important in creating a just society.

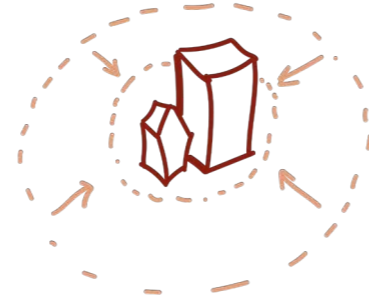
This report will take an analytical look at the area to determine the distributive justice and determine how this can be improved. Through a vision and strategies, we aim to create procedural justice, ensuring that the institutions serve the people.



Gentrification

While many cities strive for renewing their urban fabric and focusing their reformation efforts on disadvantaged areas and neighbourhoods, this may have downsides to its inhabitants. Gentrification is the process where a neighbourhood that has seen extended periods of economic decline experiences a renewed interest and investments, and thus becomes more appealing to middle- and upper-class citizens (Van Vliet, 1998). This process raises housing and amenity prices and makes the original inhabitants more likely to be pushed out of their homes and neighbourhoods (Schnake-Mahl et al., 2020).

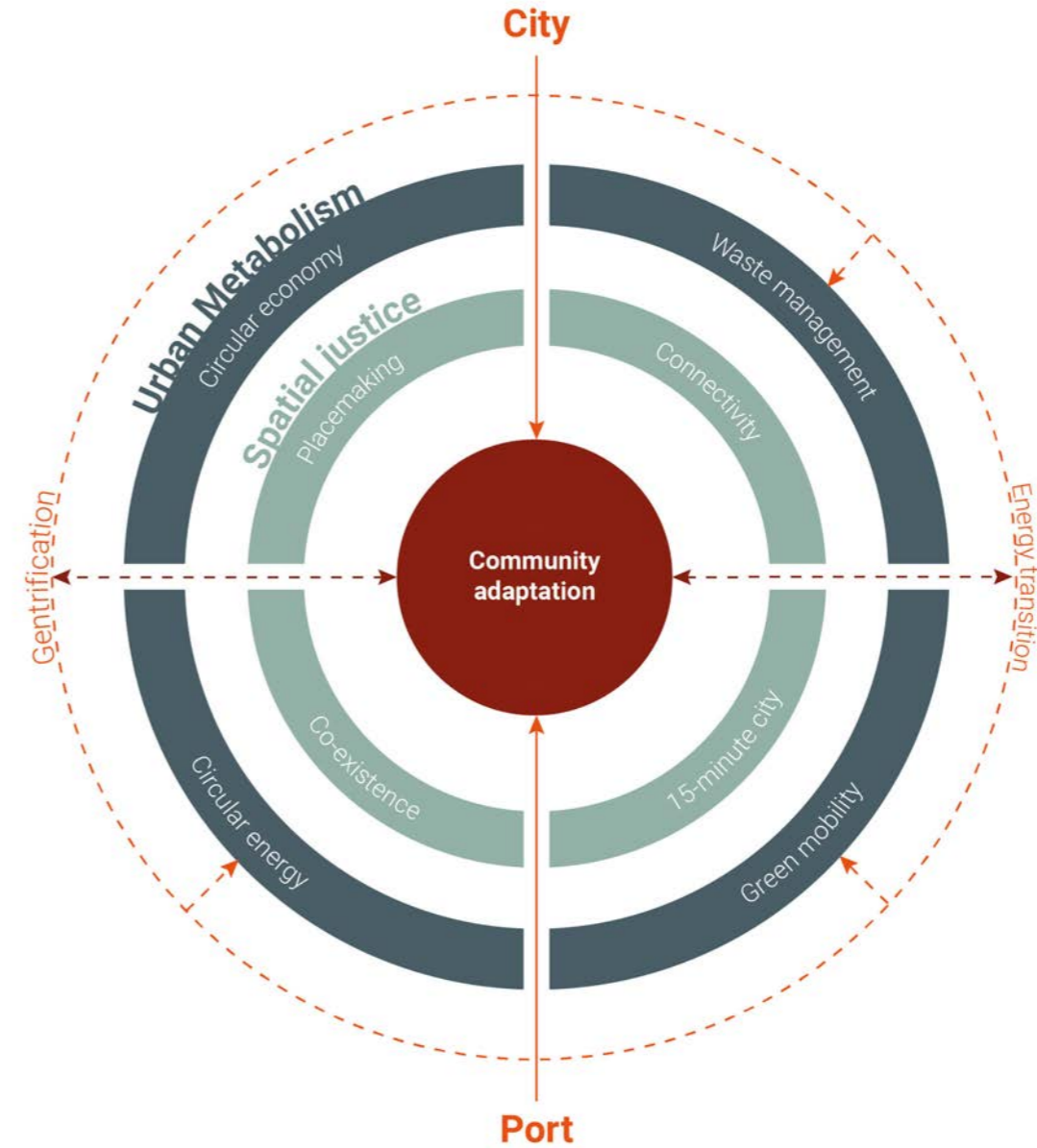
We use this definition of gentrification throughout our report, focusing on the displacement of people as a result of these processes.



2.6 Conceptual Framework

Our conceptual framework includes our transition community in the middle, while two external forces, namely the energy transition and the process of gentrification put pressure on the transition community. The energy transition and the process of gentrification are closely linked to each other, because the energy transition is causing a more liveable environment as the port becomes less polluted and less space is occupied by fossil fuel storage. Therefore more land becomes available for urban amenities, in the form of housing, public space and nature. Because the quality of these urban areas will be enhanced, the process of gentrification, which already happens in the North of Rotterdam will be enforced, making the existing communities more vulnerable.

To prevent this, we introduce two concepts that give the transition community tools to be more resilience against these external forces; Urban Metabolism and Spatial Justice. Through spatial justice, we maintain the identity of these historical port neighborhoods, while providing better connections and amenities to make these neighborhoods more connected with the city. The second concept is urban metabolism, which helps the community to become more involved and an active stakeholder, creating more awareness and make the transition towards hydrogen smooth.



Conceptual framework

III. Harbour neighborhoods

3.1 About the Neighborhoods

3.2 Living with the Port

3.3 Harbor Neighborhoods as Islands

3.4 What do we need?

3.5 Four Ingredients for the Vision

3.6 We Are the Key Players!

3.1 About the Neighborhoods

Rozenburg

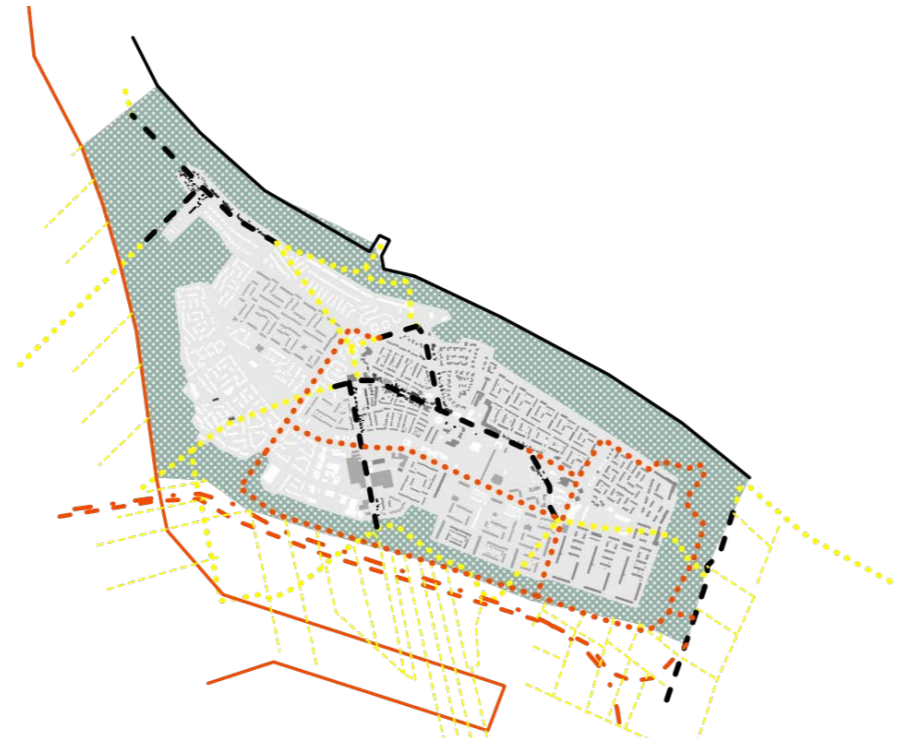
The island of Rozenburg was formed in the 1600s through the embankment of silting sandbanks. Due to heavy safety dikes the village maintained protection against fluctuating tides. After the Second World War, the village got heavily urbanized and transformed from a large scale agricultural land to a residential village for the port workers. The original polder landscape, once the backbone of the town, was gradually repurposed into a green belt. This green ring now serves as a buffer zone, shielding the residential areas from the surrounding industrial activities.

Today, Rozenburg has a population of around 12,500 (according to 2024 data from Alle Cijfers). The demographic of Rozenburg can be characterized as families that worked for generations in industries inside the harbour.

In 2010, Rozenburg was incorporated into the municipality of Rotterdam due to a lack of political autonomy. However, since the merger, many residents feel increasingly overlooked and underrepresented within the larger municipal structure.

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- . - new_railway
- ... erased_road
- ... erased_polder
- green
- 1940
- 1962
- 1970
- 1990
- 2021
- harbour neighbourhood

Palimpsest drawing of Rozenburg



3.1 About the Neighborhoods

Rozenburg

Rozenburg has the appearance of a peninsula, with water on one side and the vast industrial area of the Port of Rotterdam on the other. A wide green belt surrounds the residential neighborhoods, acting as a buffer zone and creating a kind of oasis in the middle of an industrial landscape. There is also plenty of greenery within the neighborhood itself, making it easy to forget that you are in a heavily industrialized area.

Between the village and the port area lies the A15 highway, which serves as both a physical boundary and a constant source of noise pollution. The residential fabric mainly consists of row houses and four-story apartment buildings from the 1960s, typical of post-war housing developments. In terms of public transport, options are limited: there is only a single bus line and no metro connection. As a result, many residents rely on cars for their daily commutes.

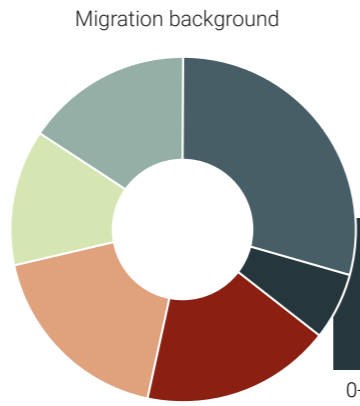
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- Houses
- Green
- Traffic border
- Railway
- - - Neighborhood border

Borders of Rozenburg

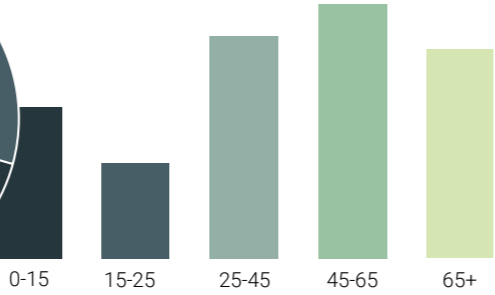


Identity photo of Rozenburg

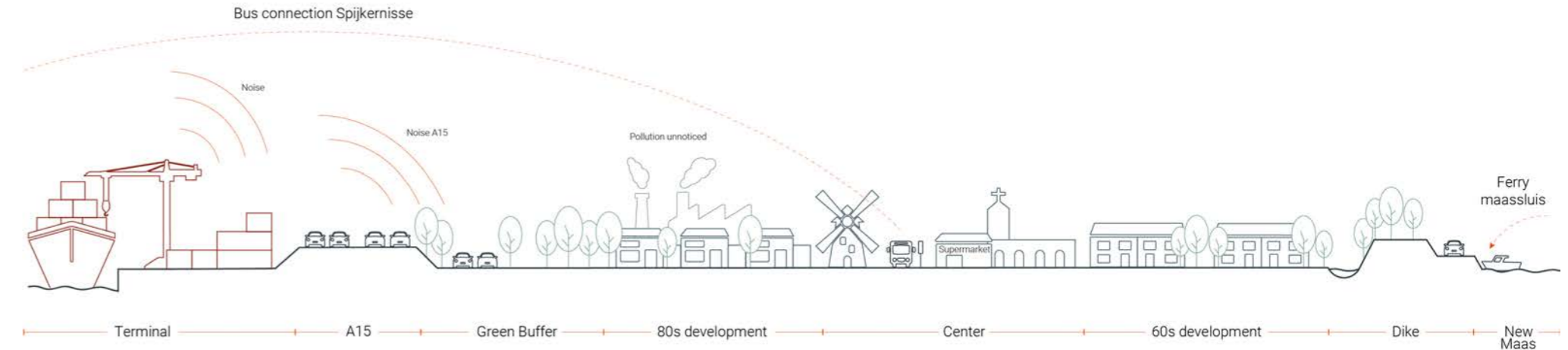
- Morocco
- Western
- Other
- Turkey
- Antilles
- Suriname



Residents by age



Demographics of Rozenburg



Section of Rozenburg

3.1 About the Neighborhoods

Pernis

Pernis is one of the oldest church communities in the region. It was traditionally a farming village, but in the 18th century it developed into a fishing village, with a flourishing salmon industry in the 19th century.

From the 1930s, the land around Pernis was gradually taken over by the municipality of Rotterdam for the development of new ports and industrial areas. This caused the village to become increasingly isolated. Since 2002, however, a metro connection has made the city center accessible within 20 minutes.

Like Rozenburg, the remains of the former polders have been turned into a buffer park to separate the residential area from industrial activity. The riverbanks have also been reshaped to allow space for shipping routes.

Pernis still has a strong local identity, shaped by its traditional, Christian and conservative community. Many residents have close ties to the surrounding port and industries, much like in Rozenburg.



Identity photo of Pernis

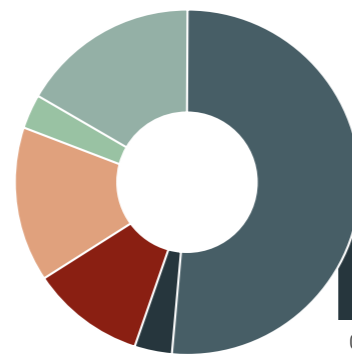
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- green
- 1940
- 1962
- 1970
- 1990
- 2021
- harbour neighbourhood

Palimpsest drawing of Pernis

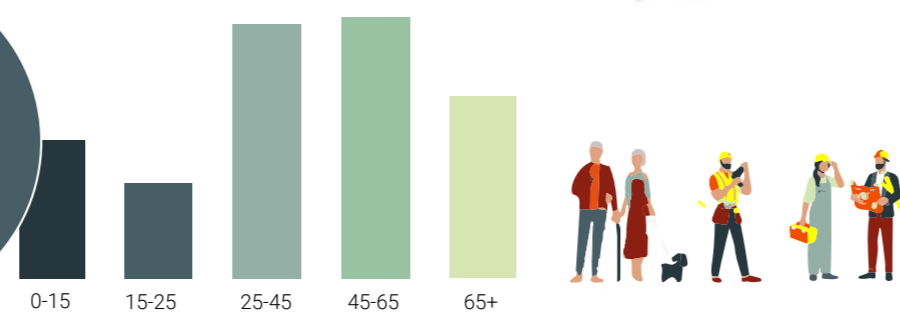


Migration background

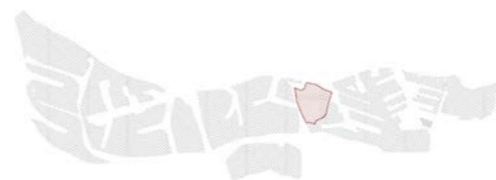
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Residents by age



Demographics of Pernis



3.1 About the Neighborhoods

Pernis

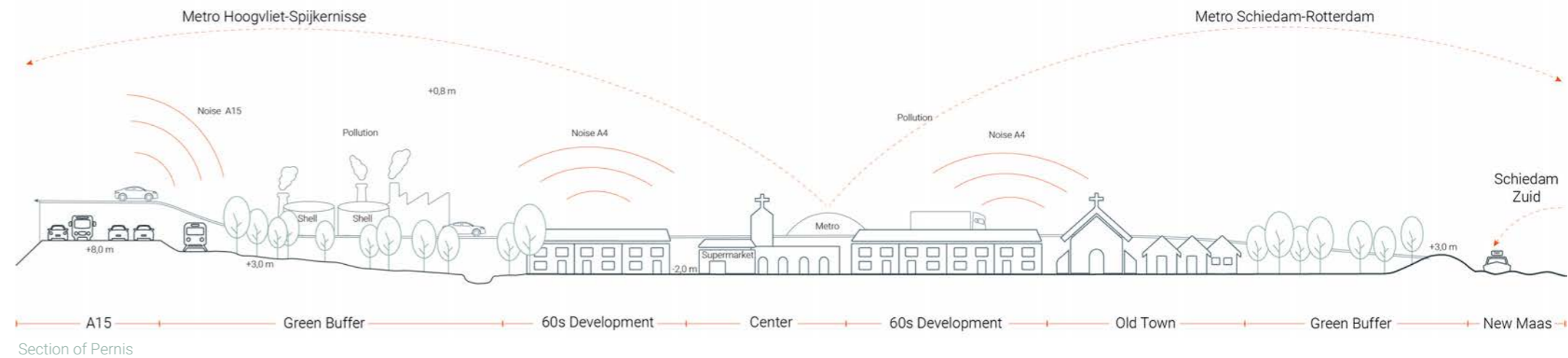
Just like Rozenburg, Pernis feels like an oasis in the middle of a heavy industrial landscape. A green belt surrounds the neighborhood and acts as a buffer between the residential area and the port. The A15 highway, once again, forms a clear boundary between housing and industry, but it also brings significant noise pollution.

Unlike Rozenburg, however, Pernis lies directly next to an oil refinery, which contributes to noticeable air pollution in the area. The residential area mainly consists of housing developments from the 1960s, giving the neighborhood a typical post-war character.

One of the main differences with Rozenburg is the quality of public transport. Since 2002, a metro connection has made it possible to reach the city center of Rotterdam in about 20 minutes. In addition, the ferry service makes it easy to travel to Schiedam Zuid, improving access to the wider region.

- Industry
- Houses
- Green
- Traffic border
- Railway
- - - Neighborhood border

Borders of Pernis



Section of Pernis

3.1 About the Neighborhoods

Heijplaat

Heijplaat was developed in the early 1900s by the Rotterdamsche Droogdok Maatschappij (RDM) to house port workers near the shipyards. Influenced by the Dutch Housing Act of 1901, which aimed to improve living conditions, it became one of Rotterdam's first garden cities.

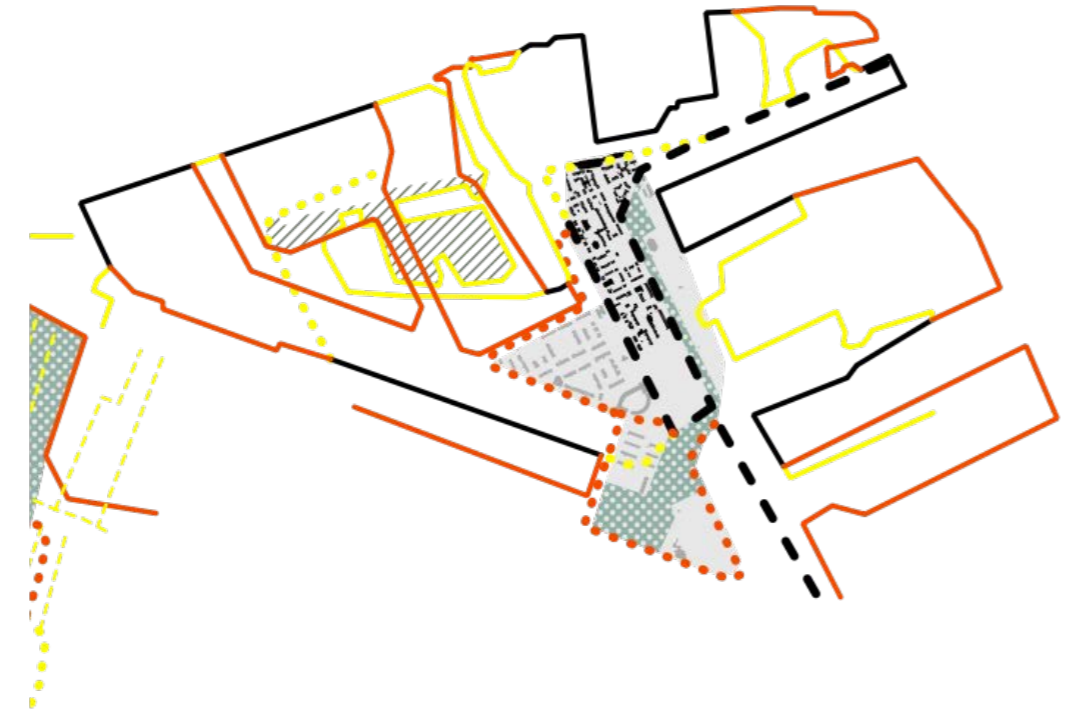
In the 1940s and 1950s, the neighborhood featured a spacious riverside park on its western edge, known as Tuindorp Heijplaat. This green area mostly disappeared in the early 1960s due to harbor expansion.

After the RDM closed, Heijplaat declined. The number of port workers dropped, suburbanization set in, and amenities disappeared, leading to a shrinking population and worsening image.

Since 2008, the area has been redeveloped as an educational and innovation campus with new projects focused on sustainable housing and leisure. As a result, the population is growing, with more expats moving into this attractive, evolving urban area.

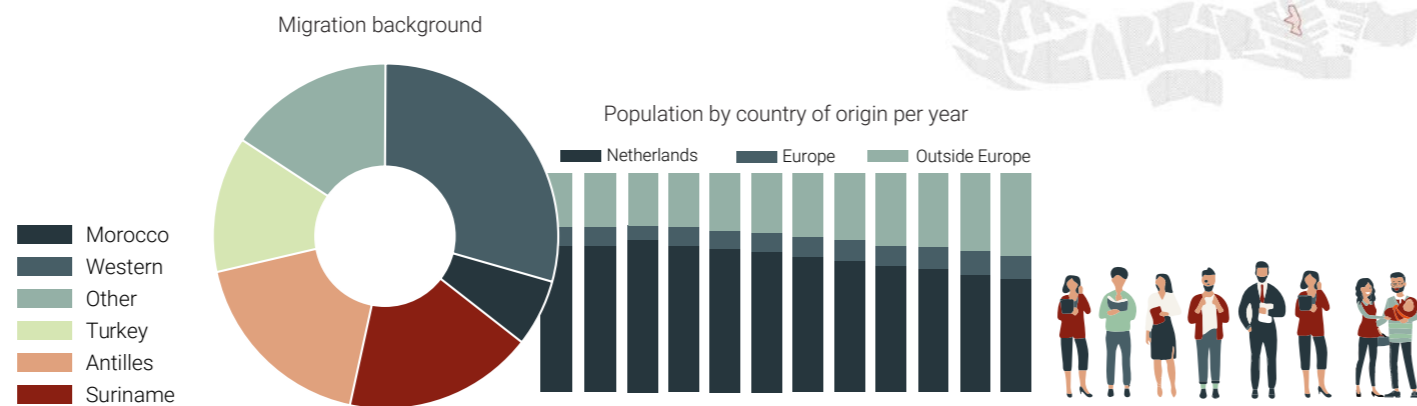


Identity photo of Heijplaat



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- 1962
- 1970
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- 2021
- harbour neighbourhood

Palimpsest drawing of Heijplaat



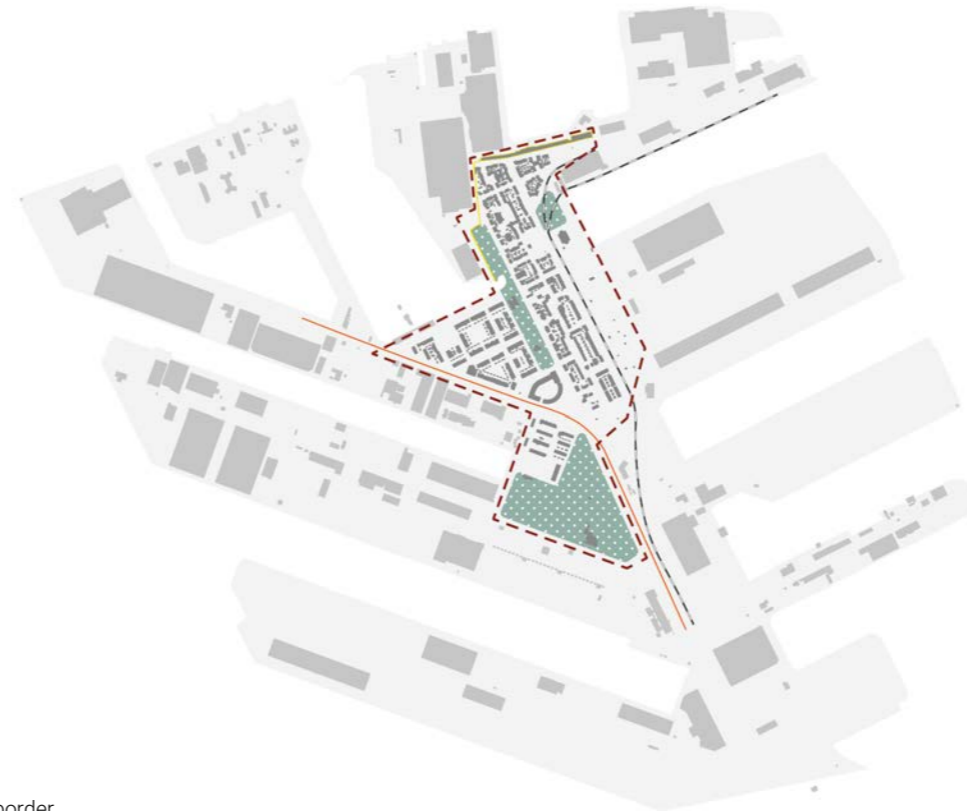
Demographics of Heijplaat

3.1 About the Neighborhoods

Heijplaat

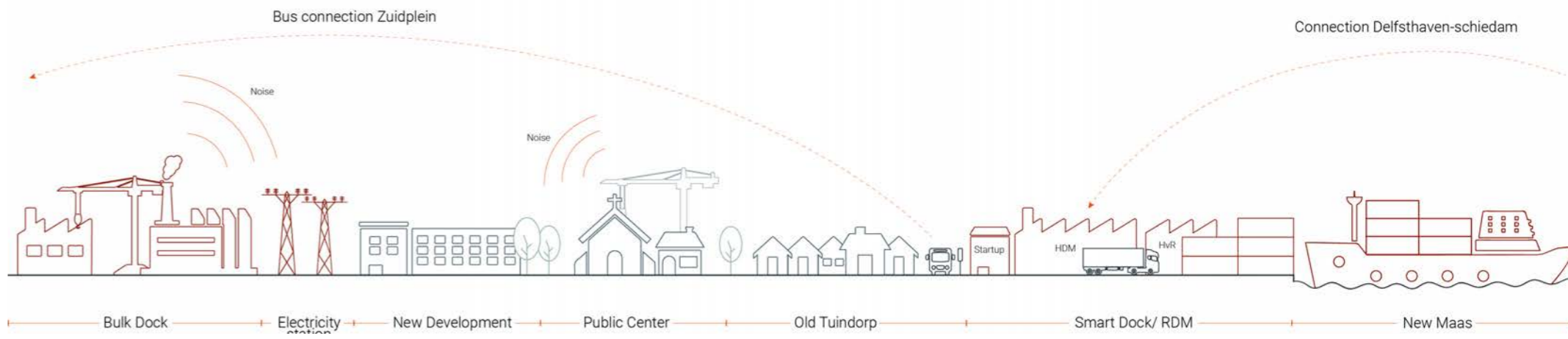
Heijplaat is, in contrast to Rozenburg and Pernis, much more integrated into its industrial surroundings. It no longer feels like an isolated village within the port, but rather part of a transforming urban-industrial landscape. The neighborhood is located closer to the center of Rotterdam, which makes it more connected and accessible. Plans are underway to improve this link even further with a new direct connection to Zuidplein.

While Rozenburg and Pernis are defined by their green belts and physical separation from the harbor, Heijplaat lacks this kind of buffering. There is little greenery in the area, and only a road and a freight rail line separate the neighborhood from nearby industry. This absence of clear borders gives Heijplaat a more open and raw character, with a young, industrial vibe. At the same time, the surrounding industries are less polluting than those in the western port areas.



- Industry
- Houses
- Green
- Traffic border
- Railway
- - - Neighborhood border

Borders of Heijplaat



Section of Heijplaat

3.1 About the Neighborhoods

Hoogvliet-North

Hoogvliet was originally a small village along the dike and got annexed with Pernis by Rotterdam. Later it was transformed into a satellite city alongside the rise of oil and chemical industries in the Vondelingenplaat and Botlek areas, leading to a rapid population boom. The remaining green areas from the original polder landscape now serve as a buffer zone and form the base of its garden city concept.

This growth, however, did not translate into social prosperity. Hoogvliet became a disadvantaged district with high crime and low living standards. Since the 2000s, major urban renewal projects have replaced outdated apartment blocks with modern row housing, aiming to improve quality of life.

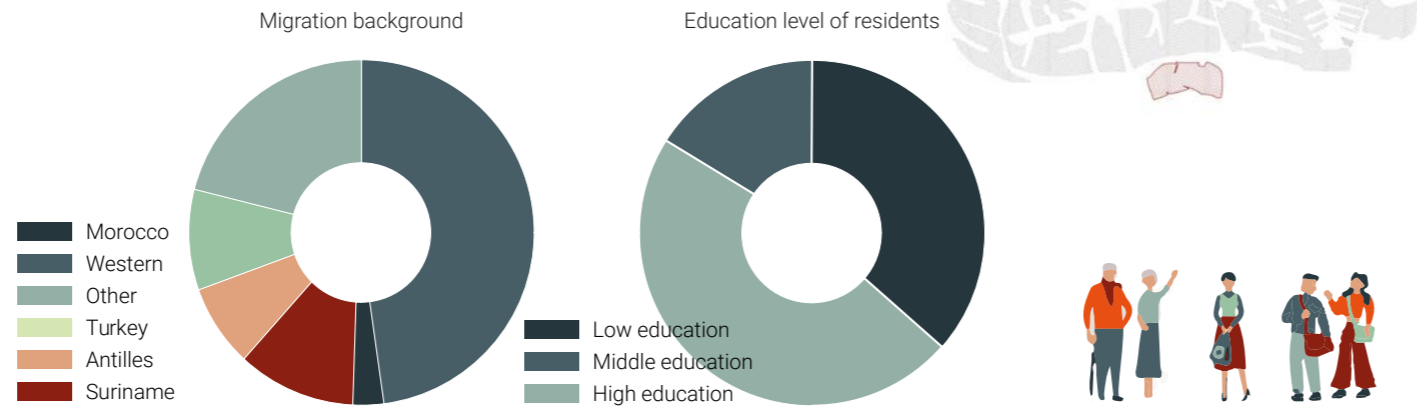
Hoogvliet today has a mixed demographic, with both a large elderly population and a younger, ethnically diverse community. A significant part of the workforce is MBO-educated and skilled in practical trades, though redevelopment in Hoogvliet-Noord is attracting more highly educated residents.



Identity photo of Hoogvliet-North



Palimpsest drawing of Hoogvliet-North



Demographics of Hoogvliet-North

3.1 About the Neighborhoods

Hoogvliet-North

Compared to other port neighborhoods, Hoogvliet is located slightly further from the core of the harbor area. Although the northern part of the district borders the oil refineries, the presence of a wide road and a green belt creates a strong buffer, making the industrial activity less noticeable in daily life.

The neighborhood was developed with a Modernist, car-oriented vision in mind. Large-scale apartment buildings from the 1960s are surrounded by generous urban green spaces, reflecting the planning ideals of that time. As a result, Hoogvliet is heavily car-dependent, with limited access to public transport. The only connection is a bus route linking the neighborhood to the Hoogvliet metro station.



Borders of Hoogvliet-North



Section of Hoogvliet-North

3.1 About the Neighborhoods

Old Charlois & Carnisse

Charlois was annexed by Rotterdam in the late 1800s, after which much of its former agricultural land was transformed into harbor areas. Originally a small harbor village, Charlois had a port in its northwest corner, now the location of the Maastunnel entrance. Surrounding polders were dug out to accommodate shipyards and waterways.

Over time, as housing quality declined, the area saw an influx of lower-income households, especially into the post-war garden towns. This led to growing social challenges. For years, Rotterdam South was known as one of the poorest urban areas in the Netherlands, with neighborhoods like Oud-Zuid, Pendrecht, and Zuidwijk labeled as “Vogelaarwijken” or problem districts.

In recent years, major redevelopment efforts have focused on the Zuidplein area, aiming to improve the neighborhood with new housing and public facilities. However, this renewal also brings gentrification and the risk of displacement. Charlois remains ethnically diverse, with a predominantly young, low-income population.



Identity photo of Old Charlois & Carnisse

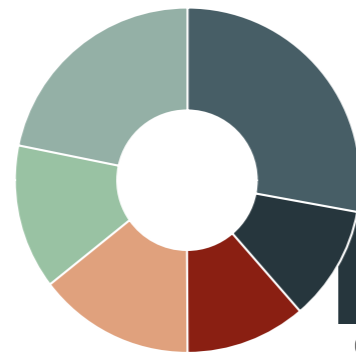
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- 1940
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- 1990
- 2021
- harbour neighbourhood

Palimpsest drawing of Old Charlois & Carnisse

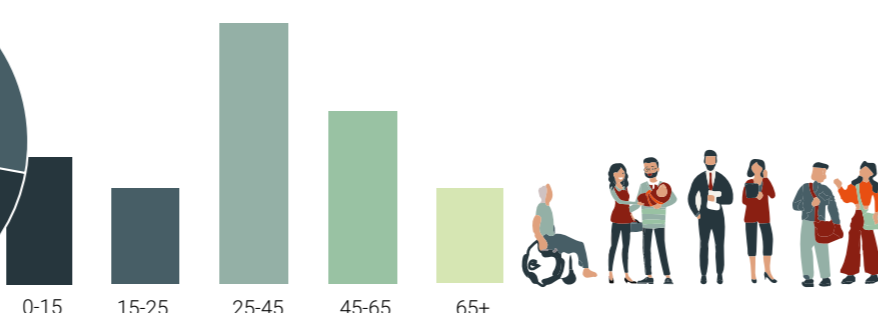


Migration background

- Morocco
- Western
- Other
- Turkey
- Antilles
- Suriname



Residents by age



Demographics of Old Charlois & Carnisse

3.1 About the Neighborhoods

Old Charlois & Carnisse

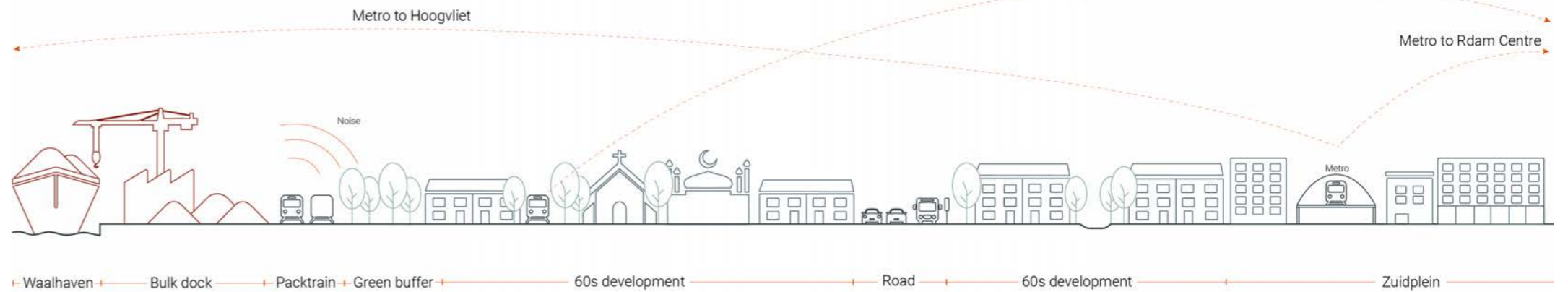
The neighborhoods in the Charlois district were designed according to the garden city principle, characterized by housing projects built by corporations within green urban environments. Although there is no green belt surrounding the area like in some other neighborhoods, Charlois is directly connected to the Zuiderpark, located just south of the district. This large park offers residents access to green space and opportunities for recreation.

Industry is not strongly present in this neighborhood. It is mostly located on to the western edge, where it is not even heavy industry. The border between the industrial area and the neighborhood consists of a mix of green space and business zones.

On the eastern side lies Zuidplein, a major public transport hub that brings strong connections to Rotterdam city center and surrounding neighborhoods. In addition to Zuidplein, the neighborhood is also well-served by tram and bus lines, providing good overall accessibility.



Borders of Old Charlois & Carnisse



Section of Old Charlois & Carnisse

3.2 Living with the port

Walkable green networks and daily lives

Do the harbor neighborhoods have enough and well-connected pleasant green areas to walk on and relax in? The area of recreational green spaces significantly decreases as you move west towards the port. The green structures of Rozenburg and Pernis function as buffer space to protect the neighborhood from nearby port activities. Hoogvliet's rather large piece of green buffer serves as a basis for its garden city concept. However, buffer greens intrinsically lack the ability to connect with other green networks, since they are by definition placed between an unwanted facility and a neighborhood subject to its externalities. Heijplaat does not even have the luxury of such a green space. Except for the short period of time when it had access to a riverside park, now the quarantine site, it has always been devoid of real green spaces. Only Old Charlois has access to a meaningful amount of green space through which one can walk to another district or neighborhood.

Where are the local centers of daily lives where small retails and public services are located? Again, the disparity between East and West is obvious: the available number of amenities plummet as you travel West. Except for Old Charlois, the local centers are all situated in the middle of the neighborhoods, disconnected to its most pedestrian friendly green structures. Their distances from the buffer greens and local transit points manifest the introverted nature of the neighborhoods. Although such placement is advantageous for protecting local retailers and consumers, it runs the risk of rotting from the inside when faced with the externalities of gentrification.

Green spaces & local centers



3.2 Living with the port

Choice of travelling modality

Rotterdam's network of public transportation follows a radial structure starting from the prosperous city center. Naturally, the neighborhoods inside the port, except for Pernis which has one metro station, the main means of public transportation are the bus and water taxis. Old Charlois and Hoogvliet most likely function as transit points where residents outside the city come to transfer to the metro or buses to access the center. The suburban lifestyle or Rozenburg and Pernis with spacious parking spaces and big cars reflect their automobile-centered lives they were forced to pursue.

Even for the neighborhoods that have access to public transportation, it should be noted that transit points are mostly located on the fringes of their neighborhoods. This illustrates the idea of functional segregation behind their planning: that life between 9am to 5pm should be separated from the rest of their lives. It also reflects again the introverted nature of these neighborhoods as places you cannot stumble upon unless you have a clear purpose for your visit.



3.2 Living with the port

Slow mobility networks

The three eastern neighborhoods which are geographically closer to the city center are surprisingly devoid of pedestrian and cycling infrastructures. It should be noted that Old Charlois, where it has decent access to public transportation and connected to Maastunnel from north of the river, is a big hole in terms of slow mobility network. In Heijlplaat and Pernis, perhaps owing to its size, not much walking or cycling is happening. Rozenburg houses a well-connected network within, but the network is strictly contained inside its borders. Only Hoogvliet North is part of an extensive network through which people can walk or cycle to Hoogvliet South or Spijkenisse.

Even though the cycling network is planned to reach every part of the port, it is easy to see these lanes won't be loved by neither harbor neighborhood residents or port workers. Who would want to cycle some 5km next to oil tanks, shipping yards and power plants, especially when the port is so car-friendly with straight and sparse roads where you can drive full speed?

Slow mobility networks



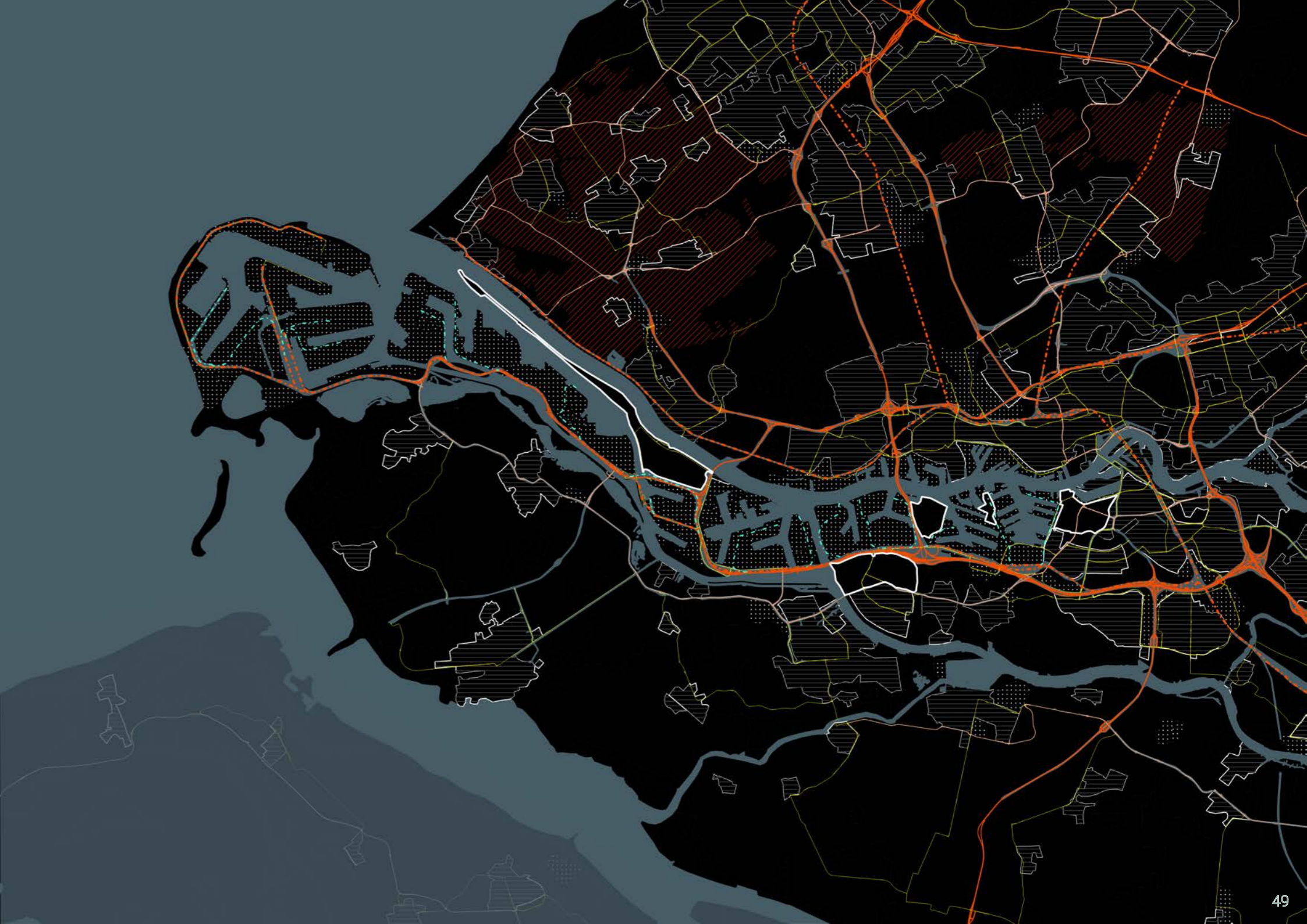
3.2 Living with the port

Industrial infrastructures

The bold infrastructures that primarily support the port industries, mainly the freight railways and motorways above ground, are the precious arteries of the Port of Rotterdam. They are the veins through which raw materials, shipped goods, and fuels are moved to produce profit that in turn helped Rotterdam rise as one of the most prosperous cities in the Netherlands. However, the prices the city had to pay are not evenly distributed. The veins become thicker south of the river and clearly prioritizes port activities before the people who had been living there before.

The ring of highway that revolves around Rotterdam city-A15, A16 and A20-runs carelessly through the harbor neighborhoods. The southern part of the ring is thickened by the freight railway tracks that run along it. The highway is the main obstacle that blocks physical connection between the neighborhoods: north of Hoogvliet, east of Rozenburg, and west of Pernis. The reason Old Charlois was so sparse with slow mobility networks is explained: it is where the primary roads run through-heavily congested roads that link the outskirts of Rotterdam to the city center. The map would naturally induce the following question to its readers: "Who would build towns like that there?" The correct question would be "Who would build bold infrastructures like that there?"

Industrial infrastructures



3.2 Living with the port

Employment opportunities

Distribution of businesses, in other words job opportunities, also shows drastic difference depending on which side of Rotterdam you live in. Especially the creative industries, where young professionals are highly populated, are densely concentrated in the city center. As a port whose biggest income comes from shipping, jobs related to storage are spread out all over the region. Naturally, the most accessible employment positions for harbor neighborhoods would be in this sector. Moreover, the lack of local businesses in the harbor neighborhoods-except for Old Charlois-should be noted. This reflects the lack of consumer power of our transition community, and the lack of vibrancy in their local centers.

Employment opportunities



3.2 Living with the port

Education accessibility

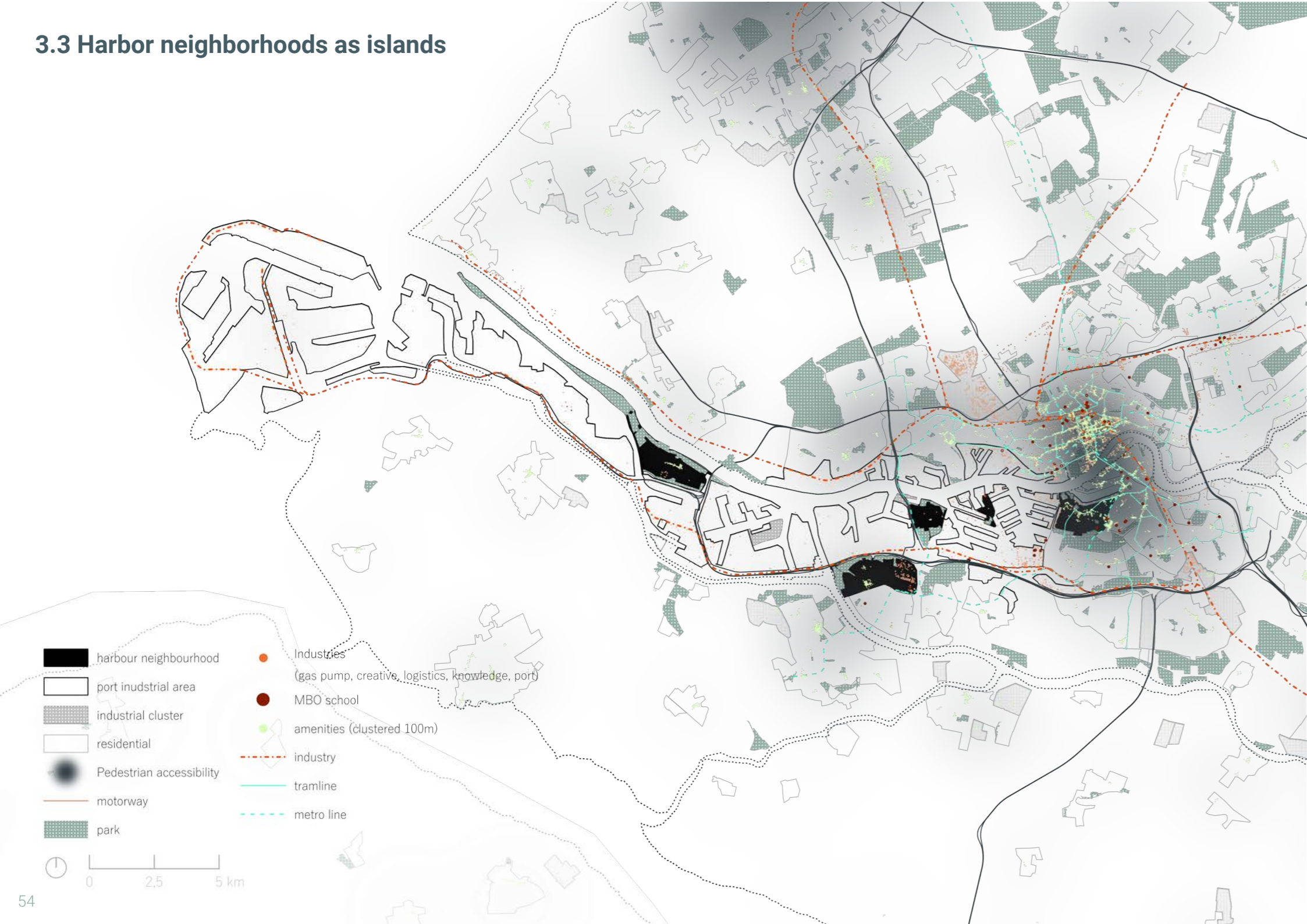
The disparities of educational institutions are clear: they are densely located north of the river. The difference is bigger in universities, with only one south of the river. The harbor neighborhoods, except for Hoogvliet North, are lacking in higher education services. Heijplaat has a recent addition thanks to the Makers district in RDM(north of Heijplaat). Neighborhoods inside the port have limited or no options when choosing middle schools: they must travel by car, ferry, bus or metro every day to do attend schools in other districts.

A cluster of MBO schools in Hoogvliet North shows the potential to connect these schools to port industries, but current lack of physical connection stands as a strong obstacle. The new school in Heijplaat also seems promising: together with developments of RDM, it has the potential to be transformed into an anchor program that will draw people to visit and change the port.

Education accessibility



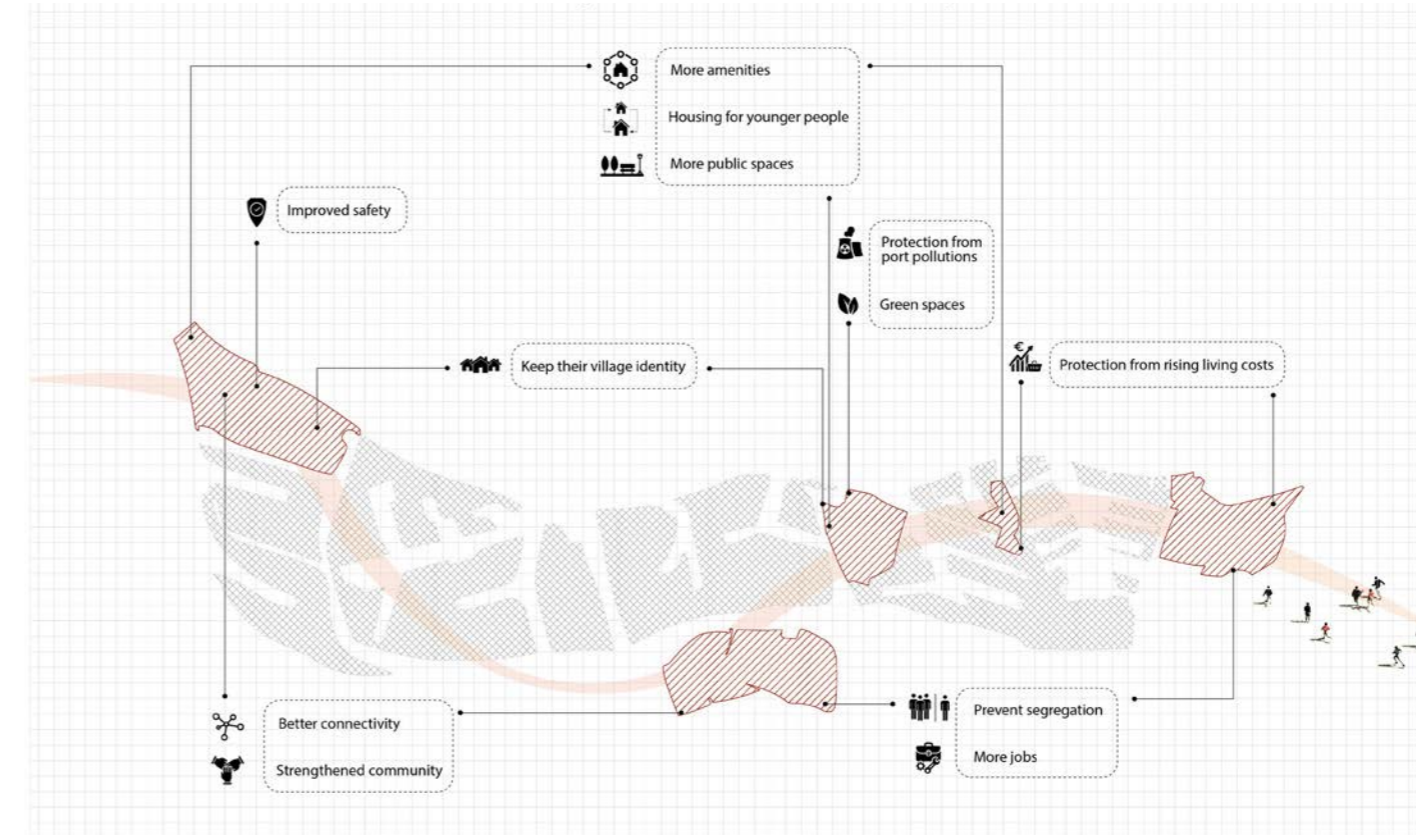
3.3 Harbor neighborhoods as islands



3.4 What do we need?

Earlier analyses revealed that the port neighborhoods differ significantly. The identity of each port neighborhood is shaped by both its demographic composition and its spatial position in relation to the harbour. This diversity leads to different priorities and needs across the area. The requirements shown here are based on a combination of resident interviews and statistical data from 'Alle Cijfers' of the municipality of Rotterdam.

Rather than applying a one-size-fits-all approach, we aim to protect and respond to the specific requirements of each neighborhood. Rather than applying a one-size-fits-all approach, we aim to protect and respond to the specific requirements of each neighborhood. Across the interviews, most residents emphasized the importance of identity, sense of community, connectivity, and green space as key values they wish to see preserved and strengthened.



3.5 Four ingredients for the Vision

Guiding themes extracted from transition community analysis to form the vision

Energy is the instigator, but we can control how it pans out.

- What sort of renewable industries will move into the refinery plots?
- Where will the new energy infrastructures be located?
- Will we have firsthand access to the new fuels and supply chains?

If **housing** for new workers were to be built near us, where and what types?

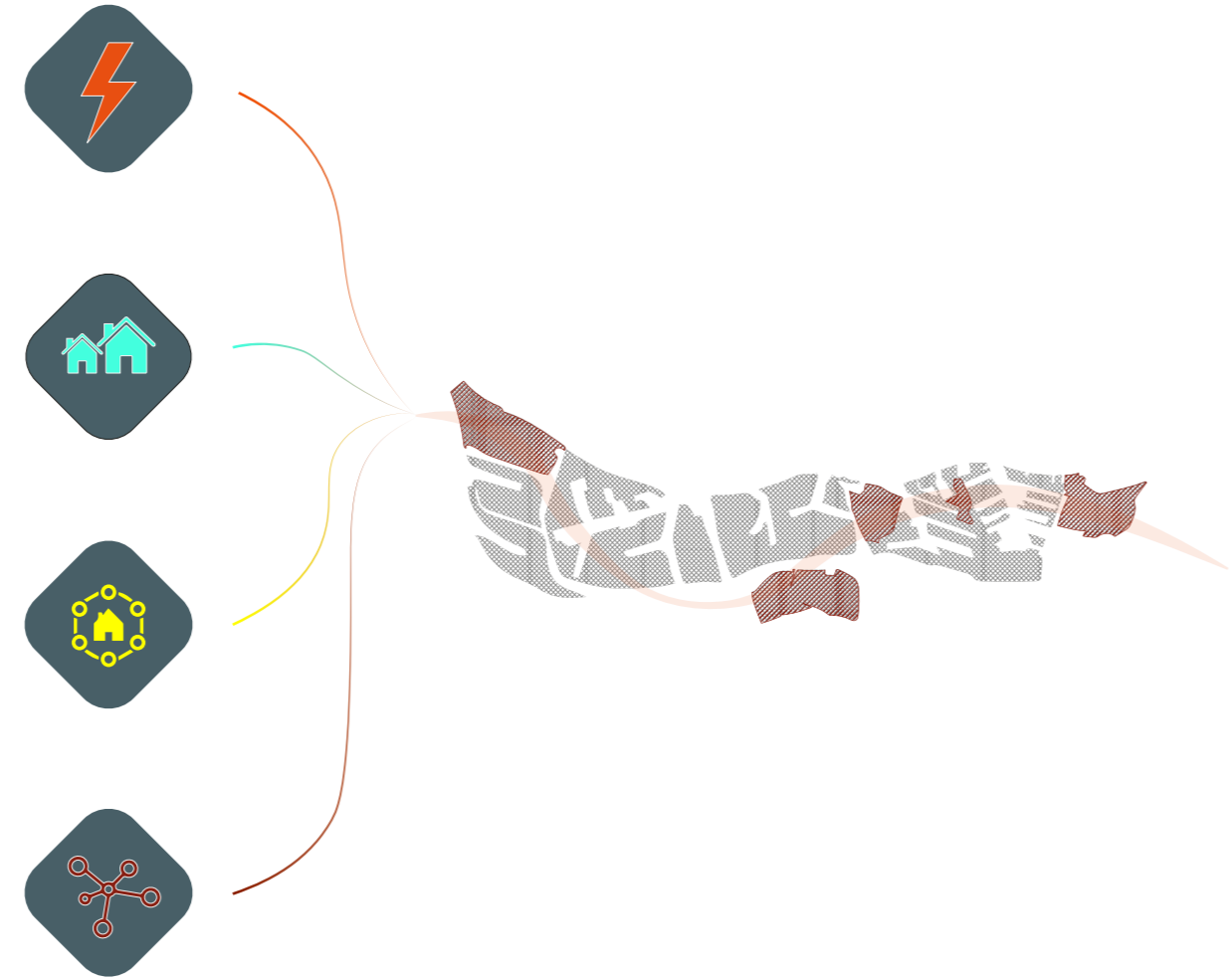
- How can we make sure these new people won't swarm our towns?
- Won't the new houses make our places unaffordable?
- Will our houses look poor or outdated compared to the new ones?

We're sick of being the 'cul-de-sac' of Rotterdam. Multimodal **connectivity** is key to our well-being.

- How can we extend our beloved parks along the riverside?
- Water is both a barrier and a buffer. How can we make most of it?
- Can the new fuels boost slow mobility in our neighborhoods?

How can we have access to more and better **amenities** while keeping our identities as enclaves?

- How can we ensure protection from the industry activities?
- Will the transition provide us with new jobs as well?
- How can we raise our voices in the whole transition process?



Transition community guiding theme diagram

Our community has always been at the centre of all the action in the harbor. The energy transition is just another one in a long line of changes that we have seen and will see. We worry for our surroundings and sense of community, but are not blind to the changes of our time. Especially here in our home close to port and sea, we understand the dangers of a changing climate and need to act accordingly to prevent a future where our children will not be able to live in the same place anymore.

Let us be heard as the people with the most heart for the port, who have spent generations here working and living it. We want our voices to be heard by those high up in the city centre of Rotterdam, who are disconnected from our wants and needs, so that they are not drowned out in the sea of voices from much more powerful forces in the harbor. We matter too.

We envision a future where our roots will not be torn out. The energy transition can only benefit us so long as we keep to that truth. The port may change, new people may come, and we may live in a different world, but we have settled long ago, and we are not likely to settle somewhere else. The new energy technologies will create a better environment, so let us live in it, instead of shipping us off to some stinking neighbourhood.



3.6 We are the port!

Transition community manifesto

IV. Vision

4.1 From Isolated Living to Archipelago

4.2 A Liveable Port

4.3 Archipelago Dissected

4.4 The Archipelago as a System

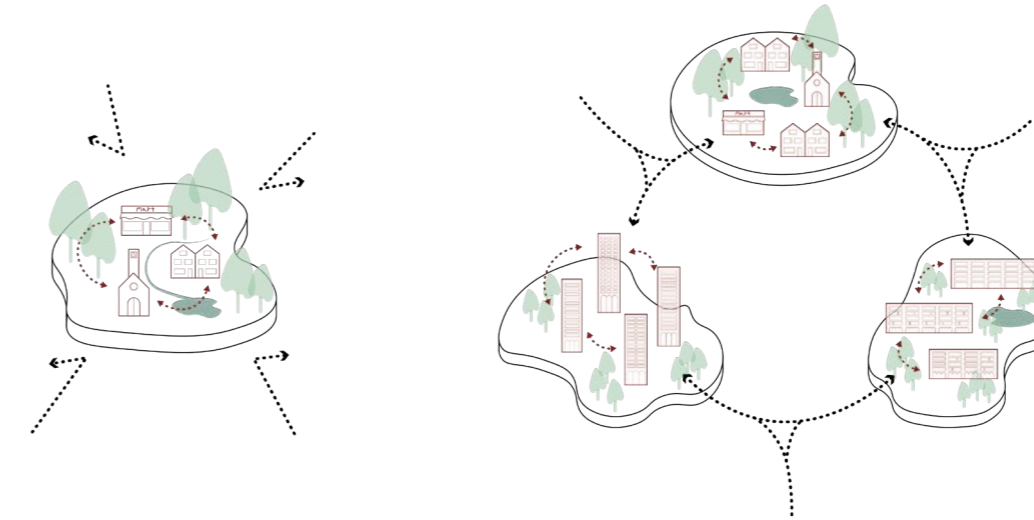
4.1 From isolated living to archipelago

Vision statement

The port of Rotterdam is slowly embracing hydrogen as the future of fuel and energy. In the coming years we hope to see a change in the right direction and a shift away from fossil fuels and towards hydrogen. This would open up the port to a sustainable market, as well as reducing its own carbon footprint. The port of Rotterdam will keep its competitive economic position in Western Europe, while promoting more sustainable industries.

This transition would open up the port in a way that hasn't been seen before. The small scale required for hydrogen production and available storage in the empty gas fields in the North Sea will open up large areas of the port and create a healthier, cleaner environment in the process. Healthier landscapes with more space for development put these communities at risk of being pushed out due to gentrification. New workers and expats also place more pressure on these communities and can amplify these effects. But how can these neighbourhoods catch this wave of change to come out stronger?

For this we present our vision of a new Rotterdam port area; The Port Archipelago. At the core, it is about flipping the hydrogen transition into an opportunity for something new, while keeping strong ties to the old. As more space opens up, more connections between the port neighbourhoods and the city are created. While they might start out as lone islands in a sea of harbor activity, slowly they will become part of a larger system; the archipelago. This system will improve the ability of the community to regenerate and deal with the problems that a hydrogen transition might bring. Through the archipelago a new network of people, energy, green, public spaces and jobs will be created that will revitalize and on the other hand empower the existing neighbourhoods through a more just urban design of the port.



From island to archipelago

4.2 A Liveable Port

Why Archipelago?

A closely knit web of relationships, ranging from interpersonal to between organizations is an integral factor that contribute to collective resilience, social justice cohesion and sustainability(Gilchrist, 2019). Despite the similar circumstances they are facing, their current standing as disconnected islands severely limits the neighborhoods' capacity to join force and raise their voices about the gentrification of the port.

The necessity to build networks does not only apply between existing neighborhoods, but also with developed ones that will house different profiles of residents and workers. However, opening up the borders and exposing the conservative or vulnerable natives would create too much tension and increase the chances of displacement. The idea that imposing different groups together leads to a win-win situation has proven to a naïve one, while evidence suggests that living with peers actually improves their welfare(Bridge et al., 2012). This where the idea of archipelago comes in: a system that enables contained neighborhoods to interact with each other.






















The archipelago will also highlight the identities of the existing neighborhoods by complementing different settlements nearby. The identity of a place requires a context where counter-position with 'the other' can be established(Hague & Royal Town Planning Institute, 2005). Establishing relations with other social groups and spatial conditions will encourage the neighborhoods to rediscover their uniqueness and invest in those qualities.

4.2 A Liveable Port

Port Archipelago Masterplan

The harbor neighborhoods that were originally isolated islands become part of an archipelago comprised of different programs and densities. Multimodal connections between the islands and to other parts of the city serve as arteries that bring vibrancy to the archipelago. Green buffers that were closed circles form a long chain of green network from east to west. Local centers link the transit points to the green spaces, forming a diverse spectrum of slow mobility network to choose from.

Port Archipelago Masterplan

-  new fuelcell station
-  new tram stop
-  new local centers
-  industries
-  mbo education
-  non-residential facilities clustered (100m)
-  new green connection
-  new metro line
-  new tramline
-  harbour neighbourhods
-  FSI high-low
-  railway
-  existing tram line
-  existing metro line
-  new green network
-  coastline
-  existing parks
-  motorway
-  port industries
-  industrial clusters
-  residential



4.3 Archipelago Dissected

Multimodal transportation on a regional scale

Extension of public transportation is essential to the archipelago vision which seeks to overcome the automobile-centered spatial order through multimodal accessibility. A light freight railway can be converted into a metro line and then connected to Tussenwater station located in the southern border of Hoogvliet North. This new metro runs through Botlek, stopping in the new park and the new MBO campus that specializes in hydrogen technology. Then it is further extended into Maasvlakte, also providing an alternative mode of commuting to the port workers. This extension raises the possibility of new workers settling in Pernis, Hoogvliet and Old Charlois instead by commuting by car from the city center.

A new tramline, on the other hand, runs on the northern side of the archipelago, linking the islands with a tram that crosses the river multiple times. One will be able to experience a chain of complementary villages by riding this tram from Old Charlois to Rozenburg, with different identities and lifestyles for each. It is a crucial mode of connection between the neighborhoods-old and new-to visit each other for different services and activities. It is also the line of development, inducing visitors of Heijlplaat-the most touristic and therefore a magnet project to be implemented in the first stages-to venture westwards.



Train running over water

Multimodal public transportation

- | | |
|---------------------|-------------|
| archipelago | hydrogen |
| new tram stop | bulk |
| new tramline | etc |
| existing tram stop | logistics |
| existing metro stop | shipping |
| main | greenhouse |
| metro | industrial |
| tramline | residential |
| infrastructure | green |
| park | |



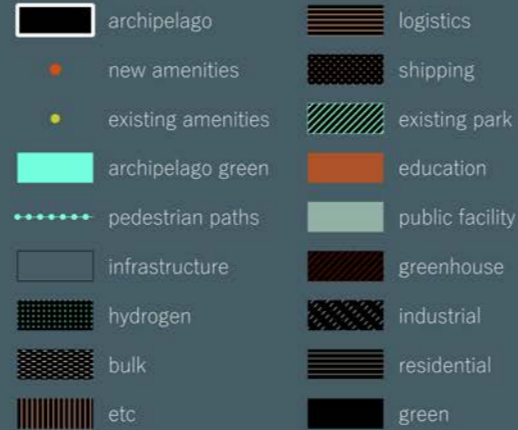
4.3 Archipelago Dissected

Slow mobility networks and vibrant local centers

Many interviewees expressed their appreciation for the small bits of walkable green spaces they had in their neighborhood. In the archipelago vision, their dreams are made true, with an extensive green network that covers approximately 30km from east to west. The buffer greens that only functioned as a closed loop are transformed into an open system where people have multiple choices of routes to choose from. The two park islands play a key role in activating the green network: parks have always been something that did not exist in their realities until now.

Thanks to the new public transportation network, local centers will be revitalized. These centers also connect the green network with the transit points, making the modal shift not only more convenient but also more interesting. Different kinds of retails are expected to appear alongside the green networks, such as cafes, restaurants, and gyms compared to ones near transit points, which would house more shops, supermarkets and hairdressers. The goal is to create a network of slow mobility where one would be able to walk or cycle seamlessly with minimal need to navigate themselves: they would only have to follow their instincts.

Slow mobility networks & local centers



4.3 Archipelago Dissected

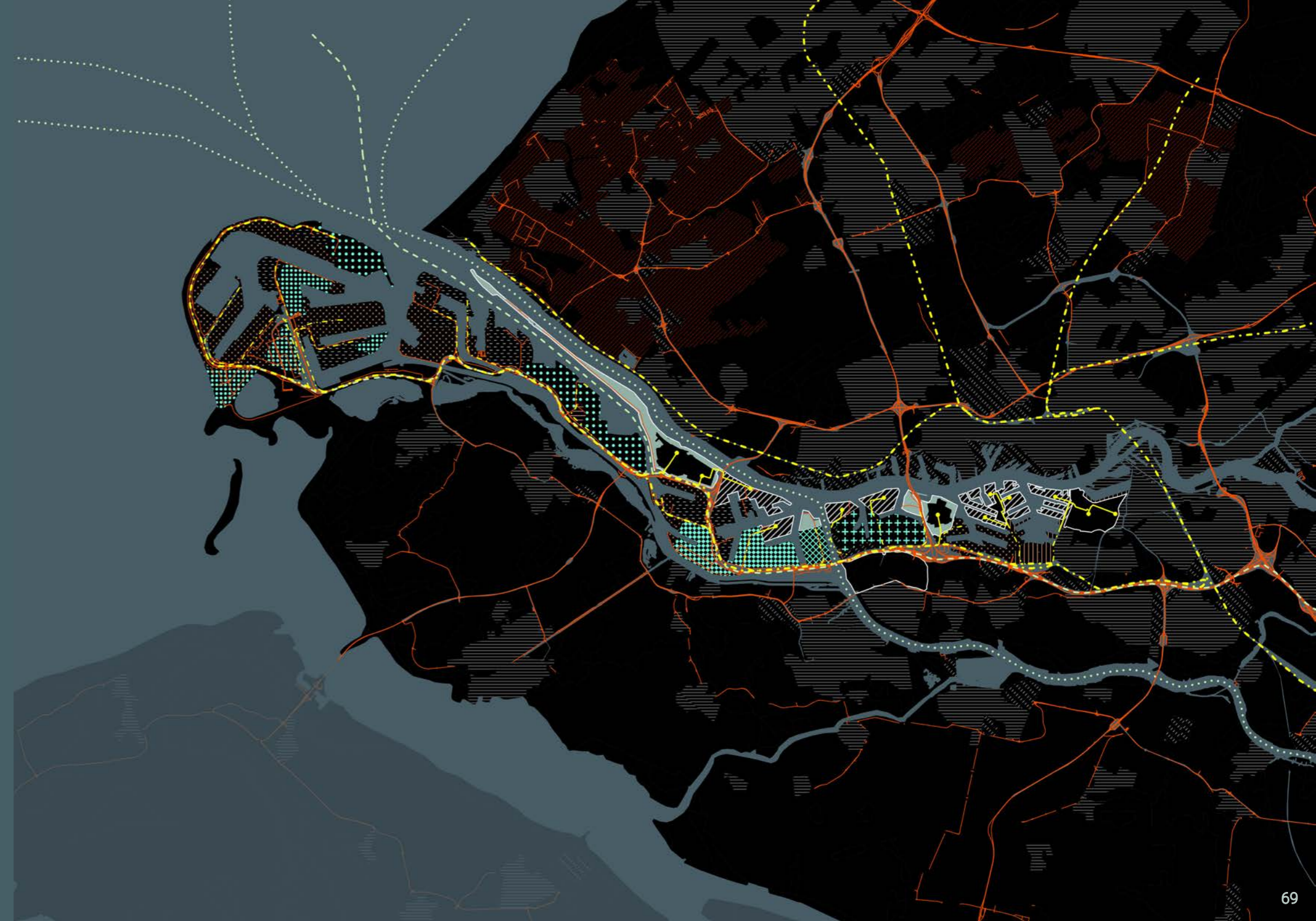
Sustainable living alongside hydrogen

Hydrogen industry is the whole context upon which the archipelago vision unfolds. Although the production of green hydrogen also requires some chemicals and metals, the amount of pollutants it produces is significantly lower than fossil fuel. Also, technological development to store hydrogen underground will allow the port activities to become much more sparse and environmentally sustainable-with less ammonia and gas tanks, and more spaces to buffer their activities. It would also allow the archipelago to be closely adjacent to hydrogen facilities without fear of being exposed to their externalities.

The high-risk facilities are located in the west of the port. Large-scale electrolyzers and import terminals are mostly housed in Maasvlakte. Fuel cell facilities and power plants that run on them are situated in Botlek and Vlondelingenplaat, near the archipelago. The archipelago benefits from a well-connected supply chain of fuel cells, so that they have more incentives to change their vehicles from fossil fuel to hydrogen fuel cells. When hydrogen will be connected to the heating network in the future, these neighborhoods will be the first to enjoy the new technology. As they are the ones most exposed to the externalities of the new industry, it is only fair that they should be the ones whose daily lives will be most significantly improved by hydrogen.

Living alongside hydrogen

- archipelago
- industrial railway
- hydrogen pipe
- hydrogen shipping
- fuel cell supply route
- roads speed limit >70
- fuel cell station
- infrastructure
- park
- new development
- bulk
- etc
- logistics
- shipping
- green
- greenhouse
- industrial cluster
- residential
- hydrogen plant
- hydrogen terminal
- fuel cell generation plant
- hydrogen fuel production
- fuel cell production



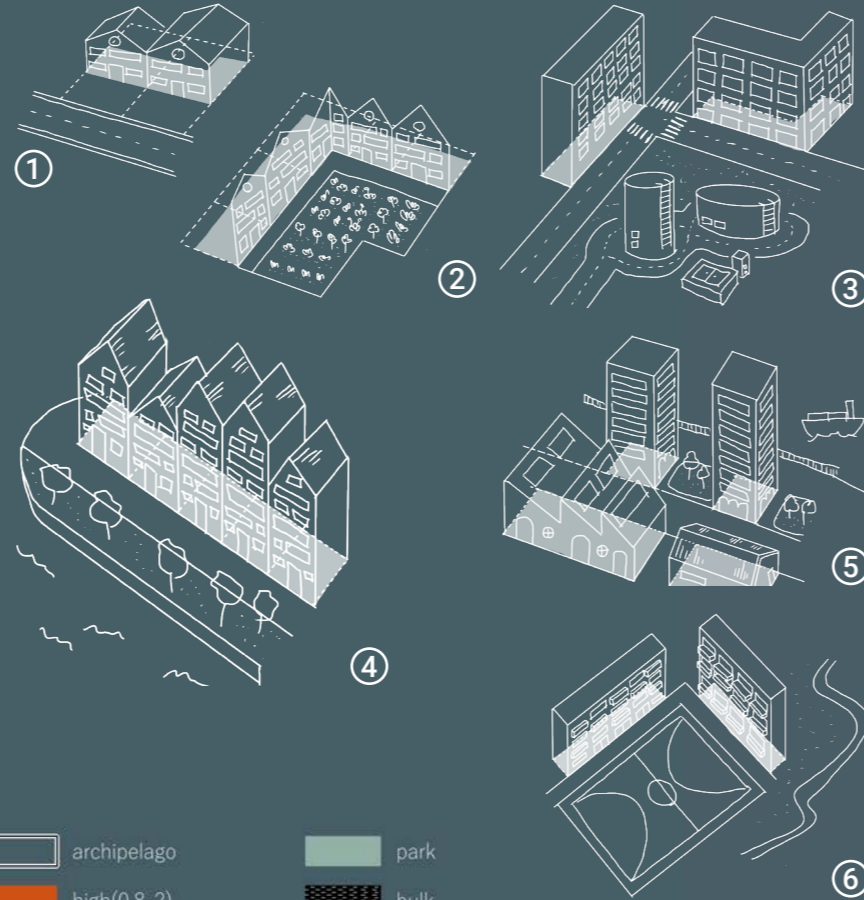
4.3 Archipelago Dissected

Different densities not just in numbers but also in qualities

Originally, Hoogvliet and Old Charlois's density is perceived as medium-high, ample with social housing that often go taller than 5 stories. The harbor neighborhoods inside the port are sparse, mostly comprised of single houses with private yards. Then how should housing be distributed throughout the archipelago, and what would be their spatial qualities?

We are not demolishing and rebuilding existing neighborhoods which accelerate gentrification process and raise housing prices; although renovations to improve insulation and decrease energy consumption would be gradually implemented. Alternative initiatives for family housing will be implemented in the residential areas allotted for permanent workers who will be coming to work and live in the port, such as collective urban farming or micro-housing. The Botlek MBO campus would be a low-medium density area, but mainly due to its open spaces where hydrogen technologies are tested, and new workers are trained and reskilled. Their housing would take the form of affordable 5 story apartments suitable for one-off labor forces. Student housing district will be a medium density neighborhood, with ample spaces for sports and recreational activities. Heijplaat's knowledge business center will be a mixture of retrofitted factory buildings and high-rise towers. Its riverbanks will house mix-use line housing alongside green networks.

Diverse qualities of densities



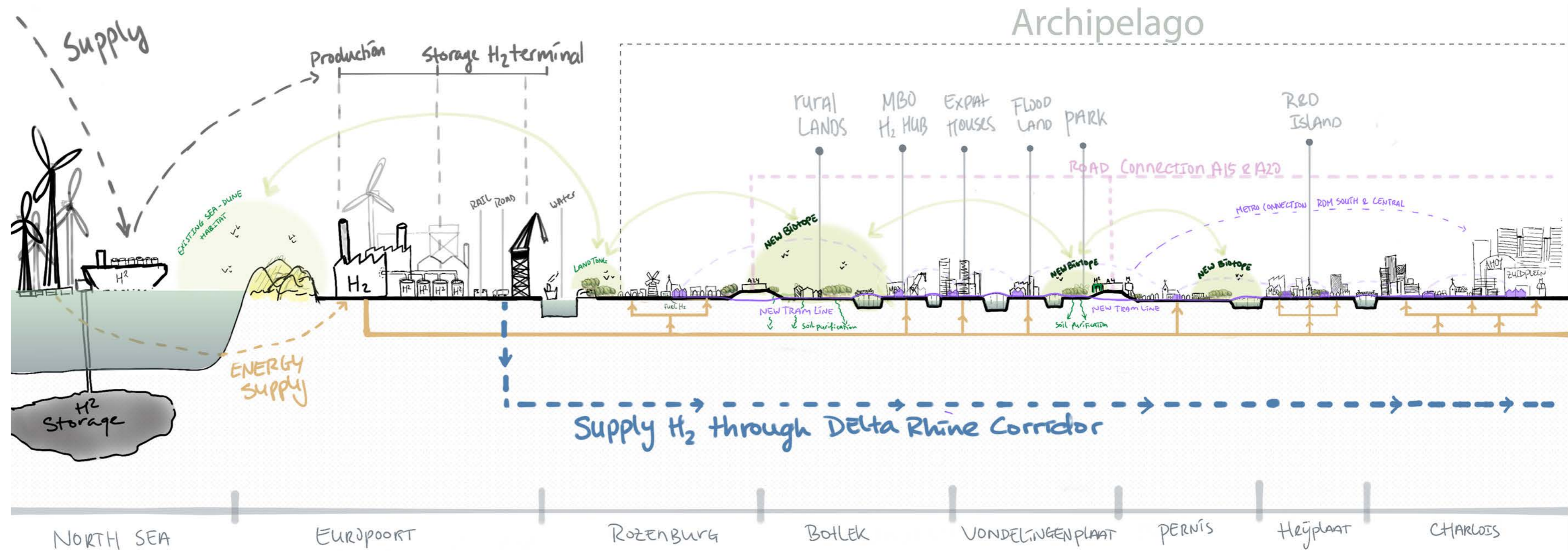
4.3 The Archipelago as a System

Visualizing the flows in the new port

The Archipelago is the link to the port and the city and accomadates different flows that improves the connection between the existing port neighborhoods and the city.

Industries and hydrogen plants are located in the Europoort and Maasvlakte district to make it convenient for the supply and storage of hydrogen using barges. The extensive industrial area is linked to the energy grid using the existing gas pipes to supply heat from industrial activities to the neighborhoods in the port and Rotterdam, and other industrial areas inland.

The heavy polluting industries are transformed or phased out, making the archipelago a liveable environment for both human and non-human. Besides, the storage of hydrogen takes place offshore, which makes way for new ecological infrastructure. Hence, this creates new biotopes linking the dunes of the Maasvlakte and the North Sea to new green structures within the archipelago and the city.



System section archipelago

V. Strategy

5.1 How to make it happen

5.2 Guiding Themes Close Up

5.3 Who is involved?

5.4 Policy in phases

5.1 How to make it happen

Strategizing with guiding themes and X curves



Four guiding themes

Four guiding themes were extracted from our fieldwork and spatial analysis of the harbor neighborhoods: energy, housing, connectivity and amenities. Our archipelago vision illustrated how these themes work in synergy to improve the spatial and socio-economic conditions of our transition community. In the strategy part, the themes are observed more closely in order to investigate how policies and stakeholders relevant to each theme will interact with each other to make the vision feasible. Then we form a strategy in which synergies and conflicts between the themes take place to power key projects. Finally, the four themes construct a combined timeline that is translated into a spatial strategy.

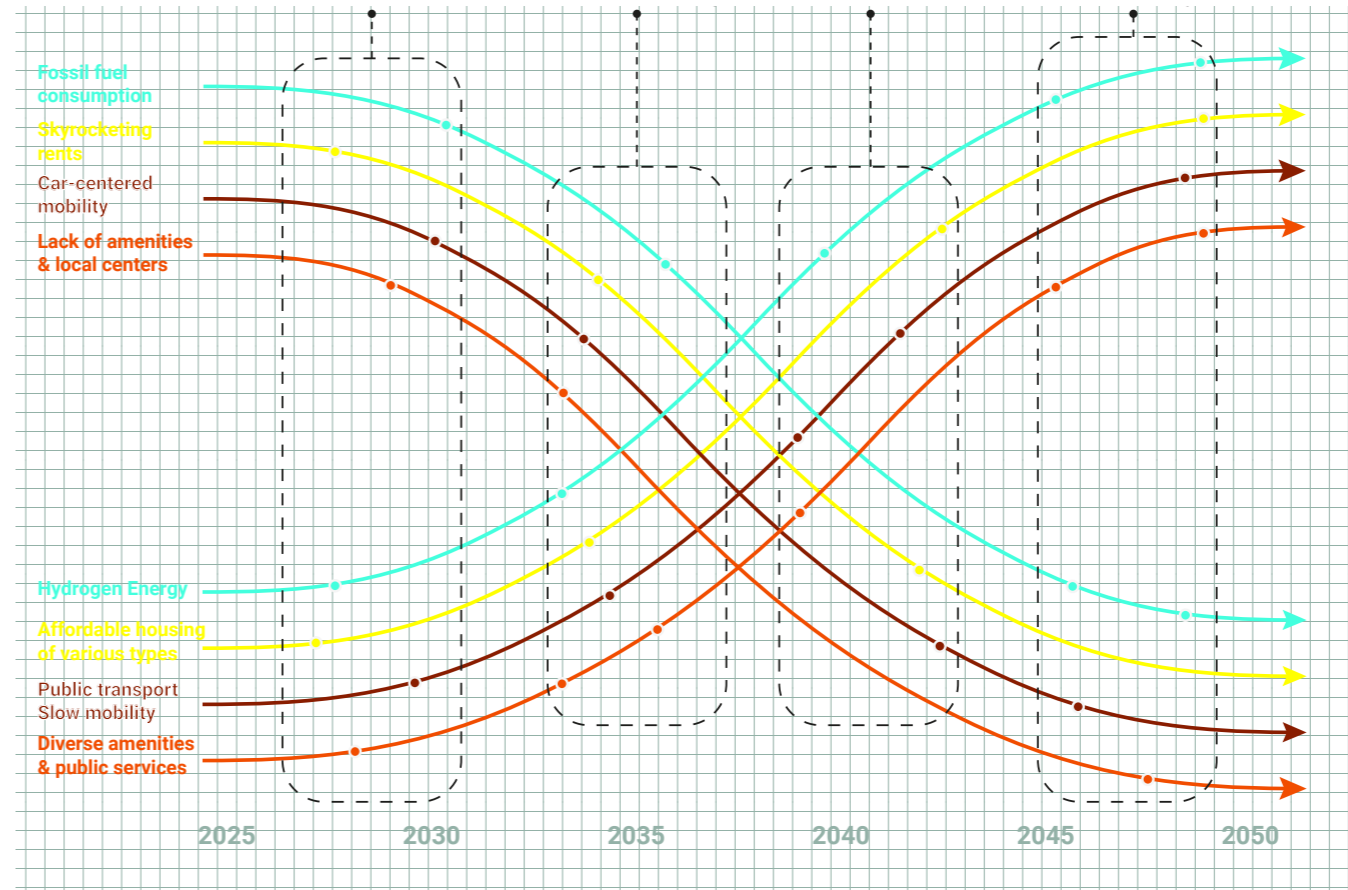


- Step by step dismantling of fossil fuel facilities
- Gradual transition to blue hydrogen powered by offshore wind energy
- Construction of hydrogen plants and terminals in Maasvlakte
- Moving shipping yards to empty plots that housed refineries
- Mass storage of hydrogen in empty gasfields offshore

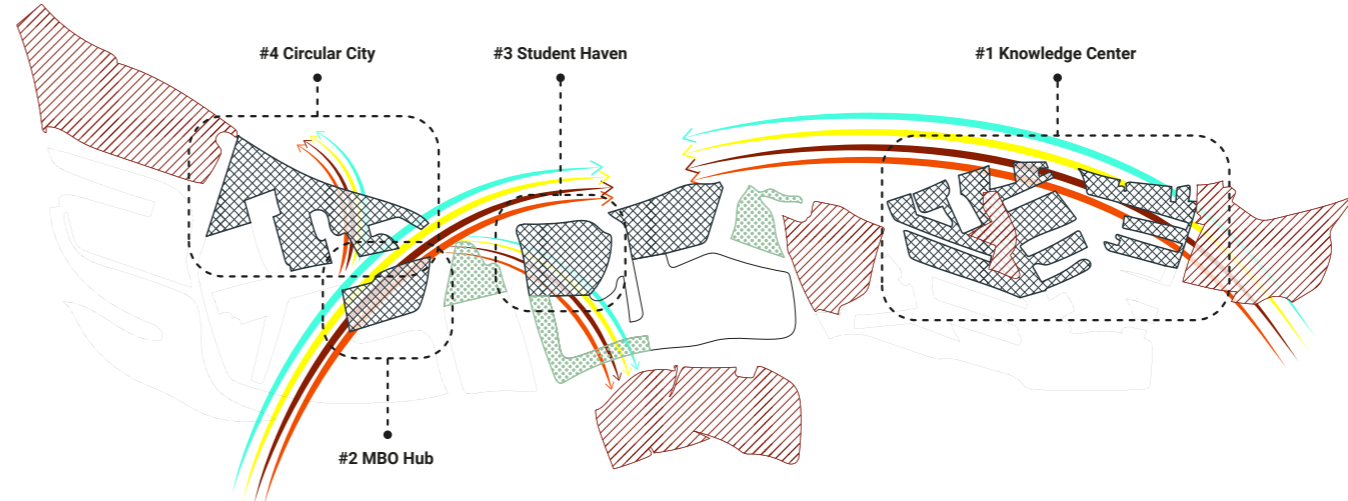
- Rent control to prevent displacement of original residents
- Diverse housing types: from single studio apartments to family housing
- Encouraging initiatives for alternative forms of affordable housing
- Increased social housing percentage for new developments in archipelago
- Subsidized renovation of old housings to reduce energy consumption

- Improved public transportation to archipelago and port
- Less car & ship traffic by converting to railway logistics
- Construction of green networks exclusive for slow mobility
- Passenger waterway connections to boost modality choice
- Renewable fuels supply chains to stimulate electrified vehicles

- Educational facilities related to renewable energy
- Job opportunities in the service sector of local centers
- Diverse spectrum of industries: from knowledge to urban farming
- Preserving and building identity through inclusive participation
- Improved air quality and noise pollution by using renewable energy



X curve timeline of Port Archipelago strategy

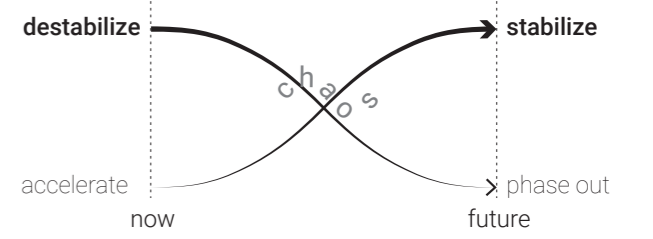


Map of archipelago with key projects

5.1 How to make it happen

Strategizing with guiding themes and X curves

The X curve is a convenient tool to understand how transitions take place. Therefore, it is also a useful method to plan and steer how transitions will pan out. The horizontal axis represents the flow of time, while the vertical axis represents the formation and termination of certain elements. On the left, the X curve begins with the destabilization of elements that will be phased out and acceleration of elements that will become the new paradigm. As the two elements cross a period of chaos emerges, the tension between the emerging and disappearing elements is heightened. The X curve finishes with a new paradigm successfully replacing the old.



Explanation of X curve

For building a strategy for our Port Archipelago vision, we are breaking down the X curves with the four themes. Four key projects are placed on the X curve, and actions necessary to make them possible are placed on the curves. The energy curve is the datum line, where grey hydrogen is converted into blue and then to green. The timeline for the energy curve is more or less a fixed one, because it is dependent on technological developments. Actions on the other three curves can be modified more flexibly to better support the key projects. Spatially, the initial two projects give momentum to the whole strategy from both east and west, facilitating and accelerating the process of development.

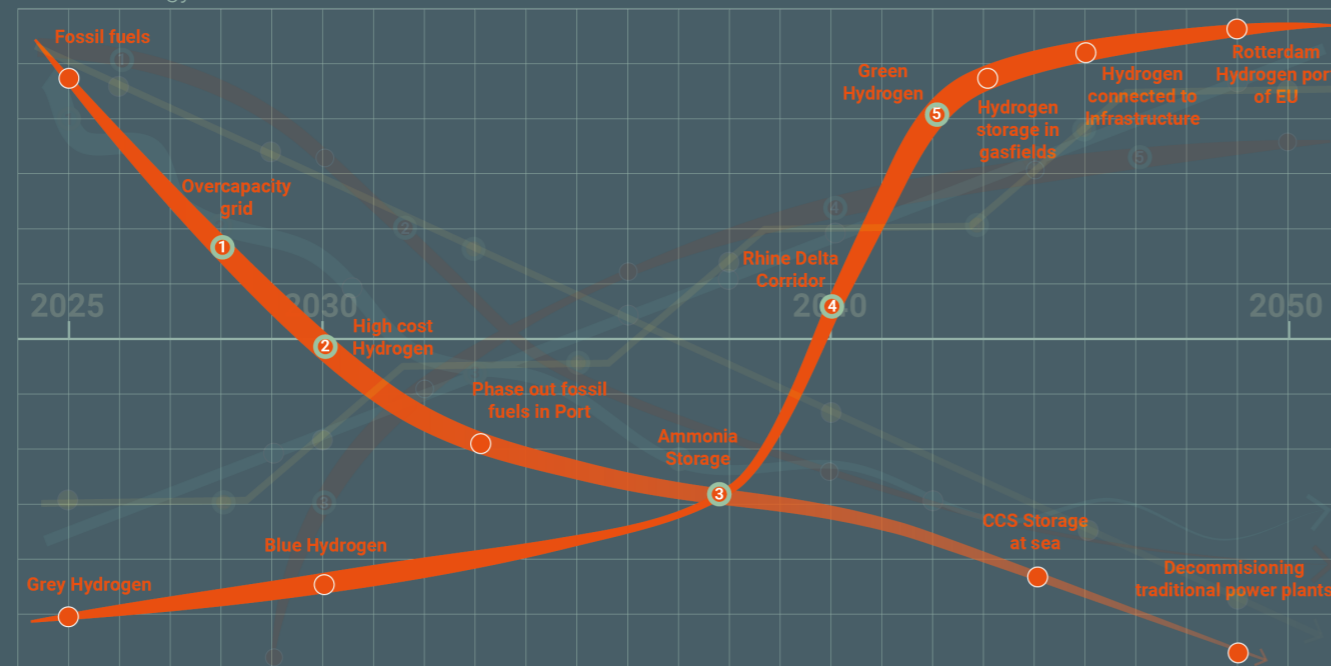
5.2 Guiding Themes Close Up

Energy

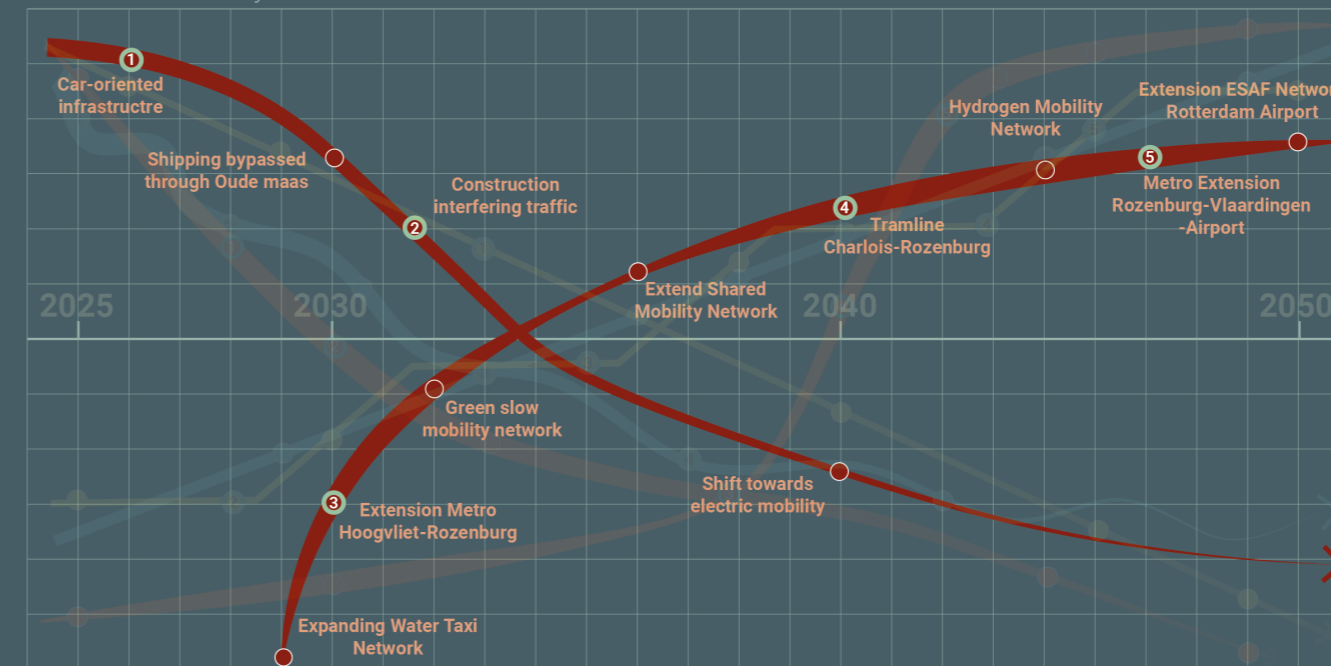
The developments of Hydrogen as a fuel source is likely to take some time, because it is in the early stages of developments which require large investments in constructing the infrastructure for the supply chain. Therefore it is necessary to break down the transition into three stages. At the moment, grey hydrogen is used. The first shift that is required is to lay the infrastructure for blue hydrogen by creating Carbon Capture Systems (CCS) in the North Sea to store CO2 emissions in vacant gas fields. Once production plants and pipeline infrastructure for transporting Hydrogen to the hinterland is constructed, the shift towards Green Hydrogen can be made. Expected is that due to economies of scale and technological innovation, hydrogen will become a more economical fuel source for industrial activities, resulting in companies making the switch towards this new alternative source.

Currently, the port is relying heavily on fossil fuels for its activities (shipping, producing, refining) because its very cheap due to the existing infrastructure. Furthermore, the exceedance of the current electricity grid makes it difficult to electrify, thus making Hydrogen an unattractive fuel source because of the high Green Premium that companies have to pay.

X Curve Energy



X Curve Connectivity



5.2 Guiding Themes Close Up

Connectivity

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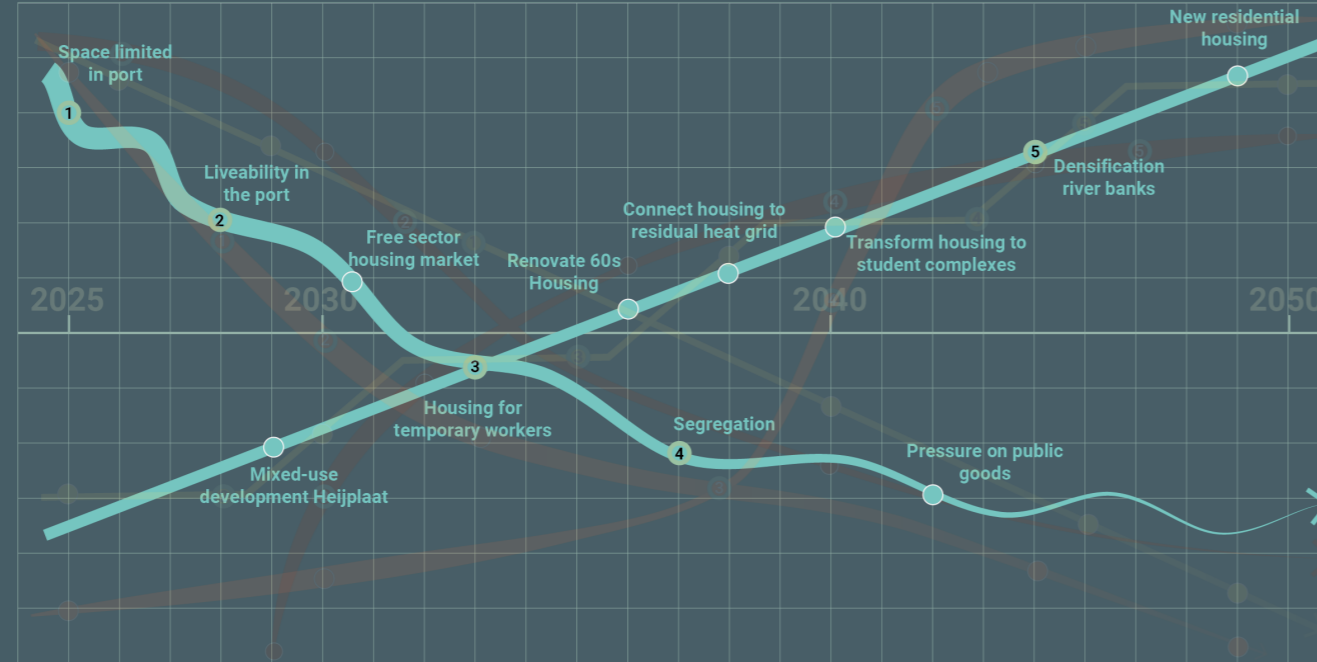
5.2 Guiding Themes Close Up

Housing

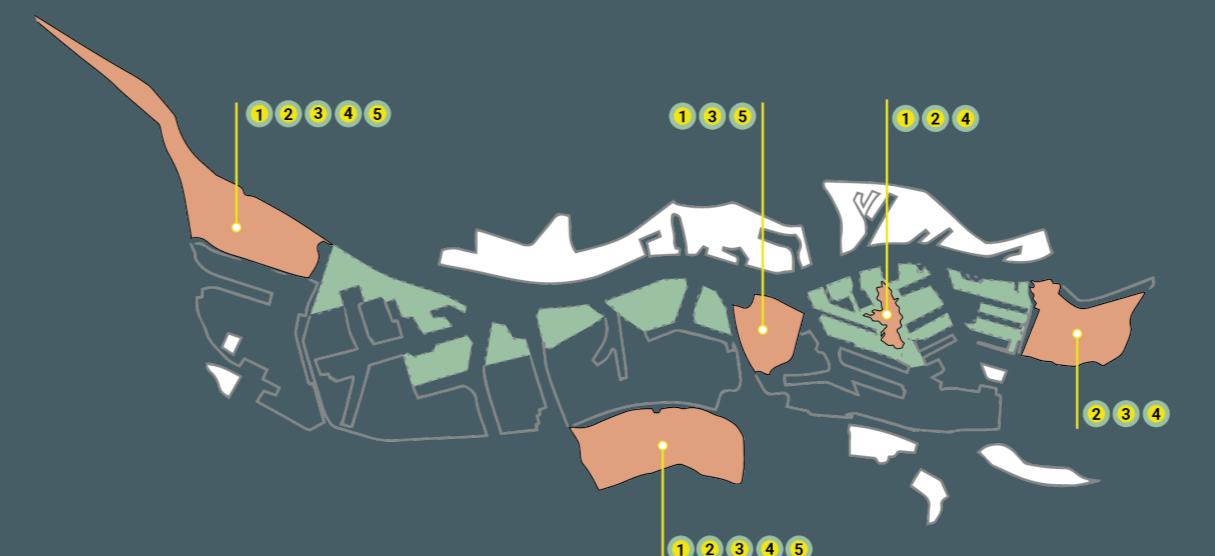
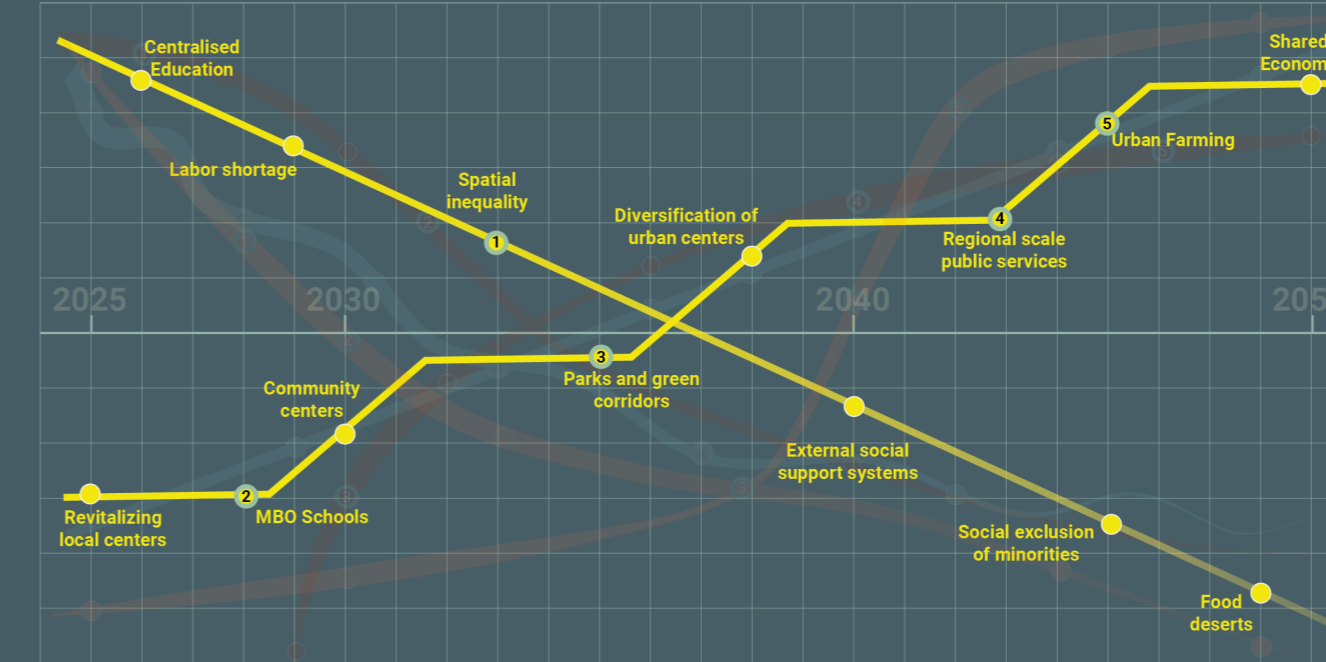
The port of Rotterdam aspires to create 50.000 houses in port area by 2040. To achieve this total, the line follows a linear pattern that suggest each year a number of housing projects is constructed and developed to accomodate housing in preparation of the inflow of new workers affiliated with the energy transition.. The development of housing will start at Heijplaat, where numerous projects are at the moment being developed. This trend will continue towards the West where plots will become available as Green hydrogen will be stored in existing gas fields.

The downward curve follows a curved pattern, to show that the new housing development triggers an adjustment period and a slight gentrification of the port area. Later once the new communities are formed, the number of social issues in the neighborhoods will be mitigated.

X Curve Housing



X Curve Amenities



5.2 Guiding Themes Close Up

Connectivity

The S-curve of amenities follows the developments of housing projects in the archipelago gradually. As the energy transition happens in different stages, it is likely that the demographic changes happen with these developments, thus that the needs for public goods and amenities are also likely to change simultaneously. At first, the goal is to revitalise the existing neighborhoods through maintaining the identity while rejuvenating local centers. Then it is necessary to create an educational environment that aligns with the needs of the existing neighborhoods for job security and remain connected to the port. The MBO hub offers a wide range of new prospects that fits the future job market. Later on community centers will empower the existing neighborhoods to start neighborhood initiatives. Once the hydrogen transition is in full swing, the need for diversification becomes higher due to new communities that will emerge, thus create a higher demand for high scale public services and amenities that align with the circular port.

One of the main challenges is to create these social magnets as amenities are heavily centralized in the city center of Rotterdam and Zuidplein. With the emergence of the MBO Hub and maintaining the distinctive identity of these existing neighborhoods, the archipelago becomes a social cohesive entity, thus requiring less amenities that focus on social security.

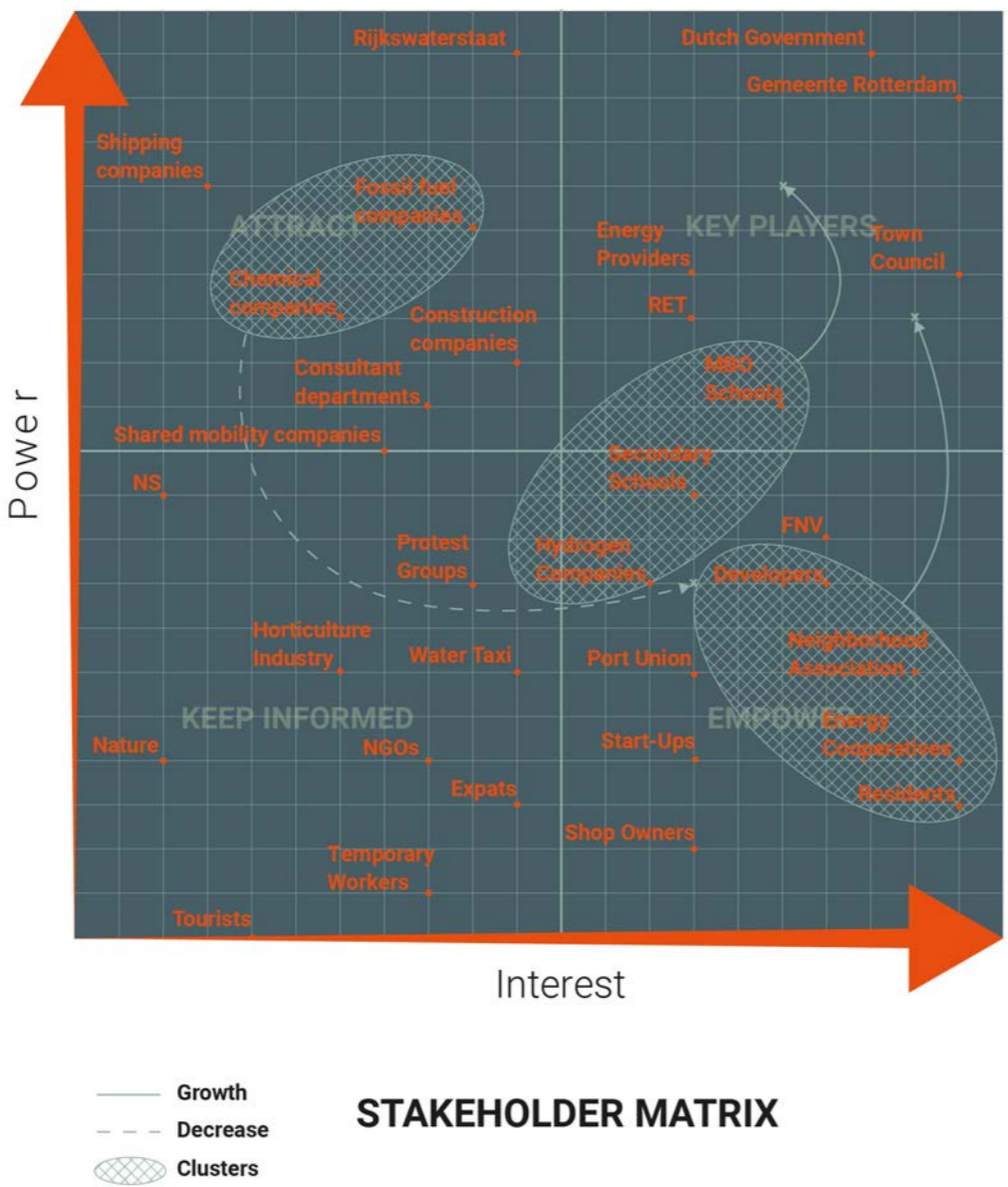
5.3 Who is Involved?

Categorizing the stakeholders in the power matrix, the transition communities and the actors that facilitate the realization of the port as the Hydrogen Hub in Europe are currently lacking power to make the transition possible in the short term. The goal is to empower these two groups, hence make them key players to make the transition happen.

Through the idea of the port archipelago, our transition community enjoys from favourable policies to participate in the shaping of the island of the archipelago. Handing the transition community the necessary amenities to create a thriving network, the existing neighborhoods are less prone by gentrification.

The second group involves the educational institutions and the hydrogen companies. Through the archipelago, a climate is developed to fill jobs for the energy transition and make way for hydrogen companies to have a prominent place in the port while having access to a job market full of skilled labour, both MBO-level as well as high level jobs that can be fulfilled by expats.

The existing chemical and fossil fuel companies are required to change their position. The archipelago emphasizes a healthy and innovative urban environment. Through energy and social policies, these companies are required to change their current practices towards more sustainability, thus making it more interesting for these companies to make the switch towards renewable energy sources.

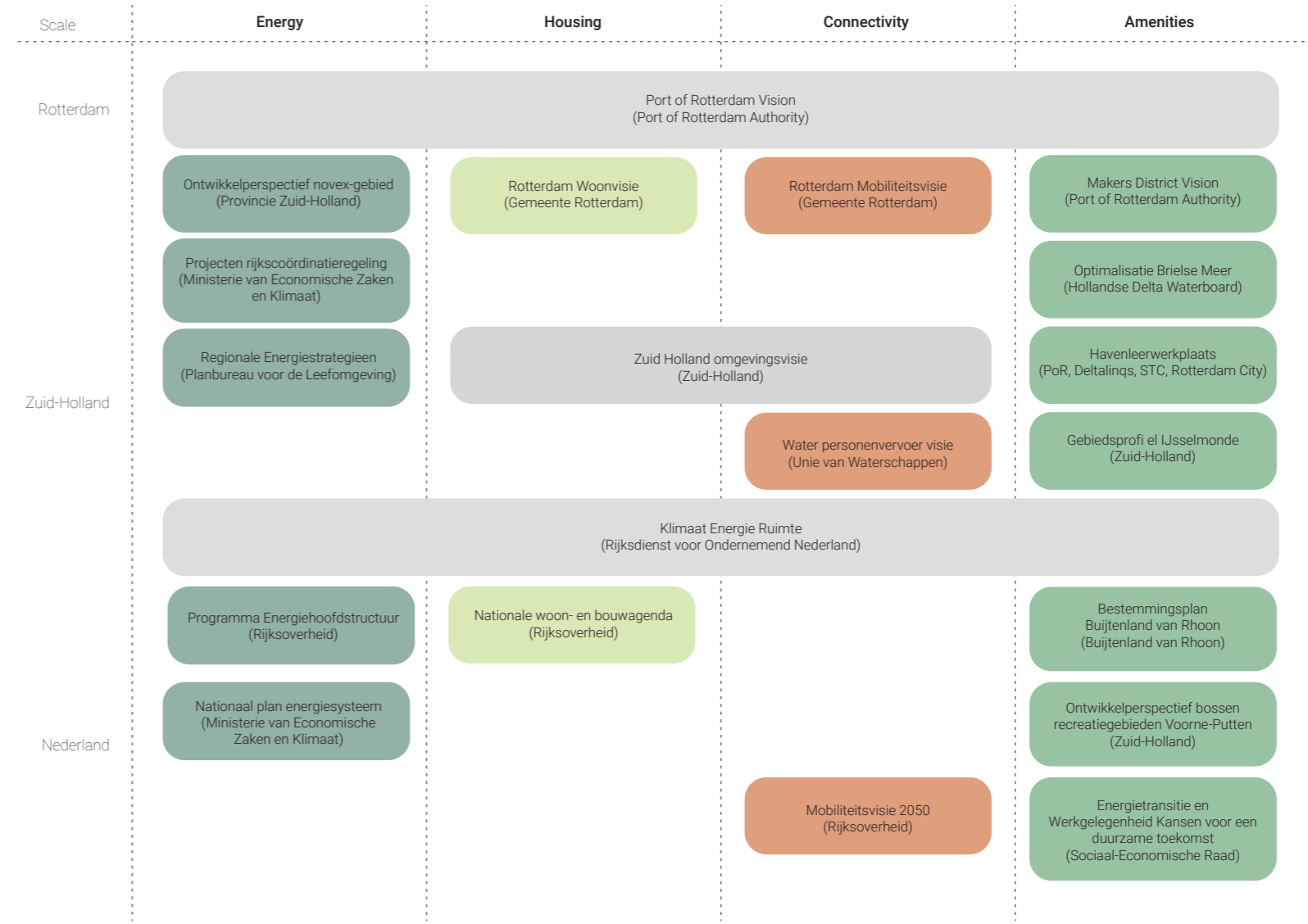


Stakeholder matrix

5.4 Policy in phases

existing policy documents

In order to properly allocate actions and policies necessary to power the key projects, a review of existing policies per themes must come first. Each policy document illustrates the visions projected by the actors. The visions have different spatial dimensions, ranging from the Port of Rotterdam to the whole of the Netherlands. Points of action and specific policies are extracted from these documents in the next chapter to configure timelines for each theme.



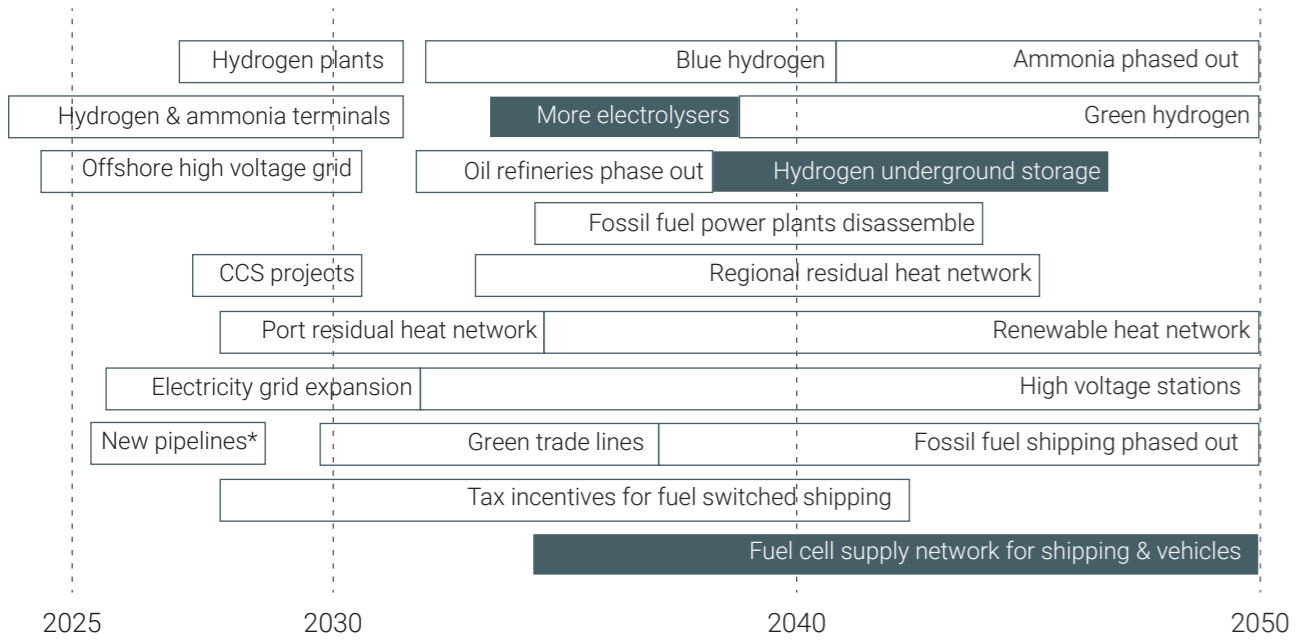
Investigated existing policies

5.4 Policy in phases

Energy: timeline and large-scale implications

Policies for energy are quite elaborately envisioned by multiple actors: from the Port of Rotterdam Authorities to national governments. Several policies have been added to boost the production of green hydrogen and provide harbor neighborhoods with the conveniences of the renewable energy supply chain before anyone else.

Energy policies in the Port of Rotterdam have the potential to impact nearby countries in North-west Europe, namely Germany, Belgium, and Sweden. Since majority of imported hydrogen will be shipped from South America and parts of Africa, Port of Rotterdam also has the power to affect far-off regions that seem irrelevant as well.



Timeline of energy policies in Port Archipelago

Large-scale implications of energy policies

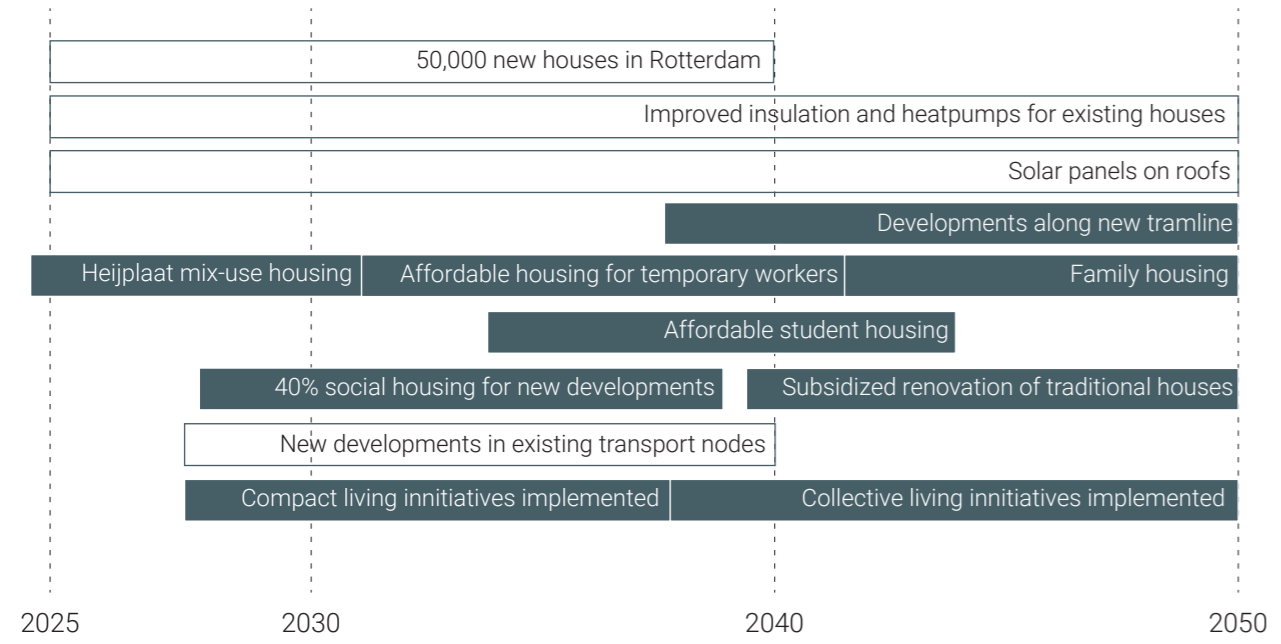


5.4 Policy in phases

Housing: timeline and large-scale implications

Housing policies are not clearly defined compared to energy. Numbers and locations have been announced, but history has proven these numbers fluctuate as planning proceeds, along with the specific locations. Renovation of houses built in the 20th century is crucial in meeting the carbon zero goals of 2050. Such measure cannot be carried out without sufficient subsidies that are also related to solar panels and heat pumps. Percentage of social housing must be increased in new developments to control rising housing prices, as well as protection measures for existing housing and rents in the archipelago area.

Housing in the archipelago will have an impact on housing as far as Den Hague, not only in terms of housing prices but also in terms of space-making. New initiatives carried out in the archipelago will encourage other nearby cities to follow the same model to build more affordable and sustainable homes. The archipelago scheme itself is in conflict with the regional plan to build along the main infrastructures of Randstad: opting to densify inside the city instead of sprawling out.



Timeline of housing policies in Port Archipelago

Large-scale implications of housing policies

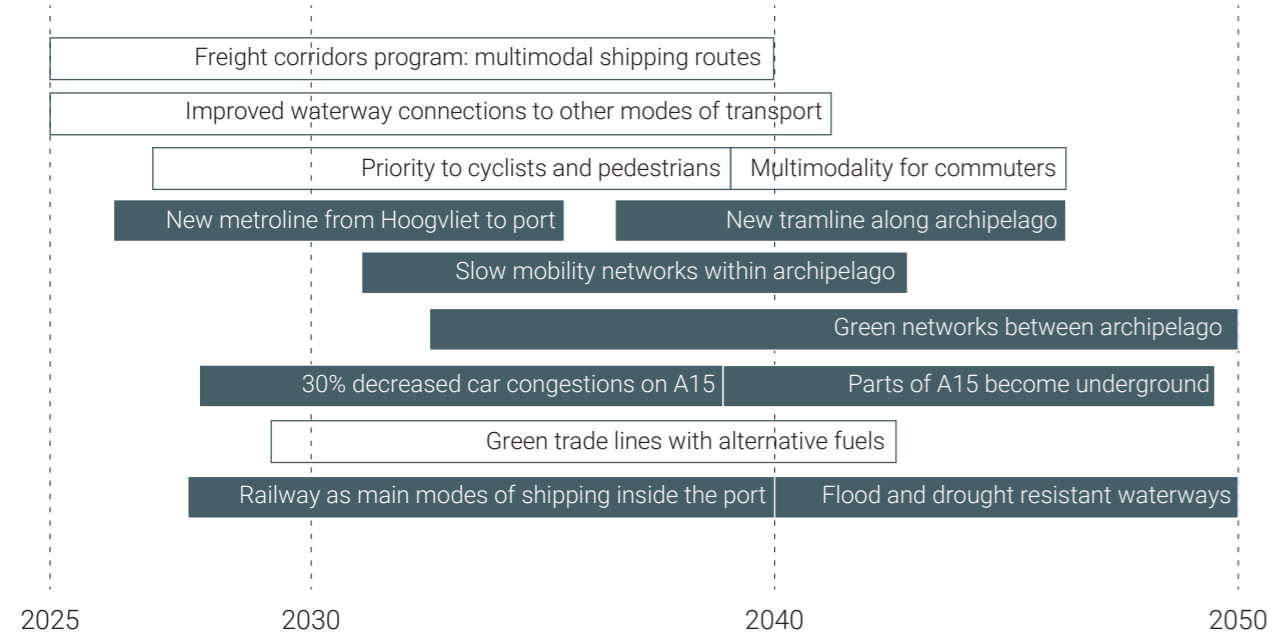


5.4 Policy in phases

Connectivity: timeline and large-scale implications

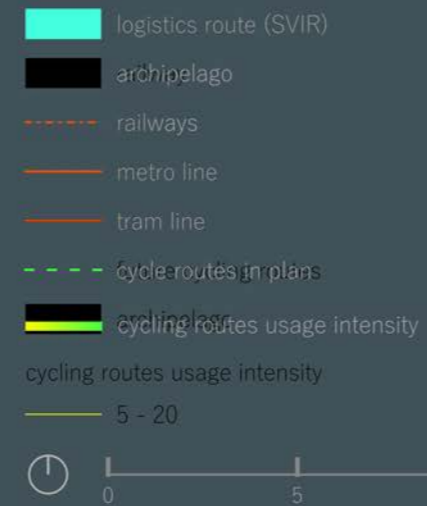
In order to install new tram connections running north of the archipelago, the inland shipping routes using Oude Maas will have to be strictly controlled, for example following a fixed timetable for when the bridge will be opened. Port industries east of Oude Maas will no longer be able to receive or send shipping by shipping: existing freight railways will have to be more intensively used. Such actions are in line with the vision of PoR Authorities, which aims to increase logistics by railways and pipelines to reduce truck traffic and cope with floods and droughts.

Policies on shipping modes and routes have the potential to impact spatial configurations on a national, or even international scale. More freight by train also leads to bolder railway infrastructure in the hinterlands. On the other hand, the slow mobility network in the port is sure to have a regional impact. Zuid-Holland is already planning to better connect suburbs and activate hinterland areas via new cycling infrastructures. Development of archipelago's slow mobility connections is likely to extend the plan westwards towards the sea.



Timeline of connectivity policies in Port Archipelago

Large-scale implications of connectivity policies

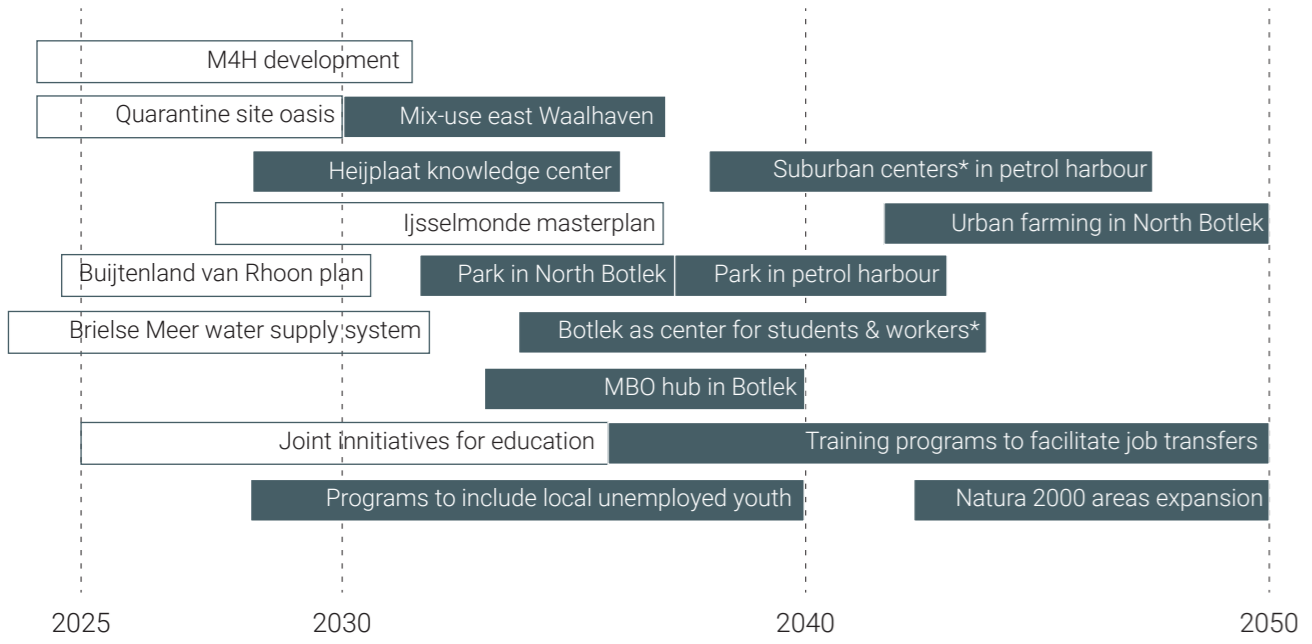


5.4 Policy in phases

Amenities: timeline and large-scale implications

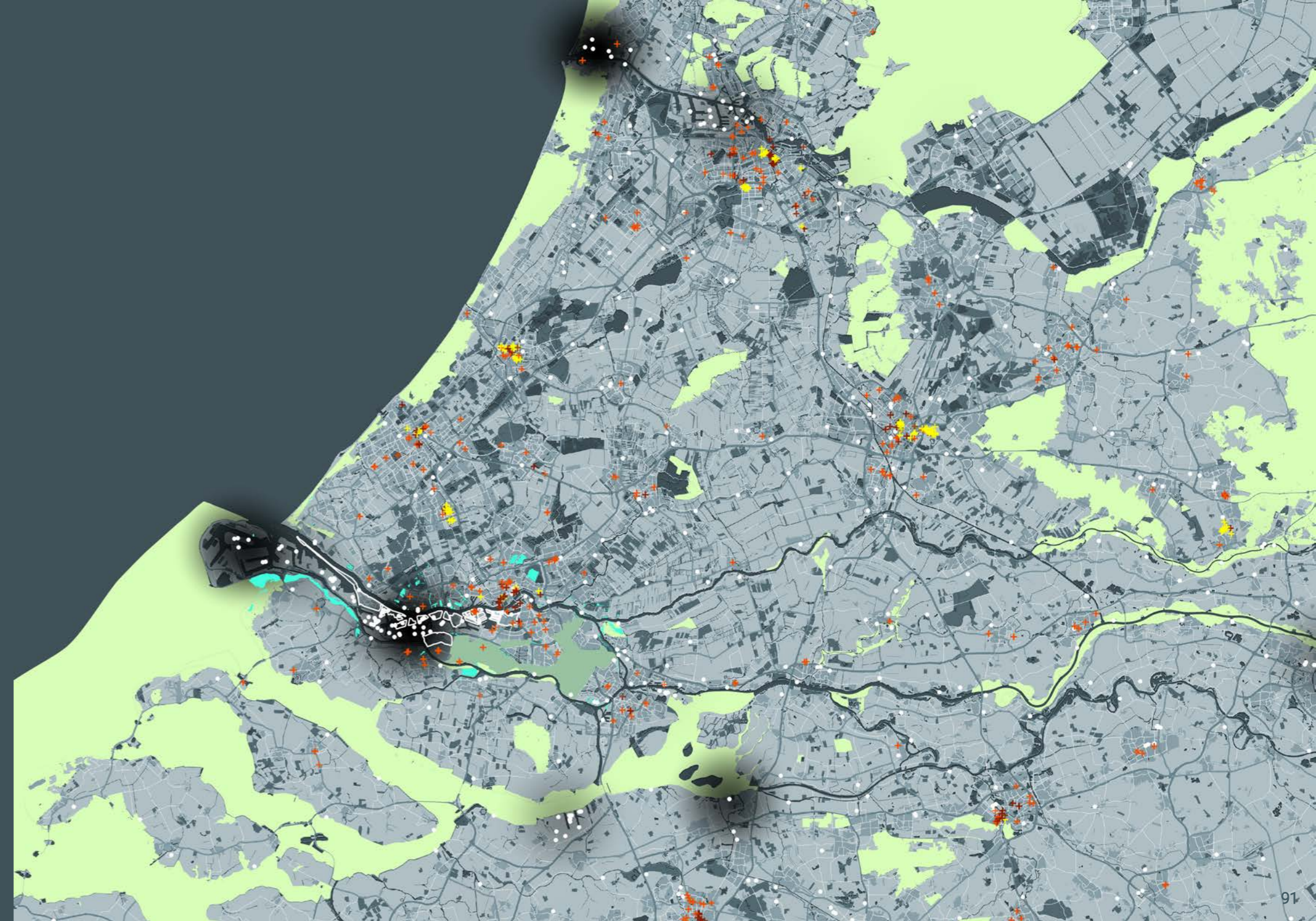
In the eyes of PoR Authorities, Heijplaat's development is already finished, except for the development of Quarantine site- a beach in the port. However, port archipelago vision aims to expand on current developments, which is mainly focused on manufacturing start-ups and relevant MBO schools, into a mix-use knowledge center that is well connected to Old Charlois. Existing joint initiatives held between port, municipality and educational institutions to heighten MBO education on renewable energy will be implemented in Botlek in the form of a campus. Plans for recreational areas around the port will be complemented by the green network of the archipelago.

Strategy to transform fossil fuel-centered industrial areas into education hubs specializing in renewable energy can be applied all around the Netherlands. Collaboration between universities and MBO schools can cover the whole country as well. Green spaces that provide shelter from heatwaves and stresses of the city will become more accessible thanks to the port archipelago, which also increases the possibility of non-human species to inhabit the port.



Timeline of amenities policies in Port Archipelago

Large-scale implications of amenities policies



VI. Strategy in Application

6.1 The Pieces of the Puzzle

6.2 Community in Action

6.3 The Adaptive Community

6.4 Chain Reaction

6.5 The New Port

6.1 The Pieces of the Puzzle

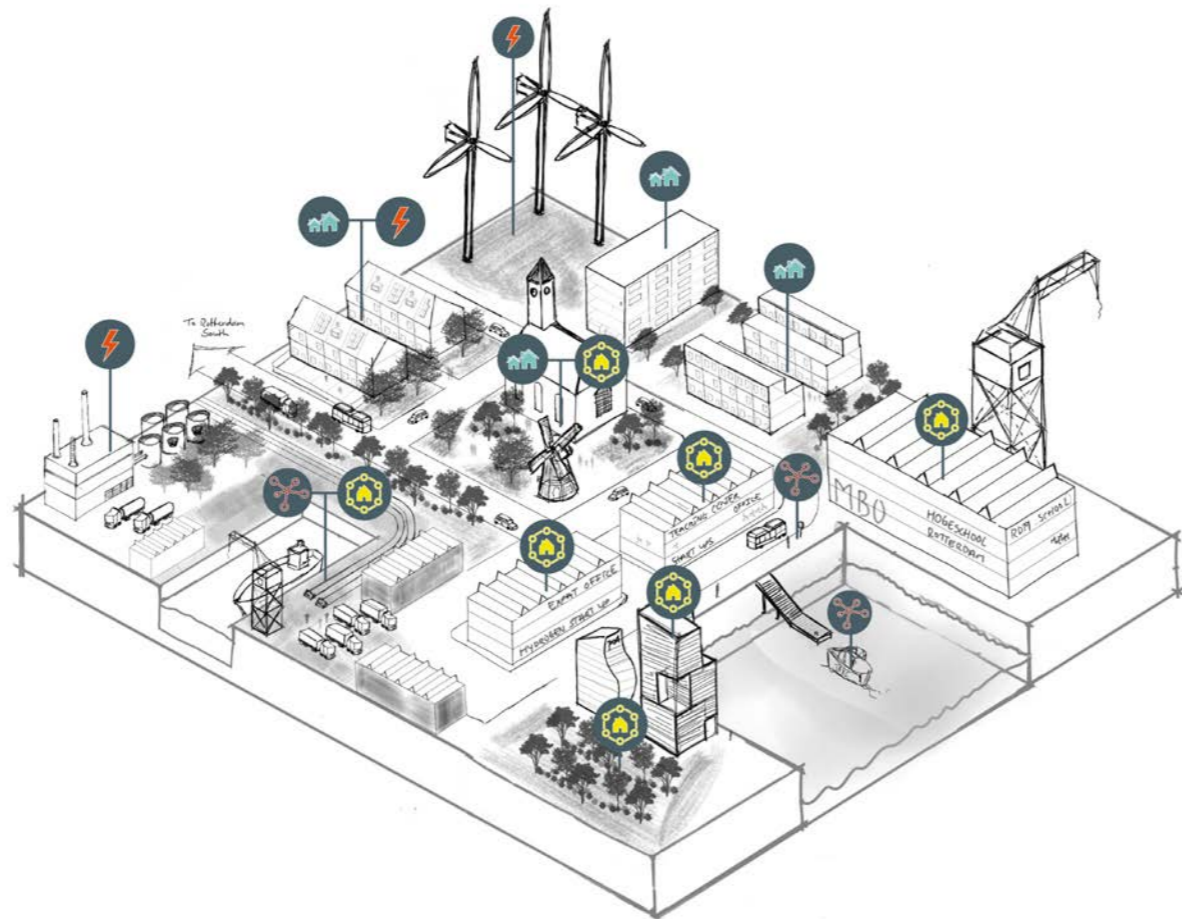
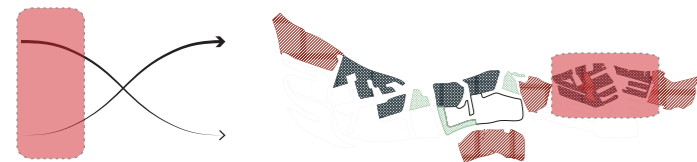
Development Dock

The development dock anticipates on the ongoing developments in the East side of the Archipelago, where educational institutions are manifested and where the municipality of Rotterdam has the ambition to create a knowledge and innovation center along with new housing developments. The development dock is an extension and creates a favourable business climate for new start ups to emerge.

The core identity and urban philosophy of these neighborhoods are retained and revitalized through policies to support local businesses, to enhance the feeling of community in these neighborhoods. This fosters the forming of an extensive community network more keen on the energy transition and become more empowered against gentrification.

The infrastructure is focused on local public transport that could be implemented in the short term, in order to better connect the area with other urban centers in Rotterdam, thus making the area less isolated.

The development dock will be a place where large corporations, looking to invest in the energy transition, and small start-ups, that are developing new hydrogen technologies, are going to meet. This will grant the start-ups the connections to implement their ideas and help further the energy transition.



Energy

1. Wind Energy
2. Residual Heat
3. Energy Cooperatives



Connectivity

1. Water Taxi Connection
2. Local Bus Connection
3. Shipping Terminal



Housing

1. New studios
2. Energy Cooperatives
3. Historical centers
4. Modern row houses



Amenities

1. Start Ups
2. Educational Institutions
3. Business district
4. Historical centers
5. Creative industries
6. Parks

Key project Development Dock

Stakeholders

Private

- A1 Developers
- A2 Hydrogen companies
- A3 Construction companies
- A4 Fossil fuel companies
- A5 Start ups

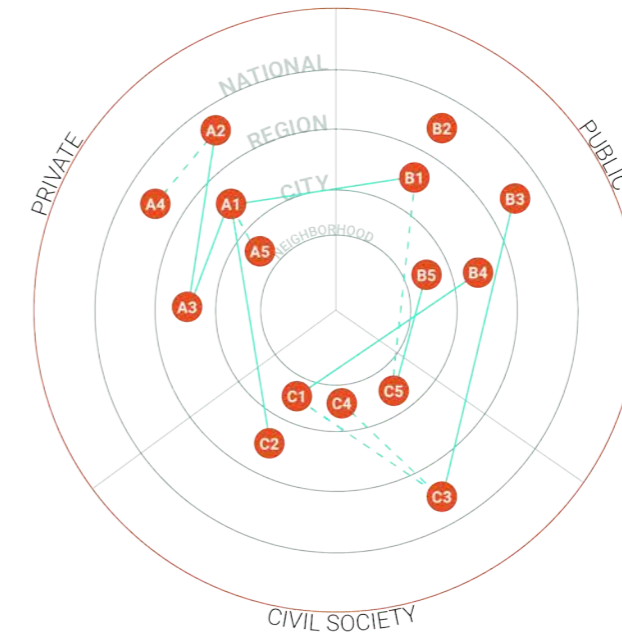
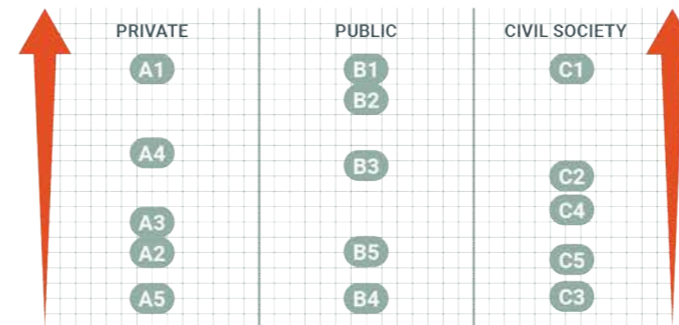
Public

- B1 Gemeente Rotterdam
- B2 Port of Rotterdam
- B3 RET
- B4 Water taxi
- B5 Town councils

Civil society

- C1 Housing collectives
- C2 Entrepreneurs alliances
- C3 Tourist guide association
- C4 Cultural heritage guardians
- C5 Residents of Heijplaat

Influence stakeholders



CONFLICTS AND RELATIONS

— Synergy
- - - Conflicts

Stakeholder synergies

- A1 B1 Collaboration on planning, permits, and sustainable urban development
- A2 A5 Create new innovations in hydrogen technology
- B5 C5 Alignment on local livability, public space quality, and participation
- A1 A3 Developers and construction companies cooperate on project execution
- A2 B1 Coordination on energy infrastructure and sustainable policy integration
- A3 C2 Collaboration between start ups
- B3 B5 New mobility infrastructure within the port area
- B4 C1 More commuting options for new residents

Stakeholder conflicts

- B1 C5 Tensions over densification, gentrification, and transparency in planning
- C3 C4 Concerns over housing pressure and cultural integration
- C3 C1 Perceived overcrowding and disruption of local life
- A5 A1 Land use and development priorities may conflict
- A2 A4 Competition interest in energy transition and infrastructure

Relevant policies

Existing policies

- Connecting education and port industries (A1 B1 A1)
- Training resources to facilitate transfer of jobs (A5)
- Knowledge industries around the port (B1)
- Young people without a starting qualification are prepared for practical work (A2 A5)
- Create a facility that will enable targeted investments in the development of job seekers (A1)
- New hydrogen plants (A2)
- 3500-4000 houses per year (A3 B1)
- Connect water transport to other modes of transport and to regional development (B4 B3)
- Connect water transport to regional development and economical activity (B4 B3)
- Vibrant mixed use (B1 A1)
- 35 TWh renewable electricity in 2030 (A2)
- 2/3 affordable housing, 1/3 social (B1 A1)
- Multi functioning nodes (B1 B3)

New policies

- Heijplaat knowledge center (A5 C2)
- New metroline (B3)
- Heijplaat mixed use housing (B1 A1)
- 40% social housing (B1)

— Synergy
- - - Conflicts

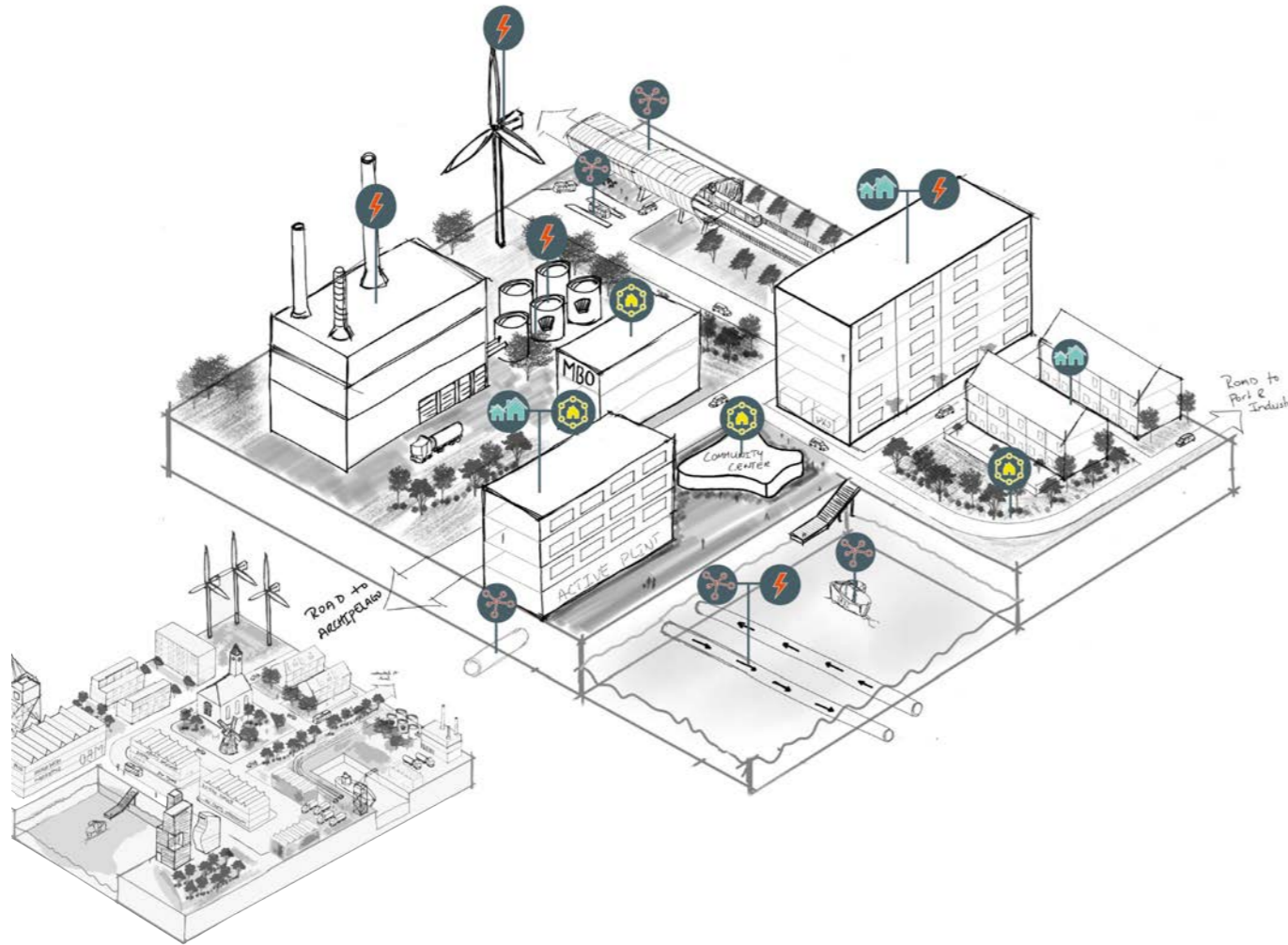
6.1 The Pieces of the Puzzle

Botlek Academy

The second key projects emphasizes educational opportunities for current and new residents. Housing is more focused on the temporary workers who will be active laying the foundation of the green hydrogen network as new blue hydrogen plants are constructed. Furthermore the jobs affiliated to construction of new infrastructure and new industries and jobs that will emerge from the hydrogen transition are accomodated. Complementary to these housing developments, public amenities in the form of small shops and community centers are established to accomodate the needs of new workers and to create a liveable urban environment.

The metro network gets a new extension from Hoogvliet to connect the South of Rotterdam with the Archipelago, and can be achieved in a short period. Furthermore, regional bus stations are linked with the metro network to create better connectivity with the rural villages.

Stakeholders in this phase will focus more on affordable housing, culture and job opportunities, working together to create new housing and amenities. Port unions become more involved with reschooling its workers, along with reskilling agencies, linking the old port to the new energy transition. Policies elaborate on mobility, focusing on slower mobility to allow for more development along these new mobility nodes.



Key project Botlek Academy

Energy

1. Blue hydrogen plant
2. Ammonia storage
3. Carbon Capture Network
4. Wind energy
5. Energy cooperatives

Connectivity

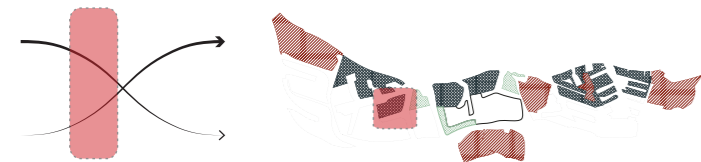
1. Metro extension from Hoogvliet
2. Regional bus terminal
3. Warmtenet
4. Water taxi connection

Housing

1. Social housing
2. Temporary housing
3. Renovated row houses

Amenities

1. Community centers
2. MBO schools
3. Active plints
4. Green riverbanks



Stakeholders

Private

- A1 Developers
- A2 Hydrogen companies
- A3 Construction companies
- A4 Fossil fuel companies

Public

- B1 Gemeente Rotterdam
- B2 Port of Rotterdam
- B3 RET
- B4 MBO schools
- B5 Neighbourhood associations

Civil society

- C1 Housing collectives
- C2 Energy cooperatives
- C3 Port unions
- C4 Reskilling agency
- C5 Community hubs collective



CONFLICTS AND RELATIONS

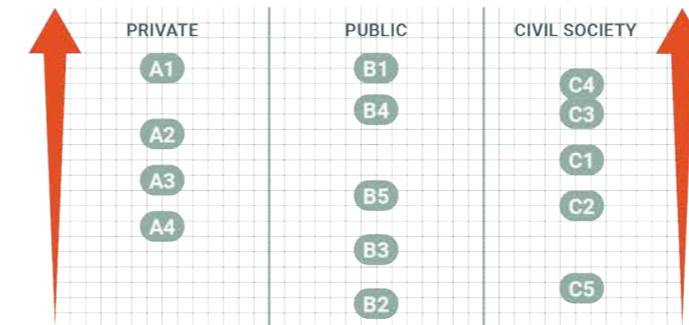
Synergy
Conflicts

Stakeholder synergies

- A2 B4 Collaboration on education for future energy workforce.
- A1 B1 Joint urban development and planning
- A3 A1 Execution of developer-led projects.
- B1 B3 Coordination on public mobility infrastructure.
- C3 B4 Support for reskilling programs for workers.
- C4 C3 Ensuring job security for port workers within the energy transition
- C2 A2 Collaboration on guiding the energy transition

Stakeholder conflicts

- A2 A4 Competition for the future energy market
- C3 A2 Tension over job displacement and industrial transition.



Relevant policies

Existing

- New hydrogen plants (A2, A3)
- Taxation policies to switch fuels in shipping (B1, A4, C2)
- Set up a vision to conform to the energy demand from 2030-2050 (B1, C2, B2)
- Freight Corridors Program to improve multimodal accessibility (B2, B3)
- More options for commuters (B3)
- Training resources to facilitate transfer of jobs (B4, C4)
- Inclusive programs for employment-vulnerable groups (B1, C4, C3)
- Young people without a starting qualification are prepared for practical work (C4, C3)
- Place new development around existing transport nodes (C1, B1)
- Transport & storage of CO2 (B2, A4)
- Make the whole IJsselmonde region a walkable, leisure+agriculture area (B1)
- 35 TWh of renewable electricity production (A2, C2)
- Modality diversity depending on density (B3, B1)
- Large scale electrolyzers (A2, A3)
- Underground hydrogen infrastructure (A2, A3)

New policies

- Affordable student housing (A1, A3, B1)
- Tram line along archipelago (B3)
- Park in Botlek and old petroleum harbours (B1, A4)
- Slow mobility networks within archipelago (B1)
- Green networks between archipelago islands (B1)

Synergy
Conflicts

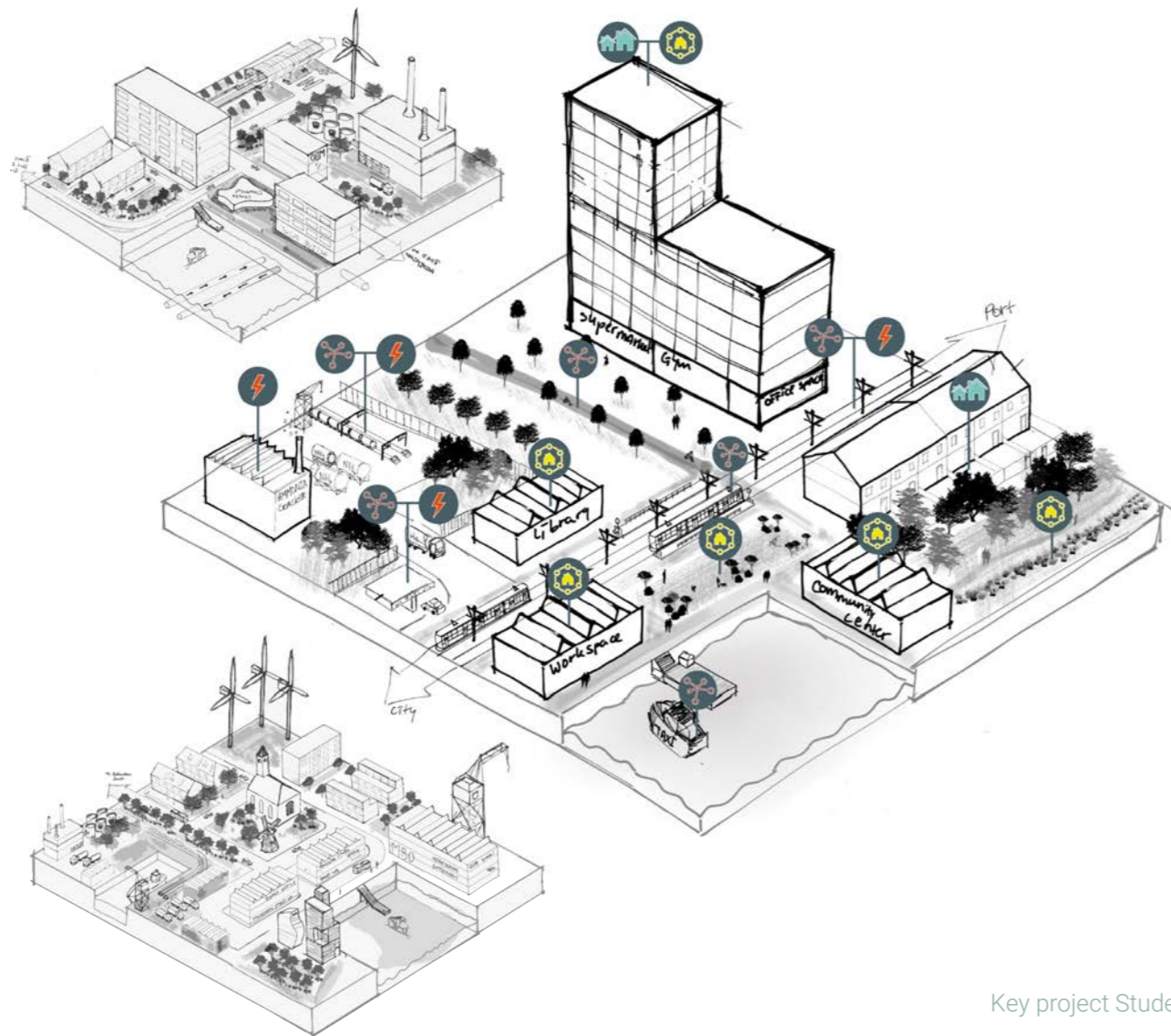
6.1 The Pieces of the Puzzle

Student Haven

The Student Haven aligns with the developments of the new MBO hub and the innovation districts emerging around Heijplaat. As the main energy and infrastructure projects are realised, the temporary workers will depart. Therefore the temporary housing are transformed into student accomodations, in combination with active ground-level commercial facilities. Former warehouses and industrial buildings are transformed into public facilities to support student living and create public spaces where new residents can meet.

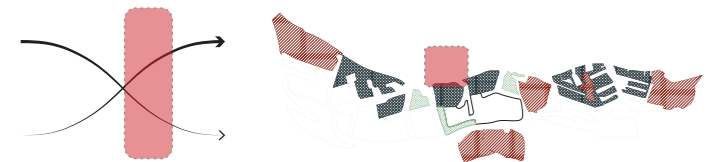
New green hydrogen plants are realised together with fuel stations and industries in the south of the archipelago in the vicinity of the existing infrastructure. The existing rail infrastructure is used for transportation of ammonia to other industries in the hinterland following the Betuwelijn, placed at an appropriate distance to secure safety and create ecological buffers. The new tram line is constructed to connect the islands and therefore the communities of the archipelago with each other.

Environmental safety collectives and the municipality of Rotterdam will ensure a safe environment for inhabitants both human and non-human. Policies will allow the hydrogen transition to seep through into the mobility sector, creating a fuel supply network for local mobility and international shipping. Older and younger generations band together to create collective living facilities, allowing more houses to be available to the right people.



Key project Student Haven

- | | | | |
|--|---|---|---|
| Energy | Connectivity | Housing | Amenities |
| <ol style="list-style-type: none"> Green Hydrogen plants Hydrogen fuel transport Ammonia storage Hydrogen infrastructure | <ol style="list-style-type: none"> Tramline Bicycle highways Water Taxi Hydrogen fuel transport H2 Fuel stations | <ol style="list-style-type: none"> Student housing Row houses | <ol style="list-style-type: none"> Public amenities Workspace Community centers Active plints Public areas Green riverbanks |



Stakeholders

Private

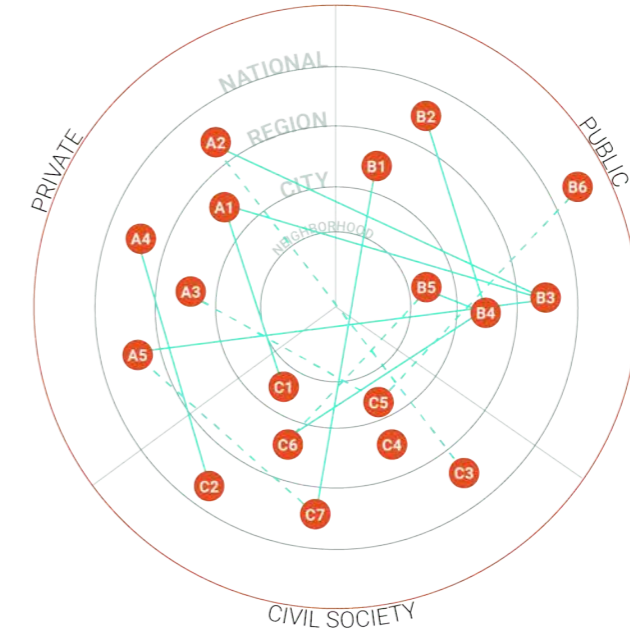
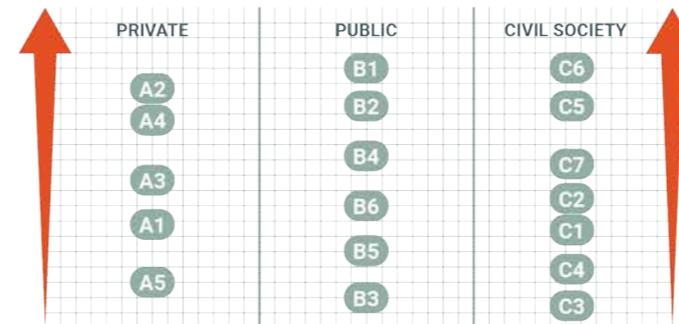
- A1 Developers
- A2 Hydrogen companies
- A3 Construction companies
- A4 Energy providers
- A5 Shared mobility companies

Public

- B1 Gemeente Rotterdam
- B2 Port of Rotterdam
- B3 RET
- B4 MBO schools
- B5 Town councils
- B6 Rijkswaterstaat

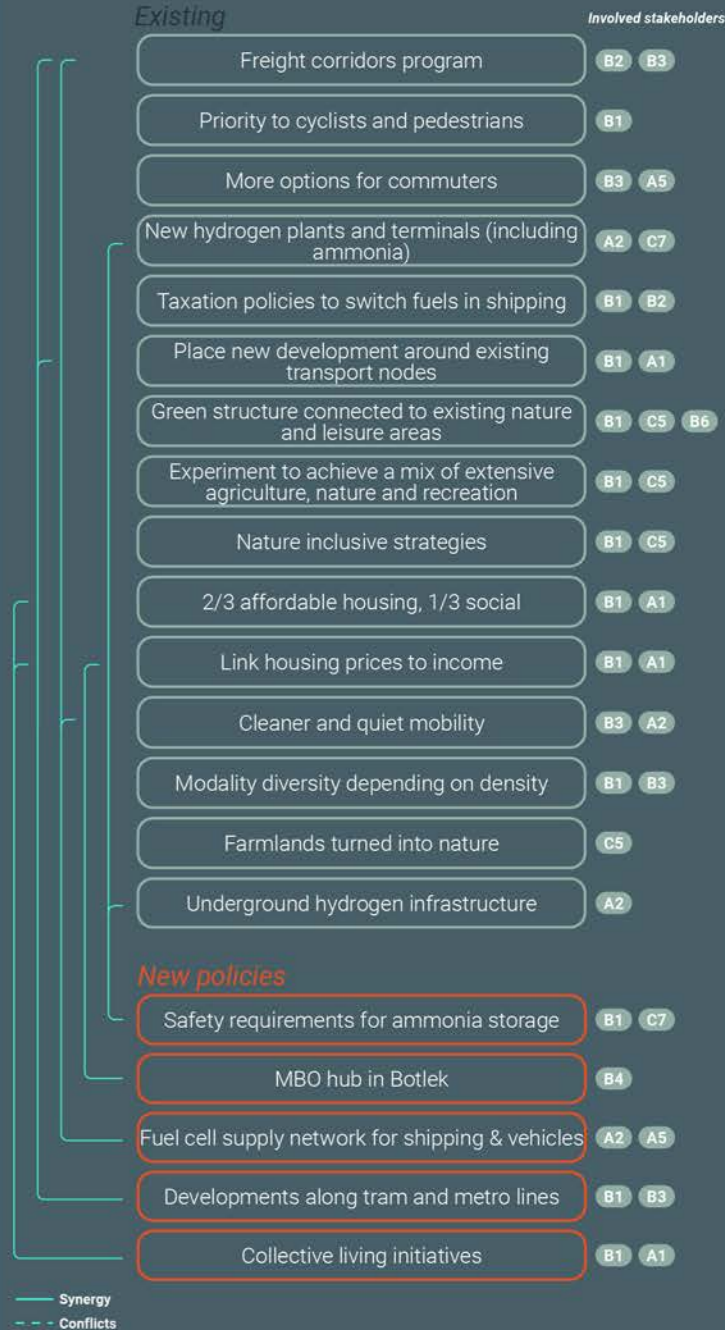
Civil society

- C1 Housing collectives
- C2 Energy cooperatives
- C3 Port unions
- C4 Reskilling agency
- C5 Urban greenkeepers
- C6 Student association
- C7 Environmental safety collective



- CONFLICTS AND RELATIONS**
- Synergy
- - - Conflicts
- Stakeholder synergies**
- A1 B3 New development along tram and metro lines and around existing transport nodes
 - A2 B3 Joint projects on hydrogen powered public transport and sustainable infrastructure
 - B1 A1 Developing new collective housing initiatives for students and the elderly
 - A5 B3 Integration of new mobility solutions with public transport systems
 - C7 B1 Partnerships on sustainability, inclusion, and community engagement
 - B4 B5 Local councils and schools collaborate on education and community integration
 - A4 C2 Collaboration on guiding the energy transition in a direction that benefits both providers and consumers
 - B2 B4 Creating a MBO hub in Botlek aimed towards (re)schooling new port workers
- Stakeholder conflicts**
- B5 C6 Tensions over housing pressure, gentrification, and lack of participation
 - A3 C5 Tension over land use priorities and environmental preservation
 - A2 C3 Conflicts over safe working and living conditions in relation to new ammonia storage
 - C7 A5 Disagreement on environmental practices and the pace of the energy transition
 - C5 B6 Conflicts over environmental protection versus water safety

Relevant policies



6.1 The Pieces of the Puzzle

Circular city

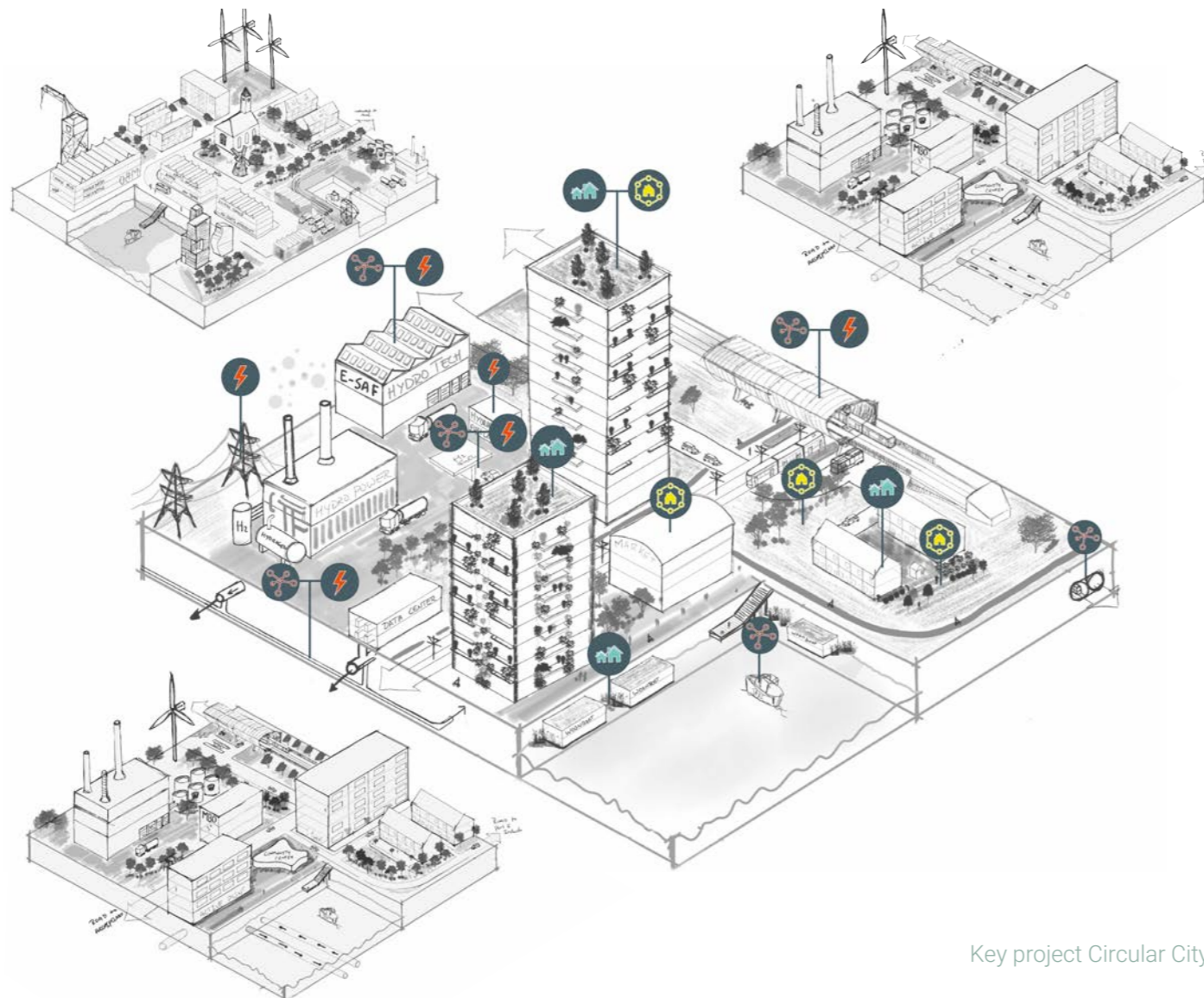
The Circular City is the final stage of the transition of the port into the Archipelago, where the city district becomes the supplier of energy to the rest of the city of Rotterdam, while offer a variety of carbon neutral housing.

The green hydrogen is fully operational and connected to the heath grid of the city, while the infrastructure for supplying hydrogen fuel to multiple industrial areas is realised. Off-shore storage in depeleted gas fields makes way for more green space for urban farming and community gardens, that fosters social cohesion in the neighborhoods.

The public transport infrastructure offers multimodel connection with urban centers and key regional destinations, for example a direct connection with Rotterdam Centraal and Rotterdam-The Hague Airport.

Stakeholders in this phase will focus on food production on a local scale. Multiple scale levels will be collaborating through intensive horticulture, or local food initiatives. Local green infrastructure will be overseen on a local scale, while the hydrogen transition will increase its scale beyond national borders.

Policies will favour hydrogen to be stored in the North Sea. Hydrogen fuel cells will power industry and transport alike, creating a network akin to gas stations in the current day. Housing will shift towards more family oriented, providing a home to new workers in the long run.

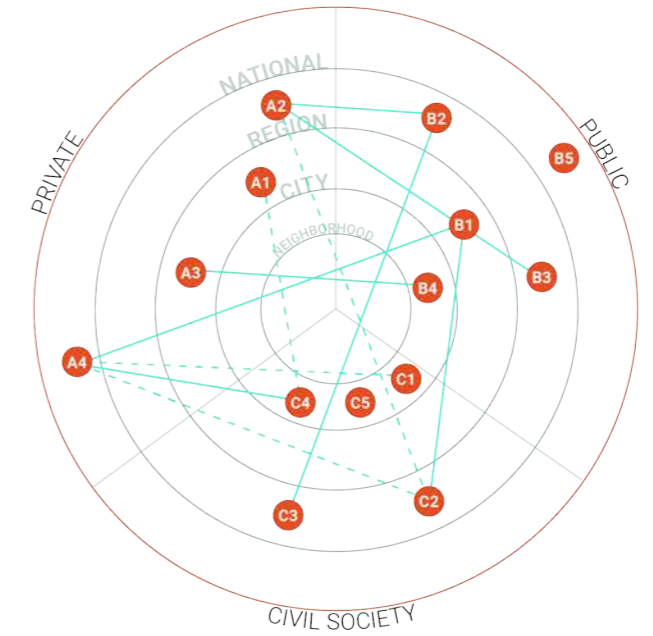


Key project Circular City

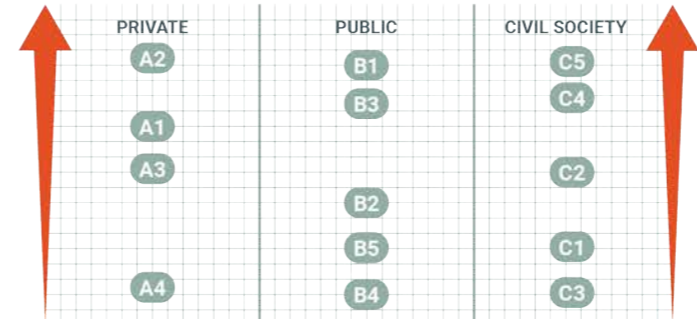
- | | | | |
|--|---|---|--|
| Energy | Connectivity | Housing | Amenities |
| <ol style="list-style-type: none"> 1. Electrification Hydrogen 2. Hydrogen fuel network 3. Fuel cell storage 4. H2 storage at sea 5. Hydrogen fuel stations | <ol style="list-style-type: none"> 1. Public transport hubs 2. Energy grid 3. Hydrogen fuel network 4. Hydrogen fuel stations | <ol style="list-style-type: none"> 1. Carbon neutral housing 2. Circular apartment buildings 3. Circular neighborhoods | <ol style="list-style-type: none"> 1. Community farms 2. Circular market 3. Community gardens 4. Rooftop parks |

Stakeholders

- Private**
- A1 Developers
 - A2 Hydrogen companies
 - A3 Construction companies
 - A4 Horticulture industries
- Public**
- B1 Gemeente Rotterdam
 - B2 Port of Rotterdam
 - B3 RET
 - B4 Town councils
 - B5 Rijkswaterstaat
- Civil society**
- C1 Housing collectives
 - C2 Energy cooperatives
 - C3 Port unions
 - C4 Foodgrowers collective
 - C5 Urban greenkeepers



- CONFLICTS AND RELATIONS**
- Synergy
- - - Conflicts
- Stakeholder synergies**
- A2 B3 Collaboration to develop hydrogen-powered public transport
 - A2 B2 Joint projects on large scale hydrogen storage to power the port and its industries
 - A4 B1 Partnership in spatial planning and alignment with urban food and energy strategies
 - A4 C4 Join local and regional scales of urban food production
 - B1 C2 Municipality supports and partners with cooperatives to ensure fair access to green hydrogen
 - B2 C3 Shift towards more hydrogen storage beneficial for the port and its workers
 - A3 B4 Shift towards constructing more family housing
- Stakeholder conflicts**
- A2 C2 Tension over access and control of green energy distribution
 - A4 C2 Conflict around high energy use versus community energy priorities
 - A4 C1 Competing interests in land use between housing and food production
 - A1 C4 Land pressure caused by urban development threatens farming spaces



Relevant policies

- | | |
|--|------------------------------|
| Existing | Involved stakeholders |
| Underground hydrogen infrastructure | A2 A3 |
| Large scale electrolyzers | A2 A3 |
| Green hydrogen | A2 C2 |
| New hydrogen plants and terminals | A2 A3 |
| Taxation policies to switch fuels in shipping | B1 B2 |
| Place new development around existing transport nodes | B1 B3 |
| Green structure connected to existing nature and leisure areas | B1 |
| Experiment to achieve a mix of extensive agriculture, nature and recreation | B1 A4 C4 |
| Nature inclusive strategies | B1 C5 |
| 2/3 affordable housing, 1/3 social | B1 A1 |
| Link housing prices to income | B1 A1 |
| Cleaner and quiet mobility | B3 A2 |
| Modality diversity depending on density | B1 B3 |
| Farmlands turned into nature | A4 B1 C4 |
| New policies | |
| Phase out CO ₂ storage in favor of hydrogen storage | A2 B2 |
| Shift towards family housing in residential neighborhoods | B1 A1 |
| Implement hydrogen as the main fuel source for industry and personal transport | B2 A2 |
| Urban farming | B1 C5 A4 |



6.2 Community in Action

The timeline visualizes how residents of the port neighborhoods are continuously involved in shaping the area's transformation. Rather than being displaced or overlooked during the transition, these residents become active participants, organizing themselves into various community formations that align with the key projects introduced across each phase. The transition communities don't all participate in the same way. Instead, they engage in different forms of action depending on their goals, resources, and position in society.

In this project, we identify three main forms of participation that give existing port neighborhood residents a voice and role in shaping the future:

- Lobbying:** communities that advocate for the needs and rights of local residents. They raise concerns, push for specific policies, and seek representation in planning processes.
- Investment:** these groups contribute financially or through cooperative ownership to ensure long-term inclusion and benefit.
- Operational involvement:** communities that participate by doing: offering services, co-managing facilities, or organizing local activities.

Small entrepreneurs alliance
This alliance defends local shop owners and small businesses during phase 1, when new commercial centers emerge. They lobby for affordable retail spaces and push back against the large companies to keep small businesses part of the area's future.

Tourist guide association
Offers tours that explore both the working port, including areas like the Maasvlakte, and the historic neighborhoods around it. By organizing community-led tours, they ensure tourism supports local jobs and reflects the port area's identity.

Cultural heritage guardians
As new developments reshape the port area, the Cultural heritage guardians advocate for the protection of the 1920s vibe and retrofitting factories. They play a key role in ensuring that transformation does not erase the cultural fabric of the neighborhoods.

Energy transition job security alliance
From phase 2, this group defends existing port workers during the shift to hydrogen. They push for job security and priority access to new hydrogen jobs, ensuring that local workers actively benefit from and are included in the energy transition.

Reskilling agency
Active from phase 2 to 4, the reskilling agency provides hands-on training to help workers adapt to the hydrogen sector. Starting in phase 2, it works closely with the development of new MBO schools and provides residents with access to practical training throughout the transition.

Community hubs collective
In phase 2, as new community centres are established across the port area, the community hubs collective plays a key role in shaping and running these spaces. The hubs foster social ties between neighborhoods, acting as bridges across the emerging archipelago.

Energy cooperatives
Energy cooperatives are resident-led groups that invest in local renewable energy systems. They aim to keep energy accessible, affordable, and community-driven. Active throughout all phases, they promote local access and shared benefits from the hydrogen sector.

Urban green keepers
In phase 3, they maintain parks and green areas across the archipelago, ensuring public spaces are cared for and accessible to all.

Student housing
In phase 3, new student housing also opens up opportunities for young people from nearby port neighborhoods, who often lack access to transitional housing. The student association fosters inclusion through events and peer support.

Environmental safety collective
In phase 3, with ammonia storage introduced, the environmental safety collective calls for clear safety standards and monitoring. They work to raise awareness of health and environmental risks during the transition.

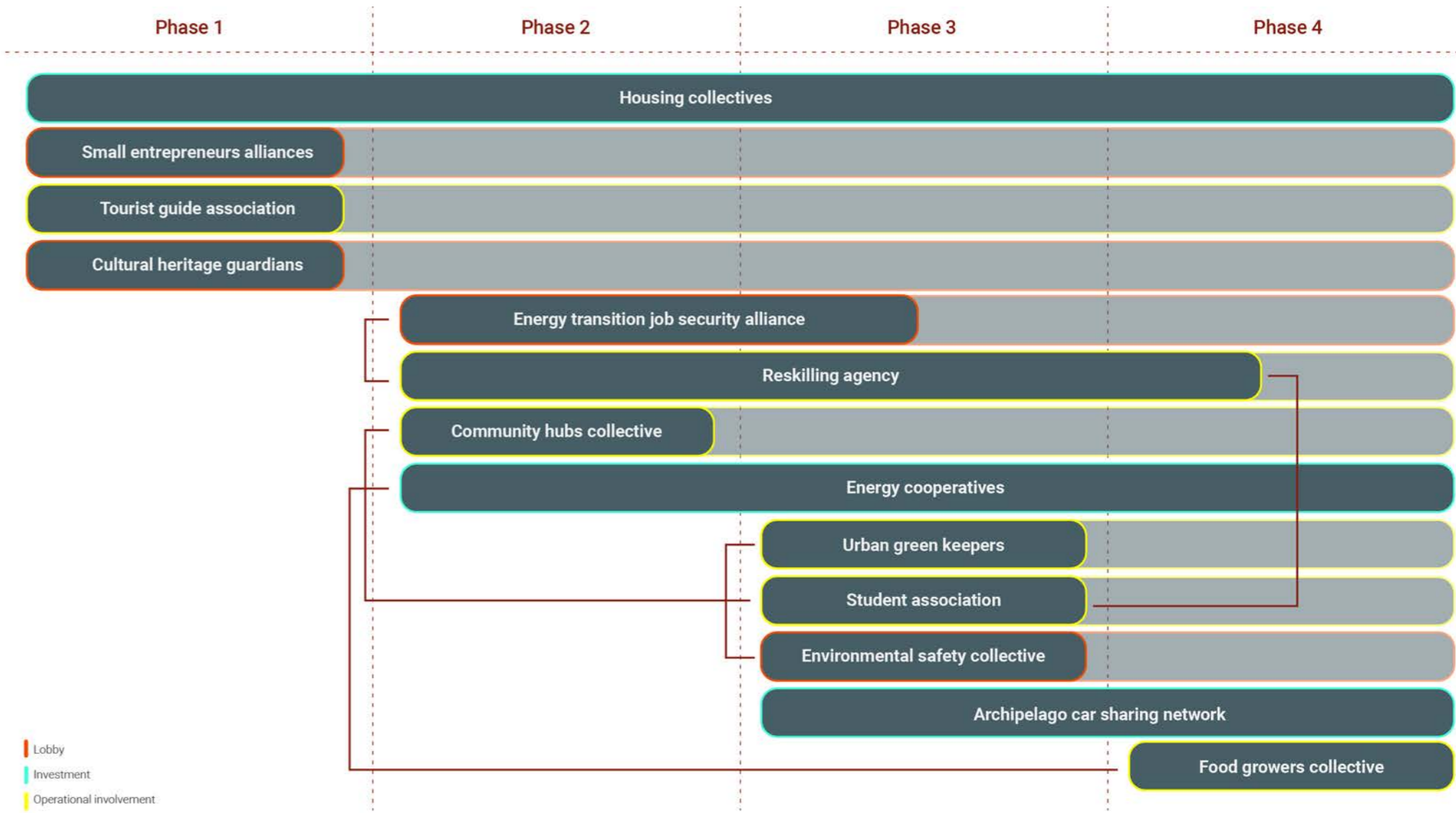
Archipelago car sharing network
This network enables residents to share cars across neighborhoods, improving everyday connections between the islands of the archipelago. It also encourages a more sustainable and collective approach to mobility.

Food growers collective
This collective brings residents together through urban farming in shared green spaces, boosting local food production and social ties. Their presence turns open space into a shared, productive resource that connects the archipelago.

In the end, the timeline reveals how a diverse set of community types, with different forms of participation, emerge and grow throughout the transition. Rather than remaining isolated or passive, the port neighborhoods become actively involved, forming a web of interconnected communities. The red lines in the diagram highlight these connections. It shows how communities collaborate, share knowledge, and support one another across phases. This growing network demonstrates that the transformation is not only spatial and infrastructural, but also deeply social.

6.2 Community in Action

TRANSITION COMMUNITY



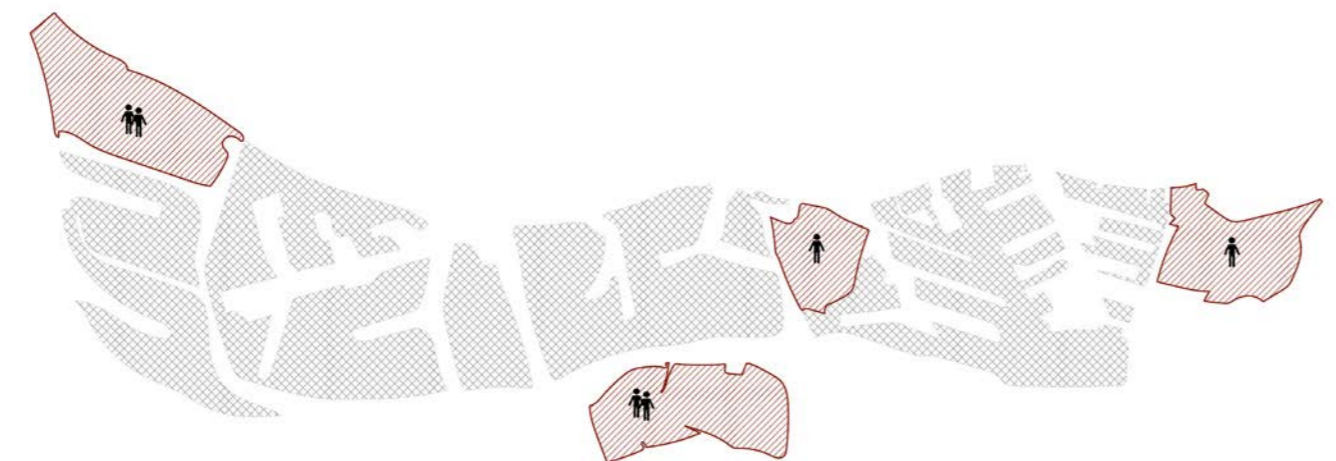
Transition communities over time

6.3 The Adaptive Community

The port neighborhoods initially existed as isolated communities. They were disconnected, both spatially and socially, and highly vulnerable to external forces such as gentrification, displacement, and loss of local identity.

With the emergence of the archipelago, this began to change. The neighborhoods are no longer only physically connected, but also socially linked through a growing network of community alliances. While a diversity of communities remains, each retaining its own identity, culture, and focus. Their growing collaboration across the archipelago enhances their collective strength.

Instead of being fragmented, they now form a unified yet diverse network. As a collective force, they are far better equipped to resist gentrification and exclusion than any single group alone. Together, they lay the foundation for a resilient community during the energy transition and for the future.

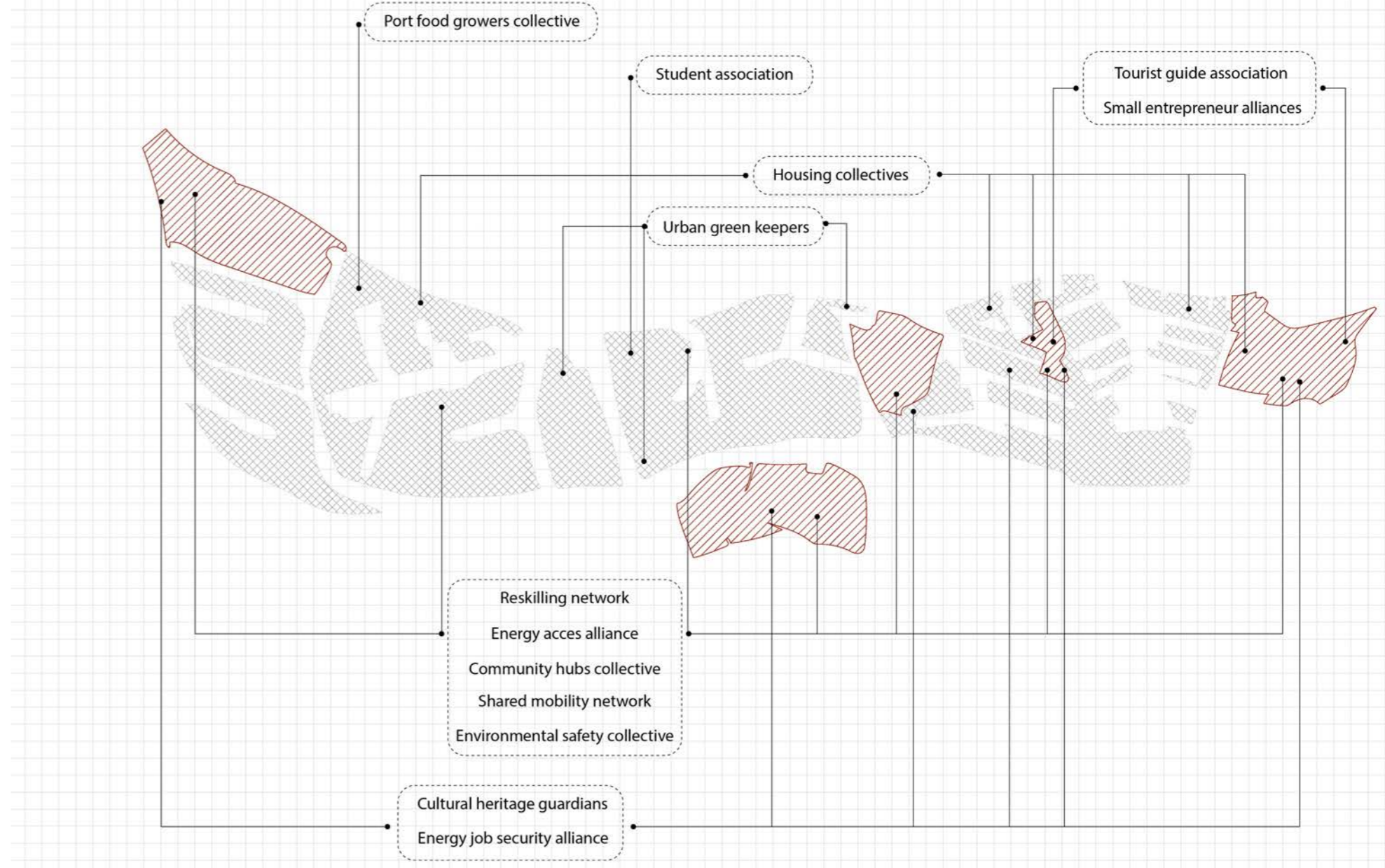


Isolated islands communities



Archipelago communities

6.3 The Adaptive Community

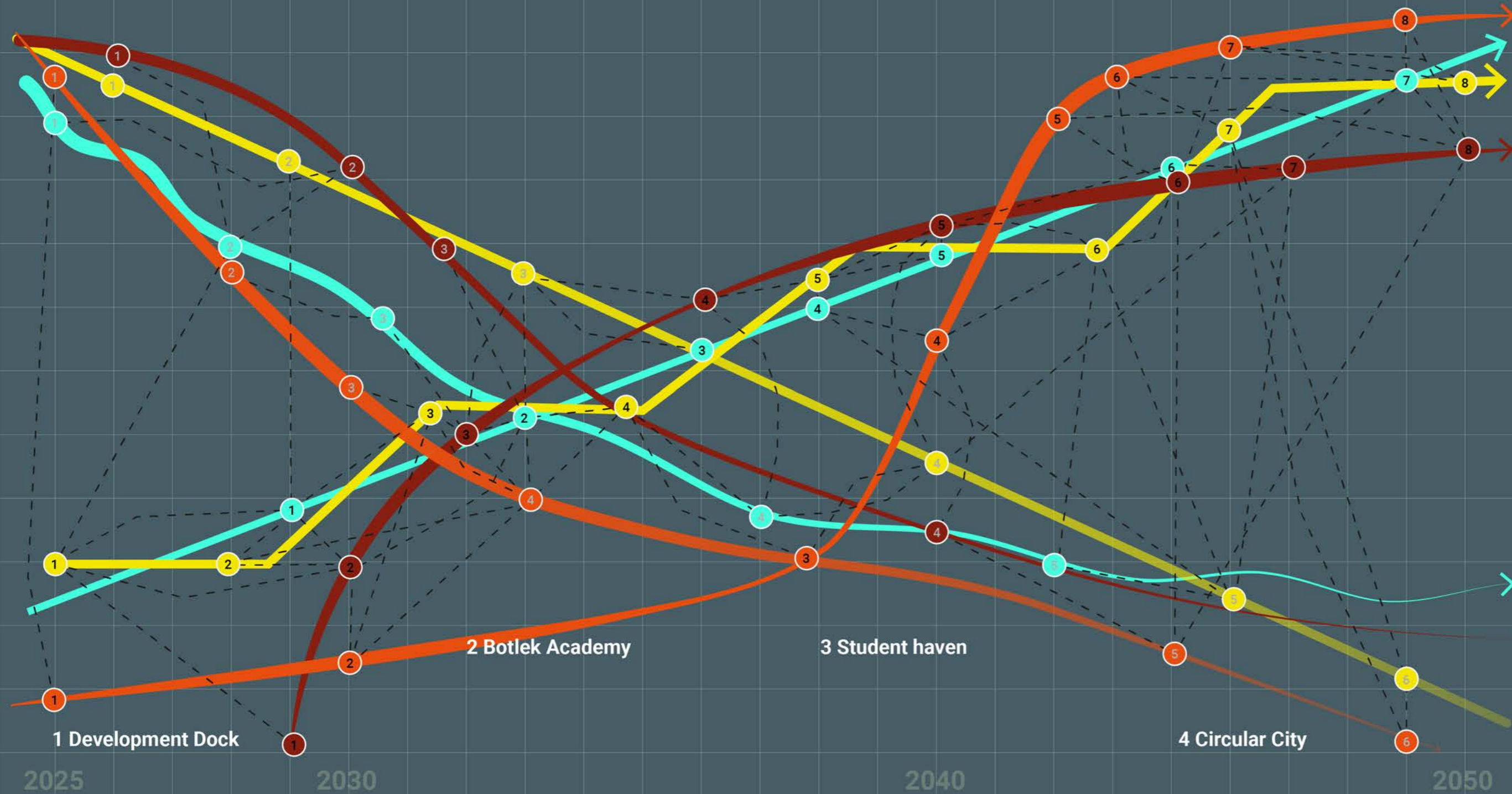


Transition communities within the archipelago

6.4 Chain Reaction

Combined X curve

X-CURVE



Connectivity
Energy
Housing
Amenities

1 Knowledge center

- 1 grey hydrogen production is allowed
- 2 blue hydrogen production is promoted
- 1 CO2 taxation is implemented
- 2 electricity grids are expanded
- 3 hydrogen production is subsidized
- 1 water taxi routes are extended
- 2 metro line is extended to Botlek
- 1 digitalized logistics begin to reduce truck traffic
- 2 shipping should bypass Oudemaas
- 1 Heijlplaas becomes a vibrant mix-use center
- 1 fossil fuel refineries start to move out
- 2 noise and air pollution decreases in PoR
- 1 local centers in Old Charlois is revitalized
- 2 community centers are built in new developments
- 1 education facilities begin to spread out
- 2 MBO labour shortage in PoR is decreased
- 1 increased social housing percentage in Heijlplaas

2 MBO hub

- 4 green logistics receive tax incentives
- 3 blue hydrogen production is promoted
- 4 CO2 taxation is implemented
- 3 projects that disrupted traffic are finished
- 2 affordable housing for temporary MBO workers
- 3 housing from 60s are renovated in PoR
- 3 new MBO schools are built in Botlek
- 4 parks and green networks are built
- 3 town councils plead for better environment
- 1 programs to employ unqualified locals are launched

3 Student haven

- 3 ammonia storage of hydrogen is restricted
- 4 Delta Rhine corridor is finished
- 5 new tramline is built through Archipelago
- 4 fossil fuel vehicles are regulated
- 4 residual heating is connected houses in PoR
- 5 affordable student complexes are built
- 1 heat pumps and solar panels installed in houses
- 5 diverse local centers are formed by locals
- 8 subsidies for harbor neighbourhoods decrease
- 5 blue hydrogen is heavily taxed
- 6 gasfield storage of hydrogen begins
- 6 PoR employment policies becomes regional

4 New suburban

- 7 hydrogen is connected to heating network
- 8 PoR becomes the hydrogen hub of Europe
- 5 CCS storage is restricted
- 6 fossil fuel powerplants are dismantled
- 6 new highrises are built along riverbanks
- 7 new family housings for are built for new workers
- 6 hydrogen fuel cells power cars, ships, and rails
- 7 metro line is extended into Maaskvlakte
- 8 ESAF network is built to Rotterdam Airport
- 7 urban farming initiatives are implemented
- 8 collective farming coops host regular markets
- 6 employment of locals receive tax incentives
- 6 food supply chain of local produce is built

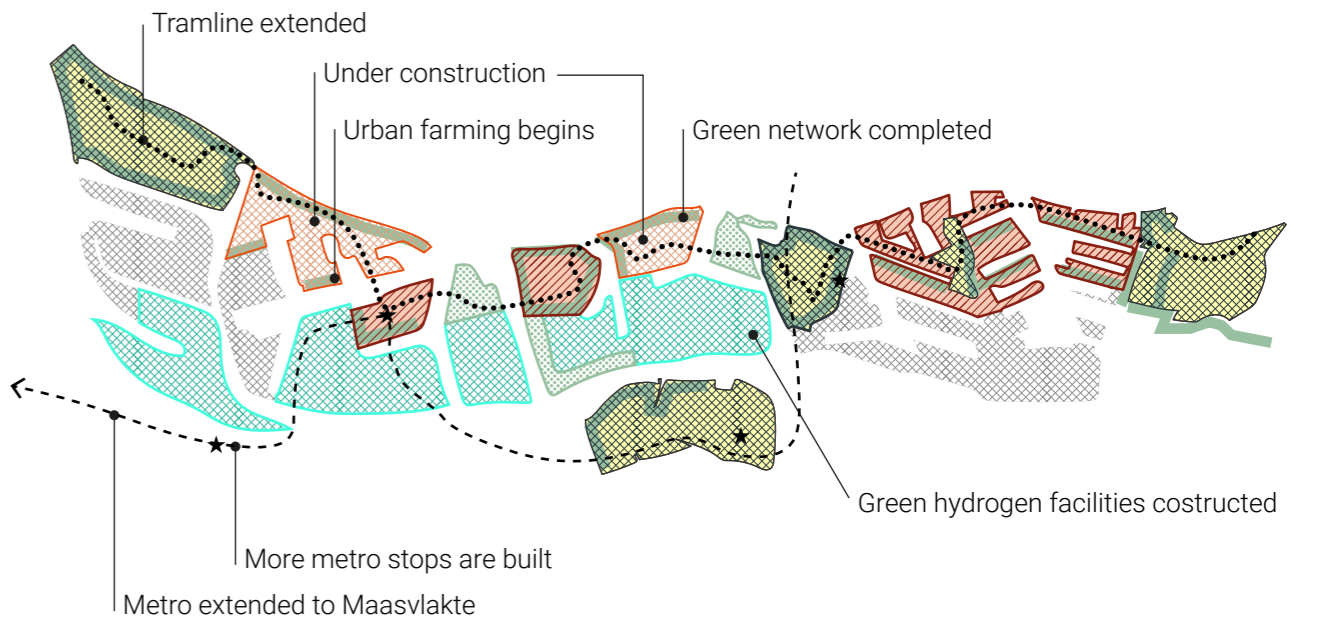
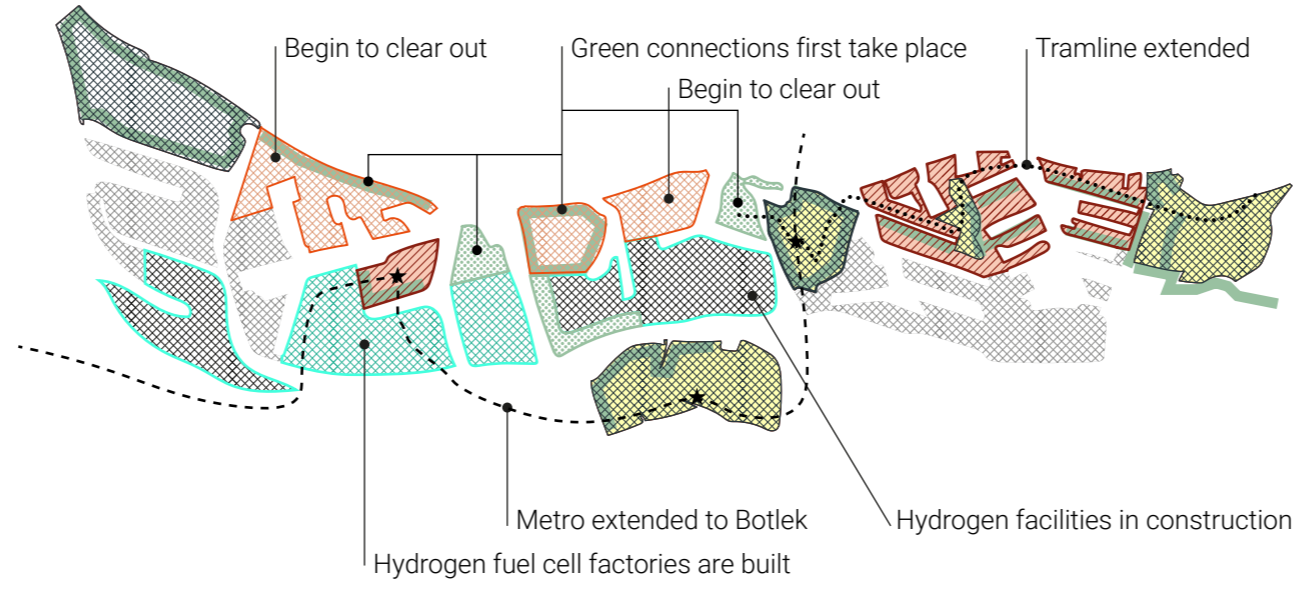
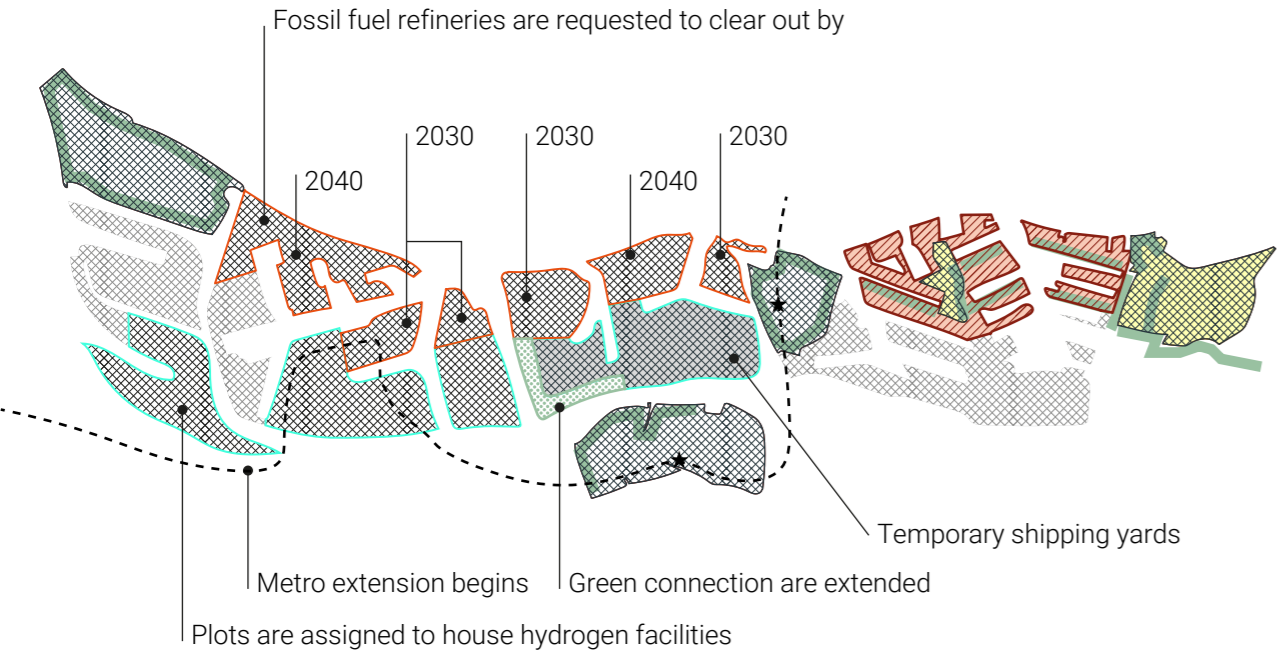
6.4 Chain Reaction

Spatial strategy for stages in-between

Parts of Vondelingenplaat are cleared before others to provide temporary shipping yards for the shipping companies that used to operate in Waalhaven and Eemhaven near Heijplaat. All ports west of Pernis are still in function, which makes construction of hydrogen facilities convenient.

Green connections are built before housing developments take place, from which temporary workers in Botlek and residents of Pernis can enjoy before anyone else.

Slow mobility networks are finished, and urban farming begins before family housing are constructed. This increases the chances of new and existing residents paying attention to the details of developments and participate as stakeholders.



1 Development Dock
Spatial timeline of Port Archipelago

2 Botlek Academy

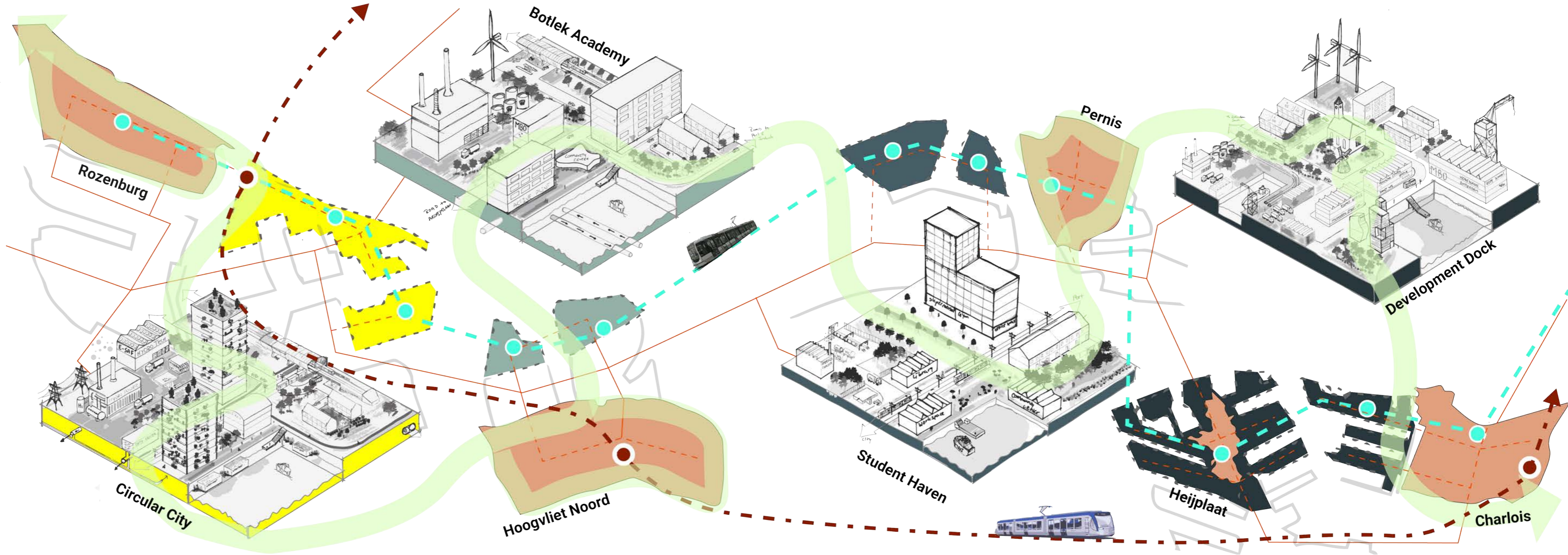
3 Student Haven

4 Circular City

6.5 The New Port

Combining the puzzle pieces together

Combining the tiles results in a group of islands with distinctive identities, but complementing the needs of the existing communities living in the port. The neighborhoods are all interconnected through an extensive renewable heat grid, while new public transport connections create flow of movement throughout the archipelago. Finally, a green continuous corridor is created as once heavily industrialized areas make way for new ecological development. The once divided harbor neighborhoods becomes a tight-knitted port community that actively takes part in the energy transition and benefits from the socio-economic transformation!



The new port connecting the islands.

6.5 The New Port

The Neighborhoods in Harmony

The core of the project is not to make one group more powerful over another, but create a symbiotic relationship where both communities can thrive, enhancing the access through infrastructure and public amenities. Different modes of public transport and an extensive slow mobility network makes it convenient for different groups to access other islands and make use of the amenities that each island has to offer. This fosters tacit encounters, improving the social cohesion between the neighborhoods in the South of Rotterdam. In addition, industries are less present in the archipelago, fostering a diverse natural urban environment. This new space can be used by the transition community to explore new forms of social activities, resulting in a more spatially just environment.



Visual representation of the old and new coexisting.

VII. Conclusion and discussion

7.1 Conclusion

7.2 Archipelago and Development Goals

7.3 Archipelago and Ethics

7.4 Recommendations

7.1 Conclusion

The port of Rotterdam is keen on becoming the biggest hydrogen hub of Europe, to maintain its competitiveness and commit to the objectives from the Paris climate accords. The new infrastructure for the hydrogen supply chain is likely to have big implications on the harbour itself and the existing neighborhoods within and surrounding the port. Fossil fuel industries are phased out and chemical plants and refineries are using the heat from hydrogen production and hydrogen fuel emitting less greenhouse gases which makes the port area a healthier environment. Secondly, the plan of storing hydrogen gas in depleted gas fields offshore frees up a lot of space for new developments. Lastly, the job market undergoes a major transformation as new jobs affiliated to the hydrogen transition are required, which are both MBO and high skilled level jobs. These three implications of hydrogen are accelerating the process of gentrification in the port, especially in the five neighborhoods Rozenburg, Pernis, Hoogvliet-Noord, Heijplaat and Charlois.

But the hydrogen transition is not only doom and gloom and could be a great opportunity for these neighborhoods to become key players. Through our urban analysis, it became apparent that these neighborhoods are operating as separate identities with little connection to each other and the city. Furthermore, these neighborhoods have very distinctive characteristics and different needs, therefore they require a different spatial intervention and organization to ensure these communities are involved in the energy transition.

To ensure that transition community is actively involved in the energy transition in the port, the core concepts of urban metabolism and spatial justice are applied. Parallel to these concepts, 4 guiding themes are developed to align the concepts with the needs of the community: Energy, Connectivity, Housing and Amenities.

Through the creation of the Port Archipelago, the once isolated neighborhoods become a cohesive entity actively involved four key projects realized in four consecutive stages. At the core of these key projects are synergies between developments in Energy, Connectivity, Housing and Amenities, that are supported through policies and collaboration between key actors. These key projects include new public transport connections and green slow mobility networks connecting the islands with each other and the city of Rotterdam. The heavily industrialized oil terminals are transformed into diverse mixed-use urban environments with new housing typologies for both existing and new workers as well as new activities from hydrogen innovation in the East to MBO hubs focusing on reskilling and practical jobs in the hydrogen industry in the West.

The local centers are revived and create new networks between the existing and new population fostering forms of coexistence in the archipelago and mitigate tensions. This offers the existing community the chance to transform into an empowered population, forming new social groups and maintaining its core identity. This creates new and distinctive social magnets in the South of Rotterdam, creating less of a divide between the North and South while being a catalyst for new developments in the region.

Thus, creating the Port Archipelago accommodates the needs of the existing communities, helping them to adapt to the socio spatial changes related to the energy transition towards hydrogen, while embracing gentrification as an opportunity to transform these existing neighborhoods into new forms of coexistence, making them more empowered and involved in the transition. This creates a more sustainable living environment and promotes spatial justice on a local and regional scale as Rotterdam becomes a more socially cohesive Rotterdam city.

7.2 Archipelago and Sustainability

Our project contributes to multiple Sustainable Development Goals (SDGs), linking local spatial strategies in the port to broader global ambitions. In this project, 7 out of the 17 goals are addressed, with a strong focus on social, spatial, and economic justice.

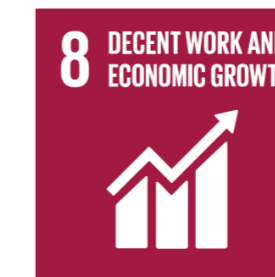
This section outlines how the port transition project contributes to these selected SDGs.



Decentralized MBO hubs and reskilling programs make education more inclusive and equitable, offering practical learning opportunities within the Port.



Our project aligns with this goal by transitioning the port's energy infrastructure from fossil fuels to hydrogen, thereby promoting cleaner energy sources.



The project supports decent work opportunities for all through the creation of hydrogen-related jobs and local reskilling programs. It also stimulates sustainable economic growth of the port.



The project builds resilient infrastructure by replacing fossil systems with hydrogen-based solutions and promotes inclusive industrial growth through innovation and community integration.



By centering the existing port neighborhoods in the energy transition, the project promotes a just socio-economic and spatial transformation, helping reduce inequalities across the port area.



The project transforms isolated port neighborhoods into a connected and resilient archipelago, creating a more inclusive and sustainable urban environment.



The project brings together public parties, private parties and civil societies in long-term collaboration. Together, these partnerships are essential to achieving the sustainability goals.

7.3 Ethics- a group reflection

Q3's method of selecting a transition community and forming a vision from their perspective does not necessarily guarantee just process or outcome. Even though the vision is reviewed in the latter half of the quarter where other perspectives are taken into account, the whole project will still be based on a vision that prioritizes certain group's interests over others. Wouldn't we be neglecting or overlooking other actors who may as well be equally important or deserving our attention? What can be done to ensure a more balanced outcome for the minorities or vulnerable groups that were not chosen as the transition community in the first place?

The Port Archipelago vision is very much focused on the distribution and flow of public goods that are crucial for the well-being of humans. Naturally, there is little scope to discuss the impacts the project will have on non-human species. Furthermore, owing to the fact that our transition community is a rather broadly defined one-only outlined by the physical borders of the neighborhoods-we are not differentiating the more vulnerable groups within the communities. Although we are addressing the likelihood of these communities to be exposed to gentrification, we may be missing on more dire needs of some subgroups.

Amenity is an important guiding theme that allows different services and spaces to take place in the archipelago: access to education, job opportunities, local centers and green spaces, some of which are finite resources. The commons this project provides are specifically designed to target a certain group who happens to have the best geographical access to them. Without appropriate measures to regulate the consumption, the commons are likely to be quickly dried out or monopolized by the transition community. Again the transition community approach itself should not

be presumed to be just; it is a tool through which just transition becomes more graspable.

There is also the question of whether it is morally correct to invest in hydrogen over other forms of renewable energy. While the positive effects are apparent for the consumer, the externalities of raw materials necessary to store hydrogen such as ammonia are more obscure and spread out on a planetary scale. To satisfy the Port of Rotterdam's ambition to handle 50% of the Netherlands' hydrogen demand, huge bulks must be imported. This means that majority of electrolyzers and ammonia facilities will be located in the global south where regulations are lax and labor is cheap. However, majority of published articles favor hydrogen as the next form of energy that will free us from the stress of climate change. Our project is also based on the assumption that the Netherlands will invest highly on hydrogen. Nevertheless, we must first critically assess if hydrogen indeed deserves such high praises and grants.

These skeptic doubts were continuously on our minds during the quarter and were brought up whenever we felt stuck or frustrated. However, we decided to be on board with the transition community perspective to see where it would take us in the end. No method is perfect; what is more important is that you keep discussing its limits and advantages to better comprehend your project. For hydrogen, discussions regarding its potential and extents were still contentious even among experts. It was difficult for us to assess whether it would be the right decision to invest aggressively in hydrogen. Therefore, we are not proposing the Dutch government should do so; we are only envisioning for our community in a scenario where this happens in reality.

7.4 Recommendations

As with all research, some questions arose that this report, with its limited timeframe and tools, could not answer. These were both technical in nature, as social.

Firstly, the consequences of creating a larger community partly from existing ones and partly from new inhabitants is something that a case study of a similar area could provide the answers to. What will a future like this look like and will the community it creates be viable? Maybe the islands will stay mostly to themselves, creating new communities, smaller, but with their own unique identity.

Secondly, what policies will be most important to prioritize? How to approach research like this, with the many involved stakeholders and scale levels, could be a research on its own. Many policy documents were written with a specific vision in mind or with different sources to pull data from. Comparing them at different scale levels and looking into which ones have priority over others could be an interesting next step.

Lastly, since we all come from spatial planning and architecture backgrounds, our knowledge when it came to hydrogen technology was limited. More real world knowledge of how these technologies would be implemented can provide better insight in the implications they would have. The overlap between spatial planning and these technologies is something which could be explored more into detail in future research.

VIII. Individual Reflections

The role of regional design has fundamentally changed in a world where climate change, social inequality, and ecological instability reinforce one another. This course has deepened my understanding of how spatial strategies do not only transform physical landscapes, but also reshape social structures and power relations. Two key elements that contributed to this insight were the requirement to design from the perspective of a transition community, and the need to develop a strategy following the vision.

In many energy transition plans, the focus is often on economic and ecological gains while the social consequences are frequently overlooked. This applies also to the transformation of the port of Rotterdam, where the hydrogen transition creates major opportunities. Yet the impact on the people already living in the surrounding neighborhoods risks being overlooked once again. That's why we chose to work with the port neighborhoods as our transition community. They are not only directly affected by the spatial changes, but also represent voices often underrepresented in planning processes. By designing from their perspective, I became more aware of social inequalities, unequal access to decision-making, and the often unheard voices of vulnerable communities. Designing from a transition community means not just reshaping space, but actively engaging with structural injustice and shifting power dy-

namics. In short, it allowed us to use design as a tool for socio-economic justice. What was especially new for me was the requirement to formulate a strategy. Often, the previous design stopped at a vision. This studio challenged us to think about implementation: How does the design fit within current policy and legal frameworks? Which actors are involved, and who holds responsibility? This part of the process showed me that a design only has real impact when it is embedded institutionally, politically, and administratively. This type of knowledge is often lacking, not only in our master's program, but possibly in the professional field as well. In my view, this gap between vision and execution often limits the transformative power of spatial design. Designers are great at imagining futures, but without strategic grounding those futures risk remaining unbuilt dreams. We must not only draw new possibilities, but also understand the rules and players that shape how those possibilities can become reality.

A strong regional design attempts to align the interests of residents, governments, and private actors, but this is very complex. Working in a group made that complexity tangible. We had to develop one shared design while bringing in different priorities and perspectives. This often led to discussions. These contrasting viewpoints pushed us to think more critically, defend our decisions, and constantly refine our vision. I believe

this process resulted in a much stronger and more inclusive proposal. Still, one insight from the methodology course stood out: the question of why supercomputers can't model our cities. The answer? Because there is no perfect model. Planning is fundamentally political, filled with competing interpretations of problems and no single 'best' solution. In short, urban design doesn't stop at creating a vision. It continues through the complex realities of society, power, and implementation. And as designers, we must be aware and take responsibility for those dimensions too!

From the start of this quarter, I have had difficulty with envisioning an entire project from the perspective and needs and wants of a single community. Every time we would discuss the vision for our region, I would have to remind myself that we were not creating a vision for every person living in it, but rather for a group of people that would be impacted by a complex transition. I found it hard to let go of an inherent trait that urban planning is not something that can be done selfishly, designing urban spaces is meant for all those who dwell in them, not a particular group. This ties back to the lectures and the concepts discussed in them. I enjoyed the lectures very much, and while some of the booklets were a tough read, I feel like using the concepts in our project, gave me a better understanding of them. After working on this project and writing the report, looking back on the booklet that I struggled with the most (The Idea of Justice), I can say that I have gained more understanding of the way spatial justice works. For the bonus brownie points I can now explain Doreen Massey's ideas in relation to the two aspects of spatial justice, distributive and procedural. The contemporaneous existence of space being closely related to distributive justice, allowing people equal chances within that space. Meanwhile procedural justice being more connected to the simultaneity of people living in that space, leaning on the asymmetrical power

dynamics, relying that those with more power are just enough in their actions to take care of those who have less. Democracy in planning is thus also something important, and something I have missed a bit in this project. While we did some quick interview during our fieldtrip, the timeframe for this project did not allow for more in depth analysis and conversation with our transition community. Especially since they were at the base of our project, and the importance placed on their presence in this course, it was a shame that we did not get the chance to pursue this further.

It would also have given us more reason to use Atlas.TI, using our own interviews as a basis for the analysis. It is now the third time I have used this program, giving it a new honest chance, but I just can't seem to fit it into my way of working. The AI incorporated helped out a bit, and it was nice that this was discussed in the lectures, but the output it created, just created more chaos in my head to use it properly. Maybe a fourth time will convince me of its usefulness.

The regional scale and the scope of this projects lends itself very well for an overarching strategy with a vision and concrete policies supporting it. In my bachelor's I have worked on larger, regional scale levels, but I have always focused more on design than on policy, which I see now has been a significant oversight. I struggled a lot with

the scale of the strategy, incorporating existing policies with stakeholders and adding our own policies, and it was not easy to let go of this design aspect of urban planning. I easily lost sight of the big picture, instead trying to focus on smaller aspects of the project, that did not fit in the grand scheme of our strategy. This has been a learning experience, but I do think I am now more confident in my ability to construct larger scale strategies in the future.

Matthijs

Working on regional scale projects is always an interesting endeavor, because of the complexities that are involved with creating vision and strategies. For this design project it was even more challenging since our group had to work with a specific transition community in mind, which is always difficult since we as urban designers always try to be idealistic and create plans that have positive implications for everyone.

During the initial stages of the project, this was exactly where our team struggled. Because little research is available on the implications of hydrogen on the socio-economic scale, we often asked ourselves whether we picked on the right community. In the beginning we were focused on port workers as a whole transition community, but could not really spatially define where these communities are located within the port. Moreover, there were some complications on defining the frames of our transition community. Our idea was to involve the new workers and expats that are affiliated to the transition towards hydrogen in our transition community group. This had an impact on clearly defining the vision, because there were two different communities with conflicting needs. Doing our urban analysis, we started to gather more information which made it more complicated to come up with a cohesive vision. Once we clearly defined our focus on gentrification of the port due to hydrogen and located the vulnerable neighborhoods, it really helped us to navigate towards a spatial vision.

Once the transition community was de-

finied, we were then faced with the issue how to define a spatial vision for these neighborhoods. While working parallel on our conceptual framework, we were faced with a similar problem, which was deciding on what concept to use. Through our urban analysis we could apply plenty of concepts to integrate in our spatial vision, but it was a matter of deciding which one to pick who could also be linked to our transition community. It was one of the lectures about urban metabolism, where we got really engaged with the work of FABRICations on their case study on the Port of Rotterdam (Tillie, 2014). Simultaneously, lectures on spatial justice formed the bridge to our transition community, which cleared the path to design the port as an Archipelago.

One could argue whether the Port Archipelago vision is indeed the answer to mitigate gentrification. It was often a question that each of us struggled to answer, because making the urban environment more liveable and creating these social magnets can actually enforce gentrification, making city districts more attractive for other groups and become prone to the side effects of the free market.

That is exactly what makes the strategical application so important and sometimes a time-consuming event, only for the spatial vision to be put in the fridge and remain untouched. And this is where we as urban designers play a key role.

In the beginning of the methodology course, the students had to put themselves as urban designers in a triangle, where each corner highlights the dimension of where urban designers play an active role: Social, Environmental and Design. Working on the strategic part of the project, I realized the importance of how are role as urban designers is more than creating nice plans, it is also a matter of how we give the actors the means to do it. If we really want to make the earth habitable for future generations and overcome all the climate change and social issues that we are facing, our way of working has to be interdisciplinary through collaboration.

It is only natural for architecture-based students to gawk at the word ‘regional’. For me, it was always a political concept applied to a large area involving numerous stakeholders and policies. I began this quarter hoping I wouldn’t end up trying to impose some ridiculously large-scale spatial intervention.

However, the transition community approach was an excellent way to overcome such fear and get me engaged in the project. It helped me navigate my way through the scale that initially seemed impalpable. The process reminded me of working with a client: shaping the needs and requirements into spatial terms while negotiating with local governments, neighbors and future tenants. Despite all the compromises, I was still designing for my client.

The first challenge was selecting the community. Our group’s attempt to define a community failed completely because we presumed our bias-that low-skill fossil fuel workers would be living in the proximities of the port-to be true and tried to justify it with evidence. Thankfully, we came to realize our mistake and opted for a broader definition by spatially outlining the communities. This turned out to be a more interesting choice, because it allowed us to also imagine how our broad community could take different forms of stakeholders throughout the project.

Another idea that fascinated me was that a region can be constructed through the eyes of a community. Until this quarter the term regional was always had the connotation of an area bigger than a city. However, through the eyes of communities, a region could have whatever shape and size necessary to improve their well-being. Sometime a region be completely trans-spatial; geographically fragmented. Especially in the European context, where disparities between urban and rural is much smaller compared to East Asian countries, the concept could be applied much more flexibly.

However, for some communities the spatial definition is everything. In US and in Europe, ‘The places that don’t matter’ are revenge voting to show their anger and frustrations(Rodriguez-Pose, 2018). These former industrial regions who are now voting far right fit the profile of our transition neighborhoods inside the port (so we were right in our definition!). As the voices of these neglected areas have begun to take effect on an international scale, perhaps it is time to shed a new light on the conventional method of constructing regions in spatial terms.

Then how about in the Korean context? Our history of industrialization was so condensed and brief that it didn’t leave people feeling deeply frustrated; they quickly moved on to the service sector. Gender and generation voting is much more prominent than rural/urban voting, as our recent president impeachment illustrates. As birth rate plummets and young people migrate to the capital, the profile of non-Seoul regions is becoming homogeneous: old, conservative landlords. For us it’s ‘the people who don’t matter’: those who are silently being displaced by the transition, faced with a question of survival or doom.

But how can people who are helplessly complying with the transition be defined as a community? Would there be enough number of those people waiting to be displaced when I go back home? Then I realized that transition community also has a temporal dimension. Transitions will not wait for people to develop communities and visions. Either the transition has to be stalled, or people need to speed up.

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9.2 Image Sources

9.3 Policies

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page	title	source
3	Urgency scream collage	Base image (https://matadornetwork.com/life/people-throw-around-word-gentrification-without-much-context-check-important-history-lesson/)
4	Hydrogen infrastructure in the Netherlands	https://www.gasunie.nl/projecten/waterstofnetwerk-nederland
4	Location of the port of Rotterdam	https://connections.routescanner.com/rotterdam?connectionType=import
5	The hydrogen production chain	https://ispt.eu/projects/hydrohub-gigawatt/
7	History of the Port Images	Sijmons, D. (2014). Landscape and Energy. In D. Sijmons, Landscape and Energy (pp. 218-247). Rotterdam: NAI010 Publishing.
7	Port of transitions collage	https://containertech.com/articles/inside-one-of-the-worlds-largest-container-ships/ https://www.portofrotterdam.com/nl/online-beleven/geschiedenis-van-de-haven#:~:text=In%20de%2017e%20eeuw%20worden,en%20Bierhaven%20(1614)%20aang
9	Map of Port Rotterdam	Geofabrik(osm_roads), PDOK(waterdeel, landgebruik)
11	Current industries and storage area	Geofabrik(osm_railways, osm_roads), PDOK(waterdeel, landgebruik)
13	Hydrogen plans for the port	Geofabrik(osm_railways, osm_roads) PDOK(waterdeel, landgebruik) Port of Rotterdam(https://www.portofrotterdam.com/en/port-future/energy-transition/ongoing-projects/hydrogen-rotterdam)
15	Hydrogen shift in the Port of Rotterdam_to be freed from pollutions	Layer Emissions (LISA Data Set of Company Data), Soil Pollution Map and Salination (GISweb Rotterdam 2023) RiVM Map noise pollution (https://www.atlasleefomgeving.nl/kaarten?config=3ef897de-127f-471a-959b-93b7597de188&activateOnStart=layercollection&gm-x=155000.000000000003&gm-y=456478.71437812824&gm-z=2.894059846274022&gm-b=1544180834512,true,1;1544715737496,true,0.8)
16-17	PoR green hydrogen labour demand	Leguijt, C., van den Toorn, E., Bachaus, A., & Jongsma, C. (2021). Jobs from investment in green hydrogen (No. 21.200427.060). CE Delft. https://cedelft.eu/publications/jobs-from-investment-in-green-hydrogen/ PoR. (2020, May 7). Port of Rotterdam becomes international hydrogen hub. Port of Rotterdam. https://www.portofrotterdam.com/en/welcome-rotterdam-europes-hydrogen-hub PoR. (2024, May). Port of Rotterdam developing Europe's Hydrogen Hub. Port of Rotterdam. https://www.portofrotterdam.com/en/welcome-rotterdam-europes-hydrogen-hub
19	Who is affected?	CBS data buurten 2023 (CBS. 2023)

9.2 Image sources

page	title	source
19	Who is affected?	CBS data buurten 2023 (CBS. 2023)
32-42	Identity & characteristics	Geofabrik(osm_railways, osm_roads) PDOK(waterdeel, landgebruik, pand, Topotijdreis) https://allecijfers.nl/
43	Living with the port_Green spaces & local centers	Geofabrik(osm_pois), PDOK(waterdeel, landgebruik)
45	Living with the port_Travelling modality	Geofabrik(osm_railways) PDOK(waterdeel, landgebruik) ArcGIS(https://services.arcgis.com/zP1tGdLpGvt2qNJ6/ArcGIS/rest/services/bus_tram_metro_haltes_AGOL/FeatureServer/0), ArcGIS(https://services.arcgis.com/zP1tGdLpGvt2qNJ6/ArcGIS/rest/services/bus_tram_metro_haltes_AGOL/FeatureServer/4)
47	Living with the port_Slow mobility networks	Geofabrik(osm_roads) PDOK(waterdeel, landgebruik)
49	Living with the port_Industrial infrastructures	Geofabrik(osm_roads) PDOK(waterdeel, landgebruik)
51	Living with the port_Education	Layer Higher Education (GISWeb Rotterdam) Public Transport Metro & Tram (GISWeb Rotterdam) Regional Bus lines (Geo Data South Holland Province)
53	Living with the port_Industrial and commercial activities	Layer Industries (LISA Data Set of Company Data) Infrastructure layers (PDOK, infrastructuur, regionale wegen)
53	Port Archipelago masterplan	Geofabrik(railways, roads, osm_pois) PDOK(waterdeel, landgebruik) Layer Higher Education (GISWeb Rotterdam) Layer Industries (LISA Data Set of Company Data)
54	Harbour neighborhoods analysis conclusion	Geofabrik(railways, roads, osm_pois) PDOK(waterdeel, landgebruik) Layer Higher Education (GISWeb Rotterdam) Layer Industries (LISA Data Set of Company Data)
54	Train running over water	https://commons.wikimedia.org/w/index.php?curid=58486445

9.2 Image sources

page	title	source
		Own pictures
57	Community manifesto collage	https://www.eia.gov/energyexplained/oil-and-petroleum-products/images/FCCDistCol.jpg https://www.petrosync.com/blog/wp-content/uploads/2024/01/oil-refinery-in-oil-and-gas-industry.png https://as2.ftcdn.net/v2/jpg/02/96/72/13/1000_F_296721330_6vi6uid1TaP38FA7esE1aL
65	Archipelago Dissected_Multimodal public transportation	Geofabrik(osm_railways,) PDOK(waterdeel, landgebruik)
67	Archipelago Dissected_Slow mobility networks & local centers	Geofabrik(osm_roads, osm_pois) PDOK(waterdeel, landgebruik)
69	Archipelago Dissected_Living alongside hydrogen	Geofabrik(osm_railways, osm_pois, osm_roads) PDOK(waterdeel, landgebruik)
71	Archipelago Dissected_Diverse qualities of densities	Rudifun_Bruto_Buurt_PV28(https://dataportaal.pbl.nl/RUDIFUN/RUDIFUN2)
83	Investigated existing policies	Go to 9.3 Policies
85	Large-scale implications of energy policies	Basemap(https://a.basemaps.cartocdn.com/rastertiles/voyager_nolabels/{z}/{x}/{y}@2x.png) Gasunie(https://www.gasunie.nl/en/expertise/hydrogen/hydrogen-network) Gemeente Hoeksche Waard(https://www.gemeentehw.nl/direct-regelen/wonen-bouwen-en-omgeving/leefomgeving/delta-rhine-corridor/)
87	Large-scale implications of housing policies	Basemap(https://a.basemaps.cartocdn.com/rastertiles/voyager_nolabels/{z}/{x}/{y}@2x.png) Zuid-Holland (Verstedelijkingsstrategie Zuid-Holland 2021 -2040) Geofabrik(osm_railways) ArcGIS(https://services.arcgis.com/zP1tGdLpGvt2qNJ6/ArcGIS/rest/services/bus_tram_metro_haltes_AGOL/FeatureServer/2)
89	Large-scale implications of connectivity policies	Basemap(https://a.basemaps.cartocdn.com/rastertiles/voyager_nolabels/{z}/{x}/{y}@2x.png) Geofabrik(osm_railways) Geofabrik(osm_railways)
91	Large-scale implications of amenities policies	Basemap(https://a.basemaps.cartocdn.com/rastertiles/voyager_nolabels/{z}/{x}/{y}@2x.png) Geofabrik(osm_railways) CBS(CO2 emission businesses from QGIS workshop) PDOK(waterdeel, natura2000, protected sites)

9.2 Image sources

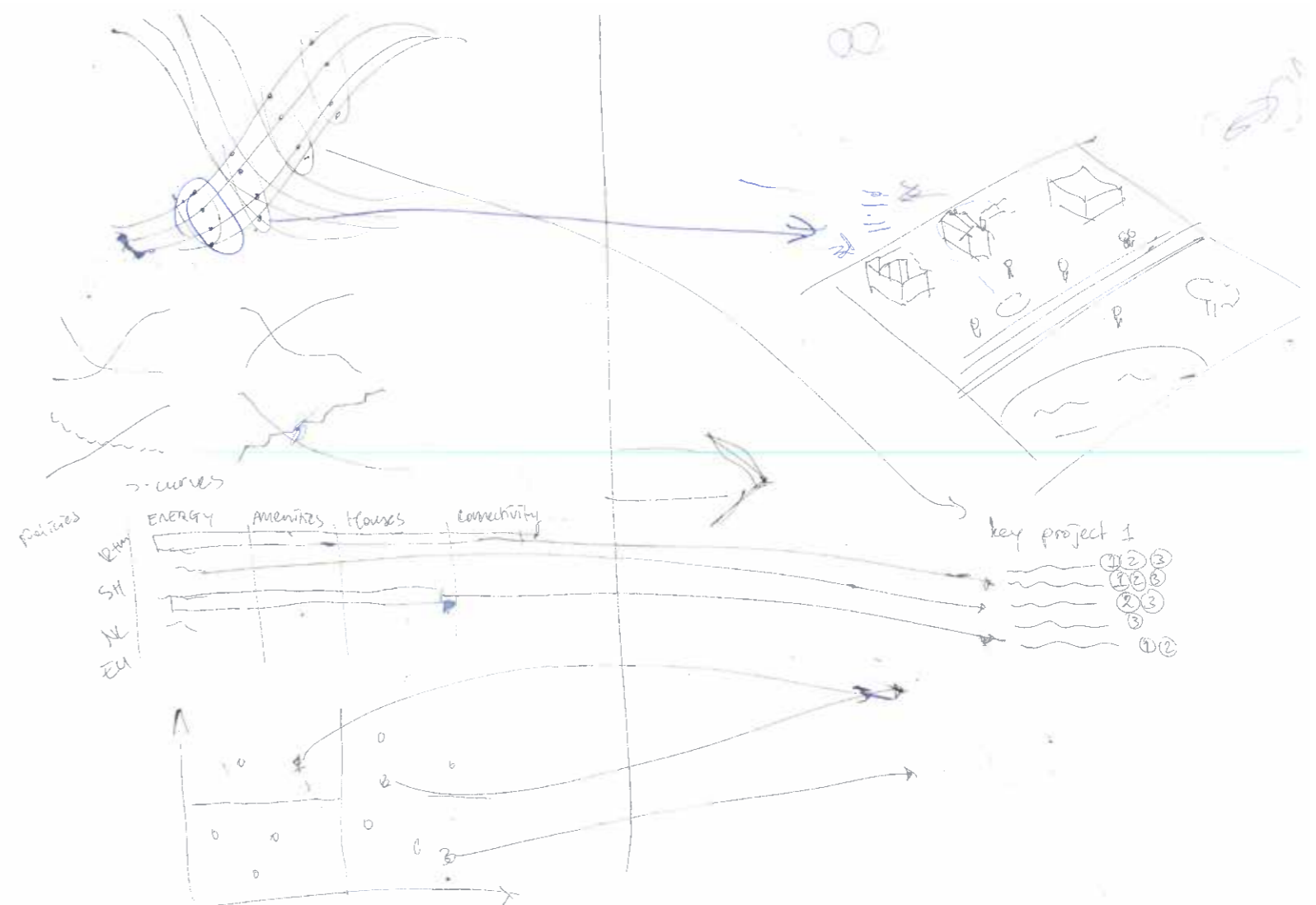
page	title	source
94-101	Policies and stakeholder analysis	various policy documents
		https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.spaceandmatter.nl%2Fwork%2Fthe-hanging-gardens-of-zandweerd&psig=AOvVaw2zoIY5ilzKViS23TDGKkzC&ust=1744288128665000&source=images&cd=vfe&opi=89978449&ved=0CBcQjhqFwoTCIC1veT5yowDFQAAAAAdAAAAABAE https://haveyoursay.portphillip.vic.gov.au/public-space-strategy/creating-places-and-communities https://www.vishopper.com/cut-out-people/people13772/cut-out-group-of-older-people-standing-and-talking https://innoblox.nl/rijtjeshuis/ https://www.1op1architectuur.nl/nieuw-eeen-complete-woonwijk/ https://www.fietsen123.nl/fietsnieuws/de-fiets-brengt-senioren-verder https://www.watertaxirotterdam.nl/rondvaarten https://www.flickr.com/photos/garstangpost/48464301256 https://nl.wikipedia.org/wiki/Metrotype_R https://leyten.nl/vastgoedbeleggingen/sw2/ https://www.greenroofs.com/2020/01/18/urban-farming-a-budding-investment-opportunity-in-real-estate/ https://urbanfarming.ku.dk/forskning/bynaer-produktion/
113	Final collage	
117	Archipelago and Sustainability	https://www.globalgoals.org/resources/

Policy	Energy	Housing	Connectivity	Amenities
Rotterdam/port				
<i>Port of Rotterdam Vision</i>	New hydrogen plants and terminals (including ammonia) and pipelines	50,000 houses by 2040	Improved physical accessibility for workers	Human Capital Agenda: connecting education and port industries
	Green trade lines: sustainable logistics chains		Green structure connected to existing nature & leisure areas	Training resources to facilitate transfer of jobs
	Taxation policies to switch fuels in shipping		Freight Corridors Program to improve multimodal accessibility - less road and more railway, pipeline, railway	Knowledge industries around the port Inclusive programs for employment-vulnerable groups
<i>Ontwikkelperspectief novex-gebied</i>	2030 realise energy infrastructure projects faster 2030 set up a vision to conform to the energy demand from 2030-2050 2030 increase efficiency on current net			
<i>RCR (Projecten rijkscoördinatie)</i>	2030 Porthos Transport & storage of CO2 2030 Aramis CCS project 2030 High voltage grid at sea			
<i>Makers District</i>				RDM is finished, M4H will be more developed M4H=Vibrant mix-use, better connected RDM=education and research, test fields Green oasis in Quarantine Site
<i>Ambachtstlab</i>				Young people without a starting qualification are prepared for the practical side in a master-Journeyman construction.
<i>Optimalisatie zoetwatervoorziening Brielse Meer</i>				Brielse Meer: important water supply for port & agriculture. New automated systems will be installed to keep water quality.
<i>Bestemmingsplan Buitenland van Rhooon</i>				Brielse Meer: Watersports, camping, golf Buitenland van Rhooon: experiment to achieve a mix of extensive agriculture, nature and recreation. Planning in progress.
<i>Rotterdam mobiliteitsvisie</i>			Priority to cyclists and pedestrians: from crossing to staying Safe and healthy connections More options for commuters Clean industry traffic	
<i>Havenleerwerkplaats</i>				Port of Rotterdam, Deltalinqs, STC-Group and the municipality of Rotterdam working together. Will create a facility shared and jointly managed by the LWAH partners that will enable targeted investments in the development of job seekers Skills Navigator Bootcamp to include vulnerable groups
<i>Rotterdam omgevingsvisie</i>		Place new development around existing transport nodes		

Policy	Energy	Housing	Connectivity	Amenities
South Holland				
<i>RES (regionale energiestrategieen)</i>	35 terawatts of renewable electricity production in 2030 More integrated approach to regional energy system needed after 2030			Nature inclusive strategies needed after: Not viewing nature as obstacles but trying to find synergies Transition policies directed towards distributional, procedural and recognition justice
<i>Rotterdam Mainport Development project</i>				2030 600 hectare nature and leisure area
<i>Zuid Holland omgevingsvisie https://omgevingsbeleid.zuid-holland.nl/omgevingsvisie/beleidskeuzes</i>		30% social housing 2/3 affordable housing, 1/3 social	check 2.1.2	
<i>Gebiedsprofiel IJsselmonde</i>				Masterplan to make the whole IJsselmonde a walkable, leisure+agriculture area
<i>Ontwikkelperspectief bossen recreatiegebieden Voorne-Putten</i>				Forest expansion plans for Voorne-Putten, including Brielse Meer
<i>Campusontwikkeling versnellen (MRDH)</i>				14 MBO and HBO campus initiatives since 2018, in sectors such as IT, cybersecurity, high tech, and energy transition.
<i>Water personenvervoer visie</i>			Connect water transport to other modes of transport Connect water transport to regional development and economical activity	

9.3 Policies

Policy	Energy	Housing	Connectivity	Amenities
<i>National</i>				
<i>Klimaat Energie Ruimte</i>	25% less energy consumption by 2050 Electricity demand increase (esp. for industries) Shift in mobility and transportation Reduction in CO2 in agriculture	Heat pumps Insulations for houses 1950-1990 Overall change for pre-war housing Minimal addition for houses 1990-2010 Offshore wind energy Solar panels Cleaner and quiet mobility: cities can be more dense	Modality diversity depending on density	Regional residual heat system Multi functioning nodes (logistics and passenger) Farmlands turned into nature
<i>PEH (Programma Energiehoofdstructuur)</i>	Electricity grid expansion -2030 : building more networks -2050 : more high-voltage stations and connections Large scale batteries Large scale electrolysers Pipelines-for hydrogen and its carriers, green gas and CO2 Underground hydrogen storage			
<i>Nationaal plan energiesysteem</i>	Gradual increase of electricity production, by renewable sources Green hydrogen by 2050, mostly from electrolys Increased heat supply, by residual heat and renewable sources			
<i>SER (Sociaal-Economische Raad)</i>				Task Force established to prepare for transition in labour market: Flexible vocational education to meet changing demands Regional SER work with private sector to draw agreements Policies directed towards inclusive job market
<i>Mobiliteitsvisie 2050</i>			Integral mobility; coherence between societal roles and modes of transport Mobility at the right place and time; substitutable, complementary, effective nodes, innovation, international opportunities Within public frameworks; safety, emissions Effective governance and tools; involve stakeholders, strengthening toolset; regional approach, investing strategy, influence behaviour	
<i>Natura 2000</i>				Oude Maas: Quality improvement of freshwater tidal areas for moist alluvial forests (softwood floodplain forests)



I. The Earth is Flat

1. From which perspective/worldview does the belief that the Earth is flat emerge?

The worldview of people believing in the flat earth conspiracy stems from a distrust in governing bodies, such as national governments, or international organizations such as the UN or the WHO. This can stem from a political agenda dictating a suspicion in established instances. Philosophically, it may be the result of people ‘just asking questions’ and looking to reframe the scientific method by refusing evidence, as long as they don’t see it with their own eyes. This can either come from a deliberate desire to keep the scientific method intact, or from stupidity, refusing to accept proof as fact and instead framing it as a lie to keep them from the ‘real truth’.

2. Flat Earthers: do they have “knowledge” or “belief”?

While trying to adhere to the scientific method of one’s own observations, flat earthers refute facts in favour of childish arguments, such as that while standing on the ground, they can not see the curvature of the earth. Because of this belief in their own knowledge, in their own eyes, they have the correct knowledge. However, a refusal of accepting any proof outside of this limited worldview, results in a disconnect from actual science. To an outside observer, this places their worldview in the ‘belief’ category, rather than knowledge.

3. How is knowledge different from believe?

Knowledge is something that can be proven by repeated provable observations. A belief in something does not need to be proven for someone to still believe in it. Because of this, the line between knowledge and belief can be very blurry. Even when facts are presented pointing to the contrary, a person can still choose to believe in the opposite. When accepting something as knowledge, a person needs to be able to change their mind about it, when provided with sufficient evidence.

4. What evidence do Flat Earthers have to justify their belief/knowledge?

Flat earthers cherry-pick their evidence, dismissing evidence that does not fit in their flat earth theory. Because of this dishonesty, the evidence they do provide instantly loses value. Their belief is rooted in the fact that governments are not honest with their people, giving way for the question to what length they would go to lie. While having a healthy amount of scepticism is good, this level of refusing to believe anything presented to them is counterproductive in science.

5. How do they propose to prove their views?

They want to start their own experiments, such as launching satellites to see the curvature of the earth for themselves.

6. What is the scientific method and how does it relate to the Flat Earth theory?

The scientific method consists of providing peers with reproducible experiments showing

certain facts. The knowledge acquired by these experiments is a cumulative effort, building on previous knowledge and expanding it. Flat earthers take this process and refuse to believe these proven experiments and cumulative knowledge. After this they try to prove the opposite of these experiments, leading them into non-scientific ways to produce false results. These false results are then being built upon, leading to more false results. The secondary data gathered by flat earthers is not a valid source, dismissing the abundant amount of evidence to the contrary.

7. What is the role of social media shaping your beliefs and your knowledge? How does social media shape conspiracy theories? Social media does not favour the truth, but rather the quantity of certain beliefs. This can have a financial or political merit for certain parties, making it interesting for them to amplify beliefs that fit their agenda. In this way, social media amplifies anti-scientific way of thinking. Personal algorithms can also keep people trapped in their beliefs, only offering them ideas that fit their beliefs. To keep these people engaged and to keep them on these social media sites, the ideas they offer need to keep being more

II. Attention Please!

1. Does your country have an active and robust civil society?

In the Netherlands there is an active civil society. People often come together through shared interests, but also to protest actions being taken in their neighborhoods. Posters being distributed for example are a common form of protest, allowing a relatively small group to have a large impact, while still leaving inhabitants with a choice to not put the poster up.

In Korea it is very different because it is still focused on development. There was a time when activity of civil society bloomed during the 2000s, but was then silenced due to the emergence of neoliberal policies more in favor of the market. However, due to recent political events the civil society base is getting more stronger.

2. What are structural inequalities and injustices?

We define structural inequalities and injustices as the limitation to a person’s freedom or right through institutions, customs, or systems that were built by the groups that benefit from these inequalities. Often it is the oppression of minority groups who lack power and social status, making it hard to change the system in their favor, apartheid or Jim Crow laws are a good example of this.

However, it is not necessarily a minority group that faces the consequences of structural inequalities. The top 1% currently is changing the system to oppress the 99% under them.

3. That are some problems of networked/multilevel governance?

Multilevel governance involves different actors on different levels, therefore fragmenting the level of responsibilities and accountabilities, therefore creating less transparency. Furthermore, it makes the decision-making process more complex and time-consuming. In the end, the effectivity of this governance method can be put in question, because ultimately there is one overarching body that takes the decision, therefore exercises more power over other actors.

4. What is the role of conflict in the planning and design process?

Conflict arises when certain concerns and priorities are being ignored by those in power. It can create a good dialogue and expose these concerns, making the project more inclusive to those having problems with it. However, it can turn into an unhealthy conflict very quickly, when people have the feeling that they are being ignored. In our eyes, involving people from the start creates a more inclusive environment where people will be more willing to accept certain choices if they are communicated towards them.

* Bonus: Why is it beneficial for planning and design processes to have an active civil society?

We define an active civil society as a diverse group of civil actors that collectively and actively take responsibility in shaping society. Having a healthy and active civil society is pivotal for the continuation of a strong democracy. When certain aspects of society are not being held in check by democratic action by its inhabitants, it is vulnerable to being exploited by more authoritarian forces or unregulated markets.

III. The Idea of Justice

1. What do you think are the great societal challenges of our times?

We believe that the increasing economic and political polarization is the biggest challenge we are currently facing. Worsening inequality and rising fascism block democratic communication that is necessary for solving critical issues such as climate change and other societal problems.

2. How does space (and especially urban space) play a role in justice?

“Cities are spaces where we simultaneously cooperate and compete for resources, and where we must decide together how these resources are distributed and shared.” [Urban] space gives way for asymmetrical power relations in which justice is required to make it operate fairly. Because spaces are important sources of income and a desired resource in dense urban settings, how they are distributed and accessible to different groups of people can generate serious inequality as well as help build just societies.

3. How can spatial planning be an instrument for democracy building and democracy strengthening?

Spatial planning has to take into account every stakeholder’s needs. This process consists of finding the right balance among the different agendas and demands of diverse groups. Therefore, spatial planning is an instrument where the right to the city can be actively exercised by all parties involved.

Participation is an important tool to help achieve this right to the city, allowing people to voice their opinions about important decisions. Participative planning thus encourages involvement of citizens in decisions of their own surroundings, stimulating a more democratic process of creating spaces which can be extended into the political realm.

4. How do you see the issue of ‘the rights of nature’? Is it feasible?

We believe that we should respect and treat nature as equal living beings, as if they have the right to exist without unnecessary pain on this planet. However, the concept of ‘rights of nature’ bestowed by humans is also quite condescending in a sense that nature would need a man-made framework and systems to sustain life.

We are skeptical about its feasibility, especially in developing countries or communities that are experiencing threats to their own human rights. Furthermore, we are too used to the notion of exploiting nature for our benefit. Even the sustainability approach focuses on the long-term benefits healthy ecosystems will bring to us, rather than their right to exist on their own.

* Explain in your own words what Doreen Massey says about urban space?

The city is a place where different people are forced to live side by side, with different lifestyles, agendas, and opinions. They consume different resources for various motives, so they become highly sensitive to the issue of distribution. In other words, people are living in their own bubbles

arguing for their own rights; not truly interacting with each other. Because their numbers and powers vary, it is not always possible to find the right balance that will satisfy everyone. Therefore it is a place where political dynamics are of critical importance.

The urban space being the dimension of the social can be seen as the multiple possibilities for social interaction that an urban space facilitates. Jane Jacobs describes the sidewalk as a space where social contracts are made, either verbally, as in neighbors becoming friends, or nonverbally as social contracts where people are looking out for each other.

IV. I have a dream!

1. Why is coordination in planning a challenge?

Projects in planning involve a lot of different stakeholders, from companies to individual citizens. Since the voices of all these stakeholders are valued equal, their interests and concerns need to be equally considered. These stakeholders may have different ideas on how to solve problems and thus lead to conflict. This conflict is central in the challenge of coordination in planning, which results in a more time and energy consuming design process.

Moreover, political differences and changes in policy can affect the outcome of a project, especially when stakeholders are not willing to take concessions and put a halt in the implementation of urban plans, for example through court trials.

2. Why can't super computers model our cities well?

While the problem starts at the complexity of cities, with all its inhabitants, systems and structures, the real difficulty of modelling a city is the unpredictability of humanity. This can come down to computers not being able to truly understand the morals and sentiments within society, but also to the political whims that institutions, like cities, are prone to. These aspects can change very suddenly due to internal or external forces, which makes it harder to model an accurate portrayal of these systems.

3. What is the Dutch government's vision for climate change? Is it enough?

The Dutch government's vision is predominantly technology oriented, placing their faith in optimizing polluting industries and systems to such a degree that they can offset the emissions with other programs. They also place too much faith in the free market and rely on private companies to change their ways. While they encourage these changes through policy and tax cuts, these are usually short-sighted and fail to address the actual problems, such as tax cuts on electric vehicles, which will only benefit the rich. More people need to be made aware of the very real dangers of climate change, especially to a country that is for 50% of its landmass reliant on infrastructure preventing floods. The government is failing the people that do not have the means to enact actual changes and condemning them to living with the problems that will eventually arise.

Basically, the stance of the government is way too passive. We are not meeting the agreed upon goals to stop climate change, current policies are simply not enough. The government should heavily invest in their own clean energy and not rely on the privatization of government agencies to solve anything.

4. What is communicative planning?

Communicative planning is a form of urban planning that takes the voices of invested stakeholders and translates them into implementation strategies. This strategy allows us to build cities that are better suited to the needs of its people and can strengthen and protect democracy.

It incorporates a bottom-up strategy, seeing planning as a formation of a public sphere where stakeholders come together to discuss issues at hand and reach consensus about a collective vision, benefiting all.

* What do the theories of Innes and Ostrom have in common?

We believe that both theories emphasize creating a stimulating climate for planning wherein the approach is very polycentric, to simulate urban planning process from different approaches. This has as a result that the viewpoints from other stakeholders that are impacted through urban planning are much better understood and form an incentive in increasing participation in the design process to achieve a just urban design.

(PS: Elinor Ostrom was indeed the first woman to win a Nobel prize in her respective field, but we believe that the first woman to win a Nobel prize was Madame Curie).

V. It's a Deal!

1. What happened during the Neolithic Revolution?

Around 10,000 BCE, people began to live in more permanent settlements committed to agriculture instead of relying on hunting and gathering. As their farming techniques improved, arable land became a coveted commodity since it enabled the owner to accumulate surplus production. Class division and complex governmental systems appeared to control the distribution of resources and manage growing populations. Cities evolved together with agriculture and social structures as cities were the places where surplus resources were concentrated and new systems were experimented.

2. Why do we need a new green deal? What's the name got to do with it?

The New Green Deal is based on a sense of urgency that the development of technology will not save the planet from climate crisis. It aims to reach a sustainable future by tackling issues of social justice and social inclusion as well as technological solutions. The name refers to Roosevelt's economic approach to cope with the great depression in the 1930s, where the state played an important actor in the market by economic reforms and public projects.

3. What is a habitat meeting and how many have there been?

Habitat meetings are held by UN to recognize the need for sustainable human settlements and rapid urbanization of cities, especially in developing countries. It initially focused on strategies to provide adequate settlements in the large-scale migration to cities, whereas now it also discusses impacts of climate change. In total there have been three meetings: 1976 in Vancouver (Canada), 1996 in Istanbul (Turkey), and 2016 in Quito (Ecuador).

4. What's the connection between science and democracy?

Science and democracy are interrelated because they both shape how people think and behave. Science produces the knowledge upon which decisions are made, and opinions are formed. However, science always differentiates beliefs from facts: the objective of science is uncovering the truth, not imposing on what the scientists believe in. Democracy is also based on a system where people can discuss and negotiate with others that hold different opinions. Therefore, both science and democracy will not function if people cannot accept that the world may not align with their beliefs. This is why scientific thinking promotes democracy, and vice versa. Fascism undermines science on purpose because it is best for their benefit to hide or bias information, which will in turn manipulate people into thinking that what they believe are facts. So dismantling science will also result in the destruction of democracy.

VI. Do Artefacts Have Policies?

1. Why does it sound a bit off to say that objects have politics?

We are still living in a period where technology on its own cannot operate and solve wicked problems. The failure of modernist ideals has proven that artefacts alone cannot shape our societies. However, these conceptions have led us to think technology exists neutrally, only to fulfill some practical(functional) purposes: that they are results of an internal technological dynamic, free of politics. Certainly, humans who are still at the helm and bearing the responsibility are the ones political? However, objects limit or induce our behaviors that align with certain political beliefs or power structures. AI is a good example, which seems neutral but is actually exposed to bias and malicious intent that will influence our thinking. A future where AI technology makes decisions for us is coming close. And it won't be free of politics.

2. What are examples of spatial expressions of political ideologies?

Two main examples mentioned in the text are the racist bridges by Robert Moses and Haussmannian boulevards. The low bridges in the Moses Parkway successfully prevented African American and Hispanic citizens to reach the beaches in Long Island by bus-their main modes of transport. Similarly, the Parisian boulevards planned by Haussman had the effect of cleaning out the slums and evicting the "undesirable" groups from the city center. Both projects were carried out with the objective of "cleansing" important public spaces by

segregating unwanted minorities.

3. What may solar panels produce in terms of internal political relationships?

Solar panels are a more decentralized form which gives individuals more control over their energy production and consumption. This fragmentation requires a different kind of governance, because it puts less constraints on the users unlike the top-down hierarchic approach, giving people more freedom on how and where solar energy is applied. The article argues that due to fragmentation chances of forming solidarity and coordination are reduced. However, in the Netherlands energy cooperatives started to emerge forming a network where electricity is shared, therefore giving more power to the citizens, perhaps also more political influence. One can question whether this is a good example, since the energy providers who own and control the electric grid still hold the power on pricing, which gives them more power than these individuals and organized energy cooperatives.

4. How does Facebook undermine democracy? In your opinion, does it simultaneously help democracy?

In a way Facebook strengthens the forming of biases and distribution of fake news due to the use of their algorithms. Algorithms are powerful tools and learn quick, which they use to outsmart humans by shaping and even strengthening certain types of human behavior and thinking. To increase or sustain the time people are hooked to their platform, Facebook's algorithms

evolved into a system that exposes their users to contents that either strongly confirm user's existing beliefs or causes violent outrages from them. Facebook's algorithms (along with other social media) played a huge role in exacerbating political polarization during the last decade. Moreover, algorithms are programmed by people and can inherit implicit biases from programmers, therefore becoming more selective in forming and segregating groups. Facebook's algorithms (along with other social media) played a huge role in exacerbating political polarization during the last decade.

These forms of social media can be used as a democratic tool, to create an environment where information is shared, and people can connect for the sake of society or the planet. The most famous example would be the Arab Spring. However, a certain level of supervision and policies are required to maintain control and prevent excessive abuse and manipulation of content circulated on social media. Nowadays these social media platforms are rather used as geopolitical tools to radicalize social groups against each other, leading to further polarization rather than a form of information and knowledge sharing to highlight social and environmental issues and make people more aware. If these platforms are left free to maximize their profits, the chances of them becoming a public sphere where healthy discussions bloom are very low.

