Figure 0.1, Collage Industry and Community

SPELL CHECKING INDUSTRY

Closing the **language barrier**

Report AR2U086 R&D

COLOPHON

ABSTRACT

They have lived there for all their lives, seen their surrounding areas developed and are now again under threat. The villages around Sittard and Geleen endure an increasing pressure of industrial growth in the region (Dolhain, 2025). With the energy transition, by the creation of one of the first green energy hubs in the Netherlands (Ministerie van Economische Zaken en Klimaat, 2024), this pressure is set to increase outside of their power to hold back. Simultaneously, the social power and capital of their villages is being undermined. A weak regional economy has continued to push young citizens to the west, seeking for opportunities, leaving the population to decline for almost 2 decades (CBS, 2022). The aging and shrinking population forces facilities to shut down or to concentrate farther, out of the reach of the villages, decreasing the social capital of the communities even more (Elzerman & Bontje, 2015; Gross, 2007). These combined factors create a risk of unchecked industrial growth. With declining power of the rural communities, their beloved villages and the centuries old culture landscape of Limburg could be displaced or lost for the coming generations.

An alternative must be found to ensure- that the voices of the communities are heard, and the landscape gets preserved for future generations. At the same time, it must recognize that industrial growth and the coming energy transition are a neces- sity for regional economic resilience. The challenge, and the opportunity, is to devel- op harmony between progress, preserva- tion and the people.

The alternative is sought on two interconnected scales. Locally, the goal is to systematically empower and strengthen rural communities by granting them greater influence over their regional landscape, regardless of land ownership. Nationally, the ambition is to reshape how similar communities govern across the Netherlands, transforming spatial planning and legislation into a more collaborative, adaptive and community-driven process. Spatially, future development will be envisioned through the eyes of the community, whole respecting the 'grammar' of the local landscape. The resulting strategy aims to preserve, strengthen and connect both community and landscape while ensuring long-term economic resilience for the region.

Keywords: Energy transition, Landscape grammar, Social capital, Sustainable Growth, Equitable participation

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1.0 INTRODUCTION

Contents

1.1 Introduction

The Dutch landscape face a drastic change within the coming decades. As the country faces many spatial demands for housing, nature, water safety and the energy transition, the pressure on the limited space within the country is increasing (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020). This pressure is felt more in the underdeveloped rural regions, that play a large role in the expanding spatial demands from all the challenges. The energy transition is a big contributor to this pressure, with both energy production and infrastructure taking up more space in the future as demand for electricity will grow significantly (TNO, 2021). Although their important positioning for providing solutions for the spatial challenges, Rural communities often do not see equitable benefits from the creation of this infrastructure in their landscape As their power often does not compare to those of the beneficiaries their position in the development system is often overlooked. Within this report we will work from such an area, the Greatheide Plateau, to work from the position of these rural communities to create a more equitable development system. Within this introduction the region and problem will be introduced from the perspective of this community

Figure 1.0, Industrial area of Chemelot seen from Elsloo looking at the north (Chemelot, 2024).

1.2 Context of the community

"A couple of kilometres from my home, I have enjoyed the fluttering and teeming around my observation hut for almost 20 years. It makes up for a lot" (Schuttelaar, 2025) a short passage from a driven bird watcher does more than capture his daily hobby, but it gives and feeling for the region of the Greatheide Plateau. Tucked between the cities of Sittard, Geleen and the industrial complex of Chemelot, this rural area stands in contrast with its direct surroundings (See figure 1.1). Where busyness reigns, this rural area stands as a beacon of silence and tranquility. It is how the people living here would describe this region, like Sjra Geurts. Sjra Geurts is one of the representatives for the village Guttecoven, a retired data analyst, describes the character of the area as: 'a tight-knit community of villages, bounded by their landscape. He stresses the importance of their communal heritage and connection to the landscape. The villages of the Greatheide Plateau can trace their history back to the 9th century, when King Zwentibold opened that forested plateau for exploitation (Graetheide comite, n.d.; Buurtvereniging Graetheide, 2019). Over a 1000-year period this region became a communal landscape, transitioning from forest to wild heath and eventually to farms. Although this communal land ended in the 19th century, the bond between the villages translates to today with many of them working together on issues in the surrounding areas, creating a cohesive voice for the villages. Still there is reason for concern. Hub Slangen is part of the committee for Greatheide, an activist group, and he is one of the 260 longtime residents of the village of Greatheide. For over 5 decades his committee has been working on protecting this area from development and striving for the protection of his village and the landscape, and for good reason. The pressures put on by the surrounding areas makes the rural areas prime space for future development, right in the path of the villages and the landscape (Slangen, 2025). They fear a loss of their community, their peaceful surroundings and the farmland, that in their hearts still belongs to the villages.
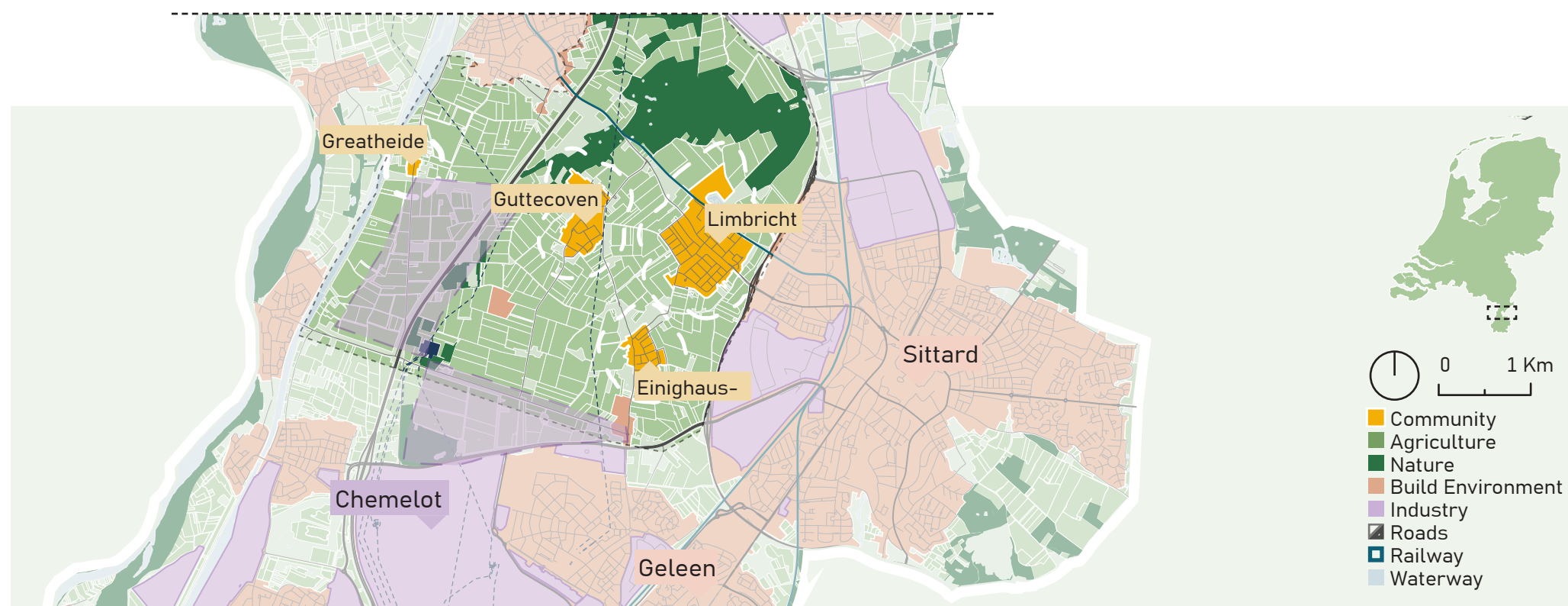
Figure 1.1 Graetheide plateau *(based on data CBS (2021) and Openstreetmap)*

It is nice here, quite, open and green

't is gód hier, rustig, oape en groen

Working together is in our blood and landscape

Samenwerking zit in ons bloed en landschap

GRAETHEIDE ROEN

GUTTECOVEN
GEM. SITTARD

Figure 1.2 Community and the landscape of the Graetheide Plateau
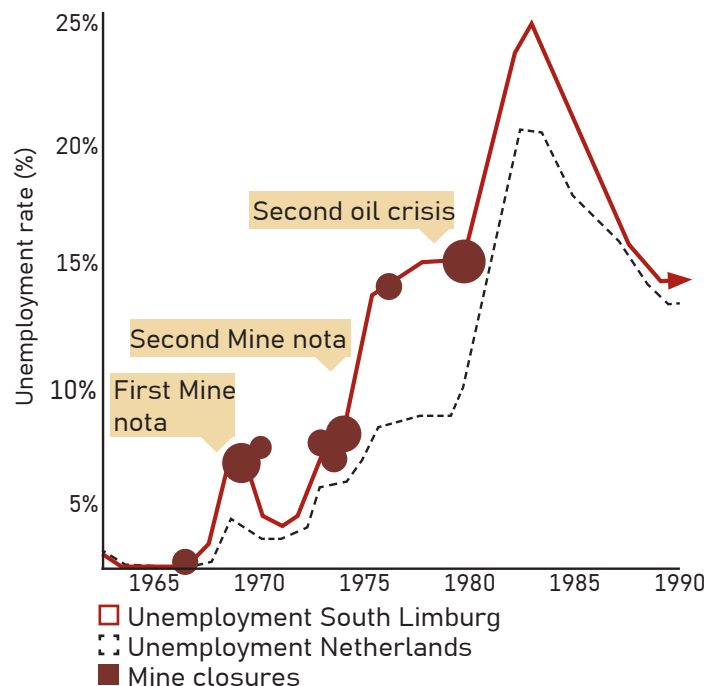
Historical context

Figure 1.3 Unemployment in South Limburg Compared to the Netherlands (Etil & Sociaal Historich Centrum voor Limburg, 2012)

The Greatheide region, like many areas in Limburg, has a complicated history with industrial and development pressures. For centuries, the area was defined by its agrarian economy, with a landscape shaped by communal farmland, patchwork fields and forested areas. While resource mining was part of the culture it was mainly done on the smaller scale (Voncken, 2008). But with the advent of the industrial revolution in the Netherlands around 1900 this changed rapidly. Going from small scale mining, suddenly huge mines were set up from both from the state and particulars. Rapid industrial growth created massive growth in both infrastructure and urbanization, seeing the population of Heerlen grow almost 500% from 1900 to 1930 (Voncken, 2008; Etil & Sociaal Historich Centrum voor Limburg, 2012). At the highest point almost 48% of the population worked for the mines directly, with 75000 jobs being indirectly and directly connected to the mining industry. Just as fast as industry came in,

it slowed after the energy transition to oil and gas in the 60's. In a span of 10 years (1965-1975) most of the mines closed (Etil & Sociaal Historich Centrum voor Limburg, 2012; Sociaal Historisch Centrum, n.d.), most of the jobs were lost and the mines were dismantled almost immediately. The Government tried to invest in the region, with the mine-notas (1966 and 1969) and the remediation operation 'van zwart naar groen' (1975) several success stories came to, from the DSM-chemical plant (later Chemelot) and the creation of the VDL car factory (Etil & Sociaal Historich Centrum voor Limburg, 2012) trying to secure new jobs in the region. Yet to the 75.000 jobs, just 14.000 were added after 1974. The lack of opportunity in Limburg created an exodus of mostly younger people from the area (Kasper et al., 2013). Something the area has never truly recovered from. It still has big implications for the current and future of the province of Limburg and also for the rural communities.

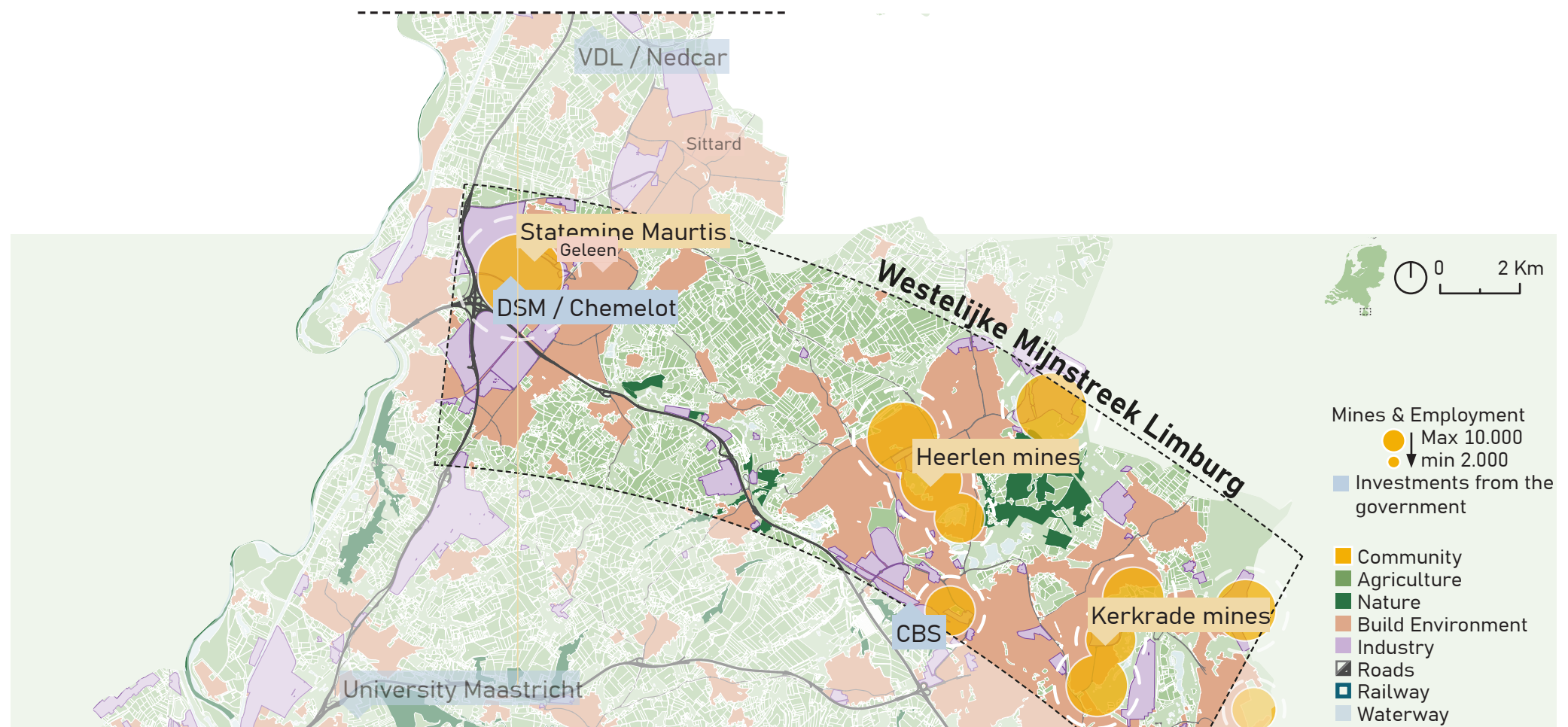Figure 1.4 Mines within Limburg (Etil & Sociaal Historich Centrum voor Limburg, 2012)

I grew up with and in the mines,
but now nothing is left

ich bin opgegroeid in en mit de mien, noé is er niks mieë va over

Figure 1.5 Community and the landscape of the Graetheide Plateau

Social pressures

A lack of opportunity after the closures of the mines painted the picture for the next decades of Limburg (Etil & Sociaal Historich Centrum voor Limburg, 2012). Where the population of the Netherlands grew steadily with 10%, the population of Limburg has seen a steady decline form the 2000's by –5% (CBS, 2025; Janssen, 2024). This is still an echo of the closures of the mines. A lack of natural growth in the population and an exodus of the young workforce in the 70's and 80's has meant that a large part of the population now consists of people over 55+. This means that despite the decline in population due to a lack of opportunity, the economic viability of the region is also pressured by a lack of available workforce in the future (WERKbedrijf, 2023). Getting a younger workforce to the area is therefore important for the future of the region. Yet, with the closure of the mines and the decline of population, many facilities have been lost. For decades the economic and demographic echoes of the mining closures have weakened the social facilities in the region (Janssen, 2024). Schools, care homes and simple facilities such as bakeries and supermarkets have been lost within the villages, making them unable to attract new residents. The lack of a new generation and faculties undermine the social capital of the villages (Gross, 2017) and their future viability.

Population

−10% 0 −5%

Decline regions

0 20 Km

Figure 1.6 Population growth 2021–2035 & Decline regions based on CBS (2022)

Facilities

Total
+0.4

Housing
+0.5

Environment
+0.0

Facilities
−0.8

Social cohesion
+0.2

Safety
+0.3

figure 1.7 Liveability Guttecoven 2022, based on Leefbarometer (Ministerie van Binnenlandse Zaken en Koningkijksrelaties, 2022)

Aging

Lim: 25.36%
NL: 19.7%

Lim: 27.9%
NL: 27.0%

Lim: 22.7%
NL: 28.0%

Lim: 11.3%
NL: 13.0%

Lim: 12.7%
NL: 16.5%

Figure 1.8 Population based on age Limburg (CBS,2022)

45–25   80+   NL
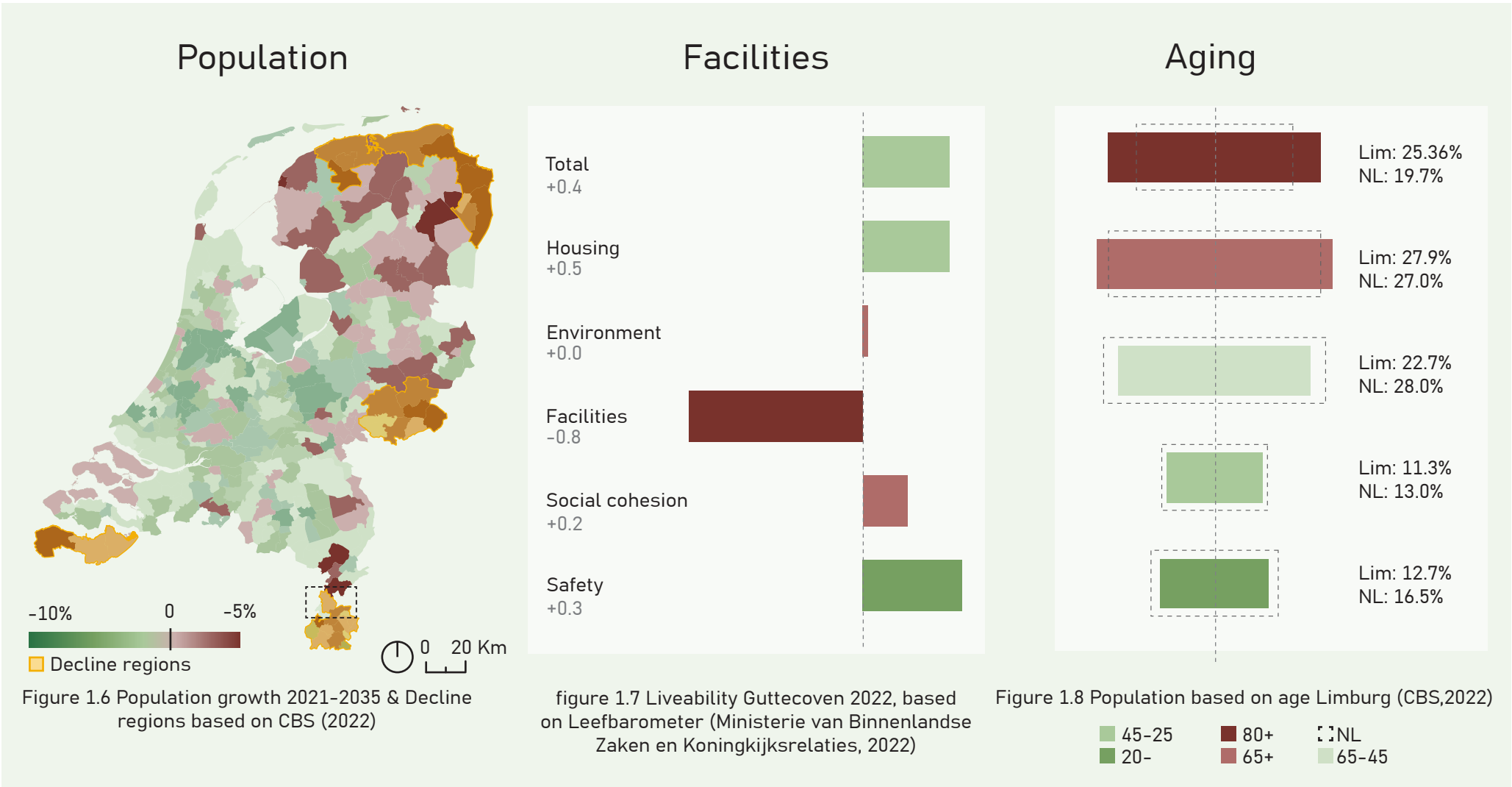20–   65+   65–45

Figure 1.9 Community and the landscape of the Graetheide Plateau

Industrial pressure

As part of the closures of the mines, major investments were made in alternatives industries within the Limburg area. For the Greatheide area, these investments were mainly focused on the Chemelot plant, at that time known as DSM. Chemelot serves as a combination name for an assortment of companies specialized in the production of Chemical products, such as fertilizers and plastics (...). The expansive growth of Chemelot and success as a replacement for the mining jobs made it a symbol for the reassurance of Limburg. Yet, it also put major pressures on the area, mainly the Greatheide area. Major parts of the Plateau were transformed into expansive chemical industries and still to this day the area around the village of Greatheide is reserved for expansion of industry, with major parts already cleared of housing. Apart from the scale of the industrial complex, it also demands a lot of infrastructure for its production chain. Both raw materials, electricity and energy have to be brought in by major infrastructure varying from pipelines, highways, high-voltage cables and river harbors. The strain the major industrial player puts on the region is the biggest pressure for development the Greatheide Plateau faces and with its economic importance it often is put in front of the interest of the community.
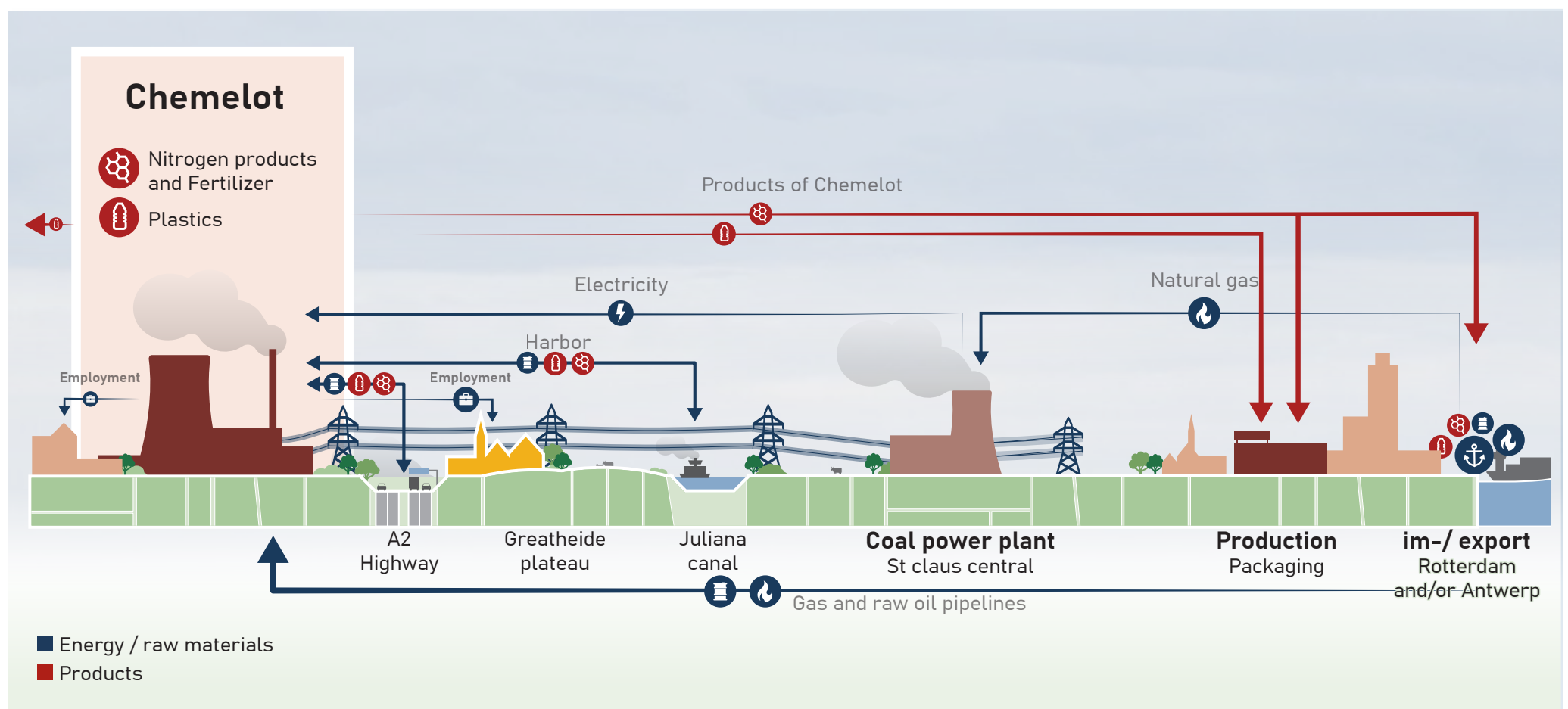

Figure 1.10 Systemic section Supply Chain Chemelot

Figure 1.11 Community and the landscape of the Graetheide Plateau

Energy transition

The strain of Chemelot on the region becomes more pronounced in the coming decades. As the chemical industry accounts for 48% of the energy use, its position in the energy transition is important to make sure to reach the goals set for climate neutrality in 2050. As the chemical industry is mainly reliant on fossil fuels for energy and production a major shift is needed. This shift will demand a restructuring and expansion of the infrastructure available. Electrification of processes demands new infrastructure with higher capacity. Direct high voltage lines from offshore wind parks (a wind energy landing (VAWOZ)) Bring in reliable sustainable energy. Other new energy sources like Hydrogen will need completely new infrastructure for production and transport. All this new infrastructure will be set up so that clusters with high energy use (Like the harbor in Rotterdam, Eemshaven and Chemelot) will become energy hubs for sustainable energy. The coming together of all this new infrastructure in this area will mean a cleaner and climate neutral industry. But for the surrounding area it will mean the creation of high development of energy infrastructure and industries that will want to establish themselves in a sustainable energy hub.
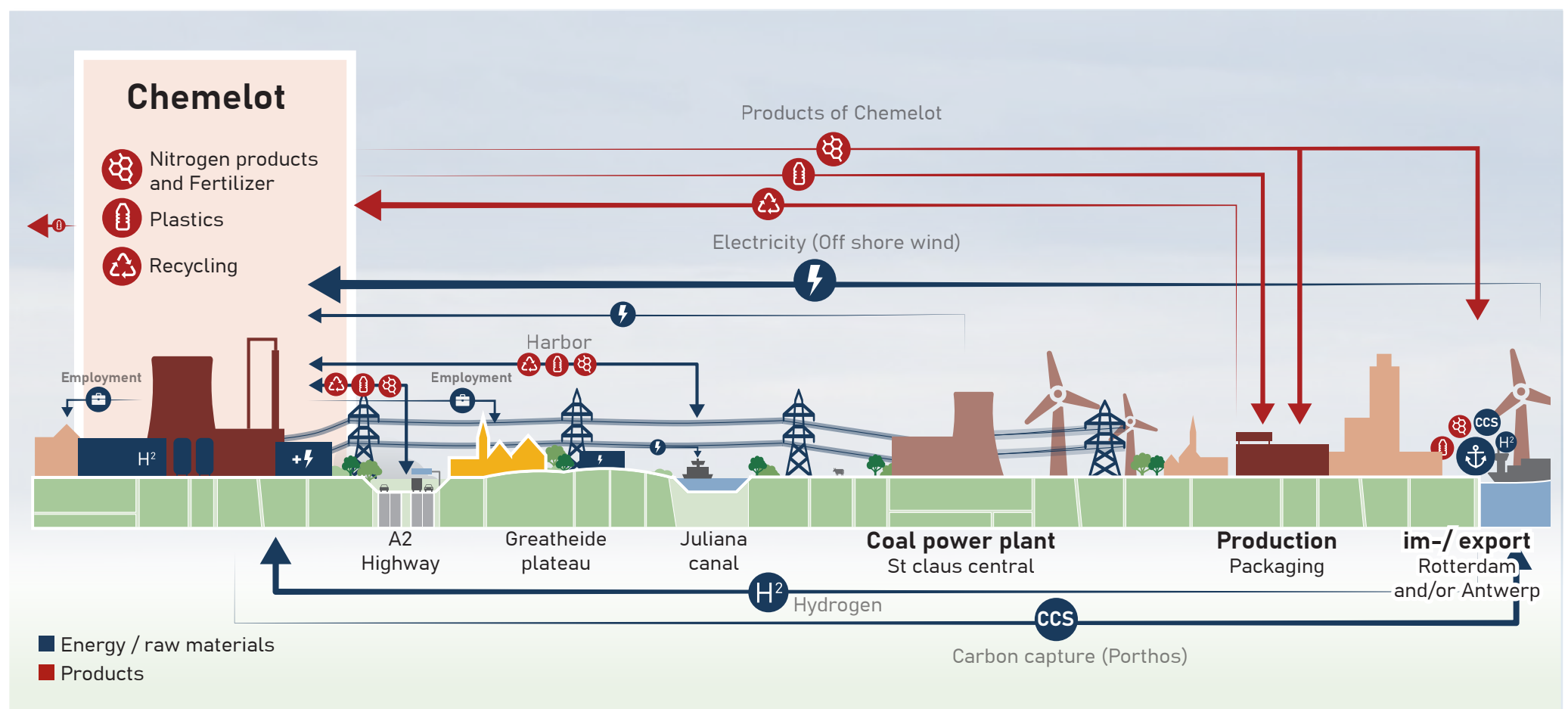

Figure 1.12 Systemic Section supply chain Chemelot after envisioned transiotion (Chemelot,2024)

Figure 1.13 Community and the landscape of the Graetheide Plateau

PROBLEM STATEMENT

The Greatheide plateau is a unique region in the South of Limburg where the societal problems from the rural areas come together with the conflicts surrounding the energy transition.

The conflict is one that has shaped the south of Limburg for a long time. With coal industry taking over the region for almost 50 years, much of the area has rapidly developed around energy and development, shaping the landscape of the Plateau. This has given the area prosperity for those 50 years but has led to major unrest after they were shut down in the advent of a major national shift from coal to oil and gas.

As the Dutch government pursues a new energy transition, the area is ones again asked to change and develop into a new energy hub. Yet the villages fear a surge in development, just as happened with the mines. Major infrastructure will again break up their landscape with pipelines of hydrogen and high-voltage powerlines disrupting the open and varied landscape. The agglomeration of this energy infrastructure and sustainable energy sources will again attract development in the area, putting a higher demand on the undeveloped and in some parts ready to be developed parts of the Greatheide Plateau. With Chemelot and the industry benefiting majorly from the expansion of infrastructure it needs to be asked what there is for these villages that will have to live with this development. As their social capital is undermined there is a sense of fear among the residents that, despite their opposition, the lack of a powerful place on the table makes them skeptical and frightful for the future of their village.

Figure 1.14 Pressures on the community

1.4 Outline

Introduction:
From the point of view of a rural community in Limburg, we introduce the problem of drastic change of their landscape that will happen due to the energy transition and related industrial development. We explain the historical context of the previous energy transition away from coal and show what pressures the community is fearful of.

Methodology:
We structure our research into three themes, that also form the underlying structure of the report: Energy transition and industrial development, Community values and spatial justice, and Landscape. We explain our approach to the project, integrating important theoretical concepts into a conceptual framework, which forms the basis of our proposal. In the end we show a closer look at the research structure and our research and design methods.

National Analysis:
We start the analysis section of the report with an expert-view National analysis. Following the three underlying themes, we explain the energy transition, taking a special focus in the impacts and pressures on rural communities. We conclude by showing tension areas where these pressures combine, to explain why we chose Limburg for our project.

Regional Analysis:
In the second part of the analysis section, we analyze the regional and local aspects of the underlying themes. This includes an explanation of who the stakeholders who participate in the development and planning of the area are and what position the community has at the table. We also show the values of the community and the pressures it faces. This chapter is closed by a top-down landscape analysis, which we later propose be done in a more collaborative way for the purposes of real-life regional planning.

Vision:
To make the vision, we tried to step in the shoes of the community as well as possible. In the foundation of the vision lays the landscape grammar, which we elaborated to fit the impacts of energy transition, and we explain how the new and the existing landscape typologies relate. We propose the new energy landscape types to have a double use as a shield from uncontrolled industrial growth, and we envision "Hearts" and "Connectors" to strengthen the communities and connect them together and to opportunities. We conclude with a vision map that acts as the spatial basis of our strategy.

Strategy:
We explain how our design principles translate into goals for the strategy, and we anchor our interventions in the conceptual framework. And we present the spatial and policy measures to realize the proposal. We suggest how the research and design process could be done in a more collaborative way, proposing a systemic change to the Dutch planning law – Omgevingswet 2.0. The chapter is concluded by a timeline presenting a comprehensive overview of the strategy, and an overview of how we reach the goals, and policy recommendations for how to adapt the legislative system to allow for smooth implementation of our proposal.

Reflection:
We reflect on the value and the impact of the proposal, and we position it in relation to the concepts of spatial justice, public goods, and sustainability. We highlight the limitations of our approach and suggest possibilities for further research. We conclude with policy recommendations aimed at policy makers highlighting our takeaways, which can be applied in other projects and policies.

Self Reflection
Each member of the team reflects on the project from their personal stance.

References:
Overview of all the references and data sources used in our report.

2.0 Methodology

Contents

In the following chapter the research & design methodology is going to be explained through the main objectives, expected outcomes, main and sub questions, literature review, the research structure and methods to answer the primary and secondary questions. After that, the conceptual framework, a result of theoretical and empirical receptions is represented as an overall synthesis shaping the basis of the design & planning process.

2.1 Aims and Goals

Aims

The main aim of the project is to understand and maintain social and spatial values while facilitating the implementation of progressive developments within the existing context. Other than that, the overall aims are focused on sustainability as – in this case – will be the energy transition transforming the administrative, spatial, economic, and social structures of the urban and rural settlements shaping metropolitan areas. There will be space needed to fit in the new energy infrastructure while the stakeholders need to be coordinated encouraging or inhibiting the transformations on their working, commuting, and living areas (Balz et al.., 2025).

Goals

To have a better understanding of the goals, they can be broken down into prominent themes identified during the initial studies on the area which are the landscape, empowerment & preservation, and energy transition & (industrial) development.

Landscape

The goal is to percept and interpret the language of the landscape and how it is structured within the context of the region consisting of various typologies it has turned to so far.

Empowerment & Preservation

To identify the community values which have emerged from a local heritage is a goal to achieve. Also, to highlight their vulnerabilities as they may be exposed to several changes both socially and spatially. And, empowering them as one of the key actors concerning the development of their habitats and engaging with the planning and design procedures autonomously.

Energy Transition & (industrial) Development

Understanding the spatial needs and impacts of energy transition is a goal to realize the practicality of the transformations on the real-world scale and by knowing that, how they can be implemented in space while the non-spatial aspects considered simultaneously. Finding the most suitable instruments to fit the transition into the existing landscape grammar is also a priority.

Expected Outcomes

Based on the highlighted issues in the problem statement, the expected outcomes would be oriented towards the main themes.

Well-known Autonomous Communities

The smaller villages' communities would be identical and well-known among the other strong actors of the area able to raise their voice for their rights on their environment.

Communities Embedded in System

The communities will be embedded in the new systematic procedures of plans, development programs and policies on different scales, able to make considerable impact by participating in those procedures autonomously.

Provision of Instruments

There will be instruments provided for all actors, specifically the communities to have a better understanding of their context and take better actions based on the spatial grammars, circular systematic procedures and common grounds to interact and evolve with each other.

Spatial Common Grounds

It is expected that the residents would have their common grounds as the beating hearts within the logical distance from neighbouring villages sharing the open spaces and facilities within their openly protected heritage landscapes.

Energy Landscape

The existing landscape would turn to an evolved land integrated with renewable energy infrastructures holding the capacity to feed the power of the region along with its evolving spatial configuration.

Aligned Industrial Growth

The overgrowing industrial clusters would remain within their controlled development boundaries, following the principal steps towards sustainability accompany with transitioning to sufficient energy sources aligning with the common good goal.

2.2 Research Question

> ### HOW TO ENSURE EQUITABLE GROWTH WHILE UP KEEPING LOCAL VALUES OF COMMUNITY AND THE LANGUAGE OF THE LANDSCAPE?

Energy transition and (industrial) development

What are the spatial needs and impacts of energy transition in the region?

What is the time line of development?

What are the benefits and burdens and how are they distributed?

Community Values & Spatial Justice

What are the values of the community?

How to empower the community?

What are their vulnerabilities?

What are the local power dynamics and how can we influence them?

How is spatial development planned right now?

What are possible ways to intervene?

Landscape Grammar

What is the logic of the landscape?

How can the new growth fit in?

Making the statement with the problems the study area is engaged with, there are major and minor questions constructed to achieve a deeper understanding of the context and goals to be set towards the improvement of the current condition.
To be more precise, the sub questions are divided based on the three main theoretical concepts that are the orientations of this project. Those concepts are as follows:
- Energy transition & (industrial) development
- Empowerment & preservation
- Landscape

As the main question is an overview of the three main concepts mentioned above, the minor questions are going to be deliberated on the three conceptual aspects specifically.
The questions above are going to be answered based on the methodology in the following chapters.

Figure 2.1 Research Question Structure

3.3 Concepts

To envision how the research can be structured, it is critical to situate the research in the broader context. Within this section, theoretical concepts will be outlined that will stand central in throughout the process. Adding to this, broader personal principles will address certain boundaries that are inherent to the research.

▪ Energy transition and industrial growth

The energy transition was the initial kick-off for creating spatial strategies. The next step towards sustainable growth is to aim for the energy transition, when many industries and households are fossil fuel neutral by relying on renewable energy sources. But that is not just the case.

Renewable energy resources provide an opportunity for local governance or local energy production. Speaking of that, there will be a potential for a self-sufficient energy system. In other words, this may lead to a societal transformation throughout this transition (Van Der Schoor & Scholtens, 2014). However, this decentralization is not the favorite displacement for the private sector companies. In the Dutch case, renewable energy production is a 'soft' issue.

To elaborate on this matter, it can be said that 'Vested interests' and an individual's own stake in an investment or project especially where a financial gain or loss is possible may result in energy businesses seeing renewable energy as a threat to their business model, instead of adapting to it (Van Der Schoor & Scholtens, 2014).

As mentioned above, energy transition may somehow transform the existing societal spatial governance systems. In the province of Limburg, there are plenty of farmlands holding great potential to shape the future energy landscape. Despite the private sector's obstacles with their low interest in renewable energy sources, the farmlands have owners who will probably be convinced to let the transition take place in their fields.

The reason behind this is explained by Francis, Van Wart & Johnson (2014) that the consolidation of farmlands into larger production units erodes the economic viability and social capital of rural communities; the local cooperatives have the functionality to create scale efficiency on the local level. Also, learning from the tragedy of the commons (Garrett Hardin, 1968), disproportionate use of common resources to benefit an individual, leading to overuse, is an enlightening example to highlight the matter of decentralized energy production. Yet the farmers have to face some challenges.

It is tricky for farmers to get started with taking in the solar panels and windmills along with their crops since it is an aging industry under threat of bureaucracy inhibiting their decision-making for the land they own. On the other hand, the increase in land value is also making it quite challenging to accept the new implementations on the land (Francis et al, 2014).

This reflects the issue with the top-bottom governance and the necessity of local agencies making the energy transition feasible. This should lead to the future development of the area within the reshaped governing system. That is the stage where the next key concept was identified.

▪ Empowerment & Preservation

The study area can be considered as a rural-urban space. Rural-urban spaces are defined by their proximity to big cities and affected by rapid and aggressive processes of land occupancy and substitution of functions, planning the land frontier, urban-rural fringe, and transitional spaces (Buciega, Pitarch & Esparcia, 2009).

Rural-urban areas don't follow a universal usage or language. For example, in the Netherlands, increased use of networks, ecosystems, local identity, and real estate were the main events. And the view is shifting to the aesthetic and consumptive values of rural spaces. As the EU demands for preservation of natural spaces (Buciega et al, 2009; Steiner & Farmer, 2017). Also, studies in European cases indicate that most of the elderly (over 65, above the national average) may choose to live within the beautiful and quiet rural areas for their retirement (Buciega et al, 2009; Steiner & Farmer, 2017). It is obvious that, throughout the transition, landscape inhabitants need a prosperous life as well, but the question is how?

Spatial Justice

The energy transition brings spatial transformations into the landscape, which the literature argues that the changes may not be adequate for all of those exposed to it. The concept of spatial justice is a necessity to be taken into account. It's always been a matter of perceived fairness. Justice is the heart of a well-functioning society. Each spatial intervention is a creation of winners and losers within the area. There are also differentiations within this notion, causing challenges throughout the design, planning, strategy making and most importantly, implementation.

There are positionings like NIMBYism (Wolsink, 2000) that may inhibit the transition because of individual interests of locals. Or the most obvious is the growth of the private sector, attempting to extend its boundaries regardless of the vulnerability of civil society or natural inhabitants. These are some of the conflicts that cause issues within the communities and bring up the spatial justice mindset, balancing the benefits and burdens in a complex socio-spatial context (Hart, 2006).

Procedural Justice

Based on the arguments above, spatial justice is hard to execute in such complexity, while the transition would rely on the communities with the lowest power at the very moment. To remove this barrier, procedural justice may be it. Bronw and Pitcher (2005) define communities as basic units of social learning. A community is a set of people who are brought together by choice or force of circumstance and who have learned to live, work, and play together in a healthy condition.

Speaking of well-being, Layder (1988) suggests that having healthy communities would make a well-ordered group that has a role in environmental management. To elaborate more on the management concept, the community has characteristics to intervene.

Communities rely on their ability to adapt and change to ensure continuity. Rural communities' sustainability comes with community-mindedness, which includes active participation, neighborliness, accepting different points of view (newcomers), community support groups and communication networks (Syme and Nancarrow, 2001; Bronw and Pitcher, 2005).

To have a better understanding of social well-being, social capital can go through the assessment. By that analysis, it'll be possible to identify how a healthy community can respond to a challenge collectively. A community that can discuss and accept different viewpoints (Syme and Nancarrow, 2001; Bronw and Pitcher, 2005). Li et al (2019) argue that to build up such sustainable rural communities within their interrelated system, three conditions need to be met:

1. Development of new economic activities that can respond to potential urban demand
2. Local entrepreneurship for new activities
3. Social capital that can support entrepreneurship

However, the conditions take a considerable systematic change on several scales of governance.

Adaptive Planning & Policy implementation through collaborative planning

It has already been argued that communities which are rich in social well-being have a greater ability to evaluate and adapt to changes such as new infrastructure developments in their locality (Bronw and Pitcher, 2005). This will be the same with the energy transition, which new infrastructure emerging from it. It will take a new style of systematic design/planning process, like adaptive planning.

Sanderson (2009) describes adaptive planning as follows:

"Adaptive planning is about purposeful organization of space in spatial policy, plans, regulations and collaborations to be able to respond to changes… [It] helps to create space for change, to respond to change or to be ready for change."

Planning also comes with the ability to act adaptively for an effective policy while considering the uncertainties & dynamics (Sanderson, 2009). However, this concept needs to go through an experimental process of trial and error because of the uncertainty about its operationalization and practical implementation due to a lack of research (Sanderson, 2009). The other approach that may enhance the practicality of the planning is collaborative policy making.

The key point about the collaborative policy design is that it creates a sense of commitment to, and responsibility for, the implementation of the policy (strategy) between the participating actors (vertical and horizontal scale). It can also encourage independently functioning subsystems to comply with the new strategy to achieve common objectives (Ansel et al, 2017).

▪Landscape

Heading back from the Dutch practice, landscape protection & heritage are supported by bringing functionality and development to it, which sounds paradoxical. It has roots in studying the 'biography' of the landscape (Van Beek et al, 2008). The term 'biography' was first coined by Samuels (1979) as the definition of landscape historical transformation throughout time. The term 'biography' was chosen since the landscape faced the changes based on the willingness of individuals and groups living in it (Van Beek et al, 2008). On the other hand, the way nature changes the people's culture is also a footprint of landscape shaping the heritage (Galkova et al, 2020).

This transition has been handed down through generations as the landscape functionalities changed with it (Van Beek et al., 2008). This also shows that the way the landscape communicates with its inhabitants has transformed over time and shaped the existing spatial typologies. This leads to the need to learn the grammar of the landscape to achieve a holwistic understanding of how it looks and functions.

Mayall & Hall (2005) described the study of grammar to arrange and categorize them: *"…Grammatical rules can be defined to take objects from a landscape vocabulary, relate them to each other, and arrange them into patterns that describe a certain landscape character."*

As the landscape vocabulary consists of physical elements like buildings, trees and networks, it holds the abstract mental concepts that represent it at the same time. This will also help to design in a way that improves ecological quality (Mayall & Hall, 2005; Larcher & Baudry, 2012).

Future heritage will be different from the ones that are known at present. Energy transition will be a technological development integrated into the existing landscape. However, both the landscape and technology have their dynamics as well. Thus, the creation of a co-evolving context consisting of an energy landscape would be a time-relative process (Sijmons et al, 2014). Based on the importance of the co-existence and co-evolution of landscape and energy, learning energy development and landscape grammar is recognized as a necessity for further steps.

▪Baseline Principles

For clarifying the principles shaping the baseline of the project, the problem statement, research question, aims & goals, and theoretical concepts were taken into account and the final synthesis shaped the essence of the whole project.

The baseline principles can be defined as follows:

The Transition Will Happen, No Matter What

One of the main pillars of the project is the energy transition taking place in the existing context gradually starting from 2030. The whole process of the research, design, planning, and strategy making are done under the acknowledgement of this aim.

Communities Are The Heart

The project is oriented around the smaller villages' communities living and facing challenges with the industrial impacts along the tidal wave of the transition in their backyards or on their rooftops (Hart, 2006). Their ability to cry out for their rights as the stakeholders of common goods in an effective way is the focus. Also, how they are heard, engaged with, think or what instruments they must make an impact with, are taken into consideration throughout the whole process.

It's Not Another Block Road

Compared to the existing mindset of how the transition is treated (Francis et al 2014), the principle is to make the transition smoother but not block it. Industries, in terms of energy, will need to be controlled through their development aligning towards a way more sustainable path of production and consumption whilst their boundaries may transform confronting the landscape and communities' territories.

It Should Fit into the Landscape

Landscape is the prominent ground of all the implementations, functions, and transformations. It is the path that reflects the previous transformations (Van Beek et al., 2008). Moreover, decoding its language helps with deeper understanding of the structure by identifying the very spatial elements within it (Mayall & Hall, 2005; Larcher & Baudry, 2012). Based on that, the landscape can determine the thresholds, potentials, vulnerabilities, and limitations of every possible implementation.

2.4 Conceptual Model

The conceptual model depicts the relationship of the separate theoretical concepts introduced to see how they can be operationalised to achieve the outcomes & goals sought in the research questions. The conceptual model in figure 2.2 is separated into 4 different concepts.

Growth system

Empowerment

Filters
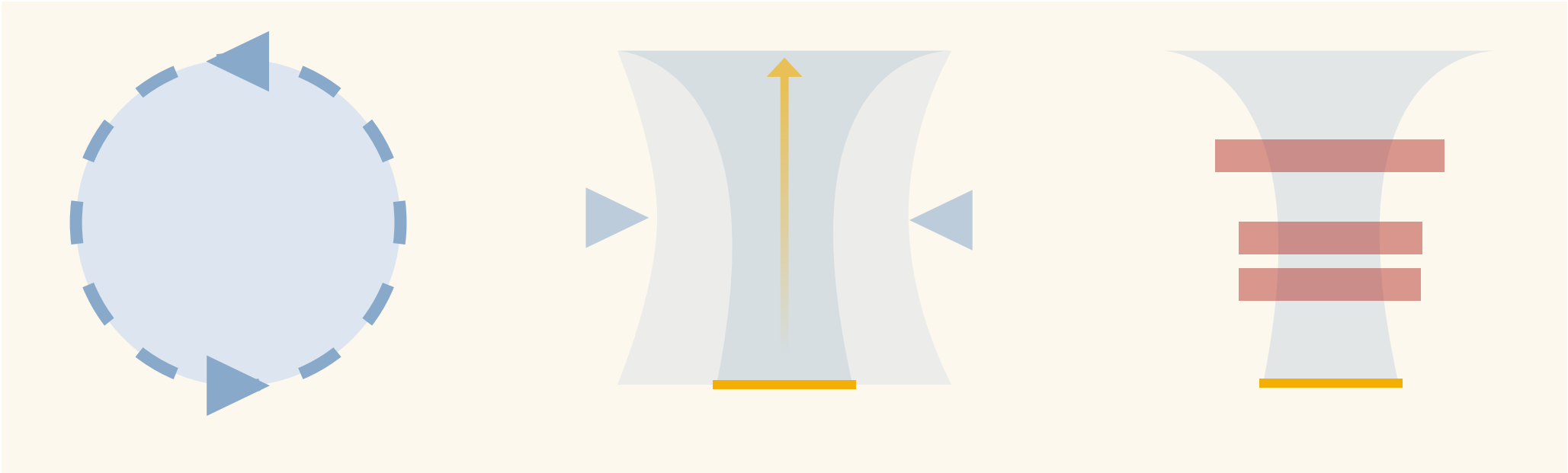
The first concept is the Growth system. From the theoretical concepts it is highlighted that the current development and administrative system is growth oriented and does not account for the community, plopping down on the community, not scaling it self to the community.

The second concept is the Empowerment of the community. Shown in Gross (2017) by improving the social capital of a community and empowerment within the process, the community can initialise power to conform the development process to its wishes.

The pinching motion initialises the formation of the development into a community orientated development. Additionally, this concept introduces the idea of moving the community directly to the growth oriented model to conform it without agencies.

By pinching the growth, it gets passed through filters that further compresses the development into a one that scales to the community. The first filter is the one of the landscapes, matching the development to the language of the landscape. The second filters are those of the values, account for the fact that development may not be in the interest of the community, but by conforming them to the values of the community they can be altered in a way that benefits them more.
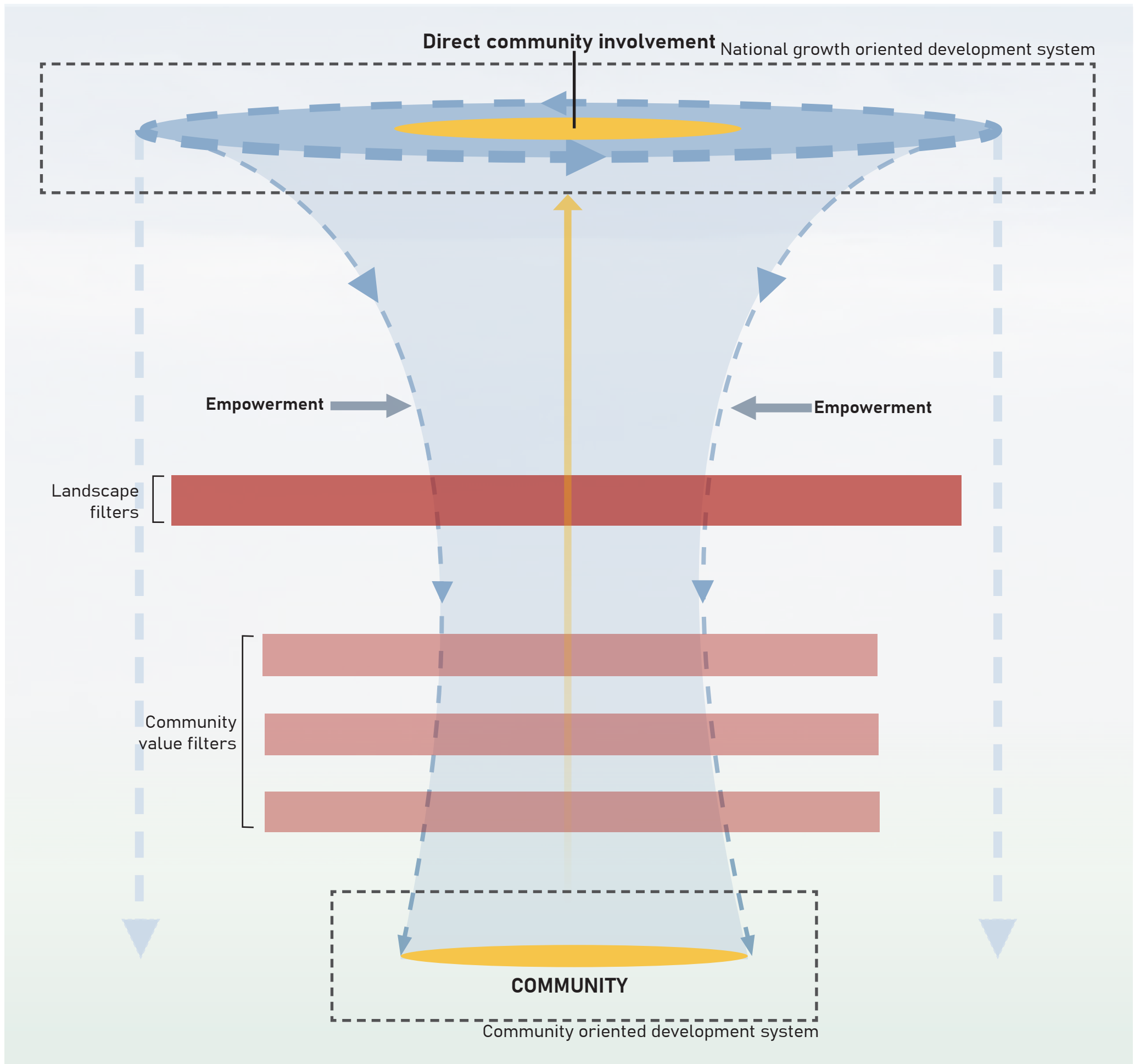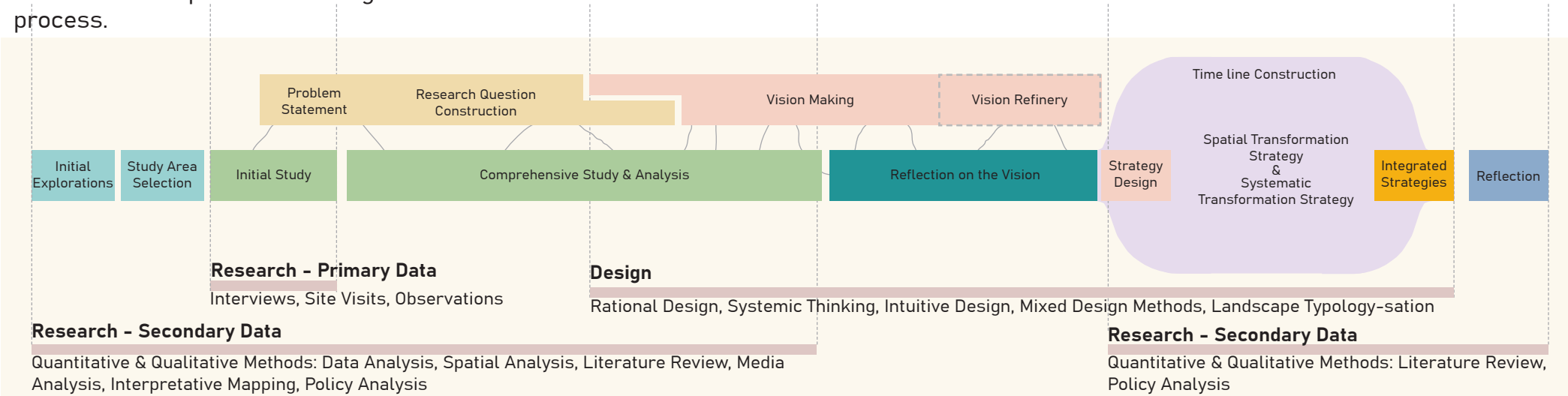
Figure 2.2 Conceptual Model

2.5 Research Structure and Methods

To explain the methodology of this process, the research structure is illustrated to showcase the combination of research & design methods to achieve the best outcomes as possible throughout the process.

Moreover, the explained methods are categorized and allocated specifically to answer the research questions.

Research – Primary Data
Interviews, Site Visits, Observations

Design
Rational Design, Systemic Thinking, Intuitive Design, Mixed Design Methods, Landscape Typology–sation

Research – Secondary Data
Quantitative & Qualitative Methods: Data Analysis, Spatial Analysis, Literature Review, Media Analysis, Interpretative Mapping, Policy Analysis

Research – Secondary Data
Quantitative & Qualitative Methods: Literature Review, Policy Analysis

Research – Primary Data ◼
Qualitative Methods
Interviews: Collecting data from groups of people associated with the study area by running street interviews and recording them.
Site Visit (Excursion): Collecting data by visiting the study area, doing observations, taking pictures, sketching etc. to have a more tangible understanding and impression from the area.

Research – Secondary Data ●
Quantitative Methods
Quantitative Data Analysis: The analysis based on quantified values such as census, graphs, population distribution, sector clustering etc.
Spatial Data Analysis Mapping: The analysis based on the spatial characteristics integrated with activity, local, economic and social variables like the network analysis, industrial activity clusterings, pipeline risk buffers, isochronous analysis based on walking distance etc.

Qualitative Methods
Policy Analysis: The analysis based on policy, legal, and administrative documents and plans on a multi scalar view point from national, regional, and local governments, assessing the systematic approaches and actions.
Literature Review: Scientific and non-scientific literature, websites, reports, also including reference projects to be utilized as reliable evidence and supporting material for the content creation.

Media Analysis: based on the collected contents from variable media platforms such as television, internet, social media, news, blogs etc.
Stakeholder Analysis: A combination of multiple methods (policy & media analysis, literature review) to assess the amount of holding stake of each target group associated with the study area based on the amount of power and interest that each actor holds.
Interpretative Mapping: The subjective interpretation of space and spatial features of located in the study area based on specific criteria like the historical mapping, landscape biography etc. ▶

Design
Rational Design: Data driven design by elaborating on (spatial) data based on parameters and thresholds (i.e. isochronous, proximities etc.) that have spatial or functional synergies within the context.
Intuitive Design: Creative visioning and drawing (i.e. sketching, creative writing, collaborative discussions, visionary statements etc.)
Mixed Design Methods: Both types of rational & intuitive design getting integrated and having synergies for a higher quality solution on multi-dimensional aspects.
Systemic Thinking: Systematic process design which was done based on the studying the legal and systematic structures of organizations on several scales. Learning the hierarchical procedures and existing functioning features.

Landscape Typology(sation): Study and classification of the existing landscape structure, creating a landscape grammar typology and a typology framework acting as a tool to envision

Supplementary ◆
The trial to step into the shoes of community as an extra method for the time that as an expert the condition is way ideal than expected.

Figure 1.3 Research Structure

HOW TO ENSURE EQUITABLE GROWTH WHILE UP KEEPING LOCAL VALUES OF COMMUNITY AND THE LANGUAGE OF THE LANDSCAPE?

Energy transition and (industrial) development

What are the spatial needs and impacts of energy transition in the region?

- Interview
- Site Visit (excursion)
- •
- Quantitative Data Analysis
- Spatial Data Analysis
- Interpretative Mapping
- •
- Rational Design
- Intuitive Design
- Landscape Typology(sation)

What is the time line of development?

- Literature Review
- Policy Analysis

What are the benefits and burdens and how are they distributed?

- Quantitative Data Analysis
- Spatial Data Analysis
- Literature Review
- Policy Analysis
- Media Analysis
- Stakeholder Analysis
- •
- Site Visit
- Interview
- •
- Intuitive Design
- Landscape Typology(sation)
- Systemic Thinking

Community Values & Spatial Justice

What are the values of the community?

- Interview
- Site Visit (excursion)
- Media Analysis
- Interpretative Mapping
- Intuitive Design
- Landscape Typology(sation)
- Community Lens

How to empower the community?

- Policy Analysis
- Stakeholder Analysis
- Literature Review
- Intuitive Design
- Mixed Design Methods
- Systemic Thinking
- Community Lens

What are their vulnerabilities?

- Policy Analysis
- Quantitative Data Analysis
- Literature Review
- Media Analysis
- Spatial Data Analysis
- Interview
- Community Lens

What are the local power dynamics and how can we influence them?

- Interview
- Site Visit (excursion)
- Media Analysis
- Interpretative Mapping
- Literature Review
- Policy Analysis
- Stakeholder Analysis
- Spatial Data Analysis
- Intuitive Design
- Rational Design
- Systemic Thinking
- Landscape Typology(sation)
- Community Lens

How is spatial development planned right now? What are possible ways to intervene?

- Policy Analysis
- Literature Review
- Interview
- Intuitive Design
- Rational Design
- Mixed Design Methods
- Landscape Typology(sation)

Landscape Grammar

What is the logic of the landscape?

- Interview
- Site Visit (excursion)
- Spatial Data Analysis
- Literature Review
- Interpretative Mapping
- Intuitive Design
- Landscape Typology(sation)
- Community Lens

How can the new growth fit in?

- Spatial Data Analysis
- Literature Review
- Interpretative Mapping
- Intuitive Design
- Rational Design
- Mixed Design Methods
- Landscape Typology(sation)
- Community Lens

3.0 National analysis

Contents

Working from the research questions and subsequent conceptual model several areas will be analyzed on multiple scales. This analysis will vary in three main categories that are central to the project. The first is the connection between (industrial) development and the energy transition and how they build on each other. The second is the search towards empowerment for our community to eventually preservation of vulnerable communities in respects to the energy transition. Lastly the Landscape will be analyzed. In this first chapter the analysis will be done on a national scale.

3.1 Energy Transition and Industrial Development

International (UN)   European (EU)   Netherlands

Paris agreement

Dutch Climate Law

European green deal

Kyoto protcol

Dutch Climate Agreement

European Climate Law

Rio summit

PEH + RES
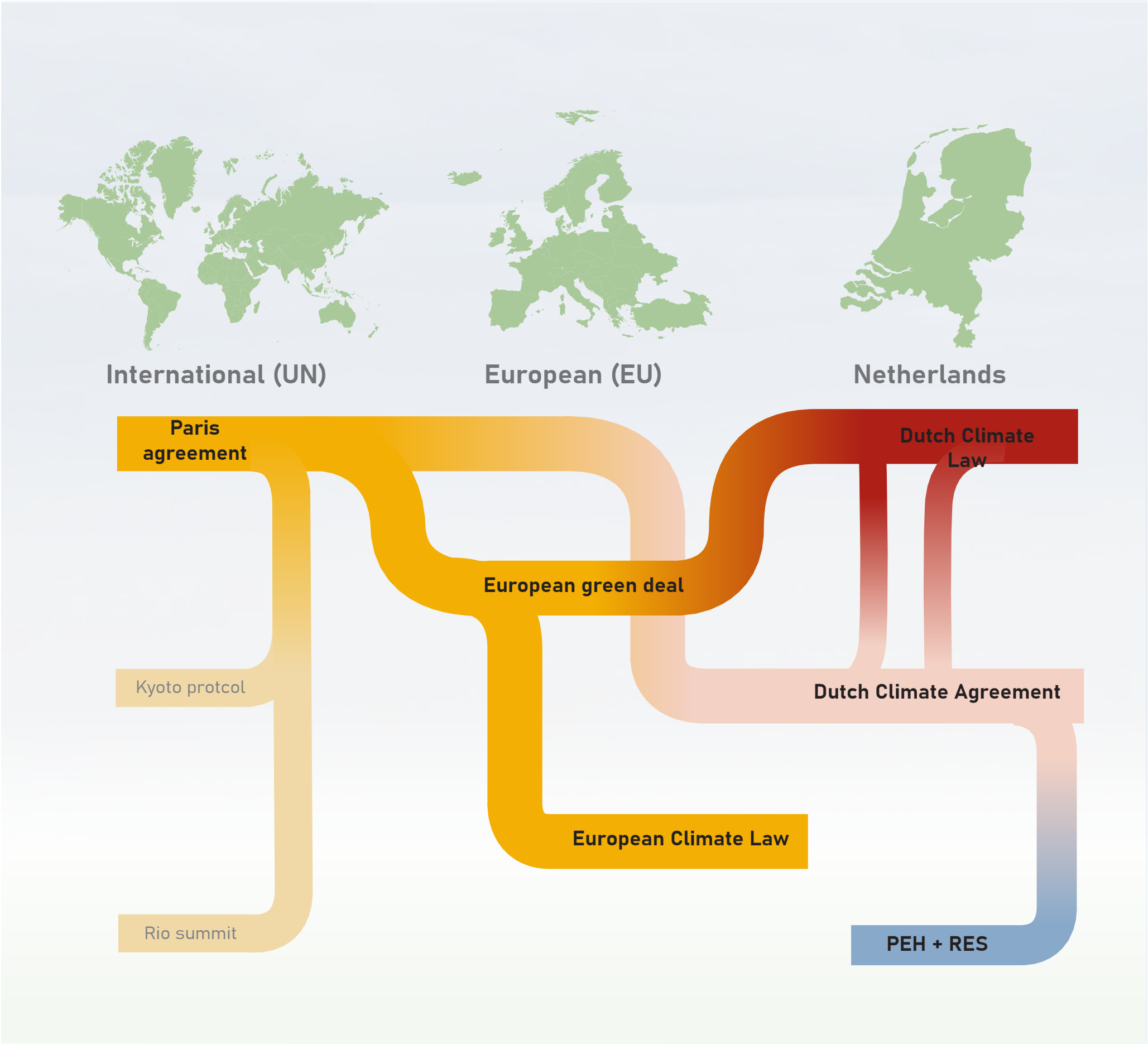
Figure 3.1 Policies surrounding the energy transition

▪Climate & Energy policy

The energy transition in the Netherlands is shaped by a combination of supranational agreements and national policy frameworks. Several international protocols stand as the foundation of both European and national policy. The most significant recent international treaty is the Paris agreement, adopted in 2015 (UNFCCC, 2015). This agreement is one of the few international binding treaties on climate change signed by 192 countries. It aims to limit global temperature rise to well below 2 degrees Celsius above pre-industrial levels, with efforts to cap it at 1.5 degrees. To achieve this overarching goal, the Paris agreements introduce several tools. Most notably are the Nationally Determined Contributions (NDCs), which require countries to outline and regularly update their plans to reduce greenhouse gas emissions). Although these contributions are not legally enforceable, the agreement does impose binding obligations regarding transparency and participation within the making of their policies. Countries also must submit updated NDCs every five years and participate in global stock takes, enabling international accountability and pressure for progress. Lastly the Paris agreements also introduced financial aid for the developing countries, both for the mitigation and adaptation of climate change. Although this has not been a success, where developed countries are apprehensive to give money, it introduces the idea of a just energy transitions, that strives to an equable outcome.

Building on the foundation of the Paris agreement, the European Union create a legislative framework trough the European green deal (European Commission, 2019) and the European Climate Law (Regulation (EU) (European Commision, 2021). The Green Deal, announced in 2019, set the European ambitions to become climate neutral in 2050, with an intermediate target of a 55% reduction in carbon emissions in 2030 (relative to 1990 levels). These targets where made legally binding trough the European Climate Law, adopted in July 2021 (European Commision, 2021). Importantly, just as the Paris agreement, the European climate law not only focusses on a reduction of greenhouse gas emission but also an equitable transition, although on a much smaller scale. To create a just transition, several mechanisms, like the Just Transition Mechanism (European Commision, 2021) where set up to support regions and sectors most effected by the energy transition. The mechanism provides both financial aid and structural assistance. Just like the Paris agreement, it also enforces the use of participation and transparency in the implementation of policy on the national scale.

At the national level the Netherlands operationalized these European aims and goals through the Dutch Climate Law (Klimaatwet) and the Dutch Climate Agreement (Klimaatakkoord). The climate law (Rijksoverheid, 2020), enacted in 2019, sets the legal foundation for Dutch climate policy, aligning it with the Eu targets: a 55% reduction in 2030 and climate neutrality (specified as a 95% reduction relative to 1990) in 2050. The Climate Agreements (Ministerie van Economische Zaken en Klimaat, 2019) is a multi-stakeholder agreement about the implementation of these goals, setting concrete actions across five key sectors for the reduction of greenhouse gas emissions.

The main goals for the energy transition are the electrification of most of the current sectors that use fossil fuels, and a shift from fossil energy sources to climate neutral ones. The Climate Agreement sets the aim at generation 74 TWh of sustainable electricity by 2030, of which 49TWh offshore and 35 onshore (Ministerie van Economische Zaken en Klimaat, 2019), which should account for 27% of the energy use in the Netherlands (Ministerie van Algemene Zaken, 2024).

To facilitate this transformation several planning frameworks where 2 are most notable:

The national Energy system Plan (Programma Energiehoofdstructuur, PEH) coordinates large-scale energy infrastructure at the national level, including production, transmission and storage (Ministerie van Economische Zaken en Klimaat, 2024a).

The Regional Energy Strategy (RES) provides a decentralized planning mechanism across 30 specified energy regions, collectively working on the creation of 35 TWh of sustainable energy on land. These regional strategies are developed collaboratively by municipalities, provinces, water boards and grid operators and represent regional interventions of the energy transition.

Within the framework of policies, it is clear how the energy transition and its interventions mainly function from a top-down approach. With both international and national ambitions being put upon smaller and smaller scales.
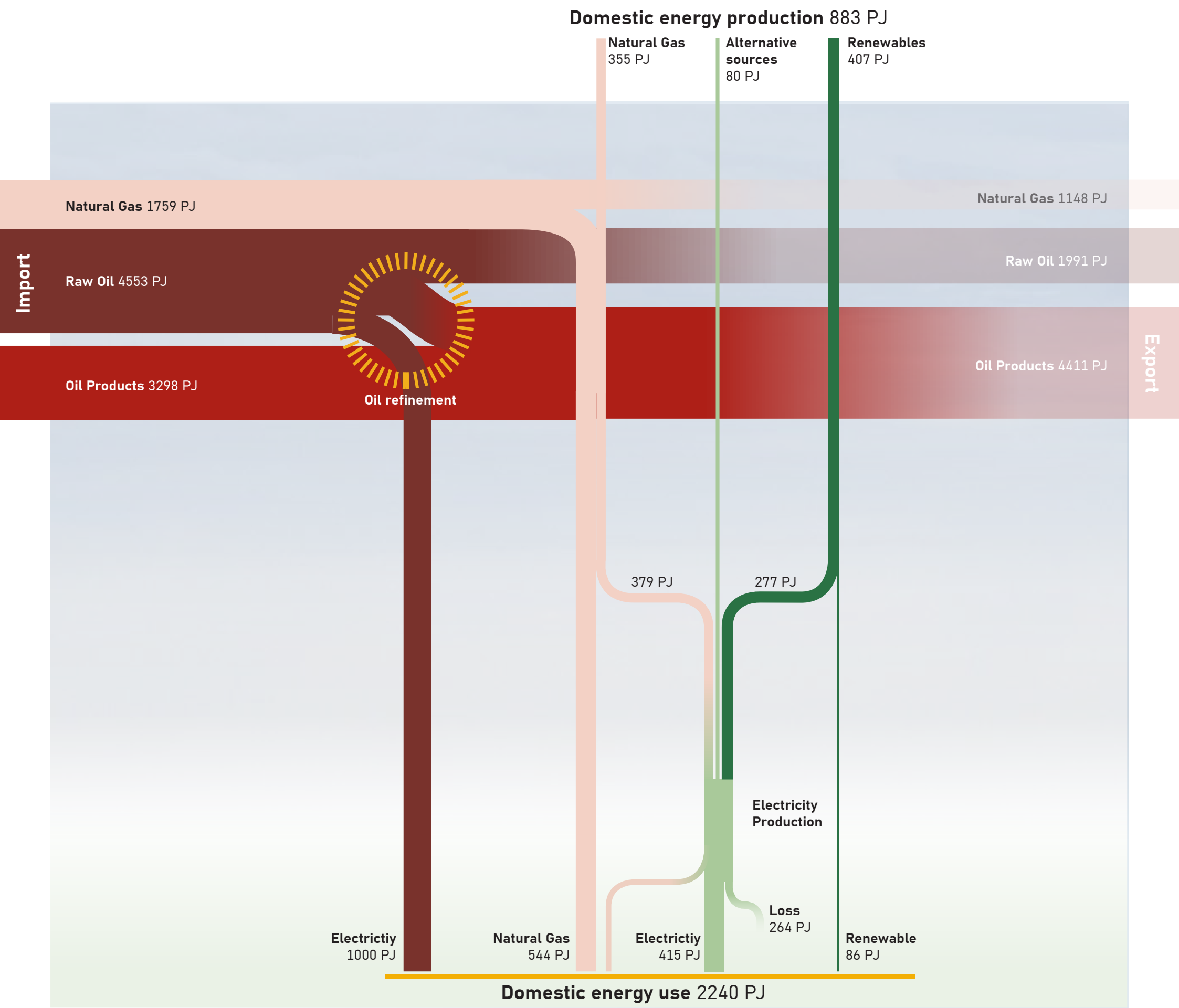
Domestic energy production 883 PJ

Natural Gas 355 PJ

Alternative sources 80 PJ

Renewables 407 PJ

Natural Gas 1148 PJ

Raw Oil 1991 PJ

Oil Products 4411 PJ

Import

Export

Natural Gas 1759 PJ

Raw Oil 4553 PJ

Oil Products 3298 PJ

Oil refinement

379 PJ

277 PJ

Electricity Production

Loss 264 PJ

Electrictiy 1000 PJ

Natural Gas 544 PJ

Electrictiy 415 PJ

Renewable 86 PJ

Domestic energy use 2240 PJ

Figure 3.2 Energy streams in the Netherlands 2023 (CLO, 2025b)

▪Energy use in the Netherlands

The Dutch energy mix in 2023 remains predominantly reliant on fossil fuels which account for approximately 83% of the total energy consumption (Centraal Bureau voor de Statistiek, 2024). For electricity use renewables account for almost 47% (compared to 40% in 2022) of the electricity consumed. The main contributor to renewable energy is wind and Solar, but Biomass also contributes at 6%. Biomass is a collection of energy taken from organic sources in the form of burning or gassing, not that half of the burning of garbage also accounts for this figure. Wind energy can be seen both in the form of offshore wind parks and onshore small turbines, Offshore accounts for 32% of the wind energy capacity (CBS, 2024). Solar forms are the last significant electricity producer,

with 21% it can mainly be found on private properties, but larger scale installations are becoming more common (CBS, 2024). The rest of the electricity production gets mainly produced by natural gas, with a smaller part reserved for coal.

Despite the growth of renewables in electricity production, for heat-energy they only account for 9,6% of the energy produced. Most of this gets produced from biomass and soil- and air= heat pumps. Most of the energy still relies on fossil fuels, mainly natural gas (accounting for 30% of the energy use) used for both heat and production of products such as fertilizers, and raw-oil and oil products (accounting for roughly 35% of the energy use), used for both the production of oil products and plastics.

Overall, the Dutch systems is still reliant on fossil fuels for mainly it's heat consumption, while renewables account for a sizable chunk of electricity use.
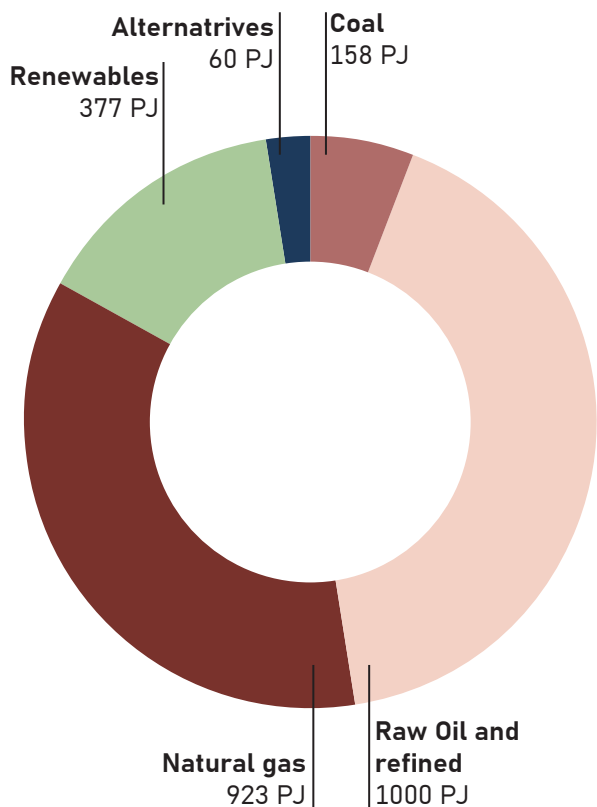
Figure 3.3 Energy use (Domestic) per energy sources (CLO, 2025a)
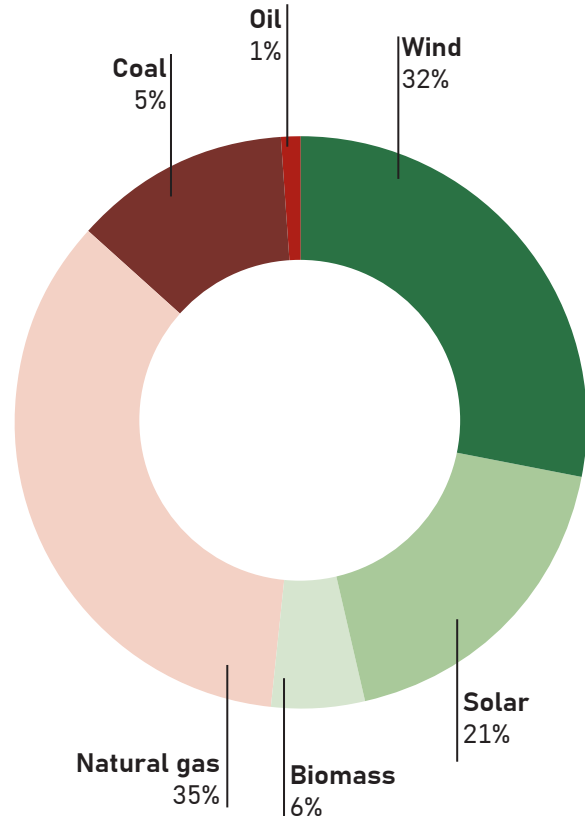
Figure 3.4 Electricty production in the Netherlands (CBS, 2024)

Figure 3.5 Current energy transport system Netherlands (Ministerie van Economische Zaken en Klimaat, 2024a)

Energy Infrastructure in Transition

With the need for the conversion of fossil energy sources to renewable ones, as outlined in the climate Agreement, multiple challenges emerge from the here before mentioned energy mix. One of the most significant issues is the fact that most of the country's energy use is directed towards heating rather than electricity. While we see that electricity is more easily converted to renewable sources, alternatives for the gas and oil depended on heating remains a bigger challenge (TNO, 2024) and this shift to electric alternatives will substantially increase electricity demand.

The projected rise in electricity use is varied, due to both different methods and scenarios being in place. But forecasted is a growth from an energy use of 119 TWh in 2019 to an estimated range of 193 to 552 TWh by 2050 (TNO & Sijm, 2024). This increase (between 150% and 350%) will be driven primarily by the electrification of heating (TNO, 2024). While this shift is in line with the climate goals set, it will not only require more sustainable energy sources but also an extensive upgrade to the infrastructure to transport and convert the electricity. However, the current energy infrastructure in the Netherlands is not adequately prepared to accommodate this sure in demand. The existing grid was not made to handle this dramatic increase in demand and supply and the more unpredictable nature of renewable energy sources. This mismatch between demand and the capacity of the grid already leads to congestion in peak times, making it that the grid is not sufficient to sustain any more growth.

Overall, the current infrastructure within the Netherlands cannot handle the extra demand and production of renewable energy as part of the climate agreements made.
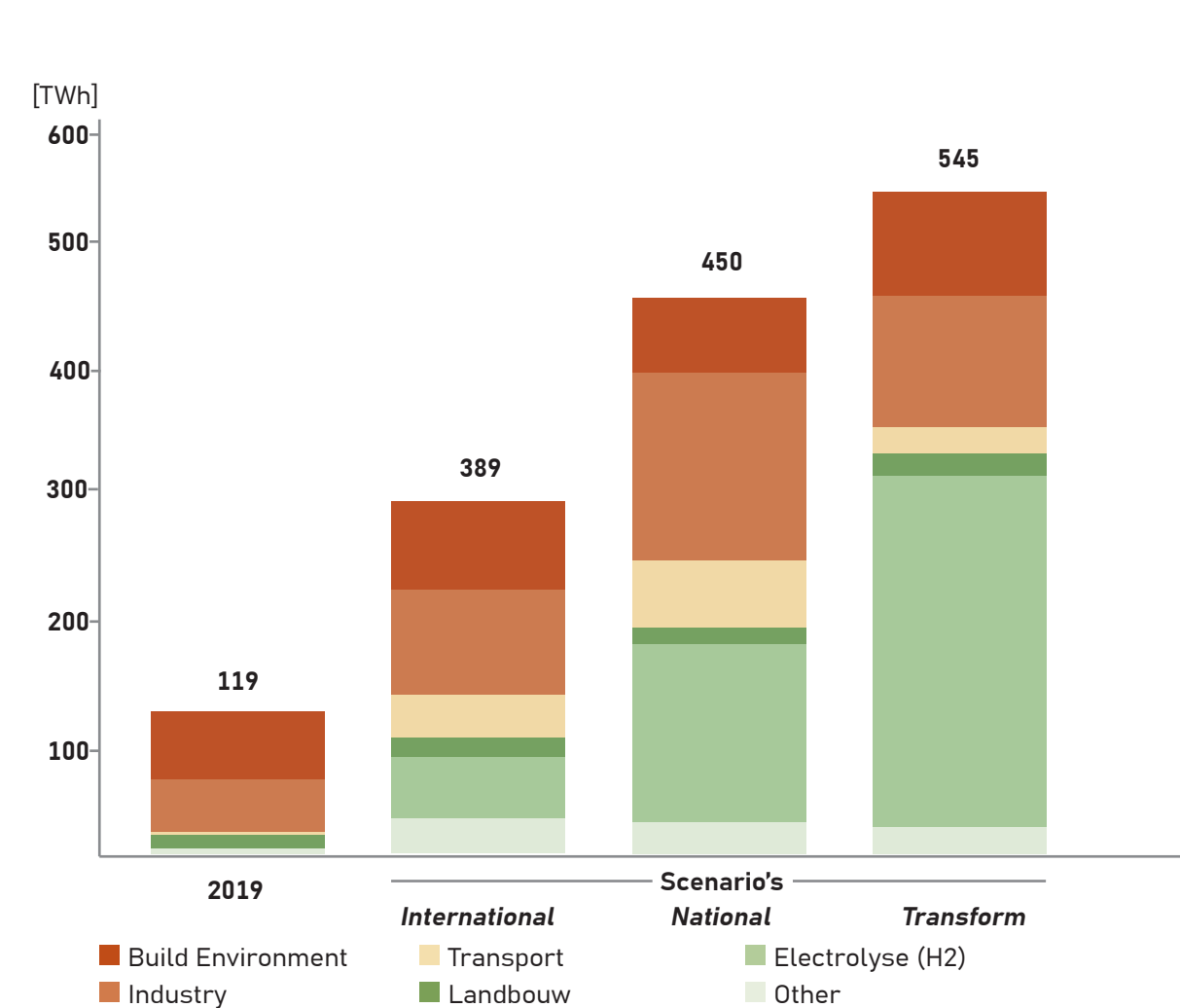
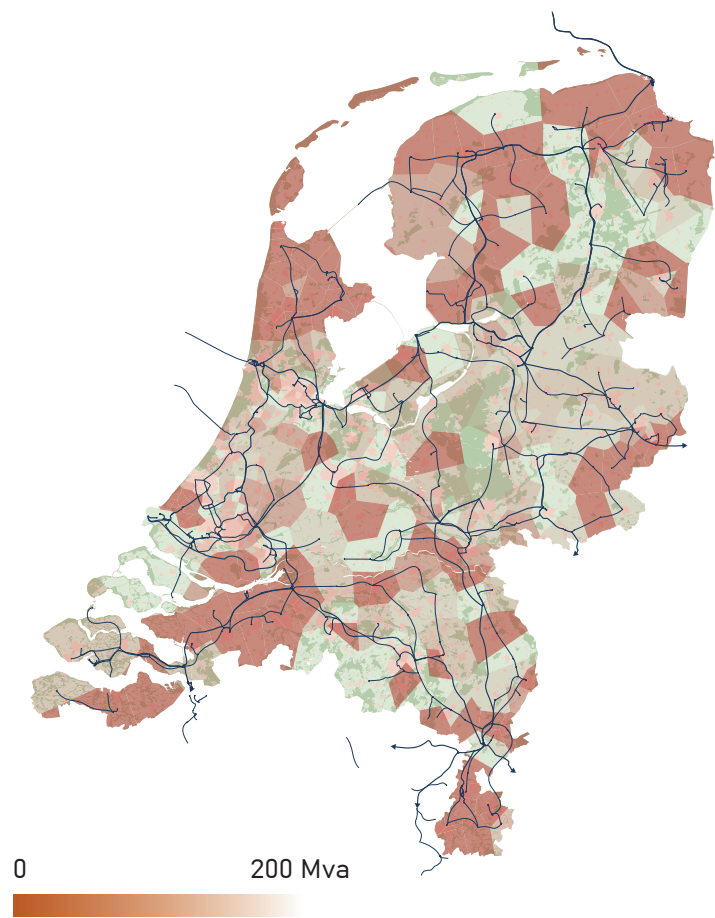Figure 3.6 Need for energy in 2050 per sector based on 3 scenario's (TNO,2024)

Figure 3.7 Available capacity grid capacity in 2031 for high voltage stations (above 25Kv) (Nationaal Georegister, 2021).

Figure 3.8 New energy system in the Netherlands (Ministerie van Economische Zaken en Klimaat, 2024a)

Legend:
- Natural gas pipelines
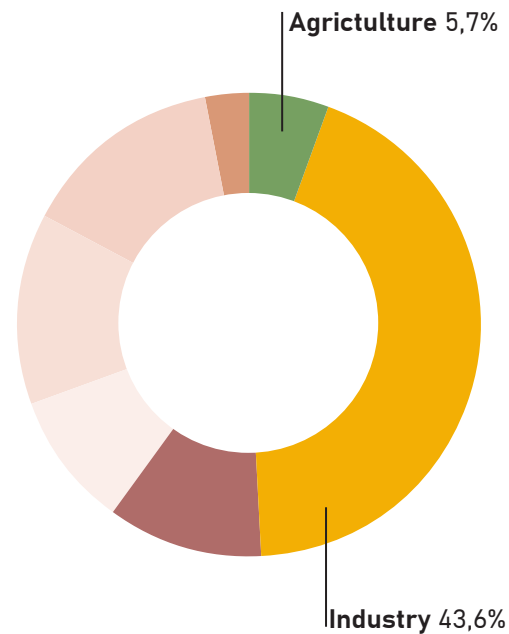- Hydrogen network
- Rhine-Ruhr corridor
- High voltage network
- Strengthening of the high voltage network
- New High voltage Network
- New High voltage stations
- High voltage stations
- Industrial clusters

Capacity

0   20 Km

Energy Transition & Benefit

Figure 3.8 Energy use per sector (CLO, 2022)
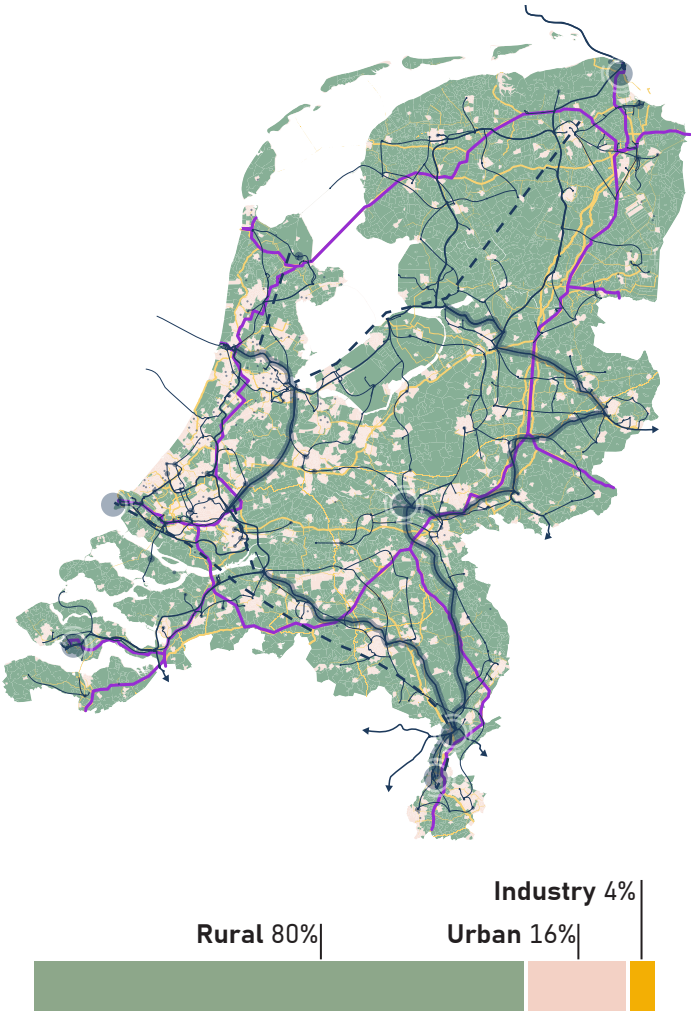
Figure 3.9 Landuse in the Netherlands (CBS, 2020)

To react to the problems with the energy infrastructure to respond to the intensification the energy demand national and regional plans have been set up to create new and update infrastructure. The national energy system Plan (Programma Energie hoofdstructuur or PEH) (Ministerie van Economische Zaken en Klimaat, 2024a) works from several scenarios based on both energy production and distribution needs to create a comprehensive overview of needed spatial interventions for upgrading the energy infrastructure. The PEH is a comprehensive and spatial translation of the national plan energiesysteem (NPE) (Ministerie van Economische Zaken en Klimaat, 2024b) and is representative of the national plans for development and policy surrounding the energy transition.

The PEH has several base principles that are important for their national strategy. The first is the to bundle energy demand and production. To relieve the load on the current infrastructure and prevent the creation of (unnecessary) extra energy infrastructure on the national infrastructure, the distance between major energy demanders and production must reduce as much as possible. Existing infrastructure will be used until capacity and/or upgraded before new infrastructure will be constructed. If new infrastructure will be needed this also will be bundled with existing infrastructure, like highways or existing pipelines and high-voltage lines. New nodes in the infrastructure, such as high-voltage stations or electrolysers, will mainly be put around existing energy infrastructure or industry clusters. Spatially this will lead to several national interventions. The production of renewable energy will for the most part be focused on wind energy on sea. Major parts of the energy infrastructure will be strengthened, both by new creating higher capacity within the existing infrastructure or by creating new infrastructure on the existing right of way. The strengthening is mainly focused on the ring of voltage lines within the country. Apart from that new infrastructure will be needed to expand the existing infrastructure. These will mainly provide links from the offshore wind parks to areas of high energy demand.

Energy used for heat is now mainly provided by gas (CLO, 2022). As part of the switch to renewable energy the current gas pipelines will be switched to Hydrogen, creating a system for hydrogen transport within the region. To support this new infrastructure electrolysers will be setup to convert electricity to Hydrogen. These will mainly be focused on industrial clusters. Lastly a new pipeline corridor will be created called the Delta-Rhine corridor. It will both transport hydrogen and be used for CCS. CCS or carbon capture storage will take carbon emission and transport them into salt caverns of disused gas field to store CO2.

The biggest beneficiaries of the new infrastructure that will be created are the sectors with the most energy use. With industry accounting for almost 48% of this energy use, and chemical industry accounting from 20% (CLO, 2022; CLO, 2025b), the new infrastructure that will be build is mainly focused to supply these fossil dependent clusters with sustainable energy. Following the cluster principle of the PEH the main energy clusters will be focused on the major industrial clusters. The infrastructure will follow this to connect these together.

Although the main beneficiary may be industry, most of the infrastructure will move through rural land. With around 80% of the land, it crosses being rural areas. With the bundling principles rural areas that are already impacted by infrastructure will be further impacted with new infrastructure disrupting the landscape. For rural areas around the industrial clusters, which will change into energy hubs, these will further be affected by industrial development fuelled by the energy transition.

3.2 Empowerment and Preservation

The expansion of the energy system proposed in the PEH clearly benefits industry and in a small part urban areas more than the rural areas it must run through. As the rural areas and agricultural industries do not directly benefit from the energy infrastructure, as they only use 6% of the energy in the Netherlands, benefits must be sought somewhere else.

To push for benefits it was established from the theoretical concepts that a proper amount of community pressure was needed to make sure they have an equal voice against the stronger (national) economic powers of the industry. The theoretical concepts state that, to create enough pressure it is important to have a strong community, with enough social capital (Gross, 2017). Therefore, a community must have facilities and a social structure that creates trust, a shared identity and cooperation. This will make them able to pursue a common goal, such as equal benefits. Yet, for rural areas in the Netherlands their social capital is under pressure. Several factors make their positioning against national interest worse, creating weaker communities.

■ Pressures of rural communties
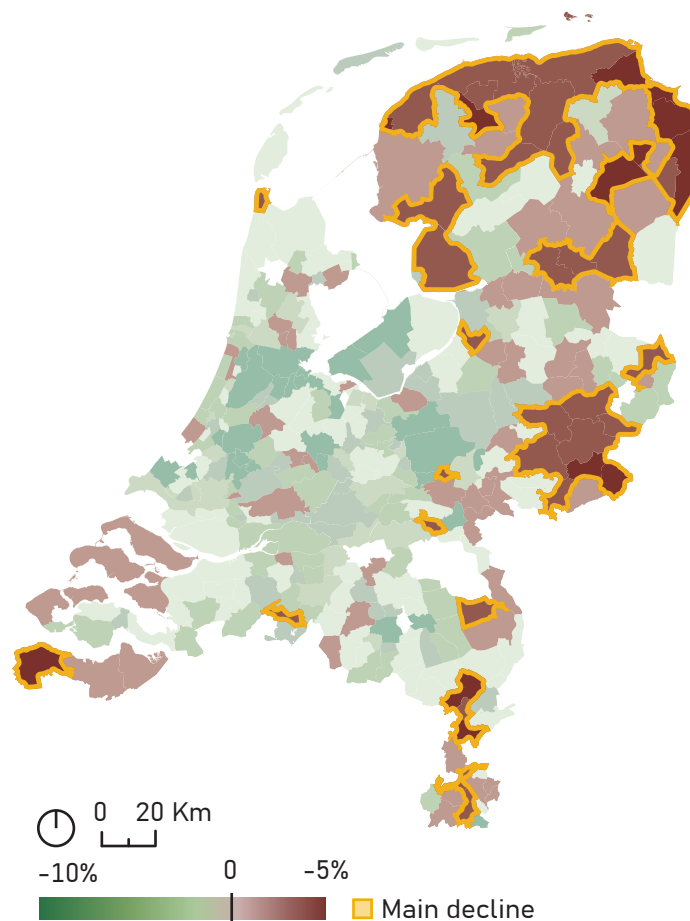
Figure 3.10 Population growth 2021–2035 & Decline regions based on CBS (2022)

Figure 3.11 Value added by Industry to GDP in regions (Van Gessel–Dabekaussen,

One of the contributor's tot leads to a lower position of communities within the energy transition is the position of industry in the national and regional economy (Van Gessel-Dabekaussen, 2018). In the region of Zuid-Limburg as an example, one industrial cluster (Chemelot) accounts for 30% of the province's GDP (TNO & CBS, 2016; Provincie Limburg et al., 2024). The added value of industry to a region GDP makes a local municipality, provincial government or national government more likely to ensure their economic position will be retained in the future.
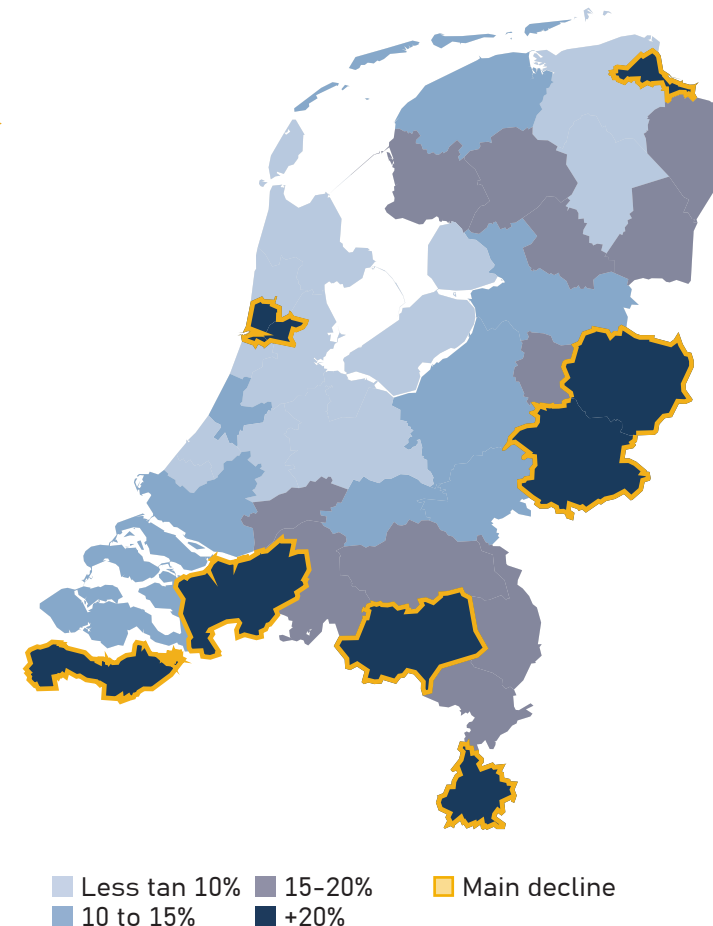
The effectiveness of communities to object to development is also depended on their manpower (Gross, 2017). With growing urbanization, rural areas face a loss of mostly younger residents to urban areas, where more connections and opportunities can be found. Migration also does not contribute as much to the growth in rural areas compared to urban ones (CBS, 2025). This makes for that certain areas with less opportunity (mainly rural) must contend with a shrinkage in their population. This creates a less favourable position for these communities around the table but also undermines the social structure of the villages.
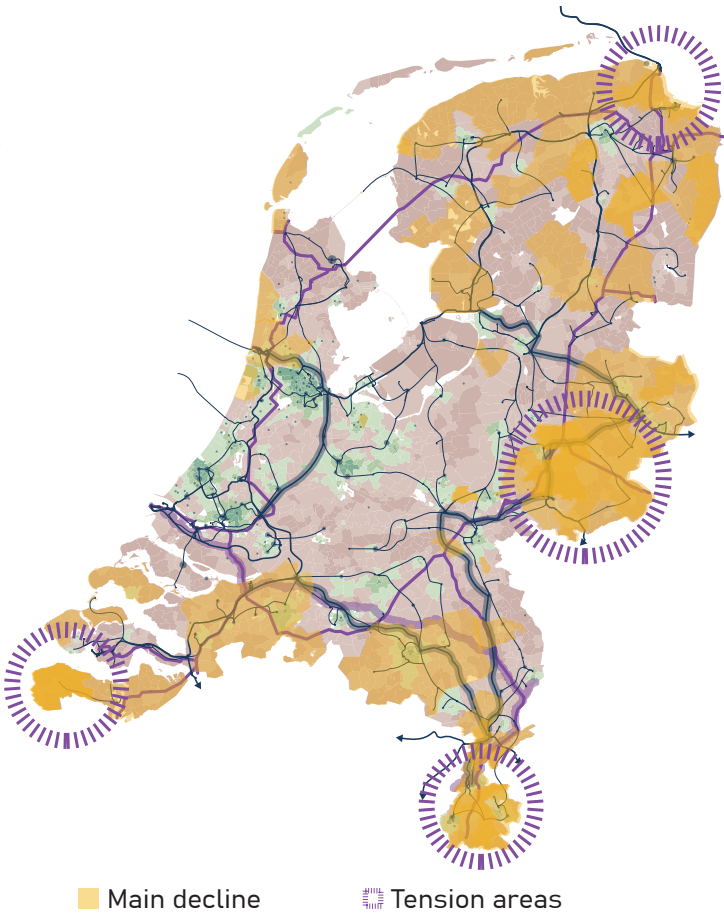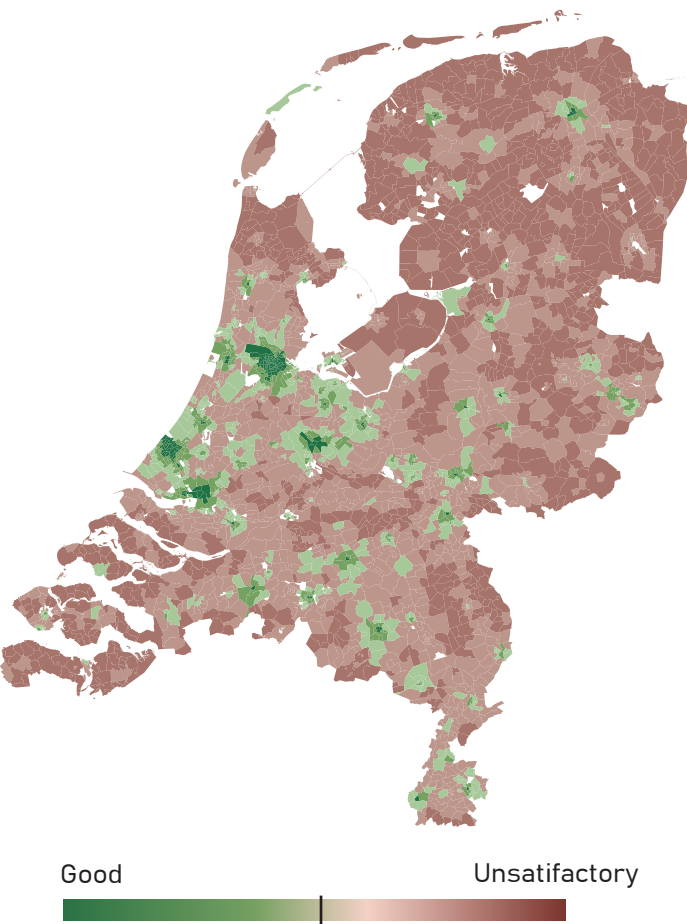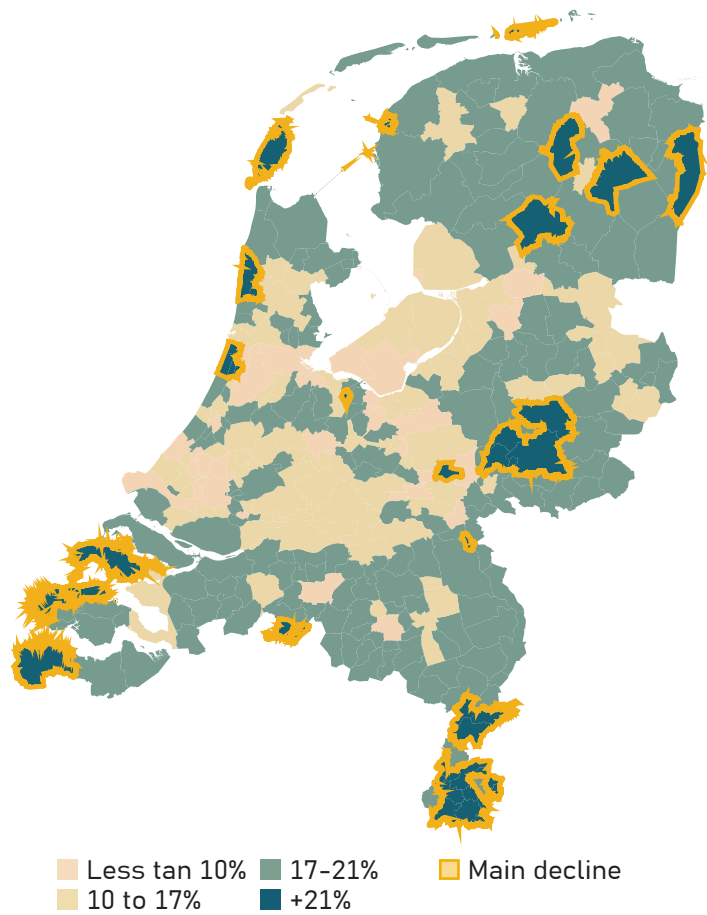
Figure 3.12 Percentage of population above 65+ (Centraal Bureau voor de Statistiek, 2024)

Figure 3.13 Liveability based on facilities (Ministerie van Binnenlandse Zaken en Koningkijksrelaties, 2022)

Figure 3.14 tension regions based on facilities, aging and shrinking population and prominance industry

The undermining of the social structure mainly happens due to generational shift in these Shrinking regions (CBS, 2025). While aging of the population is a trend within the whole of the Netherlands, in areas with a loss of residents this gets exemplified. As younger residents move away to areas with opportunities they leave behind a shrinking and aging community, removing the natural regeneration of the residents (Janssen, 2024).

The most damming effect of the shrinkage of population is the loss of jobs and facilities. With a younger resident moving away to areas with opportunities, the population that will be left will not be able to support the facilities that where available and jobs may choose to leave the area (Janssen, 2024). This will snowball more into people leaving and more facilities being closed. With rural communities already in a disadvantage, due to their lower density, they are extra susceptible to loss of facilities (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties et al., 2023).

From the analysis several areas can be identified that have most of the problematic trends for the strength of communities. Outlined in yellow, it can be seen how these pressures build up in these tension areas.
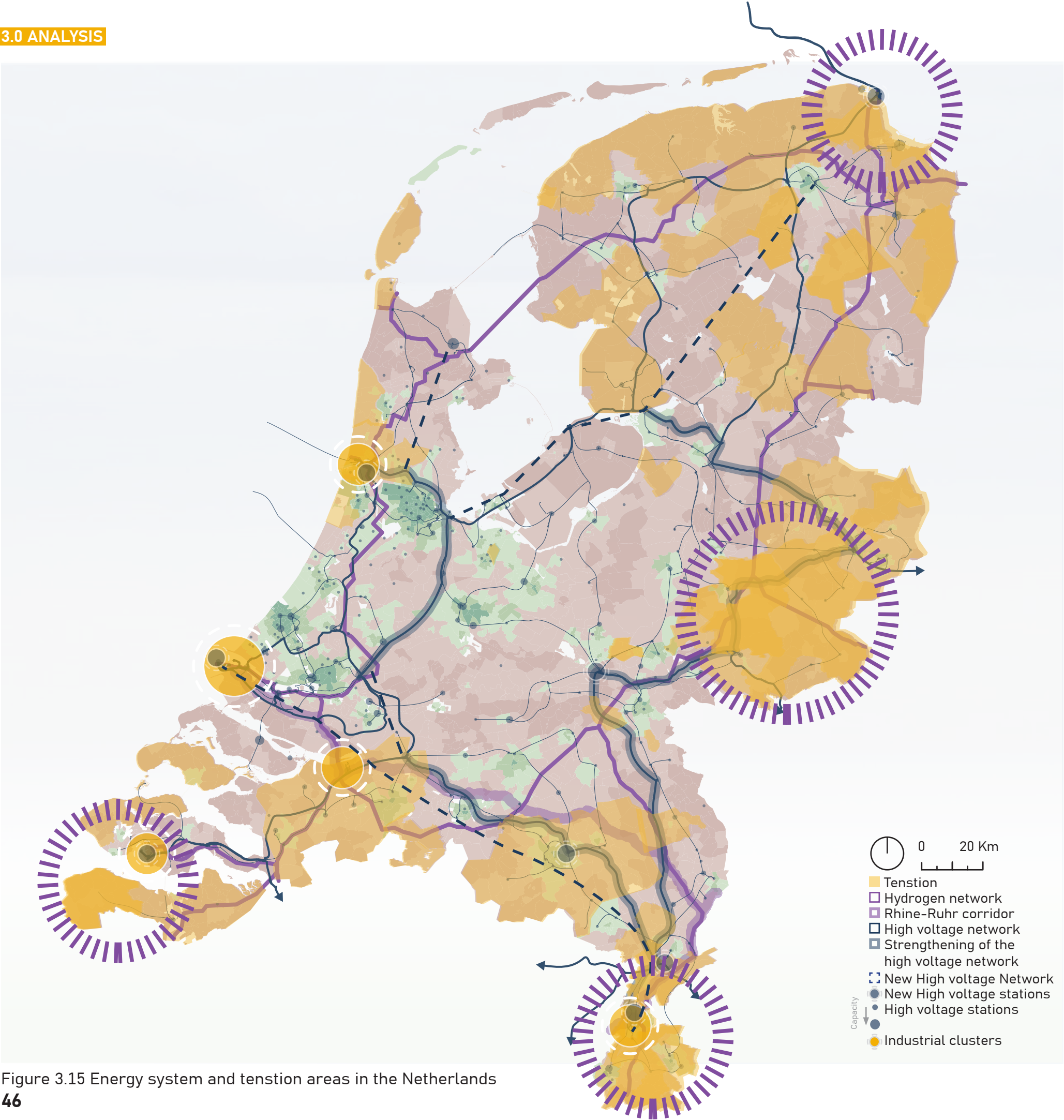
Figure 3.15 Energy system and tenstion areas in the Netherlands

3.3 Tension Areas & Development System

On the map several tension areas can be identified that are most susceptible to a lack of social capital to be able to thrive to better benefits for their community in the face of development. The most pressured areas will be the ones both in the development plans of the PEH, mainly concentrated around existing infrastructure and industrial areas. In the map, Zeeuws-Vlaanderen, South Limburg, the Achterhoek and North-Groningen can be identified as the areas with the most rural pressure. With the infrastructure considered mainly the region of South-Limburg is most pressured, with both major existing and proposed infrastructure in proximity of a prospective energy hub around the industrial cluster of Chemelot.

The current system that ensures these tension areas can find optimal benefits from development is based on a top-down approach (Ministerie van Onderwijs, Cultuur en Wetenschap, 2024). The national government creates a national vision with a long-term vision of the future. This vision creates ambitions and goals for the physical living environment that are important for the national level, both general and detailed spatially defined (Like the PEH). The national vision is self-binding for the government. Based on these policies the province creates a provincial vision. They create policies, strategies and aims that the municipality translates into interventions. Although the province can also create interventions, it is mostly the municipality that deals with the execution and the participation with local communities. This means that the communities are only approached in a top-down approach and mainly at the local level. Within a new system proposed in the NOVEX (the main planning strategy for the Netherlands) a new system should ensure better cooperation between the scales (Hollandse Hoogte & Jonge, 2022). But the NOVEX system works towards integration of the higher scales, by creating bigger overarching "NOVEX areas" for collaboration of provinces, waterboards and municipalities and the creation of an overarching strategy that overflows into regional and municipal vision. Yet in this system the local communities are only approached in a top-down manner. This top-down manner may make them able to ask for benefits but makes them rely on the willingness of the local governments to change their visions, and if their requests conflict with the national strategy there is no way to easily change it or have a say in its development and execution.

From the national analysis it is visible how a lot of the infrastructure that will be created for the energy transition is a result of top-down approaches. Both the policies that are set up and the resulting interventions follow a linear approach where participation from communities are only available at the end, when most of the national decisions are decided. Within the participation it is also the stronger voices that dictate the discussion. With bigger economic powers the structurally declining rural communities can struggle to make sure they are accounted for the burdens for the development that may not benefit them at all.
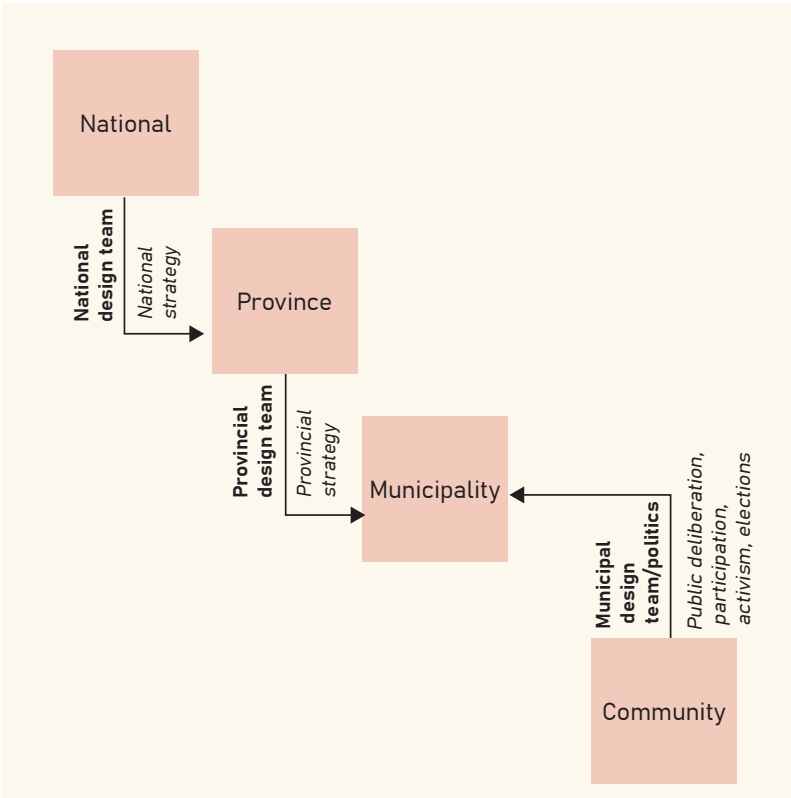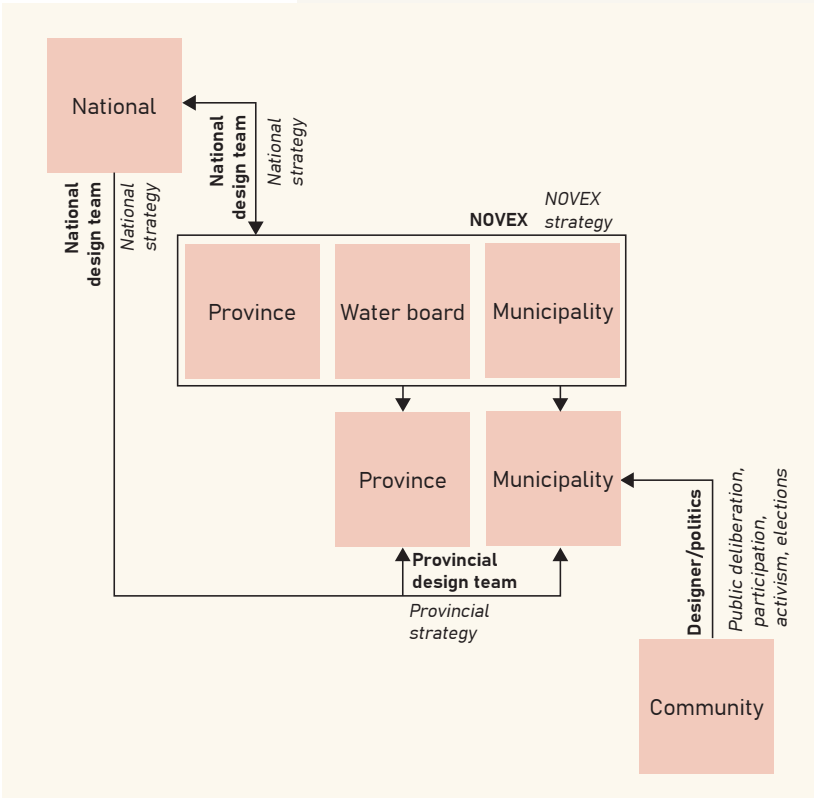

Figure 3.16 Old (Still used) System diagram
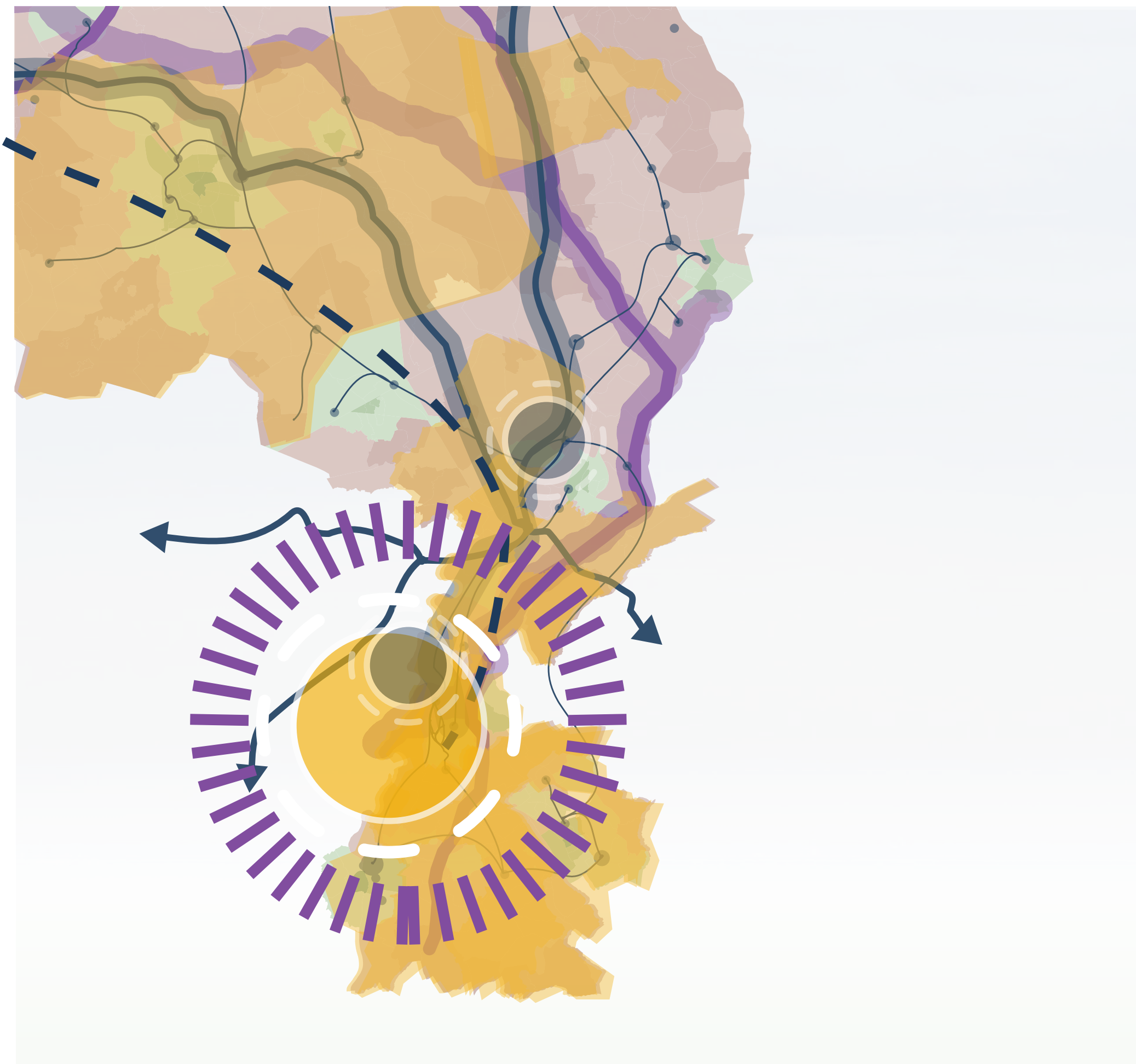

Figure 3.17 NOVEX system diagram

Figure 4.1 The tensions area in the South of Limburg, around the industrial Cluster Chemelot

4.0 Regional analysis

Contents

As the Netherlands continues to shift to a renewable future, demand to provide massive infrastructural change will only increase (Ministerie van Economische Zaken en Klimaat, 2024). These infrastructural investments range from transitioning gas-powered energy facilities to hydrogen, increasing the capacity of electrical lines, and overall increasing the demand for land to store electricity (Ministerie van Economische Zaken en Klimaat, 2024). Finding this land in the Netherlands, a country that is already limited on "unplanned" land, is incredibly difficult.

In the region of Limburg, this difficulty perpetuates deeper. A region that geographically is narrow and constrained by borders that are both set in the landscape with the Maas River bordering Belgium and bound by governance with an imaginary line defining the border with Germany. Projects in this region rarely leave individuals and communities unaffected. These impacts can be positive, such as the initial growth of Dutch energy independence growing from coal mining predominately in Limburg, providing 1000s of jobs and creating massive economic growth (Janssen, 2024). Though consequently, constraint of land created an over reliance on one industry, and as it collapsed in the 1970s, economic despair followed (Janssen, 2024). This has in part nurtured a culture of fear and hesitation towards transitions in this region. Fear of another energy transition requiring more land for environmental "resilience".

This feeling is especially strong in the communities that surround Chemelot, a major industrial site built on the former Stadsmijn Maurits. Communities that, demographically, are increasingly becoming older, have fewer children, and don't benefit from high land values (Centraal Bureau voor de Statistiek, 2024). These communities are a major focal point as our analysis is conducted and a vision is created.

Pressures are increasing on these communities, as Chemelot works to solidify its clean energy goals by switching to hydrogen (Chemelot, 2024), solidifying itself as an attractive industrial landscape. Communities are worried about unmitigated growth with the lack of a protective zone, displacement of villages that may be aging out as services are centered in the urban spaces and overall retaining land that is not overtly impacted by industrial development and energy transition.

INDUSTRIAL PRESSURE
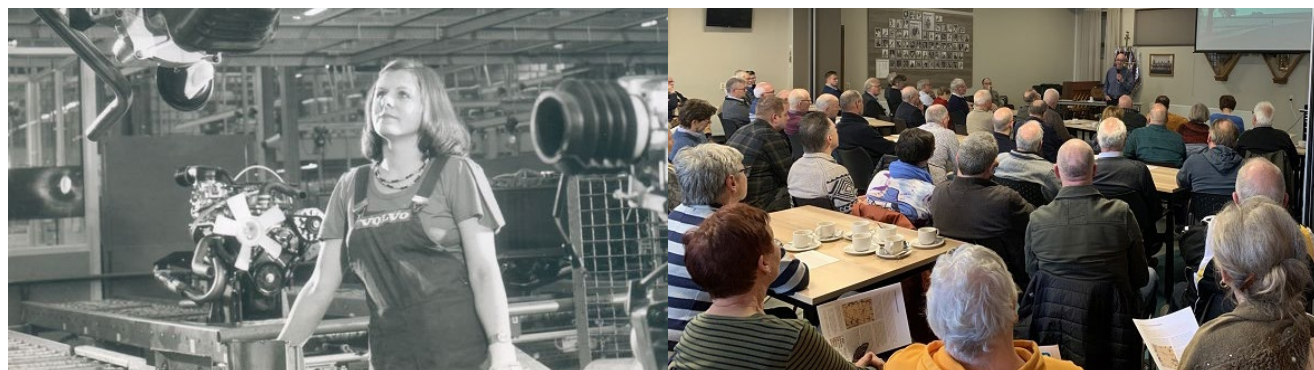
SOCIAL PRESSURE

GREEN PRESSURE

Figure 4.1, Increasing tensions in the Region

4.1 Energy transition and Industrial Development

Limburg has played a significant role in the Dutch energy landscape. Initial growth in the Netherlands was fueled quite literally by coal that was mined, processed and generated from numerous state run facilities in this region . The employment and economic growth of this region benefited massively from a strong mining industry (Jansen, 2024). Through all of this, transition has a poor connotation associated with it in this region.

As gas was discovered outside of Groningen, and coal was increasingly seen as an inefficient and unclean fuel source, the Netherlands transitioned their energy production out of Limburg. This resulted in mass shock to the economy of the surrounding area. DSM had closed all their facilities by the 1970s (Jansen, 2024).

This, unsurprisingly, resulted in protests from communities that relied on the mines for employment. Shutting down the mines was shutting down their way of living. As a solution, DSM worked closely with stakeholders to provide their land for building a petrochemical industry. These plans resulted in the creation of Chemelot, an industrial conglomerate consisting of numerous chemical producers, (Chemelot, 2025).

Chemelot is not alone in the industrial transition of the region, numerous other companies have been drawn to this region for its convenient location along the Maas for trade flow, the proximity to Belgium and Germany and the "climate resilience" as the risk of rising sea level is significantly lowered in comparison to industrial spaces in the Randstad.

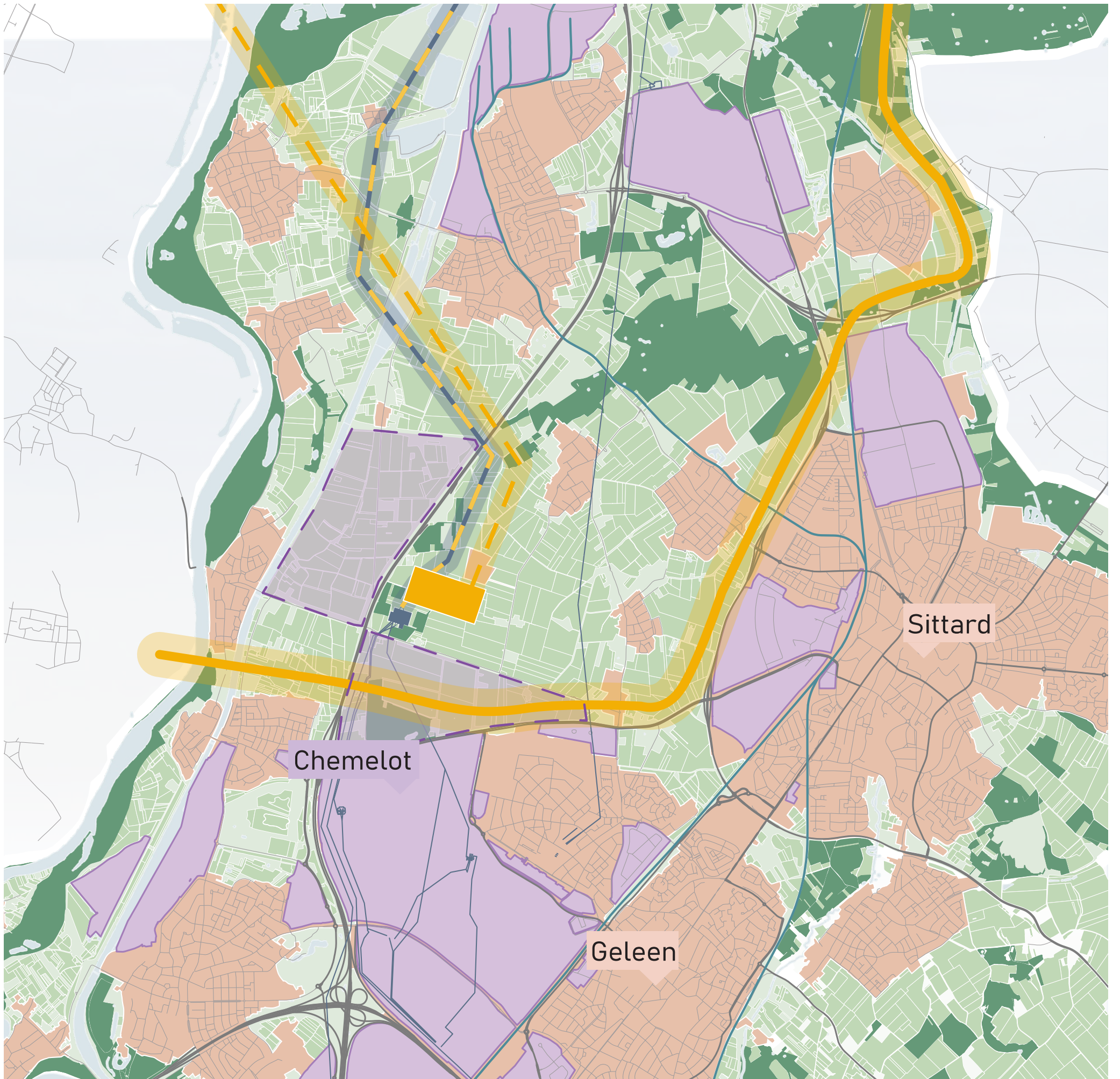Figure 4.2, A historical timeline of an industrious region

Figure 4.3 The tensions area in the South of Limburg, around the industrial Cluster Chemelot

Energy Transition

As stated in the National Analysis, most of the energy projects are focused on Industrial clusters, this is most the case in Limburg. The main industrial Cluster of Chemelot produces plastics, fertilizers and other nitrogen products using both 93.000 barrels of oil, 4 million cubic meters of natural gas a day and more than 2 million megawatts of electricity a year, mainly used to produce high intensity heat (above 400 degrees Celsius) (Chemelot, 2024). This accounts for almost 30% of the energy use in Limburg (Provincie Limburg et al., 2024). Chemelot plans to, in accordance with the national climate plans to reduce their reliance on fossil fuels. The transition aims to reduce their emissions by 65% in 2030 and be climate neutral in 2050. The plans for the transition of Chemelot come in multiple parts, firstly the used Energy must be shifted from fossil fuels to sustainable sources. As part of this shift major parts of the production chain will be electrified. This electrification mostly will be used to replace the use of oil to heat the furnaces. The shift will quadruple the energy use of Chemelot in 2050. As not all the production can be electrified another big part of the Energy transition is the use of Hydrogen, which will be used to replace natural gas in the production chain. The second part of the transition is a shift to recycling as a bigger part of the supply chain, this will mean a lower use of Oil to produce plastics.

The shift to electrification and hydrogen is what is anticipated by the PEH (Ministerie van Economische Zaken en Klimaat, 2019) and the infrastructure that is needed to support this. The PEH identifies 5 projects needed for the electrification: The strengthening of the existing 150kV high voltage connection to a 380 Kv line (in the existing right of way), the creation of a new 380 kV high voltage connection station within the Greatheide Plateau to support the new lines and lastly a brand new high-voltage line directly from the harbour of Rotterdam to create a direct landing for wind energy from the North Sea (as part of the VAWOZ (Arcadis et al., 2024)). This new infrastructure will mostly pass through or be in the Greatheide Plateau. Hydrogen has no infrastructure present in the area now. It can both be produced locally in the with electrolysers, using electricity to create hydrogen, or be brought in by pipelines. The PEH proposes the creation of brand hydrogen infrastructure in the form of reusing existing gas pipelines to create a circle within the Netherlands (See 3.4) and a new pipeline, the Delta-Rhine Corridor that will connect the harbor of Rotterdam with the Ruhr region and Chemelot. Chemelot states that they will mainly rely on incoming hydrogen instead of local production (Chemelot,2024). The current projects in the PEH do not include eventual expansion of the industrial area but it does classify Chemelot as a potential Energy Hub (Ministerie van Economische Zaken en Klimaat, 2019).

The space that will be used for all this infrastructure is mainly within the Greatheide Plateau. This is caused by the fact that Chemelot own approximately 200 hectares of land in the North of the plateau, already cleared of residents for development (Greatheide Comite, 2014). This was part of the investments made by the government during the mine closures, reserving space for the chemical industry to expand. The ownership makes it easy for Chemelot to propose energy projects within this area. The area has already seen a lot of projects proposed: A oil refinery in 1971, a nuclear powerplant in 1974, a high-tech campus in 2000 and energy storage in 2008. These have all failed due to opposition of the community or low economic viability. Yet the national push for the Energy transition and the inherent urgency of the problem and clear milestones makes the energy transition needed. The lack of space on the Chemelot site for these projects makes them be reliant on the open space left in the north.
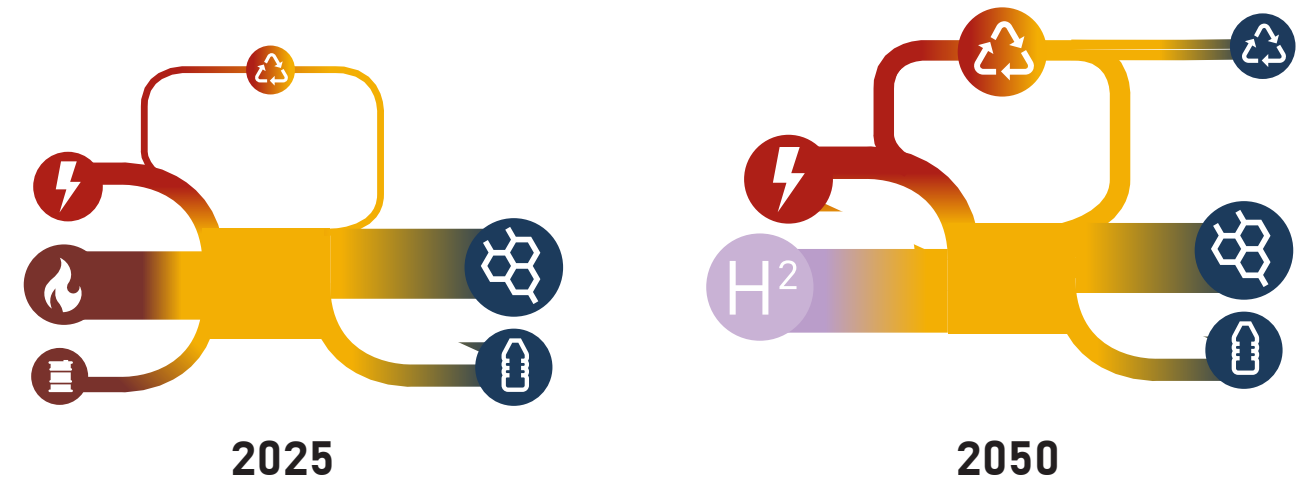

Figure 4.4 Production process Chemelot in 2024 and 2050

Stakeholder analysis

The stakeholders related to the study area and the larger scale – Limburg – were identified and their information regarding location, identity, activities, capitals, and sector in which they are affiliated was categorized. After that, the stakeholders were grouped into the three so-called sectors of the governance which are public, private, and civil society.

After that, the stakeholders were placed on the power-interest matrix based on the administrative, legal, economic, and social capabilities through several discussions of the group members that ended up as the following figure.

Overall, the stakeholders of different sectors are spread across the matrix. There are some private companies that have considerable power but don't show much interest or relation to the area of study seemingly. There are also social services and public health services that function on a large scale but are not connected to the project, at least directly. Based on the placement of each stakeholder inside this matrix, there are four general approaches that can be used for each quarter throughout the project. The approaches are to keep informed, to attract, to keep satisfied, and to empower. The ones close to the bottom left corner of the matrix are the least related and affective stakeholders. This quarter only needs to stay informed regarding the project's process. As the elements move to the right corner of the matrix, the stakeholders are the most interested and effective as possible. Thus, cluster on this quarter should always kept satisfied and completely engaged. Based on this spectrum, the most relevant stakeholders to the project are highlighted and going to be elaborated in the following paragraphs. Although the national and regional plans are progressive, civil society is not truly engaged with them based on the existing systematic procedures. Especially, the most affected groups are somehow involved in the process of the project, based on the national plans like Omgevingvisie, yet their actions contributions are limited to deliberations and nothing more. This reflects the low level of participation of the least powerful and most affected groups in the development projects on different scales.

The conclusions made from the outlined stakeholder clusters shaped the main players of the study area that are extremely vulnerable to the changes or can cause great changes.
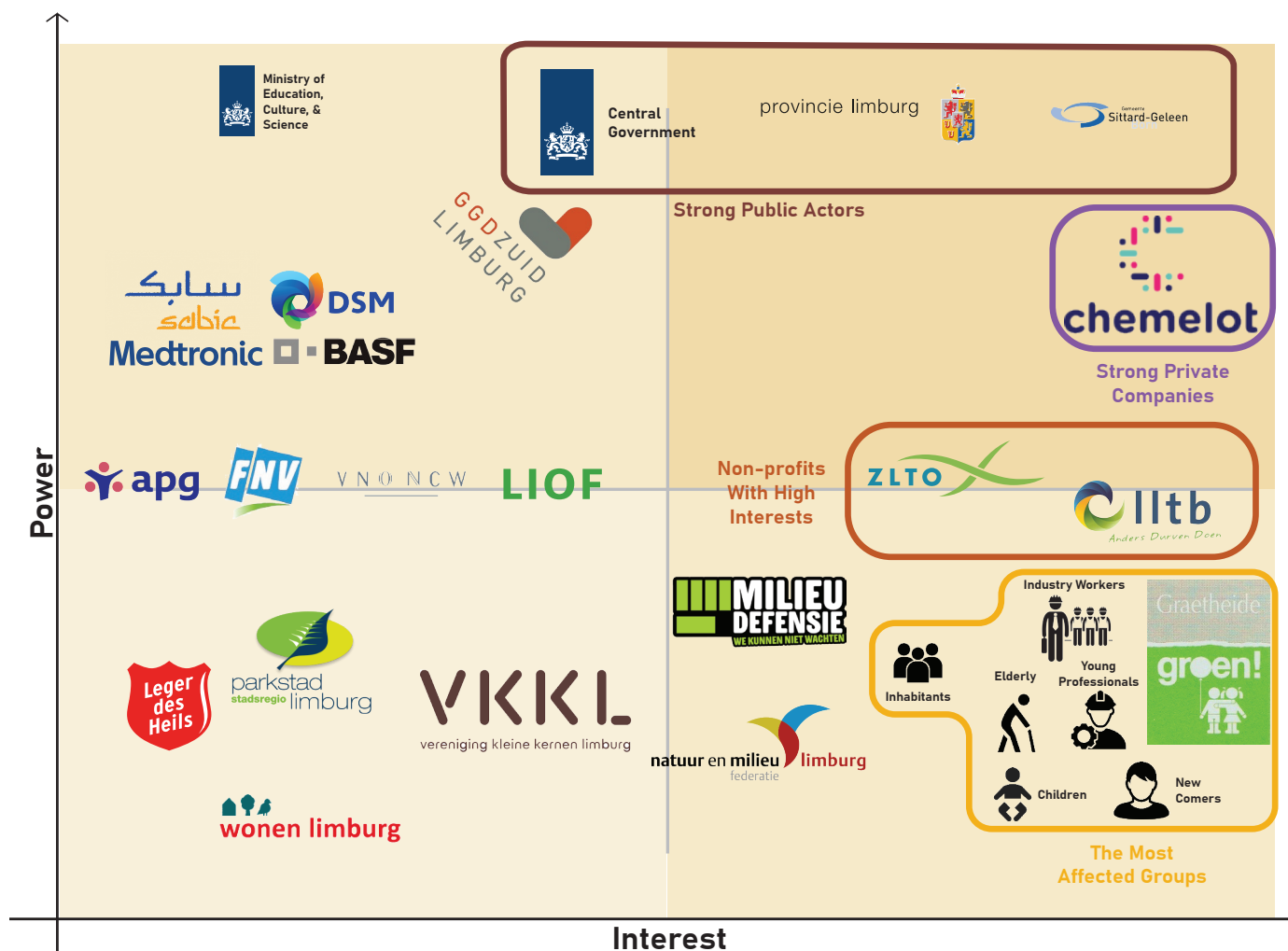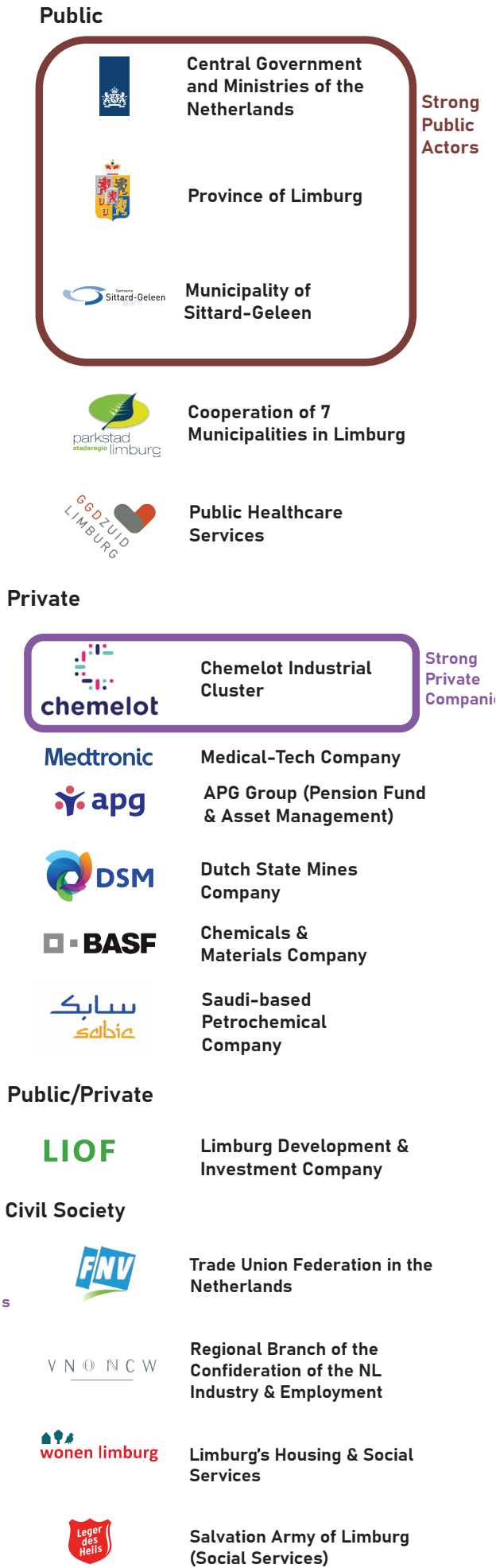

Figure 4.5 Stakeholder Analysis within the tension area

Public

Central Government and Ministries of the Netherlands

Province of Limburg

Municipality of Sittard-Geleen

Strong Public Actors

Cooperation of 7 Municipalities in Limburg

Public Healthcare Services

Private

Chemelot Industrial Cluster

Strong Private Companies

Medical-Tech Company

APG Group (Pension Fund & Asset Management)

Dutch State Mines Company

Chemicals & Materials Company

Saudi-based Petrochemical Company

Public/Private

Limburg Development & Investment Company

Civil Society

Trade Union Federation in the Netherlands

s

Regional Branch of the Confideration of the NL Industry & Employment

Limburg's Housing & Social Services

Salvation Army of Limburg (Social Services)

Rural Community Advocacy

Friend's of the Earth Federation, NL

Limburg's Nature & Environment Federation

Largest Agriculture Association in Zuid, NL

Largest Agriculture Association in Zuid

Non-profits With High Interests

Villages' Community Platform

The Most Affected Groups

Strong Public Actors

The Ministry of Economic Affairs and Climate Policy, Province of Limburg, and the Municipality of Sittard-Geleen are the most powerful public actors related to the study area. Based on the studies, the local governments are already having plans and programs towards the energy transition which could be used as guiding references making the visionary plans and strategies. This reflects the high interest of these actors in the project as well.

Strong Private Companies

In the private sector, Chemelot is the strongest actor based in the study area playing a crucial role in the industrial economy of the region. It holds more than two hundred companies within its boundaries that may grow to the existing landscape in the upcoming future (Chemelot, 2024, 2025). However, this industrial cluster has caused huge amounts of environmental impacts that affected the health of the inhabitants of the region. Acknowledging that, the company already has plans to reduce its emissions and become fossil fuel neutral by 2050 (Chemelot, 2024). By other words, the private actor is apparently keen to the energy transition which reflects its high interest in the project.

Non-Profits With High Interests

Civil society consists of several groups of people that have similarities at least in one aspect. There are large scale non-profit farmer associations that are taking the middle ground of power and almost high interest within the matrix as a large amount of the existing land is allocated to cultivation and farming which hold high potentials in shaping the future energy landscape. Also, being a non-profit organization of local farmers gives the signal that there is probably a network of local communities affiliated with the farmers as their family, friends, relatives, and neighbours that can make a connection to the other group of civil society sector.

The Most Affected Groups

Aside from the NGOs and farmers' unios, there are also less organized groups like industrial workers, elderly, rural communities, children etc. They can be considered as the most affected groups. These groups have strong interest in the project but weak in taking action. Every economic or spatial change simply affects civil society as is happening at the very moment. Based on the interviews and studies of civil society, specifically in the study area, local places like the smaller villages are not that involved in the transformations ever before.

Stakeholders

For a better understanding of each stakeholder's probable nature and characteristics along with their weaknesses and abilities, there came the idea of creating a set of personas. They are illustrated in the form of business cards depicting the formal and somehow informal profiles of the selected clusters, that are the most effective and the most affected. This would help with getting to know more human (social) sides of the actors involved in the process, which will help with tracking the power dynamics happening among them.

Public

SOPHIE
34
Municipal Agent at Sittard-Geleen Gemeente
Address: Nieuwstadt

- Residents' demands are also a priority to us
- Villages & cities need to remain stable economically
- Focused on higher quality environment
- Aware of the bureaucratice low-en time needed to be spen on implementation of complex collabrative spatial design system

- Following the existing policies (regardless of direct involvement of the civil society)
- Dependant on public relations

Thriving communities of Sittard-Geleen are our goal. Also, it really depends on the people whether they want the industrial activities to be inhibited or not.

The energy transition is inevitable

NOAH
52
Administrative Supervisor at Limburg Province
Address: Maastricht

- In contact with the regional & national government
- Knowing about the plans, policies, and strategies on a regional scale
- Aware of the economic & spatial assets

- Not sure about the local communities' demands
- Usually neutral about the private actors or civil societies

Figure 4.6 Stakeholder cards

▪Civil Society

I'm not sure if my kids even want to stay here. We should stop the industrial activities for the sake of our children!

OLIVIA
42
Household & Volunteer PR of the Nature & Environment Protection Association
Address: Roermond

- Raising awareness about natural habitats via email, phone calls, social media, newsletter etc.
- Having networks with residents and other related associations
- Doing volunteer activities against environmental impacts of industries

- The public awareness regarding the environment is not high enough
- It's hard to draw the attention to the matters people are not attracted to

NOUD
38
Farmer
Address: Einighausen

- Farmlands and their crops have provided lots of foods for the region
- In a good connection with colleagues through the unions

- I'm not sure about the trade-offs of using the solar panels/windmills on their farm field
- Not familiar with the biomass or other new energy resources and their applications on land.

The energy transition is a vague thing to me, how should I trust it?

▪Stakeholders

POL
17
High School Student
Address: Guttecoven

- Likes growing up here with the nice nature
- Does drawings in sketchbook, especially from farm fields and grass lands
- Plans to go to pursue higher education

- Not much to do around the place
- The industrial activities, polluting the natural and neighbouring area.
- Not familiar with participation

> I wish we had more things to do around our village. Sometimes it gets boring.

> I want our landscape to be safe and untouched! Windmills don't look safe to me.

LUCAS
65
Retired Resident Gardening in Their Backyard
Address: Limbricht

- Has lived there as an honourable resident for 30 years
- Good connection with the neighbours
- Loves the nature and the memorable landscape

- Doesn't like the windmills sticking out of the ground in the horizon, may ruin the landscape
- Doesn't like to pay extra taxes for solar panels on their rooftops

Transition?

ERNST
55
Restaurant Owner
Address: Limbricht

- Has tasty food
- Good network with the locals
- Friendly with nature

- Customers decline because of the low number of new visitors

> What does this energy transition have to do with me? 'Don't have much interest in it.

Figure 4.7 Stakeholder cards

▪Civil Society

SEM
47
Executive Manager at Chemelot
Address: Sittard

- Bringing investments to the area
- Industrial growth supporter
- Supports the idea of energy transition

- Overlooking the environmental impacts
- Not actively reducing the environmental impacts
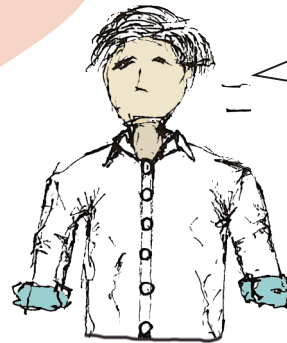
> It's necessary to keep the Chemelot working since the transition is not that feasible by 2050

TIM
37
Technician at Chemelot Gate 2 Gas Campus
Address: Geleen

- Happy with the industrial identity
- Supports the provided jobs by Chemelot
- Familiar with the industrial environments

- Worried to lose his job with the next transition
- Dependant on current expertise

> Don't demolish the existing job opportunities

YARA
27
Recently-hired Program Developer
Address: Leveroy

- Attracting other young professionals
- Bringing children
- Open to new and up-to-date developments
- Bringing human & economic capital to the area

- Difficulty with finding house close to the workplace
- Doesn't feel to be welcomed by the locals
- Not familiar with cultural heritage and values of the area
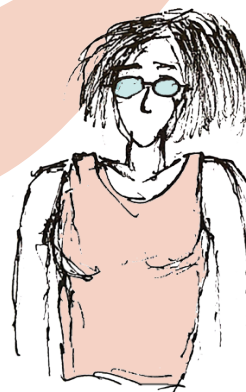
> We need more housing availability and social acceptance

4.2 Empowerment and Preservation

Within this constrained landscape there are numerous villages that have retained a strong spatial resemblance to their initial growth patterns they developed during their initial conception. These villages are often small, typically consisting of less than 2000 inhabitants, requiring them to internally develop self-reliance and robust community relationships. With the development of industry in the region, some of these communities have been wiped from the map. Gebroek for example, was a very small village north of Holtum, and has recently been removed for the development of numerous distribution warehouses along the Julianakanaal. Similarly, Lindenheuvel experienced the removal of a section of their village for the development of the Chemelot site in the 1970s. These stories happen on a much smaller scale throughout the region, with dispersed farming communities that have slowly aged out or become less productive eventually succumbing to pressures of industrial growth and selling their land Buurtvereniging (Jansen, 2024).

Some communities have decided to create a stronger bond, strengthening resilience by focusing not only internally, but externally, by reaching out to their neighboring villages to develop committees to collaborate on joint visions for their futures. Situated to the North of Chemelot and to the West of the industrial edge of Sittard, a cluster of villages has been determined to develop an organization to become more involved in the planning of the region. Guttecoven, Limbricht and Einighausen combine their shared interests of retaining the structure of their community and prospering alongside an energy transition in their region. The community is attempting to create an alternative vision of prosperity through engagement and inclusionary planning (Graetheide, 2019).

These villages were a critical starting point in research and analysis of the region. The immense need to create a community focused plan was clear as analysis of outside pressure revealed just how "targeted" these communities are. Not only from a potential expansion of Chemelot, but continued development of power infrastructure, pipelines and roadways that encircle the area. If demand for space continues or accelerates, the land surrounding the village structure is a prime target for development (Graetheide, 2019).

■Landscape

Figure 4.8, Depiction of the landscape

The conventional idea of the Dutch farm landscape typically includes dikes and polders, with villages popping up along meandering pathways, or centered comfortably around a church in the center. The landscape of the village structure in Limburg varies slightly. Polders and dikes aren't as prominent, as this land is far from the risks of the North Sea.

Rather, a long horizon of farmland emerges, with rolling hills beginning in the South. Though it continues to develop, as power lines, cooling towers, wind turbines and the flat roofs of industrial warehouses are pushed into one of the narrowest regions of the Netherlands, the open landscape still dominates for the time being. The community finds immense joy in these spaces.

Morning walks in autumn watching as the mist rises from the fields, feeling the brisk air on your face, meandering along the fields that are nearly ready for harvest. Warm spring evenings are spent cycling the numerous farm roads, zig-zagging through the landscape, smelling the fresh flowers of the tree line, and hearing the distant cry of a new-born lamb, and ending the night with an ice cream in the village center. These spaces aren't protected. To the village, these landscapes, and the activities associated with them, are critical to the well-being of these communities.

Local Community
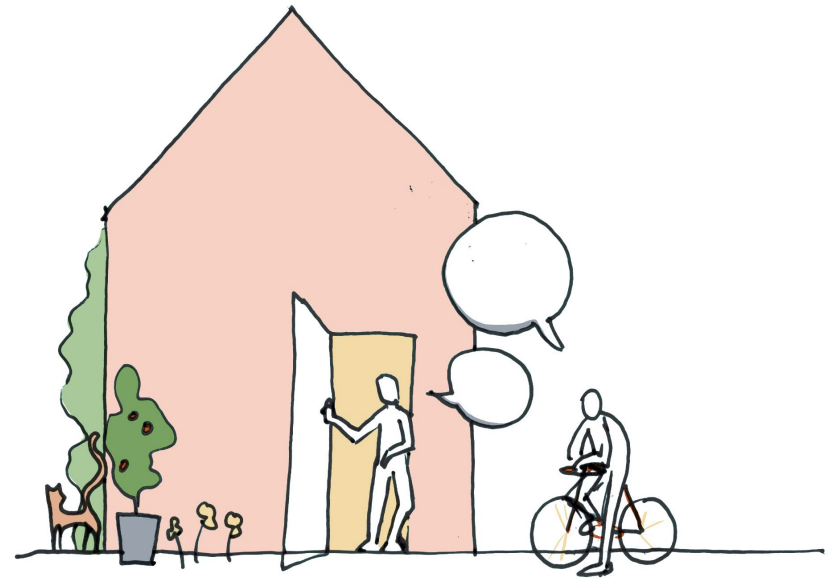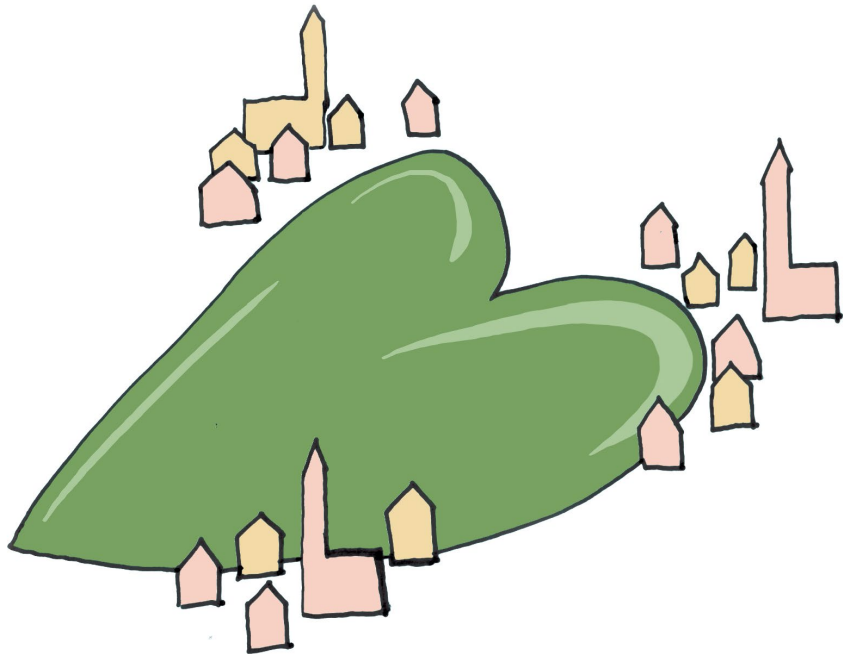
Figure 4.9, Depiction of the local community

Community is, at its core, developing a bond with individuals who are all but strangers to one another. A bond that is formed due to a shared interest in a positive or negative manner. In the case of the village example, the bond is shared to preserve the landscape, develop resilience by way of planning how to age in place and how to attract new families to the area. The goal is to provide a resilient backbone for the future of the area.

Community is desperately needed in today's world of perceived increased anti-social behavior. A plan to include the communal voice and become a seat at the table rather than an observer could shift the power dynamics in a way that inspires a new generation of organizers to think differently about their role in governance.

Missing from the equation currently is an equitable place to gather. These are, after all, three separate villages that find themselves sharing the common goal of preservation. Though they aren't far in distance for the healthy individual, the communities are increasing in age (source), putting at risk the combined organizing power. This in itself is another goal of the community. To find not only a shared common ground through conscious thought, but through physical connection.

▪Viable Village

Figure 4.10, Depiction of the undesirable conditions

The village structures benefits greatly from retaining its initial dense core structure. On a warm evening in spring, you can walk by packed restaurants buzzing with activity. Kids are running around with ice cream cones, drinks are being had, neighbors are catching up with one another and dogs are being walked. Though this activity is palpable, it isn't without a major caveat. The community, as we know it, is living with fear of industrial growth. This dense corner of the Netherlands is commonly short on available space, and the three villages are a prime target for northward expansion of Chemelot.

Despite the vibrancy of the village structure on a warm evening, most of the services that are needed on a daily basis such as banks, clinics, grocery stores, secondary schools, etc. – cannot be found within this village structure. Moving to the area requires a sacrifice that fewer people are willing to make in a modern society that appears to desire faster

service. With this lack of services and an aging population, growth is slow. This has only increased the fear of the community that they'll become more vulnerable to the expansion of Chemelot if they don't act together.

Industrial Pressures

Industrial pressure is strongly associated with the constrained landscape of South Limburg. Pipelines, industrial zones, transportation corridors and carbon emissions combine to create a limited amount of space that's unaffected

Figure 4.11, Historical photographs of Chemelot industrial site
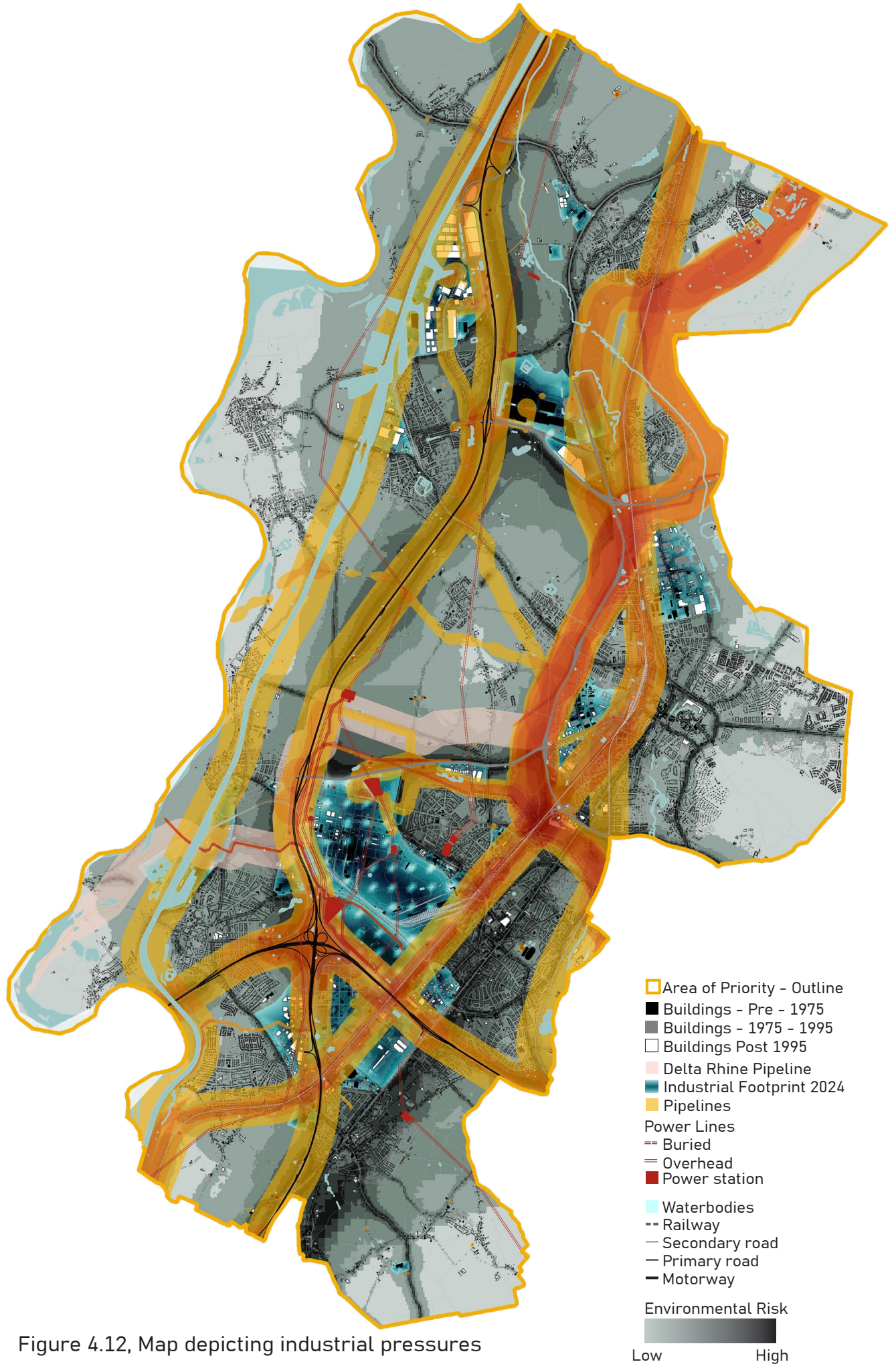
Figure 4.12, Map depicting industrial pressures

Area of Priority - Outline
Buildings - Pre - 1975
Buildings - 1975 - 1995
Buildings Post 1995
Delta Rhine Pipeline
Industrial Footprint 2024
Pipelines
Power Lines
Buried
Overhead
Power station

Waterbodies
Railway
Secondary road
Primary road
Motorway

Environmental Risk

Low   High

Social Pressures

Social pressures come in the form of grey pressure (the increasing age of communities), concentration of senior care facilities outside of the village structure, limited transportation alternatives and decreased livability due to a lack of services.

Figure 4.13, Historical photos – cultural connection to industry
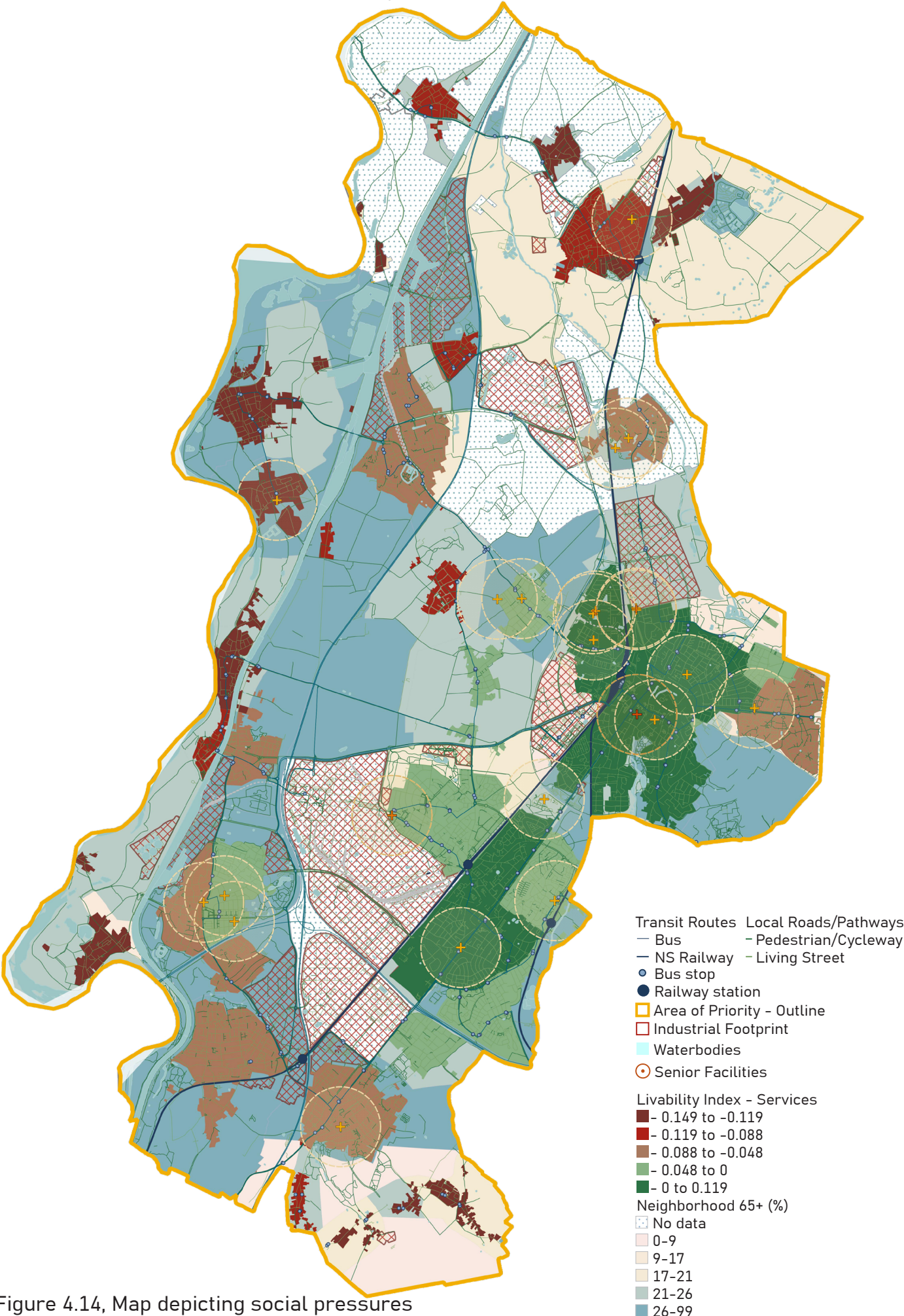
Figure 4.14, Map depicting social pressures

Transit Routes
— Bus
— NS Railway
◦ Bus stop
● Railway station
□ Area of Priority - Outline
□ Industrial Footprint
▨ Waterbodies
◉ Senior Facilities

Local Roads/Pathways
– Pedestrian/Cycleway
– Living Street

Livability Index - Services
■ – 0.149 to –0.119
■ – 0.119 to –0.088
■ – 0.088 to –0.048
■ – 0.048 to 0
■ – 0 to 0.119

Neighborhood 65+ (%)
▨ No data
□ 0–9
□ 9–17
□ 17–21
□ 21–26
□ 26–99

Green Pressures

Green pressure conveys the contrast of the landscape around Sittard-Geleen. The area is rather to the Netherlands in its natural composition, with larger hills in Valkenburg, remnants of a meandering Maas and creek beds that fed into this wild river. These combined formations resulted in strong evidence of traditional human settlements. A protected zone has been established to the South, in the hills surrounding Valkenburg, and to the North.

Figure 4.15, Industry in the open landscape
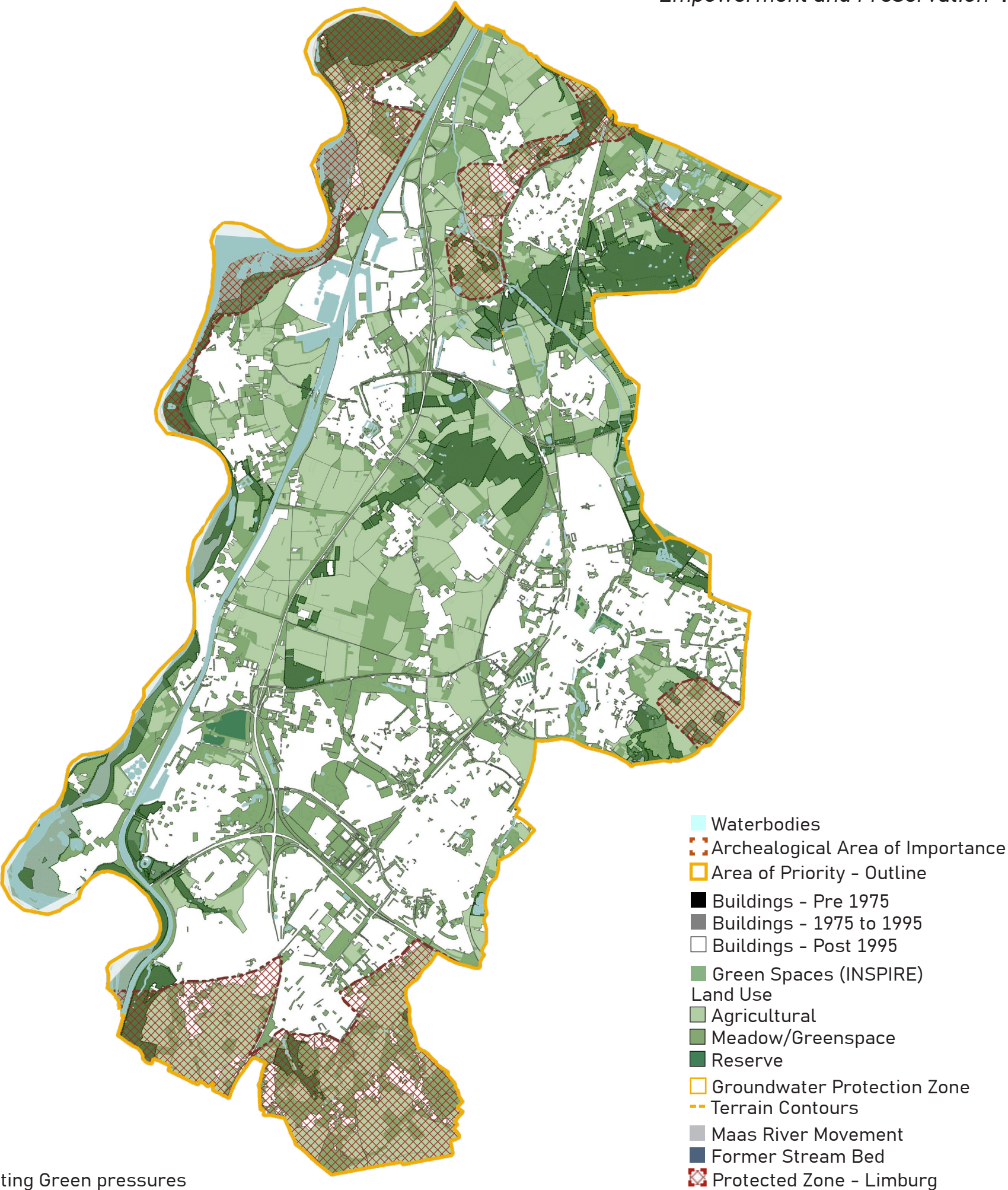
Figure 4.16, Map depicting Green pressures

Waterbodies
Archealogical Area of Importance
Area of Priority – Outline

Buildings – Pre 1975
Buildings – 1975 to 1995
Buildings – Post 1995

Green Spaces (INSPIRE)
Land Use
Agricultural
Meadow/Greenspace
Reserve

Groundwater Protection Zone
Terrain Contours
Maas River Movement
Former Stream Bed
Protected Zone – Limburg

4.3 Landscape

Urban and Industrial Growth

In the area, industry has evolved rapidly since the beginning of the industrial revolution, as the region was an important coal mining area. However, the biggest industrial sprawl came after the closure of the mines in around 1970. In the period of transition from coal to oil, there were major investments to adapt the Limburg economy, leading into major growth of industrial land.(Kasper et al., 2013) The industry grew rapidly, pressing against the landscape, and also erasing some villages and smaller settlements from the map. The adjacent cities have also been spreading their footprint, growing much faster than villages in the inbetween landscape.

The growth is guided by infrastructure, which mostly goes in the north-south direction, connecting Limburg to the rest of the Netherlands. A limit to growth is the national borders (see in the east part of the map.) Underground infrastructure corridors (in grey) also play an important role in shaping the growth. They make it impossible to build over the infrastructure paths, and undesirable to build in the risk zones, pushing the urban growth outside of the safety distances.

1. Growth caused by industry

1928

1975

1982
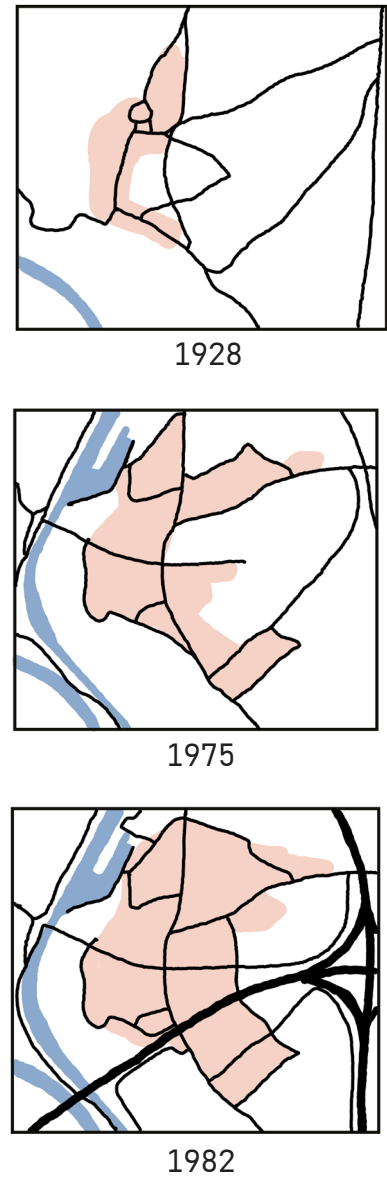
2. Industry eating a village

1972

2024
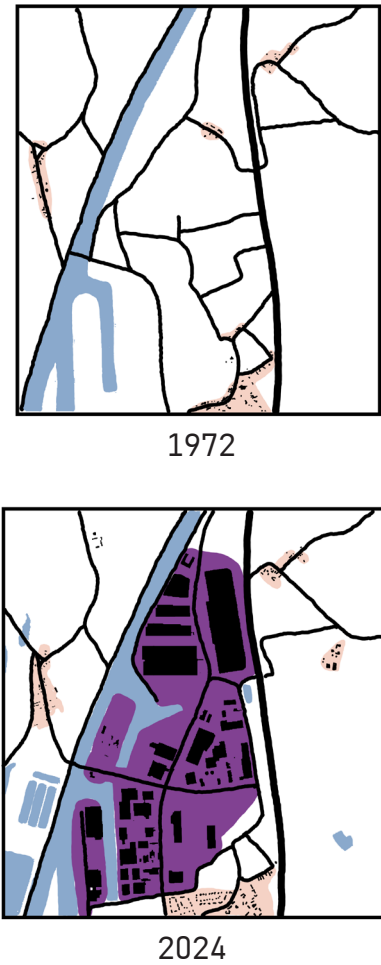
Figure 4.17 Industrial and urban development in the area since 1929 (based on: TopoTijdreeis, Atlas Leefomgeving)

1 km   2 km

-- Powerline
▪▪ Train
— Roads
-- Road that have been removed/ lost their importance
▪ Major waterways
▪ Industry since 1929
▪ Industry since 1970
▪ Industry newer
↗ Industry growth/ pressure
▫ Pipeline toxic gas risk zones/safety distances (data only for NL)
▪ Continious built-up area - 1929
▪ Continious built-up area - 1975
▪ Continious built-up area - newer
↗ Built-up growth/ pressure
◡ Stable edges of built-up area
✖ Villages lost to industrial growth
◆ Smaller settlements lost to industrial growth
▫ Netherlands

Stable Rural Landscape

The landscape inbetween the cities and industry is in stark contrast with the rapid urban and industrial development. Around the villages, which have grown much less than the cities did, the old rural field structure is intact.

Although this landscape is in general very longevous, it has undergone some major interventions. Hand in hand with industrial growth comes infrastructure development. The landscape has been cut by major infrastructural corridors, going mainly in the north-south direction. The Juliana Canal (established in 1934) is a major barrier – while the general form and character of the landscape around remained the same, the landscape connectivity logic was restructured. The north-south highway (built around 1968) influenced the landscape in a similar way. (TopoTijdreis)

Still, the character of the rural landscape around the cities and industries is very well preserved, and (between the infrastructural corridors) follows the same spatial logic as before the industrial revolution.

Figure 4.18 The stable inbetween landscape (based on: TopoTijdreis)

1 km   2 km

- Train
- Roads
-- Road that have been removed/ lost their importance
- Water since 1929
- Water since 1970
- Newer water
- Stable edges of built-up area
- Open landscape with plot structure
- Forest since 1929
- Forest since 1975
- Forest - newer
- Forest - removed
- Forest growth
- "Open Landscape" pressure
- Netherlands
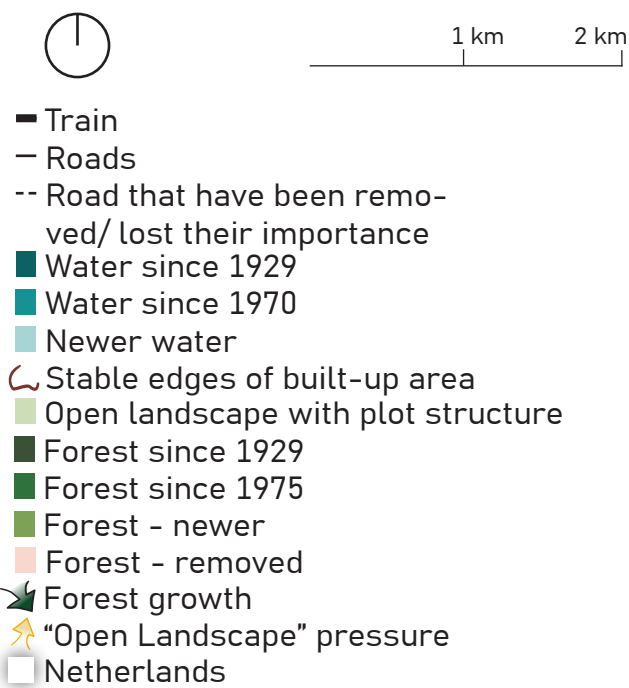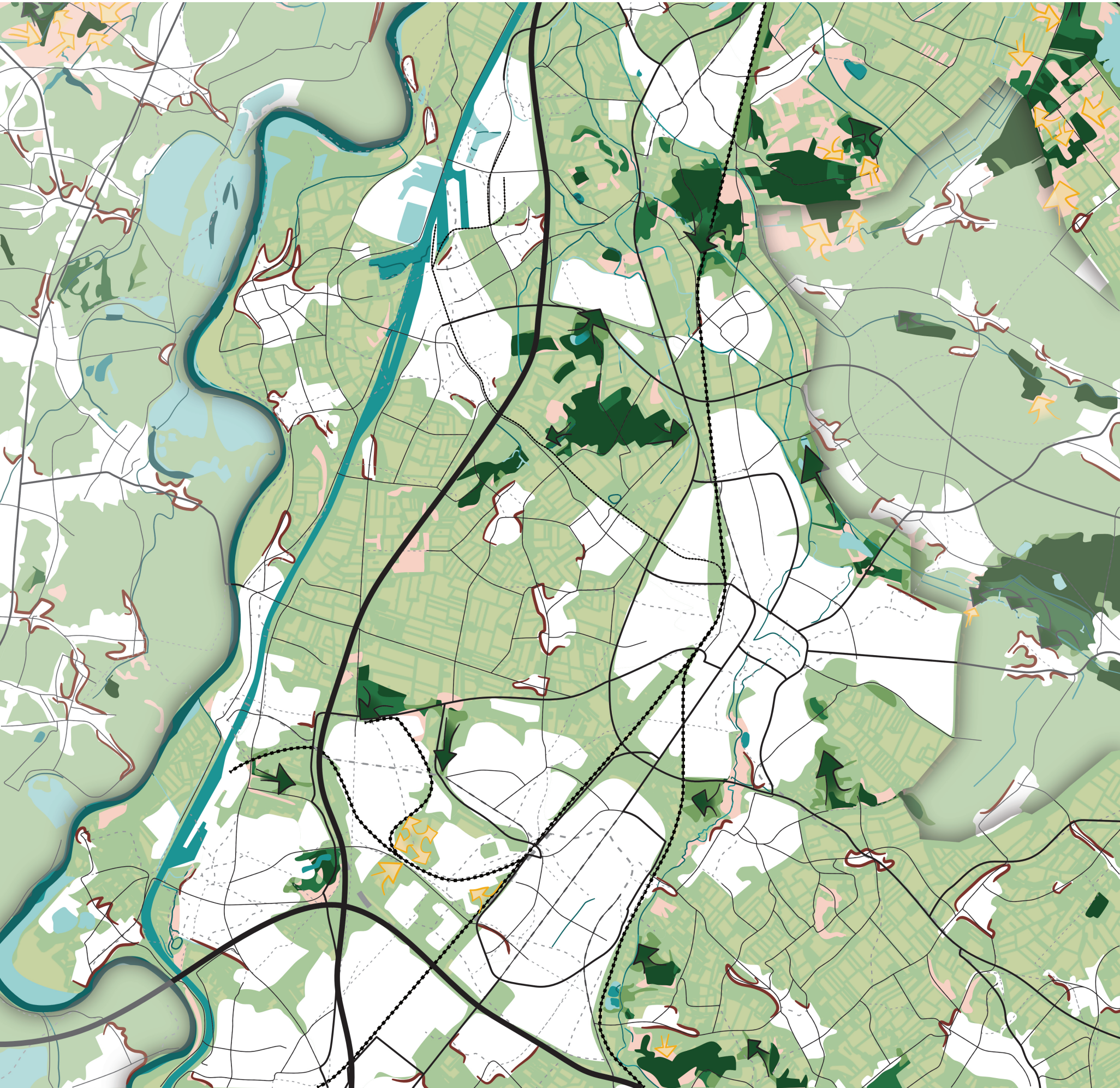
Overview of Existing Typologies

In the existing landscape of Limburg, we can find different landscape typologies. There are built-up areas that consist of small villages, a large city and some heavy industry clusters. These built-up areas are surrounded by either the traditional open agriculture landscape or by nature. In the coming pages we will explain these existing landscape typologies in more detail. The landscape typologies are explained by a vision statement, sketches of some architypes and there are a couple landscape criteria stated.

Village

City

Traditional Open Argiculture Landscape

Heavy Industry Landscape

Nature

750 m   1500 m
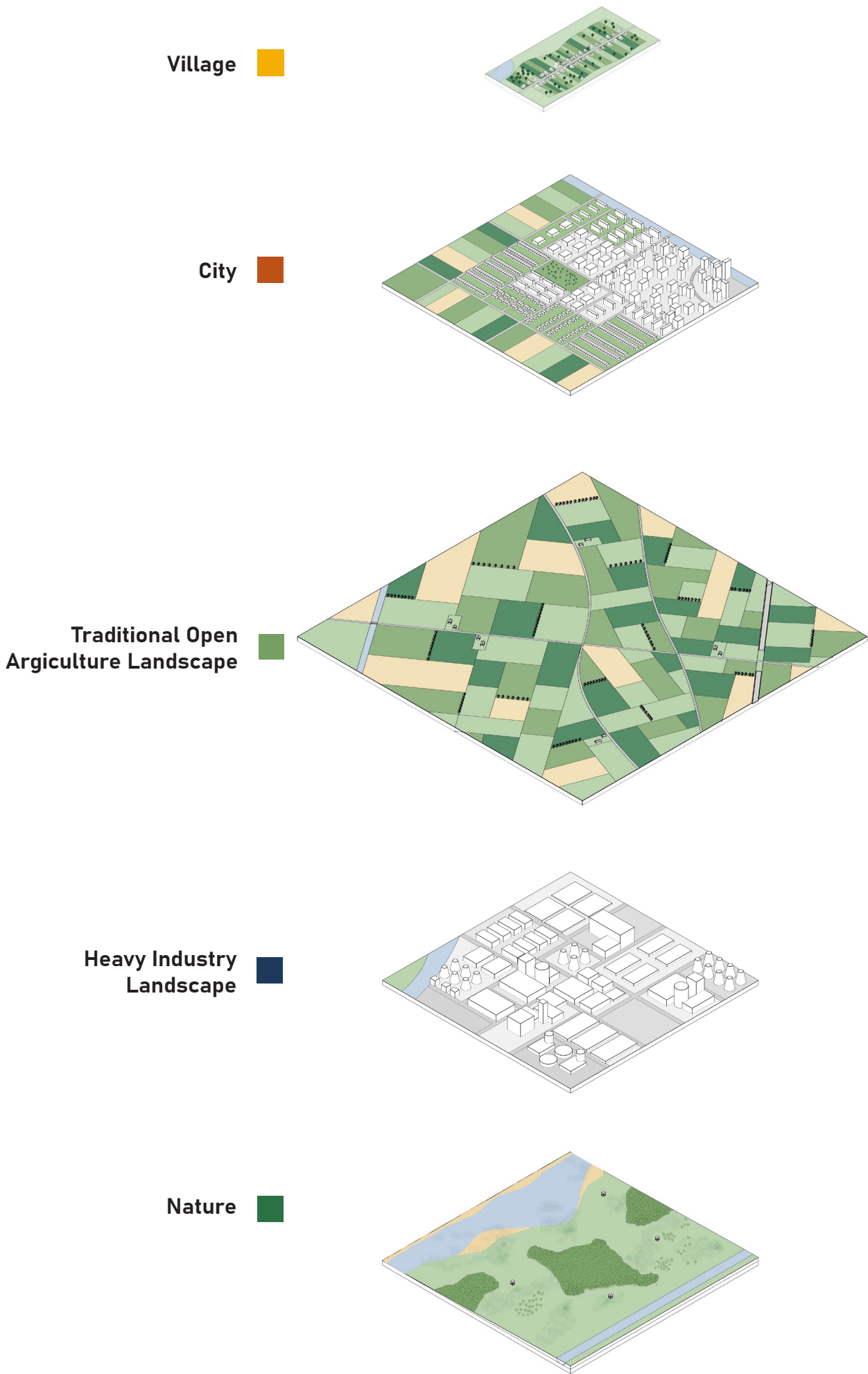
Figure 4.19 Landscape typologies within the study area
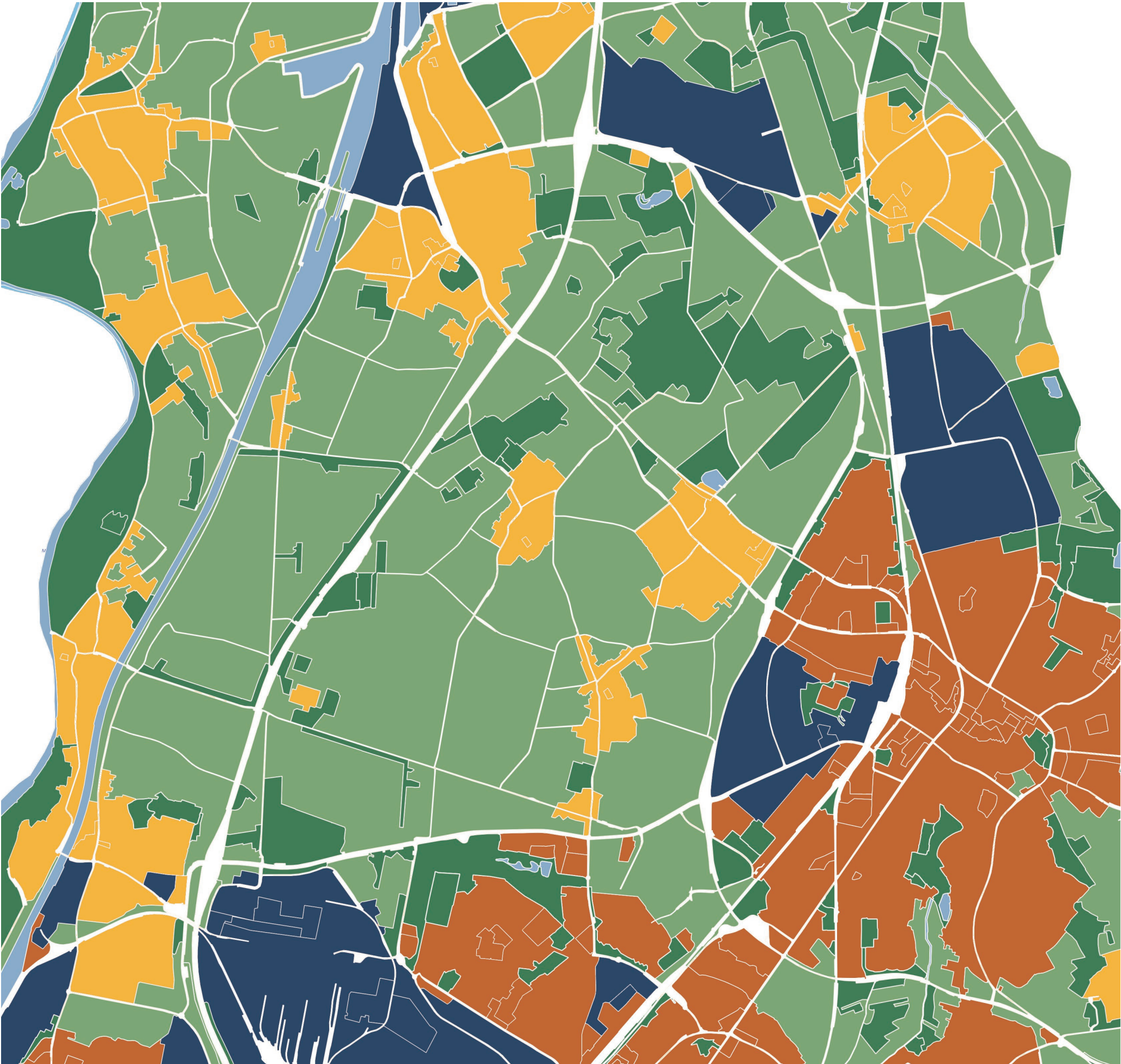
Figure 4.20 Typologies within the study area (Based on: CBS. (n.d.). CBS Existing Land Use)

Village

Keywords: *Small, Community, Open to Landscape, Landmark Church*

Vision: The village is a small settlement where the people know each other and form a community. The village consists of small houses on deep parcels and has a church in the middle of town that forms a landmark for the village. The land around the village is open and is characteristic of the Midden-Limburg region where it is found.

Manifestation of archetypes:

Water	Road	Railway	Buildings	Forest	Fields
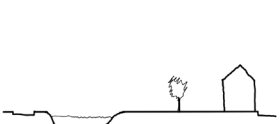
- Goes around the edge of village and doesn't interact too much
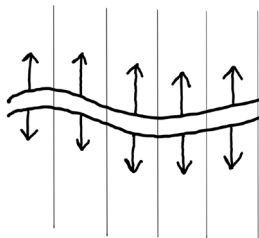
- Small local road Buildings are close to road
- Parcels are narrow, 10-20 m, and perpendicular to the road
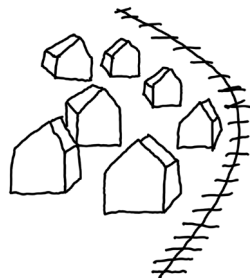
- Goes around/past the village
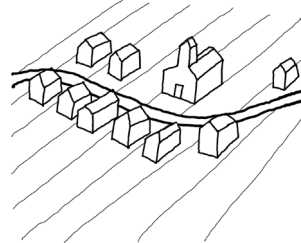
- Small family houses/flats
- Small hofs
- Local shops
- Landmark church
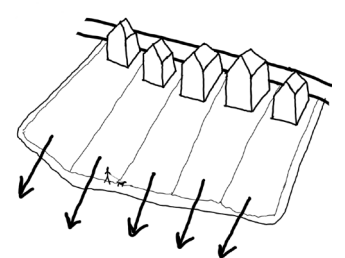
- Village ends with fields looking out over the landscape
- Edge between gardens and landscape is soft, occasionally has an edge path

Landscape Criteria en policies:

- Located on a local road
- Around the villages needs to be protected open landscape (or heart)

Landmark Church
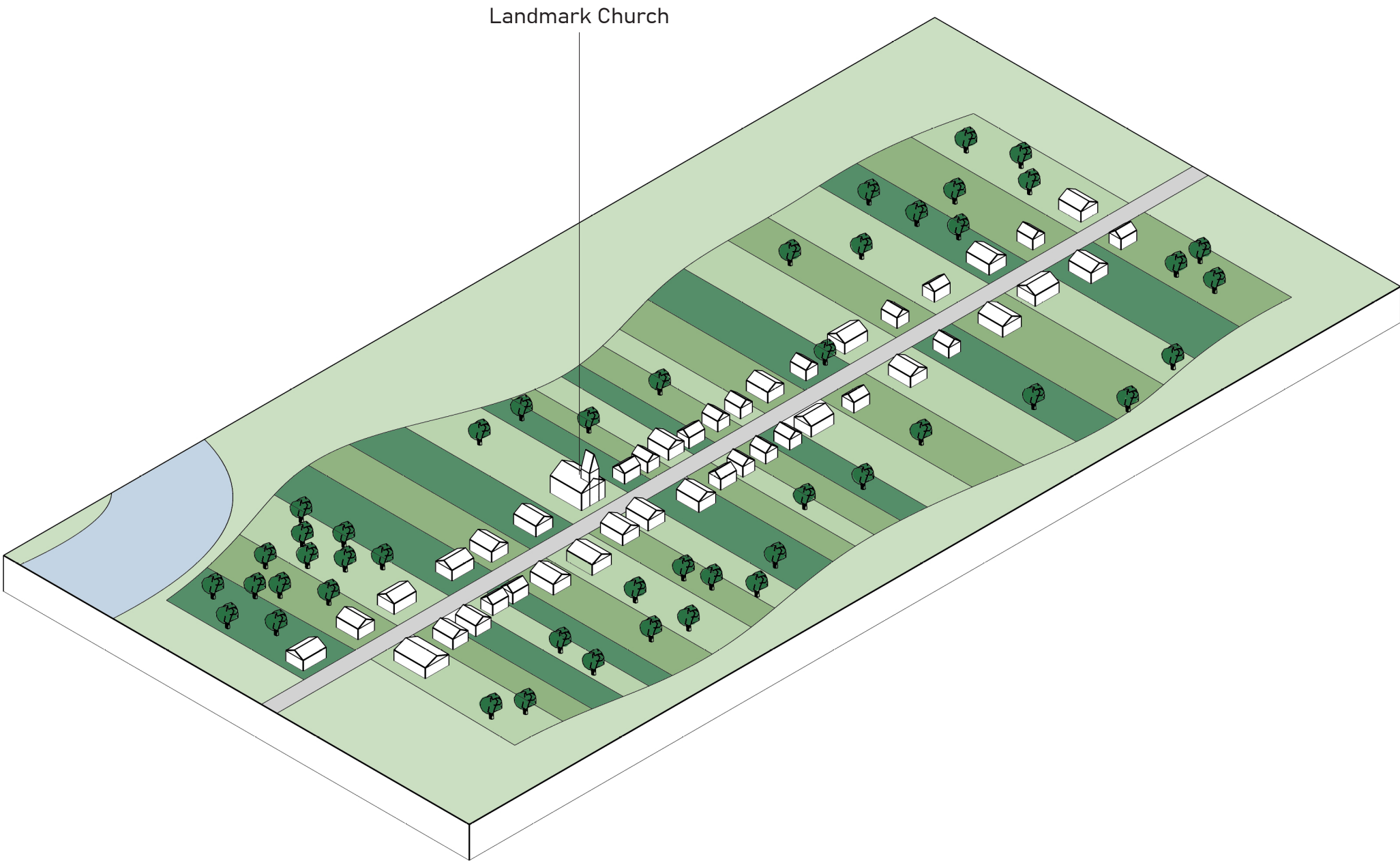
Figure 4.21 Typology village

Traditional Agricultural Landscape

Keywords: *Speaking the landscape grammar, open, traditional, heritage, small farms*

Vision: The protected open landscape is a landscape that consists of small hills that are filled with agricultural fields and small farm structures. In this landscape the openness and the heritage character of the fields is protected. Within this protection, the landscape can be slightly morphed. The space needs to speak and breathe the language of the landscape grammar.

Manifestation of archetypes:

Water	Road	Railway	Buildings	Forest	Fields

| | · Parcels are wide and can be perpendicular to the road | · Goes through the landscape as "decorative element", not integrated | · Small farms
· Chapel
· Country house | · Trees windbreak
· Forest patches in within field | · Mosaic fields
· Irregular patchwork |
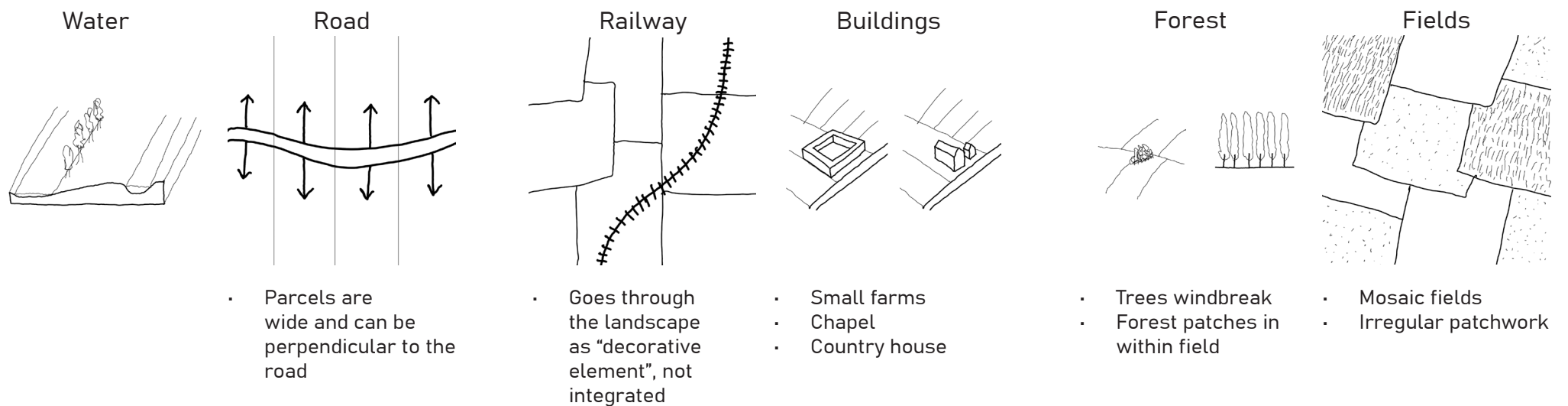
Landscape Criteria en policies:

· Any change needs to happen within the landscape grammar.
· Open character (open view planes)
· Powerlines need to be underground
· All cables underground preferably are clustered
· The highway needs to be hidden with a green pass over that fits within the landscape
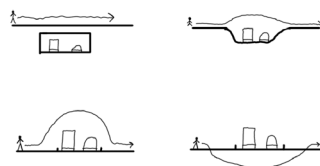
Figure 1.2 interaction highway and landscape

Farm

Green pass over highway

Trees windbreak

Cabels, pipes and
powerlines clustered

Trees windbreak
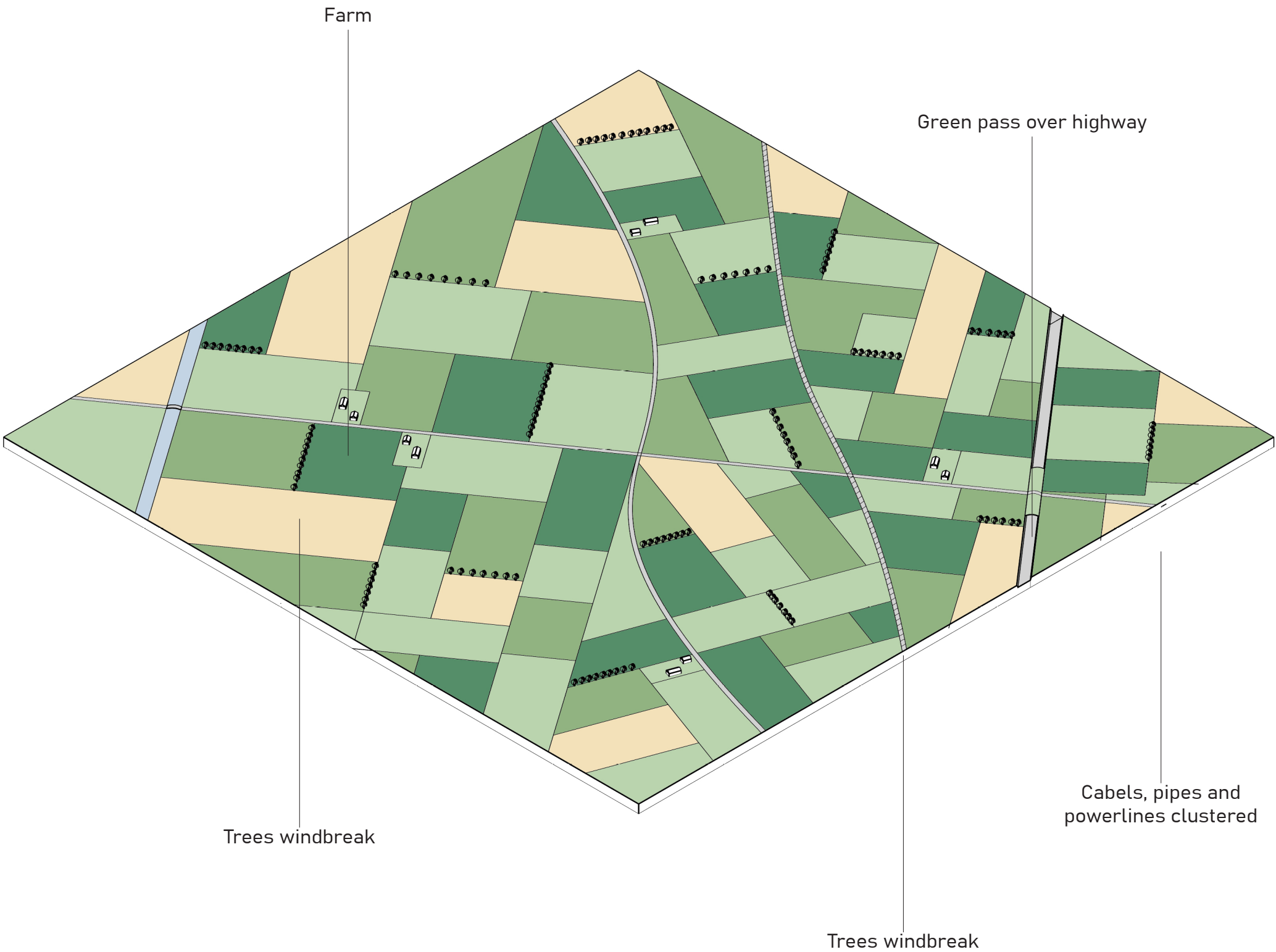
Figure 4.22Typology traditional agricultural landscape

Heavy Industry Landscape

Keywords: *Heavy industry, dangerous, toxic, introverted*

Vision: The dense industry landscape consists of industry that must be closed off to the public – due to its danger or toxicity. This industry is typically not human-scale, and this landscape does not follow the landscape grammar, instead forming a closed-off industry island. This typology can only be used in justified cases.

Manifestation of archetypes:

Water	Road	Railway	Buildings	Forest	Fields

- Port
- Front side industry can be towards the water

- Industry premises are larger and introverted

- not different from others

- Large buildings that demolish the fields, do not respect the field grain size and structure
- Dangerous and toxic

- Row of trees can be placed as a barrier at the edge of industy

- Not existing
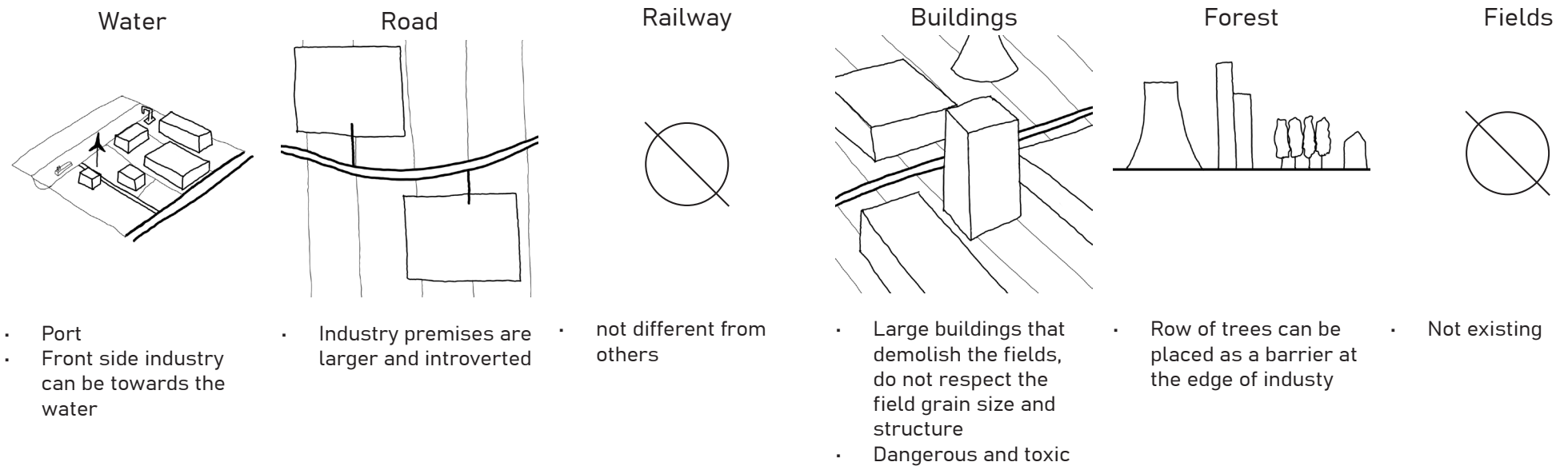
Landscape Criteria en policies:

- This typology, which does not respect landscape grammar, can be used only in justified cases, due to safety of the public and nature.
- Needs to be shielded to complete the wishes of the community, see compatibility matrix.

Industrial buildings

Port
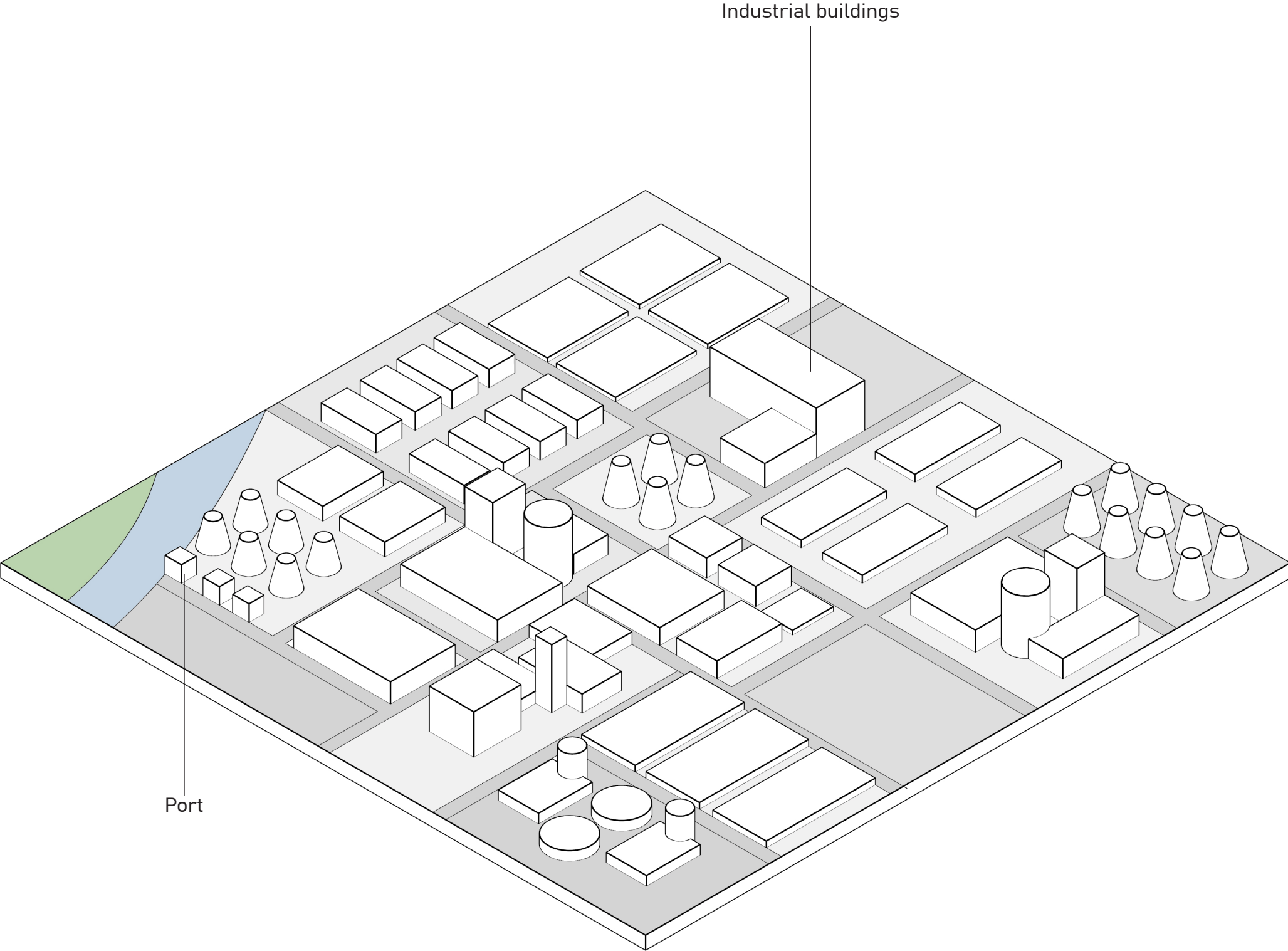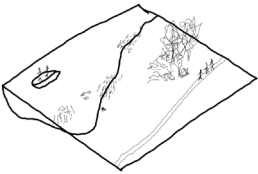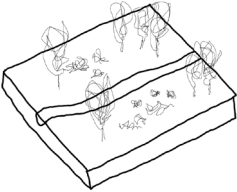
Figure 4.23 Typology Heavy Industry

Nature

Keywords: *Wild, Animals, Green, Everchanging, Evolving over time*

Vision: Nature typology is a space where humans can connect with the Earth and also recreate. Preferably with as little human intervention possible. It serves as habitats for flora and fauna, and as a reminder of the power nature has over landscape. Nature can take on many coasts – open grasslands, dense forest, majestic river.

Manifestation of archetypes:

Water	Road	Railway	Buildings	Forest	Fields

· Natural edge	· Rivers and paths are natures roads	· Not different from others	· Look-out tower · Hay rack	· Diverse · Recreational · Selective harvest	· Grassplot · Marsh · Wetland

Landscape Criteria en policies:

- Can't be any large buildings
- Least human intervention possible
- Priority to non-humans
- Where possible accessible for bikers and pedestrians
- Where possible, formal protection

everchanging fluvial
landscape

Forest

Look out tower
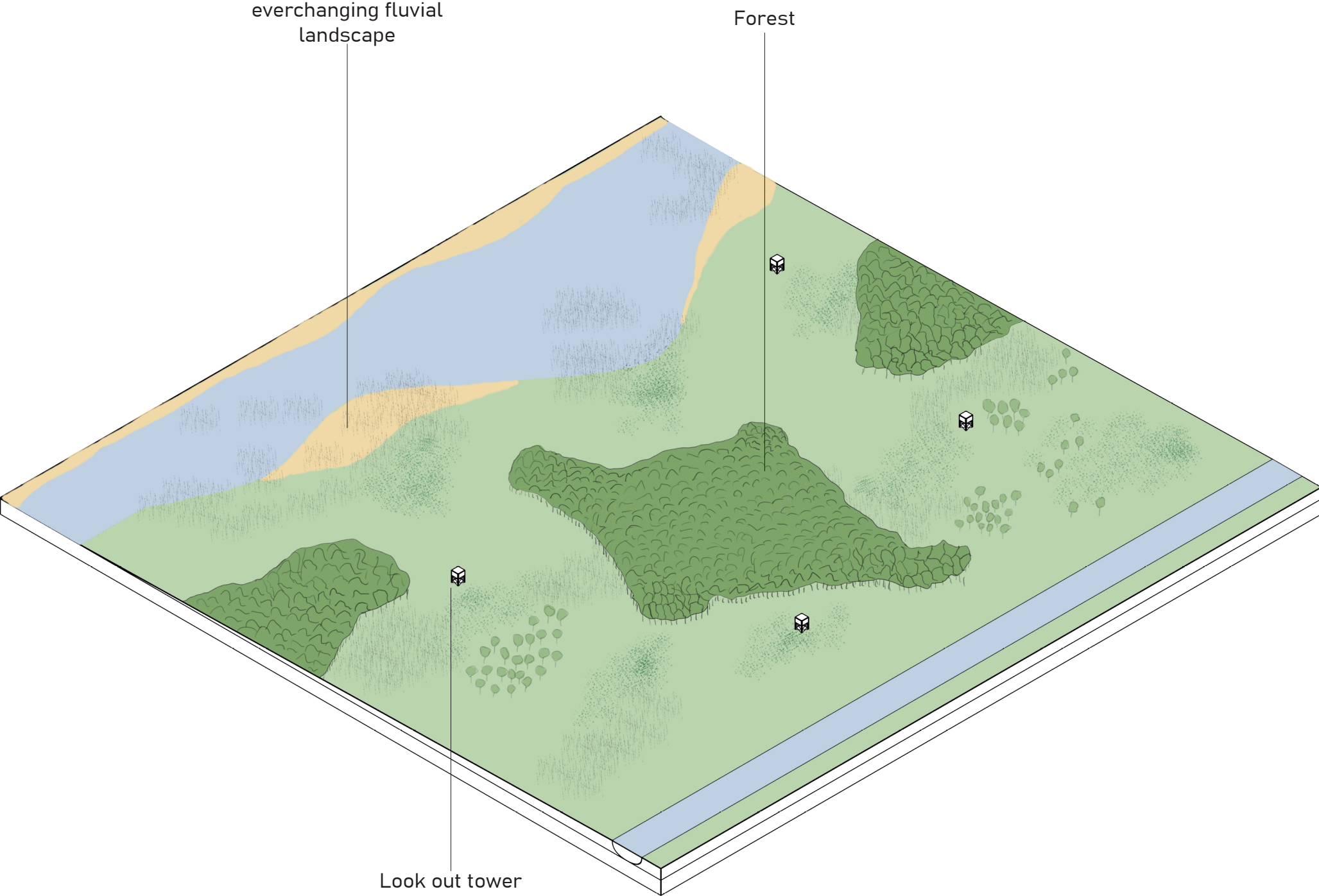
Figure 4.24 Nature

City

Keywords: *Complex, Build-up, Dense, Large, connected, central square*

Vision: The city is complex and large typology. In the centre of the city is a river and a central square where people can meet. Close to the centre the buildings are densified and close to the edge the city can be low density consistent of row houses. The city is very well connected both within itself and to other cities through rural landscape.

Manifestation of archetypes:

Water	Road	Railway	Buildings	Forest	Fields

- River going through the citycentre
- Hierachy
- Central stop
- Densified to city centre
- Less dense to city edge
- Trees in a park
- Football field Park
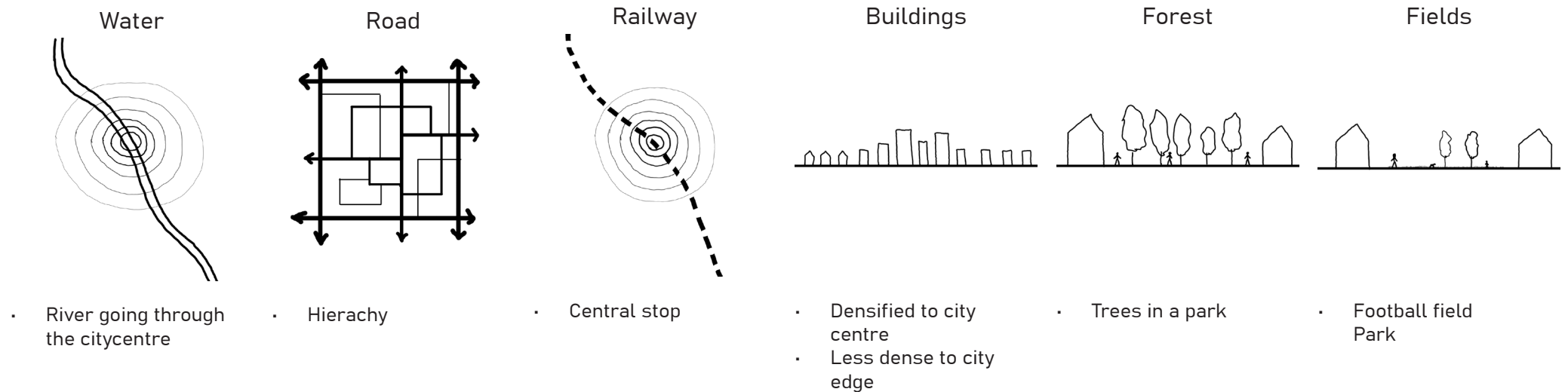
Landscape Criteria en policies:

- Edge of the city is very diverse and should be considered individually, a suburban family house landscape needs a different treatment than a modernist area.
- The city needs to be surrounded by open landscape, but in some places can have an industrial area around. Access of people to open landscape as well as economic and environmental factors should be considered.

Forest and park take
form of field
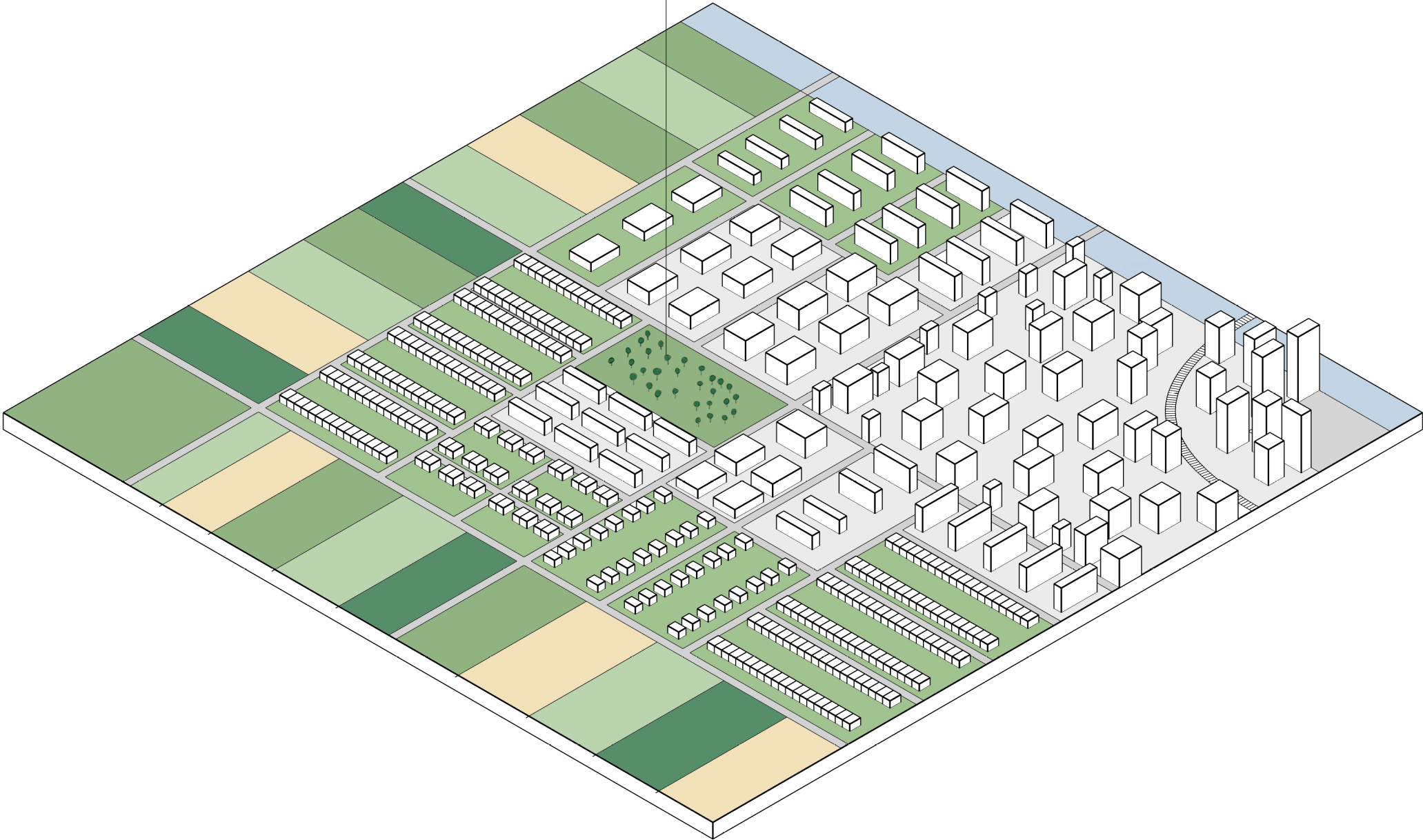
Figure 4.25 Typology city

4.4 Conclusion

Regional pressures from shifting demographic conditions coincide with growing demand for industrial space on this constrained landscape. Energy infrastructure is being built in the area to support the national transition, giving industry an opportunity to grow based on increased grid allowance. This growth is particularly strong in Chemelot, instilling a sense of fear and hesitancy amongst residents that are closest to the industrial landscape. The lack of a protected zone in their region only increases hesitation in trusting stakeholders that are outside of the community. A lack of balance is felt, as decision making is happening outside of the community's purview. This community has a sense of disempowerment, as grey pressure grows, their population declines, leaving them with even less sway. These factors, growing industry and declining community population, leaves a landscape more vulnerable. Interventions must be made to ensure that a future generation can enjoy this landscape.
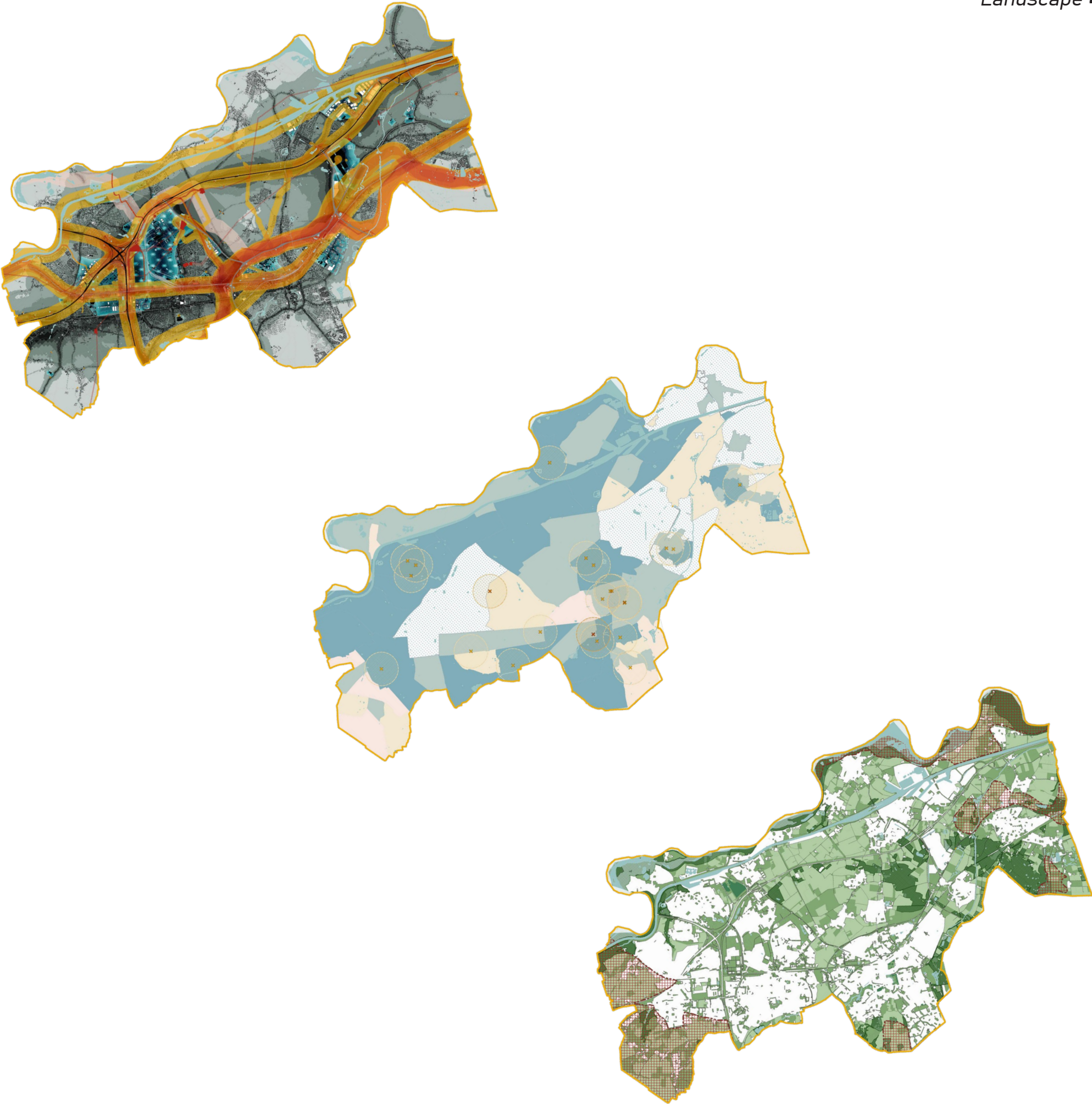
Figure 4.26 Conclusions

Figure 5.0 Impressions of the landscape

5.0 Vision

Contents

5.1 Vision Statement

On an early morning in May, you decide to take a hike to a hilltop outside of Sittard. You're met with the sunrise upon an open and diverse landscape. Villages interspersed with farms, thick trees, steam from a tower on the horizon. Your eyes wander down the road to the pasture; you see the sheep wandering through a maze of solar panels dotting the farm meadows. A whistle blows. Start of the day for the workers of Chemelot. From all corners of the landscape, you see people cycling to their economic centers, some to the village, and some to industrial zones.

Along these pathways there are children playing in the fields, teenagers fishing along the canal, and their grandparents looking on from a balcony above. Our community has been connected by a set of well-maintained common pathways and gathering space for us to bond and grow.

Together, we reshaped the territory surrounding the settlements to be our new energy landscape, shielding us and our natural heritage from unchecked industrial growth and urban sprawl. We become stronger together, attracting new families and giving a place for people to age in place. In this new horizon, the past and future are integrated in a way that respects the landscape's traditional language.

Zooming In
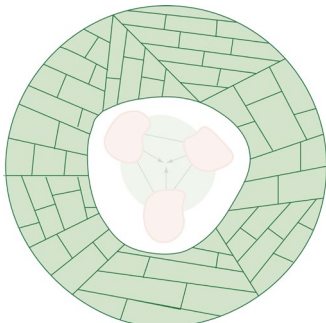

Figure 5.1 Sketching the vision for the community
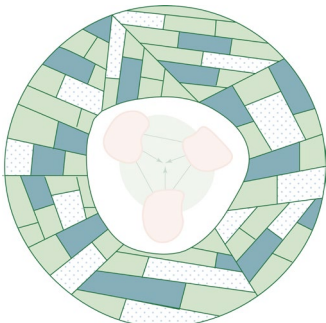
MOCK COMMUNITY VISIONING
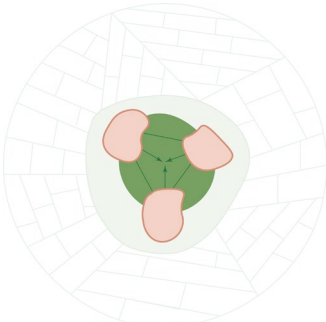
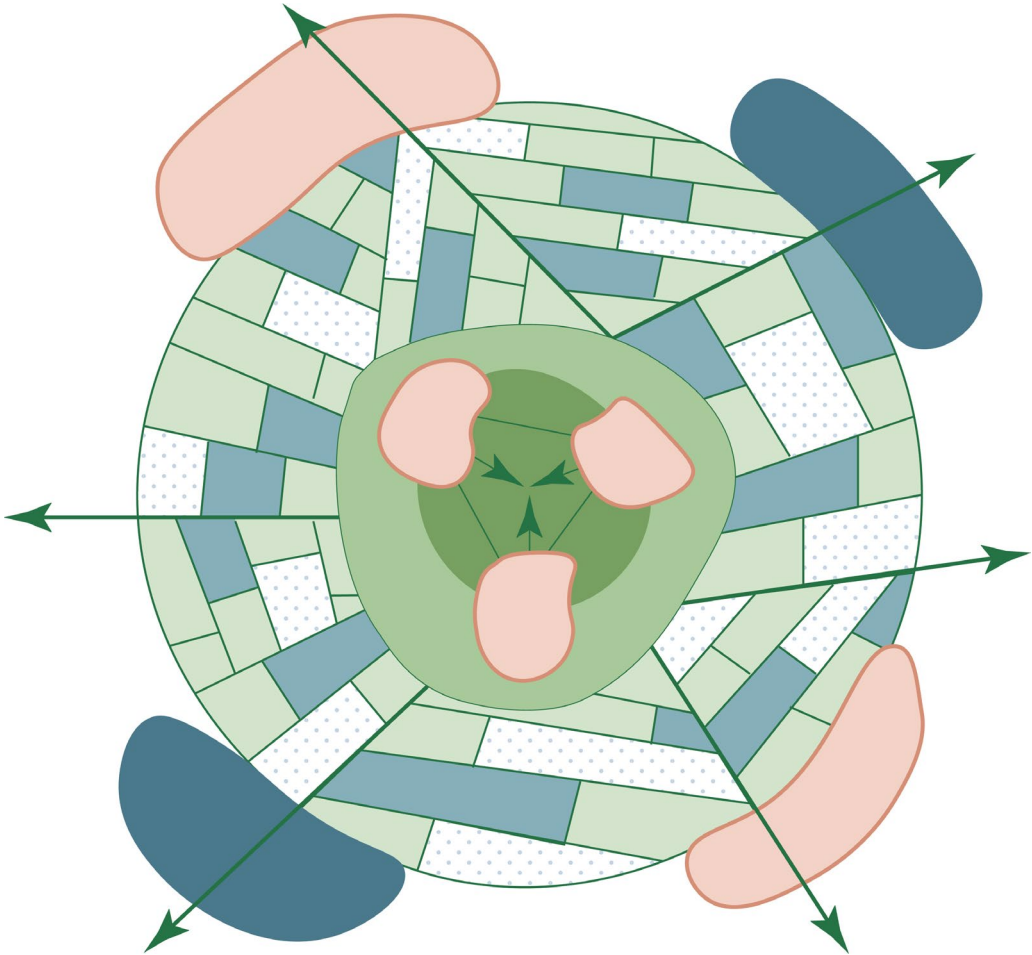PARTICIPATION AND
STRENGTHENING OF
THE COMMUNITY
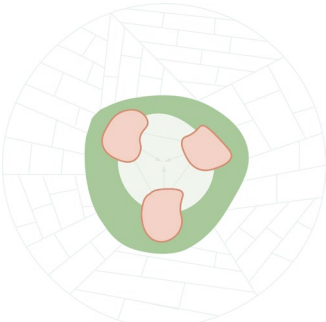
PRESERVATION BY
SHIELDING AROUND
THE COMMUNITY

ELABORATION ON
GRAMMAR OF THE
LANDSCAPE

SPATIAL ADAPTATION
OF INDUSTRY AND
ENERGY

■ Heart
■ Open Landscape
■ Agriculture
■ Energy Landscape

Figure 5.2 Disecting the vision priorities

Initial conclusions developed during the vision phase were primarily focused on preserving the open landscape of the region and empowering the community that calls this place home.

Shifting the power dynamic away from industry by developing a physical barrier to growth, a shield was proposed around industrial sites. Envisioning this space as a protector, while encouraging energy independence for the community. Zones were set aside to give industry a specific location to grow, analyzing them as spaces that would retain the vision of an open landscape. Communities rely on industry continuing to thrive in their region to maintain a strong economic status.

Pathways from the industrial spaces were developed leading not directly to village centers, but funnel spaces, or hearts. These spaces have a multi-purpose dynamic. Creating a common space for communities to gather and organize, adding services and facilities and adding to the green vibrancy of the area.

These building blocks are joined together in a spatial diagram of the abstract vision, drafting the potential locations of hearts, shields, industry and networks.
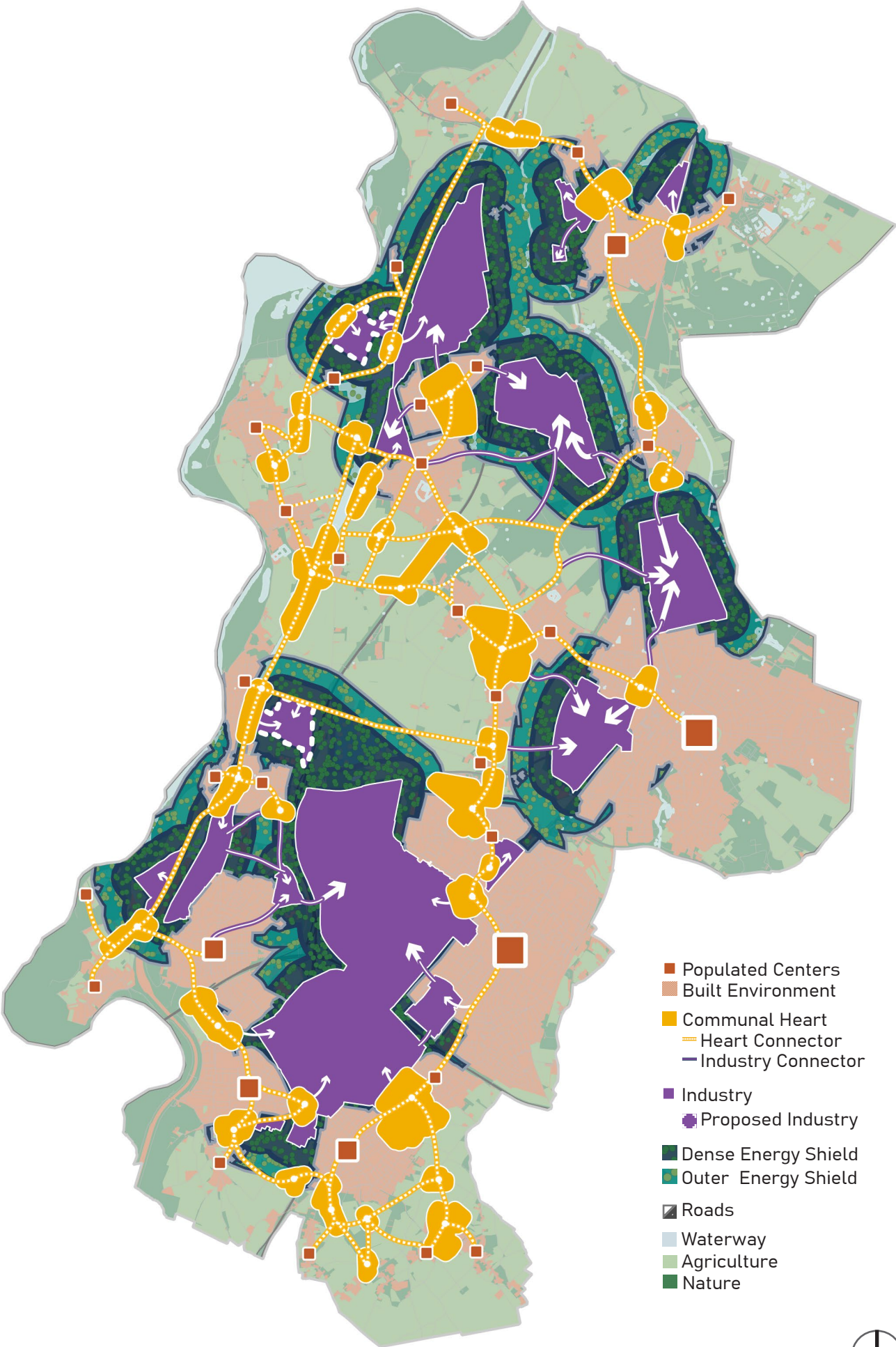

Legend:
- Populated Centers
- Built Environment
- Communal Heart
  - Heart Connector
  - Industry Connector
- Industry
- Proposed Industry
- Dense Energy Shield
- Outer Energy Shield
- Roads
- Waterway
- Agriculture
- Nature

Figure 5.3 Abstracted vision map

1:125000

5.2 Landscape

Historic Landscape

A core component of the existing regional grammar is an agricultural landscape that is more traditional compared to the commonly found Dutch polder system.

It resembles farms that could be found at the turn of the 20th century. Plot sizes have stayed consistent in size outside Sittard–Geleen. These plot sizes are strongly associated with the tight village structure that adjoins them. The farmland weaving in and out of the communities that have built themselves around it.

The community has pride and identity in this historical context. Smaller plot sizes in the landscape create more freedom to move throughout the landscape. More opportunities to know the local farming community as your neighbors, rather than conglomerates who own large plots of industrial farms.

This has slowly begun to change. Plans must be put into place to ensure that the needs of the community can be balanced through the vision.

Three villages – 1975

Three villages – 2024
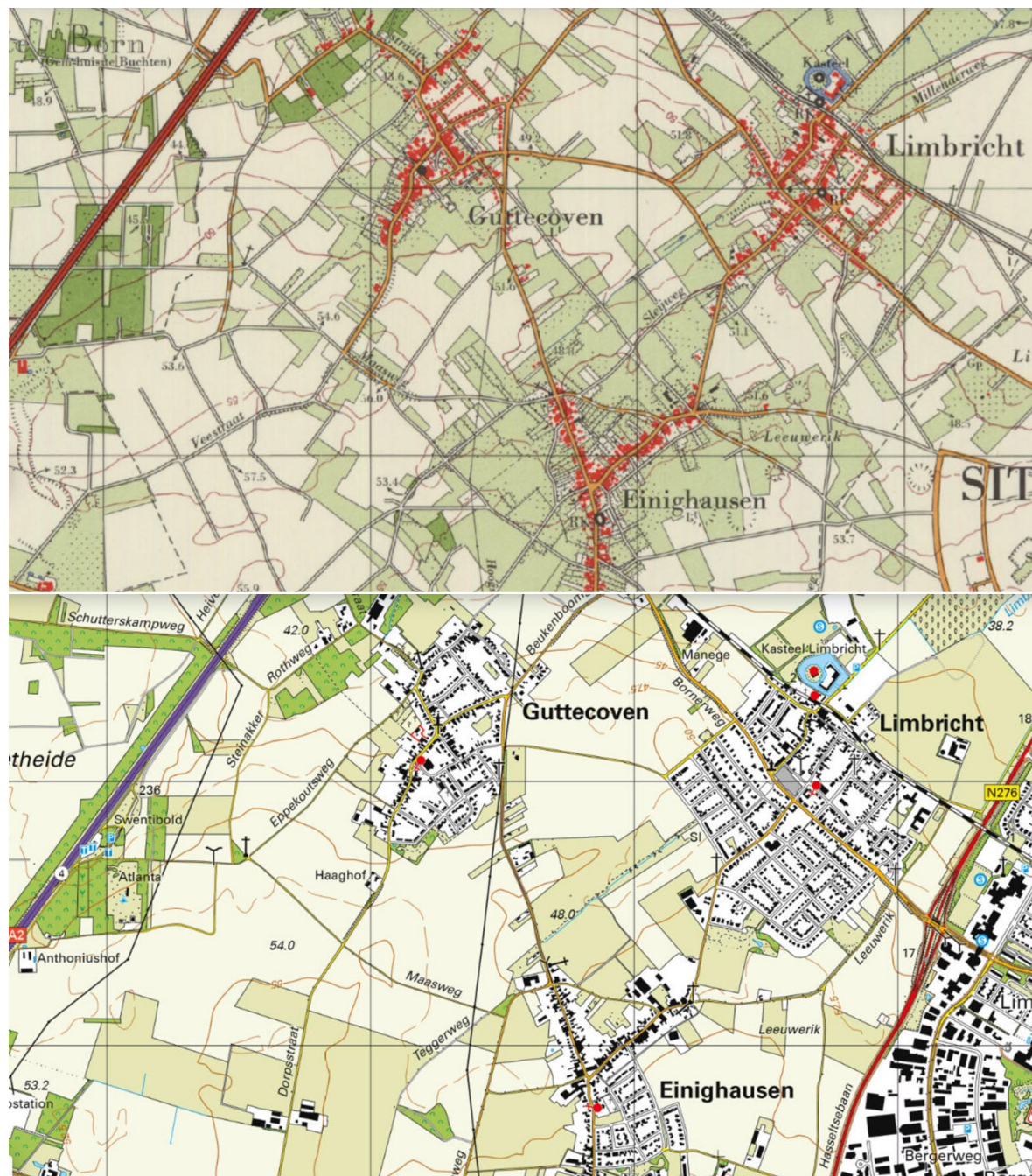
Figure 5.4 Comparing the landscape language   NTS

POLDER GRAMMAR

Agricultural landscape outside of Eemdijk, NL

LIMBURG GRAMMAR

Agricultrual landscape outside of Guttecoven, NL

Figure 5.5 Farm plot sizes comparison

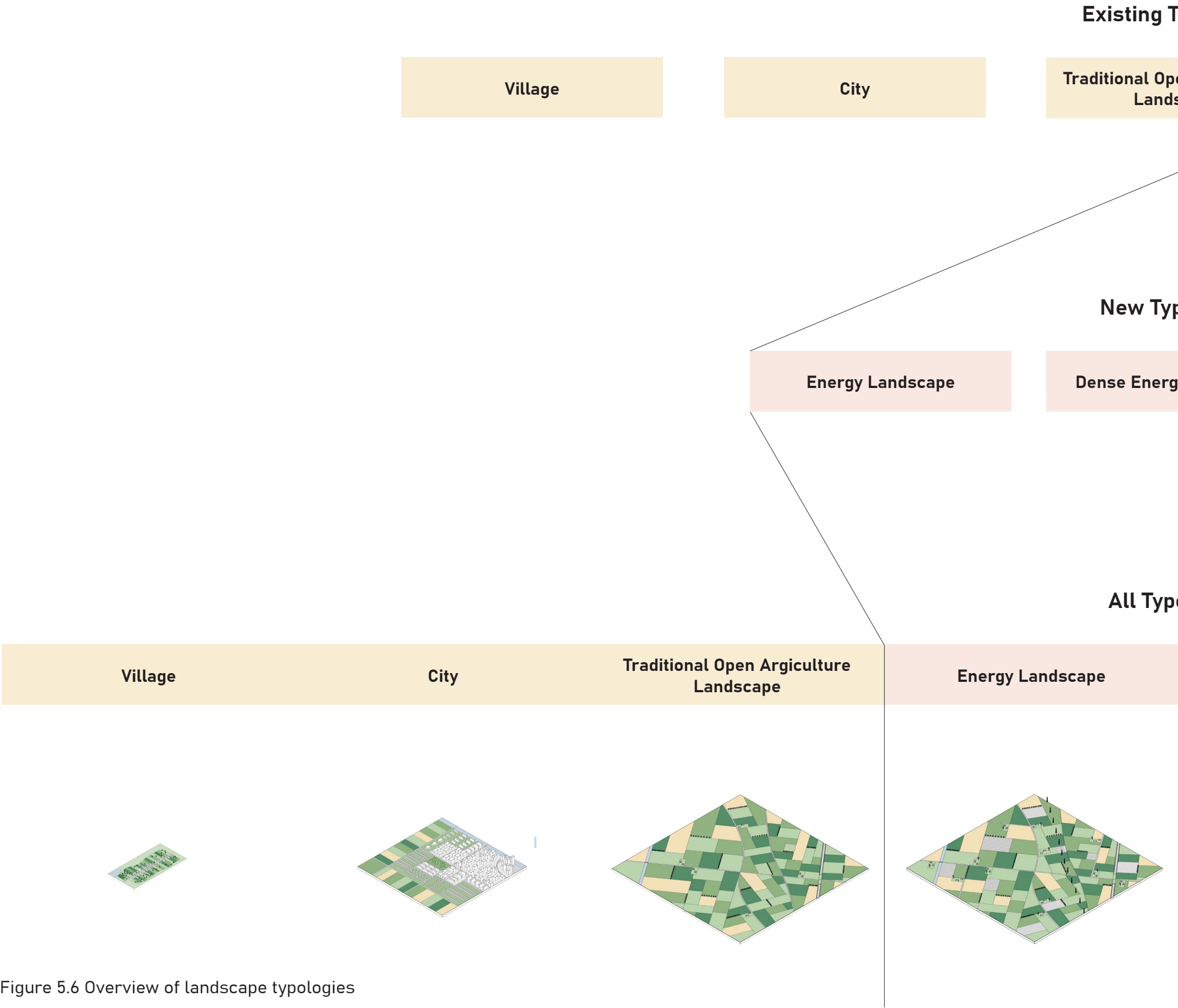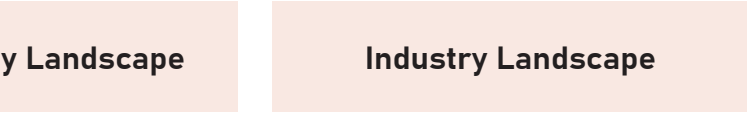☐ Farm Plots
1:50000

Landscape Tyologies

Existing T

Village	City	Traditional Op... Lands...

New Typ

Energy Landscape	Dense Energ...

All Typ

Village	City	Traditional Open Argiculture Landscape	Energy Landscape

Figure 5.6 Overview of landscape typologies

92

Typologies

en Argiculture scape	Heavy Industry Landscape	Nature

pologies

y Landscape	Industry Landscape

ologies

Dense Energy Landscape	Industry Landscape	Heavy Industry Landscape	Nature
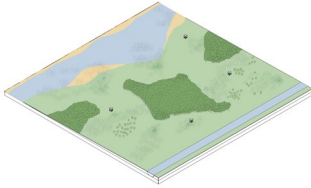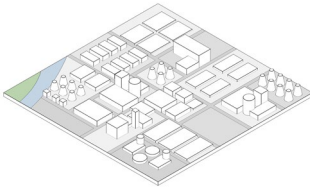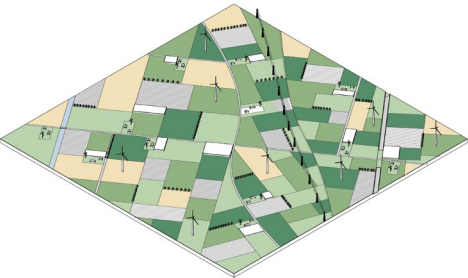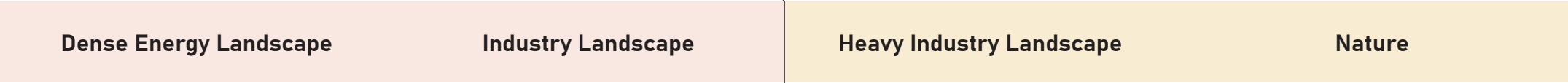
Plots

Farm plots can be used as a versatile spatial tool in the vision for the region. The community has expressed their comfort with their smaller footprint and enjoys the landscape as it currently exists. Smaller footprints ensure that anything in the built environment doesn't dominate the horizon.

The conservative approach of not designing or recommending an implementation upon the landscape is not feasible.

Alternatively, the plot sizes can be used as a catalyst and a metric for designing the future landscape.

☐ Farm Plots

Figure 5.7 Farm plot sizes in the region

1:125000

Shields

Shields are a critical part of the vision. Their location on the edge of the industrial landscape acts as a barrier to unmitigated growth. Placement of the shields was de-termined by creating a 500m buffer around the edges of existing and proposed in-dustrial location. This is the shield that requires the strongest protection.

A mix of dense energy elements will go in this zone. The secondary shield was developed with a 1000m buffer from existing and proposed industrial space. This is the outer shield.

An environment where an energy landscape can be more sparse, and the transition back into the open landscape is gradual. Built up spaces will not have a shield landscape, instead recommendations will be made to deter the displacement of these environments.
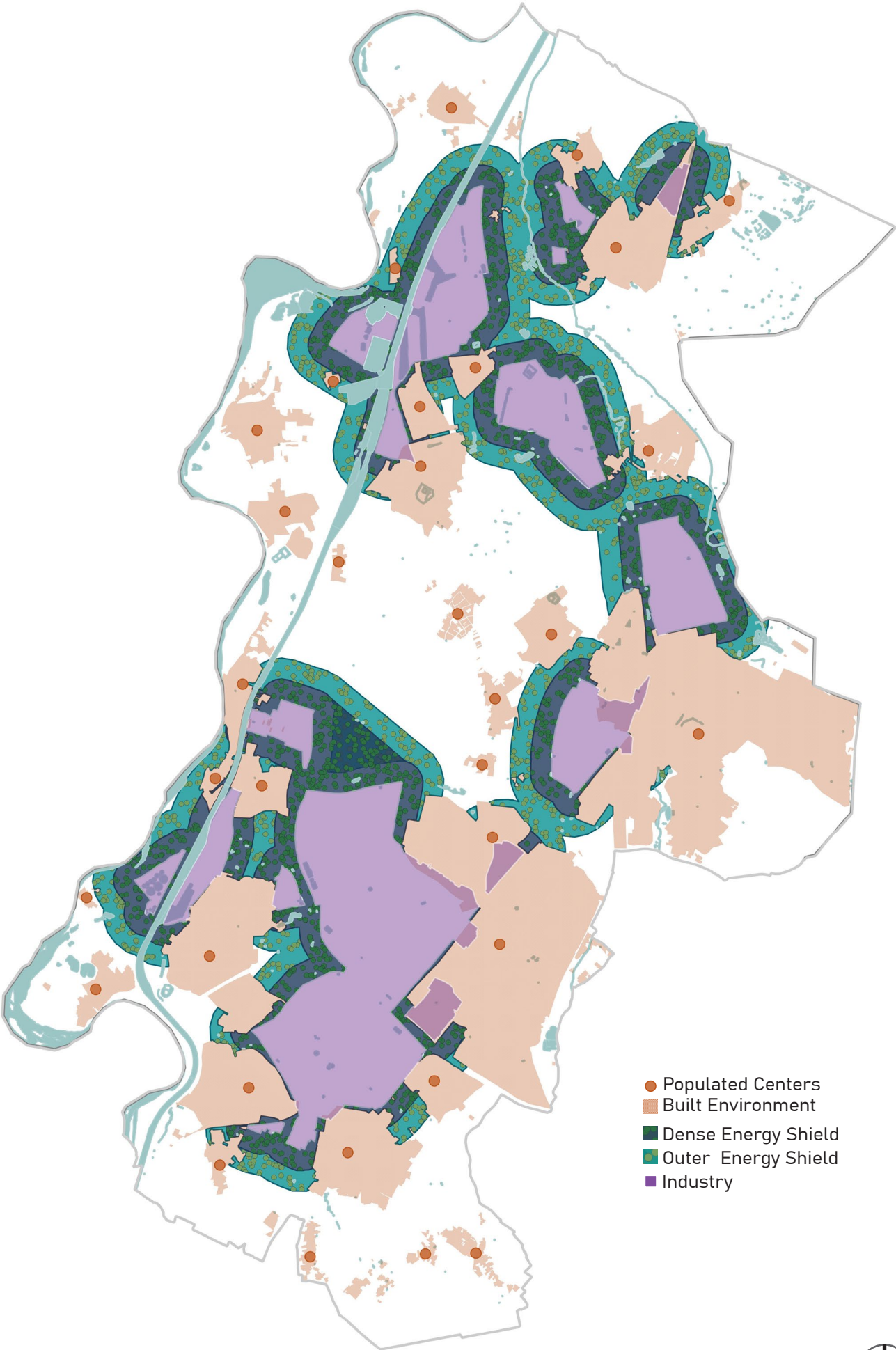

Legend:
- Populated Centers
- Built Environment
- Dense Energy Shield
- Outer Energy Shield
- Industry

Figure 5.8 Initial shields in the spatial context

1:125000

Shields & Energy

Agricultural Plots

Agricultural plots are a piece of landscape grammar that the community is familiar with. These plots are typically less than 2 Ha (source), and their spatial dynamic is far from repetitive.


Agricultrual Plots + Shield

Shields are buffered from industrial edge. 500m buffers result in the dense energy landscape typology. 1000m buffers result in the outer energy landscape. This should be developed as a hierarchical gradient the leads back into the open landscape.

Implementation

Combining these aspects together creates a randomized fabric on the landscape. Plots are intermixed between one another. Dense energy fields of solar panels may be placed next to a biomass field, pushing up against a field with small turbines, and eventually returning to an open landscape.
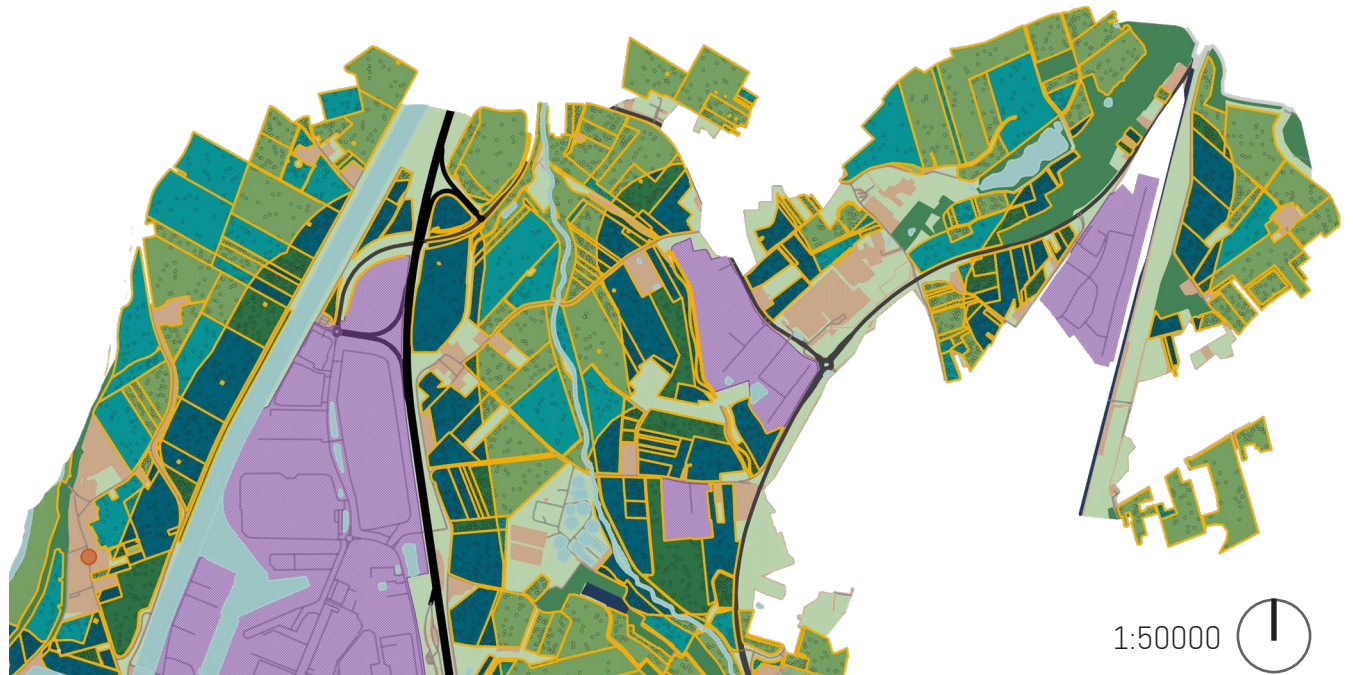
Figure 5.9 Transitioning the plots to the shields

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On the regional scale, the implementation of this results in a potential ... Ha transition (source). This should be considered a transitional process between the evolution of the open landscape to the shield. It will not be an instantaneous switch from agricultural landscape to a shield typology. Steps should be taken, and guidelines respected when this change does occur.

A successful switch should encourage innovative solutions to the energy transition that results in a strong infrastructure that still maintains a semi-open landscape. This large-scale protection should establish a greater sense of security amongst farmers and landowners in the open landscape. Increasing productivity and ensuring prosperity.
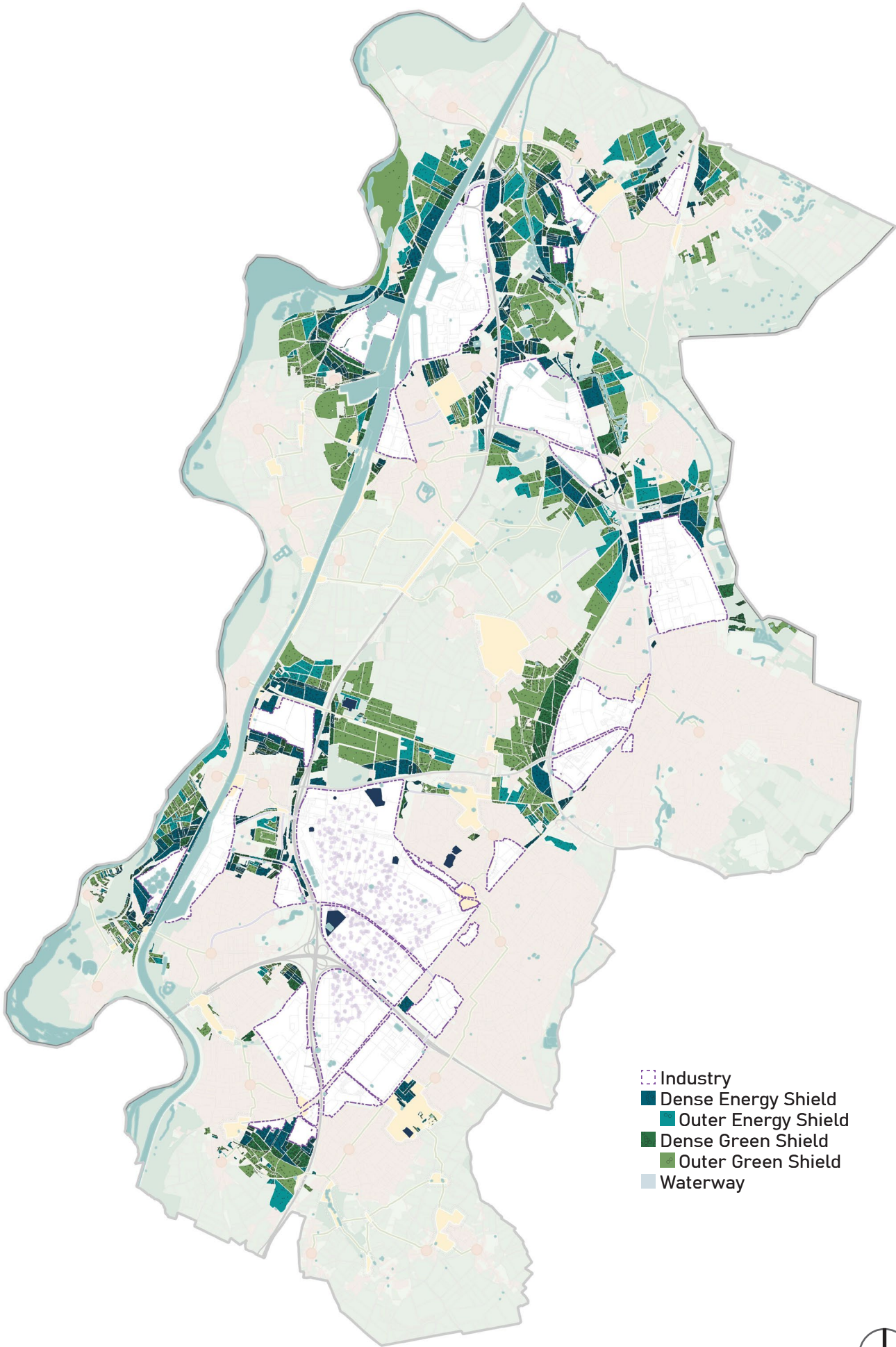
Industry
Dense Energy Shield
Outer Energy Shield
Dense Green Shield
Outer Green Shield
Waterway

1:125000

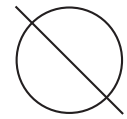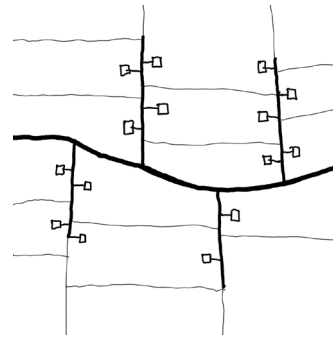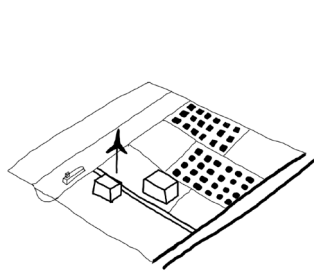Figure 5.10 Shields in the regional context

Dense Energy

The outer energy landscape is speaking the grammar of the existing agricultural characteristics. It has small to medium farms, density of the farms can be higher, but they are logically placed and imitating the scale of existing agricultural buildings. The hilly agriculture fields are still present, but have installed newer energy elements. The elements fit perfectly into the landscape grammar and are relatively small.

Landscape Criteria

– Any adaptation must happen within the existing landscape grammar

– Opportunities for small energy elements, like solar or biomass, could be added to the landscape. They must fit within the existing landscape grammar and aren't in a continuous array

– Fields remain open and productive
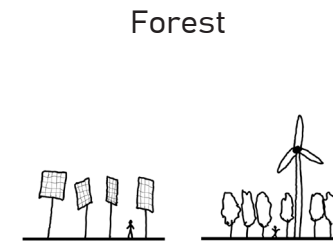
– Powerlines can be above ground

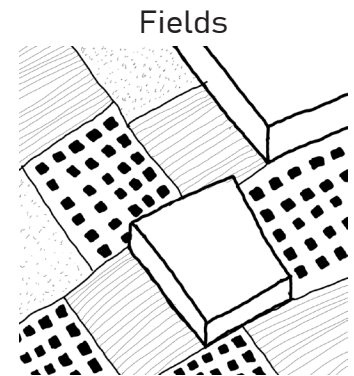Manifestation of **DENSE ENERGY** archetypes:

· not different from others
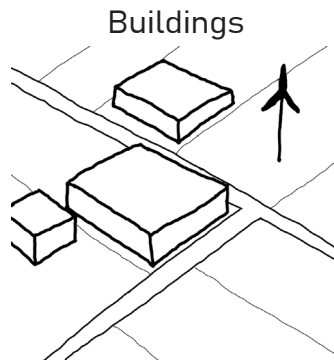
Buildings

· Medium size farms
· Height limited to rural houses
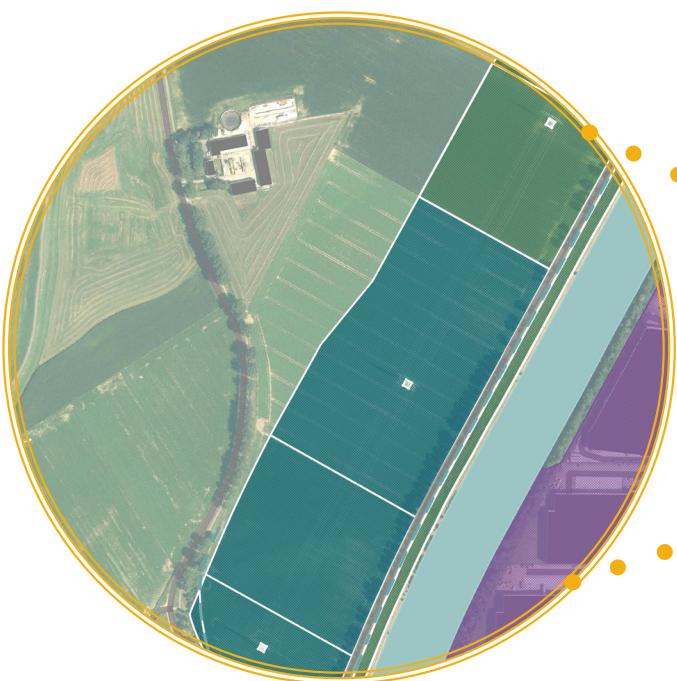
Forest

· Forest within field
· Forest consist of solar elements

Fields

· Larger solar fields
· Biomass fields
· Larger turbine structures
· Diverse field patches, more filled up by buildings

Figure 5.11 Dense energy archetypes

1:50000

Figure 5.12 Dense energy in the spatial context

DENSE ENERGY

Larger Agricultural Landscape

Denser Solar Fields

Biomass Fields

Larger Windturbines

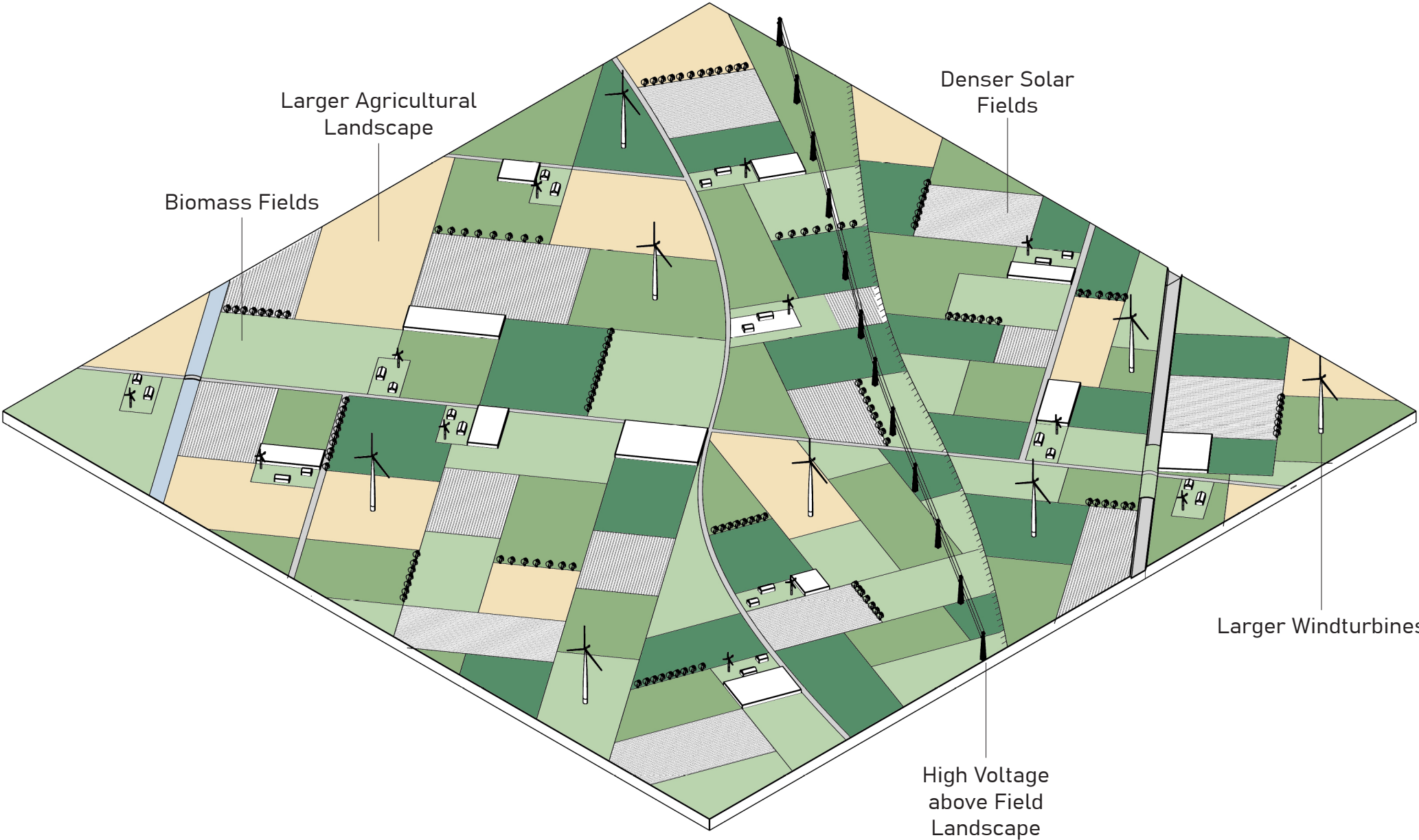High Voltage above Field Landscape

Figure 5.13 Dense energy square diagram

Outer Energy

The energy landscape is speaking the landscape grammar of the existing landscape characteristics. It has small to medium farms, the density of the farms can be higher, but they are logically placed and to scale. The hilly agriculture fields are still present, with the opportunity for new energy elements to be placed within the boundaries of the plots. The elements are appropriately sized in the landscape grammar.

Landscape Criteria

– Any adaptation must happen within the existing landscape grammar.

– Energy elements such as solar, biomass, wind or facilities must fit in the exsiting plot.

– Buildings cannot be higher than the existing rural structures.

– Building significantly larger than farms cannot exceed grain size of the fields and they have to be solitary

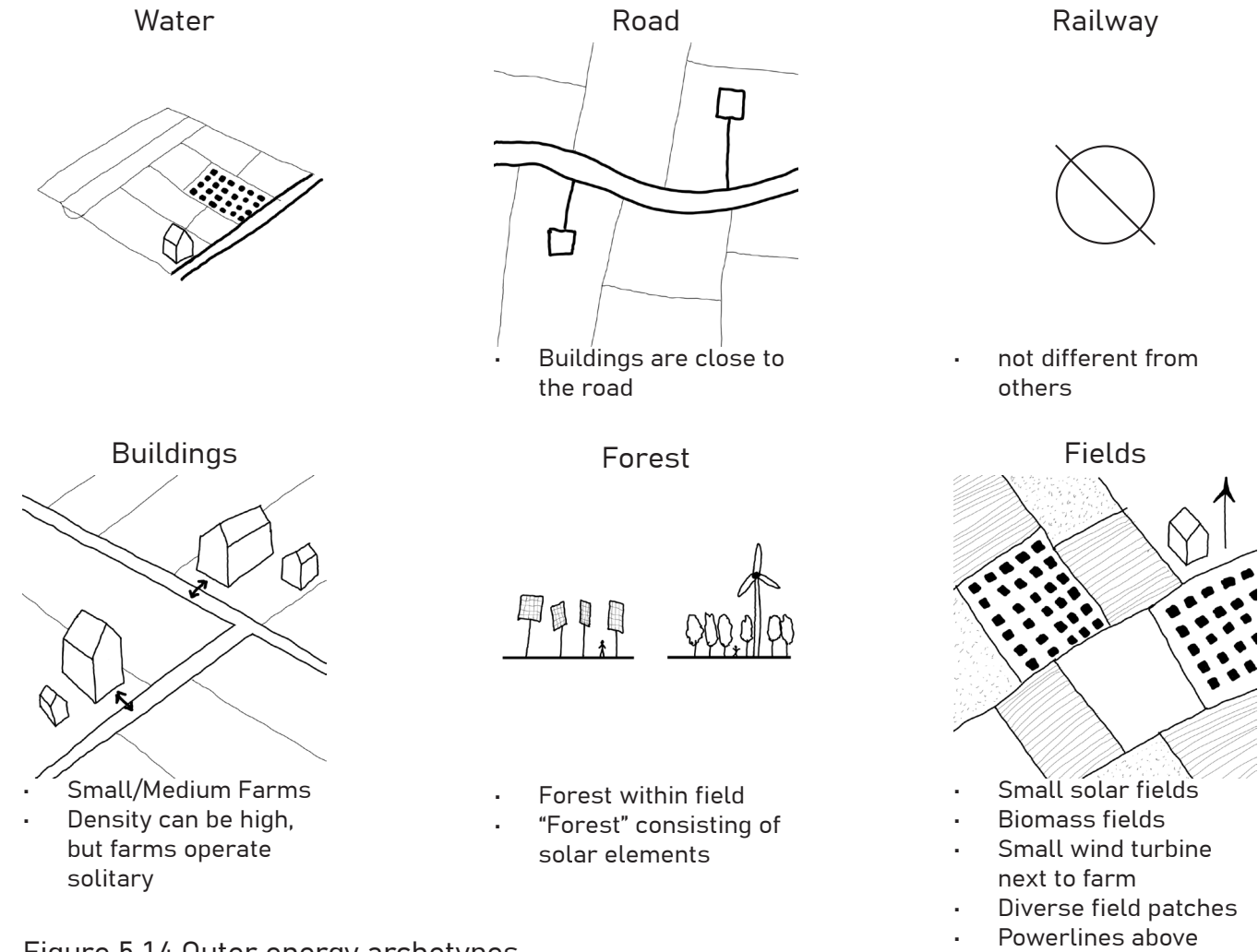Manifestation of **OUTER ENERGY** archetypes:

Water

Road

- Buildings are close to the road

Railway

- not different from others

Buildings

- Small/Medium Farms
- Density can be high, but farms operate solitary

Forest

- Forest within field
- "Forest" consisting of solar elements

Fields

- Small solar fields
- Biomass fields
- Small wind turbine next to farm
- Diverse field patches
- Powerlines above

Figure 5.14 Outer energy archetypes

1:50000

Figure 5.15 Outer energy in the spatial context

100

Solar Field

Biomass Field

Small Wind
Turbines In Farm
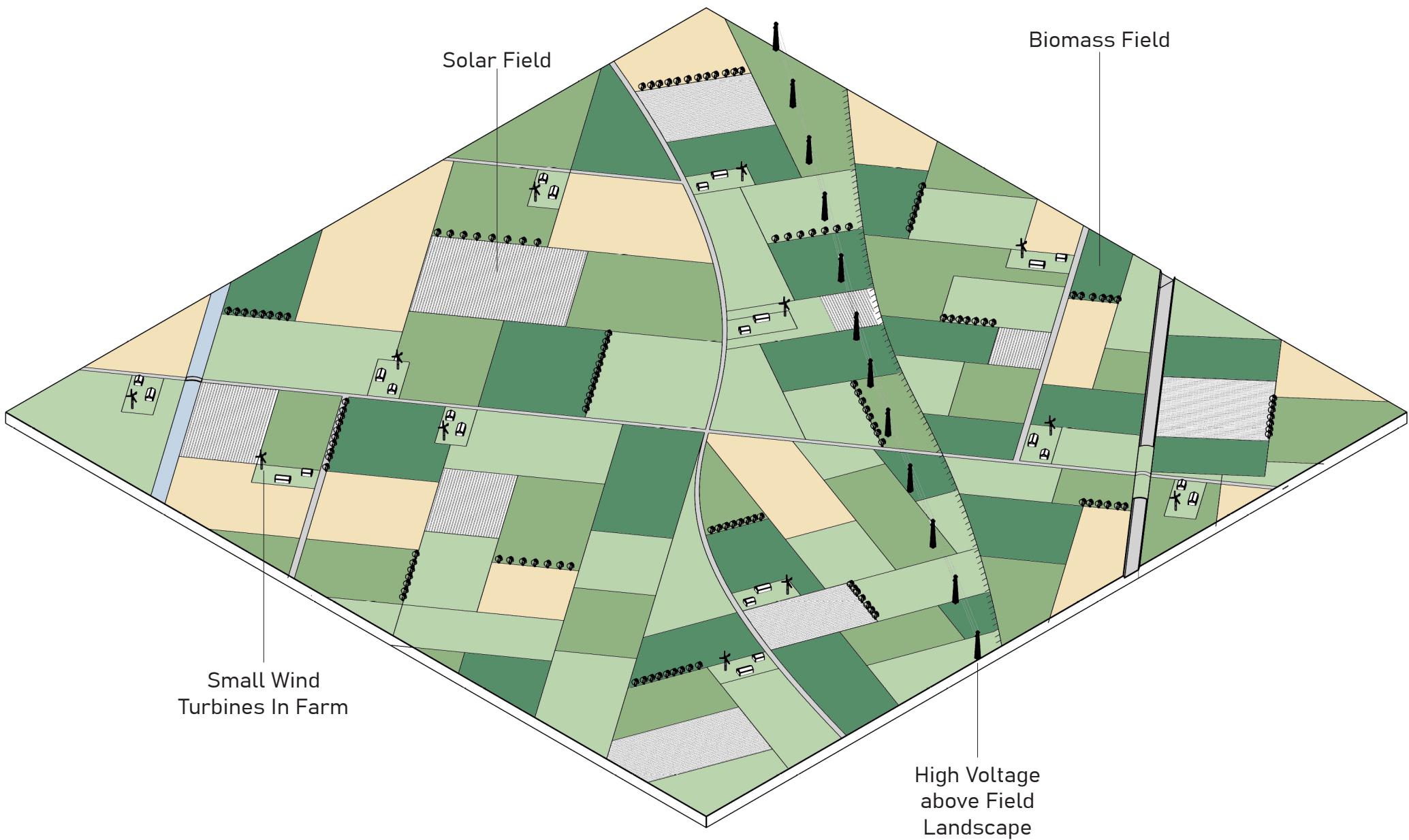
High Voltage
above Field
Landscape

Figure 5.16 Outer energy square diagram
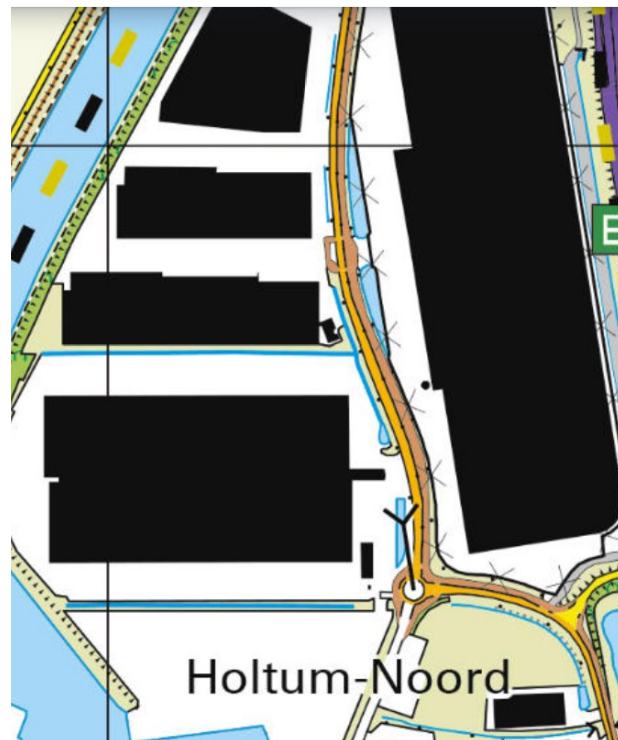
Industry Landscape

The spatial dynamics of the region are under threat of industrial changes. Building footprints have required more space for distribution, and the areas around heavy industrial zones require a greater exterior risk perimeter to accommodate for more dangerous facilities. Community members feel disengaged in this process, as industrial decisions are made by more powerful stakeholders. Interventions must be made to balance the voices.
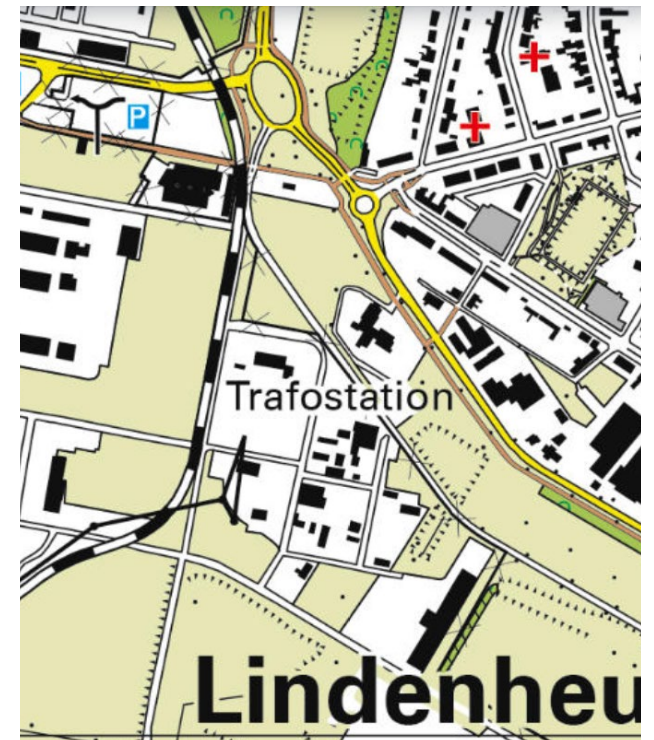

Holtum Noord – 1975
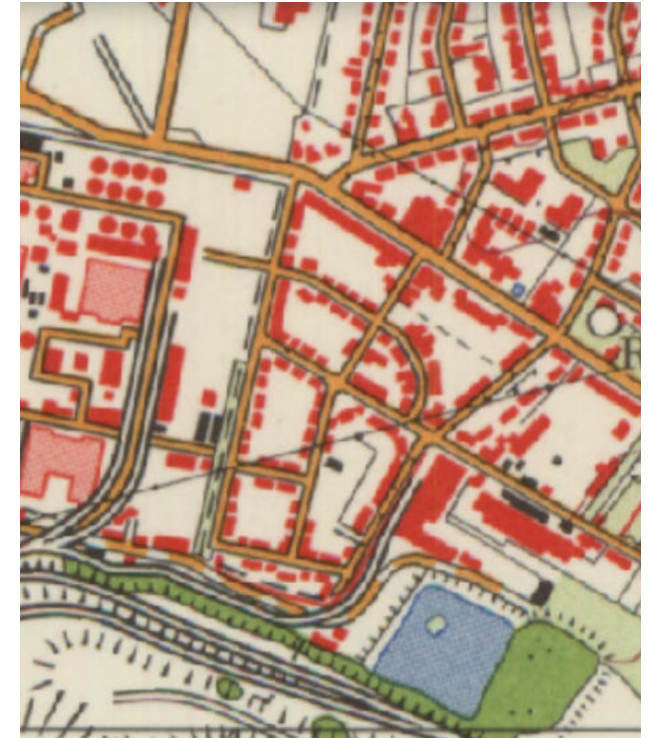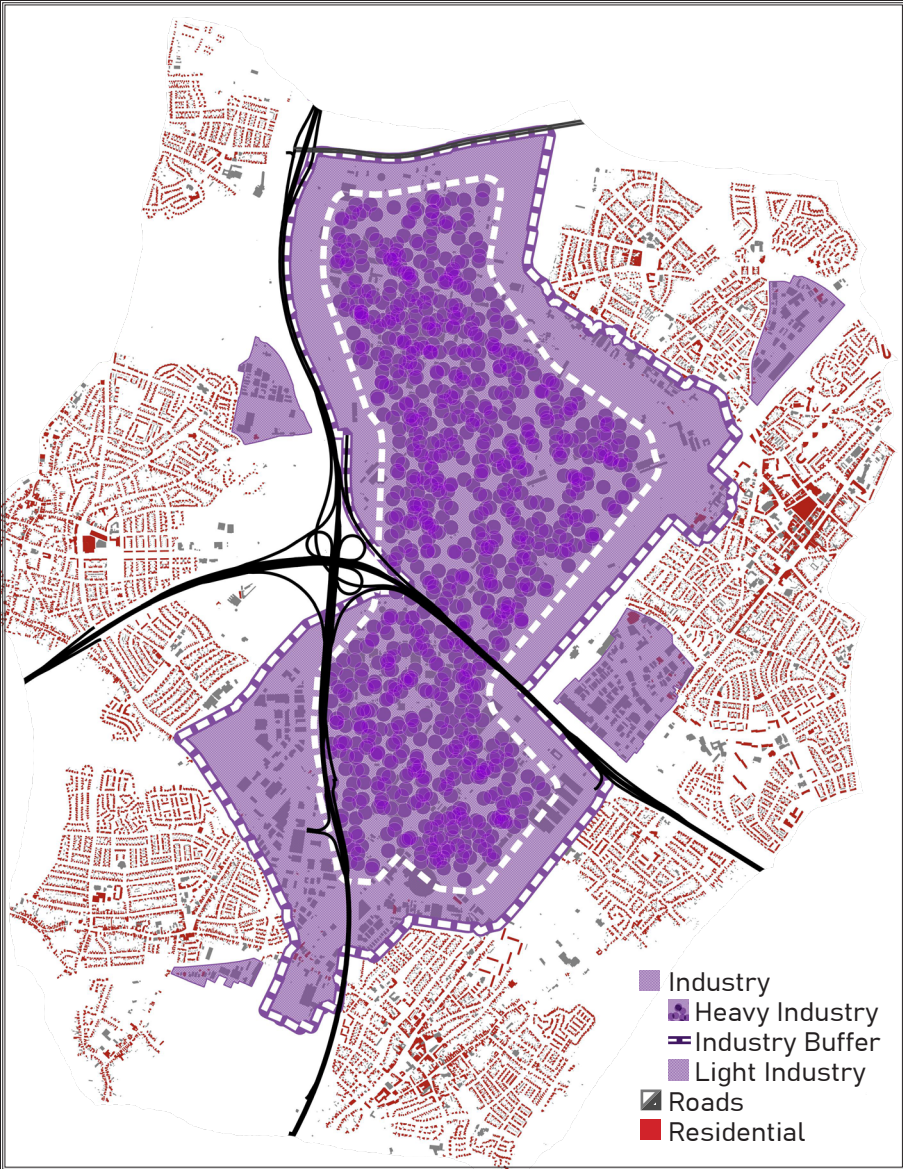

Lindenheuvel – 1975

Holtum Noord – 2024

Lindenheuvel – 2024

NTS

Figure 5.17 Industrial landscapes over time

Industry
Heavy Industry
Industry Buffer
Light Industry
Roads
Residential

Rather than abiding by an exterior safety zone, an interior safety zone should be the preferred spatial solution. A 500m buffer zone inside of Chemelot would result in 550 Ha of land set aside for heavier and more dangerous industries, keeping them away from urbanized areas.
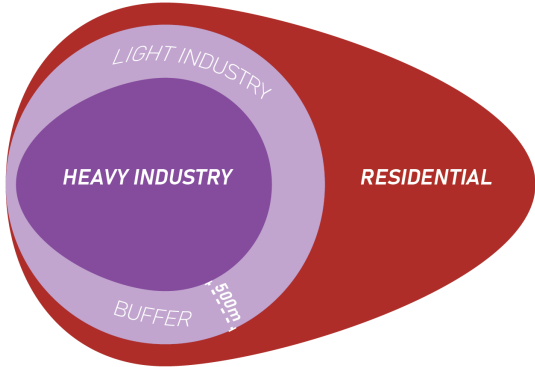

LIGHT INDUSTRY

HEAVY INDUSTRY   RESIDENTIAL

BUFFER   500m

Figure 5.18 Industrial buffer diagram

Industry
Heavy Industry
Light Industry
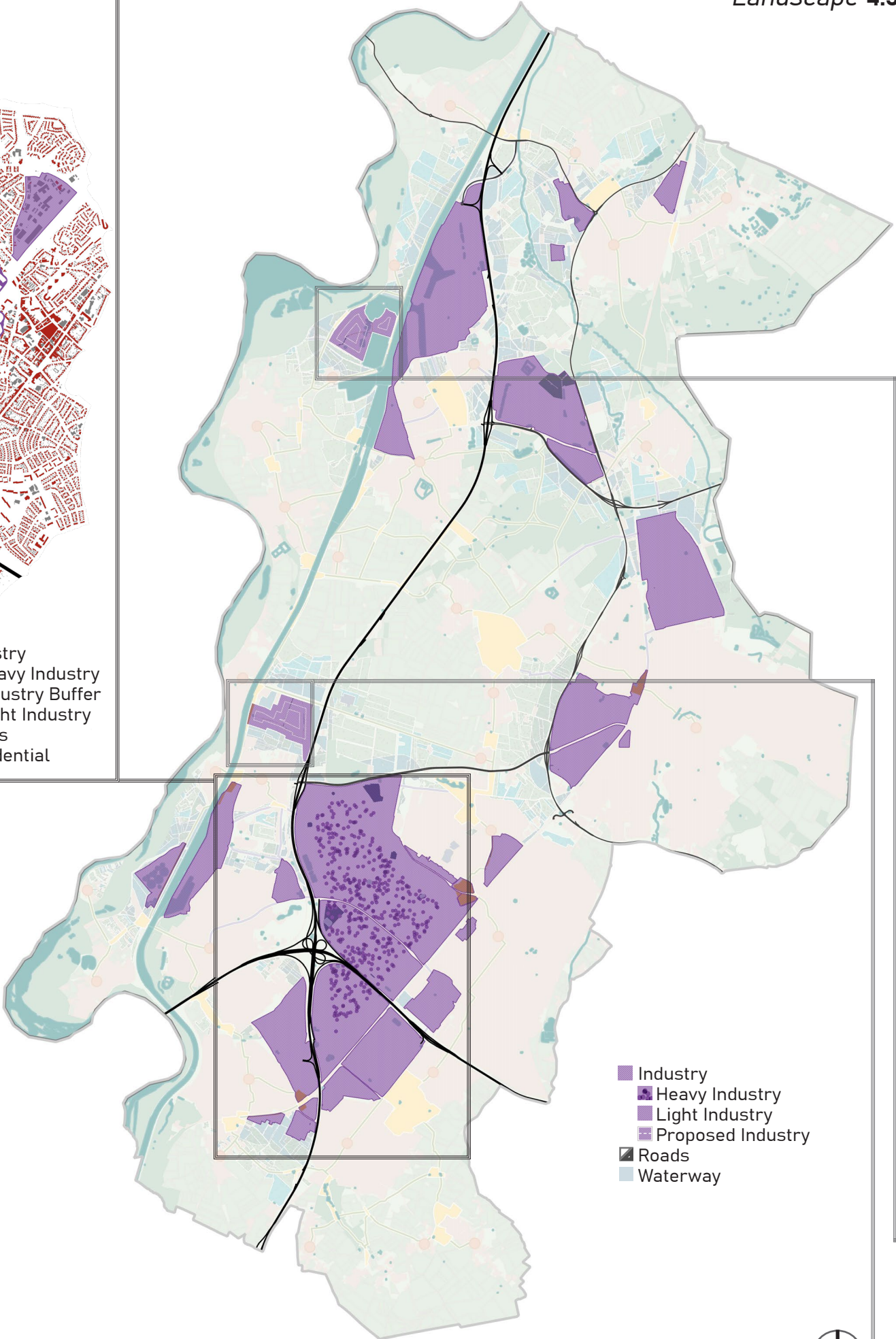Proposed Industry
Roads
Waterway

Figure 5.19 Industrial landscapes in the spatial context

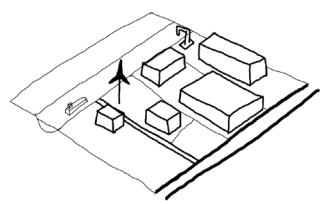1:125000

New Industry Archetypes

The industry landscape is applicable to proposed zones for new industrial growth. The structure of the clusters follow the village and agricultural grammar typology, scaled to accommodate new buildings, but never to surpass 2 Ha per lot. The buildings and elements fit into the lots elegantly and are placed in a matter to retain views of the landscape. The area is publicly accessible and intertwined with other elements of the vision such as hearts.

Landscape Criteria

– All buildings must fit within the proposed lot sizes

– Buildings are not limited to height of rural structures, but should be lower than 20m

– Heavy industry is not permitted, all industry must limit pollutants

– Should retain and build pathways for the public use. Retain accessibility through the landscape.
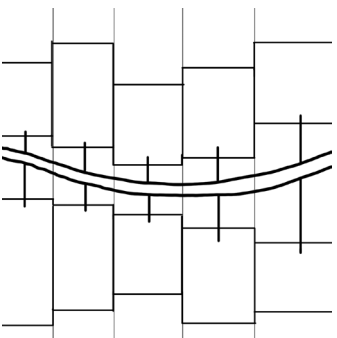
Manifestation of **NEW INDUSTRY** archetypes:

Water

- Designated port area
- Plots flow to canal

Road
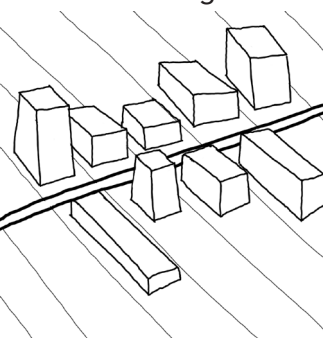
- Structured similarely to village/farm

Railway
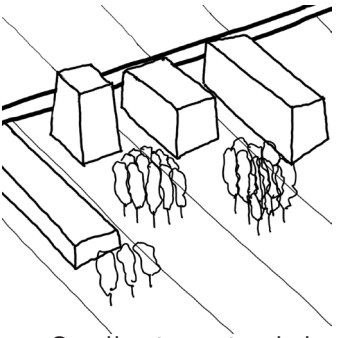
- No change

Buildings

- Medium to large buildings, that fit within field sizes
- Height not limited to rural houses

Forest

- Smaller tree stands in the back edge of lots

Fields

- Non-existant
- Smooth transition to open landscape

Figure 5.20 Industrial archetypes
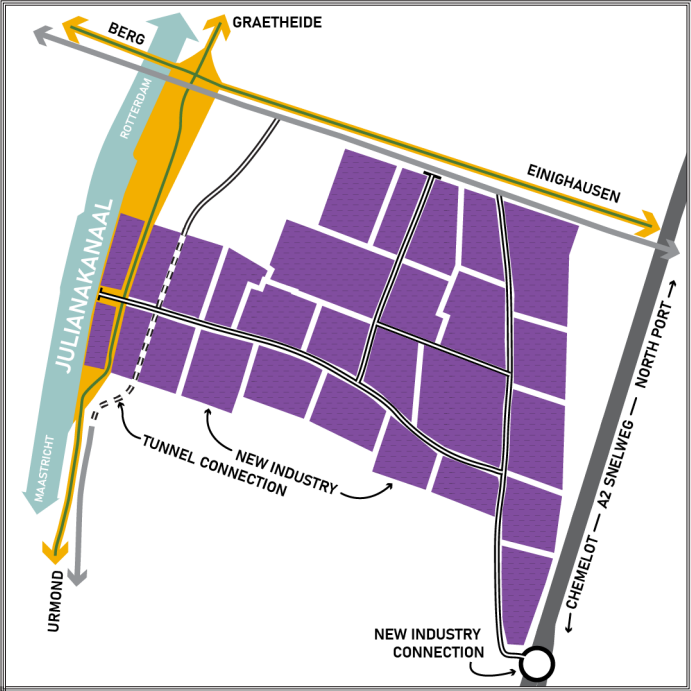
Northern Indudstry Expansion   1:25000

Figure 5.21 Northern industrial expansion

Southern Indudstry Expansion   1:25000

Figure 5.22 Southern industrial expansion

NEW INDUSTRY

Industrial Buildings

Large Wind Turbine

Denser Solar Fields
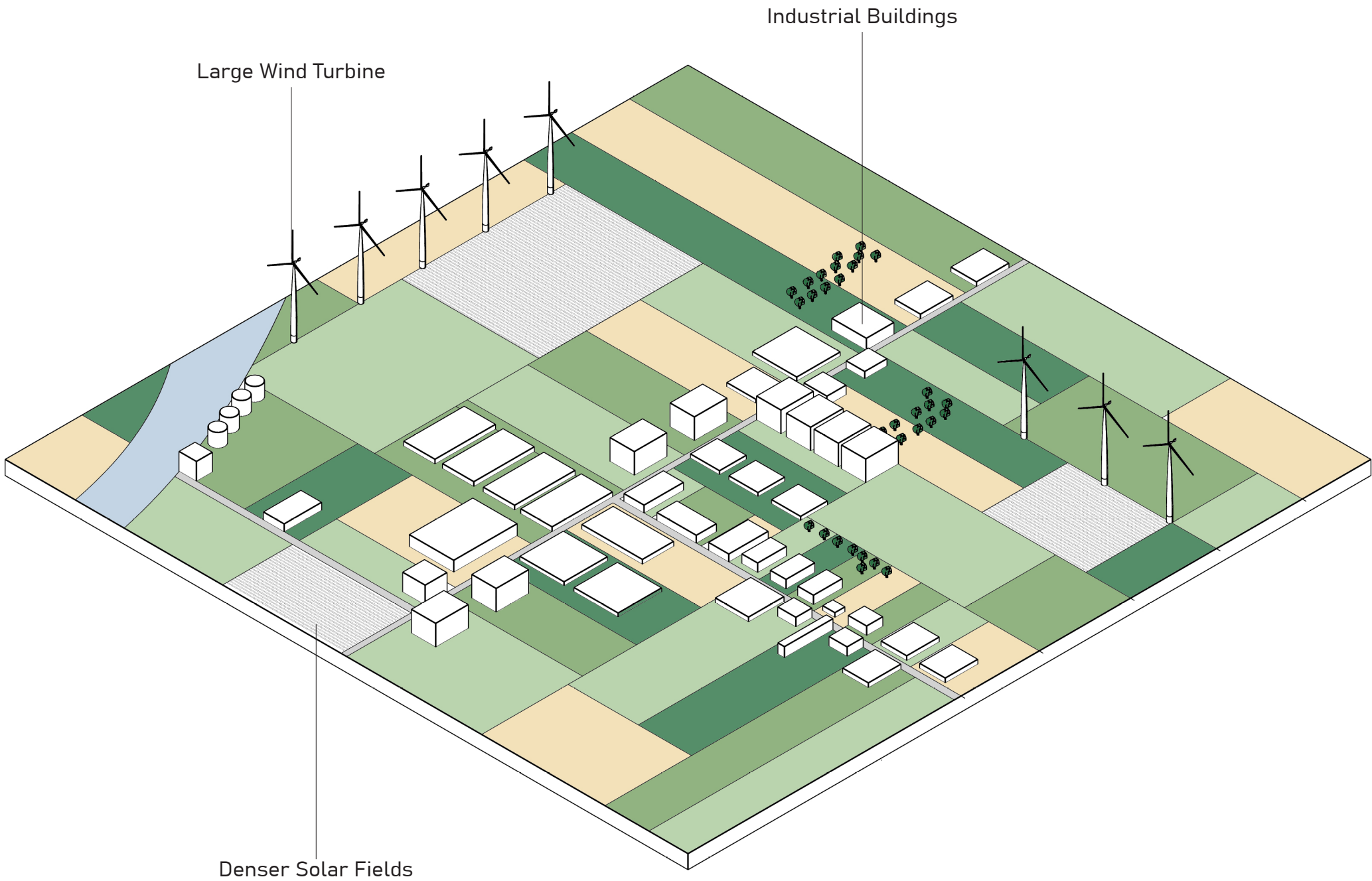
Figure 5.23 Industrial square diagram

Compatibility Matrix

On the right there is the compatibility matrix from our community. In the diagonal squares the sections of the landscape typology are shown. In the other squares the compatibility between the different typologies is shown. This is assessed by three different colors. Green means that the typologies can go directly next to each other without having any conflicts. Yellow means that they can go next to each other, but there are some rules to achieve a good connection between the typologies. Red means that they cannot go directly next to each other and that there needs to be a shield or another typology in between them.

Legend compatibility

■ Good, can be placed directly next to each

■ Can be placed directly next to each other, but some rules are necessary to achieve a good connection

■ Cannot be placed next to each other directly, necessary to place a transition zone between them

⛨ Typologies need to have a shield in between them

⛉ Typologies may need to have a shield in between them, based on if the area has tension and/or in places where the industrial landscape has developed in a way of disregarding the landscape grammar

⬆ Gradient of landscape typology intensity

Figure 5.24 Compatibility matrix

The following is a compatibility matrix between landscape types, with row and column labels: Village, City, Traditional Open Argiculture Landscape, Energy Landscape, Dense Energy Landscape, Industry Landscape, Heavy Industry Landscape, Nature.

Notes:

1. Can go next to each other, but not all around the village, needs to have some openness
2. Should be a gradient, so "normal energy landscape" inbetween
3. Can go next to each other, but not all around the city, needs to have some openness
4. Should be a gradient, so "dense energy landscape" inbetween

Typologies in the Landscape

At the Heart of the Communities

On the following eye level drawing, the new transformations based on the landscape typologies and vision map are pictured.

The current drawing focus is on the community hearts consisting of connectors, facilities, open landscapes, high and low industrial sites along with the energy landscapes with high & average densities.

Vision Map Layers Gradient

The coloured layers of the drawing represent the gradients of various layers of the vision map intervening the spatial & functional features within the designed landscape typologies. Each intervention is coloured based on the reference layer inside the vision map.

Figure 5.25 A vision of the landscape

Figure 5.26 A vision of the landscape – typology layer gradient

Legend:
- Dense Energy Landscape
- Lower Density Open Energy Landscape
- Heavy Industry Landscape
- Industry Landscape
- Inner Heart Connector
- Heart Area
- Connector
- Village Centre
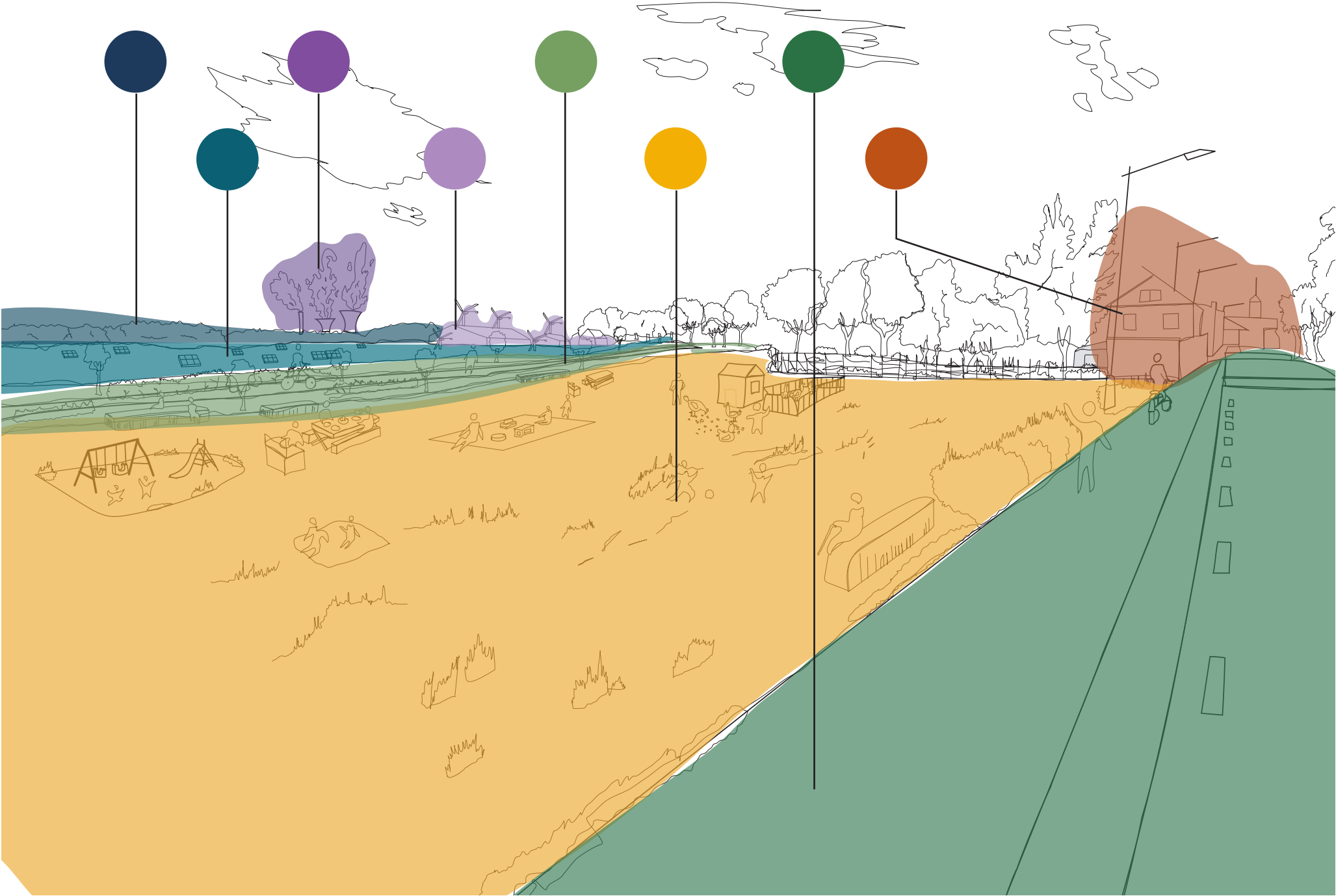
5.3 Strengthening of the Community

Hearts play a significant role in the vision of a resilient energy community. They serve numerous functions such as places to gather, locations for services and education, destinations for events and funnel points for pathways.

The spatial structure outside of the primary urban density of Sittard–Geleen tends to be represented by sparsely populated villages. These villages, as mentioned previously, have maintained their historical structure better than the urbanized centers. To this degree, the distance between one village to the next is at times a quick walk away for a healthy individual, or a small cycle ride.

This was a starting point when developing the structure of the heart system. Starting with spaces where villages were already creating centralized spatial structures, like in the three villages of Guttecoven, Einighausen and Limbricht. Existing parks and green spaces were preferred for the design of the hearts. Hearts were also developed alongside shields, to act as a double barrier of protection for communities.
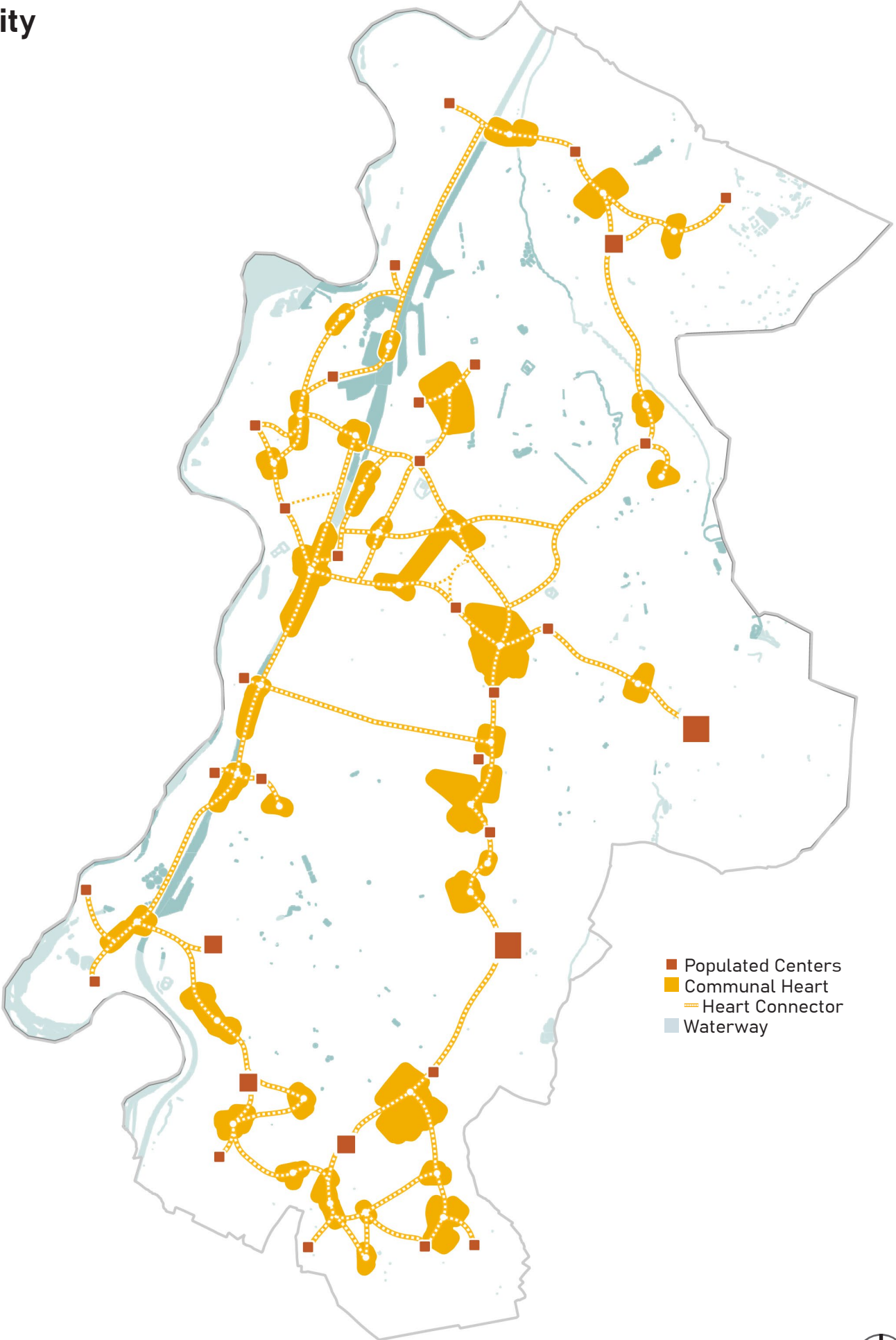
Populated Centers
Communal Heart
Heart Connector
Waterway

1:125000

Figure 5.27 Abstracted hearts and connectors

Translating the abstract hearts to a spatial heart made use of numerous existing elements. The vision is meant to infringe upon the landscape grammar in the least intrusive way. Avoiding cutting through agricultural fields, using existing roadways, and formulating a space that would be the most equitably distributed throughout the landscape. A combination of tools were used to spatially define the hearts. Using isochrones set at 800m walking distances, and 1400m cycling distances, the maximum distances a typical 65+ person travels, we found combined spaces that overlap from village to village. A line was drawn directly between these combined zones and then aligned to existing roads. The result is a patchwork of hearts and connectors that weave from village and city centers through woodlands, fields and industrial landscapes.
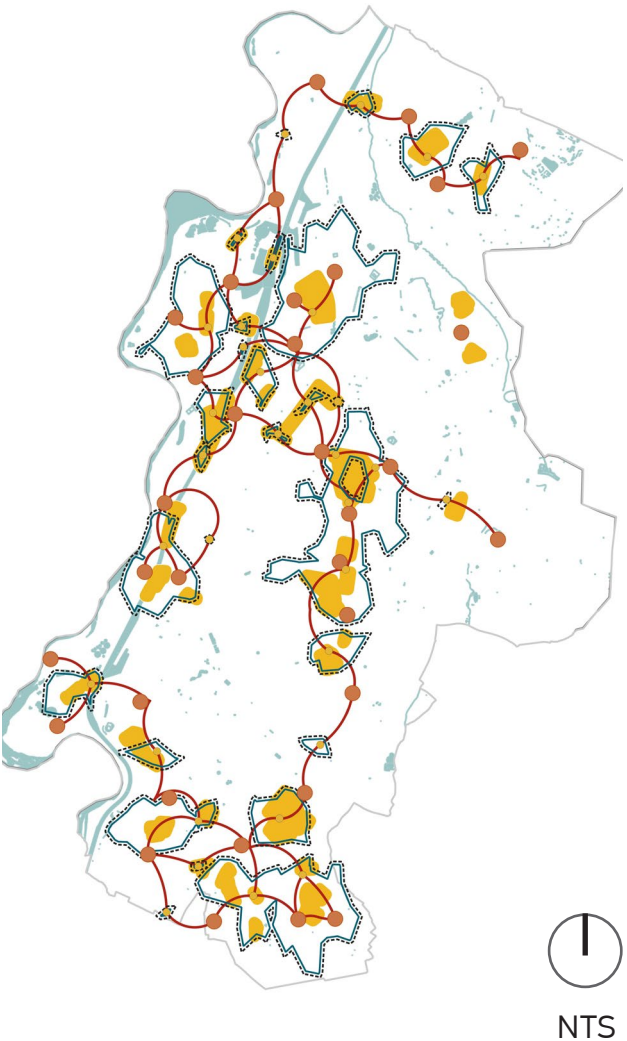

NTS

Figure 5.28 Heart connector analysis

Populated Centers
Built Environment

Communal Heart
— Heart Connector
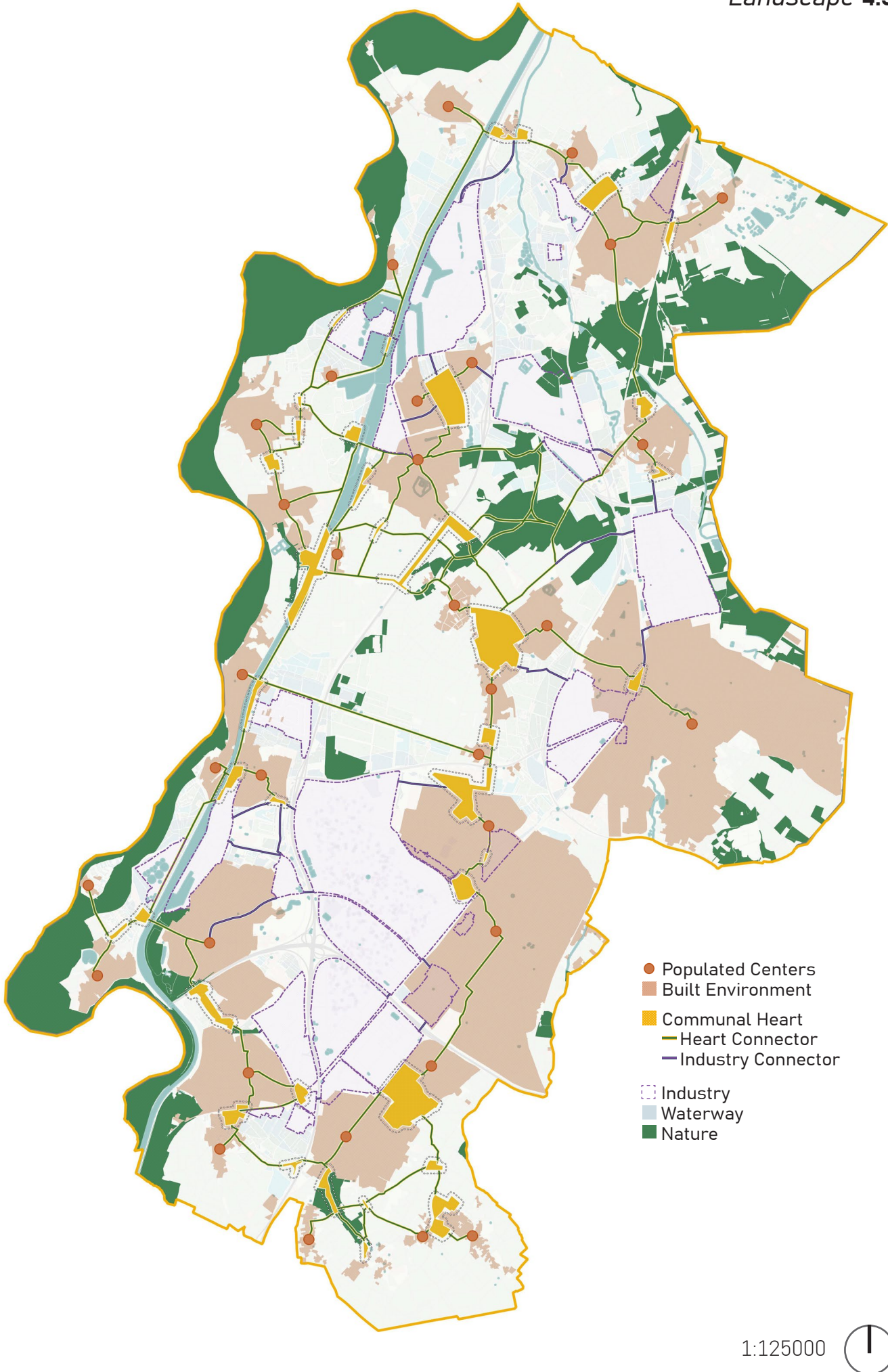— Industry Connector

Industry
Waterway
Nature

1:125000

Figure 5.29 Hearts in the spatial context

Heart Typology

The heart is common ground. Accessible and well connected to the community that shares its center, and creating pathways to numerous other centers. The heart is managed by the community. They decide what the program is and what spatial form it takes. It is a place where people from the community can meet each other. It has facilities in the denser heart, easy to reach for everyone in the communities. There are 3 types: Central, Remote and Linear. The archetypes manifest in diverse ways, adapted to the community's wishes.

Landscape Criteria

– Easily reachable for everyone in the community

– New buildings must be a public facility

– Strong infrastructural connections to nature, villages and industries

– Elements are embraced as part of place identity

– Heart is managed by the community including the program and the spatial form

Water

- Nature: Wetlands, wild rivers, streams Recreation: fishing, kayaking, swimming

Road

- Pedestrians/Cyclists
- Auto traffic contained to existing roads

Railway

- Embraced + part of the identity of the region

Buildings

- Public buildings: Schools, senior facilities, community center, libraries
- Lookout points

Forest

- Fruit trees
- Camping sites
- Picnic tables
- Outdoor learning

Fields

- Playgrounds
- Community gardens
- Picnic fields
- Native wildflowers

Figure 5.30 Heart archetypes

Figure 5.31 Viable village illustration

Manifestation of **HEART** archetypes:

A space rich in communal functions and activities, based on choice of the community

Former industrial buildings belonging to the community

Trains are part of identity

Well connected to communities

Figure 5.32 Hearts square diagram

Central Heart

Remote Heart

Linear Heart

Figure 5.33 Hearts categorized
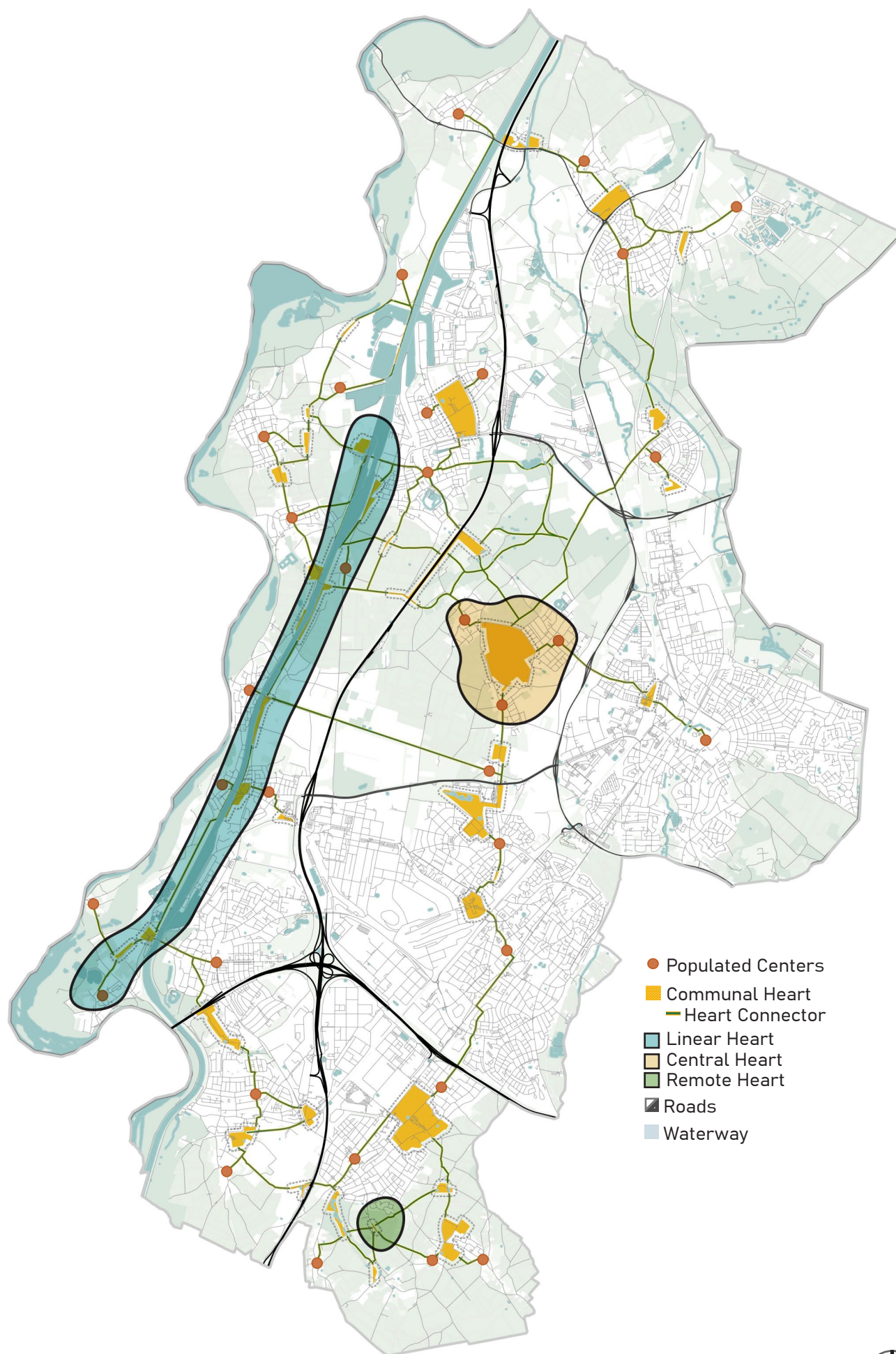
Figure 5.34 Heart types in the spatial context

Legend:
- Populated Centers
- Communal Heart
- Heart Connector
- Linear Heart
- Central Heart
- Remote Heart
- Roads
- Waterway

1:125000

5.4 New Industry

The communities rely on a strong industrial economy to provide regional job opportunities that are within a close proximity to their homes. These industrial sites are connected by arterial roads that allow for driving, cycling or walking, but public transport is extremely limited in the area. With this, some industrial sites are vast, like Chemelot whic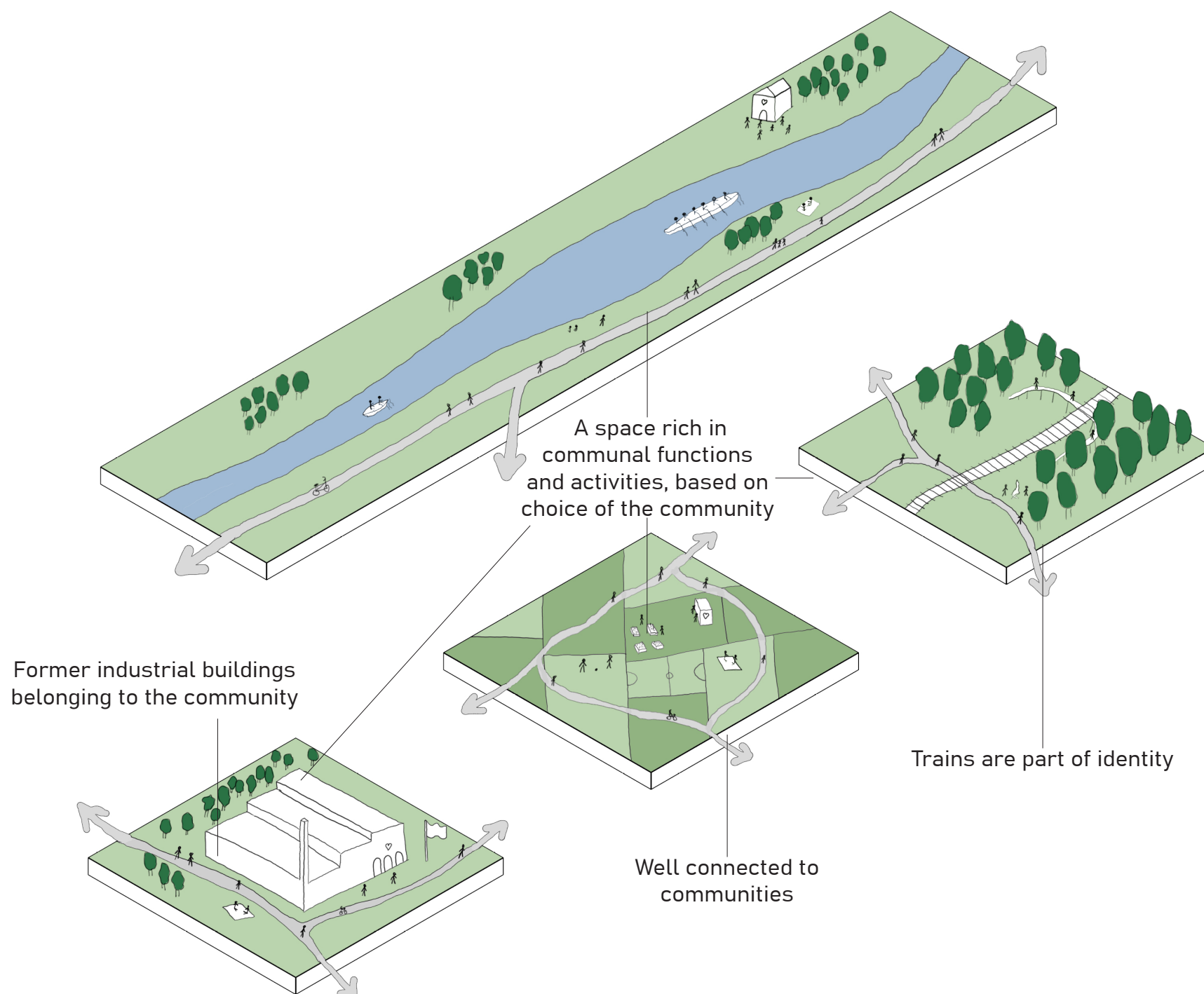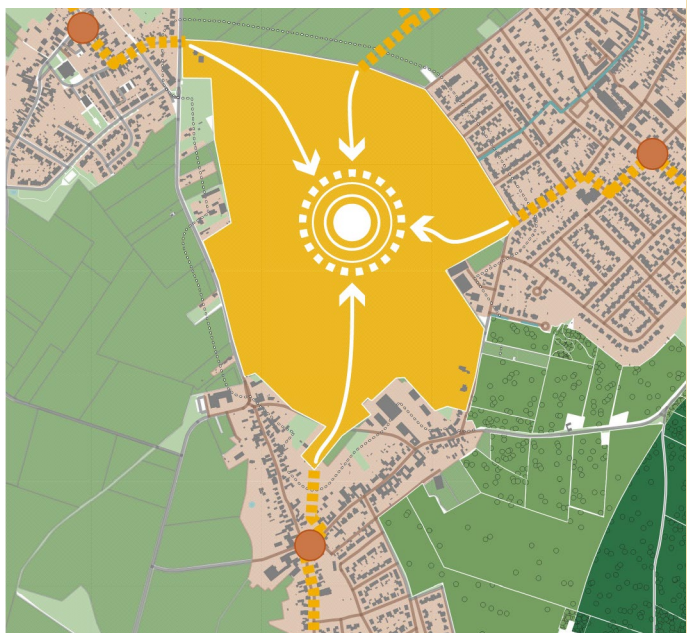h is roughly 800 Ha (Chemelot | Brightlands Chemelot Campus, z.d.). This, along with the centralization of services in urban areas, makes driving in the region a more attractive choice.

With the proposal of the heart landscape, the connections by car should be challenged by creating greater accessibility and more efficient routes for cycling and walking to these industrial spaces. Hearts that are centralized are at an even greater advantage. With facilities being along the pathways, it would allow residents to potentially drop off children before work, meet for drinks or see a movie in the park. The goal is to counter the choice of individual travel and develop strength in community space in multiple aspects of life.
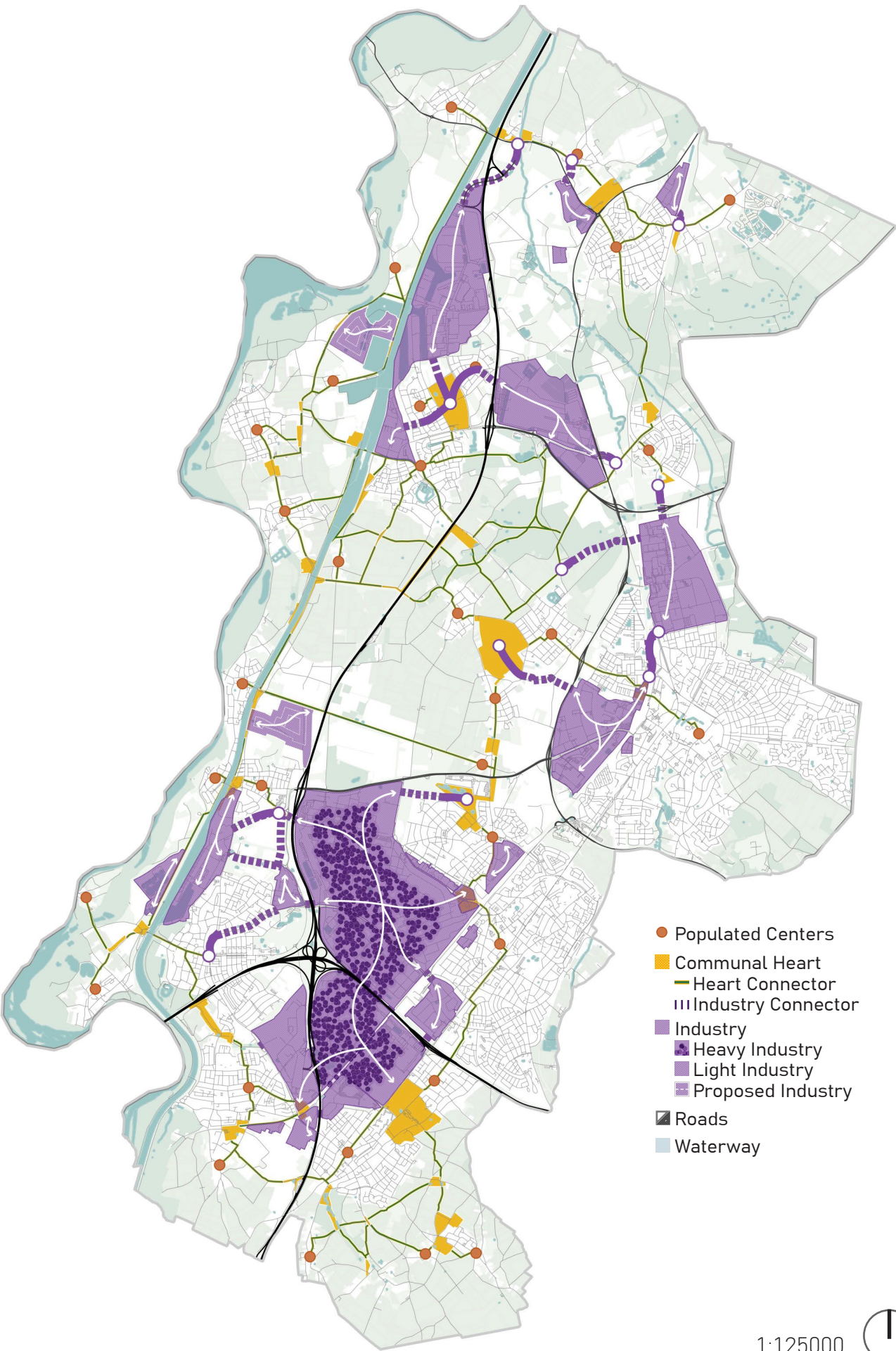

Legend:
- Populated Centers
- Communal Heart
- Heart Connector
- Industry Connector
- Industry
- Heavy Industry
- Light Industry
- Proposed Industry
- Roads
- Waterway

1:125000

Figure 5.35 Industrial connectors in the spatial context

5.5 Vision

The open landscape surrounding the village structure isn't simply an enjoyable as–pect of the region, but an attractive and critical part of the identity for individuals who call this home. Balancing the realistic demands for an industrial presence in the region, while maintaining this open space requires intervention. The grammar of the landscape can be used as a starting point.

To advantage the community, a new energy landscape type, the shield, can be developed on agricultural plots around the existing and proposed industrial spaces. This will assist in slowing unmitigated industrial growth, while increasing the energy independence of the region, reducing the need for larger scale energy interventions and infrastructure within the indus–trial space. Defining the space for industrial growth and making spatial recommendations on how that land is divided and used will be a critical role for community involvement in the vision. These pieces act together to aid the community in imagining their future within the mixed landscape.

Community and industry can still find common ground amongst this spatial power struggle. Hearts and connecting pathways will attract a future generation of workers to communities that have had slowed growth. The future for the village becomes more viable within these hearts. Services will exist to allow residents to age in places close to home rather than moving to urban centers, spaces will be set aside for education, spaces to gather, and pathways connecting to other villages and industrial centers.

The vision brings forward a harmonious relationship between industry and village landscape. Giving space to both stakeholders, while shifting the spatial advantages to those in com–munities that have been historically disenfranchised.
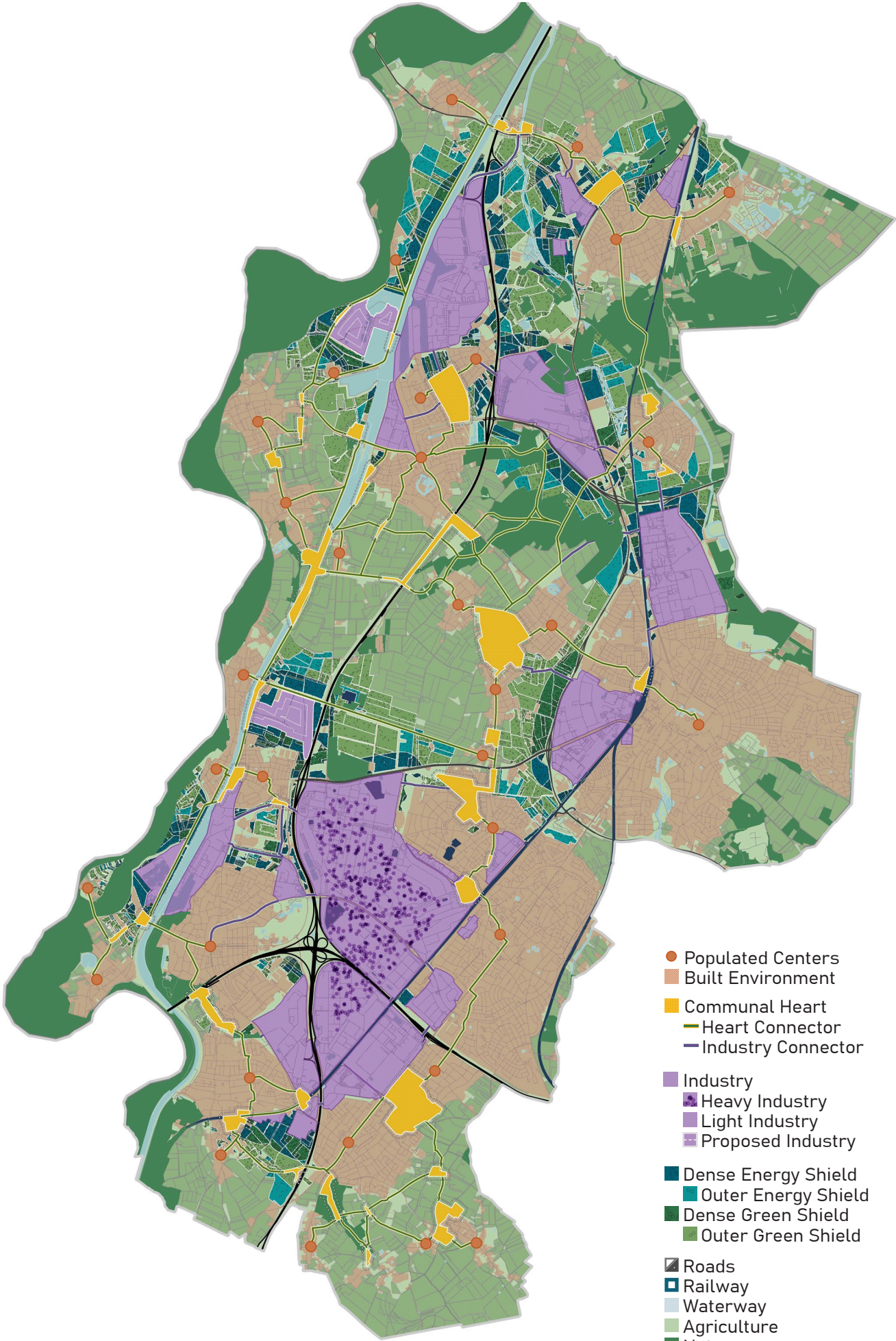
Figure 5.36 Vision map in the spatial context

Populated Centers
Built Environment

Communal Heart
Heart Connector
Industry Connector

Industry
Heavy Industry
Light Industry
Proposed Industry

Dense Energy Shield
Outer Energy Shield
Dense Green Shield
Outer Green Shield

Roads
Railway
Waterway
Agriculture
Nature

1:125000

6.0 Strategy

Contents

6.1 Introduction

This chapter describes our strategy on how to achieve our vision for the spatial development of the region. The vision is based on the principles of the community's values and is using the local landscape conditions to adapt the energy transition and its spatial implications, and it follows the Vision Map (p. 119).. Apart from the spatial implications, the strategy is also proposing a transformation of the Dutch spatial development planning system. This transformation will bring the voice of the community and other local stakeholders to the table, empowering the community to influence spatial de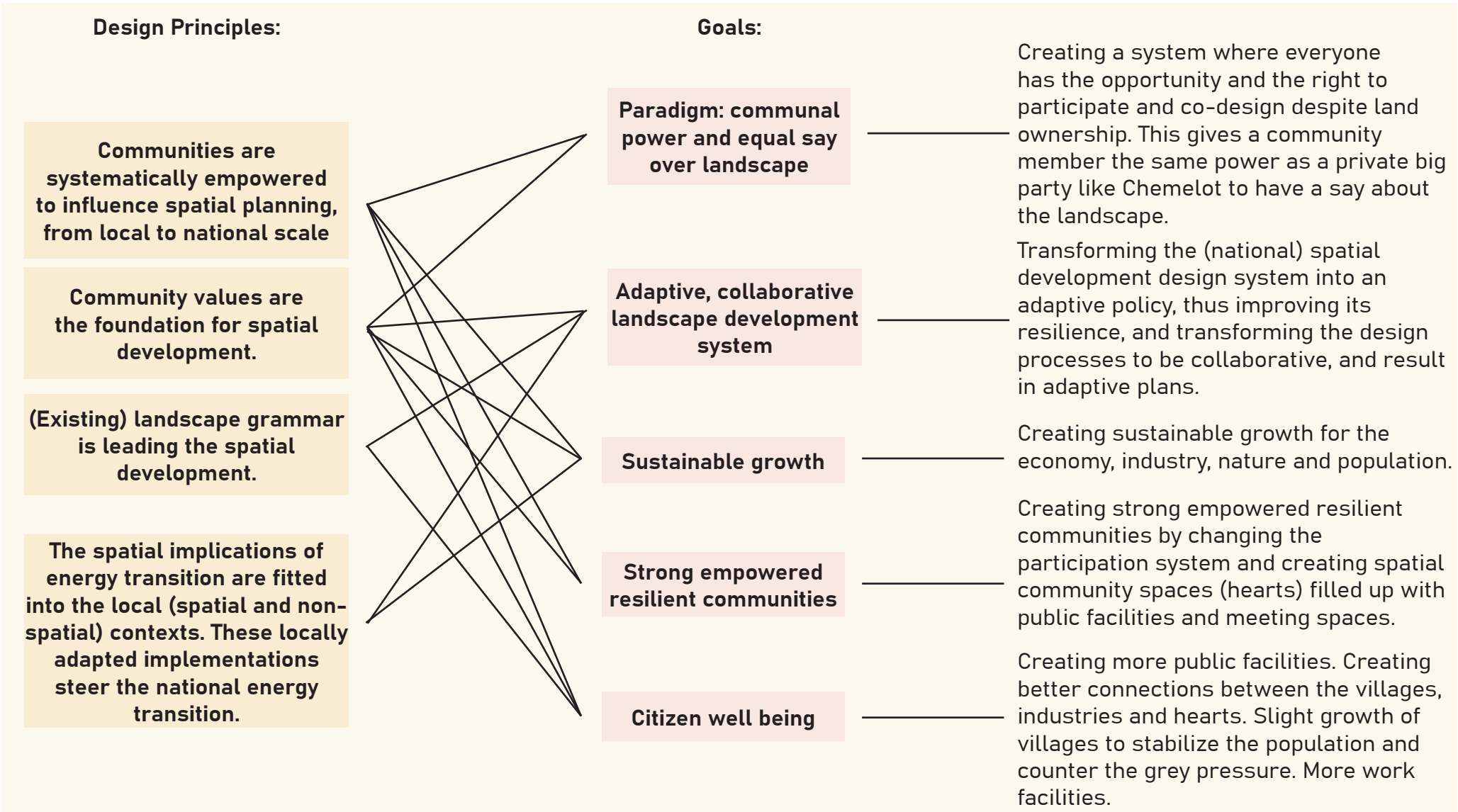velopment across scales that differ from local to national. The region is taken as the testing ground for this new systemic change and is a springboard for the large-scale systemic changes. This system will be explained on the next page and in more detail further the strategy chapter.

This chapter is structured in three different categories that is based on our three baselines: Energy transition and industrial growth, systemic empowerment of communities and landscape. These baselines come together in the timeline. The chapter ends with a conclusion and aspirations on the developed strategy.

Goals:

For our strategy we have listed five goals that we want to achieve. We transformed the principles and values presented earlier in the report (see chapter 4.5) into more specific, synthesized goals. In the diagram below the design principles are linked to the goals to see how they contribute to achieving the strategy goals.
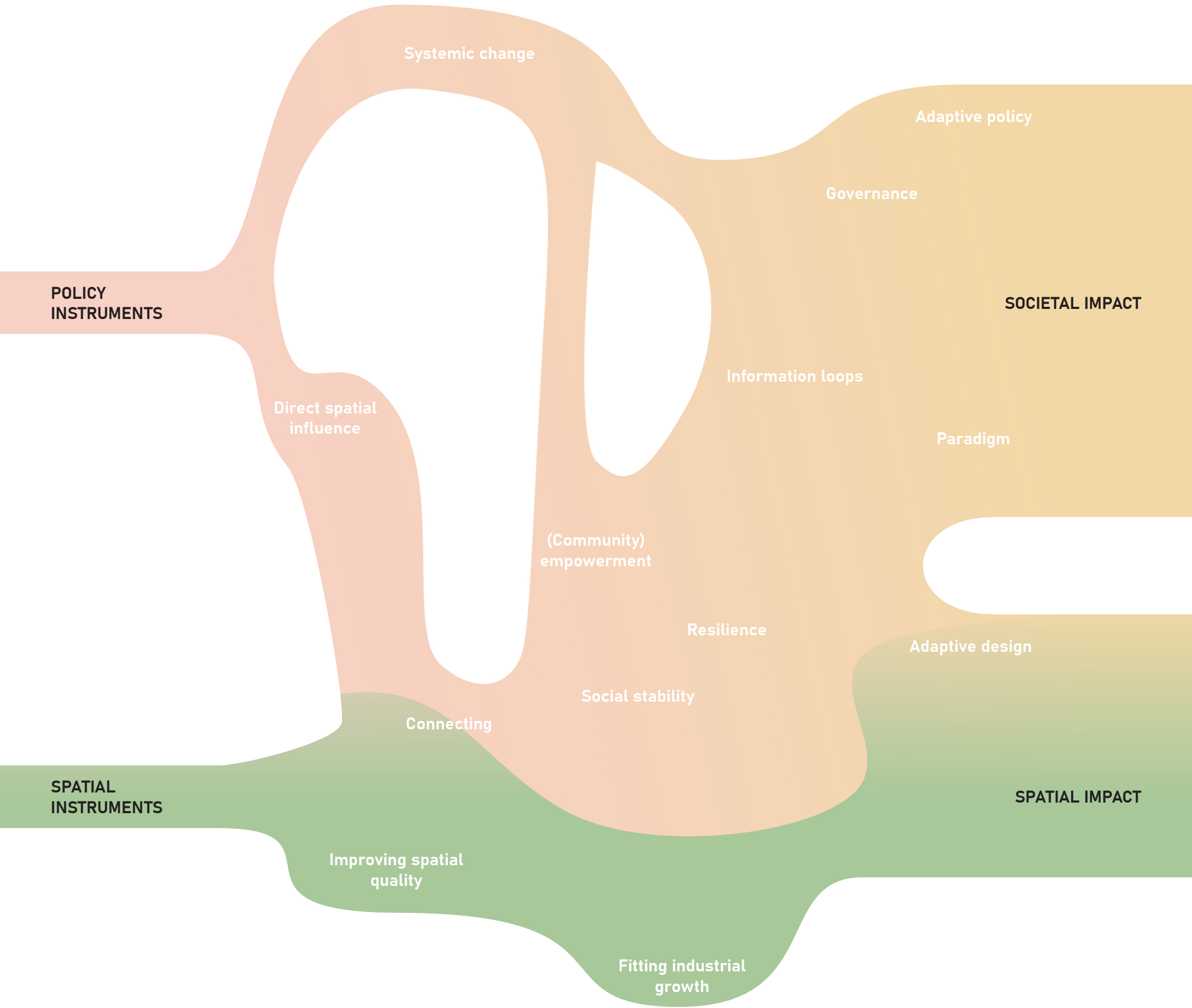
Design Principles:

Communities are systematically empowered to influence spatial planning, from local to national scale

Community values are the foundation for spatial development.

(Existing) landscape grammar is leading the spatial development.

The spatial implications of energy transition are fitted into the local (spatial and non-spatial) contexts. These locally adapted implementations steer the national energy transition.

Goals:

Paradigm: communal power and equal say over landscape

Adaptive, collaborative landscape development system

Sustainable growth

Strong empowered resilient communities

Citizen well being

Creating a system where everyone has the opportunity and the right to participate and co-design despite land ownership. This gives a community member the same power as a private big party like Chemelot to have a say about the landscape.

Transforming the (national) spatial development design system into an adaptive policy, thus improving its resilience, and transforming the design processes to be collaborative, and result in adaptive plans.

Creating sustainable growth for the economy, industry, nature and population.

Creating strong empowered resilient communities by changing the participation system and creating spatial community spaces (hearts) filled up with public facilities and meeting spaces.

Creating more public facilities. Creating better connections between the villages, industries and hearts. Slight growth of villages to stabilize the population and counter the grey pressure. More work facilities.

Systemic change

Adaptive policy

Governance

**POLICY
INSTRUMENTS**

SOCIETAL IMPACT

Direct spatial
influence

Information loops

Paradigm

(Community)
empowerment

Resilience

Adaptive design

Social stability

Connecting

**SPATIAL
INSTRUMENTS**

SPATIAL IMPACT

Improving spatial
quality

Fitting industrial
growth

Figure 6.1 Societal and Spatial scheme

The current spatial development system is the NOVEX system. In that system, the national government makes policies and vision on national level that the province and municipalities have to follow. The NOVEX system initiated that the province, the municipality and the waterboard need to make a vision together in order to be more aligned with each other which fastens the vision process. The proposal is to include the community/local stakeholders in this process. The community and other local stakeholders will come in after the national government has stated their policies and visions. With these policies and visions from the national government, the community

and other local stakeholders can make a vision that they desire. They will present this vision to the municipality. After that, the municipality will work together with the province to make a coherent plan for the region. This scheme will be explained in more detail in chapter Omgevingswet .2.0 (from p. 132).

Growth orientated spatial development system:
The growth will still be planned on a national level, by providing Development baselines (see Omgevingswet 2.0, from p. 132). By empowering the community in the system, the growth will be fitted and adapted to local conditions, by pushing it through the "filters".

Pinching of the downward motion
The spatial development will be pushed through the landscape filter by having to adapt to local landscape grammar. In this process, the community is empowered by co-defining the landscape's typologies to be used to implement the growth.
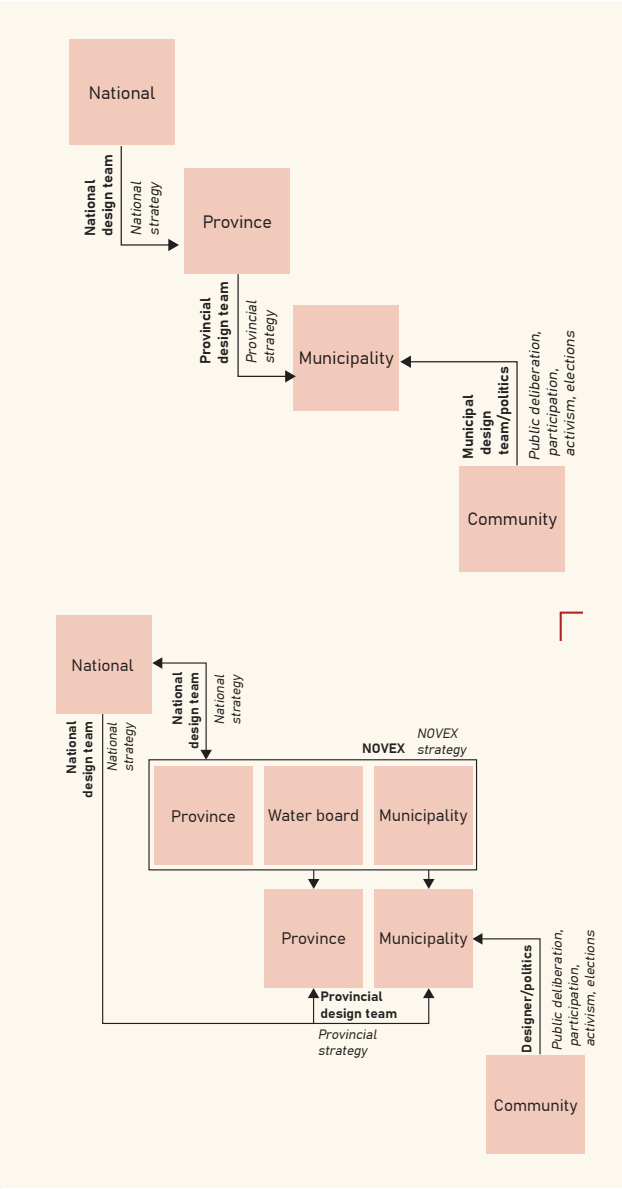

Figure 6.2 Current systems in use, old (left) and NOVEX (right) (See 3.3)
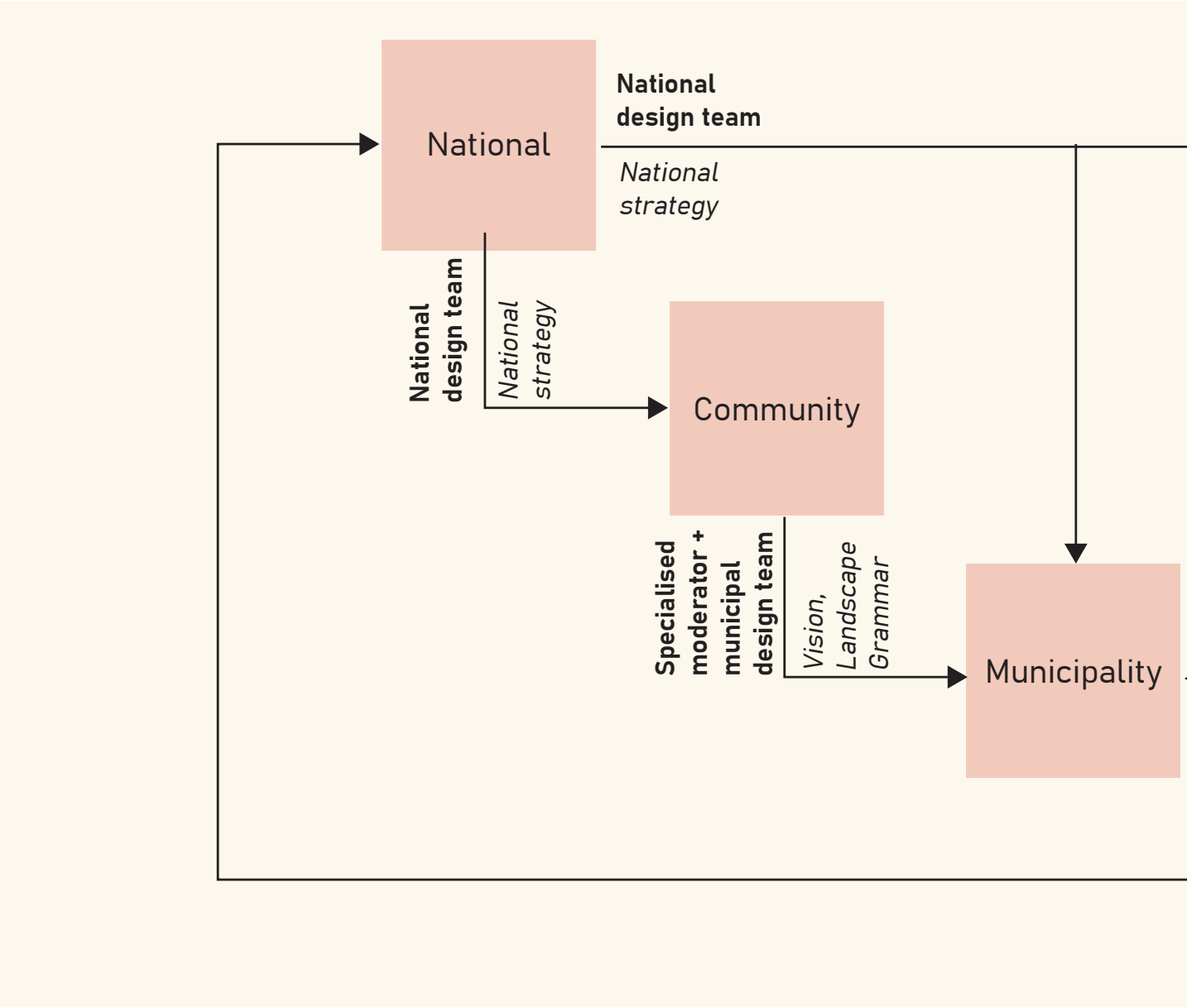
Figure 6.3 New System

The upward arrow
A feedback loop from the regional level will be created by establishing the National community forum within the new spatial planning system (see p. 133).

Landscape filter
The landscape filter constitutes collaboratively defined Landscape grammar including the conditions on which different landscape typologies are compatible. (For more information about landscape grammar, see p. 72–83, 92–93, 106–107, 142–143.)

Community values:
These filters are specific to community clusters. Overall, the aim is to empower the communities systemically (by including them in spatial development planning, p. 136–143), as well as strengthening them spatially so they can fulfill their role in the system well (by hearts and connectors, p. 144–145).

Viable village: The resilience of the village is strengthened by development of new facilities, raising attractiveness and encouraging people to stay by cultivating the space. By allowing the industry to grow and transform, new jobs are created to attract some newcomers .

Close-knit community: Heart central to the communities, facilities located in the heart and villages.

Open landscape: Around the three villages, landscape needs to really stay open, and a gradient of the different landscape types is established to create a transition zone to industry (see p. 106–109)
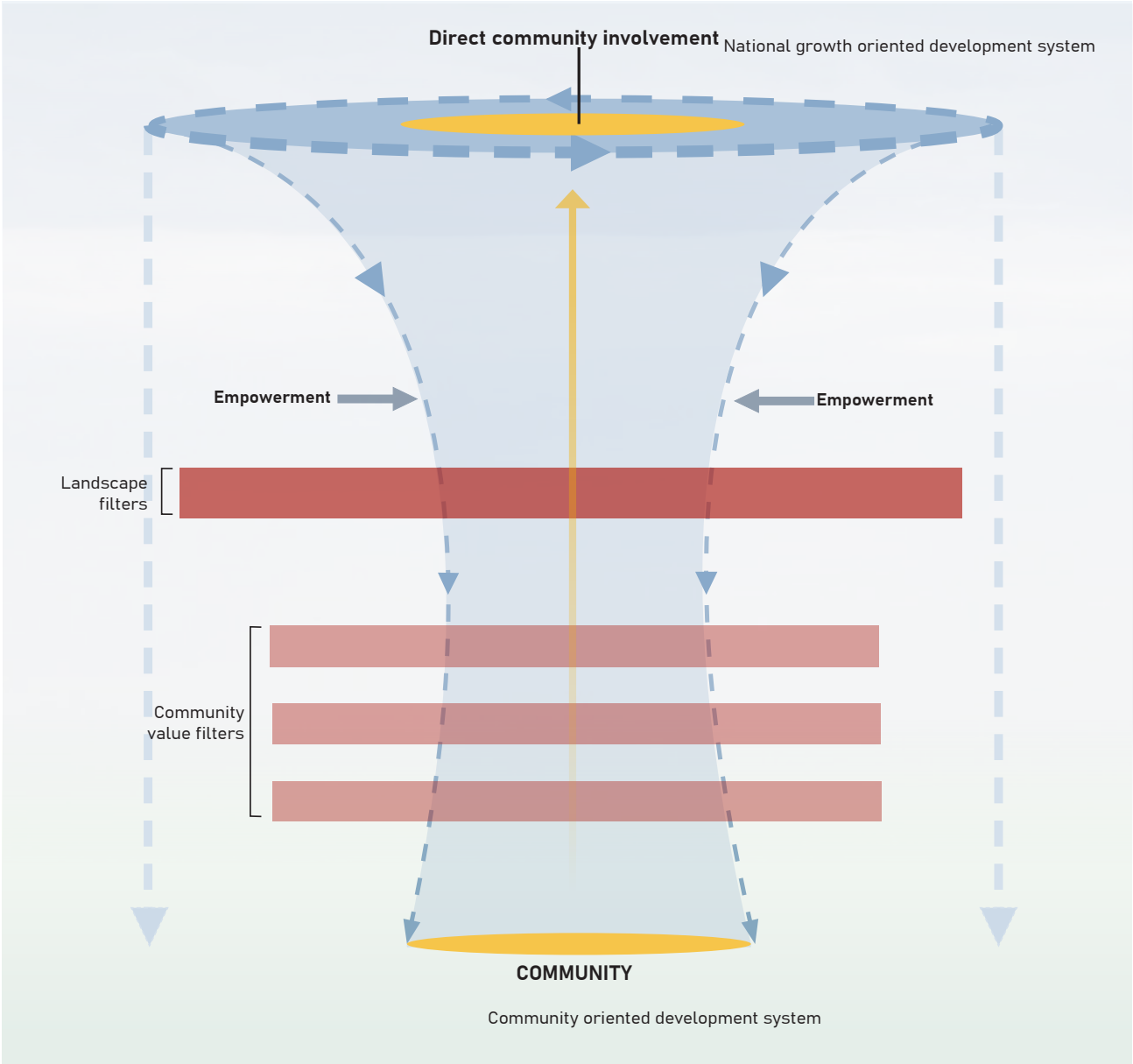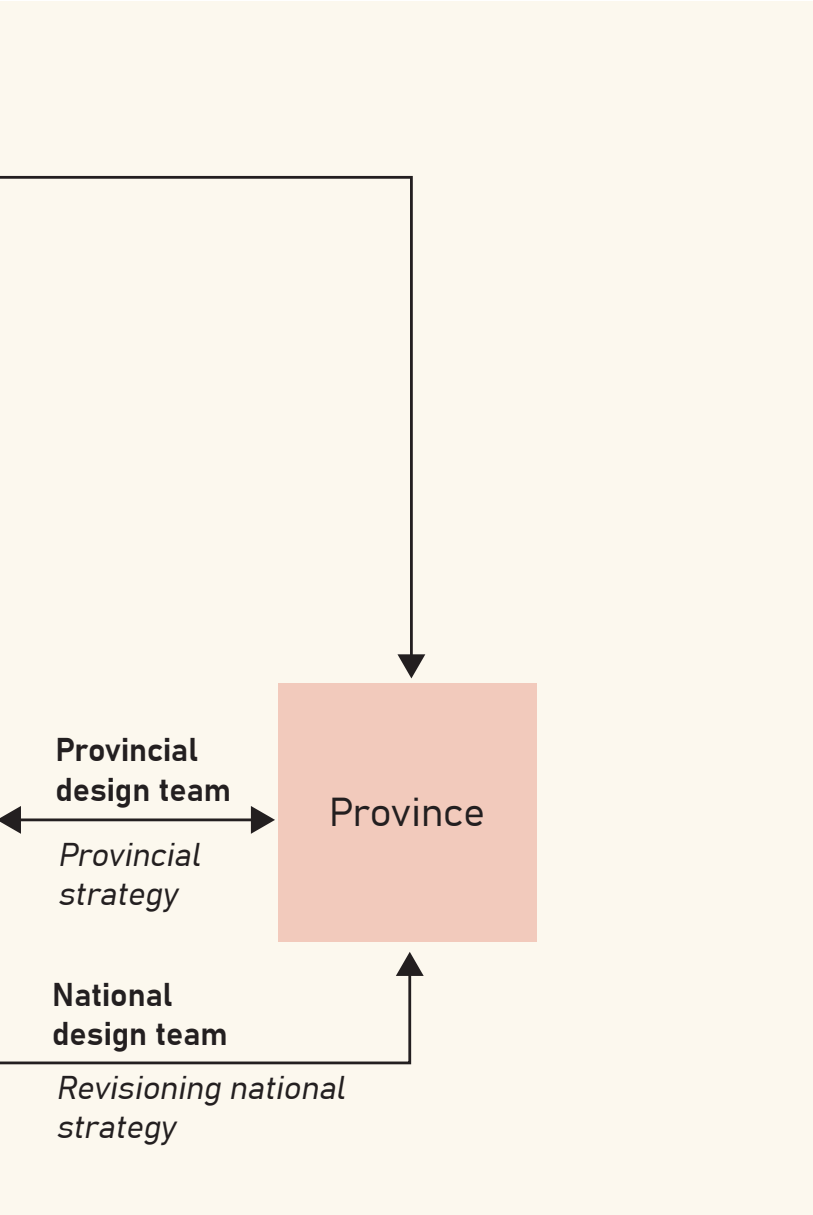

Figure 6.4 Conceptual framework

6.2 Energy transition and industrial development

▪Milestones

The energy transition is guided by timelines and milestones described in 3.1. The large national-scale energy infrastructure will undergo major development in the coming years, which will lead to a boost in local industrial transformation and development.

Industry will transition from fossil fuels to electricity and hydrogen. The area will become one of the several Dutch energy hubs and will be securely connected to the national energy network. The electricity network capacity will be raised, and a direct connection to offshore wind energy will be provided by a deep landing. Another important new connection will be the Delta-Rhine corridor, bringing in liquid hydrogen (later on also the existing gas pipelines will be converted into hydrogen pipelines.) Carbon dioxide will be captured and transported away by the corridor to be stored under the North See.

The large-scale energy infrastructure development will bring some necessary spatial implications, like the need for electrolysers, which will provide part of the hydrogen needed. It will also attract new industrial development, which in turn will lead to expansions of the (local) infrastructure. All of this will have spatial and societal impacts, including the creation of new jobs.

Binding and aspirational milestones

Our strategy will contribute to the achievement of energy transition goals and targets set on supranational and national level. We will also include the local industrial stakeholders in the collaborative design process, to ensure a coordinated approach to the local implementation of the transition. For our timeline, the following milestones are the key to consider.

Goals and milestones

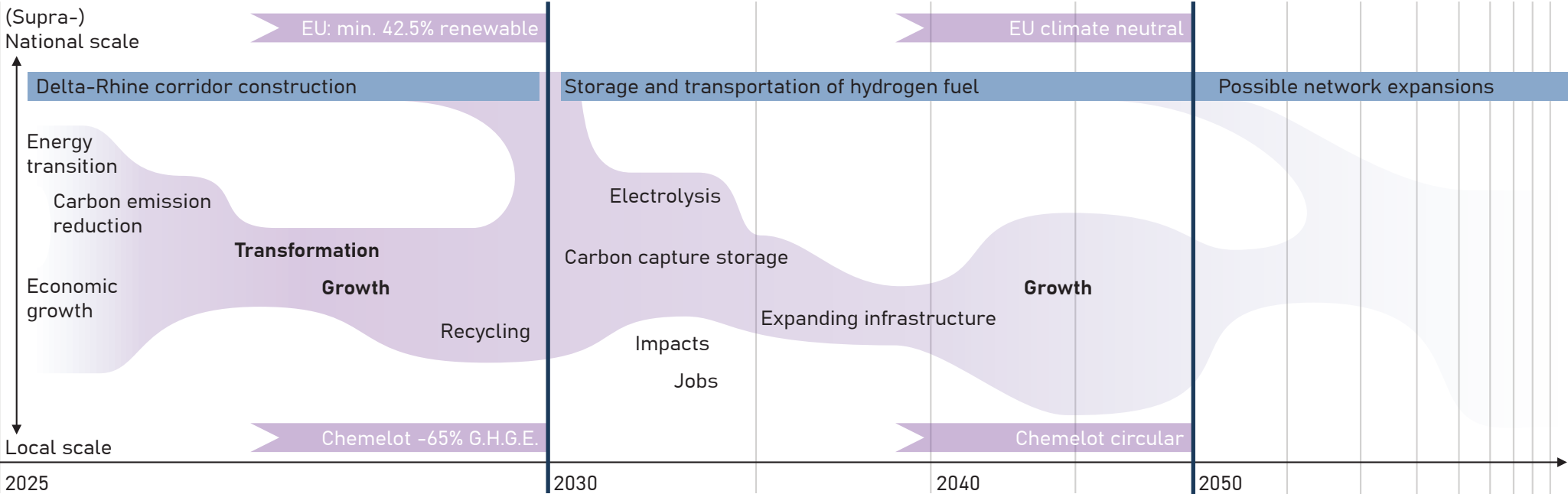|	2030	2050
EU Targets	According to the revised Renewable Energy Directive, the EU's binding renewable energy target for 2030 is a minimum 42.5%, aiming at 45%. (Directive (EU) 2023/2413)	In the Cluster Energy Strategy (Chemelot, 2024), Chemelot states the aim to target a 65% reduction of green house gas emissions in 2030 compared to 1990.
Chemelot local aspirations	The European Climate Law sets a binding objective of climate neutrality (target of net zero greenhouse gas emissions) for the EU by 2050. After, the EU should aim at achieving negative emissions. (Regulation (EU) 2021/1119)	In the Cluster Energy Strategy (Chemelot, 2024), Chemelot puts forward the ambition to become fully circular by 2050.

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Figure 6.5 Industry timeline 1

(Supra–)
National scale

EU: min. 42.5% renewable

EU climate neutral

Delta–Rhine corridor construction

Storage and transportation of hydrogen fuel

Possible network expansions

Energy
transition

Electrolysis

Carbon emission
reduction

Carbon capture storage

Transformation

Economic
growth

Growth

Expanding infrastructure

Growth

Recycling

Impacts

Jobs

Local scale

Chemelot –65% G.H.G.E.

Chemelot circular

2025

2030

2040

2050

Directing industrial growth

While we take the milestones listed above as baseline, we want to direct industrial growth in a way compatible with the communities and the landscape. For that, we will use different tools – legislative measures, spatial measures and "public pressure". The pressure will rise because of the legislative and spatial measures. Industry will be given space to participate in the new spatial development planning system.

Transparent environmental permit act
- Province level
- Introduced independently from other interventions at the start of the timeline
- Officially permitted environmental impacts and actual emissions and impacts must be itemized quarterly and annually for every entity that produces them. This applies to any facility applying for the Environmental and planning permit (Omgevingsvergunning) and its subfacilities/entities (i.e. individual companies within the Chemelot complex).
- This information must be made publicly available and made accessible to comprehend by the public. The information includes both the emission data, as well as contextualization to actual environmental impacts and the energy transition goals established nationally and supranationally.
- The information will be publicly available through, not only:
- online as part of a separated webpage segment of the provincial website of Limburg dedicated to the energy transition.
- online as a dedicated "Environmental impact" page on the websites of the individual entities, as well as on the website of the environmental permit applicant entity (i.e. Chemelot complex as a whole);
- physically in municipal and provincial offices and at the information desks of concerned private entities.

- This will act as a tool to put public pressure on stakeholders causing environmental to slow down growth and speed up the sustainable transition.

Reimbursing forward act
- Provincial level
- Introduced independently from other interventions at the start of the timeline
- Reimbursements of environmental impacts of intended developments and the processes they will lead to must be done before the environmental impact happens (ie. before construction of facilities, and during operation so that the environmental impact is never more than has been already reimbursed upfront).
- Reimbursements should be proportional and relevant to the impact. Ie. In case of impact on the natural environment, financial compensation is not desirable as it would not reimburse the impacted. The reimbursements will be decided in collaboration with the impacted (ie. the communities), or in case that is impossible with a suitable replacement person representing them (ie. an expert representing river biomes, bird species, frog species etc.)
- This will act as a factor in initial slowing down of the growth, and as a tool to realize some of the spatial interventions in our vision (especially the "nature shields", but also interventions directed to improving livability for people – hearts, connectors, local facilities.

Omgevingswet 2.0
- Revised national Environmental Planning Act, see the dedicated chapter on p. 132–135.
- In the spatial planning process, industry actors will be a part of environmental visioning and strategy making, which will lead to direct integration of innovations discussed and adjusted with local communities into the Omgevingsvisie.
- This will act as a tool to ensure fitting of energy transition and industrial growth large scale visions to local conditions.
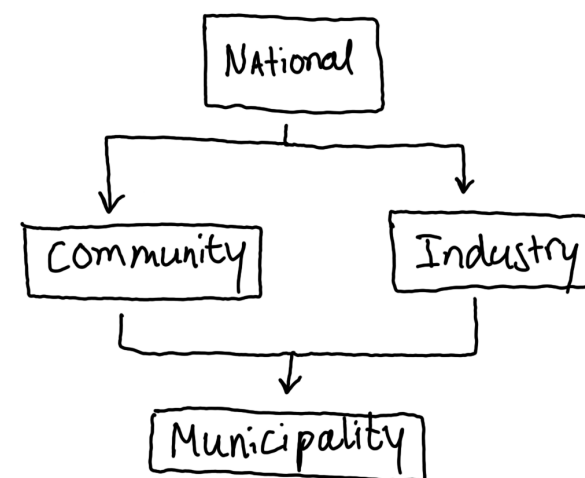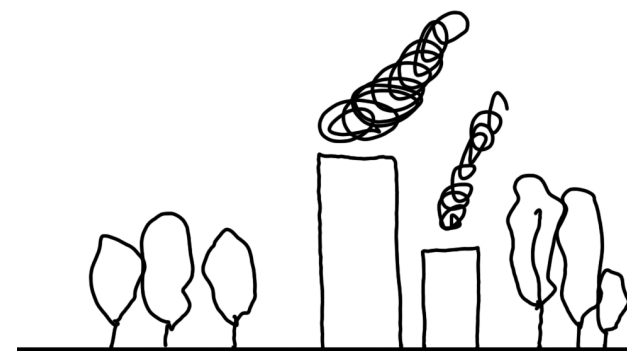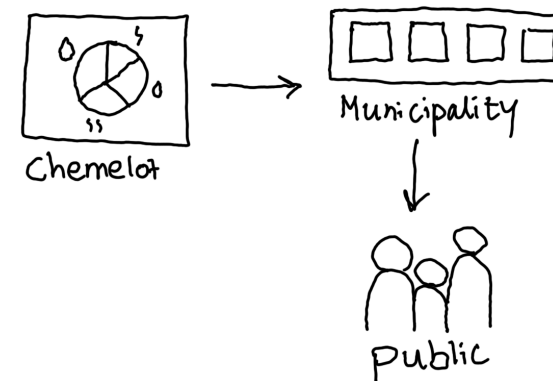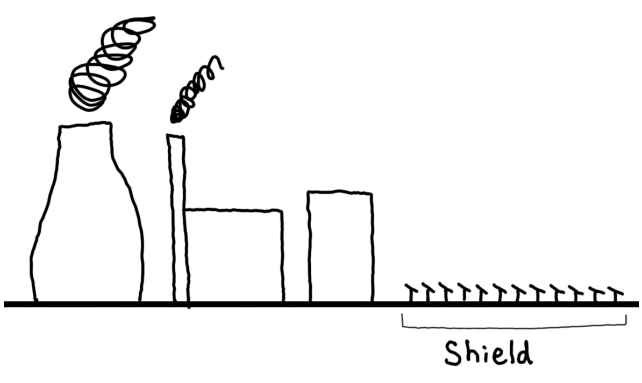
Shields

Shields are established based on a land–use directive based on the vision map. We assume the vision map will have been (more or less) agreed upon by different stakeholders, and there will be an overall willingness to comply with it. The soft motivations to comply will be public pressure and the feeling of shared responsibility over the common landscape. However, legislative instruments need to be established to further motivate landowners and enforce the land-use plan in cases of refusal to comply. These instruments might include subsidization of developing shield elements and lost incomes, or penalization in case of other instruments failing.

The goal is to establish the shields quickly and efficiently. The permit process will be well-coordinated between the different stakeholders, as they are supported by the Omgevingsvisie.
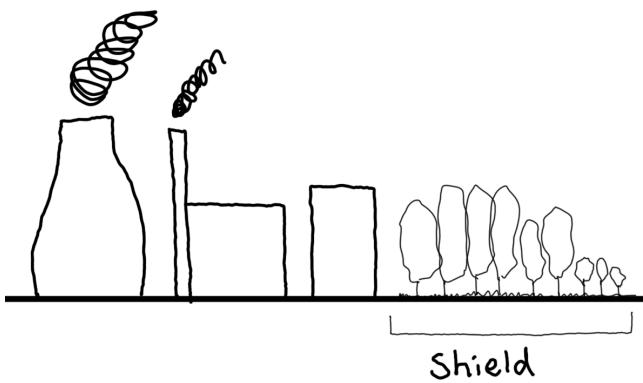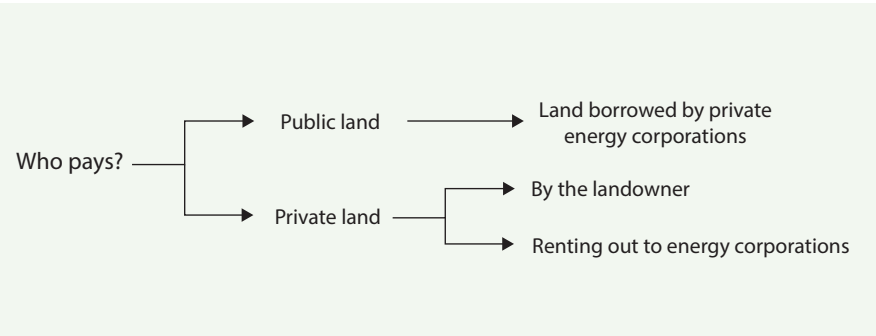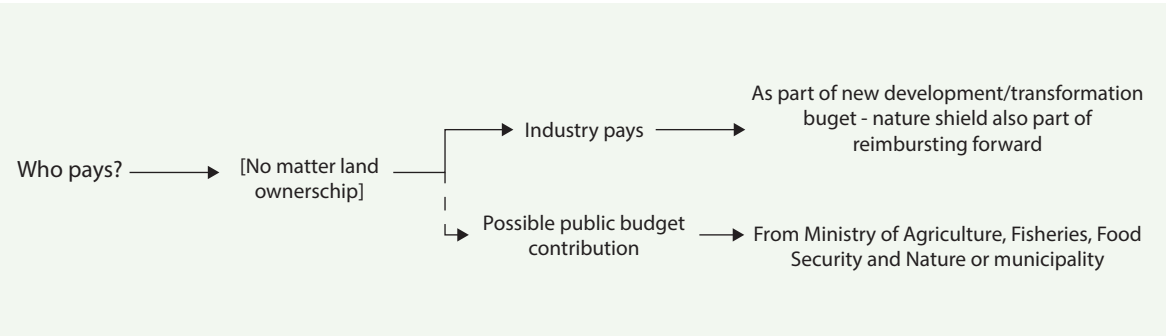

Nature shields

·   A tool to physically direct industrial growth by increasing the environmental value of the land surrounding industry.
·   The nature shield will be a stroke/field surrounding the industry that consists of plants and trees.
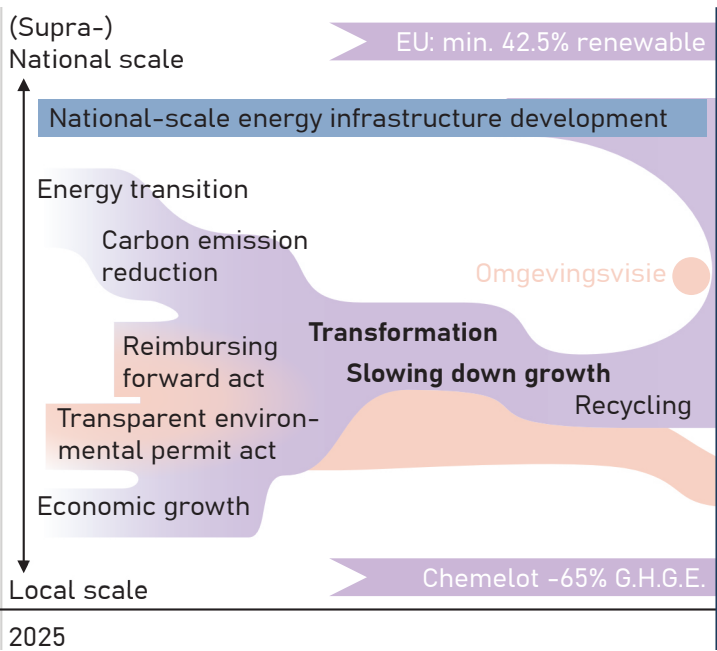
Energy shields

·   A tool to physically direct industrial growth by placing energy elements on the land surrounding the industry.
·   The energy shields will be a stroke/ field filled up with energy elements (solar panels, wind turbines, biomass).

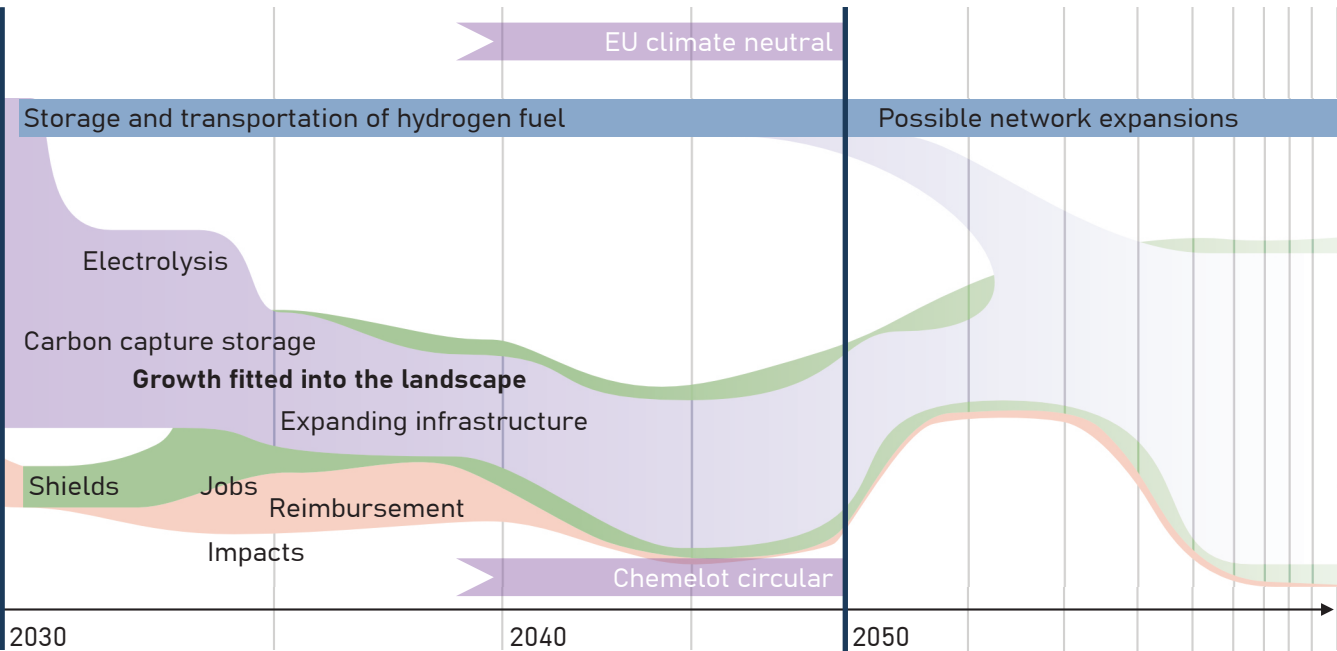Nature Shields development

Energy shields development

Figure 6.6 Industry timeline 2

6.3 Strong communities: empowerment and preservation

▪Movement of the stakeholders

The stakeholders, after implementing the design strategies, will have replacements within the power–interest matrix. Speaking of dynamics, the strategy framework will reduce the power impact of the private sector and empower civil society, specifically the rural communities and smaller villages. The cluster of Chemelot will remain interested in the area but its impact will be reduced relatively lower than the rural communities. This is a result of civil society empowerment based on the new systematic structures that removed the barriers between the public and people. In other words, this led to civil society's strong engagement throughout the developed strategic framework.
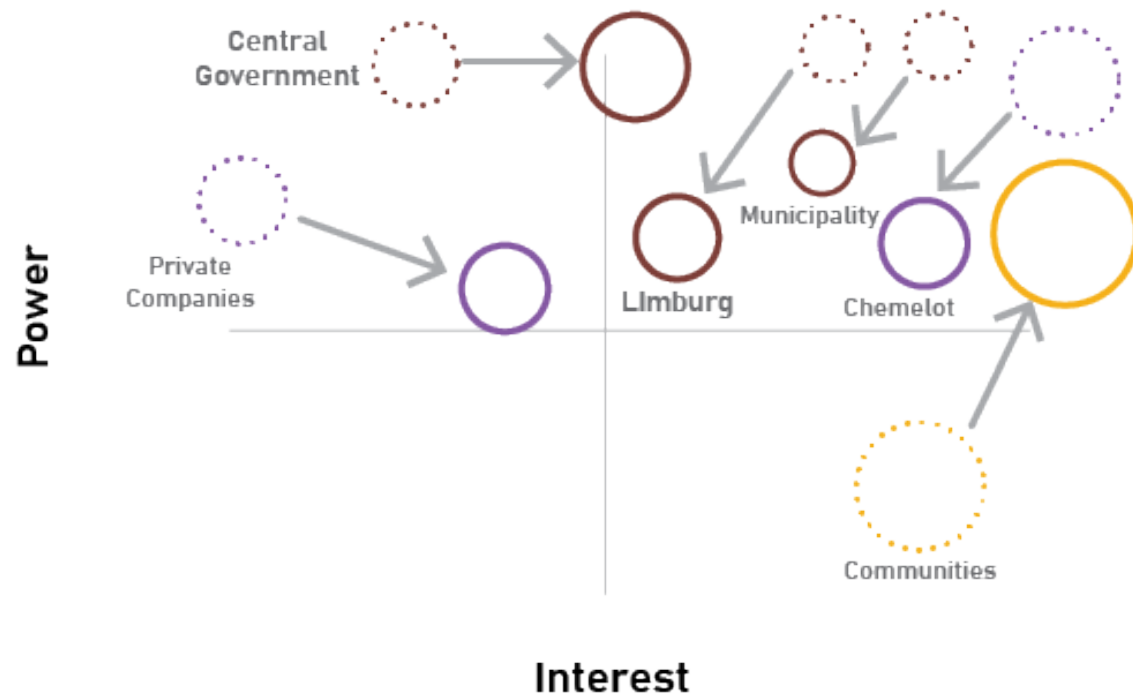

Figure 6.7 Power interest scheme abstract

Central Government:
Power: Stable
Interest: Increase, because of growing importance of industry

Private Companies:
Power: Decrease, Legal inhibition supported by actors, especially the communities, regarding the spatial & production growth.
Interest: Stable

Province Limburg:
Power: Decrease, by the systematic change of policy making processes into more circular structures consisting of more effective civil society groups.
Interest: Stable

Municipality:
Power: Decrease, because of new participation system communities will have more power
Interest: Stable

Chemelot:
Power: Decrease, because of new participation system communities will have more power
Interest: Stable

Communities:
Power: Increase, because of new participation system communities will have more power
Interest: Increase, because of new participation system communities will have more interest
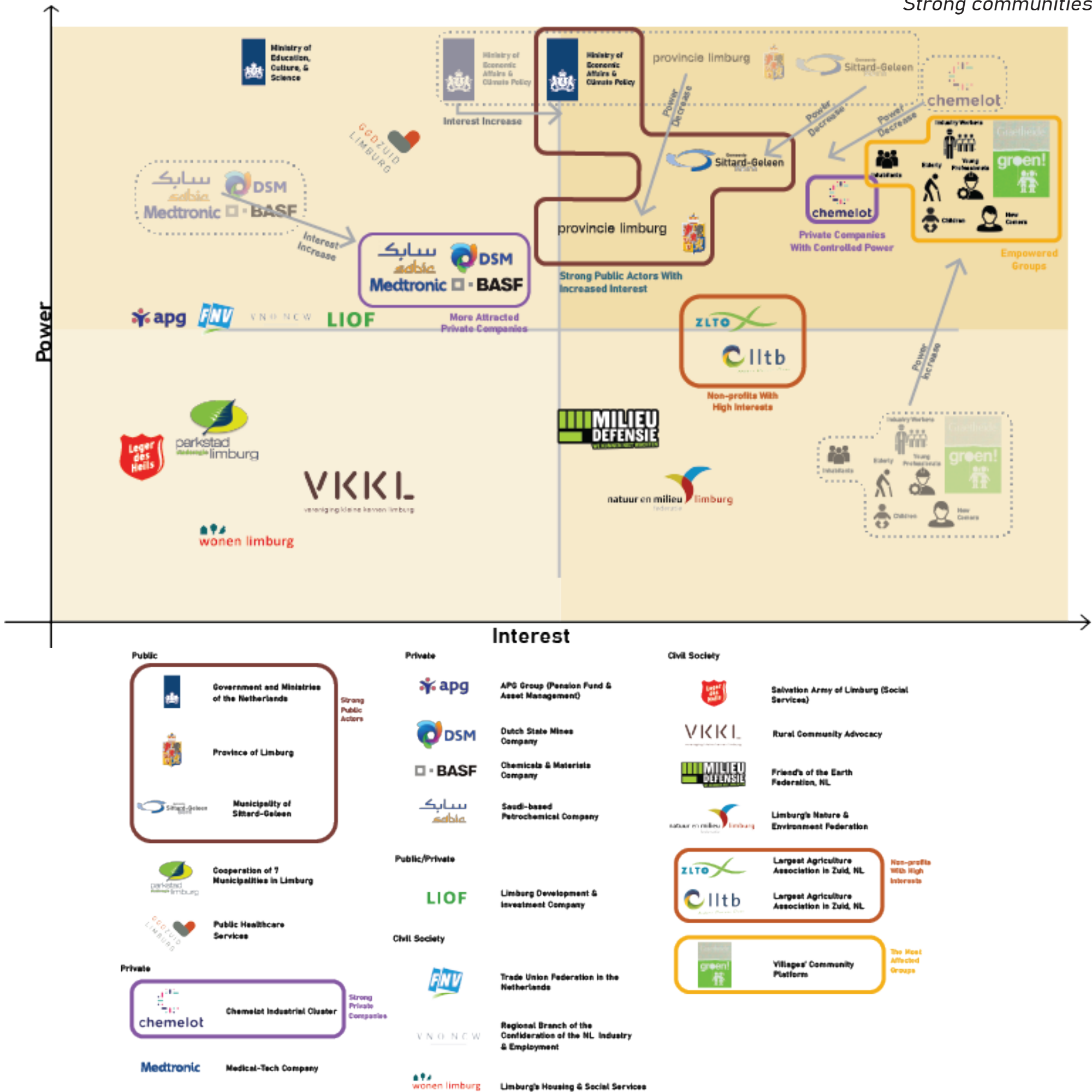
Figure 6.8 Power Interest scheme

Omgevingswet 2.0

The movement of stakeholders proposed in the previous section , needs to be achieved through a systemic change, steered across scales by different instruments. A powerful tool in changing the system is the revision of the Dutch Environmental Planning Act (Omgevingswet), which we call "Omgevingswet 2.0", which will restructure the spatial development planning process from local to national scale. The adaptive nature of this act will improve system resilience.

Other leverage we use to empower communities within the spatial planning system is the Transparent environment permit act (improving information flows leading to public pressure and improving functionality of the collaborative design process), changing the rules of the system by the *Reimbursing forward act* (the reimbursed community has power over the form of reimbursement, which precedes industrial growth), and introducing the concept of shields acting as buffers to control growth, as well as parameters partly controlled by the community, that have a direct impact on spatial development.

By influencing the system of spatial development from different points, the paradigm will be widely accepted that everyone should have the power and opportunity to co-design the spatial development of their landscape.

Aim
The spatial planning system now leaves the community out of the process. By proposing a revised *Omgevingswet*, we want to include communities and other local stakeholders in the collaborative process of an adaptive design for spatial development.

Overview of similarities and changes to current Omgevingswet

- Works still on the principle of Omgevingsvisies (environmental visions) on municipal, provincial and national levels as the main binding documents regarding spatial development. Their dependency/ the process of how they are made will be changed to reflect the newly established role of the community.

- The municipality is the lowest-scale official authority in spatial planning decisions, which also corresponds with other areas of Dutch governance.

- Inclusion of community power on different scales:
  - Knowledge establishment and power over knowledge representation is put at the basis of spatial development decisions through the concept of landscape grammar.
  - Communal values about the landscape that "belongs" to it are integrated in regional planning.
  - *National community forum* is used to exchange knowledge and shape how national planning decisions are approached to make the planning process better and inclusive of the diverse local conditions and wishes.

- Adaptive policy and plans. Omgevingswet and Omgevingsvisies might be adjusted and changed to reflect the values on which the

NEW INSTITUTIONS
Community forum

· Organized by municipality

· Moderated by an *Exchange community moderator*

· Consists of all inhabitants of the community space (ie. village residents)

· It is ensured that all members can participate, with diverse forms of participation and an adaptive schedule. The community forum is a moderately informal institution.

· A representative is chosen to join the board of the cluster forum

Cluster forum

· Organized by municipality

· Moderated by a municipal *Expert moderator*

· Consists of a board of representatives of the communities, and also cluster–wide participations.

· A representative is chosen to join the municipal forum.

Municipal community forum

· Organized by municipality

· Moderated by a municipal *Expert moderator*

· Consists of a board of representatives of the clusters, and also municipality–wide participations.

· This is the body to sit at roundtables creating the municipal *Omgevingsvisie*, and also to communicate with forums of neighboring municipalities about what happens at the borders.

· A few representatives are chosen to join the national community forum and share the responsibilities connected with it..

National community forum

· Organized and moderated by the Ministry of Housing and Spatial Planning.

· A nationwide plenum of municipal community representatives, who also can meet in smaller plenum (ie. provincial, or specific to a certain topic).

· Platform for knowledge sharing and evaluating the new design process over scales.

· Steering national visions and continually work on improving the *Omgevingswet 2.0*

· Sharing experiences and improving local implementations of *Omgevingswet 2.0*

Municipal Omgevingsvisie roundtable

· Moderated by an E*xpert moderator*

· Platform for the collaborative design of municipal *Omgevingsvisie*

· Includes the *Municipal community forum, i*ndustry, and representatives of other occupants of the municipal space, substitute representatives of nature, experts, politicians, and designers/planners

NEW ROLES

There will be many new roles, including moderator and expert positions, created by the newly established institutions and processes. This also includes new roles by which the community will take part in the system. (The industry already has organizational structures within, which will be also used for collaborative design.)

Participants

- Regular participation will work on a volunteer basis, usually in evenings/weekends. The municipality will make sure that everybody has the opportunity to take part in it, and ensure that all voices are heard and included.

Representatives

Community representative
- Represents community in the *Cluster forum* board
- Chosen from *Community forum* by consensus/temporarily by popular vote
- Reimbursed to an extent, compensated for their time
- It is encouraged to change at the community moderators when a new *Omgevingsvisie* cycle comes

Cluster representative
- Represents Cluster in the *Municipal community forum*
- Reimbursed

Municipal community representative
- Represents municipality on *National community forum*, and steers the adaptation of the system
- Some become *Exchange community moderators*
- Reimbursed – part-time public employees and with an exception position in the work law allowing them to balance their regular employment with their Omgevingswet 2.0 responsibilities.
  - Employed by the Ministry of Housing and Spatial Planning, role overlooked by the local municipality

Moderators

Expert moderator
- Active in roundtables (municipal and others), and on cluster level before *Exchange community moderators* are established
- Full time provincial expert employee, shared between multiple municipalities

Exchange community moderator
- Active in establishing compatibility matrix and refining the vision on cluster level, as well as other cluster level participatory processes.
- Drafted from *Municipal community representatives*
- Assigned to their communities based on *National community forum* discussion.
- The aim of this role is to make the conversation richer by including an outsider voice that learns together with the community. Therefore, the exchange moderator will be matched with a cluster elsewhere from their home base. This should be maximum 2 hours away by train, but far enough so that they really act like an "outside" voice.
- Goes through a moderator and participatory method course and is educated in *Omgevingswet* and how to work within the framework (incl. Compatibility matrix). They participate in the continuous adaptation of the system.
- Reimbursed – part-time public employee and with an exception position in the work law allowing them to balance their regular employment with their moderator responsibilities.
  - Employed by the Ministry of Housing and Spatial Planning, role overlooked by the local municipality

A smooth transition

Before the nationwide deployment of Omgevingswet 2.0, the principles will be tested in three to five different municipalities. This "Testing ground" experimentation phase will act as a proof of concept as well as a foundation for constructing a truly functional policy. In our proposal, Sittard-Geleen becomes one of these municipalities.

As a kick-off to the Testing ground phase, the government will propose the system framework in the form of a Omgevingswet 2.0 Prepolicy. After the testing phase is over, this framework will be reflected upon by all actors of the spatial design process.

In the final part of this phase, the National forum is established, and communities start sharing knowledge before ever having taken part in the spatial design process. They collaborated on the preparation of Omgevingswet 2.0, and also on the preparation of the first Development baseline.

Development baseline is a document providing binding national development plans and aims to be implemented through the collaborative design process.
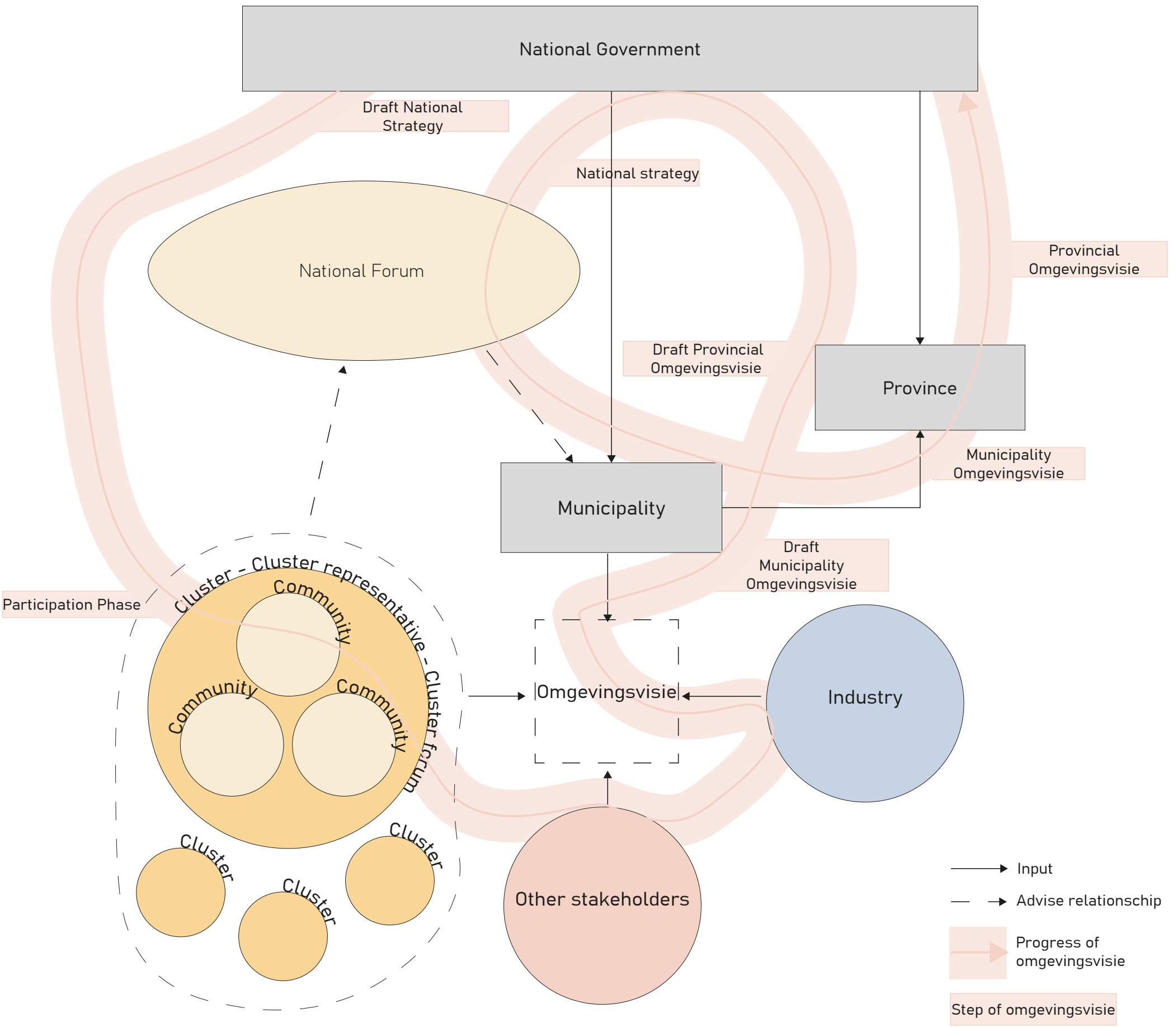
Figure 6.9 Collaborative design process scheme

New Spatial development system

To give the communities more power, we designed a new spatial development system where communities are actively engaged with the vision making process. The process starts with the vision from the national government. This will be used as a baseline during the project, their goals need to be implemented into the vision of the community. The participation process can be divided into 6 themes; stakeholder mapping, landscape grammar, common ground, conclusion on landscape typology, vision making and strategy making.

Alignment of system timeline: Sittard–Geleen will act as a testing ground, after that will be a cyclical spatial planning system – in each cycle will happen what is described by the schemes on this and next spread. Municipal and provincial Omgevingsvisies will be made at a shorter period, the landscape grammar will be revised less frequently, following a new edition of national development baseline.

Phases:
Stakeholder mapping: in this phase the designer defines all the stakeholders that need to be involved in the process. The designer organizes an individual conversation with each stakeholder to get insight into their needs. Then there is another individual session with the stakeholders where they can identify the current landscape grammar.

Landscape grammar: The designer makes the final existing landscape grammar vocabulary based on the sessions with the stakeholders.

Common ground phase: In this phase a combined stakeholder session with all stakeholders presents where they can fill in the compatibility matrix and identify what landscape typologies they are missing in their current landscape.

Conclusion on landscape typologies: The designer makes the final landscape typologies (existing and new) and makes the final compatibility matrix.

Vision making: In this phase the stakeholders are individually making a vision based on the guidelines from the national government, based on the landscape grammar tiles and the compatibility matrix.

Strategy making: In this phase the stakeholders can present their visions. The designer will then make the final strategy.

Detailed Explaination:
On the next page is a detailed version of the new spatial development system. The pink flow represents the participation process as explained on the page to the right. In this scheme on the vertical axis, the relation between the different scale levels is visible, the national scale, provincial scale, municipality scale and the cluster scale. The horizontal axis represents time. During the first phases the cluster and municipality database/ register is being built. In this database all the visions, landscape typologies and wishes are compiled. This databased is used to make the compatibility matrix that can be used throughout the Netherlands during the vision making process (see chapter Compatibility matrix, p. 142–143). Every cluster has its own moderator (see chapter Omgevingswet 2.0, p. 132–135). All these moderators together form a national forum that advises each other and share knowledge. In this scheme the strategy process is also more detailed. The strategy from the municipality will be checked with the municipality to make sure the borders are aligned and on the national level, the strategy will be checked with the neighboring countries to see if they align. After the coordination of boundaries, the national forum of moderators and the stakeholders will reflect on the process and return the feedback to the municipality..
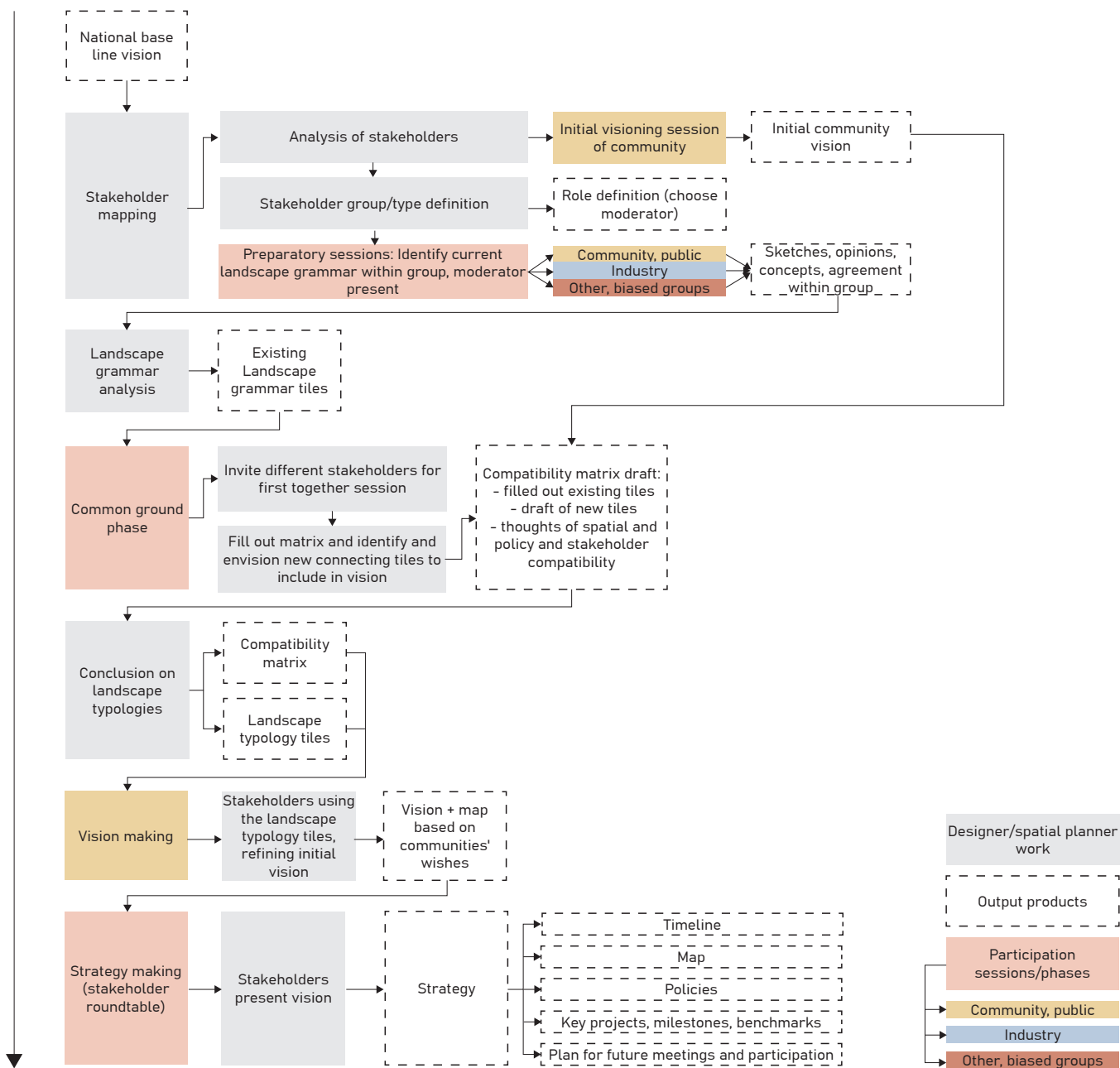
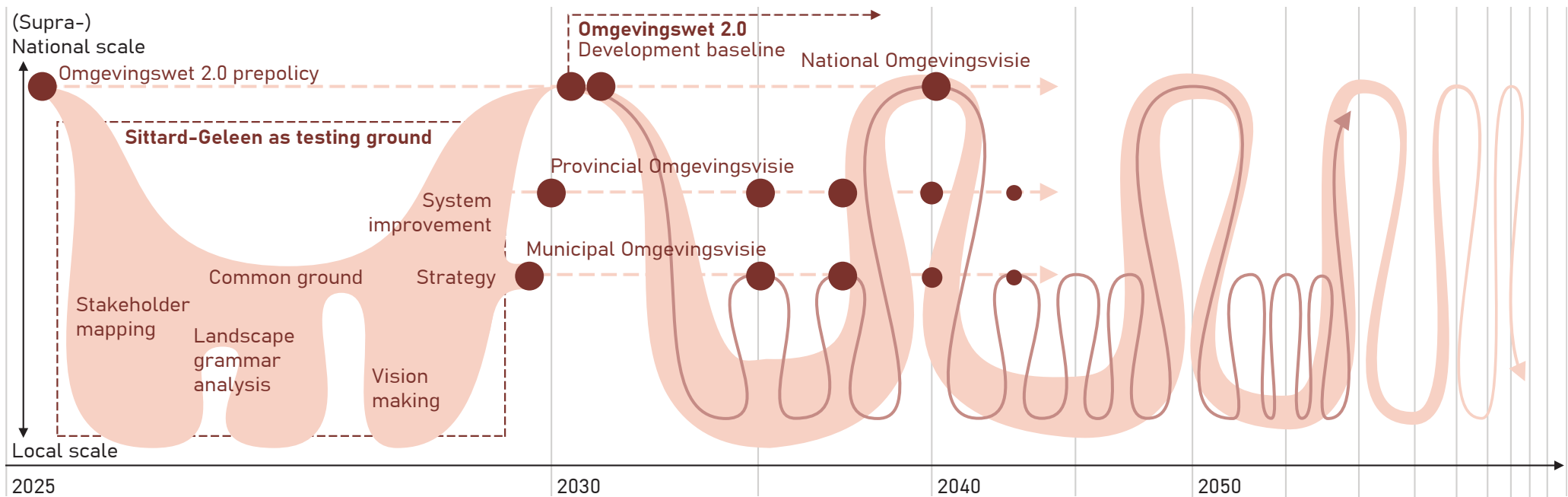Figure 6.10 New participation system

Figure 6.11 System Alligment Timeline
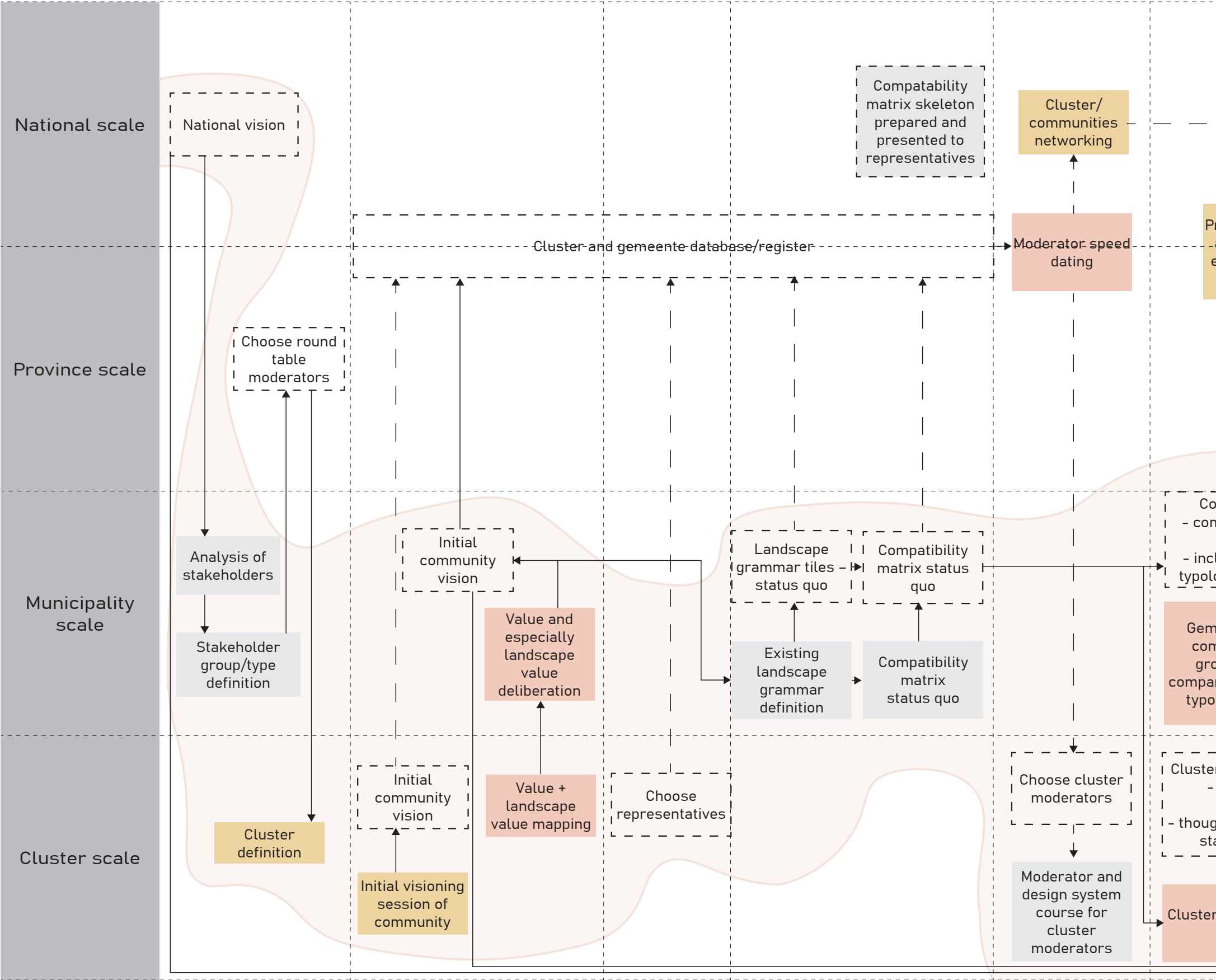
New Spatial development system scheme

Figure 6.12 New spatial development system scheme

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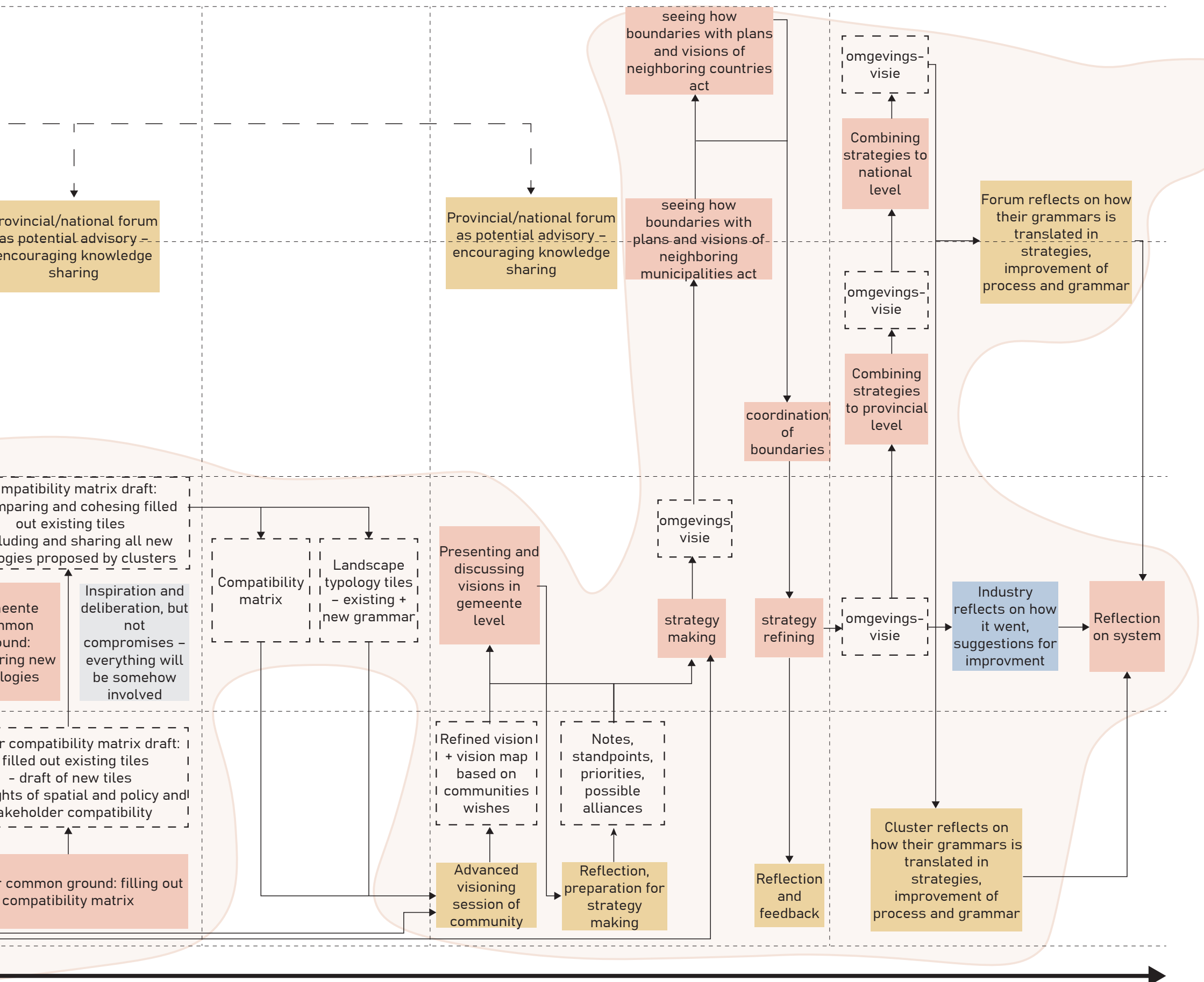**Legend:**
- Participation process
- Designer/spatial planner work
- Output products
- Participation sessions/phases
- Community, public
- Industry

Diagram text:

seeing how boundaries with plans and visions of neighboring countries act

omgevings-visie

Combining strategies to national level

rovincial/national forum as potential advisory – encouraging knowledge sharing

Provincial/national forum as potential advisory – encouraging knowledge sharing

seeing how boundaries with plans and visions of neighboring municipalities act

Forum reflects on how their grammars is translated in strategies, improvement of process and grammar

omgevings-visie

Combining strategies to provincial level

coordination of boundaries

mpatibility matrix draft: mparing and cohesing filled out existing tiles luding and sharing all new gies proposed by clusters
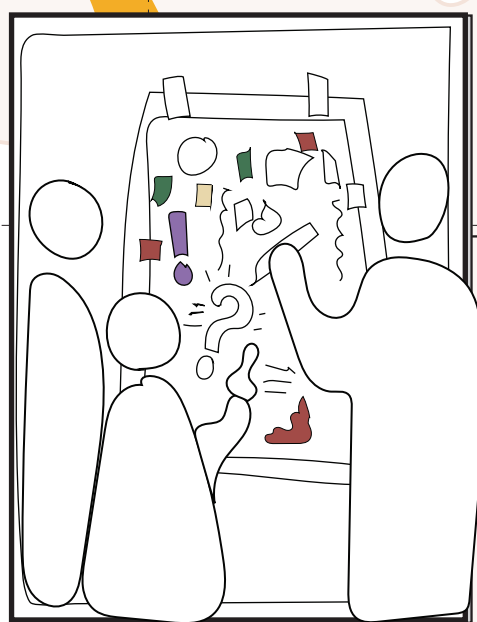
Compatibility matrix

Landscape typology tiles – existing + new grammar

Presenting and discussing visions in gemeente level

omgevings visie

strategy making

strategy refining

omgevings-visie

Industry reflects on how it went, suggestions for improvment

Reflection on system

eente mmon und: ring new logies

Inspiration and deliberation, but not compromises – everything will be somehow involved

r compatibility matrix draft: filled out existing tiles – draft of new tiles hts of spatial and policy and akeholder compatibility

Refined vision + vision map based on communities wishes

Notes, standpoints, priorities, possible alliances

Cluster reflects on how their grammars is translated in strategies, improvement of process and grammar

common ground: filling out compatibility matrix

Advanced visioning session of community

Reflection, preparation for strategy making

Reflection and feedback

Collaborative design process vision

National Scale

Discussion on new landscape typologies

Landscape grammar alignment with other communities/ stakeholders

Ooh, this is very similar to what we have!

Yeah, but why did they put in wind turbines?

Hmmm, maybe this is a viable spatial alternative for us

Village
City
Road
Energy LD
Dense LD
Industry
Heavy Industry
Nature

Village City | Road | Ene

Compatibility mat
light

Oh, I want a tram!

I like looking at the sunset over the horizon

I like my school to be right in the fields!

The community sketches the landscape grammar

Value and especially landscape value deliberation

Geme
com
grou
compar
typol

Value + landscape value mapping

Oh yeah, the farms always have a road like that!

The designer organizes an individual conversation with the community to get insight into their needs

Initial visioning session of community

...We built a hideaway in that bush! Don't tell mum!

Discussion in small focus groups

Landscape observation

Local Scale

Figure 6.13 Spatial development scheme explained

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Pokémon card of a landscape typology

Protected Heritage
Open Landscape

Netherlands, Belgium and Germany discussing the boundaries of the countries.

seeing how boundaries with plans and visions of neighboring municipalities act

Forum reflects on how their grammars is translated in strategies, improvement of process and grammar

Industry

Nature

rix traffic

eente
mon
und:
ng new
ogies

strategy making

Umm.. Did you add new rows into the compatibility matrix or did you use only what they suggested?

We actually ended up using what they suggested but we split some of the rows into multiple subcategories

Oh, interesting! I heard they did something similar in Wageningen!

Designers, community, forum and other stakeholders reflecting on process and outcomes

Designers working with the vision map from the community

Compatibility matrix

We are introducing a collaborative planning process, for that to succeed, we will need a collaborative analysis resulting in a Landscape typology dictionary. This will act as a basis for collaborative design, and as a foundation for experience and knowledge sharing between regions. This will be the Compatibility matrix as shown on the right. This matrix will be introduced and used in the context of the new spatial planning system of participation. In this matrix there are landscape typologies listed that are present in the whole of the Netherlands. Therefor the matrix can be used in the whole of the Netherlands during the spatial planning participation process. The matrix will be adapted by every municipality to reflect their specific landscape through a participative process with communities and community clusters, and also representatives of industrial and other stakeholders (further, all of these are referred to as "stakeholders".)

Every municipality starts with the same empty full matrix, as shown on the right. Then through a collaborative process, stakeholders explore and share their knowledge about the landscape. In the end, they adapt the matrix to their knowledge of the landscape and codify landscape typologies to act as the dictionary of land-use for the municipal Omgevingsvisie:. they fill out cells in the diagonal with the existing landscape typologies. These typologies will be described by drawings, words, and in other ways the stakeholders see fit. Some of the typologies do not exist in the regional landscape and can be removed from the matrix (for example in Limburg, the "open water" typology is missing.)

The community can also add typologies that are not yet present in their landscape. These typologies can be identified by exploring the compatibilities between existing typologies and fitting national plans into the local conditions. In our case, the stakeholders have decided to add three new landscape typologies: Energy Landscape, Dense energy landscape and Industry landscape.

The last step is to note the compatibility of landscape typologies in the remaining cells with a "traffic light", and possibly also other indicators or specifications based on the local conditions.

Figure 6.14 Compatibility matrix

Legend matrix

■ New added Landscape Typologies

Legend compatibility

■ Good, can be placed directly next to each

■ Can be placed directly next to each other, but some rules are necessary to achieve a good connection

■ Cannot be placed next to each other directly, necessary to place a transition zone between them

|	Village	City	Transport Nodes	Traditional Argiculture Landscape	Heavy Argiculture Landscape	Energy Landscape	Dense Energy Landscape	Industry Landscape	Heavy Industry Landscape	Nature	Open water	Open energy water
Village												
City												
Transport Nodes												
Traditional Argiculture Landscape												
Heavy Argiculture Landscape												
Energy Landscape												
Dense Energy Landscape												
Industry Landscape												
Heavy Industry Landscape												
Nature												
Open water												
Open energy water												

Empowering on the ground

In order to make the participation system work and make people want to participate in the process, we need to empower the community physically on the ground. There will be three new spatial elements introduced to empower the community: hearts, connectors and public facilities.
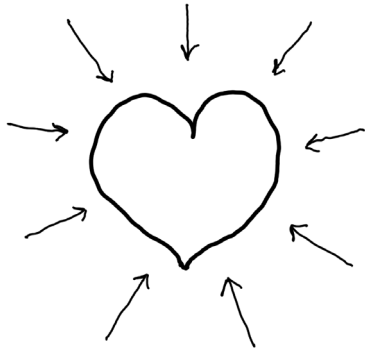
Hearts
The heart is a physical community place that is well accessible and connected to the community that it belongs to. The heart is managed by the community, and they decide what the program is. It is a place where people from the community can meet each other. It can have some public facilities that are easy to reach for every one of the communities. It can be shaped in multiple forms as long as the accessibility is good. The hearts will improve the empowerment of the communities.
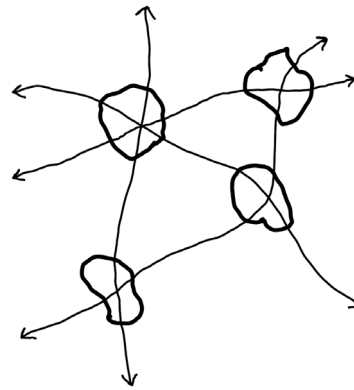
Connectors
The connectors connect different villages, hearts, cities and industries with each other. The connection will be an infrastructural connection for pedestrians and cyclists as well as a green connection for nature and animals. Around the pedestrian and the cycling path there will be a stroke of open landscape. The connectors will improve the slow accessibility in the area and will improve empowerment between different communities.
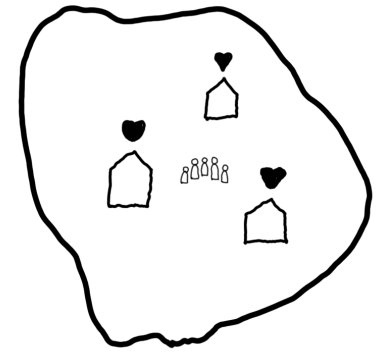
Public Facilities
In the hearts there will be new public facilities. These can be public buildings: a senior facility, library, community building, school or it can be a public outside facility: benches, picnic space, community garden, playground, event space. The public facilities will improve livability and attract new inhabitants and therefore empower the community.
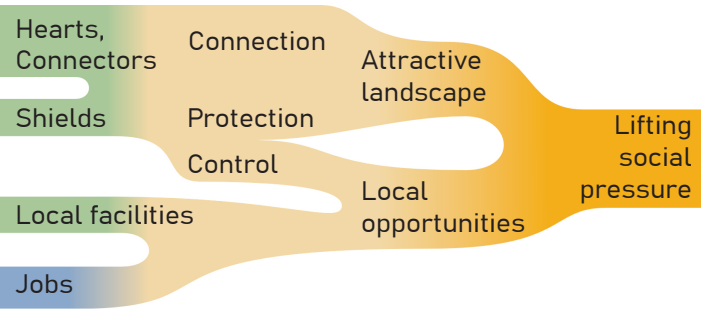
Figure 6.15 **Lifting social pressure causalities and conditions**
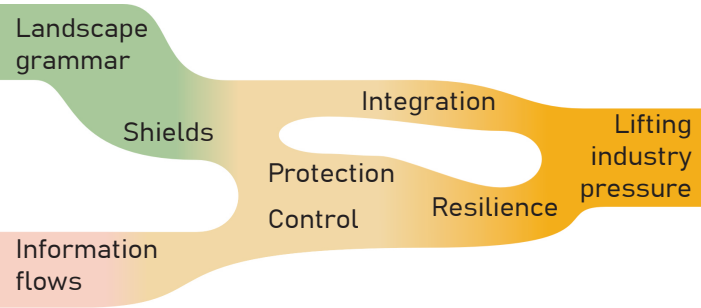
Figure 6.16 **Lifting industry pressure causalities and conditions**
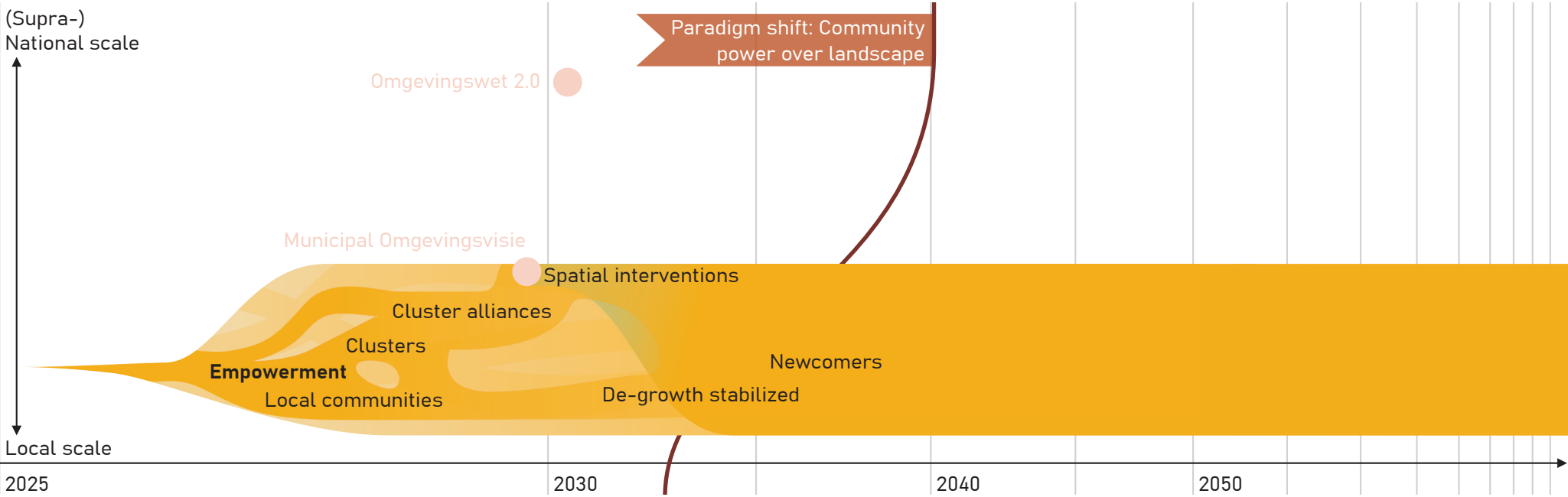
Figure 6.17 Community Timeline

6.4 Landscape

Our approach to the landscape is embedded in the basis of all three themes. This landscape chapter will follow up on the landscape strategy from the previous themes and explain specific spatial interventions of our strategy. The realization of spatial interventions can take a long time. Specific interventions might develop and change over time.

Hearts:
The hearts are managed by the community. They can decide what will be the program for the heart. The land is owned by the municipality.

Connectors:
Connectors will be built once the hearts are more developed. The land is owned by the municipality.

Public facilities:
Once the hearts are more developed, the municipality will build public facilities within the hearts.

Nature shield:
Nature shields are placed on land owned by industry. The industry will pay for the nature shields to compensate for their emissions.

Energy shield:
Energy shields are owned by private corporations who invest in energy. The land where these energy shields are on is either public ground owned by the municipality or private ground owned by a farmer.

Settlement growth:
Municipality is building new homes in the villages once the industry has developed and there are more jobs open.

Renewable energy transportation network:
Once the industry has grown, the transportation network will be expanded based on the needs of the industry. The municipality decides where the new network will come.

Industrial growth:
Industry needs to reimburse the landscape/people burdens before growing, not after.
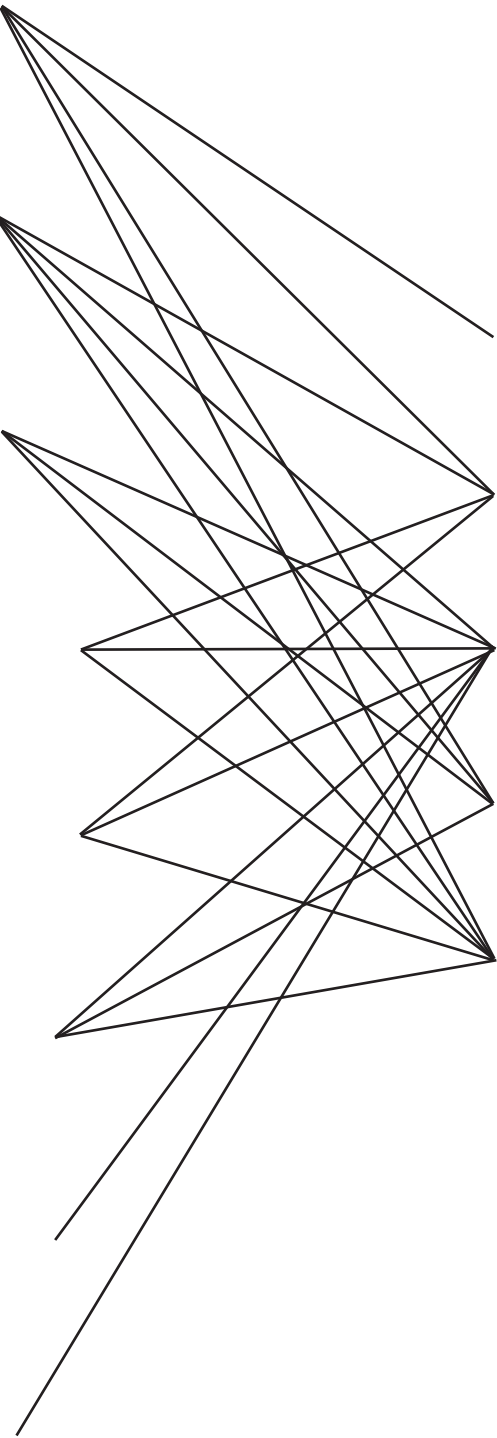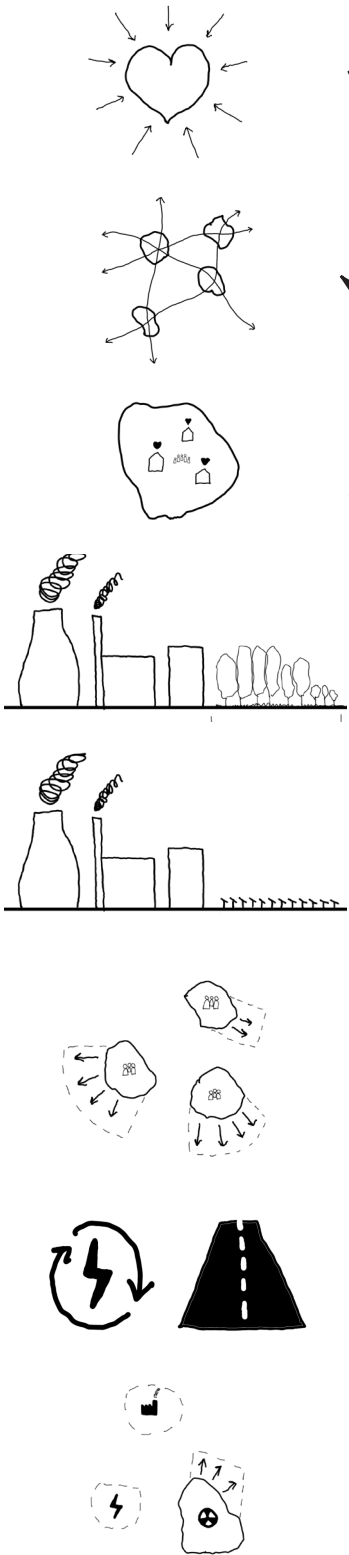
Paradigm: communal power and equal say over landscape

Adaptive, collaborative landscape development system

Sustainable growth

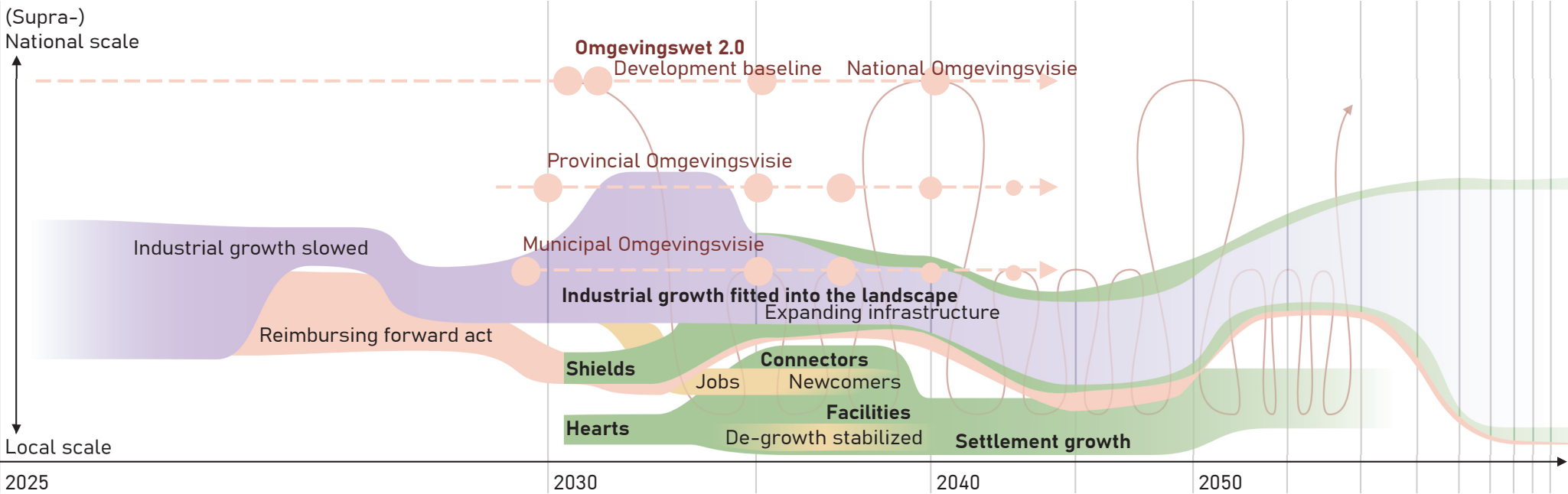Strong empowered resilient communities

Citizen well being

(Supra–)
National scale

Omgevingswet 2.0
Development baseline   National Omgevingsvisie

Provincial Omgevingsvisie

Municipal Omgevingsvisie

Industrial growth slowed

Industrial growth fitted into the landscape
Expanding infrastructure

Reimbursing forward act

Shields   **Connectors**
Jobs   Newcomers

Hearts   **Facilities**
De-growth stabilized   **Settlement growth**

Local scale

2025   2030   2040   2050

Figure 6.18 Landscape Timeline

6.5 Piecing it together

▪Goals
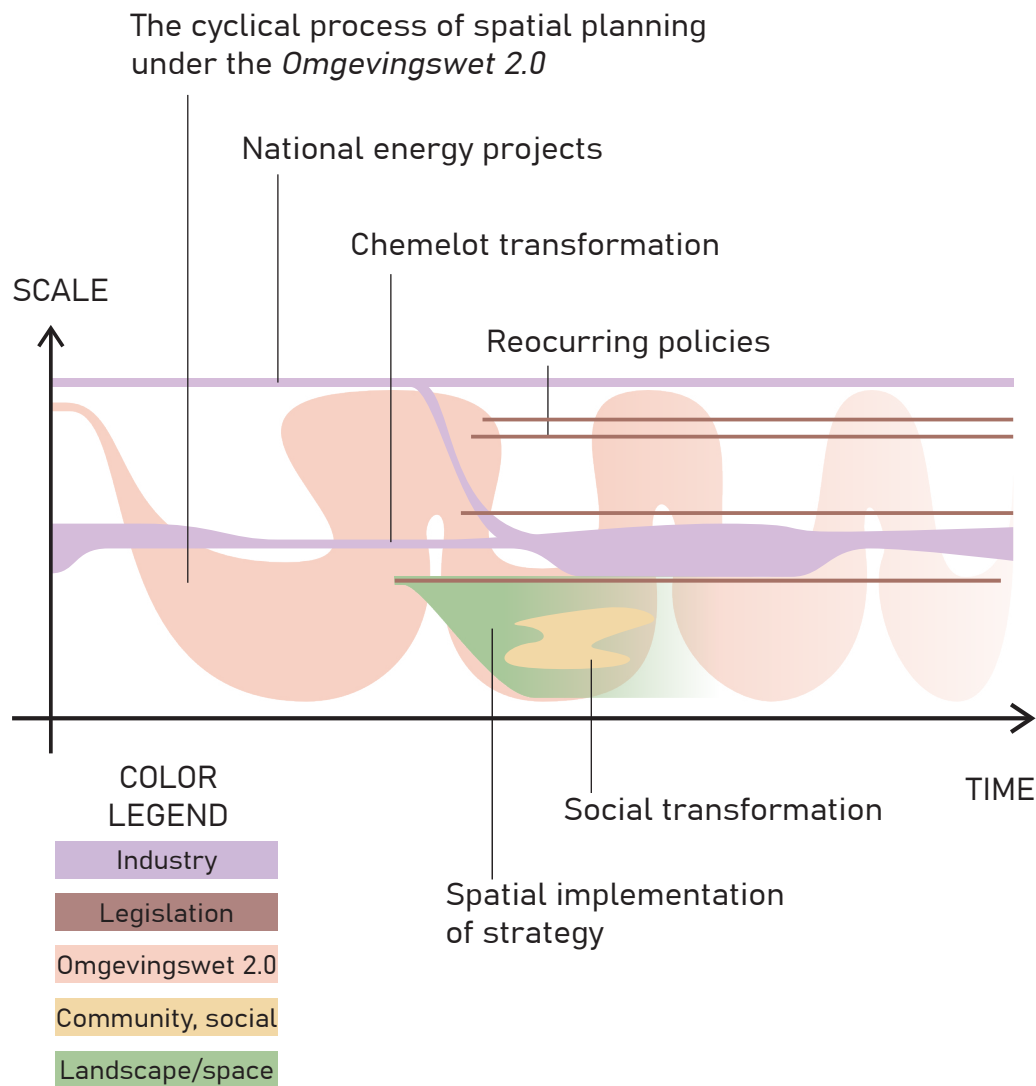
Goals and milestones

EU: min. 42.5% renewable – According to the revised Renewable Energy Directive, the EU's binding renewable energy target for 2030 is a minimum 42.5%, aiming at 45%. (Directive (EU) 2023/2413)

EU climate neutral – The European Climate Law sets a binding objective of climate neutrality (target of net zero greenhouse gas emissions) for the EU by 2050. After, the EU should aim at achieving negative emissions. (Regulation (EU) 2021/1119)

Chemelot –65% GHGE – As per the Cluster Energy Strategy (Chemelot, 2024), Chemelot is targeting a 65% reduction of green house gas emissions in 2030 compared to 1990.

Chemelot Circular – Chemelot has ambition to become fully circular by 2050. (Chemelot, 2024)

Industrial Development

1 National-scale energy infrastructure development, including the construction of the Delta-Rhine corridor pipelines for hydrogen and carbon capture and storage, and also the strengthening of the electricity network and establishment of a deep landing of wind energy.

2 Storage and transportation of hydrogen fuel enabled by the energy network development.

3 Industrial growth reduced, at the beginning by adopting legislative measures.

4 Transitioning within existing bounds of industry area.

5 Industrial growth towards renewable energy and full circularity, including also growth out of existing borders – with the Chemelot harbor at the Julianakanaal as the main location (see p. 103).

How to read the timeline:

The cyclical process of spatial planning under the *Omgevingswet 2.0*

National energy projects

Chemelot transformation

Reocurring policies

SCALE

TIME

Social transformation

Spatial implementation of strategy

COLOR LEGEND

Industry

Legislation

Omgevingswet 2.0

Community, social

Landscape/space

Figure 6.19 Legend of timeline

Empowerment and preservation -> strong communities

Goals and milestones

System change of the spatial development planning system to include more the voice of the community and local stakeholders, codified by the new Omgevingswet 2.0.

Paradigm shift into the paradigm of communal power and equal say over landscape.

Policy

1.1 The Omgevingswet 2.0 prepolicy chooses a few municipalities as testing grounds for the new system and lay the basis of the new planning law. (See p. 134 – A smooth transition.)

1.2 Omgevingswet 2.0 is the main planning law defining the spatial planning system (See p. 132-135.).

2 Development baseline is a document prepared by the Dutch government posing as the binding basis for the collaborative spatial design process.

3 Reimbursing forward act is a provincial policy prescribing industry to provide reimbursements for a planned project before carrying out development. (See p. 128)

4 Transparent environmental permit act is a provincial policy prescribing all actors who need an environmental permit to transparently share their emissions with the public. (See p. 128)

5 Omgevingsvisie of the municipality Sittard-Geleen is the binding municipal spatial planning document.

6 Omgevingsvisie of Limburg is the binding provincial spatial planning document.

7 The National Omgevingsvisie is the binding national spatial planning document.

System process and development/adaptation

01 Establishing contact between municipalities chosen to be the testing grounds as per the Omgevingswet 2.0 prepolicy.

02 Establishing contact between community clusters of the testing ground municipalities to create a smaller version of the national forum.

03 Establishing the nation-wide forum to evaluate the results from the testing ground phase and adapt them into the new Omgevingswet 2.0.

1 Stakeholder mapping is the start of the local participatory design process.

2 Initial visioning is on the level of the cluster.

3 Then follows the landscape grammar analysis and analysis of local values.

4 The results of 3 are brought together around a municipal roundtable in the Common ground phase.

5 The municipal roundtable eventually leads to a filled out compatibility matrix. (See p. 142)

6 The clusters use this common grammar – represented by the compatibility matrix – to refine and spatialize their initial visions.

7 These refined visions are brought together at the municipal roundtable into a development strategy, which is the basis of the Omgevingsvisie.

Landscape

Goals and milestones

Spatial quality is greatly improved by the initial spatial interventions.

Landscape development

1 Establishing shields is at the core of our spatial vision and is needed early on to enable industry to grow.

2 Heart establishment is a spatial push for the intraconnectedness of communities.

3 Connectors connect communities and clusters spatially and to connect the communities to outside opportunities.

4 Hearts will be continuously maintained and adapted to the changing values and needs of the communities.

5 Local facilities will be developed as part of hearts. The transformation of will also attract independent facility development in the area.

6 The connectors will be maintained and adapted to changing landscape and social conditions.

7 As the result of the transformation and the attraction of newcomers, the villages will grow slightly, in respect to the landscape grammar.

Strong Communties

Goals and milestones

(De)growth stabilized in the tree villages by attracting locals to stay.

Vital villages are formed with plenty opportunities for locals to realize themselves, with resilient communities.

Social development

1 De-growth is stabilized in the early phase of the development.

2 The job offer rises as a result of development of local facilities (as part of hearts), and as a result from industrial growth.

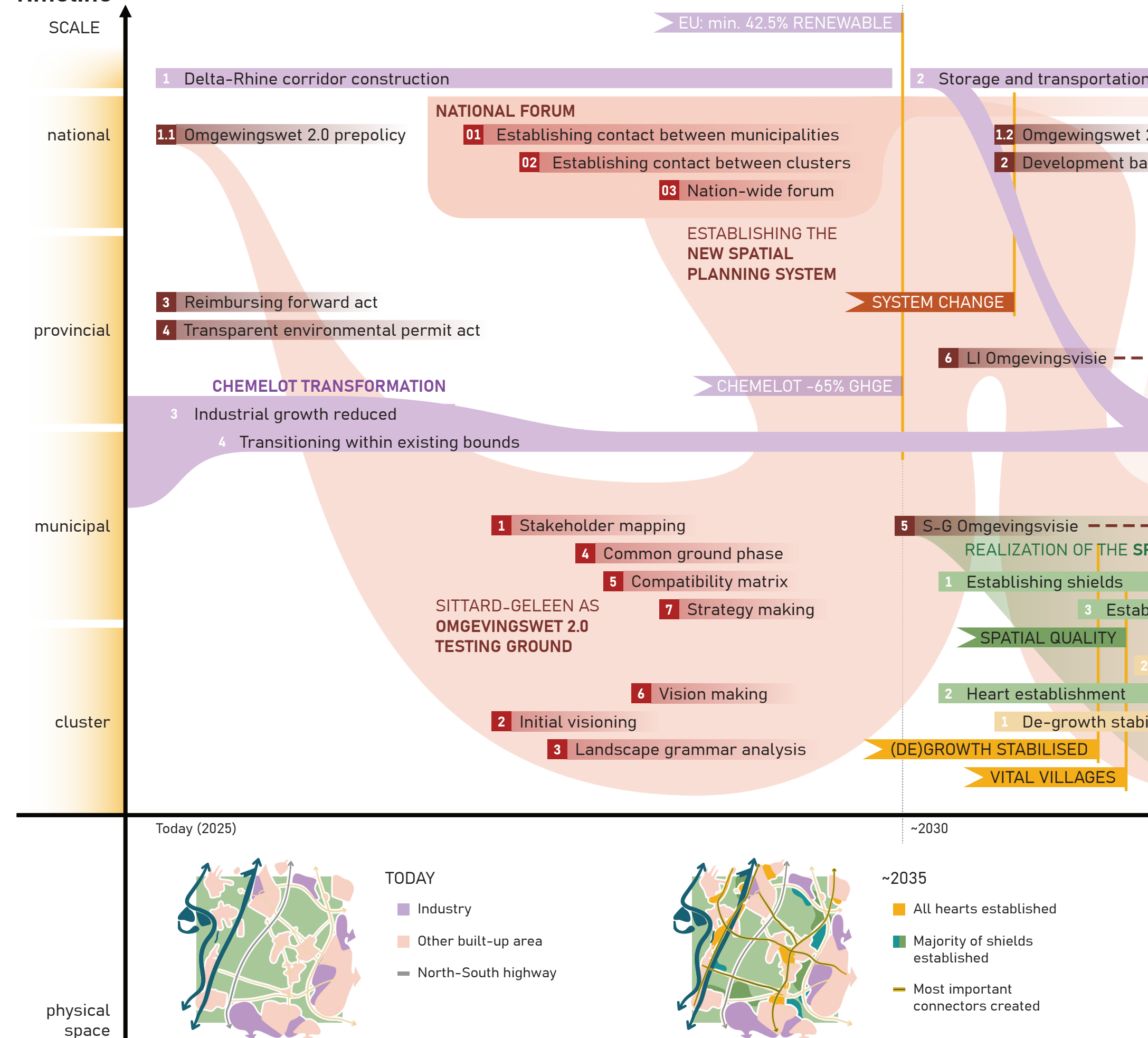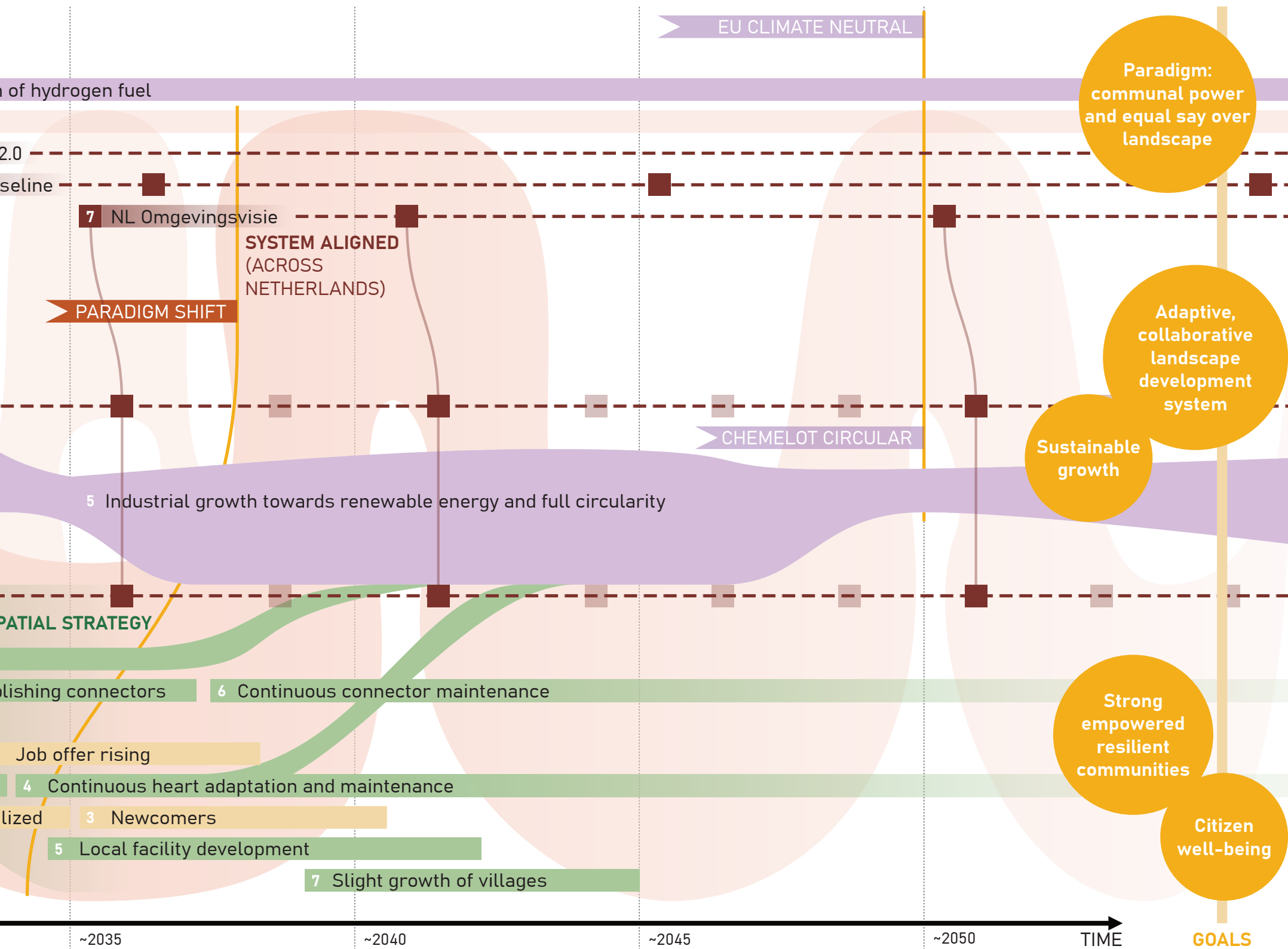**3** The spatial and social development attracts newcomers.

SCALE

EU: min. 42.5% RENEWABLE

1 Delta-Rhine corridor construction

2 Storage and transportation

national

NATIONAL FORUM
01 Establishing contact between municipalities
02 Establishing contact between clusters
03 Nation-wide forum

1.1 Omgewingswet 2.0 prepolicy

1.2 Omgewingswet 2

2 Development ba

ESTABLISHING THE
**NEW SPATIAL
PLANNING SYSTEM**

3 Reimbursing forward act
4 Transparent environmental permit act

SYSTEM CHANGE

provincial

6 LI Omgevingsvisie

CHEMELOT TRANSFORMATION

CHEMELOT –65% GHGE

3 Industrial growth reduced
4 Transitioning within existing bounds

municipal

1 Stakeholder mapping
4 Common ground phase
5 Compatibility matrix
7 Strategy making

5 S-G Omgevingsvisie
REALIZATION OF THE **SP**

1 Establishing shields
3 Estab

SITTARD-GELEEN AS
**OMGEVINGSWET 2.0
TESTING GROUND**

SPATIAL QUALITY

6 Vision making
2 Initial visioning
3 Landscape grammar analysis

cluster

2 Heart establishment
1 De-growth stabi

(DE)GROWTH STABILISED

VITAL VILLAGES

Today (2025)

~2030

TODAY
■ Industry
■ Other built-up area
— North-South highway

~2035
■ All hearts established
■ Majority of shields established
— Most important connectors created

**physical
space**

Figure 6.20 **Timeline**

EU CLIMATE NEUTRAL

Paradigm: communal power and equal say over landscape

of hydrogen fuel

2.0

seline

7 NL Omgevingsvisie

SYSTEM ALIGNED
(ACROSS
NETHERLANDS)

PARADIGM SHIFT

Adaptive, collaborative landscape development system

CHEMELOT CIRCULAR

Sustainable growth

5 Industrial growth towards renewable energy and full circularity

PATIAL STRATEGY

lishing connectors   **6** Continuous connector maintenance

Job offer rising

Strong empowered resilient communities

4 Continuous heart adaptation and maintenance

lized   **3** Newcomers

5 Local facility development

7 Slight growth of villages

Citizen well-being

~2035   ~2040   ~2045   ~2050   TIME   **GOALS**

~2050

- Continuous mainte-nance of hearts, shields and connectors
- Growth of industry
- Slight grow of villages

~2100

In this scenario, the urban and industrial growth is crumbled into the landscape following the logic of founding traditional settlements. But the options are infinite.

COLOR LEGEND

- Industry
- Legislation
- Omgevingswet 2.0
- Community, social
- Landscape/space

Strategy **149**

6.6 Reaching the goals

For the strategy we set five goals. During the chapter the strategy was described in three categories that were based on our baselines: Energy transition and industrial growth, systemic empowerment of communities and landscape. In this paragraph we will explain how each of the goals is reached.

Paradigm: communal power and equal say over landscape

We created a participation system where everyone has the opportunity and the right to participate. This can vary between a community member and a large company. They can co-design and decide despite their land ownership. This gives everyone the same power and say over the landscape.

Adaptive, collaborative landscape development system

We transformed the (national) spatial development design system into an adaptive policy and a new omgevingswet (2.0). This improved its resilience. Transforming the design processes to be collaborative results in adaptive plans, where everyone is represented.

Sustainable growth

We are creating sustainable growth for the economy, industry, nature and population. The industry is directed by legislative measures (transparent environmental permit act, forward reimbursement, new omgevingswet 2.0) and by spatial measures (shields). The population will grow slightly because of the new jobs that are available from growing industry. The economy will grow because of both industry and population.

Strong empowered resilient communities

We are creating strong empowered resilient communities by legalization measures and spatial measures. The legalization will happen because we are changing the participation system and giving the community more power to co-design and have a say. The spatial measures are new community spaces (hearts) filled up with public facilities and meeting spaces. The hearts are connected with each other by connectors.

Citizen well being

We are improving the citizens' wellbeing by creating more public facilities, creating better connections between the villages, industries and hearts. There will be more jobs available because of the grow of the industry. Therefore, there will be a slight growth of villages that will stabilize the population and counter the grey pressure.

▪Additional policy recommendations

Apart from the policies that we recommended in the strategy chapter, we have some additional and more general policy recommendations. These will make sure that the other policies will be well implemented.

- There need to be other places where the newly established institutions can firm their position, like being active in energy or stuff. Idk.
- The law needs to provide room for people who want to participate in the national/provincial forum, so they can take time off from work to do so.
- The outcome of the strategy/vision of th government (national, province and municipality) is binding and private companies (like Chemelot) need to follow the outcome of the strategy of the municipality. Meaning that they have to cooperate to make the shields, stick to the growing plan of the municipality etc.

7.0 Reflection

This chapter is a critical reflection on our research and design process and its results. We reflect on our role as designers and on the value and societal impact of our work (7.1), the sustainability of our project and the proposal's relation to other theoretical concepts (7.2), the limitations of our approach and gaps in our research (7.3), and we highlight opportunities for further research (7.4).

7.1 Values and impact of our work

In this project, we took an "expert" stance, looking at regional spatial development from an outsider perspective. As experts, we are aware of our biases . With regards to the aim of this assignment – to imagine a community-led development strategy (Balz et al., 2025). We proposed a spatial vision and strategy based on our evidence-based understanding of the local conditions and community values. However, without continuous participation, which would be outside of the scope of the course(s), we can never actually understand the values of the community. Even with bias-aware expert view, we have no right to speak for the community.

Therefore, we also proposed a systemic change in the Dutch planning system, that would lead to inclusion of active participation and collaboration of communities on municipal, provincial and national spatial plans (Omgevingsvisies .) Inclusion of diverse local voices in this process, from establishing the knowledge based on which the spatial plans are created, to influencing the way national plans are made, would be beneficial for the plan's situatedness and their smooth implementation (Ansell et al. 2017).

We positioned the spatial planning systemic changes within the bounds of the Dutch governance system. The "one government" idea would be strengthened, with the national government being the main overseer of spatial planning, providing the nationally coordinated development baselines. Moreover, the role of municipalities would be strengthened thanks to their responsibility over the Landscape grammar establishment and institutionalized coordination of the local collaborative design processes (p. 132-135 – Omgevingswet 2.0).

By creating the citizen platforms – forums on different levels (see p. 134 – new institutions in Omgevingswet 2.0), civil society would become more interconnected, making it more resilient and robust . The transformation of the spatial planning system would strengthen the Dutch democracy directly by empowering citizens to be heard and included in spatial decision making, as well as indirectly by strengthening their trust and interest in governance in general, encouraging their larger involvement in other processes as well. It might also lead to emergence of more decentralized civic initiatives, similar to our community clusters.

In our development vision and strategy, we utilize our essential power as urbanists: to shape spatial, social and economic development by spatial instruments. In our opinion, one of the ways spatial planning can strengthen democracy is preventing isolation and strengthening connections – this we do by the spatial elements of connectors and hearts (as well as non-spatially, by systemically bringing neighboring communities together to join forces to influence the spatial development). The vision is firmly found in spatial knowledge of regional Landscape grammar. By fitting energy/industry landscape into the local Landscape grammar and identity, we hope for our plans to age well as a phase in the continuous evolution and adaptation of the landscape .

To conclude, the proposed development strategy as well as the transformation of the spatial development planning system would lead to strengthening of civil society and would contribute to strengthening of the Dutch democracy, while operating within the structure of the existing governance system.

7.2 Relation to Theoretical Concepts

Based on some key theoretical concepts such as spatial justice, public goods, ethics and comprehensively, sustainable development growth, the designed strategy needs to be assessed and reflected on.

Spatial Justice

One of the prominent theoretical concepts which is considered as the essence of the strategy is justice and more specifically, spatial justice. Giving the right to all the stakeholders affiliated with the area to make or prevent a change by their own will regardless of the power they hold, could be the ideal outcome of the strategy. However, the systematic change on the national scale made by the government would be a high hope. The reason is with the practicality and the trust that is a bit fractured between the communities and the government as civil society has not been engaged in the policymaking process at all.

To be more precise about spatial justice, the fair distribution of benefits and burdens is the most generic definition of this concept (Rocco, 2025). Taking this definition, the created strategy of fending off the industry within its own boundaries, putting facilities inside the centric community hearts, transforming the farm fields into potential energy landscapes are all variations of pros and cons distributions across the landscape.

How just would these interventions be? To answer this question is based on the needs of each group that is associated with any piece of land and space within the region by any direct or indirect impact. Based on the studies of the stakeholders, each intervention was proportionally proposed by the number of tradeoffs they can take in. For example, the locals mentioned the common ground as a need to help them with their solidarity. The industrial cluster of Chemelot has already set a milestone to become fossil neutral, so it is ready to take in the new situation towards sustainability.

Public Goods

Having the community hearts as the existing public goods is one of the main interventions within this project. The hearts have both social and spatial potential to create a public good in a rural area.

The spatial aspect is the availability of landscape, open to everyone at every time. Improving the environmental qualities such as attractiveness, accessibility, and vitality would be the outcome of the community hearts implementation.

On the social aspect, the communities will share a common ground to contribute to their social activities and thrive within their smaller societies while fostering their identical heritage together. With the availability of facilities, most of the existing groups will be provided. Also, when it comes to participation, civil society will have a strong impact on its environment, and this will be a shared power among the whole members concerned about their living environment as it will be planned or even designed autonomously.

Overall, the community hearts would also have new users including the newcomers attracted to the prosperous and protected environment of the rural areas while not only keeping their heritage but also evolve towards the upcoming transitions that can already be considered as the public good.

Nevertheless, the energy transition within the rural areas is already a common that will be shared among the inhabitants. But it is uncertain that how the energy share will be distributed by the communities. As they will be one of the strongest contributors in the region, the balance of energy production, distribution, and consumption should be highly monitored by all the existing and new stakeholders as the landscape will give the fruits that have to be shared among all.

Although the hearts and the connections will be public goods, the farm fields will remain the same, only with a slight change of typology towards the energy landscape.

Sustainability

Considering the Sustainable Development Goals (SDG), the designed and planned spatial strategies are mostly focused on the social aspects of the study area as it primarily focuses on the communities of the smaller villages within the industrial region. The empowerment of resilience of these communities is one of the main objectives of the developed strategy, so they can make a considerable contribution to their environment's development along with the other actors i.e. private industrial companies (Chemelot) or local governments. However, speaking of the environment, the constructed strategies are not focused on the environment as a priority even though the spatial strategies are based on the existing landscape grammar. The natural habitats or existing living species are not a priority in this strategy plan as they were not during the analysis phase.

The most anticipated enhancements of this strategy from the SDG point of view are as follows:

- Function Accessibility – Made by the community hearts and their connections within the area
- Wellbeing – Improving the environmental quality for a better life experience
- Technological Innovation – Designing the energy landscape based on the existing landscape grammar, typologies, and compatibility matrix
- Social Innovation – Empowering the local communities as the main and most engaged actors along with the public & private sectors

Justice (especially the spatial one) – The prominent orientation of the whole project is the justice as the supporting theoretical background is almost jusitce-related

However, the strategies could go further with the sustainability of the industrial activities like the Chemelot cluster. Although there are limited policies applied on the industrial activities, the production functions themselves are not supervised or controlled by any external agencies concerned about the environmental impacts of the activities.

7.3 Limitations of the Approach

Our perspective this quarter was, as per the assignment, from the point of view of the community And we were concerning the energy transition. This lead to us focusing disproportionately on the people and economy parts of sustainability, and nature was kinda left out. In future research, it would be good to explore how nature/non-humans can be taken to the roundtable as stakeholders and included as active participants in the spatial design process.

I mean, in many ways people are part of nature and their needs overlap with nonhumans, but still this is not good

So, what about non-humans.

How do we know what they need?

Who are we to represent nonhumans in the conversation? How should that be done?

Well, if we take that lens as a feature - collaborative design struggles

Motivating the uninterested to participate? [booklet 3 – multilevel governance]

We make a lot of assumptions about people agreeing.

7.4 Suggestions for Further Research

This would need to be experimented.
What about enforcing the landuse zoning for shields? How do we make it best?
What if by making the buffers we make the space too inflexible and hard to adapt? – a payoff, and at least power in local hands.
What if despite our best efforts, the conversation wouldn't go well, what if the community's values were "wrong"
What agency should the designer have?
What should role of the planner be?
How much should we steer interpretation of values and how the base knowledge is established and perceived?

There are already some policies suggested in the strategy chapter (6.0). But in case the current proposal does not go through the implication stage, there are some policies recommended for legal and administrative purposes to be applied on future development plans, strategies or visions.
Based on the existing spatial planning and policy making systems, the municipal scales should have more policies engaging people with developments and projects taking place at local scales that are related to communities living there.

The higher scale administrative institutions like the provincial or national governments can have detailed legislations involving the lower institutions with the upcoming plans and visions, so there would be at least a clear position of what is planned or designed on the higher scale.

Also, in the newer administrative systems, the three scale agents (national, provincial and municipal) have more interrelations and interactions. Connectivity can be used to integrate the smaller institutions as well. Since there is already a slight connection between the municipality and the local communities. Therefore, this can be a bridge for the communities to join the decision–making circular system of the larger institutions by defined policies at least in a form of involvement.

8.0 Self Reflection

Contents

8.1 Chiel

This quarter was both my first taste for regional analysis and design and general teamwork. Regional design and analysis itself brought in a lot of discussion. The view you take in your analysis based on scale can change your perspective massively. As we worked from the idea of a community, we brought our perspective down fast and chose to work in a very local scale. It made us work with the idea's and values these small communities, on the scale of villages would have. In the context of this course this really brought use closer into working from one clear view, yet it also made us very distant from other areas. Our approach in our specific trio of villages on the Greatheide plateau made us so specific within our interventions that it was hard to find a way to translate these findings into a broader perspective, a challenge we did eventually accomplice but took a lot of effort. Having a laser eyed focus on one spe-cific community made us lose a sense of scalability and limit our flexibility.

I think, knowing that this issue caused problems within our design project, the ability of a regional planner to flexible and effortlessly work and switch between these scales is the most important skill to possess. As previously said the scale is im-portant for the perspective that you take, the matter of abstraction you see the world in and which actors you recognize as important. You, as an regional designer, should be the glue between the levels of actors and recognize their scale. I would call it a scale bias, but actors working on a national level often do not even consider the smaller communities we had

to research because their information is that much ab-stracted. It happened to me so many times, because at higher levels of scale you al-most get detached from the world that's lying underneath. This scale bias also hap-pened with our project. Mainly working in a smaller scale got us lost from the nation-al issues and made the project very much to focused on what this specific group wants and made us unable to work towards an integral design. More nationally pro-jected problems, such as broader economic growth or natura and water networks, where not integrated in the project. I think the most regretful part of the project that aligns with this is the loss of our focus on the broader European scale. We choose a region and community that was close to both Belgium and Germany with the intent of working towards a more integrated perspective. Yet, due to our focus on more re-gional issues that where mainly focused on the dynamics between the community, Chemelot and the Dutch government we lost focus on what their neighbours where doing and eventually did not include them in the scope of our project. I think this pro-ject was a good way of understanding the ideas of scalability, although the nature of the course made us lose this relatively fast. I think our work is still very representa-tive for the region we chose, but a better understanding of the dynamics of with both national and international conflicts and interest could have broaden the scope of the interventions and let to a more translatable strategy and vision.

8.2 Milou

In my individual reflection I would like to discuss the importance of including commu-nities' voices in a regional design process. This quarter was focused on exploring how the energy transition influences spatial development and how communities can voice their concerns in this transition process. In the power interest matrix, it is clearly stated that there are two big parties who have a lot of power in the regional design process of our region: Chemelot, a big private Industry company and the government who consist of the national, province and municipality level. The Netherlands has a top-down approach for making regional designs where the community's voice is barely heard.

Therefore, I think the strength of our project is to give empowerment to the commu-nity's voice and values while still incorporating the needs of the energy transition. During the vision making process, it became clear that in the current system of re-gional design in the Netherlands, it is hard to state the hopes and dreams of the community. We started our project with a top-down approach, did a lot of analysis on the community and on the energy transition. When we started making our vision, we got stuck. We knew who our community was and how the energy transition needed to take place, but how could we, as designers, design a vision where we decide how the values of the community and the energy elements are going to be combined? It did not feel right, so that is when we decided to take a different approach for our project and assemble a system where the community is empowered to be more involved in the regional design process.

8.3 Grant

Our project shows that it is possible to empower the community in the Dutch regional design process while still incorporate the national energy transition guidelines. In regional design it is important to not only look at the spatial implementations and vision, but also to distinguish the role of the people who needs to participate in the regional design process. We distinguished the role of the community and redesigned the participation process of the Netherlands. We took the national energy transition guidelines as a baseline in order to make our vision with the community possible. With these guidelines the community has a say on how they want these elements to be implemented in the landscape (human scale, aligned with the landscape grammar) and what they desire to have in exchange (hearts, connectors, shields etc). So, in the end, the vision is a combination where both parties are heard.

I believe that we should design for communities in this way to make a vision that peo-ple are content with and is therefore a sustainable living situation. Because why do we, or the government, have the right to decide the changes for them? It is true that we have the knowledge and sometimes we need to use this knowledge to overrule them. But in this participation system we give the community criteria to work with, so it will be a realistic vision where we can really consider their opinions.

Immense understanding at the final stages of a project is never guaranteed. Within a short period of time, roughly five to six weeks when accounting for the time it takes for a group dynamic to become comfortable with site selection, you jump from a brief analysis to a rapid vision to a fluid strategy. Developing the right vision and strategy came with hesitation. Everything that was revealed during the analysis of the region of Limburg, and the community of the villages on the edge of industry (primarily Chemelot) had pointed to a history of disenfranchisement from libertarian decision making in a top-down Dutch government. The primary focus of the project being to re-balance the scale to benefit the village landscape of Limburg from uncontrolled growth they hadn't given input on. That idea of the right vision and the right strategy had stuck out tremendously. This pressure to get everything right felt like the only pathway forward to convince ourselves that we had taken all the steps to keep the community in mind. This was a challenge that every group likely faced, but for our group, it felt like a pitfall the had only grown as we inched closer to the deadline. It went against many of our morals of decision making for those who aren't directly at the table with us.

Despite these frustrations, numerous steps were taken to replicate the methodology that hypothetically could have taken place, had the community been directly at the table. Creating multiple rough sketches of vision maps, developing meeting schedules, collaborating through digital tools such as Miro and working in small break out groups that were focused on specific aspects of the project. These conditions of consistent group work revealed and continue to reveal an interesting aspect of studying at TU Delft. When I personally found myself venting about disagreements or organizational issues, I always had to take a step back, only to realize these conflicts are a critical part of the studio. Urban design and planning are almost never solitary. In the realm of regional planning, the complexity of stakeholder demands, and internal debate only increases.

This was my first studio after taking a one-year break from my academic studies. Working on professional projects, I was able to be in nearly ultimate control over decision making. This felt entirely obvious throughout the duration of the project. At times, I took distance from the team dynamic, but never the workload itself. This was not an effective strategy. Conflict arose, and the need for more input was desired by my team members, and when I personally could have used assistance, I failed to ask in the right ways. I'm still attempting to find the ideal balance between taking time to push a piece of a project I feel a sense of ownership over, while simultaneously giving critical updates on the progress of the piece, and when to ask for help. Developing a future strategy for accomplishing a balanced community and group engagement dynamic will continue to be a personal goal moving forward.

8.4 Soroush

Spatial planning and strategy design is one of the complex tasks implemented on a regional scale. The amount of data and information needed to understand the context and the issues taking place in it are a lot and even sometimes hard to find. Making changes and trying to predict the upcoming transformations in the next 30 or 50 years is dealing with uncertainty while trying to propose solid solutions that would work out throughout the expected timeline.

The process has taken a tremendous amount of group effort as it needs numerous experts to discuss, draw the lines, propose solutions, and reflect on the procedure. Although it helps with having a better understanding of the context, it may sometimes lead to deviations. The discussion may go on and on without any solid conclusions. However, this is also part of the process itself. It is natural to have overwhelming arguments over different topics and it can be moderated by the team members themselves when needed.

Choosing transitional communities is a progressive approach towards the planning and decision-making of environmental development. As they are really involved with the implementations since they already live within that place and when it comes to implementation and constructions, the communities will witness the change, and we should know as experts if they are going to be happy with it or not. Do they even have the possibility to cry it out?

The project that we've been through mainly focused on the communities and their values even though there weren't many direct interactions with them which seems like an issue. The planning and design are done for the people, so they should know about it and be involved in it. Maybe their vision is something totally different than what was perceived. The more engagement of the people, the more public satisfaction regarding the project. Of course, it is always hard to satisfy all the stakeholders, but it is necessary that the least powerful groups could also have a share in the development, so they know that they matter, and their opinions are considered.

Not only there are hardships with the participatory processes, moderations, instructions etc. But also, it is a necessity to keep people – especially children - educated with the planning & design approaches and environmental awareness at least in a general way. Thus, there will be a basic knowledge for all of those who will be involved in or engaged with environmental projects and more. In a personal point of view, this approach will smoothen and clarify the process of decision making both for the experts and the future communities.

Speaking of practicality, the proposed strategies were mainly focused on the assumption of immediate systematic change of the legal institutions and the dramatic increase in local power might not be quite feasible. There should be more detailed political interventions in terms of legislation or proposed administrative systems followed by a strong literature review of the legal and administrative references.

8.5 Viola

As part of the strategy, we propose a change in the Dutch planning system to include community across the scales in spatial planning, as well as in modifying the system itself. We often talk about adaptability, flexibility, and affordance in our spatial designs. I believe we should also be thinking about the design process and the spatial planning system itself in these terms.

Space should allow people to use it flexibly according to their personal needs, not only in a predetermined way. To ensure resilience and longevity of a public space, we should let it co-evolve with society in ways we as designers cannot imagine. This goes for small back streets as well as whole regions. Regional planning is different from public space design in that it openly acknowledges the successive nature of space, and the innate unfinishedness of the regional development, the constant adaptation it undergoes. However, for whom exactly are we adapting the landscape? If we cannot understand the needs of everyone that will ever use "our" public space design for a backstreet, then how could we ever understand the needs of everyone who will ever use the region we (co-)design?
How shall we systematically ensure the regional plan allows for flexibility in adaptation to the actual user's needs? Users are, on the scale of regional design, individuals, as well as communities and the society. I believe the answer is to include communities in the spatial design system, as a foundation for the making of regional plans.

If community is to have agency within the system and the design process, we must adapt the system in a way that includes their local knowledge at the core of the design. A plan not built on local knowledge will not be legible to the local community, might be worse accepted, and cannot adapt to local conditions. For this reason, we propose the compatibility matrix.

It should act as a tool to structure the conversation about local knowledge of landscape, without controlling it too much. More research and testing needs to be done about which general typologies to use. If they are chosen or formulated wrong, the community's values could, unnoticed, become tinted by the biases of us, the designers. This is for me a key problematic, that also plays out in our project – how to lead the collaborative designing, and act as a moderator and a designer at the same time. Bringing in the valued design expertise, but being able to also question one's own approach and to include the voices of diverse collaborators, all while keeping in mind the ethics of all the opinions and decisions made.

Let's conclude with taking an outsider look on the spatial planning system itself. If the community should be able to adapt the landscape through the design process, shouldn't they also be able to adapt the design process through changing the system in which it is positioned? The collaborative design processes that are produced by the system should also adapt to the changing needs of the society, and we as designers can only have a limited say about how: we can only imagine a limited number of possibilities, and we can never see the world truly through the eyes of all the users of the space or system we are designing.

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Map layers, GQIS layers

BRP Gewasparcelen (Farm Plots) https://www.pdok.nl/introductie/-/article/basisregistratie-gewaspercelen-brp-

Luchtfoto 2024 Ortho 25cm RGB (Aerial Photos) https://service.pdok.nl/hwh/luchtfotorgb/wms/v1_0?request=GetCapabilities

ECONOMIE BEDRIJVIGHEID (Industrual Plots) https://portal.prvlimburg.nl/geodata/ECONOMIE_BEDRIJVIGHEID/wfs

Wijkenbuurten 2023 (Neighborhood Demographics) https://service.pdok.nl/cbs/wijkenbuurten/2023/wfs/
v1_0?request=GetCapabilities&service=WFS

Risk Map:

BAG (Basisregistratie Adressen en Gebouwen) https://www.pdok.nl/introductie/-/article/basisregistratie-adressen-en-gebouwen-ba-1

ECONOMIE BEDRIJVIGHEID (Industrual Plots) https://portal.prvlimburg.nl/geodata/ECONOMIE_BEDRIJVIGHEID/wfs

Delta Rhine Corridor https://services-eu1.arcgis.com/CS1q1cgjgJulc7n9/arcgis/rest/services/Delta_Rhine_Corridor/FeatureServer/1

mgr_tot_2020_07122022 (Risk of Industrial Disaster)

https://data.rivm.nl/geo/alo/
ows?service=WMS&version=1.3.0&request=GetLegendGraphic&format=image%2Fpng&width=20&height=20&layer=mgr_tot_2020_07122022

OSM Energy Infrastructure https://download.geofabrik.de/europe/netherlands.html

OSM Railroads https://download.geofabrik.de/europe/netherlands.html

OSM Roads https://download.geofabrik.de/europe/netherlands.html

PR Contours and Safery Distances (Pipelines) https://rev-portaal.nl/geoserver/wfs' url='https://rev-portaal.nl/geoserver/
wfs?request=GetCapabilities

Waterbodies https://service.pdok.nl/kadaster/hy/wms/v1_0?request=GetCapabilities

Social Pressures:

ECONOMIE BEDRIJVIGHEID (Industrual Plots) https://portal.prvlimburg.nl/geodata/ECONOMIE_BEDRIJVIGHEID/wfs

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Beekdal (Stream Beds) https://portal.prvlimburg.nl/geodata/PROVINCIALE_BELEIDSPLANNEN/wfs?request=getcapabilities

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p.13
Figure 1.9 Community and the landscape of the Graetheide Plateau
Old person walking
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