# Regenerative energy

Just economy transition from a socio-economic perspective for Groningen

Rik Ebbers
1st mentor: Marcin Dabrowski
2nd mentor: Ulf Hackauf
Delegate: Angela Rout
P5 presentation / Designing Complex Cities / June 2024

# Regenerative energy

Energy transition

# Regenerative energy

*"Regeneration is the process of regenerating—renewing or restoring something, especially after it has been damaged or lost."*

> Renewing and improving the energy system
> Restoring the natural system

Dictionary.com | Meanings & Definitions of English Words. (2024, June 16). Dictionary.Com. https://www.dictionary.com/browse/regeneration

# Regenerative energy

*"Regeneration is the process of regenerating—renewing or restoring something, especially after it has been damaged or lost."*

> Renewed energy among the local population

Dictionary.com | Meanings & Definitions of English Words. (2024, June 16). Dictionary.Com. https://www.dictionary.com/browse/regeneration

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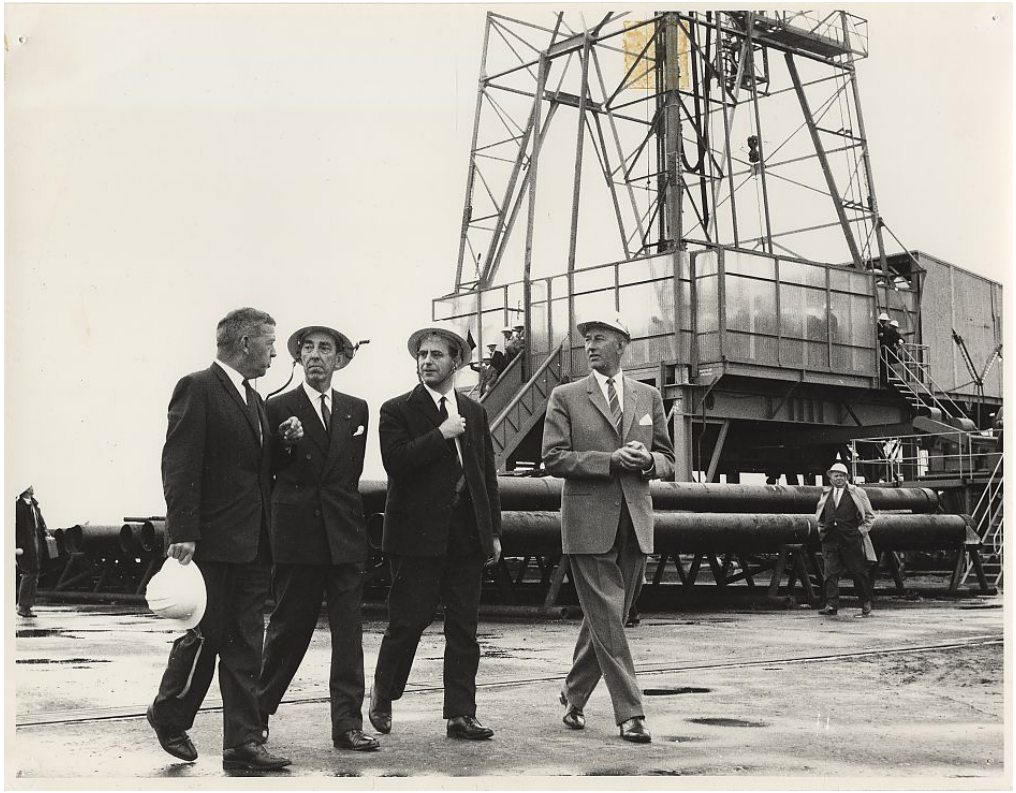
# Problem field: fossil fuels





## Finite

Minister de Pous (second from right) visits a NAM drilling site, 1962-1963. - Photo courtesy of Piet Boonstra, Groninger Archives

# Problem field: fossil fuels

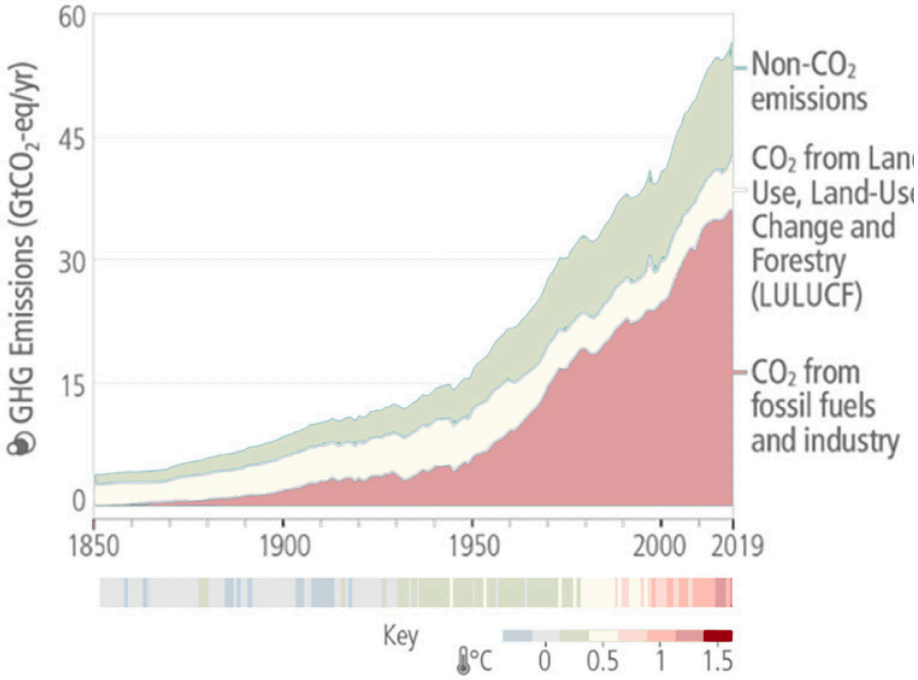



Geo political

Dependent on Russian gas. Source: El País (2022)

# Problem field: fossil fuels



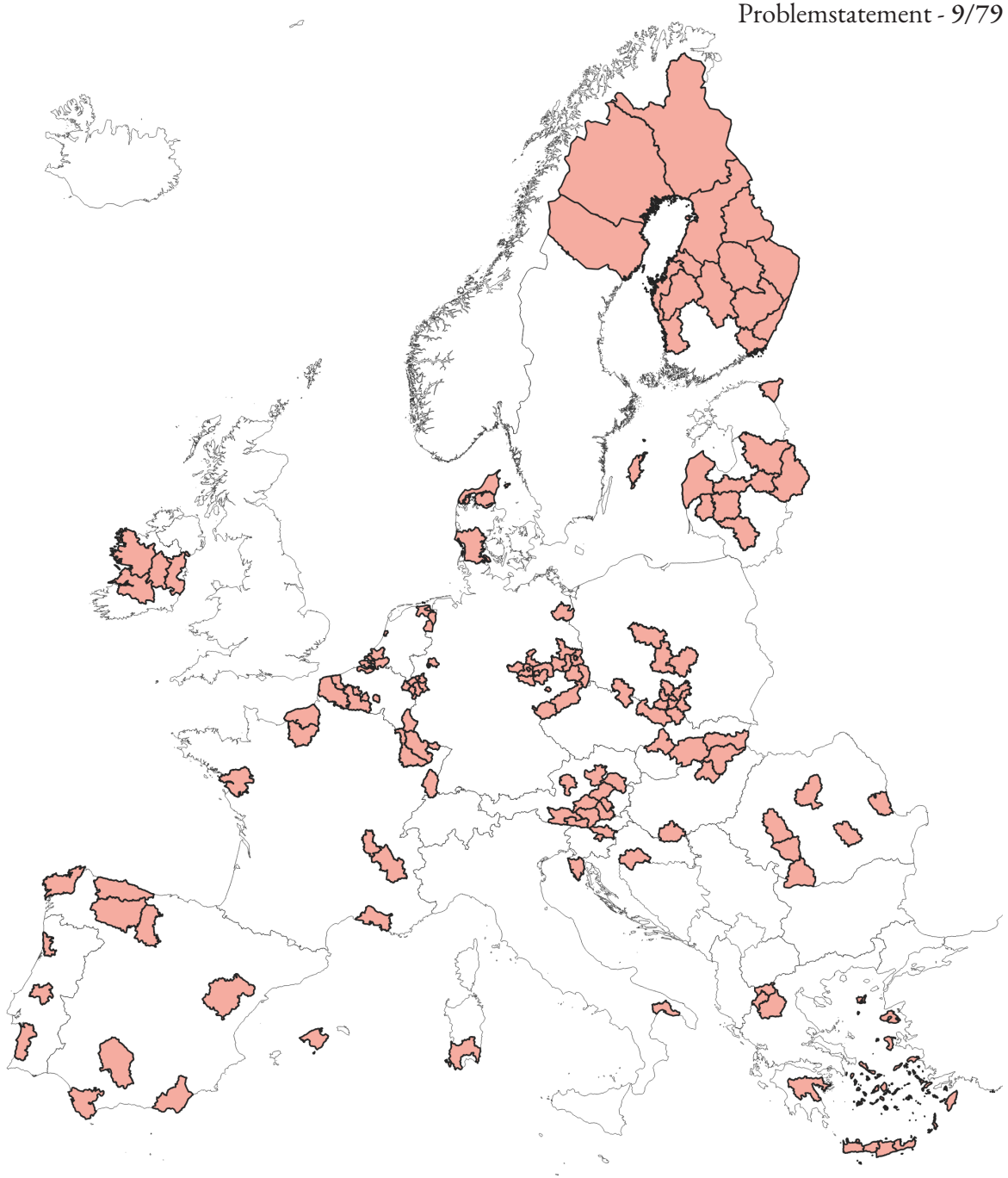



Climate change

Greenhouse gas emissions resulting from human activities continue to increase, source: IPCC 2023 (adapted)

# Problem field

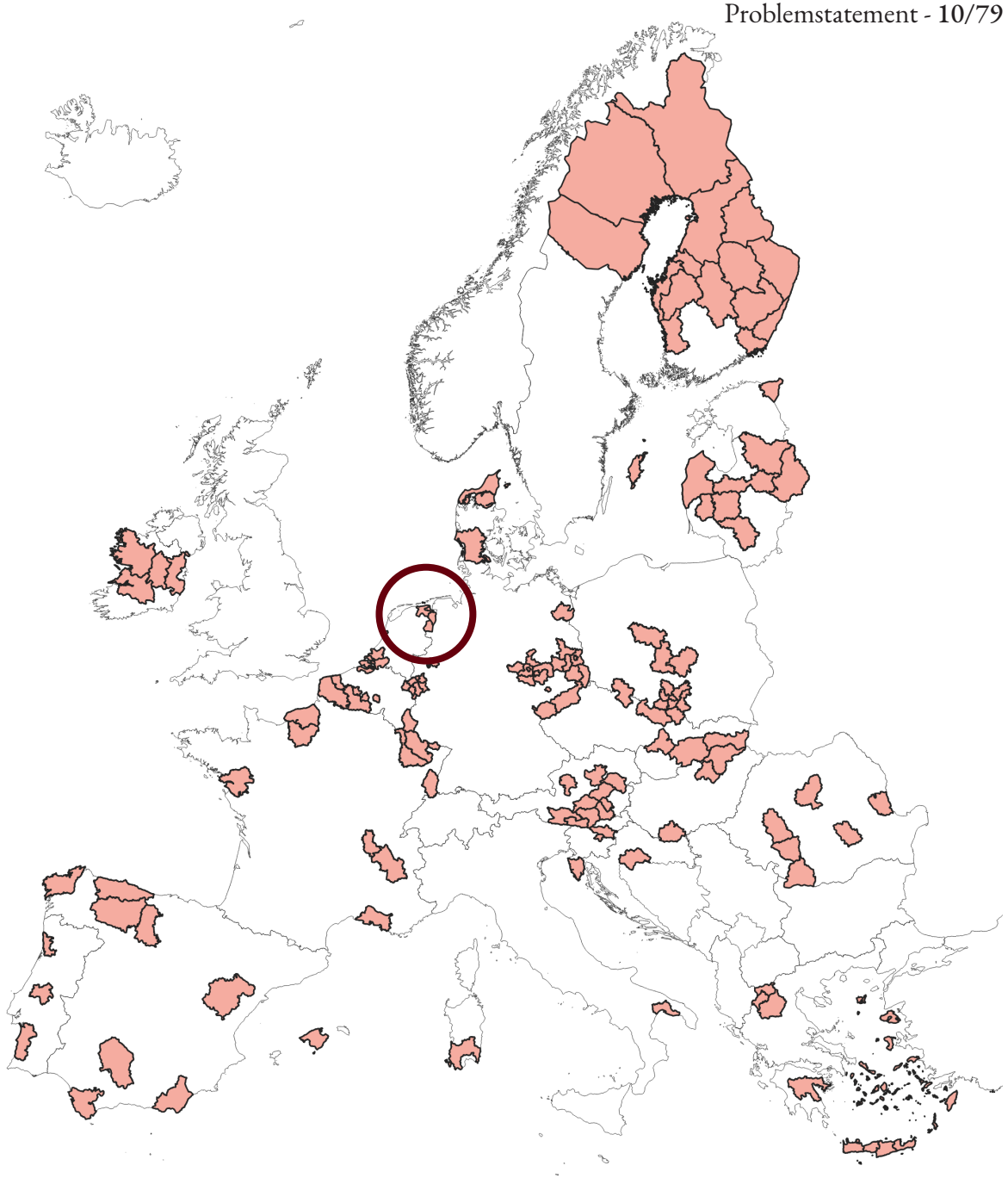
Vulnerable regions in Europe



# Problem field

Vulnerable regions in Europe

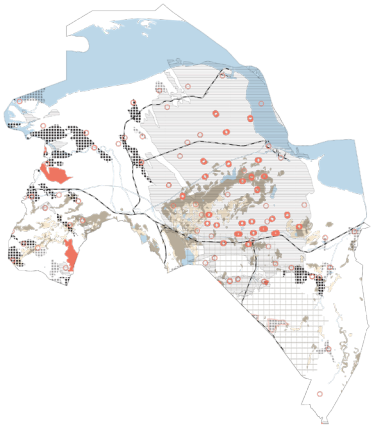
Groningen is the most vulnerable region in the Netherlands



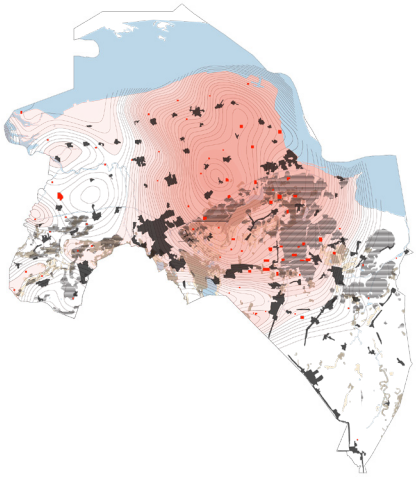
# Introduction to the problem statement



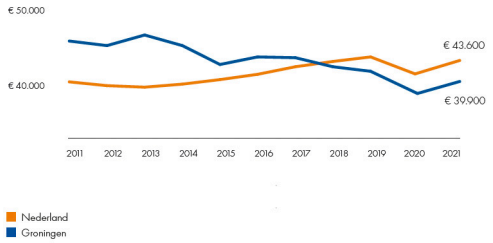
## Phase-out of fossil fuels



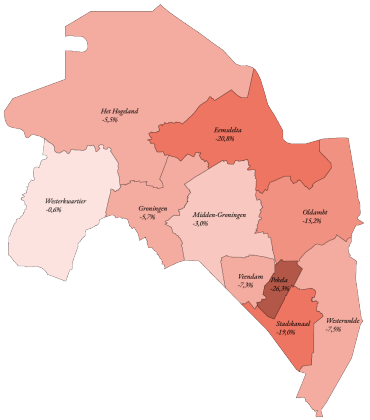
## Consequences of gas extraction



## Economic challenges

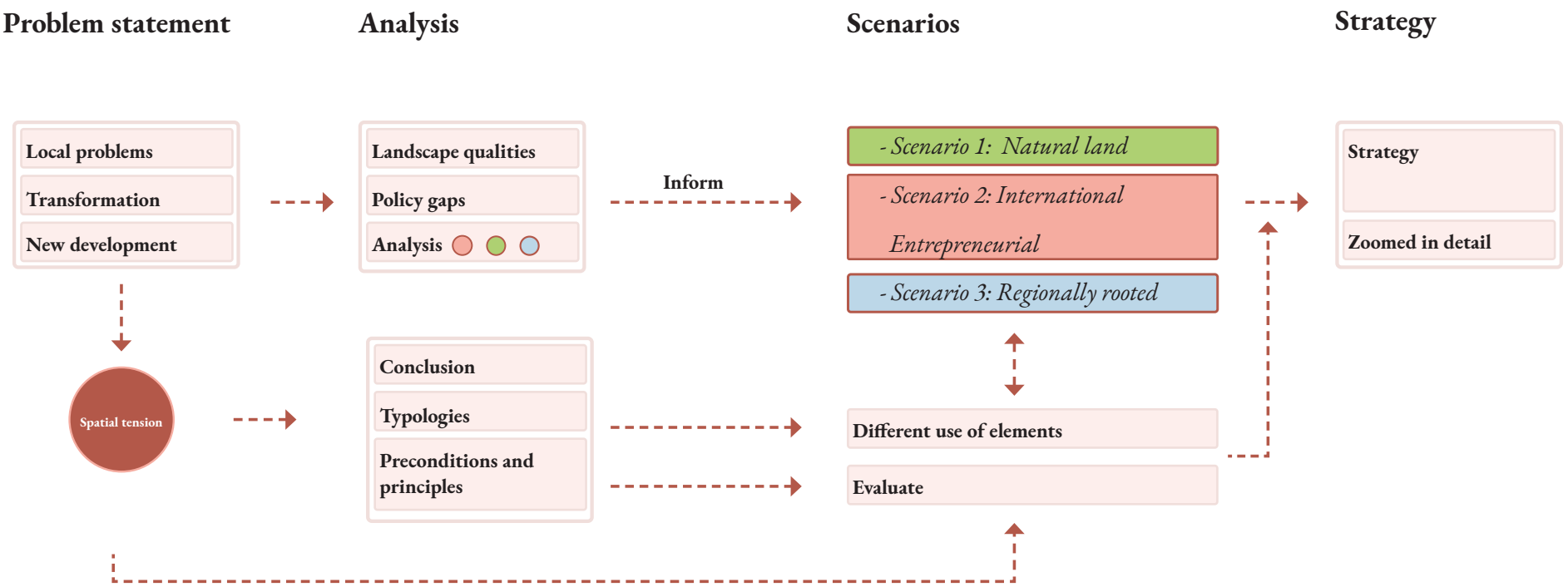



## Social problems



# Problem statement





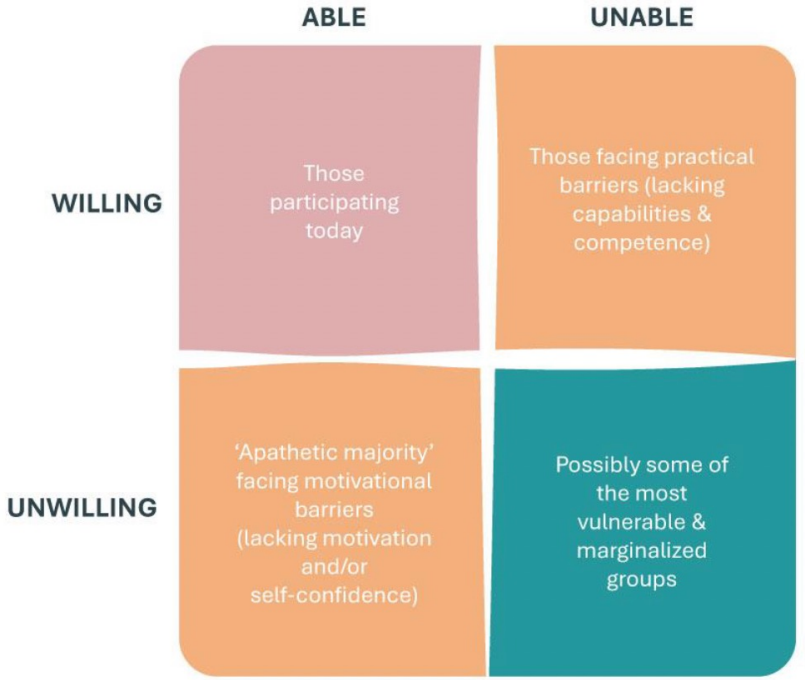
## Main question:

How can Groningen, a region vulnerable to the energy transition, facilitate a just energy transition strategy that combines spatial planning, heritage, and the inclusion of the least engaged groups?

# Index

# Social justice

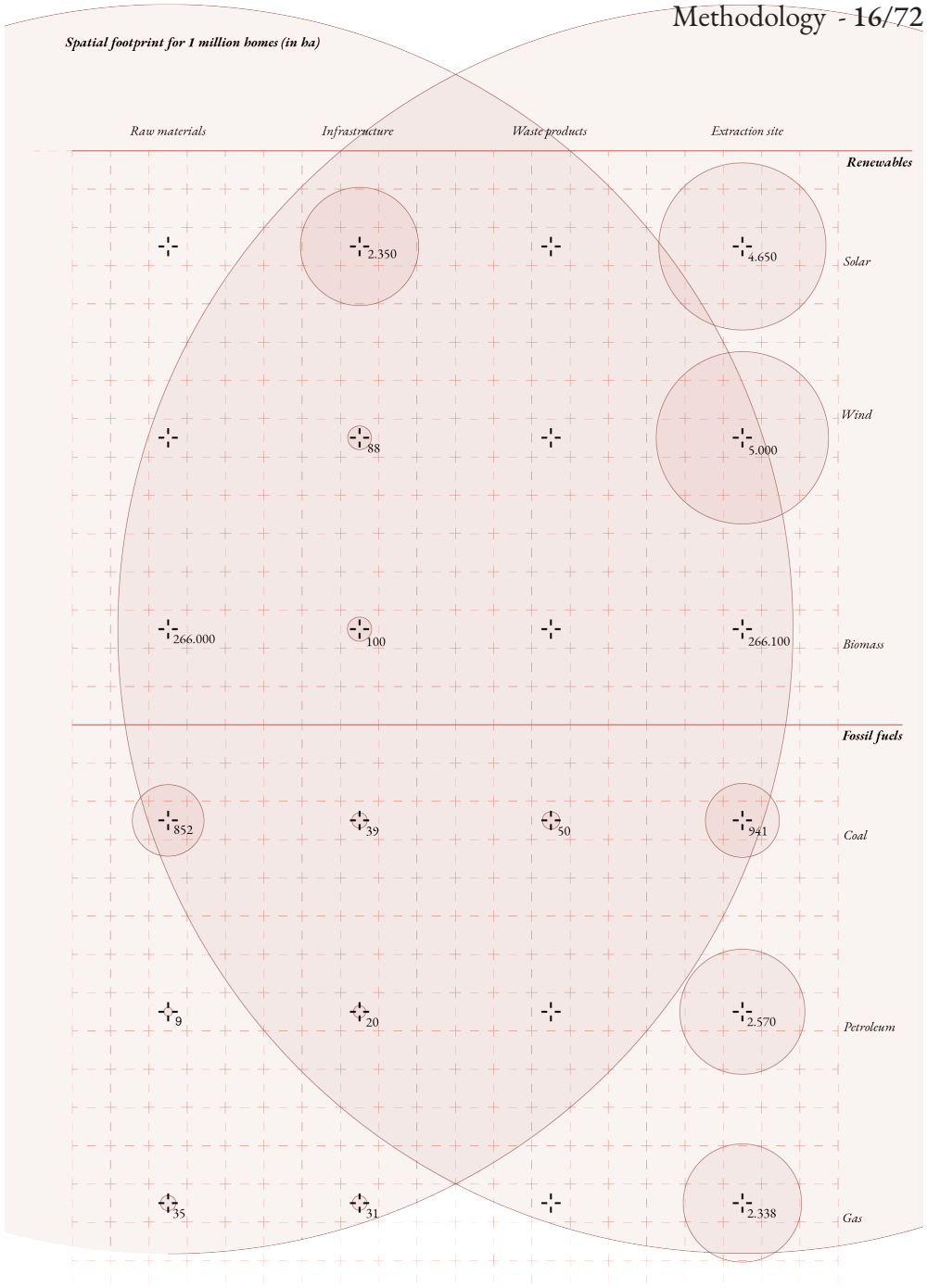
> Inform local communities
> Involve local comunities
> Involve marginalized groups > that are often heavy impacted but do not participate.




Analytical framework for distinguishing least engaged communities, source: (Verena Balz et al., 2023 p.36)

# The energy transition is spatial

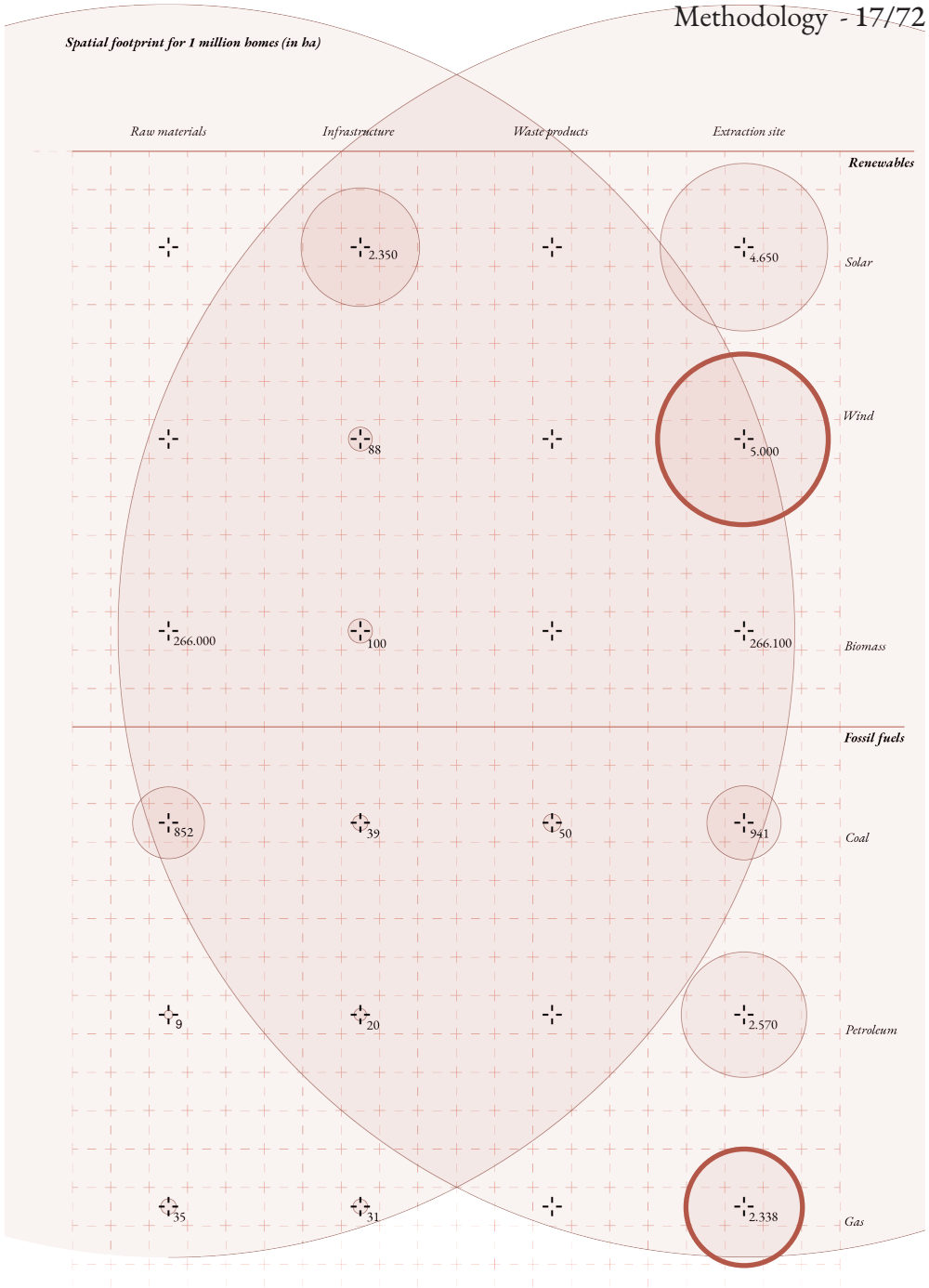
> Renewables need more space




Sijmons, D. (2014). Landscape and Energy, Designing Transition.

# The energy transition is spatial

> Renewables need more space



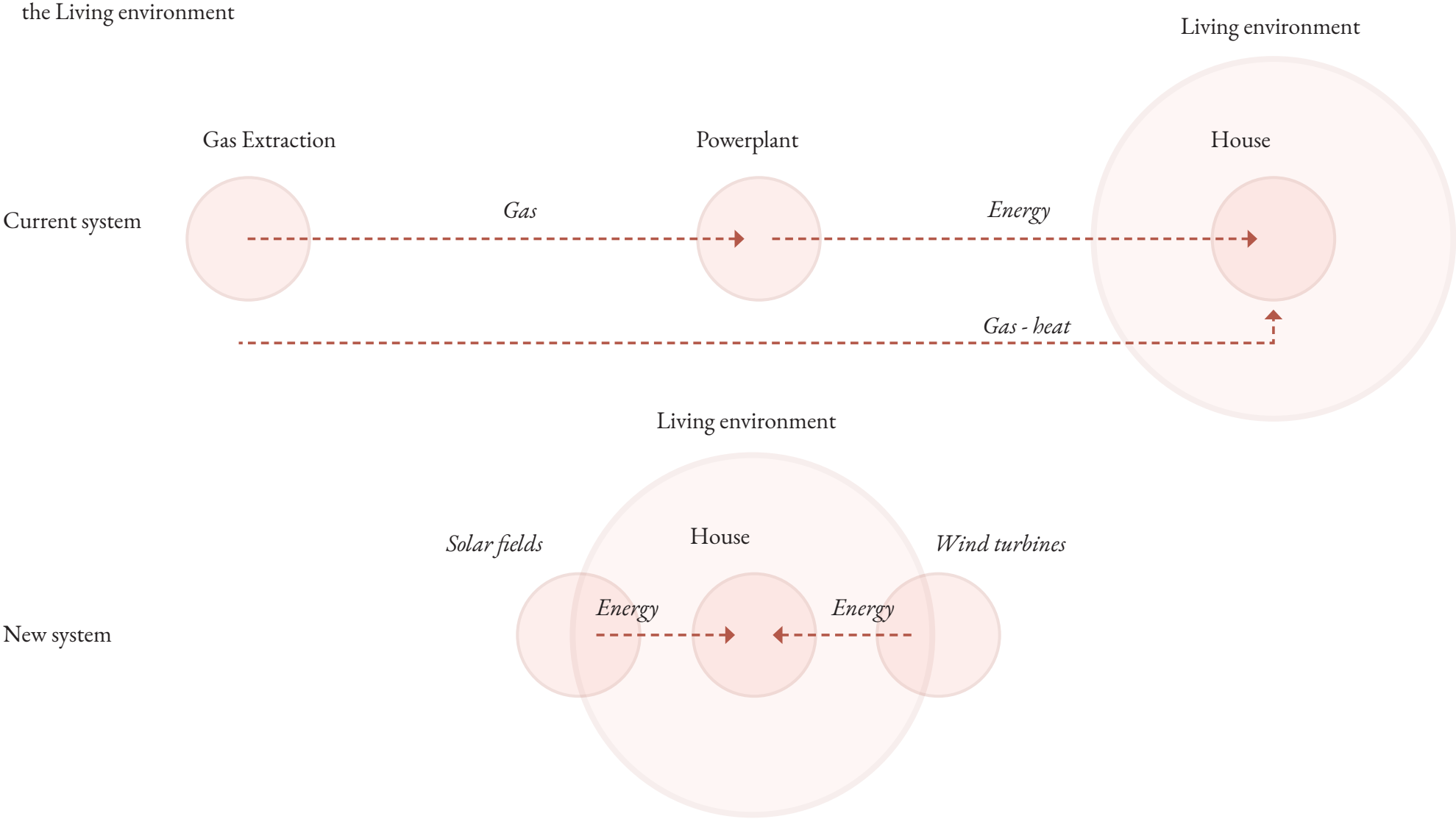

Sijmons, D. (2014). Landscape and Energy, Designing Transition.

# The energy transition is spatial



> Renewables need more space

> Renewables are more visable and have an impact on the Living environment



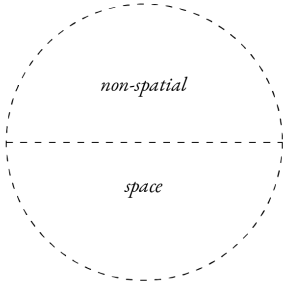
# Conceptual framework

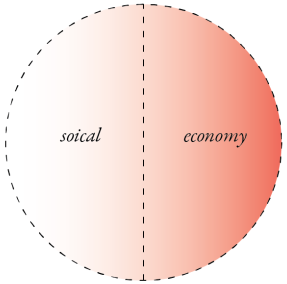


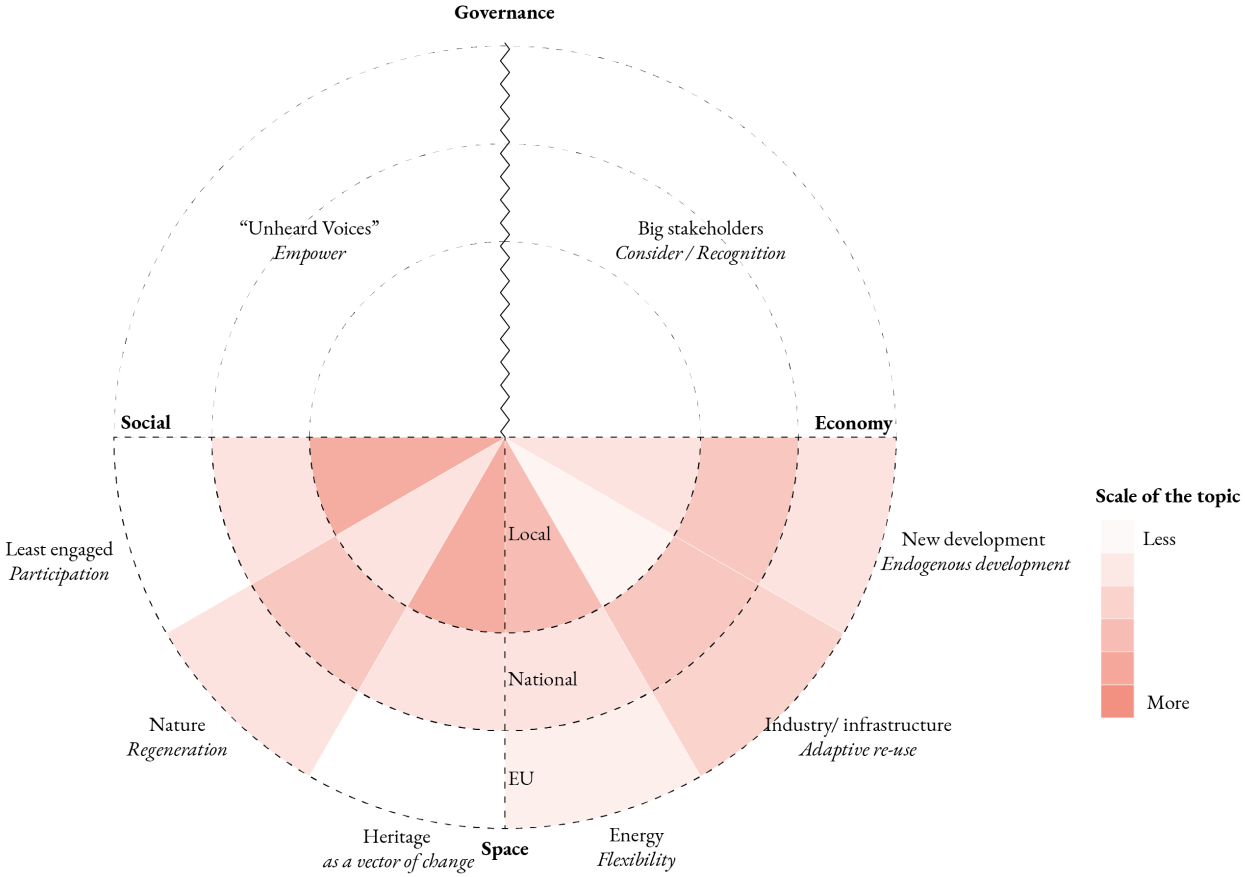
Create more balanced governance

Empower "local communities"
- with a focus "Unheard voices"

- New energy economy



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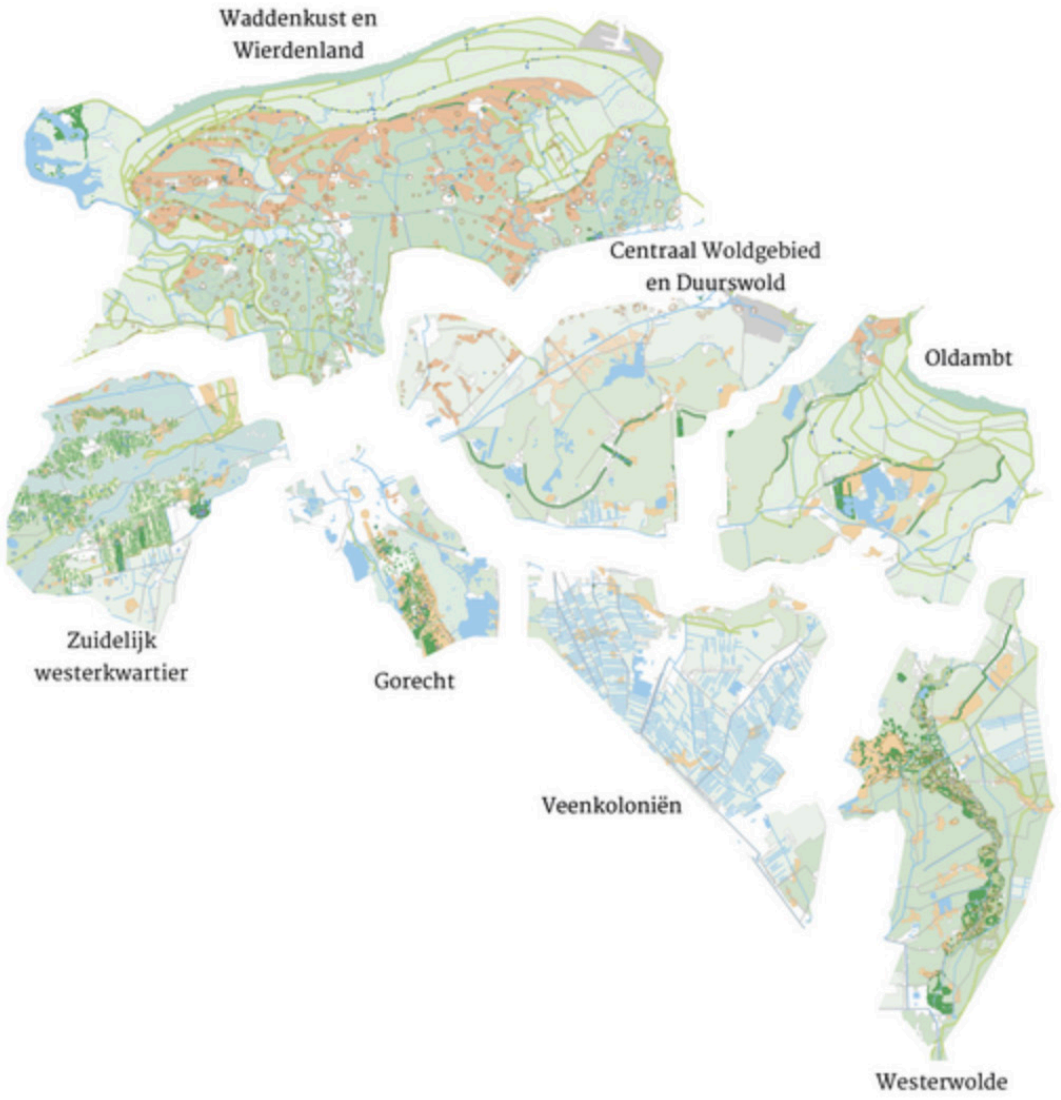
# The landscape of Groningen

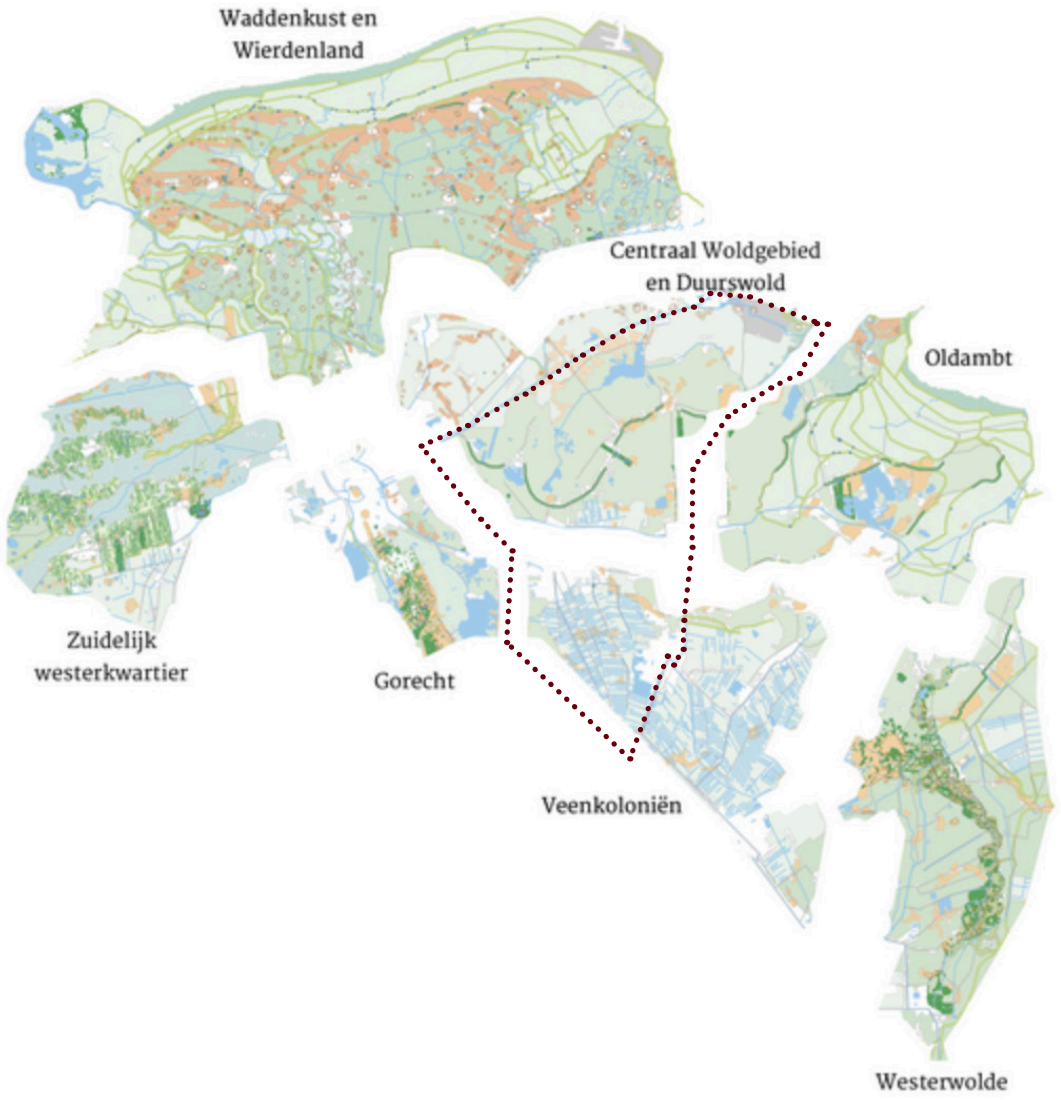





Provincie Groningen, H+N+S Landschapsarchitecten, & Stichting Libau. (2023, p.65). Startnotitie Gebiedsplan Groningen—Transitie landelijk gebied. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.provinciegroningen.nl/fileadmin/user_upload/Documenten/Dossiers/Stikstof/Startnotitie_Gebiedsplan_Groningen_Transitie_Landelijk_Gebied.pdf

# The landscape of Groningen






Provincie Groningen, H+N+S Landschapsarchitecten, & Stichting Libau. (2023, p.65). Startnotitie Gebiedsplan Groningen—Transitie landelijk gebied. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.provinciegroningen.nl/fileadmin/user_upload/Documenten/Dossiers/Stikstof/Startnotitie_Gebiedsplan_Groningen_Transitie_Landelijk_Gebied.pdf

# The central Woldsarea



Eemskanaal

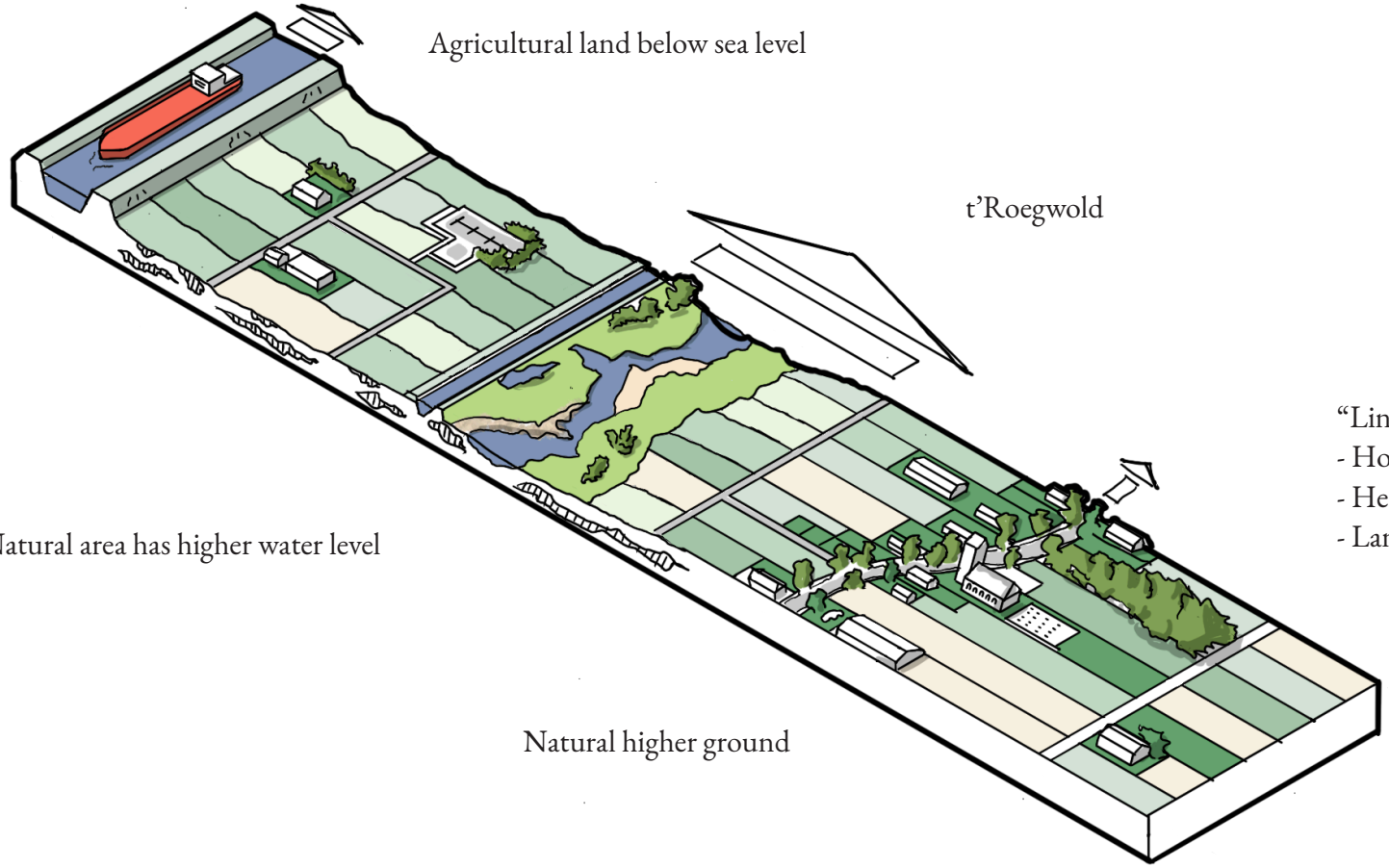
Agricultural land below sea level

t'Roegwold

Peat in underground

"Lint" villages
- Houses, farms
- Heavy tree planting
- Landmarks (like church)

Natural area has higher water level

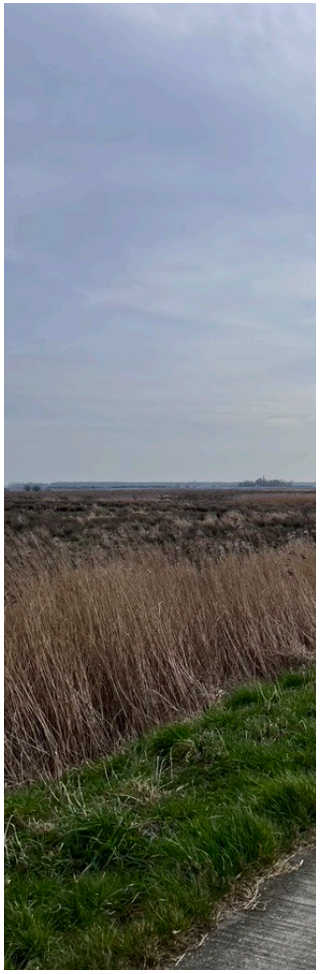


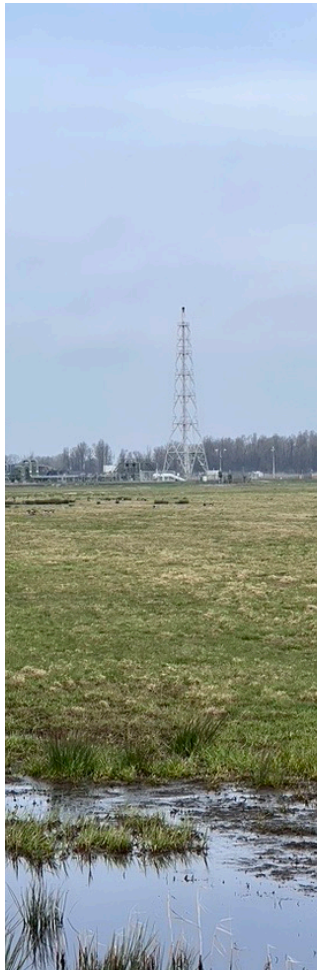
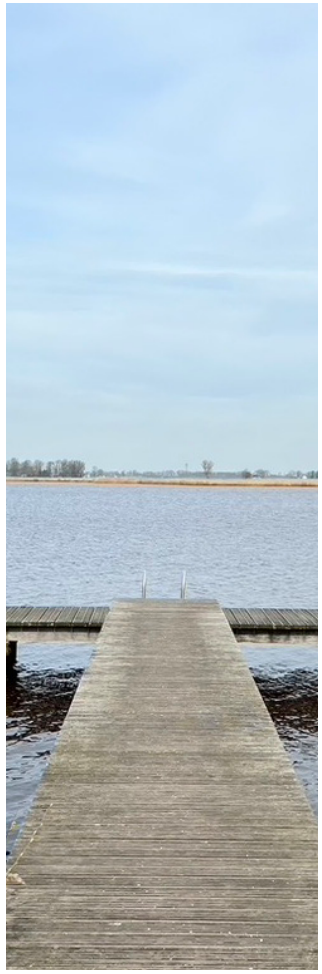
Natural higher ground

Open vs closed landscape

# Landscape qualities: open landscape



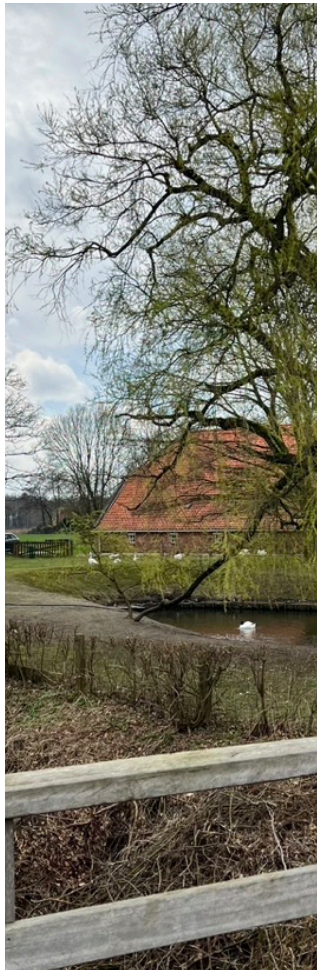




Photos by author

# Landscape qualities








Photos by author

# The Veenkolonien



Eemskanaal

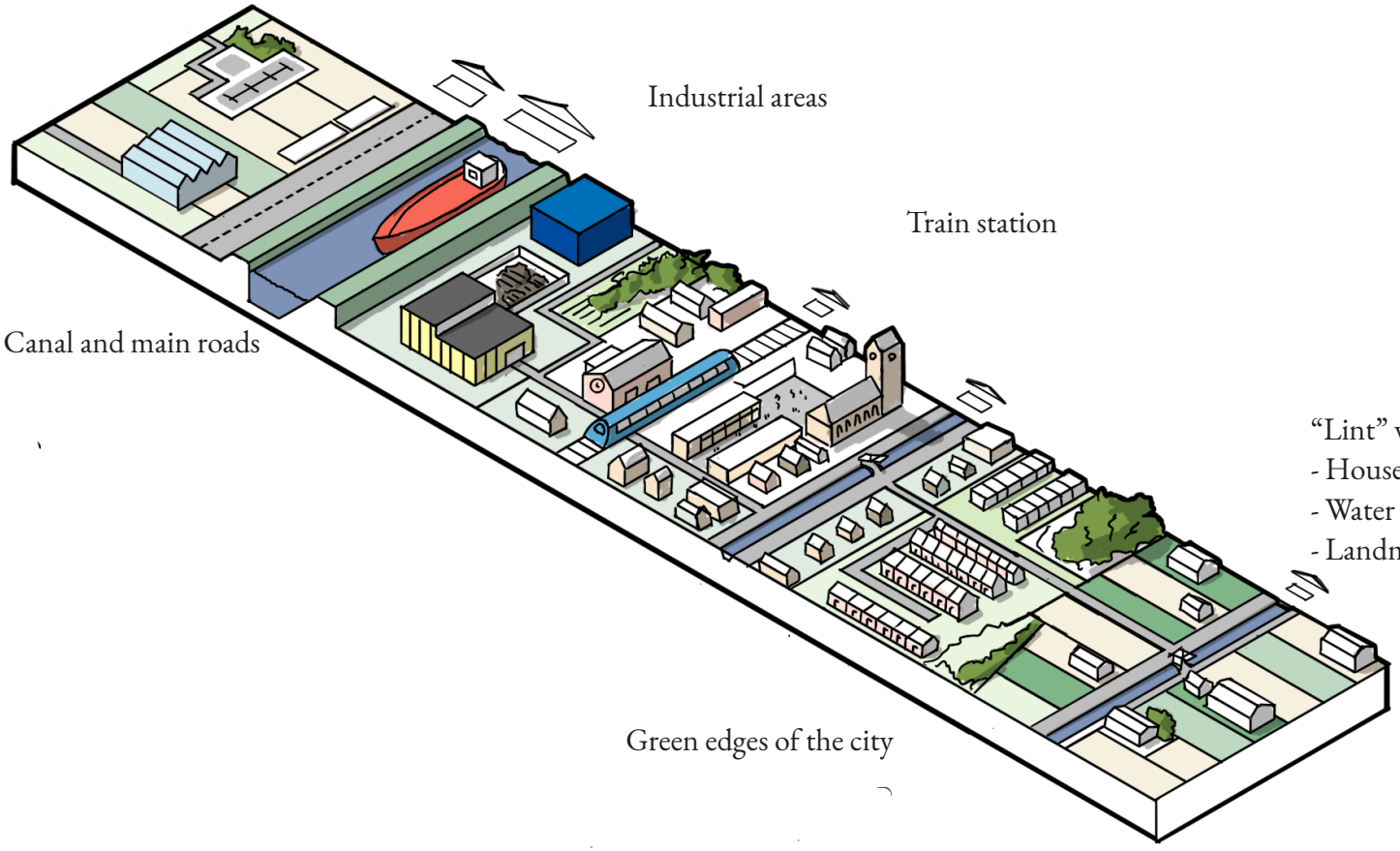
Industrial areas

Agricultural land

Train station

Canal and main roads

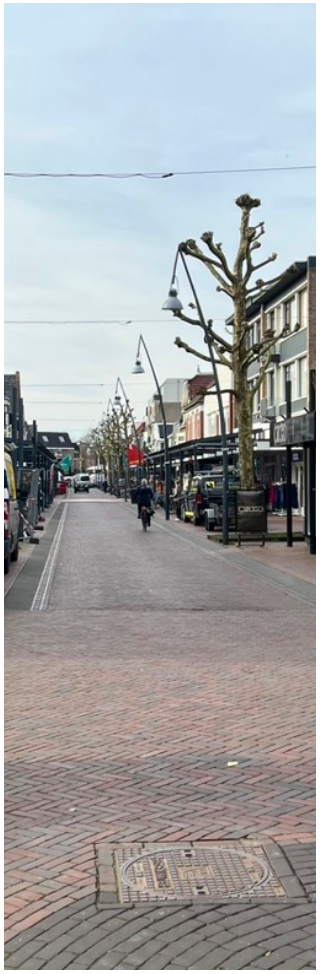
"Lint" villages
- Houses, farms
- Water
- Landmarks (like church)

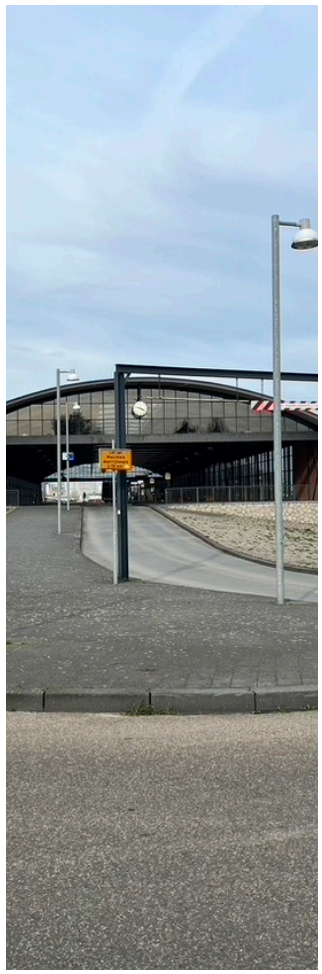


Green edges of the city

# Landscape qualities: urban area



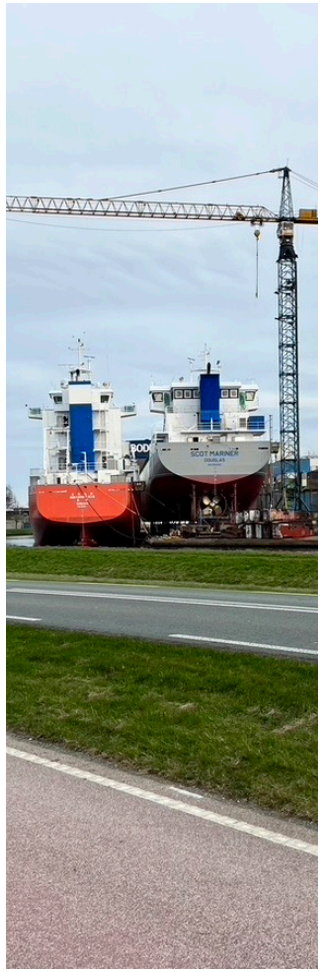
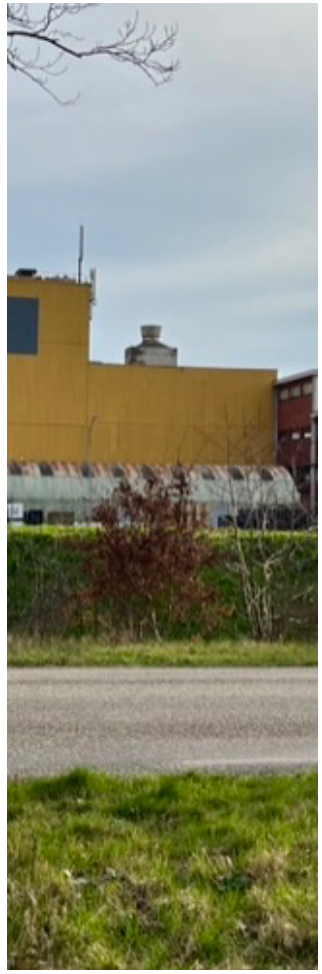




Photos by author

# Landscape qualities: industry



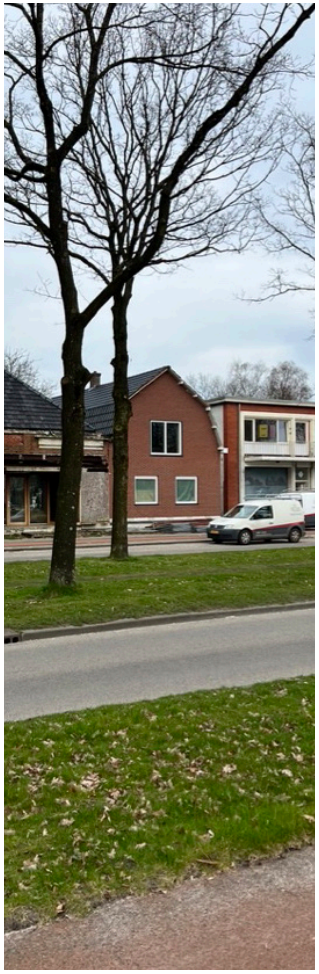
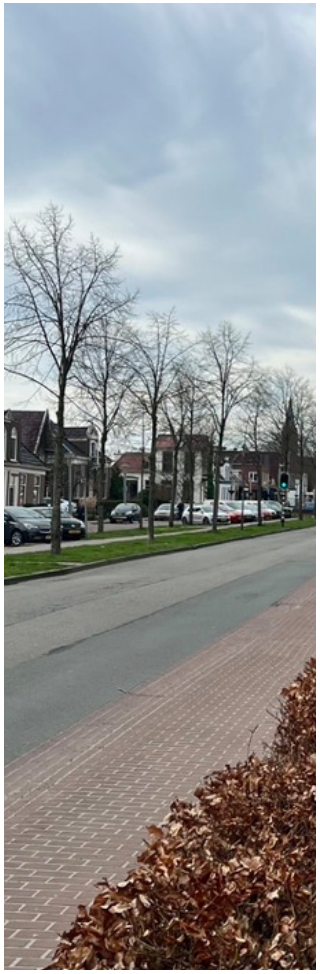
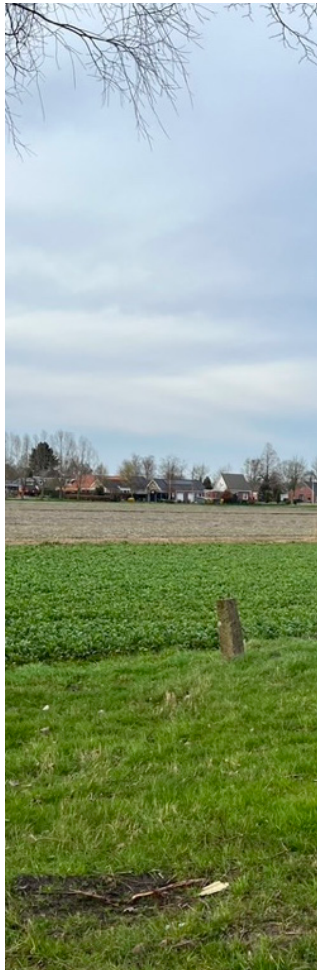
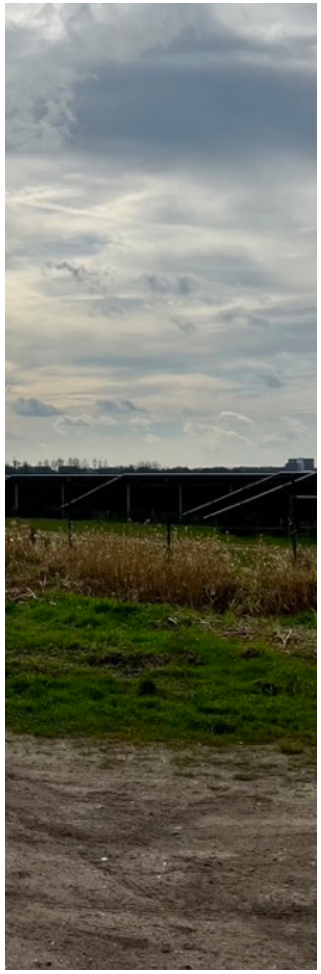
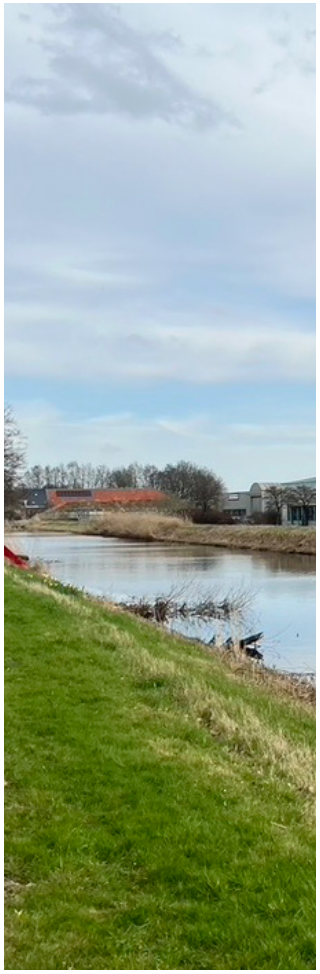


Photos by author

# Landscape qualities




Photos by author

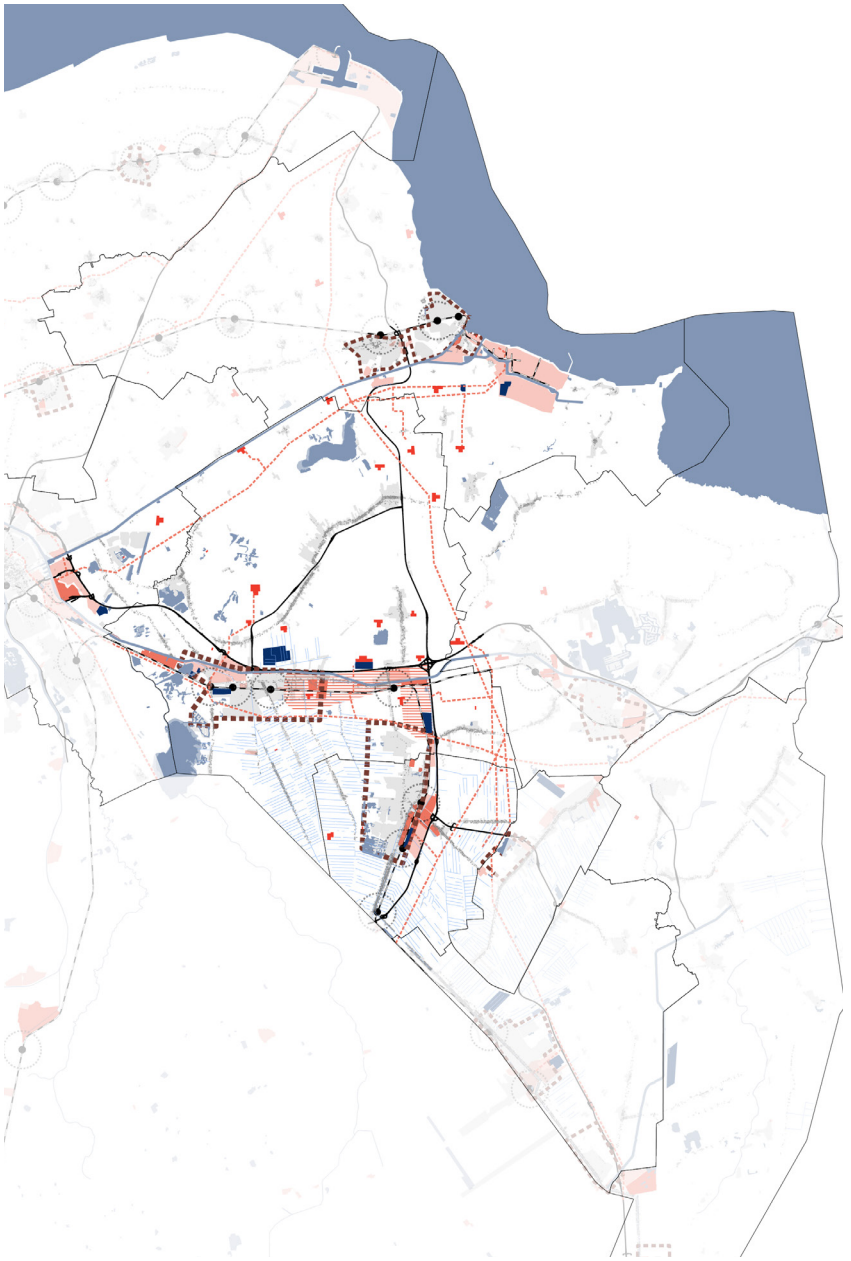
# Strength / opportunities



**Ambition: New energy economy**

> Good energy infrastructure
> Gas extraction sites (NAM locations)
> Space for the placement of renewables
> Expertise

**Area is well connected (infrastructure)**



# Weaknesess / treaths



**Rural area**

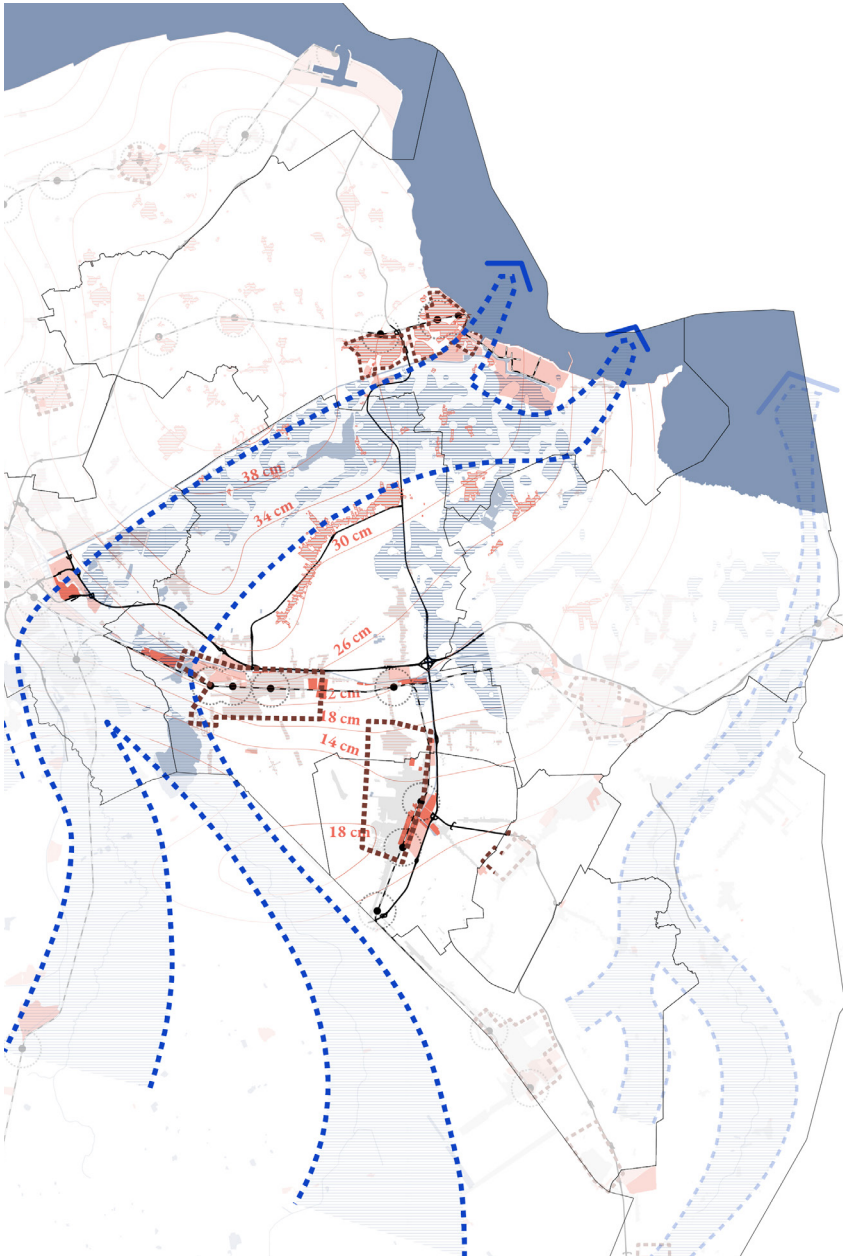
> Groundsubsidence (peat + extraction)
> C02 oxidation peat areas

> Need for more waterstorage (nature, agriculture and industry)
> Water from the IJsselmeer cannot be guaranteed in the future during dry periods

> Land-use transformation is needed (local economic activities are under pressure)

**Ecomic zone**

> Old industrial terrains
> Quality of living environment under pressure
> Shrinkage



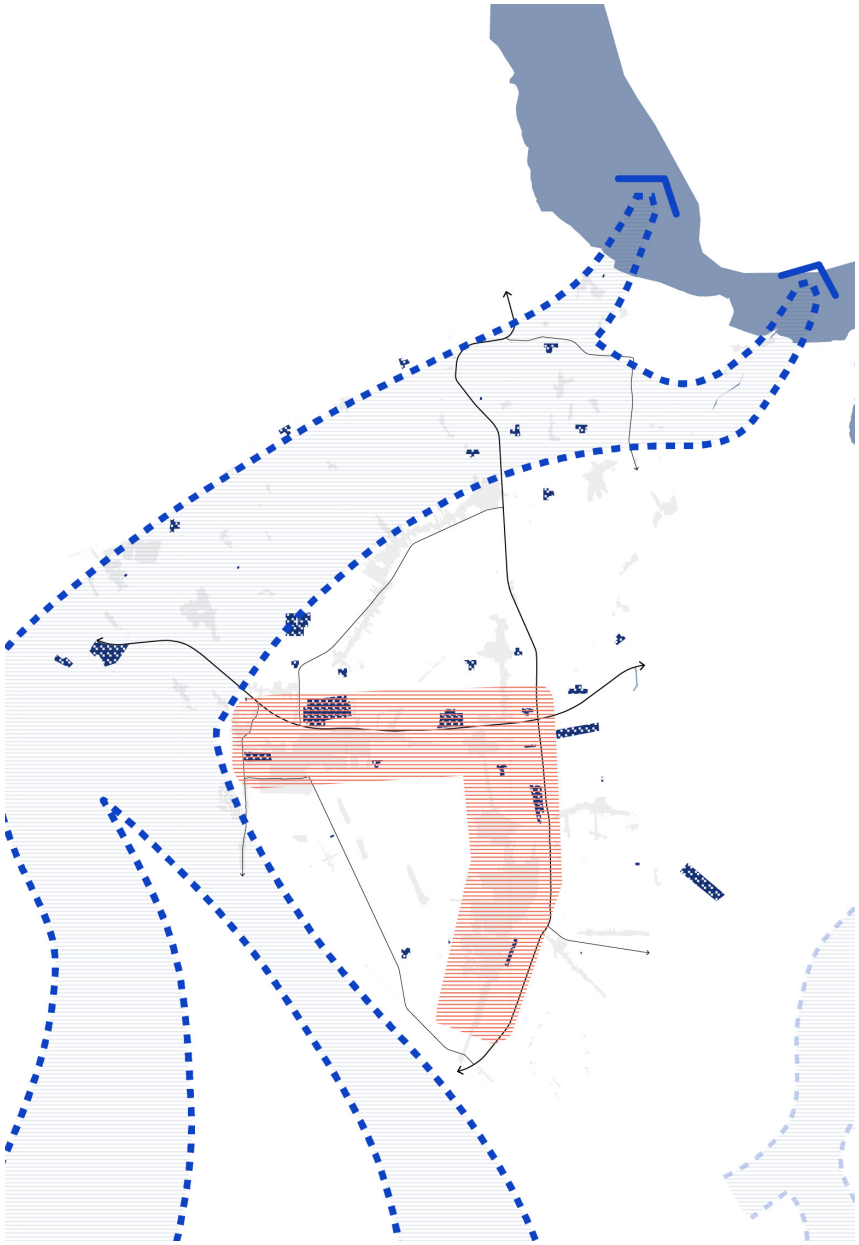
**Energy transition**

> Placement of the renewables

> Re-use of current infrastructure and NAM locations

1. development of a natural / agricultural land

2. development of an urban / economical zone



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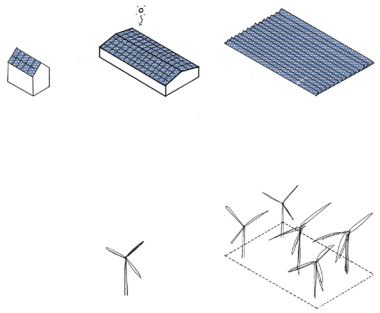
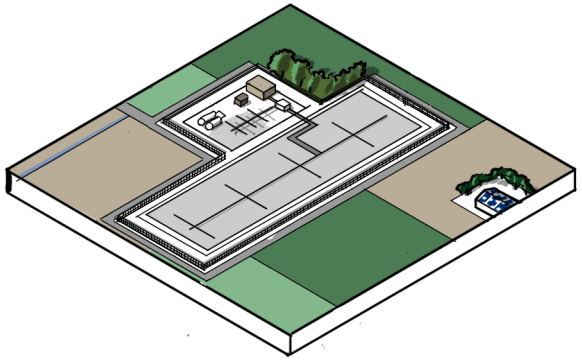
# Typologies



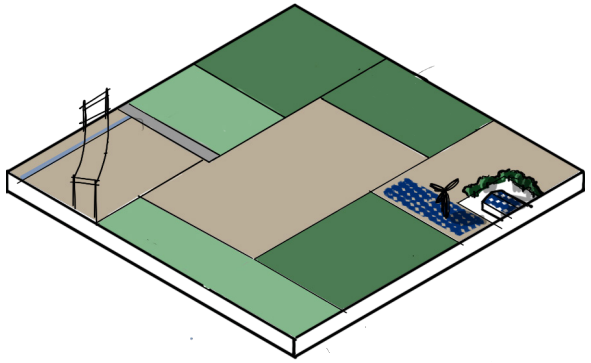
## Renewable energy



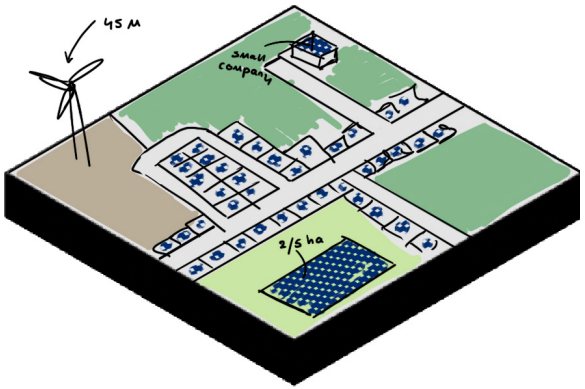
## The NAM location



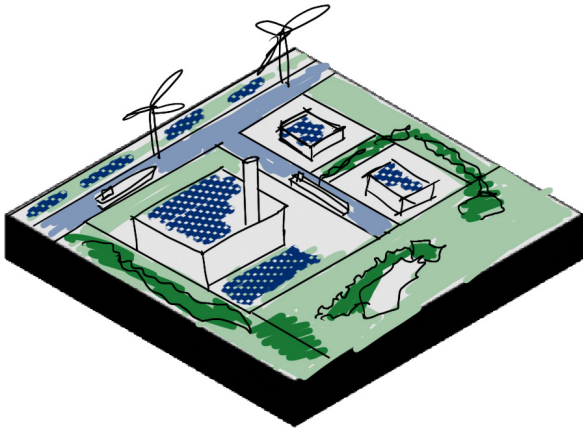
## CO2 oxidation areas



## Urban areas




## Industrial areas



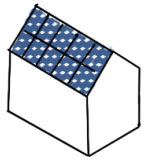
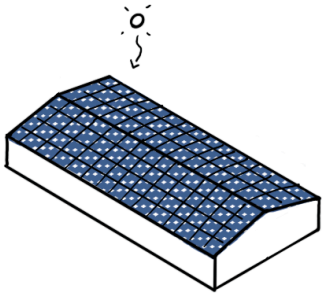
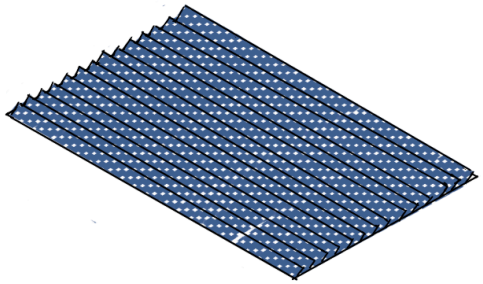
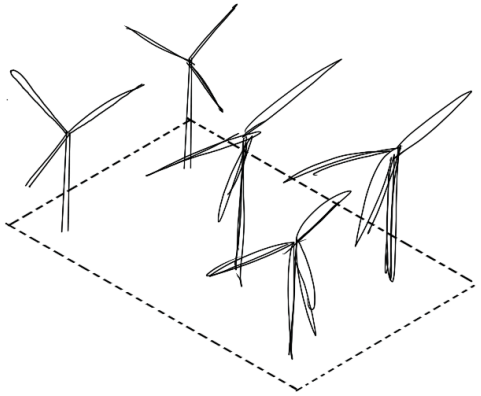
# Placement of the renewables



**Wind turbines**
> concentrated production areas
> Restrictions (sound, safety)

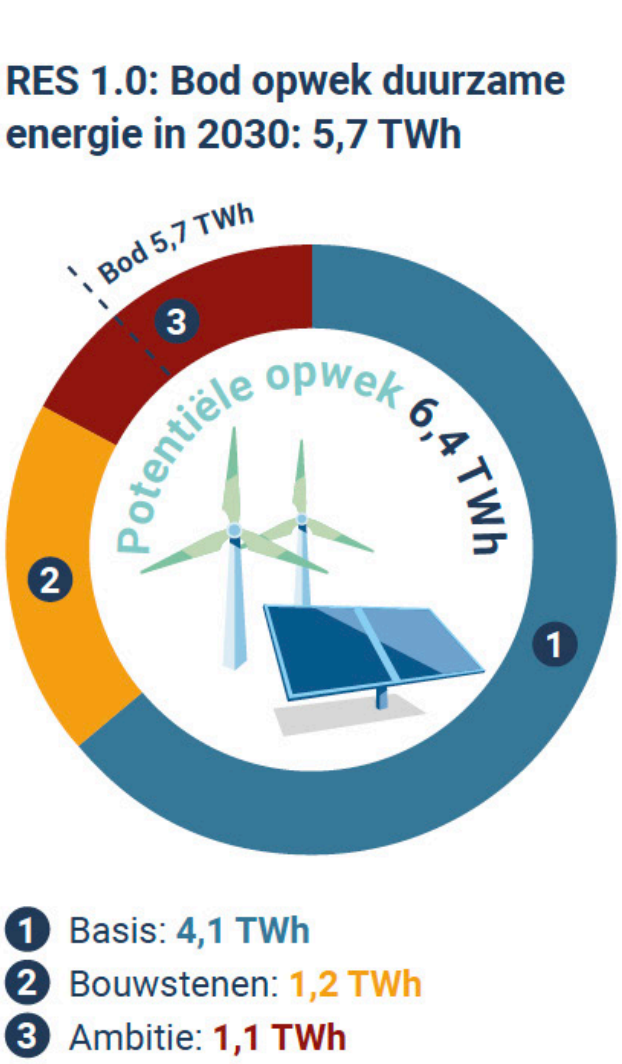
**Solar panels**
> Less restrictions

Groningen and midden-Groningen still need to prodcuce the most energy and have the CO2 emitting areas

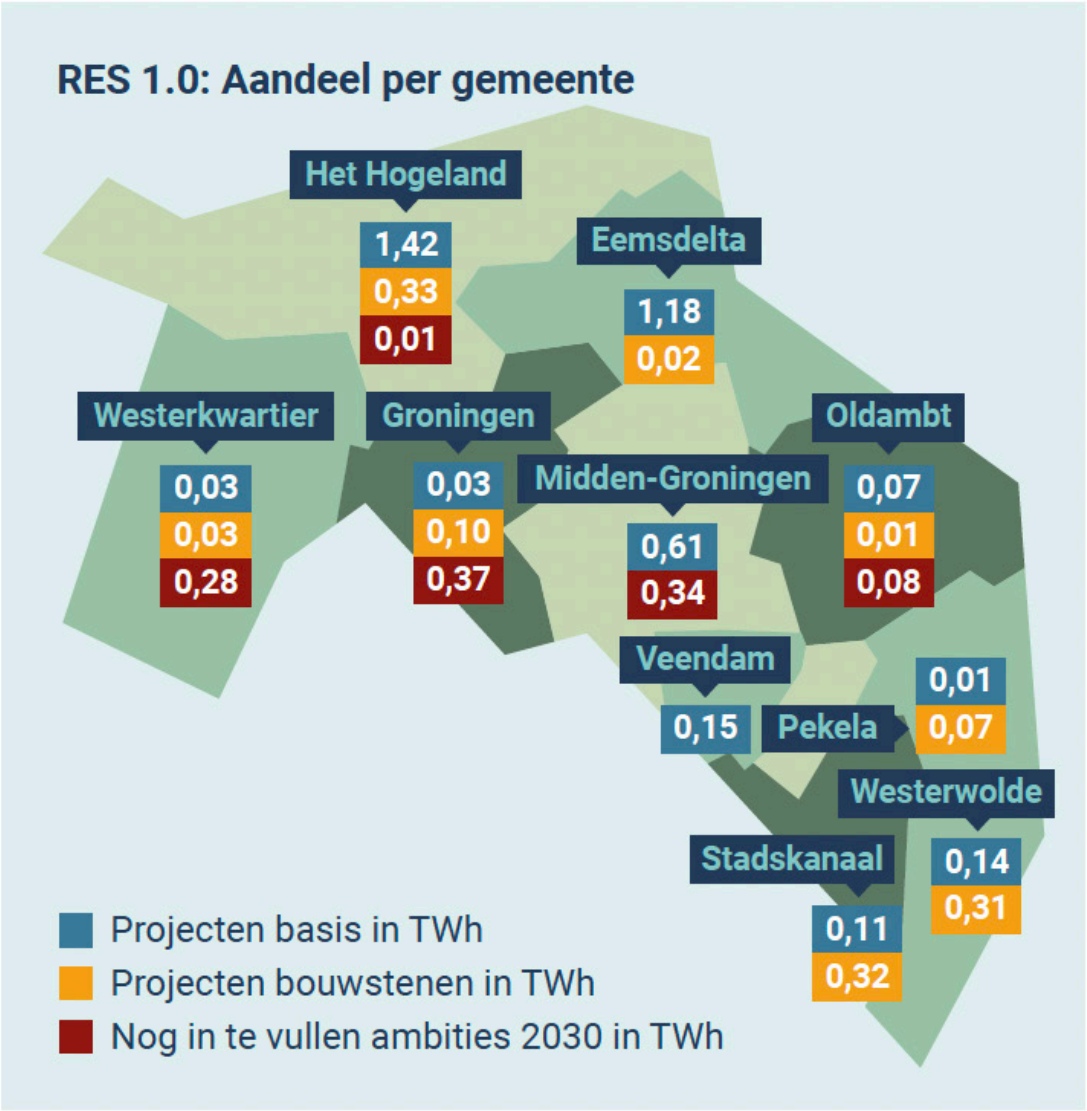
| Small scale | Medium scale | Large scale |
|---|---|---|
|  |  |  |
| not part of RES | Large roofs <2 ha | large fields > 2 ha |
|  |  | |
| Small windmills alone | Large windparks, always in groups | |

# Placement of the renewables






Figuur 1.1




Figuur 1.2

# What is 1 TWh?



**wind turbine**

> 5,6 MW wind turbines 50 - 65
> 3 MW wind turbines 110-130

**Solar parks**

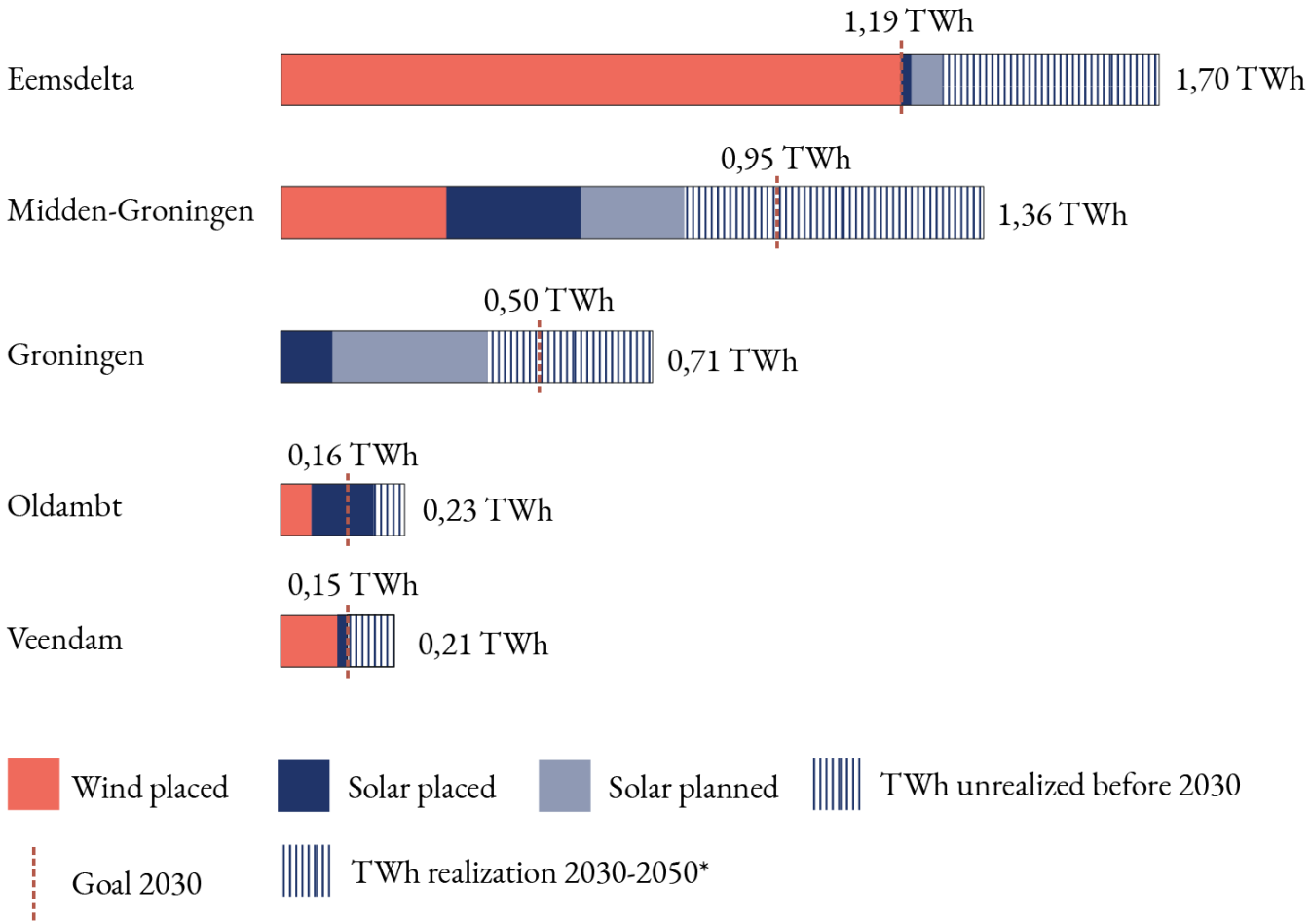
> 1100-1500 ha
> 350.000 houses with solar roofs

**Heat x amount of houses:**

> A++ 320.000 houses
> A 100.000 houses
> G 50.000 houses

# RES ambitions






**The realization for 2030-2050 is calculated bu the Author based on an asumption*

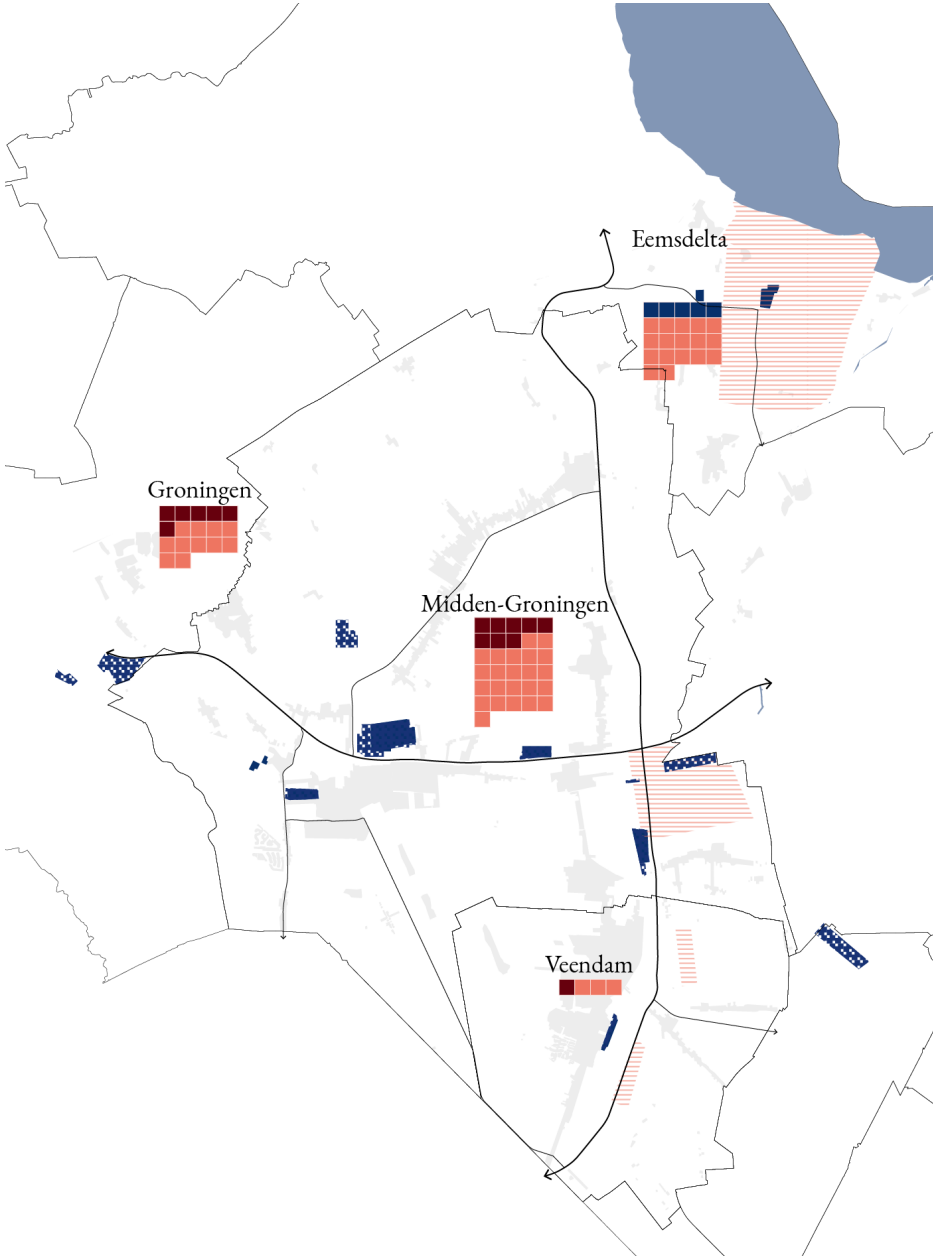
# Space for renewables



**Spatial needs:**

- solar panels take a lot of space

- 1 tile is 25 ha of solar panels



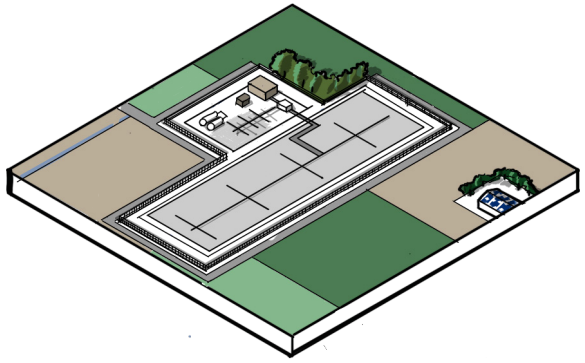
# NAM locations

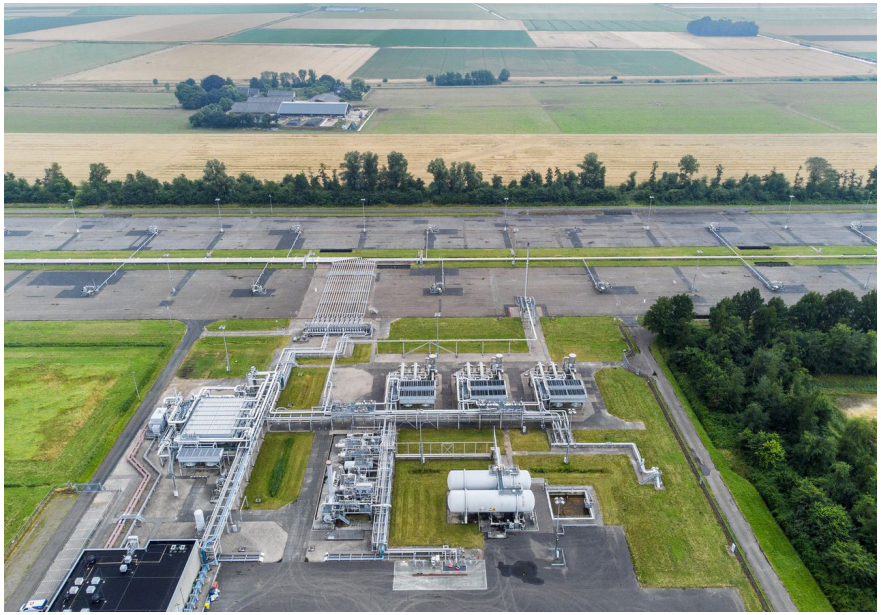


**Current policy:**
- Return the land back to agriculture
- Locations are currently closed
- Closure takes about 5 years

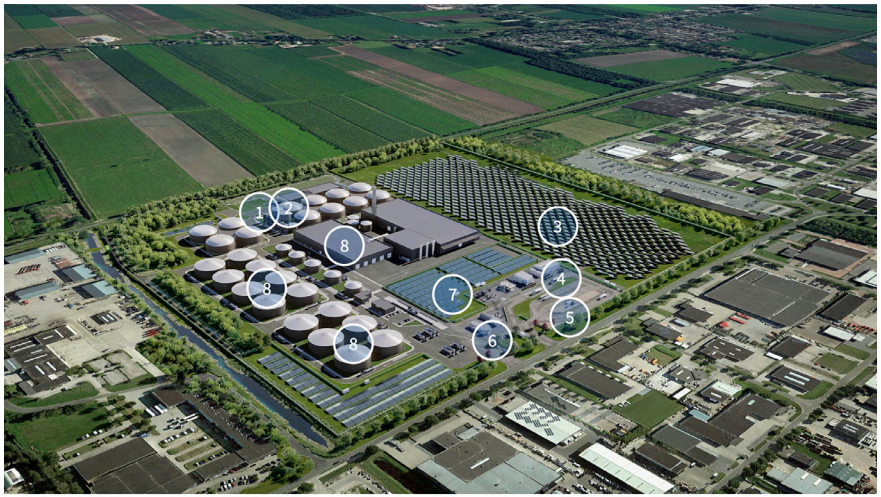
**Elements that can be re-used/ kept:**
- High voltage connection
- Gas pipelines (green gas, hydrogen)
- Roads
- Fences
- Trees arround the location

- Potential to become new energy production





Source: https://www.nrc.nl/nieuws/2022/09/06/shell-en-exxonmobil-zetten-gaswinnaar-nam-te-koop-a4140866

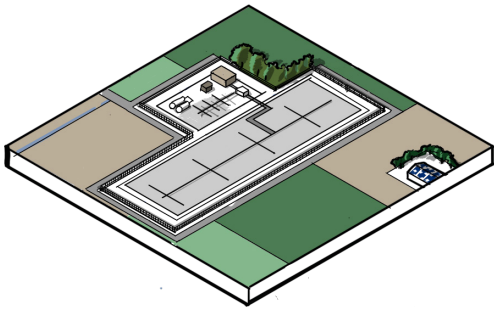



Source: https://gzinext.nl/over-gzi-next/

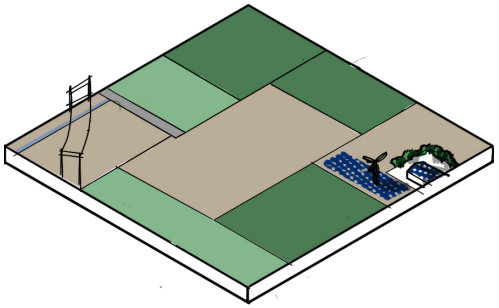
# NAM locations - possibilities



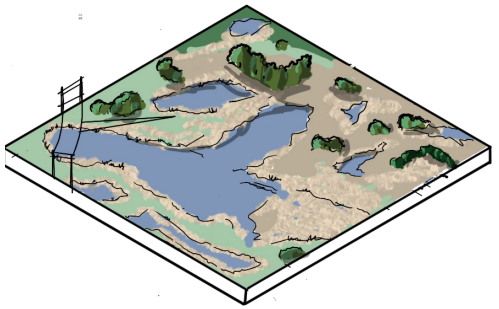
Current state



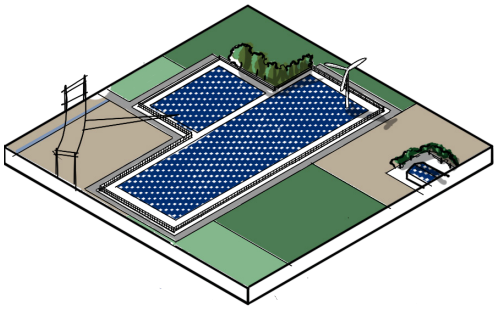
A. Bring back to agriculture



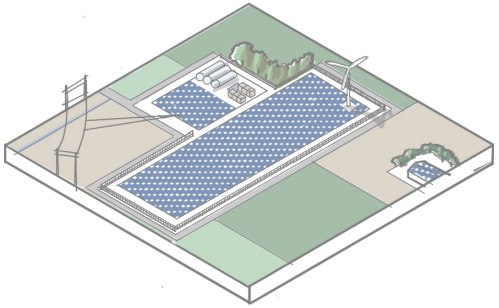
B. Re-naturalize the area



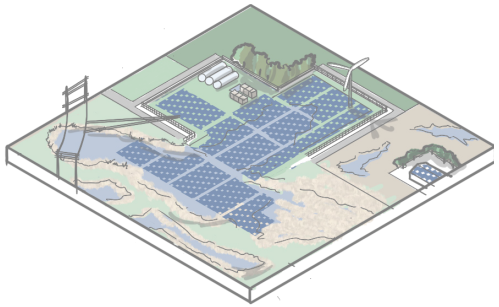
C. place renewables



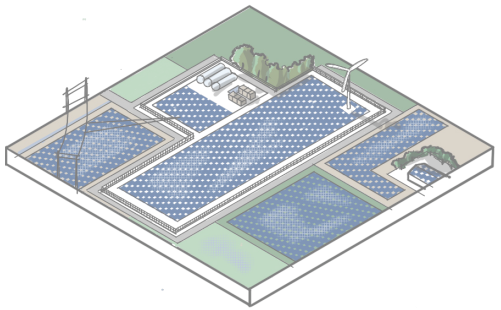
C2. Renewables + hydrogen



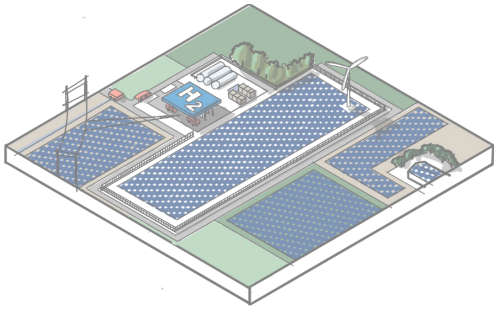
C3. Renewables + re-naturalize



C4. Renewables + hydrogen (remote)



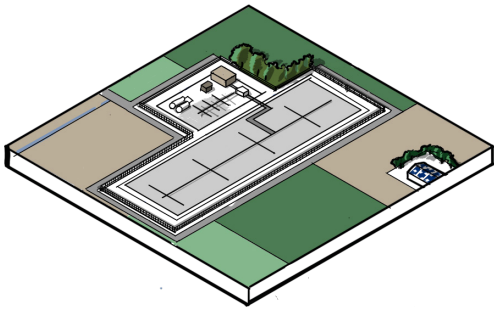
C5. Renewables + hydrogen (mobilty)



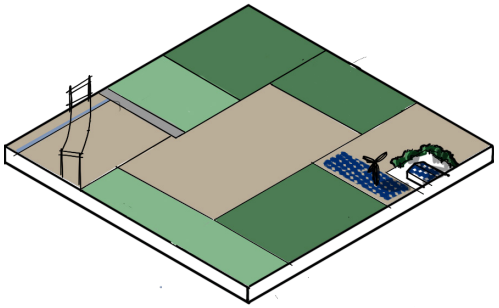
# NAM locations - possibilities



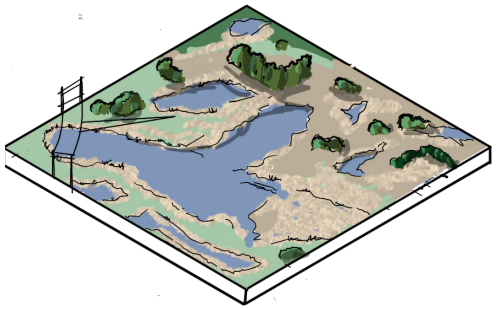
Current state



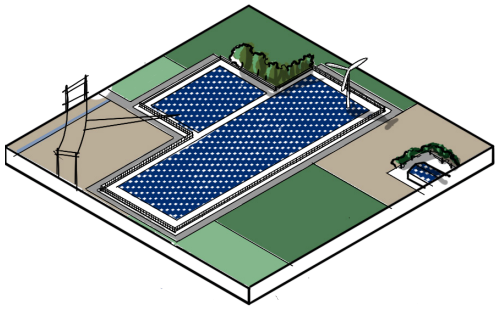
A. Bring back to agriculture



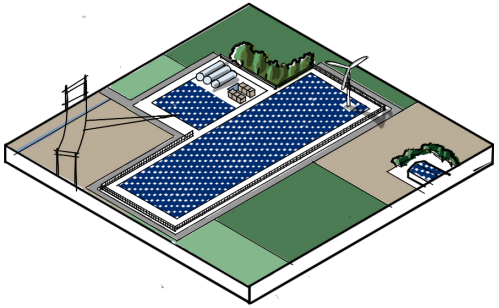
B. Re-naturalize the area



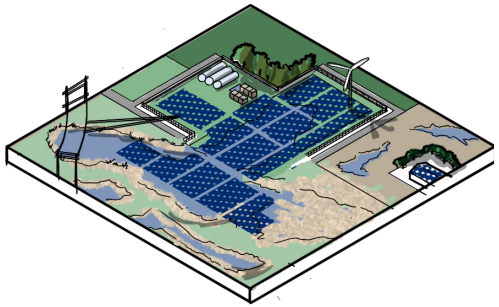
C. place renewables



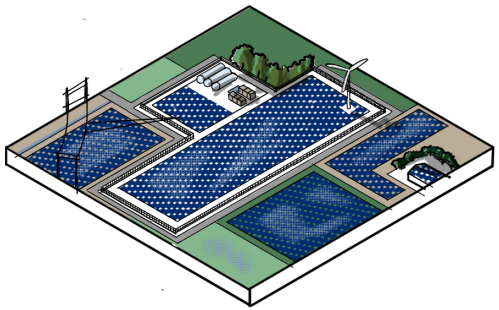
C2. Renewables + hydrogen



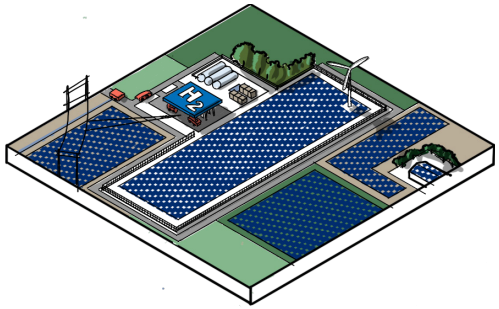
C3. Renewables + re-naturalize



C4. Renewables + hydrogen (remote)



C5. Renewables + hydrogen (mobilty)

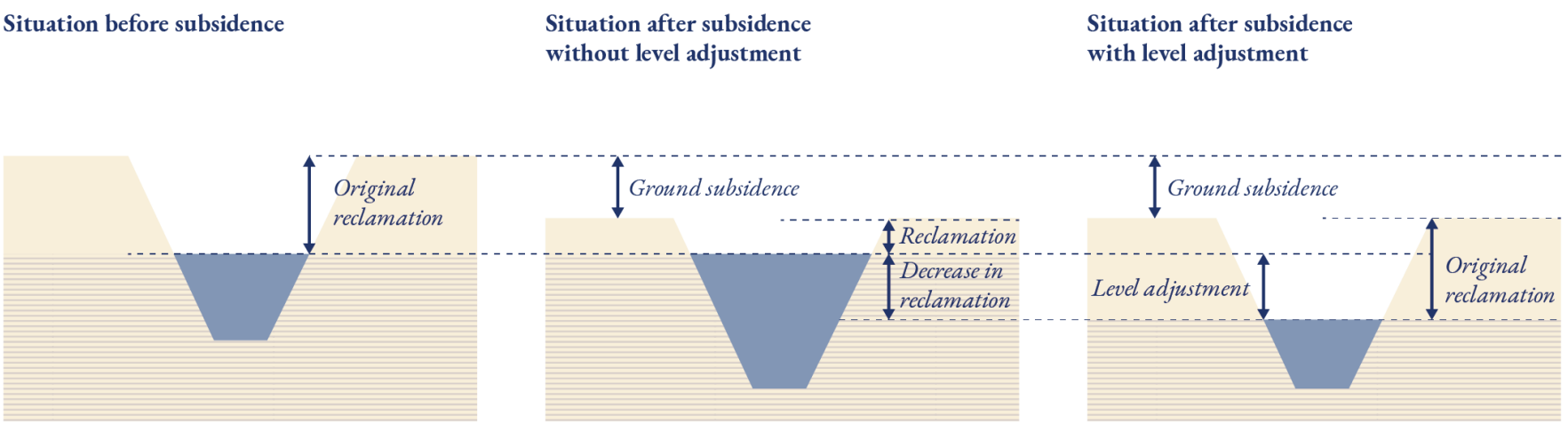


# Peat oxidation areas



- Peat oxidation is happening when peat is not below the groundwater level
- Water level needs to be low for farming

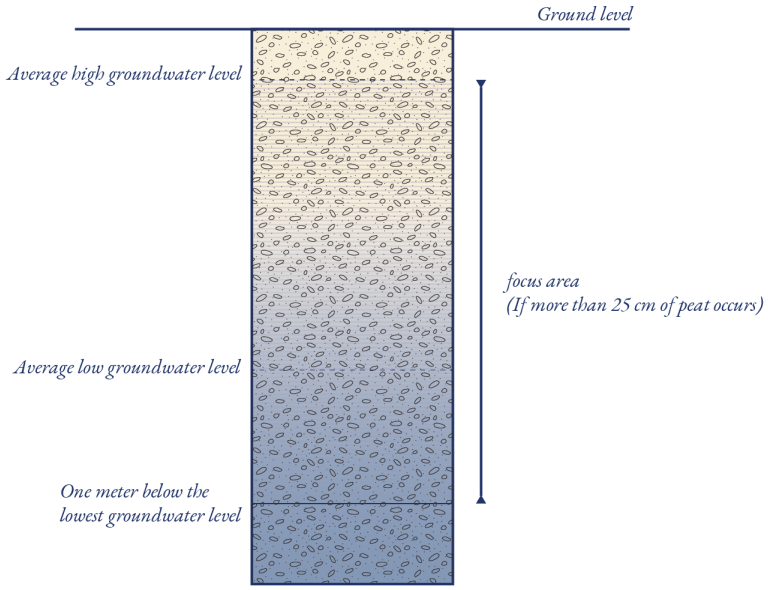
Consequences: CO2 oxidation



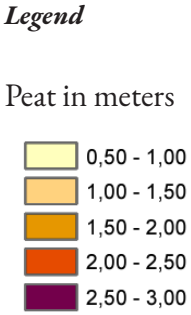

Process of ground subsidence Source: Author, adapated from: Source : https://commissiebodemdaling.nl/gevolgen/vernatting/

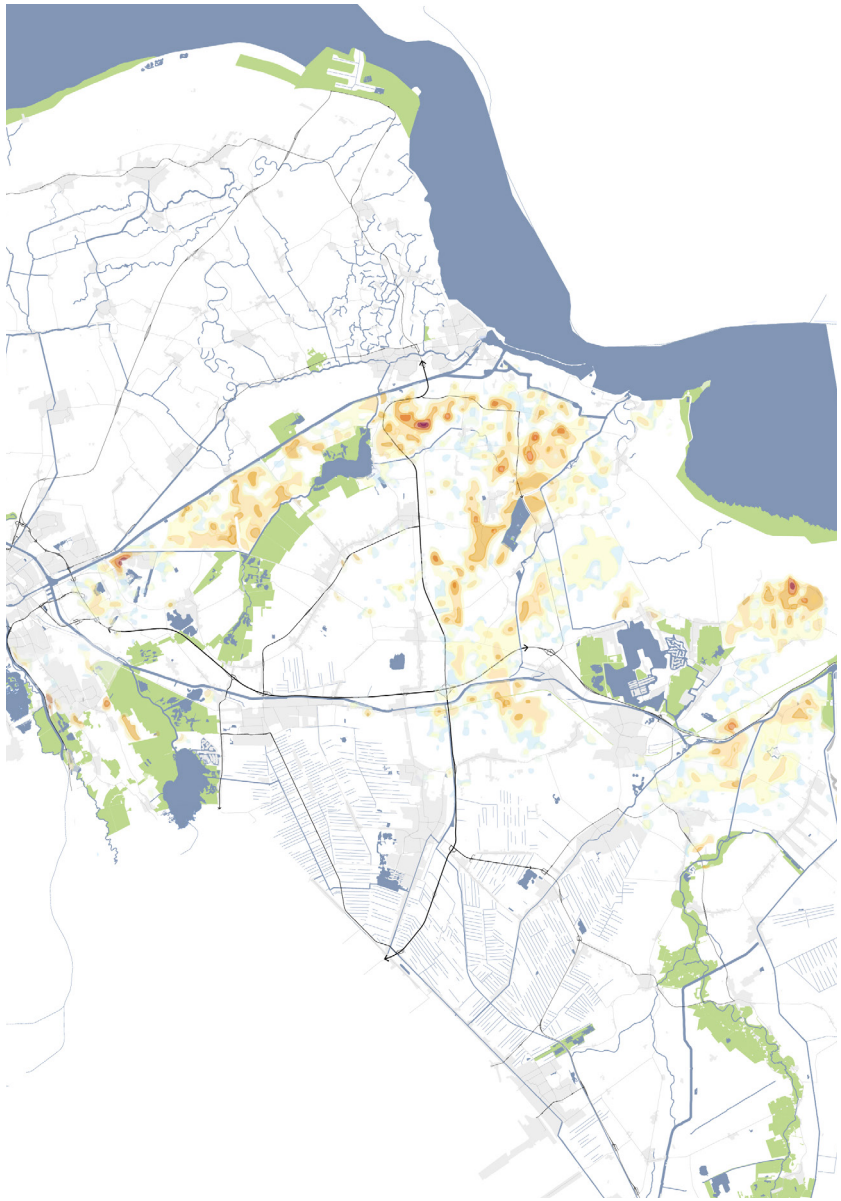
# Peat oxidation areas






How is the peat in the ground measured source: Author, adapted from (Waterbeheerprogramma 2022 - 2027, 2022)



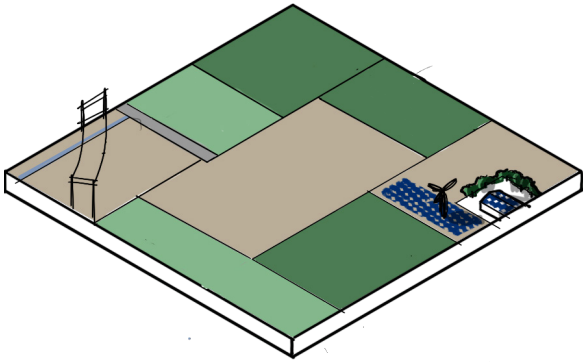



Source : waterbeheerprogramma 2022-2027 waterschap Hunze en Aa

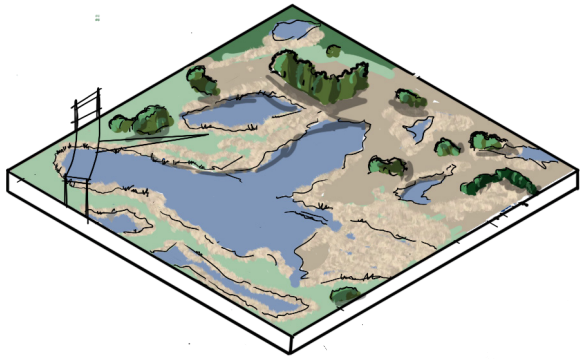
# Peat oxidation areas



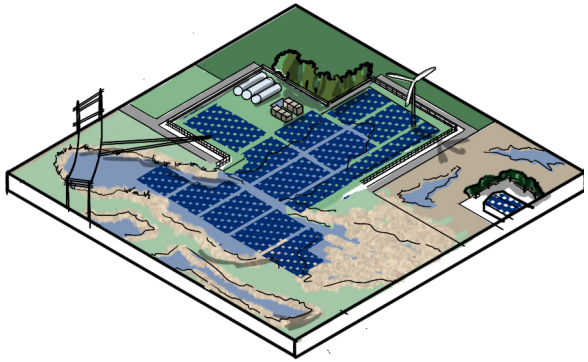
A. Keep the current agriculture



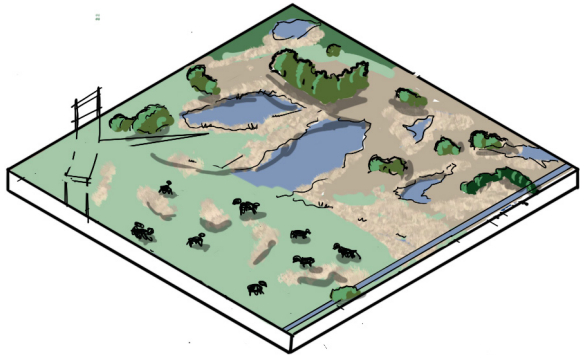
B1. Naturalize the area



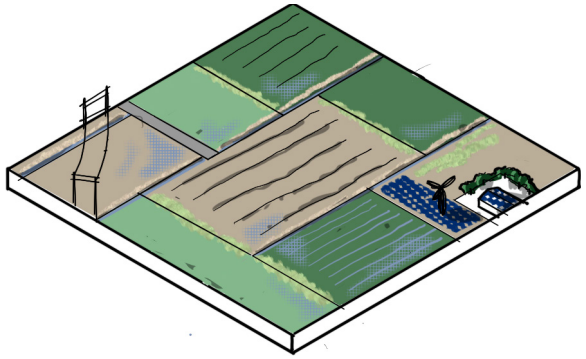
B2. Naturalize with energy production



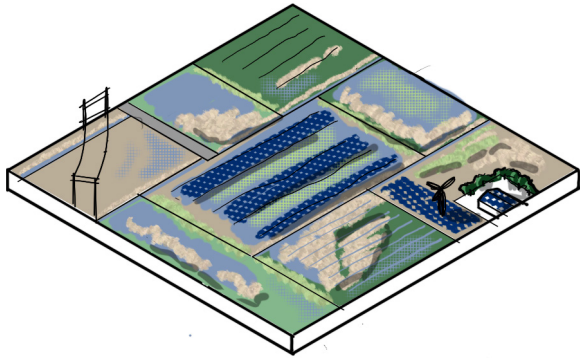
C1 Extensive grazing



C2. Farming with high water  levels



C3. Under water farming



# Industry



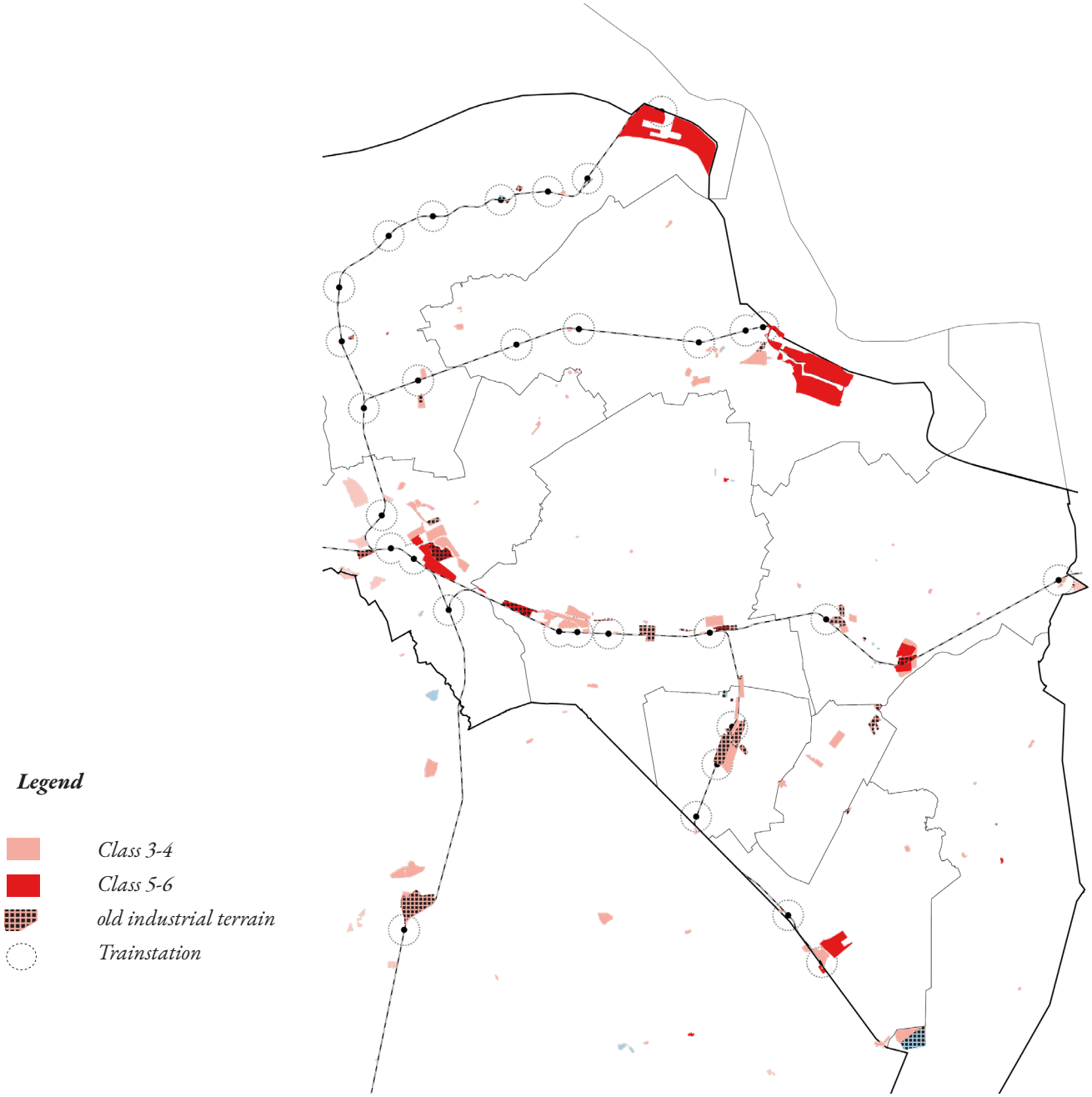
**Industry classes in the Netherlands:**

**1-2 (office / shops)**
- Low energy demand

**3-4 (small companies / manufacturing)**
- Medium energy demand
- Lot of these terrains are old

**5-6 (Heavy industry)**
- High energy demand

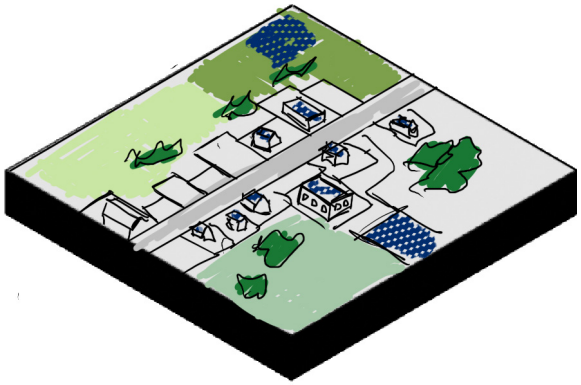
Re-purpose of the industrial terrains.



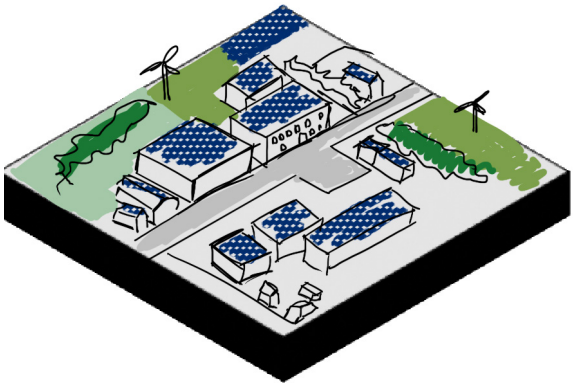
# Industry - possibilities



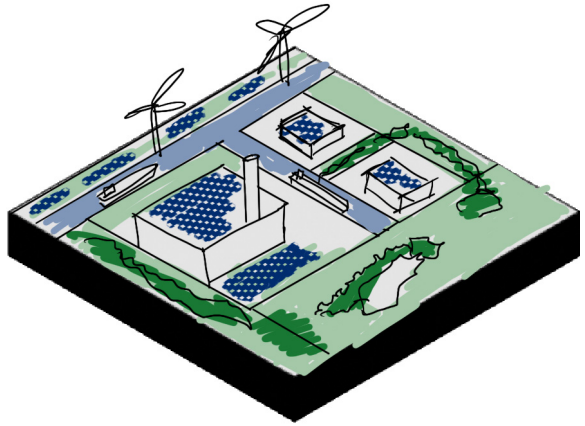
**Class 1/2 (offices, shops)**
Produce their own enegry



**Class 3/4 (small companies, manufacturing)**
Mixed use development (need energy)



**5/6 heavy industry**
Natural areas / industry (need energy)



# Urban



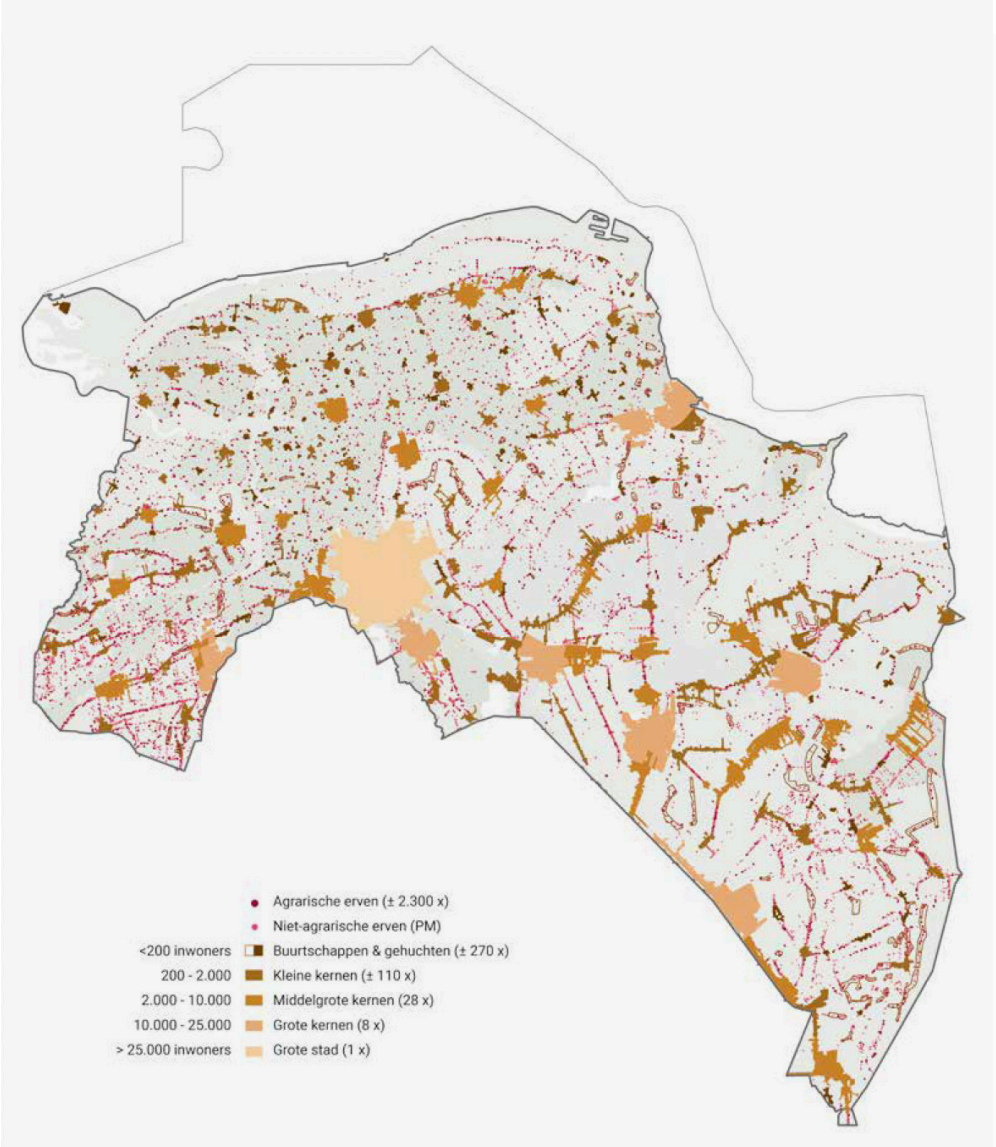
**Self producing residential areas**

| | |
|---|---|
| Agricultural yard | |
| Non- agricultural yard | |
| Hamlet or village | <200 |
| Small town | 200 - 2000 |
| Medium-sized town | 2000- 10.000 |

**Need aditional energy from other places**

| | |
|---|---|
| Small city | 10.000-25.000 |
| Groningen | >25.000 |

Adapted from the energy strategy RES

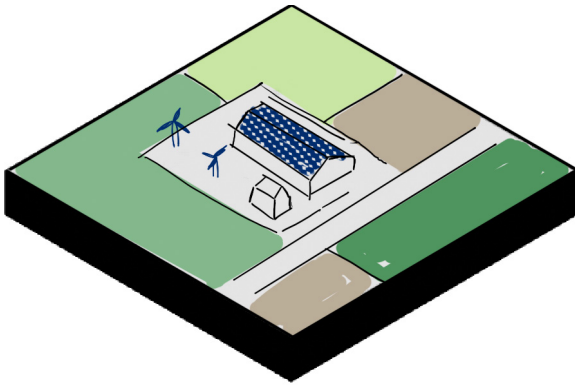



Source: Werkboek RES ruimte Groningen by H+N+S landschapsarchitecten

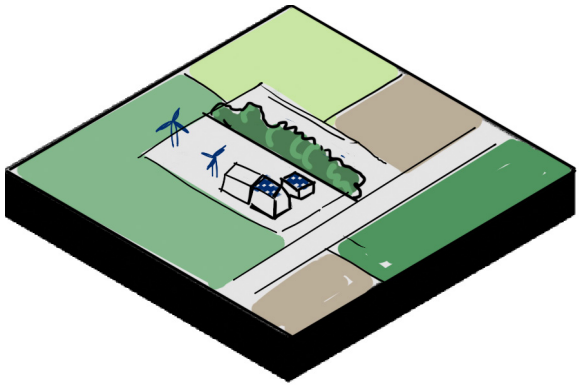
# Urban possibilities - possibilities



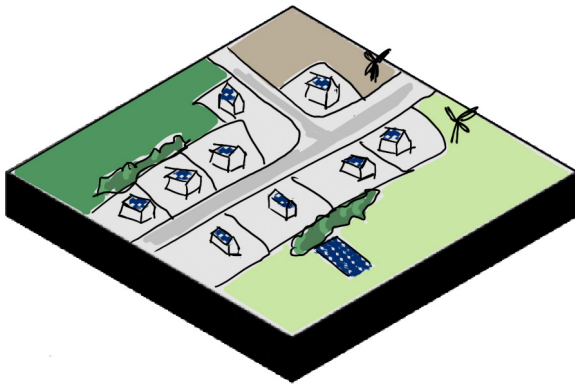
**Agricultural yard**
Solar panels on roofs / small windmills



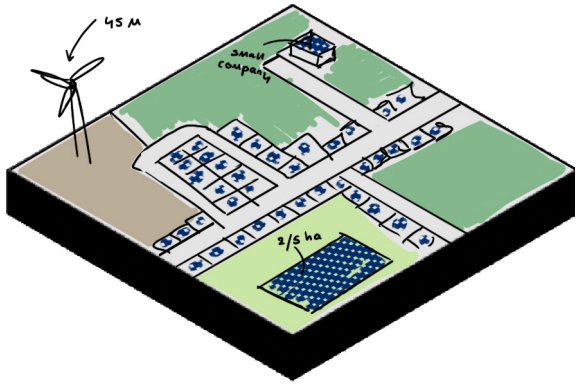
**Non agricultural yard**
Solar panels on roofs / small windmills



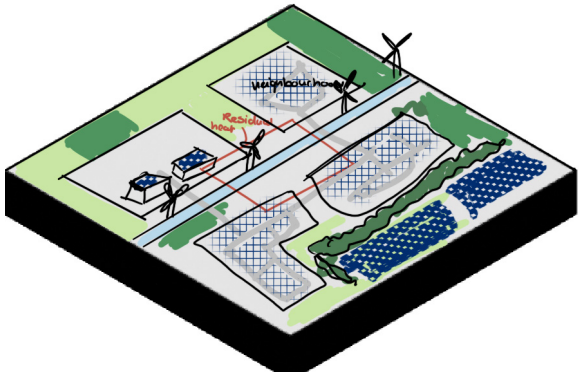
**Village <200 people**
Solar panels / comunity windmills / small solar



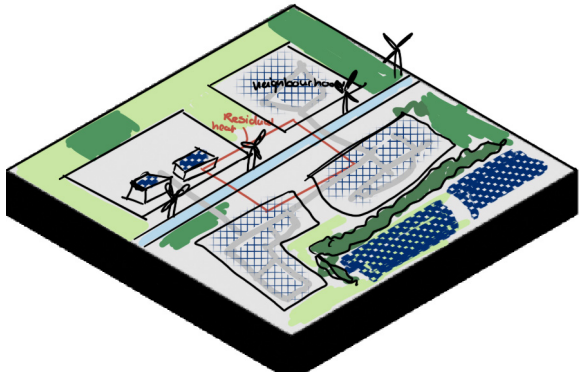
**Small town <2000 people**
Solar fields 2/5 ha / comunity windmill 45m




**Medium sized town 2.000-10.000**
Solar fields, windmills, heat network

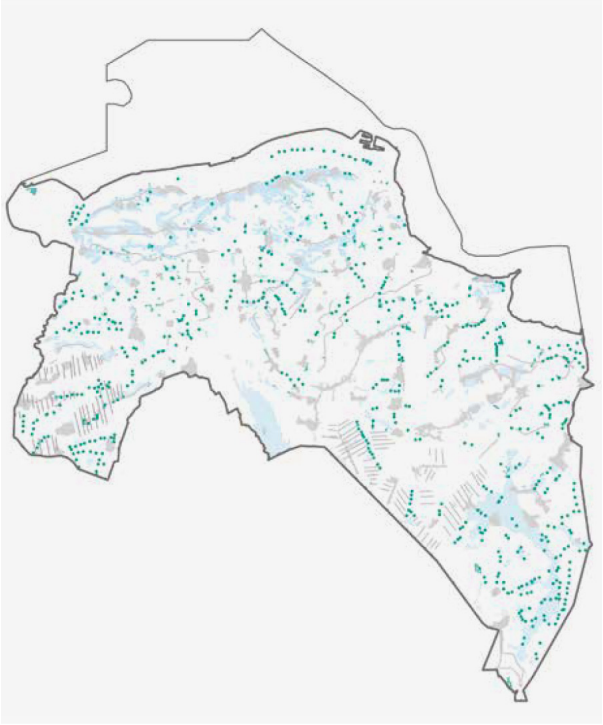



**Small city 10.000-25.000**
Solar fields, windmills, heat network + external

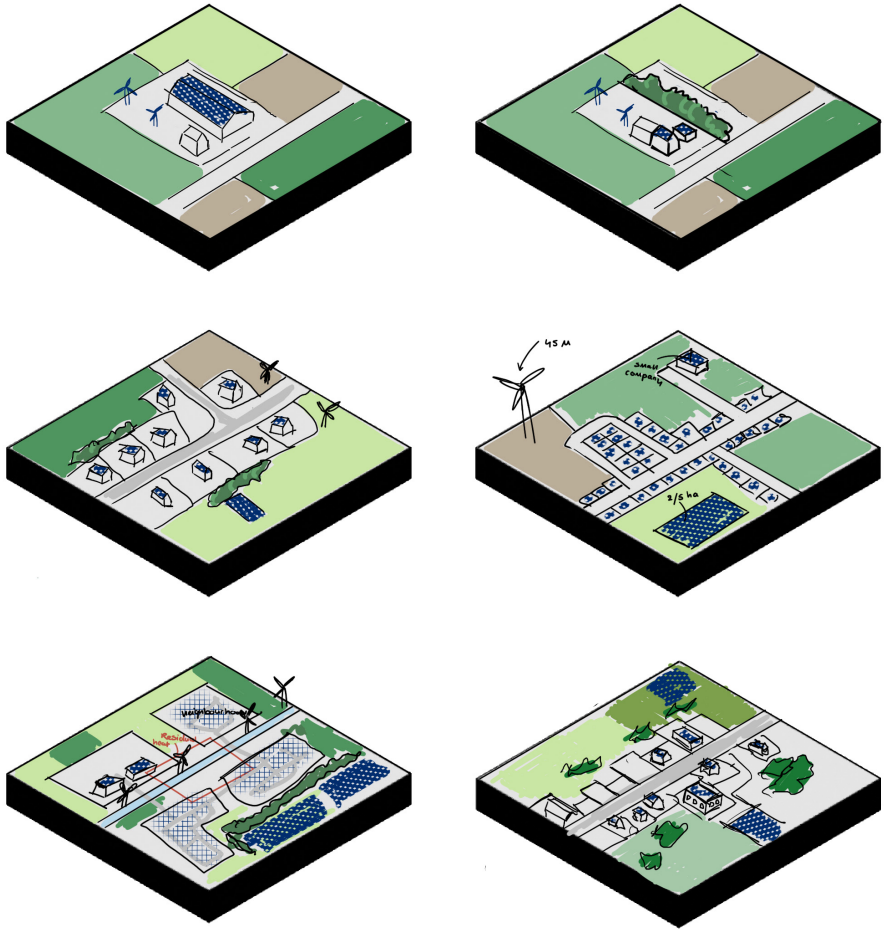


# Small scale energy landscape (self producing)



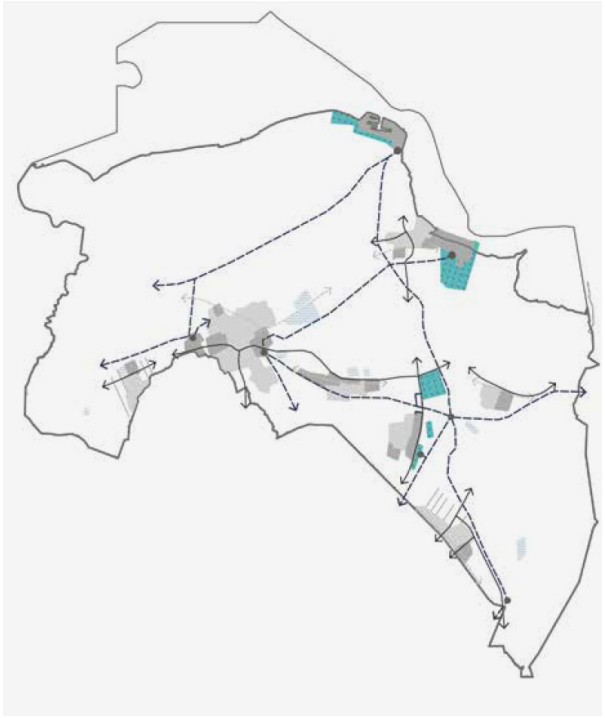


Map of small energy landscape, source: RES concept version

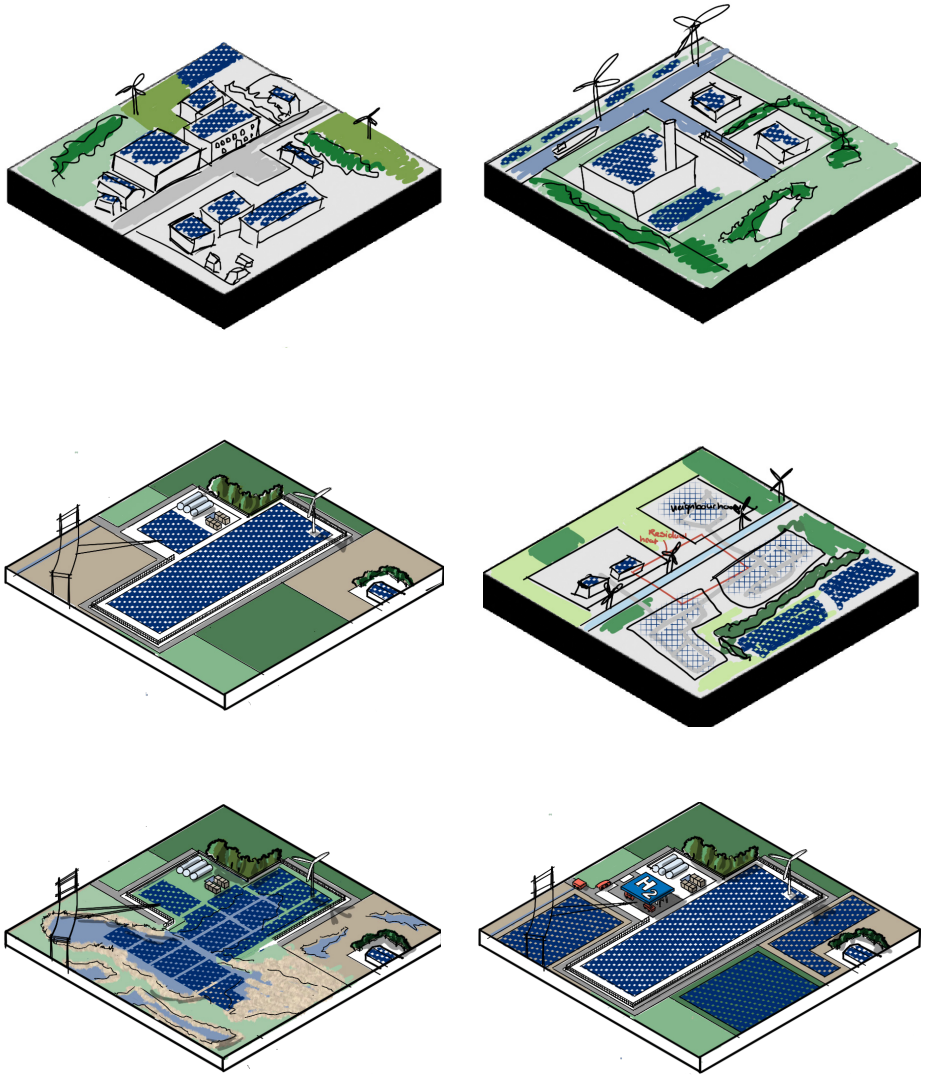


# Large scale energy landscape (dependent on other areas)





Map of large energy landscape, source: RES concept version



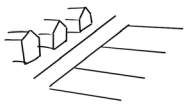
# Index

# Preconditions and principles

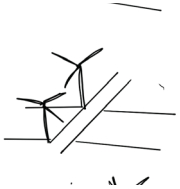


## Preconditions

Preserving the Groningen landscape and identity



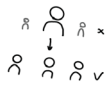
Placement of renewables and reuse of current energy infrastructure



Ensuring economic competitiveness

Addressing climate change challenges

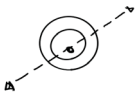
Inclusion of all groups in society



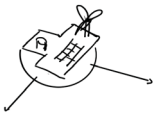
## Principles

Establishing a nature network throughout Groningen

Transforming train stations into development hubs



Repurposing NAM sites for renewable energy

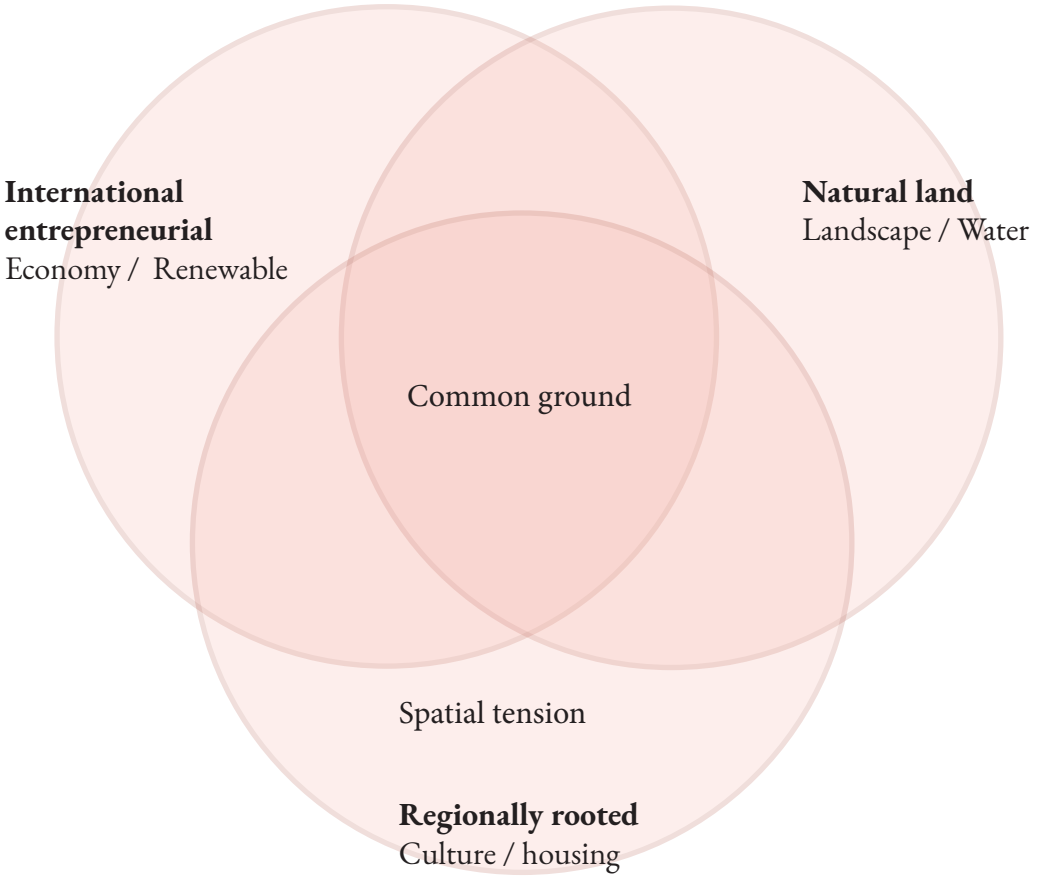


Enhancing opportunities for recreation and tourism

# Parameters for scenario's

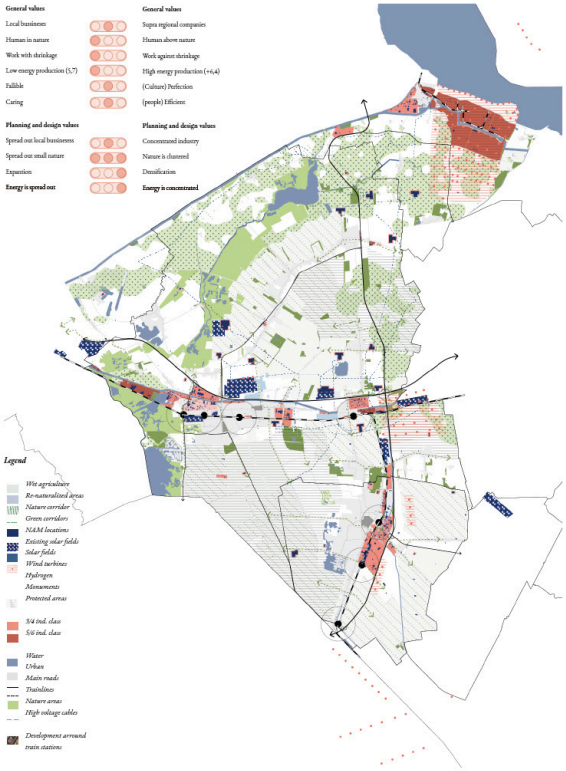


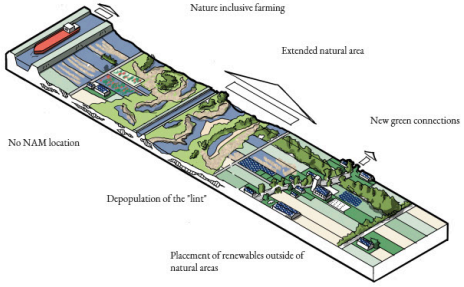
| | | |
|---|---|---|
| **General values** | | **General values** |
| Local bussineses | | Supra regional companies |
| Human in nature | | Human above nature |
| Work with shrinkage | | Work against shrinkage |
| Low energy production (5,7) | | High energy production (+6,4) |
| Fallible | | (Culture) Perfection |
| Caring | | (people) Efficient |
| **Planning and design values** | | **Planning and design values** |
| Spread out local bussinesess | | Concentrated industry |
| Spread out small nature | | Nature is clustered |
| Expantion | | Densification |
| Energy is spread out | | Energy is concentrated |



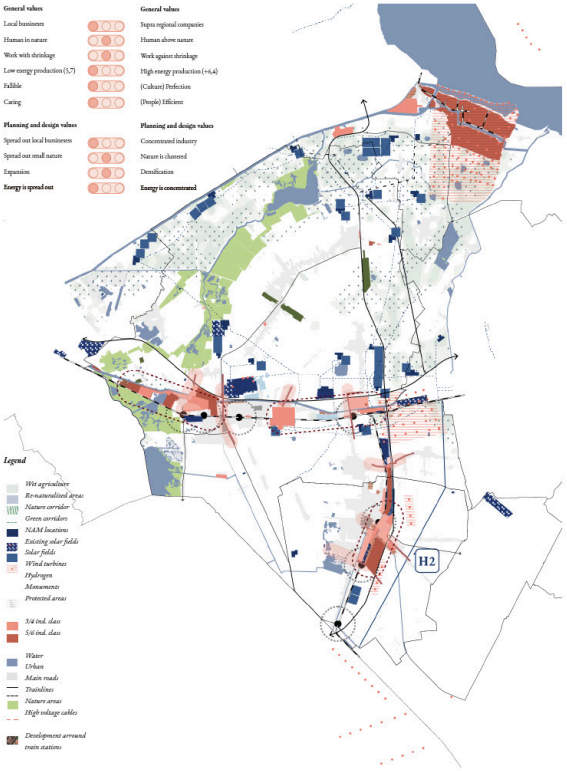
# Posters

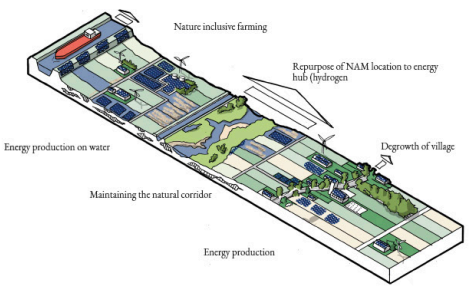
## Natural land



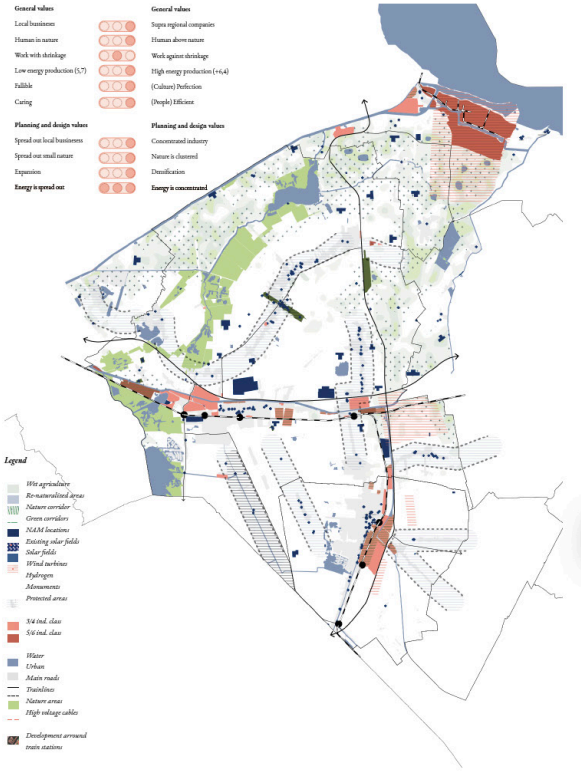



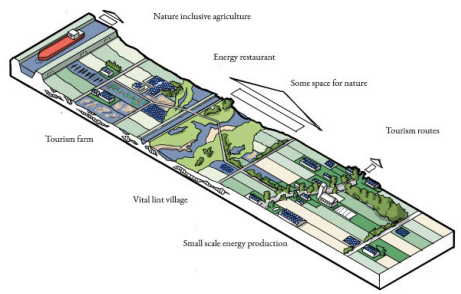

## International entrepreneurial



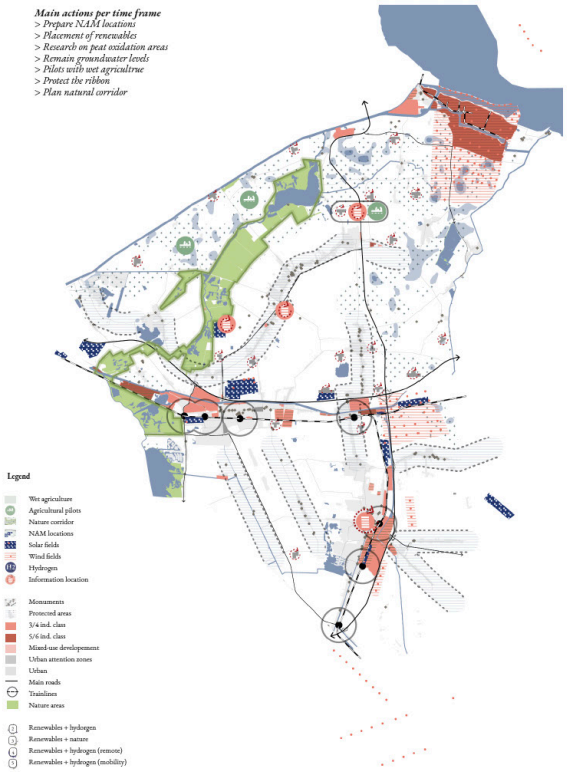

## Regionally rooted



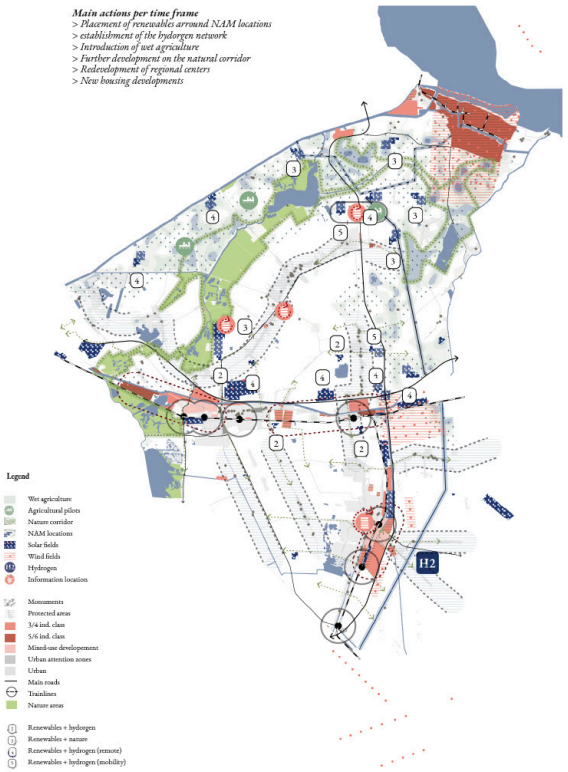



# Posters

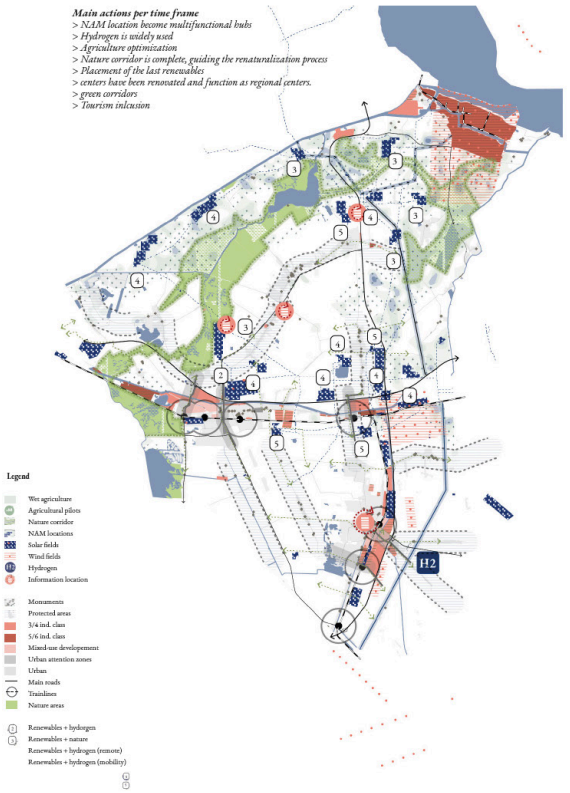
Phase 1: 2030 preparation




Phase 2: 2040 Implementation



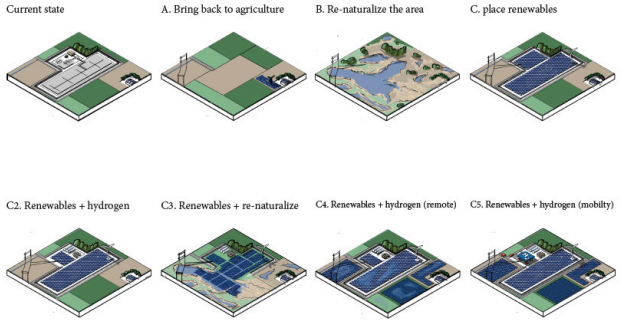

Phase 3: 2050 Establishment

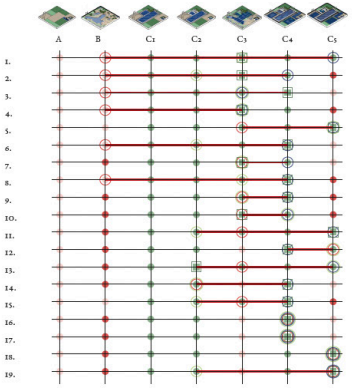


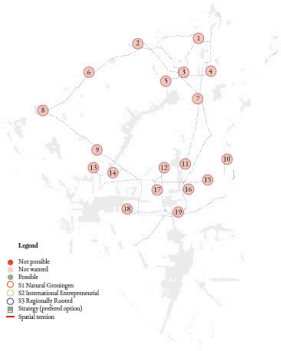

| RR | IE | NL |
|---|---|---|
| - | - | ++ |
| + | ++ | - |
| - | ++ | + |
| ++ | + | + |
| - | - | ++ |
| ++ | - | + |
| + | ++ | - |
| + | ++ | + |
| - | - | ++ |

**Preconditions**
Preserving the Groningen landscape and identity
Placement of renewables and reuse of current energy infrastructure
Ensuring economic competitiveness
Addressing climate change challenges
Inclusion of all groups in society

**Principles**
Establishing a nature network throughout Groningen
Transforming train stations into development hubs
Repurposing NAM sites for renewable energy
Enhancing opportunities for recreation and tourism



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# Social engagement strategies



## Strengthen Participatory Processes

- Organize local participation moments
- Organize workshops with the local community
- Organize events
  > energy festival
- Online discussions

## Raise public awareness

- Organize local meetings and public participation moments
- Organize workshops with stakeholders
- Inform via social media
- Create a website
- Courses at local high schools

## Spread Knowledge

- Retrain employees
- Offer local training opportunities and knowledge courses
- Make local knowledge center(s)
- Create cources for local highschools
- Information point, small van.

## Improve transparancy

- Start policy documents with why it is important for local residents.
- Share knowlegde on the website
- Annual feedback session
- Provide detailed data for students and young pofessionals
- Information point, small van.

# Governance strategies



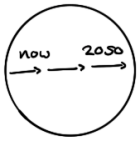
## Promoting Collaborative Policies

- Include local stakeholders
- Make more money available for local participation.
- increase the local capacity
- Organize “design tables” with profesionals from all levels

## Monitoring and Evaluation Systems

-Publish the progress every year
- social media for polls
- website

## Promoting Long-term Planning




- Make policies that are integrated on multiple scales
- Multi-sectoral planning
- Include EU and national goals

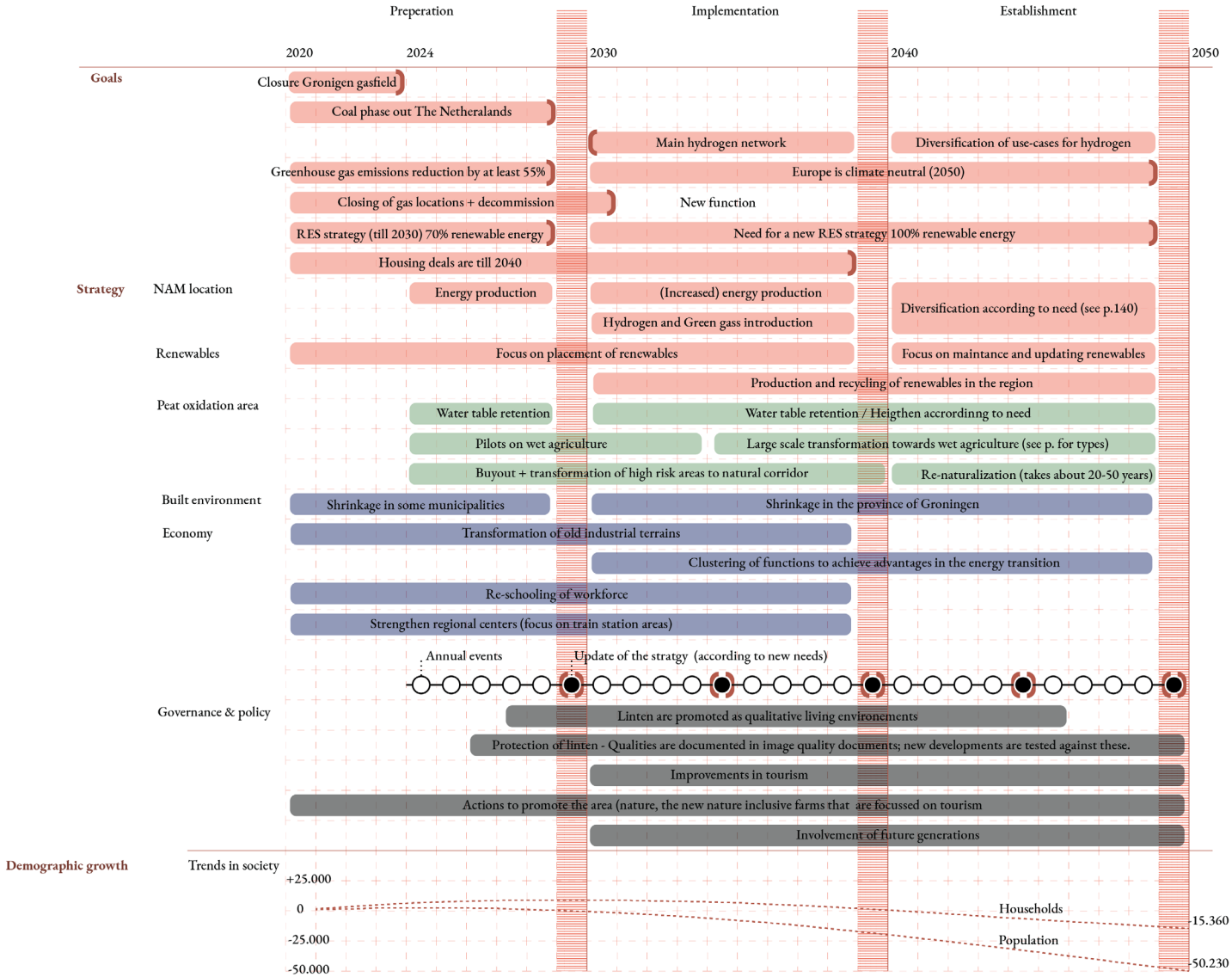
# Timeline



Annual feedback moment

**More inclusive governance:**

- Update on progress every year.
- Revisioning of the strategy every 5 years.



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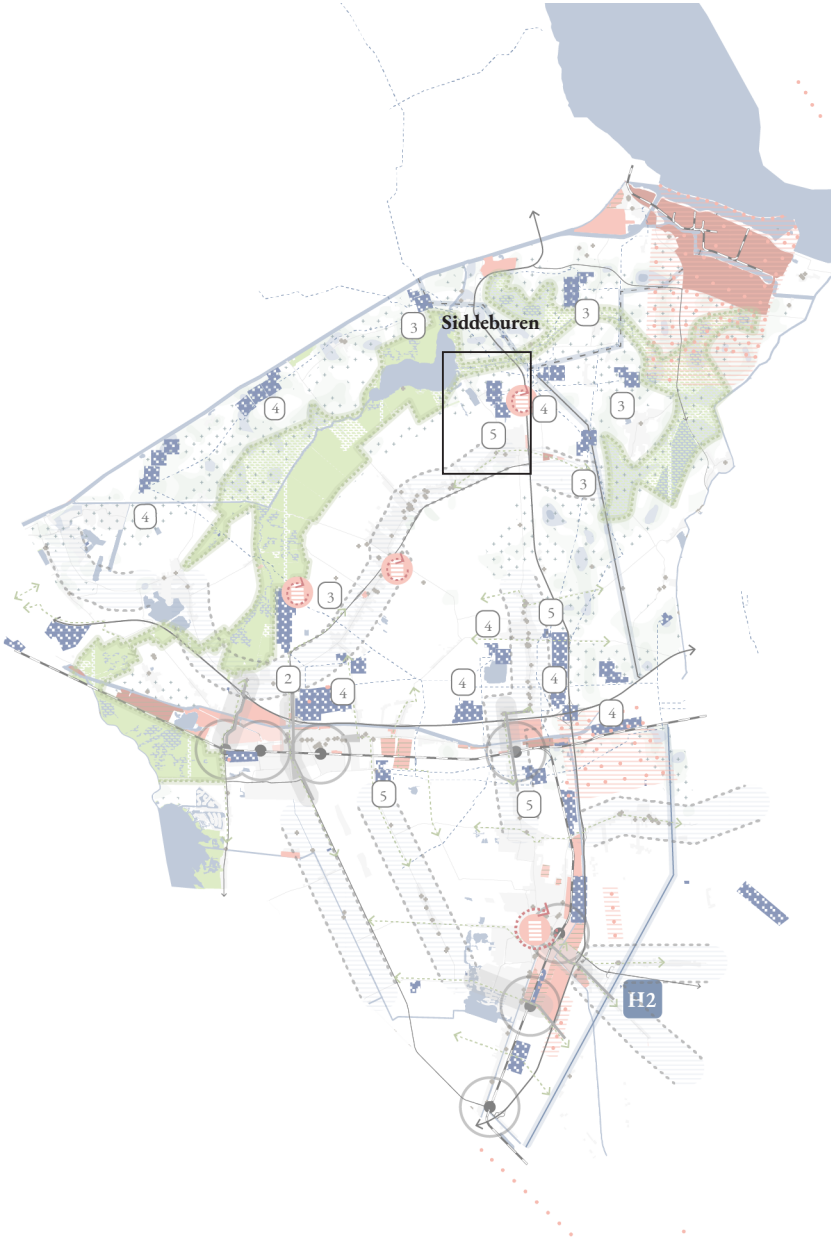
# Zoom in locations



**Location: Siddeburen**
- NAM location mobility
- Wet agriculture
- Nature
- Recreation
- Informantion location on the energy transition
- "Lint" village



# Siddeburen introduction



# Siddeburen introduction

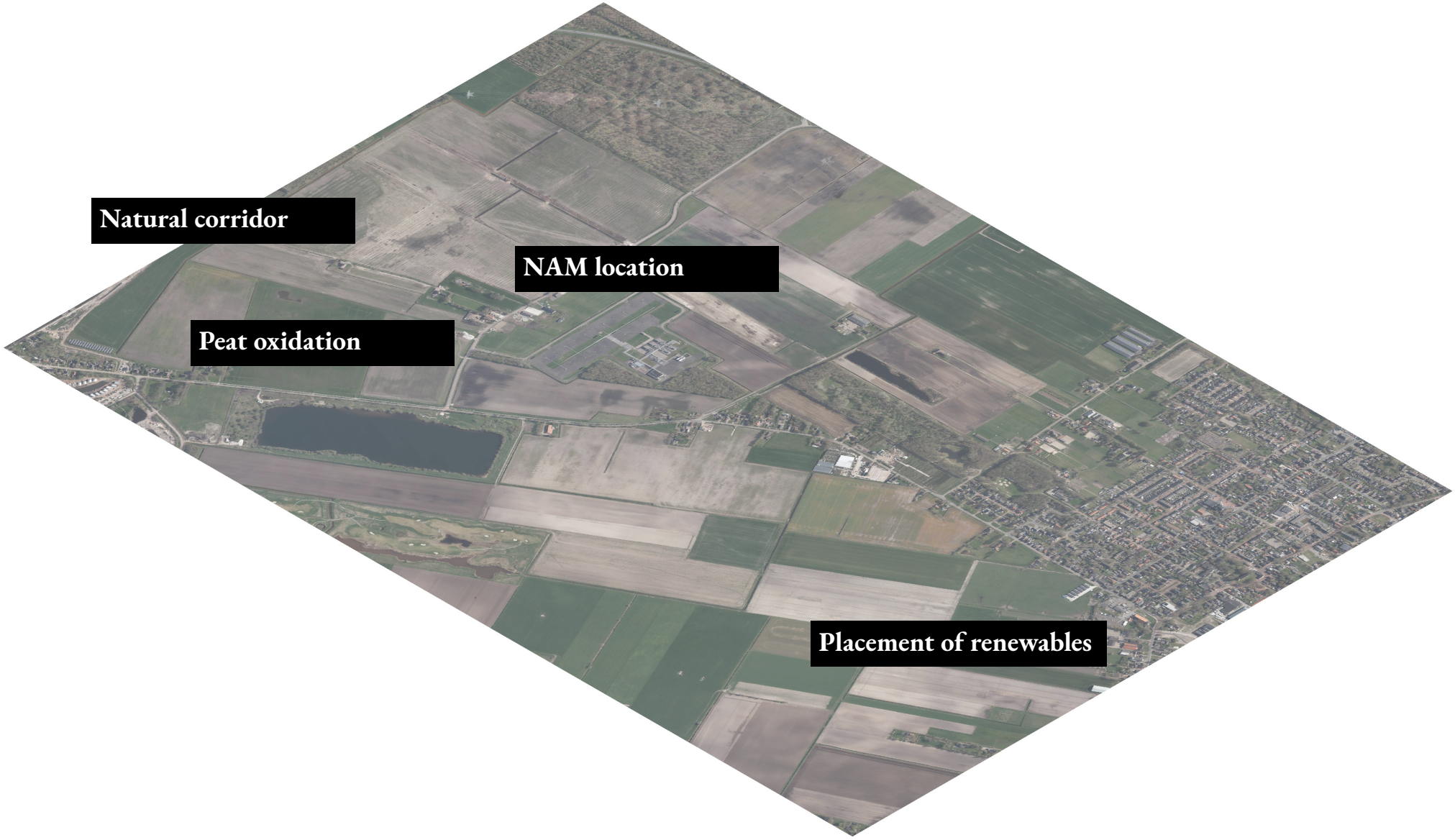


# Siddeburen introduction



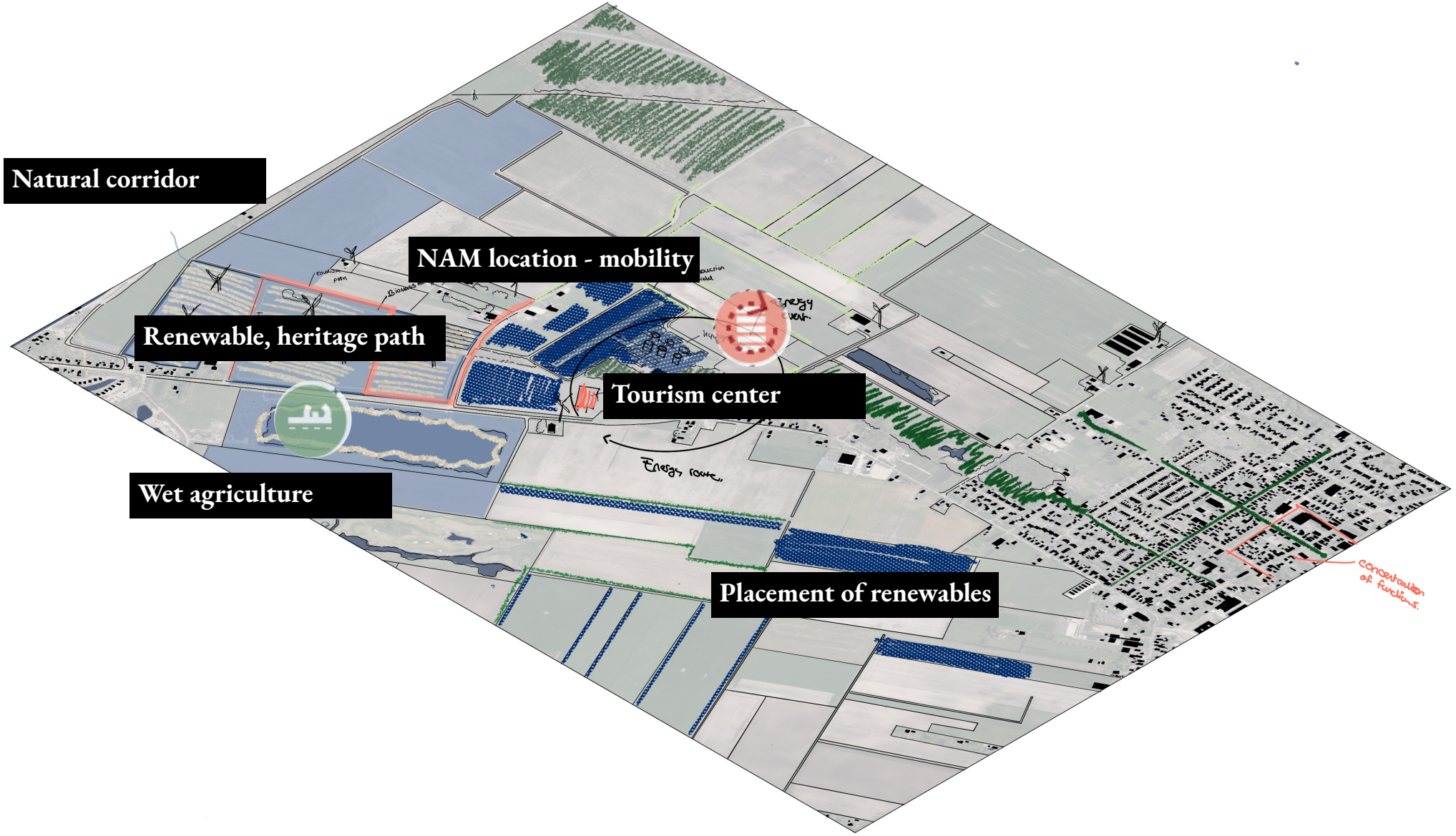
# 2024: Siddeburen





# 2050: Siddeburen



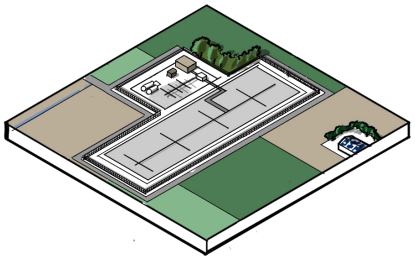


# Design intervention 1: Siddeburen

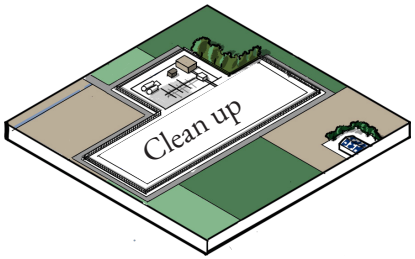


Preperation → Implementation → Establishment

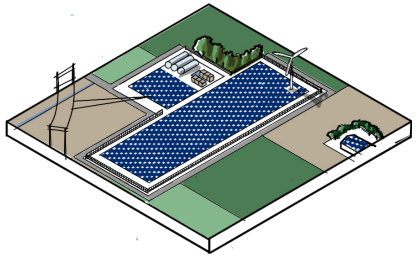
**Current situation 2024**



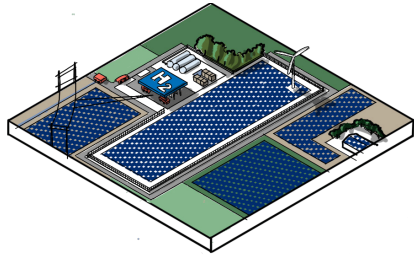
**2030 decommissioned site**



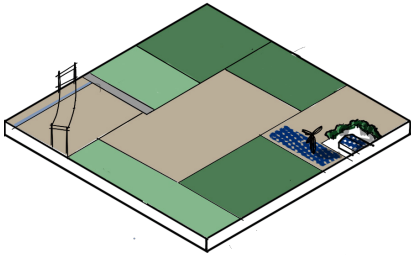

**2040 Solar park and hydrogen intergration**



**2050 Intergration with mobility**

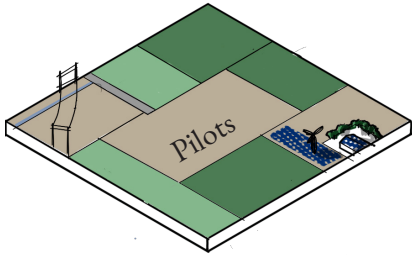


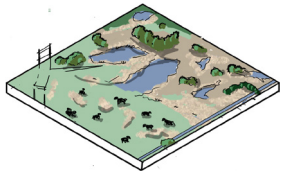

**Current situation 2024**



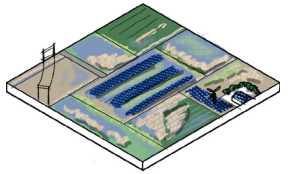
Maintain ground water level

**2035 Agricultural pilots**

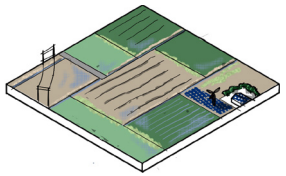


C1 Extensive grazing



C2. Farming with high water levels

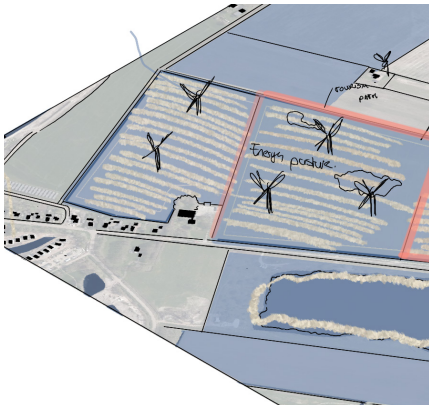


C3. Under water farming

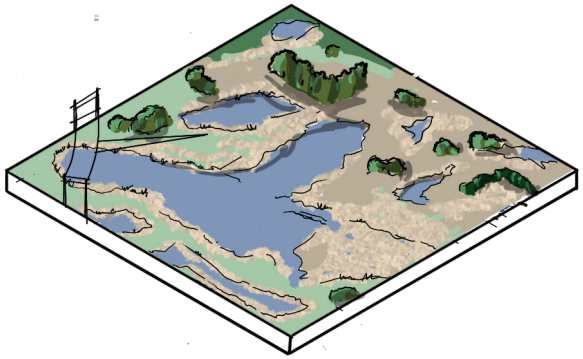
# Detail: naturalization process

**Natural corridor**

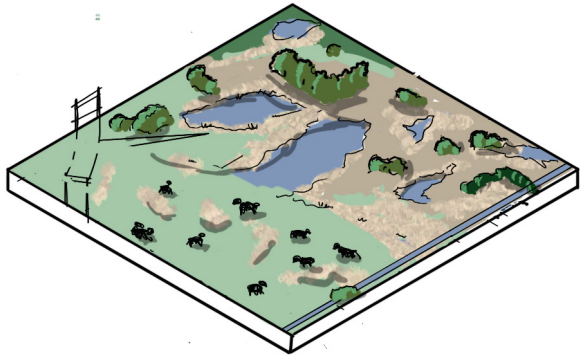


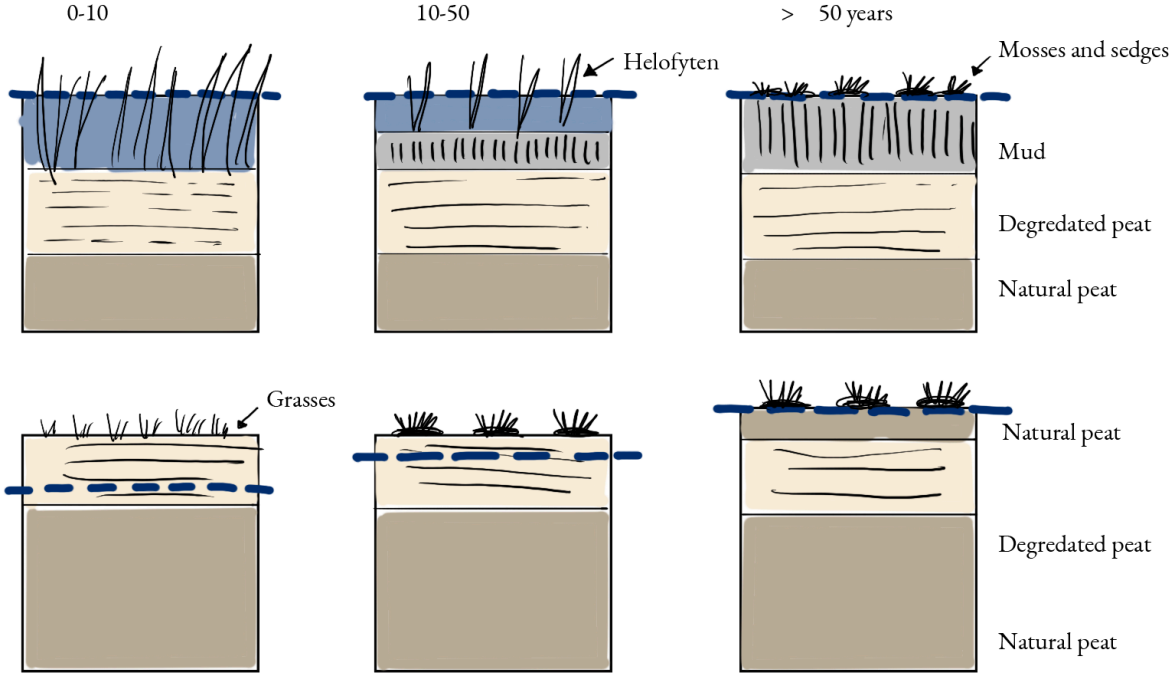



Put area under water



Slow rewetting



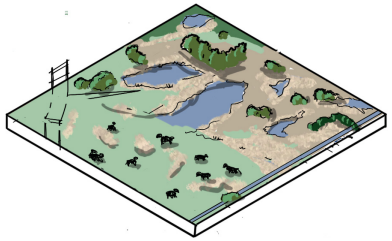



(Zak and Mclnnes, 2022)

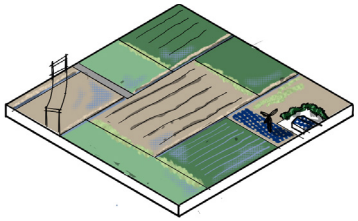
# Detail: types of wet agriculture

**Wet agriculture**



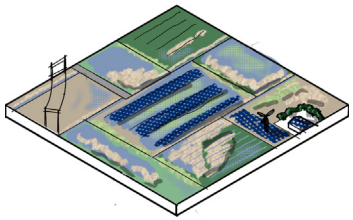


Grassland



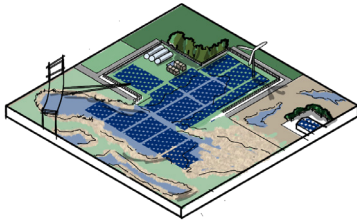
Cranberries

Lisdodde

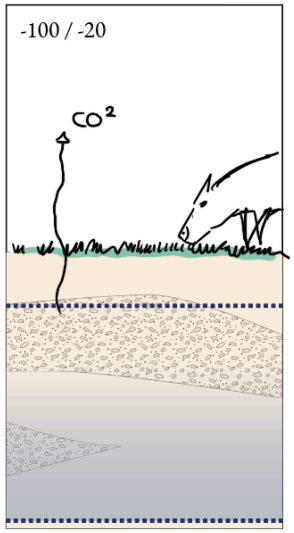


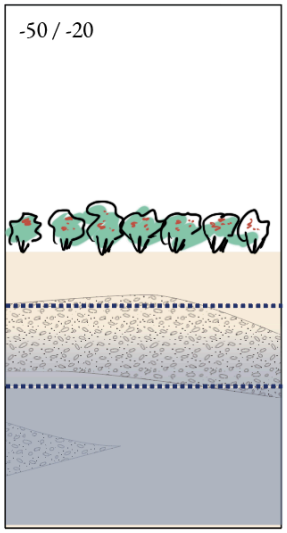
Reed

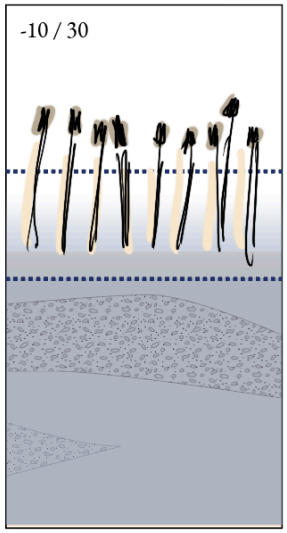
Kroosvaren

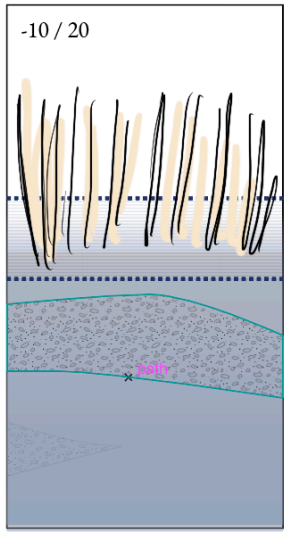


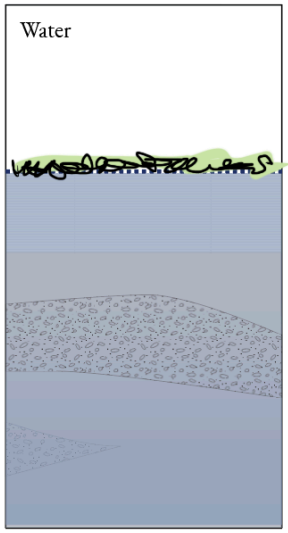
Floating PV panels

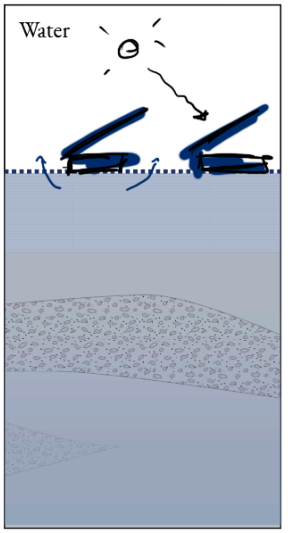



**Livestock (food)**

**Cranberries (food)**

Source: https://en.wikipedia.org/wiki/Cranberry

**Lisdodde (Building material)**

**Building material**

https://www.agroproeftuindepeel.nl/projecten/pilot-natte-teelten

**Reed (biomass, Building material)**

**Building material**

https://www.natuurmonumenten.nl/natuurgebieden/nieuwkoopse-plassen/nieuws/gesneden-riet-levert-prachtige-beelden-in-de-nieuwkoopse

**Kroosvaren (Feed for cattle)**

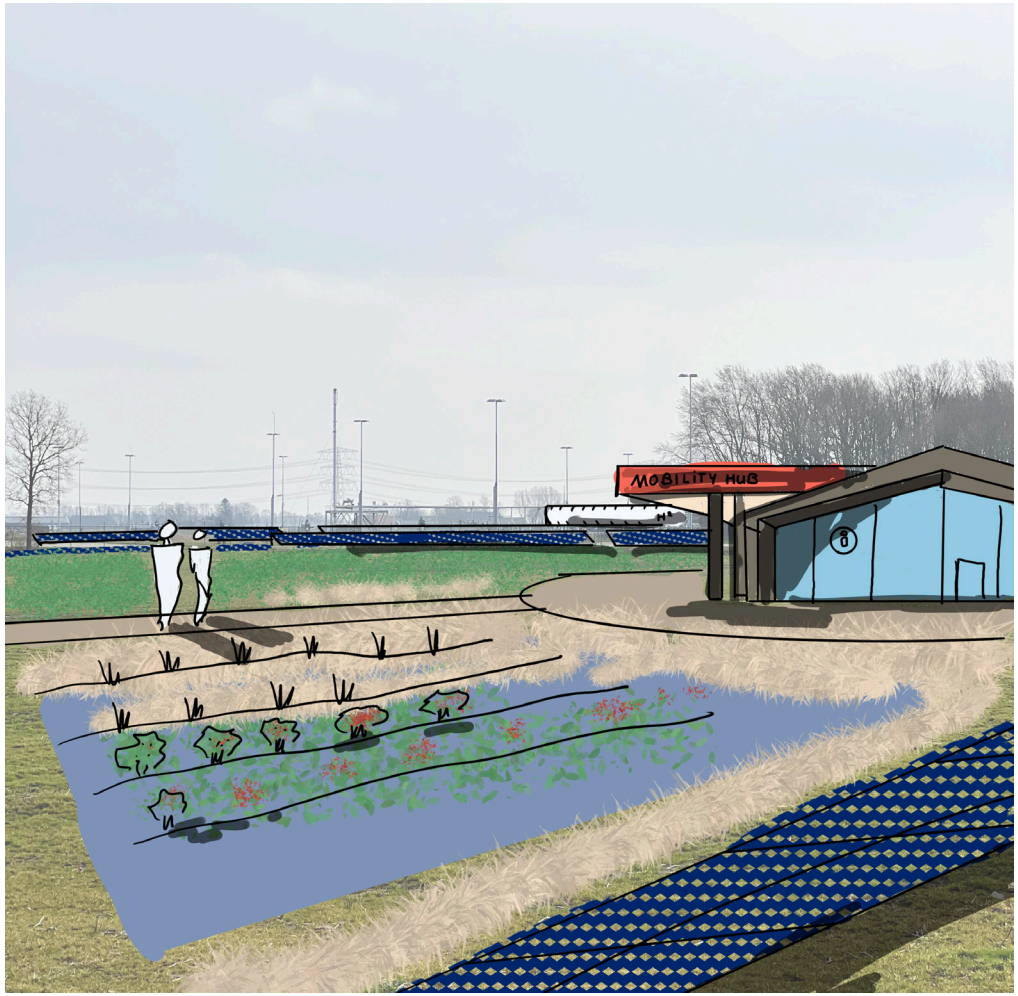
**Can be used to feed the cows**

https://microscopievandenatuur.nl/de-grote-kroosvaren


**FPV**

# Siddeburen impression





# Reflection



**Society**
- Provide information about the energy transition
- Give insight in problems and possibilities
- Create social engagement

**Scientific**
- "Research by design"
- Contributing to knowledge on energy transition
- Translation of the spatial dimension of the energy transition
- Apply this on Groningen with the help of scenarios

**Personal**
- How complicated strategies are
- Not all issues can be included

**Recomendations**

- Further development of the design

- Actively engage the community

- The link between other vulnerable regions in Europe and Groningen

Thank you

Rik Ebbers

# Methodology framework



## Problem statement

**Personal motivation**

**Problem field**

**Problem statement**

**EU**

Regional vulnerablity

**Groningen**

*Declining and aging population*

*Gas based economy*

*Ground subsidence and earthquakes*

**Research aim**

**Research question(s)**

**Methods:**

*Literature review*
*Photography*
*Mapping*
*Policy reading/ analysis*

## Theoretical framework

**Theoretical framework**

*Energy and space*

*Cultural and natural landscape*

*Just transtion*

*Shrinkage*

*Heritage ads culture and landscape*

+

**Conceptual framework**

*Adaptive energy system*

*Nature regeneration*

*Heritage as a vector*

*Least engaged*

*Inclusive governance*

*Endogenous development*

**Methods:**

*Literature review*
*Policy review*

## Analysis

**Analysis**

*Landscape qualities*

*Policy gaps*

*Energy*

*CO2 oxidation area*

*Built environment*

*Stakeholder analysis*

*SWOT*

**Conclusion**

*Typologies*

*Preconditions and Principles*

**Methods:**

*Literature review*
*Policy review*
*Mapping*
*Stakeholder analysis*
*Site visit*
*Photography*

## Research by design

**Scenarios**

*Spatial parameters*

*S1: Natural land*

*S2: International Entrepreneurial*

*S3: Regionally rooted*

*Scenario evaluation*

**Methods:**

*Mapping*
*Scenario making*
*Stakeholder analsis*

## Design

**Strategy**

*Introduction*

*Vision*

*Elements*

*Phasing*

*Timeline*

*Stakeholders*

*Engagement strategies*

**Design interventions**

*Polder*

*A12/N33*

*Veendam*

**Methods:**

*Mapping*
*Stakeholder analysis*
*Literature review*
*Research by designn*

## Reflection

**Conclusion**

*Lessons for Europe*

*Reflection*

*Evaluation*

*Ethical considerations*

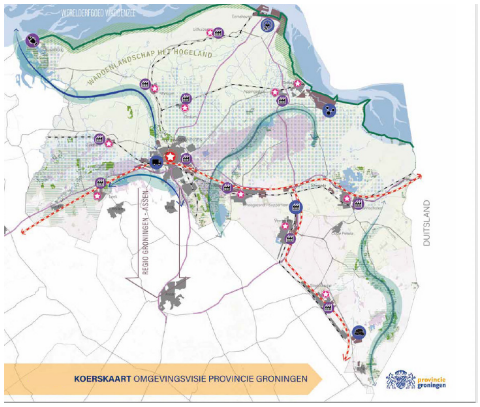
**Methods:**

*Mapping*

# Policies strategies

| Energy and economy | Housing/ social data | Water and nature challanges | Only focusses on / missing elements |
|---|---|---|---|
| Brede welvaart 2022 | Brede welvaart 2022 | | Socio economic data - non spatial |
| RES strategy / Concept RES | | RES strategy | RES Strongly energy focussed, but landscape is there |
| Ruimtelijk/ economisch ontwikkelperspectief A7/ N3 | Ruimtelijk/ economisch ontwikkelperspectief A7/ N33 | | Spatial economic - less attention to nature<br>does not cover full area, energy is not included that much |
| Just transition plan | | | JTF non spatial, just economic policy |
| | Regio deals | | Regio deals , only focussed on housing |
| | | Startnotitie gebiedsplan Groningen | Start notitie gebiedsplan, describes the qualities of |
| Nationaal program groningen | Nationaal program groningen | Nationaal program groningen | Non spatial plans |
| Concept Strategy 2050 | Concept Strategy 2050 | Concept Strategy 2050 | Concept, lacks detail for local area's |

**Concept 2050 as basis** - - →



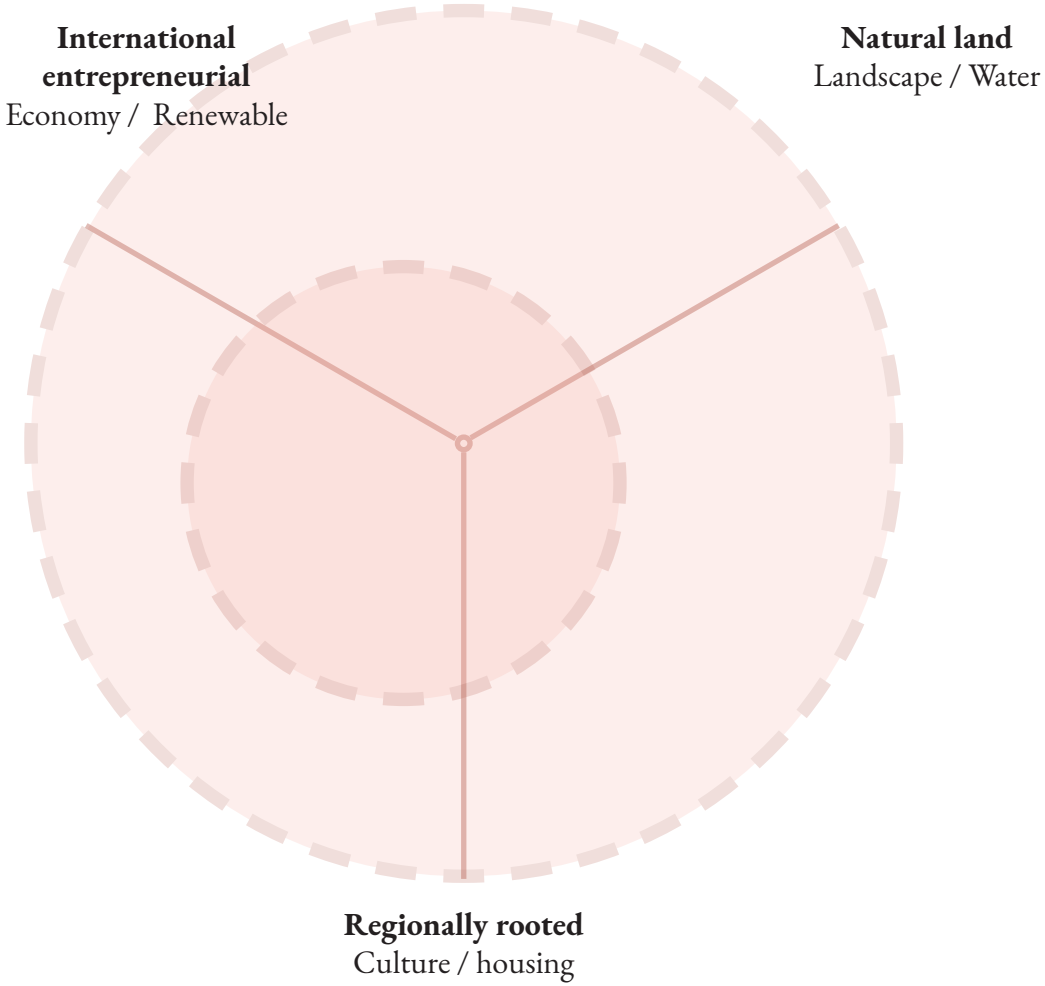

## Where are the gaps?

**No scenario's**
> To consider different futures
> Test spatial "claims" against eachother

**Lack of zoomed in detail**
> Translation strategy to design

# From scenarios to strategy

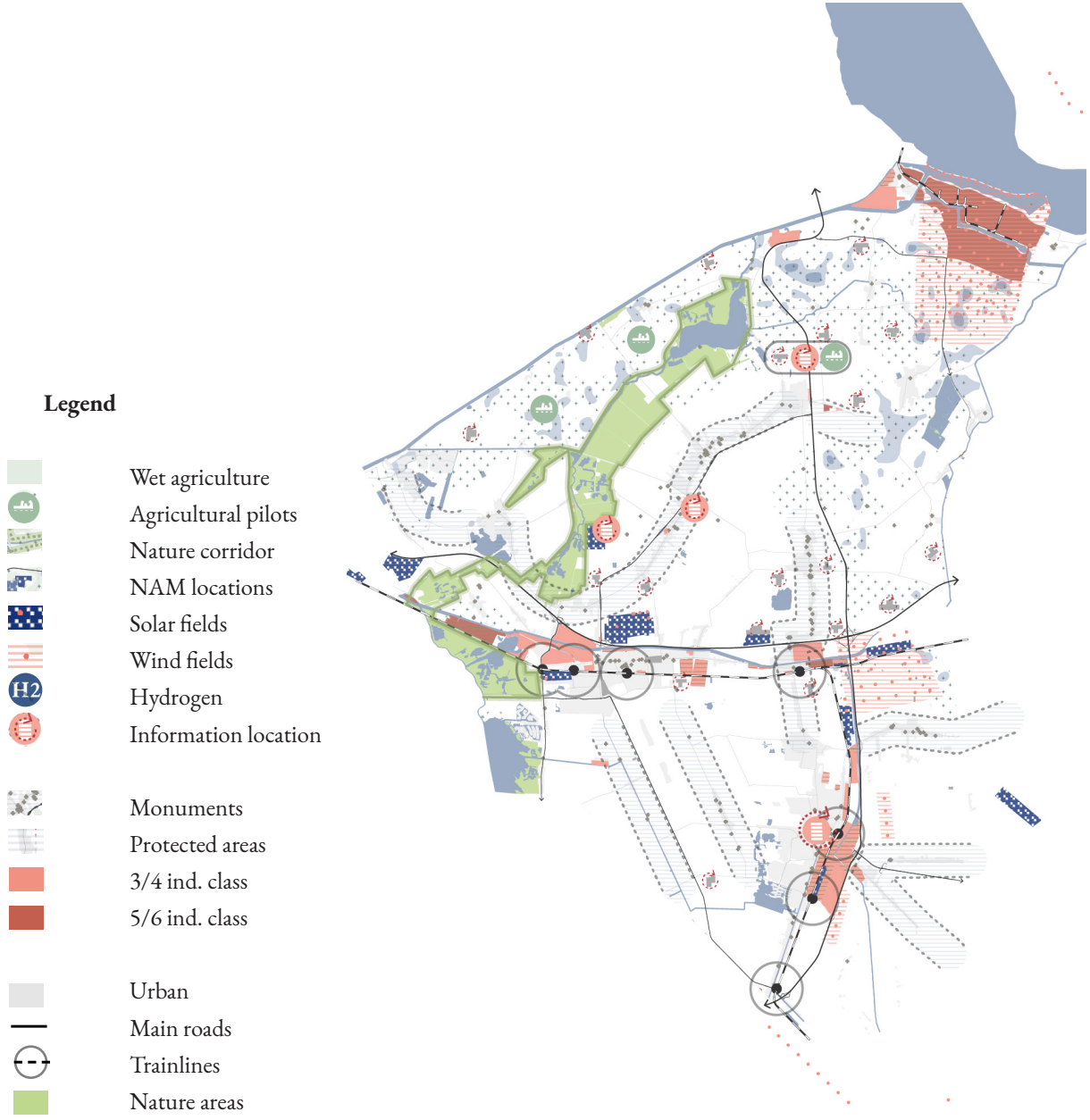




# Phase 1: 2030 preparation



Main actions per time frame
> Prepare NAM locations
> Placement of renewables
> Research on peat oxidation areas
> Remain groundwater levels
> Pilots with wet agricultrue
> Protect the ribbon
> Plan natural corridor

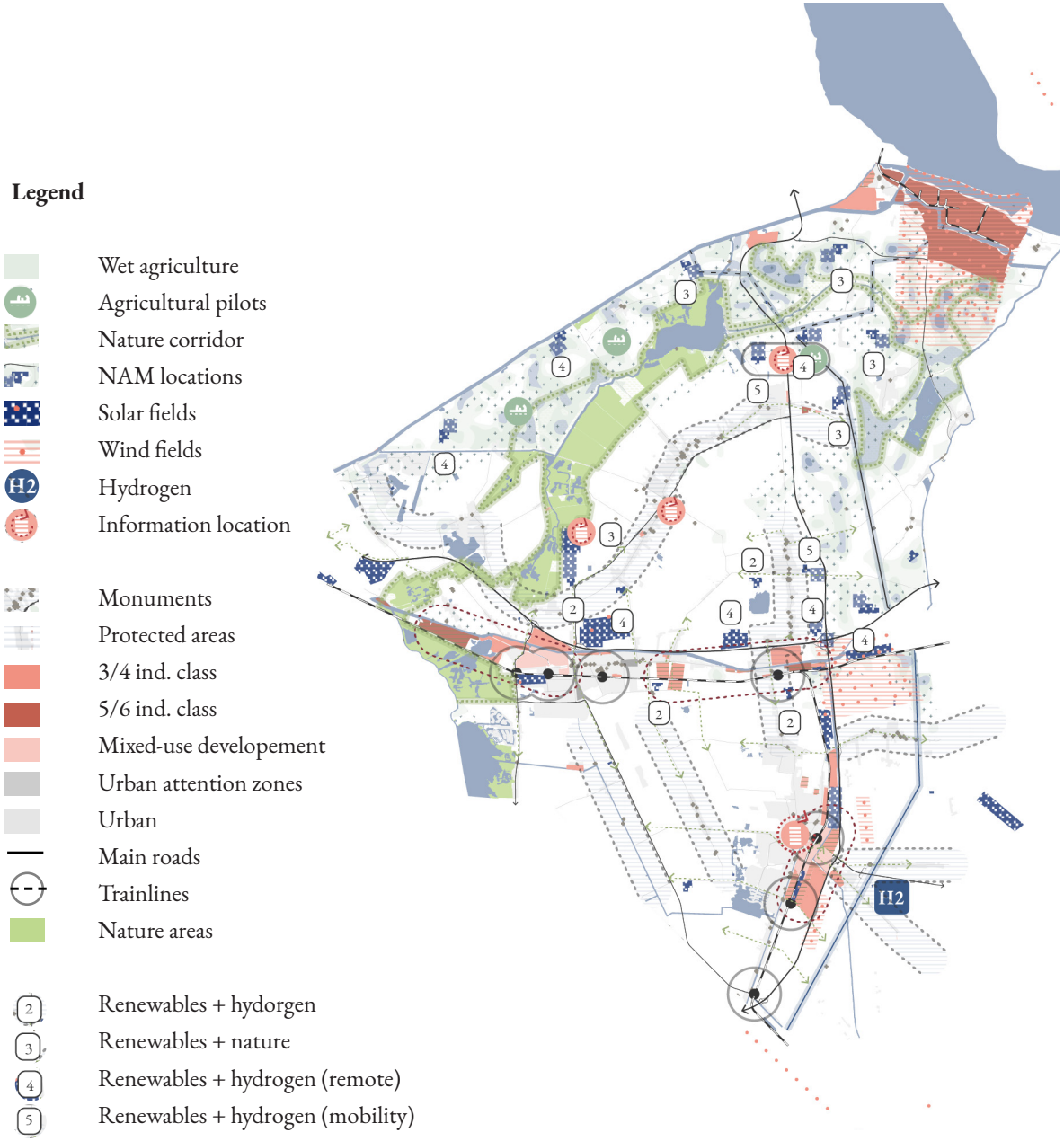


# Phase 2: 2040 Implementation



Main actions per time frame

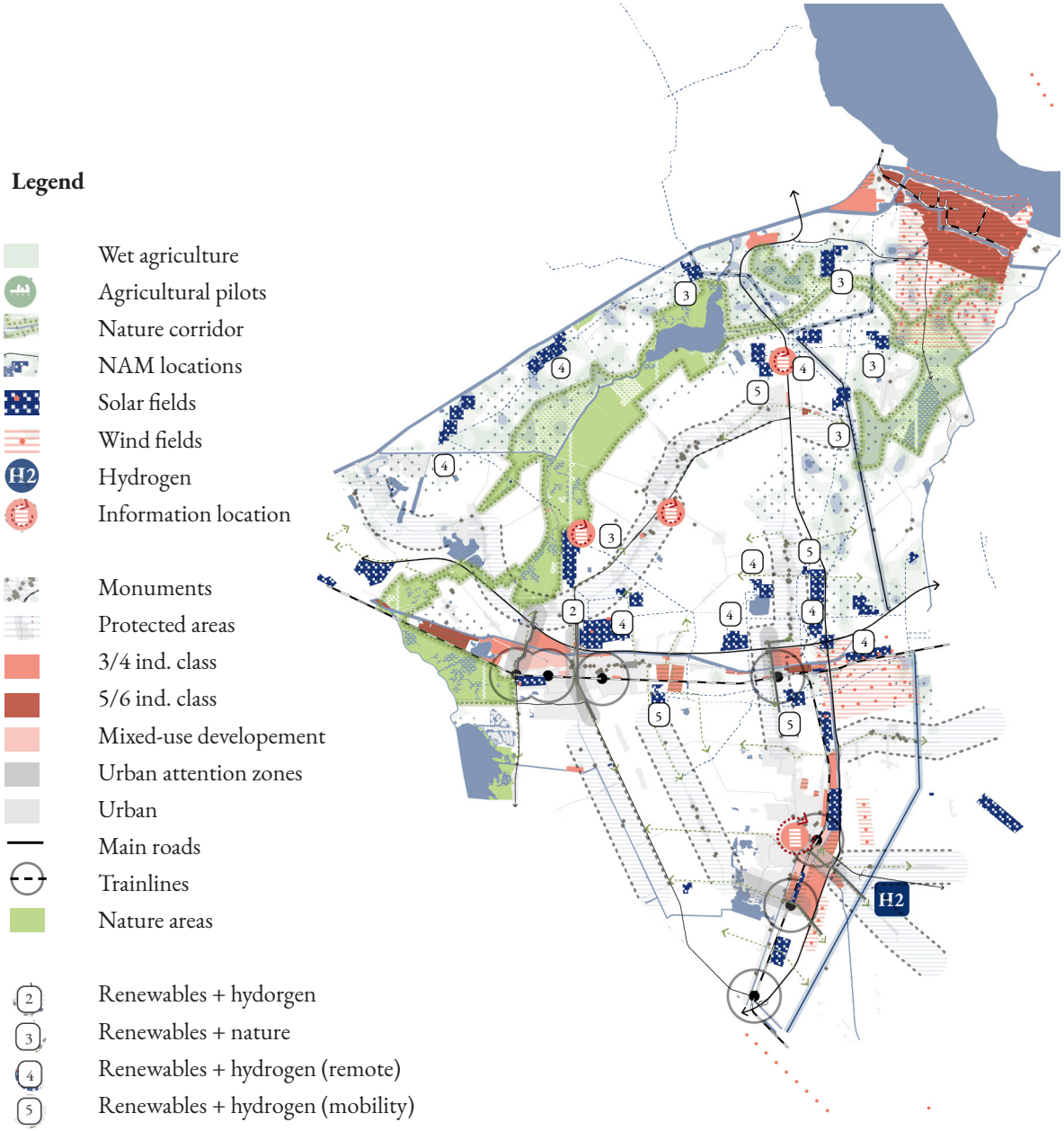
> New RES strategy
> Placement of renewables arround NAM locations
> establishment of the hydrogen network
> Introduction of wet agriculture
> Further development on the natural corridor
> Redevelopment of regional centers
> New housing developments



# Phase 3: 2050 Establishment



Main actions per time frame
> NAM location become multifunctional hubs
> Hydrogen is widely used
> Agriculture optimization
> Nature corridor is complete, guiding the renaturalization process
> Placement of the last renewables
> centers have been renovated and function as regional centers.
> Green corridors
> Tourism inlcusion



# Natural land



**General values**

Local bussineses

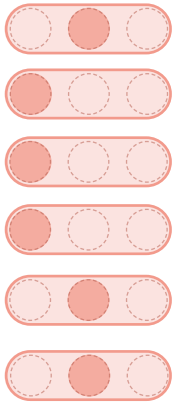
Human in nature

Work with shrinkage

Low energy production (5,7)

Fallible

Caring



**General values**

Supra regional companies

Human above nature

Work against shrinkage

High energy production (+6,4)

(Culture) Perfection

(people) Efficient

**Planning and design values**

Spread out local bussinesess

Spread out small nature

Expantion

Energy is spread out

**Planning and design values**

Concentrated industry

Nature is clustered

Densification

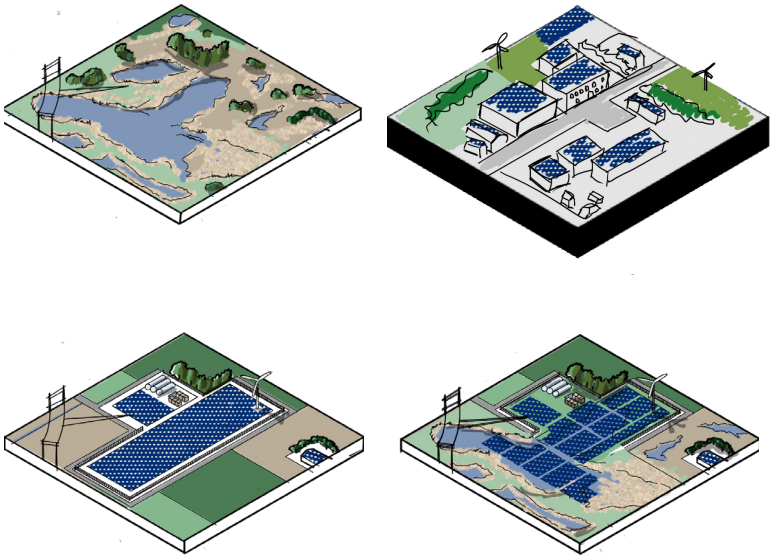
Energy is concentrated

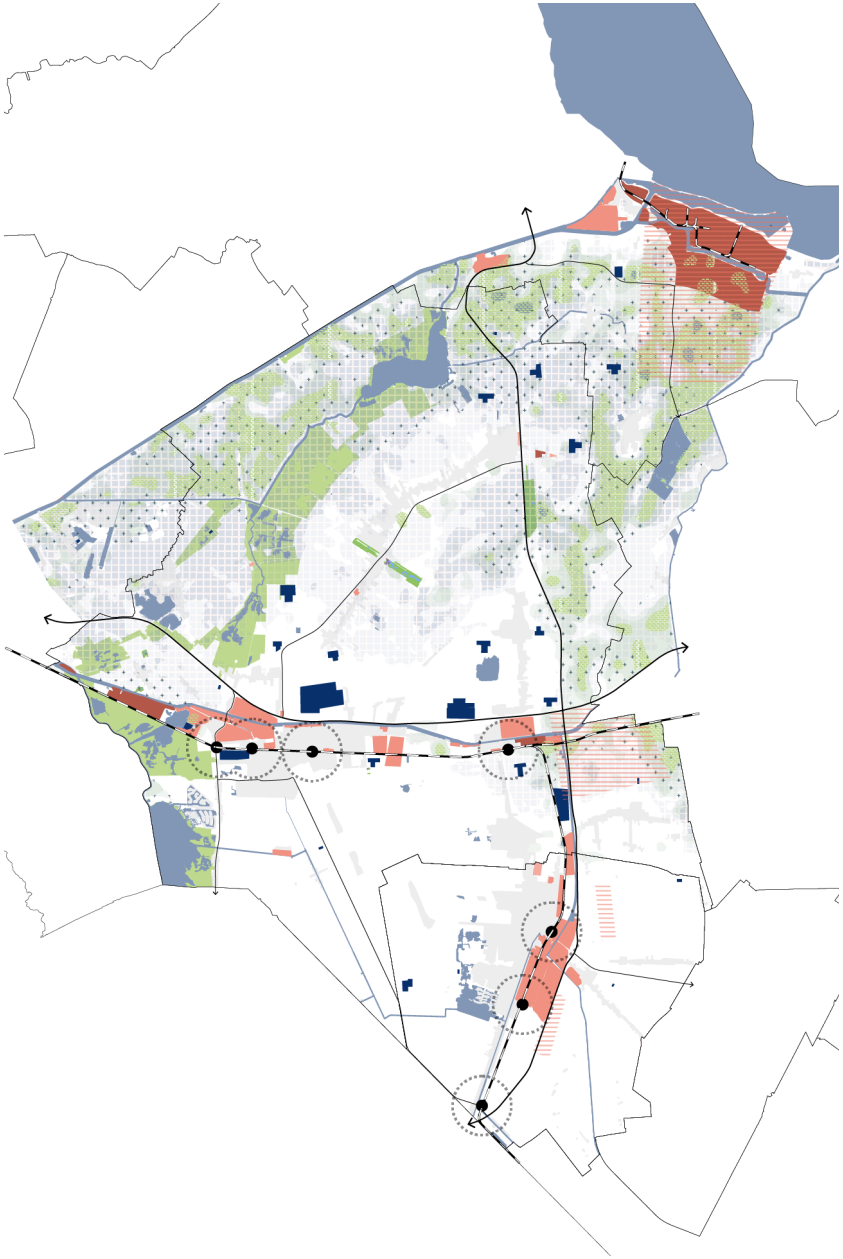
> Nature is central urbanization follows nature
> Industry only possible in selcted locations
> Countryside is working with nature
> Protected natural zones
> Natural solutions

# Natural land



## Important typologies



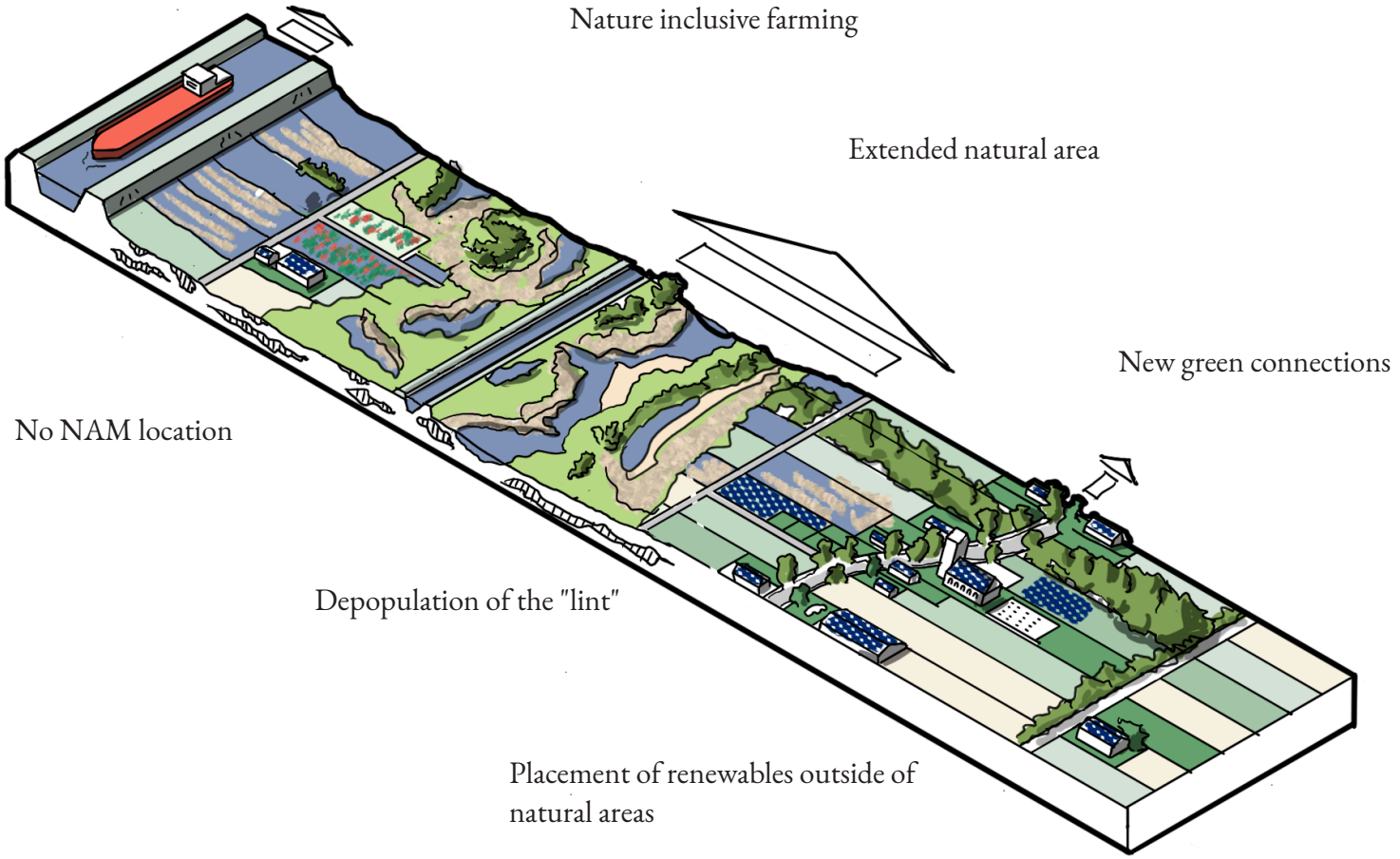


***Legend***

- *Wet agriculture*
- *Re-naturalized areas*
- *Nature corridor*
- *Green corridors*
- *NAM locations*
- *Existing solar fields*
- *Solar fields*
- *Wind turbines*
- *Hydrogen*
- *Monuments*
- *Protected areas*
- *3/4 ind. class*
- *5/6 ind. class*
- *Water*
- *Urban*
- *Main roads*
- *Trainlines*
- *Nature areas*
- *High voltage cables*
- *Development arround train stations*

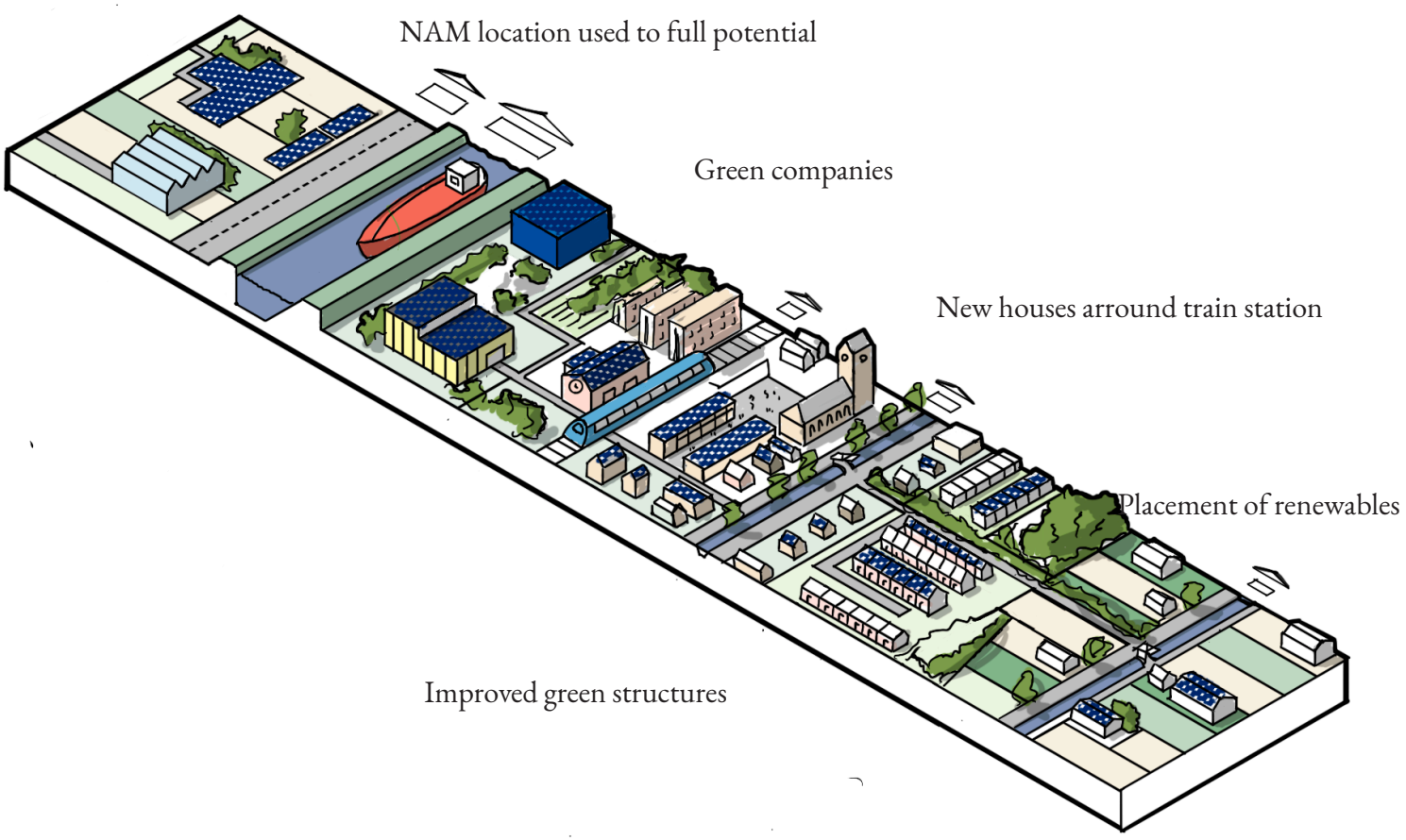
# Natural land





# Natural land





# International entrepreneurial

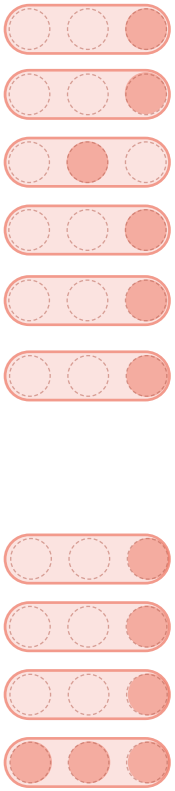


**General values**

| | |
|---|---|
| Local bussineses | Supra regional companies |
| Human in nature | Human above nature |
| Work with shrinkage | Work against shrinkage |
| Low energy production (5,7) | High energy production (+6,4) |
| Fallible | (Culture) Perfection |
| Caring | (People) Efficient |

**Planning and design values**

| | |
|---|---|
| Spread out local bussinesess | Concentrated industry |
| Spread out small nature | Nature is clustered |
| Expansion | Densification |
| Energy is spread out | Energy is concentrated |

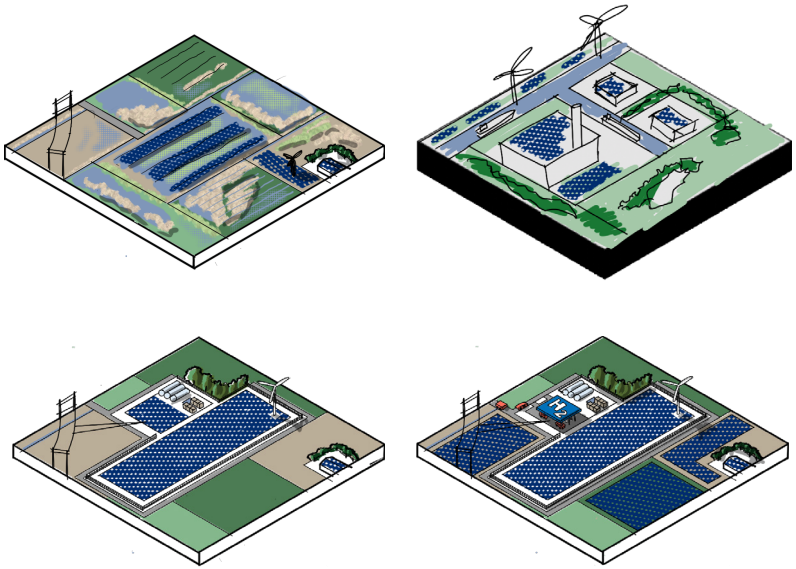


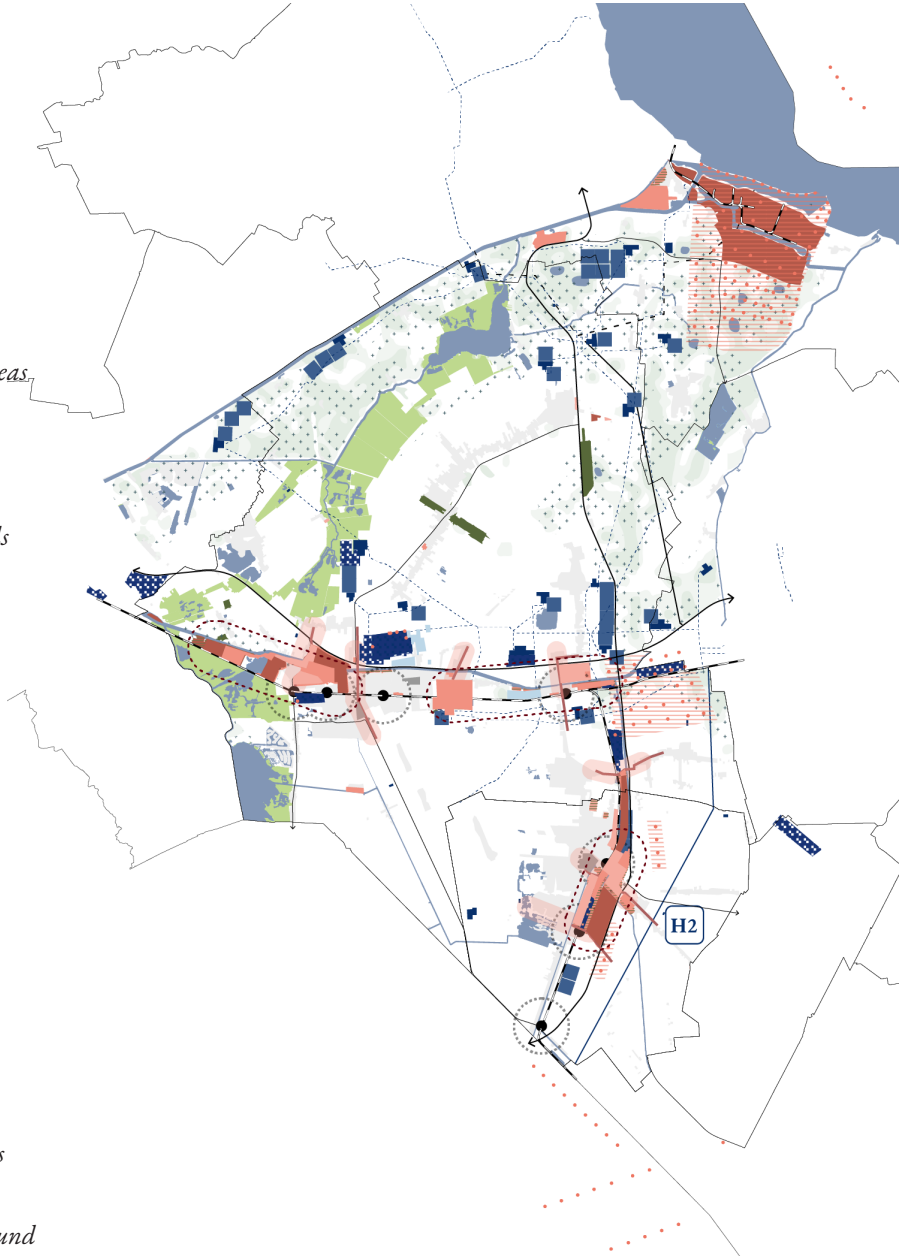
> Groningen creates large economic clusters
> Focus on regional urban centers
> Countryside is "serving" clusters
> People dominate nature
> technical solutions for sustainablity and efficiency

# International entrepreneurial



**Important typologies**






***Legend***

- *Wet agriculture*
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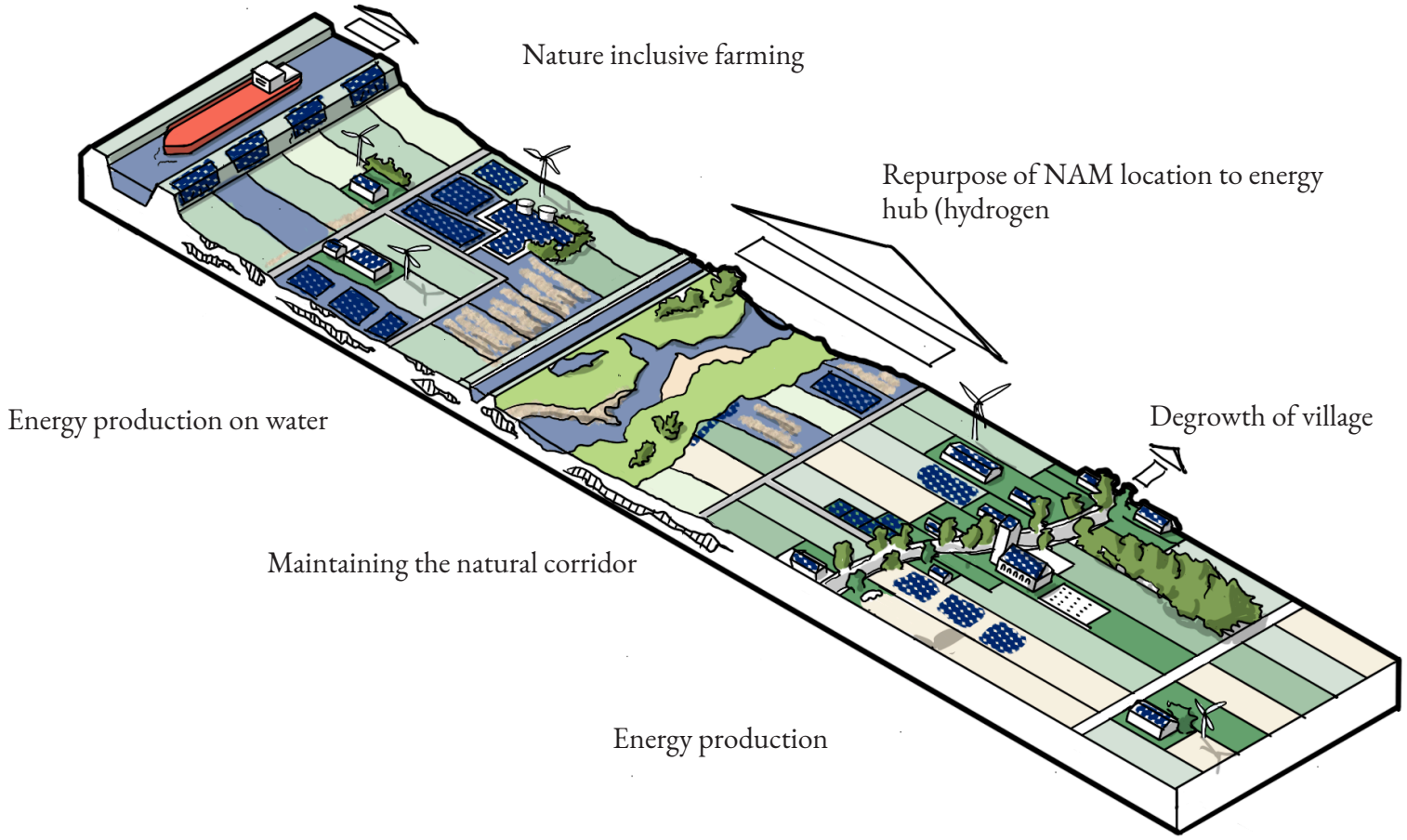
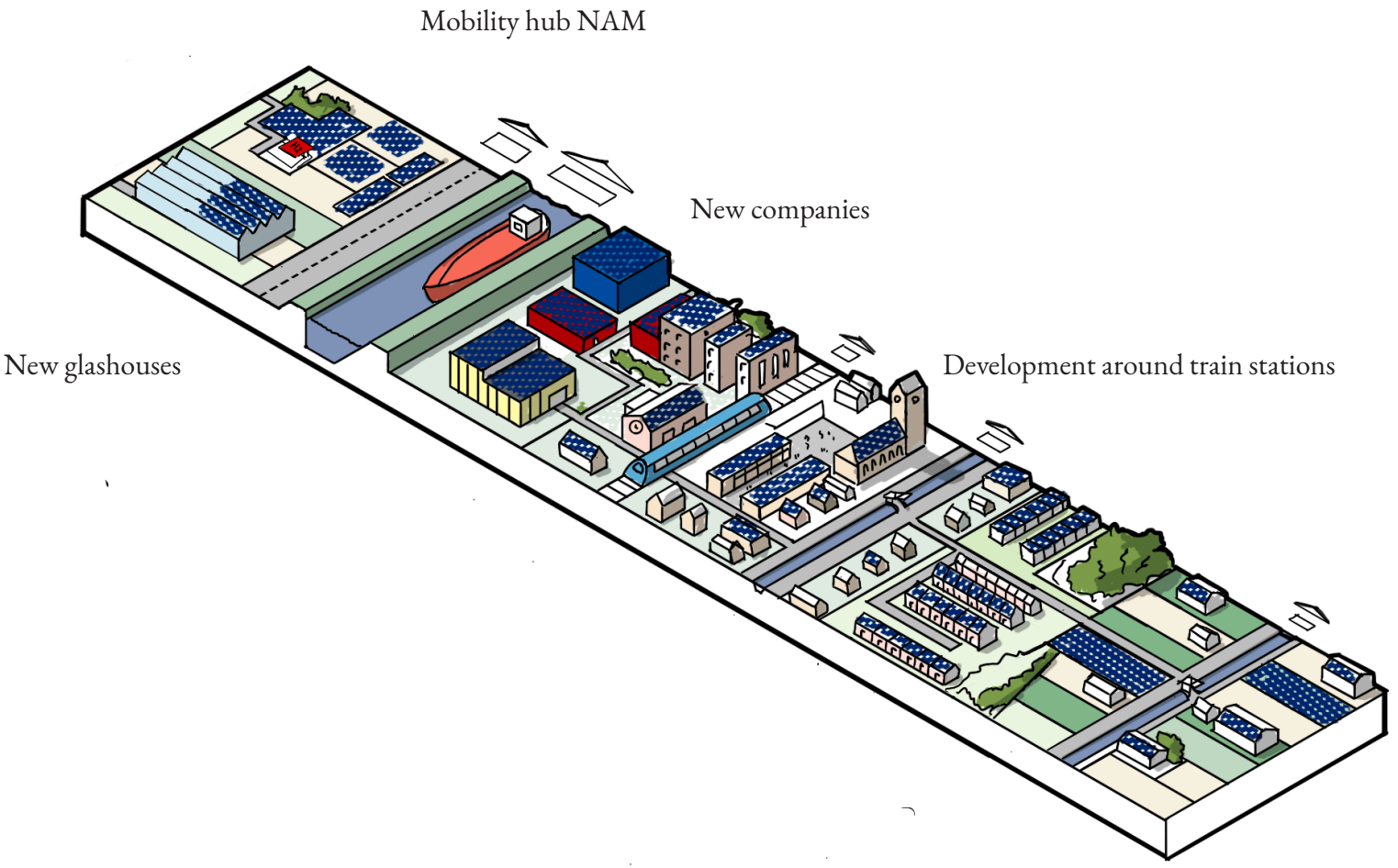
# International entrepreneurial





# International entrepreneurial





# Regionally rooted



| **General values** | | **General values** |
|---|---|---|
| Local bussineses |  | Supra regional companies |
| Human in nature |  | Human above nature |
| Work with shrinkage |  | Work against shrinkage |
| Low energy production (5,7) |  | High energy production (+6,4) |
| Fallible |  | (Culture) Perfection |
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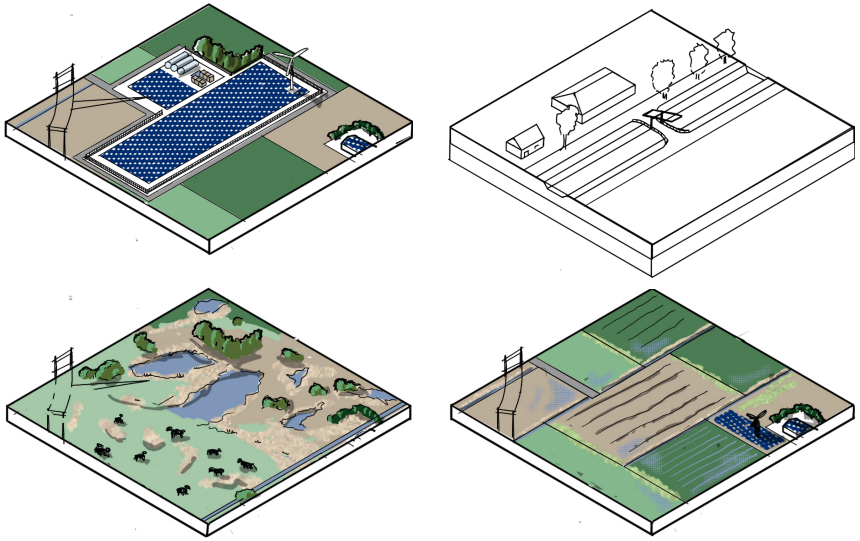
| **Planning and design values** | | **Planning and design values** |
| Spread out local bussinesess |  | Concentrated industry |
| Spread out small nature |  | Nature is clustered |
| Expansion |  | Densification |
| Energy is spread out |  | Energy is concentrated |

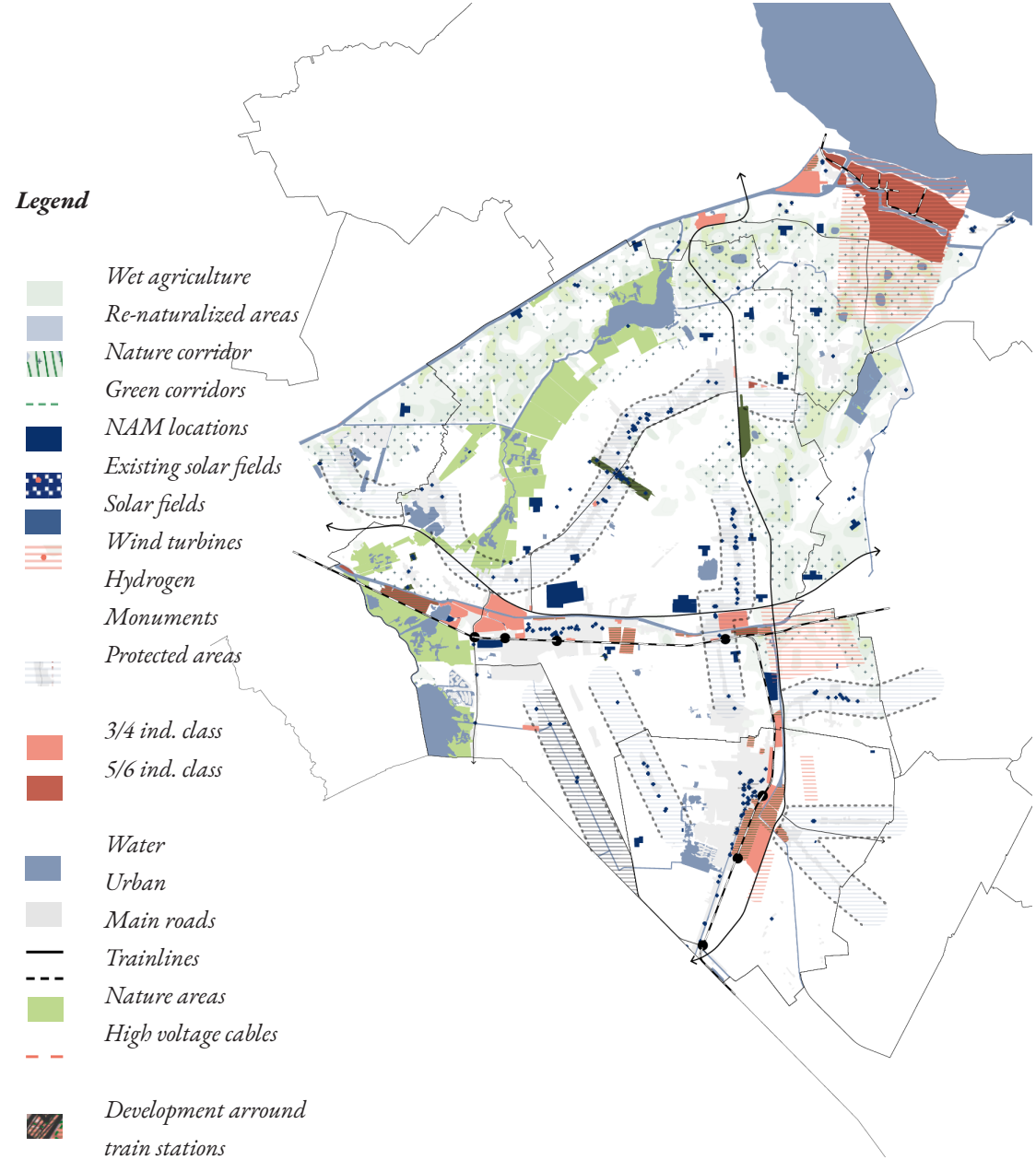
> Urbanization and natural areas stay more or less the same
> Industry only possible in selected locations
> Nature is seen as  recreative regional landscapes
> Region is supplying its own need
> Less coordination on the national level

# Regionally rooted



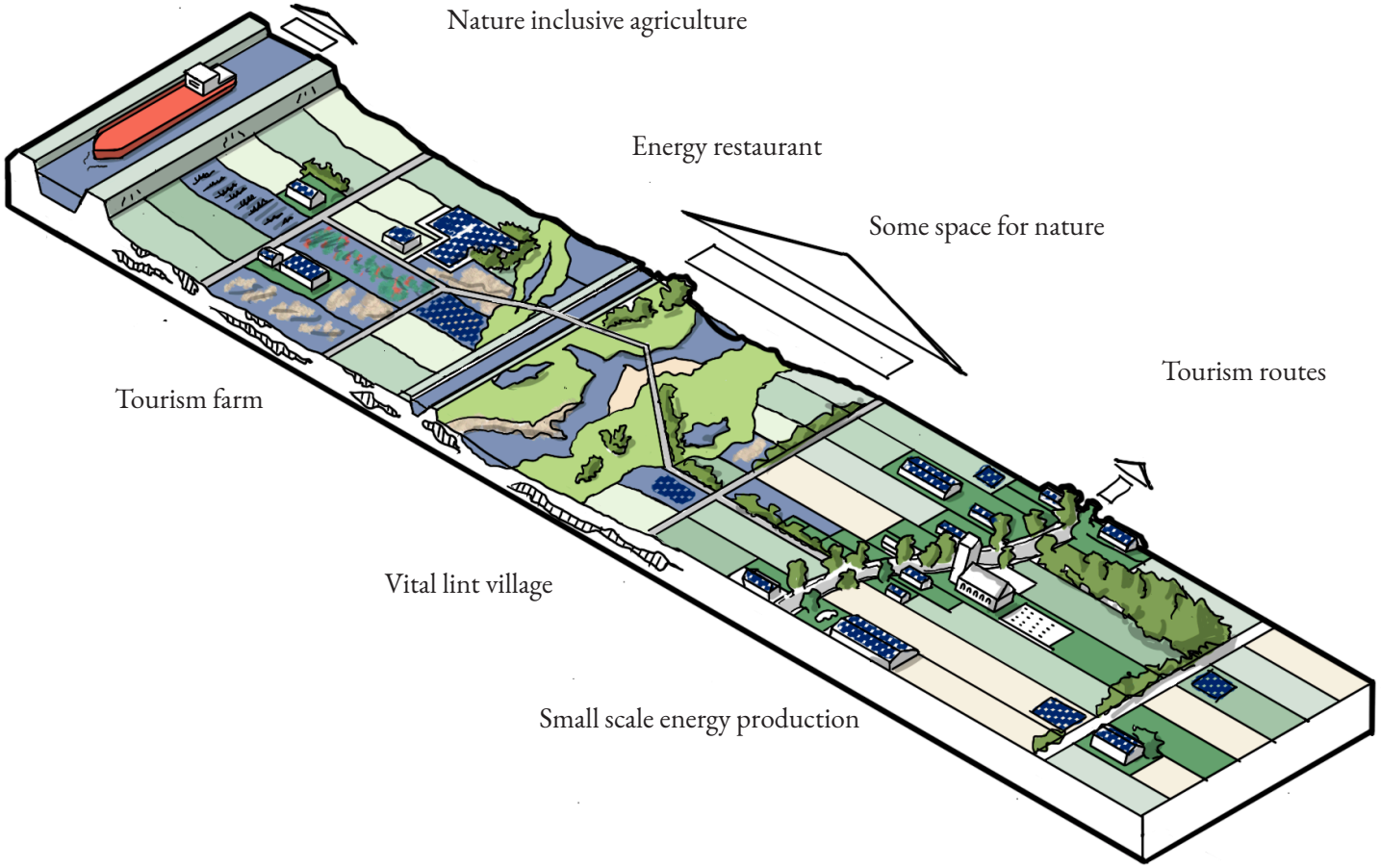
**Important typologies**





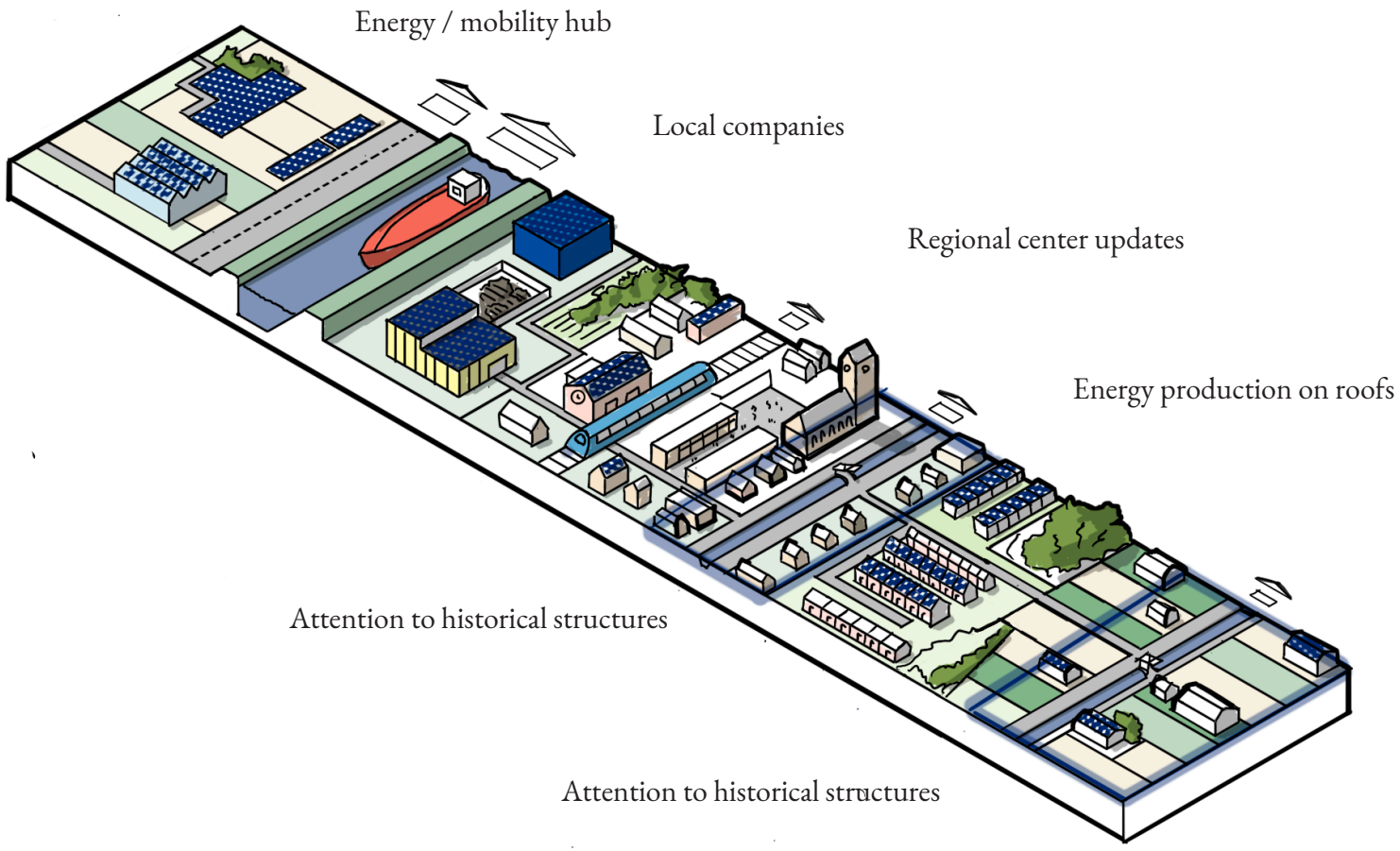
# Regionally rooted





# Regionally rooted





# Scenario evaluation



| Natural Groningen | International entrepreneurial | Regionally rooted | |
|---|---|---|---|
| | | | **Preconditions** |
| - | - | ++ | Preserving the Groningen landscape and identity |
| + | ++ | - | Placement of renewables and reuse of current energy infrastructure |
| - | ++ | + | Ensuring economic competitiveness |
| ++ | + | + | Addressing climate change challenges |
| - | - | ++ | Inclusion of all groups in society |
| | | | **Principles** |
| ++ | - | + | Establishing a nature network throughout Groningen |
| + | ++ | - | Transforming train stations into development hubs |
| + | ++ | + | Repurposing NAM sites for renewable energy |
| - | - | ++ | Enhancing opportunities for recreation and tourism |

# Scenario evaluation



| Natural Groningen | International entrepreneurial | Regionally rooted |
|---|---|---|
| - | - | ++ |
| + | ++ | - |
| - | ++ | + |
| ++ | + | + |
| - | - | ++ |
| ++ | - | + |
| + | ++ | - |
| + | ++ | + |
| - | - | ++ |

**Preconditions**

Preserving the Groningen landscape and identity

Placement of renewables and reuse of current energy infrastructure

Ensuring economic competitiveness

Addressing climate change challenges

Inclusion of all groups in society

**Principles**

Establishing a nature network throughout Groningen

Transforming train stations into development hubs

Repurposing NAM sites for renewable energy

Enhancing opportunities for recreation and tourism

# Stakeholder power/interest matrix



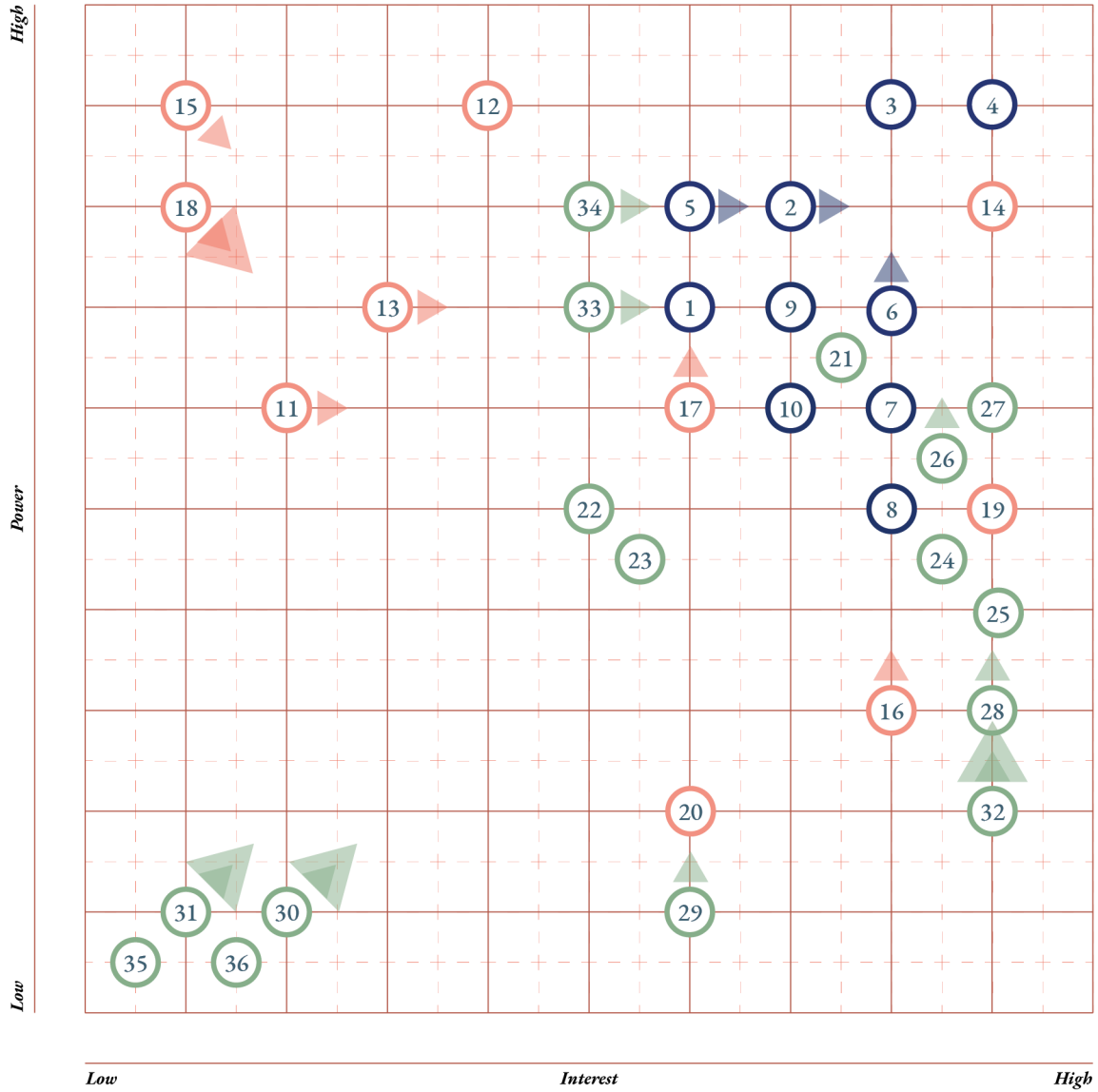
**Main changes:**

**Less power:**
18. Fossil energy companies

**Empower least engaged:**
30. Youth
31. Least engaged

> Engagements strategies

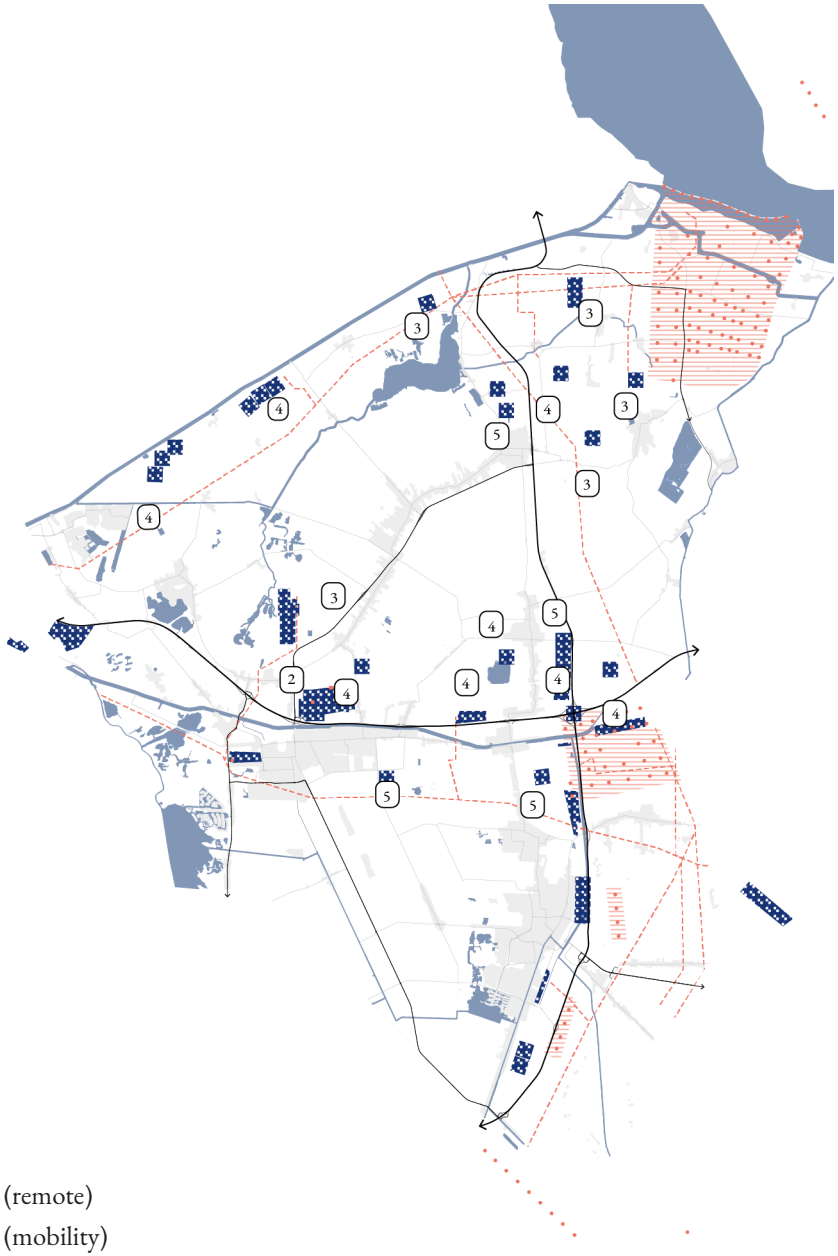
**Consider nature and animals:**
35. Nature
36. Animals



# The energy production



> Placement of the renewables arround the NAM locations
> Use of less suitable farming lands.



# The hydrogen backbone



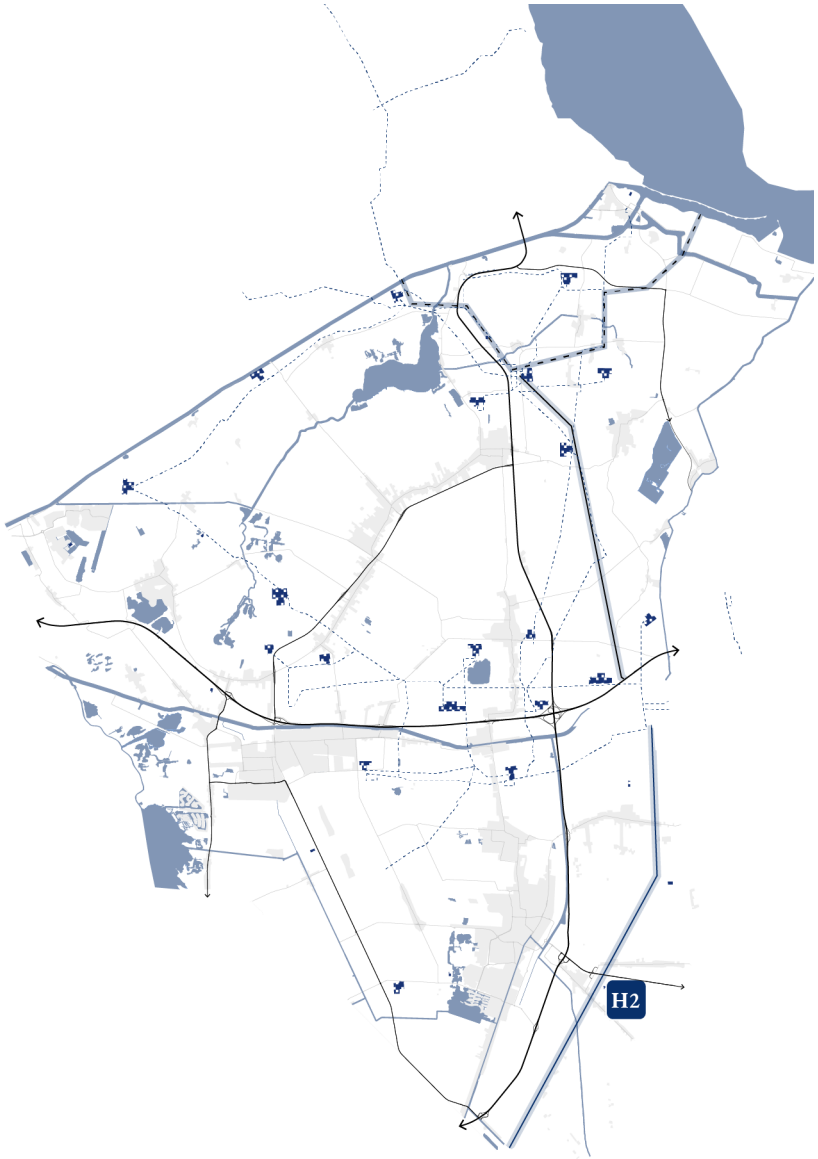
The NAM locations

> Store the hydrogen
> Conversion hydrogen towards energy
> Large scale storage veendam
> Hydrogen production

> Integration with national network

https://www.linde-engineering.com/en/about-linde-engineering/success-stories/h2-mobility.html

https://www.greenhydrogensystems.com/electrolysers/hyprovide-x-series-6mw-modular-electrolyser




**Legend**

- Urban
- NAM locations
- Hydrogen
- National pipelines
- Local pipelines

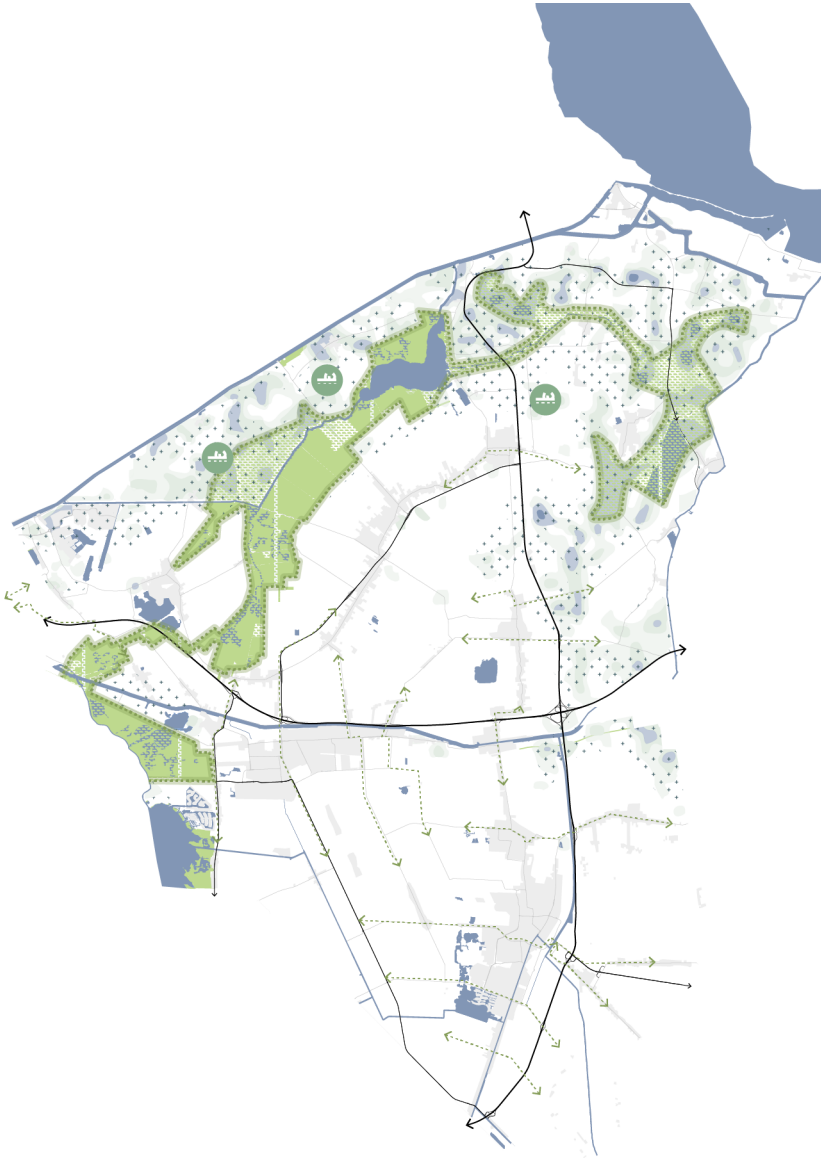
# Nature and nature inclusive farming



> test locations for green agriculture

> New natural network
> Areas for wet agriculture
> Increased water storage

> Green connections



# Built environment

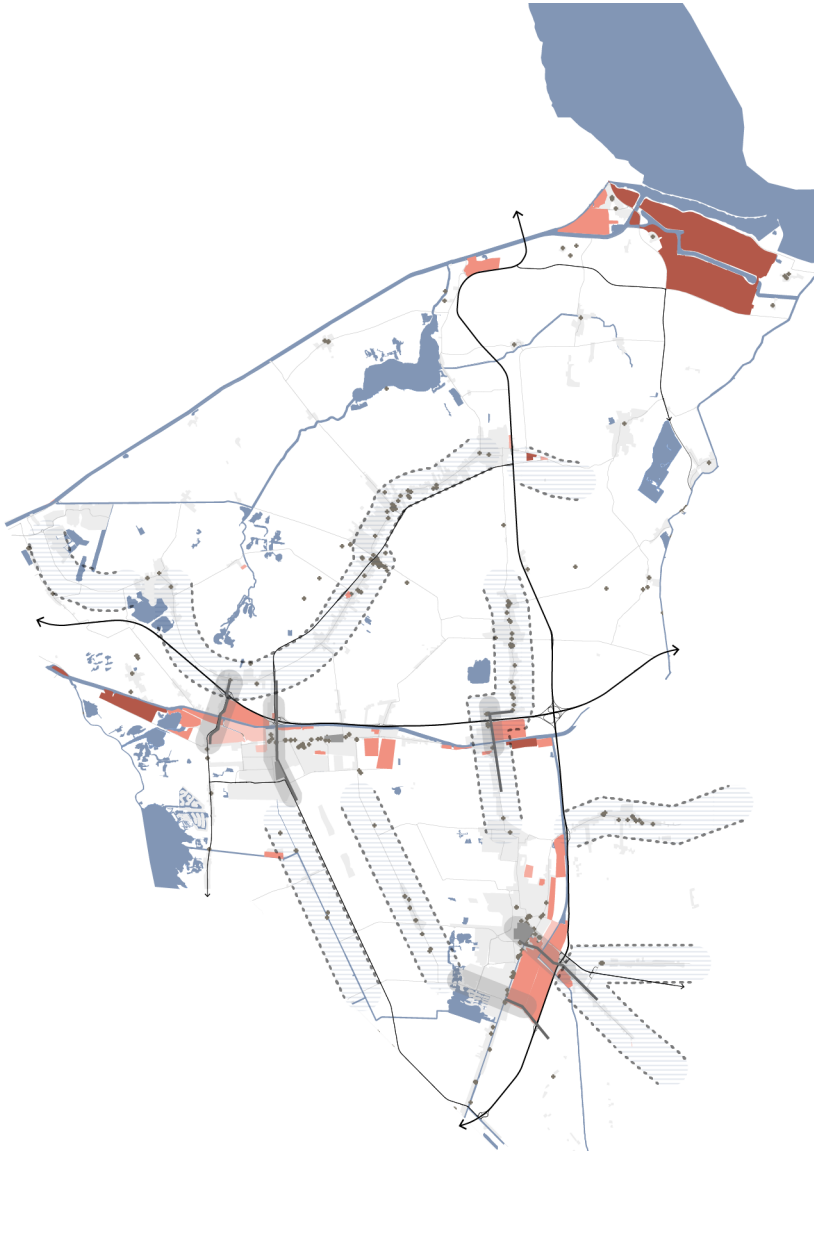


The rearangement of  the industrial areas

The protection of urban zones

Attention areas in the urban zone

Train station areas as core regions.

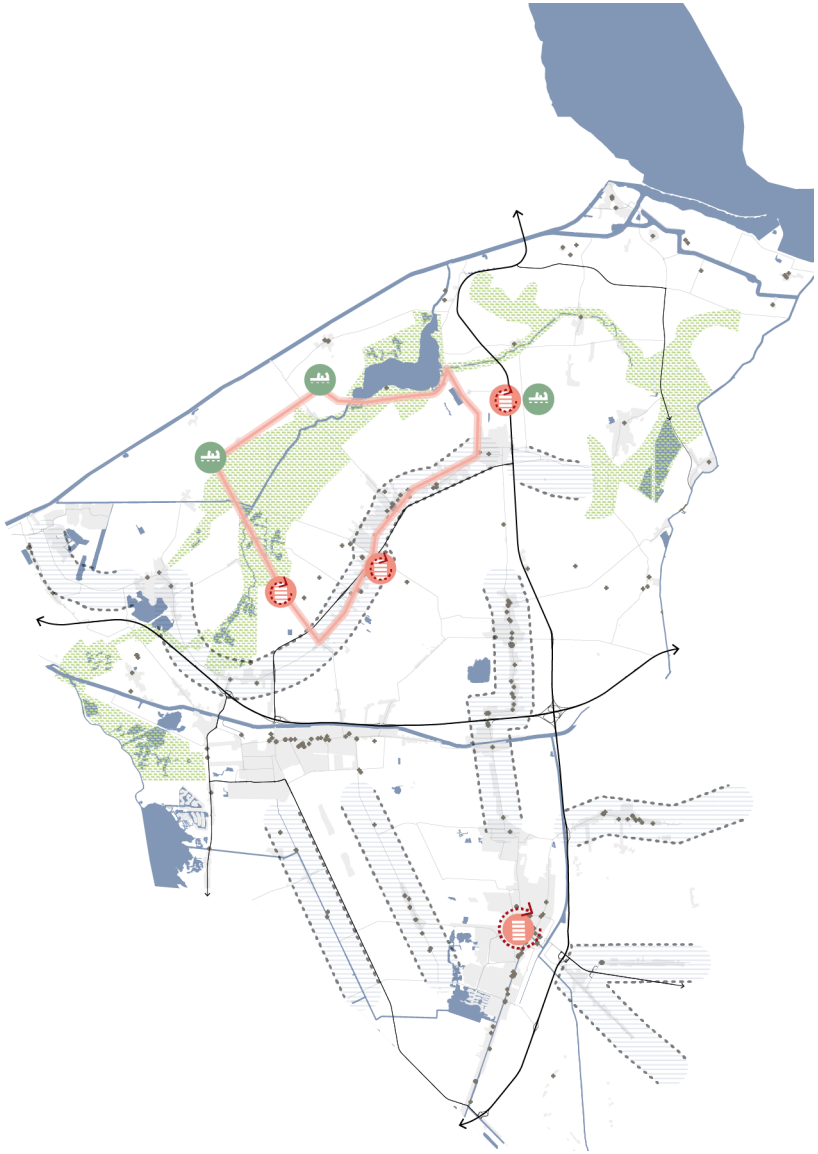


# Energy, heritage path



> Information about the energy transition

Intergration with tourism:
> Wet agriculture pilots
> NAM location
> Local heritage



# Zoom in locations



Remote namlocation can have more intergration
with natural elements