



# Energieke Bollenstreek

*Design research on the sustainability transition  
of the Bulb Region*

Anubhuti Chandna, Spatial planner and designer

Generation. Energy is specialized in the spatial opportunities and solutions around the energy transition.

Our team of experts in space and energy bridges the gap between data and strategic design.

With imagination, we simplify the complexity of the spatial tasks at hand –  
**so that we can accelerate the energy transition.**

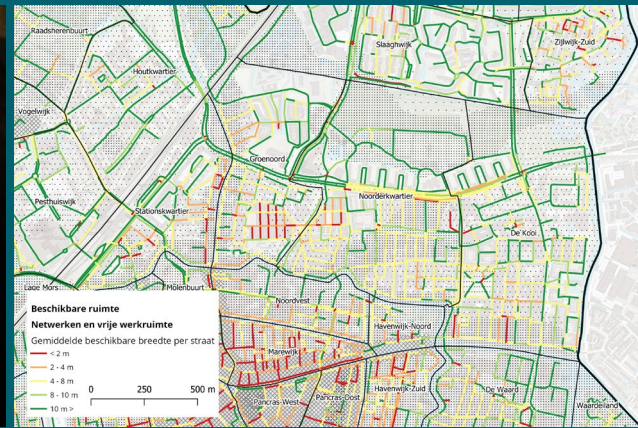
# Research

We investigate the spatial possibilities



# Data

Analysing of possible spatial solutions through data



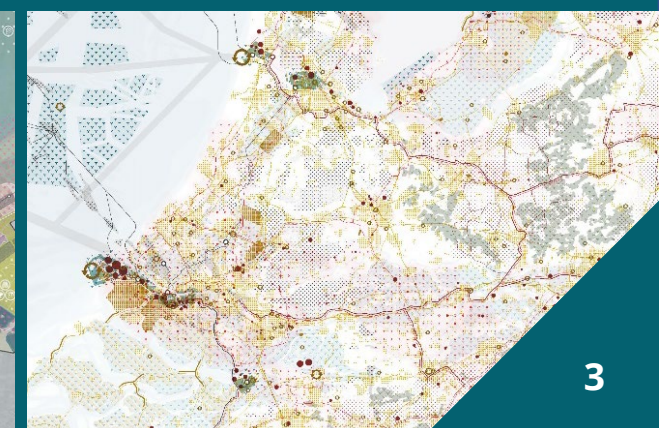
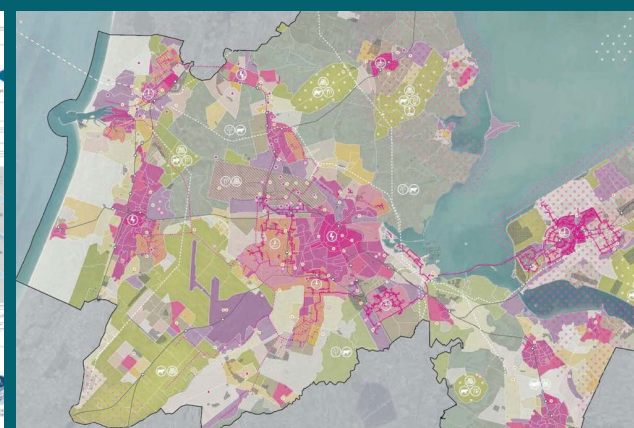
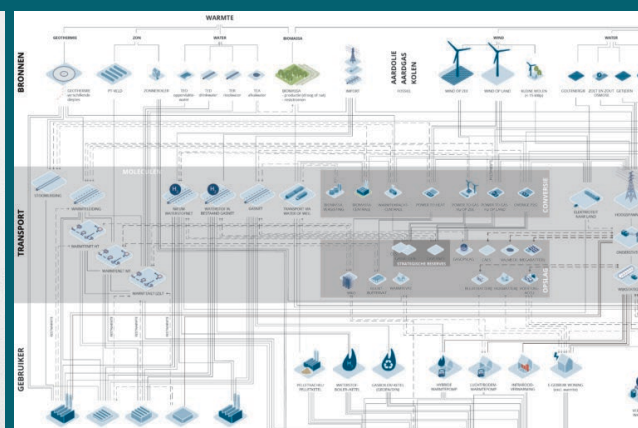
# Design

Visualize possibilities and chances with strategic design



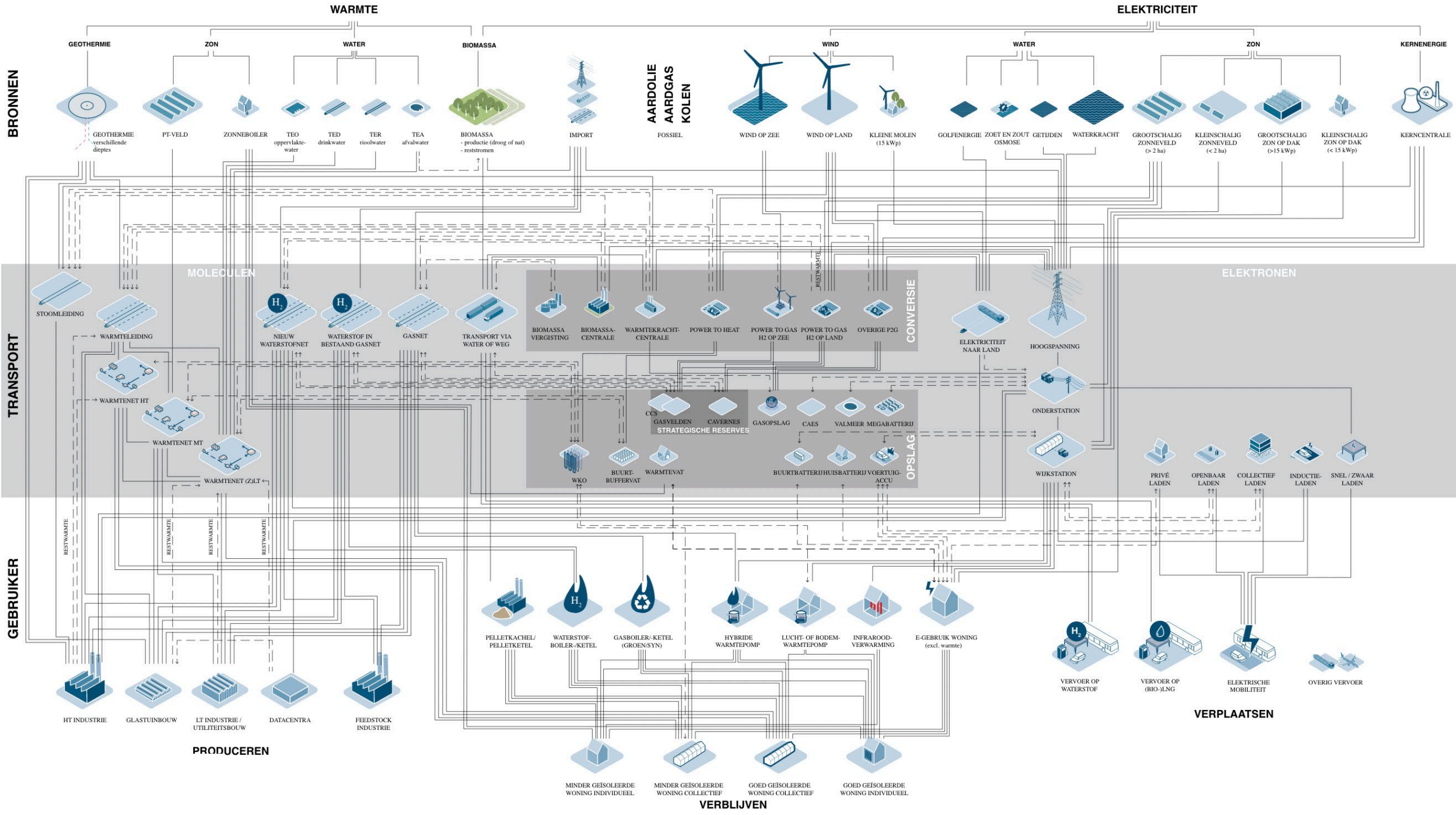
# Games

Involve everyone in the process with serious games



# energy = space





# Change is coming

- Climate
- High energy prices and conversion from a fossil to a renewable energy system
- Lack of succession in the agricultural sector
- High spatial pressure and shortages in the housing market
- Water and soil quality
- Nitrogen crisis
- Decline in biodiversity



# Bollenstreek

- Iconic production landscape
- With its own challenges and opportunities
- What does the production landscape of the future look like?



# Design research: Goal

- The design research was conducted as part of the open call “[Beautiful Production Landscapes](#)” of the [Stimuleringsfonds Creatieve Industrie](#). Under the open call, coalitions of governments, interest groups, network managers and other relevant stakeholders are invited to work with designers on new strategic visions or design proposals for the transition of a production landscape in the Netherlands.
- To analyze the challenges and opportunities facing the Dune and Flowerbulb Region and outline perspectives by exploring the transitions the bulb-growing region is undergoing to become more sustainable in relation to energy transition.
- The purpose of this design study is to find out [how solar and wind energy can contribute to accelerating and shaping the transitions in the region](#) while at the same time strengthening the spatial quality of the Bulb Region.
- The purpose was not to arrive at choices between the vertices and what-ifs described, but to provide insight into the [consequences of certain choices](#) and to discuss them with various parties in the region.



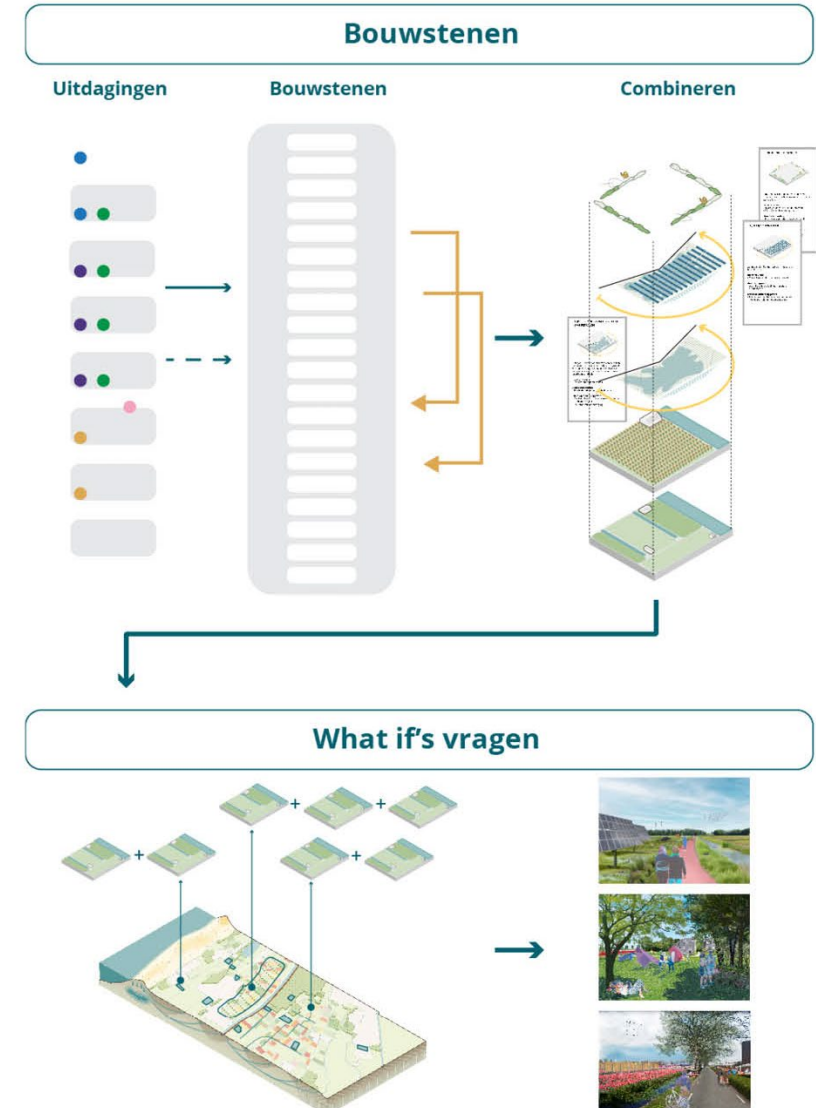
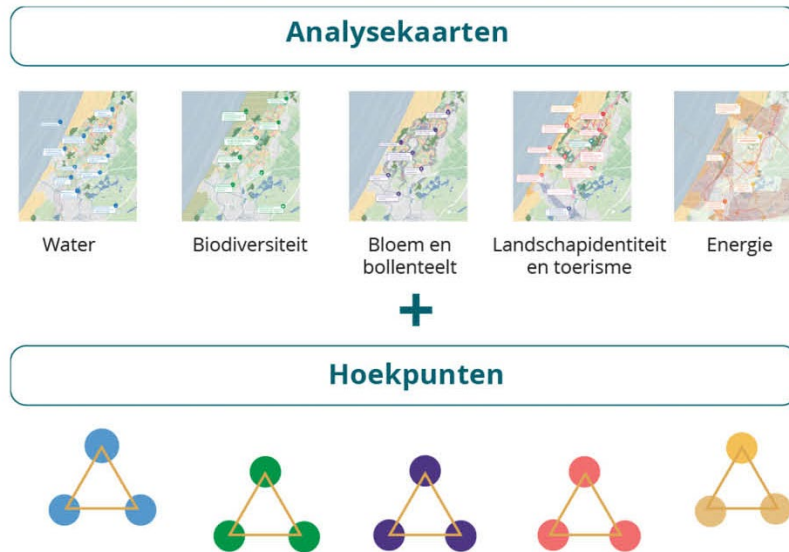
***Mensen verzetten zich niet tegen verandering. Integendeel, zij verzetten zich tegen het verlies van waarden zonder dat er nieuwe waarden voor in de plaats komen....***

***Coeterier, 1987***

*People do not resist change. On the contrary, they resist the loss of values without new values to replace them....*

# Method

- The design research has four steps: an analysis of the tasks, exploration of vertices and formulation of building blocks.



# Selected themes

- For the identified themes of water, biodiversity, bulb and flower growing, landscape identity & tourism and energy, the various challenges and opportunities have been described and mapped

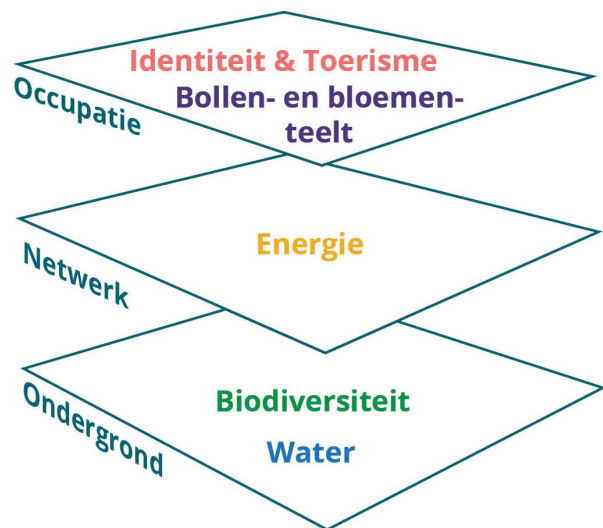


Fig. 1: Lagenbenadering i.r.t. de geïdentificeerde thema's



# Landscape types

## De Duinen

- Versterken van de zeereep door zeespiegelstijging
- Kwelwater van hoge kwaliteit raakt vermengd met oppervlaktewater van lage kwaliteit
- Verdroging door uitzakken grondwaterpeil
- Vergroten zoetwatervoorraden voor o.a. drinkwaterwinning
- Versterken van de ecologische dynamiek

## Bollen- en bloemenvelden

- Afnemende bodemvruchtbaarheid
- Vervuiling van water door uitspoeling meststoffen en gewasbeschermingsmiddelen
- Toenemende watertekorten en droogtestress door toenemende periodes van droogte
- Toenemende interne en externe verzilting
- Bollen- en bloemenvelden vragen om een specifiek waterpeil
- Biodiversiteit en waterkwaliteit staan onder druk

## Landgoederenzone

- Keukenhof als grote toeristische trekpleister
- Cultuurhistorische drager
- Economische dragers voor instandhouding

## De overgang tussen stad- land

- Hoge ruimtelijke dynamiek
- Soms een harde grens tussen stad en landschap
- Soms sprake van 'ongedefinieerde plekken en verrommeling'

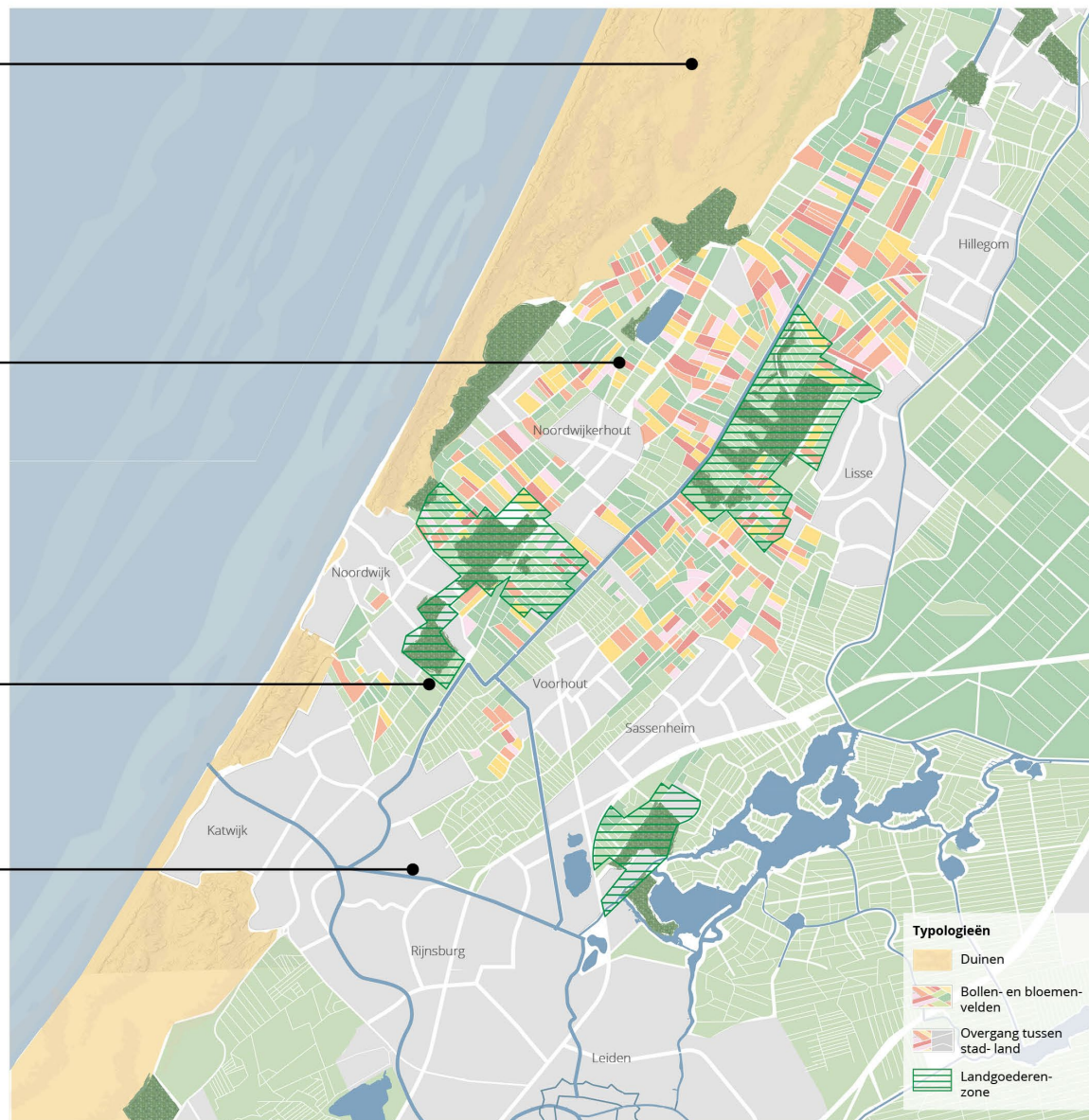
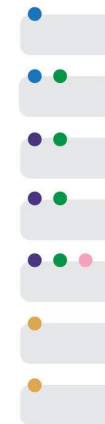


Fig 19: De landschapstypen i.r.t. de uitdagingen geïdentificeerd in de analysekaarten

# Building blocks

- Based on the analysis maps and the cornerstones discussed, more than 40 building blocks were developed which informs of the spatial intervention in the region and its impact on both the system and space.

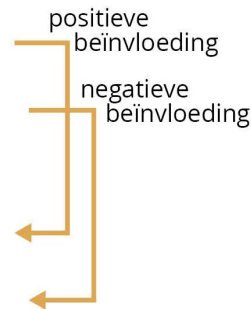
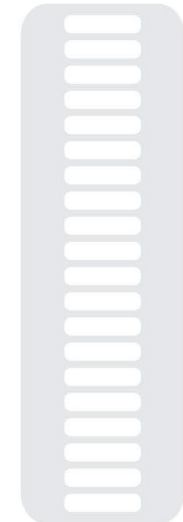
Uitdagingen  
per Thema



Mitigatie →

Adaptatie →

Bouwstenen  
met ruimtelijke claim



Water

Biodiversiteit

Bollen- en bloementeelt

Landschaps- identiteit & toerisme

Energie

# Challenges

## Thema's uitdagingen

Water

Biodiversiteit

Bollen- en bloemeteelt

Toerisme en landschaps-identiteit

Energie



# Challenges + building blocks

## Thema's uitdagingen

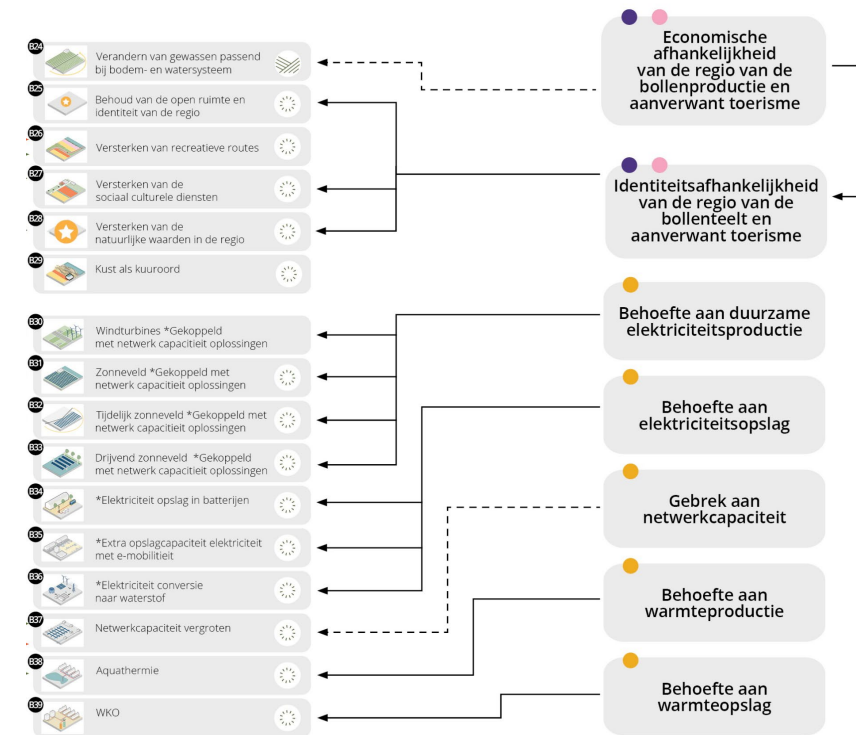
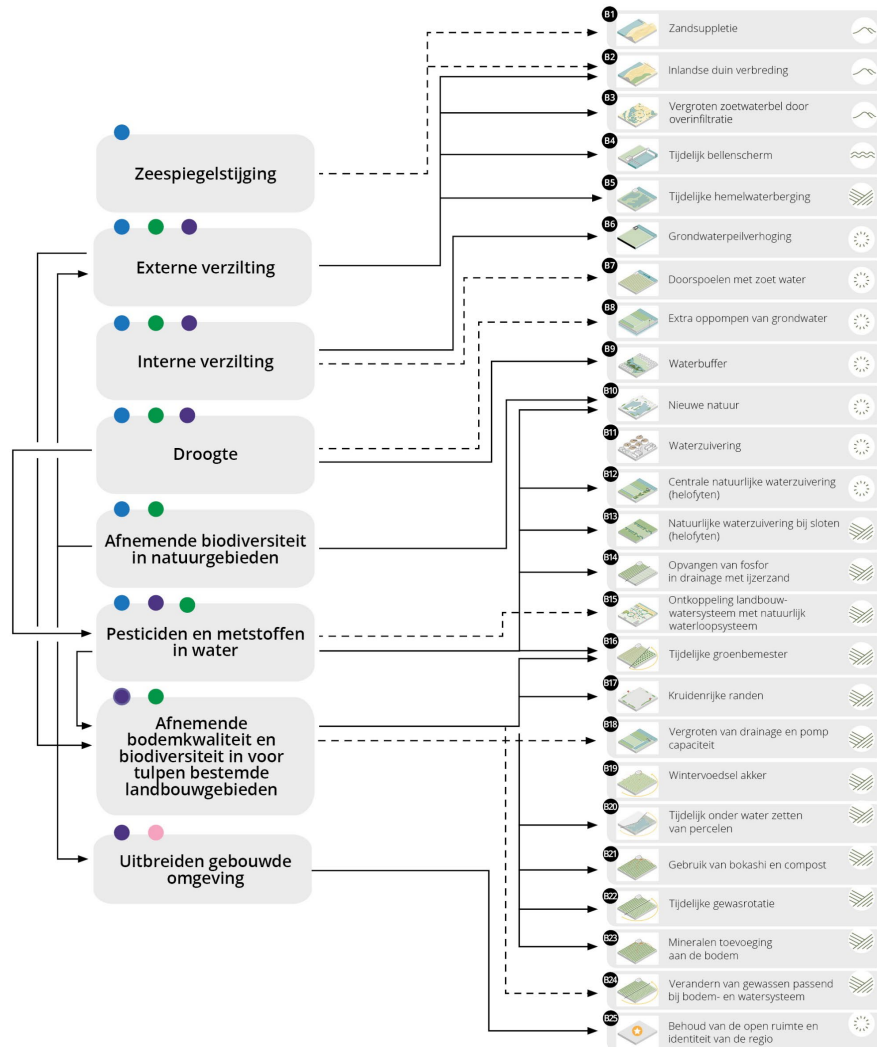
Water

Biodiversiteit

Bollen- en bloementeelt

Toerisme en landschaps-identiteit

Energie



# Challenges + building blocks

Thema's uitdagingen

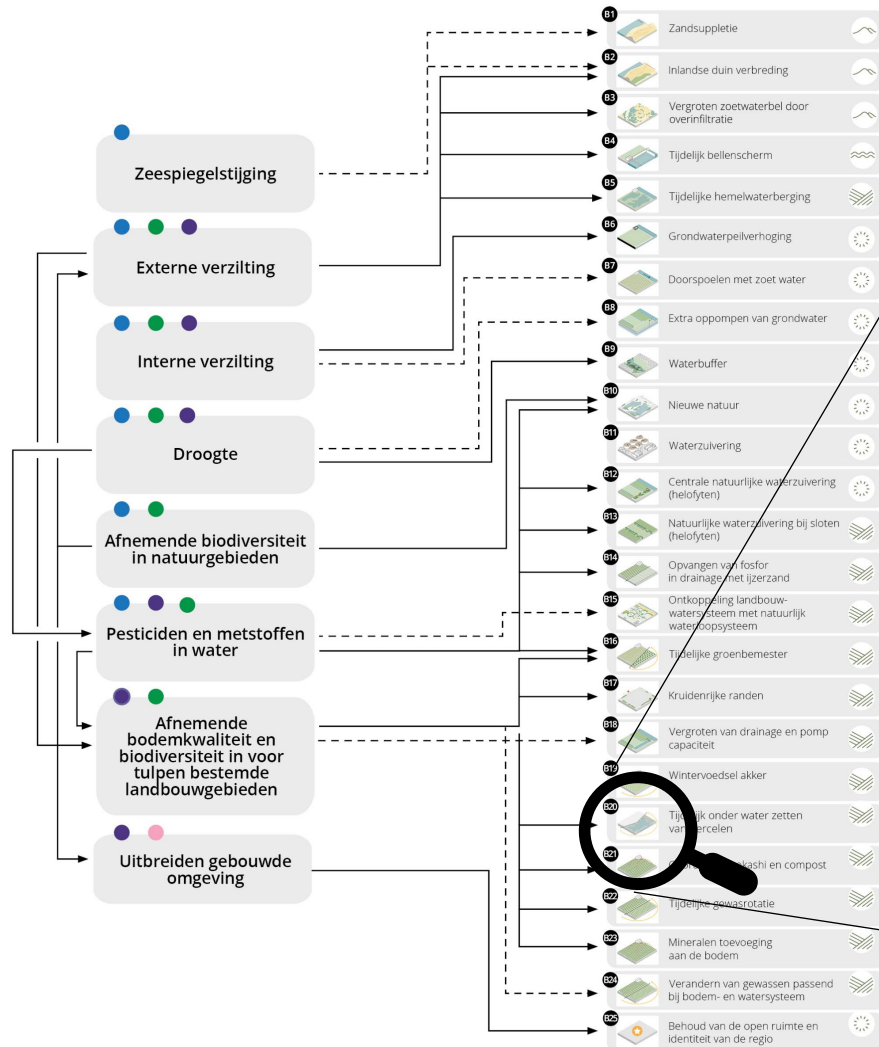
Water

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Toerisme en landschaps-identiteit

Energie



### TIJDELIJK ONDER WATER ZETTEN VAN PERCELEN

Het tijdelijk onder water zetten van de bollenpercelen, zodat de bodem vrij wordt gemaakt van aaltjes, onkruid en bollenresten. Deze aanpak voorkomt het inzetten van chemische bestrijdingsmiddelen.

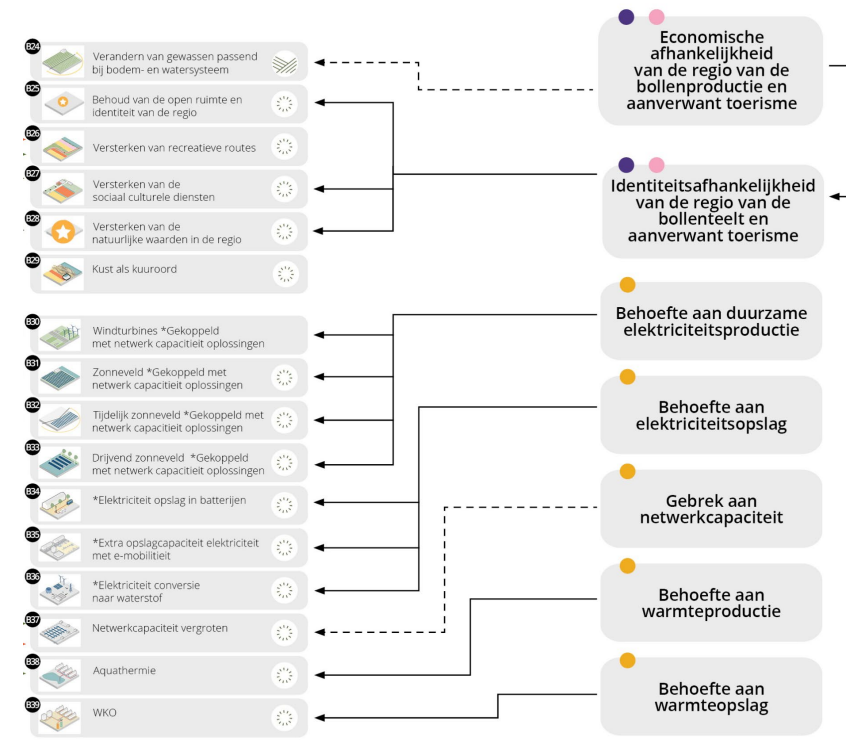
**Inzetten voor:**  
- Verbeteren bodemkwaliteit

**Aandachtspunten**  
- Beschikbaarheid van geschikt water

**Effect op andere opgaven:**  
- Biodiversiteit: zorgt voor een extra voedsel bron voor vogels  
- Toename van waterberging.

**Ruimte:**  
- Keuze op perceelsniveau

**Stakeholders:**  
- Bollenteelers, waterschap





# Challenges + building blocks + effects

## Thema's uitdagingen

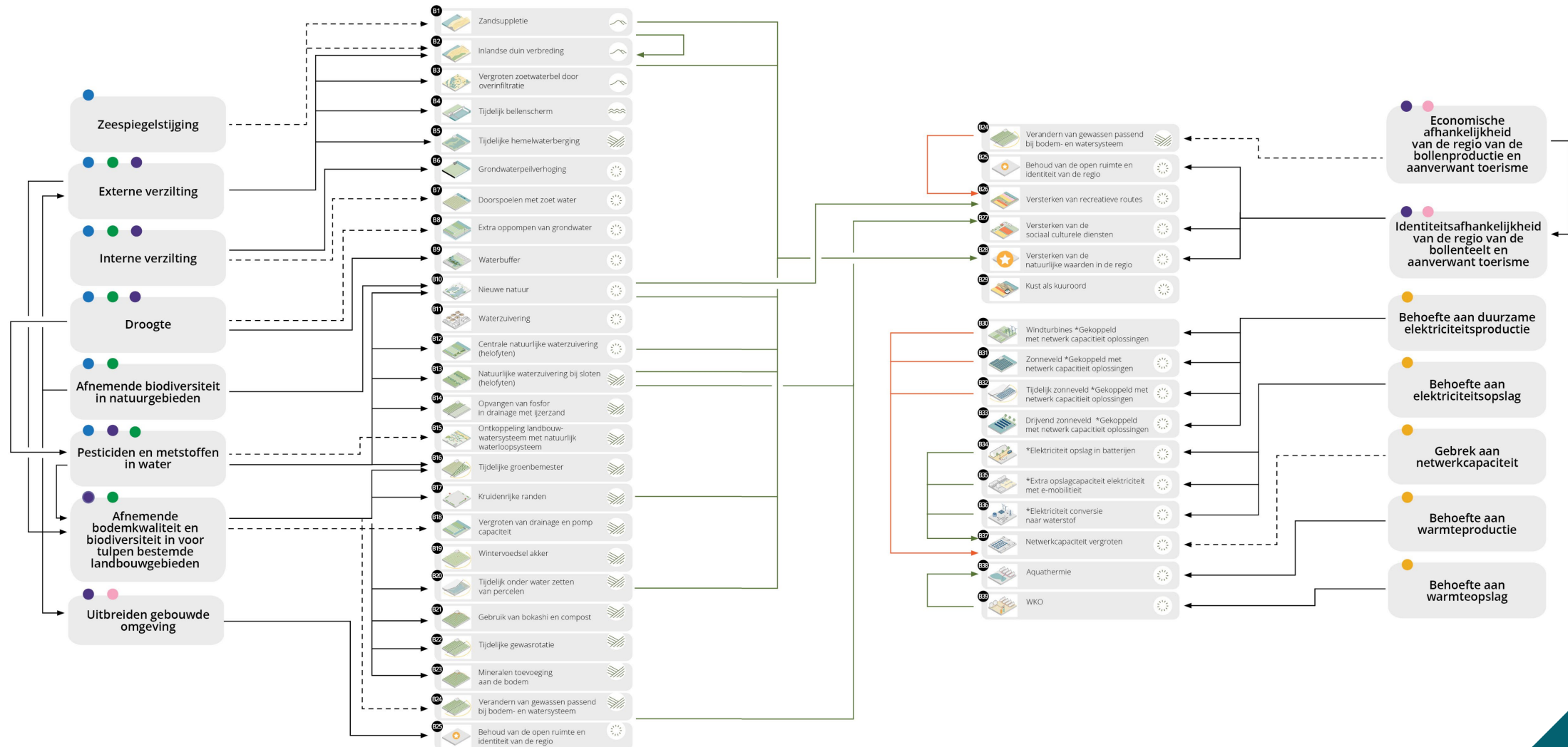
Water

Biodiversiteit

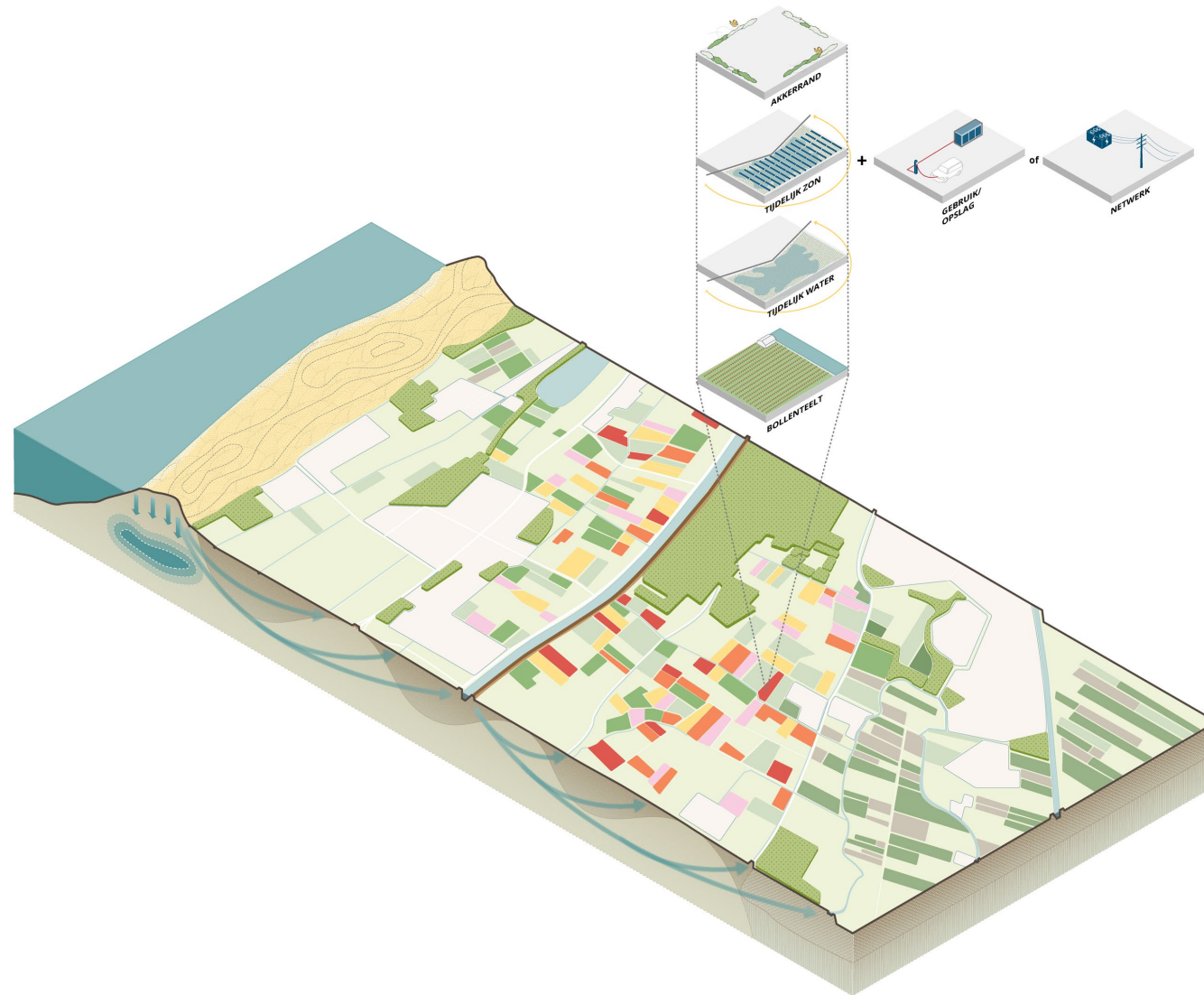
Bollen- en bloementeelt

Toerisme en landschaps-identiteit

Energie

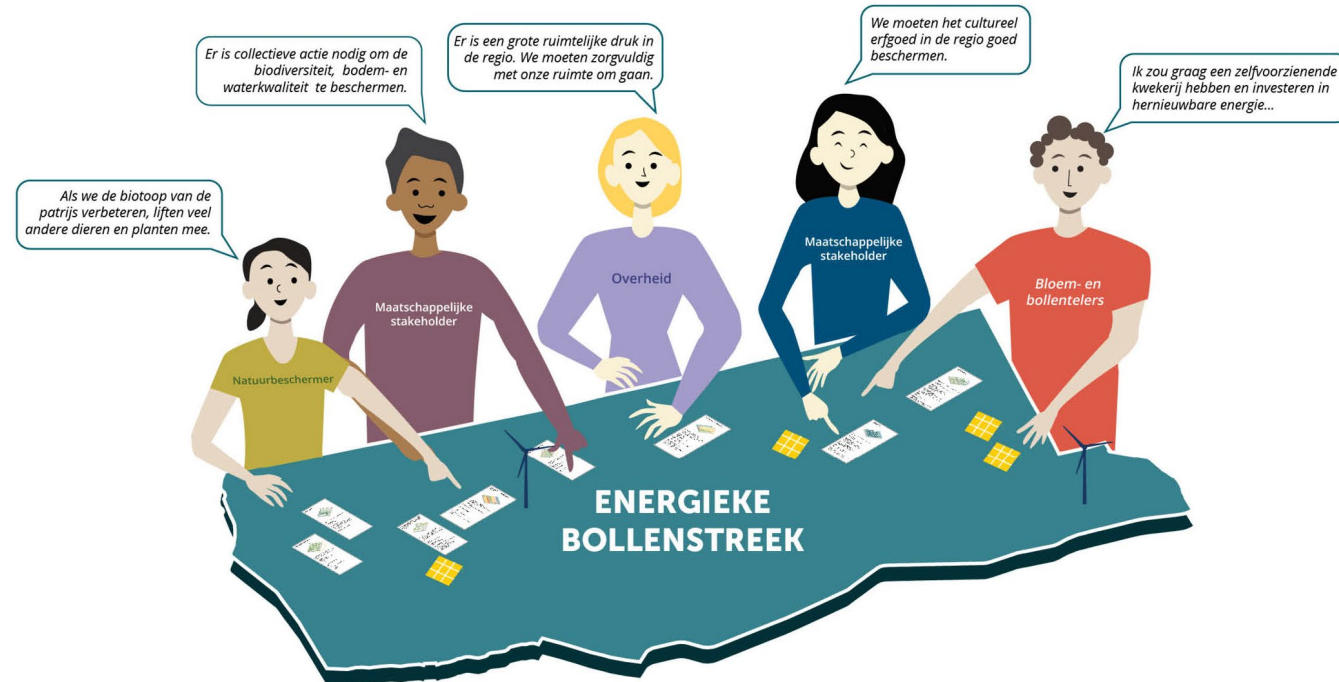


# Combining building blocks should lead to spatial quality!



# Three 'what if?' scenarios

- Using “what ifs,” we investigated how to combine building blocks to achieve landscapes with high spatial quality.
- In the “what ifs,” a starting point is to not only preserve the scenic qualities, but to strengthen them wherever possible. This by making the landscapes more adaptive and multi-use.
- These three what ifs are based on conversations we had with organizations and entrepreneurs from the Dune and Flowerbulb Region



**1. Energy becomes a  
“driver” of the transition to  
water and soil steering.**

# Energy becomes a “driver” of the transition to water and soil steering.

*As water and soil lead the region's development process, water-intensive and soil-intensive bulb production is being questioned.*

*What can be produced instead while improving soil and water quality?*

*How can the problem of salinization of water and soil be addressed?*

*What role does energy play to drive this transformation?*

# Combining building blocks

- To achieve the picture of the future, a combination of building blocks has been used.
- In the future, the presence of renewable energy will become more guiding in the activation of pumps and pumping stations. The water board's processes will be adapted to the times when sufficient wind and solar energy is available.

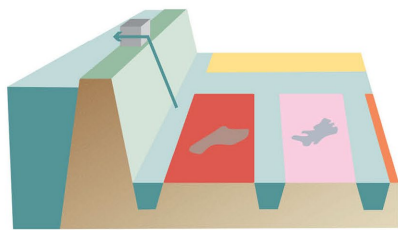
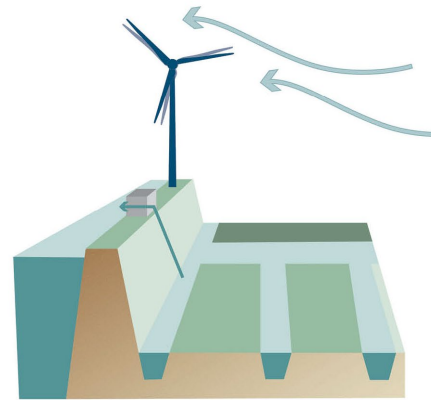


Fig. 29: Huidige situatie: Pompen wanneer de landbouw er behoefte aan heeft



Toekomstige situatie: Pompen wanneer er wind is.

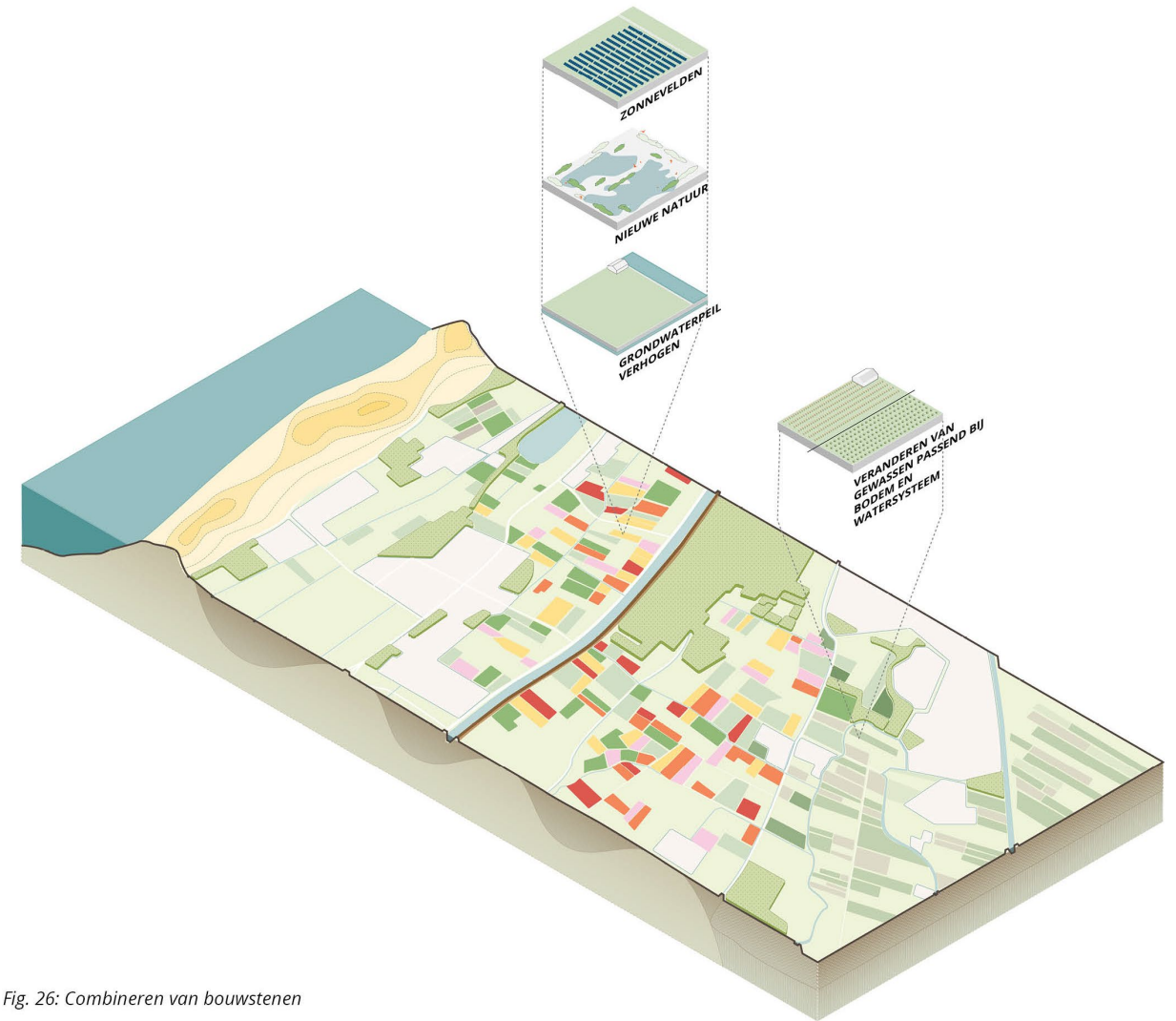


Fig. 26: Combineren van bouwstenen

# Future development

- The properties of the soil will become more leading, which determines where and how agriculture will take place
- The disappearance of bulb cultivation also means that much less plant protection products need to be used, as bulbs have high disease pressure, thus requires more extensive cultivation and more precision farming.
- The beach plains are lower lying areas which in the future, will become wetter again and be used for extensive grazing combined with energy production.

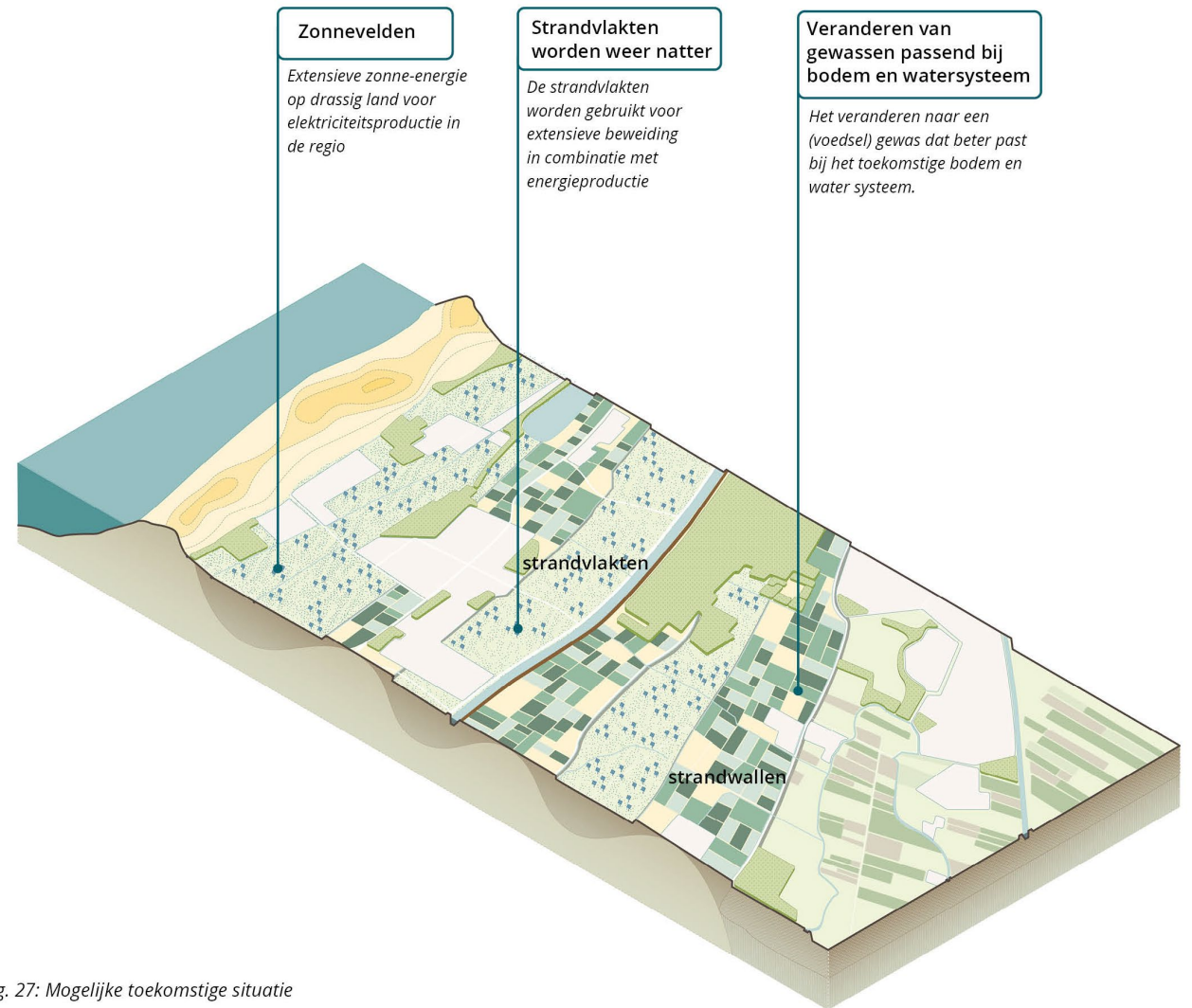


Fig. 27: Mogelijke toekomstige situatie



*Fig. 30: Overgang tussen de lager gelegen strandvelden met energieproductie en de hoger gelegen strandwallen met voedselproductie.*



**2. What if bulb growers  
become self-sufficient in  
energy and water?**

# What if bulb growers become self-sufficient in energy and water?

- *Bulb cultivation is iconic for the Dune and Flowerbulb Region.*
- *Important economic activity*
- *Increasing water shortages and drought stress due to increasing periods of drought.*
- *To be effective, sustainability should not be seen as an individual effort but as a collective decision.*
- *In this what if, bulb-growing becomes self-sufficient in energy and water to reduce its impact on the environment and make a major contribution to making the region more sustainable.*

# Combining building blocks

- The biggest interventions are on the water and energy system. In addition, there is a green-blue veining through the area, which ensures both that natural pest control can take place and that there is a network to strengthen biodiversity.
- Water is first cleaned before it enters the storage basin system. In this way, leached phosphate and crop protection agents do not enter the regional water system.

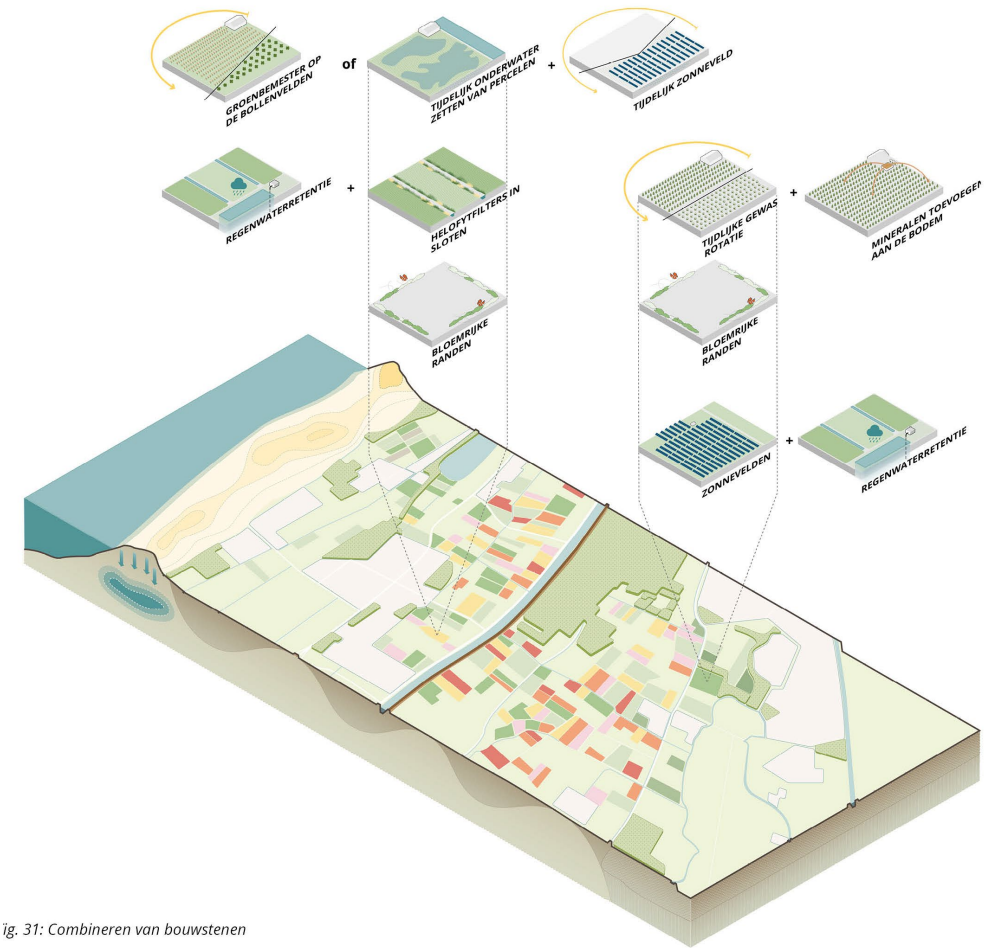


fig. 31: Combineren van bouwstenen

# Future scenario

- Biodiversity is promoted by green field edges of the bulb fields. These field edges also reduce the leaching of pesticides and minerals into the water. Herb-rich field edges and bulb hedges also provide shelter and food for the partridge and other field birds, such as the lark.

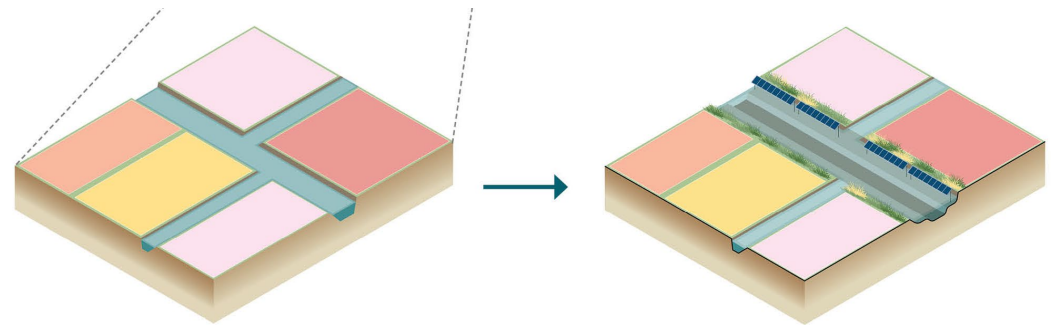


Fig. 34: Robuust watersysteem door verbreding van de sloten aan de randen van de polder

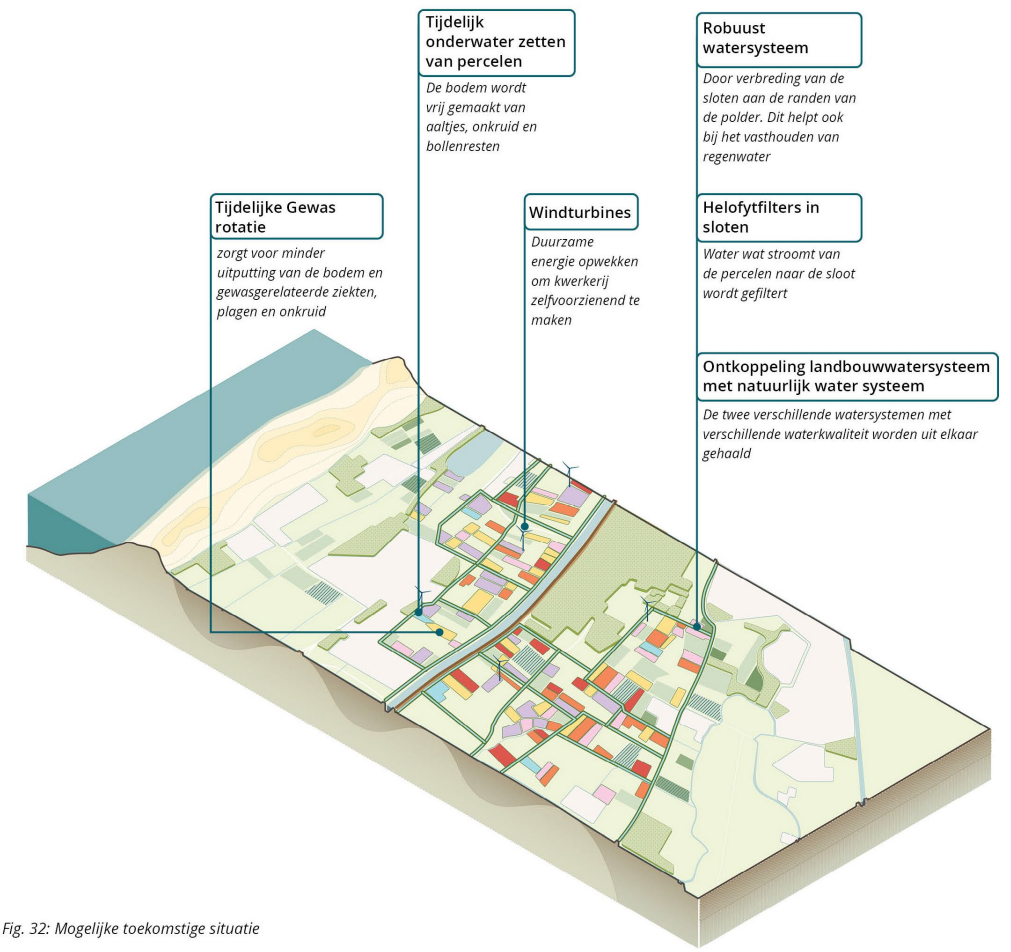


Fig. 32: Mogelijke toekomstige situatie

- Clustering of wind turbines or solar panels
- Crop diversity: growing different crops on one plot in strip cropping or other mixed forms makes crops less vulnerable to diseases and pests.
- Residue streams and cycles: the cropping plan and fertilization are designed to reduce the need for animal manure and minimize the use of artificial fertilizer in the future.

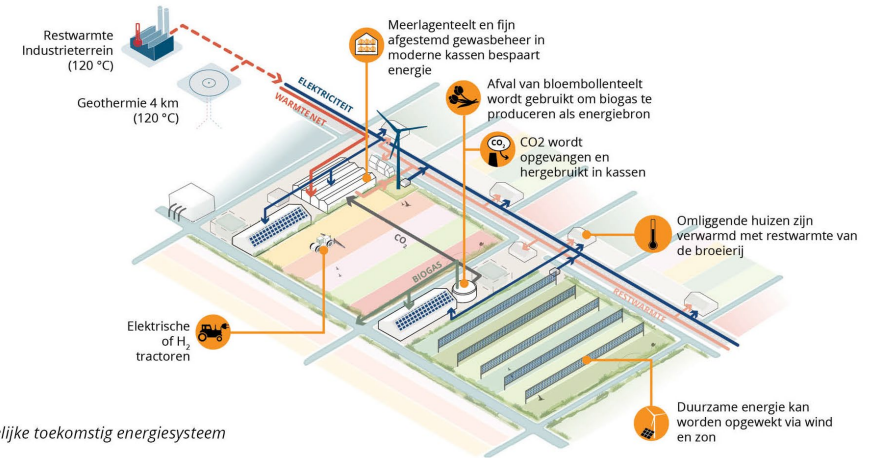


Fig. 42: Mogelijke toekomstig energiesysteem

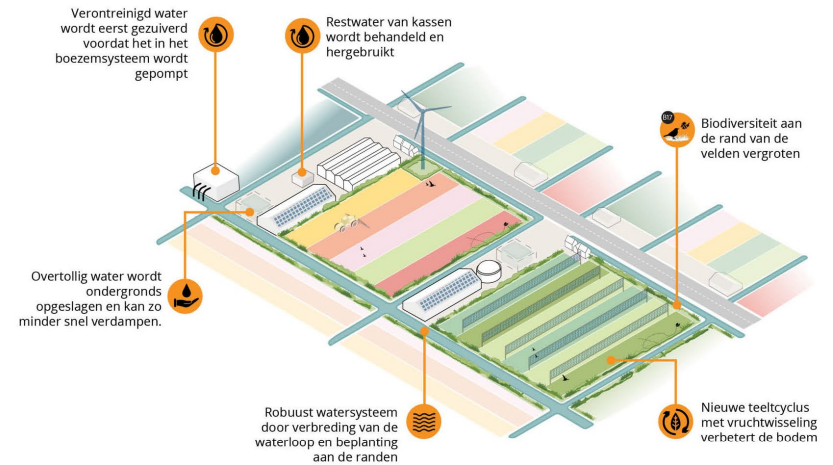


Fig. 43: Mogelijke toekomstige situatie

# Inundation strategy

- Inundation can be part of the crop rotation of a field with bulb cultivation after every 4 years.
- Temporary flooding of the bulb plots clears the soil of nematodes, weeds and bulb residues and can be combined with solar panels for those 6 months.
- Floating, extensive south 30-degree modular PV system, convenient to assemble and disassemble
- More space for biodiversity in the edges
- Flexible extensive design of panels (depending on location), space for flora, fauna and sunlight

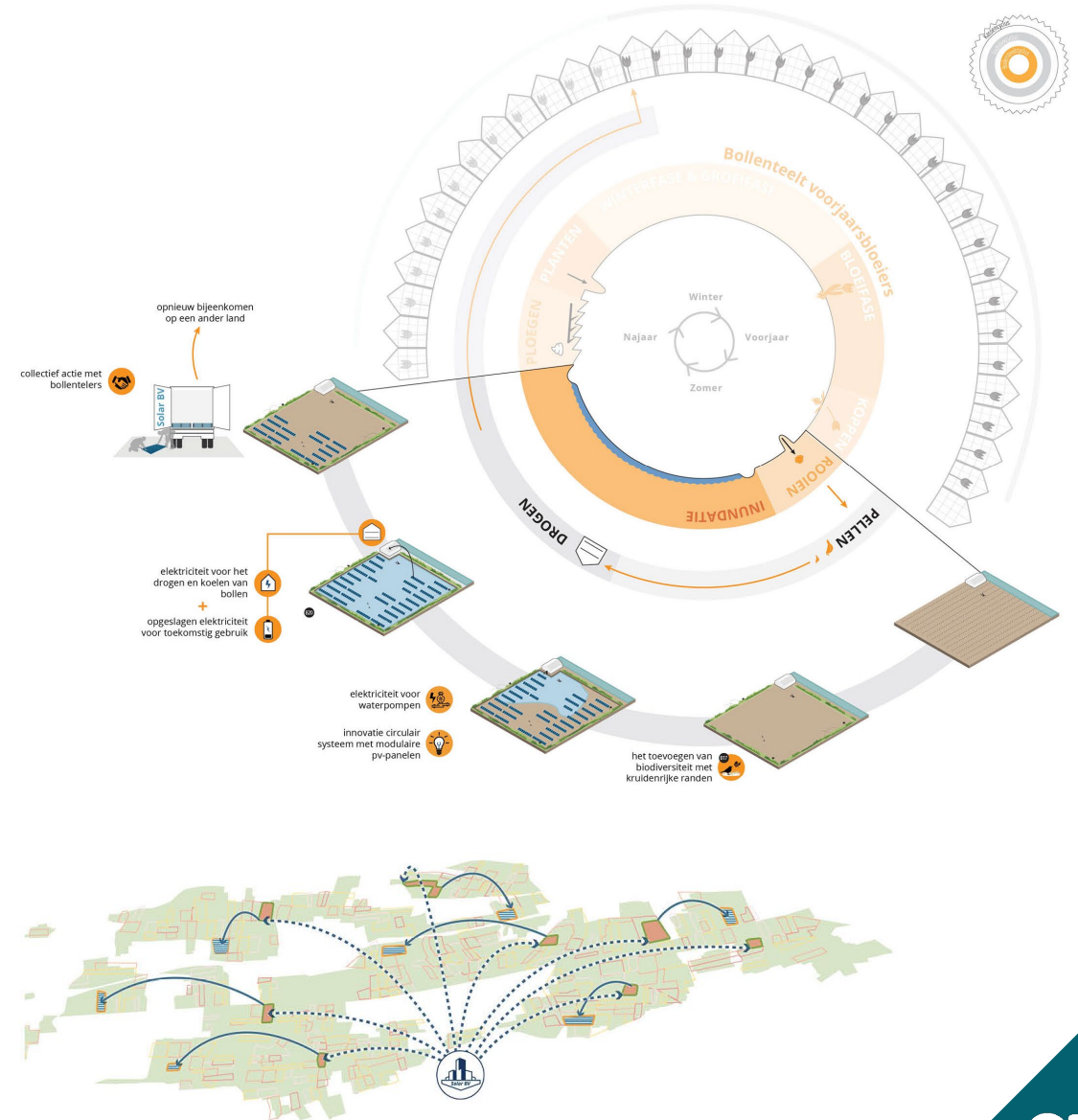




Fig. 45: Bollenteelt i.c.m. energieproductie. Geld wat wordt verdiend met windturbines wordt gedeeltelijk gestort in een omgevingsfonds, waarbij cultureel erfgoed kan worden opgeknapt en ondersteund.

**3. What if we develop new estates that produce energy?**



# What if we develop new estates that produce energy?

- *Estates are a historical part of the bulb region.*
- *Estates consist of different elements including house, park/garden and production grounds. Production of energy (wood) and food was an important element of the various estates.*
- *Housing shortage*
- *Low biodiversity in agricultural areas.*
- *Due to economies of scale, the size of bulb growers' barns is increasing. Bulb growers without successors are being taken over, allowing the building plots of retiring bulb growers to be transformed into new estates*

# Combining building blocks

- Bulb barns of retiring bulb growers can be transformed into new estates
- These estates of the future consist of housing developments, publicly accessible green structures and energy production sites.

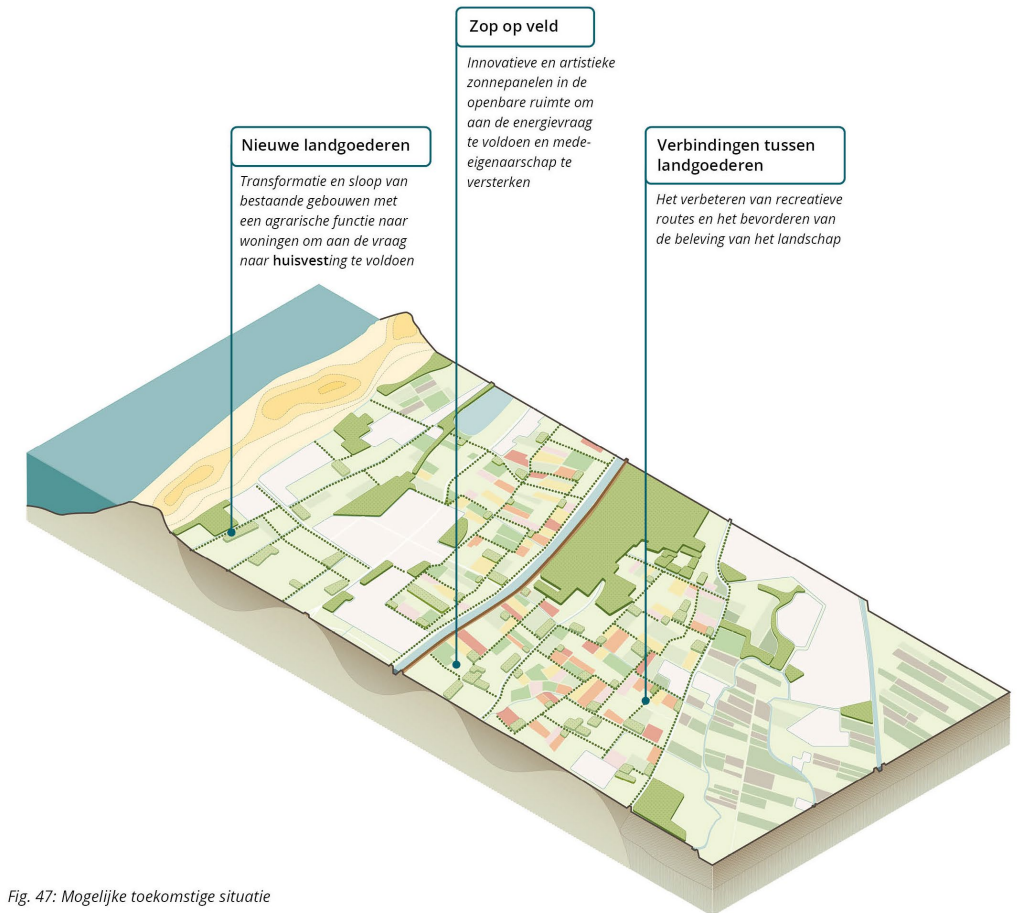


Fig. 47: Mogelijke toekomstige situatie

# Future scenario

- Together, the individual estates form a new green and recreational structure in the Bulb Region.
- Proceeds from energy production contribute to the maintenance of the estates.

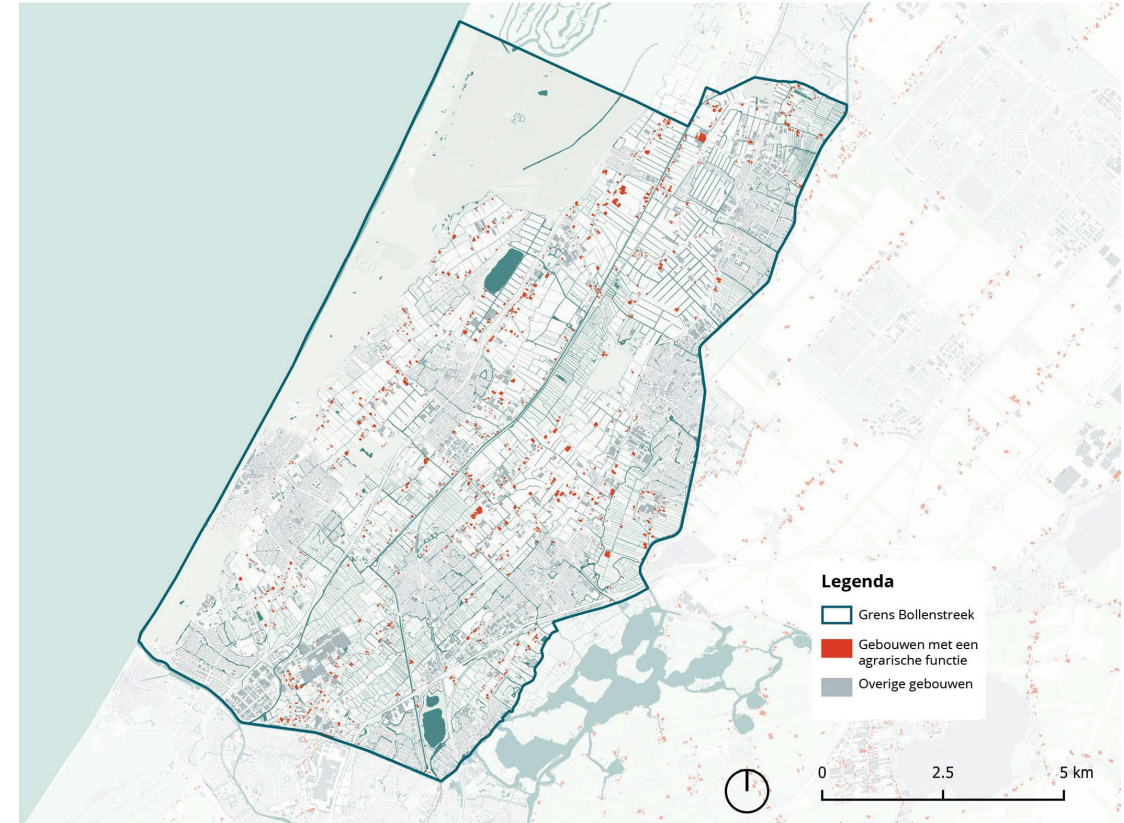


Fig. 48: Bestaande gebouwen met een agrarische functie in de regio

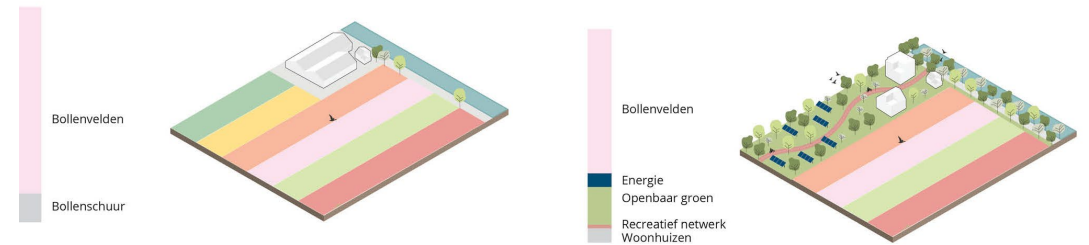


Fig. 49: Ontwikkelprijncipes landgoederen



Fig. 50: Nieuwe lanegoed met duurzame en ecologische structuren, waarbij kunstobjecten ook zonne-energie produceren.

# Conclusion

- Energy projects require space, and this space, as this study shows, can be "multiple". Solar parks can be more than just fields full of panels.
- Energy projects add a new layer to the landscape and can be realized with respect for the existing (landscape) context or give rise to an entire transformation of the landscape.
- The money earned through energy production can be (partially) invested in the area, towards maintaining the landscape and social support. One possible financial construction is an environment fund. In this way, the realization of energy projects can contribute to strengthening the landscape.
- It is also important to remember that stakeholders of the region play a crucial role in this transition. All three what-ifs require collective action from government, farms, civil society organizations and people of the region.

**Thank You**