

# SPATIAL STRATEGIES FOR CIRCULAR REGIONS

## R&D studio Spatial Strategies for the Global Metropolis

### 2022-2023 & 2023-2024 MSc Urbanism Delft University of Technology

The exhibition presents selected projects from the Research & Design studio Spatial Strategies for the Global Metropolis, part of the MSc Architecture, Urbanism and Building Sciences/Track Urbanism programme at Delft University of Technology. Students of the 2022-2023 and 2023-2024 editions of the studio explored how sustainability transitions affect peri-urban areas in a selected Dutch sub-region of the Rhine, Meuse and Schelde delta region. Taking as a starting point the challenges around the CO2 and Nitrogen balances, they observed how the multiple and often interrelated spatial claims that transitions lay on these areas unfold above, on, and below ground, envisioned how claims can be accommodated within scarce space, and how they can be reconciled with other competing demands for this space. The resulting projects, presented in this exhibition, set out visions and strategies for a more sustainable and just future. The studio was linked to the investigations of the ASSET project and aimed to provide explorations for alternative spatial strategies for circular futures of the Eurodelta.

Circularity has been one of the core concepts in the studio. The studio emphasized both the operational dimension of circularity focused on the material world (like infrastructure, resource loops, and spatial planning), as well as the transformative social dimension involving cultural shifts, inclusive governance, and circular lifestyles. With the emphasis of the 2022-2024, and 2023-2024 versions of the studio on spatial conflicts related to the metabolisms of Nitrogen, Carbon, and Water, and with the focus on peri-urban areas, the studio highlighted the importance of rethinking the processes of primary commodity production and circulation that constitute the material basis of circular environments beyond circularity. Working with intensively operationalized landscapes of agricultural production, resource extraction, circulation and waste disposal introduced opportunities to recover, regenerate, and redesign landscapes and processes, thus exploring pathways towards regenerative economies. In addition, the quite dynamic interpretation of scale in the studio framing, allowed for a productive exploration of the interplay between local, urban and regional scales, and their optimal connections with the social, economic and governance systems that mostly defined the projects.

**Contributing students:** Elena Agterdenbos, Marina Deffner, Isabella Diaz, Nikita Ham, Hasan Hashas, Cecile Ikink, Yuzhou Jin, Kristupas Kadys, Fruzsina Kovács, Aleksandra Kurkierewicz, Fenne Manshande, Laura Oosterhoff, Layne Perry, Jakob Pesendorfer, Sebestyen Pfisztner, Frithasya Jeniardina Purba, Małgorzata Rybak, Romane Sanchez, Niels Samuels, Julia Schasfoort, Floor Schepel, Greta Samulionyte, Jing Spaaij, Maximilian Theye, Evgenia Vamvakousi, Arjanne van der Padt, Madelief van der Kraan, Gillian Weber, Lotte Wiegers, Yiling Yang, Yuhang Zhai, Yuwei Zhao, Yiyan Zhou, and Yoshi So.

**Quarter coordinators:** Verena Balz, Nikos Katsikis,

**Responsible instructors in related courses:** Roberto Rocco, Marcin Dabrowski

**Studio tutors:** Verena Balz, Rodrigo Cardoso, Marcin Dabrowski, Lukas Höller, Birgit Hausleitner, Nikos Katsikis, Irene Luque Martin, Caroline Newton, Lei Qu, Francesca Rizzetto, Diego Andres Sepulveda Carmona, and Alexander Wandl

**Guest lecturers:** Istiaque Ahmed, Verena Balz, Danielle Canatella, Marcin Dabrowski, Claudiu Forgaci, Ioana Forgaci, Birgit Hausleitner, Fred Hobma, Fransje Hooimeijer, Nikos Katsikis, Kai Lan, Victor Munoz Sanz, Stephen Nijhuis, Remon Rooij, Roberto Rocco, Alexander Wandl, and Shuyu Zhang

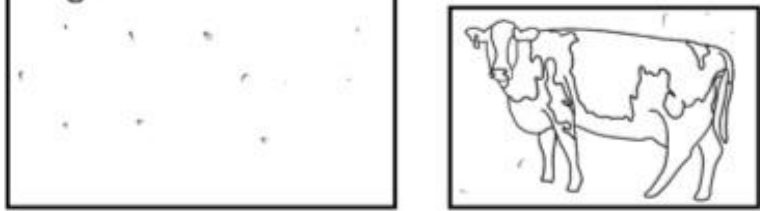
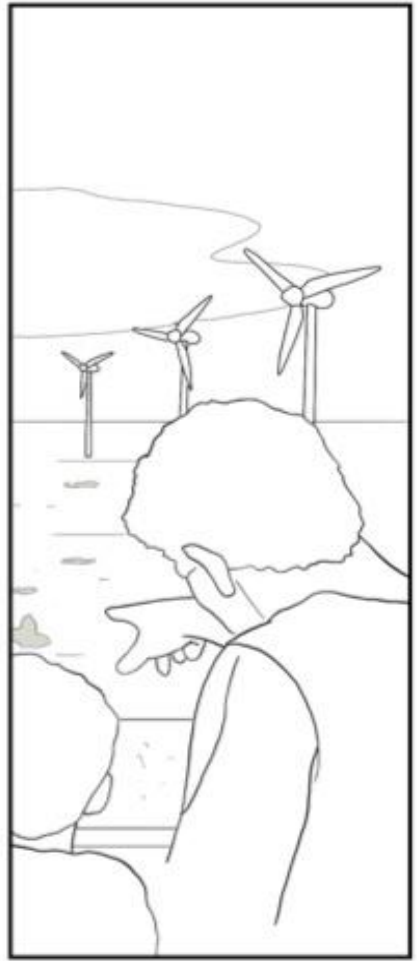
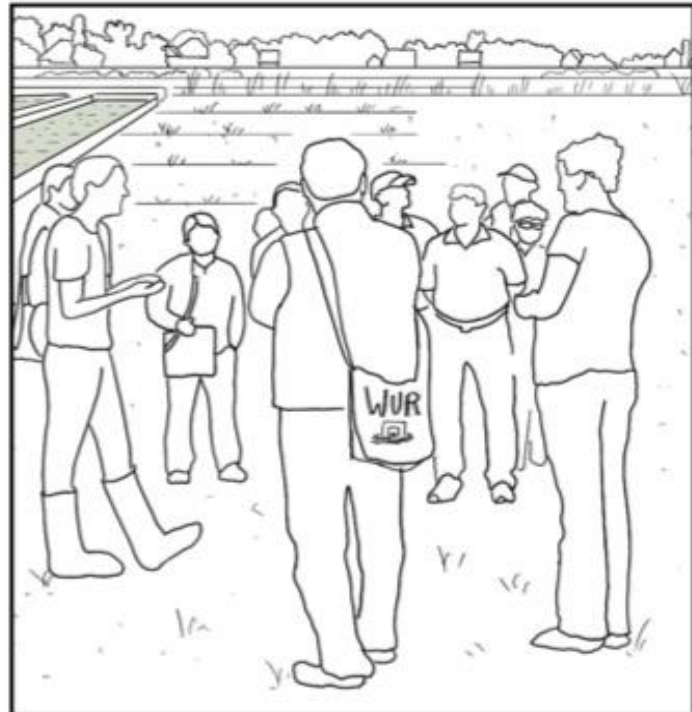
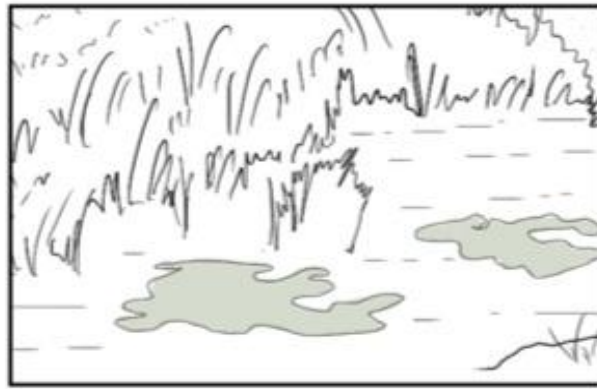
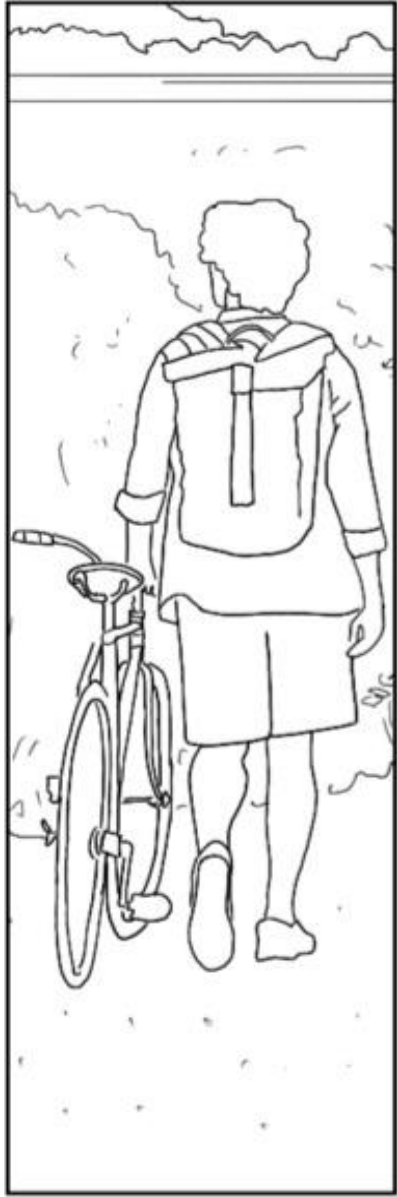
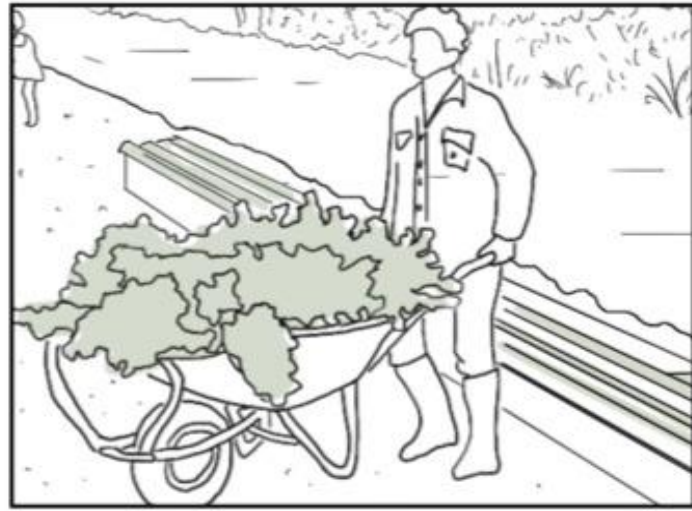
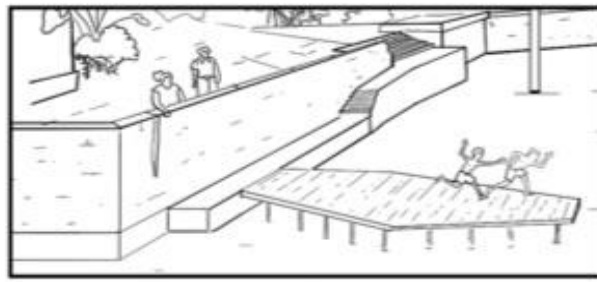
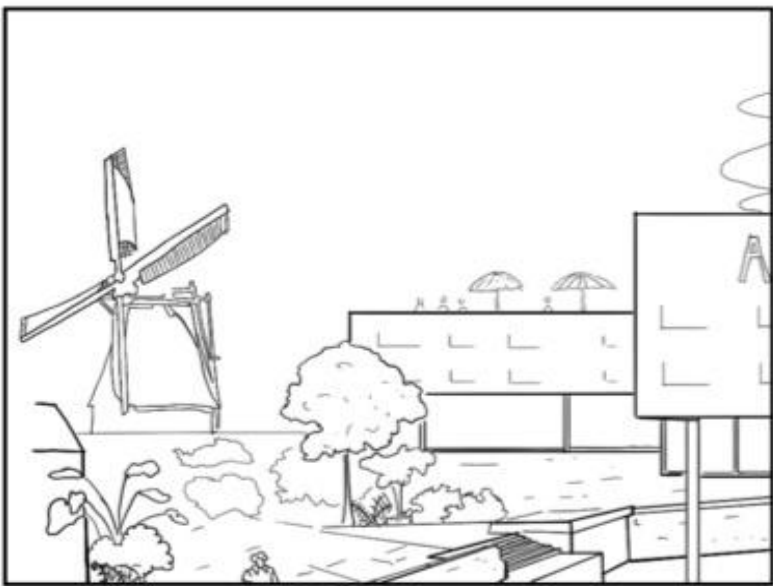
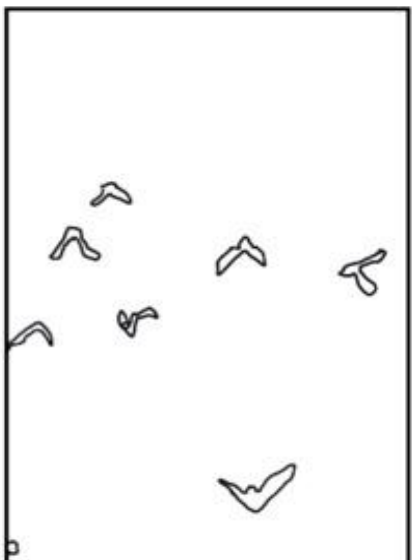
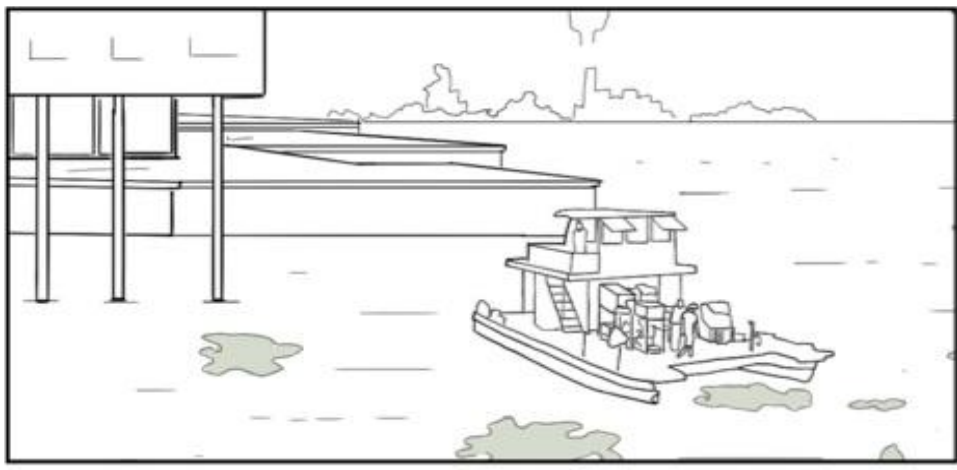
**Guest critics:** Fatemeh Mohammadniay Gharai (TU Delft), Christa Reicher (RWTH Aachen University), Dagmar Keim (City of Amsterdam), Emma de Wijs (City of The Hague), Mert Akay (TU Delft), Alankrita Sankar (Deltametropool), Tess Broekmans (TU Delft), Frenk Bekkers (Province of South Holland), Luisa Calabrese (TU Delft), Anne Loes Nillesen (TU Delft), Chun Hoi Hui (MVRDV)

**Student assistant:** Lize Knol



# From algae to thread

A deep dive into a more circular textile industry



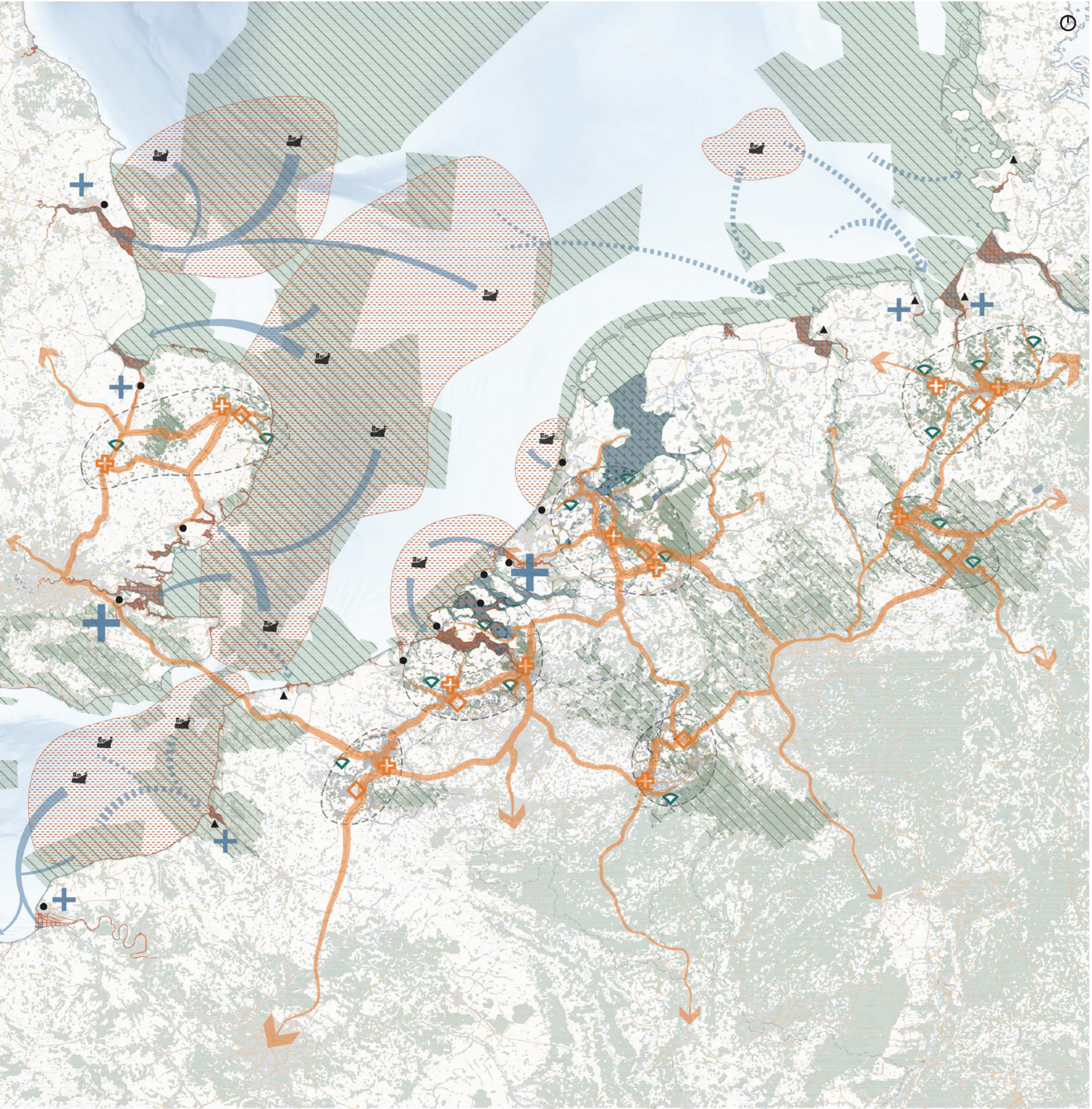
## FROM ALGAE TO THREAD

A deep dive into a circular textile industry

Student team:  
**Cecile Ikink**  
**Greta Samulionyte**  
**Yoshi So**  
**Yuwei Zhao**  
**Yuzhou Jin**

Tutors:  
**Rodrigo Cardoso**  
**Nikos Katsikis**

The project addresses plastic pollution in North-West Europe by proposing algae-based bioplastics as a sustainable alternative for the textile industry. It highlights the urgency of microplastic contamination—from ocean waste to drinking water—and frames textile production as a key sector for intervention. The project envisions North-West Europe as a testbed for a regenerative, circular supply chain. A distributed spatial network connects algae farms along wetlands and coastal zones with processing sites and textile hubs. These are aligned with existing transport corridors and waterways, minimizing emissions and maximizing connectivity. The corridors double as recreational and educational landscapes, helping reconnect people with material cycles. Visitors might encounter algae farms, floating classrooms, workshops, and exhibitions on regenerative textiles. This integration transforms passive consumption into public engagement. Supporting this transition is a policy ecosystem: plastic surcharges penalize microplastics, while algae farming is incentivized through subsidies and soil health regulations. Algae credits reward circular practices and promote healthy bioproduction landscapes. The framework goes beyond ecological benefit—it shifts cultural norms around production and resource use. In doing so, it links material innovation to spatial justice, proposing a future where textiles are part of a regional regenerative economy.



Access full report of the project:







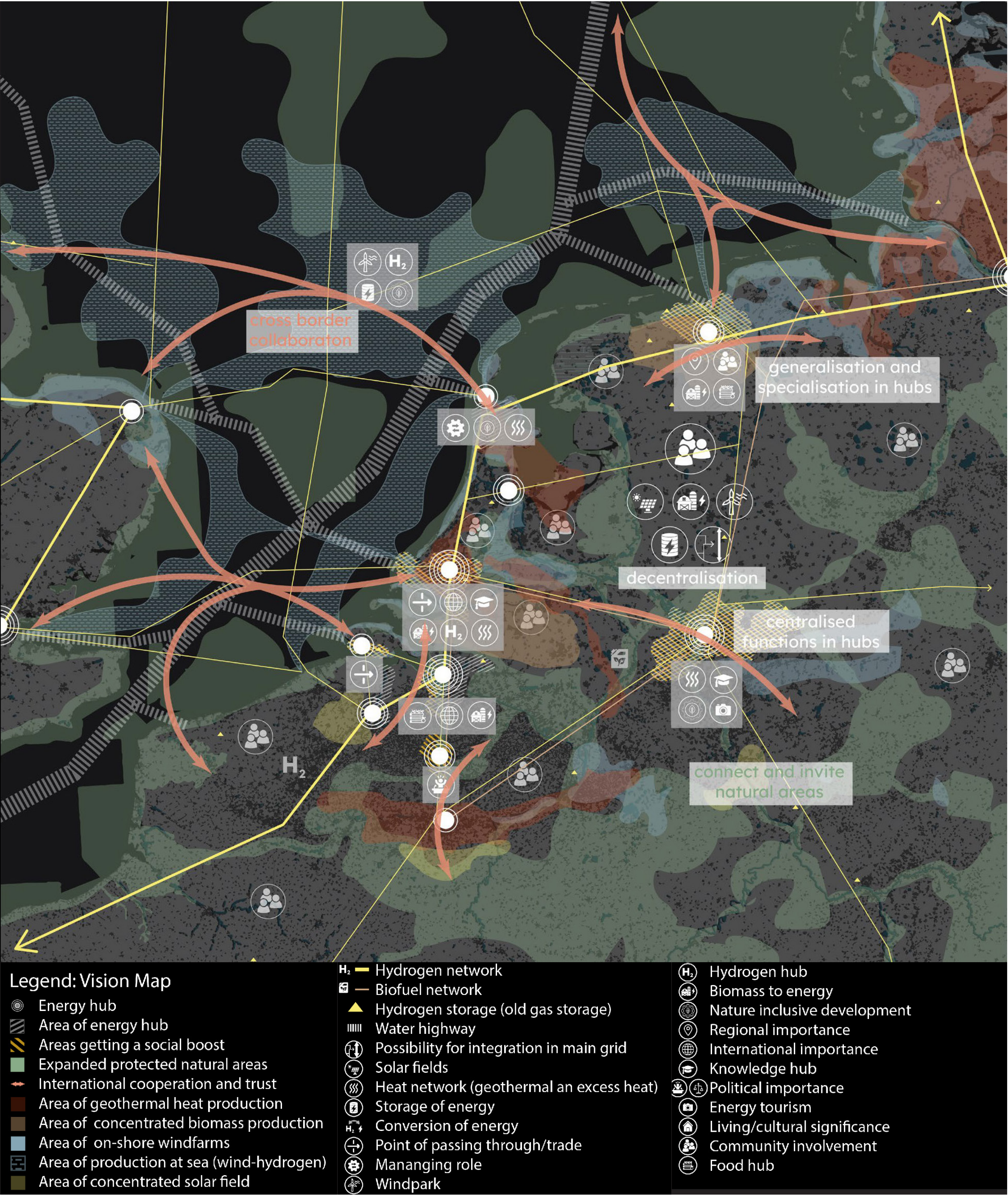
# THE POWER OF JUSTICE

Spatial Strategies for a fair Energy Transition in North-West Europe

Student team:  
**Arjanne van der Padt**  
**Hasan Hashas**  
**Jing Spaaij**  
**Małgorzata Rybak**

Tutors:  
**Alexander Wandl,**  
**Marcin Dąbrowski**  
**Roberto Rocco**

Power of Justice envisions a just and resilient energy transition by 2050 across the Rotterdam–Ruhr corridor. The strategy is built on three pillars: Geopolitics, Social Equity, and Ecology. It proposes a mosaic of specialized and generalized energy production zones tailored to local capacity, interwoven with protected nature and urban-agricultural land. These zones enable adaptive reuse of fossil infrastructure and hybrid agricultural-energy sites. They’re linked through a network of upgraded energy corridors that support decentralized and diverse flows. The transition is guided by participatory mapping—a dynamic “playing field” that visualizes scales, trade-offs, and strategies. A pattern language further connects spatial elements with policy, enabling communities and planners to co-create future energy landscapes. This participatory structure bridges the gap between local action and regional systems. The framework integrates energy infrastructure with ecological restoration, land-use planning, and social inclusion. Rather than merely technical, the transition is framed as a spatial and democratic reorganization of territory. The project emphasizes how regional planning can embed justice into climate action, ensuring that the energy shift delivers both resilience and equity.



Access full report of the project:







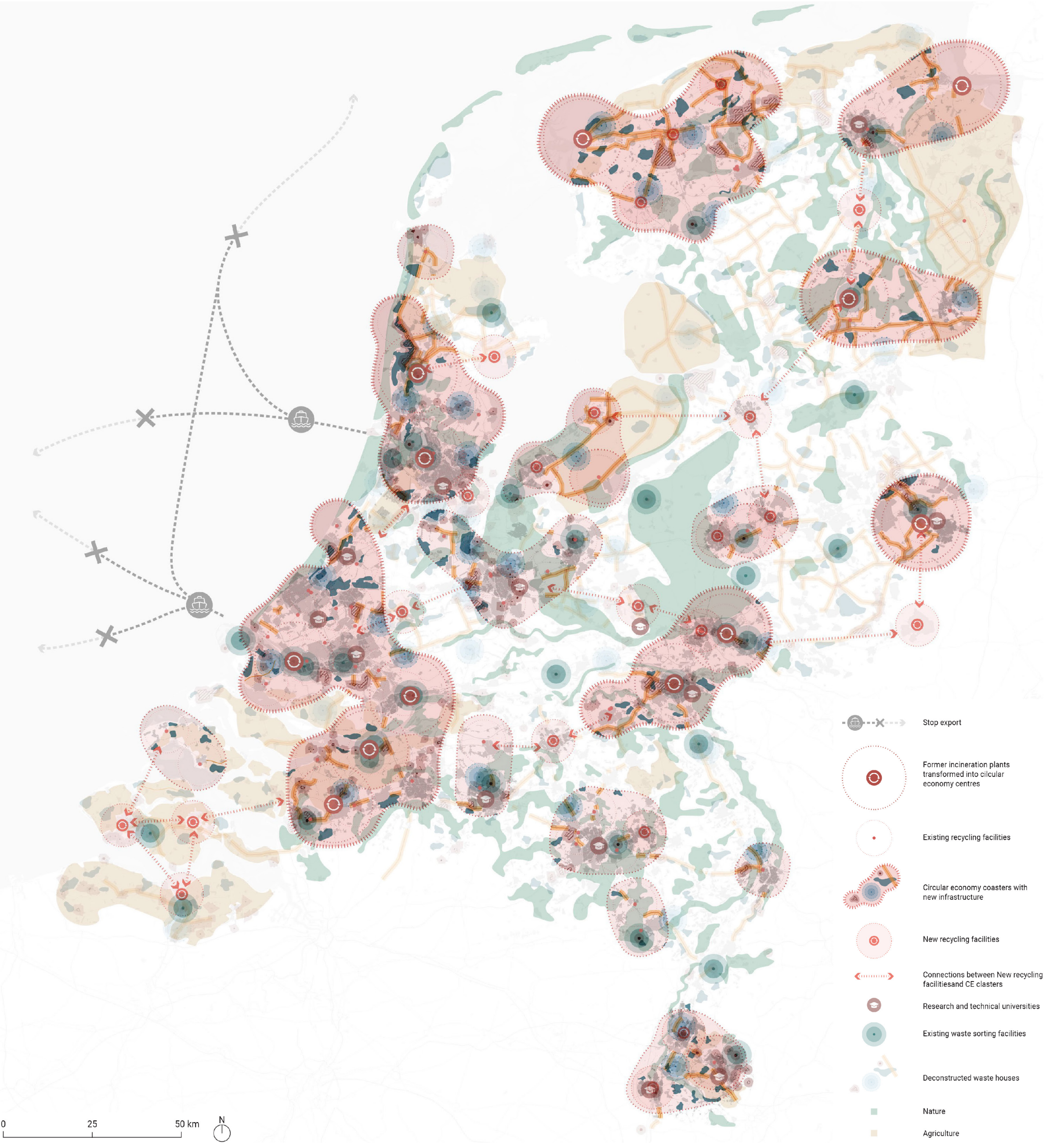
# WASTE HOUSES

## Messing up The Netherlands

Student team:  
**Isabella Diaz**  
**Aleksandra Kurkierewicz**  
**Julia Schasfoort**  
**Madelief van der Kraan**  
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Tutor team:  
**Verena Balz**  
**Lukas Höller**

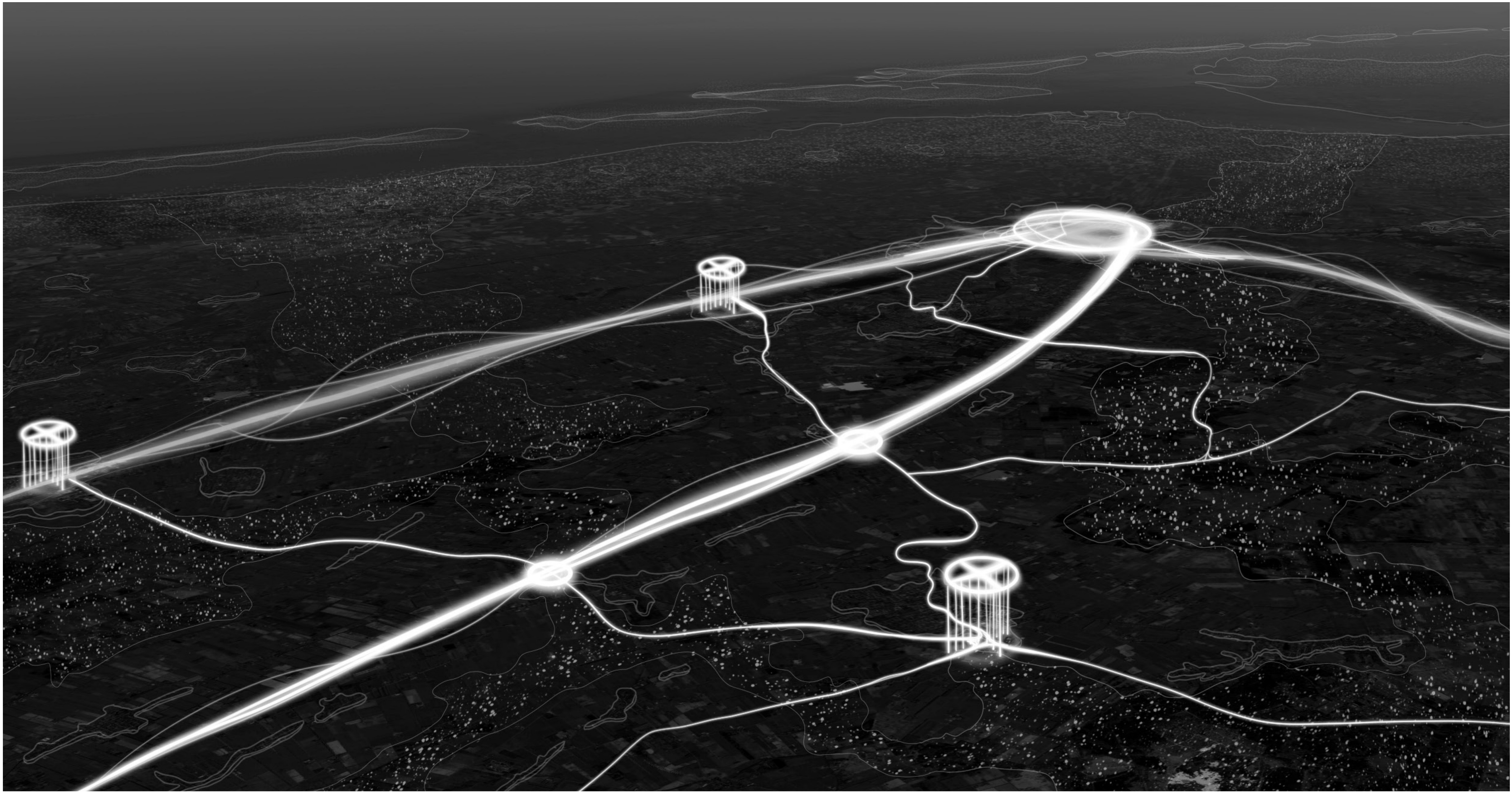
This project proposes a radical shift in Dutch waste management: halting incineration and export and internalizing all waste flows. In 2020, the Netherlands exported 32.7 million tonnes of waste and incinerated another 7.6 million—practices with serious environmental and health consequences. The solution? A new spatial infrastructure based on “waste houses” that store waste until it can be re-integrated into the economy. These highly visible structures act as both transitional storage and public symbols of overconsumption, helping raise awareness. Distributed across urban, peri-urban, and rural contexts, the waste houses are part of a network that includes upgraded recycling facilities and new circular economy centers. These buildings serve dual purposes: storage and community function. They host repair cafés, workshops, educational events, and research centers—blending civic life with material stewardship. Strategic planning ensures equitable distribution and avoids burdening specific communities. Over time, as circular processes evolve and unprocessable waste declines, waste houses are designed to be repurposed into housing, community centers, or resource banks. Their evolution mirrors the circular transition itself—from linear excess to regenerative urbanism. The project frames waste not as an externality but as a shared material and spatial responsibility.



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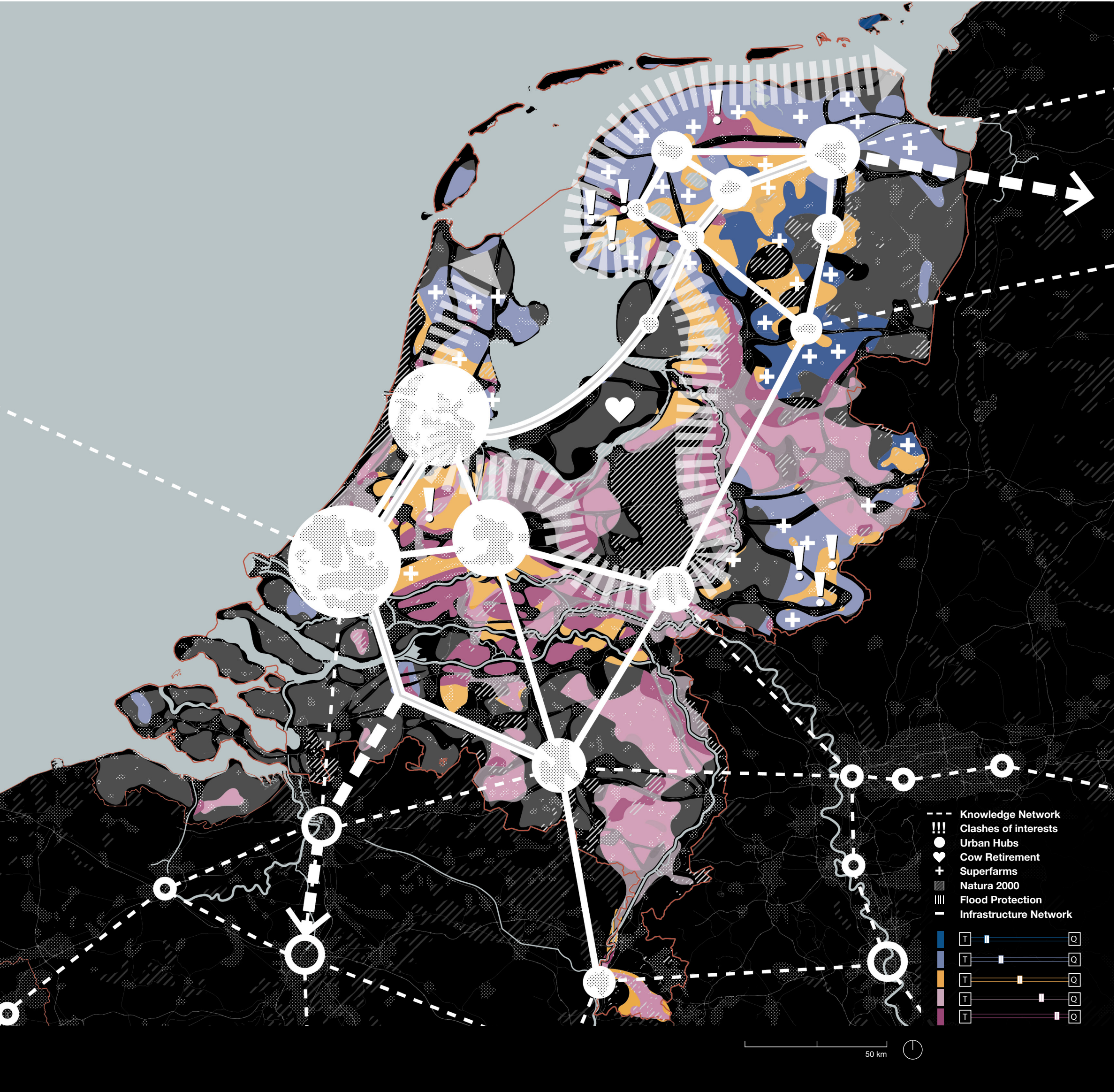
# NITROTOPIA

## Dairy Farming in Transition: Recalibrating the Nitrogen Cycle

Student team:  
**Marina Deffner**  
**Fruzsina Kovács**  
**Jakob Pesendorfer**  
**Floor Schepel**  
**Yuhang Zhai**

Tutor team:  
**Caroline Newton**  
**Irene Luque Martin**

Nitrotopia responds to nitrogen overload in Dutch agriculture, proposing a spatial transformation grounded in ecological limits and geospatial data. Using inputs like nitrogen levels, flood risk, and current land use, the project builds a gradient of transformation—ranging from intensified farming zones to areas of retreat. New typologies emerge: “superfarms” for high-efficiency production, research farms for innovation, and transition landscapes for ecosystem restoration. Two main corridors—production and research—structure the region’s metabolism. Located in the “Greater Cow Bay Area,” a proposed NOVEX zone covering Friesland, Groningen, and Drenthe, the area serves as a pilot for interprovincial coordination. A task force oversees phased implementation, engaging stakeholders in mapping, monitoring, and participatory planning. Initially top-down, governance evolves toward co-creation as spatial changes unfold. Nitrotopia is both pragmatic and visionary: it links spatial planning to ecological urgency, offering a model of regionally tailored, regenerative agricultural transition grounded in policy, data, and participation.



Access full report of the project:







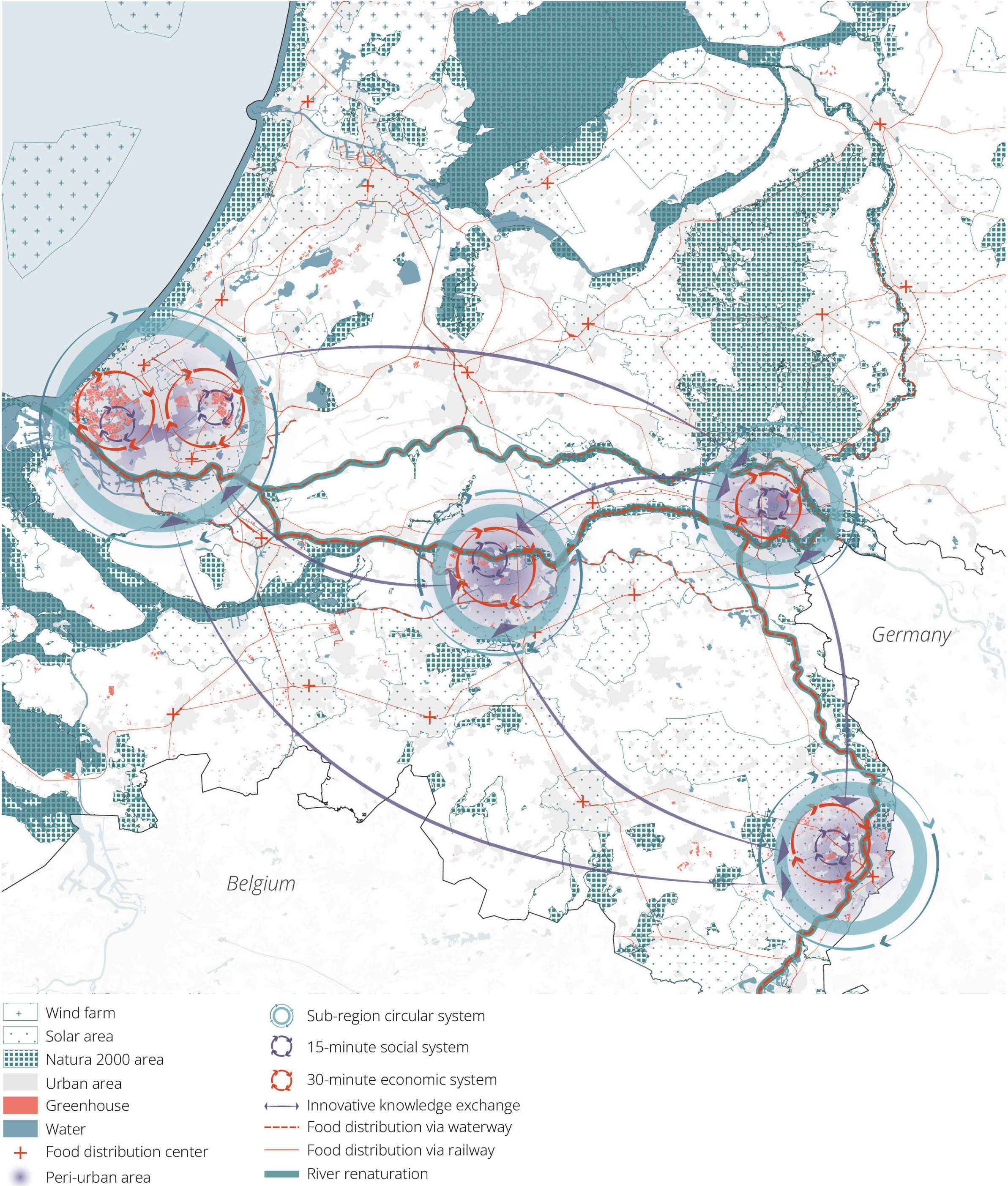
# SOWGROWCONNECT

Circular Delta 2050: Sowing the seeds for a zero-emission society through a locally-oriented, knowledge-based greenhouse horticulture

Student team:  
**Laura Oosterhoff**  
**Layne Perry**  
**Gillian Weber**  
**Lotte Wieggers**  
**Yiyan Zhou**

Tutor team:  
**Diego Andres Sepulveda Carmona**  
**Marcin Dabrowski**

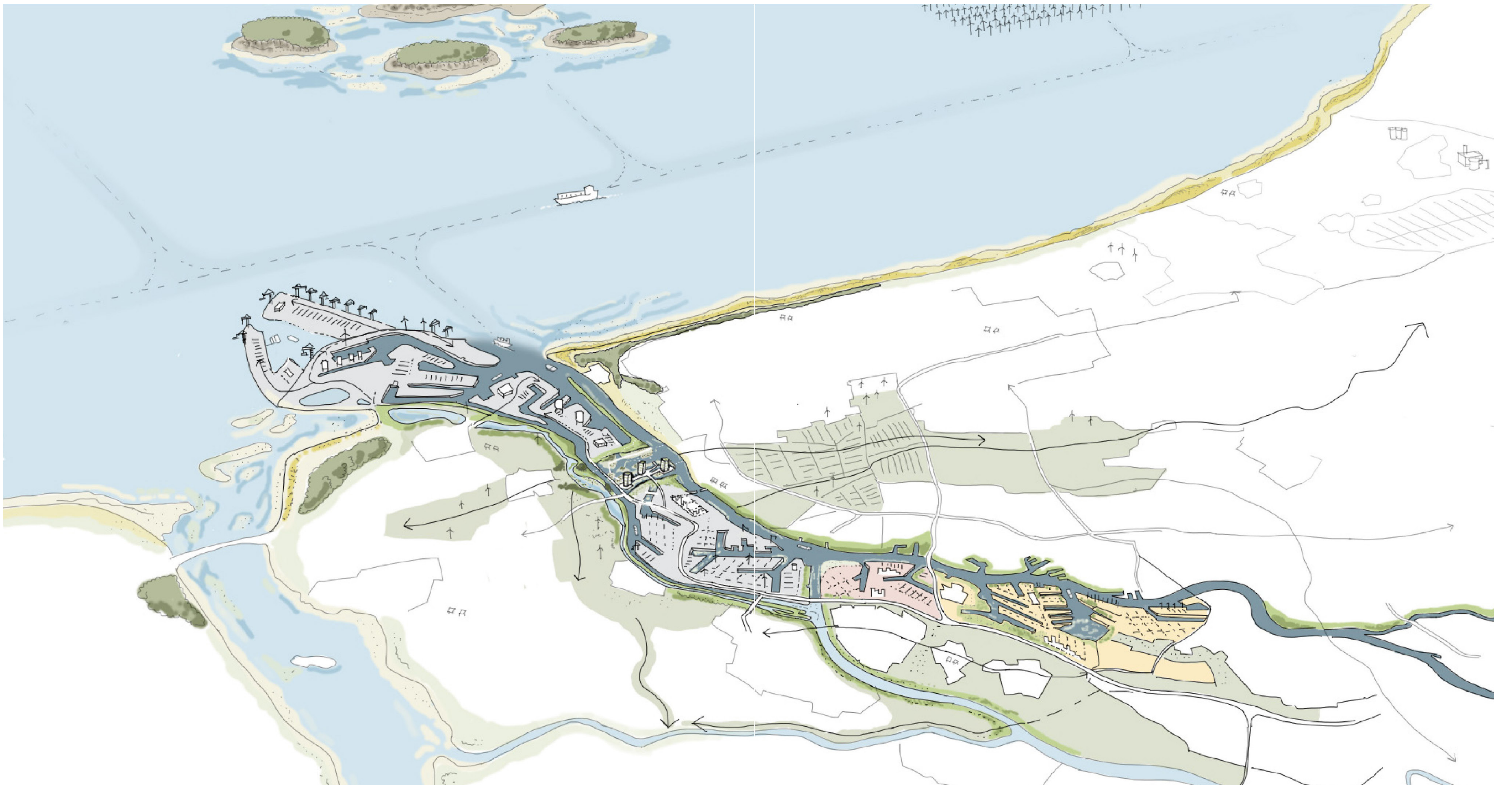
This project offers a circular future for the Dutch greenhouse sector, responsible for 19% of national emissions. Instead of phasing out this spatially and economically significant system, the team proposes a regenerative reconfiguration. The framework centers on 15-minute social systems and 30-minute economic systems—territorial scales where life, work, and resource exchange align with low-impact living. These systems are structured through modular “building blocks,” spatial typologies adapted to various Dutch contexts—from intensive greenhouse clusters to rural-urban transition zones. Each contributes to a network that links people, goods, and energy in circular loops. A transition handbook outlines implementation phases and serves as a participatory planning tool, used in physical or digital workshops. It helps stakeholders negotiate priorities and co-design regional strategies. Policy instruments combine top-down mechanisms—regulations, pricing, incentives—with grassroots initiatives, such as cooperative models and repair networks. By treating the greenhouse sector as a testbed, the project aligns spatial transformation with social engagement. The result is a replicable, regionally grounded model of agro-urban circularity.



Access full report of the project:





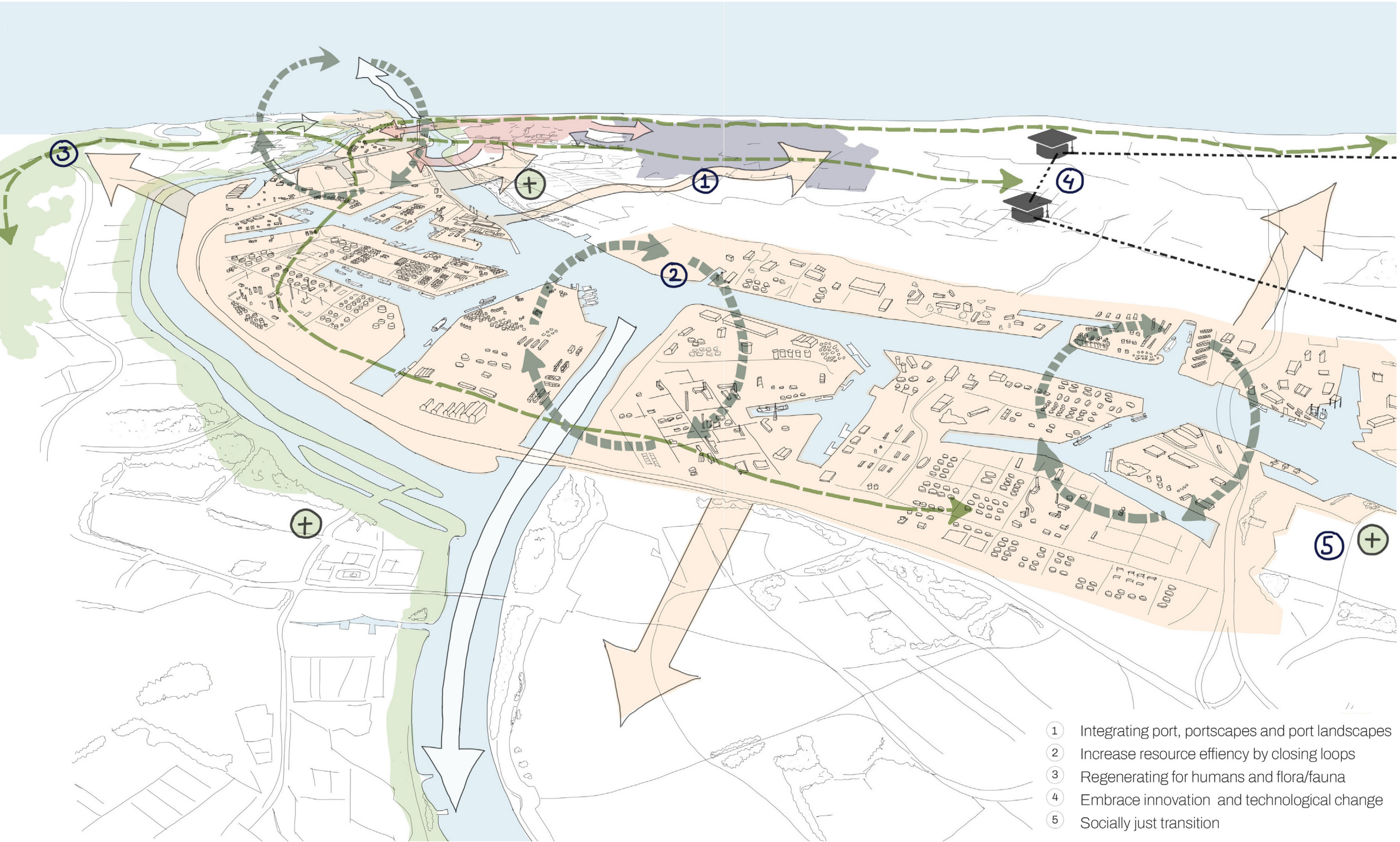


# PORTS, PORTSCAPES, AND PORT LANDSCAPES The 100 year vision and strategy for circular and just spaces

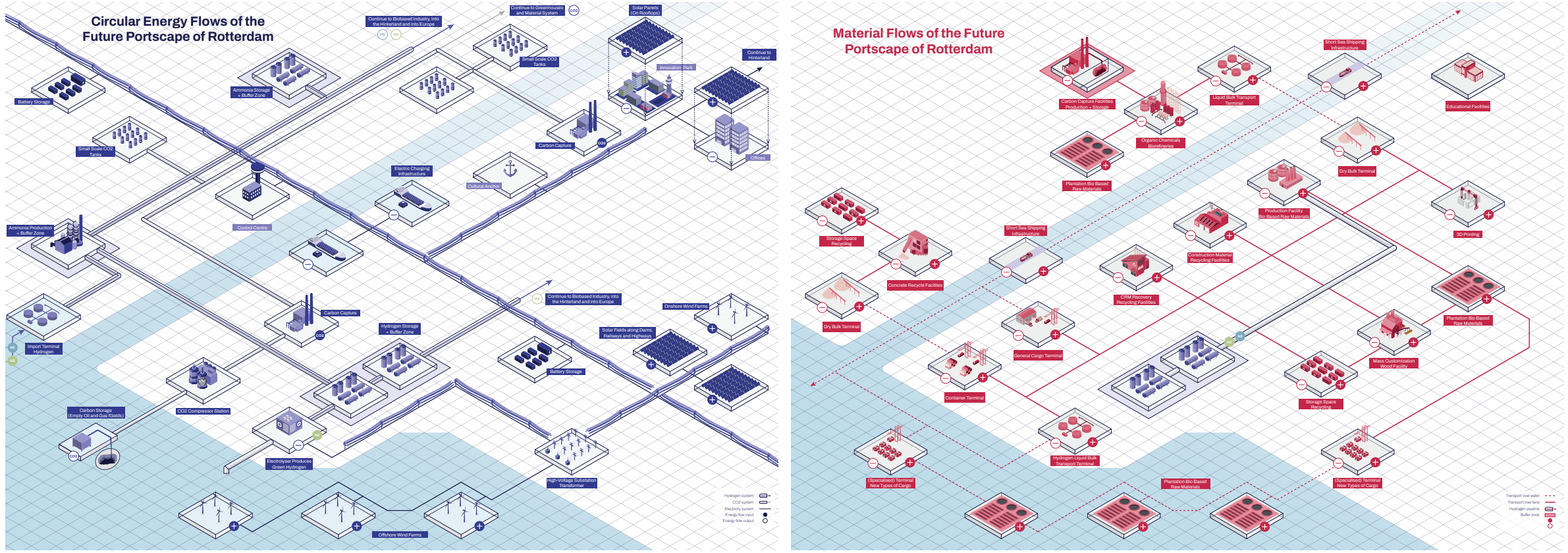
Student team:  
**Elena Agterdenbos**  
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**Romane Sanchez**  
**Maximilian Theye**

Tutor team:  
**Birgit Hausleitner**  
**Alex Wandl**

This project reimagines ports in the Eurodelta as strategic engines of circularity. Despite their key role in material flows, ports are often overlooked in spatial planning and circular transition strategies. The proposal addresses this gap by applying principles of circularity, decentralization, socio-spatial justice, and sustainable land use. Five core objectives guide the framework: integrate portscapes and their landscapes, improve resource efficiency, regenerate environments, adopt innovation, and support just transitions. Ports are seen not as isolated logistical zones but as spatial nodes embedded in circular networks. They become multifunctional spaces for clean energy, recycling, storage, and low-carbon logistics. Terminals, waterfronts, and storage zones are recast as active components in regional material cycles. A pattern language supports cross-scalar coordination, informing land-use regulation, zoning, and European policy. This shared framework enables cooperation across jurisdictions while adapting to local conditions. Ports become laboratories of circular integration—balancing economic function with environmental and social renewal. Their transformation embodies the shift from linear infrastructure to regenerative regionalism.



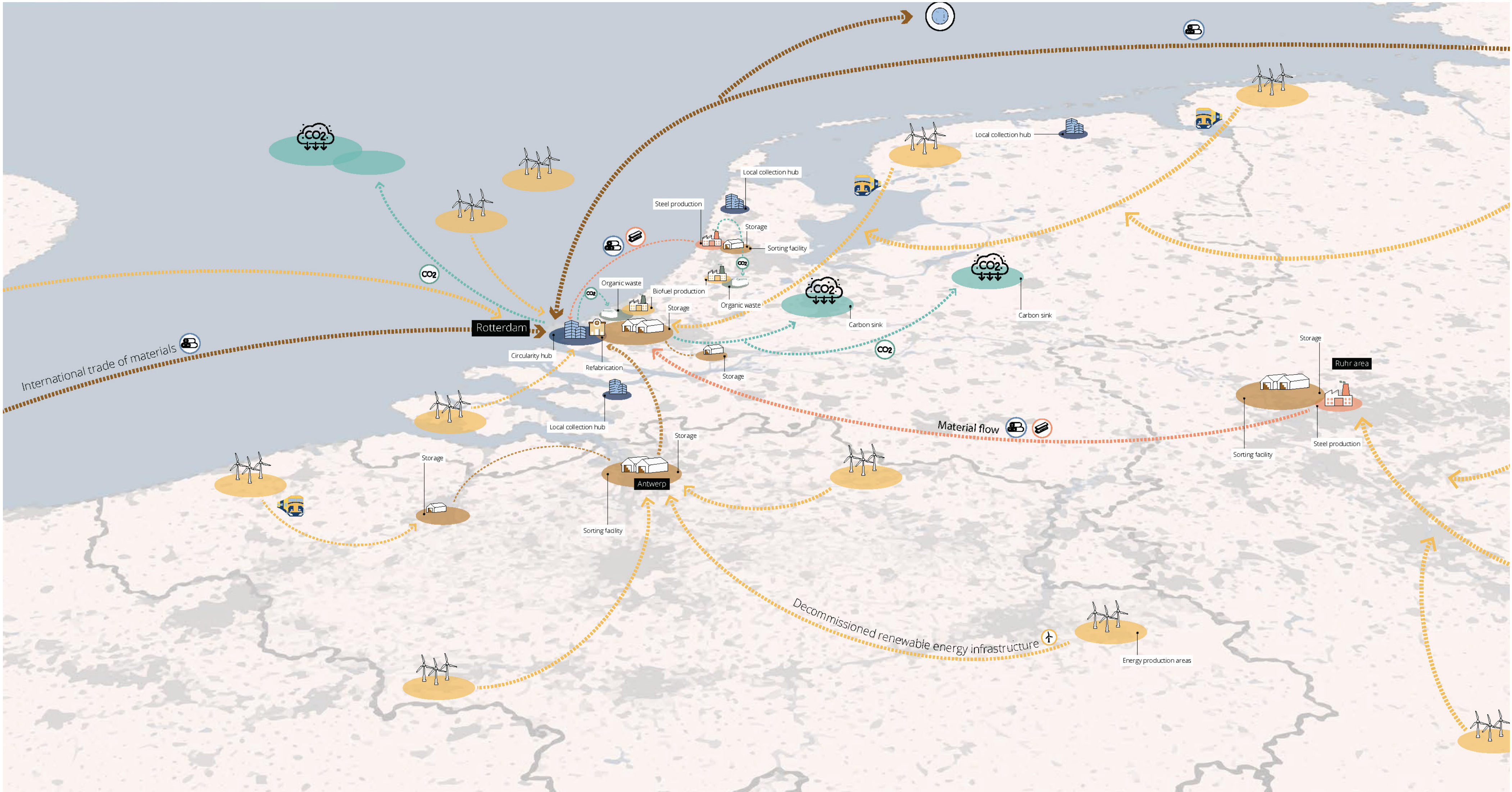
- 1 Integrating port, portscapes and port landscapes
- 2 Increase resource efficiency by closing loops
- 3 Regenerating for humans and flora/fauna
- 4 Embrace innovation and technological change
- 5 Socially just transition



Access full report of the project:





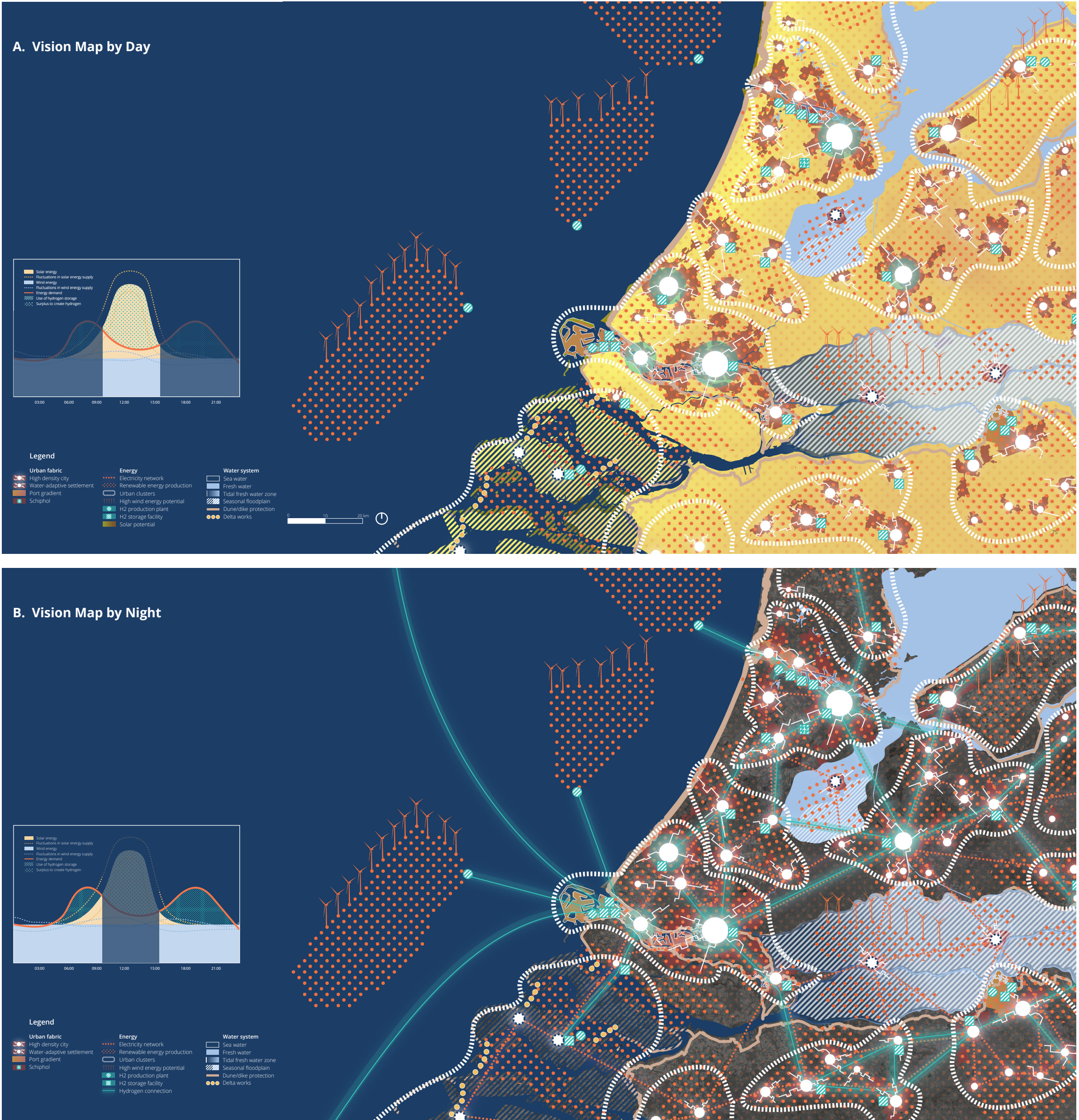


## POWERSHIFT Towards a Sustainable Post-Fossil Scape

Student team:  
**Evgenia Vamvakousi**  
**Frithasya Jeniardina Purba**  
**Kristupas Kadys**  
**Nikita Ham**  
**Sebestyen Pfisztner**

Tutor team:  
**Lei Qu,**  
**Francesca Rizzetto**

Power Shift envisions a post-fossil energy future for Rotterdam, addressing climate risk, sea-level rise, and energy transition simultaneously. The framework proposes a spatial system synchronized with a 24-hour energy metabolism: solar by day, wind and biomass by night, with hydrogen and electricity storage smoothing flows across space and time. This energy circulates through adapted infrastructures that link industrial clusters, urban neighborhoods, and natural zones. Water systems are rethought in tandem—addressing purification and conservation alongside energy flows. The transition is community-driven: co-creation studios, public meetings, and place-making initiatives shape the evolving system. Four policy tools support the framework—shaping, regulating, building capacity, and stimulating innovation. These are designed to work in sync across sectors and stakeholders. Rotterdam is presented not only as a zone of urgent adaptation but as a living lab for circular energy governance—where infrastructure, ecology, and democracy meet. The project shows how systemic coordination, spatial thinking, and inclusive design can reframe energy as a shared resource and a cultural project.



Access full report of the project:

