

Transforming City Regions for Circularity

Summer Semester 2024, Winter Semester 2024/2025 MSc Transforming City Regions

The Transforming City Regions (TCR) Master's programme at RWTH Aachen University (RWTH) offers an interdisciplinary, project-based approach to urban and regional planning. Designed to address the complexities of contemporary urbanisation, TCR bridges theory and practice through applied research and collaborative design. Thereby, TCR equips students not only to understand urban systems, but to actively shape their transformation. Following this rationale, within the EU-funded ASSET project, three interlinked courses and a Master's thesis explored circularity through site visits, design studios and strategic analysis at different scales—from neighbourhoods to macro-regions. The courses were closely linked to ongoing research, enriched by expert input, and offered different perspectives on the spatial implications of a circular economy and its practical implementation in space.

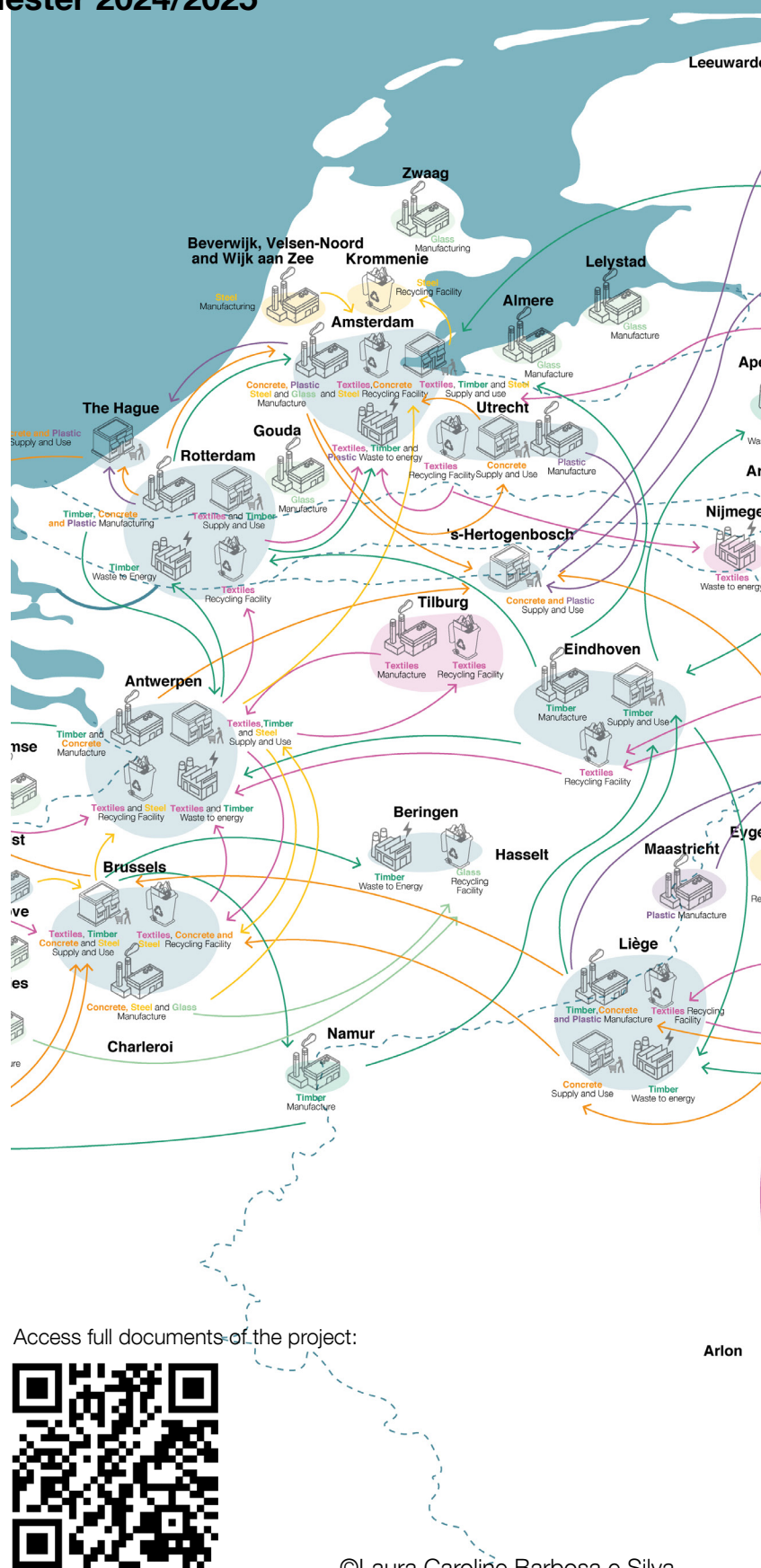
Taken together, the following project selection demonstrate that circularity must be approached across scales and over time. Planning at the neighbourhood level, as in Haven-Stad Amsterdam, benefits from early collaboration and sustained dialogue. At the regional level, integrated spatial analysis and stakeholder narratives are essential for shaping visions such as the Circular Eurodelta 2050+. The selection highlights the importance of enablers such as multi-functional hubs and flexible zoning, while also highlighting political, economic and governance challenges. Crucially, the works show that cross-border collaboration between academia, industry and government is key to overcoming fragmented systems and realising circular potential.

Contributing students: Laura Caroline Barbosa e Silva, Cemre Bingöl, Hanna Broß, Ana Paulina Cabello, Qian Chen, Elif Ertemiz, Juliana Garcia Valencia, Elies Horemans, Jordan Lewa, Yuhan Liu, Lilian Mehlem, Justin Pauls, Carolin Schwabe, Nitisha Sai Kiran Srikurmam, Valentina Vavalà, Jia Vogel, Jana Westerkamp

Tutors: Christa Reicher, Fabio Bayro Kaiser, Lara Wittfeld

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Student assistants: Laura Barbosa e Silva, Elif Ertemiz



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Integrated Project II: Evolution of functional urban areas 'Harbour City Amsterdam'

Summer Semester 2024
MSc Transforming City Regions
RWTH Aachen University

Integrated Project II: Evolution of functional urban areas 'Harbour City Amsterdam': immersed students in Haven-Stad, Amsterdam's flagship urban development. With input from local stakeholders and a dedicated site visit, students developed design concepts that incorporated circular design principles into one of Europe's largest urban regeneration sites. Applying the Spatial Strategy for Circular South-Holland, they proposed innovative mixed-use and circular neighbourhoods with multi-functional hubs and high-quality public spaces. Early stakeholder involvement and iterative feedback were key to shaping feasible, site-specific strategies that linked spatial design with systemic change.

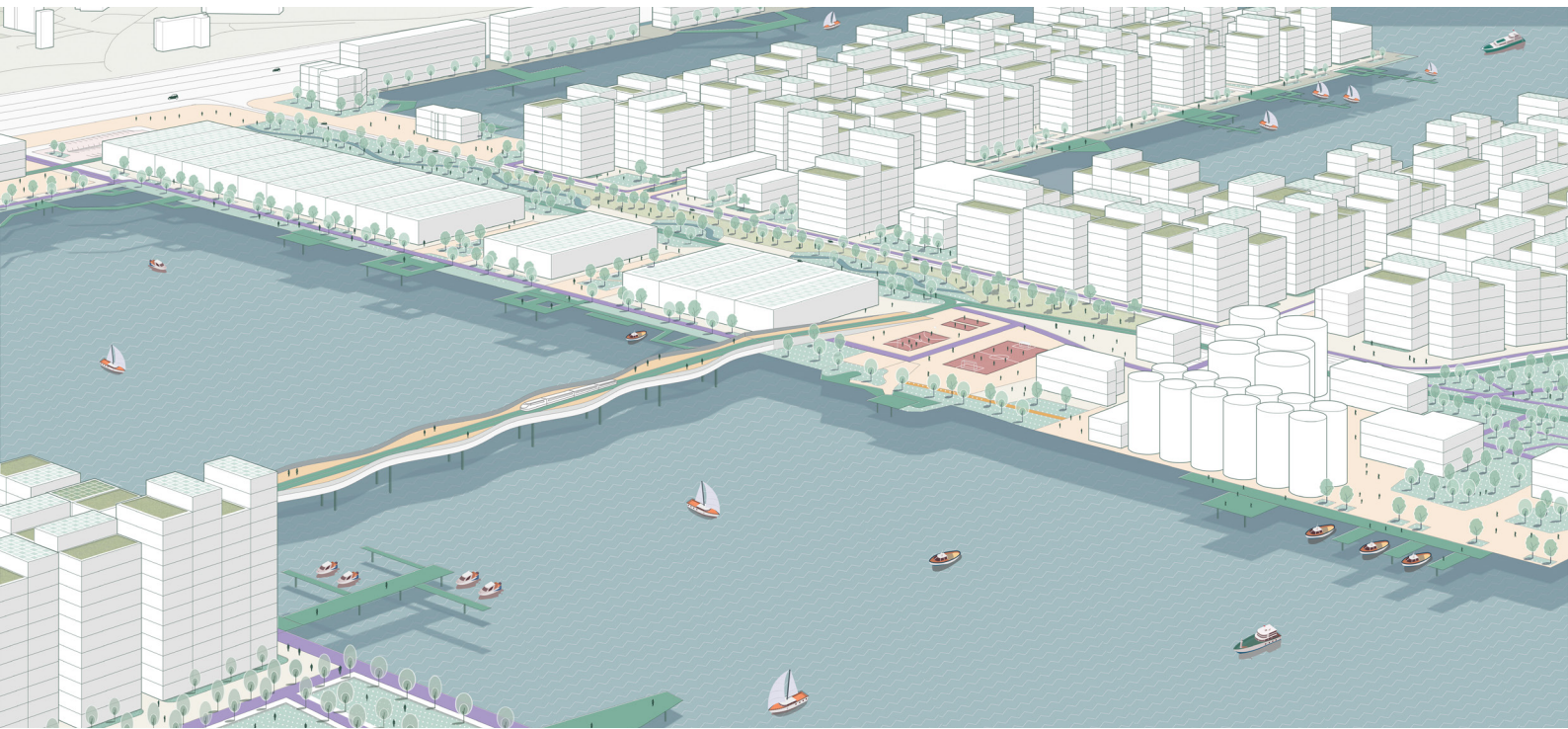
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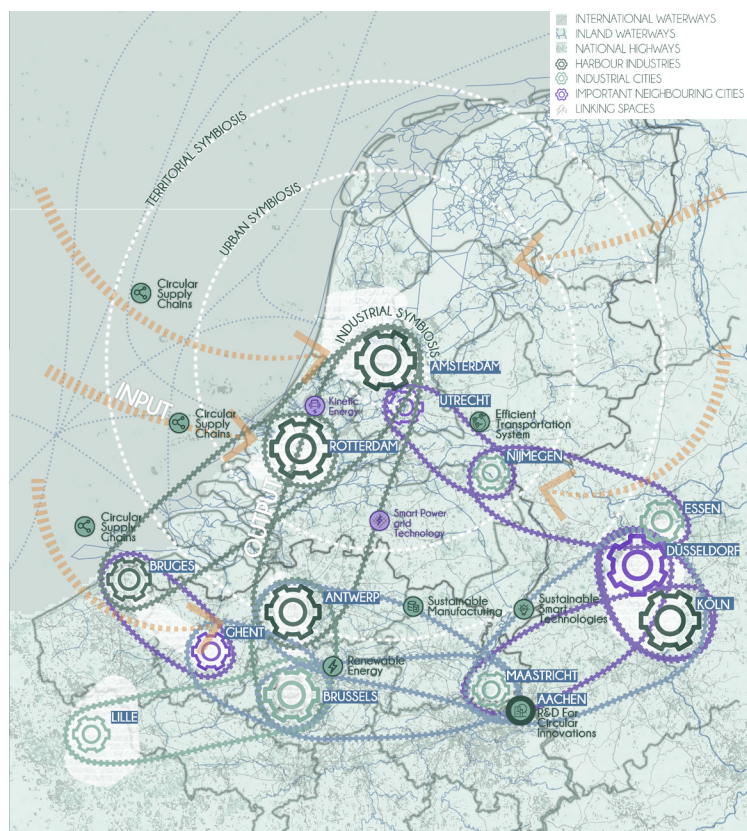
Harbour Metabolism

A Harbour City That is Harmonized with the Urban Metabolism by Focusing on Self-Sufficiency Within A Human-Centric Circular Framework

Students:

Qian Chen,
Elif Ertemiz,
Elies Horemans,
Yuhan Liu

As climate pressures intensify and cities seek new models of resilience, Harbour Metabolism proposes a human-centred, self-sufficient harbour city shaped by circular flows and technological integration. Building on Amsterdam's Integral Framework, the project uses the concept of urban metabolism to reconsider the intersection of materials, energy and social systems. The concept revolves around six strategic pillars: mining the city for reusable materials; fostering community engagement; enabling smart energy networks; supporting local innovation; and aligning policies across the Eurodelta region. These ideas are realised through green corridors, modular housing, community-driven hubs, and robust infrastructure for energy and material exchange. Every design element, from neighbourhood repair cafés to decentralised water systems, contributes to the broader vision of regenerative urbanism, where people, technology, and nature co-evolve. The project adopts a scenario-based approach, enabling stepwise implementation across scales, from individual buildings to regional corridors. The result is more than just a spatial proposal; it signals a cultural shift towards cities that consume and keep resources in a loop, and towards cities that grow and evolve in harmony with their environment. Harbour Metabolism demonstrates how spatial design, grounded in real-world systems and local agency, can activate circular practices that are socially inclusive and environmentally sound.



Access full documents of the project:





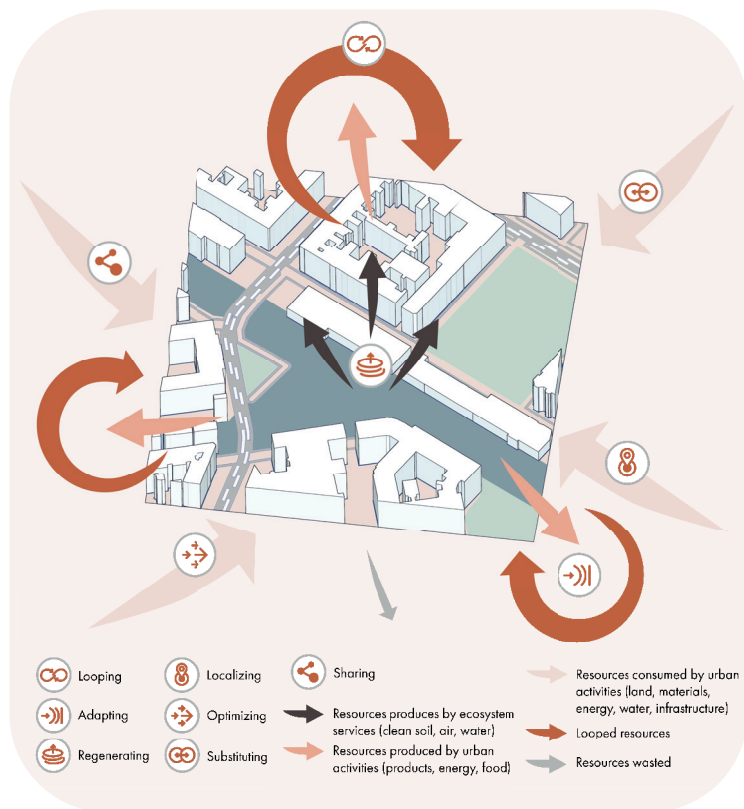
Lighthouse Haven-Stad

Leading the Way to a Circular Urban Landscape and Resource Management in Coen- & Vlothaven

Students:

Ana Paulina Cabello,
Juliana Garcia Valencia,
Jia Vogel,
Jana Westerkamp

As urban areas face mounting environmental and resource pressures, circular urbanism offers a compelling way forward by redefining how cities are planned, inhabited and sustained. Lighthouse Haven-Stad is a visionary project that aims to transform Amsterdam's Coen- and Vlothaven districts into a regenerative, future-ready city quarter. The design translates the principles of the circular economy—reuse, regeneration and resource stewardship—into a tangible framework for one of Europe's most complex port redevelopment sites. Inspired by the Spatial Strategy for Circular South-Holland and Amsterdam's Integral Framework, the team has envisioned a network of 'linking spaces': local hubs for material reuse, repair, and organic cycles. These spaces are connected by the Lighthouse Axis, a clean logistics and mobility spine that connects the district to the wider metropolitan area. The spatial plan incorporates vertical gardens in old silos, floating farms and shared public facilities, which together form a living ecosystem of circular activity. Implementation strategies include phased development, inclusive governance structures, and zoning aligned with circular performance. This project challenges the limits of conventional sustainability, demonstrating that spatial design can be a catalyst for systemic transformation. Lighthouse Haven-Stad proposes a circularity not as a technical solution, but as a creative and inclusive approach to reimagining how we can live and thrive in urban spaces.



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Research Module in urban and regional transformation ,Eurodelta 2050+: Spatial strategies for a circular built environment'

Winter Semester 2024/2025

Research Module in urban and regional transformation ,Eurodelta 2050+: Spatial strategies for a circular built environment': broadened the scope by focusing on cross-border strategies for a circular built environment in the Eurodelta. Through site visits to circular companies in Brussels and Amsterdam, stakeholder interviews and scenario development, students analysed material flows and governance frameworks. Their analytical and conceptual outputs articulated empirically based visions for a Circular Eurodelta, linking spatial planning with long-term sustainability goals.

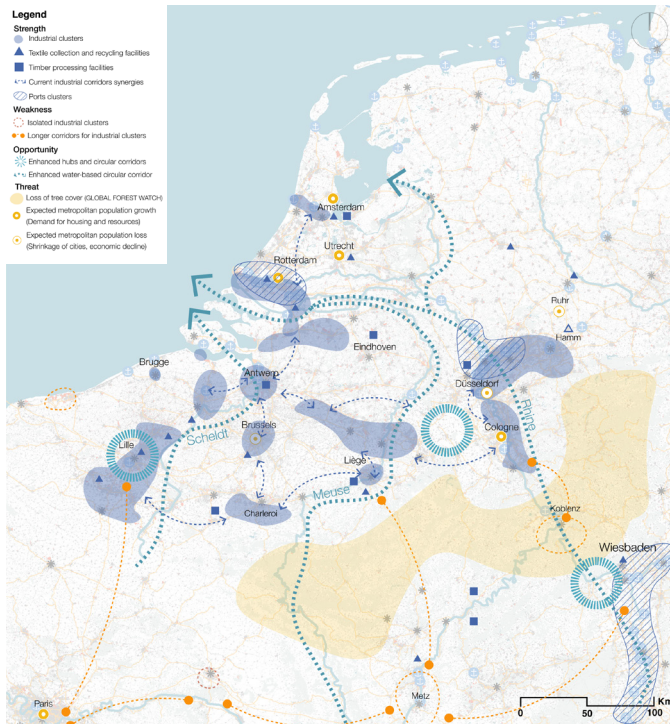
Contributing students: Laura Caroline Barbosa e Silva, Justin Pauls

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Eurodelta Corridors: Circular Strategies for Resilient Living

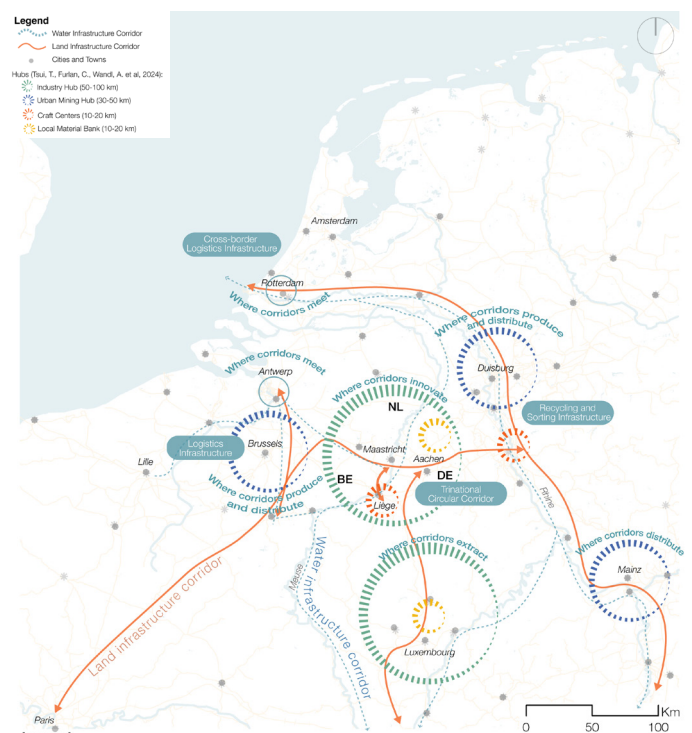
Textiles and Timber

Student:

Laura Caroline Barbosa e Silva

In an era of shifting resource dynamics and fragmented logistics, the Eurodelta region is emerging as a testing ground for rethinking how infrastructure can promote circularity. Eurodelta Corridors explores how timber and textiles—two versatile yet frequently overlooked materials—can be incorporated into construction practices via spatially coordinated corridors. These corridors range from waterways and rail lines to last-mile urban logistics, connecting production, reuse and innovation hubs across borders. Drawing on spatial data analysis, expert interviews and fieldwork, the project proposes a system comprising material banks, circular depots and shared processing centres located along the North Sea–Rhine–Mediterranean corridor. Timber provides carbon storage and renewable structures, while recycled textiles offer insulation and reduce waste, together forming the material backbone of a vision for low-carbon construction. However, logistics are important: the project found that co-locating reuse and processing sites with ports and multimodal hubs was essential in lowering transport emissions and increasing effectiveness. The project also highlights the need for governance support, including digital traceability tools and cross-border incentives. The result is a pragmatic yet inspiring vision of the Eurodelta—not just as a channel for goods, but as an active circulatory system for sustainable living. This vision calls for a rethink of infrastructure, viewing it not as a backdrop, but as the scaffolding of tomorrow's circular cities.

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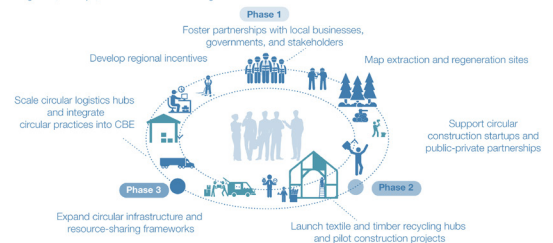


The Circular Regional Corridor: Resilience through Growth

Focus: Economic opportunity, job creation, shrinking cities, start-ups, economic incentives and regional economic resilience.

Key Infrastructure:

Circular economy hubs
Multi-modal logistics
Infrastructure investments
Industrial synergies
Flexible building use

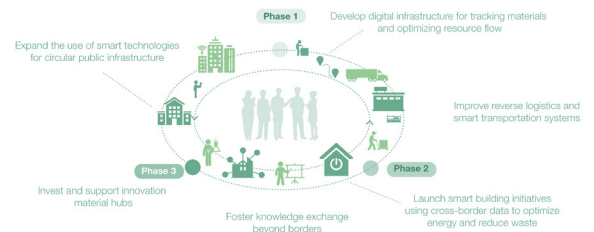


The Circular City Corridor: Smart and Innovative Built Environment

Focus: Technological innovation, material innovation hubs, smart city development, intelligent transportation systems, reverse logistics.

Key Infrastructure:

Intelligent transportation systems
Reverse logistics
Innovation hubs
Digital platforms
Flexible building use



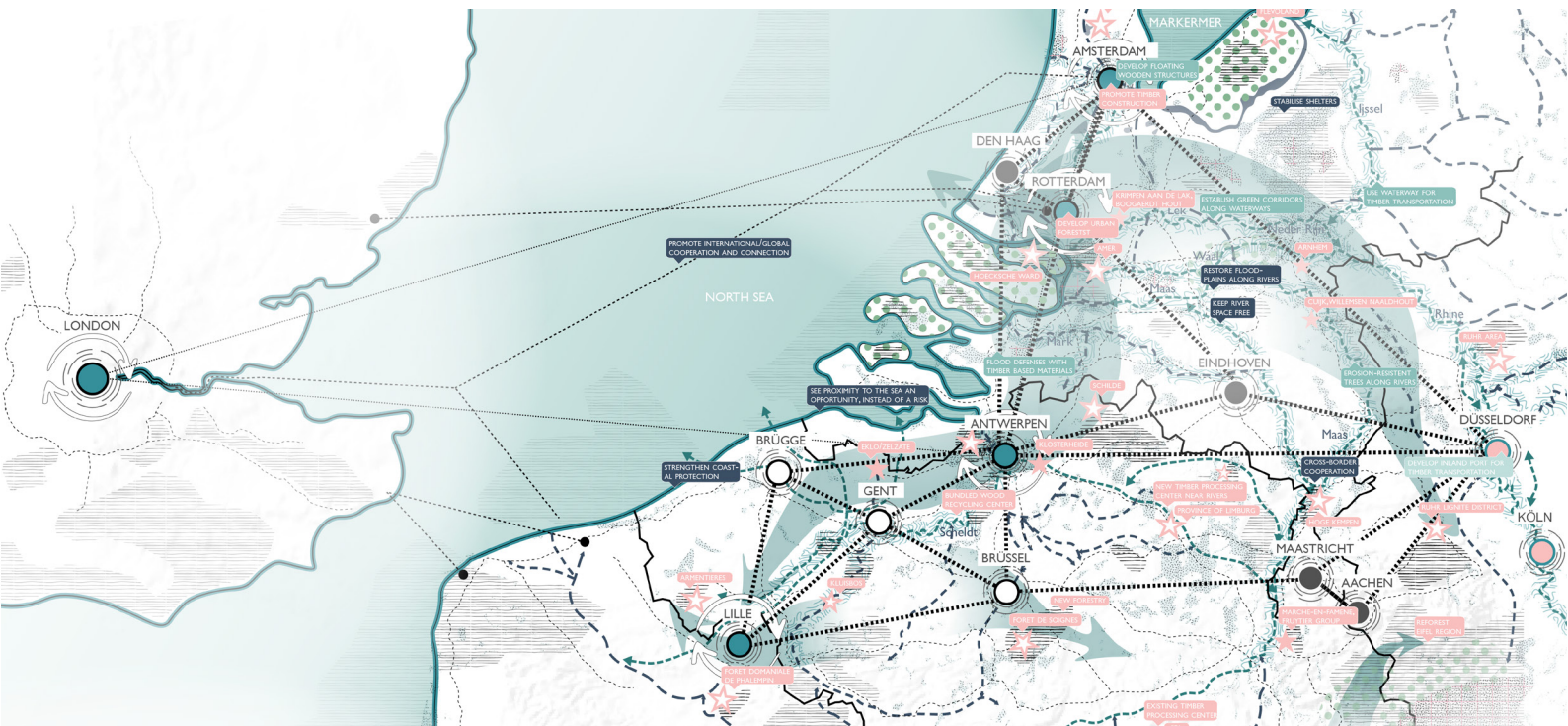
The Circular Neighborhood Corridor: Communities for the New Normal

Focus: Community empowerment, social equity, improved quality of life, stakeholder engagement, hands-on approach.

Key Infrastructure:

Local material banks
Craft and workshop centers
Drop off points for recycling
Reverse logistics stores
Community centers





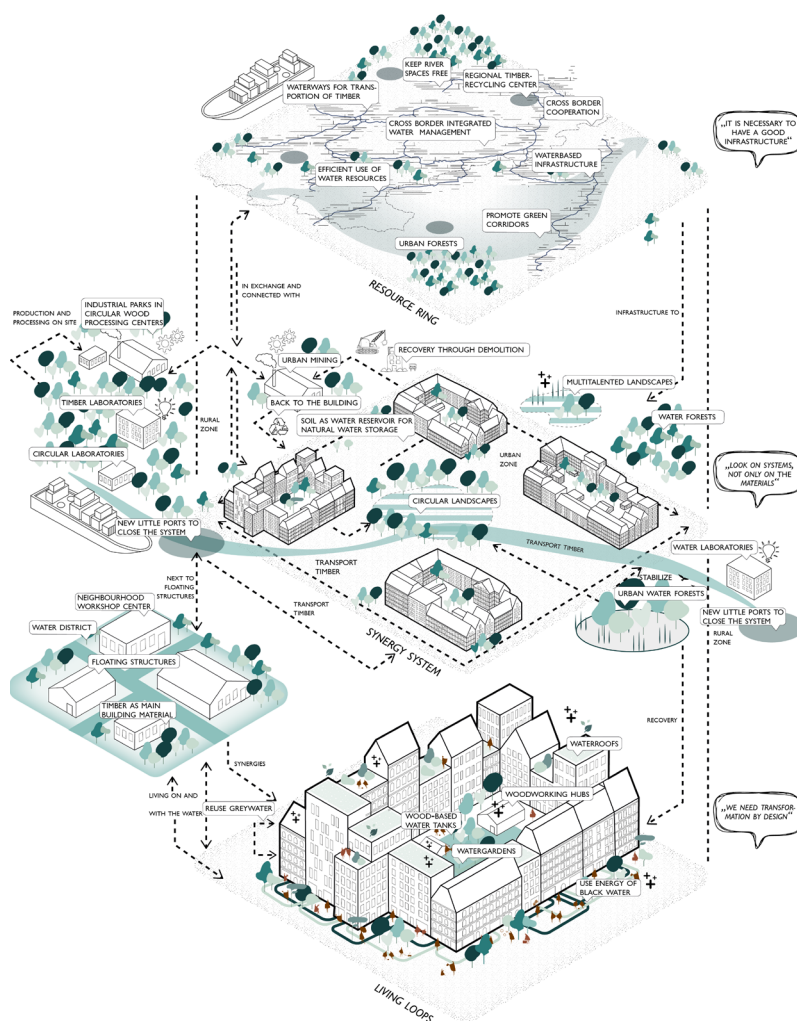
Eurodelta Spatial Synergies

Water and Timber as Key Resources in Circular Synergy Systems

Student:

Justin Pauls

Looking beyond materials to systems, Eurodelta Spatial Synergies envisions a future where water and timber shape the identity and sustainability of a deeply connected region. This project explores how these two natural resources—often siloed in planning—can work together to form spatial networks that regenerate both ecosystems and communities. Through SWOT analysis, literature review, and spatial scenario development, the proposal maps out four interlinked typologies: water laboratories, timber hubs, floating wood-based neighbourhoods, and urban forests. These nodes form a wider framework of 'circular laboratories', where innovation, education, and material recovery converge. From inland ports for timber transport to greywater systems powering local energy loops, the strategy combines practical infrastructure with place-based culture. Reforestation of key areas, green corridors along waterways, and nature-based flood defences add ecological depth to this system. Importantly, the project doesn't treat the Eurodelta as a single system, but as a mosaic of living landscapes—each with its own rhythm of flows, practices, and partnerships. In doing so, Eurodelta Spatial Synergies offers a compelling vision: that circularity is not only about efficiency, but about balance—between human needs and natural cycles, between infrastructure and imagination.



Access full documents of the project:



Master Thesis + Urban Design Colloquium + Elective Course

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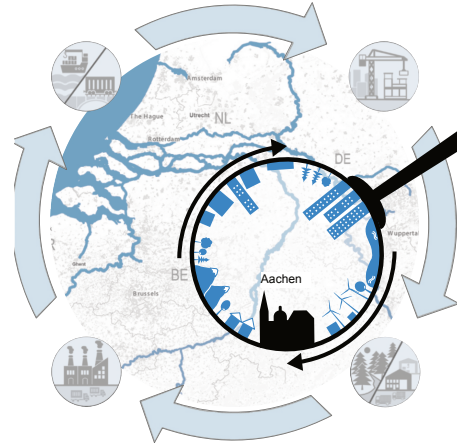
Master thesis, Crossing borders, closing loops': advanced the regional dimension of circularity by exploring how cross-border cooperation can drive systemic change in the Eurodelta. Through spatial analysis, stakeholder mapping and semi-structured expert interviews, it proposed frameworks for shared infrastructure, policy alignment and circular supply chains. The research highlighted that closing loops at scale requires not only technical solutions, but also governance innovations and coordinated planning.

Elective course, Circular urban landscapes': paired with RWTH's Urban Design Colloquium, explored how circularity is reshaping urban form and policy. Using case studies from Germany, Belgium, the Netherlands and Denmark, among others, students explored themes such as urban mining, adaptive reuse and behavioural change. Public dialogues with experts informed critical essays and visual narratives, highlighting the spatial, cultural and policy dimensions of the circular transition.

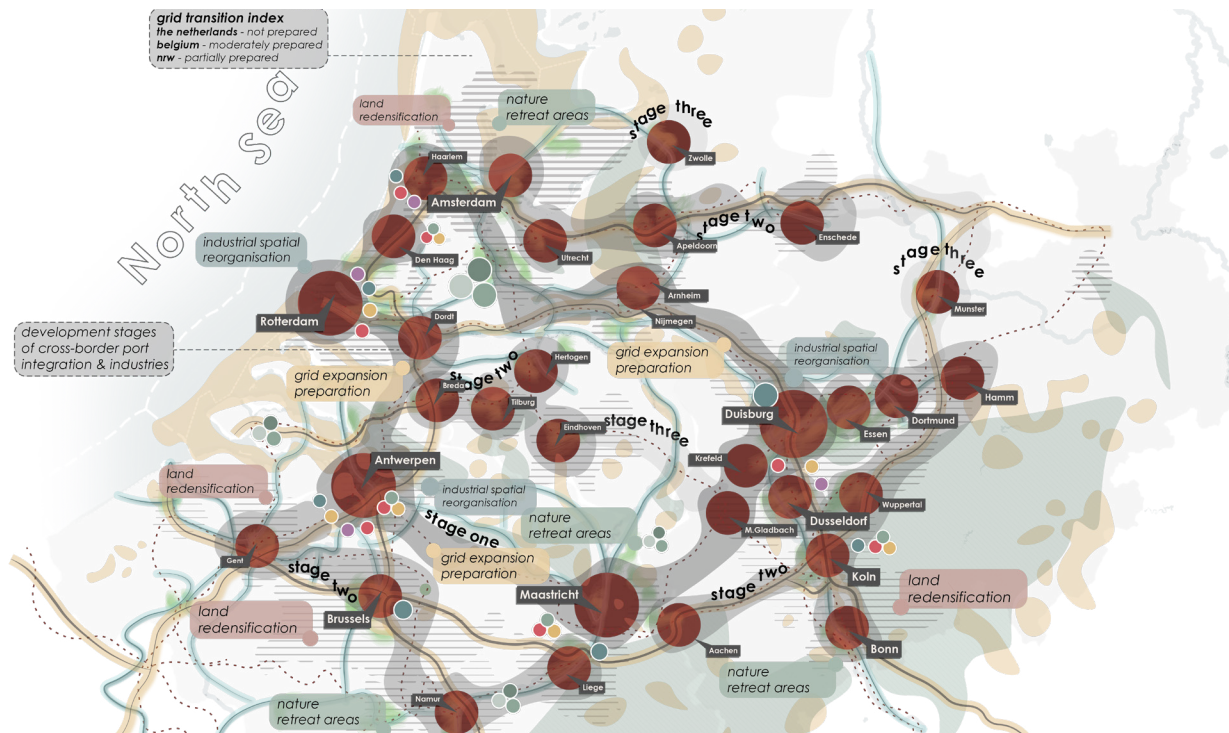
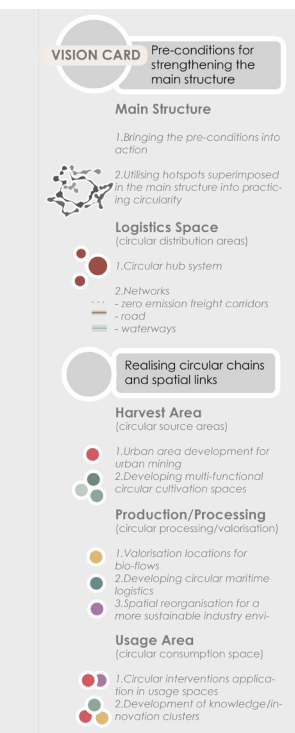
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Crossing Borders, Closing Loops: Designing Cross-Border Stakeholder Arenas for a Circular Built Environment in the Eurodelta Region

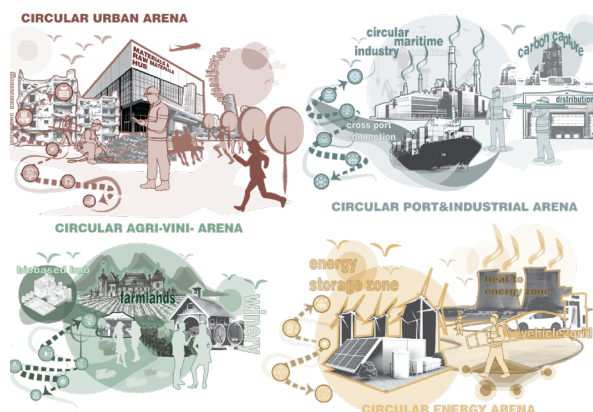
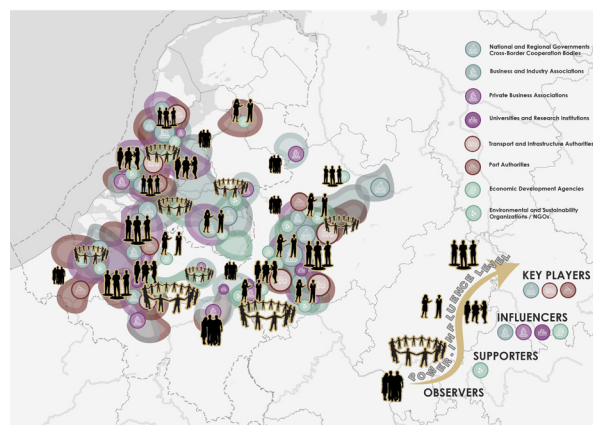
Students: Nitisha Sai Kiran Srikurman

Tutors: Christa Reicher, Jorge Peña Díaz

The Eurodelta region, spanning the Netherlands, Belgium, and Germany, hosts over 45 million people and faces critical sustainability challenges. Despite its economic vitality, fragmented governance creates a patchwork of approaches to sustainability that undermines collective progress. This research explores how to transform the Eurodelta into an integrated circular megaregion through innovative stakeholder arenas.

Key challenges include fragmented governance with inconsistent policies across borders, and inefficient material flows where construction waste and other resources are underutilized. The research identifies three strategic arenas for transformation: Urban-Industrial Clusters focusing on circular construction principles, Port-Industrial Clusters leveraging logistics infrastructure for material exchanges, and Wine-Agri-Industrial Clusters demonstrating small-scale circular innovations.

The vision proposes development phases from 2025-2052, including kickstarting pilot projects, connecting initiatives, building circular infrastructure, and establishing a fully functional circular ecosystem. Practical implementation tools include specialized toolkits for urban innovation, industrial symbiosis, agri-vini circularity, and energy integration. Success depends on cross-border stakeholder collaboration, policy harmonization, spatial integration, and knowledge networks. By connecting large-scale industrial operations with smaller bio-based enterprises through well-designed stakeholder arenas, the Eurodelta can pioneer new models of cross-border collaboration for circularity, transforming resource challenges into opportunities for sustainable prosperity.



Access full documents of the project:



