Waves of Exchange: Navigating Port Cities of the Future

DELTALAB
CENTRE
FOR URBAN
TRANSITION,
ARCHITECTURE
AND URBANISM

UNIRI

0.0
CONTENT

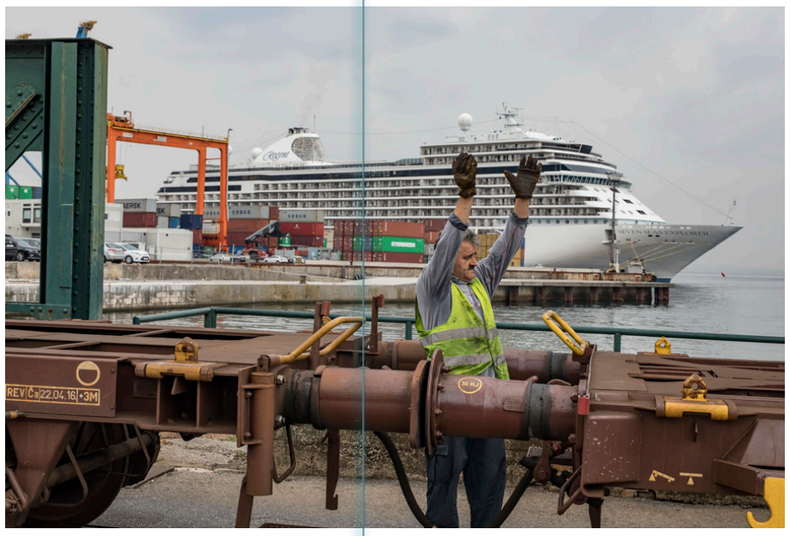
1.0 INTRODUCTION

Port cities around the world face complex challenges stemming from globalization, urbanization, and climate change. These challenges include issues such as sea-level rise, environmental degradation, economic shifts and social inequality. Additionally, port cities hold unique cultural and historical significance, often serving as gateways for trade, migration, and cultural exchange. Recognizing the importance of addressing these challenges and leveraging the opportunities presented by port cities, interdisciplinary university specialist study program URBAN STUDIES at the University of Rijeka initiated WAVES OF EXCHANGE — NAVIGATING PORT CITIES OF THE FUTURE bilateral initiative together with the Norwegian partner SAAHA arkitekter, financed through the Fund for Bilateral Relations of EEA Grants and Norway Grants.

The initiative is grounded in the understanding that port cities are dynamic and evolving urban environments that require innovative approaches to sustainable development and cultural preservation. By bringing together expertise from Rijeka and Oslo, Waves of Exchange sought to foster collaboration, knowledge exchange, and capacity building to address the multifaceted challenges facing port cities. The strategic relevance of the initiative lies in its potential to generate actionable insights, innovative solutions, and policy recommendations that can inform urban planning and development strategies.

The initiative's overarching topic is situated within the thematic focus of the new 2024/2025 generation of Urban Studies titled WATERWORLD FUTURES in which the exploration and comparison of these two port cities was situated. Through this thematic focus, Urban Studies will delve into the potential transformations of human interaction with water, through adaptation and innovation in order for civilization to survive and thrive in a world where water assumes a dominant role.

Urban Studies thus strives to offer the interdisciplinary education necessary for a meaningful contribution to the development of inclusive and resilient urban systems for port cities, in the context of various ongoing crises.



Courtesy of DELTALAB (Neven Petrović)

WAVES OF EXCHANGE: NAVIGATING PORT CITIES OF THE FUTURE SYMPOSIUM

23. 11. 2024

Moise Palace, Cres, Croatia

GREEN NEIGHBOR-HOODS: SYMPOSIUM

6.12.2024

UNIRI, F-006, Rijeka, Croatia

STUDY TRIP TO OSLO

27. 2. - 2. 3. 2025

Oslo, Norway

2.0
WAVES OF EXCHANGE SYMPOSIUM

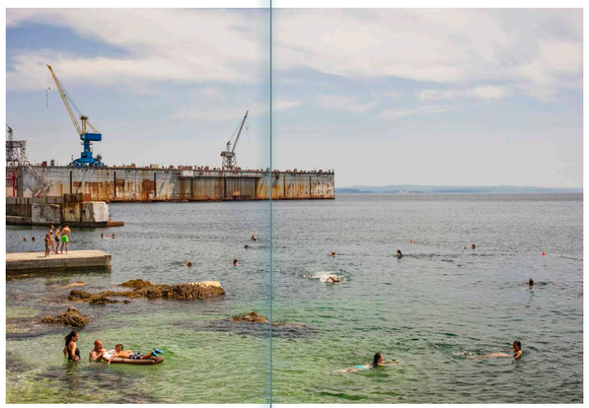
The symposium Waves of Exchange - Navigating Port Cities of the Future was held as the first public activity of the Waves of Exchange bilateral initiative. The symposium welcomed the project's Norwegian partners - SAAHA arkitekten, together with several other guest lecturers as part of a one-day program held in the Moise Palace on the island of Cres. Through a one-day symposium held an open public program, through public engagement and knowledge exchange activities, the initiative WAVES OF EXCHANGE — NAVIGATING PORT CITIES OF THE FUTURE sought to foster dialogue, collaboration, and sustainable urban development strategies for port city of Rijeka, learning from Oslo's experience.

The symposium demonstrated the potential for cross-border partnerships to address complex urban challenges and envision more resilient, inclusive, and vibrant port cities of the future.
It helped to inspire the City of Rijeka to embrace holistic approaches to urban regeneration that benefit both the environment and the communities that call this city home.

MODERATOR:
FILIP PRAČIĆ (DELTALAB)

Courtesy of DELTALAB (Filmerija)

2.1
LECTURE ABSTRACTS



Courtesy of Rijeka 2020 (Borko Vukosav)

THE (DIS)APPEARANCE OF SYMBOLS: RIJEKA AND ITS CAPITAL CITIES

LUKA SKANSI (POLIMI)

The port and railway are Rijeka's facial traits. Its tissue is made of infrastructure. Roads, industrial zones, warehouses, and service facilities are its organs, vital to its function as a port and industrial center, but also central pieces on its landscape. The infrastructure of gargantuan scale has set in and transformed the natural environment into artificial space designed to bring urban development. Some of it is fixed, like communications, junctions, and buildings. Some are mobile, like ships, trains, electrons, and bytes.

Bjørvika, Oslo (Didrick Stenersen)

SUSTAINABLE URBAN FUTURES: LESSONS FROM OSLO'S STRATEGIC PLANNING, TRANSFORMATION, AND DEVELOPMENT

ELLEN S. DE VIBE (CITY OF OSLO)

The lecture focused on the use of strategic planning and urban development tools, progressing from visionary ideas to detailed implementation. It covered three main areas. First, the Background and Introduction provided context with a discussion on the current situation in Oslo, value-driven visions, various urban development strategies in Denmark, zoning models in Oslo's urban development, and different strategic models applied in Oslo. The second area, The Fjord City Development, examined the development model, organizational approaches, planning concepts, and obligations tied to urban contracts, zoning processes, and the tangible outcomes of the project. Finally, the lecture explored the Use of Other Strategic Program including initiatives like Climate Budgeting, the Temporary Harbour Promenade project, the Car-free Livability program, and the FutureBuilt sustainability pilot program. Additional topics included the roles of federal and local architectural policies, nature-based systems (NbS) that promote marine life, and standards like the Green and Blue Factor Norm to support sustainable urban environments.

Bjørvika neighborhood (SLA / Krafftwork)

THE NATURE OF PORT DEVELOPMENTS – HOW NATURE AND PUBLIC SPACE SUPPORT THE CREATION OF SPACES FOR LIFE, ALL LIFE

FRANZISKA MEISEL (SLA)

We are in a new climate reality, with people, plants, and animals increasingly affected by climate change. Following extreme weather events like flooding and heat waves across Europe, the need for green, adaptable waterfronts in our cities has never been more pressing. Our cities, built on modernist ideals that reject nature and favor technical solutions, often fail in the face of extreme weather. This highlights the need for a new urban development approach – one that reconnects people, water, and nature. Cities must evolve as interconnected systems that adapt to nature rather than combat it, making natural elements central to urban quality of life. A paradigm shift is underway, challenging modernity's division between the city and nature. For 30 years, SLA has worked globally to bridge this gap, creating vibrant waterfronts that integrate urban spaces with historical waterways. In Oslo, SLA has helped transform the once inaccessible Bjorvika harbor into a beloved neighborhood, blending urban nature with cultural landmarks like the state opera, art museums, and public libraries. This project redefined Oslo's waterfront by integrating nature with urban life, drawing people for recreation, shopping, and social interaction. As we work on Oslo's final harbor project, Filipstad, we face new challenges: ensuring inclusivity for all income levels, enhancing resilience to climate change, and balancing high-density needs with green spaces. Addressing these issues will be crucial to creating a waterfront that serves both people and the environment.

Courtesy of SAAHA

THE IMPORTANCE OF GOOD COMPROMISE - ADNAN HARAMBAŠIĆ (SAAHA)

When working in a complex context, the ability to find good compromises becomes crucial to getting something done. While dealing with physical context is something we architects are trained to do, dealing with questions of identity and economic feasibility is more complex. What to build the future identity on and can we find a way to reconcile the need for development with the protection of the important historical heritage? If we do not take financial considerations into account, the plans we develop will never become realized. The compromise can be seen as the process of finding a common ground and interest. How we negotiate different interests and reach an agreeable solution for everyone becomes the biggest challenge faced when developing new plans and strategies. When we fail to find good compromises, things take too long, we are unable to make decisions and, in the worst case, development stops. If the process takes too long and we finally manage to adopt a plan, it is very often already out of date. If successful, a good compromise can help us develop a plan that is considered a collective vision and a plan that is robust enough to handle adjustments over time. Through a concrete example of the process behind the development of a detailed zoning plan for Hegreneset, a relatively small industrial area in the west coast city of Bergen, the advantages and disadvantages of the way this is done in Norway are illustrated. Hegreneset is to be transformed from industry to a new neighborhood, with a 950 m coast line, challenging topography, existing neighborhood in the immediate vicinity, and relatively extensive and preservation-valuable industrial heritage on and off the site.

Courtesy of DELTALAB

3.0 GREEN NEIGHBOR-HOODS: SYMPOSIUM

The Green Neighborhoods symposium explored the transformative potential of green urban renewal in shaping the port cities of tomorrow. As urbanization, social challenges, and climate crisis continue to accelerate, the need to reimagine our neighborhoods as sustainable, inclusive, and vibrant places has never been more pressing. This symposium brought together experts related to urban planning, architecture, landscape, and system design to discuss the manifold integration of both ecological and social considerations into urban development. At its core, green urban renewal addressed the environmental challenges posed by rapid urban growth by embedding sustainability into the very fabric of our cities. But the vision for green neighborhoods goes beyond environmental benefits. It equally emphasizes social equity and community well-being, recognizing that cities must serve the needs of all their residents. Thus, the focus of the lectures was on how ecological improvements can harmonize with social objectives to create neighborhoods that are both environmentally sustainable and socially inclusive. From affordable housing projects that incorporate green infrastructure, to community-led initiatives that tackle neglected urban spaces, we explored strategies that empower both residents and policymakers in fostering healthier ecosystems.

Through keynote presentations and lectures, the Green Neighborhoods symposium aimed to inspire innovative ideas, drawing specific attention to the unique challenges and opportunities faced by contemporary port cities, with a focus on Rijeka and Oslo. Despite their geographical, political, and economic differences, both cities share a rich maritime heritage and are undergoing significant transformations aimed at incorporating green urban renewal into their development strategies. Rijeka, with its industrial past, is reimagining its waterfront to foster sustainable tourism, green infrastructure, and cultural revitalization. Oslo, known for its progressive environmental policies, has been at the forefront of urban sustainability, reclaiming industrial waterfronts for public green spaces, residential areas, and cultural hubs. This year the City of Rijeka commissioned the creation of a Green Urban Renewal Strategy, based on which the development of an action plan until 2030 is underway.

These circumstances offers an opportunity for valuable cultural exchange and transition of knowledge between Oslo and Rijeka tackling how port cities can balance ecological preservation with economic growth, all while addressing social inclusion, environmental justice, and public participation. We hope this symposium can help inspire the City of Rijeka to embrace holistic approaches to urban regeneration that benefit both the environment and the communities that call these cities home.

MODERATOR:
FILIP PRAČIĆ (DELTALAB)

Courtesy of DELTALAB (Karlo Čargonja)

3.1
LECTURE ABSTRACTS

Duncan Cumming, CC BY-NC 2.0

OSLO: BALANCING SUSTAINABILITY AND URBAN CHALLENGES

PETER HEMMERSAM (AHO)

Oslo was the 2019 European Green Capital. Its sustainable and landscape-based urban planning has a long history and includes river-opening projects and a revitalised post-industrial harbourfront. Other green policies include emission reduction zones, a programme for urban liveability in the central district, and electrification of the public transport network. While green, Oslo still struggles with gentrification, social segregation, and political greenwashing.

Rammeverk, by Fragment (Kvant-1)

BEYOND THE MARKET: HOUSING ALTERNATIVES FOR A RESILIENT AND INCLUSIVE OSLO

ARILD ERIKSEN (FRAGMENT)

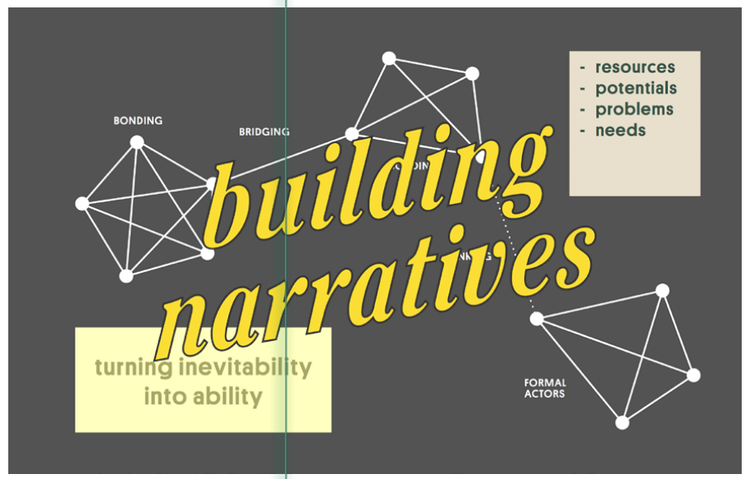
Oslo is one of the most market-liberal cities in Europe when it comes to housing development. The municipality sells all its plots at market price. There is no non-commercial rental sector. Affordable premises for artists or start-ups are becoming increasingly expensive. Work trips are getting longer. For the past ten years, Fragment has worked with a number of housing alternatives: artists' housing, urban ecological neighborhoods in the city, models for resident participation in construction and renovation, and in the last year together with the trade union movement to inspire them to build housing again.

Courtesy of Zelena Infrastruktura d.o.o.

GREEN INFRASTRUCTURE OF THE CITY OF RIJEKA

VIŠNJA ŠTEKO (GREEN INFRASTRUCTURE)

The Study and Strategy for Green Infrastructure in the City of Rijeka provides a comprehensive and integrated analysis of all factors essential to shaping the city's existing green infrastructure elements. It includes a typology of these elements and evaluates their current significance and potential for developing new functions within a planned green infrastructure network. The Strategy defines a thematic and programmatic concept, presenting specific opportunities, initiatives, and projects for establishing green infrastructure, along with pathways for their implementation. Together, the Strategy and its Plan serve as a critical professional foundation for updating the City of Rijeka's spatial planning documentation.



Courtesy of Urbani separe

BUILDING NARRATIVES

MARIN NIŽIĆ (URBANI SEPARE)

The lecture Building Narratives outlines the foundation of a growing practice born and raised in Rijeka. Urbani separe is a collective that works through long-term, layered, and deeply participatory projects that create sustainable microsystems for the endogenous and regenerative development of Rijeka.

Here, endogeny is seen as the potential of places and their communities to define, gather, and action both resources and bits of knowledge within themselves to participate in — and sometimes even direct — growth. Projects of various scales, tackling distinct urban, rural, and natural areas, will be dissected to explain the desired place of collectivity in formal and informal participatory spatial processes in Rijeka and beyond.

Courtesy of Ida Križaj Leko

RESILIENT CAMPUS

IDA KRIŽAJ LEKO (DELTALAB, URBAN STUDIES)

The Campus of the University oF Rijeka is a monofunctional enclave, whose development is burdened by the rector's four-year mandates, the constant changes in the needs of students and its locational and topographical limitations such as strong wind surges of "bura", large terrain slopes and coastal karst.

This ostensible state of continuous crisis that characterizes Campus makes it an extremely fertile field for reflection on and investigation of the contemporary city, whose zero state is defined by dynamics of contradictions and continuous crisis, by anthropocenic permeations that test all inherited, inevitably modernist, architectural skills. In such an environment, only the resistant architecture and territories survive.

Courtesy of DELTALAB (Karlo Čargonja)

FILIP
PRAČIĆ

4.0
OSLO
FIELD TRIP

Courtesy of DELTALAB (Ana Orlić)

Rooted in the understanding that port cities are complex, dynamic, and ever-evolving urban landscapes requiring innovative strategies for sustainable development, the interdisciplinary study program Urban Studies at the University of Rijeka (UNIRI) partnered with the esteemed Norwegian architectural firm SAAHA to launch the initiative Waves of Exchange: Navigating Port Cities of the Future. By bringing together expertise from Rijeka and Oslo, the initiative aimed to foster collaboration and facilitate knowledge exchange in addressing complex challenges facing port cities. The initiative's overarching theme aligned seamlessly with the new thematic framework of Urban Studies titled Waterworld Futures, within which the comparative exploration of these two port cities took place. Waterworld Futures invites students to investigate potential transformations in humanity's relationship with water as civilizations adapt, migrate, and innovate to survive and thrive in a world where water plays a dominant role.

Following the first activity—a symposium at the Moise Palace on the island of Cres in November 2024, where we attended insightful lectures on the development and transformations of Oslo's waterfront— the second activity of this bilateral initiative took the form of a field trip to Oslo, Norway. Renowned for its innovative design, world-class museums, and commitment to sustainable urban development, Oslo rendered itself as a dynamic city where contemporary architecture harmonizes with a rich heritage and breathtaking natural landscapes, presenting a distinctive synthesis of historical layers, metropolitan vibrancy, and outdoor recreation. The field trip to Oslo provided a unique opportunity to transition from theoretical discussions to immersive, on-site experience, enabling us to observe and engage directly with urban projects, architectural innovations, and infrastructural changes previously discussed during the Waves of Exchange symposium. Experiencing these developments firsthand deepened our understanding and provided a more comprehensive perspective of Oslo's seafront transformation.

EXCURSION FRAMEWORK

During the field trip, we attended several engaging lectures and guided tours. Representatives from Hav Eiendom, the Port of Oslo's property company, delivered introductory lectures outlining their mission to create a sustainable fjord city through eleven key development projects. By integrating housing, business, and cultural spaces, they assert that Bjorvika has evolved into a vibrant district, characterized by a wealth of cultural buildings, parks, and swimming areas.

A brief recent history revealed that the first architectural and urban planning competition under the overarching theme "City and Fjord: Oslo Towards the Year 2000" was commissioned in 1982. Two years later, the Port Authority transitioned from state control to municipal governance, and in 1988, the Municipal Area Plan was finally adopted, introducing the concept of the Oslo Central Waterfront for the first time. Since 1994, Norway's sustained economic growth has accelerated the realization of these previously outlined

Courtesy of DELTALAB (Ana Orlić)

plans and ambitions. In 2000— the same year Oslo's submerged motor highway, the Oslofjord Tunnel, was opened — a comprehensive study titled "Fjord City or Harbour City" was conducted, culminating in the adoption of the "Fjord City Plan" in 2008. The plan's key elements included sustainable development, a tramline, a harbor promenade, parks, mixed land use, building height regulations, and the integration of ferry cruises and cargo terminals. Fascinatingly, until just two decades ago, the city was entirely separated from the sea by port infrastructure. In response to the imperative to reconnect the city with its waterfront, Hav Eiendom's mission is to make the seafront accessible to all by reclaiming available land for public use and terraforming new expanded territories. As a result, nearly forty percent of the district consists of public spaces, parks, and a harbor promenade that runs between the buildings. However, without idealizing the current development, we also discussed the critical challenges Oslo faces, including the complete lack of affordable housing, the need for inclusivity for lower-income residents, biodiversity regeneration of the seabed, enhancing resilience to climate change, and balancing high-density development with the preservation of green spaces.

Following the lectures and discussion, we embarked on a guided tour of the seafront and the newly developed Bjorvika neighborhood. The tour was led by Ellen de Vibe, who served as Oslo's Chief City Planner for two decades; Franziska Meisel, a landscape architect and urban planner from the renowned multinational firm SLA; and Adnan Harambašić, an architect from SAAHA Arhitekter, our primary partner in the bilateral project. Through their expertise in architecture, landscape design, and urban planning, all three have left a significant imprint on Bjorvika — once an inaccessible harbor, now a vibrant urban district that seamlessly integrates nature with cultural landmarks and public spaces. This ambitious project has redefined Oslo's waterfront, embedding natural elements into the urban fabric.

Later in the afternoon, professor Peter Hemmersam provided a brief introduction to the Oslo School of Architecture and Design (AHO) and its multidisciplinary study programs.. Established as a "crisis headquarters" for the reconstruction of Oslo's devastated urban fabric after World War II, AHO has since evolved into Norway's leading institution for education in architecture, design, and landscape architecture. In addition to discussing the curricula of the master's degree programs, much attention was given to AHO's interdisciplinary research, which contributes to advancing knowledge and shaping the future of the Nordic environment. Particularly captivating was Hemmersam's work on circumpolar North and "Arctic Urbanism," which prompted a relative shift in our perception of the global atlas.

Following this, Alexandra Cruz, Head of Program and International Relations at the Oslo Architecture Triennale (OAT), delivered a lecture outlining the history of the Triennale's themes and its primary concerns. Cruz explained that the OAT is not merely a festival, but rather an "arena for exploration, development, and dissemination of architecture and urban development." The upcoming edition of the OAT will explore themes surrounding the question, "What if nature comes first?" This theme, focusing on sustainability and circularity, while shifting attention away from architecture as the Triennale's central focus, sparked a heated debate regarding the purpose and role of the architectural profession in the contemporary world.

The following day, at the SAAHA Arhitekter office, we gathered for a discussion aimed at reconciling our impressions and reflecting on the newly formed urban fabric of Oslo's seafront. The students considered their observations and experiences, contemplating the potential application of these insights within their own study-projects. In the evening, we explored some of Oslo's most iconic seafront landmarks: the MUNCH Museum, the Oslo Opera House and the new Deichman Bjorvika library. These three striking contemporary buildings, each contributing uniquely to the city's cultural and architectural landscape, stand out for their bold architectural expressions, seamless integration with their surroundings, and commitment to making culture accessible to all.

Courtesy of DELTALAB (Ana Orlić)

OIL, TRADE AND FATE: OSLO'S TRIUMPH AND RIJEKA'S LIMBO

Understanding Norway — one of the wealthiest nations on Earth — is impossible without acknowledging the pivotal role oil has played in its economic transformation. The discovery of vast oil reserves within Norway's exclusive economic zone in the North Sea marked the beginning of this most significant chapter in its economic history. In response, and grounded in the belief that this new found natural wealth was a common good, the Norwegian government established a state-owned company, Statoil, which later merged with Norsk Hydro to form Equinor. The state retains a two-thirds majority ownership in this company, whose name (derived from "Equal-Norway") reflects its core objective: to ensure the equitable distribution of national wealth. Crucially, state control over resource extraction enabled Norway to channel oil revenues into one of the most comprehensive welfare programs in the world. This long-term strategic approach to wealth management has had profound economic benefits, with Norway consistently ranking among the world's ten wealthiest countries. This politico-economic model has fundamentally shaped Oslo, transforming it into a vibrant and metropolitan place we had the opportunity to explore.

On the far side of Europe, Rijeka stands as a port city deeply enmeshed in the contradictions of a post-transitional society at the margins of global capitalism. Once a pivotal industrial and maritime center under socialist Yugoslavia, Rijeka's trajectory was profoundly disrupted by the violent dissolution of its economic foundations following the collapse of socialism and the subsequent imposition of neoliberal restructuring. Today, the city bears the scars of deindustrialization, privatization, and the erosion of the commons. Despite its strategic location on the Adriatic Sea, Rijeka has struggled to reclaim its historical role as a major Mediterranean port. Once a key driver of industrial employment, the port has been undermined by deregulation, automation, and a shift toward logistics that prioritize transshipment over local production. While the EU's infrastructural investments offer some promise, they frequently align with the imperatives of financialization rather than fostering genuine economic revitalization — prioritizing global extractive forces of capitalism over the cultivation of local resilience. Rijeka's current position in the global order reflects the unresolved tensions of post-socialist transition: a city whose potential remains perpetually deferred, compelled to follow a developmental trajectory largely dictated by external forces beyond its control. It is neither fully sovereign in its economic future nor entirely abandoned, but rather suspended in a 'limbo' of managed decline.

Although both Oslo and Rijeka are port cities, they are shaped by profoundly different historical, cultural, and socio-economic contexts, significantly influencing their current urban dynamics and economic functions. As underwhelming as it may be, any direct comparison between the two would be overly simplistic, and any attempt to apply Oslo's developmental model to Rijeka would likely be misguided and overly naive. However, despite these

Courtesy of DELTALAB (Ana Orlić)

stark differences, Rijeka could draw valuable inspiration from Oslo's success — particularly in terms of economic diversification, infrastructure modernization, and the adoption of sustainable urban planning practices. A much-needed fundamental shift in Rijeka's political and economic strategies could set this decaying port city on a path toward revitalization, fostering economic growth and improved quality of life for its residents. The exact nature of this transformation, however, remains to be carefully conceptualized, mindfully taking into account Rijeka's unique and specific circumstances.

In the light of the aforementioned assertion, the bilateral initiative Waves of Exchange has deepened the dialogue and know-how related to sustainable urban development, providing a solid foundation for ongoing student projects within Urban Studies that can (possibly and hopefully) be implemented in the future city policies. Recognizing the value of this cross-cultural exchange, the Urban Studies program will continue promoting cultural dialogue through new projects, research endeavors, and artistic collaborations with other port cities in the future.

Courtesy of DELTALAB (Ana Orlić)

5.0 COMPA-RATIVE ANALYSIS OSLO - RIJEKA

5.1 (IS)LAND MOBILITY AND E-MOBILITY

TOMISLAVA BLATNIK

ELECTRIC BUS TRANSPORT IN OSLO

Oslo's public transport company, Sporveien, operates 51 bus lines, servicing 70 million passengers annually, with a fleet of 259 electric buses. One of the main challenges for electric bus operators in Norway is the harsh winter conditions. A key solution has been implementing 24/7 vehicle charging monitoring.

Using an AI platform, a dedicated expert team in the 24/7 Network Operations Center (NOC) continuously algorithmically tracks fleet performance and charging infrastructure, applying data-driven decisions to proactively resolve issues. Features like load balancing and peak load reduction further minimize energy costs for Unibuss. Optimizing charging, reducing energy expenses, and improving route completion rates are critical for the success of public transport.

OSLO'S TAXIS

In Norway's capital, electric taxis are charged using wireless technology. Charging pads embedded in the ground and receivers installed in vehicles enable automatic charging of up to 75 kW when taxis are parked above the pads.
As a taxi approaches a charger, the wireless charging process initiates automatically. This allows taxis to recharge while waiting for passengers, eliminating exhaust emissions during idle periods while receiving renewable energy to replenish their batteries. This world-first initiative aims to make charging more efficient for the taxi industry. From 2023, all taxis in Oslo operate with zero emissions.

ELECTRIC SHORT-ROUTE FERRIES

Maritime transport emits around 940 million metric tons of CO2 annually, accounting for roughly 2.5% of global greenhouse gas emissions. In response, the International Maritime Organization (IMO) has set a target to reduce global maritime emissions by 50% by 2050. Achieving this goal will require widespread electrification of vessels, necessitating substantial expansion of port charging infrastructure. Telescopic charging systems have already been installed at ferry docking stations in Denmark, the Netherlands, and Norway.

While most maritime emissions stem from cargo shipping, passenger ferries also contribute significantly. Many coastal and island communities rely entirely on ferries for transportation. Fossil-fuel-powered ferries are heavy polluters, emitting CO2, SO2, NOx, and particulate matter. Electric ferries present a sustainable alternative, but challenges remain, including battery capacity, energy storage, and onshore charging infrastructure.

AUTONOMOUS CHARGING FOR HYBRID AND FULLY ELECTRIC FERRIES

The challenge? Diesel-powered ferries, which emit CO2, S02, NOx, and particulates, remain a primary mode of transport for many island and coastal communities. However, in the past decade, battery technology has significantly improved, making electric ferries a more viable option.

The obstacle? Most current maritime charging systems require extremely precise docking maneuvers to connect with onshore charging infrastructure. This remains a major barrier to the widespread adoption of hybrid and electric vessels.

A FLEXIBLE AND ADAPTIVE AUTONOMOUS CHARGING SYSTEM

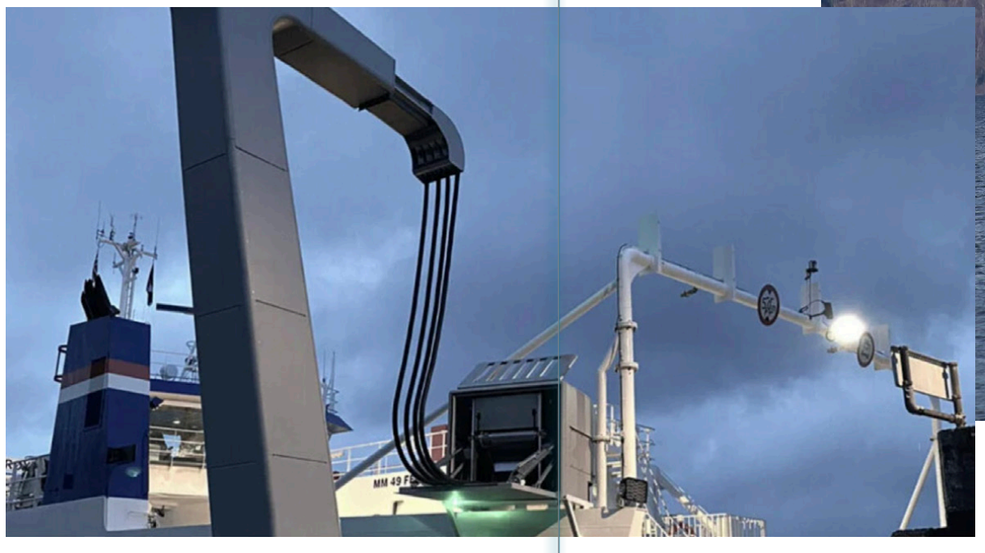
An autonomous telescopic charging solution is a fully automated system that connects AC or DC power to vessels. Its operating system detects an approaching vessel and can autonomously connect to its charging port within 20 seconds of docking.

The system features a height-adjustable connector tower and a telescopic charging arm that rotates 90 degrees. Combined with long, flexible charging cables, this allows the tower to accommodate various vessel types and sizes while automatically adapting to wind, wave, and tidal fluctuations. The system can compensate for vessel drifts of up to 2 meters.

The autonomous telescopic charging system is fully electric, eliminating emissions and operating without oil.

Constructed from weather-resistant and seawater-resistant materials, the unit has a compact footprint, requiring a base of just 0.8 x 0.8 meters. The tower's slim and sleek design integrates seamlessly into public environments and includes built-in harbor lighting.

The system is designed for approximately 10,000 charging cycles before requiring an inspection, with a full overhaul scheduled every 50,000 cycles.




THE FJORDS
FUTURE OF THE FJORDS
THE FJORDS

5.2
FLOATING SAUNAS AS URBAN HETEROTOPIAS

DARIJA DOBRILA

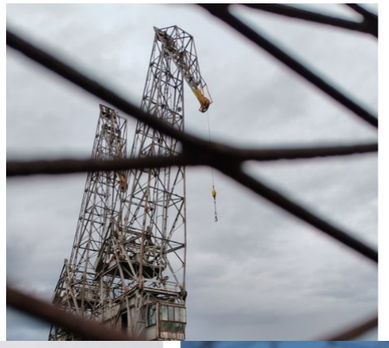
In recent years, Oslo's waterfront has undergone a profound transformation. What was once a container port has been converted into an uninterrupted public space—a seven-kilometer promenade connecting walkways, recreational zones, swimming areas, and popular floating saunas. This network of 'water points' has introduced entirely new ways of engaging with the waterfront, now used for strolling, running, and swimming.

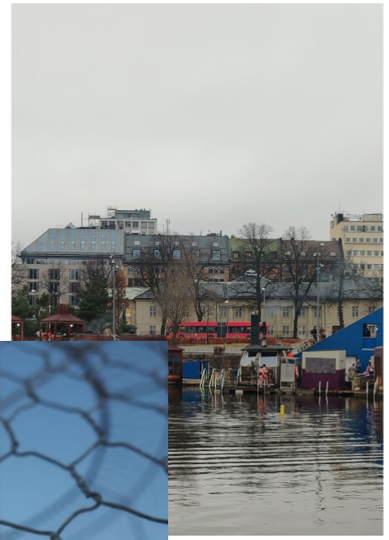
The sight of semi-naked locals and tourists plunging into the icy water in the middle of winter—first turning red from the cold, then from the heat as they relax in wooden saunas—has become a familiar scene along Oslo's waterfront. Floating saunas seem to blur the boundaries between solid ground and the sea, becoming a distinct part of public space. They come in various forms, from simple wooden cabins to strikingly designed structures that draw attention with their shapes and colors, clearly signaling their differentiating function within the urban fabric. The combination of visual contact with the cityscape, the tactile experience of wood and water, extreme thermal sensations, and social interaction within an intimate setting redefines the conventional urban experience.

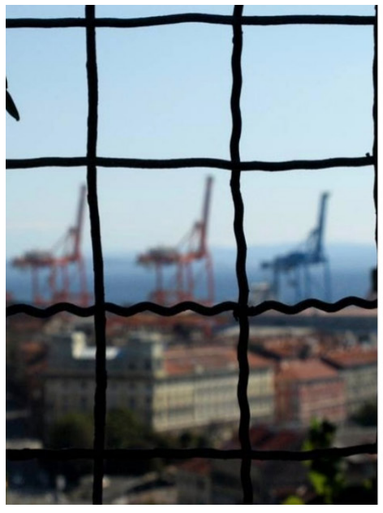
Saunas create a unique interplay between the private and public. Inside, users enjoy moments of intimate relaxation, isolated from the city's hustle and bustle, only to step out and become part of a public, almost theatrical stage on the water. Interestingly, the contrast between the enclosed, intimate sauna interior and the open, communal space outside encourages different forms of interaction, resulting in a spatial inversion—where conventional uses of space are altered through an unexpected, aquatic perspective. In this way, locals and tourists come together in an informal setting, fostering a sense of community and adventure while challenging established perceptions of the waterfront.

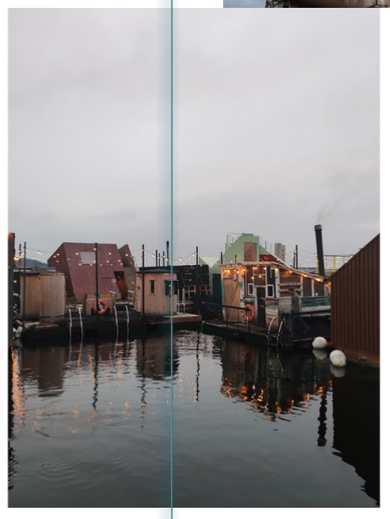
Michel Foucault argued that every society has its own heterotopias—special places set apart from everyday life, governed by different rules. Floating saunas illustrate this concept through their unique rituals of access, use, and behavior. However, it is important to note that such spaces are not universally accessible, with most saunas in Oslo requiring advance reservations and payment, creating a degree of exclusivity and limiting access for a broader population. While floating saunas contribute to urban regeneration as eco-conscious projects, they also align with gentrification processes, transforming former industrial and working-class areas into elite urban amenities. These interventions are not thus neutral; they raise questions of identity, inclusion, and social equity in the city.

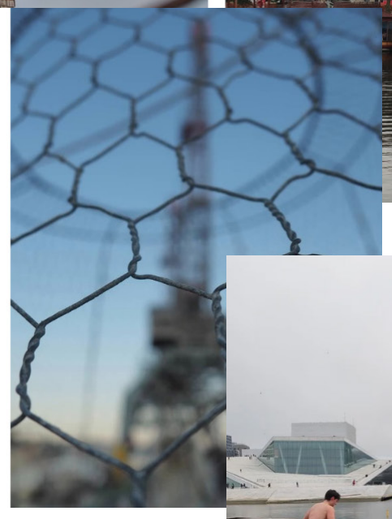
Here, a parallel can be drawn with Rijeka and its waterfront potential. While Rijeka does not yet have structures identical to those in Oslo, its coastline holds significant potential for creating its own heterotopic spaces. Oslo's example demonstrates how water can serve as a central element of urban identity and how well-thought-out interventions can greatly enhance city life. However, Rijeka's response to such challenges cannot be a mere replication of Norwegian models. Instead, it must emerge from a careful consideration of local needs, traditions, and social context. If Rijeka develops its own version of heterotopias, adapted to its historical, climatic, and cultural conditions, it has the potential to transform its 'secondary space,' the waterfront, into a powerful symbol of urban cohesion and an active part of everyday city life.

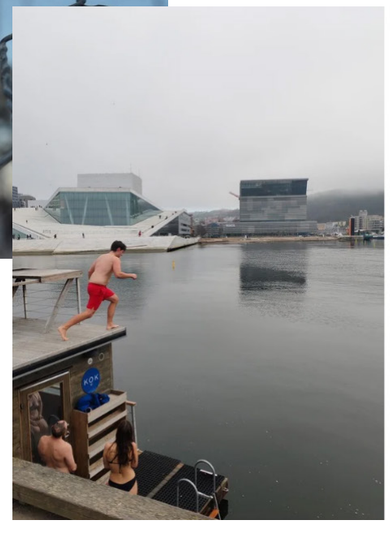


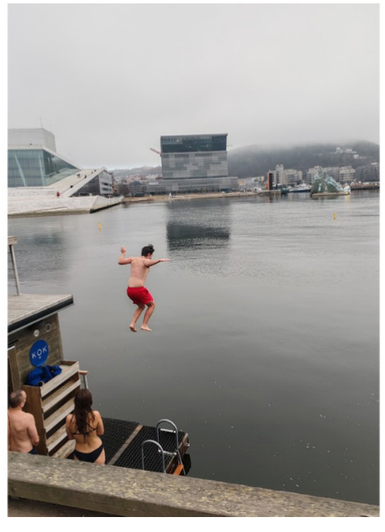


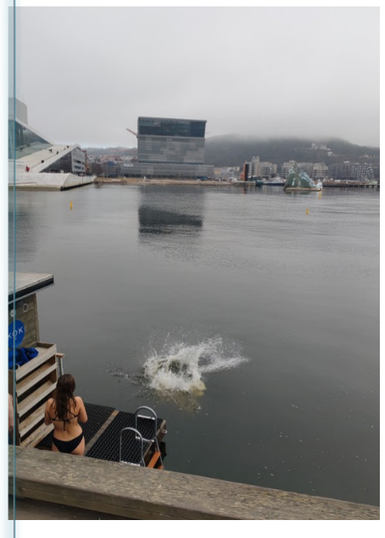












5.3
FJORD AND KARST TOURISM: VALUES AS REGULATORS OF DEVELOPMENT

MARIN NIŽIĆ

Geomorphological formations of karst and fjords are deeply shaped by water. Permeable limestone dissolves upon contact with flowing water, while the impermeable shale erodes due to migration of frozen water. Norway's coastline stretches 60.000 kilometers, whereas Croatia's is nine times shorter, having 50.000 versus 1.200 islands, islets, and reefs, and a tidal range of 2 meters versus Croatian 30 centimeters. When comparing accessible coastlines, Oslo's borders encompass 80% of the coast, while Rijeka has access to less than 40%. Tourist concentrations differ significantly — 0.25 versus 6.5 tourists per capita. At the same time, one nation is consciously aware of its fjord surroundings, while the other remains unaware of what karst truly is — visitors and locals alike.

To what extent is general development, including tourism, based on the values of a given spatial identity? Norway's values can be summarized in three core principles. Allemannsretten (the right of every person) guarantees unrestricted access to the entire uncultivated territory of the state. In other words, everyone is free to responsibly explore Norway's natural land. A tent or trailer can be set up almost anywhere, and no permits are required for foraging or marine fishing. Friluftsliv is the construction of identity through a broad range of outdoor living—from hiking, skiing, and rowing to picking wild berries, camping, and having picnics, or simply walking the dog. Koselig describes elements, customs, and practices of togetherness that stem from Norway's harsh and cold winters.

Codified values create rights, and with them comes responsibility. The primary principle of these three foundations is to leave no trace. A country with stable demographic growth has confined its spatial development within existing construction zones. However, if one remains within these gray urban boundaries, ways of engagement become even more crucial. After all, this increasingly neoliberal Right is founded on oil, unfamiliar with affordable housing, and uniquely balances public interest with private profit. When viewed plainly, the accessible waterfront within Bjorvika is merely a necessary manifestation of the law on free movement, while a well-maintained public space primarily raises the price of sold land—and, ultimately, Oslofjord is practically a dead water ecosystem.

So, if formal practice encounters only a declarative adherence to a system of values, is there an example of true spatial manifestation of Norwegian identity?

Hytte, a small cabin, is a piece of personal peace within a fast-paced nation. Originating from fishing and hunting traditions, Norwegian cabins are devoid of class affiliation. With the establishment of a state contours came the eight-hour workday, weekends, and eventually paid vacations, laying the foundations for a new leisure society. At that moment, an explosive development of cabins ensued—their vernacular nature and dispersion a reflection of an unprepared system and a lack of regulations. Today, Norway has half a million cabins available to half its population, and legal codification of environmental protections, zoning, and free coastal access is partly a reaction to their proliferation.

Following this typology through Oslo's archipelago, we arrive at a laboratory where values become regulators of development—regulators of the official narrative. Eleven small islands have historically served as service zones for the capital. Scars of industry, logistics, airports, military, and landfills have been patched up with nature reserves, with ferry networks connecting most popular excursion areas—though camping is only allowed on one island, and all lack basic communal infrastructure.

In 1918, life became divided into work and leisure, raising the question of what is the point of rest. From early spring to late autumn, workers from overcrowded Oslo would row to Lind ya on weekends and set up tents. Over time, campsites with fixed street formations emerged on the islands, followed by improvised, dismantlable cabins. Water and food were brought from the city, while sanitation remained nonexistent.

"I still remember the days when the first cabins sprang up, much to the horror of the city fathers returning by boat from their summer estates. They wrote about it in the newspapers, wondering if these people had no shame—coming here and ruining the untouched nature. And what would the tourists say, those who adored this rare, wild land so close to a real capital, exclaiming 'terribly beautiful' as they stepped onto the deck after lunch, asking the sailor what kind of land this was?"
— Johan Borgen

Workers claimed the islands by breaking the rules. This was a community that emerged despite the state, not because of it. The free-for-

all period ended in 1922 when authorities issued temporary permits for regulated settlement of the archipelago, with priority given to unions and the city's poor families. Land was leased for ten kroner a year, and floor plans could not exceed nine square meters; a color palette was introduced and typologies were designed. Outside stretched an ideal landscape, but inside, beer crates lined with newspaper. This vernacular architecture was rooted in sociality and built with the ever-present possibility of demolition.

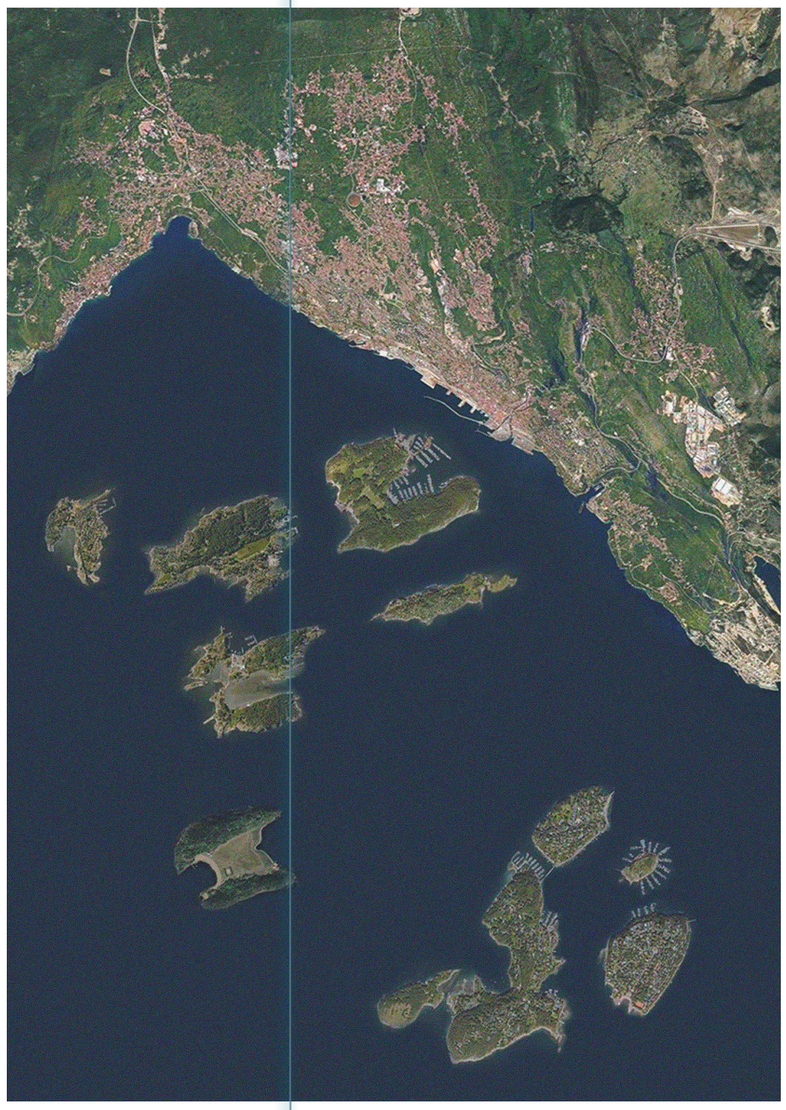
In 1963, a construction moratorium was introduced, and only in 1980 did unions and owners secure leases with the state. Today, multiple overlapping spatial plans are in effect—and all have been violated. Cabins right on the waterfront, fenced piers, improvised annexes. Satellites and drones have conducted a Norwegian version of Croatian legalization, with the public debate gathering 485 objections. At its core, the weekend community's desire is to continue self-managing the islands on a voluntary basis.

If everyone on Earth lived like half of Norwegians—having their own cabin—we would need several planets. Friluftsråd (Outdoor Council) was established in 1933 to protect access and regenerate Oslofjord. The organization brings together three districts and about twenty municipalities, managing over 20,000 hectares of green-blue territory.

Alongside an ecosystem restoration service and a fjord summer school, the council also develops a national network of communal cabins. The platform is based on repurposing abandoned structures such as cottages, lighthouses, and military facilities. All accommodations are self-sustaining, with guests responsible for food, transport, rainwater collection, cleaning, and weekend neighborliness. Maximum stay is two nights, and reservations open at the start of the year. The idea is affordable vacations for everyone.

Per capita, Croatia has 26 times more tourists than Norway. So what about our values? Unlike Norwegian ones, they have no special names, and are not translated into rights and laws. The slowness of our lifestyle, reactivity and impulsivity, improvisation and natural preservation. The remnants of Yugoslavian resort complexes and weekend getaway culture. Small renters, zimmer frei. Karst.

There is much in our mentality that can serve as a developmental regulator, but there are fewer and fewer laboratories where we are able to observe, study, and appreciate this. The Friluftsråd, or the Outdoor Council—almost untranslatable into our language— have ultimately spent a hundred years fighting against a privatized, built-up coastline.



5.4 DEVELOPMENTAL (DIS)CONTINUITIES

ANA ORLIĆ

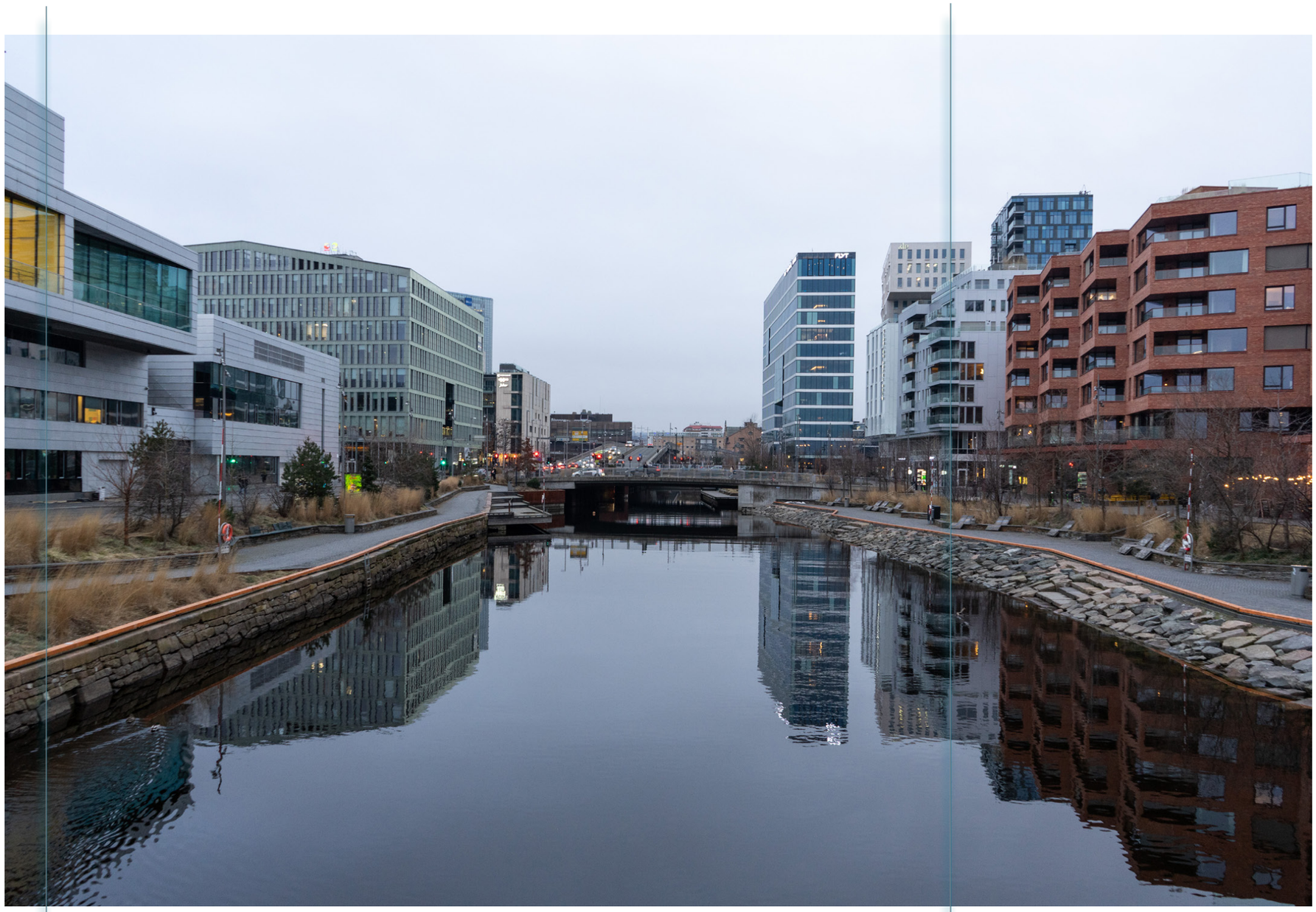
The largest Norwegian cargo and passenger port, Oslo, despite having only 25% more port space, handles approximately five times the volume of cargo as the Port of Rijeka, and primarily serves as an entry point for consumer goods imported for the Norwegian population. In contrast, the Port of Rijeka primarily caters to foreign interests, acting as a key junction within the broader network of Croatia's transport and energy infrastructure, connecting to Central Europe. While Rijeka's port facilities extend along much of the city's coastline, reflecting this complex web of flows, Oslo's cargo terminal was relocated from the city center to the southern district of Sydhavna in 2008, following a municipal decision. This move clearly separated the port from the urban fabric, and today, Oslo's port cranes are merely visible in the distance, set apart from the city by a vast stretch of water.

To enable such a transformation, the Oslo's Port Authority transitioned from national to municipal jurisdiction as early as 1984. Although acting as an independent entity within city governance, this pivotal change allowed the port to be developed in alignment with the city's needs and aspirations. Still, it took many years before the municipal Waterfront Planning Office was established—its formation in 2002 marked the beginning of Oslo's waterfront redevelopment as the city's most significant urban project, rapidly shaping its new identity. An urban master plan followed, and by 2005, architectural and urban design competitions were held for the redevelopment of public spaces. A legally binding regulation stipulated that investors developing new residential and commercial districts were also responsible for designing adjacent public spaces to ensure they remained accessible to the public.

The relocation of the port created a blank canvas for the development of new collective urban spaces, and over the past 15 years, these spaces have largely materialized through ambitious projects funded by oil capital. Public landmarks such as the Oslo Opera House have been designed as spectacular attractions, reflecting contemporary Norwegian society's aspirations for a renewed identity—a narrative that seeks expression through architecture. Yet, only in rare pockets along the Waterfront can spaces of memory be sensed. The new residential and commercial quarters, with their sleek glass facades, are built directly along the water's edge, carefully shaping their intermediate spaces and public areas. The rich sensory experience characteristic of port cities has been neutralized. Rather than continuity, these newly developed areas convey a sense of mass accumulation of smooth, disconnected volumes.

Recently, the Port of Oslo set a goal to handle 50% more cargo and 40% more passengers by 2030, accompanied by a master plan for developing the Sydhavn port district by 2050. As stated on their official website: "The Port of Oslo plans to grow in line with the city. The City Council has decided that cargo transport will be concentrated exclusively in Sydhavna, meaning we will transport more goods within a smaller area."

One can only hope that the upward trajectory of Rijeka's port development will embrace an awareness of the duality of objectives that can and should be pursued simultaneously: the port can operate more efficiently while the city reclaims its waterfront for public use. In this ongoing negotiation process, it would be desirable to preserve a few cracks and seams as a memory of transformation within the city's fabric. Development and repurposing should not mean erasing the old identity to create a new one.



5.5 CHALLENGES AND LESSONS LEARNED

BRUNO STEMBERGER

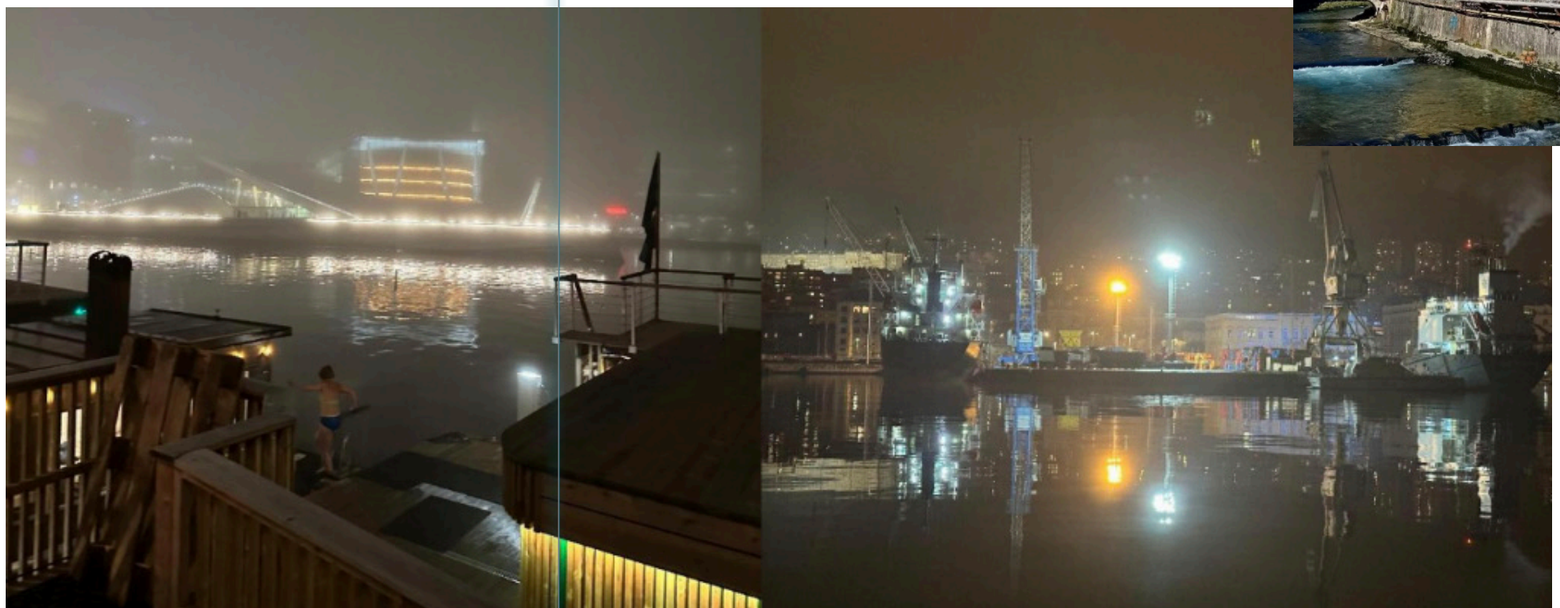
Many parallels can be drawn between Oslo and Rijeka, including their central harbors (until about 20 years ago), the presence of key railway and road infrastructure within the city, a river flowing through the urban center, a rich industrial heritage, an island archipelago in front of the waterfront, and mountains in the background (including ski resorts). The key differences between the two cities lie in their size, culture, and financial resources, with an additional distinction being Oslo's status as the nation's capital. Oslo is at a completely different stage of urban development than Rijeka. Over the past few decades, it has undergone a thorough transformation of its coastal areas, relocating industrial and port activities from the city center to peripheral zones. The freed-up spaces have mostly been converted into luxury residential neighborhoods with well-planned public amenities. Promenades, recreational spaces, cultural institutions, and social activity areas are key elements of Oslo's new waterfront. The city's identity has shifted from a port city to a city by the sea, where people can now swim in the very center.

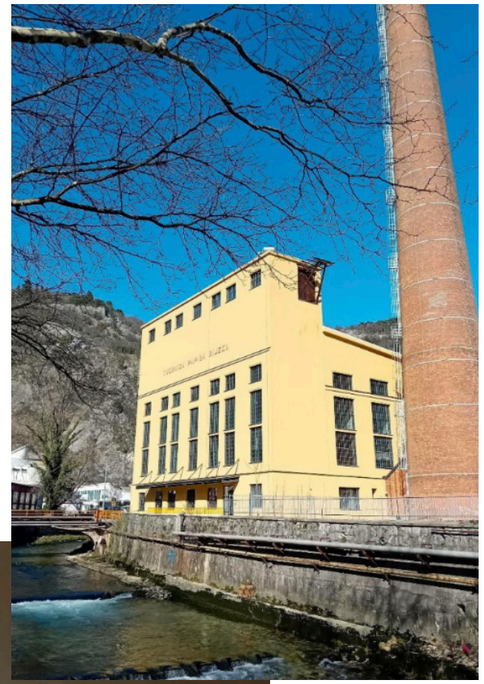
On the other hand, Rijeka still lacks a clear vision for the future transformation of its port and industrial zones. Unlike

Oslo, Rijeka is expanding its central port area by constructing a new container terminal and developing massive infrastructure to support it. Additionally, the Rječina River presents another layer of complexity, as its banks are lined with abandoned industrial buildings. Oslo's experience in revitalizing riverfront areas serves as an example of a long-term, high-quality strategy for repurposing industrial structures over a 100-year period.

A major factor behind Oslo's successful waterfront transformation has been the communication and collaboration between the state, city, port authority, and citizens, as well as the persistence of engaged residents in shaping new ideas. One of the biggest challenges in Rijeka's transformation will be avoiding gentrification and preventing favoritism toward private investors. Despite careful planning, much of Oslo's new waterfront has become dominated by expensive luxury apartments, making them inaccessible to the wider population. Simply leaving urban development to market forces often results in exclusive districts that contribute little to the broader community.

Although Oslo's financial resources far exceed Rijeka's, Rijeka can learn from Oslo's comprehensive and systematic approach to urban planning. Oslo highlights the importance of long-term planning and gradual repurposing of industrial spaces. The transformation of the city's riverfront occurred at a slower, more thoughtful pace compared to its coastal redevelopment and, in many aspects, has been more successful. This approach gives the impression of a more organic transformation, where existing structures were not simply demolished to allow investors to build entirely new districts from scratch. Instead, the repurposing of old industrial buildings took decades, allowing the city to adapt development to the real needs of its residents.





5.6 THE CITY AND THE PORT

SARA STOJAKOVIĆ

All port cities share certain spatial characteristics that stem from their specific historical development. The port, along with its associated industries and transportation networks, is a fundamental reason why these cities emerged and evolved. A common feature among them is that, at a certain point, the logic of port infrastructure completely overtakes the waterfront, separating it from the rest of the urban area. These spatial processes related to 20th century port infrastructure connect vastly different cities—the capital of one of Europe's wealthiest Scandinavian countries, and a small port city in Southeastern Europe, which only recently experienced a transition and joined the European Union over a decade ago.

Many developed port cities, including Oslo, began revitalizing their port and former industrial waterfront areas in the late 20th century—reclaiming and transforming these spaces into accessible urban environments rather than limiting them solely to port operations.[1] In Oslo, this process began in Aker Brygge, the former Akers Mekaniske Verksted shipyard, and the central Bj rvika area. These were long-term, complex transformations with a clear goal of integrating port areas into the city and creating a new urban identity, exemplified by the now-iconic Opera House.

A key principle guiding Oslo's transformation was 'doing more on less (land),' allowing port operations to continue while 'reclaiming' territory for the city. The Fjord City urban development brochure highlights this approach, stating: "Sydhavna, the Southern Harbour, will be developed to become one of Norway's largest and most efficient terminals handling all types of goods. It will also become Oslo's only area for heavy port operations."

In contrast to the Scandinavian model of decisiveness and clear goal-setting, Rijeka's port transformation appears to lack synergy between the interests of the city and the exclusive priorities of the port,

where changes occur sporadically and often spontaneously due to a lack of long-term strategy. Some areas in the city center have been freed from port functions or have 'acquired' new uses compatible with urban life, such as the passenger port, Molo Longo, and the (temporary) repurposing of the Exportdrvo building. However, other port-industrial areas—many of them abandoned for decades, including the former oil refinery in Mlaka, the petroleum port, Delta, and the old Torpedo factory—have not been integrated into the city. Apart from a few photogenic architectural elements, such as the torpedo launch ramp, these areas remain absent from the collective image of Rijeka.

The most successful example of recent urban transformation in Rijeka is the redevelopment of the former Rikard Benčić factory, which, while rooted in the city's industrial heritage, is not directly connected to the waterfront or maritime identity. However, contrary to the urban trends of transforming port cities at the turn of the 21st century, Rijeka is currently experiencing significant investments in port infrastructure, including the expansion of port territory through land reclamation and the construction of new terminals directly adjacent to the city center and urban beaches.

If we look at the past periods of Rijeka's port growth, namely in the 1950s and 60s, it is evident that port expansion brought population growth, economic prosperity, and a new urban identity. However, it remains uncertain what the current large-scale investments in Rijeka's port and infrastructure will mean for the city itself. Furthermore, when viewed through the lens of urban livability,[2] it seems that port development has taken priority over urban well-being. The sole logic of port expansion assumes increased investments and maximization of port territory, following the principle of the more, the better.

It can be concluded that Oslo's port serves the city, whereas Rijeka's port primarily serves national, regional, and transnational private interests. However, it is also important to critically examine Oslo's transformation model, which, despite creating public spaces accessible to all, has also resulted in luxury housing developments that are affordable only to the wealthy. Oslo successfully converted its port territory into an urban territory for civic life, integrating it with the rest of the city through a series of expensive, strategic decisions and ambitious engineering projects. Additionally, revenue from real estate sales in former port areas contributes directly to Oslo's municipal budget.

When comparing port transformations in these two cities, it is essential to also consider governance structures. Unlike Oslo, where the city plays a significant role in redevelopment, Rijeka's port remains under state jurisdiction, which fundamentally alters the balance of power and decision-making between the port, the city, and

01 Behind the transformation of port areas into new urban spaces lies the process of deindustrialization, as well as the evolving technological and spatial demands of the ports themselves. Ports are increasingly being relocated to the peripheral zones of port cities, where they have access to larger territories and, in some cases, deeper draft depths.

02 Bruno Latour: To escape the feeling of powerlessness, we must understand that the conditions of habitability are what allow us to exist and live well. The debate must shift from production conditions to those of habitability.

the national government. Furthermore, Oslo's status as the capital city has played a crucial role in its transformation, as emphasized by key stakeholders in the redevelopment process.

Oslo's waterfront redevelopment is branded as Fjord City, evoking images of Norway's authentic and pristine natural landscapes. However, the new fjord city is entirely artificial—just as unnatural as the former port infrastructure that once occupied the same space. The 'nature' present today is a carefully designed and constructed environment. Despite this artificiality, these open spaces are welcoming and highly popular with residents and visitors alike.

5.7
CAN BRANDING REPLACE IDENTITY?

BRANKA TOKIĆ

Oslo and Rijeka share similarities in both geographical features and economic development. While Oslo's current trajectory is heavily influenced by its status as a capital city, this was not always the case—making comparisons with Oslo universally relevant.

Oslo, like the rest of Norway, is an exceptionally wealthy city. The redevelopment of its fjord was an extremely costly endeavor, resulting in an exclusive district, meticulously branded for tourists yet still offering excellent access to public spaces. However, the question remains: will the Fjord City, with its high-end residential living and dining offerings, ever truly function as a vibrant urban neighborhood, or will it remain a backdrop. Despite expectations of population growth, the city lacks mechanisms to ensure affordable housing. Whether this growth-driven policy is sustainable will only become evident in the coming decades. In contrast, development along Oslo's Akerselva River has been more restrained, resulting in new and renovated buildings that already exhibit the characteristics of genuine urban life.

Reflecting on the comparison between Oslo and Rijeka during my brief four-day stay in Oslo, I found myself returning to the question posed above. The short answer is NO—despite its striking visual appeal, Fjord City quickly lost its intrigue. However, my appreciation for Oslo deepened when I explored other parts of the city. During our visit, we learned that research on Arctic cities is valuable because they face the same challenges as other urban centers, only more pronounced due to the Arctic's extreme climate conditions. In this sense, Oslo can serve as our 'Arctic'—a case study from which Rijeka can both learn and avoid its mistakes, while bearing in mind their stark differences: Oslo's cold climate, lack of daylight, and extreme national wealth.

Experience has shown that 'city as a product' often lacks resilience—abandoned by both capital and residents whenever circumstances shift, with some cities never even coming to life. The same fate likely awaits the heavily branded, newly built urban districts if they fail to cultivate a true 'sense of place.' Conversely, well-conceived modern projects that exist ALONGSIDE thriving urban neighborhoods can enhance the overall quality of life.

Can DELTALAB's projects bring this kind of thoughtful, high-quality urban branding to Rijeka?

WHAT SHOULD WE LEARN?

The creation of enclosed, climate-adapted spaces for year-round public gatherings alongside encouraging outdoor public space activities for residents.

Proper building maintenance and modern renovation practices. High-quality infrastructure. Prioritizing brownfield redevelopment over new construction.

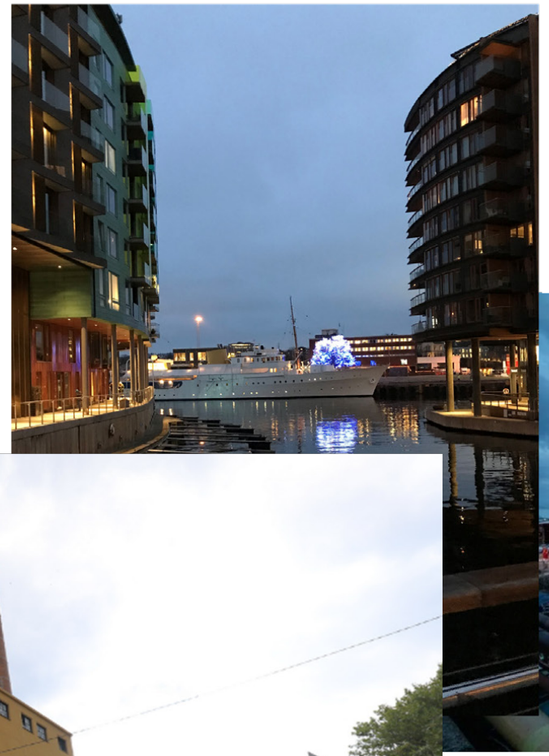
Leveraging private investment in elite locations to finance public infrastructure and spaces.

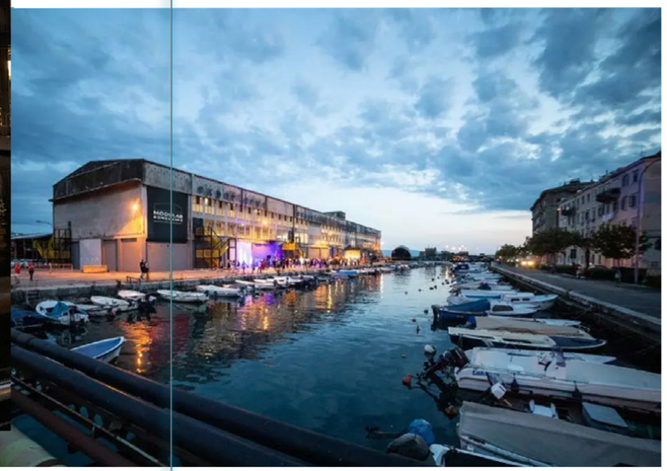
WHAT SHOULD WE DO DIFFERENTLY?

Avoid prioritizing ecological sustainability at the expense of social sustainability.

Adapt architectural solutions to mitigate urban heat islands, for example, by planting more trees along the waterfront than Oslo has.

Preserve sections of the coastline for alternative uses, ensuring a balanced urban landscape where branded, gentrified areas coexist with spaces that retain their organic identity.





5.8
THE DUAL TRANS-FORMATIONS OF OSLO'S URBAN LANDSCAPE

SANJIN VRANKOVIĆ

Like many other cities in recent decades, Norway's capital, Oslo, has increasingly surrendered urban space to automobiles. Since the 1960s, to accommodate the rapid rise in motorization and car usage, numerous road construction plans and projects have been implemented. However, these measures did not yield the expected results, and the city's continued growth led to further increase in traffic, resulting in numerous negative effects. Oslo's population is among the fastest-growing in Europe. While this has boosted economic activity, it has also put increasing pressure on space, infrastructure, the environment, air quality, and overall quality of life.

Concerns among the community grew, prompting the city to conduct a study in 2014 titled "Public Space Public Life" (PSPL). Residents' responses emphasized pedestrian streets, public urban spaces, more green areas, plants, benches, playgrounds, better maintenance and quality of streets and squares, greater availability of bike lanes, attractive shops and restaurants, fewer cars, and better public transport. The study concluded that despite the city's compact form and size, significant improvements could be made in connectivity and accessibility of urban spaces (particularly for walking and cycling), as well as in the quality and content of public areas.

As a response to these challenges, Oslo launched the Car-Free 'Livability Programme' in 2016. Its goal was to create a greener, more vibrant, and more inclusive city by reducing car traffic and car-dedicated spaces in the city center, replacing them with pedestrian zones and public and recreational infrastructure. In this way, city authorities aimed to create a sustainable urban environment, transforming an automobile-oriented urban landscape into one focused on people. Even before this initiative, plans and activities were already underway to reshape the city, free up waterfront areas by relocating the port from the center, repurpose accompanying port and transport infrastructure, and move certain transport systems underground to create space for a new urban concept. These efforts were led by the city's urban planning office and the port authority,

which had been advocating for over 30 years to transform Oslo from an industrial port city into one that is open toward the sea.

The approach Oslo took to change the hierarchy of urban activities and mobility, prioritizing people over cars, differed from strategies used in other cities. The new city administration set an ambitious plan aiming not only to make Oslo a better place to live but also to halve greenhouse gas emissions by 2020. Additionally, another crucial environmental and urban goal was set: to completely phase out fossil fuels in city transport by 2030. At the time of setting this goal, transport accounted for about 60% of the city's CO2 emissions, with almost 40% coming from private cars. A key part of the strategy to achieve these targets was reducing car traffic by 20% by 2019 and 33% by 2030 (compared to 2015 levels). To accomplish this, it was crucial to increase mobility while significantly boosting the share of public transportation, cycling, and walking in daily commutes.

The implementation process was not entirely smooth, but a series of measures were taken, with the first being restricting vehicle access in the city center. Following this, parking spaces were gradually reduced, and parking policies were destimulated through price increases and limited permits—both within the center and in surrounding areas, especially those seen as 'conflicting with the development of cycling infrastructure.' Many zones were redesigned, and numerous parking areas were repurposed for other, even alternative functions.

Additionally, measures were introduced to promote pedestrian-friendly areas, prioritizing culture and urban life. This approach was particularly applied along the fjord waterfront, where public facilities and spaces dominate, and areas are designed primarily for pedestrians, cyclists, and leisure activities. Oslo's residents were invited to contribute through discussions and idea exchanges at meetings, presentations, and online via the city's website. Measures of various scales, both temporary and permanent, were implemented across the city. These included the creation of terraces and playgrounds, urban green spaces, beaches and floating saunas, temporary cultural venues, installation of urban furniture (such as benches, sun loungers, and potted trees), placement of sculptures and other art forms in urban spaces and squares, organization of events, and enhancement of public facilities.

The most significant changes began in 2018, when traffic routes through the city center were altered, several streets were closed to vehicles, the pedestrian network was expanded, new promenades and bike lanes were built, and the number of street parking spaces was further reduced. The city council also continued collaborating with local stakeholders to develop and implement an annual calendar of activities and events. The

pedestrian network was planned even for public buildings such as the Oslo Opera House, where the design often blurs the boundary between public space, the sea, and architectural structures.

In addition to the measures mentioned, some specific policies significantly influenced Oslo's transformation. The city operates a toll system (bompenger), requiring drivers to pay a fee to enter the city, with the funds used for mobility development, climate-neutrality measures, and urban space improvements. Electric vehicles have lower fees, but they still incur some charges. Oslo is a global leader in promoting electric vehicles, with more than 80% of new cars sold in the city being electric. The city offers subsidies, free charging stations, and cheaper parking for EVs. As a result of these efforts, cycling in Oslo has increased by 80% over the past 10 years. Such a transformation has created a vibrant, safer environment with increased space for leisure, social interaction, and enjoyment of Oslo's rich cultural life, particularly in the city center, waterfront, streets, and squares.

However, an essential factor in making this transformation possible was Oslo's well-developed and efficient public transport system, designed as a multimodal, sustainable, and emission-neutral network—or as residents called it, a green system. Public transport planning emphasized zero-emission transport options, particularly promoting cycling and walking as healthy modes of travel, aligning with the desires expressed by residents in surveys.

Oslo's public transport system is modern, efficient, and highly interconnected, consisting of multiple modes: the metro (T-bane), trams (Trikken), buses, commuter trains (VY tog), ferries (Ferge), and trains (Tog). The backbone of the system, with five lines connecting the city center to suburbs is the metro, while six tram lines covering central and surrounding areas are popular for their frequent service and accessibility. Buses serve areas not covered by metro or trams, including night bus routes connecting key districts. Commuter trains (VY Tog) connect Oslo with nearby towns and suburbs, particularly useful for those traveling outside the city center. In addition to commuter trains, other train and ferry systems are well integrated into public transport, with attractive ferries operating several routes in the Oslofjord, connecting islands near and farther from the city. Ferries are integrated into the public transport system, using the same tickets as metro, trams, and buses.

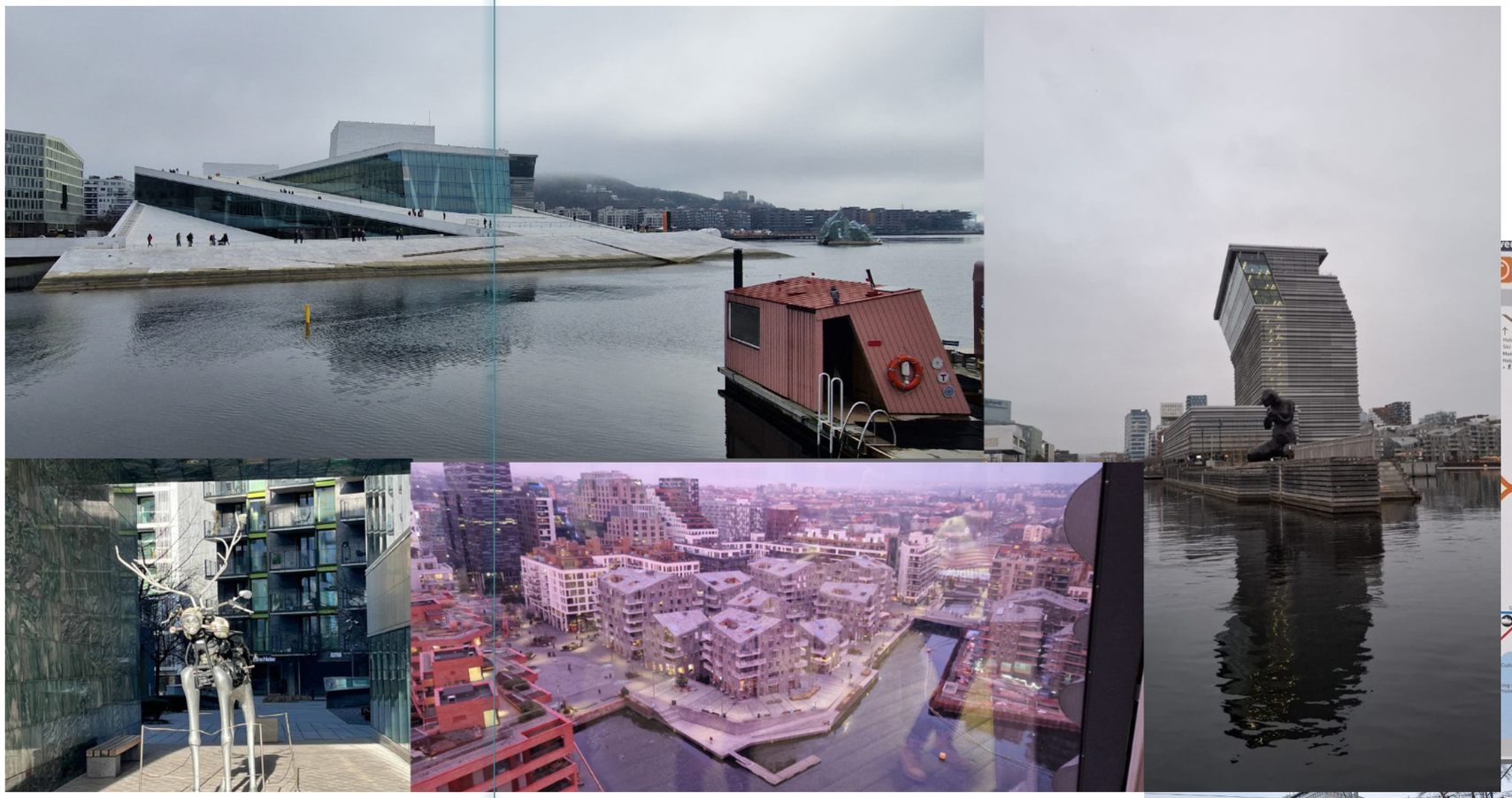
Additionally, Oslo has embraced micromobility solutions, such as bike-sharing, e-scooters, and walk-friendly paths, further complementing public transport, making the city even more efficient and sustainable. The Oslo Bysykkel bike-sharing system includes over 250 stations and 2,000 bicycles, while e-scooters from providers like Voi, Tier, Lime, and Bolt are widely available. Car-sharing services are also available, with most vehicles being electric for easier parking and charging, extending to traditional taxi services.

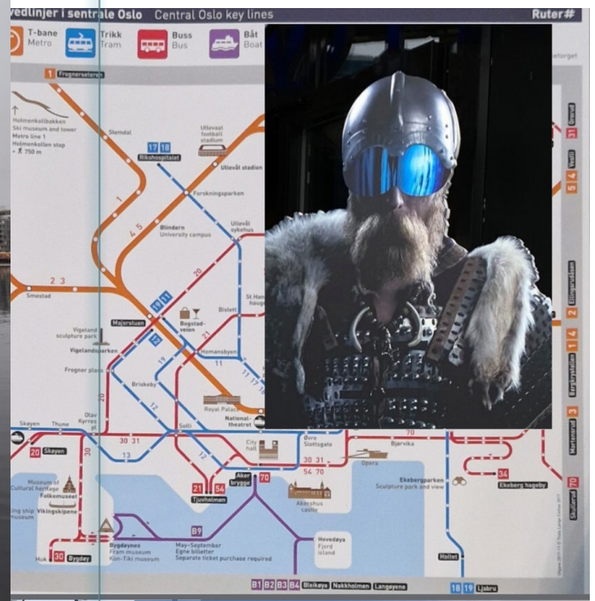
Oslo has demonstrated that it is possible to rapidly and effectively reduce urban car numbers, prioritize pedestrians, cyclists, and public transport, transforming the urban landscape into a greener and resident-friendly environment. The city has also successfully reclaimed its waterfront, replacing port infrastructure with new public spaces co-designed with its residents.

However, Oslo's efforts to improve urban life did not only spark enthusiasm but were also met with resistance, with initial plans changing multiple times towards achieving their goal. Not all measures or new urban landscapes suited the residents, and this resistance to the ideals of architectural contemporaneity and perfection is evident in the emergence of completely opposite trends—creating heterotopic spaces, some of which seem to defy the vast urban landscapes of this contemporaneity and flawlessness of the new city center.

Rijeka is a city so similar yet so different from Oslo—connected by the sea, a bay, and a port—yet fundamentally distinct, especially in terms of meteorological and maritime conditions. Both cities, situated on the edge of a bay and the sea, have been shaped by the conflicts between urban development and the inaccessibility of port infrastructure, depriving them of direct contact with the sea.

Oslo has undergone a dual transformation—a leap in which an automobile-oriented urban landscape has been reshaped into a people-centered one, turning it from a city by the sea into a city on the sea. Is Rijeka ready for such a bold transformation? This is not just a matter of spatial planning, approach, or ambition, but also of our willingness to confront not only spatial, technological, climatic, and transport challenges but also our own habits and coastal mentality.




T-bane
Metro
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5.9 THE NOT-SO-HIDDEN POTENTIALS OF URBAN WATERS

VALENTINA VUKELIĆ

While walking through the streets of Oslo, it is immediately evident that the potentials of its waters are in constant contact, interaction, and synergy. They are no longer hidden but placed at the very heart of urban life. Here, water is not just a resource—it is an active part of the everyday, used for socializing, relaxation, swimming, health, transportation, recreation, and play. Many spaces in Oslo offer natural and urban elements that enable direct contact with water, and if direct contact is not possible, various urban design elements provide indirect access. On the other hand, walking through the streets of Rijeka, such feeling is absent. Streams are mostly channeled and hidden, the downtown waterfront functions more like a traffic corridor than a public space for engaging with water, while in the few accessible areas, minimal amenities are available, making contact with the water nearly impossible. Meanwhile, the Rječina River—once the city's blue lifelines—remains forgotten amidst the brownfields, forests, and the Dead Canal. So what does water represent in Rijeka? Something to drink, something to swim in during the summer, or merely a medium for ships and transport?

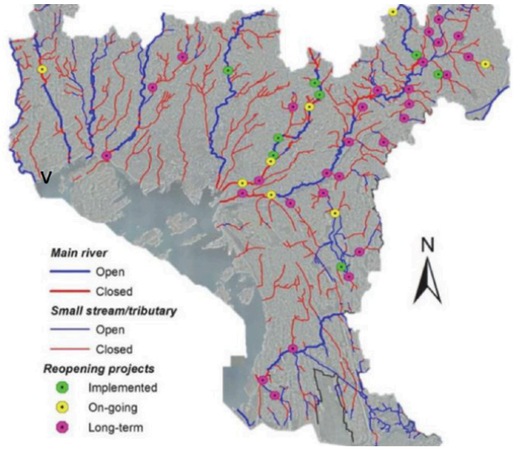
It can be said that Oslo has long ago recognized and utilized its potential. The city has introduced various elements of green-blue infrastructure, such as rain gardens, water surfaces for reducing urban heat, and systems for stormwater management and wastewater reuse. The city takes pride in projects that integrate its fjord shoreline into daily urban life, providing spaces for walking, recreation, cycling, and water sports. Water is not merely a functional element—it is part of the city's identity. Oslo has achieved sustainable urban development centered around water, and the strategies it has adopted can be recognized as a global model. In contrast, Rijeka continues to neglect and underutilize its water assets, despite having the potential to integrate them into public spaces. Waterfront areas and the banks of the Rječina River could become new recreational, cultural, or ecological hubs, yet they remain forgotten and frozen in time.

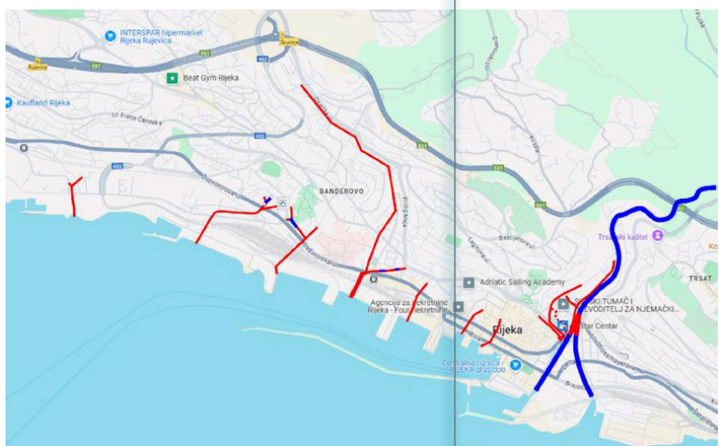
Oslo is defined by its urban waterways, having shaped the city's development throughout history. With ten main waterways within its built-up area, totaling 354 km of rivers and streams, water corridors provide vital ecosystem services, including recreational opportunities, wildlife habitats, and arteries that aid flood control. Until the 1980s, these waterways were considered problematic due to sewage overflows, pollution from emissions and spills, and obstacles to efficient urban development. As a result, many were contained in pipes or channels. In recent years, however, extreme weather events, increased precipitation, and storm surges caused by climate change have made Oslo more vulnerable to flood risks. To build resilience against flooding, the city decided to reopen its waterways as an integral part of its Climate Adaptation Plan (2014–2030), while also contributing to biodiversity, improved water quality, and public health. Continuing to work actively on reopening closed rivers and streams wherever possible, the city has long-term plans to restore 30 additional waterway sections, including eight more kilometers in the next decade.

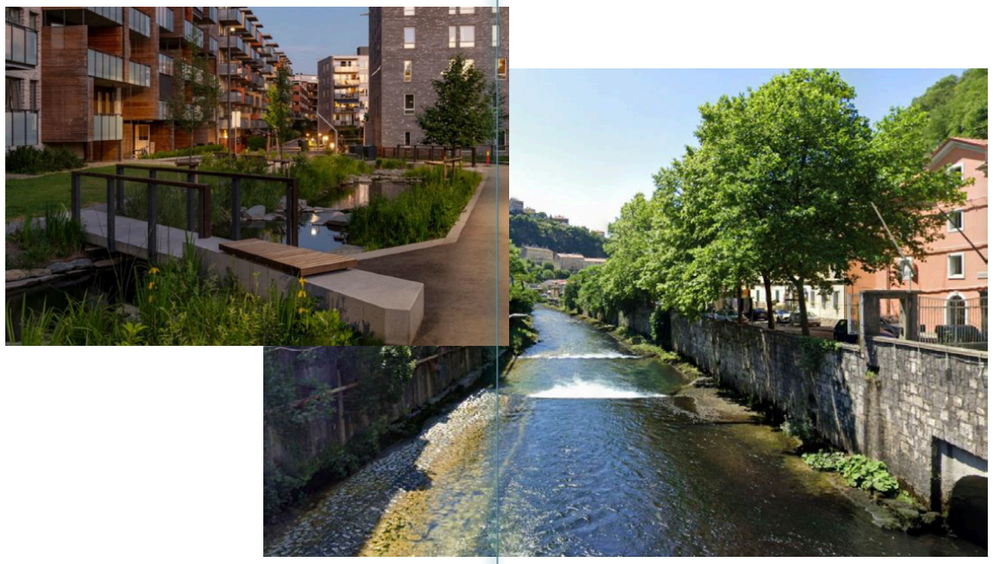
Aware of the importance and quality of its urban waters, Oslo regularly analyzes water consumption and the water quality of its main waterways. Official reports show that water quality is still not satisfactory, assessed based on the ecological status of benthic organisms. The primary pollutants include poor sewage systems, stormwater runoff from roads, and various spills. Of the eight main waterways analyzed, only the Akerselva River has good water quality, while Ljanselva and Mærradalsbekken have moderate quality, and the rest are rated poor or very poor. Despite these results, Akerselva remains vibrant, inviting people to engage and contributing to water circulation in swimming areas, with persistent efforts in renaturalization gradually improving its quality. Similarly, Rijeka could also create lively water corridors that provide both ecological and social benefits by reopening and integrating its streams into urban space.

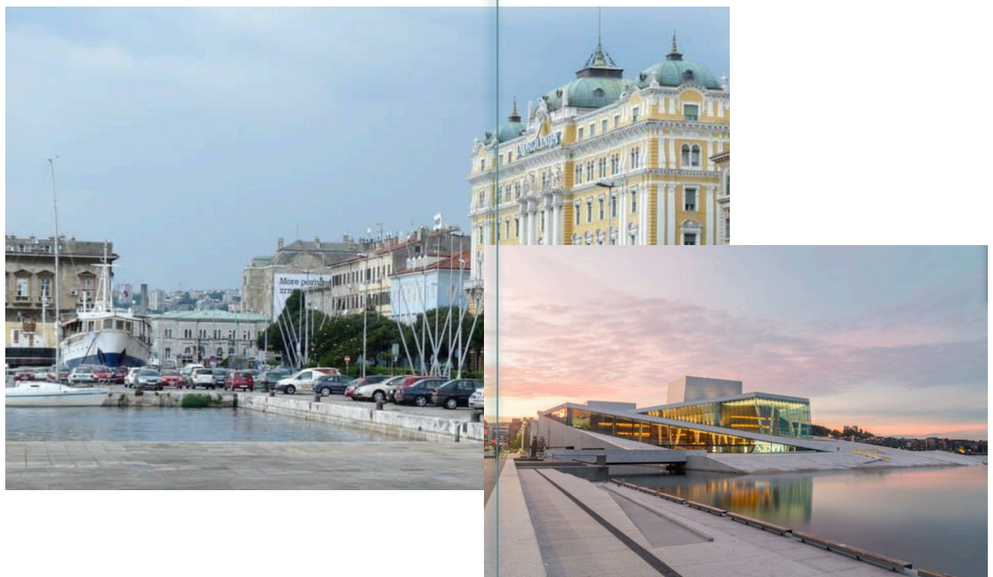
Despite being rich in water resources, Rijeka has yet to realize the full potential of its urban waters. While water once played a central role in daily life, it now lays hidden and neglected, reduced to invisible pipes and channels beneath layers of asphalt. The Rječina River, once a driver of industrial development, is all but forgotten—its banks cut off from direct contact with water by walls, bridges, and covered pedestrian corridors. In the city's urban development, water resources are not recognized as assets but are merely recorded as barriers in the urban fabric, an obstacle to be managed. Rijeka also faces urban flooding issues, with many streams unable to properly absorb and regulate stormwater, creating a significant opportunity for implementing systems that enhance absorption and reduce flood risks.

While Oslo has integrated water as an essential part of its urban life and continues to explore new innovative approaches, Rijeka is only at the beginning of that journey. On one hand, it grapples with the legacy of industrialization and urbanization, which have left a lasting mark on its urban fabric; on the other, it struggles with inertia and hesitation toward change. Following Oslo's example, and in order to achieve sustainable development while mitigating the negative effects of climate change, Rijeka should develop and implement targeted strategies and actions that enable the integration of streams and smaller rivers into the urban environment. This would require not only urban planning and infrastructure interventions but also a cultural shift that reconnects people and communities with water. Revitalizing neglected and forgotten areas could create new cultural and recreational centers, enhance environmental quality of life, improve microclimates, and mitigate the negative effects of climate change.









5.10
URBAN MONSTERS

BORNA ŽGANEC

A city is like an untamed beast—resilient and utterly unpredictable. It lives instinctively, caught in an endless feeding cycle of hunting and being hunted. This cold-blooded, prehistoric monster, like any living creature, possesses an inherent beauty. It communicates, defends its territory, has a metabolism, and reproduces. And like all monsters—like nature itself—it dances in cycles of cosmic rhythm. It sings and plays in various timbres and shades, and though their enumerable parts and instrumentation are immeasurable in their natural scale, it makes cities into profoundly noisy monsters. Every urban fabric, defined by its typology and function, is infused and interwoven with infrastructure—paths for walking, waiting, thinking, traveling, daydreaming... Cities are structured into organs and systems, interconnected like a living being, with each city having its own geometry, its unique multifaceted symmetries shaped by its habitat.

Rijeka is a longitudinal monster inhabiting both coastal and mountainous terrain, nestled between Učka, the Kvarner Gulf, and Gorski Kotar. It is marked by the sounds of seabirds, the port, the railway—and more recently, by the noise of construction. In its recent history, Rijeka had its northern tail severed along the Riviera, yet it has never quite grown back. The city is in constant conflict with its inhabitants, and just as the biome within every living organism, they determine the health of its host. A delicate balance of coexistence stretches between two extremes, yet the symbiosis remains undeniable. Through the course of its evolution, Rijeka has become a fusion of multiple monsters—a super-monster, a chimera. A chimera is a combination of several beasts, and Rijeka is a combination of transport, infrastructure, commerce, and people. The fusion of these different urban creatures has made its structures and fabric wild and unpredictable. It is not necessarily a coherent or harmonious coexistence of opposites, but it does have its own integrity. Rijeka will continue to evolve, shaped by its own mistakes. While still in this developmental phase, the question remains—what kind of other monster will Rijeka become?

Oslo, on the other hand, is a tamed beast—caged, muzzled. Its urban tissue is ordered and sterile. Its crest has been trimmed and combed. It bears little resemblance to the wild nature of Rijeka. Oslo moves in meticulously arranged rows and columns. It, too, is a super-monster, but it was not formed through violent addition, but rather through deliberate reduction. With its expansive urban spaces, Oslo has room to breathe, its lungs free to stretch their alveoli into spatial extremes. It speaks in fewer mechanical tones, is quieter, calmer. But does it still harbor a trace of untamed wilderness? Is there wildness in a Bengal tiger lurking behind the shadows of its cage? Can monsters be trained—taught proper English manners? In symbiosis with its geographic and temporal position, Oslo has acquired a distinct urban etiquette. Its people, however, remain human—full of life, consuming the city's tissue and infrastructure, building networks, calculating, multiplying.

Both maritime monsters, Oslo and Rijeka, have been shaped by the cultural and spatial landscapes they inhabit. They consist of both living and inanimate matter. The fusion of the organic and the inorganic forms identity. Any act of creation—passive or active—results in a whole that carries the traits of the natural. Every artifact, in a way, strives to become a living entity. Our Blue Bestiary contains many specimens of different species. Have we, as humans, already driven certain types of cities to extinction? Having also invented new ones—Zagreb's Mamutica, a monster within a monster, remains in constant use—its faade already evolving in symbiosis with new parasites. Different cities occupy different places in the food chain, while the temporality of urban fabric remains a testament to the cycle of life.


Oslo Havn
Oslo

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