

# Autonomous waterborne transport








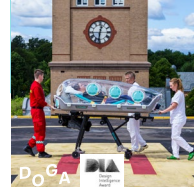










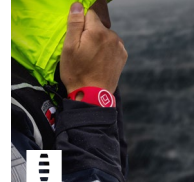



The zero-emission, cost-efficient and attractive way of getting goods and people to their destinations



Bjørn Utgård  
CEO  
[bjorn@hyke.no](mailto:bjorn@hyke.no)

 **hyke**

# Eker Group: 35 years of cutting-edge innovation

<p><b>Pivco</b> First mover in electric cars. Development, engineering and prototyping</p> 	<p><b>ASK</b> Design &amp; development of projectors for professional use, incl. world's first projector</p> 	<p><b>projectiondesign</b> HIGH PERFORMANCE PROJECTORS Inventors of single-chip projectors for the professional simulator-market</p> 	<p><b>Stokke</b> Full development cycle for pivotal product Xplory</p> 	<p><b>Loyds Paxster</b> Design and development of electric vehicles for mail/parcel delivery</p> 	<p><b>Norsap / Cameron</b> Design and engineering of drill chair for Norsap and Cameron</p> 	<p><b>Yamarin / Silver</b> Design and development of new pleasure boat series with 4 models</p> 	<p><b>EpiGuard</b> Development of the EpiShuttle Majority owner since inception</p> 	<p><b>Ecar</b> All-electric arena based automotive entertainment and competition</p> 	<p><b>Hyke</b> Zero emission urban mobility with autonomous, multi-purpose ferries</p> 	<p><b>Hydrolift E-22</b> World's fastest all-electric mid-size pleasure boat</p> 	
1993	1994	2001	2003	2012	2013	2014	2015	2019	2020	2021	
1994	2001	2003	2012	2014	2014	2014	2015	2017	2019	2020	
<p><b>Oslo Hovedflyplass Gardermoen</b> Involved in the design and development of the new main airport</p> 	<p><b>Hydrolift</b> Manufacturer of fast pleasure boats. ED provides design, development and branding services</p> 	<p><b>Koenigsegg Automotive</b> Swedish supercar Manufacturer. Majority owner 2004-2018</p> 	<p><b>Øveraasen Performance Line</b> Design and development of a whole new product line of snow blowers</p> 	<p><b>Ixion</b> The multiroom audio system IXION is a Norwegian high quality product</p> 	<p><b>Hydrolift P-42</b> Design &amp; development of new product platform of Fast Patrol Boats</p> 	<p><b>Nordic Aquafarms</b> First mover in Norway. Industrialised land-based seafood production</p> 	<p><b>Fell</b> Development of next generation kill switch to provide safety and high mobility at sea</p> 	<p><b>Zivid One</b> Design, Development and pre-production of new product platform for 3D vision cameras</p> 	<p><b>Buddy X1</b> Design &amp; development of all-carbon product line, including trailing riggy</p> 	<p><b>Roseslottet</b> 3D-scanning, CNC wood production and construction for art exhibition</p> 	
		<p><b>Koenigsegg</b> <b>50x</b> Growth in orders From 2004 to 2018</p>									

# Hyke Leadership Team



**BÅRD  
EKER**  
FOUNDER &  
CHAIRMAN

- Industrial designer and entrepreneur.
- Founder and CEO of Eker Group with a long track record of successful products and ventures, including Eker Design, Hydrolift, Koenigsegg and Projectiondesign.
- Skilled in Conceptual Design, Marketing Management, Negotiation, Sensory Integration, and Business Planning.
- UIM Class 1 World Powerboat Champion.



**BJØRN  
UTGÅRD**  
CEO

- Electrical and mechanical engineer.
- Internationally recognized thought leader in electric mobility and cleantech.
- Former Director New Markets and VP Sales at EVBox.
- Extensive climate and energy policy & technology advisory experience from the Bellona Foundation, DNV and others.
- Originated several successful cleantech ventures, including Biovotec and Hippo by Saalasti.



**JASON  
MCFARLANE**  
CTO

- Software engineer with strong technical foundation in systems development combined with creative drive for new and better solutions.
- 14 years of experience from Kongsberg Maritime, including positions as Principal Architect and Director Research & Innovation.
- Former troop commander (Lt.) and researcher at Australian Army and DSTO.



**ØYVIND  
MAGNUSSEN**  
CFO


- Experience with deal/transactions environment and in combination with the operational experience.
- Long experience from capital markets and corporate finance for growth companies.
- Working in the Investment banking Industry, with extensive experience from listing companies within the Nordics and in the US.
- Experience from global business development, strategy, financial modelling, resource planning, project financing, team management.


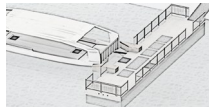




# Hyke serves two interconnected but distinct markets:

## Hyke Mobility

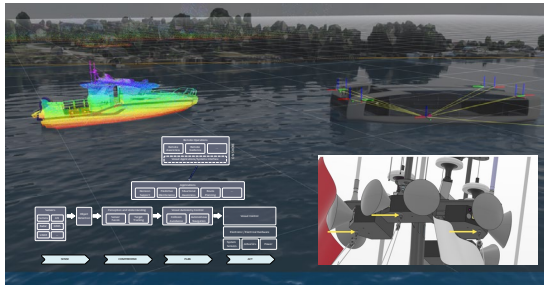
### Integrated waterborne transport solution

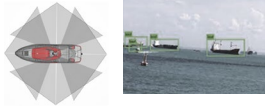

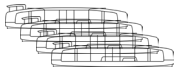




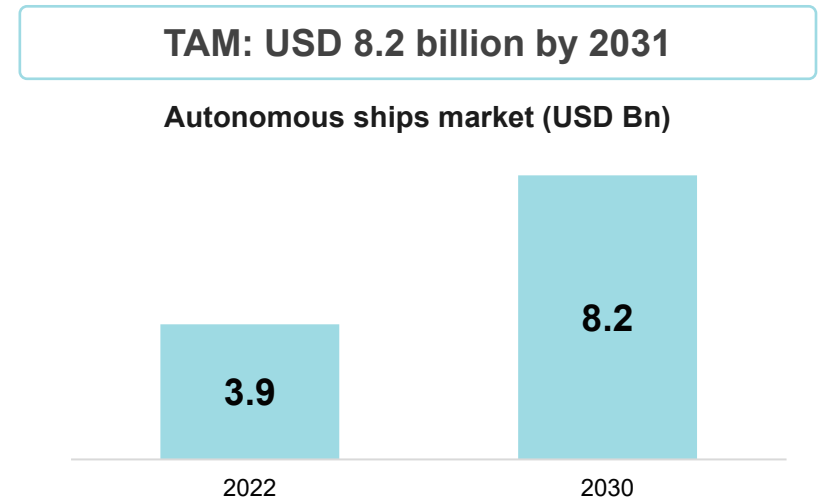
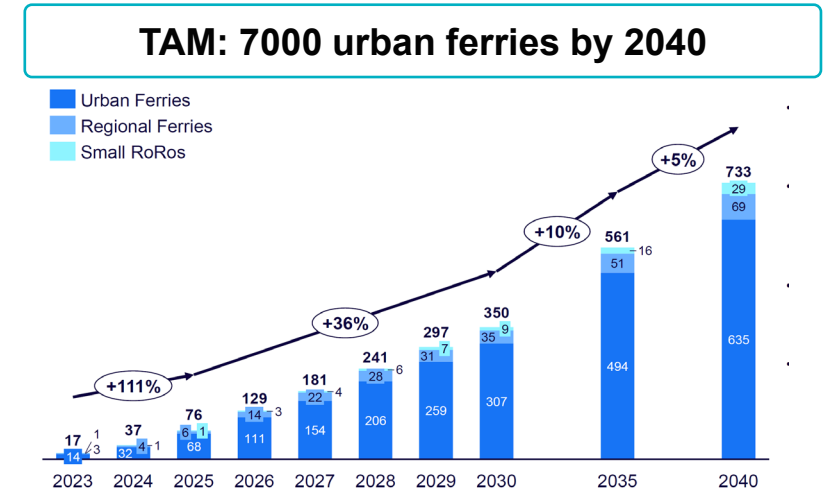
- Autonomous & electric ferries

- Docking & charging jetties

- Autonomous tech. & services

- Deployment & operations services


## Hyke Autonomy

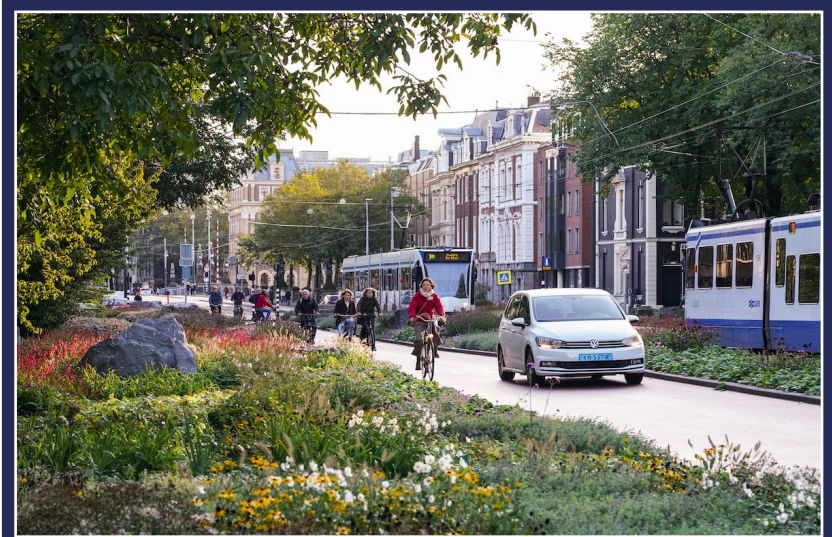
### Autonomous vessel technology



- Situational awareness

- Autonomous navigation

- Fleet management

- Operations specific modules

- Remote operations services




# Hyke Mobility: Enabling cleaner, cooler and more efficient cities



**Slashing emissions**



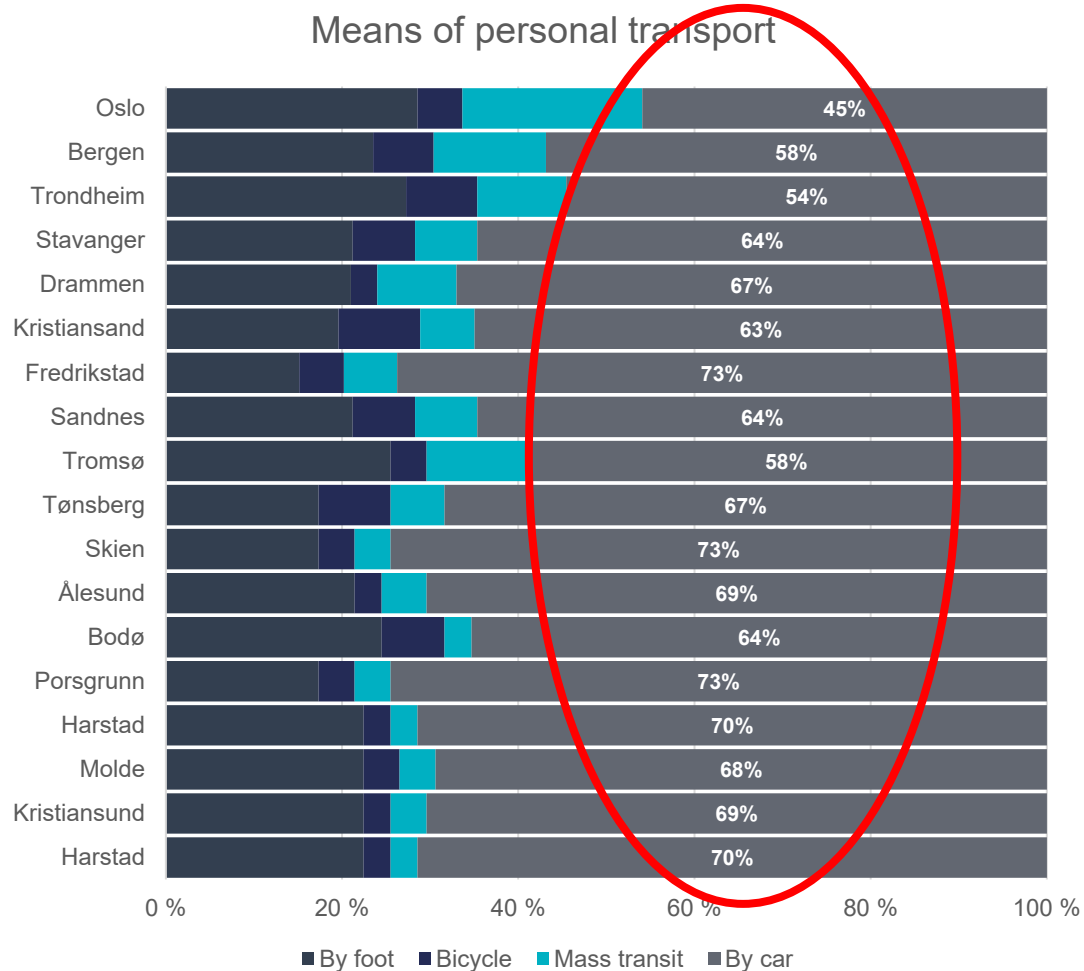
**Cutting congestion**



**Revitalizing the city**

**CITY PRIORITIES TOWARDS 2030**

# 56% of Norwegian coastal cities' CO2 emissions stem from road and marine transport



## National strategies for reducing transport emissions

- 1**

**Reduce direct emissions through zero-emission drive trains**

Hyke's zero-emission vessels and integrated charging jetties replace old ferries powered by internal combustion engines and fossil fuels.
- 2**

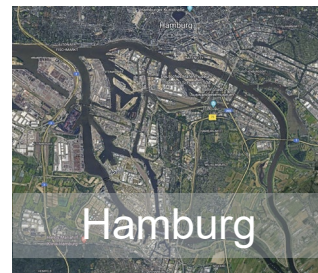
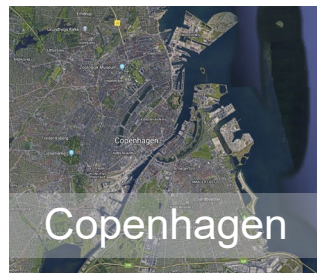
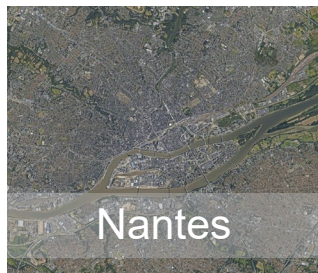
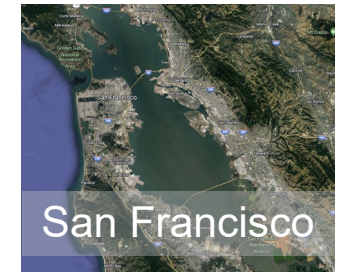
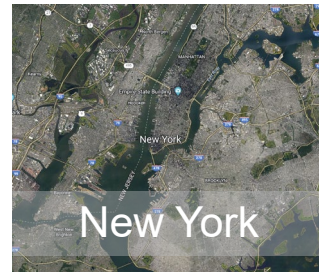
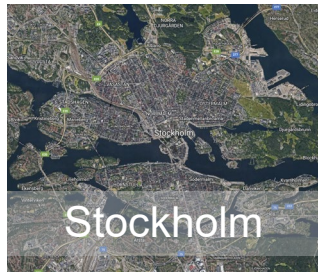
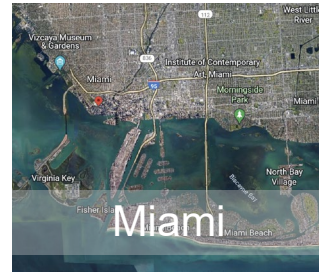
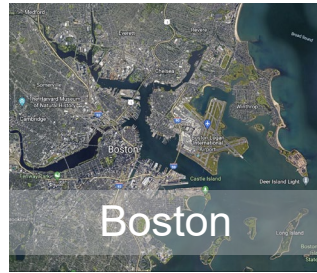
**Reduce car usage by expanding mass transit, walking and biking**

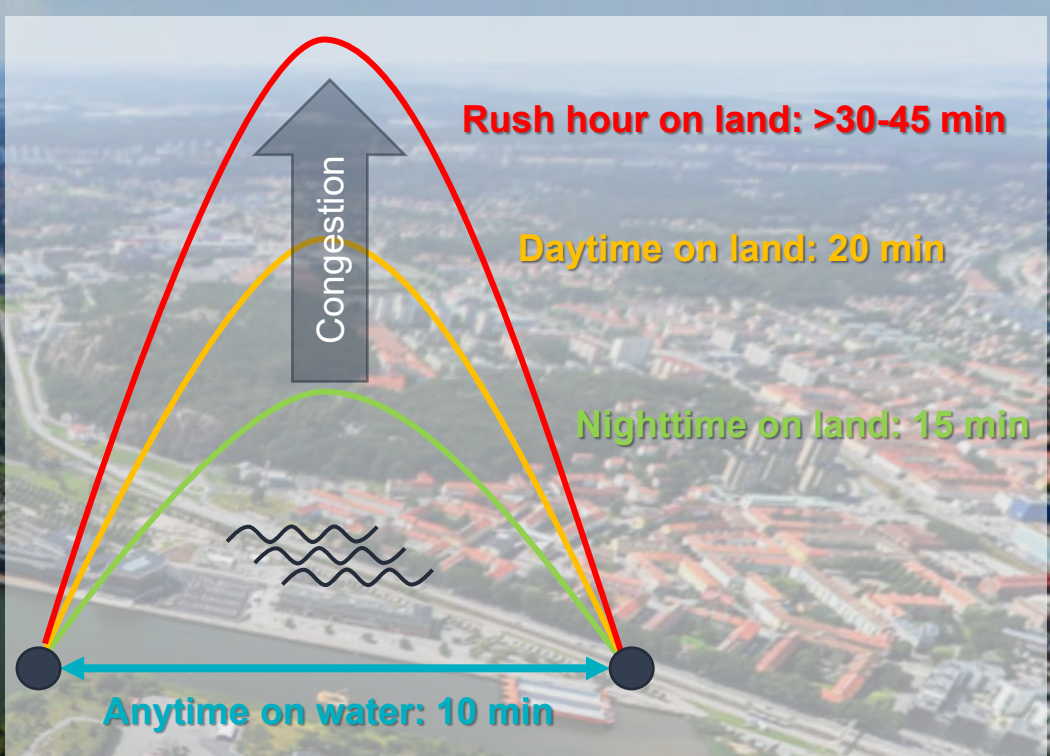
Hyke's integrated solution offers significant cost reductions compared to traditional mass-transit while offering threshold-free access for wheelchairs, strollers and bikes.
- 3**

**Reduce need for transportation through smarter city planning**

Hyke enables compact waterfront re-development and provides shortcuts across the water, reducing transportation needs compared to land-based options.

# 90% of the world's cities are located on the water





*Take a hylce!*

The Shortcut Across the Water



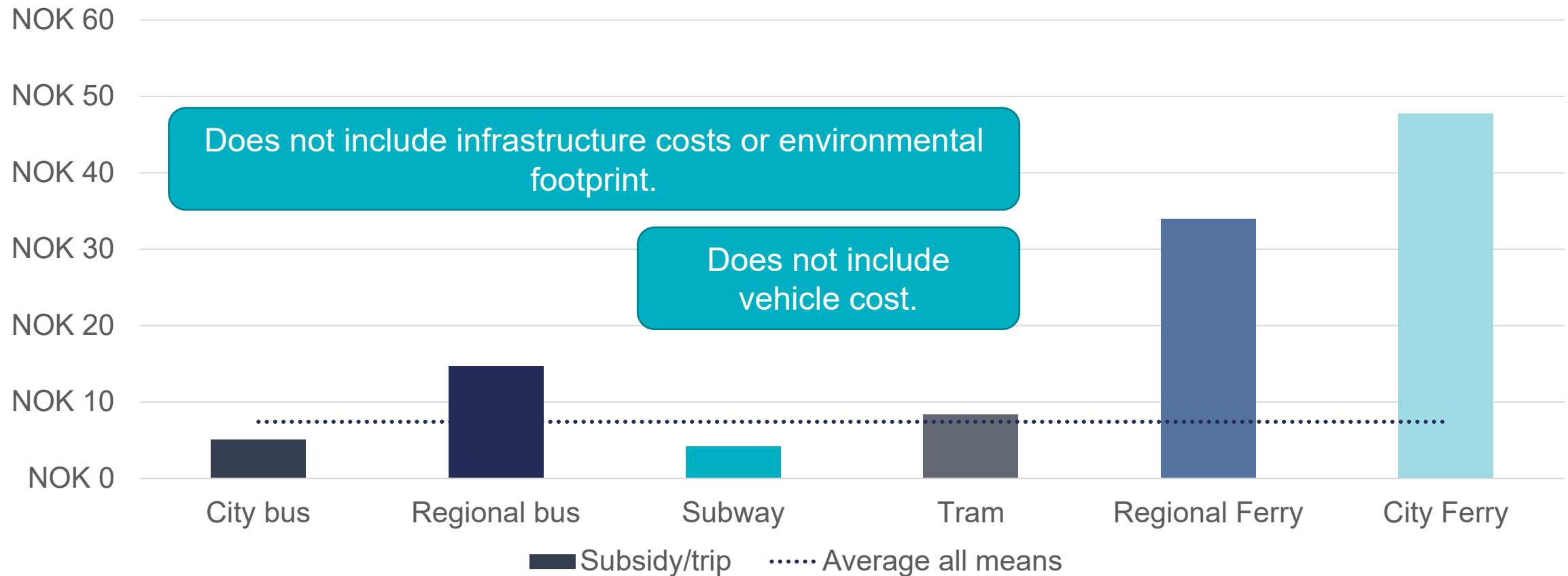
# City Ferries are popular in many cities...



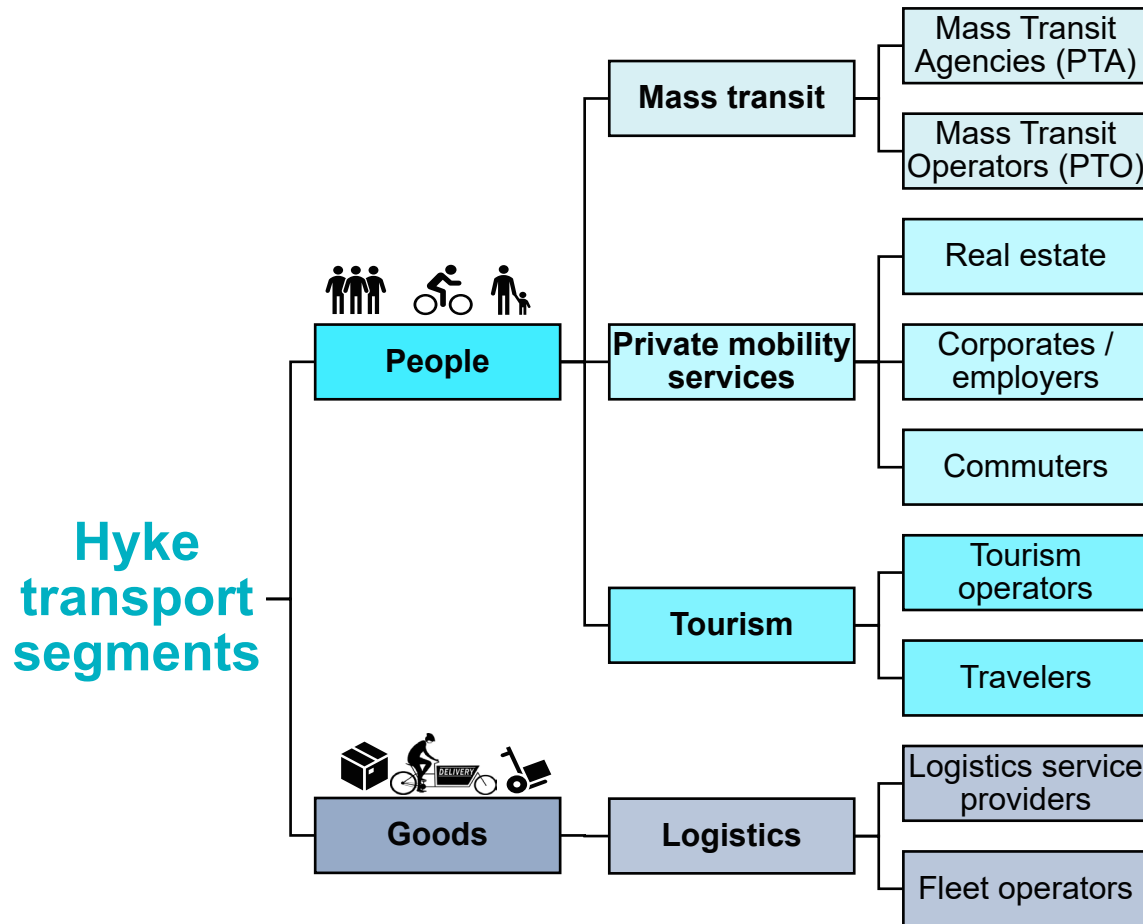
... but their economics are limited by lacking standardization and industrialization

# Problem: high dependency on subsidies

Subsidies in Ruter's network (2019)



# Cost and performance improvements enable structurally scaling up the urban waterborne transport market



- Ferries transported more than **4.3 bn passengers in 2019**, generating more than **USD 17 bn.** in direct revenues<sup>1</sup>.
- Hyke's performance improvements enable ferries to address a larger share of the broader transit and ground passenger market, which is expected to be worth **USD 634 bn. by 2025**<sup>2</sup>.
- Main customer segments directly or indirectly addressable:
  - **MTAs and city governments**, responsible for public transit services in a territory, contracts concession to operators providing service to MTA's specification.
  - **MTOs**, fleet operators holding contract with MTA, purchasing or leasing vessels.
  - **Real estate companies** procuring ferry services for bundling into property value proposition.
  - **Corporates** chartering vessel capacity to employers for employee shuttling.
  - **Commuters (B2C)** buying tickets / memberships directly from private mobility service provider operating independently on commercial terms.
  - **Tourism operators (B2B)**: providing experiences and transportation services to travelers.
  - **Tourists (B2C)**: directly serving end-customers (B2C and B2B).

- The global last mile delivery market is estimated at **USD 42.9 bn** in 2022, growing to **USD 75.5 bn by 2028**<sup>3</sup>.
- Main customer segments directly or indirectly addressable:
  - **Logistics service providers** transporting goods for own customers.
  - **Fleet operators** procuring vessel (as a service) for own operations.

1. <https://interferry.com/ferry-industry-facts/>  
 2. <https://www.pnnews.com/news-releases/global-634-billion-transit-and-ground-passenger-transport-market-to-2025-with-long-term-forecast-to-2030-301335582.html>  
 3. <https://reports.valuates.com/market-reports/QYRE-Auto-22T543/global-last-mile-delivery>



# Hyke Mobility: The revolutionary smart city ferry

World-class, award-winning Norwegian design and engineering

All-electric drivetrain combined with extremely efficient hull & thermal system

Proprietary situational awareness and navigation technology, enabling fully autonomous operations

Manned operation capability ensures market entry does not depend on regulatory change

Autonomous docking, automatic charging and built-in solar enabling 24/7 unmanned operation

Modular design enabling easy adaptation to new applications and locational requirements

Designed for low-cost manufacturing at scale to compete even with land-based alternatives





# Designed for cost-efficient and sustainable manufacturing and operation



LENGTH OVERALL	<15 meters
DRAFT	0.5 meters
BEAM	5.5 meters
MAX SPEED	15 knots / 28 kph
CAPACITY	50 pax / 5.5 tons
PROPULSION	Electric
OPERATING AREA	Class 1 / Protected waters
MATERIAL	GRP
WEIGHT	11 metric tons
POWER	60 – 150kW
ENERGY CONS.	10-12 kWh/h (at 6 knots)
BATTERY CAPACITY	95 – 285 kWh (gross)
INTEGRATED SOLAR	7 kW (peak)
CHARGING	Integrated automatic connection
THERMAL SYSTEM	Air conditioning with heat pump
NAVIGATION	Autonomy Ready
CREW	1 (Captain or Safety Officer)

[← THE BEST INVENTIONS OF 2022](#)

## Quiet, Clean Waterborne Commute

### Hyke Smart City Ferry

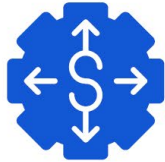
BY **DON STEINBERG**

NOVEMBER 10, 2022 6:02 AM EST

**H** yke believes its electric **Smart City Ferry** can make urban transportation greener, alleviate traffic, and revive waterfronts. “We’ve forgotten about the waterways as a city transport medium,” CEO Bjorn Utgard says. “People feel better next to water.” Set to debut commercially in early 2023 in Norway, the battery- and solar-powered ferry can autonomously navigate and dock at passenger stations, where it wirelessly recharges. Because ferries make short, predictable trips, the nearly 50-foot vessel is configured with the exact battery capacity required, maximizing efficiency. Oslo-based Hyke is in talks with transportation authorities and private operators around the world, including in New York City.

CONTACT US AT [LETTERS@TIME.COM](mailto:LETTERS@TIME.COM).

# Autonomous navigation and efficient electrification creates major new market opportunities in urban areas



*Improved OPEX compared to traditional ferries*

Distribution of OPEX of traditional urban ferry operators



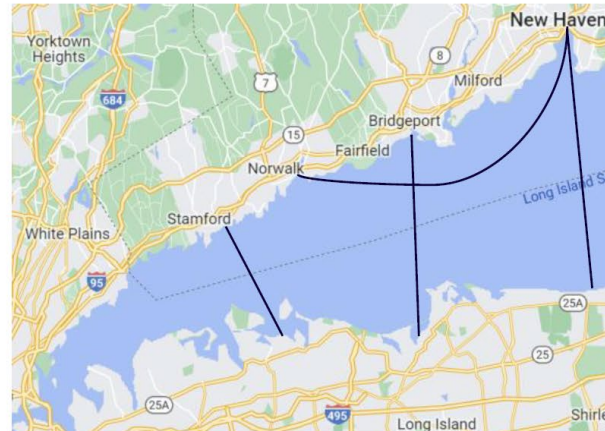
**Autonomy**

**Electrification**

- Reduce the need for personnel, especially for captains and skilled workers
- Energy cost per mile decrease
- Longer service intervals



*Travel Time Improvement*



Avoidance of traffic

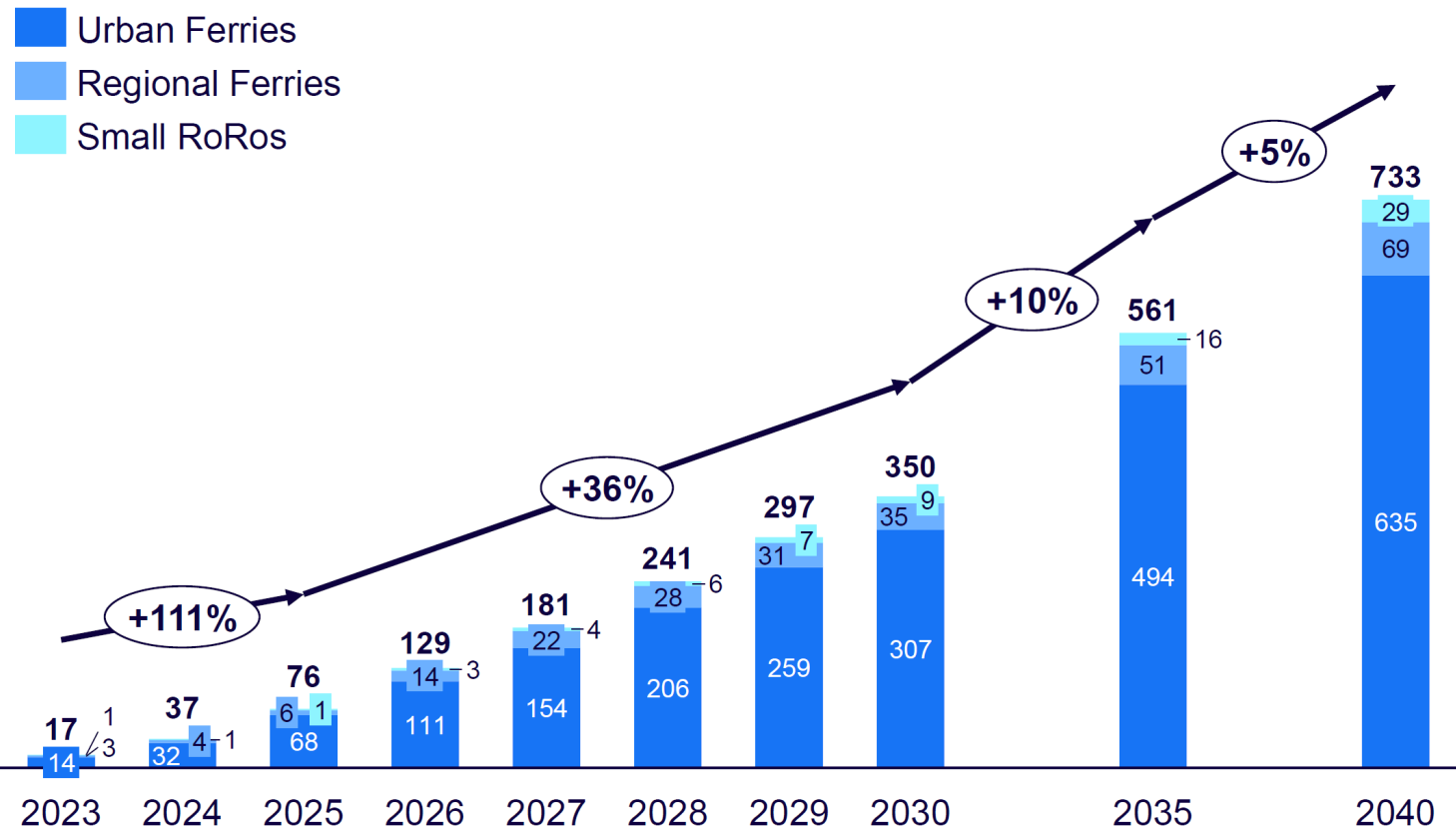
- Boat routes offer alternatives in urban areas along water bodies
- Reducing distance and shorten travel times
- Cities like New York City that suffer from traffic congestions can reduce traffic by offering additional routes

Source: ADL analysis (2022)

## Hyke Mobility: ADL market analysis shows almost 7000 cumulated units by 2040 (EU and US)

### Total Market Potential of New Electric Ships (EU + USA)

*in units per year*

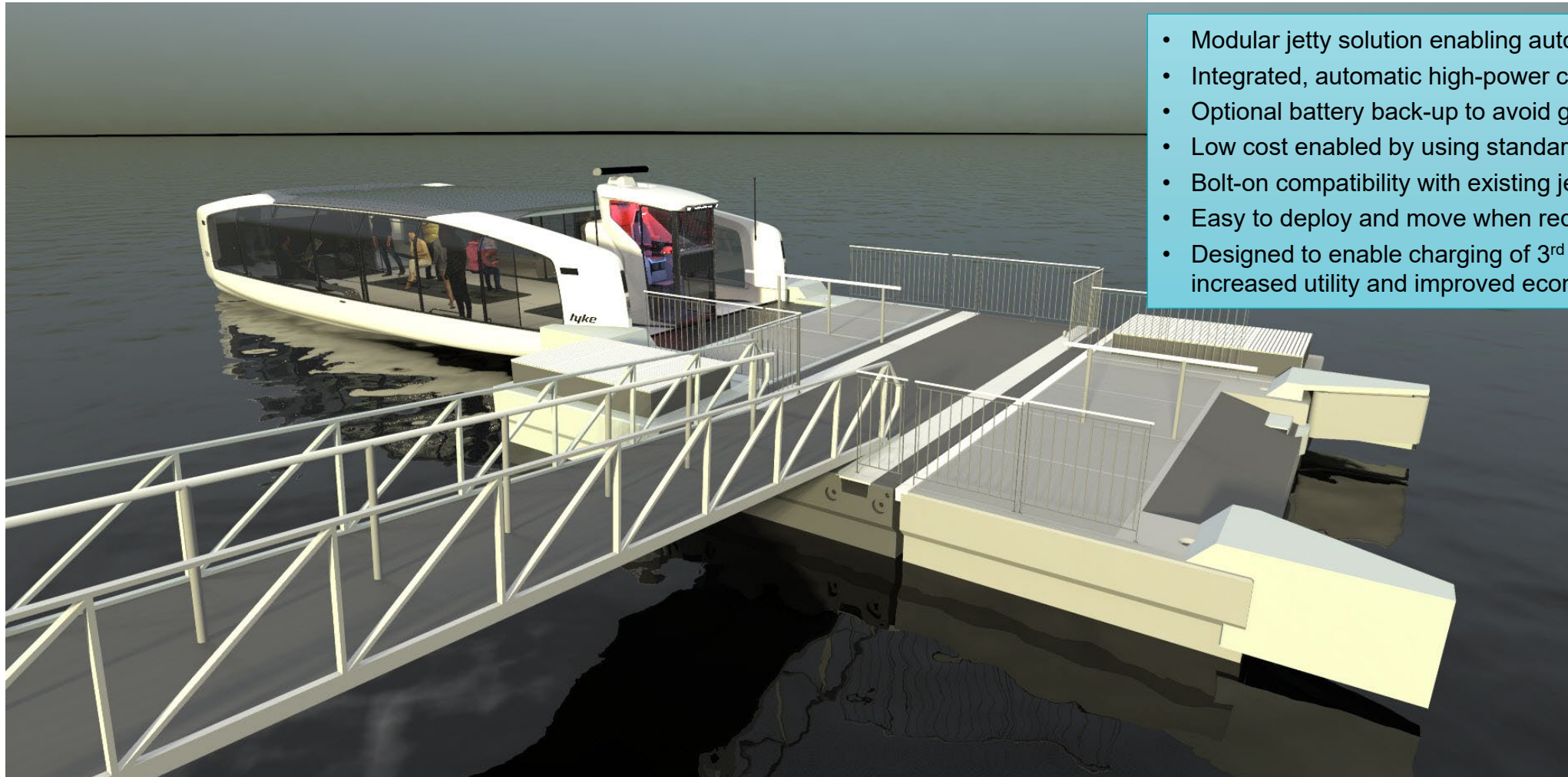


- **Almost 90%** of the market potential in terms of units comes from the **urban ferry segment**
- **Small RoRos** stay a niche market, we only expect a **cumulated demand of 219 units** until **2040**
- **Europe** as the **driver** in all 3 segments, although the **US** makes up for a **third** of the market
- **CAGR of 54%** is expected until **2030**

Source: ADL analysis (2022)



# Auto-docking and mooring solution engineered to minimize cost and enable fully autonomous operations



- Modular jetty solution enabling auto-docking
- Integrated, automatic high-power charging
- Optional battery back-up to avoid grid upgrades
- Low cost enabled by using standard jetty modules
- Bolt-on compatibility with existing jetties
- Easy to deploy and move when required
- Designed to enable charging of 3<sup>rd</sup> party vessels for increased utility and improved economics

# Safely Accelerating the Transition to Full Autonomy

## Manpower is a major concern for traditional ferry operations

- Shortage of trained captains, driving up costs and slowing business scale-up
- Manpower costs make up 70-80% of total OpEx
- Potential service interruptions due to labor conflicts
- Sub-optimal control causing loss of energy and time, and increased wear and tear
- Accidents caused by human error

## Autonomous operation optimizes operations

- Conditions-aware navigation saving time and energy
- Sea captain replaced by (optional) safety officer and supervision from remote operations center
- Swarm intelligence enabling smart fleet management
- Reducing manpower costs by 50-80%, depending on scenario



### Augmented



Automation / Decision Support



Captain



### Semi-Autonomous



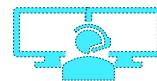
Vessel Autonomy Control



Captain



Safety Officer



### Fully Autonomous



Vessel Autonomy Control



Safety Officer



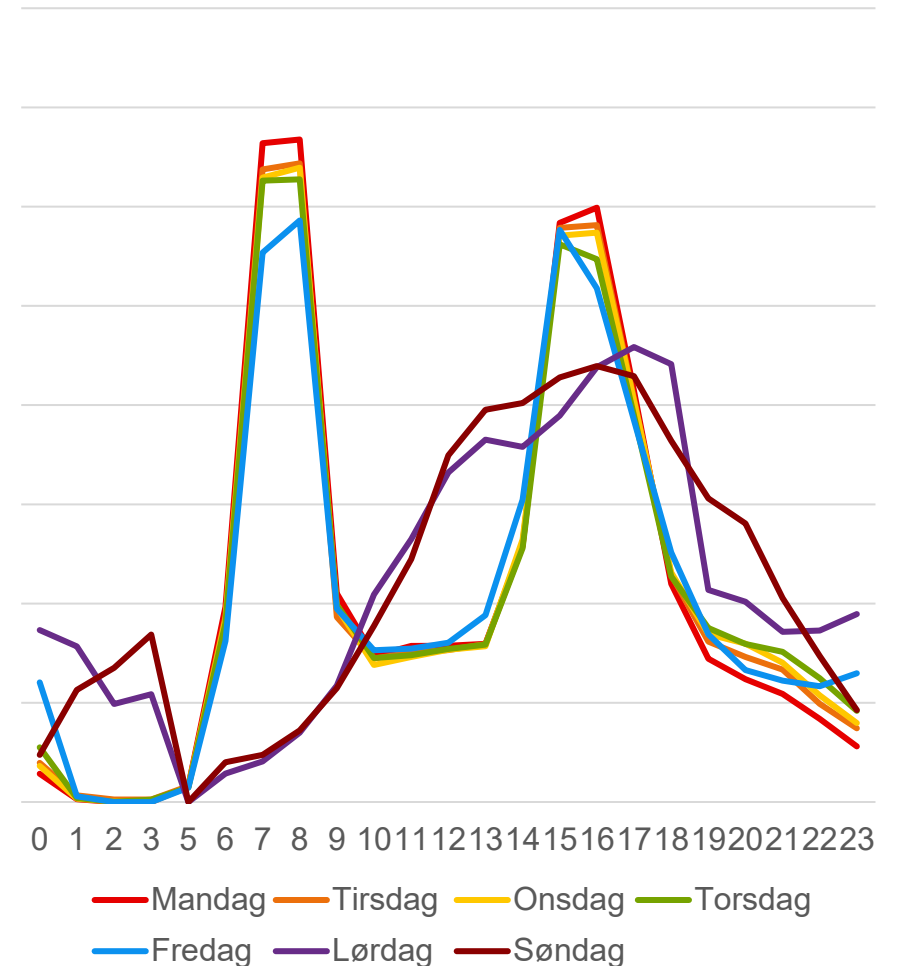
Remote Guide



Every Hyke vessel is equipped with complete sensor packs, generating real-world data and experience to accelerate development, validation and approval of Hyke's proprietary autonomous navigation and operations technology.

# Example: Nesoddsambandet

2.9 million passasjerer  
Min. 20 minutters intervall  
Halvtime/timesintervall utenfor rushtid



# Hyke delivers a step-change in environmental performance, also compared to “electrified” traditional ferries (example: Oslo)

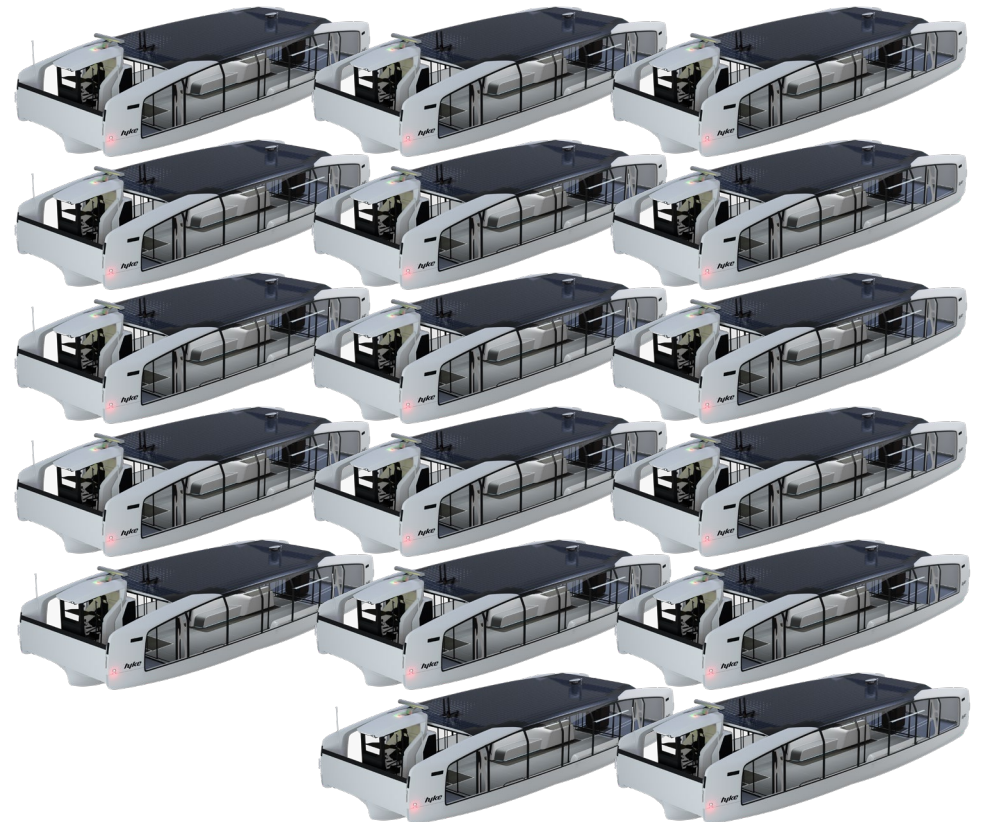
## Electrified traditional ferries



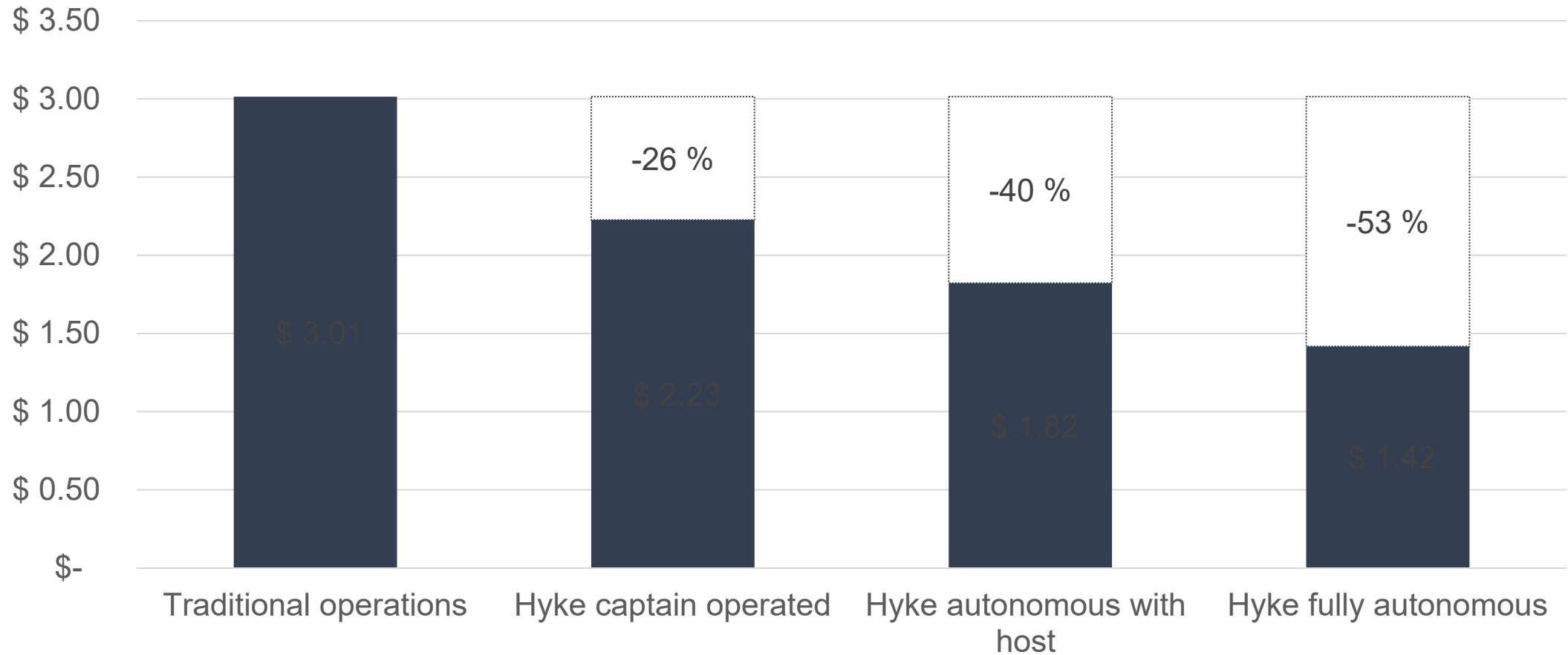
3375 tons  
6000 kWh battery  
3800 kW  
€50M  
1.55kWh/pax  
6 departures / hr

170 tons (-95%)  
2850 kWh battery (-53%)  
300 kW (-92%)  
€27M (-46%)  
0.55kWh/pax (-64%)  
36 departures / hr

## Born electric Hyke ferries



# Hyke is highly competitive from day 1 – autonomy further increases profitability

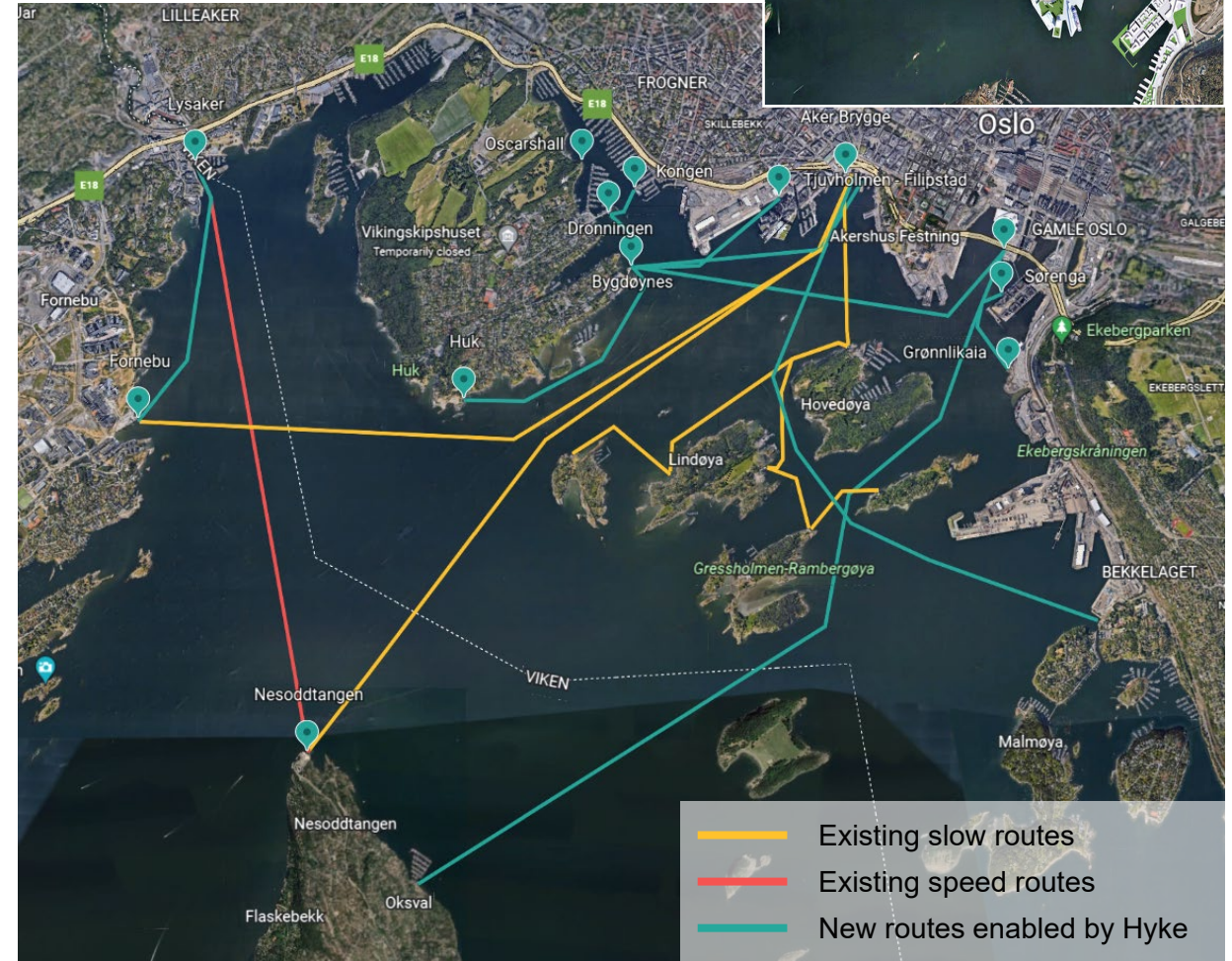
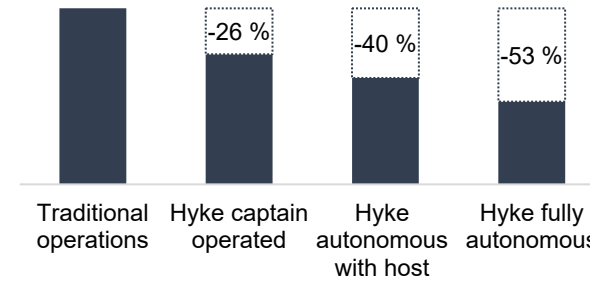


**...hailing at many more stops**

# Market scale up example: Oslo

- Massive waterfront redevelopment ongoing.
- Strong policies to reduce emissions and expand public transit.
- Strong push for ferry network expansion by real-estate and tourism companies.
- Traditional ferries held back by high subsidies and emissions.
- Hyke's step change in cost-efficiency and capabilities enables 4-5X network scale-up by 2030.
- Market growing to USD 65-80 million per year.

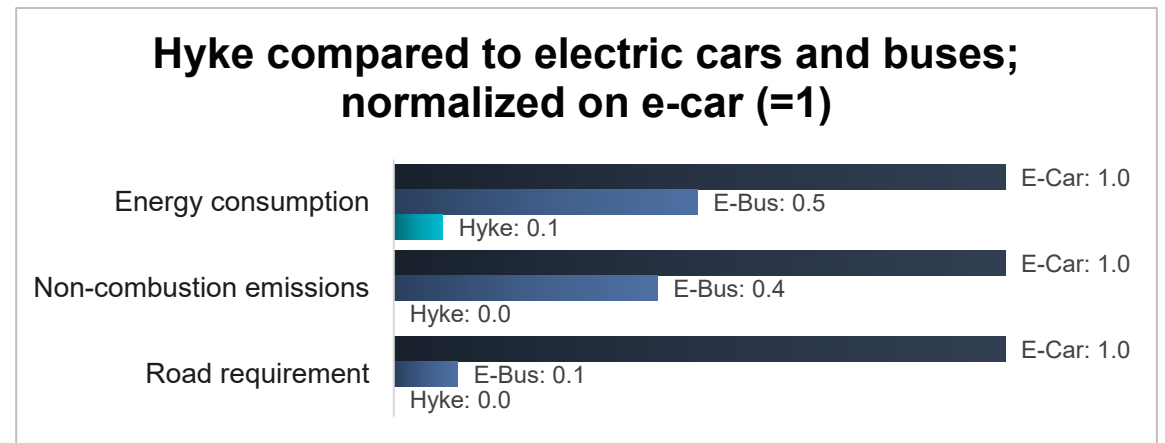
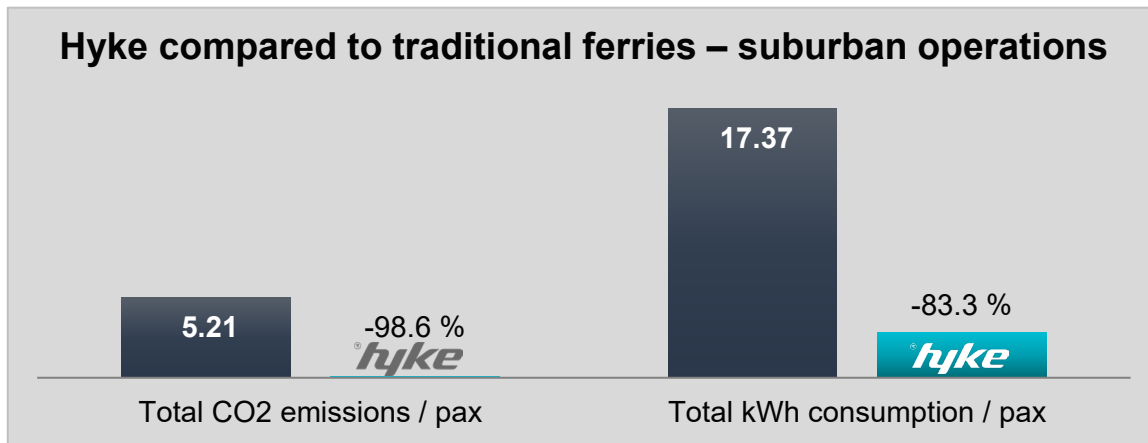
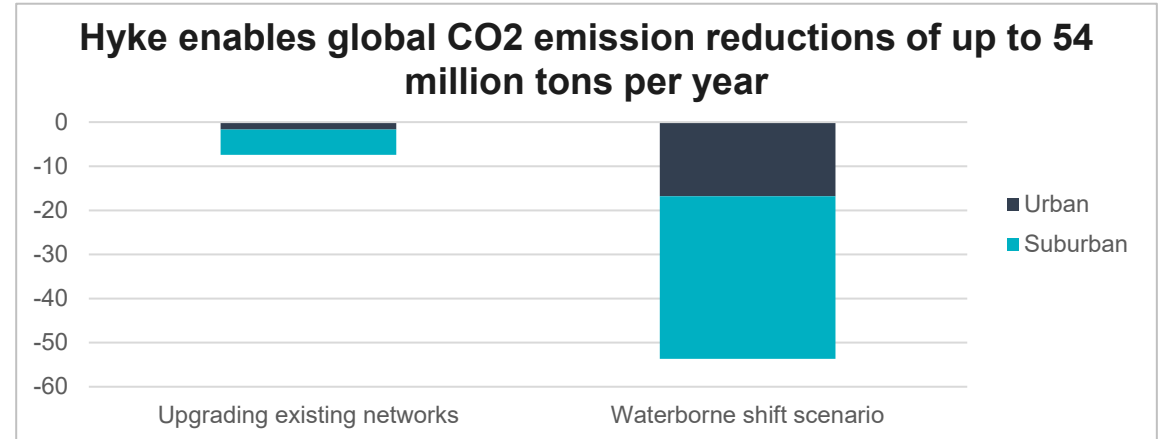
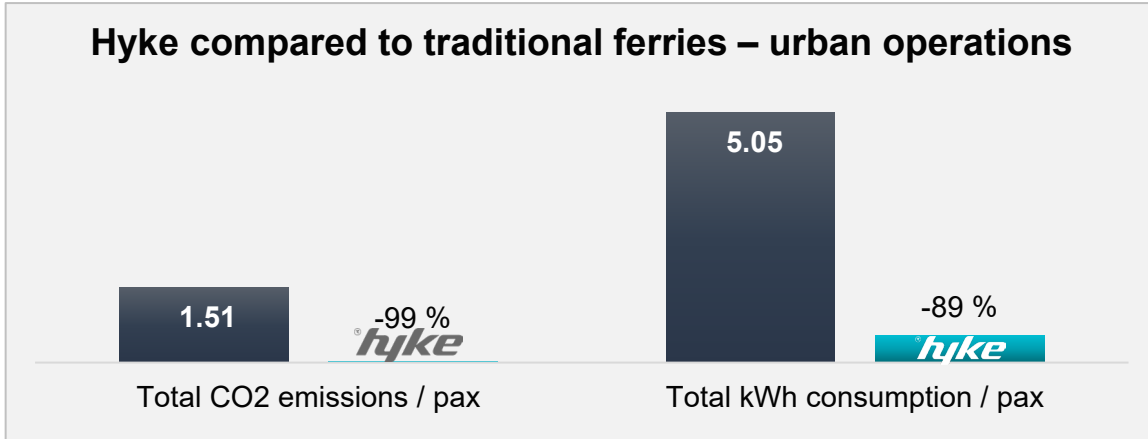
	Oslo 2022	Oslo 2030
Population	1 035 000	1 097 100
Annual trips	1 133 325 000	1 201 324 500
Annual ferry trips	5 000 000	20 000 000
Annual ferry trips per capita	5.31	18.23
Ferry market share	0.5 %	1.7 %
Hyke ferry market size (qty)	20-25	80-100
Annual market value (MUSD)	21-26	65-80







# Hyke radically reduces the environmental impact of urban mobility and logistics, even compared with electric cars and buses



Urban operations: 3 NM at 9 knots; Suburban operations: 5 NM at 19 knots.  
Source: own analysis based on Oslo ferry operations. Includes indirect CO2 emissions (Norwegian power mix 2022).

Comparison for trip from Bygdøy to center of Oslo; ferry route is 75% shorter than road route.  
Source: own analysis based on Environmental agency and own data.

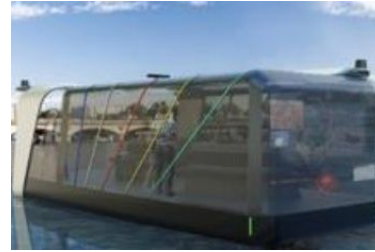
# Competitive space: Autonomous urban ferries

Hyke stands out as the definite provider of complete waterborne transport solutions based on proprietary technology

**French Olympics consortium**



**Dutch/French Olympics consortium**



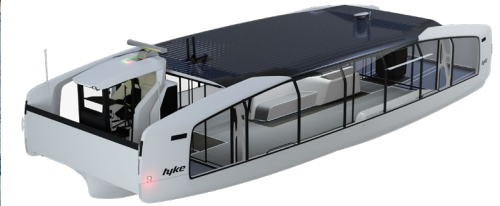
**Zeabuz / Brødrene AA**



**Greenhopper**



**hyke**

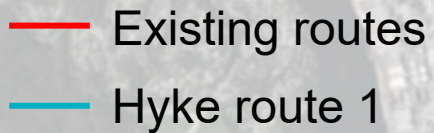


Country of origin	France	Netherlands	Norway	Denmark	Norway
Description	Consortium for Paris Olympics consisting of 5 French engineering and technology companies.	Consortium for Paris Olympics.	Consortium of 3 companies planning commercial operations in Stockholm summer 2023.	Demo project based on autonomy technology from Danish Technical University (DTU).	Hyke's offers a scalable, complete, cost-efficient and beautiful solution for waterborne mobility and logistics.
Companies	BlueNav, Orion Naval engineering, Drone Protect System, E-Nautic, Keolis (operator)	Roboat (autonomy tech) and Holland Shipyards, Sequana (operator)	NTNU / Zeabuz (autonomy), Brødrene Aa (shipyard), Torghatten (operator)	DTU (autonomy), FORCE technology (software), TUCO Marine (ship)	Hyke with Eker Group backing for shipbuilding and product design.
Length	12 m	10 m	12 m	10 m (?)	15 m
Capacity	12 pax	35 pax	25 pax	12 pax (?)	50 pax
Max speed	Low	Low	Low	Low	15 knots
Commercial deployment	Unknown beyond Paris	Unknown beyond Paris	2023	Unknown	2023

# Reference case: Byferga Fredrikstad (2023)

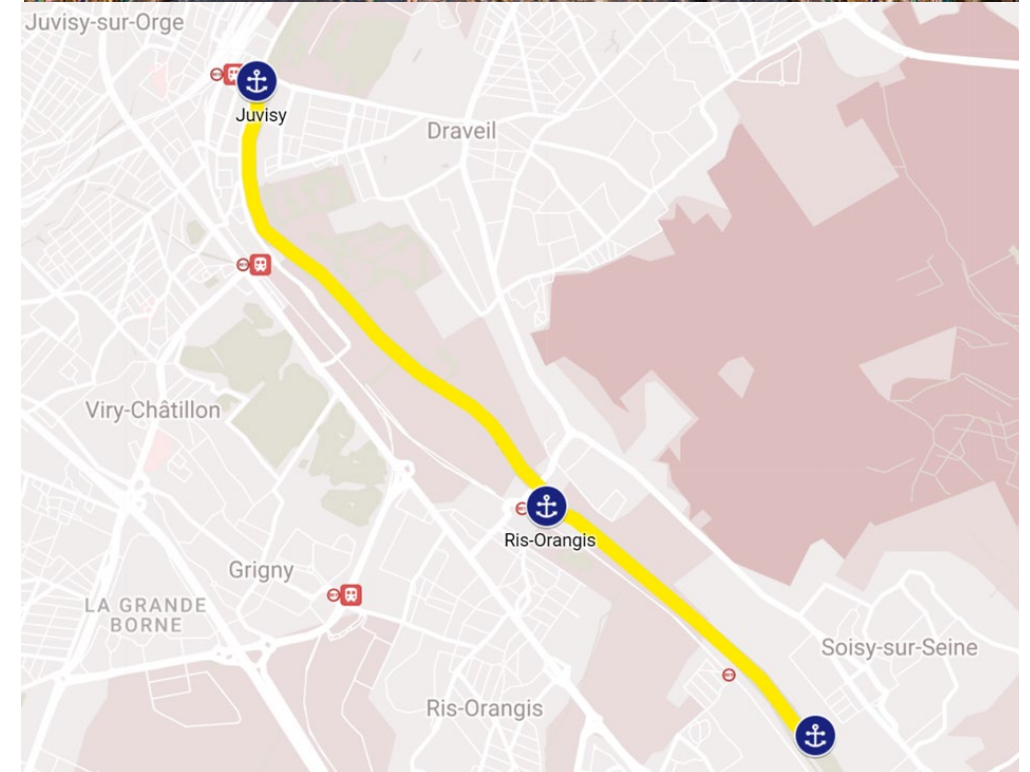
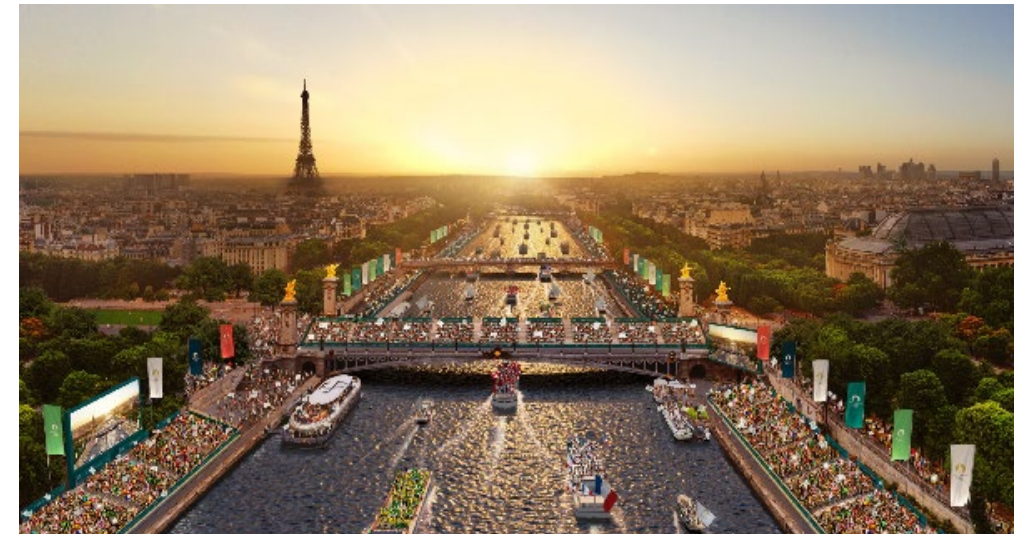


- 6 traditional vessels in operation
- 1.5M pax / year
- Current TCO per vessel: \$152 / hour

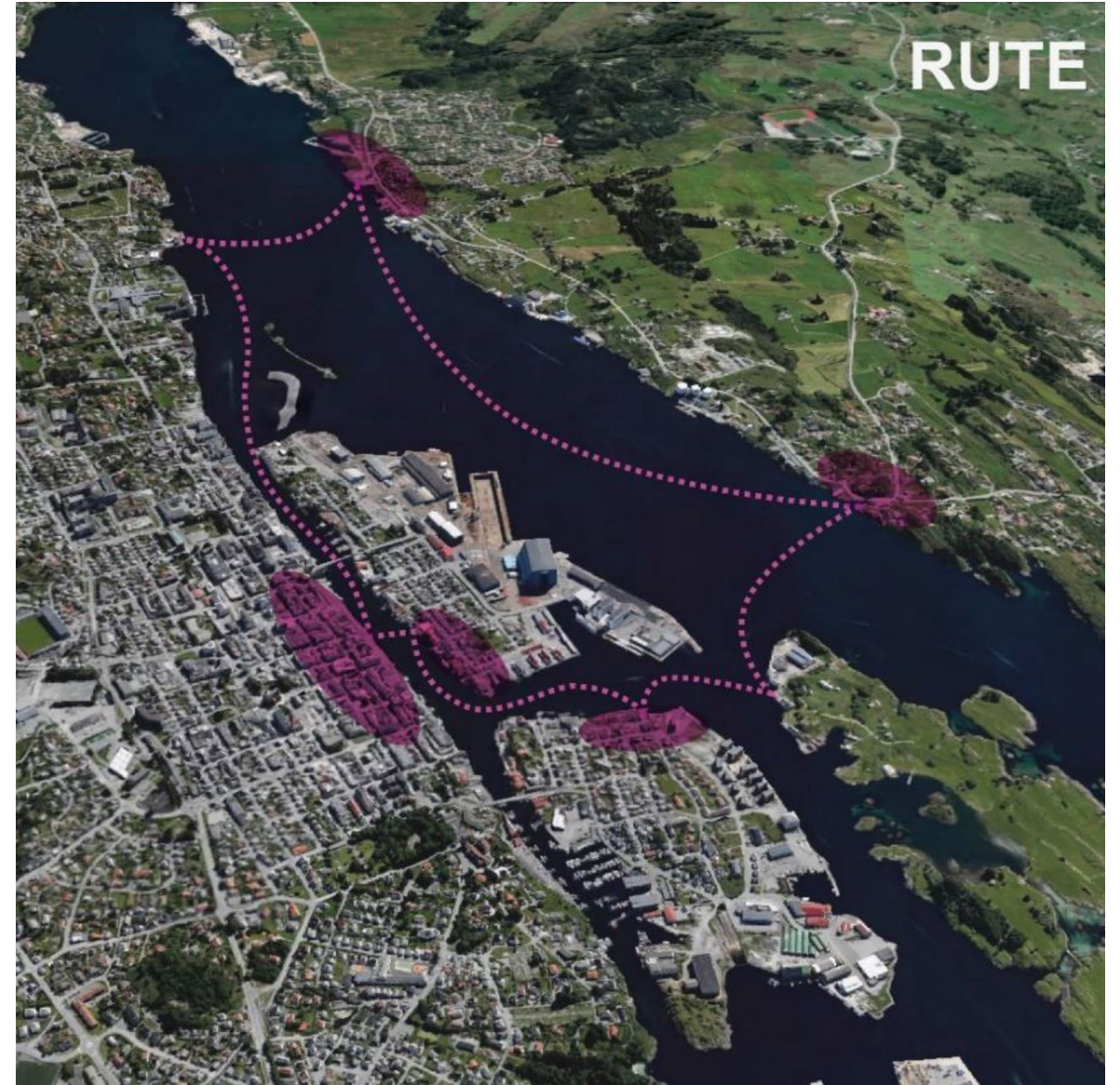


## France - Paris Olympics 2024

- France is a major target market
  - Paris is Europe's largest inland passenger port
  - 8500 km of navigable inland waterways (#1 in EU)
  - Strong policy support for decarbonizing transport and increased use of waterways
- Paris Olympics 2024 – the showcase
  - 4 ferries in operation during Olympics
  - Partnership with local operator and local governments
  - Collaboration with VNF – the operator and regulator of French inland waterways
  - Co-funded by French Government
- Multiple commercial projects in pipeline
  - Metz
  - Lyon
  - Nantes
  - Marne



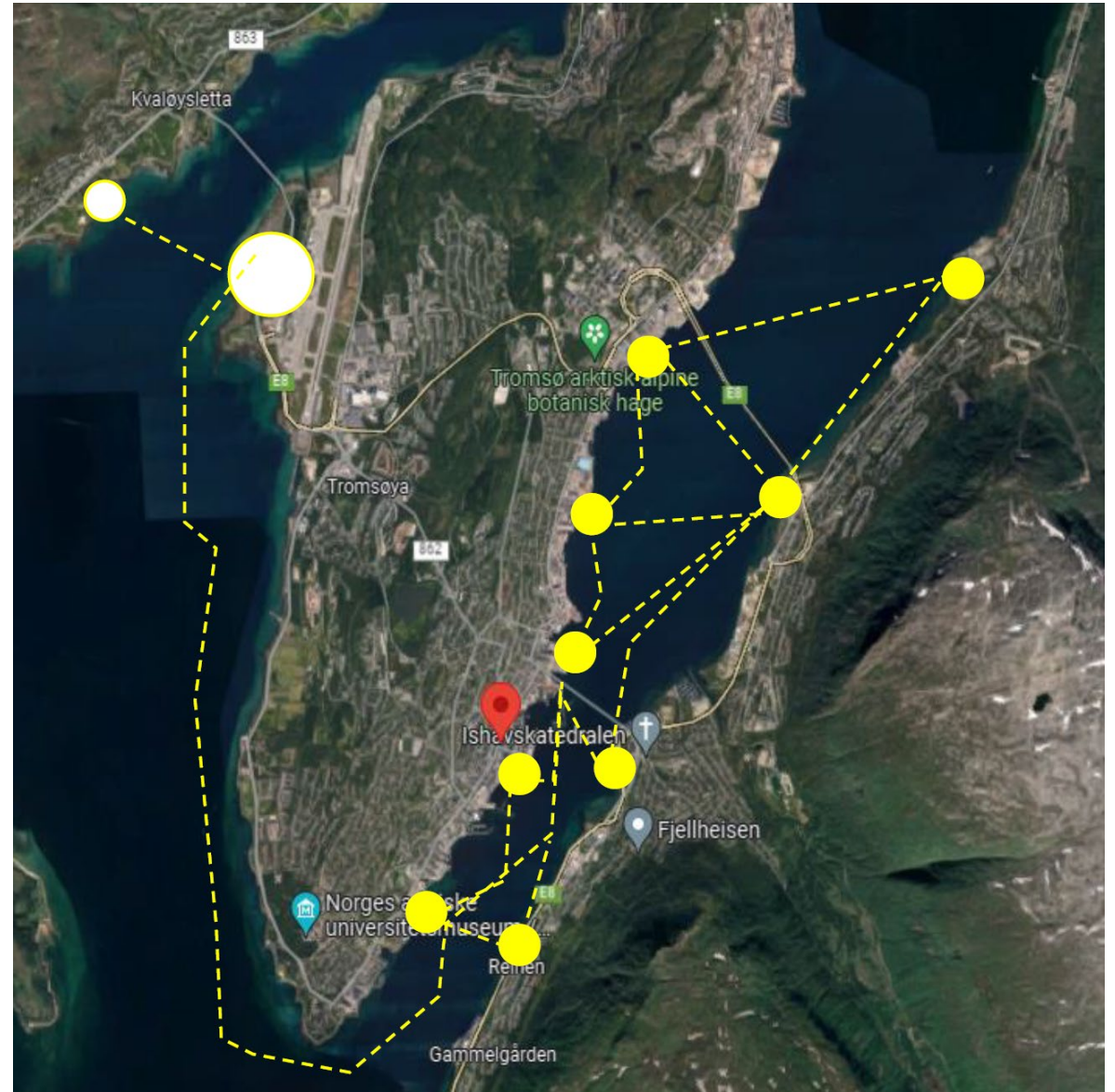
# Haugesund: collaboration established with municipality – plan to initiate operations 2023



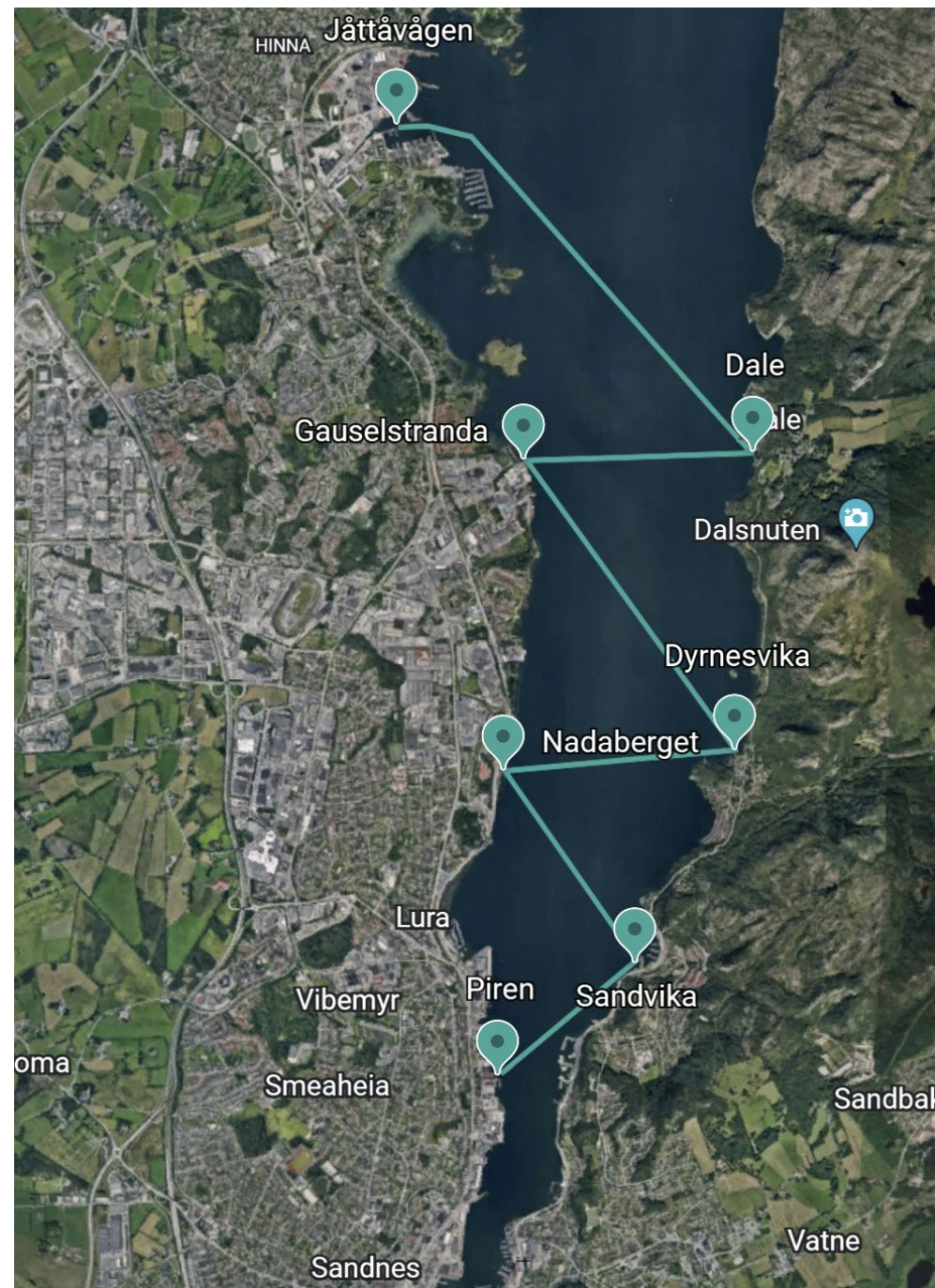
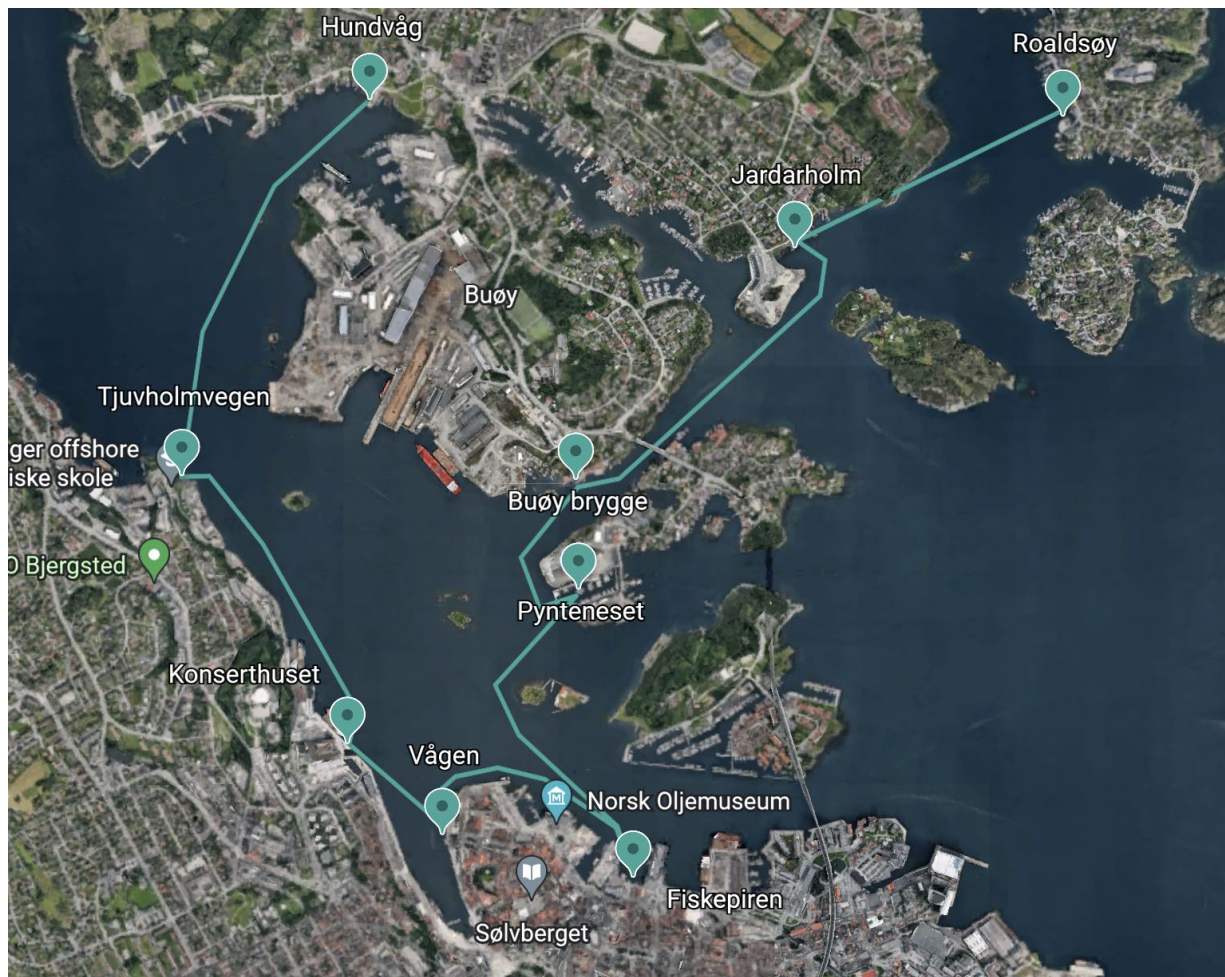
**Lol signed:  
Drammen (2024)**



**Tromsø: feasibility validated;  
with municipality and property  
developers established; operations  
likely late 2024**



# Stavanger & Sandnes: dialogue with municipality, property developers and tourism operators





# Gothenburg (2024)

An electric, autonomous network interconnecting the city

Situation

- Northern Europe's largest property development project on the north side of the river, moving the center of Gothenburg into the river.
- Effortless & hassle-free river crossing is essential for integrating the city.
- Existing travel options are mostly on land – expansion of waterborne options required.
- Quickly growing load on roads for last-mile delivery.

Complication

- Excessive peak hour travel times; ~69 hours lost per person driving in Gothenburg in 2019.
- River acts as a barrier to public transit on land, walking, and bicycling.
- Traditional ferries are expensive and inefficient, create noise and emissions, and are not suited for high frequency and accessibility.

Hyke's solution

- A network of standardized, solar-powered and autonomous ferries provide shortcuts across the river.
- Barrier-free entry for bicycles, strollers and wheelchairs, facilitating walking and biking.
- Demand-responsive and flexible routing, enabling dynamic optimization of capacity and costs.
- Off-peak spare capacity used for last-mile delivery with cargo bikes and tourism / charter trips.
- Jetty-integrated docking and charging solution.

Status

- Established dialogue with local authorities, MTA, and industry and knowledge partners for a demo project.
- Mapped out potential routes.



# USA launch market: Miami

## Miami-Dade county

- 2.7 million inhabitants + 24 million visitors
- Extensive waterways: Biscayne bay and Miami river
- 3<sup>rd</sup> most congested US city: 133 hours lost per person per year (2019)

## Target Hyke passenger routes

- Route distances: 2.5 to 4.4 NM
- Speed optimized for max 20 min trip duration
- Charging at all docks; power level for optimized peak hour runtime

## Economics: US\$23.6M per year in revenues

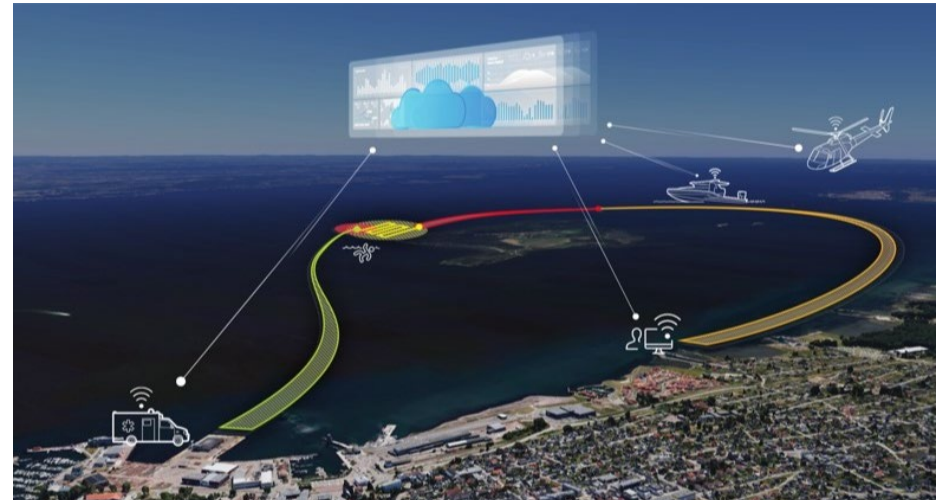
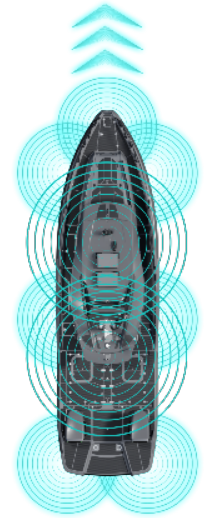
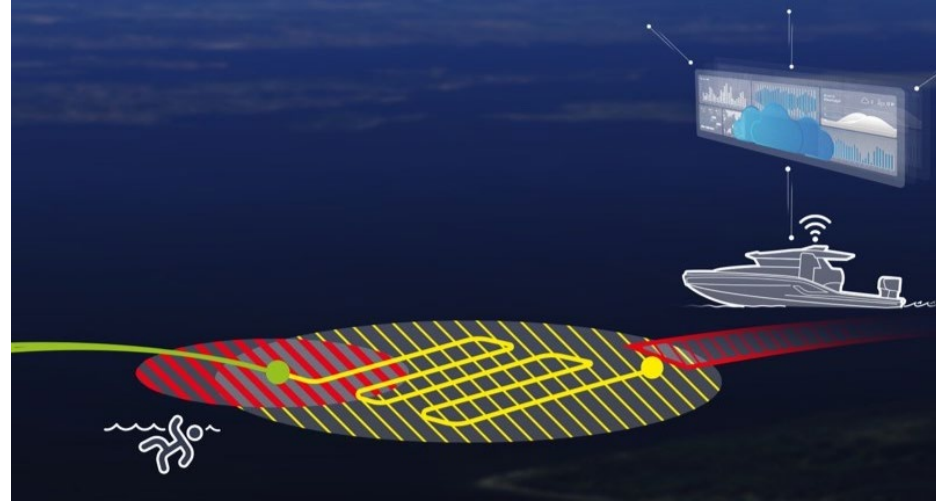
- 26 vessels in operation during peak, 13 available for other jobs off-peak
- 72 hourly departures during peak = 3600 pax/hour capacity
- With a conservative 15% annual capacity utilization and avg. trip revenue of \$5, annual operator revenues would be \$23.6M = \$0.91M per vessel

## Status:

- Partnership Lol signed with Poseidon Ferry
- Established technical dialogue with municipality
- Launch plan to be prepared during 2023



# Hyke Autonomy: Driving the shift to autonomous vessels



# Hyke Autonomy: segments and applications

## DRIVER ASSISTANCE

- AR enabled HUD
- Collision avoidance
- Route highlighting



hydrolift

## CREW WORKLOAD REDUCTION

- Intelligent mission plan
- Supervised autonomy
- Real-time monitoring
- Application specific guidance (SAR, fire, MIL)



RS(+)  
pro

## FULL AUTONOMY

- Vessel operation
- Fleet management
- Smart city int.



byferga

hyke

SPEED

LEVEL OF AUTONOMY

Established pipeline of USD 12 million for delivery by 2025