

# Oslo's e-bus conversion

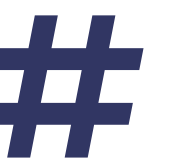
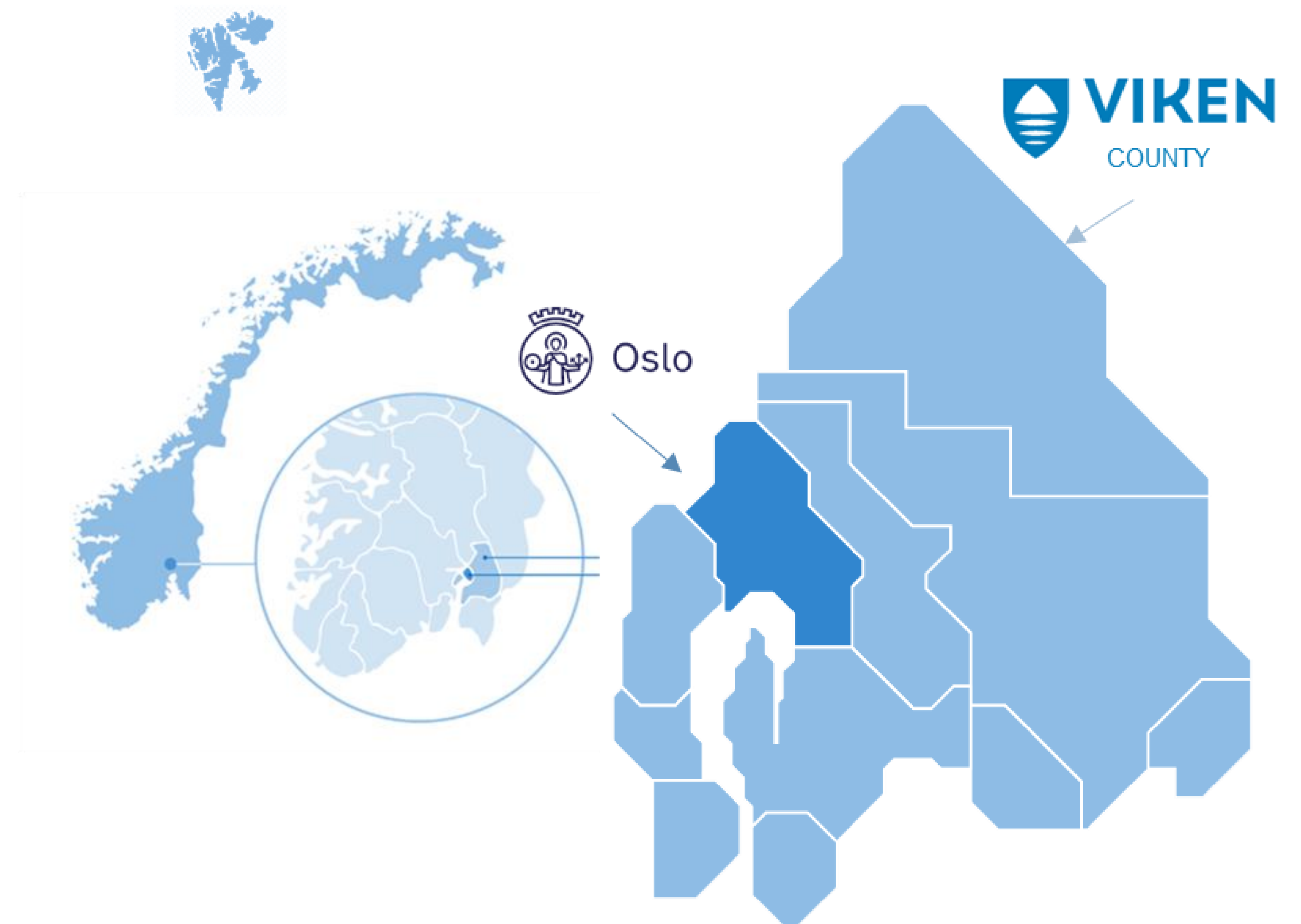
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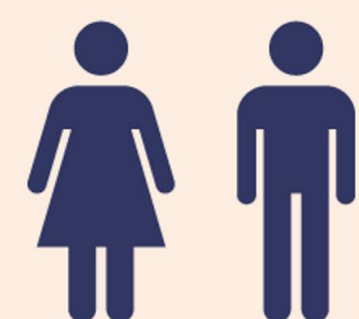


# This is Ruter

- Public transport company that plan, coordinate, order and market public transport
- Joint stock company
- Publicly owned by The City of Oslo (60%) and Viken County (40%)
- 1.3 million inhabitants of the region
- 341 million boardings in 2022



# Our strategy: Deliver sustainable freedom of movement



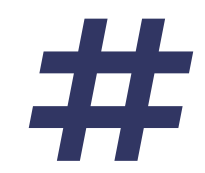
**# Deliver sustainable freedom of movement in our region through ownership of the preferred customer interface**

Offer attractive services to our customers:  
Wider transport options—greater individualisation

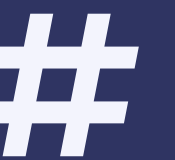
Build on our current position, services and infrastructure

Data-powered service development

Leverage market dynamics through smart partnerships



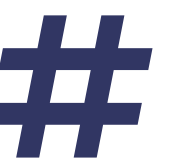
# The challenge



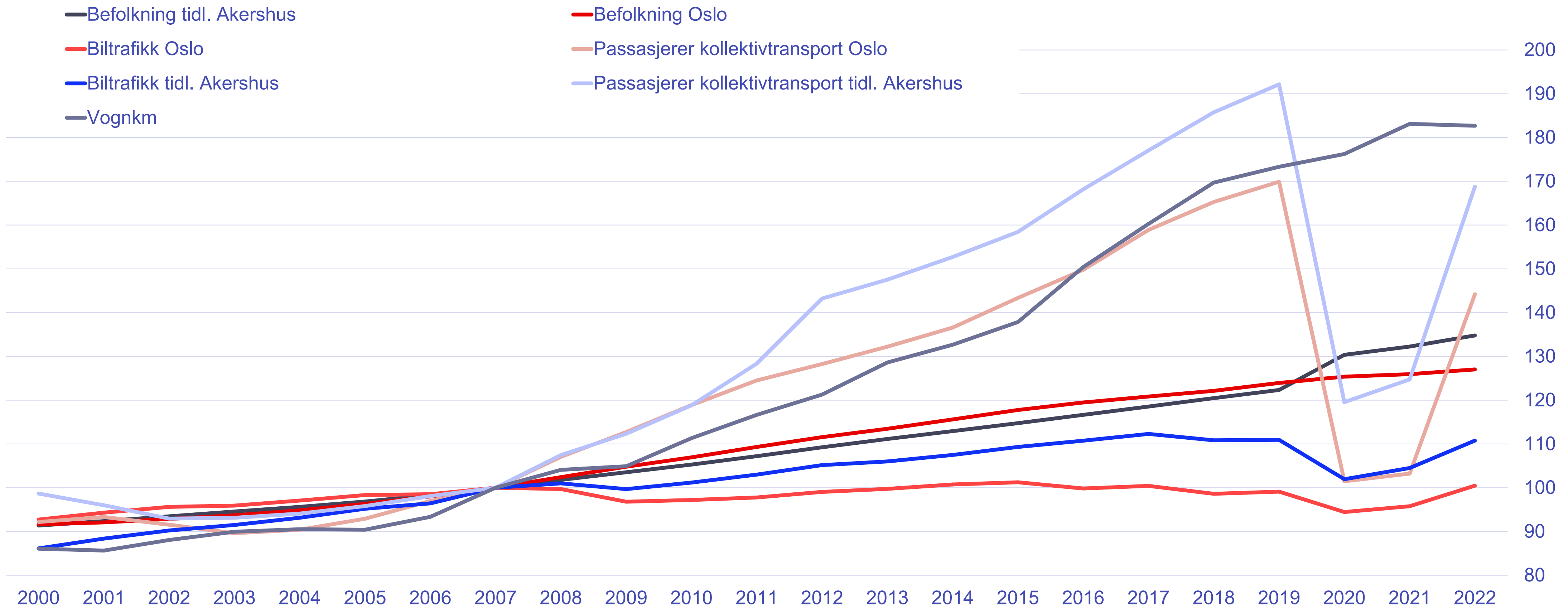


# Transport is the biggest source of CO2 emissions in Norway

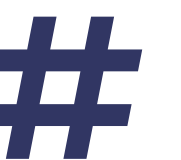
- 61 % of Norway's CO2 emissions stem from transport
- 4 % comes from public transport
- Zero-growth policy for road traffic in major urban areas in Norway
- By 2030, The City of Oslo plans to cut emissions by 95 % and become the first zero-emission city
- Making public transport zero-emission is a major step towards the political goal of the City of Oslo



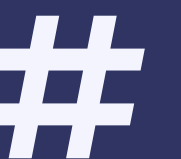
# Public transportation vs car growth 2000-2022



Indeksutvikling Oslo og del av Viken (tidl. Akershuskommuner). År 2007=100



# The impact



Goal:

2028

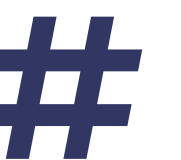
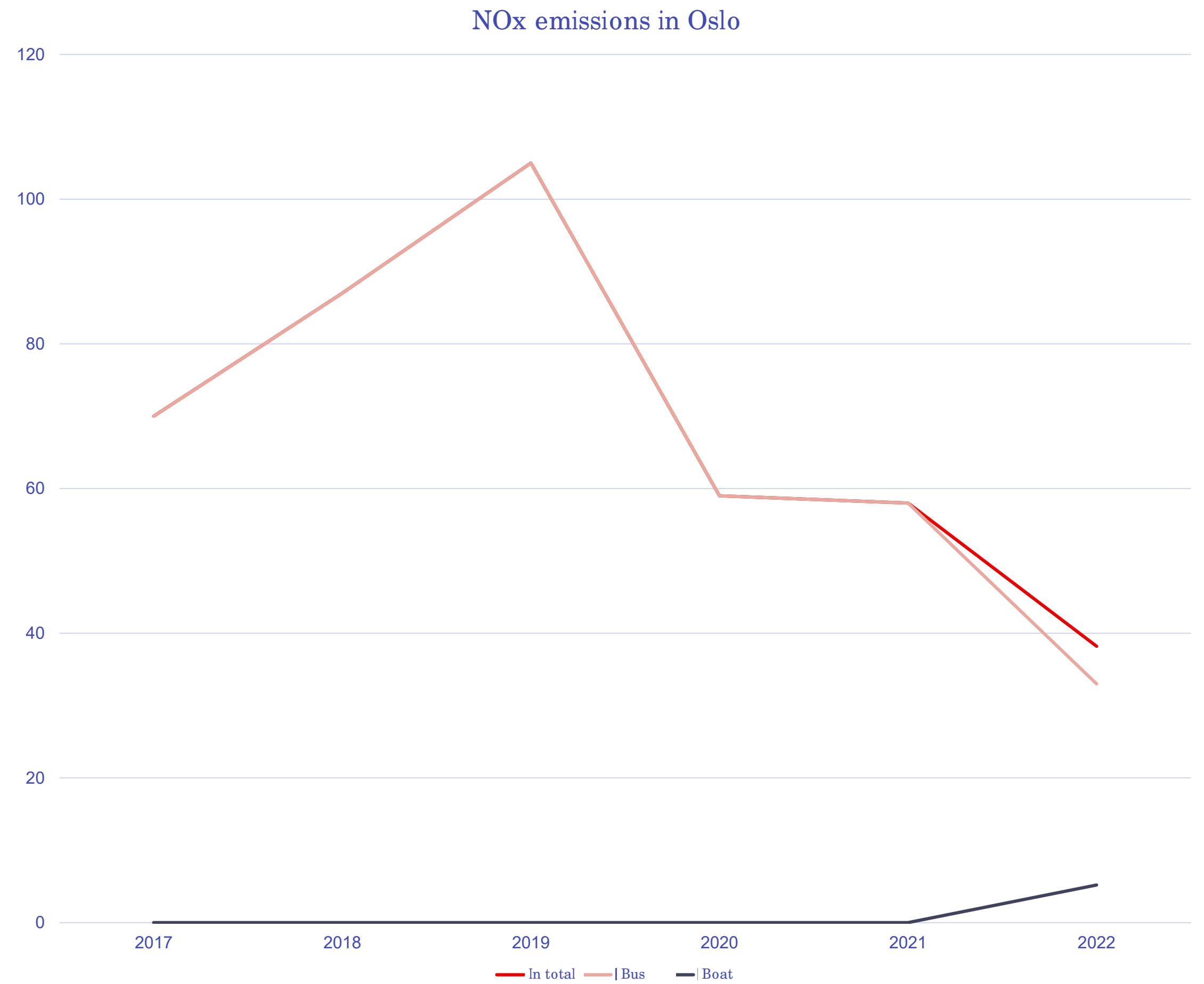
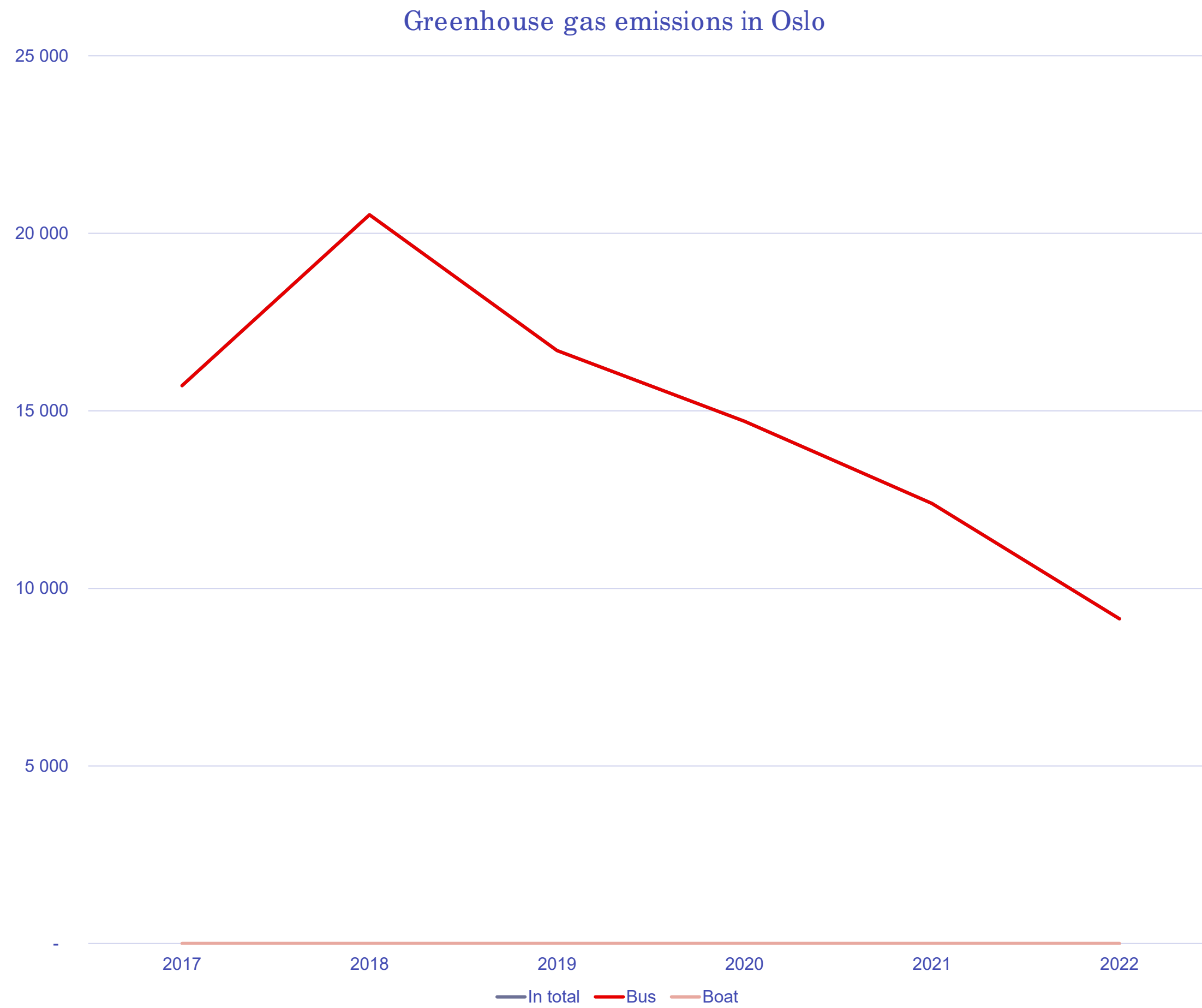
Goal achieved in Oslo:

2023

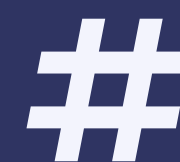




# Reduction of emissions in Oslo



# Early mover strategy



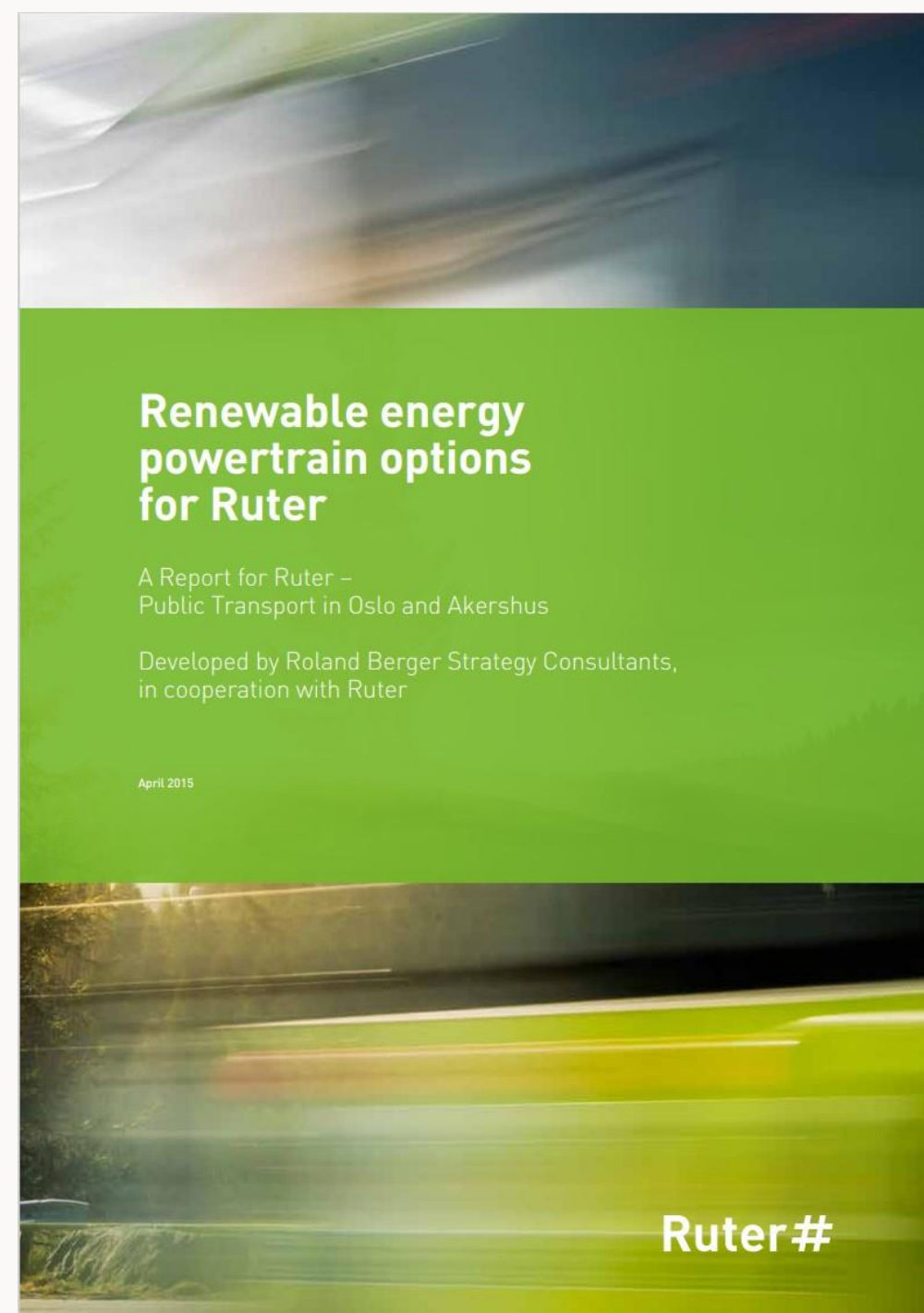
# Ruter's model

- Ruter buys bus and boat services in tenders
- Operators choose buses/vessels and charging/fuel type
- Ruter determines functional requirements
- 'zero emission' = requirement and/or evaluation criteria

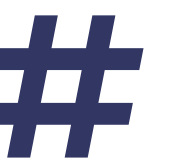


# We wanted to lead the change, rather than wait for market maturity

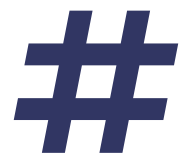
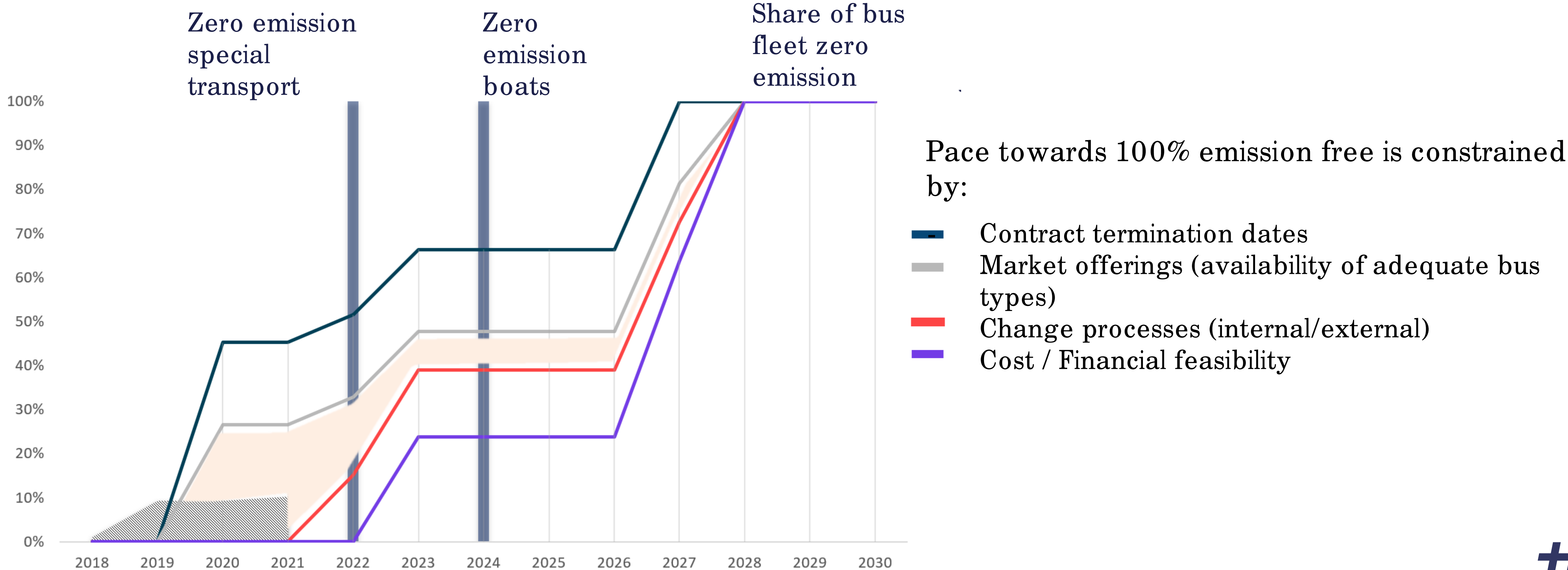
2015: Renewable energy public transport in 2020



2018: Zero-emission public transport by 2028



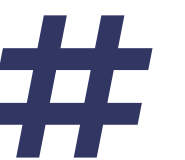
# The transition to zero-emission public transport



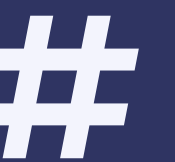


# Benefits from the Ruter-model

- Make use of latest market innovations, not locked into old methods
- We buy services in packages with specific lines, 10+ year operating period
- Ruter shares data about pilot project with operators, encourage learning and innovation



# Stages of implementation





## 2017: 6 electric buses in 2-year pilot

- 6 electric buses in 2-year pilot
- 3 operators involved
- 3 different charging solutions
- Share insight



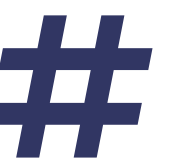
## 2019: 70 electric buses in change order

- Phase in of 70 electric buses
- Change order in existing Oslo service contracts
- 3 operators involved
- 4th charging solution
- Fast charging in depot



## 2022: 109 electric buses in new contract

- Electric buses in new contract (Oslo South)
- 109 electric buses
- 96 % emission-free material on the contract
- 1 operator



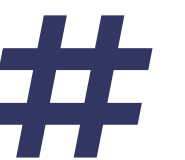


## 2023: 96% emission-free buses in Oslo

April: 183 buses in Oslo Inner-city contract



December: 137 electric buses in Oslo East





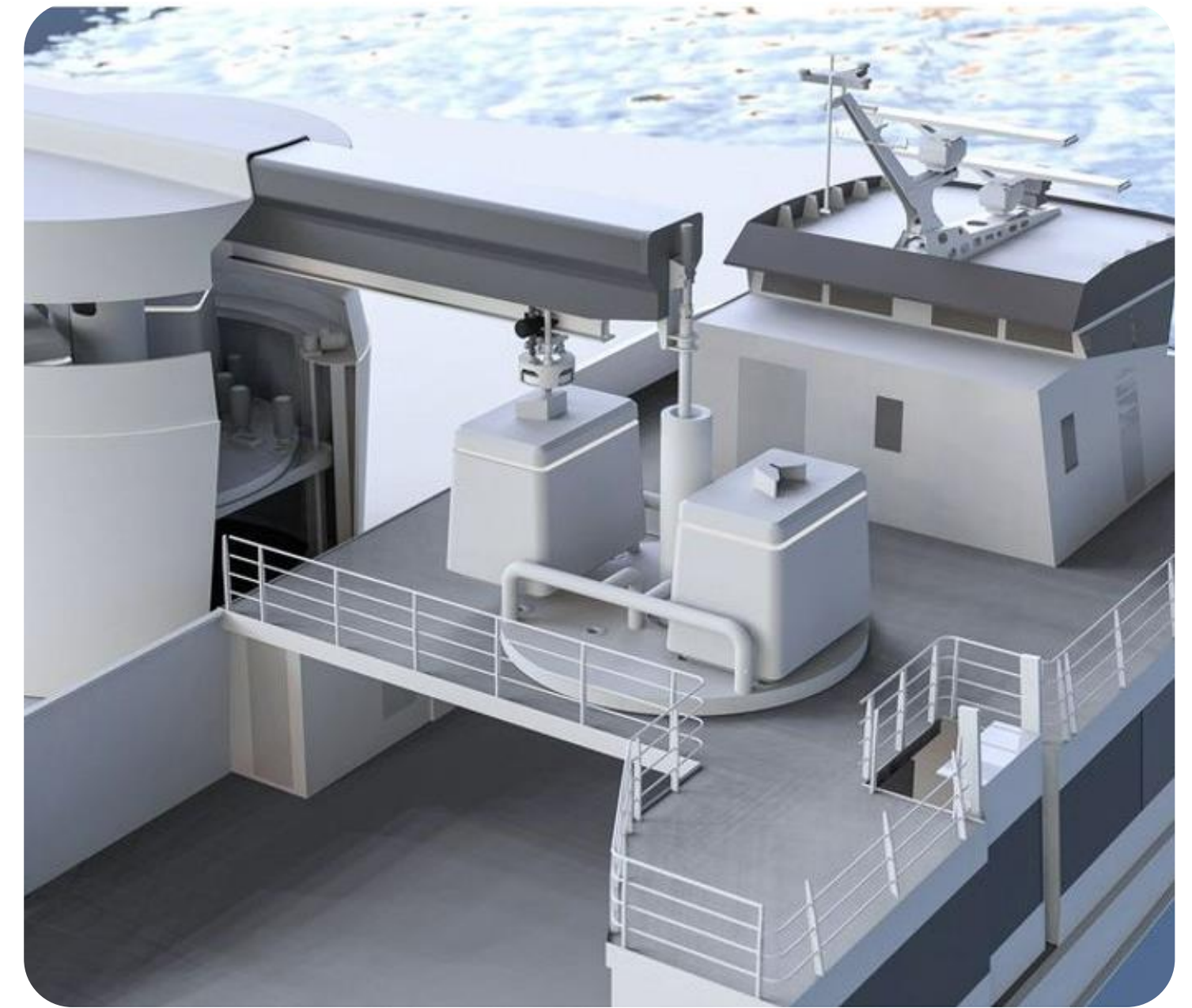
## 2019/2020: 3 ferries rebuilt to electric operation

- Norway's largest car-free passenger connection on battery
- Faster, cheaper, better for the environment
- Converted from LNG to battery pack of 26 tonnes
- Fast charging in 8 minutes from charging plug, with 2x1900 KW



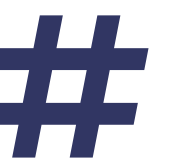
## 2021/2022: 5 new Island ferries in tender

- First tender where we asked for emission-free material
- Five new, electric and modern ferries
- Charging from pantograph
- Possibility of autonomous boats in the future



## 2024: High speed ferries converted

- Change order to convert the two current ferries into zero-emission
- Adapt new robotic battery swap technology
- Using battery replacement robot, three minutes
- Lighter weight, higher speed, longer distance

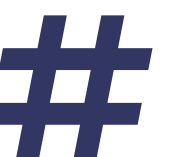


# Zero-emission public transport in the County of Viken by 2028

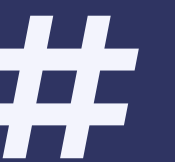
80 electric buses in 2019/2020, another 128 by 2025



Zero-emission in all contracts by 2028



# Key lessons

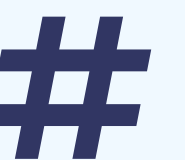


We created the market

By actively using our purchasing power, over time asking more and more from our operators

We now have a market with more suppliers offering innovative solutions at competitive prices

Roughly speaking, we have gone from 10% extra operational cost in 2017, towards 10% lower cost in 2023



# Recommendations

- Encourage innovation
- Share learning and experience – others may follow
- Focus on customer, market, innovation, flexibility
- Make use of latest market innovations
- Avoid lock-in on old style tech
- Test – pilot (with sharing of data/insight) – changing orders – tender
- Let the operators/market learn and mature through this way of working
- Set high requirements and use UN's sustainability goals



