Sustainable Nordic Cities with focus on climate smart mobility

Zero emission vehicles - final seminar 12 December 2019

Nordiskt samarbete

Energimyndigheten

TRAFIKVERKET

Swedish presidency of Nordic Ministry of councils 2018

- 4 projects all within areas where there is a clear Nordic added value of cooperation and exchanging of experiences

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Sustainable Nordic cities with focus on climate smart mobility

Aim: to contribute to a sustainable urban development by supporting the transition to fossil free and sustainable transportation in Nordic cities and their surrounding regions

Main target group: Nordic cities

Project owners: Ministry of Environment and Ministry of Infrastructure

Main project manager: Swedish Energy Agency

The Swedish Transport Administration is project manager for subproject

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4 subprojects

1. **Zero emission vehicles in cities.** A study of zero emission vehicle environmental zones and their effects on other goals than climate targets, such as social inclusion.
2. **Attractive and climate smart transportation in cities.** Dialogue meetings and exchange of experience between Nordic cities. Swedish Transport Administration.
3. **Charging electric vehicles in cities**. Change of experiences between Nordic cities.
4. **Database for charging staions.** Development of a Nordic database of the locations of public charging stations for electric vehicles.

Zero emission vehicles in cities

A study to illustrate good examples and make recommendations on the possibility of increasing the share of zero emission vehicles in cities.

1. Effects for the city and its residents?
2. Designed in order to increase social, economic and environmental sustainability?
3. Complementary instruments needed?

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Zero emission vehicles in cities – results from a Nordic study

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Evaluation aspects

- Environment (air pollution, climate gases)
- Traffic, mobility, accessibility
- Socioeconomic aspects
- Social distribution (“equity aspects”)

Activities and methods

- **Literature research**
- **City visits:** Uppsala, Aarhus, Oslo
- **15 interviews:** (academy, public, private)
- **Reference group workshop:** (national authorities, cities, mainly Sweden)
- **Final seminar:** today
- **Final report:** March 2020

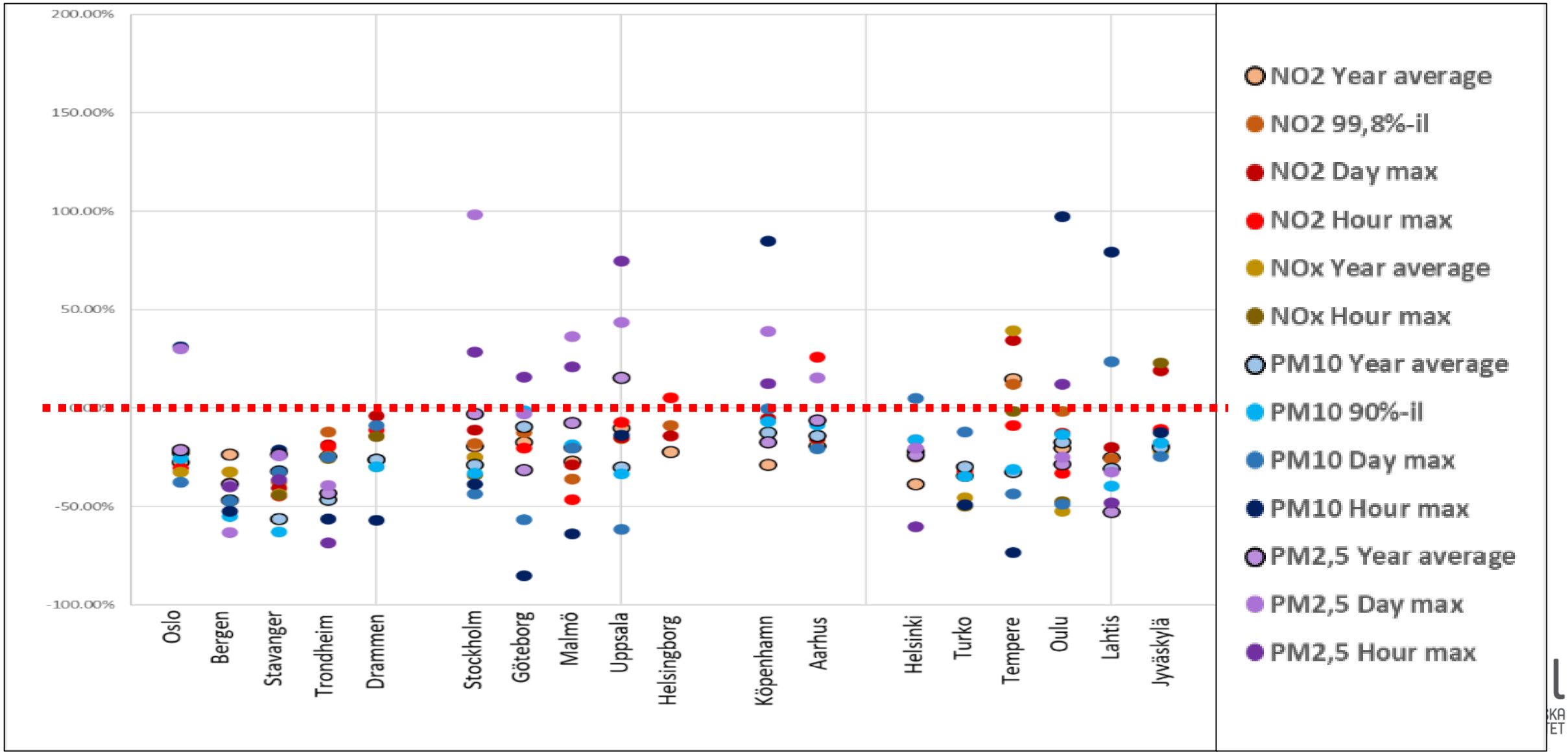
Policy instruments

- Environmental zones
- Road tolls and congestion charges
- Access to bus lanes
- Parking subsidies
- Charging infrastructure
- Public procurement
- National incentives on vehicles and fuels

PART 1

STATUS

Air quality trends, Nordic cities 2013-2017 (Selected cities and parameters)



Zero-emission vehicle ”definitions”

European Union: Clean Vehicle Directive

- regulates public procurement
- Updated 2019
- Requires a minimum share of zero-vehicles in public procurement per member state
- *Heavy vehicles*: electricity, hydrogen, methane and certain biofuels
- *Cars*: Maximum 50 g CO2/km in 2025 and 0 g CO2/km in 2030

Zero-emission vehicle ”definitions”

Iceland

- hydrogen powered and electric

Norway

- Parliament: all new cars sold by 2025 should be zero (electric or hydrogen) or low emission (plug-in hybrids)

Sweden

- Zone regulation: electric vehicles + biogas
- Car taxation (bonus – malus): Maximum 50 g CO2/km + biogas.
- Heavy vehicle incentives: Electric, Plug-in hybrids, biogas

Zero-emission vehicle ”definitions”

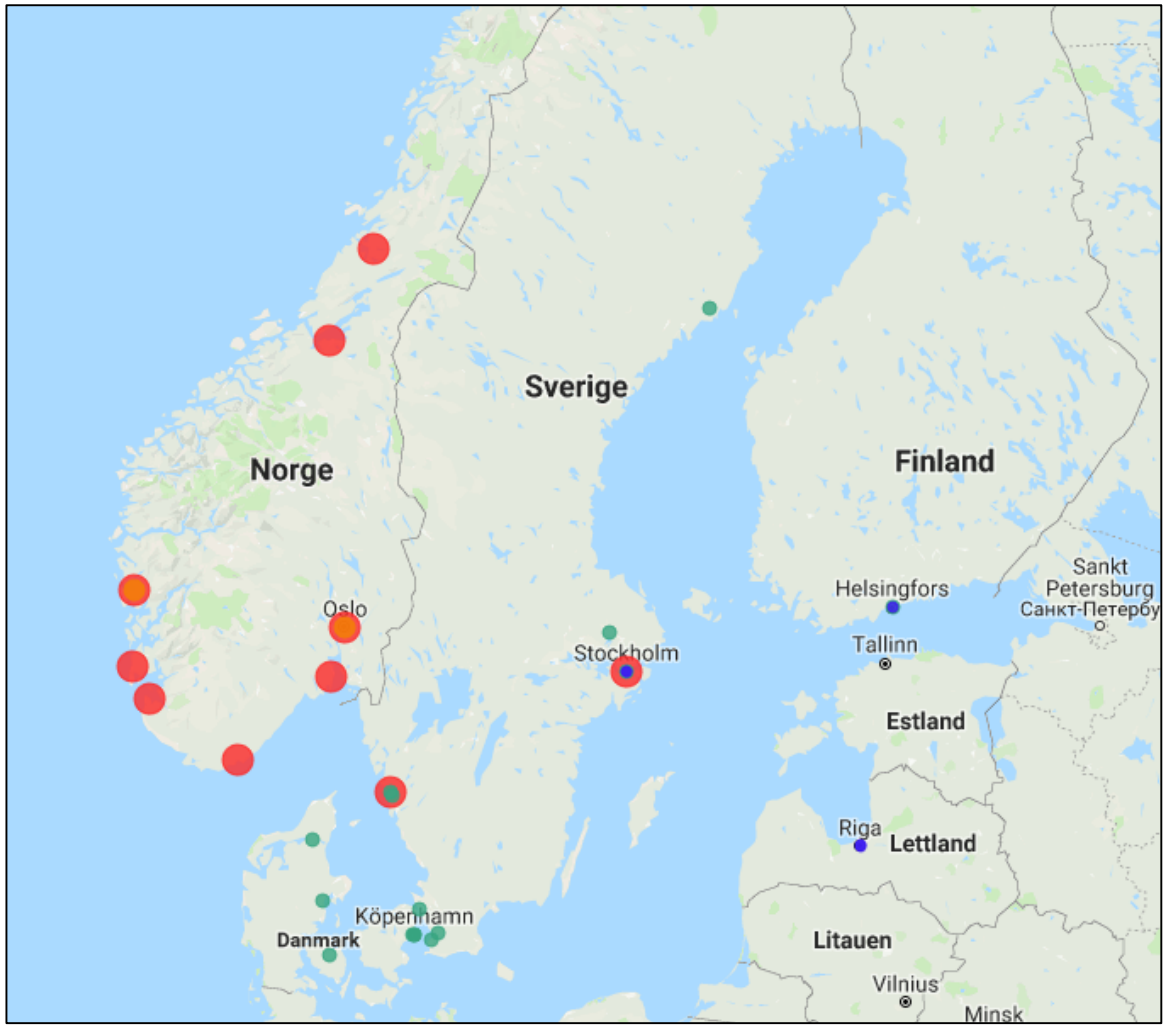
Finland

- Finnish Parliament: “zero- and low-emission” cars, renewable fuels

Denmark

- *Will be completed*

Overview of cities with traffic restricted zones in the Nordic Countries in 2019



Policy instruments, city level

Instrument	Key motivator	Implemented in (Nordic country)	Implemented in (Nordic city, example)
LEZ for heavy duty vehicles	Air quality	Sweden Denmark Finland (buses & refuse vehicles only)	Gothenburg, Stockholm, Malmö, others Copenhagen, Odense, Aarhus, Aalborg
Emission-differentiated road tolls	Air quality Increase ZEV-share	Norway	Oslo, Bergen, Trondheim, others
Pollution-emergency, temporary bans	Air quality	Norway (temporary diesel ban)	Oslo, Bergen
Studded-tire ban (on street level)	Air quality	Sweden	Gothenburg, Stockholm
Studded-tire fees (on city level)	Air quality	Norway	Oslo, Bergen, Trondheim, Stavanger

Policy instruments, city level

Instrument	Key motivator	Implemented in (Nordic country)	Implemented in (Nordic city, example)
Reduced parking fees for ZEV:s	Increase ZEV-share	Norway Iceland	Oslo, others Reykjavik
Dedicated parking spots for ZEV:s	Increase ZEV-share	Denmark	Copenhagen
Provision of public charging infrastructure	Increase ZEV-share	Norway Iceland Sweden Finland	Most larger cities
Reduced parking fees for ZEV:s	Increase ZEV-share	Norway Iceland	Oslo, others Reykjavik
Access to bus-lanes for ZEV:s	Increase ZEV-share	Norway	Oslo, others
Taxi licenses only for ZEV:s	Increase ZEV-share	Norway	Oslo
ZEV-procurement for municipal fleets	Increase ZEV-share	Norway Sweden Denmark	Oslo, Trondheim, others Stockholm others Copenhagen, others

Policy instruments, national level

Instrument	Key motivator	Implemented in (Nordic country)
CO2-differentiated annual vehicle tax/circulation tax	Climate	Sweden Iceland
Purchase bonus/subsidy for ZEV:s and LEV:s	Increase ZEV-share	Sweden Finland
Registration tax exemption	Increase ZEV-share	Norway Iceland
Registration tax reduction	Increase ZEV-share	Denmark (gradually fased out) Finland
VAT-exemption	Increase ZEV-share	Iceland Norway
Support schemes / financing for public charging stations	Increased ZEV-share	Finland Iceland Sweden

Policy instruments, national level

Instrument	Key motivator	Implemented in (Nordic country)
Reduced annual vehicle tax/circulation tax for ZEV:S	Increase ZEV-share	Denmark Finland Iceland Norway Sweden
Reduced ferry fees	Increase ZEV-share	Norway
Preferential treatment of ZEV:s for taxi licenses and other benefits	Increase ZEV-share	Denmark
Reduced company car tax for ZEV:s and LEV:s	Increase ZEV-share	Norway Sweden

Nordic countries global forerunners

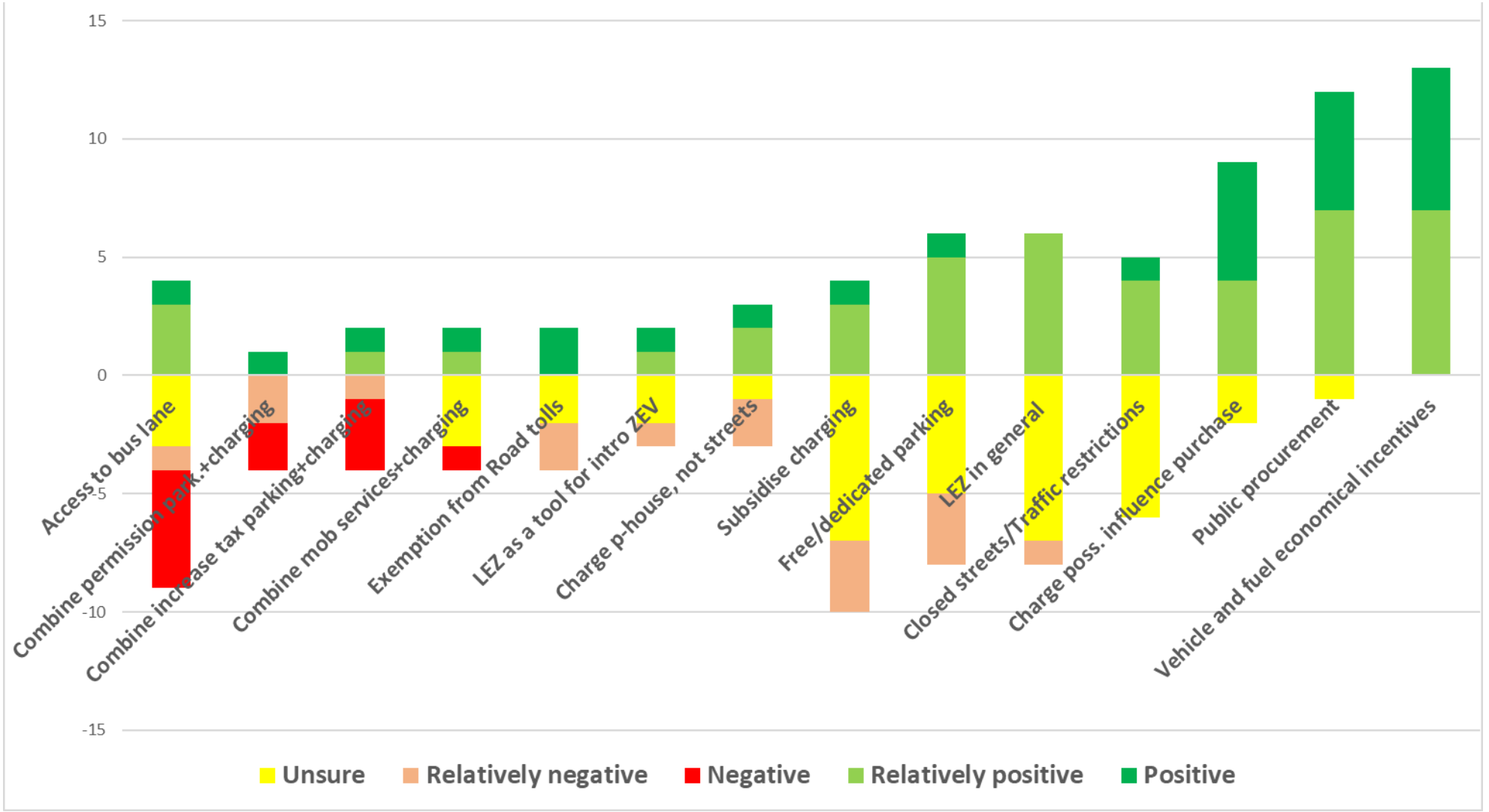
zero emission passenger cars new sale, 2019 first six months

- Norway 58 %
- Iceland 18 %
- Sweden 11 %

Interviews:
"What is the best instrument to promote zero-vehicles"?

Representative Country	City / Municipality	Academy	Private company
Sweden	Environmental zones	Vehicle taxes	Public charging
Finland	Public procurement		
Denmark	Vehicle taxes	Vehicle taxes	
Iceland	Public charging/ Procurement	Public charging	
Norway	Vehicle taxes/ Charging, parking	Vehicle taxes	Public Charging/ Environmental zones

Attituds to zero-vehicles among interviewed



PART 2

BEST PRACTISE

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Best practice – some examples (1)

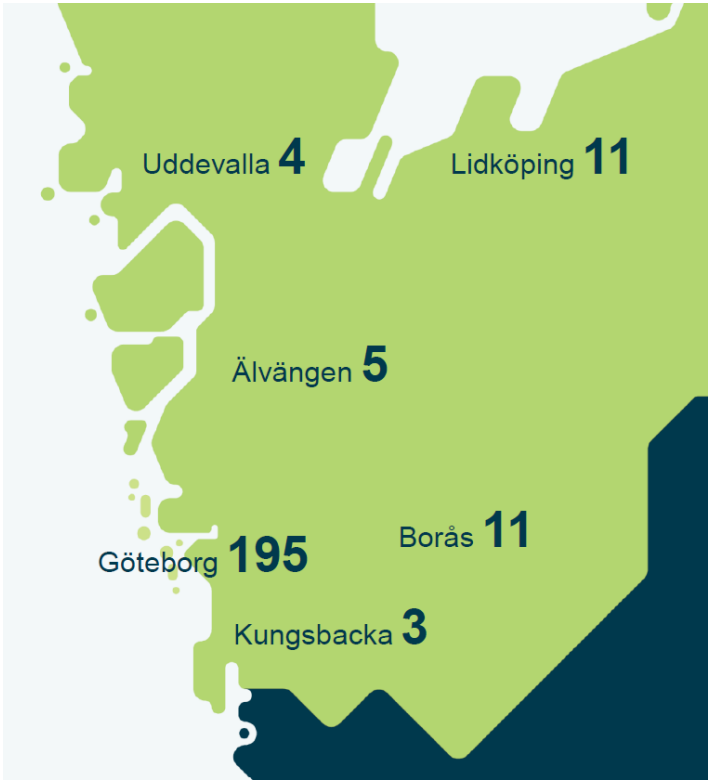
- **Reykjavik**: Well defined goals for zero-emission vehicle share in municipal fleet, increasing shares, target years.
- **Stockholm:** Collaboration with grid owners, fuel suppliers, biogas- and electric vehicle associations. Internal cooperation between local authorities and municipally owned companies.
- **Gothenburg**: Test beds for electric vehicles in project “Electricity”; a partnership with vehicle industry, electric grid owners, public transport authority, university and municipality. Buses, ferries and heavy trucks powered by renewable electricity.
- **Oslo**: Low-carbon city distribution centre “Oslo City Hub”, mostly run by electric vehicles, cargo bikes at a centrally located logistic terminal. Also a test bed with a zero emission construction site.
- **Aarhus:** Car free areas in the inner city.

Best practice – some examples (2)

- **Göteborg**: Collaboration between the public transport company, the municipality and grid owners to establish charging points and depots to city buses.
- **The project "Nollzon",** Sweden: Help companies and stakeholders to increase the demand for electric vehicles in a specific area. www.nollzon.se
- **Reykjavik:** Promote private car owners to invest in charging stations, collecting user data, establishing a fund for simplifying installations at home.
- **Amsterdam**: Combustion-engine vehicles will gradually be banned based on the emission standards 2020, 2022, 2025 and by 2030 in entire Amsterdam will be allowed only emission-free road vehicles and public transport ferries.
- **Norway:** The most ambitious strategy for introducing electric cars worldwide – but is it possible to copy?

Electric break-through in West Sweden bus fleet 2020

- 10-20 electric buses until now
- 60 new electric buses Dec 2019
- 230 electric buses Dec 2020



PART 3

CONCLUSIONS

Environmental zones reserved for zero-emission vehicles

Environment

Improved local environment

Reduced greenhouse gas emissions

A local incentive to increase the number of zero emission vehicles

Accessibility

Commercial transports, buses: Limited supply of approved vehicles

Private car travels : Strong limitation, especially for low-income groups (*Can be partly compensated*)

Socioeconomy

Commercial transports, buses: Positive effect

Private car travels : Depends on design and local conditions

Distributional effects

Commercial transports, buses: --

Private car travels: Depends on design and local conditions

Differentiated road tolls and congestion charges for zero-vehicles

Environment

Similar to zones (better local environment, less greenhouse gases, promotes zero-vehicles)

Accessibility

Commercial transports, buses: Limited effects

Private car travels : Limited effects. Low-income groups more limited (d*an be compensated*).

Socioeconomy

Commercial transports, buses: Positive effect

Private car travels : Depends on design and local conditions

Distributional effects

Commercial transports, buses: --

Private car travels: Depends on design and local conditions

Access to bus lanes for zero-vehicles

Environment

No significant effect (improvements for zero-vehicles, negative for public transports)

Accessibility

Improvement for zero-vehicle transports, negative for travellers with public transport

Socioeconomy

Uncertain

Distributional effects

Negative (Improvements for certain companies and well-situated groups, negative for low-income groups since they use public transport to a greater extent

Parking subsidies

Environment

No significant effect (improvements for zero-vehicles, negative for public transports)

Accessibility

Negative (incentive for travelling by car, increased competition with public transport)

Socioeconomy

Negative (limited or no environmental improvement, decreased accessibility by public transport)

Distributional effects

Negative (subsidy for car travellers, who on average have higher incomes than others)

Improved charging infrastructure

Positive in all aspects

The public is important for charging city distribution, public transport and apartment buildings

Public procurement

Positive in all aspects

National incentives that promotes zero-vehicles

Vehicle taxes, fuel taxes et cetera

Environment

The most important incentives for promoting zero-vehicles

Socioeconomy

Depends on design, but can give a positive effect

Distributional effects

Can be positive if subsidies to zero-vehicles (bonus) are financed by progressive taxes on CO_2-intensive vehicles (malus).

Can be negative if substantial subsidies go to purchase of new cars.

Summary of conclusions

Policy instrument for zero emission vehicles	Air quality	Climate	Mobility /Accessibility	Socio-economy	Distributional effects
Zero emission zones - Commercial transports					
Zero emission zones - Private car travels					
Differentiated road tolls and congestion charges - Private car travels					
Differentiated road tolls and congestion charges - Passenger cars					
Access to bus lanes				?	
Parking subsidies					
Charging infrastructure					
Public procurement					
National incentives for vehicles and fuels					

Positive effects	
No significant effects	
Negative effects	
Depends on design and conditions	

PART 4

RECOMMENDATIONS

Recommendations

Disclaimer

We give some general recommendation

The local situation, prerequisites and legislation varies between cities and countries

Environmental zones

- An efficient tool for improving air quality – Euro VI for heavy vehicles as a first step
- Could be combined with smaller zones for zero-vehicles
- Small zero-zones could be a powerful local tool
- Pay attention to accessibility for the public when designing the zone
- Combine with high accessibility with public transport and bike – prepare as for a car free zone
- Should be announced a long time before introduction
- Don´t forget monitoring

Road tolls, congestion charges

- Only applicable in large cities with congestion
- If revenues are used for investments in public transport et cetera, the distributional effects will be more positive
- Can be an efficient tool to meet and obtain local environmental goals
- Exemptions for zero vehicles should be phased out before effects on congestion

Access to bus lanes & Parking benefits

- Powerful local tool, but substantial risks for competing with public transport and thus negative effect on environmental, accessibility and distribution
- The more efficient tool for promoting zero-vehicles, the bigger risks for conflicts
- If introduced, decide a date or level of vehicles when the incentive will be stopped. Otherwise, difficult to phase out.

Charging infrastructure

- Focus on white spots – such as apartments in cities and buses
- Avoid fast charging in parts of city where car traffic should decrease
- Lack of charging infrastructure may weaken the “second wave” users
- Long term planning for power supply and land use for heavy users as buses
- Combine charging infrastructure with suitable parking measures as taxation for a modal shift

Procurement and test beds

- Procurement for sectors with possibility to influence and high environmental impact
- City buses, working machinery, transport services (trucks)
- Test beds for demonstration, cooperation between stakeholders and learning for upscale

National level – sales incentive

- Try to follow the polluter pays principle
- Avoid tax exemptions alone as VAT and company cars systems that increases car ownership
- Combine “bonus” and “malus” and make them revenue neutral

National level – general taxation

- Prepare for a road tax (km-based) instead of fuel taxes
- Could be differentiated – higher in cities - lower in countryside
- Could include accidents, noise, emissions, fuel efficiency, road wear
- Could be introduced for combustion-vehicles as well as for zero vehicles
- Introduce for zero vehicles when market share is between 70 – 90 %

Final remarks – the Norwegian example

- Tax incentives for buying
- Several incentives for driving

but…

- City goals for zero car growth
- Road tolls in cities
- Parking and access regulations
- Large investments in public transport

- A mixture of push and pull

Summary

- Final conference Nov-Dec 2020
- Final report March 2021
- Upcomming activites and documentation:

  http://www.energimyndigheten.se/nordiska hallbarastader

  http://www.energimyndigheten.se/en/cooperation/sustainable-nordic-cities-with-focus-on-climate-smart-mobility/

Thank you!

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