



City of Oslo

A dark blue silhouette of the Oslo skyline, including various buildings and a bridge, set against a light background with soft, overlapping geometric shapes.

# ***Paving the Way for Zero Emission Transport in Oslo from 2025 – The Road Ahead***

Sture Portvik – Manager Electro mobility  
Agency for Urban Environment  
City of Oslo

# Making EVs the right choice

With **60%** of global emissions in Oslo coming from the transport sector, the **only** way to reduce emissions in our cities is to boost a green shift in transportation. In 2008, the City Parliament in Oslo adopted “*a ten-point plan*” to reduce CO2 emissions, to which the large scale introduction of EVs plays a big part.

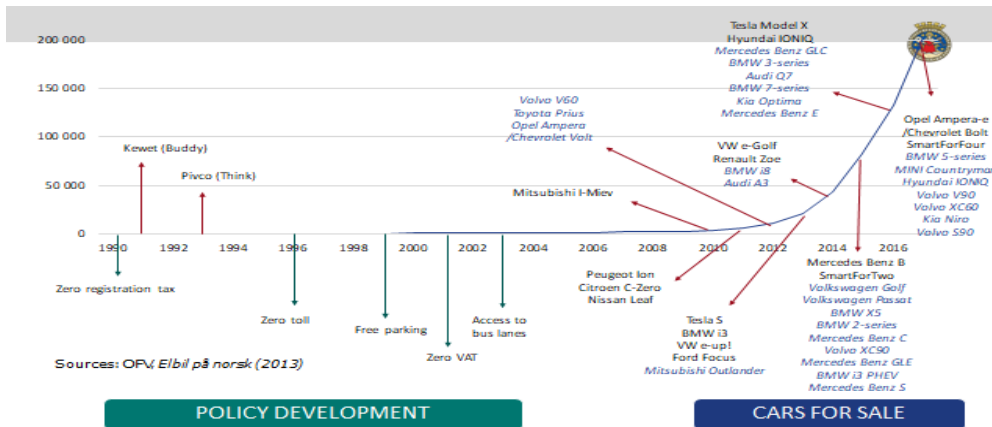


# Making EV the right choice – a big frontal sweep

**Three** critical success factors:

- EVs must be **cheap to buy** (no purchasing tax, no VAT)
- **Cheap to use** (free parking, free electricity, free passing in toll gates)
- **Convenient** to use (easy access to charging, access to parking, bus lines)

You also need **the right product** to succeed!



## Making EVs cheap to buy



### Volkswagen Golf

Import price: € 22,077  
 CO<sup>2</sup> tax: € 3,919  
 NOx tax: € 238  
 Weight tax: € 1,715  
 Scrapping fee: € 249  
 25% VAT: € 5,019  
 Retail price: € 31,236

### Volkswagen e-Golf

Import price: € 32,741  
 CO<sup>2</sup> tax: € 0  
 NOx tax: € 0  
 Weight tax: € 0  
 Scrapping fee: € 249  
 25% VAT: € 0  
 Retail price: € 32,990

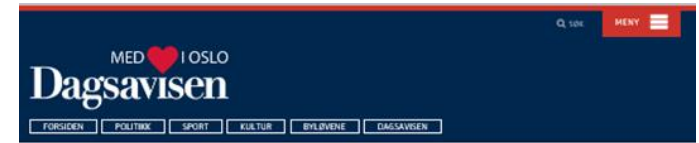
Source: OFV

# EV sales are boosting - 79 %

The share of EVs and Plug-in hybrids sales in Oslo reached **79%** in 2020, incl. 63 % BEV and 16 % PHEV.

**3 out of 4 vehicles sold are now electric.** Not rocket science.

**Green taxes are actually working, but you have to make it affordable for people to take green choices!**



## Opptatt, opptatt, opptatt!

I Oslo deler 10 elbiler på én ladeplass. Og det skal bli veldig mye verre.

**Bistand av advokat er inkludert i medlemskapet**

EL-NAF-MEDLEM



av Aslak Borgersrud

Publisert 16. nov 2018 Sist oppdatert: 14.08. 95. nov 2018

OSLO

Joda, det blir stadig flere elbil-ladere i Oslos gater. Bymiljøetaten har et mål om å bygge 200 i året. Bare nå får nyttår håper etaten å åpne et splitter nytt elbil-parkeringshus under Akershus festning med 100 nye plasser. Og omtrent like mange dukker snart opp på Vulkan.

Problemet er bare at elbil-salget vokser mye raskere. Fra 2011 har antallet elbiler i Oslo økt med over 100 prosent hvert eneste år. Nye, nokså billige elbiler er på full fart inn i markedet med stor batterikapasitet og rekkevidde.

Ingenting tyder på at veksten skal bremse.

**Advokatbistand er inkludert i medlemskapet**

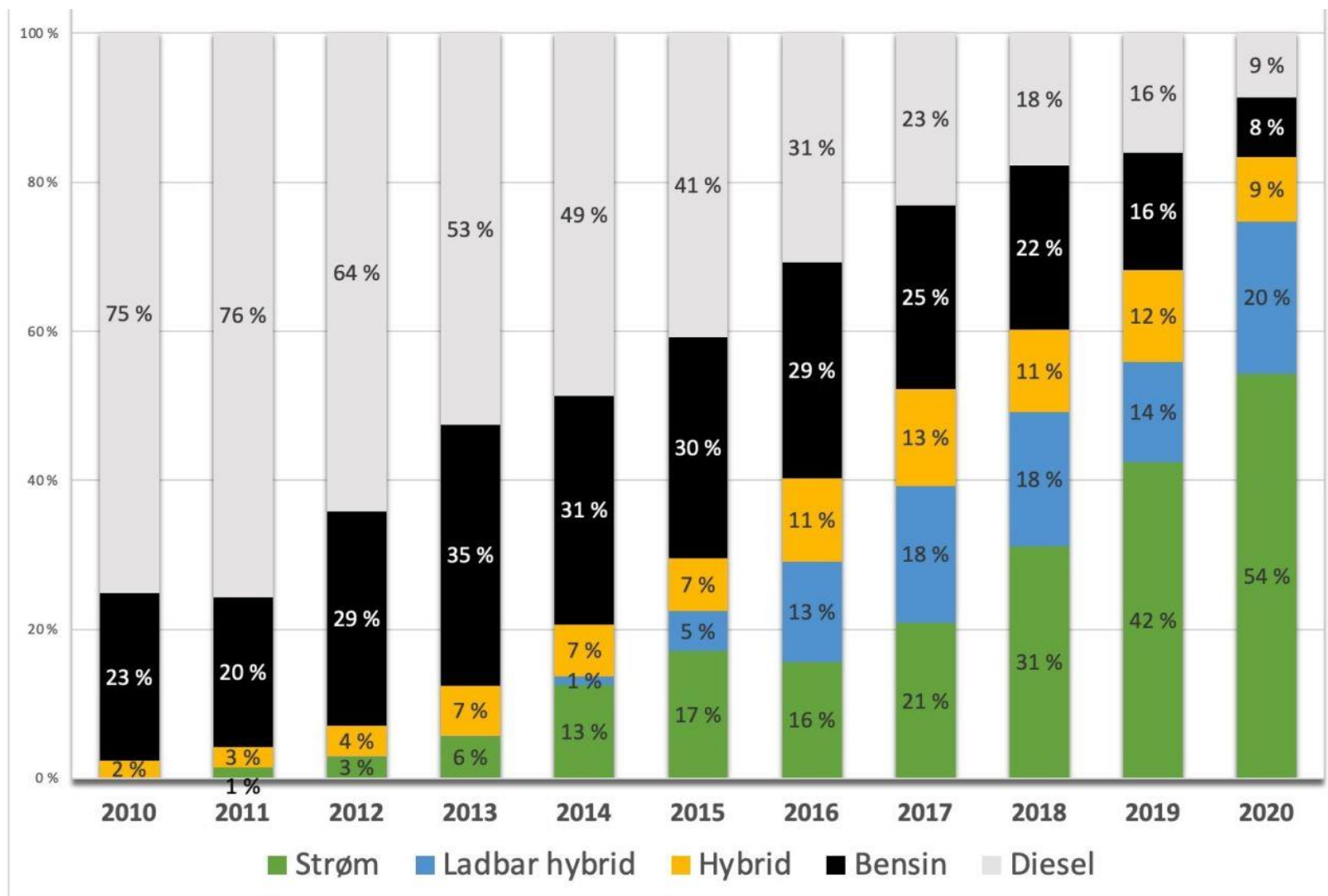
Få Koppen 2017 fra Circle K i velkomsgaet

EL-NAF-MEDLEM



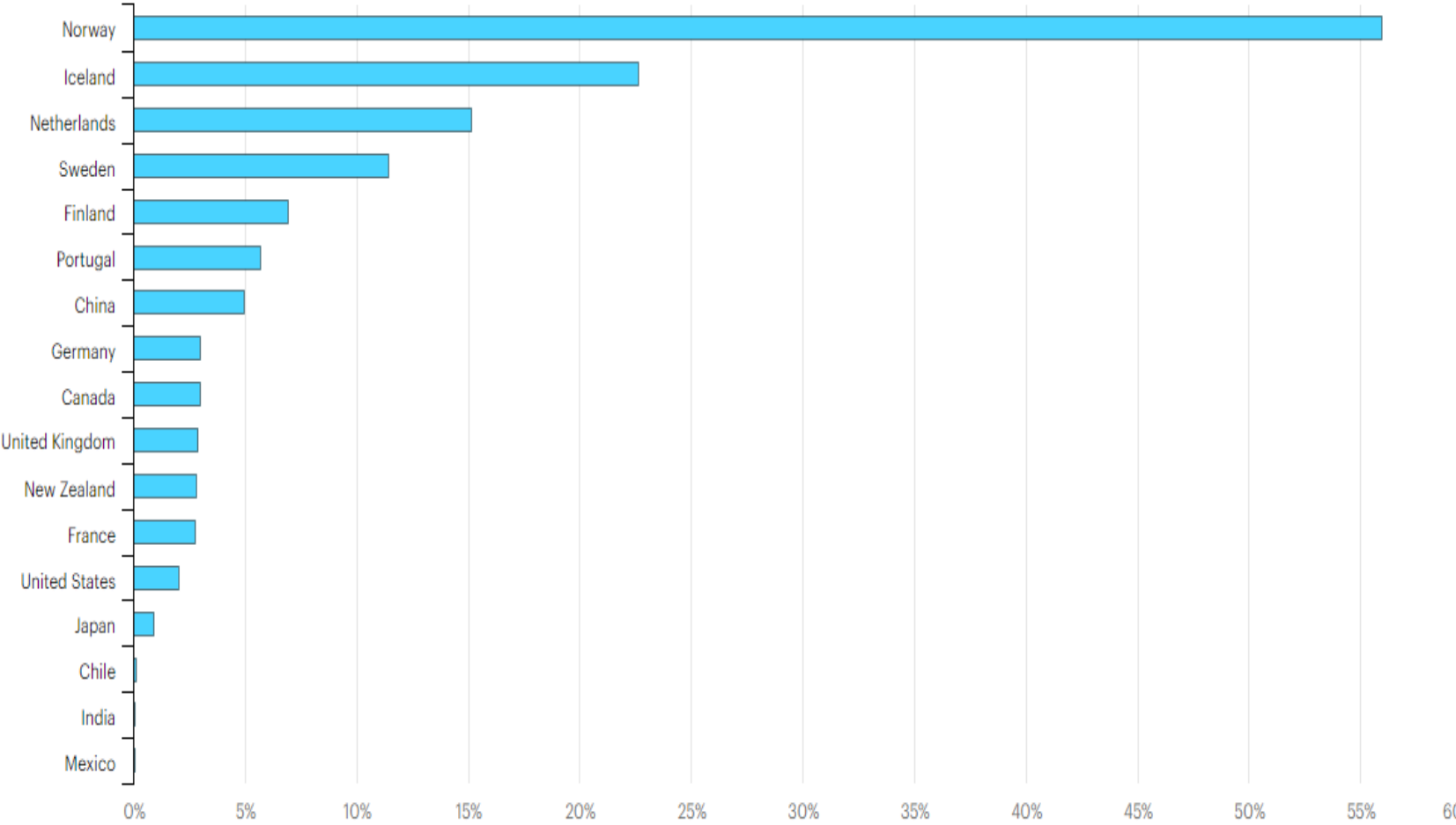


# Market shares for new cars in Norway, 2010-2020



# EV Market share in selected countries 2019

%



# Top 20 sales models in Oslo 2020

## Top sales Models so far 2020

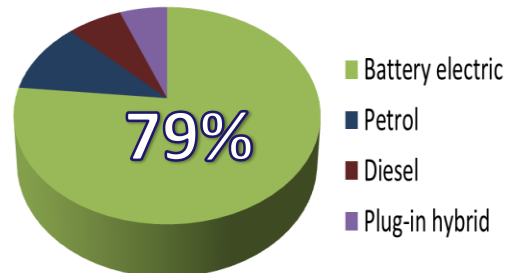
- 16 Battery Electric Cars (BEV)
- 3 Plug-in Hybrids (PHEV)
- 1 Gasolin/diesel

## New models to look out for 2020-2021

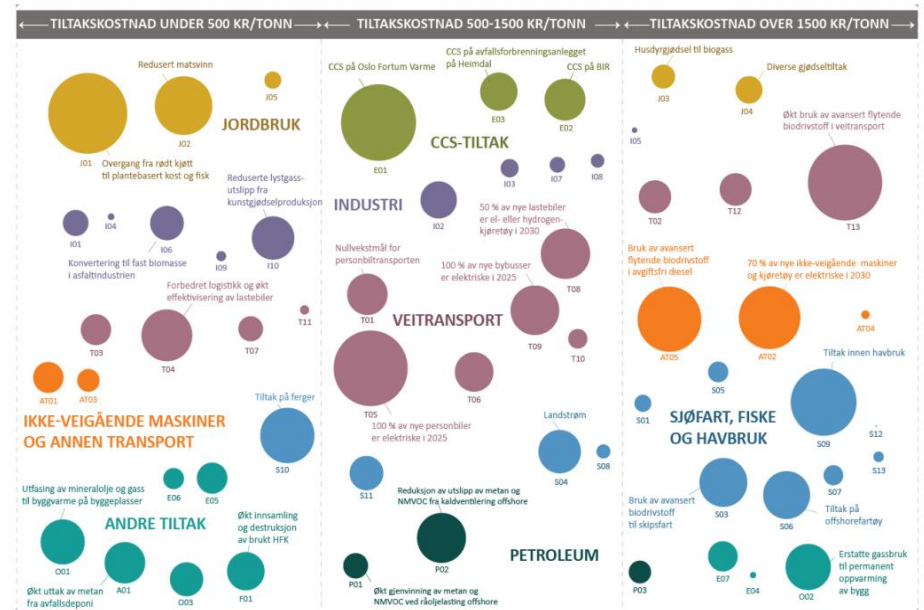
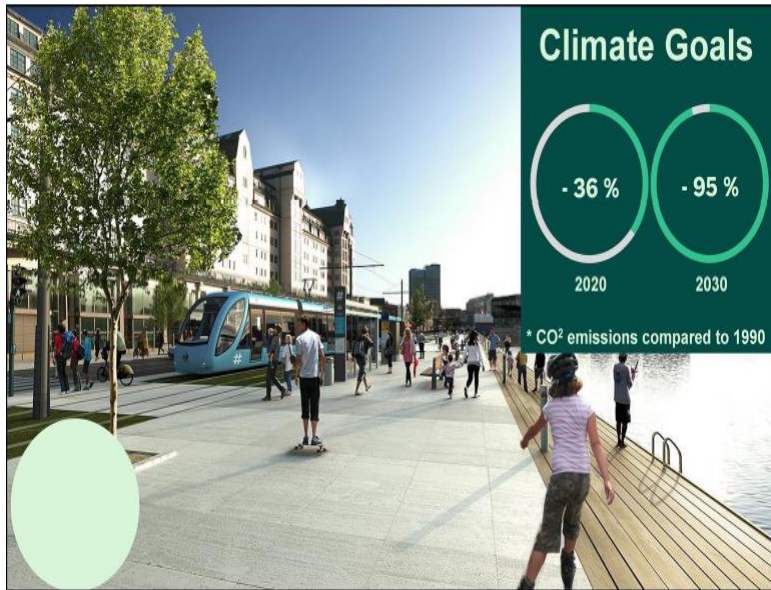


Pr. modell

| Nr.               | Merke         | Model          | Periode |          | Periode året før |          | Endring, antall |
|-------------------|---------------|----------------|---------|----------|------------------|----------|-----------------|
|                   |               |                | Antall  | Andel    | Antall           | Andel    |                 |
| Total for rapport |               |                | 12 429  | 100,00 % | 15 183           | 100,00 % | -18,14 % ▼      |
| 1                 | Audi          | e-tron         | 1 377   | 11,08 %  | 828              | 5,45 %   | 66,30 % ▲       |
| 2                 | Tesla         | Model 3        | 682     | 5,49 %   | 3 148            | 20,73 %  | -78,34 % ▼      |
| 3                 | Hyundai       | Kona electric  | 574     | 4,62 %   | 398              | 2,62 %   | 44,22 % ▲       |
| 4                 | Volkswagen    | e-Golf         | 517     | 4,16 %   | 973              | 6,41 %   | -46,87 % ▼      |
| 5                 | Nissan        | Leaf           | 432     | 3,48 %   | 669              | 4,41 %   | -35,43 % ▼      |
| 6                 | Mercedes-Benz | EQC            | 355     | 2,86 %   | 2                | 0,01 %   | 17 650,00 % ▲   |
| 7                 | Renault       | Zoe            | 295     | 2,37 %   | 223              | 1,47 %   | 32,29 % ▲       |
| 8                 | BMW           | i3             | 294     | 2,37 %   | 743              | 4,89 %   | -60,43 % ▼      |
| 9                 | Mitsubishi    | Outlander PHEV | 286     | 2,30 %   | 230              | 1,51 %   | 24,35 % ▲       |
| 10                | Skoda         | Octavia        | 265     | 2,13 %   | 249              | 1,64 %   | 6,43 % ▲        |
| 11                | Toyota        | Corolla        | 261     | 2,10 %   | 216              | 1,42 %   | 20,83 % ▲       |
| 12                | Toyota        | Rav4           | 250     | 2,01 %   | 393              | 2,59 %   | -36,39 % ▼      |
| 13                | Peugeot       | e-208          | 238     | 1,91 %   | -                | -        | 100,00 % ▲      |
| 14                | Porsche       | Taycan         | 236     | 1,90 %   | 2                | 0,01 %   | 11 700,00 % ▲   |
| 15                | Volkswagen    | ID.3           | 232     | 1,87 %   | -                | -        | 100,00 % ▲      |
| 16                | Polestar      | Polestar 2     | 229     | 1,84 %   | -                | -        | 100,00 % ▲      |
| 17                | Hyundai       | IONIQ EV       | 220     | 1,77 %   | 375              | 2,47 %   | -41,33 % ▼      |
| 18                | Seat          | Mii electric   | 207     | 1,67 %   | -                | -        | 100,00 % ▲      |
| 19                | Opel          | Ampera-e       | 195     | 1,57 %   | 173              | 1,14 %   | 12,72 % ▲       |
| 20                | Volkswagen    | e-up!          | 183     | 1,47 %   | 108              | 0,71 %   | 69,44 % ▲       |



# Electrification of transport – The Key to Zero Emission



## National goals

- 100 % of new **passenger cars** sold electric within 2025
- 100 % of new **vans** electric within 2025
- 100 % of new **heavy vans and trucks** electric within 2030
- 50 % of new **heavy trucks and long-distance trailers** electric or hydrogen within 2030
- 100 % of the **city busses** electric within 2025





# Public Policy instruments – “A big frontal sweep”

An abundant tool box of instruments. National and local incentives are pulling in the same direction.

## Purchase of zero emission vehicles

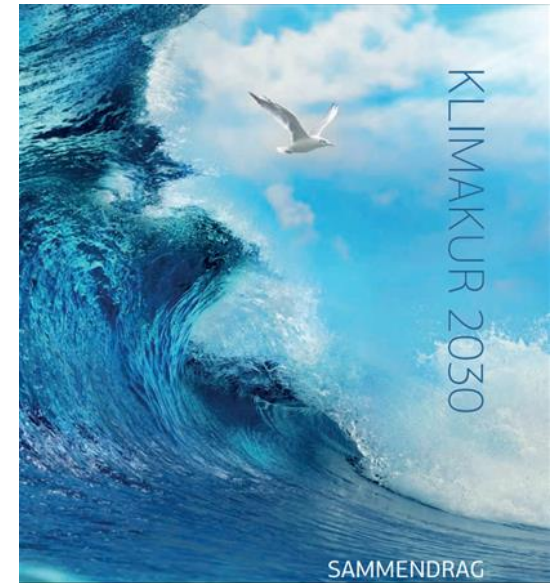
- **No purchasing tax, no VAT** (private and commercial vehicles)
- **Support schemes** for purchase of zero emission taxis, vans, trucks and construction machineries

## Charging infrastructure

- Support scheme for **housing associations, DC fast charging and charging of commercial vehicles**
- **Public charging infrastructure** available for all EVs
- **Consolidations centres** with tailor-made charging infrastructure

## Public tenders

- **Award criteria** for zero emission deliveries in public procurements (demand zero emission if three providers can deliver zero emission)
- **Only zero emission in public deliveries** from 2025 (up to 3,5 ton) and 2030 (over 3,5 ton)
- **Zero emission building sites**, and removal of excavated masses



# Public Policy instruments – “A big frontal sweep”



## User advantages for zero emission vehicles

- Free/or subsidized public **parking, electricity**, passing in **toll gates and ferries and tunnels**
- Permission to use **the bus line** (with local restrictions)

## Zero emission zones

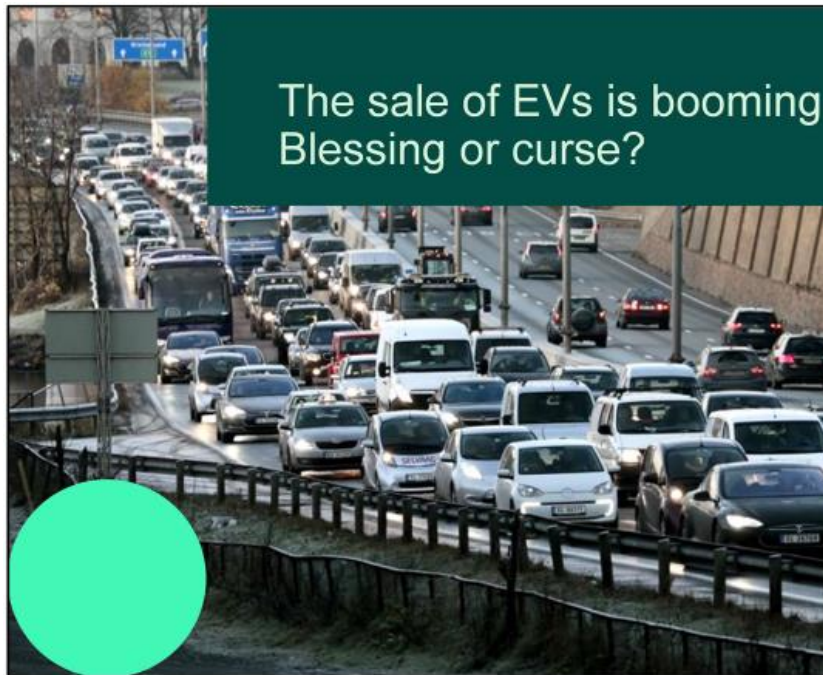
- **Car free City Centre** from 2018 (inside Ring 1)
- **Zero emission zones** from 2023 (inside Ring 2) and 2028 (inside Ring 3)

## Others

- Electrification of the **City's own fleet** (1200 vehicles)
- Only zero emission **public transportation** from 2028 (trams, metro, buses, ferries etc.)
- Only zero emission **taxis** from 2024
- New green **mobility houses**
- New **innovative projects** and technologies



# Boosting EV sales - Blessing or curse?



The sale of EVs is booming –  
Blessing or curse?

VG

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Young 10, 1000, 2000, 3000, 4000

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Originalt 11 mm  
Høydebesparende  
3 deler per m<sup>2</sup>  
Børstet aluminium

**MAXBO**

FALSK PASSASJER: Denne sjåføren var i overkant kreativ for å få kjøre i kollektivfeltet på E18 i morgenrushet. Foto: Politiet.

## Tatt for å kjøre med dukke i kollektivfeltet

Da politiet kontrollerte kollektivfeltkjøringen på E18 i morgenrushet for noen dager siden stoppet de et svært spesielt reisefølge.

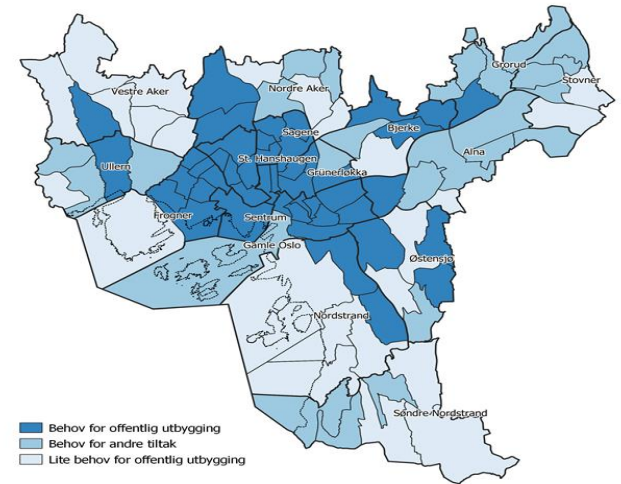
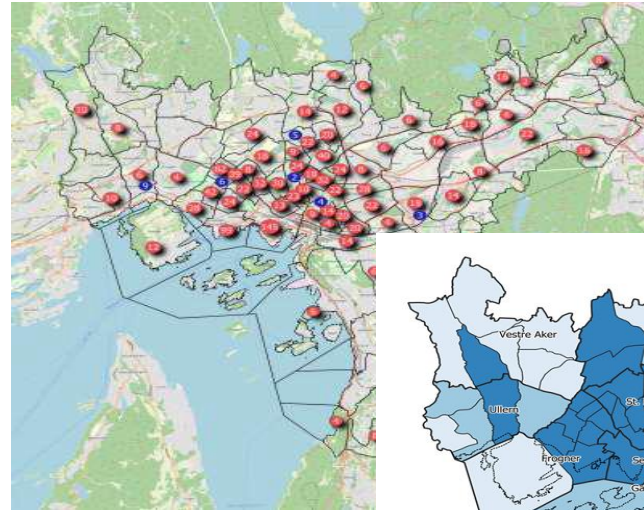
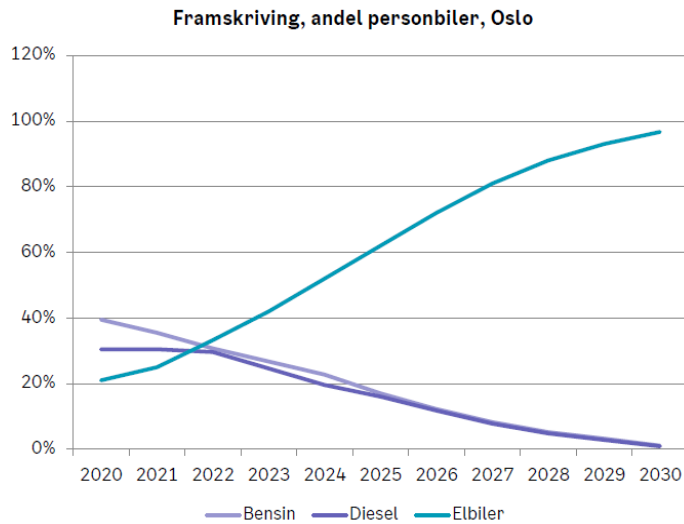
Av Annelise Frøysholm Nævre

# Public charging points – 2100 normal and 300 quick chargers



EVlink

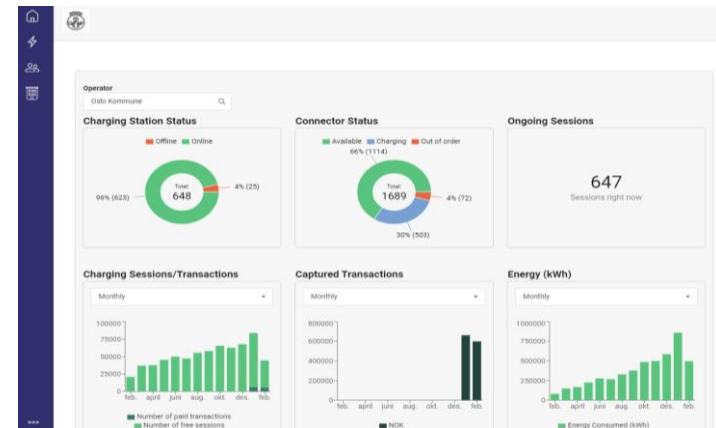
# Mapping of charging needs - from demand driven to strategic deployment



**Table 2.** Key charging metrics in select metropolitan regions.

| Metropolitan region | Public charge points per million population | Percent DC fast public charging | Electric vehicles per public charge point | 2018 BEV sales share | 2018 PHEV sales share |
|---------------------|---|---------------------------------|---|----------------------|-----------------------|
| London              | 405   | 15%                             | 7.6                                       | 1%                   | 2%                    |
| Paris               | 307   | 8%                              | 12  | 2%                   | 1%                    |
| Oslo                | 3,000                                       | 10%                             | 24  | 43%                  | 18%                   |
| Stockholm           | 717   | 10%                             | 23  | 2%                   | 11%                   |
| Madrid              | 60  | 16%                             | 39  | 1%                   | 1%                    |
| Amsterdam           | 2,750                                       | 2%                              | 4.3                                       | 7%                   | 1%                    |
| Los Angeles         | 390   | 13%                             | 39  | 4%                   | 3%                    |
| Beijing             | 1,920                                       | 33%                             | 5.3                                       | 14%                  | 0.3%                  |

Note: Each market is based on its metropolitan area rather than its city area with the exception of Beijing, which uses the city boundary. For European markets, this is based on the Metropolitan Region definition from Eurostat. Los Angeles refers to the Metropolitan Statistical Area from the U.S. Office of Management and Budget.



# Quick chargers and high performance DC

- **Quick chargers DC (50-350 kW)**. Preferably several different brands.
- **Joint-venture** between the City and private charging companies (public tenders)
- **Investment cost 50/50 split** between the City and the private operator
- **The Site** and underground infrastructure is **owned by the City**
- **The chargers owned by private** charging company
- **Net-profit split 50/50**
- **Investment cost** per DC charger: HPDC 40 000 US dollars, DC 28 000 US dollars
- **Yearly net income** per DC charger: 34 000 US dollars (average 2019 fig.)
- **Return of Investment (ROI):** 2-4years



# Grants scheme for housing communities/cooperatives

30 % of all Oslo citizens does not have a dedicated parking  
In 2019-2020, the City of Oslo facilitated

## 40 000

new charging points in the city, through a grants scheme for private citizens and businesses. This is by far the most cost efficient solution for the City (average 1000 dollars per CP)



Home

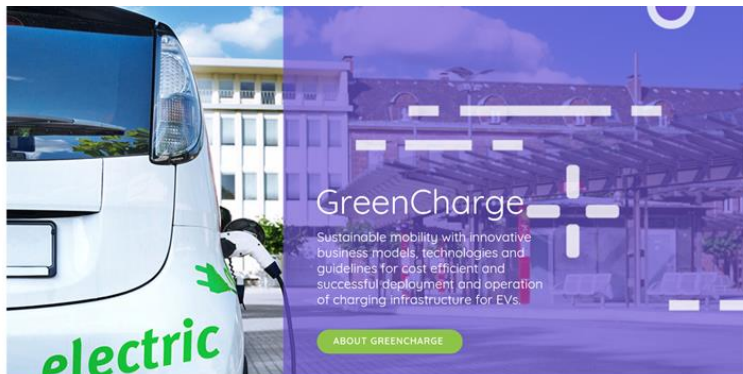
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3 Pilot living labs



# Results – 60 million tons reduction of CO2 emissions



- More than **20 percent of all cars** in Oslo are now battery electric. In most other countries battery electric cars is less than 0,6%
- DNV GL have estimated that The Norwegian EV policy have resulted in **250 000** more battery electric vehicles than otherwise would be the case.
- The Norwegian EV policy have resulted in reduction of CO2 emission of more than **60 million tons** in the decades from 2010 to 2050.
- The Global (indirect) effect due to reduced international battery cost and economy of scale, is estimated to another **320 million tons** of CO<sub>2</sub> (Like Solar energy due to Germany, California and Japan).



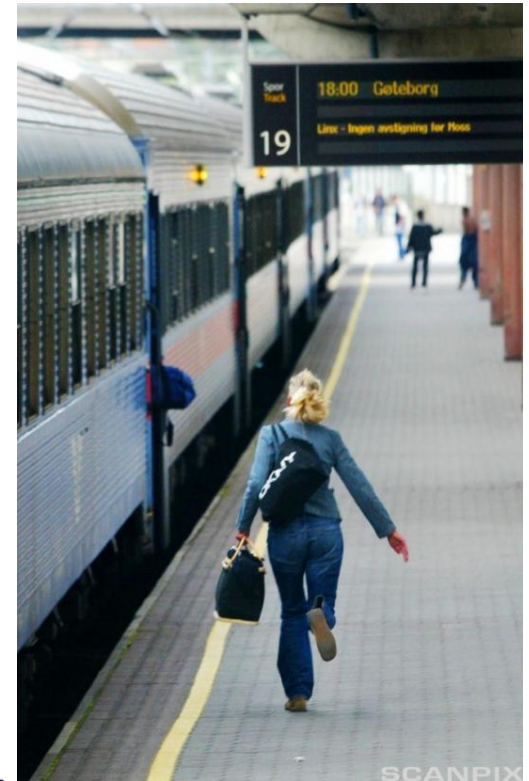


# Sky is the limit, or trouble in paradise?



## Major Challenges:

- **EV sales are boosting.** Hard to deploy chargers fast enough. From 1 (charger) - 4 (car), to 1 (charger)-28 (EV) in few years
- **Limited Space** (space/earnings requirements)
- **Local grid capacity** (capacity/processing time/cost Elvia)
- **Red tape/Long case processing time** (building permits, legal clarifications etc.)
- **61 % are living in multi-family buildings, apartments or town houses in Oslo**
- **Electrification for professional users of EVs needs a boost**



# Freight electric vehicles (FEV)

- Tailor-made hubs for freight Vehicles
- New high-performance DC chargers 150-350 kW
- Pre-booking possibilities
- Designated chargers for freight
- 80 % zero emission freight inside Ring 3 from 2020
- Public – privat partnership
- Innovative R&D projects

About Us. Press Center. DB Schenker achieves 100% electric city logistics in Oslo with new Volvo FL Electric truck

News, Aug 12, 2020

## DB Schenker achieves 100% electric city logistics in Oslo new Volvo FL Electric truck

Series production of eco-powered 16-ton trucks • First truck for DB Schenker personally welcomed by Norwegian Prime Minister Erna Solberg and CEO Jochen Thewes • Milestone in sustainable urban logistics

DB Schenker realizes its goal of zero direct emissions in all Oslo city distribution by integrating the new Volvo FL Electric truck into its sustainable Oslo City Hub. The vehicle was unveiled today by Norway's Prime Minister Erna Solberg, who thanked DB Schenker for its efforts towards greener transport solutions. The launch is supported by state-owned energy agency Enova. It is Norway's first series-produced 16-ton truck with an electric drive and will enable DB Schenker to operate sustainable logistics in Oslo and beyond.



DB SCHENKER

Følg Schenker

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## Åpning av Oslo City Hub 8. mai. Et krafttak for varelevering med null-utslipp i Oslo

Pressemelding • mai 06, 2019 08:52 CEST

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Åpningen av Oslo City Hub 8. mai markerer starten på en ny tid for bærekraftig varelevering i Oslo

Flaggskipet for grønn bydistribusjon «Oslo City Hub» åpnes av logistikkelskapet DB

# Freight electric vehicles (FEV)



Virkemiddelanalyse for utslippsfri og biogass tungtransport i Oslo innen 2030

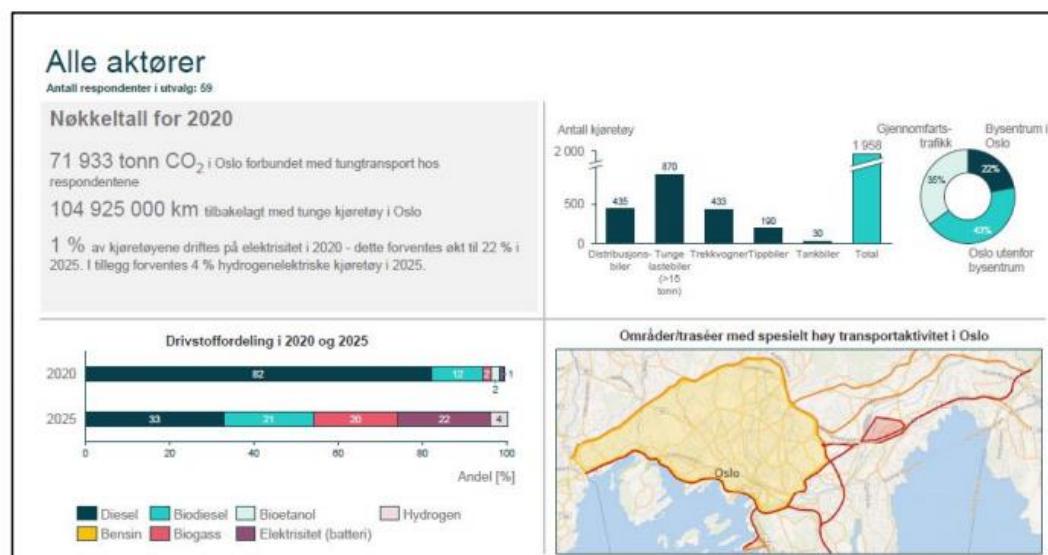
ZERO-rapport, februar 2021



Foto: Tom Wilhelmson AS

Jenny Kosberg Skagestad  
Marius Gjerset  
Liv-Elisif Kalland  
Ola Wolff Elvevold  
Stig Schjølset

- 20 % of all new **vans** battery electric in 2020
- 42 % of all **vans** in January 2021
- 1 % of **Heavy Trucks** and Long-distance Trailers. 3 % bio-gas
- **Expectation** among transporter for 2025 is 22 % electric trucks, and 20 % bio gas



Figur 4: Oversikt over samlede nøkkelfakta for alle respondentene i Hafslunds undersøkelse (2021).

# Electric taxis

Fortum and the City of Oslo are working on the world's first wireless fast-charging infrastructure for taxis

21 March 2019, 09:29 EET

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FORTUM CORPORATION PRESS RELEASE 21 March 2019

Clean-energy company Fortum is in cooperation with the City of Oslo and the American company Momentum Dynamics to build a wireless fast-charging infrastructure for taxis in the Norwegian capital.



Oslo kommune  
**Bymiljøetaten**  
Avdeling for transportlov og skiltmyndighet

Utredning

Miljøkrav til drosjenæringen



Dato: 11.8.2017



# Zero Emission Building Sites and Public Transport



#1 most loved electric vehicle world

Exclusives Clean Energy EV News EV Reviews Ti

## World's First: Zero Emission Electric Construction Site

April 9th, 2020 by [Jo Borrás](#)

Even in cities like Oslo, Norway, **which is typically thought of as progressive and "green" here in the 'States**, more than 20% of the total CO2 emissions comes from heavy-duty construction equipment. That's a huge number, and you can bet that older, less regulated machines in other major cities are even worse. That fact has motivated the authorities in Oslo to enact laws that say all new, public buildings must be built with "fossil-free" construction machinery. The jobsite you see here, featuring a ZE85 battery-powered electric excavator from Suncar HK, is just such a fossil-free site. What's more, it's believed to be the first zero emission, all-electric jobsite of its kind.



Suncar electric excavator, via Suncar HK

Norway's new laws banning heavy polluters like diesel construction machines and even passenger cars from certain city centers are hardly unique. Cities like **Barcelona, London,** and Beijing have already passed similar laws that will go into effect in the coming years, and believe other countries won't get in on the act soon, **with the general public**



# New green mobility houses



EP2

-0.42% 0.51% -1.54% -0.15% -0.32%

STOR PASS. LITEN RENTE.

Se bilmodellene

SKODA

PRIORITERT 1. PÅ AVS

**Denne storbyen er Norges beste på elbil**

Bergen tar innpå, men Oslo er elbil-hovedstaden blant storbyene i Norge. Det bestemte en jury i Arendal torsdag.



# Wanted! Innovative solutions to reduce costs, space and increase user friendliness

The New York Times

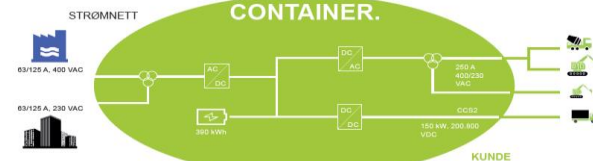
WHEELS

## Norwegian Taxis, Wirelessly Charging While They Wait for a Fare

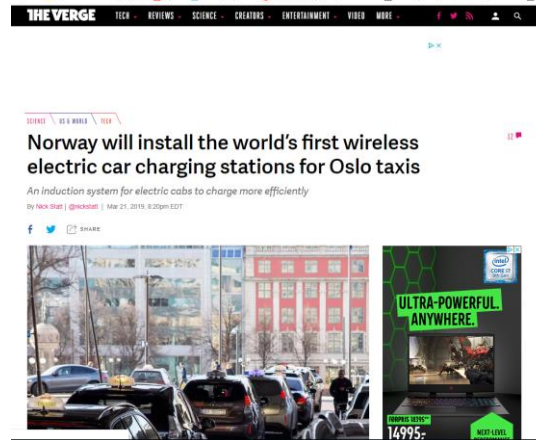
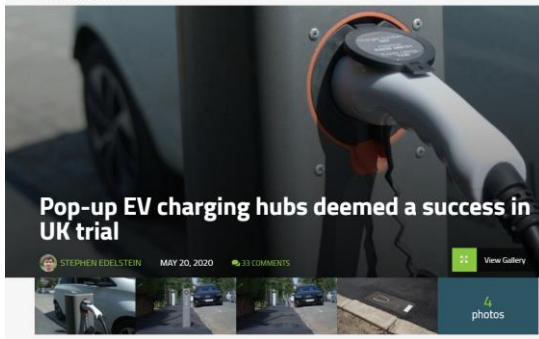
Electric Jaguars in Oslo, using tech from a former NASA architect, will soon be able to recharge on special pads embedded under the road.



GRØNN KRAFT.



# Innovative solutions – in order too reduce costs, space and increase user friendliness





# A green shift in transport is needed

Everything is connected to everything. An **holistic approach** is needed, in addition to more EVs we need:

- **More public transportation**
- **Emission free public transportation.** Fossil-free within 2020, emission free 2028 (the official goal)
- Increased focus on facilitation for **pedestrians and cyclists**
- Focus on **Autonomous Vehicle/Mobility as a Service**
- Increased focus on **(green) car sharing**
- More **freight handling by trains**
- **Green freight distribution** in the City
- Electrification and **greener heavy duty vehicles**
- **EL-Taxis**
- **Park and ride solutions**, in combination with EVs
- Increased use of **ITS**
- **Low emission zones**
- **Residential park** (free parking for EVs)
- **Congestion tax** (non for EVs)



# Other plans to reduce emissions

- **Car free City Center 2018 (Inside Ring 1)**
- **Zero emissions zones (2019 -2023)**
- **Ban on all sales of diesel and gasoline cars (from 2025)**
- **Temporarily ban on use of diesel cars on the most polluting days (from 2017)**
- **New toll gates (from 22 to 73 in 2019)**
- **Congestion tax + 74% (non for EVs) (from 2017)**
- **Residential parking (within Ring 2)**
- **Only zero emission deliveries in all public procurements (from 2025, 2030)**
- **Only zero emission Taxis (from 2024)**
- **Only zero emission public transportation (from 2025 2030)**

Environment > Climate Change

## Norway to 'completely ban petrol powered cars by 2025'

'What an amazingly awesome country', Elon Musk tweeted in response to the plan

Jess Staufenberg | Saturday 4 June 2016 17:15 BST | 248 comments



Click to follow The Independent Online



Almost a quarter of all of Norway's cars already run off electricity rather than fossil fuel. (iXer)

Norway will ban the sale of all fossil fuel-based cars in the next decade, continuing its trend towards becoming one of the most ecologically progressive countries on the planet, according to



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### Greenhouse gas emissions

#### Oslo temporarily bans diesel cars to combat pollution

Agence France-Presse  
View 16, Jan 2017 14:08 GMT  
f t e ...  
This article is 12 months old

Norway's two-day city centre has angered motorists who were encouraged to buy diesel vehicles in 2006



Oslo will ban diesel cars from the road for at least two days this week to combat rising air pollution, angering some motorists after they were urged to buy diesel cars a few years ago.

The ban will go into effect on Tuesday on municipal roads but will not apply on the national motorways that criss-cross the Norwegian capital. Better atmospheric conditions are expected on Thursday. Motorists violating the ban will be fined 1,500 kroner (£174).

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# In the future ALL transport has to be electrified!

