

# EV NORWAY

POWERED BY NATURE: A GUIDE TO NORWAY,  
THE WORLD'S LEADING EV MARKET

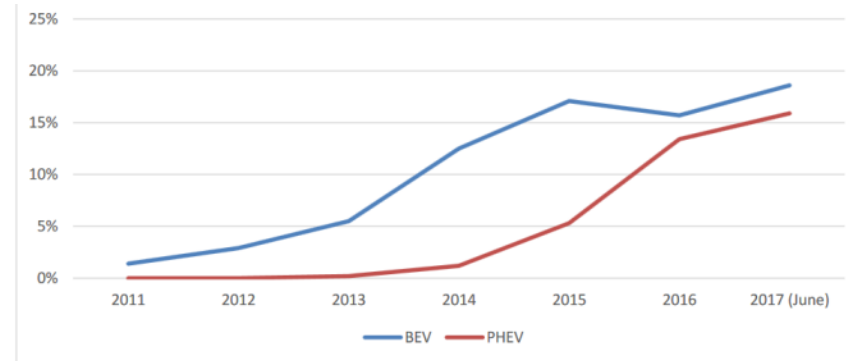
Inge Aarhus  
Environment Lillehammer  
Saint Petersburg , October 24, 2017





# State of the Art at a Glance - Norway

- Norway is leading the way for transition to zero emission electric cars. **In 2016, electric vehicles had a 29 % market share in Norway.**
- This is due to a substantial package of incentives developed to promote zero emission cars.
- The Norwegian experiences are a unique test case for decision makers in governments and in the industry globally.





# National Policies on Climate Change and Transport

## General targets and aims

The Norwegian government suggests that Norway by 2030 reduce greenhouse gas emissions by at least 40 per cent compared to the 1990 level

The Norwegian government aims for Norway to join the EU 2030 framework for climate policies in order for Norway and the EU to jointly fulfil their climate targets

### Background

- Transport sector accounts for approx. 1/4 of Norway's GHG-emissions
- Two broad political agreements on climate in the Norwegian Parliament (2008 and 2012)
- The 2012-agreement protected existing tax-incentives until 2018, or until 50 000 EVs reached
- Goal from climate agreement: 85 gram CO<sub>2</sub>/km in 2020 from new cars

## Concrete measures

- Implement climate friendly technologies via the Fund for Climate change, renewable energy and energy conversion.
- Phase out heating from fossil oil.
- Strong energy requirements in the construction sector.
- Increased focus on climate research.
- Maintain or increase carbon storage in the the forest.
- Contribute to further development of biogas in Norway.
- **Stimulate growth in public transport, cycling and walking in urban areas.**
- **Use reduced taxes on cars to get a more environment- and climate-friendly fleet of vehicles.**



# Positive and **Negative** Effects of the Policies

- Reduced CO<sub>2</sub>-emissions
- (personal cars sold in May 2015: 99 g/CO<sub>2</sub>/km -average)
- Reduced NO<sub>x</sub>-emissions
- Development of technology for the low emissions society
- Switch from public transport, cycling and walking to EV, increased traffic
- Delays for public transport and using space in the cities
- Income loss to the state, municipalities and road toll companies

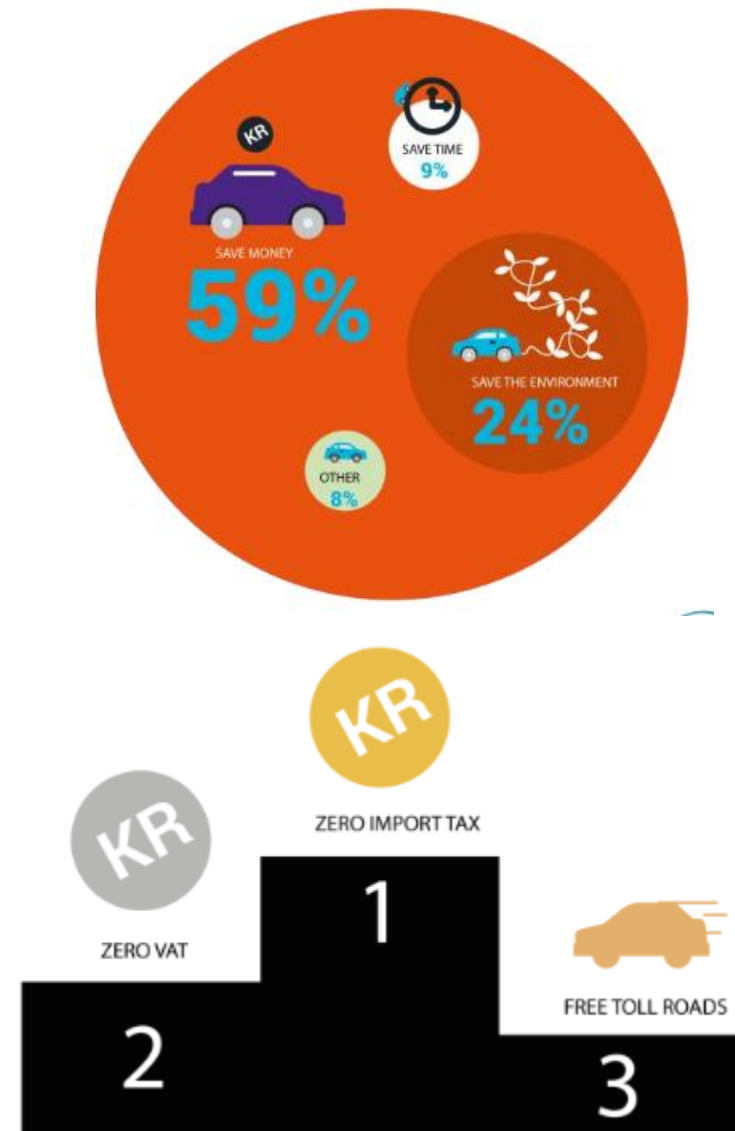
## A Global Perspective

**Mayors in Paris, London, LA etc will ban fuel and diesel cars from 2030 in parts of their cities**



# The Zero Emissions Incentives Include:

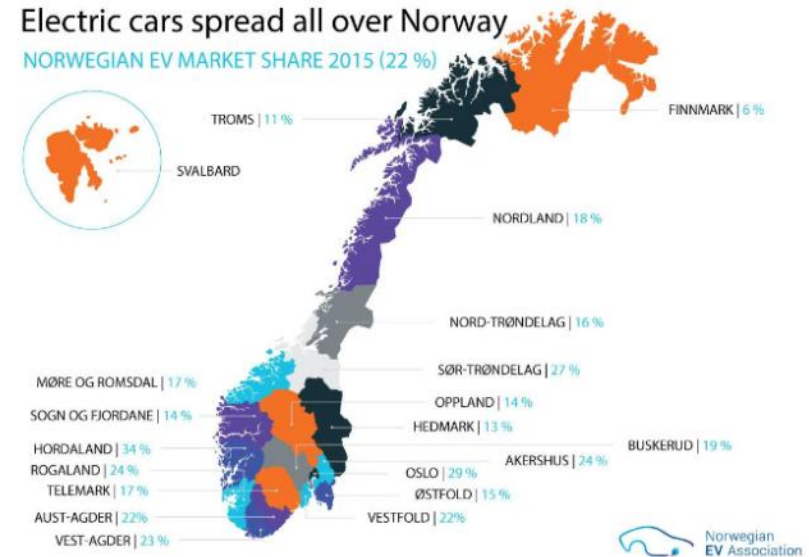
- No purchase/import taxes (1990)
- Exemption from 25% VAT on purchase (2001)
- Low annual road tax (1996)
- No charges on toll roads or ferries (1997 and 2009)
- Free municipal parking (1999)
- Access to bus lanes (2005)
- 50 % reduced company car tax (2000)
- Exemption from 25% VAT on leasing (2015)





# Consequences of EV Zero Emission Incentives

- The Norwegian policies to promote the introduction of electric vehicles (EVs) are unusually powerful.
- Many examples show that the policy means an **approximate tax relief for a EV owner about 8000 USD/year.**
- **(50.000 USD is an average price)**
- The policies is one of many measures for turning the economy into “the green shift”.
- The policies might have the unfortunate side-effect that households buy more cars and drive more.
- The policies might cause small emission reductions at high costs.
- Income loss to the state



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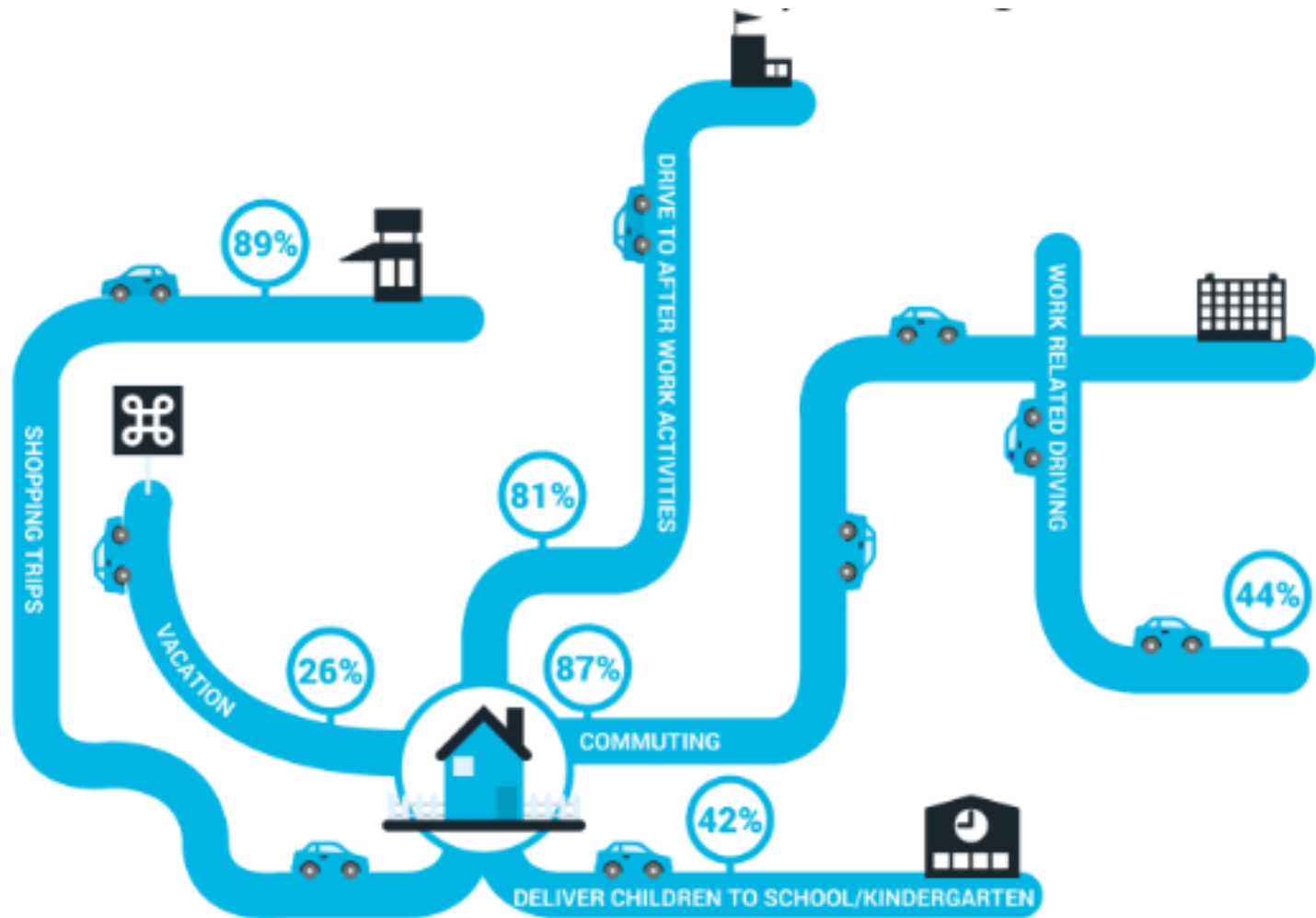
# A HAPPY EV USER CONVINCES THREE PEOPLE AROUND HIM TO BECOME ANOTHER BUYER

- The typical Norwegian EV user is a family father with high level of education and income
- 75 % of them owning 2 or more cars in the household.
- They use their EV for everyday commute, shopping and after-work activities, and, above all, almost 100% of them are either “very satisfied” (91%) or “satisfied”(9%)





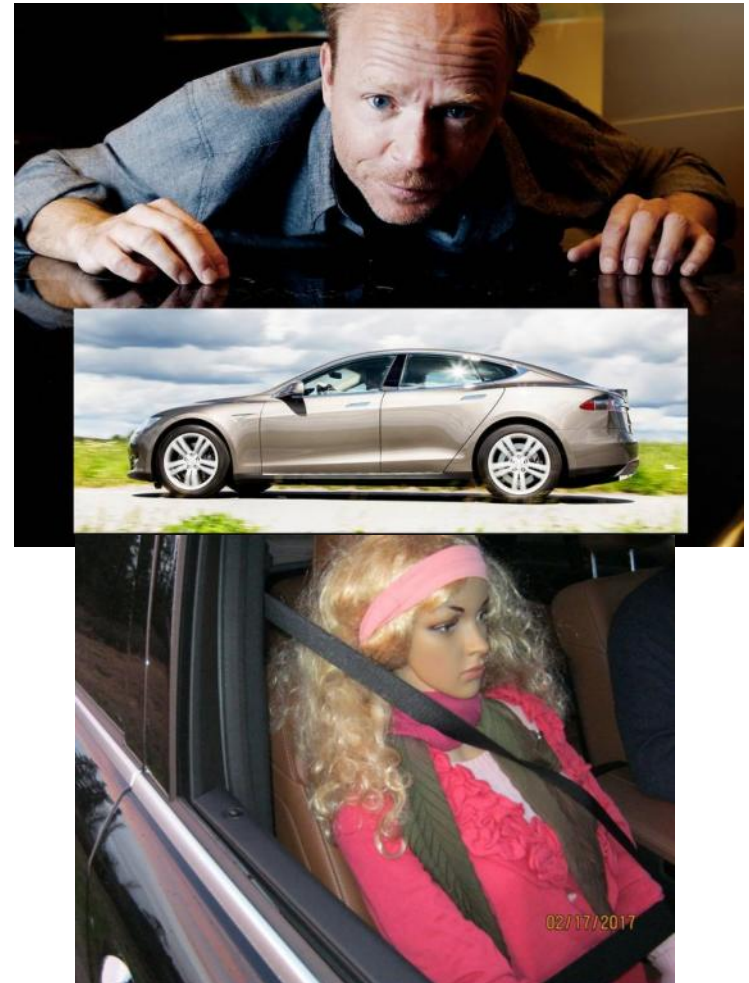
# Electric Cars Covers Most Daily Driving Tasks





# More on The Typical Norwegian EV Owner

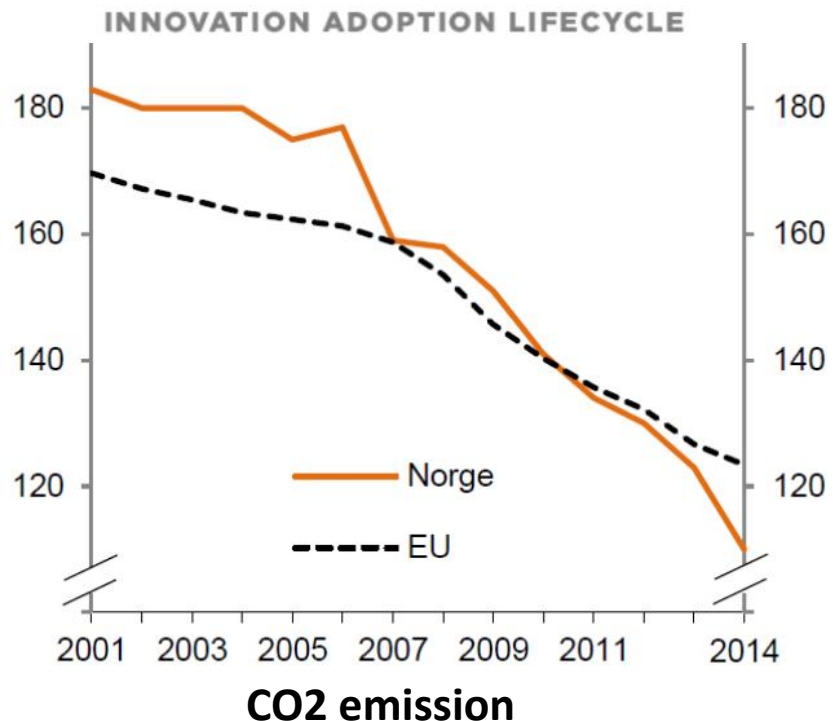
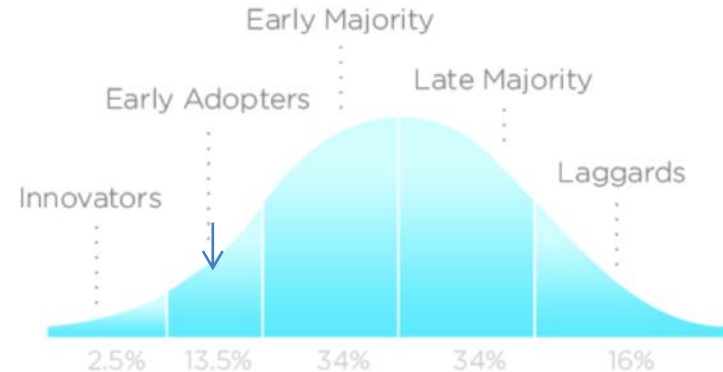
- The typical Norwegian EV owner buys his or hers electric car as an addition to their petrol or diesel car.
- The electric car quickly becomes car number one that are used for most travel needs.
- The petrol or diesel car is only used occasionally for longer trips.





# Lessons Learned

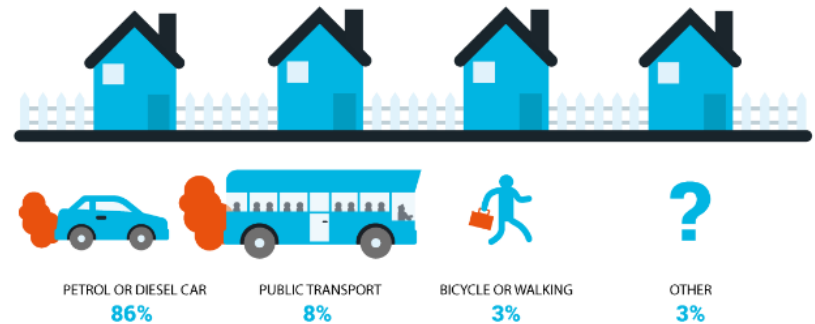
- There is no master plan that caused the Norwegian EV success.
- But, Norwegian authorities started to introduce incentives from the early 1990 to support domestic EV production like the Think EV (now bankrupt).
- Later on the EV policy became one of the most successful measures to reduce CO2 emissions from road transport.





# Lessons Learned (cont.)

- Electric cars replaces petrol and diesel cars, but not bus and bicycle.
- **The primary success factor is to make EVs cost-competitive (in other words – CHEAPER).**
- To fuel EV penetration even further, charging infrastructure is essential in the second phase.
- **Range anxiety**



Queuing for an EV?

6000 Norwegians are queuing for the new Hyundai

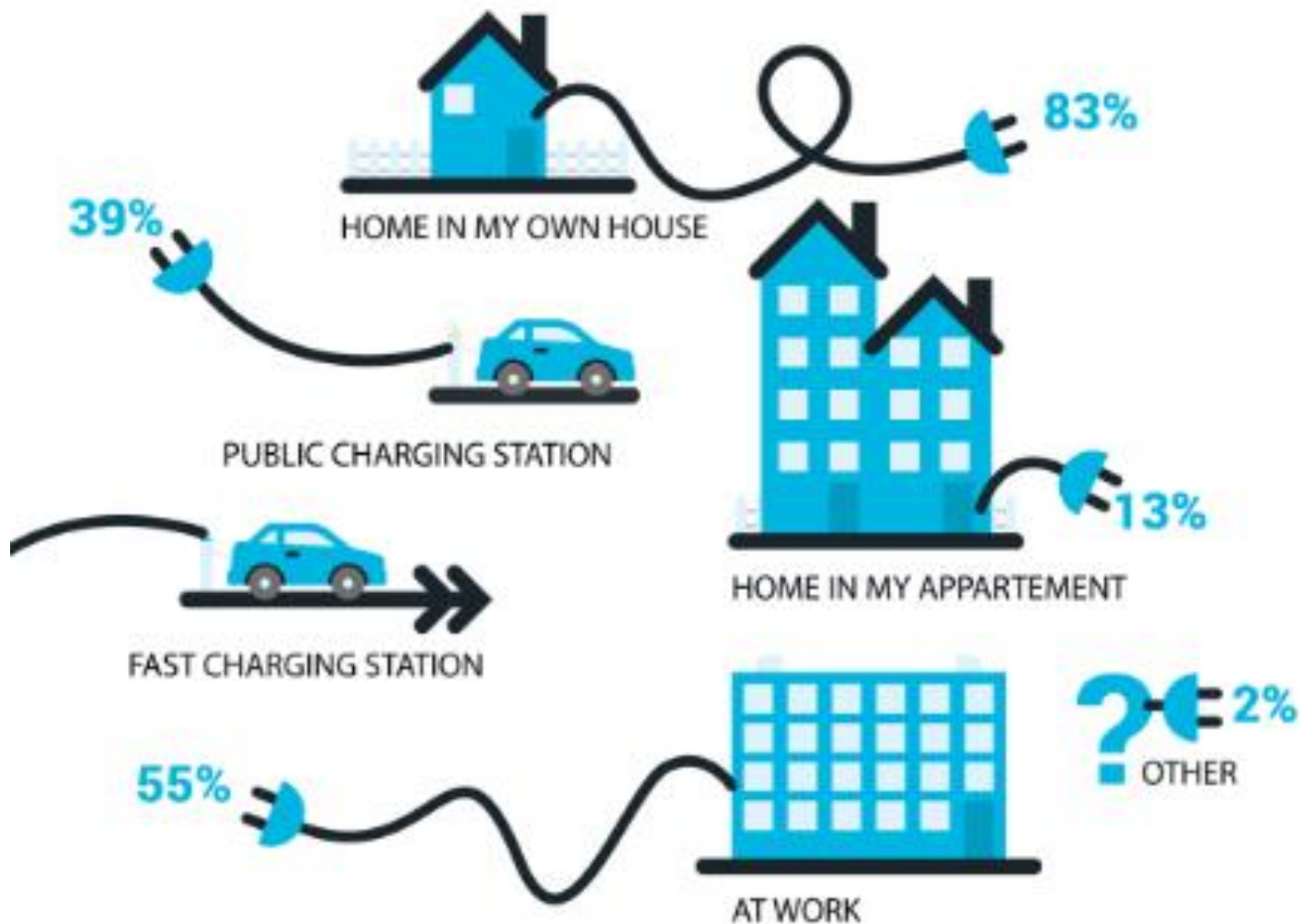


# How do Norwegians charge EVs and what do we need?





# Charging Infrastructure in Norway





# Governmental support for Charging

## Normal charging

- Norwegian governments have supported the development of a basic charging infrastructure.
- Norway's first governmental support scheme for public charging infrastructure took place in 2009-2010.
- The total support amounted to NOK 50 million and the scheme resulted in around 1800 Schuko-points (household sockets) spread all over the country.

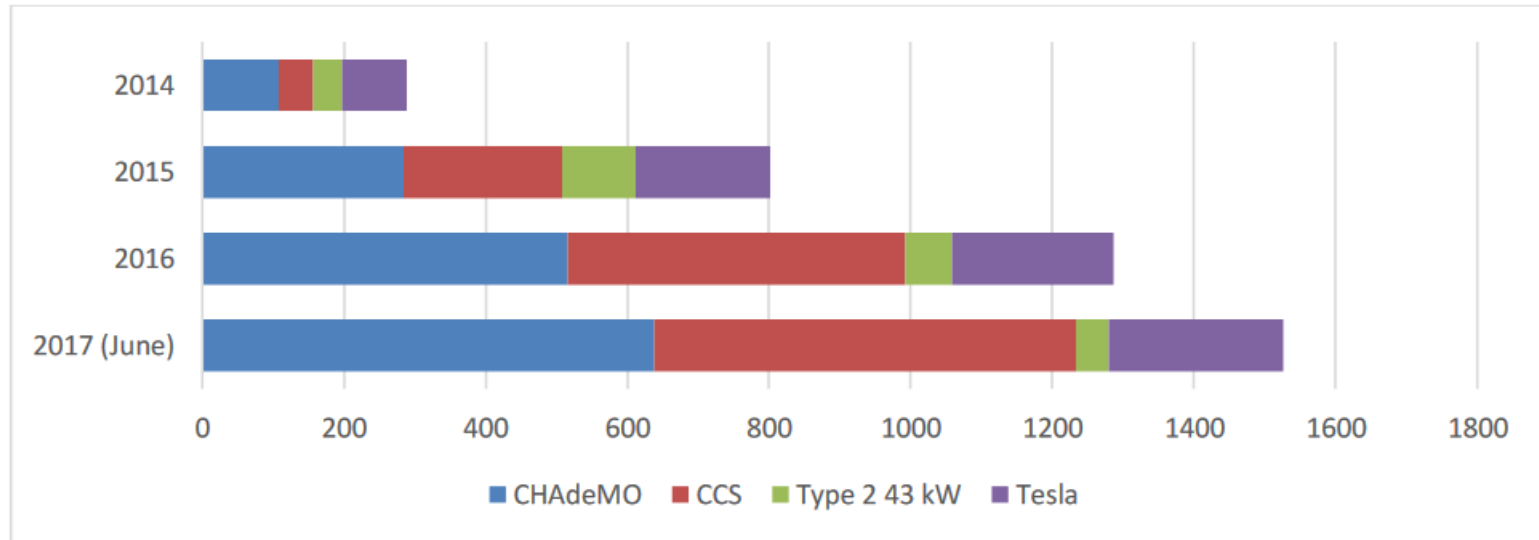
## Fast Charging

- The initial governmental support schemes for fast charging stations ran from 2010 - 2014, and totaled around NOK 50 million.
- **From 2015 the state enterprise Enova introduced a support scheme with aims to cover the Norwegian main roads with fast charging stations every 50 km (around 7500 km road network)**





# Charging in Points Norway



**Roughly 950 cars can fast charge at the same time in Norway.**



# NOBIL

## (A National Database for EV charging in Norway)

- NOBIL, a cooperation between the governmental entity Enova and the Norwegian Electric Vehicle Association, resulted in the development of an open, publicly owned database that allows everyone to build services using standardized data free of charge.
- Norway currently has the most extensive infrastructure of charging stations, as of per pax – 2200 as of 2017.



A cooperation between  
Et samarbeid mellom



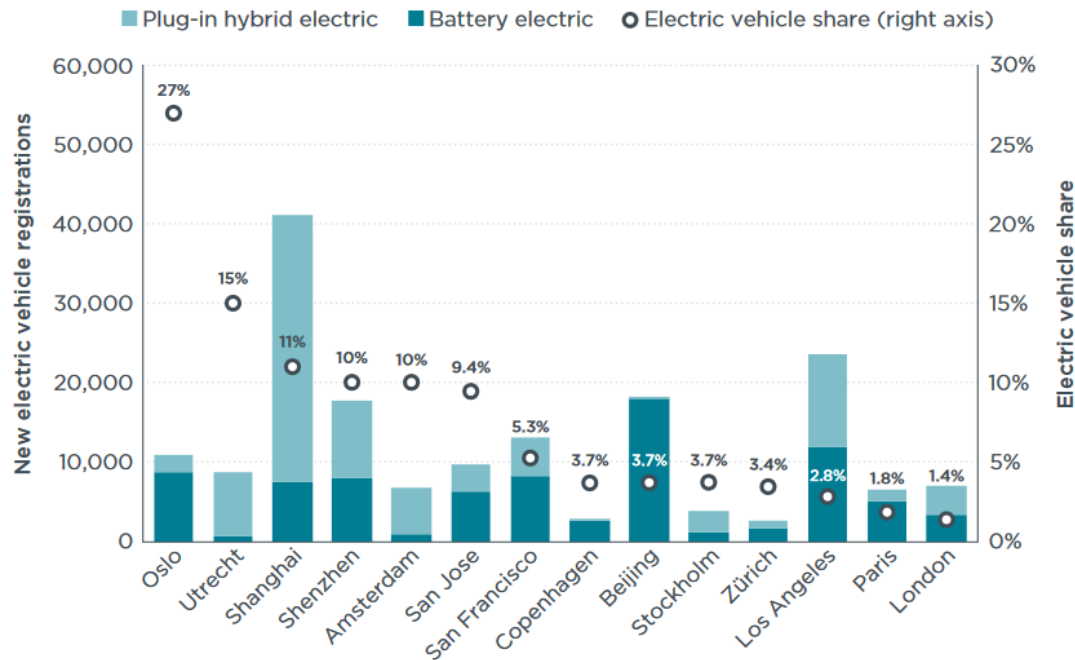


# Oslo's Vision on Climate Neutrality (also Europe's Green Capital 2019) (also twin city to Saint Petersburg)





# Oslo: Dubbed - The world capital of EV's (and this is not fake news)



## OSLO, NORWAY

Metropolitan population	1.2 million	Total electric vehicle sales	10,920
Public electric vehicle charge points per million people	2,295	Electric vehicle share of total vehicle sales	26.6%
Grid CO <sub>2</sub> emissions (gCO <sub>2</sub> /kWh)	9	Electric vehicle sales share relative to country average	1.2x



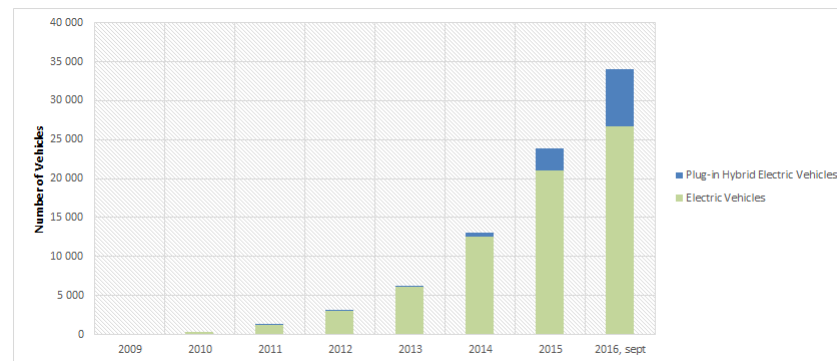
# Summary of EV support action in Oslo

Type of Program	Description	Grade
<b>Financial incentives</b>	<ul style="list-style-type: none"> <li>• No purchase or import taxes</li> <li>• Exempt from 25% VAT on purchases and leases</li> <li>• 50% reduction on company car taxes</li> <li>• No fuel taxes for electricity or hydrogen</li> <li>• Low annual road taxes</li> <li>• Exempt from road and ferry tolls</li> </ul>	++
<b>Nonfinancial incentives</b>	<ul style="list-style-type: none"> <li>• Planning low-emission zones</li> <li>• Free municipal parking</li> <li>• Free electricity for normal charging (3.6kW)</li> <li>• Discounted quick- and semi-quick charging for prioritized vehicles (e.g., EL-Taxis and Electric Freight Vehicles (FEV))</li> <li>• Bus lane access</li> </ul>	++
<b>Charging infrastructure</b>	<ul style="list-style-type: none"> <li>• 2,973 total charge points, 161 fast charge points</li> <li>• Grants for up to 60% (up to 10,000 kroner) of the cost of the installation of additional charging point</li> <li>• 2 million euros for the installation of 400 charging points between 2008-2011, 200 new charging points per year from 2013, 1,200 total by the end of 2016, and 200 new ones in 2017</li> <li>• Free public charging for normal charging (3.6 kW)</li> <li>• Cooperation with private quick charging companies to deploy quick charging stations (three deployed in 2016 with many more to come)</li> <li>• Building "a center of excellence for professional users of electric vehicles" in cooperation with the private real estate company Aspelin Ramm</li> <li>• Building dedicated quick and semi-quick charging stations for EL-Taxis together with the taxi industry</li> <li>• Building two large parking garages for electric vehicles</li> </ul>	++
<b>Research and campaigns</b>	<ul style="list-style-type: none"> <li>• Part of European FREVUE, SEEV4, BuyZET, ELAN, and REMIND Programs</li> </ul>	+
<b>Transit and fleets</b>	<ul style="list-style-type: none"> <li>• Zero emissions municipality fleet and public transportation by 2020</li> <li>• Green purchase of transport services</li> </ul>	++



# More on “The World Capital of EV”

- Oslo is “the world capital of electric vehicles (EVs)”, with almost 35 000 EVs and plug-in hybrids.
- 30% of all new cars sold in Oslo in 2015 and 2016 (by September) were EVs.
- The City of Oslo is replacing its car fleet (1100 cars) with EVs and is half way there.
- Through City ownership and financial incentives there are approximately 3000 charging points for EVs. Oslo is one of the world’s largest owners of charging infrastructure.





# More on EV Charging in Oslo

- An exponential growth of more than 100 % annually makes it hard to keep up the phase with the deployment of charging infrastructure.
- The number of EVs increased with 112% in Oslo last year, and the number of charging points increased with only 29%.
- The City of Oslo is today the country's largest owner of charging infrastructure with 728 on street charging point on public ground.
- 400 new charging points was deployed within 2015. Oslo offered 1100 public charging points by the end of 2015.





# Next - Self Driving Electric Vehicles (SDEV)

## Three Phases

- Currently SDEV are tested in a closed area in Stavanger
- A new law that allows SDEV will pass the Storting (parliament) in the spring of 2018
- A pilot and passengers will test the system in an industrial zone close to Stavanger

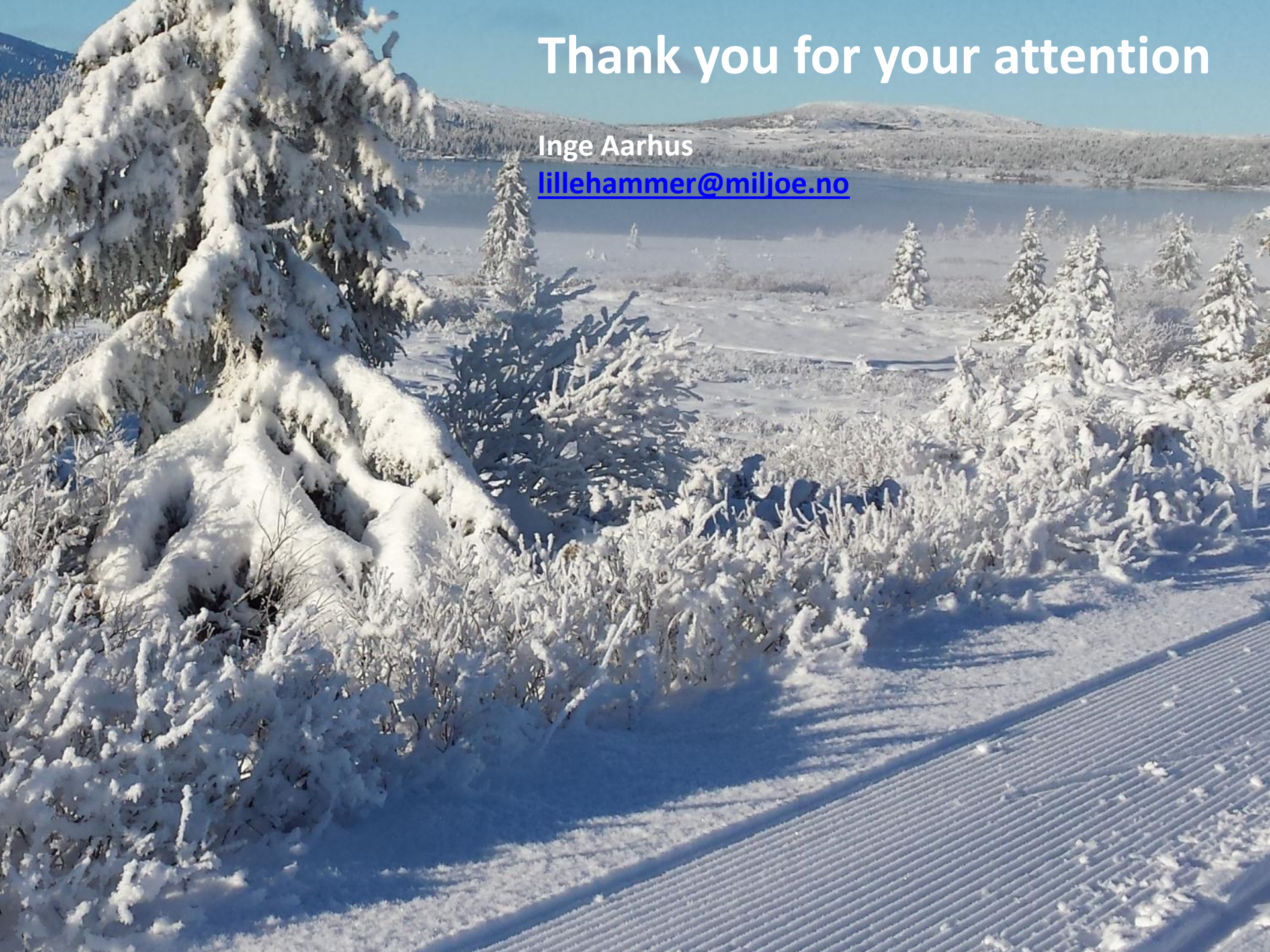




# Will Norwegians become city-bikers? (not in the near future)





A scenic winter landscape featuring snow-covered evergreen trees in the foreground and middle ground. In the background, a calm lake reflects the clear blue sky, with distant hills visible on the horizon. The scene is brightly lit, suggesting a sunny day.

# Thank you for your attention

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