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Managing Director, FIER Automotive
Portland, 21st of July, 2016



I-CVUE

INCENTIVES FOR CLEANER
VEHICLES IN URBAN EUROPE



BOSCH



DLR



**Transport
for London**



Co-funded by the Intelligent Energy Europe
Programme of the European Union.



Harm Weken

- Managing Partner of FIER Automotive
- Chairman of the board at the Foundation Limburg Electric
- Member of the Council of Advisors at Drive Oregon
- Ambassador for EVU, Electric Vehicle Union
- Board director of EASN, platform for automotive clusters and regions (2007-2015)



» Electric Mobility: Project examples

- Business development for Dutch e-mobility sector:
 - Missions to EU countries, China, India, US etc
 - 3-year program on German market
- Business planning and funding applications: smart- and e-mobility test labs, Automotive Campus Helmond (follow-up campus co-development)
- Clean vehicle fleet projects for governments
- Realisation and expansion of corporate / private e-car sharing programs together with Nissan EU and Foundation Limburg Electric
- Strategic planning and mapping of future-proof charging infrastructure
- International benchmark and technology / supplier search for electric bus consortium

- Business development and grant applications for electric trucks (incl. PHEV & hydrogen) for distribution, garbage and container transport



» Electric Mobility: European projects

I-CVUE»



- EV fleet monitoring and analysis
- Transferability of Best Practice
- Market-Potential supported by Predictive Tools

FRévue

- Support the uptake of electric freight vehicles in eight of Europe's largest cities
- Demonstrating and evaluating innovative urban logistics solutions
- New concepts and business models

e-GLM



- 10 full electric trucks (45t) with network of fast charging points in a cross border project (Germany – Netherlands) for
- Innovative logistical concepts for regional container distribution

ENEVATE

European Network of Electric Vehicles and Transferring Expertise



- Electric Vehicle Supply Chain Development
- Strategic implementation & infrastructure roll-out plan
- Market drivers and mobility concepts
- E-car sharing pilot project

BATTERI

- Intermodal, smart technologies & Alternative Fuels
- Policy & Behaviour
- Pilots



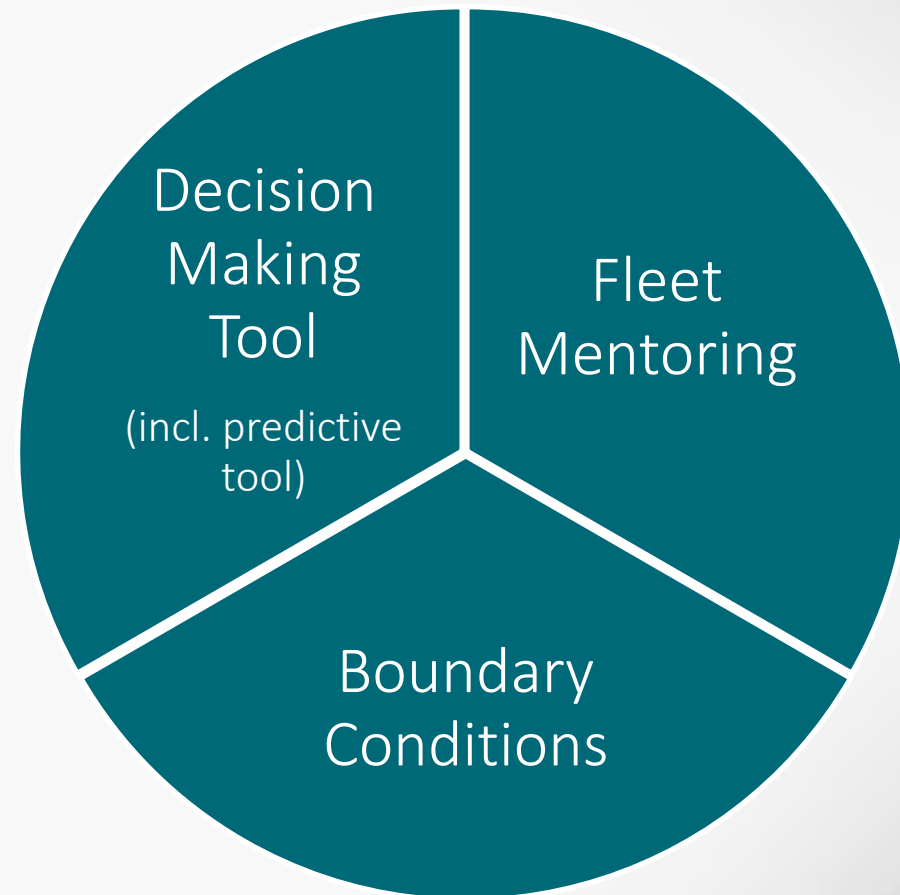
» Introduction

Aim

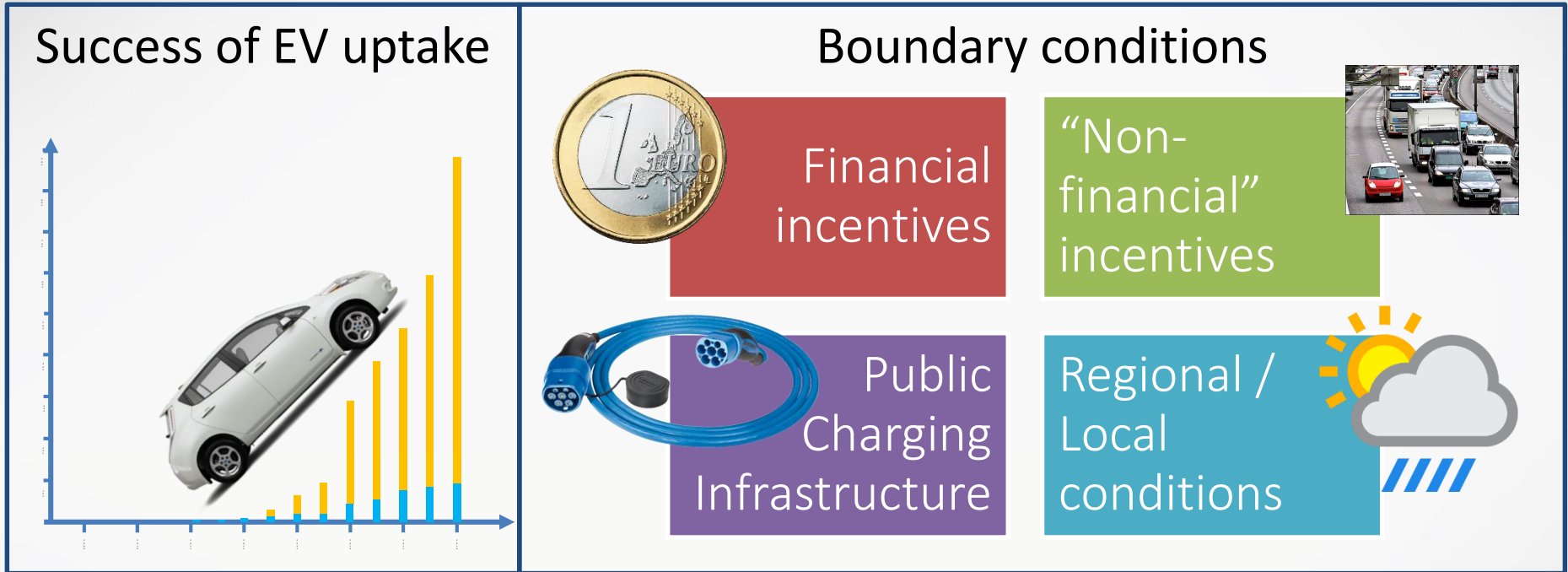
- Support the uptake of plug-in vehicles across Europe
- Reduce CO2 & other hazardous emissions in urban environments
- Increasing the number of electric vehicles in fleets

Specific objectives

- **1.000 EVs:** The main objective is to replace 1.000 traditionally fueled vehicles with electric vehicles (EVs)
- **Business cases for fleets:** will be identified by whole life cost analysis along with emission data and information on the expected commercial benefit of substituting traditionally fueled vehicles with their electric counterpart.
- **Regional authority support:** a framework to set up incentive programs according to the specific socio-economic conditions of the city, region or country
- **Decision Making Tool :** Make knowledge usable for policymakers and fleet operators through a web based tool and dissemination of results, with 500 users at the end of the project.



» The 4 Boundary Conditions studied



The analysis of the boundary conditions is focused on the **relationships** between the **success of EV uptake** and the **boundary conditions** within each country and the selected regions

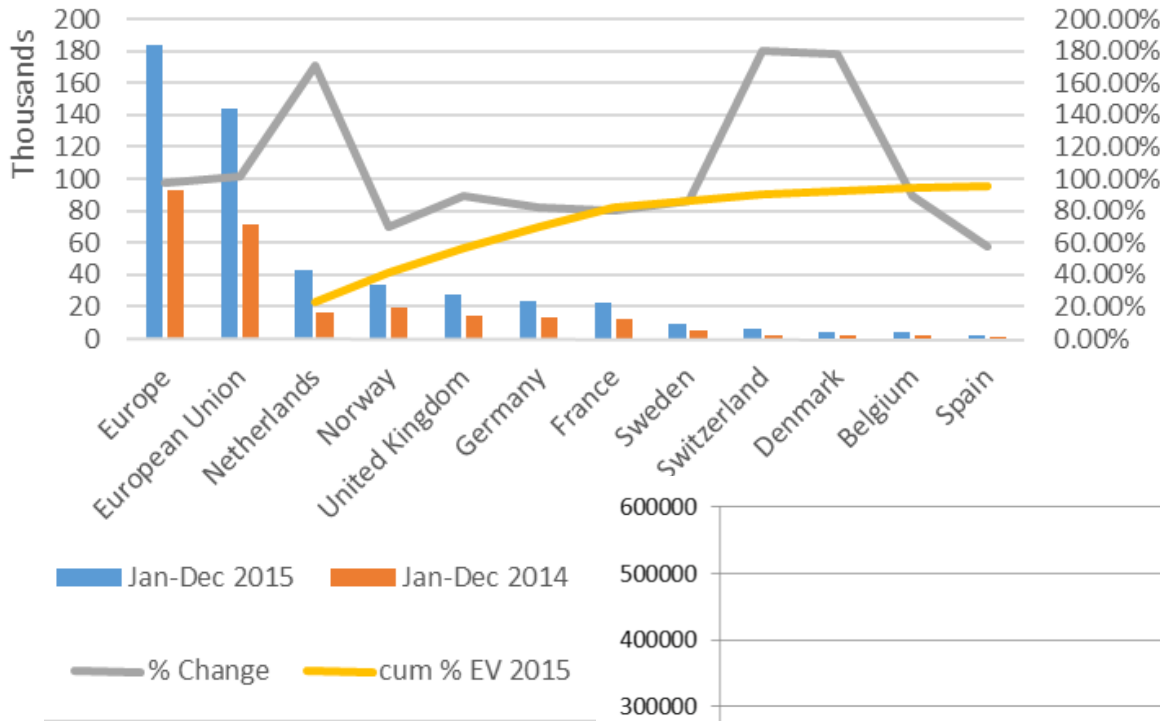


European perspective

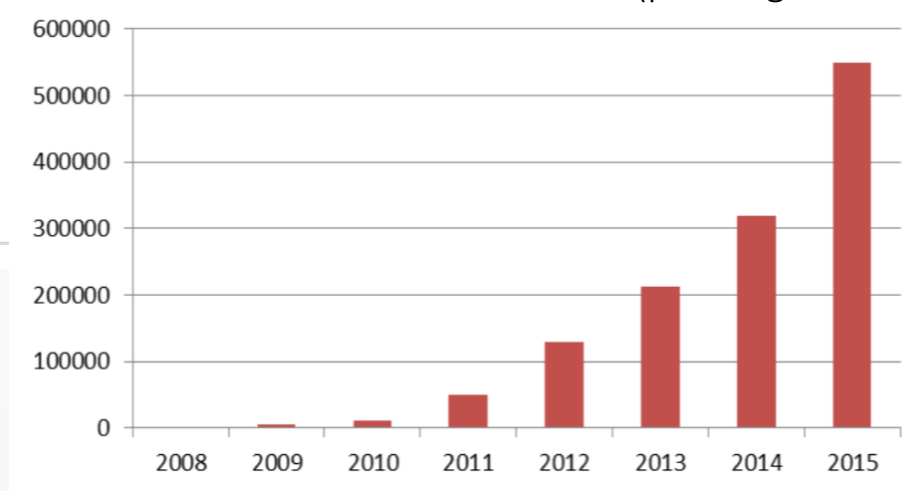


European EV sales 2015: doubled

New registrations M1 2015-2014



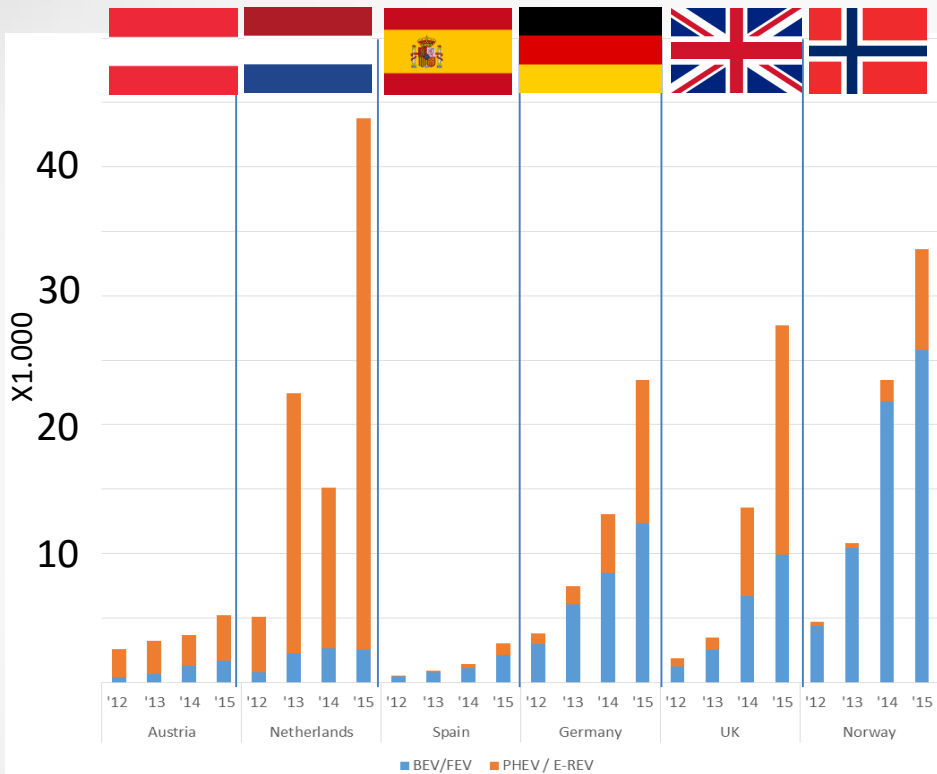
Current status: EV sales 2015 > 0.5 million
current stock 1.4 million
(passenger cars only)



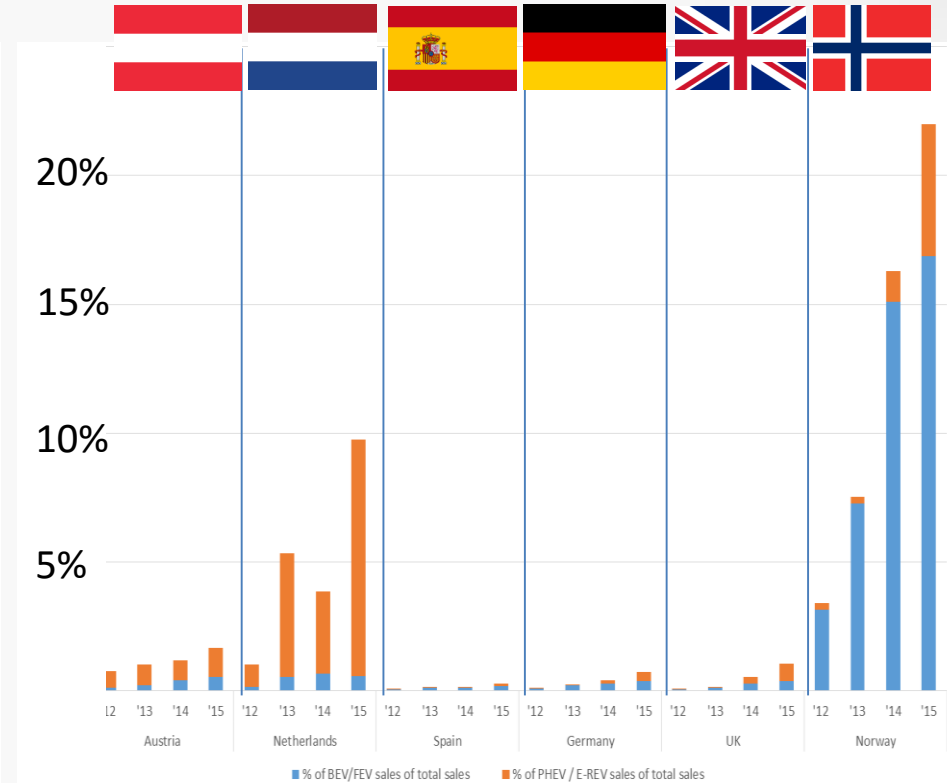
Source: AVERE

Success of EV uptake

Absolute number of sales of BEV/FEV and PHEV/E-REV per country



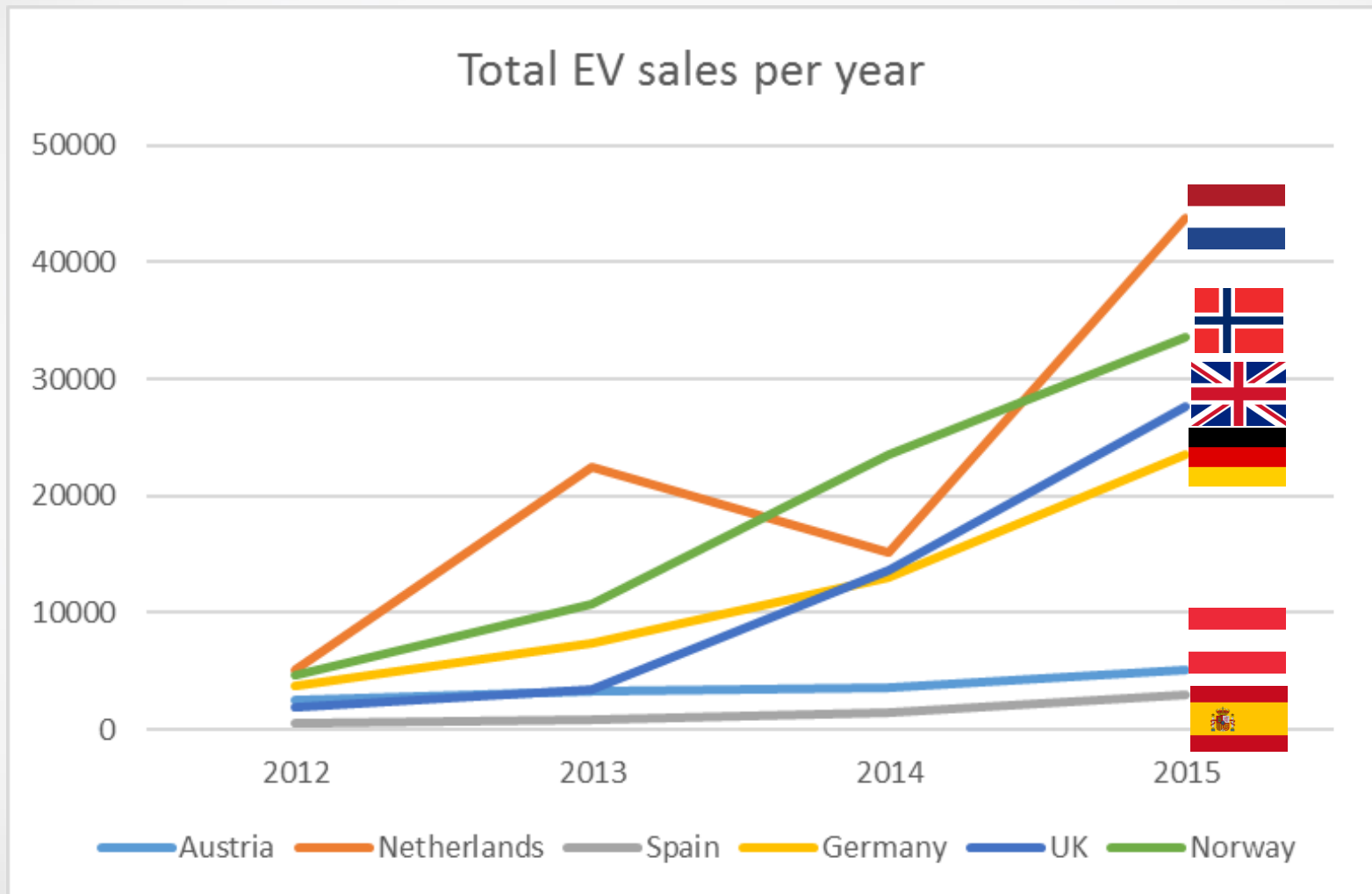
Percentages of sales of BEV/FEV and PHEV/E-REV of the total vehicle sales per country



EV's are all electric powered vehicles with a Plug. This includes BEV (Battery Electric Vehicle), FEV (Full Electric Vehicle), PHEV (Plug-in Hybrid Electric Vehicle), E-REV (Extended Range Electric Vehicle)

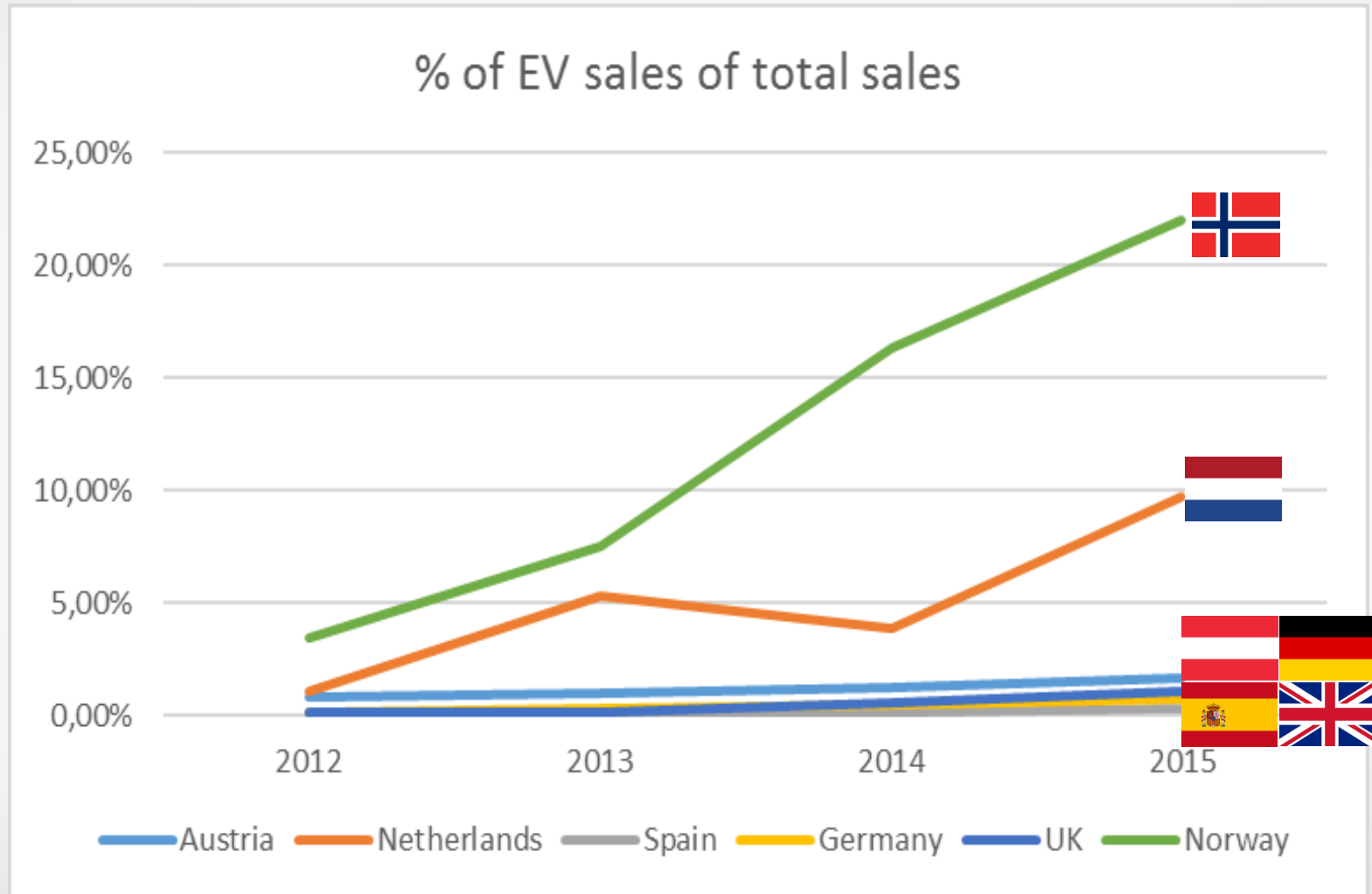
Success of EV uptake

Absolute number of sales of BEV/FEV and PHEV/E-REV per country



Success of EV uptake

Percentages of sales of BEV/FEV and PHEV/E-REV of the total vehicle sales per country



» Different financial incentives

Financial incentives:

Purchase-related measures such as (national level)

- Purchase Subsidies
- Reduced purchase tax (including VAT / purchase tax etc.)
- Other measures (like reducing the profit tax)

Operational-related measures for owners

- Reduction or exemption from road tax



Taxation for private usage of company car

- 'Benefit in kind' or 'Tax on Private Usage'

Purchase-related subsidies for local level (city / region level)

- Subsidies (-> local air pollution)

- Countries apply different types of financial incentives for the stimulation of EV uptake
- Countries with high taxation, can have a higher impact on costs differences by tax reduction or exception
- Large differences for the private and company ownership
- Some incentives also applicable for fuel efficient ICE vehicles (low CO2 emissions) → less successful for EV's.



Examples of National Purchase incentives

Tax break & Subsidy

Fleet buyers: 100%
1st year amortization
→ corporation tax

No purchase
tax for cars
with low CO2
≈ € 2.900

Up to 36% extra
depreciation for
companies (lower
tax on profit)

No purchase tax for BEV ≈ € 5.700
No VAT (usually 25%) for BEV ≈ € 5.800

Cars with CO2 emission
<75g/km: purchase cost
reduction of 35% up to
€ 6.000

Registration tax: 0% for
EV's, normally: 14,75%

€ 2.700 subsidy for EV < 40
km e-range; € 3.700 between
> 40 but < 90 km; € 5.500 >
90 km

No standard fuel
consumption tax
for (PH)EV, NoVA
(registration tax)

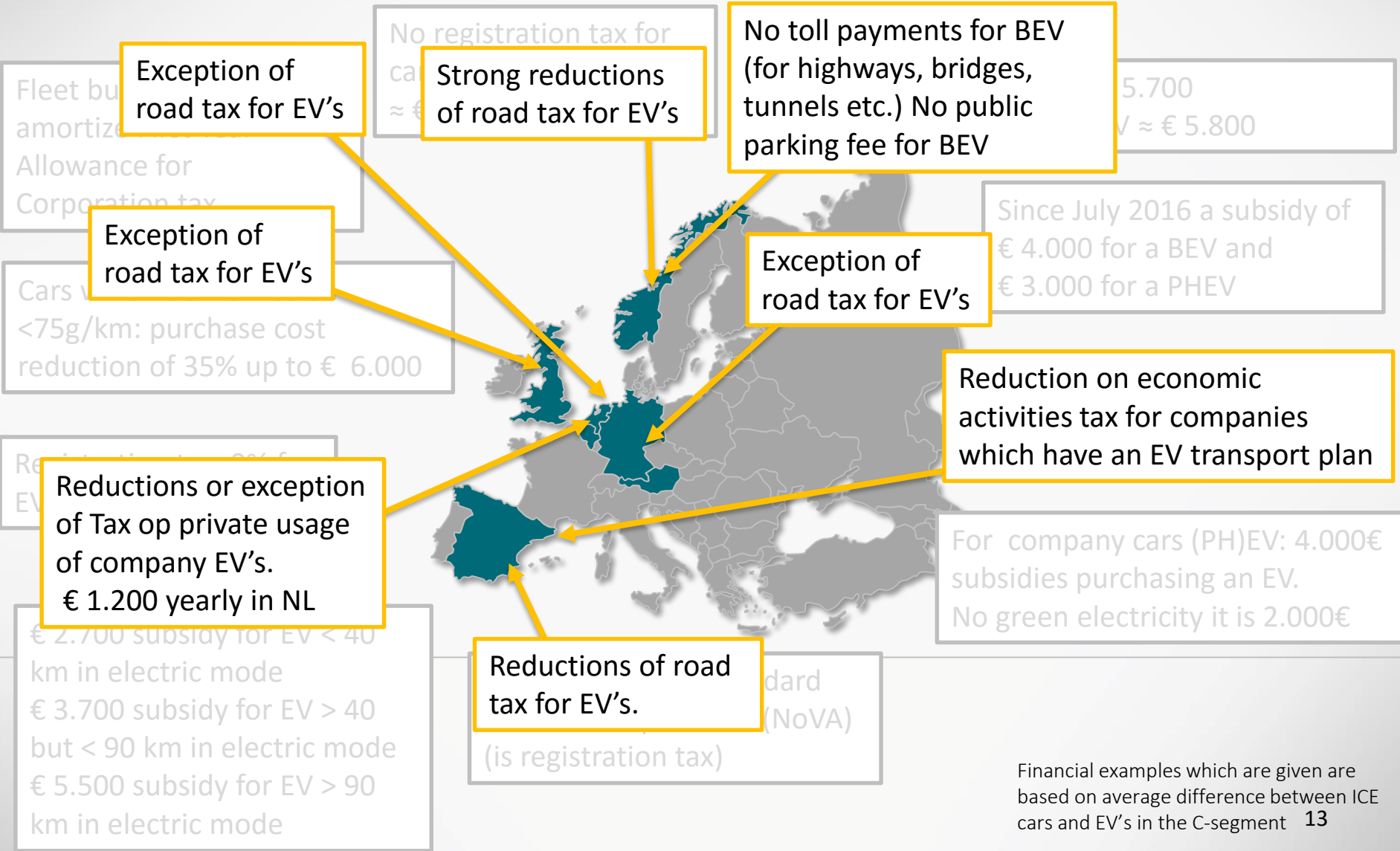
For companies VAT
on EV's deductible

7/2016: 4.000 subsidy for
BEV and € 3.000 for PHEV

For company cars (PH)EV: 4.000€
subsidies purchasing an EV.
No green electricity it is 2.000€

Financial examples which are given are
based on average difference between ICE
cars and EV's in the C-segment 12

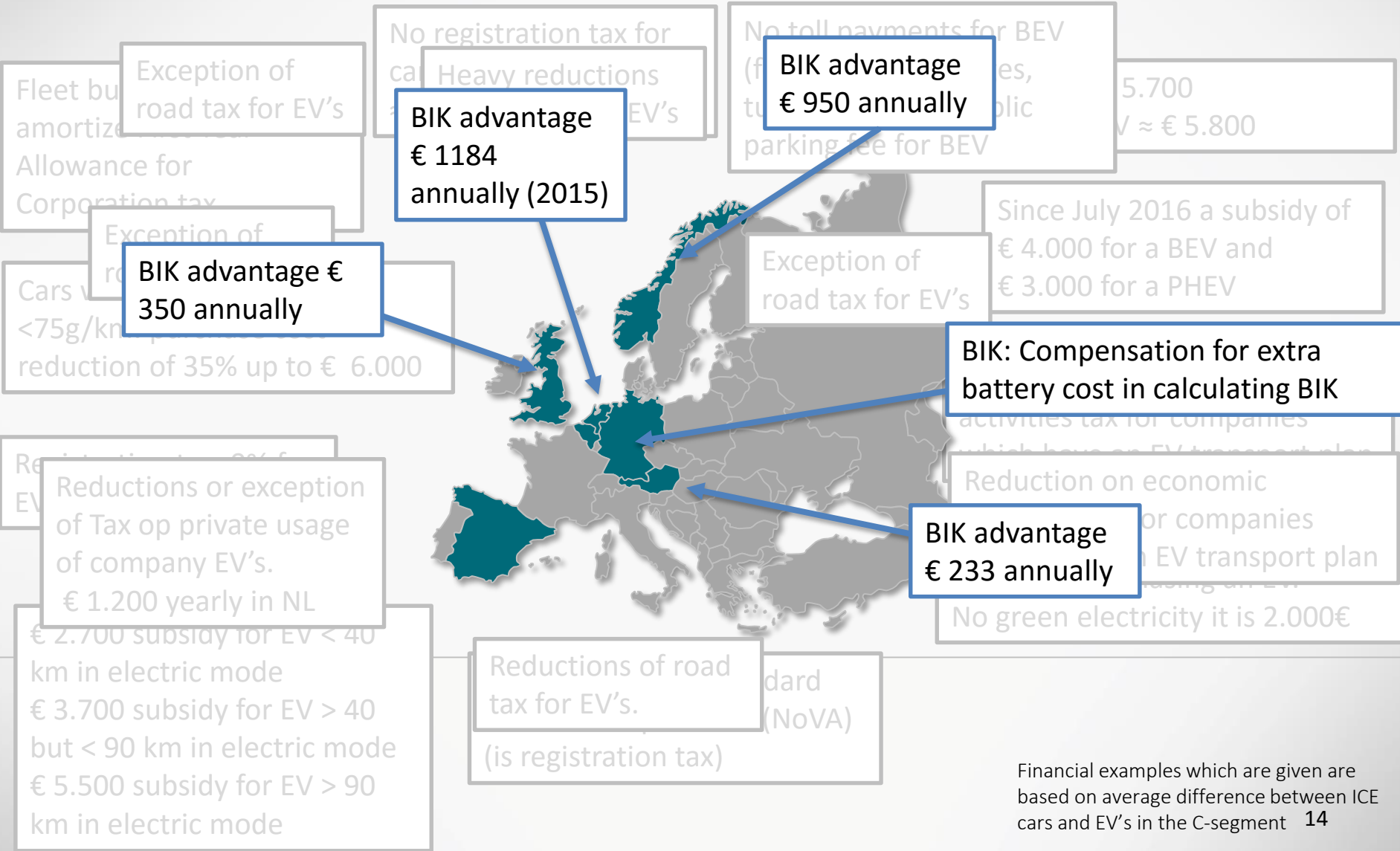
Examples of National Operational incentives



Financial examples which are given are based on average difference between ICE cars and EV's in the C-segment 13

Examples of Taxation for private usage of company car

(Benefit in kind)



Financial examples which are given are based on average difference between ICE cars and EV's in the C-segment 14

Segments selected for TCO calculations

- Financial incentives
- Non-financial incentives
- Public Charging Infrastructure
- Regional/Local conditions

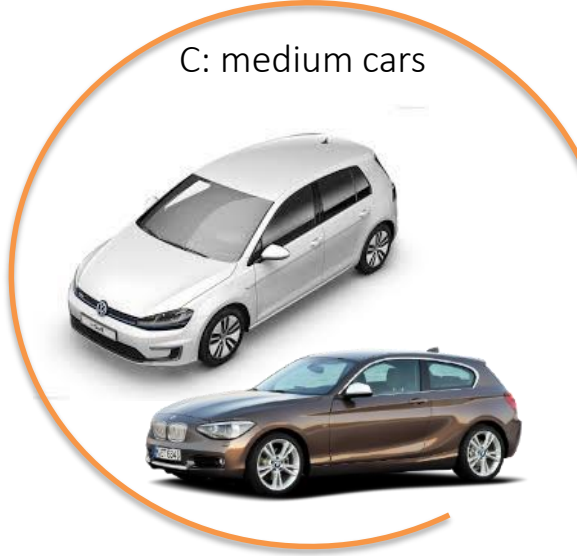
A: mini cars



B: small cars / supermini



C: medium cars



D: large cars



E: executive cars

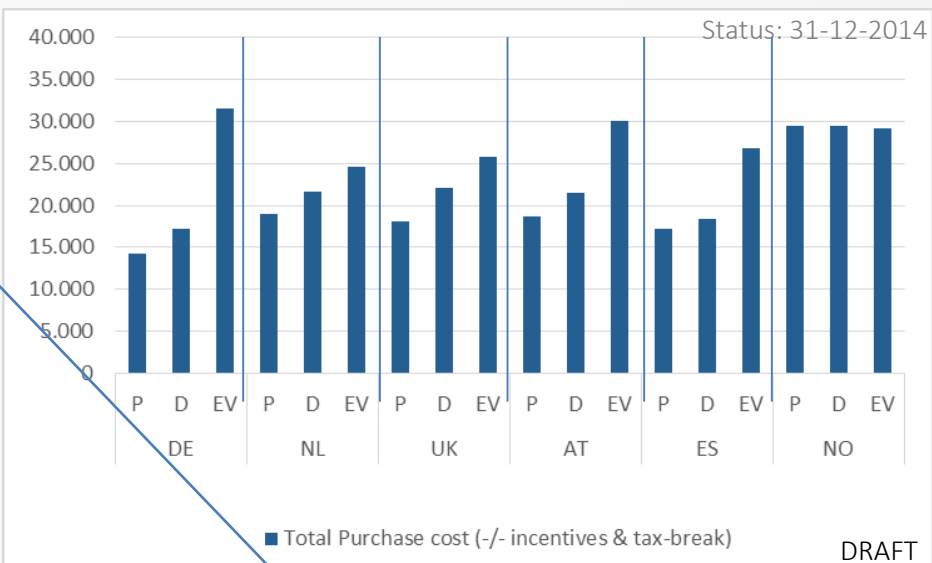
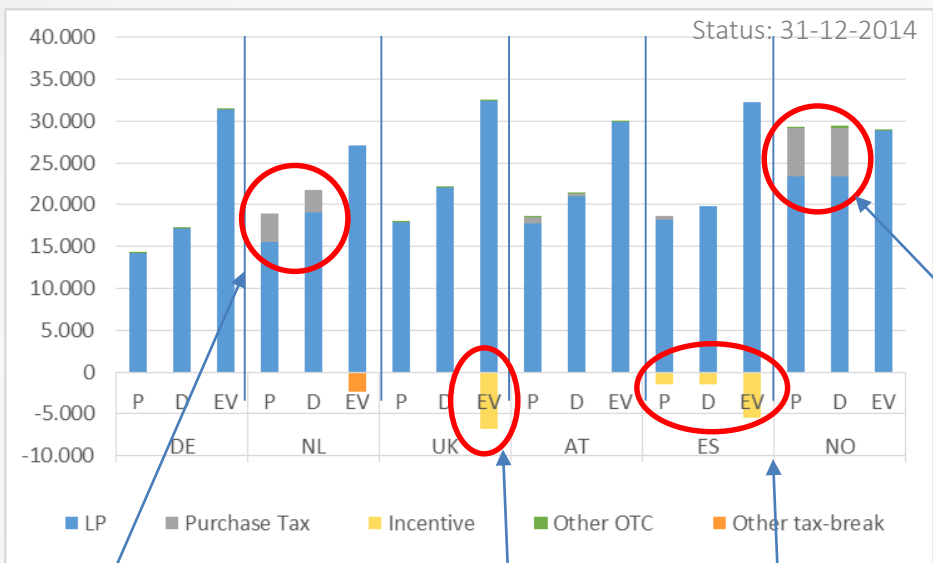


N: delivery van





Purchase costs, Company ownership, C segment



High purchase tax in NL on ICE vehicles

High financial incentive in UK for EV's with Plug

High financial incentive in Spain for environmental friendly cars

High purchase tax in NO on ICE vehicles

P: Petrol
 D: Diesel
 ICE: Internal Combustion Engine
 EV: Electric Vehicle
 LP: List Price
 OTC: One Time Costs

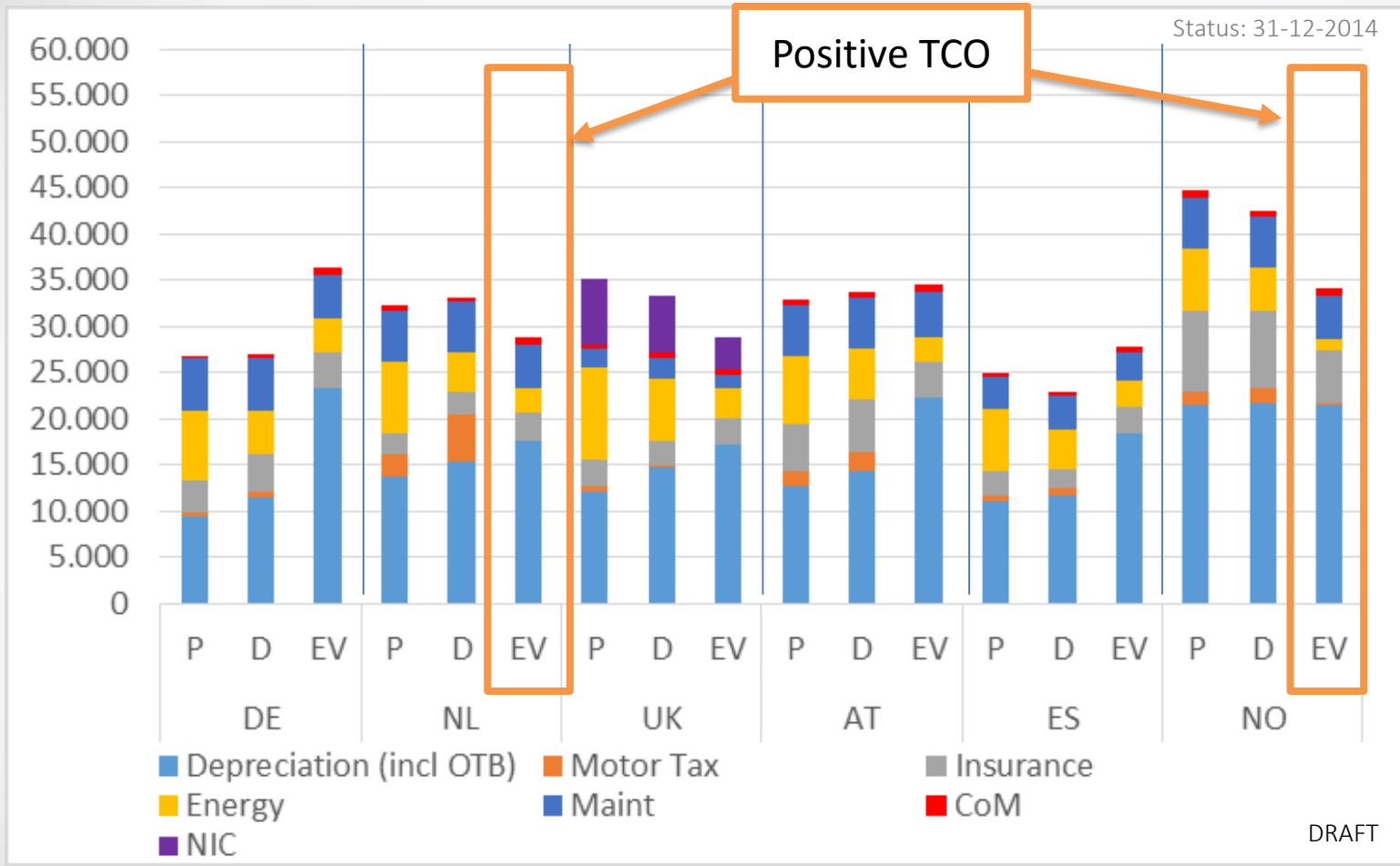


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TCO, 4 year company ownership, C segment, 24.000 km/a



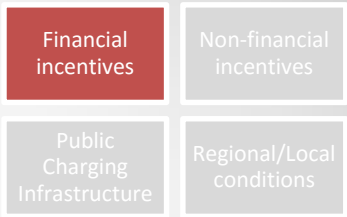
TCO costs are cumulative cost of 4 year

P: Petrol
D: Diesel
EV: Electric Vehicle
TCO: Total Cost of Ownership
OTB: One Time Benefits
Energy: petrol/diesel/electricity costs
NIC: National Insurance Contribution (social tax)
Maint: Maintenance costs
CoM: Cost of Money
ToPU: Tax on Personal Usage



Co-funded by the Intelligent Energy Europe Programme of the European Union.

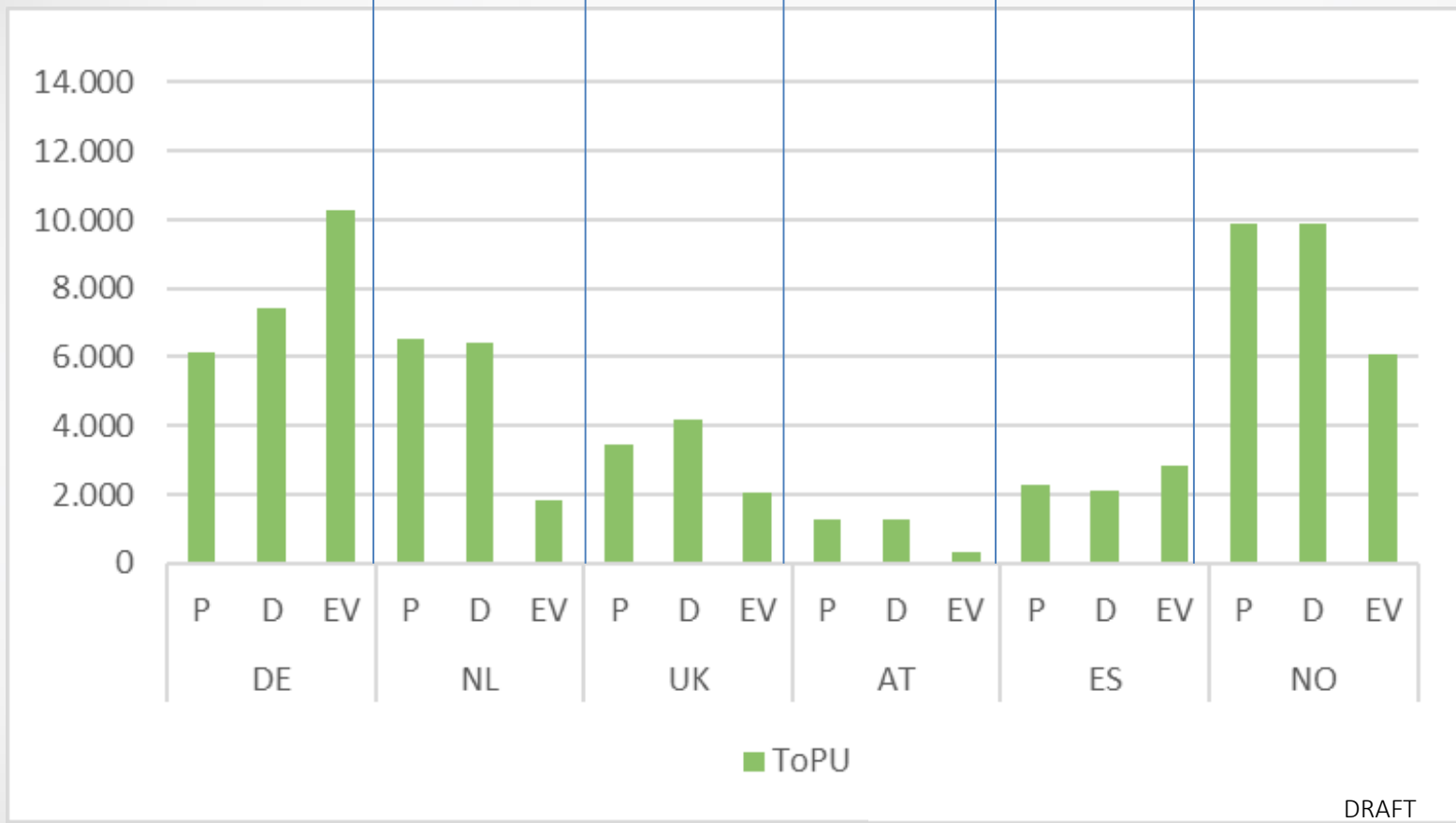




BIK, 4 year company ownership, C segment

Benefit in Kind or Tax on Private Usage of company car

Status: 31-12-2014



ToPU: Tax on Personal Usage

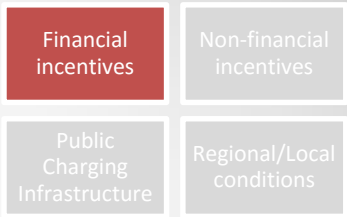


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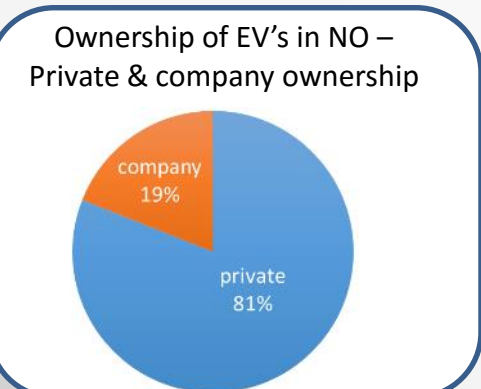
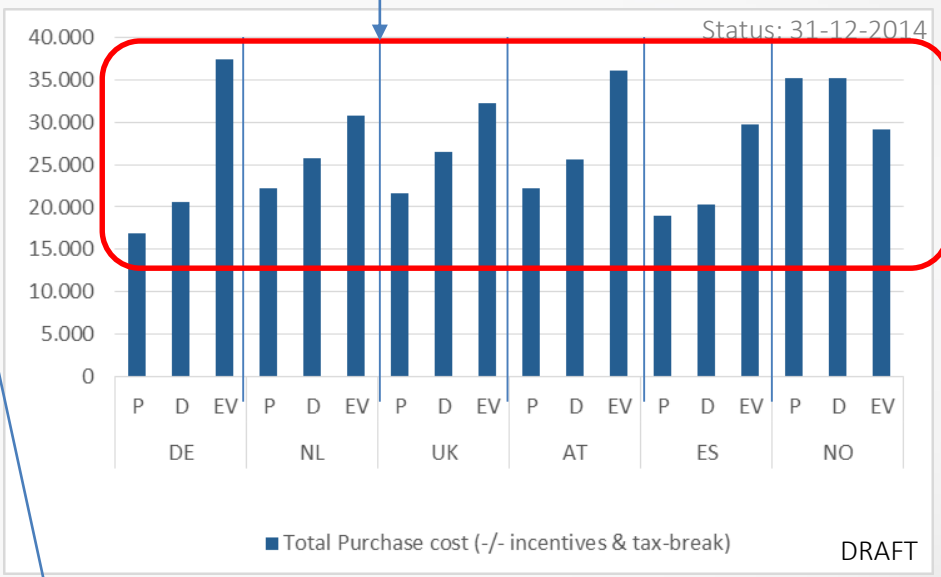
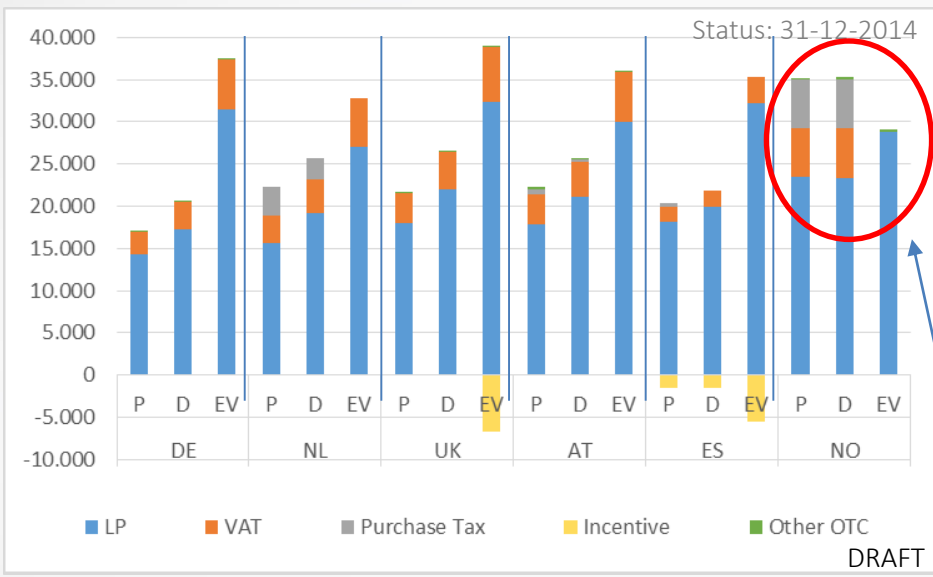




Purchase costs, Private ownership, C segment



In all countries EV's are more expensive, except for NO

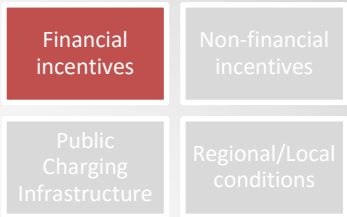


EV is without VAT and Purchase tax
→ If you target private ownership, it will increase the sales in the private market

- P: Petrol
- D: Diesel
- EV: Electric Vehicle
- LP: List Price
- OTC: One Time Costs

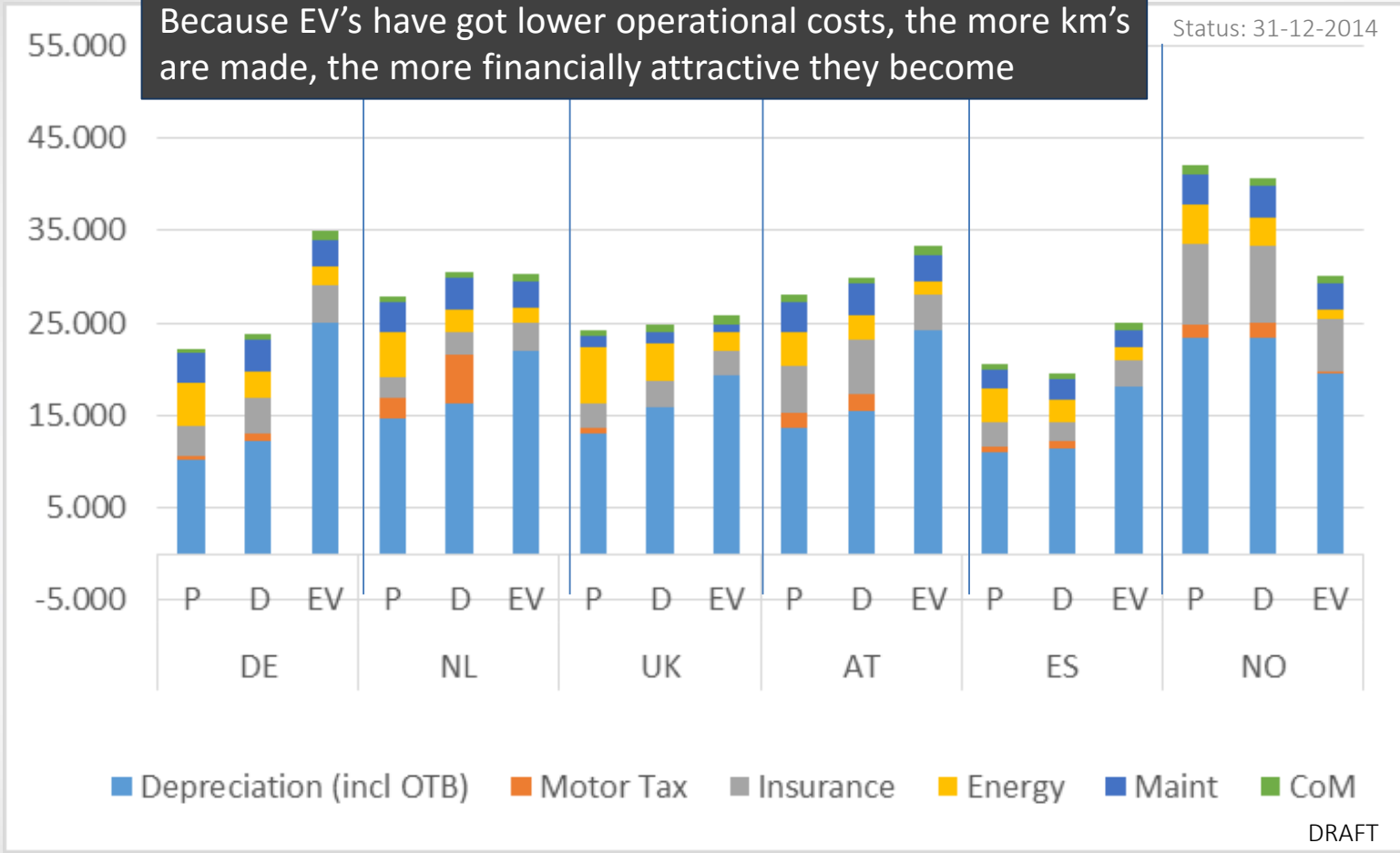


TCO, 4 year private ownership, C segment, 12.000 km/a



Because EV's have got lower operational costs, the more km's are made, the more financially attractive they become

Status: 31-12-2014



TCO costs are cumulative cost of 4 year
P: Petrol
D: Diesel
EV: Electric Vehicle
TCO: Total Cost of Ownership
OTB: One Time Benefits
Energy: petrol/diesel/ electricity costs
Maint: Maintenance costs
CoM: Cost of Money

DRAFT

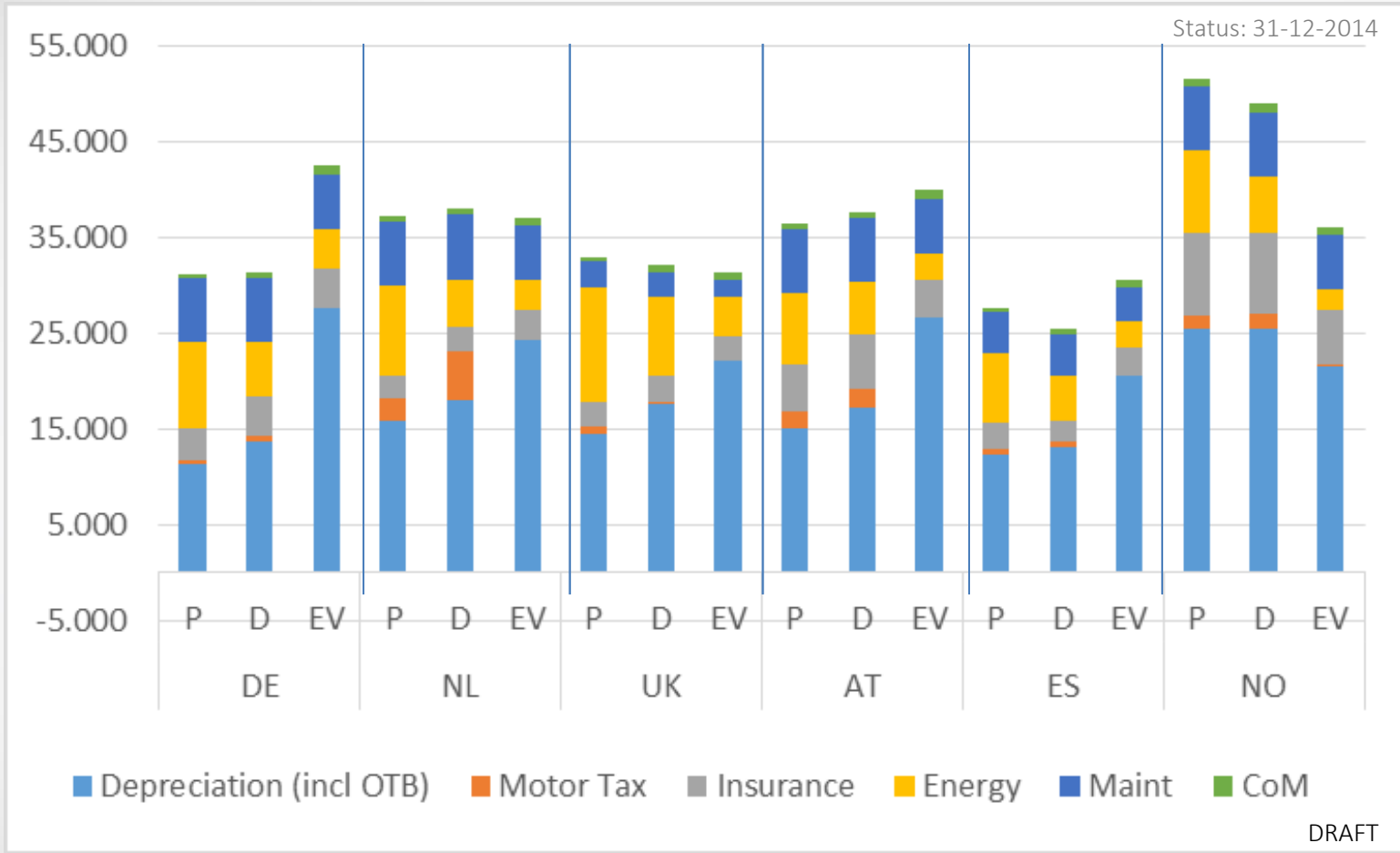


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TCO, 4 year private ownership, C segment, 24.000 km/a



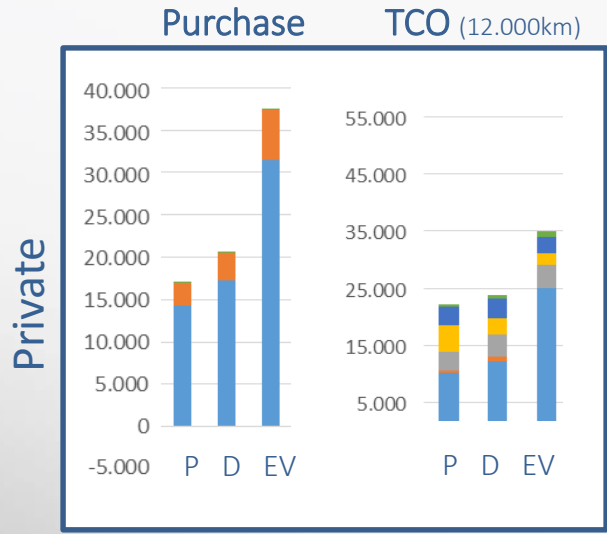
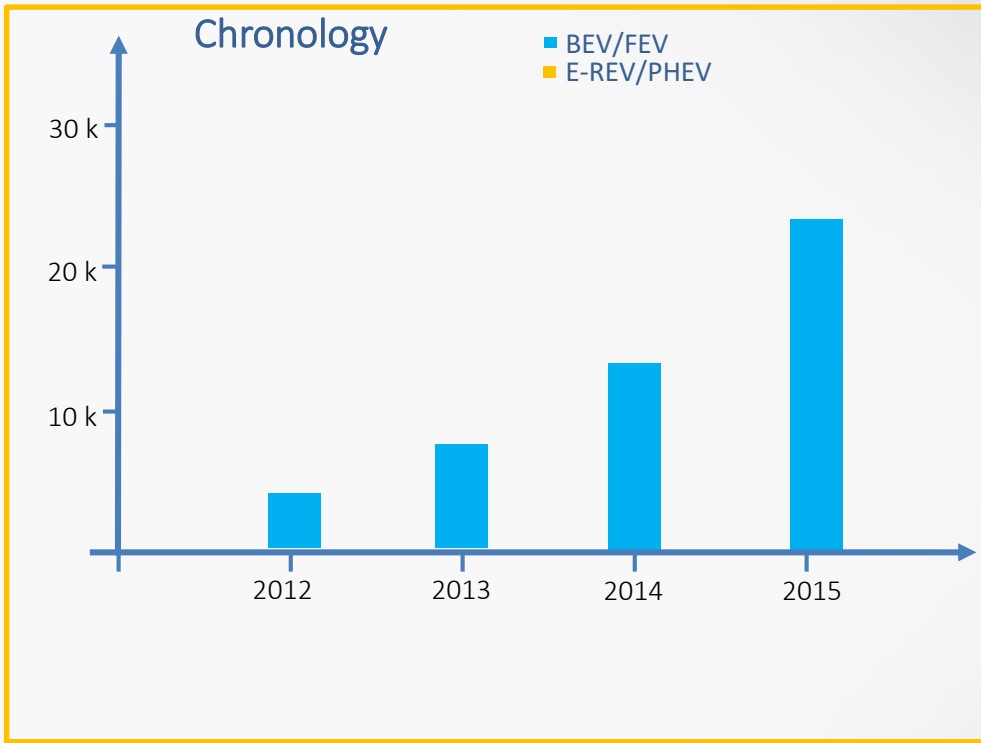
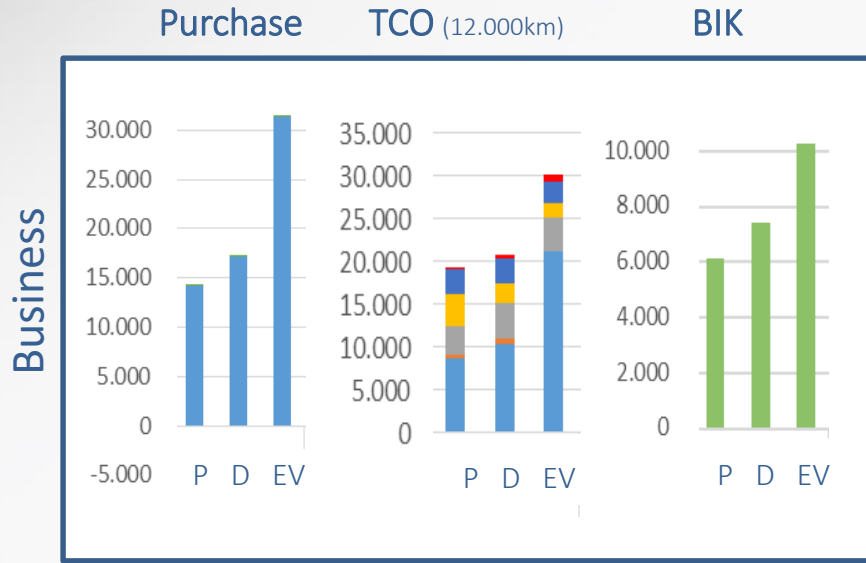
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Success of EV uptake – Germany



(Non-financial) incentives

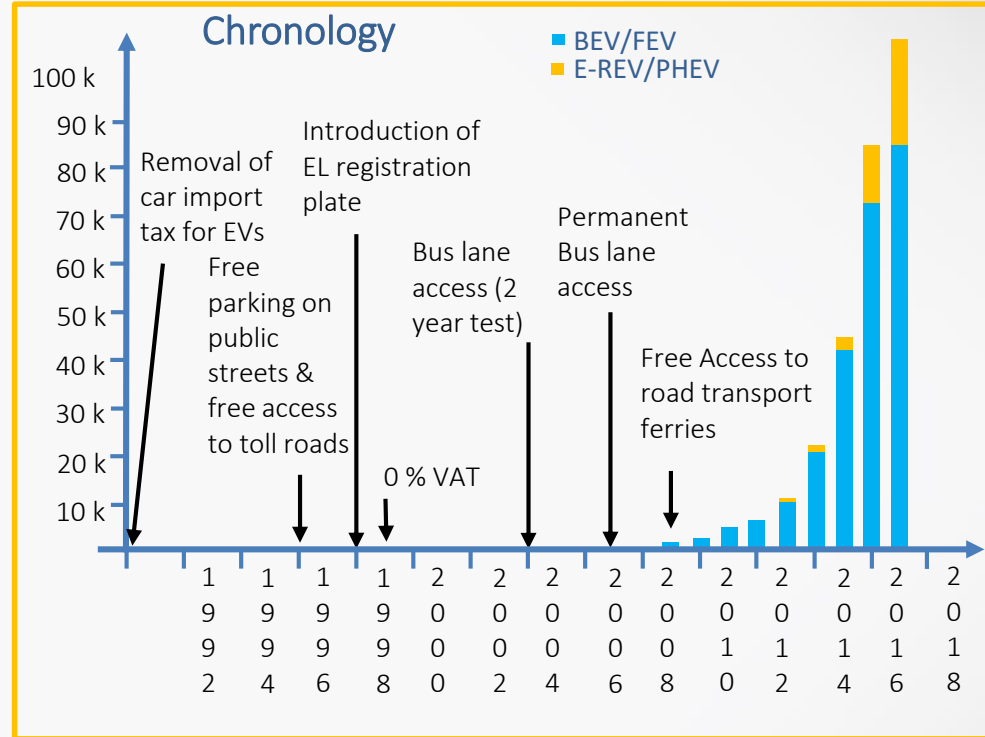
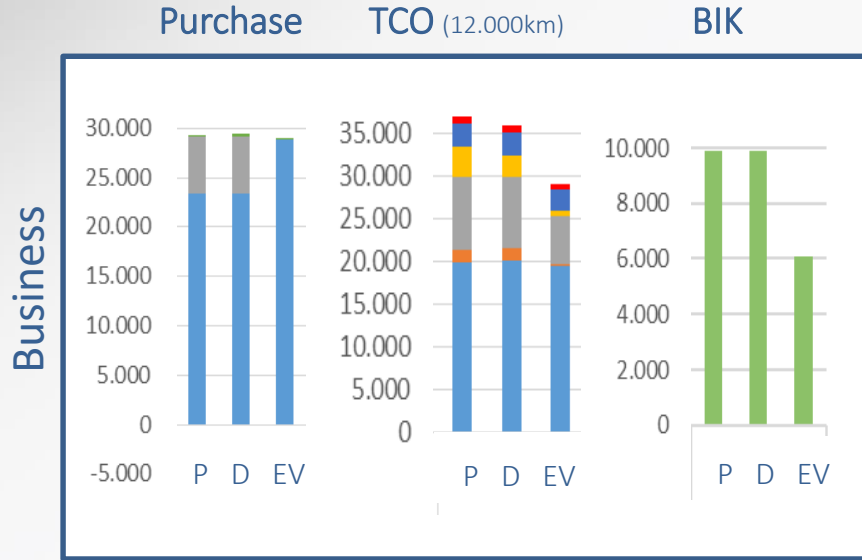
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Ambitions:

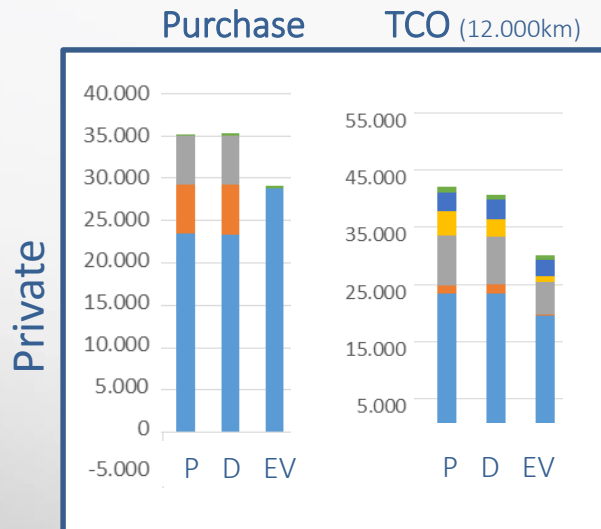
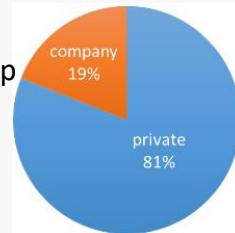
- 2020: 1.000.000 EV's
- 2020: 34.000.000 ton CO2 reduction
- 2030: cut climate gas emissions by 40%, compared with 1990 levels



Success of EV uptake – Norway



Ownership of EV's in NO – Private & company ownership



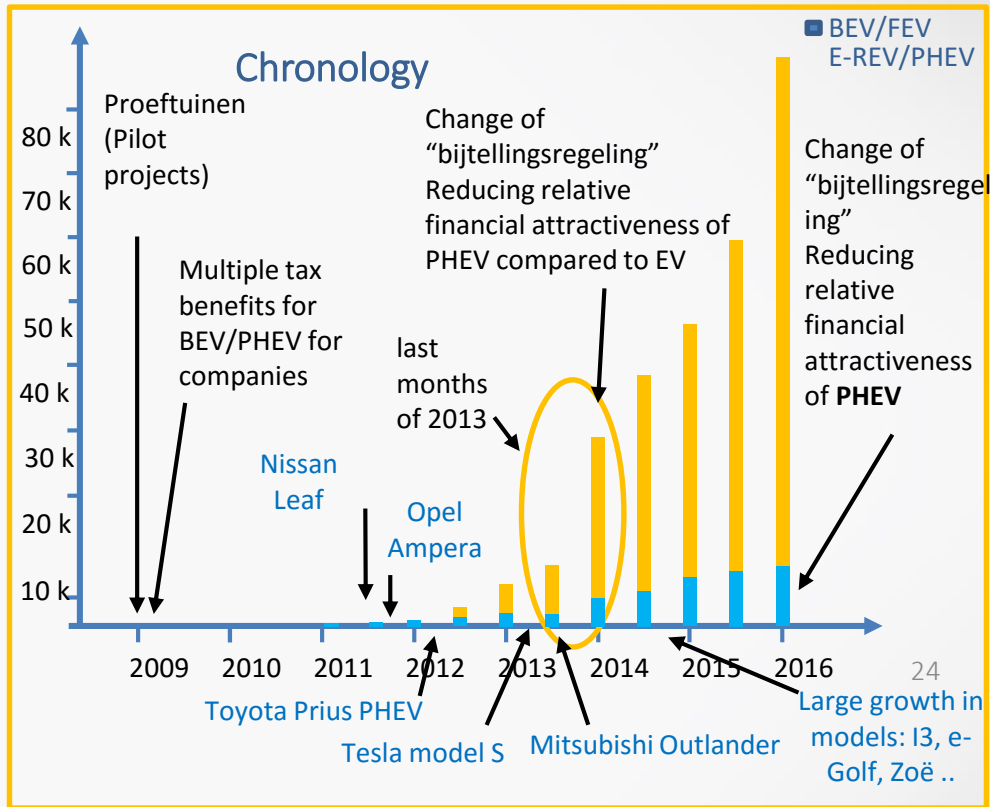
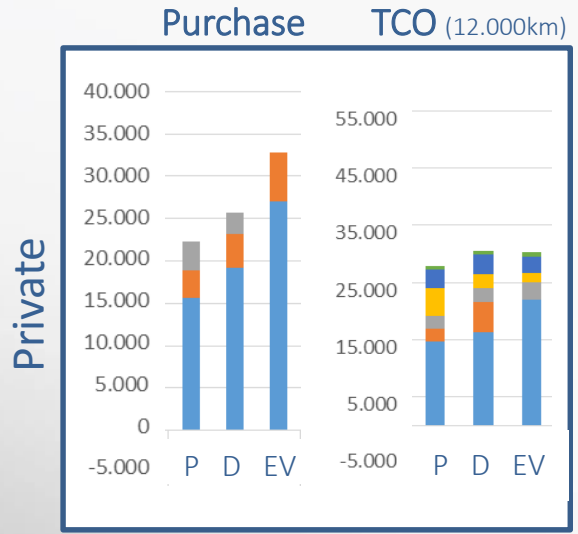
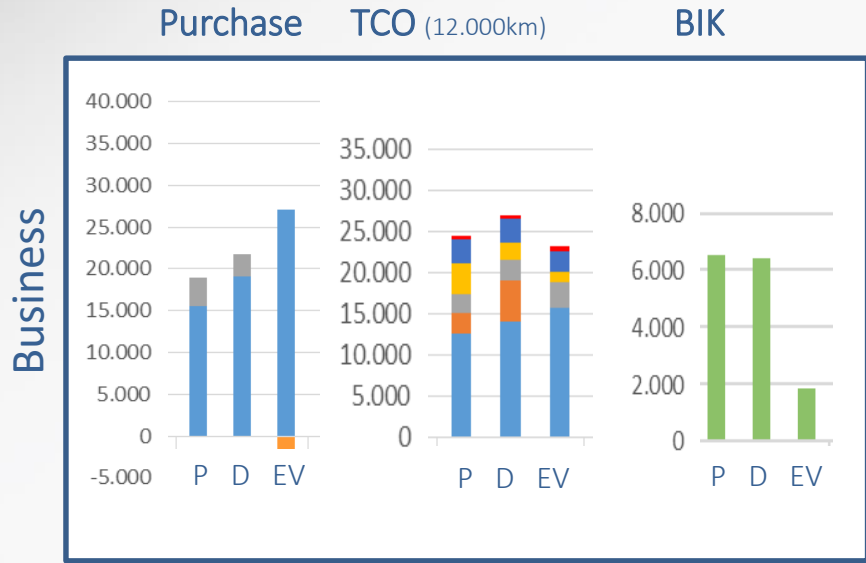
(Non-financial) incentives

- Free parking and (slow) charging on public streets
- Free access to toll roads
- Bus lane access
- Free Access to road transport ferries

Ambitions:

- 2015: Fleet City of Oslo 100% EV
- 2018: 50.000 zero emissions vehicles (2015)
- 2020: Fossil free public transportation Oslo
- 2022: All taxis zero emission Oslo
- 2025: All new registered cars zero emission
- 2030: Climate gas emissions -40% (1990)

Success of EV uptake – The Netherlands



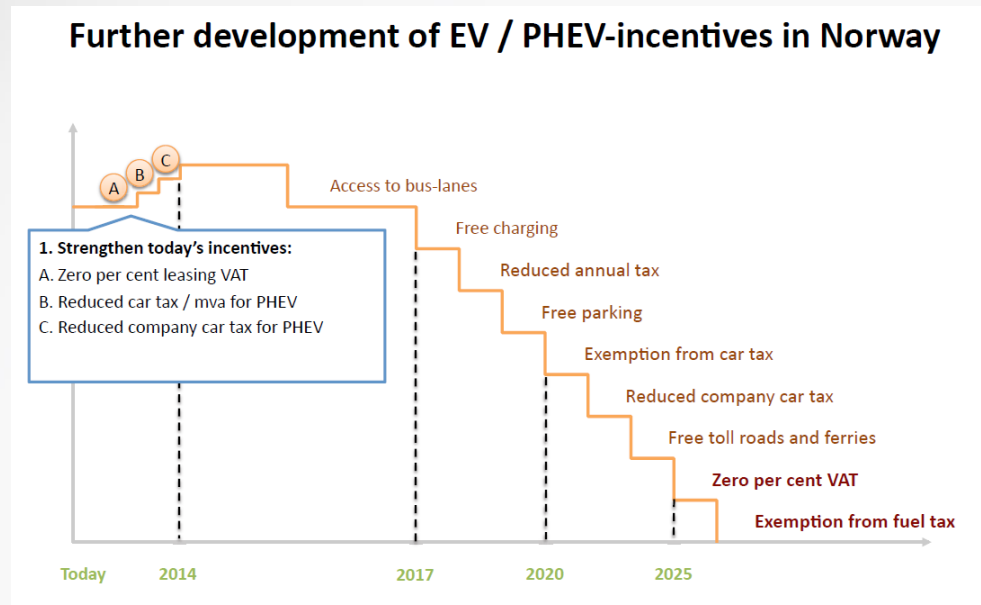
(Non-financial) incentives

- Very limited, only on regional level (Free parking / free charging)

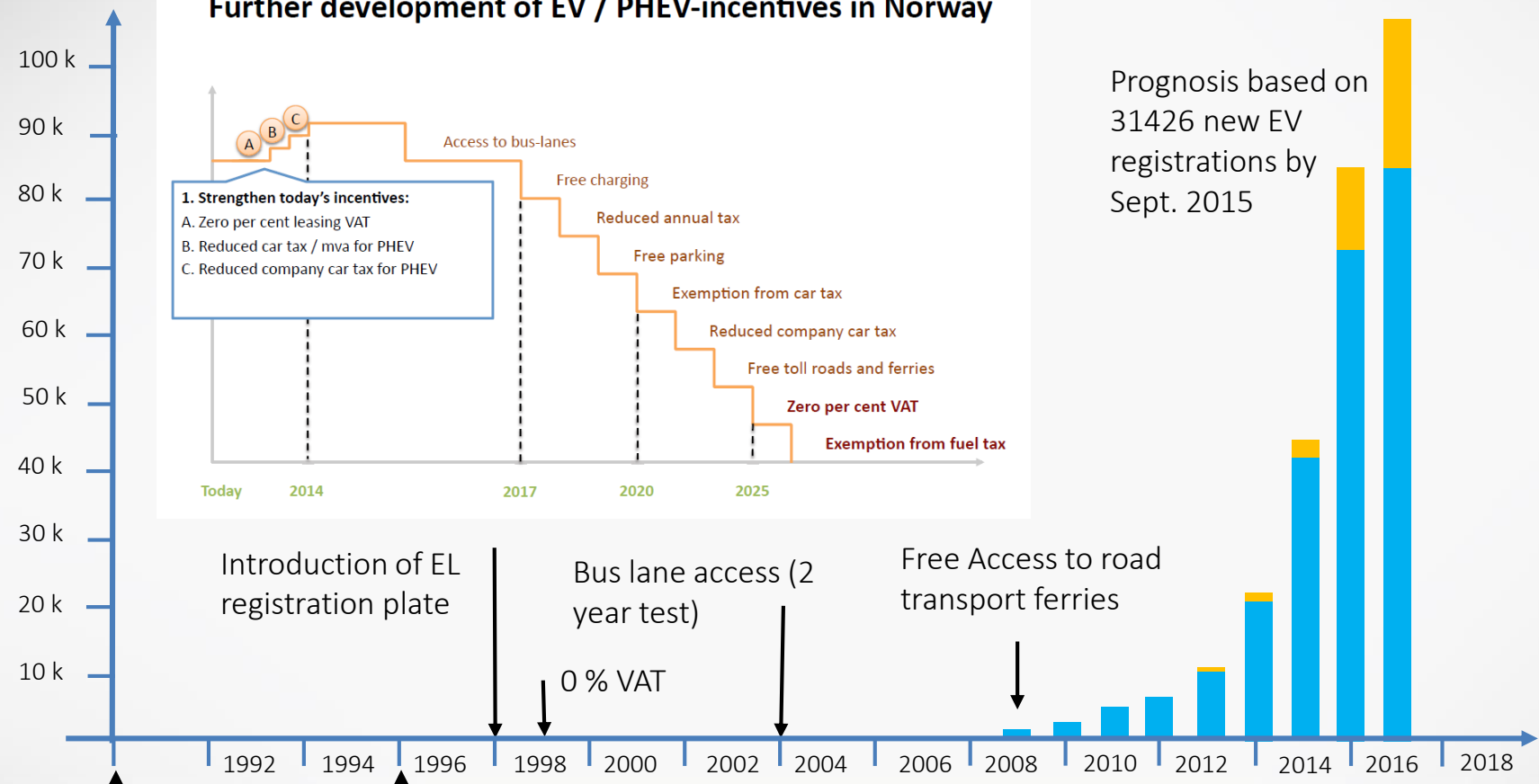
Ambition:

- 2020: 200.000 EV's
- 2035: All new registered cars zero emission
- 2050: Total car park zero-emission in 2050 & 60% less CO2 emission (1990)
- Nationwide network of charging points

Chronology in Norway



Prognosis based on 31426 new EV registrations by Sept. 2015



Introduction of EL registration plate

0 % VAT

Free parking on public streets & free access to toll roads

Bus lane access (2 year test)

Free Access to road transport ferries

Removal of car import tax for EVs

Permanent Bus lane access

Status 5.11.2015, Bosch, GS/PJ-PFP

■ E-REV/PHEV
 ■ BEV/FEV

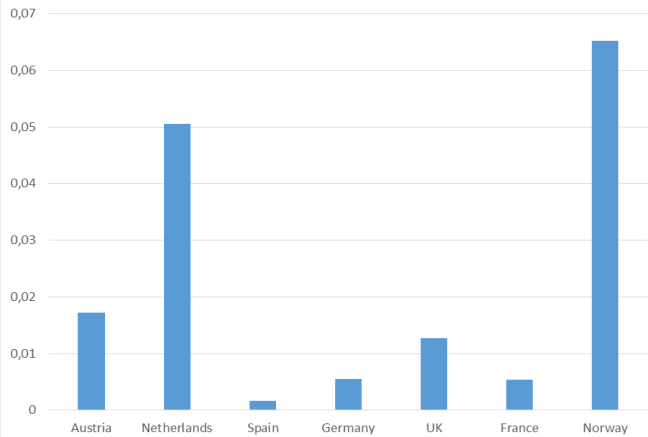
Key words: Consistency and long term predictability!

I-CVUE

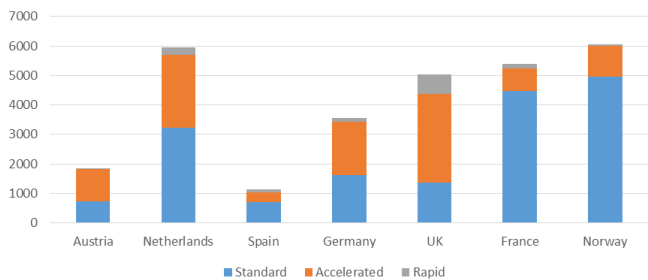
Boundary Conditions

Public Charging Infrastructure

Charge point / km road



Charging points per country



Non-financial incentives

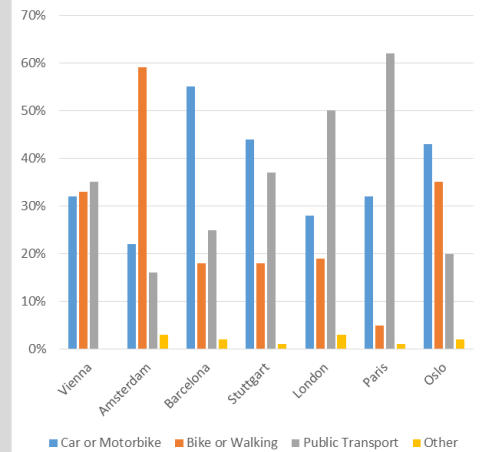


Vehicle Type	Fee (Kr)
3.5t truck	75
Car	25
Electric Car (EL)	0

Regional / Local conditions

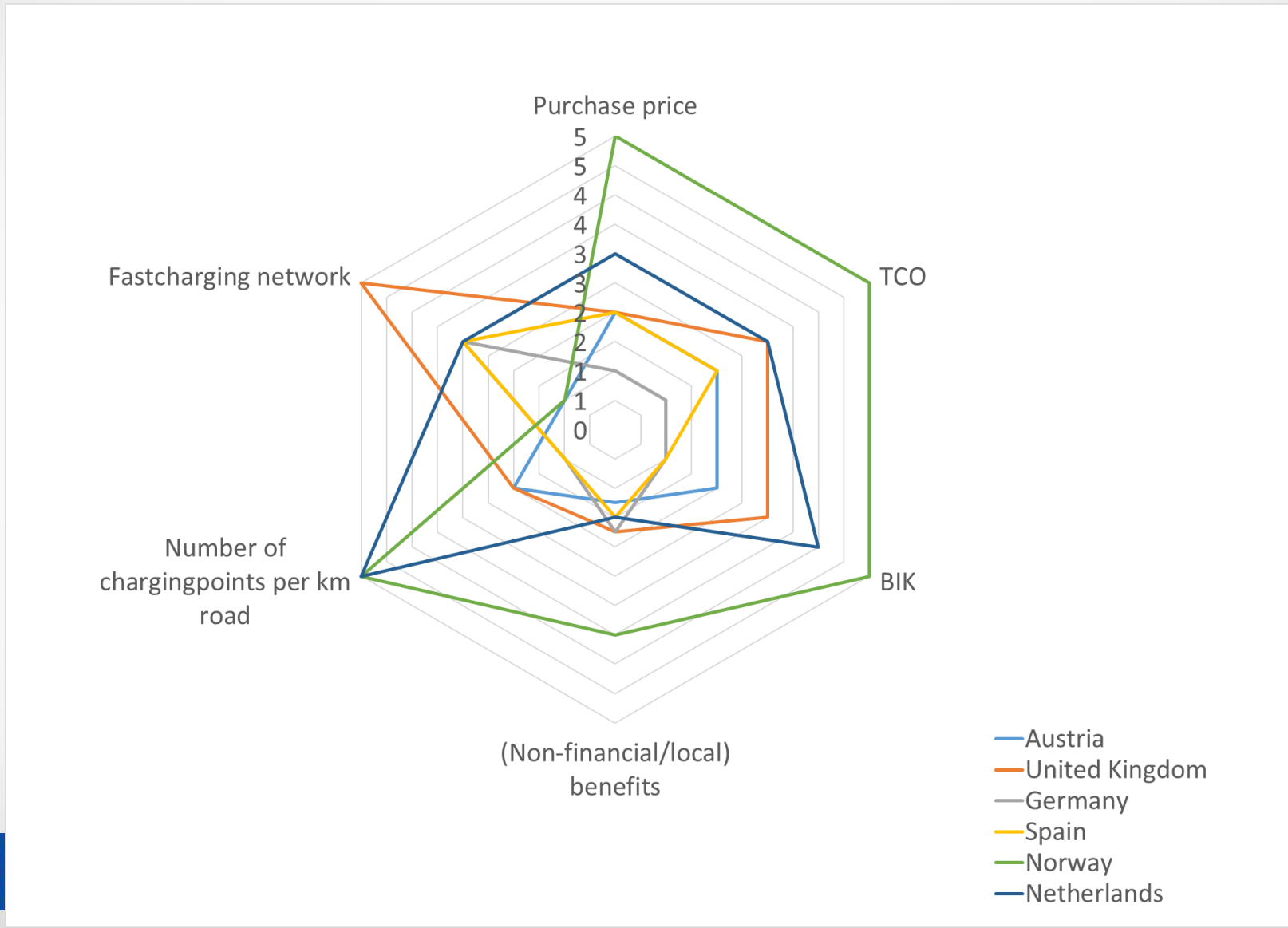


Travel mode in city



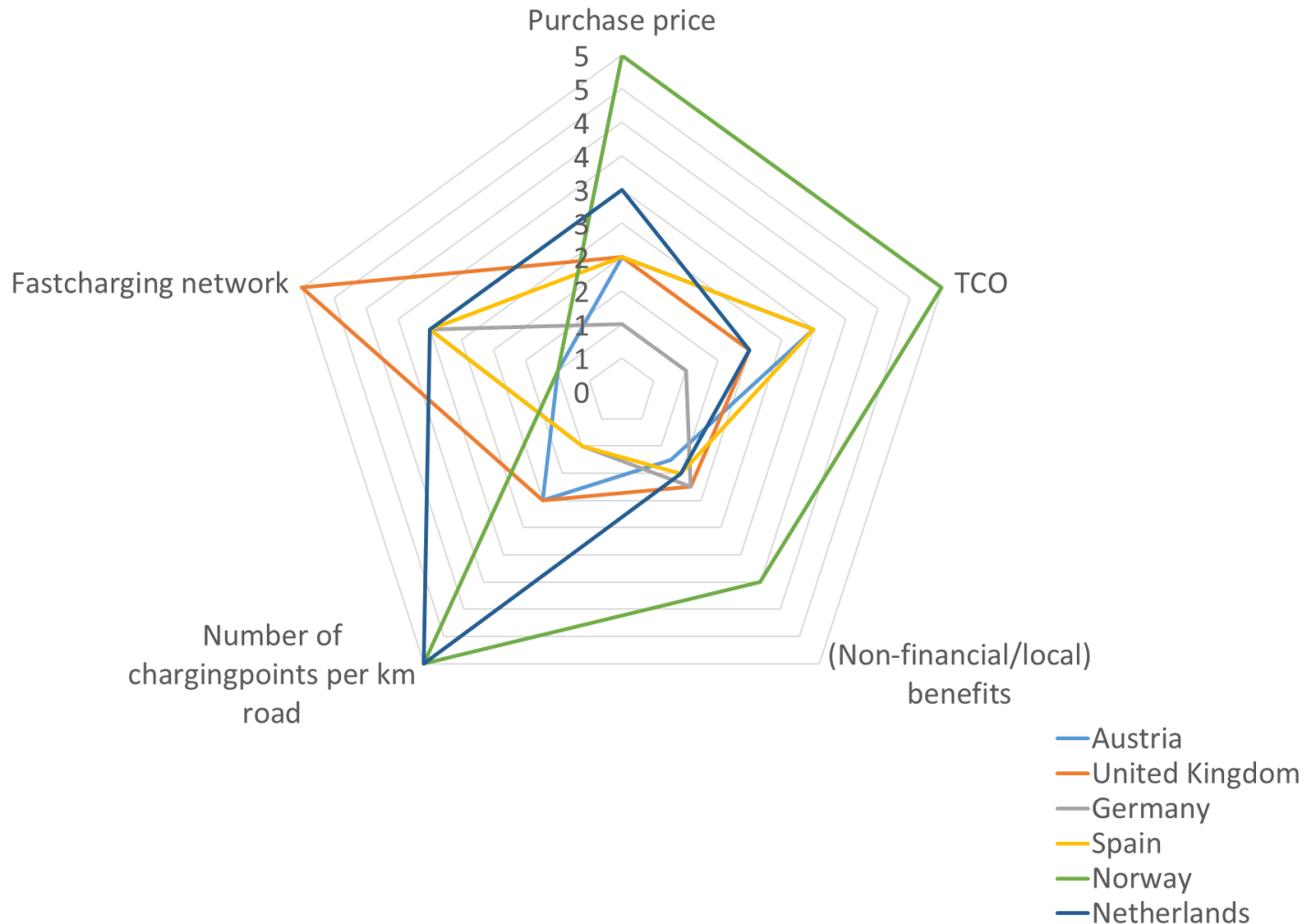
Spider web of boundary conditions

For business usage



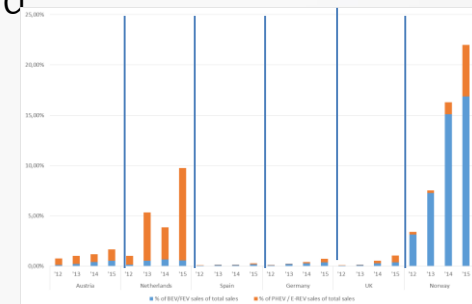
» Spider web of boundary conditions

For private usage



» Main conclusions

- More room for incentives for countries with high purchase tax
→ The polluter pay principle!
- For substantial impact on EV uptake, financial incentives need to:
 - Minimize the purchase price premium (EV – ICE)
 - Create a TCO advantage over ICE (overcome the obstacles and limitations of EV)
- Above threshold uptake-effects of incentives become progressive, below threshold effects are minimal.
- VAT exemption effects on new (private & business) and used EV sales
- Tremendous impact of daily advantages like road/parking priorities and recurring toll-cost
- Crucial: Consistent & long term stable incentive policy, including an well in advance communicated logical incentive dismantling strategy
- Dense network of (public) chargers satisfying the needs of EV drivers and matching the characteristics of their cars: Right locations, available & accessible, affordable prices and right charging speed.





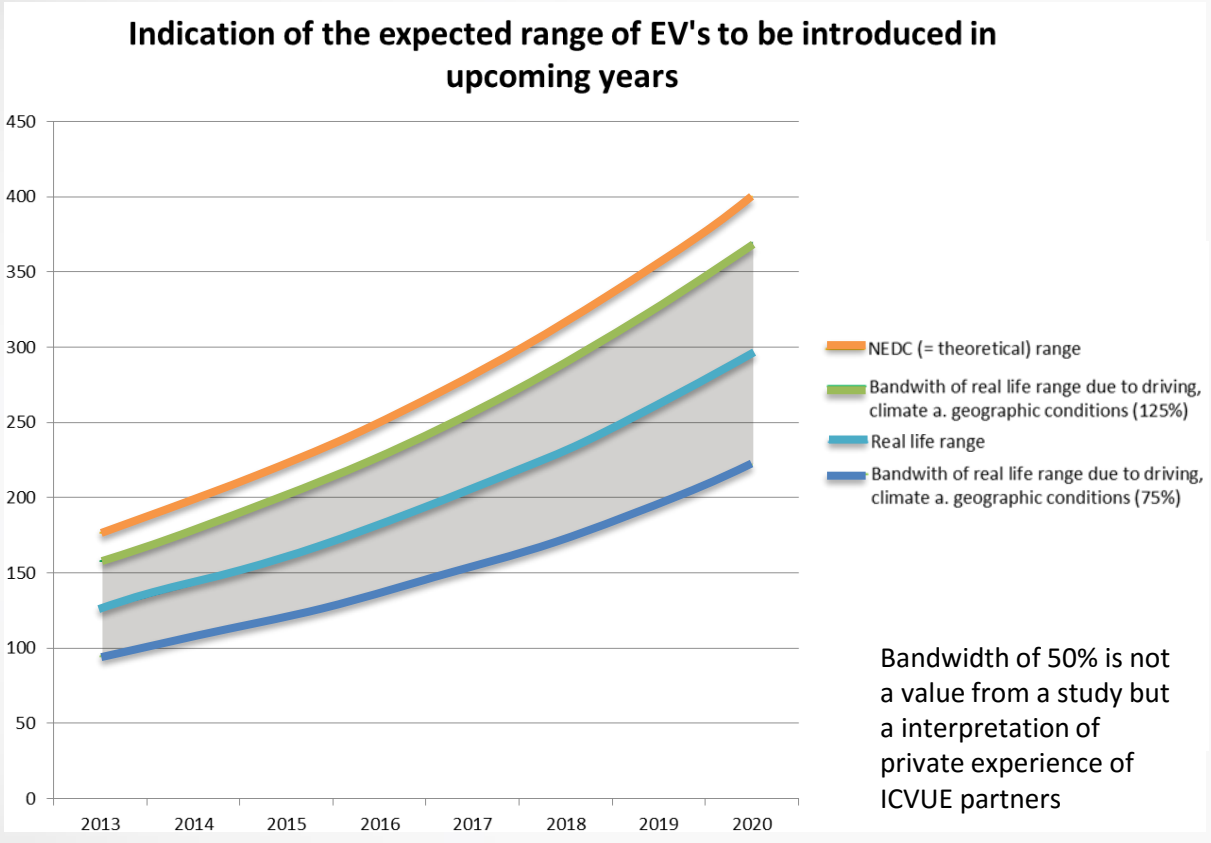
» Main conclusions

VAT exemption

- Strong influence on sales price difference relative to ICE (high net-price EV's)
- Effect of VAT exemption:
 - New EV's sold to businesses “land” as pre-owned in the private market (VAT is added)
 - Vat exemption direct effects for private market: new and pre-owned
 - Indirect effect new market → Higher residual value → Lower depreciation of new EV's → Lower leasing costs → Higher sales new EV's → Positive effect on the private and business market
- Disparities in VAT exemptions between countries create import/export flows of pre-owned vehicles → Export of (earlier subsidised) CO2 & hazardous emissions saving potential!



Indication of expected range of EV's



Remarks:

- Theoretical range is based on information provided by OEM's and/or market experts
- Real life range from current available models is based on information from journalists / vehicles tests
- Real life range for future models is based on the average deviation between theoretical range and real life range of current available models (27%)
- Vehicles which are included in this research have (or will have) a list price in a range of € 20.000 and € 40.000.



Co-funded by the Intelligent Energy Europe Programme of the European Union.





Decision support model

Introduction of the DSM webtool



DLR

Deutsches Zentrum
für Luft- und Raumfahrt
German Aerospace Center

» Decision support model

Calculation model to identify business cases for EV's

Fleet managers

Fleet level

- TCO calculation tool including monetary incentives
- Easy to use, fast to access, full of expert knowledge, still flexible to use
- To compare plug-in electric vehicles to conventional reference vehicles

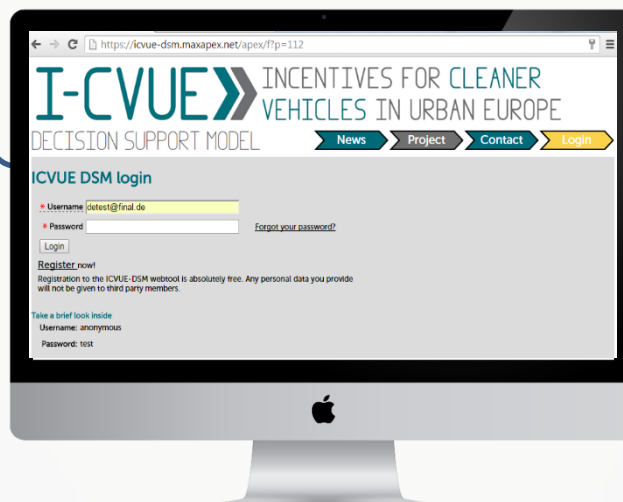
Policy makers

National level (In development)

- Possibility to analyze regional conditions for EVs (e.g. free parking etc.)
- Transfer of incentives between regions or countries
- Predictive modelling

Next steps:

- Consider first & secondary vehicle market
- Adding countries, updating, and continuation to 2020.



Please go to
the website and
register at
icvue.eu

Invitation for cooperation

- Contact us if interested in
 - Further expansion of the study (add your country e.g.)
 - Continuation of study
 - Interested in EV policy (advice)
 - Etc.



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