

AFRY

ÅF PÖYRY

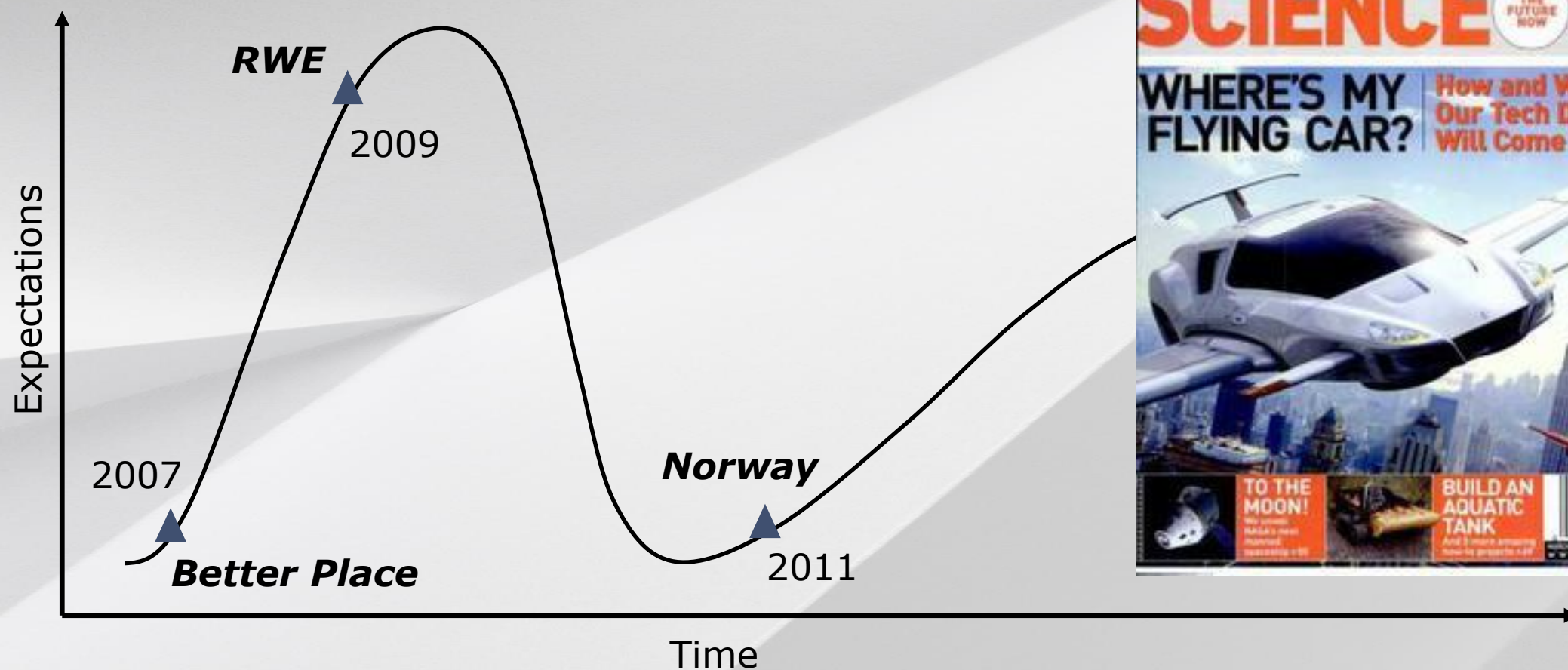


# Opportunities for Utilities to Propel the Mobility Transformation

Patrick GASSER

05 FEBRUARY 2020

## The journey of e-mobility



Source: Where is my Flying Car?, Popular Science, 2008





## **STORY:**

- Founded in 2007
- Investment of USD 850 million
- 21 operational battery-swap stations
- 1400 cars deployed in Israel and Denmark
- Filed for bankruptcy in 2013

## **MAJOR PROBLEMS:**

- High investments required
- Low demand for electric vehicles



Source: Battery-Swapping Israeli Startup Better Place Is Dead, Jalopnik.com, 2013

# RWE

## STORY:

- Over EUR 100 million marketing campaign
- Over-optimistic forecast: 2.4 million electric vehicles in 2016 in Germany
- Actual: 74'754 **x32!**

## MAJOR PROBLEM:

- High prices of electric vehicles



Source: RWE Marketing Video, YouTube, 2009



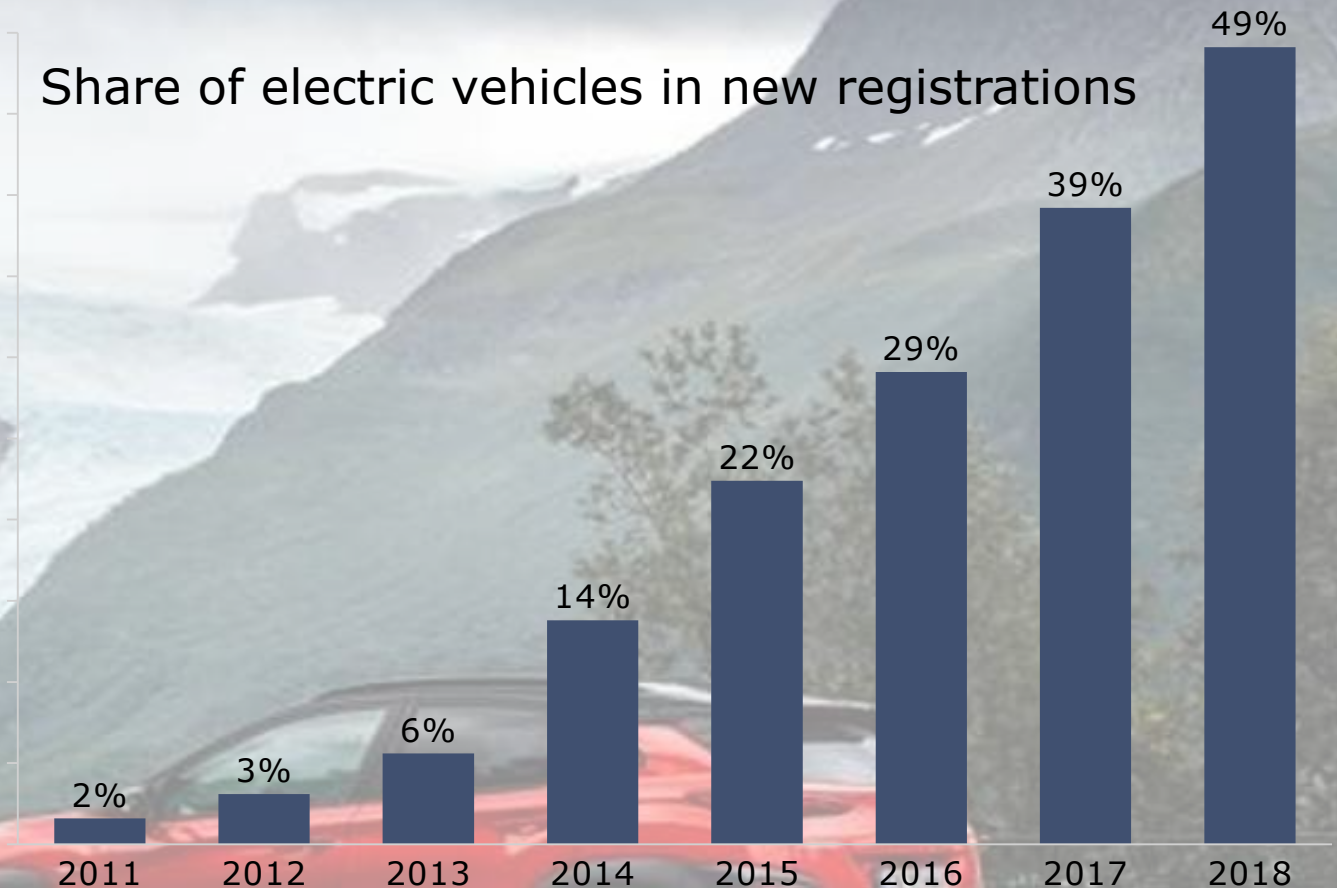
Norway



### REGULATORY CHANGES:

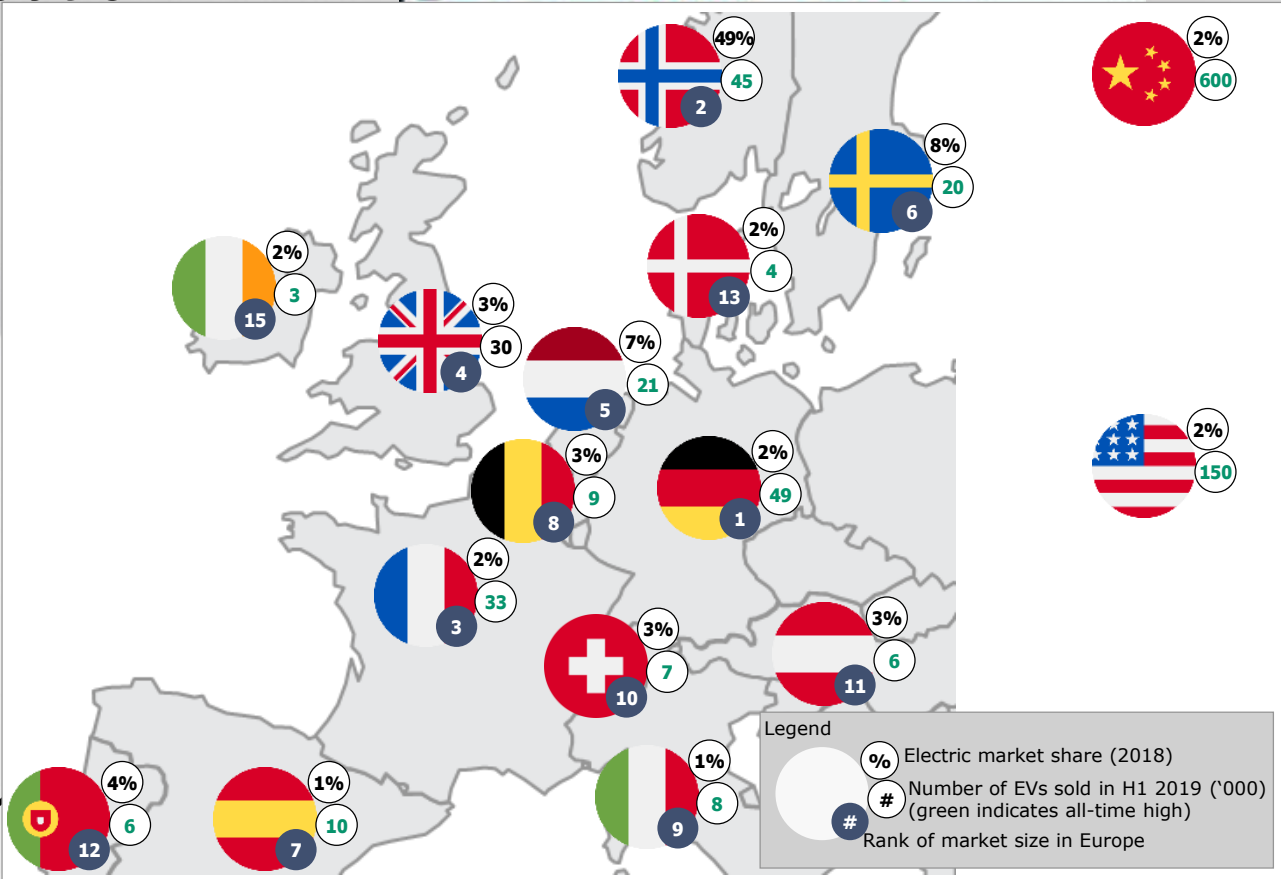
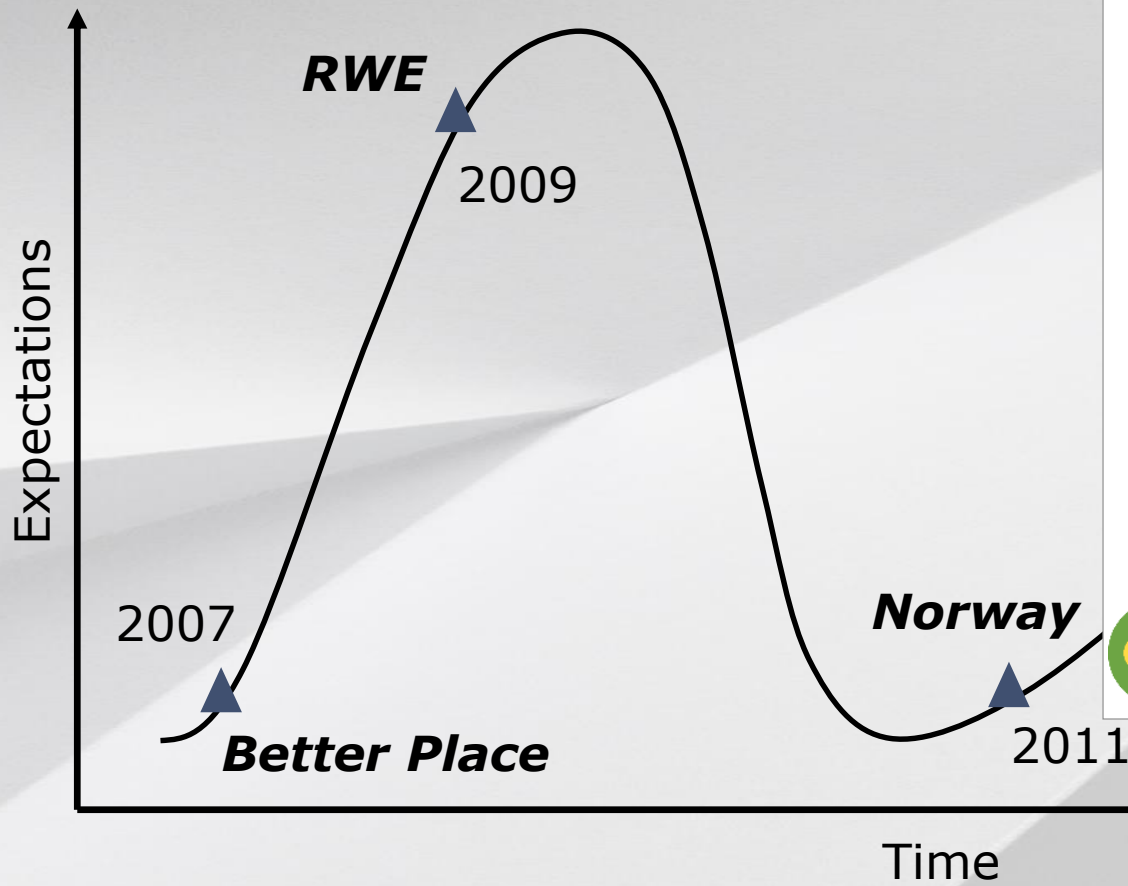
- 1996: Import tax exemption
- 1997: Road tolls exemption
- 1999: Free parking in public spaces
- 2001: No VAT (usually 25%)
- 2005: Access to bus lanes
- 2009: Free access to road ferries

### Share of electric vehicles in new registrations



Source: Plug-in electric vehicles in Norway, Wikipedia, 2020

The journey of e-mobility: current situation





## REGULATORY CHANGES

Manufacturers will have to comply or pay fines

### **EU fleet-wide emission target of 95 g CO<sub>2</sub>/km:**

Petrol: ca. 4.1 l/100 km

Diesel: ca. 3.6 l/100 km

2020: 95% compliance rate

2021: 100% compliance rate

– Penalty: EUR 95 per g CO<sub>2</sub>/km of exceedance for each car





























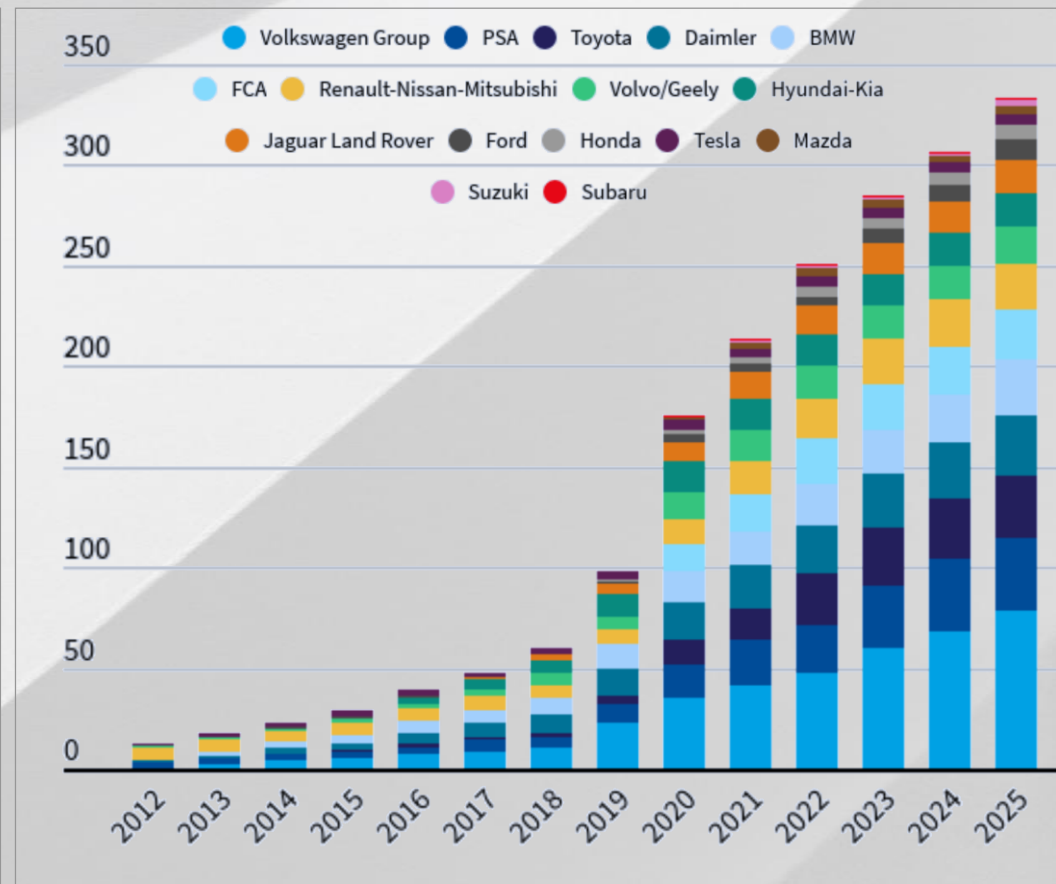


# Car manufacturers have to follow

**Largest OEM's are moving towards alternative fuels...**

**by 2025, number of electric models will double.**

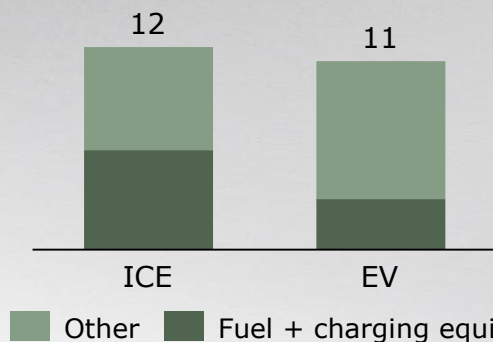
OEM	EV strategy
	Mixed strategy
   	Full range from 2022, phasing out non-EV
	Compact only, mixed strategy
 	Compact only, in process of changing operations
	Full range from 2022
  	Compact + vans
	Compact only, mixed strategy
 	Compact only
 	Compact + vans
  	Compact + SUV
	Mixed strategy
	Full range under development
 	Full range by 2022
 	Compact and performance
	Mixed strategy



Source: Transport & Environment

# Total ownership cost of electric vehicles will be lower than ICE by 2025

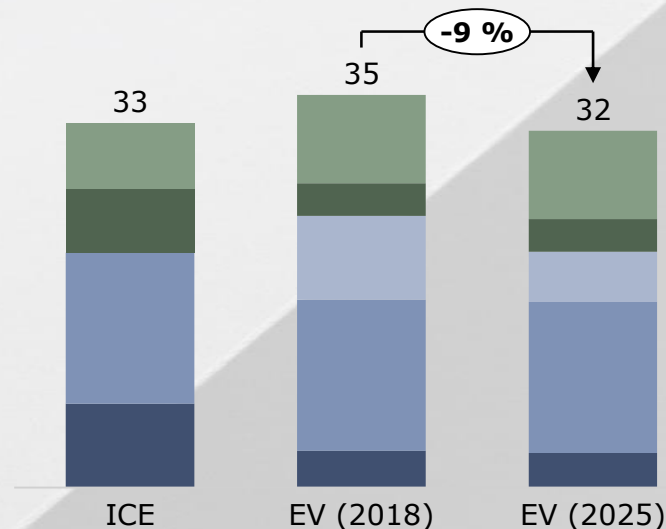
## EVs already offer cheaper fuel and maintenance costs...



- Superior efficiency of EV leads to lower fuel costs, even when accounting for cost of charging equipment
- Cost of maintaining EV is lower than of ICE
- Also considers 'replacement' cost

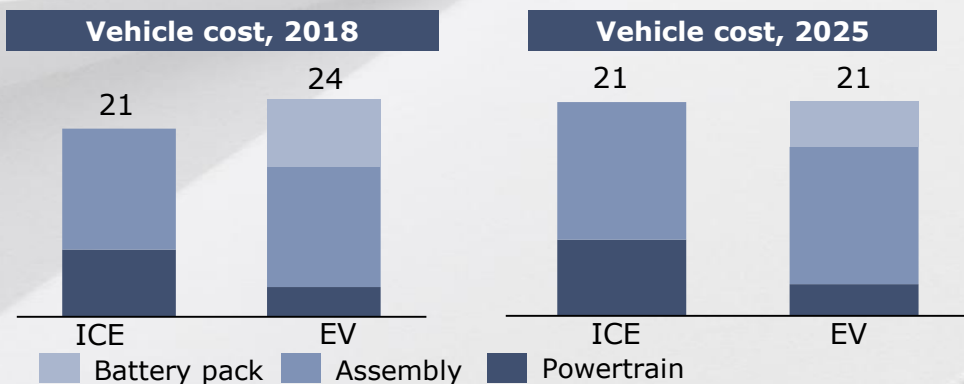
## ...making EVs competitive on a cost basis.

### Total ownership cost



- High-level calculation for the small- to medium-sized car segment
- EVs are already cheaper to maintain and fuel, and the electric powertrain elements (excl. battery) are simpler and cheaper than in ICE
- The reduction in EV costs between 2018 and 2025 is mostly down to improvements in the battery packs

## ...and falling vehicle costs will seal the deal...



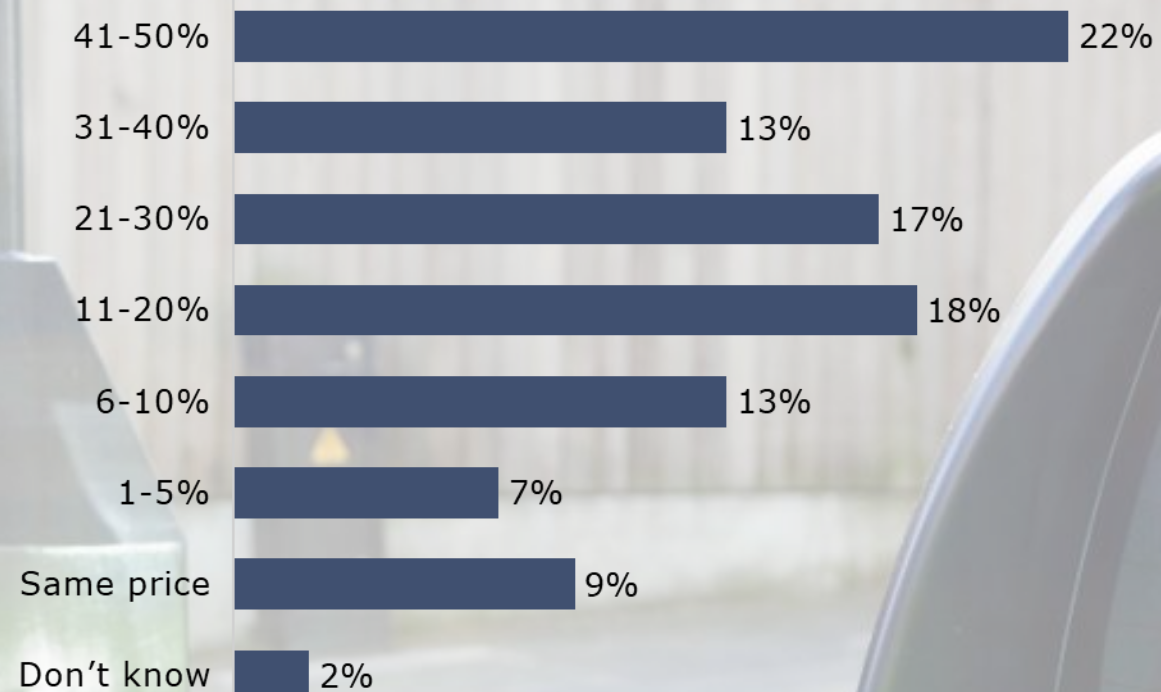
Note: Cost in USD; Source: ICCT, 2019

## People are Willing To Pay (WTP) more for electric vehicles

Why are people willing to pay more for electric vehicles?

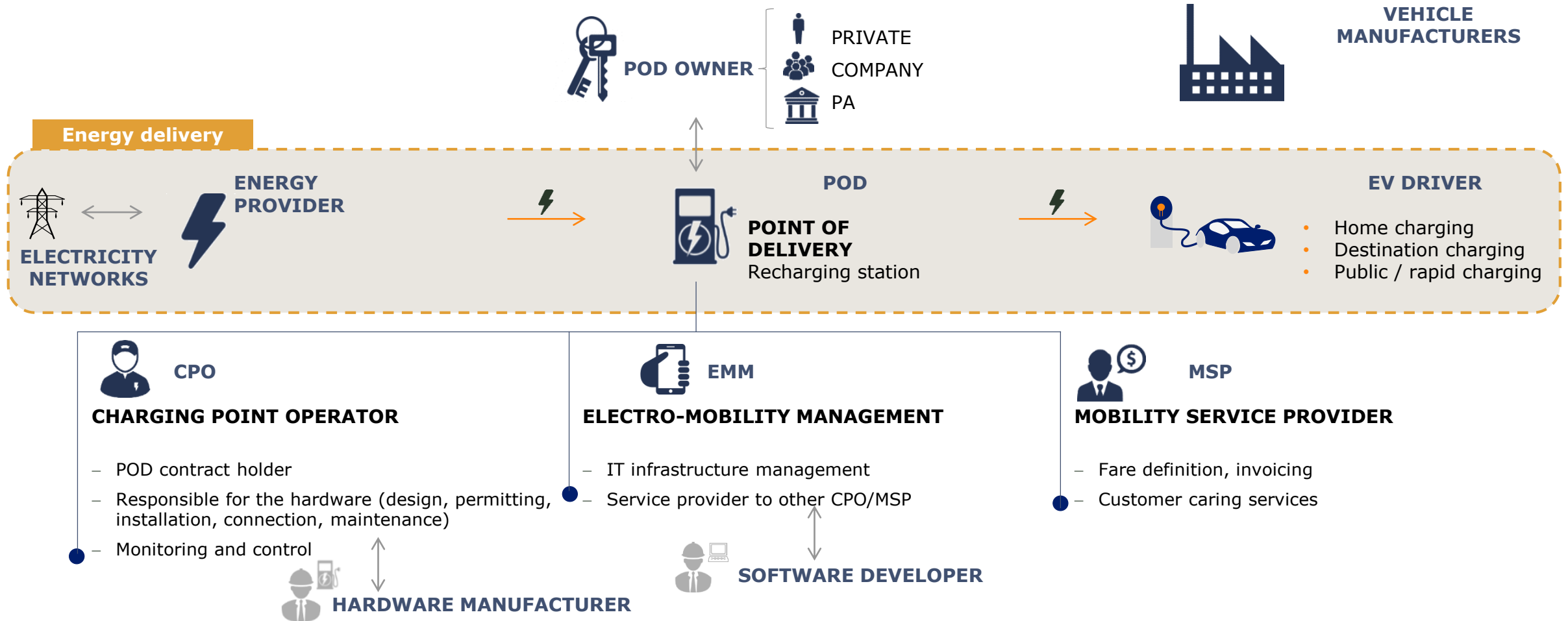
- Environmental mindset
- Hungry for new technology
- Be part of the movement
- Better safety standards

Premium WTP in Southeast Asia





From a traditional mobility model towards a much more fragmented and digital one, opening up markets for many players



## Investments into grid and charging infrastructure have increased

### Raises questions:

- Optimization of charging infrastructure layout
- Identification of suitable charging technology
- Determination of user segments and vehicle types
- Utilization of charging stations
- Estimation of costs and revenues
- Cost of ownership





## Beyond only delivering electricity, utilities can provide additional services

### New business areas:

- Smart metering (peak shaving)
- Flexibility for the electrical grid
- Hardware responsibility
- IT infrastructure management
- Questions of ownership and operations
- Provision of subscriptions (e.g. Alpiq Juicar)





## Companies are committing to electrify their vehicle fleets

- Electrify their own vehicle fleet
- Build knowledge and act as consultants
- Support others to do so:
  - Taxi companies
  - Cities
  - Co-driving
  - Car rental companies

### Amazon, DHL and IKEA front new group that's pushing for more electric vehicles

Published: Jan 22, 2020 11:55 a.m. ET



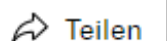
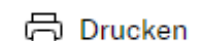
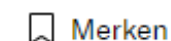
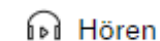
*Neue Zürcher Zeitung*

### Die Zürcher Stadtpolizei geht in Zukunft im E-Auto auf Streife

Schrittweise will die Polizei ihren Fuhrpark auf elektrischen Antrieb umstellen. Bis 2021 sollen bereits einmal sieben E-Autos für die Verkehrspolizei beschafft werden.

André Müller

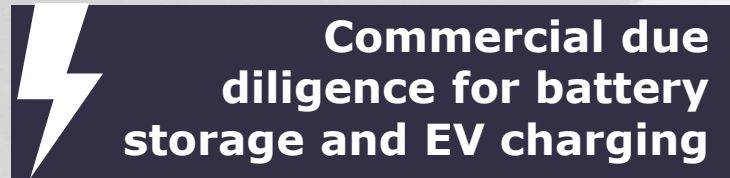
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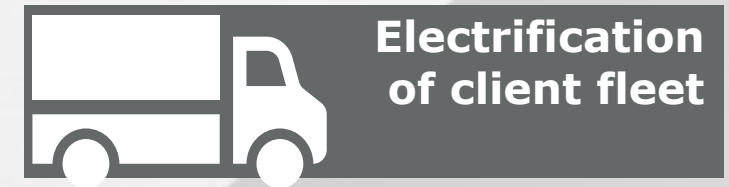
Our work in mobility spans a range of different areas, from business models to grid connections, to fleet management



- International energy company needed advice for early stage examination of opportunities in EV charging in China
- Screened regional Chinese policies
- Identified the most attractive regions according to screening criteria
- Assessed regulatory environment, cost, typical driving behaviour
- In-depth and localised model for EV charging based on location



- Client was a pension fund looking to invest in a development portfolio of GW scale batteries with private wires to support EV charging
- Helped client to understand and project future revenue streams
- Analysed management business model and assumptions
- Facilitated client understanding of competitive landscape and future evolution



- Supported automotive company in the analysis of regulatory and energy market characteristics on the design and operation DC-fast charging depots for electric vehicle fleets
- Defined parameters of business model and dimensions for charging stations
- Used scenarios in order to answer questions on the energy market/grid connection



PÖYRY

Dr. Patrick GASSER

Consultant

+41 76 356 21 37

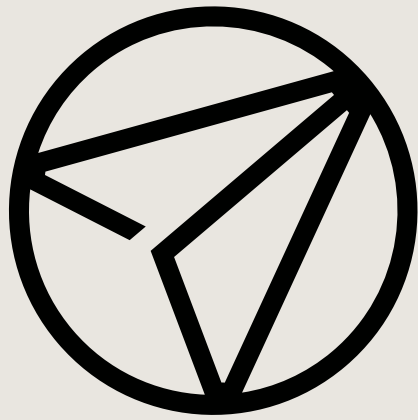
[patrick.gasser@poyry.com](mailto:patrick.gasser@poyry.com)

Herostrasse 12

8048 Zurich

Switzerland





AFRY

ÅF PÖYRY

Dr. Patrick GASSER

Consultant

+41 76 356 21 37

[patrick.gasser@poyry.com](mailto:patrick.gasser@poyry.com)

Herostrasse 12

8048 Zurich

Switzerland