

IEA Renewable Energy Working Party,
28 March 2017

Electro-mobility: status and prospects

Findings from the Global EV Outlook 2016

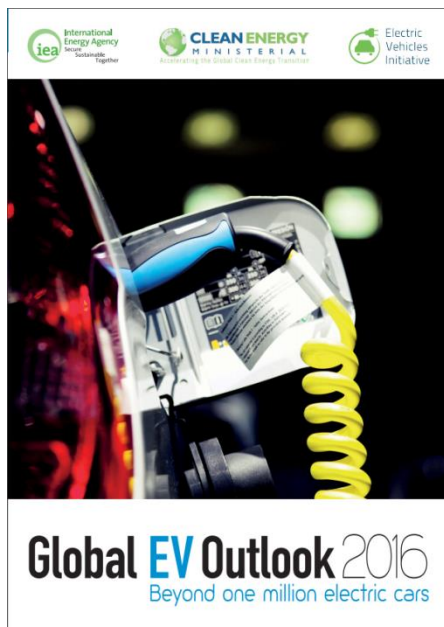
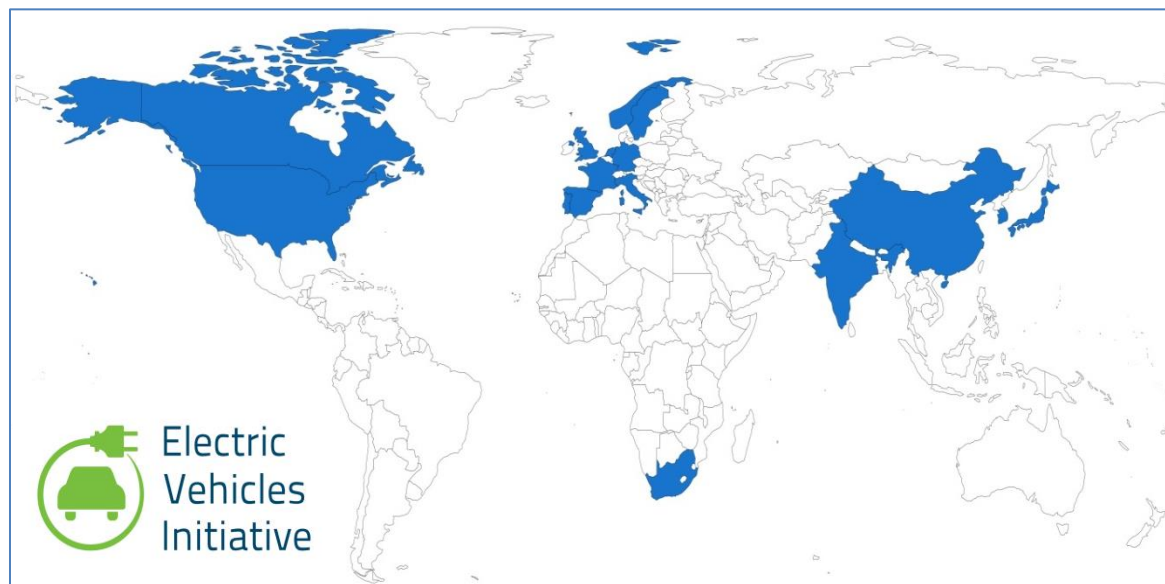
paolo Cazzola, International Energy Agency



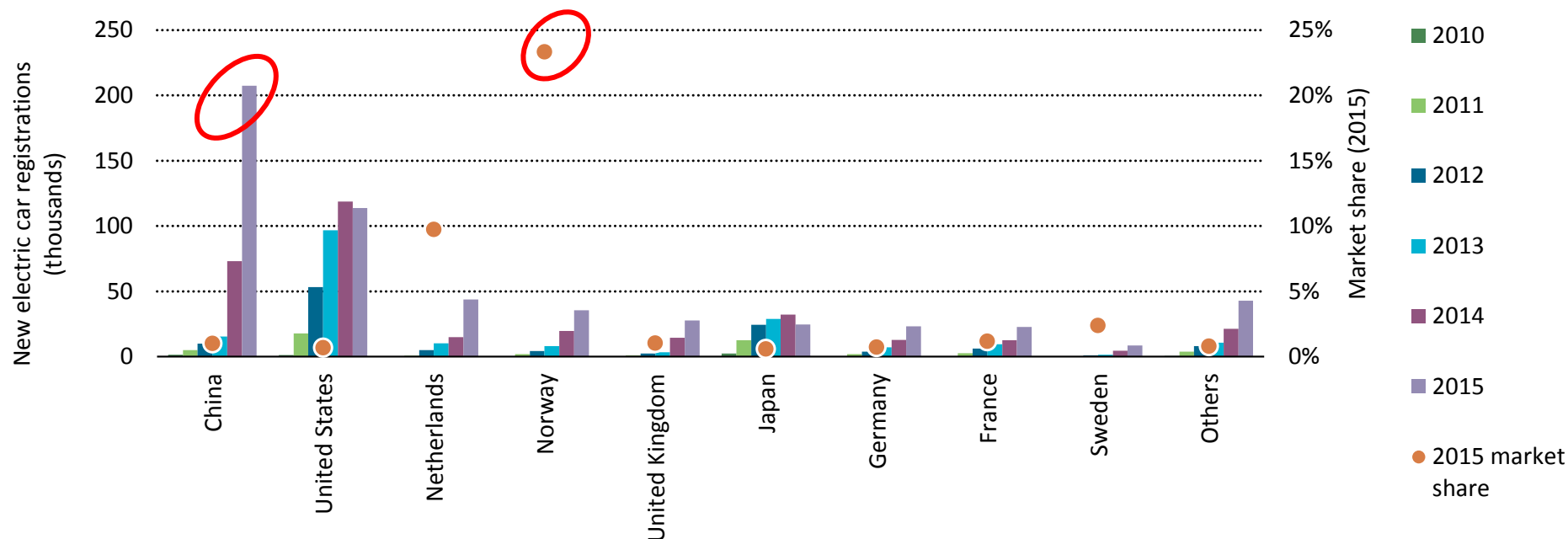
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Electric Vehicles Initiative

- EVI: Multi-government policy forum established in 2009 under CEM
- Knowledge-sharing on policies and programs that support EV deployment
- Global EV Outlook 2016, released on 31 May
- EVI data and analysis are at the basis of IEA's WEO and ETP scenarios

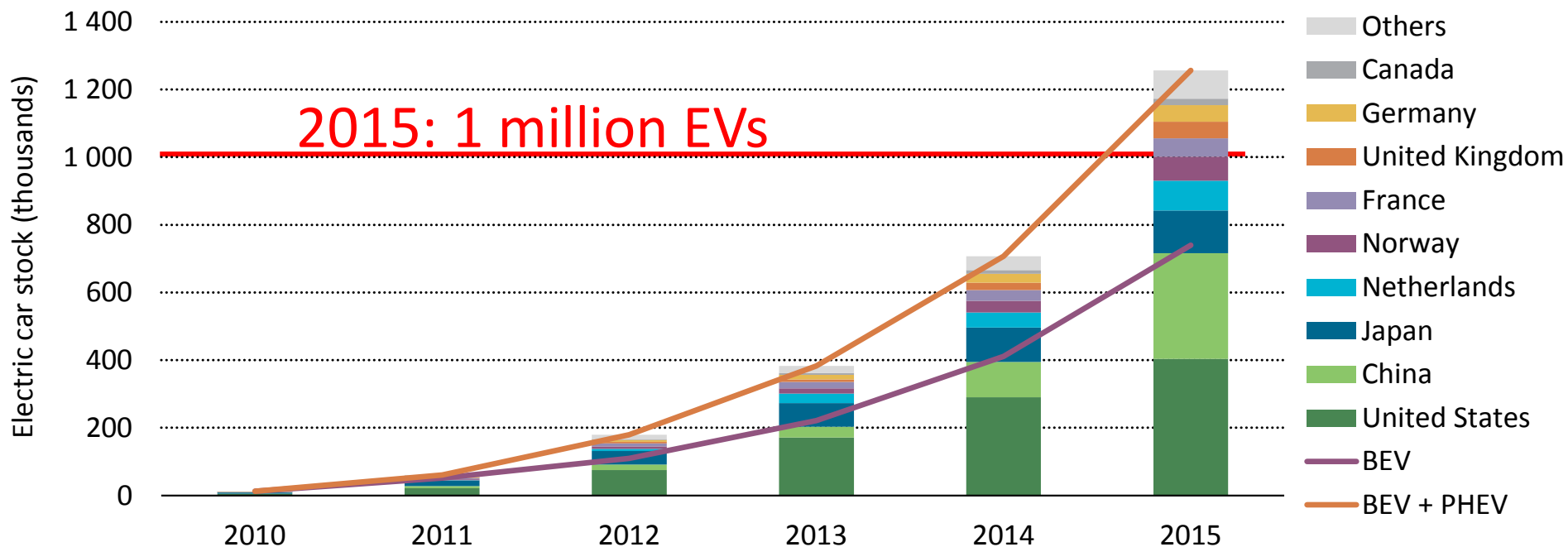


Electric car market



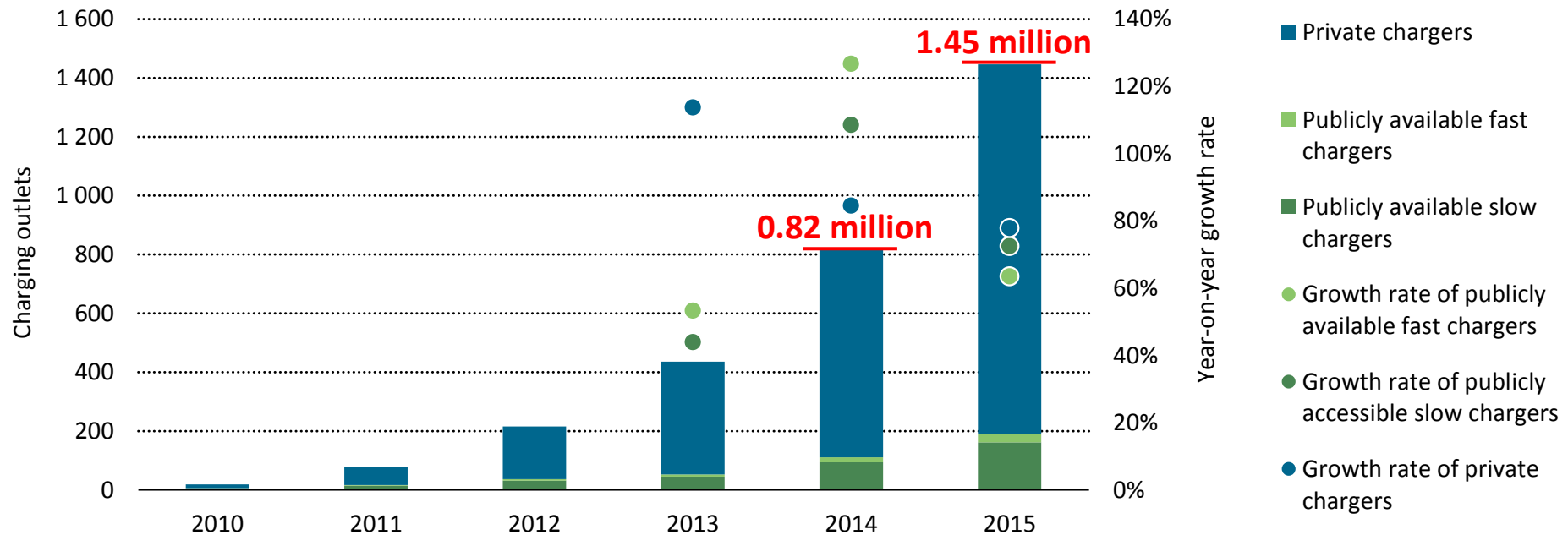
- 550,000 EVs sold in 2015 (+ 70%); about 750,000 in 2016
- China became the first EV market in 2015 and consolidated its lead in 2016, when it accounted for roughly half of the global EV sales
- EU second global market (210,000 in 2016), US third (160,000)
- 7 countries > 1% market share in 2015; 6 countries in 2016
 - Norway – 29% in 2016, Netherlands – 6%, Sweden, France, China, UK

EV stock evolution, 2010-2015

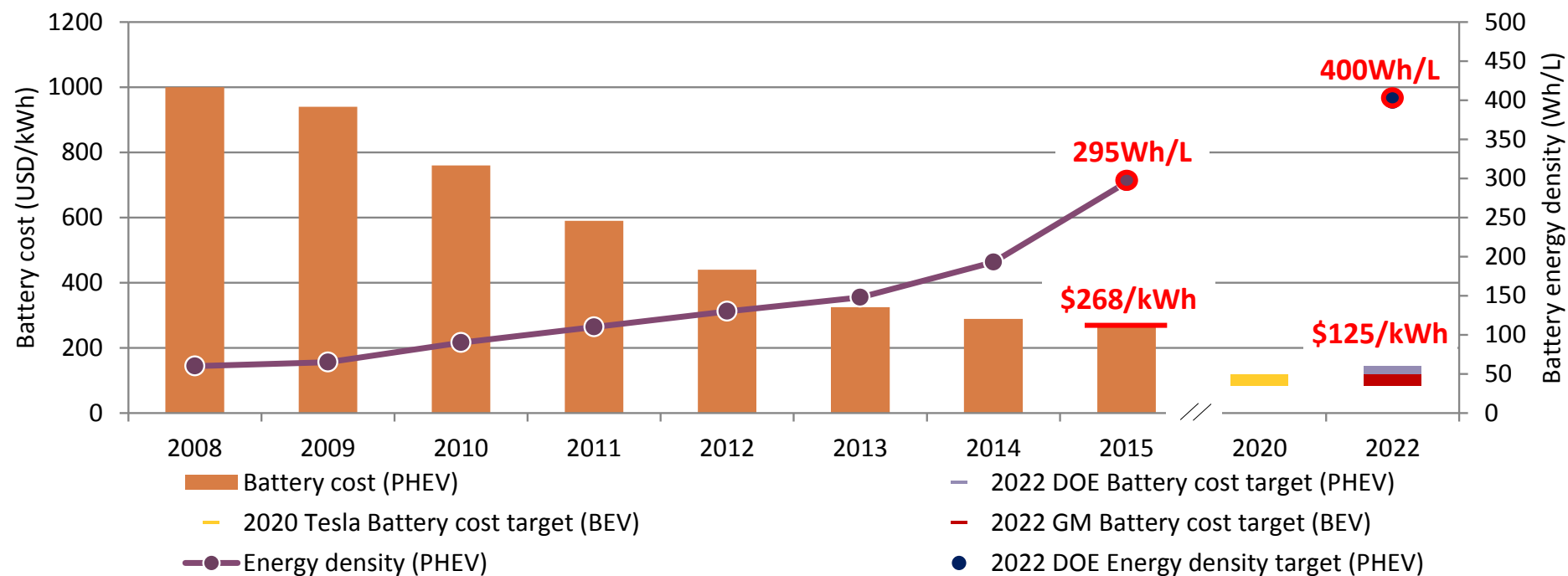


- 1.26 million EVs in circulation by end of 2015; about 2 million by the end of 2016
- 59% BEVs in 2015, PHEV increasing in 2016
- 4/5 EVs in 5 countries (US, China, Japan, Netherlands, Norway)
- Other modes: 200 M e-2Wheelers, 173 k e-buses (mainly in China) in 2015

EV Supply Equipment



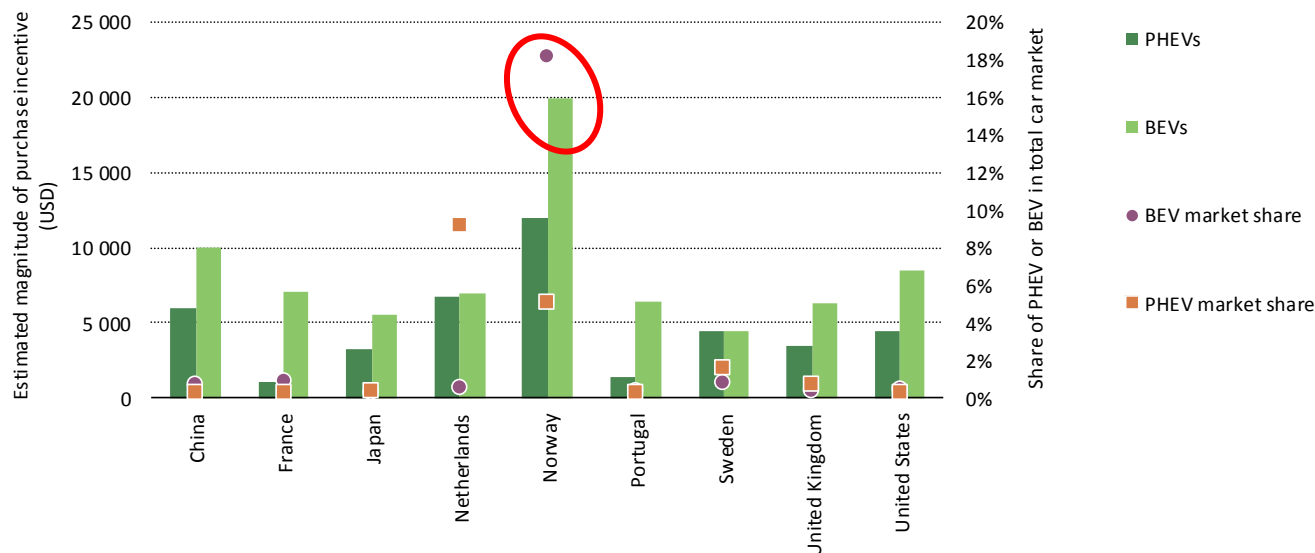
- EVSE deployment currently mainly focused on home chargers
- The deployment of publicly accessible chargers is positively correlated with the growth in EV sales



- Very encouraging signs from recent developments
 - Battery costs (PHEV): -73% in the past 7 years
- Further improvements needed
 - Ambitious announcements in the near future: -58% to go in the next 7 years

Policy support

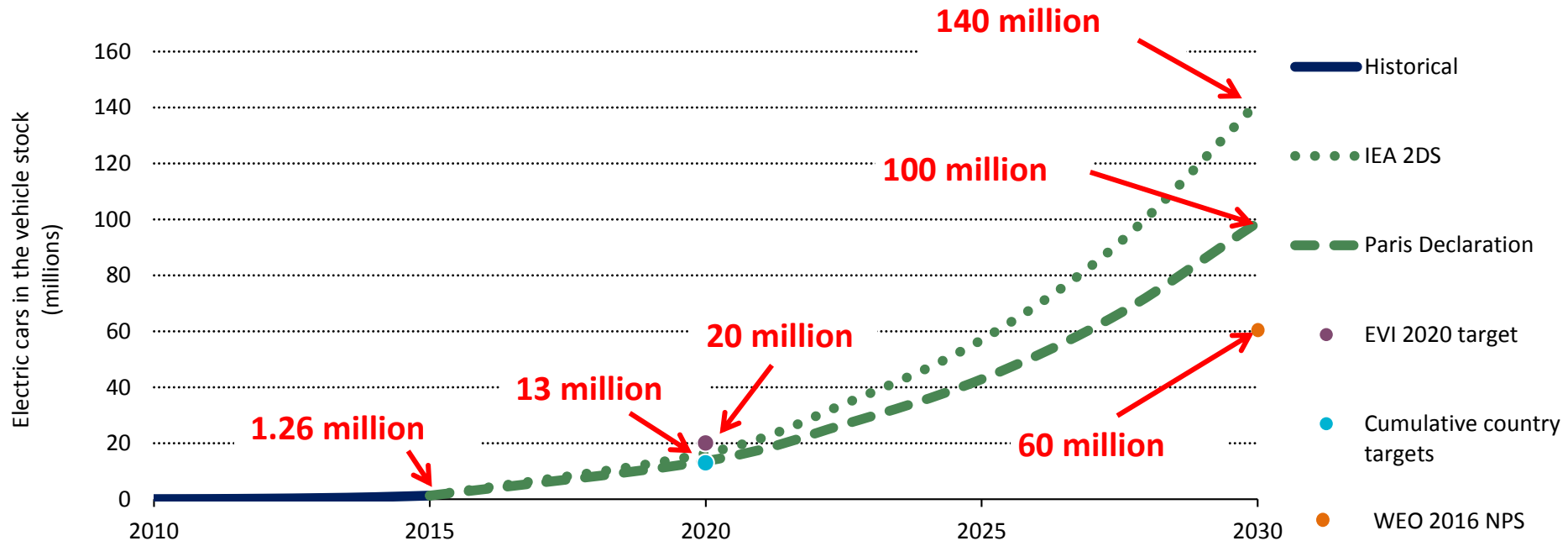
Purchase incentives and EV market shares, 2015



- EVs are unlikely to happen without policy support and technological development
- Various policy mechanisms are now behind the “market pull”
 - Vehicle purchase incentives and EVSE identified as major prerequisites for high EV market shares, additional measures add to the EV value propositions
- Policy support remains necessary in the short term to boost EV

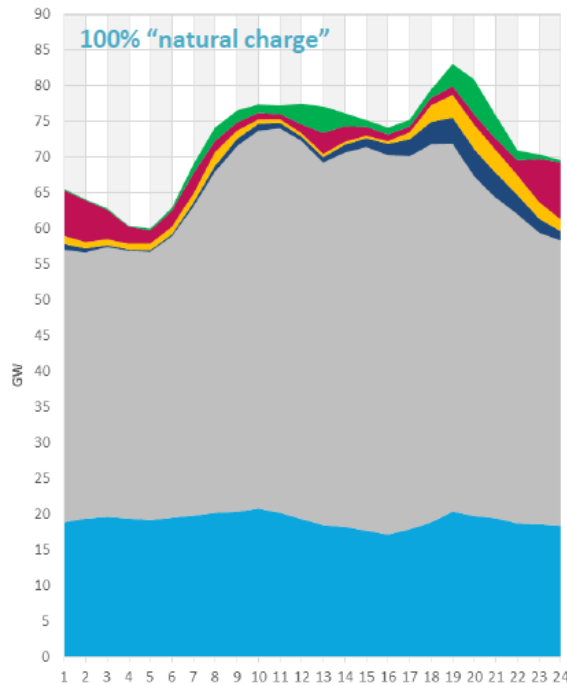
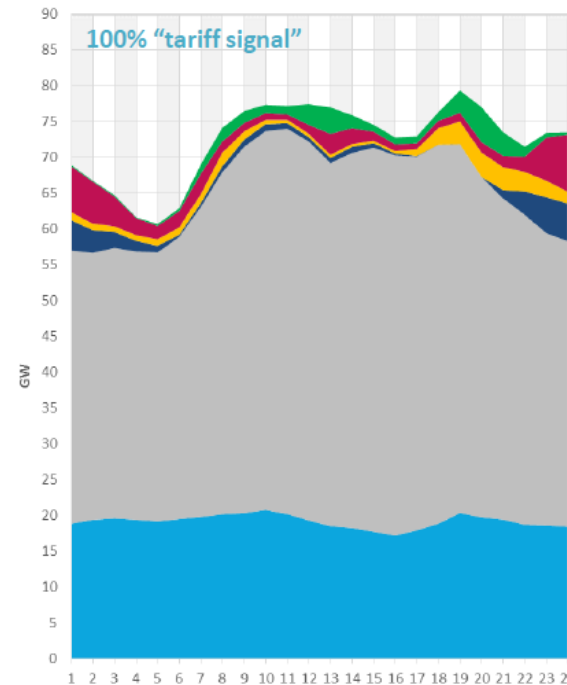
EV deployment scenarios

World



- Prospects are of EV growth, no matter the scenario
 - Flexibility/hedging on price variability and cost reductions possible (PHEVs)
 - EVs fit to meet the needs for energy diversification and GHG emission reduction

EV deployment scenarios Impacts on the load profile



Source: [RTE, 2016](#)

■ Space heating ■ Air conditioning ■ Other uses ■ EVs/PHEVs (4 million units)
■ Residential & public lighting ■ Domestic hot water ■ Cooking

About 10-15%
of the car stock

- Some impact on demand peak expected
- Likely to be manageable with price signals and other DSM measures
- DSM: questions on how to ensure response from EV owners exist
 - Little economic incentives
 - Need for aggregators for sizeable impacts

EV deployment scenarios

Impacts on the grid

- Local impacts are the earliest to come
- Charging behaviour matters

Slow charging

- One charger adds the equivalent of one apartment in terms of capacity
- Potential for flexibility through variable charging
- Synergies with the integration of variable renewables

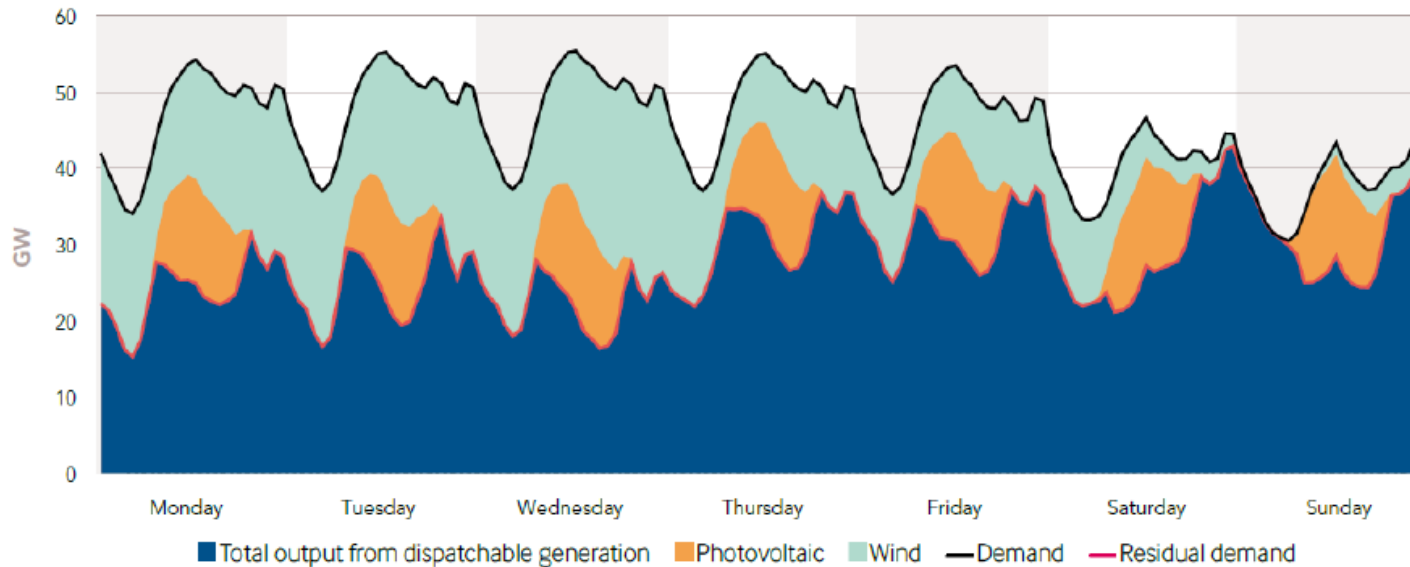
Fast charging:

- Potentially disruptive locally for distribution grids: one charger accounts like an apartment building in terms of capacity
 - Does not offer flexibility: you fast charge because you need charging quick and now
 - Not likely to take place in the evening demand peak (plug when you get home)
- Opportunities mainly for DSM (delayed charging)
 - Some scope for bidirectional charging/energy storage may exist

EV deployment scenarios

EVs and high renewable shares

Residual demand – Example of a week from Monday 24th July to Sunday 30th July 2030, “New Mix” scenario in the 2014 Generation Adequacy Report for France



Source: [RTE, 2016](#)

- What could happen with high renewables?
 - Greater variability of supply
 - Need for greater variability of demand
 - ◆ Growing importance of DSM, including EVs
 - ◆ Stronger need for opting in of EV owners in DSM schemes
 - ◆ Increasing space for bidirectional charging/energy storage

Thank you for your attention



pierpaolo.cazzola@iea.org

