Global Climate Action Agenda: Transport Action Event
COP 22, Marrakech, Morocco
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Accelerating electric vehicle deployment and support policies

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The Electric Vehicles Initiative (EVI) and IEA's role in EV support

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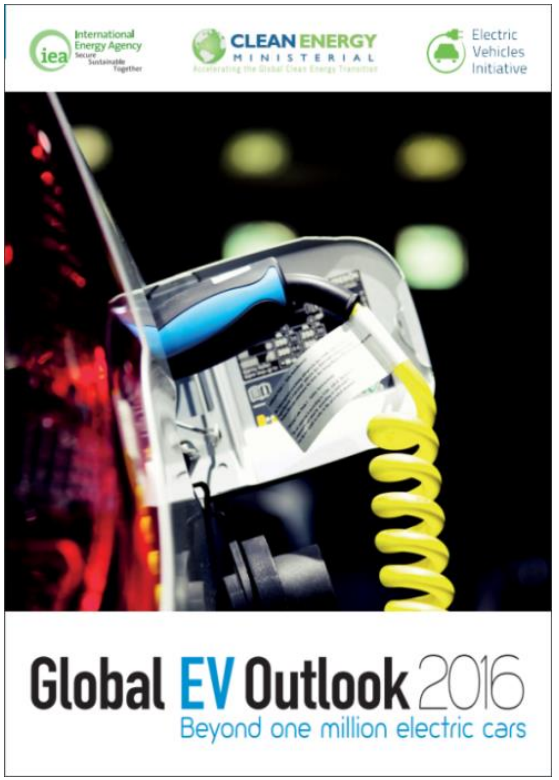
Electric Vehicles Initiative

- EVI: Multi-government policy forum established in 2009 under the Clean Energy Ministerial, coordinated by IEA
- 2015: Paris Declaration on Electro-Mobility and Climate Change and Call to Action
- Global EV Outlook 2016, released on 31 May
- EVI supports IEA data and analysis which are the basis of WEO and ETP scenarios



The role of electric vehicles (EVs) in sustainable transport

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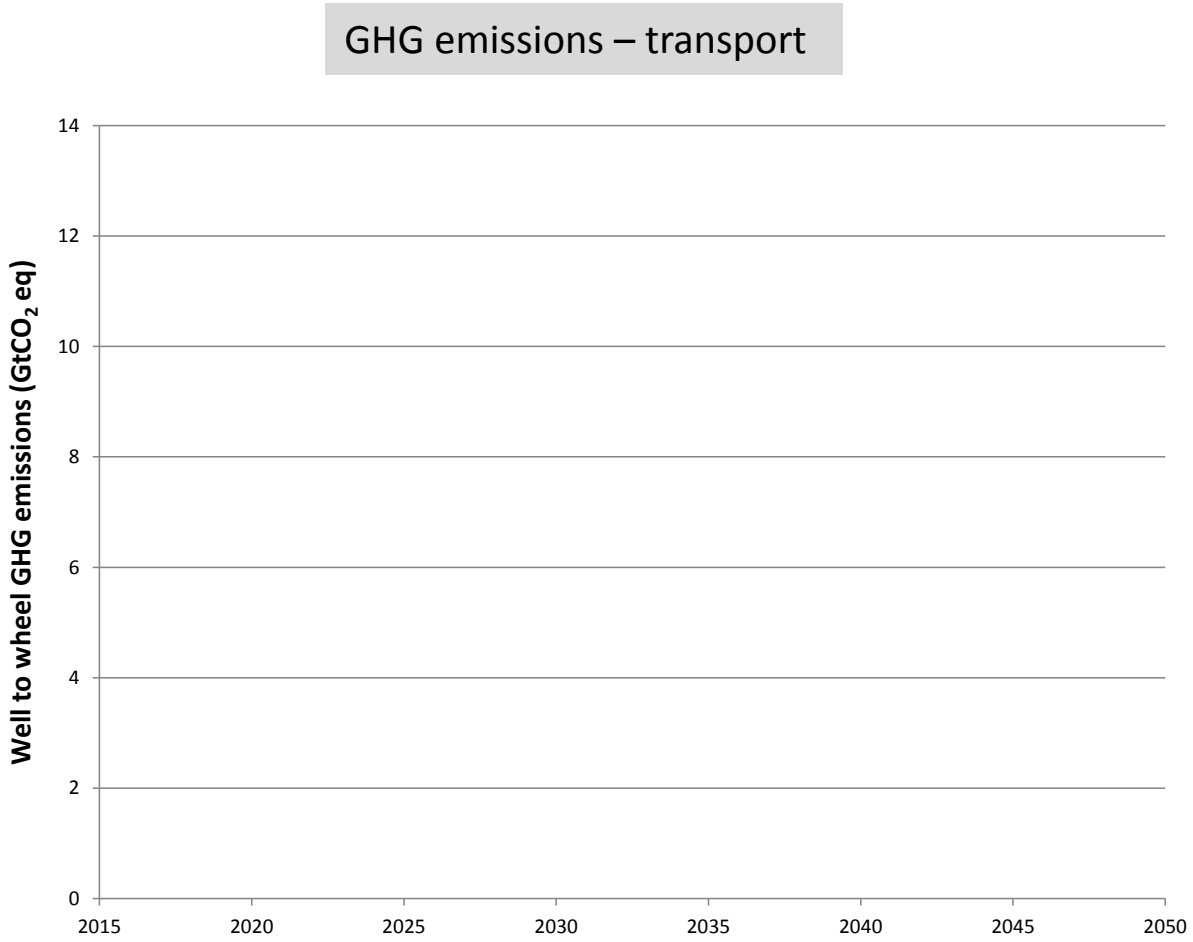

Electric vehicles are a major component of the 2DS, and vital to achieving "well below 2 degree" ambitions

The role of electric vehicles (EVs) in sustainable transport

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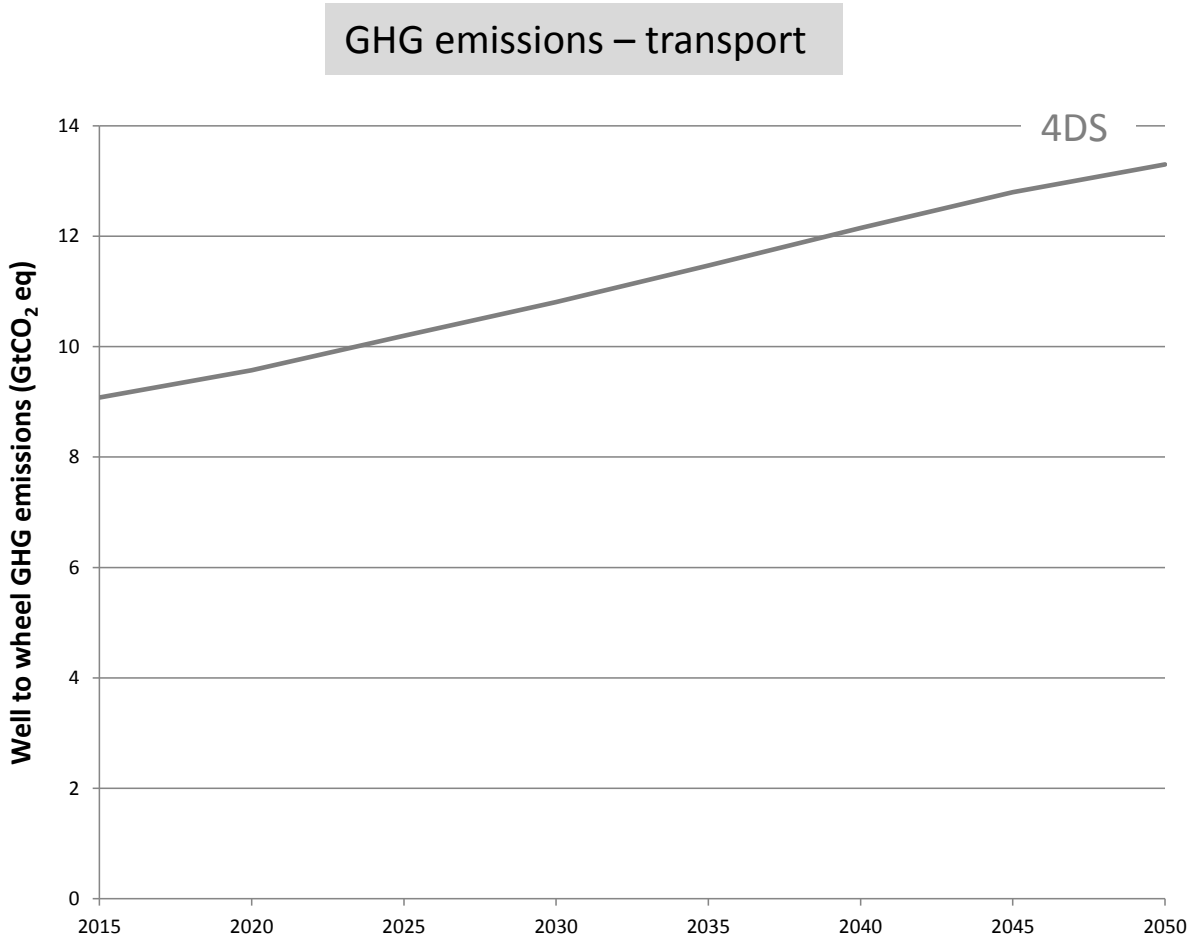

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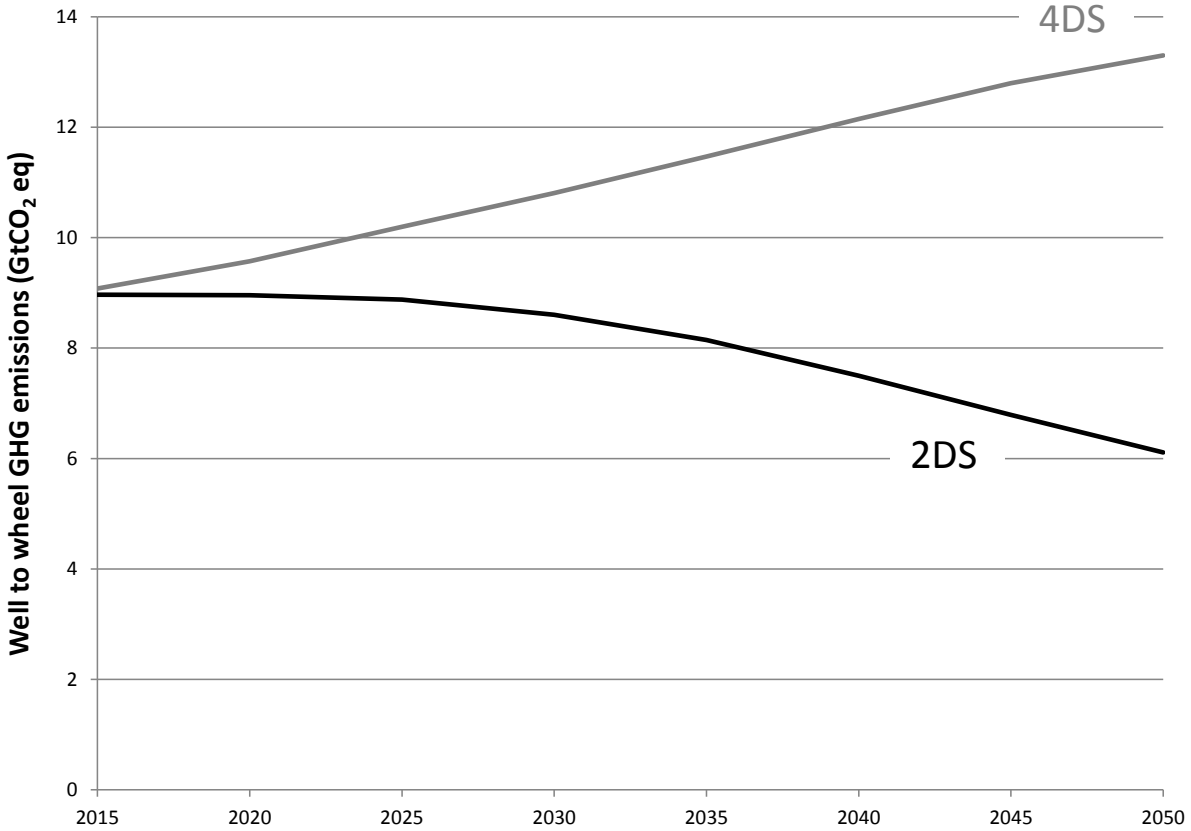
GHG emissions – transport



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The role of electric vehicles (EVs) in sustainable transport

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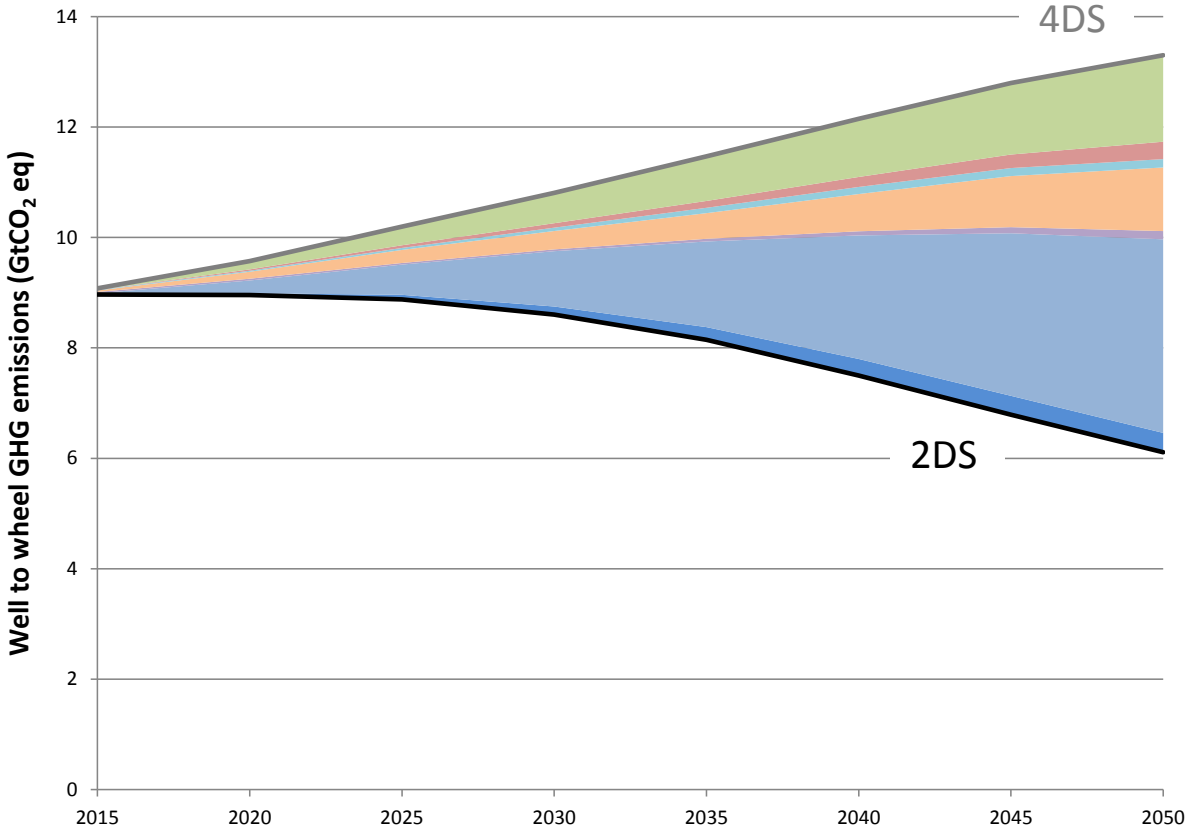
4DS to 2DS

- Aviation reduction
- Shipping reduction
- Rail reduction
- Trucks reduction
- Buses reduction
- Cars and LCV reduction
- 2 and 3 wheelers reduction

GHG emissions – transport



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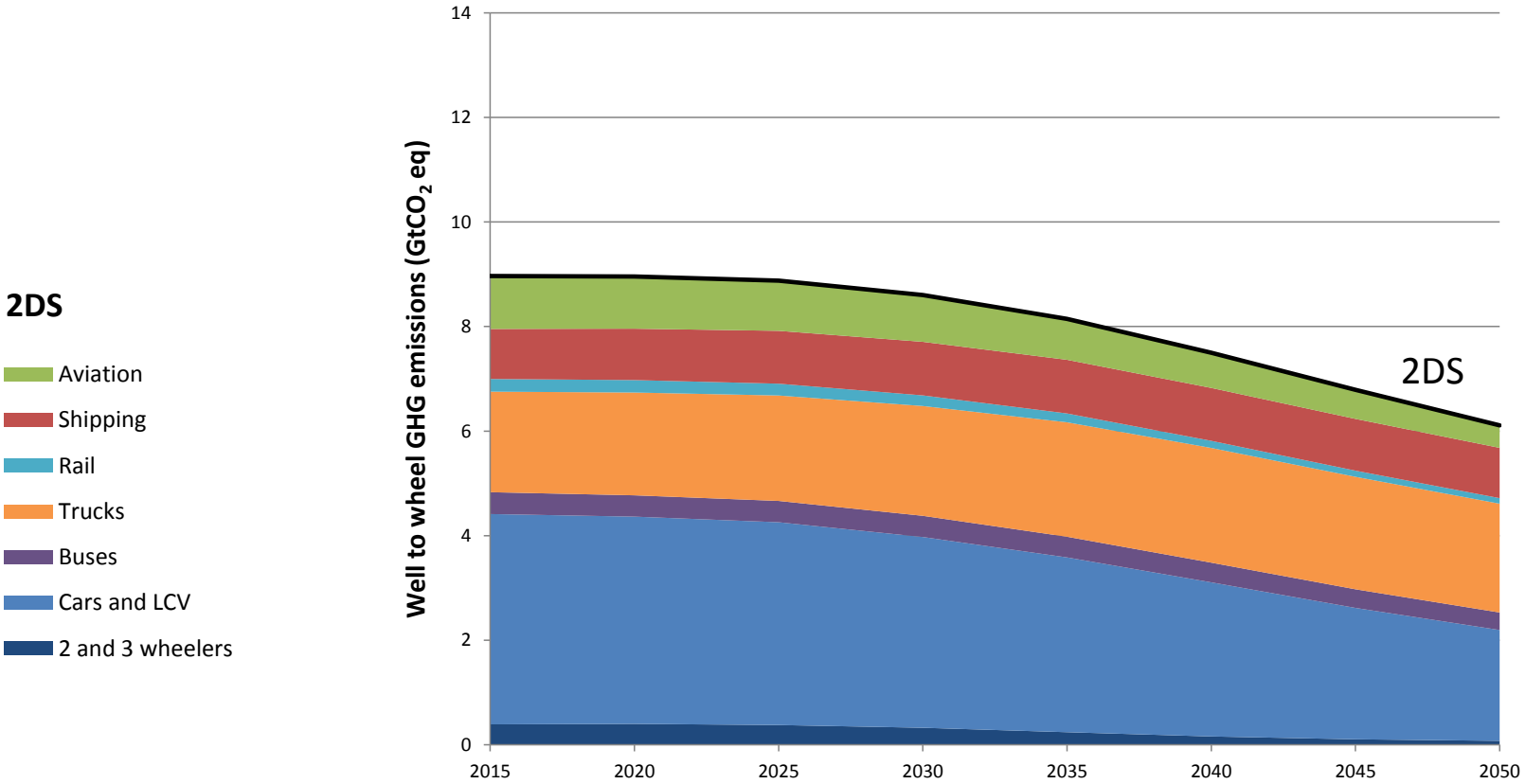

Electric vehicles are a major component of the 2DS, and vital to achieving "well below 2 degree" ambitions

EV stock evolution, 2010-2015

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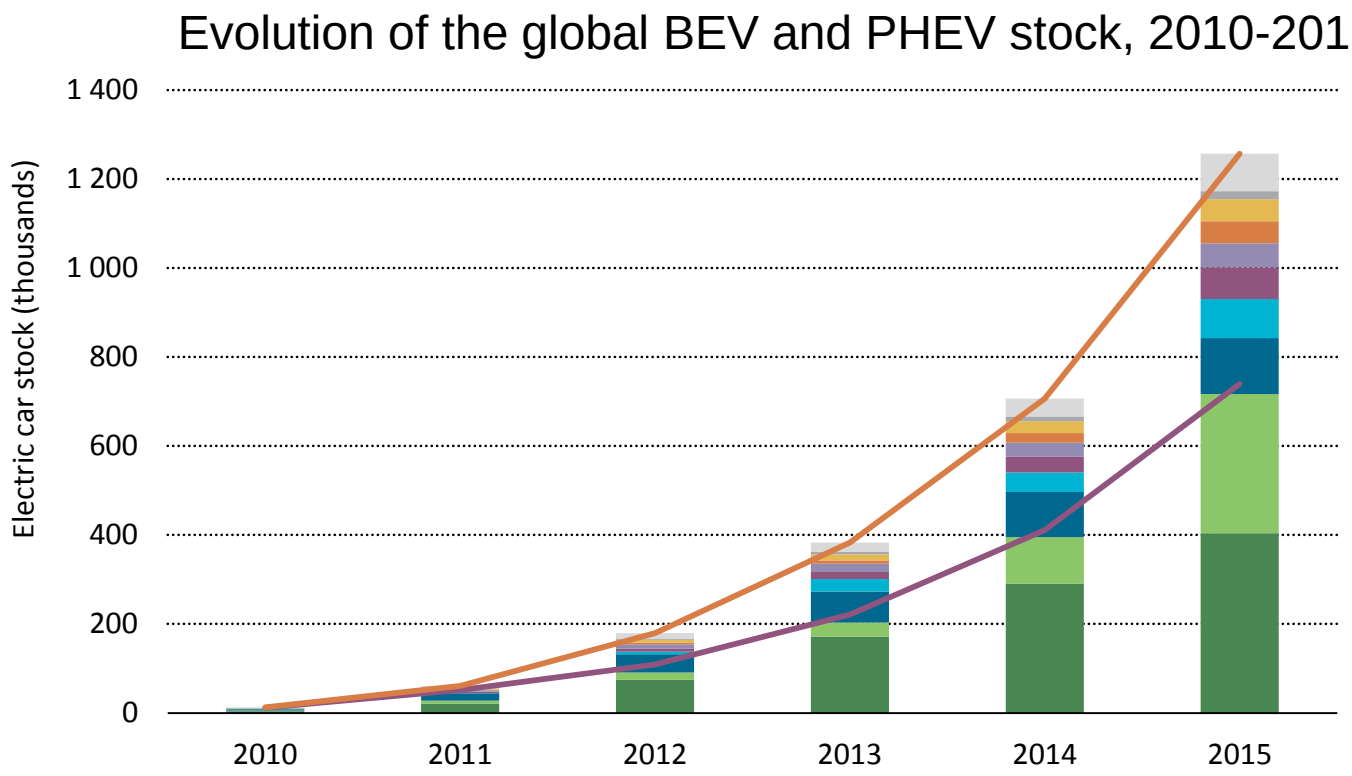
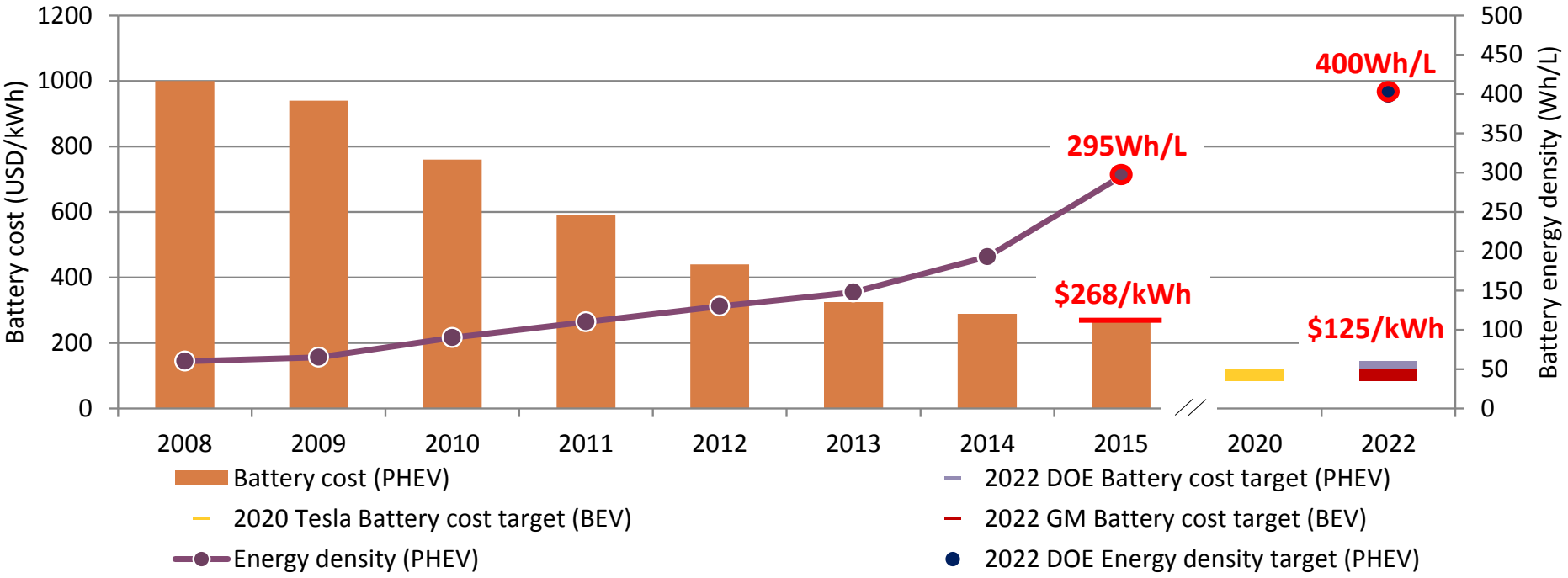


Policy support needs to be continued to reach the very ambitious targets of 30% of sales by 2030 set during COP 21

Improvement in battery costs and energy density



Battery costs and energy density showed impressive improvements over the past decade

RD&D investments will be important to ensure that this trend continues

EV support policies needed in multiple fields of mobility

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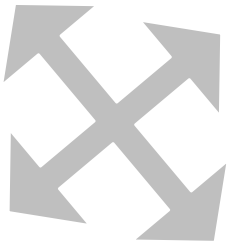
Purchase incentives

- CO_2-based, technology-based differentiated taxation and rebates
- Feebates
- VAT exemptions

Charging infrastructure roll-out

- Direct public investment
- Public-private partnerships
- Charger standards harmonization
- Fast and slow charging network planning



Circulation incentives

- Differentiated plates
- Access to bus lanes
- Free/dedicated parking
- Circulation/congestion charge exemption

Standards, regulations and mandates

- Fuel economy standards
- Fuel taxes
- **Public fleets, taxi fleets initiatives**

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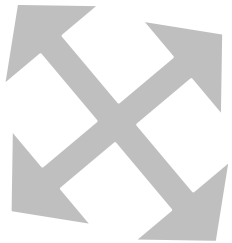

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Thank you

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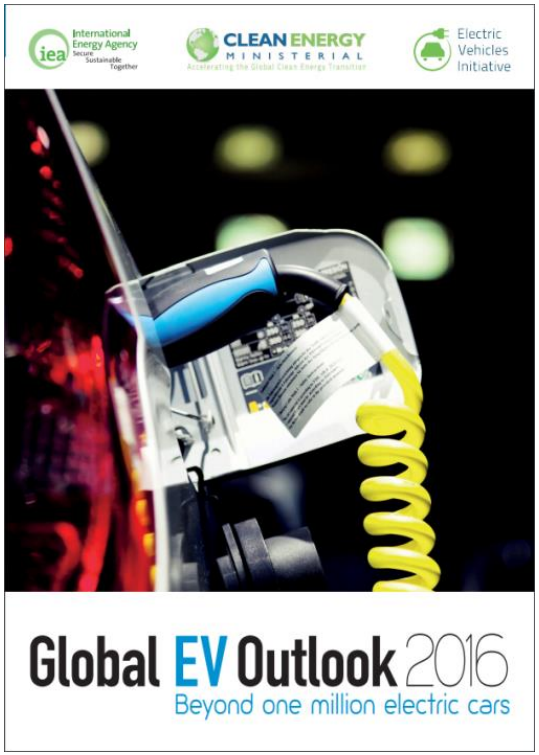
Explore the data behind *ETP*



The Global EV Outlook 2016 is freely accessible online

www.iea.org/etp

Supplementary slides

The role of electric cars in sustainable transport

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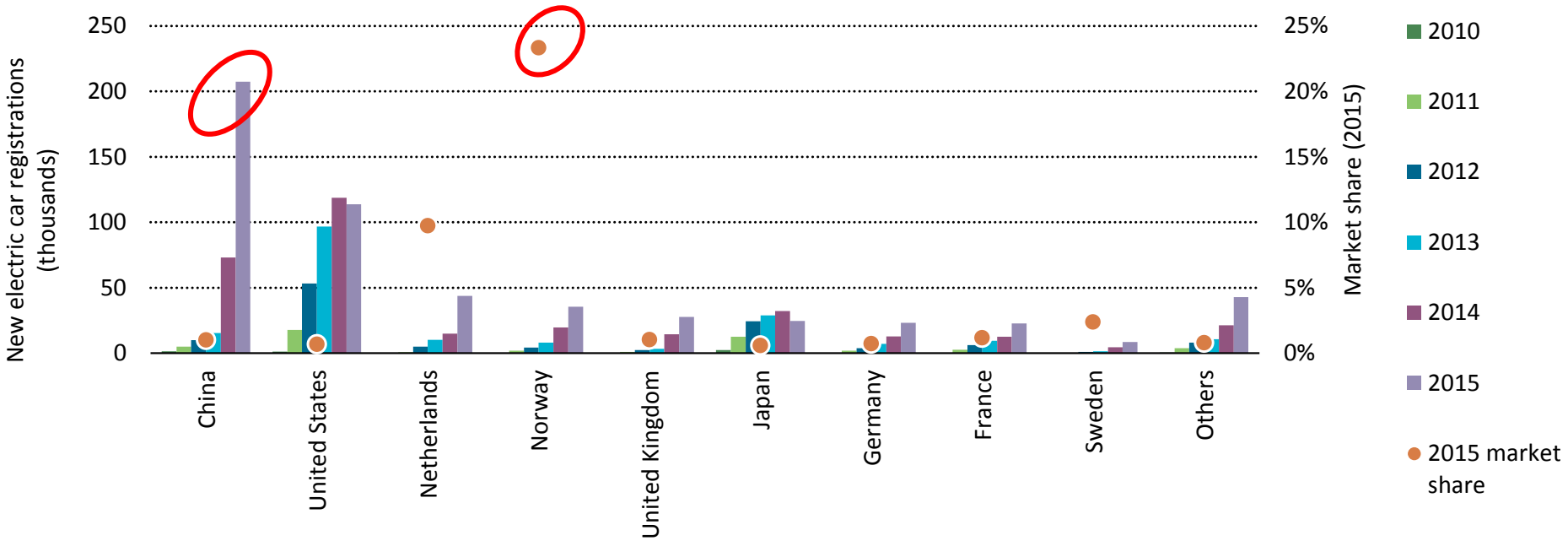
- Electric cars benefits

	Climate	Health	Energy security
Better energy efficiency than internal combustion engines			
Absence of tailpipe emissions (CO_2 and pollutants)		*(paramount in urban areas)*	
Low-carbon mode, provided that the electricity mix is low-carbon			
Reduction of oil dependency			*(+ potential for harvesting local, renewable energy sources)*

- Main hurdles and challenges
  - Upfront cost
  - Charging infrastructure and range anxiety

- Need for policy action to lift up barriers, spur adoption and harvest the benefits of EVs.

GEVO 2016: the electric car market in 2015



- 550,000 EVs sold in 2015 (+ 70%)
- China became the first EV market in 2015
- 9/10 EVs sold in 8 countries (China, US, Netherlands, Norway, UK, Japan, Germany, France)
- 7 countries >1% market share (Norway, Netherlands, Sweden, Denmark, France, China, UK)

Recent market developments: EV sales and market share

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- What is happening in 2016?

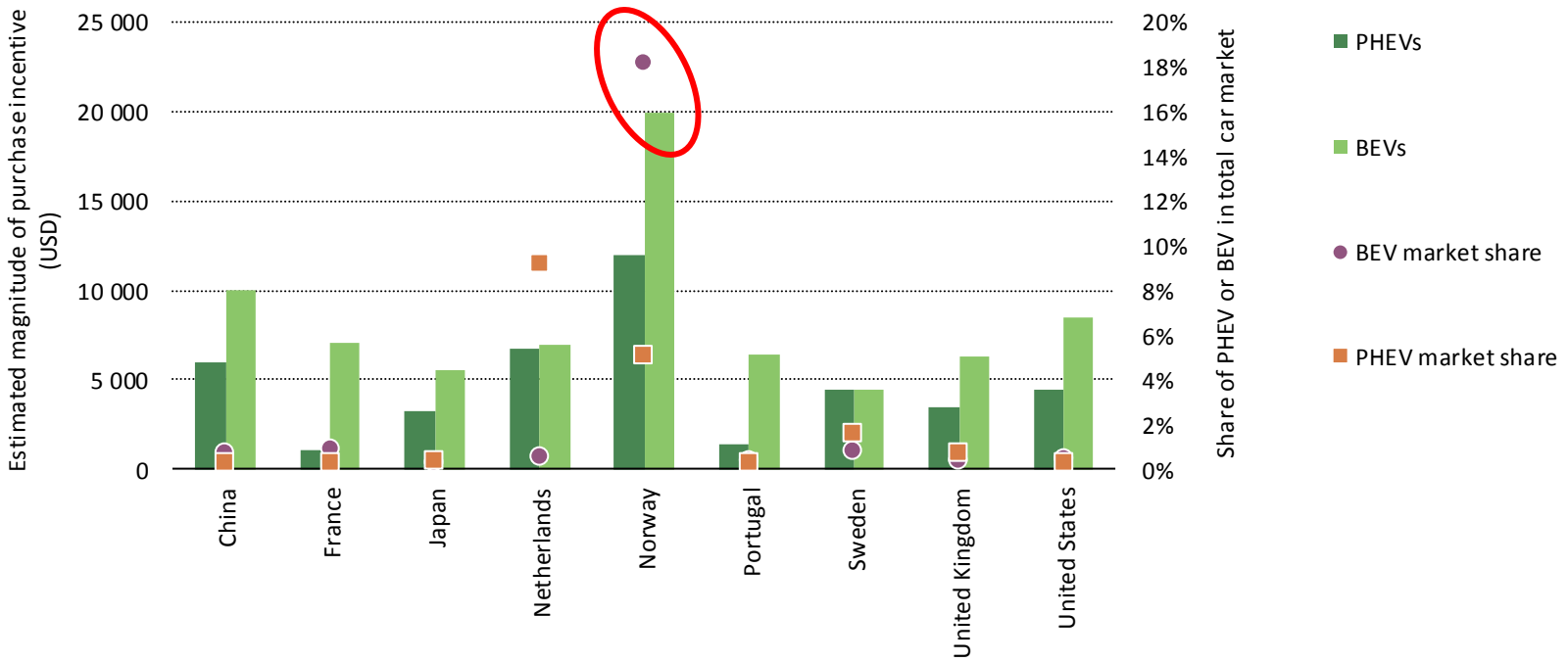
↗ **EU**: +20% sales in Q1-Q2 2016 compared to Q1-Q2 2015

⇗ **China**: +160% sales in Q1-Q2 2016 compared to Q1-Q2 2015

↘ **Netherlands**: 2.5% market share in 2016 (ytd) vs. 10% in 2015, due to changes in support mechanism and drop in PHEV sales

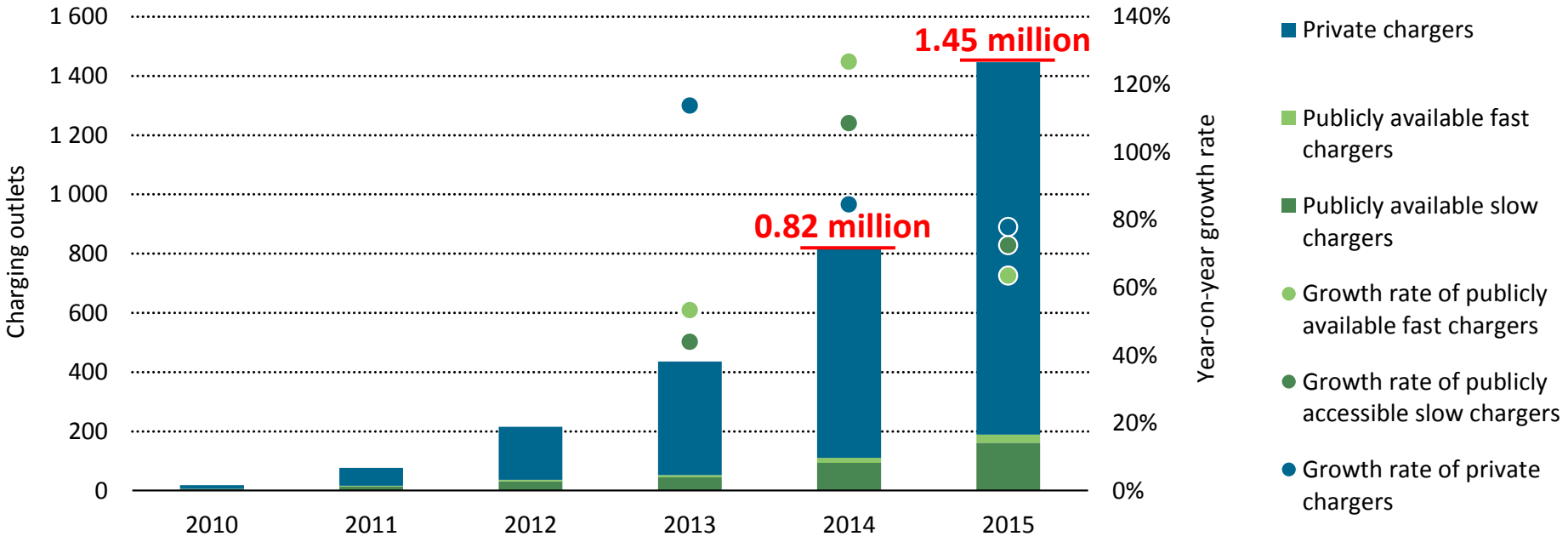
→ expecting dynamic global growth in 2016, mainly driven by China sales

Purchase incentives and EV market shares, 2015



- Various policy mechanisms behind the "market pull"
  - Differentiated taxation: CO_2-based rebates, technology-based rebates, feebates, VAT exemptions
  - Waivers on charges, preferential treatment possible if differentiated number plates are in place
- Norway stands out in terms of incentives and EV adoption
- Difficult to come to conclusions for other markets (very early phase)

EV Supply Equipment



- The deployment of publicly accessible chargers is positively correlated with the growth in EV sales
- Need for charging network to overcome range anxiety barrier
- Incentives are not just needed for vehicle purchase

EV support policies: challenges and future evolutions

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Today:

Countries are still in trial and error phase:

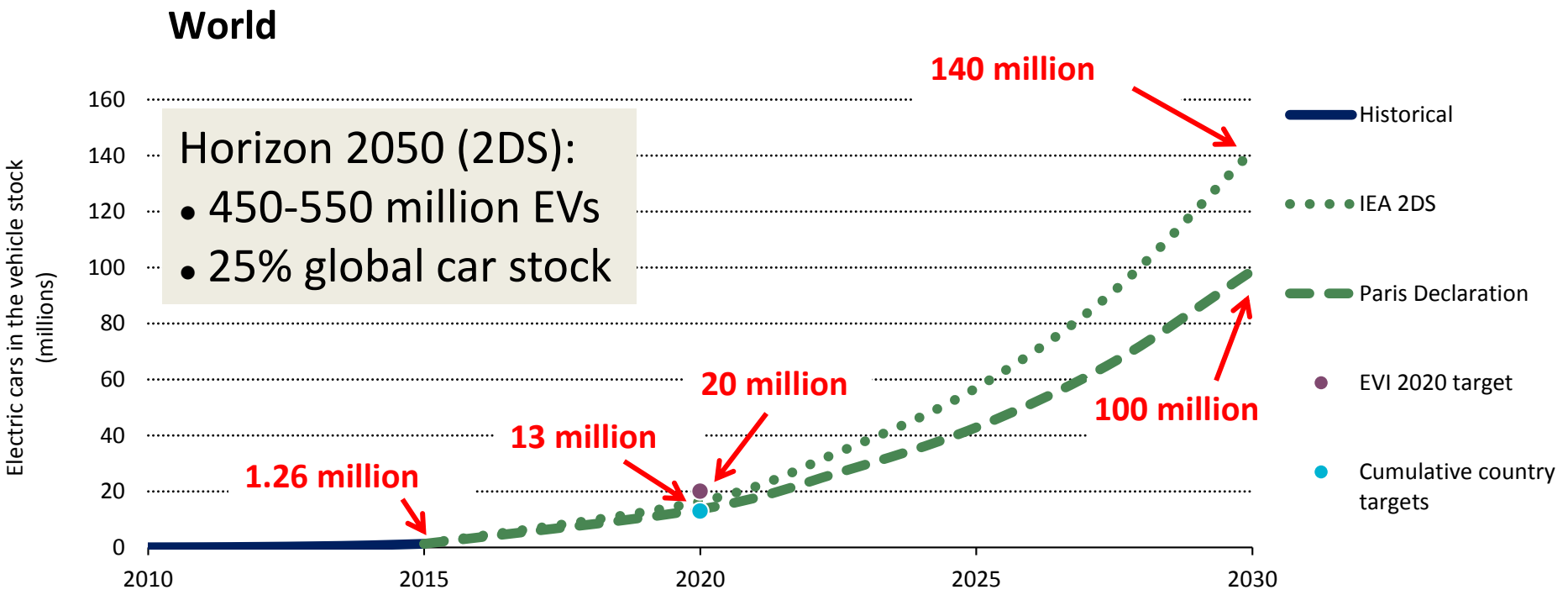
- Which policies have the highest impacts?
- Do any policies have unanticipated adverse effects?
- What is the cost-optimal and most effective combination of support policies?

Tomorrow:

- How to accompany mass market deployment within budget constraints …
- How to rethink vehicle taxation to accommodate for fuel tax losses (electric cars do use public infrastructure and remain part of the congestion challenge) …
- How to prevent potential competition between EVs and public transport …

… without hampering EV rollout?

EV deployment targets



→ Implications in terms of production scale up and need for raw materials?

EV deployment scenarios

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- Impacts on the grid?

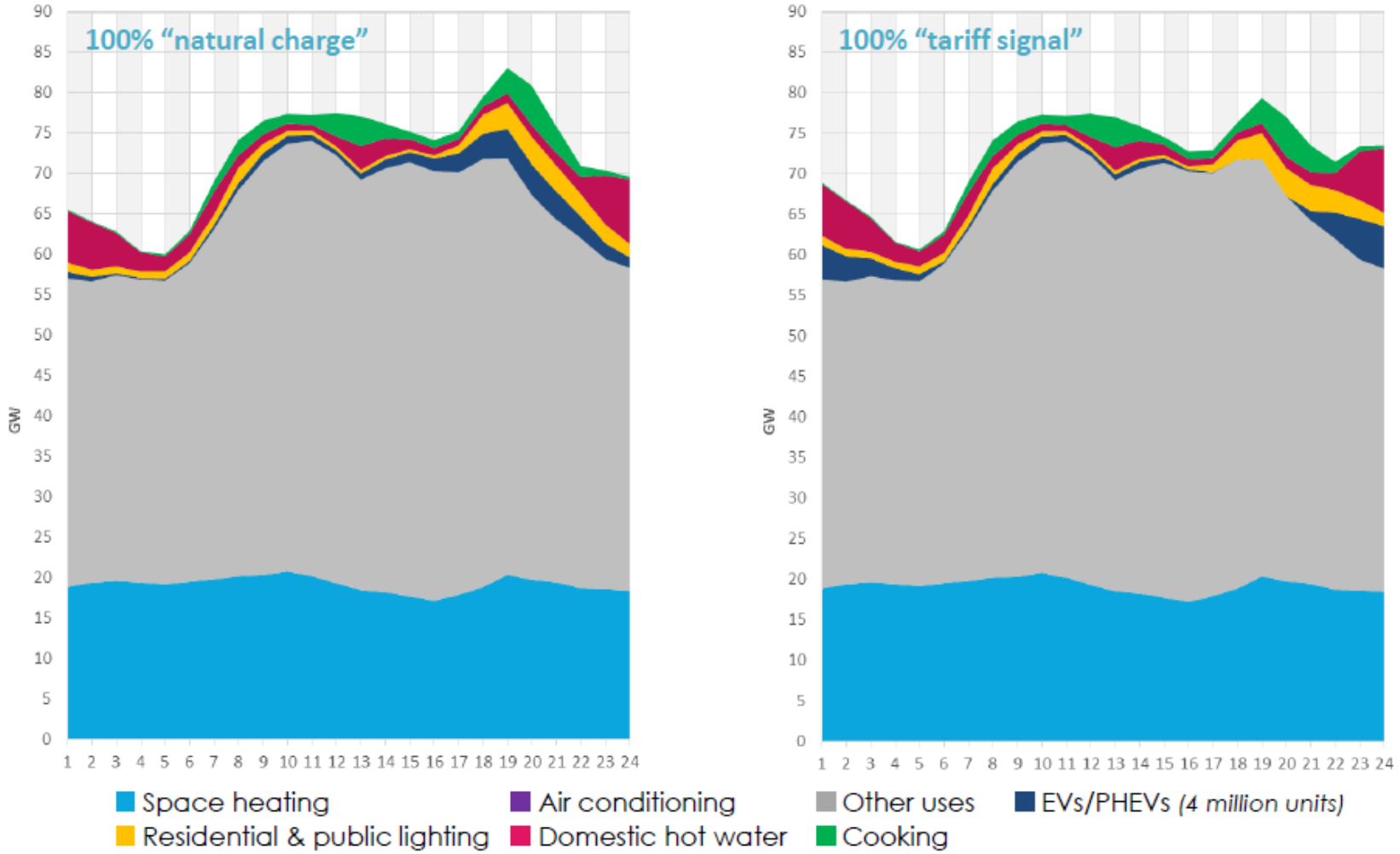
Slow charging:

- Potential for flexibility through variable charging: requires price signal, demand-side management tools, but not necessarily “vehicle-to-grid” operations.
- Synergies with the integration of variable renewables

Fast charging:

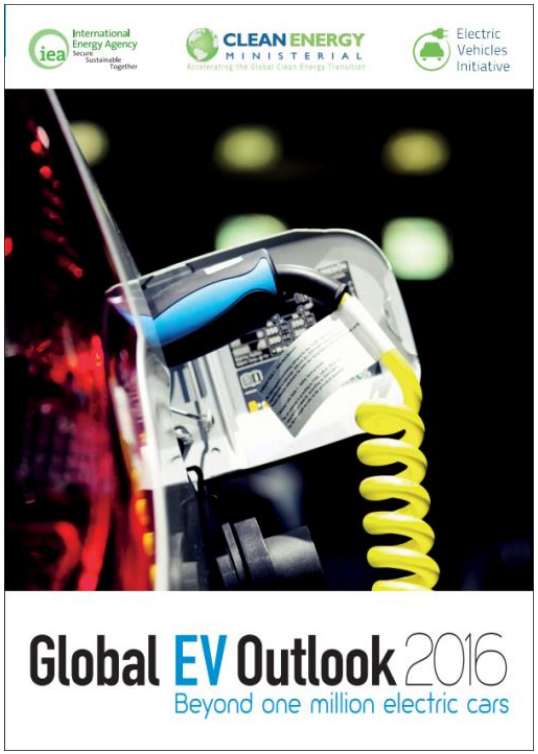
- Potentially disruptive locally for distribution grids
- Does not offer flexibility
- However, fast charging is not likely to take place in the evening demand peak (home chargers are slow chargers)

(RTE) Hourly load of a winter day with different charging modes



Source:
Réseau de Transport d'Electricité (RTE), France. Slide presented at the Paris "CEEM, Conference Electric vehicles and the electricity system" on 17 October 2016.
Presentation available at http://www.ceem-dauphine.org/assets/dropbox/CEEM_Conference_-_RTE_-_Impact_of_EV_development.pdf

Thank you for your attention



The Global EV Outlook 2016 is freely accessible online

Policy needs

- A policy framework with high taxes on conventional fuels and stringent fuel economy standards is favorable for EVs
- Purchase and circulation incentives and the availability of charging infrastructure are positively correlated with EV uptake
  - Need for fiscal measures (e.g. differentiated taxation, feebates) to kick start the market uptake
  - Need for mechanisms supporting the deployment of recharging infrastructure
- Additional measures can further increase the value proposition of EVs
  - Examples: waivers on access restrictions (bus lanes) and urban/parking pricing schemes
- Incentives can only be transitional
  - Risk of tax revenue losses (incl. from fuel purchase). Need to adapt taxation mechanisms.
  - Risk of congestion effects and detrimental effects to public transportation.
  - ➢ Need for close monitoring and periodical revisions to adapt to a fast evolving market