



Global EV Outlook 2017

Marine GORNER

Vienna, 28 September 2018



- Government-to-government forum, now comprising 15 countries



- Currently chaired by China and coordinated by the IEA
- Released several analytical publications (Global EV Outlook, City casebook)



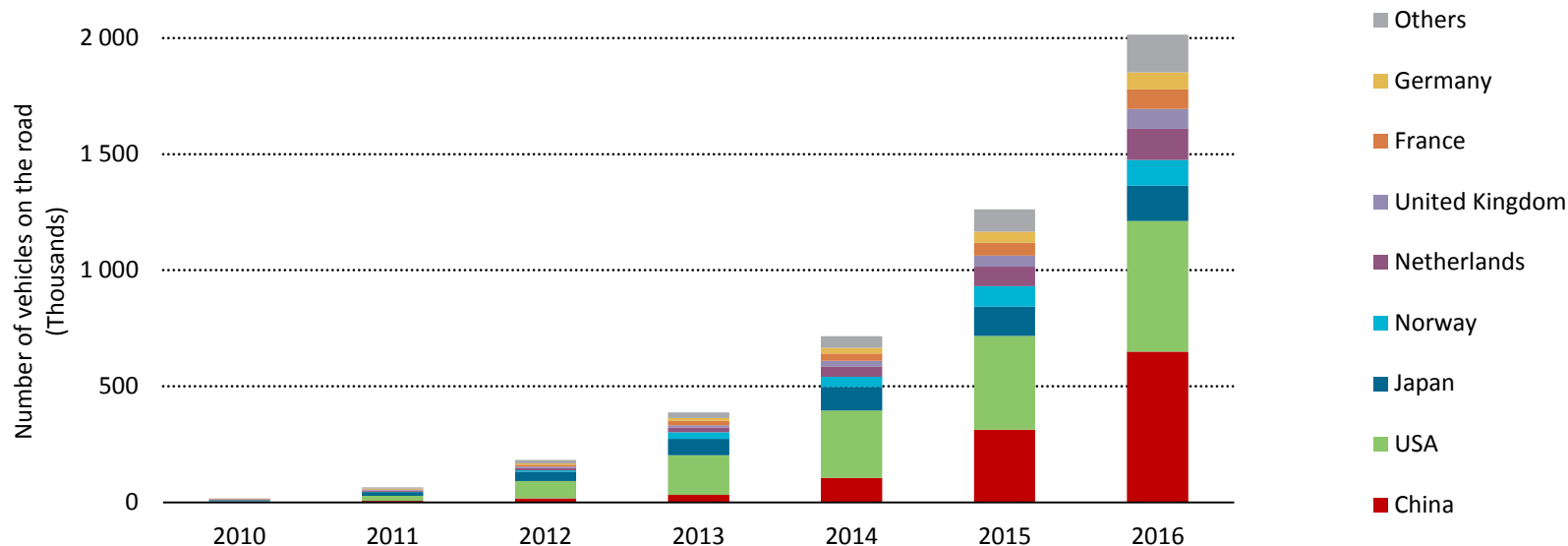
- Engaged stakeholders in high-level roundtables
- Instrumental to mobilize action and commitments (Paris Declaration on Electro-Mobility and Climate Change at COP21, Government Fleet Declaration at COP22)
- Just launched the EV30@30 Campaign, aiming to achieve a 30% market share for EVs by 2030



- Annual EVI report drafted at IEA
 - Data reporting (EV stock, sales, EVSE, battery costs)
 - Policy analysis and TCO assessment
 - CO₂ impact and role of EVs in low carbon scenarios (2030 timeframe)
 - Insights on grid integration



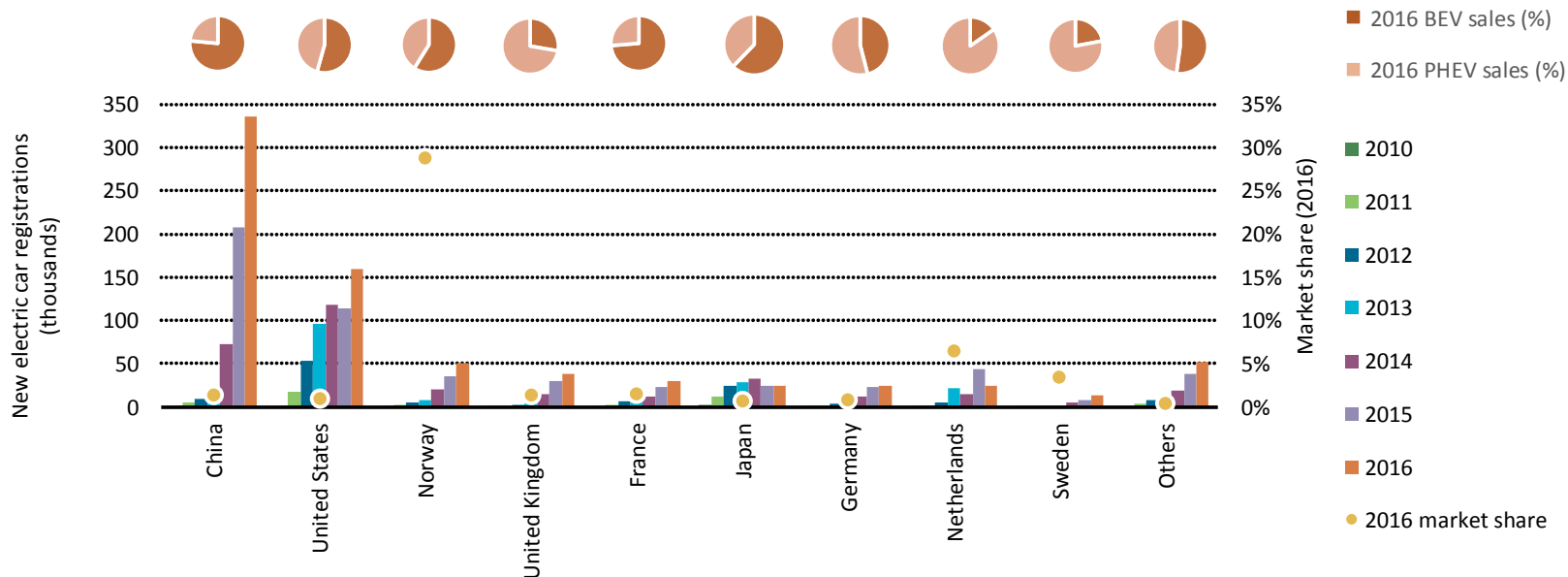
Global electric car fleet



The global electric car fleet reached 2 million units in circulation last year. Growth rates observed in 2016 and before (>40%) need to be maintained in future years

New electric car registrations reach 750 000 units in 2016

Electric car sales, market share, and BEV and PHEV sales shares in selected countries, 2010-16



95% of global electric car sales in 2016 took place in 10 countries, and 6 countries had a market share above 1%: Norway, Netherlands, Sweden, France, United Kingdom, China

E-mobility is also gaining ground in non-car modes; China leads the way



Electric 2-wheelers: > 200 million, mainly in China.

In other countries: ~200 000 in India, ~30 000 in the Netherlands, ~1 000 in the UK

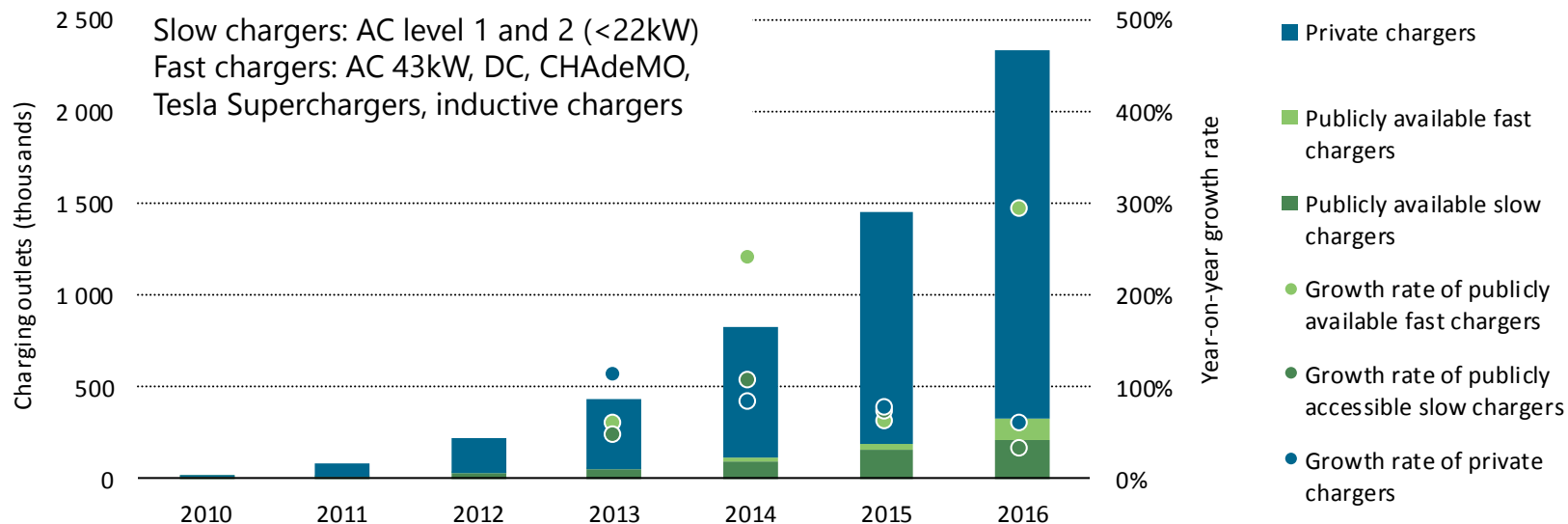
Low-Speed Electric Vehicles: ~4 million in China

Electric buses: 350 000 in China.

In Europe: deployment stage and ambitious procurement plans

EVSE deployment rates were higher than e-car adoption rates in 2016

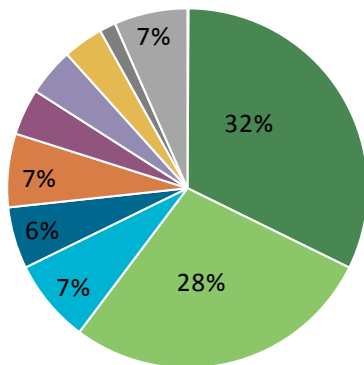
Global charging outlets, 2010-16



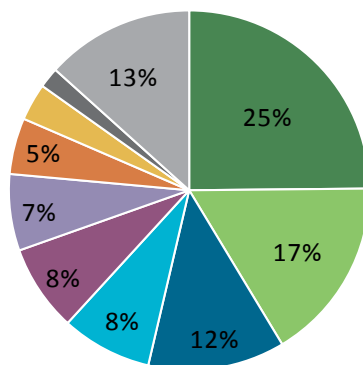
Publicly accessible infrastructure is growing to support the emerging EV market, especially publicly accessible fast chargers. This shows encouraging signs in addressing the *chicken-and-egg* issue.

EVSE outlets by country and type of charger, 2016

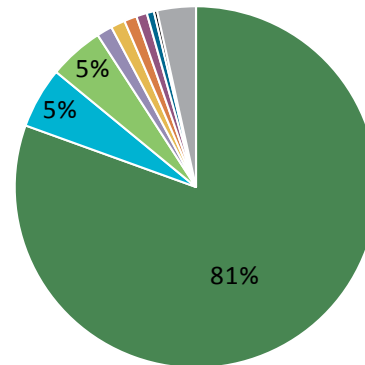
Electric car stock
2 million



Publicly available slow chargers
212 000 outlets



Publicly available fast chargers
110 000 outlets

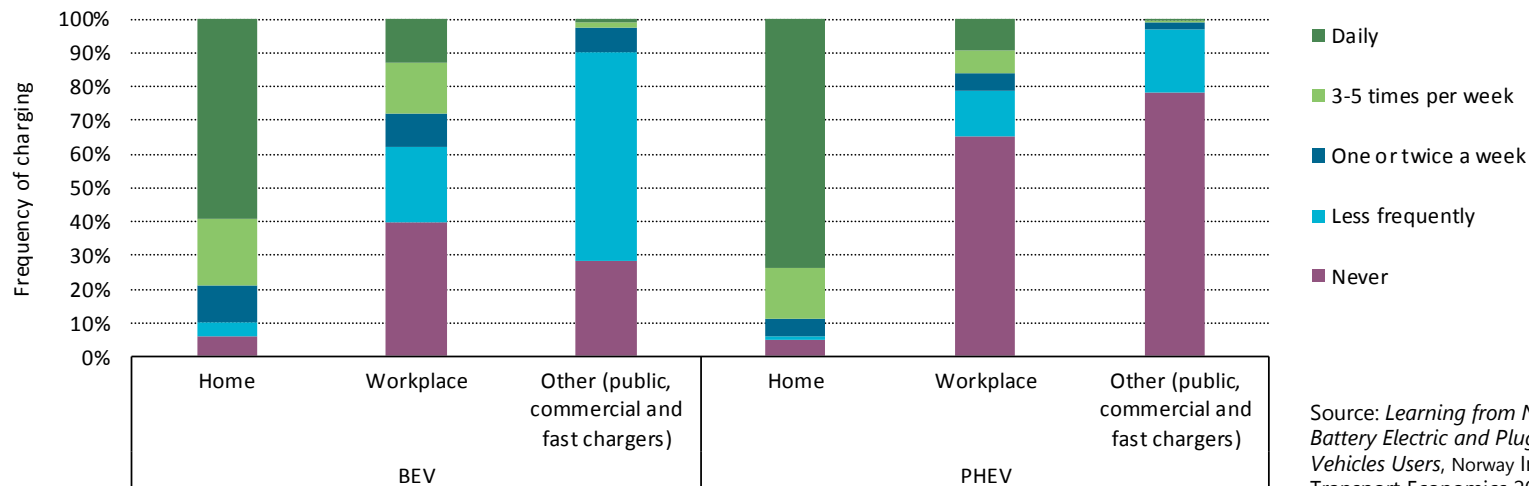


- China
- Japan
- United States
- United Kingdom
- Germany
- France
- Norway
- Netherlands
- Canada
- Others

Publicly accessible EVSE deployment varies greatly between markets and private chargers are estimated to be six times more numerous than publicly accessible chargers

Norway study confirms home charging is predominant

Charging habits for a sample of Norwegian electric car users, 2016

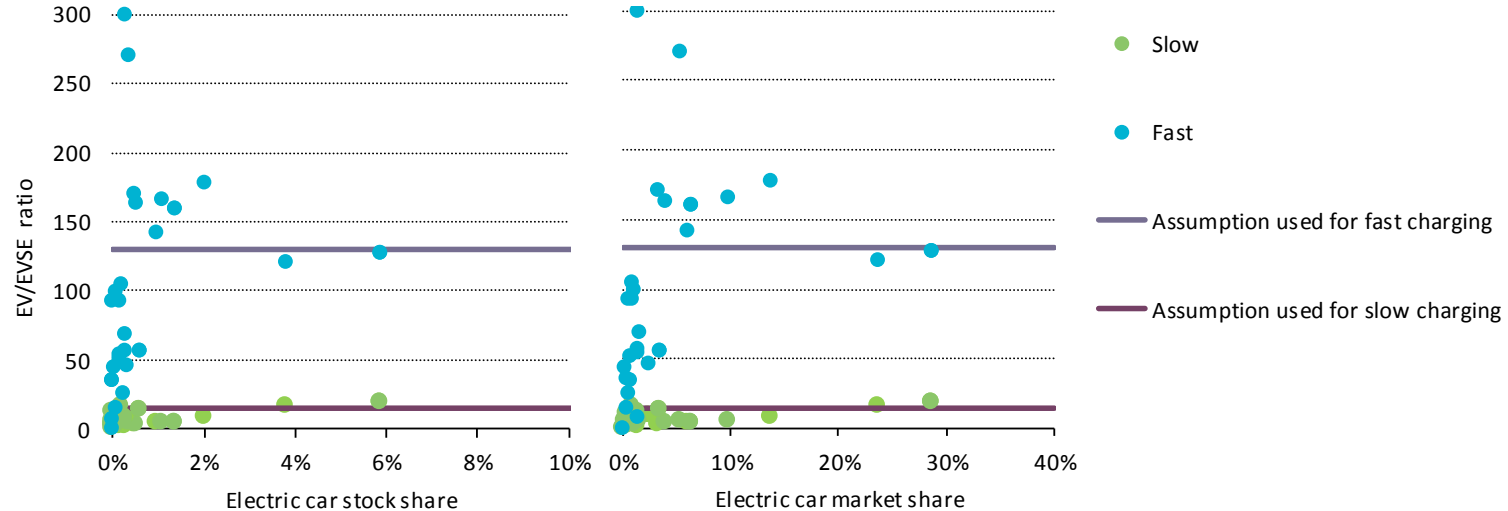


Source: *Learning from Norwegian Battery Electric and Plug-in Hybrid Vehicles Users*, Norway Institute of Transport Economics 2016

The rate of fast charging infrastructure use is very low and is usually planned. Several factors could explain this, including an “early market” effect.

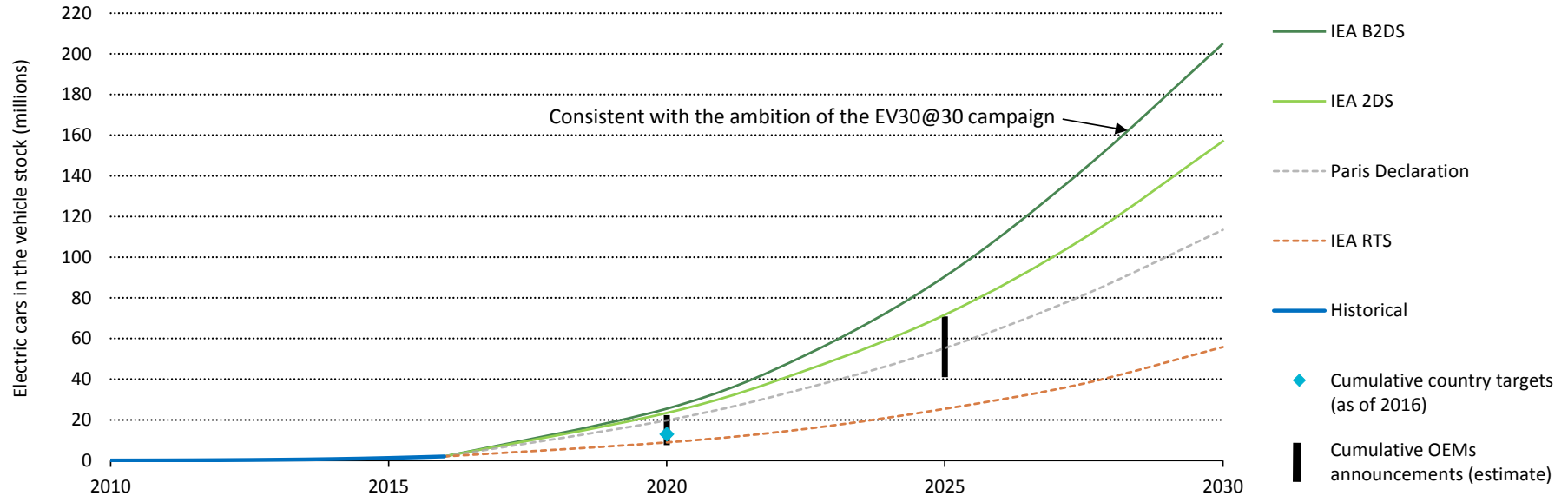
Will EV vs. public EVSE ratios converge as EV markets grow?

EV/EVSE ratios in various EV markets (publicly accessible EVSE)



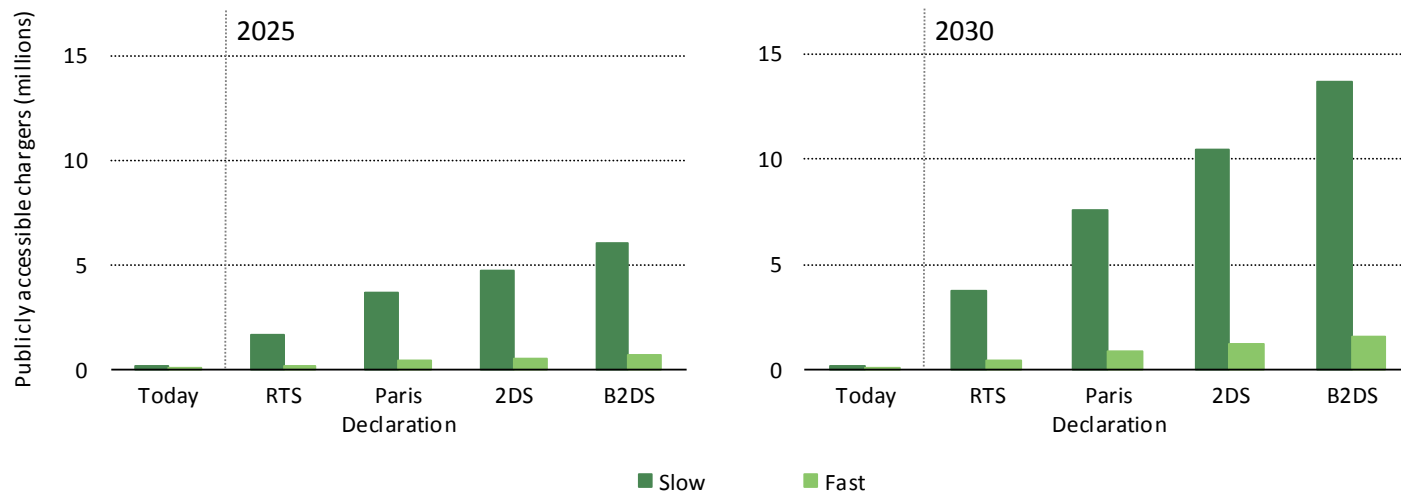
There is wide variability in EV/EVSE ratios in current market conditions. More advanced markets suggest that this could converge towards 15 EVs per slow charger and 130 EVs per fast charger .

Global electric car fleet



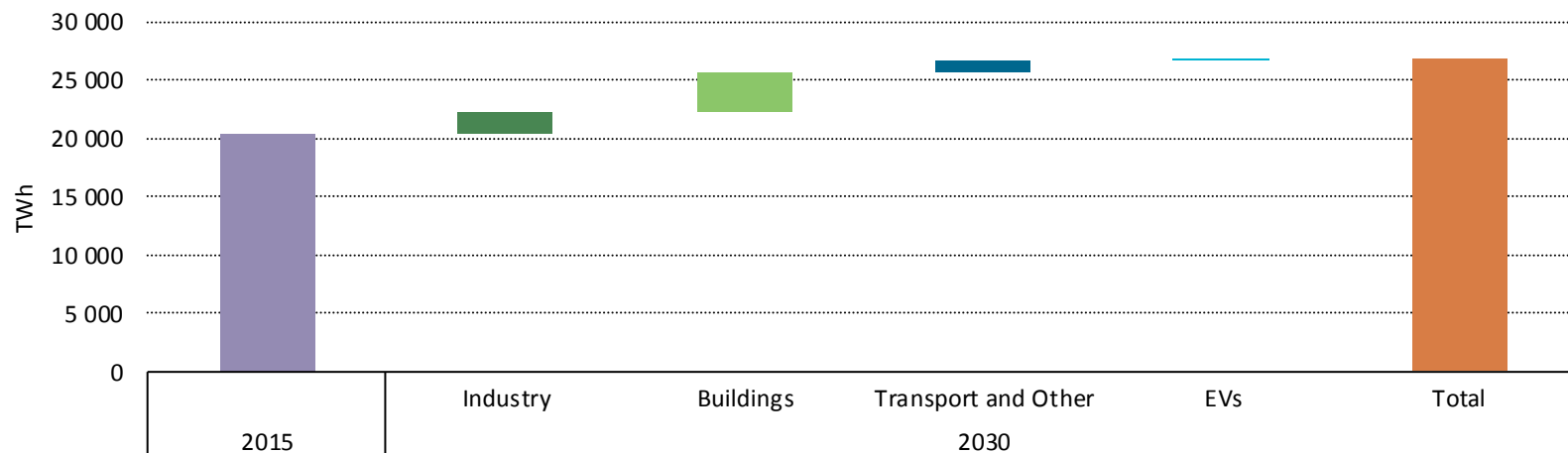
EVs will be needed to meet sustainability goals, as suggested by the EV30@30 campaign target. Early action, active government support and industry commitment are essential.

Global publicly accessible EVSE stock



Depending on the scenario considered, EVSE outlets will range between 2 and 7 million in 2025 and between 4 and 15 million by 2030. Interoperability will be key.

Global electricity demand, 2015 and 2030, 2DS



The additional energy demand from electric car loads is sizeable but largely manageable in comparison with total energy use and additional loads arising in other sectors.

- Mass electrification seems inevitable, together with large scale EVSE implementation
- Understanding the relevance of EVSE own energy use and charging efficiency is of interest to EVI activities and for the Global EV Outlook series:
 - ✓ Does it represent a sizeable share of EVs total electricity use?
 - ✓ Does it depend on the car (battery) or on the charger?
 - ✓ Who should pay for that energy?
 - ✓ Are there sizeable differences between slow and fast (or ultra-fast) charging?
 - ✓ Do communication and interoperability features impact chargers' own energy use?
 - ✓ What are V2G capabilities impacts?

Thank you for your attention.

Electric car sales are correlated to changes in EV policies

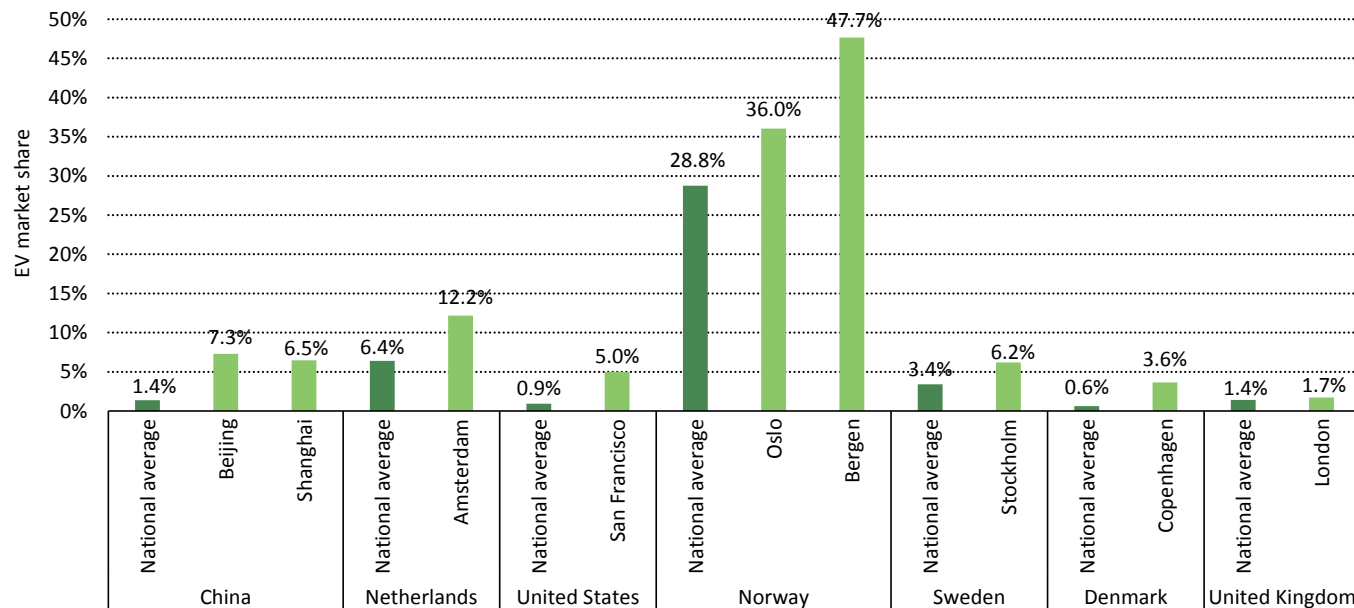
BEV and PHEV changes in incentives in a selection of countries, 2016

Country	2015 vs. 2016 policy developments		2015 vs. 2016 sales growth		2016 sales	
	BEV	PHEV	BEV	PHEV	BEV	PHEV
China		~	75%	30%	257 000	79 000
United States		~	22%	70%	86 731	72 885
Norway	~	↗	6%	164%	29 520	20 660
United Kingdom		~	4%	42%	10 509	27 403
France		~	26%	36%	21 758	7 749
Japan		~	48%	-34%	15 461	9 390
Germany		~	-6%	20%	11 322	13 290
Netherlands	~	↘	47%	-50%	3 737	20 740
Sweden	~	↘	0%	86%	2 951	10 464
Canada		~	19%	147%	5 220	6 360
Denmark		↘	-71%	-49%	1 218	182
South Korea		~	75%	-40%	5 099	164

Changes in electric car incentives, especially for vehicle purchase, can have an immediate and sizeable impact on electric car sales and steer the market towards either BEV or PHEV preference.

Cities can be a privileged space for EV support and deployment

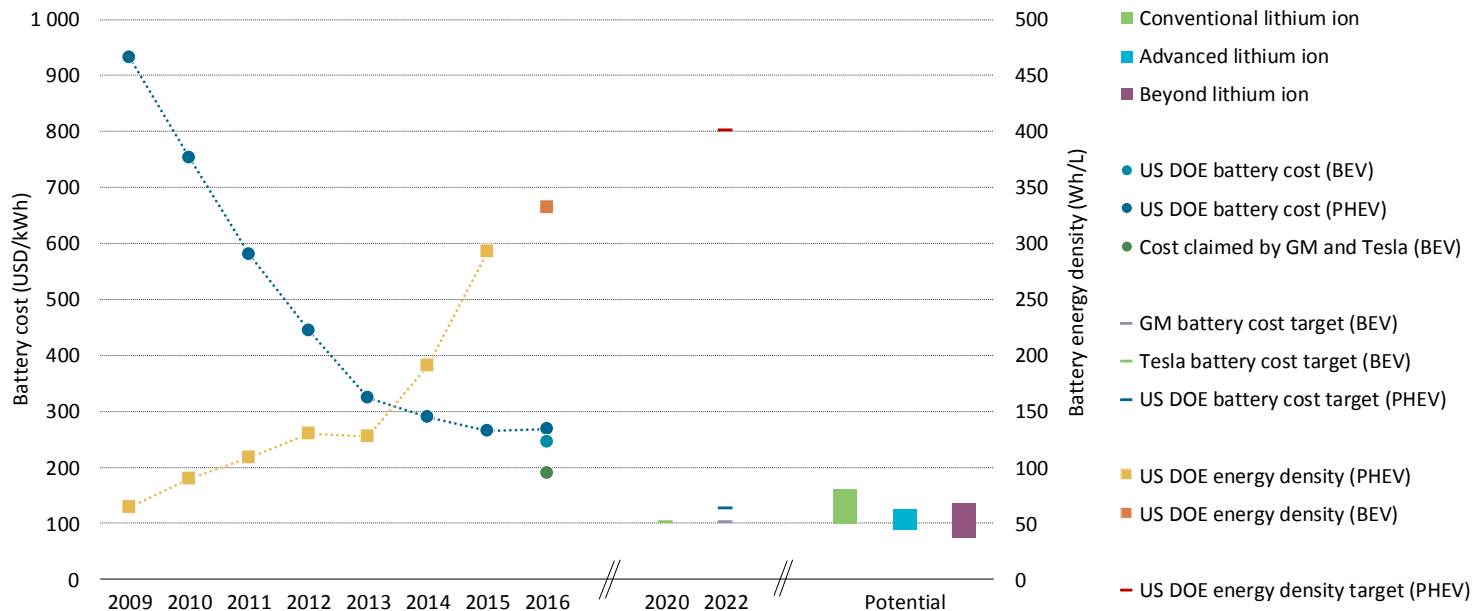
Market share of electric cars in leading EV countries compared to EV-friendly cities, 2016



In complement of government support, cities can implement measures to enhance the value-proposition of driving electric and act as innovation test-beds for the future of mobility

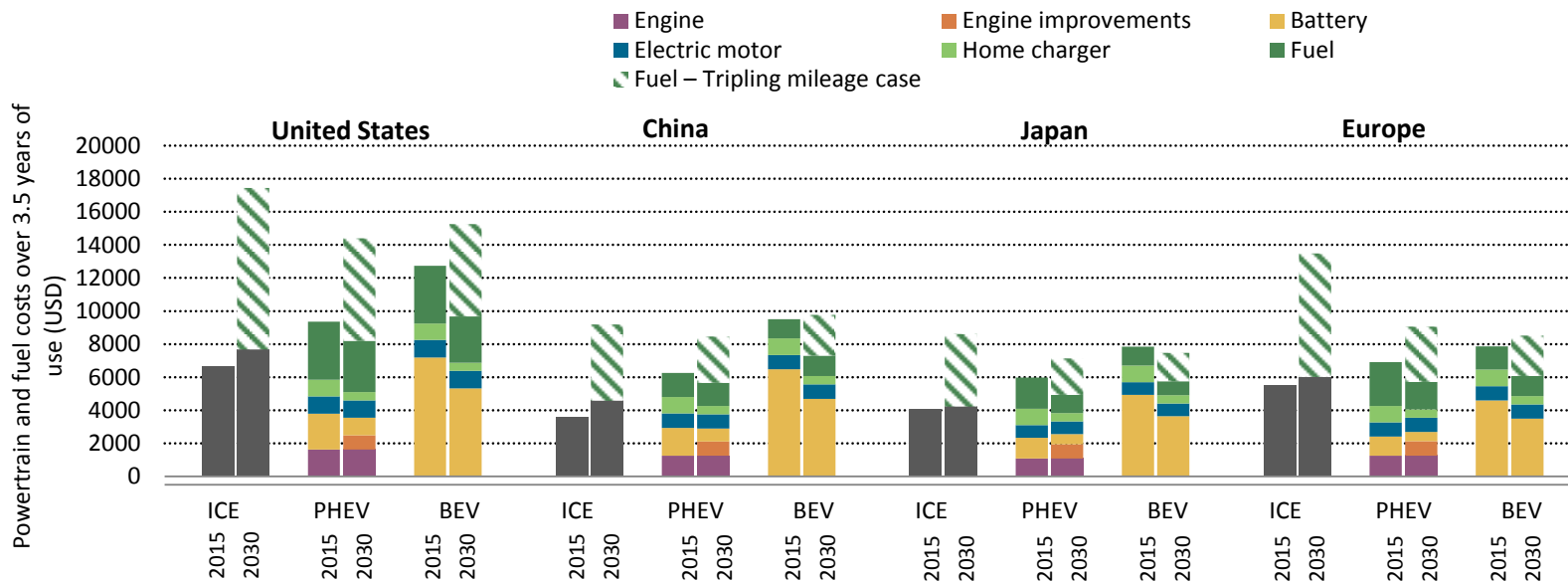
Battery costs and range as key factors for the success of e-mobility

Evolution of battery energy density and cost, 2009-16, and future prospects



Battery costs and energy density progresses are expected to keep delivering positive outcomes. This will further help lowering adoption barriers.

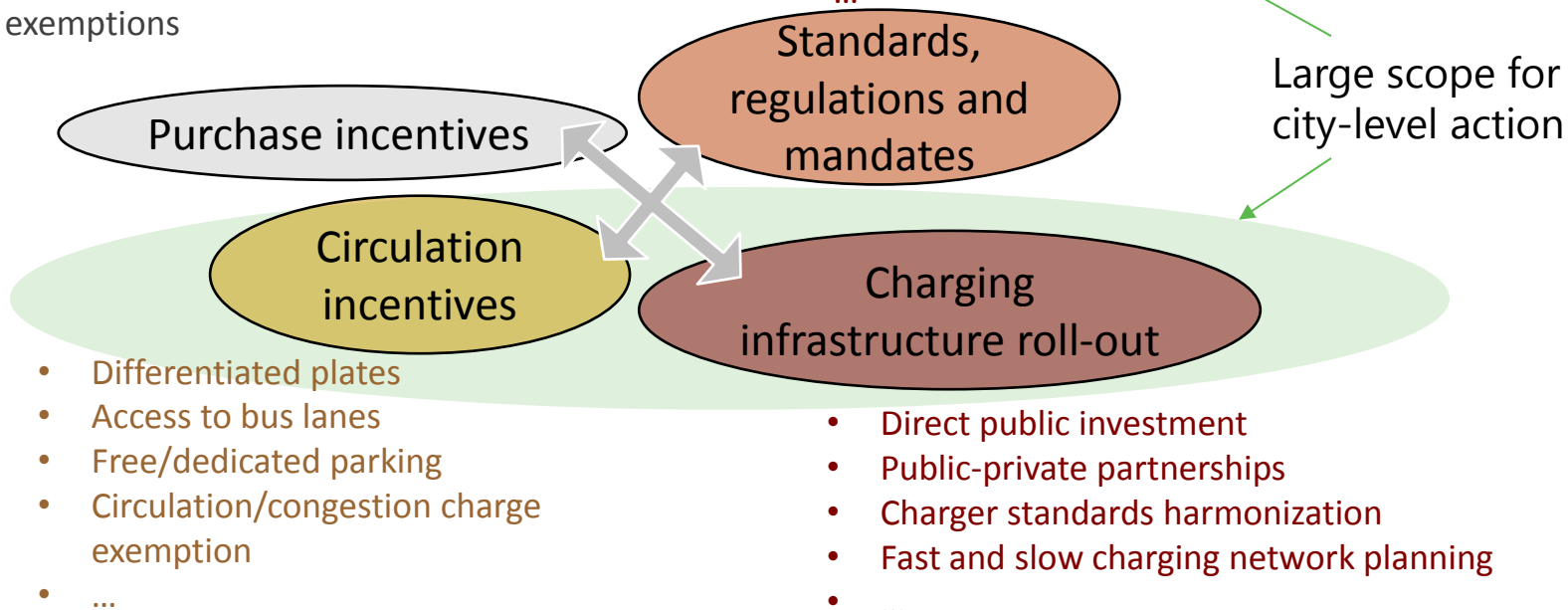
Comparative cost of passenger car technologies by country/region in the 2DS, 2015 and 2030



Achieving cost-competitiveness over the next decade will require policy instruments to allow market scale-up, reflect the cost of externalities of ICEs, and encourage synergies with new mobility models.

- CO₂-based, technology-based differentiated taxation and rebates
- Feebates
- VAT exemptions
- ...

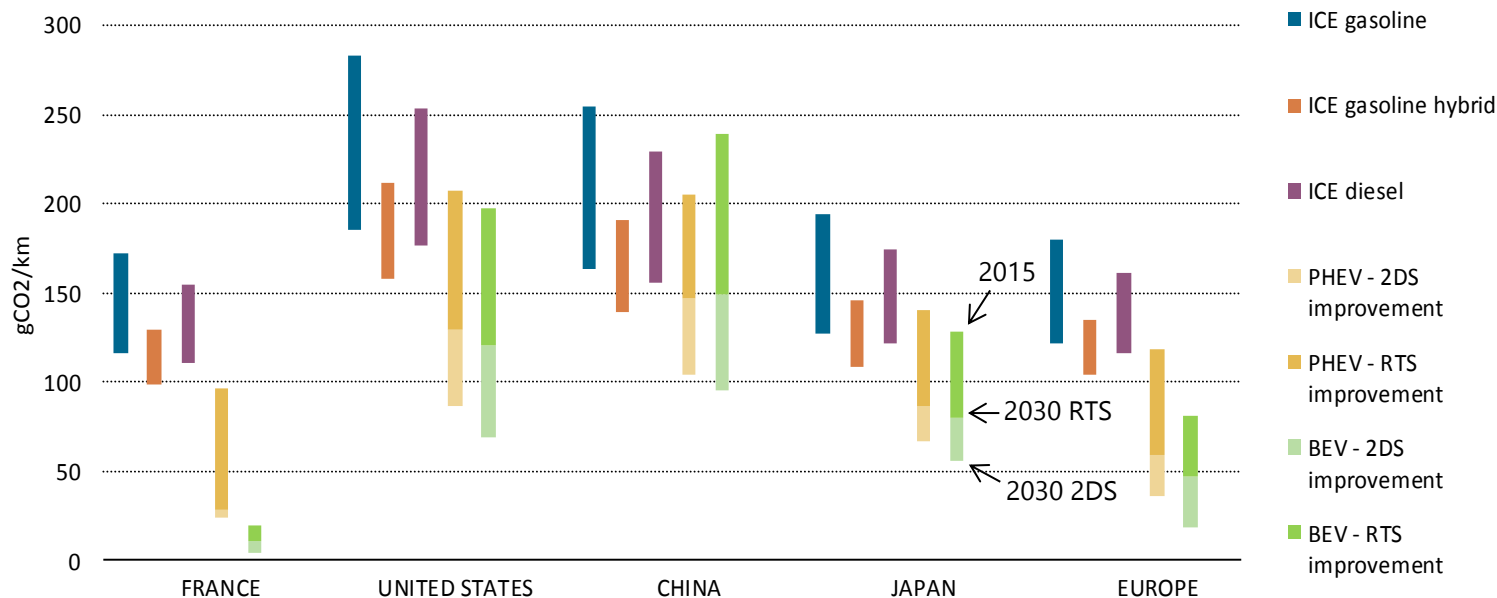
- Fuel economy standards, ZEV mandates
- Fuel taxes
- Public fleets, taxi fleets initiatives
- ...



Close monitoring of the effect of EV support policies are paramount to avoid adverse effects

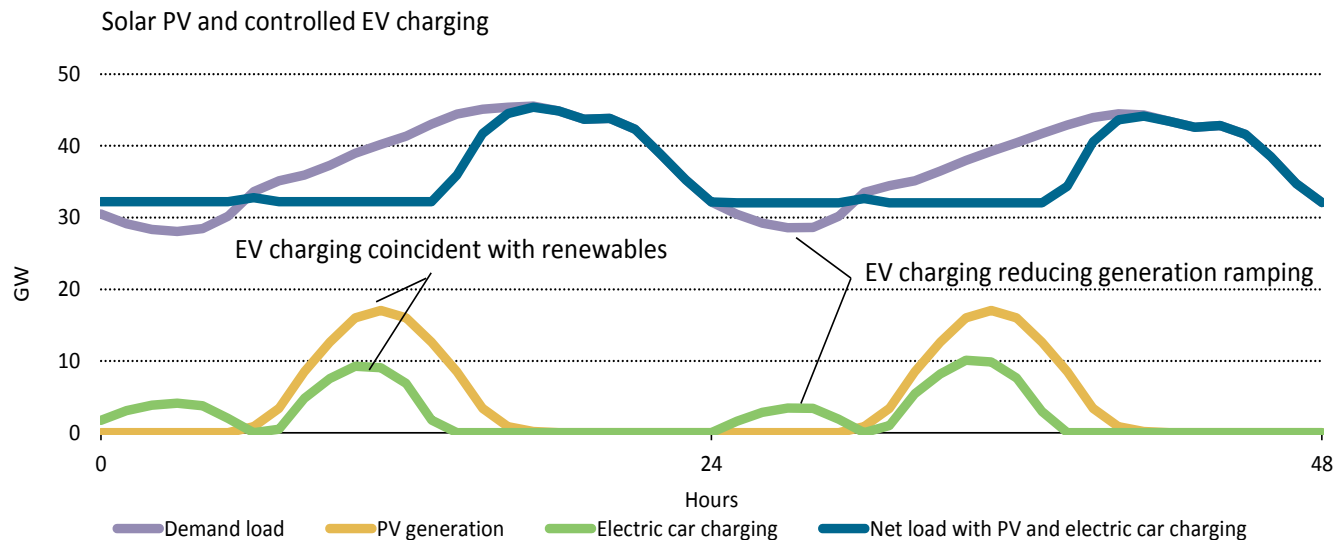
EVs benefit the environment and are essential to CO₂ emissions reduction

On-road WTW CO₂ emissions for various technologies by country/region, RTS and 2DS, 2015 to 2030



If coupled to low-carbon power, the high energy efficiency of EVs offers prospects for substantial CO₂ emissions reductions. This complements their air quality, energy security and noise reduction benefits.

Local demand profile and EV charging in the EU on a typical day, B2DS, 2030



Flexible charging will ensure minimal investment needs in grid reinforcements and optimized load synchronization with high shares of variable renewables.