



The Global EV Outlook 2019

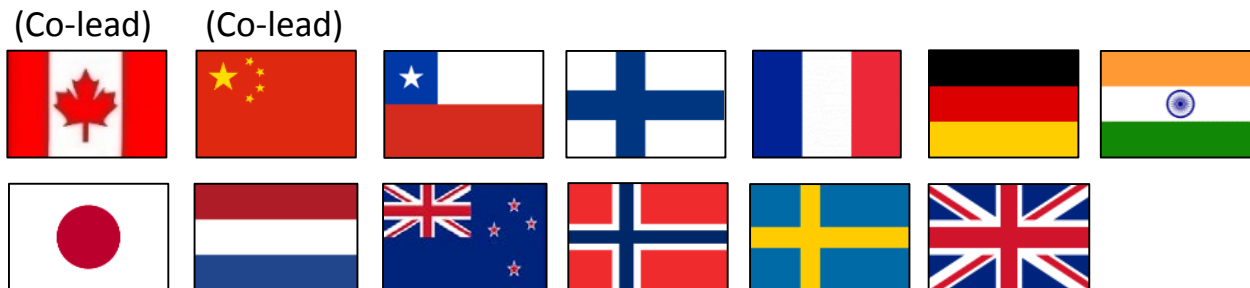
Dr. Timur Gül, Head Energy Technology Policy Division, IEA

IEEJ, Tokyo, 13 June



The Clean Energy Ministerial Electric Vehicles Initiative (EVI)

Members (2018-19)



Coordinator

Activities

Analytical publications



Commitments

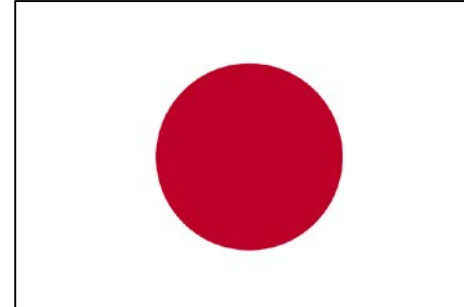
- **EV30//30**
[EV30@30 Campaign](#) (2017)
- [Paris Declaration on Electro-Mobility and Climate Change](#) (COP 21)
- [Government Fleet Declaration](#) (COP 22)

Collaborative projects

- [Global EV Pilot City Programme](#)
 EV Pilot City Programme
- € 4 million global electric mobility project for emerging economies (with UNEP and the GEF)



Policy momentum keeps increasing in key markets



- Voluntary standard for BEV fuel economy
 - Proposed passenger car fleet average fuel economy of 4L/100 km by 2025
 - Vehicle Subsidy Program: higher technical performance requirements
 - New Energy Vehicle (NEV) credits mandate
- CO₂ emissions standard for LDVs to 2030 (incl. EV credits)
 - CO₂ emissions standard for trucks to 2025-2030
 - Clean Vehicles Directive mandates, public procurement for clean LDVs, trucks and buses
 - Increasing number of member states announcing ICE and diesel bans
 - European Battery Alliance promotes the development of a local battery industry
 - Incentive schemes for of zero- and low-emission vehicles in member countries
- FAME II approved, providing incentives for public and shared three-wheelers, LDVs and buses, private two-wheelers and chargers
 - CO₂ emissions standard for LDVs in 2022
- New fuel economy standard for trucks and buses to 2025
 - Extension of of fuel economy standard for LDVs to 2030
 - 80% reduction of GHG emissions for vehicles produced by Japanese OEMs in 2050
 - EV sales targets in PLDVs for 2020 and 2030
- Proposal from federal government to freeze GHG emissions standards for new LDVs from 2022 to 2025
 - 20 states willing to stick to previous targets
 - California EV targets more ambitious: 5 million EVs by 2030

Black: policies implemented or updated in 2018

Grey: policies implemented prior to 2018

A broad portfolio of supporting policies

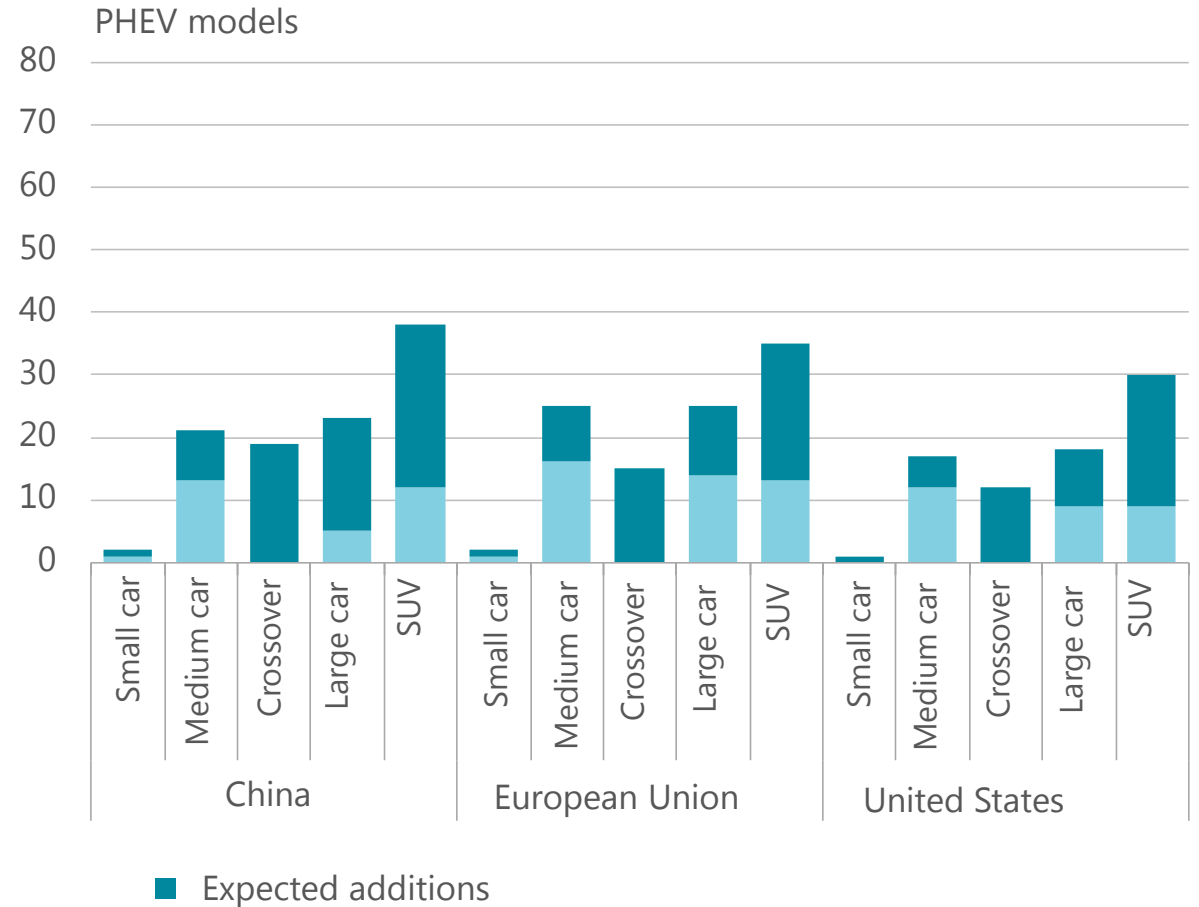
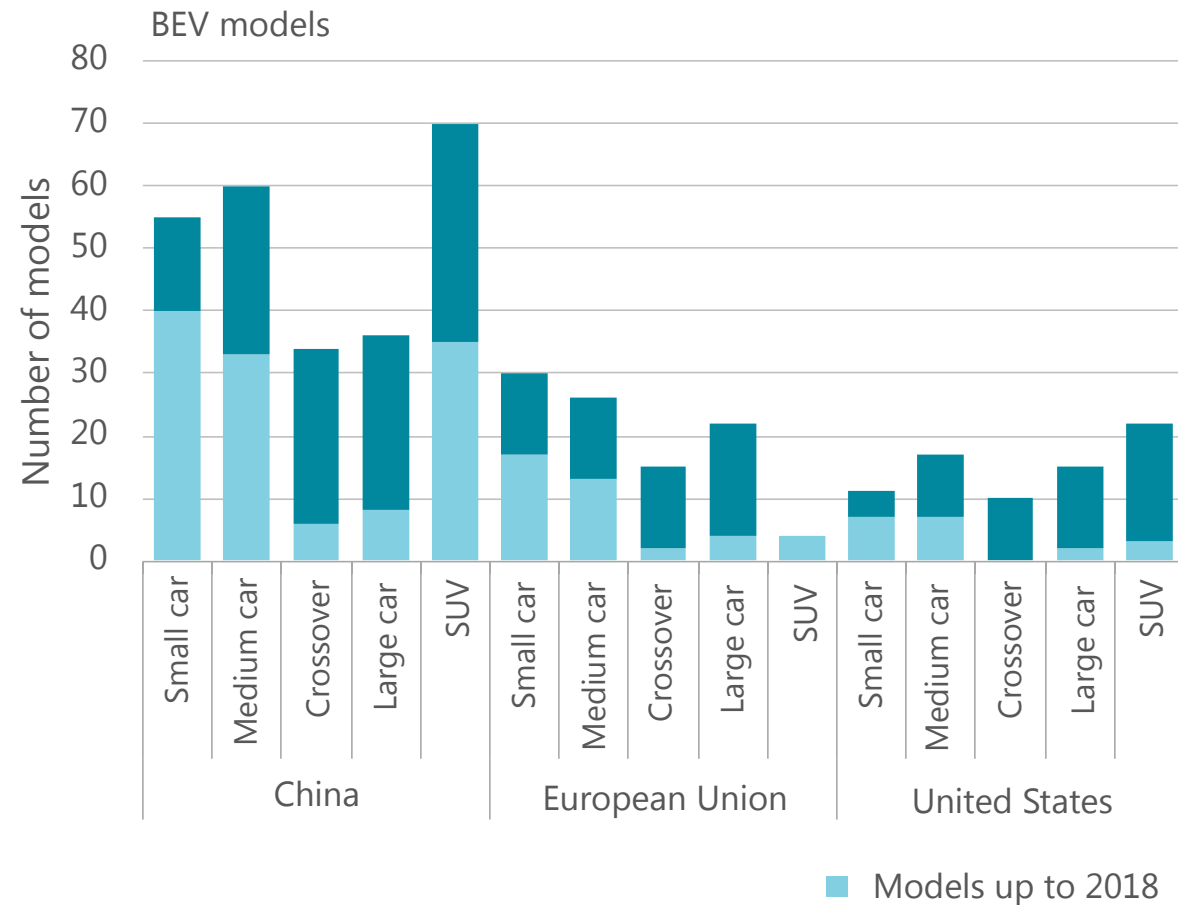
		Canada	China	European Union	India	Japan	United States
Regulations (vehicles)	ZEV mandate	✓	✓				✓
	Fuel economy standards	✓	✓	✓	✓	✓	✓
Incentives (vehicles)	Fiscal incentives	✓	✓	✓	✓		✓
Targets (vehicles)		✓	✓	✓	✓	✓	✓
Industrial policies	Subsidy	✓	✓			✓	
Regulations (chargers)	Hardware standards	✓	✓	✓	✓	✓	✓
	Building regulations	✓	✓	✓	✓		✓
Incentives (chargers)	Fiscal incentives	✓	✓	✓		✓	✓
Targets (chargers)		✓	✓	✓	✓	✓	✓

✓ Implemented at national/international level

✓ Implemented at local/state level

Policies have been a major driver of electric mobility deployment, triggering industry ambition and supporting costs reductions.

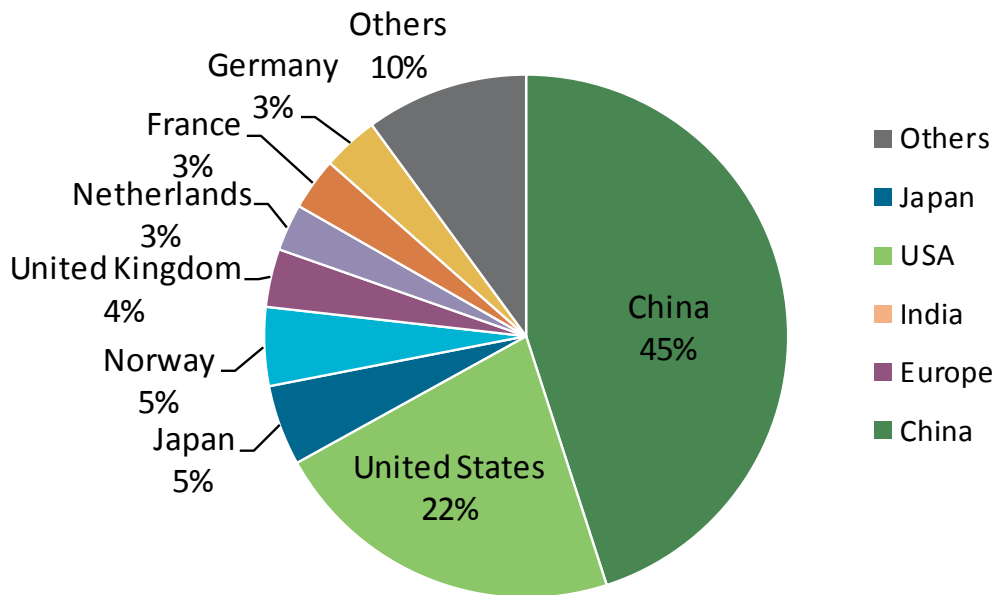
There is a broader offer of EV models becoming available



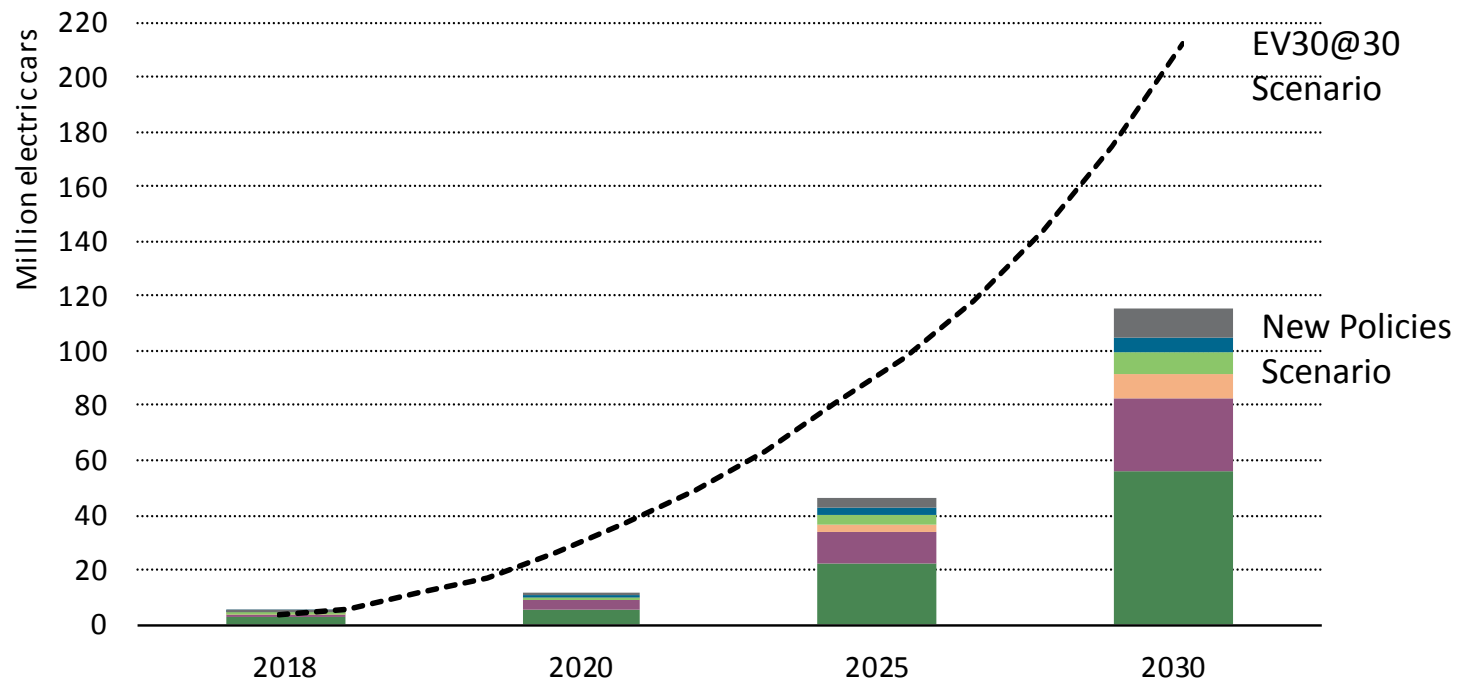
Announced electric models are more equally distributed among segments than currently. Plug-in hybrids are unlikely to be available for the small vehicle segment.

The number of electric cars on the road continues to grow

Electric car stock in 2018: 5.1 million



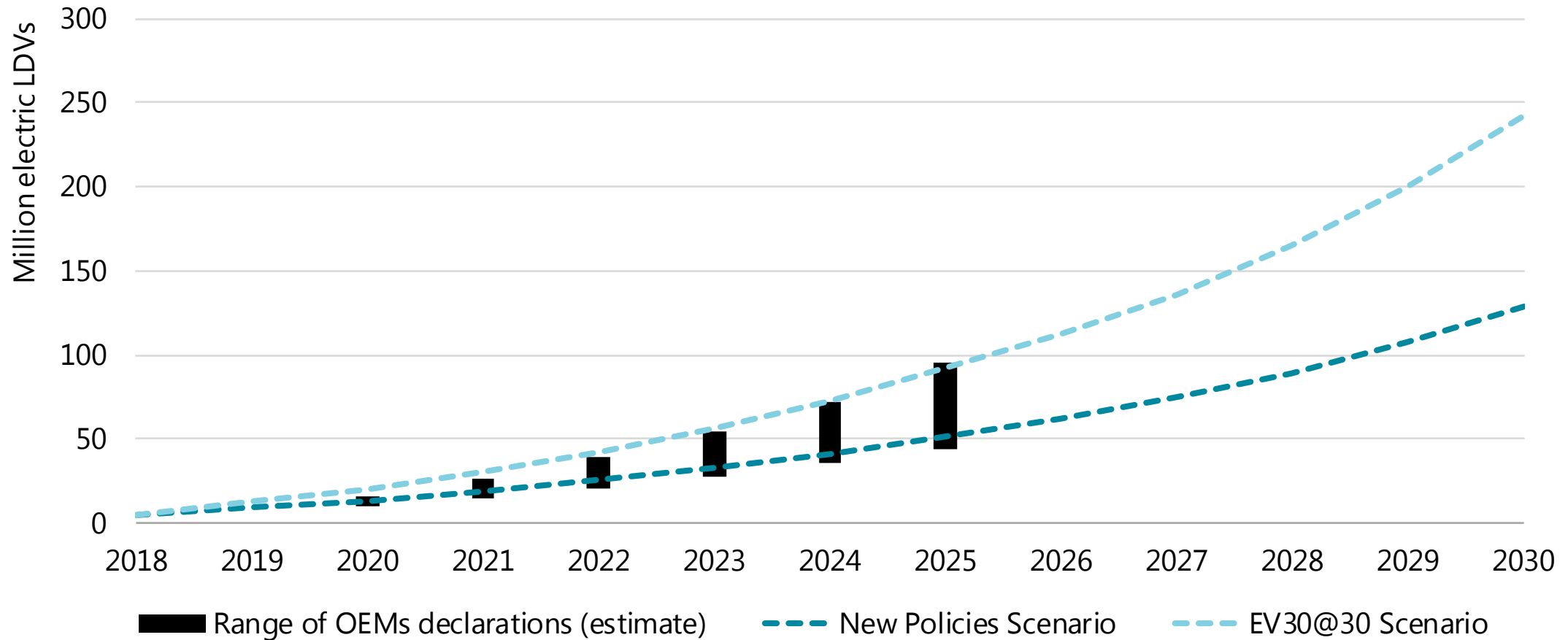
Electric car outlook



Source: Global EV Outlook 2019, <https://www.iea.org/gevo2019/>

The global electric car stock reached 5 million in 2018 and is projected to exceed 115 million by 2030 under existing policies; in the EV30@30 Scenario, it exceeds 210 million.

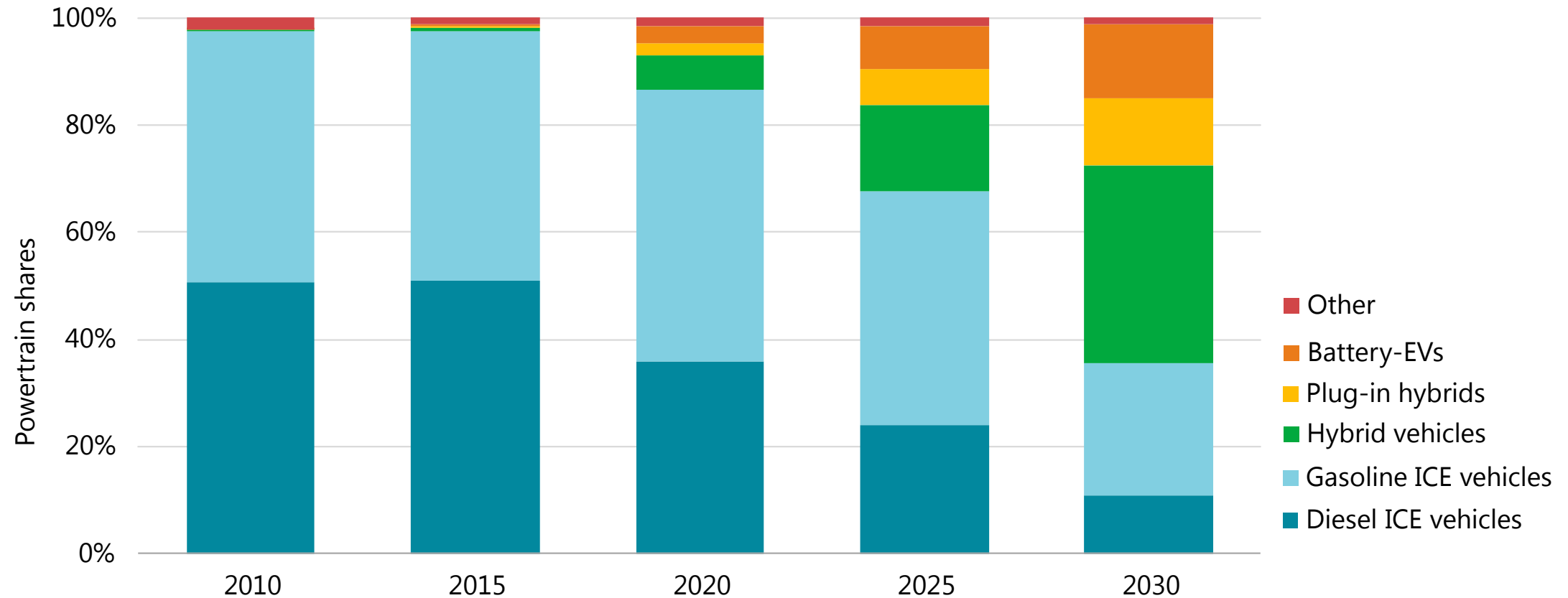
OEM targets for electric cars – a real-life check of projections



OEM targets suggest that more ambitious policy targets are achievable.

Achieving the new European Union fuel economy targets

PLDV sales share in the European Union to meet 2030 fuel economy targets

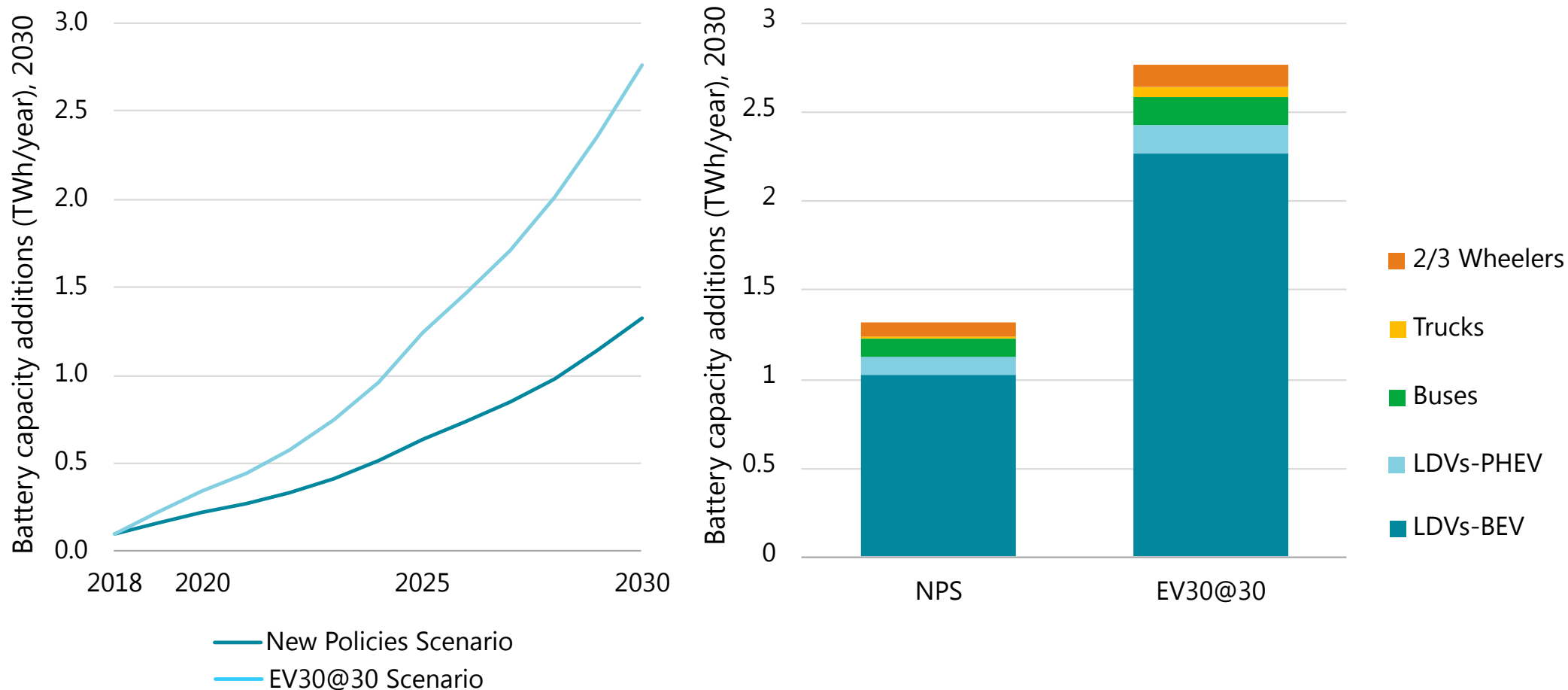


Increasing of electrified vehicles are needed to comply with the European fuel economy standards in 2030.

Global battery capacity from EVs is expanding



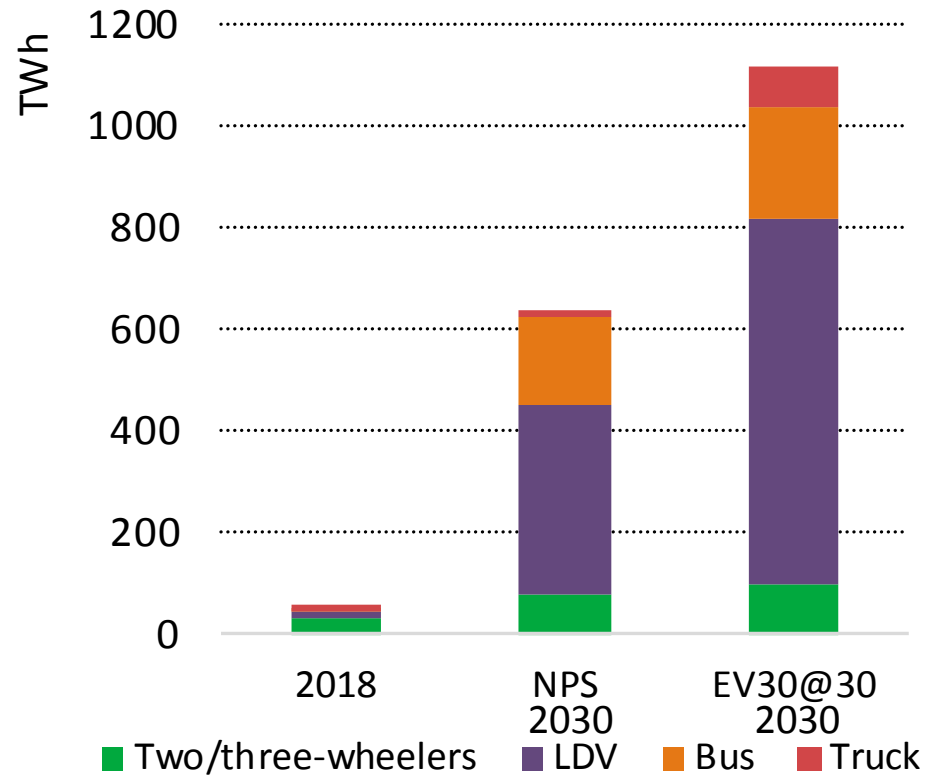
Growth in vehicle battery capacity by scenario



Battery capacity from electric vehicles is set to rise; cars are the main driver.

Challenges and opportunities from EVs for the power sector

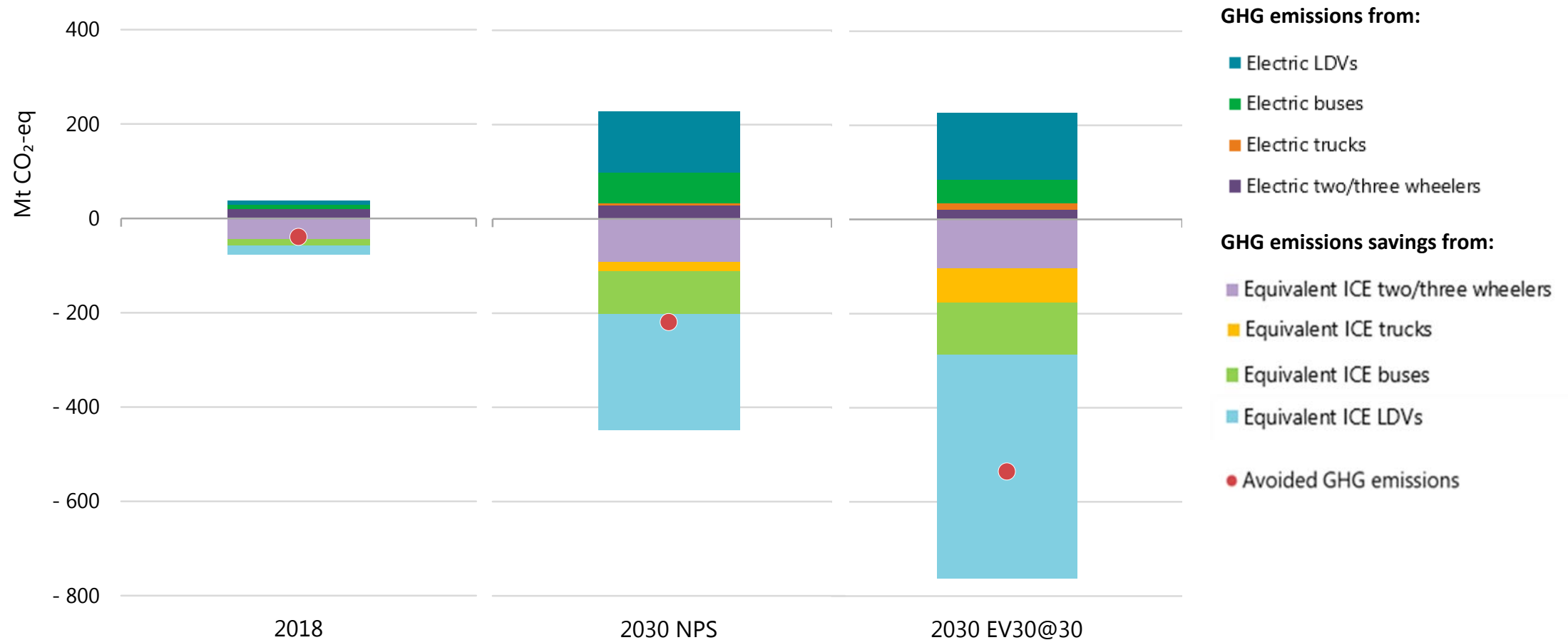
World power demand from EVs



- EVs plugged to the power network can act as storage units: demand-side response, smart charging
- EVs can become assets for power system flexibility and help integrate renewables

Electricity demand from electric vehicles is set to rise, offering a potential new source of flexibility.

Reducing well-to-wheel GHG emissions through electrification



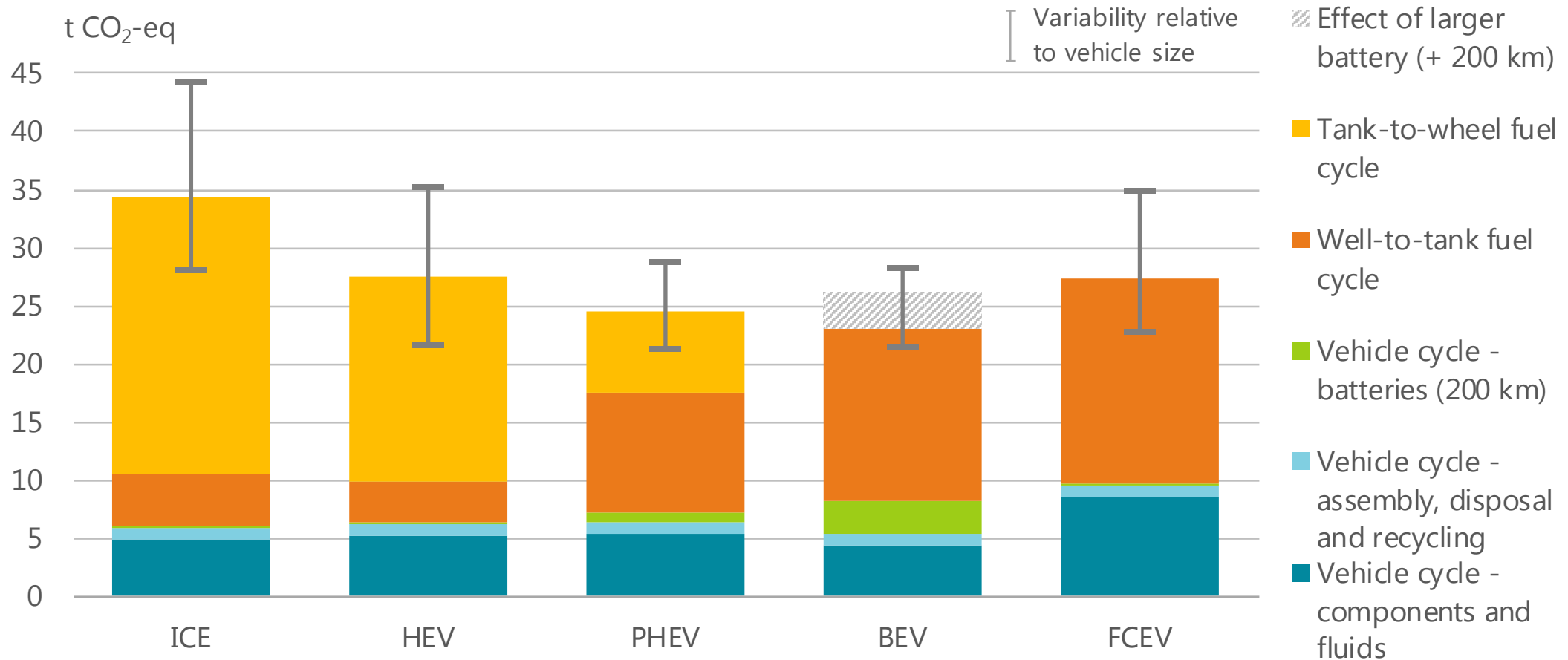
Electric vehicles reduce GHG emissions on a well-to-wheel basis through 2030; the impact is larger if electricity generation decarbonises more quickly.

The energy and environmental performance of EVs

- Electric vehicles consume much less energy at the point of use than ICE vehicles
- By 2030, electric vehicles are set to displace at least 5 times more diesel and gasoline than in 2018
- Electric vehicles reduce world well-to-wheel CO₂ emissions by 220 Mt CO₂ in 2030 in the New Policies Scenario, and 540 Mt CO₂ in the EV30@30 Scenario
- Electric vehicles abate pollutant emissions in high exposure areas (urban environments) as they have no tailpipe emissions

Assessing electric cars on a lifecycle basis

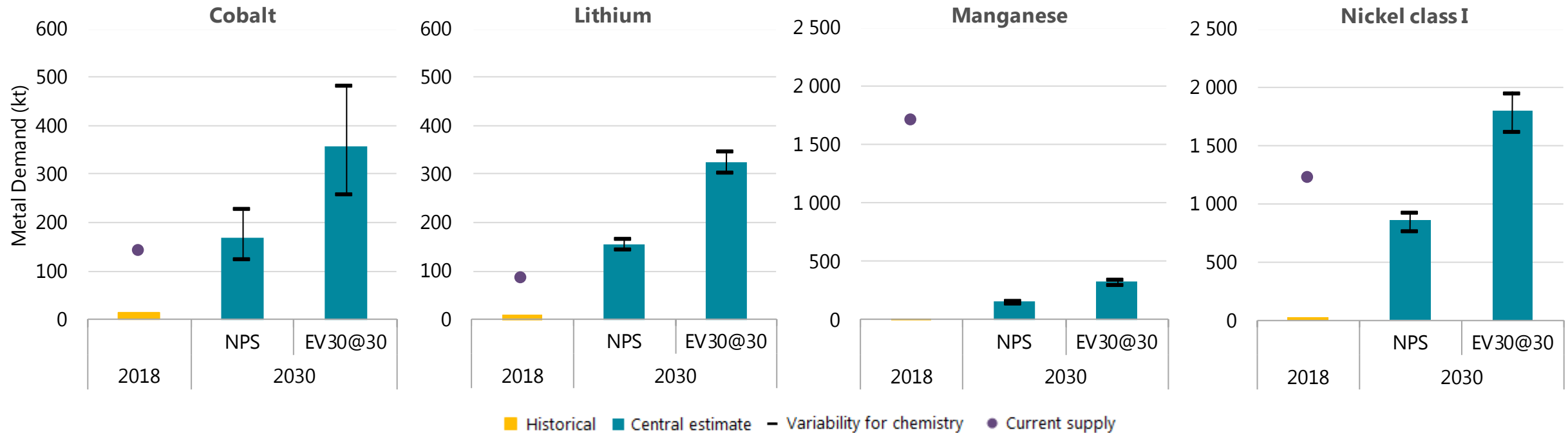
Life-cycle GHG emissions for passenger cars by powertrain, 2018



With the global average GHG intensity of electricity generation, EVs, FCEVs and HEVs have similar performance. If electricity generation decarbonises, GHG emissions of BEVs and PHEVs can decline significantly.

Electric mobility increases demand for new materials

Increased annual demand for materials for batteries from deployment of electric vehicles by scenario, 2018-30



Note: The battery chemistry mix considered for 2030 in this analysis is composed of 10% of NCA, 40% of NMC 622 and 50% of NMC 811

Demand for cobalt, lithium, manganese and nickel rises significantly to 2030.

Ensuring the stability of governmental revenues from transport taxation



Taxes and charges relative to revenue stability, management of external costs and ease of implementation

	Long-run revenue stability	Internalising GHG emission costs	Internalising air pollution costs	Recovering infrastructure costs	Ease of implementation
Vehicle tax	Good	Limited	Limited	Limited	Good
Fuel (carbon) tax	Limited	Good	Limited	Limited	Good
Distance-based charges	Good	Limited	Good	Good	Limited

Source: OECD

There are multiple options to stabilise government revenues from transport taxation; care is required to ensure social acceptability.

Conclusions

- Electric mobility is developing at a rapid pace, driven by policy ambition; industry is following suit, indicating a bright outlook for electric vehicles
- Policies evolve, starting with deployment targets & technical standards, to fiscal & regulatory measures, and support to charging infrastructure
- Electric cars are efficient & save energy; the cleaner the power mix, the greater the GHG emissions savings over the life-cycle
- Electrification brings new challenges that need anticipation, such as increases in electricity & raw material demand and a decline in tax revenues
- The IEA supports governments & industry with data & analysis on the future of clean energy technologies, including on EVs



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