

World Energy Perspectives | 2016

EXECUTIVE SUMMARY

IN COLLABORATION WITH ACCENTURE STRATEGY

E-MOBILITY: CLOSING THE EMISSIONS GAP

Over the next five to ten years, passenger vehicle manufacturers will be confronted with regulatory pressure and material penalties as gains in fuel economy fall behind the required rates of improvement set to address environmental preservation and climate change mitigation. The fuel economy targets are expected to exceed forecasted new internal combustion engine powered passenger vehicle capabilities. This report examines to what extent electric vehicles (EV) – battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV) – are the latest technologies to increase average fuel efficiency in the bid to close the emissions gap and meet stringent fuel economy standards. This new frontier represents a significant opportunity for the energy sector.

KEY FINDINGS

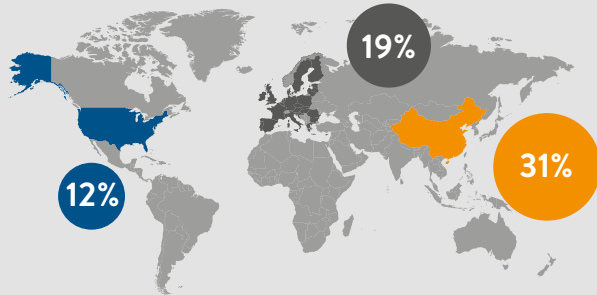
- 1 FUEL ECONOMY IMPROVEMENT TARGETS OF APPROXIMATELY 30 % FOR CARS FROM 2014 TO 2020** have been set by the European Union, US and China. These are the world's largest car markets with collective annual demand of over 40 million passenger vehicles.
- 2 ELECTRIC VEHICLES CURRENTLY REPRESENT LESS THAN 1% COMBINED MARKET SHARE** across the world's largest car markets for new passenger cars. To achieve the fuel economy improvement targets, the combined market share for electric vehicles needs to increase to 16% by 2020. EVs should therefore be considered for a central role in any policy and technology portfolio designed to lower transport emissions.
- 3 THE NUMBER OF ELECTRIC VEHICLE SALES REQUIRED TO MEET FUEL ECONOMY TARGETS** for passenger cars, is referred to as the "EV gap". In the EU, the EV gap is 1.4 million (10% of the estimated 2020 passenger car sales), in the US, it is closer to 0.9 million (11% of the projected 2020 passenger car sales), and in China, it is approximately 5.3 million (22% of the projected passenger car sales).



ELECTRIC VEHICLES: CLOSING THE EMISSIONS GAP BY MEETING FUEL EFFICIENCY TARGETS

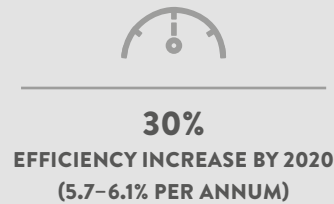
NEW PASSENGER VEHICLES MARKET SHARE

The EU, US and China are the world's largest car markets with collective annual demand of over 40 million passenger vehicles.



FUEL ECONOMY IMPROVEMENT TARGETS

Regulators in the EU, US and China have all demanded major improvements in fuel economy by 2020, requiring efficiency improvements two to three times higher than current levels.



KEY

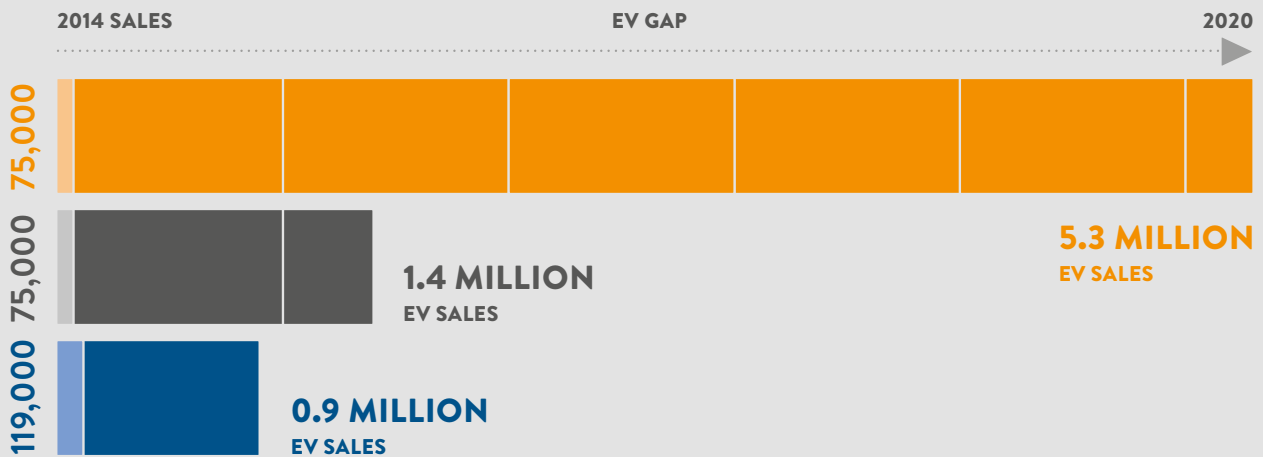
CHINA

US

EU

ELECTRIC VEHICLE SALES GAP

Even capturing less than 1% of combined sales across the three markets, electric vehicles can be key to lowering overall fuel economy to meet new requirements. The **EV GAP** is the number of electric vehicle sales that will be needed in each market to meet the regulatory requirements.



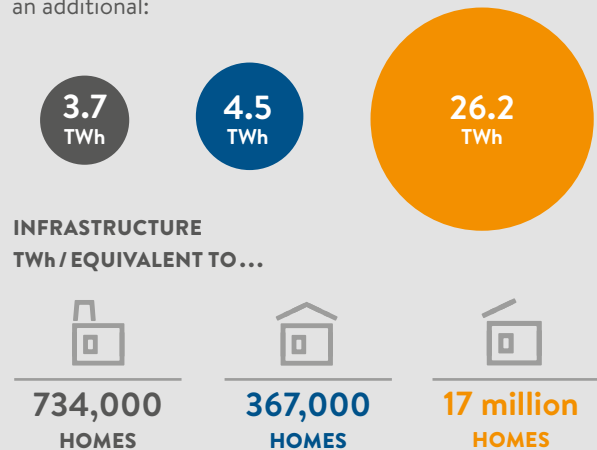
CO₂ SAVINGS

If regulators work with industry (through financial and operational incentive programmes) and consumers to make this growth a reality, the CO₂ savings could put us on the right path to closing the transport emissions gap for the decades to come.



IMPACT ON INFRASTRUCTURE

The impact on energy infrastructure would be manageable and could also create a potential growth opportunity. By 2020 each market would need an additional:



4 ELECTRIC VEHICLES' ADOPTION FACES PERSISTENT COST AND RANGE ANXIETY HURDLES, which are being addressed to varying degrees of success with government intervention and may be further allayed through regulator and market collaboration.

5 ROAD TRANSPORT IS RESPONSIBLE FOR APPROXIMATELY ONE QUARTER of all greenhouse gas emissions in the EU and US as well as 10% in China, and generates over 3 Gt CO₂. EV adoption and “closing the EV gap” could make a significant impact towards meeting country level CO₂ emissions reduction goals.

IMPLICATIONS FOR THE ENERGY SECTOR

- New fuel economy standards across the globe have made it clear that transport emissions (and liquid fuels) are a priority for regulators to address environmental preservation and climate change mitigation.
- The attractiveness of EVs as a viable option to accelerate new fuel economy improvements and meet stated objectives could result in generous incentive policies which present utilities with a potential growth opportunity.
- Electricity demand attributed to new EVs can be managed with proper planning by utilities (expected annual incremental generation requirements fall below 0.5% of 2014 total electricity generation in all three markets analysed) and could be further mitigated at the local level with emerging technologies such as vehicle-to-grid (V2G) solutions.

RECOMMENDATIONS

- **Industries:** Vehicle manufacturers will need to respond to regulatory pressures and shift their product portfolio to avoid material penalties. Additionally there is an opportunity for vehicle manufacturers and utility electricity providers to partner to deliver a superior value proposition to consumers.
- **Policymakers:** Ensure that consumer and manufacturer incentives align with new or considered emissions standards. Monitor effects of increased electricity demand to preserve the integrity of grid operations. Regulators should examine how the proposed fuel economy requirements can be matched with incentive programmes (financial and operational) and collaborate with industry in order to realise desired reductions in CO₂ emissions.
- **Consumers:** Evaluate the economic and environmental benefits of EVs alongside other alternative transportation methods that are coming online. Provide feedback to regulators and manufacturers.

ABOUT THIS REPORT

The World Energy Perspectives report on E-Mobility is part of a series of reports based on expert insights from the World Energy Council's network of energy leaders and practitioners. This series provides a bottom-up assessment of the key issues and technologies in the transport sector.

E-Mobility holds significant potential for increasing energy security, reducing carbon emissions and improving local air quality. This first E-Mobility report examines the potential of electric vehicles to meet the stringent fuel economy and emissions standards and close the gap.

Produced in collaboration with Accenture Strategy, the report focuses on the world's largest car markets (EU, US and China) along with a key case study from New Zealand.

WORLD ENERGY COUNCIL

The World Energy Council is the principal impartial network of energy leaders and practitioners promoting an affordable, stable and environmentally sensitive energy system for the greatest benefit of all.

Formed in 1923, the Council is the UN-accredited global energy body, representing the entire energy spectrum, with over 3,000 member organisations in over 90 countries, drawn from governments, private and state corporations, academia, NGOs and energy stakeholders.

We inform global, regional and national energy strategies by hosting high-level events including the World Energy Congress and publishing authoritative studies, and work through our extensive member network to facilitate the world's energy policy dialogue.

Further details at www.worldenergy.org and [@WECouncil](https://twitter.com/WECouncil)

The full report can be found at www.worldenergy.org/publications

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