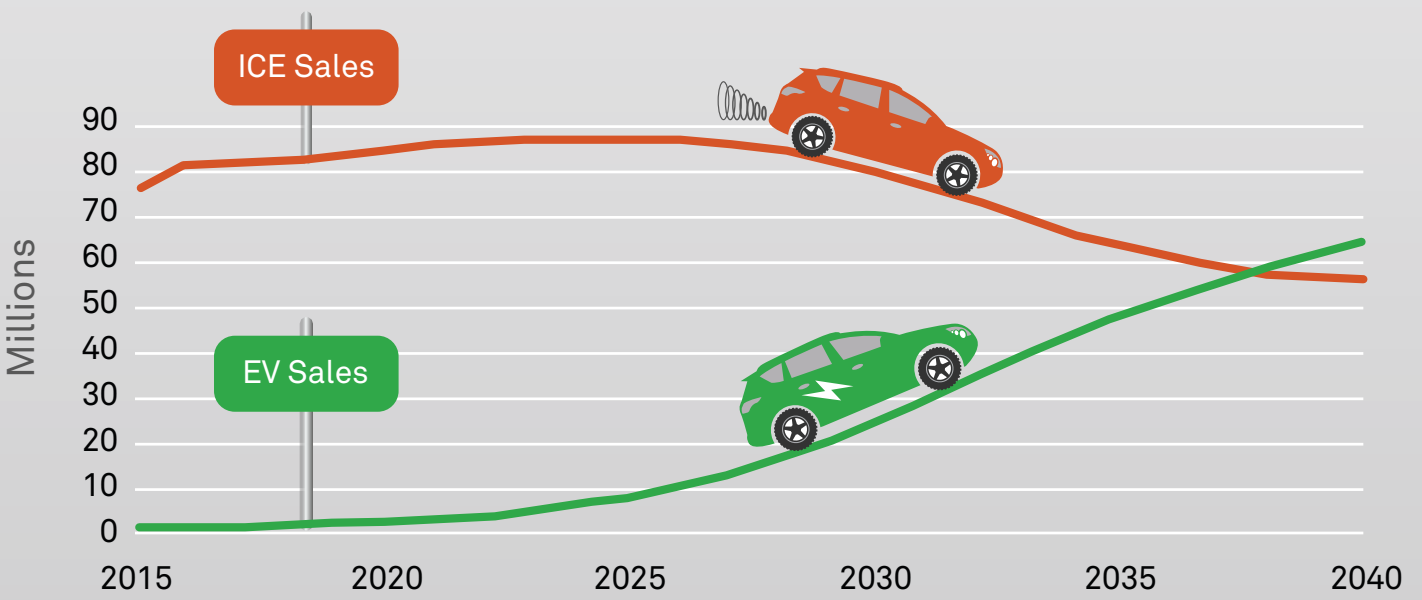


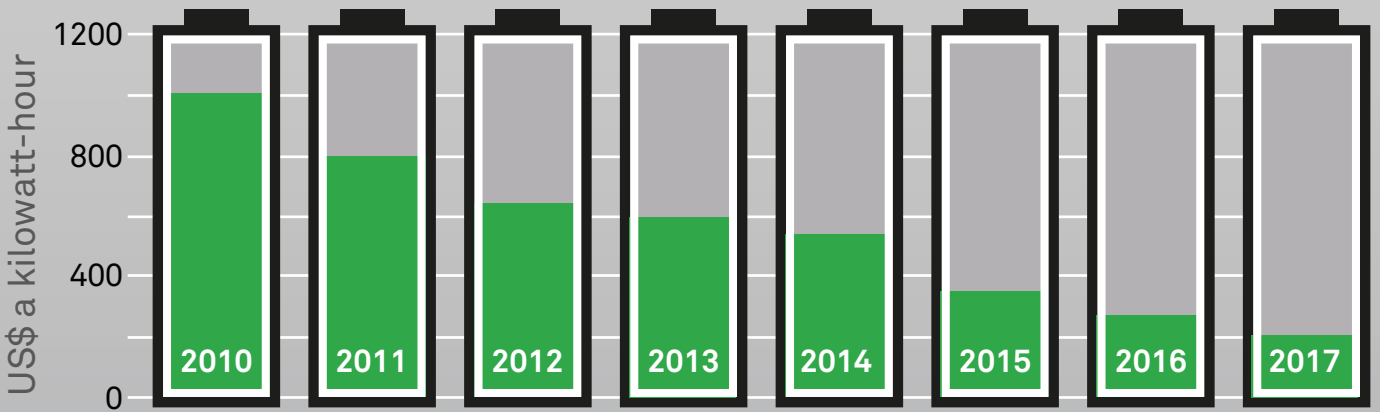
# Full charge ahead for electric vehicles?

Electric vehicle sales could overtake internal combustion engines in just over 20 years creating new investment opportunities...



Source: Bloomberg New Energy Finance. 11 September 2017.

Against a backdrop of falling lithium-ion battery prices\*



Source: Bloomberg New Energy Finance survey of over 50 companies. 05 December 2017.

\*Figures are volume-weighted averages

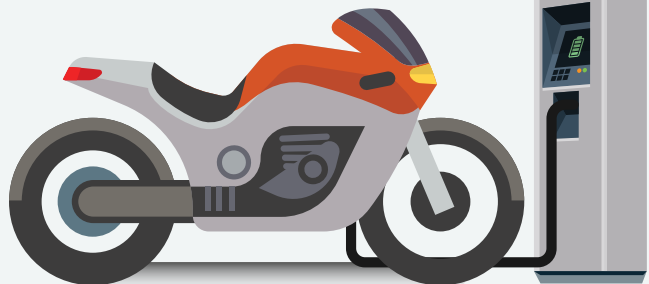
Possible applications include



Electric trucks and buses



Electric motorcycles



Electric and autonomous cars

As the electric and autonomous vehicles markets evolve, significant advances are being made in battery technology and the race is now on to build battery packs that can compete on cost with the internal combustion engine.

There is a lot of debate about how much battery packs of the future will cost with a target of US\$100 per kilowatt-hour often held up as the figure which will make them competitive with conventional petrol and diesel fueled engines. Given recent technological advances, that could be achievable by 2022-23.

Battery costs have already been dropping at about 15% per year over the past decade. Scale manufacturing and adjustments in the way chemicals and technology are applied in battery construction are also helping to improve battery energy density and the range they allow electric vehicles to travel.

Major tire manufacturers are also addressing the challenges set by the weight of EVs by developing better tires specifically designed for them. Because of the sheer weight and the higher torque of electric battery driven vehicles, their wheels do need stronger tires with lower rolling resistance. Tires will need to improve over time to support this market.

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