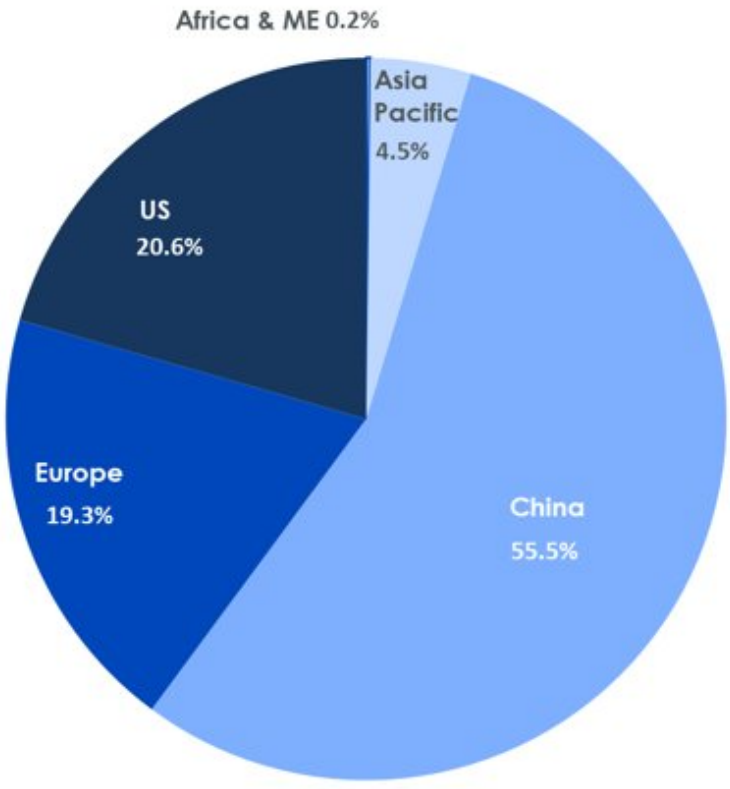
Electric Vehicles are ICEing traditional cars

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The auto industry is undergoing a radical transformation. The change is being driven by stringent global vehicle emission regulations coupled with rapid technological advancement. While global sales of traditional vehicles powered by the Internal Combustion Engine (ICE) are slowing, Electric Vehicle (EV) sales are rising. In 2018, total EVs sold worldwide rose to 2.1mn, surpassing the 2.3% penetration rate in the passenger car market. The global EV market is growing rapidly, increasing six-fold since 2013 and doubling since 2015. The share of pure Battery Electric Vehicles (BEVs) was 68.1% followed by Plug-in Hybrid Electric Vehicles (PHEV) at 31.7% and Fuel Cell Electric Vehicles (FCEV) at just 0.2%. The dominance of BEVs over PHEVs validates greater acceptance of consumers towards the era of electric mobility.

Figures 1a and 1b: Global EV sales by region and type in 2018



Source: Bloomberg, WisdomTree, data available as of close 22 March 2019

A large part of the growth in 2018 was being driven by the world's largest greenhouse gas emitter – China, which now accounts for 55% of the electric vehicle global market share. China's Association of Automobile Manufacturers (CAAM) predicts a further 1.6mn sales of new energy vehicles in 2019 as it forms a major part of the environmental policy of the Chinese government. US EV sales soared higher by 82% last year and can be credited to the successful launch of Tesla's model 3. European EV sales rose at a slower pace of 33% in 2018 largely due to disruptions from the new Worldwide Harmonised Light Vehicle Testing Procedure (WLTP)1. Nordic countries led by Sweden, Finland and Iceland have shown strong progress in adoption of EVs. Norway remains ahead of the pack in its mass market embrace of EVs and provides a perfect example of EV adoption that developed markets could experience within the next five to ten years. Under the current growth trajectory, EV producers have the potential to almost quadruple their achievement by 2020, moving to 4.5mn units, accounting for around 5% of the overall global light vehicle market according to McKinsey & Co.

Technological advancement is spearheading EV adoption

Technological improvements of EV batteries across density, chemistry and raw material usage are reducing battery costs and are expected to make EVs cost competitive with ICE vehicles by 2025. Back in 2013, an average EV could cover 80-90miles, however fast forward to today and the average BEV can cover 150-250miles on a full charge. The time taken to charge a BEV has also reduced from 40-60minutes in 2010 to around 20-45 minutes in 2019. This is helping address a key hurdle – 'range anxiety' that held back consumers from purchasing EVs.

Figure 2: Planned battery production capacity by 12 largest global battery producers

Source: Frost & Sullivan, WisdomTree, data available as of close 22 March 2019.

Forecasts are not an indicator of future performance and any investments are subject to risks and uncertainties.

Charging infrastructure is also catching up. Battery production capacity in China has leapfrogged and is expected to rise from 15GWh (Giga Watt hours) in 2016 to 110GWh by 2020. Europe also looks set to expand its sustainable battery supply chain evident from the European Commission's announcement of €100Bn investment in Lithium-ion battery (LiB) production capacity in October 2018. The European commission also expects another €50Bn to attain their goal of having a domestic LiB production supply to meet growing domestic EV demand.

Regulation remains the cornerstone of electric mobility

Generous subsidies and stringent regulations have helped drive much of the growth in EVs. However, we expect the incentives and subsidies to gradually phase out and regulation to remain at the forefront of EV adoption globally. After having subsidies in place for over a decade, the Chinese government now appears keen to wean the market off subsidies. With EV sales set to continue to rise, so will the cost of the subsidy. Consequently, China has indicated that the focus must shift towards cars with a more global appeal and is relying on range as the key metric for providing subsidies. China has reduced its

subsidies for vehicles that travel less than 150km and is expected to fully phase these subsidies out by 2020. However, China is increasing subsidies for vehicles with a range of at least 400km by 10% to further spur EV development in the right direction. The Chinese National Reform and Development Commission (NRDC) is also implementing a cap-and- trade system, similar to the zero-emission vehicle (ZEV) credits introduced in California.

Meanwhile, Europe has embarked on aggressive greenhouse reduction regulations to meet the Paris Climate Agreement. It aims for 117gm/km average CO2 emissions by 2021, a further 15% reduction by 2025 and 37.5% reduction by 2030 for new vehicles.

Unlike the rest of the world, US government policies have been mixed over the last year. While the federal tax rebate remains in place for EVs, the recent tax legislation limited it to the first 200,000 plug-in EVs sold by a manufacturer. As soon as the threshold is attained, the incentives go away. Not only has the US pulled out of the Paris Climate Accord, but in April 2018 the Trump administration was intending to weaken future fuel-efficiency standards for the first time since they were adopted in 1975. Nonetheless, the America's Pledge movement, led by California governor Jerry Brown and former New York mayor Michael Bloomberg, has pushed cities, states, business and universities to commit to lowering their emissions.

Figure 3: Leading EV markets backed by tighter regulations and generous subsidies

Source: Oliver Wyman, WisdomTree, data available as of close 22 March 2019

Conclusion

We expect the rapid pace of innovation in battery technology coupled with tighter regulation to speed up mass adoption of EVs. As adoption of EVs garner momentum they will have far reaching implications for commodities. We expect raw materials such as – nickel, copper, silver and smaller elements such as – cobalt and lithium to benefit from the uptake of EVs, which we will discuss in detail in the second part of our blog.

Sources for all data unless otherwise stated: Electric Vehicles World Sales Database as of 22 March 2019.

1 The Worldwide Harmonised Light Vehicle Test Procedure (WLTP) is used to measure fuel consumption and CO2 emissions from passenger cars, as well as their pollutant emissions.

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