ESG FOCUS

The Acceleration of Electric Mobility

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The adoption of electric mobility—the use of vehicles powered by electric motors—has burgeoned thanks to changes in societal attitudes and technological advances. Supported by related trends, including learning curves improvement, increased digitalization, advancements in autonomous and driver-assistance systems (ADAS), and mobility sharing, electric mobility has begun to come into its own.

In this paper, we detail four key trends that are helping to increase electric vehicle adoption. We also explore the implications for industries exposed to electric and internal combustion vehicles as these trends play out in markets around the world.

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Four Trends Support Electric Vehicle Growth

Consumers and investors are increasingly demanding more environmentally conscious transportation options in response to concerns about climate change, air quality and depletion of finite natural resources. This pressure has pushed businesses to increase transparency around climate change-related risks, including transition risk. For the fossil fuel industry, transition risk means the production and profitability models for extracting fossil fuel assets are no longer viable and consequently stranded. This shift in business focus results, in part, from changing consumer attitudes, toughened environmental legislation and technological advances.

The growing popularity of electric vehicles (EVs) over those powered by internal combustion engines (ICEs) has raised concerns about the impacts of acquiring the materials that enable electric mobility. Lithium, a key component of the lithium-ion battery, is a relatively plentiful element, but the mining processes used to extract it typically use huge amounts of water. Two other components, cobalt and nickel, have raised additional concerns. Cobalt has been associated with child labor and human rights issues in the Democratic Republic of Congo, the location of virtually all the world's cobalt deposits. Moves to use less cobalt have led to using more nickel, which has been associated with negative environmental issues, including toxic byproducts and contamination of other natural resources.

Governments have adopted a push-pull approach to encourage EV usage, offering financial incentives (e.g., tax credits) and issuing new regulations (e.g., mandating carbon emissions reductions). Notably, the European Union (EU) recently introduced emissions reduction targets that require carmakers to meet more stringent average carbon emissions standards or risk significant fines.[1] Advances in technology and improvement in learning curves have increased the competitiveness of alternative energy compared to longer established fossil fuel options. Finally, improving infrastructure makes it more practical for drivers to rely on EVs for everyday use.

BEV—Battery electric vehicle. E.g., Mini Electric, Nissan Leaf, Tesla Model 3.

HEV—Hybrid electric vehicle. E.g., Ford Mondeo Hybrid, Honda NSX, Toyota Yaris Hybrid.

ICE—Internal combustion engine. E.g., Vehicles with gasoline- or diesel-fueled engines.

PHEV—Plug-in hybrid electric vehicle. E.g., BMW 225xe, Mitsubishi Outlander, Volvo XC60 Twin Engine.

[1] William Boston, "EU Automakers Have to Sell More Electric Cars as New Emission Targets Loom," *Wall Street Journal*, June 21, 2019.

COVID-19 Slows Some Adoption Trends

As seen in most other industries, the coronavirus pandemic has significantly disrupted vehicle sales. Global passenger vehicle sales plunged early in 2020, and BloombergNEF (BNEF) researchers predict overall sales will decline by 23% for the year. They expect EV sales to drop for the first time in decades. Global auto sales won't return to 2019 levels until 2025, according to BNEF models. Commercial vehicles may recover by 2022, driven by rising e-commerce and higher freight demand in China and emerging markets. Order backlogs, new models and supportive governmental policies in Europe and China should help EV sales hold up better than ICE-based models. Despite this relative strength, BNEF forecasts EV sales to decline 18% to around 1.7 million in 2020.[10]

Shift in Consumer Preferences

Consumer demand for electric vehicles and hybrids has increased steadily over the past decade—from less than 500,000 units in 2013 to more than seven million today and the potential of 10 million by the end of 2020.[2, 3] Despite historically low prices for gasoline, sales of battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) continue to accelerate. COVID-19 shelter-in-place restrictions have reduced vehicle traffic worldwide, and satellite images detailing the resulting air quality improvements in major metropolitan areas have been striking. While weather conditions and deconfinement measures could skew the data of these satellite observations, asset owners focused on decarbonizing their portfolios may take the opportunity to redouble their efforts by arguing that urgently transitioning toward a lower-carbon economy is, in fact, doable. This will likely fuel further support for cleaner transportation options.

Governmental Policies

Many countries have created incentives for EV adoption and enacted regulations to ensure increased usage. The EU has mandated that cars sold there emit no more than 95 grams of carbon dioxide per kilometer in 2020 (down from 120 g/km), a limit that will ratchet down in subsequent years. Because this is an average across a company's fleet sales, such that sales of higher-emitting units can be offset by lower-emitting units, companies will be forced to increase the production of EVs and hybrids. Across Europe, individual countries have offered consumer incentives to make electric mobility options more attractive. Such inducements include tax credits, toll forgiveness, EV-only lanes, free parking, and reduced-cost charging. In an even bolder move, the EU is also planning a Green New Deal, a post-pandemic recovery stimulus plan aligned with significant environmental action. The €500 billion to €1 trillion program includes €80-90 billion dedicated to promoting EV adoption and building out charging infrastructure. In addition, China, which currently represents more than half of the world's EV usage and 99% of the global electric bus fleet, has already restricted new investment in ICE production mandating that auto companies offer EV options as a prerequisite for doing business in the country.[4]

Advances in Technology and Improving Learning Curves

Technological advances and increases in production capacity have helped lower the cost and increase the efficiency of the lithium-ion batteries that power electric vehicles. The global benchmark levelized cost of electricity for battery storage has dropped to USD150/MWh, about half of what it was two years ago.[5] Energy costs are projected to continue to decline (in 2019 USD/MWh terms) at least through 2040.[6] Such trends have helped make ownership and operation of BEVs and PHEVs more affordable. In fact, battery storage is now the cheapest new-build technology in gas-importing regions, such as Europe, China and Japan.[7] Improved production efficiency has lowered the battery unit price (the largest component of an EV's price) while technology improvements

have simultaneously increased battery range between charges. Such technological upgrades have boosted demand, and these trends are expected to continue. UBS research suggests energy storage costs could drop an additional 66% to 80% over the next decade.[8] The increasing introduction of ADAS tools also supports the acceleration of electrification in vehicles. Lane departure monitoring, collision warning, automatic braking, and parking assistance are precursors to the eventual proliferation of fully autonomous and computer-guided electric vehicles.

Improving Infrastructure

Providing accessibility to charging stations remains one of the largest barriers to widespread EV adoption. However, the range of electric batteries has improved, helping reduce drivers' "range anxiety" around the lower mobility relative to a conventional ICE. Tesla Model 3 drivers can enjoy up to 400 miles on a single charge, according to the leading electric vehicle maker. Introduction of more and faster public charging stations and lower installation and use costs for home-based charging stations have also helped. The U.S. had more than 68,000 charging stations by year-end 2019, according to the U.S. Department of Energy. That number is expected to grow exponentially; estimates from Wall Street equity research teams suggest the charging infrastructure market is growing at a compound annual growth rate (CAGR) in the mid-30% to low-40% range. BloombergNEF research reports that almost one million charging stations have been installed globally.[9]

[2] International Energy Agency, *Global EV Outlook 2019: Scaling-up the transition to electric mobility,*" OECD Publishing, Paris, https://doi.org/10.1787/35fb60bd-en.

[3] Angus McCrone, "Energy, Vehicles, Sustainability—10 Predictions for 2020," BloombergNEF, January 16, 2020, https://about.bnef.com/blog/energy-vehicles-sustainability-10-predictions-for-2020/.

[4] REN21, *Renewables in Cities: 2019 Global Status Report*, https://www.ren21.net/renewables-report-launch/.

[5] BloombergNEF, "Scale-up of Solar and Wind Puts Existing Coal, Gas at Risk," April 28, 2020, https://about.bnef.com/blog/scale-up-of-solar-and-wind-puts-existing-coal-gas-at-risk/.

[6] U.S. Energy Information Agency, *Annual Energy Outlook 2020*, February 21, 2020, https://www.eia.gov/outlooks/aeo/.

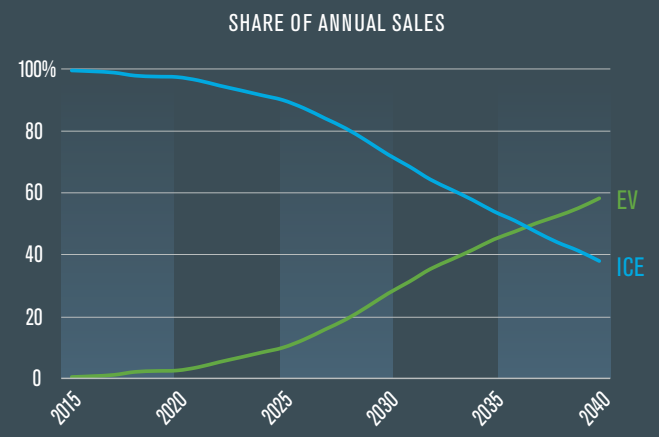
[7] Matthew Mercure, "BNEF: Onshore Wind Is Cheapest Source of New-Build Generation," North American Windpower, April 30, 2020, https://nawindpower.com/bnef-onshore-wind-is-cheapest-source-of-new-build-generation.

[8] Pippa Stevens, "The battery decade: How energy storage could revolutionize industries in the next 10 years," CNBC.com, December 30, 2019, https://www.cnbc.com/2019/12/30/battery-developments-in-the-last-decade-created-a-seismic-shift-that-will-play-out-in-the-next-10-years.html.

[9] BloombergNEF, *Electric Vehicle Outlook 2020*, https://about.bnef.com/electric-vehicle-outlook/.

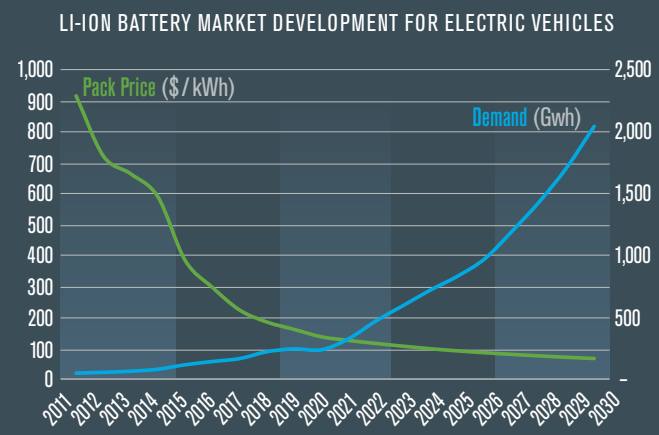
[10] Ibid.

EVs and ICE-Based Vehicles Are Undergoing Opposite Growth Trends



Source: BloombergNEF. Data from 1/1/2015-12/31/2019 and estimated from 2020 onward.

Lower Battery Prices Fuel Rising EV Demand



Source: BloombergNEF. Data from 1/1/2011-12/31/2019 and estimated from 2020 onward.

While Penetration Remains Low, Adoption Accelerates

Electric vehicles still make up only a small portion (about 2-3%) of overall vehicle sales globally. However, the number of EVs on the road has more than doubled since 2017. China and the U.S. lead in terms of the absolute number of EVs in use, followed by Europe. The Nordics significantly outpace the rest of the world in terms of EV saturation. Almost 40% of all vehicles on the road in Norway are EVs or hybrids, whereas less than 5% of U.S. vehicles are electric.[11]

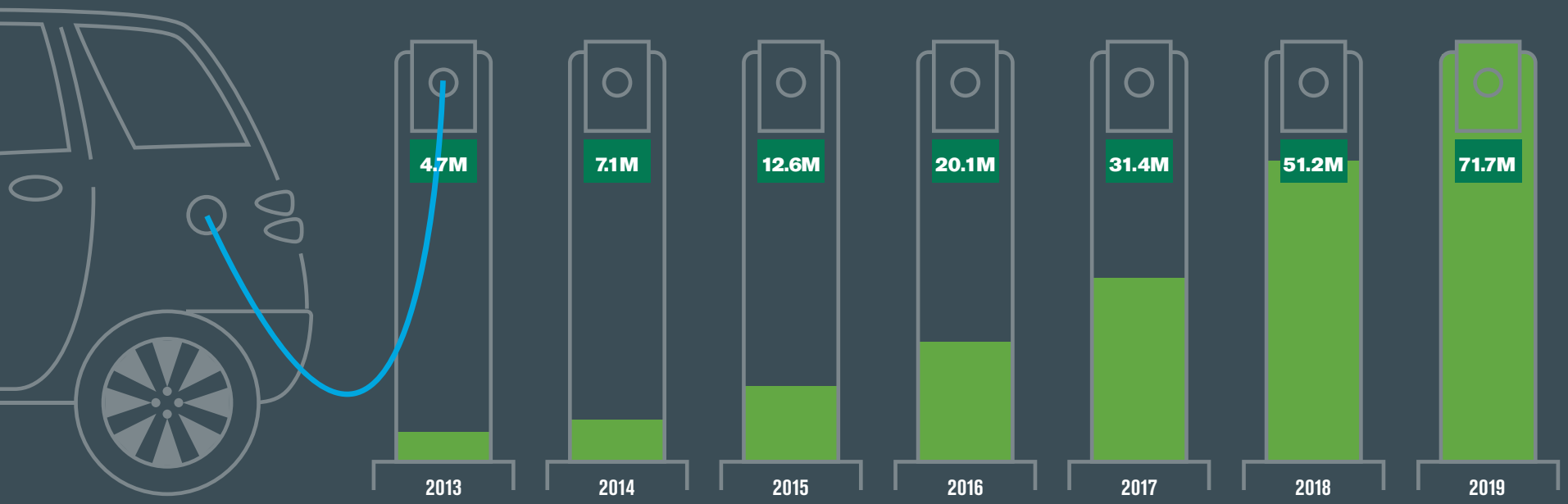
[11] Christopher McFadden, "6 Interesting Statistics about Electric Vehicles," Interesting Engineering.com, June 17, 2019, https://interestingengineering.com/6-interesting-statistics-about-electric-vehicles.

Electric Mobility Adoption Presents Positive and Negative Implications for Investors

This transformation in mobility may result in both positive and negative implications for companies across many industries. Manufacturers of components for electric vehicles are likely to benefit. This could include semiconductor manufacturers as well as makers of sensors, testing equipment and batteries. Conversely, makers of traditional ICE-related components and units could continue to see reductions in demand as the upward trends of EV adoption and governmental regulatory intervention accelerate. Decreasing demand for traditional fossil-based fuels could weigh on traditional energy names reliant on fossil fuel extraction and production.

The Number of EVs on the Roads Has Grown Steadily

ELECTRIC VEHICLES IN THE GLOBAL FLEET



Source: *Global EV Outlook 2020*, International Energy Agency. Data from 1/1/2013-12/31/2019.

ESG Risk Assessment of Two Electric Mobility-Related Companies

NXP Semiconductors is a Netherlands-/U.S.-based semiconductor company. The automotive market comprises approximately 50% of firm revenues. NXP is exposed to fast-growing segments related to automation and electrification, including the semiconductors used in ADAS system radar sensors.

- All NXP manufacturing facilities have been certified under ISO 14001, the international standard that spells out requirements for an effective environmental management system. The company also conducts annual risk assessments on its environmental, health and safety procedures. Normalized by USD millions in revenue, its total carbon emissions intensity declined at an approximate 27.8% CAGR between 2015-2017.
- NXP appears to capitalize on clean technology opportunities considering that R&D expenditures-to-sales remain robust, increasing from 17% in 2017 to 18% in 2019.
- We are encouraged by the company's attention to waste management. NXP aims to eliminate hazardous substances from its products and follows directives such as WEEE (waste electrical and electronic equipment) and ELV (end-of-life vehicle) for electronic device waste management. Its recycled hazardous and non-hazardous waste rate has increased, and the company plans to increase it to 90%. NXP concentrates 50% of its manufacturing plants in areas with medium-to-high water stress risk, but we note the company is aware that operations in semi-arid regions are increasingly vulnerable to prolonged droughts. NXP has established a team of water experts at each plant to research and manage ways to reduce consumption, including incorporating water conservation elements into facility design and launching water use goals for new technologies.
- The company has implemented a sourcing compliance strategy that extends to suppliers. It also complies with hazardous substance regulations and implements robust quality management practices, including ISO 9001 certification. NXP's human capital management strategies appear to be in line with industry standards.

ESG RISK SCORE

QUALITY RATING

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Source: American Century Investments as of 6/30/2020. Market weight means our ESG desk is neutral on the stock as the company has an average ESG profile compared to peers. Stable means the ESG profile of the company has neither improved nor worsened over the last three years.

Aptiv plc is an Ireland-domiciled company (fka Delphi, part of General Motors). Rebranded after the company spun off its powertrain business to focus on electrification, Aptiv designs and assembles vehicle electrical architecture, including wiring assemblies. It also makes the "brains" of the car—the software and systems that provide the seamless operation of all electronic features in the car. As electric vehicles proliferate and all vehicles feature more electric and electronic components, the need for complex software to manage the various systems will likely soar.

- Aptiv's spinoff of its energy-intensive segment (powertrain systems) and subsequent focus on automated driving technology is constructive. The firm's solid clean technology intensity (e.g., R&D/sales) and low environmental risk business lines (e.g., electrical infrastructure and safety solutions) align with ESG macro tailwind trends, including asset digitalization and the transition to a lower-carbon economy.
- While exposure to environmentally related issues aren't financially material for Aptiv, 85% of its strategic suppliers and 100% of its manufacturing sites are ISO 14001-certified. These issues represent greater risks to companies involved in combustion engines or fuel injection systems.
- We note improving performance across all our environmental metrics (e.g., greenhouse gases, water and waste). Aptiv's net R&D investment is up significantly, and its R&D intensity is outperforming most peers. The company's focus on electrified/automated vehicle platforms and connectivity solutions positions it well to capture growth opportunities in the clean technology space. While we acknowledge Aptiv's exposure to potential raw material supply disruptions (notably copper), the firm has established a supply chain compliance program in accordance with the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals. In alignment with best practices, internationally recognized quality certifications, such as ISO 9001 and ISO/TS 16949, are part of Aptiv's supplier requirements.
- By nature of Aptiv's products, the company has less exposure to risks associated with safety and labor management compared to peers. Nonetheless, safety standards are based on best practices and correspond to an improvement in safety rates and continued outperformance relative to peers. Aptiv's labor management practices align with industry standards.

QUALITY RATING

TREND SIGNAL

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