



RESEARCH REPORT

Executive Summary:

Electric Vehicle Market Forecasts

Global Forecasts for Light Duty Hybrid, Plug-in Hybrid,
and Battery Electric Vehicles: 2013-2020

NOTE: This document is a free excerpt of a larger report. If you are interested in purchasing the full report, please contact Navigant Research at research-sales@navigant.com.

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Section 1

EXECUTIVE SUMMARY

1.1 Market Assumptions

Electric vehicles (EVs), including hybrids, plug-in hybrids, and battery electric vehicles, are becoming an increasingly important part of the global automotive market. The growth of these vehicle sales is being driven not only by the appeal of the vehicles, but also by consumer demand for vehicles that cost less to operate than traditional internal combustion engine (ICE) vehicles, government influence on the market, and a rebounding economic environment.

For the purposes of this research, Navigant Research defines each segment of vehicles as:

- » **Hybrid electric vehicles (HEVs):** Vehicles that generate all their electric energy onboard the vehicle. HEVs include all varieties of hybrids that use electric motors for traction, including series hybrids, parallel hybrids, through-the-road hybrids, and mild hybrids. Stop-start vehicles are not included in the HEV category.
- » **Plug-in hybrid electric vehicles (PHEVs):** Vehicles that use energy stored from the grid, but also have an ICE to extend the range of the vehicle.
- » **Battery electric vehicles (BEVs):** Vehicles that use energy stored from the grid.

In updating the forecasts for EVs, Navigant Research included a number of key assumptions for the forecast period of 2013 to 2020:

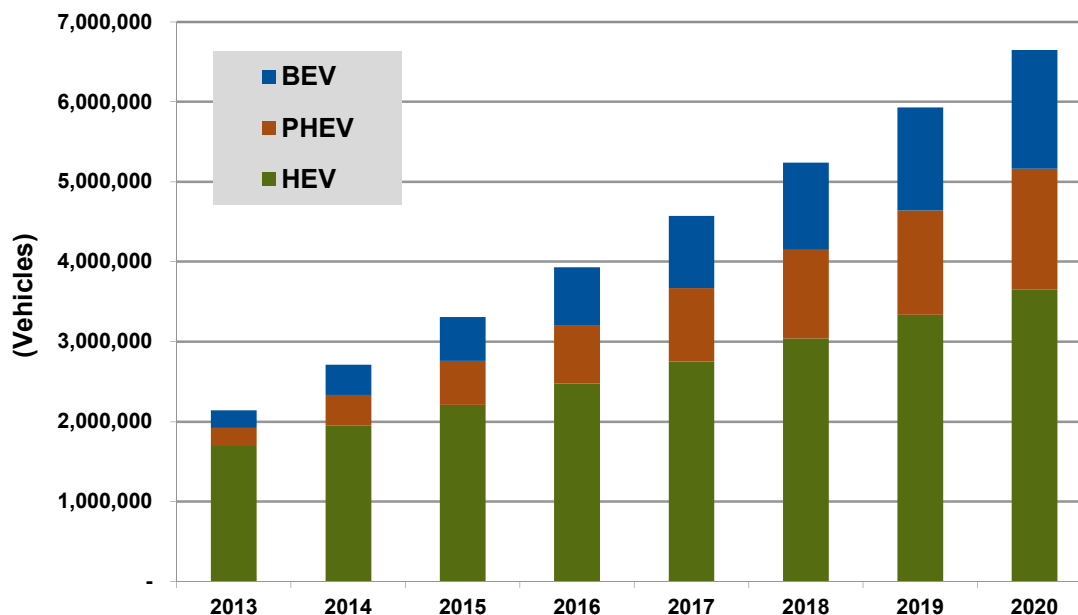
- » **Increasing vehicle availability:** Navigant tracks the launch of new HEVs, PHEVs, and BEVs. HEVs are now considered to be widely available in North America, Eastern and Western Europe, and Asia Pacific, while the numbers available in other regions remain relatively small. PHEV and BEV models are increasing in number and will be less limited by the end of 2014 or mid-2015 in most regions. Vehicles will be available from almost every mainstream manufacturer.
- » **Government influence:** Governments play a key role in the PHEV/BEV markets by both offering purchase incentives and regulating the fuel economy and emissions of ICE vehicles. Navigant Research anticipates that current incentives offered worldwide will remain in place throughout the forecast period, but are unlikely to be increased. Meanwhile, stronger regulations on fuel economy and emissions will encourage manufacturers to continue to further develop PHEV and BEV products.
- » **Decreasing HEV/PHEV prices:** Battery packs, which can account for as much as half of PEV costs, are expected to decrease during the forecast period. HEVs and PHEVs are anticipated to see a 10% and 26% decline in pack costs by 2020, respectively, while BEVs will likely remain flat, but see improvements in vehicle range and performance during that period.

- » **Gasoline/diesel prices:** The prices of petroleum-based fuels are anticipated to continue to climb throughout the forecast period. Based on a rolling average of historic prices, global gasoline and diesel prices are anticipated to increase at 7.2% and 8.3% compound annual growth rates (CAGRs) between 2013 and 2020.
- » **Economics and the overall light duty vehicle market:** Sales of light duty vehicles overall have suffered during the economic downturn in recent years. While North America and Asia Pacific are projected to continue to rebound in 2013 and 2014, the rebound in Western and Eastern Europe is not expected to be as robust. The result is a global light duty vehicle market that will grow at a CAGR of 2.4% between 2013 and 2020.

1.2 Market Forecasts

As a result of the above assumptions, Navigant Research forecasts global CAGRs of 11.5% for HEVs, 31.9% for PHEVs, and 31.5% for BEVs. Asia Pacific and North America are expected to be the largest markets for HEVs, with Japan and the United States being the largest singular markets (1.1 million and 1 million HEV sales in 2020, respectively). North America is the only market anticipated to have significantly higher sales of PHEVs than BEVs (a 1.5:1 sales ratio); Western Europe, Asia Pacific, and Latin America will be almost evenly split between the drivetrains. Asia Pacific is projected to be the largest market for plug-in electric vehicles (PEVs), with 1.6 million PHEV and BEV sales combined in 2020.

Chart 1.1 Annual Light Duty Electric Vehicle Sales by Drivetrain, World Markets: 2013-2020



(Source: Navigant Research)

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SCOPE OF STUDY

Navigant Research has prepared this report to provide participants at all levels of the EV market, including vehicle original equipment manufacturers, suppliers, and battery manufacturers, with forecasts for the market performance of HEVs, PHEVs, and BEVs. The study's major objective is to assess the market size and anticipated growth of HEVs and PEVs (PHEVs and BEVs) in the overall consumer automobile and fleet markets. All major global regions are included and the forecast period extends through 2020.

SOURCES AND METHODOLOGY

Navigant Research's industry analysts utilize a variety of research sources in preparing Research Reports. The key component of Navigant Research's analysis is primary research gained from phone and in-person interviews with industry leaders including executives, engineers, and marketing professionals. Analysts are diligent in ensuring that they speak with representatives from every part of the value chain, including but not limited to technology companies, utilities and other service providers, industry associations, government agencies, and the investment community.

Additional analysis includes secondary research conducted by Navigant Research's analysts and its staff of research assistants. Where applicable, all secondary research sources are appropriately cited within this report.

These primary and secondary research sources, combined with the analyst's industry expertise, are synthesized into the qualitative and quantitative analysis presented in Navigant Research's reports. Great care is taken in making sure that all analysis is well-supported by facts, but where the facts are unknown and assumptions must be made, analysts document their assumptions and are prepared to explain their methodology, both within the body of a report and in direct conversations with clients.

Navigant Research is a market research group whose goal is to present an objective, unbiased view of market opportunities within its coverage areas. Navigant Research is not beholden to any special interests and is thus able to offer clear, actionable advice to help clients succeed in the industry, unfettered by technology hype, political agendas, or emotional factors that are inherent in cleantech markets.

NOTES

CAGR refers to compound average annual growth rate, using the formula:

$$\text{CAGR} = (\text{End Year Value} \div \text{Start Year Value})^{(1/\text{steps})} - 1.$$

CAGRs presented in the tables are for the entire timeframe in the title. Where data for fewer years are given, the CAGR is for the range presented. Where relevant, CAGRs for shorter timeframes may be given as well.

Figures are based on the best estimates available at the time of calculation. Annual revenues, shipments, and sales are based on end-of-year figures unless otherwise noted. All values are expressed in year 2013 U.S. dollars unless otherwise noted. Percentages may not add up to 100 due to rounding.

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