



## RESEARCH REPORT

### Executive Summary:

## Electric Vehicle Geographic Forecasts

Plug-In Electric Vehicle Sales Forecasts for North America by State/Province, Metropolitan Area, City, and Selected Utility Service Territories

**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](mailto:research-sales@navigant.com).

Published 3Q 2013

**David Alexander**

Senior Research Analyst

**John Gartner**

Research Director

# Section 1

## EXECUTIVE SUMMARY

### 1.1 Background Data

This report provides an update to the detailed geographic breakdown of Navigant Research's plug-in electric vehicle (PEV) forecasts originally developed for the 2012 edition of *Electric Vehicle Geographic Forecasts*. The model for North American PEV sales by U.S. state, metropolitan statistical area (MSA), Canadian province, Canadian city, and selected U.S. utility service area has been updated to better align with actual sales data from the first full year of wide availability of PEVs.

To generate these forecasts, Navigant Research utilized a variety of data to evaluate the development of demand and sales. On a broad basis, the factors evaluated can be classified into three categories:

- » **Population, economics, and demographics:** Each level of geographic assessment included not only the population of the state, MSA, and utility service area, but also the relevant demographics of the area. Using current hybrid vehicle owner demographics as a model for green vehicle ownership, the geographic regions were ranked by an index rating that compared them with the national average (i.e., those cities with larger populations that matched the demographics of hybrid owners were given higher index ratings). The demographic measures included age, gender, household income, race, and household size. The MSAs that most match the hybrid owner demographics are:
  - › Allentown-Bethlehem-Easton, PA-NJ Metro Area
  - › San Jose-Sunnyvale-Santa Clara, CA Metro Area
  - › Worcester, MA Metro Area
  - › Denver-Aurora-Broomfield, CO Metro Area
  - › Colorado Springs, CO Metro Area
- » **PEV attitudes in the United States:** Using survey data from the Navigant Research *Electric Vehicle Consumer Survey* and qualitative data from interviews with key stakeholders, Navigant Research developed an index of positive attitudes toward PEVs. Since much of this data was obtained at the state level, California and New York were each split into two groups – Northern and Southern California and upstate and downstate New York – to ensure that MSAs within these regions had their own measures and were not influenced by large MSAs in a particular part of the state.

The resulting index shows the top regions with positive consumer attitude toward PEVs (1.0 represents the national average):

- › Northern California: 3.79
  - › New Jersey: 3.14
  - › Vermont: 2.96
  - › Texas: 2.63
  - › Southern California: 2.53
- » **Supporting infrastructure and incentives:** Since the availability of public charging stations is relevant for plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs), the density of installed electric vehicle supply equipment (EVSE) will influence potential buyers. Local state and city incentives were also taken into account, including parking and high-occupancy vehicle (HOV) lane usage benefits, as well as financial inducements.

Manufacturer vehicle rollout schedules were a factor considered in earlier versions of this report. As manufacturers launched their new PEV models, the vehicles were not available equally in all areas. Original equipment manufacturers (OEMs) typically make new vehicles available initially in what they view as key markets before moving to nationwide rollouts. In general, all U.S. states and Canadian provinces had a broad level of PEV availability by the end of 2012, and this factor will have little or no influence on local sales forecasts beyond 2013.

The forecast model for Canada is based on data similar to that used for the United States, with the exception of the PEV attitudes, for which there is not enough quantitative data to provide numeric indexes. Data for Canada is based more heavily on demographic, economic, and population data. The resulting index shows the top Canadian provinces with positive consumer demographics and population for PEV adoption (1.0 represents the national average):

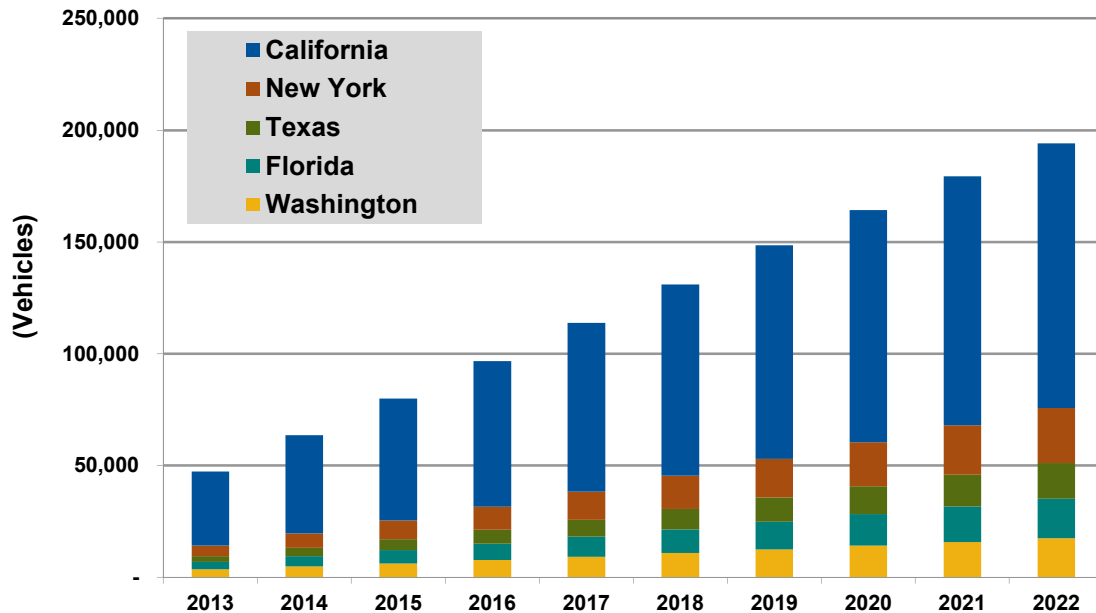
- » Ontario: 5.92
- » Quebec: 3.95
- » British Columbia: 2.22

1.2

**Market Forecasts**

Overall, sales of PEVs in the United States are expected to grow at a compound annual growth rate (CAGR) of 18.6% between 2013 and 2022, reaching a nationwide total of just over 416,000 vehicles in 2022. Based on the geographic forecast models and a qualitative assessment of the mathematical results, Navigant Research forecasts that California, New York, Washington, and Florida will likely lead the way with 813,638, 144,690, 104,924, and 103,610 cumulative PEV sales between 2013 and 2022, respectively. By 2022, Hawaii is expected to have the highest concentration of PEV sales; 9.0% of total Hawaii vehicle sales will be PEVs. Next will be California as a whole, with 6.4%) and then Oregon with 5.3%. Overall, 2.3% of total vehicle sales in the United States are expected to be PEVs in 2022.

**Chart 1.1 Annual Light Duty PEV Sales, Top Five States, United States: 2013-2022**



(Source: Navigant Research)

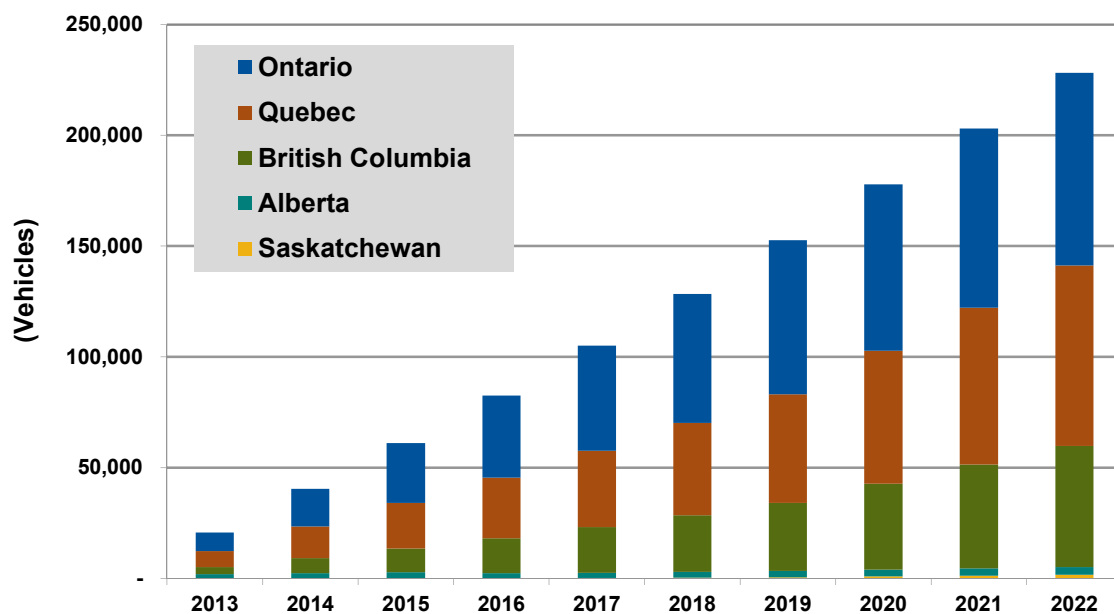
The top five MSAs for total PEV sales over the forecast period are expected to be Los Angeles, San Francisco, New York City, Sacramento, and Riverside (California). These five MSAs will account for nearly one-third of U.S. PEV sales by 2022 (112,972 sales, or 27.1% of total U.S. PEV sales). The combination of a large population area, early rollout schedules from vehicle manufacturers, and positive attitudes toward PEVs for these MSAs will result in strong CAGRs for PEV sales of up to 22% between 2013 and 2022.

To forecast service area sales, Navigant Research selected 14 of the largest utility companies in the United States: Duke Energy, Dominion Resources, Exelon, Southern Co., Southern California Edison (SCE), Edison International, FPL Group, Pacific Gas & Electric (PG&E), Public Service Enterprise Group, Entergy, Consolidated Edison, PPL, DTE Energy, and Xcel Energy. These utilities will account for a cumulative total of just over 1 million PEV sales

by 2022, or about 40.5% of all U.S. PEV sales. Note, however, that this figure represents a decline from 45.5% in 2013, indicating that PEV sales will be concentrated in the largest metropolitan areas initially, but will spread to be more evenly distributed as the market matures. SCE will account for the highest cumulative sales in 2022, with 299,683 vehicles in its service area, followed by PG&E with 251,791.

In Canada, sales of PEVs are highly correlated to the largest cities in the country. Toronto, Montreal, and Vancouver are anticipated to have the highest concentration of PEVs by 2022. These three cities will account for 84.3% of annual light duty PEV sales in Canada in 2022; their respective provinces will account for 96.8% of the 230,000 vehicles sold.

**Chart 1.2 Annual Light Duty PEV Sales, Top Five Provinces, Canada: 2013-2022**



(Source: Navigant Research)

## Section 6

### TABLE OF CONTENTS

<b>Section 1 .....</b>	<b>1</b>
<b>Executive Summary .....</b>	<b>1</b>
1.1 Background Data .....	1
1.2 Market Forecasts .....	3
<b>Section 2 .....</b>	<b>5</b>
<b>Background Data .....</b>	<b>5</b>
2.1 Introduction .....	5
2.2 Population and Demographics .....	5
2.2.1 U.S. Demographics .....	6
2.2.2 Canadian Demographics .....	7
2.3 Plug-In Electric Vehicle Attitudes .....	8
2.3.1 U.S. PEV Attitudes .....	8
2.3.2 Canadian PEV Attitudes .....	10
2.4 Vehicle and Infrastructure Availability .....	10
2.5 Overall Vehicle Market and Fuel Costs .....	11
<b>Section 3 .....</b>	<b>12</b>
<b>United States Market Forecasts .....</b>	<b>12</b>
3.1 Introduction .....	12
3.2 PEV Sales by State .....	13
3.3 PEV Sales by Metropolitan Statistical Area .....	14
3.4 PEV Sales by Selected Utility Service Area .....	16
3.5 Conclusions – U.S. Market .....	17

<b>Section 4 .....</b>	<b>18</b>
<b>Canadian Market Forecasts.....</b>	<b>18</b>
4.1    Introduction .....	18
4.2    PEV Sales by Province .....	19
4.3    PEV Sales by City .....	20
4.4    Conclusions – Canadian Market .....	21
<b>Section 5 .....</b>	<b>22</b>
<b>Acronym and Abbreviation List .....</b>	<b>22</b>
<b>Section 6 .....</b>	<b>23</b>
<b>Table of Contents.....</b>	<b>23</b>
<b>Section 7 .....</b>	<b>25</b>
<b>Table of Charts and Figures.....</b>	<b>25</b>
<b>Section 8 .....</b>	<b>26</b>
<b>Scope of Study.....</b>	<b>26</b>
<b>Sources and Methodology .....</b>	<b>26</b>
<b>Notes.....</b>	<b>27</b>

## Section 7

### TABLE OF CHARTS AND FIGURES

Chart 1.1	Annual Light Duty PEV Sales, Top Five States, United States: 2013-2022 .....	3
Chart 1.2	Annual Light Duty PEV Sales, Top Five Provinces, Canada: 2013-2022 .....	4
Chart 2.1	Index of Positive Opinion toward PEVs by State, United States: 2011 .....	9
Chart 3.1	PEV Sales as a Percentage of Total Light Duty Vehicle Sales, United States: 2013-2022 .....	12
Chart 3.2	Annual Light Duty PEV Sales, Top 10 States, United States: 2013, 2022 .....	13
Chart 3.3	PEV Sales as a Percentage of Light Duty Vehicle Sales, Top 25 States, United States: 2022 .....	14
Chart 3.4	Annual Light Duty PEV Sales, Top Five Utility Service Areas, United States: 2013-2022 .....	16
Chart 4.1	PEV Sales as a Percentage of Total Light Duty Vehicle Sales, Canada: 2013-2022 .....	18
Chart 4.2	Annual Light Duty PEV Sales, Top Seven Provinces, Canada: 2013-2022 .....	19
Chart 4.3	Annual Light Duty PEV Sales, Top Nine Cities, Canada: 2013-2022 .....	20
Table 2.1	Geographic Areas for Forecasts .....	5
Table 2.2	PEV Demographic Profile .....	6
Table 2.3	Index of Demographic Similarities between Metropolitan Statistical Areas and National PEV Profile, Top 10 MSAs, United States: 2010 .....	7
Table 2.4	Index of Demographic Similarities between Cities and National PEV Profile, Top Seven Cities, Canada: 2010 .....	7



## Section 8

### SCOPE OF STUDY

This Navigant Research report provides a detailed breakdown of U.S. and Canadian plug-in electric vehicle (PEV) sales by geographic region, including state, province, metropolitan statistical area (MSA), Canadian city, and selected U.S. utility service areas. The results, which consist of a comprehensive set of sales forecasts developed from both quantitative and qualitative research data, offer a breakdown of the North American light duty vehicle market described in other Navigant Research reports, including *Electric Vehicle Market Forecasts* and *Plug-in Electric Vehicles*.

This report's major objective is to provide a more detailed examination of the market opportunity for PEVs within smaller geographic areas. This data can be used for vehicle production planning and determining future electric load requirements, charging station requirements, and other analytical needs. The report is meant to supply data needed for making decisions and identifying trends at a state, province, or city level. It does not provide detailed trending for the overall industry.

### 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.

Published 3Q 2013

©2013 Navigant Consulting, Inc.  
1320 Pearl Street, Suite 300  
Boulder, CO 80302 USA  
Tel: +1.303.997.7609  
<http://www.navigantresearch.com>

This publication is provided by Navigant Research, a part of Navigant Consulting, Inc. ("Navigant"), and has been provided for informational purposes only. This publication is intended for the sole and exclusive use of the original purchaser under terms and conditions agreed to by the parties. This publication may not otherwise be reproduced, recorded, photocopied, distributed, displayed, modified, extracted, accessed, or used without the express written permission of Navigant. Navigant makes no claim to any government data and other data obtained from public sources found in this publication (whether or not the owners of such data are noted in this publication), and makes no express or implied warranty, guaranty, or representation concerning the information contained in this publication, its merchantability, or its fitness for a particular purpose or function. Any reference to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply an endorsement, recommendation, or favoring by Navigant. Navigant does not assume, and hereby disclaims, any liability that may result from any reliance on or use of any information contained in this publication, or for any loss or damage caused by errors or omissions in this publication. If you do not have permission from Navigant covering this publication, please refrain from accessing or using this publication. Please contact Navigant at [research-info@navigant.com](mailto:research-info@navigant.com) to obtain permission to use this publication.

©2013 Navigant Consulting, Inc. Notice: No material in this publication may be reproduced, stored in a retrieval system, or transmitted by any means, in whole or in part, without the express written permission of Navigant Consulting, Inc.