Market Outlook of the Electric Vehicle Market and Charging Infrastructure
Global Megatrends Affecting Mobility in the Future

Urbanization

E-Mobility

Smart and Sustainable Cities

New Micro Mobility Products

Car Sharing/Car Pooling

Sustainable Public Transportation and BRT

Integrated Mobility Solutions

New Business Models (Value for Many)

High Speed Rail

Geo-Socialization And Social Media

Connected and Wireless Planet

Power to the Middle Class and Gen Y

Photo Credits: Dreamstime and Commons

Source: Frost & Sullivan analysis
Global Uptake of Electrification in Passenger Vehicles

Total Electrified Vehicles likely to reach 13.4M units by 2022. Full and mild hybrids expected to be standardized across models.

Electrified Vehicles Market: Sales Forecast Estimates for hybrid, electric and fuel cell vehicles (Global), 2012-2022

- Mild Hybrids
- Full Hybrids
- BEV
- eREV
- NEV/QC
- PHEV
- FCEV

Note: Regions include North America, Europe, China, Japan, India, South Korea and Australia

Source: Frost & Sullivan Analysis
Electric Vehicle Sales—2013

In 2013, EV sales increased by 58.6 per cent and about 190,000 units were sold globally - in comparison to 119,748 units sold in 2012.


Total Electric Vehicle Market: Sales Breakdown by Region, Global, 2013

Total Electric Vehicle Market: Sales Breakdown by EV Type, Global, 2013

Note: Others include - other European countries

Note: November & December 2013 sales have been extrapolated

Note: Figures are rounded. The base year is 2013. Source: Frost & Sullivan
Comparative Analysis of Top EV OEMs by Region & Type–2013

Renault Nissan and Toyota are the only vehicle manufacturers established as a Global EV player in 2013; PHEVs are expected to get hotter post 2014 with more launches.

**OEM Breakdown by Region, Global, 2013**

- **Toyota**: APAC 9,648, North America 3,313, Europe 13,431
- **Tesla**: APAC 2,803, North America 18,596
- **Renault Nissan**: APAC 11,531, North America 22,081, Europe 21,954
- **Mitsubishi**: APAC 9,785, North America 1,110, Europe 519
- **General Motors**: APAC 99, North America 3,102, Europe 23,253
- **Ford**: APAC 234, North America 14,540

**OEM Breakdown by EV Type, Global, 2013**

- **Toyota**: PHEV ~25,037, eREV ~1,355
- **Tesla**: PHEV ~21,399
- **Renault Nissan**: PHEV ~55,566, eREV ~6,855, BEV ~4,559
- **Mitsubishi**: PHEV ~25,899, eREV ~555, BEV ~12,788
- **General Motors**: PHEV ~12,788
- **Ford**: PHEV ~1,986
Battery Electric Vehicles are likely to take up about 60% of the total EV sales in 2014, but share of PHEVs is expected to grow by 2-3%.

Expected Growth Rate: +40-44%

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan.
### Electric Vehicle Charging in North America

Approximately 50 per cent BEV users to use level 2 charging by 2017 due to less charging time

<table>
<thead>
<tr>
<th>Electric Vehicle Type</th>
<th>Charging time level 1</th>
<th>Battery Capacity</th>
<th>Level 1</th>
<th>Usage of level 2 Charging</th>
<th>Usage of Mode DC Charging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Electric Vehicles (BEV)</td>
<td>10-12 hours</td>
<td>20-25 kWh</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Extended Range Electric Vehicles (EREV)</td>
<td>6-8 hours</td>
<td>10-16 kWh</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>High Performance Electric Vehicle (HPEV)</td>
<td>&gt;15 hours</td>
<td>&gt;30 kWh</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Neighborhoods Electric Vehicles/ Quadra cycles (NEV/QC)</td>
<td>&lt;3 hour</td>
<td>~5 kWh</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Plug-in Hybrid Electric Vehicles (PHEV)</td>
<td>&lt;4 hours</td>
<td>~5-8 kWh</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
</tbody>
</table>

Source: Frost & Sullivan analysis
Global Electric Vehicle Public Charging Station Facts (2013)
The United States leads the way with the highest number of public charging stations as a result of the instantaneous implementation of government projects.

- **The United States**: 24,000 charging stations. Key participants: Coulomb, Ecotality, Aerovironment.
- **Germany**: 1,600 charging stations. Key participants: Siemens, Park & Charge, Rittal.
- **France**: 2,000 charging stations. Key participants: EDF, Park & Charge, Vinci Autoroutes.
- **The United Kingdom**: 3,100 charging stations. Key participants: Podpoint, Elektromotive, Chargemaster.
- **Spain**: 1,500 charging stations. Key participants: KEBA AG, Iberdrola, Gamesa.
- **Australia**: 450 charging stations. Key participants: Chargepoint, Better Place.
- **The Netherlands**: 900 charging stations. Key participants: Epyon, Alfen, ABB.
- **Portugal**: 700 charging stations. Key participant: MOBI.E.
- **Demark**: 600 charging stations. Key participants: Elektromotive, Better Place.
- **Sweden**: 800 charging stations. Key participants: Park & Charge, DBT.
- **China**: 2,800 charging stations. Key participants: SGCC, CSG, CNOOC.
- **Japan**: 2,300 charging stations. Key participant: Chademo.
- **Italy**: 1,100 charging stations. Key participants: ENEL, Park & Charge.
- **Norway**: 1,400 charging stations. Key participants: Lyse, Ensto, ABB.
- **Italy**: 1,100 charging stations. Key participants: ENEL, Park & Charge.

Source: Frost & Sullivan
Inductive Charging - Future Trends

Infiniti EV is expected to be the first electric vehicle to be launched during 2015 with built-in inductive charging technology.

Inductive Charging for Electric Vehicles: Future Market Trends, Global, 2010-2020

- **Test projects**
  - Demonstration projects for static charging
  - Test tracks for dynamic charging

- **Establish Standards**
  - **Initial launch of EVs with inductive charging as an option, Ex., Potentially Infiniti EV**

- **OEMs such as Audi, BMW, Renault-Nissan may start adopting to the inductive charging as a built-in or optional feature**

- **Inductive charging available as an option by default.**

- **Second phase for dynamic charging**

Source: Frost & Sullivan analysis.
Inductive Charging - Competitive Trends

Market Participants from multiple industries such as telecom, industrial automation, utilities etc are transforming the industry by establishing their presence.

Inductive Charging for Electric Vehicles: Market Trends, Global, 2012

Component manufacturers from various verticals

Telecom

Transport electrification

Utilities

Industrial Automation

EDF, Vattenfall, Endesa E.on etc

SEW-Eurodrive, Vahle etc

Bombardier etc

Qualcomm etc

Inductive Charging Market

Source: Frost & Sullivan analysis.
Contacts

Anjan Hemanth Kumar
Team Leader
Automotive and Transportation

📞 (0091) 80 6160 6666
✉️ Anjan.kumar@frost.com

Martyn Briggs
Programme Manager
Automotive and Transportation

📞 (0044) 2079157830
✉️ Martyn briggs@frost.com

Franck Leveque
Programme Manager
Automotive and Transportation

📞 (0044) 2079157871
✉️ Franck.leveque@frost.com

Sarwant Singh
Partner and Business Leader
Automotive and Transportation Department

📞 (0044) 2077303343
✉️ Sarwant.singh@frost.com