

ELECTRIC VEHICLES UNPLUGGED: A 360 Degree Vision of the Future

Electric Vehicles (EVs) are regarded as the next big thing in world mobility with various federal governments and OEMs announcing launch plans and strategically focusing on EVs. EVs form an intersection of auto and energy/utility industries, thereby creating new business models and opportunities. The new Powertrain architecture of EVs will boost the motor, electronics and battery industries, and provide additional propulsion to the energy sector.

Frost & Sullivan estimates that the Global market for Electric Vehicles could potentially grow to 1.21 million units by 2015, and possibly 2.2million units under an optimistic scenario if governments provide support with subsidies and incentives. Although Europe and North America are expected to be the two big markets for EVs, China and Japan are expected to lead the Asian markets.

Frost & Sullivan considers EVs to be a prospective market, and believes it is time for the world to open its eyes to a green future.

Sarwant Singh
Partner

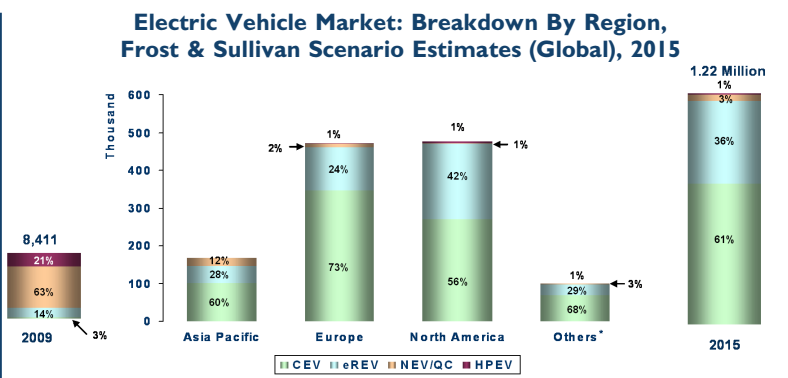
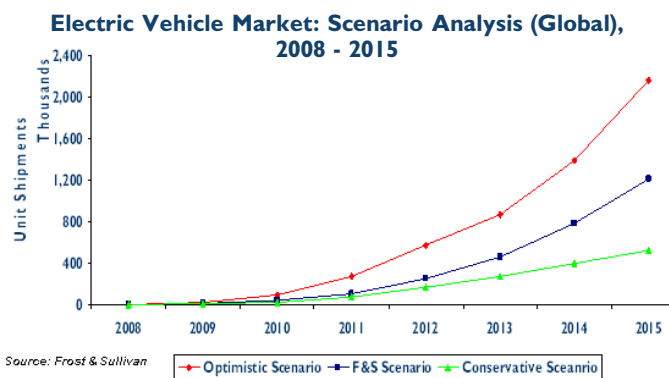
The EV market has gone from barely unnoticed on most Automakers radar screens to one of the biggest stories of 2008. Innovative EV manufacturers, new players, as well as automotive giants are firming up their plans to launch several models of electric cars post 2010.

“Considering the current state of the auto industry, oil dependence and available technologies, it is time for a change and EVs are the right choice,” states Frost & Sullivan Industry Manager, Catherine Butterworth. “We believe that governments will play a pivotal role in realising the dream of pure green mobility.”

For instance, the UK government announced a subsidy of up to €5,600 (£ 5,000) for EV buyers. This is amongst the first plans to encourage consumers to change their personal transportation preferences.

On the supply side, governments have been active in supporting EV manufacturers and utilities through funding and other incentives. For instance, Berlin has been the EV hub for German OEMs such as Daimler, BMW and Volkswagen, each having partnered with a utility to fleet test their EVs among consumers. In Spain, the Federal government, Ministry of Industry and Ministry of Environment have been pursuing various EV projects. The French government has also taken the lead in moving towards commercialisation through Renault and EDF.

This market clearly promises attractive returns for early investors - be it in the vehicle manufacturing, battery technologies, charging infrastructure, or in innovative business models that support the lifecycle of EVs!



Battery Electric Vehicles

Electric vehicles use electric motors instead of an internal combustion engine (ICE) to propel a vehicle. The electric power is derived from a battery of one of several chemistries including Lead Acid, Nickle Metal Hydride (NiMH), and Lithium-Ion (Li-ion).

Neighborhood Electric Vehicles (NEVs)	City Electric Vehicles (CEVs)	Extended-Range EVs (eREVs)	High-Performance EVs (HPEVs)
NEV is a US DOT classification for vehicles weighing less than 3,000 lbs (GVW) and top speed of 25 mph. NEVs generally are restricted to operate on streets with a speed limit of 35 mph or less.	A city car is a European classification, for a small and light vehicle intended for use in urban areas although they can operate in mixed city-highway environment. In Japan, city cars are called kei cars.	A plug-in hybrid electric vehicle (PHEV) with a IC engine or other secondary sources connected to a generator to supply the batteries. The drive range and speeds are comparable to IC engine vehicles.	Sporty PHEVs or battery electric vehicles with top speeds exceeding 100 mph and driving range exceeding 100 miles. The price of these vehicles is expected to approach or exceed \$100,000.
Examples: GEM e2, e4, e6; REVA G-Wiz i; ZENN; ZAP etc.	Examples: Smart EV, Th!nk City, BMW Mini and others	Examples: Chevy Volt, Toyota Prius PHEV, Chrysler Sedan and others	Examples: Tesla, Fiskers - Karma, Venturi - Fetish, Lightning GT

GROWTH PARTNERSHIP SERVICES

Frost & Sullivan's research on the global electric vehicles market provides you with a 360 degree holistic insight into this market, helping you identify growth opportunities and leverage your specific expertise. We have developed in-valuable expertise in the Powertrain and Alternate Propulsion industries for many years and are now able to offer an interactive solution to allow every executive throughout your organisation access to our extensive research and consulting capabilities on Electric Vehicles and surroundings technologies/topics. The partnership is set to include research studies as well as interactive deliverables (analyst hours and workshops).

Frost & Sullivan EV Proposition to Clients

- A** Ongoing annual support on **Strategic Trends within the Global EV Market**
- B** Global **Market Sizing and Forecasts** for the EV market, broken down by region, vehicle model/segment/OEM, and by Fleet and Private Customer
- C** Analysis of **Infrastructure** development trends and tracking subsidies and incentive programmes globally for EVs
- D** Conducting **Voice of the Electric Vehicle Customer (Fleets and Private) Studies** determine EV driving characteristics, acceptance of new business models and also to identify customer segments and groups
- E** **Competitor Analysis:** Analyse competitive trends, model launches and pricing vs. positioning strategies
- F** **Business Model Analysis:** Evaluate business models across the industry value chain and identify opportunities for key players including ROI analysis per each model
- G** Support the development of an appropriate **Market Strategy** through an interactive analyst presentation and workshop model

Upcoming Studies - 2009

- Customer and Market Analysis of the Fleet Market for EVs in Europe
- Strategic Analysis of Business Models Employed by EV Market Stakeholders
- Customer and Market Analysis of the Fleet Market for EVs in North America
- Strategic Analysis of the Chinese Market for Hybrid Vehicles
- Global Hybrids and EVs — Database by Region and OEMs (Q3 2009 Update)
- VOC Study on EVs — Customers Interest in EVs and Acceptability to New Business Models (Europe & North America)
- APAC Voice of Customer Study for Interest and Willingness to Buy EVs (Private)
- Strategic Analysis of Selected OEMs Telematics Strategy for EVs
- Strategic Analysis of e-Motor Bikes and e-Scooters (Europe, North America & APAC)
- Strategic Analysis of the European and North American Electrical Commercial Vehicle Market
- Strategic Analysis of the European and North American Hybrid Commercial Vehicle Market
- Top 10 Markets for EVs in Europe: Analysis of Country and City Attractiveness
- 360 Degree Global Strategic Analysis of the Battery Technologies Market
- Executive Update of the European Market for Electric Corner Modules
- Thought Leadership Report: Industrial Opportunities in the EVs Segment

Available Studies

- Strategic Analysis of Developments in Global EV Infrastructure Market
 - Strategic Analysis of APAC Passenger EV Market
 - Strategic Analysis of North American Passenger EV Market
 - Global Hybrids and EVs — Database by Region and OEMs
 - 360 Degree Analysis of the Global EV Market
 - Strategic Analysis of European Market for Electric Corner Modules
 - Strategic Analysis of Global Market for Fuel Cell EVs
 - Strategic Analysis of In Car Green Technologies
 - Strategic Assessment of European Passenger EV Market
- Please Note: Titles are subject to change and are not guaranteed.**

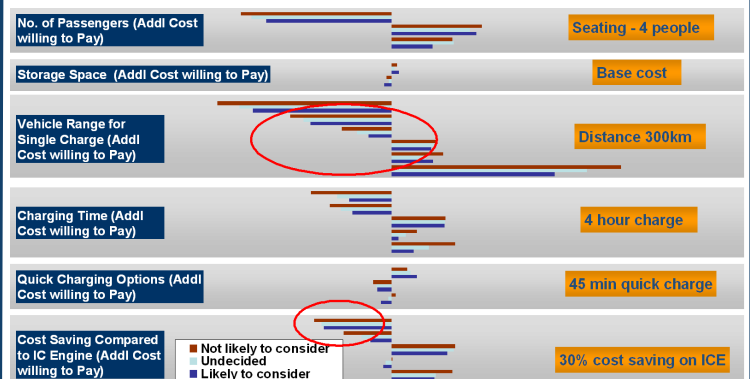


Utilities Business Model — Revenue Generating Opportunities Are Mainly Outside Selling Energy

Source Of Revenue Generation	CAGR	Calculated over 5 years
1. Revenues from Selling Electricity	CAGR = 242% (Over 5 years)	€390Mn - €400Mn
2. Revenues from selling Charging Stations	CAGR = 153% (Over 5 years)	€650Mn - €700Mn
3. Revenues from Installation & Maintenance of Charging Stations	CAGR = 158% (Over 5 years)	€490Mn - €500Mn
4. Revenues from Diagnostics	CAGR = 153% (Revenue Opportunity to start from 3rd year)	€600K - €625K
5. Revenues from Garage Referrals	CAGR = 242% (Over 5 years)	€25K - €27K
6. Revenues from Music Download	CAGR = 127% (Revenue Opportunity to start from 3rd year)	€150K - €165K
7. Revenues from Others	CAGR = 151% (Over 5 years)	€ 340Mn - € 345Mn
TOTAL: €1.9Bn - €2Bn		
Capital Investment (1st yr)	Includes: → New Energy Capacity	€48Mn - €50Mn
Fixed & Operating Cost	→ Network Recurring Cost → Charging Station Purchase Cost → Installation and Maintenance cost → Logistics, Admin, Selling, General, Rental, Marketing and Labour Cost	€640Mn - €650Mn

Those More Willing to Consider an EV Show Greater Willingness to Accept Low-End Capabilities

Respondents willing to consider an electric vehicle more likely to accept lower end capabilities such as distances of 100-200km on full charge or lower cost savings compared to a traditional ICE.



Base : Total interviews N = 1,929