

# 360 Degree Perspective of the Global Electric Vehicle Market Opportunities and New Business Models

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# Agenda

## 360 Degree Vision of the Global Electric

### Vehicle Industry



**Future Urban Mobility and Society Trends and Its Implications to Personal Mobility, and Electric Vehicles**



**Electric Vehicles Market Overview, Technology Roadmap and Infrastructure Trends**



**Global EV Market Size and Forecasts – PVs, LCVs and 2 Wheelers**



**Business Model Analysis of Key Industry Stakeholders** (Utilities, charging station and other market participants)



**London Case Study**



**Discussions**

# Definitions

# Definitions – Electric Vehicles

**Battery Electric Vehicles:** Electric vehicles (EVs) 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, nickel metal hydride (NiMH) and lithium-ion (Li-ion).

## Neighbourhood Electric Vehicles (NEVs)

NEV is a US DOT classification for vehicles weighing less than 3,000 lbs (GVW) and having a top speed of 25 mph. NEVs are generally restricted to operate on streets with a speed limit of 35 mph or less.

GEM e2, e4, e6; REVA G-Wiz i; ZENN; ZAP and others



## City Electric Vehicles (CEVs)

A city car is a European classification for small and light vehicles intended for use in urban areas although capable of operating in mixed city-highway environment. In Japan, city cars are called kei cars.

Smart EV, Th!nk City, BMW Mini and others



## Extended-range EVs (E-REVs)

These vehicles have an internal combustion engine (ICE) or other secondary source connected in a series configuration to a generator to supply the batteries. The drive range and speeds are comparable to IC engine vehicles.

Chevy Volt, Opel Ampera and others



## Plug-in Hybrid Electric Vehicle (PHEVs)

A plug-in hybrid electric vehicle (PHEV) has an internal combustion engine (ICE) with a motor along with a battery connected in parallel to the ICE. They are generally regarded as full hybrids with bigger motor/battery and a plug to recharge.

Toyota Prius PHEV, Ford Fusion PHEV, etc



## High-Performance Electric Vehicles (HPEVs)

These are 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.

Tesla, Venturi Fetish, Lightning GT, etc



# Definitions – Charging Stations

## Home charging

Vehicle charging at users residences, in their garages, drive ways and at apartment complexes as well as street residential spaces. Generally it is expected to be slow charging (Level 1) and can be used to charge EVs overnight. Home charging takes 8 to 12 hours for complete battery charging

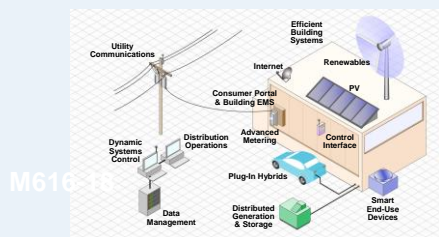
## Semi-Public Charging

Vehicle charging at office workplaces which are including in/outdoor office garages, commercial complex parking garages, etc. These too are also similar to home charging, which is expected to be mostly slow charging (level 1) apart from this they maybe fast charging (level 2) portable ones also. Its takes 2 to 3 hours for complete charge

## Public charging

The non-residential and non-workplace charging including on streets, private garages, supermarket garages etc. Expected to be a combination of fast charging (Level 2) and rapid charging (Level 3) for quick top-ups of battery power. Charging at this level is with in few minutes

### Residential, Work place charging



Workplaces, Residential apartments (including car club bays), Leisure centers and sports facilities, Retail outlets, Community facilities, Underground and Over ground rail stations, Parks and other green spaces, Education facilities

Town centers, high streets, tourist attractions, Residential areas (including car club bays)

# Definitions – Various Charging Station Levels

## Level 1 (Slow Charging)

Level 1/Slow Charging method uses a standard 240V AC branch circuit that is the lowest common voltage level found in both residential and commercial buildings. Typical amp ratings for these receptacles are 13 or 16 amps.



## Level 2 (Fast Charging)

Level 2/Fast charging is typically described as the “preferred” method for the EVs charging both for private and public facilities and specifies a 240V AC, single phase branch circuit



## DC - DC Charging (Rapid Charging)

This type of charging employs direct current from the source to get the vehicles battery to be charged to a certain degree with out converting into an alternate current .



## Inductive Charging

Method of recharging a battery with out connecting it to a charging station is by inductive charging. With this technology, electrical energy is transferred by a process called Inductive charging. This process uses magnetic forces to transfer electrical power from a transmitter to a receiver, without the use of cables or connections



# **Urbanisation Trend and Its Impact on New Mobility Business Models**

# Urbanisation to Be-Redefined in Future And Will Lead to Development of Mega Regions and Mega Corridors



## MEGA CITY

Urban area with more than 10 million inhabitants and GDP (PPP) more than 100 billion USD.

Urban area encompasses the areas of the suburbs and the outer business activity hubs.

EXAMPLE: Greater Tokyo, Greater New York, Greater Mumbai



## MEGA REGIONS

Region within the perimeter formed by the combination of two or more closely located major cities or megacities, over 15 million population

EXAMPLE: Johannesburg and Pretoria region called "Jo-Toria"



## MEGA CORRIDORS

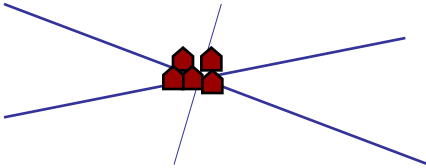
The area alongside the transport corridor connecting two or more major cities or business districts or megacities.

EXAMPLE: Hong Kong-Shenzhen-Guangzhou in China (Population 120 Million)



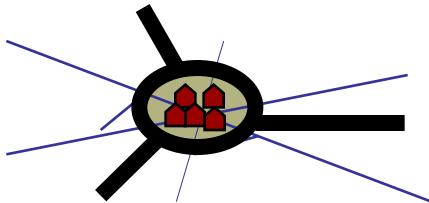
# Cities Globally Will Become Networked, Integrated and Branded - Polarization of Vehicle Sizes Is Creating Demand for EVs in Mega Cities

## 1950s Urbanisation



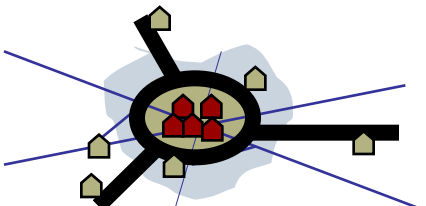
Creation of the historic centre and districts

## 2000s Suburbanisation



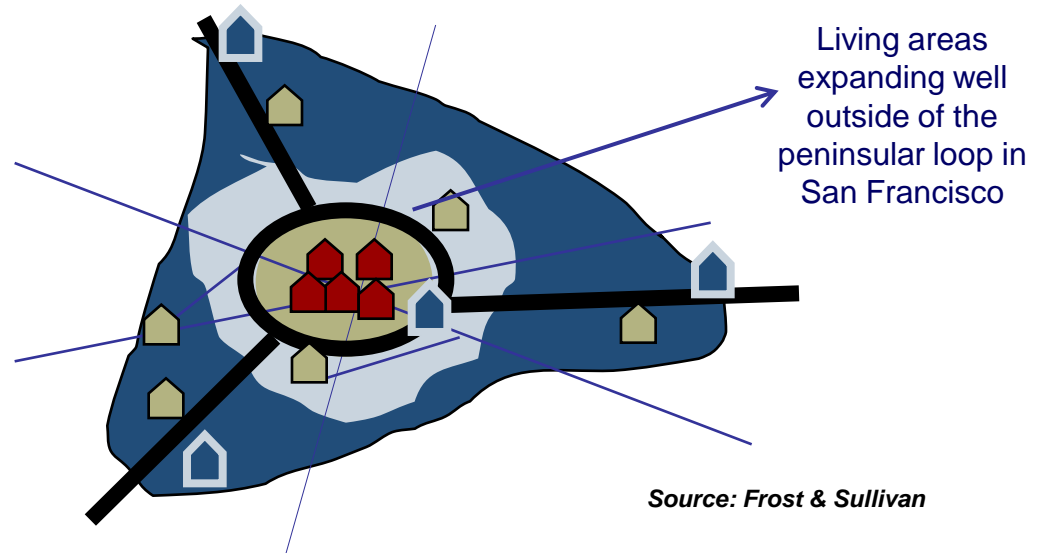
Urban sprawl, first highways and ring road

## 2015s Network City



Third suburban area and cities along the highways created, ring road overblown by the urban sprawl

## 2020s : Branded Cities



Source: Frost & Sullivan

- Most offices moved to the first belt suburbs except non cost-sensitive activities: city centres becoming shopping areas (small scale deliveries) for expensive goods and living areas for “double income, no kids” households.
  - ➔ cars needed to go to the working areas/malls outside first and second belt.
- Industry offices moved out to the first belt area as also medium income families while manufacturing facilities and low-medium income families relocated in the second and third belt areas with logistics centres created on 2nd belt periphery.
- ‘Green wave’ families living outside cities in outer suburban area. Hypermarkets and malls mostly created inside the third belt low cost area (large scales deliveries).
  - ➔ cars needed to go from outer suburban areas to join the intermodal public transport and working areas in third and second belt.

# Over 40 Global Cities to be SMART Cities in 2020 - More than 50% of smart cities of 2025 will be from Europe and North America.

China and India to see over 50 New "Sustainable" Cities



## Evolution of Megacities: Key Smart Cities (Global), 2009 - 2025



- Legend**
- ★ Cities built from scratch
  - ★ Existing eco cities
  - ★ Existing eco megacities

Source: Frost & Sullivan

# CASE STUDY: Amsterdam: A Creative Economy Working Towards Deploying Smarter Technologies To Achieve A 40% Reduction Of CO<sub>2</sub> Emissions From 1990 Levels

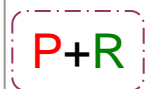
## SMART MOBILITY



- 39% commute by bicycle
- 400+ Km of dedicated cycle route
- To familiarise electric bicycle taxis



- 200 charging stations by 2012;
- 10,000 EVs By 2015
- Encourage car sharing



- Cheaper parking slots at public transit stations to park cars and board trains

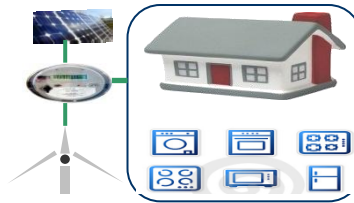


- Yearly reduction of parking spaces and increase of tariffs inside the city.
- 30 kmph speed limits on 80% of roads inside the city - makes bicycles faster by atleast 50% on a A-B trip.



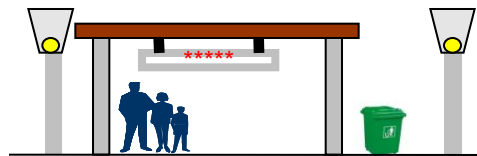
- 154 shore power connections to charge inland cargo vessels and river cruisers to be installed by 2012

## SMART LIVING



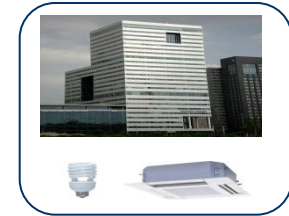
- 1200 homes to feature smart meters and energy management systems.
- 14% reduction in energy use is expected of this smart meter project

## SMART PUBLIC SPACE



- Utrechtsestraat – the popular narrow shopping street downtown is to feature energy efficient street lighting,
- Sustainable tram stops with solar powered displays and billboards
- Solar powered garbage bins with built in compacters will be installed on this street

## SMART WORKING PLACE



- ITO tower is testing the use of smart meters and energy efficient appliances to cut energy consumption.
- Design aesthetics of building absorb natural light and air from the environment thereby keep artificial lighting and HVAC use to minimum.

## SMART COMMUTE to WORK



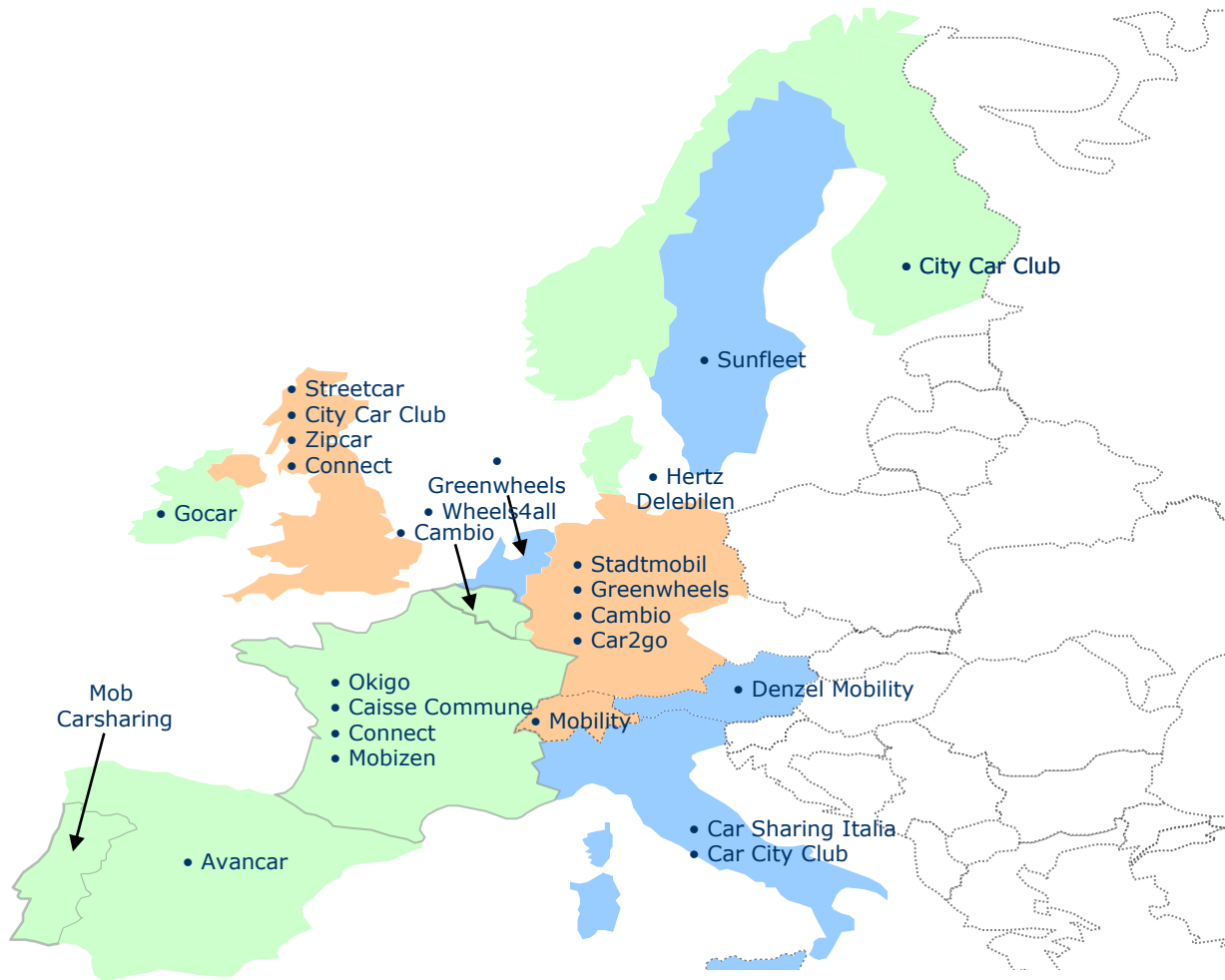
- 25 MNCs have jointly signed to reduce home to work car miles by 10% by 2012.
- Incentive/free bicycles to employees
- Free & protected bike parks at offices to encourage cycle use.
- Work from home if necessary

# New Mobility Model - Car Sharing in Europe

Germany, UK and Switzerland are the 3 biggest markets for Car-Sharing membership in Europe at present; 1 in 3 cars bought new by a CSO will be an EV after 2012



## Evolution of Megacities: Car Sharing in Europe, 2009 - 2025



Note: Others include Spain, Denmark, Finland, Greece, Ireland, Luxembourg, Portugal

Source: Frost & Sullivan

### 2016 Potential



About **€3.5 billion** in revenues



More than **5.5 million** members



More than **77,000 vehicles** in carsharing fleet

# Mobility Integrators (MI) to Offer Innovative mobility solutions to complement commuters' inter-modality and multi-modality travel split



The Concept of a Dynamic Transport Solution Integrating Different Modes Under a Single Entity to make Personal Transportation Easy and Simple

MIs will start exploiting the Web 2.0 and Mobile 2.0 Internet service to offer mobility-based applications (apps) on smart phones.

Source: Frost & Sullivan  
\*The company logos mentioned are only for descriptive purpose

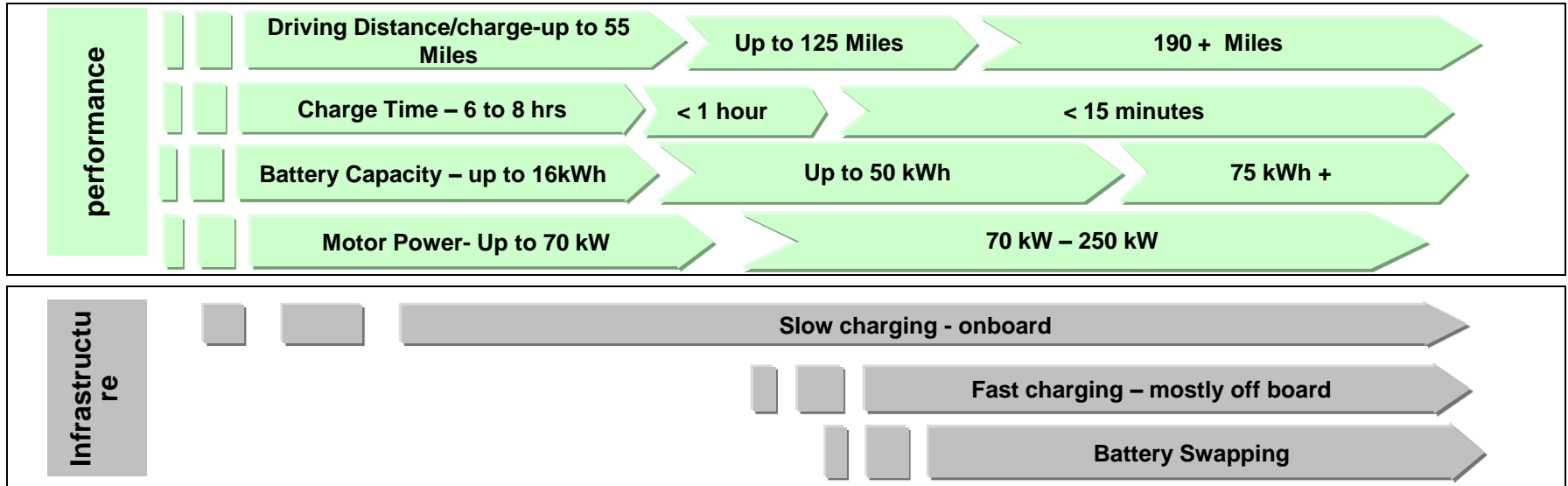
# Electric Vehicles Market Overview, Technology Roadmap and Infrastructure Trends



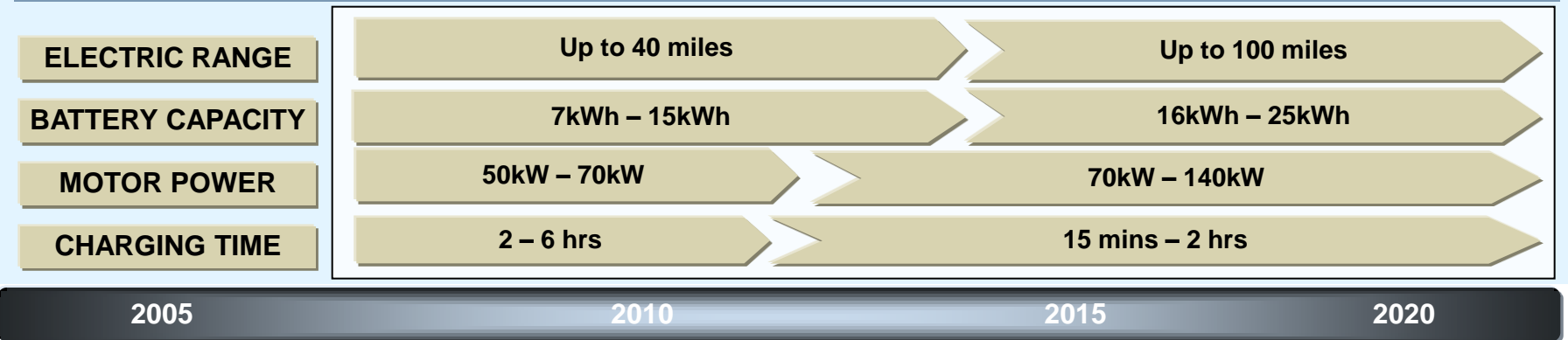
# Electric Vehicle Technology Roadmap (Global), 2008-2015

## - Charging Times to Drop to <30 Minutes by 2015

### Electric Vehicle Market: Technology and Product Roadmap for Electric Vehicles (Global), 2005-2015



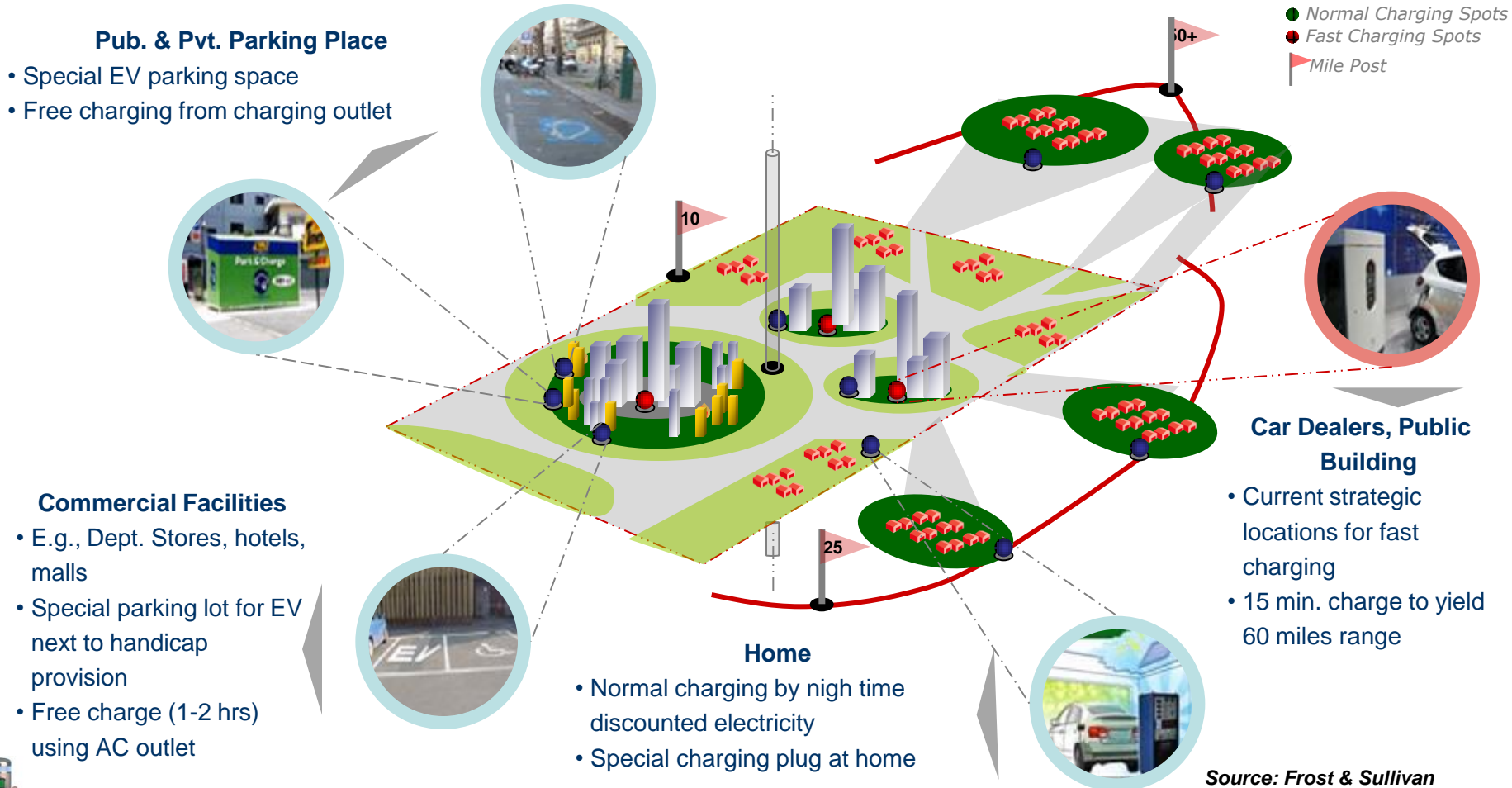
### Market for Extended-Range Electric Vehicles: Technology Roadmap for Plug in Hybrid Electric Vehicles



Source: Frost & Sullivan

# Current EV Range (50-80 Miles) Limits Developments Of Infrastructure to Metropolitan Areas.

## PRESENT DEVELOPMENTS WITH RESPECT TO ELECTRIC CHARGING STATIONS (2008 - 2015), World



Source: Frost & Sullivan

• Improved range extension will see charging points extend beyond city limits to urban and sub-urban areas with emphasis on both normal and fast charging stations



# Future Developments in Electric Charging Stations (2013 on) : Target Focus on Parking Lots With Over 30 Minute Journey Stops



- EV Range extension will see the rise of urban/sub-urban consumers using EV
- Fast charging stations seen across strategic locations on highways like motels, dining centres etc

Source: Frost & Sullivan

# European EV Charging Station Facts- With exception of Norway, most countries today have less than 1000 charging stations installed

## Germany



Number of charging stations  
2010 - ~694  
Number of charging stations  
2017- ~250K

## Netherlands



Number of charging stations  
2010- ~45  
Number of charging stations  
2017- ~45000

## Switzerland



Number of charging stations  
2010 - ~667  
Number of charging stations  
2017- ~39000

## Norway



Number of charging stations  
2010- ~2000  
Number of charging stations  
2017-. ~185K

## Portugal



Number of charging stations  
2010- ~55  
Number of charging stations  
2017- ~57000

## France



Number of charging stations  
2010 - ~270  
Number of charging stations  
2017- ~330K

## U.K.



Number of charging stations  
2010- ~544  
Number of charging stations 2017-  
~400K

## Spain



Number of charging stations  
2010 - 56  
Number of charging stations  
2017- ~220K

## Italy



Number of charging stations  
2010- ~120  
Number of charging stations  
2017- ~148K

## Austria



Number of charging stations  
2010- ~50  
Number of charging stations  
2017- ~20000

## Sweden



Number of charging stations  
2010- ~240  
Number of charging stations  
2017- ~60000

## Demark



Number of charging stations  
2010- ~50  
Number of charging stations  
2017- ~84000

## Belgium



Number of charging stations  
2010- ~(30 to 50)  
Number of charging stations  
2017- ~30000

## Finland



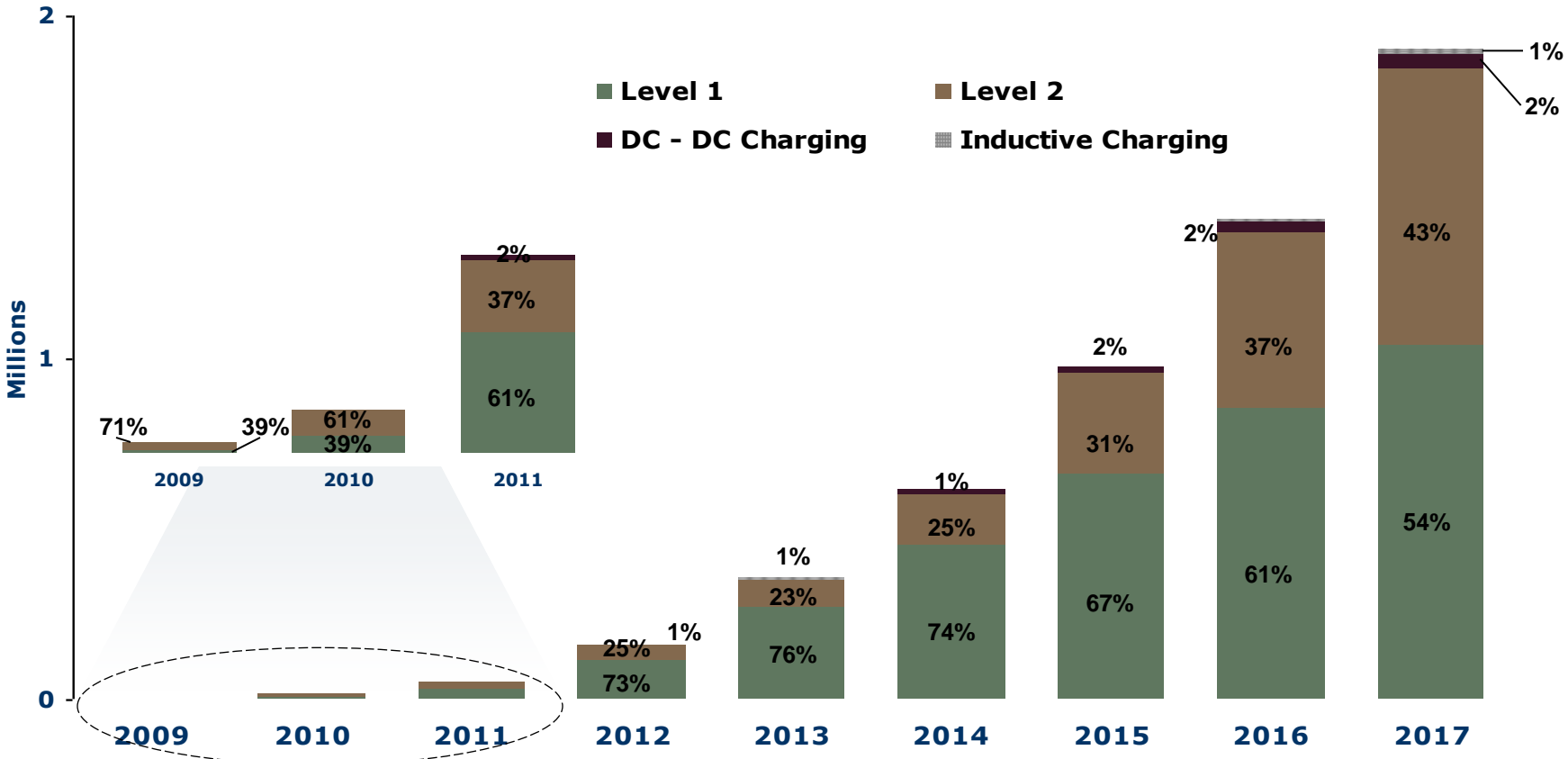
Number of charging stations  
2010- ~40  
Number of charging stations  
2017- ~1000



Source: Frost & Sullivan

# European Growth forecast: Cumulative number of various charging levels is in the range of 1.8 to 2 million by 2017

Electric Vehicles Charging infrastructure: Points growth analysis (Europe), 2011 - 2017



Note: Base numbers are rounded for all years  
Source: Frost and Sullivan

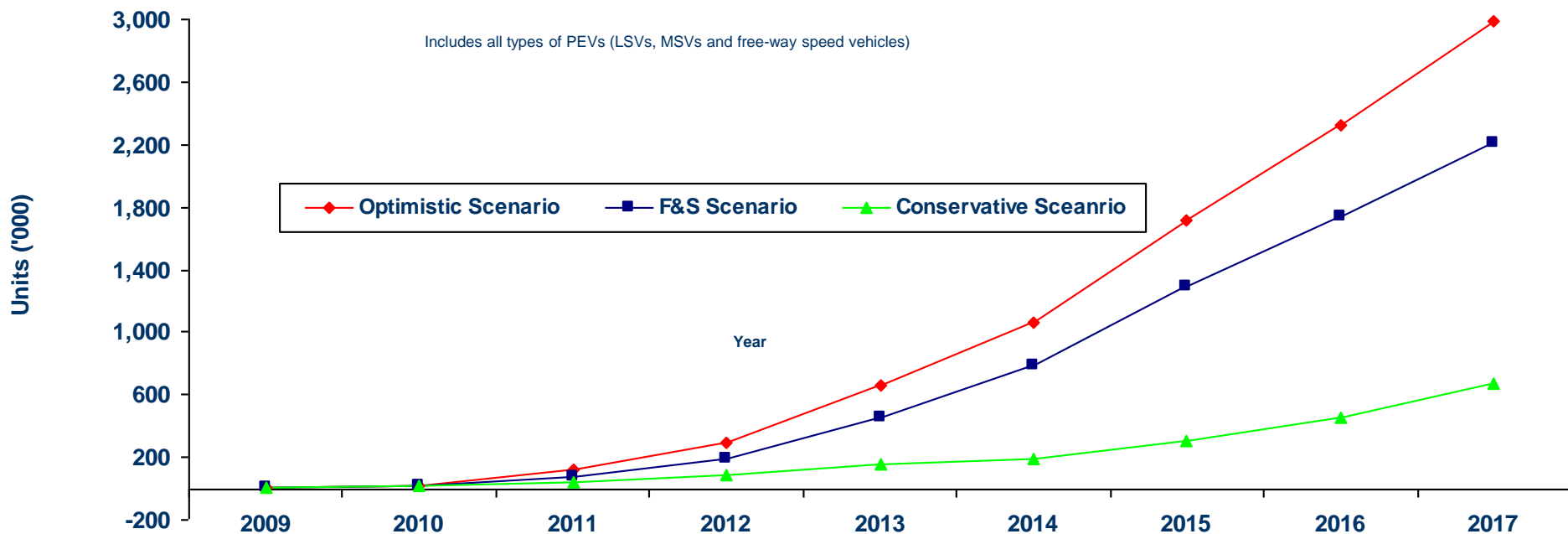
# Global Market Size and Forecasts



# Sales Forecasts Scenario Analysis:

## Global Electric Vehicle Demand Analysis – Potential Sales of 2.2 million in Frost & Sullivan Scenario by 2017

**Electric Vehicle Market: Sales Forecasts Scenario Analysis (World), 2009-2017**

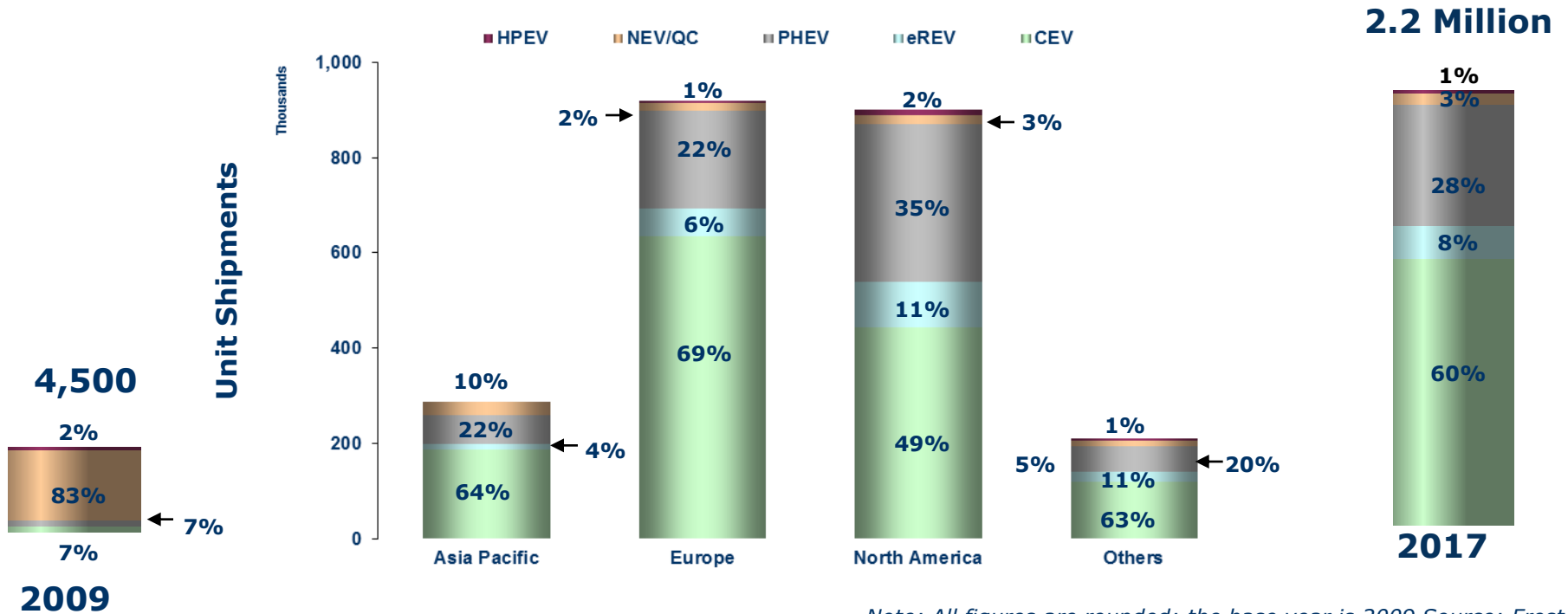


Scenario's	2010	2011	2012	2013	2014	2015	2016	2017	2020 (% of Total Car Sales)
<b>Optimistic Scenario</b>	23,100	123,800	289,500	665,000	1,060,400	1,714,500	2,220,300	3,202,000	<b>10-12</b>
<b>Frost &amp; Sullivan Scenario</b>	16,500	72,000	193,000	453,000	792,000	1,287,500	1,736,000	2,203,000	<b>5-7</b>
<b>Conservative Scenario</b>	13,500	35,600	82,500	150,300	195,100	300,500	450,000	670,000	<b>3-4</b>

Note: All figures are rounded; the base year is 2010. Source: Frost &

# EV Breakdown By Region - CEVs to Account for 69% Share In Europe; NA to Witness More PHEVs with a 35% Share

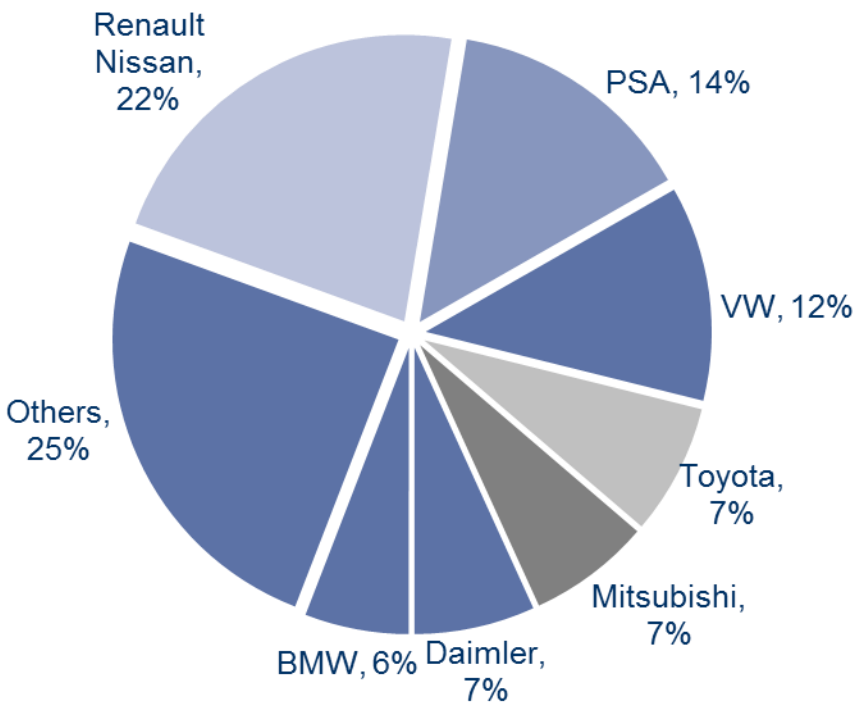
## EV Breakdown By Region – Sales Estimates (World), 2017



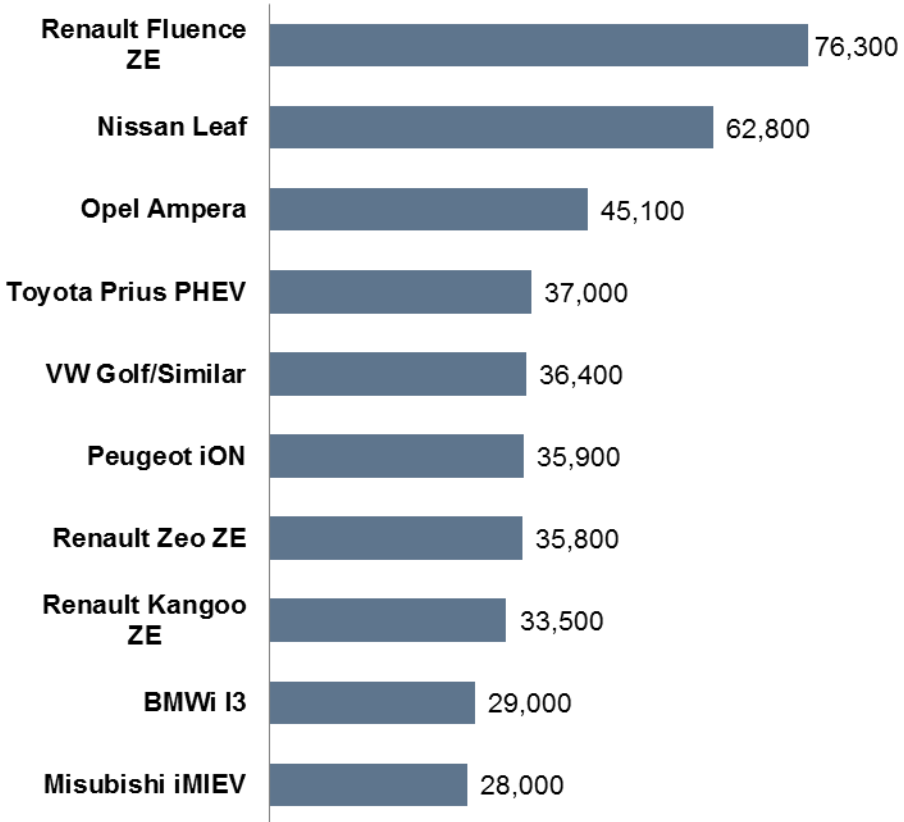
Note: All figures are rounded; the base year is 2009 Source: Frost & Sullivan

# Electric Vehicle Market Breakdown by OEMs: Renault Nissan likely to account for 22% of the market share by 2017 with Renault Fluence expected to be one of the top selling models

Electric Vehicle Market: Market share breakdown by OEMs (Europe), 2017



Electric Vehicle Market: Top 10 Electric Vehicles (Europe), 2017



Note: All figures are rounded; Source: Frost & Sullivan

# Chinese OEMs to launch over 30 EV Models in Next 3 Years

Electric Vehicle Market: Actual and Expected Electric Vehicle Models (China), 2009-2015

	2009	2010	2011	2012	
<b>A00</b>		 Beni EV Chana  QQ3 EV Chery  M1 EV Chery	 i-car Dongfeng  M1e FAW  Yueyue EV JAC  320EV Lifan	 F0 EV BYD  Mpe FAW  A00 EV SAIC  Oula Great Wall  EK-1 Geely  EK-2 Geely	<b>13</b>
<b>A0</b>				 Yuexiang EV Chana  Zhonghua EV Brilliance	<b>2</b>
<b>A</b>	 F3DM BYD	 620EV Lifan	 Haima EV FAW	 Zhixiang plug-in Chana  550 plug-in SAIC  Saibao EV Hafei  Heyue plug-in JAC	<b>7</b>
<b>B</b>			 F6DM BYD  BE 701 BAW		<b>2</b>
<b>MPV</b>		 E6 BYD  premacv EV FAW	 Shuaike EV Dongfeng		<b>3</b>
<b>SUV</b>		 Odin EV Dongfeng  Ruiqi EV Dongfeng  2008 EV Zhongtai  Midi EV BAW	 Tiggo EV Chery		<b>5</b>
	<b>1</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>Sum</b>

Source : Frost & Sullivan



# Electric 2 Wheelers – eBicycle, eScooter and eMotor Bike Market Worth Over 25M Units Worldwide

- Over 20 million electric 2 wheelers sold globally in 2008
- Modest growth expected globally with 22 million sales forecast by 2010

Motor driven by torque sensor on pedal



Sanyo Enacle



XM 3000 Electric Moped



Vectrix Electric Scooter

Regenerative braking functionality in high end models



Lead Acid / NiMH Battery

Hub motor driven purely by throttle

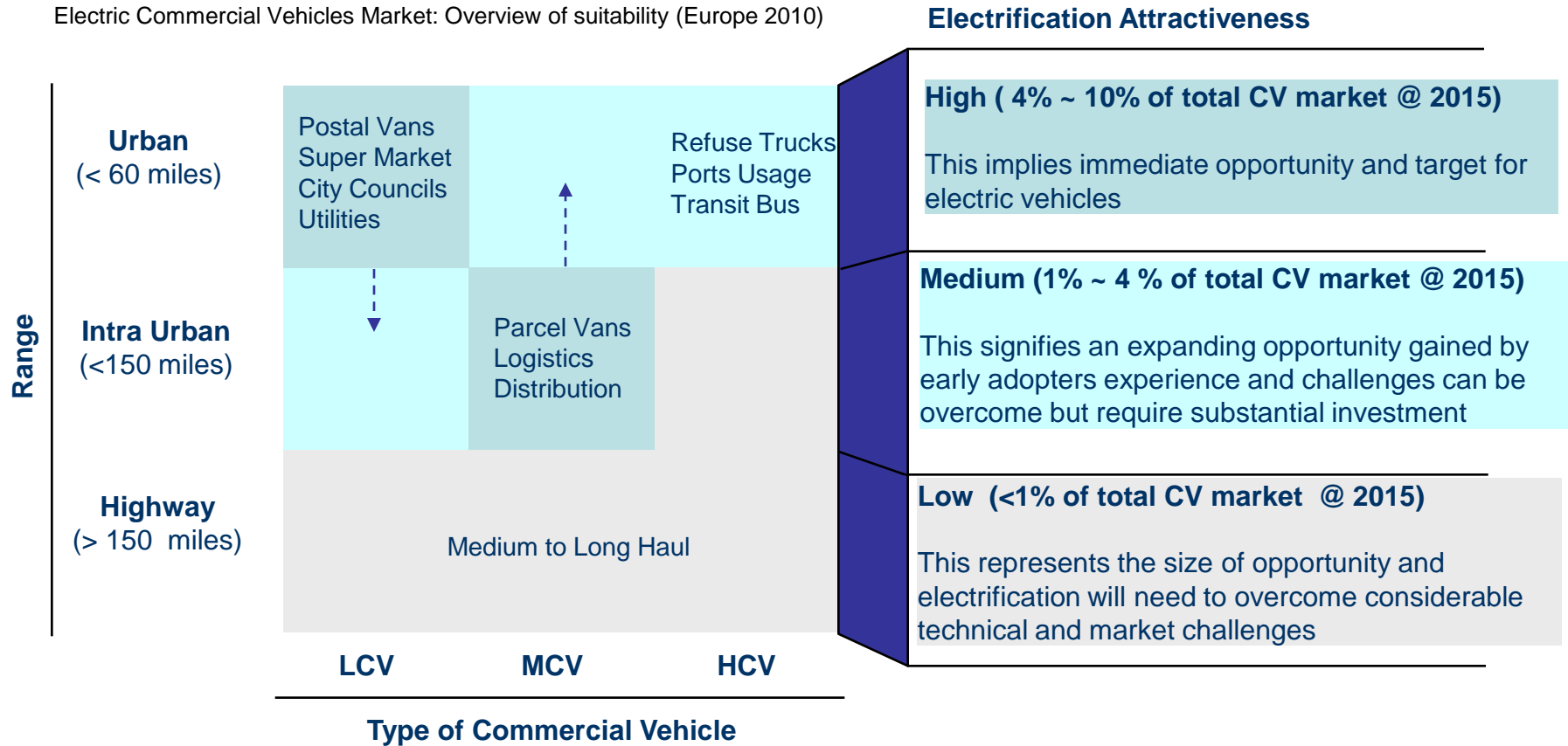
- Regenerative Braking\*
- Range – 35 km / 50 km\*

- 60 Volt lead acid battery
- Charging time – 7 hours
- Max speed – 70 kph
- Range – 80 km

- 125 Volt NiMH battery
- Charging time – 2 hours
- Acceleration (0 – 80 kph) – 6.8s
- Max speed – 100 kph
- Range – 110 km @ 40 kph

# Electric Commercial Vehicles will be concentrated more towards depot based delivery vehicles with fixed payload and work schedule cycle.

Electric Commercial Vehicles Market: Overview of suitability (Europe 2010)



**Urban**  
Usage lies in an urban environment with frequent stop and go combined with fixed load

**Intra-Urban**  
Usage lies in an urban and intra-urban distribution. May have stop and go routes

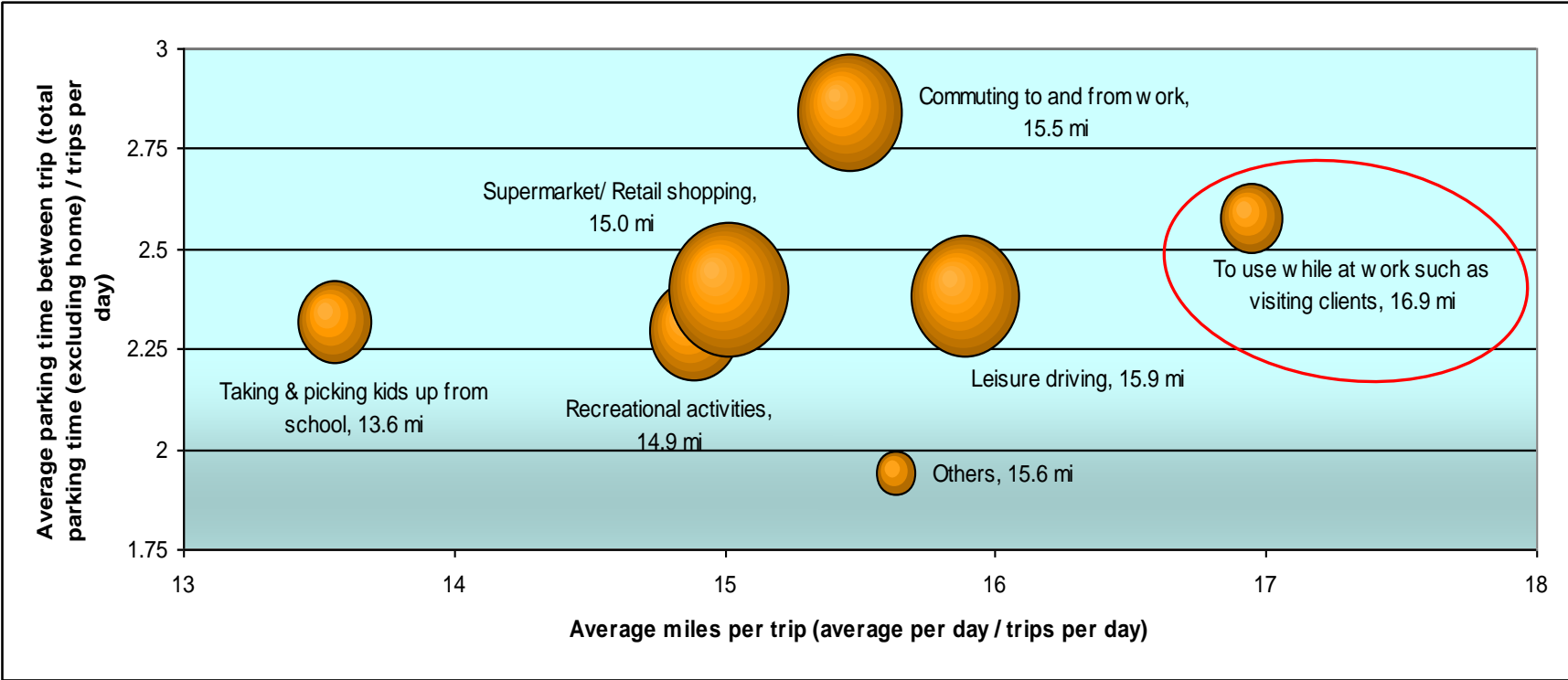
**Highway**  
Usage mostly lies in highway routes long haulage with heavy loads

Source: Frost & Sullivan

# Who is an EV Customer : Strategies differ by different markets and OEMs

NA Drivers who use their vehicle for more leisurely activities generally park short times between trips, while those that use the vehicle to commute park for longer overall.

**Q6 Average distance per day / Q5 trips per day & Q8 time spent parking / Q5 trips per day**  
**Size of bubble Q3 - percent of people that use vehicle for that activity**



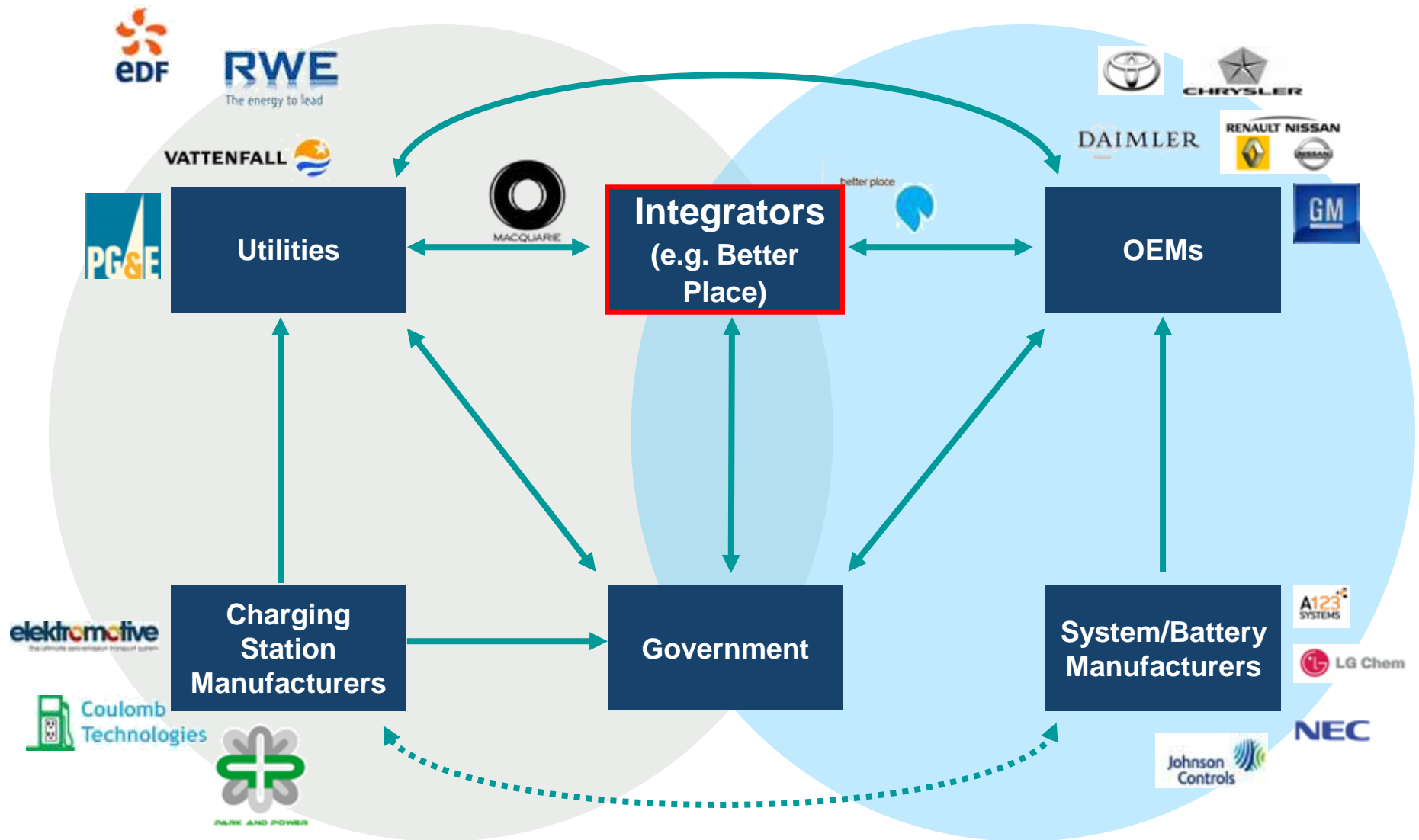
Base : Total interviews N=1,766

\* Bubble size represents % of respondents who use their vehicle for each activity

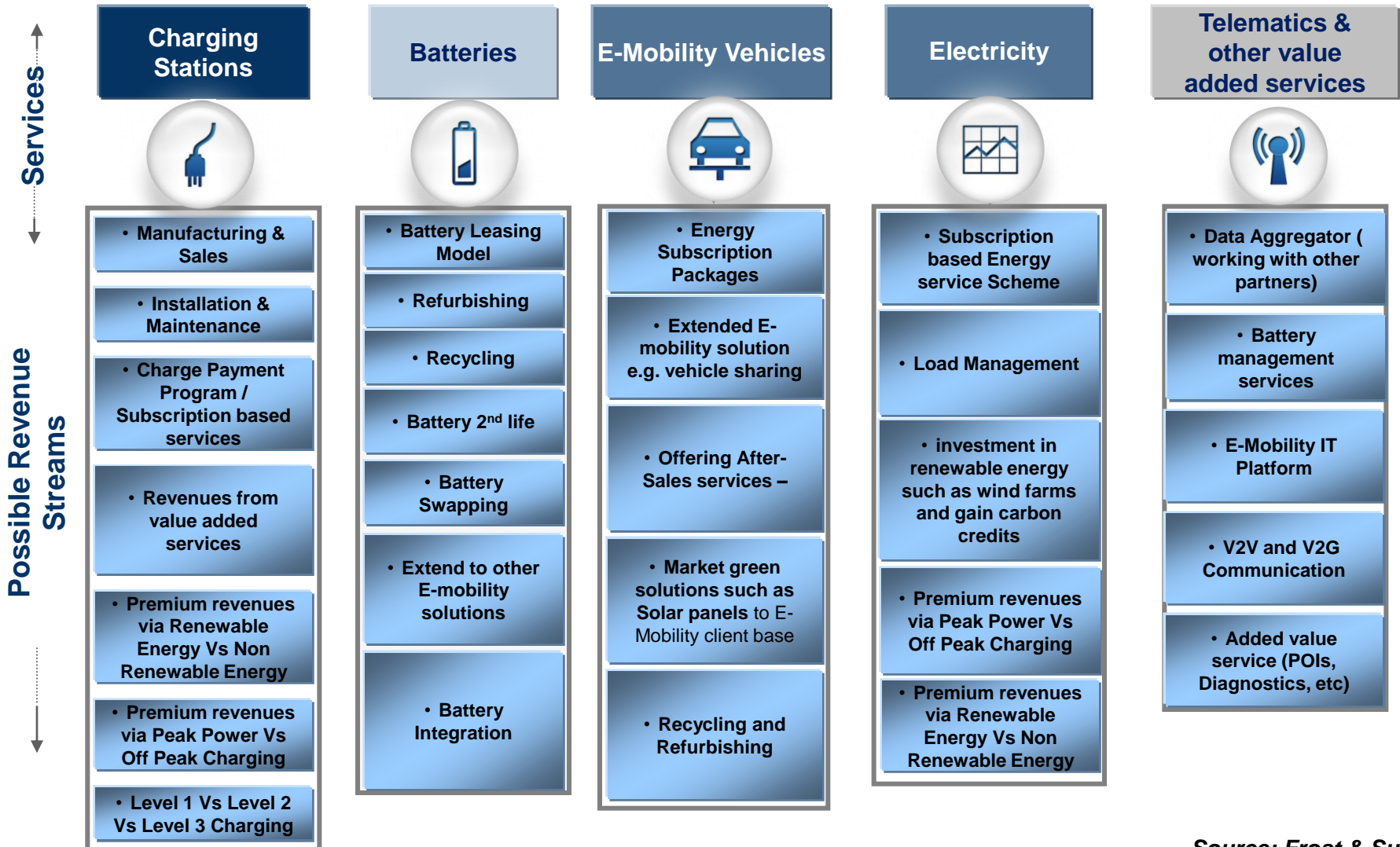
# Business Model Analysis of Key Industry Stakeholders and Key Opportunities



# Electric Vehicle Industry Value Chain Provides Opportunity to Enter New Fields

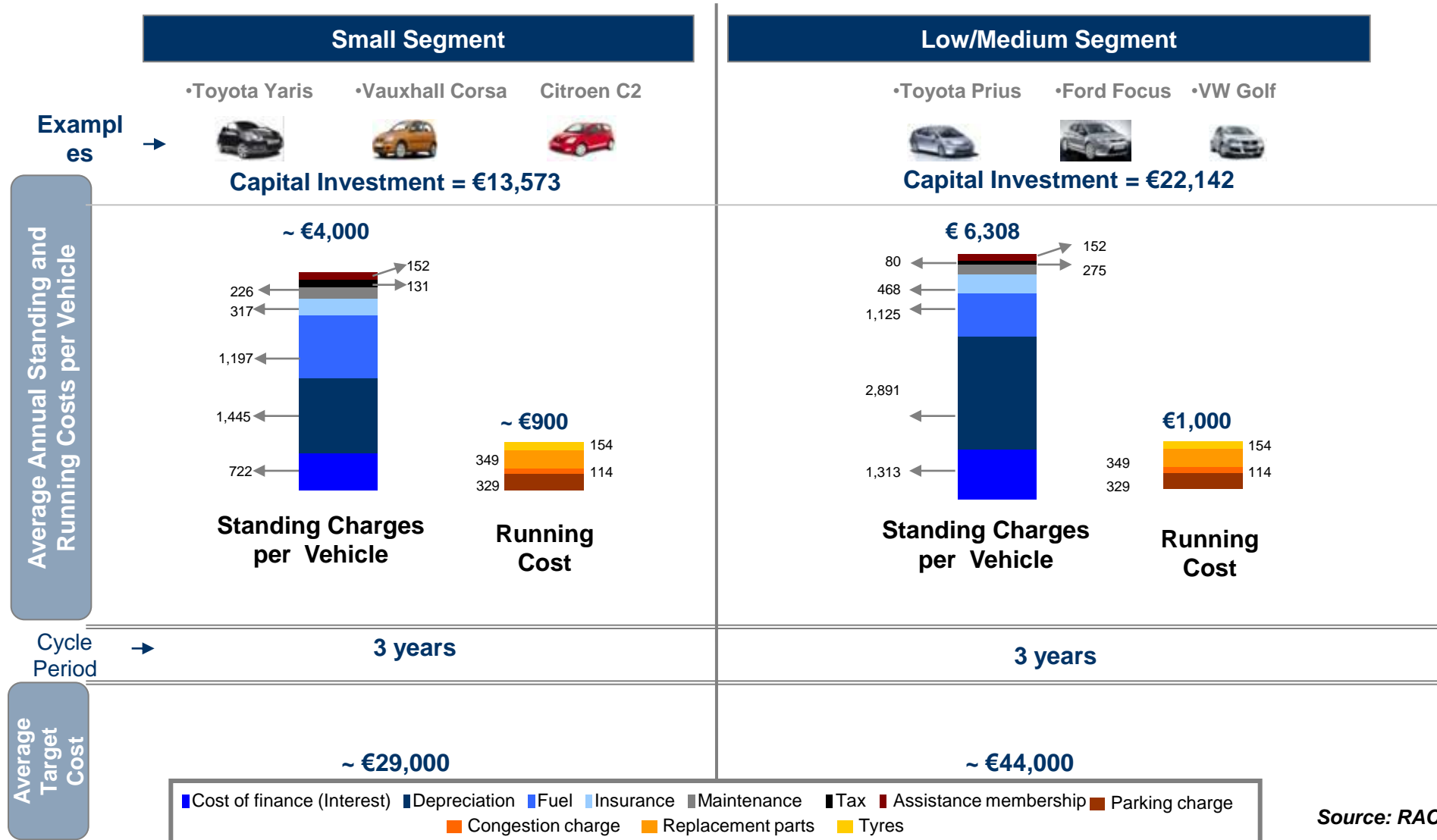


# Example of Products/Services Portfolio That Can be Offered by an Integrator in the E-Mobility Market



Source: Frost & Sullivan

# EV Business Models Will Have to Compete With The Internal Combustion Engine Cost Ownership Structure



Source: RAC

# Business Models Analysis: Future Leasing Models To Sell 75% Of EVs; The Rest 25% Sold Traditionally

	Business Model 1	Business Model 2	Business Model 3	Business Model 4
TYPE	Energy Package	Maintenance Package	Part Subsidy	Full Subsidy
COVER	Partial battery lease + Electricity	Energy Package+ Insurance+ Maintenance	Maintenance Package+ Discount	Maintenance Package+ 100% Discount
ENERGY	Monthly Bill	Flat: Max 1250 miles/month	Flat: 15,500 miles/year	Flat: ~18,500 miles/year
CONTRACT	NA	NA	4 years	7 years
SUBSIDY	NA	NA	50% car price	Free car
MONTHLY LEASE	Up to \$225	Up to \$500	\$750- \$1100	~ \$1350- \$2250

Source: Better Place, Frost & Sullivan

## Other Possible Leasing models

Flexible Mileage	Unlimited Miles	Max number of miles	Pay as you go
Flexible Contract	The customer opts for the number of years and flexible mileage- customized lease		

Note : Values that have been dealt here are an European perspective converted into US\$ at today's exchange rate.



# The Overview of Current Business Models of Vehicles in the Market: Outright Sales and leasing concept preferred by key players



Business Model	Nissan Leaf	PSA C-Zero	Think	iMEV																												
<b>Outright Purchase Price</b>	<ul style="list-style-type: none"> <li>• <b>GB£28,990</b> (Before rebate, incl. VAT)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Upfront payment left to Consumers</b></li> <li>• <b>Will use €5,000 rebate</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>€29,500</b> (Before rebate, excl. VAT) – <b>GB£23k in UK</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>£28,990</b> (Before rebate, incl. VAT)</li> </ul>																												
<b>Basic Business Packages</b>	<table border="0"> <tr> <td><b>1. Outright Purchase</b></td> <td><b>2. Leasing</b></td> </tr> <tr> <td></td> <td>-£399/m; 4yr contract</td> </tr> <tr> <td></td> <td>-Access to Charge Station</td> </tr> <tr> <td></td> <td>-IT Telematics</td> </tr> <tr> <td></td> <td>-Maintenance and Service</td> </tr> <tr> <td></td> <td>-Monthly utility Bill</td> </tr> </table>	<b>1. Outright Purchase</b>	<b>2. Leasing</b>		-£399/m; 4yr contract		-Access to Charge Station		-IT Telematics		-Maintenance and Service		-Monthly utility Bill	<p><b>1. Leasing</b></p> <ul style="list-style-type: none"> <li>-€499/month; 4yr contract</li> <li>-Vehicle + Battery</li> <li>-Telematics (Specific Assistance)</li> <li>-Navigation</li> <li>-Add. Fee for info. On status of battery (&gt;1/day)</li> <li>-<b>No charge stations</b></li> <li>-<b>Vehicle returned to dealer post contract period</b></li> </ul>	<table border="0"> <tr> <td><b>1. Outright Purchase</b></td> <td><b>2. Leasing</b></td> </tr> <tr> <td></td> <td>-€554/m;5yr contract (10% residual value)</td> </tr> <tr> <td></td> <td>-€510/m;5yr contract (15% residual value)</td> </tr> <tr> <td></td> <td>-IT Telematics</td> </tr> <tr> <td></td> <td>-Maintenance and Service</td> </tr> </table>	<b>1. Outright Purchase</b>	<b>2. Leasing</b>		-€554/m;5yr contract (10% residual value)		-€510/m;5yr contract (15% residual value)		-IT Telematics		-Maintenance and Service	<table border="0"> <tr> <td><b>1. Outright Purchase</b></td> <td><b>2. Leasing</b></td> </tr> <tr> <td></td> <td>-No announcements yet</td> </tr> <tr> <td></td> <td>- £300 inc. VAT – 3yrs/ 37,500 under MSP</td> </tr> </table>	<b>1. Outright Purchase</b>	<b>2. Leasing</b>		-No announcements yet		- £300 inc. VAT – 3yrs/ 37,500 under MSP
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	- £300 inc. VAT – 3yrs/ 37,500 under MSP																															
<b>Warranty Conditions</b>	<ul style="list-style-type: none"> <li>• <b>7 yr Battery Warranty</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>5 yr Battery Warranty</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>5 yr Battery Warranty</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>5 yr / 62,500Kms Battery Warranty</b></li> </ul>																												
<b>Residual Value</b>	<ul style="list-style-type: none"> <li>• <b>Vehicle:</b> 60% after 3 yrs</li> <li>• <b>Battery:</b> 15% after 8 yrs</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Vehicle:</b> 55% after 3 yrs</li> <li>• <b>Battery:</b> 15% after 8 yrs</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Vehicle + Battery :</b> 15% after 5 yrs</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Vehicle:</b> 60% after 3 yrs</li> <li>• <b>Battery :</b> 15% after 8 yrs</li> </ul>																												

Source: Frost & Sullivan

# Utilities Business Model – Revenue Generating Opportunities Are Mainly Outside Selling Energy

Source Of Revenue Generation	Calculated over 5 years (based on certain assumptions)
1. Revenues from Selling Electricity	€300Mn - €400Mn
2. Revenues from selling Charging Stations	€500Mn - €700Mn
3. Revenues from Installation & Maintenance of Charging Stations	€300Mn - €500Mn
4. Revenues from Other Sources (Solar panels and other retailing, Advertising, Load Balancing, Garage Referrals, Data Downloads etc)	€ 450Mn - € 650Mn

**TOTAL: €1.5 bn - €2 bn**

**Capital Investment**  
(1<sup>st</sup> yr)

Includes:

- New Energy Capacity
- Command and control centre

**€48Mn - €50Mn**

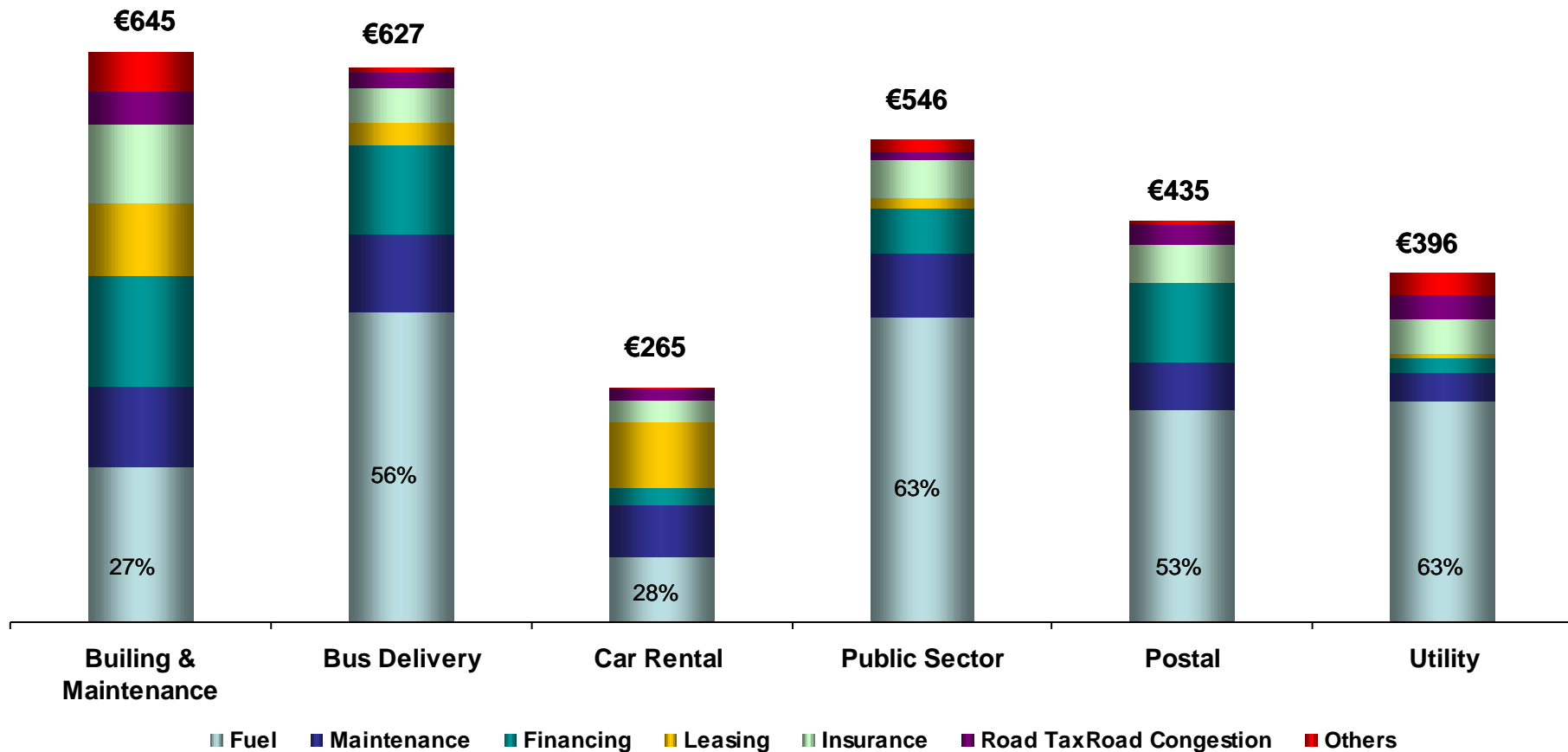
**Fixed & Operating Cost**

- Network Recurring Cost
- Charging Station Purchase Cost
- Installation and Maintenance cost
- Logistics, Admin, Selling, general , rental, Marketing and Labour Cost

**€640Mn - €650Mn**

# Total Cost Of Ownership Analysis for Fleets: Fuel costs are the predominant elements of vehicles Cost Of Ownership in Utility companies, Public Sector and Business Delivery Services

Question: Please estimate how much you spend on the following per month (Euros)



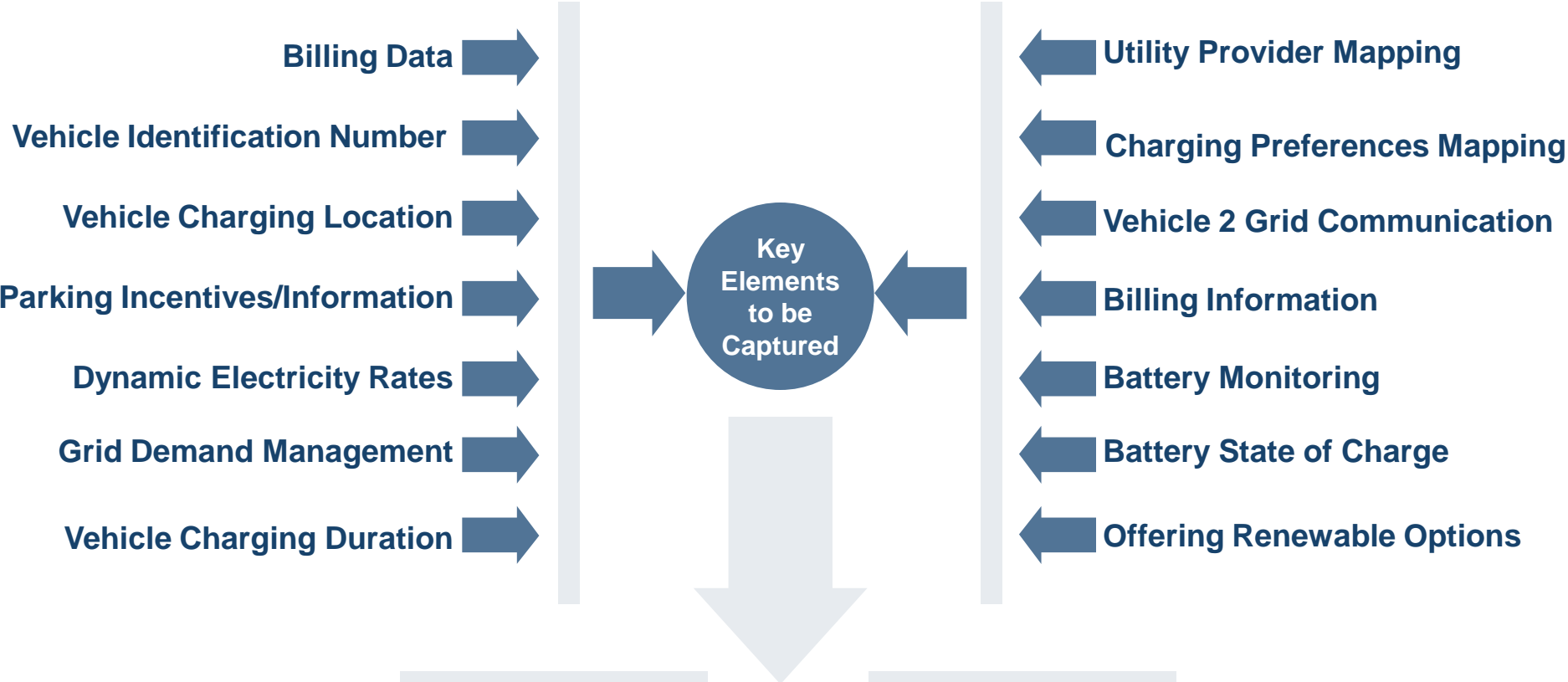
- Interestingly, fuel amounts for up to 2/3 of fleet running costs across businesses interviewed with Business Delivery and Public sector seeing it take up the largest share of their Cost of Ownership
- EV's should aim to address the Fuel and Road Taxing costs for businesses

*\* Based on 93 Interviews with Fleet Drivers who are involved in the choice and running costs of their vehicle*

# Telematics and E-Mobility IT Platform for Electric Vehicles



# eMobility IT platform : Number of Mission Critical Elements needs to be Monitored through a Communication Platform at the Charging End

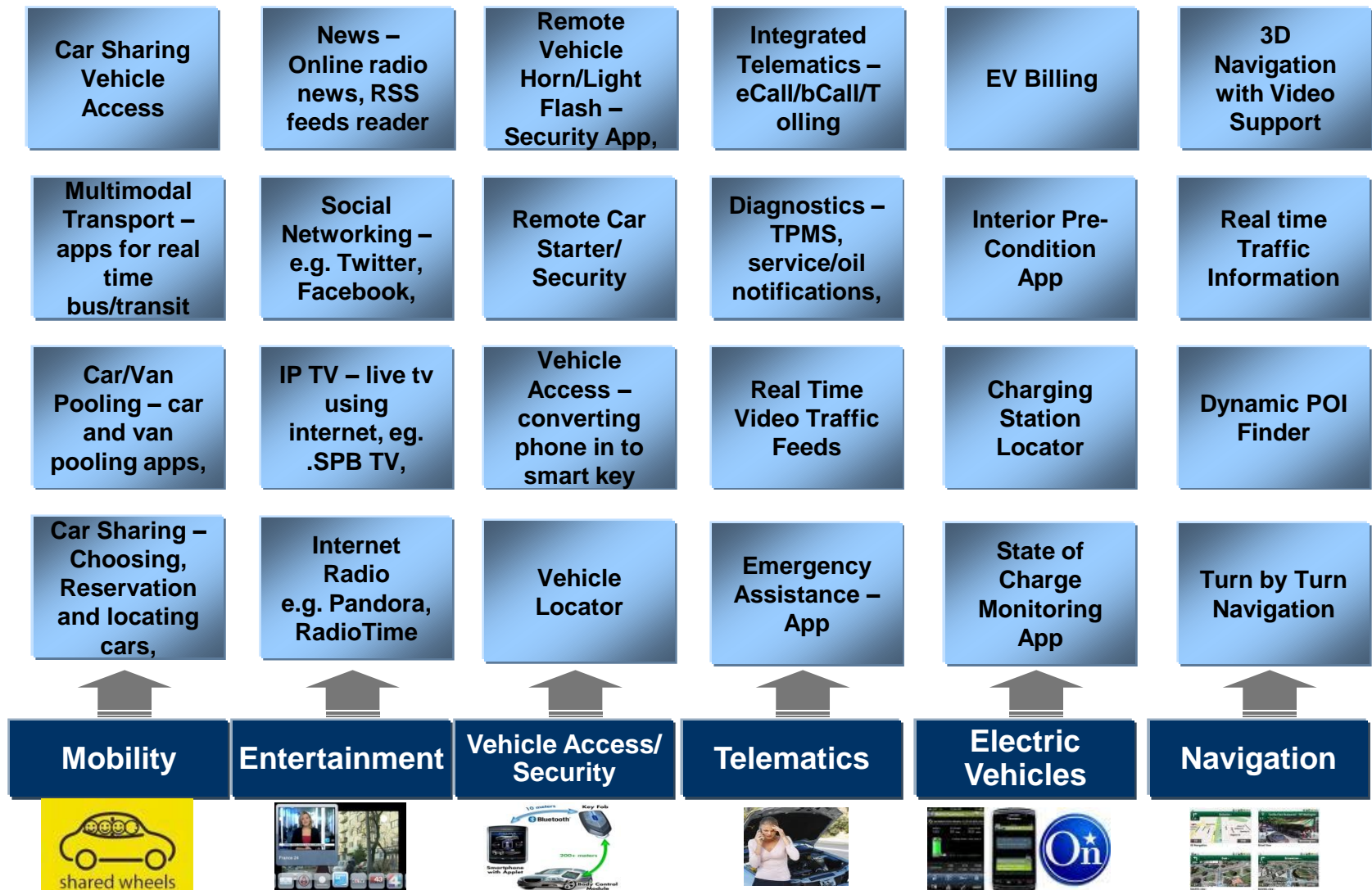


- Supporting utility is the key backbone of this infrastructure
- Grid management, load leveling/shedding support are key

- Billing is another key feature from this infrastructure
- Authenticate with security proper information for billing



# Automotive Apps: From Car Sharing to Diagnostics to EV's, Apps for Cars are becoming a Value Added Development



# Case Study - London



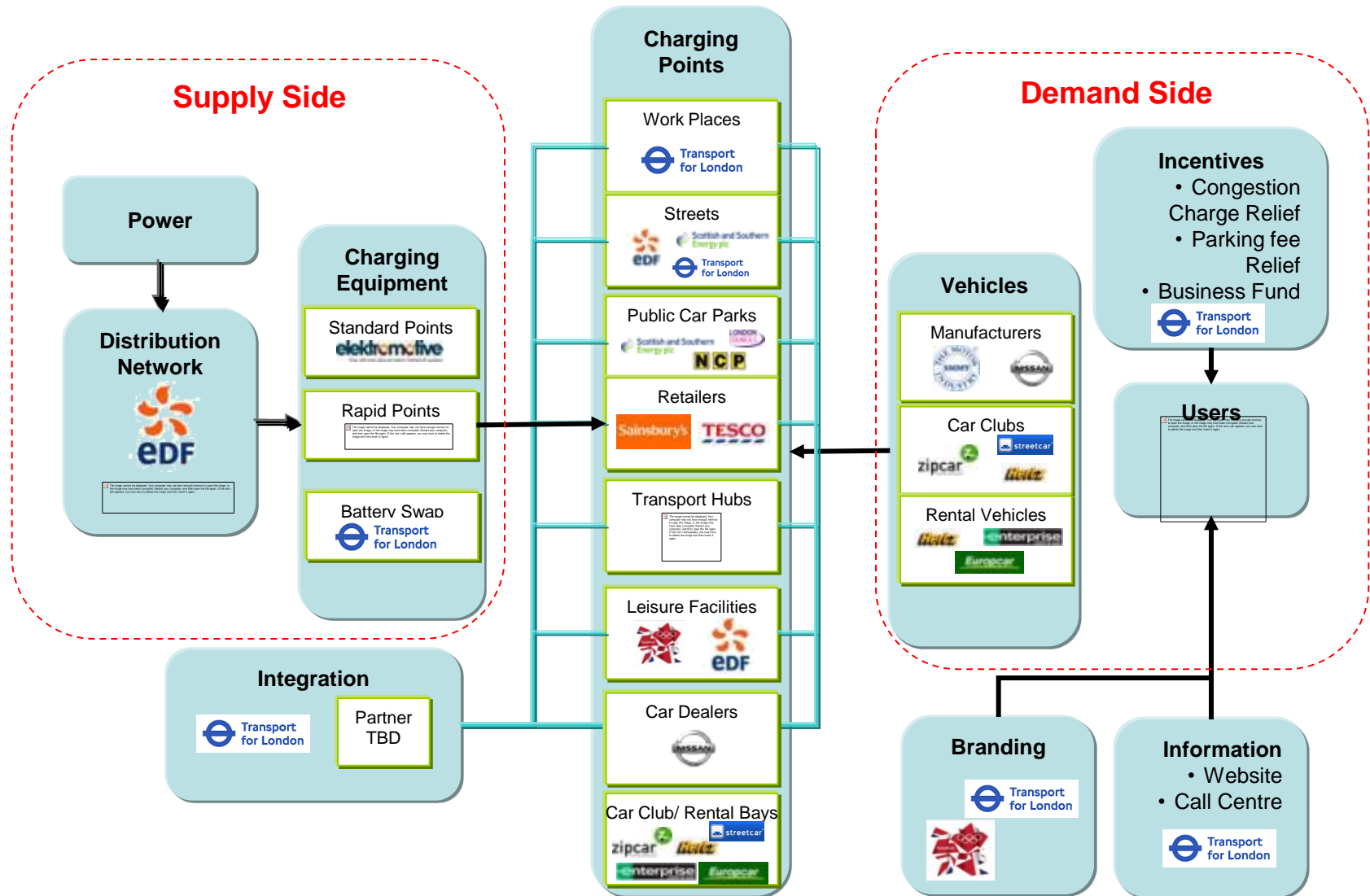
# Role of Non-Ministerial Organizations supporting E-Mobility in UK / London

<b>TFL</b>	<b>1</b>	Transport for London (TfL) is the local government body responsible for most aspects of the transport system in Greater London in England. Its role is to implement the transport strategy and to manage transport services across London
<b>OLEV</b>	<b>2</b>	The Office for Low Emission Vehicles (OLEV), a cross Whitehall team is dedicated to taking forward this ambitious program. Through OLEV, working with UK industry and the regions, key aim is to position the UK as a world leader in the development, demonstration, manufacture and use of ultra-low carbon automotive technology.
<b>Cenex</b>	<b>3</b>	Cenex is a delivery agency established with support from the Department for Business, Innovation and Skills to promote UK market development and competitiveness in low carbon and fuel cell technologies for transport applications.
<b>TSB</b>	<b>4</b>	Their role is to stimulate technology-enabled innovation in the areas which offer the greatest scope for boosting UK growth and productivity. Promotes , support and invest in technology research, development and commercialization. Spread knowledge, bringing people together to solve problems or make new advances.

Sources: 1) [tfl.gov.uk](http://tfl.gov.uk): 2) [dft.gov.uk](http://dft.gov.uk): 3) [cenex.co.uk](http://cenex.co.uk) 4) [inovateuk.org](http://inovateuk.org)



# Representative Eco-System for Electric Vehicle Infrastructure in the city of London (UK)



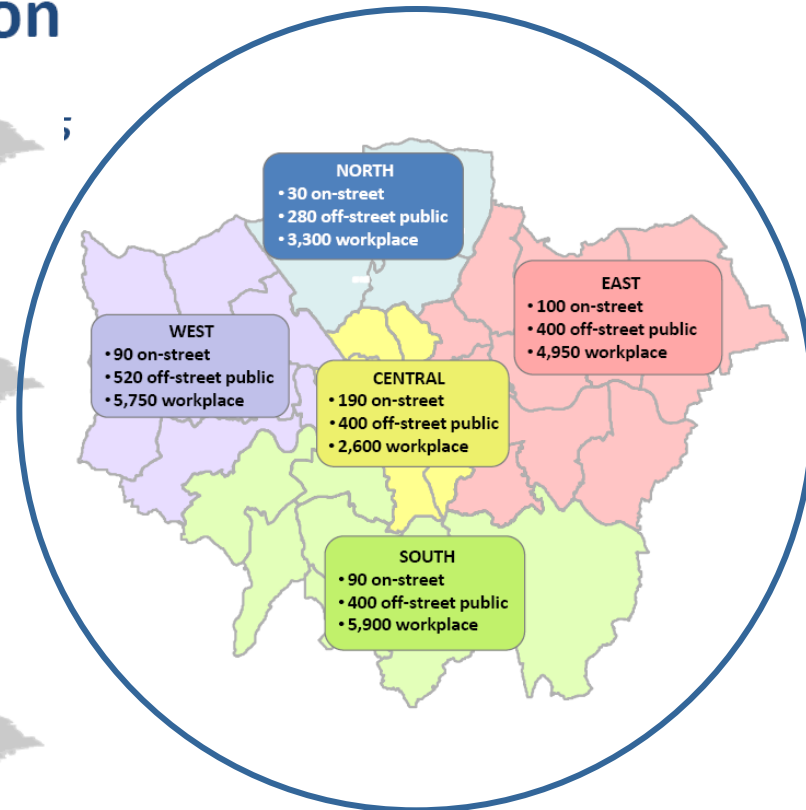
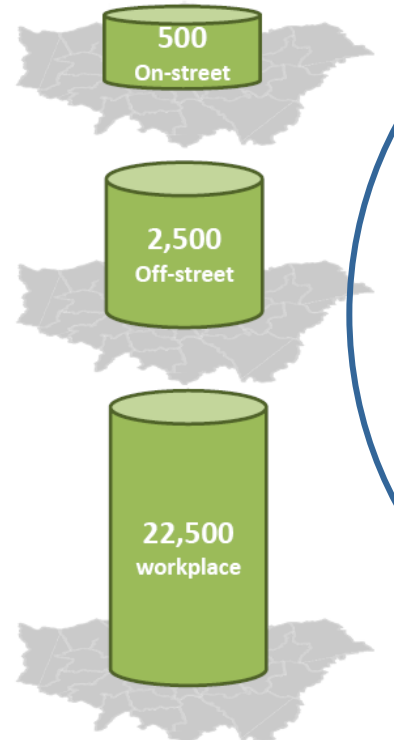
# Of the announced 25,000 charging stations in London – significant proportion of this is to be integrated in workplaces across West and South regions

## Planning EV infrastructure distribution

- 49 key town centres
- Potential EV households, poor off-street parking
- Potential EV workplaces, poor off-street parking

- Train and Tube station car park locations
- Public car park locations
- Retail car park locations
- EV “destination factor”

- Locations of workplace parking spaces
- Locations of largest employers
- EV “destination factor”



Sources: Mayors Office

## Growth Opportunities in Smart Mobility Business Models, Infrastructure and Electric Vehicles– 15<sup>TH</sup> and 16<sup>TH</sup> June in House of Parliament

Unique thought leadership platform where Parliamentarians and Corporate come together to debate transport of the future

Speakers include:

- Senior Parliamentarians and MPs
- **Dr. Bernhard Blätzel**  
Director Project Mobility Services, BMW AG, Munich
- **Robert Henrich**  
CEO, car2go (Subsidiary of Daimler)
- **Andrew Everett**  
Head of Transport  
Technology Strategy Board
- **Isabel Dedring**, Mayor of London's  
Environment Adviser
- **Michael Hurwitz**, Director, Office for Low  
Emission Vehicles (OLEV)
- **Christian Schlosser**, Ph.D., UN-Habitat  
Chief, Urban Transport Section
- Others include Sixt, Zipcar, Eaton, IBM and many others

**FROST & SULLIVAN**

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15 - 16 June 2011 | London, United Kingdom

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 <p><b>Ayoul Grouvel</b> Head of Electric Vehicles PSA Peugeot Citroen</p> <p><a href="#">Read More</a></p>	 <p><b>Robert Henrich</b> CEO car2go (Subsidiary of Daimler)</p> <p><a href="#">Read More</a></p>	 <p><b>Dr. Bernhard Blätzel</b> Director Project Mobility Services BMW AG, Munich</p> <p><a href="#">Read More</a></p>
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[click here for other speakers](#)

# Discussions



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