

Global Opportunities for SMEs in Electric Mobility

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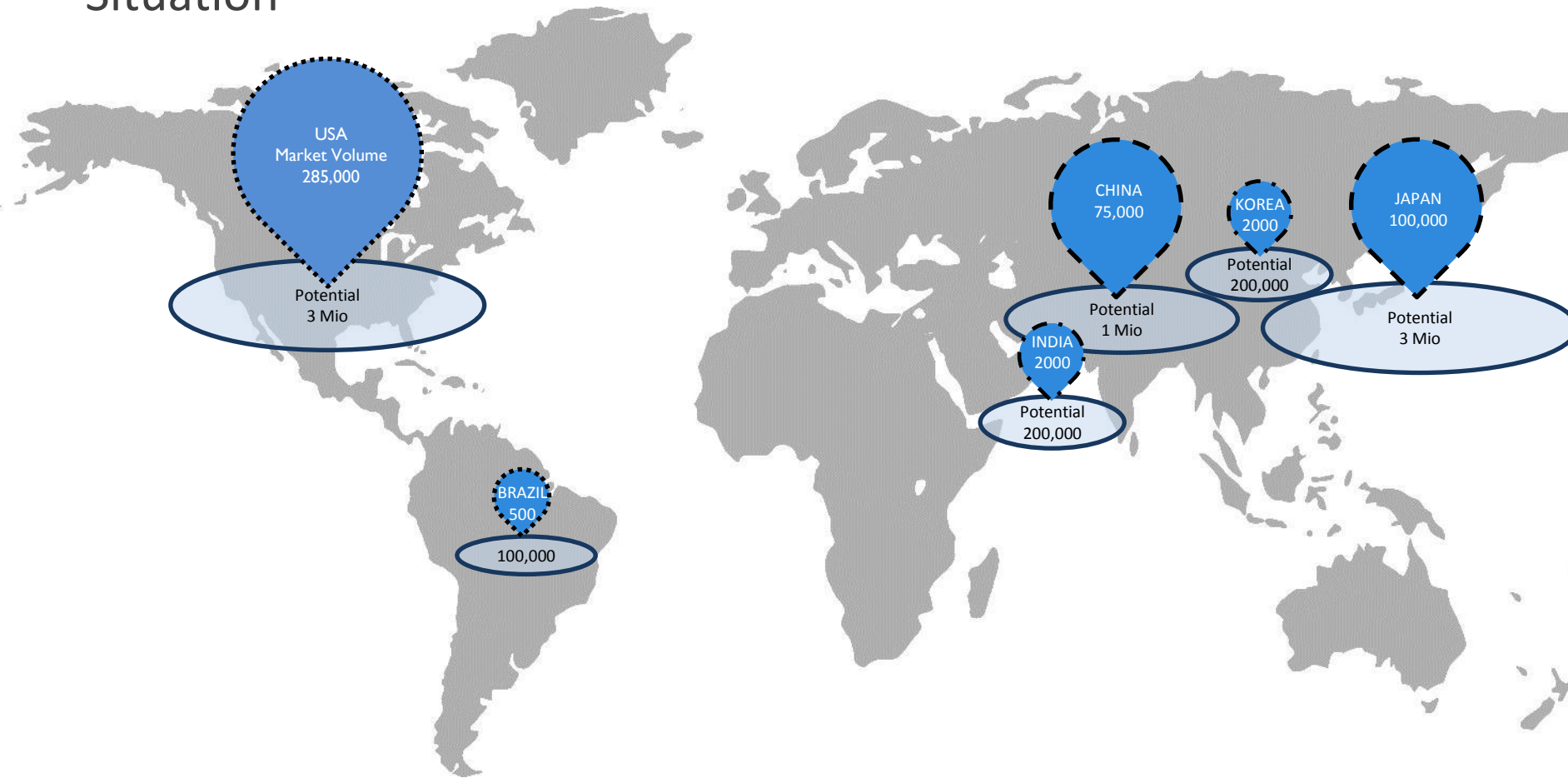
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Global EV Market

Situation



Market Volume
(2015)

Market Potential
(by governmental targets for 2020)

Entry Barriers (2014)
(low – medium – high)

Analysis of Global EV Supply Chains

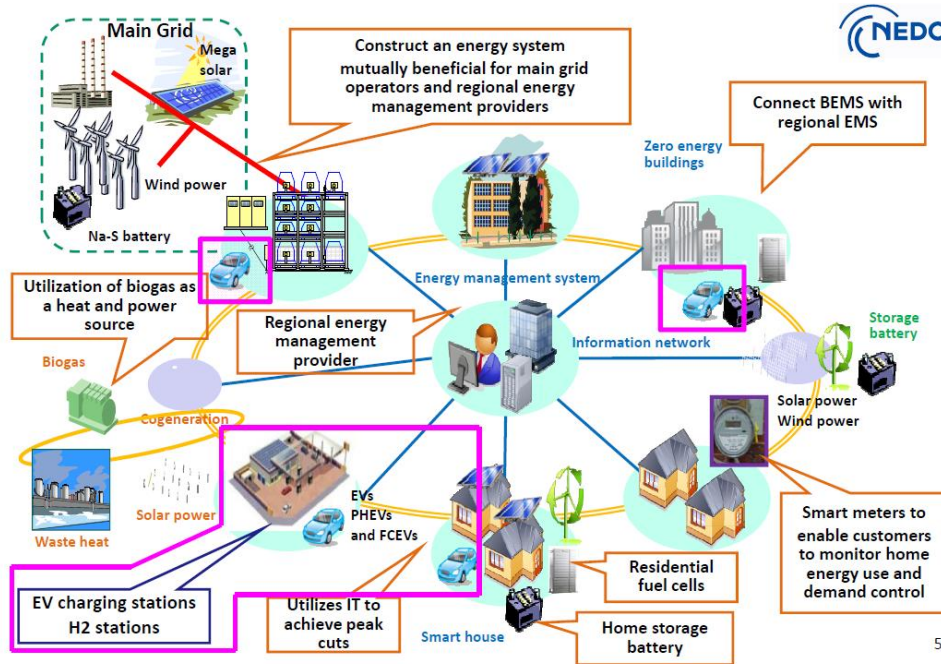


Investigation of

- Situation and framework conditions:
 - Government policies and plans, incentives, funding programmes and other initiatives
 - Market situation and specifics on customers
 - Distribution of infrastructure and initiatives to further implementation
 - Competing transport means and fuels (car sharing, public transport, fuel cell and gas vehicles)
- Trends
- Mapping of supply chains, analysis of dynamics within Porter's 5 Forces and SWOT
- Attractiveness of supply chain, qualifying and competing factors, Entry points for European SMEs

Electric Mobility in Japan

Trends – Smart Community

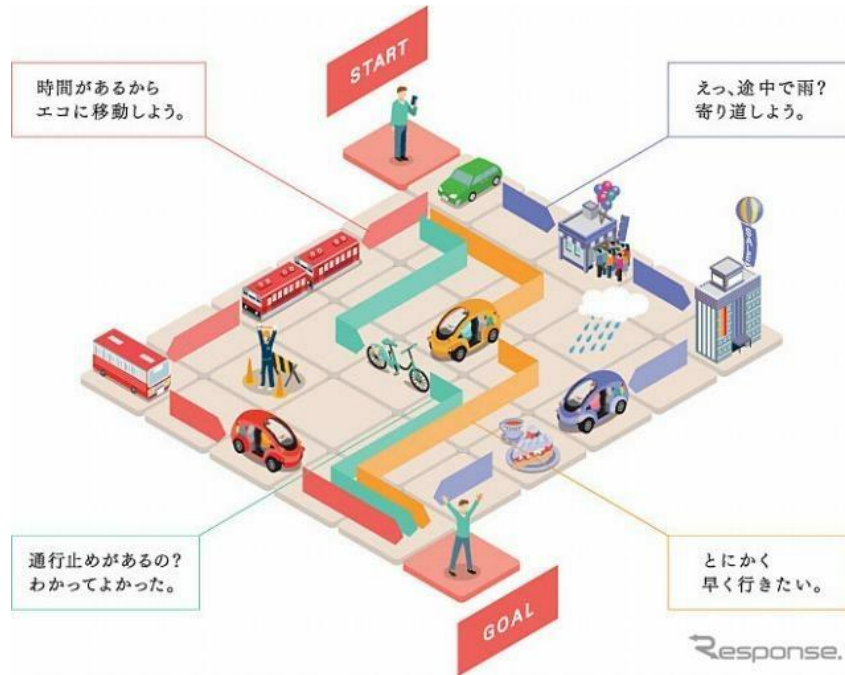


Smart Community Concept (Source: NEDO 2011)

- Use of EV batteries as emergency power supply
- Energy storage of locally produced electricity from renewable sources
- Supply and demand energy management by controlled charging and discharging of EV batteries in the smart grid

Electric Mobility in Japan

Trends – Intelligent Mobility



Toyota Coms



Hitachi Ropits

Ha:mo Concept (Source: Toyota 2013)

- Network solutions combining private car and public transportation efficiently and using micro EVs for last mile
- Autonomous, mobility supporting robots
- Synergies of electrification, connectivity, and automation also enabled by well-developed ITS infrastructure

Electric Mobility in Japan



Market Attractivity

- Japan is pioneer: EV market highly developed and innovative
- Highly efficient industry, disciplined employees, high quality standards, advanced infrastructure
- Re-organisation of traditional *keiretsu* system provides opportunities for new entrants in Japanese supplier networks in fields where know-how and expertise are complementary

Barriers

- *keiretsu* are rather closed structure and hard to access from outside
- Japanese companies expect high quality and extensive product services (product-life-time service including re-engineering, after sales service and high-quality packaging) that often requires a representation office close to customers
- Cultural and language barriers
- Can be overcome easier today by entering the Japanese supply chain through cooperations in India, China or Europe

Electric Mobility in Korea

Trends – Micro EVs

and electric fleets for big cities



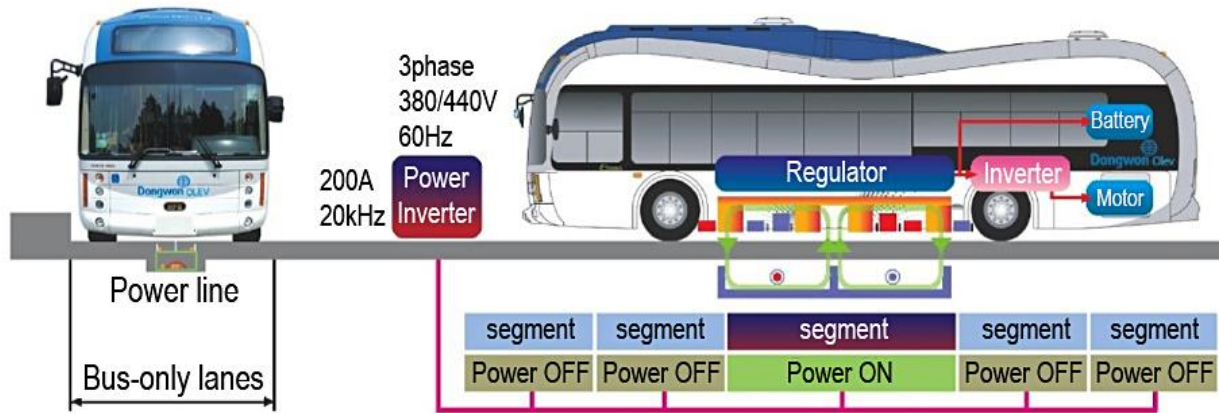
Armadillo foldable car (Source: KAIST 2013)

- All-electric car with two seats and four in-wheel motors, weight 450kg, range 100km
- Takes only 1/3 of a regular parking spot when folded

Electric Mobility in Korea



Trends – Inductive en route charging



Online Electric Vehicle (OLEV) (Source: KAIST 2013)

- Wireless electro-magnetic transmission to power electric vehicles (cars, buses, vans, etc.) in motion
- First OLEV in Seoul Zoo, 2009
- World's first commercial application of OLEV for 24km bus line in the City of Gumi since 2013
- Further applications planned in other cities, also international

Electric Mobility in Korea



Market Attractivity

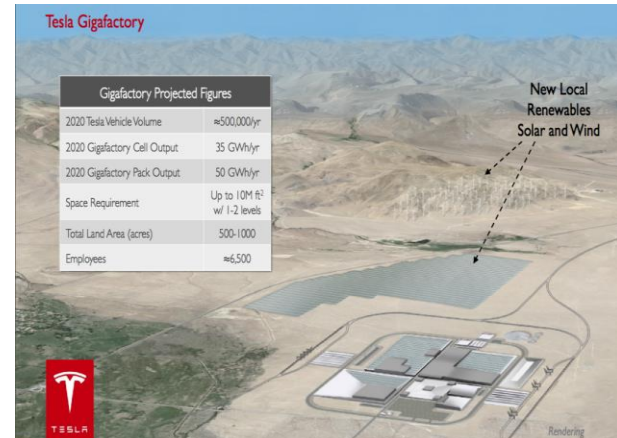
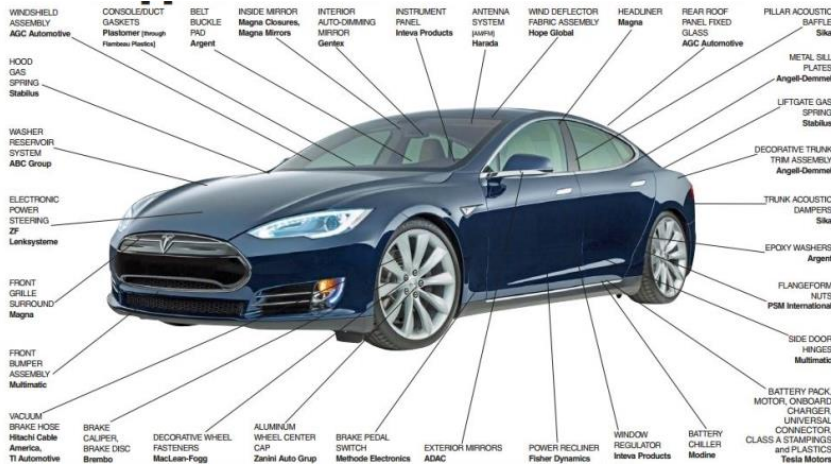
- Korea is an attractive manufacturing country: high-quality output, low production costs
- Good business opportunities in engine- and infrastructure-related businesses, charging technologies and standardization, new EV business models
- Government promotes SME growth and Korean-European technological cooperation

Barriers

- Currently low demand of EVs, users are still hesitant to purchase EVs
- SMEs have to overcome barriers to come into existing chaebols eg. by partnerships with suppliers of the chaebol or by showing prestigious references
- Highly competitive market

Electric Mobility in US

Trends – Tesla Motor Story



Tesla Model S suppliers and sketch of Tesla Battery Gigafactory in Nevada (Source: Tesla 2014)

- Tesla Model S is the first electric sedan with range up to 300km, using 1,000kg Li-ion consumer cell batteries.
- In June 2014, Tesla Motors announced its intention to share all patents to spur electric car development.
- Mass manufacturing of batteries in gigafactory to equip 500,000 Tesla cars: construction start in 2014.

Electric Mobility in USA

Trends – On-route charging for EVs



I-710 Corridor Project , Long Beach Freeway, California

- Zero emission trucks using catenary pantograph system developed by Siemens.
- Improvement of air quality and public health, safety, and the design of the highway with the horizon year 2035.

Electric Mobility in USA



Market Attractivity

- Excellent framework conditions: political and economical stability, low entrance barriers, consumers are open towards e-mobility
- New market opportunities in different sectors: vehicles, batteries, charging infrastructure, mobility services, etc.
- Strong government support for vehicle automation and technologies promoting synergies of automation and electrification

Barriers

- High competition in automotive supply chain
- Domestic suppliers benefit from their connections and business network and economies of scale
- Complex legal framework and region-dependent differences can cause difficulties

Electric Mobility in China

Trends – *Electric buses & standardization of charging infrastructure*

Pioneer in manufacturing and export of electric buses.



Standardization issued by central government in the future:
elimination of numerous local standards for charging and billing
(isolated applications)

Electric Mobility in China



Market Attractivity

- Steadily growing Chinese car market has huge potential: High sales rates and growing potential for EVs
- China lags behind in key technologies: Business opportunities for SMEs especially in design and development of control units and electronics, „intranet of cars“
- Cost advantages of up to 25% compared to other countries, due to good access to natural resources and lower labor costs.

Barriers

- Chinese companies favor Joint Ventures with bigger foreign companies: more difficult for SMEs, easier access for big multi-national players
- Government seeks to establish Chinese brands and a strong NEV market with domestic manufacturers
- Weak IP-protection: risk of losing technological know-how to Chinese partners

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