

**MARKET TRANSFORMATION OF LOW
CARBON TECHNOLOGY: ELECTRIC VEHICLES**
EXECUTIVE SUMMARY

ELECTRIC
VEHICLES
EVERYWHERE
BY 2020

REV₂₀OLUTION

CHINA, MAY 2010

MARKET TRANSFORMATION OF LOW CARBON TECHNOLOGY: ELECTRIC VEHICLES

EXECUTIVE SUMMARY

Low carbon technologies are an important means of controlling the global effects of climate change. The electric vehicle (EV) is a key developing technology which is proving to be both a challenge and a great national and global economic and environmental opportunity.

“Electric vehicles are driving economic growth and providing a radical solution for the energy needs of transportation,” said Wan Gang, China’s Minister of Science and Technology in November last year.

With the nation undergoing significant changes in its economy and society, more and more people can afford to buy cars. The Chinese government has made a real commitment to encourage the development of EVs to meet this growing demand for mass transport. The Chinese government has set a national target to reduce carbon intensity by 40-45% by 2020. The development of EVs could be one means of achieving this target.

“The Chinese government will actively promote EV development, by providing more funding and favourable policy to EV related infrastructure construction and investment,” added Wan Gang.

As a result, EV technology in China is now facing a golden opportunity to develop into a mainstream means of transport.

This report is based on in-depth research of the current developments of EVs in China. In this report we identify the barriers to short-term development as well as the efforts needed from both the government and industry to ensure that EVs are a viable alternative to cars for a mass market.

REDUCING CARBON EMISSIONS

Developing EVs will assist China’s energy conservation. The energy efficiency of EVs is 46% higher than internal combustion engines (ICEs). They also have the potential to reduce carbon dioxide emissions by 13-68% compared to ICEs. With the help of the advanced V2G (vehicle-to-grid) technology, deployment of electric vehicles can directly decrease the emission of carbon dioxide and other pollutants within a vehicle’s lifecycle, which will significantly relieve air pollution in cities. Through peak-shaving (sending power back to the grid when demand is high), EVs can also indirectly reduce carbon dioxide emissions.

IMPROVING ENERGY SECURITY AND THE ECONOMY

Developing EVs will help improve China’s energy security and reduce China’s reliance on import of oil. In 2009, 52% of China’s oil was imported.

Provided that the automotive market in China will continue to grow, the huge demand for gasoline will add further pressure to China’s energy security. The diverse energy sources of EVs will be one solution to this need for more power.

In addition, the development of EVs will financially benefit associated industries such as companies that produce and supply batteries, electric motors, electric controls, automotive parts and infrastructure.

THE CHINESE GOVERNMENT’S STRATEGY

China has established a policy framework to accelerate technology development and market transformation of EVs. The federal government has set the strategy to develop new energy vehicles and it has devised policies to support research and development, regulate the industry and encourage consumption.

Some local governments have already started to carry out these policies.

The Chinese government aims for 5% of total car sales to be for new energy cars by 2011. This will be more than 600,000 vehicles (total sales of cars in China last year: 13 million). The government has announced that they will spend twenty billion Yuan for the promotion, manufacture and sale of new energy cars, focusing on EVs.

To help achieve these goals, the government has devised the Ten Cities, One Thousand Vehicles plan which is set to demonstrate the operation of 1,000 new EVs in ten cities each year to encourage people to buy them.

⚡️ ELECTRIC VEHICLES ARE DRIVING A RADICAL SOLUTION FOR THE ENERGY

WAN GANG, CHINA’S MINISTER OF SC

CHALLENGES FOR EV ADOPTION IN CHINA

Generally speaking, although EV development has been rapidly progressing in China, the likelihood of a mass market for this technology remains a challenge.

To better accelerate EV's market transformation, government and industry will have four major challenges:

1 The type of EV. Currently there are three likely, means of development of EVs: battery EV, hybrid EV, or to develop various technologies at the same time. Bottlenecks in technology and industrialization need to be addressed.

2 Design, R and D and manufacture: China is still behind many developed countries in three major aspects: design and research and development, manufacturing of key components and the assembly of vehicles.

Key technologies such as batteries, electric motors and motor controllers are unlikely to meet commercial standards in the near future. Specifically, manufacturing techniques of lithium-ion batteries, including material, battery design, and process control and battery management systems (BMS), are still undeveloped compared with some leading countries. The key performance indicators of batteries, such as energy intensity, longevity, consistency and safety, can still be further improved.

3 Infrastructure construction: China has yet to start large-scale infrastructure construction, although grid and energy companies have released their plans of establishing EV station networks. Various issues such as large initial investment, limited profitability and long return period have all deterred major stakeholders from investing in infrastructure. The lack of standardization of sockets and batteries are also significant barriers.

4 EVs compared to ICEs, are still far too expensive to attract enough customers. Currently, hybrid EVs are still more expensive than equivalent Internal Combustion Engines (ICEs), while battery EVs can be two or three times more expensive than traditional vehicles. In the future, a larger production scale can significantly lower the cost of EVs. Many countries have subsidized the public sector for purchase of EVs, in order to speed up market transformation. However, China has yet to implement a well-designed national subsidy plan for private EV buyers.



THE CHINESE GOVERNMENT WILL ACTIVELY PROMOTE EV DEVELOPMENT

PUBLIC-PRIVATE PARTNERSHIP

EV technology is still in its early development stage in China. A government-led, public-private partnership (PPP) model will assist the development of EVs.

Recommendations for the federal government:

- Collaborate with stakeholders to develop a roadmap for R & D
- Set up a cross-department system at national level to guide and support development of EV
- Further invest in R&D, support and coordinate innovation, train and support EV professionals, and promote international cooperation in the EV industry
- Establish and implement policies to accelerate infrastructure development and ensure that people can afford to buy EVs

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**ECONOMIC GROWTH AND PROVIDING
ENERGY NEEDS OF TRANSPORTATION. **??**
SCIENCE AND TECHNOLOGY**

ROLE OF LOCAL GOVERNMENTS

In general, the following measures will help local EV market transformation:

- Develop a local plan to promote EVs to individuals and corporate consumers
- Set up appropriate institutional arrangements and actively implement demonstration programs
- Potentially cooperate with infrastructure operators to accelerate development
- Provide additional local incentives to early users of EVs

MOVING TOWARDS EV PRODUCTION

Manufacturing companies in China should collaborate with local and global manufacturers to improve technology and develop EVs for a mass market. Public Private Partnerships will assist EV trials, infrastructure planning, research and development and the provision of EVs as a real alternative to the current means of transport for both public and private use.

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