Comparative Study on Electric Vehicle Policies between Korea and EU countries

Sang-kyu Hwang
Senior Research Fellow, Korea Transport Institute (KOTI), South Korea, skhwang@koti.re.kr

Abstract

To reduce GHS significantly, Korean government announced ambitious EV deployment plan in 2010. According to that plan, one millions of EVs would be provided by 2020. However, the target of EV deployment did not achieved even though strong political support. As a result, our government modified the initial plan by reducing the target number of EVs from 1,000,000 to 200,000. Many EV experts thought such a result arose from wrong policy framework and implementation process. The purpose of paper is to find relevant policy direction in Korea by comparing the policy formulation and implementation process between EU countries and Korea. Concerning the policy formulation, we examined the legislation and planning process to know what to prepare EV policy framework. And for the policy implementing process, we analyzed various incentive measures how to stimulate the deployment of EV. With comparative research results, we drew EV policy implications.

Keywords: EV, Policy framework, Subsidy, Tax incentives, Korea, Germany, France, Netherlands, Norway
1. Introduction

Most countries met the challenges against reduction of Green House Gas for sustainable development. South Korea is also one of country faced to similar situation. More than 20% of fossil energy had been used in transport sector and their increasing rate of energy consumption did not changed in Korea as national economy grew quickly since 1980. To reduce GHS significantly, Korean government announced ambitious EV deployment plan in 2010. According to that plan, one millions of EVs would be provided by 2020. However, the target of EV deployment did not achieved even though strong political support. Until now, almost 2,500 EV has deployed in Korea. As a result, our government modified the initial plan by reducing the target number of EVs from 1,000,000 to 200,000. Many EV experts thought that this result arose from irrelevant policy framework and their implementation process.

The purpose of paper is to find relevant policy direction in Korea by comparing the policy formulation and implementation process between EU countries and Korea. To do that, we selected three EU countries including France, Germany, Netherlands and Norway. Concerning the policy formulation, we examined the legislation and planning process to know what to prepare EV policy framework. And for the policy implementing process, we analyzed various incentive measures how to stimulate the deployment of EV. With comparative research results, we drew EV policy implications.

2. Electric Vehicle Policy Framework in Korea

2.1 Brief reviews on the situation of EV deployment

Since 2005, Korea has been pursuing green car policy and running various pilot projects to deploy them. In 2010, the green car road map was released for reducing GHG. According that plan, 1 million BEVs should be provided by 2020. And to achieve this goal, Korea government enacted two acts for EV R&D and deployment and also organized the implementing structures in central governmental level.

In addition, many local governments have participated EV pilot projects. Especially, Seoul and Jeju has concentrated on EV policy deployment to reduce externalities caused by transport sector by replacing ICE car with EVs in buses and taxis. In Jeju, new governor Island announced recently that almost ICE cars would be replaced with EVs running by wind power energy by 2030.

However, even though such a strong support by central or local governments, EVs were not deployed enough as we expected before. And the economic incentive, which was important incentive to deploy EV, would be reduced soon by financial limits. As a result, EV policy in Korea may be in amidst inflection point.
2.2 Major characteristics of EV policy framework in Korea

In this section, we introduce the characteristic of EV policy framework in Korea. As we mentioned before, one of major reasons why EVs were not sold in the market, would be caused mainly by irrelevant policy framework. In these contexts, we reviewed the legislation, organization and implementing measure for stimulating EV deployment, respectively.

2.2.1 Legislations for EV deployment


The purpose of the Act (2004) on the Development and Deployment of Environment-Friendly Automobiles is to encourage the consistent development of the automobile industry. This Act was passed in 2004, and partially revised at 2008 and 2012. This Act can be characterized as the original law that stipulates the development and distribution of environment-friendly motor vehicles for the promotion of an environment-friendly vehicle industry. Also it served as the legal foundation for the distribution of environment-friendly motor vehicles.

Compared to the act(2004) mentioned before, Framework Act on Low Carbon-Green Growth enacted in 2010 aimed to promote the development of the national economy by laying down the foundation necessary for low carbon green growth, so as to pursue the harmonized development of the economy and environment. This act (2010) can be characterized as the first law integrating national and local strategy for greenhouse gas reduction and green growth.
2.2.2 Implementing organizations and their roles setting

In order to implement the EV policy, the Act instituted the roles setting among three ministries such as the Ministry of Industry and Energy, the Ministry of Environment, the Ministry of Land and Transportation. And the Presidential Committee on Green Growth has played key roles to coordinate controversial problems raised by three ministries.

- Ministry of Industry and Energy: EV development and research

The Ministry of Industry and Energy shall be responsible for the technology development and the construction of the energy-charging infrastructure for environment-friendly motor vehicles. For this purpose, the Ministry shall establish the development plans and charging equipment distribution plan for environment-friendly motor vehicles. Its major tasks include the economic measures for the promotion and distribution of electric vehicles, the establishment of the development policy for green car core source
technology and core part local production technology, the establishment of the charging station and smart grid, the safety certificate of electric vehicles and charging equipment, and the establishment of the standardized charging equipment policy and so forth.

- **Ministry of Environment: EV deployment**

The Ministry of Environment shall be responsible for the distribution of environment-friendly motor vehicles. For this purpose, it shall lead the pioneering business for the substantive distribution of environment-friendly motor vehicles. Its major tasks include the setting of the electric vehicle distribution goal, subsidy support, the expansion of the distribution of electric vehicle charging equipment, the execution of the electric vehicle leading city business, green car mandatory purchase and sale ratio adjustment, and the establishment of environment-related regulations.

- **Ministry of Land and Transportation: EV safety related standards and regulations**

The Ministry of Land and Transportation shall establish the safety standards for automobiles, focusing on electric vehicles, and suggest the improvement directions for the parking lots necessary for the construction of the charging infrastructure. In Jan 2009, the Ministry of Land, Infrastructure and Transportation revised the Guidelines on Vehicle Safety, thereby establishing the safety standard on electric vehicles, such as electric revival brake device, high-power device, and driving shaft battery.

- **Presidential Committee on Green Growth: Control tower of EV policy**

The Presidential Committee on Green Growth was established under the direct control of President in order to execute "low carbon, green growth," which was presented as the national vision in 2008, as the national task. It also have control role to harmonize controversial issues among ministries. In particular, a major conflict arose between the Ministry of Environment and the Ministry of Industry and Energy.

The Ministry of Environment insisted that more support should be given to electric vehicles than vehicles that run on other fuels to reduce the greenhouse gases through introducing electric vehicles. But the Ministry of Trade, Industry and Energy argued that there should be balanced support for conventional and green cars. An adjustment function was given to the Presidential Committee on Green Growth to redress such conflicts.

![Figure 3: Controversial issues among ministries in Korea](image)

The image represents the flowchart of the controversial issues among ministries in Korea.
2.2.3 EV deployment Plan

Korean government presented its vision of becoming one of the world’s top-four green car technology players by releasing its green car deployment plan in Dec. 2010. In line with the technology development and mass production, 1 million electric vehicles (EV), 405 thousand hybrid vehicles (HEV), and 1.8 million clean diesel (CD) vehicles shall be distributed respectively by 2020.

The Ministry of Environment intensively supported the deployment of electric vehicles by selecting 10 electric car test cities. And central and local governments gave EV purchase subsidy to minimize the price gap between EV and ICE car. As a result, as of the end of 2013, the use of EVs was very prevalent in Jeju Island while the nation had 1,647 EVs in operation.

![Comparison of EV Subsidy](image1)

![Budget & EVs supply Changes](image2)

Figure 4: EV Subsidy and EVs deployment in Korea

3. Comparison of EV policy framework in formulation and implementation

In this section, we compare the EV policy framework between EU countries and Korea in terms of policy formulation and implementing process. To do that, we selected three EU countries such as France, Germany and Norway. Concerning policy formulation, we have examined the legislation and planning process to understand EV policy framework. And for policy implementing process, we analyzed various incentive measures for deployment of EV.

3.1 France

In France, a national plan for EV development was released that two million vehicles would be deployed by 2020 and 4.5 million by 2025. An updated version was released in April 2010. To guarantee EV demand for the biggest French car manufacturers, a purchase group of 20 industry partners was formed constituting a demand of 50,000 vehicles over 5 years.

In order to insure the supply of appropriate recharging infrastructure, legislation has been introduced stipulating that all parking units of newly constructed buildings are to be equipped with an electricity outlet.
And numerous EV demonstration and test projects have been launched. They test infrastructure and vehicle technologies as well as customer behavior and business models.

EVs benefit from the highest bonus in an emission based fee and rebate (bonus/malus) system. Until July 2012, this bonus amounted to EUR 5,000 per vehicle (or maximum 20% of the purchase price). Since August 2012, the bonus amounts to EUR 7,000 (MRP, 2012).

3.2 Germany

In August 2009, a National Development Plan for Electric Mobility (NEPE) was adopted. It lays down the goal of deploying 1 million EVs by 2020 (German Federal Government, 2009). In May 2010, a national platform for electro mobility (NPE) was established. Its goal was to deliver concrete proposals that help achieve the targets set out in the NEPE. The federal government released a national government program (German Federal Government, 2011) based on the NPE’s second interim report in May 2011 (NPE, 2011). It defines solid measures to support R&D activities, EV-system development, educational programs, standardization procedures, and the development of infrastructure and electricity generation.

In April 2012, four showcase electric mobility regions were announced. All EVs registered before the end of 2015 are eligible for tax exemptions for a period of 10 years. Also, the taxation regime of fleet vehicles will be adapted to favor EVs (German Federal Government, 2011).
3.3 The Netherlands

In 2009, the Dutch Ministry of Transport proposed an action plan to support EV uptake (2009). Three main actions, altogether worth EUR 65 million, were defined in the action plan.

First is to establish a Formula E - Team that comprises individuals from industries that are essential to deploy EVs. By using a collaborative approach with all parties, the necessary interplay for a successful introduction of EVs is guaranteed.

Second is to define the Program of measures 2009 - 2011 to turn the Netherlands into a testing center for e-mobility by developing EV test areas and model regions, making public authorities “launching EV customers”, creating EV-necessary recharge infrastructure, supporting research and development adequately, establishing purchasing consortia, and defining fiscal measures such as purchase or vehicle tax exemptions. Third is to coordinated and phased development of an EV market to insure that the right actions are taken at the right time, while retaining highest possible level of flexibility.

A supporting policy package is put in place that ranges from measures supporting communication and international collaboration, and measures supporting research activities, to the definition of lead customers (the government), and safety standards. The following fiscal measures are put in place (IEA, 2011b): - exemption from additional purchase tax on new passenger cars and motorcycles until 2018; - exemption from road tax until 2018; - exemption from income tax surcharge for leased cars until 2014; - fiscal grants for companies that invest in EVs for commercial transport; - fiscal grants for companies that invest in charging stations.
3.4 Norway

An action plan for the electrification of road transport that was commissioned by the Ministry of Transport and Communication in 2009 set out the goal of attaining 200,000 EVs on Norwegian roads by 2020 (approximately 10% of the current car fleet).

In 2011, Norway attained the worldwide highest EV share of newly sold vehicles with 1.6%, or 2,038 vehicles (ahead of Denmark at 0.21%; Austria, 0.18%; and the Netherlands, 0.16%; Norbech, 2012).

Norway’s EV success is certainly due to comparatively strong and comprehensive fiscal and non-fiscal purchase incentives that have both been stipulated on a national level: EVs have access to bus lanes, benefit from free public parking, and are exempt from 25% VAT, registration taxes, and road and ferry tolling (Solvi and Norbech, 2011). These measures have been secured until the next government election in 2018, or when the country has 50,000 EVs on its roads (The Green Car, 2012).
4. Policy implications from comparisons of policy framework

Basically, governing structures for model countries are similar in a way that central or federal government engaged as a decision maker. For planning, they formed a designated public organization that coordinates activities among central and local governments, privates in EV related industries, other related public organizations, and research and development institutes. In collaboration with involved organizations, implementation plans were formed for each country and local governments taking the roles to executing the plans.

Table 2: Summary of EV policy framework in EU countries and Korea

<table>
<thead>
<tr>
<th>Countries</th>
<th>EV Plan</th>
<th>Target by 2020 and No. of EVs in 2014</th>
<th>Key Implementing Org. and Incentives measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>National EV Plan(2009. Oct)</td>
<td>2 millions EVs</td>
<td>OEM oriented Bonus-Malus</td>
</tr>
<tr>
<td>Germany</td>
<td>NEPE(2009. Aug)</td>
<td>1 million EVs</td>
<td>NPE</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Action Plan(2009)</td>
<td>200,000 EVs</td>
<td>Formular-E Tax reduction</td>
</tr>
<tr>
<td>Norway</td>
<td>Action Plan(2009)</td>
<td>200,000 EVs</td>
<td>Local government oriented Various Tax reduction</td>
</tr>
<tr>
<td>Korea</td>
<td>Green Car Plan(2010. Oct)</td>
<td>1 million EVs</td>
<td>PCGG High Subsidy for purchase</td>
</tr>
</tbody>
</table>

As explained above, Germany and France have OEM and they are taking their role in developing EVs and creating new EV business models. In France, EV OEMs are collaborating with governments to deploy EV car-sharing business and it became an iconic business model for EV deployment that most other countries
are considering it as a benchmark. In Germany, OEMs are seriously involved in a grand pilot project for improving EV technologies by reflecting EV user’s needs through behavioral researches.

Even though Netherlands and Norway do not have OEMs now, they do out perform in deploying EVs. One of their major strategies for deploying EVs is providing higher incentives for EV purchasers including monetary subsidies and tax exemptions. Also, they provide a lot of exemption for EV users from roads and vehicle regulations including permission for EVs to run on Bus Exclusive Lanes in Norway, free parking while recharging batteries, exemption on toll fees, etc.

![Figure 8: CO2 emissions in transport sector and EV deployment level (EV/ICEs)](image)

The governing framework in Korea seem similar to those of model countries as central government taking the role of decision maker and local government taking the role of executer of policy measures. Furthermore, Green Growth Committee under the prime minister’s office is taking the role as the coordinator as well. However, their roles as a coordinator do not seem strong enough to leverage positive effects from the collaboration. Korea has owned automobile companies that developing EVs. However, compared to other manufactures in other countries, their EV related activities seem relatively passive. EV manufactures must create new business models and give more options to choose various EVs for the consumers.

Furthermore, Korea government is financially supporting EV policies and granting subsidies for EV purchases. Current stage of Korea’s EV deployment is considered in the initial stage and more subsidy funds will be required to pursue EV deployment. Many expert indicated that budget constrain would be expected in the near future. Therefore, government should change EV policy from subsidy oriented incentive to new EV businesses for benefiting all parties in EV market.

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