

## Special Feature Article

### EVs infrastructure network to be advanced through public-private partnership

#### ~Current Status and Challenges for the Full-Scale Dissemination of EVs~

An essential element for the widespread use of EVs is a well-developed recharging infrastructure network. The government is planning to announce a new charging network strategy at the end of August 2023, and to move forward rapidly with the development in Japan. Private companies are increasingly entering the infrastructure business, and the commercial area is expanding. Overseas, automakers such as Tesla and Volkswagen (VW) are taking the lead in infrastructure development, and the key to establishing a stable infrastructure base in Japan will be the extent to which the public and private sectors can cooperate.

#### About 30,000 public chargers

#### Challenges abound in the recharging business

In Japan, there are approximately 30,000 public-use rechargers installed, of which approximately 9,000 are quick rechargers. These are installed at car dealers, convenience stores, and expressways, while the installation of regular chargers is expanding, at lodging facilities and shopping malls where people spend extended periods of time.

With the limited number of EVs in use, "the more chargers you install, the more you lose money" (EV infrastructure operator), it is difficult to make it a viable business. The government is therefore working to expand the recharging network by establishing a subsidy program to cover the cost of infrastructure installation and reduce the initial investment burden. Since last year, the number of private companies entering the recharger business has increased, and there have been cases of these subsidies being depleted quickly, indicating the elevated level of interest in this field.

Toyota Motor Corporation and Nissan Motor Co., Ltd. have already installed approximately 4,100 and 1,900 chargers, respectively, at their dealers and other locations. Honda Motor Co., LTD. has indicated that it plans to launch a company that will work with General Motors Company and other companies to develop a quick-charging network.

## **Number of chargers far fewer than overseas**

### **Increasing output is also an essential issue**

Overseas, Tesla has more than 18,000 "Superchargers" in the U.S. alone, with VW, BMW Group, Audi, Porsche, and others following suit. According to the Ministry of Economy, Trade, and Industry, as of 2022, 1.28 million chargers had been installed in the United States, 201,000 in South Korea, 84,000 in France, and 77,000 in Germany. Although there are differences in the size of the country and other factors, Japan is still behind other countries in terms of the simple number of chargers.

To promote the spread of EVs, the development of an infrastructure network is essential. In Japan, 90% of the average daily mileage of automobiles is less than 50 km, and in many cases it is sufficient to recharge the battery at home. Light vehicles account for approximately 50% of domestic EV sales in FY2022, and many of them have relatively small battery capacity and charging speed. In addition, since the percentage of detached owner-occupied houses is approximately 53%, which is higher than in European countries, it is important to first create an environment where basic recharging is available while also providing the necessary number of public rechargers.

Therefore, the government formulated a new strategy for charging infrastructure suited to the Japanese market and released it in August 2022 as a guideline for the year 2030. The new strategy shifts the policy from simply increasing the number of chargers to prioritizing the installation of high-power and multi-outlet chargers. The existing maintenance target of 150,000 units was doubled to 300,000 units as the base for recharging outputs, and a new target of total output of rechargers was also set, aiming for 4 million kw, approximately 10 times the current level.

The majority of the current 9,000 fast-charging units are less than 50 kw, with an average output of about 40 kw. Many regular rechargers are currently 3kw, and total output needs to be increased, introduction of 6kw and 10kw in future. To build an optimal and convenient recharging infrastructure society while reducing the social burden, we will promote the development of regular rechargers at housing complexes and quick rechargers on highways.

The output of quick chargers to be installed on highways should be at least 90 kw per unit, which is more than double the current average; if more than four units are to be installed, at least one unit should be 150 kw. The purpose is to prevent "charging congestion" at service areas where traffic is concentrated.

“Roadside stations” and automobile dealers have also set their own installation targets.

### **Measures related to electricity supply and demand constraints are also important**

While pursuing "convenience" for EV users, the new strategy is also characterized by its commitment to "making the recharging business independent" and "reducing the burden on society".

First, to make the recharging business independent, a pay-as-you-go system based on the amount of recharging will be promoted. Currently, the time-based charging system is the mainstream, but the amount of recharging depends on factors such as outside and battery temperature, vehicle characteristics, and the standard "80% in 30 minutes" has become a mere formality. Toward 2030, pay-as-you-go system will increase user acceptance. Manufacturers and related organizations will begin to create a fee system so as not to confuse users by having a disorderly fee structure.

In addition, the international standard protocol (communication procedure) "OCPP" will be added to the chargers as a supplementary requirement. The usability of the recharging network will be enhanced by providing information on space availability, function updates, and remote response to malfunctions. Japan is in the process of shifting its power source mix to emphasize renewable energy. Therefore, it also aims to avoid unforeseen power outages by limiting the use of EVs recharging when the supply and demand of electricity is tight.

The new strategy is an important policy shift for infrastructure providers, but many of them seem to be in a welcoming mood. As background, competition for grant applications has been too fierce.

The government had set aside approximately 30 billion yen in the initial budget for FY2023 and the supplementary budget for FY2022 as "subsidies to promote the introduction of charging and refueling infrastructure to promote the spread of clean energy vehicles (CEVs). However, even if the application documents were incomplete, the earlier the application was submitted, the sooner the subsidy could be secured, and applications flooded in immediately after the program began. One business owner recalls, "The subsidiers for the first half of the 2023 was a race to see how quickly we could secure the manpower and process the large volume of documents. Many businesses were forced to use human tactics, which increased their burden.

The subsidy program using reserve funds, which are financial resources that are not limited to specific uses, began in early September 2023. In addition to that the number of outlets and parking capacity are limited for each type of regular charger, and the subsidy amount has also been changed to be determined upon review. Toru Tokushige, chairman of Terra Motors Corporation, which is involved in the recharging service business, also praised the new system, saying, "The subsidy system has become clearer since September 2023, and it is now easier to grasp the amount of money and other details by passing the screening process.

The Japanese government has set a goal of "100% new electric vehicles sales by 2035," and infrastructure development is inextricably linked to the spread of EVs. Currently, however, electric vehicles include not only EVs but also hybrid vehicles (HVs) and fuel cell vehicles (FCVs), and the government has indicated that it intends to promote electrification through a "variety of options.

METI official said, "We need to maintain the existing gas station network while building a new EVs charging network. If this balance is lost, it could lead to a stagnation of Japan's automotive strategy.

The infrastructure subsidies currently provided by the government will not last forever. To make infrastructure projects self-sustaining, a sustainable and convenient recharging network must be built as soon as possible.