

September 16, 2022
ZENRIN CO., LTD.

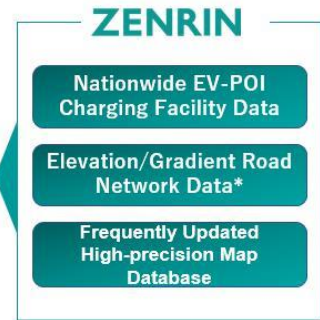
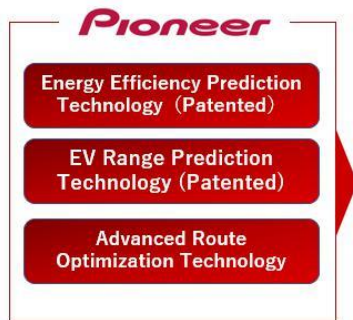
Pioneer and ZENRIN Partner to Develop and Offer Solutions and Services for EVs to Pave the Way for Carbon Neutrality

Pioneer Corporation and ZENRIN Co, Ltd. today signed a partnership agreement to develop a technology platform for EV solutions.

The scope of the partnership includes creating a technology platform that facilitates the development of solutions to make owning and driving EVs easier and more convenient, as well as providing such solutions and services to EV drivers. Both companies will bring their respective proprietary technologies and expertise to this partnership. More specifically, Pioneer offers its cloud-based platform Piomatix for Green, designed to reduce vehicle CO2 emissions and incorporates the company's advanced route optimization technologies and patented energy efficiency prediction technologies. ZENRIN offers its vast amount of high-precision, frequently updated map data, which includes road elevation and gradient, as well as its know-how in collecting and managing point-of-interest (POI) data on EV charging stations around the country.

A growing number of countries around the world have been accelerating shifts to EVs as part of their efforts to achieve carbon neutrality. Although EVs have been increasing their popularity in Japan, the pace of their gaining broader public acceptance is slower than in some other countries. This is partly because Japanese drivers are concerned about relatively shorter ranges that EVs can drive in one charge and the limited availability of charging stations in their neighborhoods. To address these concerns that drivers may have for EVs, Pioneer and ZENRIN have joined forces to develop and offer a variety of solutions and services, including notifying EV drivers of precisely how much farther they can go without recharging, navigating them to the nearest charging stations, and presenting economic models for switching from internal combustion engine vehicles (ICEVs) to EVs. The joint efforts of the two companies will facilitate wider acceptance of EVs in Japan and help achieve carbon neutrality in the mobility and energy industries.

Technology Platform for Developing Solutions for EVs



*Road elevation and gradient data increases accuracy in predicting vehicle driving ranges.

Solutions and Services for EVs

(1) Cloud-based navigation service for EVs



- For use on smartphones
- For use with next-generation in-car systems for EVs

For automakers and car-sharing and leasing companies

(2) Carbon Neutral API Services



- Charging Stations Search API
- EV Range Prediction API
- EV Routing API
- CO2 Emission Calculation API

For mobility and energy industries

(3) EV fleet consulting & productivity simulation services



- CO2 reductions
- Economic benefits
- Operational efficiency

For businesses and municipalities considering switching to EVs

Joint projects under the partnership

The partnership between Pioneer and ZENRIN focuses primarily on developing and providing the following three solutions and services, based on a jointly created technology platform to enable the development of wide-ranging solutions for EVs:

(1) Cloud-based navigation service for EVs

The cloud-based navigation service will enable EV drivers to search for charging stations from among 30,000 locations around the country, to know how much farther they can go without recharging, based on a precise calculation of vehicle electricity mileage, and to find driving routes that take them to conveniently located charging stations on the way. This service will provide EV drivers with a peace of mind on the road and will provide businesses and municipalities with a strong case for switching to EVs. In addition, by the end of 2023, we will launch a variation of navigation services for smartphones, designed to work with in-car audio systems equipped with screens. This service can be integrated seamlessly into next-generation factory-installed in-vehicle infotainment (IVI) systems for added capabilities. We will offer a wide range of solutions and services to make owning and driving EVs easier and hassle-free.

(2) Carbon Neutral API services

We will offer our business partners in the mobility and energy industries with EV solutions as web APIs, including patented EV range prediction technologies based on a precise calculation of their

electricity mileage and for navigating EVs on routes that take them to available and compatible charging stations nearby. In addition, to help drivers of ICEVs reduce vehicle CO2 emissions, we will offer an API for calculating their CO2 emissions on the road, based on our patented technology, and the Eco-Route API for navigating them on routes on which they can minimize CO2 emissions.

(3) EV fleet consulting & productivity simulation services

Our web-based economic modeling service assists municipalities and businesses in making informed decisions about switching their fleets, including trucks and taxis, from ICE vehicles to EVs, based on simulated comparisons of CO2 reductions, economic benefits, and operational efficiency between them. The service allows the economic modeling of an EV, depending on its use, simply by entering GPS tracking data collected from a smartphone placed in an ICEV currently in use.

Strengths brought to the partnership

Pioneer

Pioneer has a wealth of experience and expertise in integrating solutions into in-car systems. The company engages in the service business globally, built around its proprietary Piomatix mobility AI platform, and develops and offers services for smartphones and web API-based services. Moreover, the company combines Piomatix with its sophisticated advanced route optimization technologies and patented energy efficiency prediction technologies to create the cloud-based Piomatix for Green platform to help reduce vehicle CO2 emissions.

ZENRIN

ZENRIN has extensive sets of map data, including road elevation and gradient data, that covers all highways and streets around the country. The company also boasts practical know-how in collecting and managing nationwide EV-POI charging facility data. Through collaboration with other businesses and organizations and on-site research, the company frequently collects and updates attributable information related to charging stations, including their charging levels.