

## Responding to Climate Change and Energy Issues



### FY2019 Materiality Targets and Results

○: As planned △: Delayed

Details of Main Initiatives	FY2019 Targets	Indicators	FY2019 Results	Self-Evaluation
Reduce CO <sub>2</sub> emissions while driving	CO <sub>2</sub> emissions per new vehicle while driving: 8% reduction compared to FY2010	CO <sub>2</sub> reduction (%)	-14%	○
Reduce amount of CO <sub>2</sub> emitted by production activities	CO <sub>2</sub> emissions at production facilities per production vehicle: 37% reduction compared to FY2005	CO <sub>2</sub> reduction (%)	-41%	○
Reduce amount of CO <sub>2</sub> emitted by non-production activities	Unit CO <sub>2</sub> emissions in non-production facilities: 1% reduction compared to FY2018	CO <sub>2</sub> reduction (%)	-8.1%	○
Reduce amount of CO <sub>2</sub> emitted by logistics activities	CO <sub>2</sub> emissions per unit of transportation in Japan: 9% reduction compared to FY2010	CO <sub>2</sub> reduction (%)	-9.3%	○
Promote the acquisition of Eco-Action 21 certification to our dealers	New certifications: 5 dealers or more	Number of certified dealers	4	△

### Basic Approach

In recent years, extreme weather, such as heat waves, droughts and floods due to heavy rain, has caused disasters one after another around the world. The leading culprit behind these extreme-weather events is climate change, and global warming caused by CO<sub>2</sub> and other greenhouse gases is a major factor.

International frameworks for realizing a sustainable society, such as the Paris Agreement and the United Nations Sustainable Development Goals (SDGs) are making major progress. In particular, the Paris Agreement has set targets on climate change and fostered increased awareness toward corporate responsibility.

Automobiles generate CO<sub>2</sub> throughout the life cycle, from production to driving and disposal. For this reason, MITSUBISHI MOTORS has identified

“responding to climate change and energy issues” as a topmost material issue. In the New Environmental Plan Package, we have set new specific targets for addressing this issue.

To reduce energy consumption and CO<sub>2</sub> emissions in all business activities, including development, production and distribution, as well as at and offices, we are promoting various initiatives, such as electric vehicle technologies, the development of fuel-economy-improving technologies, the introduction of low-energy equipment in production processes and the use of renewable energy in offices and dealers.

Our electric vehicles have large-capacity batteries that can be used in energy management and as emergency power sources in times of disaster. Through these measures, we are also engaging in measures to adapt to climate change.



## Our Risks and Opportunities Related to Climate Change and Energy Issues

Recent years have seen an increase in ESG investment\*1 that utilizes non-financial information. Based on a final report by the TCFD\*2, investors are becoming significantly more aware of the long-term risks and opportunities for companies as a result of climate change.

MITSUBISHI MOTORS believes climate change presents the following risks and opportunities for its business.

\*1 Environment, social and governance (ESG) investment

\*2 Task Force on Climate-related Financial Disclosures

### Risks

The MITSUBISHI MOTORS Group's operating performance and financial condition could be affected significantly by interrupted factory operations due to meteorological disasters, as well as the need for investment to address increasingly stringent regulations related to automobile fuel efficiency and CO<sub>2</sub> emissions. Furthermore, if we fail to introduce sufficient measures to counter climate change, we could be forced to withdraw from the marketplace due to a lack of compliance with environmental regulations, and our reputation could suffer. As a result, we could experience a decrease in sales, significantly affecting our operating performance and financial condition.

### Opportunities

Sales of electric vehicles and other highly fuel-efficient vehicles could grow, due to incentives set by various countries and regions and growing environmental awareness. Sales of electric vehicles could also expand due to their ability to serve as power sources in the event of meteorological disasters.

## Developing Electric Vehicles

Automobiles emit CO<sub>2</sub> throughout their life cycle, during production, driving and disposal. Emissions are particularly high during the driving phase.

MITSUBISHI MOTORS positions its technologies for producing electric vehicles, which emit little CO<sub>2</sub> while driving, as core technologies for "responding to climate change and energy issues," and we are focusing on development in this area.

### Electric Vehicles

Electric vehicles are powered by electric motors, and so they emit no exhaust gases such as CO<sub>2</sub> while driving.

MITSUBISHI MOTORS released the i-MiEV as the world's first mass-produced electric vehicle in 2009. We are still improving it today. The i-MiEV performs much better than conventional gasoline engine vehicles, including environmental performance, acceleration starting with maximum torque, reduced noise by the electric motor, and stability with the battery unit beneath the floor. These technologies are the foundation of next-generation electric vehicles, such as plug-in hybrid electric vehicles.

## TOPICS

### 10th Anniversary of the i-MiEV Electric Vehicle



June 2019 marked the 10th anniversary of our launch of the i-MiEV, the world's first mass-produced electric vehicle. In addition to customers with high environmental awareness, the i-MiEV is being adopted widely for use as public vehicles by local and national governments, and as police cars, taxis and rental cars. They can also be used in place of gasoline vehicles to transport supplies and people when fuel supplies are cut off during emergencies.

In 2011, we adapted the i-MiEV power train for commercial vehicles and launched the MINICAB MiEV, a minicar-class commercial electric vehicle. To date (as of March 31, 2020), sales of this model have reached more than 31,000 units.

Learning from the Great East Japan Earthquake the previous year, in 2012 we launched the MiEV power BOX. This model, which can power household devices through the electricity stored in its battery, set the stage for vehicle to home (V2H) applications.



## TOPICS

### Japan Post Using Mitsubishi Electric's EVs as Delivery Vehicles



Since fiscal 2019, MITSUBISHI MOTORS has been providing Japan Post Co., Ltd. with the MINICAB MiEV, a mini-car-class commercial electric vehicle, for use as delivery vehicles. By the end of fiscal 2020, we expect the total number of vehicles delivered to reach 1,500. These vehicles are well suited for deliveries in large metropolitan areas, where travel distances are relatively short. They make up an estimated 30% of minicar-class electric vehicles used for deliveries.

The MINICAB MiEV is equipped with the drive battery and motor used in the i-MiEV. In addition to the superior environmental performance inherent to an electric vehicle, it excels in power, silence, comfort and more. It is highly effective as a delivery vehicle due to the driving range and payload capacity. By using vehicles that emit no CO<sub>2</sub> or other exhaust gas while driving, it is helping to promote environmental management by Japan Post, which aims to reduce the emission of greenhouse gases.

### Plug-in Hybrid Electric Vehicles

Plug-in hybrid electric vehicles are powered by electricity stored in drive batteries and by the motor, using the engine to generate electric power when the battery level is low. Concern over the driving range is no longer an issue as it offers the advantages of EVs: powerful driving, superb quietness and high stability.

MITSUBISHI MOTORS released the OUTLANDER PHEV in 2013. At low to medium speeds, the Plug-in Hybrid EV System uses electric power from the drive battery, but when the battery level is low, it generates electric power during operation using the engine while also supplying power to the motor and battery. Furthermore, during high-speed driving, the vehicle is driven by the engine and simultaneously assisted by the battery-powered motor. In this way, the drive mode is automatically selected according to the situation. CO<sub>2</sub> emissions are substantially lower than conventional gasoline engine vehicles, delivering outstanding environmental performance.

## TOPICS

### Launching the OUTLANDER PHEV in the ASEAN Market



We have launched the OUTLANDER PHEV in Indonesia, its first ASEAN market. Indonesia is introducing measures to curtail CO<sub>2</sub> emissions. Through the OUTLANDER PHEV, we are contributing to the country's national objectives.

In ASEAN markets as well, through the OUTLANDER PHEV we aim to increase the value we contribute to society.



## Promoting the Use of Electric Vehicles as a Way of Adopting to Climate Change

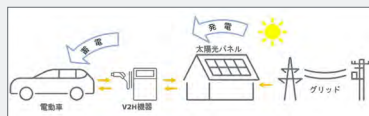
By leveraging the large-capacity batteries on its electric vehicles and plug-in hybrid electric vehicles to supply electricity, MITSUBISHI MOTORS is contributing to measures in various countries and industries to adapt to climate change and energy issues. We are applying these to such areas as energy management, V2X\* and use as emergency power sources in times of disaster.

\*A general term encompassing vehicle to home (V2H) and vehicle to grid (V2G), among others

### TOPICS

#### Commencing Trial Sales of the DENDO DRIVE HOUSE in Some Regions

We began offering the DENDO DRIVE HOUSE for sale at a particular dealership on a trial basis in October 2019.



DENDO DRIVE HOUSE is a bundled system that comprises solar panels and V2H equipment. Along with the purchase of an electric vehicle, we offer a one-stop service in which dealers provide sales, installation and after-sales maintenance. Clean, solar-derived electricity is used to power a customer's home and electric vehicle, reducing everyday fuel and electricity charges and contributing toward a low-carbon society. The solar panels can also be used to generate electricity during power outages, and the power stored in the electric vehicles can be supplied to the home.

We plan to apply the knowledge gained from this initiative to help realize the new-energy society of the future.

### TOPICS

#### Participating in Joint Study on Energy Management in Indonesia

We participated in joint study on energy management on the island of Sumba, in the Indonesian province of East Nusa Tenggara. Using solar power generation and electric vehicles, the test is aimed at finding a way to use energy efficiently in islands and other locations where gasoline is difficult to obtain.

This study, which was designed to deliver a stable supply of electricity generated from a renewable source, was conducted by Indonesia's Agency for the Assessment and Application of Technology and Kyudenko Corporation, with support from Japan's Ministry of the Environment. The test commenced in December 2017. In February 2018, MITSUBISHI MOTORS donated to the Indonesian government two i-MiEVs, eight OUTLANDER PHEVs and four quick chargers. One i-MiEV and one quick charger were used in the proof-of-concept test. The solar power is being used to



charge the vehicles, which drive about the island, accumulating test data.

The i-MiEV used in the test



Commemorative photo from the ceremony

### TOPICS

#### Implementation of V2G Demonstration Project by Using Electric Vehicles

MITSUBISHI MOTORS took part in the FY2019 V2G Aggregator Project, entrusted by the Ministry of Economy, Trade and Industry, with providing the employees' parking spaces at the Okazaki Plant as a demonstration site.

V2G is a scheme where the high-capacity batteries of electric vehicles are utilized to regulate the demand and supply of the power grid through an IT aggregation system.

In FY2019, the second year for this demonstration, we added 40 electric vehicles (for a total of 50) and established one of the largest demonstration sites in Japan. In addition, electric vehicles at multiple demonstration sites were simultaneously charged/discharged via online control, taking into consideration driving patterns restrictions, and we concluded that response speed could meet the requirements of power supply and demand directives.

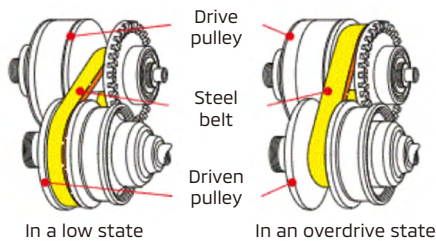
There are further needs to realize more stable power grid to keep the expansion of variable Renewable Energy resources. We believe the realization of V2G will increase the value of electric vehicles and could help to solve the environmental problems such as climate change and energy issues.



## Development of Improving Fuel Economy Technologies

MITSUBISHI MOTORS develops technologies to boost the fuel efficiency of vehicles powered by conventional engines. We are developing engine and vehicle body technologies to reduce fuel and energy waste.

### Continuously Variable Transmission (CVT)

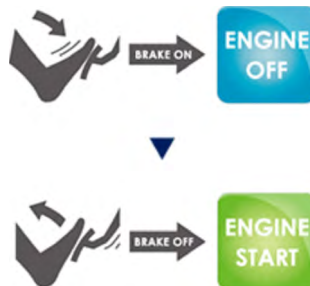


A continuously variable transmission (CVT) varies transmission ratio by seamlessly changing the effective diameter of the pulleys.

Based on throttle position information, driving power is controlled in accordance to the driving condition to achieve the most efficient balance between the engine and CVT.

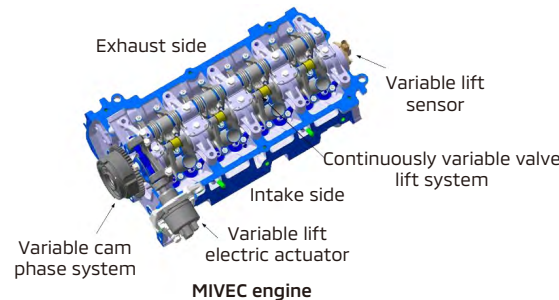
### Idle-Stop "AS&G"

AS&G is an idling stop function that automatically stops and starts the engine when the vehicle stops or moves off. This has a major effect on im-



proving the fuel economy because no fuel is consumed when at a stop. When fitted with a coasting stop function, AS&G stops the engine while decelerating.

### Variable Valve Timing Mechanism Mitsubishi Innovative Value timing Electronic Control System (MIVEC)



The MIVEC is a variable valve timing mechanism for minimizing fuel consumption. The intake valve lift is continuously varied according to the operating condition to reduce intake resistance. This minimizes air intake energy loss, resulting in improved fuel efficiency.

### Deceleration Energy Recovery (Power Generation Control)

This technology controls power generation under various driving conditions such as idling, accelerating, and cruising by conducting intensive charging of the battery using electric power generated while decelerating. We are improving fuel consumption by reducing the load on the engine during charging and power generation.

## TOPICS

### New Models: the eK CROSS SPACE and eK SPACE

Our new mini-cars that launched in March 2020, the eK CROSS SPACE and the eK SPACE, are mounted with naturally aspirated and turbo engines that use a hybrid system. This is combined with a CVT to achieve a balance between acceleration performance and fuel efficiency. Furthermore, the AS&G fitted with a coasting stop function stops the engine when travel speed falls below around 13km/h.





## Efforts in Production

MITSUBISHI MOTORS is upgrading its production facilities, introducing new equipment and improving operations in an effort to conserve energy and reduce CO<sub>2</sub> emissions from production activities.

In fiscal 2019, at our production facilities we brought on line a servo locator for our body transport device, upgraded from a hydraulic to an electrical molding machine and introduced efficient replaceable coil to billet heater.

People involved with production sites, production technologies and power supply are also taking part in energy-conservation activities. We are improving the operation of production facilities by focusing on energy-intensive processes, such as painting and forging. We are improving the operation of boilers, compressors and other equipment that supplies power. Also, we are working to optimize the operation of various types of motor. In these ways, we are introducing measures, starting from areas where we expect results to be greatest.

In an effort to introduce renewable energy, we are also setting up solar power facilities at plants in Japan and overseas.

### TOPICS

#### Establishment of a Large-Scale Solar Power Facility at the Okazaki Plant

Utilizing the energy solutions service provided by Mitsubishi Corporation and Mitsubishi Corporation Power Ltd., we installed a solar power plant capable of generating around 3MW (3GWh per year) at the Okazaki Plant, our mainstay factory for electric vehicles. The power generated there is used at the Okazaki Plant, creating a lower-carbon, cleaner production environment for electric vehicles. In fiscal 2020, we expect to expand the generating plant's capacity and introduce a power storage system (1MWh capacity) employing used batteries from the OUTLANDER PHEV that are produced and sold by the Okazaki Plant.

This initiative introduces a third-party ownership scheme for the solar power plant, in which Mitsubishi and Mitsubishi Corporation Power install and own the solar power plant and the power storage system that employs used batteries from electric vehicles, while Mitsubishi Motor provides the space for installation on the roof of its plant and buys the electricity produced by the plant. Rather than footing initial investment costs and owning the facility, under this scheme MITSUBISHI MOTORS pays only for the electric power charges and has access to CO<sub>2</sub>-free electricity.

This solar power plant and power storage system are expected to reduce CO<sub>2</sub> emissions by approximately 1,600 tons per year and reduce peak power consumption.



Large-scale solar power plant

### TOPICS

#### Introducing Servo Locators to Body Transport Equipment

The body transport equipment used in the welding and assembly processes at the Okazaki Plant had previously used air cylinders for the section that receives the body. Instead, we adopted more general-purpose electric servo locators and robotic controls.

Transitioning the segment that had been driven by an air cycling powered by compressed air to electric power succeed in reducing demand on the air compressor, lowering CO<sub>2</sub> emissions by around 200 tons per year.



Body being transported



Newly introduced servo locators



## Efforts in Distribution

MITSUBISHI MOTORS sets reduction targets for unit CO<sub>2</sub> emissions (kg-CO<sub>2</sub>/1000t km) during the transport of procured parts and products to promote initiatives for achieving these targets.

We strive to shorten transport distances through the use of less distant procurement sources and increasing direct deliveries. We also work to decrease the number of transport trips by improving the pack-

ing to increasing the load factor, and consolidating transport routes, reducing the number of trucks.

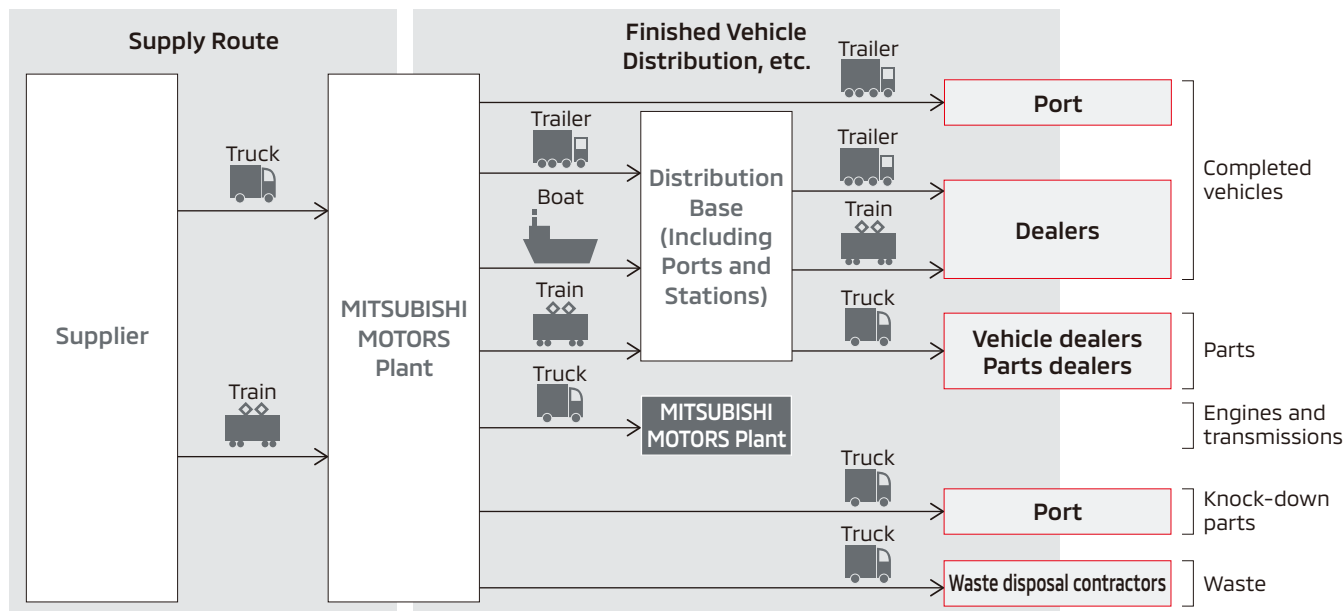
Other activities include modal shifts such as improving rail utilization rates and requesting the introduction of ecologically-friendly vehicles and promotion of eco-driving by our business partners' transport subcontractors.

## Collecting CO<sub>2</sub> Emissions Data in Distribution among Overseas Affiliates

We understand the importance of collecting and disclosing CO<sub>2</sub> emissions volumes throughout the supply chain, including overseas, and we are promoting initiatives in this regard.

Following on from the Mitsubishi Motors (Thailand) Co., Ltd. (MMTh) plant in fiscal 2018, in fiscal 2019 Mitsubishi Motors Krama Yudha Indonesia (MMKI) also began to collect and calculate CO<sub>2</sub> emissions in distribution including local land transport in Indonesia during sea/air transport.

### Target Distribution Routes for CO<sub>2</sub> Emissions Results



Transportation of vehicles (Thailand)



Sea transport



## Office Initiatives

mitsubishi motors is also promoting the use of renewable energy and introducing various types of energy-saving equipment in areas other than manufacturing, such as at research and head office locations.

Part of the electric power used at the Research and Development Building (Okazaki, Aichi Prefecture) and our head office (Minato-ku, Tokyo) is supplied by renewable energy, thanks to the erection of solar panels and making use of the Tradable Green Certificates System\*<sup>1</sup>. Also, CO<sub>2</sub> emissions are being reduced by using energy-saving electrical equipment and air conditioners.

\*<sup>1</sup> This system is used to trade environmental added value of renewable energy generated from natural energy sources using renewable energy certificates issued by a certificate issuer and confirmed by a third party organization.

## Dealer Initiatives

We encourage the acquisition of Eco-Action 21 to our dealers in Japan. Dealers that have acquired certification carry out activities such as reducing the amount of energy and water they use, lowering the amount of waste they produce, and promoting the widespread use of electric vehicles.

Also, we are promoting the development of the "DENDO DRIVE STATION" next-generation dealers to introduce the value brought by EV/PHEV toward the spread of electric vehicle. By fiscal 2019, we opened 83 DENDO DRIVE STATIONS nationwide.

"DENDO DRIVE STATION"

[WEB https://www.mitsubishi-motors.co.jp/special/dendo/index.html](https://www.mitsubishi-motors.co.jp/special/dendo/index.html)

## Dealers That Have Acquired Eco-Action 21 Certification (As of June 1, 2020)

Company
Hokkaido Mitsubishi Motor Sales Co., Ltd.
Aomori Mitsubishi Motor Sales Co., Ltd.
Yamagata Mitsubishi Motor Sales Co., Ltd.
Higashi Nihon Mitsubishi Motor Sales Co., Ltd.
Ibaraki Mitsubishi Motor Sales Co., Ltd.
Sawara Mitsubishi Motor Sales Co., Ltd.
Sobu Mitsubishi Motor Sales Co., Ltd.
Tokai Mitsubishi Motor Sales Co., Ltd.
Sunen Mitsubishi Motor Sales Co., Ltd.
Nishiowari Mitsubishi Motor Sales Co., Ltd.
Toyama Mitsubishi Motor Sales Co., Ltd.
Toyama Diamond Motors Co., Ltd.
Fukui Mitsubishi Motor Sales Co., Ltd.
Kanazawa Mitsubishi Motor Sales Co., Ltd.
Kyoto Mitsubishi Motor Sales Co., Ltd.
Nishi Nihon Mitsubishi Motor Sales Co., Ltd.
Shiga Mitsubishi Motor Sales Co., Ltd.
Fukuyama Mitsubishi Motor Sales Co., Ltd.
Kyushu Mitsubishi Motor Sales Co., Ltd.
Oita Mitsubishi Motor Sales Co., Ltd.
Kumamoto Mitsubishi Motor Sales Co., Ltd.
Nagasaki Mitsubishi Motor Sales Co., Ltd.
Kagoshima Mitsubishi Motor Sales Co., Ltd.





TOPICS

**Rolling out the DENDO DRIVE STATION across Japan's Prefectures**

MITSUBISHI MOTORS seeks to put DENDO DRIVE STATIONS into operation in prefectures across Japan. In fiscal 2019, we opened these stations at seven locations, each of which were the first in their prefecture: Toyama Main Branch (Toyama Prefecture), Ichinoseki Interchange Branch (Iwate Prefecture), Yamagata Branch (Yamagata Prefecture), Nagasaki Main Branch (Nagasaki Prefecture), Tokushima Main Branch (Tokushima Prefecture), Hinode-machi Branch (Miyagi Prefecture) and Kisarazu Branch (Chiba Prefecture). By deploying DENDO DRIVE STATIONS across Japan, we will increase the significance of electric vehicles (EVs and PHEVs) by diversifying their energy sources and communicating their value as sources of electric power in times of disaster.



Toyama Main Branch  
Toyama Mitsubishi Motor Sales Co., Ltd.



Ichinoseki Interchange Branch  
Iwate Mitsubishi Motor Sales Co., Ltd.



Yamagata Branch  
Yamagata Mitsubishi Motor Sales Co., Ltd.



Nagasaki Main Branch  
Nagasaki Mitsubishi Motor Sales Co., Ltd.



Tokushima Main Branch  
Tokushima Mitsubishi Motor Sales Co., Ltd.



Hinode-machi Branch  
Miyagi Mitsubishi Motor Sales Co., Ltd.



Kisarazu Branch  
Chiba Mitsubishi Colt Car Dealership Co., Ltd.

TOPICS

**Signing a Memorandum of Understanding on the Opening of DENDO DRIVE STATIONS in the Philippines**

In January 2020, Mitsubishi Motors Philippines Corporation (MMPC), which is our automotive assembler and distributor in the Philippines, signed a Memorandum of Understanding with five MMPC's authorized dealers, on the opening of next-generation dealerships (DENDO DRIVE STATIONS). In addition to standard dealership functions (selling new vehicles and providing after-sales service), DENDO DRIVE STATIONS are equipped with solar power generation systems and V2H\* equipment. These stations can be used to charge electric vehicles from solar power generation. Alternatively, electric vehicles can provide power to the dealerships. Like Japan, the Philippines is prone to natural disasters. Our DENDO DRIVE STATIONS are expected to help build up the country's national resilience (ability to recover from disasters).

MMPC plans to launch the OUTLANDER PHEV in 2020. The company is undertaking efforts aimed at encouraging an understanding and affinity for electric vehicles. Rolling out the DENDO DRIVE STATION should facilitate this effort, as well as contributing to automotive industry and economic development initiatives in the Philippines.

\*V2H stands for vehicle to home and this system can power household devices through the electricity stored in its battery.



Signing ceremony for a Memorandum of Understanding