

# Environmentally Friendly Automobiles

## Our Approach

“The earth, the sky and nature” are Subaru’s fields of business, and we truly do value the benefits nature provides. The Subaru Group is committed to increasing the environmental performance of its products and also to protecting the global environment throughout the life cycle of its products, from the procurement of raw materials through to the manufacturing, transportation, use, and disposal of its products.

## Management System

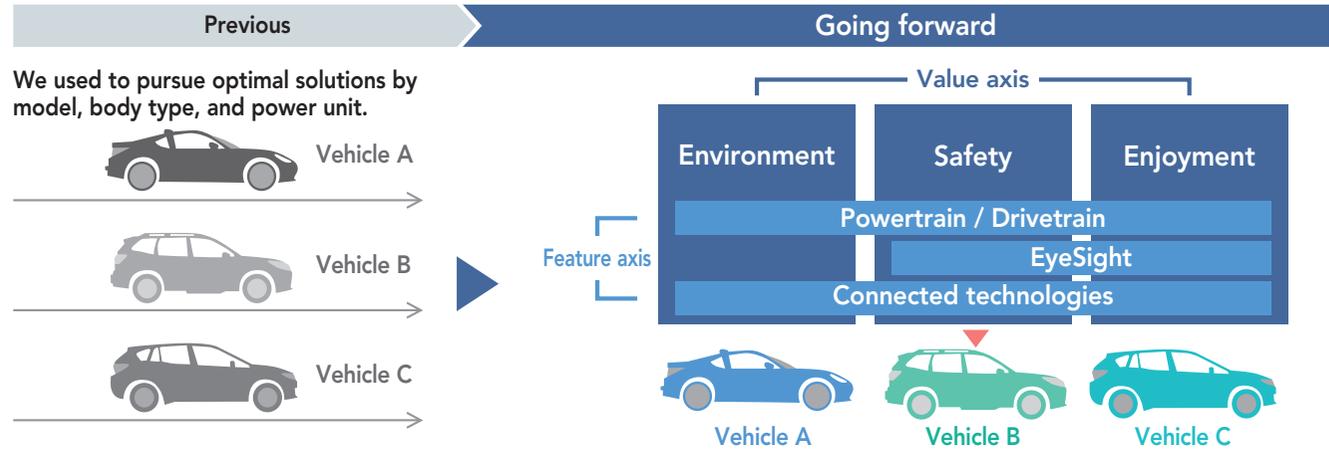
We need to effectively invest resources in the development of strategic technologies and link technology and management more comprehensively. This will enable us to address new technologies, as symbolized by the electric vehicles that will be key to resolving environmental issues, autonomous driving and connected car services, which in turn will enable us to deliver appealing products.

SUBARU has therefore transitioned to a development system that organically combines value and function from a development system based on functional units such as vehicle bodies and power units in order to accelerate the development

of new technologies such as environmentally responsible electric vehicles. We have also created the CTO Office within the Engineering Division as an organization to discuss and decide the future direction of technology development, along with a system to incorporate its outcomes into Groupwide strategies including procurement and manufacturing.

Our objective is to empower a transformation to a Groupwide optimization perspective over a division and vehicle optimization perspective within an organization that is flexibly able to address the technologies of the future. Our development system will evolve into a core platform for creating and delivering environmental and technological value that demonstrates SUBARU-ness.

**We cultivate, enhance, and accumulate future-generation core technologies that will underpin SUBARU’s future products.**



## Medium- to Long-term Goals (Long-term Vision and Milestones)

In order to contribute to a decarbonized society, SUBARU has set long-term goals (long-term vision) for reducing CO<sub>2</sub> emissions and medium-term goals (milestones) to complement them.

Even in the electric vehicle era, we will strengthen SUBARU-ness and manufacture environmentally responsible automobiles in line with our medium- to long-term goals for 2030 and 2050.

We have also set the new target of proceeding with research and development with the goal of using recycled materials<sup>\*1</sup> for more than 25% of the plastics used in new models<sup>\*2</sup> released worldwide by 2030 to help address the global waste plastic problem.

- On a well-to-wheel<sup>\*3</sup> basis, we will pursue our goal of reducing the average CO<sub>2</sub> emissions from new passenger cars by at least 90%<sup>\*4</sup> by 2050, compared with 2010.
- In the early 2030s, all commercial SUBARU cars<sup>\*1</sup> will be equipped with electric powertrain technology.<sup>\*5</sup>
- By 2030, we will pursue our goal of increasing the ratio of electric vehicles (EV) and hybrid cars to at least up to 40% of the gross number of vehicles sold globally.

\*1 Including material, chemical and plastic recycling.

\*2 Excluding models supplied by OEMs.

\*3 Well-to-Wheel: Approach to calculating CO<sub>2</sub> emissions including the emissions produced by the generation of electricity to be used by EVs and other vehicles.

\*4 Reduce total CO<sub>2</sub> emissions calculated based on the fuel efficiency (notified value) of all SUBARU automobiles sold across the world by 90% or more relative to the 2010 levels in 2050. Changes in the sales quantity due to changes in the market environment shall be taken into consideration, while minor changes in running distance shall not.

\*5 Refers to the technology used to foster the use of electricity for EVs, HEVs, and others.

## Contribution to the creation of a decarbonized society through products from SUBARU's point of view

### Global Environment Preservation

Companies are required to contribute to the achievement of a decarbonized society

#### 2050

On the well-to-wheel basis, we will pursue our goal of reducing the average CO<sub>2</sub> emissions from new passenger cars by at least 90% by 2050, compared with 2010.

#### 2030

By 2030, we will pursue our goal of increasing the ratio of electric vehicles (EV) and hybrid cars to at least 40% of the gross number of vehicles sold globally.

In the early 2030s, all commercial SUBARU cars will be equipped with electric powertrain technology.

SUBARU will accelerate the development of fundamental technologies for EVs and hybrid cars with support from alliance partners and continue offering products accentuating SUBARU's distinctions even in the emerging electric age.

SUBARU will contribute to building a decarbonized society through our distinctive and technological innovations.

## Initiatives

### Efforts to Reduce CO<sub>2</sub> Emissions for New Models

SUBARU is working to improve the fuel efficiency of conventional gasoline engine vehicles while turning its attention to expanding its lineup of electric vehicle models and promoting EV development to address stricter fuel efficiency regulations in the countries it operates in. We believe it will be important to steadily implement the above initiatives in order to reduce the amount of CO<sub>2</sub> emitted from automobiles.

### Higher Fuel Efficiency

We will continue to meet demand for conventional gasoline-powered vehicles from customers. HEVs, which we are expanding to include more models, are made by combining gasoline engines with electrification technology, and engines need further technological improvements to boost fuel efficiency. The 1.8-liter BOXER direct injection turbo DIT<sup>\*1</sup> combines the unique driving pleasure of a SUBARU with outstanding environmental performance. Installed in the new Levorg and Forester models launched in 2020, it is a next-generation BOXER engine with a turbo system that generates high torque at low RPM. Its lean combustion technology produces more energy with less fuel. Combined with the expanded Lineartronic shift range, this engine offers even more powerful acceleration off the line and superb fuel efficiency when cruising at high speed.

\*1 Direct injection turbo



New 1.8-liter direct injection engine

**Electric Vehicles—HEVs, Plug-in Hybrid Vehicles (PHEVs), Strong Hybrid Electric Vehicles (SHEVs), and Other Electromotive Vehicles (xEVs)**

SUBARU has been increasing the number of vehicles equipped with its mild hybrid e-BOXER<sup>2</sup> engine that combines a horizontally opposed engine and electric technology, and to reduce CO<sub>2</sub> emissions has implemented initiatives such as creating its own plug-in hybrid vehicle (PHEV) using the hybrid vehicle expertise of Toyota Motor Corporation (Toyota). In addition, we will launch series hybrid electric vehicles (SHEV) in the mid-2020s that incorporate Toyota Hybrid System (THS)<sup>3</sup> technology to deliver vehicles that feature SUBARU-ness while offering high-level environmental performance. We are also planning to develop xEVs with improved fuel efficiency by equipping gasoline engine vehicles with various electrification technologies. By steadily expanding our product lineup of electric vehicles, we will help reduce CO<sub>2</sub> emissions for new models.

<sup>\*2</sup> Generic term used for "horizontally opposed engine + electrification technology," which offers the unique driving pleasure of SUBARU while being environmentally friendly.

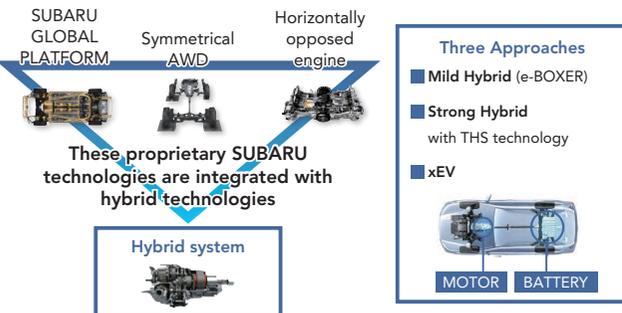
<sup>\*3</sup> TOYOTA Hybrid System



PHEV Crosstrek Hybrid



Forester Advance equipped with the e-BOXER power unit



**Electric Vehicles (EVs)**

SUBARU plans to launch SOLTERRA around the middle of 2022 as another step toward the era of the electric car. SUBARU's first global EV, SOLTERRA, is designed to be environmentally responsible. It utilizes the e-SUBARU Global Platform, a dedicated EV platform we jointly developed with Toyota, as well as the AWD technology we have developed for many years and Toyota's outstanding electrification technology, thus bringing together the strengths of both companies. An SUV with the unique appeal of

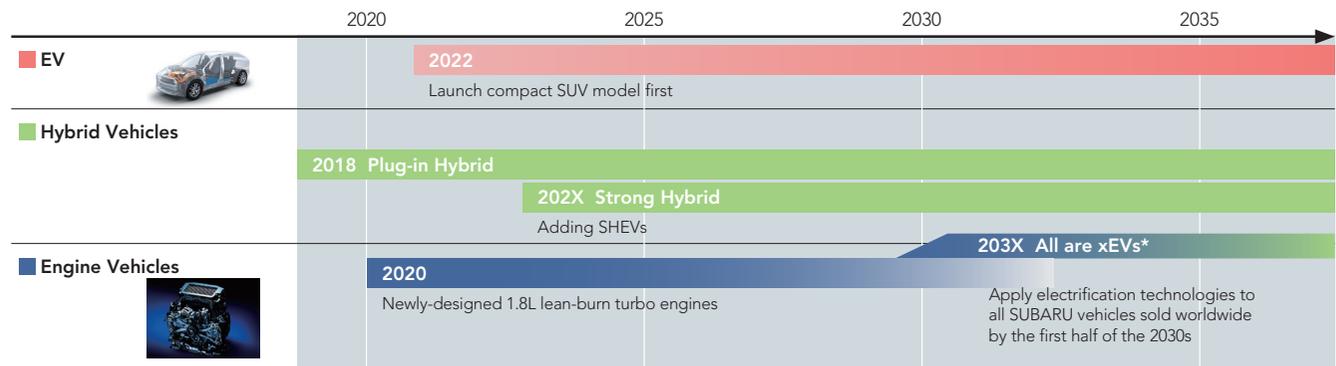


SUBARU name for a jointly developed EV: SOLTERRA  
"SOLTERRA" is a coined word that combines the Latin words "sol," which means "sun," and "terra," which means "earth."

an EV, SOLTERRA will launch in Japan, the U.S., Canada, Europe, China, and elsewhere as a new option in the SUBARU SUV lineup.

SUBARU continues to develop and deliver products that meet societal needs and contribute to the environment through advanced technologies, thereby contributing to the protection of the global environment. We will continue to consider practical functions and customer preferences as we enhance our lineup in the markets we serve with environmentally friendly vehicles that are unique to SUBARU and that can deepen relationships with customers.

Reducing CO<sub>2</sub> emissions with electrification technologies while further accentuating "SUBARU-ness" in the environmental era



\* Vehicles with electrification technology.

### Life Cycle Assessment

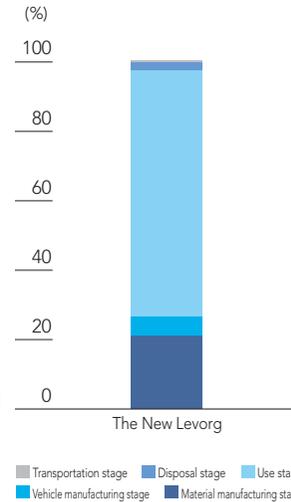
SUBARU conducts LCA\*4 to evaluate CO<sub>2</sub> emissions during the entire life cycle of automobiles, from raw material procurement to manufacturing to transportation, use, and disposal. We will quantify the environmental impact of automobiles and proactively develop automobiles taking into account the need for decarbonization from the design stage.

SUBARU will reduce environmental load throughout the entire lifecycle by improving fuel efficiency and electrification technologies.

\*4 Life cycle assessment (LCA) is an environmental impact assessment method that comprehensively evaluates environmental load at every stage of the life cycle of products and services from raw material procurement to production, use, disposal and recycling.

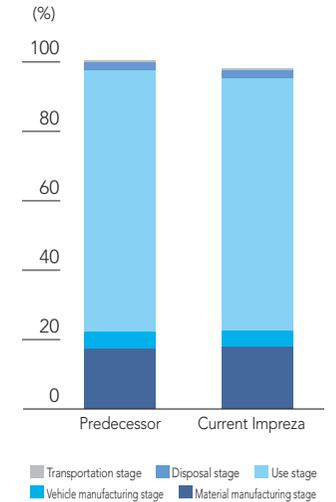
#### Levorgg

The displacement class of the new Levorg announced in October 2020 has changed.  
The ratio of CO<sub>2</sub> emissions at each LCA stage is shown on the right.



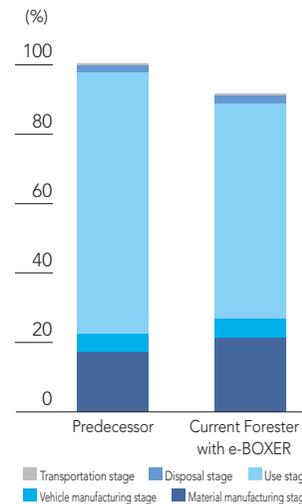
#### Impreza

LCA of the new Impreza, which was fully redesigned in fall 2016, is shown on the right.  
The new Impreza reduces CO<sub>2</sub> emissions by 2.3% over its life cycle compared with its predecessor.



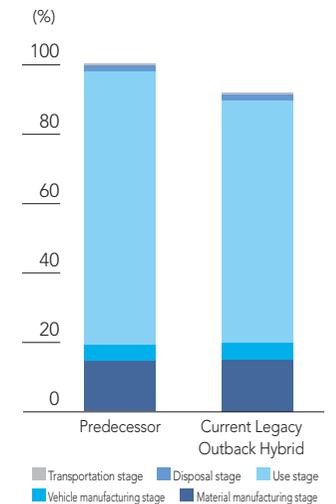
#### Forester (e-BOXER)

LCA of the new Forester with e-BOXER announced in June 2018 is shown on the right.  
It reduces CO<sub>2</sub> emissions by 8.7% over its life cycle compared with its gasoline-fueled predecessor.



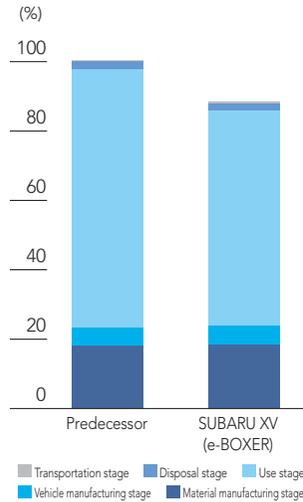
#### Legacy Outback

LCA of the new Legacy Outback announced in October 2014 is shown on the right.  
The new Legacy Outback reduces CO<sub>2</sub> emissions by 8% over its life cycle compared with its predecessor.



### SUBARU XV (e-BOXER)

LCA of the new SUBARU XV (e-BOXER) announced in October 2018 is shown on the right. It reduces CO<sub>2</sub> emissions by 12% over its life cycle compared with its gasoline-fueled predecessor.



### Design for Recycling

SUBARU incorporates recyclability into its automobile design process to make effective use of limited resources.

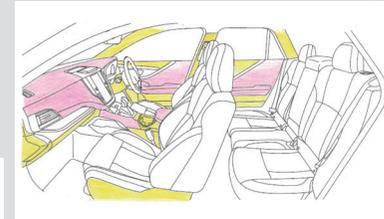
#### Increased ease of dismantling wiring harnesses

A harness layout and structure are designed in such a way as to enable quick and efficient recovery of wiring harnesses.



#### Use of easy-to-recycle materials

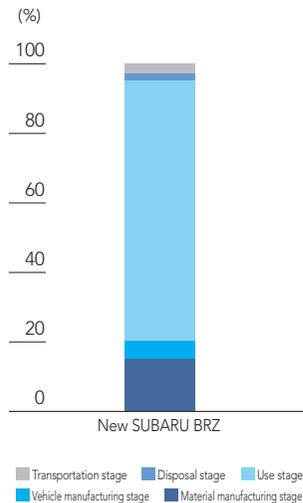
Olefin resin with superior recyclability is actively used for interior parts.



- Made from an olefin resin material
- Made of olefin resin

### SUBARU BRZ

The ratio of CO<sub>2</sub> emissions at each stage of the LCA for the SUBARU BRZ launched in July 2021 is shown on the right. The displacement class is different from the predecessor model, so only data for the new model is presented.



#### Improved material identification

Material identification is displayed on both the inner and outer surfaces of bumpers to facilitate material separation.



#### Adoption of easy-to-dismantle structure

Trunk and rear gate opener switches are now clipped, rather than screwed, in place.



## Utilizing Recycled Resins

To contribute to realizing a resource recycling society and a decarbonized society, SUBARU is working to develop technologies to utilize recycled resins and biomass materials in place of the resins currently used in automobiles.

### ■ Subaru of America, Inc.

Subaru of America, Inc. helped develop and launch environmentally friendly accessories in the form of floor mats made from used recycled materials for the 2021 Crosstrek Sport®. The surface and lining of these floor mats are made from 100% recycled materials such as trash removed from the ocean.



Floor mats made from recycled materials

## Cleaner Exhaust Gas

To achieve and maintain clean air across the globe, SUBARU is developing technologies for cleaner exhaust gas, targeting not only conventional air pollutants such as hydrocarbon compounds and nitrogen oxides but also particulate matter, which is feared to have serious impacts on human health. At the product level, we are expanding our range of models that meet the latest regulations by country, while addressing emerging regulations at the development level.

Japan: 2018 low emissions standards

U.S.: State of California's SULEV standards

Europe: Euro 6 emission standards (final stage)

China: China 6 emission standards

We will develop and propose reasonable products for customers based on the results of research conducted to identify the optimal specifications in each country, including research on the components of exhaust gas that will be regulated in the future. To this end, we are designing materials on an atomic level to improve the performance of the catalyst, which plays a major role in producing cleaner exhaust gas, while also reducing the use of precious metal.

## Reducing Environmentally Hazardous Substances

SUBARU is also collaborating with suppliers in reducing the use of environmentally hazardous substances in automobiles.

We achieved the environmentally hazardous substance reduction targets for lead, mercury, hexavalent chromium and cadmium set by the Japan Automobile Manufacturers Association, Inc. (JAMA) for all new models released in and after 2008.

In order to ensure compliance with the REACH regulation, ELV Directive, Chemical Substance Control Law and other regulations enforced across the world, we are further reducing the use of lead and replacing phthalic acid-based plasticizer and other hazardous chemical substances with alternatives.

## Reducing VOCs\*5 in Vehicle Interiors

SUBARU is reviewing the components and adhesive agents used in vehicle interiors in order to reduce the use of volatile organic compounds (VOCs).

For the Legacy, Levorg, Impreza, Forester, and SUBARU BRZ, we achieved the voluntary target set by the JAMA\*6 by reducing the concentration of the 13 substances defined by the Japanese Ministry of Health, Labour and Welfare to levels below the indoor concentration guideline values. We will continue our efforts to reduce the levels of VOCs to make the in-vehicle environment even more comfortable.

\*5 Organic compounds that easily volatilize at room temperature, such as formaldehyde and toluene, which are said to cause nose and throat irritation.

\*6 Voluntary target set by the JAMA in its "Voluntary Approach in Reducing Cabin VOC Concentration Levels," which was announced with the intention of reducing the in-vehicle concentrations of the 13 substances designated by the Ministry of Health, Labour and Welfare to levels equivalent to or lower than the values set in the guidelines, for new models produced and sold in Japan in and after FYE March 2008.

[JAMA's "Voluntary Approach in Reducing Cabin VOC Concentration Levels" \(Japanese version only\)](#)

# Climate Change

## Our Approach

SUBARU recognizes that climate change is one of the most pressing global issues, and respects the goal of the Paris Agreement to hold the increase in the global average temperature to well below 2°C above pre-industrial levels. SUBARU will contribute to this goal by reducing CO<sub>2</sub> emissions from its products, factories and offices to help decarbonize society. SUBARU has set long-term and medium-term goals as milestones for its target of carbon neutrality in 2050.

## Risks and Opportunities Identified

SUBARU defines and identifies risks and opportunities associated with climate change to achieve sustainable business activities.

We have identified a number of risks associated with climate change. Initiatives to address climate change may be inadequate or abnormal weather may cause delays in procurement, production and distribution. In addition, transition risks and physical risks may have impacts and outcomes that are currently extremely difficult to predict. Increased R&D expenses, lost sales opportunities due to reduced customer satisfaction and brand image, and delays in procurement, production and distribution due to abnormal weather are among the potential impacts of these risks. These risks could have a material impact on the operating results and financial position of the Subaru Group.

On the other hand, effective initiatives to address climate change could lead to opportunities to create new markets and employment and also use capital and energy more efficiently.

### Main Risks Identified

#### ■ Business Management in General

- (1) If SUBARU fails to implement adequate initiatives to achieve low-carbon/zero-carbon outcomes, its brand value could be harmed, which could affect the company's sales and recruiting ability. Capital costs could also rise, due to increased difficulty in obtaining financing from medium- and long-term investors.
- (2) There is an argument that NDCs need to be expanded to be able to achieve the Paris Agreement's "well below 2°C" target, and thus countries may revise their NDCs to set more stringent targets. Such revisions could have a significant impact on SUBARU's business activities.
- (3) As an impact of climate change, extreme torrential rain will frequently cause floods in various locations, which could pose

risks of SUBARU's operations being affected by disrupted supply of raw materials and submerged factories.

#### ■ Products

- (1) If SUBARU fails to meet fuel economy regulations imposed in Japan, the U.S., Europe, and China, the company could incur additional costs or losses related to negative incentives, such as fines or non-penal fines for legal violation, and credit purchase for unmet standards. Also, some of our products could fail to satisfy certain fuel economy standards, resulting in restrained sales opportunities.
- (2) At present, it is difficult to predict technological progress and price optimization for electrification, which will likely cause a substantial gap with the real state of market needs. In such a situation, SUBARU could incur unnecessary and excessive R&D costs while facing a decline in customer satisfaction, resulting in unexpected losses and reduced sales opportunities as well as hampered advancement of the company's electrification efforts.
- (3) To promote electrification, it is crucial to ensure profitability for the entire product cycle ranging from procurement and use to disposal. Thus, it is essential to involve SUBARU's upstream and downstream partners in exerting efforts toward this end. Failure to do this could render the company unable to meet the profitability goal for the entire product life cycle.
- (4) SUBARU views electrification as a steady medium- to long-term trend, and also anticipates the possibility of its swift and sweeping penetration of the market at some stage. SUBARU could be unprepared for such prospect in terms of technology and timely product lineups, and thus suffer from a resultant loss of product sales opportunities.
- (5) There is a possibility that SUBARU might suffer from shortages of natural resources used for tires and metal resources for electrification technologies.

**Production Phase**

- (1) If SUBARU continues to use energy derived from fossil fuels, it could incur rising costs, due not only to geopolitical factors associated with petroleum and the like, but also to carbon taxes, emission quotas, and other government policies and regulations.
- (2) If use of renewable energy does not grow as expected, SUBARU could face slower progress in achieving its Scope 1 and 2 emissions reduction goals.

**Main Opportunities Identified**

- (1) If SUBARU advances its efforts to make products more environmentally friendly as planned and global climate change mitigation/adaptation efforts progress adequately, the company will be able to maintain its key markets. This scenario also implies a possibility of the company creating new markets through receiving support for its safe and reliable products, a source of its strength, even in the face of intensifying extreme weather conditions that are to some extent unavoidable in certain parts of the world.
- (2) Through contributing to addressing climate change issues, SUBARU could increase its brand value, thereby enhancing its sales and recruiting ability. This could make it easier for the company to obtain financing from investors, thereby lowering capital costs.
- (3) Regarding energy use during the production phase, by transitioning to renewable energy while at the same time giving due consideration to cost-effectiveness, SUBARU could overcome the risk of being exposed to price fluctuations involved in energy derived from fossil fuels, thereby preventing future cost increases.

\* The risks and opportunities described above are based on past facts and currently available information, and may change significantly due to such factors as future economic trends and the business environment facing SUBARU. The opportunities described represent those for SUBARU's products to contribute to climate change adaptation and do not anticipate climate change-related deterioration.

**Management System**

SUBARU has established the Environment Committee for the purpose of promoting the sustainable growth of both society and the company, and thereby contributing to global environment conservation. The committee discusses targets and measures from broad as well as medium- to long-term perspectives that accommodate environmental standards required by future societies, and evaluates the progress of related implementations and achievements.

The Environment Committee is chaired by the Executive Officer in charge of the Sustainability Division appointed by the Board of Directors. Details of discussions by the Environment Committee are reported to the Sustainability Committee. We also have a system for escalation and reporting to the Executive Management Board Meeting and Board of Directors to be used as necessary. Management of climate change-related activities is included in the responsibilities of the environmental management structure. Environmental risks and opportunities associated with climate change are assessed and monitored, and undergo management review before major issues are reported to the Board of Directors. Each of the four bodies within the structure – Production & Environment Subcommittee, Global Warming Prevention Division, Domestic Affiliated Companies' Environment Subcommittee, and Sales and Service/Distribution Environment Subcommittee – meet twice a year for the purpose of monitoring.

**Governance Structure Related to Climate Change**



**Medium- to Long-term Goals (Long-term Vision and Milestones)**

In order to contribute to a decarbonized society, SUBARU has set long-term goals (long-term vision) for 2050 and medium-term goals (milestones) for around 2030, regarding the product (Scope 3) and production phases (Scope 1 and 2).

SUBARU is investigating compliance with relevant policies including the fuel efficiency regulations of the countries it serves. We formulate our own scenarios and plans for achieving our medium- to long-term goals based on policy trends and scenario-specific information published by the International Energy Agency and others.

Category	Target year	Goal
Products (Scope 3)	2050	Reduce average well-to-wheel CO <sub>2</sub> emissions from new vehicles (in operation) by 90% or more compared to 2010 levels
	Early 2030s	Apply electrification technologies to all SUBARU vehicles produced and sold worldwide
	Up to 2030	Make at least 40% of SUBARU global sales electric vehicles (EVs) or hybrid electric vehicles (HEVs)
Plants and offices (Scope 1 and 2)	FYE March 2051	Achieve carbon neutrality
	FYE March 2031	Reduce CO <sub>2</sub> emissions by 30% compared with FYE March 2017 (total volume basis)

## Aiming at a 20,000 t-CO<sub>2</sub> Reduction from Plants and Offices

As part of the new medium-term environmental plan, Environment Action Plan 2030, the Subaru Group took on the challenge of reducing CO<sub>2</sub> emissions by 20,000 tons over the three years from FYE March 2019 through FYE March 2021. The actual reduction through FYE March 2021 was 36 thousand t-CO<sub>2</sub>, which significantly exceeded the target.

We will pivot to Environment Action Plan 2030, and will implement additional initiatives to reduce CO<sub>2</sub> emissions at plants and offices.

## Main Initiatives and CO<sub>2</sub> Emission Reduction Equivalents in FYE March 2021

Main initiatives	FYE March 2021 Results
Captive-consumption solar power system installed at Gunma Oizumi Plant <sup>*1</sup>	2,807t-CO <sub>2</sub>
Zero-carbon electricity from Aqua Premium and the Gunma Prefecture Hydropower Plan introduced at Gunma Main Plant	14,110t-CO <sub>2</sub>
Captive-consumption solar power system installed at Subaru Accessory Center and Kanto PDI Center <sup>*2</sup>	274t-CO <sub>2</sub>
Zero-carbon electricity from the Tochigi Furusato Denki program introduced at Utsunomiya South Plant and 2nd South Plant	4,906t-CO <sub>2</sub>
Green Power certificates utilized at Tokyo Office	3,772t-CO <sub>2</sub>
Solar power system installed at SIA Technical Training Center <sup>*3</sup>	119t-CO <sub>2</sub>
Green Power and Green Heat certificates <sup>*4</sup> utilized at Head Office (Ebisu Subaru Building) and Subaru Training Center	1,384t-CO <sub>2</sub>
Introduced carbon-free electric power at Ichitan Co., Ltd.	2,888t-CO <sub>2</sub>
Switching to LED lighting (total from FYE March 2019 to FYE March 2021) <sup>*5</sup>	3,251t-CO <sub>2</sub>
<b>Total</b>	<b>35,591t-CO<sub>2</sub></b>

\*1 Came online in May 2020. \*2 Came online in April 2020. \*3 Came online in December 2019. \*4 Provisional values to be verified under the Green Energy-based CO<sub>2</sub> Reduction Certification System of the Agency for Natural Resources and Energy (part of the Ministry of Economy, Trade and Industry) and the Ministry of the Environment. \*5 Total amount for the three-year plan period (FYE March 2019: 440 t-CO<sub>2</sub>; FYE March 2020: 1,428 t-CO<sub>2</sub>; FYE March 2021: 1,383 t-CO<sub>2</sub>).

## Initiatives to Reduce 20,000 Tons of CO<sub>2</sub> Emissions by FYE March 2021

### Captive-consumption solar power system



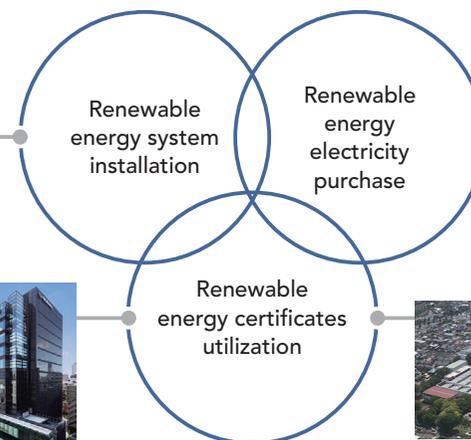
Japan's largest-scale captive-consumption solar power system (Gunma Oizumi Plant)



Subaru Accessory Center, etc.



Head Office and Subaru Training Center



### Purchase of hydroelectricity



Utsunomiya South Plant/ 2nd South Plant



Tokyo Office



Gunma Main Plant

## Achievements

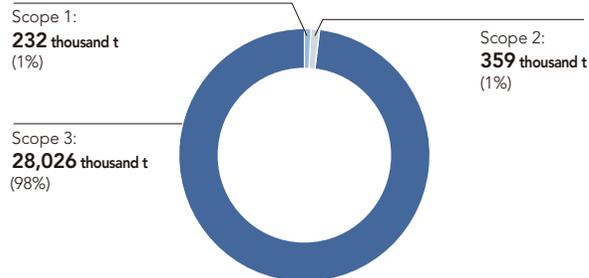
For FYE March 2021, SUBARU has reported a total of 28,617 thousand t-CO<sub>2</sub> of supply chain greenhouse gas emissions (Scopes 1, 2, and 3). Out of the total amount, 98% is related to Scope 3, the majority of which stems from the use of sold products.

Although our direct CO<sub>2</sub> emissions (Scopes 1 and 2) constitute only a marginal portion of the total, we are making proactive efforts to diminish direct emissions, which we believe will encourage the entire SUBARU value chain to work as a team and in greater earnest. In FYE March 2021, energy consumption decreased by 1,174 TJ due to a decrease in production, and Scope 1 and 2 emissions decreased 58 thousand tons due to the use of renewable energy and the temporary suspension of factory operations due to COVID-19 and the semiconductor shortage. Going forward, we will introduce cutting-edge energy conservation functions and renewable energy sources in order to further reduce CO<sub>2</sub> emissions and energy use.

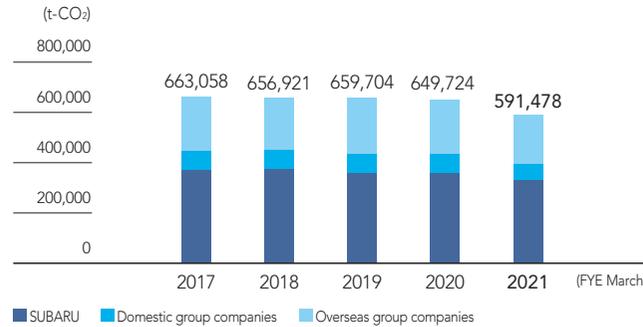
Scope 1: Direct emissions of greenhouse gases from a company's own facilities.

Scope 2: Indirect emissions of greenhouse gases from the use of purchased or acquired electricity, heat, and/or steam supplied by another company.

Scope 3: All indirect emissions other than Scope 1 and 2 emissions, including those arising from the procurement of raw materials, transport, product use, and the disposal process, as well as arising from employee commuting, business travel, etc.



### CO<sub>2</sub> Emissions by Organization



### Energy Consumption



### CO<sub>2</sub> Emissions by Scope



SUBARU calculates energy consumption and CO<sub>2</sub> emissions based on the Act on the Rational Use of Energy and the Act on Promotion of Global Warming Countermeasures. However, we use coefficients for overseas group companies that are based on local laws and regulations. We revise results for previous years after reviewing the relevant data.

CO<sub>2</sub> Emissions (Scopes 1, 2, 3) / Energy Consumption

Scope:

SUBARU: SUBARU CORPORATION

Domestic group companies: Yusoki Kogyo K.K., Fuji Machinery Co., Ltd., Ichitan Co., Ltd., Kiryu Industrial Co., Ltd., Subaru Logistics Co., Ltd., SUBARU dealerships

Overseas group companies: Subaru of Indiana Automotive, Inc., Subaru of America, Inc., Subaru of Canada, Inc., Subaru Research & Development, Inc.

Environmental  
ManagementEnvironmentally  
Friendly Automobiles**Climate  
Change**Resource  
RecyclingWater  
Resources

Biodiversity

Prevention  
of PollutionFYE March 2021 Environmental  
Performance Data for Plants and OfficesCO<sub>2</sub> Emissions (Scope 3)

Category	Greenhouse Gas Emissions (t-CO <sub>2</sub> )		
	FYE March 2019	FYE March 2020	FYE March 2021
1. Purchased goods and services	1,703,682	1,992,046	1,583,247
2. Capital goods	372,211	413,287	282,713
3. Fuel- and energy-related activities not included in Scope 1 or Scope 2	78,815	105,323	91,725
4. Transport and delivery (upstream)	658,268	737,817	601,167
5. Waste generated in operations	31,984	32,095	26,446
6. Business travel	4,446	4,554	4,689
7. Employee commuting	13,506	13,835	14,245
8. Leased assets (upstream)	N/A	N/A	N/A
9. Transportation and delivery (downstream)	N/A	N/A	N/A
10. Processing of sold products	N/A	N/A	N/A
11. Use of sold products	29,079,531	29,736,064	24,941,586
12. End-of-life treatment of sold products	556,139	575,107	478,558
13. Leased assets (downstream)	2,394	2,463	1,998
14. Franchises	N/A	N/A	N/A
15. Investments	N/A	N/A	N/A

Source: The calculation method for SUBARU Scope 3 emissions has been revised in reference to the Basic Guidelines on Accounting for Greenhouse Gas Emissions throughout the Supply Chain Ver. 2.3 (December 2017) by the Ministry of the Environment and Ministry of Economy, Trade and Industry; the Emissions Unit Value Database Ver. 3.0 by the Ministry of the Environment Database of emissions unit values; and SUBARU's life cycle assessment (LCA) calculation standards.

## Initiatives

SUBARU is reducing its CO<sub>2</sub> emissions by using renewable energy and upgrading to highly efficient machinery and equipment with the aim of achieving carbon neutrality in 2050.

Renewable energy in FYE March 2021 will account for 3.4% of the energy consumption of the entire Subaru Group. All of the electricity used at Gunma Main Plant, Utsunomiya South Plant and 2nd South Plant and the Ebisu Subaru Building is carbon-neutral electric power.

In addition, energy conservation initiatives at the Gunma Main Plant that centered on the introduction of an exhaust heat recovery system in the automotive painting process received the 2020 Energy Conservation Center Chairman's Award from the Energy Conservation Center, Japan.

We have also been proactively switching to LED lighting since FYE March 2016, and in FYE March 2021 we reduced CO<sub>2</sub> emissions by approximately 1,400 tons annually by switching approximately 2,500 lighting fixtures to LED lighting.

In addition, Subaru Kohsan Co., Ltd. sells electricity generated from solar power generation facilities in Gunma and Shiga prefectures.

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## Gunma Plant

The Gunma Plant's West Building, completed in April 2016, has installed solar panels with a 20 kWh capacity, and employed two key advanced environmental functions: a new-generation lighting system that has incorporated individual address control and image-pickup human-presence sensor technologies; and a high-efficiency air-cooling heat-pump chiller. The plant has also adopted a number of non-mechanical features that can help achieve energy conservation and workplace comfort, such as low-e double-pane windows, trench heating/cooling systems, and balconies that create an attractive recreation space while also serving as a sunlight blocker.

### ■ Purchase of Carbon-Neutral Electricity (Gunma Main Plant, Oizumi Plant)

The Gunma Main Plant had been purchasing a portion of its electricity through the Aqua Premium rate plan specifically for sales of hydropower, but switched to the Gunma Hydropower Plan in November 2020. All of its electricity is now from hydropower, which reduced CO<sub>2</sub> emissions by approximately 14 thousand tons in FYE March 2021.

We also reduced CO<sub>2</sub> emissions by approximately 1,200 tons by using non-fossil fuel certificates for the approximately 2,500 MWh of electricity the Oizumi Plant of Gunma Manufacturing Co., Ltd. purchased in FYE March 2021.

### ■ Introduction of High-efficiency Air-conditioning Systems (Gunma Yajima Plant)

The automobile painting process involves repeated heating and cooling steps, which consumes a huge amount of energy. To address this issue, the Gunma Yajima Plant adopted a heat pump-based highly efficient heat source system to replace the previous

discrete heat source system, starting its operation in 2018. In FYE March 2021, the new technology reduced CO<sub>2</sub> emissions by 2,338 tons compared with the previous system.

### ■ Replacement of Cogeneration Facilities

Because the first cogeneration facilities installed at the Gunma Plant had been in operation for 15 years, we replaced the old facilities with new equipment that started operation in 2019. For the replacement, we selected a model with specifications that make a greater contribution to energy savings in light of the most recent energy consumption profile.

In FYE March 2021, the new facilities reduced CO<sub>2</sub> emissions by 6,000 tons compared with operation period of the previous model.

### ■ Solar Power Generation at the Gunma Oizumi Plant and the Gunma Yajima Plant

Since May 2020, the Gunma Oizumi Plant has been operating one of the largest solar power generation facilities for internal use in Japan. It generates approximately 5,000 MWh/year, and the Gunma Yajima Plant reduced CO<sub>2</sub> emissions by approximately 2,800 tons in FYE March 2021. In addition, the Gunma Yajima Plant will install solar power generation equipment in a multi-story parking garage and final inspection building, and begin using it in FYE March 2022.

## Aerospace Company (Utsunomiya Plant and Handa Plant)

### ■ Carbon-Neutral Electricity Purchased through the Tochigi Furusato Denki Program for Regional Production and Consumption

In FYE March 2019, SUBARU's Aerospace Company adopted the Tochigi Furusato Denki program<sup>\*1</sup> to provide electricity to its Utsunomiya South and 2nd South Plants. The program offers electricity from hydropower generation projects owned by Tochigi Prefecture, and represents Japan's first-ever power supply program themed on the "local production for local consumption" concept.

The above program enables the two plants to reduce emissions by an average of 4,700-plus t-CO<sub>2</sub> per year. This program also includes a scheme to spend part of the funds from bill payment, including from SUBARU, on environmental conservation projects promoted in Tochigi Prefecture.

<sup>\*1</sup> Electricity service program co-hosted by the Tochigi Public Enterprise Bureau and TEPCO Energy Partner, Inc. Supplies electricity generated by eight hydroelectric power stations run by the Tochigi prefectural government. Hydropower users can claim to be emitting no CO<sub>2</sub> from using the electricity, on the grounds of its carbon-free generation process.

### ■ Replacement of Cogeneration Facilities

In March 2021, upon completion of the contract with the energy service company (ESCO<sup>\*2</sup>) we replaced the cogeneration system it installed in 2005. In addition to reducing CO<sub>2</sub> emissions, the new cogeneration system enhances community and employee safety with its blackout start function that can initiate power generation if the power grid goes down for an extended period.

<sup>\*2</sup> A Ministry of the Environment program that covers all expenses related to energy-saving improvements that reduce utility costs, with ESCO providing all services from energy-saving diagnosis and design to construction, operation, maintenance, and financing.

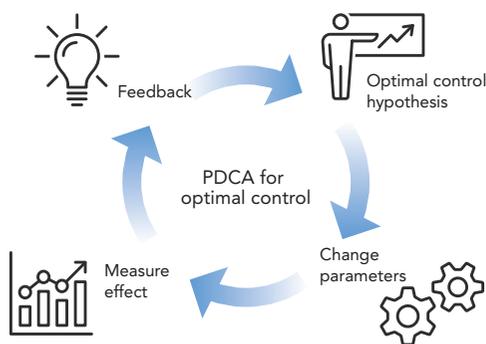
**IoT Enables Stable Supply of Factory Air and Improved Energy Efficiency**

SUBARU is moving forward with digital transformation (DX) driven by information and communication technologies (ICT) and the Internet of things (IoT). We began the systemization of air factory analysis, data analysis and the introduction of countermeasures in November 2019. We have implemented three measures: investigating and repairing air leaks, restricting air supply and improving operating efficiency. We expect energy savings to reduce CO<sub>2</sub> emissions by 500 tons per year.



Air leak investigation

**Improve Compressor Operating Efficiency**



**Tokyo Office**

The Tokyo Office is in Mitaka, Tokyo. It is subject to the Tokyo Cap-and-Trade Program for large facilities as per the Tokyo Metropolitan Environmental Security Ordinance. The Tokyo Office is therefore reducing CO<sub>2</sub> emissions with two priority initiatives: promoting energy conservation by improving facilities and by proactively adopting energy-saving equipment. We are also promoting the use of renewable energy, and have installed solar power generation equipment with approximate capacity of 30 kW on the rooftops of office buildings. The system generated 38 MWh in FYE March 2021, which the Tokyo Office used for a portion of its electricity requirements.

We are also reducing CO<sub>2</sub> emissions by using the Green Power Certificate system. In FYE March 2021, we purchased 8,535 MWh of electricity under the Green Power Certificate system, which effectively reduced CO<sub>2</sub> emissions equivalent to 3,772 tons.

**Offices**

**Head Office (Ebisu Subaru Building) and Subaru Training Center**

Targeting offices with zero CO<sub>2</sub> emissions, we use the Green Power Certificate and Green Heat Certificate systems for the electricity and heat we use. In FYE March 2021, we reduced CO<sub>2</sub> emissions by 1,384 tons.

**Subaru Accessory Center**

In March 2020, the Subaru Accessory Center introduced a solar power generation facility with annual power generation capacity of 1,145 MWh/year. We plan to reduce CO<sub>2</sub> emissions by approximately 274 tons annually.

**Subaru Research and Experiment Center**

The Subaru Research and Experiment Center installed solar power generation equipment in FYE March 2018, and generated 64 MWh in FYE March 2021.



Subaru Research and Experiment Center

**Domestic group companies**

**Fuji Machinery Oizumi Plant**

The Oizumi Plant of Fuji Machinery Co., Ltd. installed solar power generation equipment in FYE March 2018, and generated 36 MWh.



Fuji Machinery Co., Ltd. Oizumi Plant

**Ichitan Co., Ltd.**

Ichitan has been reducing annual CO<sub>2</sub> emissions by 2,888 t-CO<sub>2</sub> by purchasing carbon-free electricity.

**Subaru Kohsan Co., Ltd.**

Subaru Kohsan Co., Ltd. entered the business of marketing electricity from solar power generation facilities. The project, which involved the installation of solar power generation equipment with a rated output of 420 kW (equivalent to 100 detached houses) in Kiryu, Gunma Prefecture, resulted in the sales of 627 MWh of electricity in FYE March 2020. Subaru Kohsan also launched power generation in Shiga Prefecture in March 2021 with annual capacity of 1,553 MWh.

## Overseas group companies

### Subaru of Indiana Automotive, Inc. (SIA)

The SIA Technical Training Center has solar power generation equipment on its roof and LEDs with motion sensors for all indoor lighting. The center generated 160 MWh of solar in FYE March 2021, and reduced electricity use by replacing compressors and other air-conditioning equipment.

### Subaru of America, Inc.

Subaru of America, Inc.'s new headquarters and training center have acquired silver LEED certification,<sup>\*3</sup> which is higher than standard certification.

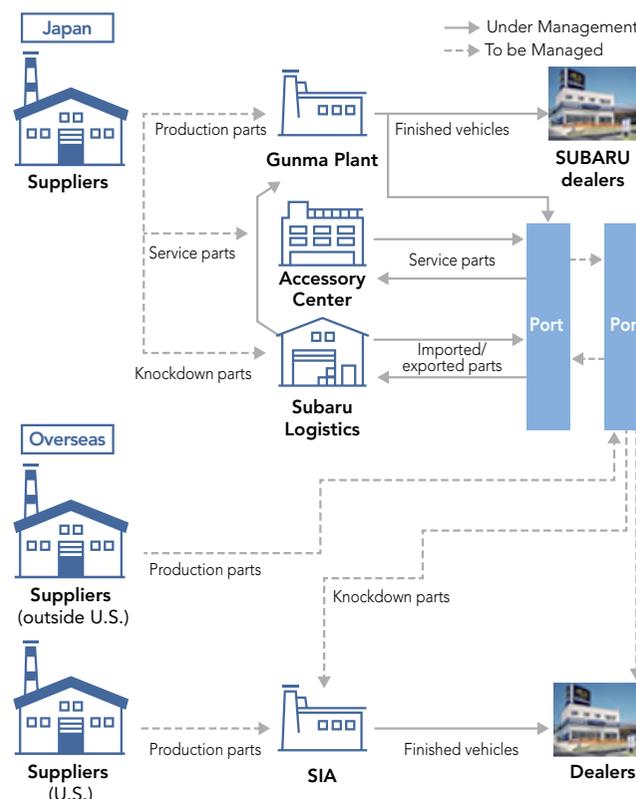
\*3 Leadership in Energy and Environmental Design (LEED) certification is a green building certification system developed and operated by the U.S. Green Building Council (USGBC). It provides objective environmental performance data on buildings through evaluation of energy conservation and environmental impact reduction abilities for a range of project stages from overall planning and design to construction, management, and maintenance. Acquisition of the certification is becoming popular in the U.S. and others.

### Subaru Canada, Inc.

The building that houses the relocated office of Scott Subaru, a retailer of Subaru Canada, Inc., from 2019 boasts a distinctively high energy efficiency design that enables comfort without air conditioning systems. In recognition of this, the building is the world's first retail facility to obtain a passive house certification.

## Distribution

SUBARU is working with its logistics and distribution arms to reduce CO<sub>2</sub> emissions from the entire group through increased transport efficiency for finished vehicles and export parts. We will enhance supply management, which will contribute to carbon neutrality in 2050.



## Transport of Finished Vehicles

To improve the transport efficiency for finished vehicles, SUBARU is rolling out various measures, including establishing optimal standard routes, ensuring flexibility to accommodate shipping of a wide range of vehicle types and sizes (particularly large cars), improving loading efficiency, installing digital tachographs<sup>\*4</sup> to help energy conservation, and promoting modal shift.<sup>\*5</sup>

As a result of expanded efforts for consolidated and standardized transportation routes, per unit CO<sub>2</sub> emissions from transportation of SUBARU vehicles in FYE March 2021 declined 6.4% from the FYE March 2007 level, against the target of a 1% reduction per year from the base year. We will continue with our efforts to pursue further reductions.

\*4 Fitted to a vehicle to automatically record its journey information, such as driving time and speed, and store the information in the installed recording medium, such as a memory card. The device is employed broadly by industries involving the commercial operation of vehicles as a tool for driving management. As the system can present clear data of recorded events, including sudden acceleration and deceleration, fuel-wasting engine idling, and dangerous driving, it is expected to help drivers increase their awareness of safe driving and fuel economy.

\*5 For cargo transportation, switching transportation modes from trucks to those imposing less environmental burden, such as railway and seaborne systems.

## Export Parts

Subaru Logistics Co., Ltd., which packages and ships parts for overseas production of SUBARU vehicles, makes ongoing efforts to improve the container fill rate. Key activities relate to utilizing unused upper space in high cube containers, improving packing modes, and employing lighter-weight packaging materials. Despite these ongoing initiatives, the container fill rate decreased to 85.4% in FYE March 2021 due to production fluctuations at our U.S. factory.

We are also increasing transport route efficiency. We began using the container round use system<sup>\*6</sup> in FYE March 2018. This enabled us to reduce emissions by 400 t-CO<sub>2</sub> year on year in FYE March 2021. The use of inland container depots<sup>\*7</sup> has reduced 67

Environmental Management

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**Climate Change**

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t-CO<sub>2</sub>, which is equivalent to 472 containers. We will continue to implement initiatives to reduce CO<sub>2</sub> emissions.

\*6. System for shared use of sea freight containers between importers and exporter. Allows empty containers that have been used for import to be directly reused for export, without first being returned to the originating port, thereby decreasing unnecessary shipment of empty containers from ports.

\*7. Inland function for consolidation of sea freight container cargo. Introduced as part of redevelopment plans for the overland portion of sea freight container transportation systems to save shippers' transport costs and increase transport efficiency.

	2017	2018	2019	2020	2021 (FYE March)
Container fill rate	89%	88%	79%	94%	85%

### ■ Distribution Center

Subaru of America, Inc.'s regional distribution center has participated in the Oregon Clean Fuel Program since 2020 and has begun switching to electric trucks. In addition, Subaru of America reduced CO<sub>2</sub> emissions by installing solar power generation equipment on the new building of the relocated regional distribution center.

### Sales

Dealers in Japan have switched to LED lighting and high-efficiency air conditioning when replacing aging equipment. In addition, Tokyo Subaru Co., Ltd. and Kanagawa Subaru Co., Ltd. have reduced total CO<sub>2</sub> emissions by approximately 2,600 tons in FYE March 2021 by switching to purchases of carbon-neutral power.

We will continue to pivot to decoupling energy consumption and CO<sub>2</sub> emissions with initiatives to create environmentally responsible dealers that care about people.



Employees in charge of Tokyo Subaru and Kanagawa Subaru

### External Partnerships

SUBARU is tackling the climate change challenge through partnerships with suppliers, customers, and industry groups.

#### ■ Alliance with Toyota Motor Corporation

SUBARU and Toyota Motor announced an agreement to jointly develop EV platforms and vehicles applying SUBARU's AWD technologies and Toyota Motor's electrification technologies. This agreement will enable the two automakers to multiply their technical strengths with the goal of creating attractive EV products.

#### ■ Suppliers

We have set out a code of conduct that requires supplier selection and management mechanisms relating to climate change issues, and share the code with our suppliers, asking them to take appropriate actions when providing orientation sessions. This measure has encouraged suppliers to voluntarily work to obtain ISO14001 certification, resulting in a decline in environmental accidents and mismanagement events.

We have also created and run a system to assist voluntary Tier 2 customers\*<sup>8</sup> in seeking Eco Action 21 certification.

\*<sup>8</sup> Secondary subcontractor that supplies parts to motor vehicle manufacturers.

#### ■ Industry Groups

SUBARU is a member of the climate change committee of the Japan Automobile Manufacturers Association, Inc. (JAMA). Also, the President and Executive Vice Presidents are JAMA directors responsible for the body's executive decision making, and decisions made by the JAMA are reflected in SUBARU's mid-term management vision.

#### ■ Customers

Carter Subaru Ballard, a U.S. dealer, runs regional forest conservation campaigns involving its customers. Specifically, for each test drive in a SUBARU car, the dealer donates one tree to be planted in areas along national highways, and an additional three trees for each purchase. This forestation initiative engages customers and local residents and helps them become more aware of environmental issues, including climate change.