



## Environmental Report 2019 –Toward the Toyota Environmental Challenge 2050–

### Editorial Policy

Toyota Motor Corporation considers environmental issues to be one of its management priorities. Since 1998, we have published an annual Environmental Report to explain our environmental initiatives. From FY2017, the content of the report is presented in conformance with the six challenges defined under our long-term initiative, the Toyota Environmental Challenge 2050.

The Environmental Report is a specialized publication excerpted from the Sustainability Data Book. It covers only our environmental initiatives. For information on Toyota's CSR management and initiatives, please refer to our Sustainability Data Book 2019.

We have also published the Annual Report, in which Toyota shares with our stakeholders the ways in which Toyota's business is contributing to the sustainable development of society and the Earth on a comprehensive basis from a medium- to long-term perspective.

### Period Covered by Report

The data featured in this report covers the fiscal year 2019, from April 2018 to March 2019. For major ongoing initiatives, data from April 2019 onward is also included.

### Scope of Report

The report covers Toyota Motor Corporation (TMC) initiatives as well as the activities of consolidated subsidiaries and affiliates in Japan and overseas.

### Reference Guidelines

- Ministry of the Environment of Japan Environmental Reporting Guidelines (2018 Version)
- A GRI Sustainability Reporting Guidelines comparison chart is available on the website



Scan QR code for details

### About the Icons

**Third Party Assurance** Denotes data confirmed through Independent Practitioner's Assurance

**Annual Report** <https://global.toyota/en/ir/library/annual/>

**Securities Reports (Japanese text only)**

<https://global.toyota/jp/ir/library/securities-report/>

**U.S. SEC Filings**

<https://global.toyota/en/ir/library/sec/>

**Financial Results**

<https://global.toyota/en/ir/financial-results/>

**Corporate Governance Reports**

<https://global.toyota/en/ir/library/corporate-governance/>

**Sustainability Data Book 2019**

<https://global.toyota/en/sustainability/report/sdb/>

**Environmental Report 2019**

–Toward the Toyota Environmental Challenge 2050–

<https://global.toyota/en/sustainability/report/er/>

- The Toyota website also provides information on corporate initiatives not included in the above reports.
 

Sustainability	<a href="https://global.toyota/en/sustainability/">https://global.toyota/en/sustainability/</a>
Environment	<a href="https://global.toyota/en/sustainability/esg/">https://global.toyota/en/sustainability/esg/</a>
Social Contribution Activities	<a href="https://global.toyota/en/sustainability/esg/social-contribution/">https://global.toyota/en/sustainability/esg/social-contribution/</a>

**TOYOTA**        
**ENVIRONMENTAL**  
**CHALLENGE 2050**



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## Overview of Toyota Motor Corporation

### Company Profile

Company Name	Toyota Motor Corporation
President and Representative Director	Akio Toyoda
Company Address	Head Office 1 Toyota-cho, Toyota City, Aichi Prefecture, Japan Tokyo Head Office 1-4-18 Koraku, Bunkyo-ku, Tokyo, Japan Nagoya Office 4-7-1 Meieki, Nakamura-ku, Nagoya City, Aichi Prefecture, Japan
Date Founded	August 28, 1937
Capital	635.4 billion yen (as of end of March, 2019)
Main Business Activities	Motor Vehicle Production and Sales
No. of Employees (consolidated)	370,870 (as of end of March, 2019)
No. of Consolidated Subsidiaries	608 (as of end of March, 2019)
No. of Affil. Accounted for under the Equity Method	63 (as of end of March, 2019)

### Non-automotive Business



#### Financial Services

Provides financial services for vehicle loans and leasing in more than 30 countries and regions worldwide.



#### Housing

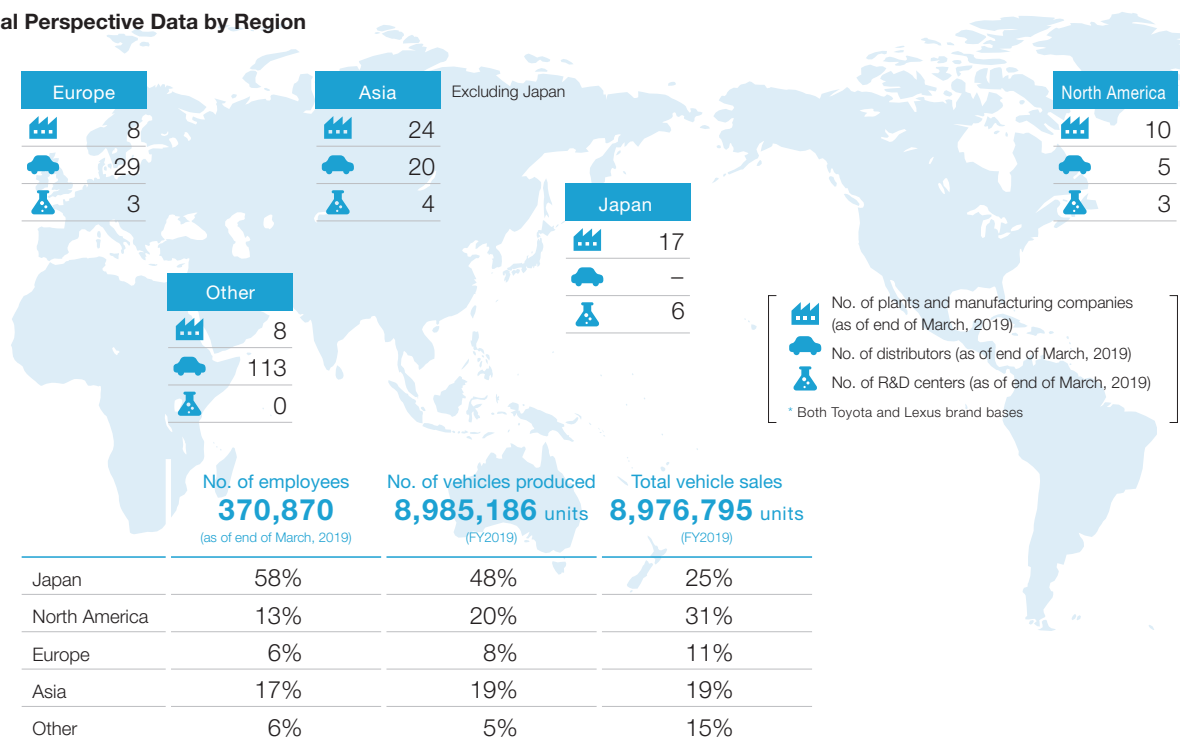
Consolidating the Toyota Group's knowledge to offer a wide variety of housing services to meet different customer needs.



#### Other Business

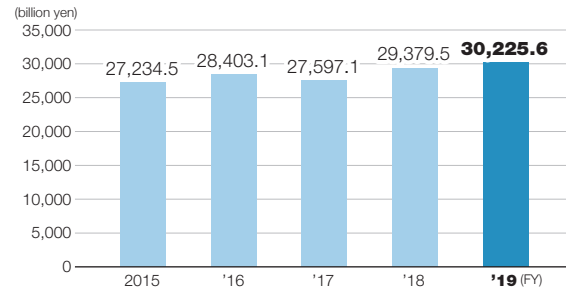
Toyota is also involved in marine businesses, as well as biotechnology and afforestation businesses.

### Global Perspective Data by Region

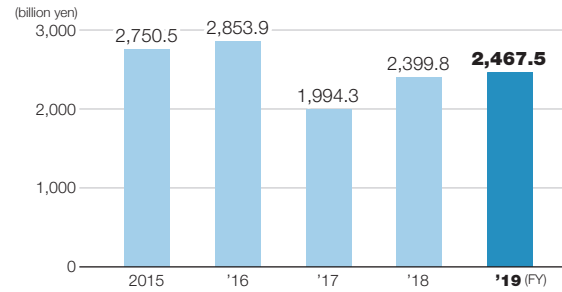


## Consolidated Financial Highlights Based on U.S. GAAP—Generally Accepted Accounting Principles (Financial years ended March 31)

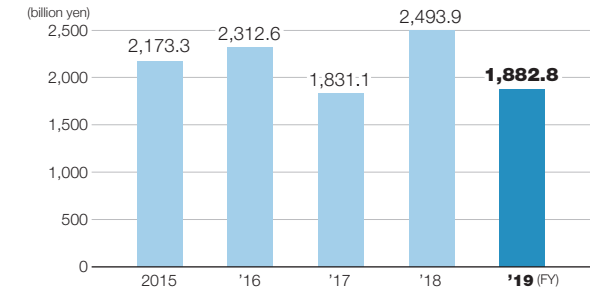
### Net Revenues



### Operating Income

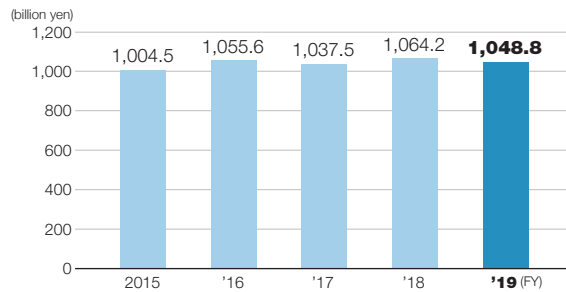


### Net Income

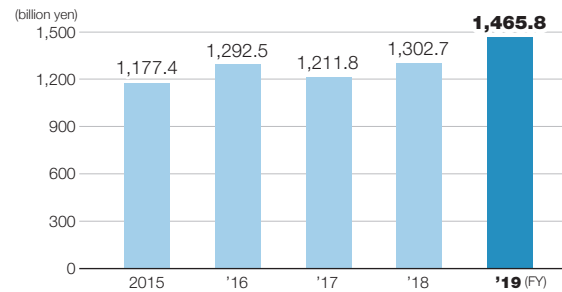


• Shows the net income attributable to the shareholders of Toyota Motor Corporation

### R&D Expenses



### Capital Expenditures



• Capital expenditure excludes vehicles for leasing

## Highlights

### Toyota Becomes Signatory to the TCFD Recommendations

Toyota supports and signed the recommendations announced by the Task Force on Climate-related Financial Disclosures (TCFD) established by the Financial Stability Board. We will analyze the risks and opportunities resulting from climate change, taking into consideration the TCFD recommendations, and conduct appropriate information disclosures.



### Biotope Tsutsumi, intended to help conserve the ecosystem, Wins the Biotope Award Grand Prize

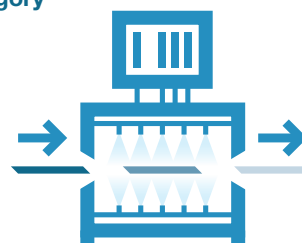
Biotope Tsutsumi is the largest biotope among TMC plants in Japan. Active measures to conserve rare species undertaken in cooperation with experts were highly evaluated.



### Minister of Economy, Trade and Industry Award

#### 2018 Energy Conservation Grand Prize received in the joint implementation category

Efforts to save energy through rapid heating of thermoplastic CFRP using superheated steam were recognized, and Toyota won the Minister of Economy, Trade and Industry Award along with Chubu Electric Power Co., Inc. and Yutaka Electronics Industry Company Limited.



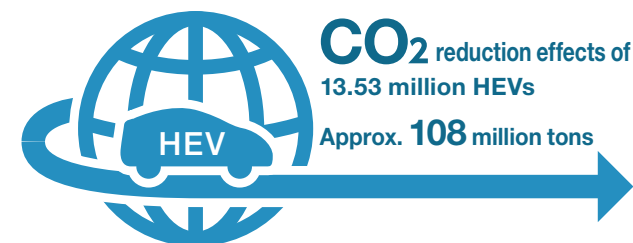
#### Environmental Report 2018 Wins Prize of the 22nd Environmental Communication Awards

### Grand Prize in the Environmental Reporting Category

Toyota's investigation of climate-related risks and opportunities based on the 2°C and beyond 2°C scenarios, the logic of the 2030 Milestone designed to achieve the Toyota Environmental Challenge 2050, and other elements were highly evaluated.



Cumulative global sales of hybrid electric vehicles (HEVs):  
**Approx. 13.53 million units**



### Purchase of the Certificate of Green Power

Contribute to global environmental conservation and support the expansion of renewable energy

The Certificate of Green Power

**40,000 MWh**

The Certificate of Green Heat

**56,000 GJ**



## Message from the Head of the Company

### For our “Home Planet”

Firstly, I would like to express my sincere gratitude for your continued support and understanding.

As in previous years, many precious lives were lost in a number of natural disasters last year and as well as Japan, other countries worldwide also suffered damage caused by natural disasters. One factor behind these natural disasters is global warming, although there are other accumulated issues we must resolve, such as air pollution and energy problems.

Economic growth is the basic responsibility of our generation. At the same time, we are also responsible for conserving our beautiful home for future generations, as a place where they can live safely. As we all know, sky and sea are connected over the world, where we should retain a global vision. Just as we love our own home town and country, we must love the Earth, home to all of us and bequeath this beautiful Home Planet to the next generation. This is the responsibility with which our generation has been tasked.

We need to rethink our “Home Planet” perspective, above and beyond concepts of “home town” and “home country.”

The automobile industry has proactively developed new environmental technologies, but however excellent they may be, technologies remain globally inefficient unless they are popularized. The condition of environmental problems and how vehicles are used vary depending on the country or region. To accommodate all customers’ requests, Toyota aims to be a “manufacturer offering a full lineup of electric vehicles.”



Regarding fuel cell vehicles, besides the existing “zero emission,” Toyota has proposed a new concept of “minus emission,” which features absorbing air when generating electricity and then emitting cleaner air. Toyota has also begun establishing a new and unprecedented partnership by granting its electrification patents free of charge.

Underpinning these activities is our hope to “help conserving our beautiful Home Planet by popularizing environmental technologies.” What else can we do for our “Home Planet?” I would like to think and act together with all the Toyota staff working around the world.

We kindly request the continued support and understanding of all our stakeholders.

September 2019

**Akio Toyoda**

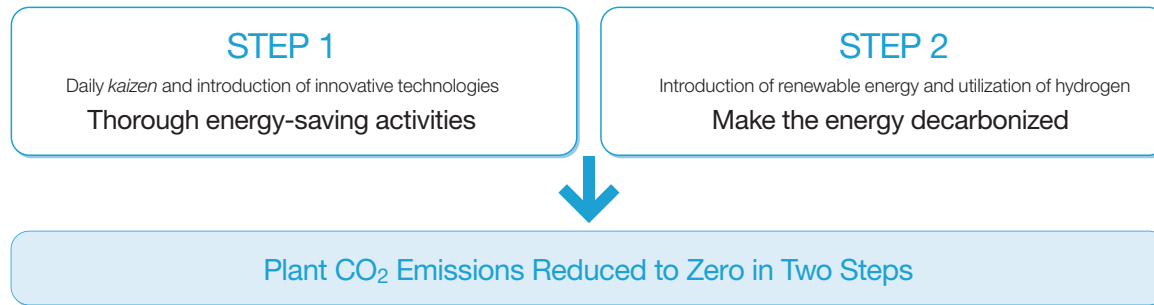
President  
Toyota Motor Corporation



Special Feature

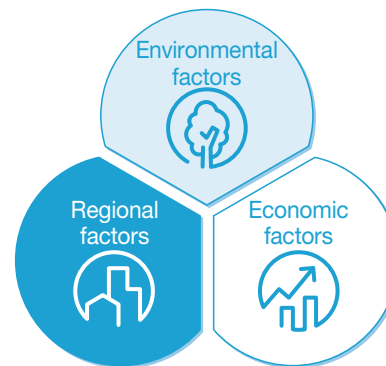
## Effective Use of Renewable Energy Toward Creating a Decarbonized Society by 2050

In recent years, one means of decarbonization that holds particular promise is the use of renewable energy. Toyota is working to reduce CO<sub>2</sub> through comprehensive energy-saving activities by daily *kaizen* and introduction of innovative technologies at manufacturing sites. In addition, to decarbonize the energy needed, Toyota is promoting both the introduction of renewable energy and the utilization of hydrogen. The utilization of renewable energy is an issue that needs to be addressed throughout society, and accordingly, we are collaborating with many parties including the national and local governments as well as local communities and other businesses. Our objective is to achieve zero CO<sub>2</sub> emissions at our plants all over the world by 2050.



### Three Perspectives on the Expanding Use of Renewable Energy

Toyota is expanding the use of renewable energy while taking into consideration the perspectives of environmental, regional, and economic factors. At Toyota plants, we are introducing in-house renewable energy for internal consumption and promoting the use of renewable energy through Group-wide efforts in collaboration with local communities tailored to the systems and social trends in each region of the world. We are also selecting options that lead to the widespread use of renewable energy throughout society such as the Certificate of Green Power. Toyota actively participates in creating systems and mechanisms that lead to the widespread use of renewable energy and is working to expand the use of renewable energy throughout society.



### Main Projects in Japan

#### Participation in Local Production and Local Consumption Model for Renewable Energy

We are participating in the SDGs Toyota Renewable Energy Challenge, a demonstration project launched by Toyota City in 2019 to locally produce renewable energy for local consumption. Under this initiative, locally produced renewable energy including solar power and biomass energy as well as its environmental value are utilized at local public facilities, plants, and so on. As a part of this initiative, Toyota is challenging to make battery electric vehicles (BEVs) carbon free throughout their entire product life cycle. Specifically, utilizing the environmental value of renewable energy through the Certificate of Green Power with “Ha:mo,” car-sharing ultra-compact BEVs, we seek to reduce carbon throughout the product lifecycle. In addition, the



demonstration project will create new value and contribute to the creation of a sustainable society.

Ha:mo COMS

#### Purchase of the Certificate of Green Power

Since April 2018, we are working to expand the use of renewable energy utilizing the Certificate of Green Power to achieve its environmental challenges.

The Green Power Certificate system is a mechanism to trade the environmental added value of electric power generated from wind power, solar power, biomass, and other renewable energy; certificate issuers receive third party certification in the form of the Certificate of Green Power. The fees paid by companies, local governments, and others that purchase the Certificate of Green Power are used to maintain and expand power generating facilities through the certificate issuers.

The Certificate of Green Power: **40,000 MWh**

The Certificate of Green Heat: **56,000 GJ**



Special Feature: Effective Use of Renewable Energy

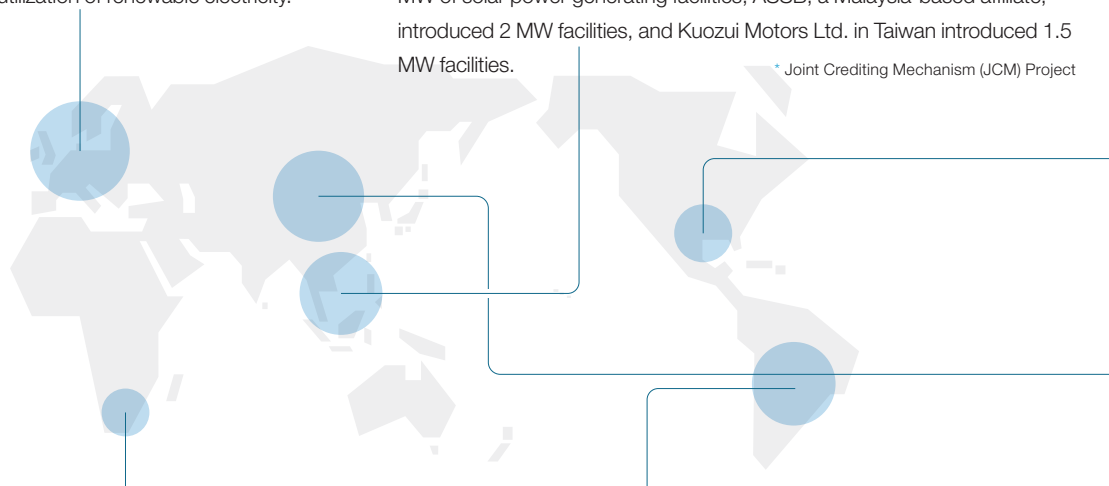
Toyota Environmental Challenge 2050/2030 Milestone

FY2019 Review of the Sixth Toyota Environmental Action Plan

## Main Projects Overseas

### Europe: 100 Percent Renewable Electricity Used at 4 Plants

Europe is a region suited to the introduction of renewable energy, and we are actively utilizing renewable electricity tailored to local characteristics. TMMT, a Turkey-based affiliate, TMUK-D, an U.K.-based affiliate, TMMP, a Poland-based affiliate, and TMR, a Russia-based affiliate, began purchasing 100 percent renewable electricity in 2018. We will continue to expand the utilization of renewable electricity.



### Asia-Pacific: Solar Power Generation Introduced in Southeast Asia, India, and Taiwan

TMP, a Philippine-based affiliate, began generating a capacity of 1 MW of solar power\*, and TMT and TDEM, a Thailand-based affiliates, began generating a capacity of 2.5 MW and 3.4 MW\*. TMT and STM, Thailand-based affiliates, are implementing a three-year plan to introduce approximately 37 MW of solar power generating facility starting in 2019. In addition, TKM and TKAP, an India-based affiliate, introduced 26 MW and 3 MW of solar power generating facilities, ASSB, a Malaysia-based affiliate, introduced 2 MW facilities, and Kuozui Motors Ltd. in Taiwan introduced 1.5 MW facilities.

\* Joint Crediting Mechanism (JCM) Project

### South Africa: Continue Introduction of Solar Power Generation

At TSAM, a South Africa-based affiliate, additional solar panels with a capacity of 1.3 MW were installed on the rooftop, reducing reliance on fossil fuels. The company plans continuous activities for the utilization of renewable electricity.

### South America: 100 Percent Renewable Electricity by 2020

Electric power generated from renewable energy is being introduced starting in areas that are highly suitable for renewable energy in terms of their economic and regional factors.

TDB, a Brazil-based affiliate, utilizes electric power generated from hydroelectric power, wind power, and biomass, and has achieved 100 percent renewable electricity.

The use of electric power generated from renewable electricity by TASA, an Argentina-based affiliate, is currently approximately 25 percent, but the company is introducing additional renewable electricity with a target of reaching 100 percent by 2020. As a result, CO<sub>2</sub> emissions will be reduced by approximately 40,000 tons.

### North America: Renewable Electricity Covers All Electric Power at North American Headquarters Campus

The new head office of TMNA, a North America-based affiliate, was designed to maximize the utilization of natural light by adopting exterior walls made predominantly from glass. Also, southern exposures have generous roof overhangs to control sunlight to appropriate levels. Moreover, the buildings and parking facility have more than 20,000 solar panels installed, providing more than 30 percent of the electric power used in the buildings. Electricity is also purchased from wind power generated in Texas, and as a result, renewable electricity covers all electric power usage.



The new head office of TMNA, North America

### China: Solar Power Generation Being Introduced at Plants

The introduction of on-site solar power generating facilities is being considered for all plants, and installation on building rooftops and parking facilities is being conducted at plants where installable. Approximately 10 MW of solar power generating facilities have been installed at the new plants of GTMC and TFTM, so far. In addition, installation is already completed at TFAP, TFTD, GTE, and other sites, bringing the total solar power generating capacity at the plants of all China-based affiliates to 28 MW.



Solar panels at GTMC

## Toyota Environmental Challenge 2050

### —Going Beyond Zero Environmental Impact and Achieving a Net Positive Impact

We have formulated the Toyota Earth Charter based on the Guiding Principles at Toyota, considering environmental issues as a paramount importance, and have established its promotion structure to address such issues. In the course of perceiving public opinions or world trends and while considering our focus in the years to come, Toyota is working on this problem with new ideas and technologies ahead of future challenges. In October 2015, we formulated six challenges based on piles of environmental issues and we have been moving ahead, aiming to establish a future society in harmony with nature.

#### Six Environmental Challenges to Be Achieved by Toyota Toward 2050

<p><b>Challenge 1</b></p> <p><b>Challenge 1</b></p>	<p><b>Challenge 2</b></p> <p><b>Challenge 2</b></p>
<p><b>Challenge 3</b></p> <p><b>Challenge 3</b></p>	<p><b>Challenge 4</b></p> <p><b>Challenge 4</b></p>
<p><b>Challenge 5</b></p> <p><b>Challenge 5</b></p>	<p><b>Challenge 6</b></p> <p><b>Challenge 6</b></p>

Toyota is contributing to achieving the goals and targets of the SDGs\* through measures to realize the Toyota Environmental Challenge 2050. On the first page of each challenge, relevant goals and targets of the SDGs are described together with action plans and goals of the sixth Toyota Environmental Action Plan for achieving the SDGs.

\* Sustainable Development Goals: International goals for the period from 2016 to 2030 set forth in the 2030 Agenda for Sustainable Development adopted at the United Nations General Assembly in September 2015. The SDGs consists of 17 goals and 169 targets.



#### Processes to Identify and Implement the Key Challenges (Materiality)

Environmental challenges may involve both business risks and opportunities. It is therefore essential to identify key challenges (materiality) from both risk and opportunity perspectives when formulating a long-term vision. In order to grasp the potential risks and business opportunities, Toyota has collected information, analyzing and identifying environmental challenges from the standpoints of the degree of relevance to stakeholder and the importance for our business.

<b>STEP</b> <b>1</b>	<p><b>Organize Medium- to Long-term Issues Based on the Business Environment</b></p> <p>We examined a wide range of global trends in collecting and analyzing information. These include scientific predictions for the environment in 2050, global frameworks and policy trends, development in emerging countries, major index from external rating agencies, and world leaders' remarks on environmental issues at G7 Summits. This broad examination provided us with an understanding of macroeconomic trends and important needs of societies, enabling us to organize candidate challenges.</p>
<b>STEP</b> <b>2</b>	<p><b>Extract Key Challenges (Materiality)</b></p> <p>From the candidate challenges organized in Step 1, we extracted challenges that need to be addressed based on analyses of external affairs obtained through key indicators of ESG investors and research institutions, and communication with stakeholders including international organizations, NGOs, and consumers, while the analyses of internal affairs is based on the Guiding Principles at Toyota, the Toyota Earth Charter, and discussions among concerned internal divisions.</p>
<b>STEP</b> <b>3</b>	<p><b>Evaluate and Identify Key Challenges (Materiality)</b></p> <p>We conducted two-axis mapping of the challenges extracted in Step 2 from the perspectives of the level of relevance to stakeholders and the risks and potential for creation of new business within Toyota's business activities and prioritized them.</p>
<b>STEP</b> <b>4</b>	<p><b>Toyota Environmental Challenge 2050 Formulation, Regular Review of Action Plans, and Information Disclosures</b></p> <p>We formulated challenges that are of high relevance to stakeholders and are priorities for Toyota as the Toyota Environmental Challenge 2050 (Six Challenges) and approved by the Corporate Planning Meeting (current "Sustainability Meeting"), which deliberates on Toyota's medium- to long-term strategies. Steady implementation of our challenges requires top management's recognition of environmental initiatives as potential business opportunities and make effective investments, in addition to involving Toyota Group companies as well as strengthening collaboration with our business partners. Accordingly, we will review and evaluate our action plans on a regular basis.</p>

Special Feature: Effective Use of Renewable Energy

Toyota Environmental Challenge 2050/2030 Milestone

FY2019 Review of the Sixth Toyota Environmental Action Plan

## 2030 Milestone Set in Order to Achieve the Toyota Environmental Challenge 2050

In September 2018, Toyota announced the 2030 Milestones, indicating the status of the six challenges in 2030, which is one of the medium- to long-term initiatives to achieve the Toyota Environmental Challenge 2050. By setting quantitative and

qualitative milestones for each of the challenges, we will be able to promote reductions of the environmental impacts and accelerate activities that have a net positive social impact. And by establishing it in combination with the Toyota Environmental

Action Plan which sets specific action plans and targets for every five-year period, we will clarify value-creation stories for achieving the Toyota Environmental Challenge 2050, further promote activities, and contribute to the realization of a sustainable society.

Toyota Environmental Challenge 2050		2030 Milestone
<b>Challenge 1 New Vehicle Zero CO<sub>2</sub> Emissions Challenge</b>		
Reduce global average CO <sub>2</sub> emissions during operation from new vehicles by 90 percent from Toyota's 2010 global level	Accelerate widespread use of next-generation vehicles to save energy and respond to diverse range of fuels <ul style="list-style-type: none"> <li>• Accelerate global expansion of electrified vehicles</li> <li>• Joint development of electrified vehicles and establish networks to encourage their widespread adoption</li> </ul>	<ul style="list-style-type: none"> <li>• Make annual global sales of more than 5.5 million electrified vehicles, including more than 1 million zero-emission vehicles (BEVs and FCEVs)</li> </ul> The estimate of global average CO <sub>2</sub> emissions reduction in g-CO <sub>2</sub> /km from new vehicles will be 35 percent or more, which may vary depending on market conditions, compared to 2010 levels
<b>Challenge 2 Life Cycle Zero CO<sub>2</sub> Emissions Challenge</b>		
Completely eliminate all CO <sub>2</sub> emissions from the entire vehicle life cycle	Reduce CO <sub>2</sub> emissions along the entire vehicle life cycle, from materials production, parts and vehicle manufacturing to driving and disposal stage <ul style="list-style-type: none"> <li>• Develop and expand use of low-CO<sub>2</sub> emission materials</li> <li>• Promote eco-friendly action throughout the entire value chain</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce CO<sub>2</sub> emissions by 25 percent or more over the entire vehicle life cycle compared to 2013 levels by promoting activities for the milestones of Challenges 1 and 3, and with support from stakeholders such as suppliers, energy providers, infrastructure developers, governments and customers</li> </ul>
<b>Challenge 3 Plant Zero CO<sub>2</sub> Emissions Challenge</b>		
Achieve zero CO <sub>2</sub> emissions at all plants by 2050	Promote both the development and introduction of low-CO <sub>2</sub> technologies and daily <i>kaizen</i> and the utilization of renewable energy and use of hydrogen, at all production plants <ul style="list-style-type: none"> <li>• Reduce CO<sub>2</sub> emissions per unit at newly established plants by simplifying and streamlining production processes and taking innovative energy-saving measures</li> <li>• Use renewable energy at all plants</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce CO<sub>2</sub> emissions from all plants by 35 percent compared to 2013 levels</li> </ul>
<b>Challenge 4 Challenge of Minimizing and Optimizing Water Usage</b>		
Minimize water usage and implement water discharge management based on individual local conditions	Promote activities from the two perspectives of water volume and water quality <ul style="list-style-type: none"> <li>• Reduce water usage in existing production processes as well as introducing technologies reducing industrial water usage through rainwater use and improving water recycling rates</li> <li>• Manage water discharge quality by complying with strict standards, improving the local environment by returning clean water for nature</li> </ul>	<ul style="list-style-type: none"> <li>• Implement measures, on a priority basis, in the regions where the water environment is considered to have a large impact                             <ul style="list-style-type: none"> <li>&lt;Water quantity&gt; Complete measures at the four Challenge-focused plants in North America, Asia and Southern Africa</li> <li>&lt;Water quality&gt; Complete impact assessments and measures at all of the 22 plants where used water is discharged directly to river in North America, Asia and Europe</li> </ul> </li> <li>• Disclose information appropriately and communicating actively with local communities and suppliers</li> </ul>
<b>Challenge 5 Challenge of Establishing a Recycling-based Society and Systems</b>		
Promote global deployment of End-of-life vehicle treatment and recycling technologies and systems developed in Japan	Establish a recycling-based society with four key features: use eco-friendly materials; use auto parts longer; develop recycling technologies; and manufacture vehicles from End-of-life vehicles Two global projects started in 2016: <ul style="list-style-type: none"> <li>• Toyota Global 100 Dismantlers* Project</li> <li>• Toyota Global Car-to-Car Recycle Project</li> </ul>	<ul style="list-style-type: none"> <li>• Complete establishment of battery collection and recycling systems globally</li> <li>• Complete set up of 30 model facilities for appropriate treatment and recycling of End-of-life vehicles</li> </ul>
<b>Challenge 6 Challenge of Establishing a Future Society in Harmony with Nature</b>		
Connect nature conservation activities beyond the Toyota Group and its business partners among communities, with the world, to the future	Enhance Toyota's long-standing nature conservation activities promoting harmony with nature, environmental grants, and environmental educations Develop three "connecting" projects started in 2016, sharing our know-how and environmental experiences <ul style="list-style-type: none"> <li>• Connecting communities: Toyota Green Wave Project</li> <li>• Connecting with the world: Toyota Today for Tomorrow Project</li> <li>• Connecting to the future: Toyota ESD Project</li> </ul>	<ul style="list-style-type: none"> <li>• Realize "Plant in Harmony with Nature"— 12 in Japan and 7 overseas —as well as implement activities promoting harmony with nature in all regions where Toyota is based in collaboration with local communities and companies</li> <li>• Contribute to biodiversity conservation activities in collaboration with NGOs and others</li> <li>• Expand initiatives both in-house and outside to foster environmentally conscious persons responsible for the future</li> </ul>

\* Dismantlers: Operates dismantling business for vehicles

Special Feature: Effective Use of Renewable Energy

Toyota Environmental Challenge 2050/2030 Milestone

FY2019 Review of the Sixth Toyota Environmental Action Plan

## Think About the Climate Change Effects in 2030 Using Scenario Analysis

### The Scenario Analysis Process

To confirm that the 2030 Milestone is a valid and resilient strategy for addressing the effects that climate change will have on Toyota, we conducted scenario analysis by picturing multiple future images in 2030.

The climate scenarios mentioned above were developed by referencing scenarios equivalent to “2°C (2DS)” and “Beyond 2°C (B2DS)” in the International Energy Agency (IEA) reports and others.

#### STEP 1 Set Future Images Assuming Climate Change Effects

1 We pictured multiple images of the automobile industry and the mobility society in 2030, by referencing the IEA scenarios and assuming climate change effects.

#### STEP 2 Consider the Impacts on Toyota

2 We considered what impacts each of the future images as of 2030 will have on Toyota’s business strategies and finances.

#### STEP 3 Confirm Measures under 2030 Milestone

3 Based on the impacts that Toyota will have, we confirmed that the 2030 Milestone has sufficient resilience under different climate change scenarios.

### STEP 1 Set Future Images Assuming Climate Change Effects

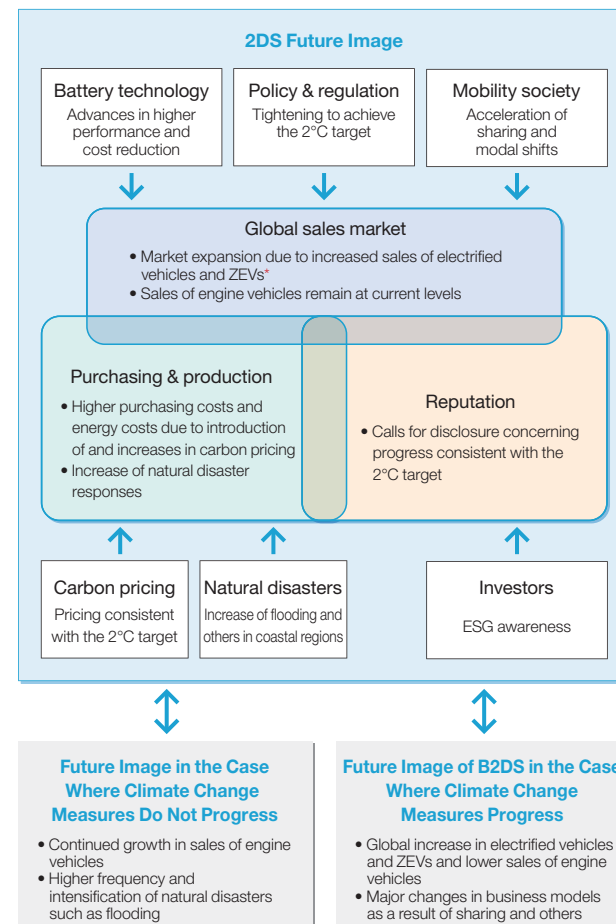
As climate change measures proceeds, there is a possibility that the automobile industry and the entire mobility society will be exposed to substantial changes such as stricter policies including fuel efficiency regulations and the introduction of and increases in carbon pricing as well as advances in technology, and changes in customer awareness. In light of these climate change effects, based on the IEA scenarios and others, we developed multiple future images of 2030 as the external environment that will surround Toyota. With regard to the IEA scenarios, we put focus on the 2°C scenario (2DS) and pictured future images in cases where climate change measures do not progress and where climate change measures progress further (B2DS).

#### Consider the Impacts of Climate Change

Category	Climate Change Effect on Society
Policy & regulation	Tighter controls on fuel efficiency and ZEVs Introduction of and increases in carbon pricing Carbon emissions targets and policies in each country Subsidy policy for energy-saving, renewable energy, and others (eco-car and ZEV subsidies, reduced taxes) Fossil fuel subsidies
Technology	Advances in battery technology and lower prices Advances in information and communication technologies such as AI and IoT Changes in business models to sharing and others Enhance charging and hydrogen infrastructure
Energy	Changes in the energy mix Spread of low-cost renewable energy supply systems Changes in energy demand
Reputation	Changes in customer environmental awareness Changes in ESG awareness by investors
Chronic physical impacts	Sea level rise Changes in rainfall and weather patterns Increasing average temperatures
Acute physical impacts	Intensification of abnormal weather

Set future images based on highly significant impacts

### Future Image in 2030



#### Future Image in the Case Where Climate Change Measures Do Not Progress

- Continued growth in sales of engine vehicles
- Higher frequency and intensification of natural disasters such as flooding

#### Future Image of B2DS in the Case Where Climate Change Measures Progress

- Global increase in electrified vehicles and ZEVs and lower sales of engine vehicles
- Major changes in business models as a result of sharing and others

\* Zero Emission Vehicles: Vehicles that do not emit CO<sub>2</sub> at all during operation such as BEVs and FCEVs

\* Created by referencing reports from IEA, IPCC and others

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## STEP 2 Consider the Impacts on Toyota

We considered the impacts on Toyota for each of the future images developed in STEP 1.

No matter what type of society develops in 2030, the global market for the new vehicles will expand, but in a society where climate change measures proceeds further, it is believed that changes to business models will accelerate as a result of sharing and others.

We believe that in such a society, it will be possible to expand CO<sub>2</sub> reduction effects as a result of the use of hybrid electric vehicles (HEVs) and other electrified vehicles including ZEVs in sharing businesses, which are expected to have higher utilization rates compared to private ownership of vehicles. This in turn will lead to increased business opportunities.

With regard to effects on production and purchasing, introduction of and increases in carbon pricing is anticipated in accordance with the global advance of climate change measures, leading to the possibility of higher purchasing and production costs.

On the other hand, in the case where climate change measures are not adequate throughout society, production interruptions and supply chain disruptions are likely to increase as a result of higher frequency and intensification of natural disasters such as flooding.

## STEP 3 Confirm Measures Under 2030 Milestone

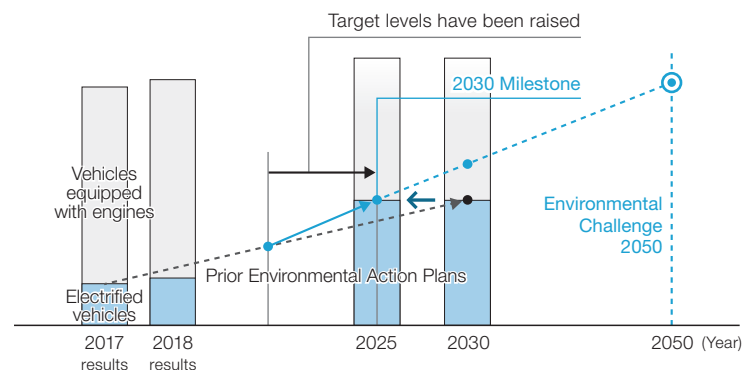
Milestone		
Challenge 1	Challenge 2	Challenge 3
Electrified vehicle sales: <b>5.5</b> million units ZEV sales: <b>1</b> million units	Reduce CO <sub>2</sub> emissions by <b>25%</b> over the entire vehicle life cycle compared to 2013	Reduce CO <sub>2</sub> emission from plants by <b>35%</b>

The percentages of electrified vehicles and ZEVs in global sales of new vehicles vary considerably depending on the scenario, and in anticipation of these circumstances, it will be important to flexibly consider powertrain lineups and development of mobility businesses.

Under the 2030 Milestone, the percentage of ZEVs will exceed the 2DS level, but will not reach the level necessary to achieve B2DS. However, through the development of HEVs, Toyota has been establishing a mass production base by cultivating the component technologies essential to electrified vehicles. These technologies can also be utilized in ZEVs, and Toyota is capable of making flexible and strategic changes to powertrain lineups according to demand changes. Therefore, Toyota will be able to respond to changes in social demand through advances in its electrified vehicle technologies.

Specific measures relating to electrified vehicle sales targets include the announcement that the projection for achieving the electrified vehicle sales target in the 2030 Milestone has been moved up by approximately five years. Also, Toyota invested in Uber which develops a large sharing business in North America, and is steadily proceeding correspondence to the development of new mobility business including developing automated driving ridesharing.

### Raising Action Levels



With regard to the effects on purchasing and production as a result of the introduction of and increases in carbon pricing, we determined that we will be able to respond to the risks of cost increases by steadily implementing initiatives under Challenges 2 and 3.

Going forward, we will continuously confirm that initiatives are adequate based on the progress of Challenges 2 and 3 while confirming trends relating to carbon pricing.

Furthermore, in the case where climate change measures throughout society are not adequate, there may be negative effects on production and purchasing as a result of natural disasters, but we will contribute to climate change measures through our environmental challenge initiatives and consider means of minimizing the impacts on purchasing and production from climate change.

With regard to the ongoing confirmations of the suitability and progress of the 2030 Milestone, we believe that we will have opportunities for stable funding and increase corporate value by enhancing responses to dialogues with institutional investors and other stakeholders as well as various ESG evaluation indicators through appropriate information disclosures.

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## Summary: FY2019 Review of the Sixth Toyota Environmental Action Plan

Area	FY2019 Results Overview	
<b>Low Carbon</b> (Climate Change, CO <sub>2</sub> )		<p><b>Challenge 1:</b> By improving environmental performance and expanding vehicle lineups, we reduced global average CO<sub>2</sub> emissions from new vehicles during operation by 14.9 percent compared to 2010. We sold 1.63 million hybrid electric vehicles (HEVs) globally, surpassing our target (1.5 million units per year). Additionally, we began selling two plug-in hybrid electric vehicle (PHEV) models in China, and premiered the CH-R and IZOA battery electric vehicle (BEV) models, planned for launch in 2020, at Auto Shanghai. As for fuel cell electric vehicles (FCEVs), we enhanced our production facility in preparation for increased sales.</p>
		<p><b>Challenge 2:</b> In the area of product development, we conducted life cycle assessment using Eco-VAS of six vehicle models sold in Japan. In all models, we achieved CO<sub>2</sub> emission levels equivalent to or lower than those of reference vehicles. In the area of logistics, we reduced CO<sub>2</sub> emissions through steady <i>kaizen</i> activities (loading efficiency improvement, shortening of logistics routes, and modal shifts).</p>
		<p><b>Challenge 3:</b> To reduce CO<sub>2</sub> emissions in production, we continued to introduce innovative production technologies into processes that consume a lot of energy, such as painting processes. Furthermore, we are expanding reduction effects globally through <i>yokoten</i> of measures especially on adoption of steamless and airless processes and on a shift to LED lighting, as well as best practices in daily <i>kaizen</i> activities. We also accelerated global introduction of renewable energy, especially with the goal of achieving 100 percent usage in 2019 in Europe and 2020 in South America.</p>
<b>Recycling</b> (Resources, Water)		<p><b>Challenge 4:</b> To reduce water usage, we comprehensively promoted introduction of reduction technologies and daily water-saving efforts, such as water recycling and reducing the amount of steam used in painting processes. At Challenge-focus plants on reducing water usage, we formulated activity road maps toward the next Environmental Action Plan and began taking actions proactively.</p>
		<p><b>Challenge 5:</b> In the area of resource recycling, we set up a model facility for properly processing End-of-life vehicles in Vietnam. We also prepared a video manual on large lithium-ion battery removal for PHEVs and distributed it to countries where we have been selling HEVs. In addition, we established battery 3R promotion organizations in four regions (North America, Europe, China, and Asia). In order to further promote plastic recycling, we began studying ways to utilize more recycled plastic first in Europe where the recycled plastic market is large. In the area of production, we are continuing to implement daily waste-reduction measures, such as converting grinding dust into a valuable material by reducing its water content. In the area of logistics, we introduced simplified and returnable packaging and wrapping materials, steadily reducing the waste generated and the material used in packaging and wrapping.</p>
<b>Harmony with Nature</b>		<p><b>Challenge 6:</b> In the Toyota Green Wave Project, as the first step of the Plant in Harmony with Nature, we opened a new biotope at the Tsutsumi Plant under cooperation from the local residents and experts, and established an activity structure based on an indicator species survey. In the Toyota Today for Tomorrow Project, we continued collaboration toward biodiversity conservation by jointly hosting a side event with the International Union for Conservation of Nature (IUCN) at an UN conference, and donating vehicles to NGOs involved in survey and conservation initiatives for endangered species. In the Toyota ESD Project, in addition to activities in the existing Toyota Global Environment Month, we introduced a new internal education campaign featuring wildlife and water with the aim of enhancing employee awareness about the environment.</p>
<b>Management</b>	<p><b>Environmental Management:</b> Six minor environmental non-compliance issues occurred. In response to these incidents, we developed preventive measures and implemented comprehensive <i>yokoten</i> of these measures. In the area of sales and service, we created and distributed an Environmental Guidebook to dealers in Japan. We also strengthened our environmental initiatives overseas based on regional environmental guidelines. Toyota's Environmental Report 2018 won the Grand Prize in the Environmental Reporting Category at the 22nd Environmental Communication Awards. The investigation of climate-related risks and opportunities based on the 2°C and beyond 2°C scenarios, the logic of the 2030 Milestone to realize the Toyota Environmental Challenge 2050, and other elements were highly evaluated.</p>	

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✓✓ : Steady progress toward FY2021 target  
 ✓ : Issues exist, but FY2021 target is expected to be met  
 - : FY2021 target is not expected to be met

	Action Items	Specific Actions and Goals	FY2019 Results	Evaluation	Page																														
Low Carbon (Climate Change, CO <sub>2</sub> )	(1) New Vehicle Zero CO <sub>2</sub> Emissions Challenge																																		
	1. Develop technologies to achieve the best fuel efficiency performance	<ul style="list-style-type: none"> <li>Reduce rate in average CO<sub>2</sub> emissions from new vehicles globally by over 22% from 2010 global level as of 2020                             <ul style="list-style-type: none"> <li>Develop high-performance powertrain through TNGA and introduce it in steps</li> <li>Achieve further high-performance development of HEVs and expand their deployment</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Reduced 14.9% in global average CO<sub>2</sub> emissions from new vehicles (Japan, United States, Europe, and China) in 2018 compared to 2010</li> <li>Development of low-CO<sub>2</sub>-emitting engines and transmissions through TNGA made contributions</li> <li>Further improved the environmental performance of HEVs and expanded the product lineup</li> </ul>	✓✓	21																														
	2. Promote development of next-generation vehicles using electric power and widespread adoption according to their features	<ul style="list-style-type: none"> <li>HEV: Promote higher performance and expand the lineup to broaden consumer adoption of HEVs, aim to reach annual HEV sales of 1.5 million units and cumulative sales of 15 million units by 2020</li> <li>PHEV: Establish PHEV as core electrified vehicle in support of fuel diversification and develop higher-performance PHEVs and promote widespread adoption</li> <li>BEV: Promote technology development for short-distance purposes in combination with low-carbon traffic systems</li> <li>FCEV: Promote activities to further reduce cost, achieve greater compactness and durability, and strengthen product appeal toward effective use of hydrogen as an important future energy source</li> </ul>	<ul style="list-style-type: none"> <li>HEV: Sales in 2018 were 1.63 million units, and cumulative sales reached 13.53 million units (including PHEV)</li> <li>PHEV: Launched Corolla/Levin PHEV models in China</li> <li>BEV: Accelerated development for the full-scale introduction of mass production BEVs developed in-house, initially in China in 2020</li> <li>The lineup will be expanded to more than 10 vehicle models in the first half of the 2020s</li> <li>FCEV: Expanded and improved fuel cell stack and high-pressure hydrogen tank production facilities in preparation for FCEV sales expansion starting around 2020</li> </ul>	✓✓	19																														
	(2) Life Cycle Zero CO <sub>2</sub> Emissions Challenge																																		
	3. Promote environmental management for product development (Eco-VAS)	<ul style="list-style-type: none"> <li>Steadily promote environmental target management using vehicle environmental assessment (Eco-VAS) at the development stage                             <ul style="list-style-type: none"> <li>Reduce life cycle environmental impact or both fully redesigned models and new models compared with previous models</li> <li>Disclose assessment results properly to customers on website and in product catalogues</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Conducted assessment using Eco-VAS for five new and redesigned models and one partially redesigned model in Japan</li> <li>Life cycle CO<sub>2</sub> emissions of all assessed models were equivalent to or lower than their reference vehicles (CO<sub>2</sub> emissions from the Corolla Sport HEV models were cut by 6% compared to the 2016 HEV models of the same class)</li> </ul>	✓✓	22																														
	4. Study practical use development of catalyst technology-based CO <sub>2</sub> absorption and new material creation (artificial photosynthesis, etc.)	<ul style="list-style-type: none"> <li>Develop artificial photosynthesis technologies from CO<sub>2</sub>, water, and solar power                             <ul style="list-style-type: none"> <li>Complete basic verification tests for creation of primary CO<sub>2</sub>-absorbing material (material or fuel) using the world's most efficient photosynthetic unit in 2020</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Technology for artificial photosynthesis that uses low-cost iron, silicon, and manganese as catalysts achieved conversion efficiency equal to that of conventional technology using precious metals</li> </ul>	✓✓	-																														
	5. Pursuing Transportation Efficiency and Reducing CO <sub>2</sub> Emissions in Logistics Activities	<ul style="list-style-type: none"> <li>Promote CO<sub>2</sub> reduction activities by further improving transportation efficiency (take comprehensive measures to reduce total distance travelled and promote further modal shift)</li> </ul> <table border="1"> <thead> <tr> <th>Region</th> <th>Item</th> <th>Base year</th> <th>Target (FY2021)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Japan</td> <td>Total emissions</td> <td>FY1991</td> <td>25% reduction</td> </tr> <tr> <td>Emissions per transportation volume</td> <td>FY2007</td> <td>14% reduction (1% reduction per year)</td> </tr> <tr> <td>Overseas</td> <td colspan="3">Measured performance</td> </tr> </tbody> </table>	Region	Item	Base year	Target (FY2021)	Japan	Total emissions	FY1991	25% reduction	Emissions per transportation volume	FY2007	14% reduction (1% reduction per year)	Overseas	Measured performance			<ul style="list-style-type: none"> <li>Conducted <i>kaizen</i> activities (loading efficiency improvement, shortened transportation routes, and modal shifts) and reduced CO<sub>2</sub> as indicated below:</li> </ul> <table border="1"> <thead> <tr> <th>Region</th> <th>Item</th> <th>Base year</th> <th>FY2019 results</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Japan</td> <td>Total emissions</td> <td>FY1991</td> <td>35% reduction</td> </tr> <tr> <td>Emissions per transportation volume</td> <td>FY2007</td> <td>20% reduction</td> </tr> <tr> <td>Overseas</td> <td colspan="3">Measured performance</td> </tr> </tbody> </table>	Region	Item	Base year	FY2019 results	Japan	Total emissions	FY1991	35% reduction	Emissions per transportation volume	FY2007	20% reduction	Overseas	Measured performance			✓✓	24
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6. Contribute to local communities through the expansion of local grid energy management technologies	<ul style="list-style-type: none"> <li>Establish micro-grid (F-grid) and regional optimal energy management technology and promote domestic and overseas rollout                             <ul style="list-style-type: none"> <li>Verify the tests in Ohira-mura project in Tohoku and Motomachi Plant project in Toyota City</li> <li>Deploy technologies at other plants in Japan and countries in Asia, etc.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Promoted all projects as planned                             <ul style="list-style-type: none"> <li>Ohira-mura project in Tohoku (F-grid): 21% energy saving and 25% CO<sub>2</sub> reduction after introduction of the technology</li> <li>Motomachi Plant project in Toyota City: Completed NEDO demonstration project</li> <li>Continuously develop practical application of chemical thermal storage technology</li> <li>Investigation of <i>yokoten</i> in both Japan and overseas: Continued the collection of information (on installation conditions, laws and regulations, etc.)</li> </ul> </li> </ul>	✓✓	-																															
7. Promote an integrated approach to reduce CO <sub>2</sub> emissions in road traffic sectors	<ul style="list-style-type: none"> <li>Contribute to realization of smart mobility society through IT and ITS technologies                             <ul style="list-style-type: none"> <li>Based on the verification tests results of next-generation transportation system Ha:mo in Japan and France, which we use ultra-compact BEVs, aim to deploy technologies in other regions and establish business models, considering the Olympic and Paralympic Games Tokyo 2020</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Continued verification tests of Ha:mo in Tokyo, Toyota City, and Okinawa Prefecture with a viewpoint of business feasibility, and started verification tests in Bangkok, Hagi City, and Izumo City</li> </ul>	✓✓	-																															
	<ul style="list-style-type: none"> <li>Actively participate in integrated traffic flow improvement project for establishment of a low-carbon mobility society                             <ul style="list-style-type: none"> <li>Establish WBCSD/SMP 2.0 Sathorn Model and formulate roadmap for Bangkok rollout</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Continued discussions with relevant Thai ministries and agencies for rollout of the Sathorn Model in Bangkok</li> </ul>	✓✓	-																															
	<ul style="list-style-type: none"> <li>Promote adoption of eco-driving globally                             <ul style="list-style-type: none"> <li>Promote eco-driving globally among customers and employees</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Provided a self-diagnosis service for eco-driving to drivers of vehicles equipped with T-Connect</li> <li>In conjunction with Eco Driving Month in November designated by the Japanese government, created posters featuring Toyota athletes for internal education to address the key points of eco-driving in an impressive manner</li> </ul>	✓✓	23																															

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Low Carbon (Climate Change, CO <sub>2</sub> )	(3) Plant Zero CO <sub>2</sub> Emissions Challenge																																													
	8. Reduce CO <sub>2</sub> Emissions in Production Activities	<ul style="list-style-type: none"> <li>Promote activities to reduce CO<sub>2</sub> emissions through the development and deployment of low-CO<sub>2</sub> production technologies and daily <i>kaizen</i> <ul style="list-style-type: none"> <li>Pursue further productivity and include offices and other sites in rollout of activities</li> </ul> </li> <li>Utilize clean energies in accordance with the particular conditions of each country and region                             <ul style="list-style-type: none"> <li>Promote introduction in stages toward FY2021</li> </ul> </li> <li>Manage greenhouse gases from sources other than energy sources</li> </ul> <table border="1"> <thead> <tr> <th>Region</th> <th>Item</th> <th>Base year</th> <th>Target (FY2021)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Global*</td> <td>Emissions per vehicle</td> <td>FY2002</td> <td>39% reduction</td> </tr> <tr> <td>Emissions per vehicle</td> <td>FY2002</td> <td>48% reduction</td> </tr> <tr> <td rowspan="2">TMC</td> <td rowspan="2">Total emissions</td> <td>1990</td> <td>28% reduction</td> </tr> <tr> <td colspan="2">Promote regional No. 1 reduction activities</td> </tr> <tr> <td>Overseas</td> <td colspan="3">Promote regional No. 1 reduction activities</td> </tr> </tbody> </table> <p>* TMC + worldwide consolidated subsidiaries (manufacturing)</p>	Region	Item	Base year	Target (FY2021)	Global*	Emissions per vehicle	FY2002	39% reduction	Emissions per vehicle	FY2002	48% reduction	TMC	Total emissions	1990	28% reduction	Promote regional No. 1 reduction activities		Overseas	Promote regional No. 1 reduction activities			<ul style="list-style-type: none"> <li>Promoted development of low-CO<sub>2</sub> production technologies and steadily introduced developed technologies</li> <li>Globally conducted <i>yokoten</i> of daily <i>kaizen</i> practices through shop-oriented environmental activities and accelerated CO<sub>2</sub> reduction activities</li> <li>Purchased renewable energy and increased in-house power generation by installing solar panels</li> </ul> <table border="1"> <thead> <tr> <th>Region</th> <th>Item</th> <th>Base year</th> <th>FY2019 results</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Global</td> <td>Emissions per vehicle</td> <td>FY2002</td> <td>37% reduction</td> </tr> <tr> <td>Emissions per vehicle</td> <td>FY2002</td> <td>46% reduction</td> </tr> <tr> <td rowspan="2">TMC</td> <td rowspan="2">Total emissions</td> <td>1990</td> <td>47% reduction</td> </tr> <tr> <td colspan="2">Implemented reduction scenarios that match local situations</td> </tr> <tr> <td>Overseas</td> <td colspan="3">Implemented reduction scenarios that match local situations</td> </tr> </tbody> </table>	Region	Item	Base year	FY2019 results	Global	Emissions per vehicle	FY2002	37% reduction	Emissions per vehicle	FY2002	46% reduction	TMC	Total emissions	1990	47% reduction	Implemented reduction scenarios that match local situations		Overseas	Implemented reduction scenarios that match local situations			✓✓
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Recycling (Resources, Water)	(4) Challenge of Minimizing and Optimizing Water Usage																																													
	9. Reduce water usage in production activities	<ul style="list-style-type: none"> <li>Promote continual activities to reduce water usage in consideration of water environment in each country and region                             <ul style="list-style-type: none"> <li>Introduce innovative initiatives linked with planning of new plants and production line reforms</li> <li>Reduce water usage through daily <i>kaizen</i> and other activities</li> </ul> </li> </ul> <table border="1"> <thead> <tr> <th>Region</th> <th>Item</th> <th>Base year</th> <th>Target (FY2021)</th> </tr> </thead> <tbody> <tr> <td>TMC (vehicle plants)</td> <td>Usage per vehicle</td> <td>FY2002</td> <td>12% reduction</td> </tr> <tr> <td>Overseas</td> <td colspan="3">Promote regional No. 1 reduction activities</td> </tr> </tbody> </table>	Region	Item	Base year	Target (FY2021)	TMC (vehicle plants)	Usage per vehicle	FY2002	12% reduction	Overseas	Promote regional No. 1 reduction activities			<ul style="list-style-type: none"> <li>Reduced water usage by reusing wastewater used in painting processes and over-achieved the goals</li> </ul> <table border="1"> <thead> <tr> <th>Region</th> <th>Item</th> <th>Base year</th> <th>FY2019 results</th> </tr> </thead> <tbody> <tr> <td>TMC (vehicle plants)</td> <td>Usage per vehicle</td> <td>FY2002</td> <td>23% reduction</td> </tr> <tr> <td>Overseas</td> <td colspan="3">Implemented reduction activities according to local water conditions</td> </tr> </tbody> </table>	Region	Item	Base year	FY2019 results	TMC (vehicle plants)	Usage per vehicle	FY2002	23% reduction	Overseas	Implemented reduction activities according to local water conditions			✓✓	32																	
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	(5) Challenge of Establishing a Recycling-based Society and Systems																																													
	10. Reduce consumption of dwindling natural resources through use of renewable resources and recycled materials	<ul style="list-style-type: none"> <li>Reduce the use of petroleum-derived plastics                             <ul style="list-style-type: none"> <li>Develop technology for recycled plastics and eco-plastics meeting quality and performance requirements</li> <li>Establish collection systems for used plastics</li> </ul> </li> <li>Promote reuse of rare resources and use of recycled materials                             <ul style="list-style-type: none"> <li>Develop CFRP recycling technologies</li> <li>Develop technologies for recycling and reducing use of rare earth materials</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Reduced the usage of petroleum-derived plastics                             <ul style="list-style-type: none"> <li>Studied ways to utilize more recycled plastic first in Europe where the recycled plastic market is large</li> <li>Continued to collect and recycle End-of-life bumpers generated through repair work at Toyota dealers; efforts to enhance the efficiency of the scheme in order to reduce costs are underway</li> </ul> </li> <li>Promoted reuse of rare resources and use of recycled materials                             <ul style="list-style-type: none"> <li>Continued developing technologies for recycling CFRP materials (carbon fiber separation, recovery, and resinification)</li> <li>Joint development partners displayed carbon fiber separation and recovery technologies at exhibitions</li> <li>Continued developing technologies that can reduce the amount of rare earth metals used in HEV motor magnets while maintaining motor performance</li> </ul> </li> </ul>	✓	33																																									
	11. Achieve industry-leading levels in easy-to-dismantle design for effective resource recycling	<ul style="list-style-type: none"> <li>Maintain and improve industry-leading levels for easy-to-dismantle design                             <ul style="list-style-type: none"> <li>Integrate reliable easy-to-dismantle designs into all models including next-generation vehicles (BEV, FCEV) and smart mobility vehicles</li> <li>Develop and integrate easy-to-dismantle designs into new technologies and new materials parts</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:                             <ul style="list-style-type: none"> <li>Continued to apply easy-to-dismantle designs to newly developed vehicles such as the Century, Crown, Corolla Sport, and Lexus ES and UX</li> <li>Developed techniques for the efficient extraction of hydrogen gas from FCEVs and conducted demonstrations for dismantling operators</li> <li>Developed low-cost gas extraction tools and currently preparing for market launch</li> </ul> </li> </ul>	✓✓	35																																									
	12. Contribute worldwide through End-of-life vehicle treatment and recycling technology developed in Japan	<ul style="list-style-type: none"> <li>Deploy proper End-of-life vehicles treatment technology overseas in accordance with conditions in each country and region                             <ul style="list-style-type: none"> <li>Conduct proper End-of-life vehicle treatment in accordance with local End-of-life recycling laws, while enhance initiatives in countries and regions where laws are expected to be introduced, based on the guidance</li> <li>Establish 100 of proper model End-of-life vehicle treatment facilities (7 sites by 2020)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Prepared a video manual on large lithium-ion battery removal for PHEVs</li> <li>Completed a model facility in Vietnam</li> </ul>	✓✓	36																																									
	13. Expand original recycling systems for End-of-life vehicles worldwide	<ul style="list-style-type: none"> <li>Promote advanced development of Toyota's original recycling technologies and provide support overseas Japan                             <ul style="list-style-type: none"> <li>Enhance technologies for remanufacturing and recycling nickel-metal-hydride batteries (lowering cost) and provide support overseas</li> <li>Establish technologies for remanufacturing and recycling lithium-ion batteries and provide support overseas</li> <li>Practical use of recycling wiring harnesses in Japan (expand scale of operations)</li> <li>Practical use of recycling magnets in Japan (expand scale of operations)</li> <li>Develop power generation and storage systems using HEV units</li> <li>Study and set goals for bumper collection and recycling technologies in major regions overseas</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:                             <ul style="list-style-type: none"> <li>Since the launch of the first-generation Prius in FY1998, collected a cumulative total of 132,000 batteries from End-of-life vehicles for reuse and recycling</li> <li>Continued high-priority promotion of remanufacturing and reuse of batteries, including stationary storage use</li> <li>Established battery 3R promotion organizations in North America, Europe, China, and Thailand, focusing on activities in Asia (Thailand) and Europe, with plans to expand to other countries and regions in the future</li> <li>Continued to extract rare earths from collected magnets for recycling and reuse as magnetic materials and so on; since FY2013, collected and recycled a cumulative 41 tons of magnets</li> <li>Continued investigation of large-capacity storage battery systems in cooperation with an electric power company and began investigation of storage battery systems for stores in cooperation with a major convenience store operator</li> </ul> </li> </ul>	✓✓	37																																									



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	Action Items	Specific Actions and Goals	FY2019 Results	Evaluation	Page																																																			
Recycling (Resources, Water)	(5) Challenge of Establishing a Recycling-based Society and Systems																																																							
	14. Reduce waste and use resources efficiently in production activities	<ul style="list-style-type: none"> <li>Promote activities to reduce waste through development and deployment of waste reduction-oriented production technologies and daily <i>kaizen</i> <ul style="list-style-type: none"> <li>Promote waste reduction and efficient use of resources through improving yields and other source-oriented measures</li> <li>Promote activities to reduce resources loss by reducing amounts of valuables and waste generated</li> </ul> </li> <li>Promote activities to reduce metal scrap generation and implement All-Toyota campaigns to effectively use resources internally</li> </ul> <table border="1"> <thead> <tr> <th>Scope</th> <th>Region</th> <th>Item</th> <th>Base year</th> <th>Target (FY2021)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Waste</td> <td>Japan<sup>2</sup></td> <td>Total volume generated</td> <td colspan="2">Promote activities to reduce metal scrap generation and implement All-Toyota campaigns to effectively use resources internally</td> </tr> <tr> <td rowspan="3">Waste<sup>1</sup></td> <td>Japan</td> <td>Waste volume generated per vehicle</td> <td>FY2002</td> <td>35% reduction</td> </tr> <tr> <td rowspan="2">TMC</td> <td rowspan="2">Waste volume generated per vehicle</td> <td colspan="2">Zero landfill waste<sup>3</sup></td> </tr> <tr> <td>FY2002</td> <td>63% reduction</td> </tr> <tr> <td>Overseas</td> <td colspan="4">Promote regional No. 1 reduction activities</td> </tr> </tbody> </table> <p><sup>1</sup> Waste at cost, incinerated waste, and landfill waste <sup>2</sup> TMC + worldwide consolidated subsidiaries (manufacturing) <sup>3</sup> Zero means direct landfill waste equal to 1% or less the amount generated in FY1996</p>	Scope	Region	Item	Base year	Target (FY2021)	Waste	Japan <sup>2</sup>	Total volume generated	Promote activities to reduce metal scrap generation and implement All-Toyota campaigns to effectively use resources internally		Waste <sup>1</sup>	Japan	Waste volume generated per vehicle	FY2002	35% reduction	TMC	Waste volume generated per vehicle	Zero landfill waste <sup>3</sup>		FY2002	63% reduction	Overseas	Promote regional No. 1 reduction activities				<ul style="list-style-type: none"> <li>Converted valuable material by reducing the water content of grinding dust and reduced the volume of waste steadily</li> </ul> <table border="1"> <thead> <tr> <th>Scope</th> <th>Region</th> <th>Item</th> <th>Base year</th> <th>FY2019 results</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Waste</td> <td>Valuables</td> <td>Total volume generated</td> <td colspan="2">Promoted yield improvement and reliably collected scrap materials</td> </tr> <tr> <td rowspan="3">Waste</td> <td>Japan</td> <td>Waste volume generated per vehicle</td> <td>FY2002</td> <td>33% reduction</td> </tr> <tr> <td rowspan="2">TMC</td> <td rowspan="2">Waste volume generated per vehicle</td> <td colspan="2">Zero landfill waste</td> </tr> <tr> <td>FY2002</td> <td>62% reduction</td> </tr> <tr> <td>Overseas</td> <td colspan="4">Promoted various activities, such as reuse</td> </tr> </tbody> </table>	Scope	Region	Item	Base year	FY2019 results	Waste	Valuables	Total volume generated	Promoted yield improvement and reliably collected scrap materials		Waste	Japan	Waste volume generated per vehicle	FY2002	33% reduction	TMC	Waste volume generated per vehicle	Zero landfill waste		FY2002	62% reduction	Overseas	Promoted various activities, such as reuse				✓✓
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	15. Reduce packaging and wrapping materials and using resources efficiently in logistics activities	<ul style="list-style-type: none"> <li>Promote <i>kaizen</i> with a focus on increasing use of returnable containers and reducing the amount of wrapping material (Japan) Continue <i>kaizen</i> at conventional level (down 14% from FY2007) (Overseas) Assess best practices</li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives: (Japan) Reduced 35% compared to 2006 by continuously reducing wrapping materials (Overseas) Assessed best practices</li> </ul>	✓✓	38																																																			
Harmony with Nature	(6) Challenge of Establishing a Future Society in Harmony with Nature																																																							
	16. Promote expansion of nature conservation activities Connecting Communities	<ul style="list-style-type: none"> <li>Toyota Green Wave Project—an initiative to connect with local communities through the various activities undertaken by all Toyota companies and their global affiliates to conserve the natural environment <ul style="list-style-type: none"> <li>Continue the currently sustainable plant activity and simultaneously expand the various activities of all Toyota Group companies to overseas subsidiaries, affiliates and local communities and expand the reach of activities in partnership with stakeholders</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Continued activities by All-Toyota Harmony with Nature Working Groups at group and other companies (22 companies) (Activities to Connect Communities) <ul style="list-style-type: none"> <li>The number of activities by participating companies were expanded to 248 (up 14% year on year) and the cumulative number of participants exceeded to 135,000</li> <li>Held a joint event in May 2018 and a biotope joint study in September, strengthening group collaboration</li> <li>Two new projects were started (Kinuura Bay little tern conservation and maintenance of Izunuma walking trail in the Northeast Japan area) (Enhancement of awareness) <ul style="list-style-type: none"> <li>Launched a dedicated website for public in June 2018 to raise further awareness</li> </ul> </li> </ul> </li> <li>Commenced "Plant in Harmony with Nature" activities <ul style="list-style-type: none"> <li>Established an implementation organization for indicator species surveys conducted by employees at a model plant in Japan (Tsutsumi Plant)</li> <li>Opened a new biotope in October 2018 and won the Biotope Grand Prize at the 11th Biotope Recognition Event</li> <li>Started ecosystem monitoring at the Teiho Plant in cooperation with local residents and various experts</li> </ul> </li> <li>A Thailand-based affiliate launched a Harmony with Nature Working Group with Toyota Group companies in Thailand and conducted tree-planting events and others</li> </ul>	✓✓	39																																																			
	17. Boost grant for environmental activities Connecting with the World	<ul style="list-style-type: none"> <li>Connect environmental and biodiversity conservation activities to the world through grants for those activities <ul style="list-style-type: none"> <li>Toyota Today for Tomorrow Project –</li> <li>Strengthen grants for projects helping to solve environmental issues as a means to prioritize the area of environment among social contribution activities. Collaborate with global organizations and stakeholders to provide new value and extend the circle of activities globally</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Built cooperative relationships with international organizations and NGOs as described below and received positive feedback, in particular from government officials, experts, and NGOs <ul style="list-style-type: none"> <li>Conducted the following activities in collaboration with the International Union for Conservation of Nature (IUCN): <ul style="list-style-type: none"> <li>Improved the IUCN website, increasing data on the status of biodiversity conservation</li> <li>Jointly organized a side event at the Convention on Biological Diversity's 14th Conference of the Parties (COP14) (held in November 2018)</li> </ul> </li> <li>As a part of its support for the Red List Project, donated vehicles to BirdLife International and Conservation International and held a presentation ceremony at COP14</li> <li>Took measures to protect endangered wildlife and conducted patrols to prevent illegal logging as a part of the WWF Living Asian Forest Project</li> </ul> </li> <li>Continued the Toyota Environmental Activities Grant Program to support small- and medium-size NGOs and NPOs</li> </ul>	✓✓	42																																																			

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	Action Items	Specific Actions and Goals	FY2019 Results	Evaluation	Page
Harmony with Nature	(6) Challenge of Establishing a Future Society in Harmony with Nature				
	18. Boost contribution to environmental education "Connecting environmental activities to the future"	<ul style="list-style-type: none"> <li>Toyota ESD Project—an initiative to strengthen environmental education using regional work sites and company property, and thereby connect environmental conservation activities to the future                             <ul style="list-style-type: none"> <li>Globally expand education of local residents and children utilizing forests and green biotopes at plants, and so on</li> <li>Promote development of educational programs taking advantage of the special characteristics of company-owned land (The Toyota Shirakawa-Go Eco-Institute, Forest of Toyota, Miyagawa Forest in Mie Prefecture, etc.) and promote human resources development to connect to the future</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives: (Employee education)                             <ul style="list-style-type: none"> <li>Same as No. 25 (Forest of Toyota)</li> <li>Held hands-on nature programs for local elementary school children (5,155 children in FY2019)</li> <li>In July 2018, hosted an education event to plan and implement an observation tour featuring dragonflies as a part of a series of programs to learn about the living creatures of satoyama (Toyota Shirakawa-Go Eco-Institute)</li> <li>Provided hands-on nature programs for children and adults; the total number of people staying at Shirakawa-Go in FY2019 was 15,480, and 10,113 people participated in institute programs during the year.</li> <li>The SDGs Education Forum in Toyota Shirakawa-Go Eco-Institute was held in November 2018 as an activity to enhance the value of the eco-institute</li> </ul> </li> </ul>	✓✓	44
Harmony with Nature	19. Promote environmental contributions through biotechnology and afforestation business automotive peripheral technologies, and forest conservation activities	<ul style="list-style-type: none"> <li>Respond to environmental issues with biotechnology                             <ul style="list-style-type: none"> <li>Promote cellulose ethanol development by further improvement of yeast ferment capacity</li> <li>Contribute natural capital creation by applying to the area of agriculture and farming biomass business</li> </ul> </li> <li>Contribute to "Adaptation" in climate change through urban greening business and group owned technology                             <ul style="list-style-type: none"> <li>Respond to heat island (dissemination of wall greening; high efficient shading paint)</li> </ul> </li> </ul> <hr/> <ul style="list-style-type: none"> <li>Establish a model to use resources effectively in Forestry in Miyagawa, Mie Prefecture</li> <li>Realize a sustainable technical center in harmony with nature and local communities at the new research and development facility currently in the planning stage</li> </ul>	<ul style="list-style-type: none"> <li>Promoted initiatives in the area of biomass                             <ul style="list-style-type: none"> <li>Promoted development of yeast with the world's leading ethanol productivity and biomass (Napier grass and sugarcane) that is resistant to environment changes such as climate change.</li> <li>Using the above, promoted ethanol production from biomass that does not compete with food and feed supply in North America and Indonesia</li> </ul> </li> <li>Promoted initiatives in the area of urban greening                             <ul style="list-style-type: none"> <li>Promoted installation of green building materials (smart green walls) mainly at TMC plants*</li> <li>*Business was transferred to Oshima Landscape Construction Co., Ltd. in July 2019</li> </ul> </li> </ul> <hr/> <ul style="list-style-type: none"> <li>Toyota Mie Miyagawa Mountain Forest                             <ul style="list-style-type: none"> <li>For the "Forest Challenge and Development Project", which seeks to create new utilization of trees and forests, the selected projects started activities in April 2018 to promote reinvigoration of local communities and forests</li> </ul> </li> <li>New Toyota R&amp;D Center                             <ul style="list-style-type: none"> <li>Continued steady environmental conservation activities and surveys at the development site and reported the results to the Environment Monitoring Committee (twice annually)</li> <li>Worked with experts to continue activities to conserve wild birds, which are declining in number in Aichi Prefecture</li> <li>Since the start of site preparation, nesting by Japanese night herons was confirmed at the business site for the first time</li> </ul> </li> </ul>	✓✓	45
	Environmental Management	20. Strengthen consolidated environmental management	<ul style="list-style-type: none"> <li>Enhance activities of various environmental committees to improve environmental management activities and ensure superior environmental performance (CO<sub>2</sub>, water, etc.) across all business activities in countries and regions around the world</li> </ul> <hr/> <ul style="list-style-type: none"> <li>Thoroughly comply with environmental laws and regulations and strengthen proactive prevention measures for environmental risks</li> </ul> <hr/> <ul style="list-style-type: none"> <li>Improve chemical substance management by carefully monitoring legal trends in each country and region</li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives: (Japan)                             <ul style="list-style-type: none"> <li>Held the "All-Toyota Production Environment Conference and Liaison Committee (Executives' Meeting)" to discuss Toyota Group initiatives in the area of production and logistics (Overseas)</li> <li>Held the "Global Environment Meeting" with those responsible for environmental matters (general manager level) from all six overseas regions, and discussed the promotion of challenges 3 and 4 in 2018</li> <li>Held the "Environment Strategy Meeting" with those responsible for environmental matters (executive level) from the four major regions (North America, Europe, China, Asia) and TMC and discussed medium- to long-term global environmental strategies</li> <li>Held the seventh Global ECO Awards to promote environmental <i>kaizen</i> activities in the area of production and logistics and conducted <i>yokoten</i> of best <i>kaizen</i> practices</li> </ul> </li> </ul> <hr/> <ul style="list-style-type: none"> <li>Took the following initiatives:                             <ul style="list-style-type: none"> <li>Held seminars targeting those responsible for environmental initiatives at Toyota Group companies in Japan</li> <li>Six environmental non-compliance issues among the environmental management companies (five in Japan and one overseas)</li> <li>All were minor non-compliance issues and complaints, and corrective measures and <i>yokoten</i> were completed</li> </ul> </li> </ul> <hr/> <ul style="list-style-type: none"> <li>Deployed chemical substance management globally                             <ul style="list-style-type: none"> <li>Complied with Toyota internal rules</li> <li>Evaluated and improved chemical substance management systems by auditing and investigating suppliers' processes</li> </ul> </li> </ul>	



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Management	Environmental Management																																															
	21. Reduce vehicle exhaust emissions to improve urban air quality in each country and region	<ul style="list-style-type: none"> <li>Steadily introduce low-emissions vehicles to improve urban air quality in each country and region</li> <li>Contribute to air quality improvement through air quality research in collaboration with research organizations in each country</li> </ul>	<ul style="list-style-type: none"> <li>In response to stricter emissions regulations intended to improve the urban environment in various countries and regions, steadily introduced vehicles that satisfy those regulations</li> </ul>	✓✓	49																																											
	22. Reduce VOC emissions in production activities	<ul style="list-style-type: none"> <li>Develop and deploy VOC emissions reduction technologies through reduced usage of paint and thinners in painting processes                             <ul style="list-style-type: none"> <li>Promote continual reduction in VOC emissions through initiatives linked to painting equipment upgrade plans as well as daily <i>kaizen</i></li> </ul> </li> </ul> <table border="1"> <thead> <tr> <th>Scope</th> <th>Region</th> <th>Item</th> <th>Target (FY2021)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Vehicle body painting</td> <td>Japan</td> <td>Emissions volume per area painted</td> <td>26 g/m<sup>2</sup> or less (average for all lines)</td> </tr> <tr> <td>TMC</td> <td>Emissions volume per area painted</td> <td>19 g/m<sup>2</sup> or less (average for all lines)</td> </tr> <tr> <td>Overseas</td> <td colspan="2">Promote regional No. 1 reduction activities</td> </tr> <tr> <td>Bumper painting</td> <td>TMC</td> <td>Emissions volume per area painted</td> <td>310 g/m<sup>2</sup> or less (average for all lines)</td> </tr> <tr> <td>Other painting</td> <td>Japan/overseas</td> <td colspan="2">Promote VOC emissions reduction activities</td> </tr> </tbody> </table> <p>* TMC + consolidated subsidiaries in Japan (manufacturing)</p>	Scope	Region		Item	Target (FY2021)	Vehicle body painting	Japan	Emissions volume per area painted	26 g/m <sup>2</sup> or less (average for all lines)	TMC	Emissions volume per area painted	19 g/m <sup>2</sup> or less (average for all lines)	Overseas	Promote regional No. 1 reduction activities		Bumper painting	TMC	Emissions volume per area painted	310 g/m <sup>2</sup> or less (average for all lines)	Other painting	Japan/overseas	Promote VOC emissions reduction activities		<ul style="list-style-type: none"> <li>Continued efforts to reduce the use of cleaning solvents and to increase the percentage of waste solvent recovery</li> </ul> <table border="1"> <thead> <tr> <th>Scope</th> <th>Region</th> <th>Item</th> <th>FY2019 results</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Vehicle body painting</td> <td>Japan</td> <td>Emissions volume per area painted</td> <td>21.5 g/m<sup>2</sup></td> </tr> <tr> <td>TMC</td> <td>Emissions volume per area painted</td> <td>15.0 g/m<sup>2</sup></td> </tr> <tr> <td>Overseas</td> <td colspan="2">Promoted coating efficiency improvement and others</td> </tr> <tr> <td>Bumper painting</td> <td>TMC</td> <td>Emissions volume per area painted</td> <td>176 g/m<sup>2</sup></td> </tr> <tr> <td>Other painting</td> <td>Japan/overseas</td> <td colspan="2">Promoted painting condition optimization and others</td> </tr> </tbody> </table>	Scope	Region	Item	FY2019 results	Vehicle body painting	Japan	Emissions volume per area painted	21.5 g/m <sup>2</sup>	TMC	Emissions volume per area painted	15.0 g/m <sup>2</sup>	Overseas	Promoted coating efficiency improvement and others		Bumper painting	TMC	Emissions volume per area painted	176 g/m <sup>2</sup>	Other painting	Japan/overseas	Promoted painting condition optimization and others	
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23. Promote environmental activities in cooperation with business partners (suppliers)	<ul style="list-style-type: none"> <li>Reinforce cooperation with suppliers to further promote environmental activities globally                             <ul style="list-style-type: none"> <li>Ensure compliance with each country's laws and regulations while steadily promoting chemical substance management</li> <li>Pursue cooperative environmental activities in a broad range of areas, including CO<sub>2</sub> emissions reduction, resource recycling, water impact reductions, and the establishment of societies in harmony with nature</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:                             <ul style="list-style-type: none"> <li>Continued to request activities based on the revised TOYOTA Green Purchasing Guidelines (at 36 affiliates in 15 countries)</li> <li>Updated self-assessment check list for domestic suppliers to ensure thorough chemical substance management</li> <li>Promoted measures to utilize the self-assessment results in future activities</li> <li>Conducted <i>yokoten</i> of such activities to major overseas affiliates</li> <li>Engaged in interactive communications through the CDP Supply Chain Program (climate change and water) such as briefing sessions for participating suppliers</li> <li>Started study sessions on environment topics at Kyohokai (a supplier organization)</li> <li>Continued commendation of suppliers that made substantial contributions to environmental initiatives</li> </ul> </li> </ul>	✓✓	50																																												
24. Promote environmental activities in cooperation with business partners (dealers and distributors)	<ul style="list-style-type: none"> <li>Promote environmental management in cooperation with dealers and distributors (Japan)                             <ul style="list-style-type: none"> <li>Promote environmental activities by adhering closely to the Toyota Dealer CSR Checklist and promote CO<sub>2</sub> emissions reduction, etc., by improving environmental management</li> </ul> </li> <li>(Overseas)                             <ul style="list-style-type: none"> <li>Promote and strengthen environmental activities led by each regional headquarters and distributor in each country (CO<sub>2</sub> reduction, etc.)</li> <li>Promote and strengthen Dealer Environmental Risk Audit Program</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:                             <ul style="list-style-type: none"> <li>(Japan)                                     <ul style="list-style-type: none"> <li>Promoted enhancement of environmental management of dealers including reduction of CO<sub>2</sub> emissions by updating the check items under the Toyota Dealer CSR Checklist</li> <li>Prepared the environmental guidebook in May 2019 to expand the policy for environmental activities to dealers</li> </ul> </li> <li>(Overseas)                                     <ul style="list-style-type: none"> <li>Reinforced environmental initiatives including CO<sub>2</sub> reductions based on environmental guidelines prepared in each region</li> <li>99 distributors and 4,506 dealers from 96 countries worldwide participated in the Dealer Environmental Risk Audit Program, and 96% of participating dealers satisfied all 5 audit requirements (up 1% year on year)</li> </ul> </li> </ul> </li> </ul>	✓✓																																													
25. Bolster global employee education and awareness activities	<ul style="list-style-type: none"> <li>Raise awareness of environmental conservation through global environmental education among employees                             <ul style="list-style-type: none"> <li>Systemize environmental education programs conducted in cooperation with consolidated affiliates</li> <li>Conduct environmental education in accordance with situations in each country and region</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:                             <ul style="list-style-type: none"> <li>Conducted environmental educations for employees around the world, during the Toyota Global Environmental Month</li> <li>Conducted education using internal digital signage and the intranet, reimbursed Eco Test fees, and others in Japan</li> <li>Conducted Toyota Saves the Wildlife Campaign (September 2018) and the Water Week Campaign (March 2019) other than the Toyota Environment Month to raise environmental awareness throughout the year</li> <li>Continued environmental lectures conducted by outside speakers, environmental seminars for employees, and environmental education for new employees</li> </ul> </li> </ul>	✓✓	51																																												
26. Enhance active disclosure of environmental information and communication	<ul style="list-style-type: none"> <li>Enhance environmental information disclosures                             <ul style="list-style-type: none"> <li>Expand business organizations subject to collection of environmental information, and creation of the system</li> <li>Further enhance "Environmental Report" contents</li> </ul> </li> <li>Further enhance environmental communications activities in each country and region globally</li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:                             <ul style="list-style-type: none"> <li>Our Environmental Report 2018 won the Grand Prize in the Environmental Reporting Category of the 22nd Environmental Communication Awards by high evaluation of the logic of the 2030 Milestone indicating the suitability of the Toyota Environmental Challenge 2050, investigation of climate-related risks and opportunities based on the 2°C and beyond 2°C scenarios, and others</li> <li>Continued to produce and publicly release "econohito" videos effectively spotlighting employees who are working on the Toyota Environmental Challenge 2050</li> <li>Produced videos introducing the Environmental Challenge 2050 and the Toyota Global Today for Tomorrow Project, posted them on websites and social media, and shared them with overseas affiliates</li> <li>Became signatory to the Task Force on Climate-related Financial Disclosures recommendations for appropriate climate-related information disclosures (April 2019)</li> </ul> </li> </ul>	✓✓	52																																												

Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
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## Challenge 1 New Vehicle Zero CO<sub>2</sub> Emissions Challenge

### Fundamental Approach

Extreme weather phenomena around the world are wreaking havoc on society, attesting to the reality of global warming. If adequate measures are not taken, the harm will become even more severe, and the risks of global-scale damage have been pointed out. Under these circumstances, the Paris Agreement, which came into effect in 2016, sets long-term goals to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

As the world is moving toward the realization of the beyond 2°C scenario, Toyota sees this situation as both a risk and an opportunity and announced the “New Vehicle Zero CO<sub>2</sub> Challenge.” Toyota will strive to slash average CO<sub>2</sub> emissions per vehicle by 90 percent in comparison with 2010 levels, by 2050.

Based on the idea that eco-friendly vehicles contribute to society only when they come into widespread use, we are not only deploying technologies for conventional engine vehicles, but also accelerating advances in technology and its widespread adoption for the electrified vehicles that Toyota has been developing (including hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), battery electric vehicles (BEVs), and fuel cell electric vehicles (FCEVs)).

Toyota is committed to continue working hand in hand with stakeholders to build the necessary infrastructure that supports the widespread adoption of these vehicles.

Through these initiatives, we will contribute to achieving SDG 7.3 (improvement in energy efficiency) and 13.1 (reduction of CO<sub>2</sub>).

#### Related SDGs



Target	7.3 (improvement in energy efficiency)	13.1 (reduction of CO <sub>2</sub> )
Sixth plan targets and progress	No. 1, 2 (p.14)	No. 1, 2 (p.14)

## Promoting Development of Next-generation Vehicles Using Electric Power, and Widespread Use According to Their Features

In order to curb greenhouse gases, we believe that effective vehicle electrification is essential for the efficient use of energy, and encouraging the use of alternative fuels. Since the launch of the Prius, a pioneering electrified vehicle, Toyota has taken the initiative in developing and promoting the widespread use of electrified vehicles based on the belief that eco-friendly vehicles can contribute to the environment only when they come into widespread use.

In December 2017, we announced the challenges toward the popularization of electrified vehicles, which is one of the medium- to long-term initiatives. We aim to achieve global sales of more than 5.5 million electrified vehicles including more than 1 million BEVs and FCEVs, which are ZEVs\*, by 2030. We will expand dedicated electrified models and electric options through about 2025 and will have no vehicles available only as an engine model globally. Starting in 2020, we will accelerate the introduction of BEVs, initially in China, and will expand BEV models to more than 10 in the first half of the decade worldwide.

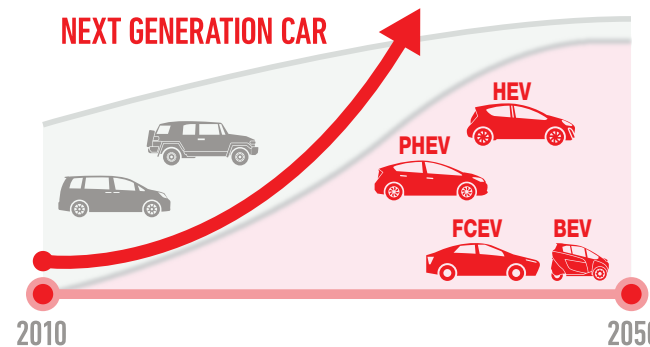
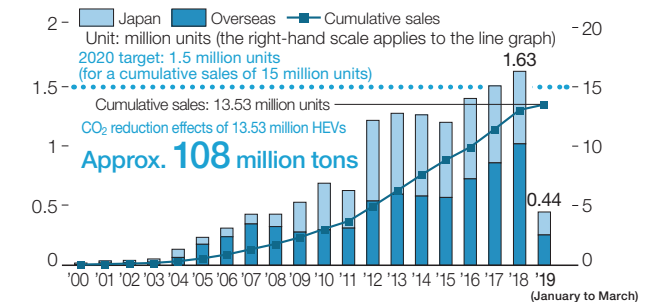
We will also expand the lineup of FCEVs and PHEVs throughout the 2020s. With regard to HEVs, we will raise the efficiency of the 2.0-liter Toyota Hybrid System (THS II) while developing various types of hybrid systems such as high-power and simplified versions, expanding the product line-up to meet customer needs.

[Environmental Data p. 54-A](#)

\* Zero Emission Vehicles: Vehicles that do not emit CO<sub>2</sub> at all during operation such as BEVs and FCEVs

### Annual HEV Sales and Cumulative Sales (Global)

Third Party Assurance



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**Column** **Accelerating the Widespread Use of Electrified Vehicles (China)**

Toyota is reinforcing local development and production systems for electrified vehicle powertrains in China to accelerate the electrification of vehicles.

In April 2019, Toyota premiered the C-HR and IZOA BEV models at Auto Shanghai in China. The C-HR and IZOA BEV models will be the first Toyota brand BEVs to launch in China. Sales are slated to start from 2020.

Also, Toyota's other booth exhibited a variety of electrified vehicles, such as HEV variants for the RAV4 and the Alphard/Vellfire, as well as the Corolla/Levin PHEV models, and the RHOMBUS, a BEV concept car.

Sales of the Corolla and Levin PHEV models started in March 2019. And, by further promoting local production of electric motors, batteries, inverters, and other electrified vehicle core technologies, Toyota aims to further accelerate its vehicle electrification efforts. As for FCEVs, Toyota has been conducting verification tests with the MIRAI since 2017, and is considering the local introduction of other fuel cell vehicles such as the FC Coaster.



Top: C-HR (BEV); bottom: RHOMBUS

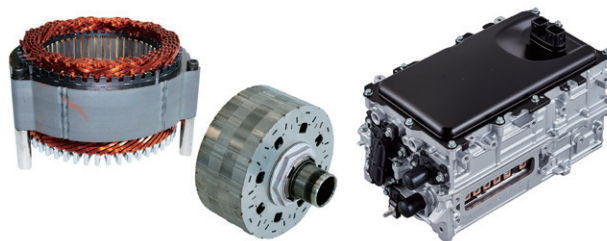
**Column** **Grant Royalty-Free Licenses for Vehicle Electrification Technology Accumulated Through HEV Development**

Since 2015, Toyota granted royalty-free licenses based on their belief that it is important to give priority to spurring more widespread use of FCEVs, and therefore believed concerted initiatives with energy companies that are looking to expand hydrogen station infrastructure, and automobile manufacturers that are looking to move forward with FCEV development and market introduction, will be vital.

In April 2019, Toyota decided to grant royalty-free licenses (Toyota holds approximately 23,740 patents worldwide including pending applications) for vehicle electrification-related technologies such as motors, power control units (PCUs), and system controls as a part of its initiative to promote the widespread use of electrified vehicles.

Toyota will also provide technical support to other manufacturers developing and manufacturing electrified vehicles when they utilize Toyota's powertrain systems.

Toyota believes that this new initiative will spur the development and market launch of electrified vehicles globally, contributing to curb global warming by reducing CO<sub>2</sub> emissions.



Motor

PCU

**Column** **Supporting the Olympic and Paralympic Games Tokyo 2020 with Eco-Cars**

As a worldwide partner of the Olympic and Paralympic Games Tokyo 2020, Toyota aims to contribute by providing the latest mobility (over 3,000 passenger vehicles for official use), mainly eco-cars, to help achieve low environmental impact Games compared to the recent past Games.

**Main Initiatives**

- Support transportation services for athletes and affiliated guests around the Athletes' Village with e-Palette, the next-generation BEV, and its driving system
- Provide personal mobility solutions such as the Toyota i-ROAD as well as a standing-riding device to support working staff at the Games, such as security officers
- Toyota will support the Games by providing vehicles for official use, such as Mirai FCEVs, as well as Fuel Cell forklifts made and sold by Toyota Industries Corporation



Top: e-Palette; bottom: Toyota i-ROAD

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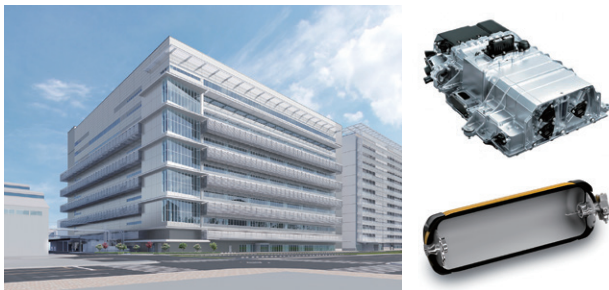


### Expanded and Improved Fuel Cell (FC) Stack and High-Pressure Hydrogen Tank Production Facilities in Preparation for Increased Sales of FCEVs Starting After 2020

Toyota aims global sales of FCEVs, at least 30,000 per year after 2020. Annual sales today is 3,000, and to prepare for this production level toward ten-fold increase, Toyota is expanding production facilities for FC stacks, the core units of FCEVs, and the high-pressure hydrogen tanks that store the hydrogen fuel.

For FC stack production facility, we are constructing a brand-new building at the Honsha Plant. The production of high-pressure hydrogen tanks will be handled by a new, dedicated line added inside the Shimoyama Plant. The new facilities are expected to pursue comprehensive reductions in CO<sub>2</sub> emissions from the production stage as one measure for achieving the Plant Zero CO<sub>2</sub> Emissions Challenge.

Going forward, Toyota will strengthen its FCEVs and FCEV buses product appeal, and also keep working with Toyota Group companies to develop a hydrogen supply infrastructure and construct a low-carbon hydrogen. Through these and other initiatives, company is actively contributing to the realization of a hydrogen-based society.



Left: The FC stack production building under construction within the Honsha Plant premises;  
right top: FC stack; right bottom: High-pressure hydrogen tank

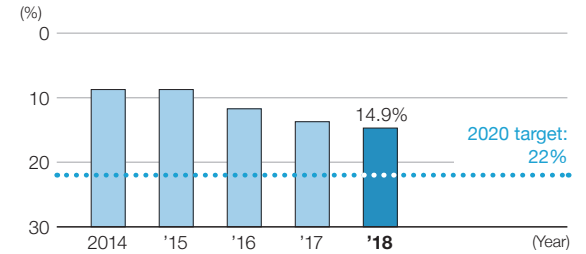
### Developing Technologies to Achieve the Leading Fuel Efficiency Performance

Toyota is committed to reducing the global average CO<sub>2</sub> emissions from new vehicles more than 22 percent by 2020 from the 2010 level to steadily proceed with our challenge. As specific initiatives, we plan to further improve the environmental performance of electrified vehicles and expand their use in line with developing and deploying powertrains with high environmental performance, based on our next-generation platform strategy known as TNGA\*.

The Crown was launched in June 2018. The 2.5-liter and 3.5-liter models are dedicated HEV models. The Corolla Sport 1.8-liter model, released on the same month, is also a dedicated HEV model, and the 1.2-liter model with a downsized engine provides exceptional fuel efficiency by adopting an advanced fuel injection system that achieves optimal combustion efficiency.

\* Toyota New Global Architecture: Toyota's company-wide global program to structurally transform automobile design. The goal of TNGA is to dramatically improve the basic performance and marketability of Toyota vehicles by reforming and integrally redesigning powertrain components and vehicle platforms.

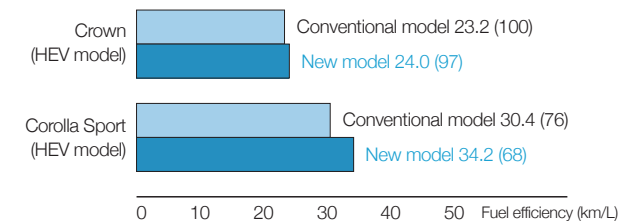
### Global Average CO<sub>2</sub> Emissions from New Vehicles Reduction Rate Versus 2010 (Japan, U.S., Europe, China)



• The average CO<sub>2</sub> emissions (g/km) of new vehicles in each year, based on the fuel efficiency value (CO<sub>2</sub> emissions) certified by each national authority

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### Fuel Efficiency Comparison Between Selected New Models Introduced in FY2019 (in Japan) and Conventional Models



• Fuel efficiency values are based on JC08 test cycle verified by (Ministry of Land, Infrastructure, Transport and Tourism of Japan)  
• CO<sub>2</sub> emissions (g/km) in brackets

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## Challenge 2 Life Cycle Zero CO<sub>2</sub> Emissions Challenge

### Fundamental Approach

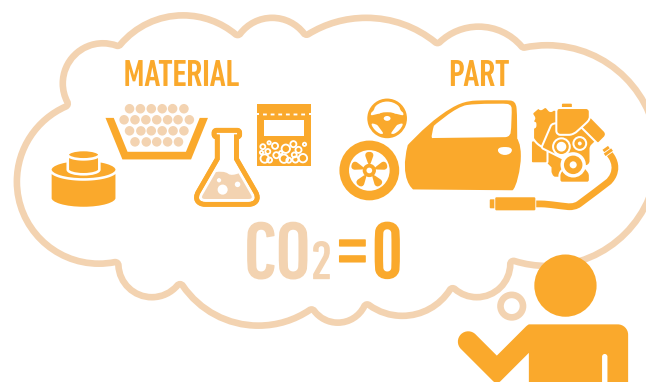
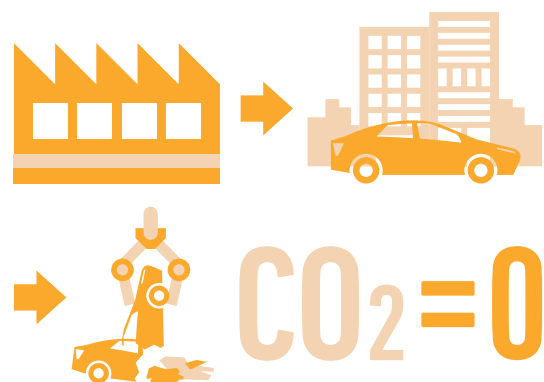
To mitigate the various risks posed by climate change, the “Life Cycle Zero CO<sub>2</sub> Emissions Challenge” seeks to completely eliminate CO<sub>2</sub> emissions not only while driving vehicles, but throughout the entire vehicle life cycle including materials and parts manufacturing and vehicle assembly, maintenance, disposal, and recycling. Some electrified vehicles may have materials and parts that increase CO<sub>2</sub> emissions in the processes of manufacturing. Possible means of reducing this include adopting low CO<sub>2</sub> emitting materials during manufacturing as well as reducing material usage and the number of

parts used. It is possible to reduce CO<sub>2</sub> emissions in the disposal and recycling stages by expanding use of recycled materials and designs that make it easier to dismantle vehicles. We will accelerate eco-friendly designs as we pursue “ever-better cars.” We will also promote reductions in CO<sub>2</sub> through the efficient use of mobility by providing mobility services and supporting the widespread adoption of eco-driving. Through these initiatives, we will contribute to achieving SDG 12.8 (sustainable lifestyle) and 13.1 (reduction of CO<sub>2</sub>).

#### Related SDGs



Target	12.8 (sustainable lifestyle)	13.1 (reduction of CO <sub>2</sub> )
Sixth plan targets and progress	No. 7 (p. 14)	No. 3, 4, 5, 6, 7 (p. 14)



## Promoting Environmental Management in Product Development (Eco-VAS)

### Steady Promotion of Environmental Target Management

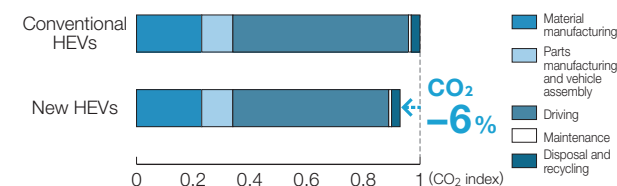
To reduce the environmental impact of its vehicles, Toyota has introduced the Eco-Vehicle Assessment System (Eco-VAS) to set and achieve environmental targets such as life cycle CO<sub>2</sub> and recyclability, under the guidance of the chief engineer, including at the development stage.

In this system, we conduct LCA\* which assesses the impact of the vehicle life cycle on the environment at all stages including materials and parts manufacturing, vehicle assembly, driving, maintenance, disposal, and recycling.

In FY2019, we conducted LCA for five new and redesigned models (Century, Corolla Sport, Crown, and Lexus ES and UX) and one partially redesigned model (Probox/Succeed).

\* Life Cycle Assessment: A comprehensive technique to assess vehicle's impact on the environment over the entire life cycle from resource mining through to disposal and recycling, by quantifying the impact of each stage

### LCA Results of Corolla Sport HEV Models



- Evaluations are based on driving a vehicle in JC08 test cycle (Ministry of Land, Infrastructure, Transport and Tourism of Japan) for a lifetime mileage of 100,000 km (Toyota data)
- LCA assessment results are shown as an index



The LCA that Toyota conducts on its passenger vehicles has been tested and certified by German third-party organization TUV Rheinland based on ISO 14040/14044 standards

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### Response to Scope 3

Scope 3 is a standard established to measure CO<sub>2</sub> emissions at all stages of a company's business activities and identify areas for future reductions. Scope 3 accounts for not only CO<sub>2</sub> emissions from their activities and those of their consolidated subsidiaries (Scope 1 and Scope 2), but emissions from other stages of the life cycle, such as procured materials and parts, transportation, employee commuting and business travel, along with the driving, maintenance, and disposal of customer vehicles.

The calculation results for FY2019 are overall Scope 3 CO<sub>2</sub> emissions of 414.91 million tons-CO<sub>2</sub>, with category 1 and category 11 combined accounting for the bulk of the total, approximately 97 percent.

Category 1 covers emissions from materials and parts at the manufacturing stage, while category 11 covers emissions from vehicles driven by customers. Therefore, use of lightweight parts, materials selection, development of fuel efficiency improvement technologies, and next-generation eco-friendly vehicles are important measures that will lead to CO<sub>2</sub> emissions reduction.

Moving forward, we will continue to monitor Scope 3 emissions and utilize the findings to take measures for developing technologies.

#### CO<sub>2</sub> Emissions Ratio of 15 Categories in Scope 3 (FY2019 Global Basis)

Third Party Assurance

Category	Emissions volume (million tons-CO <sub>2</sub> )	Emissions ratio (%)
1. Purchased goods and services	63.29	15.3
2. Capital goods	4.54	1.1
3. Fuel- and energy-related activities (not included in Scope 1 or 2)	0.93	0.2
4. Upstream transportation and distribution	0.89	0.2
5. Waste generated in operations	0.12	0.0
6. Business travel	0.15	0.0
7. Employee commuting	0.64	0.2
8. Upstream leased assets	—	—
9. Downstream transportation and distribution	0.01	0.0
10. Processing of sold products	1.17	0.3
11. Use of sold products	339.25	81.8
12. End-of-life treatment of sold products	3.84	0.9
13. Downstream leased assets	—	—
14. Franchises	—	—
15. Investments	0.08	0.0
Total for categories 1 through 15	414.91	100

- The calculation range mainly covers financial consolidated automotive business
- CO<sub>2</sub> emissions from the use of sold products are calculated from the average fuel efficiency and estimated lifetime mileage of vehicles in Japan, U.S., Europe, China; the consolidated number of vehicles sold in FY2019; and the CO<sub>2</sub> emission factor
- Upstream and downstream leased assets are included in the other category, and franchises are not included

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### Column Eco-Driving Supported Through Diagnosis of Driving Tendencies and the Provision of Advice by the Car

The Corolla Sport is a connected car that comes with data communication modules as standard on all grades. By linking the vehicle with the Toyota Smart Center, drivers can receive 24-hour support, and by equipping the T-Connect navigation system, enhanced services can be used. MyTOYOTA for T-Connect is an application used to coordinate with Toyota vehicles equipped with T-Connect/G-BOOK to check the status and driving data of the registered vehicle. The driving diagnosis function makes automatic diagnoses based on customer's driving tendencies, and displays the results from the perspectives of safe driving and eco-driving.

Eco-driving is numerically scored based on four items: accelerator work, brake work, speed maintenance, and idling. Monthly reports provide driving advice and indicate fuel efficiency rankings among users in Japan.



MyTOYOTA for T-Connect eco-diagnosis function



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## Pursuing Transportation Efficiency and Reducing CO<sub>2</sub> Emissions in Logistics Activities

To reduce CO<sub>2</sub> emissions in its logistics activities, Toyota Motor Corporation (TMC) is taking measures to improve the transportation efficiency of production parts, completed vehicles, and spare parts.

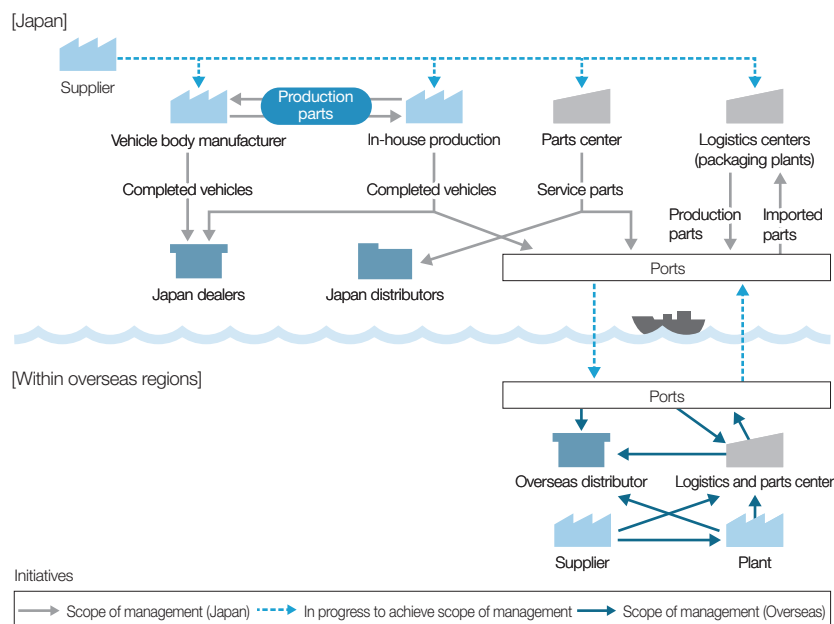
In FY2019, we continued fuel efficiency initiatives, including loading efficiency improvement, shortening logistics routes, modal shifts, and so on, maintaining CO<sub>2</sub> emissions per unit of workload (transportation volume) at 104.2 g-CO<sub>2</sub>/tkm (same as the previous year).

CO<sub>2</sub> emissions from logistics operations totaled 0.289 million tons (up 1.0 percent year on year), due largely to an increase in volume in Japan.

At the global level, Toyota began assessing CO<sub>2</sub> emissions in each country and region in FY2008, and indicated global target guidelines starting in FY2014. Based on these guidelines, each country and region set a goal toward which they have been carrying out reduction activities.

As a result, Toyota's global CO<sub>2</sub> emissions in FY2019 totaled 2.20 million tons. We will make a full analysis of results and continuously strive to further improve transportation efficiency and reduce CO<sub>2</sub> emissions per transportation volume.

### Scope of Assessment of CO<sub>2</sub> Emissions in Logistics Activities



### Trends in CO<sub>2</sub> Emissions per Ton-kilometer (Transportation Volume) from TMC Logistics Operations (Japan)

	FY	2015	2016	2017	2018	2019
CO <sub>2</sub> emissions from logistics (million tons)		0.278	0.275	0.282	0.286	0.289
CO <sub>2</sub> emissions per ton-kilometer (g-CO <sub>2</sub> /tkm)		109.6	108.4	105.2	104.2	104.2

• CO<sub>2</sub> conversion factors: The CO<sub>2</sub> conversion factors were calculated based on guidelines such as the "Guidelines on Disclosure of CO<sub>2</sub> Emissions from Transportation & Distribution (version 3.0)" issued by Ministry of Economy, Trade and Industry and Ministry of Land, Infrastructure, Transport and Tourism of Japan

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### Results of TMC Kaizen Initiatives to Reduce CO<sub>2</sub> Emissions (Japan)

Products	Main kaizen initiatives	Reduction volume (thousand tons)
Completed vehicles	Increased the use of maritime transportation, reviewed transportation routes, and improved loading efficiency by changing stopover points	2.8
Production parts	Consolidation, elimination, and reorganization of transportation routes	1.1
Service parts	Increased packing efficiency in shipping containers and shortened transportation distances by reviewing stopping points	0.5
Total		4.4

### Global Logistics CO<sub>2</sub> Emissions

	FY	2017	2018	2019
CO <sub>2</sub> emissions from logistics (million tons)		2.14	2.17	2.20

- Total CO<sub>2</sub> emissions from business that handle logistics in each region (seven regions: North America, Europe, China, Southeast Asia, South Africa, South America, Japan) from delivery of production parts, service parts, and completed vehicles
- Transportation between regions (e.g., Japan to North America) has been excluded from the scope of calculations
- Some production and sales businesses (different to businesses that handle logistics) that directly handle deliveries in North America, China, and Southeast Asia have been excluded from the scope of calculations
- CO<sub>2</sub> emissions have been calculated according to the calculation methods of each business

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Optimizing Water Usage

Challenge 5  
Challenge of Establishing a Recycling-  
based Society and Systems

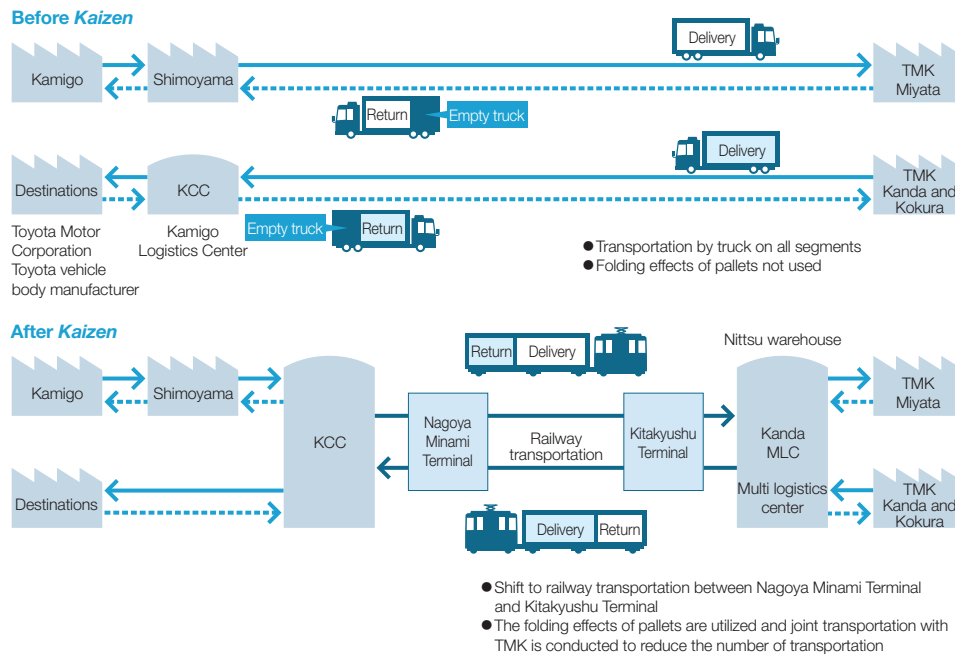
Challenge 6  
Challenge of Establishing a Future Society  
in Harmony with Nature

Environmental Management

**Column** Reduction in CO<sub>2</sub> Emissions by Changing the Structure of Kyushu Route

For logistics to Kyushu, engines produced at the Kamigo Plant and Shimoyama Plant in the Toyota Motor Corporation (TMC) Honsha region were transported overland by truck to the Toyota Motor Kyushu, Inc. (TMK) Miyata Plant, but empty pallets were transported on the return trip. Moreover, engines and transaxles produced at TMK's Kanda Plant and Kokura Plant were transported to various TMC plants, and similarly, empty pallets were transported on the return trips.

By focusing on these two examples and reducing the total number of trips made by both companies, CO<sub>2</sub> during transportation was reduced. In addition, previously all transportation was made by truck, but by implementing a modal shift to railway transportation between the Nagoya Minami Terminal and the Kitakyushu Terminal, CO<sub>2</sub> during transportation was reduced even further. Furthermore, the folding effects of pallets were utilized to reduce the total number of transportation trucks from 18 to 13 per day. As a result of these measures, CO<sub>2</sub> emissions were reduced from 10,052 tons-CO<sub>2</sub> per year to 1,495 tons-CO<sub>2</sub> per year.

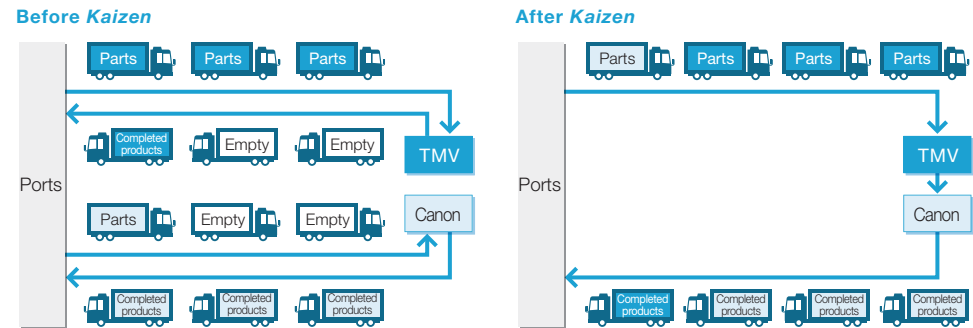


**Column** CO<sub>2</sub> Emissions Reduction Through Joint Transportation (Vietnam)

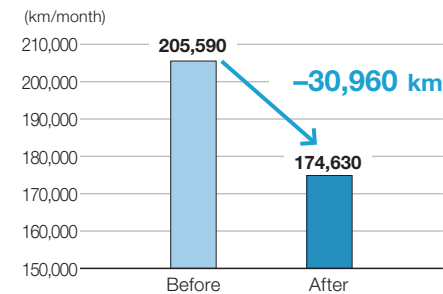
TMV, a Vietnam-based affiliate, produces the Corolla, Camry, and other vehicles. Many production parts are transported from overseas by ship and then transported by truck from the port in Vietnam to TMV. Conversely, the completed vehicles produced by TMV are transported by truck to the port and then sent overseas by ship. The number of transportation trucks to transport the parts is greater than that of completed vehicles, resulting in empty space on trucks from TMV to the port.

Meanwhile, Canon Inc. has a nearby plant. Unlike TMV, Canon has few imports but a large volume of exports, and as a result, has empty space on trucks going from the port to the plant. By adjusting their trucking schedules and transporting each other's products in the empty space, TMV and Canon were both able to reduce the number of transportation trucks and cut CO<sub>2</sub> emissions.

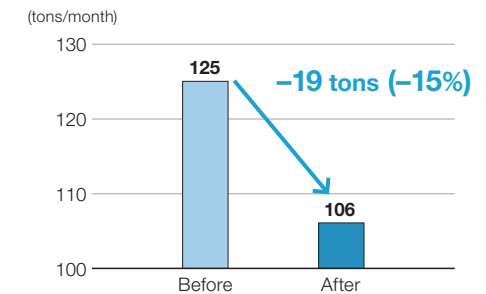
As a result of these measures, the distance travelled by trucks was reduced from 205,590 km to 174,630 km per month and monthly CO<sub>2</sub> emissions fell from 125 tons to 106 tons, a reduction of about 15 percent.



Comparison of travel distances



Comparison of CO<sub>2</sub> Emissions



Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
Challenge

Challenge 2  
Life Cycle Zero CO<sub>2</sub> Emissions  
Challenge

Challenge 3  
Plant Zero CO<sub>2</sub> Emissions  
Challenge

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## Challenge 3 Plant Zero CO<sub>2</sub> Emissions Challenge

### Fundamental Approach

The Plant Zero CO<sub>2</sub> Emissions Challenge seeks zero CO<sub>2</sub> emissions in the vehicle manufacturing process. To achieve this, Toyota will work on both the introduction of innovative technologies and daily *kaizen* and the introduction of renewable energy and utilization of hydrogen.

First of all, processes and the time required were reduced by simplifying and streamlining manufacturing processes, which made an improvement to energy use efficiency, including equipment optimization and the use of waste heat. Furthermore, we use every possible means to reduce CO<sub>2</sub> emissions including introducing an

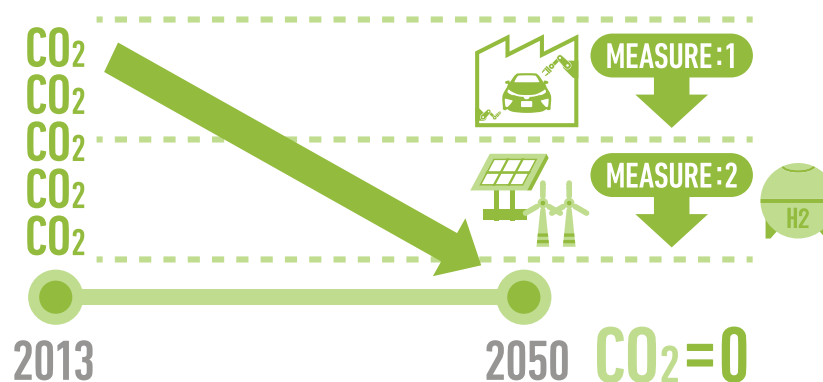
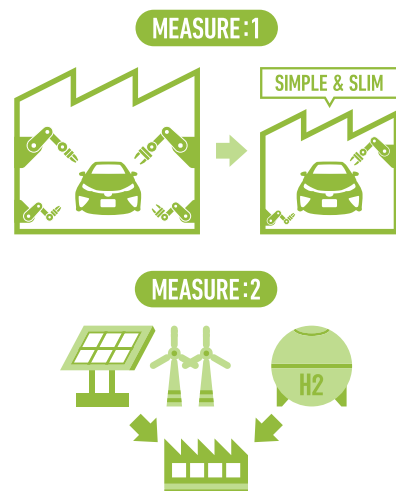
innovative process called *karakuri* that does not consume any energy source at all. In addition, we will effectively utilize renewable energy such as solar power and wind power along with hydrogen energy, and we are committed to continuing working hand in hand with stakeholders to build the necessary infrastructure to support the widespread use of these energy sources.

Through these initiatives, we will contribute to achieving SDG 7.2 (introduction of renewable energy), 7.3 (improvement in energy efficiency), 9.1 (infrastructure development), 9.4 (sustainable production processes), and 13.1 (reduction of CO<sub>2</sub>).

#### Related SDGs



Target	7.2 (introduction of renewable energy) 7.3 (improvement in energy efficiency)	9.1 (infrastructure development) 9.4 (sustainable production processes)	13.1 (reduction of CO <sub>2</sub> )
Sixth plan targets	No. 8 (p. 15)	—	No. 8 (p. 15)
and progress	No. 8 (p. 15)	No. 8 (p. 15)	No. 8 (p. 15)



## Reduce CO<sub>2</sub> Emissions in Production Activities

### Introduction of Innovative Technologies and Daily *Kaizen*

In our production activities, we have been developing and introducing low-CO<sub>2</sub> production technologies along with taking daily improvement measures to achieve our reduction targets.

In FY2019, Toyota Motor Corporation (TMC) plant manufacturing divisions worked with production engineering and drive force personnel to conduct energy diagnoses at production sites, propose improvements, implement measures, and undertake energy-saving activities (internal ESCO activities). In addition, TMC continuously undertook *yokoten*\* of best practices.

Also, energy-saving effects were achieved by starting to introduce innovative technologies with a focus on painting processes as well as adopting steamless and airless processes and shifting to LED lighting. As a result, we reduced total CO<sub>2</sub> emissions to 1.11 million tons (down 2.9 percent year on year), and CO<sub>2</sub> emissions per unit produced to 0.387 tons (down 1.8 percent year on year).

Globally, there were some overseas affiliates with higher CO<sub>2</sub> emissions as a result of increase in production volumes in conjunction with the installation of new production lines, but CO<sub>2</sub> reductions were accelerated by adopting TMC best-practice in their own business operations. Affiliated companies in Japan conducted study sessions to share know-how on energy-saving activities with vehicle manufacturing companies and parts manufacturers, and that information was reflected in improvements at each company. We also observed other industries and worked to discover new ideas of *kaizen*. Moreover, CO<sub>2</sub> emissions reduction effects were achieved by actively purchasing renewable energy from regions where an environment for the introduction of renewable energy has been developed, and by installing solar panels to generate in-house power for internal consumption. As a result of these measures, total CO<sub>2</sub> emissions were 7.65 million tons (down 1.8 percent year on year), and CO<sub>2</sub> emissions per unit produced were 0.712 tons (down 3.8 percent year on year). In order to further reduce CO<sub>2</sub> emissions from production activities, we will continue our energy-saving activities, such as internal ESCO activities and accelerate introduction of innovative technologies.

\* *Yokoten* refers to sharing of improvement practices, know-how, non-compliance and other information within the All-Toyota Group

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New Vehicle Zero CO<sub>2</sub> Emissions  
Challenge

Challenge 2  
Life Cycle Zero CO<sub>2</sub> Emissions  
Challenge

Challenge 3  
Plant Zero CO<sub>2</sub> Emissions  
Challenge

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**Trends in Total CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources) and CO<sub>2</sub> Emissions per Unit Produced at TMC**

Third Party Assurance

	FY	2015	2016	2017	2018	2019
Total CO <sub>2</sub> emissions (million tons)		1.18	1.15	1.16	1.14	<b>1.11</b>
CO <sub>2</sub> emissions per unit produced (tons/unit)		0.413	0.408	0.398	0.394	<b>0.387</b>

- Scope of coverage: Production and non-production divisions (excluding employee benefit facilities)
- Conversion factors: CO<sub>2</sub> emissions were calculated using the Nippon Keidanren's 1990 conversion factors

[Environmental Data p. 58-V](#)



Plant and Work Site  
Environmental Data

**Trends in Global Total CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources) and CO<sub>2</sub> Emissions per Unit Produced**

Third Party Assurance

	FY	2015	2016	2017	2018	2019
Total CO <sub>2</sub> emissions (million tons)						
Japan (TMC)		1.25	1.21	1.20	1.19	<b>1.16</b>
Japan (consolidated EMS and its subsidiaries)		3.66	3.55	3.57	3.61	<b>3.62</b>
North America		1.17	1.13	1.21	1.19	<b>1.20</b>
China		0.65	0.69	0.70	0.73	<b>0.80</b>
Europe		0.29	0.27	0.30	0.30	<b>0.24</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America		0.77	0.72	0.83	0.77	<b>0.63</b>
Total		7.79	7.57	7.81	7.79	<b>7.65</b>
Direct emissions (Scope 1) (million tons)		2.72	2.49	2.55	2.55	<b>2.50</b>
Indirect emissions (Scope 2) (million tons)		5.07	5.08	5.26	5.24	<b>5.15</b>
CO <sub>2</sub> emissions per unit produced (tons/unit)		0.753	0.744	0.741	0.740	<b>0.712</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 120 companies

- GHG Protocol was used to calculate emissions
- Conversion factors: [Environmental Data p. 58-W](#)

[Environmental Data p. 57-R](#)

**Introduction of Renewable Energy and Utilization of Hydrogen**

Toyota is promoting the introduction of renewable energy, taking into consideration the characteristics of each country and region.

When introducing renewable energy, we place the highest priority on in-house generating facilities (such as solar power generation) and in-house consumption at Toyota plants and other facilities.

In FY2019, we generated 39,528 MWh of renewable electricity globally.

\* See the special features, "Effective Use of Renewable Energy for Creating a Decarbonized Society in 2050" (pp. 7-8) and "Toward Realizing a Decarbonized Society in 2050: Use of Hydrogen Energy" (pp. 28-30).

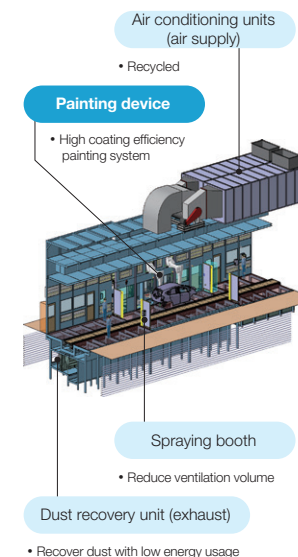
**Column Introduction of Innovative Technologies in Painting Processes**

Painting processes involve robots equipped with paint spray devices installed in large painting booths. The vicinity needs equipment such as air conditioning units for venting large volumes of air, and paint ovens. As a result, large amounts of CO<sub>2</sub> are emitted.

To reduce CO<sub>2</sub> emissions, attention was focused on cutting the amount of paint wasted by paint spray devices as a result of paint rebounding from vehicle bodies.

By switching to electrostatic adhesion technology that does not rely on the air used in the past, coating efficiency was increased 20 percent and the amount of air used was slashed by 75 percent. This also resulted in a reduction in the amount of ventilation. As a synergy effect of the improvement in coating efficiency and reduction in ventilation volume, the spray dust recovery method used in painting booths was changed from water recovery to absorption by dry filters, reducing water usage and waste, and cutting air conditioning energy use.

These innovative technologies were introduced at the Tsutsumi Plant, and we plan to expand introduction at other plants including overseas plants.

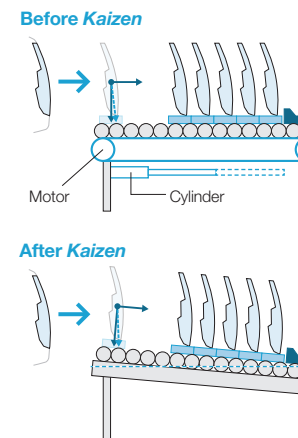


**Column Karakuri Method Introduced to Reduce Energy Usage (Thailand)**

TMT, a Thailand-based affiliate, took measures to reduce energy consumption by introducing a *karakuri* method to facilities at its Ban Pho Plant.

Previously, 12 motors and 38 cylinders were used on each line to transport doors to the assembly location during the vehicle assembly process. After implementation of this *kaizen*, the production line was inclined so that the doors move under their own weight. The incline angle was determined by conducting repeated trials to ensure that there is no impact on product quality during transportation. By having workers press on a pedal to lift the doors and transport them to the next line, the energy used by motors, cylinders, and so on has been reduced to zero.

As a result of this *kaizen*, energy consumption per unit produced is down 0.065 kWh, annual energy consumption is down 12,082 kWh, and annual CO<sub>2</sub> emissions have been reduced by 6,500 kg.



Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
Challenge

Challenge 2  
Life Cycle Zero CO<sub>2</sub> Emissions  
Challenge

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Plant Zero CO<sub>2</sub> Emissions  
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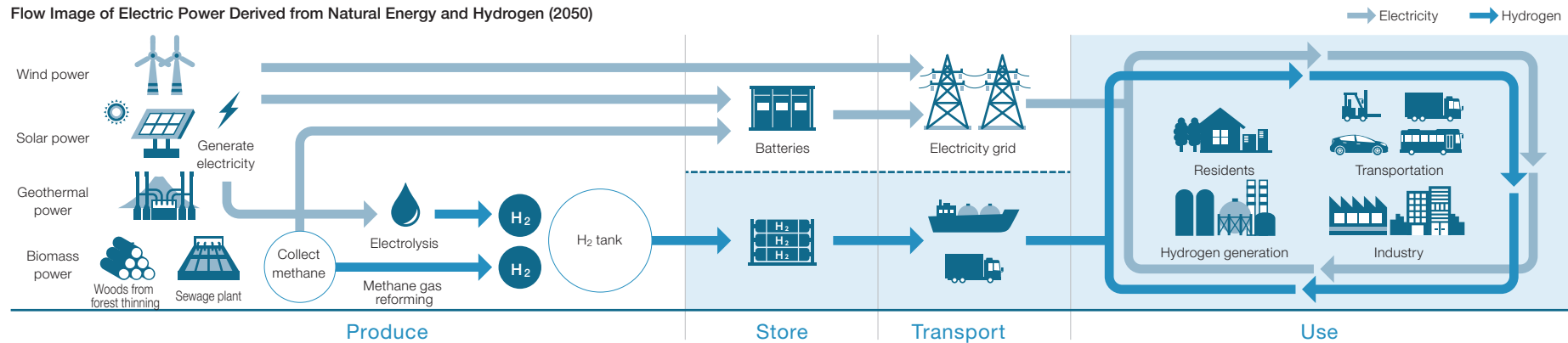
Environmental Management

## Toward Realizing a Decarbonized Society in 2050: Use of Hydrogen Energy

In conjunction with the rising use of electricity derived from natural energy in recent years, hydrogen holds great promise as a means of absorbing fluctuations and surpluses in renewable energy and for energy storage and transportation.

Toyota is participating in the creation of mechanisms for the use of hydrogen energy throughout society and is contributing to the realization of a decarbonized society.

Flow Image of Electric Power Derived from Natural Energy and Hydrogen (2050)



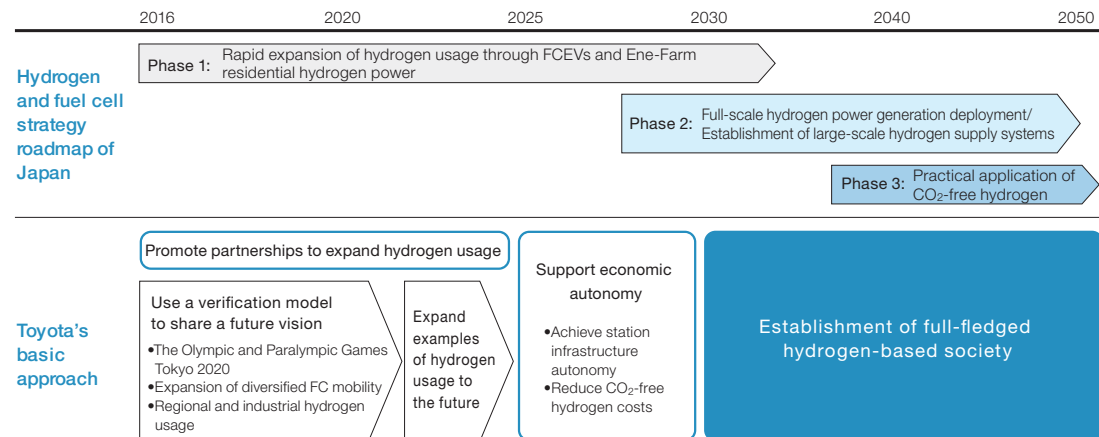
### Strategies and Steps

Building infrastructure and making hydrogen widespread as a new energy are major challenges to realizing a hydrogen-based society. Toyota is promoting the widespread use of fuel cell electric vehicles (FCEVs) and actively collaborating with national and local governments, local communities, and industries. We will strive to expand the use of hydrogen and make it economically viable.

#### Toyota's Current Mission

- (1) Achieve a hydrogen-based society through the widespread use of FCEVs
- (2) Collaborate with government, local communities, and the energy industry to build structures and perform verification tests

### Aligning Toyota's Strategies and Steps with National Policies of Japan (Examples in Japan)



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Challenge

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Challenge

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## Main Projects in Japan (Collaboration with Local Communities: Since FY2019)

Toyota's FCEV sales target for around 2020 is at least 30,000 units annually on a global basis, including at least 10,000 units in Japan.



Plants

### Expanded and improved fuel cell stack and high-pressure hydrogen tank production facilities in preparation for sales expansion starting in 2020

(Aichi Prefecture, since May 2018)  
Fuel cell stacks: Honsha Plant  
High-pressure hydrogen tanks: Shimoyama Plant

#### Toyota's role

Pursuing comprehensive reductions in CO<sub>2</sub> during FCEV production as one measure for achieving the 2050 Plant Zero CO<sub>2</sub> Emissions Challenge

Plants

### Development of low-carbon hydrogen supply chain in Aichi Prefecture starts

(Aichi Prefecture, since April 2018)  
Aichi Prefecture, Chita City, Toyota City, Chubu Electric Power Co., Ltd., Toho Gas Co., Ltd., Toyota Motor Corporation, and Toyota Industries Corporation established an organization to promote collaboration among industry, academia, and government 2030 vision and roadmap formulated

#### Toyota's role

Reform city gas derived from biogas; produce, compress, and store low-carbon hydrogen  
Start a project to utilize low-carbon hydrogen for fueling FC forklifts at the Motomachi Plant



Energy creation

### Japan H<sub>2</sub> Mobility, LLC established

(Tokyo, since March 2018)  
Established by Toyota Motor Corporation, Nissan Motor Co., Ltd., Honda Motor Co., Ltd., JXTG Nippon Oil & Energy Corporation, Idemitsu Kosan Co., Ltd., Iwatani Corporation, Tokyo Gas Co., Ltd., Toho Gas Co., Ltd., Air Liquide Japan Ltd., Toyota Tsusho Corporation, and Development Bank of Japan Inc.

#### Toyota's role

Participate in the LLC and operate hydrogen stations through collaboration with parties located throughout Japan

Community

### The Olympic and Paralympic Games Tokyo 2020 demonstrate models of the next-generation mobility society and a clean, hydrogen-based society to the world

(Tokyo, through 2020)

#### Toyota's role

Support as a Worldwide partner of the IOC, as well as providing mobility means such as FCEVs and FCEV buses, and initiatives for the next-generation mobility society

Energy creation

### Hydrogen-based mobility partnership between railways and automobiles

(Kanto, since September 2018)  
East Japan Railway Company and Toyota

#### Toyota's role

Develop FCEVs and FCEV buses using advanced FC technology, and expand hydrogen supply infrastructure

Plants

### Solar water electrolysis hydrogen station project at Motomachi Plant

In April 2019, we introduced SimpleFuel™ to its Motomachi Plant. SimpleFuel™ is a hydrogen station that uses electricity from solar panels to produce hydrogen from the electrolysis of water, which is then supplied to FC forklifts after it is compressed and pressurized. It can produce up to 99 Nm<sup>3</sup>/day of hydrogen, enough to fuel seven or eight FC forklifts. Its compact size means it can be installed in small spaces, making it suitable for refueling FC forklifts within the plant.

Plants

### Toyota develops world's first general-purpose hydrogen burner for industrial use

Toyota developed the world's first general-purpose hydrogen burner for industrial use in collaboration with Chugai Ro Co., Ltd. and introduced it into the forging line in Toyota's Honsha Plant. In conventional hydrogen burners, a high flame temperature leads to environmentally hazardous NOx emissions, making the practical use of hydrogen burners challenging. In the case of the newly developed burner, hydrogen and oxygen are ignited without being fully mixed, leading to slow combustion, and by reducing oxygen concentration to a proper value NOx emissions are greatly reduced.

Community

### FCEV buses adopted as shuttle bus from the Chubu Centrair International Airport

The Chubu Centrair International Airport has been working on building a hydrogen utilization model, utilizing FC forklifts and FCEV buses. A new hydrogen station opened at the airport in March 2019, enabling high-capacity refueling to FCEV buses. Taking advantage of this new hydrogen station, FCEV buses were introduced as shuttle bus connecting Aeon Mall Tokoname and the airport from June 2019.



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## Main Projects Overseas (Partnerships for the Widespread Use of FCEVs and Hydrogen Usage)

Toward realization of a hydrogen-based society, we are accelerating a variety of initiatives, including the widespread use of FCEVs, in cooperation with partners worldwide.

### Membership in Hydrogen Council Quadruples Size in 18 Months

In January 2017, the Hydrogen Council was established in Davos, Switzerland as the first global hydrogen initiative. The Council is represented by leaders from global companies including Toyota striving to promote hydrogen usage as a means to achieve climate change goals. In November 2017, the Council announced the world's first concrete vision for the use of hydrogen. Due to advances in hydrogen-related technologies, hydrogen is expected to account for 18 percent of final energy demand by the middle of the 21st century, reducing CO<sub>2</sub> emissions by 6.0 billion tons, generating 2.5 trillion U.S. dollars in business annually, and creating jobs for 30 million people. By welcoming additional 14 members in September 2018, the Hydrogen Council now brings together an impressive group of 53 leading companies, accounting for more than 3.8 million jobs and 2.5 trillion euros in revenue from across 11 different countries (based on FY2018 data from the member companies). The group has more than quadrupled in size since launching just 18 months ago, and this rapid expansion reflects surging interest in hydrogen deployment.

### Forecast of the Effects of Hydrogen-related Technologies

Percentage of final energy accounted for:      Converted amount of annual business:

**18%**

**US\$2.5 trillion**

CO<sub>2</sub> emissions:

**6.0 billion tons**

Projected employment creation effects:

**30 million jobs**

Wide-spread use of FCEVs

**Portugal**  
Supply its fuel cell system to CaetanoBus, which manufactures and sells buses in Portugal

(September 2018)  
Aiming for autumn 2019, CaetanoBus started driving verification tests by developing, manufacturing, and launching city buses equipped with FC systems in Europe



Wide-spread use of FCEVs

**China**  
Started driving experiment by launching MIRAI on a test basis (January 2017)

Wide-spread use of FCEVs

**China**  
Started supplying parts of FC units for buses to Beiqi Foton Motor, a commercial vehicle manufacturer in China (April 2019)

Wide-spread use of FCEVs

**Canada**  
Started driving experiment by launching MIRAI on a test basis (February 2017)

Wide-spread use of FCEVs

**U.S.**  
Shell and Toyota collaborate on building a hydrogen station network in California (February 2017)

Hydrogen usage

**U.S.**  
TMNA, a North America-based affiliate, builds Tri-Gen to produce hydrogen and electricity from biomass (December 2017)

Wide-spread use of FCEVs

**U.S.**  
Started verification tests for large-scale FC trucks at the Port of Los Angeles in April 2017

Toyota took the next great leap towards commercialization based on the verification tests, unveiling the first of Toyota and Kenworth's jointly developed heavy-duty commercial FC truck (April 2019)



Hydrogen usage

**UAE**  
Participated in joint research for realizing a hydrogen-based society (January 2017)

Wide-spread use of FCEVs

**Australia**  
MIRAI test launch (July 2016)

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## Challenge 4 Challenge of Minimizing and Optimizing Water Usage

### Fundamental Approach

According to forecasts, the world's population will grow to 9.1 billion by 2050, water demand will increase 55 percent from current levels, and 40 percent of the world's population is therefore expected to suffer water shortages\*.

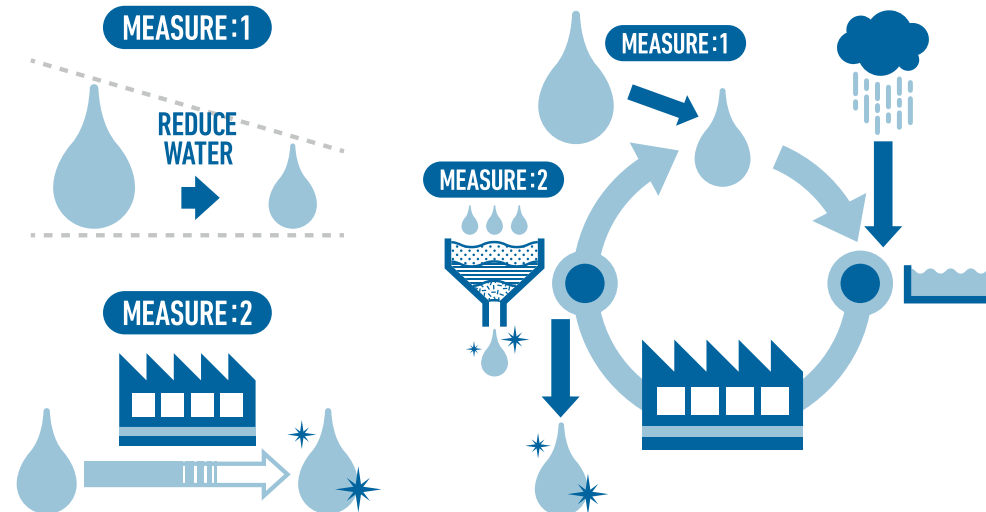
Water problems such as increases in water stress in conjunction with rising populations and stricter regulations in response to deterioration of water quality in rivers and other water sources are important issues from the perspective of risks in corporate activities. Water is used in painting and other car manufacturing processes. This makes it imperative to reduce the impact on the water environment, to whatever degree possible.

There are significant differences in the characteristics of the water environment depending on the region, but we have two main

strategies: thoroughly reduce the amount of water usage and purify wastewater thoroughly and return. Toyota has implemented various initiatives such as collecting rainwater to reduce industrial water usage, cutting water usage in production processes, recycling wastewater to reduce amounts withdrawn from water sources, and returning high-quality water to local environments. In the future, we will undertake measures that have a positive impact on local water environments, taking into consideration the local requests and water issues.

Through these initiatives, we will contribute to achieving SDG 6.3 (improve water quality) and 6.4 (secure water resources).

\* According to Toyota data



### Related SDGs



Target	6.3 (improve water quality) 6.4 (secure water resources)
Sixth plan targets and progress	— No. 9 (p. 15)

### Measures Undertaken in Accordance with the Toyota Water Environment Policy

Although water-related issues and measures differ depending on the region, Toyota established the Toyota Water Environment Policy and takes action in order to achieve the goals of our water environment Challenge on a global level.

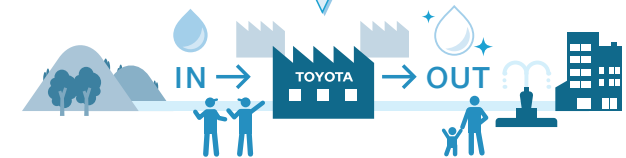
Under the Toyota Water Environment Policy, we are assessing our impact on water environments and working to minimize those impacts from two perspectives: the input side, where we thoroughly reduce the amount of water usage, and the output side, where we purify wastewater thoroughly and return.

We take action from three directions—the pursuit of environmental technologies, community-rooted operations, and cooperation with society—and strive to become the No. 1 regional plant leading to prosperity throughout the entire society.

### Toyota Water Environment Policy

Striving to consider the importance of water sustainability, Toyota will aim for realizing prosperous societies that will share a sound water environment to the future.

### Become No. 1 regional plant leading to prosperity throughout the entire society



#### Thoroughly reduce the amount of water usage

Minimize the impact on regional water resources by minimizing water withdrawal and utilizing rainwater

#### Purify wastewater thoroughly and return

Have a net positive impact on the environment by returning clean water in the local water environment



Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
Challenge

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## Reduce Water Usage in Production Activities

To reduce water usage in our production activities, we have been working to introduce innovative technologies alongside planned upgrades to our production lines, and to conduct daily measures to reduce water usage. In FY2019, Toyota Motor Corporation (TMC) continued measures such as reducing the amount of steam used in production processes. Total water usage was 10.1 million m<sup>3</sup> (down 2.2 percent year on year). The production volume decreased, but a uniform amount of water is used regardless of the number of units, and consequently, water usage per unit produced was 4.1 m<sup>3</sup> (up 4.4 percent year on year). Globally, Toyota is steadily implementing measures to reduce water usage according to the actual water environment in each country and region. Measures were implemented to recycle wastewater and more affiliates decreased their water usage. However, as a result of an increase in the number of units produced due to the creation of new production lines and other factors, total water usage was 33.7 million m<sup>3</sup> (up 2.3 percent year on year). Due to implementation of water quality measures, an increase in the number of washings, and other factors, water usage per unit produced was 3.2 m<sup>3</sup> (up 0.4 percent year on year). Moving ahead, we will continue striving to minimize impacts on the water environment through the promotion of water-saving and water recycling.

Trends in Total Water Usage and Usage per Unit Produced at TMC

Third Party Assurance

	FY	2015	2016	2017	2018	2019
Total water usage (million m <sup>3</sup> )		11.5	10.9	10.7	10.3	<b>10.1</b>
Water usage per unit produced (m <sup>3</sup> /unit)		4.9	4.7	4.3	4.0	<b>4.1</b>

- Scope of coverage: Production and non-production divisions (excluding employee benefit facilities)
- Water usage per unit produced indicates the amount of water consumed per unit produced at vehicle assembly plants

Trends in Global Total Water Usage and Usage per Unit Produced

Third Party Assurance

	FY	2015	2016	2017	2018	2019
Total water usage (million m <sup>3</sup> )						
Japan (TMC)		5.2	4.9	4.7	4.5	<b>4.5</b>
Japan (consolidated EMS and its subsidiaries)		11.9	11.3	12.6	13.1	<b>13.8</b>
North America		5.3	5.0	6.0	5.7	<b>5.7</b>
China		2.5	2.5	2.6	2.7	<b>3.4</b>
Europe		1.2	1.1	1.4	1.6	<b>1.5</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America		4.9	4.5	5.5	5.3	<b>4.8</b>
Total		31.0	29.3	32.8	32.9	<b>33.7</b>
Water usage per unit produced (m <sup>3</sup> /unit)		3.0	2.9	3.1	3.1	<b>3.2</b>

- Scope of coverage: Vehicle assembly plants of TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 36 companies

### Water Reduction by Using RO Wastewater (South Africa)

TSAM, a South Africa-based affiliate, reduced its water usage in the Body Paint Plant (an area that uses large volumes of water) by reusing the wastewater generated from the RO process\*.

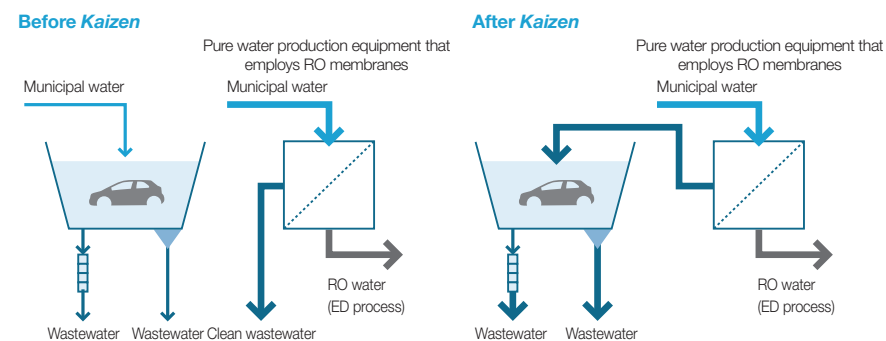
Prior to the change, TSAM used municipal water in the body washing process. *Kaizen* measures were implemented in accordance with policies to substantially reduce water usage and reuse wastewater to reduce water intake.

First, TSAM comprehensively investigated the flow rates, quality, and volumes of municipal water and wastewater generated to determine which processes could use recycled wastewater. The company also examined the risks associated with reusing wastewater. Based on the results, TSAM identified that it could reuse the wastewater generated from the RO process.

Municipal water and wastewater generated from the RO process differ only in their conductivity and are equivalent in other measures of water quality, indicating that the reuse of this wastewater would not present any problems. Based on this, TSAM decided to use recycled wastewater for the washing process prior to undercoat painting. As a result, usage of municipal water was reduced while maintaining the same high level of painting quality.

Due to this *kaizen*, water usage per unit produced was reduced by 23.6 liters, and annual water usage reduced by 3,285 m<sup>3</sup>.

\* Reverse Osmosis process: A water purification process that utilizes membranes to remove impurities from the water



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Challenge

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## Challenge 5 Challenge of Establishing a Recycling-based Society and Systems

### Fundamental Approach

Due to global population increase along with the pressure for economic growth and convenient lifestyles, the pace of resource consumption is accelerating. If large-scale exploitation continues as it is, natural resources will be depleted, and if waste increases due to mass consumption, appropriate disposal will be unable to keep pace, resulting in risks of environmental pollution.

To prevent the environmental impact caused by End-of-life vehicles, Toyota launched the Toyota Global 100 Dismantlers\* Project, to establish social systems for End-of-life vehicle proper treatment. In order to realize an ideal resource-recycling based society, it is necessary to grasp the risks of resource depletion and the possibility of creating business opportunities, and initiatives are needed in four key areas: (1) use

eco-friendly materials, (2) use auto parts longer, (3) develop recycling technologies, and (4) manufacture vehicles from End-of-life vehicles. Toyota aims to realize the ultimate recycling-based society, and promotes the Toyota Global Car-to-Car Recycle Project so that we can utilize resources from End-of-life vehicles for manufacturing new vehicles.

Through these initiatives, we will contribute to achieving SDG 9.1 (infrastructure development), 9.4 (sustainable industrial processes), 11.6 (reduction of environmental impact of cities), 12.2 (sustainable management and efficient use of natural resources), 12.4 (management of waste), and 12.5 (reduction of waste).

\* Dismantlers: Operates dismantling business for vehicles

### Reduce Consumption of Dwindling Natural Resources Through Utilization of Renewable Resources and Recycled Materials

#### Reduce the Usage of Petroleum-derived Plastics

Since the early 1990s, Toyota has been collecting and recycling bumpers replaced at dealers as a way to reduce the usage of petroleum-derived plastics. Some plastic parts collected from End-of-life vehicles are reused for energy as a heat source except using for used parts. Others are recycled into plastics for non-automobile use after going through a machine-automated sorting process.

Amid the growing need to further promote plastic recycling, we will encourage even greater utilization of recycled plastics and continue to study new technologies for collecting and recycling plastics from End-of-life vehicles to support sustainable economic growth globally.

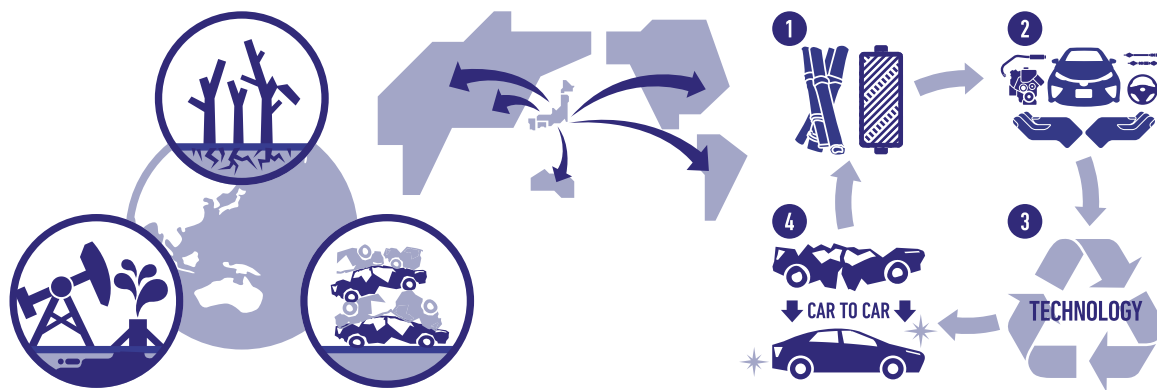
[Environmental Data p. 56-I](#)

#### Promote the Reuse of Rare Resources and Recycled Materials

Hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), fuel cell electric vehicles (FCEVs), and other electrified vehicles use significant amounts of rare resources compared to conventional gasoline vehicles. Some of these resources often carry risks such as resource depletion or uneven supply among regions. In order to promote the reuse of rare resources and recycled materials, we are collaborating with partner companies to establish a framework for collecting and recycling HEV batteries and automobile motor parts, along with cemented carbide tools used in production. HEV batteries, for example, contain rare metals such as nickel and cobalt. Since launching the first-generation Prius in 1997, we have built our own recovery network to collect End-of-life HEV batteries for recycling and reuse. As of March 2019, we collected a cumulative total of 132,000 End-of-life HEV batteries.

#### Related SDGs

			
Target	9.1 (infrastructure development) 9.4 (sustainable production processes)	11.6 (reduction of environmental impact of cities)	12.2 (sustainable management and efficient use of natural resources) 12.4 (management of waste) 12.5 (reduction of waste)
Sixth plan targets and progress	No. 12, 13 (pp. 15, 16) No. 10, 11, 12, 13, 14 (pp. 15, 16)	No. 14 (p. 16)	No. 10, 11, 12, 13 (pp. 15, 16) No. 14 (p. 16) No. 10, 11, 12, 13, 14 (pp. 15, 16)



Challenge 1  
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Challenge

Challenge 2  
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Challenge

Challenge 3  
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The collected batteries undergo inspection to determine which parts can be reused as stationary storage batteries or vehicle replacement batteries. Parts not suitable for reuse are recycled as raw metal materials.

Toyota began recycling automobile motor magnets in 2012. As of March 2019, we collected a cumulative 41 tons of magnets, recycling rare earth.

For cemented carbide tools, we launched a system to extract and recycle tungsten\* in 2010. As of March 2019, we recycled a cumulative total of approximately 196 tons of cemented carbide tools.

The use of Carbon Fiber Reinforced Plastics (CFRP) is expected to increase in the future to support the design of light-weight vehicles.

Development of technologies for material recycling of CFRP is ongoing. As electrified vehicles become increasingly widespread, the amounts of End-of-life parts, such as batteries and motors that contain rare resources, are expected to increase.

We will continue material recycling activities.

\* Tungsten: Japan imports all of its demand for tungsten, which is used in the cutting edges of 80 percent of cemented carbide tools

Cumulative amount of  
automobile motor  
magnets recycled

**41 tons**

Cumulative amount of  
End-of-life batteries  
collected

**132,000 units**

Column **Operating HEVs with Reused Batteries in Ayutthaya and 3R (Rebuilt, Reuse, and Recycle) Measures (Thailand)**

TMT, a Thailand-based affiliate, is implementing a variety of initiatives to achieve the Toyota Environmental Challenge 2050.

In November 2018, TMT opened Toyota Ayutthaya Green Town, an embodiment of the six challenges of the Toyota Environmental Challenge 2050, at Ayutthaya, a famous World Heritage site.

At the facility, visitors can use Ha:mo, ultra-compact BEVs, which are also available for tourism use at Ayutthaya. The vehicles are largely powered with carbon-free renewable electricity generated from solar panels installed on the roof of the parking facility. To store charging electricity, a battery station that reuses End-of-life batteries from HEVs is also installed, enabling excess power to be effectively utilized.

In response to the increased use of electrified vehicles, in May 2019

TMT began production of onboard batteries at its Gateway Plant in Chachoengsao Province and establishing a 3R (Rebuild, Reuse, Recycle) scheme for End-of-life batteries.

TMT is creating a resource recycling scheme whereby the modules that can be reused will be employed in stationary battery stations to store power in plants and homes, while modules that cannot be reused will be sent to a newly established recycling plant for use as materials in new batteries and stainless steel.

This is the first such 3R measure for HEV batteries outside of Japan. It will contribute to reducing waste and the development of a recycling-based economy in Thailand and is expected to promote the effective use of renewable energy.



A Ha:mo vehicle being charged with carbon-free renewable electricity generated from solar panels installed on the roof of the parking facility



A power storage system that reuses End-of-life HEV batteries

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## Achieve Industry-leading Levels in Easy-to-dismantle Design for Effective Resource Recycling

To promote material recycling of End-of-life vehicles, Toyota directly visits dismantling companies in Japan and overseas to investigate actual conditions and gain insight into the development of vehicle structure that makes it easy to dismantle and separate parts. We have actively adopted these designs for new models since 2003 with the launch of the Raum passenger car.

The new Century, Corolla Sport, Crown, and Lexus ES and UX launched in FY2019 adopt the TNGA<sup>1</sup>, a new concept for car manufacturing. These vehicles continue to incorporate easy-to-dismantle designs to

ensure safe and speedy dismantling operations.

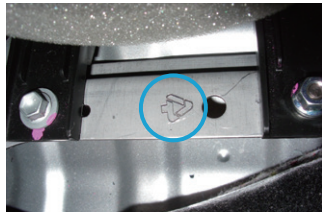
In other areas where we adopt new structures, parts, and other technologies, we will continue to ensure easy-to-dismantle designs in order to maintain and enhance the capability to dismantle vehicles.

<sup>1</sup> Toyota New Global Architecture: Toyota's company-wide global program to structurally transform automobile design. TNGA aims to dramatically improve the basic performance and marketability of Toyota vehicles by reforming and integrally redeveloping powertrain components and platforms.

### Vehicle Structure for Easy Dismantling

#### Removal of heavy battery components from hybrid electric vehicle

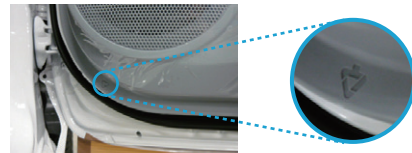
"Easy-to-dismantle marks" are added to show points where parts can be hoisted with good balance.



#### Removal of door trim<sup>2</sup>

"Easy-to-dismantle marks" are added to indicate places where the load required for removing the door trim can be reduced.

<sup>2</sup> Door trim: The panels lining the inner part of the door

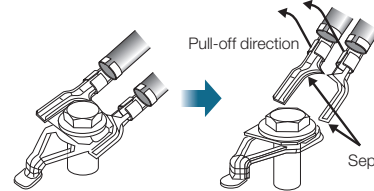


#### Wiring harness<sup>3</sup>

#### Use of pull-tab type ground terminal for wiring harness

Assembled condition

During dismantle

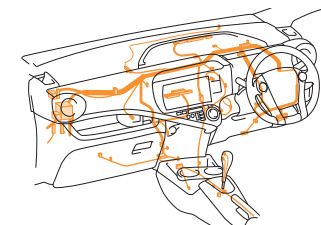


<sup>3</sup> Wiring harness: A bundled assembly of wires running throughout the vehicle body for power supply and signal communications

Separated from thinner areas

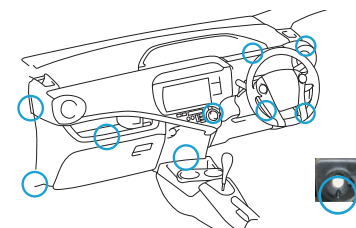
#### Wiring harness layout innovation

The wiring harness can be stripped out without interfering with other components.



#### Removal of instrument panel

The positioning of the V-grooves makes it easy to remove the instrument panel by pulling it strongly.



#### Use of "Easy-to-dismantle mark"

"Easy-to-dismantle marks" are added to show key points for disassembly tasks



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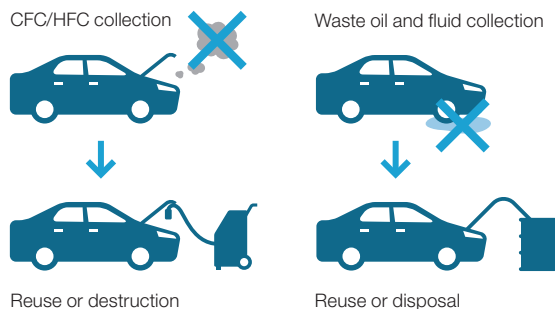
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## Contribute Worldwide Through Appropriate End-of-life Vehicle Treatment and Recycling Technology Developed in Japan

When End-of-life vehicles are not properly disposed or dismantled, this may not only affect regional environments, but also cause risks to the health and safety of local residents. To prevent these problems, we promote the Toyota Global 100 Dismantlers Project. Through this project, we aim to establish social systems for properly treating of End-of-life vehicles without imposing regional environmental impact. By using our long-established technologies and know-how, we contribute to the establishment of social systems for appropriate End-of-life vehicle treatment. In FY2019, in addition to surveys conducted in the Asia region, we started surveys on End-of-life vehicle treatment in the Africa region. On the other hand, in developed countries, we prepared a video manual on large battery removal for PHEVs and began preparing a video manual on hydrogen gas removal for FCEVs, which is expected to occur in the future. We will continuously research the flow of End-of-life vehicles, setting treatment levels according to the conditions of national and regional infrastructures and work to establish model facilities in cooperation with local affiliates.

Through the Toyota Global 100 Dismantlers Project, we will strive to establish recycling-based societies that enable efficient resource recycling with proper treatment of waste oil, fluids, and CFC/HFC gas at model facilities and take measures such as calling on national governments to ensure that such measures take root as social systems.

### Image of Appropriate End-of-life Vehicle Treatment



### Column Prepare Video Manual on Battery Removal for PHEV

As PHEVs and FCEVs become more common, proper removal of batteries and hydrogen tanks and release of hydrogen gas will become issues that need to be addressed. Since batteries are high-voltage and hydrogen tanks are under high pressure, it is important to ensure safety during the dismantling process. To respond to these issues, we prepared a video manual on how to remove large-sized batteries as reference material for proper battery removal not only in Japan, but in each country and region. The videos cover six topics: (1) How to identify between PHEV, BEV, and HEV; (2) Precautions for removing; (3) Procedures for removing and storage; (4) Check for any abnormality in damaged batteries; (5) Storage of vehicles submerged or damaged by accidents; and (6) Inspection and preparation prior to transportation. Detailed explanations are also provided on the tools to be used and methods of ensuring safety during removal of heavy, high-voltage batteries. There is no narration in this prepared video, but English subtitles are inserted. This video will be used as master for localization of narration and subtitles for each country and region to support battery removal.



### Column Model Vehicle Dismantling Facility Established (Vietnam)

In April 2019, TMV, a Vietnam-based affiliate, set up a model End-of-life vehicle dismantling facility\* in Phuc Yen City, Vinh Phuc Province. Under the support of TDEM, the Asian regional headquarters in Thailand, this facility was set up by referring to the preceding model in Thailand and as the second model facility in Southeast Asia supporting the Toyota Global 100 Dismantlers Project. Infrastructure for the proper treatment of End-of-life vehicles has not been established in Vietnam, and operations that have negative impacts on the environment such as dumping waste oil and fluids and releasing CFC/HFC gas into the atmosphere are conducted. This model facility finally reached establishment, by securing proper treatment of End-of-life vehicles through the guidance of dismantling methods to the existing recycling company by TMV environmental team. Setting up such a model facility is expected to prevent water and soil contamination through the proper treatment of waste oil and fluids and prevent global warming through collection and thermal treatment of CFC/HFC gas. We plan to make further efforts to incorporate proper treatment of End-of-life vehicles into the social system in Vietnam in collaboration with the government and other involved parties. In Vietnam, a regulation on establishment of collection sites for End-of-life vehicles and motorcycles took effect in January 2018, and it is expected to further accelerate the proper treatment of End-of-life vehicles.

\* Green Industrial Environment Company



Model dismantling facility

Oil removal

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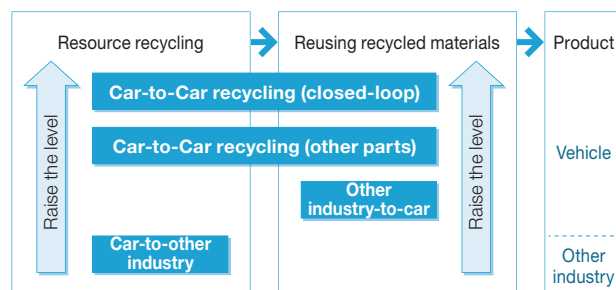
Environmental Management

## Expand Original Recycling Systems for End-of-life Vehicles Worldwide

In order to realize an ultimate recycling-based society, we promote the Toyota Car-to-Car Recycle Project that is based on the concepts of reduce, reuse, and recycle, aiming specifically at elimination of resource-related risks and global warming.

In FY2019, we revalidated systems for the collection and proper treatment of HEV batteries globally. We also reinforced information sharing with a focus on the main regions where electrified vehicles have already been introduced and identified issues in each region. The ultimate goal of this project is closed-loop recycling, the concept that the vehicles parts and materials are recycled into identical parts. We will continue promoting “Car-to-Car Recycling” through gradual progress in both aspects of this system, namely the first phase of resource recycling in which vehicle parts and materials are turned into raw materials for new parts, and the second phase of fully reusing recycled materials in new vehicles.

### Image of “Car-to-Car Recycling”



## Reduce Waste and Use Resources Efficiently in Production Activities

Toyota strives to reduce the waste volume from production activities by developing and deploying new production technologies while taking continual daily measures in terms of the sources of waste (design and production method innovations), resource recycling, resulting cost reductions, and so forth.

In FY2019, Toyota Motor Corporation (TMC) shifted from paying for recycling to selling recycling materials as valuable goods and so on, by reducing the water content of grinding dust. The total waste volume, as a result, was 32.2 thousand tons (down 1.5 percent year on year), and the waste volume per unit produced was 11.2 kg

(down 0.4 percent year on year).

Globally, the waste volume increased in some areas due to increases in production in conjunction with the establishment of new lines. On the other hand, by reducing the amount of water in paint sludge and by the changes in recycling markets, corrugated boards and scrap woods were converted into valuable materials and the waste volume was reduced in some areas. The total waste volume, as a result, was 496 thousand tons (down 0.6 percent year on year), and the waste volume per unit produced was 46.2 kg (down 2.7 percent year on year).

### Trends in Total Waste Volume and Waste Volume per Unit Produced at TMC (Japan)

Third Party Assurance

	FY	2015	2016	2017	2018	2019
Total waste volume (thousand tons)		35.9	35.2	33.8	32.7	<b>32.2</b>
Waste volume per unit produced (kg/unit)		12.5	12.5	11.6	11.3	<b>11.2</b>

- Scope of coverage: Production and non-production divisions (excluding employee benefit facilities)
- The total waste volume in production divisions consists of waste generated through production activities
- Waste volume: Waste at cost + incineration + landfill [Environmental Data p. 56-M](#)
- Waste at cost: Waste that is recycled for a fee

### Trends in Global Total Waste Volumes and Waste Volume per Unit Produced

Third Party Assurance

	FY	2015	2016	2017	2018	2019
Total waste volume (thousand tons)						
Japan (TMC)		36	35	34	33	<b>32</b>
Japan (consolidated EMS and its subsidiaries)		353	348	359	383	<b>381</b>
North America		29	29	30	29	<b>31</b>
China		17	17	17	18	<b>20</b>
Europe		14	11	12	14	<b>11</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America		26	21	22	22	<b>21</b>
Total		475	461	474	499	<b>496</b>
Waste volume per unit (kg/unit)		46.0	45.3	45.0	47.4	<b>46.2</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 120 companies
- Waste volume: Waste at cost + incineration + landfill

[Environmental Data p. 57-R](#)  
[Environmental Data p. 56-N](#)

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## Reduce Packaging and Wrapping Materials and Use Resources Efficiently in Logistics Activities

Toyota Motor Corporation (TMC) is taking a broad range of initiatives to reduce the amount of packaging and wrapping materials used in logistics. These include increasing packaging efficiency in shipping containers, using returnable containers\* to reduce the amount of unrecyclable materials used, and making packaging and wrapping materials simplified and lighter.

In FY2019, TMC succeeded in reducing the usage of packaging and wrapping material per shipment unit to 6.21 kg/m<sup>3</sup> (same as the previous year) by making packaging and wrapping materials smaller

and adopting returnable shipping containers. The total usage of packaging and wrapping materials amounted to 46.4 thousand tons (up 1.3 percent year on year).

On a global basis, Toyota continued efforts to gather and share information on best practices at each affiliate.

Moving forward, we will promote the efficient use of resources when shipping goods, while striving to reduce the usage of packaging and wrapping materials.

\* Returnable containers: To enable used packaging materials to be returned to original shipping points for reuse

### Trends in Usage of Packaging and Wrapping Materials at TMC (Japan) and Packaging and Wrapping Materials per Shipment Unit at TMC (Japan)

	FY	2015	2016	2017	2018	2019
Usage of packaging and wrapping materials (thousand tons)		51.7	50.9	51.4	45.8	<b>46.4</b>
Usage of packaging and wrapping materials per shipment unit (kg/m <sup>3</sup> )		6.98	7.36	6.87	6.21	<b>6.21</b>

### Results of Activities to Reduce Usage of Packaging and Wrapping Materials at TMC (FY2019, Japan)

Products	Main improvement activities	Reduction volume (thousand tons)
Production parts	Review and improvement of packaging specifications	<b>0.3</b>
Service parts	Review packaging materials and reduce the amount of cushioning materials	<b>0.7</b>
Total		<b>1.0</b>

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Challenge

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## Challenge 6 Challenge of Establishing a Future Society in Harmony with Nature

### Fundamental Approach

It is critical for humans to conserve forests and other natural environments in all regions for coexistence in harmony with nature. However, deforestation is progressing across the world, resulting in the fragmentation of diverse living creature habitats, as well as the continuing loss of biodiversity. This entails a number of issues including the loss of biological resources that are essential for society, causing natural disasters, and spurring global warming, and we believe that it poses a risk to the potential for the sustainability of the entire society.

In light of this risk, Toyota launched Harmony with Nature projects and is taking action to expand “Connecting Communities” activities

in various regions of Japan and overseas in order to “enrich the lives of communities” in each region.

Toyota is also developing “Connecting with the World” environmental activities in collaboration with NGOs in Japan and overseas, as well as “Connecting to the Future” environmental education activities targeting Toyota employees and the next generation. We aim for a future where people and nature live in harmony by these three “connecting” activities.

Through these initiatives, we will contribute to achieving SDG 12.8 (sustainable lifestyle), 15.1 (conservation of terrestrial ecosystem), and 15.a (secure financial resources).

### Promote Expansion of Nature Conservation Activities Connecting Communities – Toyota Green Wave Project

Toyota Group companies have conducted afforestation activities at their respective plants and undertaken environmental conservation activities in their surrounding areas. The Toyota Green Wave Project is an initiative to connect communities through these diverse activities promoting harmony with nature.

By extending Toyota Group activities to promote harmony with nature in Japan and overseas, we aim to expand living creature habitats and help create a sustainable society, benefitting biodiversity.

Specific programs include the Plant in Harmony with Nature Project, which creates environments that foster nature and living creatures, and the All-Toyota Green Wave Project, which fosters ties between local communities and the Group.

#### Related SDGs



Target	12.8 (sustainable lifestyle)	15.1 (conservation of terrestrial ecosystem) 15.a (secure financial resources)
Sixth plan targets and progress	No. 18 (p. 17)	No. 16 (p. 16) No. 17 (p. 16)

#### ● Toyota Green Wave Project Connecting Communities



#### ● Toyota Today for Tomorrow Project Connecting with the World



#### ● Toyota ESD Project Connecting to the Future





Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
Challenge

Challenge 2  
Life Cycle Zero CO<sub>2</sub> Emissions  
Challenge

Challenge 3  
Plant Zero CO<sub>2</sub> Emissions  
Challenge

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Society in 2050

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Challenge of Minimizing and  
Optimizing Water Usage

Challenge 5  
Challenge of Establishing a Recycling-  
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Challenge 6  
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Environmental Management

### Community-based Plant in Harmony with Nature

Afforestation activities have been conducted since 2007 with the theme of creation of forests at plant sites. The Tsutsumi Plant, where the Prius is produced, serves as a model plant for this project. Having developed our activities as a “Plant in Harmony with Nature” since FY2018, we have expanded on our work to include the management of various living creature habitats. In October 2018, as part of this initiative, we opened Biotope Tsutsumi, in order to help conserve the original local ecosystem. Based on the concept of a traditional Japanese broad-leaved *satoyama* forest consisting primarily of the *konara* oak, the Biotope Tsutsumi environment integrates waterside, grassland, forest, and other natural areas. Representative animal and plant species have been selected as indicator species to provide quantitative measurements that will allow objective evaluations and a regular cycle of reviews of the project details. Furthermore, the project is also introducing fish species compatible with the local ecosystem (*ginbuna*) and conserving rare fish species (*minami medaka* and *ushimotsugo*). These activities are being pursued as a collaborative and unified effort with local residents, under the guidance of the city of Toyota and various experts. Recognized for these activities, the project won the Biotope Grand Prize at the 11th Biotope Recognition Event (FY2019). We will use the Tsutsumi Plant as a model project, to actively promote environmental conservation activities rooted in the local ecosystem, by assessing suitable initiatives at Toyota’s other production plants worldwide.



Release of fish

### Plant in Harmony with Nature Project Leads the Way to the Better Environment

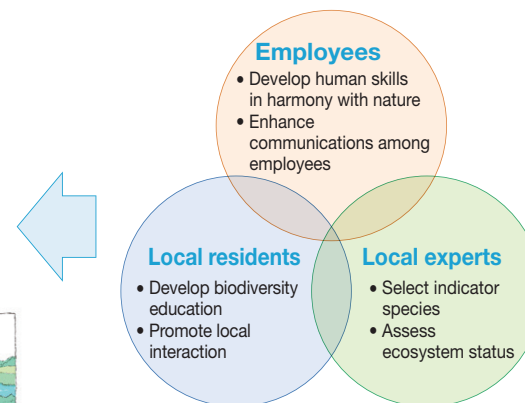
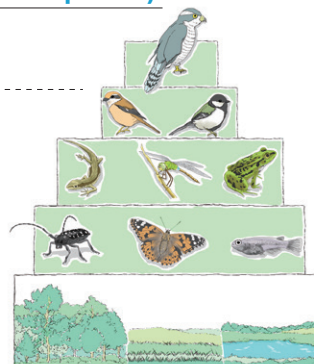
#### Living creatures (indicator species)

Result KPI  
(final target)

Process KPI (evaluate progress)  
Example: Small animals  
(birds, butterflies, frogs)

Review activities based on results

Maintaining and improving  
**habitats**



### Biotope Tsutsumi

Log house  
(administrative office)

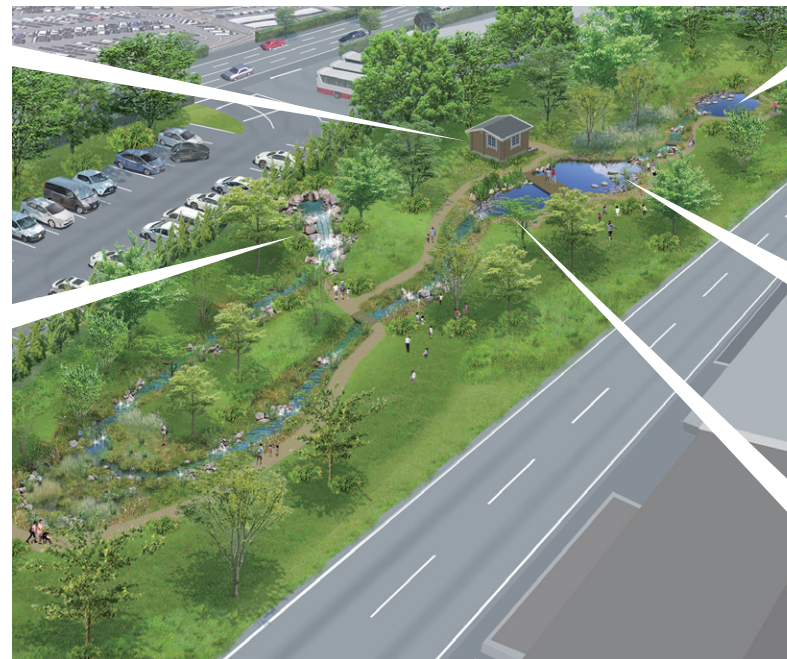


Conducting fish stock  
conservation

Neo-natural river  
reconstruction method



Creating hiding places for  
living creatures



Ushimotsugo



Ginbuna



Minami medaka



Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
Challenge

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Life Cycle Zero CO<sub>2</sub> Emissions  
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Environmental Management

**Column** **Conduct Ecosystem Surveys at the Teiho Plant with Local High School Students –MORIBITO Project of Waterside and Greenery**

The Teiho Plant is undertaking biodiversity conservation activities that take advantage of the plant's environment, as MORIBITO Project of Waterside and Greenery. As the first step, local ecosystem surveys were conducted four times starting in May 2018.

The surveys were conducted under the supervision of experts from Aichi Gakusen University, Aichi University of Education, and Toyota Yahagi River Institute, and were attended by employees as well as students from the local Toyota Nishi High School. A total of 120 people surveyed the plants and animals in the rivers, ponds, and rice paddies in and around the Teiho Plant.

These activities have begun to paint a clearer picture of the ecosystems in the area where the Teiho Plant is located. In the future, we plan to use the acquired knowledge in order to continue maintaining and improving the living creature's habitats that take advantage of the plant's environment (reservoir and forest).



Survey of aquatic life



Survey of birds



Survey of old bird nests



Survey of frogs

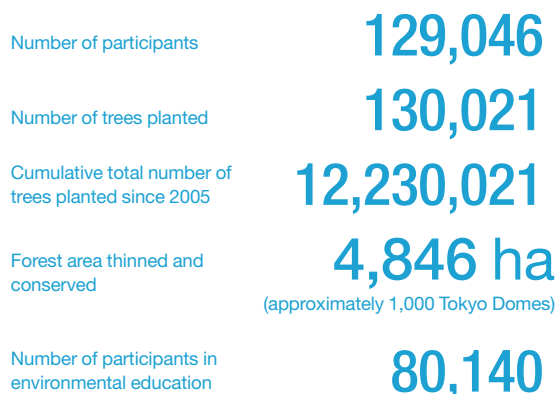
**All-Toyota Harmony with Nature Working Group Activities –All-Toyota Green Wave Project**

Toyota Green Wave Project Working Groups were established by 23 affiliated companies in May 2015 (22 affiliates participating in 2019) to expand initiatives in harmony with nature, enhance the dissemination of information, and strengthen cooperation by participating companies. In FY2019, 248 activities were carried out in Japan. In May 2018, collaborative activities were conducted as the fifth All-Toyota unified activities. A total of 265 people, including 43 people from 19 working group member companies, carried out activities to eradicate lanceleaf tickseed, which has been designated by Aichi Prefecture as one of 30 non-native species requiring measures. All-Toyota programs will be implemented, "connecting" to locations all over Japan, to eradicate the non-native species that have become a major problem in various areas.



The Fifth "Connecting" Activity: Eradicating lanceleaf tickseed

**FY2017–FY2019 Cumulative Total (All-Toyota Results in Japan)**



**Initiative to Improve Recognition of Biodiversity**

In June 2018, the All-Toyota Green Wave Project volume 3 was published and distributed to employees of all Toyota affiliates. The dedicated website sends out information about each company's activities in a timely fashion and is enhancing the sharing of activities both in and outside of the company.



Projects featured on the website

**Column** **Afforestation Project in Fengning to Prevent Yellow Sand (China)**

In Fengning Manchu Autonomous County, Hebei Province, where advancing desertification has become a serious problem, Toyota started an afforestation project in 2001, which has been continued by Toyota Motor (China) Investment Co., Ltd. (TMC) since 2011.

Fengning Manchu Autonomous County is located approximately 180 km northwest of Beijing and acts as a passage for the yellow sand from the deserts in Inner Mongolia. Back when the afforestation project was started, the yellow sand clouded the sky in Beijing in spring, blocking the sun for many days in a row. The afforestation project, which has continued for the past 18 years, has planted about 5.55 million trees in approximately 3,430 ha of land. The land that was once being desertified became green and the amount of yellow sand blown into Beijing has also been significantly reduced, helping improve its environment. In the future, nature classes and other activities will be added to the project.



Before afforestation (2000)



After afforestation (2015)

Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
Challenge

Challenge 2  
Life Cycle Zero CO<sub>2</sub> Emissions  
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Environmental Management

## Boost Grant for Environmental Activities Connecting with the World—Toyota Today for Tomorrow Project

We have established the Toyota Today for Tomorrow Project to bolster our long-standing Toyota Environmental Activities Grant Program and afforestation projects in China and the Philippines on a global basis. With the aim of contributing to society, we will work together with organizations engaged in nature conservation around the world by establishing projects to solve issues in the areas of living in harmony with nature and biodiversity.

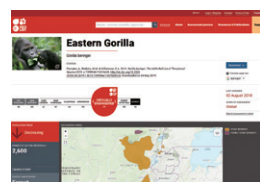
### Toyota Collaborates with IUCN to Enhance Species Conservation Data

Toyota began a five-year partnership with IUCN<sup>1</sup> in May 2016 to promote scientific understanding of the biodiversity crisis.

Under the partnership, we provide annual grants of approximately 1.2 million U.S. dollars, supporting the IUCN to enhance the IUCN Red List<sup>2</sup>.

With this support, the IUCN will conduct assessments of extinction risk for more than 28,000 species, accounting for 35 percent of species requiring assessment. This represents a major step forward in the IUCN's goal of gaining more comprehensive view of the conservation status of biodiversity on the Earth.

The support also enabled the IUCN to enhance its Red List website, which can now immediately display photo, habitat, and other information on the species when its name is entered, improving the website's ease of viewing and usability.



IUCN Red List website

Web <https://www.iucnredlist.org/>

- 1 International Union for Conservation of Nature: Founded in 1948, IUCN is a membership Union uniquely composed of both government and civil society organizations
- 2 The IUCN Red List of Threatened Species™: A list of threatened species in the world managed by the international organization IUCN

### FY2019 Activities:

#### Introduced Toyota's Biodiversity Conservation Initiatives at COP14

In November 2018, the Convention on Biological Diversity's 14th Conference of the Parties (COP14) was held in Sharm El Sheikh, Egypt. A Toyota side event jointly hosted with IUCN explained the progress in partnership activities for biodiversity conservation being carried out jointly with IUCN and environmental NGOs, and communicated to the participants that successful case examples can be shared. Dr. Jane Smart of IUCN, who chaired the event, mentioned how Toyota's support is enhancing the IUCN Red List, which forms the basis for global conservation activities, and is leading the private sector's biodiversity initiatives in Thailand. The event received favorable comments from many government officials, including a high-ranking officer in the Secretariat of the Convention on Biological Diversity.

#### Number of Species that Have Been Assessed, Thanks to Toyota's Support

April 2016–March 2017	1,333
April 2017–March 2018	3,717
April 2018–March 2019	4,034
2016–2019 (3-year total)	9,084



Photo by IISD/Kiara Worth (enb.iisd.org/biodiv/cop14/side-events/20nov.html)  
After the side event with Dr. Jane Smart of IUCN (far right)

### FY2019 Activities:

#### Presenting Vehicles to Environmental NGOs at COP14

Environmental NGOs BirdLife International (BL) and Conservation International (CI) have conducted surveys and conservation activities of species listed as threatened on the IUCN Red List.

Toyota has been supporting important activities for expanding the Red List and has provided vehicles to the two organizations since 2016. In FY2019, on the occasion of COP14 in Egypt, Toyota donated vehicles for their field surveys in two African countries (Zimbabwe and Kenya) and two Asian countries (the Philippines and Indonesia).



Photo by IISD/Kiara Worth (enb.iisd.org/biodiv/cop14/side-events/20nov.html)  
Presentation ceremony



Donated Hilux

### FY2019 Activities:

#### Improved Mountain Gorilla Habitat

IUCN uses new surveys of threatened species to provide updated versions of the IUCN Red List.

The November 2018 update reported that the number of mountain gorillas, an Endangered species, was beginning to recover as a result of cross-border conservation activities and community involvement. The species' status had improved from Critically Endangered (CR) to Endangered (EN), and the IUCN Red List was used to communicate this positive conservation message to the world.



Photo: Ludovic Hirfmann (CC BY 2.0)

Mountain gorillas

Challenge 1  
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Environmental Management

## Continuing its Five-year Partnership with WWF on Living Asian Forest Project

Toyota is continuing its five-year partnership with World Wide Fund for Nature (WWF) aiming at accelerating the globe's transition to sustainability. Toyota is the first car company and the first Japanese company to sign a Global Corporate Partnership agreement with WWF. To promote biodiversity conservation under the partnership, Toyota has made annual one million U.S. dollar grants to WWF since 2016 to support the Living Asian Forest Project. The Living Asian Forest Project aims to strengthen existing WWF activities to conserve tropical forests and wildlife in Southeast Asia and launch new conservation activities.

### FY2019 Activities:

#### Protected Sumatran Rhinoceros, a Designated Endangered Species

The population of the Sumatran rhinoceros has declined to the point where continued breeding in the wild might be difficult, leading to concern about their extinction. Therefore, urgent conservation actions were required.

Beginning in 2013, WWF Japan and WWF Indonesia have been carrying out conservation activities in forests inhabited by Sumatran rhinoceroses. And, in November 2018, these organizations successfully rescued a Sumatran rhinoceros on the island of Borneo and immediately transferred it to a safe protective facility.

Safely capturing an animal living in a high-risk area was hailed as a very positive event by interested parties. Additionally, continued patrol of the Tesso Nilo National Park has significantly reduced illegal logging of the forest.



© Richo Hafizh Zainur Richa/WWF-Indonesia

Rescued Sumatran rhinoceros



Transporting the rhinoceros

## Toyota Environmental Activities Grant Program

In 1999, Toyota was honored with the Global 500 Award from the United Nations Environment Programme. To commemorate receipt of this award, in FY2001, we launched the Toyota Environmental Activities Grant Program to support the environmental activities of NPOs and other groups. The main themes of the grant program are biodiversity and climate change. Grants are offered to support projects overseas (up to seven million yen per project) and projects in Japan (up to three million yen or one million yen per project). Over the 19 years since the program was established, we have supported 387 projects in 54 countries and regions worldwide.

### FY2019 Activities (Project in Japan):

#### Nature-based Solutions by Urban Green Infrastructure

The Toshima Green Infrastructure Network (TGIN), based in Toyoshima Ward, is seeking ideal forms of urban green infrastructures\* that address issues presented in local communities, and then promotes and implements such infrastructures. Green infrastructures are being implemented in collaboration with local store associations, local residents, local governments, NPOs, and Taisho University students. For example, TGIN has created a rooftop farm and a rain garden at the Taisho University Nishisugamo campus, where TGIN is based, and is searching for ways to use green infrastructures to solve various societal challenges, such as the heat and heavy rain caused by climate change, earthquakes that directly hit the capital, and biodiversity loss. Additionally, TGIN is communicating ideal forms of urban green infrastructures to society at large. It is trying to increase the scale of its activities through collaboration with initiatives in other regions inside and outside Japan, as well as mutual learning.

\* Urban green infrastructure is an initiative that promotes wise utilization of nature's functions within urban areas in order to promote sustainable communities, such as growing a variety of crops in rooftop farms at Taisho University (The Gamall Farm) and having children in the neighboring communities come on a tour or experience harvesting



Harvesting sweet potatoes at a rooftop farm with children from the neighboring communities



Scan QR code for details

[Environmental Data p. 56-O](#)

### FY2019 Activities (Project overseas):

#### Future Creation Project Through Local Knowledge and Traditional Knowledge of the Karen Tribe

Conference of Earth Environment from Akita is working on conserving the ecosystem services in the very biologically diverse Kane Klachan Forest Complex (KKFC) in Thailand, as well as on building an effective and balanced resource management system.

The goal of this project is to create villages in which people's livelihood and nature conservation can coexist by utilizing the inherited local knowledge and traditions of the Karen tribe living in KKFC that contribute to sustainable utilization of natural and cultural resources. Specific initiatives included supporting introduction of sustainable organic farming, and developing teaching materials for building a sustainable community, targeted at elementary and junior high school students. Furthermore, since many similar issues are found throughout Asia, the project is also taking actions to spread the initiative to other regions, for example, holding workshops that cover a wide area in order to develop the human resources necessary for continuing activities and build consensus.

The project has helped people deepen their understanding about the value of natural resources and continue to autonomously manage the systems that have been built.



Hand weaving, representing the Karen tribe's traditional culture

Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
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Environmental Management

## Boost Contributions to Environmental Education Connecting to the Future — Toyota ESD Project

Human resources development is crucial for expanding environmental conservation activities to the future. Consequently, the Toyota Education for Sustainable Development Project promotes sustainable human resource development suited to local communities. Our corporate training approach is to nurture environmentally conscious employees and leverage their awareness to make it better for business. Additionally, we are connecting our training activities to the future by making the best use of the features of business sites and company-owned fields to provide environmental education for children, who will be responsible for sustainable societies in the future.

### Toyota Shirakawa-Go Eco-Institute

In 2015, to commemorate the institute's 10th anniversary, we enhanced the hands-on nature programs. The institute emphasis on a "children's camp" that nurtures children's environmental awareness, self-reliance, and ability to take action, through shared education as a new theme, that enhances growing and learning together toward living in harmony with nature.

The total number of people staying overnight at Shirakawa-Go in FY2019 was 15,480, and 10,113 people participated in institute programs during the year. Toyota Shirakawa-Go Eco-Institute will continue to develop new hands-on nature programs to nurture an awareness of living in harmony with nature among a growing number of adults and children.

### FY2019 Activities:

#### SDGs Education Forum in Toyota Shirakawa-Go Eco-Institute\*

In November 2018, as a development of the Toyota ESD Project, Toyota Shirakawa-Go Eco-Institute supported and cosponsored the three-day, two-night forum, held with the goal to research SDGs education and deepen exchanges among young researchers. A total of 30 people attended the forum, including students, researchers, and people from the private sector, educational institutions, local

governments, and NPOs.

Three lecturers conducted lectures and discussions entitled "Biodiversity from the SDGs perspective," "Education at Toyota Shirakawa-Go Eco-Institute for nurturing people who bear the future," and "Methodology for communicating SDGs." The participants also experienced the programs being implemented at the institute. Some of the participants commented, "Now I understand the global flow surrounding SDGs," "The forum helped me realize what I need to do to switch to thinking that these problems are mine, not someone else's," and "I learned the joy of observing nature." The Forum's results are posted on the institute's website.

With the goal of helping enhance the value of hands-on nature education in Japan, SDGs Education Forum will continue planning a variety of initiatives.

\* Hosted by SDGs Education Research Society  
Cosponsored by the "SDGs Education" Research Group of the Japanese Society for Environmental Education and the ESD Research Center of Rikkyo University  
Supported by Toyota Shirakawa-Go Eco-Institute



SDGs Education Forum



Experiencing local culture and nature activities

### Forest of Toyota

Forest of Toyota in Toyota City is a company-owned forest near the urban areas. It has been maintained based on the environment of *satoyama*, which was once part of our lives, creating a forest where living creatures can naturally inhabit.

Forest of Toyota was opened to the public in 1997, and anyone can walk freely through it and take part in various events to experience the *satoyama* environment and learn about nature through their five senses. Since 2001, we have also provided hands-on learning events for local elementary school children. In FY2019, these events were attended by 5,155 children.

## FY2019 Activities: Planned and Implemented Dragonfly Observation Tour

In 2017, we hosted the "Future of Harmony between People and Nature as Learned from Dragonflies," held in the Forest of Toyota featuring the living creatures of *satoyama*. As a follow-on activity, in July 2018, we held an event in which participants themselves planned and implemented a dragonfly-based environmental education program. Dragonflies are familiar creatures that make use of the waterside environments that people create in their lives. They can be easily adopted as an environmental education theme because their egg-laying and hatching behaviors can be observed.

An expert provided basic knowledge about dragonflies, including the roles they play in the ecosystem and the current status of marshes they inhabit, and the forest interpreter explained the detailed ecology and key points in planning an observation tour. The participants considered the impact people have on nature and the need for living in harmony with nature. After planning an observation tour designed to convey these types of information, they utilized handmade goods modeled after dragonflies to convey the importance of natural environment conservation to parent-child members collected by Japan Agricultural Cooperatives (JA) Aichi Toyota.

Comments were received such as, "I learned that it is necessary to protect the natural environment in order to also protect dragonflies" (from one parent-child pair) and "I learned the secrets for planning observation tours, which will be very useful in my future activities" (from a planning participant).

We plan to continue holding environmental programs that will take advantage of familiar creatures to teach people about nature and encourage them to take action.



Planning of observation tour



Dragonfly observation tour

Challenge 1  
New Vehicle Zero CO<sub>2</sub> Emissions  
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## Promoting Environmental Contributions Through Biotechnology and Afforestation Business, Automotive Peripheral Technologies, and Forest Conservation Activities

### Toyota Mie Miyagawa Mountain Forest

Planted Japanese cedar and Japanese cypress trees account for approximately 80 percent of the 1,702 ha of forest Toyota has owned in Odai Town, Taki District of Mie Prefecture since 2007. Although this region has the history of timber industry, a decline in domestic forestry had left much of the forest unmaintained. Over the last 10 years, we have been thinning the forest, and as well as providing other functions which benefit the public, such as soil and water conservation, we have also been extracting and utilizing logs that can be used as lumber. Furthermore, by introducing automobile manufacturing expertise to forest management, we are achieving efficient management.

#### FY2019 Activities:

#### Forest Challenge and Development Project

In FY2018, we started a new project, the Forest Challenge and Development, aiming for new utilization of trees and spaces. Business plans were widely collected from the public, and participants selected through screening started their projects in April 2018. One of the participants, a woodworking artist, is collaborating with a local, nationally renowned frame maker to develop carefully designed wooden products for daily life. He is also promoting a project that connects items produced from forests with consumers who use those items, while deepening his connection with the local community, for example, by holding a woodworking workshop at local Subaru Gakuen High School, Mie Prefecture.



Woodworking workshop



Hand-carved butter knives

As one of the new projects, an event to walk with your dog in the forest called “Doggies Playing in the Forest” was held. Based on a desire to help city dwellers become more interested in forests, the event was designed to increase people’s awareness about forests and forestry while enjoying a walk in the forest with dogs rather than just simply strolling in the forest. We are aiming to build a framework that can return the profits from the events to the forests. Through these initiatives, we are hoping to increase the number of people who are involved with forests and trees, and promote new future projects so that our program can become a model for revitalizing local communities and forests.

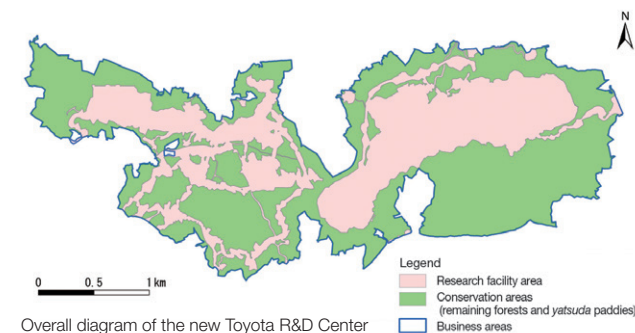


Event to walk with your dog in a well-maintained forest

### Initiatives at the New Toyota R&D Center Promoting Harmony with Nature and Local Communities

Toyota is constructing a new R&D Center in the overlapping area of Toyota City and Okazaki City. This new facility will be a hub for development of sustainable next-generation mobility. The main design concept is a technical center in harmony with nature and local communities. About 60 percent of the total project site will be conserved as areas for the regeneration of forests and management of valley bottom rice fields in collaboration with the local community. In April 2019, work was completed on the central section of the new R&D Center which takes a county road as its primary feature. Partial operation of the site as “Toyota Technical Center Shimoyama” is now underway.

Toyota intends to continue cooperating with experts, local governments, and local residents to conduct environmental conservation activities in the forest and valley bottom rice fields of this valuable *satoyama* ecosystem. We also plan to actively share information including the status of these activities and findings gained from them.



#### FY2019 Activities:

#### Confirmed Nesting of Japanese Night Heron at Business Site

Since the start of site preparation in 2012, nesting by Japanese night heron was confirmed at business site for the first time. After nesting was confirmed, several protective steps were implemented under the guidance of experts. For example, slope-planting work and blasting near the nesting site were temporarily halted, and entry by weed-cutting workers was restricted. We plan to continue creating habitats friendly to a variety of living organisms.



Japanese night heron

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Environmental Management

## Environmental Management

### Fundamental Approach

Toyota formulated the Toyota Earth Charter (established in 1992 and revised in 2000) as a policy for environmental initiatives based on the Guiding Principles at Toyota (established in 1992 and revised in 1997) to contribute to the sustainable development of society and the earth through its corporate activities.

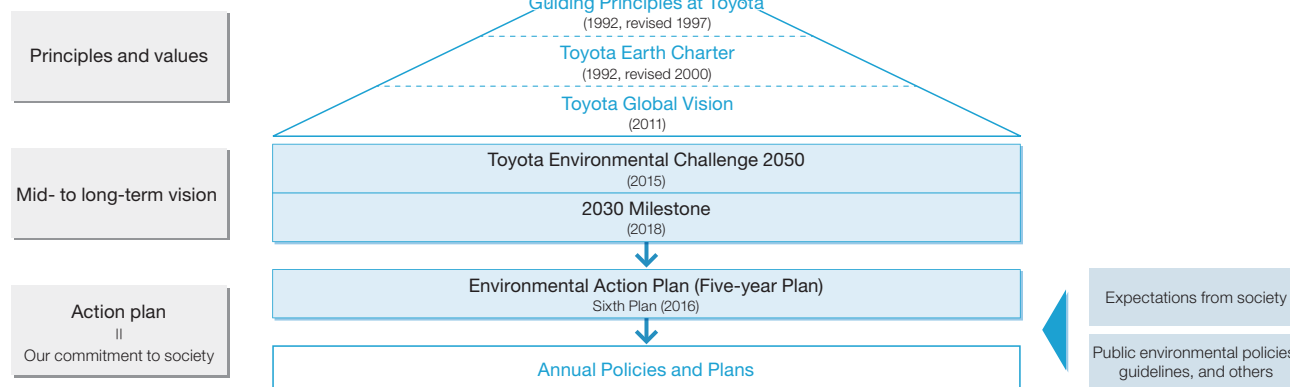
In addition, the Toyota Global Vision announced in 2011 emphasizes the importance of “Respect for the Planet” and positions the environment as one of three values\* that Toyota provides to society. Based on this approach, Toyota formulated the Toyota Environmental Challenge 2050 in 2015 as its long-term vision for environmental initiatives, and in FY2017 launched the Sixth Toyota Environmental Action Plan (FY2017–2021). Toyota is identifying

environmental risks and opportunities that can affect business operations and incorporating them into management plans to work for sustainable development in harmony with society. Under this structure, Toyota is promoting steadily, the environmental management activities globally, including legal compliance activities, collaboration with business partners, and employee education. Through these activities, we will contribute to achieving SDG 3.9 (reduction of environmental pollution), 6.3 (improvement of water quality), 11.6 (reduction of environmental impact of cities), 12.4 (management of waste), 12.6 (adopt sustainable practices and integrate sustainability information), and 12.8 (sustainable lifestyle).

\* Three values: Safety, environment, and *waku-doki* (excitement and exhilaration that wows you)

Related SDGs				
Target	3.9 (reduction of environmental pollution)	6.3 (improvement of water quality)	11.6 (reduction of environmental impact of cities)	12.4 (management of waste) 12.6 (adopt sustainable practices and integrate sustainability information) 12.8 (sustainable lifestyle)
Sixth plan targets and progress	No. 20, 21, 22 (pp. 17, 18)	No. 20, 23 (pp. 17, 18)	No. 20, 21, 22 (pp. 17, 18)	No. 20, 22 (pp. 17, 18) No. 23, 24, 26 (p. 18) No. 25 (p. 18)

### Structure of Toyota's Environmental Actions



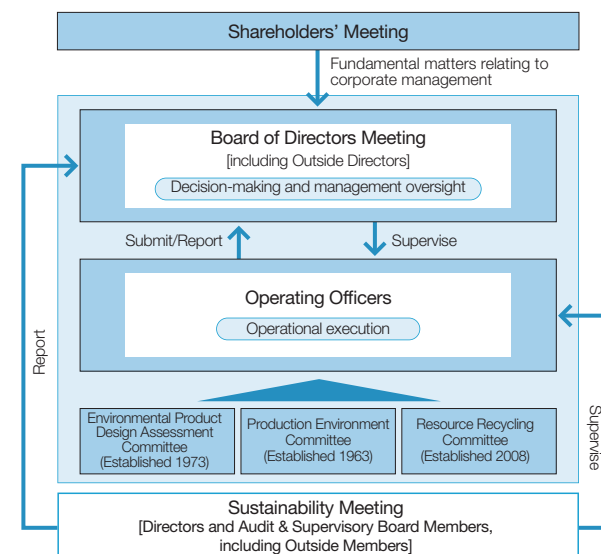
### Toyota's Environmental Management Systems

At Toyota Motor Corporation (TMC), Operating Officers entrusted by the Board of Directors make timely decisions and carry out environmental initiatives. The Sustainability Meeting, chaired by the Chief Risk Officer (CRO), deliberates on key issues such as corporate governance and risk management, as well as environmental risks, opportunities, and actions to be taken in response.

TMC also set “environment KPIs (CO<sub>2</sub>),” as indicators of the progress of measures to reduce CO<sub>2</sub> in products and production, and reports on them as key management information twice annually at meetings attended by all Executives and those above Field General Manager.

In addition, TMC has three core Environmental Committees: the Environmental Product Design Assessment Committee, the Production Environment Committee, and the Resource Recycling Committee. These committees consider issues and responses, and all relevant divisions work together to carry out company-wide initiatives.

### TMC's Promotion Structure (as of July 2019)



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Challenge 6  
Challenge of Establishing a Future Society  
in Harmony with Nature

Environmental Management

## Promotion Structure

The Environmental Management System (EMS) is promoted to all consolidated subsidiaries on the financial accounting basis as well as non-consolidated subsidiaries if considered important from the viewpoint of environmental management.

The 678 EMS companies consist of 237 production and sales companies under the direct management of TMC (12 production and sales companies, 79 production companies, and 146 non-production companies), as well as 441 companies managed by way of consolidated subsidiaries.

Environment Committees have been established in six regions

around the world where Toyota operates business (Europe, China, North America, Africa, Asia, and South America). These committees steadily promote environmental initiatives and enhance our global responses.

The environmental leaders from the six regions, TMC Environmental Affairs Division, and other relevant divisions established a meeting structure (Global Environment Meeting/Environmental Strategy Meeting) where they can all meet to discuss and share information on global issues that affect multiple regions.

## Main Companies in Japan (Alphabetical Order)

(as of March 31, 2019)

<b>Production Companies</b> (40 companies)	<b>Group 1</b> • Consolidated subsidiaries • Automotive manufacturing companies and others • TMC secondary companies	Daihatsu Motor Co., Ltd., Hino Motors, Ltd., Toyota Auto Body Co., Ltd., Toyota Motor East Japan, Inc., Toyota Motor Hokkaido, Inc., and Toyota Motor Kyushu, Inc.	<b>All-Toyota Production Environment Conference Members</b>
	<b>Group 2</b> • Companies not subject to consolidated accounting • Main parts manufacturers • Body manufacturers and others.	Aichi Steel Corporation, Aisan Industry Co., Ltd., Aisin AI Co., Ltd., Aisin AW Co., Ltd., Aisin Seiki Co., Ltd., Aisin Takaoka Co., Ltd., Denso Corporation, JTEKT Corporation, Tokai Rika Co., Ltd., Toyoda Gosei Co., Ltd., Toyota Boshoku Corporation, Toyota Industries Corporation, and Toyota Tsusho Corporation	
	<b>Group 3</b> • Consolidated subsidiaries • Parts manufacturers	Cataler Corporation, Central Motor Wheel Co., Ltd., Kyoho Machine Works, Ltd., Primearth EV Energy Co., Ltd., Toyota Home Co., Ltd., and Yutaka Seimitsu Kogyo, Ltd.	
	<b>Group 4</b> • Consolidated subsidiaries • Various other products production companies	Admatechs Co., Ltd., Japan Chemical Industries Co., Ltd., Shintec Hozumi Co., Ltd., and Toyota Energy Solutions, Inc.	
	<b>Group 5</b> • Companies not subject to consolidated accounting • Parts manufacturers	Chuo Spring Co., Ltd., Chuoh Pack Industry Co., Ltd., Fine Sinter Co., Ltd., FTS Co., Ltd., Futaba Industrial Co., Ltd., Koito Manufacturing Co., Ltd., Kyowa Leather Cloth Co., Ltd., Taiho Kogyo Co., Ltd., Toyoda Iron Works Co., Ltd., Trinity Industrial Corporation, and Tsuda Industries Co., Ltd.	
<b>Logistics Companies</b> (4 companies)	• Consolidated subsidiaries • Completed vehicle distribution • Parts distribution	Aichi Rikuun Co., Ltd., Tobishima Logistics Service, Inc., Toyofuji Shipping Co., Ltd., and Toyota Transportation Co., Ltd.	<b>All-Toyota Logistics Environment Conference Members</b>
<b>Sales Companies</b> (50 companies)	Fukuoka Toyopet Corporation, Toyota Corolla Aichi Co., Ltd., and others		
<b>Other Types of Businesses</b> (47 companies)	Aero Asahi Corporation, Delphys Inc., TACTI Corporation, Toyota Central R&D Labs., Inc., Toyota Enterprise Inc., and others • Including one company not subject to consolidated accounting		

## Environmental Management Promotions (Individual Companies)

- STEP 1. Organize internal structure (governance)
- STEP 2. Thorough risk management (compliance and voluntary actions)
- STEP 3. Maximize environmental performance

\* Varies according to the nature of business

## Main Overseas Scope (as of End of March 2019)

<b>Europe region</b> <b>37</b> subsidiaries European Environment Committee (Established 2002)	<b>China region</b> <b>14</b> subsidiaries China Environment Committee (Established 2007)	<b>North America region</b> <b>18</b> subsidiaries North America Environment Committee (Established 2004)
<b>Africa region</b> <b>3</b> subsidiaries South Africa Environment Committee (Established 2008)	<b>Asia region</b> <b>21</b> subsidiaries Asia Environment Committee* (Established 2007)	<b>South America region</b> <b>3</b> subsidiaries South America Environment Committee (Established 2006)

\* The Asia Pacific Environment Committee was changed to the Asia Environment Committee in 2019



Challenge 1  
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Challenge

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Challenge

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Challenge

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Environmental Management

## Promote Strengthening of Consolidated Environmental Management

### ISO 14001 certification by production affiliates Production

Maintain 100 percent certification by having all domestic and overseas production affiliates renew their certification.

### Eco-factory Activities Production

Toyota has been conducting eco-factory activities since FY2004 with the aims of steadily incorporating environmental measures into plant activities and becoming No. 1 regional plant. Our eco-factory activities are to build and develop a mechanism which surely incorporates environmental measures into each stage from planning to design and operations. These measures will be utilized for projects such as construction of new plants, major renovations of existing plants, and capacity expansions.

In FY2019, we carried out eco-factory activities at six plants in Mexico, the United States, China, and Malaysia.

We will continue to promote eco-factory activities as a means to contribute to regional environmental conservation around the world.

#### Eco-factory Activities

Region	Mexico	U.S.	China		Malaysia
			Plant No. 3	Plant No. 4	
Work site, plant	TMMGT	MTMUS	GTMC		ASSB Plant No. 2
Planning stage		2019		2019	
Audits of facility specifications	2019	2019		2020	2019
On-site audit (building)	2020	2020		2021	2019
On-site audit (equipment)	2020	2020		2022	2019
Compliance and risk assessment	2020	2022	2019	2022	2020
Performance assessment	2021	2023	2020	2023	2021

• The years indicate activities implemented in FY2019 or planned for fiscal years thereafter

: Completed

### Global ECO. Awards Production and Logistics

Toyota presents its own Global ECO. Awards for production and logistics companies to encourage environmental *kaizen* activities at overseas affiliates for carrying out the Toyota Environmental Challenge 2050 and promote *yokoten*\* of the best *kaizen* practices.

In FY2019, 6 finalists out of 17 teams selected from 6 regions around the world were invited to give their presentations in Japan. The presentations included an example of identification, recovery, and use of “discarded heat” from a painting plant air conditioning floor, and an example of analysis of local regional weather to identify and improve optimal operational patterns for equipment such as refrigerators, booth air conditioning, and ovens.

Through the presentations, each affiliate learned the beneficial aspects of other examples, for use in higher-level *kaizen* activities around the world.

\* *Yokoten* refers to sharing of *kaizen* practices, know-how, non-compliance and other information within the All-Toyota Group



Members of the Gold Awards winning teams from six affiliates with Hiroyoshi Ninoyu, Deputy Chief Officer, TMC (center of bottom row)

#### Award Results

Award Categories	Award for On-site <i>Kaizen</i> Activity	
Gold Awards	TMMC (Canada) TMUK-B (U.K.) GTMC (China)	TMT-BP (Thailand) ..... ⑦ <a href="#">Challenge 3 p. 27</a> TDB (Brazil) TSAM (South Africa) ..... ⑦ <a href="#">Challenge 4 p. 32</a>
Silver Awards	TMMC (Canada) TMMBC (Mexico) TMR (Russia) SFTM Chanchun (China) TMCAP (China) TFTM (China)	TMT-GW (Thailand) STM (Thailand) TKAP (India) TMV (Vietnam) TASA (Argentina)

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Environmental Management

## Legal Compliance Activities Production

Toyota aims to ensure that its production activities pose zero environmental risk to local communities. The foundation of our efforts is preventive measures to avoid non-compliance issues and complaints.

Neglecting preventive measures can lead to situations where non-compliance may occur. We consider these situations to be non-compliance near-misses, and we take stringent measures to root out the causes of these near-misses and prevent reoccurrence. For incidents posing significant risk, we share information on reoccurrence prevention measures through environmental affairs meetings at all Group companies. Additionally, we are taking measures to completely eliminate the use of ozone-depleting substances, and no significant releases have been found.

In FY2019, Toyota was not involved in any major environmental incidents causing air or water pollution, nor was the Group subject to fines or penalties. However, there were six minor non-compliance issues among the environmental management companies (five in Japan and one overseas).

We continued to outsource proper treatment of Polychlorinated Biphenyl (PCB). Also, due to amendment of the Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes, we are conducting a survey of high-concentration PCB ballast stabilizers (compressors in which PCB is sealed) at all plants and work sites in order to complete treatment of high-concentration PCB waste by the March 31, 2021 deadline.

At six of our production plants, we completed groundwater pollution prevention measures in 1997. We continue to conduct pumping aeration and purification to complete purification and ensure that groundwater is purified to levels below standards.

The levels of trichloroethylene at production plants are reported to the government and to local councils in the surrounding communities.

[Environmental Data p. 57-P.Q](#)

## Emissions Reductions That Contribute to Improvement of Urban Atmospheric Environments in Each Country and Region Research and Development

Based on the Guiding Principles at Toyota, which call for us to dedicate our business to providing clean and safe products, we are working to develop and make widely available vehicles with outstanding environmental performance, we are working to clarify the true state of the environment by introducing atmospheric reaction analysis equipment. We are also conducting cooperative atmospheric environment research according to the research levels and needs of each country and region, contributing to improvement of the atmospheric environment around the world. We actively participate in atmospheric enhancement measures conducted by the Japan Automobile Manufacturers Association and conduct joint research with research institutions, universities, and other organizations in countries worldwide.

## Reduce VOC Emissions in Production Activities Production

VOCs\* are one of the causes of photochemical oxidation, the cause of photochemical smog. Toyota has been striving to reduce VOCs emitted in vehicle painting processes. Specifically, we have reduced the use of paints and thinners, continuously promoting initiatives linked to painting facility refurbishment plans and day-to-day activities to reduce VOC emissions.

In FY2019, as a result of a higher production rate of models with high design levels and quality requirements, usage of paint materials increased and the volume of VOC emissions per area painted in TMC body painting processes (average for all lines) was 15.0 g/m<sup>2</sup> (up 4.2 percent year on year). For TMC and its consolidated subsidiaries in Japan, VOC emissions volume was 21.5 g/m<sup>2</sup> (same as the previous year).

Also, the volume of VOC emissions per area painted in TMC bumper painting processes (average for all lines) was 176 g/m<sup>2</sup> (down 0.4 percent year on year).

\* Volatile Organic Compounds: Used in painting, adhesives, and other products, VOCs are volatile at room temperature under normal pressure. VOCs cause air pollution and soil contamination, raising concerns about the influence on the human body.

### Trends in VOC Emissions Volume in Vehicle Body Painting Processes at TMC Third Party Assurance (Average for All Lines, Japan)

	FY	2015	2016	2017	2018	2019
VOC emissions per area painted (g/m <sup>2</sup> )		17.2	15.8	14.6	14.4	15.0

### Trends in VOC Emissions Volume in Vehicle Body Painting Processes by Consolidated Subsidiaries in Japan

	FY	2015	2016	2017	2018	2019
VOC emissions per area painted (g/m <sup>2</sup> )		22.6	21.8	21.5	21.5	21.5

\* Vehicle assembly plants of TMC and consolidated subsidiaries and other companies in Japan, a total of eight companies

### Trends in VOC Emissions Volume in Bumper Painting Processes at TMC (Average for All Lines, Japan)

	FY	2015	2016	2017	2018	2019
VOC emissions per area painted (g/m <sup>2</sup> )		282	253	193	176	176

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Environmental Management

## Promote Environmental Activities in Cooperation with Business Partners (Suppliers) Purchasing

### Initiatives in Accordance with the Green Purchasing Guidelines

Toyota purchases a wide range of materials, parts, and equipment from many different suppliers. We have collaborated with suppliers on implementing environmental initiatives through TOYOTA Green Purchasing Guidelines<sup>1</sup>, seminars, and other means.

After announcing the Toyota Environmental Challenge 2050, we revised guidelines in January 2016, working with suppliers to maintain existing measures including compliance with the laws and regulations of each country and managing substances of concern and undertake an even broader range of environmental initiatives to reduce greenhouse gases, assess water risks and reduce impact on water environments from those risks, encourage resource recycling, and protect ecosystems in support of the Challenge.

We request that our tier 1 suppliers to roll out environmental initiatives to their suppliers, and we seek to realize the entire supply chain<sup>2</sup> management in the pursuit of a sustainable society.

Toyota released the Green Purchasing Guidelines published not only in Japan, but also at overseas purchasing sites. We will continue to request suppliers to promote initiatives in accordance with the guideline.

<sup>1</sup> Green Purchasing Guidelines: Prioritizing the purchase of parts, materials, equipment, and services with a low environmental footprint when manufacturing products

<sup>2</sup> Supply chain: The entire flow of business activities related to a product, from procurement of materials for manufacturing, to production control, logistics, and sales

### Mutual Study About the Environment

We study environmental issues with suppliers through a variety of opportunities.

CSR Seminars are held each year, and at the FY2019 session, environmental initiatives were explained with a focus on the 2030 Milestone announced in September 2018, and once again requested the cooperation and collaboration of suppliers.

In January 2019, theme-specific research groups of the Kyohokai, which is consisted of more than 200 parts suppliers, commenced activities on environmental topics. The aim is to enhance environmental management of each company by exchanging information among companies and conducting lectures by experts.

### Recognition of Suppliers' Environmental Initiatives Started

Toyota established the Environmental Activity Awards in FY2018 to commend suppliers who make company-wide efforts with major contributions to conduct environmental initiatives throughout the vehicle lifecycle and entire supply chain.

## Assessing Risks and Opportunities Related to Climate Change and the Water Environment in Supply Chains

We introduced the CDP Supply Chain Program in FY2016 to support continuous environmental initiatives conducted with suppliers. The program enables us to assess environmental risks and opportunities across the supply chain.

We have been enhancing the quality of the program's activities through communication with suppliers.

### Ensuring Compliance with REACH and Other Global Regulations on Chemical Substances

In order to minimize severe negative impacts on human health and the environment due to the production and use of chemical substances, nations are strengthening laws related to chemical substances, which include the Chemical Substances Control Law in Japan, and the ELV Directive<sup>3</sup> and REACH regulation<sup>4</sup> in Europe. To properly respond to these regulations, Toyota has built and is operating chemical substance management frameworks in cooperation with its suppliers.

We continued these efforts in FY2019 and asked suppliers in Japan to conduct self-assessments of their operations. We also worked with suppliers to take further measures. We also shared these efforts to main overseas sites.

<sup>3</sup> End-of-life Vehicles Directive: A European Union directive on vehicle disposal designed to reduce the impact of End-of-life vehicles on the environment

<sup>4</sup> Registration, Evaluation, Authorization and Restriction of Chemicals regulation: A European Union regulation for managing chemical substances to protect human health and the environment

## Promote Environmental Activities in Cooperation with Business Partners (Dealers and Distributors) Sales and Service

Toyota has strong bonds of trust with its dealers and distributors built on shared values for products and services, supporting a long history of collaborative initiatives in environmental activities. Given their direct contact with customers, dealers are a critical partner in carrying out environmental initiatives.

In Japan, Toyota works with the Toyota National Dealers' Advisory Council to promote unified efforts among all dealers to implement voluntary activities based on the Toyota Dealer CSR Guidelines.

In overseas regions, we strongly promote environmental management through environmental activities led by regional headquarters and distributors along with continual DERAP<sup>5</sup> implementation.

<sup>5</sup> Dealer Environmental Risk Audit Program: Audit program to reduce environmental risks at overseas dealer service shops

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### Promoting Environmental Initiatives at Domestic Dealers

In May 2019, the Toyota National Dealers' Advisory Council issued an updated Legal Compliance Manual (formerly the Toyota Dealer CSR Checklist) with explanations of key laws and regulations and checkpoints as a tool to support the voluntary compliance activities of dealers and taking measures to reduce environmental risks. Toyota also organized guidelines on initiatives for achieving zero lifecycle CO<sub>2</sub> emissions (Challenge 2) under the Toyota Environmental Challenge 2050 in the form of an Environmental Guidebook and issued it to dealers. Actions are being taken to establish eco-dealers.

### Raise Ratio of Dealers Achieving DERAP

Toyota continues to implement the Dealer Environmental Risk Audit Program (DERAP) to reduce environmental risks at overseas dealer service shops. This program is intended to conduct audits of five fundamental environmental items including the proper management of waste and treatment of water discharge. In FY2019, a total of 99 distributors and 4,506 dealers from 96 countries worldwide participated in DERAP, an increase of 7 distributors and 210 dealers from FY2018. All 5 requirements were satisfied by 4,325 dealers, 96 percent of all participating dealers (up 1 percent year on year). We will continue to support expansion of DERAP participation and support dealers and distributors such as by creating environmental guidelines for each overseas region based on global environmental guidelines and determining the status of operations.

### Further Strengthen Global Employee Education and Awareness Activities

In accordance with the national policies of Japan, Toyota designated June as its "Toyota Environment Month" in 1973 and has been taking measures since then to raise employees' awareness and actions for the environment. In 1991, we changed the name to "Toyota Global Environment Month," and we are expanding activities globally. We ensure that all global employees are aware of Toyota Global Environment Month by distributing the President's message on the

environment through global affiliates in their local languages and making event-related notifications on monitors at various locations throughout company sites and on the intranet.

### Year-round Awareness Activities for Employees

Starting in FY2018, we provided environmental information to employees, planning and carrying out a variety of programs throughout the year to enhance employees' environmentally conscious mind and accelerate measures for achieving the Toyota Environmental Challenge 2050. Toyota Global Environment Month is considered to be one part of these measures.

For each program, a cycle with three phases—know, learn, and act by taking voluntary action—are performed with regard to the environment, and options are available for each rank according to the level of employees' awareness and environmental understanding. In FY2019, we took measures to encourage better understanding of the content of the Toyota Environmental Challenge 2050 and generate action. To raise interest, throughout the year we devised innovations such as "information that can be touched" and "information that enters the eyes."

#### Phase: Know

Following the measures taken in FY2018 including the use of digital signage installed in various locations throughout the company to disseminate environmental information and displaying educational screens when PCs are started, in FY2019, we undertook new measures that address the issue of water and wildlife conservation. During the Water Week Campaign in August, a special page was created on the intranet to inform employees about water issues and the importance of water resources. Educational stickers were also utilized within the company to convey the importance of water resources. In addition, to promote World Water Day (March 22), fun in-house events were conducted such as requesting employees to collect pictures related to water or something blue, wearing something blue and taking photos with Toyota's environmental character. These innovative measures were taken to lower the hurdles to participation and educate participants on the importance of natural water.



The World Water Day event on March 22



An educational sticker encouraging careful use of water resources

The Toyota Saves the Wildlife Campaign was launched in September 2018 as a new internal appeal concerning the Toyota Today for Tomorrow Project, a part of Challenge 6. During the campaign, special pages were created on the intranet to present information on Toyota's collaboration with the World Wide Fund for Nature (WWF) and the International Union for Conservation of Nature (IUCN), with which Toyota has established global partnerships, and goods with an original Toyota and WWF logo and other items were sold in the in-house shop. The "WITH STAMP" seals, which combine a family name with the image of an endangered animal, were extremely popular and approximately 700 seals were sold. A portion of the sales proceeds were allocated to WWF activities for protecting the natural environment.

Posters highlighting Toyota's initiatives with the WWF and IUCN were prepared and distributed to divisions in January and February 2019, respectively. The posters were also displayed in key stations in Tokyo, Nagoya, and Osaka in March, raising awareness and understanding.



Examples of WITH STAMP seals



Posters highlighting initiatives undertaken with the WWF and IUCN

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Environmental Management

### Phase: Learn

During the learn phase, we provide opportunities to learn about the environment throughout the year such as holding environmental lectures conducted by outside instructors and reimbursing test fees to employees who pass the Certification Test for Environmental Specialists (Eco Test). The instructors for the ninth environmental lecture were Hiroko Ida, a weather forecaster, and Seita Emori, a researcher at the National Institute for Environmental Studies, Japan. They gave a lecture entitled “Weather Forecast for 2050: Take Action Now to Preserve a Beautiful Earth 30 Years in the Future.” Approximately 1,450 employees attended and engaged in a lively exchange of opinions during the question and answer session.

### Phase: Act

Similar to the previous year, an Environmental Campaign of Creative Suggestion System was conducted as a main program of Toyota Global Environment Month, and a wide variety of environmental proposals were submitted, raising awareness. In addition, measures were taken during the period from October to December, which includes Eco-Drive Month in November, to raise awareness and increase understanding among employees regarding eco-driving. Continuing from the previous year, in FY2019 we sought to learn and gain understanding by distributing messages about eco-driving that draw attention through surprise. Specifically, we created posters that create a lasting impression with messages that cite 10 key elements of eco-driving recommendations intertwined with athletes affiliated with Toyota.

### New Employee Training Program Raises Sense of Ownership

In FY2019, new employee training program was conducted for approximately 690 employees and included courses by the Environmental Affairs Division on the fundamentals of global environmental issues, Toyota’s environmental initiatives, and environmental risks Toyota is facing. The training provides an opportunity for employees to consider and be aware of the environment as a personal issue after they are assigned and to acquire

the basis for putting that awareness into practice in their day-to-day activities.

### Enhance Active Disclosure of Environmental Information and Communication

Toyota Motor Corporation (TMC) strives to proactively disclose environmental information and enhance its communication through an annual Environmental Report, its website, and events. In February 2019, our Environmental Report 2018 won the Grand Prize (Minister of the Environment Prize) in the Environmental Reporting Category at the 22nd Environmental Communication Awards sponsored by Ministry of the Environment of Japan and other organizations. The investigation of climate-related risks and opportunities based on the 2°C and beyond 2°C scenarios, the logic of the 2030 Milestone that was set toward the Toyota Environmental Challenge 2050, and other elements were highly evaluated.

On the corporate website, pages were reorganized according to ESG frameworks to convey information about Toyota’s initiatives in a more understandable manner. In conjunction with announcement of the 2030 Milestone, the environmental challenge page was updated to comprehensively explain current conditions and the status sought for 2030 and 2050.

Toyota produced three sequels of “econohito,” which is a web video content featuring employees who undertake environmental activities toward achieving the Toyota Environmental Challenge 2050. The new contents covered Challenge 6. Social media was also utilized to disseminate environmental information.

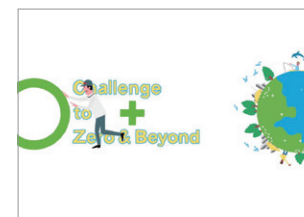


econohito



Awards ceremony for the Environmental Communication Awards

We also produced and posted videos to raise interest in Toyota’s environmental initiatives among the general public and provided them to overseas affiliates. The video introducing the Toyota Environmental Challenge 2050 employs pop-style animation. A video promoting Challenge 6: Toyota Today for Tomorrow Project introduced a new technique—popping the world’s largest scale bubble wrap art—to introduce Toyota’s environmental conservation activities undertaken with the IUCN.



Animated video



Promoting activities with the IUCN

At events, workshops and other programs are conducted to raise environmental awareness.

At the Water is Life 2018 (global high school students conference) held in July 2018, we conducted a workshop with Shibuya Kyoiku Gakuen Shibuya Junior and Senior High School and Shibuya Kyoiku Gakuen Makuhari Junior and Senior High School and implemented a hands-on, easily understood program with a focus on Toyota’s water-related initiatives.

We also had a booth at the Junior Eco-Club National Festival 2019 held in March 2019, where we used fill-in-the-blank quizzes and animated video to convey in a fun manner the key points of Toyota’s environmental initiatives.



Water is Life 2018



Junior Eco-Club National Festival 2019

## Toyota Earth Charter

### I. Basic Policy

#### 1. Contribution toward a prosperous 21st century society

Contribute toward a prosperous 21st century society. Aim for growth that is in harmony with the environment and set as a challenge the achievement of zero emissions throughout all areas of business activities.

#### 2. Pursuit of environmental technologies

Pursue all possible environmental technologies, developing and establishing new technologies to enable the environment and economy to coexist harmoniously.

#### 3. Voluntary actions

Develop a voluntary improvement plan, based on thorough preventive measures and compliance with laws, which addresses environmental issues on the global, national, and regional scales, and promotes continuous implementation.

#### 4. Working in cooperation with society

Build close and cooperative relationships with a wide spectrum of individuals and organizations involved in environmental preservation, including governments, local municipalities, related companies and industries.

### II. Action Guidelines

#### 1. Always be concerned about the environment

Take on the challenge of achieving zero emissions at all stages, i.e., production, utilization, and disposal.

- (1) Develop and provide products with top-level environmental performance
- (2) Pursue production activities that do not generate waste
- (3) Implement thorough preventive measures
- (4) Promote businesses that contribute toward environmental improvement

#### 2. Business partners are partners in creating a better environment

Cooperate with associated companies.

#### 3. As a member of society

- Actively participate in social actions.
- (1) Participate in the creation of a recycling-based society
  - (2) Support government environmental policies
  - (3) Contribute to non-profit activities

#### 4. Toward better understanding

Actively disclose information and promote environmental awareness.

### III. Organization in Charge

#### Promotion by the Sustainability Meeting which consists of top management

## Environmental Data

### Challenge 1: New Vehicle Zero CO<sub>2</sub> Emissions Challenge

#### A Sales of Electrified Vehicles (Global)

Third Party Assurance

Year	2015	2016	2017	2018
Vehicle sales (thousand units)				
Hybrid and plug-in hybrid vehicles	1,203.9	1,400.6	1,517.9	<b>1,630.7</b>
Fuel cell vehicles	0.5	2.0	2.7	<b>2.4</b>
Total	1,204.4	1,402.6	1,520.6	<b>1,633.1</b>

### Challenge 3: Plant Zero CO<sub>2</sub> Emissions Challenge

#### B Calorific Energy Use Ratio at TMC (Japan)

Third Party Assurance

FY	2016	2017	2018	2019
Ratio (%)				
Electricity	45.8	44.8	45.3	<b>48.5</b>
City gas	49.3	51.3	50.1	<b>46.7</b>
Heavy oil A	4.1	2.9	2.9	<b>2.9</b>
Kerosene	0.4	0.5	0.4	<b>0.5</b>
Hot water	0.3	0.3	0.3	<b>0.3</b>
Cold water	0.1	0.1	0.1	<b>0.1</b>
Renewable energy	0.0	0.1	0.9	<b>1.0</b>

• Conversion factors: [Environmental Data p. 58-Y](#)

#### C Global Total CO<sub>2</sub> Emissions (Actual Emissions Volume from Energy Consumption at Stationary Emission Sources)

Third Party Assurance

FY	2016	2017	2018	2019
Total CO <sub>2</sub> emissions (million tons)				
Japan (TMC)	1.52	1.52	1.50	<b>1.47</b>
Japan (consolidated EMS and its subsidiaries)	4.03	4.32	4.30	<b>4.32</b>
North America	0.93	0.96	0.96	<b>0.96</b>
China	0.63	0.64	0.64	<b>0.70</b>
Europe	0.25	0.27	0.27	<b>0.22</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America	0.73	0.75	0.75	<b>0.62</b>
Total	8.09	8.46	8.42	<b>8.29</b>
CO <sub>2</sub> emissions per unit produced (tons/unit)	0.795	0.803	0.800	<b>0.772</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 120 companies [Environmental Data p. 57-R](#)
- GHG Protocol was used to calculate emissions
- Conversion factors: [Environmental Data p. 58-X](#)

**D Global Energy Consumption (at Stationary Emission Sources)**

Third Party Assurance

	FY	2016	2017	2018	2019
Consumption volume by region (PJ <sup>1</sup> )					
Japan (TMC)	15.5	15.8	15.6		<b>14.8</b>
Japan (consolidated EMS and its subsidiaries)	46.3	45.9	46.7		<b>46.5</b>
North America	13.5	13.5	13.6		<b>13.7</b>
China	5.7	5.7	5.9		<b>6.5</b>
Europe	3.7	3.7	3.8		<b>3.7</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America	8.0	8.0	7.6		<b>7.3</b>
<b>Total</b>	<b>92.7</b>	<b>92.6</b>	<b>93.2</b>		<b>92.5</b>
Energy consumption per unit produced (GJ <sup>2</sup> /unit)	9.12	8.79	8.85		<b>8.61</b>

- 1 Peta joule:  
Peta represents 10<sup>15</sup> and a joule is a unit of energy
- 2 Giga joule:  
Giga represents 10<sup>9</sup> and a joule is a unit of energy
- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 120 companies [⑦ Environmental Data p. 57-R](#)
  - Conversion factors: [⑧ Environmental Data p. 58-Y](#)

	FY	2016	2017	2018	2019
Consumption volume by energy type (PJ)					
Electricity		38.7	38.5	38.5	<b>38.3</b>
City gas		29.7	29.9	30.1	<b>28.7</b>
Natural gas		15.0	15.0	15.0	<b>15.3</b>
LPG		2.3	2.3	2.3	<b>2.1</b>
LNG		0.9	0.9	1.1	<b>1.3</b>
Coke		1.0	1.0	1.0	<b>0.9</b>
Coal		0.5	0.5	0.6	<b>0.6</b>
Heavy oil A		1.2	1.0	0.9	<b>0.8</b>
Diesel oil		0.4	0.4	0.4	<b>0.4</b>
Kerosene		0.2	0.2	0.2	<b>0.2</b>
Steam		1.1	1.1	1.2	<b>1.1</b>
Hot water		0.7	0.7	0.7	<b>0.8</b>
Others		0.7	0.7	0.6	<b>0.7</b>
Renewable energy		0.3	0.4	0.6	<b>1.3</b>
<b>Total</b>	<b>92.7</b>	<b>92.6</b>	<b>93.2</b>		<b>92.5</b>

**Challenge 4: Challenge of Minimizing and Optimizing Water Usage**

**E Global Water Withdrawal Volume by Source**

	FY	2017	2018	2019
Water withdrawal volume (million m <sup>3</sup> )				
Municipal water		47.9	47.9	<b>48.8</b>
Groundwater		12.0	12.6	<b>12.2</b>
Rainwater		0.2	0.2	<b>0.2</b>
Water discharge from other organizations		0.8	0.0	<b>0.0</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 115 companies

**F Global Water Discharge by Destination**

	FY	2017	2018	2019
Water discharge volume (million m <sup>3</sup> )				
River/lake		32.3	32.9	<b>33.6</b>
Groundwater		0.7	0.4	<b>0.8</b>
Brackish surface water/seawater		3.1	2.8	<b>2.7</b>
Sewage		9.2	8.9	<b>8.9</b>
Other organizations		0.6	1.8	<b>2.6</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 102 companies

**G Global Recycled Water Discharge**

	FY	2017	2018	2019
Volume of recycled water discharge (million m <sup>3</sup> )		2.2	1.9	<b>2.1</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 21 companies



## Challenge 5: Challenge of Establishing a Recycling-based Society and Systems

### H Trends in Vehicle Recovery Rate and ASR<sup>1</sup> Recovery Rate at TMC (Japan)

	FY	2015	2016	2017	2018	2019
Vehicle recovery rate <sup>2</sup> (converted into a per-vehicle value) (%)		99	99	99	99	<b>99</b>
ASR recovery rate <sup>3</sup> (%)		97	97	98	98	<b>97</b>

<sup>1</sup> Automobile Shredder Residue: Residue after vehicles are shredded

<sup>2</sup> Vehicle recovery rate: Calculated by combining the percentage recycled and recovered through the dismantling and shredding processes, approximately 83% (quoted from the April 2003 joint council report), with the remaining ASR rate of 17% × ASR recovery rate of 98%

<sup>3</sup> ASR recovery rate: Recovery volume/amount collected

### I Trends in Damaged and Removed Bumpers Collected and Recovered at TMC (Japan)

	FY	2015	2016	2017	2018	2019
Amount collected (thousand pieces)		855	809	770	775	<b>765</b>
Collection rate (%)		72.9	69.4	67.4	68.3	<b>69.6</b>

### J Volume of Raw Materials Used and Ratio of Recycled Materials Used (Global)

	FY	2017	2018	2019
Volume of raw materials used (million tons)		13.90	13.75	<b>14.03</b>
Ratio of recycled materials used (%)		24	24	<b>24</b>

### K Damaged and Removed Parts Collected and Recovered at TMC (FY2019, Japan)

Bumpers	765,000 pieces (collection rate of 69.6%)
Lead wheel balance weights <sup>4</sup>	25.0 tons
Amount of oil delivered using tanker trucks (bulk supply system <sup>5</sup> )	64.8% of the volume sold by parts distributors

<sup>4</sup> Lead wheel balance weights: Weights used to ensure rotation balance when joining a wheel and tire

<sup>5</sup> Bulk supply system: Filling oil directly to large-capacity tanks located on site

### L Supply of Used and Remanufactured Parts at TMC (FY2019, Japan)

Parts name	Number of parts supplied	
	Used and remanufactured parts	New parts (reference)
Automatic transmissions	1,077	78
Power steering gear	3,613	1,609
Torque converters	1,015	6,266
Used parts	30,264	—

### M Breakdown of Total TMC Waste Volume

Third Party Assurance

	FY	2015	2016	2017	2018	2019
Breakdown of total waste volume (thousand tons)						
Waste at cost		34.8	34.1	32.8	31.7	<b>31.3</b>
Incinerated waste		1.1	1.1	1.0	1.0	<b>0.9</b>
Landfill waste		0.0	0.0	0.0	0.0	<b>0.0</b>
Total		35.9	35.2	33.8	32.7	<b>32.2</b>

### N Breakdown of Global Total Waste Volume

	FY	2015	2016	2017	2018	2019
Breakdown of total waste volume (thousand tons)						
Waste at cost		400	386	394	417	<b>408</b>
Incinerated waste		58	56	59	63	<b>62</b>
Landfill waste		17	19	21	19	<b>26</b>
Total		475	461	474	499	<b>496</b>

## Challenge 6: Challenge of Establishing a Future Society in Harmony with Nature

### O Results of Toyota Environmental Activities Grant Program (Global)

	FY	2015	2016	2017	2018	2019	Cumulative total
Country/region covered (programs)							
Asia-Pacific		7	5	7	5	<b>6</b>	<b>116</b>
North America, Latin America		0	1	0	0	<b>2</b>	<b>22</b>
Africa		1	3	1	3	<b>1</b>	<b>33</b>
Europe		2	1	2	2	<b>1</b>	<b>15</b>
Japan		11	16	18	18	<b>17</b>	<b>201</b>
Total		21	26	28	28	<b>27</b>	<b>387</b>

\* FY2019 grant topics: Biodiversity, climate change

## Environmental Management

### P Environment-related Non-compliance Incidents and Complaints at TMC (Japan)

	FY	2015	2016	2017	2018	2019
Non-compliance incident (Cases)		0	0	1 <sup>1</sup>	1 <sup>2</sup>	1
Complaint (Cases)		0	0	0	0	0

<sup>1</sup> See P46 of the Environmental Report 2017

<sup>2</sup> See P55 of the Environmental Report 2018

- Number of non-compliance incidents and complaints are determined based on internal standards

### Q Trichloroethylene Levels at TMC (FY2019, Japan) Third Party Assurance

Plants	Levels of groundwater before remediation (mg/L)
	(Environmental standard value: 0.01)
Honsha	Less than 0.002-0.59
Motomachi	Less than 0.002-0.15
Kamigo	Less than 0.002-0.10
Takaoka	Less than 0.002-0.22
Miyoshi	Less than 0.002-0.07
Tsutsumi	Less than 0.002-0.21

- In 1997, Toyota completed implementation of measures to prevent outflow of groundwater at the six production plants listed above  
Toyota is continuing groundwater remediation using pump and aeration treatment without exceeding the standard values  
Trichloroethylene levels are reported to the authorities concerned  
Levels are also explained to citizens at local council meetings
- Measurements are taken at all Toyota Motor Corporation (TMC) plants, and nothing is detected at plants other than those listed
- The levels are expressed as a range since each plant includes multiple measurement points

## Statements Relating to Environmental Data

### R Scope of Data Coverage (TMC (1 company) and consolidated EMS in Japan (77 companies including subsidiaries) and overseas (42 companies), a total of 120 companies)

TMC: One company

Japan: Main production companies

Group 1	Group 2	Group 3	Group 4	Group 5
Daihatsu Motor Co., Ltd. Toyota Motor Kyushu, Inc. Toyota Motor East Japan, Inc. Toyota Motor Hokkaido, Inc. Toyota Auto Body Co., Ltd. Hino Motors, Ltd.	Aisan Industry Co., Ltd. Aisin AW Co., Ltd. Aisin AI Co., Ltd. Aisin Seiki Co., Ltd. Aisin Takaoka Co., Ltd. Aichi Steel Corporation JTEKT Corporation Denso Corporation Tokai Rika Co., Ltd. Toyoda Gosei Co., Ltd. Toyota Industries Corporation Toyota Boshoku Corporation	Cataler Corporation Kyoho Machine Works, Ltd. Central Motor Wheel Co., Ltd. Toyota Housing Corporation Primearth EV Energy Co., Ltd. Yutaka Seimitsu Kogyo, Ltd.	Admatechs Co., Ltd. Shintec Hozumi Co., Ltd. Toyota Energy Solutions, Inc. Japan Chemical Industries Co., Ltd.	FTS Kyowa Leather Cloth Co., Ltd. Koito Manufacturing Co., Ltd. Taiho Kogyo Co., Ltd. Chuoh Pack Industry Co., Ltd. Chuo Spring Co., Ltd. Tsuda Industries Co., Ltd. Toyoda Iron Works Co., Ltd. Trinity Industrial Corporation Fine Sinter Co., Ltd.

Overseas: Main production and production/sales companies

North America	China	Europe	Asia (excluding Japan), Australia, Middle East, South Africa, Latin America
TMMK (U.S.) TMMI (U.S.) TMMWV (U.S.) TMMAL (U.S.) TMMTX (U.S.) TMMMS (U.S.) BODINE (U.S.) TABC (U.S.) TMMC (Canada) CAPTIN (Canada) TMMBC (Mexico)	TFTM TFTD TTFC TFAP TFTE FTCE SFTM GTMC GTE TMCAP	TMR (Russia) TMMP (Poland) TMMF (France) TMUK (U.K.) TMMT (Turkey) TPCA (Czech Republic)	TSAM (South Africa) TKM (India) TKAP (India) IMC (Pakistan) TMMIN (Indonesia) TMT (Thailand) STM (Thailand) ASSB (Malaysia) TMP (The Philippines) TAP (The Philippines) TMV (Vietnam)

### S Conversion Factors Used to Calculate "Global Average CO<sub>2</sub> Emissions from New Vehicles Reduction Rate Versus 2010 (Japan, U.S., Europe, China)"

Gasoline	2.32 kg-CO <sub>2</sub> /L
Diesel oil	2.58 kg-CO <sub>2</sub> /L
LPG	3.00 kg-CO <sub>2</sub> /kg, 0.507 kg/L (liquid density) <sup>3</sup>

<sup>3</sup> Japan Environmental Management Association for Industry, "Carbon Footprint of Products Communication Program, Basic Database" (version 1.01)

- "Greenhouse Gas Emissions Accounting and Reporting Manual" (version 4.3.2), Japanese Act on Promotion of Global Warming Countermeasures

**T Conversion Factors Used to Calculate Respective Emission Volume of 15 Categories in Scope 3 and Ratio of Total Emissions**

Category	Conversion factors												
Category 1: Purchased goods and services	<ul style="list-style-type: none"> <li>Ministry of the Environment of Japan, "Database on Emissions Unit Values for Accounting of Greenhouse Gas Emissions, etc., by Organizations Throughout the Supply Chain" (version 2.6)</li> </ul>												
Category 2: Capital goods	<ul style="list-style-type: none"> <li>"Greenhouse Gas Emissions Accounting and Reporting Manual" (version 4.3.2), Japanese Act on Promotion of Global Warming Countermeasures</li> </ul>												
Category 3: Fuel- and energy-related activities (not included in Scope 1 and Scope 2)	<ul style="list-style-type: none"> <li>Ministry of the Environment of Japan, "Database on Emissions Unit Values for Accounting of Greenhouse Gas Emissions, etc., by Organizations Throughout the Supply Chain" (version 2.6)</li> <li>Japan Environmental Management Association for Industry, "Carbon Footprint of Products Communication Program, Basic Database" (version 1.01)</li> </ul>												
Category 5: Waste generated in business operations	<ul style="list-style-type: none"> <li>Ministry of the Environment of Japan, "Database on Emissions Unit Values for Accounting of Greenhouse Gas Emissions, etc., by Organizations Throughout the Supply Chain" (version 2.6)</li> </ul>												
Category 6: Business travel													
Category 7: Employee commuting	<ul style="list-style-type: none"> <li>Ministry of the Environment of Japan, "Database on Emissions Unit Values for Accounting of Greenhouse Gas Emissions, etc., by Organizations Throughout the Supply Chain" (version 2.6)</li> <li>Japan Environmental Management Association for Industry, "Carbon Footprint of Products Communication Program, Basic Database" (version 1.01)</li> </ul> <table border="1"> <tr> <td>Gasoline</td> <td>2.66 kg-CO<sub>2</sub>/L</td> </tr> <tr> <td>Diesel oil</td> <td>2.74 kg-CO<sub>2</sub>/L</td> </tr> </table>	Gasoline	2.66 kg-CO <sub>2</sub> /L	Diesel oil	2.74 kg-CO <sub>2</sub> /L								
Gasoline	2.66 kg-CO <sub>2</sub> /L												
Diesel oil	2.74 kg-CO <sub>2</sub> /L												
Category 9: Downstream transportation and distribution	<ul style="list-style-type: none"> <li>"Greenhouse Gas Emissions Accounting and Reporting Manual" (version 4.3.2), Japanese Act on Promotion of Global Warming Countermeasures</li> <li>Japan Environmental Management Association for Industry, "Carbon Footprint of Products Communication Program, Basic Database" (version 1.01)</li> </ul>												
Category 11: Use of sold products	<ul style="list-style-type: none"> <li>Japan Environmental Management Association for Industry, "Carbon Footprint of Products Communication Program, Basic Database" (version 1.01)</li> </ul> <table border="1"> <tr> <td>Gasoline</td> <td>2.66 kg-CO<sub>2</sub>/L</td> </tr> <tr> <td>Diesel oil</td> <td>2.74 kg-CO<sub>2</sub>/L</td> </tr> <tr> <td>LPG</td> <td>1.81 kg-CO<sub>2</sub>/L, 0.507 kg/L (liquid density)</td> </tr> </table> <ul style="list-style-type: none"> <li>"Greenhouse Gas Emissions Accounting and Reporting Manual" (version 4.3.2), Japanese Act on Promotion of Global Warming Countermeasures</li> </ul> <table border="1"> <tr> <td>Gasoline</td> <td>2.32 kg-CO<sub>2</sub>/L</td> </tr> <tr> <td>Diesel oil</td> <td>2.58 kg-CO<sub>2</sub>/L</td> </tr> <tr> <td>LPG</td> <td>3.00 kg-CO<sub>2</sub>/L</td> </tr> </table>	Gasoline	2.66 kg-CO <sub>2</sub> /L	Diesel oil	2.74 kg-CO <sub>2</sub> /L	LPG	1.81 kg-CO <sub>2</sub> /L, 0.507 kg/L (liquid density)	Gasoline	2.32 kg-CO <sub>2</sub> /L	Diesel oil	2.58 kg-CO <sub>2</sub> /L	LPG	3.00 kg-CO <sub>2</sub> /L
Gasoline	2.66 kg-CO <sub>2</sub> /L												
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LPG	3.00 kg-CO <sub>2</sub> /L												

**U Conversion Factors Used to Calculate "Trends in CO<sub>2</sub> Emissions per Ton-kilometer (Transportation Volume) from TMC Logistics Operations (Japan)"**

Railway	22.0 g-CO <sub>2</sub> /tkm
Vessel	39.0 g-CO <sub>2</sub> /tkm
Gasoline	2.32 kg-CO <sub>2</sub> /L
Diesel oil	2.62 kg-CO <sub>2</sub> /L
Heavy oil C	2.98 kg-CO <sub>2</sub> /L

• Used "Guidelines on Disclosure of CO<sub>2</sub> Emissions from Transportation & Distribution" (version 3.0) issued by Ministry of Economy, Trade and Industry of Japan and Ministry of Land, Infrastructure, Transport and Tourism of Japan, and other guidelines

**V Conversion Factors Used to Calculate "Trends in Total CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources) and CO<sub>2</sub> Emissions per Unit Produced at TMC"**

Electricity	0.3707 kg-CO <sub>2</sub> /kWh	Coke	3.2426 kg-CO <sub>2</sub> /kg
Heavy oil A	2.6958 kg-CO <sub>2</sub> /L	Coal	2.3557 kg-CO <sub>2</sub> /kg
Heavy oil C	2.9375 kg-CO <sub>2</sub> /L	Hot water	0.0570 kg-CO <sub>2</sub> /MJ*
Kerosene	2.5316 kg-CO <sub>2</sub> /L	Cold water	0.0570 kg-CO <sub>2</sub> /MJ
LPG	3.0040 kg-CO <sub>2</sub> /kg	Steam	0.0570 kg-CO <sub>2</sub> /MJ
City gas	2.1570 kg-CO <sub>2</sub> /Nm <sup>3</sup>		

\* Mega joule: Mega represents 10<sup>6</sup> and a joule is a unit of energy  
• CO<sub>2</sub> emissions were calculated using the Nippon Keidanren's 1990 conversion factors

**W Conversion Factors Used to Calculate "Trends in Global Total CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources) and CO<sub>2</sub> Emissions per Unit Produced"**

- GHG Protocol was used to calculate emissions
- Emissions from electric power were calculated using the 2001 conversion factor from the "CO<sub>2</sub> Emissions from Fuel Combustion" from IEA, Paris, France (2007 edition)
- For items other than electric power: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan.
- For city gas, steam, hot water, cold water, and coke-oven gas, conversion factors used were those quoted in the Japanese Act on Promotion of Global Warming Countermeasures (March 2017)

**X Conversion Factors Used to Calculate Global Total CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources)**

- GHG Protocol was used to calculate emissions
- Emissions from electric power were calculated using the 2016 conversion factor from the "CO<sub>2</sub> Emissions from Fuel Combustion" from IEA, Paris, France (2018 edition)
- For items other than electric power: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan
- For city gas, steam, hot water, cold water, and coke-oven gas, the conversion factors used were those quoted in the Japanese Act on Promotion of Global Warming Countermeasures (March 2017)

**Y Conversion Factors Used to Calculate Global Energy Consumption (at Stationary Emission Sources)**

- Electricity conversion factor is 3.6 (GJ/MWh)
- Other energy conversion factors were based on the Japanese Act on Promotion of Global Warming Countermeasures (March 2017)

## Independent Practitioner's Assurance Report

# Deloitte.

デロイト トーマツ


(TRANSLATION)

### Independent Practitioner's Assurance Report

August 9, 2019

Mr. Akio Toyoda,  
President,  
Toyota Motor Corporation

Masahiko Sugiyama  
Representative Director  
Deloitte Tohmatsu Sustainability Co., Ltd.  
3-2-3, Marunouchi, Chiyoda-ku, Tokyo

We have undertaken a limited assurance engagement of the quantitative environmental information indicated with  for the year ended March 31, 2019 (the "Quantitative Environmental Information") included in the "Environmental Report 2019" (the "Report") of Toyota Motor Corporation (the "Company").

#### Our Independence and Quality Control

The Company is responsible for the preparation of the Quantitative Environmental Information in accordance with the calculation and reporting standard adopted by the Company (as described in the footnotes of graphs and tables, etc., included in the Quantitative Environmental Information). Greenhouse gas quantification is subject to inherent uncertainty for reasons such as incomplete scientific knowledge used to determine emissions factors and numerical data needed to combine emissions of different gases.

#### Our Responsibility

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. We apply International Standard on Quality Control 1, *Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance and Related Services Engagements*, and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

#### Our Responsibility

Our responsibility is to express a limited assurance conclusion on the Quantitative Environmental Information based on the procedures we have performed and the evidence we have obtained. We conducted our limited assurance engagement in accordance with the International Standard on Assurance Engagements ("ISAE") 3000, *Assurance Engagements Other than Audits or Reviews of Historical Financial Information*, issued by the International Auditing and Assurance Standards Board ("IAASB"), ISAE 3410, *Assurance Engagements on Greenhouse Gas Statements*, issued by the IAASB and the *Practical Guideline for the Assurance of Sustainability Information*, issued by the Japanese Association of Assurance Organizations for Sustainability Information.

The procedures we performed were based on our professional judgment and included inquiries, observation of processes performed, inspection of documents, analytical procedures, evaluating the appropriateness of quantification methods and reporting policies, and agreeing or reconciling with underlying records. These procedures also included the following:

- Evaluating whether the Company's methods for estimates are appropriate and had been consistently applied. However, our procedures did not include testing the data on which the estimates are based or reperforming the estimates.
- Undertaking site visits to assess the completeness of the data, data collection methods, source data and relevant assumptions applicable to the sites.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had we performed a reasonable assurance engagement.

#### Limited Assurance Conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the Quantitative Environmental Information is not prepared, in all material respects, in accordance with the calculation and reporting standard adopted by the Company.

The above represents a translation, for convenience only, of the original Independent Practitioner's Assurance report issued in the Japanese language.

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Deloitte Touche Tohmatsu Limited



Toyota is a Worldwide Olympic/Paralympic Partner in the category of vehicles, mobility support robots and mobility services.

## TOYOTA MOTOR CORPORATION

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