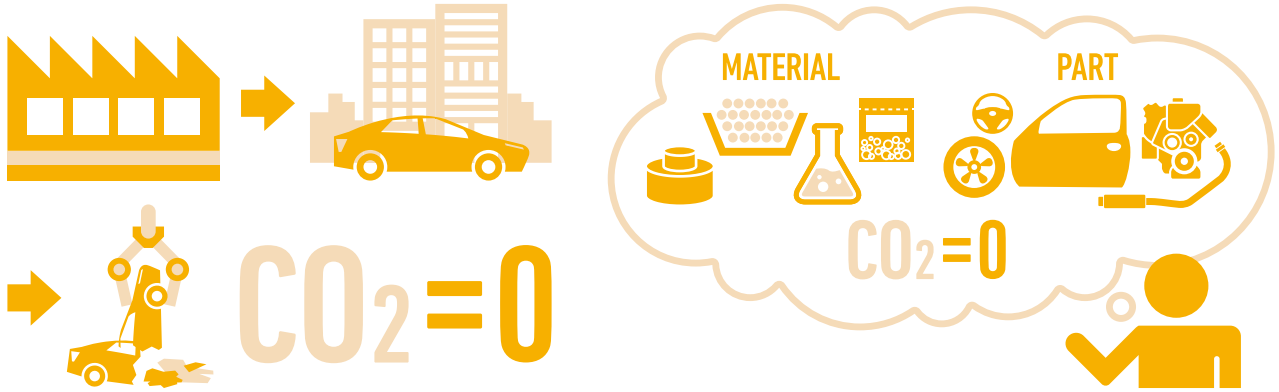
Challenge 2 Life Cycle Zero CO_2 Emissions Challenge

Fundamental Approach To mitigate the various risks posed by climate change, the "Life Cycle Zero CO_2 Emissions Challenge" seeks to completely eliminate CO_2 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_2 emissions in the processes of manufacturing. Possible means of reducing this include adopting low CO_2 emitting materials during manufacturing as well as reducing material usage and the number of parts used. It is possible to reduce CO_2 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."



Promoting Environmental Management in Product Development (Eco-VAS)

Steady Promotion of Environmental Target Management

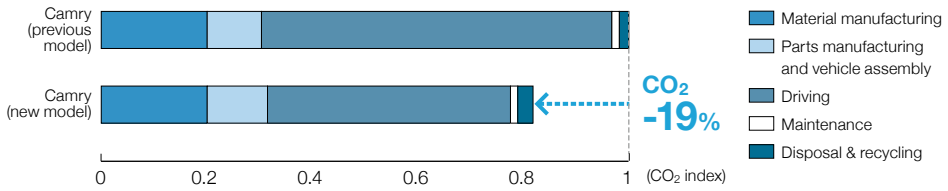
To reduce the environmental impact of its vehicles, Toyota has introduced the Eco-Vehicle Assessment System (Eco-VAS) to set and achieve environmental targets such as life cycle CO_2 and recyclability, under the guidance of the chief engineer, including at the development stage.

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 FY2018, we conducted LCA for one new model, three redesigned models (Camry, Pixis Epoch, and Lexus LS), three partially redesigned models (Aqua, Corolla Axio, and Corolla Fielder), and one improved model (Lexus RS).

The new Camry, launched in August 2017, has life cycle CO_2 emissions that are approximately 19 percent lower compared to the previous Camry.

* LCA (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

Camry LCA Results



- 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

Response to Scope 3

Scope 3 is a standard established to measure CO_2 emissions at all stages of a company's business activities and identify areas for future reductions. Scope 3 accounts for not only CO_2 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 FY2018 are overall Scope 3 CO_2 emissions of 412.01 million tons-CO_2, 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_2 emissions reduction.

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

CO_2 Emissions Ratio of 15 Categories in Scope 3 (FY2018 Global Basis) Third-Party Assurance

Category	Emissions volume (million tons-CO_2)	Emissions ratio (%)
1. Purchased goods and services	**61.19**	14.9
2. Capital goods	**4.18**	1.0
3. Fuel- and energy-related activities (not included in Scope 1 or 2)	**0.95**	0.2
4. Upstream transportation and distribution	**0.87**	0.2
5. Waste generated in operations	**0.12**	0.0
6. Business travel	**0.15**	0.0
7. Employee commuting	**0.66**	0.2
8. Upstream leased assets	**—**	—
9. Downstream transportation and distribution	**0.01**	0.0
10. Processing of sold products	**1.41**	0.3
11. Use of sold products	**338.51**	82.2
12. End-of-life treatment of sold products	**3.79**	0.9
13. Downstream leased assets	**—**	—
14. Franchises	**—**	—
15. Investments	**0.17**	0.0
Total for categories 1 through 15	**412.01**	100

- The calculation range mainly covers financial consolidated automotive businesses
- CO_2 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 FY2018; and the CO_2 emission factor
- Upstream and Downstream leased assets are included in the other category, and Franchises are not included

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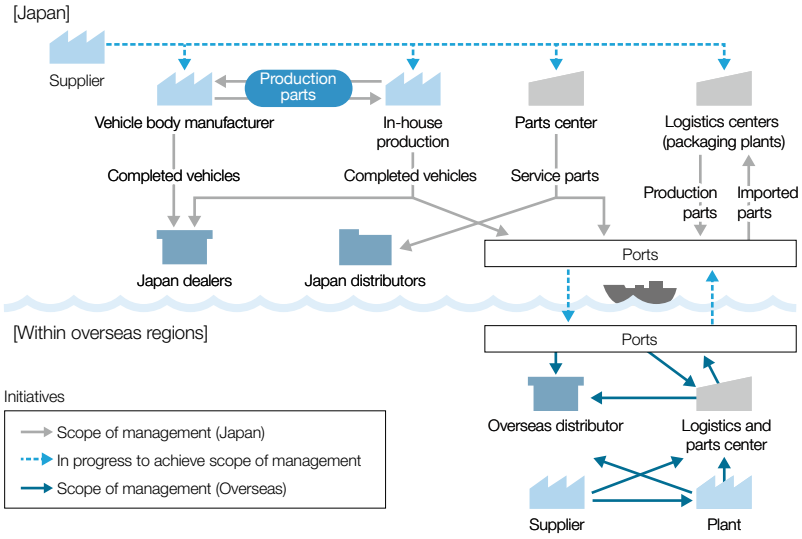
Pursuing Transportation Efficiency and Reducing CO_2 Emissions in Logistics Activities

To reduce CO_2 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 FY2018, we continued fuel efficiency initiatives, including loading efficiency improvement activities, shortening logistics routes, and so on, reducing CO_2 emissions per unit of workload (transported volume) to 104.2 g-CO_2/tkm (down 1.0 percent year on year). CO_2 emissions from logistics operations totaled 0.286 million tons (up 1.4 percent year on year), due largely to an increase in completed vehicles shipments in Japan.

At the global level, Toyota began assessing CO_2 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_2 emissions in FY2018 totaled 2.17 million tons. We will make a full analysis of results and continuously strive to further improve transportation efficiency and reduce CO_2 emissions per transportation volume.

Scope of Assessment of CO_2 Emissions in Logistics Activities



Trends in CO_2 Emissions per Ton-kilometer (Transportation Volume) from TMC Logistics Operations (Japan)

FY	2014	2015	2016	2017	**2018**
CO_2 emissions from logistics (million tons)	0.290	0.278	0.275	0.282	**0.286**
CO_2 emissions per ton-kilometer (g-CO_2/tkm)	106.6	109.6	108.4	105.2	**104.2**

- CO_2 conversion factors: The CO_2 conversion factors were calculated based on guidelines such as the "Guidelines on Disclosure of CO_2 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_2 Emissions (Japan)

Products	Main *kaizen* activities	Reduction volume (thousand tons)
Completed vehicles	Transportation distances decreased as a result of increased use of maritime transportation and review of production sites	2.4
Production parts	Expansion of railway, etc.	3.1
Service parts	Use of return trips to return empty pallets, etc.	0.4
Total		5.9

Global Logistics CO_2 Emissions

FY	2017	**2018**
CO_2 emissions from logistics (million tons)	2.14	**2.17**

- Total CO_2 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_2 emissions have been calculated according to the calculation methods of each business
- Errors in FY2017 data were corrected

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Modal Shift to Ships Implemented Using Port at New Site

To implement a modal shift that will reduce CO_2 emissions by shifting from overland transportation of completed vehicles using car carriers to maritime transportation on ships, Toyota created a port site in Amagasaki City, Hyogo Prefecture and started operations in January 2018.

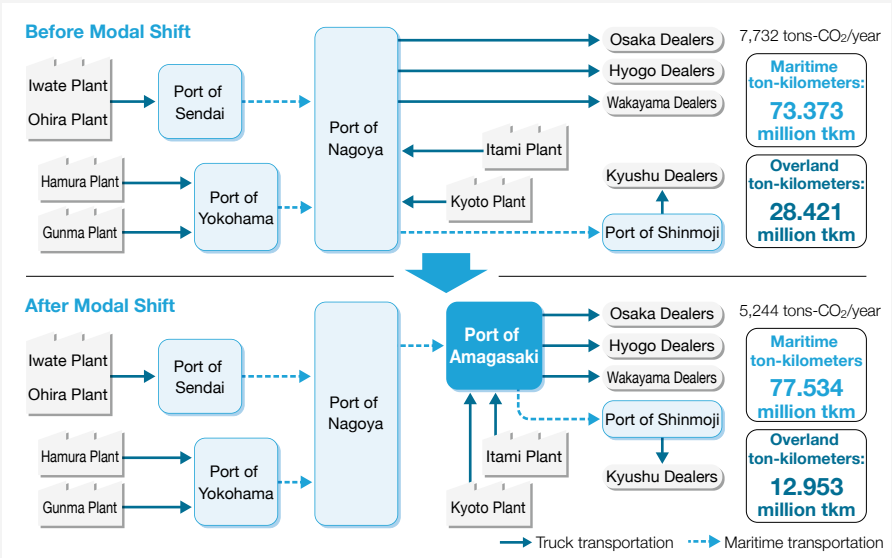
Previously, completed vehicles were transported from the Tohoku and Kanto regions to the Kansai region went overland from the Port of Sendai or the Port of Yokohama to the Port of Nagoya by sea, and from there the vehicles were transported overland to individual dealers.

With the recent creation of the Amagasaki Port Service Branch, vehicles are transported by ship from Nagoya to Amagasaki and then transported overland to dealers.

Also, until now, completed vehicles from plants in the Kansai region shipped to Kyushu were transported by ship via the Port of Nagoya to Shinmoji in Fukuoka Prefecture, but now this route uses the Port of Amagasaki, resulting in shorter distances overland from plants to the port and at sea to the Port of Shinmoji.

These modal shifts are expected to cut CO_2 emissions from 7,732 tons annually to 5,244 tons annually, a reduction of 2,488 tons.

Cargo ton-kilometers in overland transportation are expected to decline 15,468 thousand tkm.



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CO_2 Reduction Through Joint Transportation (India)

TKM, an affiliate that assembles vehicles, and TKAP, an affiliate that manufactures parts, are both located in Bangalore in southern India. Their plants are 2 km from each other. They are separate companies, however, and each plant conducted its own transportation of production parts.

Recently, the two companies began joint transportation efforts to reduce CO_2 emissions in logistics. Not only do the companies have many suppliers in common, but also TKM transports many large, lightweight items, while TKAP transports numerous small but heavy objects. With the utilization of joint transportation, it is possible to reduce the number of transportation trucks by carrying mixed loads of heavy and light parts.

However, there were various challenges in order to realize joint transportation, such as different ordering systems used by TKM and TKAP, different plant operating days, and the cost allocation method for joint transportation. The two companies held discussions and were able to take countermeasures such as setting suitable inventories.

In conjunction with the start of joint transportation, they also reviewed transportation routes, and as a result, CO_2 emissions were reduced by a total of 266 tons per year. Furthermore, the joint transportation was expanded through *yokoten** to Toyota Industries Engine India (TIEI), reducing emissions by an additional 232 tons per year. Ongoing efforts will be made to cut CO_2 through further reviews of routes and the application of *yokoten* to other plants.

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