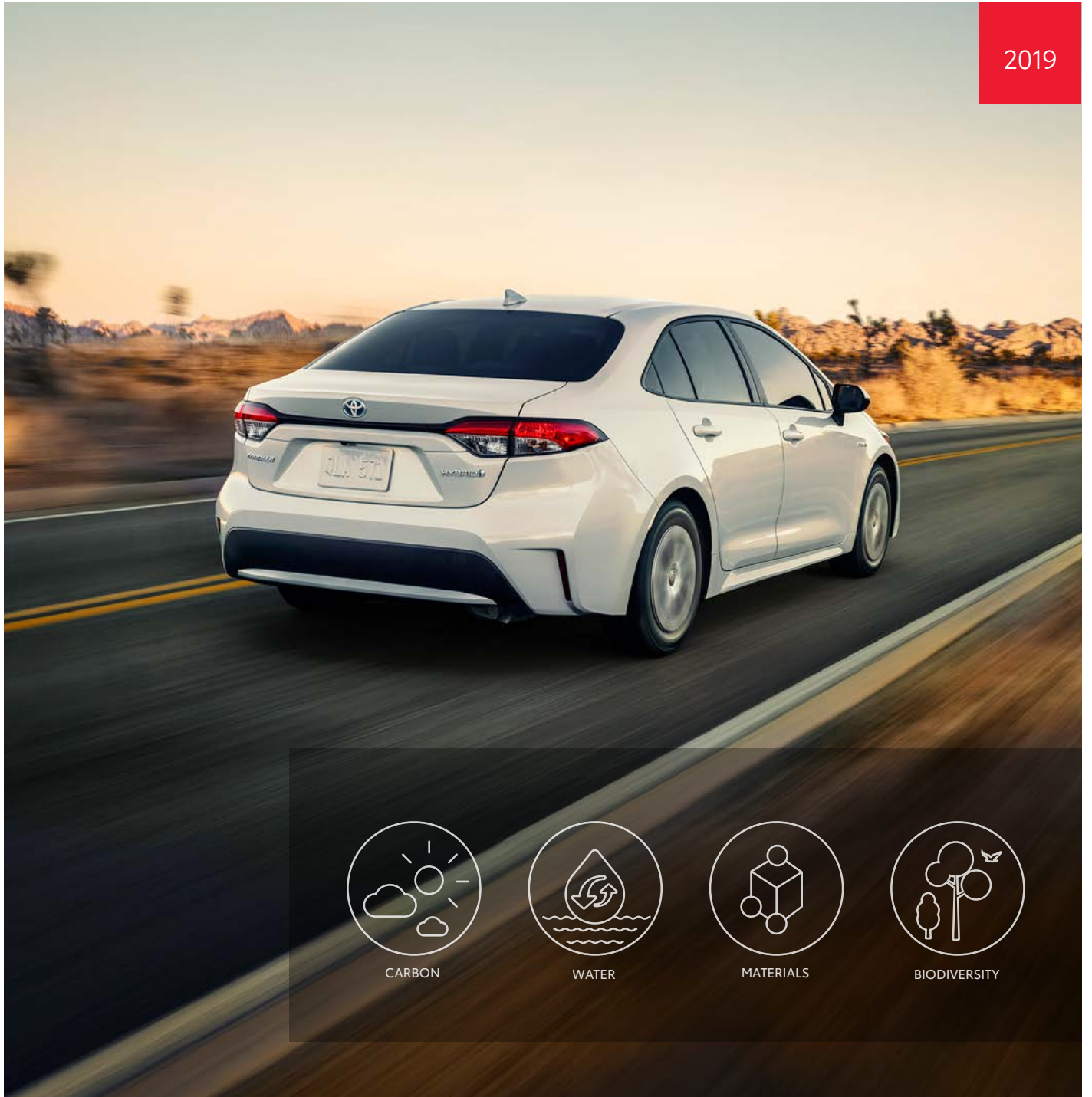


TOYOTA

North American  
Environmental  
Report

2019



# ABOUT THIS REPORT

Toyota Motor North America, Inc. (TMNA) is a subsidiary of Toyota Motor Corporation (TMC). TMC is headquartered in Japan and produces [an annual environmental report](#), which covers TMC initiatives as well as activities of consolidated subsidiaries and affiliates around the world.

TMNA has been producing a regional environmental report covering activities in the United States, Canada and Mexico since 2002. Our 2019 report covers TMNA activities under the Toyota and Lexus brands during fiscal year 2019 (April 1, 2018 through March 31, 2019) and product model year 2018. Data presented with different dates are clearly indicated.

We listened to your comments and suggestions about last year's report and considered them in improving this report. We appreciate your feedback. You may participate in a survey found [here](#).

© December 2019

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# WELCOME

Welcome to Toyota's **2019 North American Environmental Report**, where we feature information about our environmental strategy and performance across four key focus areas—**Carbon, Water, Materials and Biodiversity**—plus related **outreach** activities. We believe concentrating our efforts within these core focus areas will have the greatest positive impact on society, the planet and our business.



LET'S FACE IT:  
THERE'S ONLY  
ONE PLANET EARTH.  
That's why we focus  
on environmentally  
sustainable solutions  
in everything we do  
and every vehicle  
we make. From our  
North American  
manufacturing  
plants to the more  
than 1 million Toyota  
and Lexus vehicles  
we assemble, we are  
advancing toward a  
brighter tomorrow.

Here in North America, we are innovating, continuously improving, and thinking big and boldly, all to go beyond minimizing negative impacts and bring us closer to creating a net positive impact on the planet and society. In this report, you'll learn about how the Toyota Environmental Challenge 2050 is informing our regional strategy and pushing us to build a better, smarter, more sustainable future.

Challenge 2050 was issued by Toyota Motor Corporation as a set of six goals that are part of the company's global, long-term commitment to supporting the creation of a more inclusive and sustainable society. Challenge 2050 is inspiring Toyota team members, partners and customers and connecting them with the company's core commitment to sustainable mobility.

# DEAR READER

For Toyota, having a positive impact on society is more than just a corporate goal, it's part of our culture. Whether we're improving our company-wide sustainability or developing new products and services to improve mobility for all, Toyota is always looking to "Start Your Impossible", a personal challenge from company President Akio Toyoda.

It's one reason we remain committed to the Toyota Environmental Challenge 2050, a set of six goals designed to build a foundation for a healthier, more sustainable future. The goals are:

1. Reduce CO<sub>2</sub> emissions from new vehicles by 90 percent from 2010 levels
2. Eliminate CO<sub>2</sub> emissions in our supply chain and at our dealers
3. Eliminate CO<sub>2</sub> emissions from our operations
4. Protect water resources
5. Support a recycling-based society
6. Operate in harmony with nature.

These goals won't be easy to achieve, which is precisely what makes them worthwhile. Toyota can't do it alone, which is why we engage with our local communities, our dealers and suppliers as well as numerous nonprofit organizations. It's a team effort that's beneficial to all involved.

Our latest North American Environmental Report not only sums up our progress as a company, such as having the most popular fuel cell electric vehicle on the road in the Mirai, it also highlights individual team members who have contributed to our continued success. They are an inspiring example of how small changes can produce big results. Whether it's finding new ways to reduce the amount of chemicals we use at our plants or donating time to worthy causes in their hometowns, Toyota team members exemplify our corporate desire to improve the world around us.

I'm proud of our progress so far, but there's more to be done. Toyota is confident that we're on the right track, and with continued commitment from our team members, dealers and communities, we'll make great strides towards a cleaner, more sustainable environment in the future.

A handwritten signature in black ink that reads "Jim Lentz". The signature is fluid and cursive.

**Jim Lentz**  
Chief Executive Officer  
Toyota Motor North America, Inc.

# HIGHLIGHTS



CARBON

- Toyota is committed to offering an electrified version of each Toyota and Lexus model by 2025. Globally, Toyota has committed to sales of 5.5 million electrified vehicles, including 1 million zero-emission vehicles, by 2025.
- Toyota and Kenworth are rolling out 10 hydrogen-powered fuel cell electric heavy-duty trucks (FCETs) in southern California as part of the Zero-and-Near-Zero Emission Freight Facilities project. The project will increase zero emission trucking capacity at the ports of Los Angeles and Long Beach and is expected to reduce emissions by 453 metric tons of CO<sub>2</sub>e.
- Toyota is entering into Virtual Power Purchase Agreements (VPPAs), which will be used to reduce GHG emissions from our North American operations by up to 40 percent over the next three years.



WATER

- Toyota's North American manufacturing plants recycled or reused 565 million gallons of water last year. That's equivalent to the annual water use of 5,159 average American families (based on U.S. EPA estimates that the average American family uses 300 gallons of water per day at home).



MATERIALS

- Toyota's North American facilities recycled, reused or composted 93 percent of all waste in 2018. That's more than 755 million pounds of waste kept out of landfills and incinerators.
- Toyota's assembly plant in Cambridge, Ontario, developed a new cleaning agent that saves 11,300 gallons of solvent and reduces the number of bumpers that need to be recycled by half.
- Toyota is partnering with the Ann Arbor Summer Festival, one of the largest public multi-arts gatherings in Michigan, to make this a zero-waste event. In just one year, the festival went from 100 percent landfill to diverting over 75 percent of its waste to compost and recycling.



BIODIVERSITY

- Across North America, Toyota has 17 sites with pollinator gardens supporting monarch butterflies along their migration path.
- Toyota has 13 sites engaged in conservation programs certified by Wildlife Habitat Council.



OUTREACH

- In 2019, residents from cities across the U.S. took part in the 8th annual National Mayor's Challenge for Water Conservation, presented by the Wyland Foundation and Toyota, by pledging to save over 3 billion gallons of water over the next year.
- For the 20th consecutive year, Toyota was the national corporate sponsor of National Public Lands Day, hosted by the National Environmental Education Foundation. Between 1999 and 2018, more than 50,000 Toyota volunteers spent 193,000 volunteer hours building and maintaining 1,500 miles of trails, planting 100,000 trees, shrubs and other native plants, and removing 30,000 pounds of invasive species.
- In the U.S., Canada and Mexico, we have supported 67 Toyota and Lexus dealerships in becoming LEED®-certified. Achieving LEED certification illustrates the dealerships' commitment to sustainable construction and remodeling.

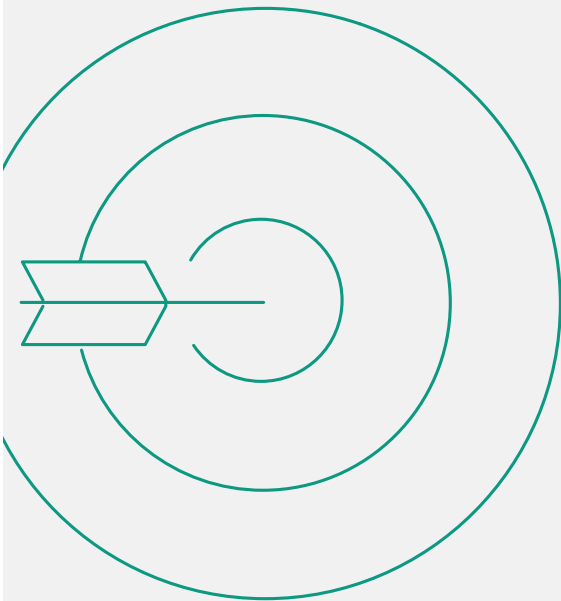
- In Performance, see ["Green Building" on page 74](#) for information on our latest Platinum LEED® awards.
- In Performance, see ["Awards" on page 57](#) for a list of some of our most recent environmental awards.

**Environmental  
Sustainability Strategy**

**Priority Issues**

**2021 Targets**

**Governance**



# STRATEGY

Toyota's global vision of **respect for the planet** is a core value of the company and a driving force behind our environmental initiatives. Respect for the planet is also the foundation for Toyota Motor North America's environmental sustainability strategy.



HERE IN NORTH AMERICA, our activities supporting Challenge 2050 are organized by our core focus areas of Water, Carbon, Materials and Biodiversity. Our long-term strategy in each of these focus areas shows how we are taking steps to address the world's pressing environmental problems and become part of the solution.



# ENVIRONMENTAL SUSTAINABILITY STRATEGY

TOYOTA MOTOR  
NORTH AMERICA

## 2050 Environmental Sustainability Strategy



**RESPECT FOR THE PLANET** is one of Toyota's core values.

To demonstrate the company's commitment to this value, Toyota issued the Environmental Challenge 2050, a set of six global challenges to move our company beyond zero environmental impact to achieving a net positive impact on society. Here in North America, we have developed a strategy to align with these six challenges and achieve a net positive impact in our region.

### Environmental Challenge 2050

To go beyond zero environmental impact and achieve a net positive impact:

1. Eliminate almost all CO<sub>2</sub> emissions from new Toyota vehicles
2. Partner with suppliers and dealers to help them eliminate CO<sub>2</sub> from their operations
3. Eliminate all CO<sub>2</sub> emissions from Toyota facilities and processes
4. Ensure all Toyota facilities and processes conserve and protect water resources
5. Ensure all Toyota facilities and processes support a recycling-based society
6. Ensure all Toyota facilities and processes operate in harmony with nature

### TMNA Environmental Mission

TMNA will demonstrate Respect for the Planet and achieve a net positive impact on society and the environment by:

1. Supporting Toyota's global Environmental Challenge 2050 through our five-year Environmental Action Plans and regional strategy
2. Managing priority issues specific to the North American region
3. Engaging in outreach by promoting awareness, developing strategic partnerships and sharing know-how with business partners and other stakeholders to create positive change

### TMNA Focus Areas

TMNA has organized its priority issues into four focus areas:



Carbon



Water



Materials



Biodiversity

### TMNA 5-Year Environmental Action Plans

Five-year targets in the following areas ensure incremental progress toward our 2050 goals:

- Four Focus Areas
- Outreach

The Toyota Environmental Challenge 2050, unveiled in September 2015, consists of six goals that seek to make a game-changing contribution to some of the critical environmental issues facing the world today, including climate change, water scarcity, resource depletion, and species and habitat loss. Challenge 2050 was developed by Toyota Motor Corporation and applies to all Toyota affiliates globally.

## ENVIRONMENTAL SUSTAINABILITY STRATEGY CONTINUED

Challenge 2050 is how team members across the company, in every region of the world, put Toyota's global vision of respect for the planet into action. Challenge 2050 unites us all with a common purpose – to be more than just good stewards of the environment, and to create positive changes beyond our facility boundaries.

Within Toyota Motor North America (TMNA), we developed a regional environmental sustainability strategy to align Toyota's global vision and Challenge 2050 with our regional four focus areas – Carbon, Water, Materials and Biodiversity. These focus areas in turn provide the framework for our five-year environmental action plans.

In each focus area, we are working towards minimizing environmental impacts and, through outreach activities, towards a net positive impact on society and the planet. To further elaborate on our strategy for achieving Challenge 2050, we issued position statements in April 2018. These statements represent our regional roadmap for attaining sustainable development by 2050.

- [CARBON Position Statement](#)
- [WATER Position Statement](#)
- [MATERIALS Position Statement](#)
- [BIODIVERSITY Position Statement](#)

Achieving Challenge 2050 will require innovation, creativity and new ideas. We will not get there by continuous improvement alone. For more on what it will take to achieve Challenge 2050, see the [Feature Story: The Challenge in Challenge 2050](#).

## PRIORITY ISSUES

A global environmental materiality assessment was conducted by our parent company, Toyota Motor Corporation (TMC), as part of developing the Toyota Environmental Challenge 2050. TMC evaluated global trends, risks and opportunities, including the United Nations (UN) 2030 Agenda and the 17 Sustainable Development Goals (SDGs), and identified the following serious environmental issues facing society and the planet:

- Extreme weather phenomena attributed to greenhouse gas emissions
- Aggravated air pollution in cities
- Water shortages due to population growth
- Resource depletion
- Ecosystem fragmentation and biodiversity loss

TMC then evaluated the importance of these issues to Toyota and external stakeholders. As a result of this process, TMC identified six material issues:

- 1** CO<sub>2</sub> emissions from new vehicles
- 2** CO<sub>2</sub> emissions from upstream activities and end-of-life treatment of vehicles
- 3** CO<sub>2</sub> emissions from vehicle manufacturing
- 4** Water stewardship
- 5** Materials management
- 6** Biodiversity protection

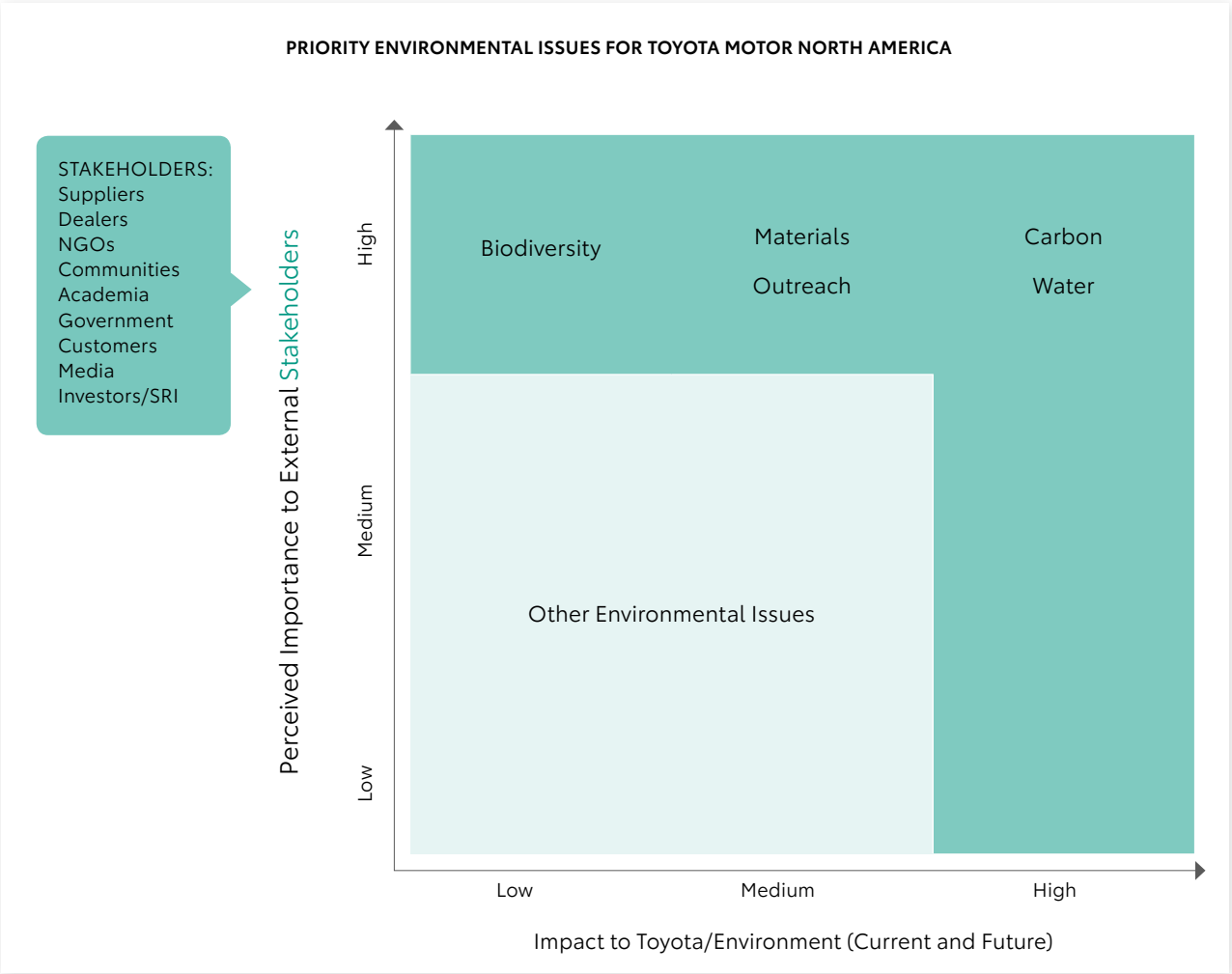
TMC addresses these six issues in the Toyota Environmental Challenge 2050, which was introduced in September 2015.

TMNA's process in North America followed a similar path. Our identification of environmental priority issues aligns with TMC's but consolidates the three CO<sub>2</sub> emissions challenges into a single issue we call "Carbon." We also call out the importance of sharing know-how for achieving a net positive impact by 2050. Our priority issues in North America are our four focus areas – Carbon, Water, Materials and Biodiversity – as well as Outreach.

We continue to manage other environmental issues, including air quality and green building, and we are as dedicated as ever to compliance with all applicable environmental laws and regulations. See "[Performance](#)" for information on our activities and progress in these areas.

→ See the Feature Story on [Contributing to the UN Sustainable Development Goals](#) for information on how Toyota's environmental sustainability activities are supporting the UN SDGs.

PRIORITY ISSUES CONTINUED



## 2021 TARGETS

TMNA's Environmental Action Plan (EAP) for fiscal years 2017 to 2021 puts us on a path to achieving all six of the Toyota Environmental Challenge 2050 goals. We know there is much to do and a long way to go, but we are putting the building blocks in place to set us up for success by 2050.

**TMNA ENVIRONMENTAL ACTION PLAN, FY2017-2021**

| FOCUS AREA   | CHALLENGE 2050 | FY2021 TARGET  | STATUS | FY2019 PROGRESS  |
|--------------|----------------|--|--------|--|
| CARBON       | Challenge 1    | Foster accelerated adoption of next-generation vehicles by continuously supporting education and infrastructure deployment | Δ      | <ul style="list-style-type: none"> <li>Announced global corporate commitment to offer an electrified version of each Toyota and Lexus vehicle by 2025.</li> <li>Supported education initiatives and continued participation in the Hydrogen Council.</li> <li>Continued partnerships in the U.S. with Shell, FirstElement Fuels and Air Liquide on hydrogen fueling infrastructure.</li> </ul> |
|              | Challenge 2    | Improve GHG emissions intensity from all logistics 5% from a baseline of FY2016  | O      | <ul style="list-style-type: none"> <li>Improved GHG intensity from owned and third-party U.S. parts and vehicle logistics by 19% compared to FY2016.</li> <li>Began drayage at Port of Los Angeles with zero-emissions Kenworth/Toyota fuel cell electric heavy-duty trucks.</li> </ul>  |
|              | Challenge 3    | Improve absolute GHG emissions from North American operations 15% from a baseline of FY2016                                | Δ      | <ul style="list-style-type: none"> <li>Reduced absolute GHG emissions by 6% compared to FY2016.</li> <li>Announced virtual power purchase agreements that will reduce GHG emissions from North American operations by up to 40%.</li> </ul>  |
| WATER        | Challenge 4    | Prioritize and implement water stewardship plans for facilities in water-stressed areas                                    | Δ      | <ul style="list-style-type: none"> <li>Mapped major sites with Aqeduct™ and prioritized 15 sites in areas of "high" water stress.</li> <li>Continued to implement water reduction projects at various sites.</li> </ul>  |
| MATERIALS    | Challenge 5    | Reduce the use of packaging materials  | Δ      | <ul style="list-style-type: none"> <li>Outdoor wood grain-embossed deck furniture contains up to 60% of low-end plastic scrap, which includes packaging waste from Toyota's manufacturing plant in Cambridge, Ontario.</li> </ul>  |
| BIODIVERSITY | Challenge 6    | Participate in regional biodiversity activities that support wildlife corridor(s)  | Δ      | <ul style="list-style-type: none"> <li>Toyota has 17 sites with gardens that support monarch butterflies and other pollinators. These gardens are located along the monarch butterfly's migration path and provide food and shelter to the butterflies at various stages of their life cycle as they make their way south for the winter, then return in the spring.</li> </ul>                |

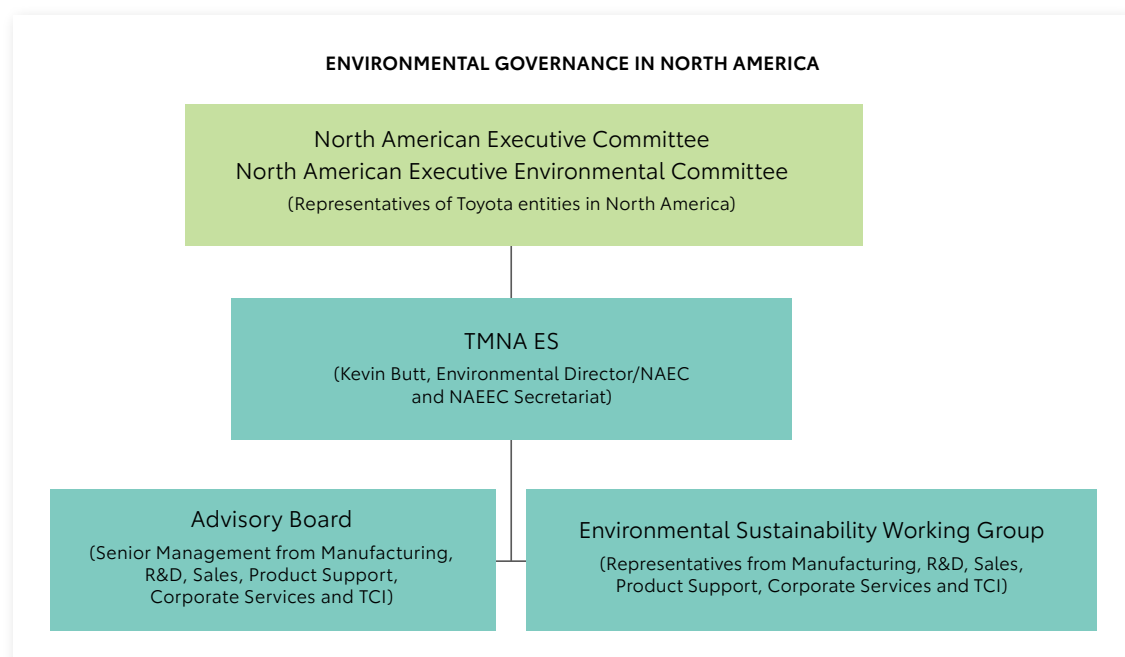
## GOVERNANCE

TMNA's Environmental Sustainability (ES) department reports to the North American Executive Environmental Committee (NAEEC) and serves as the chief environmental body representing Toyota entities in North America. ES, in cooperation with the NAEEC, establishes activities and provides one voice for appropriate responses to environmental sustainability issues in North America. The ES department's primary responsibilities include setting policy and direction for the region, developing consolidated environmental action plan goals and targets, and developing the annual North American Environmental Report.

TMNA ES facilitates an Advisory Board and Working Group as a coordinating mechanism across the organization. Both are comprised of environmental experts and representatives from various divisions:

- Manufacturing
- Research and Development
- Sales
- Product Support
- Corporate Services (includes Regulatory Affairs and Legal)
- Social Innovation
- Compliance and Audit
- Toyota Canada Inc. (TCI)

This report contains information from these divisions. Representatives from these divisions also participate in focus groups that concentrate on specific environmental issues (such as water or biodiversity). These focus groups report to the Environmental Sustainability Working Group and help develop and implement environmental action plan targets, develop strategies for the region, perform benchmarking and data gathering activities, and raise awareness among team members and external stakeholders.



## Carbon Targets

CO<sub>2</sub> From New Vehicles

CO<sub>2</sub> From Dealers & Suppliers

CO<sub>2</sub> From Operations



# CARBON

"Carbon" is one of Toyota's four focus areas in North America. Our carbon strategy addresses Challenges 1, 2 and 3 of the Toyota Environmental Challenge 2050 through **reducing CO<sub>2</sub> emissions from new vehicles, helping suppliers and dealers eliminate their CO<sub>2</sub> emissions, and eliminating CO<sub>2</sub> emissions from our operations.** Climate change affects people in all parts of the global community. We are working at every stage of the vehicle life cycle to help the world build a low carbon future.



**HOW DO WE  
REDUCE CARBON?**  
We improve fuel efficiency and use hybrid technology to reduce CO<sub>2</sub> emissions from our vehicles, and we find innovative ways to cut energy and fuel use to reduce CO<sub>2</sub> emissions from our manufacturing plants and logistics operations.



## CARBON TARGETS

Between fiscal years 2017 and 2021, Toyota Motor North America (TMNA) will accomplish the following challenges:

### **Challenge 1 (Reduce New Vehicle CO<sub>2</sub> Emissions): Foster Accelerated Adoption of Electrified Vehicles (On Track)**

Globally, the company has committed to offer an electrified version of each Toyota and Lexus vehicle and to sales of 5.5 million electrified vehicles, including 1 million zero-emission vehicles, by 2025. In North America, we seek to accelerate the adoption of electrified vehicles by continuously supporting education initiatives and infrastructure deployment. For information on our approach to electrification, see our feature story: [Electric Avenue](#).

## EDUCATION

We engage in a variety of activities to educate consumers and the public about our advanced technology vehicles. For example, we host ride and drive events, participate in demonstration programs with universities and government agencies, and support influential opinion leader forums such as the Environmental Media Awards. We also partner with the Electrochemical Society (ECS) to encourage young professors and scholars to pursue research in green energy technology that may promote the development of next-generation vehicles capable of utilizing alternative fuels (see "[ECS Young Investigator Fellowship](#)" for more information).

Toyota is also a Steering Committee member of the Hydrogen Council, a global initiative of leading energy, transport and industry companies with a united vision and long-term ambition for hydrogen to foster the transition to a low carbon society. The Hydrogen Council works with and provides recommendations to several key stakeholders such as policy makers, investors, international agencies and civil society to achieve these goals. Launched at the 2017 World Economic Forum in Davos, the Council is led by two Co-Chairs from different geographies and sectors.

## INFRASTRUCTURE DEPLOYMENT

Hydrogen fueling infrastructure is key for commercialization of fuel cell electric vehicles (FCEVs) like Toyota's Mirai. The University of California Irvine estimates only 68 stations are needed to support 10,000 FCEVs state-wide, and 38 are already operating. The California Energy Commission (CEC) has earmarked funding for about 100 total hydrogen stations to be built over the next several years. **Shell**, in partnership with Toyota, has opened two retail stations in the Sacramento area and plans to open five more in the Bay Area by the end of 2020.

Furthermore, Toyota has helped fund the development of hydrogen infrastructure that is already supporting a growing community of more than 6,000 FCEV drivers in the United States:

- **FirstElement Fuels** is working to develop an integrated and reliable network of fueling stations across California in target market locations consistent with the California Fuel Cell Partnership Road Map. As of August 2019, FirstElement has successfully opened 19 gaseous hydrogen stations and is currently developing its next 12 liquid hydrogen stations.
- In the northeastern United States, **Air Liquide** is working to develop and supply a fully integrated hydrogen fueling infrastructure network of 12 stations to support the introduction of Mirai on the East Coast.

Additionally, Toyota Canada has been working closely with partners to ensure the introduction of an appropriate fueling infrastructure in Canada. In June 2018, Canada's first public retail hydrogen refueling station opened in Vancouver. In February 2019, another station opened in Québec City, and others in Canada are in the works. Toyota Mirai became available for fleet purchase in Quebec during the winter of 2019 and in British Columbia during the summer of 2019.

### **Challenge 2 (Reduce Dealer & Supplier CO<sub>2</sub> Emissions): Reduce GHG emissions intensity from all logistics (owned and third-party) by 5 percent, from a baseline of fiscal year 2016 (achieved)**

Our target to reduce greenhouse gas (GHG) emissions intensity covers owned and third-party logistics (manufacturing production control logistics plus U.S. service parts/accessories and vehicle logistics operations). Total emissions from these sources were estimated to be 767,000 metric tons CO<sub>2</sub>e in fiscal year 2019. As part of Challenge 2 of Challenge 2050, we are working with our logistics partners to significantly reduce these emissions.

We currently track GHG emissions intensity from owned and third-party U.S. service parts/accessories and vehicle logistics from all transport modes (trucking, marine, air and rail). Since fiscal year 2016, these logistics operations have improved GHG intensity by 19 percent. These operations have achieved the target and strive to continue to improve efficiency.



Toyota Transport (truck carrier) and Toyota Logistics Services (shipper) continue to participate in the U.S. Environmental Protection Agency (EPA) SmartWay® Transport Partnership, a market-driven partnership aimed at helping businesses move goods in the cleanest, most efficient way possible. One of the main purposes of SmartWay is to improve fuel efficiency and reduce GHG emissions from the movement of goods.

- See "[P10 / GHG Intensity from U.S. Parts and Vehicle Logistics](#)" For GHG Intensity Performance From U.S. Service Parts/ Accessories and Vehicle Logistics.
- For More Information On Activities To Reduce GHG Emissions From Third-Party Logistics, see "[Suppliers](#)".

### **Challenge 3 (Eliminate CO<sub>2</sub> Emissions from our Facilities): Reduce absolute GHG emissions (Scopes 1 and 2) from North American operations 15 percent, from a baseline of fiscal year 2016 (on track)**

Total Scope 1 and 2 GHG emissions have decreased 6 percent between fiscal year 2018 and the baseline year of fiscal year 2016. The decrease is a result of lower production volumes and the implementation of energy efficiency measures.

TMNA is entering into Virtual Power Purchase Agreements (VPPAs). We will use them to reduce emissions from our North American operations by up to 40 percent over the next three years.

- See ["CO<sub>2</sub> From Operations"](#) for more on the VPPAs and our activities to reduce energy use and GHG emissions.
- See ["Greenhouse Gas Emissions"](#) for GHG emissions performance data.
- See ["Vehicle CO<sub>2</sub> Emissions"](#) for performance data related to GHG emissions per vehicle produced.

## CO<sub>2</sub> FROM NEW VEHICLES

**Challenge 1 of the Toyota Environmental Challenge 2050** calls on all Toyota regions globally to reduce CO<sub>2</sub> emissions from new vehicles by 90 percent by 2050, from a 2010 baseline.

To achieve this challenge, Toyota is pursuing multiple pathways to reduce vehicle fuel consumption and GHG emissions and is committed to utilizing various forms of electrification including hybrid, battery electric, and fuel cell technology. We try to match technologies to customer needs and government policies in each specific region. We evaluate vehicle powertrains, weight, aerodynamics and other design factors to boost vehicle efficiency while preserving the vehicle size, power, driving range and affordability that our customers demand — without sacrificing world-class vehicle quality, durability, reliability, safety features and performance.

There are several factors that must be weighed when considering the appropriate match. That's why we research driving trends, sociological behaviors, the changing energy and transportation landscape, the synergies between vehicle fuels and technologies, and the evolution of cities. Government initiatives can also influence the adoption of advanced technologies where the market and supporting infrastructure are still developing. Researching these factors helps us understand which technologies are best suited for the circumstances in a given market.

Going forward, hybrid technology will continue to be at the foundation of Toyota's approach to minimizing the environmental impacts of gasoline-powered vehicles. Knowledge gained from hybrid development and deployment is helping Toyota accelerate the introduction of future powertrains that can utilize a wide variety of energy sources and fuels, including hydrogen and electricity. Toyota believes that we will utilize not only hybrid technology going forward but all electrified technologies, and has committed that by 2025 an electrified version of each vehicle will be offered.

## CO<sub>2</sub> FROM NEW VEHICLES CONTINUED

Toyota and Lexus currently have 16 electrified vehicle models on the market in North America. This includes 14 hybrid electric vehicles, one plug-in hybrid electric vehicle and one hydrogen-powered fuel cell electric hybrid vehicle. Cumulative Toyota and Lexus hybrid sales in the region are over 3.5 million vehicles (as of July 2019). These numbers mean that Toyota will continue to use our portfolio of technologically advanced powertrains to develop and build our vehicles to readily adapt to future consumer needs while minimizing environmental impacts.

Looking further into the future, Toyota is collaborating with research entities, universities and companies on materials science research, investing in artificial intelligence to help accelerate the design and discovery of advanced materials. The research is helping to identify new advanced battery materials and fuel cell catalysts that can power future zero-emission and carbon-neutral vehicles. These efforts are helping to lay the groundwork for the future of clean energy to bring us even closer to achieving Toyota's goal of reducing global average new vehicle CO<sub>2</sub> emissions 90 percent by 2050.

For additional information related to vehicle CO<sub>2</sub> emissions, please see the following:

- Toyota's approach to electrification [Feature Story: Electric Avenue](#).
- TMNA's target to foster accelerated adoption of next-generations vehicles, see "[Carbon Targets](#)".
- Our fuel economy and vehicle GHG performance in the Performance section "[Vehicle CO<sub>2</sub> Emissions](#)".

### TOYOTA'S HYBRID ELECTRIC FLEET

| MODEL                    | TYPE OF HYBRID ELECTRIC VEHICLE |
|--------------------------|---------------------------------|
| Toyota Mirai             | Fuel Cell Electric              |
| Toyota Prius Prime       | Plug-in Gasoline-Electric       |
| Toyota Prius             | Gasoline-Electric               |
| Toyota Prius c           | Gasoline-Electric               |
| Toyota Avalon Hybrid     | Gasoline-Electric               |
| Toyota Camry Hybrid      | Gasoline-Electric               |
| Toyota Corolla Hybrid    | Gasoline-Electric               |
| Toyota Highlander Hybrid | Gasoline-Electric               |
| Toyota RAV4 Hybrid       | Gasoline-Electric               |
| Lexus ES 300h            | Gasoline-Electric               |
| Lexus LC 500h            | Gasoline-Electric               |
| Lexus LS 500h            | Gasoline-Electric               |
| Lexus NX 300h            | Gasoline-Electric               |
| Lexus RX 450h            | Gasoline-Electric               |
| Lexus RX 450hL           | Gasoline-Electric               |
| Lexus UX 250h            | Gasoline-Electric               |

All listed models are available as of December 2019.

## CO<sub>2</sub> FROM NEW VEHICLES CONTINUED

### ADVANCING CONVENTIONAL TECHNOLOGY

The Toyota New Global Architecture (TNGA) exemplifies key elements of our technology strategy for simultaneously reducing vehicle CO<sub>2</sub> emissions, increasing fuel economy and boosting vehicle performance. Toyota is proud to announce new vehicle models that continue building upon the TNGA technology advancements showcased in previous North American Environmental Reports. The latest additions to our TNGA lineup<sup>1</sup> for Toyota include the new 2021 Mirai, 2021 RAV4 Plug-in Hybrid, 2020 Highlander and 2020 Corolla Hybrid, while in the Lexus lineup, the new 2019 ES demonstrates a balance of performance and luxury with revolutionary vehicle efficiency. Continuing the use of TNGA enables many of the groundbreaking technologies to be more easily shared with future vehicles and is helping Toyota realize our commitment to “making ever-better cars.” TNGA’s integrated development supports the concept of total optimization for a lightweight, streamlined, high-performance platform and powertrain unit. TNGA helps us meet consumers’ needs while continuing to improve the efficiency of our vehicles.



The completely redesigned 2021 Mirai fuel cell electric vehicle, with a targeted 30 percent increase in range, will go on sale in 2020.

### 2021 MIRAI FCEV

Toyota is excited to announce a completely redesigned 2021 Mirai Fuel Cell Electric Vehicle (FCEV) based on Toyota’s premium rear-wheel drive TNGA platform. The new Mirai offers improved passenger room, comfort and a new driving experience than its pioneering forerunner. A targeted 30 percent increase in range is achieved by improved fuel cell system performance and increased hydrogen storage capacity. At its core, the Mirai is an electric vehicle, but it never needs to be plugged in to recharge. An FCEV generates its own electricity onboard from hydrogen and oxygen, with water as the only tailpipe

emission. A fill-up takes just about five minutes at a hydrogen fueling station. The second-generation Mirai, which will go on sale in late 2020, will deliver a significant evolution of Toyota's hydrogen FCEV powertrain technology and offer a critical look into the future.

<sup>1</sup> TNGA models = Toyota Avalon, Camry, Corolla, Highlander, Mirai, Prius and RAV4; and Lexus LS, UX and ES

## CO<sub>2</sub> FROM NEW VEHICLES CONTINUED

### 2021 RAV4 PHEV

The 2021 Toyota RAV4 Plug-in Hybrid Electric Vehicle (PHEV) utilizes TNGA and offers the most powerful hybrid RAV4 ever. Unlike any other, the new RAV4 plug-in hybrid will be celebrated by its all-electric range, spirited acceleration, nimble handling and impeccable style. The 2021 RAV4 PHEV was introduced in November 2019 at the Los Angeles International Auto Show and more details can be found in the associated press release.

### 2020 TOYOTA HIGHLANDER

The 2020 Highlander utilizes TNGA and offers improved conventional and hybrid powertrain. The 295-horsepower 3.5-liter V6 utilizes a D-4S Injection system combining direct fuel injection with port fuel injectors to help optimize efficiency, power and emissions in all conditions. The new-generation Toyota Hybrid System in the 2020 Highlander Hybrid combines a high-efficiency 2.5-liter DOHC four-cylinder engine with two electric motors in a system that's more compact and more efficient than before. This leads to a combined miles per gallon (mpg) that is 17 percent better than the previous generation Highlander Hybrid. Additionally, the battery pack is small enough to be installed under the rear seats, so it doesn't take up any cargo or passenger space and it continues to provide customers the utility they need.



Introducing the first-ever Toyota Corolla with a hybrid powertrain and an EPA estimated combined fuel economy of 55 mpg.

### 2020 TOYOTA COROLLA

The newly designed 2020 Toyota Corolla sedan utilizes the same TNGA 2.0-liter inline four-cylinder Dynamic Force direct-injection from the 2019 hatchback. In addition to the advanced TNGA 2.0-liter engine, we are introducing the first-ever Corolla with a hybrid powertrain. The new hybrid system combines a 1.8-liter four-cylinder gasoline engine with two motor/generators paired with an electronically controlled planetary-type continuously variable transmission (CVT) providing excellent efficiency and performance. This new hybrid system is paired with a smaller battery pack to ensure consumers have the same utility as they have come to expect with the Corolla. This first-ever Corolla Hybrid continues the "fun to drive" identity while having an EPA estimated combined fuel economy of 55 mpg.



## CO<sub>2</sub> FROM NEW VEHICLES CONTINUED

### 2019 LEXUS ES

Following in the path of the LC and LS flagship coupe and sedan, the ES is the latest expression of the new generation of Lexus vehicles. Specifically, in the ES 300h a new, fourth-generation Hybrid Drive System couples an ultra-efficient, Atkinson cycle 2.5-liter, four-cylinder gas engine with a lighter, more compact, more power dense electric motor and self-charging hybrid system. The ES hybrid system achieves excellent fuel efficiency and powerful acceleration due to the new hybrid transaxle with improved efficient internal power flow and a higher-efficiency power control unit. A new, more compact hybrid battery is located beneath the rear seats, contributing to ideal weight balance and low center of gravity, while enlarging cargo space. All of this allows the Lexus ES 300h to have an EPA estimated combined fuel economy of 44 mpg, making it one of the most fuel-efficient luxury vehicles without a plug.

## CO<sub>2</sub> FROM DEALERS & SUPPLIERS

**Challenge 2 of the Toyota Environmental Challenge 2050** calls on us to engage with our dealers and suppliers to support their efforts to eliminate GHG emissions by 2050.

### DEALERS

There are approximately 1,850 Toyota and Lexus dealerships in the United States, Canada and Mexico, all independently owned franchises. The Toyota and Lexus brands work with their dealerships on an individual basis, providing vendor support for products and programs that improve energy efficiency and save money. Through efforts like the Toyota Image II facility initiative and Lexus Vision USA, dealerships incorporate the best of sales and retail by including features such as LED lighting and windows that allow for natural light.



Toyota of Vallejo installed a 251 kW rooftop solar system that is offsetting an average of 61 percent of the dealership's electricity needs.

One dealership in California has leveraged these features and is not only saving energy and money but is also annually avoiding 275 metric tons of GHG emissions, equivalent to the emissions from about 58 passenger vehicles driven for one year. Toyota of Vallejo installed a 251 kilowatt rooftop solar system, designed by Cool Earth Solar, a SunPower® commercial dealer. The system covers about half of the 30,000 square foot rooftop, offsetting an average of 61 percent of the dealership's electricity needs.

By combining the rooftop system with an LED lighting retrofit on the display lot, the dealership is saving over \$100,000 – or 85 percent – of its annual electric bill. With the LED retrofit plus the addition of a 30 percent federal investment

tax credit, Toyota of Vallejo's rooftop system is expected to pay for itself in just over four years and deliver a projected \$3.8 million in savings over 25 years.

## CO<sub>2</sub> FROM DEALERS & SUPPLIERS CONTINUED

And while the rooftop system may be hidden from view, an energy monitor installed in the customer lounge provides a visible reminder of the clean energy produced on a daily, weekly and monthly basis. Now, customers who once watched the flat-screen TV are drawn to the energy monitor. Going solar is showing customers that the dealership is focused on sustainability.

→ See ["P12 / Toyota/Lexus LEED® Dealerships"](#) for information on dealership LEED® certifications by brand.

## SUPPLIERS

When considering the full life cycle impacts of manufacturing, distributing and driving vehicles, supply chain impacts exceed our own. That's why TMNA is a member of U.S. EPA's Suppliers Partnership for the Environment (SP), an innovative partnership between automobile original equipment manufacturers, their suppliers and EPA. SP provides a forum for small, mid-sized and large automotive suppliers to work together, learn from each other and share environmental best practices.

We are focusing our supplier engagement activities with third-party logistics carriers. According to the International Transport Forum and the Organization for Economic Cooperation and Development (OECD), trade-related freight transport emissions will increase by almost a factor of four between 2010 and 2050. Experts project that by 2050, global freight transport emissions will surpass those from passenger vehicles.

Toyota's logistics network is a complex operation that ensures smooth shipping and delivery of vehicles, parts and accessories, from the supplier to the plant, to Toyota's distribution centers, and ultimately to dealerships and customers. Through the use of returnable shipping containers, packaging reductions, light weighting and densification, our own logistics operation has reduced waste, fuel consumption and GHG emissions, and we have helped our third-party logistics carriers do the same.

We set a target to reduce the GHG intensity of both owned and third-party logistics by 5 percent by fiscal year 2021, from a 2016 baseline. Fiscal year 2019 results can be found on [page 18](#).

Toyota's production control logistics group – which procures the parts and materials used to manufacture our vehicles – is working on a strategy to reduce GHG emissions from two primary sources: over the road transportation (OTR) and cross dock yard operations. The group's focus is converting diesel-powered OTR equipment to alternative fuels such as renewable compressed natural gas, and to trial alternative power systems at the cross docks such as electric shunt trucks.

**United Road**, one of our auto-hauler highway partners, is a U.S. EPA SmartWay member and has implemented several initiatives to reduce fuel consumption and GHG emissions. For example, an electric auxiliary power unit is installed on their trucks that allows drivers in sleeper trucks to maintain cabin temperature without the truck running, which saves 1.2 gallons of diesel fuel per hour. Additionally, United Road has more than 900 trucks equipped with diesel particulate filters or diesel exhaust fluid and 100 such new units currently on order.

**Crowley Logistics** introduced two of the world's first combination container/roll on-roll off (ConRo) ships powered by liquified natural gas (LNG). These vessels are used to deliver Toyota vehicles between Jacksonville (Florida) and Puerto Rico. Fueling the ships with LNG reduces emissions significantly, including a 100 percent reduction in sulfur oxide (SOx) and particulate matter (PM), a 92 percent reduction in nitrogen oxide (NOx), and a reduction of carbon dioxide (CO<sub>2</sub>) of more than 35 percent per container, compared with current fossil fuels.



## ZERO-EMISSIONS FREIGHT PROJECT

Over 16,000 trucks serve the Los Angeles and Long Beach port complexes, North America's largest trade gateway for containerized cargo. That number is estimated to double by 2030. Freight transport is a significant – and growing – contributor to greenhouse gas emissions.

The Zero-and-Near-Zero Emission Freight Facilities project (ZANZEFF) provides a large-scale “Shore-to-Store” hydrogen fuel cell electric technology framework for freight facilities. The initiative is expected to help reduce emissions by over 453 metric tons of CO<sub>2</sub>e and NO<sub>x</sub>, ROG and PM<sub>10</sub> by 0.72 weighted tons.

The Port of Los Angeles, a global maritime leader with respect to zero-emission and near-zero emission technology testing and adoption, will develop ZANZEFF in three phases:

- **Roll out of 10 new zero-emissions hydrogen-powered fuel cell electric heavy-duty trucks (FCETs)** utilizing the Kenworth T680 Class 8 model combined with Toyota's fuel cell electric technology. The FCETs will ultimately move cargo from the Los Angeles and Long Beach ports throughout the Los Angeles area, the Inland Empire, the Port of Hueneme, and eventually to Merced. Four of the ZANZEFF trucks will be operated by Toyota Logistics Services, three by United Parcel Services, two by Total Transportation Services Inc., and one by Southern Counties Express. This phase is designed to kick-start the leap to a new class of goods movement vehicles, while reducing emissions in disadvantaged communities in these areas.
- **Development of two new large-capacity heavy-duty hydrogen fueling stations** by Shell in Wilmington and Ontario, California. The two new stations will join three additional stations located at Toyota Logistics Services in Long Beach and Gardena R&D facilities to form an integrated, five station heavy-duty hydrogen fueling network for the Los Angeles basin. Together, these stations will provide multiple sources of hydrogen throughout the region, including over one ton of 100 percent renewable hydrogen per day at the Toyota Logistics Services station to be operated by Shell, and important research and development advances at a pair of stations operated by Air Liquide, all enabling zero-emissions freight transport.
- **Expanded use of zero-emissions technology in cargo terminal and warehouse environments**, including the first two zero-emissions yard tractors to be operated at the Port of Hueneme, as well as the expanded use of zero-emissions forklifts at Toyota's vehicle logistics warehouse at the Port of Long Beach.

“The collaboration between the Port of Los Angeles, Kenworth, Toyota and Shell is providing an excellent opportunity to demonstrate the viability of fuel cell electric technology in both drayage service and regional haul commercial vehicle applications operating in Southern California,” said Mike Dozier, general manager of Kenworth Truck Company and PACCAR vice president. “The performance of the 10 Kenworth Class 8 trucks being developed under this program is targeted to meet or exceed that of a diesel-powered truck, while producing water as the only emissions byproduct.”

The new generation zero-emission truck expands on the capabilities of Toyota's first two Project Portal Proof of Concept trucks through enhanced capability, packaging, and performance, with an estimated range of more than 300 miles per fill, twice that of a typical drayage trucks' average daily duty cycle. Since operations began in April 2017, the Project Portal “Alpha” and “Beta” Proof of Concept Class 8 trucks have logged more than 14,000 miles of testing and real-world drayage operations in and around the ports of Los Angeles and Long Beach while emitting nothing but water vapor.

## ZERO-EMISSIONS FREIGHT PROJECT CONTINUED



Ten Kenworth/Toyota FCETs under the ZANZEFF project are being rolled out in southern California, increasing the ports' zero-emission trucking capacity and further reducing the environmental impact of drayage operations.

"Toyota is committed to hydrogen-powered fuel cell electric technology as a powertrain for the future because it's a clean, scalable platform that can meet a broad range of mobility needs with zero emissions," said Bob Carter, executive vice president of sales at TMNA. "The ZANZEFF collaboration and the innovative 'Shore-to-Store' project allow us to move heavy-duty truck fuel cell electric technology towards commercialization."

CARB awarded \$41 million dollars to the Port of Los Angeles for the ZANZEFF project as part of California Climate Investments, a California initiative that puts billions of cap-and-trade dollars to work reducing greenhouse

gas emissions, strengthening the economy and improving public health and the environment, particularly in disadvantaged communities.

## CO<sub>2</sub> FROM OPERATIONS

**Challenge 3 of the Toyota Environmental Challenge 2050** calls on us to eliminate all CO<sub>2</sub> emissions from the use of energy at our facilities.

During fiscal year 2019, we used nearly 4 billion kilowatt-hours (kWh) of electricity and natural gas in our North American operations. We consumed or offset almost 56 million kWh of renewable energy in North America during fiscal year 2019, mostly through onsite solar and the purchase of renewable energy credits. Toyota is one of the top 20 corporate users of installed onsite solar capacity in the U.S., according to the Solar Energy Industries Association.

Our use of electricity and natural gas resulted in emissions of 1.2 million metric tons of CO<sub>2</sub>e.

We track certain GHG reduction projects through our corporate production engineering group; not all projects implemented by the plants are captured. Of the projects we tracked in fiscal year 2019, we counted emissions reductions from manufacturing plant activities of more than 28,000 metric tons of CO<sub>2</sub>e. In addition to ongoing LED lighting retrofits, our plants and other facilities implement measures, such as installing variable frequency drives on cooling water pumps, that impact daily operations and reduce energy consumption. For example:

- Toyota Canada's vehicle processing centers (VPCs) have replaced their huge pylons with smaller, more energy-efficient signs, and at the Montreal VPC, vehicles are kept inside the workshop so that they don't need to idle to warm up.

## CO<sub>2</sub> FROM OPERATIONS CONTINUED

- Team members at Toyota's assembly plant in Tijuana, Mexico, installed variable frequency drives in the HVAC system and high efficiency motors in the air supply fan, which saves 144,000 kWh and 759 metric tons of CO<sub>2</sub>e per year.
  - At our assembly plant in Kentucky, team members added automatic shutoff to the cleaning mode on the HVAC systems in the paint booths. Previously, the cleaning mode would be turned on and left running over the weekend. Now, it shuts off after two hours. Similarly, the stamping conveyor line was running all the time. Now, the conveyors are shut down when the machine is not stamping parts. These two changes have led to annual savings of 4.3 million kWh and 2,300 metric tons of CO<sub>2</sub>e.
  - Our powertrain plant in Huntsville, Alabama, supports high school interns each summer to encourage interest in the Advanced Manufacturing Technician degree program, a two-year associates degree program in industrial maintenance from Calhoun Community College. During the summer of 2018, four soon-to-be high school seniors – two from Mae Jemison High School and two from New Century Technology High School – worked at the plant five days a week for six weeks. They participated in a plant-wide environmental scavenger hunt and found several opportunities to use less energy. Their efforts resulted in saving 116,000 kWh, 62 metric tons of CO<sub>2</sub>e and more than \$8,000.
- See ["P08 / GHG Emissions from Toyota's North American Operations"](#) for GHG emissions performance data.
- See ["P09 / GHG Emissions Per Vehicle Produced"](#) for performance data related to GHG emissions per vehicle produced.
- See ["Awards"](#) for information on how energy savings earned Toyota Motor Manufacturing Alabama an Air Pollution Control Award.
- See ["Awards"](#) for information on TMNA's four ENERGY STAR Building certifications.

## RENEWABLE POWER THROUGH VPPAS

Toyota Motor North America (TMNA) is committing to aggressively reduce its carbon output in North America by entering into Virtual Power Purchase Agreements (VPPAs). We will use them to reduce GHG emissions from our North American operations by up to 40 percent over the next three years. The move represents another major step towards Toyota's Environmental Challenge 2050 goal of cutting global GHG emissions from plant operations to zero by the year 2050.

Under the VPPAs, TMNA is contracting with renewable energy providers to generate wind and solar power that will be provided directly to regional electric grids. The supply of renewable power is expected to reduce use of fossil fuels while improving the sustainability of the electric grid in the area.

By powering our operations from the enhanced grid and applying Renewable Energy Credits earned by funding the generation of renewable electricity, Toyota expects to substantially offset emissions from our facilities in North America.

"Toyota has long been defined by its commitment to responsible environmental practices, and we're proud to build upon that great legacy," said Kevin Butt, regional director of Environmental Sustainability for TMNA.

"We are committed to setting an example of sustainability that goes beyond vehicles to show how a company can significantly reduce the environmental impact of its operations. By cutting our North American GHG emissions by up to 40 percent, we will be that much closer to our goal of having a net positive impact on the


## CO<sub>2</sub> FROM OPERATIONS CONTINUED

environment by the middle of this century.”


Toyota's VPPA program is the result of more than six years of research into how best to reduce and offset emissions from the company's operations, working in partnership with MIT, the National Renewable Energy Lab, the Rocky Mountain Institute, and others. It is part of a wider effort across the company to reduce the environmental impact of enterprise operations as we also work to limit vehicle emissions.

# THE POWER OF VPPAs

VIRTUAL POWER PURCHASE AGREEMENT



**TOYOTA ENVIRONMENTAL CHALLENGE 2050**




**LET'S MAKE A BETTER PLANET**


**BY DRIVING A CLEAN MOBILITY FUTURE TOGETHER**

Toyota is committed to reducing emissions from the energy we use. We are taking action, through power purchase agreements, to supply emissions free renewable energy to the same grid we get our power from. This is one step in converting our energy demand to emissions free energy.

**TARGET RENEWABLE ENERGY SOURCES = ZERO EMISSIONS**



WIND



SOLAR

**VISION FOR TOYOTA'S VPPAs**

**ONE**

Toyota contracts renewable source electricity generators to put electricity on the grid.

**TWO**

Renewable provider supplies the grid with energy secured by Toyota.


**THREE**

Local grid receives regular renewable input, decreasing fossil fuel demand.

**FOUR**

Toyota balances energy use with renewable energy generated for the grid.

**= CLEANER MOBILITY**



**VPPAs = New Renewable Generation = Reduced Carbon Emissions = Environmental Sustainability**

**NEW RENEWABLE POWER GENERATORS**

**UP TO 40 PERCENT REDUCTION IN TOYOTA'S NORTH AMERICAN GHG EMISSIONS**

## Water Target

### Conserving Water

### Supporting Community Efforts



# WATER

“Water” is one of Toyota’s four focus areas in North America. Our approach to water stewardship addresses Challenge 4 of the Toyota Environmental Challenge 2050 and emphasizes **conserving water** and **raising awareness in our communities** about water issues. Every living thing needs water to survive. Our actions today to protect this precious resource create lasting value and build a better tomorrow for us and the planet.



**HOW DO WE USE LESS WATER?**  
We find ways to conserve, especially in our manufacturing processes. Each year, we use fewer and fewer gallons to produce a vehicle, which is really important in water-stressed areas, such as California, Texas and Mexico.

## WATER TARGET

Between fiscal years 2017 and 2021, Toyota Motor North America (TMNA) will:

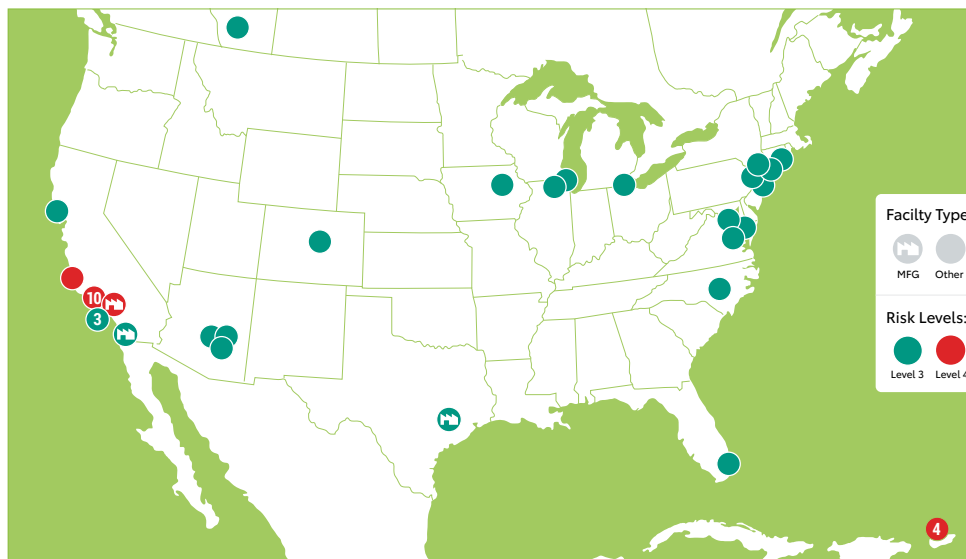
### **Challenge 4 (Conserve Water): Prioritize and implement water stewardship plans for facilities in water-stressed areas (on track)**

TMNA's water stewardship strategy focuses on facilities located in areas of water risk. We define water risk according to Aqueduct™, a tool developed by the World Resources Institute to help companies, investors, governments and communities better understand where and how water risks are emerging around the world. The centerpiece of Aqueduct is the Water Risk Atlas, which combines 12 indicators in three categories (physical risk quantity, physical risk quality, and regulatory and reputational risk) to create an overall map of where and how water risks may be prevalent.

We have mapped all our North American locations (manufacturing plants, offices and parts and vehicle distribution centers). The Atlas shows 16 of Toyota's North American locations in areas of "high" overall water risk (Level 4) and 25 in areas of "medium to high" risk (Level 3). Currently, we do not have any sites in areas of "extremely high" risk (Level 5).

In fiscal year 2019, 3 percent of the water Toyota withdrew in North America was at sites in areas of high water risk (Level 4), as defined by the Water Risk Atlas. We continue to work on developing water stewardship plans at our highest risk sites. These plans will address water conservation (including potentially absolute water reduction targets), water quality, and outreach activities with suppliers and local communities.

TOYOTA'S OVERALL WATER RISK IN NORTH AMERICA



This map was generated using data from WRI's Aqueduct™ Water Risk Atlas. The Atlas creates an overall map of where and how water risks may be prevalent. We mapped all our North American locations. We show on the map the sites in two risk categories: "high" (Level 4) and "medium to high" (Level 3). We do not have any sites in the "extremely high" (Level 5) category. Circles with numbers inside indicate multiple facilities of that type; the map is too small to show each site in that area.

## CONSERVING WATER

During fiscal year 2019:

- Toyota **withdrew** almost 1.81 billion gallons of water at more than 100 North American facilities, including assembly and unit plants, parts and vehicle distribution centers, R&D sites and offices. Only 3 percent of water withdrawal occurred in an area of high water stress, identified as level four in the Water Risk Atlas. We do not currently have any sites located in an area of “extremely high risk” (level 5).
- More than 94 percent of this water came from municipal **sources** (both fresh and recycled water from utilities); other sources included surface water bodies, groundwater and rainwater.
- We estimate 1.1 billion gallons were **discharged**, either to surface waters or to municipal utilities.
- **Consumption** (defined as withdrawal minus discharge, or the water that was not returned to either a municipal utility or surface or ground water) was 671 million gallons.
- Our North American manufacturing plants **recycled or reused** 565 million gallons, which is 31 percent of our total withdrawal. Recycled and reused water includes recycled wastewater and water recycled (instead of rejected) through a reverse osmosis system.
- **Water intensity** – gallons of water withdrawn per vehicle produced – was 982 gallons. Water withdrawn includes water used at both production and non-production sites.

Examples of **water conservation activities** included the following:

- Toyota’s research and development facility in Ann Arbor, Michigan, began collecting storm water in a retention pond to use for irrigation. Before installing the pond, all irrigation water was drawn from a groundwater well. Now, up to 6.6 million gallons from the retention pond may be used for irrigation in the summer months.
- Our aluminum casting plant in Jackson, Tennessee, is replacing nearly 85,000 gallons per year of municipal water with rainwater. Rainwater is captured from the outdoor holding tank farm, fed through a bag filter, then routed to the plant’s cooling water holding tank. The captured rainwater is ultimately used to cool the die cast machines and quench parts.
- At the vehicle assembly plant in Georgetown, Kentucky, team members now turn off the reverse osmosis system when it’s not being used. This saves about 30 gallons of water per vehicle, or about 15 million gallons annually.

In addition to efforts to use less water, water quality monitoring is another key component of Toyota’s approach to water stewardship. Some of our sites discharge wastewater that we monitor and treat to meet local, state and federal regulations and to ensure we don’t negatively impact water bodies. In fact, Toyota, as part of our enhanced environmental management system, requires all manufacturing sites to operate below discharge permit limits by an average of 20 percent. There were no unplanned discharges of wastewater that adversely affected water bodies during fiscal year 2019, and no water bodies were adversely affected by Toyota’s wastewater discharges.

→ See ["Water" on page 76](#) for water performance data.



## SUPPORTING COMMUNITY EFFORTS

Toyota supports community efforts to educate individuals and families about water conservation and the importance of protecting water resources. These activities help scale up conservation efforts and make positive outcomes more impactful.

- For the eighth consecutive year, the Wyland Foundation and Toyota presented the **National Mayor's Challenge for Water Conservation**. The campaign generated hundreds of thousands of pledges from people across the U.S., who committed to saving 3 billion gallons of water over the next year. See the full story: ["National Environmental Education Foundation"](#).
- Through its inaugural Drive4Five Campaign, Toyota awarded an impact grant to the **Huron River Watershed Council (HRWC)** to offer environmental science, technology, engineering and math (STEM) programming through place-based, hands-on learning. Over 1,500 high school students from 15 schools across southeast Michigan will participate in the STEM program and river water cleanup in the 2019-2020 school year. Students will learn freshwater science, including how to test for water quality indicators in their home streams, applying lessons from math, biology, ecology and chemistry. The program will also offer students opportunities to snorkel in the river to collect scientific data alongside professionals. Ultimately, this program will help students understand the importance of river health and what they can do to improve and protect it.
- Team members from Toyota Motor Manufacturing Mississippi (TMMMS) regularly volunteer their time to conduct water sampling experiments and teach area students about water stewardship. For example, at the beginning of the 2018-2019 school year, a Toyota mentoring team worked with 25 Pontotoc County students in grades 7-12 on a water experiment as part of **Project H.O.P.E.**, an afterschool program. Team members brought water quality testing equipment while the students donned gloves and safety glasses and made observations about the quality of different water samples.
- Team members from TMMMS also worked with fourth graders from Pontotoc, Union and Lee counties on a water experiment in May of 2019 as part of **4-H's Science, Engineering and Technology Day** at Tombigbee State Park. Team members explained how water is recycled at the Toyota assembly plant in Blue Springs and how metals from car painting activities are removed from the wastewater. The water experiment raises awareness about the importance of conserving water and protecting water resources. This program, which is fully funded by TMMMS, is the product of an ongoing partnership between Mississippi State University, Toyota and 4-H to enhance water conservation efforts across the state.



Team members from Toyota's assembly plant in Mississippi volunteer at an afterschool program that focuses on life-skills education for students ages 13 to 18. Team members worked on a water sampling experiment to raise awareness about the importance of conserving water and protecting water resources.

## MATERIALS

**Materials Target**

**Sustainable Materials**

**Eliminating Waste**

**Supporting Community Recycling**



# MATERIALS

“Materials” is one of Toyota’s four focus areas in North America. Materials include everything we use, from the raw materials that become vehicles, to the office furniture and cafeteria supplies we rely on every day, to the waste we recycle or dispose. Our materials strategy addresses Challenge 5 of the Toyota Environmental Challenge 2050, which calls on us to support a recycling-based society. We do that by **using sustainable materials, eliminating waste** and **supporting community recycling**. Everything we do today to better manage materials builds a cleaner, healthier future.



HOW DO WE  
REDUCE WASTE?  
We emphasize  
recycling at all  
of our locations,  
from the largest  
manufacturing site  
to the smallest  
office. We even  
recycle waste  
from construction  
projects. Everyone  
plays a role in  
making sure  
material stays out  
of the trash.

## MATERIALS TARGET

Between fiscal years 2017 and 2021, Toyota Motor North America (TMNA) will:

### **Challenge 5 (Support a Recycling-Based Society): Reduce the use of packaging material (on track)**

When shipping vehicle parts, automotive companies and their suppliers use a variety of packaging types to prevent damage and maximize warehouse space.

One way Toyota has reduced packaging is through the use of returnable shipping containers. Across North America, Toyota uses returnable packaging modules and racks for shipping parts between suppliers, distribution centers, plants and dealerships. These returnable containers take the place of thousands of wooden pallets and cardboard boxes.

Toyota Motor Manufacturing Canada (TMMC) is converting low-end plastic scrap into beautiful, durable outdoor furniture. Low-end plastic waste streams, such as plastic caps and poly film trays used as packaging, were largely disposed of using “energy from waste” services at a cost. Now, TMMC has found a better way. Green Metals Canada Inc., a Toyota Group Company, partnered with Rivalries Inc. to create outdoor wood-grain embossed deck furniture made from a combination of postindustrial and post-consumer plastic waste. The current prototype Muskoka chairs are manufactured using 100 percent recycled plastic and contain up to 60 percent plastic scrap from TMMC.

## SUSTAINABLE MATERIALS

Over the course of a vehicle’s life cycle, sustainable materials – those that are renewable, recyclable or are made of recycled content – have a smaller greenhouse gas footprint and generate less waste than their alternatives. We continue to develop and commercialize technologies that enable the use of sustainable materials in a range of components and applications. For example:

- **Bio-based plastics** — plastics derived either wholly or in part from plant materials — are used in the seat cushions in Toyota Prius, Corolla and RAV4, and in Lexus RX 350.
- **Post-industrial garment clippings** made of cotton and synthetic fibers are used in door panel insulation, floor silencer and floor mats.
- **Isopropyl alcohol** is used instead of a chemical solvent at the vehicle processing center in Toronto to clean bumper protectors prior to installation.

In addition to sustainable materials, we also look for alternatives to **rare earth metals**, which are necessary components in hundreds of products across a wide range of applications, especially high-tech consumer products like electric vehicles. The mining of rare earth metals can have negative environmental and social consequences. Our parent company, Toyota Motor Corporation, has developed a magnet used in electric vehicle motors that replaces up to 50 percent of the neodymium, a rare earth metal, with more abundant and cheaper lanthanum and cerium. Toyota expects the magnets to be used in electric vehicles and other applications in the first half of the 2020s.

## ELIMINATING WASTE

Waste (both hazardous and non-hazardous) generated by our North American facilities totaled 812.5 million pounds in calendar year 2018. Only 1.6 percent was sent to landfills for disposal. (For certain waste streams, landfill disposal is required by law.) We recycled, reused or composted 93 percent and sent 5.4 percent to waste-to-energy, fuels blending or incineration facilities.

We continue to focus on recycling both production and office waste. Many of our plants, including our assembly plant in Indiana, as well as our new corporate headquarters in Plano, Texas, are updating their recycling programs to capture even more streams for recycling and composting, and to make it easier for team members to know what can and can't be recycled. Our aluminum casting plant in Troy, Missouri, has switched from segregation to single-stream recycling stations, which greatly reduces the risk of recycling streams becoming contaminated with trash.

Examples of projects that minimize waste include the following:

- During the past two years, eight of Toyota's U.S. parts distribution centers have been using Shark Solutions to recycle 117,000 pounds of broken windshields that are damaged in our supply chain. Shark is the only recycler we've found to find a valuable use for the safety film, made of polyvinyl butyral (PVB), in the windshield. Typically, the glass is separated from the film and the film is disposed. Now, both the film and the glass are recycled: The safety film is used in carpet backing and other products, while the glass is usually turned into insulation. Shark Solutions has been selected to be part of the SDG Accelerator, a United Nations program funded by the Danish Industry Foundation and implemented in partnership with Monitor Deloitte, aimed at accelerating business solutions that address the challenges embedded in the Sustainable Development Goals (SDGs). As part of the SDG Accelerator, Shark Solutions is working to establish a larger sustainable sourcing model to collect broken windshields. The company continues to expand in the Americas and Europe, with an additional focus on markets in India, China, South Korea, Japan and Thailand.
- Toyota Motor Manufacturing Kentucky (TMMK) eliminated three waste streams:
  1. 7,900 headliners are no longer incinerated per year because team members improved the installation process and eliminated defects.



Toyota's Canadian assembly plant in Cambridge, Ontario, developed a new cleaning agent to clean the robots in the paint booth between colors. The new solvent/water mix uses 43,000 liters (11,300 gallons) less solvent than the previous version and reduces the number of bumpers that need to be recycled in half.

For more details, please see the story [here](#).

## ELIMINATING WASTE CONTINUED

2. 750 rocker panels – stamped steel pieces located along the sides of the vehicle between the front and rear wheel well openings – are no longer disposed per year because the transfer process between the assembly line and the plastics shop was improved.
  3. Team members worked with a supplier to strengthen the tabs on headlights to keep them from breaking during installation, which keeps about 276 headlights out of the waste stream annually.
- Team members at Toyota Motor Manufacturing Texas (TMMTX) are filtering and reusing tire lube, used for attaching tires to the wheels, and saving 145,000 pounds of material annually. This is one of many projects that showcases the assembly plant's commitment to conserving natural resources and following recycling best practices, which earned TMMTX the 2018-2019 Gold ReWorksSA Recycling Certification. See ["Awards"](#) for more information.

→ See ["Waste"](#) for waste performance data.

→ Toyota Canada won an award for vehicle battery recycling – for more information, see ["2018 Green Award Of Excellence"](#).

## SUPPORTING COMMUNITY RECYCLING

The best way for us to help create a net positive impact on the environment is to share our expertise with others. That's why team members participate in community events that help spread the word about the environmental and cost benefits of reducing, reusing and recycling.

### HOUSEHOLD WASTE COLLECTION EVENTS

Since 1994, Toyota has helped team members and communities recycle and properly dispose of household waste. During designated collection days, team members and residents from surrounding communities are invited to drop off electronic waste, appliances, paint and other household items that are difficult to recycle or dispose. Team members also collect items such as clothing and eyeglasses that can be donated to those in need.

Several sites in the U.S. and Canada have been hosting these events for several years and together, they have ensured more than 2.2 million pounds of material have been recycled or properly disposed. Recent events include:

- Toyota's assembly plant in Georgetown, Kentucky, hosted a collection event in May 2019 for team members and residents from surrounding communities in partnership with the city of Georgetown, Scott County and Green Metals, Inc. More than 846 vehicles came to the plant to drop off 177,000 pounds of household and electronic waste as well as documents for shredding and recycling.
- Toyota's assembly plant in Princeton, Indiana, hosted household waste and recycling days for team members and Gibson County residents in October 2018 and April 2019. In addition to fluorescent light bulbs, paints, pesticides and other household items, more than 550 vehicles stopped by to drop off over 500 pounds of household batteries, 900 gallons of used oil, 5 gallons of medicine, and 7 box trucks of used electronics. Between the two events, almost 59,000 pounds of waste were collected and recycled or properly disposed.



## HOUSEHOLD WASTE COLLECTION EVENTS CONTINUED

- Toyota's aluminum casting plant in Troy, Missouri, participated in a recycling event with the city. Team members helped to collect 18,600 pounds of electronic waste from community members.
- Toyota's powertrain plant in Huntsville, Alabama, collected 2,320 pounds of household waste from team members during an Earth Month collection event.
- Toyota's assembly plants in Cambridge and Woodstock, Ontario, hosted their seventh electronic waste drop-off for team members during Earth Month (April) 2019 and collected 6,200 pounds (2,800 kilograms).
- Toyota Canada's head office in Toronto and Quebec regional office held events in June 2019 and collected 2,000 pounds of electronic waste and 1,500 pounds of donations.

## ANN ARBOR FESTIVAL FOOTPRINT INITIATIVE



The Ann Arbor Summer Festival (A2SF) is one of the largest public multi-arts gatherings in the state of Michigan, attracting an estimated 80,000 people to the campus of the University of Michigan and downtown Ann Arbor over three and a half weeks. In partnership with Toyota, A2SF created the Festival Footprint Initiative to transform the festival into a zero-waste event. Festival goers also learned about various environmental initiatives from local nonprofits at the Festival Footprint Learning Center tent.

The Ann Arbor Summer Festival (A2SF) is one of the largest public multi-arts gatherings in the state of Michigan, attracting an estimated 80,000 people to the campus of the University of Michigan and downtown Ann Arbor over three and a half weeks. In partnership with Toyota, A2SF began the Festival Footprint Initiative with a goal of transforming the event over the next two to three years into a zero-waste event.

In 2019 – the first year the Festival Footprint Initiative was implemented – the results were remarkable. In only one year, the festival went from landfilling 100 percent of waste, to diverting over 75 percent to compost and recycling. Festival goers utilized three-stream waste receptacles and learned about various environmental initiatives from local nonprofits at the Festival Footprint Learning Center tent. All A2SF food vendors and caterers were compliant with requirements to only offer compostable containers, utensils and serve ware. Additionally, with the support of the City of Ann Arbor A2H2O program, the festival implemented water stations to reduce plastic water bottle usage. The sizeable reduction in

the event's environmental footprint after only one year demonstrates a major commitment to improving the environment by the festival and Toyota.

**Biodiversity Targets**

**Protecting Species**

**Supporting Conservation Education**





# BIODIVERSITY

“Biodiversity” is one of Toyota’s four focus areas in North America. Biodiversity refers to the variety and interdependence of species and ecosystems and the natural patterns they form. Our biodiversity strategy addresses Challenge 6 of the Toyota Environmental Challenge 2050 by **protecting vulnerable species** and **raising awareness** about the importance of conservation. We are committed to operating in harmony with the environment and building healthy ecosystems so that future generations may continue to enjoy the natural wonders of our world.



HOW DO WE PROTECT BIODIVERSITY?  
Toyota’s Biodiversity efforts minimize the disruption of natural habitats and proactively support local species. This is especially important as we plan, construct and manage our facilities across North America.

## BIODIVERSITY TARGETS

Between fiscal years 2017 and 2021, Toyota Motor North America (TMNA) will:

### Participate in regional biodiversity activities that support wildlife corridors (on track)

Seventeen Toyota sites across North America have planted pollinator gardens to nurture monarch butterflies and other pollinator species. All 17 gardens are along the monarch migration path. The gardens provide food and shelter to the butterflies at various stages of their life cycle as they make their way south for the winter, then return in the spring.

- The assembly plant in Cambridge, Ontario
- The assembly plant in Woodstock, Ontario
- The assembly plant in Princeton, Indiana
- The assembly plant in Georgetown, Kentucky
- The assembly plant in Blue Springs, Mississippi
- The assembly plant in San Antonio, Texas
- The aluminum alloy wheel plant in Delta, British Columbia
- The powertrain plant in Huntsville, Alabama
- The powertrain plant in Buffalo, West Virginia
- The aluminum casting plant in Jackson, Tennessee
- The aluminum casting plant in Troy, Missouri
- The production engineering and manufacturing center in Georgetown, Kentucky
- TMNA's headquarters campus in Plano, Texas
- Toyota Canada's head office in Toronto, Ontario
- The Supplier Center in York Township, Michigan
- The R&D facility in Ann Arbor, Michigan
- The parts distribution center in Boston, Massachusetts

TOYOTA AND THE MONARCH MIGRATION



The monarch is the only butterfly known to make a two-way migration. Monarchs from the eastern part of North America migrate to the Sierra Madre Mountains in Mexico, while those from west of the Rocky Mountain range overwinter in California. Some migration routes are as long as 3,000 miles. It can take as long as two months for a monarch to complete the journey south.

Toyota hopes to help the monarchs by offering these colorful commuters a "pollinator pit stop" on their trip south in the Fall and north in the Spring. Toyota has 17 facilities with pollinator gardens located along the monarch's migration pathway.

## BIODIVERSITY TARGETS CONTINUED



Team members at Toyota Canada's head office in Toronto planted a pollinator garden in April 2019 as part of Earth Month and were excited to see monarch butterflies visiting the milkweed only a few months later!

New gardens that support monarchs and other pollinators planted recently include four gardens planted at the R&D facility in Ann Arbor, Michigan; a garden planted at the aluminum alloy wheel plant in Delta, British Columbia; and a garden planted at Toyota Canada's head office.

## PROTECTING SPECIES

We have transitioned from landscaping to habitat management as a way to support native species. We focus on the species that call our sites home.

- See "[Endangered And Protected Species](#)" for a list of endangered and protected species found at or near our sites and what we do to protect them.
- See "[Protected Areas/ Critical Habitat](#)" for a list of TMNA sites in or near a protected area, critical habitat or biodiversity hotspot.

## WILDLIFE HABITAT COUNCIL

Pollinators come in different shapes and sizes, from bees to birds, bats and butterflies. They move pollen from the male to the female part of a flower to fertilize the plant. These industrious creatures pollinate more than flowers. A variety of food crops, like apples, pumpkins and alfalfa, rely on honeybees for pollination.

With more than 21,000 acres of land in North America, Toyota is dedicated to doing our part to support pollinator species. Twelve of our larger sites maintain pollinator gardens as part of conservation programs certified by the Wildlife Habitat Council® (WHC). WHC partners with corporations, fellow conservation

## PROTECTING SPECIES CONTINUED

organizations, government agencies and community members to empower and recognize wildlife habitat and conservation education programs. WHC's certification standard, Conservation Certification, recognizes meaningful wildlife habitat management and conservation education programs.

Our partnership with WHC began in 1999 when Toyota joined WHC's membership. In 2008, the conservation program at our Kentucky assembly plant became Toyota's first WHC certification. WHC helps us inventory plant and animal species on our sites and identify appropriate projects. Our protected areas include grassland, wildflower meadows, pollinator gardens and forests.

During 2019, several sites enhanced their certified programs. For example:

- Four new native flower gardens were planted at the assembly plant in Kentucky.
- Approximately 2,500 native perennials were planted as pollinator habitat at the front entrances of the assembly plant in Cambridge, Ontario.
- The aluminum casting plant in Troy, Missouri, worked with a Missouri Master Naturalist to double the size of the pollinator garden.
- Team members at the Supplier Center in York Township, Michigan, planted a 500 square-foot wildflower meadow.
- Team members at the powertrain plant in Alabama participated in a planting activity during Earth Month celebrations that expanded the existing pollinator garden.

→ See ["P04 / Wildlife Habitat Council Conservation Certifications"](#) for a list of TMNA sites with programs certified by the Wildlife Habitat Council.

## SUPPORTING CONSERVATION EDUCATION

Supporting community initiatives helps to scale up conservation efforts. In the communities where we live and work, we focus our efforts on building knowledge and fostering a love of nature in children through school programs. Allowing youngsters to experience wildlife and learn about biodiversity at an early age helps them understand the value of biodiversity and the importance of protecting it.



During Earth Week 2019, Toyota's assembly plant in Indiana hosted Earth Aware Camp at Camp Carson in Princeton and Wesselman Woods Nature Preserve in Evansville. Team members shared their knowledge of all things environmental with third graders, who spent a day doing activities and games designed to teach them about environmental responsibility. Mesker Park Zoo brought its "Going, going, gone" animal exhibit to share with the kids what impacts humans have on animals and their habitats.



Team members from Toyota's assembly plant in San Antonio, Texas, partnered with the San Antonio Zoo to host a Learning Garden Party for 50 fifth graders from Southwest Independent School District. Students had the opportunity to learn about conservation at five learning stations: Honeybees, General Pollinators, Bats, Horned Lizards, and Planting Pollinator Seeds.

**Net Positive Impact**

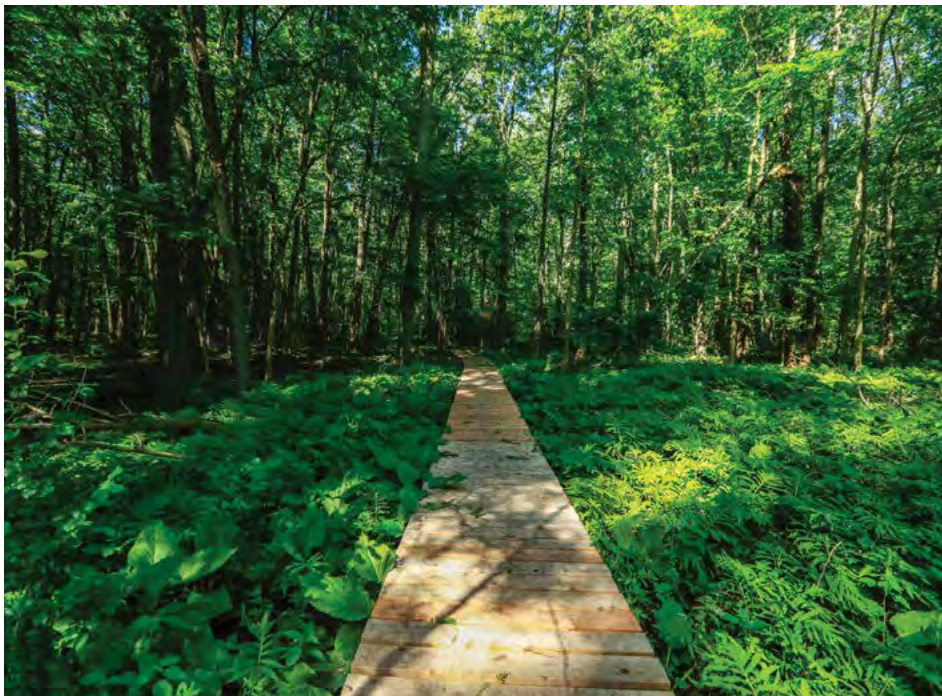
**Communities & Nonprofits**





# OUTREACH

“Outreach” is a core element of Toyota’s approach to our four main focus areas in North America. We conduct outreach activities related to Carbon, Water, Materials and Biodiversity as a way of **creating a net positive impact**. By **collaborating with various stakeholders**, our actions harness the power of partnerships to advance us beyond building better cars – we are building connections that are helping to shape a more sustainable future.



WE KNOW TO REALLY MAKE A DIFFERENCE, we must work with others and share our know-how. We support a variety of outreach projects that align with our key focus areas of Carbon, Water, Materials and Biodiversity. Through the power of collaboration, our actions harness the power of partnerships to help us shape a more sustainable future.

## NET POSITIVE IMPACT

Outreach with our stakeholders, such as "[Dealers](#)", "[Suppliers](#)", "[Communities & Nonprofits](#)", is a crucial component of our environmental sustainability strategy. Through outreach, we create mechanisms for building on the successes of our environmental programs and scaling up the outcomes.

We can act locally and make a difference globally.

We acknowledge that a stronger commitment to partnership and collaboration is needed to address the world's environmental challenges successfully. Across our diverse set of partnerships, we are taking steps to build a path to achieving the Toyota Environmental Challenge 2050 and a net positive impact. Through the power of collaboration, we hope to create lasting positive outcomes on a macro scale that will help us build a more sustainable future.

In addition to our community and nonprofit partnerships described below, Toyota Motor North America is also a member of two U.S. EPA partnerships: **SmartWay Transport Partnership** ([page 18](#)) and **Suppliers Partnership for the Environment** ([page 24](#)).

## COMMUNITIES & NONPROFITS

TMNA supports local and national community projects that align with our core focus areas of Carbon, Water, Materials and Biodiversity. By concentrating our support on organizations that address challenges in these four areas, we are building on our environmental commitment beyond minimizing negative impacts and helping to promote positive environmental change across the North American region. We share our know-how and collaborate so that we can build more than great cars – we are building a better tomorrow by harnessing the power of collective action.

TMNA team members participate on the Boards of Directors or Executive Committees of several nonprofit organizations, such as Yellowstone Forever, Kentucky Fish & Wildlife Foundation, "[National Environmental Education Foundation](#)", "[Wildlife Habitat Council](#)" and Environmental Media Association. TMNA is also a member of the National Council of World Wildlife Fund (WWF), an advisory group to WWF's Board of Directors in the U.S.

→ See also "[Supporting Community Efforts](#)" for information on Toyota's local partnerships in Michigan and Mississippi.



## COMMUNITIES & NONPROFITS CONTINUED



For the fourth consecutive year, team members from Toyota Canada's head office participated in the WWF CN Tower Climb for Nature. The CN Tower Climb challenges participants to climb the 1,776 stairs of Toronto's tallest tower. In 2019, Toyota's team of 33 raised more than CAN\$5,000 to support nature and wildlife in Canada and across the globe.

## ECS YOUNG INVESTIGATOR FELLOWSHIP

The ECS Toyota Young Investigator Fellowship is a partnership between the Electrochemical Society (ECS) and Toyota Research Institute of North America (TRINA), a division of Toyota Motor North America R&D. The fellowship encourages young professors and scholars to pursue research in green energy technology that may promote the development of next-generation vehicles capable of utilizing alternative fuels.

Electrochemical research has already informed the development and improvement of innovative batteries, electrocatalysts, photovoltaics and fuel cells. Through this fellowship, ECS and Toyota hope to see further innovative and unconventional technologies borne from electrochemical research.

The selected fellows receive restricted grants of \$50,000 to conduct the research outlined in their proposals within one year. They also receive a one-year complimentary ECS membership as well as the opportunity to present and/or publish their research with ECS.

Each year, fellows deliver presentations to Toyota, discussing the overall scope of the research before participating in breakout sessions, where the winners meet with specific research groups that are more directly connected to their topical areas. During these sessions, the fellows learn about some of the research being developed at Toyota, connecting fundamental work to applied research.

## ECS YOUNG INVESTIGATOR FELLOWSHIP CONTINUED

The ECS Toyota Young Investigator Fellowship Selection Committee chose five recipients to receive the 2019–2020 fellowship awards for projects in green energy technology:

- Professor Jennifer L. Shaefer, University of Notre Dame
- Professor Neil Dasgupta, University of Michigan
- Professor Kelsey Hatzell, Vanderbilt University
- Professor Nemanja Danilovic, Lawrence Berkeley National Laboratory
- Dr. Zhenhua Zeng, Purdue University

Now in its fifth year, the ECS Toyota Young Investigator Fellowship is an annual program; the 2020–2021 request for proposals was issued in the fall of 2019.

## LEXUS ECO CHALLENGE

More than 2,300 students in grades 6–12 participated in the 12th annual Lexus Eco Challenge, an educational contest that empowers students to learn about the environment and take action to improve it. Each year, a total of \$500,000 in scholarships and grants is awarded to the winning student teams, their teachers and schools.

Through the first two phases of the Lexus Eco Challenge, 32 middle and high school teams were selected as finalists. Each finalist earned a \$10,000 prize to be shared among the team, teacher and school, and was invited to embark on the final challenge to reach beyond their local community to inspire environmental action. The teams communicated their innovative ideas to a wide audience in the last round, broadening the reach of their work to people outside their communities.

Lexus and Scholastic, the global children's publishing, education and media company, reviewed the finalists' innovative submissions and selected one middle and one high school team as the 2018–19 Lexus Eco Challenge Grand Prize winners. The Grand Prize-winning teams each received an additional \$30,000, divided into a \$7,000 grant for the school, a \$3,000 grant for the team's teacher advisor, and \$20,000 in scholarships for the students to share. Eight First Place-winning teams were awarded an additional \$15,000 in grants each.

## LEXUS ECO CHALLENGE CONTINUED



This year's high school Grand Prize-winning team was the Aquapals from Arlington High School in Lagrangeville, New York. The Aquapals and teacher advisors Tricia Muraco and Maribel Pregnall focused on utilizing aquaponic farming techniques to reduce polychlorinated biphenyls (PCBs). From their research, the students generated a 35-page manual for aquaponic farming, which they shared with local students and legislators to encourage change within the Hudson River Valley. After establishing five aquaponic systems and presenting to over 1,000 students close to home, they turned their attention abroad, collaborating with 14 farmers in eight countries.



The Grand Prize-winning middle school team was Food Miles Matter from North Broward Preparatory School in Coconut Creek, Florida. With the help of teacher advisor Hope Kennedy, the team tackled the problem of greenhouse gas emissions generated by interstate produce transport. Looking to eliminate "food miles" generated by trucked produce from the diets of their classmates, the team partnered with their school cafeteria staff to identify and grow fresh produce in the school garden, just feet from where it would be eaten.

## NATIONAL ENVIRONMENTAL EDUCATION FOUNDATION

Toyota has been partnering with the National Environmental Education Foundation (NEEF) for 25 years. NEEF partners with local organizations across the nation to connect people of all ages and abilities with public lands for recreation, hands-on learning and community-building.



## NATIONAL PUBLIC LANDS DAY

For the 20th consecutive year, Toyota was the national corporate sponsor of National Public Lands Day (NPLD), hosted by NEEF. Held every September, NPLD is the largest single-day volunteer effort for public lands in the U.S. It is a celebration of the work, play and learning that takes place on public lands every day and offers everyone an opportunity to help maintain these special places.

For NPLD 2018, Toyota had 50 projects planned across 20 states and Puerto Rico, and expected more than 3,000 team members to volunteer. Additionally, Toyota provided the support for nearly 2,000 additional community projects across the nation.

## RESTORATION & RESILIENCE GRANTS

Extreme weather events have been grabbing headlines with increasing frequency. Whether a hurricane, tornado or flood, communities face the challenge of recovering from the damage and preparing for potential repeats. Nonprofit organizations are taking a larger role in helping communities rebound, and restoring their access and enjoyment of local public lands is an important component. To support these efforts, NEEF, with sole funding support from Toyota Motor North America, awarded \$200,000 in Restoration & Resilience Grants in 2018 to support the work of nonprofit organizations on public lands impacted by natural disasters.



## RESTORATION & RESILIENCE GRANTS CONTINUED

"These grants are part of a sustained effort, which kicked off on National Public Lands Day, to restore and fortify public lands affected by natural disasters and extreme weather," said Meri-Margaret Deoudes, CEO and president of NEEF.

The grants range from \$14,000 to \$20,000 per site, and projects are required to mobilize local volunteers and educate them on the impact of their actions on the long-term sustainability of the lands.

"Focusing on the resiliency and sustainability of public lands not only benefits those lands but also the surrounding communities," said Kevin Butt, regional director, Toyota Environmental Sustainability.

"For 25 years, we have partnered with NEEF to build capacity and scale up efforts of nonprofits conducting this important environmental work throughout the U.S."

Grantees are required to provide interim reports during the grant period. As of the middle of 2019, the 10 nonprofit grant recipients reported the following progress:

- 301 acres of land restored or enhanced
- 18,920 square feet of invasive species removed
- 6,960 pounds of trash collected
- 25 miles of trail restored or maintained
- 300 native trees planted

Grants were given to the following groups:

### HURRICANES

- The **Big Thicket Natural Heritage Trust in Kountze, Texas**, received funds to remove large debris and trash left by Hurricane Harvey from the bayou that runs through the Big Thicket National Preserve.
- The **Timucuan Trail Parks Foundation in Jacksonville, Florida**, will use the funds to hold service learning projects throughout the Timucuan State and National Parks of Jacksonville focusing on how healthy salt marshes and coastal ecosystems can mitigate impacts of future hurricanes.
- The **Fundación Amigos de El Yunque in San Juan, Puerto Rico**, will use the funds to restore the El Toro Trail, one of only two trails in the El Yunque National Forest that has been re-opened to the public since the destruction from Hurricanes Irma and Maria.
- **The Student Conservation Association** will put the funding towards a collaborative project with the Houston Independent School District's Furr Institute for Innovative Thinking to work with students to identify, map and eradicate invasive species that have propagated in the Herman Brown Park in Houston, Texas, since Hurricane Harvey.

### FIRES

- **The Northwest Youth Corps in Eugene, Oregon**, will use funding to expand volunteer efforts to improve nearly 15 miles of trails in the Columbia River Gorge National Scenic Area and Mt. Hood National Forest, damaged by last year's massive Eagle Creek Fire.
- **The Mountain Studies Institute in Silverton, Colorado**, will use the award to create a resilience action plan, conduct community outreach and organize volunteer activities for the Hermosa Creek and Animas River areas near Durango, Colorado, which are recovering from the 416 Fire.

## RESTORATION & RESILIENCE GRANTS CONTINUED

### DROUGHTS

- **The Land Trust of North Alabama in Huntsville, Alabama**, will use funding to restore 2.3 miles of the Bluff Line Trail on the Monte Sano Nature Preserve, one of the largest urban nature preserves in the US.
- **The Arizona Trail Association in Phoenix, Arizona**, will put funds towards fabricating and installing a 2,500 gallon water catchment system on one of the driest sections of the Arizona Trail near Pinal County, improving local access to public lands and water reliability.

### TORNADOES AND FLOODS

- The **Shawnee Resource Conservation and Development Area, Inc. in Golconda, Illinois**, will put funds towards a public awareness campaign on the impact of invasive species and the decline of pollinator habitat after a tornado swept through the northwest portion of the Shawnee National Forest in Herod, Illinois.
- The **Southern Appalachian Wilderness Stewards (SAWS) in Asheville, North Carolina**, will use the funding to support specialized recovery efforts in the Cohutta Wilderness area, a remote, rugged section of the Chattahoochee National Forest, in Sucre, Georgia, after severe flood damage.

## NATIONAL MAYOR'S CHALLENGE FOR WATER CONSERVATION

In 2019, residents from cities across the United States took part in the eighth annual Wyland National Mayor's Challenge for Water Conservation by committing to save over 3 billion gallons of water over the next year. Residents around the nation made 740,143 pledges to change behaviors ranging from fixing home leaks to reducing harmful runoff into local rivers and streams.

The month-long campaign, held in April, was presented by the Wyland Foundation and Toyota, with support from the U.S. EPA; National League of Cities; The Toro Company; Earth Friendly Products – maker of ECOS; Ecosystems, LLC; and Conserva Irrigation. The challenge addresses the growing importance of educating consumers about the many ways they use water.

Mayors from 35 states vied to see whose city could be the nation's most "water wise." The cities with the highest percentage of residents making pledges during the campaign were Rexburg, Idaho; Palm Coast, Florida; Athens, Georgia; Tucson, Arizona; and Columbus, Ohio.

In addition to reducing overall water waste, challenge participants in 50 states pledged to reduce the use of 8.6 million single-use plastic water bottles and eliminate 179,000 pounds of hazardous waste from entering watersheds. By altering daily lifestyle choices, pledges also resulted in potentially 80 million fewer pounds of waste going to landfills. Potential savings of 22.6 million gallons of oil, 12.9 billion pounds of carbon dioxide, 196 million kilowatt-hours of electricity, and \$39.6 million in consumer cost savings rounded out the final pledge results.

## PERFORMANCE

**Awards**

**Air Quality**

**Biodiversity**

**Carbon**

**Compliance**

**Dealers**

**Environmental  
Management Systems**

**Green Building**

**Materials**

**Water**



# PERFORMANCE

In this section, we provide data related to TMNA's environmental performance.



PROOF OF  
TOYOTA'S  
ENVIRONMENTAL  
LEADERSHIP is  
in our first-class  
performance,  
year after year.  
And in our action  
plans. We are  
always honest  
and authentic  
about where we  
are and where  
we're headed.



## AWARDS

### 2019 AIR POLLUTION CONTROL ACHIEVEMENT AWARD

In 2019, Toyota Motor Manufacturing Alabama (TMMAL) won its 12th City of Huntsville Air Pollution Control Award for installing larger capacity motors and variable frequency drives on cooling system pumps and fans for air compressors and compressed air dryers. These improvements resulted in annual energy savings of 413 megawatt-hours, enough to power 23 homes in the Huntsville area for one year.

### 2019 CANADA'S GREENEST EMPLOYERS

Toyota Motor Manufacturing Canada (TMMC) was recognized as one of Canada's Greenest Employers for 2019. Now in its 12th year, Canada's Greenest Employers is an editorial competition that recognizes employers leading the nation in creating a culture of environmental awareness. Winning employers, selected by editors of Canada's Top 100 Employers, are evaluated using four main criteria:

1. Unique environmental initiatives or programs they have developed;
2. Whether they have been successful in reducing their own environmental footprint;
3. Whether their employees are involved in these programs and contribute unique skills; and
4. Whether their environmental initiatives have become linked to the employer's public identity, attracting new employees or customers.

### 2018-2019 GOLD REWORKS SA RECYCLING CERTIFICATION

Toyota Motor Manufacturing Texas (TMMTX) earned the 2018-2019 Gold ReWorksSA Recycling Certification. ReWorksSA, a division of the San Antonio Solid Waste Management Division, celebrates businesses that are committed to a high level of sustainable materials management. TMMTX has implemented many projects showcasing the assembly plant's commitment to conserving natural resources and following recycling best practices.

### 2018 EPA ENERGY STAR BUILDING CERTIFICATIONS

Four Toyota buildings were certified by U.S. EPA's ENERGY STAR program in 2018. To be eligible for ENERGY STAR certification, a building must meet strict energy performance standards and operate more efficiently than at least 75 percent of similar buildings nationwide. Certification is annual.

- Toyota Motor Manufacturing Indiana (TMMI), East Plant
- Toyota Motor Manufacturing Indiana (TMMI), West Plant
- Toyota Motor Manufacturing Kentucky (TMMK), Plant 1
- North American Parts Center Kentucky (NAPCK)

## AWARDS CONTINUED

### 2018 GOVERNOR'S AWARD FOR ENVIRONMENTAL EXCELLENCE

The Indiana Department of Environmental Management (IDEM) manages the Indiana Governor's Awards for Environmental Excellence. The awards recognize exemplary environmental practices. Toyota Motor Manufacturing Indiana (TMMI) earned the 2018 Environmental Excellence Award for Five Years of Continuous Improvement. TMMI implemented various sustainability projects over a five-year period to reduce the plant's impact on the environment. The following reductions have been achieved since 2012:

- Energy Consumption – 42% per vehicle
- Carbon Dioxide Emissions – 31% per vehicle
- Water Usage – 24% per vehicle
- Volatile Organic Compound Emissions – 20% per vehicle
- Waste Generation – 19% per vehicle
- Landfill Waste Disposal – maintained zero waste to landfill

### 2018 GREEN AWARD OF EXCELLENCE

For the second year in a row, Toyota Canada Inc. (TCI) won a Green Award of Excellence from East Penn Canada. The award recognizes TCI's commitment to vehicle battery recycling. TCI, along with Toyota and Lexus dealers across Canada, have achieved a used battery recovery rate of 92.1 percent, compared to the Canadian average for auto manufacturers of just 83.4 percent.

### CLEAN INDUSTRY LEVEL 2 CERTIFICATION

Toyota Motor Manufacturing de Baja California (TMMBC) earned the Clean Industry (Industria Limpia) Certification for Environmental Performance Level 2. The certification is administered by PROFEPA (Mexico's national environmental agency). Level 2 certification is awarded to companies that successfully demonstrate to a third-party auditor they satisfactorily meet all environmental compliance requirements and execute natural resource efficiency. The two-year certification is valid through June 2020.

→ See "[Green Building](#)" for information on our most recent LEED® awards.

## AIR QUALITY

### CRITERIA POLLUTANT TAILPIPE EMISSIONS

Hydrocarbons, nitrogen oxides (NO<sub>x</sub>) and carbon monoxide — all byproducts of fuel combustion — are linked to various air quality issues such as smog formation as well as various health effects. Limiting criteria pollutant tailpipe emissions from our vehicles helps to reduce some of the environmental impacts of driving.

The U.S. Environmental Protection Agency (EPA) and the state of California have certification programs to categorize vehicles in terms of their level of tailpipe emissions (the Canadian program is aligned with the U.S. federal program). EPA's certification program is changing from Tier 2 and began phasing in Tier 3 in 2017.

While the EPA Tier 3 and California Low Emission Vehicle III (LEV III) regulations have different nomenclature for categorizing vehicle emissions, the bins include the same vehicle emission groupings. For the 2017 model year, EPA Tier 3 and California LEV III regulations required an auto manufacturer's fleet average to meet an emission standard for non-methane organic gas with nitrogen oxides (NMOG + NO<sub>x</sub>) of 0.086 g/mi for passenger cars and light-duty trucks up to 3,750 pounds, and 0.101 for other light-duty trucks. The standard decreases until 2025, when the NMOG + NO<sub>x</sub> average for both sets of vehicles will become 0.030 g/mi.

The EPA Tier 3 vehicle standards were intended to be harmonized with California's Low Emission Vehicle program and create a federal vehicle emissions program that allows automakers to sell the same vehicles in all 50 states. The vehicle standards are being implemented over the same timeframe as the greenhouse gas/fuel efficiency standards for light-duty vehicles (promulgated by EPA and the National Highway Traffic Safety Administration in 2012) as part of a comprehensive approach towards regulating emissions from motor vehicles.

Environment and Climate Change Canada has issued Tier 3 regulations aligned with the final U.S. Tier 3 rule.

Toyota's goal is to maintain flexibility to build vehicles based on customer preferences. In setting tailpipe emission regulations, we believe standards should be performance-based and consider the interaction with other vehicle rules — such as fuel economy/greenhouse gas standards — to ensure the total package of requirements is effective and acceptable to the consumer. Fuels must be considered with vehicle technologies as a holistic system. Reduced sulfur levels in gasoline, required by the federal Tier 3 and California LEV III programs, are enabling the after-treatment systems being designed for compliance.

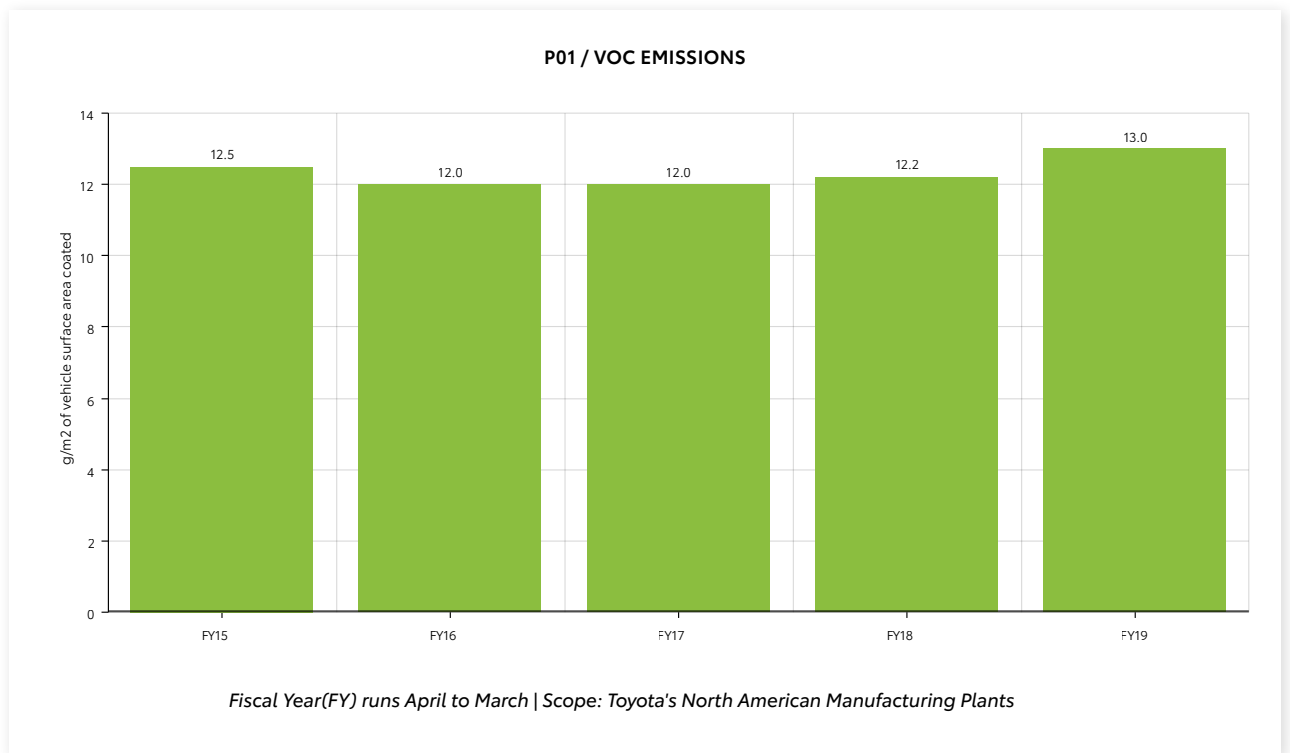
Toyota annually complies with the state of California, U.S. and Canadian federal vehicle emissions programs, and we have met the requirements for each model year.

The American Council for an Energy Efficient Economy (ACEEE) "Greenest Vehicles of 2019" list includes Toyota Prius Prime, Toyota Prius Eco<sup>2</sup>, and Toyota Camry Hybrid LE. The list is notable in that it considers a variety of criteria when determining the greenest cars, including the car's emissions, emissions from the electric grid on which the vehicle is charged, and energy necessary to build and dispose of the car.

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2 The Prius Eco is an available trim level within the Prius model line. This trim option offers customers even better fuel efficiency thanks to lighter weight and further optimized aerodynamics.

## VOLATILE ORGANIC COMPOUNDS



**ABOUT THIS CHART:** The primary concern with non-greenhouse gas air emissions is smog. Smog is formed as particulate matter, nitrogen oxides and volatile organic compounds (VOCs) react with sunlight. Smog has been linked to several health issues and is particularly prevalent in dense urban areas with heavy traffic, industrial activity and sunny, warm climates.

Painting operations generate most of Toyota's VOC emissions. Toyota's North American manufacturing plants measure grams of VOCs emitted per square meter of vehicle surface area coated (g/m<sup>2</sup>). There was a slight increase in VOC emissions from fiscal year 2018 to 2019 because of production shifting from cars to more trucks, mainly at our assembly plant in Baja California, Mexico, where base coats are applied with a solvent-borne system. We expect VOC emissions to decrease as we continue to improve transfer efficiency and launch additional water-borne paint systems.

# BIODIVERSITY

## ENDANGERED AND PROTECTED SPECIES

### P02 / ENDANGERED, THREATENED, OR PROTECTED SPECIES ON OR NEAR TOYOTA SITES

| TOYOTA SITE   | ENDANGERED, THREATENED, OR PROTECTED SPECIES   | LAW/REGULATION   | ACTIVITIES  |
|---|--|--|---|
| All TMNA sites in North America                                   | Monarch butterfly  | The U.S. Fish & Wildlife Service is legally bound to determine whether to protect monarchs under the Endangered Species Act. A decision will be made by December 2020. | <a href="#">See BIODIVERSITY/Biodiversity Targets</a>   |
| Manufacturing plant in Baja California, Tecate (Mexico)           | <ul style="list-style-type: none"> <li>Ceanothus verrucosus (a medicinal shrub)</li> <li>Crotalus ruber (a native rattlesnake)</li> <li>Linx rufus (bobcat)</li> <li>Lepus californicus (black-tailed jackrabbit)</li> <li>Ferocactus gracilis (fire barrel cactus)</li> </ul> | Protected by Mexico's Ministry of Environment and Natural Resources (SEMARNAT) under NOM-059-SEMARNAT-2010   | These species are found on 143 acres of the site's property that are protected as a wildlife preserve.  |
| Manufacturing plants in Cambridge and Woodstock, Ontario (Canada) | Tree Swallow   | Protected by the Migratory Birds Convention Act  | <a href="#">Installed 71 bird boxes at Toyota's assembly plants in Cambridge and Woodstock, Ontario.</a>  |
| Engine plant in Huntsville, Alabama                               | Alabama cave shrimp  | Protected by the U.S. Endangered Species Act   | Cave shrimp are found in an area of the site that is not disturbed by site operations or activities.  |
| Assembly and unit plant in Georgetown, Kentucky                   | Short's Goldenrod, Indiana Bat   | Protected by the U.S. Endangered Species Act   | Planted Short's Goldenrod along a one-mile nature trail onsite  |
| Vehicle logistics site at the Port of Portland, Oregon            | Coho Salmon  | Protected by the U.S. Endangered Species Act   | Salmon Safe certified; site maintains a bioswale and storm water pollution prevention program; team members participate in annual cleanup of the Willamette River |

*\*Includes Toyota-owned sites in operation as of September 2019.*

**ABOUT THIS CHART:** As sites apply for certification of their conservation programs with the Wildlife Habitat Council, they work with a WHC biologist to take an inventory of species onsite. This inventory includes any species listed by federal law as endangered or threatened. In addition to the 12 sites with WHC-certified programs, we have begun to inventory other manufacturing and logistics sites. As we gather this information, it will be used to inform our biodiversity strategy and project selection.

→ ["Protecting Species"](#)

## PROTECTED AREAS/ CRITICAL HABITAT

**P03 / TOYOTA SITES IN OR NEAR A PROTECTED AREA, CRITICAL HABITAT OR BIODIVERSITY HOTSPOT**

| SITE NAME   | LOCATION                        | TYPE OF OPERATION | PROTECTED AREA, CRITICAL HABITAT AND/OR BIODIVERSITY HOTSPOT              |
|---|---------------------------------|-------------------|---|
| TMMBC   | Baja California, Tecate, Mexico | Manufacturing     | Hotspot: California Floristic Province; Protected area: Wildlife Preserve |
| TMMC  | Woodstock, Ontario, Canada      | Manufacturing     | Protected Area: Vansittart Woods wetlands                                 |
| TABC  | Long Beach, California          | Manufacturing     | Hotspot: California Floristic Province                                    |
| Gardena Technical Center                                | Gardena, California             | R&D               | Hotspot: California Floristic Province                                    |
| LA Parts Distribution Center                            | Los Angeles, California         | Parts logistics   | Hotspot: California Floristic Province                                    |
| TLS Long Beach  | Port of Long Beach, California  | Vehicle logistics | Hotspot: California Floristic Province                                    |
| San Ramon Regional Office and Parts Distribution Center | San Ramon, California           | Parts logistics   | Hotspot: California Floristic Province                                    |
| North American Parts Center California                  | Ontario, California             | Parts logistics   | Hotspot: California Floristic Province                                    |
| TLS Portland  | Port of Portland, Oregon        | Vehicle logistics | Critical Habitat for Soho Salmon  |
| TAPG  | Phoenix, Arizona                | Proving ground    | Critical Habitat for Yellow-billed Cuckoo                                 |
| MTMUS   | Huntsville, Alabama             | Manufacturing     | Critical Habitat for the Spring Pygmy Sunfish                             |

**ABOUT THIS CHART:** TMNA has begun an analysis to determine whether sites are in a protected area, critical habitat or biodiversity hotspot (see below for definitions of these terms). We started with our largest facilities, those that have Conservation Certification from the Wildlife Habitat Council, and those undergoing major renovations. In the table above, we only include the sites located in these areas. We will be analyzing additional sites going forward and the information will be used to inform our biodiversity strategy and project selection.

A **Protected Area** is defined as a geographic area that is designated, regulated or managed to achieve specific conservation objectives. (GRI Standards Glossary 2016)

**Critical Habitat** is a term defined and used in the U.S. Endangered Species Act. It is a specific geographic area(s) containing physical or biological features that are essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an unoccupied area(s) if it is determined to be essential for the conservation of the species.

A **Biodiversity Hotspot** is defined as an area that meets two criteria:

It must have at least 1,500 vascular plants as endemics — which is to say, it must have a high percentage of plant life found nowhere else on the planet. A hotspot, in other words, is irreplaceable.

It must have 30 percent or less of its original natural vegetation. In other words, it must be threatened.

Around the world, 36 areas qualify as biodiversity hotspots. They represent just 2.3 percent of Earth's land surface, but they support more than half of the world's endemic plant species and nearly 43 percent of endemic bird, mammal, reptile and amphibian species.

Critical Ecosystem Partnership Fund (CEPF) maintains a list of hotspots by region. CEPF is a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan, the MacArthur Foundation and the World Bank.

→ ["Protecting Species"](#)

## WHC CONSERVATION CERTIFICATIONS

P04 / WILDLIFE HABITAT COUNCIL CONSERVATION CERTIFICATIONS

| TOYOTA SITE NAME                                 | YEAR THE SITE'S PROGRAM WAS ORIGINALLY CERTIFIED | CERTIFICATION LEVEL |
|--|--|---------------------|
| Toyota Motor Manufacturing, Alabama              | 2014   | Gold                |
| Toyota Motor Manufacturing, Kentucky             | 2008   | Gold                |
| Toyota Motor Manufacturing, Mississippi          | 2014   | Gold                |
| Toyota Motor Manufacturing, West Virginia        | 2016   | Gold                |
| Toyota Motor Manufacturing Canada, Woodstock     | 2012   | Gold                |
| Toyota Motor Manufacturing, Indiana              | 2013   | Silver              |
| Toyota Arizona Proving Grounds                   | 2017   | Silver              |
| Toyota Technical Center, York Township, Michigan | 2017   | Silver              |
| Toyota Technical Center, Ann Arbor, Michigan     | 2019   | Silver              |
| Toyota Motor Manufacturing, Texas                | 2015   | Certified           |
| Toyota Motor Manufacturing Canada, Cambridge     | 2017   | Certified           |
| Bodine Aluminum, Jackson, Tennessee              | 2015   | Certified           |
| Bodine Aluminum, Troy, Missouri                  | 2016   | Certified           |

**ABOUT THIS CHART:** Wildlife Habitat Council (WHC) partners with corporations, fellow conservation organizations, government agencies and community members to empower and recognize wildlife habitat and conservation education programs. WHC's certification standard, Conservation Certification, recognizes meaningful wildlife habitat management and conservation education programs.

Our partnership with WHC began in 1999 when Toyota joined WHC's membership. In 2008, the conservation program at our Kentucky assembly plant became Toyota's first WHC certification. WHC helps us inventory plant and animal species on our sites and identify appropriate projects. Our protected areas include grassland, wildflower meadows, pollinator gardens and forests.

→ ["Protecting Species"](#)

## CARBON

### VEHICLE CO<sub>2</sub> EMISSIONS

Our efforts to improve fuel economy and reduce GHGs have become more aggressive with the adoption in the United States of new fuel economy and GHG emissions standards for passenger cars and light trucks through the 2025 model year. By 2016, the new vehicle fleet was required to meet a GHG standard of 250 grams of CO<sub>2</sub> per mile, equivalent to a Corporate Average Fuel Economy (CAFE) standard of 35.5 miles per gallon (mpg); by 2025, cars and light trucks are required to yield a combined 54.5 mpg. While overall compliance is based on a fleet average, each vehicle has a fuel economy/GHG target based on its footprint.

One significant challenge to meeting these standards is having technology options available in vehicles that consumers are willing to purchase in sufficient quantities needed for compliance with the standards. Low fuel prices have added to this challenge. In 2012, when the standards were set through the 2025 model year, it was impossible to predict market outcomes so far into the future, since preferences are largely determined by factors such as fuel price and economic conditions, which are beyond an auto manufacturer's control. As such, the regulations call for a feasibility evaluation of the 2022–2025 standards, which is now underway. Toyota is collaborating with the relevant government agencies to ensure the regulations are aligned with technology and market realities while achieving the program's environmental goals.

The Canadian federal government introduced a GHG emissions regulation under the Canadian Environmental Protection Act for the 2011–2016 model years, and in October of 2014 issued final GHG regulations for the 2017–2025 model years.

In Mexico, the government has modeled vehicle GHG standards after U.S. requirements. The standards require automakers to meet a single sales-weighted fleet average over the period 2014 through 2016, and allow credits generated in 2012 and 2013 to be used towards compliance. These standards have been appropriately tailored to the unique driving conditions and product mix associated with the Mexican market and contain similar compliance flexibilities and lead time as those offered in the United States.

Many of our hybrid products are already capable of meeting their respective future targets for fuel economy and GHG standards in all three countries. But there is still a sense of urgency as states like California seek to accelerate the number of zero-emission vehicles on the road to meet its ZEV requirements.

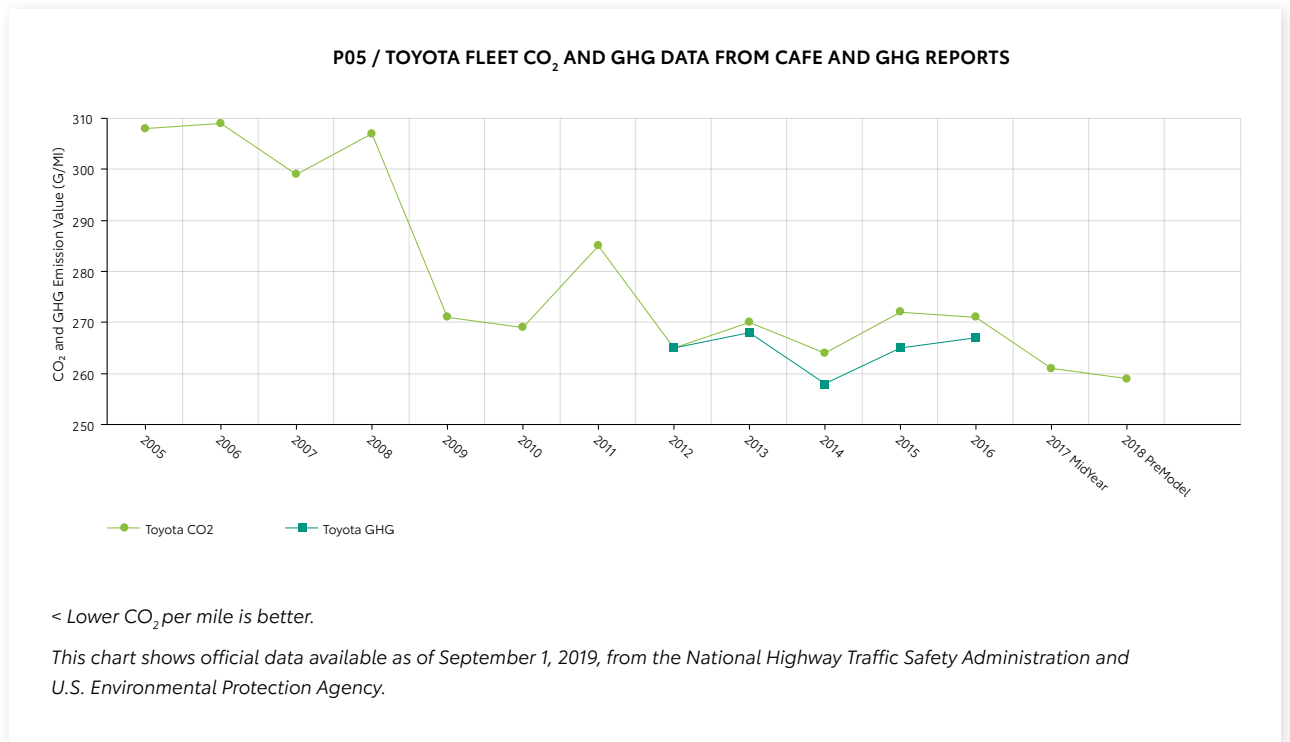
Toyota achieved the required U.S. Corporate Average Fuel Economy (CAFE) standards and met the required vehicle GHG standards in the United States, Canada and Mexico. See Figures P5–7 below for Toyota fleet performance in the U.S., Canada and Mexico.

→ See [page 19](#) for more information about reducing vehicle CO<sub>2</sub> emissions.

→ View the feature on [Toyota's approach to electrification](#)



## VEHICLE CO<sub>2</sub> EMISSIONS CONTINUED



**ABOUT THIS CHART:** The performance of the U.S. vehicle fleet is being shown in two ways. The darker blue line shows Toyota's fleet-wide fuel economy (CAFE) presented in terms of grams of CO<sub>2</sub> per mile. This measure of performance, shown in previous Toyota North American Environmental Reports, only reflects GHG emissions reductions measured at the tailpipe during the official government test procedure.

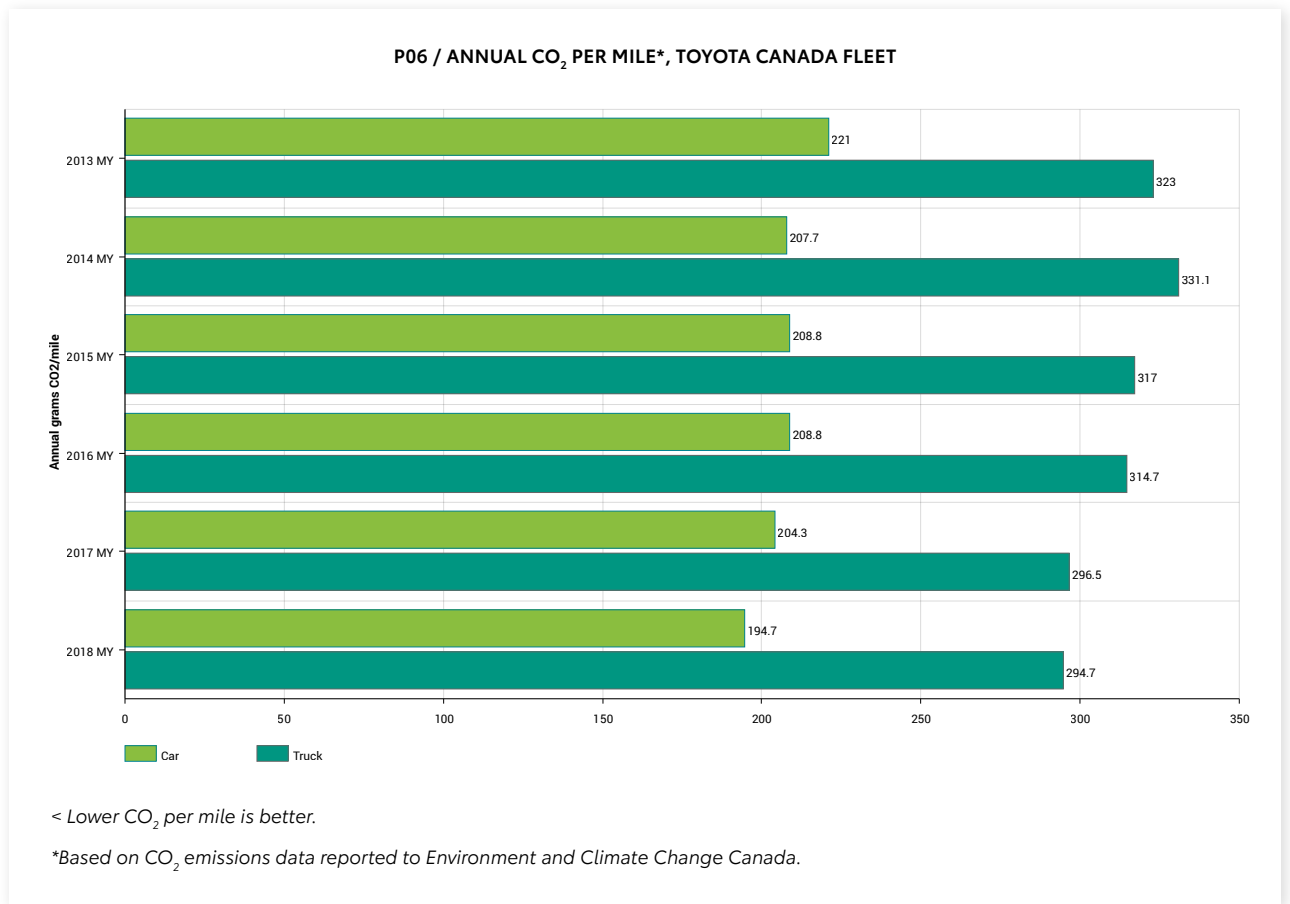
The shorter, lighter blue line depicts a broader view of GHG performance that entails provisions in the U.S. EPA GHG program (starting with the 2012 model year). The annual GHG compliance values account for real-world GHG benefits from off-cycle technologies, such as air conditioning and aerodynamic improvements not observed over the official testing conditions.

Showing both values provides a transparent way of looking at Toyota's historical fleet performance as we continue to pursue both GHG reductions and fuel economy improvements under both the GHG and CAFE programs.

→ Follow this link for more information about [the U.S. National Highway Traffic Safety Administration \(NHTSA\) Corporate Average Fuel Economy \(CAFE\) program.](#)

→ Follow this link for more information about the [U.S. EPA GHG program.](#)

## VEHICLE CO<sub>2</sub> EMISSIONS CONTINUED



**ABOUT THIS CHART:** The Canadian federal government introduced a GHG emissions regulation under the Canadian Environmental Protection Act for the 2011–2016 model years, and in October of 2014 issued final GHG emissions regulations for the 2017–2025 model years. Toyota has met the regulatory obligations regarding vehicle CO<sub>2</sub> emissions in Canada for each model year.

Natural Resources Canada (NRCAN) named five Toyota/Lexus vehicles as best-in-class for fuel efficiency for the 2018 model year. Best-in-class vehicles have the lowest combined fuel consumption rating, based on 55 percent city and 45 percent highway driving. For each class, the most fuel-efficient conventional vehicle and the most efficient advanced technology vehicle (where applicable) are recognized. Five Toyota and Lexus vehicles were awarded by NRCAN for the lowest estimated annual fuel use in their respective classes:

Toyota Prius c (Compact car)

Toyota Prius (Mid-size car)

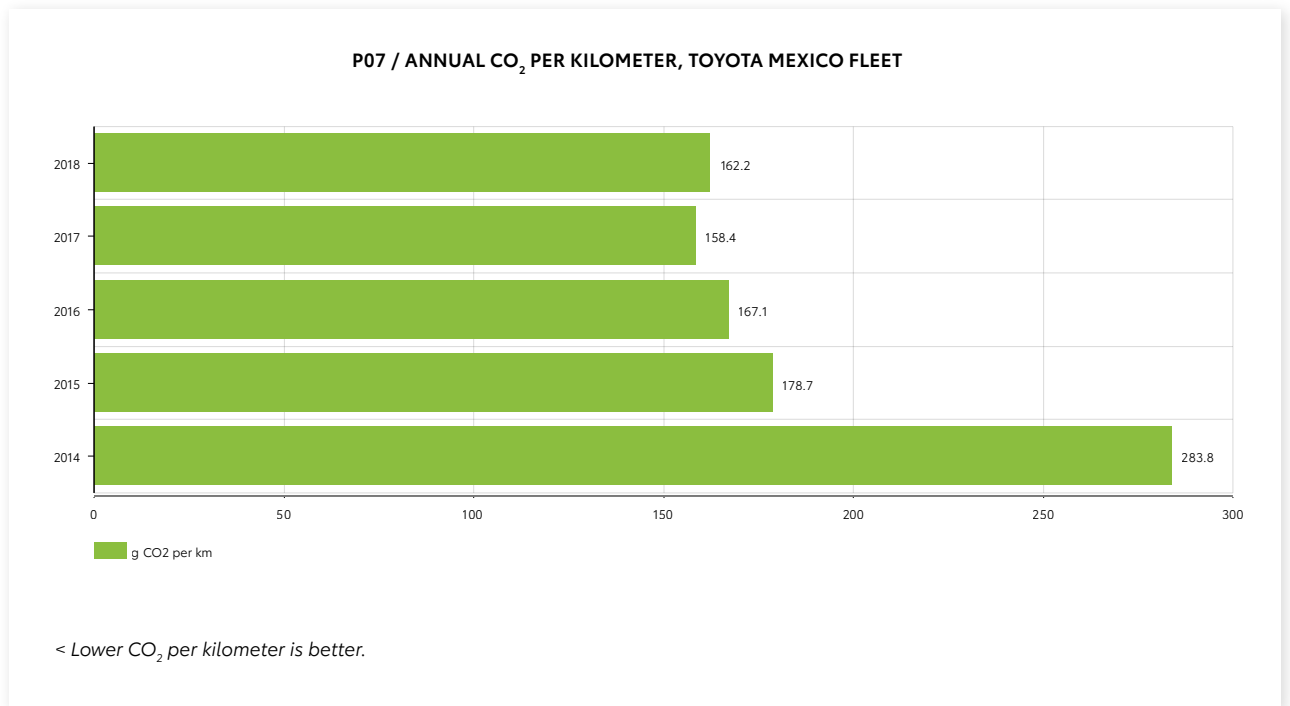
Toyota Prius v (Mid-size station wagon)

Toyota RAV4 Hybrid AWD (Small SUV)

Lexus RX 450h AWD (Standard SUV)

This marked the 18<sup>th</sup> year in a row that at least one vehicle from the Prius Family was named to the list.

## VEHICLE CO<sub>2</sub> EMISSIONS CONTINUED



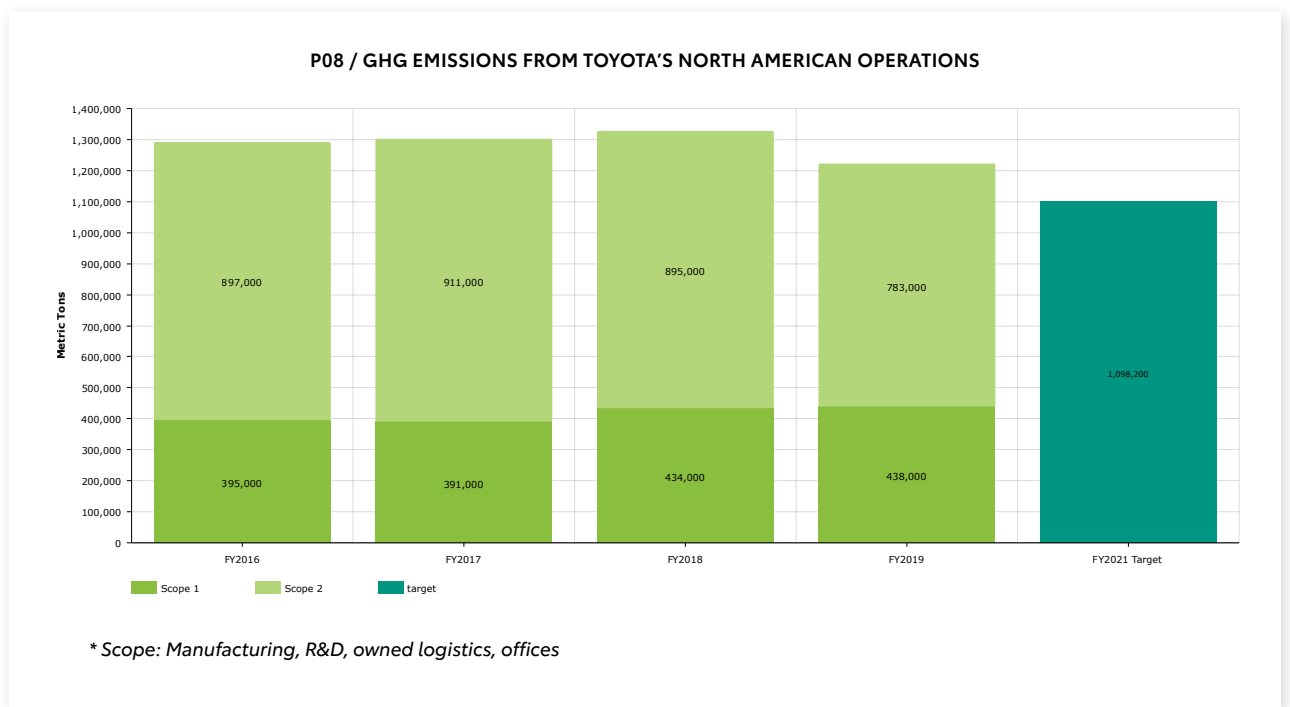
**ABOUT THIS CHART:** In Mexico, the government has modeled vehicle GHG standards after U.S. requirements. The standards require automakers to meet a single sales-weighted fleet average and allow credits generated in 2012 and 2013 to be used towards compliance. These standards have been appropriately tailored to the unique driving conditions and product mix associated with the Mexican market and contain similar compliance flexibilities and lead time as those offered in the United States. Toyota continues to be in compliance with these standards.

## GREENHOUSE GAS EMISSIONS

Three of Toyota's U.S. manufacturing plants are required to report GHG emissions data under U.S. EPA's Greenhouse Gas Reporting Program. Individual plant data for our plants in Kentucky, Texas and Indiana are available on EPA's website through its online data publication tool.

In Canada, Toyota Motor Manufacturing Canada (TMMC) and Canadian Autoparts Toyota, Inc. (CAPTIN) are required to report GHG emissions data. TMMC's Cambridge plant is required to report under Environment Canada's Greenhouse Gas Emissions Reporting Program; both the Cambridge and Woodstock plants are required to report GHG emissions to the province of Ontario under its Environmental Protection Act. CAPTIN is required to report GHG emissions to the province of British Columbia under its Greenhouse Gas Reduction Act.

## GREENHOUSE GAS EMISSIONS CONTINUED

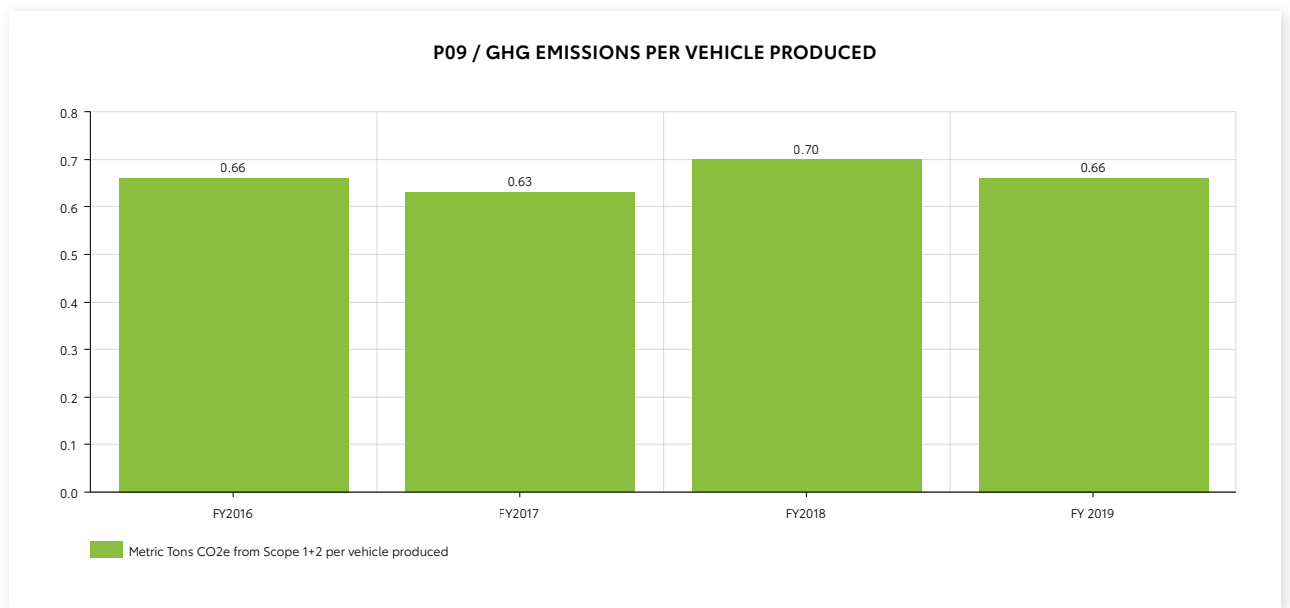


**ABOUT THIS CHART:** Total Scope 1 and 2 GHG emissions have decreased 6 percent between fiscal year 2018 and the baseline year of fiscal year 2016. The decrease is a result of lower production volumes and the implementation of energy efficiency measures.

→ ["CO<sub>2</sub> FROM DEALERS & SUPPLIERS"](#)

→ ["Carbon Targets"](#)

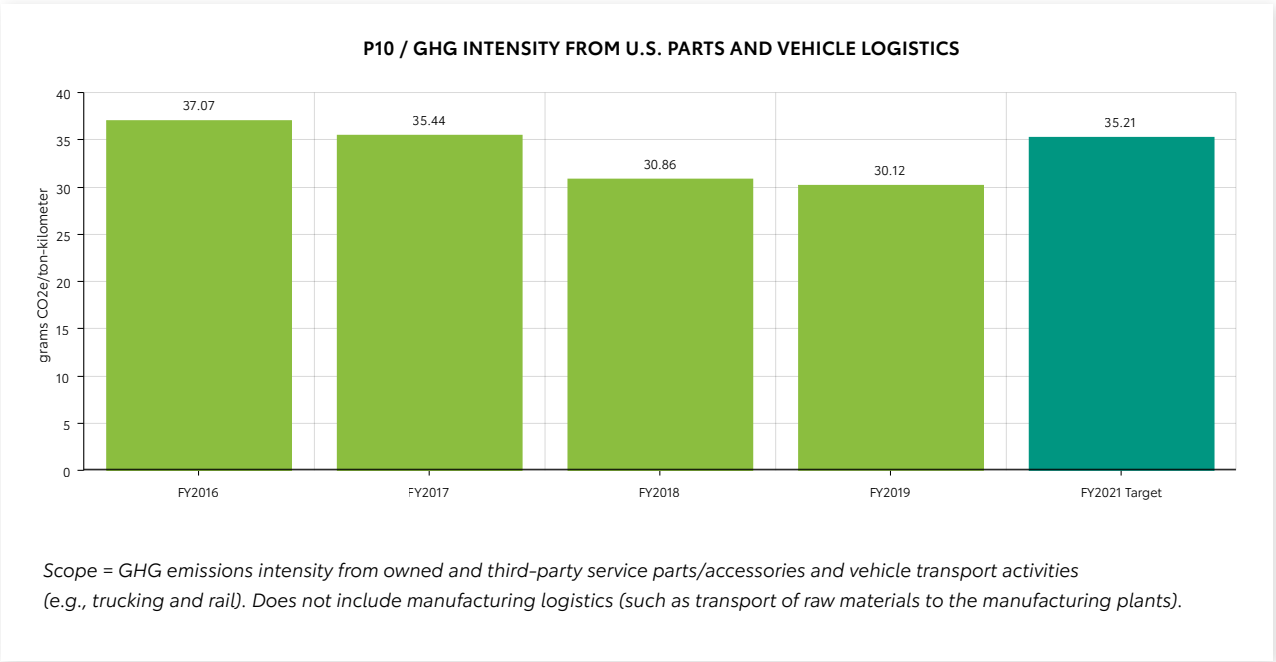
## GREENHOUSE GAS EMISSIONS CONTINUED



**ABOUT THIS CHART:** This chart shows Scope 1 and Scope 2 GHG emissions from all North American sites, including manufacturing, logistics, sales and R&D. Scope 1 and 2 GHG emissions per vehicle produced decreased by 5.7 percent in fiscal year 2018 compared to the previous year due to an overall decrease in production. This decrease is in line with the decrease in total Scope 1 and 2 emissions reported in Figure P08.

→ ["CO<sub>2</sub> From Operations"](#)

GREENHOUSE GAS EMISSIONS CONTINUED



**ABOUT THIS CHART:** We track GHG emissions intensity for owned and third-party U.S. service parts/accessories and vehicle logistics from all transport modes (trucking, marine, air and rail). These logistics operations have improved GHG intensity by 19 percent compared to the baseline year (fiscal year 2016). We have achieved the target and strive to continue to improve efficiency.

- ["CO<sub>2</sub> FROM DEALERS & SUPPLIERS"](#)
- ["Carbon Targets"](#)

## COMPLIANCE

### P11 / ENVIRONMENTAL COMPLIANCE

|      | SIGNIFICANT ENVIRONMENTAL VIOLATIONS |
|------|--------------------------------------|
| FY13 | 0                                    |
| FY14 | 0                                    |
| FY15 | 0                                    |
| FY16 | 0                                    |
| FY17 | 0                                    |
| FY18 | 0                                    |
| FY19 | 0                                    |

**ABOUT THIS CHART:** Many of our activities in vehicle development, manufacturing and logistics are subject to local, state, provincial and federal laws and regulations that govern chemical management, air emissions, water discharges, storm water management, greenhouse gas emissions, and waste treatment and disposal. These laws and regulations vary by facility based on the type of equipment operated and the functions performed.

Toyota defines significant environmental violations as those resulting in fines of \$5,000 or more and in an impact to the environment. In fiscal year 2019, our North American manufacturing plants and logistics sites had zero significant environmental regulatory violations.

## DEALERS

P12 / TOYOTA/LEXUS LEED® DEALERSHIPS

|              | TOYOTA    | LEXUS     |
|--------------|-----------|-----------|
| Platinum     | 5         | 0         |
| Gold         | 21        | 4         |
| Silver       | 16        | 3         |
| Certified    | 14        | 4         |
| <b>Total</b> | <b>56</b> | <b>11</b> |

*\*As of July 2019, 59 Toyota and Lexus dealerships in the U.S., 7 in Canada and 1 in Mexico have earned LEED® certification.*

**ABOUT THIS CHART:** The Toyota and Lexus brands provide guidance to dealerships on sustainable strategies to achieve LEED® certification. LEED®, or Leadership in Energy and Environmental Design, is a point-based system administered by the U.S. and Canadian Green Building Councils promoting a whole-building approach to sustainable construction and remodeling. LEED® certification is based on meeting stringent requirements in sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

Toyota and Lexus brands have achieved various levels of LEED certification for the construction and renovation of their sales and service areas. As of July 2019, 67 Toyota and Lexus dealers in the U.S., Canada and Mexico have achieved LEED certification, and more are registered with the U.S. Green Building Council.

Toyota and Lexus recognize the hard work that goes into the LEED certification process. The continued efforts not only are attractive to environmentally conscious consumers, they also can provide dealerships an edge in recruiting and retaining team members.

→ ["Dealers"](#)



## ENVIRONMENTAL MANAGEMENT SYSTEMS

P13 / ISO 14001 CERTIFICATIONS OF TOYOTA'S NORTH AMERICAN FACILITIES

|                              | LOCATION  | ORIGINAL CERTIFICATION DATE |
|------------------------------|---|-----------------------------|
| Manufacturing Plants         | Huntsville, Alabama                             | 2005                        |
|                              | Long Beach, California                          | 1998                        |
|                              | Princeton, Indiana                              | 1999                        |
|                              | Georgetown, Kentucky                            | 1998                        |
|                              | Troy, Missouri                                  | 1998                        |
|                              | Blue Springs, Mississippi                       | 2012                        |
|                              | Jackson, Tennessee                              | 2007                        |
|                              | San Antonio, Texas                              | 2008                        |
|                              | Buffalo, West Virginia                          | 2000                        |
|                              | Woodstock, Ontario                              | 2009                        |
|                              | Cambridge, Ontario                              | 1998                        |
|                              | Delta, British Columbia                         | 1997                        |
|                              | Baja California, Mexico                         | 2006                        |
| Vehicle Distribution Centers | Toronto, Ontario                                | 2002                        |
|                              | Montreal, Quebec                                | 2003                        |
| Parts Distribution Center    | Toronto, Ontario                                | 2001                        |
|                              | Vancouver, British Columbia                     | 2002                        |
| Sales and Regional Offices   | Canadian Sales Headquarters in Toronto, Ontario | 2001                        |
|                              | Pacific Regional Office and TFS                 | 2002                        |
|                              | Quebec Regional Office and TFS                  | 2005                        |
|                              | Prairie Regional Office and TFS                 | 2008                        |
|                              | Atlantic Regional Office and TFS                | 2006                        |

*\*List of certified sites in North America as of July 2019.*

**ABOUT THIS CHART:** Environmental management systems are an essential part of Toyota's overall effort to minimize risks and achieve leading levels of environmental performance. Each Toyota location has an environmental management system (EMS) that identifies the significant environmental aspects and impacts of its operations and sets corresponding controls, goals and targets to manage and reduce these impacts over time. The facilities listed in the chart have been third-party certified to ISO 14001, the International Organization for Standardization's standard for designing and implementing an effective environmental management system.

## GREEN BUILDING

**P14 / TOYOTA'S NORTH AMERICAN FACILITIES WITH LEED® CERTIFICATIONS**

| TOYOTA FACILITY   | LOCATION                     | YEAR | CERTIFICATION LEVEL |
|---|------------------------------|------|---------------------|
| Production Engineering & Manufacturing Center   | Georgetown, Kentucky         | 2019 | NC Platinum         |
| Toyota Supplier Center  | York Township, Michigan      | 2019 | NC Platinum         |
| Toyota Motor North America Headquarters<br>(Office Towers, High Bay Evaluation Building, Vehicle Delivery Center) | Plano, Texas                 | 2017 | BD+C Platinum       |
| Chicago Service Training Center   | Aurora, Illinois             | 2015 | NC Gold             |
| Lexus Eastern Area Office   | Parsippany, New Jersey       | 2014 | CI Platinum         |
| Toyota Kansas City Training Center  | Kansas City, Missouri        | 2012 | NC Gold             |
| Toyota Inland Empire Training Center  | Rancho Cucamonga, California | 2010 | CI Gold             |
| Toyota Technical Center   | York Township, Michigan      | 2010 | NC Gold             |
| Toyota Racing Development North Carolina  | Salisbury, North Carolina    | 2010 | NC Certified        |
| Lexus Florida Training Center   | Miramar, Florida             | 2009 | CI Gold             |
| Toyota Phoenix Training Center  | Phoenix, Arizona             | 2009 | CI Silver           |
| North America Production Support Center   | Georgetown, Kentucky         | 2006 | CI Silver           |
| Toyota Motor North America, Inc.  | Washington, D.C.             | 2016 | CI Silver           |
| Portland Vehicle Distribution Center  | Portland, Oregon             | 2004 | NC Gold             |
| Toyota Motor Sales - South Campus   | Torrance, California         | 2003 | NC Gold             |

*BD+C = Building Design + Construction*

*NC = New Construction*

*CI = Commercial Interiors*

**ABOUT THIS CHART:** Fifteen Toyota and Lexus facilities have achieved Leadership in Energy and Environmental Design (LEED®) certification. LEED® is a point-based system administered by the U.S. and Canadian Green Building Councils promoting a whole-building approach to sustainable construction and remodeling. LEED certification is based on meeting stringent requirements in sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. Ranging from office space to vehicle distribution centers, these facilities represent Toyota's continued efforts to improve the design and efficiency of all operations. Toyota Motor North America is a platinum member of the U.S. Green Building Council.

→ [Building for the Future](#)

# MATERIALS

## WASTE

**P15 / TOTAL WASTE (POUNDS)**

|   | 2015               | 2016               | 2017               | 2018               |
|---|--------------------|--------------------|--------------------|--------------------|
| <b>Regulated Waste*</b>                       |                    |                    |                    |                    |
| Recycled/Reused Regulated Waste               | 13,494,000         | 4,570,000          | 4,879,000          | 4,499,000          |
| Incineration, Waste to Energy, Fuels Blending | 11,183,000         | 7,247,000          | 11,599,000         | 11,843,000         |
| Landfill                                      | 48,000             | 692,000            | 33,000             |                    |
| <b>Non-Regulated Waste</b>                    |                    |                    |                    |                    |
| Composted                                     | 1,088,000          | 831,000            | 1,080,000          | 908,000            |
| Recycled Scrap Steel from Mfg Plants          | 659,718,000        | 678,953,000        | 656,129,000        | 670,020,000        |
| Other Recycled/Reused                         | 79,267,000         | 87,805,000         | 79,940,000         | 79,800,000         |
| Incineration, Waste to Energy, Fuels Blending | 26,574,000         | 33,933,000         | 29,314,000         | 32,081,000         |
| Landfill                                      | 7,602,000          | 8,081,000          | 16,995,000         | 13,363,000         |
| <b>TOTAL WASTE (Pounds) GENERATED</b>         | <b>798,974,000</b> | <b>822,112,000</b> | <b>799,969,000</b> | <b>812,514,000</b> |

*\*Regulated waste includes hazardous, universal and special wastes regulated at the federal, state, provincial or local level. Non-regulated waste is all other waste.*

Scope = Toyota's North American headquarters, manufacturing, R&D, sales and logistics sites in the U.S., Canada and Puerto Rico. Also includes data from manufacturing in Mexico. Data from non-manufacturing sites in Mexico will be included in future years. Data excludes construction and demolition waste from new construction and expansion projects.

**ABOUT THIS CHART:** Waste data is collected on a calendar year basis. In 2018, our North American manufacturing plants, logistics sites and offices sent only 1.6 percent of waste for disposal to landfills. (For certain waste streams, landfill disposal is required by law.) We recycled, reused or composted 93 percent and sent 5.4 percent of waste to waste-to-energy or fuels blending facilities. Total waste in 2018 was higher than 2017, in part due to a new line for cosmetic panels installed at our plant in southern California and additional aluminum machining at our assembly plant in Kentucky.

→ ["Eliminating Waste"](#)

## WATER

P16 / FY 2019 WATER (GALLONS)

|                   | TOTAL (ALL OF TMNA) * | WATER-STRESSED AREAS ** |
|-------------------|-----------------------|-------------------------|
| Water Withdrawal  | 1,806,964,000         | 59,193,000              |
| Water Discharge   | 1,136,206,000         | 34,513,000              |
| Water Consumption | 670,758,000           | 24,680,000              |

\*Scope: Manufacturing, R&D, owned logistics, offices

\*\*Water-stressed areas have been identified with WRI's Aqueduct™ Water Risk Atlas and include high risk sites (no sites are currently rated as very high risk).

**ABOUT THIS CHART:** Toyota withdrew 1.807 billion gallons of water at more than 100 North American facilities, including assembly and unit plants, parts and vehicle distribution centers, R&D sites and offices. Only 3 percent of water withdrawal occurred in an area of high water stress, identified as level four in the Water Risk Atlas. We do not currently have any sites located in an area of "extremely high risk (level 5).

More than 94 percent of this water came from municipal sources (both fresh and recycled water from utilities); other sources included surface water bodies, groundwater and rainwater.

We estimate 1.1 billion gallons were discharged, either to surface waters or to municipal utilities.

Consumption (defined as withdrawal minus discharge, or the water that was not returned to either a municipal utility or surface or ground water) was almost 671 million gallons.

→ ["Conserving Water"](#)