

TOYOTA

2011 North America Environmental Report

Challenge, Commitment, Progress



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SCOPE OF THIS REPORT:

This North America Environmental Report covers activities across the North American region—the United States, Canada and Mexico. This report also covers the Toyota, Lexus and Scion brands in North America.

The period covered in this report is fiscal year 2011 (April 1, 2010 through March 31, 2011) and product model year 2011. We report on fiscal year 2011 activities and provide a five-year retrospective to recognize accomplishments and challenges at the close of our second five-year environmental action plan (FY2007 – FY2011). We also provide information on our company's economic presence in North America. If data is presented with different dates, this is clearly indicated.

This report is available on the Web at www.toyota.com/environmentreport2011. A French version is provided on the Web only at www.toyota.ca (click on Environment/Report).

We listened to your comments and suggestions about last year's report and used them to improve this report. We would appreciate hearing from you again. You may participate in a survey on the Web.

This report was published in November 2011.

CONTACT TOYOTA MOTOR NORTH AMERICA, INC.

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TOYOTA | dear reader

WE ARE PLEASED TO PRESENT the 2011 Toyota North America Environmental Report. Here you will find information on our environmental activities during fiscal year (FY) 2011, as well as a summary of the five-year period of our second environmental action plan (FY2007 – FY2011). This report also provides information on Toyota's economic presence in North America. Highlights of our performance are provided in Figure A.

The past five years presented a number of challenges. In FY2007, the economy experienced a strong downturn, and product recalls began soon after. We were faced with production slow-downs and hard decisions. And yet, despite our challenges, we found ways to reduce environmental impacts in all areas of our business. We used downtime to train employees, and we challenged them to find opportunities for improving our performance.

The result is that we met many of the targets in our environmental action plan, and in some cases even exceeded them. Where targets were missed, we still made progress reducing our impact. Employees even went beyond our walls and found opportunities in their communities, sharing their knowledge and expertise to improve the environmental performance of others.

Partnerships have been instrumental to our success. They are a key aspect of both our Guiding Principles and our Earth Charter. Our corporate vision encourages us to build close and cooperative relationships with a wide range of stakeholders to meet common goals.

In the last few years, we have begun to more fully realize the value of these partnerships. Partnerships allow us to demonstrate the feasibility of our advanced technology vehicles. Our partners help us reduce greenhouse gas emissions, recycle waste and reduce air emissions from activities such as painting. They help us find ways to use eco-plastics and renewable materials in the design of our vehicles.

But partnerships are also a way for us to help others. We are helping towns and counties reduce energy use, working with a nonprofit on making and testing biodiesel, and donating plastics to a community center for recycling. We conduct “treasure hunts” with suppliers to teach them how to find energy and water savings. We work with dealerships to help them build “greener” facilities. We partner with organizations to conserve public lands and promote environmental education. Details of these activities and many more can be found throughout this report.

Sustainability is at the heart of our vision for the future. Sustainability is about designing advanced technology vehicles with a low carbon footprint and producing vehicles with as little impact to the environment as possible. This is why the launch of our Prius Family concept at the Detroit Auto Show in January 2011 was so timely. These vehicles, beginning with Prius v, are being rolled out using hybrid technology that produces high fuel economy and low tailpipe emissions.

Sustainability is part of a broader vision of corporate responsibility that includes the safety and diversity of our employees and the well-being of the communities around us. No company can become sustainable by working on its own. We will continue to rely on partnerships to help us achieve our sustainability goals—and to help our partners achieve theirs.



Yoshimi Inaba
Yoshimi Inaba
 Director
 Toyota Motor Corporation
 President & Chief Operating Officer
 Toyota Motor North America, Inc.



Dian D. Ogilvie
Dian Ogilvie
 Senior Vice President & Secretary
 Toyota Motor North America, Inc.

“Toyota is more committed than ever to being an environmental leader, but we must earn it with our actions, our products and our dedication to communities.”

– Dian Ogilvie, Senior Vice President & Secretary, Toyota Motor North America, Inc.

FIGURE A

Summary of Performance	
PERFORMANCE INDICATOR	RESULT
Environmental Performance	
U.S. Car CAFE	12% improvement, 2007-2010
U.S. Truck CAFE	10% improvement, 2007-2010
Canadian Car CAFC	2% improvement, 2007-2010
Canadian Truck CAFC	9% improvement, 2007-2010
Energy Consumed Per Vehicle Produced (Manufacturing)	10% increase, FY2007-FY2011
CO ₂ Emissions at U.S. Plants Per Vehicle Produced	6% decrease, FY2007-FY2011
Nonsaleable Waste Per Vehicle Produced (Manufacturing)	35% decrease, FY2007-FY2011
Water Used Per Vehicle Produced (Manufacturing)	18% increase, FY2007-FY2011*
VOC Emissions Per M ² of Vehicle Surface Area Coated	10% decrease, FY2007-FY2011
Total Waste Recycling Rate at U.S. Parts and Vehicle Distribution Centers in FY2011	93%
Number of Toyota and Lexus Models Containing Bio-based Plastics	7
Number of ISO 14001 Certified Locations in 2011	41
Number of Years Without a Hazardous Materials/Dangerous Goods Violation (Logistics)	13
Number of LEED® Certified Toyota Facilities in 2011	10
Number of LEED® Certified Toyota and Lexus Dealerships in 2011	15
Number of Plug-in Hybrid Demonstration Program Vehicles Deployed in North America	163
Total Number of Toyota and Lexus Hybrids Sold in North America (as of June 30, 2011)	1,502,611

*The target for water use in manufacturing is based on a base year of FY2001. While there was an increase in water usage between FY2007 and FY2011, the target was still met. Please see page 38 for more information.

TOYOTA

environmental vision & action

Employees from Toyota's largest plant, located in Scott County in Georgetown, Kentucky, conducted an assessment of the county courthouse to identify opportunities to save energy. Based on the significant energy and cost savings achieved as a result of the partnership with Toyota, a new phase is being added to the project to find similar savings at the county fire houses.



“At the heart of Toyota’s vision for a sustainable future is partnerships—by working together, we can achieve so much more.”

— Yoshi Inaba, Director, Toyota Motor Corporation, President & Chief Operating Officer, Toyota Motor North America, Inc.



TOYOTA'S COMMITMENT TO THE ENVIRONMENT is reflected in our Earth Charter, where we present our vision for “growth that is in harmony with the environment.” To achieve this harmony, Toyota employees consider environmental impacts at all stages of the vehicle life cycle and address issues like fuel efficiency, the commercialization of advanced technology vehicles, the materials used to manufacture a vehicle, energy and water consumption, air emissions, waste generation and disposal, and the effects of transporting vehicles and parts from plants to dealerships. We build action plans to help us manage performance in these areas.

In March of 2011, we concluded our second North American Environmental Action Plan (EAP). This report describes the results of our action plan activities, including which targets were achieved and which were missed. As part of the Toyota Way, we continue to strive for improvement.

As we begin a new environmental action plan in North America, we are focused more broadly on sustainability. Sustainability is commonly defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs. At the heart of sustainability is a respect for the environment.

Sustainability is reflected in Toyota's Guiding Principles, which direct us to “work with business partners... to achieve stable, long-term growth and mutual benefits.” Sustainability cannot be achieved alone. Partnering with government agencies, nonprofits, academia and other businesses allows us to achieve far more than we could on our own.

One example of such a partnership is with Tesla Motors, Inc. Together we will produce the RAV4 EV, planned for launch in the U.S. in 2012. This will be a fully-engineered electric vehicle that produces zero emissions and targets a real world driving range of 100 miles. The electric vehicle is one component in our portfolio of advanced technologies that will lead to solutions for sustainable mobility.

Toyota's involvement with Scott County's energy management team, described in the next section, is another example of working with others toward sustainability, this time on a regional level. And Toyota's West Virginia plant is a Sustainability Partner with the U.S. Environmental Protection Agency's (EPA) Mid-Atlantic Office. The Sustainability Partnership provides an opportunity for collaboration with EPA, state agencies and other entities that are on the cutting edge of innovation in sustainability. Toyota receives technical assistance from EPA and other partners in developing sustainability program elements and quantifying results, and is part of a network that shares lessons learned and best practices.

Through the kind of holistic thinking that these partnerships promote, and by working with others, we are improving performance and having a positive impact on the environment. We will continue to rely on partnerships to help us achieve our environmental goals—and to help our partners achieve theirs.

► **PARTNERSHIP:** **GOVERNMENT OF SCOTT COUNTY, KENTUCKY**

In 2009, employees from Toyota's Kentucky plant created an energy conservation partnership with the governments of Scott County and the city of Georgetown, where the plant is located. The goal of the program was to develop a sustainable energy management system with cost and environmental benefits, using donated employee hours.

Toyota conducted an assessment of Scott County's courthouse to identify energy saving opportunities and provided recommendations for improvement. A lighting retrofit at the courthouse resulted in a 37% reduction in electricity use, while upgrading the boiler resulted in a 72% reduction in natural gas use.

Toyota employees created tracking tools for staff members at the courthouse to manage energy data from the courthouse meters and confirm the billing information from the utility companies. The tools allow staff to clearly see any anomaly or trend that develops and take action. The staff members report they have been able to sustain the reductions that were realized in 2009.

The city of Georgetown has decided to create an energy management team for the city. The team will be comprised of members from the various city departments and Toyota employees from the Georgetown plant. Employees from the plant are working with the team to train them on the assessment methods used to identify reduction opportunities; the city will then lead the activity with Toyota's support. Toyota will then focus on developing a program to sustain reductions over the long term.



Employees from our Georgetown, Kentucky, plant partnered with the Scott County Courthouse to identify energy savings opportunities and implement reductions.

FIGURE B

TOYOTA'S GUIDING PRINCIPLES

ADOPTED JANUARY 1992, REVISED APRIL 1997

1. Honor the language and spirit of the law of every nation and undertake open and fair corporate activities to be a good corporate citizen around the world.
2. Respect the culture and customs of every nation and contribute to economic and social development through corporate activities in local communities.
3. Dedicate ourselves to providing clean and safe products and to enhancing the quality of life everywhere through our activities.
4. Create and develop advanced technologies and provide outstanding products and services that fulfill the needs of customers worldwide.
5. Foster a corporate culture that enhances individual creativity and teamwork value, while honoring mutual trust and respect between labor and management.
6. Pursue growth in harmony with the global community through innovative management.
7. Work with business partners in research and creation to achieve stable, long-term growth and mutual benefits, while keeping ourselves open to new partnerships.

TOYOTA'S EARTH CHARTER (APRIL 2000)

The Toyota Earth Charter, published in 1992 and updated in 2000, describes Toyota's Basic Action Policy and Action Guidelines regarding environmental improvements.

I. BASIC POLICY

1. Contribute toward a prosperous 21st century society

Aim for growth that is in harmony with the environment, and set a challenge to achieve zero emissions throughout all areas of business activities.

2. Pursue environmental technologies

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

3. Take action voluntarily

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

4. Work in cooperation with society

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

II. ACTION GUIDELINES

1. Always be concerned about the environment

Work toward achieving zero emissions at all stages, i.e., production, utilization and disposal;

Develop and provide products with top-level environmental performance;

Pursue production activities that do not generate waste;

Implement thorough preventive measures;

Promote businesses that contribute toward environmental improvement.

2. Business partners are partners in creating a better environment

Cooperate with associated companies.

3. As a member of society

Actively participate in social actions;

Participate in creation of a recycling-based society;

Support government environmental policies;

Contribute to nonprofit activities.

4. Toward better understanding

Actively disclose information and promote environmental awareness.

▶ TOYOTA'S GUIDING PRINCIPLES AND EARTH CHARTER

Toyota has positioned environmental management as a priority issue. Our Guiding Principles, which serve as the fundamental management policy for Toyota's operations worldwide, reflect Toyota's commitment to providing safe and innovative products while respecting the environment and the cultures of the local communities in which we operate. Building on the commitment to the environment made in the Guiding Principles, the Earth Charter was developed in 2000 to exemplify our comprehensive approach to managing environmental issues. The Guiding Principles and Earth Charter are presented in Figure B.

▶ ENVIRONMENTAL ACTION PLAN

In its "Global Vision 2020," Toyota established a mission to reexamine the relationship between nature and industry in order to find a harmonious balance between the two. This mission stems from Toyota's desire to be a responsible member of society and a driving force behind the development of sustainable practices. To translate this mission into concrete action, Toyota relies on its environmental action plan (EAP) process.

The process for developing an environmental action plan begins with Toyota's parent company in Japan, Toyota Motor Corporation (TMC). Every five years, TMC develops a global five-year environmental action plan. Each Toyota region then uses TMC's plan to structure its own action plan. By developing regional EAPs, Toyota ensures that local conditions and priorities are taken into account, while still providing a consistent framework for planning worldwide.

The process of developing an environmental action plan relies on fundamentals of the Toyota Way, a means for employees around the world of thinking about and acting on environmental challenges. The two pillars of the Toyota Way are “Continuous Improvement” and “Respect for People.” These core values help us constantly look for ways to reduce environmental impacts, and encourage us to respect and empower the individual and the team to take responsibility and maximize results.

The environmental action plan is a critical tool used to help us manage our environmental impacts across all aspects of our operations. It provides clear direction to all business functions and creates a way for us to prioritize resources, measure progress and reassess performance in light of changing conditions.

Toyota’s consolidated five-year North American Environmental Action Plan, presented in Figure C, is the second consolidated EAP developed in North America and is the foundation of this report. This EAP covers five fiscal years beginning in April 2006 and ending in March 2011.

The North American Environmental Action Plan organizes goals and targets around five key areas:

- Energy and Climate Change
- Recycling and Resource Management
- Air Quality
- Environmental Management
- Cooperation With Society

Each area contains several targets established to ensure progress toward an overall goal. The targets encompass environmental impacts at each vehicle life cycle stage. During the design stage, targets in Energy and Climate Change deal with the commercialization of advanced technology, fuel choices and fuel efficiency; targets in Recycling and Resource Management address design for recycling; and targets in Air Quality cover tailpipe emissions and vehicle cabin air quality. The impacts managed during the design stage also cover many of the impacts during the vehicle use and end-of-life stages.

During the production and logistics stage, targets in Energy and Climate Change deal with energy consumption, greenhouse gas (GHG) emissions, and the GHG impacts from transporting our vehicles and parts across the continent; targets in Recycling and Resource Management cover recycling, waste generation, zero landfill, paper use, remanufactured parts and water consumption; targets in Air Quality address air pollution.

We also set targets that transcend the life cycle. In Environmental Management, targets guide work with our suppliers and dealerships, as well as on our internal environmental management systems. Targets in Cooperation With Society ensure that we promote environmental stewardship, education and research with philanthropic partners and communicate our progress to the public.

This report describes the progress we made in North America in the last year of the action plan (fiscal year 2011, which spanned April 1, 2010 through March 31, 2011), as well as the overall progress we made over the life of the action plan. Throughout this report, we highlight key sentences that indicate whether a target was achieved or missed. These sentences are in bold and are followed by the target number from the EAP in Figure C.

Over the course of the coming year, we will be working on improving our environmental reporting efforts. When we launch our next report, we will publish new goals and targets for Toyota North America through fiscal year 2016.

FIGURE C

CONSOLIDATED SUMMARY OF SECOND TOYOTA NORTH AMERICAN ENVIRONMENTAL ACTION PLAN (FY2007-FY2011)	
GOALS AND TARGETS	STATUS
ENERGY AND CLIMATE CHANGE	
GOAL 1: Promote the development of technologies to achieve best-in-class fuel efficiency performance	
Targets: 1.1 Annually meet or exceed CAFE and CAFC standards in U.S. and Canada, respectively 1.2 Continue development and deployment of fuel-efficient technologies through the proactive engagement of stakeholders	● ●
GOAL 2: Introduce vehicle technologies that support the diversification of energy and fuel sources	
Targets: 2.1 Promote awareness of the CO ₂ reductions and energy security benefits of bio and synthetic fuels 2.2 Partner with industry and government to identify and solve challenges toward full-scale commercialization of alternatively fueled vehicles	● ●
GOAL 3: Promote the development of clean-energy vehicles and ensure wider market acceptance	
Target: 3.1 Demonstrate feasibility, support necessary infrastructure development, and advocate policies that promote progress toward full-scale commercialization of advanced vehicle technologies	●
GOAL 4: Promote initiatives to reduce traffic congestion through a variety of networking technologies	
Target: 4.1 (Revised 2010) Promote and communicate Toyota's efforts in Intelligent Transportation Systems (ITS) through media outreach, educational seminars and creation of ITS collateral assets	●
GOAL 5: Understand current CO₂ emissions volumes from North American operations and take action to reduce emissions	
Targets: MANUFACTURING 5.1 Using FY2002 as a base year, reduce total energy usage of manufacturing facilities/operations in North America by 27% per vehicle produced to 6.3MMBTU/vehicle produced 5.2 Meet or exceed AAM Climate VISION target of a 10% reduction in CO ₂ emissions per vehicle from U.S. assembly operations by CY2012 (CY2002 base year) SALES AND LOGISTICS 5.3 (Revised 2010) By FY2011, reduce energy consumption of U.S. facilities by 32.6%, from a FY2001 base year 5.4 Achieve 10% reduction in energy consumption from all Toyota Canada facilities by 2010 5.5 Track greenhouse gas emissions resulting from U.S. vehicle and parts logistics and continue to evaluate logistics-related emissions reduction methods (e.g., modal shifts, new technologies)	× ● × × ●
RECYCLING AND RESOURCE MANAGEMENT	
GOAL 6: Further promote and apply the Design for Recycling (DfR) concept	
Target: 6.1 Evaluate new materials from renewable resources toward further introduction of eco-friendly parts	●
GOAL 7: Reduce waste and the need to recycle material throughout all operations and processes	
Targets: MANUFACTURING FACILITIES 7.1 Reduce compensated waste (nonhazardous waste plus materials Toyota pays to be recycled) to 30 kg/vehicle 7.2 Maintain near-zero waste to landfill NONPRODUCTION FACILITIES: Vehicle Design Facilities: 7.3 Annually achieve zero hazardous landfill and reduce nonhazardous waste toward zero landfill SALES AND LOGISTICS FACILITIES 7.4 Recycle 75% of Toyota Motor Sales Headquarters waste by FY2010 7.5 Divert 95% waste from Toyota Canada main campus from landfill by FY2010 7.6 Reduce Toyota Canada facility paper consumption per person by 25% by FY2010 7.7 (Revised 2008) U.S. North American Parts Operations: Reduce waste to landfill by 25% to 5.1 pounds per 1,000 pieces shipped 7.8 (Revised 2008) U.S. Toyota Logistics Services: Maintain a 90% recycle rate and dispose 0.25 pounds or less per vehicle shipped	● ● ● ● × ● × ● ●
GOAL 8: Reduce water consumption	
Targets: MANUFACTURING: 8.1 Reduce water usage by 13% to 0.98 kgal/vehicle, from a FY2001 baseline SALES AND LOGISTICS 8.2a For U.S. facilities, evaluate baseline in FY2008 and set reduction targets in FY2009, focusing on areas where water is most scarce 8.2b Maintain water consumption at FY2008 levels 8.3 Achieve 10% water consumption reduction from Toyota Canada facilities by 2010	● ● ● ●

EAP Target Status:

- Achieved × Missed
○ On Track S Suspended

GOALS AND TARGETS	STATUS
RECYCLING AND RESOURCE MANAGEMENT	
GOAL 9: Promote management and further reduce the use of substances of concern (SOCs)	
Targets: 9.1 Reduce the use of mercury, lead, cadmium and hexavalent chrome in production and service parts and accessories to the <i>de minimis</i> levels in the current EU Directive 9.2 Identify and solve challenges toward effective management of additional vehicle SOCs 9.3 Facilitate SOC tracking and verification and support the development of SOC alternatives	● ● ●
AIR QUALITY	
Target: 9.4 Develop and implement alternative materials to reduce vehicle cabin VOC levels	●
GOAL 10: Reduce emissions to improve air quality in urban areas	
Targets: 10.1 Meet all applicable emissions standards, including Tier 2 and LEV II new vehicle certification standards 10.2 Maintain leading level in-use vehicle emissions compliance performance 10.3 Promote the development of ultra low emissions technologies and introduce the lowest emitting vehicles	● ● ●
GOAL 11: Implement initiatives to reduce and track VOC usage and emissions	
Targets: 11.1 <i>Vehicle Painting:</i> Reduce body painting VOCs to a corporate average of 14.0 g/m ² 11.2 <i>Vehicle Plastics:</i> Determine a VOC baseline in FY2006 and set plant targets that begin in FY2007	● ●
ENVIRONMENTAL MANAGEMENT	
GOAL 12: Steadily reduce the environmental impact of Toyota vehicles over their product life cycle	
Target: 12.1 Introduce implementation of Eco-Vehicle Assessment System (VAS) on all new or redesigned vehicle models beginning in CY2007	S
GOAL 13: Strengthen consolidated environmental management by incorporating environmental measures at the planning stages of a product or process	
Targets: NA OPERATIONS — ALL 13.1 Minimize environmental risks and achieve leading levels of environmental performance 13.2 Sales and Logistics: Maintain ISO 14001 certification at U.S. vehicle and parts logistics facilities 13.3 Sales and Logistics: Achieve ISO 14001 registration at two remaining (of nine total) Toyota Canada facilities by the end of 2007 13.4 Zero annual notices of violation and complaints 13.5 Consider LEED® (Leadership in Energy and Environmental Design) certification for new buildings/remodeling 13.6 Manufacturing: Develop eco-plant plans for all new production facilities (designing plants to minimize environmental impacts)	● ● ● × ●
GOAL 14: Enhance and further promote environmental management systems for business partners	
Targets: 14.1 SUPPLIERS: Update Toyota environmental requirements (Green Supplier Guidelines) for U.S. plant manufacturing suppliers 14.2 DEALERS: Implement U.S. dealer environmental training programs (HazMat, environmental, pollution prevention) 14.3 DEALERS: Achieve LEED certification at eight dealerships and a Certified Service Center by FY2010. Continue to cultivate interest in LEED at dealers.	● ● ●
COOPERATION WITH SOCIETY	
GOAL 15: Actively contribute to sustainable development efforts	
Target: 15.1 Strengthen Toyota's North American philanthropy efforts toward environmental/sustainable development projects and partnerships that contribute to development of new technologies, education and the preservation of biodiversity 15.2 Toyota Canada to maintain 25% of total annual philanthropic contributions directed toward environmentally focused programs 15.3 Promote basic environmental research aimed at CO ₂ emissions reductions	● ● ●
GOAL 16: Enrich stakeholder communications	
Targets: 16.1 Increase the transparency of Toyota's environmental plans, activities and performance by strengthening environmental communication with government agencies, eNGOs, business partners and local communities	●
RECYCLING AND RESOURCE MANAGEMENT	
GOAL 17: Contribute to the development of a recycling-based society	
Targets: 17.1 Launch at least 100 additional remanufactured parts applications per year 17.2 Expand the use of environmentally preferable paper in U.S. sales and marketing operations 17.3 Encourage the safe and environmentally appropriate disposal of tires by dealers through the TMS Tire Program	× ● S

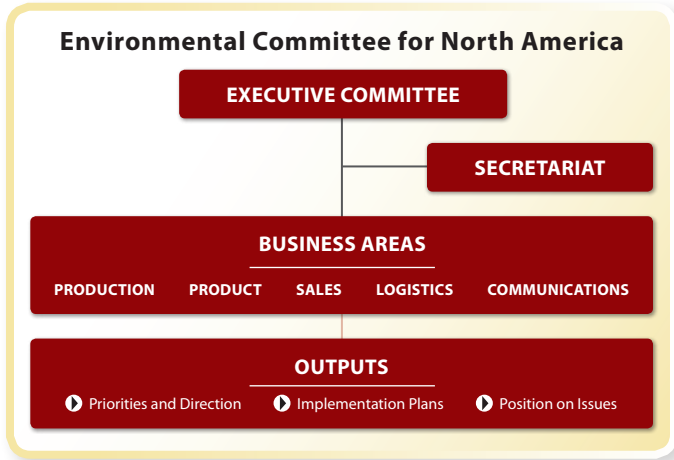
EAP Target Status:

- Achieved × Missed
- On Track S Suspended

► ENVIRONMENTAL GOVERNANCE

Toyota, like many large corporations, has a number of business areas or functions that make environmental decisions. We coordinate across these business areas and among our affiliated companies to effectively address our total environmental footprint. Toyota’s governance structure for environmental issues in North America is our Environmental Committee for North America (ECNA), and is illustrated in Figure D.

FIGURE D



The Environmental Committee for North America serves the following essential functions:

- Implementing Toyota’s corporate principles, policies and action guidelines.
- Setting overall direction and strategy to achieve the company’s vision.
- Establishing priorities, creating action plans and implementing those plans.
- Formulating unified positions on key environmental issues.
- Generally coordinating environmental activities.

CHIEF ENVIRONMENTAL OFFICERS



Stephen Beatty
Managing Director
Toyota Canada Inc.



Kevin M. Butt
General Manager
Toyota Motor Engineering & Manufacturing North America, Inc.



Dian Ogilvie
Senior Vice President & Secretary
Toyota Motor North America, Inc.



Christopher P. Reynolds
Group Vice President and General Counsel
Toyota Motor Sales, U.S.A., Inc.

The President from each North American affiliate and their designated delegates comprise the Executive Committee of the ECNA. Each Business Area within the Committee is then represented by a senior executive lead and environmental experts. Chief Environmental Officers responsible for coordinating planning and action within each affiliate, also serve the ECNA at either the Executive Committee (as a delegate) or Business Area level. Our current Chief Environmental Officers are pictured above.

The Environmental Committee for North America oversees development of the consolidated five-year Environmental Action Plan and the publication of this report. In addition, each of Toyota’s North American affiliates has established its own environmental governance structure.

TOYOTA | energy & climate change

The charging station at the Oregon Museum of Science and Industry is part of Portland's electric vehicle infrastructure. Portland State University is one of Toyota's program partners for the Prius Plug-in demonstration program.



Toyota is the most fuel-efficient full-line manufacturer in the U.S.



TOYOTA'S MOST SIGNIFICANT ENVIRONMENTAL IMPACT

is energy consumption. Our manufacturing plants consume electricity and natural gas to produce vehicles. The logistics operation consumes diesel to transport vehicles and parts across North America. And customers consume gasoline to drive Toyota, Lexus and Scion vehicles millions of miles a year.

Energy in all its forms is expensive—and getting more so every year—and its generation and use can be major contributors to greenhouse gas emissions. Toyota established targets five years ago in our environmental action plan to reduce energy consumption at all stages of the vehicle life cycle. While we missed some of these targets, we still found ways to reduce energy use throughout the business.

Toyota's employees implemented numerous *kaizens*, or continuous improvement opportunities, to reduce energy use at manufacturing plants and logistics sites. They also went into their communities to help local governments and others find ways to reduce energy use. For example, Toyota formed community partnerships with Scott County and the city of Georgetown in Kentucky to help develop energy management plans; please see the Environmental Vision and Action chapter for more information.

We moved our advanced technology vehicle programs forward by continuing our demonstration programs for fuel cell, electric and plug-in hybrid vehicles. One of our partners, Portland State University, is featured below. Our partnership with the university illustrates the broad range of issues that needs to be addressed to achieve sustainable mobility. The university is helping us gather information on the performance of our advanced technology vehicles; they are also using these vehicles to create coursework around urban planning and integrated transportation modes and fostering discussion in the broader community through seminars and conferences. It is this holistic approach that will lead to solutions for achieving sustainable mobility in North America.

Toyota's performance in the areas of fuel efficiency, advanced vehicle technologies, energy use and greenhouse gas emissions is described in this chapter.

► PARTNERSHIP: PORTLAND STATE UNIVERSITY

Portland State University (PSU) has a small but growing teaching curriculum focused on electric vehicles through their College of Engineering and Computer Science, along with a Smart Grid course offered by the College of Urban and Public Affairs. PSU's Urban Center has served as a launch site for vehicles from Toyota and some of our competitors. The Urban Center is in the heart of Portland's transportation electrification triangle, showcasing the integration of urban design and urban planning with integrated transportation modes involving streetcars, light rail trains, buses, passenger vehicles, bicycles and wide pedestrian boulevards.

In 2008, PSU co-produced Toyota's Meeting of the Minds: Transportation at the Crossroads, a three-day executive colloquium in Portland. Shortly thereafter, Toyota loaned four first-generation RAV4 EV vehicles to PSU for university use. PSU is also one of Toyota's program partners for its Prius plug-in demonstration program. The University deployed eight vehicles to demonstration drivers in Portland, Salem, Corvallis, Eugene and Ashland, as well as two vehicles to the car sharing service Zipcar.

► FUEL EFFICIENCY

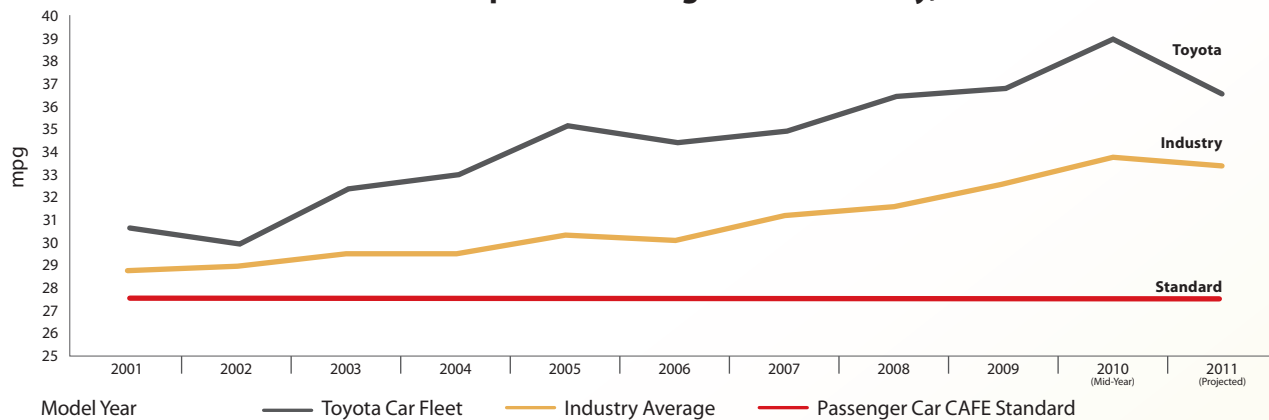
Fuel efficiency is the distance a vehicle can be driven on a certain amount of fuel, measured in the U.S. as miles per gallon (mpg). Fuel consumption is the quantity of fuel burned over a defined distance, and in Canada is measured as liters of fuel burned per 100 kilometers traveled (L/100 km). The amount of fuel burned is directly related to emissions of carbon dioxide (CO₂), a greenhouse gas: The more fuel burned, the more CO₂ emitted.

Through the 2011 model year, fuel efficiency of new vehicles has been regulated by Corporate Average Fuel Economy (CAFE) standards in the U.S. In Canada, voluntary Company Average Fuel Consumption (CAFC) targets were in place through the 2010 model year. (Beginning with the 2011 model year, mandatory regulations are in place. See the discussion on *New Fuel Economy and GHG Emissions Standards* below.) Both CAFE and CAFC are sales-weighted averages of the fuel economy of a manufacturer's fleet.

Toyota offers the most fuel-efficient fleet of any full-line manufacturer. **As seen in Figure E, Toyota has been performing better than CAFE standards and CAFC targets for both passenger cars and light trucks, and better than the industry average. (Target 1.1)** Our CAFE and CAFC performance is driven by higher volume sales of our most fuel-efficient vehicles, such as Prius and Corolla. Since it was introduced in the U.S. in 2000, Prius, when compared to the average car, has saved American consumers more than an estimated 900 million gallons of gas, \$2.5 billion in fuel costs and 14 million tons of CO₂ emissions.

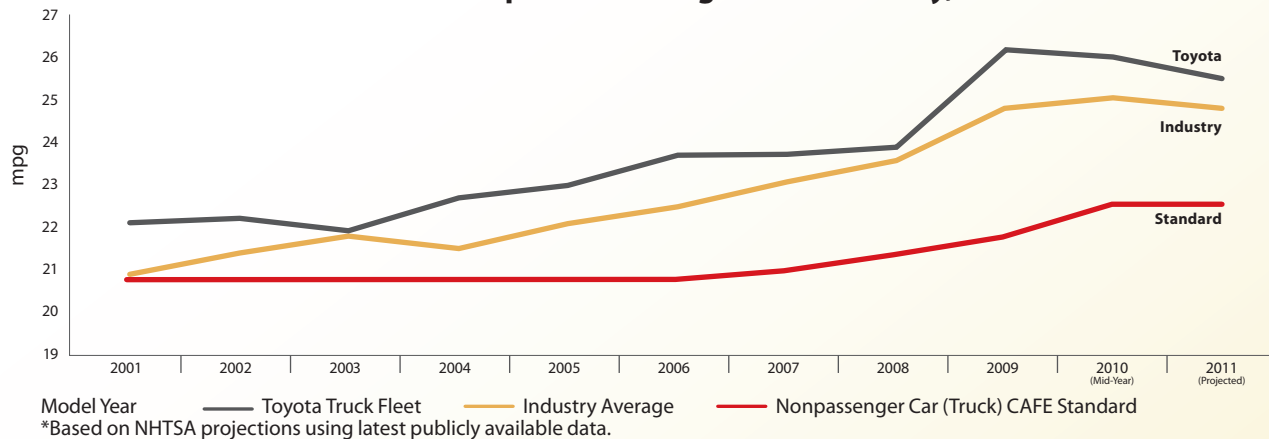
FIGURE E

U.S. Car Corporate Average Fuel Economy, or CAFE



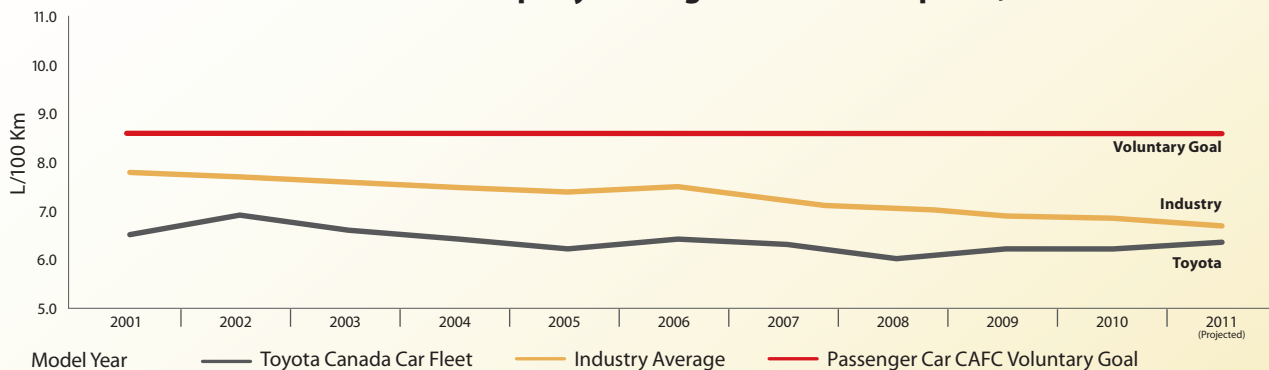
Indicates Better Performance

U.S. Truck Corporate Average Fuel Economy, or CAFE



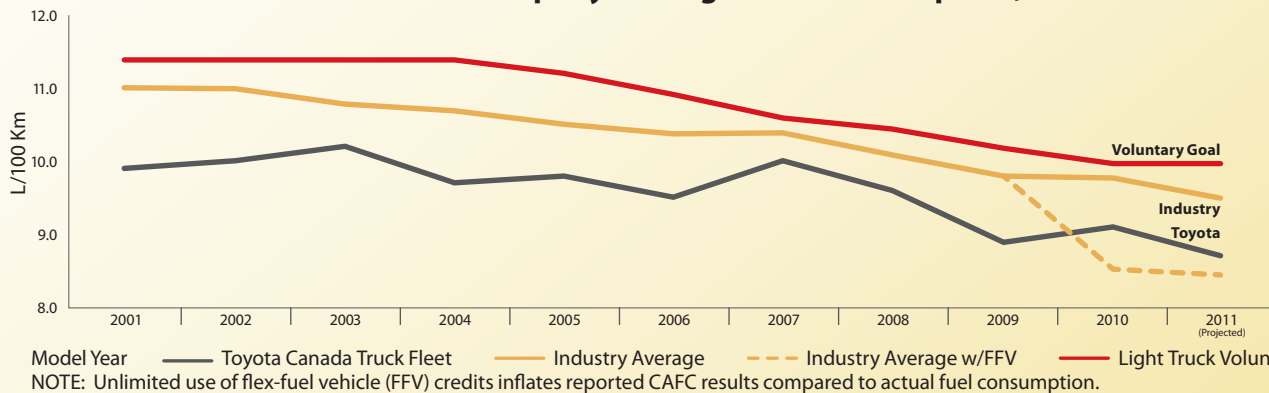
Indicates Better Performance

Canadian Car Company Average Fuel Consumption, or CAFC



Indicates Better Performance

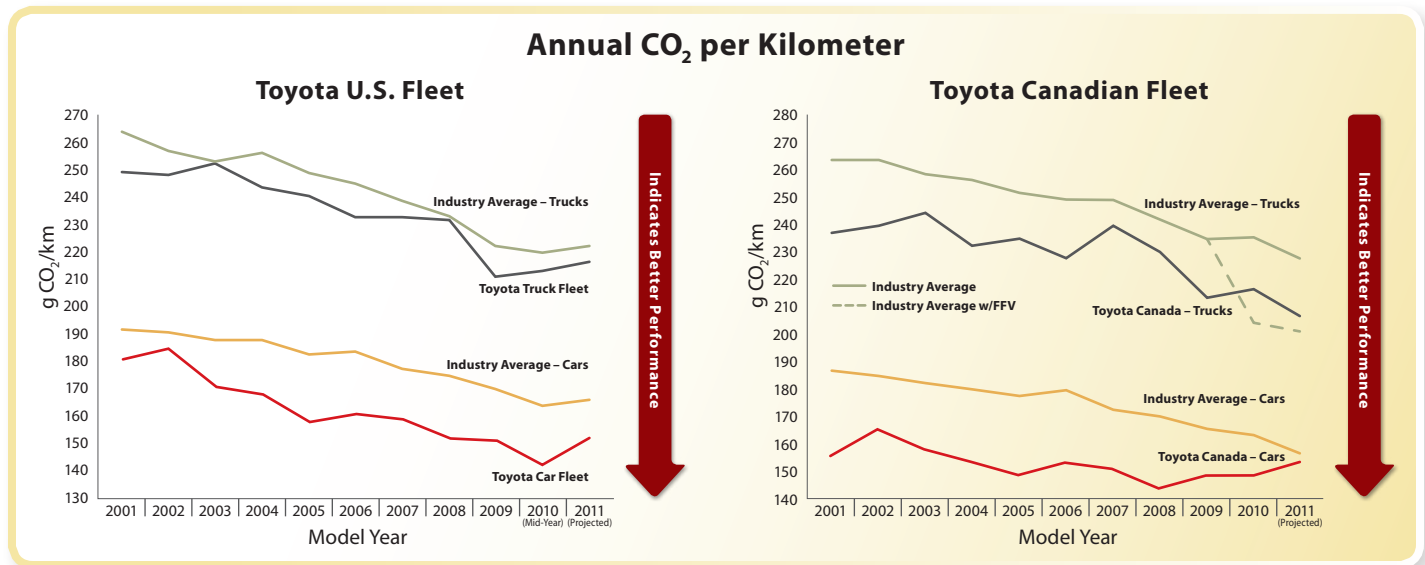
Canadian Truck Company Average Fuel Consumption, or CAFC



Indicates Better Performance

NOTE: Unlimited use of flex-fuel vehicle (FFV) credits inflates reported CAFC results compared to actual fuel consumption.

FIGURE F



CO₂ emissions from Toyota's new vehicles are below that of the industry average in both the U.S. and Canada, for both cars and light-duty trucks.

To achieve these results, we are continuing with the development and deployment of fuel-efficient technologies. **(Target 1.2)** Toyota's engineers evaluate body design, engines, transmissions, vehicle weight and other factors to find ways to improve fuel efficiency. For example, over 50% of the vehicles offered in North America use low viscosity SAE 0W-20 multigrade engine oil. This low viscosity oil enables increased fuel economy over higher viscosity oils by reducing friction while maintaining necessary lubrication in the engine. These fuel-efficient technologies also help to reduce CO₂ emissions from Toyota's fleet (please see Figure F).

New Fuel Economy and GHG Emissions Standards

For nearly 30 years, new vehicle fuel economy standards in the U.S. have been established by the National Highway Traffic Safety Administration (NHTSA). These standards also have been adopted in Canada, with minor adjustments to fit the Canadian market. Beginning with the 2009 model year, the regulatory landscape became more complex, as the California Air Resources Board (ARB) began regulating greenhouse gas (GHG) emissions from new vehicles sold in California. Over a dozen other U.S. states subsequently adopted the California GHG standards. And finally, as a result of the Supreme Court decision in *Massachusetts vs. EPA*, the U.S. Environmental Protection Agency (EPA) began developing GHG regulations for new motor vehicles at the federal level. The result was an inefficient and complicated set of overlapping regulations at the federal and state level.

In April 2010, as a result of an agreement between regulators and auto makers, EPA, NHTSA and ARB finalized a coordinated national program for fuel economy and GHG emissions standards for passenger cars and light trucks in the U.S. This agreement greatly reduced the complexity of the

regulations while preserving environmental benefits. These requirements cover the 2012 through 2016 model years. By 2016, the new vehicle fleet must meet a GHG standard of 250 grams of CO₂ per mile (equivalent to a CAFE standard of 35.5 miles per gallon).

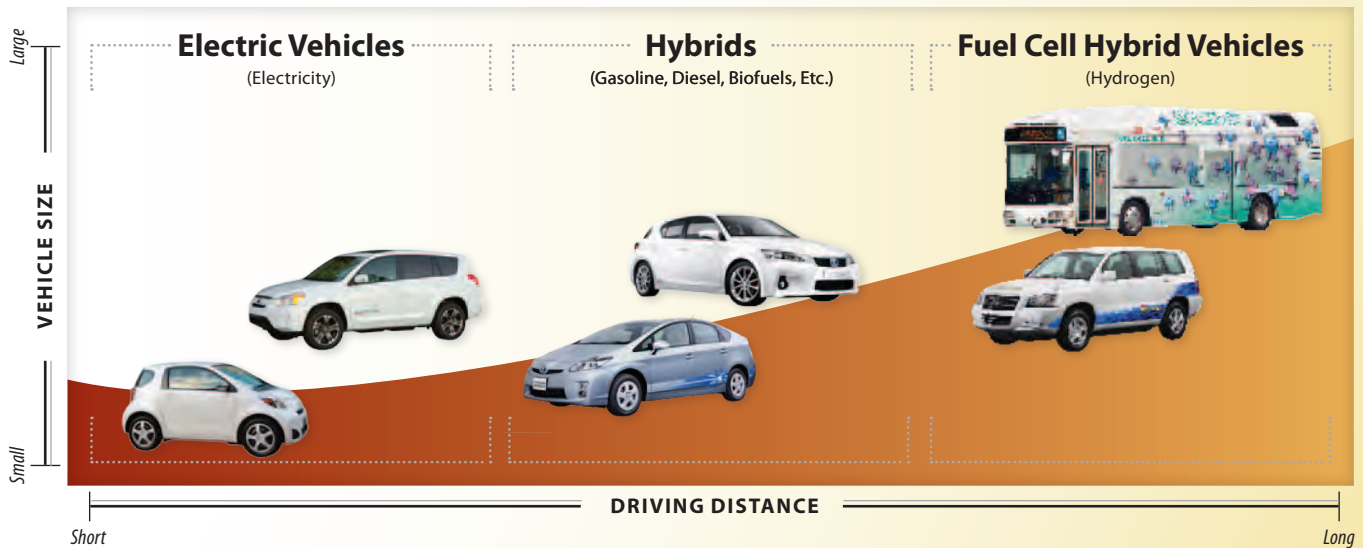
Toyota in Canada supports a harmonized approach with the U.S. to setting fuel consumption standards. The Canadian federal government introduced a fuel consumption regulation under the Canadian Environmental Protection Act for the 2011 through 2016 model years that contains requirements similar to the CAFE standards adopted in the U.S.

The process of developing these standards is an example of how government and industry can work together. It illustrates one of the cornerstones of how Toyota approaches public policy—through partnerships. EPA and NHTSA have worked closely with auto manufacturers, the state of California, environmental groups and other stakeholders to craft a national approach that will achieve significant reductions in energy consumption and GHG emissions.

Toyota supports the agencies' commitment to maintaining a single national framework for fuel economy and vehicle GHG regulation beyond 2016. In fact, in August 2011, Toyota joined other auto makers in support of extending the strong national fuel economy and GHG program to cover the 2017 to 2025 model years. Final standards for this time period are expected to be finalized by mid-2012. Toyota in Canada continues to support harmonization between the two national programs. Toyota's approach to advanced technology and the work done through partnerships on alternative transportation fuels—both discussed later in this chapter—will be instrumental to our success in meeting these new standards.

FIGURE G

Energy Sources for Toyota's Advanced Technology Vehicles



The vehicles shown from left to right are: Scion iQ, RAV4 EV, Prius, Lexus CT 200h, FCHV-adv and a fuel cell hybrid bus.

► FUELS DIVERSITY

The diversity of transportation fuels plays a key role in helping countries realize their energy security and greenhouse gas reduction goals. Alternatives to traditional gasoline and diesel fuels, such as ethanol, biodiesel, natural gas and electricity, are already in the marketplace in many parts of the world. Others, like hydrogen, cellulosic ethanol, biohydrocarbons and various synthetic fuels, are on the horizon. Although beneficial in many ways, fuels diversity challenges global auto manufacturers to design and build competitive vehicles with vastly different powertrains and operating characteristics. A number of Toyota's advanced technology vehicles are designed to use alternative fuels such as electricity and hydrogen (please see Figure G).

To help stakeholders better understand the benefits and challenges of fuels diversity, Toyota is participating in a National Petroleum Council study that will result in a report on the prospects of future transportation fuels through 2035, with views to 2050, for auto, truck, air, rail and waterborne transport. The study, requested by the Secretary of the Department of Energy, has four main objectives:

- Address fuel demand, supply, infrastructure and technology in the context of U.S. objectives to protect the environment, promote economic growth and competitiveness, and support energy security.
- Describe accelerated technology pathways to improved fuel efficiency, reduced environmental impact and deployment of alternative fuels at scale.

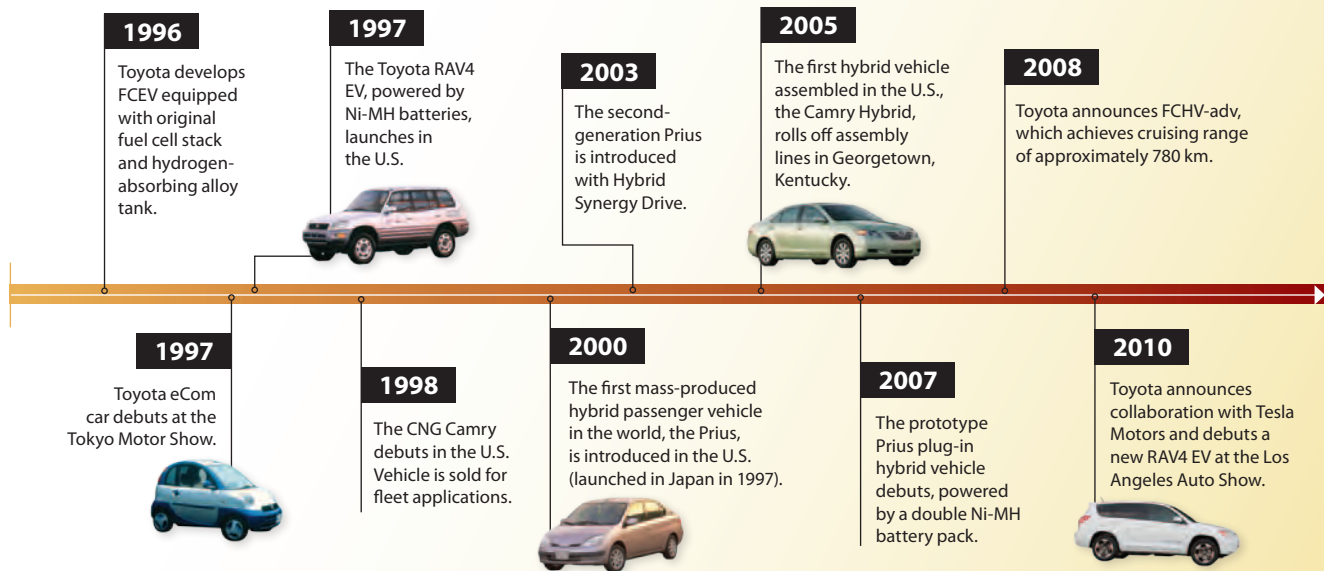
- Deliver insights into potential policy options and investments that industry and government can take to accelerate the acceptance of alternative fuels, engines and vehicles.
- Describe actions that industry and government can take to stimulate the technological advances and market conditions needed to reduce life-cycle GHG emissions in the U.S. transportation sector by 50% by 2050 relative to 2005 levels, while enhancing the nation's energy security and economic prosperity.

Biofuels

Toyota is also monitoring biofuel R&D and production scale up (Target 2.1). Last year, approximately 13 billion gallons of corn ethanol were blended with gasoline in the U.S., reducing gasoline consumption by about nine percent. This is a significant accomplishment, but raises concerns about using a food crop for fuel. Developing processes that can produce fuels from nonedible plants or agricultural residue avoids these concerns and is the goal of researchers around the world. Researchers are working on producing alcohols from cellulose, and gasoline or diesel from biomass, sugars or algae. Currently, a number of these biofuel processes have been shown to work on a small scale. The challenge has been to demonstrate economic viability at a commercial-scale fuel facility (over 100 million gallons per year). Toyota believes initial commercial application for these processes will be biochemicals or bioproducts, because they are more profitable and require lower cost production facilities than fuels. As a result, ethanol from corn and sugar cane will continue to account for the majority of the world's biofuel production.

FIGURE H

Advanced Technology Vehicle Milestones



Toyota strongly supports the development of alternative fuels to help reduce dependence on foreign oil and potentially reduce vehicle emissions. However, along with many other automobile manufacturers, Toyota is concerned about the U.S. Environmental Protection Agency (EPA) waivers approving use of E15 for model year 2001 and newer vehicles that were not designed to operate on this level of ethanol. This is why Toyota, as a member of the Alliance of Automobile Manufacturers, has joined with other engine producers to oppose EPA's E15 waiver decisions.

Toyota recognizes that ethanol and other renewable fuels will continue to play an important role in U.S. energy policy. But, rather than pursue a retrospective solution that carries substantial risks for consumers, automakers, equipment makers and fuel providers, we need a prospective solution that provides adequate lead time for vehicle development, fueling infrastructure modifications and misfueling prevention measures. In support of this notion, and to avoid a continually moving target, Toyota stands ready and willing to develop vehicles capable of operating on higher levels of ethanol, provided the issues of lead time, infrastructure and misfueling are addressed.

We welcome the opportunity to work with key stakeholders in Congress, the regulatory agencies, the auto industry, the fuel industry and others to examine a practical pathway forward that would introduce midlevel ethanol blends into the market, while being mindful of vehicle and infrastructure compatibility.

▶ ADVANCED TECHNOLOGY VEHICLES

Toyota's approach to sustainable mobility focuses on the world's future reliance on mobility systems tailored to specific regions or markets, rather than individual models or technologies. We acknowledge that one technology will not be the "winner" and that a mobility system in Los Angeles will probably look very different from systems in Dallas, New York, London or Shanghai. That's why Toyota is investing in a number of advanced technology vehicles and is rolling out conventional hybrids across our entire lineup, as well as plug-in hybrids, electric vehicles and fuel cell hybrid vehicles. Please see Figure H for significant milestones in the development of advanced technology vehicles.

We continue to work with government agencies and other partners to address a number of key challenges associated with full-scale commercialization of advanced technology vehicles. (Target 2.2) Toyota also continues to participate in and support SAE's Committee on Safety Standards and SAE's Fuel Cell Safety Working Group. We contributed to the drafting of two technical papers on FCHV safety. The first paper, SAE J2578 (*Recommended Practice for General Fuel Cell Vehicle Safety*, January 2009), provides introductory mechanical and electrical system safety guidelines that should be considered when designing fuel cell vehicles for use on public roads. The second paper, SAE J2579 (*Technical Information Report for Fuel Systems in Fuel Cell and Other Hydrogen Vehicles*, January 2009), defines design, construction, operational and maintenance requirements for hydrogen storage and handling systems in on-road vehicles.

Toyota views the current lack of infrastructure for both fuel cell and electric vehicles as one of the greatest obstacles to commercialization. Without convenient places to recharge or refuel, the main stream consumer will be less willing to adopt these advanced technologies. Through the California Fuel Cell Partnership (CaFCP), Toyota is working with government agencies, other auto manufacturers, utilities and other key stakeholders to support the development of necessary infrastructure for these vehicles. **Our demonstration programs in North America play a key role in supporting infrastructure development by educating the public and stimulating the development of infrastructure to support deployment of our advanced technology vehicles. (Target 3.1)**

Electric Vehicles

Toyota engineers have been studying electric vehicles (EVs) for nearly 40 years. Since the early 1970's, Toyota has made enormous strides in creating a consumer- and environmentally-accepted electric vehicle. To date, Toyota has developed the TownAce EV (van) and the Crown Majesta EV (sedan) in the Japanese market, the Toyota e-com (a two passenger concept EV) and two generations of the RAV4 EV in the U.S. market. Alongside the company's ground-breaking hybrid, plug-in hybrid and fuel cell vehicles, EV technology represents another component of the company's long-term vision for sustainable mobility.

Toyota debuted the second-generation RAV4 EV, the RAV4 EV Prototype-Phase Zero, at the Los Angeles Auto Show in November 2010. This vehicle was built as part of a collaboration between Toyota and Tesla Motors, Inc. on the development of electric vehicles, parts, production systems and engineering support.



Toyota is collaborating with Tesla Motors, Inc. on the development of a RAV4 electric vehicle. The fully-engineered vehicles will be built at our facility in Woodstock, Ontario, and will be brought to market in the U.S. in 2012.

A total of 31 RAV4 EV Prototype-Phase Zeros were built for a demonstration and evaluation program running through 2011. These demonstration vehicles utilize the current RAV4 vehicle built in Woodstock, Ontario, and integrate a lithium metal oxide battery pack and additional components built by Tesla at its facility in Palo Alto, California.

The purpose of the EV demonstration program is to educate the public about electric vehicle technology and promote the development of electric vehicle charging infrastructure. The customer experience has been a major focus from the beginning. In April 2011, Toyota held a "ride and drive" event at its annual Sustainable Mobility Seminar in La Jolla, California, providing the media with its first opportunity to drive these prototype vehicles.

Toyota's end goal for the RAV4 EV has been a vehicle with driveability characteristics as close to the conventional RAV4 as possible. The fully-engineered vehicle will target a real world driving range of 100 miles in a wide range of climates and conditions, produce zero emissions and is planned for launch in 2012.

EV limitations, such as recharging time and limited range, continue to be barriers for consumers' willingness to consider the technology. While some consumers are willing to accept these limitations for the vehicle's smooth electric drivetrain and zero tailpipe emissions, this is only a small percentage of the market. EVs will be one option in our portfolio of advanced technologies, but not the solution for every customer.

Hybrid Vehicles

Toyota introduced Prius, the first mass-produced gasoline-electric hybrid powertrain vehicle, to the global market in 1997. Toyota sees hybrid technology as a stepping stone to minimizing the environmental impacts of gasoline-powered vehicles. Ultimately, we believe hybrid technology is the foundation of future powertrains that can utilize a wide variety of energy sources and fuels, including hydrogen, biofuel, natural gas and electricity.

Toyota celebrated the sale of the one millionth Prius in the United States in April 2011. This is the third milestone for Toyota's hybrid lineup in the last year that started with the announcement of worldwide Prius sales topping two million in October 2010, and overall global Toyota hybrid sales passing three million in March 2011.

Prius topped both the U.S. EPA's and Natural Resources Canada's lists of the most fuel-efficient vehicles for 2011, and was named the best overall value of the year for the last nine years in a row by IntelliChoice. It has the highest owner loyalty of any midsize vehicle for four of the last five years, according to R.L. Polk.

Toyota debuted the Prius v in January 2011 at the North American International Auto Show in Detroit. Prius v, which goes on sale in the fall of 2011, was the first vehicle to be debuted as part of the Prius Family. It is a midsize vehicle that provides more than 50% additional interior cargo space than the current Prius.

HYBRID FLEET

Toyota will launch two Prius Family members in 2012, the Prius Plug-in Hybrid and the Prius c Concept. They will join the current fleet of Toyota and Lexus hybrids:

- Prius, launched 2000
- Highlander Hybrid, launched 2005
- Lexus RX 400h/RX 450h, launched 2005
- Camry Hybrid, launched 2006
- Lexus GS 450h, launched 2006
- Lexus LS 600h L, launched 2007
- Lexus HS 250h, launched 2009
- Lexus CT 200h, launched 2011
- Prius v, launched 2011

*Launch dates refer to North American launches.

Plug-In Hybrid Vehicles

As the global leader in hybrid vehicles, it is vital that Toyota expand our hybrid drive technology. A pathway that shows promise to reduce fuel consumption and emissions (including CO₂) is the plug-in hybrid vehicle (PHV).

Toyota's PHV offers all the advantages and utility of a conventional hybrid vehicle, plus gives the consumer the ability to drive all electrically and recharge the on-board battery pack from home or any location with an electrical outlet. Depending on the driving profile, regular recharging can reduce gasoline consumption by up to one-third over a conventional Prius, which in turn reduces both mobile source GHGs and criteria pollutants. This is accomplished by adding a modestly larger battery pack to a conventional Prius platform. Drivers can commute to work and complete shorter trips using only electricity, while enjoying the benefits of an efficient hybrid and unlimited driving range for longer trips. The smaller battery approach avoids the additional cost and potential underutilization associated with larger PHV battery systems.

The second-generation PHV is based on the third-generation Prius. With the introduction of a lithium-ion drive battery, the demonstration program vehicle can operate in electric-only mode at higher speeds and for longer distances than the conventional Prius hybrid. This Prius PHV achieves a maximum electric-only range of approximately 13 miles and can reach highway speeds in electric-only mode. For longer distances and higher speeds, the PHV reverts to "hybrid mode" and operates like a regular Prius.

The lithium-ion (Li-ion) batteries powering the second-generation PHVs are built in conjunction with PEVE (Panasonic EV Energy Company, LTD), a joint venture with Toyota. Because of its superior energy density compared to NiMH chemistry, Li-ion technology is a leading contender for the PHV application. But the PHV duty cycle (regular deep discharges) is much harder on a battery than the frequent mild discharges traditional hybrid batteries must endure. In addition, Li-ion batteries have shown sensitivity to extreme hot and cold temperatures. Consumers have come to expect their hybrid vehicle battery will last the life of the vehicle, and Toyota will only bring a PHV to market that will live up to that expectation. Confirmation of the durability of the lithium-ion battery pack is just one of the many aspects that was exhibited during the PHV demonstration program.



Portland State University is tracking the percentage of time the PHVs are operating in all electric mode. One key benefit of the Prius Plug-in is that the alternative to the electric mode is a conventional hybrid, which is high on fuel economy and low on tailpipe emissions.

PHV Demonstration Program

In late 2009, Toyota began delivery of 600 second-generation PHVs to participants in a global demonstration program. Toyota has placed more than 160 of these vehicles with North American program partners in regional clusters in the U.S. in Colorado, California, New York, Oregon, Massachusetts and Washington, D.C., and in Canada in British Columbia, Manitoba, Ontario and Quebec. Each placement scenario has a variety of "use cases" or driving conditions (e.g., commute length, usage type, access to charging) to gain maximum input on vehicle performance and customer needs.

The goals of the program are to demonstrate plug-in hybrid technology, educate and inform the public, evaluate performance and better understand the technology's benefits to future customers. On the consumer side, this program allows Toyota to gather in-use driving feedback and understand customer expectations for plug-in technology. On the technical side, the program aims to confirm the overall performance of Toyota's first-generation lithium-ion battery technology in a wide variety of real world applications, and encourage further development of public-access charging station infrastructure. This demonstration program will help prepare the market and provide Toyota the opportunity to inform, educate and prepare customers for the electrification of the automobile in general and the introduction of plug-in hybrid technology in particular.

Participants in the demonstration program include, among others, the British Columbia Institute of Technology, the University of California at Berkeley, Georgetown University, the California Center for Sustainable Energy, the Port Authority of New York and New Jersey, California's South Coast Air Quality Management District, and Zipcar locations in Boston, San Francisco and Portland. For more information on PHV demonstration program partners, please visit www.toyota.com/esq.

In the spring of 2010, Toyota placed 18 Prius PHVs with Xcel Energy's SmartGridCity™ project in Boulder, Colorado. The vehicles are the focus of an interdisciplinary research project coordinated by the Renewable and Sustainable Energy Institute (RASEI), a joint venture between the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) and the University of Colorado at Boulder. RASEI, Xcel and Toyota are using the program to gather data on vehicle performance and charging patterns, consumer behavior and preferences, and electric utility/customer interactions. The location offers the additional benefit of monitoring high altitude, cold climate performance of Toyota's first-generation lithium-ion battery.

In mid-2011, data from U.S. demonstration program vehicles began streaming to www.toyota.com/esq. As the vehicles gather miles, data such as fuel economy, miles driven, charge incidents and additional content is viewable online. In addition, demonstration partners are sharing data amongst themselves and comparing usage and performance of the vehicles. A sample of the data collected by the California Center for Sustainable Energy is shown in Figure I.

This in-use, readily available data helps consumers understand how the plug-in hybrid vehicles are being used, how they are performing and if a plug-in is the right vehicle for them. One key benefit of the Prius Plug-in is that the alternative to the electric mode is a conventional hybrid, which is high on fuel economy and low on tailpipe emissions.

FIGURE I

Demonstration Program Partner: California Center for Sustainable Energy Vehicle Usage Data

Total miles driven over seven weeks: **3,455**

Number of drivers: **13**

Drivers with access to home charging: **9**

Drivers with access to workplace charging: **13**

Average work commute: **22** miles roundtrip

Total gallons of gasoline used: **42**

Total kilowatt-hours of electricity used: **300**

Petroleum reduction over seven weeks: **68%**

GHG emissions reduction: **60%** (assuming average CA electricity generation)

The California Center for Sustainable Energy conducted a PHV demonstration program in the summer of 2010 with two Prius PHVs. The information collected is an example of the kinds of data needed to understand the customer experience and market demand.

Fuel Cell Hybrid Vehicles

Toyota's fuel cell hybrid vehicles (FCHVs) are powered by fuel cells that generate electricity from hydrogen. Hydrogen gas is fed into the fuel cell stack where it is combined with oxygen from air. The electricity produced by this chemical reaction is used to power the vehicle's electric motor and charge the battery. A fuel cell vehicle emits only water vapor; the exhaust contains no particulate matter, hydrocarbons or other pollutants.

Toyota began a lease program for FCHVs in the U.S. and Japan in 2002 with universities and corporate customers. Currently, over 60 FCHVs are in service in California, New York and Connecticut with universities, corporations and government agencies. Toyota has gathered millions of miles of on-the-road information about our FCHVs. For example, we carried out a road test in September 2007 along the Alaska-Canadian (ALCAN) Highway. Driving 2,300 miles (3,700 kilometers) between Fairbanks, Alaska, and Vancouver, British Columbia, the FCHV proved its ability to maintain consistent performance under demanding conditions.



Toyota completed a 2,300-mile trek in an advanced prototype of the new Toyota FCHV along the Alaska-Canadian (ALCAN) highway. As you can see, the vehicle withstood rough road conditions and severe weather, and performed perfectly.

Since the 2002 introduction of the first-generation FCHV, Toyota engineers have continued to improve the vehicle range, durability and efficiency through advances in the fuel cell stack and the high-pressure hydrogen storage system, while achieving significant cost reductions in materials and manufacturing. The latest FCHV iteration, the FCHV-advanced (FCHV-adv), was introduced in 2008 and boasts an estimated range increase of more than 150% over the first-generation FCHV. The FCHV-adv fuel cell system features four compressed hydrogen fuel tanks, an electric motor, a nickel-metal hydride battery and a power control unit.

Fuel cell vehicles have faced a challenge in cold regions because the water produced in fuel cell operation tends to freeze in the fuel cell stack and auxiliary parts. Toyota has consistently worked to improve cold weather performance of the fuel cell, and the FCHV-adv can start in temperatures as low as -30 degrees Celsius.

Toyota began delivering our latest-generation FCHV-adv to limited test customers in late 2008. To demonstrate the in-use driving range of this vehicle, Toyota conducted a driving range and fuel economy evaluation with engineers from the National Renewable Energy Laboratory and the Savannah River National Laboratory. Two FCHV-adv vehicles were instrumented, filled with hydrogen fuel and driven during a variety of driving conditions on a weekday from Torrance, California, to San Diego, then to Santa Monica and back. Both FCHVs completed the 332-mile (534-kilometer) trip with enough hydrogen left in the tanks to keep going an estimated 100 miles (160 kilometers). Fuel economy on the journey was approximately 68 miles per kilogram of hydrogen (109 kilometers per kilogram). (A kilogram of hydrogen is roughly the same energy equivalent as a gallon of gasoline.)



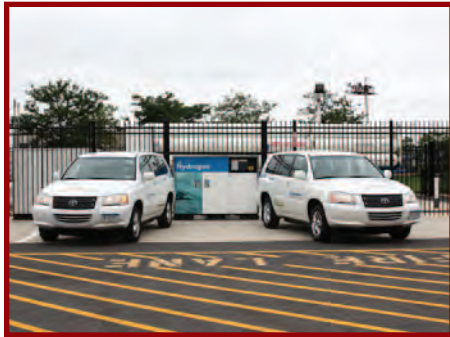
The FCHV-adv was certified in a government field evaluation as having a range of approximately 431 miles on a single tank of hydrogen.

Toyota is deploying more than 100 FCHV-adv vehicles by 2013 with universities, private companies and government agencies in both California and New York as part of a nationwide demonstration program. During this period, additional regions and partners will be added as new hydrogen stations come online. The demonstration program aims to increase awareness of fuel cell technology and spur development of much-needed infrastructure prior to the planned market introduction of the FCHV in 2015.

Development of Hydrogen Infrastructure

Before manufacturers can begin selling fuel cell vehicles in a given region, there must be adequate and convenient hydrogen refueling infrastructure. Japan has committed to building 100 and Germany 500 hydrogen refueling stations by 2015. Hydrogen infrastructure is also growing in the U.S., but additional stations are needed before mass market introduction in 2015.

Ten new fueling stations are planned in California, funded by the California Energy Commission. Through the California Fuel Cell Partnership, Toyota worked jointly with other automakers on recommendations for fuel demand and locations of these stations.



Toyota deployed 12 FCHVs to New York's Port Authority to be used at John F. Kennedy and LaGuardia airports. These vehicles are supported by a hydrogen station at John F. Kennedy Airport.

Toyota placed 10 FCHV-adv vehicles in the Connecticut area in the fall of 2010. The vehicles are supporting the new SunHydro solar-powered hydrogen fueling station located at Proton Energy Systems' headquarters in Wallingford, Connecticut. SunHydro is leading the development of hydrogen fueling stations along the East Coast that will make it possible to drive a fuel cell vehicle from Maine to Florida. When completed, the series of SunHydro stations will be the world's first privately-funded network of hydrogen fueling stations.

In May 2011, the first hydrogen fueling station in the U.S. fed directly from an active industrial hydrogen pipeline was opened in Torrance, California. Located adjacent to Toyota's U.S. sales and marketing headquarters campus, the station is a collaborative effort between Toyota, Air Products and Shell, and received funding assistance from the South Coast Air Quality Management District and the Department of Energy. Shell operates the facility, and Air Products provides onsite equipment, station maintenance and hydrogen gas through a pipeline from its plants in Wilmington and Carson, California. The station will be used by Toyota and other manufacturers to fuel hydrogen fuel cell vehicles.



The hydrogen fueling station adjacent to Toyota's U.S. sales and marketing headquarters is fed by an active industrial hydrogen pipeline. The station is used by Toyota and other auto manufacturers to fuel hydrogen fuel cell vehicles.

Shell and Toyota are also working together to establish a learning center at the facility to provide hydrogen and station information to local students and the general public. The opening of the station serves as another landmark in the California Hydrogen Highway initiative, aiming to create clean air solutions and develop new technology jobs across the state.

To further utilize the hydrogen pipeline, Toyota is partnering with Ballard Power Systems to install a one-megawatt hydrogen fuel cell generator to offset peak electricity demand on its Torrance campus. The fuel cell is scheduled for installation in 2012 and is estimated to reduce annual CO₂ emissions by 10,000 tons.

Toyota's partnerships with Shell, Air Products and Ballard on hydrogen infrastructure and stationary fuel cell technology illustrate our commitment to innovation, sustainability and our communities. It is only by working with others that we are able to accomplish these milestones.

▶ ADVANCED TRANSPORTATION SOLUTIONS

There has been steady progress in the development of technology that allows vehicles to communicate with one another and with roadway infrastructure. Toyota engineers in Ann Arbor, Michigan, designed an application of this technology called the Green Wave Advisor. This device enables traffic signals to communicate directly with the vehicle. The signals send information to the vehicle that is translated and displayed for the driver. The device shows the driver suggested speed ranges that, if followed, allow the driver to pass through a series of green traffic lights. **Toyota's engineers are continuing to develop and demonstrate advanced transportation solutions for our vehicles that will work in concert with public infrastructure technologies. (Target 4.1)**

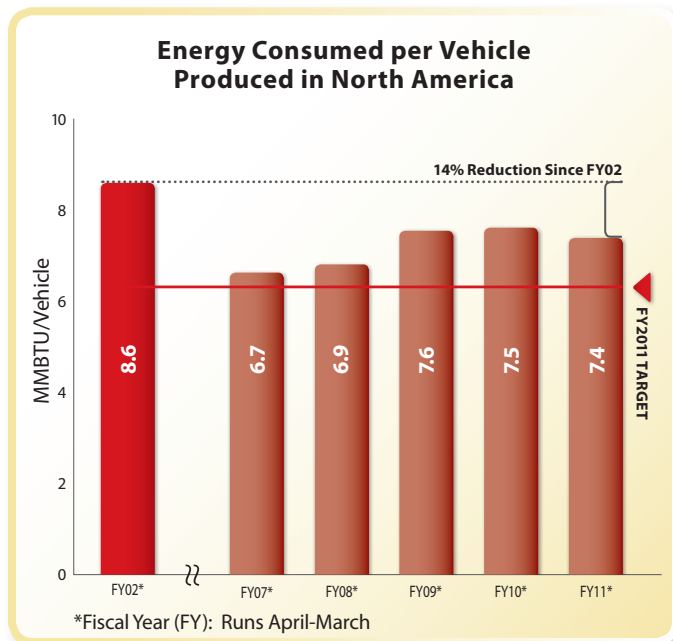
► ENERGY CONSUMPTION

Toyota facilities across North America closely track and manage energy consumption. Energy use is a major factor in the generation of greenhouse gas (GHG) emissions. In addition, the rising cost of energy provides incentive for reducing energy consumption. Targets to reduce energy use cover all of our facilities and are described below.

Manufacturing

Toyota's North American manufacturing facilities set a target to reduce energy use by 27% per vehicle produced by FY2011, from a FY2002 baseline with a projected production volume of 2.05 million vehicles. **In FY2011, energy consumption decreased slightly from FY2010 to 7.47 MMBTUs per vehicle, with production at 1.31 million vehicles (please see Figure J). This was not enough to meet the target of 6.3 MMBTUs per vehicle. (Target 5.1)** The North American plants have run as much as 60% below capacity in the last three years, while the minimum amount of energy (fixed load) needed to run the plants has remained fairly constant. At the same time, Toyota added almost 11 million square feet of manufacturing capacity in North America, including one new engine plant and one new casting plant. Combined, these challenges severely impacted per vehicle energy performance.

FIGURE J



Despite these challenges, total energy use has been reduced over the last five years. In 2011 Toyota's North American manufacturing affiliate (Toyota Motor Engineering & Manufacturing North America, Inc.) received an ENERGY STAR® Sustained Excellence Award for the seventh consecutive year. U.S. EPA selects organizations for this award that have exhibited exceptional leadership year after year in the ENERGY STAR program.

Toyota's North American manufacturing operations have a strategic goal to become the regional leader in energy performance in North America. They are focusing on:

- Benchmarking buildings and processes, both internal and external, to identify opportunities for reducing energy consumption.
- Use of *kaizen*, *yokoten* (or transfer of knowledge) and innovative technology.
- Implementation of major projects to achieve energy reductions.
- Development of renewable resources.
- Standards development (ISO 14001, Enterprise Management).

Toyota's newest plant in Blue Springs, Mississippi, has implemented a combination of innovative and operational *kaizens* that have resulted in energy savings of approximately 50,000 MMBTUs. Many of these *kaizens* were implemented after construction to address internal feedback and Toyota's strategic goal. Some additional examples of activities that have helped the plants in North America reduce energy consumption are described below.

Annual Energy Challenges

The Georgetown, Kentucky, plant has held an annual President's Shutdown Energy Challenge since 2005. This contest encourages the different shops to compete to achieve the highest reduction in energy consumption during the December shutdown, based on a comparison of energy use from the previous shutdown. The Plastics Shop won the 2010 contest with a 37% energy reduction. Reduction efforts were particularly challenging this shutdown because of necessary model change work that had to be done in several shops. Since the inception of the program, the Kentucky plant has reduced CO₂ by more than 11,000 metric tons. Summer and Winter Shutdown Challenges are now held across Toyota's North American plants.

HVAC Variable Frequency Drives

Toyota's plant in Buffalo, West Virginia, led the way in demonstrating the benefits of variable frequency drive (VFD) installation on HVAC systems. VFDs allow motors to run at a level needed to meet demand, rather than at full power. Installing VFDs reduces the electrical consumption of motors and the gas consumption of burners resulting in annual savings of over 30,000 MMBTUs. VFDs in the HVAC system will be retrofitted at the Blue Springs, Mississippi, plant as a *yokoten* activity, and installation at other locations is being studied.

Lighting Retrofits

In 2003, Toyota began investigating the energy reduction potential of high-bay fluorescent lighting through small-scale projects implemented at four plants. Based on the results of these projects, high-bay fluorescent lights were added to the specifications for new plant construction, and their installation was recommended to all North American plants. Now all of our North American plants use fluorescent lighting.

Lighting can represent four percent or more of a plant's energy use. We have replaced more than 40,000 400-watt HIDs with 220-watt fluorescent fixtures. Fluorescent lighting has reduced high-bay energy consumption by more than 50%.

Steam Elimination

Since 2002, Toyota has been investigating, piloting and developing the infrastructure needed to eliminate the need for steam generated from central boilers at North American plants. Steam is used to condition air to control temperature and humidity. A significant amount of natural gas is required to generate steam that must be transferred throughout the plant. By measuring energy use at individual processes, we discovered significant steam loss through the many miles of pipes used to generate steam. The losses from the miles of piping can be eliminated by installing smaller boilers at point of use, which places the heat delivery system right at the process where it is needed. Doing so eliminates steam losses and reduces energy consumption and, therefore, greenhouse gas emissions.

The process of eliminating steam must work around the manufacturing schedule. This means we only work on these projects during the two week-long shutdowns per year and non-production days.

By taking advantage of the additional non-production days over the last two years, Toyota's plant in Georgetown, Kentucky, made significant progress on steam elimination projects. They removed direct injection steam systems and now use nozzles to spray de-ionized water to produce humidity. They also removed steam coils and installed direct fire burners, which provide very efficient heat transfer. They have eliminated the use of steam in two top-coat booths and in one primer booth, and are now working in the plastics shop. They recently began design and implementation in the second paint shop. Once implementation is complete, they will be able to shut down the centralized boilers and eliminate the need for natural gas to generate steam.

Because steam generation requires natural gas, it contributes to greenhouse gas (GHG) emissions. Prior to FY2003, the Kentucky plant's average GHG emissions attributed to steam consumption totaled 49,700 metric tons. It was 11,500 metric tons in FY2011, a reduction of 77%. GHGs from steam consumption will be further reduced once the project is completed.

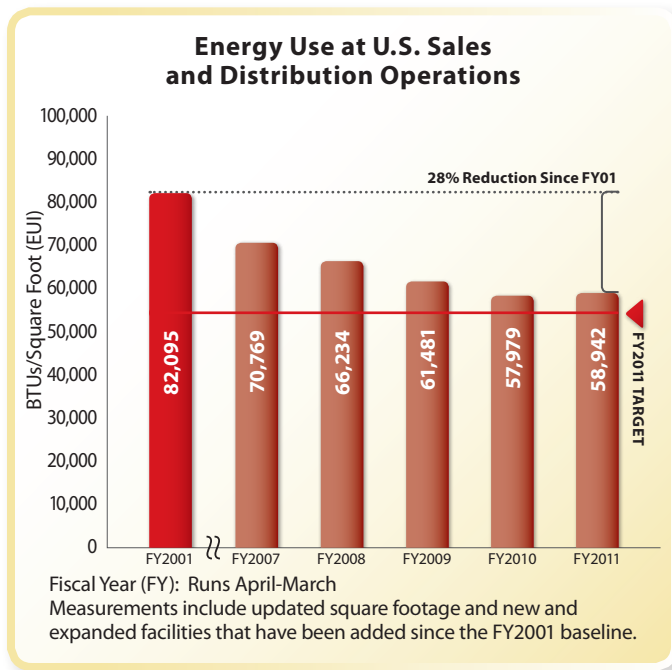
Toyota's assembly plant in Princeton, Indiana, is also installing point-of-use boilers to eliminate the need for central steam generation. The Kentucky and Indiana plants are sharing information about the project and learning from each other. This allows the projects to progress at a faster pace and fosters communication between the facilities. Toyota's Texas and Canadian plants are considering similar projects to eliminate steam, and will benefit from the learning done at the Kentucky and Indiana facilities.

Sales and Logistics

Toyota's sales and logistics operations in the U.S. and Canada each set energy reduction targets that cover their headquarters campus, sales offices and logistics facilities. In Canada, the target was to reduce energy consumption 10% by 2010, from a 2004 baseline. **While they missed this target due to growth in operations between 2004 and 2007, they were able to reduce energy consumption by approximately one percent over the course of the action plan. (Target 5.4)**

In the U.S., the initial target was to reduce energy consumption 18% from an FY2001 baseline by FY2011. Energy consumption is measured in BTUs per building square foot (BTU/ft²). The target was achieved early in FY2007, and a new target was set to reduce energy consumption 26% by FY2011. This target was achieved in FY2010, and another new target was set to reduce energy 32.6% by FY2011. **They missed this target, achieving 28.2% (please see Figure K). (Target 5.3)**

FIGURE K



Even though they missed the most recent target, Toyota's U.S. sales and logistics sites are constantly looking for ways to save energy. Over the course of this five-year action plan, their energy performance has been recognized by the ENERGY STAR program, which is administered by the U.S. EPA and Department of Energy. Six buildings were certified as ENERGY STAR buildings in 2008, meaning they met strict energy performance standards and used less energy, were less expensive to operate and caused fewer greenhouse gas emissions than their peers. One building, Toyota Plaza in Torrance, California, was awarded this certification each year between 2005 and 2009. The last building to be certified was the North American Parts Center in Hebron, Kentucky, in early 2010. This certification must be updated annually, and due to the downward shifts in the economy over the last year, Toyota did not allocate resources to apply for these certifications in 2010, but expects to do so again in future years.

In FY2011, Toyota's vehicle distribution center in Long Beach, California, installed task lighting using fluorescent fixtures with high-output lamps and eliminated 80 unnecessary light fixtures. Insufficient light was making clear film installations difficult and defects were not being identified. With the new lighting, damage and defects are clearly visible, reducing excess vehicle movement and rework. In addition to lowering energy consumption, a major benefit was to overall efficiency and quality.

In FY2011, Toyota's U.S. sales and marketing division installed a new media wall at one of their data centers. By using two projectors instead of eight 50-inch LCD monitors, they reduced energy consumption by over 12,200 BTUs per hour, or almost 8.8 million BTUs per month.

▶ RENEWABLE ENERGY

Toyota supports the development of renewable energy sources and has been expanding the use of renewable energy. Renewable energy sources decrease dependence on petroleum and reduce greenhouse gas emissions associated with energy generation. Our first distributed generation project began in 2002 when a 536-kilowatt photovoltaic (PV) system was installed at the U.S. sales headquarters South Campus in Torrance, California. Since going online, this system has generated over 4.6 million kilowatt-hours of electricity. We also have PV systems at two parts distribution facilities that generate a total of 3.8 megawatts of electricity, and a five-kilowatt PV system at our plant in Huntsville, Alabama.



Our parts center in Ontario, California, installed a photovoltaic array that is expected to produce more than 3.7 million kilowatt-hours per year. This provides almost 58% of the electricity needed at the facility.

Toyota's North American manufacturing plants have been experimenting with different applications of PV systems since 2008. The Blue Springs, Mississippi, facility installed a 50-kilowatt array to light one of the parking areas. The plant in Georgetown, Kentucky, also experimented with a solar panel and wind turbine. When these did not work out as planned, they were moved to the plant's Environmental Education Center and Nature Trail. They power a fountain on the trail and provide an opportunity to educate visitors about solar power and renewable energy.

In addition to solar power, Toyota supports the expansion of renewable power through direct purchase and through the purchase of renewable energy credits (RECs). RECs are tradable commodities that represent proof that a certain amount of electricity was generated from an eligible renewable energy resource. The vehicle distribution center in Portland, Oregon, and the Lexus Training Center in Dallas, Texas, purchase renewable energy directly from a green power utility. We also purchase RECs for our regulatory affairs office in Washington, D.C., and training centers in Florida, Arizona and California. Not including RECs, approximately eight percent of the total electricity needs of Toyota's U.S. sales, distribution and government relations buildings is generated by a renewable power source.

▶ GREENHOUSE GAS EMISSIONS

Toyota has been compiling a North America-wide greenhouse gas (GHG) inventory for the last three years. The North American inventory measures GHG emissions from the consumption of electricity and natural gas at plants, logistics facilities and owned and leased office space, as well as from fuel consumption by in-house trucking operations and third-party carriers, employee commuting and business travel. The process of preparing this consolidated inventory has helped us better understand where GHG emissions occur, and has facilitated information sharing across our affiliate companies.

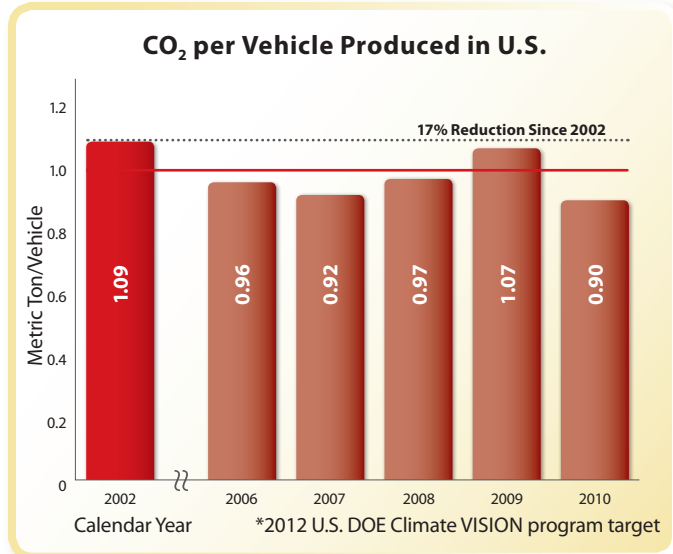
Toyota's U.S. sales and logistics operation has been compiling its own annual GHG inventory for over a decade. The inventory accounts for GHG emissions from electricity and natural gas consumption, parts and vehicle transportation, business travel and employee commuting. The methodology used to calculate emissions is based on The GHG Protocol® developed by the World Resources Institute and the World Business Council for Sustainable Development. Over the years, Toyota has made a number of incremental improvements to the process, such as:

- Developing more accurate emission factors.
- Estimating emissions of methane, nitrous oxide and hydrofluorocarbons.
- Creating procedures to describe how each portion of the inventory is developed, such as data collection, quality checks and emissions calculations.
- Gathering data from additional business units.
- Defining a baseline year for target setting.
- Establishing a policy for recalculations.
- Improving data capture.
- Calculating emissions for activities once categorized as *de minimis*.
- Working with third-party carriers to obtain more accurate information.

These improvements have resulted in better data accuracy and a more complete and robust inventory. The results are now rolled up to the North America-wide GHG inventory.

Energy use at Toyota's assembly plants is the main source of GHG emissions. As described in the *Energy Consumption* section, our plants carefully manage energy use and have found innovative ways to reduce consumption and corresponding GHG emissions. In the U.S., as part of a voluntary program with the Department of Energy, Toyota and other auto manufacturers committed to reducing GHG emissions from manufacturing by 10% per vehicle produced by the end of 2012, compared to a 2002 baseline. **We met this target, having reduced CO₂ emissions at U.S. plants 17% to 0.90 metric tons per vehicle (please see Figure L). (Target 5.2)**

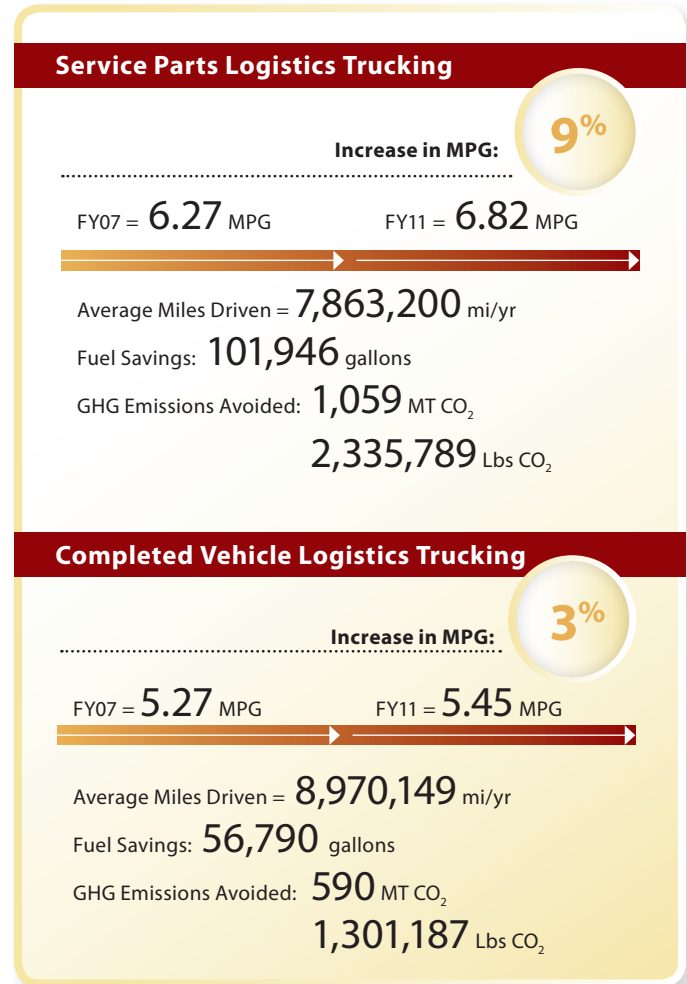
FIGURE L



Fuel consumption from the transport of parts and vehicles is another major source of GHG emissions. Much of our parts and vehicle transport activity is conducted by third parties. Because our activities influence the GHG emissions of these third parties, **our U.S. sales and logistics operation tracks these emissions and has been working with both in-house and third-party carriers to reduce GHG emissions from transportation activities. (Target 5.5)**

From our in-house service parts and vehicle logistics trucking operations, initiatives such as driver education, idling reduction and the installation of various aerodynamic equipment have contributed to a combined annual fuel savings of almost 160,000 gallons per year. This translates to over 3.6 million pounds of GHG emissions avoided per year (please see Figure M).

FIGURE M



We have also been working with third-party carriers—both rail and trucking—to improve fuel economy. We conducted research with third-party trucking companies on how aerodynamic equipment installed on trucks could improve fuel economy. We began testing this equipment in 2008, and have since installed the equipment on a number of Toyota's logistics trucks. As a result, there has been a five percent improvement overall in fuel economy. A number of our third-party carriers have also implemented this equipment on their fleet.

TOYOTA |

recycling & resource management

The Jackson County Development Center sells plastic donated by Toyota's West Virginia plant to PTI, Incorporated to fund programs for the disabled. PTI makes flying discs out of the plastic, and since 2009, Toyota has been buying these discs to hand out at local events.



Using returnable containers for shipping, Toyota saved 27.2 million pounds of wood and 10.5 million pounds of cardboard in FY2011.



CREATING A RECYCLING-BASED SOCIETY is one of the action guidelines in the Toyota Earth Charter. In North America, we see our efforts to accomplish this as a key to being a good neighbor in the communities where we live and work. As we gain experience from implementing initiatives in our own facilities, we seek to share these best practices by teaching others how to create their own recycling programs and how to make better raw material choices. To further encourage recycling in our society, we partner with other businesses and nonprofit organizations to find outlets for our waste, and to help them find better ways to manage their own waste. One of these partnerships—with the Jackson County Development Center in West Virginia—is described below, and provides an example of our long-term vision of making our business more sustainable.

Toyota looks for opportunities to manage resource use at all stages of the vehicle life cycle. To do so, targets were established five years ago to design vehicles using more renewable and recyclable parts and with minimal levels of substances of concern (such as heavy metals). Targets were also developed for plants, distribution centers and offices for waste generation and disposal, recycling and water consumption. In addition, targets were set for purchasing recycled content paper for use in marketing materials and offering remanufactured parts to customers. Our performance in these areas is described in this chapter.

► **PARTNERSHIP:
JACKSON COUNTY DEVELOPMENT CENTER**

Since 2004, our plant in West Virginia has been collecting and baling plastics to donate to the Jackson County Development Center. The center sorts and sells the plastics, using the income to provide training and employment opportunities to the disabled.

In 2008, Toyota employees visited the Jackson County Development Center to see how the plastics were sorted. Our employees learned that quite a bit of trash was mixed with the plastics. The employees at the plant took it upon themselves to learn how to better segregate waste streams to decrease the amount of trash that goes to the center. This “go and see,” or *genchi genbutsu*, is one of the five practices of the Toyota Way: To make correct decisions, you must go to the source of an issue and observe. Determining the facts increases the likelihood of identifying problems and their root causes.

Since 2009, the Jackson County Development Center has been selling plastic donated by Toyota to PTI, Incorporated. PTI grinds, melts and forms the plastic into flying discs (similar to Frisbees®). Toyota buys the flying discs from PTI to hand out during local events. The flying discs help Toyota employees who volunteer at schools and other local events teach children about recycling and what each of us can do to help protect our world.

In recognition of Earth Day, employees from Toyota’s West Virginia plant spent time with 100 students from Hometown Elementary School explaining the recycling efforts utilized at the plant and the benefits of each. They also explained the technology behind the Toyota Prius and gave each student a flying disc made from the recycled plastic from the plant.



Children visiting our facility in Buffalo, West Virginia, receive flying discs made from used packaging plastic from our operations.

The long-standing partnership between Toyota and the Jackson County Development Center is now in its eighth year. Toyota has donated just under 1.9 million pounds of plastic to the center since 2009. This is but one example of how Toyota works with local communities to share knowledge and resources for the benefit of everyone.

► SUBSTANCES OF CONCERN

For years, Toyota's engineers have been incorporating chemical management into the design of vehicles in order to minimize the use of these chemicals and increase the recyclability of the vehicles. In 2004, Toyota made a voluntary commitment in North America to minimize certain substances of concern (SOCs) in parts and accessories to the *de minimis* levels specified in the European Union's Directive on End-of-Life Vehicles—even though vehicles were not being exported to Europe. Our SOC strategy initially focused on four heavy metals known to cause environmental and health effects: hexavalent chrome, mercury, lead and cadmium. **After working closely with our suppliers over a number of years, parts and accessories in North America have not contained SOCs above levels outlined in the European Union's Directive since 2007. (Target 9.1)**

To ensure parts and accessories do not contain SOCs at levels above *de minimis*, our parent company in Japan has been using IMDS (International Material Data System). Suppliers are required to enter data into IMDS detailing the chemical composition of parts and accessories. This data helps Toyota track the use of chemicals on the Global Automotive Declarable Substance List (GADSL), a list developed and maintained by a global automotive stakeholder committee. Use of IMDS is particularly crucial for ensuring compliance with international recyclability laws (such as those in China, Korea, Europe and Japan), since the presence of certain chemicals impedes recycling of the vehicles.

We are beginning to adopt IMDS in North America to facilitate SOC tracking and verification for vehicles assembled here that will be exported to international markets with recyclability laws. (Target 9.3) For example, Toyota is exporting the Camry and Sienna from North America to South Korea; using IMDS will ensure these vehicles meet South Korea's recyclability laws.

Our recent experience with using IMDS in North America is helping us better understand its benefit for overall materials management. The use of IMDS facilitates the effective management of SOCs beyond heavy metals. (Target 9.2) Two additional SOCs were identified in recent years: copper (found in brake pads) and decabromodiphenyl ether (decaBDE), a flame retardant used in textiles and acrylics.

Recent legislation in Washington and California phases out the use of copper in brake pads by 2025. We recognize the need for this legislation, and for improved water quality. The Alliance of Automobile Manufacturers—of which Toyota is a member—received the prestigious 2011 Edmund G. “Pat” Brown Award from the California Council for Environmental and Economic Balance (CCEEB) for its work on this legislation. This award is given to a person or organization that exemplifies the spirit of environmental and economic balance. The partnership between the Alliance and environmental groups was commended for working together to find a practical, achievable regulation that both protects water bodies and maintains high standards of vehicle safety. We are now working on finding a suitable alternative to the copper used in brake pads.

Toyota, along with other automobile manufacturers, has also been working with suppliers to develop a replacement for decaBDE. The U.S. EPA and chemical suppliers reached a voluntary agreement to phase out production of decaBDE by 2013. Toyota is working on a replacement that meets the federal motor vehicle safety standard FMVSS302 on flammability of interior materials. **Toyota engineers worldwide continue to investigate and develop alternatives for these and other SOCs. (Target 9.3)** We also frequently survey emerging legislation to identify where Toyota will need to develop alternatives to chemicals used in the manufacturing of vehicles.

► **DESIGNING VEHICLES WITH RENEWABLE RESOURCES**

Toyota uses ecological plastics—plastics derived either wholly or in part from plant materials—as well as other natural and recycled materials in numerous parts and components. Because our ecological plastics use a polypropylene/polylactic acid (PP/PLA) alloy derived from plant material, we are reducing reliance on petroleum-based plastics. In each model redesign and running change, we think about how to use more renewable and recyclable materials.

Over the course of the last five years, Toyota has evaluated numerous materials made from renewable resources to assess their performance, appearance, safety and mass production capability. (Target 6.1) We have introduced environmentally preferable parts in a number of our vehicles, as shown in Figure N. We are currently investigating new materials for fabrics and carpets as well as additional applications of PP/PLA-based and natural fiber-based materials in North American vehicles.

FIGURE N

Vehicles Containing Bio-based Plastics	
MODEL	PART
Prius	Seat cushions Scuff plate Cowl side trim
Corolla	Seat cushions
Matrix	Seat cushions
RAV4	Seat cushions
Lexus RX 350	Seat cushions
Lexus HS 250h	Luggage trim upholstery Cowl side trim Door scuff plate Tool box area Floor finish plate Seat cushions Package tray
Lexus CT 200h	Luggage compartment liner Carpeting

► **WASTE REDUCTION AND RECYCLING**

Across all of our North American operations, Toyota views waste as an inefficiency and makes reducing waste and increasing recycling a high priority. Toyota implements projects both big and small to eliminate waste where possible and continuously improve our performance.

Toyota has received a number of awards recognizing our waste reduction and recycling efforts:

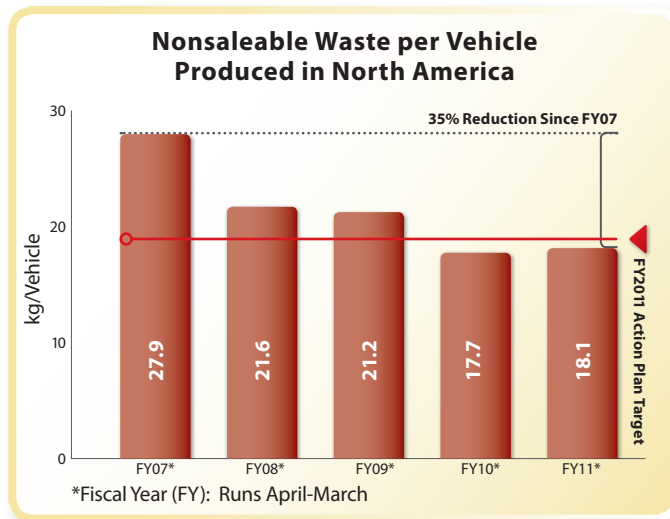
- Toyota’s plant in Long Beach, California, was recognized in 2010 by the Long Beach Chamber of Commerce with an **Environmental Leadership Award** for their recycling efforts.
- Toyota’s U.S. sales and logistics division was selected by the U.S. Environmental Protection Agency’s Office of Resource Conservation and Recovery to receive the **2010 WasteWise Honorable Mention for Waste Reduction in the Workplace**.
- Six of Toyota’s California facilities were also recognized in 2010 by the **Waste Reduction Awards Program (WRAP)** administered by the California Integrated Waste Management Board. This program recognizes California businesses and nonprofit organizations for their outstanding waste reduction efforts. Since 1994 Toyota facilities have won 68 of these awards, including two WRAP of the Year awards in 2003 and 2006.

Manufacturing Plants

Toyota’s North American Waste Working Group meets regularly to share *kaizens* (continuous improvement opportunities) and ideas, review current waste regulations and impacts to our operations, discuss target setting and waste reduction, and review approved outlets for all wastes generated at our facilities. The forum this group provides fosters trust, partnership and information sharing, all of which are critical to meeting our goals.

Waste is tracked at our manufacturing facilities in two ways: the amount of nonsaleable waste we generate and the amount of waste we send to landfill. Nonsaleable waste is waste that cannot be recycled or reused and, therefore, must be thrown out, as well as materials for which Toyota must pay someone to recycle. We strive to reduce this waste at the source or find ways to reuse or recycle it. We set a target to reduce nonsaleable waste to 30 kg per vehicle by FY2011. **We achieved this target in FY2007; in FY2011 it was 18.1 kg per vehicle. (Target 7.1)** Our progress against this target is illustrated in Figure O.

FIGURE O



Toyota’s assembly plant in Indiana has had particular success with this target: They have reduced nonsaleable waste to 10 kg per vehicle. They accomplished this by increasing their recycling rate and by educating employees about proper waste segregation. In FY2011, they modified paint sludge hoppers to install a false bottom to allow water to drain. This *kaizen* reduced waste by about one pound per vehicle. They also began using a pulper in 2009 to recycle paper products from the cafeteria, and in 2010 added additional paper products such as bathroom paper towels and break room waste. The pulper shreds the paper products and mixes them with water to form a slurry. Most of the water is then removed and reused by the pulper. The pulp is sold to a paper recycling facility to make paperboard and cardboard boxes. Close to 500,000 pounds of paper have gone through the pulper in the last three years. This project reduces the plant’s general trash annually by 1.2 pounds per vehicle.



Employees at our plant in Princeton, Indiana, use a pulper to shred paper dishes from the cafeteria, paper break room waste, and bathroom paper towels and mix them with water to form a paper slurry. The pulp is sold to a paper recycling facility for use in products like paperboard and cardboard boxes.

Toyota's engine plant in West Virginia makes parts such as cams and cranks. They create hundreds of thousands of gallons of coolant waste in their processes, and a few years ago, they weren't able to treat the coolant wastewater on site. This meant they were sending off wastewater in two tanker trucks per day. They installed a sequencing batch reactor (SBR) to treat the oily wastewater. This system uses bacteria to eat away at the oil in the coolant. They are now able to pretreat and discharge the water to a public treatment facility. Treatment at the publicly owned treatment works (POTW) allows the water to be safely returned to the environment along with treated wastewater from the rest of the town.

Zero Waste to Landfill

Zero waste sent to landfill is another important metric we track at Toyota plants. We set a target to achieve near-zero waste to landfill (measured annually as a 95% or greater reduction in waste to landfill, averaged across our North American plants). **This target was achieved each of the last three years. (Target 7.2)**

Our zero landfill metric is driven by the Toyota Production System, where the elimination of *muda*, or waste, in all aspects of business is a main objective. Toyota's parent company in Japan has challenged plants worldwide to send zero waste to landfill. While this has not resulted in the elimination of all waste, it has required significant focus on all three "R's": Reduce, Reuse and Recycle.

Our plant in Cambridge, Ontario, has achieved their landfill target for each of the past five years, and for the last two years has achieved truly zero landfill. Their focus has been on diverting waste from landfill and maximizing the number of "waste streams" that can be recycled. A waste stream is a classification of a type of waste. By categorizing the waste streams throughout the plant, they were able to better understand where and how wastes were being generated. Once categorized, they determined which streams could be recycled or reused, and developed tools (such as color-coded waste bins and signs) to improve segregation of these wastes into appropriate bins. The plant now has 45 different recycling categories that lead to a significant reduction in waste to landfill. They were the first North American plant to segregate waste in the cafeteria; elsewhere in the plant, they segregate batteries, sandpaper, oily rags and rubber gloves, to name a few.

Nonproduction Facilities

At our nonproduction facilities, we achieved our target of zero hazardous waste to landfill and made considerable progress in reducing nonhazardous waste toward zero landfill. (Target 7.3)

Toyota's design facilities continue to maintain zero landfill for hazardous and universal waste. To avoid sending nonhazardous waste to a landfill, waste from our design centers in Michigan is sent to a waste-to-energy facility. While the annual volume of nonhazardous waste—at less than 37 tons—is relatively small compared to our manufacturing plants, we still look for ways to reduce, reuse and recycle.

At Toyota's North American manufacturing headquarters campus in Erlanger, Kentucky, a six-month investigation into waste segregation was conducted. Each of the nearly 50 waste segregation areas was inspected to determine whether they were being used properly. Between FY2007 and FY2011, this activity, along with an increase in employee motivation to properly dispose of waste and continued training of incoming employees, led to a 61% reduction in the amount of waste generated that can't be recycled.

Beginning in 2009, the cafeteria began using compostable utensils, to-go containers, straws and cookie bags. They send over 70,000 pounds of compostable waste each year to Toyota's plant in Georgetown, Kentucky, to be composted on site. The compost generated from this process is used in grounds-keeping at the Georgetown plant as well as in a produce garden, the produce from which is donated to families in need.

Sales Offices

Toyota's U.S. sales headquarters campus set a target to recycle 75% of its waste by FY2010. While they missed the target, it was not by much—they achieved 74% as of FY2011 while diverting 100% of their waste from landfill. (Target 7.4) At the same time, our Canadian sales headquarters diverted 96% of their waste from landfill, slightly exceeding their target of 95%. (Target 7.5)

The cafeterias at our headquarters campus in southern California have made significant strides over the last five years to decrease the amount of trash generated. They recently began offering for purchase a Toyota Green Café Key Tag that allows unlimited use of reusable green eco-tainers when dining at any of the campus cafés. Instead of disposable take-out containers, these durable eco-tainers can be picked up at the café, then returned after a meal for the café to clean and reuse. Since 2007, the cafés have also switched from bleached to natural finish napkins and replaced Styrofoam® to-go containers with bagasse containers, a renewable resource made of sugarcane by-product. In addition, on-campus catering transitioned from disposable plastic utensils to reusable serving ware with SpudWare®, made from potatoes. They have also been introducing local farmers and sourcing produce locally when possible. Many of these measures have also been adopted at the Canadian sales headquarters campus in Toronto, Ontario.

Parts and Vehicle Distribution

Combined, Toyota’s U.S. vehicle and parts distribution centers achieved a 93% recycle rate at the end of FY2011 (please see Figure P). To achieve this, Toyota’s U.S. parts and vehicle distribution divisions set individual targets to increase recycling and reduce the amount of waste sent to landfill.

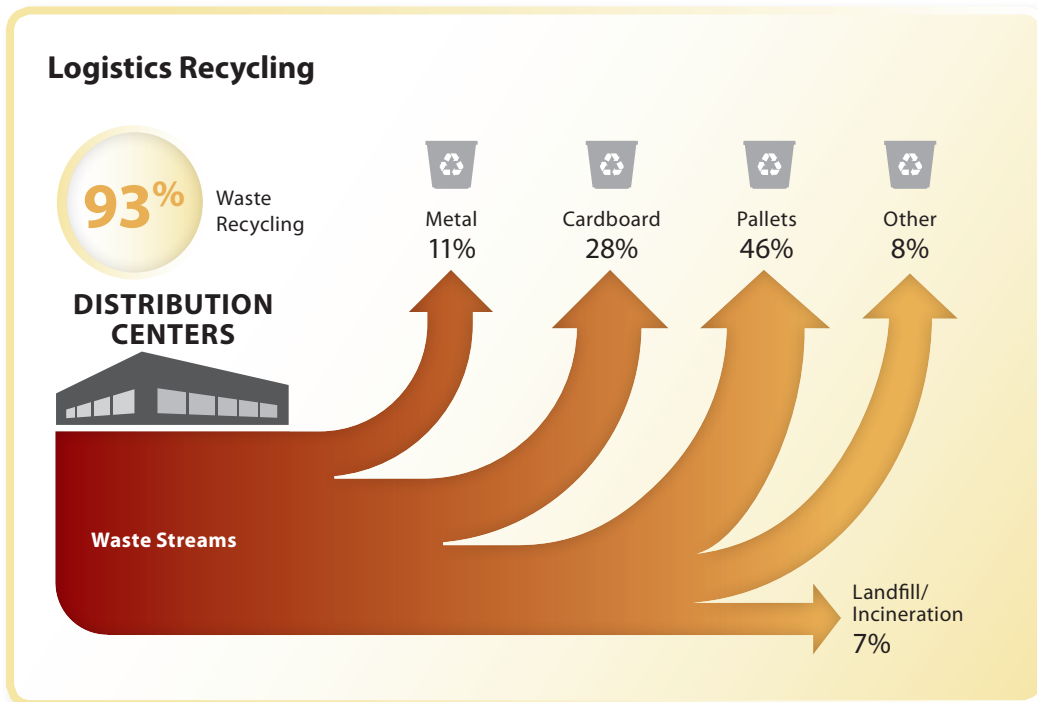
In 2007, the parts distribution division set a five-year target to reduce waste to landfill to 9.06 pounds per 1,000 pieces shipped by FY2011 (a 33% reduction). They achieved 6.8 pounds per 1,000 pieces shipped in FY2008, exceeding their target after only two years. In 2008, they established a new target to reduce waste to landfill by 25%, to 5.1 pounds per 1,000 pieces shipped. **They achieved this target: As of the end of FY2011, they were at 4.14 pounds per 1,000 pieces shipped. (Target 7.7)**

In the last five years, all parts distribution locations collectively diverted almost 82 million pounds of materials from landfill. Toyota’s parts distribution facility in Cincinnati, Ohio, became the second parts distribution facility (after New York) to achieve zero waste to landfill in FY2008. The local landfill is receiving 24,000 pounds less of waste per year, and the city of Indianapolis is getting clean steam energy from incinerating our trash in a waste-to-energy facility.

Toyota’s vehicle distribution division initially set a five-year target to recycle 90% of their waste. This was achieved in FY2008. The recycle rate was not telling the whole story, since they also try to reduce or reuse materials at the facilities. Except for breakroom and cafeteria waste, most of the waste generated comes from operations. Using a disposal rate based on a set production unit allows them to see if they are generating less waste while processing vehicles. So they set a new target to dispose of 0.25 pounds or less per vehicle shipped while maintaining the 90% recycle rate. **They achieved this target: In FY2011, their recycling rate was 94% and their disposal rate was 0.15 pounds per vehicle processed. (Target 7.8)**

Many of our facilities have picked the “low-hanging fruit” in terms of recycling and reducing waste, but we are not satisfied. Our facilities are now working on finding additional opportunities for improvement. For example, the vehicle distribution center in Princeton, Indiana, worked with the nearby manufacturing plant and found a way to recycle the two wire harnesses and the hood latch that were being disposed of with every installation on the four-cylinder Highlander.

FIGURE P



Toyota’s North American Parts Operations division uses over 45,000 reusable metal shipping containers in place of cardboard and wood pallets, up from only 30,000 just a few years ago. These returnable containers are used between selected North American parts distribution centers and vehicle distribution centers, dealers and suppliers. The returnables are also used increasingly for shipments to Canada and Puerto Rico. In FY2011, 120 suppliers were using returnable containers, and there are plans for adding additional suppliers in the coming years. Using the returnables program for shipping floor mats in FY2011 saved 467,000 pounds of wood and 299,000 pounds of corrugated cardboard. Overall, 27.2 million pounds of wood and 10.5 million pounds of cardboard were saved in FY2011.

► **PAPER USE**

Our U.S. sales and marketing groups instituted an environmentally preferable paper purchasing program five years ago to encourage the purchase of recycled content paper. **Since 2007, they have been using fine paper with at least 10% post-consumer waste (PCW) content and office paper with at least 30% PCW content. (Target 17.2)** Lexus has been able to source fine paper for brochures that meet our quality needs and contain 30% PCW—up from only 10% in 2008. The paper used for the Lexus CT brochure, for example, is composed of 30% PCW. The paper, called Lexus Pursuit 30, is manufactured with 100% renewable energy sources. The printing facility is the only one in the U.S. to emit virtually no volatile organic compounds (VOCs). In addition, 90% of the paper we purchase is certified by the Forest Stewardship Council (FSC) as containing virgin content that has been sustainably sourced.

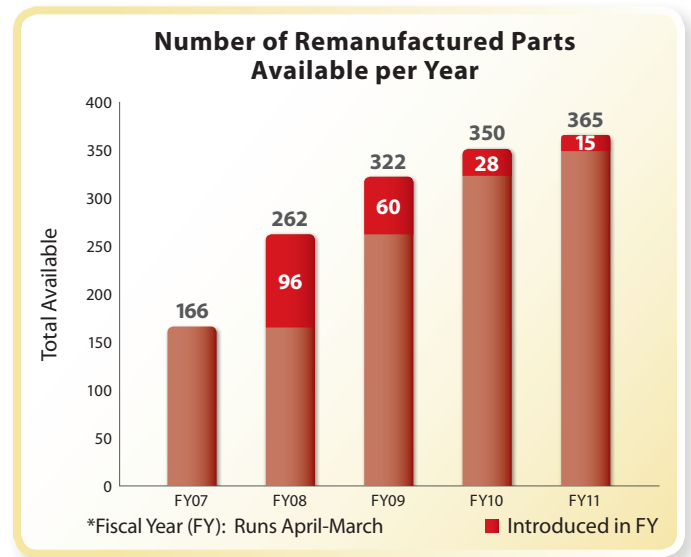
Our marketing groups have also cut down on brochure printing to avoid discarding unused materials. In the past, they printed as many as 6.9 million Toyota brochures and almost 3.5 million Lexus brochures; in FY2011, they printed 5.1 million Toyota and about 1.3 million Lexus brochures. Over the last five years, this has saved more than \$70 million in paper and printing costs, while reducing the environmental impacts of fiber harvest, paper making and printing.

Our Canadian sales headquarters has also been managing paper use through its print-on-demand program. In 2007, they set a target to reduce paper consumption 25% per person by the end of calendar year 2010. **They were on track in 2009, but in 2010 missed the target, mainly due to increased printing required by vehicle servicing activity. (Target 7.6)** Overall, the Canadian sales office has saved over 2.7 million sheets of paper since 2006.

► **REMANUFACTURED PARTS**

Toyota continues to support customer needs by offering a lineup of remanufactured service parts. Since remanufactured parts require fewer resources to produce than their new counterparts, offering and using them decreases our overall impact on the environment. **As a result of fewer model launches per year and a decrease in market demand, we have not hit our target to launch 100 remanufactured parts applications each year (please see Figure Q). (Target 17.1)** But we are still committed to introducing new applications. The Toyota Wholesale Parts Web site highlights remanufactured parts and provides information on ordering, benefits and features, new programs, technical information and available resources. For more information please visit www.toyotapartsandservice.com.

FIGURE Q



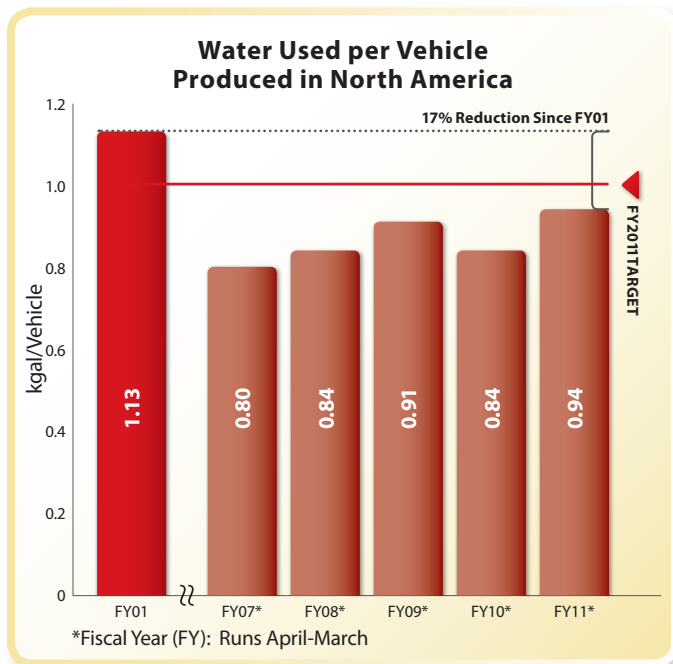
► **WATER CONSUMPTION**

At Toyota, we focus on reducing water consumption in all of our North American operations, while reusing or recycling water wherever we can.

Manufacturing

Toyota’s manufacturing plants are our biggest users of water. We set a target to reduce water usage 13% to 0.98 kilogallons per vehicle from a FY2001 baseline. **Despite changes to production volumes over the last few years that caused us to use more water per vehicle processed, we have achieved this target since FY2007 (please see Figure R). (Target 8.1)**

FIGURE R



Toyota formed the North American Water Group in 2004 to develop a strategy to better manage water use. Each manufacturing facility provides a representative to the group, where a consensus approach is used to identify general direction and set targets.

Our water management strategy over the past five years has focused on a 3Rs Analysis—Reduce, Reuse and Recycle. In the water conservation pyramid, reduce is the foundation and provides the most opportunities for improvement at the lowest cost. It is the fundamental first step in water management. Reuse is in the middle, with recycling at the top. Reuse may require only simple filtration to utilize a waste stream for makeup to another nearby process, whereas recycling is the most costly and difficult to implement of the three “R’s.” Our long-term strategy focuses on “renewable” water—using innovation to make recycling more viable.

We began conducting annual “*kaizen* water blitzes” at plants to implement the strategy. A *kaizen* blitz is conducted by a team of experts from the host plant, visiting plants, water treatment experts, and, in some cases, equipment suppliers. The team spends a week at a host plant studying processes, understanding usage and finding ways to make improvements. “Low hanging fruit” and obvious ideas for *kaizens* (continuous improvement opportunities) are generated in this blitz format. The next-generation water blitz is called a *jishuken*, or in-depth study, of our largest water users. We generate a water balance—the volume and quality of water coming in to a process, and the volume and quality going out—looking at water use from all angles. We study each process that uses water to look for inefficiencies and opportunities. By understanding the water on a chemistry level, we can find uses for waste streams at other nearby processes that we may have not identified in the blitz format. We understand how and why water is used and develop reduction strategies, keeping product quality in the forefront every step of the way.

Some examples of *kaizens* implemented during the 2011 fiscal year are described below.

- Toyota’s plant in Cambridge, Ontario, discovered two opportunities last year to save significant amounts of water. As a direct result of a water *jishuken* activity, the first opportunity was discovered in one of the paint shops. Water is used to flush dirt and oil off of vehicles coming from the weld shop into the paint shop. Employees added filtration systems and began reducing the amount of water used to clean the vehicles. Changes to timers on de-ionized misting sprays were also added. This *kaizen* resulted in savings of 13.6 million gallons (51.5 million liters) of water in FY2011.
- The second opportunity was identified in the welding shop. Water is used to cool the robotic welding guns to prevent melting. This water must be extremely clean or the welding guns become clogged. The strainers used to clean the water get flushed periodically, using a lot of water. This water was being disposed of, representing a large waste in water and chemical agents used in the cooling tower. Instead, the plant diverted the backwash to a new second filter that cleans the wastewater stream during flushing. The clean water now goes back into the tank to be used again later in the process. Now, a much smaller amount of water is lost during the flushing process. Reusing the water saves almost 3.4 million gallons per year.

- In our San Antonio, Texas, facility, another *jishuken* activity identified savings of over 50 gallons per vehicle, including reducing spray rinse-water makeup by installing additional recirculation sprays in some stages. The additional rinsing action of the new sprays reduced the overall water requirement by about 40%. In addition, hot wastewater from steam traps was rerouted to the initial deluge rinses at the front of the rinse line, improving cleaning capability as well as saving water.
- Toyota's plant in Baja California, Mexico, has begun to recycle final effluent water by blending it into the surface water source used to make all of the plant's process water. They are currently recycling five percent of the entire effluent stream with a target of 25% by the end of 2011.

Sales and Logistics

While water consumption is not the most significant environmental impact from our sales and logistics operations, Toyota sets targets to manage water use. **In 2008, the U.S. sales and logistics operation completed an evaluation of water consumption at their facilities and set a target to maintain water use at 2008 levels—despite the expansion of facilities. (Target 8.2a)** Our Canadian sales and logistics facilities also have a target to reduce water consumption 10% by the end of 2010, from a 2004 baseline. **They exceeded this target, reducing consumption a total of 45%. (Target 8.3)**

Since 2009, Toyota's U.S. sales and logistics operation has been successful at maintaining water consumption at 2008 levels. (Target 8.2b) To achieve this, more sites began using recycled water. At the Regional Sales Office in Denver, the Regional Sales Office and Parts Distribution Center in Chicago and the North American Parts Center in Ontario, California, recycled water is used for landscape irrigation. At the U.S. sales headquarters campus in southern California, recycled water is used for landscape irrigation and toilet flushing.

TOYOTA | air quality

Toyota's plant in Huntsville, Alabama, donates used cooking oil that Alabama A&M University turns into biodiesel. The biodiesel runs one of the campus buses, and will have other applications in the future.



For vehicles offered in the 2011 model year, 35% of Toyota, Lexus and Scion cars are rated SULEV or better.



AIR POLLUTANTS SUCH AS PARTICULATE MATTER, nitrogen oxides, carbon dioxide and volatile organic compounds (VOCs) react with sunlight to form smog. Smog has been linked to a number of health issues and is particularly prevalent in dense urban areas with heavy traffic, industrial activity, and sunny, warm climates.

Toyota has targets that span the vehicle life cycle to reduce emissions of these air pollutants. During the design and development phase, we work on reducing emissions of air pollutants from tailpipe exhaust and from materials used in the vehicle cabin. During the production process, we focus on reducing emissions from painting operations. We have made progress in each of these areas over the last five years.

Partnerships have played key roles in our success. Toyota's suppliers are helping us identify materials that emit lower levels of cabin VOCs, as well as paints and paint technologies that reduce VOC emissions. We are also helping others develop innovative technologies that may one day be useful in our own operations. One example is Toyota's partnership with Alabama A&M University, described in more detail below. We are donating used cooking oil to the university to convert into biodiesel. We hope to find applications for the biodiesel in our own operations in the future.

Our performance in the areas of reducing tailpipe emissions, designing vehicles using ultra low emission technologies, reducing VOCs in vehicle cabins and reducing VOCs from painting activities is discussed in this chapter.

► **PARTNERSHIP: ALABAMA A&M UNIVERSITY**

Since September 2010, more than 220 gallons of used cooking oil have been delivered from the Toyota engine plant in Huntsville, Alabama, to a lab at Alabama A&M University as part of a biodiesel donation program. The Huntsville plant, which builds V6 and V8 engines for Tacoma and Tundra pickup trucks and Sequoia full-size sport utility vehicles, donates between 55 and 100 gallons of cooking oil per month to the university. The waste oil from the plant's cafeteria, along with oil from other sources, is being converted into biodiesel—and the fuel is expected to someday run buses on A&M's campus as well as other equipment.

Some of the leftover oil has already been converted to biodiesel and tested in a private vehicle. The biodiesel will soon be tested further, to see how it performs fueling the engines of a small tractor and irrigation pumps. Toyota executives have also asked that diesel shunt trucks and a diesel generator at the Huntsville plant be used to test the fuel.

Biodiesel is a cleaner-burning alternative fuel produced from domestic, renewable resources such as plant oils from crops like corn and soybeans, animal fats, used cooking oil and even new sources such as algae. Biodiesel contains no petroleum, but it can be blended at various levels with petroleum to create a biodiesel blend that works in diesel engines with few modifications. There are significant benefits to air quality from developing transportation systems that run on biodiesel or biodiesel blends. When compared to burning diesel as a fuel, burning biodiesel results in lower exhaust emissions of the pollutants that form smog and ozone (hydrocarbons) and acid rain (sulfur oxides and sulfates).

Toyota personnel are also exploring the possibility of using byproducts from the biodiesel refining process to create other products, such as soaps, that could be used at the Toyota plant. If that happens, we could create a completely closed-loop sustainable system through the biodiesel donation program.



Dr. Ernst Cebert of Alabama A&M University's Department of Natural Resources and Environmental Sciences conducts a visual test on biodiesel to check for clarity. Toyota is a partner with the university in its biodiesel research project.

▶ TAILPIPE EMISSIONS

The state of California and the U.S. Environmental Protection Agency each has their own certification programs to categorize vehicles in terms of their level of tailpipe emissions (Canada and the U.S. have equivalent standards). In California, the Low-Emission Vehicle II (LEV II) regulations categorize vehicles as LEV (Low Emission Vehicle), ULEV (Ultra Low Emission Vehicle), SULEV (Super Ultra Low Emission Vehicle), ZEV (Zero Emission Vehicle), or AT-PZEV (Advanced Technology Partial Zero Emission Vehicle). In the U.S. and Canada, vehicles are categorized into Tier 2 Bins one through eight. Lower bin numbers correspond to vehicles with lower tailpipe emissions; Bin 1 is for vehicles with zero tailpipe emissions.

In 2011, the California LEV II regulations required an auto manufacturer's fleet average to meet an emission standard for nonmethane organic gas (NMOG) of 0.035 grams per mile (gpm) for passenger cars and light-duty trucks up to 3,750 pounds, and 0.043 for other light-duty trucks. The federal programs in both the U.S. and Canada require a manufacturer's fleet average to meet a Tier 2 NO_x standard of 0.07 gpm. **Toyota annually complies with the state of California, U.S. and Canadian federal vehicle emissions programs, and we have met the standards for the 2011 model year. (Target 10.1)**

Toyota continues to introduce low emission vehicles using a variety of ultra low emissions technologies. (Target 10.3) All Toyota, Lexus and Scion passenger cars (except the Lexus LFA) currently sold in North America are rated ULEV or better.

TOYOTA AND LEXUS SULEVS

Specifically for vehicles offered in the 2011 model year, 35% of all Toyota, Lexus and Scion cars and 14% of trucks are certified to SULEV or better. These vehicles include:

- Prius
- Camry PZEV
- Camry Hybrid
- Highlander Hybrid
- Lexus RX 450h
- Lexus LS 600h
- Lexus GS 450h
- Lexus HS 250h
- Lexus CT 200h

Over the years, Toyota has been recognized as an industry leader in the manufacture of vehicles with good fuel economy and exhaust emission performance. For example, Toyota has demonstrated exemplary in-use compliance in the mandatory In-Use Verification Program (IUV) required by the U.S. EPA and the California Air Resources Board. **We tested 120 vehicles in FY2011, for a total of over 1,300 vehicles since 2000. (Target 10.2)**

▶ VEHICLE CABIN VOC EMISSIONS

Volatile organic compounds (VOCs) can be emitted from materials in the vehicle interior after manufacturing, commonly recognized as the “new car smell.” These materials include plastics, leather textiles, glues, sealants and additives. We work with our suppliers to develop alternatives that emit lower levels of VOCs in the vehicle cabin.

Over the last five years, we have made progress on developing such alternatives. (Target 9.4) For example, we worked with our suppliers to develop new tape systems to reduce toluene emissions. More recently, we have been working with our suppliers on reducing formaldehyde and acetaldehyde that form during leather retanning and finishing.

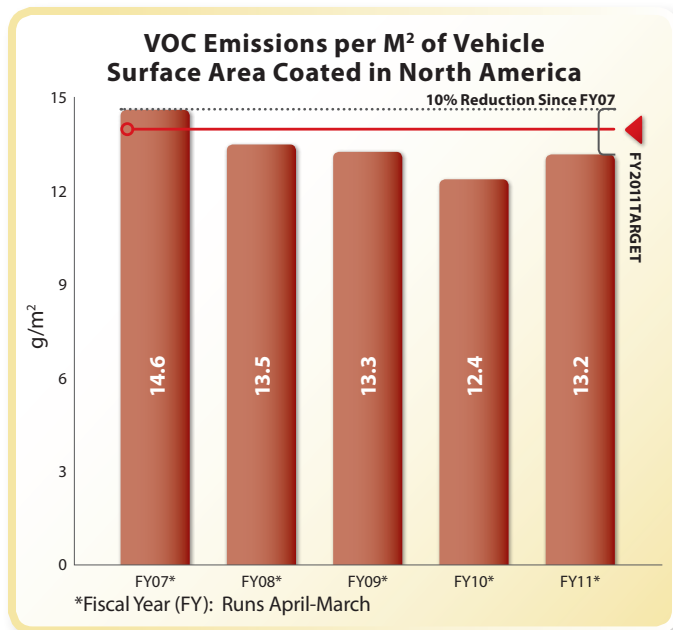
Auto manufacturers are working toward one global standard to test emissions of VOCs in vehicle cabins at the component level. In the meantime, a voluntary standard for the full vehicle exists from the Japan Automobile Manufacturers Association (JAMA). Toyota believes this standard addresses compounds readily found in vehicle cabins. For the 2011 model year, the North American-produced Sienna, Avalon, Corolla, Venza and Highlander conform to this standard.

► VOC EMISSIONS FROM PAINTING OPERATIONS

Within Toyota's facilities, painting operations generate the majority of emissions of volatile organic compounds (VOCs). We have a North American Manufacturing VOC Working Group that studies aspects of the painting process to find ways to reduce VOC emissions. We look at painting operations as a whole, as well as the components of the process to find big and small ways to *kaizen*. We benefit from sharing best practices and transfer of knowledge, or *yokoten*, from one plant to the next.

Toyota's North American plants measure grams VOCs emitted per square meter of vehicle surface area coated (g/m^2). We set a target to achieve a corporate average of $14.0 \text{ g}/\text{m}^2$ by FY2011. **We achieved this target in FY2008, and continued to meet the target in FY2011 with an average of $13.2 \text{ g}/\text{m}^2$ (please see Figure S).** (Target 11.1)

FIGURE S



In addition to vehicle painting, we also paint exterior plastics fascia, which are mostly bumpers. **VOC emissions from plastics painting operations are currently tracked and measured against internal plant targets.** (Target 11.2)

In early 2000, Toyota began investing in waterborne paint systems at a number of our paint shops across North America as a way to reduce VOC emissions. We have installed waterborne systems at many of our plants, including our newest plants in Woodstock and Blue Springs. Since 2009, we have also used waterborne paint systems at all vehicle distribution centers with paint operations.

Despite the downward turn in the economy over the last few years, we continue to improve our painting technology and look for *kaizens* that will lead to additional VOC emission reductions. VOC emission reduction activities in North America over the last five years have included:

- Block painting vehicles of the same color, which reduces the frequency of line/applicator cleaning and, therefore, the volume of cleaning or purge solvent used.
- Reducing the amount of solvent used to purge and clean the paint spray applicators.
- Introduction of lower VOC-content cleaning solvents.
- Removing edge coat paint from wheels that did not require it.

TOYOTA |

environmental management

The car wash at Mungenast Lexus of St. Louis is designed to use 36 gallons of reclaimed water for each wash. This is one of the measures that earned the dealership enough points to achieve Silver LEED® certification.



A total of 15 Toyota and Lexus dealerships in the U.S. and Canada have achieved LEED® certification.



TOYOTA TAKES A SYSTEMATIC APPROACH to environmental management. We have a third-party certified environmental management system (EMS) in place at all of our production and logistics facilities. A critical element of these systems is action planning—setting the goals and targets described throughout this report. The environmental management system drives our accomplishments by providing a framework for identifying significant environmental aspects and impacts, setting goals and targets to manage the impacts, measuring performance and identifying areas for improvement.

Toyota also uses the EMS as a tool for educating suppliers. We teach suppliers how to implement an environmental management system, the action planning process and how to conduct “treasure hunts”—a way of analyzing a process to find opportunities for reduction.

We also use the tools in our environmental management system to help Toyota and Lexus dealerships with green building projects. Our work with Mungenast Lexus of St. Louis, Missouri, is one example. The Lexus Facilities Design Department partnered with the dealership and its architectural firm to navigate through the LEED® (Leadership in Energy and Environmental Design) certification process. We shared our knowledge of the green building process to help the dealership save water and energy, reduce waste and improve indoor air quality. We share our expertise with the hope that our partners will then encourage such practices in the broader community.

Our performance in the areas of dealer support, supplier engagement, environmental management systems, compliance and sustainable building is described in this chapter.



The Lexus Facilities Design Department works with dealerships and their architectural firms to navigate through the LEED certification process.

► **PARTNERSHIP: MUNGENAST LEXUS OF ST. LOUIS**

Mungenast Lexus of St. Louis received Silver LEED certification in 2010. LEED (Leadership in Energy and Environmental Design) is a point-based program administered by the U.S. Green Building Council that promotes a whole-building approach to sustainable construction and remodeling. LEED certification is based on meeting stringent evaluations in such areas as sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

Mungenast was a new construction, built from the ground up. Examples of interior and exterior measures implemented by the dealership to make its facility more sustainable include:

- A car wash reclamation system that uses 72% reclaimed water per wash (featured in the photo to the left).
- Xeriscaping with native and drought-tolerant plants for a water-efficient landscape.
- Insulated architectural precast panels and aluminum curtain walls with high performance glazing.
- A white roof with special layers of insulation for reduced heat island effect and energy efficiency.
- Highly efficient HVAC and electrical systems with sensors.
- Skylights in the service shop to provide natural light and reduce energy use.
- Millwork and furniture made with third-party certified woods.
- Finishes and paints with low volatile organic compound (VOC) content.

The measures taken by Mungenast Lexus reduce or eliminate negative impacts on the environment. The partnerships we form with our Lexus dealerships are one example of how we seek to educate consumers more broadly about sustainable lifestyle choices, so they can enjoy maximum luxury with minimal impact to the environment. Please see www.lexusvisionusa.com for more information.

► **GREEN DEALERSHIPS**

We work closely with our dealerships to promote green building practices. Both our Toyota and Lexus divisions have programs to work with dealers on new construction and remodeling projects that encourage the use of the U.S. Green Building Council guidelines. A study performed on LEED-certified Toyota dealerships shows the average dealer who completes the LEED process is saving 26% on their energy costs per square foot per year. We are finding that the often rapid return on investment for environmentally sustainable materials, energy-efficient lighting fixtures and other LEED elements shows other dealers the economic sense of pursuing LEED certification.

We exceeded our target and assisted 11 U.S. Toyota dealerships in obtaining LEED certification. (Target 14.3)

One Toyota dealership in Canada and three Lexus dealerships in the U.S. have also achieved LEED (please see Figure T). Eight more dealers have completed construction and are waiting for their ratings to be decided; six are under construction and are targeting LEED; 12 are in the design and permitting phase; and eight more have registered their intent to pursue LEED with the U.S. Green Building Council. We have a number of other dealers learning about LEED who may decide to pursue certification in the future.



2007
Pat Lobb Toyota of McKinney, Texas, is the first dealership of any of the automobile manufacturers to achieve LEED certification.



2009
The pre-owned building of Sewell Lexus of Fort Worth, Texas, is the first Lexus dealership to achieve LEED certification.



2010
The Kendall Toyota dealership in Eugene, Oregon, achieves LEED Platinum, the highest level of certification possible and the first LEED Platinum dealership in the world.



2010
Stratford Toyota in Stratford, Ontario, is Toyota's first Canadian dealership to achieve LEED certification. This is also the first LEED Gold dealership and the highest rated dealership in Canada.

FIGURE T

North American Dealerships with LEED Certifications

DEALER NAME	LOCATION	YEAR CERTIFIED	CERTIFICATION LEVEL
Dave Mungenast Lexus of St. Louis	St. Louis, Missouri	2010	Silver
Grossinger City Toyota	Chicago, Illinois	2010	Silver
James Toyota	Flemington, New Jersey	2010	Silver
Jerry Durant Toyota	Granbury, Texas	2010	Silver
Kendall Toyota	Eugene, Oregon	2010	Platinum
Stratford Toyota	Stratford, Ontario, Canada	2010	Gold
Toyota of El Cajon Certified Center	Santee, California	2010	Gold
Toyota of El Cajon	El Cajon, California	2010	Silver
Caldwell Toyota	Conway, Arkansas	2009	Gold
Fitzgerald's Lakeforest Toyota	Gaithersburg, Maryland	2009	Gold
Lexus of Las Vegas	Las Vegas, Nevada	2009	Gold
Mark Miller Toyota	Salt Lake City, Utah	2009	Gold
Sewell Lexus Pre-Owned	Fort Worth, Texas	2009	Gold
Toyota of Rockwall	Rockwall, Texas	2008	Gold
Pat Lobb Toyota	McKinney, Texas	2007	Silver

▶ DEALER SUPPORT

As of the end of 2010, there were approximately 1,800 Toyota, Lexus and Scion dealerships in the U.S., Canada and Mexico. Often, our dealers' biggest challenge is understanding and complying with all applicable environmental regulations and standards, mainly for hazardous waste and hazardous materials. **Over the past five years, we have worked with industry and the Coordinating Committee For Automotive Repair (CCAR) to launch a number of training programs to help dealerships meet this challenge. (Target 14.2)**

In 2008, we revamped our Web-based environmental assistance network and launched the C.L.E.A.N. Dealer Web site (Community Leadership Environmental Assistance Network) at www.cleanddealer.com. The Web site now includes environmental, health and safety resources as well as hazardous materials information. Since launching in 2008, the number of unique users has increased over 100% and page views have increased by over 300%.

HazMatU (www.hazmatu.org/tms), an industry dealer training program on hazardous materials transportation, was introduced and made mandatory for Toyota dealerships in 2008. During the same year, we launched the Toyota Recycling and Environmental Awareness (TREA) program, an online voluntary nonhazardous waste recycling program for U.S. dealers. The site has seen over 35,000 hits since launch, with 88% of dealers reporting participation in a recycling program in 2010 that included at least one of the following: cardboard, office paper, soft plastics, scrap metal or used beverage containers.

In an effort to continually improve our battery recycling program, we recently introduced the use of returnable packaging for the shipment of large format nickel-metal hydride (NiMH) batteries for our hybrid vehicles. These containers will be used to ship the batteries to and from the dealers. To prepare for the launch of the durable reusable containers, a training program was developed to educate the dealers on how to properly pack the NiMH batteries in the reusable containers. Spent batteries are collected from the dealers and transported to our plant in Long Beach, California. Spent batteries are either exported to Japan for inspection and possible remanufacture, or recycled here in the U.S.



Spent batteries from our hybrid vehicles are collected from dealers and transported to our plant in Long Beach, California, for export to Japan for proper recycling and disposal management.

▶ PARTNERING WITH SUPPLIERS

Toyota recognizes that environmental impacts extend into our supply chain. We work closely with our suppliers to share our knowledge and experience to help them improve their environmental performance.

In 2000, Toyota's manufacturing headquarters in North America released a set of Green Supplier Guidelines to encourage suppliers to support Toyota's environmental goals by going beyond compliance with environmental laws and regulations. **We updated these Guidelines in early 2007. (Target 14.1)**

Since the launch of the updated Guidelines, we have conducted training sessions and benchmark exercises to teach suppliers about how we manage waste streams and how we conduct environmental action planning. We also facilitate energy saving activities (treasure hunts) with interested suppliers to help them identify ways to reduce. Toyota has shared its treasure hunt process with 157 Tier 1 suppliers to date. Treasure hunt participants receive training, access to Toyota's energy tools, and support from the engineering team on investigating and designing energy reduction projects. Since the program began in 2008, savings of 34,000 metric tons of CO₂ and 250,000 MMBTUs have been identified during 36 supplier treasure hunts.

FIGURE U

ISO 14001 Certifications of Toyota's North American Facilities

LOCATION	ORIGINAL CERTIFICATION DATE	DATE OF LATEST RECERTIFICATION
Manufacturing Plants		
Manufacturing Headquarters in Erlanger, Kentucky	2000	2009
Huntsville, Alabama	2004	2010
Long Beach, California	1998	2010
Princeton, Indiana	1999	2011
Georgetown, Kentucky	1998	2010
St. Louis, Missouri	1998	2010
Troy, Missouri	1998	2010
Blue Springs, Mississippi	TBD*	
Jackson, Tennessee	2007	2010
San Antonio, Texas	2008	2010
Buffalo, West Virginia	2000	2009
Woodstock, Ontario	2009	<i>Will be 2012</i>
Cambridge, Ontario	1998	2010
Delta, British Columbia	1997	2009
Baja California, Mexico	2006	2009
Vehicle Distribution Centers		
Georgetown, Kentucky	1998	2010
Lafayette, Indiana	2008	2011
Long Beach, California	1999	2011
Port Newark, New Jersey	2000	2011
Portland, Oregon	2004	2011
Princeton, Indiana	1999	2011
San Antonio, Texas	2007	2010
Toronto, Ontario	2002	2011
Montreal, Quebec	2003	2011
Parts Distribution Centers		
Aurora, Illinois	2004	2009
Cincinnati, Ohio	2001	2010
Glen Burnie, Maryland	2001	2011
Hebron, Kentucky	2003	2009
Kansas City, Missouri	2000	2010
Mansfield, Massachusetts	2000	2009
Ontario, California	2002	2011
Portland, Oregon	1999	2011
San Ramon, California	2001	2010
Torrance, California	2001	2011
West Caldwell, New Jersey	2003	2009
Toronto, Ontario	2001	2011
Vancouver, British Columbia	2002	2011
Sales and Regional Offices		
Canadian Sales Headquarters in Toronto, Ontario	2001	2011
Pacific Region and TFS	2002	2011
Quebec Regional Office and TFS	2005	2011
Atlantic Regional Office and TFS	2006	2011

*Production has not started at the Mississippi plant, and therefore the site has not yet been certified.

▶ ENVIRONMENTAL MANAGEMENT SYSTEMS

Environmental management systems (EMSs) are an essential part of Toyota's overall effort to minimize risks and achieve leading levels of environmental performance.

(Target 13.1) All of Toyota's North American manufacturing plants and logistics sites and several office complexes have an environmental management system certified to the International Organization for Standardization's (ISO) 14001 standard. **(Targets 13.2 and 13.3)** These 41 locations are listed in Figure U to the left. Each location's EMS identifies the significant environmental aspects and impacts found there, and has corresponding goals and targets to manage and gradually reduce these impacts over time.

▶ COMPLIANCE

Our North American logistics sites achieved their 13th year with no hazardous materials or dangerous goods violations, and their ninth year with no environmental non-conformances resulting in monetary fines.

Toyota's North American manufacturing plants received two notices of violation in 2010. **(Target 13.4)** The plant in Texas had a wastewater violation for exceeding their zinc limit, and the plant in Tennessee had a waste violation for not properly labeling used oil containers. Corrective actions have been implemented in both cases to ensure these issues do not recur.

Toyota is one of a number of companies named as a potentially responsible party (PRP) at the Portland Harbor Superfund Site in Portland, Oregon, and at a waste management site in Calvert City, Kentucky. We continue to work on groundwater remediation at our Newark vehicle distribution center with the New Jersey Department of Environmental Protection and the New York/New Jersey Port Authority. At the Long Beach vehicle distribution center, we are working with the Port of Long Beach and the Regional Water Quality Control Board to monitor groundwater quality.

▶ PLANNING FOR NEW PRODUCTION FACILITIES

Prior to beginning construction on a new assembly plant or a major expansion of an existing plant, Toyota develops an "Eco-Plant Plan" that directs us to use the best available technology to minimize environmental impacts and meet or exceed regulatory requirements. Each plan contains operational performance targets for energy use, VOC emissions, waste generation and water consumption. These plans consider best practices and are tailored to local conditions. After the plans have been developed and approved, audits are conducted throughout the construction and trial phases to verify that the plan has been followed.

Over the past five years, Toyota has implemented eco-plant plans for our new manufacturing facilities in Woodstock, Ontario (opened in 2008), and Blue Springs, Mississippi (scheduled to open in late 2011). We also confirmed through an audit in 2007 that our assembly plant in San Antonio, Texas, is operating in a manner consistent with its eco-plant plan. **(Target 13.6)**

FIGURE V

North American Facilities with LEED Ratings

TOYOTA FACILITY	LOCATION	YEAR	CERTIFIED LEED RATING
Toyota Inland Empire Training Center	Rancho Cucamonga, California	2010	CI Gold
Toyota Motor North America, Inc.	New York, New York	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	NC Silver
Toyota Motor North America, Inc.	Washington, D.C.	2006	CI Silver
Portland Vehicle Distribution Center	Portland, Oregon	2004	NC Gold
Toyota Motor Sales – South Campus	Torrance, California	2003	NC Gold

NC = new construction CI = commercial interiors

▶ LEED® CERTIFICATION

Toyota has achieved LEED® certification (Leadership in Energy and Environmental Design) at a number of facilities, including leased office spaces and a vehicle distribution center. **(Target 13.5)** LEED is a point-based program administered by the U.S. Green Building Council that promotes a whole-building approach to sustainable construction and remodeling. Figure V lists the Toyota locations in the U.S. that have achieved LEED certification.

While we do not consider LEED certification in all cases, we do evaluate the inclusion of sustainable elements in each building design phase. In recognition of these efforts, the International Facility Management Association (IFMA) recognized the corporate real estate and facilities department of Toyota's U.S. sales and logistics division with the 2010 Sheila Sheridan Award for Sustainable Design and Energy Efficient Products. This is one of 18 Awards of Excellence given by the IFMA to leaders in facilities management.

TOYOTA |

cooperation with society

An emergency grant from TogetherGreen allowed Wildcat Glades Conservation and Audubon Center in Joplin, Missouri, to launch new summer camps and environmental education programs for children affected by the tornado that hit in May 2011. Children canoed to a site on Shoal Creek where they learned about the watershed and helped clean up the site.



Building strategic partnerships that foster environmental stewardship, education and research is an integral element of Toyota's commitment to sustainable growth.



TOYOTA'S GUIDING PRINCIPLES put commitment to people and the environment at the heart of everything we do. We strive for growth in harmony with the environment that strengthens the communities around us.

Building strategic partnerships is an integral element of Toyota's commitment to sustainable growth. Toyota partners with nonprofit and community organizations, schools, universities, trade associations and other businesses. Elsewhere in this report, we describe how Toyota shares its knowledge and expertise with partners to lessen environmental impacts. **Through partnerships we also promote stewardship, education and research. (Target 15.1)** Toyota's signature partnership is with the National Audubon Society, featured below. Through a grant from Toyota, Audubon launched *TogetherGreen™*, a program that aims to inspire people to take action to improve the health of our environment. In its fourth year, *TogetherGreen* is active in 182 cities and 49 states across the U.S.

The North American Environmental Report (on the Web at www.toyota.com/environmentreport) is used to communicate our environmental plans, activities and performance to our partners and other interested stakeholders. (Target 16.1) Providing this information publicly helps our partners better understand how we address environmental issues within our business and across the vehicle life cycle.

We recognize that the most challenging issues require a broad set of stakeholders to discuss options and develop workable solutions. This is why a number of our partnerships, such as those discussed in the Energy and Climate Change chapter on advanced technology, involve multiple organizations, business and government. We also participate in and sponsor meetings and conferences with experts on a variety of topics to address issues such as sustainable mobility and smart cities. For the last few years, we sponsored Meeting of the Minds conferences and have been hosting Sustainable Mobility Seminars to explore the future of mobility.

In this chapter, we describe a number of our national partnerships that promote environmental education, stewardship and research, as well as examples of local community engagement.

► **PARTNERSHIP:** **NATIONAL AUDUBON SOCIETY**

In 2008, Toyota and the National Audubon Society launched a five-year program called *TogetherGreen™*, funded by a \$20 million grant from Toyota. The program has three main components:

1. Fund conservation projects by established environmental groups across the U.S. through **Innovation Grants**.
2. Train the environmental leaders of tomorrow as **Fellows**.
3. Offer volunteer and individual action opportunities that significantly benefit the environment through **Volunteer Days**.

Toyota and Audubon announced the Year Three Innovation Grants in late 2010. Nationwide, 43 projects in 27 states will receive nearly \$1.1 million to support solutions-based environmental projects. Funds were awarded to partnerships between Audubon groups (local Chapters or programs of Audubon's large national network) and other organizations in their communities—with more than 125 partner organizations involved in Innovation Grant projects in the coming year. Some of the projects that received grants include:

- The Louisville Audubon Society will work with local volunteers in Goshen, Kentucky, to restore grassland at the Creasey Mahan Nature Reserve.
- The Potomac Valley Audubon Society will create a nature park at the headwaters of Flowing Springs in Ranson, West Virginia.
- With an emergency grant from *TogetherGreen*, Wildcat Glades Conservation and Audubon Center has been able to restructure their summer programming to provide children affected by the tornado that hit Joplin, Missouri, in May 2011 with healing nature camps, while providing their parents with much-needed time on their own to restore their homes and communities. After the tornado struck, the Joplin Family YMCA and the Boys and Girls Club were overwhelmed with requests for their services. Wildcat Glades is providing children with high quality environmental activities in a safe place, integrating art therapy, nature journaling, volunteerism and other learning activities to help the children experience the power of nature to heal, and to inspire them to become more deeply engaged in environmental stewardship. The Center is also working to provide free trees to devastated neighborhoods, and children participating in the camps will make bird houses out of lumber reclaimed from the tornado to distribute along with the trees.

Toyota and Audubon also selected 40 Year Three *TogetherGreen* Fellows based on their leadership, skills and commitment to engaging people of diverse backgrounds. In all, the 2010 Fellows will help engage thousands of people to protect habitat, wildlife and water and save energy in 34 cities in 22 different states. The Fellows include:

- **Kenya Stump** (Lexington, Kentucky) will form the “Kentucky Biofuels for Schools Program” to educate high school students on biofuels and installing biodiesel processing equipment.
- **Sara Peel** (Warsaw, Indiana) will educate children and adults on the Wabash River ecosystem by developing a Web-based tool to study stormwater impact, carbon footprints and wildlife habitat.
- **Justin Schott** (Ann Arbor, Michigan) will expand the Detroit Youth Energy Squad (D-YES), a program that trains young people to perform energy retrofits and teach residents to understand energy bills and practice conservation.
- **Sara Espinoza** (Washington, D.C.) will develop and translate materials into Spanish for meteorologists in the Telemundo network to teach viewers conservation tips during weather reports.

To date, *TogetherGreen* volunteers across the country have donated over 700,000 hours, including more than 700 Toyota employees in New York, Kentucky, Indiana, Missouri, Texas and California. For more information on *TogetherGreen*, please visit www.togethergreen.org.



This Green Initiative Tour is part of Sara Peel's place-based education campaign along the Wabash River. Sara is one of 40 *TogetherGreen* Fellows.

▶ ENVIRONMENTAL STEWARDSHIP

National Public Lands Day

For the 12th year, Toyota sponsored National Public Lands Day (NPLD) in partnership with the National Environmental and Education Foundation (NEEF). This national program, held annually in September, is the largest hands-on volunteer event to improve and enhance public lands.

In addition to providing sponsorship, Toyota encourages employees to get involved in NPLD activities by volunteering to care for parks, forests, rivers, beaches, shorelines and other public lands. During NPLD 2010, more than 3,500 Toyota employees volunteered at 41 different sites in 20 states and U.S. territories (please see Figure W).

Each year, more and more Toyota associates are becoming involved in NPLD. From the program's inception in 1999 through 2010, the number of sites where Toyota employees volunteer has grown from 18 to 41. Similarly, employee participation has increased from nearly 900 Toyota volunteers in 1999 to more than 3,500 in 2010.

During NPLD 2010, more than 170,000 volunteers maintained existing trails and built new trails and bridges, beautified stream beds, removed trash and invasive plants, and planted 1.6 million trees. These projects contributed an estimated \$15 million in improvements to federal, state and local public lands. For more information, please visit www.PublicLandsDay.org.

Willamette Riverkeeper and a host of other partners coordinated an NPLD cleanup event to clean 187 miles of the Willamette River. Employees at Toyota's Portland, Oregon, vehicle distribution center hosted a cleanup at Cathedral Park to clean the Portland Harbor portion of the river.



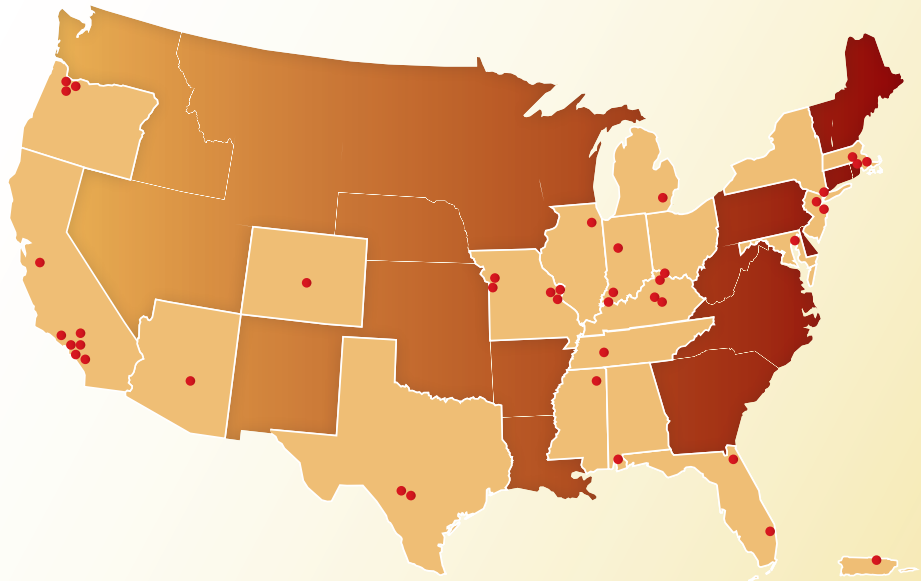
Using 10 canoes, 13 kayaks and four motorboats, Toyota employees helped clean up a portion of the Willamette River during a 2010 NPLD event.

FIGURE W

National Public Lands Day 2010 | Toyota Site List

Total
Number
of Sites:

41

**ALABAMA**

Dog River Clearwater Revival, Mobile

ARIZONATonto National Forest, Lower Salt River
Recreation Area, Mesa**CALIFORNIA**

Alta Vicente, Rolling Hills Estates

El Dorado Nature Center/
Granada Beach, Long BeachLytle Creek, San Bernadino National Forest
Lytle Creek, CA

Mt. Diablo State Park, Walnut Creek

Shiplay Nature Center, Huntington Beach

Venice Beach Least Tern Colony, West Hollywood

COLORADO

Castlewood Canyon State Park, Franktown

FLORIDA

Amelia Island State Park, Jacksonville

Quiet Waters Park, Deerfield Beach

ILLINOIS

Dick Young Forest Preserve, Batavia

INDIANA

Courthouse Square, Princeton

Armstrong Park, Lafayette

Mesker Park Zoo, Evansville

KENTUCKY

Big Bone Lick State Park, Union

Ward Hall, Georgetown

Waveland State Historic Site, Lexington

MASSACHUSETTS

Foxboro State Park, Franklin

Massachusetts Audubon, Attleboro Springs
Attleboro

West Hill Dam, Uxbridge

MARYLANDFort McHenry National Monument and
Historic Shrine, Baltimore**MICHIGAN**

Sharon Lake Preserve, Grass Lake

MISSOURI

Swope Park, Kansas City

Cuivre River State Park, Troy

Ruth Park Woods, University City

Smithville Lake, Smithville

Vinita Park, Vinita Park

MISSISSIPPI

Trace State Park, Belden

NEW JERSEY

Cross Estate, Boonton

Silas Condict County Park, Boonton

NEW YORK

Fort Washington Park, Hudson River, New York

OHIO

Blue Ash Nature Park, Cincinnati

OREGON

Kelley Point Park, Portland

Mary S. Young State Park, West Linn

Portland Harbor Portion of Willamette River,
Portland**PUERTO RICO**

Fort San Cristobal, San Juan

TENNESSEE

Liberty Garden, Jackson

TEXAS

City of San Antonio/Graffiti Wipe-Out, San Antonio

Medina Natural Area, San Antonio

Mitchell Lake Audubon Center, San Antonio

Partnership With WWF in the Galápagos Islands

Ten years ago, on January 16, 2001, an oil spill in the Galápagos Islands resulted in approximately 240,000 gallons of oil and bunker fuel being dumped into the ocean near San Cristóbal Island. World Wildlife Fund® (WWF) asked Toyota to help evaluate the overall impact of fossil fuels in the islands—the risks of using and transporting them, as well as ways to avoid future oil spills. This marked the beginning of a unique partnership. Within seven months, that partnership produced the Galápagos Energy Blueprint, aimed at transforming the islands' energy systems from traditional fossil fuel-based systems to a system based on sustainable energy sources and clean technologies.

Since 2001, WWF and Toyota have worked together to implement the Energy Blueprint and transform the Galápagos into a model of community-based conservation and sustainable development. The partnership has also evolved to address other issues such as waste management and recycling. A *Waste Management Blueprint for the Galápagos Islands* was created in 2009, and now nearly 50% of all waste generated on the islands is being recycled.

Key accomplishments related to both energy and waste management include:

- The design and renovation of the islands' central fuel storage facility on Baltra Island.
- The implementation of a solar energy project that meets most of the electricity needs on Floreana Island.
- A renewable energy education campaign.
- The expansion of an oil recycling project on Santa Cruz Island and the establishment of a similar project on San Cristóbal Island.
- A comprehensive recycling program on Santa Cruz Island.
- The creation of a Municipal Environmental Department on Santa Cruz Island.
- An ongoing recycling education campaign.

Education and outreach have been key components of everything we've done in the Galápagos Islands. As we have grown in our knowledge and experience in working in the islands, we have broadened our scope beyond just energy. We look holistically at what "sustainability" requires, such as building the human capacity of the islands. We hope this project can serve as a model elsewhere in the world for the possibilities that partnerships can create.

Toyota Evergreen Learning Grounds

In Canada, we set a target to contribute at least 25% of our philanthropy to environmental programs annually. **We have met this target each of the past five years. (Target 15.2)** One example of this philanthropy is our partnership with **Evergreen**. Toyota in Canada and its dealerships have partnered with Evergreen for over a decade, working together to transform Canadian school grounds into natural learning environments. The Toyota Evergreen Learning Grounds program has empowered close to one million students at almost 3,000 schools across Canada, helping them create inviting natural play spaces and outdoor learning environments.

In granting over CAN\$2 million for greening projects at Canadian schools, the Toyota Evergreen Learning Grounds program offers students a close, hands-on relationship with the natural world while educating them about the importance of restoring, protecting and celebrating it. In the process, students transform their traditional school grounds, which are often a combination of asphalt and turf, into natural learning spaces that feature trees, wildflowers and shaded areas.

In just one of many examples from across the country, Learning Grounds worked closely with students at Montreal's Perspectives II High School, which has many high-risk youth from tough neighborhoods. As part of the "McGill-Evergreen Teaching for a Healthy Planet" field initiative, Perspectives' students planted native trees and shrubs and built benches, planters and a mural. The students increased their knowledge and understanding of environmental issues, and were able to apply their classroom learning in a real context, bridging the theory-to-practice gap that exists in many teacher education programs.

Please also visit the following Web sites for information on two of our other national programs:

Arbor Day Foundation's Tree Campus USA Program
www.arbordaynow.org

National 4-H Council's 4-H2O Program
www.4-h.org/4-h2o

► ENVIRONMENTAL EDUCATION

Toyota International Teacher Program

Now in its 13th year, the Toyota International Teacher Program promotes environmental conservation and sustainability as well as global understanding through international study tours for secondary school teachers from the United States. Administered by the Institute of International Education, the program began in 1998. Since then, more than 635 educators nationwide have traveled to the Galápagos Islands, Costa Rica or Japan, completing a two-week study tour to a country where finding innovative solutions to environmental challenges is a high priority. Please see www.iie.org/toyota for more information.

Upon returning to their classrooms, these teachers apply what they have learned to create interdisciplinary, solution-focused educational approaches. It is estimated that more than 635,000 students have benefited from these travel programs and expanded curriculums. The teachers also participate in professional conferences, seminars and community workshops to share what they have learned.

During a recent study tour held in 2010, U.S. teachers traveled to the Galápagos and interacted with local environmental experts and Galapagueño teachers. To prepare for that tour, the selected teachers visited Everglades National Park in Miami for a brief orientation and exploration of the Everglades biosphere, which is similar to that of the Galápagos Islands.

Both present and past study-tour participants have been successful in increasing environmental awareness and global understanding in U.S. classrooms. Examples of such teachers include:

- Past Galápagos participants Mary Craig and Sheri Thompson collaborated to create a library for Delia Ibarra Elementary School in the Galápagos. The two teacher-librarians are leading students and teachers in fundraising efforts for the books and other library materials, and are raising funds for U.S. students to travel to the Galápagos Islands on a service trip in summer 2012.
- Dana Crosby, former Galápagos participant, led her class to win a \$20,000 grant provided by National Geographic and SunChips®. Crosby and her students built a greenhouse with the funding. As a result, her students now understand how to plant “green” gardens, grow organic produce and prepare organic meals, and reduce their carbon footprints by eating locally grown foods.

- Jason Shields, former Costa Rica participant, stated that the tour gave him an “experience that completely revolutionized my pedagogy.” Shields now leads his students in creating a backpack hydro electric generator, building wind turbines, and spearheading leasing his school’s roof space for solar panels, allowing the school to buy back the energy for an inexpensive price.

This year, Toyota extended the reach of the Toyota International Teacher Program with its first study tour to the Republic of South Africa. A record number of 1,026 applications were received from which 24 teachers from 18 states were selected. The study tour enabled these teachers to learn first-hand about sustainability and conservation efforts in South Africa, the country’s rich cultural heritage, and the economic and political issues facing the country today.

During their travels to Johannesburg, Pretoria, Durban, Cape Town and Kruger National Park, teachers participated in a variety of activities that highlight the relationship between South African history, culture and the environment. U.S. teachers were matched with South African educators of similar grade level and focus area to better aid in collaboration both in the field and after the program. This collaboration is a first of its kind for the program.

Through the Toyota International Teacher Program, teachers are helping local communities contribute to solving global problems, and their students are being exposed to a global experience that enhances their understanding of environmental issues in their own communities and around the world.



A teacher and her host plant cacao at Finca La Virgen near Guácimo, Costa Rica, as part of a study tour under the Toyota International Teacher Program.

Wyland Foundation

Toyota formed a relationship with the Wyland Foundation, an organization founded by the renowned marine life artist of the same name. This group helps children and families around the U.S. discover the importance of healthy oceans and waterways through public art programs, classroom science education and live events.

By serving as Wyland's environmental education outreach partner, Toyota worked with the foundation to launch Earth Month Heroes, a program that recognizes exemplary teachers who are not only finding ground-breaking ways to encourage students to work toward sustaining a healthy planet, but who also believe in the difference each student can make. Throughout the month of April, one teacher per day was honored based on their ability to foster interest in environmental studies. Winning teachers from Los Angeles and Orange Counties, grades K-12, each received a \$500 cash prize for their classroom, with a chance to win a \$5,000 grand prize to support their education efforts. In addition, Wyland recognized and honored the winning teachers at a special Earth Month Kickoff event on March 31, which also served as a rededication ceremony for Wyland's restored marine life mural "Gray Whale Migration," in Redondo Beach.

In conjunction with Earth Month Heroes, the Wyland Foundation and Toyota sponsored the Mayor's Challenge, a contest that brought cities across Southern California together to focus on water conservation and pollution reduction in a friendly competition. Based on a successful pilot program in Orlando, Florida, the Mayor's Challenge encouraged cities to register residents for an online water conservation pledge. During Earth Month, individual pledges from citizens applied toward their city's total water savings and pollution reductions over the following year. Hermosa Beach was the city with the highest percentage of participating residents, and was recognized for pledging to save 121,540,821.5 gallons of water.



The artist Wyland painted a mural with the help of family and friends at the 2010 Green Port Fest in Long Beach, California. Toyota supports the Wyland Foundation, founded by the artist of the same name to educate children and families about the importance of healthy oceans and waterways.

Please also visit the following Web sites for information on two of our other national programs:

Toyota TAPESTRY
www.nsta.org/pd/tapestry

Lexus Eco Challenge
www.scholastic.com/lexus

► RESEARCH PARTNERSHIPS

Toyota supports research partnerships that promote reductions in greenhouse gas (GHG) emissions. (Target 15.3)

Over the past five years, we funded a project through the Pew Center on Climate Change that researched best practices implemented by major companies in reducing energy use and GHG emissions. The results of the project were shared in 2010 through conferences, media and the Pew Center Web site.

Southern Forests for the Future

In 2009, Toyota awarded \$1.49 million to the World Resources Institute to support Southern Forests for the Future, a project to raise awareness of the threats facing southern U.S. forests and to increase the amount of forest conserved or managed in a sustainable manner. In 2010, the project focused on identifying and developing a portfolio of options that align economic incentives with keeping forest as forest. In 2011, the options demonstrating the most promise are being piloted and rolled out. The project's long-term goal is to help catalyze sustainable stewardship of an additional 20% of southern U.S. forests by 2020.

Since the project began, 75,000 visitors have linked to www.SeeSouthernForests.org to learn about the threats facing forests and Toyota's partnership with WRI.

▶ LOCAL COMMUNITY ENGAGEMENT

Toyota has developed partnerships with local community organizations where we live and work. These partnerships allow our employees a chance to volunteer in their communities and to share their knowledge and expertise.

Below are examples of how we engage with our local communities:

- **The Great Canadian Shoreline Cleanup** is an event sponsored by the Vancouver Aquarium. Employees from Toyota's plant in Delta, British Columbia, volunteered this year to clean up part of the shoreline. Data logged about the garbage and debris collected during the event is being used by the aquarium staff to research the origins and prevalence of shoreline litter.
- **World Water Monitoring Day™** is an international education and outreach program that builds public awareness and involvement in protecting water resources around the world by engaging citizens to conduct basic monitoring of their local water bodies. Employees from Toyota's plant in Princeton, Indiana, worked with 2,375 sixth grade students to sample water at various locations.
- **YMCA Camp Carson** annually hosts an interactive and educational experience celebrating Earth Month. Employees from Toyota's Indiana plant invited nearly 400 Gibson County third grade students from 11 schools to the camp this year.
- **The Ohio River Sweep** is an event held in six states to clean up the banks of the Ohio River and several of its tributaries. Employees from Toyota's North American manufacturing headquarters campus in Erlanger, Kentucky, participated in this year's cleanup.
- **The Nature Conservancy** received \$25,000 from Toyota's plant in Kentucky for its 30 nature preserves and over 100 conservation easements. With this funding, the Nature Conservancy plans to implement the proper management needed to ensure the preserves continue to benefit rare and threatened plant and animal species.

- **The 47th Annual West Virginia Youth Environmental Day** was sponsored by Toyota's West Virginia plant and held at North Bend State Park in Parkersburg.
- **The Palos Verdes Peninsula Land Conservancy** in California received a Tundra from Toyota to be used to assist in habitat restoration and trail maintenance on the 1,600 acres of preserved land that spans the peninsula.
- **The 186th Street Elementary School** in Gardena, California, was joined by actress Malin Akerman for an Earth Day assembly and tree planting. Toyota underwrites support of this school as part of the Environmental Media Association's work with schools across Los Angeles to create and support organic garden programs. These gardens are used to teach students in urban areas about science, nutrition and the importance of protecting the planet.

MillionTreesNYC

MillionTreesNYC is a citywide, public-private program with an ambitious goal: to plant and care for one million new trees across New York City's five boroughs by 2017. By planting one million trees, New York City can increase its urban forest—a valuable environmental asset made up of street trees, park trees and trees on public, private and commercial land—by 20%, while achieving the many quality-of-life benefits that come with planting trees.

Toyota is one of the primary sponsors of this project, launched in 2007 jointly by the City's Department of Parks and Recreation and the New York Restoration Project. Since the program's launch, more than 500,000 trees have been planted throughout the city, putting the program one year ahead of schedule.

Kentucky Plant's Wildlife Habitat Council Certifications

The Wildlife Habitat Council (WHC) is a nonprofit group of corporations, conservation organizations and individuals dedicated to restoring and enhancing wildlife habitat. WHC works with corporations and other landowners to create tailored voluntary wildlife habitat enhancement and conservation education programs on corporate facilities and in the communities where they operate.

The Wildlife Habitat Council's Corporate Wildlife Habitat Certification/International Accreditation Program recognizes commendable wildlife habitat management and environmental education programs at individual sites. Certification criteria are stringent. Sites must demonstrate that programs have been active for at least one year with a management plan that lists goals, objectives, prescriptions and complete documentation of all programs.

The Certification Review Committee, a panel of WHC wildlife biologists and staff, reviews the materials for certification eligibility and recognizes deserving projects under an appropriate category. WHC offers certification in two separate categories: Wildlife at Work and Corporate Lands for Learning.

In 2008, our plant in Georgetown, Kentucky, was the first Toyota plant to obtain certification to the Wildlife Habitat Council's Wildlife at Work and Corporate Lands for Learning programs. The plant's programs began in 2006, when they set aside 50 acres within the 1,300-acre site for an Environmental Education Center and Nature Trail. The one-mile trail runs through old and second-growth forest and features educational kiosks and tree identification posts. Kiosks and posts explore a variety of topics such as the prairie habitat, wildflowers, birds, aquatic life and composting.



Students visiting the Environmental Education Center and Nature Trail at Toyota's Kentucky plant learn about prairie habitat, birds and wildflowers. They also learn about composting, recycling and other ways that industry can reduce its impact on the environment.

Since 2006, bridges, decks and benches built from sustainable materials have been added to the trail, and the plant partnered with the U.S. Fish and Wildlife Service to restore native habitat. They planted eight Short's goldenrod plants, a federally endangered species, and transplanted Kentucky switch cane that, once established, will provide a healthy home for migratory birds and small mammals. The plant also partnered with Bluegrass Personal Responsibility In a Desirable Environment (PRIDE) and teachers from local high schools to create a Web-based curriculum for fourth through 12th grades. These activities focus on the same environmental issues students learn about while visiting the nature trail: water quality and conservation, solid waste, energy and air quality.

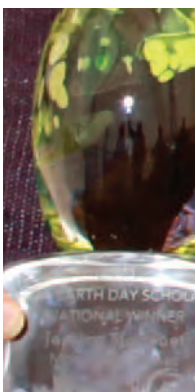
In 2010, more than 5,600 students visited the Environmental Education Center and Nature Trail at Toyota's Kentucky plant. A transportation fund was established in 2008 to help schools offset the cost of a trip. More than 1,300 students have benefited from this fund since 2008.

Between the tours of the plant and the use of the environmental education center, students, scout groups and the community are shown Toyota's vision of how industry and the environment can coexist. Other North American plants are also exploring certifications with WHC.

TOYOTA |

north american presence

Toyota's Earth Day Scholarship Program recognized Jessica Magonet of Montreal for her environmental commitment and leadership, both at her school and in her community.



The RAV4 electric vehicle, jointly developed by Toyota and Tesla Motors, will be built at Toyota's assembly plant in Woodstock, Ontario, and will be brought to market in 2012.



TOYOTA HAS BECOME AN INTEGRAL MEMBER of the communities where we live and work by developing relationships. We partner with government agencies, nonprofits, environmental groups, schools and universities to clean up public lands, develop citywide energy management plans and train the leaders of tomorrow. We partner with other businesses to build hydrogen infrastructure, research sustainable mobility and recycle materials that we can't reuse.

One of the ways we make communities more sustainable is by hosting sustainability or conservation events at our facilities. We collect household hazardous waste from employees and neighbors at our Indiana and Kentucky plants and at the manufacturing corporate office; we round up electronic waste at our headquarters campuses in Erlanger, Kentucky; Torrance, California; and Toronto, Ontario. We plant trees, clean up rivers and teach students how to recycle. All of these activities involve working with others in large and small ways, and reinforce our commitment to local communities.

We describe below one of Toyota's longest-running Earth Day programs, the Toyota Earth Day Scholarship Program. Toyota's support of this program through the Toyota Canada Foundation illustrates our commitment to Toyota's Earth Charter, which tells us to build close and cooperative relationships with a wide spectrum of individuals and organizations, and to actively participate in community activities.

► **PARTNERSHIP: EARTH DAY CANADA**

One of 20 exceptional regional student winners from across Canada, Jessica Magonet of Montreal, Quebec, has been named as the national winner of the 2011 Toyota Earth Day Scholarship program. Jessica's environmental achievements were recognized with a check for CAN\$5,000 and a Panasonic notebook computer at the Green Vehicle Rendez-Vous. Jessica codeveloped a five-year action plan to reduce her school's ecological footprint and created her school's environmental club. She led the installation of a student-managed composting system, a center for recycling environmentally harmful objects and a two-day conference for Quebec and Ontario students to discuss the link between environmental degradation and world poverty. She is currently Chair of the Sierra Youth Coalition Executive Committee.

Toyota Canada provides support to the Toyota Canada Foundation, which through Earth Day Canada, operates the Toyota Earth Day Scholarship program to reward and encourage environmental commitment and action among students. An entrance scholarship of CAN\$5,000 is presented to graduating high school and *Cégep* (*Collège d'enseignement général et professionnel*) students entering their first year of post-secondary education. Recognizing that environmental issues are increasingly being tackled through multidisciplinary approaches, winners are selected regardless of their intended program of study. Now in its ninth year, CAN\$700,000 has been awarded to 140 young Canadians through the Toyota Earth Day Scholarship Program. Please visit www.earthday.ca/scholarship for more information.

► **TOYOTA BY THE NUMBERS**

Toyota established operations in North America in 1957, and today operates 14 manufacturing plants here. Toyota’s plants in the U.S., Canada and Mexico produced over 1.4 million vehicles in calendar year 2010. We sold more than two million vehicles in 2010 at nearly 1,800 Toyota, Lexus and Scion dealerships in North America. More than 67% of the vehicles sold in North America were built here.

Toyota continues to invest in the communities where we do business. Our direct investment in North America in 2010 was valued at over \$23 billion and included over 30 manufacturing, research and design, sales, financial and logistics facilities. We employed over 36,000 people with an annual payroll of \$3.27 billion.

FIGURE X

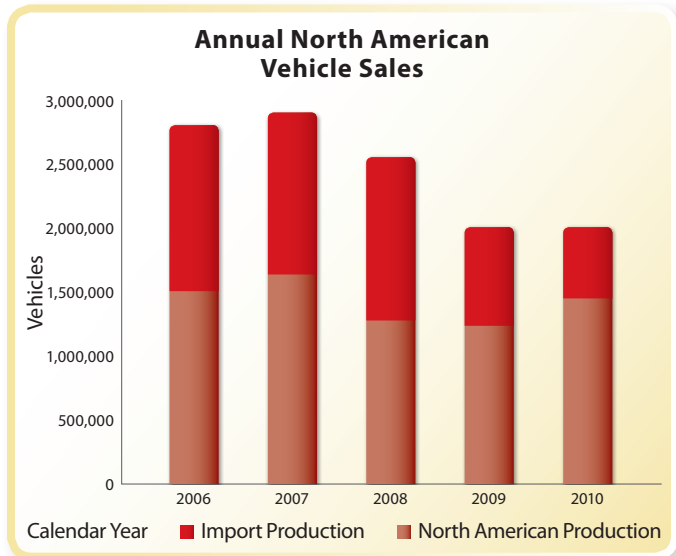


FIGURE Y

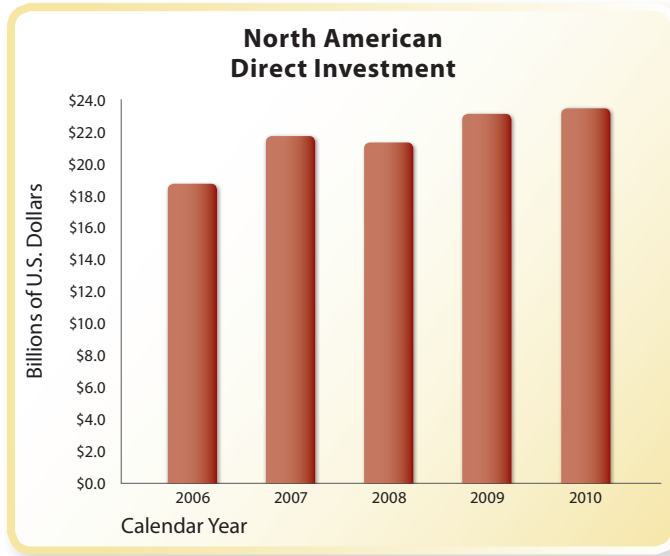


FIGURE Z

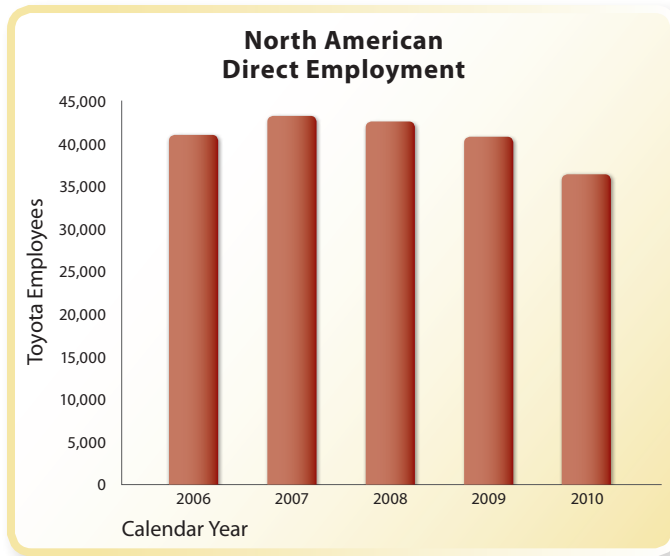


FIGURE AA



Despite the slowdown in the economy over the last few years, Toyota remains committed to maintaining a strong presence in North America. This fall, our newest plant in Blue Springs, Mississippi, will begin producing Corollas.

We also recently announced a new investment of \$2.1 million to Bodine Aluminum—Tennessee, Inc., which will create approximately 10 new jobs at the Jackson facility. The plant in Jackson, Tennessee, and its sister facility in Troy, Missouri, will provide transmission case and housing for Toyota's West Virginia plant, where transmissions for vehicles produced in North America are made. As a company, Toyota is committed to producing its vehicles where they are sold, and the investment in new transmissions built in West Virginia exemplifies that commitment.

Toyota and Tesla Motors, Inc. announced a partnership in 2010 to cooperate on the development of electric vehicles and parts, and production system and engineering support. Thirty-one demonstration vehicle prototypes combining Toyota's RAV4 model with a Tesla electric powertrain are slated for production. In April 2011, media had their first opportunity to drive the first prototype demonstration program vehicle at the Sustainable Mobility Seminar. The demonstration vehicles are powered by lithium metal oxide battery packs with a usable output of 37 kWh and a real world EV driving range of 100 miles.

We aim to bring the vehicle to market in the U.S. in 2012. The RAV4 vehicles will continue to be built at our facility in Woodstock, Ontario, while Tesla will build and supply the battery as well as other related parts and components from its new facility in Palo Alto, California.

► **TOYOTA'S NORTH AMERICAN
AFFILIATE COMPANIES**

Toyota Motor North America, Inc. (TMA), is the holding company for Toyota's U.S. sales and manufacturing operations with offices in New York City, Washington, D.C., and Miami. Functions include government and regulatory affairs, energy, environment, economic research, philanthropy and corporate communications.

Toyota Motor Engineering & Manufacturing North America, Inc. (TEMA), is headquartered in Erlanger, Kentucky. The company is responsible for Toyota's North American engineering design and development, R & D, and manufacturing activities in the U.S., Canada and Mexico.

In 2011, our manufacturing facilities were located in:

- Huntsville, Alabama
- Long Beach, California
- Princeton, Indiana
- Georgetown, Kentucky
- Blue Springs, Mississippi
- St. Louis and Troy, Missouri
- Jackson, Tennessee
- San Antonio, Texas
- Buffalo, West Virginia
- Delta, British Columbia
- Cambridge and Woodstock, Ontario
- Baja California, Mexico

Toyota Motor Sales, U.S.A., Inc. (TMS), headquartered in Torrance, California, is the marketing, sales, distribution and customer service arm of Toyota, Lexus and Scion in the United States. TMS markets products and services through a network of nearly 1,500 Toyota, Lexus and Scion dealers in the U.S.

Toyota Canada Inc. (TCI), headquartered in Toronto, Ontario, is the exclusive Canadian distributor of Toyota, Lexus and Scion cars, SUVs and trucks at 315 dealerships. TCI has regional offices in Vancouver, Calgary, Montreal and Halifax, and parts distribution centers in Toronto and Vancouver.

NORTH AMERICAN OPERATIONS

-  Toyota Sales or Service Office*
-  Lexus Sales or Service Office*
-  Financial Services Office*
-  Manufacturing Facility
-  Supplier State/Province
-  Holding Company
-  Research & Development Center
-  Design Center
-  Hino Operation or Manufacturing Facility
-  Dealerships throughout North America

*May represent more than one location.
Data as of 12/08. ©2009

