

Special Feature

# We explore the future of a smart mobility society that will bring a smile to people worldwide

Toyota continues to take on various challenges toward the realization of the Toyota Global Vision\*.

Toward a society where mobility means safety, efficiency and freedom.

Toward a net positive society going beyond zero environmental impact.

Striving for ever-better cars through TNGA, toward a society with new wonder and exhilaration utilizing AI and Big Data.

Rewarded with a smile, by exceeding your expectations.

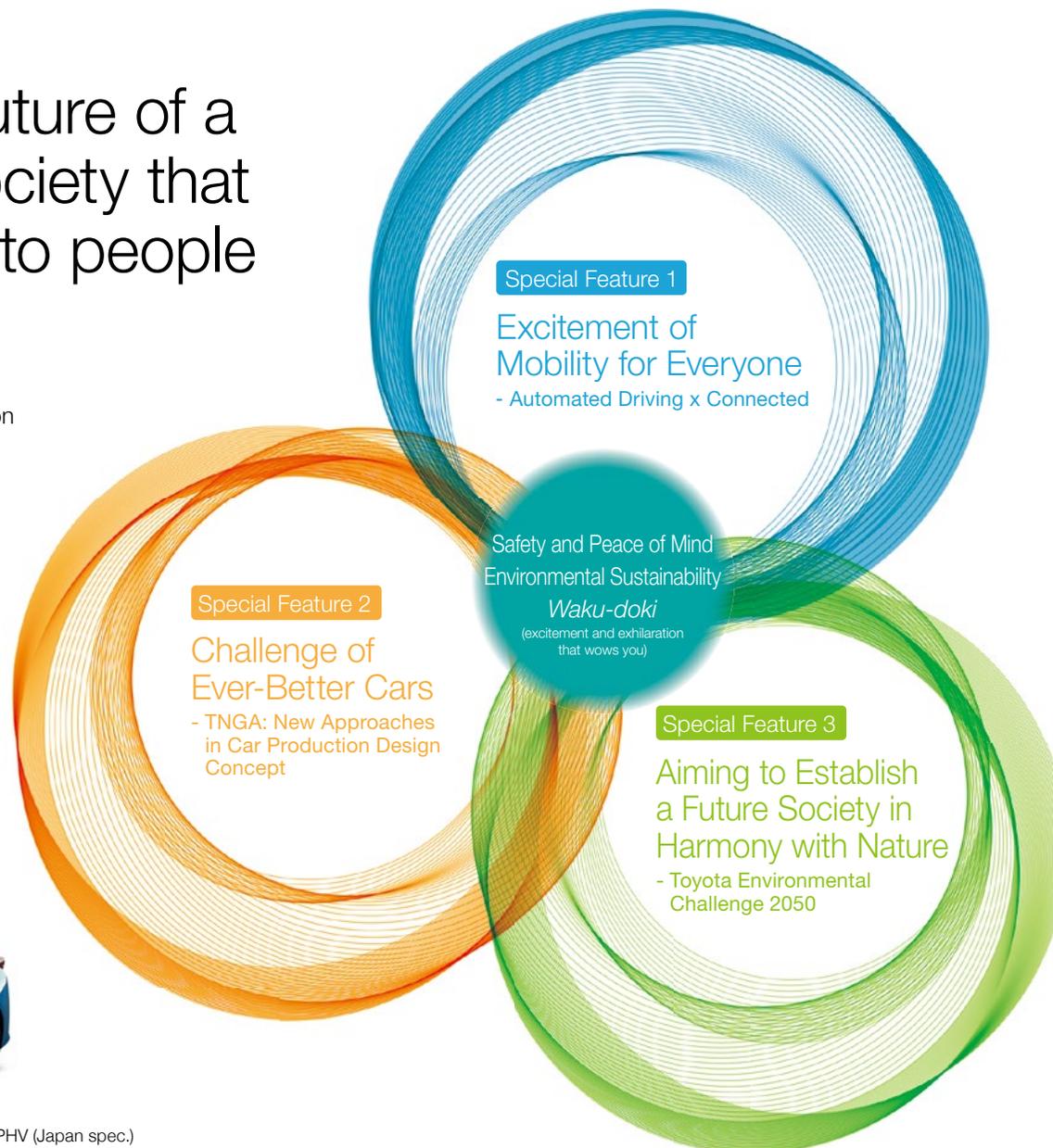
Through Safety and Peace of Mind, Environmental Sustainability, and *Waku-doki* (excitement and exhilaration that wows you), Toyota is pioneering the future of a smart mobility society.

\* Toyota Global Vision

[Web](#) Company (Global Vision)



New Prius PHV (Japan spec.)  
Exhibited in Smart Community Japan 2016.



Special  
Feature  
1

Automated Driving x Connected

# Excitement of Mobility for Everyone



Toyota has continued unrelentingly to face challenges with its founding principles of “Contributing to society by making automobiles.” With the business environment greatly changing and the technological progress further accelerating, we will continue to provide a new value of mobility meaning safety, efficiency, and freedom for everyone by merging all of our accumulated technological power with state-of-the-art technologies.

Using Artificial Intelligence (AI) technology applied to automated driving, we will establish a teammate relationship between people and cars. Using connected technology will enable a variety of customers to drive cars safely, confidently and happily. Toyota is actively addressing open innovation as well as in-house research and development to contribute to a more affluent society where everyone can live safely and freely with peace of mind.

## Taking on challenges with numerous possibilities in order to create new value

**Gill Pratt**, CEO of Toyota Research Institute Inc.

The Toyota Research Institute (TRI) is committed to researching and developing artificial intelligence (AI) in order to build an affluent society.

In our research and development projects, we will focus first on researching ways people and machines can work together in the area of mobility. I believe that automated driving technologies allow people and cars to help one another in a partnership, creating a new enjoyment in cars if the driver does not have to worry about traffic accidents.

When my father reached the age of 83, I saw that driving was now becoming dangerous for him and I had to convince him to hand over his car keys. If automated driving technologies had been developed at that time, he would not have had to give up his freedom to move around by himself. We will use AI to take on these types of issues.

In addition, we hope to provide the freedom of “mobility” to all persons, not just moving around outside in cars, but also moving around inside from room to room. Because I believe that this freedom can drastically improve the quality of life.

Furthermore, we will continue to research the possibilities of AI in other areas besides mobility. We are committed to developing technology for applications in a wide range of fields, such as the discovery of new materials and production management systems.

TRI will continue to search for numerous possibilities and take on challenges in order to create new value.



# People and Cars as Teammates

## Accelerated Development of Automated Driving Technology

Through the continuous study of automated driving since the 1980s aiming at ever-better cars, in October 2015, Toyota announced the concept for automated driving: the Mobility Teammate Concept. This is a unique philosophy of Toyota which seeks out a relationship between people and vehicles so they have the same objectives, stand by and support one another as companions would do, in order to realize a society in which every person can enjoy mobility safely, comfortably and freely. In addition, the Mobility Teammate Concept contains Toyota's sincere hope to "provide precious cars for all" including those who love driving or are not good at driving, senior citizens and the visually challenged.



### Technological Development Measured by Degree of Difficulty in Automated Driving

Technologies required for automated driving differ in difficulty according to road conditions. Toyota recognizes these challenges and organizes them in accordance with the level of difficulty to solve them. By steadily progressing step by step Toyota will lead the world in the field of automated driving.

Required driving capability	Driving safely, following all traffic rules		Driving on known roads wisely	Driving on any roads
Road conditions	Highway 	Major surface roads 	Surface roads 	Any roads 
Required driving intelligence	 360° recognition of surrounding vehicles	 Recognition with wider area and higher density	 Recognizing/predicting behavior of various moving objects	 Ability of self learning and self improving
Degree of difficulty	Low <span style="display: inline-block; width: 100px; height: 10px; background: linear-gradient(to right, blue, black);"></span> High			

### Three types of intelligence crucial to the success of the Mobility Teammate Concept



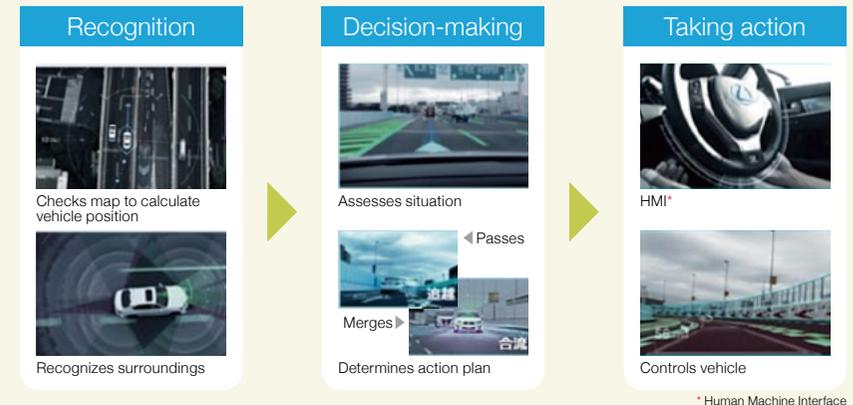
## Aiming at realization around 2020 Highway Teammate

In October 2015, developed under the Mobility Teammate Concept, Toyota debuted an automated driving demo car equipped with Highway Teammate functions for highways. The built-in system in this car has enabled automated driving possible from the on-ramp to the off-ramp on a highway, merging onto

and exiting from a highway, lane changes, and maintaining safe distances from lane lines and other vehicles through appropriate recognition, decision-making, and action according to actual traffic conditions. We are aiming at the realization of Highway Teammate around 2020.



### Automated driving technologies work by using three critical processes



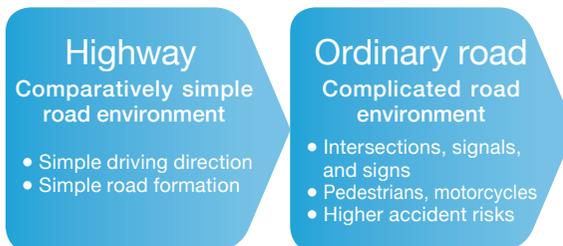
The Highway Teammate requires a higher level of coordination in three processes from recognition, decision-making, to taking action. Therefore, we are developing travel technologies where the car can find a safer route automatically by the integrated use of

detailed maps to grasp car positions correctly, high-end sensing technology and recognition technology to identify the types of moving items, and auto-sensing technology to realize smooth driving.

# Utilization of Artificial Intelligence (AI) Technology and Big Data

## The Challenge of Automated Driving on Ordinary Roads

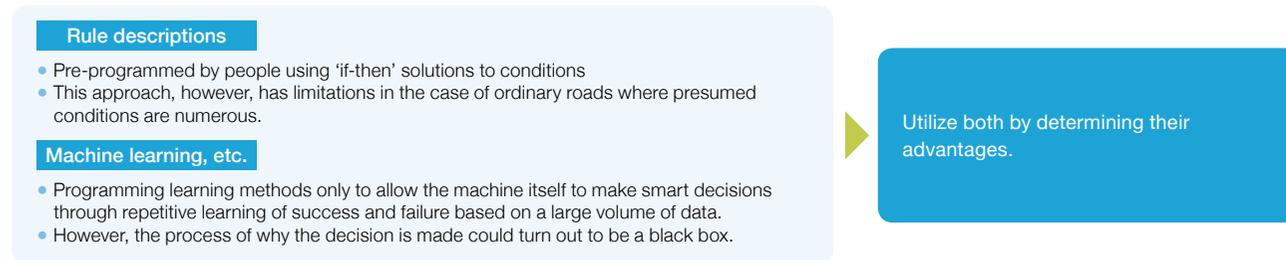
To “provide everyone with freedom of movement” is Toyota’s hope contained in the Mobility Teammate Concept. In order to realize this dream, we are aware of the need to address the challenge of automated driving on all roads on which people throughout the world drive along. Therefore, Toyota is committed to realizing automated driving on ordinary roads which is more difficult than highways. We are aiming at the realization of a sustainable smart mobility society in the future by merging the accumulated technology and insight of *Monozukuri* (manufacturing) with state-of-the-art technology such as AI technology and Big Data.



## Challenge to Ordinary Roads

### Utilization of AI Technologies

In order to make smarter decisions, in the existing rule descriptions in its system designs, Toyota is applying state-of-the-art AI technologies such as machine learning, one of which is deep learning of existing rule descriptions in its system designs.



### Utilization of Big Data

Toyota considers both making a concerted effort to acquire driving data during the development of automated driving, and the vast amount of data acquired from connected cars released in the market driving under diverse global road conditions, as key factors to accelerate AI learning.

After the results learned from driving data of individual cars are reviewed using the vast data including information from other cars, all connected cars will receive feedback of the results. This will allow the occurrence of near miss accidents anywhere in the world to become empirical knowledge of every car worldwide.



## Urban Teammate

### Driving demonstrations of an automated driving demo car on an ordinary road were held

To realize automated driving on ordinary roads, Toyota gave a driving demonstration of an automated driving demo car, equipped with an Urban Teammate function under development, at the Summit Conference of the Leading Industrialized Nations (so-called Ise-Shima Summit) held on May 26 and 27, 2016.



## Further Use of AI Technology Expanding the world with Big Data

Advanced AI technology can bring innovation not only to automated driving but also to a wide range of fields such as robot technology. In addition, it is expected to underpin future industrial technologies and create new industries.

In order to further strengthen research and development in AI technology, Toyota has established a new company, the Toyota Research Institute (TRI) in the United States, where we will focus on AI technology that can harmonize with people, such as accident-free cars, mobility that enables everyone to enjoy freedom of travel, and robots supporting seniors’ life with dignity. Furthermore, we will work on the technological development of new material, production control systems, etc.

As summarized above, Toyota will work towards realizing a more affluent Smart Mobility Society through information sharing and connecting with all customers including drivers.

# People, Cars and Communities Will Be Connected

## Connected technology will expand new possibilities

Toyota will not only promote the creation of ever-better cars, but also create new value in sustainable mobility societies by using the connected services utilizing Big Data beyond the framework of the completed vehicle business.

### Utilize Big Data Riding on the Strength of Toyota

Big Data is not only used to advance Toyota's driving technologies. By analyzing and reflecting on the vast data acquired by the 10 million vehicles sold every year, we can create ever-better cars from research and development, production and sales to after-sales service.

#### Functions of Agents

- Predict the driver's actions, understand their intention, and support them for safer and more comfortable driving.
- Provide services, for example, recommending preventative check-ups at the dealer by predicting car trouble and wear before it happens.
- Make remote software updates available based on the usage conditions of the driver.

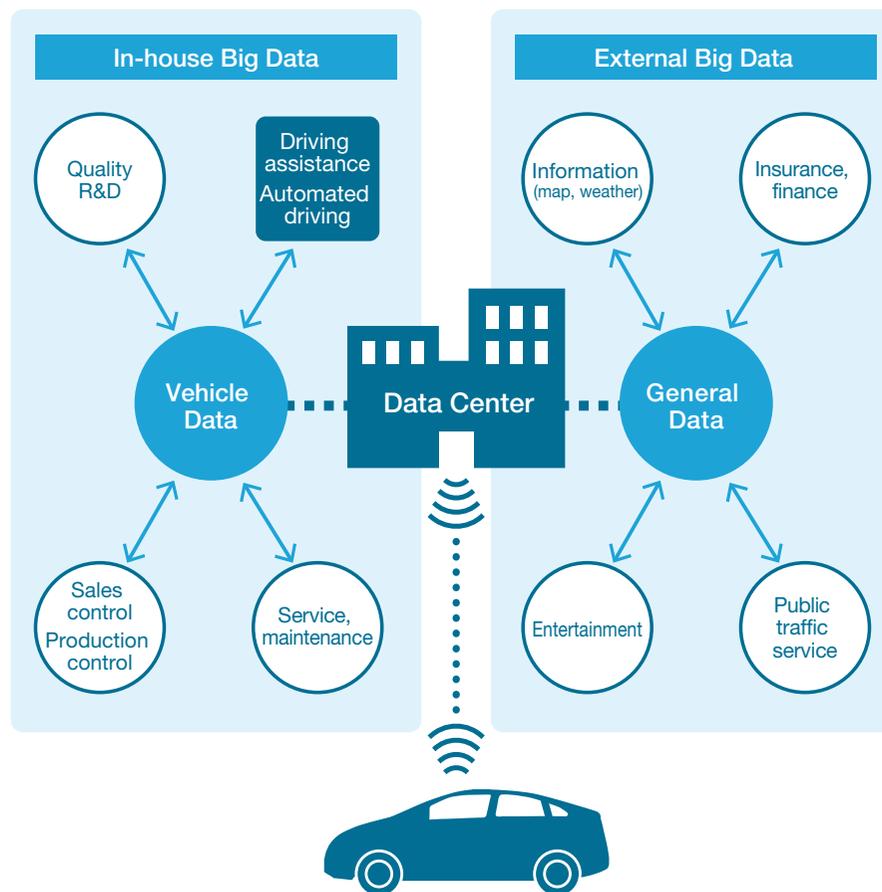
#### Next Generation's CRM\*/Marketing

- Realize the next generation's marketing/customer service of cars, users, dealers, and manufacturers working together while protecting personal information.

\* Customer Relationship Management

#### Remote Maintenance

- Provide solutions to car abnormalities by quickly detecting and sensing on-going symptoms from a remote place.
- Always monitor car conditions with <communication + data processing>, to enable prompt maintenance service.



### Utilize a combination of various social data

By combining a variety of data generated by cars connected to a social information infrastructure, we will be able to create new services useful for communities. Toyota hopes to utilize this technology beyond the framework of completed vehicle business to make our lives and communities safer and more affluent.

#### Social Information Service

- Utilize car data for life information service in combination with weather, finance, and electric power data etc.
- Use weather information to offer new traffic information and forecast service.
- Provide "Route History Map" to inform drivers of traffic conditions just after a large earthquake, etc.
- ▶ Sustainability Data Book 2016: Published Route History Maps in the Aftermath of Kumamoto Earthquake (Focus) (P23)

#### Traffic Information Service

- Provide traffic information in combination with weather information, etc. to help avoid traffic jams and accidents.

#### New Service Useful for Daily Life

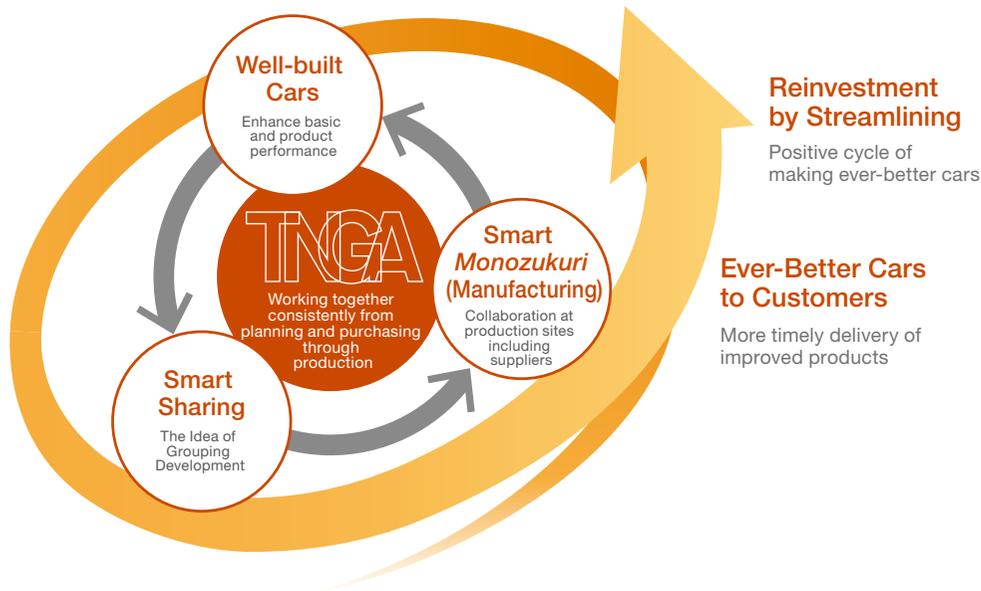
- A new service is available in cooperation with car lease and ride sharing businesses.
- An initiative for telematics car insurance started in the United States jointly with Aioi Nissay Dowa Insurance Co., Ltd.

**Web** New Telematics Car Insurance Services Company to be Launched in U.S.

Special  
Feature  
2

**TNGA** Toyota New Global Architecture  
New Approaches in Car Production Design Concept

# Challenge of Ever-Better Cars



## TNGA Cycle Accelerates Making Ever-Better Cars

The idea of TNGA cycle underlies the improved basic and product performance of Well-built Cars while incorporating smart sharing that considers total optimization, and promotes Smart *Monozukuri* (manufacturing) in collaboration with suppliers and production sites. This initiative has enabled a 20% reduction in development resources compared to the conventional ratio by reinvesting reserves to improve quality and product performance, leading to more timely delivery of ever-better cars.

Under the Customer First policy, Toyota has worked towards ever-better cars to respond to our customer's requests from all over the world. With the expansion of production volume, however, we have faced new challenges to our existing development and production approaches that are optimized for individual models. Toyota has therefore undergone structural reorganization named Toyota New Global Architecture (TNGA) based on a new way of thinking to promote and continue our ever-better cars principle. Starting from the Prius\* until around 2020 about half of Toyota cars will be produced in line with our ever-better cars principle through TNGA.

\* Launched in Japan in December 2015

Interview with the development leader of the first TNGA car Prius

**The development of the New Prius was in tandem with the TNGA Development. This was really the fruit of cooperation and collaboration.**

**Koji Toyoshima**, Chief Engineer

When I was assigned as the development leader of Prius, I felt it was necessary to clearly determine what is required for Prius under our making ever-better cars policy. I decided to thoroughly investigate what hybrid cars should be and to create a list of unique Toyota features and improvements to make a new Prius. In addition, we worked together hand-in-hand to develop both Prius and TNGA; so we had to simultaneously develop TNGA parts to be equipped for Prius. As we consider Prius to be the standard for Toyota's vehicle development hereafter; we set our target higher and continued to



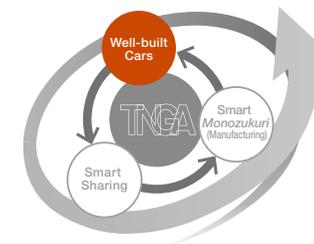
aim for it. The new model Prius, the first launch in TNGA initiatives, is the fruit of the challenges thought to be impossible by many members from design and production engineering divisions and supplier partner companies.



# Well-built Cars

## Enhance Basic and Product Performance

At first sight, you long for this car.  
Once taking a ride, you want to keep driving it for ever.  
This is Toyota's idea of ever-better cars.



# TNGA

Resonate with Feeling

COOL STYLE

FUN TO DRIVE



Listen to Reason

HIGH FUEL EFFICIENCY

SAFETY AND PEACE OF MIND

### TOYOTA C-HR (For Europe)

In March 2016 Toyota C-HR was displayed at the Geneva International Motor Show. It will be launched in Japan in 2016, and in Europe in early 2017.

### Newly Developed Powertrain and Platform

The foundation of TNGA is to make well-built cars by enhancing basic and product performance. We have refined them more than ever to create "The design you long for at first sight and the driving performance you don't want to lose after taking the first ride." In order to drastically improve the basic performance, we have developed a new heart in our vehicles; the power train unit including the engine, transmission, and HV system, and the platform for the

maximization of respective functions and performance as well as the car's total optimization.



New platform by TNGA

### New Powertrain

Revolutionary improvement both in fuel efficiency and vehicle performance was achieved by reforming the whole system combining the engine, transmission and HV unit. It is expected that the fuel efficiency of the conventional model engine system will be improved by more than 25%\* and vehicle performance by more than 15%\*; while the fuel efficiency of the HV system will be also improved by more than 15%\*.

\* At conventional ratio

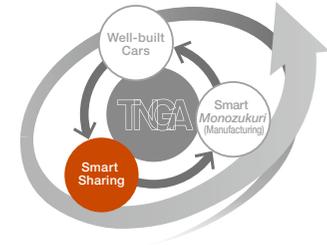
### New Platform

The top-class low center of gravity was realized by reforming the underbody and suspension and by lowering the position of the powertrain. Along with contributing to the car's low-lying attractive style, these reforms also offer better controllability and a more sophisticated ride with improvement in passive safety performance that ensures safety and peace of mind.

### New Body Structure and Safety and Peace of Mind

The framework structure was drastically reviewed to try to improve body stiffness (improved by 30 to 65% of the conventional ratio) and to further strengthen the body joints using newly-adopted laser-welding technology, etc. Always seeking customers' safety and peace of mind, we have pursued more stringent standards for collision safety GOA\* and Toyota Safety Sense, a Collision Avoidance Support Package.

\* Global Outstanding Assessment



# Smart Sharing

## The Idea of Grouping Development

Incorporating Grouping Development, and being smart to share well-built parts, we deliver ever-better cars that meet customers' needs.

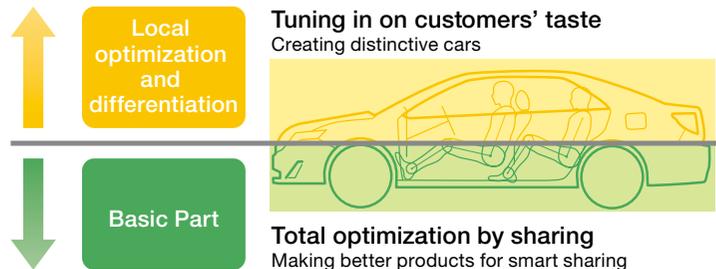
### Balancing the Total Optimization with Individual Optimization at a Higher Level

The following illustration shows the image of making ever-better cars by TNGA. It is divided into two parts. The basic part (green) includes powertrain, platform, etc. aimed at Smart Sharing in order to improve car's basic performance. The differentiated part (yellow) includes the

car's interiors and exteriors tailored to the customers' tastes. Toyota will continue to make ever-better cars by balancing the Total Optimization using smart sharing with Individual Optimization to make every model more attractive.

#### [Individual Optimization] Make Every Model the Most Attractive

Tuning in on regional needs and customers' tastes, the chief engineer in charge of development designs every car model. We will make attractive cars along with the adoption of specially designed parts and fine tuning of driving.



#### [Total Optimization] Smart sharing across the models and their platforms

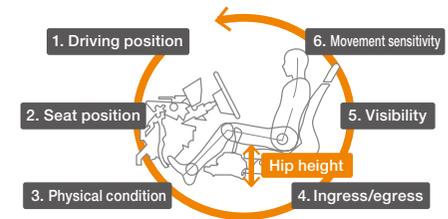
In a new way of making cars with TNGA, a medium and long term product lineup strategy is decided based on body size, body type, region, and proposed timing of the car launch. Based on this strategy, the architectural design concept will be determined to improve basic performance. Then in accordance with the planned product lineup and the architecture, the optimized lineup scenario by part will be strategically established.

### Example of Architecture: Driving Position

TNGA has established the architecture to optimize basic performance by identifying the best driving position as indicated below. Based on this architecture, the hip height was sorted into five positions in order to conduct smart sharing for each component surrounding the driver.

Define the optimum driving position with six viewpoints

By placing the well-built parts in the best position, the concept to realize the "High Performance = Optimum Driving Position" has been defined.



Sorted into five groups of hip points

Based on the mid- and long-term products lineup, all the driving positions for all products were sorted into five hip points.

Hip height		Body size		
		Small	Medium	Large
High	1			
	2			
	3			
	4			
Low	5			

(Image of parts grouping)

Smart Sharing of each part

Smarter sharing is done by not only the grouping into five parts but also through further creative investigation for the other part on the car body. (There are various restrictions in reality: FF/FR, body width of compact cars/full-size cars, variation in model parts such as shift-by-wire, etc.)

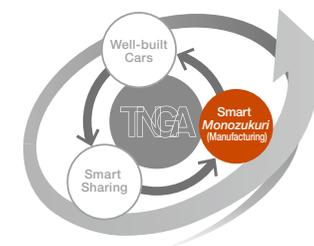
• Sheet frame				• Shift lever			
1				1			
2				2			
3				3			
4				4			
5				5			

(Image of parts grouping)

# Smart *Monozukuri* (Manufacturing)

## Collaboration at Production Sites Including Suppliers

In purchasing and manufacturing, focusing on smart manufacturing of ever-better cars, we make the most of the merits of Smart Sharing.



### Promoting Further Cooperation with Suppliers

Many car parts are purchased from suppliers; so close cooperation with them is essential for smart sharing of parts and modules by TNGA. Toyota has strived for "Monozukuri Innovation" with suppliers to reduce *Muri* and *Muda* (impossibility

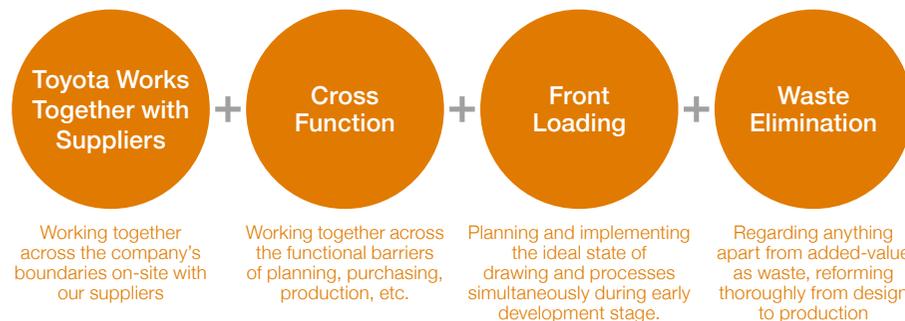
and waste) by considering vehicle development, parts design, and production at the same time. We have been promoting drastic reform activities to change the flow of making cars in tandem with TNGA.

### Monozukuri Innovation Supporting Ever-Better Parts Manufacturing

*Monozukuri* Innovation involves Toyota's individual divisions making a part-based cross-functional team with suppliers, and running the drawing and production process with *Genchi Genbutsu* (on-site hand-on experience) simultaneously at the early development stage. In order to realize ever-better parts manufacturing, we identify waste at production sites and combine the wisdom from the

design stage through production. For example, waste is eliminated to reduce the number of parts by changing the design structure, reviewing production lines and processes and so on. At the same time, in order to improve quality and strengthen competitiveness further, we are committed to manufacturing every single part to the best of our abilities.

### Consistent Four Initiatives



### Prompt Delivery of Ever-Better Products to Customers

Sharing across the platforms by TNGA will lead to more efficient production. By establishing a mid- and long-term product lineup, the car structures to be introduced in the future can be predicted to eliminate waste, which will lead to more simple and slim production lines. Production line configuration (such as how to attach parts to the body and the facility specifications) can therefore be standardized allowing

the prompt development of TNGA car production in factories all over the world. Eventually products of the same quality can be delivered more promptly to customers throughout the world.

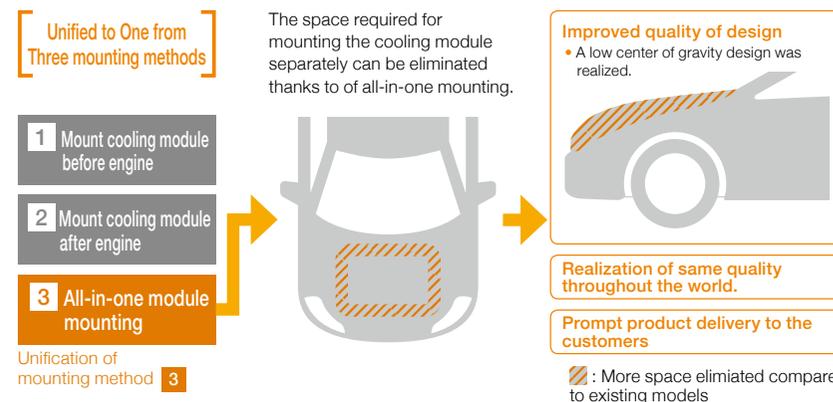
Promoting modularization such as all-in-one engine mounting of cooling module in tandem with TNGA will enable a positive cycle to realize cars with excellent design.

#### Related Information

▶ Initiatives for Sustainable Growth (Value Chain): Production (P38)

### Merits of Sharing: Example of All-in-one Engine Mounting of Cooling Module

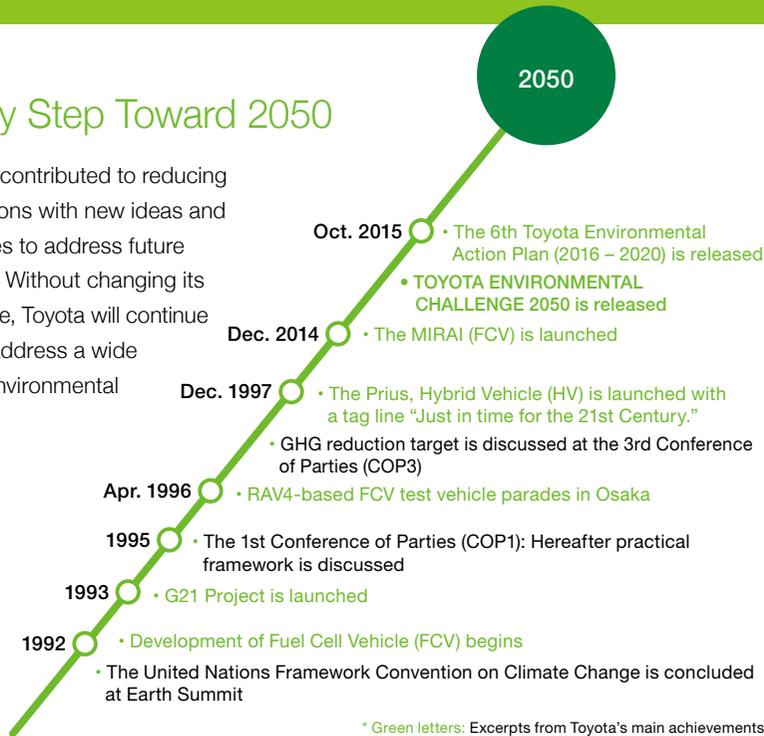
The cooling module for the all-in-one engine mounting, which used to have three types of mounting methods, has enabled us to cut out the space required for individual mounting, realizing a low center of gravity design along with improved quality and productivity.



# Aiming to Establish a Future Society in Harmony with Nature

## Step by Step Toward 2050

Toyota has contributed to reducing CO<sub>2</sub> emissions with new ideas and technologies to address future challenges. Without changing its basic stance, Toyota will continue striving to address a wide variety of environmental challenges.



We have formulated the Toyota Earth Charter based on the Guiding Principles at Toyota, considering environmental issues as a paramount importance, and have established a promotion structure to address such issues. In the course of perceiving public opinions or world trends while considering our focus in the years to come, we have embarked on new challenges to tackle unsolved environmental issues.

In October 2015, we formulated and announced the Toyota Environmental Challenge 2050. Our ideal goal has grown higher from "Toyota's presence will not impact environment" to "Toyota's presence will have a positive impact on the environment." We are going further with an aim to establish a future society in harmony with nature.

## Leading Innovation with Technology and Creativity to Address Environmental Challenges

Takeshi Uchiyamada, Chairman of the Board of Directors

~From the Keynote Speech at the 2015 Toyota Environmental Forum~



Since its foundation, Toyota has inherited the corporate philosophy, "Contributing to society through manufacturing of cars." Similarly, we have embraced unshakable belief of "Leading innovation with technology and creativity." The first-generation Prius launched in 1997 is one of our achievements. Upholding a mission to "Manufacturing new vehicles for the 21st century," we developed the HV system not available at that time, and its unprecedented fuel efficiency performance contributed to the reduction of environmental impact.

I believe that the keys to success are to reverse ways of thinking, "to make the impossible possible" and "breakthrough technology." We will never change this basic stance, "Do what should be done instead of doing what is possible." This spirit of innovation challenge is the Toyota's DNA. We wish to continue to be a company that creates a desirable future with our stakeholders and brings smiles to our customers and society.

Background and Purpose

# Realization of Challenge to ZERO & Beyond

Toyota has promoted a wide range of environmental initiatives to address worsening global environmental issues. We will strive to reduce the environmental impact of automobiles as close to zero as possible, and will roll out new initiatives towards a sustainable society looking to make a positive impact on the earth and society.

## Serious Environmental Issues Facing Earth and Society

The impacts on the global environment are becoming more serious. Social demands have also become stringent due to growing concerns on the environment.

- Extreme weather phenomena attributed to GHG emissions
- Aggravated air pollution in cities
- Water shortages due to population growth
- Resource depletion such as metals
- Fragmentation of ecosystem due to development
- Degrading biodiversity due to ecosystem changes and climate change



## Six Challenges for 2050

### I. Challenge of Achieving Zero

Challenge 1

#### CO<sub>2</sub> 0 New Vehicle Zero CO<sub>2</sub> Emissions Challenge

**Target** Reduce global average new vehicle CO<sub>2</sub> emissions by 90% from Toyota's 2010 global level

**Actions** Further popularize next-generation vehicles to save energy and use diverse fuels

- Further popularize HV & PHV globally
- Further popularize zero emission vehicles such as FCV & EV

Challenge 2

#### CO<sub>2</sub> 0 Life Cycle Zero CO<sub>2</sub> Emissions Challenge

**Target** Completely eliminate all CO<sub>2</sub> emissions, including materials, parts and manufacturing from the vehicle lifecycle

**Actions**

- Reduce CO<sub>2</sub> emissions during material production by developing and adopting more low CO<sub>2</sub> emission materials
- Reduce environmental impact by adopting more recycled biomaterials

Challenge 3

#### CO<sub>2</sub> 0 Plant Zero CO<sub>2</sub> Emissions Challenge

**Target** Achieve zero CO<sub>2</sub> emissions at all plants by 2050

**Actions** Introduce and develop low CO<sub>2</sub> technologies and daily *Kaizen*, and promote use of renewable energy and hydrogen

- Reduce energy use to one third by simplifying and streamlining production processes and innovative energy saving
- Use wind power produced on-site at our Tahara Plant by around 2020

### II. Net Positive Impact Challenge

Challenge 4

#### Challenge of Minimizing and Optimizing Water Usage

**Target** Enact effective wastewater management and minimize water consumption based on individual local situations

**Actions** Reduce water consumption in existing manufacturing processes as well as introducing technologies that reduce industrial water consumption through rainwater use and improving water recycling rates

Improve local environment by ensuring by our own standards that plant wastewater is cleaner than local river water

Challenge 5

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

**Target** Promote global rollout of end-of-life vehicle treatment and recycling technologies developed in Japan

**Actions** Establish a recycling-based society with four key areas:

- (1) utilizing eco-friendly materials;
- (2) using parts for longer;
- (3) developing recycling technologies;
- (4) manufacturing vehicles from end-of-life vehicles

Two global rollout projects started from 2016:

- 1) Toyota Global 100 Dismantlers\*1 Project
- 2) Toyota Global Car to Car Recycle Project

Challenge 6

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

**Target** Promote global rollout of the nature conservation activities beyond the Toyota Group and its business partners

**Actions** Expand Toyota's long-standing nature conservation activities in the areas of forestry, environmental grants, and environmental education

The following three future-oriented projects started from 2016 to share our knowhow and experience gained from these environmental activities

- 1) Connecting communities: Toyota Green Wave Project
- 2) Connecting with the world: Toyota Today for Tomorrow Project
- 3) Connecting to the future: Toyota ESD\*\*2 Project

\*1: Business operators who dismantle automobiles  
\*2: Education for Sustainable Development

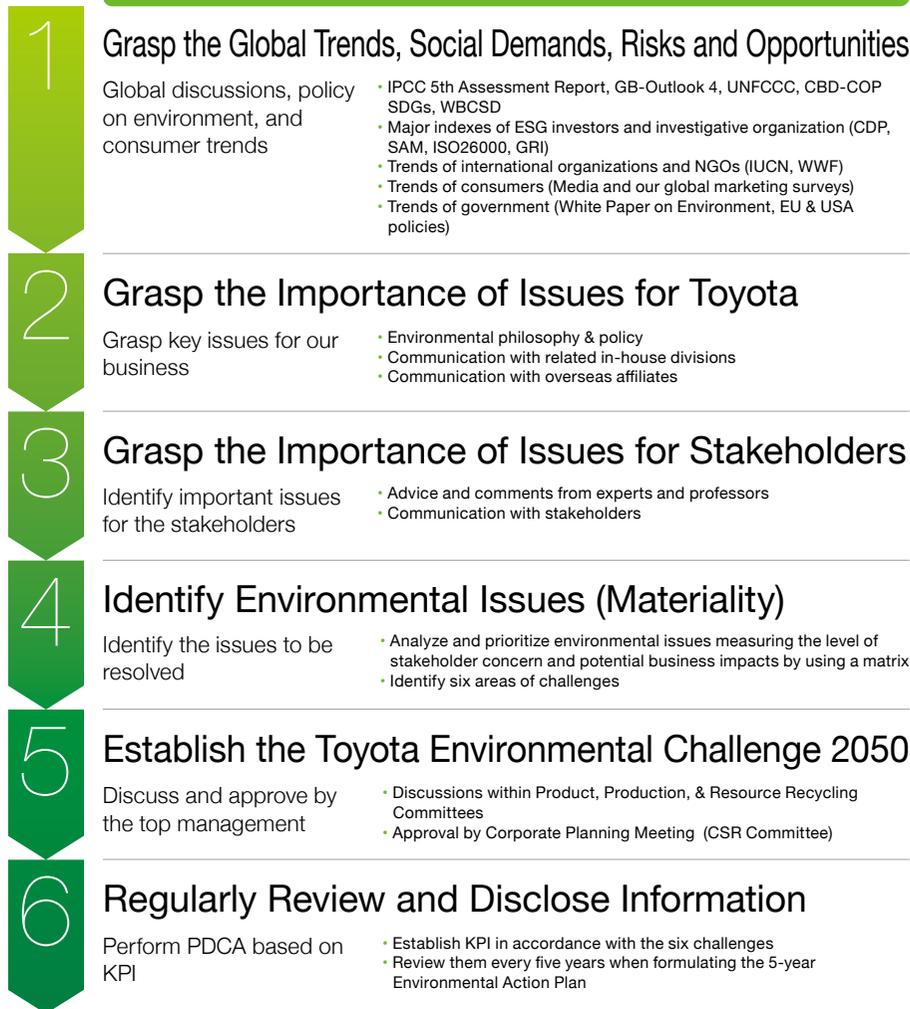
Formulation Process

# Identify Key Environmental Issues (Materiality) for Six Challenges

Since environmental issues may involve some risks whereas they will create business opportunities, it is essential to identify key challenges when formulating a long-term vision. In order to grasp potential risks and business opportunities, Toyota has collected information, and simultaneously analyzed and identified environmental challenges from the aspects of their importance for both stakeholders and our business.

After the Toyota Environmental Challenge 2050 was authorized by the Corporate Planning Meeting that determines the mid-term and long-term strategies of the corporation, we started focusing on the establishment of a company-wide structure. When we formulate our Environmental Action Plan every five years, we review the plan accordingly.

Process to Identify and Implement the Key Challenges



Collect and Analyze Information

When we collect and analyze information, we grasp the trends of the macro economy and the key points to address, based on the scientific predictions concerning the environment in 2050, global framework, policy trends, movements of emerging countries, major index of credit rating agencies, and world leaders' remarks on environmental issues at G7 Summits.

Grasp Importance of Challenges

We grasp the importance of challenges by analyzing the consistency with the Guiding Principles at Toyota and the Toyota Earth Charter, maintaining good communication with our stakeholders and input from in-house Divisions.

Identify the Key Challenges

We identify the key environmental challenges, measuring the impact level of stakeholder concern and our business activities or potential business opportunities by using a matrix. Consequently we analyze and prioritize the importance of the said challenges.

Steadily Implement Challenges

In order to steadily implement environmental activities, it is important that the management regards them as business opportunities, plans proper investments for environmental strategies, and enhances collaboration with business partners by involving global group companies on a company-wide basis.

We will establish a steady promotion structure with a regular progress check and a review of the action plan.

Progress of Action Plans

# Steadily Promote the Action Plan for Realization

We are proactively promoting multiple activities to realize the Toyota Environmental Challenge 2050 released in October 2015, along with developing more practical strategies and roadmaps. Following is the two examples of our activities.

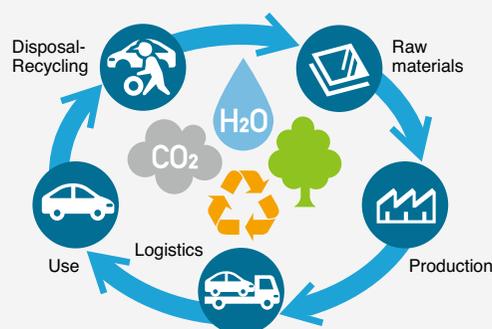
## Revision of the Toyota Green Purchasing Guideline

In accordance with the Toyota Environmental Challenge 2050, we revised the Toyota Green Purchasing Guideline in January 2016.

Major Revision Points

1. Expanded environmental initiatives such as greenhouse gas emissions, water environment, resource recycling and biodiversity
2. Enhanced “Environmental consciousness in the entire vehicle lifecycle” from raw material purchase to disposal and recycling
3. Enhanced the environmental management of the entire supply chain

We will continue strengthening our collaboration with suppliers world-wide, and strive to realize a sustainable society with them.



Further green purchase in collaboration with suppliers

## The initiative started with the International Union for Conservation of Nature (IUCN)

Toyota has initiated a partnership with one of the international organizations, IUCN, to provide funding to expand knowledge of threats to global biodiversity. This is one of the projects in Challenge 6 in the Toyota Environmental Challenge 2050, and part of “Toyota Today for Tomorrow Project” that connects us with the world.

IUCN and Toyota will broaden the

scope of the “IUCN Red List of Threatened Species™” through a five-year partnership from 2016, and this will increase the knowledge on the extinction risk of more than 28,000 species. At the same time, we will disseminate data to stop the loss of biodiversity and knowledge of key food sources for a significant portion of the global population.



(From left to right)  
Inger Anderson, IUCN Director General,  
Didier Leroy, Executive Vice President, Toyota Motor Corporation  
Dr. Jane Smart, Global Director of IUCN's Biodiversity Group

## Ambitious Declaration that Defined the 21st Century Ahead of the World

### Hiroshi Komiyama

Chairman of the Institute, Mitsubishi Research Institute, Inc./President, Platinum Society Network

For the past 20 years I have continually reiterated in the Vision 2050 (Japanese book: *Chikyu Jizoku-no Gijyutsu* - Technology of Global Sustainability) that human civilization can be sustainable if we can realize a resource recycling-based society by making use of “urban mines”, significant improvement of energy efficiency by technology, and use of renewable energies including solar, wind, hydropower, geothermal power, and biomass energy.

I believe that the Toyota Environmental Challenge 2050 released in October 2015 is really the way we can put this idea into practice. It is a bold and aggressive declaration. In particular, the challenges of reducing CO<sub>2</sub> emissions from driving vehicles by 90 percent; plants' zero CO<sub>2</sub> emissions; and building vehicles from end-of-life vehicles, are excellent.

Hereafter, I sincerely expect Toyota to lead Japan and the world through the disclosure of its action plan to steadily implement this declaration and its progress.

