

# Friendly to the Global Environment



Production Engineering Headquarters  
Production Environment Committee Chairperson:  
Akitsugu Ishiguro,  
Executive Vice President

## Maintaining a Society of Prosperous and Convenient Living into the Future

One of the fundamental principles of Toyota Auto Body is harmony with the environment, and in keeping with the ideals of our predecessors we began carrying out the Fifth Toyota Auto Body Environmental Action Plan beginning from fiscal year 2011. Aiming for the sustainable development of society and the world, we are introducing new technologies at times when new products are produced or equipment is replaced, and we are working to preserve the global environment through activities which involve all employees. In the future, we will continue to work together with members of local communities and continue building a prosperous society.

### Toyota Auto Body Basic Environmental Policy (Established in 1993, Revised in 2004)

#### (1) Contributing to a prosperous 21<sup>st</sup> century

To contribute to a prosperous 21st century, we aim for growth in harmony with the environment, and are challenging ourselves to achieve zero emissions in all areas of our business activities.

#### (2) Pursuing environmental technology

Toyota Auto Body is pursuing all potential environmental technologies and we are making efforts to develop and establish new technologies that realize a balance between the environment and economic concerns.

#### (3) Self-initiated efforts

Starting with our efforts for thorough preemptive prevention and compliance with legal standards, we have established self-initiated kaizen plans based on global-scale environmental issues, and we continue to promote such self-initiated efforts.

#### (4) Coordinating and cooperating with society

Beginning from cooperation with affiliated companies and industries, we are building cooperation and coordination with a large sector of society involved in environmental conservation that includes the government and prefectural governments.

### Toyota Auto Body Environmental Action Plan

As we aim for the sustainable development of society and the world through environmentally friendly manufacturing, we have established action items in each field (development, production and logistics, and procurement), and are continually carrying out comprehensive environmental management.

1993	1995	2000	2005	2010	2015	2020
<b>First Plan</b>	<b>Second Plan</b>	<b>Third Plan</b>	<b>Fourth Plan</b>	<b>Fifth Plan</b>	<b>Sixth Plan</b>	
◇Construct a system for environmental programs.	◇Improve the level of the programs by introducing ISO14001.	◇Achieve zero landfill waste and expand the areas of environmental activities.	◇Work to reduce CO <sub>2</sub> emissions on a global basis, and apply environmentally friendly designs to our products.	◇Promote to develop a compact EV ◇Build a prosperous society through activities conducted together with local communities.	(Now being formulated)	

	Building a low-carbon society	Building a recycling-oriented society	Building a society that lives in harmony with nature
Product environment (development and design)	<ul style="list-style-type: none"> <li>Improve fuel efficiency by reducing vehicle weight</li> <li>Participate in projects for promoting the introduction of super-compact mobility</li> </ul>	<ul style="list-style-type: none"> <li>Improve ease of vehicle dismantling</li> <li>Expand use of recycled materials</li> <li>Develop materials using plant fibers</li> </ul>	<ul style="list-style-type: none"> <li>Improve the management of products containing chemical substances</li> <li>Introduce products that contain fewer substances that impact the environment</li> </ul>
Production environment (production and logistics)	<ul style="list-style-type: none"> <li>Develop/introduce production technology that reduces greenhouse gas emissions, improve productivity, and intensify energy-saving activities</li> <li>Improve transport efficiency in our logistics operations and switch to electric vehicles for on-site logistics</li> </ul>	<ul style="list-style-type: none"> <li>Carry out activities to reduce emissions and improve yield</li> <li>Reduce the amounts of packaging materials used</li> </ul>	<ul style="list-style-type: none"> <li>Reduce environmental-impact substances (VOC) in painting operations</li> </ul>
Environmental management (Environmental administration)	<ul style="list-style-type: none"> <li>Promote and improve consolidated environmental management</li> <li>Enhance and promote environmental education and training</li> </ul>	<ul style="list-style-type: none"> <li>Create factories that coexist with local communities and are harmonized with nature</li> <li>Promote further environmental activities that are coordinated with suppliers</li> </ul>	

[Fifth Toyota Auto Body Environmental Action Plan](#)

[Product and Production Environmental Action System and Items](#)

[Fiscal Year 2014 Action Results](#)

# Friendly to the Global Environment

## Product Environment

Three Priority Themes:

Low Carbon

Recycling Orientation

Harmony with Nature

## Development of Weight-Reducing Technologies that Contribute to Top-Class Fuel Economy Performance

Energy and global warming problems are important environmental issues that may have a major effect on humanity and the ecosystem. In cooperation among related divisions, we are developing technologies and working from the initial design stage in order to create environmentally friendly vehicles.

### Developing Weight Reduction Technologies for Vehicle Parts

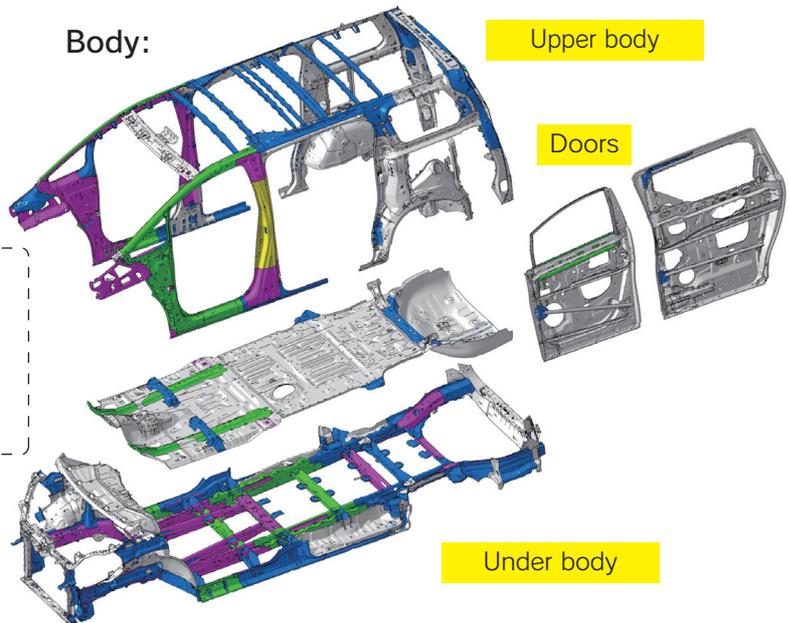
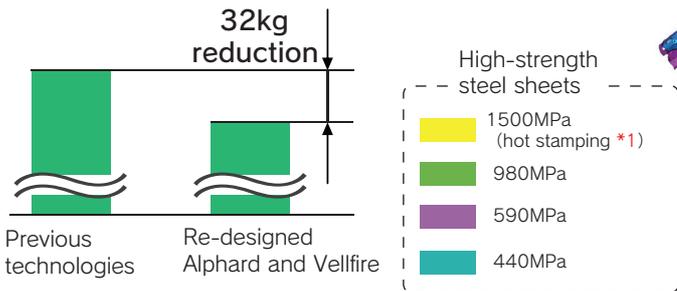
Improving the power train and reducing vehicle weight are essential in order to improve fuel economy. We consider reducing the weight of vehicle parts as a core approach of Toyota Auto Body, and the entire company is actively working for this purpose.

#### Main programs for reducing the weight of re-designed Alphard and Vellfire body and interior parts

By using high-strength steel sheets for approximately 62% of the underbody (by weight), and by improving the structure and reducing the thickness of interior parts, we achieved a weight reduction of 32 kg. The use of high-strength steel sheets also efficiently increases rigidity, creating a lightweight and strong body while also ensuring collision safety performance.



Discussion of the re-designed Alphard and Vellfire weight reductions involving officers of the development and production engineering divisions



\*1 Hot stamping: A part forming method where steel softened by heating to a high temperature is press formed and, at the same time, hardened by cooling when it comes into contact with the die.

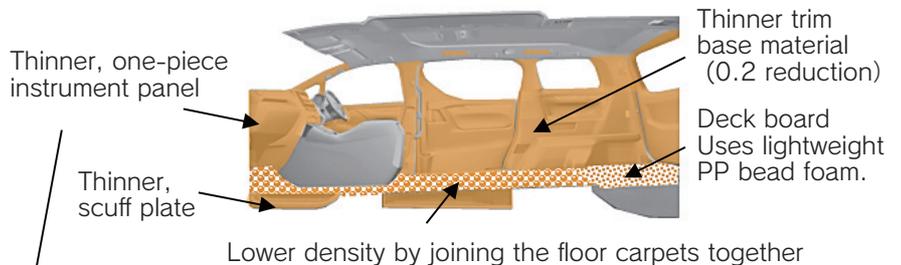
#### Comment by a the re-designed Alphard and Vellfire developer

Body Design Div. Makoto Murakami



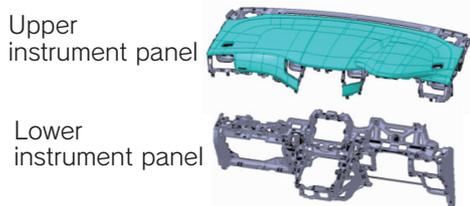
We were able to achieve a large reduction in weight by coordinating with related divisions beginning from the initial development stage, using high-strength steel sheets, and optimizing part layout.

#### Interior:



Old model: Separate upper/lower structure

New model: One-piece upper/lower forming



Increasing the strength of the unit part allows thinner material, reducing the weight by approximately 3 kg.

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## Expanded Use of Recycling-Friendly Designs for Efficient Use of Resources

Because we understand that all resources are finite, based on the 3 R's (reduce, reuse, recycle), we are working to improve the ease of dismantling, expand the use of recycled materials, and develop and design plant-fiber materials.

### Improving the Ease of Vehicle Dismantling

As heavy machinery for vehicle dismantling has become widely used in the markets, we are working in cooperation with Toyota to develop vehicle structures that can be dismantled more easily.

#### Improving the ease of wiring harness dismantling with heavy machinery

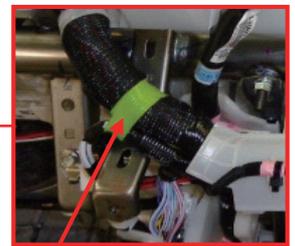
Green tape is used at key positions to show where wiring harnesses can be removed efficiently when scraping the re-designed Alphard and Vellfire, improving the ease of dismantling.



Video Showing the Use of Heavy Machinery for Vehicle Dismantling



Instrument panel wiring harness

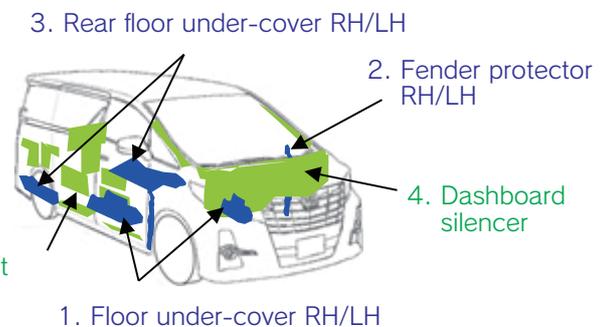


Green tape is added at the wiring harness positions to show the starting points for easy removal

### Expanding the Use of Recycled Materials

#### Expanding the use of recycled materials made from waste plastics and felt from the market

The re-designed Alphard and Vellfire use recycled polypropylene and recycled felt, increasing the use of recycled materials.



Parts 1 to 3: Polypropylene (bumper, other recycled materials)  
Parts 4, 5: Recycled felt

### Development of Materials using Plant Fibers

#### Use of cedar from woodland thinning

We have developed the new flame retardant injection molding material TABWD \*1. This material uses cedar from woodland thinning as a reinforced fiber in combination with polypropylene. It is used in the wiring harness protectors in the re-designed Alphard and Vellfire hybrids, as we continue to work for more effective use of resources.

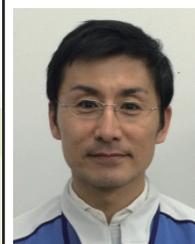


\*1. TABWD : Toyota Auto Body Wood plastic

#### Comment from a TABWD developer

New Business Development Div.

Takuya Nishimura



In the future, we intend to expand the range of products which use this injection molding material made with cedar from woodland thinning, and will propose new ways of using it that will lead to more effective use of resources.

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Three Priority Themes:

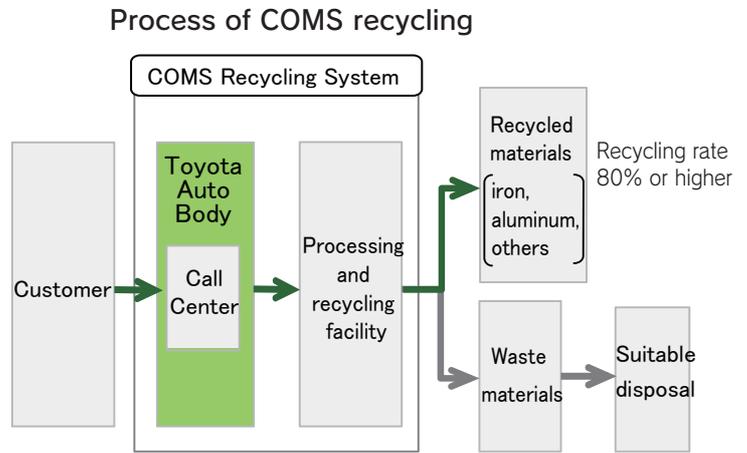
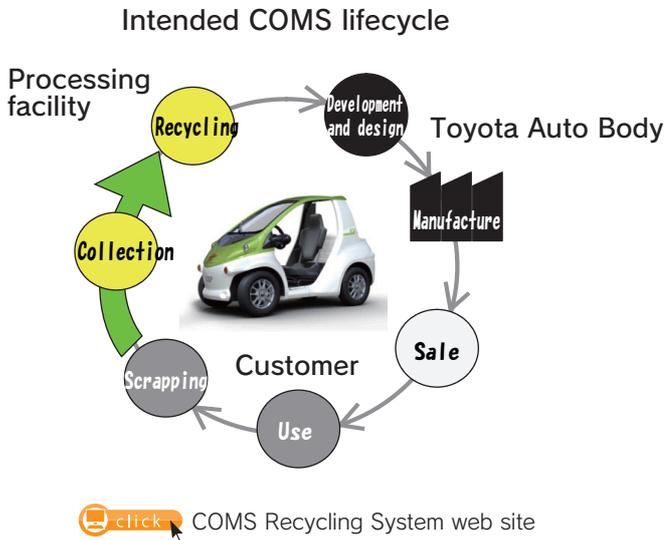
Low Carbon

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## Start of a Recycling Business for the COMS Super Compact EV

The COMS Recycling System that was launched in April 2015 is an original recycling system constructed by Toyota Auto Body for the COMS – a vehicle which is not subject to the Automobile Recycling Act. We will continue to work for the creation of a recycling-oriented society in the future.



We have acquired a national permit from the Ministry of the Environment and constructed a recycling system which customers in all parts of Japan can use.

[COMS Recycling System web site](#)

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## Improving Management of the Chemical Substances Used in Products

We at Toyota Auto Body are coordinating with our raw material and parts suppliers to identify and assess the risks of the chemical substances that are used in our products, and we are working to protect the environment via actions such as managing chemical substances and changing to the use of substances with lower environmental impacts

### Certain Compliance with REACH Regulations and Other International Chemical Substance Regulations

Regulations of chemical substances include the Japanese Chemical Substance Control Act\*1, the European ELV Directive\*2, and the REACH Regulations\*3, as well as independent regulations in North America and Asia.

Toyota Auto Body is working together with Toyota Motor Corporation and our suppliers to build and administer a system for chemical substance management under these kinds of international chemical substance regulations.

In fiscal year 2014, we standardized our compliance with chemical substance control regulations, and established firm practices for IMDS\*4 registration by suppliers as we collect information about the chemical substances that are used in our products.



Based on green purchasing guidelines for environmental preservation, we are supporting the introduction of chemical substance management systems at subsidiary companies.

\*1. Chemical Substance Control Act: Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.

\*2. ELV Directive: End-of-Life Vehicles Directive

\*3. REACH Regulations : Registration, Evaluation, Authorization and Restriction of Chemicals

\*4. IMDS : International Material Data System

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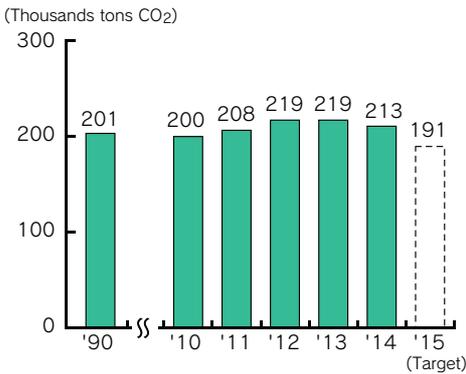
## Extensive energy-saving and CO<sub>2</sub> emissions reductions in production activities

We are developing and introducing technologies for low-CO<sub>2</sub> production, improving production line productivity, fully eliminating waste in everyday activities, and promoting optimal equipment operation.

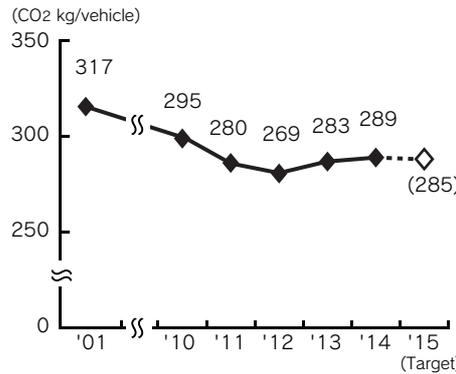
### CO<sub>2</sub> reduction activities launched with the start of production for the re-designed Alphard and Vellfire

- Introduction of new machining methods at the start of production of new vehicles (Examples (1) (2))
- CO<sub>2</sub> emissions reduction and increase in the self power-generation rate with a new cogeneration system at the Inabe Plant (Example (3))
- Extensive reduction in power and air leakage loss between shifts and on holidays (Example (4))

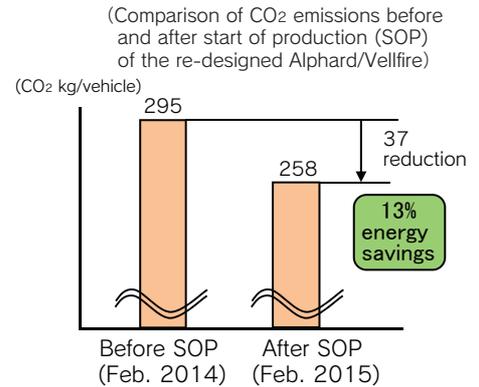
#### CO<sub>2</sub> emissions (Toyota Auto Body)



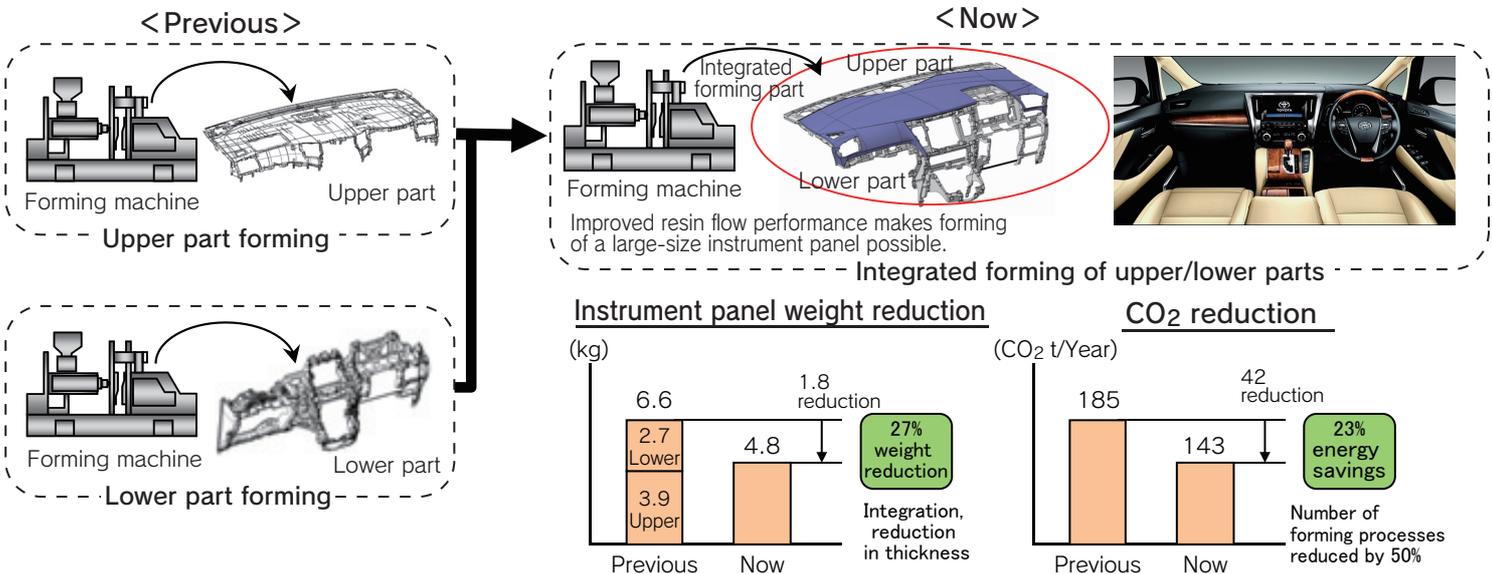
#### CO<sub>2</sub> emissions per vehicle (Toyota Auto Body)



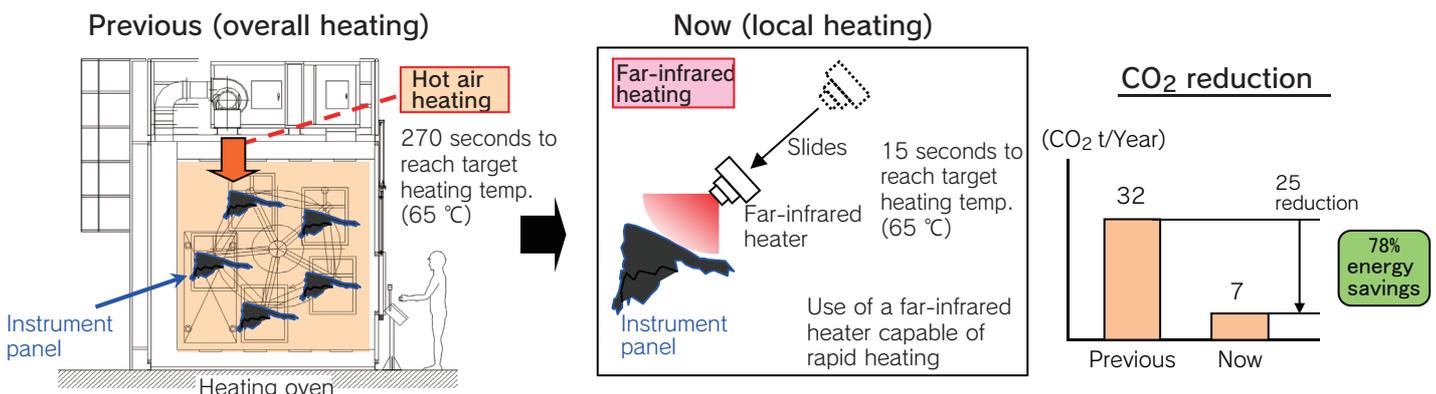
#### CO<sub>2</sub> emissions per vehicle (Inabe Plant)



### Example (1): Energy savings resulting from integrated forming of the instrument panel upper and lower parts:



### Example (2): Energy savings resulting from improved method for heating of vacuum forming base material:



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## CO<sub>2</sub> reduction activities launched at the start of production for the re-designed Alphard and Vellfire

### Example (3): CO<sub>2</sub> emissions reduction and increase in the self power generation rate with a new cogeneration system at the Inabe Plant:

A new gas engine cogeneration system has started operating at the Inabe Plant (from Jan. 2015). It will contribute to further reducing CO<sub>2</sub> emissions in the future.

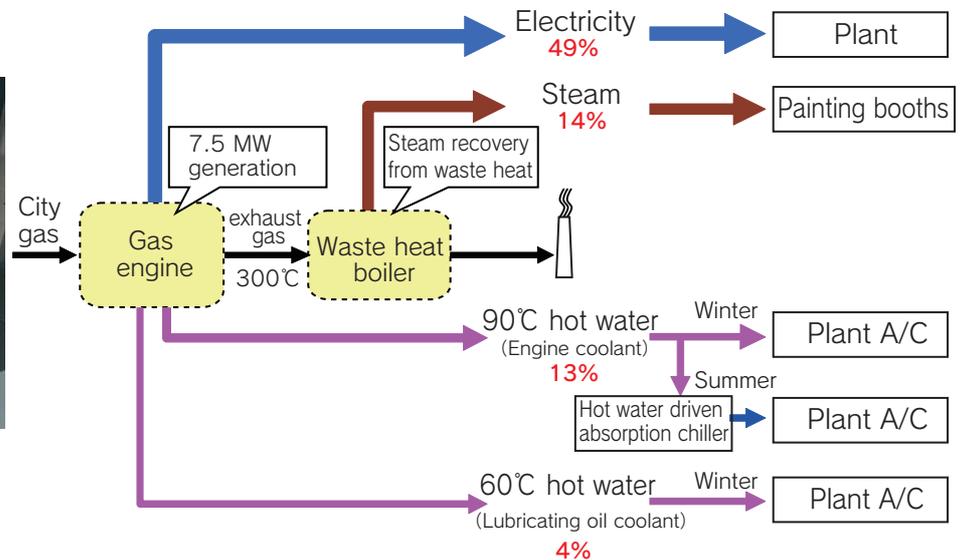
System characteristics:

- Overall efficiency is 80% of the maximum for the gas engine class. The expected annual reduction in CO<sub>2</sub> emissions is 11,000 tons.
- A model with a large generating output is used, increasing the self power-generation rate to 32%.
- A system capable of supplying power during blackouts in the event of a major earthquake or other disaster was adopted.

Overall efficiency 80%



The latest gas engine system with a generation efficiency of 49%



### Example (4): Extensive reduction in power and air leakage loss between shifts and on holidays:

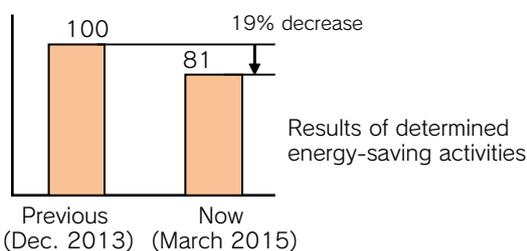
In fiscal year 2014, benchmark targets were set for each shop at the Fujimatsu, Inabe, and Yoshiwara Plants, and as a result of the efforts below we succeeded in achieving a 500-ton annual reduction in CO<sub>2</sub> emissions.

- Voluntary inspections for early repairs of air leakage
- Providing weekly and monthly results data to make the effects of activities visible
- *Genchi-genbutsu* energy-saving inspections by officers at each plant to create awareness and motivation for energy-saving activities



*Genchi-genbutsu* energy-saving inspections by officers (March 2015)

### Example: Amount of air leakage per hour in stamping and body processes at Inabe Plant (indicator)



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## Environmental Management

### Strengthening Consolidated Environmental Management

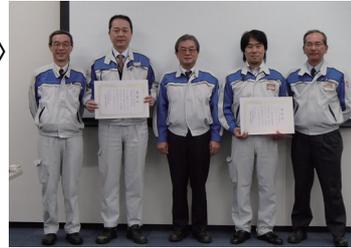
We have created a management system that coordinates our subsidiaries in Japan and overseas, and suppliers, and are actively carrying out activities including (1) educational activities aimed at raising the level of environmental action, and (2) activities to prevent environmental risk.

#### Introduction of an awards system to raise the activity level



Beginning from fiscal year 2014, we set up a system of awards for workplaces that contribute to environmental preservation programs, aiming to raise the level of these activities.

Awards were presented to workplaces that achieved large reductions in energy loss when equipment was not operating (Yoshiwara Plant's Final Assembly Div. and Inabe Plant's Stamping Shop).



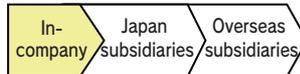
Awards ceremony (Feb. 2015)



Activities at the award-winning workplace: Air leakage inspection (Yoshiwara Plant's Final Assembly Div., Sep. 2014)

#### Environmental education activities

A variety of educational activities are carried out to correspond with Environment Month.



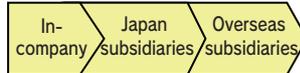
In fiscal year 2014, lectures on the subject of The Present and Future of Global Warming were held, presenting an excellent opportunity for employees to understand the facts about global warming and renew their recognition of the need for energy-saving.



WWF Japan: Lecture by Ms. Konishi (Aug. 2014)



#### Activities to prevent outflow of chemicals, production wastewater, and other contaminants



Aiming to prevent outflow from production processes, chemical storage areas, and other places, in addition to carrying out daily management, we have also decided procedures in case of spills to ensure that contaminants do not leak from the company grounds, and are conducting systematic emergency training for rapid action. In fiscal year 2014, these activities were also carried out at overseas subsidiaries.

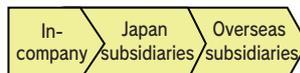


Training to prevent wider contamination in the event of a spill  
Kariya Plant (Aug. 2014)



TAW (Oct. 2014)

#### Strengthening management including at subsidiary companies in Japan and overseas



We continued to acquire ISO14001 certification at our production sites. In fiscal year 2014, the certification was newly acquired by three overseas subsidiaries, and certification has now been acquired by all production sites.

Through liaison meetings and on-site audits, the contents of programs at consolidated companies in Japan and overseas are checked regularly. Environmental improvement case studies and other information are also shared, and environmental training is conducted.



ISO14001 certification acquired by APMM (Feb. 2015)



On-site audit T-TEC (Sept. 2014)

## Other Environmental Data

Resource Investment into and Emissions Produced by Our Business Operations

Active Release of Environmental Information

Environmental Accounting

**In order to utilize the valued opinions of all readers to enhance further and reflect information more accurately for these CSR activities and this report of Toyota Auto Body for the future, please enter information in the survey.**

The opinions and information provided will only be used for the purpose mentioned above.  
(Private information will be handled appropriately pursuant to the Toyota Auto Body "Privacy Policy" )

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## Publishing

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