

## Pursuit of Clean Production Activities

**Toyota Auto Body continues the challenge of achieving clean production processes.**

### Emissions generated in the environment and resource input volume

The below diagram shows emissions from the environment and resource input volume for production processes for which Toyota Auto Body is working toward reducing substances of concern while also effectively using resources.

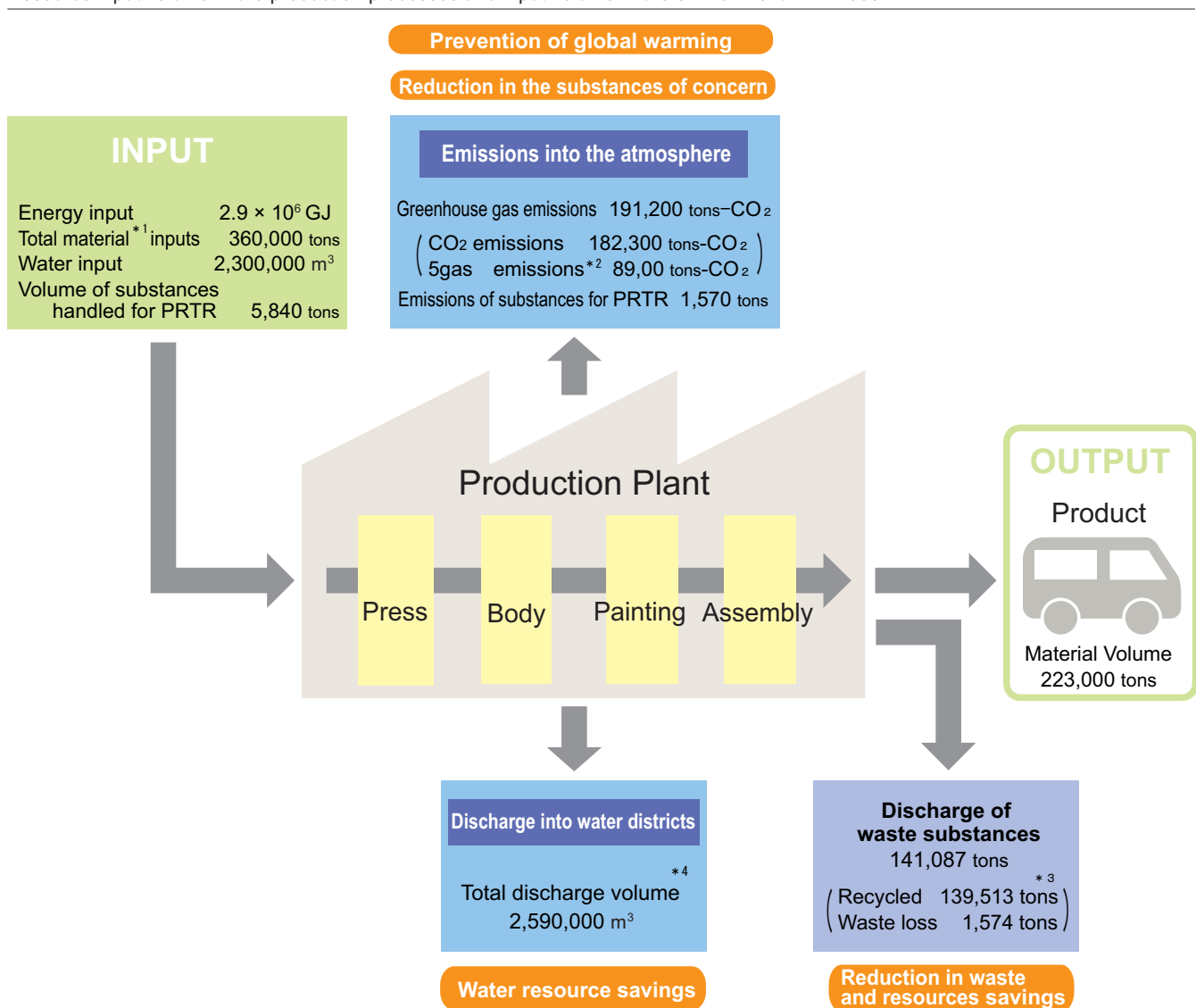
Input volume of input resources (INPUT) for production processes in 2005 was  $2.9 \times 10^6$  GJ for various electrical demands, 360,000 tons of resources for main materials, and 2,300,000 m<sup>3</sup> of plant water resources for plant water.

In addition, emissions of substances of concern consisted of greenhouse gases of 191,000 tons of CO<sub>2</sub> discharged into the atmosphere, and 2,590,000 m<sup>3</sup> of water discharged into water districts.

Among 141,087 tons of waste substances, 139,513 tons were recycled by being sold, or made into cement materials, and 1,574 tons became unrecyclable waste.

➤ Efforts to reduce emissions in production are in the report on pages 23-31.

Resource input volume in the production processes and input volume in the environment in FY2005



\* 1 Total substances: steel sheets, molded materials, paint etc.

\* 2 5gas: The five greenhouse gases other than CO<sub>2</sub>, are methane (CH<sub>4</sub>), dinitrogen monoxide (N<sub>2</sub>O), hydrofluorocarbon (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF<sub>6</sub>).

\* 3 Indicates the volume of either various possible recyclable materials that have value or that are inverse onerous contract materials. Also indicated is whether the disposal volume is not enough to be processed or can be directly disposed of in landfills.

\* 4 Total of water volume used is large because initial rainwater is processed and then released.



## Promotion of Global Warming Prevention

### Promoting reduced CO<sub>2</sub> emissions by changing to clean fuels and introducing new technologies.

#### Reducing the amount of greenhouse gas emissions

Emissions of CO<sub>2</sub> cause global warming, and we at Toyota Auto Body set the target to reduce FY1990 CO<sub>2</sub> emissions 5% by the end of FY2005. To achieve this reduction target, our efforts mainly focused on areas such as “developing and introducing energy saving production equipment” and also “removing *Muda* (waste) from the production line.”

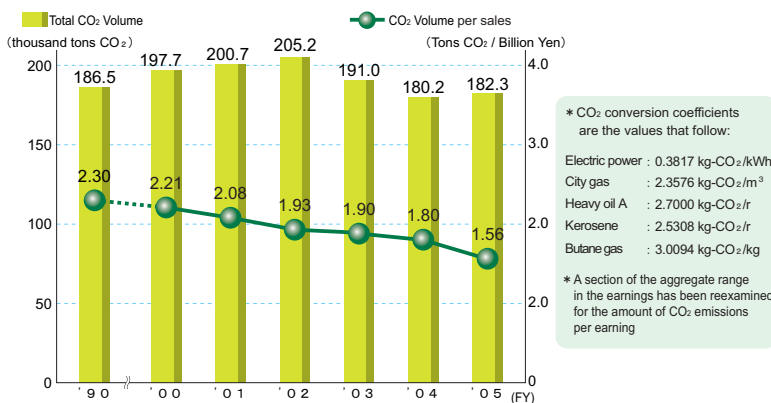
In FY2005, Toyota Auto Body achieved a large decrease in CO<sub>2</sub> emissions through various efforts that include shortening painting booths and dry-off oven involving new changes to painting booths for top-coating at the Fujimatsu plant, as well as recycling of

exhaust heat recovered from the air-conditioning of booths.

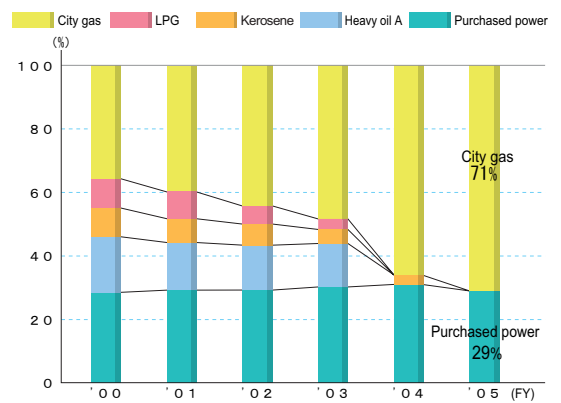
In addition, Toyota Auto Body changed to using clean natural gas for fuel instead of kerosene for its boilers, and in FY2005, Toyota Auto Body used only electricity and city supplied gas for production processes.

In FY2005, despite an 11% increase in production of vehicles from FY2004, CO<sub>2</sub> emissions from production processes were minimized at 1% (1,823,000 tons of CO<sub>2</sub>) compared to the previous year. The target “to reduce 1990 CO<sub>2</sub> emissions 5% by the end of FY2005” resulted in a “2.2% reduction compared to FY1990.”

#### CO<sub>2</sub> Volume ( Production process )



#### Energy amounts used

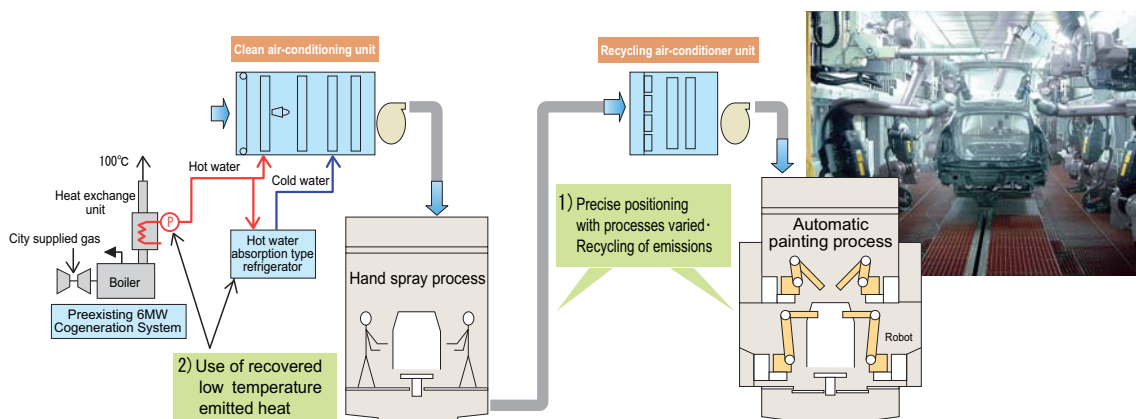


#### An example Comprehensive energy saving in the top-coat painting process at Fujimatsu Plant

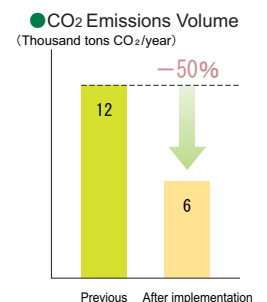
For the new top-coat painting process facility, Toyota Auto Body has worked to decrease energy required for the heat source supply method, air-conditioning systems, and the method of construction.

- 1) Air emissions from air-conditioning used in the hand-spraying process is recycled to the automatic painting process, and air-conditioning air volume has been reduced in booths due to precision positioning of paint robots and varying the lengths of the coating processes.
  - 2) Toyota Auto Body has achieved substantial reductions in energy used for air-conditioning by utilizing the preexisting natural gas cogeneration system to use the air-conditioning heat source of the top-coat painting process and also to recover heat emitted at low temperatures.
- By these efforts, Toyota Auto Body was recognized as being a company that supports business through the streamlining of energy use.

#### System Flow



#### Low energy effects



## Pursuit of Clean Production Activities

### Reduction of substances of concern

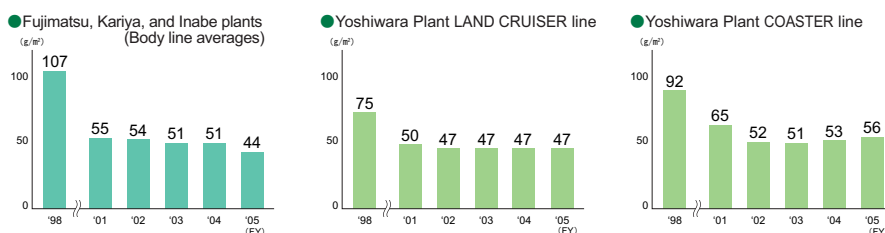
Toyota Auto Body produced results in reducing the substances of concern such as VOC and the volume of substances subject to PRTR by introducing water-borne paints.

#### Reductions in the volume of VOC emissions

Toyota Auto Body achieved its goal for reducing the main VOC, thinner, used in the body painting process, by implementing successful measures to “recover purge solvents” and “improve paint adhesion.”

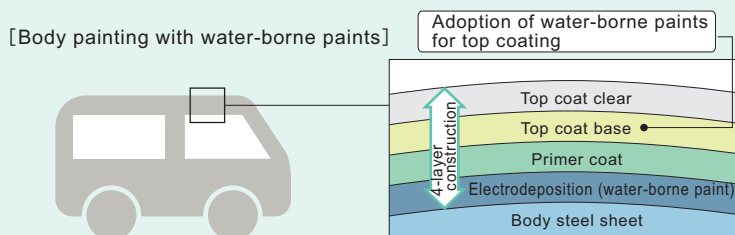
A further reduction in VOC came with implementing a change to use water-borne paints in FY2005.

Amount of VOC emissions (grams) per painted area (square meters)



#### An example Reductions in VOC emissions by using water-borne paints Fujimatsu Plant body line

In FY2005, a change to using water-borne paints for the top coating was implemented to coincide with the new Estima model change and upgrading of the painting booths at the Fujimatsu Plant. As a result, there was a significant reduction in VOC emissions.



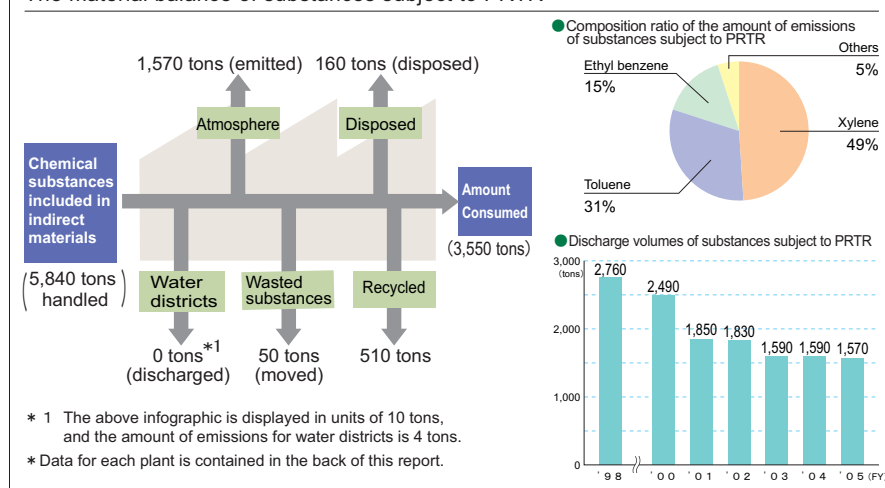
#### Reduction in the volume of PRTR emissions

More than half of the substances subject to PRTR emitted during production processes are paint solvents such as xylene and toluene. A significant decrease in the use of these substances were achieved similarly to the efforts to reduce the volume of VOCs introduced in the previous example of changing to water-borne paints at the Fujimatsu plant body painting process.

In FY2005, there was an increase of 11% in the vehicles produced compared to the previous year, FY2004, while there was a 1% decrease (1,570 tons) of substances subject to PRTR.

Our goal to “reduce substances subject to PRTR by 50% from FY1998 volume,” resulted in a “43% reduction subject to PRTR compared to FY1998 volume.”

The material balance of substances subject to PRTR



#### PCB storage

As of the end of FY2005, the laws required storage conditions for PCB to have items such as three transformers, 91 condensers, and fluorescent ballast among other items.

#### Dioxin monitoring

At the Yoshiwara plant, there must be one incinerator that must be maintained with strict accordance to ordinances so that the emission density standard is at a level below 1/1000th.



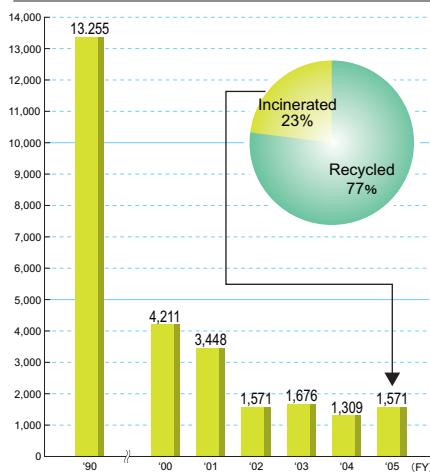
## Reduction of Waste Materials and Resource Saving

Toyota Auto Body achieved the goal to reduce combustible waste substances and have zero landfill waste as implemented in the Third Environmental Action Plan.

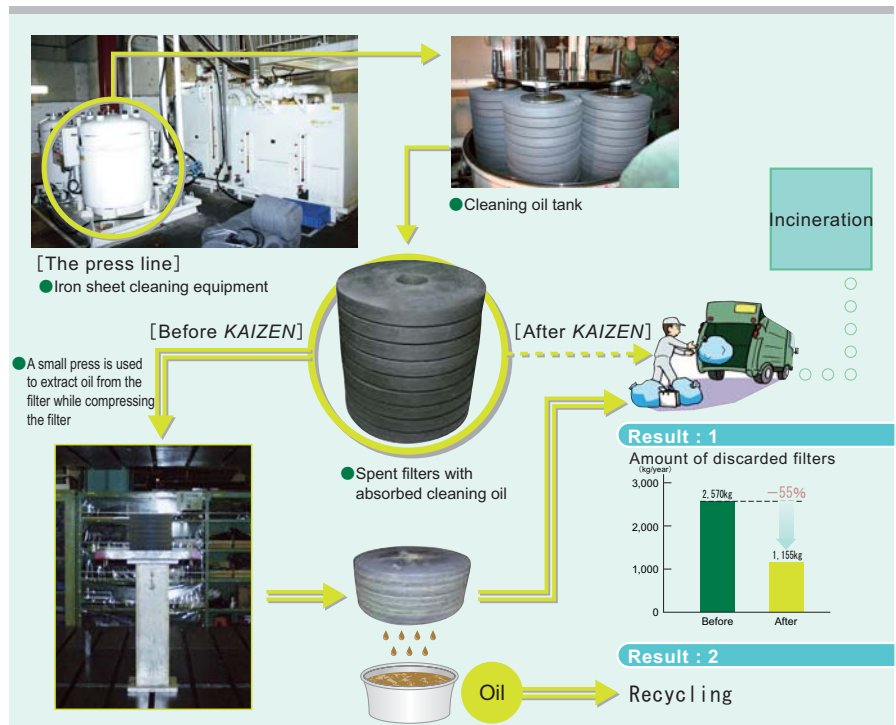
### Zero landfill waste substances and combustible waste substances reductions

As the first step in reducing waste substances, zero landfill waste was achieved in 2001, and thereafter, the company-wide target for combustible waste reduction was achieved three years earlier than the original plan. After our main efforts to "reduce the volume of waste", "reduce waste at the source", and "reuse and recycle waste" were achieved, we endeavored to maintain these efforts. In FY2005, an increase in production was met with an increase of 262 tons of waste.

#### Combustible Waste Substances



**An example** On the press line, Toyota Auto Body made efforts to make large reductions of completely used filters from iron sheet cleaning equipment.



### Correct disposal of waste substances

As a measure to improve trust in the handling of waste substances, Toyota Auto Body has educated employees in charge of waste substances at each plant to strictly manage and control waste substances when entrusted with them in such cases as recovery and issuance an accurate manifest. In addition, meetings to exchange views on disposal of waste substances have been held since last year to communicate with the waste disposal engineers.

In FY2005, confirmation of the designated disposal companies allowed all 67 companies be included in this plan.



Education for the correct disposal of waste substances



Exchanging of views with disposal companies

### Resource saving activities

Toyota Auto Body is working to improve the extraction rate of iron sheets that constitute vehicle bodies. In 2005, we also made efforts to reexamine and reduce loss in waste of materials from die assemblies and cutting processes, and also undertook recycling of scrap iron, reducing discarded amounts of front and rear milling ends, and reducing damaged steel coils.

## Pursuit of Clean Production Activities

### Saving Water Resources and Streamlining of Material Flow

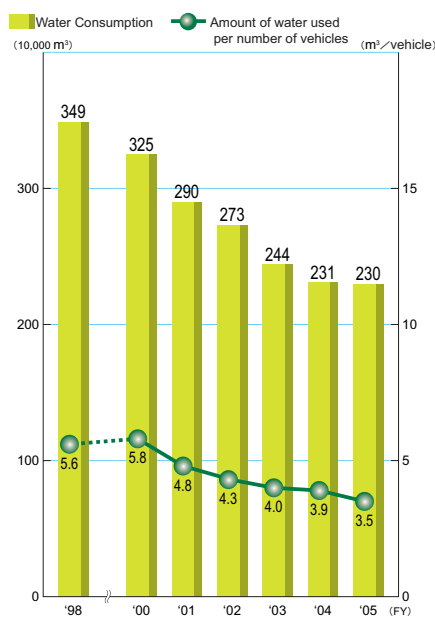
Toyota Auto Body is making efforts to reduce packaging materials and CO<sub>2</sub> in logistics and also save important water resources.

#### Conserving water resources

Toyota Auto Body has already succeeded in meeting its target of reducing water resources (4.5 m<sup>3</sup>/vehicle), and we continue our effort to conserve water.

In 2005, we made efforts to "reduce water used in cooling systems."

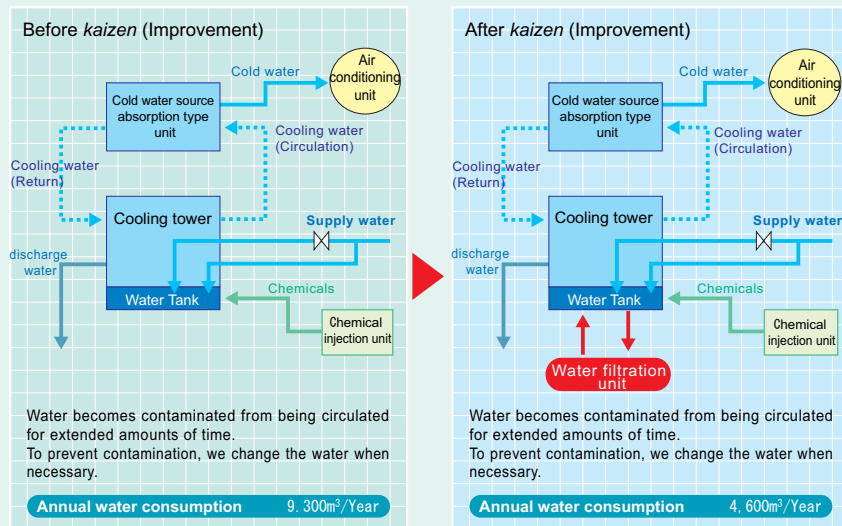
#### Water use in the production process



#### An example A reduction in the amount of water used by a cooling tower water filtration unit

Use of a water filtration unit to prevent contamination for water cooling systems led to reductions in the amount of water use.

**Annual water use reduction 4,700m<sup>3</sup>/Year**

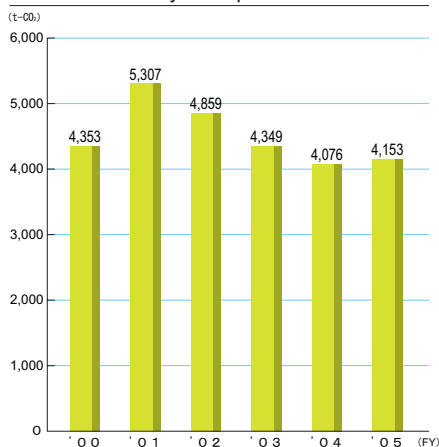


#### Improvements in logistics

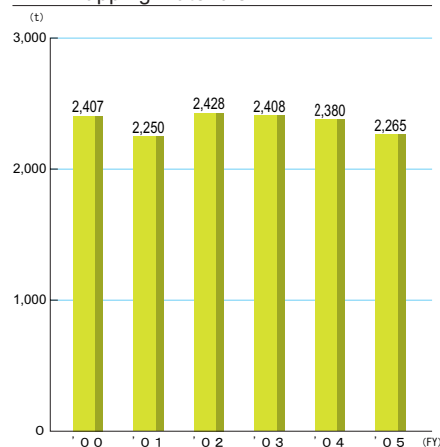
Toyota Auto Body has achieved better efficiency by reexamining transport routes and also through kaizen of cargo layouts for transport of vehicle parts.

In addition, we are continuing activities to reduce the amount of packaging and wrapping materials that we use. In 2005, the result of our efforts led us to achieve our targets of 5,163 tons of CO<sub>2</sub> for logistics and 2,344 tons of packaging and wrapping materials.

#### CO<sub>2</sub> emissions volume caused by transportation



#### Usage of Packaging and Wrapping Materials





## Regional Environment Conservation

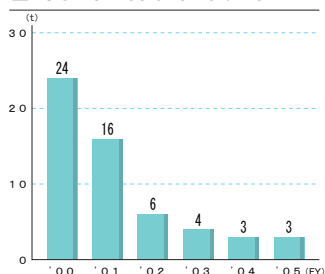
Toyota Auto Body observes environment-related laws for the atmosphere, water quality, and soil which together form the foundation of environmental conservation.

### Managing the atmosphere

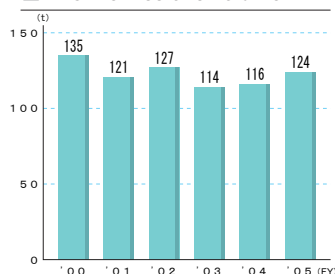
We are taking measures for managing NOx and sulfur oxides (SOx), which pollute the atmosphere and cause acid rain, by changing to use city gas in addition to management of incineration conditions and the use a low nitrous oxide (NOx) burners.

All the plants have satisfied the exhaust gas regulation in the atmosphere in TY2005.

■ SOx emissions volume



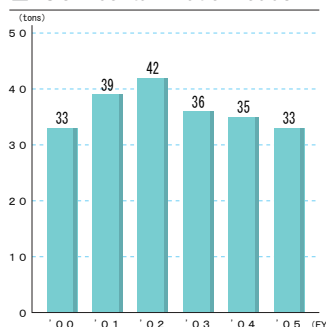
■ NOx emissions volume



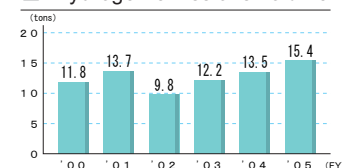
### Managing water

Control and disposal of water emissions is done at a comprehensive water emission disposal plant for all our plants. Even in FY2005, all the plants satisfied within the regulatory values for water emissions. Substances for comprehensive volume regulation, levels of COD (chemically oxidized demand) hydrogen, and phosphor are currently changing to be lower by between 10 to 40% of regulation values.

■ COD contamination loads



■ Hydrogen emissions volume



■ Phosphor emissions volume



### Noise concerns ( Construction of a soundproofing wall in the western area of the Kariya Plant )

From January of 2006, the body line began production in the western section of the Kariya Plant. With an expected increase in noise in the southern side of the plant, we built a soundproofing wall.



Soundproofing wall

### Conservation efforts for soil and ground water

Toyota Auto Body is taking the initiative in surveying soil and ground water. We found that while all plants were confirmed to be below the environmental standard for substances with records of being used in the past, we also found that at certain plants, concentrations of substances were detected for which there was no record of use had exceeded the environmental standard.

A plausible reason for these findings is these substances flowed in to the soil and ground water from outside the plants. Toyota Auto Body is reporting measurement results to the government and local communities.

#### ■ Substances used and their year of elimination

Plant	Substances used	Year of elimination
Fujimatsu Plant	1.1.1-trichloroethane	1995
	Dichloromethane	1996
Kariya Plant	1.1.1-trichloroethane	1985
	Dichloromethane	1967
Yoshiwara Plant	Dichloromethane	1998
	Tetrachloroethylene	2001

\* No records exist for the Inabe Plant

#### ■ Fujimatsu Plant ground water measurements (FY2005)

Substance name	Measurement value	Environmental standard (units: mg/ℓ)
Tetrachloroethylene	0~0.057	0.01
Tetrachloro-carbon	0~0.024	0.002
Trichloroethylene	0~0.086	0.03

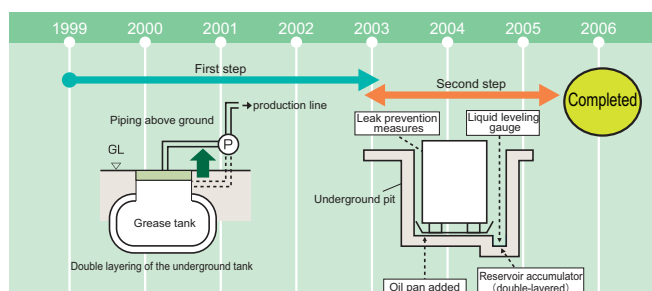
#### ■ Kariya Plant ground water measurements (FY2005)

Substance name	Measurement value	Environmental standard (units: mg/ℓ)
Trichloroethylene	0~0.003	0.03
1.1-dichloroethylene	0~0.023	0.02

\* Both Inabe and Yoshiwara plants were below environmental standards

### Prevention of Soil Contamination by Oil Leakage

In 1999, Toyota Auto Body established measures to prevent soil pollution with the first step being to double layer tanks buried underground. The second step was to initiate main efforts toward double layering reservoir accumulators, which was completed by the FY2005.



## Production Plant Action

At production plants, Toyota Auto Body is implementing steady progress in solid environmental conservation activities with environmental management.



### The Fujimatsu and Kariya plants

In aiming to have harmony with the environment, Toyota Auto Body takes the lead in protecting the environment in order to contribute to a prosperous 21st century society. We are setting the challenge to reduce waste substances and also substances of concern.

We are making efforts to foresee our impact on the environment and prevent pollution based on our observance of environmental regulations.

Toyota Auto Body contributes to society by educating and enlightening our employees to be mindful of environmental conservation, and also contributes through achieving communication by coordinated efforts both inside and outside our company, and also in local communities.



Managing Director / Fujimatsu Plant Manager **Sadao Kondo**

#### Plant Outline

- Address ● 100 Kanayama, Ichiriyama-cho, Kariya City, Aichi Prefecture, Japan 448-8666
- Number of employees ● 7,288 (As of the end of March, 2006)
- Land area ● 423,000m<sup>2</sup> (Kariya Plant : 123,000m<sup>2</sup>)

#### Main products



#### Environmental conservation efforts

Toyota Auto Body is making solid progress in activities for environmental conservation to save energy and resources, and to have zero emissions (zero waste substances). Additionally, based on the total clean principle for achieving harmony with the environment, Toyota Auto Body also produces hybrid vehicles (PRIUS and ESTIMA), made possible through Toyota concurrent evolution of ecology and power.

##### Energy saving activities

- In order to decrease CO<sub>2</sub> emissions, all employees are taking part in "CoolBiz" and "WarmBiz" dress code activities.
- We are also promoting activities that limit energy loss through the implementation of energy saving equipment such as cogeneration and inverters.

##### Promotion of energy saving and zero emissions

- We achieved "Zero emissions" with no waste substances in landfills by FY2002 from effective use of sorting of 28 waste substances(waste plastics,paint waste,etc). In addition, through coordination between the design production divisions, we are promoting activities that reduce resource losses of such as steel materials and resins.



Explaining standard sorting of waste substances to junior high school students

##### Coexistence with local communities

- Communication with Fujimatsu Elementary School students for planting and harvesting kenaf.
- Efforts to provide environmental learning such as an Anjo Junior HighSchool Observation.
- Periodic measurements of emissions taken for water quality and the atmosphere.
- Periodic patrols for daily environmental conservation in addition to implementation of emergency training for unexpected events.



Kenaf plantation

##### Improving the education and common knowledge of all employees

- Participation in 530 (Zero waste), sorting of waste substances, and education to turn off lights unnecessary.
- Creation of an Environmental PR corner to improve employee awareness.



Environmental PR corner



## Inabe Plant

The Inabe Plant began operations in 1993 under the concept of "coexistence of nature, people, and technology".

The plant mainly produces minivans, and annual production of the ALPHARD, ALPHARD hybrid, HIACE, and welfare vehicles is approximately 200,000 vehicles.

With the plant surrounded by natural settings, the plant is actively implementing environmental conservation activities by taking such action as becoming receiving approval for the 1997 ISO 14001 International Standard approved, in addition to Toyota Auto Body self-initiating strict standard values for measurement activities.



Executive Corporate Officer / Inabe Plant Manager **Masatoshi Shirai**

### Plant Outline

- Address ● 10 Ichinohara, Inabe-cho, Inabe City, Mie Prefecture, Japan 511-0201
- Number of employees ● 2,188 (As of the end of March, 2006)
- Land area ● 785,000m<sup>2</sup>

### Main products



ALPHARD



HIACE · REGIUSACE



TOWNACE · LITEACE VAN



REGIUSACE Welfare Vehicles

### Environmental conservation efforts

By applying an environmental management system, the Inabe Plant is showing good results for its efforts to reduce waste substances, and save energy and water resources. We are also having communication with local community.

#### Environmental auditing

- In order to strengthen our effort toward environmental conservation, in 1997 we received approval for the became ISO14001 International Standard approved and in October of 2005, the plant passed a surveillance by an outsourced auditor.



Surveillance of the Inabe Plant

#### Emergency training

- The Inabe plant also conducts training for unexpected emergencies in production activities. In FY2005, we implemented a training simulating the flow of polluted water into the Hosoya River, into which water used at the plant is usually sent.



Emergency training at the Hosoya River

#### Communication with the local community

- The Inabe plant holds regular meetings to address such items as city requests to the plant and meetings with local government officials, in addition to providing explanations of our environmental conservation activities to the city and at local government meetings. For local communities to understand more about our plant, we invite people in the community to various events in the plant to facilitate better communication with employees.



DREAMS in INATY

#### Coexisting with the community (Social contributions)

- The Inabe Plant regularly cleans and weeds the 1 km section of the prefectural road that runs near the plant and from 1999, the plant has participated in the prefectural road "Foster parent system" which is promoted by Mie Prefecture. Other activities include a transport service for physically challenged and elderly people that began in 2003, which is provided by volunteer employees who register. This year, the transport service has operated 21 times (42 people).



Employee weeding and cleaning activities

## Environmental efforts at production plants



### Yoshiwara Plant

In 1999, the Yoshivara Plant received ISO14001, and we are actively promoting activities for all employees to effectively use resources, prevent global warming, and engage in regional environmental conservation.

From 2003, this plant succeeded in zero waste substances for landfills (disposing no waste substances in landfills), reduced the amount of CO<sub>2</sub> emissions by 10% compared to 1990 levels, and we are currently expanding activities to our suppliers. All employees of the Yoshivara Plant work together under our plant slogan of “decide, protect, and confirm”. This plant is involved in reducing SOC<sub>s</sub> and also activities for excellent and efficient production.

Executive Corporate Officer / Yoshiwara Plant Manager **Muraaki Ogawa**  
(Managing Director from June of 2006)

#### Plant Outline

- Address ● 25 Kamifujike, Yoshiwara-cho, Toyota City, Aichi Prefecture Japan 473-8512
- Number of employees ● 1,419 (As of the end of March, 2006)
- Land area ● 289,700m<sup>2</sup>

#### Main Products



LAND CRUISER 100

COASTER

Delivery Vans

#### Environmental conservation efforts

The Yoshivara Plant is surrounded by rice paddies and a residential community. Fortunate to be in such an environment, all the employees of this plant are involved in environmental conservation activities to preserve the atmosphere and water quality, while reducing noise and waste substances

##### Considerations for Regional environmental conservation

■ We at the Yoshivara Plant are promoting planned kaizen activities to reduce our burden on the environment by not only observing legally set standard, but we have initiated standards that are even stricter in order to enforce emissions of disposed water and gas emissions, and even reductions in noise. In particular, we are working to further implement measures for decreasing noise, for which the strictest standards have been set, by building soundproofing walls and making efforts to reduce transport truck noise.



A soundproofing wall for a charging transformer

##### Activities for saving energy and reducing waste substances

■ For activities that involve reducing waste substances, the Yoshivara Plant has implemented sorting and recycling of 62 types of waste substances from each work area. Our efforts for energy saving involve deciding target values for each work area to attain through a spirit of competition and also through conducting mutual study. These efforts have produced significant results. Hereafter, we at the Yoshivara Plant consider contributing to both prevention of global warming and reducing the burden on the environment and local communities as the overriding issues of concern, and are promoting the coordination of environmental conservation activities with the local community.



An energy-saving example presentation

##### Regional coexistence (Activities that contribute to society)

■ During the environmental awareness month of June, we are implementing activities to beautify the environment. On that day, 183 plant employees participated in contributing to the community.



GOMIZERO (Zero Trash) activities

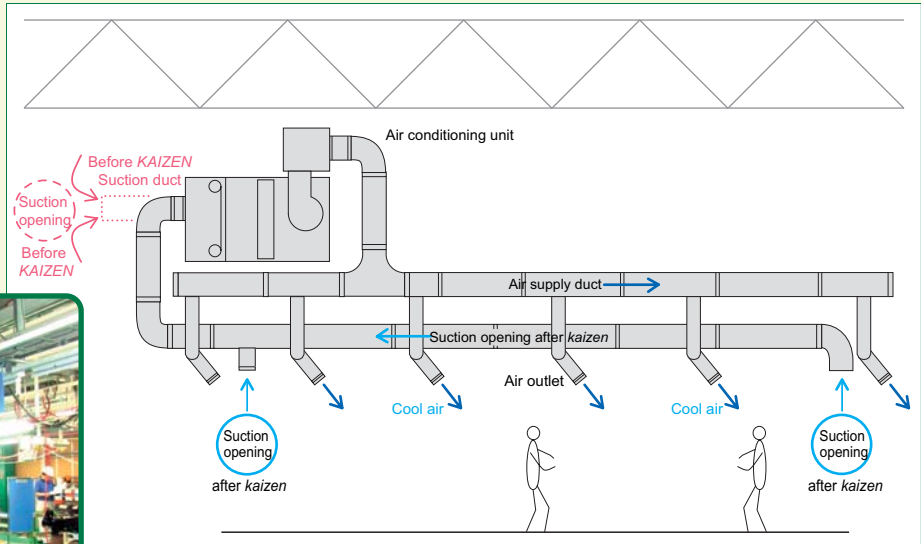


# Environmental Topics

## Energy-saving air conditioning equipment (Yoshiwara Plant)

For the new production line, we changed the location of the air conditioning suction opening from being near the ceiling (warm air) to being near the production line (cool air), in order to use emitted cool air. This change increased air conditioning efficiency by reducing energy use by 20%.

Suction opening after kaizen

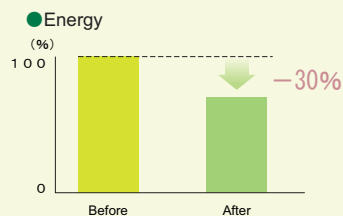
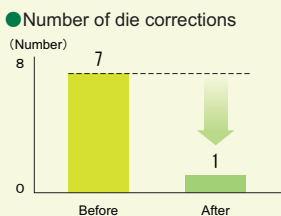
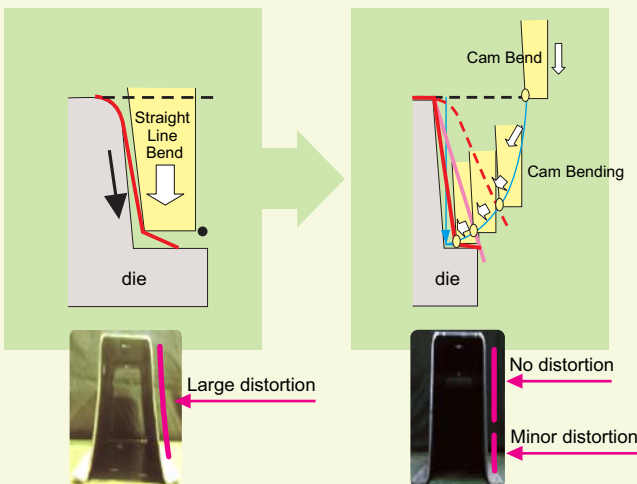


## Energy savings in the cam bending process

As a process to avoid imprecision in the high-strength steel sheet bending process for vehicle body frameworks, the cam bender was developed. Toyota Auto Body has been able to lessen the amount of residual internal stress in the steel sheets which is the cause for imprecision in this method of bending. Aside from improving the precision of parts, we have reduced the energy use by shortening the bending process (elimination of the distortion correction die), and also improved efficiency of die assembly maintenance. This technology was recognized by the JSTP (Japan Society for Technology of Plasticity)-Tokai branch and it received a technology award.

Before kaizen

After kaizen



## Resource conservation in the Simple Multi-Stage Press

Previously, remainder materials of small presses that were designated as scrap are now effectively used with the introduction of the Simple Multi-Stage Press, whereby small part forming presses are arranged vertically. With the part able to be pressed near the production line waste associated with transporting parts has been reduced. A total of 12 parts are pressed, and there has been a reduction in part cost and consumed energy loss.

Inserting and removing materials

Pressing

