

SPECIAL FEATURE: CARING FOR THE ENVIRONMENT THROUGH AUTOMOTIVE MATERIALS AND WATER TREATMENT BUSINESS

STARTING POINT

14

Toray's corporate slogan, "Innovation by Chemistry," accurately portrays the company's history of continuing business structural reform centering on chemical technologies.

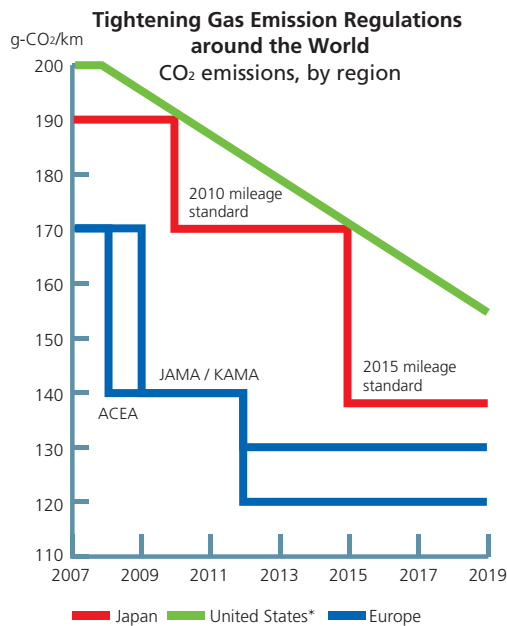
Founded in 1926, Toray commenced operations as a rayon filament manufacturer and soon established a leading position in Japan's fiber and textile industry in the three major synthetic fibers of nylon, polyester, and acrylic sectors. Encouraged by the advancement of Japan's petrochemical industry, Toray also entered the plastics industry and built a wealth of technological expertise in such areas as organic synthetic chemistry, polymer chemistry, and biochemistry. Deploying their expertise, Toray has grown into a worldwide chemical conglomerate in wide-ranging areas, such as fine chemicals, electronic materials, carbon fiber composite materials, pharmaceuticals and medical products, and water treatment membranes. Moreover, our operations cover the full spectrum ranging from basic materials to processed products.

At present, Toray is mobilizing its strengths in four core technologies—organic synthetic chemistry, polymer chemistry, biotechnology, and nanotechnology—to strategically expand its water treatment business and operations in the automotive applications. Water treatment membrane technologies are much anticipated as an effective means of addressing the worldwide problem of water shortages. In this field, Toray launched Japan's first reverse osmosis (RO) membrane, called *Romembra**, in 1980 and has since advanced its business with a full lineup of separation membranes. In the automotive applications field, in 1971 we were the first in the world to start full-scale commercial production of carbon fiber composite materials, much hailed as key to making lighter vehicles. Since then, we have built a position as a top supplier of such materials, and we are strengthening our competitive edge through further technological development and expansion of production facilities.

Automobile demand continues to grow; at the end of 2006, there were 921,839,128 automobiles operating on roads around the world. This equates to 139 vehicles per 1,000 people, or one vehicle for every 7.2* people on the planet. Given growing concern about global warming and climate change caused by greenhouse gases, finding ways to reduce carbon dioxide emissions is a growing worldwide issue. For this reason, governments around the world are tightening regulations on gases, including carbon dioxide, emitted by automobiles. Meanwhile, the cost of automobile fuel continues to rise amid surging prices of crude oil, highlighting the urgency in the automobile industry to develop low-fuel-consuming vehicles.

Against this background, major automakers are working to replace metal components of cars with plastics and other lightweight materials. In addition, a project has recently started to make vehicles lighter through to the full-scale use of carbon fiber reinforced plastic (CFRP). Recently, carbon fiber is especially attracting widespread attention as a material that simultaneously addresses two issues facing the automotive industry: cutting carbon dioxide emissions and lowering fuel costs.

* Source: Japan Automobile Manufacturers Association, Inc. (JAMA)



* U.S. standard is based on reduction to 35mpg (156g-CO₂/km) by 2020, with 4% annual reductions thereafter, as approved by the U.S. Senate. Because the standard for the period to 2020 is unclear, we have drawn a straight line from the 2008 level for practical purposes.

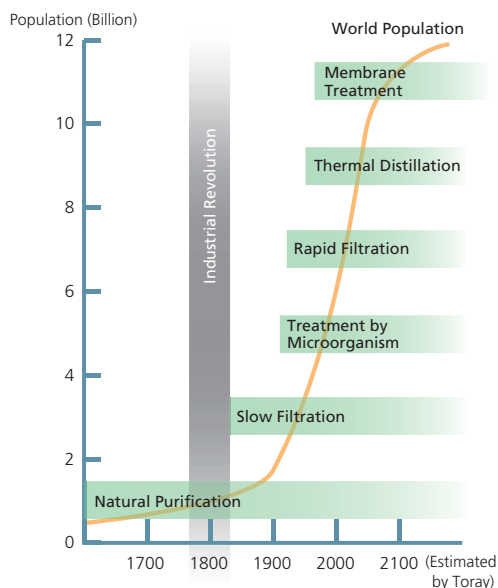


AUTOMOBILES

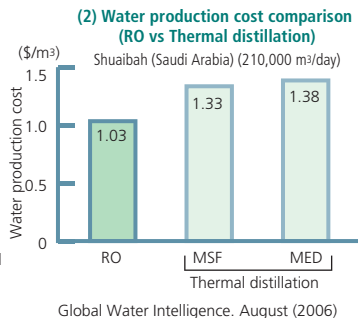
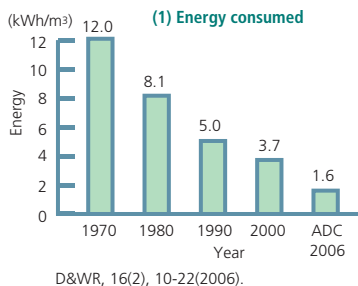
NEEDS

WATER TREATMENT

Increase of World Population and Development of Water Treatment Technologies



Advanced Membrane Treatment Technology for Seawater Desalination



Although the Earth is often referred to as the “water planet,” only 0.01% of its water is fit for human consumption. However, demand for water is growing rapidly, due to rising populations and the expansion of emerging economies, and the problem is further exacerbated by global warming-induced drought and water pollution caused by industrialization. It is estimated that around 1.1 billion people around the world do not have regular access to safe drinking water, while water shortages are predicted even in North America, Europe, and other regions by 2025.

Today, it is difficult to secure ample water supplies, both quantitatively and qualitatively, depending on self-purification processes. Accordingly, the world is eagerly awaiting proliferation of membrane treatment methods, which allow high-speed treatment with water quality controlled to high levels of accuracy. Membrane treatment is attracting worldwide attention because it consumes less energy and entails lower water production costs compared with traditional thermal distillation methods.

Membrane treatment can be used to desalinate seawater, which accounts for 97.5% of the Earth’s total water system. Thanks to technological advances, moreover, membrane technology is being used increasingly to purify sewage and water from lakes, rivers, and underground, because it removes harmful bacteria and permits highly accurate treatment.

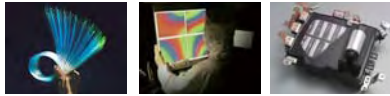
Toray has a proven track record as a supplier of materials for wide-ranging automotive applications, with a broad array of products that include fibers & textiles, plastic resins, and carbon fiber composite materials. Underpinning these businesses is a strong base of advanced technologies, which Toray Group is harnessing to provide optimal solutions to its customers in the automotive industry.

Carbon fiber composite materials hold considerable promise for facilitating major advances in vehicle weight reduction. In addition to high-quality, high-performance carbon fiber that excels against the competition, Toray supplies intermediate, composite, and other materials. Accordingly, Toray holds global top market share for carbon fiber composite materials used in automotive applications.

In 2007, Toray decided to establish "Automotive & Aircraft Center (A&A Center)" in Nagoya. We have opened the "Automotive Center (AMC)" as a technological base for developing automotive components and materials, and the "Advanced Composite Center (ACC)" for the development of composite technologies. By integrating our capabilities in these ways, we are stepping up development of technologies for the automotive industry.

* Please see page 29 for more details on the A&A Center.

Others 17%



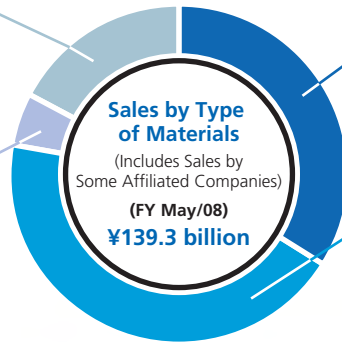
Optical Fibers Color Filters for LCDs Films for Capacitors

Carbon Fiber Composite Materials 5%



Propeller Shaft Rear Spoiler Hood

Toray Group Sales of Automotive Materials



Fibers & Textiles 34%



Materials for Airbags Materials for Seatbelts Materials for Car Seats

Plastic Resins 44%



Intake Manifold and Materials for Cylinder Head Covers Package for Capacitors for Hybrid Cars



Toray has world-leading membrane technologies on the back of Toray's core technologies, organic synthetic chemistry, polymer chemistry, biotechnology, and nanotechnology. Prominent among these is the RO membrane, which requires the most advanced technology while being capable of separating very tiny substances. Toray has developed a number of high-performance RO membranes, including a high boron rejection RO membrane that separates boron from seawater with high efficiency, as well as a low-fouling membrane that can be used in wastewater recycling. In terms of both technological standard and market share, Toray holds a world-leading position in this field.

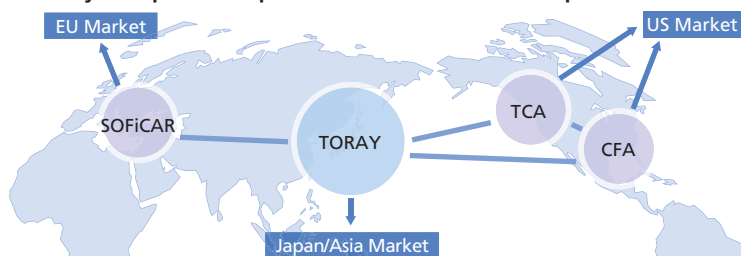
In addition to RO membranes, Toray has also developed nanofiltration (NF) membranes, ultrafiltration (UF) membranes, and microfiltration (MF) membranes. We also have process technologies for combinations of these four membrane types. In addition, utilizing microbial technology, we have commercialized a membrane bioreactor (MBR) for wastewater treatment. Indeed, our strengths lie in our wide-ranging technologies and our full product lineup. Mobilizing these strengths, we offer optimal integrated membrane systems tailored to the water source and intended usage, boasting unparalleled performance and cost-competitiveness.

Types of Membranes and Toray's Products

Size	0.001µm	0.01µm	0.1µm	1µm	10µm
Separation materials	Ion, Low molecule weight organics		High molecular weight polymer	Colloid	Clay
	Trihalomethane Monovalent Ions	Agricultural & Organic Material Multivalent Ions	Virus	Bacteria	Coliform Cryptosporidium
Types	RO (Reverse Osmosis)		NF (Nanofiltration)	UF (Ultrafiltration)	MF (Microfiltration)
Toray's membrane products	RO membrane		NF membrane	PVDF Hollow Fiber UF/MF membrane PS Hollow Fiber MF membrane Home Water Purifiers	Immersed membrane for MBR Torayvino*

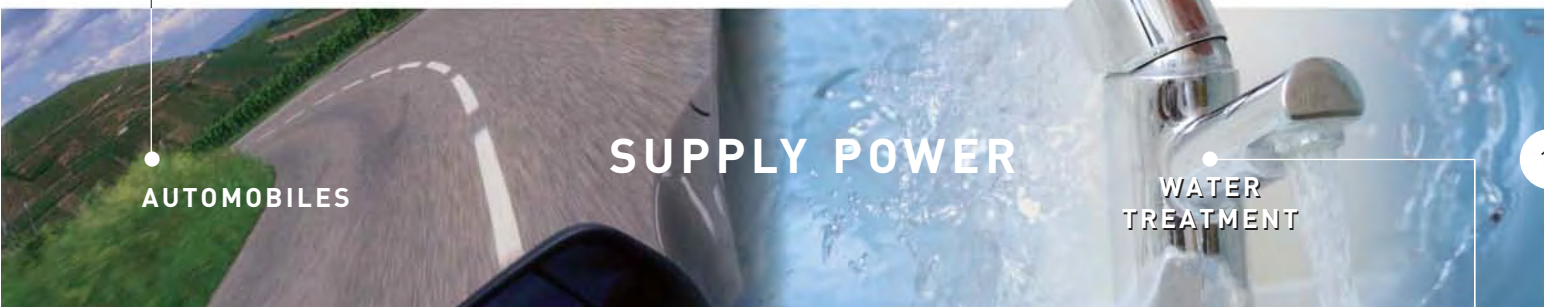
Toray supplies fibers & textiles, plastic resins, and carbon fiber composite materials, which are major materials used in automotive applications. For all of these materials, we are building a global operation system that promotes "right productions and sales bases at the right place" by linking our production facilities around the world. To best serve the automotive industry, for example, we have three production bases—one each in Japan, United States, and Europe—for carbon fiber composite materials, for which we anticipate further increases in demand. Moreover, we have maintained our global top market share by developing a vertically integrated business covering everything from yarns (precursors) to composites. With respect to carbon fiber and prepreg (intermediate) materials, we will continue making proactive capital investments aimed at further broadening our supply capability to meet future demand.

Toray Group Global Operation for Carbon Fiber Composite Materials



Production Capacity of Each Production Base

	Société des Fibres de Carbone S.A. (SOFICAR) (FRA)	TORAY (Ehime/Ishikawa) (JPN)	Toray Composites (America) (TCA) (USA)	Toray Carbon Fibers America (CFA) (USA)
Carbon Fiber (t)	3,400 → 5,200 (Jan, 08) (Dec, 08)	7,300 → 8,300 (Jan, 08) (Jul, 09)		3,600 → 5,400 (Jan, 08) (Dec, 08)
Prepreg (1,000m ²)		10,800 → 16,600 (Jan, 08) (Jan, 09)	11,400 → 17,200 (Jan, 08) (Jul, 08)	



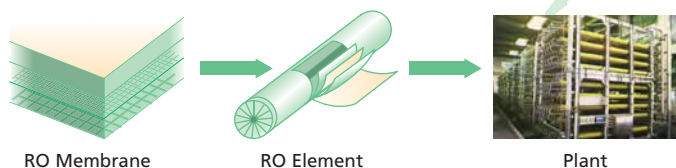
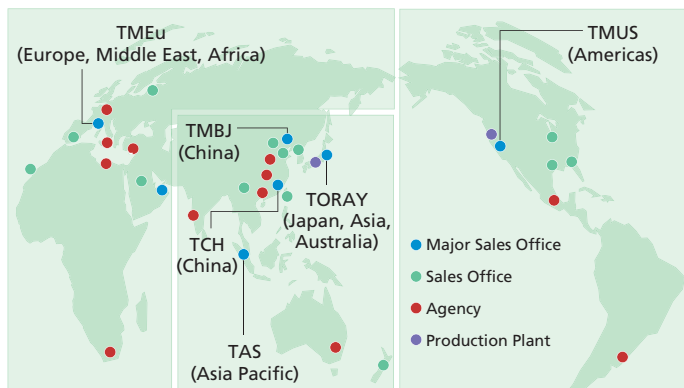
SUPPLY POWER

AUTOMOBILES

WATER TREATMENT

In water treatment, Toray is building a global team-based sales system covering major world markets, with sales operations in North America, Europe, the Middle East, Southeast Asia, China, and Japan. In FY Mar/08, we boosted the RO membrane production capacity of our Ehime Plant in Japan to 1.8 times the level of March 2007. During the year, we also increased production capacity for RO elements at the Ehime Plant and at Toray Membrane USA, Inc. (TMUS), based in San Diego, California.

Global Supply System for Water Treatment Business



Paralleling growth in capacity has been a sharp increase in orders. In seawater desalination, for example, we secured RO membrane orders for the Hamma Seawater Desalination Plant in Algeria (capacity of producing 200,000 cubic meters per day) and the Shuaibah Desalination Plant in Saudi Arabia (150,000 cubic meters per day). In wastewater recycling, a decision was reached in June 2008 to use Toray's RO membranes in the Changi Water Reclamation Plant in Singapore, the world's second-largest wastewater recycling plant, with an output of 228,000 cubic meters per day. This follows an order for the world's largest wastewater recycling facility, the Sulaiybiya Wastewater Treatment and Reclamation Plant in Kuwait (output of 320,000 cubic meters per day), which we shipped in 2004. Accordingly, Toray's cumulative orders in the RO membrane field equate to more than 14 million cubic meters per day, providing sufficient water to meet the needs of 57 million people.

Toray is the only RO membrane maker in the world accepting orders for large-scale seawater desalination plants with capacities of producing 100,000 cubic meters per day or higher from major markets in the Caribbean, the Middle East, and East Asia. We believe this is testimony to our exceptional technological prowess that addresses technological requirements in different regions around the world.

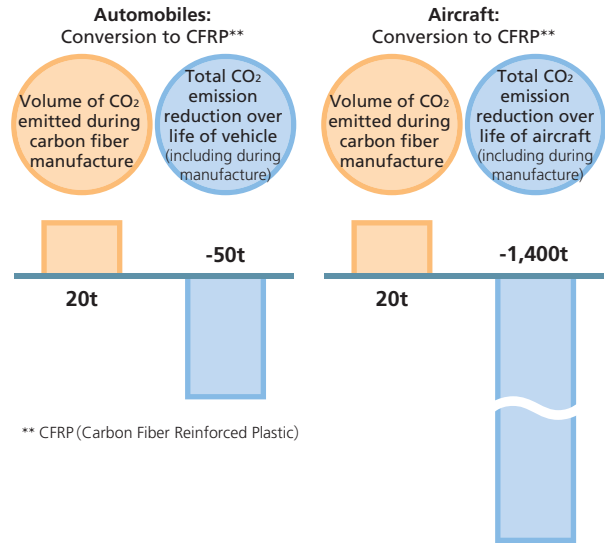
Using carbon fiber in automobile production brings major benefits in reducing carbon dioxide emissions. Although 20 tons of carbon dioxide are emitted in the manufacture of one ton of carbon fiber, the resulting weight reduction in an automobile achieves a 50-ton* reduction in carbon dioxide emissions over a typical vehicle's 10-year life span.

At present, demand for carbon fiber for automotive applications centers on high-end vehicles priced at ¥30 million or higher, and is limited to around 400 tons per year. If carbon fiber is adopted in vehicles priced at ¥5 million or higher, however, carbon fiber for automotive applications demand will potentially explode to exceed 50,000 tons per year, up from 35,000 tons, worldwide carbon fiber demand in FY Mar/08.

To encourage more widespread use of carbon fiber in automobile application, we must consider ways to lower the cost of carbon fiber itself while developing low-cost molding technologies for carbon fiber composites. We are pursuing cost reduction of carbon fiber by increasing the scale of production facilities. With respect to molding technologies, we are cutting costs by minimizing the time required for molding. Through these initiatives, Toray plans to tap latent demand for carbon fiber composite materials in automotive applications and thus help address global environmental issues. At the same time, the materials will help boost total Toray Group sales in the automotive business applications (including sales of fibers & textiles and plastic resins) to ¥200 billion by FY Mar/11 and ¥350 billion by FY Mar/16.

* JCMS estimate (assuming 30% reduction in vehicle bodyweight through use of CFRP)

CO₂ Reduction per Ton of Carbon Fiber "JCMS model"



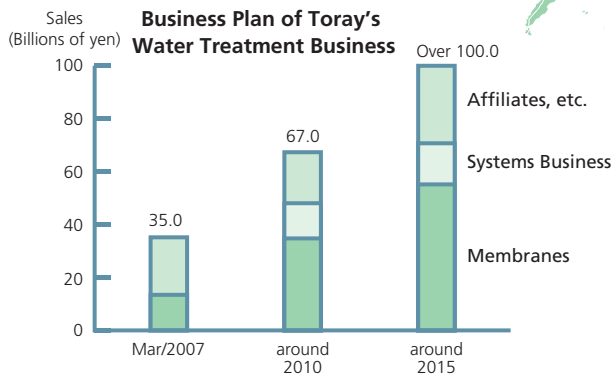
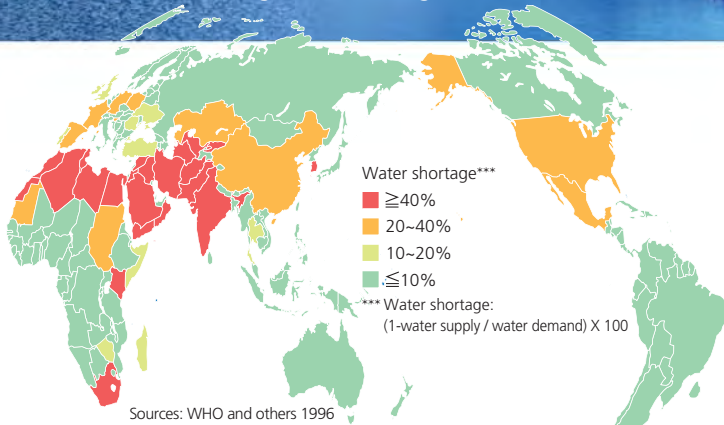
** CFRP (Carbon Fiber Reinforced Plastic)



AUTOMOBILES

DEVELOPMENT IN THE FUTURE

Water Shortage Presumed Regions in 2025



The 21st century has been dubbed the "water century" due to serious shortages of water supply envisaged in the years ahead. In this context, the necessity and importance of water treatment is expected to increase in the future.

The global water supply and sewage business, currently valued at around ¥60 trillion, is expected to reach ¥100 trillion by 2025. Meanwhile, regions now affected by water shortages, such as the Middle East and North Africa, will expand to include China, India, Europe and North America in the future. Against this background, more large-scale seawater desalination plants will be built in various regions. In the field of water and wastewater treatment, meanwhile, the need for membrane-based treatment, which can be used to tackle the twin issues of wastewater treatment and water shortages, will grow in the future.

Toray Group is a comprehensive membrane manufacturer, with a full spectrum of high-performance water treatment membrane products based on its core membrane technology. In this role, we will use our technological strength to provide even higher performance, cost competitive membranes and systems and otherwise address the various issues required to promote the widespread adoption of the membrane treatment method. In addition to water treatment membrane products, we will offer comprehensive solutions, including membrane process technologies and systems. Our plan is to expand our water treatment business to ¥67 billion around 2010 and ¥100 billion around 2015.