



25

Business Summaries and Strategies by Segment

Until fiscal 2016 (the year ended March 31, 2017), Toray had six segments: Fibers & Textiles, Plastics & Chemicals, IT-related Products, Carbon Fiber Composite Materials, Environment & Engineering, and Life Science.

Recently, however, growth business fields that are considered socially important are becoming more diverse, ranging from transportation to the environment, resources and energy, and health care and longevity. As a result, our Group products are increasingly being used in more complex and varied ways. To meet these changing societal needs, in fiscal 2017 we eliminated the Plastics & Chemicals and IT-related Products to create a new segment called Performance Chemicals.

For ease of understanding, we will first go over our fiscal 2016 performance in the former six segments. We will then outline our future key initiatives and forecast based on the five new segments.

Results by Segment for Fiscal 2016

(Billions of yen)

Years ended March 31	2015	2016	2017
Net sales	856.7	892.0	856.1
Operating income	55.6	68.9	66.8
Assets	705.5	680.9	722.1
Operating income to net sales	6.5%	7.7%	7.8%
ROA (Operating income/Assets)	8.4%	9.9%	9.2%
Capital expenditures	37.0	35.4	41.1

Results

In Japan, demand for apparel and industrial applications remained weak. Against this background, Toray Group strived to expand sales on the whole and worked to improve profitability by upgrading the business primarily through promotion of a business format that integrates fibers to textiles to final products and improving profitability through cost reduction. Overseas, mainly in apparel applications, business performance of some subsidiaries in Southeast Asia and other regions were affected by a slowdown in final demand in Europe and China. On the other hand, materials for automotive applications and hygiene products remained strong in general.

As a result, overall sales of Fibers & Textiles segment declined 4.0% to ¥856.1 billion from the previous year and operating income fell 3.1% to ¥66.8 billion.

Core Growth Driving
Business

Fibers & Textiles

TOPICS

Toray to Start Airbag Nylon Fiber and Fabric Business in Mexico

Toray has decided to start an automobile airbag nylon fiber and fabric business at our Mexican subsidiary, Toray Advanced Textile Mexico, S.A. de C.V. (TAMX). TAMX will introduce production facilities with annual production capacity of about 10,000 tons of nylon fibers and fabrics for airbags by investing approximately ¥10 billion. Operations are set to begin in March 2018. Demand for airbag fabrics in the Americas is expected to continue growing significantly. This is creating increased demand for production of those fabrics in Mexico.

The establishment of the new production base in Mexico is in response to such growing demand by building an integrated production system for yarn to fabric in the Americas, which is one of the most prominent airbag fabric markets in the world, and capture the robust demand for airbag fabric around the world including in Asia and Europe.

Toray to Enhance Production Capacity of High-performance Polypropylene Spunbond Nonwoven Fabric in Republic of Korea

Toray has decided to enhance the production capacity of its high-performance polypropylene spunbond for hygiene products at Toray Advanced Materials Korea Inc. (TAK), which is Toray's Korean subsidiary. TAK will build an additional facility—to start operations in April 2018—with a production capacity of approximately 18,000 tons per year.

Demand for disposable diapers has been rapidly increasing in ASEAN member countries, India, and China, and major hygiene products manufacturers have been successively declaring plans to expand plants producing products for these countries. Accordingly, demand for PP spunbond, the main raw material of disposable diapers, is expected to grow, and there could be shortages in supply. Toray's PP spunbond is currently sold widely throughout Asia. The PP spunbond production facility being added at P.T. Toray Polytech Jakarta (TPJ) started operation in September 2016. Toray will continue to expand its business in emerging markets such as rapidly growing China, India, and ASEAN countries.

Toray's Italian Subsidiary to Enhance Production Capacity of Alcantara®

Toray has decided to increase production of luxury material Alcantara® at Alcantara S.p.A. The company plans to invest approximately ¥35 billion in a phased manner over the next five years, in response to the trend in demand, to roughly double the current production capacity.

Alcantara® has been adopted as automobile interior material primarily in luxury models due to its global brand recognition and a varied product lineup. Demand for use in electric vehicles is also expanding. Demand for Alcantara® is not limited to automobile interior application, with growing new demand for it as a material to decorate consumer electronics devices such as PCs and headphones, which is expected to lead to a shortfall in production capacity of the material in 2019. The decision to enhance production is in response to such robust demand.



Core Growth Driving
Business

Plastics & Chemicals

TOPICS

(Billions of yen)

Years ended March 31	2015	2016	2017
Net sales	496.4	521.2	499.1
Operating income	23.9	29.4	33.8
Assets	562.1	524.6	542.0
Operating income to net sales	4.8%	5.6%	6.8%
ROA (Operating income/Assets)	4.5%	5.4%	6.2%
Capital expenditures	21.5	31.2	25.1

Results

In the resin business, shipment for automotive applications was strong in general, both in Japan and overseas. Besides automotive applications, Toray Group also promoted sales expansion of ABS and PPS resins. In the film business, while overseas demand for some applications in the U.S. and Europe was sluggish, the Group made efforts to expand sales of high value-added products in Asia and other regions, and the products for packaging applications performed strongly in Japan. Toray Group, despite many of the business's products being affected by price competition in Japan and abroad, strived to improve profitability of the business by focusing on sales expansion of high value-added products as well as on cost reduction.

As a result, overall sales of Plastics & Chemicals segment declined 4.2% to ¥499.1 billion from the previous year while operating income increased 15.0% to ¥33.8 billion.

Toray is Now the World's Largest PPS Resin Manufacturer

In July 2016, we held the completion ceremony for a new plant that produces polyphenylene sulfide (PPS) resin TORELINA® at our wholly owned Korean subsidiary Toray Advanced Materials Korea Inc. Moreover, by manufacturing sodium hydrogen sulfide (NaSH) and paradichlorobenzene (p-DCB), the two main raw materials for manufacturing PPS resin at the same plant, Toray intends to make it a cost competitive integrated manufacturing base producing everything from raw materials and polymers to compounds. The plant has a capacity to produce 8,600 tons of PPS resin annually, which, with our existing Tokai plant, will boost our annual production capacity of PPS resin to 27,600 tons.

Toray Group is a comprehensive PPS manufacturer, which offers PPS not only as compounds but also as films and fibers, and is the largest player in the field. With the establishment of the new production facility announced this time, the Group will pursue expansion of its compounds lineup into high-performance and environmentally friendly products, whose demand is expected to grow in the future, and further enhance its position as the world's number-one in the PPS resin field.

Toray to Increase Production Capacity of TORAYPEF® Polyolefin Foam at U.S. Subsidiary

We have decided to increase our production capacity of TORAYPEF® polyolefin foam manufactured at our subsidiary, Toray Plastics (America), Inc. (TPA), in Rhode Island. TORAYPEF® is a polyolefin foam developed using Toray's proprietary manufacturing method with a wide range of uses including for automobile interiors, as insulation for consumer electronics, and as cushioning material for housing and civil engineering applications due to its excellent moldability, heat insulation, cushioning and moisture-barrier properties. We are investing about ¥4.0 billion to add a manufacturing facility with an annual production capacity of 3,000 tons, which will become operational in early 2018. With this, our total TORAYPEF® production capacity at TPA will increase significantly to 7,500 tons a year.

Veterinary Drug to Treat Chronic Kidney Disease in Cats Approved for Manufacture and Sale

Toray's new veterinary drug to treat chronic kidney disease in cats, RAPROS™, an oral prostacyclin (PGI₂), attained approval for manufacture and sale on January 13, 2017. Kyoritsu Seiyaku Corporation started sales in April this year. RAPROS™ is an oral prostacyclin (PGI₂), with beraprost sodium as its active ingredient. It works to protect vascular endothelial cells, to widen blood vessels, to inhibit inflammatory cytokine production and has an antiplatelet effect. These pharmacological actions are thought to improve the ischemia and hypoxia of the kidney, and to help limit the deterioration in kidney function and to improve clinical symptoms.

RAPROS™ is the first drug approved in Japan clinically proven to help limit the deterioration of kidney function. We believe this paves the way to provide encouraging treatment options for cats. We at Toray will continue to respond to veterinarians' unmet medical needs in caring for animals by developing new drugs.



Strategically Expanding Business

IT-related Products

TOPICS

(Billions of yen)

Years ended March 31	2015	2016	2017
Net sales	248.0	251.1	254.4
Operating income	24.5	26.2	30.5
Assets	360.4	362.9	384.8
Operating income to net sales	9.9%	10.4%	12.0%
ROA (Operating income/Assets)	6.8%	7.2%	7.9%
Capital expenditures	16.3	29.8	32.4

Results

Among materials for flat panel displays, smartphone- and tablet terminal-related materials performed strongly with shipments for organic EL applications growing. Shipment of battery separator films for lithium-ion secondary batteries expanded reflecting demand growth. While many of the business's applications were affected by price competition, Toray Group strived to improve profitability of the business by focusing on sales expansion of high value-added products as well as on cost reduction.

As a result, overall sales of IT-related Products segment increased 1.3% to ¥254.4 billion from the previous year and operating income rose 16.7% to ¥30.5 billion.

Strengthening Group Structure for Separators for Lithium-ion Secondary Batteries

Toray decided to absorb Toray Battery Separator Film Co., Ltd. (Toray BSF), a wholly owned consolidated subsidiary that manufactures and markets separators for lithium-ion secondary batteries (LIB), effective April 1, 2017. In the LIB market, the business environment is significantly changing as the demand for electric vehicles is expected to grow rapidly in addition to the existing consumer electronics applications, which makes it even more important to have the ability to quickly respond to the growth and sophistication of functions of separators for LIB. Based on the recognition of these trends, Toray decided to absorb Toray BSF to strengthen the foundation of our Group structure to appropriately respond to the LIB separator business.

Toray's Printing-type CNT Semiconductor Achieves World's Highest Level of Carrier Mobility

In the field of semiconductor single-walled carbon nanotubes (CNTs), Toray's printing-type semiconductor achieved the world's highest level of carrier mobility (an index of mobility of carriers, such as electron holes and electrons, within the semiconductor) of 81 cm²/Vs. With this result, we became the world's first to show that it is possible to use printing technology to manufacture at low cost highly functional devices such as ultra-high frequency radio-frequency identification (UHF RFID) tags, IC tags with a long transmission distance, that are arguably vital in the IoT era.

Toray Develops World's First UV Printing System Free of Organic Solvents

Toray has developed a waterless UV printing system using water-soluble inks, an extremely eco-friendly approach to printing as it uses no volatile organic solvents. The system is made possible through the use of Toray's newly developed hydrophilic polymer and TORAY WATERLESS PLATE®. The developed waterless UV offset printing system can be cleaned with a water-based cleaning agent—as it contains no volatile organic solvents and the inks used are water soluble—thus reducing emissions and use of volatile organic solvents generated in the printing process. Furthermore, printing conditions such as temperature are greatly improved, significantly reducing generation of volatile organic compounds (VOCs).



TORAY WATERLESS PLATE®

(Billions of yen)

Years ended March 31	2015	2016	2017
Net sales	158.4	186.2	161.6
Operating income	26.2	36.1	24.0
Assets	436.8	429.5	461.0
Operating income to net sales	16.6%	19.4%	14.8%
ROA (Operating income/Assets)	6.7%	8.3%	5.2%
Capital expenditures	45.5	32.1	46.5

Results

In the Carbon Fiber Composite Materials segment, while the final demand for aircraft was strong, demand for carbon fiber intermediate products (prepreg) remained on a weak note, reflecting the inventory adjustment in the supply chain. Demand of products for compressed natural gas tank applications was slow due to the impact of the decline in crude oil prices. Meanwhile, shipment for wind turbine blade applications expanded on the back of growing demand.

As a result, overall sales of Carbon Fiber Composite Materials segment declined 13.2% to ¥161.6 billion from the previous year and operating income fell 33.6% to ¥24.0 billion.

Strategically Expanding
Business

Carbon Fiber
Composite Materials

TOPICS

Toray to Enhance Production Facilities of Large Tow Carbon Fiber

Toray has decided to enhance the production facilities for large tow carbon fiber at Zoltek Companies, Inc. By the end of 2017, Zoltek will begin increasing production capacity and will continue to do so until capacity at the Mexico plant is doubled to more than 10,000 tons per year. With this expansion, Zoltek's total global production capacity will grow to more than 20,000 tons per year from the current 15,000 tons.

This capacity expansion is a key move, as the demand for large tow carbon fiber is growing rapidly for industrial applications including wind turbine blades, and the industry is already experiencing a supply shortage, especially in Asia, led by China and India. While the current expansion in production capacity will address this surge in demand in the short term, usage of large tow carbon fiber is expected to increase exponentially in automobile structures in the future. In order to respond to this active demand, Toray plans to continue expanding carbon fiber production capacities at Zoltek and to establish a stable supply structure.

Toray to Establish Large-scale Production Facility for Fuel Cell Electrode Substrates at its Ehime Plant in Japan

Toray has decided to develop a new large-scale production facility at our Ehime Plant, Japan, for manufacturing carbon paper for the electrode substrates of fuel cell stacks. With a planned completion date of May 2018, we will build a cutting-edge facility—approximately five times the capacity of our current Shiga Plant—to efficiently produce carbon paper.

Toray's carbon paper for electrode substrates of fuel cell stacks has now been consecutively adopted for the fuel cell vehicle MIRAI, by Toyota Motor Corporation, and for the fuel cell vehicle CLARITY FUEL CELL, by Honda Motor Co., Ltd. Fuel cell vehicles are the ultimate in environmentally friendly driving, emitting no carbon dioxide, and mark a huge step towards building a hydrogen-based society. Currently, Japanese vehicle manufacturers are starting serious development of next-generation models. Moreover, demand for other applications, such as forklifts, is expected to increase. Therefore, we decided it was necessary to dramatically expand production capacity.



Intensively Developing and Expanding Business

Environment & Engineering

TOPICS

(Billions of yen)

Years ended March 31	2015	2016	2017
Net sales	180.0	183.3	186.1
Operating income	8.0	9.6	9.9
Assets	204.2	193.8	204.3
Operating income to net sales	4.5%	5.2%	5.3%
ROA (Operating income/Assets)	3.9%	4.8%	4.8%
Capital expenditures	3.3	3.6	4.5

Results

In the water treatment business, although Toray Group continued to work on sales expansion of reverse osmosis membranes and other products, exports from Japan were affected by the further appreciation of the yen. Among domestic subsidiaries in the segment, pharmaceuticals-related plant construction and lithium-ion secondary battery-related machinery at an engineering subsidiary performed strongly.

As a result, overall sales of Environment & Engineering segment increased 1.5% to ¥186.1 billion from the previous year and operating income rose 3.3% to ¥9.9 billion.

Toray Establishes New Company to Manufacture and Sell Water Treatment Membranes in China

In June 2016, Toray established a new company, Toray WBD Membrane Technology (JS) Co., Ltd. (TWMT), in a joint venture with Jiangsu Water Business Doctor Environmental Technology Co., Ltd., a leading engineering company in the industrial wastewater field in China. TWMT plans to manufacture and sell water treatment membranes for use in membrane bioreactor (MBR) systems and rapidly expand its presence in the Chinese market with its proprietary membrane, MEMBRAY®.

Demand for MBRs for wastewater recycling is expected to increase in China on the back of tightening regulations for water quality and demand for use in solving water shortages—both byproducts of industrial development. Toray's water treatment membranes are the core of our Green Innovation business. We will continue to target large-scale orders for projects using our MEMBRAY® MBR membrane. In addition, we will accumulate further sales for our membranes that hold top-level market shares, namely our reverse osmosis membrane ROMEMBRA® and our UF membrane TORAYFIL®, which is used for applications such as treating river water.

Toray Celebrates 30th Anniversary of Household Water Purifier TORAYVINO®

Toray's line of household water purifiers, TORAYVINO®, which reached its 30th anniversary this fiscal year since debuting in 1986 as a counter top water purifier, has expanded to meet the changing needs and lifestyles of customers to include faucet mounted and under-the-sink water purifiers, and pitchers and dechlorinating shower heads. In 2014, the line boasted total cumulative sales of 100 million units and filter cartridges. We will continue to provide delicious and safe water for everyone's family as the leading household water purifier manufacturer.



Faucet mounted TORAYVINO®

(Billions of yen)

Years ended March 31	2015	2016	2017
Net sales	57.0	55.8	54.2
Operating income	4.1	3.1	2.1
Assets	82.9	83.3	79.7
Operating income to net sales	7.1%	5.5%	4.0%
ROA (Operating income/Assets)	5.1%	3.7%	2.7%
Capital expenditures	2.5	3.2	3.4

Results

In the pharmaceutical business, sales volume of pruritus treatment REMITCH® grew solidly, as the product received approval for an additional indication in 2015, while it was affected by the National Health Insurance drug price revision in April 2016. Shipment of natural-type interferon beta preparation FERON® and orally active prostacyclin derivative DORNER® remained sluggish due to the impact of alternative medicines and their generic drugs. In the medical devices business, shipment of dialyzers grew strongly in Japan and overseas.

As a result, overall sales of Life Science segment declined 3.0% to ¥54.2 billion from the previous year and operating income fell 30.0% to ¥2.1 billion.



Intensively Developing and Expanding Business

Life Science

TOPICS

Toray Expands Range of Pruritus Treatment REMITCH®

In March 2017, Toray received approval to manufacture and market a new dosage form of REMITCH® CAPSULES 2.5 µg, an orally disintegrating tablet formulation (REMITCH® OD Tablets 2.5 µg). These new tablets can be taken with or without water. Therefore, it is expected to expand the options available to patients whose swallowing capabilities have deteriorated, such as the elderly, or those who have restrictions on water intake.

Also, in September 2016, we filed an additional indication of efficacy for REMITCH® CAPSULES 2.5 µg to treat pruritus (use only when sufficient efficacy is not obtained with the existing therapies or treatments) in peritoneal dialysis patients in Japan. By obtaining this indication—adding another option to available treatments—we expect to be able to greatly contribute to the treatment of pruritus in peritoneal dialysis patients.

Full-scale Release of New Dialysis Machine TC-R

Toray has begun full-scale sale of its multi-patient dialysis machine TC-R in June 2016. TC-R achieves a new level in safety and comfort for dialysis treatments, meeting the high requirements of the medical industry for safety, dependability, operability, workability, functionality and cleaning of dialysate. Compared to previous Toray dialysis machines it has improved dialysate adjustment and supply capabilities, as well as dialysate cleaning capacity through its endotoxin retentive filter (ETRF).



TC-R

– REMITCH® is a registered trademark of Torii Pharmaceutical Co., Ltd.

Breakdown of Medium-term Business Strategies by New Segments

The new segments, which apply from fiscal 2017, are categorized as follows. Fibers & Textiles is a Core Growth Driving Business. Newly created Performance Chemicals, which eliminated the former Plastics & Chemicals and IT-related Products, and Carbon Fiber Composite Materials are Strategically Expanding Businesses, while Environment & Engineering and Life Science are Intensively Developing and Expanding Businesses. Under this new five segment structure we will aim to sustainably grow revenue in each business. Moreover, while Performance Chemicals is basically a Strategically Expanding Business, chemicals and some resin products are Core Growth Driving Businesses.



Note: Fiscal 2016 results have been restated to conform with new segments.

Segment Changes	Business Categories	Former Segment	New Segments (from fiscal 2017)
	Core Growth Driving Businesses	Fibers & Textiles	Fibers & Textiles
		Plastics & Chemicals	Performance Chemicals
	Strategically Expanding Businesses	IT-related Products	
		Carbon Fiber Composite Materials	Carbon Fiber Composite Materials
Intensively Developing and Expanding Businesses	Environment & Engineering	Environment & Engineering	
	Life Science	Life Science	

Basic Strategies

- Maintain and reinforce domestic business foundation and processing platform, and further strengthen business competitiveness
 - Reinforce business foundation of its existing operations at overseas locations, and expand business in growth business fields and regions
 - Strengthen Toray Group's global operations and create new business areas by developing and expanding business on multiple levels combining its strengths in diverse product lines, supply chain, and global sales
- ➔ Aim to achieve significant growth by the global fibers/textiles/final products integrated business format and SCM, reinforce value chain of strategic products, and expand new business areas

Main Products

Filament yarns, staple fibers spun yarns, woven and knitted fabrics of nylon, polyester, acrylics and others; non-woven fabrics; ultra-microfiber non-woven fabric with suede texture; apparel products

Resins, Chemicals Business

- Allocate management resources and promote business expansion in growing businesses including PPS resin, resin compounds overseas and automotive materials

Films Business

- Invest in lithium-ion battery separator films and promote sales expansion through product development
- Reorganize manufacturing of PET film, increase value of existing products by utilizing global operations, and enhance sales expansion

Electronic & Information Materials Business

- Expand sales of organic EL-related materials and accelerate technology development and commercialization of products beyond the LCD display field

Resins and molded products, poly-olefin foam, films and processed film products, raw materials for synthetic fibers and plastics, fine chemicals, veterinary medicine, electronic & information materials, graphic materials, etc.

Aerospace Applications

- Further strengthen existing partnerships
- Capture new programs

Industrial Applications

- Reinforce the overwhelming top position in the market by leveraging comprehensive strength with lineups of regular tow and large tow products
- Reinforce the overwhelming top position in the wind-turbine application market through strengthening alliances with major customers, supported by the cost competitiveness in large tow products
- Develop intermediate products/molding technology and enhance the supply chain to meet the full-scale expansion of demand for automotive applications

Carbon fibers, carbon fiber composite materials, and molded products from those materials

Water Treatment Business

- Expand business and improve revenue and profit in the membrane business
- Enhance new development of reverse osmosis membrane products and strengthen cost competitiveness
- Expand sales of UF membranes in China and the USA
- Strengthen business foundation in the water treatment system and plant business

Engineering Business

- Expand plant business and industrial machinery (in the environment and energy fields, and life science field)
- Make use of external resources in growth areas
- Strengthen cost competitiveness
- Accelerate overseas expansion

Comprehensive engineering; condominiums; industrial equipment and machinery; environment-related equipment; water treatment membranes and related equipment; materials for housing, building and civil engineering applications

Pharmaceutical Business

- Expand sales of oral antipruritus drug, REMITCH®
- Create next-generation drug with new process
- Adjust management system associated with downsizing of existing pharmaceutical business

Medical Devices Business

- Expand sales of emergency and intensive care products
- Develop dialyzer products and expand sales in Japan and overseas
- Enhance expansion of bio-tools

Pharmaceuticals; medical devices

– REMITCH® is a registered trademark of Torii Pharmaceutical Co., Ltd.