



Fiscal 2017 ~2019 Medium-term Business Plan Update

Tosoh Corporation
May 18, 2018

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Tosoh's English materials name the fiscal year, which runs from April to March of the following year, after the year in which it ends.



1. Metrics

1-1. Consolidated Results

- **FY18**: New record high profits owed to continued favorable business environment throughout the fiscal year
- **FY19**: Business performance has achieved medium-term targets. However, forecast for FY19 results compared to FY18 is lower due to the yen appreciation, rising raw material costs and the softening of the polyurethane market.

(Unit: billion yen)

	FY2017 Actual	FY2018 Actual	FY2019		FY2019 Medium-term plan
			Forecast	vs. FY2019 Plan	
Net Sales	743.0	822.9	850.0	100.0	750.0
Operating Income	111.2	130.6	110.0	25.0	85.0
Operating Income Ratio	15.0%	15.9%	12.9%	1.6%	above 10%
ROE	20.1%	19.6%	—	—	above 10%
US Dollar	108 ¥/\$	111 ¥/\$	105 ¥/\$	-5 ¥/\$	110 ¥/\$
Euro	119 ¥/€	130 ¥/€	130 ¥/€	10 ¥/€	120 ¥/€
Naphtha	34,725 ¥/kl	41,925 ¥/kl	47,000 ¥/kl	7,000 ¥/kl	40,000 ¥/kl



1-2. Results by Sectors

- **FY18**: Continuing from FY17, commodity continue to drive business performance, acquiring 70% of total profits.
- **FY19**: While commodity sector is forecast to exceed medium-term performance targets, the specialty sector is forecast below performance targets due to factors such as increasing prices of raw materials.

										(Unit: billion yen)
		FY2017 Actual	FY2018 Actual	FY2019				FY2019 Medium-term plan		
				Forecast		vs. FY2019 Plan				
Net Sales	Commodity	441.4	509.8	516.7		75.7		441.0		
	Specialty	175.9	187.1	194.2		10.2		184.0		
	Engineering / Others	125.7	125.9	139.1		14.1		125.0		
	Total	743.0	822.9	850.0		100.0		750.0		
Operating income / ratio	Commodity	68.0 15.4%	89.1 17.5%	68.7 13.3%		30.7 4.7%		38.0 8.6%		
	Specialty	35.4 20.1%	33.9 18.1%	33.5 17.2%		-6.5 -4.5%		40.0 21.7%		
	Engineering / Others	7.8 6.2%	7.5 6.0%	7.8 5.6%		0.8 0.0%		7.0 5.6%		
	Total	111.2 15.0%	130.6 15.9%	110.0 12.9%		25.0 1.6%		85.0 11.3%		

1-3. Commodity Results

- **FY18**: Market for polyurethane raw materials continues to be strong, achieving significantly higher profits compared to FY17.
- **FY19**: Polyurethane market is expected to soften due to rising yen and raw material prices. While profits are forecast lower compared to FY18, overall performance will exceed 30 billion yen above medium-term targets.

		FY2017		FY2018		FY2019		FY2019 Medium-Term Plan
		Actual		Actual		Forecast	vs. FY 2019 Plan	
Net Sales	Petrochemical	161.7		174.8		180.9	16.9	164.0
	Chlor-alkali	279.7		335.0		335.8	58.8	277.0
	Total	441.4		509.8		516.7	75.7	441.0
Operating Income	Petrochemical	20.1	12.4%	22.5	12.9%	13.5	-3.5	17.0
	Chlor-alkali	47.9	17.1%	66.6	19.9%	55.2	34.2	21.0
	Total	68.0	15.4%	89.1	17.5%	68.7	30.7	38.0
(Unit: billion yen)								
Exchange rate		¥/US\$	108	111		105	Δ5	110
Domestic naphtha		¥/kl	34,725	41,925		47,000	7,000	40,000
Benzene		\$/t	727	814		800-900	225	600-650
PVC		\$/t	855	860		800-900	50	750-850
VCM		\$/t	710	683		650-750	75	600-650
Liquid caustic soda		\$/t	388	560		600-700	325	300-350
MDI (monomeric)		\$/t	1,922	2,957		2,500-2,700	1,100	1,450-1,550
MDI(polymeric)		\$/t	1,544	2,518		1,800-2,000	850	1,000-1,100
※Market price difference is calculated by comparing with average prices								

1-4. Specialty Results

- **FY18**: Decreased profit year-on-year, owed to lower profit from ethyleneamines and an increased depreciation expense from investments in growth businesses
- **FY19**: Profits are forecast below medium-term targets due to high raw material prices, less profits, and delays in sales expansion plans, etc.

		FY2017	FY2018	FY2019		(Unit: billion yen)
		Actual	Actual	Forecast	vs. FY 2019 Plan	FY2019 Medium-Term Plan
Specialty products	Sales	175.9	187.1	194.2	10.2	184.0
	Operating income	35.4 20.1%	33.9 18.1%	33.5 17.2%	-6.5 -4.5%	40.0 21.7%
Exchange rate	US dollar ¥/US\$	108	111	105	-5	110
	Euro ¥/€	119	130	130	10	120

Factors leading to the variance between actual and medium-term plan

- Ethyleneamines: Less profits due to higher costs of raw materials and softening of the market
- Zirconia: Reduction in profit margins due to high raw material prices
- High-silica zeolites (HSZ): Sales targets not reached due to delays in customers' qualification of new grades etc.

2. Investment plan

2-1. Investment Plan: Specialty-related investments

- Further invest in growth businesses and build a manufacturing infrastructure that can respond to increasing demand
- 10 billion yen to be invested in affiliated companies in order to respond to rapidly growing demand from the semiconductor industry

Key Investment Projects	Destination	Completion Date	Objective
➤ Construction of new HSZ plant	Malaysia	Commercial operations began April 2017	Expansion of growth businesses
➤ Capacity increase of existing HSZ plant	Nanyo Complex	Spring 2019	
➤ Capacity increase of existing zirconia plant	Yokkaichi Complex	Commercial operations began March 2017	Expansion of growth businesses
➤ Capacity increase of existing zirconia plant	Nanyo Complex	Summer 2019	
➤ Improve efficiency of bromine plant		Commercial operations began April 2017	Improve competitive strengths
➤ Capacity increase of existing AIA reagents plant	Toyama	Commercial operations began November 2016	Expansion of growth businesses
➤ Capacity increase of TOYOPEARL separation and purification media plant	Nanyo Complex	Summer 2018	
➤ Capacity increase of separations and diagnostics equipment plant		Fall 2018	
➤ New manufacturing plant for genetic testing reagents		Spring 2020	Improve current manufacturing capacities
➤ Respond to growing demand for semiconductors (10 billion yen investment in quartz-related products manufacturing capacity)	—	—	To meet growing demand

2-2. Commodity & infrastructure-related investments

- Invest in enhancing efficiencies of upstream processes towards strengthening competitiveness
- Increase polyvinyl chloride (PVC) production capacity in the Philippines where infrastructure-related investments are expected to grow
- Increase manufacturing capacity of high margin derivatives products and raise profitability of vinyl isocyanate business operations

Commodity

Key Investment Projects	Destination	Construction Completion Date	Objective
➤ Increase efficiency of naphtha cracker, install gas turbine	Yokkaichi Complex	Spring 2020	Increase competitiveness of commodity products
➤ Increase efficiency of in-house power generation facilities	Nanyo Complex	Winter 2018	
➤ Increase manufacturing capacity of PVC at Philippine Resins Industries, Inc.	Philippines	Winter 2018	Capture growing markets
➤ Increase manufacturing capacity for baking soda	Nanyo Complex	Spring 2018	Strengthen caustic soda/chlorine derivatives products
➤ Expand shipment facility for hydrochloric acid		Summer 2018	
➤ Increased manufacturing capacity of specialty-grade MDI (for high value-added use)		Commercial operations began July 2017	Expand sales of specialty-grade products

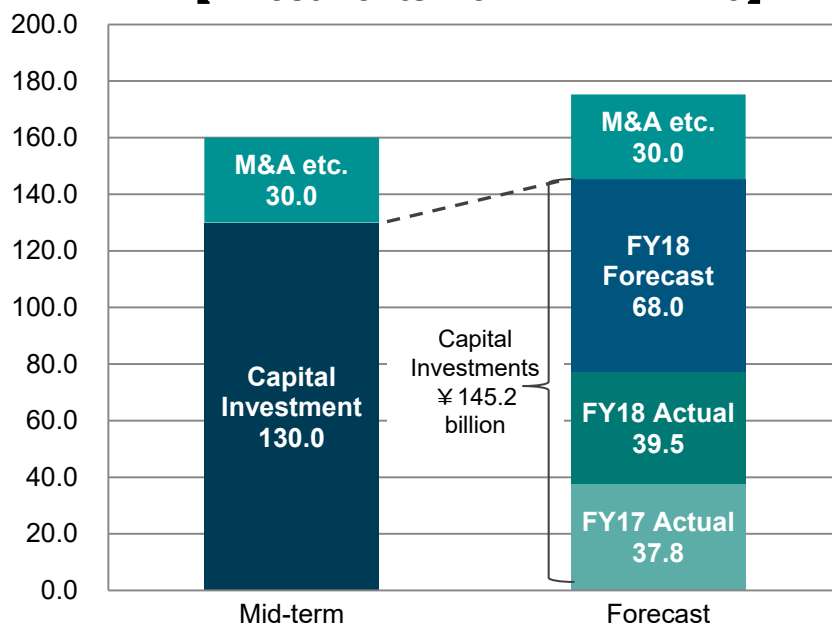
Infrastructure

Key Investment Projects	Destination	Construction Completion Date	Objective
➤ New Nanyo Complex's main building	Nanyo Complex	Spring 2018	Renewal of facilities
➤ New research facilities		Fall 2019	Renew facilities and promote R&D
		Yokkaichi Complex	

2-3. Three-year investments

- Capital expenditures for the previous three-year period is expected to exceed the medium-term plan by approximately 15 billion yen
- M&A: To be decided based on careful assessment of risks and synergies

【Investments from FY17 - FY19】



Capital Investments

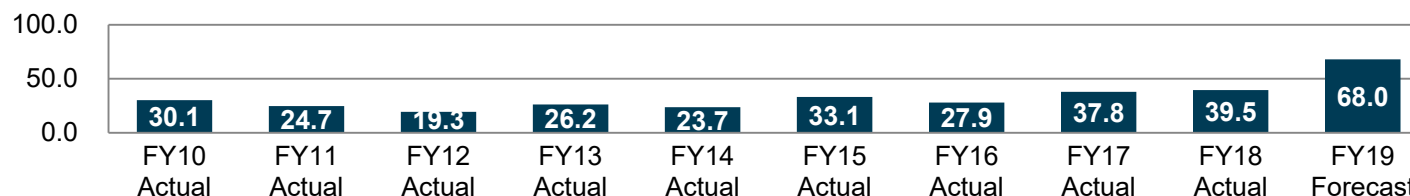
- ◆ Invest according to medium-term plan
- ◆ FY19: Amount of investment to increase in line with the completion of large scale projects

M&A, Etc.

- ◆ Proceed with several R&D fund investments
- ◆ M&A: Tosoh will consider mainly bioscience-related projects with a flexible investment target of approximately 30 billion yen.

(Unit: Billion yen)

【Capital Investments】



3. Research and Development

3-1. R&D Structure

- Aim to innovate and enhance R&D's infrastructure and accelerate the development of infrastructure, equipment and facilities.
- Source information on latest technologies and M&A through the utilization of external parties

3 Key Areas of R&D

Life Sciences

- Clinical diagnostic systems and reagents
- Separation and purification media for pharmaceuticals
- Polymer materials for medical use
- Ceramic materials for dental applications

Electronic Materials

- Thin film materials for electronic devices
- Electronic and hole transport materials for organic EL
- Optical polymers for display devices
- Silica glass for semiconductors and LCDs

Environment & Energy

- Chemicals for environmental remediation
- Zeolites for catalysts
- Materials for lithium-ion batteries
- Advanced polymers

Infrastructure renewal and expansion of capabilities

- New research facilities at Nanyo and Yokkaichi Complexes
- Polyurethane and Polymer Materials Research Laboratories relocated to Yokkaichi Complex
→ Established Yokkaichi Complex as fortified center for petrochemical and polymer development
- Introduce automated screening equipment¹ → Acceleration of zeolite catalyst development
- Introduce state-of-the-art inflation molding equipment² → Polyethylene differentiation
- Introduce Japan's highest-performance NMR equipment³

<Note 1> Equipment that can search for the optimum conditions of zeolite synthesis. It has more than 10 times the processing power of conventional devices.

<Note 2> Installed equipment capable of multilayer inflation molding and acceleration of resin development according to customer's request

<Note 3> Introduced Japan's highest-performance magnetic field nuclear magnetic resonance (NMR) equipment at Tosoh Analysis and Research Center Co., Ltd. This equipment is able to carry out analysis of a nucleus' structure by utilizing properties within the nucleus that causes resonance in a magnetic field.

Strengthen information gathering and evaluation system

- Established a team in the US consisting of technology and venture investment experts and Tosoh researchers
- Investments in research funds
- Strengthen industry-academia-government collaboration

3-2. R&D (Life sciences)

Life Sciences

◆ Accelerate customer assessments for the full-scale adoption of Tosoh's heat-resistant polyethylene for medical use

- Developed infusion bag that can be sterilized at 121° C, and polyethylene for bottles. Also, accelerating customer assessments both in Japan and abroad for full-scale adoption. : We have developed an antioxidant-free polyethylene that is capable of withstanding a high temperature of 121 ° C, which is becoming the world standard in line with rising standards for hygiene and cleanliness (PP and other materials require antioxidants).

◆ Expand lineup of HPLC columns and packing media for the synthesis of antibody drugs

- Antibody packing media (developed in 2013) will enter full scale adoption. It has high adsorption and alkali resistance, and it can also carry out highly efficient purification of antibodies.
- Development of packing media that can efficiently purify low molecular weight antibodies In conventional products, a low molecular weight antibody is purified by combining an appropriate mix of packing media. By developing this packing media, an efficient purification is possible.
- Development of a column for liquid chromatography to measure the quality of antibodies. It is possible to quickly evaluate the structure of sugar chains that are related to the quality of antibody drugs. Used for research and development of antibody drugs.

◆ Tosoh Invests in Platelet Manufacturing Venture AdipoSeeds Co., Ltd. (News Release of Jan 15, 2018)

- Underwrote a third-party allocation of shares and increased its investment stake in AdipoSeeds Co., Ltd. The company was established by professors at Keio University with the goal of commercializing technology for artificially manufacturing platelets from mesenchymal stem cells derived from subcutaneous adipose tissue. Tosoh aims to contribute in this joint collaboration through the application of separation and purification, microfabrication, and protein modification technologies that it has developed over many years of research. : There are potential issues concerning the stable supply of transfusion platelets: first, the supply of platelets is entirely dependent on donated blood; and second, platelets have a short shelf life of only four days. And while the number of patients who will require platelet transfusion is expected to increase as Japanese society continues to age, the number of younger blood donors is on the decline; blood platelet preparations will not be available in sufficient volume. It is in this context that research toward commercialization is proceeding in the development of substitutes for transfusion platelets.

3-3. R&D: Electronic materials / Environment & Energy

Electronic Materials

- **Develop coating-type organic electroluminescence (EL) materials and strengthen marketing in anticipation of market transition to coating-type materials**
 - Assessed that the characteristics of coating-type materials are not inferior to vapor-deposition type materials : Cost reduction and larger area of coating can be achieved compared to vapor-deposition type materials, and deterioration of product characteristics was an issue that needs to be resolved.
- **Develop high-performance gas barrier material (for organic EL display), further advance customer appraisals and quality improvement**
 - This is a gas barrier material that is indispensable for the quality improvement of flexible organic EL displays. : Conventional gas barrier materials have low barrier properties, owing to dot penetration etc. of organic EL that arises due to transmission of water and oxygen.
- **Developed new conductive polymer material, to be marketed to fields that require polymer materials with high processability / durability**
 - Self-doped (homogeneous water-soluble) conductive polymer with the world's highest conductivity. : Used for anti-static films and capacitors. Mainstream external doping types (slurry dispersion) have problems in processing capability and durability. Self-doped types will eliminate these issues.

Environment & Energy

- **Released high-performance heavy metal wastewater treatment agent**
 - A high-performance heavy metal wastewater treatment agent that has high heavy metal trapping performance and does not generate toxic gas. : Existing products have low heavy metal trapping performance, and generate toxic hydrogen sulfide gas when used. These issues are resolved with this product.
- **Developed high-functional grade of high-silica zeolite for automobile exhaust gas catalyst**
 - Develop grades according to customers' request and further promote differentiated products. : Developed next-generation high-performance products. Will aim to develop a NOx reduction catalyst that can meet rising stringent regulation standards with improved durability.
- **Aim for commercialization of ultra-high molecular weight polyethylene**
 - To develop applications and receive customer evaluations with the aim to commercialize in fiscal 2019 : Developed polyethylene that boasts of the world's highest molecular weight with Tosoh's original catalyst (2015). Used in sliding parts, LiB separators, etc.
- **Developed PPS compound with enhanced resistance to thermal shock; Started full-scale sample work**
 - Improved resistance to thermal shock (fluctuations of high and low temperatures) by 80% when compared to conventional industry-standard products. : Contribute to further weight reduction of automobiles by thinning and compounding products.

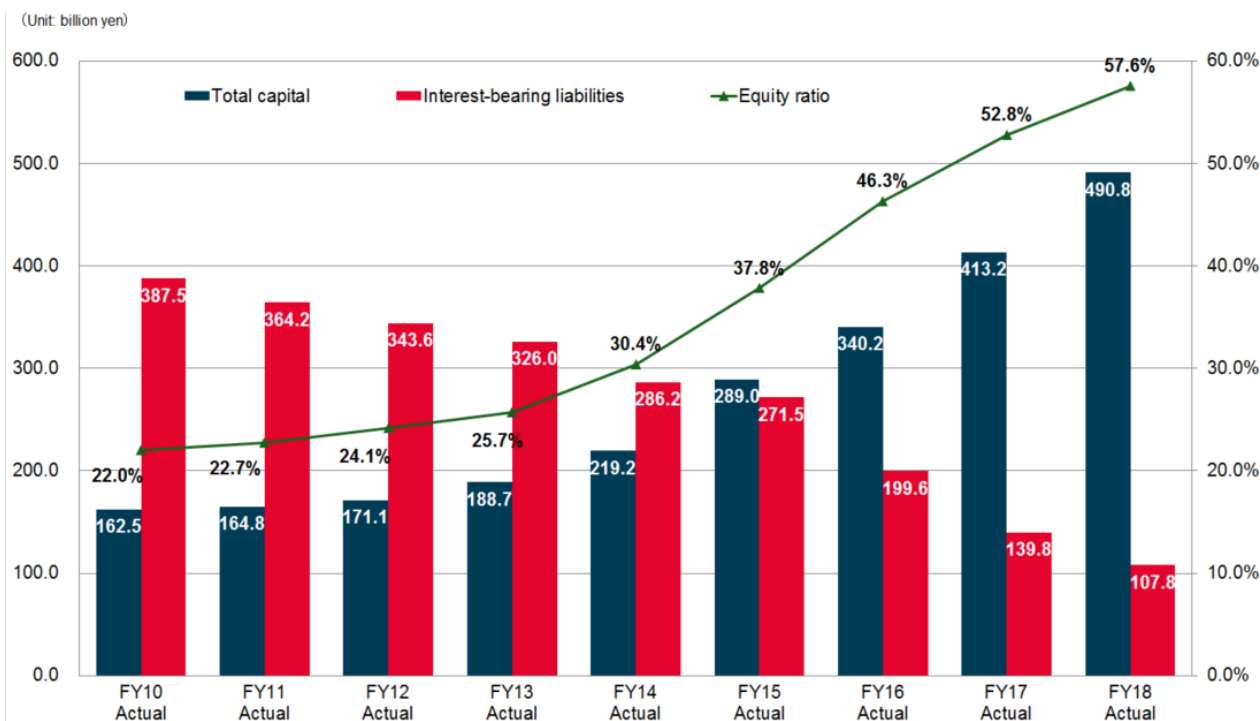
4. Financials

4. Financials: Strengthen financial base

- Achieved the targets earlier than expected, owing to favorable business performance
- Continue to maintain a strong financial base that enables flexible M&A and investment

Financial Metrics (as of March 31, 2018)

- ◆ Equity ratio : 57.6% (+4.8% YoY)
- ◆ Interest-bearing debt : 107.8 billion yen (-32 billion yen YoY)
- ◆ Net debt-equity ratio : 0.003 (-0.128 YoY)



5. Safety Reform

5. Safety reform measures

- Ensure zero abnormal events caused by internal processes as from FY2016
- Re-obtained high pressure gas safety inspection certification at the Nanyo Complex (December 2017)

Key Measures

- ◆ Continue to invest funds into strengthening preventive safety

Conducted equipment inspections from 2014 to 2016. Based on inspection results, preventive safety and maintenance is planned accordingly and will continuously be strengthened over the next few years

- ◆ Built a purpose-specific plant for education and training

Foster operators' ability to respond to problems through hands-on training

- ◆ Utilize IoT technology to monitor plants

Status of the plant operations displayed on large screens installed at manufacturing facilities and at Tokyo headquarters so as to monitor the situation at the respective plants in a timely manner

- ◆ Rolled out Big Data-powered abnormality prediction system

This system enables quicker-than-usual detection and notification of abnormalities that arise from equipment malfunction or failure

6. Next Medium-term Business Plan

6. Direction of next medium-term plan

- Strengthen the commodity and specialty businesses in a balanced way.
- Build portfolio in businesses that are resistant to changes in the external environment

Commodity: Current measures

- Strengthen the infrastructure of Vinyl Isocyanate Chain
- Strengthen the infrastructure of petrochemical business
- Increase PVC production capacity at subsidiary Philippine Resins Industry, Inc. (PRII)

Commodity: Future measures

- **Further strengthen the infrastructure and manufacturing capacity of the Vinyl Isocyanate Chain**: Fortify manufacturing capacities while renewing ageing assets.
- **Petrochemical business to focus on high value-added products**: Ultrahigh molecular weight polyethylene; PPS with improved resistance to thermal shock etc.
- **Further advances into the Indian market**: Leverage resources in Tosoh India Pvt. Ltd. and fortify sales structure of polyurethane raw materials etc.

Specialty: Current measures

- Invest in expansion for growth businesses
- Strengthen efficiency and thereby competitiveness of bromine operations
- Invest 10 billion yen in semiconductor-related businesses

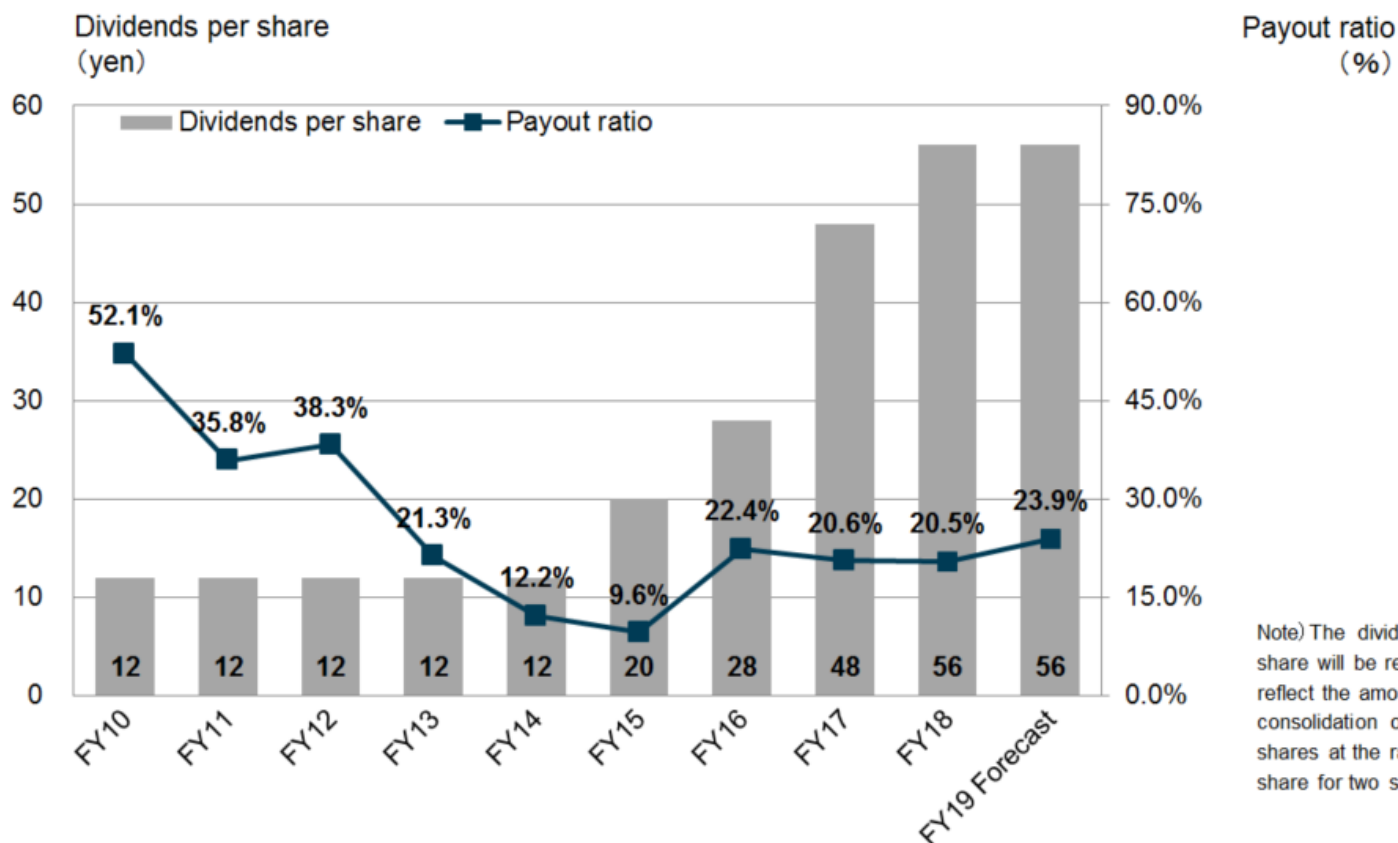
Specialty: Future measures

- **Grow businesses through the utilization of capacity increases**: High-silica zeolite, zirconia, and bioscience-related products, etc.
- **Further strengthen bromine business operations**: Identify business growth potential and increase manufacturing capacity (including bromine derivatives) as needed.
- **Investments in semiconductor-related products**: Additional investments in both local and overseas plants based on market demand
- **New product launches**: New organic materials, bioscience products for antibody drugs, etc.

7. Policy on Shareholders' Returns

7. Dividends

- Core policy: To provide continuous and stable dividends to shareholders.
- Dividends to be raised by ¥8 a share to ¥ 56 a share in FY18, with plans to continue the same amount in FY19.
- In the medium to long term, we aim for a dividend payout ratio of 30%.



《Note》

This presentation contains information and medium-term plans and forecasts based on data available at the present time of creation. As such, Tosoh Corporation makes no guarantees regarding forward-looking plans or forecasts as the operating environment is subject to risks and uncertainties that may result in substantial changes in the future.

(End)