We "Act" to touch the heart and make society better

2019 Financial Results

- Consolidated -

SHOWA DENKO K.K.

February 13, 2020

Motohiro Takeuchi, CFO
Director & Managing Corporate Officer

Consolidated Companies

■ Consolidated subsidiaries: 61 〔+3 (newly consolidated 10, excluded 7)〕

【Newly consolidated】

(Chemicals)
GMM: GMM Development Holdings Limited,
GMM Coatings Private Limited,
Zhuhai Sunbright New Materials Co., Ltd.
ILAG: HC Holding Beta AG, Industrielack Holding AG,
Industrielack AG,
Ilag High Performance Coatings (Shanghai) Co., Ltd.,
ILAG RUI ZHONG NEW MATERIAL (SHANGHAI) CO., LTD.
(Electronics) SHOKO Electronics K.K.
(Others) HC Holdings K.K.

【Excluded】

PT. Showa Esterindo Indonesia (Petrochemicals, liquidation)
Nippon Polytech Corp. (Chemicals, sold)
Ganzhou Zhaori Rare Earth New Materials Co., Ltd. (Electronics, sold)
SHOWA DENKO CARBON Shanghai Co., Ltd. (Inorganics, liquidation)
SHOWA DENKO CARBON Canada Inc. (Inorganics, decline in importance)
SHOTIC (Singapore) Pte Ltd. (Aluminum, liquidation)
Showa Aluminum Corporation of America (Aluminum, merger)

■ Equity method applied: 11 〔newly applied, excluded: none〕

Selected Data

(Average)

	2018	2018 Oct.-Dec.	2019	2019 Oct.-Dec.	Increase/decrease	Increase/decrease Oct.-Dec.
■Exchange rate:						
¥/US$	110.4	112.9	109.1	108.8	appreciated by 1.4	appreciated by 4.1
¥/€	130.4	128.8	122.1	120.3	appreciated by 8.4	appreciated by 8.5
■Domestic naphtha price: ¥/KL	51,100	54,200	42,000	41,300	-9,100	-12,900
■Aluminum						
LME price: US$/T	2,116	1,975	1,811	1,758	-304	-216
Domestic market*: K¥/T	292	280	250	246	-42	-34

Exchange rate at December 31, 2018 ¥111.0/US$, at December 31, 2019 ¥109.6/US$
⇒Yen appreciated by ¥1.4/US$

*Domestic market: data from Nikkei

Summary

(Unit: Billions of Yen)

	2018	2019	Increase/decrease
Net sales	992.1	906.5	-85.7
Operating income	180.0	120.8	-59.2
Non-operating income and expenses, net	-1.2	-1.5	-0.3
Interest/Dividends income and expenses	-0.6	0.3	0.9
Equity in earnings of affiliates	1.3	0.7	-0.5
Foreign exchange gains or losses	-0.3	-0.7	-0.4
Other	-1.5	-1.8	-0.4
Ordinary income	178.8	119.3	-59.5
Extraordinary profit	2.1	2.9	0.8
Extraordinary loss	-35.4	-24.3	11.1
Income before income taxes	145.5	97.9	-47.6
Income taxes	-28.8	-22.6	6.2
Net income	116.8	75.3	-41.5
Net income attributable to non-controlling interests	-5.2	-2.2	3.0
Net income attributable to owners of the parent	111.5	73.1	-38.4
Net income attributable to owners of the parent per share	¥758.15	¥501.03	¥-257.12
Cash dividends per share	¥120	¥130 (planned)	¥10

Extraordinary Profit/Loss

(Unit: Billions of Yen)

	2018	2019	Increase/decrease
■Extraordinary profit	2.1	2.9	0.8
●Gain on sales of non-current assets	0.2	0.7	0.5
●Gain on sales of investment securities	1.5	1.7	0.2
●Gain on sale of businesses	—	0.3	0.3
●Other	0.4	0.2	-0.2
■Extraordinary loss	-35.4	-24.3	11.1
●Loss on sales and retirement of noncurrent assets	-5.2	-5.2	0
●Impairment loss	-22.6	-15.7	6.9
●Other	-7.6	-3.5	4.1
■Extraordinary profit/loss, net	-33.3	-21.4	11.9

● Impairment loss (2019)

(Unit: Billions of Yen)

Segments	Businesses	Amount
Chemicals	Functional Chemicals	-2.8
Aluminum	Aluminum Specialty Components	-10.4
	Aluminum Can (Japan)	-0.8
	Other	-1.6
	Total	-15.7

Consolidated Sales by Segment

(Unit: Billions of Yen)

	2018	2019	Increase/ decrease	Comments
Petrochemicals	268.9	250.7	-18.2	【Olefins】sales decreased (shipment volumes up after the 2018 large-scale shutdown maintenance, market prices down) 【Organic chemicals】sales decreased (vinyl acetate, ethyl acetate: market prices down) 【SunAllomer】sales slightly decreased
Chemicals	156.5	157.5	0.9	【Basic chemicals】sales slightly decreased (AN: market prices down, ammonia, chloroprene rubber: sales maintained at the year-earlier level) 【Electronic chemicals】sales decreased (shipment volumes down) 【Industrial gases】【Functional chemicals】sales maintained at the year-earlier level 【Coating materials】newly consolidated
Electronics	111.9	96.4	-15.5	【HDs】sales decreased (shipment volumes down mainly in 1H) 【Rare earths】sales decreased (structural reform), 【Compound semiconductors】sales decreased (shipment volumes down) 【LIB materials】sales decreased (shipment volumes down) 【SiC epitaxial wafers】sales decreased (shipment volumes for export down)
Inorganics	266.1	230.1	-36.0	【Ceramics】sales decreased (shipment volumes of alumina and abrasives down) 【Graphite electrodes】sales decreased (shipment volumes down due to reduced production in and after mid-2019)
Aluminum	108.3	97.5	-10.7	【High-purity foil for capacitors】sales decreased (shipment volumes down) 【Aluminum specialty components】sales decreased (shipment volumes of automotive parts and industrial equipment down) 【Aluminum cans】sales maintained at the year-earlier level
Others	137.3	126.2	-11.2	【SHOKO】sales decreased
Adjustments	-56.9	-52.0	4.9	
Total	992.1	906.5	-85.7	

(note) From 2019 SDK changed the segmentation (SiC epitaxial wafers business was transferred from “Others” to “Electronics”) . Figures of 2018 are based on the new segmentation.

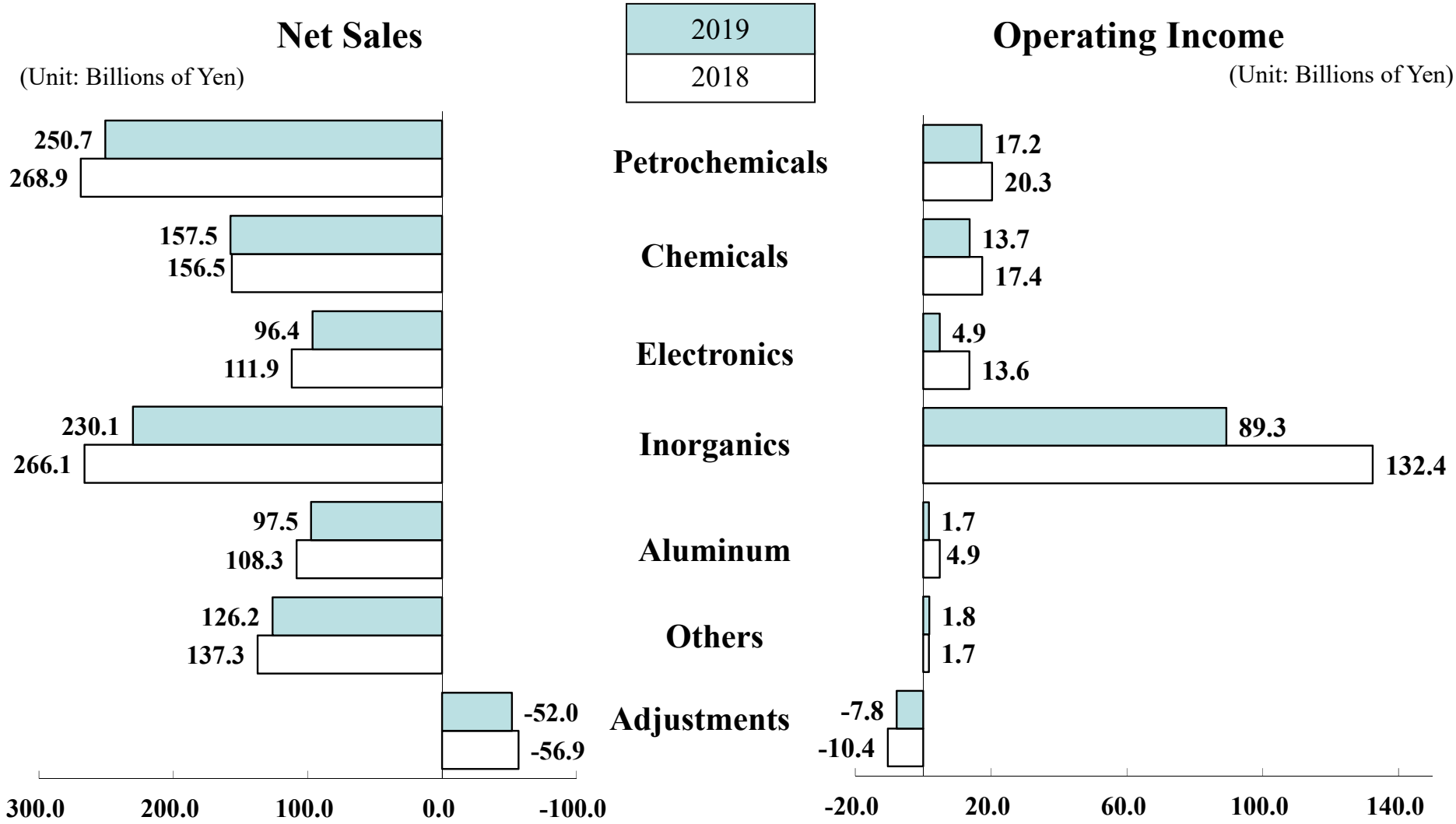
Consolidated Operating Income by Segment

(Unit: Billions of Yen)

	2018	2019	Increase/ decrease	Comments
Petrochemicals	20.3	17.2	-3.1	【Olefins】profit decreased (profit up after the 2018 shutdown maintenance, depreciation of naphtha inventory due to a fall in market price, spread squeezed due to softening supply-demand situation in Asia) 【Organic chemicals】profit maintained at the year-earlier level 【SunAllomer 】profit increased
Chemicals	17.4	13.7	-3.7	【Basic chemicals】profit maintained at the year-earlier level 【Electronic chemicals】profit decreased (shipment volumes down) 【Industrial gases】profit decreased (shipment volumes down, shipping cost up due to tight supply in Western Japan) 【Functional chemicals】profit decreased (shipment volumes down)
Electronics	13.6	4.9	-8.7	【HDs】profit decreased (shipment volumes down) 【Rare earths】profit maintained at the year-earlier level, 【Compound semiconductors】profit decreased (shipment volumes down) 【LIB materials】profit decreased (shipment volumes down) 【SiC epitaxial wafers】profit decreased (shipment volumes for export down, R&D cost up)
Inorganics	132.4	89.3	-43.2	【Ceramics】profit decreased (shipment volumes down) 【Graphite electrodes】profit decreased (shipment volumes down due to reduced production in and after mid-2019))
Aluminum	4.9	1.7	-3.2	【High-purity foil for capacitors】profit decreased (shipment volumes down) 【Aluminum specialty components】profit decreased (shipment volumes of automotive parts and industrial equipment down) 【Aluminum cans】profit increased (effect of structural reform in Japan)
Others	1.7	1.8	0.1	【SHOKO】profit increased
Adjustments	-10.4	-7.8	2.6	
Total	180.0	120.8	-59.2	

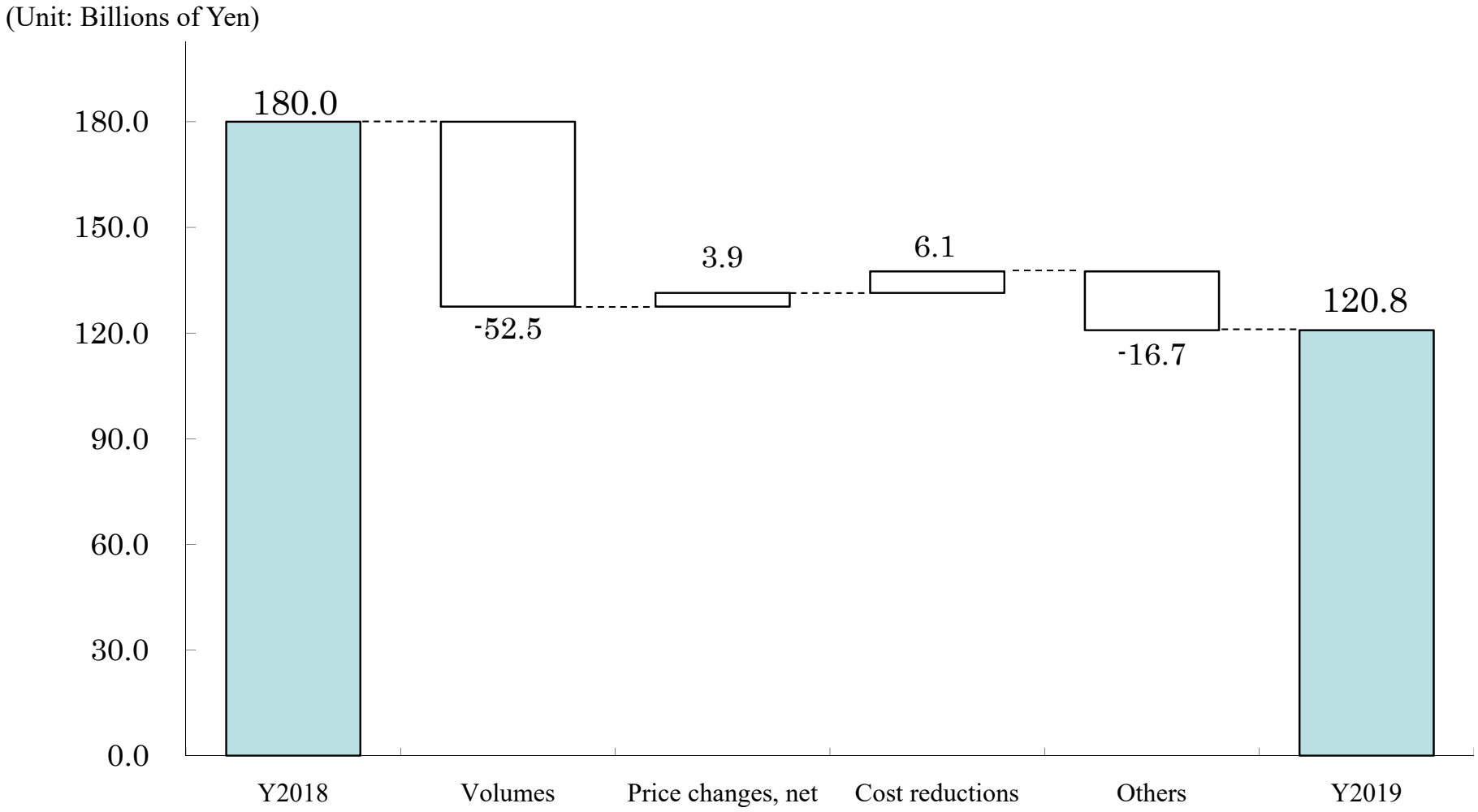
(note) From 2019 SDK changed the segmentation (SiC epitaxial wafers business was transferred from “Others” to “Electronics”) . Figures of 2018 are based on the new segmentation.

Sales and Operating Income by Segment



(note) From 2019 SDK changed the segmentation (SiC epitaxial wafers business was transferred from “Others” to “Electronics”) . Figures of 2018 are based on the new segmentation.

Operating Income Breakdown by Factor



Consolidated Balance Sheet

(Unit: Billions of Yen)

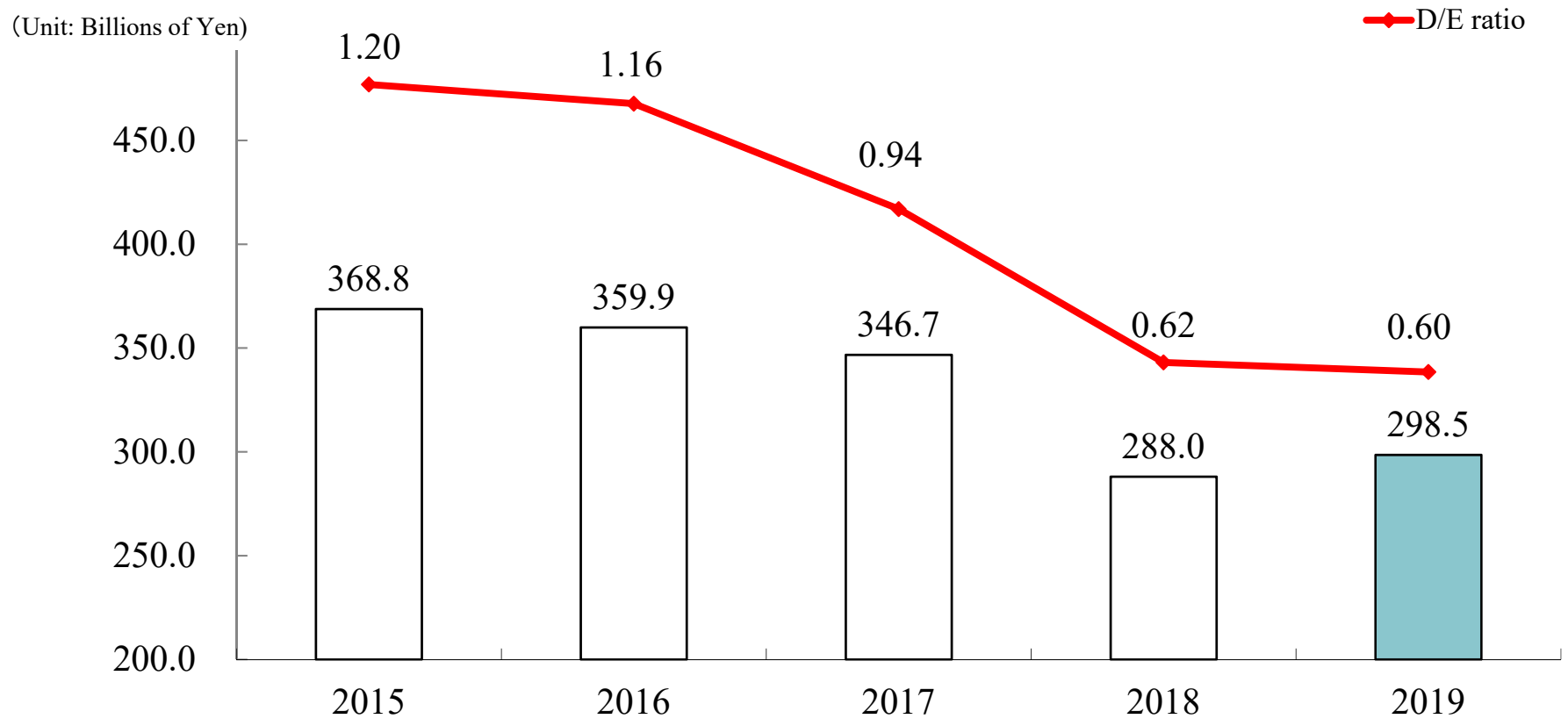
Assets	Dec. 31, 2018	Dec. 31, 2019	Increase/ decrease	Liabilities and net assets	Dec. 31, 2018	Dec. 31, 2019	Increase/ decrease
Cash and deposits	113.2	122.1	8.9	Notes and accounts payable	139.4	117.5	-21.9
Notes and accounts receivable	203.7	170.3	-33.4	Interest-bearing debt	288.0	298.5	10.6
Inventories	152.8	173.7	20.9	Net defined benefit liability	22.0	10.0	-12.0
Other current assets	26.8	31.0	4.2	Other liabilities	160.2	130.9	-29.3
Total current assets	496.5	497.1	0.5	Total liabilities	609.6	556.9	-52.7
Buildings and structures	78.8	79.8	1.0	Capital stock	140.6	140.6	0
Machinery and equipment	146.8	140.7	-6.1	Capital surplus	78.9	78.9	0
Land	235.0	226.4	-8.6	Retained earnings	197.7	249.2	51.5
Other tangible fixed assets	17.9	26.3	8.5	Treasury stock	-11.7	-11.7	-0
Total tangible fixed assets	478.4	473.2	-5.2	Total shareholders' equity	405.5	457.1	51.5
Intangible fixed assets	15.0	22.6	7.7	Valuation difference on available-for-sale securities	7.5	9.8	2.3
Investments and other assets	85.1	83.5	-1.6	Deferred gains or losses on hedges	0.8	0.4	-0.4
incl. investment securities	71.9	71.8	-0.1	Revaluation reserve for land	33.3	33.1	-0.2
				Foreign currency translation adjustment	7.1	4.1	-2.9
				Remeasurements of defined benefit plans	-8.2	-5.1	3.1
				Total accumulated other comprehensive income	40.4	42.3	1.9
				Non-controlling interests	19.4	20.1	0.7
Total fixed assets	578.5	579.3	0.9	Total net assets	465.3	519.4	54.1
Total assets	**1,075.0**	**1,076.4**	**1.4**	**Total liabilities and net assets**	**1,075.0**	**1,076.4**	**1.4**

Total Assets
Interest-bearing Debt and D/E ratio

(Unit: Billions of Yen)

	Dec. 31, 2018	Dec. 31, 2019	Increase/ decrease
● Total assets	1,075.0	1,076.4	+1.4
● Interest-bearing debt	288.0	298.5	+10.6
● Debt/Equity ratio	0.62 times	0.60 times	improved 0.02p
● Stockholders' equity ratio	41.5%	46.4%	+4.9p

Interest-bearing Debt



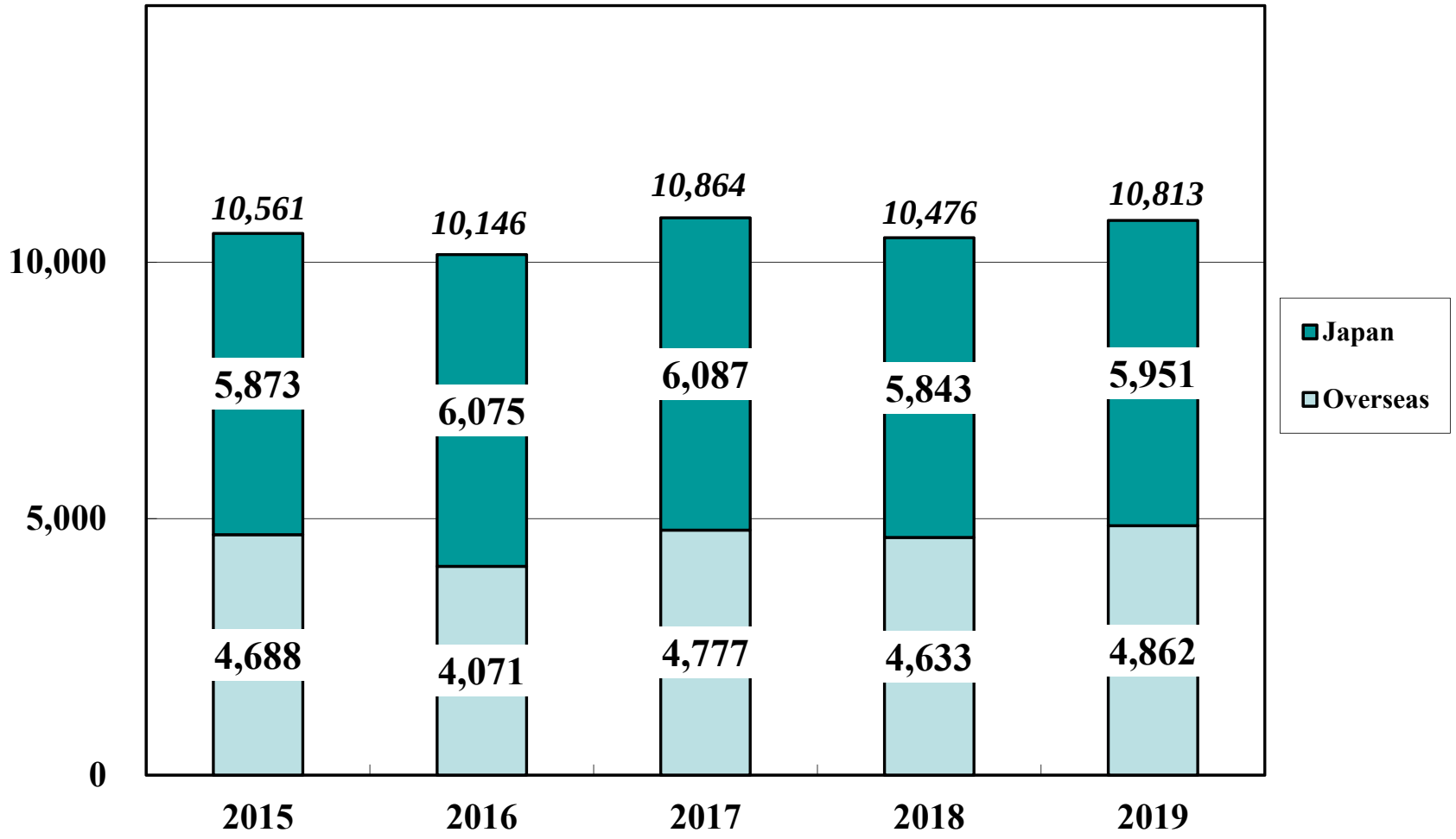
Equity ratio	31.5%	31.8%	34.3%	41.5%	46.4%

Consolidated Cash Flows

(Unit: Billions of Yen)

	2018	2019	Increase/ decrease
●CF from operating activities	149.8	78.6	-71.2
●CF from investing activities	-49.3	-48.2	1.2
●Free CF	100.4	30.4	-70.0
●CF from financing activities	-61.1	-18.5	42.5
●Others	-3.4	-3.0	0.4
Increase/decrease of cash and equivalents	36.0	8.9	-27.1

Total Number of Employees and Breakdown by Location



Japan	55.6%	59.9%	56.0%	55.8%	55.0%
Overseas	44.4%	40.1%	44.0%	44.2%	45.0%

Capital Expenditures/ Depreciation by Segment

(Unit: Billions of Yen)

	2018		2019		Increase/decrease	
	Capital expenditures	Depreciation	Capital expenditures	Depreciation	Capital expenditures	Depreciation
Petrochemicals	5.1	5.0	4.4	4.1	-0.6	-0.9
Chemicals	8.0	8.8	11.4	9.3	3.4	0.5
Electronics	11.4	9.8	10.5	9.3	-1.0	-0.6
Inorganics	8.1	8.0	11.7	8.0	3.6	0.1
Aluminum	5.5	5.7	8.5	4.8	2.9	-0.8
Others	3.5	2.1	3.8	2.1	0.2	-0
Total	41.7	39.5	50.2	37.7	8.5	-1.8

(note) From 2019 SDK changed the segmentation (SiC epitaxial wafers business was transferred from “Others” to “Electronics”) . Figures of 2018 are based on the new segmentation.

Selected Data 2019, 2020 Forecast (Consolidated)

(*Unit: Billions of Yen)

	2018	2019	2019-2018 Increase/ decrease	2020 Forecast	2020-2019 Increase/ decrease
●Exchange rate: ¥/US$	110.4	109.1	appreciated by 1.4	105.0	appreciated by 4.1
¥/€	130.4	122.1	appreciated by 8.4	115.0	appreciated by 7.1
●Domestic naphtha price: ¥/KL	51,100	42,000	-9,100	39,200	-2,800
●Aluminum LME price: US$/T	2,116	1,811	-304	1,775	-36
●Interest-bearing debt*	288.0	298.5	10.6	300.0	1.5
●Interest/dividend income less interest expenses*	-0.6	0.3	0.9	0.2	-0.1
●R&D expenditures*	19.7	20.6	0.9	22.7	2.1
●Number of employees: people	10,476	10,813	337	11,084	271
●Total employment cost*	79.4	85.9	6.5	84.5	-1.4

2020 Forecast (Consolidated)

(Unit: Billions of Yen except Cash dividends per Share and Net income per Share)

	2019	2020 Forecast	Increase/ decrease	2020 Forecast 1st Half	2020 Forecast 2nd Half
Net sales	906.5	810.0	-96.5	370.0	440.0
Operating income	120.8	50.0	-70.8	9.0	41.0
Non-operating income and expenses	-1.5	-3.0	-1.5	-2.0	-1.0
Ordinary income	119.3	47.0	-72.3	7.0	40.0
Extraordinary profit	-21.4	-22.0	-0.6	-7.5	-14.5
Extraordinary loss					
Net income attributable to owners of the parent	73.1	15.0	-58.1	-2.0	17.0
Net income attributable to owners of the parent per share	¥501.03	¥102.83	¥-398.20		
Cash dividends per share	¥130 (planned)	¥130	¥0	¥60	¥70

Net Sales by Segment, 2020 Forecast (Consolidated)

(Unit: Billions of Yen)

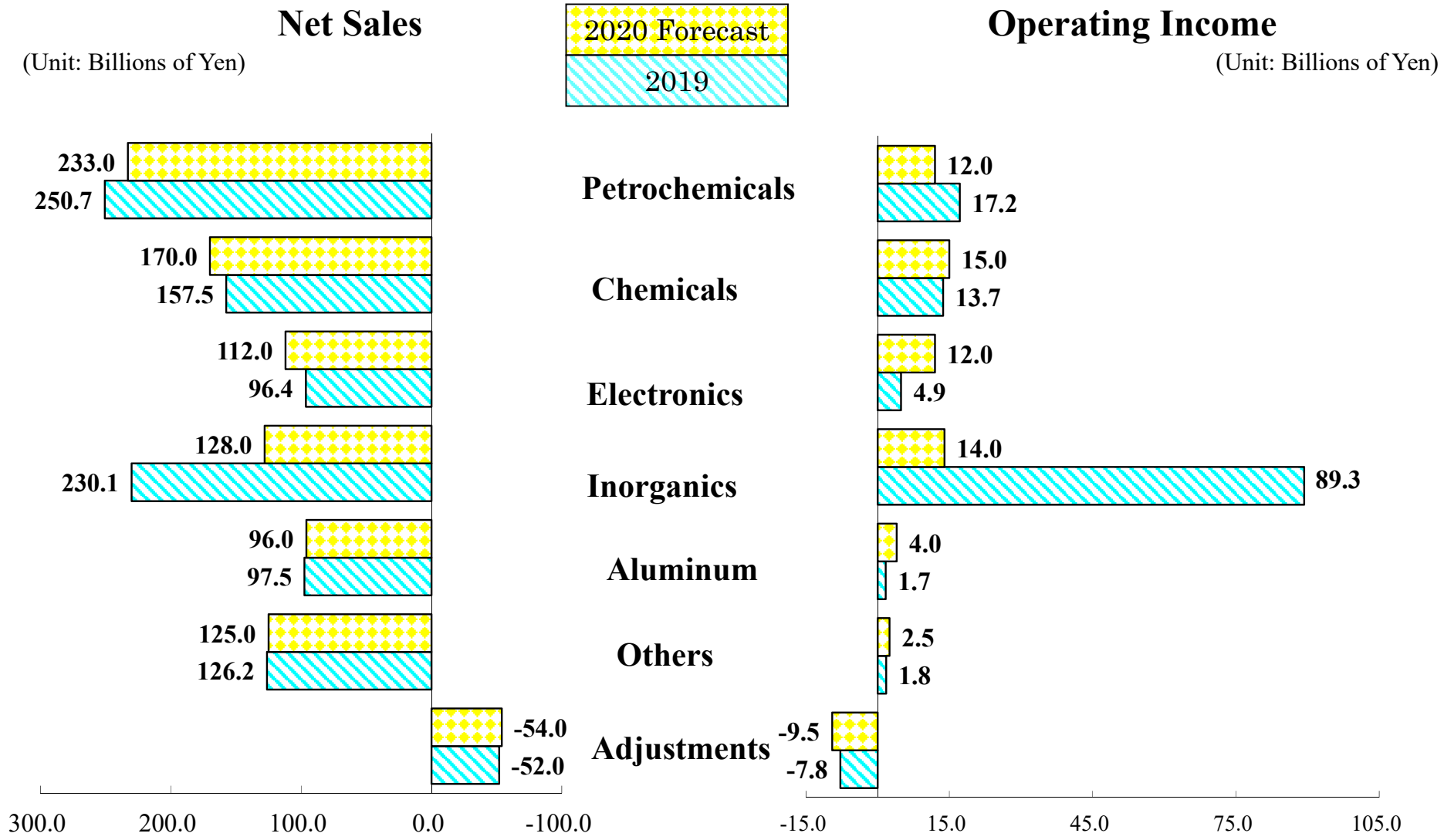
	2019	2020 Forecast	Increase/ decrease	Comments	2020 Forecast	
					1st Half	2nd Half
Petro-chemicals	250.7	233.0	-17.7	Market prices expected to be weak due to the economic slowdown in Asia	111.0	122.0
Chemicals	157.5	170.0	12.5	Electronic chemicals: shipment volumes expected to be up expected due to recovery in the semiconductor market	81.0	89.0
Electronics	96.4	112.0	15.6	HDs: shipment volumes for data centers expected to be up	46.0	66.0
Inorganics	230.1	128.0	-102.1	Graphite electrodes: shipment volumes expected to be down due to reduced production mainly in 1H	53.0	75.0
Aluminum	97.5	96.0	-1.5	Rolled products, Aluminum specialty components: expecting slight improvement Aluminum cans: shipment volumes in Japan expected to be weak	44.0	52.0
Others	126.2	125.0	-1.2	SHOKO: market prices expected to be down in plastics business	61.0	64.0
Adjustments	-52.0	-54.0	-2.0		-26.0	-28.0
Total	906.5	810.0	-96.5		370.0	440.0

Operating Income by Segment, 2020 Forecast (Consolidated)

(Unit: Billions of Yen)

	2019	2020 Forecast	Increase/ decrease	Comments	2020 Forecast	
					1st Half	2nd Half
Petro-chemicals	17.2	12.0	-5.2	Spread squeeze expected due to softening market	4.0	8.0
Chemicals	13.7	15.0	1.3	Electronic chemicals: shipment volumes expected to be up	6.0	9.0
Electronics	4.9	12.0	7.1	HDs: shipment volumes for data centers expected to be up	1.0	11.0
Inorganics	89.3	14.0	-75.3	Graphite electrodes: shipment volumes expected to be down, raw material inventory prices up due to difference in the timing of procurement	1.0	13.0
Aluminum	1.7	4.0	2.3	Rolled products, Aluminum specialty components: expecting slight improvement Aluminum cans: effect of structural reform in Japan	1.0	3.0
Others	1.8	2.5	0.7		1.0	1.5
Adjustments	-7.8	-9.5	-1.7		-5.0	-4.5
Total	120.8	50.0	-70.8		9.0	41.0

Sales and Operating Income, Forecast for 2019



Consolidated Cash Flows, 2020 Forecast

(Unit: Billions of Yen)

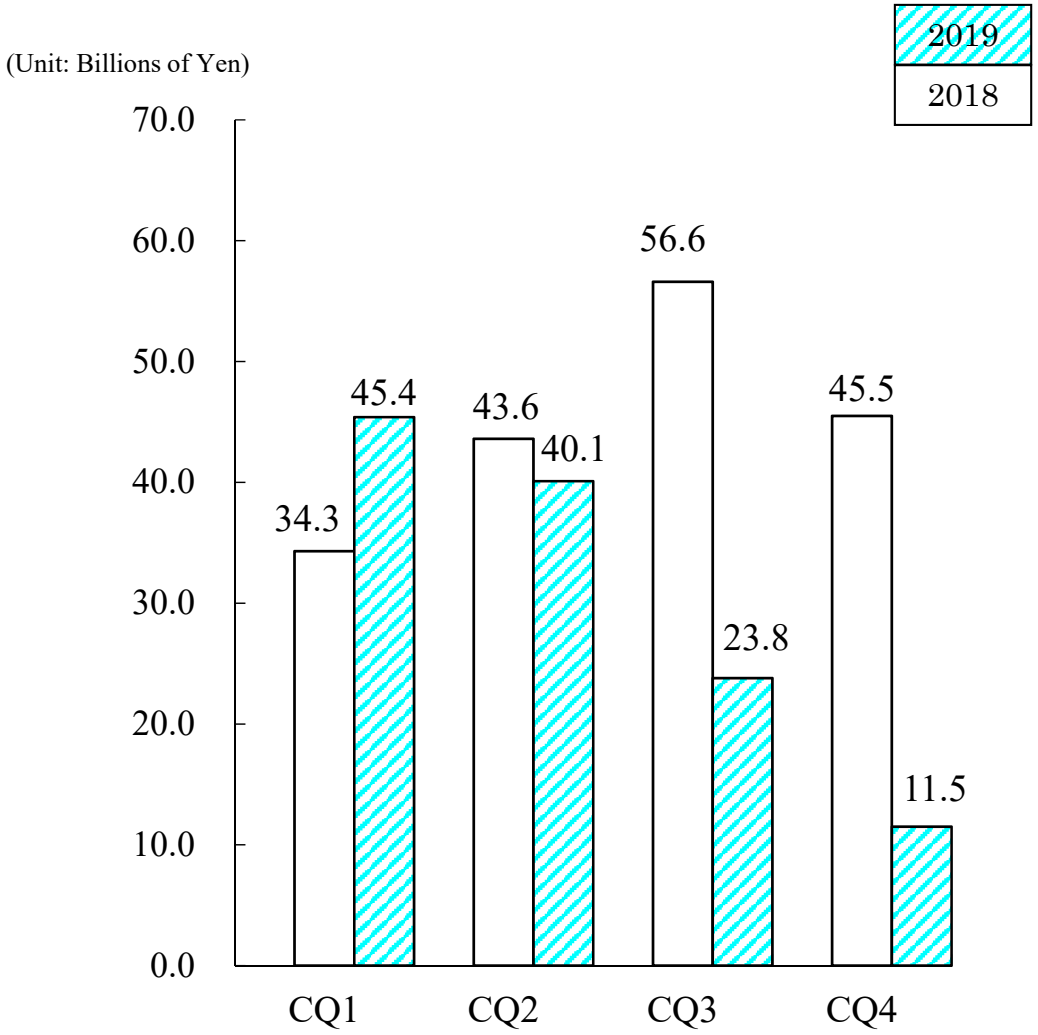
	2019	2020 Forecast	Increase/ decrease
●CF from operating activities	78.6	55.0	-23.6
●CF from investing activities	-48.2	-50.0	-1.8
●Free CF	30.4	5.0	-25.4
●CF from financing activities	-18.5	-26.0	-7.5
●Others	-3.0	0	3.0
Increase/decrease of cash and equivalents	8.9	-21.0	-29.9

Capital Expenditures/Depreciation by Segment
2020 Forecast

(Unit: Billions of Yen)

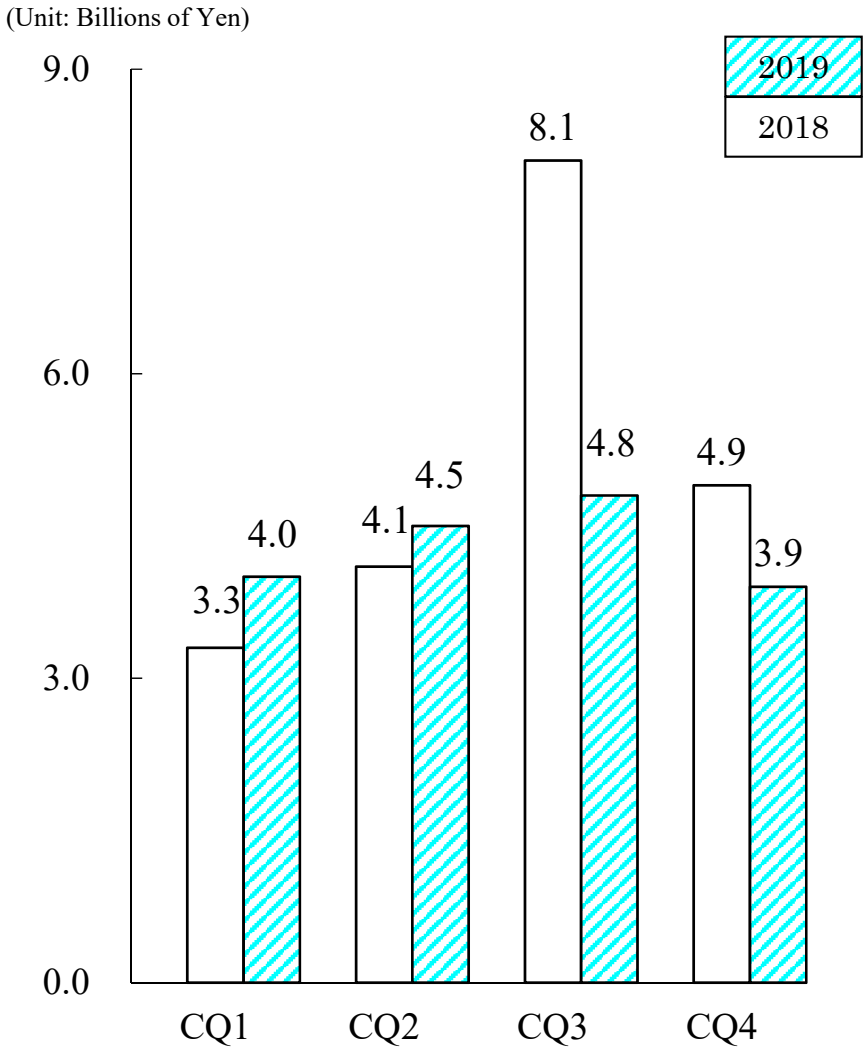
	2019		2020 Forecast		Increase/decrease	
	Capital expenditures	Depreciation	Capital expenditures	Depreciation	Capital expenditures	Depreciation
Petrochemicals	4.4	4.1	7.4	4.6	3.0	0.5
Chemicals	11.4	9.3	13.6	9.8	2.2	0.5
Electronics	10.5	9.3	13.9	9.8	3.4	0.5
Inorganics	11.7	8.0	12.0	8.5	0.3	0.5
Aluminum	8.5	4.8	7.5	4.6	-1.0	-0.2
Others	3.8	2.1	4.7	2.9	0.9	0.8
Total	50.2	37.7	59.1	40.3	8.8	2.7

(Reference) Quarterly Operating Income

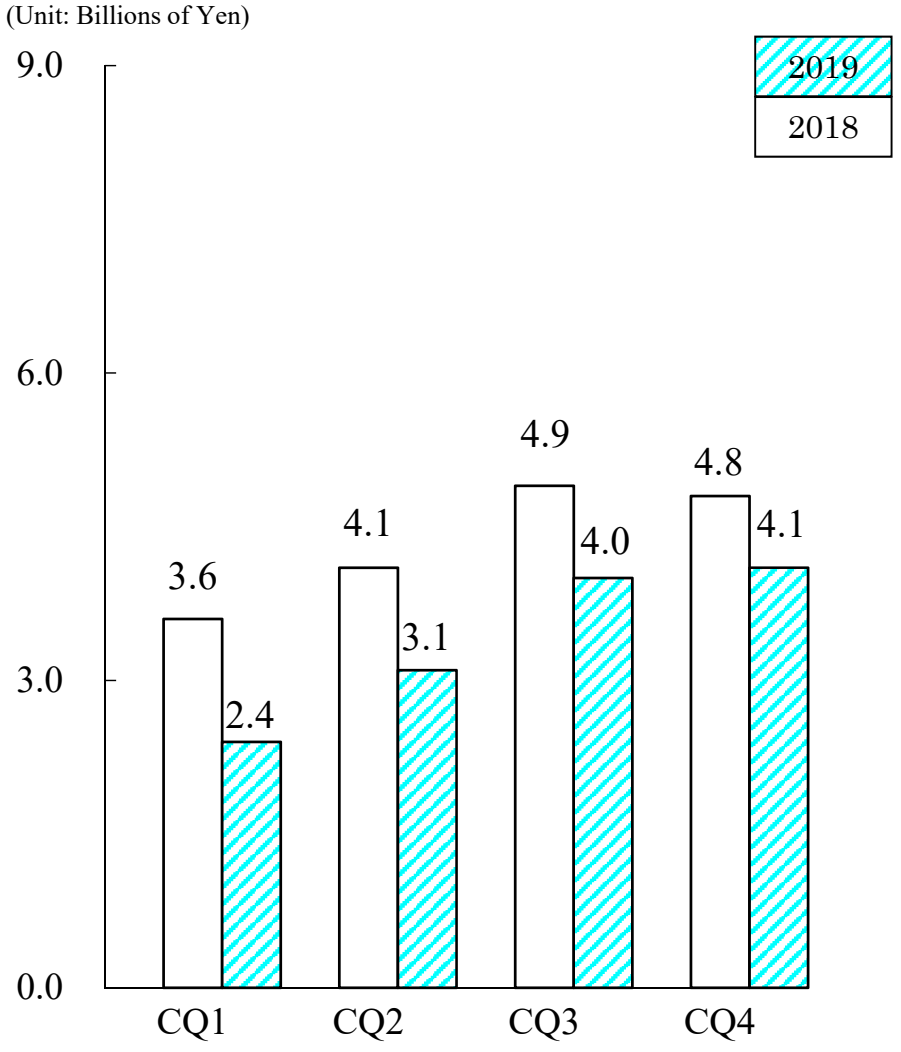


(Reference) Quarterly Operating Income by Segment

《Petrochemicals》

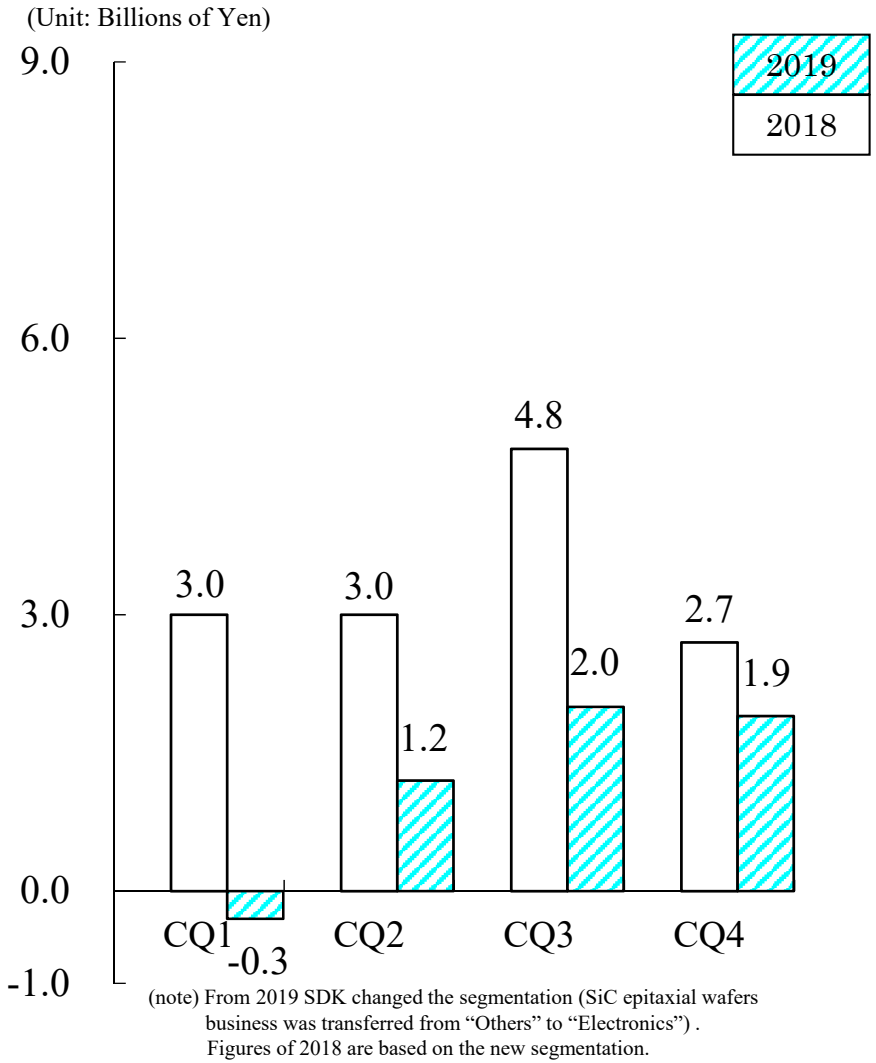


《Chemicals》



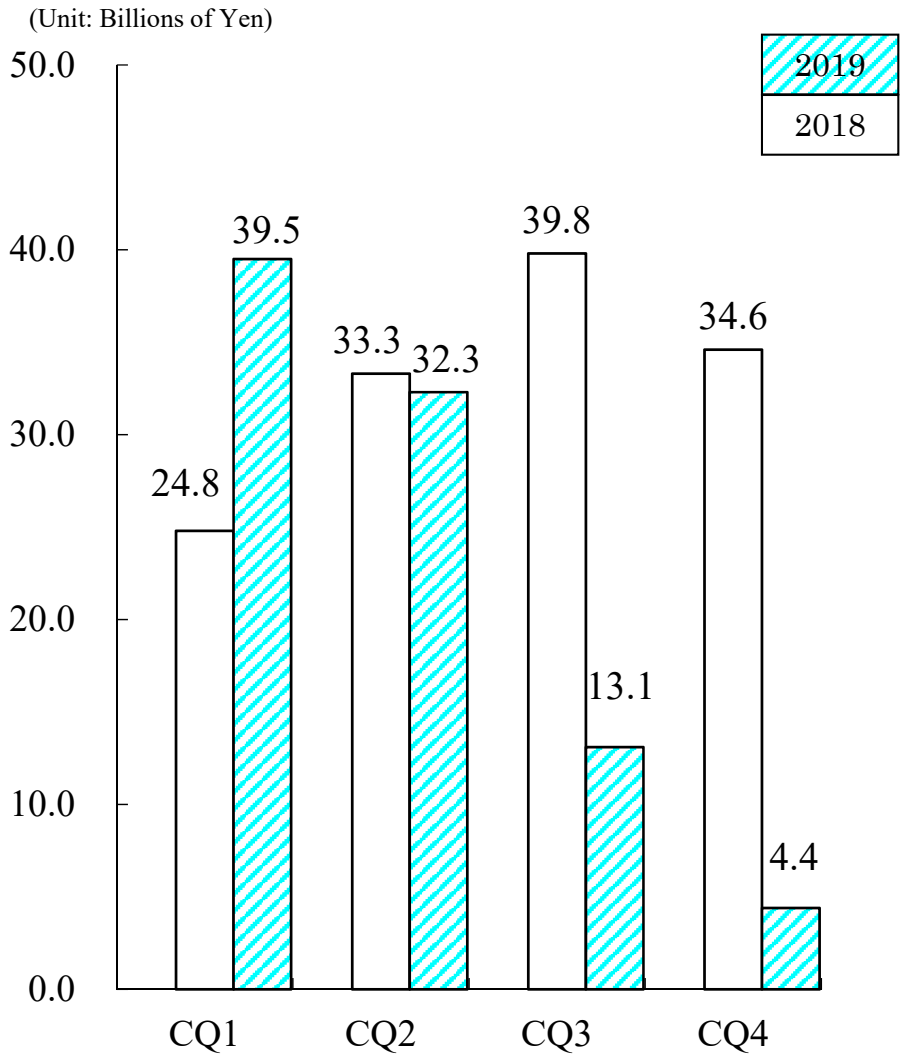
(Reference) Quarterly Operating Income by Segment

《Electronics》



(note) From 2019 SDK changed the segmentation (SiC epitaxial wafers business was transferred from "Others" to "Electronics") .
Figures of 2018 are based on the new segmentation.

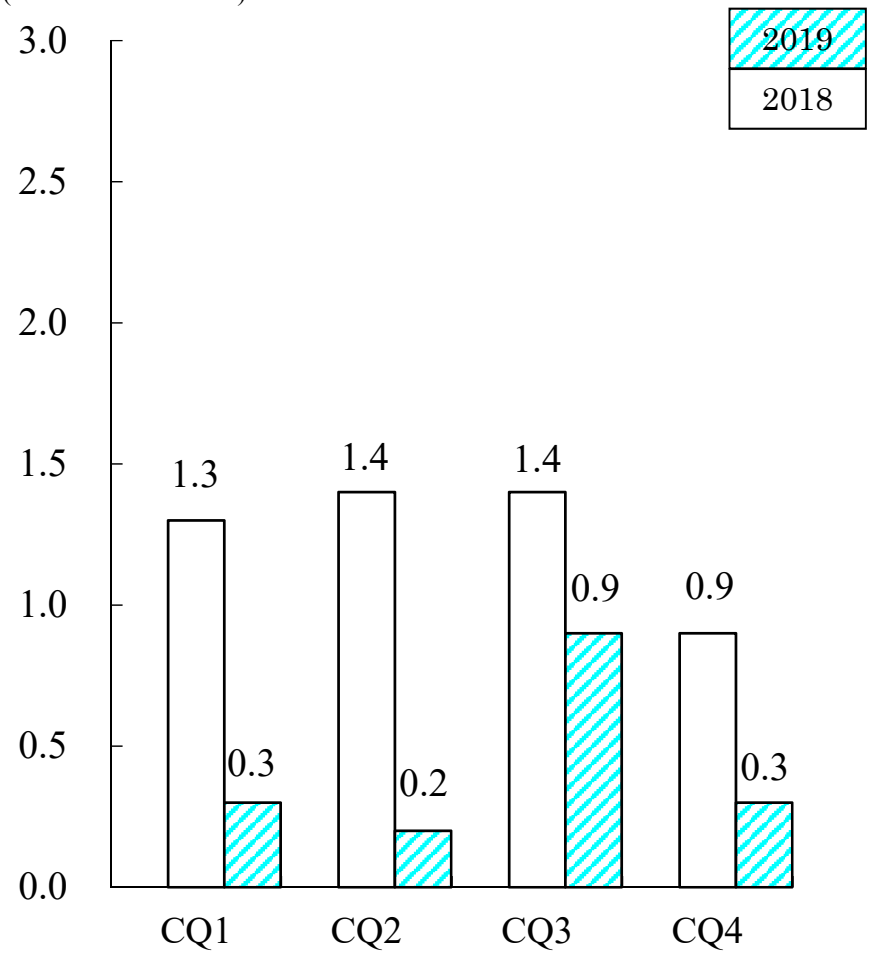
《Inorganics》



(Reference) Quarterly Operating Income by Segment

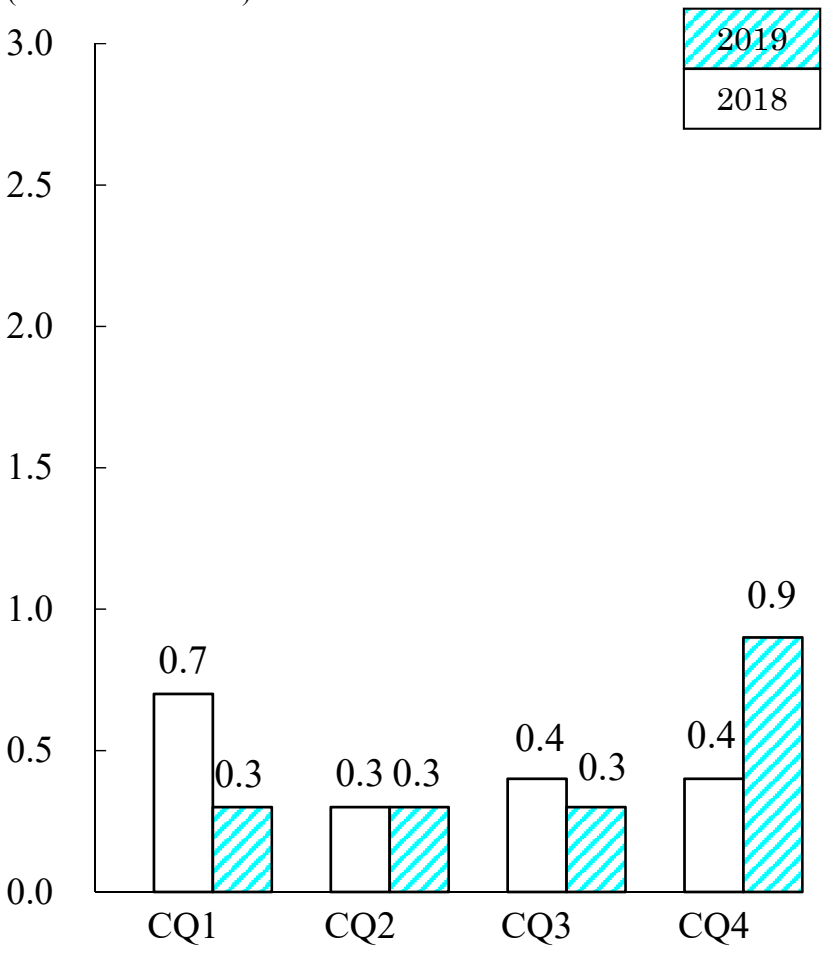
《Aluminum》

(Unit: Billions of Yen)



《Others》

(Unit: Billions of Yen)



(note) From 2019 SDK changed the segmentation (SiC epitaxial wafers business was transferred from “Others” to “Electronics”) .
Figures of 2018 are based on the new segmentation.

Topics

[General]

- **Planned commencement of tender offer for shares in Hitachi Chemical Company, Ltd.**

  For detail, please refer to our news releases and their notes announced on December 18, 2019.

- **Acquired ILAG Group, global non-stick coatings manufacturer**

  In July 2019, SDK acquired all shares in Industrielack AG (ILAG), which leads the ILAG Group, a specialty non-stick coating materials manufacturing company. Non-stick coating materials (NSCs) are used on consumer goods such as cookware, bakeware, and home electrical appliances, and also on industrial goods including automotive parts and other industrial equipment, for the purposes of preventing sticking of substances on their surfaces and supporting low friction and release during use. The global market for NSCs is put about ¥130 billion (about $1.2 billion) a year (SDK's estimate as of May 2019). ILAG has the fourth largest share in the consumer-goods NSC market of worldwide operating companies. ILAG exports its products to more than 50 countries. On the other hand, SDK already acquired GMM Group, another large manufacturer of NSCs for consumer goods, in November 2016. Therefore, SDK Group can pursue a synergy effect of integrated operation and marketing between ILAG and GMM groups because they have competitive market shares in different geographic areas in the world. In addition, after the acquisition of ILAG, annual sales figure of SDK's NSC business leaped up to about $60 million, and now has strong presence and competitiveness in global market, especially in the field of consumer goods. SDK's functional polymer/monomer business sector manufactures and sells materials for coatings for various purposes, and have rich expertise in prescription and manufacturing of raw materials for high-performance coatings and evaluation of performance of those coatings. NSCs can be classified into three categories in terms of raw materials, namely, fluorinated-resin based, silicon based, and Sol-Gel based coatings. Therefore, SDK can offer optimum solutions to its own NSC business by taking advantage of its wide-ranging businesses, products and technologies as an integrated chemical company.

Topics

[General]

● Revised CSR policy

In May 2019, the Showa Denko Group revised its CSR policy in order to clearly show our stakeholders that we aim to contribute to creating sustainable society from the medium- to long-term perspective. Our new CSR policy determines that “We at the Showa Denko Group will aim to make ourselves a social contribution company that satisfies all stakeholders by contributing to solving issues concerning SDGs through its business activities, and ensuring all employees’ conduct conforming to Our Code of Conduct.” Under this new CSR Policy, the Group will continue striving to create economic and social value based on safety and compliance. In addition, SDK endorsed the aim of the opinion offered by Financial Stability Board* (FSB) to establish Task Force on Climate-related Financial Disclosures (TCFD). We will disclose the effect of climate change on our business in a positive manner, following guidelines which is to be offered by TCFD in the near future.

*Financial Stability Board was established in 2009, and copes with fragility of international financial system and promotes dialogue among authorities responsible for stability of financial system.

Topics

[General]

● Set 2030 GHG reduction target conforming to global standard

In July 2019, SDK set a medium-term target figure to reduce emissions of greenhouse gases (GHGs) by 2030. In addition, recognizing importance of information disclosure to the global community, SDK has decided to announce the amount of the Showa Denko Group's GHG emissions in conformity with "GHG Protocol," which is the global standard, starting from the data for FY 2018 (April 2018 - March 2019). Based on these policies, the Showa Denko Group set a goal of 11% reduction of GHG emissions from its domestic bases for FY 2030 compared with that for FY 2013. In addition, with the announcement of data for FY2018 as its beginning, the Showa Denko Group has started to disclose the total amount of GHG emissions from bases at home and abroad in accordance with GHG Protocol, namely, the amount of direct GHG emissions from the Group's own facilities (Scope 1), the amount of indirect GHG emissions from purchased or acquired electricity, steam and heat (Scope 2), and the amount of indirect GHG emissions from the corporate value chain (Scope 3). The Group will announce these data through its integrated report (Showa Denko Report), its Website explaining the Group's CSR activities, and other media. Moreover, aiming to set the Group's global warming mitigation measures as a part of its business strategy, the Group will introduce Internal Carbon Pricing* mechanism and incorporate reduction of GHG emissions into the decision-making process for investment as a factor to be considered. The Showa Denko Group will continue introducing environment-conscious production equipment and technologies, promoting environment protection measures, and providing products that support recycling-oriented society, thereby contributing to creation of society where affluence and sustainability are harmonized.

*Internal Carbon Pricing: This mechanism assumes a situation in which emission of CO_2 is taxed, makes target organizations recognize the value of low-carbon operation, and motivates them to choose investment programs with less CO_2 emission.

Topics

[General]

- **Established a technology to joint aluminum alloy and polycarbonate directly**

SDK developed a technology to joint aluminum alloy and polycarbonate resin directly. Mechanical joining with bolts and nuts and gluing is widely used to joint metal and plastics. Technologies to joint metal and resins directly when resin materials are injected for molding are now attracting manufacturers' attention because such technologies enable manufacturers to simplify manufacturing processes, improve productivity, and process parts with complicated shapes. It has been believed difficult to joint aluminum alloy with amorphous engineering plastics including polycarbonate resin by utilizing joining technologies depending on mechanical cohesiveness including anchoring. However, SDK has successfully developed a technology to joint aluminum alloy and polycarbonate resin directly by utilizing our special surface-treatment technology and expertise in primers. This new technology is characterized with joining mechanism utilizing not only anchoring effect but also chemical cohesiveness. In addition, in experiments, this technology successfully achieved cohesiveness of more than 25MPa between aluminum alloy and polycarbonate under normal molding condition for polycarbonate resin. Since this technology realizes direct joining between polycarbonate resin, which has wide multiplicity of use, and light aluminum alloy, it is applicable to molding of composite housings for smartphones and other equipment. For the future, we will aim to strengthen cohesiveness and durability of this joining, apply this technology to heat-resistant super-engineering plastics, and put automotive parts made with this technology to practical use.

Topics

[General]

● Introduced SAP S4/HANA as next-generation ERP system

In May 2019, SDK introduced “SAP S/4HANA,” an enterprise resource planning (ERP) system developed by SAP SE, and started operation of the new system in January 2020. The new ERP system will gather and accumulate various primary information about production, logistics, sale, accounting and procurement, and will realize integrated management of that information. In addition, SDK will strengthen its marketing function with additional new system, aiming to maximize customer experience. SDK will utilize SAP S/4HANA for issuing sophisticated sales forecast and simulating profit and loss so that the Company can make proper decisions quickly. In addition, SDK will introduce a marketing support system which will enable the Company to implement cross-sectional CRM* and generate new business opportunities. The total investment in our information infrastructure of this time will amount to about 4 billion yen. The Showa Denko Group holds up “Maximization of CUSTOMER Experience” as its business strategy, and promotes utilization of AI/IoT related technologies as measures to strengthen the Group’s business foundation. SDK will analyze information accumulated in the new system with AI and other leading-edge technologies, realize more efficient management of the Group and offer excellent solutions as combination of high-quality products and services.

*CRM is an abbreviation of “customer relationship management,” which is a management method to provide customers with more satisfactory products and services by accumulating and analyzing data concerning customers’ purchasing behavior and history.

Topics

[General]

- **Contracted with Oita Trinita to be a uniform sponsor**

In December 2019, SDK signed a contract with Oita Football Club Co., Ltd. (Oita Trinita), a member of J. League, to be a uniform sponsor to have SDK's corporate logo on the right clavicular position of the uniform of Oita Trinita. Term of the contract is one year, from February 1, 2020 to January 31, 2021. Showa Denko Group's business bases has been promoting various programs to activate dialogue with regional communities. Oita Petrochemical Complex has been organizing various programs, aiming to maintain harmonious relationship with the regional community for 50 years since the start of operation of its ethylene plant in 1969. Oita Trinita also has been contributing to revitalization of the regional community and promotion of sports as a community-based football club. SDK believes that its support to Oita Trinita as a uniform sponsor, in addition to its support to the regional community as the holder of naming rights of Oita Trinita's home stadium (Showa Denko Stadium Oita), will contribute to further promotion of CSR activities, and therefore decided to support Oita Trinita as a uniform sponsor,. The Showa Denko Group will continue promoting various programs, aiming to fulfill its CSR and make itself "a company contributing to sound growth of society" that satisfies all stakeholders.

[Petrochemicals segment]

- **Decided to commercialize 1,3-BG, a raw material for cosmetics**

In October 2019, SDK decided to commercialize 1,3-butylene glycol (1,3-BG), which is mainly used as raw material for cosmetics. SDK has finished installation of facilities to produce 1,3-BG in its Oita Complex, and plans to start sale of the product in April 2020. 1,3-BG is mixed into many kinds of cosmetics as moisturizing component. Due to rapid growth in Asian demand for cosmetics, the demand for 1,3-BG is expected to increase 10% every year*. SDK will realize production of 1,3-BG with quality good enough to be used as an ingredient of cosmetics by utilizing its original technology, and support the growth of cosmetics market centering on Asia from supply side of raw materials including 1,3-BG. SDK will continue striving to make its petrochemicals business the most competitive one in East Asia by enhancing its profitability through commercialization of new derivatives and improvement in mutual cooperation among members of the regional complex, including strengthening of its acetyl chain.

*SDK's estimate

Topics

[Chemicals segment]

- **Decided to establish second factory in Shanghai to produce electronic high-purity gases**

In January 2020, SDK decided to establish its subsidiary's second factory in Shanghai to produce high-purity gases for electronics. Shanghai Showa Electronics Materials Co., Ltd. (SSE), which is SDK's wholly owned subsidiary producing high-purity gases for electronics, acquired a right to use a site for its second factory adjacent to the First Factory for 50 years, and will establish facilities to produce high-purity nitrous oxide (N_2O) and high-purity octafluorocyclobutane (C_4F_8) gases and a dangerous goods warehouse to stock high-pressure gases. The second factory will start its operations in the second half of 2021. High-purity N_2O is a specialty gas used to form oxidized films on surfaces of integrated circuits which will compose semiconductor chips or display panels. High-purity C_4F_8 is a specialty gas used for etching of those oxidized films and other micromachining processes. The Showa Denko Group is now producing high-purity N_2O at Kawasaki Plant and a site of a group company in the Republic of Korea, and high-purity C_4F_8 at Kawasaki Plant and SSE's First Factory in Shanghai. Due to progress in information communication technologies including 5G mobile communication technology and Chinese government's policy to nurture high-technology industry, the market in China for semiconductor chips and display panels. In order to strengthen its adaptability to changes in needs of the market, including the need for stable supply of high-purity gases, the Group now aims to promote "local consumption of locally produced high-purity gases" further. Moreover, in the present situation where the Chinese government is strengthening regulations on chemicals, establishment and expansion of the Showa Denko Group's dangerous goods warehouse in China to stock high-pressure gases will enable the Group to strengthen its supply chain and competitiveness. By combining its production and quality-control technologies and getting best supply system ready for customers, the Showa Denko Group will further strengthen its high-purity gas business. In addition, since the market for semiconductor chips in Taiwan is also expected to expand, SDK's subsidiary "Taiwan Showa Chemicals Manufacturing Co., Ltd." will establish a new facility to produce high-purity C_4F_8 with annual production capacity of 150t. The start-up of operations of the new facility in Taiwan is scheduled to be in the spring of 2020.

Topics

[Chemicals segment]

- **Started shipments of BMC for TOYOTA's hybrid vehicles in China**

  SDK started supplying bulk molding compound (BMC) to Toyota Motor Corporation (TOYOTA) as sealing material for generator motors used in COROLLA HYBRID and LEVIN HYBRID recently launched in China. SDK's BMC has such characteristics as high heat conductivity, insulation properties, heat resistance, fluidity, dimensional stability and chemical resistance. The material has been used as sealing material for generator motors for hybrid vehicles (HVs), such as TOYOTA's PRIUS. This time, TOYOTA decided to develop and produce electric-vehicle power trains in China on the occasion of the introduction of two new HV models for the Chinese market. In response to this new policy, Shanghai Showa Highpolymer started producing BMC for HVs for the first time since its foundation in 2010, and supplying the material to Toyota Motor (Changshu) Auto Parts. The Chinese government introduced this year a new environmental regulation, obliging car makers to produce a certain number of new energy vehicles (NEVs). There is a move to spread the use of HVs as fuel-efficient cars for environmental protection. Thus, the HV market in China is expected to grow further.

- **Started mass production of liquefied carbon dioxide in Oita Petrochemical Complex**

  Showa Denko Gas Products Co., Ltd. (SGP), a consolidated subsidiary of SDK, established a new plant to produce liquefied carbon dioxide in its Oita Plant in the premise of SDK's Oita Petrochemical Complex. This new plant has a capacity to produce 15,000t of liquefied carbon dioxide per year, and started to ship products in April 2019. A tight supply-demand situation for liquefied carbon dioxide is chronic due to scaling back of domestic oil-refining and ammonia production which has been supplying carbon dioxide as by products. This new plant utilizes carbon dioxide gas stably supplied from chemical plant in the Complex, and will continue supplying products to customers in the region in a stable manner, thereby contributing to the growth of the regional economy.

Topics

[Electronics segment]

- **Developed second generation of high-grade SiC epitaxial wafers**

SDK has developed a second generation of high-grade silicon carbide (SiC) epitaxial wafers (HGE-2G) for power semiconductors. SDK has been mass-producing the first generation of high-grade epitaxial wafers under the trade name of “High-Grade Epi” (HGE). HGE-2G achieved further improvement in quality. When compared with the currently mainstream silicon-based semiconductors, SiC-based power semiconductors can operate under high-temperature, high-voltage, and high-current conditions while substantially reducing energy loss. These features enable device manufacturers to produce smaller, lighter and more energy-efficient power control modules, and the products’ market is rapidly expanding. SiC power semiconductors are already used in power modules for servers in data centers, on-board battery chargers and rapid charging stands for EVs. In addition, SiC power semiconductors are expected to be used in power control units (PCU) for EVs in the first half of 2020s. Thus the demand for SiC-based semiconductors is expected to grow further. In the new product “HGE-2G,” SDK has succeeded in controlling the density of surface defect, which affects production yield of power semiconductors, to be half of our HGE by improving epitaxial SiC growth process. In addition, SDK has succeeded in enhancing reliability of power semiconductors through improving the basal plane dislocation conversion rate by more than ten times compared with that of HGE. The global demand for SiC epitaxial wafers is expected to increase to be about ¥150 billion by 2025. As the largest independent manufacturer of SiC epitaxial wafers, and under a motto of “Best in Class,” SDK will continue coping with rapid expansion of the market for SiC epitaxial wafers, developing reliable products, and investing positively to expand its production capacity, thereby making its SiC epitaxial wafer business a *Koseiha* business.

Topics

[Electronics segment]

- **Began shipment of MAMR-technology-based HD media**

In 2019, SDK began shipment of newly developed 3.5-inch HD media which have storage capacity of 2 terabyte per disk based on the Microwave Assisted Magnetic Recording (MAMR)[*1] technology for next-generation hard disk drives (HDDs). This product, which SDK developed with its new technology, has been adopted by Toshiba Electronic Devices & Storage Corporation for use in MAMR-technology-based 18 terabyte near-line HDD, which represents the largest storage capacity[*2] in the industry. Due to the rapid expansion of cloud service and video content, data centers need HDDs with larger storage capacity. HD media are key parts for HDDs to determine their storage capacities, and SDK has been quickly launching top-quality media based on innovative technologies. As the largest independent HD media supplier, SDK will continue contributing to the increase in storage capacities of HDDs in accordance with its motto of "Best in Class."

*1: MAMR is an abbreviation of Microwave Assisted Magnetic Recording, which is a technology to assist high-density recording of data into HD media by radiating microwave on magnetic layer of the disk to reduce coercive force only when data is written into there.

*2: As of February 11, 2019.

Topics

[Inorganics segment]

- **Decided to improve Carbon Division's production sites in Europe**

In May 2019, SDK decided to improve facilities to produce graphite electrodes at its production sites in Europe in order to establish a global system for supplying products with the same high quality. These sites are controlled by SDK's consolidated subsidiary SHOWA DENKO CARBON Holding GmbH, The construction work and quality improvement efforts are scheduled to begin in 2019 for completion in 2020 and the amount of investment will be about ¥5 billion. In its graphite electrode business, SDK is operating production sites in the USA, Europe, Japan, China and East Asia, with the largest share in the world's production capacity of high-quality graphite electrodes. SDK aims to achieve the synergy effect of business integration (BIS40 Note) while ensuring stable supply and optimizing supply cost at respective graphite electrode production sites. SDK will continue taking various measures to achieve "Value in Use No. 1" for customers and to increase the competitiveness and profitability of its graphite electrode business.

Note: "BIS40" refers to SDK's medium-term plan for maximizing the synergy of integrating graphite electrode business of SDK and its U.S. subsidiary Showa Denko Carbon, Inc. with that of former SGL GE Holding GmbH (acquired in 2017). Specifically, SDK aims to optimize its global supply and distribution channels, increase its bargaining power in raw material procurement, and combine respective advantages; namely, high productivity and cost-competitiveness of former SGL sites with high product quality at SDK's Omachi Plant and Showa Denko Carbon, Inc. Through these measures, SDK aims to achieve "Value in Use No. 1" for customers, and produce an economic effect of ¥4 billion by 2020.

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Topics

[Aluminum segment]

- **Decided to establish third aluminum can production base in Vietnam and streamline domestic aluminum can production lines**

In April 2019, Showa Aluminum Can Corporation (SAC), a consolidated subsidiary of SDK, decided to establish its third base in Vietnam to produce aluminum cans, aiming to expand its business in that country. This new production base is to be located in Ba Ria-Vung Tau Province, which is in the southern part of Vietnam. In addition, SAC also decided to expand the capacity of can end production lines in the existing factory located in the northern part of Vietnam. Hanacans Joint Stock Company (Hanacans), an affiliated company of SAC incorporated in Vietnam, has lines to produce can bodies and can ends in its Bac Ninh Factory located in the northern part of Vietnam, and lines to produce can bodies in its Quang Nam Factory located in the central part of Vietnam. Hanacans will establish a new factory, which is to have capacity to produce 1.3 billion can bodies per year, in the suburbs of Ho Chi Minh City in the southern part of Vietnam, and install an additional line to produce can ends with production capacity of 1.1 billion can ends per year in Hanacans' Bac Ninh Factory. As a result of these measures, Hanacans will have three factories to cover everywhere in Vietnam, and have capacities to produce 3.1 billion can bodies and 3.3 billion can ends per year in total. The total amount of investment in the construction of the new factory and additional can-end production line is expected to be about ¥7 billion. The new facilities are scheduled to start production in July 2020. As for SAC's domestic aluminum can business which is now operating three production bases in Japan, SAC decided in May 2019 to stop a part of its production lines to manufacture aluminum cans in its two plants, Oyama Plant and Hikone Plant, and streamline the company's domestic production capacity to be about 60% of the current level by June 2020, in order to respond to changes in the domestic market environment. In its domestic aluminum ca business, SAC will promote introduction of formulas linked to aluminum-metal prices to calculate and determine sales prices of aluminum cans, aiming to stabilize its revenue base.