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

Second Quarter, 2019 Financial Results

- Consolidated -

SHOWA DENKO K.K.

August 7, 2019

Motohiro Takeuchi, CFO
Director & Corporate Officer

Performance forecast and other statements pertaining to the future as contained in this presentation are based on the information available as of today and assumptions as of today regarding risk factors that could affect our future performance. Actual results may differ materially from the forecast due to a variety of risk factors, including, but not limited to, the economic conditions, costs of naphtha and other raw materials, demand for our products such as graphite electrodes and other commodities, market conditions, and foreign exchange rates. We undertake no obligation to update the forward-looking statements unless required by law.

Consolidated Companies

- Consolidated subsidiaries: 56 (2 companies excluded)
  - 1 company newly consolidated
    - SHOKO Electronics K.K. (Electronics)
  - 3 companies excluded
    - PT. Showa Esterindo Indonesia (Petrochemicals, liquidation)
    - SHOWA DENKO CARBON Shanghai Co., Ltd. (Inorganics, liquidation)
    - SHOTIC (Singapore) Pte Ltd. (Aluminum, liquidation)
- Equity method applied: 11
  - Newly applied or excluded: none

Selected Data

(Average figure)

	Jan.- Jun. 2018	Jan.- Jun. 2019	Increase/ decrease
■Exchange rates:			
¥/US$	108.7	110.1	Yen depreciated by ¥1.4/$
¥/€	131.6	124.3	Yen appreciated by ¥7.3/€
■Domestic naphtha price: ¥/KL	48,350	43,300	-5,050
■Aluminum			
LME price: US$/T	2,210	1,850	-361
Domestic market*: K¥/T	299	255	-44

Exchange rate at December 31, 2018 ¥111.0/US$, at June 30, 2019 ¥107.8/US$
⇒Yen appreciated by ¥3.2/US$

*Domestic market: data from Nikkei

Summary 2018 (Jan.1 – Jun.30) vs. 2019 (Jan.1 – Jun.30)

(Unit: Billions of yen except cash dividends per share)

	Jan.-Jun., 2018	Jan.-Jun., 2019	Increase/decrease
Net sales	455.8	475.5	19.6
Operating income	77.9	85.5	7.6
Non-operating income and expenses, net	-0.3	-0.6	-0.3
Interest/Dividends income and expenses	-0.5	0.2	0.7
Equity in earnings of affiliates	0.6	0.5	-0.1
Foreign exchange gains or losses	-0.4	0.1	0.5
Other	0	-1.4	-1.5
Ordinary income	77.6	84.8	7.3
Extraordinary profit	0.5	1.8	1.3
Extraordinary loss	-2.0	-3.0	-1.0
Income before income taxes	76.1	83.6	7.6
Income taxes	-15.2	-16.2	-0.9
Profit	60.9	67.5	6.6
Net income attributable to non-controlling interests	-2.9	-1.7	1.3
Net income attributable to owners of the parent	57.9	65.8	7.9

Midterm dividends per share (yen)	20	50	30

Extraordinary Profit/Loss

(Unit: Billions of Yen)

	Jan.-Jun., 2018	Jan.-Jun., 2019	Increase/decrease
■Extraordinary profit	0.5	1.8	1.3
●Gain on sales of non-current assets	0.1	0.5	0.4
●Gain on sales of investment securities	0.3	1.2	0.9
●Other	0.2	0.1	-0
■Extraordinary loss	-2.0	-3.0	-1.0
●Loss on sales and retirement of non-current assets	-1.7	-1.0	0.7
●Impairment loss	-0.1	-1.1	-1.1
●Loss on liquidation of subsidiaries	—	-0.6	-0.6
●Other	-0.3	-0.2	0.1
■Extraordinary profit/loss, net	-1.5	-1.2	0.3

Consolidated Sales by Segment

(Unit: Billions of Yen)

	Jan.-Jun. 2018	Jan.-Jun. 2019	Increase/ decrease	
Petrochemicals	115.4	127.5	12.1	【Olefins】sales increased (shipment volumes up due to large-scale shutdown maintenance in 2018. The absence of periodic shutdown maintenance in 2019) 【Organic chemicals】sales increased (vinyl acetate, ethyl acetate: shipment volumes up) 【SunAllomer Ltd. 】sales increased (shipment volumes up)
Chemicals	74.6	73.5	-1.1	【Basic chemicals】sales slightly decreased (AN: market prices down, chloroprene rubber: sales up, ammonia: sales maintained at the year-earlier level) 【Electronic chemicals】sales decreased (shipment volumes down) 【Industrial gases】sales slightly increased 【Functional chemicals】sales slightly increased
Electronics	56.7	44.6	-12.1	【HDs】sales decreased (shipment volumes down: production adjustment for use in data centers) 【Rare earths】【Compound semiconductors】sales significantly decreased 【LIB materials】sales decreased (shipment volumes down) 【SiC epitaxial wafers】sales increased (shipment volumes up)
Inorganics	116.5	142.7	26.3	【Ceramics】sales decreased (shipment volumes of general-purpose alumina down) 【Graphite electrodes】sales significantly increased (global market prices up)
Aluminum	53.3	49.0	-4.3	【High-purity foil for capacitors】sales decreased (shipment volumes down) 【Aluminum specialty components】sales decreased (shipment volumes for automotive parts and industrial equipment down) 【Aluminum cans】sales slightly increased (shipment volumes up)
Others	67.2	64.3	-2.9	【SHOKO Co., Ltd. 】sales slightly decreased
Adjustments	-27.9	-26.1	1.8	
Total	455.8	475.5	19.6	

(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

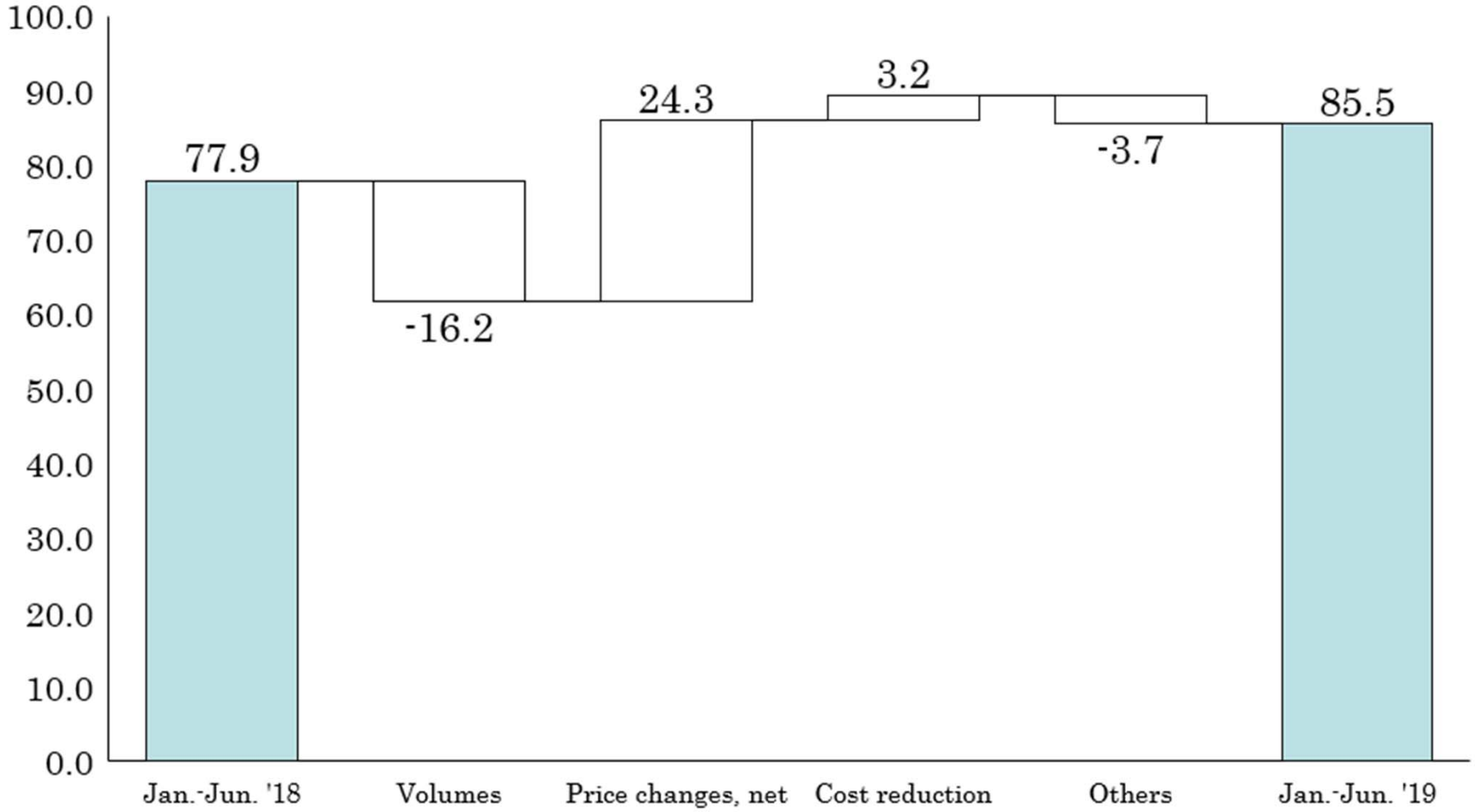
(Unit: Billions of Yen)

	Jan.-Jun. 2018	Jan.-Jun. 2019	Increase/ Decrease	
Petrochemicals	7.4	8.5	1.1	【Olefins】profit decreased (shipment volumes up due to the 2018 shutdown maintenance, depreciation of naphtha inventory due to a fall in price, spread squeezed) 【Organic chemicals】profit increased (vinyl acetate, ethyl acetate: shipment volumes up) 【SunAllomer Ltd. 】profit increased (shipment volumes up)
Chemicals	7.8	5.5	-2.2	【Basic chemicals】profit decreased (AN: market prices down) 【Electronic chemicals】profit decreased (difference in shipment item mix, shipment volumes down) 【Industrial gases】profit decreased (shipment volumes down, shipping cost up due to tight supply in Western Japan) 【Functional chemicals】profit maintained at the year-earlier level
Electronics	6.0	0.9	-5.1	【HDs】profit decreased (shipment volumes down: production adjustment for use in data centers) 【Rare earths】profit maintained at the year-earlier level, 【Compound semiconductors】profit significantly decreased 【LIB materials】profit decreased (shipment volumes down) 【SiC epitaxial wafers】profit decreased (R&D cost up)
Inorganics	58.1	71.8	13.7	【Ceramics】profit increased (general-purpose alumina: profitability improved) 【Graphite electrodes】profit increased (global market prices up, China: profit down due to market softening)
Aluminum	2.7	0.5	-2.2	【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 slightly increased (Japan: profit up, Vietnam: profit maintained at the year-earlier level)
Others	0.9	0.6	-0.3	【SHOKO Co., Ltd.】profit slightly increased
Adjustments	-5.0	-2.4	2.6	
Total	77.9	85.5	7.6	

(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

(Unit: Billions of Yen)



Consolidated Balance Sheet

(Unit: Billions of Yen)

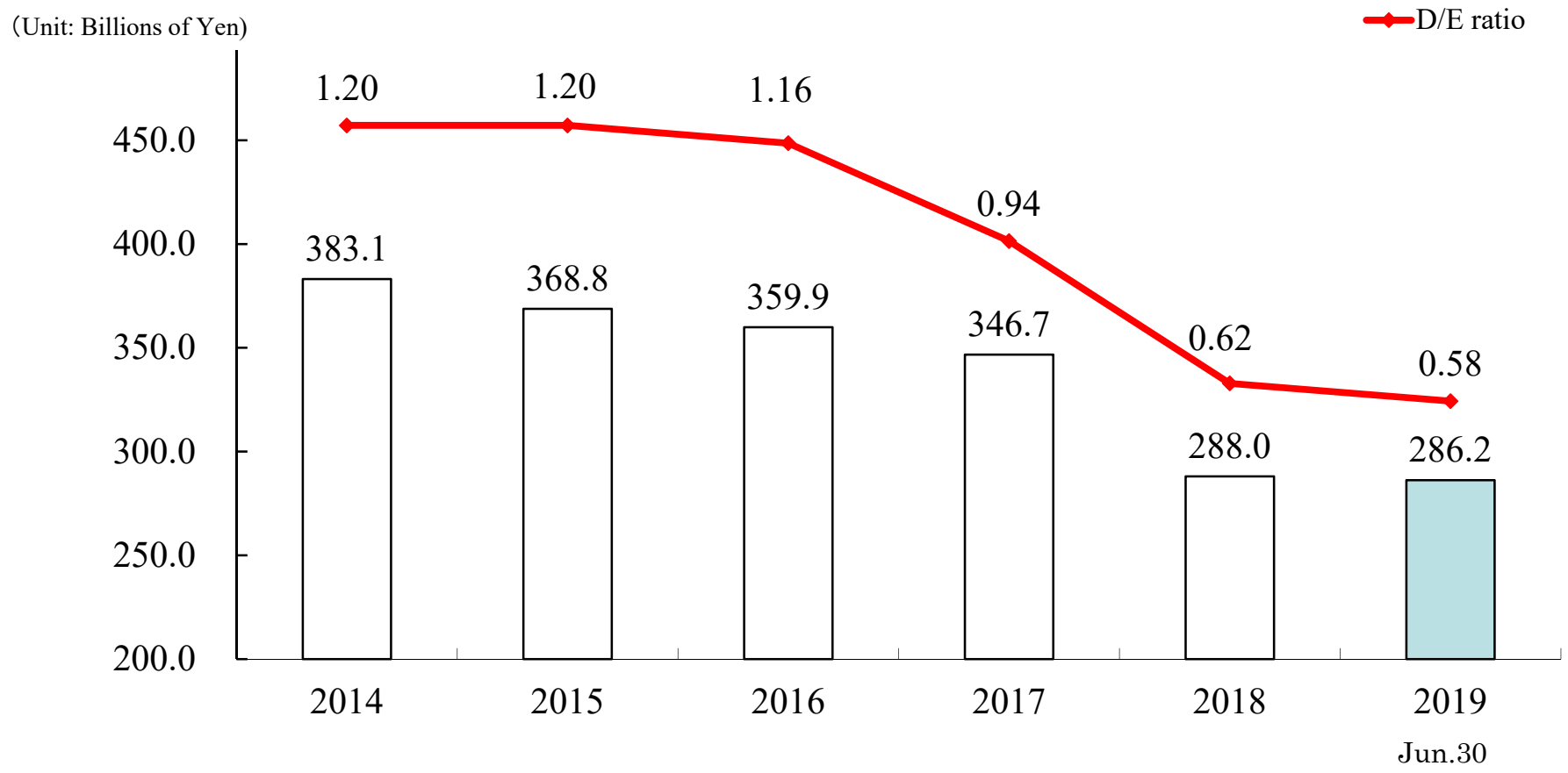
Assets	Dec. 31, 2018	Jun. 30, 2019	Increase/ decrease	**Liabilities and net assets**	Dec. 31, 2018	Jun. 30, 2019	Increase/ decrease
Cash and deposits	113.2	113.8	0.6	Notes and accounts payable	139.4	125.7	-13.8
Notes and accounts receivable	203.7	183.4	-20.3	Interest-bearing debt	288.0	286.2	-1.8
Inventories	152.8	170.1	17.3	Net defined benefit liability	22.0	13.2	-8.8
Other current assets	26.8	30.5	3.7	Other liabilities	160.2	141.9	-18.3
Total current assets	496.5	497.7	1.2	Total liabilities	609.6	567.0	-42.7
Buildings and structures	78.8	79.4	0.6	Capital stock	140.6	140.6	0
Machinery and equipment	146.8	141.7	-5.1	Capital surplus	78.9	78.9	0
Land	235.0	236.7	1.7	Retained earnings	197.7	249.3	51.6
Other tangible fixed assets	17.9	22.4	4.5	Treasury stock	-11.7	-11.7	-0
Total tangible fixed assets	478.4	480.1	1.7	Total shareholders' equity	405.5	457.2	51.6
Intangible fixed assets	15.0	16.7	1.7	Valuation difference on available-for-sale securities	7.5	8.1	0.6
Investments and other assets	85.1	83.3	-1.8	Deferred gains or losses on hedges	0.8	0.1	-0.7
incl. investment securities	71.9	69.9	-2.0	Revaluation reserve for land	33.3	33.0	-0.3
				Foreign currency translation adjustment	7.1	-0	-7.1
				Remeasurements of defined benefit plans	-8.2	-7.3	0.9
				Total accumulated other comprehensive income	40.4	33.9	-6.5
				Non-controlling interests	19.4	19.7	0.4
Total fixed assets	578.5	580.1	1.6	Total net assets	465.3	510.8	45.5
Total assets	**1,075.0**	**1,077.8**	**2.8**	**Total liabilities and net assets**	**1,075.0**	**1,077.8**	**2.8**

Total Assets
Interest-bearing Debt and D/E ratio

(Unit: Billions of Yen)

	Dec. 31, 2018	Jun. 30, 2019	Increase/ decrease
● **Total assets**	1,075.0	1,077.8	2.8
● **Interest-bearing debt**	288.0	286.2	-1.8
● **Debt/Equity ratio**	0.62 times	0.58 times	Improved by 0.04p
● **Stockholders' equity ratio**	41.5%	45.6%	4.1p

Interest-bearing Debt



Equity ratio	29.7%	31.5%	31.8%	34.3%	41.5%	45.6%

Consolidated Cash Flows

(Unit: Billions of Yen)

	Jan.-Jun. 2018	Jan.-Jun. 2019	Increase/ decrease	2019 Revised forecast*
●CF from operating activities	52.2	40.5	-11.7	95.0
●CF from investing activities	-25.5	-17.9	7.7	-60.0
●Free CF	26.7	22.6	-4.0	35.0
●CF from financing activities	-12.9	-18.7	-5.8	-13.0
●Others	-1.9	-3.3	-1.5	0
Increase/decrease in cash and cash equivalents	11.9	0.6	-11.3	22.0

* 2019 revised forecast was announced on Aug. 7, 2019.

Selected Data (Consolidated)

(Unit: Billions of Yen)

	Jan.-Jun. 2018	Jan.-Jun. 2019	Increase/ decrease
●Interest/dividend income less interest expenses	-0.5	0.2	0.7
●Capital expenditures	20.7	22.3	1.6
●Depreciation and amortization	19.8	18.6	-1.2
●R&D expenditures	10.3	10.1	-0.2
●Number of employees (Unit: people)	10,589	10,603	14
●Total employment cost	39.8	42.3	2.5

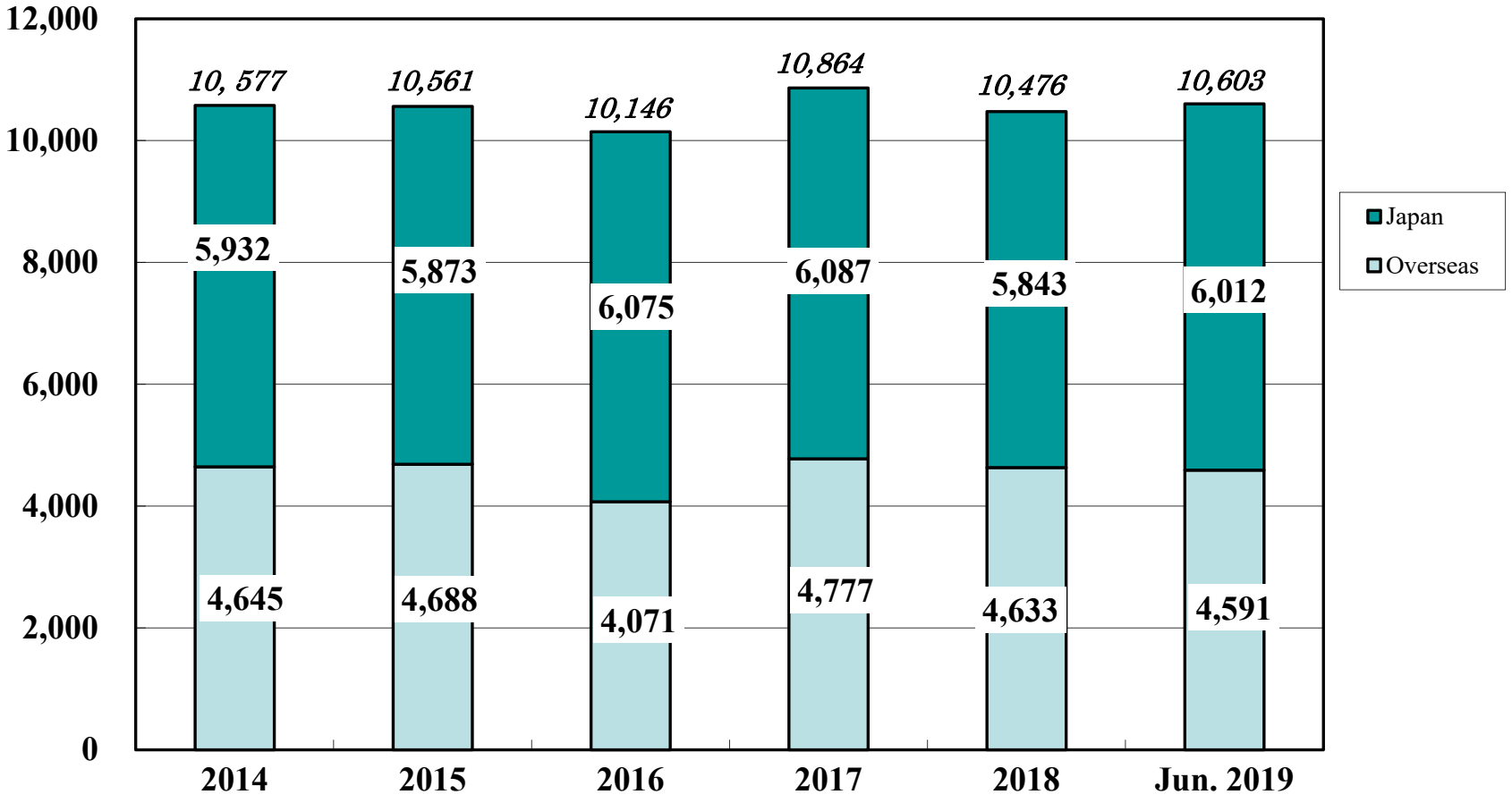
Capital Expenditures/ Depreciation by Segment

(Unit: Billions of Yen)

	Jan.-Jun., 2018		Jan.-Jun., 2019		Increase/decrease	
	Capital expenditures	Depreciation	Capital expenditures	Depreciation	Capital expenditures	Depreciation
Petrochemicals	3.7	3.0	2.3	2.1	-1.4	-0.9
Chemicals	4.1	4.4	4.5	4.5	0.4	0.1
Electronics	6.3	4.9	5.4	4.6	-0.9	-0.3
Inorganics	2.1	3.8	3.7	4.1	1.6	0.3
Aluminum	3.1	2.7	4.5	2.4	1.4	-0.3
Others	1.4	1.1	1.9	1.0	0.5	-0.1
Total	20.7	19.8	22.3	18.6	1.6	-1.2

(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.

Total Number of Employees and Breakdown by Location



Japan	56.1%	55.6%	59.9%	56.0%	55.8%	56.7%
Overseas	43.9%	44.4%	40.1%	44.0%	44.2%	43.3%

Selected Data, Forecast

(Unit: Billions of Yen)

	2018 Actual	2019 Revised Forecast*	Increase/ decrease
● Exchange rate: ¥/US$		2019 earlier forecast** 105.0	
	1H 108.7	1H actual 110.1	1H 1.4
	2H 112.2	2H revised 110.0	2H -2.2
¥/€$		2019 earlier forecast** 126.0	
	1H 131.6	1H actual 124.3	1H -7.3
	2H 129.2	2H revised 126.0	2H -3.2
● Domestic naphtha price: ¥/KL		2019 earlier forecast** 53,400	
	1H 48,350	1H actual 43,300	1H -5,050
	2H 53,850	2H revised 47,400	2H -6,450
● Aluminum LME price: US$/T		2019 earlier forecast** 2,150	
	1H 2,210	1H actual 1,850	1H -360
	2H 2,021	2H revised 1,950	2H -71
● Interest-bearing debt at the year end	288.0	310.0	22.0
● Interest/dividend income less interest expenses	-0.6	0.2	0.8
● R&D expenditures	19.7	21.5	1.8
● Number of employees	10,476	10,712	236
● Total employment cost	79.4	85.4	6.0

* 2019 revised forecast was announced on Aug. 7, 2019.
**2019 earlier forecast was announced on Feb. 14, 2019.

2019 Forecast

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

	2018 Actual	2019 Revised Forecast*	Increase/ decrease	2019 Earlier Forecast**	Increase/ decrease (against earlier)
Net sales	992.1	980.0	12.1	1,100.0	-120.0
Operating income	180.0	145.0	-35.0	190.0	-45.0
Non-operating income and expense	-12.0	-3.0	-1.8	-5.0	2.0
Ordinary income	178.8	142.0	-36.8	185.0	-43.0
Extraordinary profit / Extraordinary loss	-33.3	-20.0	13.3	-20.0	0
Net income attributable to owners of the parent	111.5	90.0	-21.5	120.0	-30.0
Net income attributable to owners of the parent per share (yen)	758.15	616.96	-141.19	822.61	-205.65
Cash dividends per share (yen)	120 (Q2) 20 (Q4) 100	130 (planned) (Q2) 50 (Q4) 80 (planned)	10	130 (planned)	—

* 2019 revised forecast was announced on Aug. 7, 2019.
** 2019 earlier forecast was announced on Feb. 14, 2019.

Consolidated Net Sales by Segment, 2019 Forecast

(Unit: Billions of Yen)

	2018 Actual*	2019 Revised Forecast**	Increase/ decrease	2019 Earlier Forecast***	Increase/ decrease (against earlier)
Petrochemicals	268.9	260.0	-8.9	290.0	-30.0
Chemicals	156.5	160.0	3.5	166.0	-6.0
Electronics	111.9	105.0	-6.9	106.0	-1.0
Inorganics	266.1	270.0	3.9	340.0	-70.0
Aluminum	108.3	105.0	-3.3	110.0	-5.0
Others	137.3	135.0	-2.3	142.0	-7.0
Adjustments	-56.9	-55.0	1.9	-54.0	-1.0
Total	992.1	980.0	-12.1	1,100.0	-120.0

* SDK changed the segmentation from 2019 (SiC epitaxial wafers business was transferred from “Others” to “Electronics”) .
Figures of 2018 are based on the new segmentation.
** 2019 revised forecast was announced on Aug. 7, 2019.
*** 2019 earlier forecast was announced on Feb. 14, 2019.

Consolidated Operating Income by Segment, 2019 Forecast

(Unit: Billions of Yen)

	2018 Actual*	2019 Revised Forecast**	Increase/ decrease	2019 Earlier Forecast***	Increase/ decrease (against earlier)
Petrochemicals	20.3	15.5	-4.8	18.0	-2.5
Chemicals	17.4	14.5	-2.9	15.0	-0.5
Electronics	13.6	8.0	-5.6	12.5	-4.5
Inorganics	132.4	111.0	-21.4	148.0	-37.0
Aluminum	4.9	2.5	-2.4	5.5	-3.0
Others	1.7	1.0	-0.7	1.5	-0.5
Adjustments	-10.4	-7.5	2.9	-10.5	3.0
Total	180.0	145.0	-35.0	190.0	-45.0

*SDK changed the segmentation from 2019 (SiC epitaxial wafers business was transferred from “Others” to “Electronics”) .
Figures of 2018 are based on the new segmentation.
**2019 revised forecast was announced on Aug. 7, 2019.
***2019 earlier forecast was announced on Feb. 14, 2019.

Capital expenditures/Depreciation Forecast by Segment for 2019

(Unit: Billions of Yen)

	2018 Actual*		2019 Revised Forecast**		Increase/decrease	
	Capital expenditures	Depreciation	Capital expenditures	Depreciation	Capital expenditures	Depreciation
Petrochemicals	5.1	5.0	4.8	4.2	-0.2	-0.8
Chemicals	8.0	8.8	10.9	9.2	2.9	0.4
Electronics	11.5	9.9	11.9	9.3	0.4	-0.6
Inorganics	8.1	8.0	13.7	8.6	5.6	0.7
Aluminum	5.5	5.7	11.9	4.9	6.4	-0.7
Others	3.4	2.1	4.3	2.3	0.9	0.2
Total	41.7	39.5	57.6	38.5	15.9	-0.9

* 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.

** 2019 revised forecast was announced on Aug. 7, 2019.

Summary (Reference)

CQ1 (Jan.1 – Mar.31), 2019 v s. CQ2 (Apr.1 – Jun.30), 2019

(Unit: Billions of Yen)

	CQ1, 2019	CQ2, 2019	Increase/ decrease
Net sales	234.7	240.8	6.0
Operating income	45.4	40.1	-5.3
Non-operating income and expenses, net	-1.2	0.6	1.7
Interest/Dividends income and expenses	0	0.1	0.1
Equity in earnings of affiliates	-0.5	1.0	1.5
Foreign exchange gains or losses	0.2	-0.1	-0.4
Other	-0.9	-0.5	0.5
Ordinary income	44.2	40.6	-3.5
Extraordinary profit	0.3	1.5	1.2
Extraordinary loss	-0.7	-2.3	-1.6
Income before income taxes	43.8	39.9	-3.9
Income taxes	-9.5	-6.7	2.8
Profit	34.3	33.2	-1.1
Net income attributable to non-controlling interests	-1.2	-0.5	0.7
Net income attributable to owners of the parent	33.1	32.7	-0.3

(Reference) Consolidated Sales by Segment

(Unit: Billions of Yen)

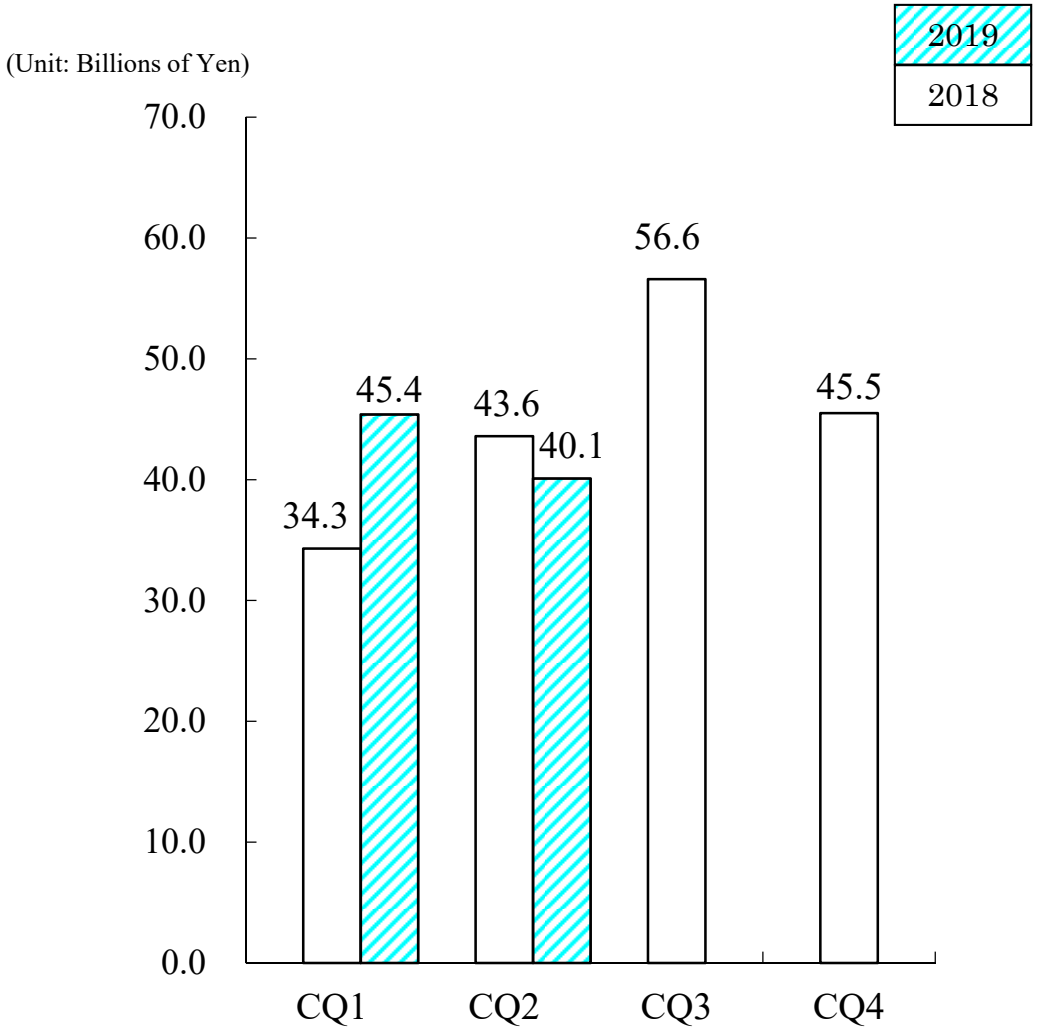
	CQ1, 2019	CQ2, 2019	Increase/ decrease	
Petrochemicals	62.7	64.8	2.0	【Olefins】sales increased (shipment volumes up) 【Organic chemicals】sales increased (shipment volumes up) 【SunAllomer Ltd.】sales slightly decreased
Chemicals	36.0	37.5	1.5	【Basic chemicals】sales slightly increased (shipment volumes up due to the CQ1 shutdown maintenance, AN: market prices up) 【Electronic chemicals】sales maintained at the CQ1 level 【Industrial gases】sales increased (shipment volumes up by seasonal changes) 【Functional chemicals】sales increased (shipment volumes in China up)
Electronics	20.6	24.0	3.5	【HDs】sales increased (shipment volumes up) 【Rare earths】sales decreased, 【Compound semiconductors】sales slightly increased 【LIB materials】sales increased (shipment volumes up) 【SiC epitaxial wafers】sales increased (shipment volumes up)
Inorganics	72.4	70.3	-2.1	【Ceramics】sales maintained at the CQ1 level 【Graphite electrodes】sales decreased (shipment volumes down)
Aluminum	23.8	25.3	1.5	【High-purity foil for capacitors】sales decreased (shipment volumes down) 【Aluminum specialty components】sales maintained at the CQ1 level 【Aluminum cans】sales increased (shipment volumes up: seasonal in domestic market)
Others	32.4	31.9	-0.6	【SHOKO Co., Ltd.】sales decreased
Adjustments	-13.1	-13.0	0.1	
Total	234.7	240.8	6.0	

(Reference) Consolidated Operating Income by Segment

(Unit: Billions of Yen)

	CQ1, 2019	CQ2, 2019	Increase/ decrease	
Petrochemicals	4.0	4.5	0.5	【Olefins】profit increased (shipment volumes up) 【Organic chemicals】profit slightly increased 【SunAllomer Ltd.】profit decreased
Chemicals	2.4	3.1	0.7	【Basic chemicals】profit increased (shipment volumes up due to the CQ1 shutdown maintenance, AN: market prices up) 【Electronic chemicals】profit maintained at the CQ1 level 【Industrial gases】profit increased (shipment volumes up by seasonal changes) 【Functional chemicals】profit maintained at the CQ1 level
Electronics	-0.3	1.2	1.5	【HDs】profit increased (shipment volumes up) 【Rare earths】profit slightly increased, 【Compound semiconductors】profit maintained at the CQ1 level 【LIB materials】profit slightly increased 【SiC epitaxial wafers】profit maintained at the CQ1 level
Inorganics	39.5	32.3	-7.2	【Ceramics】profit maintained at the CQ1 level 【Graphite electrodes】profit decreased (Raw material inventory prices up due to difference in procurement timing, shipment volumes down)
Aluminum	0.3	0.2	-0	【High-purity foil for capacitors】【Aluminum specialty components】 profit slightly decreased 【Aluminum cans】profit increased (shipment volumes up: seasonal in domestic market)
Others	0.3	0.3	0	
Adjustments	-0.8	-1.6	-0.7	
Total	45.4	40.1	-5.3	

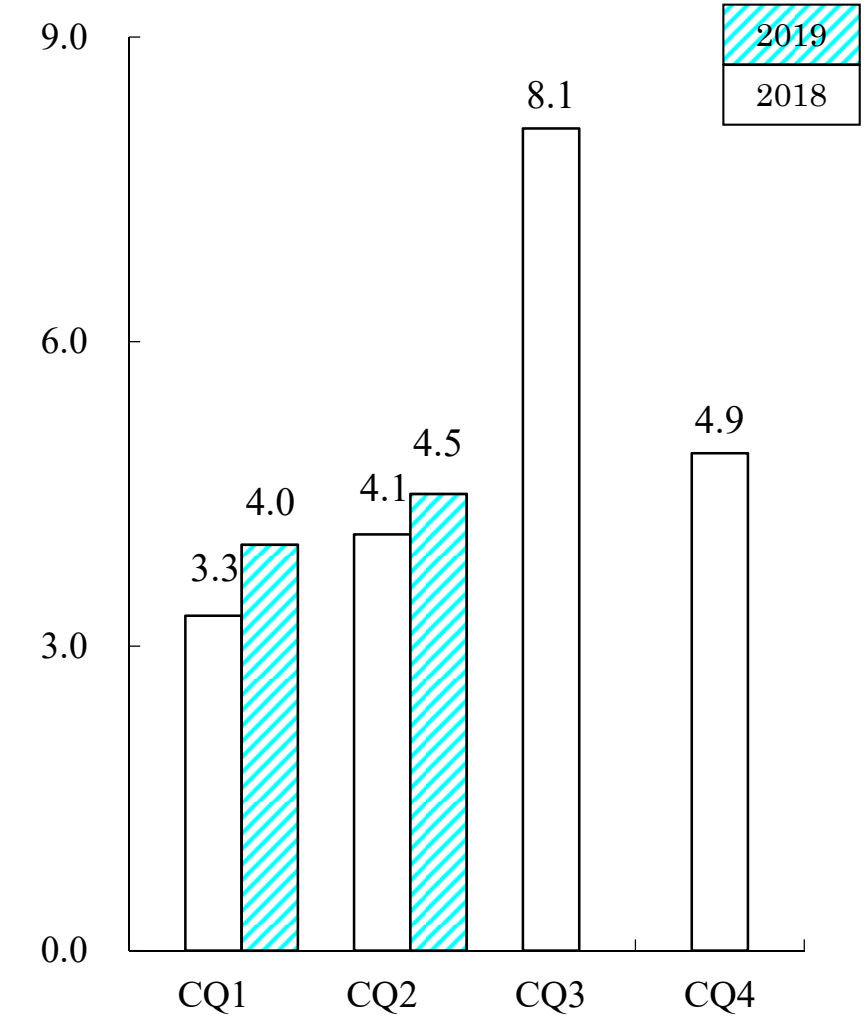
(Reference) Quarterly Operating Income



(Reference) Quarterly Operating Income by Segment

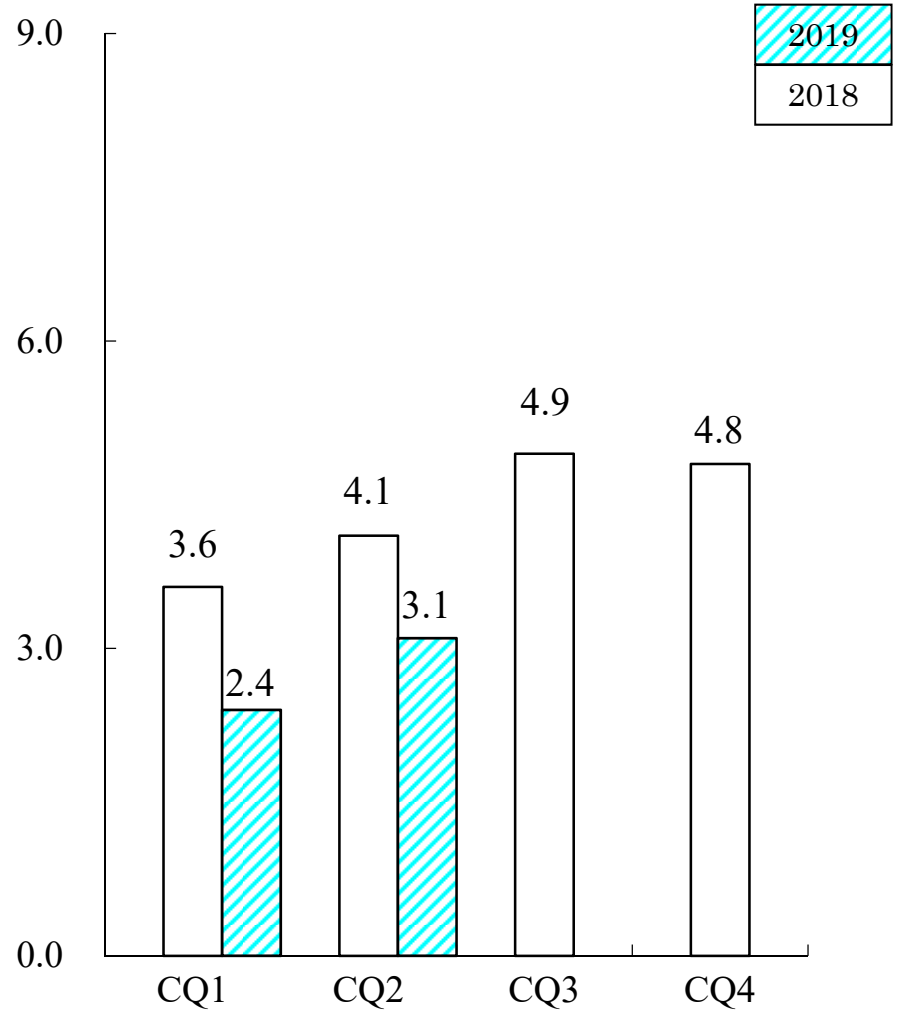
《Petrochemicals》

(Unit: Billions of Yen)



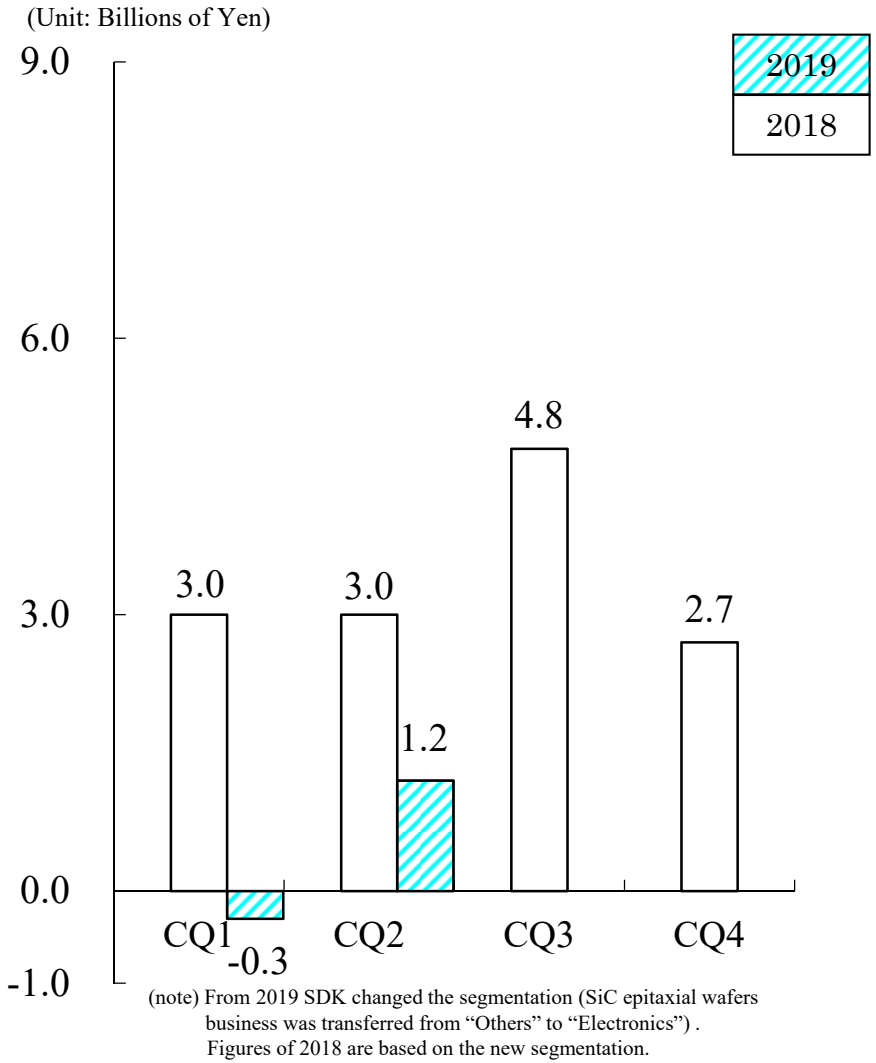
《Chemicals》

(Unit: Billions of Yen)



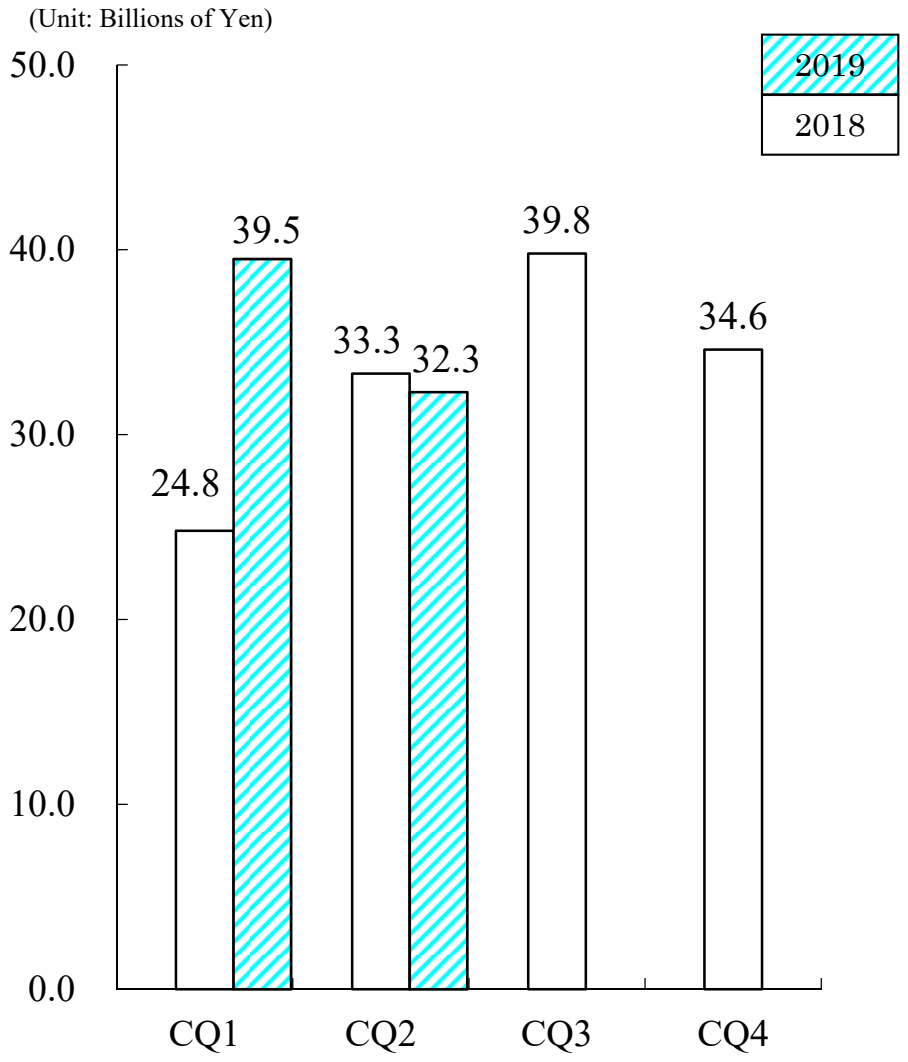
(Reference) Quarterly Operating Income by Segment

《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.

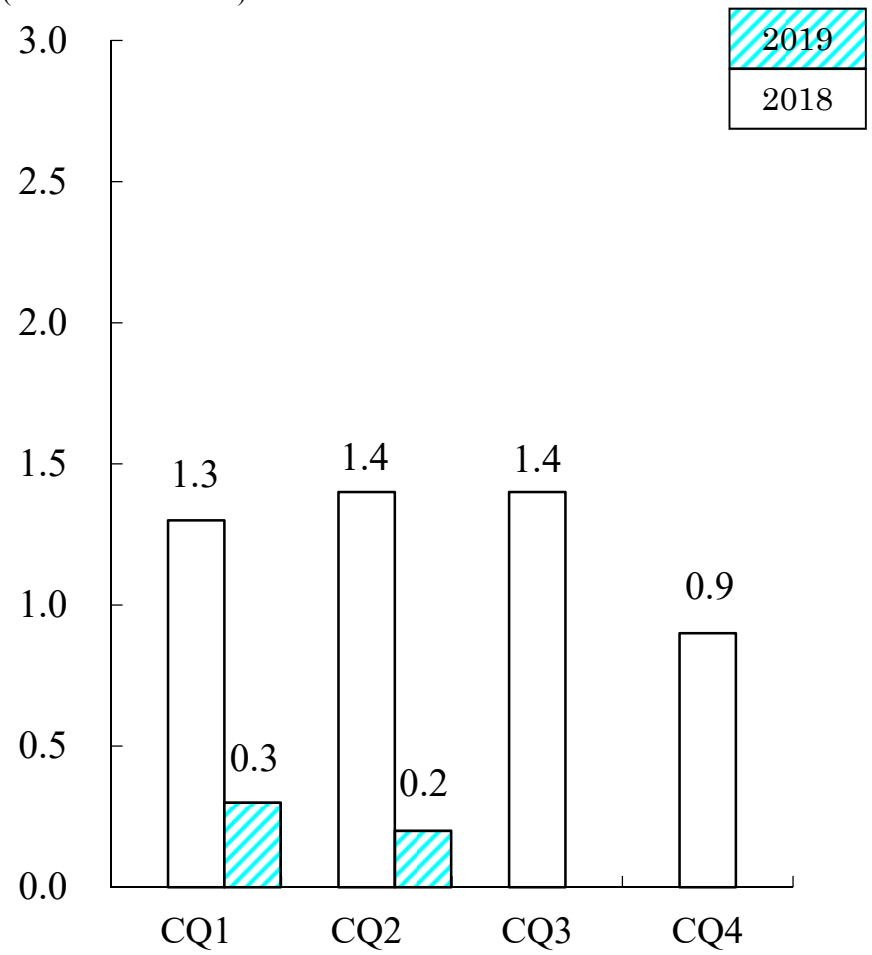
《Inorganics》



(Reference) Quarterly Operating Income by Segment

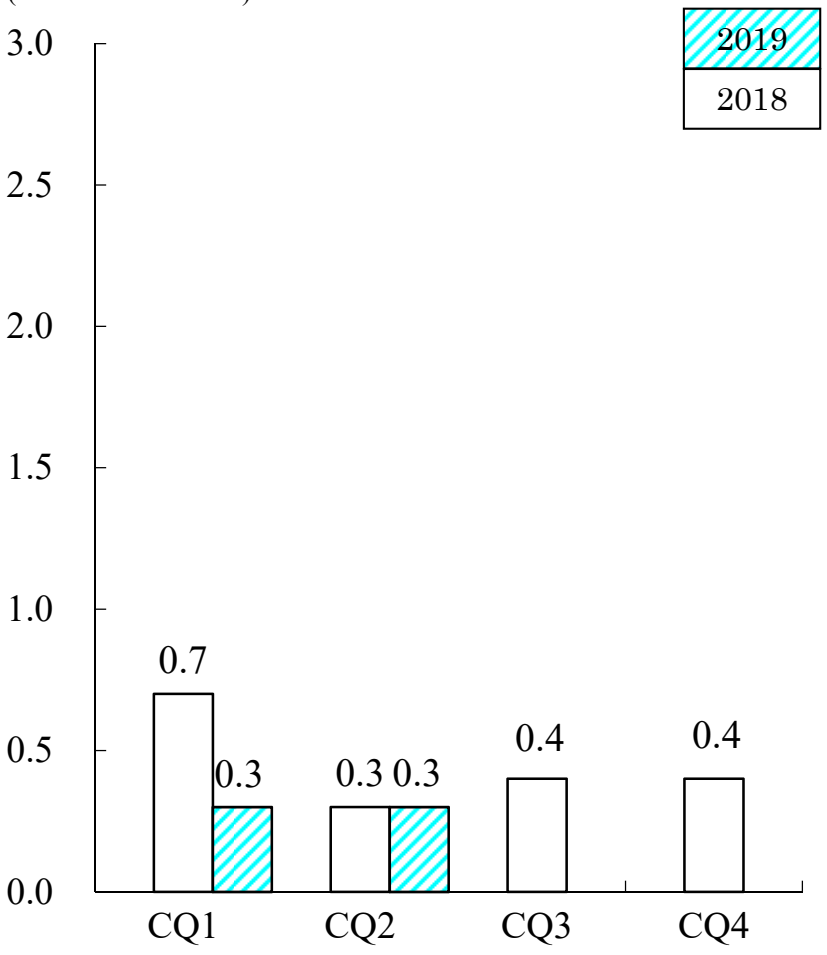
《Aluminum》

(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]

- 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). This time, 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, starting from the announcement of data for FY2018, the Showa Denko Group will 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.

Topics

[General]

- Acquired ILAG Group, global non-stick coatings manufacturer

In July 2019, SDK acquired all shares in ILAG Industrielack AG, which leads the ILAG Group (ILAG), a specialty non-stick coating chemicals manufacturing company. Non-stick coating chemicals (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 for 2019). ILAG has the fourth largest share in the consumer-goods NSC market of worldwide operating companies. ILAG's products are also applied on industrial goods. ILAG exports its products manufactured in Switzerland 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 high 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]

- Decided to introduce SAP S4/HANA as next-generation ERP system

In May 2019, SDK decided to introduce “SAP S/4HANA,” an enterprise resource planning (ERP) system developed by SAP SE, and will start operation of the new system in January 2020. SDK decided to introduce this new system with a view to establishing information platform which will support further globalization of the Group’s business activities and management. 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]

- Established a technology to joint aluminum alloy and polycarbonate directly

In August 2019, 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 with 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. In 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

[Chemicals segment]

- 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 this April. Liquefied carbon dioxide is made from carbon dioxide gas contained in by-product gas generated in the processes of oil-refining, steel-making and ammonia production. However, a tight supply-demand situation for liquefied carbon dioxide is chronic due to scaling back of oil-refining and ammonia production in Japan. 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. SGP's project to establish Oita Plant has been acknowledged by relevant organizations that it is eligible for the "Program to subsidize establishment of corporate bases in Oita City" sponsored by Oita City and the "Program to promote establishment of corporate bases that can lead growth of regional economies" sponsored by the Ministry of Economy, Trade and Industry (METI) under the provision of Regional Future Investment Promotion Act.

Topics

[Electronics segment]

- To begin shipment of MAMR-technology-based HD media

In 2019, SDK will begin 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). In terms of Conventional Magnetic Recording (CMR)*2, this product represents the 10th generation media. This new product 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*3 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: CMR is an abbreviation of Conventional Magnetic Recording, which is a kind of Perpendicular Magnetic Recording (PMR) technology without the use of Shingled Magnetic Recording (SMR). CMR ensures high random access.

*3: 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 three production sites in Europe, one each in Germany, Spain and Austria, 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. This project is expected to be equivalent to reducing SDK's total production capacity by around 5% during this period. In its graphite electrode business, SDK is operating a total of seven production sites in Japan, Europe, the USA and Asia, with the largest share in the world's production capacity of high-quality, ultrahigh power (UHP) electrodes. This year, 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.

Topics

[Aluminum segment]

- **Decided to streamline domestic aluminum can production lines**

In May 2019, Showa Aluminum Can Corporation (SAC), a consolidated subsidiary of SDK, decided to stop a part of its production lines to manufacture aluminum cans in its Oyama Plant and Hikone Plant, in order to respond to changes in the domestic market environment. SAC has been manufacturing aluminum cans in its three plants in this country, located in Oyama, Hikone and Omuta. SAC decided this time to stop a part of lines to produce aluminum cans, mainly for non-alcoholic beverages, and streamline its production capacity to be about 60% of the current level by June 2020. In the domestic market for aluminum cans, the demand for cans for alcoholic beverages continues to be strong due to an increase in the demand for alcoholic beverages other than beer and beer-like beverages, though the demand for beer/beer-like beverages continues declining. However, the demand for aluminum cans for non-alcoholic beverages is expected to decrease significantly due to a shift from aluminum cans to PET bottles. As a result, the total demand for aluminum cans in Japan is expected to continue stagnant into the future. In its domestic aluminum can business, SAC will promote introduction of formulas linked to aluminum-metal prices to calculate and determine sales prices of aluminum cans, and will focus its management resources mainly on production of cans for alcoholic beverages, aiming to stabilize its revenue base. SAC will also promote further development of ink-jet printing technologies suitable for production of multiple models and smaller lots and search for new use of aluminum cans, aiming to improve its profitability.

Topics

[Aluminum segment]

- **Decided to additionally expand capacity for producing high-grade SiC epitaxial wafers for power devices**

  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. This time, SAC decided to establish a new factory, which is to have capacity to produce 1.3 billion can bodies per year, 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.