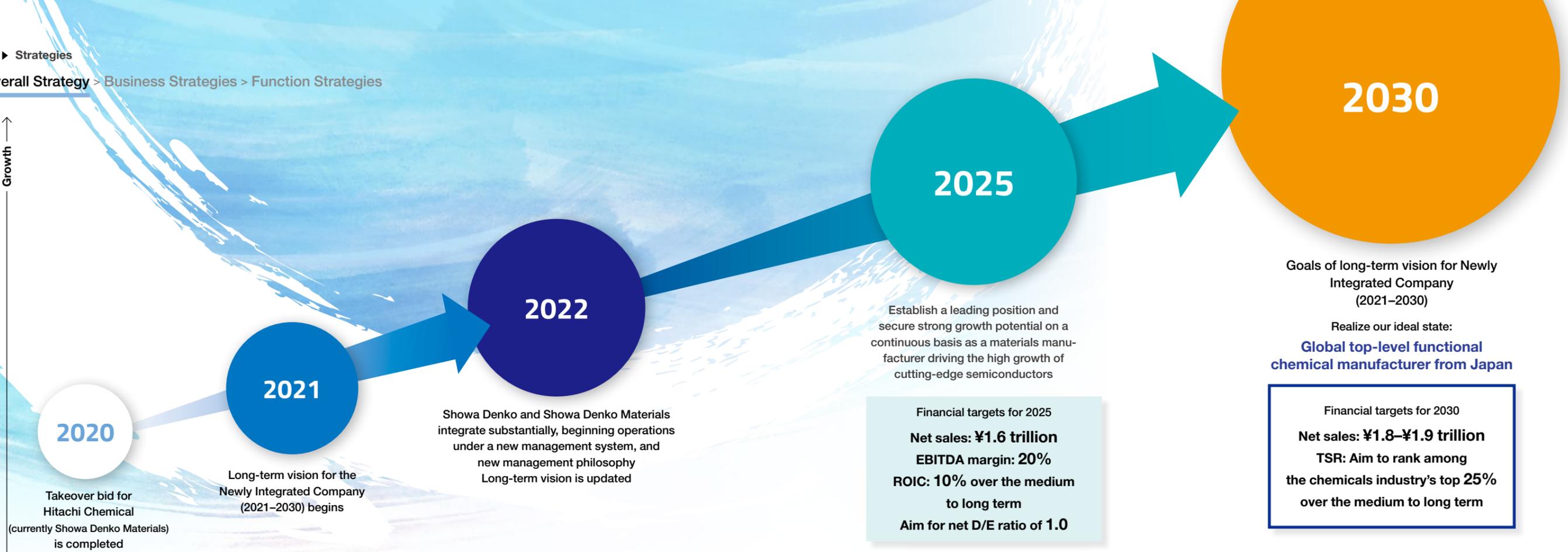


Growth ↑



2020

Takeover bid for Hitachi Chemical (currently Showa Denko Materials) is completed

2021

Long-term vision for the Newly Integrated Company (2021–2030) begins

2022

Showa Denko and Showa Denko Materials integrate substantially, beginning operations under a new management system, and new management philosophy. Long-term vision is updated

2025

Establish a leading position and secure strong growth potential on a continuous basis as a materials manufacturer driving the high growth of cutting-edge semiconductors

Financial targets for 2025  
**Net sales: ¥1.6 trillion**  
**EBITDA margin: 20%**  
**ROIC: 10% over the medium to long term**  
**Aim for net D/E ratio of 1.0**

2030

Goals of long-term vision for Newly Integrated Company (2021–2030)

Realize our ideal state:  
**Global top-level functional chemical manufacturer from Japan**

Financial targets for 2030  
**Net sales: ¥1.8–¥1.9 trillion**  
**TSR: Aim to rank among the chemicals industry's top 25% over the medium to long term**

Earning capacity →

# Overview of Our Long-Term Vision

With the unification of the management systems of Showa Denko and Showa Denko Materials in January 2022, both companies have effectively realized their integration through a system in which management is executed by 12 corporate officers common to both companies, under the president and CEO.

In conjunction with the launch of a new management system and the establishment of a new corporate philosophy, we also updated the long-term vision that we had announced in December 2020 and are moving forward with initiatives to achieve our ideal state in 2030.

## Purpose (Our Aspiration)

**Change society through the power of chemistry**

Contribute to the sustainable development of global society by creating functions required of the times as an advanced material partner

## Ideal State

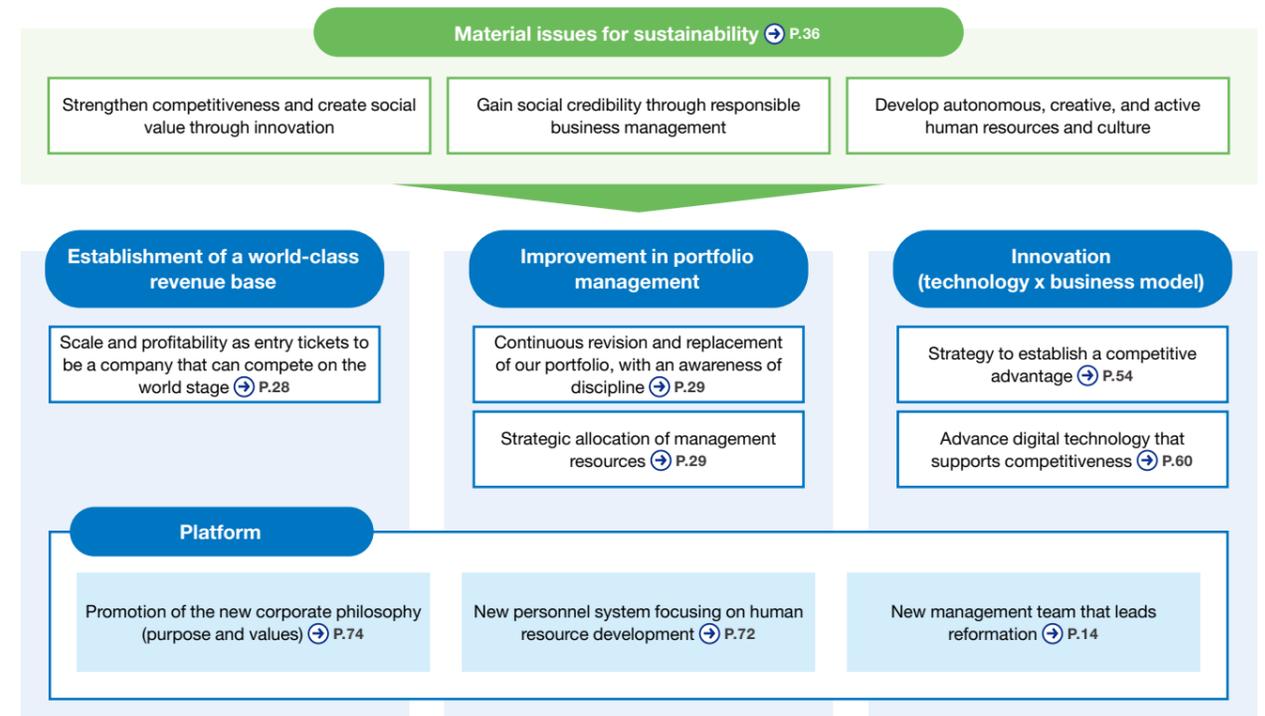
As we aim to realize the goal in our long-term vision of becoming a global top-level functional chemical manufacturer, we will strive to be a company that can compete on the world stage in both qualitative and quantitative terms, a company that contributes to the sustainable development of a global society through innovation and the capability to develop new businesses, and a company that attracts the attention of other corporations by developing co-creative talent that represents Japan's manufacturing industry.

### Global Top-Level Functional Chemical Manufacturer from Japan

<p><b>Company that can compete on the world stage</b></p> <p>World-class competitiveness and profitability</p>	<p><b>Company that contributes to a sustainable global society</b></p> <p>Capability to create innovations and to develop new businesses</p>	<p><b>Company that develops co-creative talent that represents Japan's manufacturing industry</b></p> <p>Ability to train competitive talent with shared values</p>
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## Main Strategies

Our long-term vision positions sustainability as an essential component of our Companywide strategies. Accordingly, we will establish a platform to become a global top-level functional chemical manufacturer and promote strategies incorporating our material issues for sustainability aimed at establishing a world-class revenue base, improving portfolio management, and spurring innovation.



Overview of the Long-Term Vision

# Financial and Capital Strategies

## Scale and Profitability as “Entry Tickets” to Be a Company That Can Compete on the World Stage

### Long-Term Numerical Targets

Showa Denko believes that strength in both quantitative and qualitative terms is essential to competing on the world stage. Quality means being able to contribute to society, and contributing in a sustainable manner is especially important. On the other hand, being strong in quantitative terms—that is, being a profitable company of a certain scale—is vital from the perspective of maximizing corporate value as well as from the perspective of contributing to society by implementing timely investments to secure earnings.

With regard to our long-term numerical targets, we aim to maximize corporate value by scrupulously achieving our numerical targets through the pursuit of scale and profitability to the tune of net sales of ¥1.6 trillion or more and an EBITDA margin of 20% or more as “entry tickets” to be a company that can compete on the world stage.

To more accurately highlight our strategic intent and our efforts to improve the management of our portfolio, we changed disclosure segments in December 2022. With the segment reclassifications, we will aim to more clearly show the effects of the strategic allocation of management resources and continuous revision and replacement of our business portfolio, of which the most obvious example is our focused investment on semiconductor materials.

Please see page 40 for details on segment reclassifications.

### Initiatives to Improve ROIC

Turning to our key performance indicators (KPIs), in a change from the KPI set forth in the long-term vision we announced in December 2020, we have introduced return on invested capital (ROIC) as a key numerical target from the perspective of emphasizing discipline.

We will promote awareness of ROIC-focused management among the heads of each business headquarters by measuring ROIC by each headquarters and the sub-business units that constitute the business headquarters and by ranking each sub-business unit by its ROIC components. In addition, we will instill ROIC-focused management and strive to improve portfolio management with the aim of achieving ROIC of 10% or more, by implementing both regular monitoring on a quarterly basis and a variety of measures, such as linking ROIC to management evaluations and bonuses.

	2021 (results)	2025 (target)	2030 (target)
Net sales* (trillion yen)	¥1.4	¥1.6	¥1.8–1.9
EBITDA margin (%)	14.3	20	
ROIC (%)	4.3	10% over the medium term	
Net D/E ratio (times)	1.15	Aim to achieve 1.0	

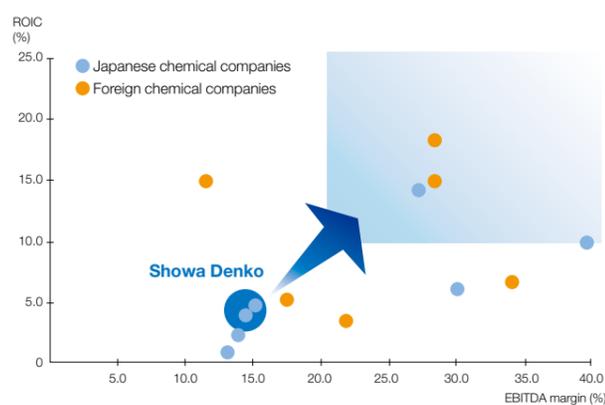
\* Figures do not reflect the impact of future M&As.

### Change to New Segments for Disclosure in Line with the New Business Portfolio Strategy

New segments	Subsegments	EBITDA margin (2025 target)
Semiconductor and Electronic Materials	Semiconductor materials (front-end and back-end processes)	30% or more
	Device solutions (HD)	
Mobility	Automotive products	20% or more
	Lithium-ion battery materials	
Innovation Enabling Materials	Ceramics	15% or more
	Aluminum specialty components	
Chemicals	Petrochemicals	15% or more
	Graphite electrodes	
Others	Life science	Achieve critical mass

Attribute of the business portfolio  
■ Core Growth ■ Fundamental Technologies/Materials  
■ Stable Earnings ■ Next-Generation

### Asset Efficiency and Profitability of Global Chemical Companies

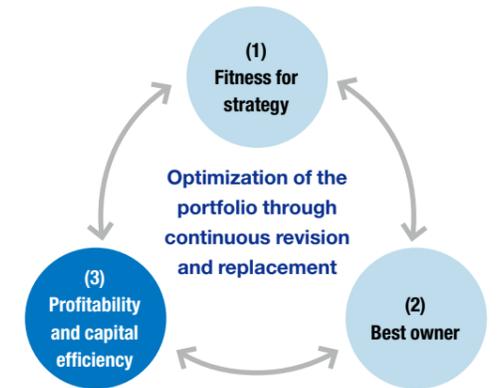


Source: Prepared by Showa Denko based on financial results and other disclosed materials.

## Improvement in Portfolio Management

Portfolio companies incessantly strive to improve their portfolios. Showa Denko strives to further improve its portfolio management by continuously revising and replacing its business portfolio. The Company has adopted three criteria as its portfolio management policy, as follows. (1) Fitness for strategy: Whether a business matches the strategies of the Company’s overall strategies and the strategies reflecting the roles of each business unit in accordance with the attributes of the portfolio, with sustainability as a prerequisite. (2) Best owner: Who the best management authority is to maximize the value of a business. (3) Profitability and capital efficiency: Whether a business or investment will satisfy expectations in terms of profitability and capital efficiency. Using these criteria as management guidelines, we focus on ROIC and seek to maximize corporate value.

### Portfolio Management Policy

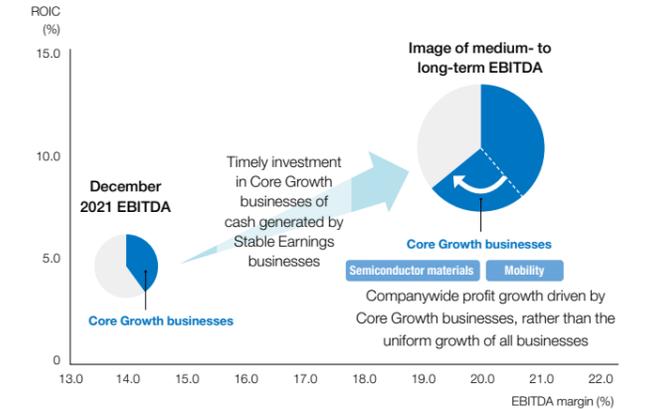


### Strategic Allocation of Management Resources

Showa Denko is concentrating its management resources in semiconductor materials and mobility, its Core Growth businesses, while utilizing the funds it obtained through a public offering in 2021. We will aim to drive Companywide profit growth and to achieve profitability and capital efficiency that are high enough to compete on the world stage, through the focused allocation of management resources in Core Growth businesses.

Furthermore, we will increase the proportion of net sales accounted for by Core Growth businesses by growing such businesses. This strategy will see Companywide profit growth driven by Core Growth businesses, rather than the uniform growth of all businesses. As a result, we will raise the Companywide EBITDA margin—at a level equivalent to that of global chemical companies’ scale of business and profitability—which is the weighted average of the EBITDA margins of each business.

### Image of Growth by Strategic Allocation of Management Resources to Core Growth Businesses



### Progress in Portfolio Reform

In its long-term vision, Showa Denko launched targets for selling ¥200 billion worth of businesses in terms of business value. Subsequently, the Company promptly made decisions on business sales, such as announcing the sale of its aluminum can, aluminum rolled product, food wrap film, printed wiring board, and energy storage device businesses. To date, we have achieved approximately 80% of our target. We are working to optimize the allocation of management resources and restructure our business portfolio to realize continuous growth and spur innovation through the integration of the technologies of Showa Denko and Showa Denko Materials. In proceeding with such efforts, we have carefully examined each of the businesses for sale and transferred them to the best owners, who can fully utilize the technological capabilities and strengths of such businesses, including solid relationships with customers, to facilitate their further development.

As for businesses that we will continue to operate, those connected to the semiconductor industry—a Core Growth business—will require large-scale investment given the likelihood of high market growth. With this in mind, we will raise investment funds on a Companywide basis by earning stable profits through Stable Earnings businesses such as petrochemicals and carbon.

As there is no end point to portfolio management, we will continuously examine business portfolio replacement to continue improving growth and profitability on an ongoing basis.

## Overview of the Long-Term Vision | Financial and Capital Strategies

### Specific Roadmap for Achieving Our Targets

#### Measures to Improve Profit

With regard to cost reductions and improvements in the profit structure, we promoted initiatives to reduce costs and enhance the profit structure to create synergistic effects through the integration of Showa Denko and Showa Denko Materials in a variety of areas. These included sales, procurement, production, and business site integration, with the expectation of achieving profit improvement of ¥28 billion by the end of 2023. As a result of these efforts, we achieved an improvement of ¥20.8 billion in 2021, ahead of the planned schedule.

With improvement measures progressing steadily, we have increased our target for profit improvement by ¥2 billion to ¥30 billion by the end of 2022, a year ahead of schedule.

Policy	Effect (Billions of yen)		
	Under the long-term vision	Under the update of the long-term vision	
	2021 (forecast)	2021 (actual results)	2025 (forecast)
<b>Improvement of profit from sales</b>			
• Revision of sales policies for customers and agents, etc.	¥3.0	¥3.2	¥3.0
<b>Reduction of purchasing and logistics costs</b>			
• Use of common materials and consolidation of logistics-related suppliers	3.0	2.6	3.0
• Sharing of transportation vehicles, warehouses, and personnel, etc.			
<b>Reduction of rents</b>			
• Reduction through head office integration	1.0	1.0	1.0
<b>Optimization of operations / improvement of productivity</b>			
• Structural reforms through organizational integration and operational efficiency improvements, etc.	14.0	7.3	15.0
• Improvement of productivity on manufacturing lines			
<b>Reduction of other costs</b>			
• Reduction of common costs, SG&A expenses, etc.	7.0	6.7	8.0
<b>Companywide total</b>	<b>¥28.0</b>	<b>¥20.8</b>	<b>¥30.0</b>

#### Efforts to Streamline Our Assets

In our long-term vision, we adopted a plan to generate ¥50 billion in funds by 2021. Under this plan, we worked to boost working capital and sell cross-shareholdings and other assets. Thanks to these efforts, we raised ¥64.7 billion in 2021, far exceeding the original plan.

In addition, we determined a policy under which we will in principle sell all of our cross-shareholdings. Moreover, we will generate a further ¥65 billion by 2025 and reduce our assets by over approximately ¥130 billion on a cumulative basis by 2025, by advancing measures such as the sale of idle assets.

Initiatives	Effect (Billions of yen)		
	Under the long-term vision	Under the update of the long-term vision	
	2021 (forecast)	2021 (results)	2025 (forecast)
Improvement in working capital*1	¥25.0	¥25.3	¥30.0
Sale of strategically held shares*2	20.0	29.4	45.0
Sale of other assets*2	5.0	10.0	55.0
<b>Companywide total</b>	<b>¥50.0</b>	<b>¥64.7</b>	<b>¥130.0</b>

\*1 Calculated from working capital turnover days at the end of 2020, number of days of improvement in 2021 (actual) and 2025 (estimate), and sales figures of retained businesses.

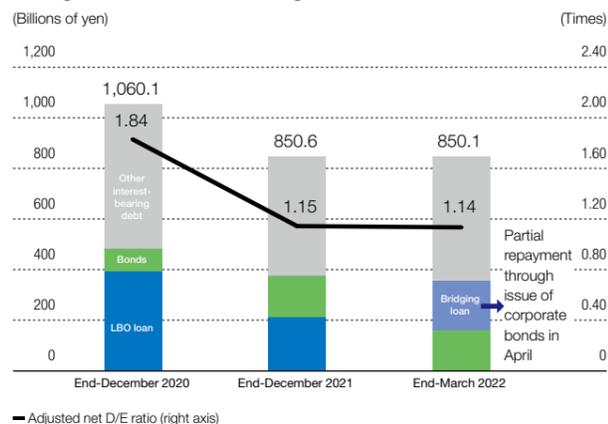
\*2 Accumulated amount of the sale of shares since 2020, excluding sale of shares of affiliate companies and divested businesses.

#### Reduction of Interest-Bearing Debt

At the end of December 2021, our interest-bearing debt came to ¥850.6 billion, down ¥209.5 billion compared with the end of December 2020. This reduction reflected such factors as the sale of assets in conjunction with reform of our business portfolio and efforts to streamline assets. The net D/E ratio increased to 1.15, partly as a result of the public offering. In December 2021, meanwhile, we issued bonds (¥100 billion), the proceeds of which we used to partially repay a leveraged buyout (LBO) loan. In addition, we carried out the prepayment of the LBO loan at the end of March 2022 by converting it to a bridging loan to reduce finance costs. We also issued a further ¥113 billion of bonds in April 2022, which we used to partially repay the bridging loan.

We will continue to aim to stabilize finances and cut finance costs by reducing interest-bearing debt.

#### Changes in the Interest-Bearing Debt Balance



— Adjusted net D/E ratio (right axis)

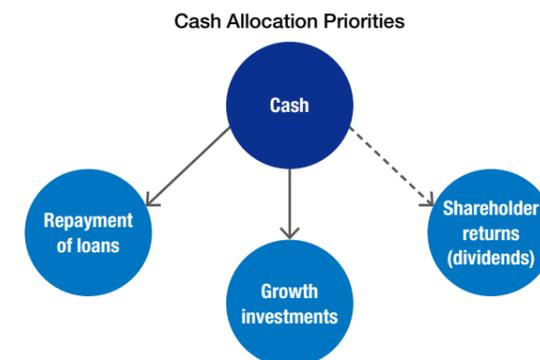
#### Capital Allocation

In view of the post-integration situation, we must allocate cash obtained through future business growth and business sales to implement growth investments aimed at expanding profits, while prioritizing to a certain degree the repayment of loans. While we aim to generate ¥1 trillion in cash flow from operating activities over the next five years on a consolidated basis, we plan to direct approximately a half to two-thirds of the cash flow generated to capital expenditures centered on Core Growth businesses, applying the remainder to maintaining stable dividends and reducing interest-bearing debt. If further strategic investments become necessary, we will raise funds through asset sales, portfolio replacement, and other means.

### Shareholder Returns Policy

As for shareholder returns, Showa Denko aims to achieve total shareholder return—a comprehensive indicator for improving corporate value—at a level in the top 25% of the global chemical industry.

As previously mentioned, to improve our corporate value we will actively carry out capital expenditures centered on Core Growth businesses and reduce interest-bearing debt to bolster our financial standing. In addition, for the time being we will maintain a dividend policy of paying stable dividends.



In view of the post-integration situation, we must prioritize to a certain degree the repayment of loans and growth investments aimed at expanding profits.

### Operating Results (Fiscal 2021)

The Group recorded consolidated net sales of ¥1,419,635 million in 2021, a substantial increase of 45.8% compared with the previous year. Sales in the Others segment decreased significantly due to the deconsolidation of SHOKO CO., LTD., resulting from the transfer of shares in the company. Sales were also down in the Aluminum segment as a result of the sale of the aluminum rolled products and aluminum can businesses. However, sales increased in the Petrochemicals segment thanks to market recovery. Sales were also up in the Chemicals, Electronics, and Inorganics segments due to a rise in sales volumes compared with fiscal 2020, when the impact of the COVID-19 pandemic led to a significant decline in sales. The increase in consolidated net sales also reflected the inclusion of the Showa Denko Materials segment in the consolidated results for the entire year.

The Group posted operating income of ¥87,198 million, a turnaround of ¥106,647 million from the operating loss in the previous year. Each segment was impacted by a decline in the production of automobiles and other vehicles consequent upon a shortage in the supply of semiconductors and by soaring raw materials prices. Despite such adverse conditions, operating income increased in the Petrochemicals segment due mainly to a significant improvement in the naphtha price factor, and in the Inorganics segment owing to a sizeable increase in sales volumes in conjunction with a recovery in demand for steel.

Operating income was also boosted by the inclusion of the Showa Denko Materials segment in the consolidated results for the entire year, although the deconsolidation of SHOKO CO., LTD., led to a decline in operating income in the Inorganics segment. The effects of various measures in the Chemicals, Electronics, and Aluminum segments also prompted an increase in operating income.

Although the Company recorded a net loss attributable to owners of the parent of ¥12,094 million, this represented an improvement of ¥64,210 million from the previous fiscal year. The loss was attributable to the recording of business restructuring expenses of ¥30.1 billion in connection with the transfer of the energy storage devices and systems businesses and the posting of environmental expenses of ¥9.0 billion for production sites in the Aluminum Specialty Components business.

Total assets at the end of the year amounted to ¥2,142,390 million, a decrease of ¥61,216 million from the level at December 31, 2020. Although cash and deposits increased largely as a result of a rise in funds received from a public offering, total assets declined due to a drop in tangible fixed assets and intangible fixed assets including goodwill. Despite an increase in accounts payable-trade, total liabilities came to ¥1,323,937 million, down ¥161,588 million from the level at December 31, 2020, as a result of a decline in interest-bearing debt.

#### Topics: Communication with Shareholders and Investors

Showa Denko provides disclosure on the Group's vision, strategies, and corporate information in an easy-to-understand, timely, and appropriate manner, engaging in investor relations (IR) activities to deepen trust and understanding of the Group through proactive dialogue with shareholders and investors.

Although the impact of COVID-19 has resulted in a shift to communication with shareholders and investors centered on online briefings and telephone conferences, the Company's management team held a small meeting with analysts after taking sufficient infection countermeasures. The meeting saw a lively discussion on the update of the long-term vision under the new management system. In addition, we held a Packaging Solution Center facility tour and business briefing in March 2022, holding the tour and briefing in a hybrid format with in-person and online participants. In addition, we held an online company briefing for individual investors in December 2021, with the participation of 556 individual investors from across Japan.



Packaging Solution Center facility tour and business briefing

## Discussion between the CFO, the CSO, and an Analyst

# Working to Be a Company Continuing to Create Value in a Sustainable Manner

Showa Denko invited Mikiya Yamada of Mizuho Securities Co., Ltd., to join Hideki Somemiya, Showa Denko's chief financial officer (CFO), and Tomomitsu Maoka, the chief strategy officer (CSO), for a discussion on the Company's financial and capital strategies, to ensure that it continuously creates value in a sustainable manner.

(The discussion was held in a Showa Denko conference room on April 13, 2022.)



### Hideki Somemiya

Managing Corporate Officer and CFO  
Showa Denko K.K.

#### Profile

Hideki Somemiya held positions at Nomura Research Institute, Ltd., Merrill Lynch Japan Securities Co., Ltd., and JPMorgan Securities Japan Co., Ltd., where he was managing director of the Technology, Media & Telecommunication Group of the Investment Banking Division prior to joining Sony Corporation. At Sony, Mr. Somemiya was in charge of Groupwide M&A activities, served as CFO of semiconductor operations, and took part in the launch of an AI sensing solution business. He joined Showa Denko in October 2021 and took up his current position in January 2022.

### Mikiya Yamada

Senior Analyst, Equity Research  
Department, Mizuho Securities Co., Ltd.

#### Profile

Mr. Yamada began his career at Dow Chemical Japan Ltd., where he served in a number of positions, including general manager of research and development and of financial planning as well as financial planning manager for Dow's Pacific region. After working for Goldman Sachs Co., Ltd., JPMorgan Chase & Co., Lehman Brothers Japan Inc., and Barclays Securities Japan Limited, he joined Mizuho Securities in 2016. Mr. Yamada covers the chemical and textile sectors extensively in his current position.

### Tomomitsu Maoka

Managing Corporate Officer and CSO  
Showa Denko K.K.

#### Profile

After starting his career at A.T. Kearney, Inc., Tomomitsu Maoka moved to Infineon Technologies Japan K.K., and then to Lenovo Japan K.K., where he was involved in business strategies and business model transformation, before joining Renesas Electronics Corporation. At the company, he covered various roles including corporate planning, the entire operations in China, etc., as senior vice president. He joined Showa Denko in October 2021 and took up his current position in January 2022.

### Aiming to Become a Global Top-Level Functional Chemical Manufacturer from Japan

**Yamada** Let me begin by saying that the strategy outlined in the update of Showa Denko's long-term vision—of clearly committing management resources to business areas where the Company can prevail—was very straightforward. With the adoption of semiconductor materials and mobility as the two pillars of its investments, the Company has set out a well-defined scenario for the semiconductor materials area in which it will invest in semiconductor gases, a strength of Showa Denko; back-end process materials, a strength of Showa Denko Materials (formerly Hitachi Chemical); and ceria-based slurry, where vertically integrated synergies can be utilized.

In contrast, I believe that challenges remain in mobility. I wonder if Showa Denko's mobility business is of a sufficient scale for it to operate successfully in the mobility area. I have my doubts regarding both the significance of positioning mobility as one of the two priority investment areas and the likelihood of the Company prevailing in competition. Prevailing in growth areas naturally requires the commitment of abundant management resources. Unfortunately, however, I do not believe that Showa Denko's financial standing allows for the investment of adequate management resources in both areas at the present time. While I applaud the Company's determination and its approach to semiconductor materials, I think that many investors are looking for a more persuasive narrative on how it will implement its strategies.

**Somemiya** Thank you for your comments. As you correctly point out, we recognize that improving our financial standing is our highest priority. We must achieve a more appropriate capital structure and develop the strength to facilitate our next major growth investment. Under the new leadership of president and CEO Takahashi, Showa Denko has laid out a management approach with an emphasis on return on invested capital (ROIC), with a view to not only instilling portfolio management (P.28) within the Company but also making disciplined investment an aspect of our appeal to external communities. This stance reflects our intention to respond to the points raised by capital markets.

When I joined the Showa Denko Group in October 2021, head office and individual divisions communicated in a manner resembling a hub-and-spoke system. However, as we set about implementing portfolio management, those who lead stable earnings businesses within the Company are entitled to know how the businesses receiving the cash they have generated will invest that cash and what returns are being targeted. Therefore, to improve on the previous structure, we updated it to allow all the general managers of divisions to also take part in discussions on the plans of other divisions, beginning in December 2021. With the updated structure enabling each division to understand its own role in overall optimization, we have introduced ROIC and key performance indicators (KPIs) as a shared language and aim to make the structure function effectively. This structural change was not achieved overnight. Rather, it was realized by president and CEO Takahashi (the then CSO), who established the foundations over a period of three years, including the unification of reporting formats.

Acquiring the former Hitachi Chemical entailed a financial risk in terms of generating cash flow. The acquisition was the biggest decision in our history. Given Showa Denko's current position, I regard achieving a more appropriate capital structure as an urgent priority to take the Company to a point where it can carry out strategic investments under normal conditions. We are aiming to generate ¥1 trillion

in operating cash flow over the next five years and plan to invest between half and two-thirds of this amount with a focus on semiconductor materials. In the update of our long-term vision, we have indicated our intentions for capital structure and capital allocation as part of our financial strategies. We will also continue to refine our targets, such as the appropriateness of a debt-to-equity (D/E) ratio of 1.0—a long-term numerical target—and implement financial management to establish a balance sheet with capacity for further investment.

Although remuneration linked to our stock price currently applies only to directors and corporate officers, we envisage introducing this system for all employees at some point. In promoting portfolio management, we believe that our corporate value will improve if employees strive to achieve overall optimization with an awareness of the roles of each portfolio category, which in turn allows us to show them that they will be rewarded accordingly. We therefore aim to implement this system for employees after providing a sufficient explanation of its introduction.

**Maoka** Showa Denko and the former Hitachi Chemical have a good relationship, with each strength complementing the other's weaknesses. Although Showa Denko, which is positioned in the midstream section of the value chain, has capabilities in materials development, difficulties in understanding how its products are used in the downstream section made it challenging to develop products with high added value. On the other hand, the former Hitachi Chemical, which is positioned in the downstream section of the value chain, has outstanding insight into how its customers wish to use its materials in their products and a wealth of know-how on meeting their requirements. However, over-optimizing its adaptability has resulted in the gradual erosion of its capabilities in midstream materials composition and development as well as in investment. We view the integration of the two companies as an excellent combination, because it facilitates value creation using the entire value chain, applying Showa Denko's material development capabilities to address the requirements of Showa Denko Materials' customers.

Going forward, the way in which we solve social issues will be an important theme. The main area in which we have been able to demonstrate our ability to create synergies is in semiconductor materials. We must set forth a more specific value creation scenario in the mobility area, exactly as Mr. Yamada points out. Today, our business activities involve the connected, autonomous, shared, and electric (CASE) field for automobiles. Within this field, we focus on electrification trends, as we believe it is crucial for us to enhance added value while creating new products and services that leverage the synergies of both companies.

Vertical integration that strengthens the value chain from midstream



## Discussion

to downstream in such a manner is highly unusual. For this reason, I believe that we can create unique models and value and I aim to take on a variety of challenges.

**Yamada** You mean that the newly integration of Showa Denko and Showa Denko Materials will enable the integrated Company to proceed to a new dimension. To make that happen, I believe that it will be vital for everyone involved to work together, as Mr. Somemiya has explained. The Company will not be able to record great achievements unless all concerned are aware of their own roles and understand each other's specific characteristics and ideas. In that sense, communicating collectively, rather than on a one-to-one basis, surely holds the key to creating synergies and accomplishing strategies.



**Somemiya** You are absolutely right. If one excludes the large petrochemicals, hard disk, and graphite electrode businesses, Showa Denko is a collection of 20 or more medium-sized businesses with net sales on a scale ranging from ¥20 billion to ¥60 billion, as opposed to a corporate entity with net sales of ¥1.4 trillion. Accordingly, we view achieving overall optimization through portfolio management and ensuring that everyone understands the trajectory of our overarching strategy as critical aspects of our business management.

To this end, we will strengthen cross-divisional functions that transcend the boundaries of each organization. To give an example, the organization of the CFO, which I preside over, reports to Chief Human Resource Officer (CHRO) Nori Imai on frontline conditions and other matters as a member of the organization under the CHRO. In addition, those engaged in accounting in all divisions—who have thus far been closely affiliated with their own divisions—will report to me on such issues as division expenditures, as members of the organization under the CFO. In this way, we have put in place a system in which the CFO and the CHRO provide support for the operation of divisions while steadfastly communicating Companywide policies to divisions through those engaged in personnel and accounting in each division and functional division. The aim of this system is to strengthen cooperation between CXOs and business divisions. We have introduced the same arrangement for other CXOs as well, although the degree of corporate governance differs according to function.

In addition, we have begun tackling the development of human resources with high potential. While it had been common for employees to build a career in the division to which they were assigned after joining Showa Denko, the Company is now expanding the promotion of transfers across divisions and job rotations, including at the head office, which will enable management teams to identify and develop human resources with high potential.

**Maoka** Beginning in 2022, Showa Denko has been holding town hall meetings at various locations. At these meetings, Mr. Somemiya touched on the ranking of business divisions in terms of ROIC. At first, I was concerned that we would receive negative feedback from those in the business field about being ranked in such a way. However, many responded that they were grateful, as no one had ever discussed such an issue with them before and it was enlightening. All those present expressed their understanding of the explanations provided on portfolio management and ROIC, which helped them to gain an appreciation of the rationale behind the Company's decisions. Speaking personally, I was greatly heartened to learn that employees felt this way on the occasion of the meeting.

**Yamada** Your experience makes clear that sharing information is the first step. I believe that making an issue visible facilitates the establishment of a shared language, which further enhances the importance of working together.

**Maoka** As horizontal cooperation progresses between businesses, situations will arise in which—for example—a business supplying raw materials commits funds to product development expenses or capital expenditures, which might put Business A at something of a disadvantage but result in a positive outcome for the Company as a whole. At such times, I intend to rate the efforts of Business A as valuable and demonstrate that assessment resolutely in terms of my actions. Since focusing only on numbers would ultimately result in failure, I believe it is crucial that we move forward while placing due importance on both individual businesses and the Company as a whole.

**Somemiya** The greater the number of employees who understand and implement Showa Denko's purpose and values\*, the better we can establish a virtuous cycle that improves not only the Company's financial but also its nonfinancial value. President and CEO Takahashi has frequently pointed out that tomorrow will not be better than today unless we change what we do, the way we do it, and the people who do it. Therefore, I hope that Showa Denko's Values will become a deeply ingrained part of its guiding precepts.

\* Values: This is the value system we hold dear. It entails being Passionate & Results-Driven, Agile & Flexible, having Open Minds & Open Connections, and maintaining a Solid Vision & Solid Integrity.

**Yamada** Although it may not be appropriate for an analyst who basically focuses on business results to say so, I believe that around only half of a company's value may be found in its numbers. To convert value that is not expressed in numbers into that which is visible in the numbers over the long term, it is important for employees to move in the same direction while remaining confident that they are being evaluated properly in both quantitative and qualitative terms.

### Roadmap for Realizing Our Long-Term Vision as a "Co-creative Chemical Company"

**Yamada** As implied in Showa Denko's purpose—"Change society through the power of chemistry"—society will not be transformed without the power of chemistry. It is my belief that the power of chemistry is indispensable to maintaining the types of value that we currently enjoy, to the maximum possible extent. At the same time, the power of chemistry has an integral role to play in helping society progress toward the resolution of environmental issues, such as carbon neutrality, and the achievement of the United Nations Sustainable Development Goals (SDGs), including the goals related to

social inequality and hunger, in a way that leads to greater affluence. With that said, the fact remains that the SDGs cannot be achieved through chemistry alone. This is why shifting to a co-creation model that reflects current circumstances is the correct direction for Showa Denko to take. The way in which it makes this shift will be of the utmost importance, and I have high expectations of the Company in this regard. Co-creation increases the number of stakeholders with whom Showa Denko engages. As such stakeholders each have stakeholders with a host of interests of their own, I believe that Showa Denko can make a more persuasive case for convincing stakeholders to join it in realizing co-creation, if it can demonstrate in specific terms the way in which it will distribute the value created with internal and external parties.

People's attitudes do not change readily. I believe that it is only when people first change their actions and achieve results and experience success that their attitudes change.

**Maoka** I believe that efforts toward carbon neutrality cannot progress without the consent of consumers. To this end, we must involve not only companies but also a variety of stakeholders, such as governments. Showa Denko carries out two sets of activities under the Jisso Open Innovation Network of Tops (JOINT) and JOINT2 (📍 P.45), consortiums engaged in the development of semiconductor packaging materials, substrates, and equipment that are prime examples of activities involving stakeholders. As materials alone cannot create products of value, co-creation initiatives with a range of parties are indispensable. Also important is highlighting the significance of such initiatives to the world. Even if Showa Denko does something of value, ultimately it will see no returns and create no incentives if no one knows that the Company was responsible for the achievement. Establishing a system to address this point will be a challenge for us as we go forward. Although we have focused on in-house collaboration between divisions and departments thus far, I believe that it is vital to create a foundation to create value by pursuing co-creation, without being constrained by company or corporate frameworks.

**Yamada** Providing an environment for creating such a foundation is of crucial importance. Meanwhile, I feel that the chemical industry is lagging behind other industries in making use of digitization. Although Showa Denko is making great strides in terms of streamlining production and other matters, I hope that it will leverage digital technology to connect directly with customers, academia, and society to create new value. I think that connecting directly with a variety of stakeholders will invigorate communication and increase the sharing of information, which will contribute to the overall optimization of companies and of the industry.

**Somemiya** Utilizing digital technology to connect directly with a variety of stakeholders certainly holds the key. I also hope that we can create a platform in which more people with open minds can participate, and construct an ecosystem that enables not only Showa Denko but all parties to enjoy the advantages.

Similarly, achieving carbon neutrality requires the involvement of all parties, including the industry as a whole and governments, rather than the efforts of a single company. To this end, we must create a movement that is committed to fundamentally realizing carbon neutrality.

**Yamada** If companies only invest at their own convenience and at a time that suits them, the fundamental issue will remain unsolved. Instead, I believe that it is crucial for co-creation partners to build systems by reconciling their respective viewpoints and objectives. Although Showa Denko is prepared to do what it can to realize carbon neutrality, making investments in carbon neutrality on its own would not produce the returns demanded by investors, who would



not tolerate such investment. I believe that progress can only be made by improving co-creation to a stage where all parties know the actions that they must take in order to work together.

### Promoting Dialogue with Investors and Other Stakeholders

**Yamada** This year marks the 20th year since I began covering Showa Denko, and I have been truly impressed with the progress it has made. Again, as Showa Denko's purpose sets out, society will not change without the power of chemistry. The chemical industry appeals to me. I sincerely hope that Showa Denko will become one of the world's leading chemical companies. To achieve this status, it must actively communicate information to customers and the various stakeholders with whom it engages in co-creation, including communicating more information to society and stakeholders.

**Somemiya** The reason we have not communicated information to an adequate extent lies in the fact that we have not been sufficiently active. Through my communication with investors as CFO, I have come to realize very keenly that Showa Denko has not sufficiently met the trust and expectations of its stakeholders. We have not necessarily been negligent in any way, and I do appreciate that we have worked to engage with stakeholders to the best of our ability. Nevertheless, given that we have not met such trust and expectations while remaining unaware of changes in the external environment due to our long history and past connections, we must make a fresh start. On this basis, the two companies will become a new company called Resonac\*, rather than two companies coming together. Accordingly, the new company will be aware of the need to create a vision and new value.

\* Resonac is the name of the newly integrated company to be established in 2023 (subject to approval at the extraordinary shareholders' meetings scheduled to be held for both companies in September 2022).

**Maoka** When Mr. Yamada spoke at a study session held for the management team at Showa Denko, his answer to a question on why the chemical industry was not fairly evaluated—despite the value it produced—was that chemistry was basically the name of a process and that the activities of the chemical industry were not widely known. This reply made a strong impression on me. It made me aware once again that it is important to objectively analyze how our business affects a variety of people and to develop methods of improvement. Ultimately, we deliver value to people, rather than companies or investors. We must devote ourselves to implementing a way of co-creating that captures people's hearts, unshackled by the past conventions of the chemical industry.

## Material Issues for Sustainability (Materiality)

To change society through the power of chemistry based on our purpose, we are strengthening our business execution system in accordance with the belief that we must position the concept of sustainability as an essential component of management. As part of these efforts, we have established Sustainability Vision 2030 and identified material issues for sustainability to implement the main strategies of our long-term vision. We are also working to raise awareness of the material issues within the Company.

### Roadmap for Achieving Sustainability Vision 2030

Positioning 2022, the year preceding the launch of the newly integrated company in 2023, as a year for preparations to achieve Sustainability Vision 2030, we have conducted repeated discussions and built a system to achieve the vision, such as incorporating issues of materiality into our medium- to long-term targets. In 2023, we will continue our efforts with the aim of enabling our unique essence to blossom from approximately 2026 onward, by adapting our initiatives based on engagement with a variety of stakeholders.

To achieve Sustainability Vision 2030, we have established five key areas and are promoting activities on a Companywide basis with the Sustainability Department, which began in January 2022, serving as the secretariat. The five key areas are (1) improvement of sustainability management to integrate it with management and business strategies; (2) creation of sources of growth through the development of businesses and technologies with a focus on sustainability; (3) creation of value resulting from the resolution of cross-organizational issues, such as carbon neutrality; (4) value creation through improvement of stakeholder engagement; and (5) cultivation of a sustainability mindset among employees.

**Sustainability Vision 2030**

**Achieve corporate growth through the resolution of social issues**  
Develop into a company with like-minded partners across the world that realizes its own continuous growth and corporate value improvement, by solving social issues and offering value to society through its technologies and businesses

**A company with like-minded partners throughout the world**  
Become a "Co-creative Chemical Company" that is the first choice of, and can choose, partners in creating a sustainable and better society, including future generations of customers, employees, investors, and stakeholders



Cultivation of a sustainability mindset among employees based on our purpose and values

### Sustainability Management

The management team, corporate headquarters, business divisions, plants, and Group companies unite as one to promote cross-organizational projects and internal cooperation, with the CEO supervising and the CSO driving the promotion of sustainability. After deliberating and deciding on important items such as policies and plans in relation to sustainability, the Management Committee consults with and reports to the Board of Directors.

The Company completely overhauled its sustainability promotion system in 2022. Under the new system, the Sustainability Promotion Council convenes a monthly meeting at which Group CXOs, including the president and CEO, assemble. The meeting sees discussions on a variety of topics, such as medium- to long-term strategies, non-financial KPIs, and engagement with stakeholders. In addition, the

council has put in place a system to address specific issues with agility and on a cross-organizational basis by establishing projects and other bodies under its control. The Company also strives to cultivate a sustainability mindset by organizing forums for internal communication where officers and employees exchange opinions.

#### Sustainability Promotion System (As of June 30, 2022)



#### Corporate Officer Study Groups

A corporate officers' study group meeting, held in March 2022, discussed a variety of sustainability issues, such as awareness of supply chain risks and the importance of addressing the issue of climate change. The meeting also saw a range of discussions on the Company's purpose. These included a discussion in which participants gave their views on the social and environmental impact resulting from the Company's use in its operations of natural resources (such as hydroelectric power).

#### New Employee Training

Training for new employees in April 2022 saw groupwork on the theme of whether companies could create profits through sustainability contributions. As the generation that will lead the Company into the future, participants voiced many frank opinions which engaged sincerely with social issues, without being bound by Showa Denko's business structure or current restrictions.

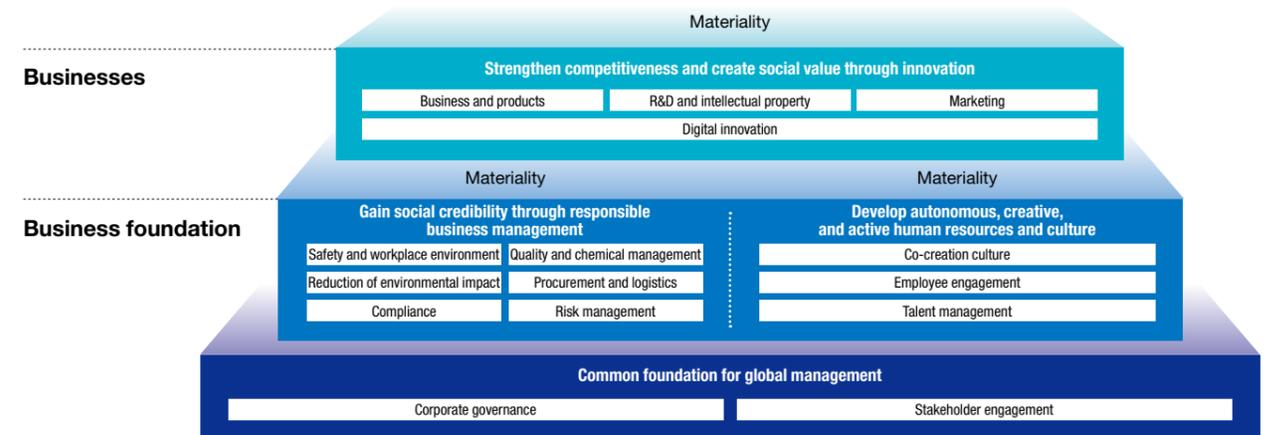
#### Forums for Exchanging Opinions with Directors and Audit & Supervisory Board Members

At a meeting held in May 2022 to facilitate the exchange of opinions with directors and Audit & Supervisory Board members, corporate officers shared their determination to pursue sustainability. Concurrently, participants engaged in a lively discussion on the development of the human resources who will lead efforts to create value over the medium to long term, as well as the importance of making decisions based on the understanding of a wide range of risks.

### Material Issues for Sustainability

With an eye on 2030, Showa Denko has identified three issues of materiality in addition to their constituent elements. We have reflected these issues of materiality in the strategies set out in the long-term vision (P.27), and aim to incorporate them into our nonfinancial KPIs by approximately 2025.

The three issues of materiality are also related to the ideal state set out in our long-term vision through to 2030: becoming a company that can compete on the world stage, a company that contributes to a sustainable global society, and a company that develops co-creative talent that represents Japan's manufacturing industry. In addition, they address both the achievement of our long-term vision and the expectations of society. While we have not set KPIs for corporate governance or stakeholder engagement, we will also focus on these areas, which are as important as our issues of materiality in establishing a common foundation for global management.



### Contribution to the SDGs through businesses

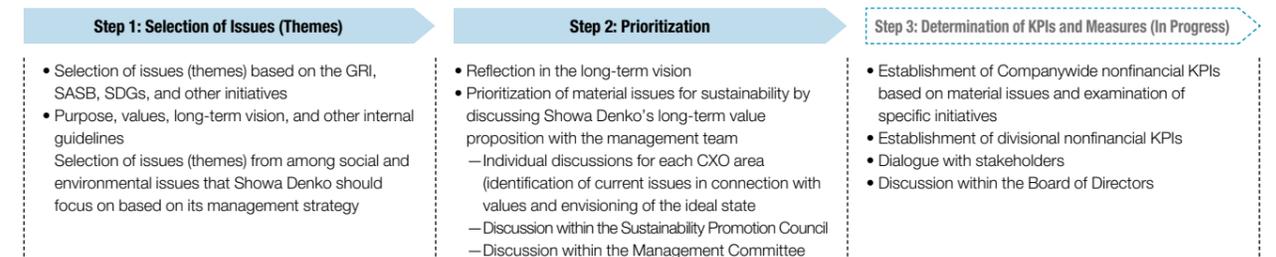
We have positioned the focus of our corporate activities as contributing to SDGs 12 and 17 as a Co-creative Chemical Company that seeks to create a recycling-oriented society. Goals that we contribute to through businesses and products are in the upper part of the semicircle, with goals that we contribute to through our business foundation in the base. Going beyond areas where we already contribute through our businesses, we are looking ahead with the aim of contributing to the creation of a future that we seek to realize through the power of chemistry.



The issues we will identify and solve that are not expressed in SDGs 1 to 17: the future we seek to realize through the power of chemistry

### Process for Formulating Material Issues for Sustainability and Nonfinancial KPIs

In identifying its material issues, Showa Denko selected issues that contribute to realizing its long-term vision in terms of both expectations from society and level of importance to the Company. Currently, we have begun formulating material issues and related strategies and measures as well as Companywide nonfinancial indicators. Going forward, we plan to further evolve them, including by establishing divisional KPIs, through discussions with the Board of Directors and dialogue with stakeholders.



## Material Issues for Sustainability

### Material Issues for Sustainability and Nonfinancial KPIs

We will increase the likelihood of achieving our issues of materiality with an eye on 2030 and our related medium-term nonfinancial KPIs. We will do this by featuring the KPIs in a series of Companywide management cycles ranging from formulation to implementation, progress confirmation, and monitoring and supervision by the Board of Directors.

The table below shows our corporate-level KPIs based on our three issues of materiality. (For a portion of the KPIs, the indicators have been removed.) We will incorporate the indicators into each divisional unit while continuing to hold repeated discussions, to determine specific initiatives that enhance the motivation of employees to engage with them.

Going forward, we will continually revise the KPIs in accordance with our level of progress in achieving them, and with the views and expectations of a variety of internal and external stakeholders.

#### Strengthen competitiveness and create social value through innovation

<b>The Company's ambition</b>	<b>Our ambition</b>	The source of our growth lies in business activities utilizing our technological capabilities to change society through the power of chemistry. We will strengthen our competitiveness through innovation and our businesses to create social value.
	<b>2030 targets</b>	We create social value through our businesses via a series of processes—from the identification of social issues to the development of technologies and the provision of solutions—and the harnessing of initiatives through co-creation.
	<b>Key constituent elements for achieving issues of materiality</b>	<ul style="list-style-type: none"> <li>• Creation of social value through our businesses</li> <li>• Identification of social issues and provision of customer value through marketing</li> <li>• Facilitation of open innovation and cooperation</li> <li>• R&amp;D and intellectual property strategies that solve social issues</li> <li>• Products and business strategies that contribute to the achievement of the SDGs</li> <li>• Digital innovation that improves and accelerates the creation of social value</li> </ul>
<b>KPIs (Issues we plan to discuss and confirm with stakeholders)</b>	<b>Key items</b>	<ul style="list-style-type: none"> <li>• Setting of targets and establishment of evaluation indicators for sustainability businesses and products</li> <li>• Initiatives for life cycle assessment (LCA)</li> </ul>
	<b>2025 targets</b>	<ul style="list-style-type: none"> <li>• Establish, implement, and monitor targets by business and mainstay product</li> <li>• Calculate the LCA for mainstay products and introduce evaluation methods at the R&amp;D phase</li> </ul>
	<b>2021 results</b>	<ul style="list-style-type: none"> <li>• Launched studies to formulate business evaluation indicators that include new social and environmental aspects</li> <li>• Commenced the pilot operation of a scheme to calculate our carbon footprint</li> </ul>
<b>Value creation</b>	<b>Social value</b>	<ul style="list-style-type: none"> <li>• Create social and environmental value directly and indirectly as a chemical manufacturer that serves as the basis for a variety of industries</li> <li>• Aim to maximize our positive impact and minimize our negative impact on society and the environment through the thorough implementation of responsible consumption and production in all of our businesses</li> </ul>
	<b>Environmental value</b>	
	<b>Economic value</b>	<ul style="list-style-type: none"> <li>• Create economic value by achieving business growth through the provision of social and environmental value, thereby helping to improve our corporate value</li> <li>• Raise employee motivation by helping employees to gain a solid sense that we are realizing our purpose through our businesses</li> </ul>

#### Gain credibility through responsible business management

<b>The Company's ambition</b>	<b>Our ambition</b>	As a chemical manufacturer, we will conduct responsible business management in all of our businesses from perspectives including safety, the environment, and quality to realize a sustainable society together with stakeholders, such as suppliers and customers. In addition, we will reinforce and enhance our system for managing increasingly diverse and complex risks by thoroughly implementing soft-law-based compliance going beyond legal and regulatory compliance.
	<b>2030 targets</b>	In addition to cultivating a safety culture and eliminating accidents of every kind, we will earn the trust of stakeholders by minimizing and preparing to tackle a wide range of risks, including strategic, operational, and hazard risks, to flexibly address the changing management and business environments and continuously offer value that is unique to us.
	<b>Key constituent elements for achieving issues of materiality</b>	<ul style="list-style-type: none"> <li>• Establishment of environments where all people can work with peace of mind</li> <li>• Provision of quality and safety to maximize customer value</li> <li>• Reduction of environmental impact throughout the entire product life cycle</li> <li>• Creation of a sustainable society, by working together with suppliers</li> <li>• Thorough implementation of soft-law-based compliance going beyond legal and regulatory compliance</li> <li>• Reinforcement of our system for managing increasingly diverse and complex risks</li> </ul>
<b>KPIs (Issues we plan to discuss and confirm with stakeholders)</b>	<b>Key items</b>	<ul style="list-style-type: none"> <li>• Cultivation of a safety culture and elimination of occupational incidents, equipment-related accidents, environmental accidents, accidents involving products, and product compliance violations</li> <li>• Reduction of environmental impact resulting from business activities</li> <li>• Promotion of sustainable procurement</li> <li>• Strengthening of integrated risk management and thorough implementation of compliance going beyond legal and regulatory compliance</li> </ul>
	<b>2025 targets</b>	<ul style="list-style-type: none"> <li>• Achieve zeros in five target categories</li> <li>• Reduction of greenhouse gas emission (GHG) volumes</li> <li>• Improve the quality of communication utilizing a self-assessment questionnaire</li> <li>• Entrench a global compliance standard and code of conduct within the Group</li> <li>• Establish and operate an integrated risk management structure and enhance our risk management system</li> </ul>
	<b>2021 results</b>	<ul style="list-style-type: none"> <li>• Number of serious occupational incidents, serious equipment-related accidents, environmental accidents, and quality compliance violations</li> <li>• Began consideration of new sustainable procurement guidelines (scheduled for formulation and disclosure in 2022)</li> <li>• Launched the examination of a new risk management system, compliance standard, and code of conduct (scheduled for formulation, introduction, and disclosure in 2022)</li> </ul>
<b>Value creation</b>	<b>Social value</b>	<ul style="list-style-type: none"> <li>• Balancing of our contribution to the resolution of social issues and duty as a chemical manufacturer through responsible business management</li> </ul>
	<b>Environmental value</b>	<ul style="list-style-type: none"> <li>• Reduction of environmental impact through improved recycling rates by reducing GHG emissions and waste</li> </ul>
	<b>Economic value</b>	<ul style="list-style-type: none"> <li>• Improvement of motivation, raising of productivity, reduction of costs, and enhancement of brand value through eradication of all types of accidents and other incidents and increased efficiency of internal processes</li> </ul>

#### Develop autonomous, creative, and active human resources and culture

<b>The Company's ambition</b>	<b>Our ambition</b>	The source of our value lies in cultivating co-creative individuals and nurturing a corporate culture to solve issues imaginatively via co-creation by forming connections autonomously with customers and stakeholders through empathy, including various parties who will lead future generations.
	<b>2030 targets</b>	Through the cultivation of creative and co-creative individuals and the nurturing of a corporate culture conducive to their development, we will aim to become a developer of talent whose employees are the envy of other companies.
	<b>Key constituent elements for achieving issues of materiality</b>	<ul style="list-style-type: none"> <li>• Nurturing of a co-creation culture born of mutual trust and respect</li> <li>• Development and acquisition of professional-minded human resources</li> <li>• Improvement of employee engagement</li> </ul>
<b>KPIs (Issues we plan to discuss and confirm with stakeholders)</b>	<b>Key items</b>	<ul style="list-style-type: none"> <li>• Implementation of our corporate philosophy</li> <li>• Strengthening of talent management</li> <li>• Continuous growth of individuals and the organization</li> <li>• Active involvement of human resources and ensuring of their psychological safety through the deepening of diversity and inclusion</li> </ul>
	<b>2025 targets</b>	<ul style="list-style-type: none"> <li>• Further evolve and strengthen examples of co-creation from our global awards</li> <li>• Increase the number of appointments through in-house recruitment that promote autonomous career development</li> <li>• Improve engagement-related scores</li> <li>• Enhance the diversity of management and nurture an inclusive corporate culture by increasing the ratio of female managers</li> </ul>
	<b>2021 results</b>	<ul style="list-style-type: none"> <li>• Planned and launched global awards (opportunities to accelerate the embodiment of our purpose and values) for the newly integrated company</li> <li>• Designed the way in which we will operate in-house recruitment for the newly integrated company</li> <li>• The ratio of female managers came to 4.5% in Japan and 11.5% globally</li> </ul>
<b>Value creation</b>	<b>Social value</b>	<ul style="list-style-type: none"> <li>• Promote innovation through internal and external co-creation aimed at solving social issues by cultivating the growth and active involvement of creative and co-creative individuals and the nurturing of a conducive corporate culture.</li> </ul>
	<b>Environmental value</b>	
	<b>Economic value</b>	<ul style="list-style-type: none"> <li>• Raise employee motivation and realize high productivity by boosting the competitiveness of human resources through strategic job rotations, with management developing leaders from the perspective of Companywide optimization.</li> </ul>

### Material Issues for Sustainability and Nonfinancial KPIs

We held a dialogue with outside experts on establishing our issues of materiality and KPIs



**Kenji Fuma** WEB  
CEO  
Neural Inc.

**Fuma:** The power of materials and chemistry is integral to solving social issues. There are many tasks that Showa Denko must and can address. Given that changes in the business environment will become even more dramatic from 2030 onward, Showa Denko should position the current period of the long-term vision as an 8.5-year period for preparing to reap the fruits of innovation in 2030 and beyond, eliminating restrictions in relation to people, products, money, time, and other matters. While there is no need to achieve KPIs in full from day one, it is crucial to move forward a step or two from the status quo and inspire a desire on the part of the relevant divisions to move ahead. Work on KPIs does not finish with their establishment. As revision becomes necessary, I think that Showa Denko's process of carefully formulating KPIs through repeated internal discussions is highly commendable. Nevertheless, becoming a company that can compete on the world stage, and a company with like-minded partners throughout the world, requires the inclusion of a global perspective. It is necessary for Showa Denko to backcast from its ideal state with a more long-term outlook. While I believe that its emphasis on people is also praiseworthy, Showa Denko must draw in and involve the generation of employees who will be at the heart of its management in 2040 and 2050. I also think it would be a good idea for the Company to cultivate future generations while exposing them to experiences outside the Company.

**Sustainability Department:** While we have positioned the achievement of our medium-term KPIs as a first step looking ahead to 2030, we reaffirmed that we must take larger steps, incorporating a global perspective, and nurturing a mindset to motivate all employees to work. We will also consider activities that benefit Showa Denko and society into the future, such as science, technology, engineering, art, and mathematics (STEAM) education.

### Views on Material Issues for Sustainability and Nonfinancial KPIs from the Employees in Charge

We met employees in charge of environmental safety, risk management, and compliance to hear their views on materiality and KPIs



**Meiko Saihata** WEB  
Employee in charge of environment and safety

Safety is our top priority and guiding principle. We have adopted the goal of eliminating accidents, disasters, and environmental accidents. We will not adopt half-hearted targets. This is because no one should suffer. We will continue to exhaustively communicate these targets with employees while incorporating them into our systems and frameworks one at a time.



**Tomotaka Tsutsuzaki** WEB  
Employee in charge of risk management



**Daisuke Yoshida** WEB  
Employee in charge of compliance

I hope we take the best elements of both the Showa Denko Group and the Showa Denko Materials Group, and make them better. We are striving to integrate the management of operational and hazard risks and develop global standards transcending regions that will serve as a foundation for our diverse range of employees, in order to underpin our contributions to further business growth and a sustainable society. In addition, a Companywide, cross-organizational team is currently formulating the Group Code of Conduct.

Note: Visit our website for details on the dialogues and interviews.

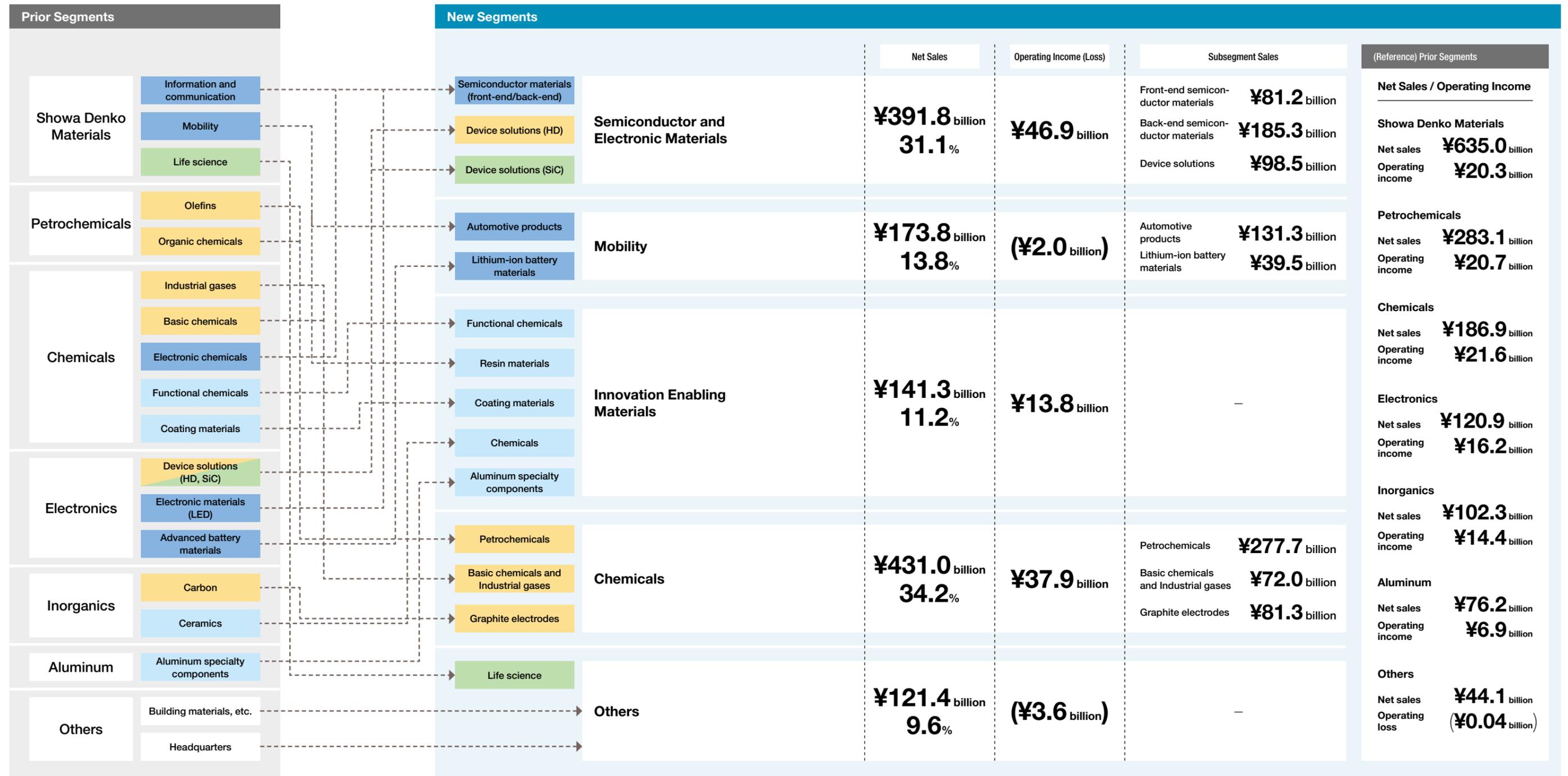
## Segment Overview (Fiscal 2021)

The Company's reportable segments were revised effective 2022 to more accurately display the benefits of the strategic allocation of management resources and ongoing revision and asset replacement of business portfolios.

The defined Core Growth businesses, Fundamental Technologies/Materials businesses, Stable Earnings businesses, and Next-Generation businesses all have a distinctive role within our portfolio. By fulfilling this role with a high degree of competitiveness, these businesses will help us continue to supply the market with new functions and thereby achieve ongoing growth.

### Business category

- Core Growth: Invests massively in businesses with huge growth potential
- Fundamental Technologies/Materials: Technology platform business to support innovation of other businesses
- Stable Earnings: Earns a stable profit and generates investment capital for the entire Group
- Next-Generation: Promotes investment while verifying viability to develop next-generation pillar businesses

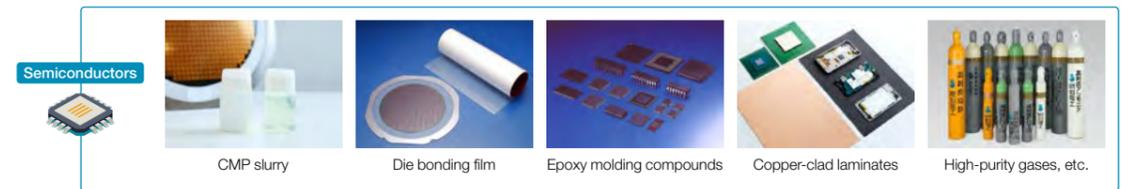


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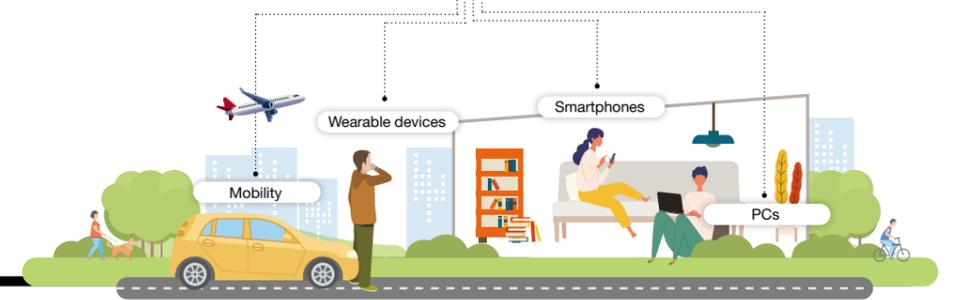
1. Segment data figures have not been audited by a certified public accountant and are provided as reference figures that exclude the aluminum can and sheet, plastic food wrap, printed wiring board, and electricity storage device operations transferred in 2021.
2. Segment performance figures on subsequent pages only reflect retained businesses.



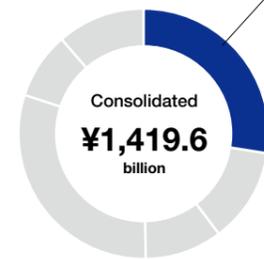
# Semiconductor and Electronic Materials



Showa Denko Products in Everyday Life



## Fiscal 2021 Net Sales



## Semiconductor and Electronic Materials

**Net sales**  
**¥391.8 billion**

**Operating income**  
**¥46.9 billion**

**Semiconductor materials**  
**Front-end ¥81.2 billion**  
**Back-end ¥185.3 billion**

**Device solutions**  
**¥98.5 billion**

## Management Target

**EBITDA margin**  
**30% or more**  
**in 2025**

## Strategy for Realizing the Long-Term Vision

As a leading global manufacturer, Showa Denko is driving the advancement of semiconductor technologies with its strength in materials. Our front-end and back-end semiconductor materials provide a key technology for contributing to people's happiness while protecting the environment through semiconductor manufacturing processes and end products.

	Results in 2021	Plan for 2022	Vision for the future (2030)
<b>Semiconductor materials</b> Front-end Back-end	<ul style="list-style-type: none"> <li>Year-on-year increases in sales and income</li> <li>Contributions to performance from efforts to build reliable supply structures at bases and bolster production capacity of copper-clad laminates and CMP slurry amid robust demand</li> <li>Decision to establish an advance package verification platform (JOINT2) comprised of substrate, equipment, and material manufacturers to create a de facto standard for next-generation semiconductor packages</li> </ul>	<ul style="list-style-type: none"> <li>Construction of growth platforms to become a global leader</li> <li>Preparation of new sales promotion themes and management of pipelines to achieve growth leading up to 2025 (key account strategies, and enhancement of development capabilities from a medium- to long-term perspective)</li> <li>Development of a resilient supply chain management system allowing for swift risk detection and stable supply</li> <li>Flexible investment plan prescribing timely investment and responsive adaptation</li> <li>Verification and material development of 2.xD, 3D, and other next-generation semiconductor packages through JOINT2 activities</li> </ul>	<ul style="list-style-type: none"> <li>Goal of becoming a world-leading semiconductor material manufacturer that supports the advancement of a sustainable, digital society</li> <li>Contribution to the realization of a sustainable society by conserving energy and reducing environmental impacts through the supply of advanced semiconductor materials</li> <li>Growth outpacing the market</li> </ul>
<b>Device solutions (HD)</b>	<ul style="list-style-type: none"> <li>Higher demand for large-capacity HD media used in near-line servers for use in data centers; robust demand for HD media employed in PCs due to the spread of teleworking and online learning</li> <li>Conclusion of a joint development contract of HAMR<sup>1</sup>-based next-generation HD media with Seagate</li> <li>Start of mass production of MAMR<sup>2</sup> HD media for Toshiba</li> <li>Development of MAS-MAMR<sup>3</sup> HD media as second-generation MAMR media</li> <li>Expanded aluminum substrate production capacity and improvement of productivity</li> </ul>	<ul style="list-style-type: none"> <li>Growth of sales centered on media for large-capacity near-line servers, demand for which is rapidly increasing, through industry-leading development and mass production of best-in-class HD media</li> <li>Maximization of aluminum substrate and media production capacity through improvement of efficiency and operating rates at existing production facilities</li> <li>Promotion of cost reduction to compensate for increases in fixed costs caused by higher production and sales volumes and rises in raw material prices</li> </ul>	<ul style="list-style-type: none"> <li>Contribution to storage demand supporting increased data traffic volume and transmission speed as a large-capacity media technology leader</li> <li>Development and mass production of future media technologies to create 100 TB hard disk drives</li> <li>Acceleration of integration of digital transformation and automation of production activities and virtual linkage of multiple factories, to be operated as one</li> <li>Pursuit of sustainability through production activities and recycling of post-sale products</li> </ul>
<b>Device solutions (SiC)</b>	<ul style="list-style-type: none"> <li>Conclusion of a sales and joint development contract with Infineon Technologies AG</li> <li>Conclusion of a long-term supply contract with ROHM Co., Ltd.</li> <li>Conclusion of a long-term supply contract with Toshiba Electronic Devices &amp; Storage Corporation</li> <li>Significant increase in sales volumes due to long-term supply contracts, allowing for the posting of operating income</li> </ul>	<ul style="list-style-type: none"> <li>Response to growth in demand centered on automotive and industrial products amid accelerated energy conservation and decarbonization trends</li> <li>Provision of best-in-class SiC epitaxial wafers with high reliability and low cost for high voltage and high current applications</li> <li>Timely plans to expand production capacity based on trends in growing markets</li> </ul>	<ul style="list-style-type: none"> <li>Provision of solutions as SiC epitaxial wafer technology leader in response to rapid growth in demand for SiC power semiconductors amid an accelerated global push for carbon neutrality</li> <li>Proactive supply of high-value-added products (MOSFETs, high-voltage-resistant Schottky barrier diodes) in response to more sophisticated and specialized quality requirements</li> <li>Launch and mass production of eight-inch wafers to help reduce costs of SiC power semiconductors</li> </ul>

<sup>1</sup> HAMR: Heat-assisted magnetic recording  
<sup>2</sup> MAMR: Microwave-assisted magnetic recording  
<sup>3</sup> MAS-MAMR: Microwave-assisted switching microwave-assisted magnetic recording

## Competitive Edge

**Operating Environment Outlook and Showa Denko's Strategy**  
 Robust growth in semiconductor demand is anticipated as a result of progress toward a digital society, and it is thus incredibly likely that technological advancement and market growth will continue within a certain scope of technological development. The positions of market participants have already been solidified in this market. While there is some chance that industry reorganization may take place, it is unlikely that an upheaval in the industry structure or the emergence of a significant new player will occur. Based on this outlook, the Semiconductor and Electronic Materials segment will act in accordance with its position as a Core Growth business to develop highly competitive operations with a lineup that encompasses comprehensive solutions and a wide variety of front-end and back-end semiconductor materials.

Risks faced by the Semiconductor and Electronic Materials segment include the potential for increases in raw material, energy, or logistics costs or supply chain disruptions as a result of geopolitical risks. To counter these risks, the segment is developing a resilient supply chain management system designed to facilitate the swift detection of risks and the stable supply of products to customers. As one facet of these efforts, we are constructing a system for integrated management and tracking of semiconductor production and shipment information in Malaysia and other parts of the Indo-Pacific area. This system is scheduled to be implemented in December 2022.

## Semiconductor Material Technology Trends

As semiconductors are endowed with more sophisticated functions, there is a rising need for more minutely detailed circuit patterns to be etched through front-end wafer fabrication processes. Meanwhile, in back-end processes, which generally entail mounting chips made from individual wafers onto substrates, the number of components included on chips and in electronic components is increasing at a rapid pace, creating a rising need for new package structures that use 2.xD and 3D mounting technologies to achieve higher mounting density. These trends are boosting demand for Showa Denko's existing highly functional, high-share materials as well as for the new advanced functional materials under development.

In front-end processes, we facilitate customers' development activities with our CMP slurry (nanoceria slurry) capable of creating precise circuit patterns with 2 nm nodes as well as with our precision etching gases and high-purity solvents. At the same time, we assist production activities around the world with back-end process offerings such as photosensitive dry film, copper-clad laminates, and die bonding film supported by superior functionality and strong supply capabilities.

Moreover, Showa Denko is the founding member of the JOINT2 consortium, which is collaborating with regard to substrates, materials, and equipment to help resolve customer issues and accelerate development speeds.

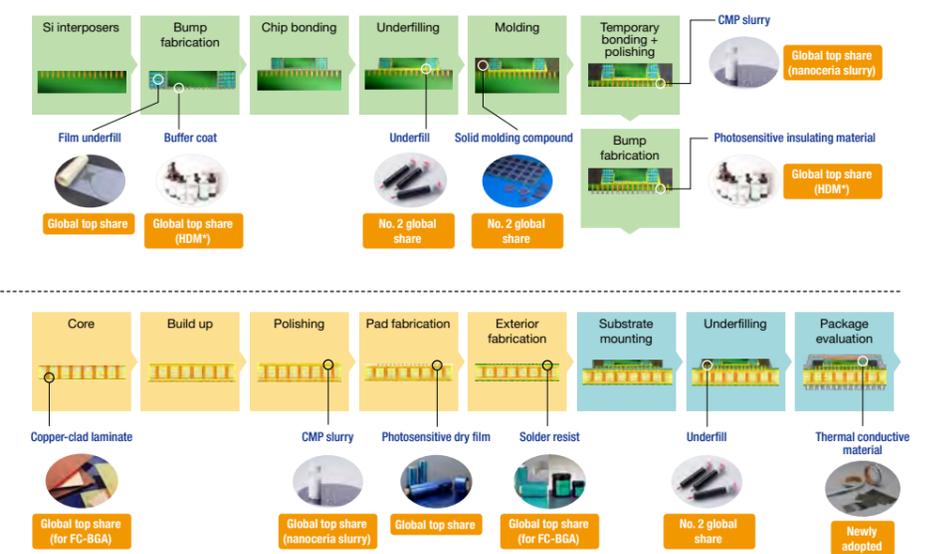
## Technological Requirements and Showa Denko's Products

Front-end semiconductor materials	
Technological requirements	Requirement-satisfying products
Precision polishing	CMP slurry (nanoceria slurry)
Precision processing (etching)	High-purity gases for electronic materials
Higher-quality solvents	High-purity solvents

Back-end semiconductor materials	
Technological requirements	Requirement-satisfying products
Close connection, resolution	Photosensitive dry film
High conductivity, low warping	Copper-clad laminates
Reliability	Die bonding materials

## Showa Denko's Lineup of 2.xD and 3D Mounting Products and Associated Market Shares



\* Shares of HDM (HD Microsystems, Ltd.)  
 Note: The above global share figures for products are based on Showa Denko's estimates.

## Semiconductor and Electronic Materials

### Initiatives for Resolving Social Issues as a "Co-creative Chemical Company"

#### Contributions to the Realization of a Sophisticated Digital Society Characterized by Popularization of Teleworking and 5G and IoT Technologies

##### Showa Denko Develops HD Media for MAS-MAMR Technology

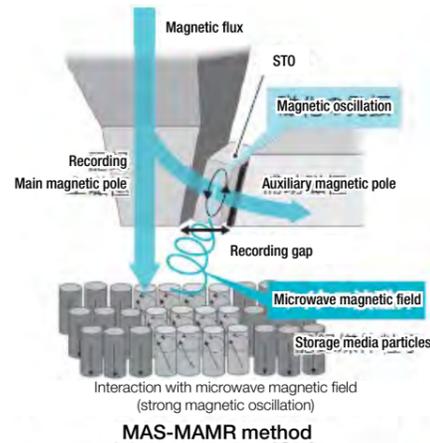
Showa Denko has developed hard disk (HD) media for hard disk drives (HDDs) that support data recording with microwave assisted switching-microwave assisted magnetic recording (MAS-MAMR) technology, which is a next-generation data recording technology based on a new data recording principle suggested by the Toshiba Corporate Research & Development Center and Toshiba Electronic Devices & Storage Corporation (hereinafter collectively called Toshiba).

MAS-MAMR is a next-generation data recording method that can achieve a further increase in the data-storage capacity of HDDs. At present, MAMR is a leading-edge data recording technology that has already been put into practical use. The newly developed MAS-MAMR technology makes possible a data recording track on the surface of HD media that is drastically narrower than that of MAMR-technology-based HD media, through utilization of the strong magnetic oscillation effect of the MAS effect\*, thereby increasing the data storage capacity of HDDs.

Aiming to put this new data-recording technology into practical use, Showa Denko has been developing HD media supporting MAS-MAMR in collaboration with Toshiba and TDK Corporation, which is a manufacturer of read/write heads for HDDs. In this joint development program, Showa Denko, Toshiba, and TDK have cooperatively proved for the first time in the world that HDD, as a combination of read/write head equipped with a dual spin-injection-layer (developed by TDK) and HD media equipped with a new-type magnetic layer (developed by SDK), can substantially increase HDDs' data storage capacity through the MAS effect.

On the basis of the results of the technology development program mentioned above, and aiming to realize large-capacity near-line HDDs with storage capacity of more than 30 TB, Showa Denko will accelerate development of HD media supporting MAS-MAMR, which Toshiba aims to put to practical use as the second-generation MAMR.

Showa Denko will accelerate two-way development of HD media supporting MAS-MAMR and heat assisted magnetic recording (HAMR) in accordance with its motto of "Best in class," thereby developing the best HD media in the world.



\* The MAS effect denotes the microwave assisted switching effect. The MAS effect is an effect of strong magnetic oscillation between a spin torque oscillator (STO) and magnetic recording media. This strong magnetic oscillation enables an HDD manufacturer to record digital data on the surface of HD media with a recording track narrower than those of HDDs equipped with conventional magnetic recording technologies.

### Initiatives for Resolving Social Issues as a "Co-creative Chemical Company"

#### Contributions to Energy-Conserving, High-Efficiency, Compact Power Modules

##### Showa Denko Launches Mass Production of six-inch SiC Single Crystal Wafers

Showa Denko has launched mass production of silicon carbide single crystal wafers (SiC wafers) with a diameter of six inches (150 mm), which are used as materials for SiC epitaxial wafers\*1 to be processed and installed into SiC-based power semiconductors (SiC power semiconductors). SiC power semiconductors have excellent heat resistance and high withstanding voltage, much better than those of conventional silicon-based power semiconductors, which are currently the mainstream of power semiconductors. SiC power semiconductors contribute to improvement in a power module's energy efficiency and downsizing. Accordingly, the demand for SiC power semiconductors is increasing rapidly in various fields, especially those for use in electrified vehicles, railcars, and industrial equipment.

As an independent supplier of SiC epitaxial wafers, Showa Denko has the global top share in the market, and has been providing power-device manufacturers with best-in-class SiC epitaxial wafers. Showa Denko's SiC epitaxial wafers are thus highly acclaimed by power device manufacturers both in and outside Japan.

We have even been examining the possibility of starting independent production of SiC wafers. From 2010 to 2015, Showa Denko took part in the Novel Semiconductor Power Electronics Project Realizing Low Carbon Emission Society,\*2 which was organized and outsourced by the Ministry of Economy, Trade and Industry (METI) and the New Energy and Industrial Technology Development Organization (NEDO). This is just one of the co-creative venues through which we have been developing mass production technologies.

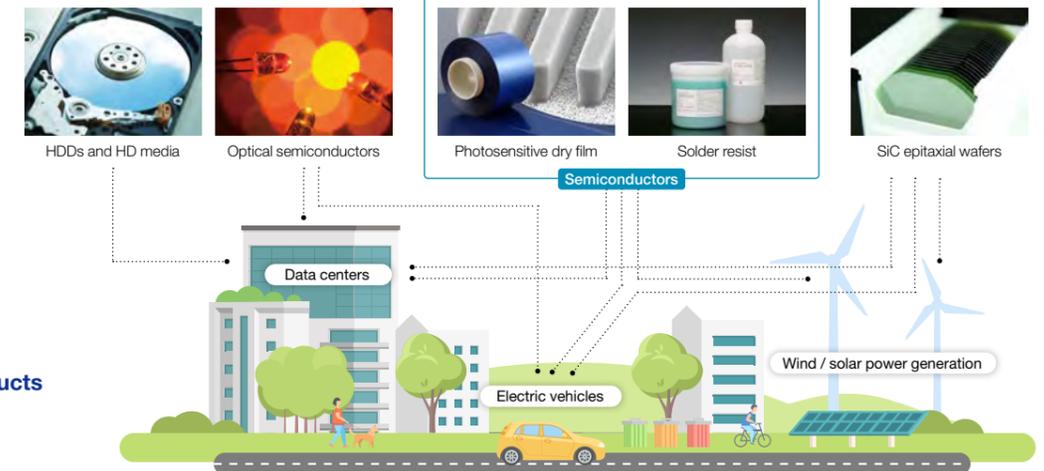
Showa Denko decided to launch in-house mass production of six-inch SiC wafers because plural customers have adopted the Company's SiC epitaxial wafers made from its in-house produced six-inch SiC wafers. On the other hand, the Company will continue purchasing SiC wafers from its partners to respond to rapidly growing demand for SiC epitaxial wafers for power semiconductors. In this way, Showa Denko will diversify the sources of SiC wafers, thereby establishing a stable supply chain for SiC epitaxial wafers.



Six-inch single crystal wafer for SiC power semiconductors

\*1 SiC epitaxial wafers are a material for semiconductors made from SiC wafers by depositing a thin layer of epitaxial SiC on the surface of the wafer.

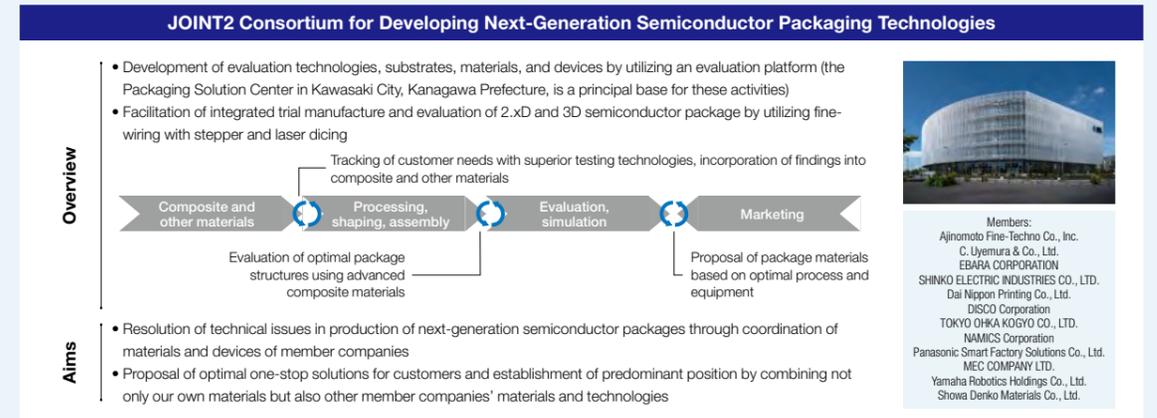
\*2 The Novel Semiconductor Power Electronics Project Realizing Low Carbon Emission Society is a project aiming to establish technology to realize a stable supply of SiC wafers with large diameters. In 2010 the project was started and entrusted by METI, and in 2011 control of the project was transferred to NEDO.



### Showa Denko Products in Everyday Life

## Open Innovation of Semiconductor Package Materials and Processes

### Co-creation through JOINT2



The commercial deployment of 5G mobile communication systems is moving forward. It can therefore be expected that we will see the proliferation of post-5G systems featuring ultralow latency\*1 and the capacity for multiple simultaneous connection\*2 in fields such as autonomous driving and telemedicine. In the past, functions such as logic and memory were installed in different IC chips on substrates. However, accommodating post-5G systems will require an increased density of IC chips and other components to prevent signal latency. Accordingly, there is a need for technologies that allow for high-density packaging of differing chips within a single semiconductor package.

JOINT2, a consortium of 12 companies involved in the development of semiconductor mounting materials, substrates, and equipment, was established in October 2021 with the goal of developing the 2.xD, 3D, and next-generation

semiconductor mounting technologies necessary for telecommunications systems compatible with post-5G systems.

Member companies of JOINT2 have formed multiple working groups through which they share technologies and information via open innovation. In this manner, these companies are teaming up to develop precision bump jointing technologies\*3 and precision circuit fabrication technologies\*4 along with the high-reliability, large-scale substrate technologies necessary for mounting multiple components in order to achieve higher levels of component density on next-generation semiconductors.

\*1 Low time lag in communications

\*2 Ability for a single substation to accommodate simultaneous connections from multiple devices

\*3 Technologies for connecting IC chips and other components in a perpendicular direction using densely fabricated metal protrusions

\*4 Technologies for connecting IC chips and other components in a parallel direction using densely fabricated metal protrusions

Japanese companies hold large shares of the global markets for semiconductor materials, substrates, and equipment. However, maintaining our technological edge in these markets will require a platform through which engineers can discuss and evaluate cutting-edge packages. It was this belief that prompted me to propose JOINT2. Private-sector consortiums are rare in this industry, and we therefore face a lot of difficulties as a leading member of the organization. Still, I cannot deny the fact that we are already seeing experiments through JOINT2 produce results more quickly than could have been accomplished alone. I look forward to an even faster pace once we build additional cleanrooms.

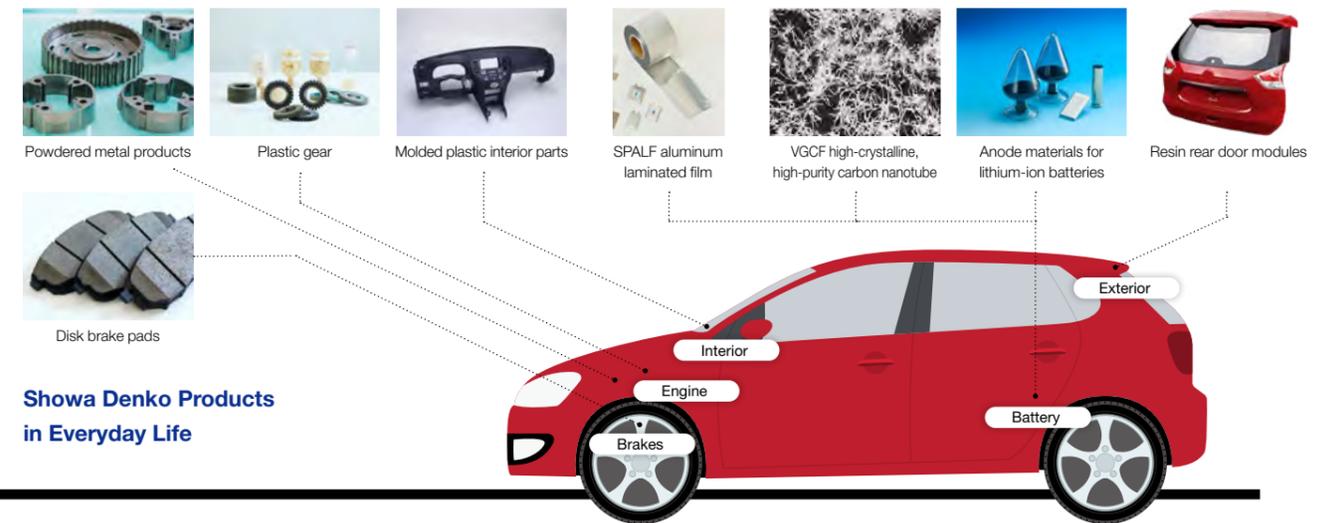


Hidenori Abe

General Manager, Packaging Solution Center

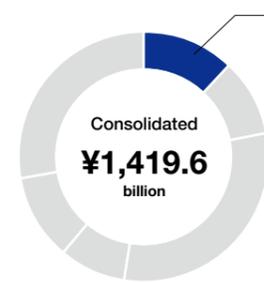


# Mobility



Showa Denko Products in Everyday Life

## Fiscal 2021 Net Sales



### Mobility segment

Net sales **¥173.8 billion**

Operating loss **(¥2.0 billion)**

**Automotive products**  
¥131.3 billion

**Lithium-ion battery materials**  
¥39.5 billion

## Management Target

EBITDA margin  
**20% or more in 2025**

## Strategy for Realizing the Long-Term Vision

The Mobility segment is positioning the rising technological needs associated with CASE (connected cars, autonomous/automated driving, shared, and electric) technologies, particularly those related to the development of electrified vehicles, as a business opportunity. To capitalize on this opportunity, the segment is implementing a growth strategy of developing its business while taking advantage of Showa Denko's weight reduction, electrification, and heat control technologies. Moreover, business growth will be pursued by incorporating market growth while positioning CASE-related needs as a key growth driver. The business portfolio of this segment will also be managed with the goal of increasing the ratio of sales from CASE-related products, which was approximately 50% in fiscal 2021, to 65% in fiscal 2025. We thereby aim to accomplish our target of an EBITDA margin of 20% or more.

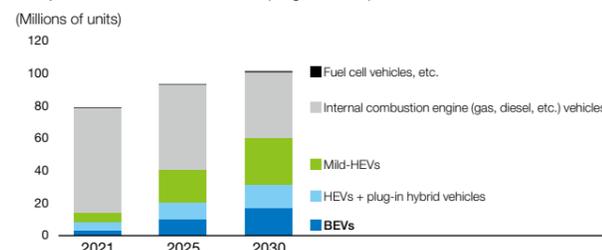
	Results in 2021	Plan for 2022	Vision for the future (2030)
<b>Automotive products</b>	<ul style="list-style-type: none"> <li>Performance lower than initial forecasts, despite recovery in automobile production volume from the impacts of the COVID-19 pandemic in the first half of 2021, due to a decrease in automobile production caused by supply shortages for semiconductors in the second half of 2021</li> <li>Commencement of production of rear door modules and copper-free disk pads for 15 new automobile models</li> <li>Establishment of a production base for rear door modules in Wuhan, China</li> </ul>	<ul style="list-style-type: none"> <li>Higher sales and income, despite ongoing semiconductor shortages, due to the resumption of recovery trend projected in the second half of 2022</li> <li>Commencement of production of resin rear door modules, interior and exterior parts, and copper-free disk pads for new automobile models; reinforcement of supply chain management to fulfill supply responsibilities</li> <li>Aggressive investment in products and technologies required for next-generation automobiles, including technologies for weight reduction, electrification, and heat control</li> </ul>	<ul style="list-style-type: none"> <li>Top share acquired through aggressive investment as a Core Growth business targeting niche markets</li> <li>EBITDA margin of 20% to be targeted as a Core Growth business</li> </ul>
<b>Lithium-ion battery materials</b>	<ul style="list-style-type: none"> <li>Expansion of a range of models using Showa Denko anode materials for hybrid-electric vehicles (HEVs) and of related patents</li> <li>Enhancement of capabilities of SPALF aluminum laminated film and conclusion of a large-scale sales agreement for VGCF conductive additive spanning the period from 2021 to 2022</li> </ul>	<ul style="list-style-type: none"> <li>Acceleration of development of new anode materials to respond to rapid charging performance and other technical needs of next-generation EVs</li> <li>Acquisition of certification for high-end SPALF models and steady expansion of production capacity and construction of a resilient supply chain for SPALF and VGCF</li> </ul>	<ul style="list-style-type: none"> <li>Target of net sales of ¥115.0 billion to be achieved by incorporating rising needs associated with the advancement of CASE technologies and pursuit of carbon neutrality</li> </ul>

## Competitive Edge

The mobility market is currently in a period of great change. To work toward carbon neutrality and address social issues, numerous countries have set CO<sub>2</sub> emissions reduction targets calling for reductions of 30% to 40% over the next decade. Such implementation of stricter environmental regulations is driving growth in demand for electric vehicles (EVs), and it has thus been estimated that EVs will increase to represent more than half of the cars on the road within 10 years. Restrictions are even being placed on electrified vehicles, as the European Union is slated to ban sales of HEVs after 2035. Showa Denko will thus be pursuing business growth by targeting battery-electric vehicles (BEVs), which will no doubt see growth over the long term.

## Global Powertrain Production by Application

IHS production volume forecast (August 2020)

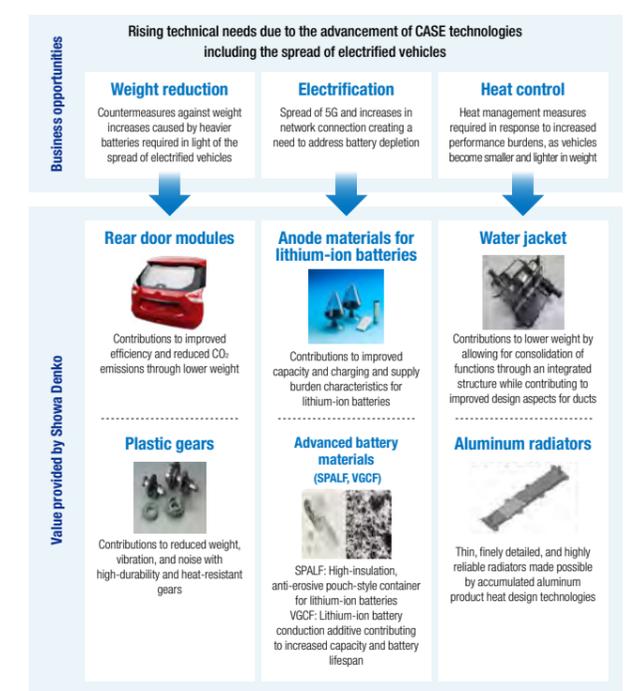


The Mobility segment aims to expand its business by addressing the needs of the automotive market while positioning CASE-related needs as a key growth driver. This will require us to respond to new technical needs. Accordingly, Showa Denko will be supplying a lineup of battery solutions to accommodate smaller, lighter-weight, and electrified vehicles; material solutions for controlling heat, sound, and electromagnetism; and module solutions that assist in system design tasks such as module development.

At the same time, we will be work to claim the top market share through aggressive investment focused on niche markets.

Specific measures will include the expansion of the range of existing customers' models for which our molded plastic exterior products are used as well as approaching new customers. Our main target in this endeavor will be market segments where we expect to see a strong need for reducing the weight of resin rear door modules while accommodating design concerns. As for composite materials, we will maintain our leading share for mainstay plastic gears while approaching new customers with various heat management products for electrified vehicles. In addition, we will develop a service model for advanced battery materials that satisfies customers' development needs while boosting the quality of SPALF in order to earn the top share in the mobility market.

## Growth Strategy for the Mobility Business



## Initiatives for Resolving Social Issues as a "Co-creative Chemical Company"

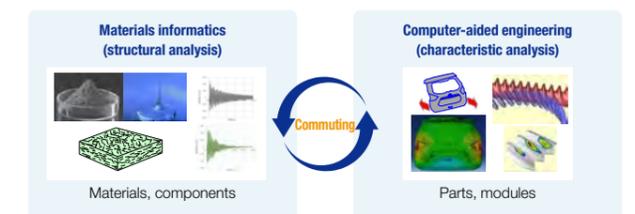
### Reinforcement of Development Capabilities through Materials Informatics

Showa Denko faces the need to reinvent its development style. This need is arising in light of factors such as the shorter development lead times required as technical needs and values change in response to trends such as the advancement of CASE technologies and the pursuit of carbon neutrality. Meanwhile, major automobile manufacturers and suppliers are increasingly embracing model-based design, which entails simulating the terminal component functions and performance features necessary for overall automotive systems using virtual models. This design approach makes it possible to adopt a development style in which materials informatics is used to combine various materials selected from databases before computer-aided engineering methodologies are employed to perform analyses and thus conduct prototyping and testing in a virtual environment. Moreover, if we gained the ability to share data and model information with stakeholders, it would be possible to facilitate swift automobile development processes that seamlessly link the designing of materials, components, modules, and automotive systems.

We aim to create a unique model-based design development style by utilizing Companywide materials informatics technologies to

systematically digitize, organize, and compile the insight, experience, and manufacturing insight we have accumulated over our years of working with customers in the mobility field.

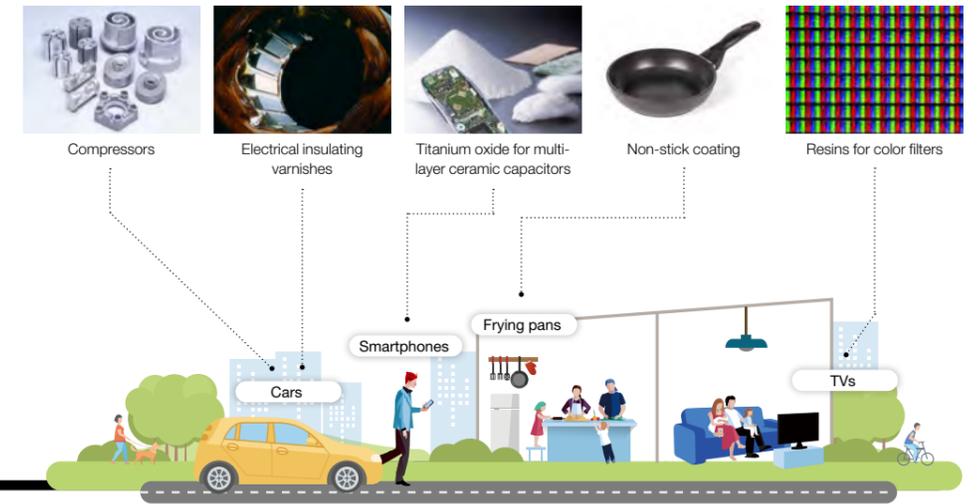
Going forward, we will continue to coordinate with automobile manufacturers and suppliers as well as with industry-academic-government research institutions to develop materials and manufacturing processes and to perform verification tests in local facilities. We thereby hope to continue supply materials, components, and parts that are useful to society.



Showa Denko's Intended Approach toward Model-Based Design



# Innovation Enabling Materials



Showa Denko Products in Everyday Life

## Fiscal 2021 Net Sales



## Innovation Enabling Materials segment

Net sales  
**¥141.3 billion**

Operating income  
**¥13.8 billion**

## Management Target

EBITDA margin  
**15% or more in 2025**

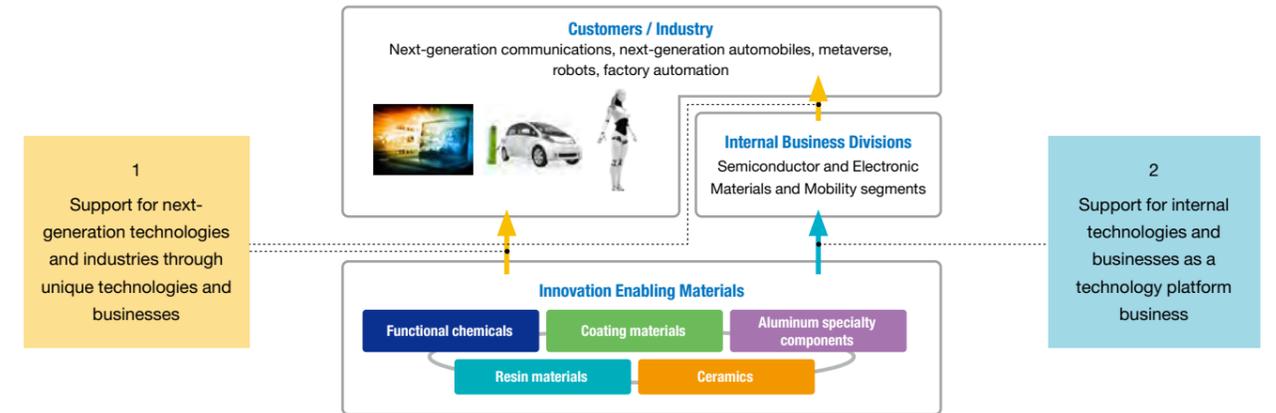
## Strategy for Realizing the Long-Term Vision

The Innovation Enabling Materials segment features an extensive lineup of technologies and materials as a technology platform business supporting innovation and competitiveness improvements in Showa Denko's Core Growth, Stable Earnings, and Next-Generation businesses.

This segment strives to remain a step ahead of the changing times by supplying the organic, inorganic, aluminum, and other functional materials deemed valuable by the market. In this way, the Innovation Enabling Materials segment will become a vessel for the creation of new businesses over the medium to long term and a driver behind the fulfillment of our purpose.

## Competitive Edge

The competitive edge of the Innovation Enabling Materials segment lies in the positioning of its unique technologies and businesses. Moreover, as a technology platform business, it generates intra-segment synergies while supporting the technologies and operations of Core Growth businesses to enhance our technical capabilities and secure a more sophisticated position for its unique technologies and businesses.



	Results in 2021	Plan for 2022	Vision for the future (2030)
<b>Functional chemicals</b>	<ul style="list-style-type: none"> <li>Strong demand centered on the electronic materials market</li> <li>Increased profitability driven by structural reforms pertaining to fundamental products</li> <li>Decision to bolster production capacity for functional materials for use in electronic materials</li> <li>Synergies generated with Showa Denko Materials</li> </ul>	<ul style="list-style-type: none"> <li>Stable earnings secured by increasing resilience to operating environment changes</li> <li>Increased income spread achieved through sales promotions for high-performance, high-margin products</li> <li>Reinforcement of functions and systems for supporting the development of other businesses</li> <li>Integration with the resin materials business division</li> </ul>	<ul style="list-style-type: none"> <li>Leader in specific sectors of the global market</li> <li>Provision of value to society through the ability to aggregate individual strengths</li> </ul>
<b>Resin materials</b>	<ul style="list-style-type: none"> <li>Recovery from impacts of the COVID-19 pandemic centered on the Chinese market</li> <li>Establishment of mass production systems in Japan and China for polyimide varnishes for electrified vehicle motors</li> <li>Growth of sales and acquisition of new certifications for semiconductor and electronic materials</li> <li>Stable supply of materials for internal use</li> </ul>	<ul style="list-style-type: none"> <li>Establishment of earnings structures that are resilient to changes in raw material trends</li> <li>Expansion of sales of polyimide and polyamide-imide varnishes for electrified vehicles</li> <li>Accelerated improvements to the product sales mix achieved through a focus on the ratio of sales from new products</li> <li>Response to sources of potential future needs in the Semiconductor and Electronic Materials and Mobility segments</li> </ul>	<ul style="list-style-type: none"> <li>Communication of the benefits of highly competitive functional materials together with the functional chemicals division to help resolve social issues through internal and external effort</li> </ul>
<b>Coating materials</b>	<ul style="list-style-type: none"> <li>Construction of a factory in Malaysia and the promotion of integrated operation with factories in China</li> <li>Development of new eco-friendly products</li> <li>Assembly of a dedicated sales team for online sales channels</li> <li>Development of a joint framework for Group procurement activities</li> </ul>	<ul style="list-style-type: none"> <li>Extension of the production system into other areas of the world</li> <li>Promotion of sales of eco-friendly products</li> <li>Bolstering of sales channels for consumer products (emerging countries, online)</li> <li>Expansion of scope of applications and regions of operation for industrial coating materials</li> <li>Development of new products for growth markets</li> </ul>	<ul style="list-style-type: none"> <li>Development of the coating business to serve major global players and contribute to Companywide growth as a new business capitalizing on unique composite insight</li> </ul>
<b>Ceramics</b>	<ul style="list-style-type: none"> <li>Strong performance of materials for electronic device, heat dissipation, and glass polishing applications driven by recovery in demand for electronic devices, high-speed communications, and automotive products</li> <li>Favorable performance of polishing and refractory materials due to recovery in demand for automotive and steel products</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing generation of synergies between CMP slurry and heat dissipation materials</li> <li>Acceleration of development of next-generation materials for electronic devices</li> </ul>	<ul style="list-style-type: none"> <li>Supply of first-rate ceramics products and services that surpass customer expectations and contribute to the resolution of social issues</li> </ul>
<b>Aluminum specialty components</b>	<ul style="list-style-type: none"> <li>Robust demand in the first half of 2021 due to recovery from the impacts of the COVID-19 pandemic</li> <li>Sluggish growth in sales beginning in the third quarter as a result of semiconductor shortages</li> <li>Higher costs due to soaring prices of additive metal materials in the fourth quarter</li> <li>Impressive sales of extrusion products for railcars</li> </ul>	<ul style="list-style-type: none"> <li>Construction of earnings structures that are resilient to operating environment changes</li> <li>Development of next-generation radiators</li> <li>Application of aluminum processing technologies to mass production in pursuit of carbon neutrality</li> <li>Receipt of suspension component orders from around the world</li> </ul>	<ul style="list-style-type: none"> <li>Contribution to society through the combination of aluminum with other materials</li> </ul>

## Initiatives for Resolving Social Issues as a "Co-creative Chemical Company"

### Resin Materials: Electrical Insulating Varnishes

Electrical insulating varnishes contribute to improved functionality in the motors of electrified vehicles. Showa Denko boasts the leading share of 35% (based on estimates by the Company) in the Japan market for polyimide and polyamide-imide resin varnishes, which require particularly high levels of durability and reliability, together with a large share of the global market.

### Coating materials: Non-Stick Coatings

Together with customers producing cooking utensils, Showa Denko is rolling out its MAXIMIZING green campaign designed to communicate the sustainability principles exemplified by the materials used in cooking utensils directly to end users. Carried out in Europe, this campaign has proved successful in boosting sales of cooking utensils.

### Ceramics: Aluminum Nitride Filler

Showa Denko's aluminum nitride fillers contribute to smaller electronic components with excellent wet resistance and high thermal conductivity. Improving wet resistance is one of the greatest challenges in developing aluminum nitride fillers, but we succeeded in achieving a

massive improvement by utilizing our proprietary ultrathin membrane surface processing technology, allowing our fillers to help create electronic components with higher functionality and longer lifespans.

### Functional Chemicals: Isocyanate Monomer

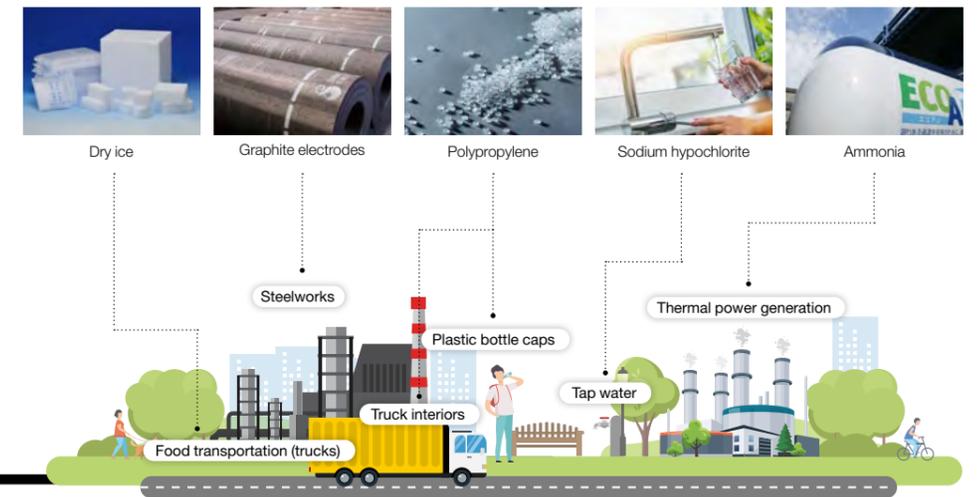
Isocyanate monomers are functional monomers that contain two functions in a single molecule. The increased freedom of molecular design granted by these isocyanate monomers can be used to improve the features of materials for a wide variety of applications, including photosensitive resin materials, paints, and coating materials.

### Aluminum Specialty Components: Aluminum Radiators for Electrified Vehicles

Aluminum radiators help to improve the reliability and heat dissipation characteristics of the power modules that are a central component of electrified vehicles as one of the multiple materials employed in these modules. Further increases in the functionality of power modules can be achieved by using our thermal performance simulation technologies, power module mounting technologies, and multi-material optimization technologies.

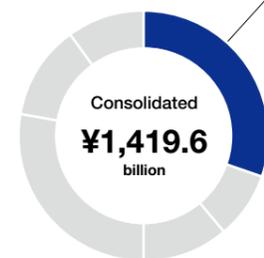


# Chemicals



Showa Denko Products in Everyday Life

## Fiscal 2021 Net Sales



### Chemicals segments

Net sales  
**¥431.0 billion**

Operating income  
**¥37.9 billion**

**Petrochemicals**  
**¥277.7 billion**

**Basic chemicals and Industrial gases**  
**¥72.0 billion**

**Graphite electrodes**  
**¥81.3 billion**

## Management Target

EBITDA margin  
**15% or more in 2025**

## Strategy for Realizing the Long-Term Vision

The Chemicals segment has a broad-ranging lineup of highly competitive, high-share products, including olefins, organic chemicals, graphite electrodes and other carbon products, basic chemicals, and industrial gases. With this lineup of products that function as the building blocks of various industries and infrastructure, this segment continues to contribute to society through safe and secure operations. At the same time, improvements to production processes are being pursued with the goal of contributing to the happiness and prosperity of people and to harmony with the global environment.

	Results in 2021	Plan for 2022	Vision for the future (2030)
<b>Petro-chemicals</b>	<ul style="list-style-type: none"> <li>Greater-than-expected recovery in demand after the impacts of the COVID-19 pandemic</li> <li>Increases in product market prices due to a more favorable balance of supply and demand</li> <li>Contributions to higher earnings following rises in the price of naphtha (difference between the receipts and disbursements of raw materials and products)</li> <li>Massive year-on-year increase in operating income</li> </ul>	<ul style="list-style-type: none"> <li>Continuation of strong demand</li> <li>Looser balance of supply and demand due to construction of additional facilities in Asia</li> <li>Greater-than-expected market deterioration continuing since the start of 2022</li> <li>Rising costs due to higher prices for crude oil and naphtha</li> <li>Decrease in production volume as a result of shutdown maintenance of the Oita Petrochemical Complex conducted once every four years</li> </ul>	<ul style="list-style-type: none"> <li>Improvements to profitability and efforts to limit volatility in earnings</li> <li>Reduction of 30% in CO<sub>2</sub> emissions from the Oita Petrochemical Complex in comparison to 2013</li> </ul>
<b>Basic chemicals and Industrial gases</b>	<ul style="list-style-type: none"> <li>Greater-than-expected recovery in demand after the impacts of the COVID-19 pandemic</li> <li>Substantial improvement in the earnings structure due to a tighter balance of supply and demand</li> <li>Record-breaking operating income</li> <li>Higher costs due to logistics stagnation and a rise in raw material/fuel prices seen in the second half of 2021</li> </ul>	<ul style="list-style-type: none"> <li>Continuation of strong demand</li> <li>Ongoing logistics stagnation</li> <li>Prolonged rise in costs due to soaring raw material/fuel prices</li> <li>Aggregate volume of used plastic recycled reached one million tons in January 2022</li> </ul>	<ul style="list-style-type: none"> <li>Promotion of the popularization of low-carbon ammonia</li> <li>Creation of a hydrogen use network together with companies near the coastal area of Kawasaki City</li> </ul>
<b>Graphite electrodes</b>	<ul style="list-style-type: none"> <li>Alleviation of surplus graphite electrode inventories of customers</li> <li>Achievement of the No. 1 global share of sales and production volume in the three-month period from October to December 2021</li> <li>Decrease in use of blast furnaces and increase in use of electric furnaces in the global steel production industry from an ESG perspective (resulting in growth in demand for graphite electrodes)</li> <li>Higher sales and income following recovery in demand for steel and electrodes</li> </ul>	<ul style="list-style-type: none"> <li>Increased use of renewable energy                             <ol style="list-style-type: none"> <li>Utilization of big data for management of water intake; maximization of hydroelectric power generation volume through sophisticated prediction of water volume fluctuations</li> <li>Global expansion (starting with Europe)</li> </ol> </li> <li>Pursuit of synergies with AMI Automation (sale of electric furnace operation optimization software, etc.)</li> <li>Analysis of the relationship between furnace operating conditions and electrode quality (data science)</li> <li>Expansion of strategic supply partnerships with customers</li> <li>Maximization of sales volume at prices ensuring an appropriate spread</li> <li>Improvement in cost-competitiveness</li> </ul>	<ul style="list-style-type: none"> <li>Stable supply of electrodes supporting a global transition toward electric furnaces as the No. 1 global supplier</li> <li>Contributions to the development of zero-emissions electric furnaces</li> <li>Reductions in CO<sub>2</sub> emissions (30% reduction from 2013) and in waste and use of renewable energy at factories</li> <li>Stable operation of water system underpinning the plan of Omachi City, Nagano Prefecture, to evolve into a futuristic city based on the principles of the SDGs and maximization of community water system efficiency through utilization of natural resources and big data</li> </ul>

## Competitive Edge

### Petrochemicals

#### Policies

We will seek to boost competitiveness and help achieve carbon neutrality in 2050 based on our vision of developing a sustainable business that consistently generates high profits.

#### Major Products

Olefins, organic chemicals



#### Business Strengths

- The Oita Petrochemical Complex is located in close proximity to the Asian market, giving this export base one of the greatest geographical advantages in Japan in terms of logistics. We anticipate that we will have access to an increased range of business opportunities as demand for petrochemical products grows overseas.
- The capacities of our equipment and our operating track record enable us to accommodate a diverse range of ethylene feedstock, giving us the ability to respond flexibly to changes in the volatile raw material market.
- We boast a lineup of unique, high-market-share acetyl derivatives (ethyl acetate, n-Propyl acetate, and allyl alcohol) that take advantage of proprietary catalysts and processes, and we hold the top share in the Japanese market for these products.
- Our lineup of reliable olefin derivatives (polyethylene, polypropylene, etc.), assembled through alliances in Japan, make us competitive in high-value-added fields.
- Development is underway for a low-concentration CO<sub>2</sub> separation system employing an innovative separation agent to further our quest toward carbon neutrality in 2050 (P.52).

### Basic chemicals and Industrial gases

#### Policies

Foundations are being developed so that we can become Asia's foremost chemical supplier.

#### Major Products

Industrial gases, basic chemicals

#### Business Strengths

- Capitalizing on the advantageous urban location of the Kawasaki Plant, we are catering to needs for a diverse range of functional chemicals including industrial gases, fiber materials, high-purity gas for semiconductor production, and medical and agricultural materials.
- Chemical recycling technologies are being utilized to produce ammonia using hydrogen extracted from used plastic. As a result of these efforts, the amount of used plastic recycled reached one million tons in January 2022. Moreover, the CO<sub>2</sub> emitted during manufacturing processes is used to produce dry ice and liquid CO<sub>2</sub>, meaning that our operations produce effectively zero emissions (P.52).

### Graphite electrodes

#### Policies

By supplying the world's best electrodes coupled with unparalleled services, we will promote efficient and eco-friendly steel recycling and thereby contribute to the sustainable development of society.

#### Major Products

Graphite electrodes

#### Business Strengths

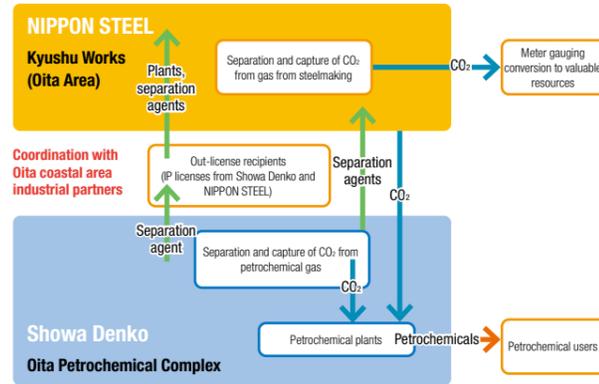
- With the No. 1 position in the global market and the ability to ship electrodes from production bases in six countries, we are promoting local production and consumption in the United States, Europe, and Asia.
- Our base of more than 200 customers around the world is being utilized to engage in strategic supply partnerships with customers who share our values, in order to stabilize operations. Such partnerships are also leading to increased operational stability in terms of procurement.
- Through our partnership with AMI Automation, we are working together with customers to enhance operations at production sites via digital technologies for optimizing electric furnace operating conditions. Electric furnaces are an effective means of conserving energy and cutting CO<sub>2</sub> emissions (reduced equipment damage, increased electricity efficiency in production processes, higher electrode output) (P.52).
- We are promoting renewable energy use on a global scale. In Japan, for example, we are using hydroelectric power as the primary power source at the Omachi Plant. We have also commenced long-term procurement of renewable energy in Europe (P.64).

Chemicals

Initiatives for Resolving Social Issues as a “Co-creative Chemical Company”

Petrochemicals: CO<sub>2</sub> Capture and Use Initiatives to Achieve Carbon Neutrality

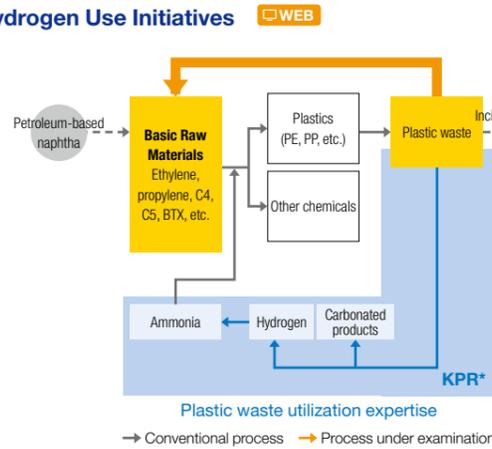
Showa Denko has teamed up with NIPPON STEEL CORPORATION in a co-creative venture to develop a low-concentration CO<sub>2</sub> separation system that employs an innovative separation agent. In May 2022, this initiative was adopted for the CO<sub>2</sub> separation and capture technology development project of NEDO under its Green Innovation Fund. Together with NIPPON STEEL CORPORATION, we are developing technologies for the low-cost separation and capture of low-pressure, low-concentration CO<sub>2</sub> from sources such as factory exhaust gas, while verifying the feasibility of technologies for producing chemical products from captured CO<sub>2</sub>. We anticipate that these technologies will allow us to develop and grow CO<sub>2</sub> separation and capture plant operations and separation agent operations. The technology is also expected to give rise to chemical business models that use CO<sub>2</sub> and are thus not dependent on fossil resources, and thereby contribute to carbon neutrality.



Basic chemicals and Industrial gases:

Co-creative Plastic Chemical Recycling and Large-Scale Hydrogen Use Initiatives

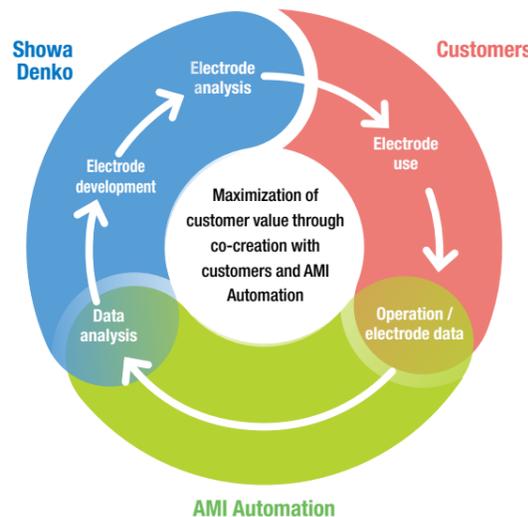
Showa Denko's Kawasaki Plant is developing its Kawasaki Plastic Chemical Recycling\* operations through which it decomposes used plastics to extract hydrogen. The hydrogen collected in this manner is utilized for a variety of initiatives, including verification tests of supply for fuel cells for hotels. Showa Denko is a world leader in synthesizing ammonia by utilizing low-carbon hydrogen extracted from gas produced through the process of used plastic chemical recycling. We have been producing ammonia in this manner for many years, and as a result the total volume of used plastic recycled reached one million tons in January 2022. Moreover, the Company began examining the possibility of establishing a base in the coastal area of Kawasaki City to create a cycle for expanding supply and demand to use hydrogen in this manner. Under the envisioned scheme, we would coordinate with seven partners from various industries to form a carbon use network to track medium- to long-term hydrogen demand and supply network feasibility within the area.



\* Kawasaki Plastic Chemical Recycling, plastic recycling business operated at the Kawasaki Plant

Graphite electrodes: Maximization of Customer Value in the Steel Recycling Process through Digital Transformation

Showa Denko is the No. 1 global manufacturer of the graphite electrodes that are indispensable to the electric furnaces used to melt iron scraps as part of the steelmaking process. To further build upon these operations, in 2021 we acquired a stake in Mexico-based AMI Automation, a global provider of sophisticated electrode elevation control systems and other services for optimizing the operation of electric furnaces. By strengthening our relationship with this company, we aim to contribute to the maximization of value for customers through a service lineup that expands beyond the sale of graphite electrodes to include operational support and the development of optimal electrodes. Moreover, in 2022 we began collecting operating data from customers' electric furnaces to perform big data analyses for use in proposing optimal electric furnace operating conditions, constructing optimized electrode development systems, and enhancing data science initiatives. In this manner, we will pursue ongoing improvements in the value that we provide to customers through co-creation with these customers and with AMI Automation.



Contribution to Healthy and Fulfilling Lifestyles



Minaris Regenerative Medicine, LLC, is a global provider of services specializing in regenerative medicines including clinical trials and contract manufacturing.

Minaris Medical Co., Ltd., has cultivated a solid operating foundation over its more than 40 years of operation and is able to supply in vitro diagnostic products for various fields including clinical chemistry and immunology.



Others

Life Science

Minaris is Showa Denko's life science brand.

Strategy for Realizing the Long-Term Vision

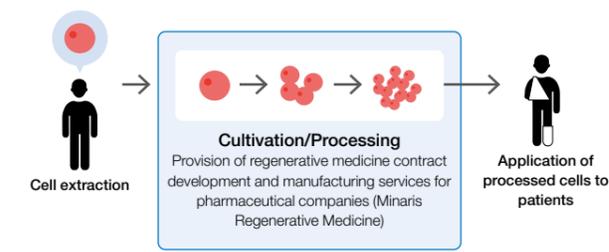
The life science business has been positioned as a pillar of Next-Generation businesses. In this business, we are engaged in manufacturing process development and contract manufacturing of regenerative medicines and the production and sale of in vitro diagnostic products. In 2020, the names of certain life science business Group companies and products were changed to unite them under the Minaris brand, to enable the development of global operations under a stronger brand.

	Results in 2021	Plan for 2022	Vision for the future (2030)
<b>Regenerative medicine</b>	<ul style="list-style-type: none"> <li>Establishment of a manufacturing base network encompassing three regions (North America, Europe, and Japan)</li> <li>Development of a manufacturing base network (start of the expansion of bases on the east coast of North America and construction of a second factory in Germany)</li> </ul>	<ul style="list-style-type: none"> <li>Augmentation of production facilities to improve quality and efficiency (completion of the expansion of bases on the east coast of North America, advancement of construction of a second factory in Germany that is scheduled to commence operations in 2024, and the full-fledged start of regenerative medicine production in Japan)</li> <li>Construction a high-quality, high-efficiency manufacturing network through introduction of IT systems at bases</li> </ul>	<ul style="list-style-type: none"> <li>Provision of high-quality regenerative medicine contract manufacturing services out of bases in North America, Europe, and Japan as a partner to pharmaceutical companies, to contribute to the development and popularization of regenerative medicine and subsequently healthy and fulfilling lifestyles for people around the world</li> </ul>
<b>Medical products</b>	<ul style="list-style-type: none"> <li>Acquisition of approval for a new allergy diagnostic reagent panel from the U.S. Food and Drug Administration (FDA)</li> <li>Commencement of joint development with the National Cancer Center of a fast COVID-19 test using cellular immunity methodology</li> </ul>	<ul style="list-style-type: none"> <li>Expansions of the share for cholesterol lipid and diabetes HbA1c reagents</li> <li>Start of shipments of creatinine kidney disease reagents for overseas markets</li> <li>Acceleration of new product development combining FDA approval processes and point of care testing technologies through coordination with the U.S. reagent subsidiary and a U.S. research institution</li> </ul>	<ul style="list-style-type: none"> <li>Establishment of a position as a global company by bolstering operations in distinctive areas of strength and creation of diagnosis technologies and products to support prevention, diagnosis, and treatment, to realize personalized medicine</li> </ul>

Initiatives for Resolving Social Issues as a “Co-creative Chemical Company”

Regenerative Medicine

With bases in North America, Europe, and Japan, Minaris Regenerative Medicine supplies contract manufacturing services, through which it produces reliable, high-quality regenerative medicine products on a global basis. These services can be used to produce regenerative medicines with the same level of quality as conventional pharmaceuticals, regardless of whether these medicines are derived from T-cells, mesenchymal stem cells, iPS cells, or some other type of cell, autologous or allogeneic. Contributions are made to Minaris Regenerative Medicine's pharmaceutical company customers through the supply of these medicines. Moreover, the provision of safe and effective regenerative medicines to patients through customers helps society to combat intractable and recurrent diseases that are difficult to treat with conventional methods, such as cancer and hereditary disorders.



Medical Products

It is expected that the role of clinical examinations will grow increasingly important in the years ahead, as examinations are used to treat diseases based on evidence and prevent pre-symptomatic lifestyle diseases, and thereby extend people's lifespans. Minaris Medical has a long history of providing diagnostic products, dating back to its commercialization of the enzyme-method reagent for measuring total cholesterol in 1975. In the years that followed, this company went on to provide a biochemical test for diseases such as hyperlipidemia and diabetes as well as in vitro diagnostic products such as allergy immunological tests and medical devices. Looking ahead, we will strive to create technologies, products, and services to support prevention, diagnosis, and treatment in order to realize personalized medicine. In this way, Minaris Medical will seek to become the company patients choose by contributing to healthy and fulfilling lifestyles through the supply of new value in clinical examinations.



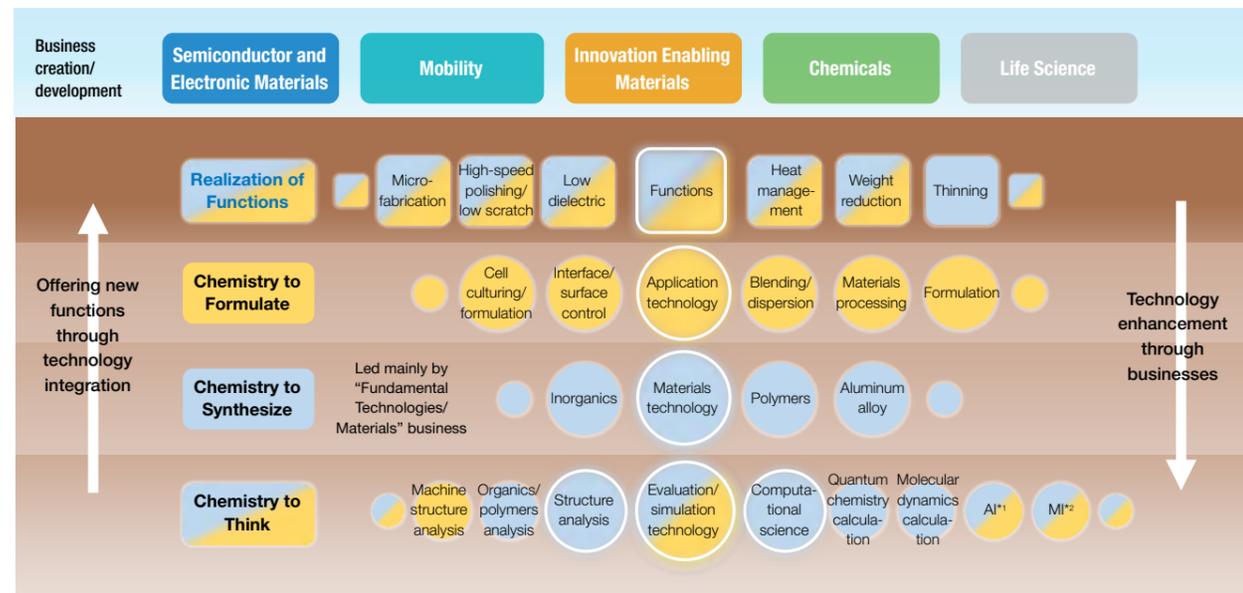
# R&D Strategies

## Mission of Creating Value

Inspired by its vision of generating synergies between “Chemistry to Synthesize,” “Chemistry to Formulate,” and “Chemistry to Think,” to contribute to the production of world-leading products and technologies, Showa Denko is advancing R&D activities aimed at accomplishing three missions: broadening of technology portfolios to create innovation, promotion of cross-business technology development, and changing society through long-term R&D projects.

## R&D Strategy Policy

With an eye to fulfilling its purpose, Showa Denko will carefully monitor market trends, to expand the range of markets in which it participates, by combining its expertise in fields of strength where it can differentiate itself on the material level. Furthermore, we will take a hybrid approach combining “Chemistry to Synthesize,” “Chemistry to Formulate,” and “Chemistry to Think” while enacting a strategy of generating synergies between the material technologies of Showa Denko and the application technologies of Showa Denko Materials.

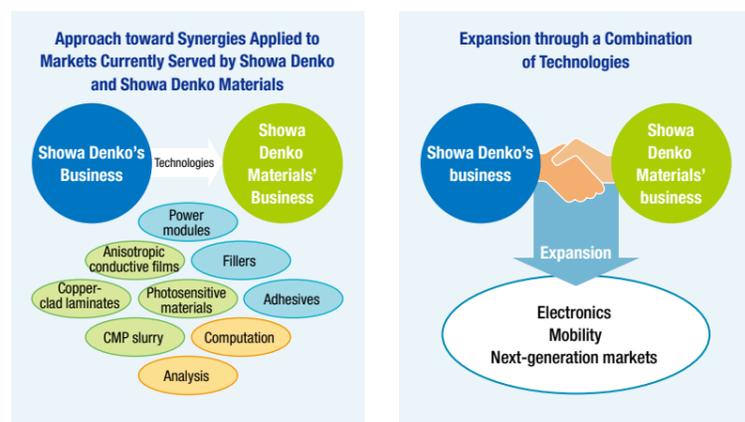


● Mainly Showa Denko ● Mainly Showa Denko Materials

\*1 AI = Artificial Intelligence \*2 MI = Materials informatics

As one facet of these efforts, coordination will be pursued between the teams of the chief technology officer (CTO), the Chief Strategy Officer (CSO), and the chief marketing officer (CMO) to create dimension maps to track the technologies and products offered by both companies. This approach will enable employees from all divisions to better create value for customers by effectively combining products and technologies, the scope of which has become substantially larger following the integration, within their respective functions.

Multiple projects have been launched to pursue short-term synergies in areas such as anisotropic conductive films, power modules, CMP slurry, and heat management. We plan to increase the number of such projects in the future.



Based on the measures prescribed for realizing our long-term vision, in 2022 we will move ahead with efforts to prepare for the complete integration scheduled for 2023, focused around five priority measures. The first priority measure is integrated operation through a virtual organization. We are advancing the substantive integration of functions through a virtual management approach that will remove the barriers between R&D organizations a step ahead of other divisions. The second priority measure is the promotion of projects to generate synergies and broaden our technology portfolio. In fiscal 2022, we will work to generate synergies between the technologies of both companies, and these synergies are anticipated to contribute to higher sales, in the areas of semiconductor and heat management materials. The third priority measure is to implement deep-level digital transformation. To this end, electronic experiment notes and statistical analysis software will be deployed throughout the Company and a material informatics (MI) platform will be constructed. We aim thereby to foster a culture of utilizing accumulated data and promote the evolution of digital technologies using MI and process informatics. The fourth priority measure is the promotion of co-creation. This measure will be advanced through the pursuit of internal synergies as well as through open innovation with external partners. The fifth and final measure is the achievement of carbon neutrality. The path toward carbon neutrality will be paved by means of our efforts through the new Stage for Co-creation venue (p.57) and activities based on long-term R&D themes.

Through such ongoing efforts, we aim to evolve our R&D organizations to make them vessels of unending innovation by 2030, by enhancing our R&D activities from a large-term perspective and broadening our technology portfolio.

## Initiatives to Resolve Social Issues as a “Co-creative Chemical Company”

### Cultivation of Co-creative Human Resources

As the first step of our efforts to become a “Co-creative Chemical Company,” it is important to cultivate engineers who can respond ably to the operating environment and social changes. Moreover, these engineers must possess an effective understanding of the integration of our organizations and be proactive in learning about our new colleagues.

Meanwhile, many of our engineers have voiced their desire to contribute to the resolution of social issues through a new, cross-organizational network based on their role in supporting the technologies that are core of the Company. Seeking to protect and nurture this self-driven spirit of altruism, we have begun initiatives to cultivate co-creative human resources.

### Kagaku no Wa

Kagaku no Wa is an exchange forum that was established to provide a venue for interactions between researchers from both Showa Denko and Showa Denko Materials. We anticipate that this venue will provide a casual environment for researchers to get to know one another, discuss technologies, and thereby generate synergies. Kagaku no Wa meetings are held once a month, and a total of roughly 200 people have participated thus far. Moreover, these activities are giving rise to new initiatives, such as sustainability forums and statistics study groups.

### Technology Forums

Technology forums are arranged as an opportunity for everyone involved in the R&D process to consider the type of researcher they wish to become, make new discoveries, and change how they think and act. It is anticipated that like-minded researchers will gather at

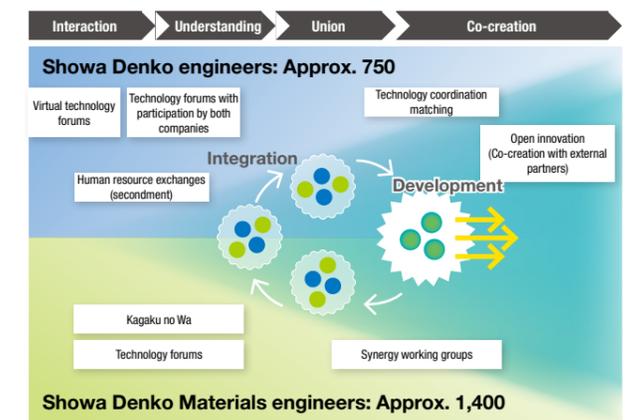
## Measures for Realizing the Long-Term Vision

- Strategic allocation of resources
- Establishment and implementation of technology strategies based on industry trends and product roadmaps
- Promotion of projects to generate synergies and expand the technology portfolio
- Creation of innovation by broadening the technology portfolio
- Deep-level digital transformation of R&D activities using computational science and AI
- Construction of platforms to support and reinforce R&D activities to create future new businesses
- Advancement of cross-business technology development
- Promotion of open innovation and co-creation as a “Co-creative Chemical Company”
- Creation of a workplace environment that attracts diverse human resources and is conducive to the development of new pipelines
- Advancement of activities through the Stage for Co-creation venue based on long-term R&D themes
- Contribution to the realization of a sustainable society through innovation
- Cultivation of a corporate culture emphasizing safety and compliance

## Functions of the CTO Team



these forums and help each other to work toward their respective goals. These forums were originally an initiative implemented by Showa Denko Materials, but the activities have been inherited by the newly integrated company based on the widespread endorsement of their spirit among Showa Denko engineers. We have positioned technology forums as a venue open to free participation by anyone, regardless of position or rank. Overcoming the limitations imposed by the prolonged COVID-19 pandemic, we were able to arrange forums with participation by employees from both companies in fiscal 2021. Subsequently, an organization committee was assembled in 2022 to transform these forums into an event that is planned, operated, and held by volunteer engineers from any company. In fiscal 2022, these forums included 67 presentations and were attended by 730 people.



**R&D Strategies**

**Topics**

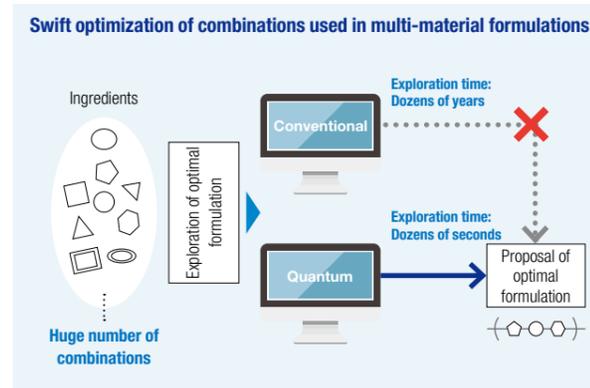
The Computational Science and Technology Information Center supports “Chemistry to Think,” which is advocated by Showa Denko through its use of simulation, artificial intelligence (AI), and MI technologies. Simulation technologies are used to formulate highly reliable development policies based on solid logic and to win customers’ trust with effective explanations of the underlying mechanisms of technologies. Meanwhile, increased attention has been directed toward AI and MI technologies in recent years, and these technologies have helped us to break away from our prior dependence on intuition and experience to accelerate material development. In fact, we have been named among the top 30 companies in the world in terms of our MI technologies,<sup>\*1</sup> indicating the strong global presence that we have established in this area.

Quantum computing technologies are being adopted as a means to enhance our MI technologies. These technologies can be used to calculate optimal combinations of materials at a speed dwarfing that of conventional methods. Accordingly, quantum computing technologies are key to determining the optimal combinations of multiple materials in a more reasonable timeframe when applying MI technologies to the “Chemistry to Formulate” that is a strength of Showa Denko Materials. Based on this recognition, the Computational Science and Technology Information Center has adopted the Digital Annealer<sup>\*2</sup> quantum-inspired technology<sup>\*3</sup> of Fujitsu Limited and is accumulating expertise to transition to an Ising model that uses the Digital Annealer for MI calculations. This approach has allowed for optimal combinations of semiconductor materials, with a performance roughly 30% higher than prior combinations, to be selected from among the 10<sup>50</sup> possible combinations in mere dozens of seconds. In this manner, quantum computing allows for optimization that is tens of thousands of times faster than the optimization provided through conventional methods, which were also restricted by a more limited scope.

The Computational Science and Technology Information Center seeks to improve its own technical capabilities while democratizing computational science technologies. To these ends, we are providing systems that development engineers can use to perform simulations and utilize AI and MI technologies by themselves. We are also cultivating data scientists. At the same time, we are creating the functions expected of us as an advanced material partner through data-driven development.

<sup>\*1</sup> Source: *Technology Landscape: Key players in materials informatics*, Lux Research, Inc.  
<sup>\*2</sup> Domain-specific (dedication of computation capacity to specified domains) computer architecture (basic computer design consisting of memory and computing circuits) specialized in solving computationally intensive combinatorial optimization problems  
<sup>\*3</sup> High-performance computing technologies that are inspired by quantum technology, although not directly using quantum effects

**Optimization of Semiconductor Material Formulation**



**Stage for Co-creation Venue for Long-Term Co-creative R&D Projects with Internal and External Partners**

**Overview**

The Stage for Co-creation\* is a venue established in Yokohama City based on our vision of becoming a “Co-creative Chemical Company.” As a diverse range of people from inside and outside the Group gather at this venue to take part in co-creation, it is expected to drive the creation of new pipelines.

Initiatives based on long-term R&D themes that will contribute to future generations are being advanced at the Stage for Co-creation, which also houses three platforms to support and accelerate R&D activities aimed at creating new, sustainable businesses. The four R&D centers (Material Science Analytics Center, Computational Science and Technology Information Center, Process Solution Center, and Chemicals Assessment & Management Center) that are currently

supporting R&D activities are also engaged in activities using the Stage for Co-creation.

In addition to long-term R&D themes and platforms, another characteristic of the Stage for Co-creation is cross-business technology support functions, which link the Company’s various technologies. These functions allow this facility to create and promote R&D themes that contribute to the realization of a sustainable society. Furthermore, the Stage for Co-creation is open to members of the community and even people from overseas, making it a venue for collaboration and co-creation among individuals from inside and outside the Group.

\* Previously named the Stage for Fusion, the name was changed on May 1, 2022, to clarify its function as the Stage for Co-creation based on the vision of becoming a “Co-creative Chemical Company.”

**Platforms**

**Construction of Platforms to Support and Accelerate R&D Activities Aimed at Creating New, Sustainable Businesses**

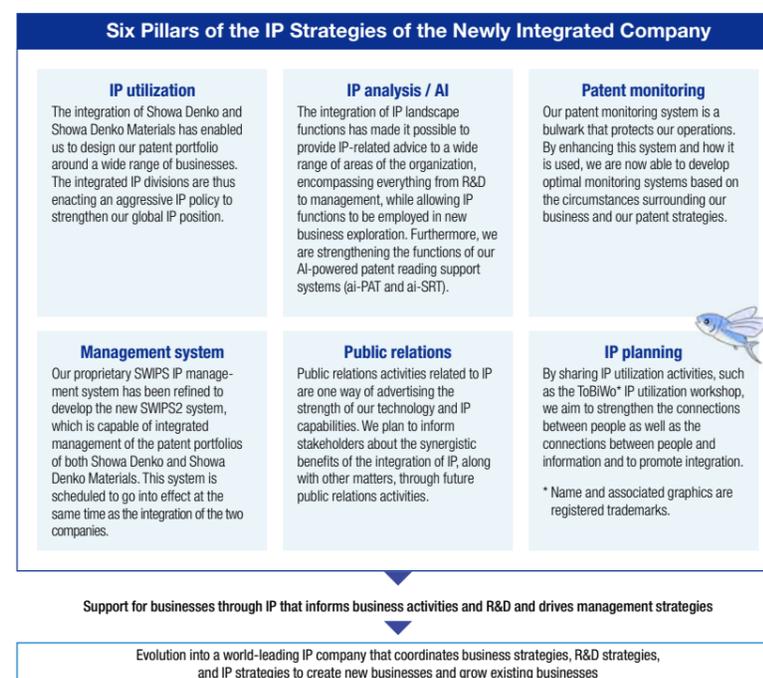
<p><b>Sustainability</b></p> <ul style="list-style-type: none"> <li>Cultivation of sustainability-based mindsets inside and outside of the Company through communication via the Stage for Co-creation</li> <li>Provision of a forum to consider what problems might occur if environmental issues were left unattended and explore resolutions to issues through the “Chemistry to Think”</li> </ul>	<p><b>Technology data</b></p> <ul style="list-style-type: none"> <li>Creation of a database of internal and external technologies as a platform to support the transition from R&amp;D based on experience and tacit knowledge to data-driven R&amp;D</li> </ul>	<p><b>Coaching and mentorship</b></p> <ul style="list-style-type: none"> <li>Cultivation of an atmosphere conducive to ongoing value creation, in which people from inside and outside the Group gather based on shared visions, with the goals of building structures for progress and meeting new colleagues</li> </ul>
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**Intellectual Property Strategies**

Intellectual property (IP) strategies are intimately related to business strategies and R&D strategies and are imperative to a company. Accordingly, close coordination is pursued between divisions responsible for these three types of strategies to promote seamless information sharing and co-creative strategy formulation.

Moreover, the newly integrated company regards its IP strategies as one of its important managerial strategies, and formulates and implements its business, R&D, and IP strategies in a manner that promotes synergistic resonances among them. We are also working constantly to build a robust and broad network of patents for our major business segments and important products, to maintain our competitive edge.

The four IP functions of planning and foundations, technologies and strategies, research and analysis, and contracts and relationships are housed within the Intellectual Property Department, to promote IP activities that inform and promote R&D and business activities from the standpoint of functions.



**Long-Term R&D Themes**

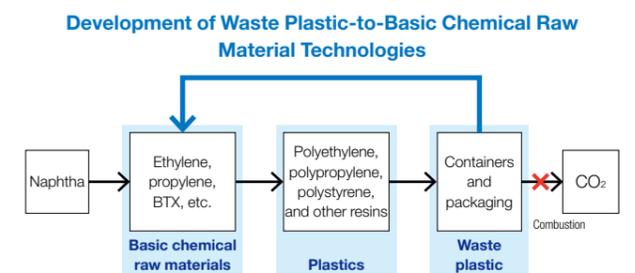
**Next-Generation High-Speed Communications Materials**

The upcoming 6G (Beyond 5G) world is expected to feature a sustainable society in which everyone can express their humanity and where people, things, and experiences are seamlessly connected. Taking a backcasting approach from our vision for 2030, we will advance integrated development of organic and inorganic composite materials that cannot be produced using existing technologies (or refined versions of existing technologies) in the Beyond 5G world. The Company thereby aims to have developed world-leading telecommunications technologies by the 2030s.



**Plastic Recycling**

The environment surrounding plastic recycling has undergone massive transformations in recent years. Specifically, significant attention has been garnered by plastic-to-plastic carbon resource recycling methods, particular chemical recycling processes capable of producing recycled plastic with the same qualities as virgin plastic. Showa Denko is developing waste plastic-to-olefin recycling technologies for use in promoting carbon resource recycling and transitions in the raw materials and manufacturing processes for the basic chemical products that support society.



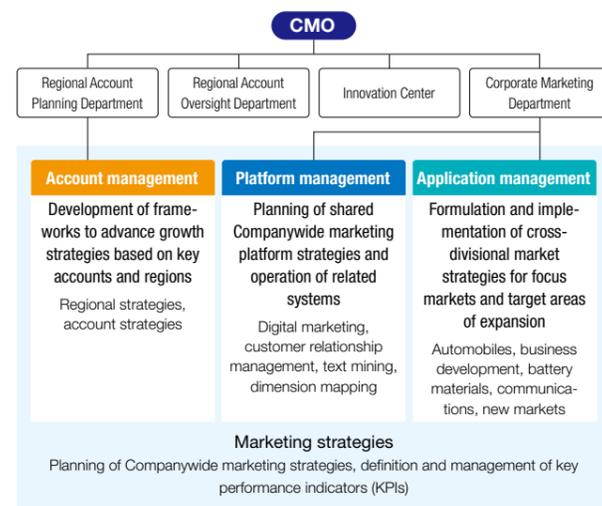
# Marketing Strategies

## Mission for Creating Value

The Showa Denko Group conducts marketing activities that entail coordination between Groupwide business and sales divisions from the perspectives of markets, customers, and regions. In addition, we are developing and utilizing digital tools to improve the efficiency of marketing procedures, as we seek to generate co-creative projects through the proposal of new value and the provision of hands-on technical experience to customers.

## Policies and Management

Our marketing organizations are actively reinforcing systems for internal coordination to maximize our ability to propose new value and provide hands-on technical experience to customers. A particular focus is the enhancement of regional account management, through which we seek to maintain an understanding of region-specific customer issues so that we can provide optimal solutions. We also formulate and implement cross-divisional marketing plans to enhance our understanding of markets and applications, in an effort to provide value that blurs the lines between divisions.



## Innovation Center for Creating Value

The Innovation Center has been established on the 29th floor of Pacific Century Place Marunouchi in Tokyo, located next to our Marunouchi office, to serve as a venue for co-creation and relationship building with stakeholders.

This facility is used as forum for two-way communication aimed at exploring new themes. Visitors will find hands-on exhibits that let them experience some of our core technologies, to facilitate our goal of engaging in co-creation with customers, business partners, and all of our other stakeholders.



Innovation Center (Chiyoda-ku, Tokyo)

## Strategies

The integration of Showa Denko and Showa Denko Materials has greatly increased the breadth and depth of our technology portfolio and product lineup. We have thus undertaken efforts to allow for better visualization of the products and technologies of the newly integrated company, so that employees of manufacturing, development, sales, or other divisions can choose combinations more effectively from this massively expanded range of offerings and thereby create value for customers through their respective functions.

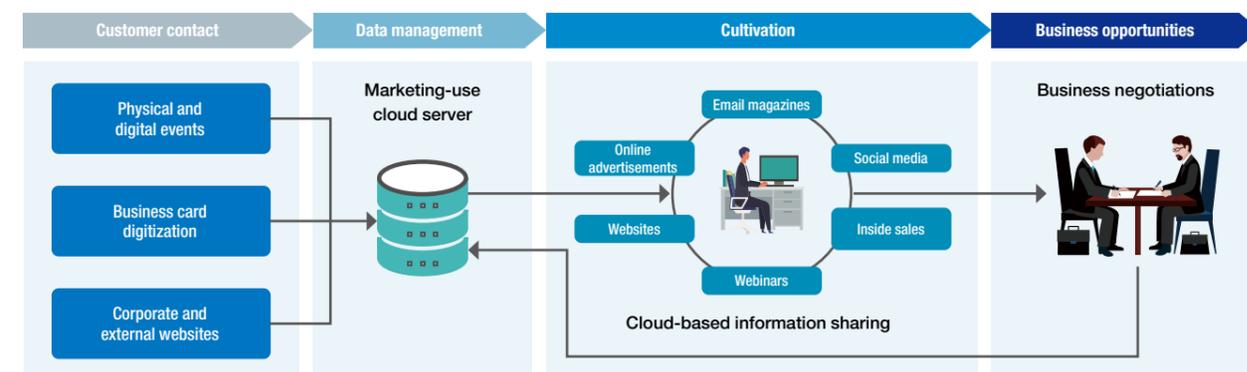
At the same time, marketing divisions are coordinating with sales divisions to collect information on market technology trends and the technical issues faced by customers. The market and customer needs revealed through this process will be addressed with combinations of the newly visualized products and technologies, to propose value that takes advantage of the unique characteristics of the Showa Denko Group.

## Marketing Platform Development

The global COVID-19 pandemic has made it more difficult for us to communicate directly with customers, a situation that has placed increased importance on digital marketing initiatives powered by digital tools. For this reason, we are developing systems that allow employees of business and sales divisions to conduct smooth promotional campaigns via marketing activities through digital channels, such as websites, email magazines, and social media. At the same time, we are exploring new marketing channels on a global scale.

Moreover, customer relationship management systems and initiatives for better mobilizing sales divisions are under way with the aim of facilitating smooth, cross-divisional sharing of sales and marketing information and improving operational efficiency.

## Companywide Marketing Support Platform



## Examples Digital Marketing Campaigns

### Campaigns Targeting the Japanese Market

- Almic-can highly secure and esthetically appealing food packaging
- Contribution to reduced use of plastic for food packaging
- Targeted promotions aimed at the food production industry, conducted by combining email magazines and websites



### Campaigns Targeting the European Market

- Low transmission loss-adhesive film
- Contribution to large-capacity, high-speed electrical equipment required in next-generation communications platforms
- Strong reception through webinars advertised via social media



## Initiatives to Resolve Social Issues as a “Co-creative Chemical Company”

### WelQuick Technology Embodying a Hybrid Approach

WelQuick employs a technology concept for bonding of dissimilar materials, such as metals and resins, that was born out of co-creation between polymer field engineers and aluminum field engineers.

In recent years, there has been an increasing need in the field of material bonding and adhesion to save energy and labor. As such, customers need joining and bonding processes that are both simple and time-saving. In addition, “multi-materialization” has become a keyword in materials development to realize weight reduction or high strength through the combined use of dissimilar materials such as resins and metals. In response to such customer and market needs, we have developed a film-type bonding technology that is easy to use and provides strong bonding of dissimilar materials based on our material technologies and interface control technologies for both resins and metals.

Moreover, WelQuick is easily detached and can be reapplied after detachment, making it incredibly reusable. This feature, combined with the lack of a need for volatile organic compounds, makes this a product that contributes to the realization of a sustainable society.



# IT and Digital Strategies

## Mission for Value Creation

In order for us to continue contributing to the sustainable development of global society, we must continue to create new value through co-creation with internal and external stakeholders. We will evolve and refine our business operations both internally and externally through advanced and utilization of IT and digital technologies and data. In addition, through the development of core digital human resources, we will contribute to continuous business improvement and transformation, competitive enhancement, co-creation with all stakeholders, and the creation of social value.

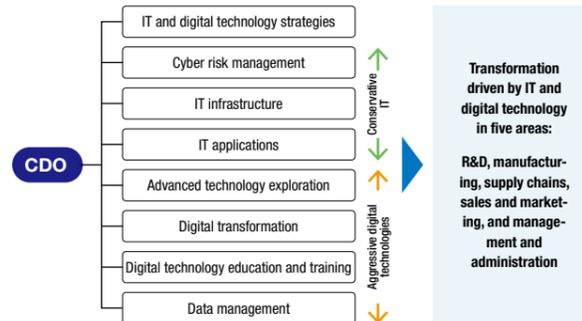
## Policies and Management

We conduct our business under the basic digital transformation policy of contributing to the enhancement of competitiveness and the creation of social value through industry-leading IT and digital utilization.

This means that by thoroughly utilizing IT and digital technology, we will strengthen our innovation and business development capabilities, competitiveness and profitability, and human resource development capabilities, thereby contributing to the realization of our vision of becoming a company that compete globally, a company that contributes to a sustainable global society, and a company that develops co-creative talent which represents Japan's manufacturing industry.

To accomplish these objectives, we will reform our operating processes in a manner that enables faster and more sophisticated management decisions and operations, reinvent business models to develop solutions and businesses that create new value for customers and society by connecting business chains through data, and explore and apply innovative IT and digital technologies that transform society and the Company.

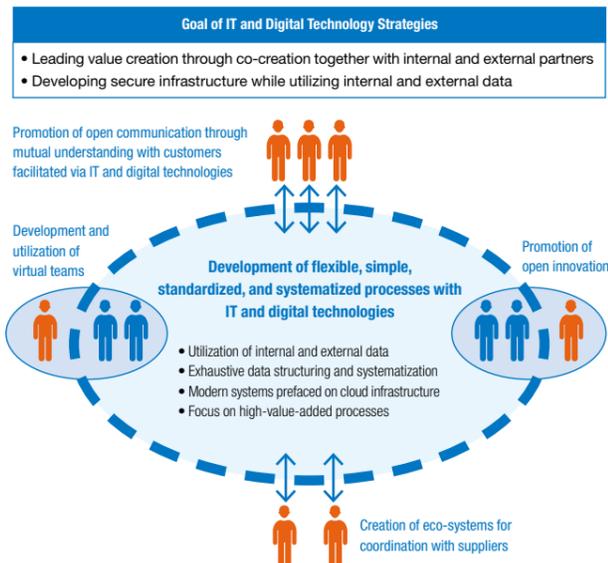
At the same time, we will support these initiatives by supplying comfortable and safe IT and digital platforms that can be used by anyone to access the information they need, anytime and anywhere. We are also developing human resources that can utilize these platforms along with a corporate culture that facilitates these efforts.



## Strategies

To achieve these goals, we will (1) reform business processes to speed up and enhance management decision-making and business operations, (2) reform business models to create solutions and business models that provide new value to customers and society by connecting all business chains with data, and (3) explore and apply innovative IT and digital technologies to bring about major changes in society and the Company.

At the same time, we will provide a safe and comfortable IT and digital infrastructure that supports these efforts, connecting people to necessary information anytime, anywhere, and with anyone, and promote the development of human resources and an organizational culture that will enable them to make full use of this infrastructure. At the same time, we will need to develop digital-proficient human resources while rolling out digital transformation measures to create new businesses, improve value in existing businesses, and promote increased co-creation with customers.

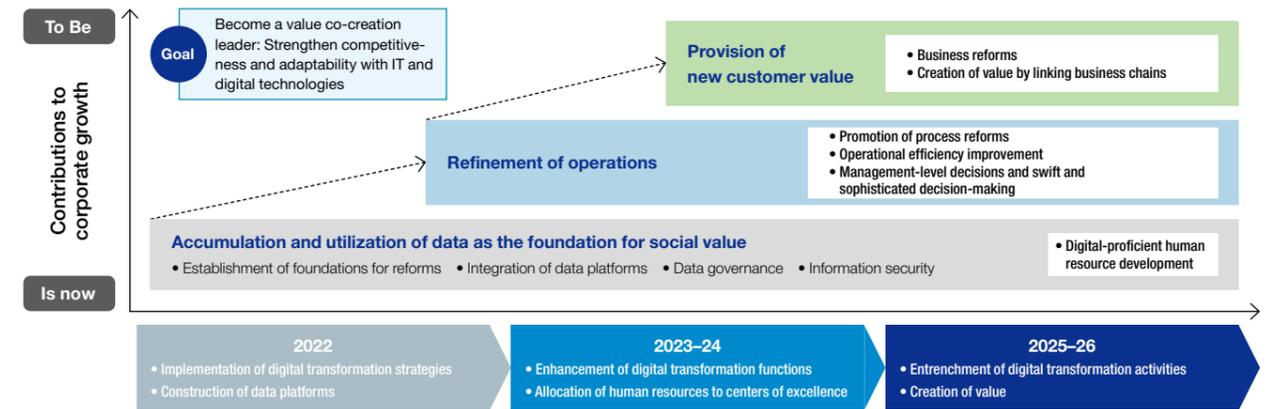


## Progress toward the Long-Term Vision and Roadmap

We are currently moving forward with measures for integrating systems and infrastructure in preparation for the complete integration of Showa Denko and Showa Denko Materials scheduled for January 2023. The consolidation and standardization of the operating processes of both companies will be an essential part of the integration. However, we do not intend to simply have one company conform to the other's existing systems. Rather, our top priority will be to examine, through a concerted effort, the approach toward digital transformation that will allow the newly integrated company to utilize IT and digital technologies in the manner that is best suited to realizing the processes deemed ideal.

By reinforcing our operating platforms and promoting ongoing digital transformation, we aim to create three business chains comprised of information on items along the supply chain, information on technologies along the engineering chain, and the circular chain that contributes to society. These three chains will be linked to facilitate the Company's efforts to become a leader in value co-creation activities for a changing society with the power of chemistry. IT and digital technologies will be used to support these efforts.

## Initiatives Founded on Basic Digital Transformation Policy



## Measures and KPIs to Address Material Sustainability Issues

The newly integrated company must provide value to society in order to continue growing and improving its corporate value. Digital technologies will be imperative to this undertaking.

Material sustainability issues related to digital technologies include improving the efficiency of the process of identifying social and customer needs through digital marketing, accelerating R&D activities for contributing to the resolution of social issues through digital transformation, and utilizing big data-powered IP analyses in management strategies. Looking more broadly at our corporate activities, we also must develop and utilize the digital platforms necessary to support our business activities in relation to data-driven management made possible through data linkage, digital supply chains, smart factories, digital sales, and digital offices. Accomplishing these objectives will require that we embrace the latest IT technologies while heightening the digital maturity of our organization from the perspective of overall optimization. Accordingly, ongoing efforts are being made to supply employees with digital infrastructure and to provide education and training related to such digital technologies.

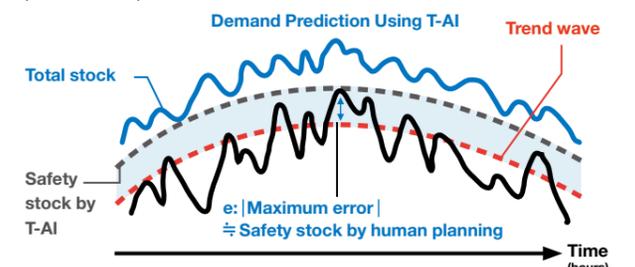
Two KPIs have been defined to gauge our level of digital maturity: the maturity of data management and analysis on a team and division basis, and the digital literacy of employees.

## Initiatives to Resolve Social Issues as a "Co-creative Chemical Company"

### Inventory Management through Introduction of T-AI

Products must be delivered within the timeframe indicated by the customer, and this requires that we secure inventories matched to customer requests and based on our production capacity. At the same time, however, inventories must be maintained at an appropriate level to prevent surpluses. To address these contradictory requirements, we introduced the T-AI system, which is based on the ARIMA model. Having input historic inventory, production, and shipment data, this system can predict future demand, including how seasonal or other factors may cause demand to fluctuate. These predictions make it possible to improve the accuracy of production plans, which were previously dependent upon the experience and intuition of our staff, while reducing the amount of work needed to formulate these plans. Production representatives are thus now able to accelerate the cycle of revising production plans in response to changing trends and to increase the frequency of such revisions. This greater ease in planning has better equipped us to respond to customer requests while maintaining appropriate inventory levels.

The T-AI system is applied to varnish, acrylate, and other product lineups.



# Measures to Combat Climate Change

(Disclosure in Line with the TCFD Recommendations and Carbon Neutrality Initiatives)

## Basic Stance and Policies

Although it uses fossil raw materials and fuels in its product manufacturing processes and emits a considerable amount of greenhouse gases, the Showa Denko Group has many products that contribute to energy conservation and to the carbon cycle. We regard measures to combat climate change as a management priority in terms of both risks and opportunities. In May 2019, we announced our endorsement of the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). In accordance with these recommendations, we are promoting sound dialogue with our stakeholders while evaluating risks and opportunities related to climate change and conducting scenario analysis to inform initiatives that enhance our resilience.

## Governance and Risk Management

Climate change and other sustainability initiatives are overseen by the Group CEO and promoted by the Group CSO. Meanwhile, strategies to mitigate climate change risks and contribute to the greater society are discussed regularly by the Sustainability Promotion Council, which includes the CEO and other chief officers, after discussion by a Groupwide carbon neutrality project team. Opportunities are emphasized alongside risks in these discussions. Information on climate change and other risks with the potential to significantly impact the management of the Company is registered in an integrated manner in our risk management system via Companywide risk assessment activities. Top risks, those risks deemed to have a particularly high frequency or potential degree of impact, are evaluated through discussion by the dedicated Risk Management Committee. Important matters examined by the Sustainability Promotion Council and the Risk Management Committee are submitted to the Management Committee for deliberation and decision before being reported to the Board of Directors.

## Strategy and Scenario Analysis

Our assessments of the potential impact of climate change on our businesses were conducted with a focus on data centers. Under the scenarios projecting average global warming of 2°C and 4°C above pre-industrial levels, demand for semiconductors and hard disks (HDs) is expected to grow in conjunction with the data center market, as the digitalization of

society advances. However, these scenarios do not present hope for a large increase in the electricity supply as society transitions to low-carbon energy sources, meaning that governments will likely be providing active support to energy-saving undertakings, and customers' desire for energy conservation options can thus be expected to grow.

Accordingly, there will be a need to reduce the energy consumption of equipment, such as central processing units (CPUs), graphics processing units, memory, HDs, and power supplies at data centers. As semiconductors become more intricate, their energy-saving benefits increase rapidly. Showa Denko is therefore poised to contribute to energy savings by enhancing the precision of its CMP slurries and high-purity etching gases.

However, there is a limit to the degree to which the intricacy of CPUs can be increased. This is one of the reasons we launched the JOINT2 consortium, which is tasked with accelerating development of semiconductor material technologies that contribute to energy savings through higher package density and smaller distance between circuits in back-end semiconductor production processes.

Looking ahead, we anticipate an increased range of opportunities for use of our materials. For example, we have embarked on collaborative initiatives with an affiliate in the optoelectronics field, which is expected to produce next-generation energy-saving technologies. Other opportunities can be seen in the rising capacity of HD media and the move toward SiC devices for power supplies in response to the popularization of electrified vehicles.

## Climate Change-Related Risks and Opportunities and Major Response Measures

Recent scenario analyses led us to update the identified risk and opportunities in the semiconductor and electronic materials domain. In this domain, additional decarbonization initiatives will be needed, but there are also significant opportunities on which to capitalize, as this area represents one of our Core Growth businesses.

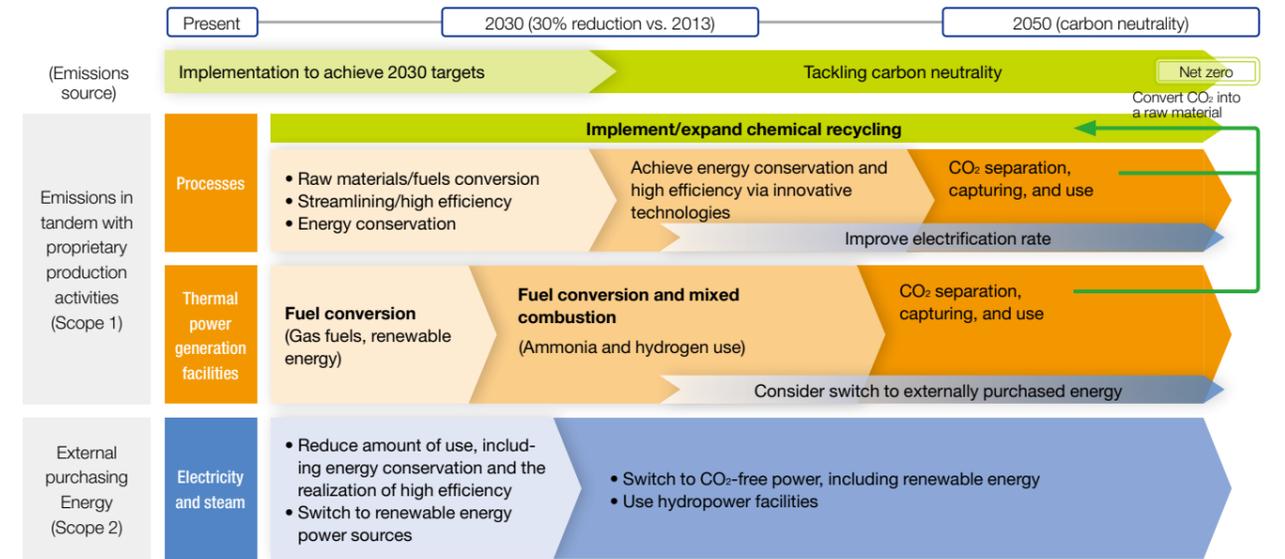
## Climate Change-Related Risks and Opportunities and Major Response Measures (The following is a selected extract—please see our website for full details) [WEB](#)

Impact of climate change	Domain	Risk	Opportunity	Response
Transition risks and opportunities (1.5°C and 2°C scenarios)	All business domains	○	○	<ul style="list-style-type: none"> <li>Revision of GHG emissions reduction targets for 2030 and establishment of the roadmap (P.63)</li> <li>Carbon neutrality initiatives pertaining to chemicals and petrochemicals (P.63)</li> <li>Participation in the GX (Green Transformation) League</li> <li>Promotion of products, development of new products, and improvement of competitiveness in response to the needs of a decarbonized society</li> <li>Advancement of R&amp;D based on long-term themes at the Stage for Co-creation (new research facility) (P.57)</li> <li>Development of eight-inch SiC wafers for next-generation green power semiconductors (adopted as part of the NEDO Green Innovation Fund project) (P.44)</li> <li>Development of a low-concentration CO<sub>2</sub> separation system employing an innovative separation agent (adopted as part of the NEDO Green Innovation Fund project) (P.52)</li> <li>Reinforcement of the global semiconductor material supply chain (adopted under the Ministry of Economy, Trade and Industry subsidiary program for overseas market survey projects for building resilient supply chains in the Indo-Pacific area)</li> </ul>
				<ul style="list-style-type: none"> <li>Establishment of life cycle assessment and carbon footprint calculation frameworks (P.64), tracking of CO<sub>2</sub> emissions, and formulation of reduction plans</li> </ul>
				<ul style="list-style-type: none"> <li>Establishment of the JOINT2 consortium to develop next-generation semiconductor package technologies (adopted as part of the advanced semiconductor manufacturing technology development project under the NEDO post-5G telecommunications system platform reinforcement R&amp;D program) (P.45)</li> <li>Assessment of environmental standard conformity of product designs, and development of low-carbon products</li> </ul>
				<ul style="list-style-type: none"> <li>HD media R&amp;D to reduce electricity consumption of data centers</li> <li>Response to increased demand for SiC power semiconductors</li> </ul>
Physical risks and opportunities (4°C scenario)	All business domains	○	○	<ul style="list-style-type: none"> <li>Analysis of flood risks at manufacturing sites</li> <li>Regular risk identification and reduction activities, and enhancement of business continuity planning</li> </ul>
				<ul style="list-style-type: none"> <li>Suspended operation of manufacturing sites due to flooding, and decrease in profit caused by an increase in the equipment repair cost</li> </ul>

## Indicators and Targets

In preparation for the upcoming integration, we reviewed our greenhouse gas emission reduction targets for 2030 in 2021 and set the target of a 30% reduction relative to the 2013 level. We will review the medium- to long-term plans made for each of our sites, aiming at the creation of a low-carbon economy, and set the medium-term targets for our overseas Group companies. To achieve our greenhouse gas emission reduction targets for 2030, we will further reduce our greenhouse gas emissions and promote energy conservation. Carbon neutrality will also be pursued leading up to 2050, to accomplish the goal of becoming a company that contributes to a sustainable global society as put forth by our long-term vision.

## Roadmap to Carbon Neutrality in 2050



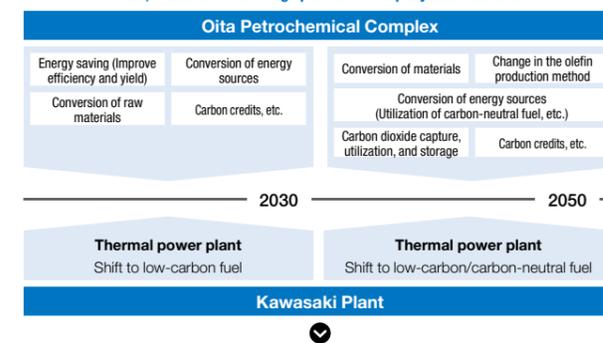
- Up to 2030, promote initiatives for rigorous streamlining, increased efficiency, energy conservation, and conversion to gas fuels (high-efficiency co-generation system)
- Promote technology development for new GHG capture and utilization processes and sustainable plastic chemical recycling
- From 2030 to 2050, promote in earnest initiatives for fuel conversion/mixed-combustion using ammonia and hydrogen, and electrification of production processes
- Promote utilization of private hydroelectric power and shift to renewable energy power for use in production
- Aiming to achieve carbon neutrality, promote the development of innovative GHG capture/utilization technologies, utilization of recycled GHG as chemical materials, and implementation of sustainable plastic chemical recycling technologies

## Path to Carbon Neutrality Centered on Petrochemicals and Other Chemicals

The Chemicals segment provides products that are indispensable to society. At the same time, however, it emits more greenhouse gases during its production processes than other segments. For this reason, petrochemical and other chemical operations will be a central focus of our efforts to achieve carbon neutrality. Up until 2030, our pursuit of carbon neutrality will involve building upon existing technologies centered on those for conserving energy and switching to new energy sources. R&D efforts looking toward 2050, meanwhile, will include the low-concentration CO<sub>2</sub> separation system employing an innovative separation agent that was adopted by NEDO under its Green Innovation Fund. [WEB](#)

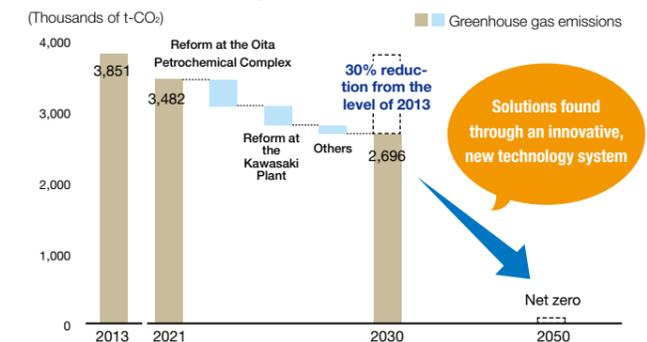
## Roadmap for Petrochemicals and Chemicals Businesses

Formulation of reduction measures for the Oita Petrochemical Complex and Kawasaki Plant, contributors of a large portion of Companywide emissions



Promote independent measures while searching for solutions through co-creation with stakeholders

## Road to Carbon Neutrality



## Topics

### Graphite Electrode Production through Renewable Energy Use

Our Omachi Plant, which produces graphite electrodes, has three hydroelectric power generation facilities (Aoki, Tokiwa, and Hirotsu) that utilize the region's shared water resources. Hydroelectric power generation is a reliable, low-carbon source of electricity. In April 2022, this plant also shifted to power sources, certified as not being generated using fossil fuel for electricity purchased, to supplement that procured through hydroelectric power generation. Following the example of the Omachi Plant, our mother factory, we are promoting similar renewable energy initiatives in Europe.

The Omachi Plant is located in Omachi City, Nagano Prefecture, which became the first municipality to be recognized by the Japanese government as evolving into a futuristic city based on the principles of the SDGs in July 2020. Accordingly, this city has unveiled a plan of becoming a sustainable city with plentiful water nurturing co-creative partnerships inspired by the SDGs. Showa Denko is supporting this plan by providing all of the water from the 36 km of waterways it manages for hydroelectric power generation purposes for use in agriculture or daily use by community members. In addition, we are using big data to examine ways to maximize the output of our hydroelectric power generation systems, as part of our efforts to promote the effective use of water together with the community.

Further efforts to reduce greenhouse gas emissions will be taken in the years ahead. These efforts will not be limited to the use of renewable energy and may involve conversion to more eco-friendly fuel sources. Through these initiatives, we will supply graphite electrodes produced using an eco-friendly process.



Hydroelectric power station of the Omachi Plant (Hirotsu)

### Greenhouse Gas Abatement Systems

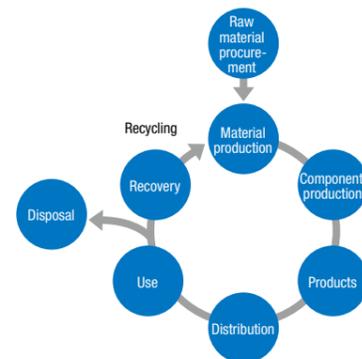
We are developing exhaust gas abatement systems that treat perfluorochemical (PFC) gases, which have a particularly high greenhouse effect coefficient, to contribute to reductions in emissions of greenhouse gases. To date, more than 1,200 of our systems have been delivered around the world. PFC gases are used in processes such as semiconductor etching, and the Company produces and sells high-purity PFC gases as a product. Semiconductors are crucial components found in various products used throughout society. As a chemical manufacturer, we seek to minimize the negative impacts of manufacturing processes on the global climate. We are therefore ramping up foundational development activities for catalysts and chemicals that are more effective at preventing emissions of harmful gases. On this front, we have concluded a joint development agreement with a South Korean abatement system manufacturer, to help us redevelop our product lineup in accordance with requirements of countries around the world. This company has succeeded in commercializing combustion-type and plasma-type abatement systems and boasts superior mechatronics and engineering capabilities. These strengths are anticipated to lead to technical synergies with Showa Denko, which itself has strengths in the field of chemicals, and thereby help us to combat global warming through improvements to existing equipment, cost reductions, and enhancements to systems for local production and consumption.



### Life Cycle Assessment and Carbon Footprint Initiatives

Life cycle assessments are a means of quantitative evaluation of the environmental impacts of products and services throughout their entire life cycle, or within a specified portion of this life cycle. At Showa Denko, we base life cycle assessments on our accumulated experience and insight to use assessments as one facet of our establishment and construction of systems, in preparation for the upcoming integration. Specifically, we are developing frameworks to apply life cycle assessment methodologies to measure the total amounts of greenhouse gas emissions (carbon footprint) associated with individual products. For example, life cycle assessments have been commenced to quantify the greenhouse gas emission reduction benefits of the recycling technologies that utilize waste plastic at the Kawasaki Plant. We have also been expanding the scope of these assessments beyond products to apply these methodologies from the R&D phase, and plans have been formulated to begin performing life cycle assessments of R&D activities in 2023. Contracts have been concluded with external life cycle assessment experts to provide guidance to support our implementation of these activities, allowing us to receive advice on our assessment methodologies. Moreover, we participate in the life cycle assessment research groups of external organizations, to coordinate with external experts and other companies through research on concrete case studies.

#### Product Life Cycle



# Environment

## Policies and Management

Showa Denko has defined the basic policy for its responsible care activities (P.66) as being considerate of health, safety, and the environment throughout all stages of product life cycles, and we are working to reduce environmental impacts across product life cycles in accordance with this policy. As a chemical company, we of course seek to minimize the missions of hazardous substances, waste, and pollutants and to fulfill our responsibility as an emitter of such substances. We are also going a step further to appropriately assess the impact of our business on the environment and to implement measures for preserving the environment based on the findings of such assessments, while contributing to the pursuit of carbon neutrality and to the resolution of social issues.

The CEO is the highest authority for environmental preservation

activities, and it is the CEO who leads us in shaping the responsible care policies that form the basis of our environmental preservation activities and in communicating these policies inside and outside the Group. Business divisions and sites are responsible for advancing environmental preservation activities based on these policies, while our headquarters offers support for these activities. Moreover, information on the status of environmental management is shared at regular meetings of the Responsible Care Promotion Council and the Management Committee. These meetings are also used as an opportunity to set Groupwide environmental preservation activity targets, which are then deployed to business sites. Business sites advance environmental preservation and management activities based on the details of responsible care plans formulated by the site manager.

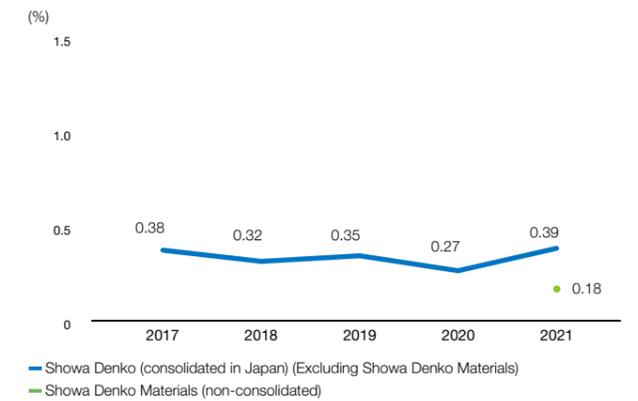
## Strategies

One of the material sustainability issues defined in the Company's long-term vision is "gain social credibility through responsible business management." Our efforts to address this issue include a range of environmental initiatives. Environmental management pertaining to environmental risks—such as global warming, waste, and water, air, soil, noise, and vibration pollution—is being improved based on our responsible care policies and through initiatives to develop supply chain-spanning monitoring systems and effective environmental risk management systems. With especially strong environmental management systems overseas, the newly integrated company is promoting environmental preservation on a global scale.

The following KPIs have been defined in relation to material sustainability issues along with targets for 2025, which we are steadily working toward.

Greenhouse gas emissions (Scope 1 + Scope 2) (P.25)

### Ratio of Industrial Waste Sent to Landfills



Priority measures	Targets for 2025	Results in 2021
1) Greenhouse gas emissions (carbon neutrality declaration) 2) Industrial waste sent to landfills 3) Environmental accidents	1) 30% reduction in greenhouse gas emissions (Scope 1 + Scope 2) from fiscal 2013 (consolidated) * Target for 2030 2) 0.5% or less in Japan, 5.0% or less outside Japan 3) Zero environmental accidents (consolidated)	1) 10% reduction for Showa Denko and 0.5% reduction for Showa Denko Materials from fiscal 2013 2) 472 tons out of 135,000 tons of industrial waste sent to landfills, for a ratio of 0.35% (Showa Denko [consolidated in Japan] + Showa Denko Materials [non-consolidated]) 3) Zero accidents (Showa Denko [consolidated in Japan] + Showa Denko Materials [non-consolidated]) (Global information collection frameworks to be developed)

### Environmental Measures in Kitakata City

Surveys of soil and underground water at our production base in Kitakata City, Fukushima Prefecture, revealed that the content of fluorine and other substances in soil and underground water exceeded the regulatory standards on the premises as a result of past operations. This fact was reported to the Fukushima Prefectural Government in December 2020, resulting in the site being designated an area which requires action in accordance with the Soil Contamination Countermeasures Act. Environmental response measures based on this act have been implemented since 2021.

### Minamata Disease in Niigata Prefecture

With regard to Niigata Minamata disease, which was officially recognized in 1965, we maintain an awareness of the significant scale at which substances emitted by Showa Denko have caused damage to the victims and residents of neighboring areas through contamination of the Agano River, and we are committed to collaborating with the Japanese government as well as local governments in order to cope with this issue with sincerity, and to provide solutions in accordance with the Pollution-related Health Damage Compensation Law and other relevant laws and regulations.

# Occupational Health and Safety

## Policies and Management

At the Showa Denko Group, occupational safety activities are positioned as part of our responsible care activities and are thus advanced under our responsible care system. The basic philosophy of our occupational safety activities is to place safety as our top priority. We are therefore promoting the development of a workplace environment in which all employees can work safely, in good health, and with peace of mind.

Occupational safety activities are overseen by the president, and safety meetings are held once every two weeks, in principle, with an emphasis on delivering bad news fast. These meetings serve as an

opportunity to communicate information regarding safety within the Group to management, and for management to provide guidance to be disseminated throughout the Group. In addition, forums for discussions regarding occupational health and safety between labor and management are arranged at the business site and at the Companywide level. We thereby facilitate discussions and workplace patrols related to occupational health and safety by members of management and labor unions, creating a unified front between labor and management to promote occupational safety.

## Strategies

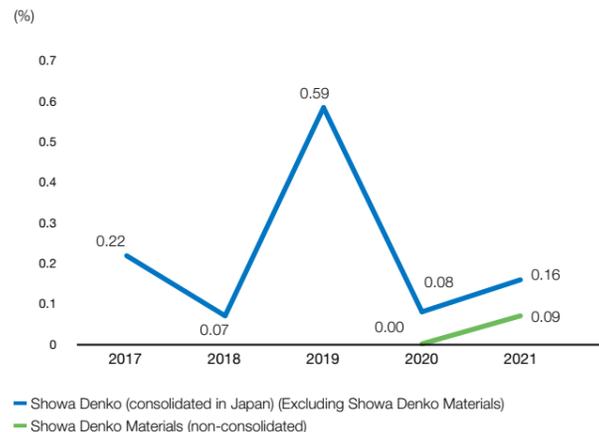
We seek to develop a globally applicable system to prevent occupational and equipment-related accidents based on a risk management approach. The global regulations that will form the basis for this system are scheduled to be formulated within 2022, with the goal of putting the actual system into effect in 2025. Specific provisions to mitigate occupational accident risks will include enhanced occupational health and safety and equipment maintenance risk assessments, ongoing improvements to management systems, and sharing of accident information to prevent the occurrence of similar accidents. The positive elements of the occupational safety activities of both Showa Denko and Showa Denko Materials will be incorporated into the standards for the newly integrated company, and these standards will then be deployed on a global scale. Furthermore, KPIs will be defined for these activities to monitor their progress and drive improvements.

At the same time, we will integrate the training programs of both companies to facilitate the cultivation of human resources with high levels of safety awareness to support these systems and activities. We thereby aim to foster people, workplaces, and cultures with a strong emphasis on safety. In addition, a safety awareness survey will be conducted as necessary to gauge the level of entrenchment of our desired culture of safety, to highlight any issues that might exist, and to facilitate ongoing system improvements.

We have also set the targets of zero occupational and equipment-related accidents, including accidents that do not result in lost work time. Meanwhile, initiatives are being implemented based on the following KPIs related to material sustainability issues in our long-term vision.

Priority measures	Targets for 2025	Results in 2021
1) Fostering of a culture emphasizing safety 2) Occupational accidents 3) Lost time incident rate 4) Equipment-related accidents	1) Establishment of a culture emphasizing safety to eliminate occupational accidents (measured through global employee awareness surveys and improvement seen in results) 2) Zero serious occupational accidents (consolidated) 3) 0.1 or less (consolidated, equivalent to zero accidents resulting in lost time over a 10-year period at a site with 500 employees) 4) Zero serious equipment-related accidents (consolidated)	1) Identification of potential risks and advancement of safety measures 2) 0 (Showa Denko [consolidated in Japan] + Showa Denko Materials [non-consolidated]) 3) 0.13 (Showa Denko [consolidated in Japan] + Showa Denko Materials [non-consolidated]) 4) 0 (Showa Denko [consolidated in Japan] + Showa Denko Materials [non-consolidated])

## Lost-Time Incident Rate (LTIR)



## Responsible Care Initiatives

Responsible care initiatives entail voluntary action to protect safety, the environment, and health across the entire life cycle of chemical products, which ranges from development to manufacturing, distribution, use, final consumption, and disposal. We are always pursuing higher levels of quality in our chemical products, to ensure that they can be used safely and with peace of mind. At the same time, we seek to earn greater levels of trust from stakeholders through active engagement.

Based on our belief that safety must be our top priority, we are working to accomplish targets related to occupational health and safety, climate change and other environmental activities, and quality and chemical management.

# Quality Assurance

## Policies and Management

Guided by our policy of providing world-class quality that contributes to the sustainable development of society, we are reinforcing global quality assurance governance and pursuing ongoing improvements through concerted Company efforts as we integrate regulations and measures to build the quality assurance frameworks of the newly integrated company. We are also targeting higher levels of quality awareness through the consolidation and expansion of quality training programs, to stimulate the growth of organizations and the people

who support them. By building frameworks and heightening awareness in these manners, we will foster a culture that emphasizes quality.

The chief quality officer (CQO) leads an oversight organization that houses functions related to formulating quality-related strategies and systems, managing these systems, conducting monitoring, and promoting globalization and IT system development. Improvements in these areas are pursued through the implementation of a PDCA (plan-do-check-act) cycle via coordination with business sites.

## Strategies

The following priority quality assurance measures are being implemented on a global scale. In addition, our long-term vision defines KPIs for material sustainability issues. Initiatives are underway based on these KPIs.

### Priority Measures

- 1. Maximization of value provided to customers and society**  
We will track the results of evaluations of the Company by customers.
- 2. Reinforcement of global quality assurance governance**  
Two-way communication will be practiced as we strive to establish governance systems and quality information sharing frameworks that match the needs of specific businesses and regions, to create a global quality management system and ensure that this system is reflected effectively in the activities of bases.

### 3. Pursuit of ongoing improvements through concerted Company efforts

- (1) Steps are being taken to develop frameworks for assessing and mitigating product quality risks across product life cycles, to prevent accidents arising from quality safety issues.
- (2) Information on the lessons to be learned from complaints is managed in an integrated manner, to develop frameworks to prevent future complaints.
- (3) Digital transformation methodologies related to quality management, such as automatic uploading of inspection logs, are being used to facilitate improvements in this area.

### 4. Stimulation of the growth of organizations and the people who support them

Quality compliance training programs employing case studies of actual violations are conducted on an ongoing basis, to foster a culture of diligent manufacturing throughout the organization.

Priority measures	Targets for 2025	Results in 2021
1) Product-related accidents 2) Quality compliance violations 3) Product stewardship	1) Zero product-related accidents (consolidated) 2) Zero violations (consolidated) 3) 100% implementation rate for chemical management risk assessments* (consolidated)	1) 0 (consolidated) 2) 0 (consolidated) 3) 55% (Showa Denko (non-consolidated))

\* Assessed through GPS safety summaries (GSSs) of priority risk assessment substances (62 substances stipulated by the Company in 2019)

## Topics

Showa Denko was presented with first prize in the fiscal 2021 Japan Initiative of Product Stewardship (JIPS) award program organized by the Japan Chemical Industry Association (JCIA). This program recognizes member companies of the association that have conducted superior initiatives as detailed by their disclosed safety activity summaries, which is one of the voluntary activities encouraged for chemical management. Our receipt of this honor is thought to be a reflection of our sequential risk assessments of high-priority substances from among the chemicals we manufacture and sell, as well as our proactive disclosure of the results of these assessments. The safety activity summary we prepared in 2021 contained the results of 30 risk assessments, and this summary was made available through the JCIA BIGDr chemical risk assessment support portal.

In 2022 and beyond, we will continue these activities as a newly integrated company, implementing ongoing improvements to the content of our safety activity disclosure to help stakeholders better comprehend our efforts.



# Sustainable Procurement

## Policies and Management

The Showa Denko Group aspires to build long-term relations of trust with suppliers and contribute to the realization of a sustainable society. To this end, we adhere to high ethical standards in our procurement activities and develop fair and impartial procurement frameworks to promote responsible procurement activities. We also strive to develop sustainable businesses across the supply chain, ranging from raw material procurement to manufacturing, sales, and distribution.

As we work toward the full integration of Showa Denko and Showa

Denko Materials as a corporate entity, we are moving ahead with the integration of our procurement policies, supplier screening standards, procurement procedures, and procurement regulations through the Purchasing & Distribution Subcommittee. This organization is staffed by representatives of the procurement divisions of Showa Denko and Showa Denko Materials under the guidance of the chief operations, manufacturing, and engineering officer (CMEO). In addition, important meetings and training programs have been held jointly since 2021.

## Strategies

In its procurement activities, the Group is committed to exercising social responsibility with regard to the environment, human rights, and compliance from a global perspective. To this end, we have established procurement guidelines detailing the initiatives that we want suppliers to join. Adherence to these guidelines in collaborative activities is anticipated to lead to improved corporate value for both parties. Moreover, the CSR procurement guidelines issued by Showa Denko and Showa Denko Materials were integrated and revised in 2022 to enhance our

competitiveness on the global stage as a newly integrated company, to form the Sustainability Procurement Guidelines. We aim to spread awareness among suppliers of the new guidelines in the years ahead.



In addition, our long-term vision defines the following priority measures for material sustainability issues, and we are working to advance these measures.

Priority measures	Targets for 2025	Results in 2021
Improvement of communication quality through supplier self-assessment questionnaires	Improved response rates Higher rate of suppliers exceeding the satisfactory threshold	Began formulating the Sustainability Procurement Guidelines for the newly integrated company (established in 2022, with awareness raising activities underway)

## Initiatives in 2021

Showa Denko previously requested that all of its suppliers comply with the Showa Denko Group's CSR Procurement Guidelines. To raise suppliers' awareness with regard to our sustainable procurement activities, we asked new suppliers to fill out CSR self-assessment questionnaires when starting business with us, and we requested major existing suppliers to do so once every three years. Additionally, each year we visit around 40 suppliers to conduct on-site CSR inspections, during which we speak with them about their environmental, human rights, compliance, and other initiatives.

The results of CSR self-assessment questionnaires and on-site CSR inspections have been aggregated, and applicable suppliers were provided with feedback reports that clarified their standing relative to the average of all suppliers and of their own business category and provided advice on making improvements. These activities are positioned as the pillars of our supplier risk assessment activities,

and in principle we conduct supplier risk assessments for all items and services that we purchase.

Concurrently, Showa Denko Materials distributed its Supply Chain CSR Procurement Guidelines to new suppliers when starting business with them and asked them to submit a report on the completion of checking as part of efforts to raise awareness among suppliers. In the future, efforts will be advanced as a newly integrated company based on the KPIs defined in our long-term vision.

In addition, we issued a declaration to voluntarily take actions based on our endorsement of the principles of the white logistics movement aimed at improving working conditions in the logistics industry advocated by the Ministry of Land, Infrastructure, Transport and Tourism; the Ministry of Economy, Trade and Industry; and the Ministry of Agriculture, Forestry and Fisheries. Initiatives are underway in accordance with this declaration.

## Results of Supplier CSR Self-Assessment in 2021

Number of respondents: **327** companies Average score: **65.4**

Score	Number of companies (%)	Improvement efforts
50 or more	239 companies (73%)	Were requested to work on matters that needed improvement and pursue higher-scoring initiatives
30 to 50	78 companies (24%)	Were requested to work on matters that needed improvement, and were offered Showa Denko's proposal on improvement measures Note: Visits made as needed, to exchange opinions on efforts on both sides and check improvements with the next self-assessment.
Below 30	10 companies (3%)	Were requested to work on matters that needed improvement, and were offered Showa Denko's proposal on improvement measures Note: Visits made as needed, to discuss early improvement and check improvements with the next self-assessment.

# Compliance

## Policies and Management

The Company believes a compliance philosophy that emphasizes adherence to both laws and soft law standards is imperative for the continuity of its business. Accordingly, we are implementing systems and initiatives to entrench, throughout the organization, an ethical standard based on honesty, impartiality, and integrity alongside our commitment to compliance with the laws, regulations, and social norms of every country and region that we serve.

The upcoming milestone of the corporate integration of Showa Denko and Showa Denko Materials, scheduled for January 2023, is being positioned as an opportunity to instill awareness of corporate ethics and compliance among all Group employees. We will also be examining methods of installing and operating frameworks to appropriately monitor the state of compliance.

## Strategies

The newly integrated company will focus on introducing and enacting global compliance standards over the medium to long term, with the goal of gaining social credibility through responsible business management. In addition, a new code of conduct will be prepared and its understanding and awareness promoted. We will also seek to increase recognition of our Corporate Ethics Hotline, so that we can protect our reputation and improve the ability of the organization to combat internal misconduct.

to the new code of conduct among all Group companies.

Furthermore, code of conduct booklets are scheduled for production. These booklets will be used as a tool to facilitate a deeper understanding of the code and help employees reflect this code in their daily business activities and everyday life. Meanwhile, our annual Corporate Ethics Month will continue to serve as a time to promote understanding of the code through the Group.

## Group Code of Conduct

A project team comprised of employees from both Showa Denko and Showa Denko Materials is currently in the process of formulating a code of conduct that will set forth the minimum required standards of actions and the rules we will expect all members of the newly integrated company to observe. This code of conduct is scheduled to be announced during our annual Corporate Ethics Month in October 2022. We plan to prepare Japanese-, English-, and Chinese-language versions of this code for the announcement, which will then be used to promote understanding of and adherence

## Corporate Ethics Hotline Consultation and Whistleblowing System

Showa Denko and Showa Denko Materials have set up compliance hotlines that are available to all stakeholders who wish to seek consultation or report any issues regarding compliance. The two companies, moreover, make proper and prompt responses to such reports, with due consideration to confidentiality and the prevention of disadvantageous treatment of hotline users. As for serious cases, all matters, from reporting to investigation to corrective and preventive measures, are reported to the Management Committee and the Board of Directors.

Priority measures	Targets for 2025	Results in 2021
1) Entrenchment of the Group Code of Conduct 2) Penetration of Group global compliance standards	1) Increase workplace communication opportunities and number of participants 2) Reduction in number of serious legal breaches and increase in number of reports through the whistleblowing system	1) Commencement of the formulation of the new Group Code of Conduct (scheduled for completion in 2022) 2) Commencement of the formulation of global compliance standards (introduction completed in 2022)

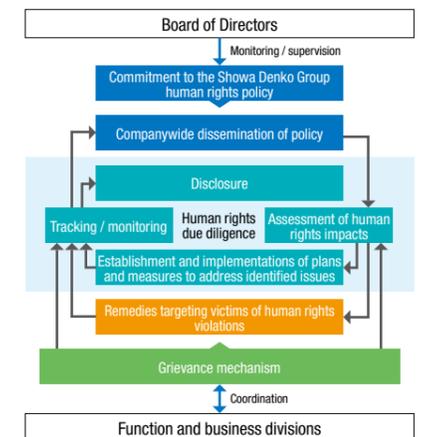
## Initiatives Based on Our Human Rights Policy

The Showa Denko Group Human Rights Policy was established in 2021. All employees are expected to conform their actions to this policy, and we request that suppliers and all other business partners adopt the spirit of the policy. We also continue to build upon human rights due diligence activities in accordance with this policy.

In 2021, focus was placed on risk assessments of Showa Denko Group employees in Japan and on process assessments of sustainable procurement activities. Any human rights issues discovered through these assessments will be addressed through concrete improvement activities, including training to raise awareness, revisions to regulations, and reforms to procurement processes.

In 2022, we expanded the scope of human rights due diligence activities to include overseas Group employees, workers with non-direct employment schemes in Japan and overseas, and the supply chain in its entirety. This move was made based on the rising geopolitical risks and on our need to act as a newly integrated company. Through this expanded scope of activities, we have begun identifying high-risk areas.

Priority measures	Targets for 2025	Results in 2021
Human rights	Establishment of human rights due diligence processes and implementation frameworks	Commencement of human rights policy establishment, issue identification in Japan, and response measure formulation



# Risk Management

## Mission of Creating Value

The Company takes steps to identify the risks that could potentially impact business management, to support management decision-making and thereby facilitate the appropriate allocation of finite resources.

## Risk Management Policies and Frameworks

The Showa Denko Group has adopted a risk assessment, response, and review process that is compliant with the ISO 31000 standard. Once a year, a comprehensive identification of risks, including potential risks associated with business activities, and an evaluation of risks (risk inventory) are conducted at more than 140 frontline organizations, such as sections and groups. Results of risk inventory activities are reviewed at the site level by the top leadership of the respective division, plant, or Group company before being registered in the Group's risk management system. Registered risks may be identified as serious risks based on their potential frequency or degree of impact.

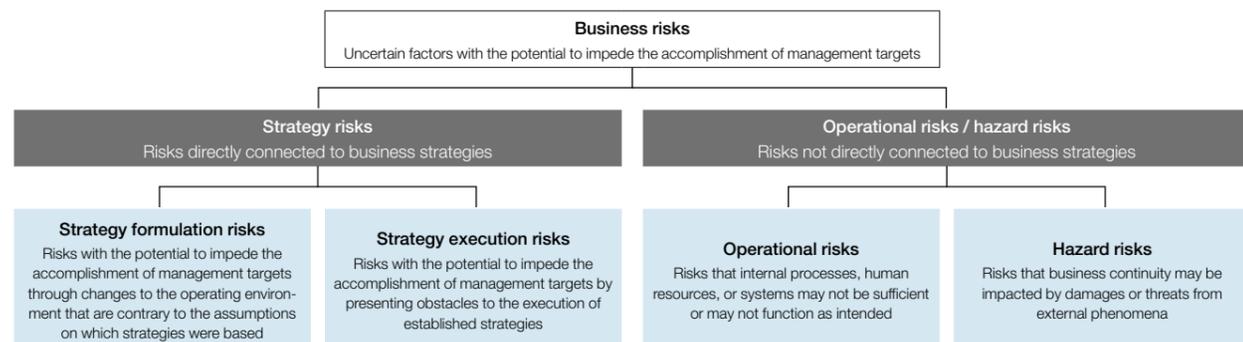
The Risk Management Committee deliberates on the directions of countermeasures for identified serious risks and their appropriateness before reporting its findings to the Management Committee and the Board of Directors. The risk management departments of business sites then carry out the measures approved through this process. Of the risks examined by the Risk Management Committee, strategy risks are overseen by the CSO and the CFO, while operational and hazard risks are overseen by the CRO. These officers coordinate with business divisions to address the respective risks. Moreover, the perspective of risks management is installed within the scenario planning and business intelligence functions of the CSO, to effectively embed risk management into management strategies.

The chief officer organizations act as risk oversight divisions by drafting risk scenarios and countermeasures for their respective areas of risk responsibility. Business divisions, meanwhile, take risk inventory of the subsidiaries they oversee. In these ways, risk management is conducted on a Groupwide scale.



## Showa Denko's Definition of Risks

Showa Denko divides risks into three categories: strategy risks, operational risks, and hazard risks. Strategy risks are then further subdivided into risks of changes in the assumptions on which strategies are based and risks that the established strategies cannot be implemented as intended. Passive risk management based on the conventional focuses of safety and compliance will not be enough to ensure ongoing improvements in corporate value; it will also be necessary to engage in aggressive risk management that entails promoting appropriate risk taking. Based on this recognition, the newly integrated company will judge risks from a comprehensive perspective and reflect these judgments in management strategies.



## Measures and KPIs to Address Material Sustainability Issues

The following are two priority measures for reconciling the disparity between the current risk management systems and those envisioned for the newly integrated company. By advancing these measures, we aim to develop a world-class risk management system.

Priority measures	Targets for 2025	Results in 2021
1) Development and operation of comprehensive risk management systems 2) Reinforcement of the second line of defense*	1) Operation of comprehensive risk management systems for strategy risks, operational risks, and hazard risks 2) Exercise of management functions through the risk assessment system	1) Trial introduction of the new risk management system (initial deployment in Japan operations) 2) Commencement of integration of the management functions of both companies (with implementation of monitoring functions scheduled for 2022)

\* The second line of defense: Corporate divisions that monitor the relevant risks and provide warnings and advice positioned between the business execution divisions that control risks as risk owners (the first line of defense) and the internal control divisions (the third and final line of defense)

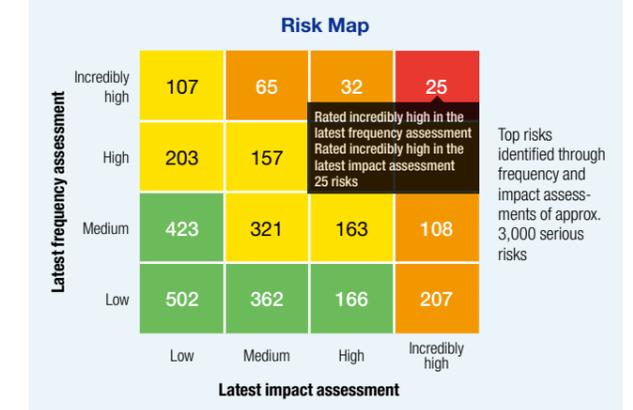
## Risk Inventory Activities

In 2021, the RSA Archer® Suite\* was introduced as a shared tool for integrated management for use by both Showa Denko and Showa Denko Materials. This decision was made after a comparative assessment of the risk management systems of both companies.

Approximately 3,000 serious risks from among the risks threatening both companies have been registered in this system. These risks were then categorized based on their potential frequency and degree of impact, to identify serious and priority risks. Risks that are judged

to have both an incredibly high frequency and a potential degree of impact have been positioned as top risks. The risk phenomena and response plans for the top risks were discussed among the relevant divisions, with information shared, and reports were issued to the management committee. Moreover, the results of assessments through the system were shared with Companywide managers to help mitigate frontline risks.

\* A risk management system provided by RSA Security LLC



## Specific Risks and Countermeasures

<p><b>Accidents</b></p> <p>Risk of impediments to product supply due to damages to the production facility or loss of employee safety as a result of accidents, etc.</p> <p><b>Countermeasures</b></p> <ul style="list-style-type: none"> <li>• Extensive utilization of the safety management system</li> <li>• Analyses and training based on case studies of past accidents occurring inside and outside the Company, etc.</li> </ul>	<p><b>Information security risks</b></p> <p>Risk of leaks of confidential or personal information, halts to operation of internal systems due to cyberattacks, alteration of corporate websites, etc.</p> <p><b>Countermeasures</b></p> <ul style="list-style-type: none"> <li>• Training programs to improve information security awareness</li> <li>• Measures to prevent information security incidents</li> <li>• Response measures to limit the impact of incidents, etc.</li> </ul>	<p><b>Supply chain risks</b> (Natural disasters, infectious diseases, environmental and human rights issues, conflicts, trade friction, etc.)</p> <p>Risk of impediments to product supply due to damages to production facilities as a result of earthquakes, floods, or other natural disasters; pandemics; environmental or human rights issues; conflicts; or trade friction occurring in areas of the Company's supply chains</p> <p><b>Countermeasures</b></p> <ul style="list-style-type: none"> <li>• Preemptive identification of multiple risks and implementation of swift response measures</li> <li>• Establishment of risk mitigation regulations and rules, and dissemination to business partners</li> <li>• Identification of priority products, establishment of business continuity plan manuals, institution of training programs, etc.</li> </ul>
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# Human Resource Strategies

## Mission of Creating Value

**Based on the purpose and values that constitute its corporate philosophy, Showa Denko believes that its human resource strategies should focus on fostering co-creative human resources and cultivating the associated corporate culture. This approach will be crucial to proposing creative resolutions to issues through co-creation founded on autonomous bonds with customers and other stakeholders, shaped by mutual understanding and a resonance of values. Such human resources are a wellspring of value for the Company. Based on this recognition, we aim to develop an organization in which all employees can feel tangible growth through the career paths that suit them.**

## Policies and Management

A substantive integration of the management teams of Showa Denko and Showa Denko Materials took place in 2022. To unite employees around the world and orient them toward a single shared goal, we also established a corporate philosophy, which defines our purpose and values, as the most important guideline for the newly integrated company. In addition, a new culture and communication division was established under the control of the CHRO with the goal of helping employees form an intimate and personal connection to our purpose and values. It is anticipated that such connections will help employees to maintain a sense of their purpose and aspirations, as well as those of the Company, even in times plagued with uncertainty.

At the same time, we recognize that acting in accordance with our corporate philosophy will require us to secure a diverse staff and to

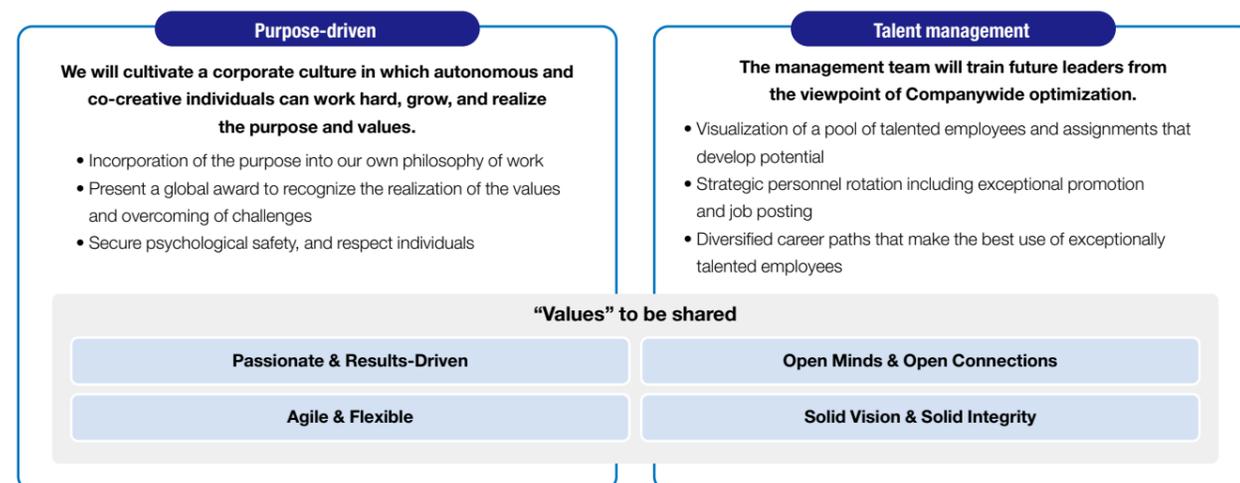
aggregate the insight of these diverse individuals into a greater body of collective knowledge. Based on this recognition, our diversity and inclusion promotion team will be integrated into the aforementioned culture and communication division to play a leading role in the development of our corporate culture.

There is also a need for management to foster leaders from the perspective of Companywide optimization. For this reason, we are strengthening systems to clearly identify candidates for future leadership roles and boost the competitiveness of our human resources through strategic job rotations. In addition, human resource business partnership systems are being reinforced to facilitate the growth and endeavors of businesses, from the perspectives of people and organizations, together with the General Managers of business divisions.

## Strategies

A top priority in fostering a corporate culture based on a shared understanding of our purpose and values will be to create a platform that underpins this culture, by aggregating the insight of diverse individuals into a greater body of collective knowledge. Specifically, we will implement measures to promote the dissemination of and personal connection with our purpose and values, which should serve as the basis for the judgments of all officers and employees, eradicate unconscious biases, and promote diversity. We thereby aim to develop an organization in which

employees feel the psychological safety necessary to engage in constructive discussion, regardless of their rank, division, or affiliated company. Furthermore, a global award program to accelerate the embrace of our purpose and values is slated for launch in 2022. Conducted jointly by Showa Denko and Showa Denko Materials, this award program will offer an opportunity to recognize initiatives that embody our corporate philosophy and to provide stimulation and motivation to employees of all organizations and from all countries.



## Progress toward the Long-Term Vision and Roadmap

The first phase of our initiatives to foster co-creative human resources and cultivate the associated corporate culture, in order to propose creative resolutions to issues through co-creation, will be to establish the necessary foundations for a newly integrated company. In this phase, we will arrange unique training sessions to bolster the co-creative collaboration capabilities of employees and officers as part of the aforementioned initiatives for disseminating our corporate philosophy, guaranteeing psychological safety, and eradicating unconscious biases.

Furthermore, the future leader candidates clearly identified through a joint effort by Showa Denko and Showa Denko Materials will be sent to selective leadership training programs in fiscal 2022. One element of these

programs will be coaching aimed at thoroughly instilling our corporate philosophy into these candidates. The second phase of these efforts will take place after the integration scheduled for January 2023. Initiatives in this phase will include streamlining operating processes through the global introduction of core systems and improving employee experiences through exhaustive analysis of employee engagement surveys and utilization of the results. The third phase will involve strengthening global governance and talent management. In this phase, we aim to have globally integrated organizations and human resource management system operating with human resource systems, development programs, and career paths that are codified on a Groupwide level.



## Measures and KPIs to Address Material Sustainability Issues

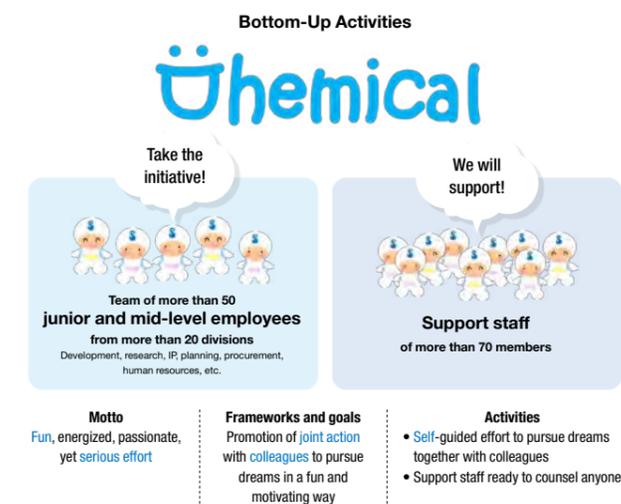
The material sustainability issues defined for 2030 include fostering creative and autonomous co-creative human resources and cultivating the associated corporate culture. The following four priority measures have been established with regard to this issue, and we are examining the possibility of linking these measures to medium-term nonfinancial KPIs. We look to codify these initiatives to form a Companywide management cycle of establishing KPIs, implementing measures, confirming progress, and monitoring and supervising initiatives through the Board of Directors.

Priority measures	Targets for 2025	Results in 2021
1) Exercise of management philosophy 2) Enhancement of talent management 3) Ongoing growth of people and organizations 4) Promotion of employee success and psychological safety through diversity, equity, and inclusion	1) Evolution and enhancement of co-creative initiatives through the global award program 2) Increase in the number of applications through the internal open application system to contribute to autonomous career development 3) Improvement of employee engagement-related scores 4) Promotion of diversity in management and cultivation of an inclusive corporate culture through increases in the ratio of female managers (7% in Japan and 13% on a global basis [consolidated])	1) Development and launch of the global award program for the newly integrated company (acceleration of the embrace of our purpose and values) 2) Preparation of the internal open application system for the newly integrated company 3) Introduction of employee engagement surveys for the newly integrated company 4) Ratio of female managers of 4.5% in Japan and 11.5% on a global basis (consolidated)

## Dhematic Community for Voluntary, Co-creative Action

Established a step ahead of the integration of Showa Denko and Showa Denko Materials, Dhematic is a community for voluntary action by new employees. This community consists of 12 teams that explore topics such as new business creation, framework establishment, and corporate culture reforms.

Currently, more than 50 employees from more than 20 divisions across the two companies are participating in activities on a team that matches their interests. Through this community, new employees can broadcast their goals while teaming up with colleagues from different divisions and age groups to tackle the challenges they feel a need or desire to address at the moment. These voluntary activities provide employees with a sense of motivation and have thus been contributing to accelerated co-creation between the employees of both companies, while heightening employee engagement. Cultivating our desired corporate culture through reforms to the behavior of management will not be the only path through which we strive to become a “Co-creative Chemical Company”; we will also seek to build this culture through an autonomous virtuous cycle of recognizing the self-driven co-creation activities of employees, motivating them, and supporting such action through coworkers and supervisors.





Special Feature

# Cultivation of a New Corporate Culture

## Vision for 2030

A campaign was launched in December 2021 to promote the dissemination of our corporate philosophy, which is comprised of our purpose and values, with the goal of having our purpose and values permeate all areas of our activities by 2030. We have defined three processes that are expected to be indispensable to accomplishing this goal: (1) promotion of recognition and understanding, (2) facilitation of tangible expression and personal connection, and (3) systematization and encouragement of free expression. Given the importance of these processes, we intend to go beyond simply having management issue messages directed at employees to design and enact processes that encourage employees to understand and form a personal connection with our purpose and values. Moreover, the process of disseminating our purpose and values will be accelerated through the new culture and communication division established under the control of the CHRO. This division will play a role in developing frameworks to encourage all employees to change how they act, to better embody our values and thereby contribute to fulfilling our purpose.

### Purpose

**Change society through the power of chemistry**

### Values

- Passionate & Results-Driven
- Agile & Flexible
- Open Minds & Open Connections
- Solid Vision & Solid Integrity

## Background to the Initiatives

The corporate philosophy for the newly integrated company, comprised of our purpose and values, was established in December 2021, prior to the scheduled integration as a corporate entity. This decision was based on the recognition that the integration of our corporate philosophy and the cultivation of a corporate culture based on this philosophy would be vital to maximizing the benefits of the integration. The newly integrated company will strive to become a global, top-level functional chemicals manufacturer as a “Co-creative Chemical Company.” If we are to accomplish this goal, it will be crucial for all employees to have an intimate and personal connection with our purpose and values. However, there are obstacles in this regard in the form of a lack of opportunities at Showa Denko and Showa Denko Materials to think about the relationship between one’s work and the corporate philosophy. To rectify this issue, we have begun arranging opportunities for individual employees to discuss the purpose of their workplace as well as their own personal purpose and values.

## Initiatives to Disseminate Our Purpose and Values

Our initiatives for disseminating our purpose and values will take part over three phases based on the aforementioned three processes of (1) promotion of recognition and understanding, (2) facilitation of tangible expression and personal connection, and (3) systematization and encouragement of free expression.

For the first phase, we advanced awareness raising activities over a period of approximately two months, to foster understanding with regard to our purpose and values. These activities included the distribution of messages from management to employees on our purpose and values (messages for employees from president and CEO Hidehito Takahashi, etc.) and discussion forums (town-hall meetings and roundtable discussions led by management, etc.). After these activities, we conducted rank-based training (training for section, department, and division leaders, etc.) as well as events to stimulate discussion between employees across organization lines (Online Café events, global award program, etc.) as part of the second phase of our initiatives.

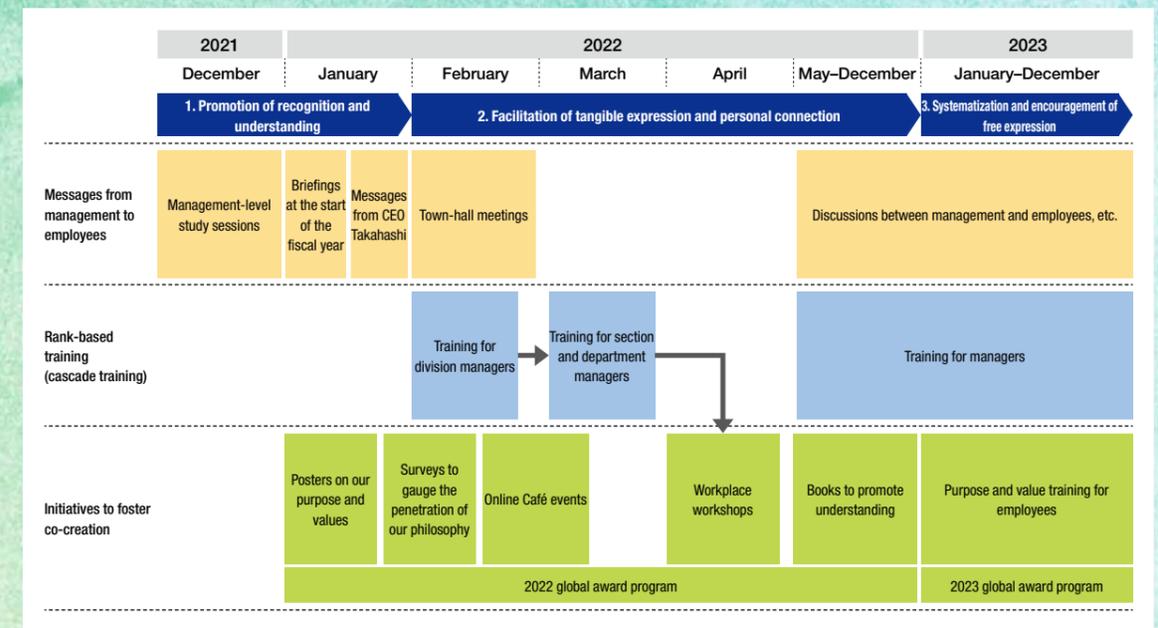
As a result, a global survey of employees conducted in February 2022 found that around 90% of employees recognized our purpose and values, while roughly 70% indicated that they understood these principles. These results indicate a clear success of the first-phase initiatives. Looking ahead, we plan to implement second-phase initiatives to facilitate tangible expression of and personal connection with our purpose and values followed by third-phase initiatives for promoting systematization and encouragement of free expression.

Approx. **90% recognition**  
Approx. **70% understanding**

5.8%	No awareness	5.2%
5.6%	Heard about the announcement	4.8%
17.6%	Have read, seen, or heard about it	16.2%
23.7%	Comprehend the content	22.7%
23.3%	Feel a sense of understanding toward it	26.1%
24.0%	Feel a sense of understanding toward it and incorporate it in work activities	24.9%
<b>Purpose</b>		<b>Values</b>

Level of Understanding and Personal Connection with Our Purpose and Values (February 2022)

## Roadmap



Online participation by approx. 500 individuals from seven countries

Discussions between Management and Employees

Town-Hall Meetings

At a study session held for members of management in December 2021, participants were given the opportunity to rethink the views of management on our purpose and values, leading the participants to declare the policies based on which they personally will work toward achieving our aims. Later, the background for the establishment of our purpose and values, as well as the sentiments encapsulated in our purpose and values, were explained to employees through town-hall meeting events that began in January 2022. Discussions at town hall meetings and roundtable discussions have yielded questions and comments regarding our concrete vision for a "Co-creative Chemistry Company" and the desire for a corporate culture that allows employees to pursue their ambitions without fear of failure. We continued to arrange opportunities for discussions on an ongoing basis thereafter, leading to a wider range of communication between management and employees. Meanwhile, president and CEO Takahashi has been actively visiting business sites and Group companies, and around 30 such visits took place over the period from January to June 2022. Topics raised at such forums for discussion with employees have not been limited to our purpose and values; human resource development and a range of other topics have also been brought up. Furthermore, president and CEO Takahashi and CFO Somemiya have been working to communicate a broad range of information outside of these events through the Company blog. Topics covered ranged from the measures they will focus on in the future to more personal comments.

The opportunity to speak directly with management was incredibly valuable as it let me feel their passion about changing our current situation.

I was able to sense management's strong commitment to transforming human resource development frameworks.



Comments from Participants  
Town-hall meeting at the Shiojiri Plant

Rank-Based Training

Training for Section, Department, and Division Managers

In February 2022, training sessions were held for the division managers of various organizations. These sessions included group work and role-playing activities designed to help division managers understand our purpose and values and their background, to forge a personal connection with these principles, and to find an effective way to explain them in their own words to the employees they oversee. Later, division managers led training sessions for section and department managers positioned below them, during which they explained their visions of their respective organizations, discussed how they should change their actions based on these visions, and stated how these matters related to our purpose and values. The section and department managers then went on to organize workshops in their workplaces, where anecdotes about exercising our values were shared among participants. The workshops also entailed discussions aimed at formulating a shared vision of the type of organization they wish to have, and the changes in actions that will be required to accomplish this goal.

Comment from a Participant

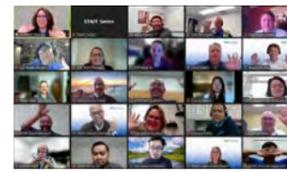
Through this experience, I was able to gain an understanding of the actions that should be pursued from the perspective of our organization and business division. Moreover, the training session for section and division managers proved to be a valuable opportunity for sharing thoughts and sentiments among managers.



Satoshi Hara General Manager, Basic Chemicals Division, Showa Denko K.K.

Cross-Organizational Dialogue Event

Online Café



A series of Online Café events were arranged for employees of Showa Denko and Showa Denko Materials over the period from February to March 2022. A total of 10 events were held, in Japanese, English, and Chinese, to promote understanding regarding our purpose and values as well as mutual understanding about the two companies. Approximately 2,400 employees took part in these events.

The events opened with explanations of our purpose and values from management, after which employees were broken up into groups of three to four people to exchange opinions on the appeal of our future as the newly integrated company, based on the theme of what the Company will look like in 2030 through action based on our purpose and values. Brisk exchanges of opinion were seen at all events, and dialogues branched out from the defined discussion theme, leading participants to talk about subjects such as the issues they sense regarding their work or company and their ambitions for the future.

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Comment from a Participant

The event made me realize the importance of expressing one's own interpretation of our values and of being accepting toward other interpretations.



Kanami Nakamura  
Advanced Performance Materials Operational Headquarters, Information and Communication R&D Center, Information and Communication Business Headquarters, Showa Denko Materials Co., Ltd.

Employee-Participation Activities for Delivering Solutions That Exceed the Bounds of Customer Expectations and Imagination

Global Meetings

Initiatives in 2021

In 2021, Showa Denko advanced initiatives to maximize the value of customer experiences (CX) to achieve its goal of becoming a KOSEIHA Company, while Showa Denko Materials conducted its Working On Wonders Beyond Boundaries (WOW-BB) to provide impressive solutions that surpass customer expectations. In addition, Showa Denko's CX Global Awards and Showa Denko Materials' WOW Global Awards were held to provide forums for sharing and honoring best practices. The judging events for the respective global awards were held jointly in 2021 to share best practices and encourage exchanges between employees from both companies.

Awards Presented to Integrated Teams

The 2021 global awards featured activities by several integrated teams comprised of employees from both Showa Denko and Showa Denko Materials. Even though this event preceded the announcement of the

new corporate philosophy, the integrated teams proved engaged in empowered action founded on mutual respect as well as respect for the corporate philosophies of both companies. As such, the activities of the integrated teams were shared within the organization as best practices. A total of 15 teams were selected for gold medals or WOW Grand Prix awards. The projects of these teams included initiatives that had been advanced through an ongoing process of iteration aimed at accomplishing their goals, as well as initiatives that placed emphasis on internal and external stakeholders. All of the award-winning activities were those that warranted sharing throughout the organization. At the April 2022 global meeting, which saw attendance by some 500 people from seven countries, presentations were made by the 15 award-winning teams, and an award ceremony honoring these teams was held.

Future Initiatives

In 2022, global awards will be completely integrated between the two companies

based on the concept of co-creation and mutual understanding. These programs are expected to provide a prime opportunity to accelerate the exercise of our purpose and values and to express our values through working together with employees from around the world. In addition, workplaces have established declarations of action based on our purpose and values, and numerous entries for awards have been received with themes pertaining to targets and concrete initiatives based on the declarations. The judging events are scheduled to take place in September 2022. We look forward to the events providing opportunities for discussions regarding individuals' experiences of exercising our purpose and values, and the resulting feelings of mutual understanding are expected to provide positive stimulation. It is therefore anticipated that the global awards will contribute to cross-organizational co-creation and a mutual pursuit of higher ambitions.

Comment from Participants

Our team sought to achieve substantial reductions in the weight of automotive external components, to contribute to the realization of a low-carbon society. Through the development of proprietary materials, we succeeded in reducing the amounts of materials used in these components, and consequently their weight, by 45% compared to prior offerings. Other teams have also produced significant advancements by working toward their goals. We believe that it is activities such as these that exhibit our values and help to fulfill our purpose as a newly integrated company.

Team Body Dep Shimodate Works (Goshomiya) Showa Denko Materials

Presentation by a gas development team from Showa Denko's Electronic Chemicals Division (top photograph)



Column Future Design Project

The Future Design Project, launched in 2021, sees participation from members of management and employees from around the world, making this project a consistent venue for discussion regarding the future of the newly integrated company. In 2021, activities of the project included discussions of the values to be emphasized by the newly integrated company and requests for suggestions for the Company's new name. These activities gave us an understanding of employees' expectations and feelings with regard to the newly integrated company. In 2022, the project will promote understanding with regard to the corporate philosophy of the newly integrated company and work to develop a new corporate slogan. By having employees participate in these activities, we hope to craft a vision for the Company that encompasses the expectations of its members.