

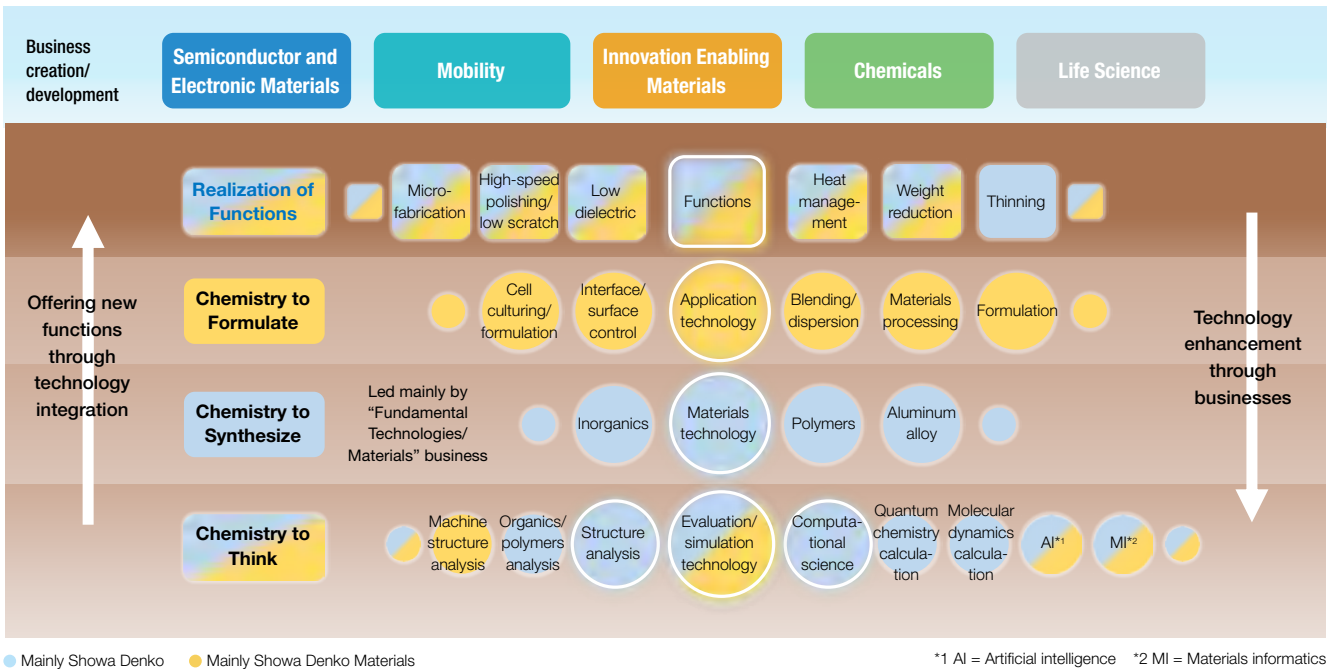
R&D Strategies

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.

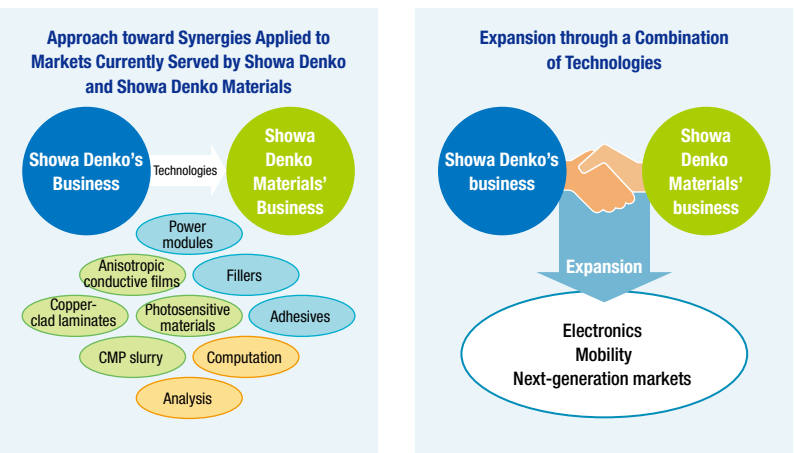
R&D Strategy Policy

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.



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.

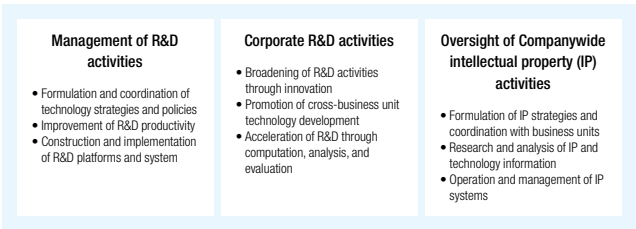
Technology Forums

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

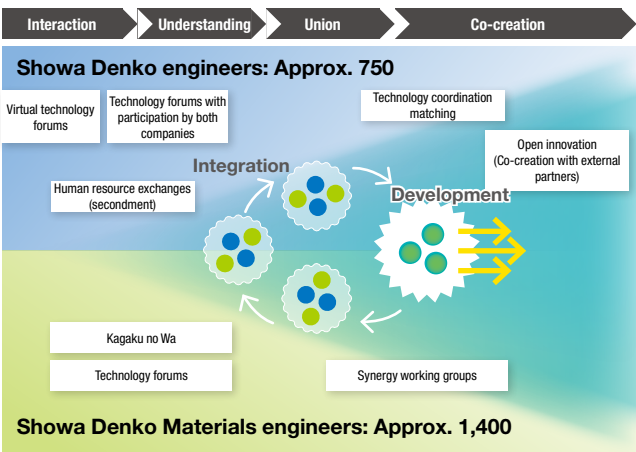
Measures for Realizing the Long-Term Vision

- 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

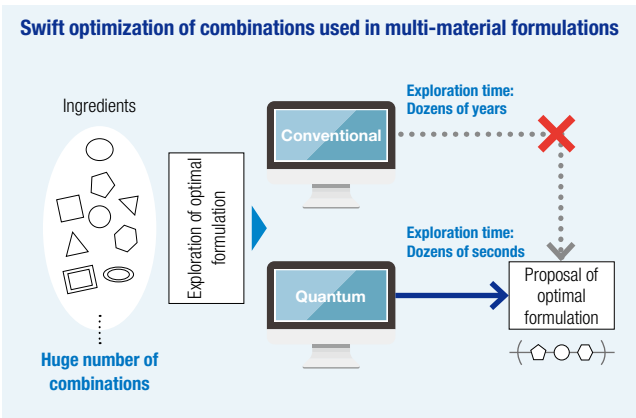
The Computational Science and Technology Information Center supports “Chemistry to Think,” which is advocated by Showa Denko through its use of simulation, artificial intelligence (AI), and MI technologies. Simulation technologies are used to formulate highly reliable development policies based on solid 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,*1 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*2 quantum-inspired technology*3 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 10⁵⁰ 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.

*1 Source: *Technology Landscape: Key players in materials informatics*, Lux Research, Inc.
*2 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
*3 High-performance computing technologies that are inspired by quantum technology, although not directly using quantum effects

Optimization of Semiconductor Material Formulation

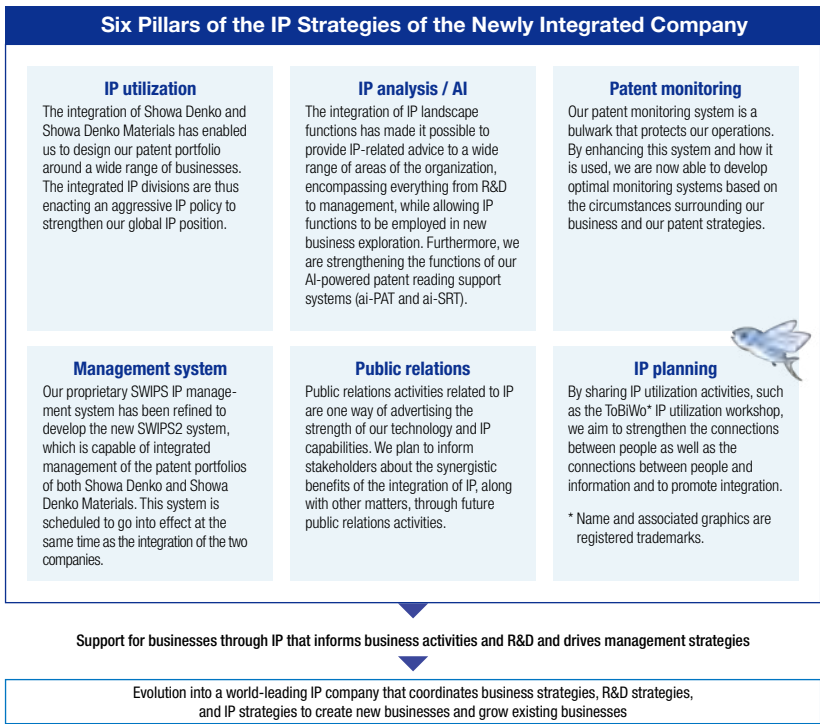


Intellectual Property Strategies

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.



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

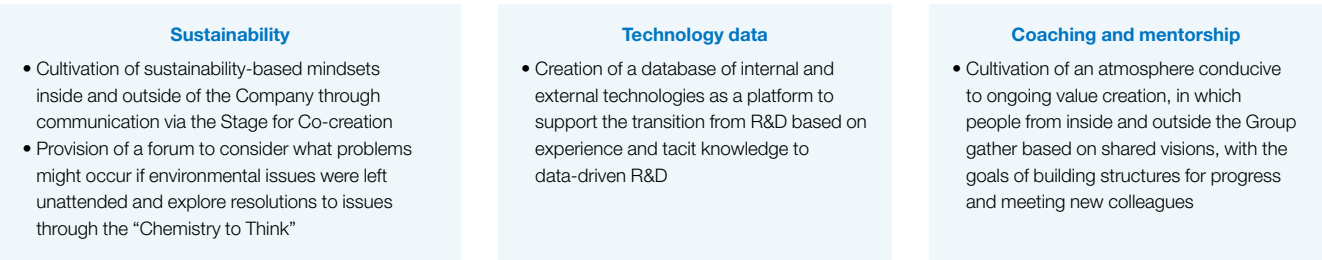
supporting R&D activities are also engaged in activities using the Stage for Co-creation.

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

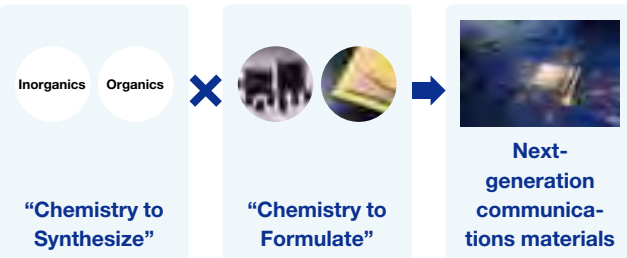
Construction of Platforms to Support and Accelerate R&D Activities Aimed at Creating New, Sustainable Businesses



Long-Term R&D Themes

Next-Generation High-Speed Communications Materials

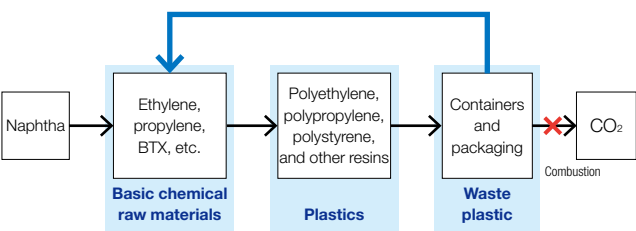
The upcoming 6G (Beyond 5G) world is expected to feature a sustainable society in which everyone can express their humanity and where people, things, and experiences are seamlessly connected. Taking a backcasting approach from our vision for 2030, we will advance integrated development of organic and 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.

Development of Waste Plastic-to-Basic Chemical Raw Material Technologies



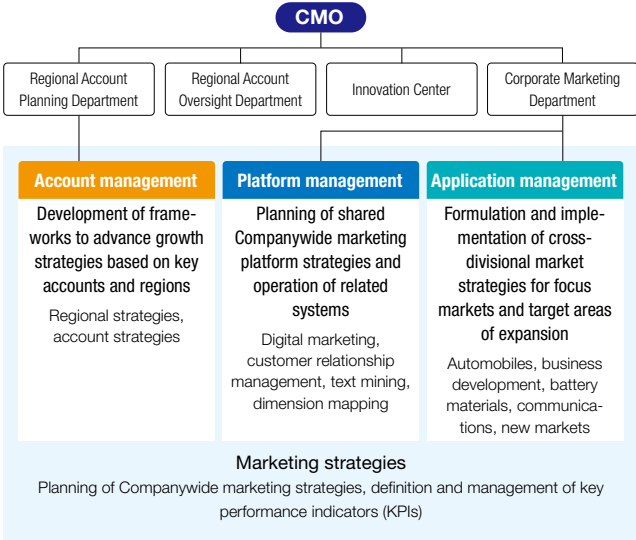
Marketing Strategies

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.



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.

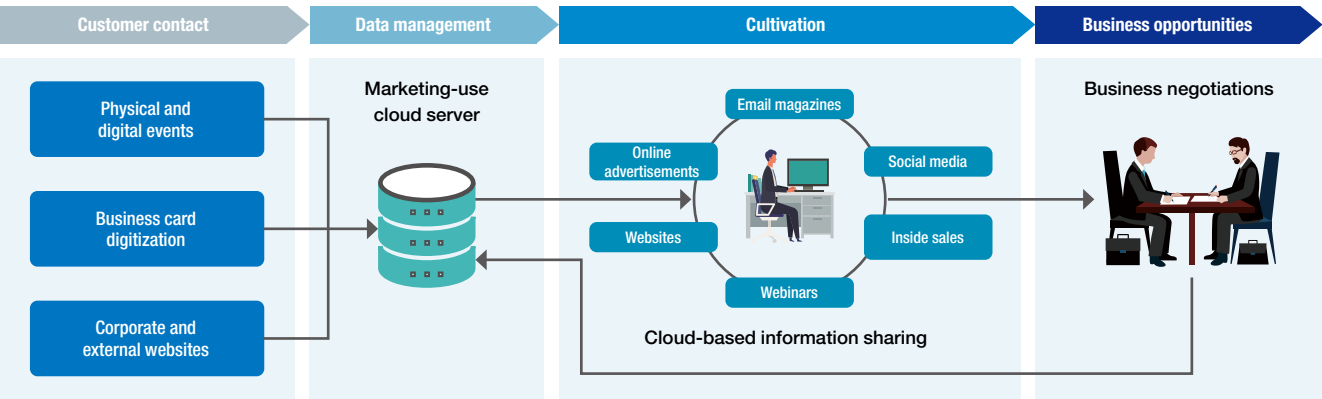
At the same time, marketing divisions are coordinating with sales divisions to collect information on market technology trends and the technical issues faced by customers. The market and customer needs revealed through this process will be addressed with combinations of the newly visualized products 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

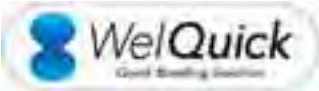


Initiatives to Resolve Social Issues as a “Co-creative Chemical Company”

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.

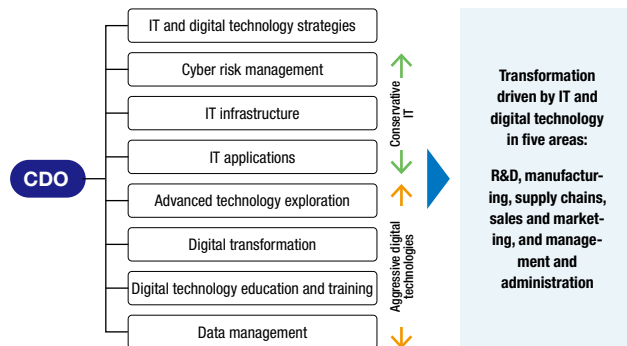
Policies and Management

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.

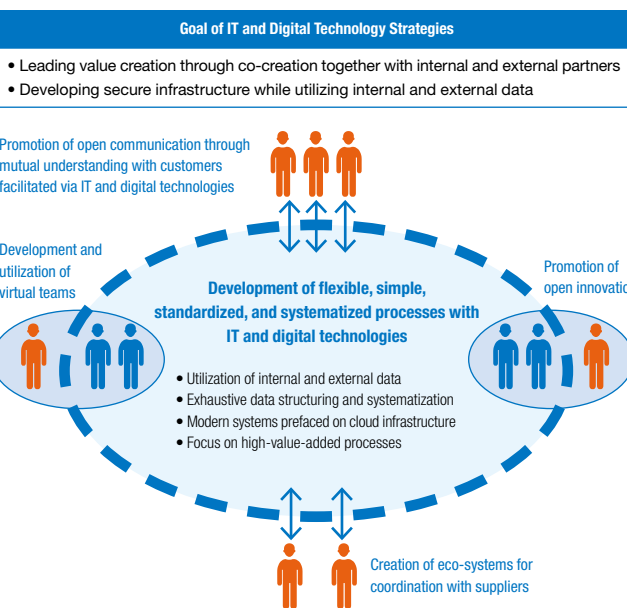
At the same time, we will support these initiatives by supplying comfortable and safe IT and digital platforms that can be used by anyone to access the information they need, anytime and anywhere. We are also developing human resources that can utilize these platforms along with a corporate culture that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

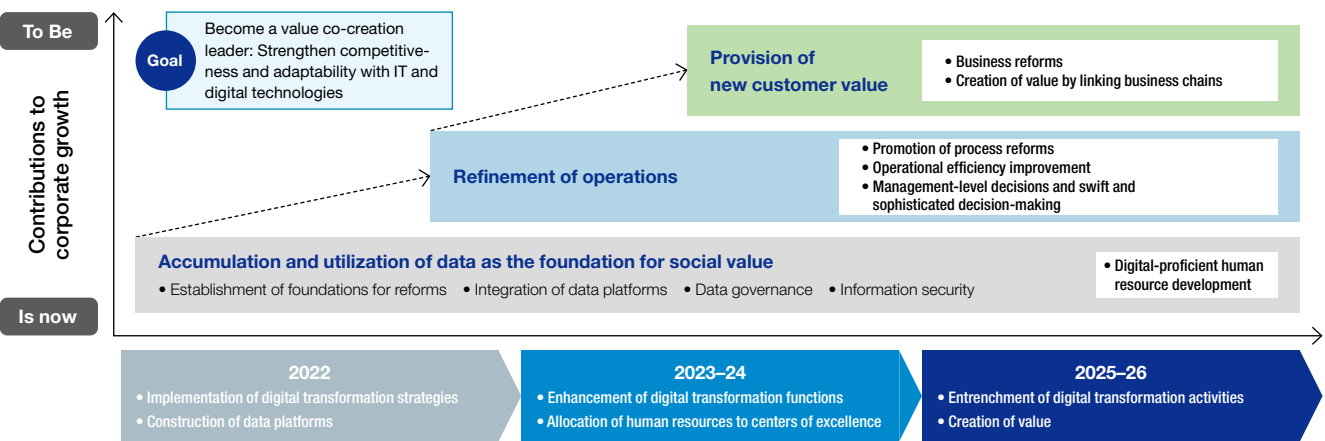


Progress toward the Long-Term Vision and Roadmap

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.

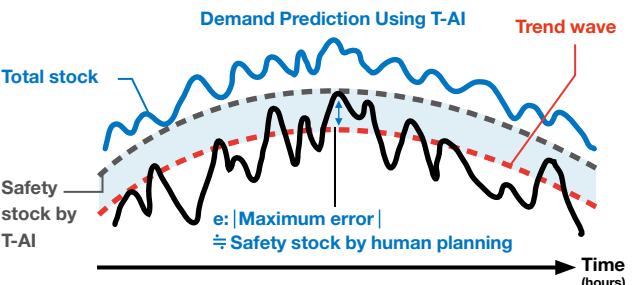
Two KPIs have been defined to gauge our level of digital maturity: the maturity of data management and analysis on a team and division basis, and the digital literacy of employees.

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.

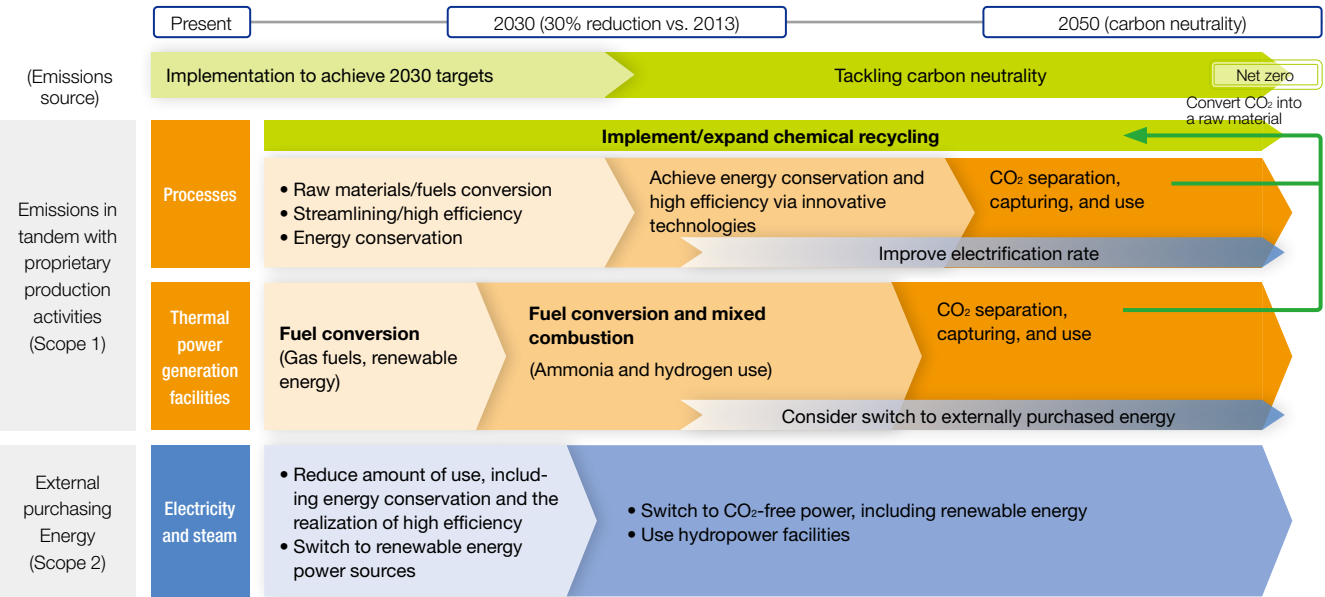
Climate Change-Related Risks and Opportunities and Major Response Measures (The following is a selected extract—please see our website for full details) WEB

| | Impact of climate change | Domain | Risk | Opportunity | Response |
|--|---|--|------|-------------|--|
| Transition risks and opportunities (1.5°C and 2°C scenarios) | Increase in tax (cost) due to the introduction of carbon pricing | All business domains | ○ | | • Revision of GHG emissions reduction targets for 2030 and establishment of the roadmap (P.63) • Carbon neutrality initiatives pertaining to chemicals and petrochemicals (P.63) • Participation in the GX (Green Transformation) League |
| | Increases/decreases in sales due to changes in consumer behavior and awareness | | ○ | ○ | • Promotion of products, development of new products, and improvement of competitiveness in response to the needs of a decarbonized society • Advancement of R&D based on long-term themes at the Stage for Co-creation (new research facility) (P.57) |
| | Greater request for initiatives and disclosure related to decarbonization from customers | | ○ | | • Establishment of life cycle assessment and carbon footprint calculation frameworks (P.64), tracking of CO ₂ emissions, and formulation of reduction plans |
| | Government policies supporting decarbonization initiatives of companies | Semiconductor and electronic materials | ○ | ○ | • Development of eight-inch SiC wafers for next-generation green power semiconductors (adopted as part of the NEDO Green Innovation Fund project) (P.44) • Development of a low-concentration CO ₂ separation system employing an innovative separation agent (adopted as part of the NEDO Green Innovation Fund project) (P.52) • 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) |
| | Response to technological innovation and reductions to the electricity consumption of semiconductor devices | | ○ | ○ | • 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&D program) (P.45) • Assessment of environmental standard conformity of product designs, and development of low-carbon products |
| Physical risks and opportunities (4°C scenario) | Growing demand for energy-saving, next-generation power semiconductors in conjunction with an increase in data processing volumes brought about by digitalization | All business domains | ○ | ○ | • HD media R&D to reduce electricity consumption of data centers • Response to increased demand for SiC power semiconductors |
| | Suspended operation of manufacturing sites due to flooding, and decrease in profit caused by an increase in the equipment repair cost | | ○ | | • Analysis of flood risks at manufacturing sites • Regular risk identification and reduction activities, and enhancement of business continuity planning |

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



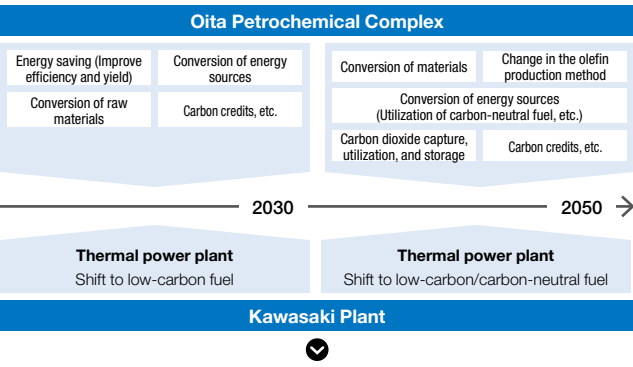
- Up to 2030, promote initiatives for rigorous streamlining, increased efficiency, energy conservation, and conversion to gas fuels (high-efficiency co-generation system)
- Promote technology development for new GHG capture and utilization processes and sustainable plastic chemical recycling
- From 2030 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 CO₂ separation system employing an innovative separation agent that was adopted by NEDO under its Green Innovation Fund. WEB

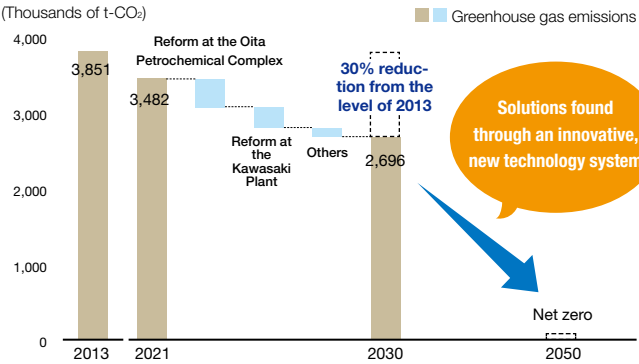
Roadmap for Petrochemicals and Chemicals Businesses

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



Note: Figures represent the total of Scope 1 and Scope 2 emissions for Showa Denko (consolidated in Japan) and Showa Denko Materials (non-consolidated).

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

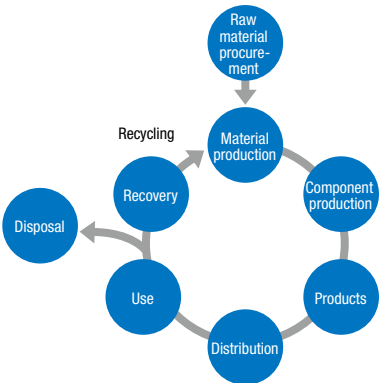
We are developing exhaust gas abatement systems that treat perfluorochemical (PFC) gases, which have a particularly high greenhouse effect coefficient, to contribute to reductions in emissions of greenhouse gases. To date, more than 1,200 of our systems have been delivered around the world. PFC gases 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.

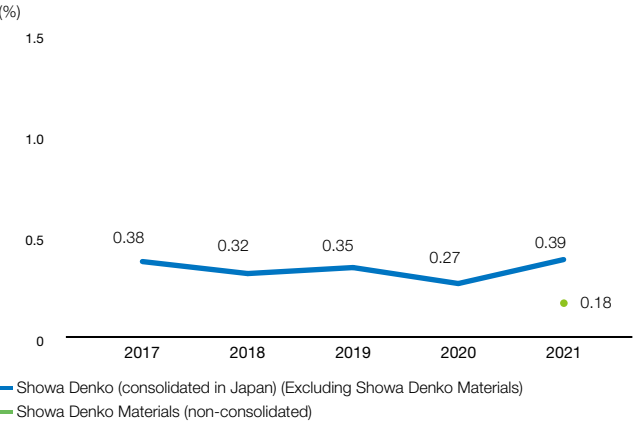
Strategies

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

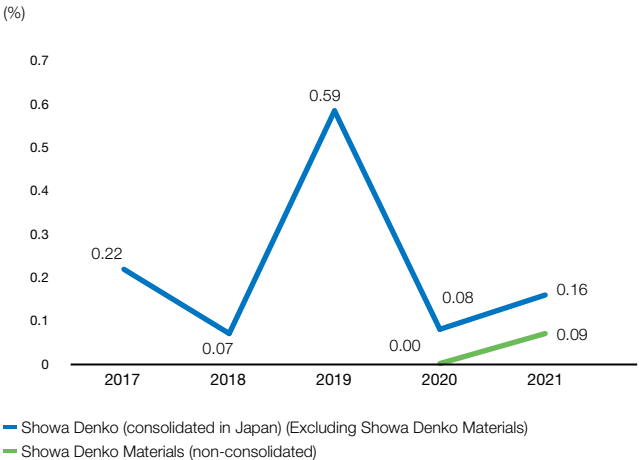
We seek to develop a globally applicable system to prevent occupational and equipment-related accidents based on a risk management approach. The global regulations that will form the basis for this system are scheduled to be formulated within 2022, with the goal of putting the actual system into effect 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 2021Japan 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.

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) |

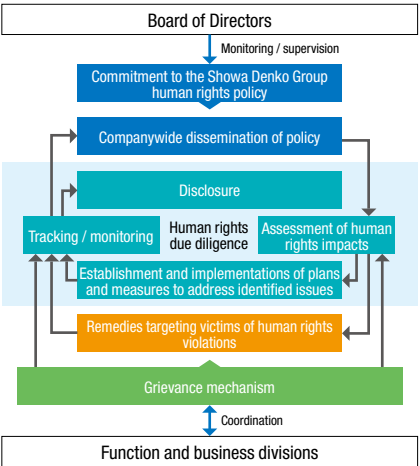
Initiatives Based on Our Human Rights Policy

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.

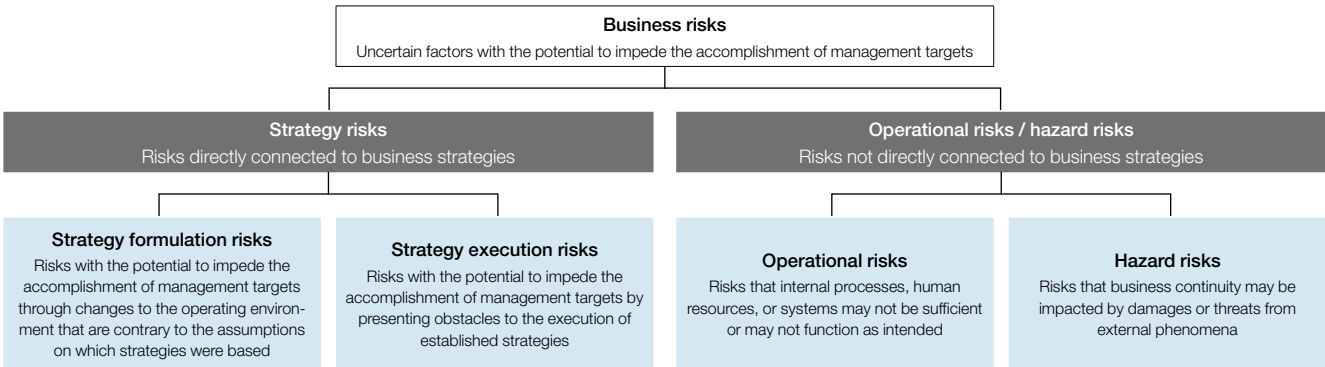
The Risk Management Committee deliberates on the directions of countermeasures for identified serious risks and their appropriateness before reporting its findings to the Management Committee and the Board of Directors. The risk management departments of business sites then carry out the measures approved 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)

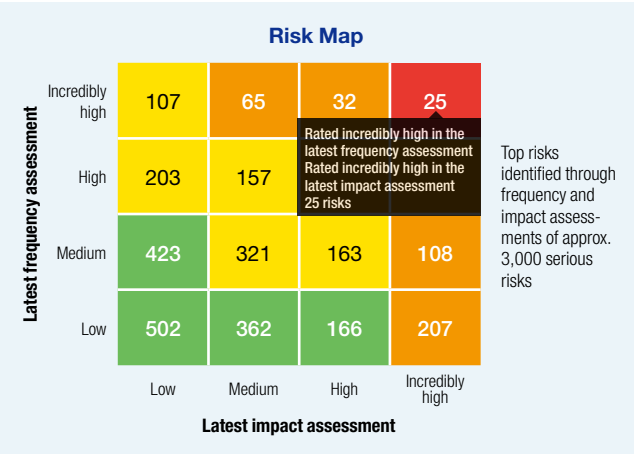
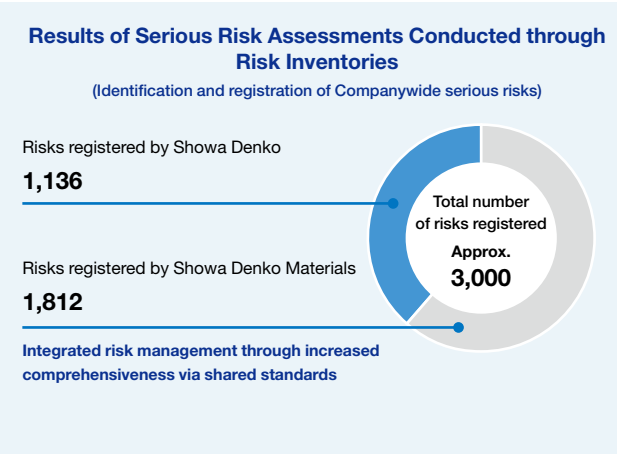
Risk Inventory Activities

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

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

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

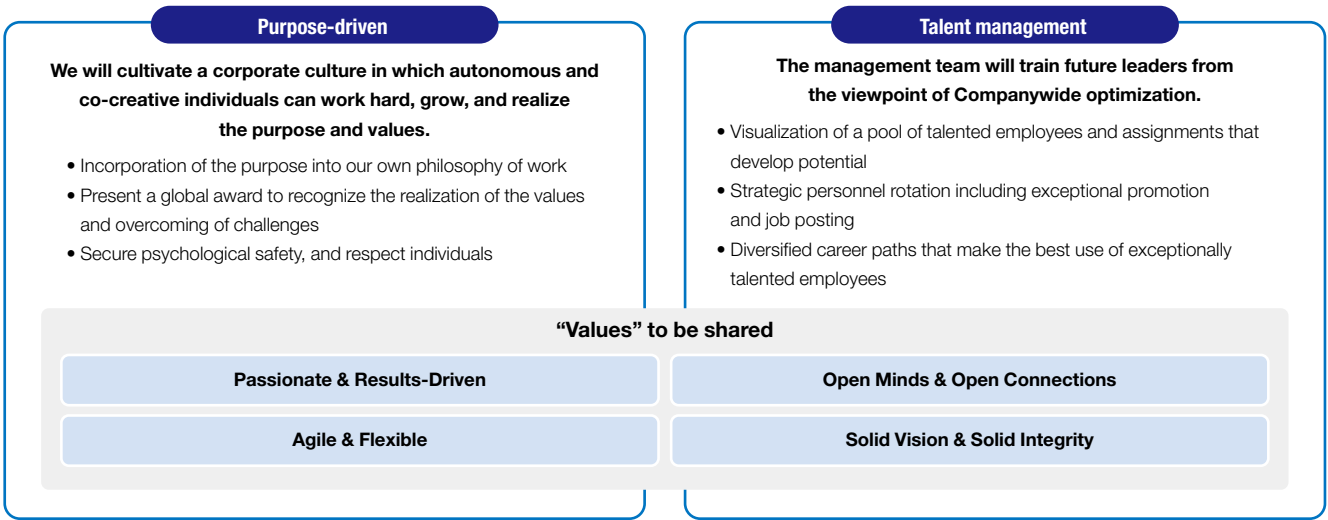
aggregate the insight of these diverse individuals into a greater body of collective knowledge. Based on this recognition, our diversity and inclusion promotion team will be integrated into the aforementioned culture and communication division to play a leading role in the development of our corporate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

| Results in 2021 | Plan for 2022 | Vision for the future (2030) |
|--|--|---|
| <p>Cultivation of the corporate culture</p> <ul style="list-style-type: none">• Arrangement of workshops open to employee participation on a voluntary basis to discuss the values of the newly integrated company• Announcement of values to employees• Distribution of video messages by the presidents of Showa Denko and Showa Denko Materials, expressing sentiments encapsulated in the corporate philosophy | <p>Cultivation of the corporate culture</p> <ul style="list-style-type: none">• Communication of the meaning of integration through messages from the new president• New Year's greeting from the new president• Town-hall meetings at business sites• Online Café events to help employees form a personal connection with the corporate philosophy• Distribution of booklets to facilitate understanding of the corporate philosophy• Section and department manager training and workplace workshops to promote understanding of the corporate philosophy and set organizational targets <p>Talent management</p> <ul style="list-style-type: none">• Training sessions to bolster co-creative collaboration capabilities (dissemination of the corporate philosophy, securing of psychological safety, and eradication of unconscious biases)• Selective leadership training | <ul style="list-style-type: none">• Evolution into a leading company that develops human resources which other companies want, by cultivating the corporate culture and fostering creative and autonomous co-creative human resources |

Measures and KPIs to Address Material Sustainability Issues

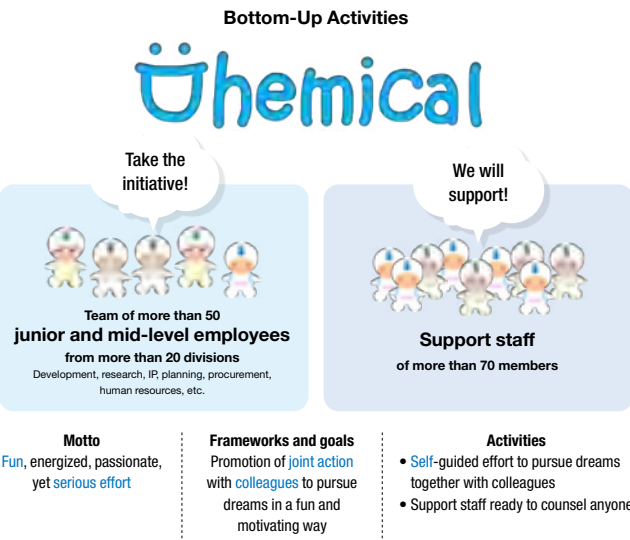
The material sustainability issues defined for 2030 include fostering creative and autonomous co-creative human resources and cultivating the associated corporate culture. The following four priority measures have been established with regard to this issue, and we are examining the possibility of linking 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 |
|---|--|--|
| <p>1) Exercise of management philosophy</p> <p>2) Enhancement of talent management</p> <p>3) Ongoing growth of people and organizations</p> <p>4) Promotion of employee success and psychological safety through diversity, equity, and inclusion</p> | <p>1) Evolution and enhancement of co-creative initiatives through the global award program</p> <p>2) Increase in the number of applications through the internal open application system to contribute to autonomous career development</p> <p>3) Improvement of employee engagement-related scores</p> <p>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])</p> | <p>1) Development and launch of the global award program for the newly integrated company (acceleration of the embrace of our purpose and values)</p> <p>2) Preparation of the internal open application system for the newly integrated company</p> <p>3) Introduction of employee engagement surveys for the newly integrated company</p> <p>4) Ratio of female managers of 4.5% in Japan and 11.5% on a global basis (consolidated)</p> |

: Dhemical Community for Voluntary, Co-creative Action

Established a step ahead of the integration of Showa Denko and Showa Denko Materials, Dhemical 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.





Cultivation of a New Corporate Culture

SHOWA DENKO Report 2022 75

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 Someniya 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.

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.