

## Resonac's Long-Term Vision

# 03 How to Change

What We Will Focus on to Achieve Change

What are our specific measures to change society through the power of chemistry?

This section describes our sustainability and business strategies to help you understand how we intend to accomplish our purpose.

2020

Former Hitachi Chemical joins  
the Showa Denko Group



2021

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

45	Resonac's Long-Term Vision
49	Financial and Capital Strategies
55	Promoting Sustainability
57	Material Issues and Non-financial KPIs
59	Resonac Pride Products & Services
62	CTO Roundtable with Young Researchers

65	R&D and Intellectual Property Strategies
69	Marketing Strategies
71	Digital Strategies
73	Semiconductor Materials Global Top Management Roundtable
77	Semiconductor and Electronic Materials
81	Mobility
83	Innovation Enabling Materials
85	Chemicals



Brief introduction of  
future-oriented projects

2023

Complete integration  
as Resonac

**RESONAC**  
Chemistry for Change

2025

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

Financial targets for 2025

EBITDA margin ..... 20 %  
ROIC .... 10 % over the medium to long term  
Net D/E ratio ..... Aim to achieve 1.0

2030

Goals of the long-term vision

Realize our ideal state

Global top-level functional  
chemical manufacturer  
from Japan

- **TSR:** Rank among the chemicals industry's top 25% over the medium to long term
- Achieve Sustainability Vision

**Yoshishige Okuno**  
General Manager,  
Research Center for Computational  
Science and Informatics



**Now!!**

**First semiconductor materials manufacturer in Japan to apply virtual reality (VR) in product development**

Molecular design applying VR leads to R&D achieving the required properties. This initiative takes advantage of our advanced computational science and technology for deeper material analysis and discovery of new materials. First, we intend to promote the use of VR throughout Resonac, and in the future, we envisage positioning it as an in-house infrastructure. We will accelerate R&D by fully utilizing computational science and simulation.

**Yohei Shimizu**  
Materials Informatics Platform Group  
Research Center for Computational  
Science and Informatics



**Future?**

**Promoting the space business through co-creation with ispace, inc., a startup**

A team composed of people who aspire to contribute to the sustainable development of global society by creating functions required of the times as an advanced material partner in the field of space development are promoting a project to establish a space business. Not only through cross-sectional collaboration but also through open innovation with ispace, inc. and other external partners, we are firstly focusing on branding that will lead to enhancement of corporate value with a view to future commercialization.

## Overview of the Long-Term Vision

Showa Denko acquired Hitachi Chemical during the period of the medium-term management plan to 2021. The company set its course toward growth and declared its goal of becoming a global top-level functional chemical manufacturer by 2030. In January 2022 Showa Denko and Hitachi Chemical substantially integrated their management and formulated the purpose. In February 2022 Showa Denko revised its long-term vision announced in December 2020 and began value creation as a Co-creative Chemical Company. In January 2023 Resonac was established.

### Resonac's Long-Term Vision: Our Ideal State for 2030

In order to become a global top-level functional chemical manufacturer, we must enable our unique essence to blossom while satisfying the requirements of stakeholders with respect to both financial and nonfinancial aspects. Positioning sustainability as the cornerstone of its corporate strategy, Resonac has established measures and nonfinancial targets linked to its envisioned ideal state and material issues for sustainability (materiality), with a view to achieving its long-term vision by promoting initiatives.

#### Long-term vision Ideal state

Company that can compete on  
the world stage



World-class competitiveness and  
profitability

Company that contributes to a  
sustainable global society



Capability to create innovations  
and to develop new businesses

Company that develops co-creative talent that  
represents Japan's manufacturing industry



Ability to train competitive talent  
with shared values

#### Material Issues for Sustainability (Materiality)

Strengthen co-creation &  
competitiveness and create  
social value through  
innovation

Gain credibility through  
responsible business  
management

Develop autonomous,  
creative, and active human  
resources and culture

#### Financial targets and results

	Results in 2022	Targets for 2025
Net sales	¥1.4 trillion	Over ¥1 trillion
EBITDA margin	12.2%	20%
ROIC	3.3%	10% over the medium to long term
Net D/E ratio	1.07	Aim to achieve 1.0

#### Nonfinancial targets and results (examples)

	Results in 2022	Targets for 2025
Scores of the survey on implementation of the purpose and values	Degree of implementation: 30% Degree of empathy: 60% Degree of understanding: 80% Recognition: Almost 100%	Inculcation of the purpose and values and cultivation of a co-creation culture
Greenhouse gas emissions	4,270 thousand tons	30% reduction from the level of 2013
Serious occupational accidents	0	Zero occurrence

## Overview of the Long-Term Vision

### Key strategies for achieving the long-term vision



Establishment of a world-class revenue base



Improvement in Portfolio Management



Innovation (technology x business model)



Strengthening of management foundation (platform)

#### Direction and progress

- Letter from the CFO [P25](#)
- Scale and Profitability to be a Company that can Compete on the World Stage [P49](#)
- Instillation of ROIC-focused Management [P51](#)
- Semiconductor Materials Global Top Management Roundtable [P73](#)
- Business Strategies [P77](#)

- Financial and Capital Strategies [P49](#)
- Strategic Allocation of Management Resources [P52](#)
- Direction and Progress in Portfolio Reform [P52](#)

- Special Feature: What is a Co-creative Chemical Company? [P13](#)
- Special Feature: Resonac Pride Products & Services [P59](#)
- CTO Roundtable with Young Researchers [P62](#)
- R&D and Intellectual Property Strategies [P65](#)
- Marketing Strategies [P69](#)

- Human Capital Management Dialogue [P37](#)
- Team Takahashi: Aspirations for Human Resources Development [P41](#)
- Resonac's Human Capital Management [P89](#)
- IT and Digital Technology Strategies [P71](#)
- Roundtable: Our Transformation of the Board of Directors [P113](#)

#### Topics

### Analysis of Opportunities and Risks for Achieving the Long-Term Vision

We held a workshop in June 2023 to analyze opportunities and risks linked to Resonac's three material issues. Participants included the CFO, CSO, CHRO, CTO, and other executives and discussion ranged from financial aspects to nonfinancial aspects such as human resources and R&D. In particular, we need to keep a close eye on changes in the internal environment as a result of company integration. Paying greater attention to internal changes in the process of integration in addition to changes in the external environment in management's monitoring and evaluation, we will reflect those internal changes in goal setting.

#### Opinions expressed at the workshop held in June 2023

- Opportunities**
- Transformation triggered by the integration of two companies
  - New synergy derived from different technological fields
  - Greater efficiency and creativity through business process integration
  - Creation of new value, mindful that chemistry is a building block of industries

- Risks**
- Decline in engagement of human resources due to changes resulting from the integration of two companies / human resources retention risk / loss of the heritable culture as well as experience and know-how learned from failure
  - Decline in co-creation capabilities and competitiveness due to delays in industry restructuring and portfolio reform
  - Weakening of the management foundation owing to lack of understanding of potential risks and lack of risk-taking



Workshop on opportunities and risks linked to materiality

## Financial and Capital Strategies

### Scale and Profitability to be a Company that can Compete on the World Stage

#### Numerical Targets for 2025 under the Long-Term Vision

Resonac believes that management strength in both quantitative and qualitative terms is essential for competing on the world stage. In addition to qualitative evaluation of the company's ability to contribute to society, especially from the perspective of sustainability, we consider quantitative evaluation of the company's scale and profitability to be important.

Our numerical targets for the scale and profitability for 2025 under the long-term vision, namely, net sales of ¥1 trillion or more and an EBITDA margin of 20% or more, are "entry tickets" to be a company that can compete on the world stage. We aim to maximize corporate value by achieving the numerical targets in pursuit of a solid revenue base. Moreover, whereas we had been using ROE as a key performance indicator (KPI) for some time, we introduced return on invested capital (ROIC) to replace ROE at the time of revision of the long-term vision in fiscal 2022.

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

#### Key financial KPI targets

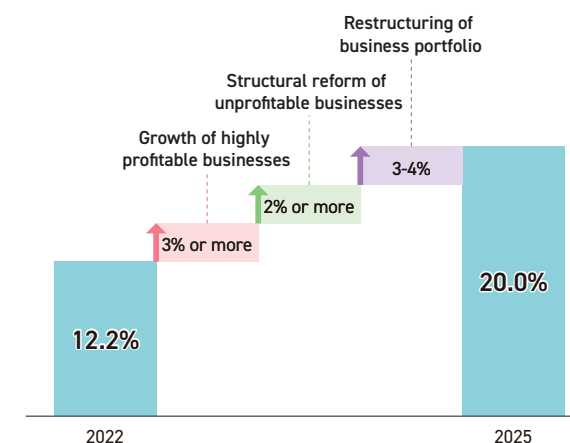
	2022 (results)	2025 (targets under the long-term vision)
Net sales	¥1.4 trillion	Over ¥1 trillion
EBITDA margin	12.2%	20%
ROIC	3.3%	10% over the medium to long term
Net D/E ratio	1.07	Aim to achieve 1.0

#### To Achieve EBITDA Margin of 20%

Whereas our target of EBITDA margin for 2025 is 20%, the result for 2022 was 12%, 8 percentage points lower than the 2025 target. We are implementing various measures to achieve the target, including growth of highly profitable businesses ( [P52](#) Strategic Allocation of Management Resources), structural reform of unprofitable businesses ( [P50](#) Elimination of Unprofitable Products), and restructuring of business portfolio ( [P52](#) Direction of and Progress in Portfolio Reform).

The scope of improvements required will vary in line with changes in the business environment. We will aim to achieve the target by quickly adjusting the scope and allocation of resources for improvement in accordance with the situation.

#### To improve EBITDA margin



#### Segments for disclosure in line with the new business portfolio strategy

New segments	Subsegments	EBITDA margin (2025 target)
Semiconductor and Electronic Materials	Semiconductor Materials (front-end/back-end processes) Device Solutions (HD) Device Solutions (SiC)	30% or more
Mobility	Automotive Products Lithium-ion Battery Materials	20% or more
Innovation Enabling Materials	Ceramics Functional Chemicals (resins, etc.) Aluminum Specialty Components Coating Materials	15% or more
Chemicals	Olefins and Derivatives Basic Chemicals and Industrial Gases Graphite Electrodes	15% or more
Others	Life Science	Achieve critical mass

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

## Financial and Capital Strategies

### Management Cycle for Achieving the Long-Term Vision

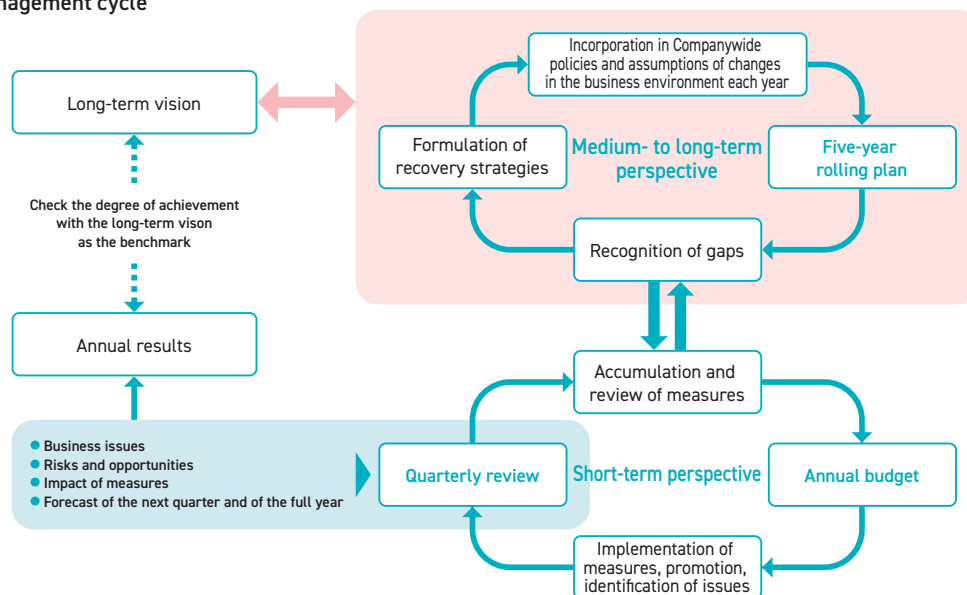
We currently operate a management cycle to achieve the long-term vision and KPIs from medium- to long-term and short-term perspectives. (See the figure below for details.)

From the medium- to long-term perspective, we annually review our business strategies, strategy implementation, and numerical targets for the next five years, in light of the latest market trends and analysis based on the 3Cs model (taking into account customers, competitors, and the Company). The plan formulated is referred to as a "five-year rolling plan." This plan articulates our strategic direction for sustainable growth and maintaining competitiveness, serving as the foundation for the realization of our long-term vision.

From the short-term perspective, we formulate an annual budget based on the first year of the five-year rolling plan. This annual budget allows the five-year rolling plan to be incorporated into a concrete action plan, on which basis the progress of individual measures and achievement of KPIs are monitored quarterly, enabling early detection of problems and implementation of countermeasures.

By organically integrating the management cycle from both medium- to long term and short-term perspectives, while adhering to the long-term vision, we can flexibly respond to changing market conditions in order to achieve sustainable growth and maximize profits.

#### Management cycle



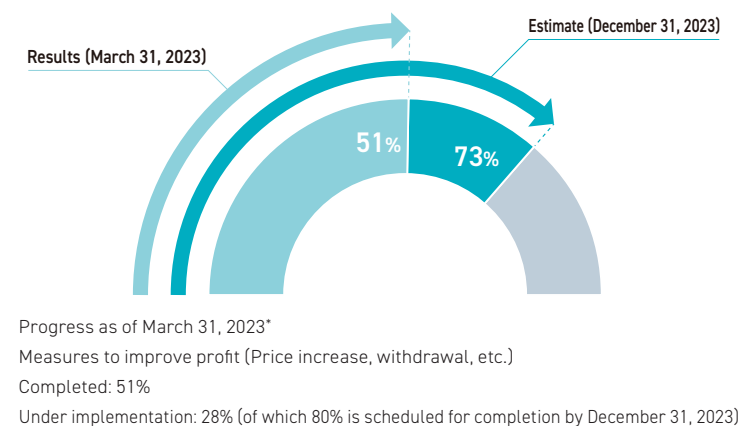
### Elimination of Unprofitable Products

As part of our initiatives to improve profitability, each business unit calculates the profit margin for each customer and product and implements specific improvement measures for low-margin products, such as review of raw material suppliers, cost reduction through improved production efficiency, and price revisions in light of market conditions.

However, for products judged to be unable to achieve expected profit margins or cost reduction targets despite these measures, we formulate plans that include withdrawal from such products or scaling back, and manage progress on a quarterly basis. Through these initiatives, we are concentrating resources on highly profitable products and businesses to achieve qualitative improvement of profit.

Furthermore, the Mobility Segment has formed a team designated for structural reforms to emphasize the initiatives (P52 Direction of Portfolio Reform). Progress in other business units is shown below.

#### Status of completion of the measures to improve profit



\*The Mobility Segment, and the Olefins and Derivatives business which is largely affected by market conditions, are excluded.  
\*Completion of measures and their impact on revenue are not necessarily simultaneous.



## Financial and Capital Strategies

### Instillation of ROIC-focused Management

We are working to raise and instill awareness of ROIC-focused management throughout Resonac from the management level to frontline employees.

In particular, in order to spread ROIC improvement to frontlines, we are promoting initiatives to link frontline KPIs to ROIC, which is a management KPI, and the ROIC target is set under the long-term vision.

Specifically, we set KGIs, KPIs, and KAs at each level from the management level to the frontlines. At the frontline level, we set indicators that can be managed by business and product lineup while serving as targets for improvement measures. Frontline personnel set and prioritize targets based on the degree of impact of each indicator on KGIs, and manage milestones, such as who should do what and by when.

In the future, we will promote horizontal deployment of the best practices of businesses, in which ROIC improvement is steadily progressing, to other businesses, thus facilitating Companywide instillation of ROIC-focused management.

#### Sharing of ROIC ranking by business

ROIC components are measured for each business unit and businesses are ranked by ROIC. The semi-annual ranking results are communicated to the management of each business unit so that highly transparent management is achieved on Companywide. It also contributes to healthy competition among business units.

#### Incorporation of ROIC as a mandatory item of training for managers

As part of Companywide training for managers, a lecture is provided on the definition of ROIC and why ROIC is important, including actual examples of business profitability improvement by making use of ROIC.

#### ROIC-linked executive compensation and bonuses for managers

ROIC was introduced as an evaluation indicator for short-term incentives (bonuses) in executive compensation and bonuses for managers.

[P126 / Short-Term Incentives](#)

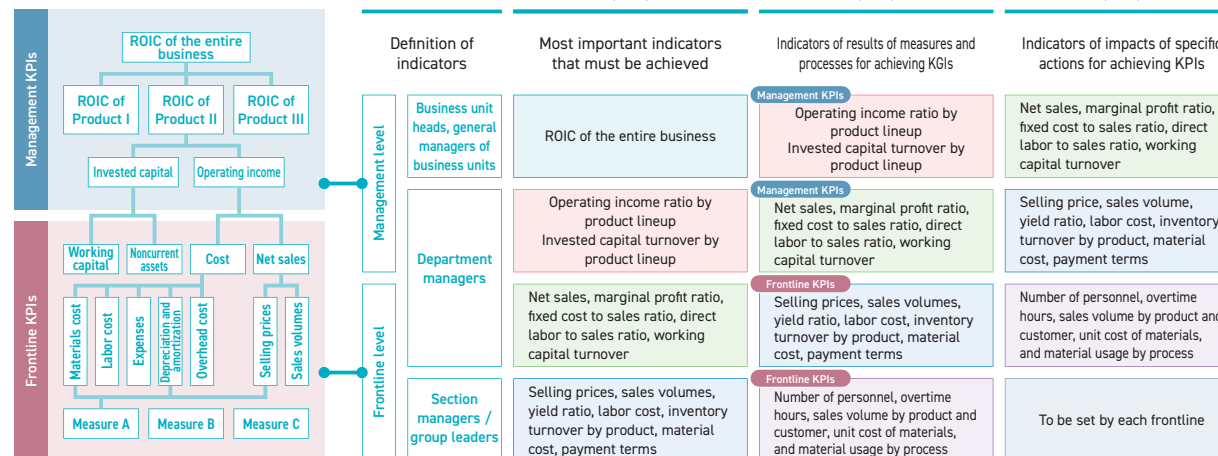
## Improvement in Portfolio Management

### Resonac's Portfolio Management Policy

We have adopted three criteria as the portfolio management policy, as follows. (1) Fitness for strategy: Whether a business matches the strategies of Resonac's overall strategies and the strategies reflecting the roles of each business unit in accordance with the attributes of the portfolio, with sustainability as a prerequisite. (2) Best owner: Who the best management authority is to maximize the value of a business. (3) Profitability and capital efficiency: Whether a business or investment will satisfy expectations in terms of profitability and capital efficiency.

There is no final form of Resonac's portfolio management. We strive to further improve portfolio management by continuously revising and replacing the business portfolio.

### Management KPIs and frontline KPIs (examples)



### Portfolio management policy

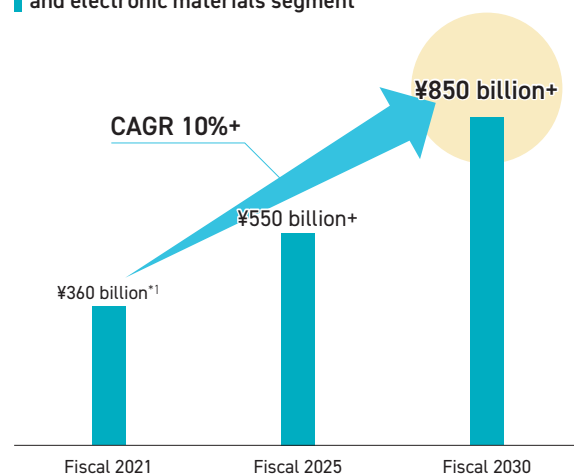


## Financial and Capital Strategies

### Strategic Allocation of Management Resources

By concentrating management resources on Core Growth businesses, we expect the Core Growth businesses to drive Companywide profit growth, rather than uniform growth of all businesses. In particular, the semiconductor materials business is expected to outperform the high growth of the market. By focusing on investments in the Semiconductor and Electronic M-aterials segment, we aim to achieve sales growth and EBITDA growth as shown in the figure. From 2022 onward, we have engaged in major capital expenditures focused on CMP slurries, copper clad laminates, and dicing die bonding films, and we are considering further investments in these areas in the future.

### Medium- to long-term sales forecast for semiconductor and electronic materials segment<sup>\*2</sup>



<sup>\*1</sup> A rough estimate based on internal management figures and taking into account the impact of the sale of a business, etc.

<sup>\*2</sup> The above forecast is based on the information currently available and does not consider the impact of short-term market fluctuations. Actual results may differ materially from the forecast due to a variety of risk factors and uncertainties in the future.

(Source: Our Policy toward Realization of a "Co-Creative Chemical Company," material for presentation on February 14, 2022)

Moreover, as a means for concentrating management resources on Core Growth businesses, we have established investment policies for businesses according to their respective portfolio attributes (Core Growth/Fundamental/Stable Earnings/Next-Generation). With this in mind, we will raise investment funds on a Companywide basis by stably generating cash through Stable Earnings businesses such as Olefins and Derivatives and Graphite Electrodes.

### Investment policies according to portfolio attributes

Core Growth businesses	Growth investment appropriate for market expansion and sales expansion
Stable Earnings and Fundamental businesses	Investment within the scope of depreciation and amortization centering on investment for maintenance, BCP, and profit improvement
Next-Generation businesses	Upfront investment to ensure sales potential in addition to market expansion

In order to achieve optimal allocation of management resources from a Companywide and long-term perspective, in 2022 we reviewed the investment decision-making process.

As part of this revision, a new framework was introduced to centralize information and increase transparency so that the CFO, CSO, CMEQ, and other executives can evaluate investment risks and returns multifacetedly at investment meetings where major investments are discussed.

As a result, information asymmetry between departments proposing investment and screening departments has been greatly reduced and active discussions are held, resulting in more rational and speedy investment decision-making based on the characteristics of individual businesses.

Moreover, whereas previously we used the same discount rate for investments throughout the Company, in 2023 we introduced a risk premium by business segment and by country for investment, in order to address investment risk more appropriately. This change enables more accurate assessment of investment risk and will lead to higher investment efficiency and more sophisticated portfolio management.

### Direction of and Progress in Portfolio Reform

We are accelerating portfolio reform through business divestitures, in addition to organic growth of existing businesses as described in the previous section. Following the acquisition of the former Hitachi Chemical in 2020, we carried out the following business divestitures.

Fiscal 2021: Sold aluminum cans, aluminum rolled products, food wrap films, printed wiring boards, energy storage devices businesses

Fiscal 2022: Sold ISOLITE GmbH, a manufacturer/distributor of thermal insulations for automobiles, aircraft and other industrial applications, which was part of the mobility business

Fiscal 2023: Sold the diagnostic reagent business in July

We are working to optimize the allocation of management resources, review and replace the business portfolio to realize continuous growth, and spur innovation through the integration of the technologies of the two predecessors of Resonac. Regarding business divestitures, we meticulously examined each of the businesses for sale in advance and transferred them in a state with value to the best owners, who can fully utilize the technological capabilities and strengths of these businesses, including solid relationships with customers, to facilitate their further development.



## Financial and Capital Strategies

### Positioning of Each Business in Fiscal 2023

Regarding the positioning of existing businesses within the Company, existing businesses are classified and measures are implemented as shown in the table below, taking into consideration changes in the business environment. For businesses that have not achieved the profitability required by the portfolio to which they belong, in addition to the management cycle described above, individual restructuring projects are being promoted, and business units and the organization under the CFO are working together to improve profitability. In particular, for the automotive products business, for which a fundamental review of the business model and business transformation are required, a team designated for structural reforms has been formed in the Mobility Business Headquarters, and the resources of the organization under the CFO have been allocated to this business to promote reform.

#### Semiconductor materials / SiC epitaxial wafers

Allocate resources to increase production capacity mainly of businesses with high profitability, ahead of high market growth

#### Olefins and Derivatives / Basic Chemicals and Industrial Gases / Graphite Electrodes

Implement measures to improve stability of profitability and increase the probability of cash generation. Examine strategic compatibility of the Olefins and Derivatives business with the medium- to long-term portfolio, with a view to industry restructuring

#### Automotive products / HD media

Implement rationalization measures attuned to changes in the business environment, including product selection and concentration and restructuring of the production system for optimization, to achieve profitability appropriate for portfolio attributes

#### Life Science

Considering whether we are the best owner, we decided to sell the diagnostic reagent business, while continuing to consider whether to sell the regenerative medicine business.

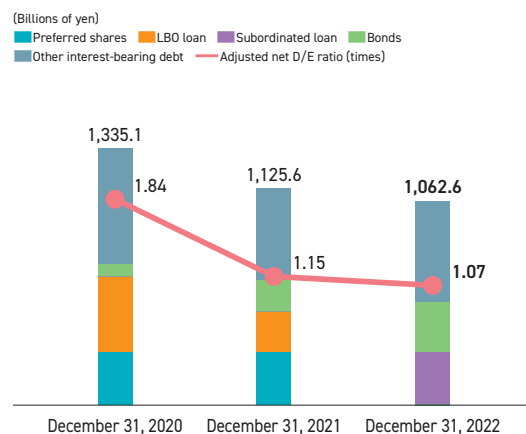
### Pursuit of Capital Efficiency

#### Reduction of Interest-Bearing Debt

Interest-bearing debt amounted to ¥1,062.6 billion as of December 31, 2022, an increase of ¥212.0 billion compared with the figure as of December 31, 2021, due to execution of subordinated loan financing for the purpose of early purchase of preferred shares in 2022. Despite the increase in interest-bearing debt, the switch from preferred shares, for which a high level of dividends are payable, to subordinated loans will reduce financing costs for the full year from fiscal 2023. The net D/E ratio improved to 1.07 owing to an increase in shareholders' equity and an increase in foreign currency translation adjustments resulting from the yen's depreciation.

We will continue to reduce interest-bearing debt in order to stabilize finances and cut finance costs.

#### Post-adjustment Net D/E Ratio\*, interest-bearing debt, and preferred shares



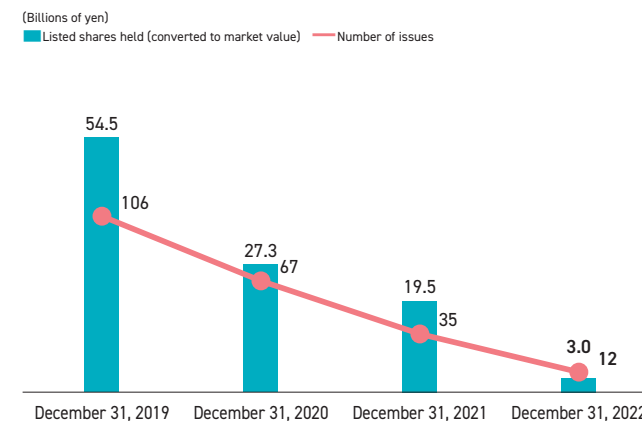
\*December 31, 2020 and 2021:  $\frac{(\text{Loans payable} + \text{Commercial papers} + \text{Bonds payable} + \text{Lease liabilities}) - \text{Cash and deposits} + 50\% \text{ of preferred shares}}{(\text{Total shareholders' equity} + 50\% \text{ of preferred shares})}$   
 \*December 31, 2022:  $\frac{(\text{Loans payable} + \text{Commercial papers} + \text{Bonds payable} + \text{Lease liabilities}) - \text{Cash and deposits} - 50\% \text{ of subordinated loan}}{(\text{Total shareholders' equity} + 50\% \text{ of subordinated loan})}$   
 50% of preferred shares and 50% of subordinated loan (included in loans payable) are evaluated as equity capital based on the credit rating by Japan Credit Rating Agency, Ltd. on April 21, 2020 and April 27, 2020, respectively.

#### Efforts to Streamline Assets

Under the long-term vision, we adopted a plan to generate a cumulative total of ¥50 billion in funds by 2021 and worked to improve working capital and sell cross-shareholdings and other assets. We had raised a cumulative total of ¥90.7 billion by 2022, far exceeding the original plan. Regarding cross-shareholdings, at the end of 2021 we determined a policy to sell all of our cross-shareholdings, in principle. Sale of almost all of the listed shares held by Resonac on a non-consolidated basis amounting to ¥46.9 billion had been completed by 2022. To complete sale of all the cross-shareholdings, we will continue to promote sale of shares, including those held by our operating subsidiaries.

We will continue to promote streamlining and cash conversion of assets, including sale of idle assets and consolidation of sites.

#### Cross-shareholdings (listed shares)\*



\*Listed shares held by group companies are included. The figure as of December 31, 2019 includes shares held by former Hitachi Chemical.

## Assets streamlining and cash conversion

Initiatives	Amount of improvement/sale compared with those before the integration (billions of yen)	
	Long-term vision (forecast)	Update (results for 2022)
Improvement in working capital <sup>*1</sup>	25.0	13.0
Sale of cross-shareholdings <sup>*2</sup>	20.0 (cumulative total)	46.9 (cumulative total)
Sale of other assets <sup>*2</sup>	5.0 (cumulative total)	30.9 (cumulative total)
<b>Companywide total</b>	<b>50.0</b>	<b>90.7</b>

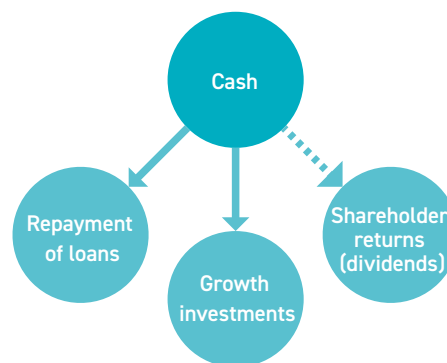
<sup>\*1</sup> Calculated by multiplying the difference between working capital turnover days at the end of 2020 and working capital turnover days at the end of 2022 by sales figures of continuing businesses.

<sup>\*2</sup> Cumulative amount of proceeds from sale since 2020. Excluding sale of shares of affiliated companies and divested businesses.

## Capital Allocation

We allocate cash flows obtained from business growth and business divestitures to growth investments contributing to profit expansion and to repayment of loans in parallel, taking into consideration the post-integration situation. Specifically, we plan to allocate half to two-thirds of the cash flow generated to capital expenditures, and the remainder to reduction of interest-bearing debt and dividend payments. Moreover, to maximize cash flow, we will generate the necessary cash flow by promoting sale of idle assets, business divestitures, reduction of expenses, and other means.

## Cash allocation priorities



In view of the post-integration situation, we must prioritize to a certain degree the repayment of loans and growth investments aimed at expanding profits. Our policy is to allocate half to two-thirds of cash to growth investments.

## Shareholder Returns Policy

As for shareholder returns, we aim to achieve total shareholder return (TSR)—a comprehensive indicator for improving corporate value—at a level in the top 25% of the chemical industry over the medium to long term.

To enhance corporate value, as mentioned above, we will actively engage in capital expenditures centering on Core Growth businesses. Distribution of dividends will be determined rationally, taking into consideration the business conditions comprehensively.

## Management's Communication with Shareholders and Investors

We emphasize communication with our shareholders and investors, and our management team takes a deep interest in their feedback. Opinions and requests from shareholders and investors, as well as topics related to the stock price, are actively addressed and discussed at Management Committee meetings attended by CXOs and business unit heads, and at forums for exchange of opinions with directors and other executives.

We are also actively engaged in nonfinancial disclosure and dialogue aimed at enhancing corporate value. At the time of the announcement of financial results for the full year of fiscal 2022, in his presentation the CEO articulated his commitment to human capital management, positioning it as a top priority issue, to develop co-creative human resources who can put portfolio strategy into practice to achieve long-term enhancement of corporate value through the multiplier effect of portfolio reform, individual capabilities, and corporate culture. In addition, the CFO is actively engaged in dialogue with major shareholders and institutional investors (people in charge of ESG and exercise of voting rights).

In IR activities, we have been enhancing the quality of communication in English, while also increasing the number of personnel, with the aim of improving the quality of dialogue with investors, especially overseas investors, who are oriented toward long-term holdings. Although communication had centered on online briefings and telephone conferences due to the impact of the COVID-19 pandemic, we resumed overseas IR activities with the participation of the CEO and CFO in fiscal 2022.

Through disclosure on the Group's vision, strategies, and corporate information in an easy-to-understand, timely, and appropriate manner, we will continue proactive dialogue with shareholders and investors and reflect their feedback in management to further enhance corporate value.

## Promoting Sustainability

To change society through the power of chemistry based on our purpose, we are strengthening our business execution system in accordance with the belief that we must position the concept of sustainability as an essential component of management. As part of these efforts, we have established Sustainability Vision 2030. We have also identified material issues for sustainability (materiality) and set nonfinancial KPIs to implement initiatives so as to achieve our long-term vision.

### Roadmap for Achieving Sustainability Vision 2030

Having established Sustainability Vision 2030, we are promoting sustainability initiatives. In 2022, we established a promotion system, held active discussions on materiality, and defined nonfinancial KPIs in each CXO area (functional aspects). From 2023, the year of Resonac's inauguration, we began incorporating sustainability assessments into management's performance evaluations and delving deeper into each area, including the progress and appropriateness of initiatives aimed at achieving the KPIs. To enable our unique essence to blossom from approximately 2026 onward, we are stepping up engagement with various stakeholders.

#### Sustainability Vision 2030

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

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

2022

#### Preparation and Launch

- Identify material issues for sustainability (materiality) and establish KPIs
- Integrate various types of data

2023-2025

#### Trial and Error

- Incorporate sustainability-oriented perspectives in portfolio management and the development of businesses and technologies
- Improve stakeholder engagement

2026

#### Blossoming of Our Essence

- Harness initiatives through co-creation
- Bolster businesses and technologies that can change society through the power of chemistry

"Co-creative Chemical Company"



Future we seek to realize through the power of chemistry

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

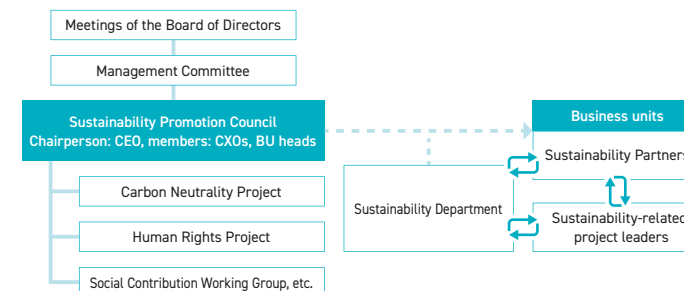
### Roadmap for realizing the long-term vision

	Results in 2022	Plan for 2023
<b>Sustainability management</b>	Identification of material issues for sustainability (materiality) and establishment of KPIs; partial disclosure	Incorporation of sustainability targets in management's key evaluation items, enhance nonfinancial KPIs
<b>Management strategies and business strategies</b>		Designing of a system for Resonac Pride products and services and start of operation
<b>Cross-organizational specific material issues</b>	Grasping of the Companywide current status about specific issues, such as climate change and human rights, establishment of projects	Updating of the roadmap for climate change action, visualization of Scope 3, expansion of the range of products within the scope of CFP calculation by product, start of human rights due diligence
<b>Engagement with external parties</b>	Start of investor engagement, identification of issues for improving external evaluation, consideration of improvement measures	Start of multi-stakeholder engagement
<b>Cultivation of the mindset within Resonac</b>	Planning and implementation of measures to cultivate sustainability mindset	Expansion and continued implementation of measures to cultivate sustainability mindset

### Sustainability Management

The CEO supervises Resonac's sustainability and the CSO is responsible for the promotion of sustainability. The Management Committee deliberates and decides on important items such as policies and plans and then consults with and reports to the Board of Directors. Starting in 2022, the Sustainability Promotion Council convenes a monthly meeting that Group CXOs, including the CEO, attend, and a quarterly expanded meeting, which is also attended by the heads of business units, to discuss wide-ranging agenda items [P56](#). In addition, to address specific issues with agility and on a cross-organizational basis, several projects have been established, which report to the council.

Starting in 2023, Sustainability Partners have been appointed in business units and CXO organizations in order to link the matters discussed at the council's meetings to organizational operations and disseminate them to employees. By means of communication through Sustainability Partners, we aim to promote sustainability reflecting the current status, issues, and interests of each unit. Moreover, by creating opportunities for horizontal communication among Sustainability Partners, we encourage active exchange of information on changes in customer requirements and other issues that transcend differences among the industries we serve, so that Sustainability Partners can proceed with foresight.



## Promoting Sustainability

### Sustainability promotion council agenda (examples)

January	● Material issues and non-financial KPIs
February	● External evaluation of ESG and strengthening of initiatives
March	● Sustainability issues in the CHRO area ● Human rights initiatives
April	● Sustainability issues in the CMO area ● Carbon Neutrality Project
May	● Sustainability issues in the CRO area ● Integrated report (planning) ● Materiality and nonfinancial KPIs
June	● Integrated report (planning) ● Climate change action and disclosure in accordance with TCFD recommendations ● Formulation of "Our Code of Conduct"
July	● Social contribution activities ● Sustainability-contributing business
August	● Application of nonfinancial KPIs to business units ● Sustainability issues in CDO, CMO, and CTO areas
September	● Carbon neutrality and five-year plan ● Companywide implementation of carbon footprint calculation
October	● Governance (sustainability evaluation of executives and employees) ● Integrated report (feedback) ● Cultivation of sustainability mindset
November	● Responsible Care Initiatives ● Response to customers' requirements for disclosure initiatives ● Social contribution activities commendation system
December	● Wrap-up of 2022 and 2023 action plan ● Nonfinancial KPI monitoring

### Identification of Materiality and Management Cycle

Resonac's materiality consists of management issues that contribute to realizing its long-term vision in terms of both society's expectations and degree of importance to the Company. Materiality is determined by reflecting the intent of the frontlines through discussions with each CXO area (function) and feedback from management at Sustainability Promotion Council, and is continually reviewed while exchanging opinions with internal and external stakeholders.

In 2022, we identified materiality, set Company-wide nonfinancial KPIs, and discussed initiatives to be promoted through concerted efforts. In 2023, taking into account actual applications of the KPIs and discussions with external stakeholders, the appropriateness of the KPIs is discussed at Sustainability Promotion Council to monitor, enhance, and refine the KPIs. We began discussion on risks and opportunities based on materiality and reviewed our operating environment. To achieve nonfinancial KPIs, we will discuss various issues and intend to disclose revisions and enhancement of initiatives step by step.

[P48 / Overview of the Long-Term Vision](#)

### Incorporation of Sustainability Evaluation in Executive Performance Evaluation

Recognizing the importance from a medium- to long-term perspective of first strengthening the current structure and promoting measures, in 2023 we began incorporating sustainability evaluation items into short-term performance-linked items of executive compensation [P126](#). In the process of identifying the evaluation items that vary according to executives, we again discussed the priorities of the nonfinancial KPIs related to materiality and the roadmap toward their achievement. Moreover, these items are designed to link with employee evaluation through management by objective (MBO). Positioning linkage with compensation as an important measure for promoting sustainability, we will continue to consider how best to incorporate sustainability evaluation in executive performance evaluation.

#### Sustainability evaluation items incorporated in short-term executive performance evaluation in 2023 (examples)

- Establishment of data infrastructure for strengthening human capital management
- Promotion of visualization of GHG emissions
- Introduction of CFP indicator to R&D themes
- Implementation of specific measures to strengthen risk management
- Holding of ESG briefings and implementation of measures to enhance ESG assessment

#### Topics

### New Employee Training and Sustainability Roundtable to Cultivate Sustainability Mindset

As part of measures to cultivate a sustainability mindset among employees, we conducted training on sustainability for new employees, continuing from the previous year. In 2023, the training consisted of group work with the theme "Let's put into words what 'sustainability' means to Resonac!" Moreover, on their own initiative employees launched the Sustainability Roundtable, a forum for employees who are tackling sustainability-related issues. Employees from various organizations gather and hold study sessions, lectures, and workshops.

















## Material Issues and Non-financial KPIs

Our goals and the value we aim to create are classified below according to three issues of materiality identified with 2030 as the time horizon. In 2023 we began considering the opportunities and risks associated with each issue.

Materiality	Our ambition	2030 targets	Social value	Environmental value	Economic value	Opportunities	Risks
<b>1 Strengthen co-creation capabilities &amp; competitiveness and create social value through innovation</b>	<p>The source of our growth lies in business activities utilizing our technological capabilities to change society through the power of chemistry. We will strengthen our co-creation capabilities and competitiveness through innovation and our businesses to create social value.</p>	<p>We create social value through our businesses via a series of processes—from the identification of social issues to the development of technologies and the provision of solutions—and the harnessing of initiatives through co-creation.</p>	<p>Maximization of our positive impact and minimization of our negative impact on society and the environment through the thorough implementation of responsible consumption and production as a chemical manufacturer that serves as the basis for a variety of industries</p>		<p>Enhancement of corporate value by achieving business growth through the provision of social and environmental value</p> <p>Enhancement of employee motivation by helping employees to gain a solid sense that we are realizing our purpose through our businesses</p>	<ul style="list-style-type: none"> <li>● Creation of social value based on applicability to resolution of wide-ranging social issues</li> <li>● Enhancement of corporate value by flexibly responding to changes in customers and capital markets and to their expectations</li> </ul>	<ul style="list-style-type: none"> <li>● Obsolescence of material manufacturers' technologies due to development of digital and AI technologies</li> <li>● Decline in co-creation capabilities and competitiveness due to delayed response to environmental and social issues</li> <li>● Decline in co-creation capabilities and competitiveness due to delays in industry restructuring and portfolio reform</li> </ul>
<b>2 Gain credibility through responsible business management</b>	<p>We will conduct responsible business management from perspectives including safety, the environment, and quality to realize a sustainable society together with stakeholders, such as suppliers and customers. In addition, we will reinforce and enhance our system for managing increasingly diverse and complex risks by thoroughly implementing soft-law-based compliance going beyond legal and regulatory compliance.</p>	<p>In addition to cultivating a safety culture and eliminating accidents of every kind, we will earn the trust of stakeholders by minimizing and preparing to tackle a wide range of risks, including strategic, operational, and hazard risks, to flexibly address the changing management and business environments and continuously offer value that is unique to us.</p>	<p>Balancing of our contribution to the resolution of social issues and duty as a chemical manufacturer through responsible business management</p>	<p>Reduction of environmental impact through reduction of GHG emissions, waste reduction, and improved recycling rates</p>	<p>Improvement of motivation, raising of productivity, reduction of costs, and enhancement of brand value through eradication of all types of accidents and other incidents and increased efficiency of internal processes</p>	<ul style="list-style-type: none"> <li>● Helping customers ensure quality by offering safe and secure products and services</li> <li>● Increased added value through realization and maintenance of advanced manufacturing processes</li> </ul>	<ul style="list-style-type: none"> <li>● Loss of trust in society due to environmental and safety incidents</li> <li>● Weakening of the management foundation due to lack of understanding of potential risks and lack of appropriate risk-taking</li> <li>● Decline in co-creation capabilities and competitiveness due to delayed response to regional and national laws and regulations and soft law, including international norms</li> </ul>
<b>3 Develop autonomous, creative, and active human resources and culture</b>	<p>We are cultivating co-creative human resources and nurturing a corporate culture to solve issues imaginatively via co-creation by forming connections autonomously with customers and stakeholders through empathy, including various parties who will lead future generations.</p>	<p>Through the cultivation of autonomous and creative individuals and the nurturing of a corporate culture conducive to their development, we will aim to become a developer of talent whose employees are the envy of other companies.</p>	<p>Resolution of social issues by co-creation and innovation through the growth and active involvement of autonomous and creative individuals and the nurturing of a corporate culture conducive to the attainment of such objectives</p>		<p>Active involvement of employees and higher employee motivation through strategic job rotations and development of leaders from the perspective of Companywide optimization and realization of high productivity</p>	<ul style="list-style-type: none"> <li>● Facilitation of innovation through development and creation of co-creative human resources</li> </ul>	<ul style="list-style-type: none"> <li>● Personnel retention risk due to inability to cultivate and maintain organizational culture and engagement</li> <li>● Stagnation of innovation due to lack of psychological safety</li> </ul>

## Material Issues and Non-financial KPIs

The nonfinancial KPIs were formulated based on the thoughts of frontline employees  and discussions by the management team in light of the external environment. We will continually revise the KPIs, reflecting the views and expectations of various internal and external stakeholders through dialogues with them.

Materiality	Constituent elements	Key items (KPIs)	2025 targets	Relevance
<b>1 Strengthen co-creation capabilities &amp; competitiveness and create social value through innovation</b>	<b>1-1</b> Creation of social value through our businesses	<b>1-1-1</b> Resonac Pride products and services <b>1-1-2</b> CFP-related initiatives	<b>1-1-1-1</b> Accreditation by open process <b>1-1-2-1</b> Calculation of CFP of major products	Businesses 
	<b>1-2</b> Identification of social issues and provision of customer value through marketing	<b>1-2-1</b> Vitalization of customer- and market-driven activities <b>1-2-2</b> Promotion of digitalization <b>1-2-3</b> Enhancement of customer database	<b>1-2-1-1</b> Enhancement of product pipeline that contributes to customer value <b>1-2-2-1</b> Strengthening overseas and regional information dissemination using digital marketing <b>1-2-2-2</b> Centralized Companywide pipeline management <b>1-2-3-1</b> Formulation of customer strategy for each business	Marketing 
	<b>1-3</b> Promotion of open innovation	<b>1-3-1</b> Co-creation with external parties	<b>1-3-1-1</b> Promotion of open innovation and increase of the ratio of external themes <b>1-3-1-2</b> Number of papers and external presentations <b>1-3-1-3</b> Increase of the number of cross-organizational themes	R&D 
	<b>1-4</b> R&D and intellectual property strategies that resolve social issues	<b>1-4-1</b> Strengthening of R&D and intellectual property strategies <b>1-4-2</b> Human resource development	<b>1-4-1-1</b> Increase of the ratio of introduction of life cycle assessment (LCA) <b>1-4-1-2</b> Enhancement of intellectual property indicators, such as Market Coverage (MC), which indicates market value, and Technology Relevance (TR), which indicates technological value <b>1-4-2-1</b> Assignment of leaders and professional-minded human resources at an appropriate ratio <b>1-4-2-2</b> Completion of a venue for co-creation	Digital 
	<b>1-5</b> Facilitation of resolution of social issues through digital transformation	<b>1-5-1</b> Data-driven management <b>1-5-2</b> Promotion of digital transformation and development of professional-minded human resources <b>1-5-3</b> Enhancement of IT and digital literacy	<b>1-5-1-1</b> Establishment of the platform for standardization and analysis of financial data <b>1-5-1-2</b> Establishment of a process for obtaining ESG data <b>1-5-2-1</b> Promotion of projects through collaboration between centers of excellence and business units <b>1-5-3-1</b> Digital experience and education of all employees	Occupational Health and Safety 
<b>2 Gain credibility through responsible business management</b>	<b>2-1</b> Establishment of environments where all people can work with peace of mind	<b>2-1-1</b> Fostering of a culture emphasizing safety <b>2-1-2</b> Occupational accidents <b>2-1-3</b> Lost time incidents <b>2-1-4</b> Equipment-related accidents	<b>2-1-1</b> Establishment of a culture emphasizing safety to eliminate occupational accidents <b>2-1-2,3,4</b> Zero serious occupational accidents (consolidated) <b>2-1-3-1</b> Lost time incident rate: 0.1 or less (consolidated, equivalent to zero accidents resulting in lost time over a 10-year period at a site with 500 employees) <b>2-1-4-1</b> Zero serious equipment-related accidents (consolidated)	Quality Assurance 
	<b>2-2</b> Provision of quality and safety to maximize customer value	<b>2-2-1</b> Product-related accidents <b>2-2-2</b> Quality compliance violations <b>2-2-3</b> Product stewardship	<b>2-2-1,2</b> Zero product-related accidents and quality compliance violations <b>2-2-3-1</b> 100% execution of risk assessment of priority risk assessment substances* (consolidated in Japan) <small>*Assess substances stipulated by the Company by issuing safety summary reports</small>	Chemicals Management 
	<b>2-3</b> Reduction of environmental impacts throughout the value chain, respect for human rights	<b>2-3-1</b> Reduction of greenhouse gas emissions <b>2-3-2</b> Reduction of industrial waste sent to landfills <b>2-3-3</b> Environmental accidents <b>2-3-4</b> Respect for human rights	<b>2-3-1-1</b> 30% reduction (Scope 1 + Scope 2) from fiscal 2013 (consolidated) (2030 target) <b>2-3-2-1</b> 0.5% or less of industrial waste generated (consolidated in Japan) <b>2-3-3-1</b> Zero environmental accidents (consolidated) <b>2-3-4-1</b> Establishment of human rights due diligence implementation frameworks	Environment 
	<b>2-4</b> Creation of a sustainable society, working together with suppliers	<b>2-4-1</b> Improvement of quality of communication with suppliers	<b>2-4-1-1</b> Improved CSR questionnaire response rates, higher rate of suppliers exceeding the satisfactory threshold	Human Rights 
	<b>2-5</b> Thorough implementation of soft-law-based compliance going beyond legal and regulatory compliance	<b>2-5-1</b> Inculcation of "Our Code of Conduct" <b>2-5-2</b> Thorough implementation of Group global compliance standards	<b>2-5-1-2</b> Increase of the degree of inculcation (survey) <b>2-5-2-1</b> Reduction in number of serious legal breaches <b>2-5-2-2</b> Increase in number of reports through the whistleblowing system	Procurement 
	<b>2-6</b> Reinforcement of our system for managing increasingly diverse and complex risks	<b>2-6-1</b> Development and operation of comprehensive risk management systems <b>2-6-2</b> Reinforcement of the second line of defense	<b>2-6-1-1</b> Operation of new comprehensive risk management systems for risks associated with change in the external environment, operational risks, and hazard risks <b>2-6-2-1</b> Enrichment of the Group's internal control framework through data linkage with the second/third lines of defense <b>2-6-2-2</b> Commencement of expansion of processes outside Japan and centralization of risk data within the Group	Compliance 
	<b>2-7</b> Reinforcement of our system for managing increasingly diverse and complex risks	<b>2-7-1</b> Development and operation of comprehensive risk management systems <b>2-7-2</b> Reinforcement of the second line of defense	<b>2-7-1-1</b> Operation of new comprehensive risk management systems for risks associated with change in the external environment, operational risks, and hazard risks <b>2-7-2-1</b> Enrichment of the Group's internal control framework through data linkage with the second/third lines of defense <b>2-7-2-2</b> Commencement of expansion of processes outside Japan and centralization of risk data within the Group	Risk Management 
<b>3 Develop autonomous, creative, and active human resources and culture</b>	<b>3-1</b> Supply of human resources required by the business	<b>3-1-1</b> Workforce planning with enhanced linkage with business strategies <b>3-1-2</b> Preparation of next-generation leader candidates and visualization	<b>3-1-1-1</b> Future talent portfolio fulfillment rate <b>3-1-2-1</b> Succession planning preparation rate	Human Resources 
	<b>3-2</b> Cultivating and communicating attractiveness to be chosen	<b>3-2-1</b> Strengthening of employer branding <b>3-2-2</b> Enhancement of wellbeing <b>3-2-3</b> Human resources system integrated with the corporate philosophy	<b>3-2-1-1</b> Hiring plan fulfillment rate <b>3-2-2-1</b> Detrimental voluntary turnover rate <b>3-2-3-1</b> Engagement score	
	<b>3-3</b> Creation of autonomous, professional-minded human resources	<b>3-3-1</b> Provision of opportunities to encourage career ownership	<b>3-3-1-1</b> Internal promotion rate (key positions)	
	<b>3-4</b> Cultivation of corporate culture conducive to co-creation	<b>3-4-1</b> Inculcation of the purpose and values and cultivation of a co-creation culture <b>3-4-2</b> Realization of workplace environment conducive to active involvement of diverse employees	<b>3-4-1-1</b> Survey score of the degree of implementation of the purpose and values <b>3-4-2-1</b> Survey score of psychological safety <b>3-4-2-2</b> Ratio of female managers	





## Special Feature

# Contributing to Society and Customers by Fulfilling Our Purpose through Resonac Pride Products & Services

## Approach to Resonac Pride Products and Services

As an advanced material partner, Resonac aims to contribute to the sustainable development of global society by creating functions required of the times, with the goal of contributing to the happiness and prosperity of people and to harmony with the global environment. In order to achieve this, it is important to visualize how much value our products and services, which we provide in a wide range of areas from upstream to downstream in the value chain, have provided to customers and society.

Upon integration, the SDGs-contributing products of the former Showa Denko Group will be renewed as Resonac Pride Products and Services, and the Group will place even greater emphasis on contributing to customers and society going forward.

In terms of certification, we aim to integrate the points of view of third parties in evaluation from the perspectives of value provided to customers and society by changing society based on our purpose as well as the appropriateness of Resonac's four values, risk assessment such as product environmental assessment and reputation, future potential and impact such as sales plans and market share, and relevance to shared global goals (SDGs).

Main items of confirmation for certification	Points of certification
<b>Implementation of purpose and values</b>	Appropriateness
What is the value provided to customers and society? (quantified as much as possible)	
What kind of values are demonstrated?	
<b>Risk assessment</b>	Risk perspectives from third party points of view
What kind of risks are there when evaluated from various perspectives such as product environmental assessment and reputation?	
<b>Sales plans</b>	Future potential and impact
Sales plans and market share	
<b>Relevance to SDGs</b>	Relevance to shared global goals (including future potential)
How does it contribute to the 17 goals and 169 targets, and is it related to the essence of the SDGs?	

## Certification process

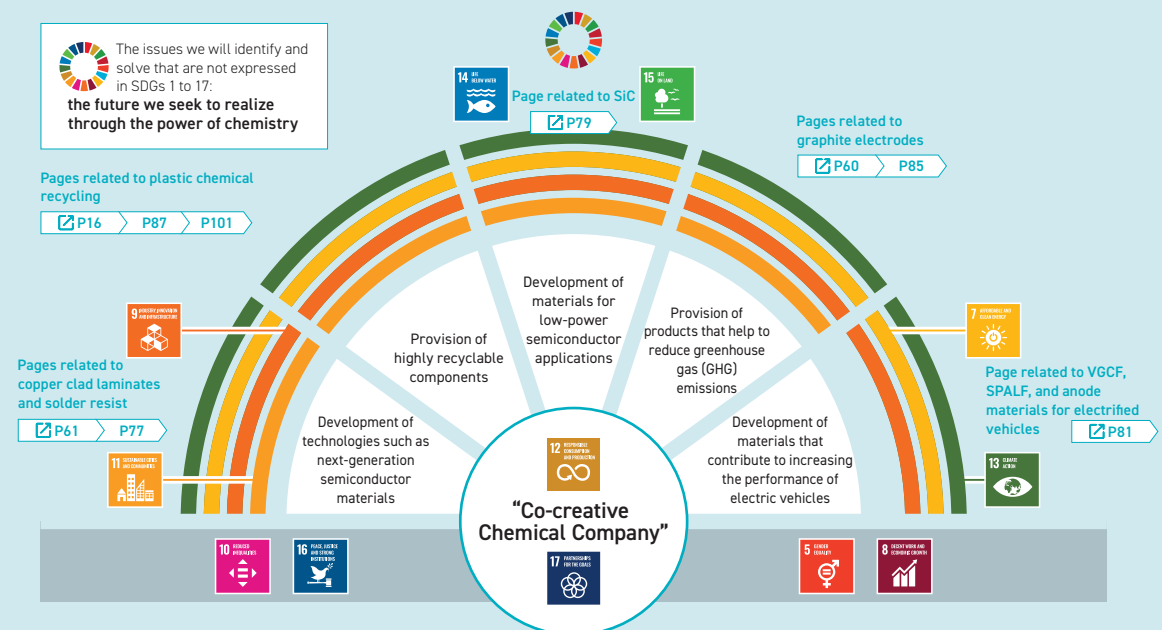
[P90 / Dialogue with University Professors on Resonac Pride Products](#)

Until 2022, product and service certification was carried out in-house, but going forward, we will include third party participation to increase objectivity and transparency. We plan to involve various stakeholders, including investors, experts, customers, and next-generation members, as third parties.



## Contribution to the SDGs through businesses

As a Co-creative Chemical Company that seeks to create a recycling-oriented society, we have made contributing to SDGs 12 and 17 the focus of our corporate activities, and positioned goals that we contribute to through businesses and products as well as goals that we contribute to through our business foundation as follows. In addition to the areas we are already working on, we are looking ahead with the aim to contributing to the creation of a future that we seek to realize through the power of chemistry.



## Iron recycling and greenhouse gas reduction for the realization of an advanced recycling-oriented society using graphite electrodes

### Realization of our purpose

Resource circulation through iron recycling, greenhouse gas reduction through hydroelectric and wind power generation and utilization

The process of manufacturing iron, which is an important material that supports social infrastructure, from iron ore (blast furnace method) is one of the largest sources of CO<sub>2</sub> emissions. However, the electric furnace method, which melts and recycles scrap iron, is capable of reducing CO<sub>2</sub> emissions to 1/4, and is therefore an important process for a sustainable society. Resonac is the number one global manufacturer of graphite electrode materials, which are essential for the electric furnace method, and supplies stable and high-quality graphite electrodes manufactured in six plants around the world to steel manufacturers in various countries through local production and consumption. Currently, we are working on the greening of electrodes at these six plants, and in order to avoid emitting GHG emissions in the graphite electrode manufacturing process, we are promoting 100% green power generation with hydroelectric and wind power generation at our European plants. In addition, we have started to install solar cells on the roof of the plant in Malaysia. Our graphite electrodes will continue to support people's lifestyles through the recycling of iron products.

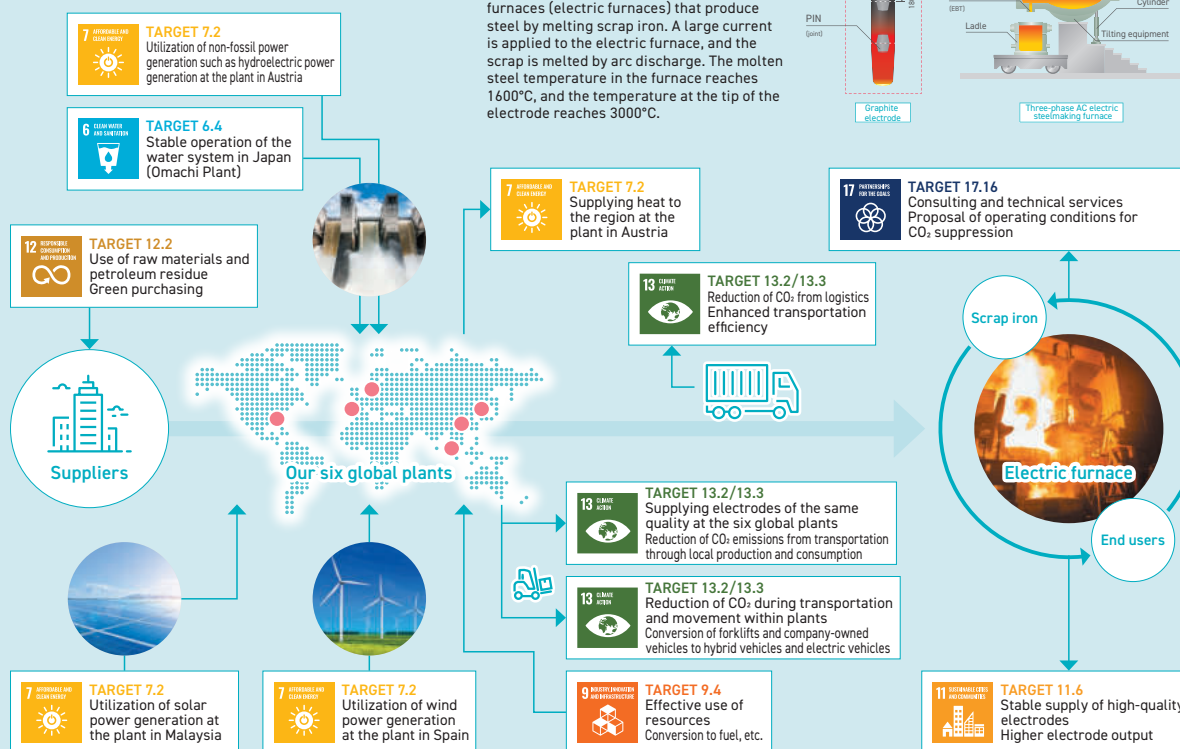
P85 / Chemicals

### Demonstrating our values

#### Co-creation with local communities

In Omachi City, where one of our domestic plants is located, agricultural production was being hampered by the low temperature of water from melted snow. Since 1954, we have been operating a 36 km-long water utilization system that includes three hydroelectric power stations, and by raising the temperature of water before using it for irrigation, we contribute to a stable water supply and improve yields for a wide range of local farmers. At our plant in Austria, waste heat after baking electrodes is supplied to the regional heating network in order to make effective use of it, contributing to the reduction of CO<sub>2</sub> emissions throughout the region, and in this way, Resonac is working on co-creation with local communities on a global scale.

### Details of global co-creation



### Comments from stakeholders

#### Mr. Leopold Schilcher, Mayor of Bad Goisern, Austria



The plant in Austria makes effective use of waste heat from electrode baking to provide a stable supply of heat to the regional heating network. Especially in the current energy crisis, this supply of regional heating unites more than 300 partner companies and local residents. In light of these efforts, Mr. Leopold Schilcher, Mayor of Bad Goisern, Austria, stated that he is proud to have such a reliable company as Resonac Graphite in the city of Bad Goisern, and that he believes Resonac Graphite brings benefits to the community with its innovative concept.

Mr. Leopold Schilcher, Mayor of Bad Goisern, Austria (center of photo)

## Contribution to a digital society and reduction of environmental impact through copper clad laminates and solder resist

**Realization of our purpose** Spread of infrastructure with advanced electronic materials for semiconductors, advancement of digital communication technology, and reduction of environmental impact

As digital society progresses, digital communication technology using semiconductors has become essential for sustainable social development. Through the supply of high-performance advanced electronic materials for semiconductors, Resonac is contributing to AI technology that realizes new services and industrial processes using large amounts of data, next-generation wireless communication technology (5G, 6G, etc.), improved vehicle safety, improved transportation services and the spread of communications and transportation infrastructure, advancement in digital communication technology, enhanced device energy saving, and the reduction of environmental impact.

**Demonstrating our values** Higher functionality and resource conservation of electronic devices using copper clad laminates and solder resist, and co-creation through JOINT2

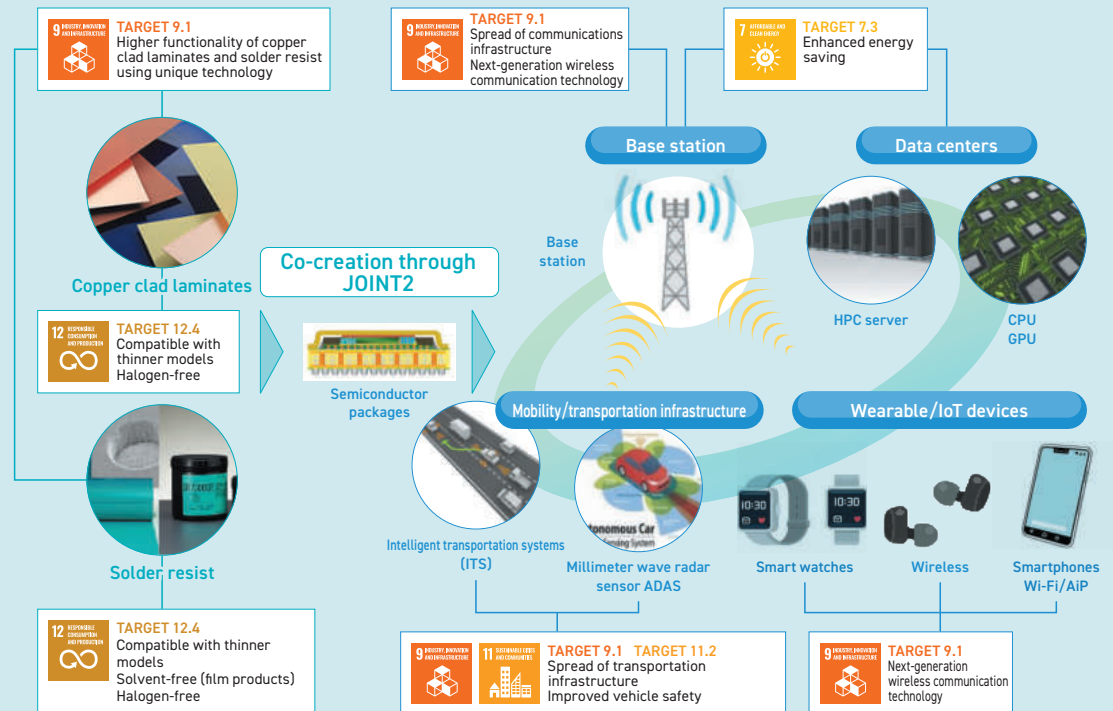
As electronic devices become lighter and smaller, we are developing cutting-edge technologies in a timely manner that can respond to thinner and higher-density semiconductor devices, while also supporting the sophistication of digital communication technology and contributing to the reduction of environmental impact. In addition to the conventional liquid type solder resist, we have developed film products that do not contain solvents, thereby reducing their environmental impact when used by customers, and by making them thinner, we are also contributing to resource conservation. For copper clad laminates, we have created high-performance substrate materials using our unique synthesis technology, contributing to the increased functionality of electronic devices. Moreover, since they can be applied to thin packages, they contribute to resource conservation. Both solder resist and copper clad laminates are halogen-free, which contributes to the reduction of environmental impact.

All of these materials contribute to the resolution of technical issues in production of next-generation semiconductor packages in collaboration with member companies of JOINT2, and realize co-creation with other companies through the supply chain.

[P15 / Packaging Solution Center](#) > [P78 / Semiconductor and Electronic Materials](#)

In 2023, Resonac's copper clad laminates (MCL-E-705G, 795G) received the General Award from the Japan Chemical Industry Association, and were commended as products that have contributed to the advancement of science and technology.

### Contributing to a digital society with semiconductor materials



#### Comments from stakeholders

Mr. Koji Izumi, Division Manager of Global Purchasing Division, Strategic Corporate Planning Operation of IBIDEN CO.,LTD.

As digital transformation progresses, areas of data utilization will expand further, and the associated rise in data center investments is expected to increase demand for large, highly functional IC package substrates. A stable supply of highly reliable raw materials is essential in order to supply society with competitive IC package substrates that meet the needs for higher functionality and energy conservation. Resonac is an important partner that supports our manufacturing, from copper clad laminates with excellent warpage reduction and flatness, to highly reliable solder resist and photosensitive dry film such as Photec.\* We hope to continue deepening our cooperation with Resonac in order to supply highly reliable products and reduce energy consumption and waste generation during production by improving production efficiency within our company.

\*Photec is a registered trademark of Resonac.

CTO Roundtable with Young Researchers

# Creating Innovation through Co-creation and Synergy while Leading Resonac as It Competes on the Global Stage

(From the left of the photo)

**Masato Fukushima**  
**Keisuke Mameda**

**Mao Owada**

**Kohsuke Kakuda**

**Yuzuru Kobayashi**

Corporate Officer and Chief Technology Officer (CTO)

Cross Functional Group, Functional Molecular Chemistry Research Department, Institute for Polymer Technology (work location: Kawasaki Plant)

Next-Generation High-Speed Communications Materials Group, Stage for Co-creation (work location: Stage for Co-creation)

Informatics Group, Research Center for Computational Science and Informatics (work location: Stage for Co-creation)


Structural Control Group, Device Materials Research Department, Institute for Advanced Integrated Technology (work location: Shimodate Plant)



## Shared language required for co-creation and synergy

**Fukushima:** Resonac aims to achieve innovation and business development capabilities that contribute to a sustainable global society. Innovation does not necessarily have to be destructive. When we look at what we have accumulated so far from a different perspective, or when we add something like beauty to a certain function, it can suddenly turn into innovation. As a chemical manufacturer, we want to create important technologies for products that make end users think, "Wow, this is innovative." What do all of you think is necessary to bring about innovation?

**Kakuda:** I think that the ability to keep up with cutting-edge technology, the ability to incorporate what you have learned into your own technology and implement it, and co-creation are necessary. At the Research Center for Computational Science and Informatics

at the Stage for Co-creation , I mainly develop AI technology and use it to develop semiconductor materials. So far, I have managed to cut the development period by half and formulate an experiment policy using AI technology. Since the Stage for Co-creation consolidates internal research functions and domestic and overseas knowledge, I feel that it is easy for a chain reaction to occur in which innovation by AI technology leads to further innovation.

**Kobayashi:** At the Institute for Advanced Integrated Technology, I am currently working with development departments to develop next-generation substrate materials by utilizing the technological synergies of the former Showa Denko K.K. and the former Hitachi Chemical Co., Ltd. When it comes to synergy, I sometimes think that there is still a lack of a shared language due to differences in backgrounds. I think that a shared language involves those in charge sharing the technologies and expertise that they have cultivated thus far, and





spreads a common understanding of what must be done to create products that satisfy customers. I believe that cultivating this kind of shared understanding will lead to new discoveries and spark innovation.

**Owada:** I would also like to make full use of the synergy of our in-house technologies. The mission of the Next-Generation High-Speed Communications Materials Group, to which I belong, is to develop materials and technologies for composite materials that will be used in the telecommunications field in the 2030s. We are co-creating with the Analysis Center for

Materials Science and the Research Center for Computational Science and Informatics from the perspective of establishing analysis methods and predicting properties through simulations. I sometimes think that a shared language would increase the speed of sharing each other's cultures and improve the speed of R&D.

**Mameda:** I believe that understanding customer needs is essential for innovation. I am in charge of an internal collaboration theme that deals with the development of low-thermal-expansion resins that aim to reduce the warpage of copper clad laminates. In the development theme that I was in charge of before, I regretted that I might not have fully grasped the needs of external customers. Currently, there are related parties and customers in the company, which makes it easier to understand customers and their future needs. In order to deepen mutual understanding, we are promoting hands-on and face-to-face initiatives, such as creating data sharing sites with our partners and receiving two-week practical training at our partners' locations.

**Fukushima:** With the merging of the former Showa Denko K.K. and the former Hitachi Chemical Co., Ltd., there should be opportunities to create new innovation in the process of understanding each other's cultures and finding inspiration to create one single culture. To that end, how we go about creating a shared language is both important and challenging. I believe that establishing a shared language starts with discussing the needs of customers and society and what we must do to meet them.



### Synergy starts with real communication

**Kakuda:** In order to deepen discussion, I feel that it is important to connect key people. In addition, I think it is important to connect others with your own abilities and knowledge.

**Kobayashi:** I feel the same way. When I think about co-creation and synergy, I feel that although connections are currently being formed between divisions, there is still a lack of people who truly understand each other's positions and act accordingly. Resonac possesses computational science technology in addition to material manufacturing and composite technology, and I look forward to what kind of leaps will be made when these three strengths come together.

**Owada:** I think that, to date, there are many technologies that have not been commercialized, and I would like to create a system that promotes the sharing of such knowledge and utilizes it on a person-in-charge basis.


**Mameda:** Technology and knowledge are shared at presentations and other events, and I hope that this will lead to the integration of technologies, and that said integration will lead to the creation of value. To that end, it is necessary to promote not only systems but also exchanges between human resources, and I believe that these people-to-people exchanges will lead to the integration of technologies. In addition to understanding data such as the technologies and specifications of those we are co-creating with, I believe that it is important to work together to grasp what customers are truly struggling with and understand significant issues that may not be visible yet.

**Fukushima:** To achieve that, it is essential to have real communication where people gather and information flows naturally. I'm looking forward to seeing what kinds of reactions will occur as opportunities for communication increase.



### Co-creation that deepens empathy

**Kobayashi:** Since its creation, I have been participating in an in-house circle called "Dchemical," which was voluntarily set up by young employees. In this circle, I belong to a team that considers and researches ideas for new product themes, and I have been involved in this for about three years. Resonac now has an environment that encourages such activities. I feel that this is symbolic of the new Resonac, in the sense that it will lead to co-creation, synergy, and innovation.

**Mameda:** I have been participating in "REBLUC (Resonac Blue Creators )," a new system that began in 2022. REBLUC is a purpose-driven thinking community that started to elicit mutual understanding, where the passions and senses of purpose of each and every employee, such as the desire to change society or contribute to the world, overlap. For example, even if I wanted to solve a problem that I had set myself, or wanted to make friends



to start a new business, I wouldn't have known how to go about doing that with the conventional systems within the company. I feel that REBLUC is a good system that allows everyone to start thinking of such things more lightly and openly.

**Kakuda:** I believe that creating a culture that facilitates the creation of new businesses will benefit the company both internally and externally. By succeeding with a new business, one can become a pioneer, which leads to motivation. By establishing ourselves as a pioneer, excellent human

resources will gather at Resonac, where innovation and further new business development will become possible.

**Mameda:** I agree that becoming a pioneer has a great impact on motivation. I think there is a lot to be gained from being a number one brand, and I would like to take on the challenge of how far we can establish that, even if it is difficult.

**Fukushima:** For engineers of a company, I'm sure it must be an irreplaceable joy to see your creations providing value to society and being recognized by the market and customers. I would like for everyone to always pay attention to what kind of value your creations connect to.

**Owada:** Of course. Customers are the closest to the market, but we are aware that we need to see the market directly, not just through customers.

**Kakuda:** The direct customers of the Research Center for Computational Science and Informatics are those in charge of experiments in each division within the company. I see the lack of opportunities to interact with customers beyond those as an issue, and I am trying to increase opportunities to do so. When you interact with actual products and customers, it becomes easier to empathize and understand how a certain calculation might be useful, which in turn makes it easier for innovation through co-creation to occur.

**Fukushima:** In both research and development, it is important to empathize with the target group.

## To Resonac engineers competing on the global stage

**Fukushima:** The process of growth is important, including what kind of career you all choose to pursue, be it in research, development, manufacturing, sales, or something else. Whether you become a specialist as a researcher, or a generalist after experiencing several positions, I would like for you all to enjoy such decisions as part of figuring out your careers. The company is in the process of designing a human resource development system that allows such career choices.

**Mameda:** Ten years have passed since I joined the company. I have been thinking about whether I should build a career as an engineer going forward, or whether I should gain experience in another division. In order to change society through the power of chemistry, I honestly think it would be wonderful if we could create an environment where everyone can proceed as they wish and fully demonstrate their individual strengths.

**Fukushima:** Creating such an environment is essential. In R&D, I would like to develop human resources who can think strategically. People who can draw a roadmap for investment, personnel, scheduling, etc. when they want to develop new materials.

**Owada:** Since starting my current job, I have started observing the market and searching for future changes more than ever before, and I find it both challenging and interesting. I would like to be able to think about the next step based on what I want to focus on the most.

**Kobayashi:** Sometimes I feel like there is a gap between what I'm good at and what I want to do, and I'm trying to be conscious of the goals I should be looking at for the future. Rather than wait for an appointment from the company, I am strengthening my determination to pursue my own career.

**Kakuda:** It's been four years since I joined the company, and for the first time, I became a direct mentor to junior employees. While training him I mentor, I want to be inspired by my team members and increase my own experience, so that in five to ten years, both myself and my team members will have broadened our horizons.

**Mameda:** I would like to become a person who can understand the purpose of customers and the society they want to realize, and contribute to that society. It is important for engineers to connect with sales and business divisions who research the market and come up with ideas on how to connect it to society. As a company as a whole, I would like to think about how to create a system to go from R&D to products.

**Fukushima:** I think we have entered an era in which engineers are led by people who have an understanding of what the world needs and people who can create systems that keep up with that. I would like to create an environment in which you all can enjoy the current, transitional period, and take on challenges without fear of failure. You all have ownership over your own careers. As technology continues to develop, Resonac's engineers should stay strongly connected to each other, and compete openly on the world stage without being bound by the framework of the company. I strongly feel that all of you are ready for this.





## R&D and Intellectual Property Strategies



### Mission of Creating Value

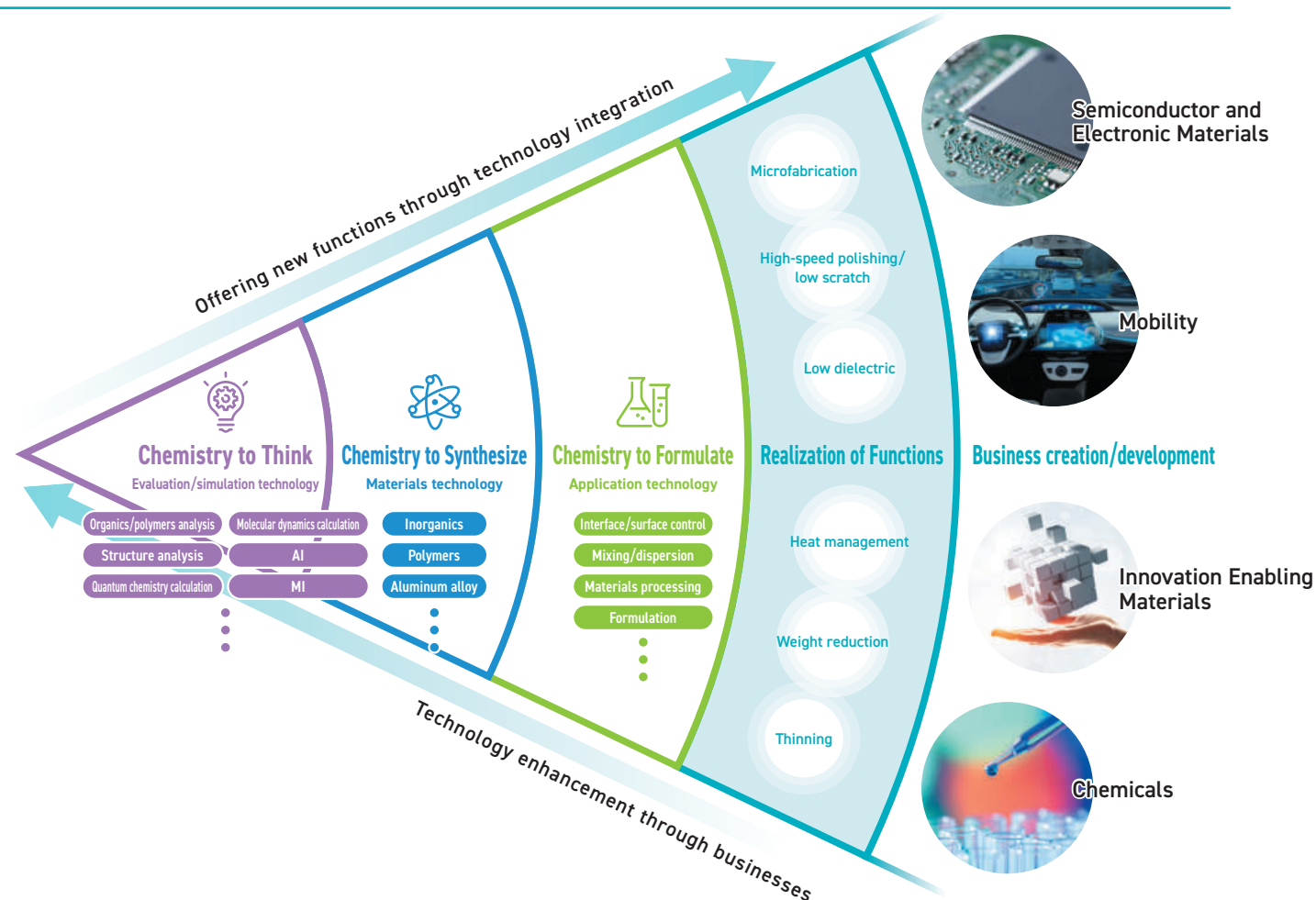
Inspired by its vision of generating synergies between "Chemistry to Synthesize," "Chemistry to Formulate," and "Chemistry to Think," to contribute to the production of world-leading products and technologies, Resonac is advancing R&D activities aimed at accomplishing three missions: broadening of technology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

### Policies

We will pursue the following three missions to realize our purpose and contribute to resolving social issues by creating the world's No. 1 technologies and products through co-creative technological development.

- 1 Deepen materials technology and promote horizontal deployment of technologies
- 2 Strengthen fundamental technologies such as computational science and informatics, analysis and evaluation analysis
- 3 Facilitate networking and open innovation through the exchange of human resources within the company and with people outside the company, transcending the boundaries of business and technology fields, and expand added value through synergies

In order to drive creation of synergies by technological resonance of "Chemistry to Synthesize," "Chemistry to Formulate," and "Chemistry to Think," the CTO organization is executing corporate R&D activities, management of R&D activities, and oversee Companywide intellectual property (IP) activities.



## R&D and Intellectual Property Strategies

### Mission of R&D organizations

#### Institute for Advanced Integrated Technology

- Create new businesses, and research and develop materials including metal, inorganic and composite materials
- Enhance values of existing businesses and products, and cultivate their surrounding areas, which may grow further in the future
- As a hub for evaluation technologies related to power modules, promote the entire process from development of materials and composites to design and evaluation of devices

#### Institute for Polymer Technology

- Research and develop materials including organic and polymeric materials
- Enhance values of existing businesses and products, and cultivate their surrounding areas, which may grow further in the future
- As an analysis center for composition, general structure, surface structure and microstructure of organic and inorganic materials, accelerate the product development cycle of material development, analysis and evaluation

#### Research Center for Computational Science and Informatics

- Promote Companywide R&D with computational science and informatics
- Solve problems of products through atomic- and molecular-level simulation/structural and fluid simulation/AI analysis technologies; accumulate, analyze and utilize internal and external technical data
- Establish the base of data-driven R&D and develop the talent

#### Stage for Co-creation

- Promote long-term R&D projects that contribute to resolving social issues in collaboration with a diverse range of people inside and outside Resonac

[P15 / Stage for Co-creation](#)

#### Intellectual Property Department

- Oversee the intellectual property activities of the entire company and contribute to R&D, business, and management strategies

#### R&D Planning Department

- Ensure smooth operation of Companywide R&D activities based on Resonac's diverse technologies and business domains
- Formulate technology strategies, promote open innovation, and establish and operate various infrastructure and systems to support the execution of R&D activities

### Roadmap for realizing the long-term vision

Results in 2022	Plan for 2023	Vision for the future (2030)
<ul style="list-style-type: none"> <li>● Completed substantial integration of functions with a view to complete integration. Pursued synergy of the two companies' technologies centering on development of semiconductor materials</li> <li>● With regard to deep-level digital transformation, deployed electronic lab notebooks and statistical analysis software throughout the Company</li> <li>● Organized the internal structure to vigorously promote open innovation inside and outside the Company</li> <li>● Clarified the ideal post-integration state of R&amp;D human resources</li> </ul>	<ul style="list-style-type: none"> <li>● As projects to generate synergies, accelerate and enrich development of advanced materials in the semiconductor field and promote vertical collaboration</li> <li>● With regard to deep-level digital transformation, accelerate R&amp;D utilizing computational science and data-driven R&amp;D</li> <li>● Facilitate co-creation through vigorous open innovation inside and outside the Company</li> <li>● Accelerate R&amp;D activities throughout the company to achieve carbon neutrality</li> <li>● Formulate a plan to develop leaders who will drive R&amp;D activities and professional-minded human resources to develop core technology</li> </ul>	<ul style="list-style-type: none"> <li>● Be a provider of technology and solutions attuned to the needs of society, the market, and customers</li> <li>● Be a driving force of unceasing innovation by addressing and resolving technological issues inside and outside the Company</li> <li>● Be the source of a stream of technologies contributing to a truly sustainable society by enhancing R&amp;D activities from a long-term perspective</li> <li>● Be the source of a stream of leaders and professional-minded human resources for the above R&amp;D activities</li> </ul>

### Targets and results of KPIs on material issues

[P58 / Material Issues and Non-financial KPIs](#)

KPIs and 2025 targets	Results in 2022
<b>Co-creation with external parties:</b> <ul style="list-style-type: none"> <li>● Promotion of open innovation and increase of the ratio of external themes</li> <li>● Number of papers and external presentations</li> <li>● Increase in the number of cross-organizational themes</li> </ul>	<ul style="list-style-type: none"> <li>● Start of consideration of actions to facilitate open innovation</li> </ul>
<b>Strengthening of R&amp;D and intellectual property strategies</b> <ul style="list-style-type: none"> <li>● Increase of the ratio of introduction of life cycle assessment (LCA)</li> <li>● Enhancement of intellectual property indicators, such as Market Coverage (MC), which indicates market value, and Technology Relevance (TR), which indicates technological value</li> </ul>	<ul style="list-style-type: none"> <li>● Started LCA calculation of research themes</li> <li>● Set targets of IP indicators</li> </ul>
<b>Human resource development</b> <ul style="list-style-type: none"> <li>● Assignment of leaders and professional-minded personnel at an appropriate ratio</li> <li>● Completion of a venue for co-creation</li> </ul>	<ul style="list-style-type: none"> <li>● Started discussion on personnel assignment</li> <li>● Opened the Stage for Co-creation</li> </ul>

## Priority Measures for 2023

Based on the measures prescribed for realizing our long-term vision, in 2023 we are promoting activities focused on four priority measures.

- Promotion of projects to generate synergies and broaden our technology portfolio:** Business units and R&D organizations will work together to generate synergies and accelerate and enrich development of advanced materials in the semiconductor field and promote vertical collaboration. The Power Module Integration Center is constructing a system to accelerate co-creation with customers for each material. [P16](#)
- Implementation of deep-level digital transformation:** We will accelerate R&D utilizing computational science and data-driven R&D and construct a material informatics (MI) platform to foster a culture conducive to utilizing data and promote the evolution of digital technologies using MI and process informatics. [P67](#)
- Promotion of co-creation:** This measure will be advanced through the pursuit of internal synergies as well as through open innovation with external partners. [P15](#) [P67](#)
- Achievement of carbon neutrality:** The path toward carbon neutrality will be paved by our efforts utilizing the new Stage for Co-creation and activities based on long-term R&D themes, such as a carbon cycle through plastic recycling, CO<sub>2</sub> separation and recovery, and conversion to chemicals. [P16](#)

Through such ongoing efforts, we aim to drive unceasing innovation leading to resolution of technological issues inside and outside the Company by 2030. We also aim to be the source of a stream of technologies contributing to a sustainable society by enhancing R&D activities from a long-term perspective.

## R&D and Intellectual Property Strategies

### Co-creation Initiatives to Resolve Social Issues

#### Digital Transformation of R&D using computational science and AI—Co-creation with external parties and adoption of cutting-edge technology

DX

The Research Center for Computational Science and Informatics is one of the few organizations in the world that integrates computational science (molecular simulation, structural and fluid simulation) and informatics (AI<sup>1</sup>, MI<sup>2</sup>, image analysis, natural language processing, and development of the infrastructure for data utilization) technologies at a single location. The Center's technologies are applied to R&D issues in all of Resonac's business segments. The Center's mission is to position Resonac as a world-class functional chemical manufacturer by maximizing R&D capabilities and business competitiveness.

In 2022, the Center had 35 opportunities to present its outcomes externally, including lectures by invitation, publishing of papers, and conference presentations in Japan and abroad. The Center's activities were also covered by numerous news releases and newspaper articles. The Center's initiatives for digital transformation of R&D based on "developing infrastructure for data utilization that supports accumulation, analysis, and utilization of data" and "fostering processes, culture, and organizations that utilize data" have attracted great interest in society, and we have invited many government agencies and companies that have requested our services to the Stage for Co-creation to exchange opinions. [Web](#)

Moreover, through co-creation with a U.S. startup we are adopting and utilizing cutting-edge technologies. We collaborated with QSimulate, a company with cutting-edge simulation technologies, on the development of a new capability for its quantum simulation platform for materials development, which reduces an experienced researcher's workload by more than half.

[Web](#) We are also working with Enthought, a startup that supports digital transformation of its partners, to transfer Enthought's cutting-edge AI and MI skills to our young data scientists who are promoting deployment and utilization of AI and

MI applications throughout our material development departments. [Web](#)

#### Cases of Co-creation with Internal and External Partners in 2022 and Outcomes

**Cases of Co-creation with Internal Partners** We hold Technology Forums as opportunities for employees involved in R&D throughout the company to interact and discuss beyond the boundaries of their place of work and R&D fields. In 2022, the forum had 730 participants. Presentations of 67 themes and feedback on them strengthened technology sharing and relationships among engineers throughout the Group.

In addition, in-house working group activities are conducted with the aim of solving problems in product development by combining the Group's materials technologies and evaluation and analysis technologies. The application of technologies to new products is already yielding good results.

**Cases of Co-creation with External Partners** We are conducting Open Innovation (OI)<sup>3</sup> activities to search for partners and promote collaboration worldwide. In 2022,

our dedicated OI team, which promotes OI with external partners, obtained information on more than 2,000 innovative startup technologies from affiliated venture capital firms. Having meticulously examined the potential synergy effects between these technologies and our own technologies, we started collaboration with five startups with a view to introducing their technologies.

On the Stage for Co-creation, we promote long-term R&D themes that will lead to the creation of future businesses.

As part of the initiatives, we have started collaboration with Microwave Chemical to establish advanced recycling technology that realizes plastic-to-plastic circulation. Using microwave irradiation, ethylene and propylene, which are feedstocks for plastics, can be efficiently produced from used plastics. In addition to accelerating R&D with a view to practical application of this technology, we aim to resolve social issues by expanding the circle of co-creation to a wide range of stakeholders, including local governments and consumers.

[P16 / Long-term R&D Themes Contributing to the Next Generation](#)

#### Open innovation through co-creation with a range of stakeholders



\*1 Artificial intelligence

\*2 Materials informatics

\*3 OI is a methodology that incorporates the knowledge and technology possessed by external organizations in product development and technological innovation to break away from the self-sufficiency. It was proposed\* by Henry Chesbrough in 2003.  
Henry Chesbrough, "Open innovation: The new imperative for creating and profiting from technology," Harvard Business School Press, 2003.

## R&D and Intellectual Property Strategies

### Contribution to Business by Vigorous Utilization of Intellectual Property

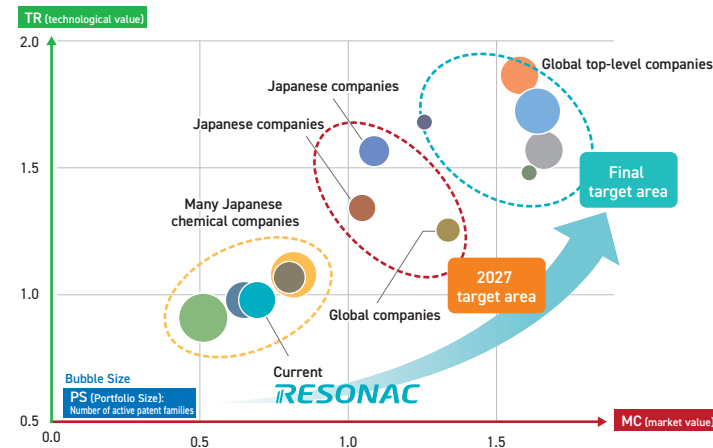
The objective is to increase the number of patents that attract the attention of other companies and obtain rights in countries with large markets in cooperation with business units. By further increasing the market value (measured by MC<sup>1</sup>) and technological value (measured by TR<sup>2</sup>) of our patent network, we aim to raise MC and TR to the area indicated by the dotted line in the center of the figure below by 2027 as the first step, and eventually to be on par with global top-level companies.

In addition, our MC and TR are trending upward compared with the previous year, reflecting our commencement of a post-merger portfolio review, and we are beginning to see positive results of integrated intellectual property activities.

We will enhance our business advantage through the timely and appropriate exercise of our intellectual property rights. To this end, we will further strengthen our patent network to achieve differentiation of our proprietary technologies from those of competitors.

\*1 Market Coverage (MC) is a score calculated based on information on countries where patent applications are filed.  
\*2 TR (Technology Relevance) is a score calculated based on the number of citations.

### Target area of market value and technological value of the patent network



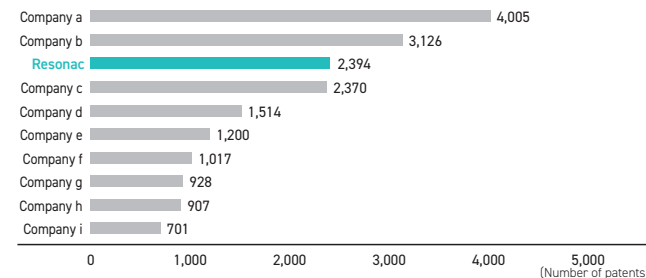
\*Evaluation of active patents using LexisNexis PatentSight® patent analytics

### Utilization of IP Landscape to Develop Patent Application Strategies in line with the Situation of Each Business Segment and Business

For each business, the Intellectual Property Department, business units, and R&D organizations collaborate and utilize the IP landscape to visualize the patents held by Resonac and clarify Resonac's position in each technological field. Based on the results of IP landscaping and the issues of each business, such as the EBITDA margin, we develop application strategies appropriate for each business to expand and strengthen our patent network.

We have a wide range of technologies related to the semiconductor field, from front-end to back-end processes. Our patents in this field are on a par with those of global companies. Taking CMP slurry, one of the semiconductor materials, as an example, a bird's-eye view of related patents shows that we hold patents related to our key technologies such as nanoceria slurry, ceria slurry, silica slurry, and polymer additives, which are the source of our strength. The IP landscape also indicates the technologies that are the source of our strength.

#### Number of Patents Held in the Semiconductor Field



\*Evaluation of active patents using LexisNexis PatentSight® patent analytics

#### Competitive Advantage in the CMP Slurry Field



\*Evaluation using the ThemeScape function of Clarivate's Derwent Innovation patent analysis tool

### Vigorous Dissemination of IP-related Information to External Parties [Web](#)

With the aim of enhancing corporate value, we vigorously communicate our IP-related initiatives to external parties.

In addition to timely news releases on the gaining of patents related to our key technologies and the construction of our patent network, we promote IP landscape and technology trend research by utilizing our advanced IP information analysis technology, and disseminate the results of such research to external parties. Moreover, we have posted IP information on our website as fact data on our ESG initiatives. [Web](#) We will continue to strive to communicate our intellectual property policies to investors in an easy-to-understand manner and enhance information disclosure.

## Marketing Strategies

### Mission of Creating Value

To resolve social issues, through proposal activities that help customers resolve their technological issues, we create new business and contribute to Resonac's sustainable growth. Moreover, we promote Companywide standardization of activities to offer problem-solving value propositions to make them Resonac marketing processes. Furthermore, we will promote construction and operation of digital tools throughout the Company to improve the efficiency of marketing-related operations.

### Policies and Management

Our marketing divisions (the CMO organization), comprising the Corporate Marketing Department, Regional Account Planning Department, and the Innovation Center, are executing marketing efforts in collaboration with business units, sales departments, and site oversight departments in Japan and overseas.

In addition to planning of Companywide marketing strategies, the Corporate Marketing Department formulates and implements market-specific or application-specific cross-divisional marketing plans and also constructs and operates the marketing platform common throughout the Company. The Regional Account Planning Department is planning and building a system to promote growth strategies based on regions and customers. The Innovation Center serves as a venue for triggering co-creation and relationship building with stakeholders. Hands-on exhibits enable visitors to experience some of our core technologies, thus facilitating achievement of our goal of engaging in co-creation with customers, business partners, and all of our other stakeholders.

### Strategy for Realizing the Long-Term Vision

We have collectively defined our activities for offering problem-solving value propositions to customers as Resonac marketing processes, and utilize frameworks such as MGAP<sup>\*1</sup> and VP<sup>\*2</sup> when considering new businesses. We use MGAP to identify technological issues faced by customers, organize VPs in relation to the features of our products (Features), differentiation from competing technologies (Advantages), and benefits to be gained by customers (Benefits), and repeatedly verify product concepts in order to promote marketing. We are promoting Companywide standardization of marketing activities, using the common frameworks in cooperation with the R&D and intellectual property departments (the CTO organization) in the early phase of marketing, and with sales divisions in a later phase once customer evaluation has progressed.

<sup>\*1</sup> MGAP: Multi Generation Application Planning

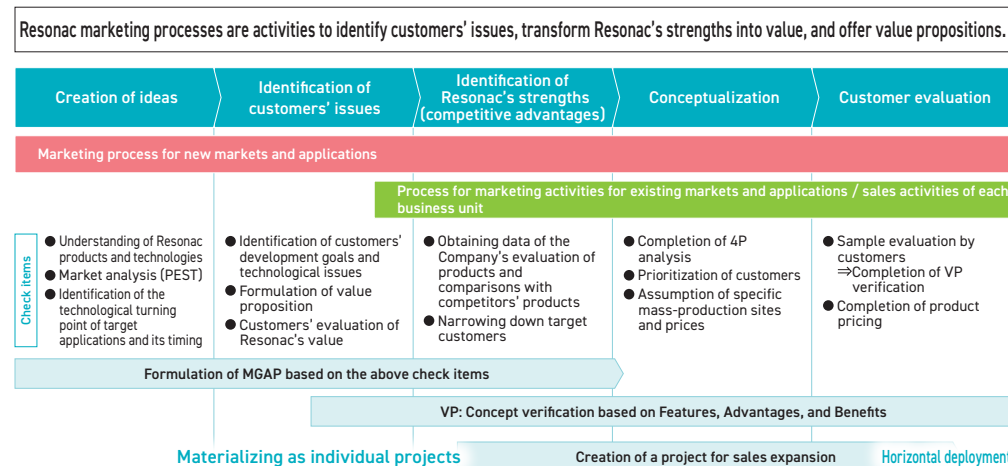
<sup>\*2</sup> VP: Value Proposition

<sup>\*3</sup> CRM: Customer Relationship Management

### Roadmap for realizing the long-term vision

Results in 2022	Plan for 2023	Vision for the future (2030)
<ul style="list-style-type: none"> <li>● Approached promising markets using Resonac marketing processes and began creation of specific new projects</li> <li>● Promoted greater sophistication of the marketing platform utilizing digital technology</li> </ul>	<ul style="list-style-type: none"> <li>● Accelerate creation of new projects in specific markets (EV, power module) by promoting entrenchment of Resonac marketing processes throughout the Company</li> <li>● Strengthen digital marketing activities overseas and promote utilization of CRM<sup>*3</sup> systems to visualize new projects throughout the Company</li> </ul>	<ul style="list-style-type: none"> <li>● Resonac marketing processes are standardized and entrenched throughout the Company. Marketing divisions (the CMO organization), business units, and sales divisions including those overseas collaborate and create new projects attuned to market needs of the times.</li> <li>● Digital marketing at overseas sales companies is systematized. CRM systems have become the standard infrastructure for visualization of sales and marketing activities.</li> </ul>

### Resonac marketing processes



Promote marketing in cooperation with the CTO organization and business units, using the above processes

## Marketing Strategies

### Targets and results of KPIs on material issues

P58 / Material Issues and Non-financial KPIs

KPIs and 2025 targets	Results in 2022
<b>Vitalization of customer- and market-driven activities</b> <ul style="list-style-type: none"> <li>Enhancement of product pipelines that contribute to customer value</li> </ul>	<ul style="list-style-type: none"> <li>Execution of marketing based on MGAP and VP</li> </ul>
<b>Promotion of digitalization</b> <ul style="list-style-type: none"> <li>Strengthening of overseas and regional information dissemination using digital marketing</li> <li>Centralized Companywide pipeline management</li> </ul>	<ul style="list-style-type: none"> <li>Execution of digital marketing activities mainly by principal business headquarters</li> <li>Identification of business issues for companywide application of CRM</li> </ul>
<b>Enhancement of customer database</b> <ul style="list-style-type: none"> <li>Strengthening of customer strategies of businesses, utilizing customer database</li> </ul>	<ul style="list-style-type: none"> <li>Identification of key customers and clarification of issues for establishment of a visualization system</li> </ul>

## Co-Creation Initiatives to Resolve Social Issues

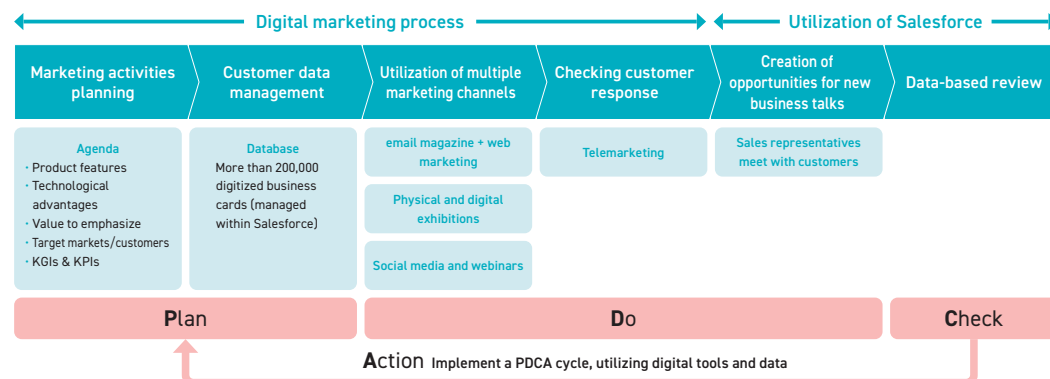
### Promotion of Digital Marketing

DX

The use of digital platforms is indispensable for efficiently and comprehensively promoting value propositions in the market. The Corporate Marketing Department, in cooperation with the CDO organization and the related parties in each business unit, is promoting digital marketing utilizing the Web, email magazines, webinars, etc., and promoting the use of CRM systems to visualize and share the results of marketing activities.

### Overview of Activities of the Digital Marketing Team and the CRM Team

Supporting Companywide marketing activities based on the processes below



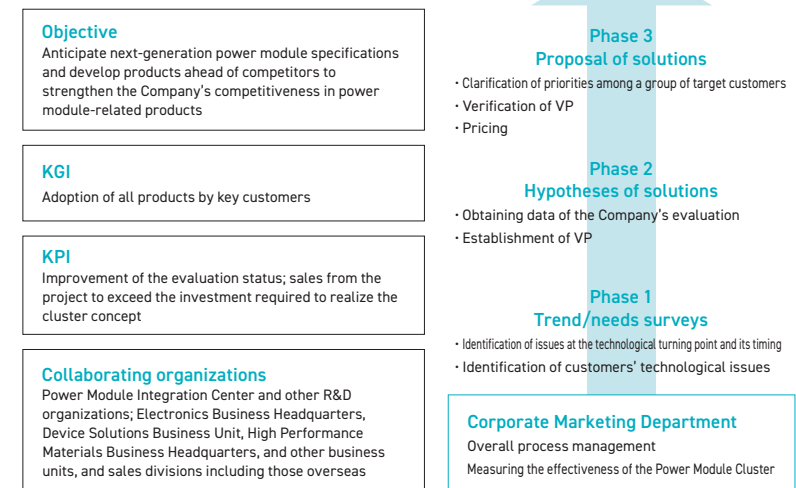
## Marketing Activities in the Automotive Market

While promoting entrenchment of Resonac marketing processes throughout the Company, we are promoting marketing activities in markets with sustainable growth potential in cooperation with R&D and intellectual property departments (the CTO organization) and business units. Specifically, we are focusing on value propositions for batteries for EVs and motor-related materials, demand for which is expected to grow rapidly in the automotive market, and for power module-related materials for the electronics market.

In line with the global expansion of the EV market, power modules are attracting attention as a stable power source for driving the motors used in EVs and for charging the batteries. Resonac has established a Companywide project organization, the Power Module Cluster, to address this market, and is offering value propositions through the combination of multiple products, rather than creation of a business through provision of standalone products.

P16 / Co-creation with Customers Started for Evaluation of Power Module Materials

### Overview of the power module cluster concept





## Digital Strategies

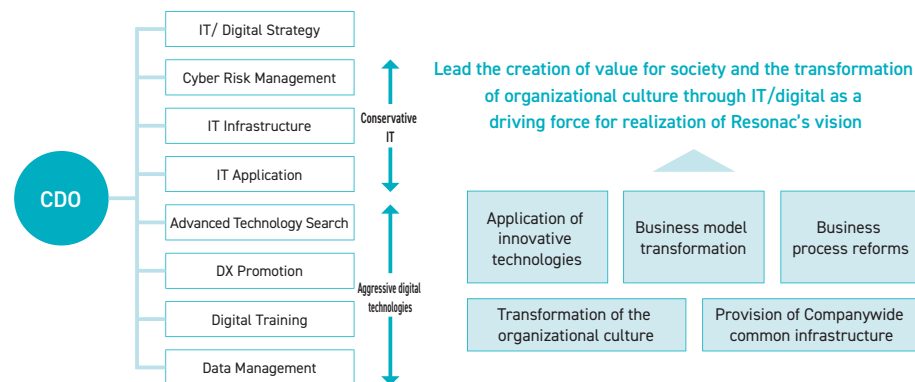
### Mission of Creating Value

We will evolve and refine our business processes both internally and externally through advanced and thorough utilization of digital technologies and data and lead the transformation of our organizational culture. In addition, through the development of core digital-proficient human resources and their optimum assignment, we will continue improving and transforming our businesses and contribute to co-creation with all stakeholders and the creation of social value.

### Policies and Management

Our basic digital transformation policy is to contribute to the enhancement of competitiveness and the creation of social value through the utilization of industry-leading digital technologies. In other words, by creating an environment that enables thorough utilization of digital technologies and promoting human resource development, we will strengthen the Group's innovation and business development capabilities and competitiveness. The eight departments that belong to the CDO organization closely collaborate according to objectives and issues to achieve Resonac's vision of becoming a company that can compete globally, a company that contributes to a sustainable global society, and a company that develops co-creative talent that represents Japan's manufacturing industry.

To this end, we will promote (1) development of human resources proficient in advanced digital skills, (2) development of an internal digital environment, (3) standardization of business processes and evolution and transformation of business processes through Groupwide utilization of digital technologies, and (4) operation of management-level meetings responsible for governance and monitoring of effectiveness to promote strategic digital investment.

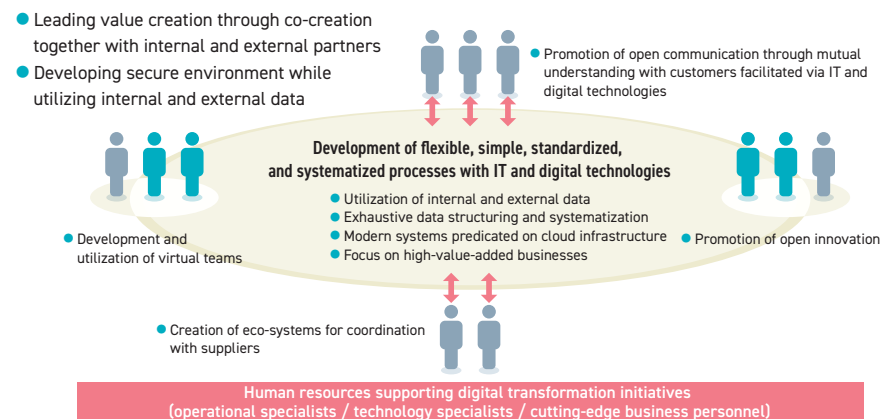


### Digital Innovation Strategies

By updating our business systems to an open, secure, and modern architecture and organically linking them to visualize business processes, we aim to enable management of the data of all our business operations. We will analyze the issues and future prospects of entire business processes through utilization of the data thus obtained within the Group and digital technologies so as to continue the evolution of our business processes both internally and externally.

Moreover, having defined the three types of human resources needed to implement digital transformation, namely, high-level operational specialists, technology specialists, and cutting-edge business personnel, we are focusing on skill development. Furthermore, we will clarify digital transformation issues common to the Group as a whole and assign appropriate personnel according to the themes to promote DX swiftly.

### Goal of IT and digital technology strategies



## IT and Digital Technology Strategies

### Roadmap for realizing the long-term vision

Results in 2022	Plan for 2023	Vision for the future (2030)
<ul style="list-style-type: none"> <li>Start of vigorous recruitment of digital-proficient human resources</li> <li>Formulation of digital transformation strategies toward data-driven management and launch of Resonac Way Transformation (RWT) to standardize and systematize business processes, rules, and data</li> </ul>	<ul style="list-style-type: none"> <li>Start of visualization and analysis of information on business administration by RWT</li> <li>Concentration and development of human resources with expertise in key themes by utilizing the iCompetency Dictionary proposed by the Information-technology Promotion Agency, Japan (IPA)</li> <li>Utilization of AMI's human resources with advanced digital skill sets <a href="#">P88</a></li> </ul>	<ul style="list-style-type: none"> <li>Digital transformation is promoted in all businesses and operations, and non-core operational areas that do not contribute to Resonac's competitiveness are automated by 2030.</li> <li>Resources are concentrated on core operations that are the source of our competitiveness and digital technologies are utilized to promote co-creation with stakeholders and contribute to creation of high social value.</li> </ul>

### Digital transformation at Resonac (Links to relevant pages and the website)

Classification	Title	Relevance
Application of innovative technologies	Establishment of integrated data pipeline to collect, format, and accumulate data and analyze them with AI	<a href="#">P67</a> <a href="#">Web</a>
	Collaboration with QSimulate on the development of a system that can reduce man-hour of the workflow of quantum science calculation for materials development by more than half	<a href="#">P67</a> <a href="#">Web</a>
	Participation in Enthought's materials informatics (MI) acceleration program	<a href="#">P67</a> <a href="#">Web</a>
	Strengthening of mobility materials development capabilities using MI	<a href="#">P82</a>
Business process reforms	Promotion of digital marketing	<a href="#">P70</a>
	Establishment of a database for centralized management of semiconductor supply chain information	<a href="#">P80</a>
Business model transformation	Provision of digital solutions for operation of electric furnaces through AMI	<a href="#">P88</a> <a href="#">Web</a>

### Targets and results of KPIs on material issues

[P58 / Material Issues and Non-financial KPIs](#)

Targets for 2025	Results in 2022
<b>Data-driven management</b> <ul style="list-style-type: none"> <li>Completion of financial data standardization concept, establishment of Companywide standardized data analysis platform</li> <li>Establishment of a process for obtaining ESG data</li> </ul>	<ul style="list-style-type: none"> <li>Start of utilization of software for visualization and analysis</li> <li>Launch of RWT activities</li> </ul>
<b>Promotion of digital transformation and development of professional-minded human resources</b> <ul style="list-style-type: none"> <li>Promotion of projects through collaboration between centers of excellence organization and business units</li> </ul>	<ul style="list-style-type: none"> <li>Start of a cross-organizational structure centering on the Digital Transformation Department</li> <li>Strengthening of the pool of digital-proficient human resources by hiring personnel who can work effectively to promote digital transformation right away</li> </ul>
<b>Enhancement of IT and digital literacy</b> <ul style="list-style-type: none"> <li>Digital experience and education of all employees</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of a structure for education and training</li> </ul>

## Resonac Way Transformation Launched

Resonac Way is both the state to which our employees aspire and the fundamental manner in which we do our work. In 2022 we began Groupwide initiatives, named "Resonac Way Transformation (RWT)," for unification of Resonac's terminology, standardization of business processes, and structuring of data. The objective is to eliminate, or minimize as much as possible, misunderstandings and rework caused by different definitions of terms and inefficiency caused by differences in business processes, and to lay the foundation for quick decision-making by structuring data.

We will promote RWT transcending business and regional boundaries to create an environment and foundation where employees can focus on their essential work autonomously and efficiently. We will promote visualization and analysis of business administration information to realize faster and sophisticated management decision-making by the end of 2023.

#### Topics

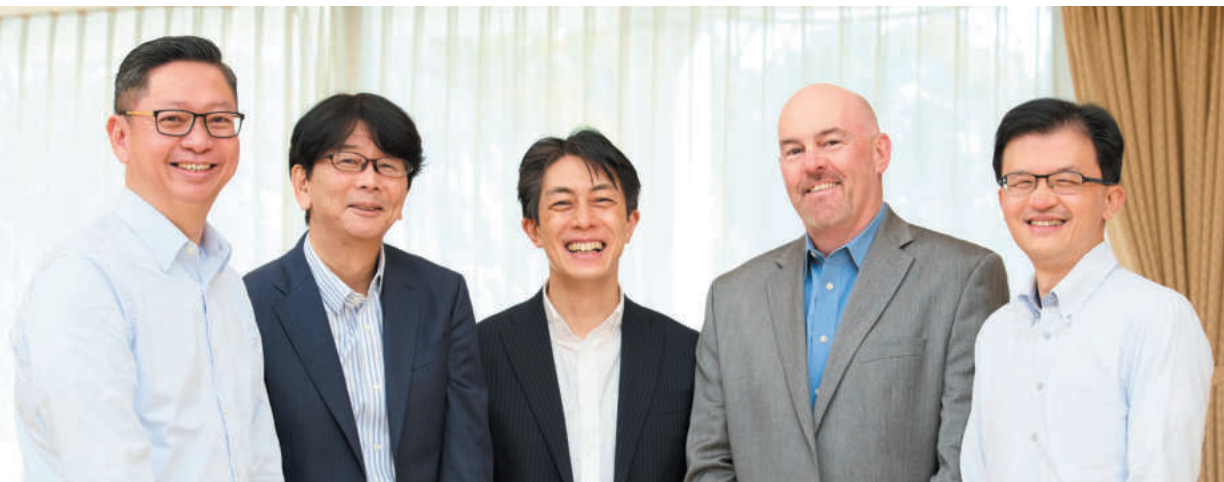
### Productivity Improvement by Using Internal Social Media (Workplace)

DX

For swift information sharing among frontline workers and managers and supervisors at manufacturing sites, use of Workplace from Meta, an enterprise communication tool, is spreading, starting with manufacturing sites in Japan.

Until now, paper, whiteboards, and telephones have been the primary means of communicating information at manufacturing sites, and workers do not have computers. Such workers are provided with smartphones and tablets that are configured to ensure information security so that use of Workplace is safe and secure.

This allows sharing of work know-how and information on problems that occur at frontlines together with images and videos. In the event of equipment stoppages or other problems, supervisors, from wherever they are, can quickly issue instructions and address problems, enabling quick recovery. These initiatives are resulting in a series of cases of productivity improvement and reduction of overtime.

**Sim Mong Teck**

Chairman  
Resonac Asia-Pacific Pte. Ltd.

**Tomomitsu Maoka**

Director, Managing Corporate Officer, Chief  
Strategy Officer (CSO)  
Resonac Holdings Corporation

**Youjie Tsai**

Chairman and General Manager  
Resonac International  
(Taiwan) Co., Ltd.

**Hiroyuki Yamashita**

Managing Corporate Officer, Resonac Holdings  
Corporation  
General Manager, Electronics Business Headquarters,  
Resonac Corporation

**Dennis Parker**

President and COO  
Resonac America, Inc.

The Semiconductor Materials Business is positioned as a growth business in Resonac's long-term vision. With strong demand expected to continue over the long term, there are growing customer demands for further strengthening of technological development capabilities and supply chain management including product supply, environment, and human rights, and Resonac recognizes the need to respond proactively to these demands.

Hiroyuki Yamashita, who oversees the Electronics Business, the heads of sales in the U.S., Taiwan, and Singapore, as well as CSO Tomomitsu Maoka, all gathered to discuss Resonac's strategies, challenges, and responses.

## Semiconductor Materials Global Top Management Roundtable

# Semiconductor Materials Business: Key to Resonac's Growth

## Characteristics of the Semiconductor Materials Business and Reason for Resonac's Role

**Maoka:** Currently, the global semiconductor business is undergoing a period of drastic change as countries are enclosing their production bases. The semiconductor materials field, which is Resonac's main business, is expected to grow in line with the increasing demand for semiconductors, with a CAGR of 5.2% until 2025. In particular, double-digit growth rates are expected for materials for high-performance semiconductors, which is our focus.

**Yamashita:** The Semiconductor Materials Business is characterized by the fact that it is difficult to commoditize products because it is necessary to communicate with customers collaboratively in pursuit of miniaturization and package complexity. Resonac, which has a large number of products with the world's top market share, is able to keep abreast of technological trends and customer needs through communication with customers, and is always ahead of the curve in technological development.

The semiconductor materials business has high barriers to entry. Resonac, born from the integration of Showa Denko and Hitachi Chemical, has developed a number of world-class semiconductor materials and leads the industry.

[Maoka]



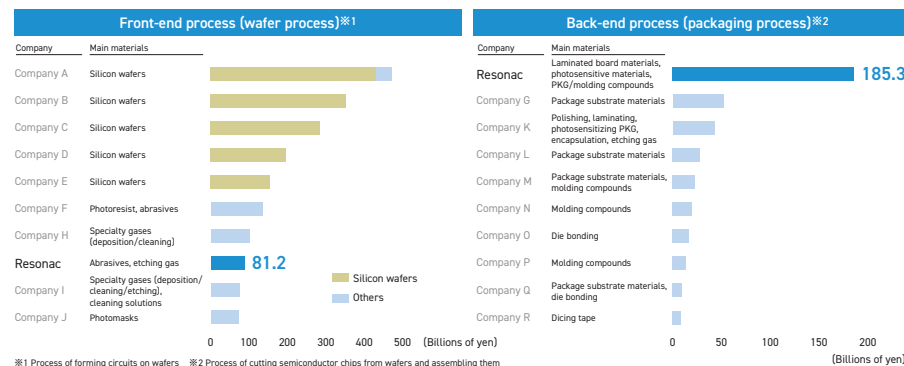
**Maoka:** Production processes that are determined as a result of communication tend to avoid change. The material design of semiconductor materials is highly challenging, requiring optimization by integrating electrical engineering, thermodynamics, structural mechanics, and physical property chemistry. It is a business with high barriers to entry.

**Yamashita:** This is a field where Resonac's long-standing relationships of trust with its customers come into play. Another advantage is Resonac's unique positioning within the semiconductor materials industry. Most semiconductor material manufacturers are niche market players that demonstrate strength in a few products, and there are not many players like Resonac that are involved in multiple products with high market shares.

**Maoka:** In the age to come, as semiconductor manufacturing becomes increasingly enclosed within each country, semiconductor material manufacturers will need to expand their production bases in each country, and they will need to be large in size to survive. This is why M&A is becoming more active, and Resonac has become a pioneer in this field.

**Yamashita:** Resonac has products with a high market share in the front-end and back-end processes of semiconductor production. Until now, technological innovation in semiconductors has been driven by front-end processes, which are responsible for the miniaturization of circuits formed on silicon wafers. However, with the 2 nm process approaching, further miniaturization has become difficult, and it will be necessary to achieve higher functionality through back-end mounting technology. In this back-end process, multiple materials are used to achieve high functionality, and the complex three-dimensional structure of a so-called 2.X-dimension package requires the optimal combination of more than 10 materials. Resonac excels at matching up with its customers, which is why Resonac continues to grow with back-end materials accounting for approximately 70% in semiconductor materials sales.

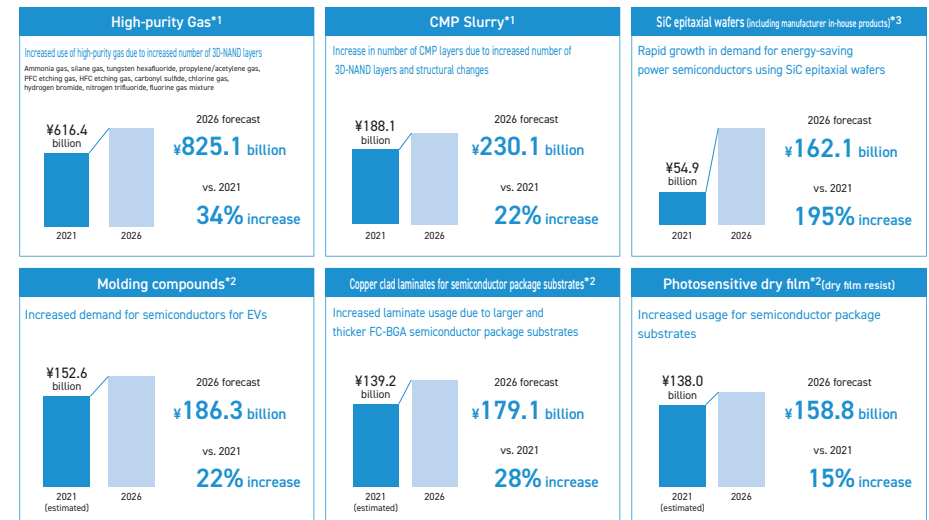
## Resonac's position in the front-end and back-end processes of semiconductor manufacturing



## Resonac's Semiconductor Materials Business Strategy

**Maoka:** Going forward, materials in which we have a high market share are also expected to grow across the board. We have positioned the Semiconductor Materials Business as our growth business, and our business and corporate headquarters will work together to analyze management resources and the external environment, set viable strategies based on cost-effectiveness and feasibility, and make focused investments.

## Growth projection for semiconductor materials, in which the company has a high market share



Source: \*1 Fuji Keizai, "2022 Current Status and Future Prospects of the Semiconductor Materials Market"

\*2 Fuji Chimera Research Institute, "2021 New Materials Handbook for Electronics Packaging"

\*3 Compound Semiconductor Market Monitor, Module I, Q2 2022, prepared by the Company based on data from Yole Intelligence three companies (as of November 2022)

Remarks: High-purity gas, CMP slurry, and SiC epitaxial wafers are converted to ¥130 per dollar.

Investing over ¥250.0 billion over the next five years. Resonac, which has many products with the world's No. 1 market share in the semiconductor materials field, will formulate a strategy based on risk analysis and promote co-creation on a global basis to fulfill its societal role.

[Yamashita]





**In the U.S. market, where cutting-edge technology is in high demand, it makes a lot of sense for Resonac to take the lead in expanding co-creation efforts.** [Dennis]

**Yamashita:** In 2022, sales increased on the back of strong demand for semiconductors. On the other hand, operating income decreased due to the time lag in the transfer of raw material price hikes to selling prices and other factors. In 2023, demand and inventory adjustment trends are becoming increasingly uncertain, and it is extremely difficult to foresee the timing of recovery from the adjustment. Although the current external environment is severe, the semiconductor market will continue to expand over the medium- to long-term, and we want to make forward-looking investments for the next several years. We will execute timely capital investments commensurate with the growth of the semiconductor market, especially strategic investments related to increased production, rationalization, and new products, to ensure a steady return on our investment.

#### Strengthening of Development Capabilities and Co-creation in Line with Market Speed

**Dennis:** Resonac's presence in the U.S. market has been also increasing, especially in recent years, including inquiries for etching gases and CMP slurries. Customers demand high levels of technology, and Resonac America, Inc. is working together with its customers to develop advanced design and manufacturing technologies.



**Yamashita:** We keep recognizing the importance of meeting customer expectations, strengthening our development capabilities to keep up with the speed of the market, and accelerating the launch of new products. To this end, we are considering the possibility of establishing in the U.S. a function similar to the Packaging Solutions Center that we have established in Japan. We would like to make this a place for co-creation with semiconductor, materials and equipment manufacturers, as well as a place to consolidate information on advanced technologies.

**Maoka:** In the U.S., the Chips Act is creating a unique semiconductor ecosystem. By entering this ecosystem, rather than maintaining the status quo, we will have the opportunity to acquire information on cutting-edge packages and to use our own materials in the early development phase, aiming to continue to be the global No. 1 in back-end processes. In fact, overseas customers who have observed our co-creation efforts in Japan have been both surprised and highly impressed. We expect that this co-creation will also help differentiate the Japanese semiconductor industry itself.

**Dennis:** In the U.S. market, where cutting-edge technology is in high demand, we believe it is very meaningful for Resonac to take the lead in expanding this kind of co-creation initiative in order to increase its presence.

#### Regional Strategies and Supply Chain Management

**Dennis:** As geopolitical risks increase, major semiconductor manufacturers are increasing their investments and facilities in the U.S., and demand for semiconductor materials in the U.S. is also growing. Improvements are expected for our supply chain, which produces and fills products at our production facilities in Asia and transports them to the United States.

**Sim:** One of the major issues in the Asian region, especially in Singapore, is supply chain issues. Aiming to maintain stable supply and competitiveness, we are building a supply chain system and centrally managing information in the Indo-Pacific region. In April 2023, we presented a case study on our global supply chain system in Malaysia. Due to environmental issues, production and logistics constraints, and geopolitical risks, there is a need to reduce risks and improve the efficiency of the entire semiconductor supply chain.

**Maoka:** To address these issues, we have placed a dedicated liaison in the Corporate Planning Department at our head office since April 2022. As one of the leaders in the semiconductor materials industry, we plan to work with the Ministry of Economy, Trade and Industry to expand our activities to reduce risks and improve efficiency throughout the supply chain.

**In response to the demand to reduce risks and improve efficiency throughout the supply chain, including business continuity, the environment, and human rights, the Singapore base is also promoting proactive information management.** [Sim]







**In response to the expected strong demand in the semiconductor materials field, we have made large-scale investments in Taiwan to increase production capacity for nanoceria slurries and copper clad laminates. We are also preparing for geopolitical risks. [Tsai]**

**Tsai:** In order to build a foundation for growth in Taiwan, we have been making efforts with a focus on acquiring new projects in cutting-edge and growing fields such as next-generation communications (5G), HPC, AI, and xEV, which are key trends. In January of this year, Resonac Semiconductor Materials (Taiwan) Co., Ltd. expanded its production capacity for nanoceria slurries, which are used in the formation process of semiconductor logic circuits for cutting-edge devices, to meet the rapidly growing demand in these growth fields. In July, the company also increased the capacity of its ceria slurries, which can achieve both high polishing speed and low scratches. Likewise, we plan to increase our production capacity of copper clad laminates for semiconductor package substrates by 2025 with the introduction of new production lines and equipment.

**Yamashita:** On the other hand, we have many customers in China and Taiwan, and our business strategy requires us to closely monitor the trends and purchasing strategies of our customers in Greater China, including end users. The Electronics Business Headquarters, which I lead, has a high ratio of employees in Greater China, about 30%, and I believe that risk management, including employee employment and safety management, is important.

**Maoka:** In the semiconductor industry, with the major technologies being held by the U.S. and manufacturing in Taiwan and materials in Japan, the division of labor is divided by country. Monitoring geopolitics and business continuity management (BCM) are becoming increasingly important. We are working with the governments and administrations of each country, gathering information and advancing scenario planning, to establish a system capable of immediate response.

**Sim:** We recognize that issues such as the environment and human rights are also important matters demanded by society and our customers, and we at the front lines of sales are determined to respond with a high level of awareness. More and more, we recognize the need to collaborate with customers, suppliers, and our colleagues at Resonac around the world.

#### As a Leader in the Global Semiconductor Materials Business

**Maoka:** Resonac has many products with the world's No. 1 share in the semiconductor materials field, and we view our responsibility to society as very important. The rapid deterioration of the global economy and the decline in consumer demand are affecting the semiconductor market as well, and it is currently difficult to determine at what point the market will recover. However, the semiconductor market will continue to expand in the long-term. With an eye on a sudden recovery, we will continue to monitor market trends and work to obtain early information on the timing of a demand recovery.

**Yamashita:** Our business headquarters' three-year plan through 2025 focuses on developing new products and providing one-stop solutions centered on semiconductor materials, achieving highly efficient operations by strengthening supply chain management, and building strong partnerships in the value chain.

**Maoka:** It is all about co-creation, isn't it. What can be solved by a single company will become less and less. Resonac will drive the global semiconductor materials business by creating together with all stakeholders.

**Yamashita:** Through semiconductor materials, we will support the future development of digital society and contribute to sustainable social development.







## Business Strategies

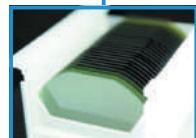
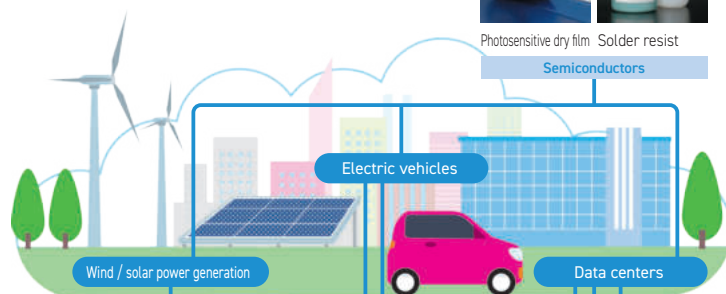
## Semiconductor and Electronic Materials

## Resonac products in everyday life



Photosensitive dry film Solder resist

Semiconductors



SiC epitaxial wafers



Optical semiconductors



HD media

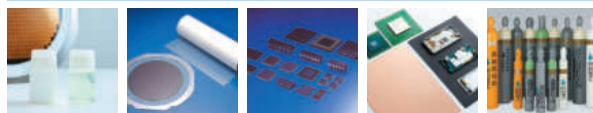


Mobility

Wearable devices

Smartphones and PCs

Semiconductors



CMP slurry

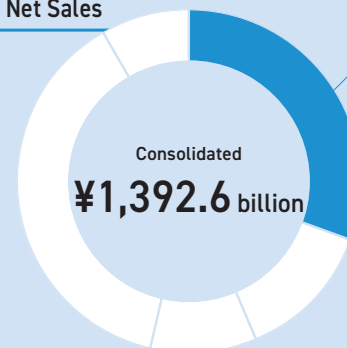
Die bonding film

Epoxy molding compounds

Copper clad laminates

High-purity gases, etc.

## Fiscal 2022 Net Sales



## Semiconductor and Electronic Materials

Segment net sales

¥427.2 billion

Segment operating income

¥45.5 billion

## Management Target

EBITDA margin **30% or more** in 2025Semiconductor materials: Front-end **¥100.2 billion**Semiconductor materials: Back-end **¥188.3 billion**Device Solutions **¥99.3 billion**

## Strategy for Realizing the Long-Term Vision

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

	Results in 2022	Plan for 2023	Vision for the future (2030)
<b>Semiconductor materials</b> Front-end / Back-end	<ul style="list-style-type: none"> <li>Year-on-year increase in sales and decrease in income</li> <li>Sales increased reflecting strong semiconductor demand through the first half of 2022, despite the impact of semiconductor production adjustment starting in the second half of the year. Operating income decreased owing to the impact of soaring raw materials prices.</li> <li>Implementation of the largest investment plan in the past several years to ensure capture of strong future demand (copper clad laminates for semiconductor package substrates and CMP slurry)</li> </ul>	<ul style="list-style-type: none"> <li>Enhancement of the business model to continue winning with cutting-edge technology while strengthening the earnings base</li> <li>Despite the current difficult market conditions due to the deteriorating semiconductor market, steady implementation of the following measures to achieve sustainable growth over the medium to long term               <ol style="list-style-type: none"> <li>Promotion of carbon neutrality</li> <li>Introduction of global supply chain management system</li> <li>Medium- to long-term R&amp;D and account strategies</li> <li>Response to geopolitical risks</li> <li>Improvement of EBITDA margin</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>Goal of becoming a world-leading semiconductor material manufacturer that supports the advancement of a sustainable, digital society</li> <li>Contribution to the realization of a sustainable society by conserving energy and reducing environmental impacts through the supply of advanced semiconductor materials</li> </ul>
<b>Device Solutions</b> HD/SiC	<p><b>HD media</b></p> <ul style="list-style-type: none"> <li>Start of shipment of newly developed HD media for near-line HDDs with the industry's largest storage capacity of 26 TB <a href="#">Web</a></li> <li>HDD demand, having expanded rapidly during the COVID-19 pandemic, slowed down and entered an adjustment phase in the second half of 2022.</li> <li>Completion of expansion of aluminum substrate production capacity</li> </ul> <p><b>SiC</b></p> <ul style="list-style-type: none"> <li>Year-on-year increases in sales and income as a result of maximization of production and sales to meet strong demand</li> <li>Strengthened partnerships with Infineon Technologies AG (Germany) and other customers, and concluded long-term supply contracts <a href="#">Web</a></li> <li>Acceleration of development and launch; start of mass production of third-generation six-inch epitaxial wafers and shipment of 8-inch epitaxial wafer samples</li> <li>Eight-inch epitaxial wafer development program selected for NEDO Green Innovation Fund Projects <a href="#">Web</a></li> </ul>	<p><b>HD media</b></p> <ul style="list-style-type: none"> <li>Continuation of industry-leading development and mass production of best-in-class HD media to lead technological innovation in media for large-capacity near-line servers</li> <li>Optimization of production scale in response to adjustment of HDD demand, which expanded rapidly until 2022</li> </ul> <p><b>SiC</b></p> <ul style="list-style-type: none"> <li>Year-on-year increases in sales and income due to persistently strong demand</li> <li>Realization of stable supply (stable and maximized production of epitaxial wafers and substrates, stable procurement of key materials)</li> <li>Thorough implementation of key account strategies and conclusion of long-term supply contracts with more customers and renewal</li> <li>Acceleration of development of eight-inch epitaxial wafers and substrates</li> </ul>	<p><b>HD media</b></p> <ul style="list-style-type: none"> <li>Contribution to storage demand supporting increased data traffic volume and transmission speed as a large-capacity media technology leader</li> <li>Pursuit of sustainable growth through production activities and recycling of post-sale products</li> </ul> <p><b>SiC</b></p> <ul style="list-style-type: none"> <li>Maintenance of top share as an independent supplier of SiC epitaxial wafers</li> <li>SiC epitaxial wafer technology leader to lead the industry's technological innovation</li> <li>Proactive supply of solutions in response to more sophisticated and specialized quality requirements</li> <li>Expansion of production of eight-inch wafers and productivity improvement to contribute to further expansion of the SiC device market</li> </ul>

## Business Strategies: Semiconductor and Electronic Materials

### Competitive Edge (Semiconductor Materials)

#### Operating Environment Outlook and Resonac's Strategy

Affected by the rapid deterioration of the global economy and declining consumer demand in 2022, the semiconductor market is experiencing a temporary decrease in demand. However, we expect that technological innovation and market growth are likely to continue in line with the advancement of society's digitalization. Moreover, the importance of semiconductors as specified critical materials designated by the Economic Security Promotion Act is increasing, and countries are making major efforts and introducing regulations to secure the supply of semiconductors. We view these developments as both a risk and an opportunity for us.

Risks include the potential for increases in raw material, energy, or logistics costs or supply chain disruptions as a result of geopolitical risks. Resonac is striving to develop a resilient supply chain management system designed to facilitate the swift detection of risks and the stable supply of products to customers and is making steady progress step by step.

There will be opportunities to capture new demand. In the future, along with changes in the supply chain, changes in the business formats of players and the entry of new manufacturers are expected, and uncertainty and complexity will increase. Capitalizing on a lineup that encompasses a wide variety of front-end and back-end semiconductor materials and the high market share, and the broad customer network built on those strengths, as well as the JOINT2 consortium activities, which aim to establish advanced semiconductor mounting technology through co-creation with industry peers, we will quickly identify changes and create high value-added products that meet the needs in order to develop highly competitive operations.

#### Semiconductor Material Technology Trends

As semiconductors are endowed with more sophisticated functions, there is a rising need for more minutely detailed circuit patterns to be etched through front-end wafer fabrication processes. Meanwhile, in back-end processes, which generally entail mounting chips made from individual wafers onto substrates, the number of components included on chips and in electronic components is increasing at a rapid pace, creating a rising need for new package structures that use 2.xD and 3D mounting technologies to achieve higher mounting density.

These trends are boosting demand for Resonac's existing highly functional, high-share materials as well as for the new cutting-edge materials under development.

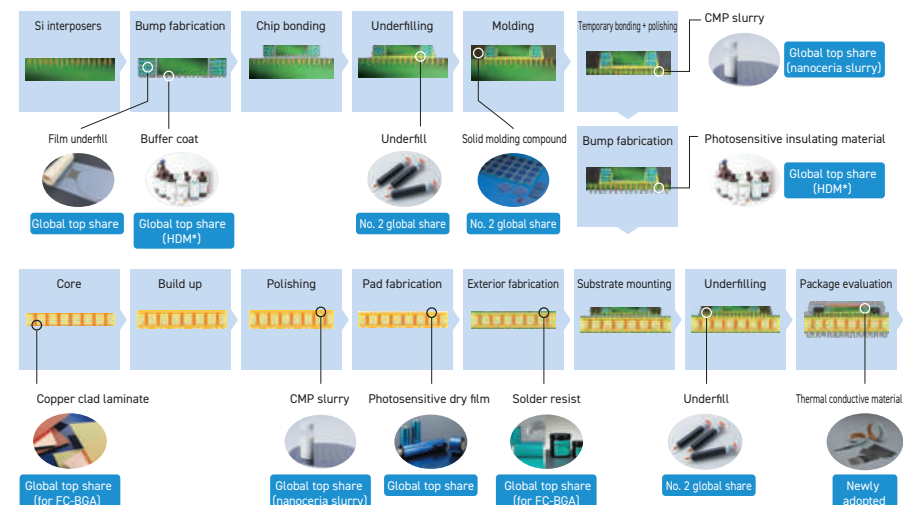
In front-end processes, we facilitate customers' development activities with our CMP slurry (nanoceria slurry) capable of creating precise circuit patterns with 2 nm nodes as well as with our precision etching gases and high-purity solvents. At the same time, we assist production activities around the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

Moreover, the JOINT2 consortium is collaborating on substrates, materials, and equipment to help resolve customer issues and accelerate development. Specifically, we are conducting collaborative evaluations with several leading semiconductor manufacturers on 2.xD/3D packages.

#### Technological requirements and Resonac's products

Front-end semiconductor materials	
Technological requirements	Requirement-satisfying products
Precision polishing	CMP slurry (nanoceria slurry)
Precision processing (etching)	High-purity gases for electronic materials
Higher-quality solvents	High-purity solvents
Back-end semiconductor materials	
Technological requirements	Requirement-satisfying products
Close connection, resolution	Photosensitive dry film
Dielectric property, low warping	Copper clad laminates
Reliability	Die bonding materials

#### Resonac's lineup of 2.xD and 3D mounting products



\*Shares of HDM (HD Microsystems, Ltd.) in the buffer coat and photosensitive insulating material markets  
Note: The above global share figures for products are based on Resonac's estimates.

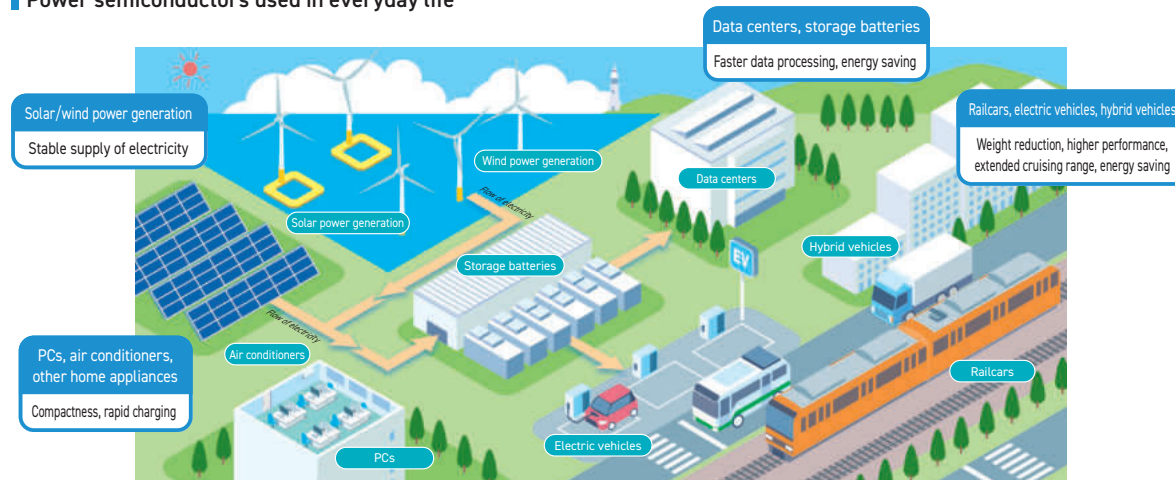
## Business Strategies: Semiconductor and Electronic Materials

### Competitive Edge (Device Solutions/SiC)

#### Society Realized by Power Semiconductors

Power semiconductors control and convert electric power and are used in all types of devices that are powered by electricity, everything from industrial equipment to familiar home appliances. With less power loss and heat generation than conventional silicon-based power semiconductors, SiC power semiconductors are key devices that contribute to energy conservation, achieving both voltage characteristics and conversion efficiency. GaN power semiconductors are also attracting attention. Although, as a material for power devices, GaN has properties superior to those of SiC in some respects, there are still issues to be resolved in terms of high current capability. SiC power semiconductors resolve this issue and are also cost competitive. The market for SiC power semiconductors is expanding rapidly as they are widely used in various applications, such as electric vehicles (EVs), renewable energy, high-speed charging stations for xEVs, and railcars.

#### Power semiconductors used in everyday life



#### Attractiveness of SiC Power Semiconductors

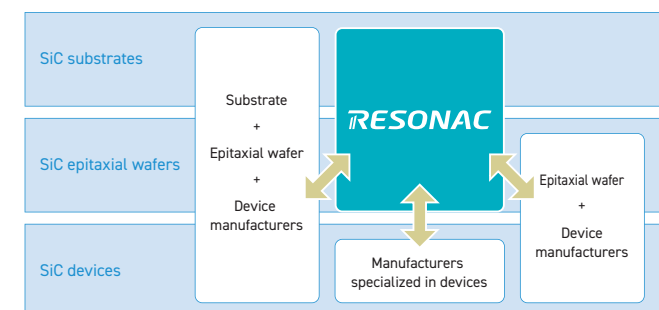
- 1 Compactness and weight reduction** SiC power semiconductors have high withstand voltage and excellent thermal characteristics. Compared to conventional silicon-based power semiconductors, SiC power semiconductors enable compacter design and contribute greatly to weight reduction of electric units.
- 2 Extended cruising range** It is known that the cruising range of vehicles using SiC power semiconductors is extended due to the combined effect of weight reduction and battery performance improvement (loss reduction), making SiC power semiconductors key devices for the diffusion of electric vehicles.

#### Resonac's Contribution to SiC Power Semiconductors

Resonac is the world's largest independent supplier of SiC epitaxial wafers, which are key materials for SiC power semiconductors. As a manufacturer specialized in epitaxial wafers, we aim to be an optimal co-creation partner capable of providing epitaxial wafers tailored to various customers and their respective SiC devices. Our SiC epitaxial wafers have been used for various applications owing to their high quality, including industry-leading low levels of surface-defect density and basal-plane dislocation.

Regarding automotive applications for which especially high reliability is required, Resonac's SiC epitaxial wafers have been adopted for the drive element of the on-vehicle inverter installed in the new model LEXUS RZ, based on our track record of supplying SiC epitaxial wafers that have excellent features and quality. Whereas 150-mm (six-inch) epitaxial wafers are currently the mainstream for SiC power semiconductors, a shift to 200 mm (eight-inch) wafers is expected. The use of larger-diameter wafers increases chip production output, enabling device manufacturers to improve productivity and reduce costs. Recognizing such market needs, we began sample shipments of 200 mm SiC epitaxial wafers in 2022 and are working toward early mass production.

#### Resonac's business model as a manufacturer specialized in epitaxial wafers



As a manufacturer specialized in epitaxial wafers that does not handle SiC devices, attract device manufacturers that manufacture substrates and epitaxial wafers in-house as customers

## Business Strategies: Semiconductor and Electronic Materials

### Co-Creation Initiatives to Resolve Social Issues

#### Establishment of a Database for Centralized Management of Semiconductor Supply Chain Information to Reduce Risk and Improve Efficiency Throughout the Semiconductor Supply Chain

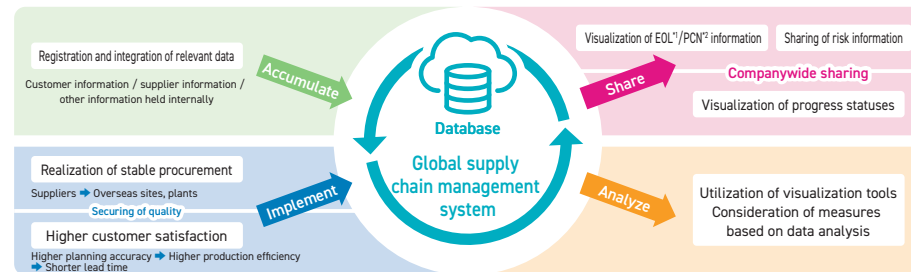
DX

While demand for semiconductor materials is expected to remain robust as digitalization of society advances, the supply chain is unstable owing to the combination of diverse issues, including environmental problems, recent constraints on production and logistics, and geopolitical risks.

In these circumstances, we have been building a supply chain system in the Indo-Pacific area to ensure stable supply of semiconductor products and maintain and strengthen competitiveness. We expect centralized management of supply chain information from suppliers to customers on a common platform will enable us to respond quickly to customer needs and shorten lead times, such as through early detection of risks and optimization of operations at each site. In addition, it will enable us to promptly respond to the increasing number of requests from customers and other parties in recent years for assurances regarding the non-presence of environmentally regulated substances and the absence of human rights abuses, such as forced labor.

This initiative was adopted under the Ministry of Economy, Trade and Industry subsidy program for overseas market survey projects for building resilient supply chains for fiscal 2021. Resonac took part in the Japan-Malaysia Public Private Industrial Policy Dialogue held in Kuala Lumpur, Malaysia, in April 2023 and gave a presentation on its efforts to strengthen the supply chain for semiconductor materials. We are making steady progress with the establishment of a global supply chain management system step by step and we plan to expand it in the future to reduce risk and improve efficiency throughout the supply chain.

#### Goals to be achieved through introduction of a global supply chain management system



Conduct data-driven business operations and decision-making by centrally managing and sharing data, analyzing the accumulated data, and implementing actions based on the analysis results.

\*1 EOL (End of Life): Suppliers' termination of provision of products and services

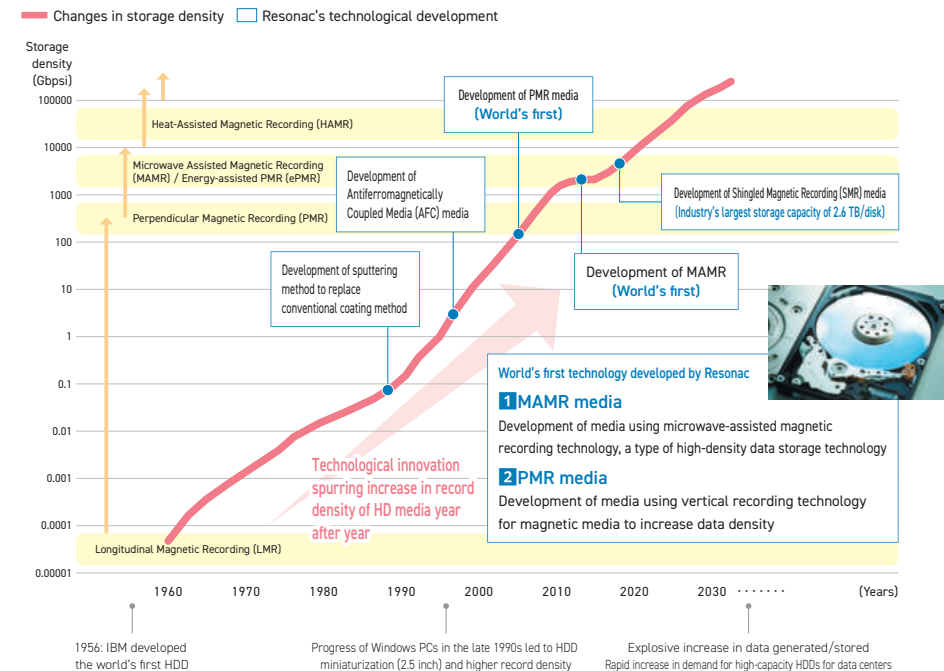
\*2 PCN (Product Change Notification): Notification on changes of product specifications and process changes

#### Introducing Advanced HD Media Technology to the Market ahead of Competitors as the World's Largest Manufacturer Specialized in HD Media, Making a Significant Contribution to Development of the Data Economy

With the spread of cloud services and the increase in video content, the amount of data generated and stored continues to increase dramatically worldwide, and data centers to store data require larger-capacity hard disk drives (HDDs). Resonac is a supplier of HD media, key components that determine the storage capacity of HDDs. For 35 years since we started our business in the late 1980s, we have continued to lead the world in providing and mass-producing HD media while always co-creating new technologies with our customers.

As a newly integrated company, Resonac will continue pursuing further technological innovation to realize higher-capacity HDDs and support the growing data economy.

#### Resonac's revolutionary technological development in HD media



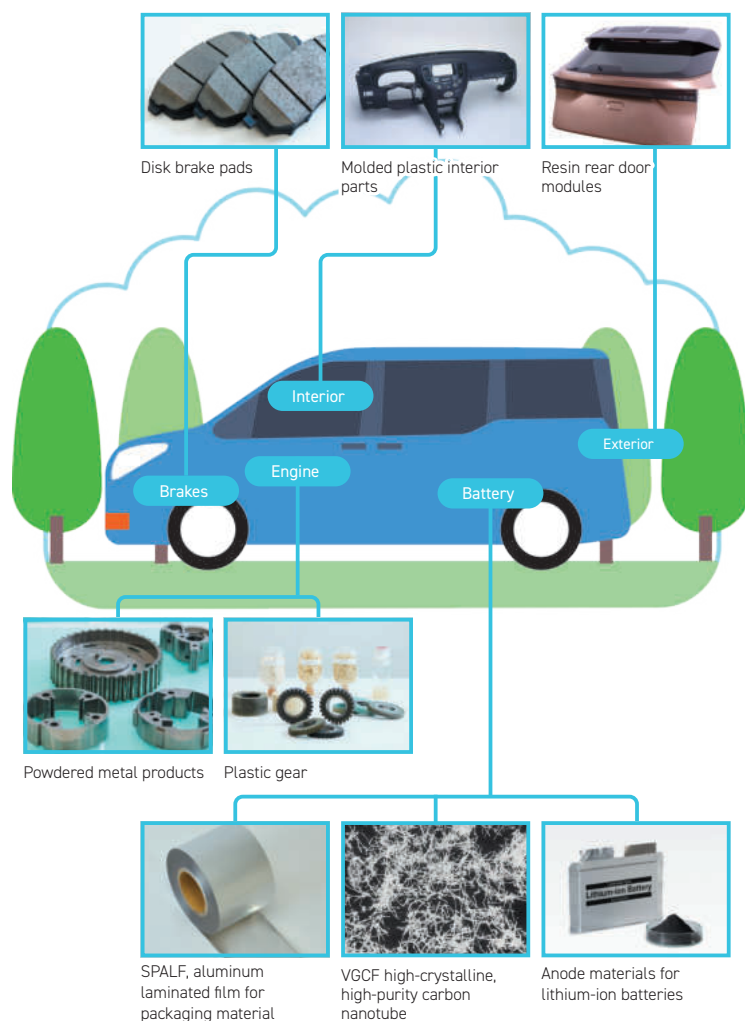




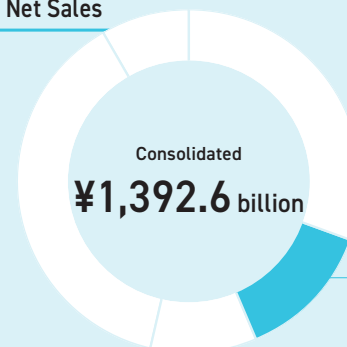
## Business Strategies

## Mobility

## Resonac products in everyday life



## Fiscal 2022 Net Sales



## Mobility Segment

Segment net sales

¥180.6 billion

Automotive products ¥146.4 billion

Lithium-ion battery materials ¥30.7 billion

Segment operating loss

¥(0.7 billion)

## Management Target

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

## Strategy for Realizing the Long-Term Vision

Currently, the Mobility segment is positioning the rising technological needs associated with CASE (connected cars, autonomous/automated driving, shared, and electric) technologies, particularly those related to the development of electrified vehicles, as a business opportunity. As a growth strategy, the segment is taking advantage of Resonac's weight reduction, electrification, and heat control technologies to develop business and achieve growth. On the other hand, for the business for internal combustion engine vehicles, whose market is expected to shrink, we will work to build a strong revenue base by optimizing production capacity and implementing measures for fixed costs. Through business portfolio management in this way, we aim to achieve our target of an EBITDA margin of 20% or more.

	Results in 2022	Plan for 2023	Vision for the future (2030)
Automotive products	<ul style="list-style-type: none"> <li>Performance lower than initial forecasts, reflecting a decrease in automobile production volume caused by supply shortages for semiconductors</li> <li>Commencement of production of rear door modules and copper-free disk pads for 12 new automobile models</li> <li>Split off of the ceramics business*1 and the insulating materials business</li> </ul>	<ul style="list-style-type: none"> <li>Higher sales and income, despite ongoing semiconductor shortages, due to the resumption of the recovery trend as we project for the second half of 2023</li> <li>Launch of foam molded products for new car models, plastic gears for new applications, copper-free disk pads, etc. Promotion of passing increased cost of raw material and energy on selling price</li> <li>Promotion of the establishment of a solid revenue base through structural reforms</li> </ul>	<ul style="list-style-type: none"> <li>Top share acquired through aggressive investment as a Core Growth business targeting niche markets</li> <li>EBITDA margin of 20% to be targeted as a Core Growth business</li> </ul>
Lithium-ion battery materials	<ul style="list-style-type: none"> <li>Expansion of a range of models using Resonac anode materials for battery-electric vehicles (BEVs) and development of new products</li> <li>Winning new projects for SPALF aluminum laminated film and expansion of production capacity for VGCF conductive additive</li> </ul>	<ul style="list-style-type: none"> <li>Development of new anode materials to respond to rapid charging performance and other technical needs of next-generation EVs</li> <li>Acquisition of certification for high-end SPALF models and steady expansion of production capacity and construction of a resilient supply chain for VGCF</li> </ul>	<ul style="list-style-type: none"> <li>Target of net sales of ¥115.0 billion to be achieved by incorporating rising needs associated with the advancement of CASE technologies and pursuit of carbon neutrality</li> </ul>

\*1 Former Hitachi Chemical's automotive and semiconductor fields



## Business Strategies: Mobility

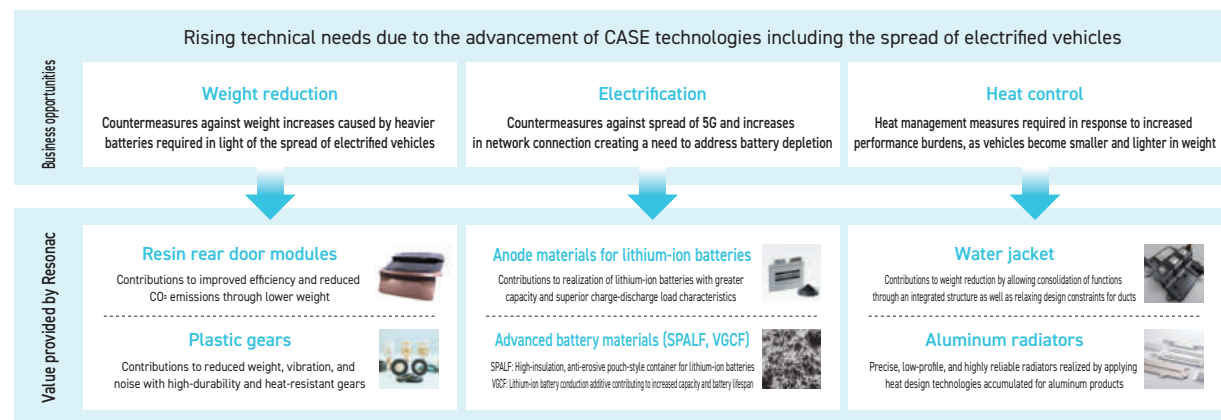
### Competitive Edge

The mobility market is currently in a period of great change. To work toward carbon neutrality and address social issues, numerous countries have set CO<sub>2</sub> emissions reduction targets and implemented stricter environmental regulations (excluding vehicles that use environmentally friendly fuels). This is driving growth in demand for electric vehicles (EVs). It has been estimated that EVs will increase to represent more than half of the cars on the road within 10 years. Among EVs, Resonac will be pursuing business growth by targeting battery-electric vehicles (BEVs), which will no doubt see growth over the long term.

The Mobility segment aims to expand its business by addressing the needs of the automotive market while positioning CASE-related needs as a key growth driver. This will require us to respond to new technical needs. Accordingly, Resonac will be offering a lineup of battery-related solutions to accommodate smaller, lighter-weight, and electrified vehicles; materials for controlling heat, sound, and electromagnetic waves; and modularization of components.

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

### Growth strategy for the mobility business

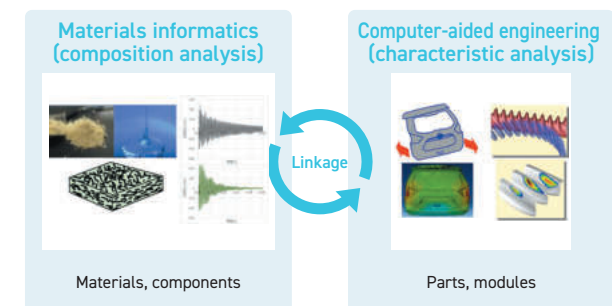


### Co-creation Case Study

DX

#### Reinforcement of Development Capabilities through Materials Informatics

Currently, strong emphasis is put on shorter development lead times, in addition to responses to changes in technical needs and values, such as the advancement of CASE technologies and the pursuit of carbon neutrality. To this end, major automobile manufacturers and suppliers are increasingly embracing model-based design, which entails simulating the terminal component functions and performance features necessary for overall automotive systems using virtual models. This design approach makes it possible to adopt a development style in which materials informatics is used to combine various materials selected from databases before computer-aided engineering methodologies are employed to perform analyses and thus conduct prototyping and testing in a virtual environment. For example, in the development of technology to improve the properties of lithium-ion battery materials, by utilizing model-based design, which applies the knowledge, experience, and manufacturing know-how we have cultivated over many years with our customers, we achieved a reduction of over 95% in the number of experiments, resulting in a shorter development lead time. Going forward, we will continue collaborating with industry-academic-government research institutions to develop materials and manufacturing processes and to perform verification tests in local facilities. Thus, we intend to continue supplying materials, components, and parts that are useful to society.



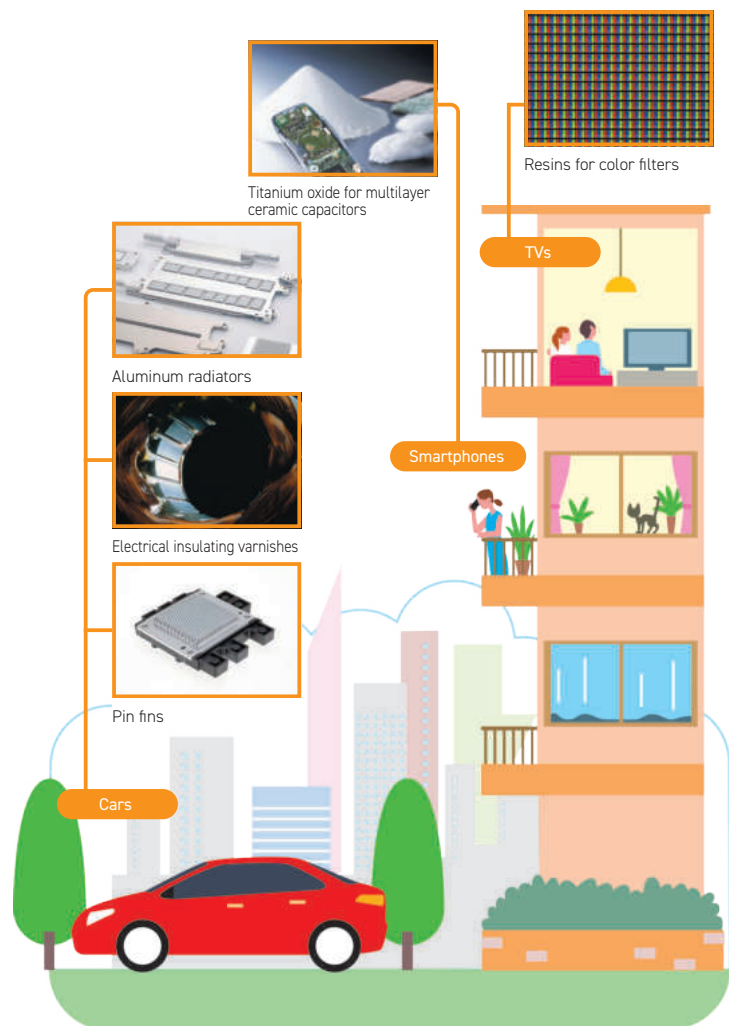
Resonac's Intended Approach toward Model-Based Design

## Business Strategies

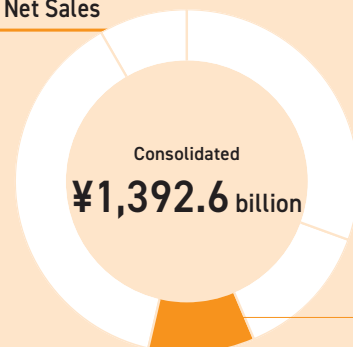


## Innovation Enabling Materials

## Resonac products in everyday life



## Fiscal 2022 Net Sales



## Innovation Enabling Materials segment

Segment net sales

¥141.1 billion

Segment operating income

¥10.1 billion

Management Target

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

## Strategy for Realizing the Long-Term Vision

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

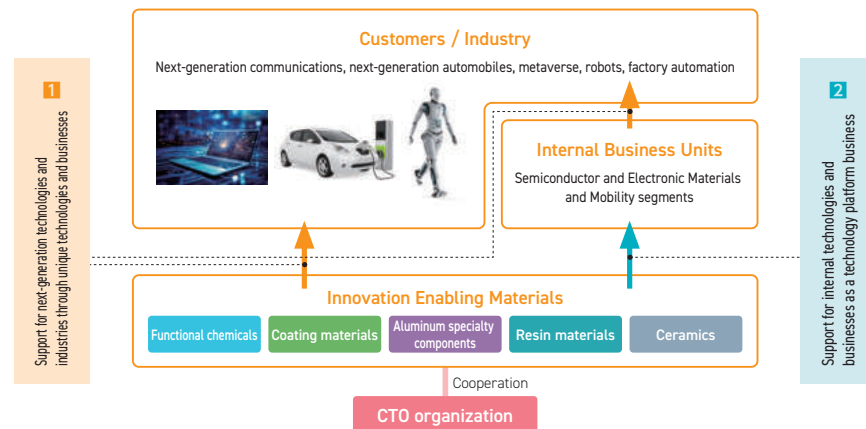
This segment strives to remain a step ahead of the changing times by supplying the organic, inorganic, aluminum, and other functional materials deemed valuable by the market. In this way, the Innovation Enabling Materials segment will become a vessel for the creation of new businesses over the medium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

	Results in 2022	Plan for 2023	Vision for the future (2030)
Functional chemicals	<ul style="list-style-type: none"> <li>Implementation of price revisions in response to rising costs</li> <li>Decline in profitability due to the impact of the lockdown in China and the decline in the electronic materials market from the second half of 2022</li> </ul>	<ul style="list-style-type: none"> <li>Increased income spread achieved through healthy transition of products</li> <li>Increased profit margin by expanding sales in high-value-added areas</li> </ul>	<ul style="list-style-type: none"> <li>Leader in specific sectors of the global market</li> <li>Provision of value to society through the ability to aggregate individual strengths</li> </ul>
Resin materials	<ul style="list-style-type: none"> <li>Implementation of price revisions in response to rising costs</li> <li>Enrichment of product lines for electrified vehicles</li> </ul>	<ul style="list-style-type: none"> <li>Implementation of improvements to the product sales mix achieved through a focus on the ratio of sales from new products</li> <li>Profit stabilization by linking raw material prices to selling prices</li> <li>Continued stable supply of products by building a resilient supply chain</li> </ul>	<ul style="list-style-type: none"> <li>Communication of the benefits of advanced functional materials meeting changes in social needs to help resolve social issues through internal and external efforts</li> </ul>
Coating	<ul style="list-style-type: none"> <li>Promotion of extension of the production system into other areas of the world</li> <li>Implementation of reform of the earnings structure</li> <li>Regarding consumer goods, decline in Europe and the U.S. and expansion in emerging countries (especially India)</li> </ul>	<ul style="list-style-type: none"> <li>Extension of the production system into other areas of the world</li> <li>Capturing of demand for eco-friendly products in light of environmental laws and regulations</li> <li>Expansion of sales channels for consumer products in emerging countries</li> <li>Expansion of scope of applications and regions of operation for industrial coating materials</li> </ul>	<ul style="list-style-type: none"> <li>Development of the non-stick coating business to become a major global player and creation of new businesses capitalizing on our insight into proprietary formulations</li> </ul>
Ceramics	<ul style="list-style-type: none"> <li>Decline in profitability due to decline of the electronic materials market</li> <li>Development of new products for electronic devices</li> <li>Greater generation of synergies between CMP slurry and heat dissipation materials</li> </ul>	<ul style="list-style-type: none"> <li>Securing of profit spread through flexible pricing according to the market trend</li> <li>Mass production of new products for electronic devices</li> <li>Improved productivity by strengthening cross-organizational functions among sites and integrated operations</li> </ul>	<ul style="list-style-type: none"> <li>Supply of first-rate ceramics products and services to customers that surpass their expectations and contribute to the resolution of social issues</li> </ul>
Aluminum specialty components	<ul style="list-style-type: none"> <li>Decline in demand due to parts shortages, particularly in semiconductors for automotive components</li> <li>Making improvement of forging line productivity manifest</li> <li>Promotion of reform of the earnings structure to ensure resilience to change in the operating environment</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of profit margin through price revisions and product mix improvement, including review of low-profit transactions</li> <li>Acquisition of certification for scrap alloys and processes contributing to reduction of CO<sub>2</sub> emissions</li> <li>Promotion of internal synergy of automotive components (electrification)</li> </ul>	<ul style="list-style-type: none"> <li>Creation of new value through the combination of aluminum with other materials</li> </ul>

## Business Strategies: Innovation Enabling Materials

### Competitive Edge

The competitive edge of the Innovation Enabling Materials segment lies in (1) its unique technologies and businesses that support next-generation technologies and industries and (2) its role as the technology platform business supporting technologies and businesses of internal business units. Regarding internal technological synergies, the segment aims to enhance the positioning of its unique technologies and businesses as well as its technological capabilities through collaboration with the Institute for Polymer Technology and the Stage for Co-Creation, which are parts of the CTO organization.



### Co-Creation Initiatives to Resolve Social Issues

#### Next-Generation Semiconductor Area

We are contributing to the growing need for 2.xD/3D mounting technology required to realize next-generation high-speed communications by providing advanced material technology.

##### Heat-dissipating fillers

High-thermal-conductivity fillers efficiently dissipate heat generated by high-density mounting and high-speed communication and contribute to miniaturization of electronic components.

##### Low-dielectric resin

Advanced low-dielectric resin design technology contributes to suppression of transmission loss in high-density mounting and high-speed communication areas.

##### Fine abrasive grains for CMP slurry

They are used in the surface planarization process for multilayering of circuits on semiconductor wafers and contribute to higher integration of semiconductors.

#### Mobility Area

In response to the growing needs for weight reduction, electrification, and thermal control in line with the progress of the trend toward electrified vehicles, the segment is providing advanced proprietary technologies and making a contribution.

##### Electrical insulating varnishes

In addition to promoting development of polyimide resin and other materials, we are strengthening the supply system in Japan and overseas and contributing to high voltage reliability of drive motors for electrified vehicles.

##### Adhesives for automotive application

High-strength and highly reliable adhesives between metal/resin and resin/resin and processing technologies contribute to vehicle body weight reduction.

##### Aluminum radiators

Improved heat dissipation and reliability of power modules through thermal performance simulation technology, aluminum alloy design technology, and processing technology contribute to electrification of automobiles.

### Topics

## Innovation Achieved through Integration of Showa Denko and Hitachi Chemical

### Revival of Low-Dielectric Resin Whose Commercialization was Once Abandoned



**Daisuke Fujimoto**  
Packaging Materials Research Department,  
Institute for Polymer Technology

When the decision was made to integrate the two companies, I was engaged in R&D of materials for 5G and 6G at the former Hitachi Chemical and had an opportunity to mutually share the technologies between the two companies. In the course of numerous discussions, I came across the former Showa Denko's low-dielectric resin, which had been abandoned 20 years ago because it was difficult to use, and recognized its superior characteristics that outweighed its shortcomings. Transcending the organizational boundaries, we mastered the technology, and by reflecting in our ongoing investigations what we had learned, my team was able to successfully improve the performance of low-dielectric resin. I think we were able to recognize the potential of dormant technology, because we had been a user of products of the former Showa Denko. I continue to enjoy discovering technologies that can be utilized in future development and creating new value with them.

### New Value of Pin Fins Unlocked by AI Deep Learning



**Rio Anzai**  
Automation Technology Promotion Department  
Plant Solutions Center  
Engineering Division



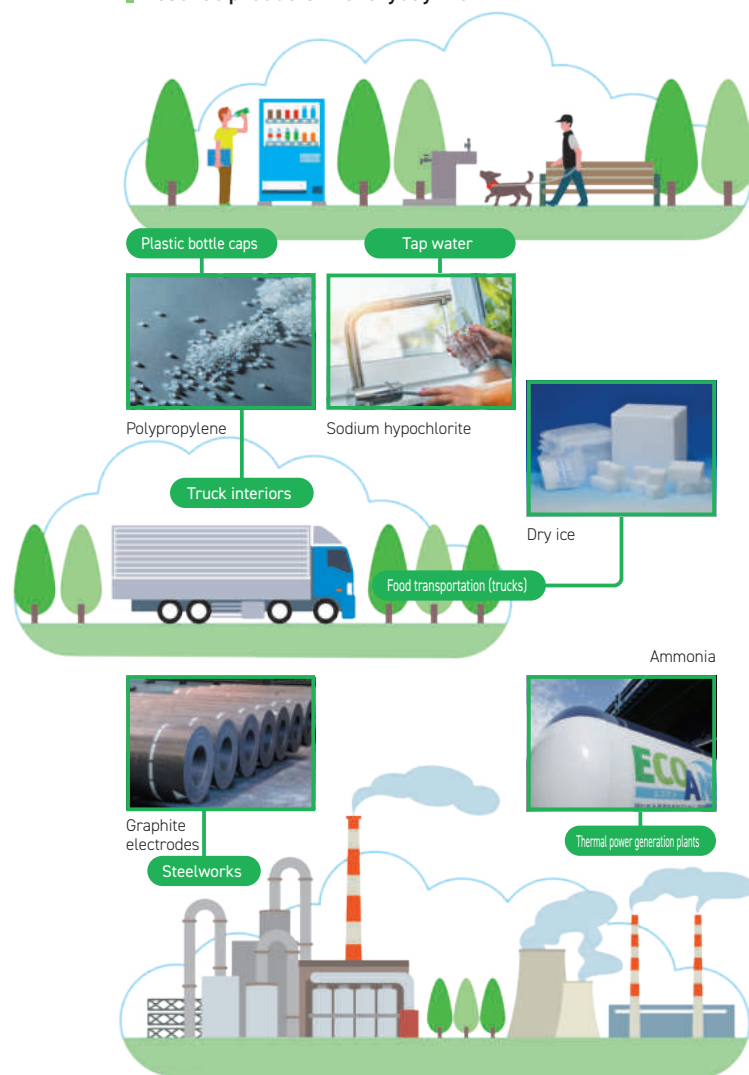
**Yusuke Takeuchi**  
Aluminum Specialty Components Business Unit  
High Performance Materials Business  
Headquarters

Pin fins, aluminum specialty components of the former Showa Denko, became the first product that transitioned to the mass-production phase, utilizing automatic inspection technology employing AI deep learning, which the former Hitachi Chemical spent more than five years developing. It all started when, at a technical results presentation held prior to the official integration of the two companies, we realized the potential for deploying elemental technologies in the product inspection process of pin fins. With technology enhanced to a level outstripping commonsense expectations for the pin fin team, the study is progressing far faster than we had imagined possible, and we are excited about prospects for future development.

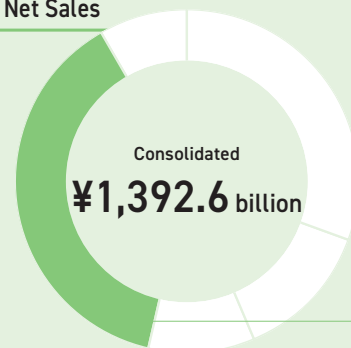
## Business Strategies

## Chemicals

## Resonac products in everyday life



## Fiscal 2022 Net Sales



## Chemicals segments

Segment net sales

¥527.8 billion

Olefins and Derivatives ¥324.7 billion

Basic Chemicals and Industrial Gases ¥87.1 billion

Graphite Electrodes ¥115.7 billion

Segment operating income

¥24.9 billion

Management Target

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

## Strategy for Realizing the Long-Term Vision

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

	Results in 2022	Plan for 2023	Vision for the future (2030)
<b>Olefins and Derivatives</b>	<ul style="list-style-type: none"> <li>Decrease in sales volume as a result of shutdown maintenance conducted once every four years</li> <li>Year-on-year increase in sales due to higher sales prices in line with the soaring price for naphtha</li> <li>Year-on-year decrease in operating income due to lower sales volume and sluggish market</li> </ul>	<ul style="list-style-type: none"> <li>Increase in sales volume because of no shutdown maintenance in 2023, optimization of plant operation by swiftly responding to the trend of supply and demand</li> <li>Promotion of sales expansion of high-margin products and expansion of technology licensing business</li> <li>Promotion of initiatives to reduce CO<sub>2</sub> emissions</li> </ul>	<ul style="list-style-type: none"> <li>Improvements to profitability and efforts to limit volatility in earnings</li> <li>Reduction of 30% in CO<sub>2</sub> emissions from the Oita Petrochemical Complex in comparison to 2013</li> </ul>
<b>Basic chemicals and industrial gases</b>	<ul style="list-style-type: none"> <li>Vigorous promotion of price pass-on in response to increased costs due to rising raw material and fuel prices</li> <li>Trend toward full capacity utilization reflecting strong demand and operating income level remained robust</li> <li>Confirmation that greenhouse gas emissions from production of ammonia from used plastic are at least 80% less than in the case of conventional methods <a href="#">Web</a></li> </ul>	<ul style="list-style-type: none"> <li>Forecast of strong demand and maintaining of high capacity utilization</li> <li>Logistics environment to improve and surge in raw material and fuel prices to slow down</li> <li>Acquisition of ISCC PLUS certification, an international certification system for sustainable products, in March 2023 for three products, namely, ammonia, hydrogen, and acrylonitrile, made from raw materials derived from used plastics <a href="#">Web</a></li> </ul>	<ul style="list-style-type: none"> <li>Substantial reduction of CO<sub>2</sub> emissions (raw materials for KPR* to be 100% plastic, fuel conversion of power generation facilities at the Kawasaki Plant)</li> <li>Creation of a hydrogen use network together with companies near the coastal area of Kawasaki City</li> <li>Initiatives for resource recycling in Kawasaki City (utilization of used plastics)</li> </ul>
<b>Graphite electrodes</b>	<ul style="list-style-type: none"> <li>Higher performance due to improved unit sales prices amid declining demand</li> <li>Establishment of strategic relationships with customers and promotion of conclusion of long-term sales contracts</li> <li>Greater use of renewable energy to reduce CO<sub>2</sub> emissions</li> </ul>	<ul style="list-style-type: none"> <li>Capturing of growing demand for electric furnaces for decarbonization, strengthening of the supply system for and increase in market share of large-diameter electrodes (28-inch and larger)</li> <li>Provision of services to optimize electric furnace operation through AMI, an affiliate (engaged in sale of electric furnace operation optimization software) and enhancement of the value provided to customers through sales of the highest quality graphite electrodes</li> <li>Decarbonization of manufacturing processes through the use of hydrogen fuels, etc.</li> <li>Promotion of conclusion of long-term stable procurement contracts for raw materials</li> </ul>	<ul style="list-style-type: none"> <li>Supply of the highest quality graphite electrodes worldwide, as the overwhelming No. 1 global manufacturer, to support electric furnace production and economic growth around the world.</li> <li>Promotion of decarbonization of manufacturing processes to supply clean electrode products with virtually zero emissions</li> </ul>

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

## Business Strategies: Chemicals

### Competitive Edge

	Olefins and Derivatives	Basic chemicals and industrial gases	Graphite electrodes
Policies	We will seek to boost competitiveness and help achieve carbon neutrality in 2050 based on our vision of developing a sustainable business that consistently generates high profits.	Collectively naming Resonac plants in the Kawasaki area Kawasaki Chemical Park, we are laying the foundation for realization of our vision.	By supplying the world's best electrodes coupled with unparalleled services, we will promote efficient and eco-friendly steel recycling and thereby contribute to the sustainable development of society.
Major Products	Olefins, organic chemicals	Industrial gases, basic chemicals	Graphite electrodes
Business Strengths	<ul style="list-style-type: none"> <li>The Oita Petrochemical Complex is located in close proximity to the Asian market, giving this export base one of the greatest geographical advantages in Japan in terms of logistics.</li> <li>The capacities of our equipment and our operating track record enable us to accommodate a diverse range of ethylene feedstocks, giving us the ability to respond flexibly to changes in the volatile raw material market.</li> <li>We boast a lineup of unique acetyl derivatives (ethyl acetate, n-Propyl acetate, and allyl alcohol) that take advantage of proprietary catalysts and processes, and we hold high shares in the Japanese market for these products.</li> <li>Our stable lineup of olefin derivatives (polyethylene, polypropylene, etc.) make us competitive in high-value-added fields.</li> <li>Development is underway for a low-concentration CO<sub>2</sub> separation system employing an innovative separation agent to further our quest toward carbon neutrality in 2050 <a href="#">P87</a></li> </ul>	<ul style="list-style-type: none"> <li>Capitalizing on the advantageous urban location of the Kawasaki Plant, we are catering to needs for a diverse range of functional chemicals, including basic chemicals that support everyday life, industrial gases, fiber materials, and medical and agricultural materials.</li> <li>Chemical recycling technologies are being utilized to produce ammonia using hydrogen extracted from used plastic. We have been maintaining stable commercial production for 20 years and the cumulative volume of used plastic recycled has exceeded one million tons.</li> <li>Ammonia produced by Resonac from used plastics is low-carbon ammonia whose greenhouse gas emissions during production are at least 80% less than those from conventional production methods.</li> <li>We are expanding chemical recycling for raw materials to include not only used plastics but also used clothing and other textile products and are promoting collaboration with a trading company and the apparel industry. <a href="#">P87</a></li> </ul>	<ul style="list-style-type: none"> <li>With production bases in six countries, we are able to stably produce and supply graphite electrodes in Europe, the United States, and Asia.</li> <li>Local production and consumption eliminate long-distance transportation and country risk, ensuring stable supply.</li> <li>We sell high-quality electrodes to more than 200 customers around the world while, at the same time, providing support services for electric furnace operation through AMI, thereby helping our customers improve the efficiency of their electric furnace operations and providing value that only we can offer. <a href="#">P88</a></li> <li>We will establish a production and supply system for large-diameter products of 28 inches or larger in order to respond to the expected shift of steel production from blast furnaces to electric furnaces and to the increasing scale of electric furnace production as a result of the trend toward decarbonization.</li> <li>We will focus on supplying environmentally friendly and clean graphite electrodes by vigorously promoting the use of a hydroelectric power plant we own in Omachi City, Nagano Prefecture, renewable energy in Europe, and other measures to reduce CO<sub>2</sub> emissions. <a href="#">P60</a></li> </ul>

#### Topics

### Kawasaki Chemical Park



The Kawasaki Plant aspires to be a platform where basic chemicals and high-value-added derivative businesses coexist and prosper together, with strong cost competitiveness based on a safe, stable, and secure business operation, and refers to its vision as "Kawasaki Chemical Park." In addition to the business development and manufacturing capabilities accumulated in the course of many years of business activities, the Kawasaki Plant will lay new foundations and acquire new skills in order to adapt to the times, aiming to become a plant capable of carrying out business activities that meet the needs of the times in a timely manner.

### Vision and competitiveness of Kawasaki Chemical Park

Sustainability to  
inspire the world

Sustainability to  
transform society

Sustainability to  
compete in the world

Business development capabilities to respond to needs of the times

- Development and commercialization of new derivatives
- Development and commercialization of high-value-added products

Production foundations / manufacturing capabilities

- [Hardware aspect] Strong infrastructure, including electricity, gas, and water supply, to support chemical plants
- [Software aspect] Procurement and logistics, security and disaster prevention, maintenance design, and human resource development accumulated through many years of experience



## Business Strategies: Chemicals

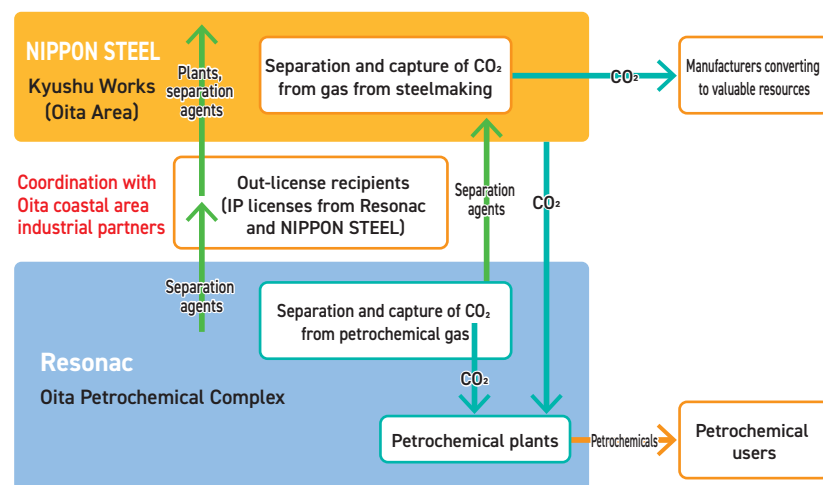
### Co-Creation Initiatives to Resolve Social Issues

Olefins and Derivatives

Web

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

Resonac has teamed up with NIPPON STEEL CORPORATION and Kyoto University and five other national universities in a co-creative venture to develop a low-concentration CO<sub>2</sub> separation system that employs an innovative separation agent. In May 2022, this initiative was adopted for the CO<sub>2</sub> separation and capture technology development project of NEDO under its Green Innovation Fund, and full-scale technology development began in October 2022. By using structure-flexible porous coordination polymer (PCP), which is completely different from the porous materials (zeolite, activated carbon, etc.) used in existing separation agents, we are developing technologies and processes for the low-cost separation and capture of low-pressure, low-concentration CO<sub>2</sub> from sources such as factory exhaust gas, while verifying the feasibility of technologies for producing chemical products from captured CO<sub>2</sub>. We anticipate that these technologies will allow us to develop and grow CO<sub>2</sub> separation and capture plant operations and separation agent operations. The technology is also expected to give rise to chemical business models that use CO<sub>2</sub> and are thus not dependent on fossil resources, and thereby contribute to carbon neutrality.



Basic Chemicals and Industrial Gases

#### Commercialization of Low-Carbon Hydrogen for a Hotel

As part of a demonstration project of the Ministry of the Environment launched in 2015, the Company has been supplying low-carbon hydrogen to Kawasaki King Skyfront Tokyu REI Hotel since June 2018. Following completion of the demonstration project in 2022, the hotel decided to upgrade its fuel cell facility, and commercial supply of low-carbon hydrogen produced by Resonac will start upon the completion of installation of the new facility by the end of 2023.



Kawasaki King Skyfront Tokyu REI Hotel

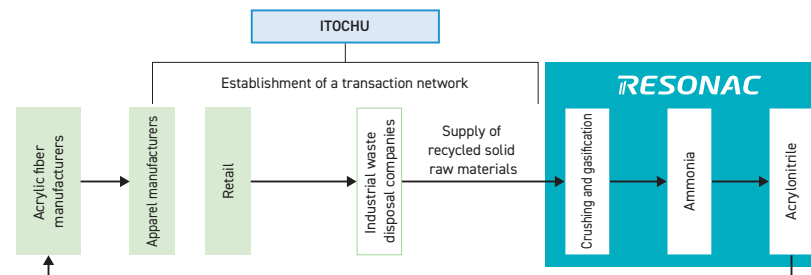
We are supplying the new facilities with low-carbon hydrogen produced from used plastics, which constitute part of the raw materials, via a pipeline. The electricity, heat, and other energy generated by this facility is equivalent to about 15% of the energy used by the hotel.

#### Collaboration with ITOCHU Corporation in Textile Recycling in the Chemical Recycling Business

Resonac announced conclusion of a memorandum of understanding with ITOCHU regarding the ARChemia recycling project in March 2023. The objective is to include used textiles, such as clothing, as raw materials for the plastic chemical recycling business at the Kawasaki Plant (KPR), in addition to used plastics.



Resonac transforms recycled solid raw materials, a mixture of used plastics and textiles, into raw materials for textiles, such as acrylonitrile, leading to resolution of waste-related social issues and contributing to realization of a fiber-to-fiber recycling society.



## Business Strategies: Chemicals

### Co-Creation Initiatives to Resolve Social Issues

#### Graphite Electrodes

#### Project to Maximize Value of Co-Creation by AMI and Resonac Graphite through Digital Solutions

Resonac Graphite (RG) is the No. 1 global manufacturer of the graphite electrodes that are indispensable for the electric furnaces used to melt iron scrap in the steelmaking process. Following the acquisition of a stake in Mexico-based AMI Automation, a provider of services for optimizing the operation of electric furnaces, in 2021, RG will make AMI Automation a wholly-owned subsidiary in the third quarter of 2023. Through this partnership, RG is able to provide customers with unique and advanced digital solutions to help them achieve the best performance in the operation of their electric furnaces. By building strong partnerships with its customers, RG will stabilize its graphite electrode business and strengthen its position as a world leader. In 2022, the transformed business model started to yield good results in the North America and Southeast Asia regions.

In December 2022, the Resonac AMI Synergy Project (RAS1 Project) was launched to take the global co-creation strategy to the next level, and discussions by global members selected from both AMI and RG are in full swing. In line with making AMI a wholly-owned subsidiary, through more intense and integrated co-creation by our multinational team, we aim to transform ourselves into a service provider that further strengthens our global No. 1 position in the electrode business as a partner (Digital Enabler) supporting customers' digitalization.



RAS1 Project members drawn from both AMI and RG worldwide

DX

#### Strengths created by combination of Resonac and AMI



#### Topics

#### Prospects for Utilization of AMI Human Resources Going Beyond the Graphite Business

AMI has approximately 200 digital transformation-related engineers, including about 20 AI engineers. Digital transformation of the entire Resonac Group will be accelerated in collaboration with the Research Center for Computational Science and Informatics, which specializes in computational and information science, the source of Resonac's strengths in digital transformation, and the CDO organization promoting digital transformation activities. In addition to provision of operation optimization systems for electric furnaces, AMI also offers production automation and control solutions for a wide range of industries, including paper, cement, and petroleum. Going forward, we will also promote joint projects to support manufacturing frontlines.