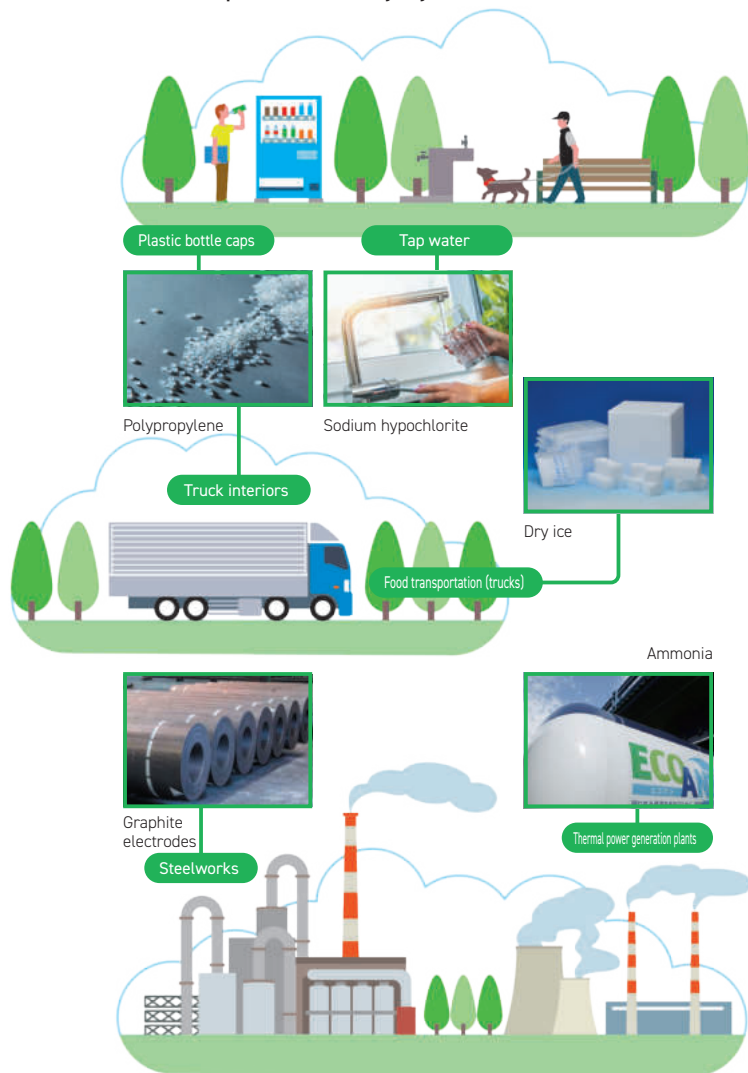




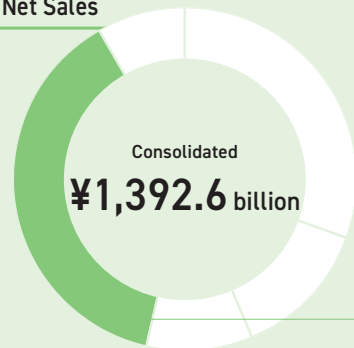
Business Strategies

Chemicals

Resonac products in everyday life



Fiscal 2022 Net Sales



Chemicals segments

Segment net sales

¥527.8 billion

Segment operating income

¥24.9 billion

Management Target

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

Olefins and Derivatives **¥324.7 billion**

Basic Chemicals and Industrial Gases **¥87.1 billion**

Graphite Electrodes **¥115.7 billion**

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)
Olefins and Derivatives	<ul style="list-style-type: none"> Decrease in sales volume as a result of shutdown maintenance conducted once every four years Year-on-year increase in sales due to higher sales prices in line with the soaring price for naphtha Year-on-year decrease in operating income due to lower sales volume and sluggish market 	<ul style="list-style-type: none"> 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 Promotion of sales expansion of high-margin products and expansion of technology licensing business Promotion of initiatives to reduce CO₂ emissions 	<ul style="list-style-type: none"> Improvements to profitability and efforts to limit volatility in earnings Reduction of 30% in CO₂ emissions from the Oita Petrochemical Complex in comparison to 2013
Basic chemicals and industrial gases	<ul style="list-style-type: none"> Vigorous promotion of price pass-on in response to increased costs due to rising raw material and fuel prices Trend toward full capacity utilization reflecting strong demand and operating income level remained robust Confirmation that greenhouse gas emissions from production of ammonia from used plastic are at least 80% less than in the case of conventional methods Web 	<ul style="list-style-type: none"> Forecast of strong demand and maintaining of high capacity utilization Logistics environment to improve and surge in raw material and fuel prices to slow down 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 Web 	<ul style="list-style-type: none"> Substantial reduction of CO₂ emissions [raw materials for KPR* to be 100% plastic, fuel conversion of power generation facilities at the Kawasaki Plant] Creation of a hydrogen use network together with companies near the coastal area of Kawasaki City Initiatives for resource recycling in Kawasaki City (utilization of used plastics)
Graphite electrodes	<ul style="list-style-type: none"> Higher performance due to improved unit sales prices amid declining demand Establishment of strategic relationships with customers and promotion of conclusion of long-term sales contracts Greater use of renewable energy to reduce CO₂ emissions 	<ul style="list-style-type: none"> 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) 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 Decarbonization of manufacturing processes through the use of hydrogen fuels, etc. Promotion of conclusion of long-term stable procurement contracts for raw materials 	<ul style="list-style-type: none"> 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. Promotion of decarbonization of manufacturing processes to supply clean electrode products with virtually zero emissions

*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"> 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. 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. 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. Our stable lineup of olefin derivatives (polyethylene, polypropylene, etc.) make us competitive in high-value-added fields. Development is underway for a low-concentration CO₂ separation system employing an innovative separation agent to further our quest toward carbon neutrality in 2050 P87 	<ul style="list-style-type: none"> 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. 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. 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. 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. P87 	<ul style="list-style-type: none"> With production bases in six countries, we are able to stably produce and supply graphite electrodes in Europe, the United States, and Asia. Local production and consumption eliminate long-distance transportation and country risk, ensuring stable supply. 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 AML, thereby helping our customers improve the efficiency of their electric furnace operations and providing value that only we can offer. P88 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. 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 CO₂ emissions. P60

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

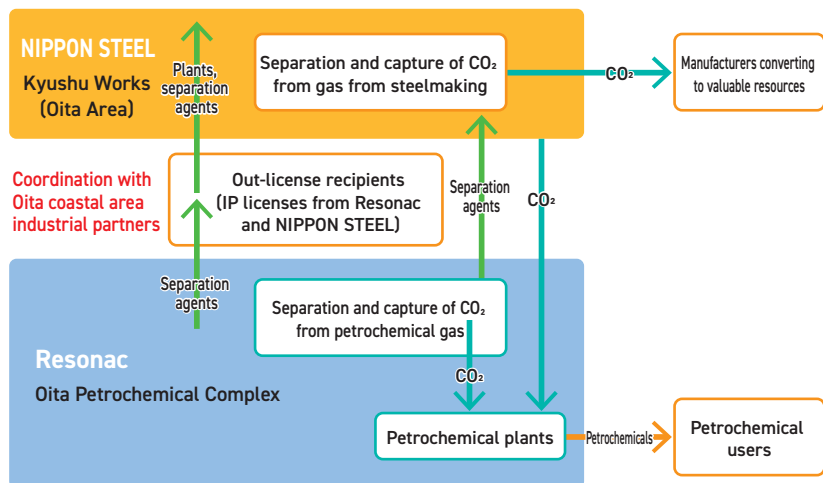
Business Strategies: Chemicals

Co-Creation Initiatives to Resolve Social Issues

Olefins and Derivatives 

CO₂ 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 CO₂ separation system that employs an innovative separation agent. In May 2022, this initiative was adopted for the CO₂ 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 CO₂ from sources such as factory exhaust gas, while verifying the feasibility of technologies for producing chemical products from captured CO₂. We anticipate that these technologies will allow us to develop and grow CO₂ separation and capture plant operations and separation agent operations. The technology is also expected to give rise to chemical business models that use CO₂ 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

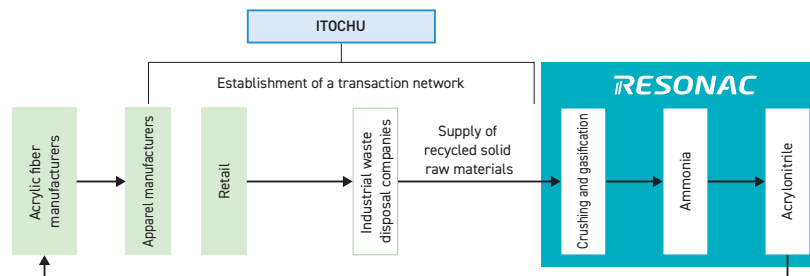
We are supplying the new facilities with low-carbon hydrogen produced from used plastics, which constitute part of the raw materials, via a pipeline. The electricity, heat, and other energy generated by this facility is equivalent to about 15% of the energy used by the hotel.

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

DX

Project to Maximize Value of Co-Creation by AMI and Resonac Graphite through Digital Solutions [Web](#)

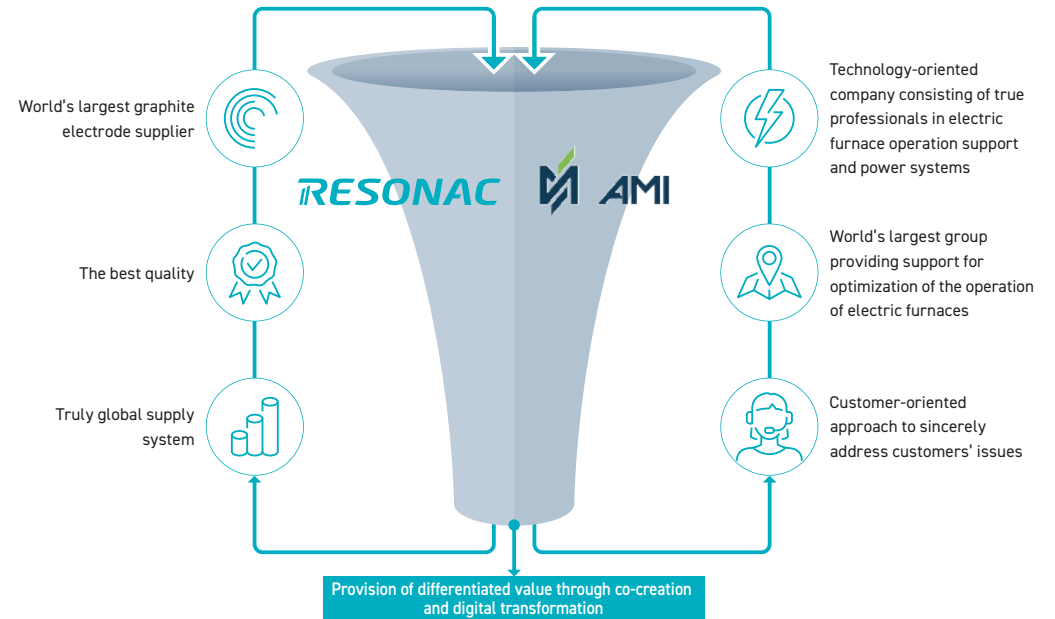
Resonac Graphite (RG) is the No. 1 global manufacturer of the graphite electrodes that are indispensable for the electric furnaces used to melt iron scrap in the steelmaking process. Following the acquisition of a stake in Mexico-based AMI Automation, a provider of services for optimizing the operation 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

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.