

Value Creation at the Hitachi Metals Group

For us, creating value for our customers means providing help to solve social issues in various fields and leads to enhanced corporate value.

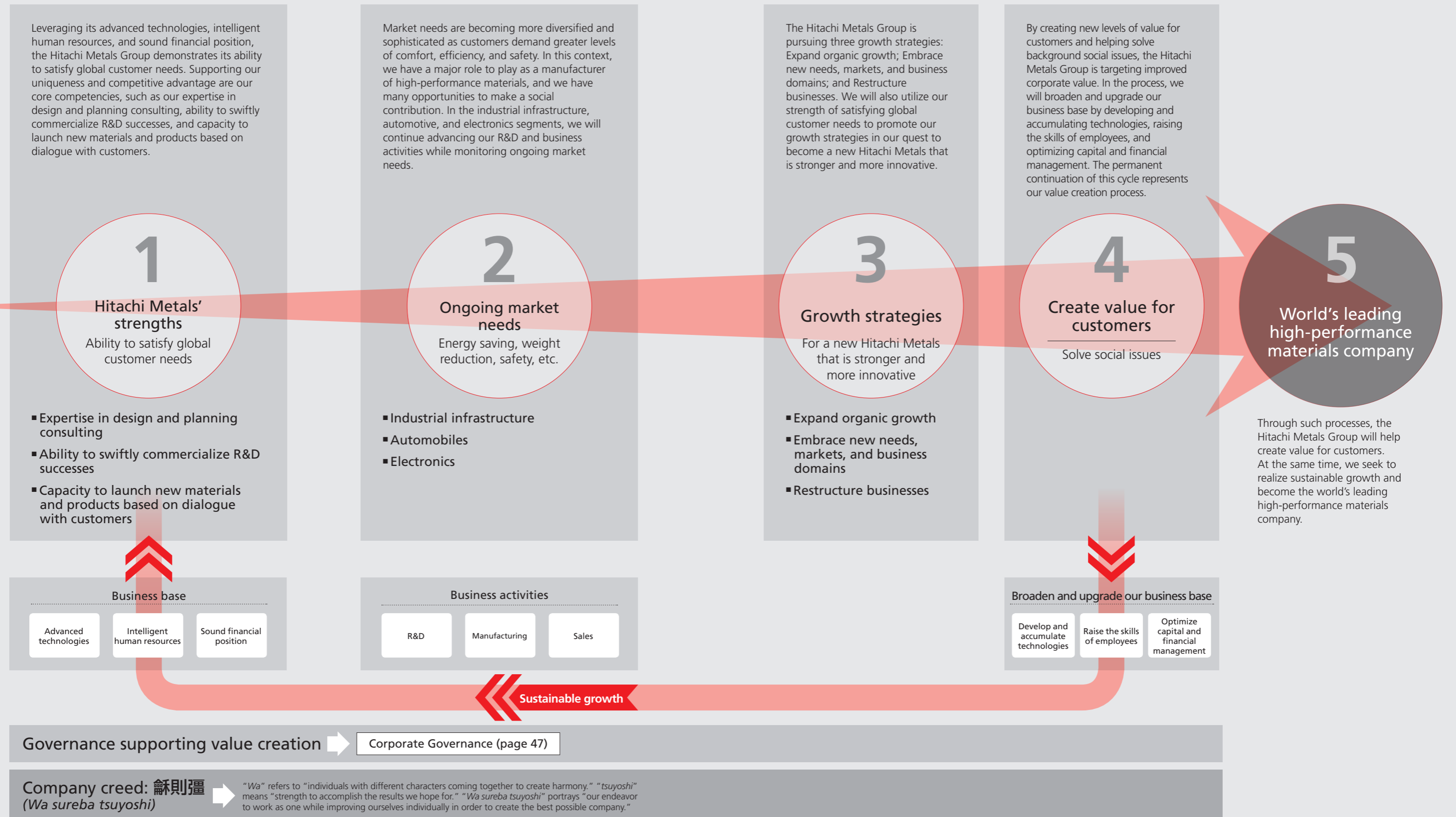
In this section, we explain the value creation process of the Hitachi Metals Group as a whole and describe our strengths—the source of value creation. We then introduce specific initiatives to address ongoing future needs and describe the progress of our materiality analysis.

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The Hitachi Metals Group's Value Creation Process

In these ever-changing times, the Hitachi Metals Group constantly monitors the requirements of customers and markets and supplies advanced new products and technologies that are at the forefront of their era. For us, creating value for our customers means providing help to solve social issues in various fields and leads to enhanced corporate value. Through this process of value creation, we embrace the challenge of becoming the world's leading high-performance materials company.



Business Bases Embodying the Hitachi Metals Group's Strengths

The keys to the Hitachi Metals Group's strengths are its "advanced technologies" and "intelligent human resources." Since our foundation, our widely knowledgeable personnel have maintained a commitment to quality. Rather than keeping pace with and following the competition, we develop a wide range of products brimming with creativity and backed by advanced technologies, to meet the needs of customers all over the world.

Business base 1

Advanced Technologies

In addition to exploiting our knowledge about the characteristics of various materials to pursue extremely high-quality core technologies and enhance quality, we have *monozukuri* skills that enable us to create and mass-produce items that meet customers' needs. We deploy these capabilities to achieve "mass production of quality" and support value creation at the Hitachi Metals Group.

By exhaustively targeting "mass production of quality" in this way, we have achieved the top market share in our fields of focus.

Mass production of quality

Core technologies

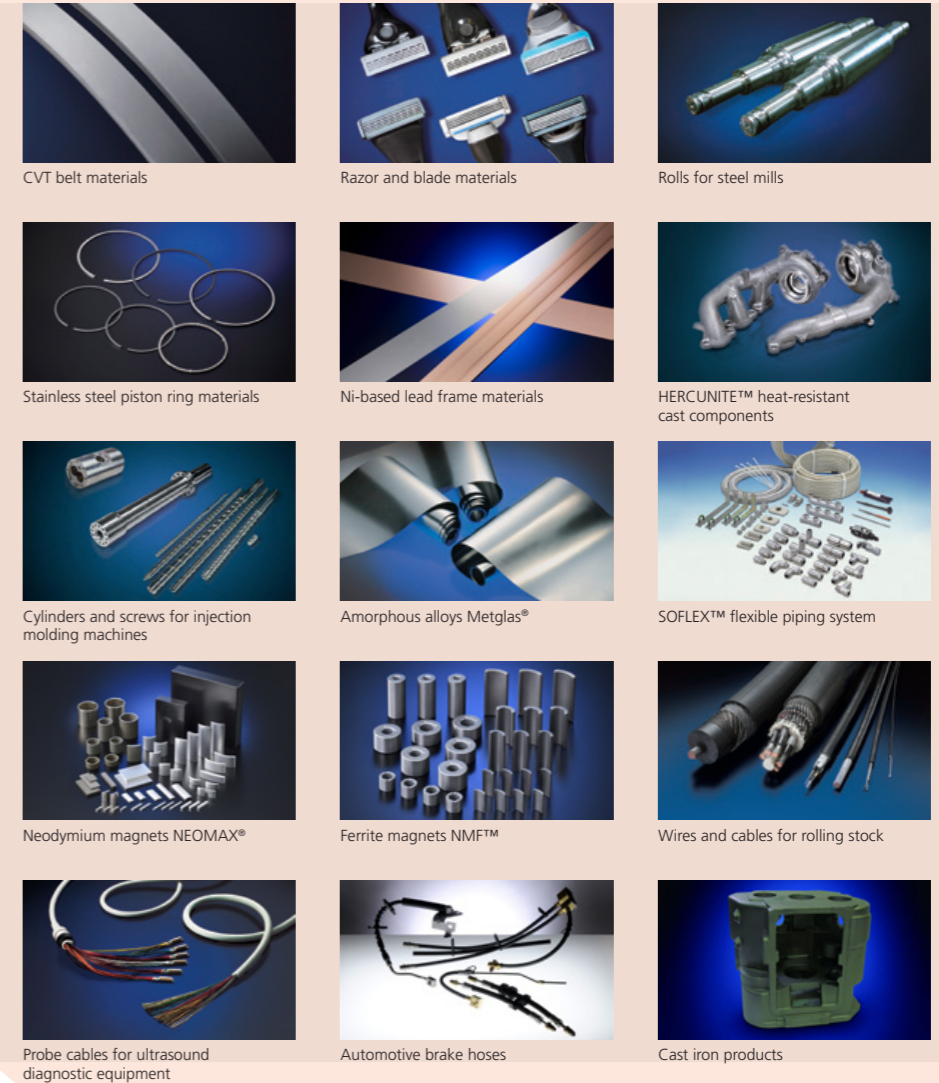
Technologies and ideas to extract materials' maximum performance

- Alloys and design technologies
- Manufacturing and processing technologies
- Analysis/evaluation technologies

Monozukuri skills

- Industry-leading production capacity
- Industry-leading cost competitiveness

Top market share achieved



Business base 2

Intelligent Human Resources

Human resources are central to the foundation of value creation. Sharing the Group's corporate creed of "*Wa sureba tsuyoshi*," each and every employee demonstrates unique attributes to achieve growth and harnesses strengths to overcome difficulties. In these ways, we are creating new levels of value globally.

和則強

Wa sureba tsuyoshi

Individual strengths

Diversity

Shared values

Initiatives focused on

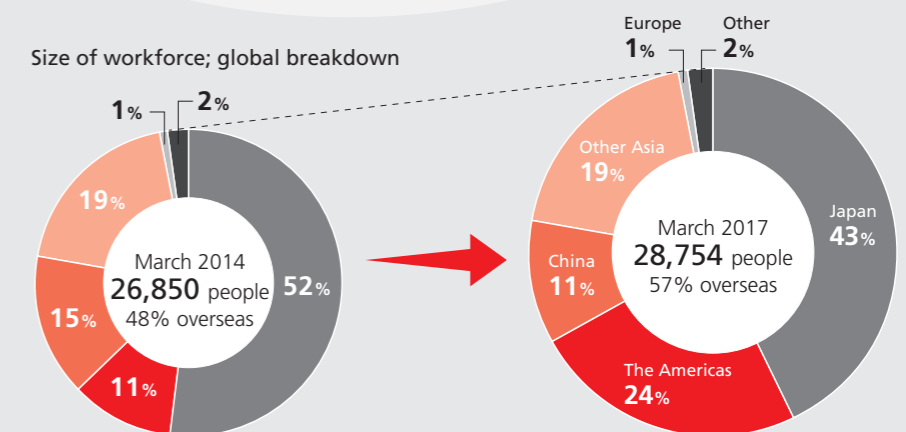
Promoting human resource management globally

Promoting human resource diversity and work style reforms

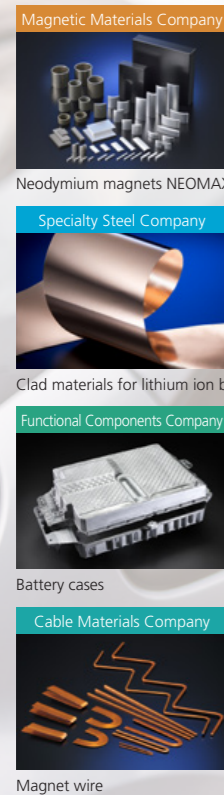
Sharing a common global philosophy

For more details about these initiatives, please refer to page 56.

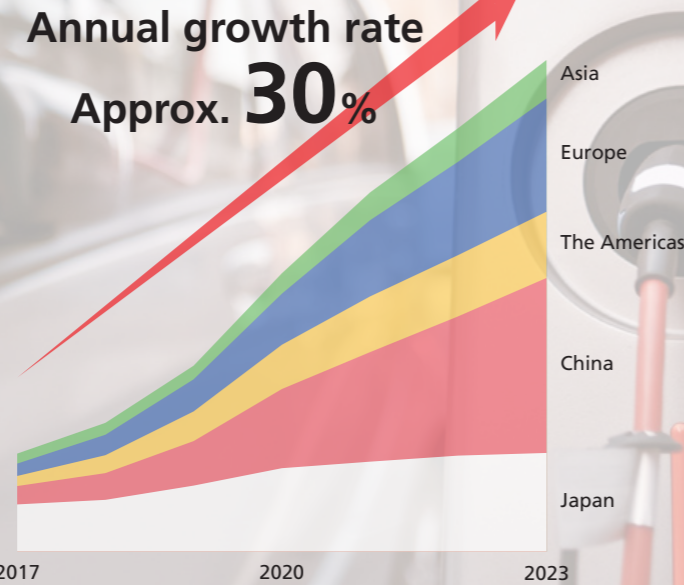
Size of workforce; global breakdown



Contributing to innovation in xEV*



Projection of HEV and EV production (As of March 31, 2016)



Source: Company estimates, based on various materials

* General term for electric vehicles (EVs), hybrid electric vehicles (HEVs), and plug-in hybrid electric vehicles (PHEVs).

Deploying advanced technologies and innovative production lines to address demand and expedite growth globally

Environmental regulations in various countries boosting demand for xEVs

The markets for xEVs are rapidly expanding in various nations amid tightening regulations governing CO₂ emissions and fuel efficiency. Due to significantly increasing demand in the Americas, Europe, and China, we expect the global market to grow around 30% per year until 2023.

The U.S. state of California has enacted regulations whereby a certain percentage of automobiles sold must be zero emission vehicles (ZEVs). Moreover, the state is expected to tighten those regulations in 2017. In conjunction with this, every automaker in the Americas is expected to expedite development of various models, including plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs). In Europe, meanwhile, the UK and France have declared they will prohibit domestic sales of gasoline and diesel vehicles by 2040.

Even in China, the world's largest automobile market since 2009, the market is growing sharply because of subsidies for EV purchases. Moreover, that nation announced its "Energy-efficient and new-energy vehicles industry development plan," which targets xEV production of 5 million units by 2020.

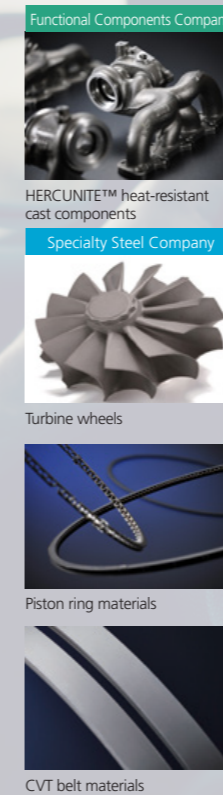
Addressing vibrant demand through innovative production lines and products from our internal companies

NEOMAX®, a core product of the Magnetic Materials Company, has been highly acclaimed in the market as the

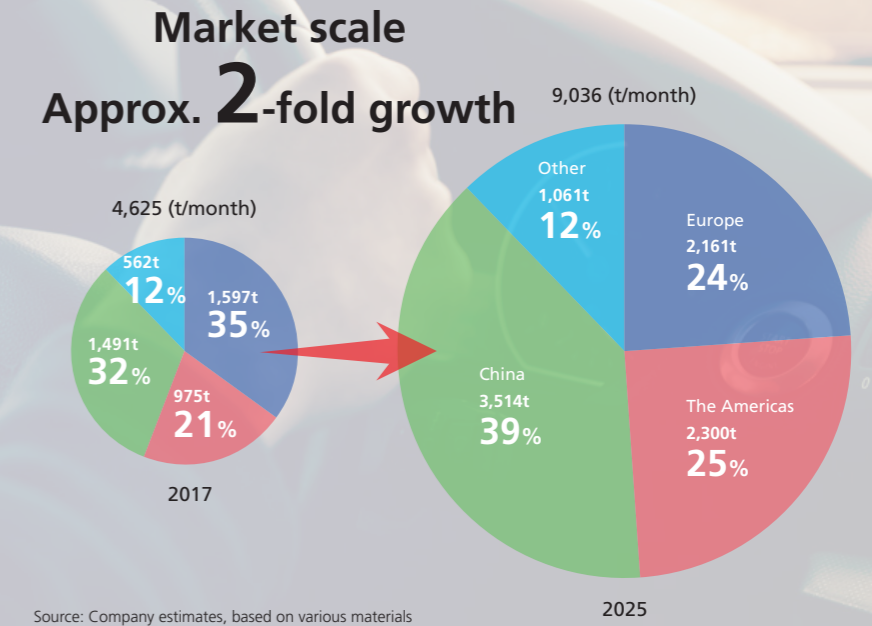
world's leading brand of neodymium magnets used in hybrid electric vehicles (HEVs) and EV drive motors. To address worldwide growth of the new-energy vehicle market, we are building innovative production lines and reinforcing our global production system with the start of mass production in a joint venture in China, in a plan to meet increasing customer needs. In building our innovative production lines, we are using IoT technologies to introduce real data management while strongly promoting quality consistency and high-efficiency production. We will also enhance competitiveness from the material flow perspective, by increasing technology to limit the use of heavy rare earth elements to significantly reduce use of those elements, as well as by using proprietary technologies to solidly establish recycling processes.

Further, the Specialty Steel Company offers soft magnetic materials, which are widely used in cladding materials for batteries—including use in current-collecting clad foils of lithium ion batteries to meet increasing capacity requirements—as well as use in electromagnetic compatibility (EMC) and noise-reduction parts. Meanwhile, the Functional Components Company offers battery cases, and the Cable Materials Company's products include magnetic wire incorporating proprietary technologies that contribute to advances in compactness and the longevity of motors. With abundant product lineups offered by our internal companies, we will meet the vibrant demand for xEV.

High value-added functions to enhance energy efficiency of gasoline-powered vehicles



Projection of market scale for heat-resistant cast components



Source: Company estimates, based on various materials

Diverse lineup and integrated design and processing system to satisfy increasingly sophisticated needs

Accelerating fuel saving of gasoline-powered vehicles through multifaceted approaches

To help realize a sustainable society, automakers are expediting efforts to save energy with multifaceted approaches. Even gasoline-powered vehicles, which have driven the motorization era to date, are showing good progress in improving environmental performance. These technologies are continuing to evolve and are mainly aimed at downsizing, materials-based weight reduction, enhanced thermal efficiency through engine combustion improvements, and reduction of friction loss in the drive train.

Cars with high environmental performance that achieve downsizing with turbochargers (turbo-engine cars) tend to have lower prices than xEVs. This can be one reason why the production volume of these cars is increasing rapidly worldwide, including in the Americas, Europe, and China.

HERCUNITE™ and other products making a contribution

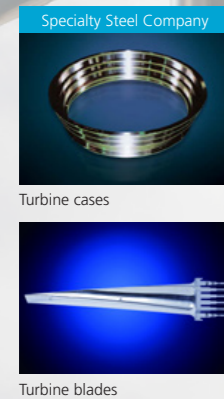
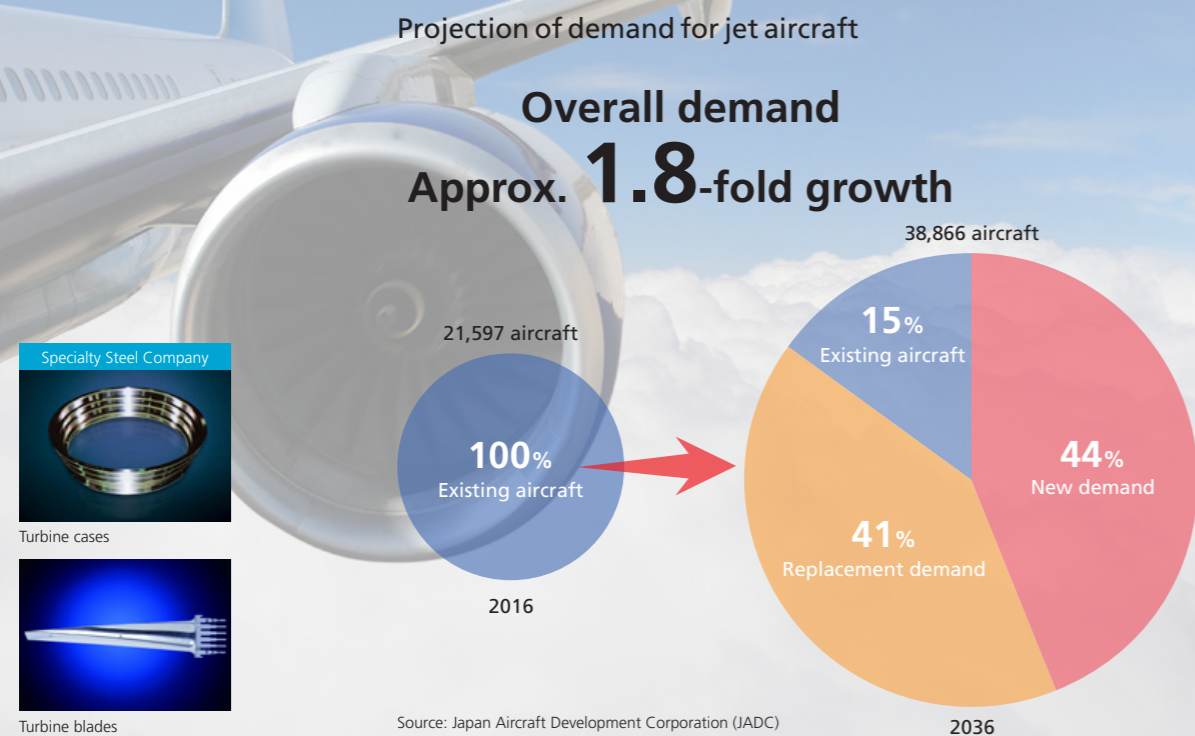
HERCUNITE™ heat-resistant cast components, the mainstay products of the Functional Components Company, are used in turbochargers. These products are frequently adopted in turbo-engine cars not only because of their high heat resistance, but also because they offer solutions backed by our

advanced processing technologies. Our outstanding capabilities in materials development reduce costs with designs that match the temperature ranges required by customers and through optimization of materials in line with the application. We also offer solutions through CAE*-based design support. Moreover, the Specialty Steel Company makes turbine wheels, which are key turbocharger components.

High-performance piston rings also contribute greatly to reducing friction loss in the entire engine. The Specialty Steel Company offers stainless steel piston ring materials that are highly effective in reducing friction loss. We also have a broad range of products that accurately reflects fuel-saving needs. These include CVT belt materials, which help reduce friction loss in power trains.

* CAE (computer-aided engineering): Using computer-based simulations to verify whether a designed structure would meet performance requirements, even before it is built.

Boldly using technological expertise in the aircraft industry, where demand is growing



Proprietary No. 1 technologies and synergies among the three companies address needs for fuel efficiency and cost reduction in aircraft

Demand to grow 1.8-fold in 20 years, driven mainly by small passenger aircraft

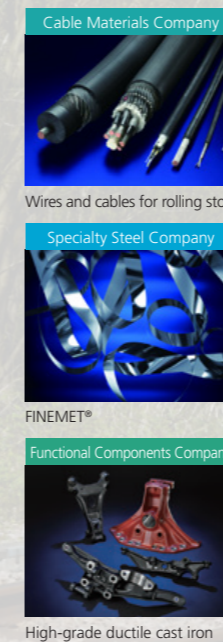
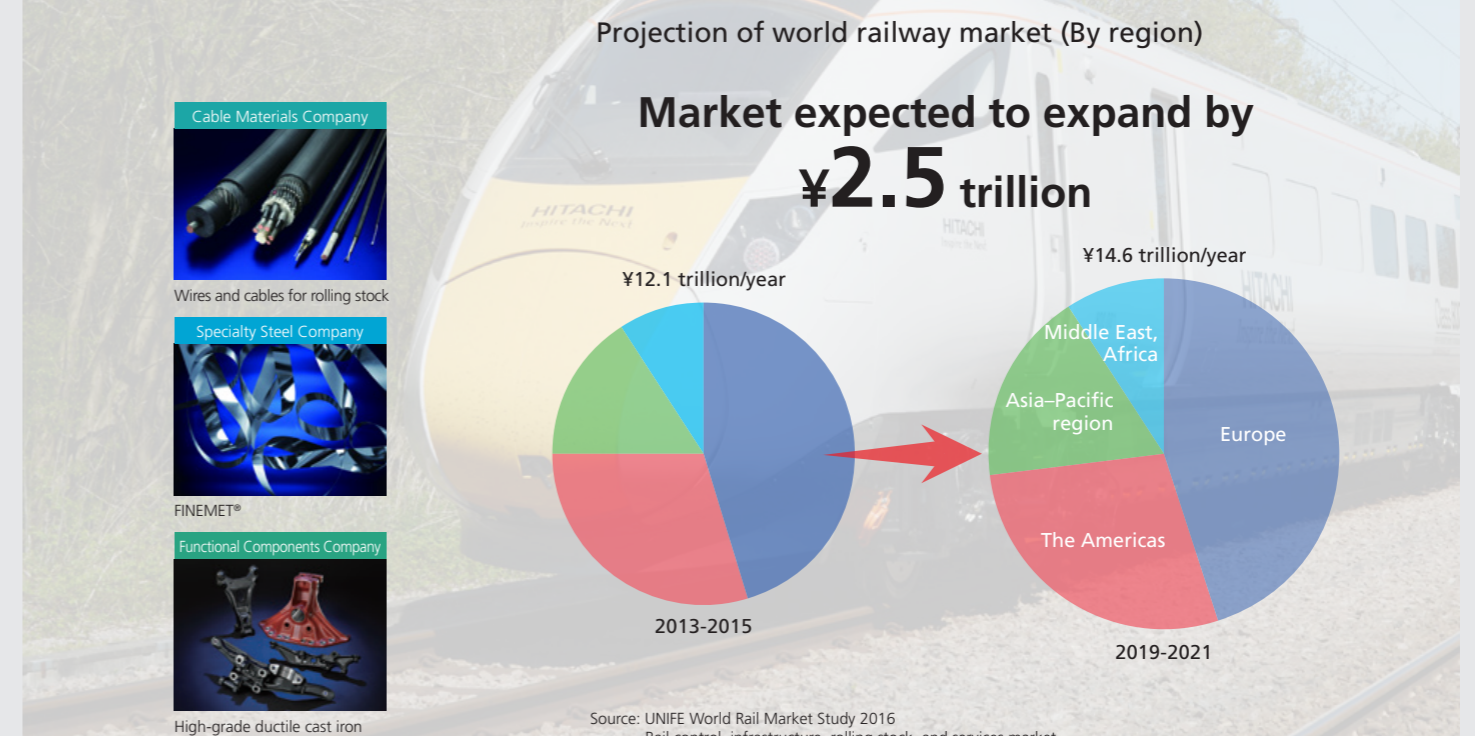
In the world aircraft market, annual demand for jet aircraft is projected to reach around 38,866 units by 2036. This represents 1.8-fold growth compared with the current demand, buoyed by flourishing passenger demand, which will rise around 5% per year until 2035, as well as by the introduction of new, highly economical models with good fuel economy.

Active investments and synergies among the three companies to address flourishing demand

Against this background, we have positioned the aircraft business as a new growth driver. At our Yasugi Works, in addition to a 24-ton vacuum induction melting and casting (VIM) furnace that commenced operation in March 2015, we have made other major investments, including in a 10,000-ton free forging press and a high-speed radial forging machine. At Hitachi Metals MMC Super Alloy, Ltd., we have started operating a large 840-ton ring mill capable of pressure 2.5 times greater than before. In addition to these successful investments, we have formed an alliance with Japan Aeroforge, Ltd., which has a 50,000-ton forging press, the world's largest. Under the alliance, we are setting up a supply system that can handle large components.

In 2015, we acquired certification from customers for our engine shaft materials and made good progress in acquiring certifications that are essential in the aircraft and energy businesses. We will expedite these efforts in the future. Going forward, we will create synergies among the three companies while making continuous capital expenditure and introducing CAE and other analysis technologies to accelerate the development of R&D and manufacturing technology. We are striving to become one of the world's top four aircraft materials manufacturers. Our revenue targets for the aircraft and energy businesses are ¥37 billion in fiscal 2018 and over ¥60 billion in fiscal 2025, almost double the fiscal 2018 target.

Contributing to worldwide high-speed railway plans with technologies and ideas



Powerful backup for realization of high-speed railway through 3D harness design and manufacturing and reinforcement of Chinese operations

High-speed rail plans progressing in China, Europe, the Americas, and elsewhere

Plans are currently under way to build numerous high-speed railway systems around the world. In addition to global environmental problems and high oil prices, this reflects the economic growth of emerging countries, which has brought about population concentration and traffic congestion in urban areas. There is also pent-up demand in Europe, where high-speed railways are already well developed, and high-speed railways around the world are expected to grow at an average annual rate of 3% over the next 20 years. Under the Chinese government's 13th five-year economic plan, investments totaling around 3.8 trillion yuan will be made to extend the nation's railway network to 30,000 kilometers from the current 20,000 kilometers. In the UK, the birthplace of railways, the High-Speed Two (HS2) railway plan is showing good progress, while large-scale high-speed railway plans are advancing in India, the U.S., Indonesia, Malaysia-Singapore, Vietnam, and elsewhere.

Original technology used in European and Chinese markets

High-speed railway networks will continue serving as important infrastructure because they are environmentally friendly and enable mass transportation. Positioning its railway-related business as a growth area, the Cable Materials Company will

forge ahead with active business expansion in Europe and China.

The Hitachi Group received orders from railway operator Abellio for Class 385 commuter trains for the global market. In response, our Cable Materials Company designed and built rolling stock harnesses using 3D design techniques, in addition to selling stand-alone rolling stock electric cable. In 2016, we also established a harness supply base for rolling stock in the Czech Republic. Starting by supplying rolling stock production bases in the UK, a business developed by the Hitachi Group, we will strongly target business entry and development with rolling stock manufacturers across Europe.

As for rolling stock manufacturers in China, we have strengthened our solution-based sales capabilities and increased production capacity at our supply base in Suzhou. We will continue contributing to railway development in China by introducing new products that are thinner, lighter, and longer-lasting.

Meanwhile, our Specialty Steel Company offers its FINEMET® series of material for noise control, and our Functional Components Company supplies high-grade ductile cast iron and other products. In these and other ways, Hitachi Metals as a whole continues making proposals to rolling stock manufacturers to address their needs with respect to factors such as weight reduction.

TOPICS: Initiatives to Identify Social Issues

At the Hitachi Metals Group, we believe we can address perennial market needs by seeking solutions for social issues through our core business operations. Choosing not to consider the entire Group collectively, we identify important social issues based on the characteristics of each of our four companies and have started reflecting these in various activities.

Materiality Analysis Approach

In light of future mega trends, we identified social issues that may impact the Group's sustainable growth and evaluated the importance of such issues from multifaceted perspectives.

STEP 1

Identify social issues

Looking at social issues and mega trends that will affect the future, such as the Sustainable Development Goals (SDGs), set by the United Nations, we pinpointed social issues pertaining to the Group.



STEP 2

Examine actions to address social issues

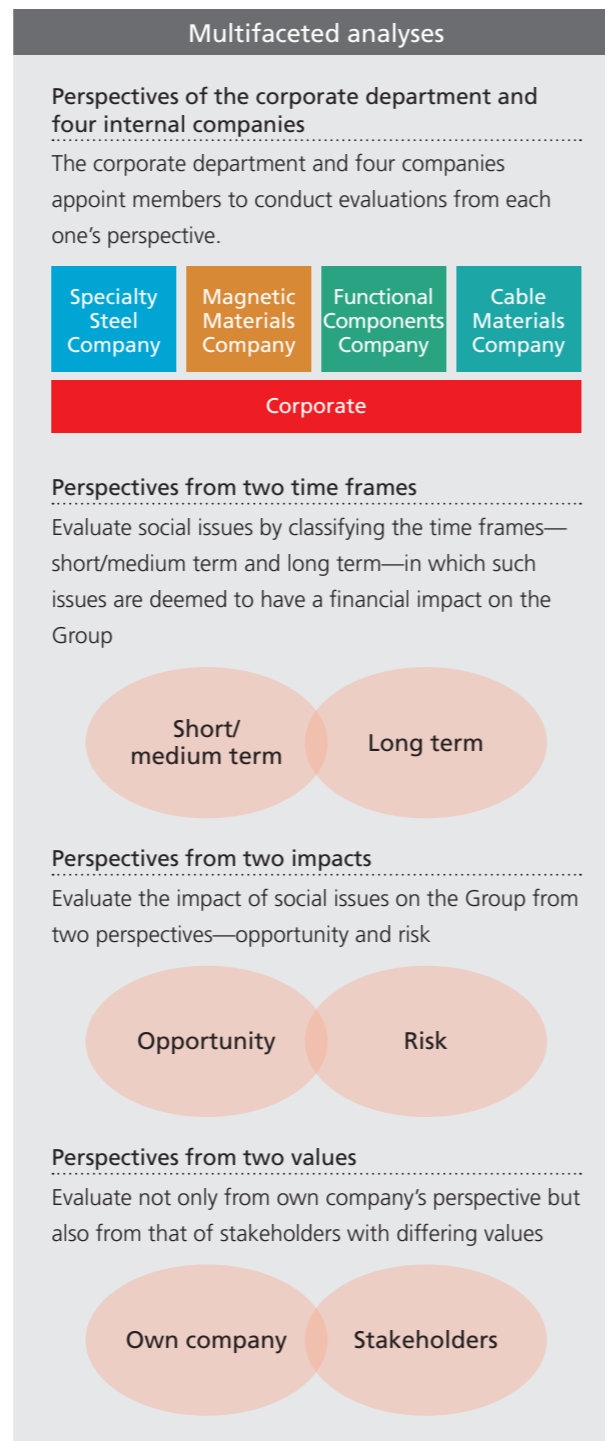
Our corporate department and our four internal companies considered actions to address the identified social issues, using assumed time frames.

STEP 3

Evaluate social issues

For each time frame, we assessed the size of the impact on the Group—from the perspectives of both risk and opportunity—and evaluated the social issues according to strategic priorities.

Dialogue with stakeholders conducted
 (Please refer to the next page.)



Dialogue with Stakeholders Conducted

We held a dialogue with stakeholders and outside experts to obtain opinions about social issues that the Hitachi Metals Group should prioritize from the perspective of stakeholders.

Date: February 27, 2017
Location: Conference Room, Hitachi Metals Head Office



Keisuke Takegahara
 Executive Officer, Deputy Chief Research Officer, the Development Bank of Japan Inc.



Makiko Akabane
 Country Director, Japan, CSR Asia Tokyo Office

For the stakeholder dialogue, we invited two outside experts—Mr. Keisuke Takegahara, Executive Officer, Deputy Chief Research Officer, the Development Bank of Japan Inc., and Ms. Makiko Akabane, Country Director, Japan, CSR Asia Tokyo Office—with participation by six members of our Materiality Analysis Project.

Discussions focused on social issues, which differ according to evaluation perspectives, namely, business perspectives of the project members and stakeholder perspectives put forward by the outside experts.

Mr. Takegahara praised the effectiveness of our materiality analysis, which this time was conducted for each internal company rather than the entire Group. He also emphasized the need to reaffirm the importance of resolving social issues through our core business, which as a matter of course is ensuring a stable supply of products from the perspective of long-term investors.

Ms. Akabane pointed out the importance of understanding social issues from the perspective of each country and region, stating that Hitachi Metals, as an entity that operates globally, should address issues that could arise in various countries and regions, such as fraud and resource-related problems, in addition to issues important to Japan. She also offered advice on the importance of efforts in areas that could become major social issues in the future, such as ethics and employees' health.

Our project members obtained feedback about the results of evaluations conducted from their own business perspectives. Through a Q&A session, they also gained a deeper understanding of social issues that Hitachi Metals should address.

VOICE | Opinion of project member

The Materiality Analysis Project has been promoted mainly by six members from the corporate management planning division and each internal company. They conducted evaluations of issues important to the Group from the perspectives of opportunity and risk, while considering the perceived scale of any impact on our business environment in light of SDGs and other future social issues and mega trends, as well as projected changes in the world over the medium and long terms.

Hitachi Metals provides highly functional materials to the automotive, industrial infrastructure, and electronics sectors. Due to the wide range of products handled by our four internal companies, however, it was very difficult for the project members to have the same thinking about materiality analysis. Still, although the discussion stalled at times, the project members used their collective, cross-lateral capabilities, with advice from outside experts, to gain a deeper understanding of social issues that the Group should address.

I hope that the project's activities can be used to formulate the Group's next medium-term management plan.



Mikio Kawai
 General Manager, Planning Department, Magnetic Materials Company