Environmental Value Produced by Hitachi Metals

The Group is striving to provide environmental value in each stage related to monozukuri. From the R&D stage to the product lifecycle, we are developing products that contribute to decarbonation and reduction of energy use. With the aim of achieving carbon neutrality in production, we are expanding the deployment of renewable energy and promoting energy saving. And, at the stage of using the Group's products by our customers, we are providing environmental value that meets the demands of the times, such as environmentally-friendly products that reduce the use of energy and greenhouse-gas emissions.

R&D

Major measures

- Strengthening environmentally-friendly products that contribute to decarbonization and reduction in energy used over products life cycle.

Examples of efforts

Reduction of greenhouse-gas emissions during manufacture of cathode materials

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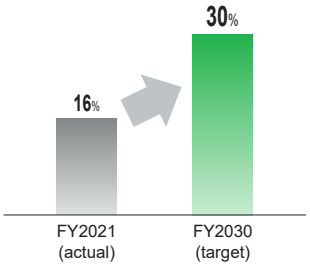
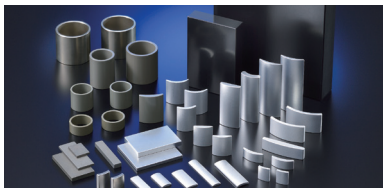
Comparison of new products



Aiming to realize a decarbonized and energy-efficient society throughout the product lifecycle

Uses



Major measures

- Promotion of sales of environmentally conscious products
- Promotion of decarbonation and energy conservation (for customers)

Examples of efforts

Neodymium magnets: Contributing to popularization of xEVs

Amorphous alloys: Contributing to energy efficiency of power transformers

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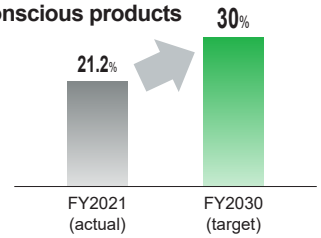
Sales ratio of key environmentally conscious products



Manufacturing

Major measures

- Expansion in deployment of renewable energy
- Promotion of energy conservation
- Expansion of use of recycled raw materials

Examples of efforts

One of the largest photovoltaic panel installations in Japan

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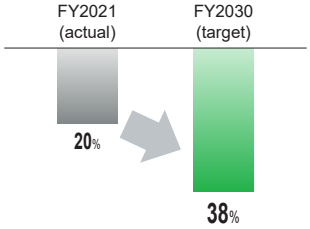
CO_2 emission reduction (compared to FY2015)



R&D

Reducing greenhouse-gas emissions during production of cathode materials

Lithium-ion batteries (LIBs) are used in a wide range of fields, from mobile devices to hybrid and electric vehicles, owing to their high energy density, compact size, and light weight, and demand for LIBs is expected to grow rapidly, especially for use in electric vehicles. The key component of LIBs is the cathode material, which assures LIBs have both high capacity and long life.

We have developed (i) a technology that gives LIBs both longer life and higher capacity while reducing the amount of cobalt used in the cathode material and (ii) a manufacturing technology that increases the options for the raw materials composing the cathode. We have also developed " microstructure-control technology" for suppressing degradation of the crystal structure of the cathode that accompanies the charge-discharge cycle. Moreover, the cobalt content, which is an essential major component of cathode materials, can be reduced by 80% (compared to that of our conventional cathodes). As a result, greenhouse-gas emissions derived from cobalt raw materials during manufacturing can be reduced.

In the future, we will introduce these technologies as solutions for customers involved in mass production of cathode materials and development of LIBs.

Cathode materials for lithium-ion batteries

Manufacturing

One of the largest solar-panel installations in Japan

We have decided to install a solar-power generator with a power-generation capacity of approximately 10 MW (megawatts), which is one of the largest self-consumption-type solar-power generation facilities in Japan, in the Kumagaya district, centered on the Kumagaya Magnetic Materials Works and the Global Research & Innovative Technology Center (GRIT).
We effectively utilized the long daylight hours of Kumagaya City and the green areas in the Kumagaya district to install the large-scale and highly efficient facility. The generator is scheduled to be operational by September 2023, and all of the electricity that it generates, approximately 11.5-million kWh/year, will be consumed in the district. We are using the TPO/PPA model* (Third Party Ownership/Power Purchase Agreement) for this project.

Our Group's policy is to (i) reduce CO_2 emissions from our own operations by 38% by 2030 (compared to 2015) as a mid-term target and (ii) achieve carbon neutrality by 2050. As a result, we will contribute to the transition to a decarbonized society. As for renewable energy, we aim to introduce 35,000 MWh/year by 2030, and the installation of the generator in the Kumagaya district will be the centerpiece of the plan.

* A system by which a power-generation company installs a solar-power generation system on a site or roof provided by the owner of the facility (Hitachi Metals) and provides the power generated by the system to the user of the facility (Hitachi Metals) for a fee.

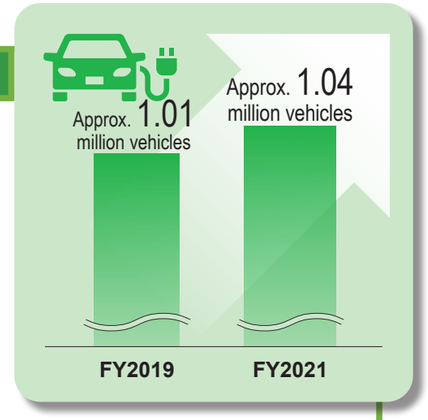
Uses

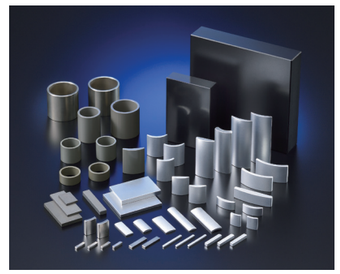
Neodymium magnets contribute to the popularization of xEV vehicles

In 1982, our company (Sumitomo Special Metals at that time) invented the neodymium magnet, which generates much stronger magnetic force than that of the common ferrite magnet. Generally, as the magnetic force of the magnet gets stronger, the performance of the motor gets higher, and the motor can be designed to be smaller and lighter. In particular, in regard to the technological evolution of xEVs*, it plays an important role as an indispensable material enabling smaller, lighter, more-efficient, and more-energy-efficient motors.

As a permanent magnet boasting the world's-highest magnetic force, NEOMAX® is used in fields such as vehicles, IT and home appliances, industry, medicine, and the environment and energy.
Currently, the Hitachi Metals Group is focusing on the automotive field, which is undergoing transformations to, for example, being connected, automated driving, and electrification. By providing high-performance neodymium magnets, we are contributing to production of higher efficiency and smaller drive motors and generators for xEVs.

*xEV: A collective term for electric vehicles (EVs), hybrid electric vehicles (HEVs), and plug-in hybrid electric vehicles (PHEVs).





Neodymium magnet NEOMAX®

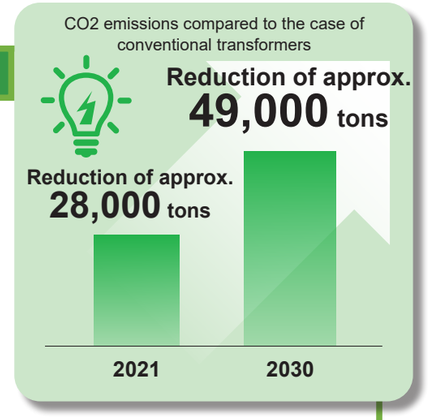
Uses

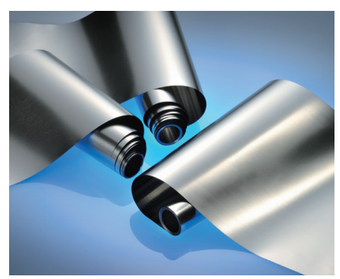
Amorphous alloy contributes to energy saving in power transformers

Electricity generated at power plants incurs transmission loss while it is being transmitted to factories and homes. High-voltage electricity transmitted from power plants is converted to lower voltages by transformers for safe use; however, transformers not only consume power during the power conversion but also lose power during standby. To solve that problem, since 2003, Hitachi Metals Group has provided Metglas®, namely, an amorphous alloy that reduces standby power consumption to about one-third that in the case of conventional core materials (such as electromagnetic steel sheets) used for transformers.

Unlike ordinary metals and alloys, amorphous alloys have no crystalline structure and exhibit excellent soft magnetic properties, and those features make it possible to suppress power loss in standby mode. By providing core materials for amorphous transformers, we aim to contribute to reducing CO_2 emissions* by approximately 50,000 tons per year (compared to the figure for conventional magnetic-steel transformers). In March 2020, we developed a new amorphous material, called MaDC-A, which will contribute to further improving transformer efficiency.

* Based on shipment volume and difference in transformer energy loss, according to Indian standards. For the CO2 emission coefficient, we use IEA CO2 emissions from fuel combustion (2017 world).





Amorphous-alloy ribbon Metglas®