Special Feature Article
Toward Decarbonization by 2050
~Parts manufacturers accelerating efforts~.

Automotive parts manufacturers are moving full steam ahead in their efforts to decarbonize their operations. In parallel with their own efforts to reduce carbon dioxide (CO_2) emissions, automakers are taking action throughout their supply chains ("Scope 3") and are asking parts suppliers to do the same. To this end, companies are focusing on the development of environmentally friendly products as well as measures to eliminate the use of fossil fuels, reduce energy loss, and utilize renewable energy sources. The government is also planning to create a roadmap for carbon neutrality in the automotive industry, and efforts to achieve this goal are becoming more and more "mandatory".

Requests for decarbonization from automakers are in full swing

Automobile manufacturers have been considering various measures to achieve carbon neutrality by 2050, but this year there has been a series of moves to move these measures forward. Last year, Toyota Motor Corporation asked its major parts suppliers to reduce their CO_2 emissions by 3% from the previous year, aiming to be carbon neutral by 35 years. Honda Motor Co., Ltd. has also asked its suppliers to reduce CO_2 emissions by 4% each year from FY19 to virtually zero by FY50, starting in FY25. Nissan Motor Co., Ltd. has also selected parts suppliers to cooperate in activities to reduce emissions.

Yamaha Motor Co., Ltd. has announced that it will reduce CO_2 emissions at its plants to virtually zero by 35 years. One of the reasons for the move forward is "increased business risks, such as the border carbon tax". The European Union (EU) plans to introduce a border carbon tax in 2026, which will impose a tax on imports from countries with lax environmental regulations, such as those that do not meet the emission standards set by the EU. Manufacturers expanding their business globally are under pressure to respond.

In response to these moves, parts manufacturers are stepping up measures to reduce CO_2 emissions. DENSO CORPORATION is the spearhead of decarbonization. They aim to achieve carbon neutrality at its 200 plants worldwide without using CO_2 emission allowances by 2035. In April 2021, a cross-divisional organization, "Monozukuri Carbon Neutral Headquarters," was established to promote energy efficiency and decarbonization.

Visualization of energy usage using the Internet of Things (IoT) quickly produced results. It was found that the fans and conveyors continued to operate even after the furnace was shut down. Power saving is achieved by incorporating a shutdown circuit. Also, in the aluminum die-casting production process, centralized melting furnaces and casting machines have been downsized and integrated into automated systems. In the semiconductor wafer manufacturing process, the reuse of waste heat from steam drain was promoted.

As a result, the company achieved its goal of halving CO_2 emissions per production volume compared to FY2012, three years ahead of schedule. They plan to share its expertise in reducing CO_2 emissions internally and externally by setting up a carbon-neutral showroom.

The use of renewable energy is also advancing. Imasen Electric Manufacturing has set a goal of reducing CO_2 emissions from its business activities by 50% by 2030 from the FY2013 level. To realize this goal, solar panels have been installed at the Gifu Plant and will be expanded to other plants in the future. They also aim to reduce CO_2 emissions by replacing air cylinders used in presses and other equipment with electric cylinders developed in-house. Compressors for air cylinders are in constant operation and consume large amounts of electricity. While confirming the effectiveness of the system, they will gradually roll out the system to its factories and work to decarbonize its production activities.

PACIFIC INDUSTRIAL CO., LTD. has switched to renewable energy for all electricity used at its three sites in Japan. They will also install and increase the number of solar panels, aiming to halve the Group's CO_2 emissions from the FY 2019 level by FY 2030, and to achieve a 20% renewable energy use ratio.

Bridgestone has also set a goal of reducing its electricity consumption by 50% from the 2011 level by 2030, and is switching to renewable energy sources for purchased electricity at its domestic and overseas plants. In Thailand, they have installed 2,160 solar panels at their factory and switched all electricity at its local research center to renewable energy. Through these efforts, they aim to increase the ratio of renewable energy in their electricity consumption to more than 50% by 2023, and to be carbon neutral by 2050.

Yorozu plans to reduce CO_2 emissions from its production processes to virtually zero at a new plant scheduled to start operations in Tokai region in 2024. In addition to the use of renewable energy, they plan to go carbon neutral with their fuel heat source and produce entirely with green power.

Steel Industry Unites to Promote Decarbonization

Steel manufacturers, which are responsible for the largest amount of CO_2 emissions in the manufacturing industry, are united in their efforts to commercialize "carbon-neutral steel". Kobe Steel, Ltd. has begun offering "Kobenable Steel", a steel material that significantly reduces CO_2 emissions in the blast furnace process.

Nippon Steel Corporation will also start supplying carbon neutral steel from FY2023. They plan to use electric furnaces to produce electromagnetic steel sheets and automotive steel sheets, initially at the 700,000-ton level per year.

JFE Steel Corporation has announced that it is considering suspending one blast furnace in the Kurashiki district of their Western Japan Works and introducing an electric furnace. They will consider the construction of a new high-efficiency large electric furnace when it is due for refurbishment between 2027 and 2030. It is said to reduce CO_2 emissions by 3 million tons per year.

Processing methods are also attracting attention. That is cold stamping of ultra-high tensile strength steel sheets (super high-tensile materials). Although demand for hot stamping (hot stamping), in which steel is heated before processing, has been increasing among Japanese automobile manufacturers, there is a movement to review this method because of its low CO_2 emissions during the stamping process. The use of cold-pressed parts as a lightweight, high-strength super high-tensile material for electric vehicles may expand.

In June, The Japan Research and Development Center for Metals, Nippon Steel Corporation, JFE Steel Corporation, and Kobe Steel, Ltd. jointly accepted Green Innovation Fund project from New Energy and Industrial Technology Development Organization (NEDO). Since most of the CO_2 emitted by the steel industry comes from the iron ore reduction process by blast furnaces, they are working on the technological development and social implementation of "hydrogen reduction technology," in which hydrogen is used instead of coal.

Soft reforms such as electricity conservation awareness and ESG are also important.

Policies to become carbon neutral are not limited to hardware measures. A survey on carbon neutrality conducted by Nikkan Jidosha Shimbun revealed many familiar initiatives, such as reducing electricity consumption.

PACIFIC INDUSTRIAL CO., LTD. has time to review CO_2 emissions and other data at factory management meetings, and has established a forum for

sharing activities toward carbon neutrality with its suppliers. TACHI-S CO., LTD. will also install equipment that enables it to check the status of electricity use, and will promote the use of LED lighting and electrification of company-owned vehicles.

Futaba Industrial Co., Ltd. is encouraging employees to turn off standby power, and is also working to switch to LEDs from fluorescent and other lighting, and to electrify air conditioning heat sources and forklifts. Imasen Electric Industrial Co., Ltd. is also working to reduce the defect rate and improve productivity, along with the elimination of the use of heavy oil.

Some companies have launched initiatives to raise awareness of environmental considerations, including carbon neutrality, for their employees. NTN Corporation has introduced its own award system to promote ESG (Environmental, Social, and Governance) among its employees. They have divided the 13 key issues set as important issues into the three categories of "E" (Environment), "S" (Society), and "G" (Governance), and awards will be presented to outstanding initiatives linked to these categories, linking employees' daily work and ESG management.

Support from financial institutions and government agencies is also essential.

There is also a move toward carbon neutrality and electrification through collaboration between the automotive industry and financial institutions. In order for manufacturers, Tier 1s, small and medium suppliers, and financial institutions to share information across hierarchical boundaries, Tokai Local Finance Bureau (Director-General Michio Saito) launched the "Carbon Neutral Support Liaison Group by the Automotive Industry and Financial Institutions". The first liaison meeting held in June at Tokai Local Finance Bureau was attended by representatives from Toyota Motor Corporation, DENSO CORPORATION, and AISIN CORPORATION as well as regional banks and credit unions. Information was shared on the direction that automobile manufacturers and Tier 1s are taking and the current status of small and medium-sized suppliers. The meeting will continue to be held in the future.

In reducing CO_2 emissions throughout the supply chain, it is important not only to take action at manufacturing sites, but also to decarbonize the materials used in products themselves. Chemical and materials companies involved in materials for automobiles are promoting the use of biomass and recycling of raw materials used for materials as well as manufacturing processes.

Among these, efforts in engineering plastics and super engineering plastics, which are more highly functional than commodity resins, have been particularly prominent. Mitsubishi Chemical Group Corporation's DURABIO is made primarily from plant-derived isosorbide. Compared to conventional polycarbonate (PC) resin, it has superior transparency and optical properties, and is already being used by Toyota Motor Corporation and SUZUKI MOTOR CORPORATION for interior and exterior parts such as front grilles.

Mitsui Chemicals, Inc. and TEIJIN LIMITED are the first companies in Japan to convert PC resin to biomass. Mitsui Chemicals, Inc. will convert bisphenol A (BPA), a raw material for PC resin, into biomass. TEIJIN LIMITED will use this BPA to produce PC resin. In the first half of 2023, TEIJIN LIMITED plans to obtain ISCC Plus (International Sustainability Carbon) certification and begin production at its Matsuyama Plant.

Toray Industries, Inc. succeeded in converting adipic acid, a raw material for polyamide 66, an engineering plastic, into biomass. This is the world's first initiative to use sugar derived from inedible components of plants. Currently in the research and development stage, they aim to commercialize the product in around 2030 by conducting market research and developing production technology.

In the area of recycling, Mitsubishi Chemical Corporation is working on a demonstration project using acrylic resin used in lamp covers and other products, and SUMITOMO CHEMICAL COMPANY, LIMITED has begun to establish a recycling technology for acrylic resin. Demonstration facilities will be installed at the Ehime Plant, and the demonstration is scheduled to begin in the fall of this year. It plans to ship samples of recycled products in 2023.

Ministry of Economy, Trade and Industry (METI) has begun preparing a technology roadmap for the automotive industry to achieve carbon neutrality by 2050, and plans to finalize its direction by the end of this year. Specifically, it is expected to include decarbonization technologies related to the use of renewable energy in battery manufacturing and production processes.

The degree to which each company achieves this goal is expected to affect its ability to continue doing business with automobile manufacturers and to raise funds. Measures to decarbonize the industry are increasingly moving from voluntary to mandatory, and parts manufacturers are being asked to take greater action.