Special Feature on the Environment

TMHMS' Path toward Zero CO_2 Emissions

Toyota Material Handling Manufacturing Sweden AB (TMHMS), a subsidiary manufacturing materials handling equipment in Sweden, became the first company in the Toyota Industries Group to achieve a zero CO_2 emissions plant.

Toyota Material Handling Europe AB (TMHE), a subsidiary serving as the regional headquarters of the materials handling equipment business in Europe, has formulated a two-pronged policy aimed at zero energy *muda* (waste) and zero carbon emissions from our operations by 2030 in accordance with Toyota Industries' Environmental Action Plan. Based on this policy, the TMHE Group has been striving to reduce CO_2 emissions at all of its bases in Europe in collaboration with customers and business partners.

In 2019, TMHMS, one of TMHE Group companies, became the first company in the Toyota Industries Group to achieve a zero CO_2 emissions plant and realize the policy.

We will share their efforts and accomplishments broadly both in and outside the Toyota Industries Group and seek to contribute to the creation of a sustainable society.

Ernesto Domínguez
TMHE President and CEO

Toward a Zero CO_2 Emissions Plant

Along with daily energy-saving activities, TMHMS made efforts in three major areas.

① Switching to district biomass-derived steam for heating*
② Only using electricity from renewable energy sources
③ Switching from LPG to biogas

＋

Daily energy-saving activities

↓

Zero CO_2 emissions plant

① Switching to district biomass-derived steam for heating

As its heating-purpose energy, TMHMS uses biomass-derived steam supplied through district heating. TMHMS replaced heavy oil used for space heating and liquefied petroleum gas (LPG) for heating wash water in the painting pretreatment process with biomass steam in 1987 and 2009, respectively.

② Only using electricity from renewable energy sources

TMHMS introduced hydropower in 2015 and became the first company in the Toyota Industries Group to solely use green electricity, thereby eliminating CO_2 emissions from electricity consumption.

③ Switching from LPG to biogas

Switching to biomass steam and green electricity only left one issue: about 3,000 tons of CO_2 emitted every year from the use of LPG mainly in painting dry-off ovens. To eliminate the emissions, the manufacturing, environment, procurement and other departments of TMHMS joined hands and launched Project Zero in 2017. After much consideration, they decided to introduce biogas, a gas from biomass, which does not use fossil fuels, and began to install necessary equipment and modify existing facilities. TMHMS completed its switch to biogas in August 2019 and achieved a zero CO_2 emissions plant for the first time in the Toyota Industries Group.

* Biomass is a general term used to refer to organic materials coming from plants and animals. When viewed from the lifecycle of an organic material, biomass is regarded as carbon neutral, as CO_2 emitted when generating steam or burning gas is offset by CO_2 absorbed during photosynthesis.

Evaluation of the Efforts of TMHMS

These advanced efforts of TMHMS throughout its business activities were highly recognized. In December 2019, the company received a Biogas Award (second place), which is given to local governments, companies and individuals in Sweden, and was selected as the Sustainable Company of the Year by the local community.

Future Activities to Reduce CO_2 Emissions throughout the Product Lifecycle

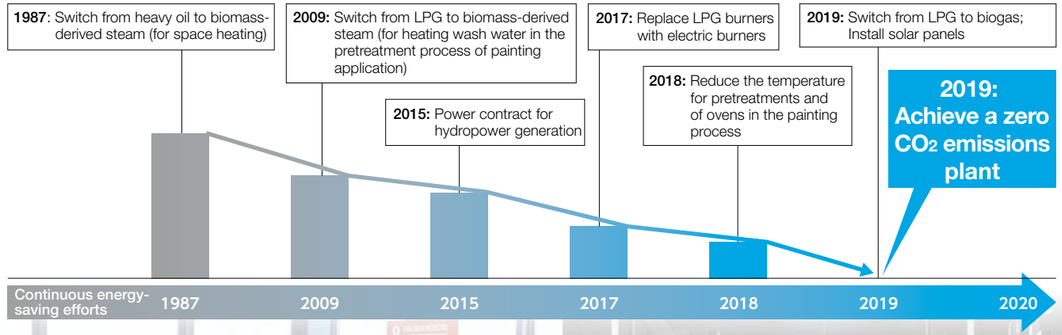
In addition to achieving zero plant CO_2 emissions, TMHMS has been working to reduce CO_2 emissions throughout the product lifecycle from production to sales, use, disposal and recycling. In January 2020, TMHMS made a first step in its efforts to reduce logistics-derived CO_2 emissions with the introduction of biogas trucks in collaboration with transportation companies. These trucks will be used in some of the transportation operations between TMHMS plants and between TMHMS and business partners. In production operations as well, TMHMS is making continuous efforts to reduce energy consumption by installing solar panels, visualizing energy use and undertaking *kaizen* (improvement) activities. Through these endeavors, TMHMS intends to make a higher level of contribution to the realization of a low-carbon emission society.

Johanna Arnstedt
Environment Manager of Project Zero

Richard Bjersér
Project Manager of Project Zero

Three key factors led to the success of the project. The first is the Toyota Industries Group's clear Environmental Vision, which provided strong motivation for us to work for a zero CO_2 emissions plant. The second is strong management on site, with project members from various departments gathering their capabilities to carry out a reliable simulation for realizing a zero CO_2 emissions plant. The last is that a biogas plant promoted under Sweden's major energy policies was located nearby.

■ Path toward Achieving a Zero CO_2 Emissions Plant



Displays celebrating World Environment Day

Production at carbon-free plant