

Obtained ZEB Certification via the First Attempt in Japan to Use Solar Panels at a Construction Field Office Before Transferring Them to the Main Building

Toda Corporation (Head Office: Chuo-ku, Tokyo; President: Seisuke Otani) and Murata Manufacturing Co., Ltd. (Head Office: Nagaokakyo-shi, Kyoto; President: Norio Nakajima; hereafter, “Murata Manufacturing”) are pleased to announce that they have obtained ZEB*1 certification in the construction of the Ceramic Capacitor R&D Center at Fukui Murata Manufacturing Co., Ltd. (Location: Echizen-shi, Fukui Prefecture; President: Shinji Nomura; hereafter, “Fukui Murata Manufacturing”), a manufacturing subsidiary of Murata Manufacturing, through the first attempt in Japan to take the solar panels that are intended for use in the main building of a construction project and use them at the construction field office, with the intention to relocate them to the main building when it is completed. The two companies initiated their efforts, with Toda Corporation planning to use ZEB design technology to construct the building in an environmentally friendly manner and Murata Manufacturing endeavoring to reduce Scope 3 greenhouse gas emissions during the construction.

*1 ZEB (Net Zero Energy Building) refers to a building that aims to reduce the annual primary energy balance consumed by the building to zero through energy conservation achieved by means of high thermal insulation and high-efficiency facilities, as well as energy production by means of solar panels, while maintaining a comfortable indoor environment. ZEB certification is divided into four levels depending on the energy reduction rate, with the highest level of “ZEB” requiring energy reduction of 100% or more.



Photo 1: ZEB-certified field office



Photo 2: Solar power system at the field office

■ Background and effects of the initiative

Amid the expectation for companies to curb greenhouse gas emissions to counteract climate change, we, as a registered ZEB planner, have set a goal of increasing the percentage of ZEB-equivalent projects to at least 50% of our design and consulting work in FY2025. Murata Manufacturing is working to reduce greenhouse gas emissions in Scope 3 Category 2 (emissions from the construction and manufacture of its own capital goods), which account for 12.6% of its total greenhouse gas emissions, across its entire supply chain. Murata Manufacturing aims to achieve carbon neutrality along the full length of its supply chain, including Scope 3, by FY2050.

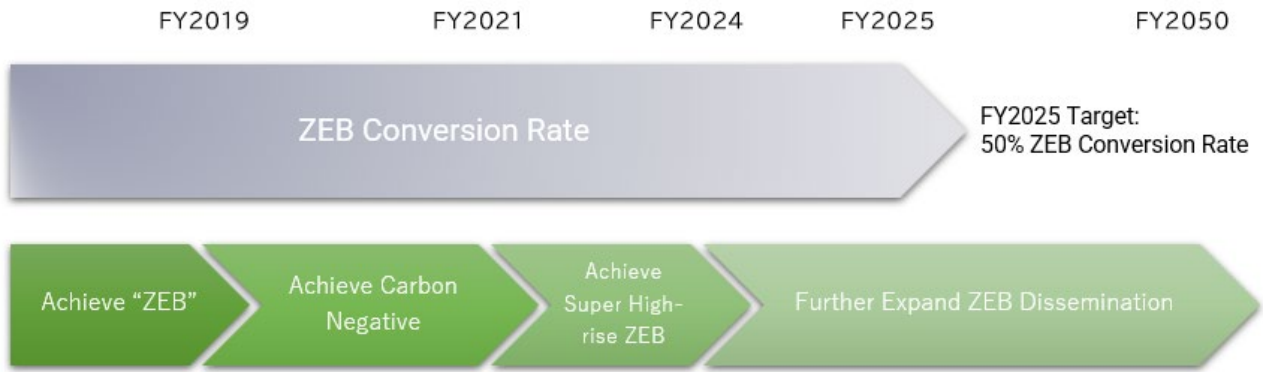


Fig. 1: Our targets for ZEB-equivalent projects

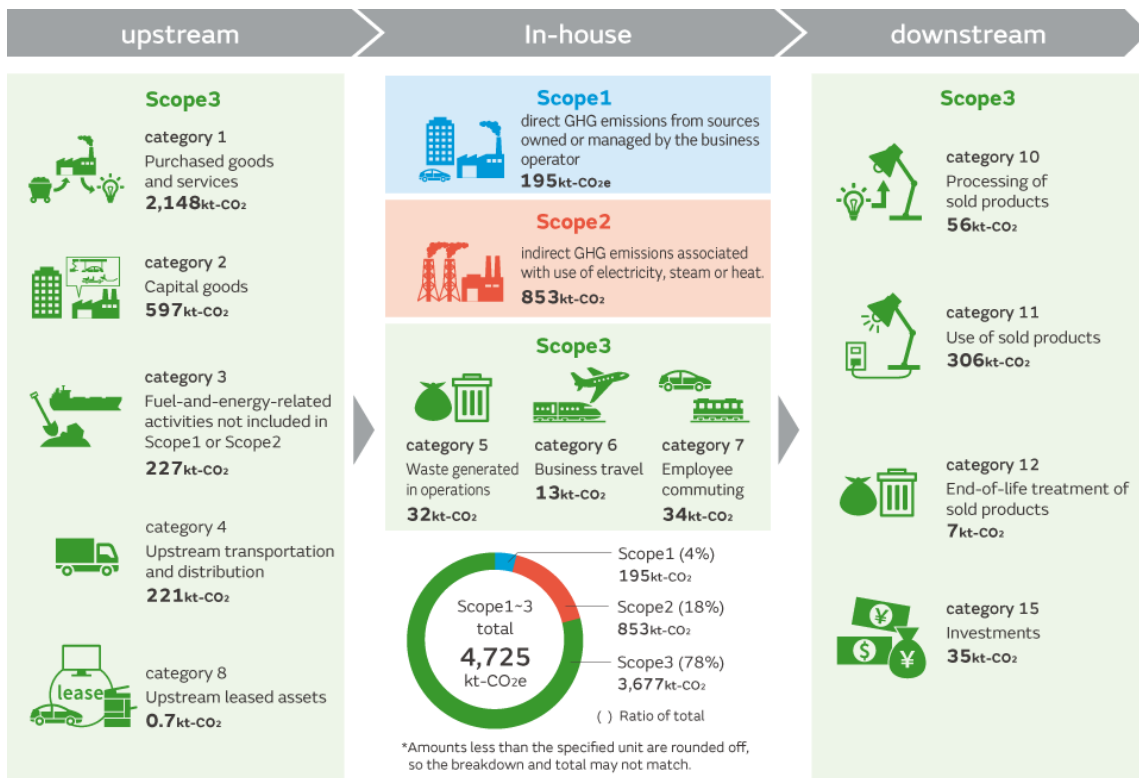


Fig. 2: Murata Manufacturing's greenhouse gas emissions in FY2023

Together with Fukui Murata Manufacturing, the Company has planned a ZEB construction field office (hereafter, "the Project") for the construction of the Ceramic Capacitor R&D Center—the first such facility to be built by a private company—in the urban development area around Echizen-Takefu Station. This project is in line with the urban development concept*² aimed at decarbonizing the area around the station. In this project, the ordering client and construction contractor will collaborate in their use of the solar panels that will eventually be installed on the main building, thereby reducing greenhouse gas emissions throughout the building's lifecycle and contributing to the community.

By reducing power consumption at the construction field office, the Project is expected to reduce CO₂ emissions by approximately 22.9 tons per year based on the CO₂ emission conversion factor for electric power*³. In addition, following the temporary use of the construction field office, the solar panels will not be discarded. They will instead be transferred to the main building, where they will continue to be used, thereby making effective use of limited resources.

*² From the Echizen-Takefu Station Area Urban Development Public-Private-Partnership (PPP) Project concept

*³ Conversion carried out with the CO₂ emissions coefficient 0.499 kg-CO₂/kWh (Hokuriku Electric Power Company FY2022 adjusted actual results)

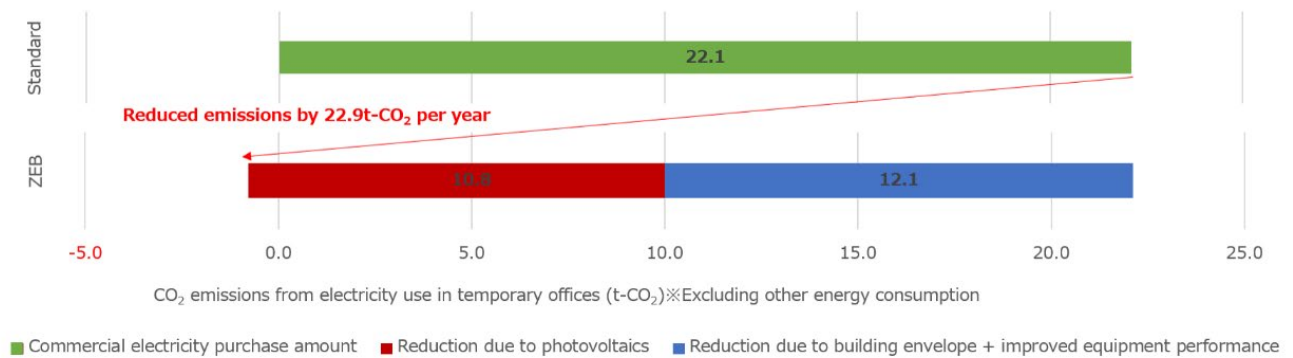


Fig. 3: Comparison of CO₂ emissions for ZEB and non-ZEB

■ Special efforts made to obtain ZEB certification

On August 1, 2022, the Company released a prefabricated office with ZEB specifications as “[Japan’s first ZEB-certified construction field office.](#)” On this occasion, we built a ZEB version of a prefabricated building that is in widespread use as a construction field office.

The Project achieved a 54% reduction in primary energy consumption by adding insulation to the roof, walls and first floor, improving the performance of the building envelope by adding thermal barrier film to the windows, planning for a high-efficiency air-conditioning system with optimized capacity in anticipation of the operation of the office, and installing LED lighting. Factoring in the electricity generated by the solar panels, a net 103% reduction is possible.

In addition, other solar power generation systems have been installed, featuring stands that are easy to install and remove, specially developed for construction sites based on the findings of a subsidized project in Fukushima Prefecture*⁴. This system works well with construction field offices (prefabricated houses) that are designed to be relocated and removed, and can be reused at other sites.

*⁴ [Joint research and experimental study by three companies of renewable energy utilization and easily relocatable generation/storage systems at construction sites](#)

[Project overview]

- Overview of ZEB prefabricated house-type office
 - Building size: 9 attached 2-story buildings with a total floor space of 306.52 m²
 - Building envelope specifications: Insulation and thermal barrier film installed
 - Air conditioning equipment: capacity-optimized PAC + high-efficiency device
 - Ventilation equipment: exhaust fan
 - Lighting: LED
 - Hot water supply: High-efficiency LPG water

非住宅建築物 再エネ設備あり

建築物省エネ法に基づく
省エネ性能ラベル

エネルギー消費性能

★★★★★

ZEB水準

エネルギー消費性能が、事務所等の用途で★5つ、病院等の用途で★4つを達成

ネット・ゼロ・エネルギー ZEB (ZEB_{NEZ})

太陽光発電の売電分も含めてエネルギー収支がゼロ以下を達成

第三者評価 **BELS** セラミックコンデンサ研究開発センター-工事現場事務所 評価日 2024年10月18日

Fig. 4: BELS certification

■ Remote visualization implemented by way of IoT sensors, etc.

As part of this project, IoT sensors and a remote system to monitor the amount of solar power generation will be installed to verify the effectiveness of ZEB by monitoring temperature, main power consumption, and power generation 24 hours a day via cloud computing. Applying this technology will also enable detailed air conditioning settings by heat-mapping the thermal environment of the construction field office. In addition to improving comfort while saving energy, the visualization of the room environment can be used to educate employees about climate change.

■ Toward more environmentally friendly construction

This project has obtained ZEB certification through the implementation of various renewable energy and energy-saving technologies in the construction field office, but electricity needs that cannot be covered by these technologies must be purchased from external sources. We are therefore purchasing renewable electricity from an off-site power supplier (Eneserve Corporation) to power the construction work, thereby achieving even more environmentally friendly construction.

In addition, we have constructed a building (prefabricated house) to demonstrate the use of heat-insulating paint, and we are verifying the effectiveness of such paint as part of this project as well. The building envelope of this demonstration building has already had its performance improved by adding insulation, but we are also testing the possibility of using insulating paint to further improve the building envelope's performance in multiple use cases in the future.

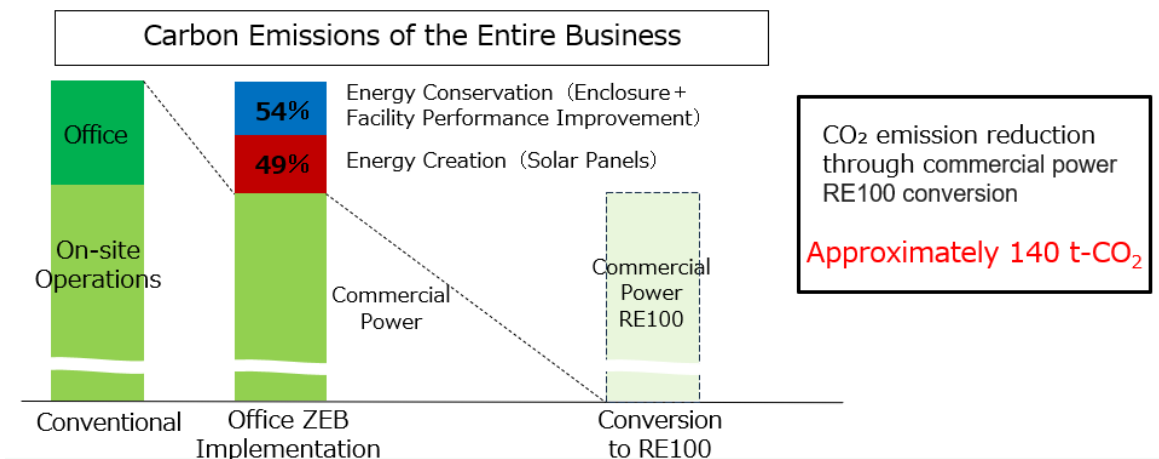


Fig. 5: CO₂ emissions reductions across the entire construction site

■ Future developments

Energy conservation and comfort will continuously be verified through the operation of this construction field office, contributing to the further promotion of ZEB and the attainment of a decarbonized society.

<Reference source>

Murata Manufacturing website https://corporate.murata.com/en-global/csr/environment_murata/climate_change

We will strive to optimize our business portfolio by promoting strategic investments in priority management businesses and intangible assets that will drive future growth and to achieve our mid-to-long-term goal of 8% ROE, as well as to further enhance corporate value.

