Sustainability TOPIC 3 Examples of Environmental Solutions

In the Medium-Term Business Plan (2021-2023), "to target the front-runner status in the environmental sector, accelerating our initiatives toward carbon neutrality," the Taisei Group identifies sustainability-related key issues. Utilizing various viewpoints and technical capabilities, we propose solutions and work together with our customers to create a global community filled with hopes and dreams for the benefit of future generations.

NET ZERO ENERGY BUILDING

Contributing to a Sustainable Society by Promoting the Conversion of Existing Buildings into Zero Energy Buildings (ZEBs) "Green Renewal ZEB"

Taisei Corporation calls the promotion of the conversion of existing buildings into Zero Energy Buildings "Green Renewal®." By posing six key words, we are implementing initiatives to improve the health of people, buildings, and the planet.

Energy conservation: Using the latest sensing technology to wisely select energy to use
Energy generation: Having solar power generation installed not only on rooftops but also on windows and walls
Decarbonization: Adopting building materials that reduce CO_2 emissions
Wellness: Promoting human wellness by actively using natural light
Smart: Utilizing data obtained with various sensors to provide information and control
Security: Protecting building users from risks of infectious diseases and earthquakes

Among these, we named the initiative to introduce technologies that lead to energy conservation and generation and renew existing buildings as Zero Energy Buildings (ZEBs) "Green Renewal ZEB." Currently, to implement the plan, we are converting the existing buildings owned by the Group into a ZEB. We modify buildings by introducing the latest technologies to conserve and generate energy. After renewal, ZEB will be realized by utilizing operational data. We will continue to contribute to the popularization of renewal ZEBs and the achievement of a decarbonized society.

Concept of Green Renewal ZEB

Taisei Corporation Kansai Branch

Applying advanced and general-purpose ZEB technology to meet diverse customer needs

Power generation using building exterior, large storage batteries, AI control, total support including investigation, planning and operation, zero energy, zero CO_2, and zero stress

Taisei Corporation Yokohama Branch

Utilization of general-purpose ZEB technology for medium-scale stock officescustomer needs

External wall/window power generation, reinforcement of thermal insulation, general-purpose equipment ZEB, conversion to wooden interior, biophilic design, and infectious disease control at offices and training centers

TAISEI U-LEC Co., LTD. Kawagoe Plant

Carbon neutral plan with mega-solar power facility

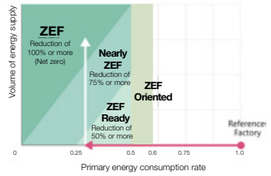
Rooftop solar power generation, carbon recycled concrete, CLT, Conversion to 100% ZEB for office buildings

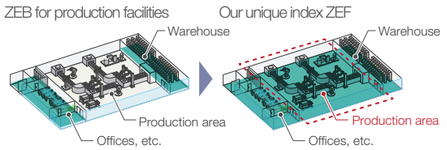
NET ZERO ENERGY FACTORY

Our Unique Index for Factories' Zero Energy Consumption, "ZEF"

Taisei Corporation defined Net Zero Energy Factory (ZEF) as a production facility aiming to reduce its required annual primary energy balance to zero with energy conservation and generation. For ZEF, we adequately evaluate the energy* consumed in the factory, including air conditioning, ventilation, lighting, hot water supply, and elevators in production areas of the plant, which had not been included in the ZEB assessment. By calling it "Green ZEF®," we will promote the promotion of the application of ZEF as well as the expansion of decarbonizing activities.

*Excluding energy consumption required for production facilities





ZEF's First Project

H1 Building of Oki Electric Industry Honjo Plant, where our first ZEF project began, obtained the highest rating on a 5-point scale under the Building-Housing Energy-efficiency Labeling System (BELS)*1, and became the first large-scale production facility in Japan to receive ZEB certification*2.

Oki Electric Industry Honjo Plant H1 Building

*1 Building-Housing Energy-efficiency Labeling System (BELS)
A third-party certification system led by the Ministry of Land, Infrastructure, Transport and Tourism that specializes in the energy-saving performance of buildings. The BEI (energy saving performance index) is calculated in accordance with the calculation method determined by the government. The number of ☆ is determined in five stages according to the value, and a building that has superb energy saving performance among the highest ranked ☆ 5 is certified as ZEB.

*2 ZEB
A building that reduces primary energy consumption by 50% or more from the standard primary energy consumption, excluding the amount of energy generated, and reduces the amount of primary energy consumption by 100% or more from the standard primary energy consumption by adding the amount of energy created.

T-WOOD®

Taisei Corporation's Wooden Building Building Made of Wood with CO_2 Fixation Effect

The promotion of the utilization of wood contributes to control of global warming due to its carbon fixation property, and spaces made of wood are effective to keep the mind and body healthy.

Taisei Corporation has a track record that contributed to the creation of new wooden architectural traditions through the succession of innovations working on both traditional and modern buildings. T-WOOD® series is the technology that we have developed for wooden buildings. They satisfy the performance and economic needs of modern architecture and can be used for a wide range of purposes from new construction to renovation.

Taisei Corporation's facilities

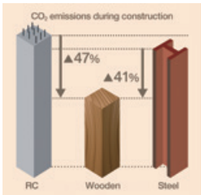
Maibara City Hall

Omiya ward office, Omiya library

Reducing CO_2 Emissions during Construction

Compared to reinforced concrete (RC) structures or steel construction, wood products are easy to manufacture and transport. Therefore, they are a material that emits less CO_2 during construction. In addition, since the weight of buildings is lighter, the burden of the construction of foundation structure and earthwork can be reduced, thus reducing CO_2 emissions.

CO_2 emissions can be cut further by reusing wood products.



Conservation and Creation of Diverse Natural Environment "10-year Nurturing of Forests"

In the development of the Fujisan Nanryo Industrial Park, we conducted the "10-year nurturing of forests" project, modeled after the natural forest, using trees suitable for the local environment. It has been confirmed that a forest with biodiversity richer than those of the surrounding forests was formed 10 years after the planting of saplings. To create a forest, we used a method of "nature-type greening" that nurtures forests by having trees competing each other. As an industrial park that coexists with nature and interacts with the local community, it has received the Environment Minister's Award at the 49 Environmental Awards.

Ten years after the planting

T-eConcrete® / Carbon-Recycling

Recycling CO_2 as a Resource
Development of Environmentally Friendly Concrete

Taisei Corporation has developed and commercialized the T-eConcrete® series, environmentally friendly concrete that reduces CO_2 emissions by replacing some or all of its cement with industrial by-products and carbon recycled products. In addition, we have developed the T-eConcrete® / Carbon-Recycling, carbon-recycled concrete that reduces CO_2 emissions to a negative level and achieves carbon negative.

T-eConcrete® / Carbon-Recycling uses calcium carbonate, which is produced by reacting calcium components with CO_2 recovered from factory exhaust gas, and solidifies calcium carbonate with binding materials consisting mainly of blast furnace slag, an industrial by-product, to fix CO_2 in concrete. As a result, problems such as corrosion of reinforcing steel inside concrete and deterioration of strength, which occurred when CO_2 was directly incorporated into concrete, have been improved. In addition, it has become possible to reduce the CO_2 balance of concrete by incorporating a large amount of CO_2.

The Company has developed a number of environmentally conscious concrete technologies, including the "T-eConcrete® / Zero-Cement Type," which received the Japan Society of Civil Engineers' 2014 Environmental Award (Group I) and the Engineering Society of Japan's 2021 Engineering Incentive Special Award. T-eConcrete® / Carbon-Recycling was created by combining the previous technical research results and existing technologies.

Practical Application of Environmentally Friendly Concrete Technology

The Zero-Cement Type of the environmentally friendly concrete T-eConcrete® series is the first concrete in Japan to be used in the shield segment. Since then, it has been applied in various fields. The newly developed T-eConcrete® / Carbon-Recycling has also begun to be applied to on-site pavement, stone-like paving blocks and buildings, and the practical application of the environmentally friendly concrete T-eConcrete® is expanding.

Collaboration with a Study Group

The T-eConcrete® Research Group (core company: Taisei Corporation) was established in 2020 aiming to further contribute to the reduction of CO_2 emissions. Currently, more than 20 companies, including civil engineering and building material manufacturers, are participating in the group. We provide fundamental information such as a rich store of data and knowhow on materials and construction to the member companies in charge of product development. Then, each company integrates them into the manufacturing technology of its own products. In this way, we are working on the development of various concrete products used for the interior and exterior of civil engineering structures and buildings that satisfy customers' needs.

Carbon-recycled stone-like paving blocks