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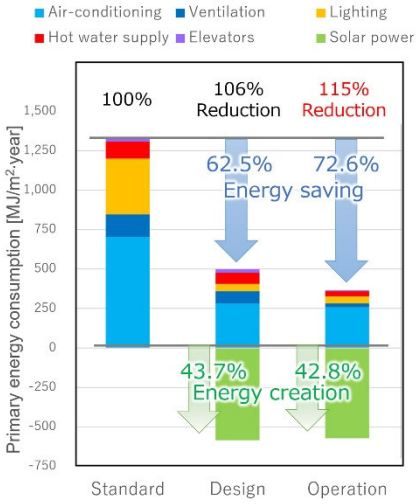
Mitsubishi Electric's Net Zero Energy Test Facility Cuts Annual Operating Energy to Below 0%

New ZEB operational technology reduces standard primary energy consumption by 115% in first year

TOKYO, November 15, 2021 – Mitsubishi Electric Corporation (TOKYO: 6503) announced today that its SUSTIE® net zero-energy building (ZEB) test facility, which launched at the company's Information Technology R&D Center (Kamakura, Kanagawa Prefecture) in 2020, reduced its energy consumption to less than 0%, meaning that it created more energy than it consumed, in its first full year of operation. The facility, a medium-sized office building with more than 6,000m^2 of floor space and equipped with solar panels, deployed ZEB operating technology to optimize operations, resulting in a 115% reduction in energy use compared to standard primary energy consumption as specified in Japan's Building Energy Conservation Law (values differ according to region and building use). The results demonstrate that ZEB-level operation is possible even in dense urban areas while maintaining a highly comfortable and productive work environment.

SUSTIE ZEB test facility



Annual primary energy

Immediately after SUSTIE began operating, newly developed ZEB operating technology was deployed to simulate the use of building equipment, such as air conditioning and lighting, including temperature and brightness, to predict energy consumption and comfort levels for a one-year period. The technology conducted repeated simulations in combination with multi-objective optimization technology using Mitsubishi Electric's proprietary AI technology Maisart®[1] to generate a building operating plan that balanced energy consumption

and human comfort, resulting in energy creation of 571.75MJ/m^2, energy consumption of 366.07MJ/m^2 and an energy balance of -205.68MJ/m^2 (all figures annual).

The technology was shown to reduce the time required for trial-and-error setting of facility parameters, such as temperatures, light dimming rates, etc. for each room, which enabled the building to achieve ZEB-level operation in its first year beginning from the first day of occupancy (October 19, 2020, to October 18, 2021).

[1] Mitsubishi Electric's AI creates the State-of-the- ART in technology Maisart

Overview of SUSTIE

Location		5-1-1 Ofuna, Kamakura, Kanagawa Prefecture, Japan (premises of Information Technology R&D Center, Mitsubishi Electric Corporation)
Size and type		Building: 1,954m^2; Total floor space: 6,456m^2; 4-story steel-frame
Energy performance[2]	Design phase	Annual energy consumption:499.94MJ/m^2 Annual energy creation: 583.66MJ/m^2 World-leading BEI[3] primary energy consumption evaluation index of -0.06 (or 0.37 excluding solar power-energy generation)
	Operation phase	Annual energy consumption:366.07MJ/m^2 Annual energy creation: 571.75MJ/m^2 World-leading BEI primary energy consumption evaluation index of －0.15 (or 0.27 excluding solar power-energy generation)
Certifications[4]		BELS 5-star (☆☆☆☆☆) rating and 〖ZEB〗[5] certification from Building-Housing Energy-efficiency Labeling System (BELS), a third-party certification body in Japan CASBEE Wellness Office certification “S rank” from Institute for Building Environment and Energy Conservation WELL Building Standard® preliminary certification “platinum level” from International WELL Building Institute™

[2] Design phase based on WEBPRO values and operational phase (10/19/20－10/18/21) based on actual measured values. WEBPRO is an energy consumption performance calculation program of the Building Research Institute.
[3] Ratio of primary energy consumption at time of design compared to standard primary energy consumption.
[4] First building in Japan to obtain highest ranks of these three certifications (as of November 15, 2021, internal research).
[5] Highest ZEB ranking in BELS certification system.

Feature of ZEB Operation Technology

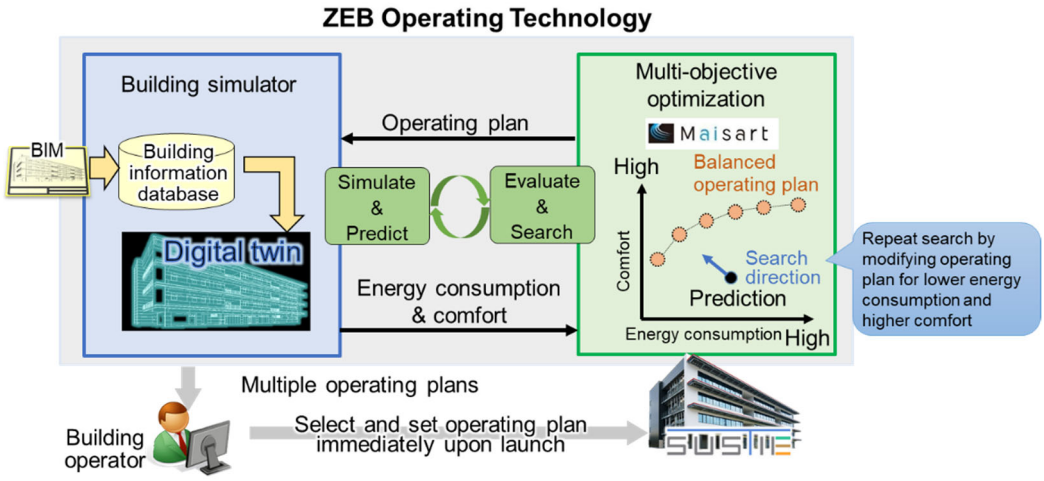
1) Building simulator supported with digital twin

- Digital twin reproduces building conditions with great precision, using building information such as floor area, insulation performance, etc. as well as building equipment type and performance in BIM[6] format.
- Energy consumption and comfort predictions based on temperature settings, dimming rates, changes in occupancy, annual climate, etc.

[6] Building Information Modeling is a method for centrally managing and utilizing information on building lifecycles (planning, design, construction, and operation), including three-dimensional information on buildings and their equipment.

2) Multi-objective optimization technology used to optimize annual operating plan

- Multi-objective optimization technology using Maisart is used to develop an operating plan that minimizes energy consumption and maximizes comfort, seemingly conflicting objectives.
- Using AI, the new technology quickly searches for the prediction that best balances energy consumption and comfort, based on 2,500 calculations instead of the theoretically required 1,000 trillion calculations, and thereby devising an optimal operating plan.



Pre-planning ZEB operation technology used in SUSTIE

About Maisart

Maisart encompasses Mitsubishi Electric's proprietary artificial intelligence (AI) technology, including its compact AI, automated-design deep-learning algorithm and extra-efficient smart-learning AI. Maisart is an abbreviation for "Mitsubishi Electric's AI creates the State-of-the-ART in technology." Under the corporate axiom "Original AI technology makes everything smart," the company is leveraging original AI technology and edge computing to make devices smarter and life more secure, intuitive and convenient.

SUSTIE and Maisart is a registered trademark of Mitsubishi Electric Corporation.
WELL Building Standard is a registered trademark of International Well Building Institute PBC.

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About Mitsubishi Electric Corporation

With 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Mitsubishi Electric enriches society with technology in the spirit of its "Changes for the Better." The company recorded a revenue of 4,191.4 billion yen (U.S.$ 37.8 billion*) in the fiscal year ended March 31, 2021. For more information, please visit www.MitsubishiElectric.com

*U.S. dollar amounts are translated from yen at the rate of ¥111=U.S.$1, the approximate rate on the Tokyo Foreign Exchange Market on March 31, 2021