

10. ZEB Renovation of Technical Research Institute Head Office

Tomohiro Matsunaga, Takashi Sakazaki, Fumiko Nakanishi, Masaya Iwashita, Koichi Inadome

The Net Zero Energy Building (ZEB) concept targets lower building primary energy consumption. Our company is seeking to promote the concept as a ZEB planner authorized by SII while studying ZEB design methods and developing elemental technologies. We renovated the head office of our Technical Research Institute to meet ZEB standards by combining several common and highly effective technologies, setting the renovation target to a nearly ZEB rating (75% of primary energy consumption).

We calculated energy consumption at four steps: the state before renovation; consideration of increase in energy consumption due to functional improvements; the amount of energy supplied by photovoltaics; and, finally, the energy savings required to achieve the goal of nearly ZEB. We deployed an ambient task lighting system controlled by daylight sensors and LED lamps throughout the building. Improving the insulation of glass and the outer walls reduced the heat load on the building, allowing, in turn, the selection of air conditioning equipment of lower rated capacity. These efforts reduced the energy consumption of the entire building by 55%, and to 76% when including the positive energy offset achieved via photovoltaics. This building achieved a nearly ZEB rating under the BELS certification scheme.

Key words: ZEB, renovations