# Environmental Considerations for Value Chain Management

Design/ Development | Procurement | Production | Packaging/ Transportation | Usage | Disposal/ Recycling

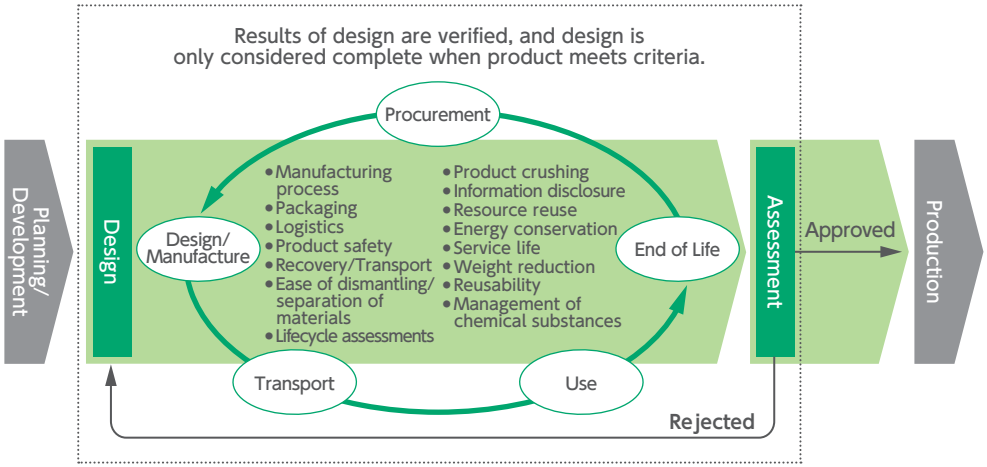
## Implementation of Environmentally Conscious Design

### Product Development in Consideration of the Overall Lifecycle of Products

As the concept of" lifecycle thinking" grows increasingly more important globally, the Mitsubishi Electric Group aspires to reduce environmental load by closely overseeing the entire product lifecycle, from collecting resources to design, manufacture, and disposal after use. Since fiscal 2004, product environmental assessments for all newly developed products have been implemented from the perspective of MET.* From fiscal 2016, we began operating the assessment based on the Design for Environment rules that conform to international standards focusing on lifecycle thinking. Furthermore, with regard to the index that measures improvements in the environmental efficiency of products (Factor X), we have established an original calculation method based on the MET standard so that it can be used for product environmental assessment.

* MET stands for material (effective use of material resources), energy (efficient use of energy) and toxicity (avoiding emissions of toxic substances with potential environmental risk).

### The Concept of Design for the Environment




Product Environmental Assessment that Gives Consideration to MET throughout the Lifecycle of Products

## Research and Development of Products and Technologies to Solve Environmental Issues

### Example Development and Operation of ZEB for Net-Zero Energy Consumption


ZEB testing facility "SUSTIE"

In October 2020, Mitsubishi Electric completed the construction of a net-zero energy building test facility, SUSTIE, on the premises of the Information Technology R&D Center (Kamakura City, Kanagawa Prefecture). This new facility conducts research and development aimed toward the further spread of ZEBs*1. Looking ahead to the future of ZEB, we are working to realize Mitsubishi Electric's original ZEB+® (zeb plus)*2 concept and to enhance the functionality of buildings, for example by increasing the efficiency of working environments.

SUSTIE has received '*ZEB*' certification as well as the highest BELS*3 5-star rating with regard to the building's energy efficiency. Additionally, it has acquired the highest Rank S certification in CASBEE Wellness Office*4, which is a certification system for the health and comfort of an office. SUSTIE became Japan's first medium-sized office building (building alone) with a total floor space of more than 6,000m² to obtain both of these certifications. This proves that SUSTIE has simultaneously achieved "energy efficiency," "comfort," and "healthiness," which has hitherto been considered difficult.

ZEB is more than just a building design. It is important for ZEB to be operated as planned at the time of design, as well as for it to be further improved based on the results of its operation. More than fifty different experiments are currently underway at SUSTIE. Relevant divisions across the company will be kept informed of the outcome of these experiments, so they can also be used for the development of new products.

*1 ZEB: Net-Zero Energy Building

*2 ZEB+®: Mitsubishi Electric's unique initiative that aims to enhance building functionality by adding such values as productivity, comfort, convenience, and business continuity to ZEB, and managing a building throughout its lifecycle.

*3 BEL: Building-Housing Energy-efficiency Labeling System

*4 CASBEE Wellness Office: A tool for evaluating the specifications, performance, and efforts of the office area of buildings to support the maintenance and improvement of the health and comfort of their users.

#### Definition of ZEB

ZEB is a building designed for net-zero primary energy consumption on an annual basis. Buildings are classified into four ranks according to their reduction rate of primary energy consumption. SUSTIE is ranked in the highest '*ZEB*' category, as it has achieved a reduction of 106% through energy saving and creating measures compared with the standard primary energy consumption.

#### ZEB Ranking (Classification According to Reduction in Primary Energy Consumption)

| | |
|---|---|
| *'ZEB'* | Energy savings (50% or more reduction) + 100% or more reduction through energy creation |
| *Nearly ZEB* | Energy savings (50% or more reduction) + 75% or more reduction through energy creation |
| *ZEB Ready* | 50% or more reduction through energy savings |
| *ZEB Oriented* | 30% or more or 40% or more reduction*5 through energy savings |

*5 For buildings with a total floor space of more than 10,000 m². The required rate of energy savings varies depending on the type of facility.