MITSUBISHI ELECTRIC
Changes for the Better
Automating the World

e-F@ctory | e-F@ctory Alliance | Toward Manufacturing in a Decarbonized Society

Driving

National Sustainability

by DIGITALIZING & DECARBONIZING for Thailand Industry and Society

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As a general electronics manufacturer, we leverage our efforts and knowledge in order to provide solutions to "realize a decarbonized society" and "address labor shortages."

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Energy-saving Initiatives of Mitsubishi Electric

1 Introduction of high efficiency equipment

Cast resin transformers for power distribution

EX α series

3-phase motors

SF-PR

IPM motors

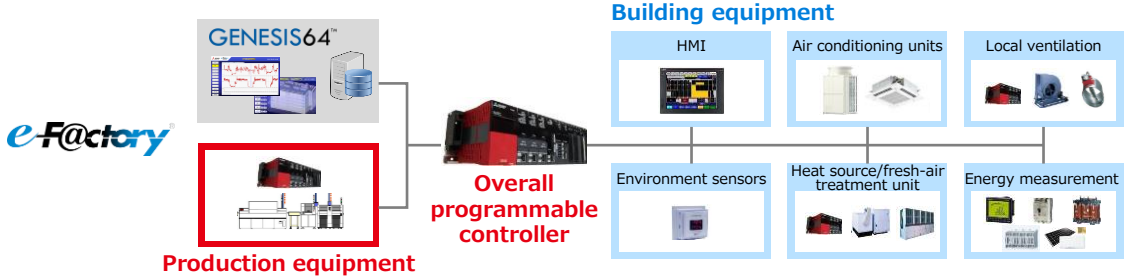
MM-EFS

Inverters

FREQROL-A800

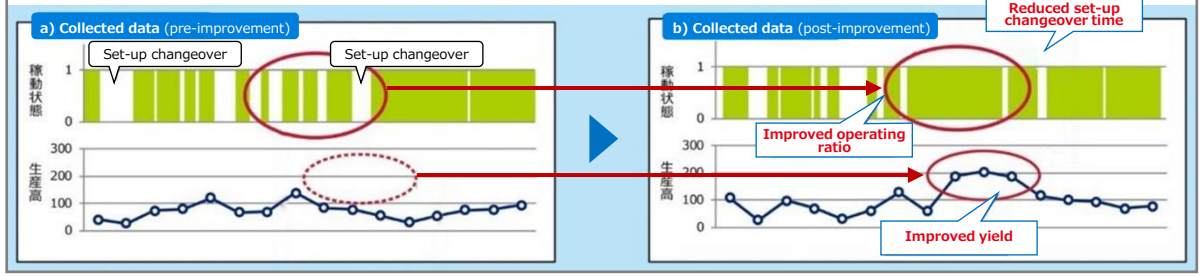
2 Construction of an energy management system

Visualization of all types of information through general-purpose programmable controller and network connection to facilitate simple analysis and improvement



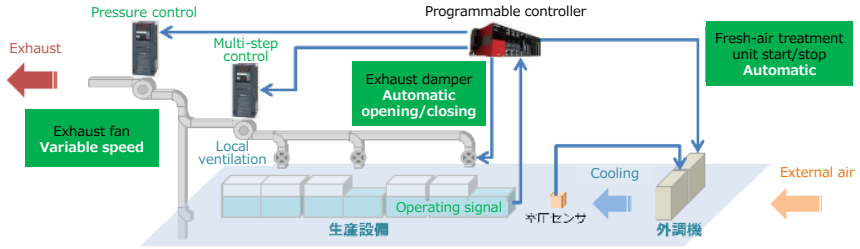
3 Improved productivity through FA-IT collaboration

Collects and analyzes the operating condition of each piece of equipment. Reduces set-up changeover time and improves productivity and operating ratio



4 Collaborative control between building equipment and production equipment

Optimal operation of building equipment (local ventilation) to suit production equipment operation



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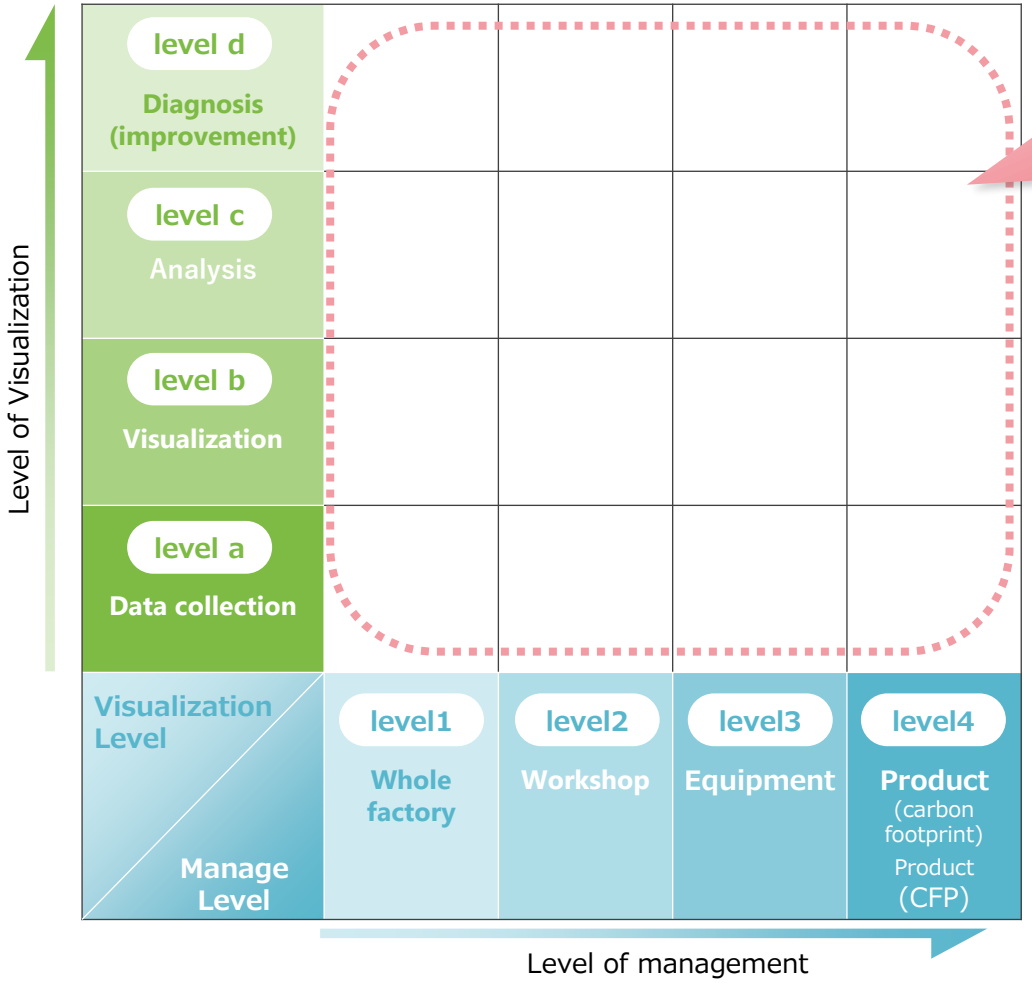
SMKL carbon neutral

As a way to evaluate the current level and improve to the next step
SMKL (Smart Manufacturing Kaizen Level) suggest.



**SMKL stands for carbon neutralization, represented by 16 squares.
It is one of the evaluation indicators (rulers).**

●What SMKL can do

① Carbon neutrality evaluation indicators can be created for each facility, line, factory, and supply chain.

② The current carbon neutralization level can be grasped, and it is useful for continuous improvement activities (Kaizen).

③ Planned investment decisions for carbon neutralization of factories can be made between management and equipment managers.

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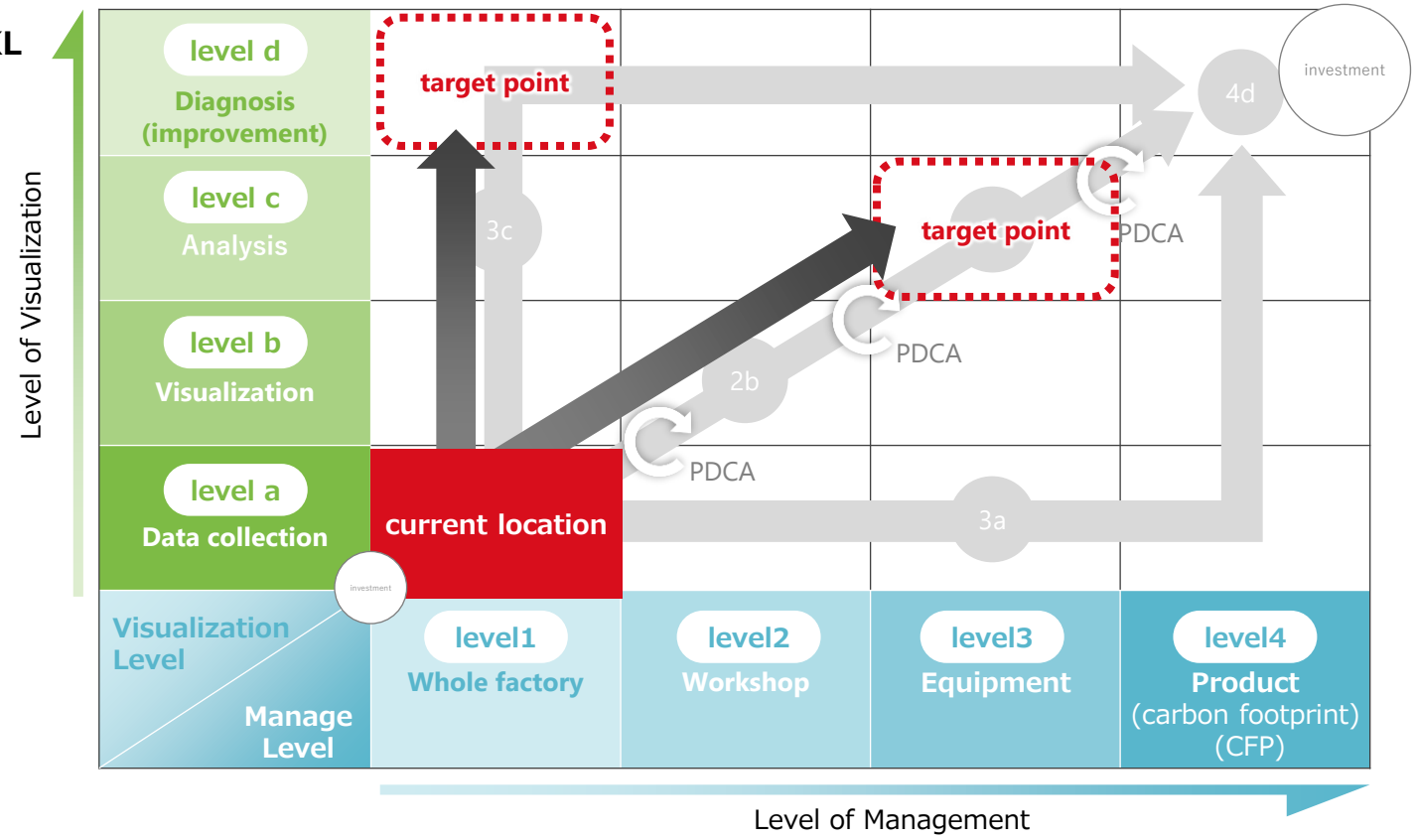
How to use SMKL

You can evaluate your current location and understand to what level carbon neutralization has been achieved. You can also use it as a roadmap for capital investment because you can see what kind of equipment will be introduced and how much investment is required.

● **Features of SMKL**



- **By organizing your company's current position and setting a target point, you can consider capital investment for each step toward your goal.**

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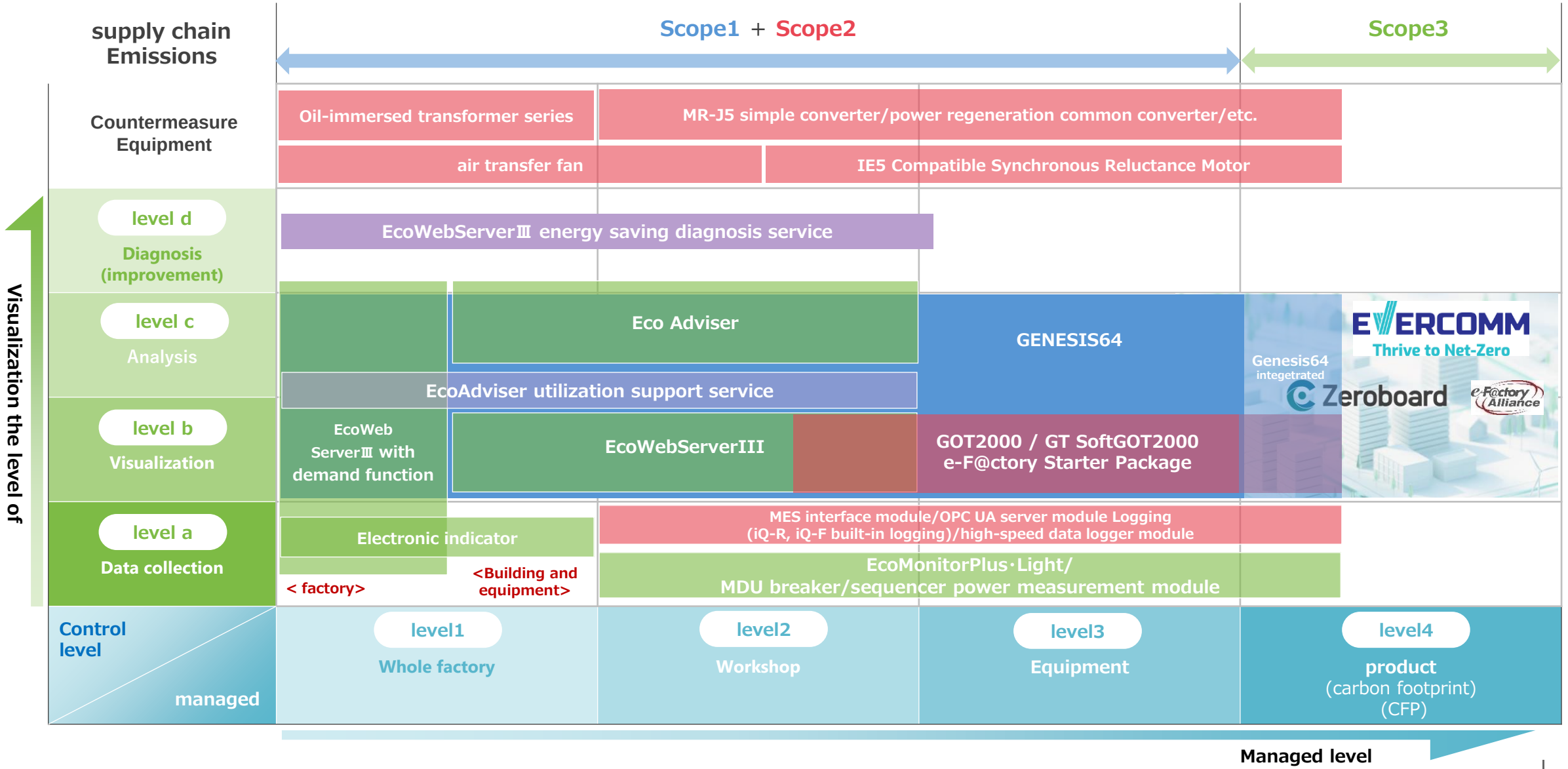
Mitsubishi Electric's proposal for carbon neutrality



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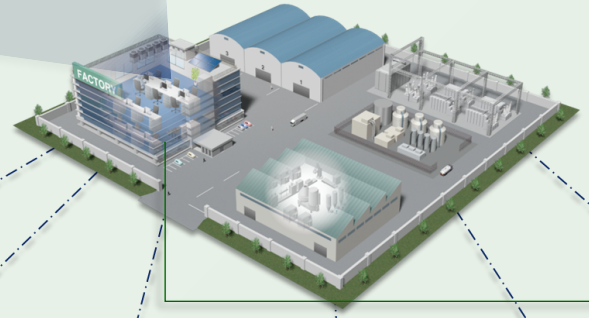
Prepare Visualization Solutions in utilizing related DATA for CO_2 Emission Management

GENESIS64™
"Production Monitoring and Productivity Management"

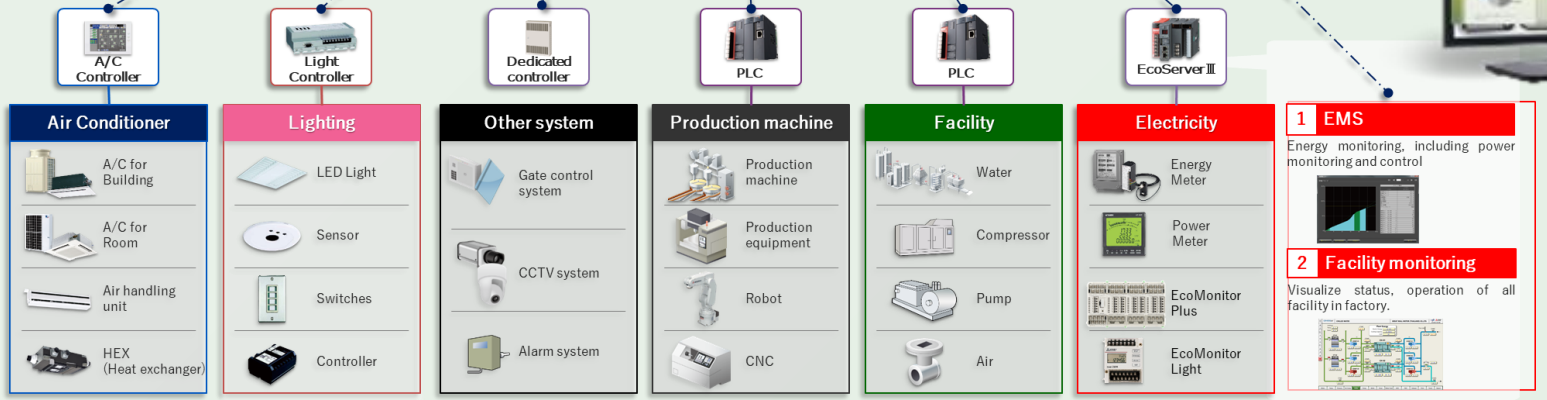
Factory Management System



GENESIS64™

Decarbonization Dashboard
"Can be applied for Carbon Credit"

"Decarbonization/Energy Monitoring & Management System"



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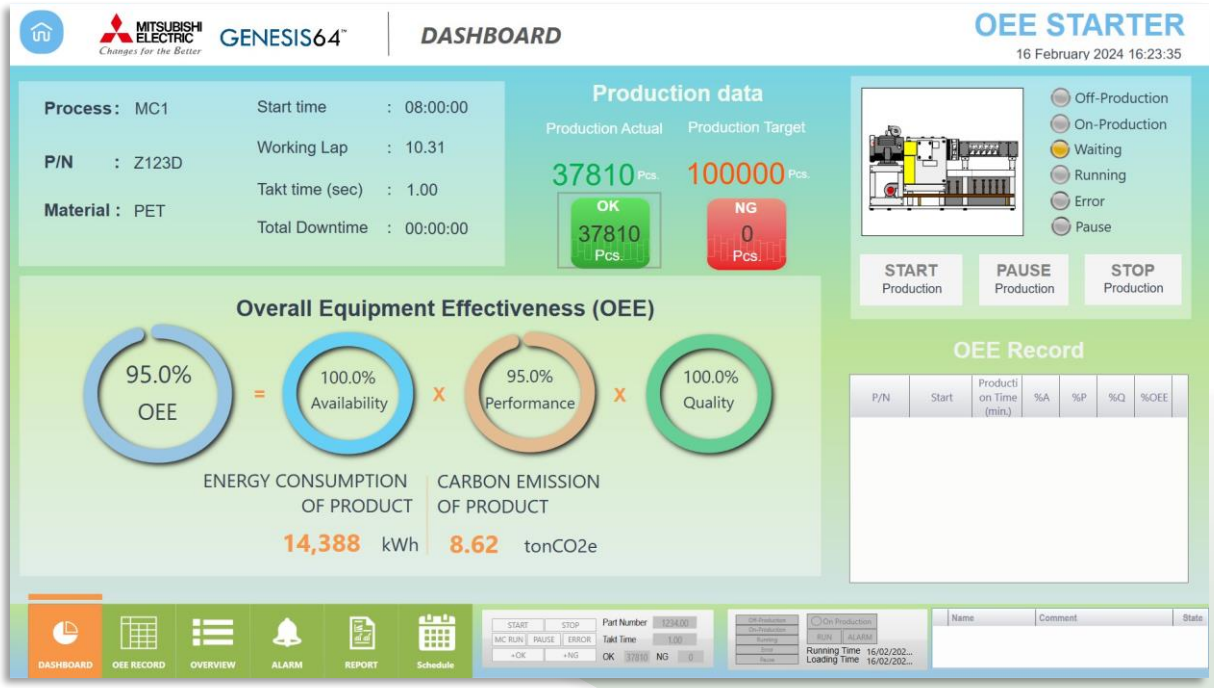
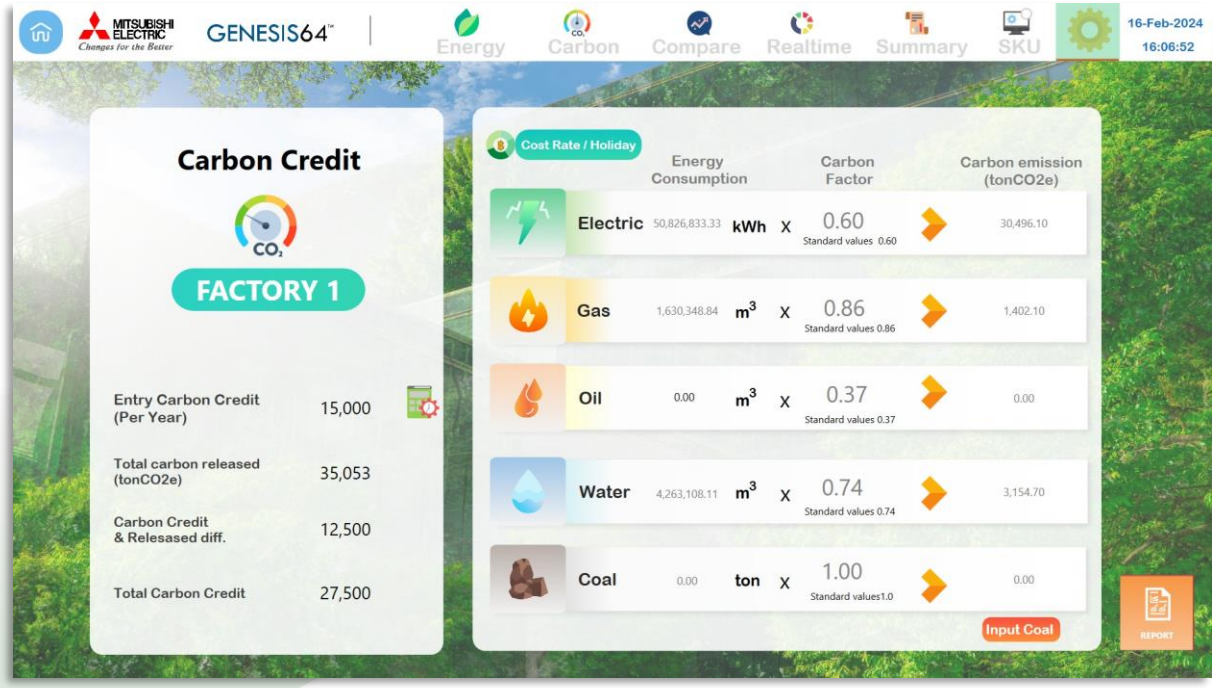


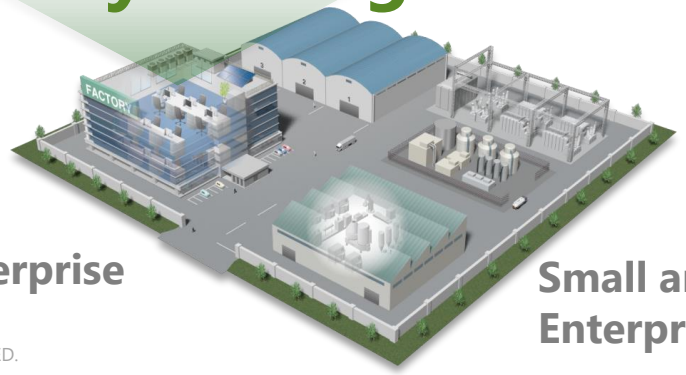
OEE monitoring



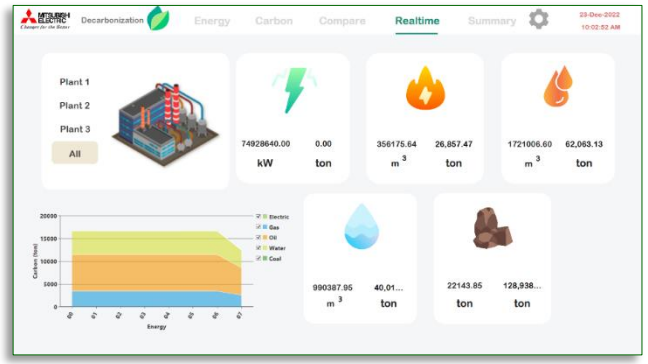
Carbon Emission monitoring

Visualization of Factory Management

Large Enterprise



Small and Medium Enterprise



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Connect both Ecosystems for collaborating together in Decarbonized Society

Digitalizing Ecosystem

Visualization Solution

GENESIS64 SOCOTEC

Decarbonization Dashboard

EVERCOMM Thrive to Net-Zero

zeroboard

carbon neutral

SOCOTEC BUREAU VERITAS

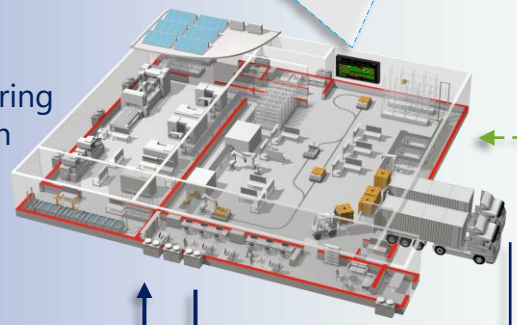
- ❑ T-VER Credit Certification
- ❑ Carbon Credit Register

Global
e-Factory Alliance
1100 partners

Local
e-Factory Alliance
88 partners

MITSUBISHI ELECTRIC Changes for the Better Ecosystem

e-Factory Digital Manufacturing Implementation



Apply Carbon Credit for Trade Condition (Carbon Offset)

Automation Park · TARA · TGI · MARA · SIMTEC · AOTS · CORE

Incentives & Financing

วิริยะประกันภัย THE VIRIYAH INSURANCE · กรมสรรพากร THE REVENUE DEPARTMENT · THAILAND BOARD OF INVESTMENT · JCM · depa · สสว. · EXIM THAILAND · SME Development Bank

TGO Service Platform

- Climate Action Communication
- CAA TGO Climate Action Academy
- NAMA-NDC Tracking
- T-VER Credit Certification
- Product Carbon Labels Certification
- Organization Carbon Footprint Certification
- TGO Activity Promotion
- GHG Situation
- Climate Science
- Climate Action Knowledge Hub
- Climate Action Leader Forum
- Training Program +
- Education Program
- Conferences & Seminars
- Energy · Transport · Industry · Waste · Forestry · Agriculture
- CFP · CFR
- Area-based Footprint & Action Plan
- LESS Certification
- Carbon Neutral & Carbon Offset Certification
- International Crediting Technical Body
- CDM DNA
- JCM JC Secretariat
- Province | City | Municipality Local Administration Org.
- carbon neutral network · Carbon Market · Registry System

❑ Carbon Credit Trade Register

Carbon Trade Platform

Carbon Trade

Decarbonizing Ecosystem

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Collaborate with AMEICC, AOTS and EEC to develop "GX Training" course for manufacturing

AOTS · SOCOTEC · Zeroboard

System Analyst (SA) Course

	Requirement Analysis & Targeting	Technical Solutions & Feasibility		Financial Feasibility	Productivity Improvement
Procedure	System Analysis: Requirement Study & Targeting; Pain Point Analysis; Green Idea Generation & Selection	Scope & Specification: Design Scope; Design Specification	Conceptual Design & Technical Study: Concept Design; Equipment Selection; Proof of Concept	Financial Study: Project Cashflow; Project Budget; Business Profile	Productivity Confirm: Model Builder; Capacity Dry Run; Result Analysis
Tool	Management Interview Lean tool Energy Efficiency Analysis tool	Spec Sheet (Machine, Plant Layout, Product)	Sketching Drawing Carbon Emission Estimate Simulation Program	ROI, NPV, IRR, PB	Simulation Tools Lean Tools IE Tools Energy Efficiency Tools
Result	Pain Point & 3 Idea Solutions (operation, tactical, strategy) Approval Idea	Design Scope & Specification; Conceptual Design Proof of Concept; Automation and Decarbonization Feasibility Report		Financial Feasibility Report	Production Line Improvement @Productivity or Carbon Reduction >10%

Adjusted Decarbonization Contents (Green SA Course draft)

Pain point analysis
- Energy efficiency info.
- Renewables info.
- Decarbonization info.

Propose Solution
- Energy conservation
- Technical of energy efficiency

Propose Feasibility
- Carbon Credit, Net zero
- CFP calculation

Project Presentation
- Automation concepts with decarbonization

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Measures to address labor shortages

Helping to solve the issue of labor shortages by utilizing automation and AI technology

Automation

Skill transfer

Maisart

To address issues such as a declining labor force and skill transfer, we support labor-saving and quality stabilization by providing robots, sensors, and AI technology.

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Human Resource Development -Overview of Educational Institutions & Training Networks in Thailand

12 Vocational Colleges

1.) A General Secretary of Vocational Education Commission
2.) Rayong Technical College
3.) Saraburi Technical College
4.) Uttaradit Technical College
5.) Ayutthaya Technical College
6.) Nakorn Sri Thammarat Technical College
7.) Khon Kean Technical College
8.) Minburi Technical College
9.) Eastern College of Technology (E. Tech)
10.) Nakorn Ratchasima Technical College
11.) Chonburi Technical College
12.) Chitralada Technology Institute

23 Universities

1.) Mahanakorn University
2.) Pathumwan Intst. Of Technology.
3.) King Mongkut's University of Technology North Bangkok
4.) Thai-Nichi Institute of Technology
5.) King Mongkut's Institute of Technology Ladkrabang
6.) Rajamangala Lanna University of Technology
7.) Rajamangala Group – 9 Universities
8.) Institute of Fields and Robotics (FIBO)
9.) Burapha University – Automation Park and AAI Course
10.) Panyapiwat Institute of Management
11.) Kanchanaburi Rajabhat University
12.) Thepsatri Rajabhat University
13.) Prince of Songkla Univesity
14.) Srinakharinwirot University –In 2021 Data Science
15.) Sirindhorn International Institute of Technology

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Integrated all Industrial Transformation Ecosystems for working together in EEC area

Mitsubishi Electric Alliance Partner

Global: e-F@ctory Alliance — 1100 partners

Local: e-F@ctory Alliance — 88 partners

Education

Association & Government

Financial Support

MITSUBISHI ELECTRIC — Being a center for collaborating and integrating all parties in Ecosystem to driving forward the industrial transformation in EEC

Connected with DEPA in Digital Technology Promotion/Program

"Center of Collaboration for Industrial Transformation"

Connected with NECTEC in Advance Technology Testbed & Sainbox

Collaborating together for driving forward the industrial transformation in Thailand

Education

Competitions Collaboration

300 Persons /year

VEC PLC Competition

- Regional
- National

42 Persons /year

DSD World Skill

27 Persons /year

RMUT Competition

9 RMUT

48 Persons /year

TPA Robot contest

TPA Robot Contest
Thailand Championship
หุ่นยนต์ ส.ส.ท. ชิงแชมป์ประเทศไทย

120 Persons /year

Smart Automation4.0

Training AD Didactic Systems Teachware

TGI

Y2023

Innovation Technology

+ 537 Persons /year

Mitsubishi Electric FA Cup

e-F@ctory

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The Important of New Jigsaw

Demands Creation Management

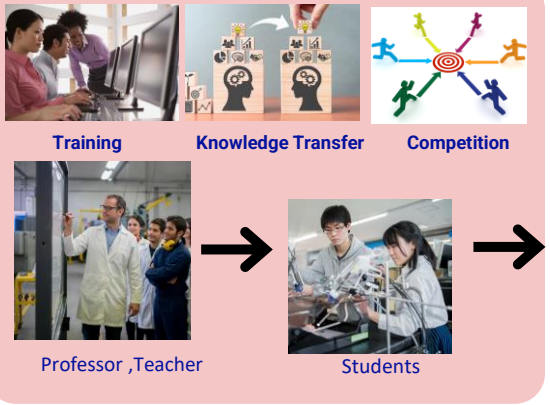
GOALS
- Create automation workforce in Thailand
- Develop Digital Manufacturing in Thailand
- Contribute to Decarbonized Society

Supply

MITSUBISHI ELECTRIC Changes for the Better

Factory Automation Systems Provider

Education Activities

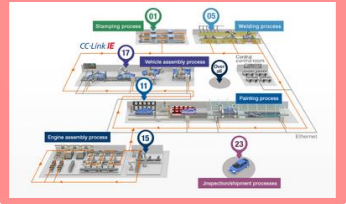


Manage a good experience with Mitsubishi Electric Brand --> Loyalty
<Future User Development>

Workforce

Qualified Future User

MITSUBISHI ELECTRIC Changes for the Better Benefits for Mitsubishi Electric



Digital transformation in manufacturing

Automation Users

Demand

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MITSUBISHI ELECTRIC
Changes for the Better

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Thank you

for your kind attention

Toward Manufacturing in
a Decarbonized Society

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