

# Mitsubishi Electric

## Energy Management System for Factory (FEMS) & Building (BEMS)

21 Nov. 2018  
K. Miyashita, President  
Mitsubishi Electric do Brasil

1. Mitsubishi Electric Corporation - Overview & Policy
2. Our Energy Management System (EnMS)
  - 2-1 FEMS (Factory Energy Management System)
  - 2-2 BEMS (Building Management System)
  - 2-3 Other EnMS

# 1. Mitsubishi Electric Corporation

## Mitsubishi Electric Corporation

Head Office:	Marunouchi, Tokyo, Japan
President & CEO:	Takeshi Sugiyama
Established:	Jan. 15, 1921 (100 <sup>th</sup> year in 2021)
Consolidated Net Sales:	4,431 Bil JPY ( <b>US\$ 40 Bil. Net Sales</b> , FY2017)
Operating Income:	319 Bil JPY ( <b>US\$ 2.9 Bil. Profit</b> , FY2017)
Employees:	<b>142,000</b> ( in 40 countries)
Fortune Global 500	<b>No. 279</b> ( 25 <sup>th</sup> in Japan )
Rating	<b>Moody's A1</b> <b>Standard &amp; Poor's A+</b>



## Mitsubishi Electric do Brasil

**Mitsubishi Electric do Brasil / MELCO Automotivos do Brasil**  
150 employees

# 1. Management Philosophy

## Corporate Mission

The Mitsubishi Electric Group will continually improve its technologies and services by applying creativity to all aspects of its business. By doing so, we enhance the quality of life in our society.

Embodiment of the Corporate Mission

**“Global Leading Green Company”**

Growth Targets to be Achieved by FY2020

Net Sales 5 trillion JPY or more  
OPM 8% or more

Initiatives to Create Value

Provide Products, Systems, and Services Globally

Make Strong Businesses Stronger

Technology Synergies/  
Business Synergies

Contemporary Challenges in Society

Environmental issues

Resource/ Energy issues

# 1. Management Philosophy for 17 SDGs

Mitsubishi Electric group will contribute to meeting the SDGs' globally shared 17 goals by continuing to pursue sustainable growth through all corporate activities, including value creation to solve challenges in society



## SUSTAINABLE DEVELOPMENT GOALS 17 GOALS TO TRANSFORM OUR WORLD



# 1. Total Solution in **Brazil/LATAM**



BUILDING  
AUTOMATION



REFRIGERATION  
SYSTEMS



UNINTERRUPTIBLE  
POWER SUPPLIES

## Building Solution



INDUSTRIAL  
AUTOMATION



PROCESS  
AUTOMATION



EDM/LASER  
AND CNC

## Automation & Energy Saving Solution



TRANSPORTATION  
SYSTEMS



VISUAL INFORMATION  
SYSTEMS



AUTOMOTIVE  
COMPONENTS

## Social Infrastructure & Transportation Solution





















# Electrical Energy Cost /Industry (US\$/100KWH in 2017)



BRA 14.7



AVER. 9.8

	COUNTRY	US\$/100KWH in 2017
1	 ITALY	18.02
2	 JAPAN	15.55
3	 GERMANY	14.29
4	 SLOVAK	12.88
5	 BELGIUM	12.75
6	 U.K.	12.60
7	 IRELAND	12.54
8	 SWITZERLAND	12.38
9	 PORTUGAL	12.18
10	 SPAIN	11.29
11	 FRANCE	10.46
12	 AUSTRIA	10.31
13	 KOREA	9.85
14	 DENMARK	9.81
15	 GREECE	9.66
16	 POLAND	8.89
17	 CZECH	8.85
18	 HUNGARY	8.72
19	 CANADA	8.38
20	 NEW ZEALAND	8.31

(Source: DECC, OECD countries)

## 2. Energy Management System(EnMS)

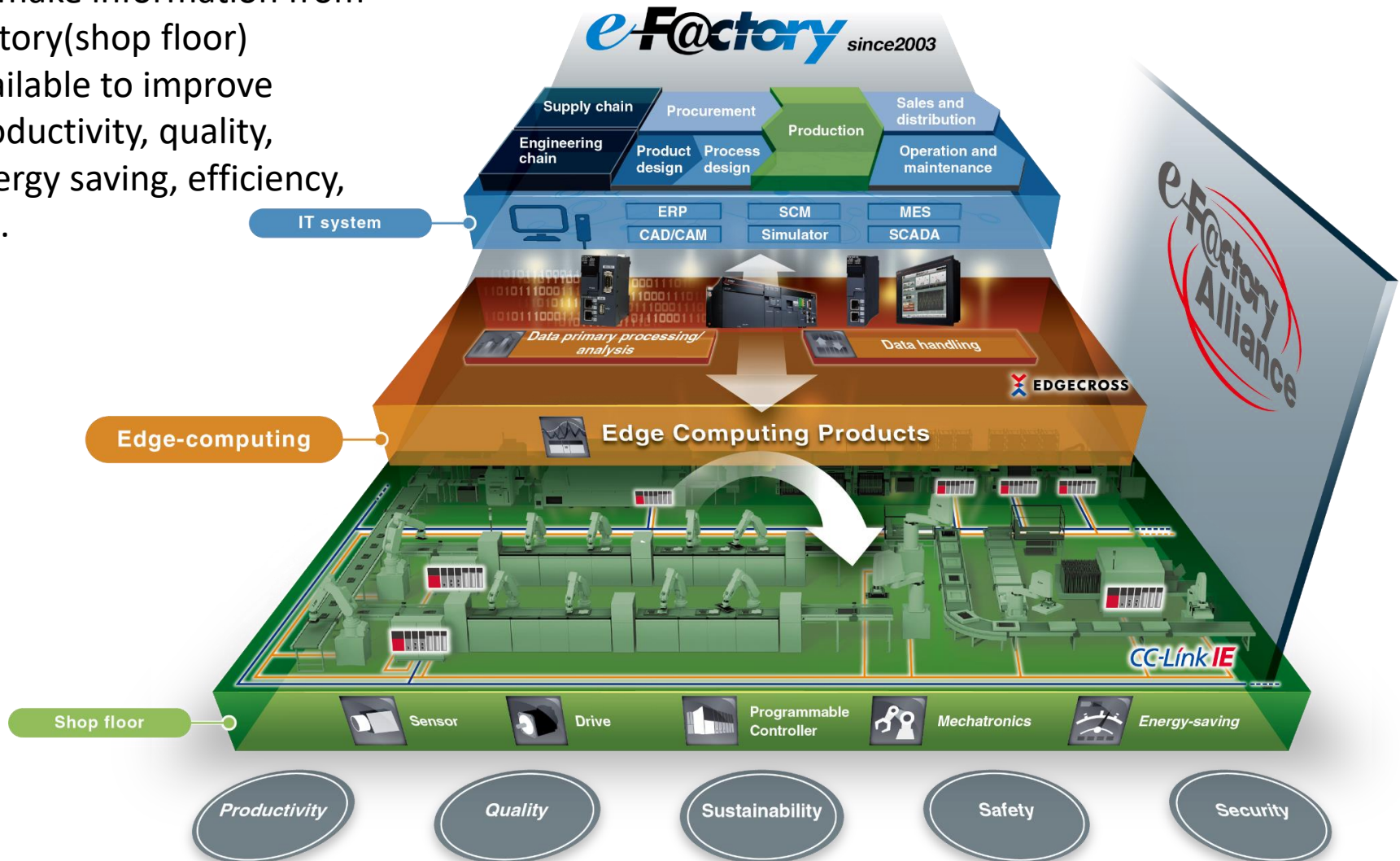
- 2-1 **FEMS** (**F**actory Energy Management System)
- 2-2 **BEMS** (**B**uilding Energy Management System)
- 2-3 **Other EnMS**

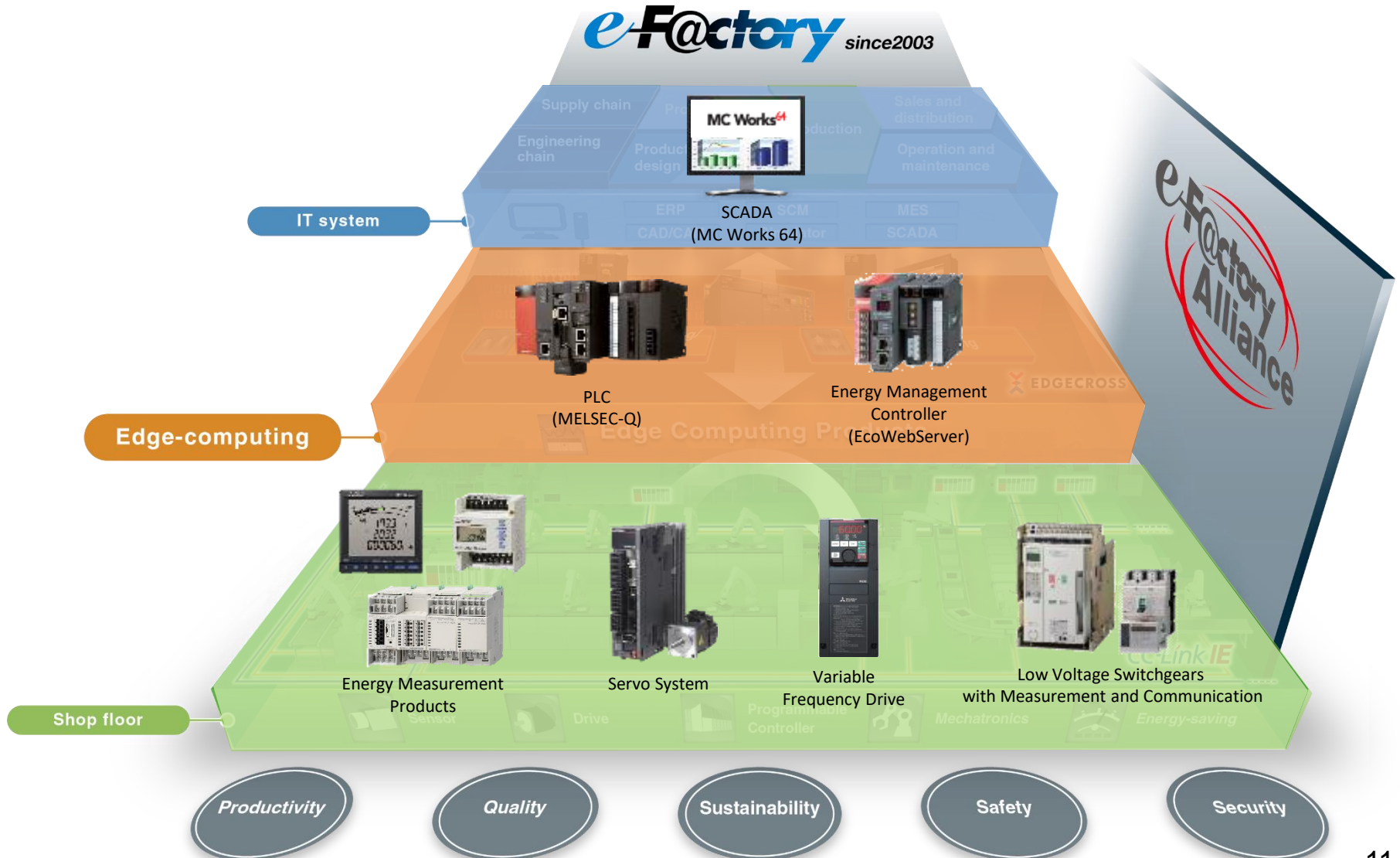


- 2-1 **FEMS** (**F**actory Energy Management System)
- 2-2 BEMS (Building Energy Management System)
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### e-F@actory objective:

To make information from factory(shop floor) available to improve productivity, quality, energy saving, efficiency, etc.







Energy Measurement

Understand energy consumption, acquiring data for trend analysis and actions.



Process Control

Optimize process control for variable demand and personalized items.



Protection and Measurement

Not only protect your system, but keep maintenance easier by using measurement circuit breakers.

Drive Motors with the most efficient solution reducing energy consumption and increasing motor lifespan.



Efficient Motor Control

Control and Visualize your entire Factory, taking energy saving actions based on real-time information.



SCADA  
(MC Works 64)

Store and Control energy information in a web based solution, with quick and easy access.



Energy Management  
(EcoWebServer)



# Mitsubishi Electric - Fukuyama Factory Case

### MITSUBISHI ELECTRIC – FUKUYAMA WORKS

**Since:** February 1<sup>st</sup>, 1943

**Facilities:** 95,000m<sup>2</sup>

**Employee:** 2,000

**Visitors:** 10,000 + /year

#### Manufacturing process of products:

- Circuit Breakers (ACB, MCCB)
- Measurement & Control equipment  
(Power Meter, EcoWebServer etc.)

**More than 1,000 measured points.**



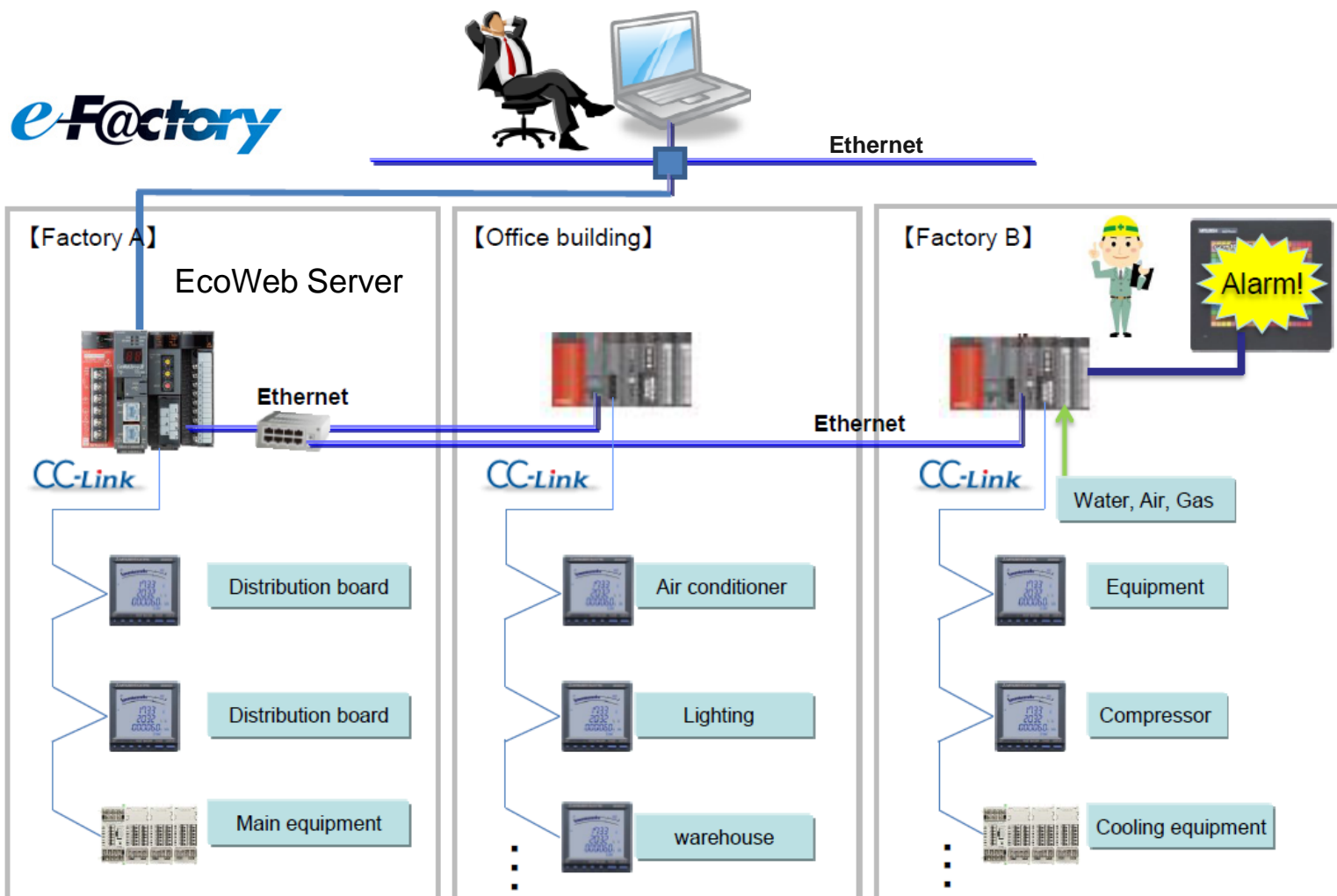
## REDUCTION:

- **ELECTRICITY DEMAND - 1.7 MW/YEAR**
- **ANNUAL CONS. ENERGY - 70 MW<sub>H</sub>/YEAR**
- **ELECTRIC BILL - 25%**

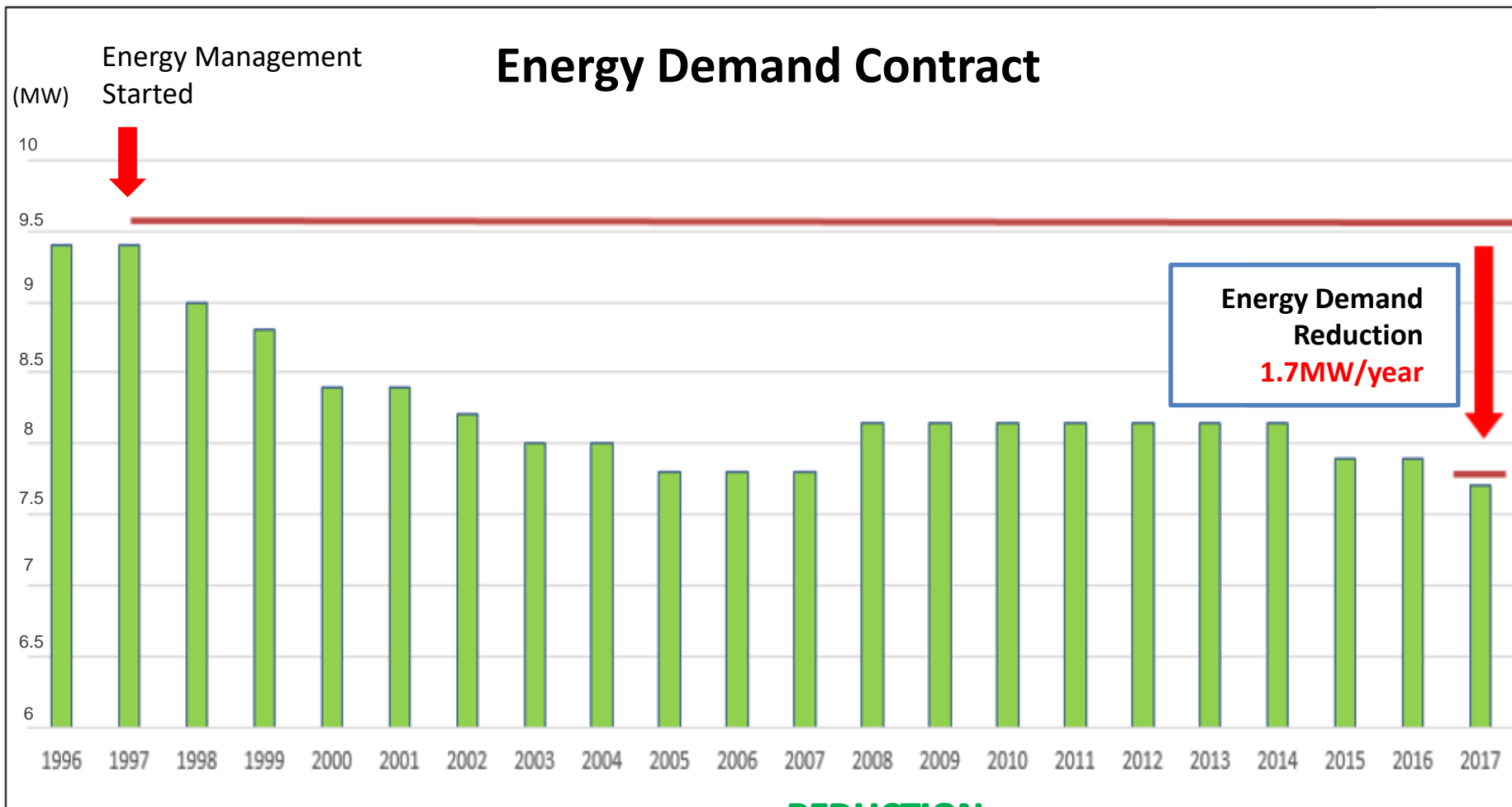
### System Configuration

- **SCADA:** MC Works
- **PLC:** Q-Series
- **EMS:** EcoWeb Server
- **Meters:** ME110, EcoMonitorLight/Plus, ACB, MDU MCCB etc...
- **Remote I/O:** CC-LINK IE Field
- **Inverter:** FR-A800 series

# Mitsubishi Electric - Fukuyama Factory Case



### Mitsubishi Electric - Fukuyama Factory case



**Notes:**

- (1) Energy demand reduction was achieved because of both equipments and operation.
- (2) ISO 14001 certified in December 1997

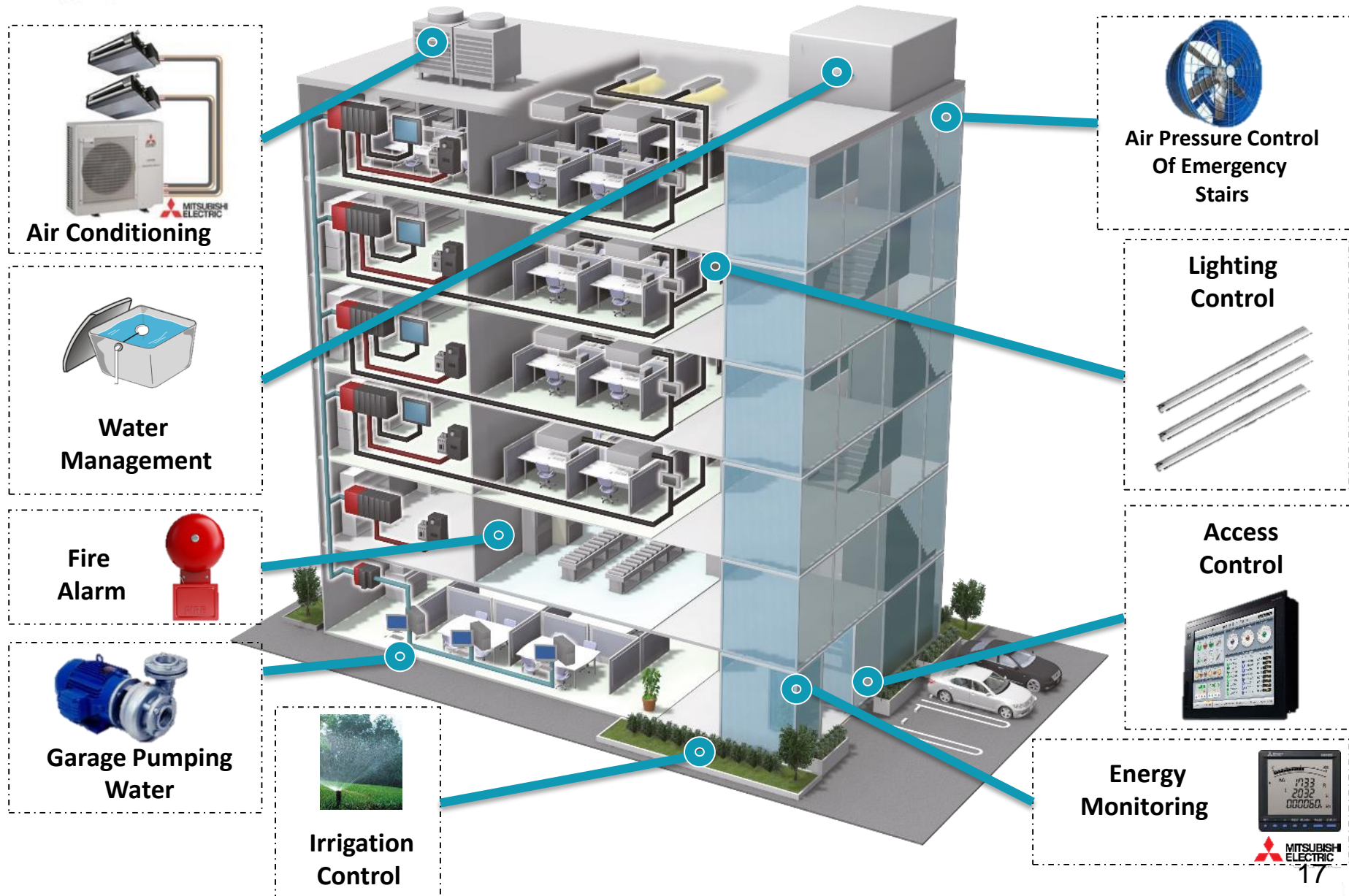
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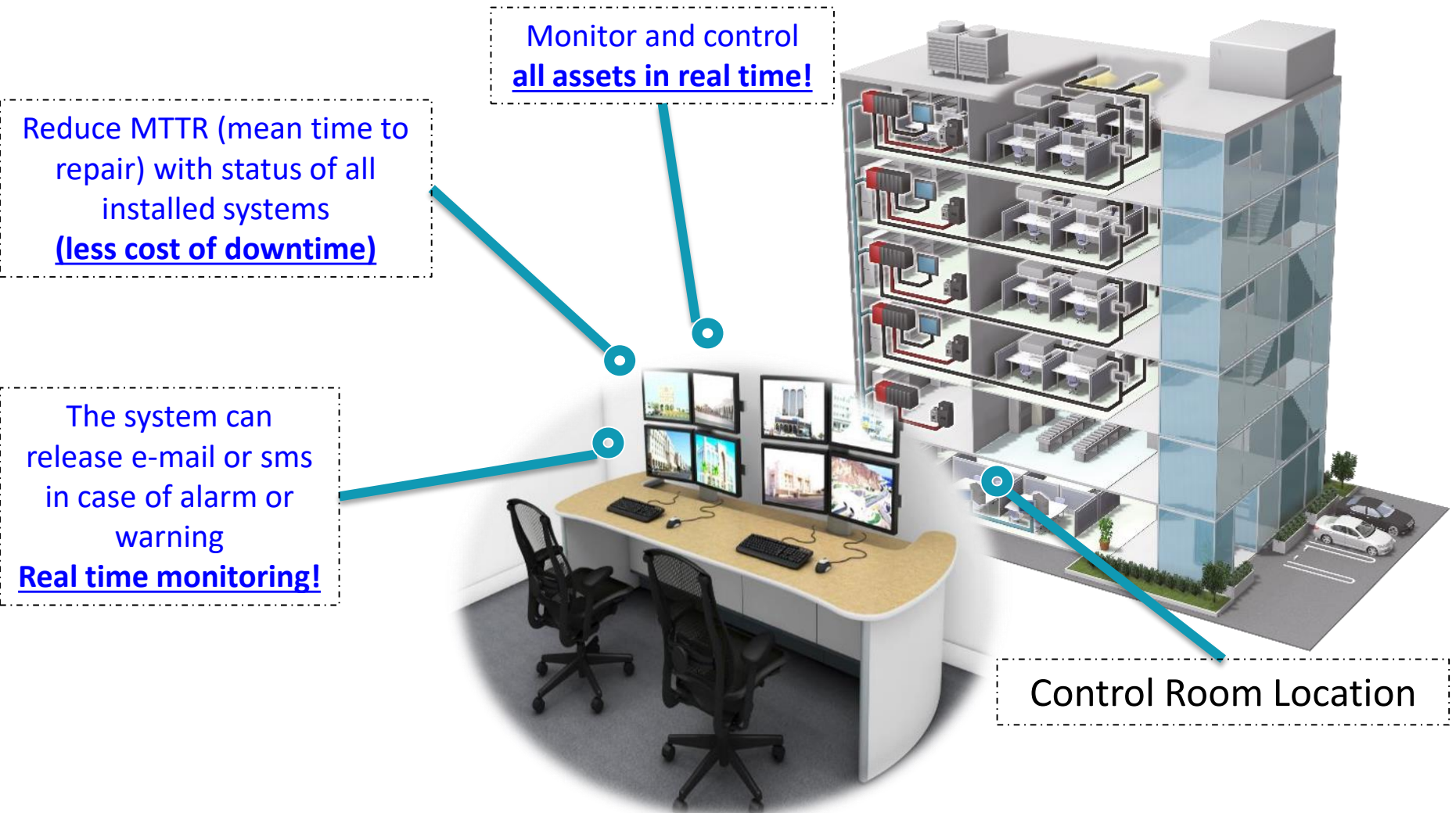
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- 2-3 Other EnMS



## 2-2. Our BEMS



## 2-2. Our BEMS



**BEMS REDUCE THE SYSTEM DOWNTIME  
WITH ENERGY SAVING!**

## 2-2. Our BEMS

### Japan House Sao Paulo

- Japan government project for better understanding & presence of Japanese Technology & Culture in Brazil
- 3 floors with 2,000m<sup>2</sup> at Avenida Paulista.
- With Mitsubishi Electric products;



- Elevator

- JET TOWEL (Hand drier)

- Air conditioning systems  
(High efficiency VRF system)

- BEMS  
(Building Energy Management System)



Elevator



Air conditioners



JET TOWEL

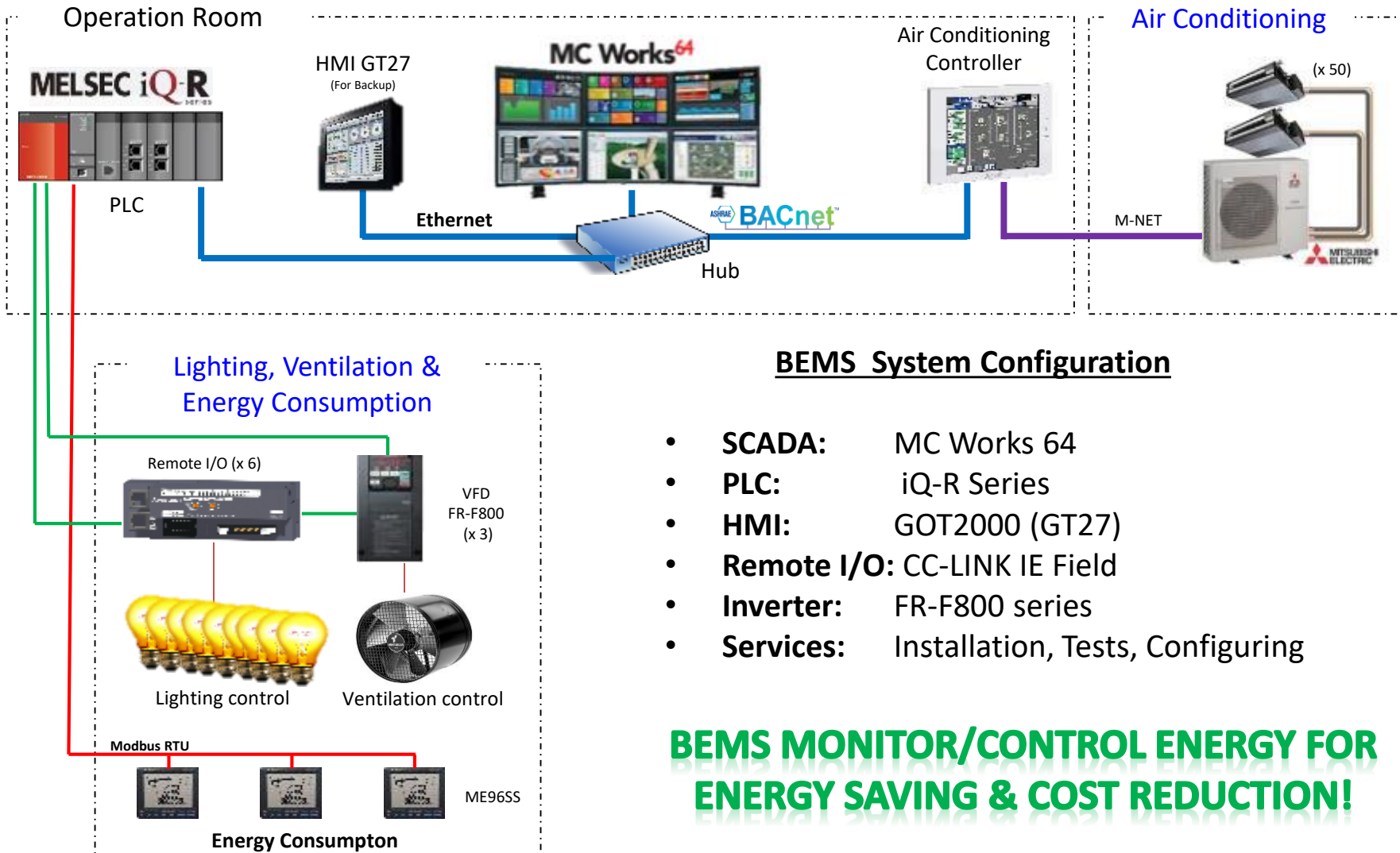


BEMS



## 2-2. Our BEMS

### Japan House Sao Paulo



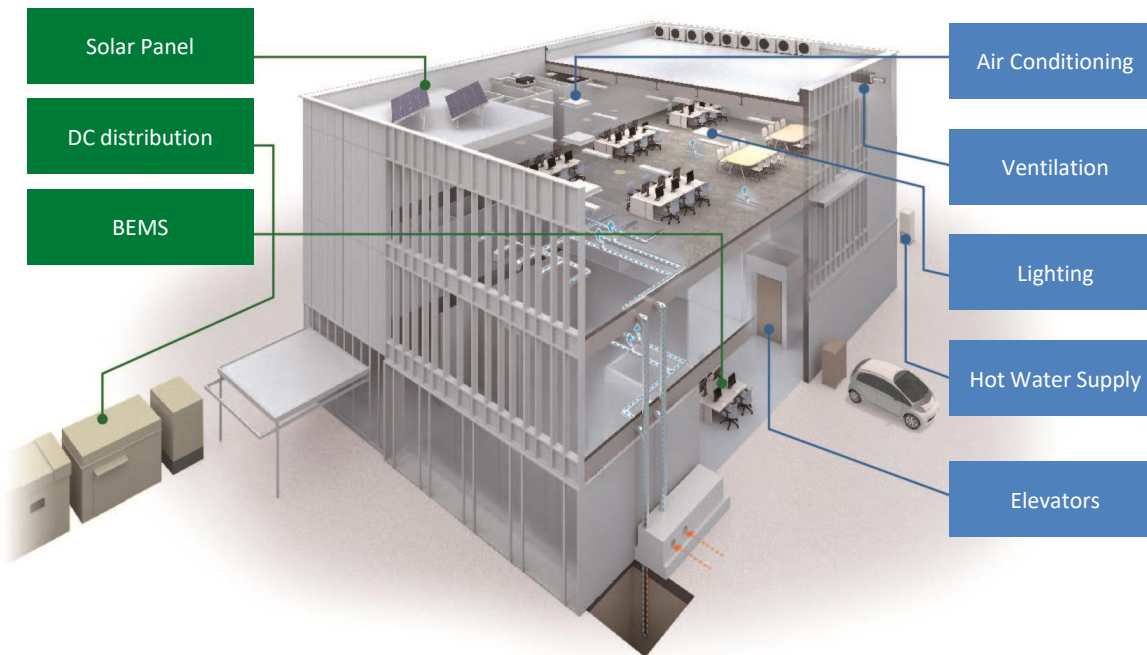
#### BEMS System Configuration

- **SCADA:** MC Works 64
- **PLC:** iQ-R Series
- **HMI:** GOT2000 (GT27)
- **Remote I/O:** CC-LINK IE Field
- **Inverter:** FR-F800 series
- **Services:** Installation, Tests, Configuring

**BEMS MONITOR/CONTROL ENERGY FOR  
ENERGY SAVING & COST REDUCTION!**

### ZEB (net Zero Energy Building) in Japan

**Shirasagi Denki Kogyo's building  
in Kumamoto, Japan  
(after large earthquakes in 2017)**



**With Mitsubishi Electric's**

- ZEB consulting
- Air conditioning systems
- Ventilation
- Hot water supply
- Elevators
- Solar panels
- DC distribution
- BEMS

**And other suppliers technology**

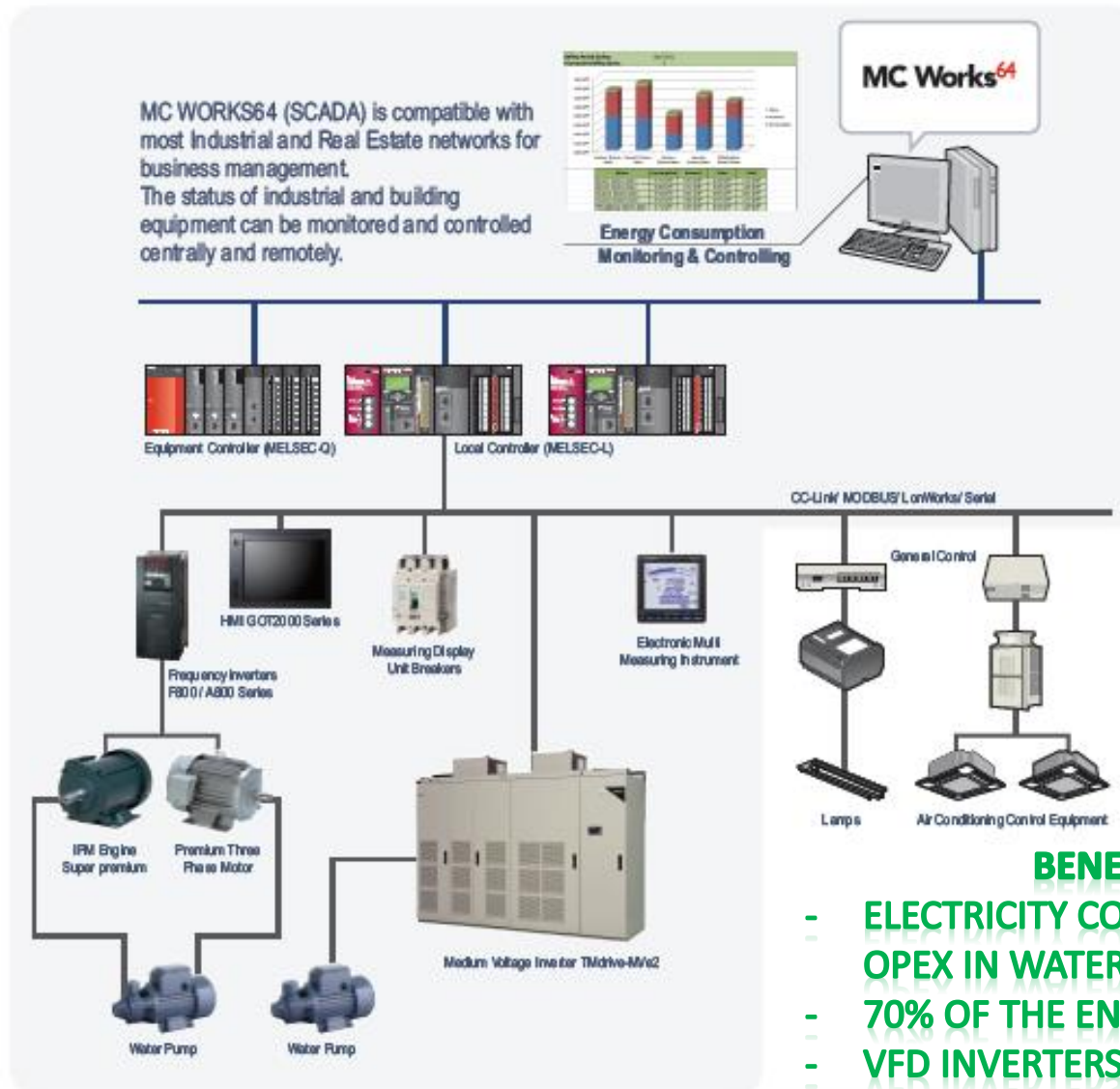
- Geo Power System
- Hot water supply using solar
- Heat Insulation materials etc.

**This building was accredited as  
“ZEB Ready Building” with 50%  
or more energy saving**

**ZEB/BEMS ARE OUR EXPERTISE!**

- 2-1 FEMS (Factory Energy Management System)
- 2-2 BEMS (Building Energy Management System)
- 2-3 Other EnMS

## 2-3. EnMS for Water Treatment (WT) facility



### BENEFITS FOR WT FACILITY

- ELECTRICITY COSTS REPRESENT SECOND HIGHEST OPEX IN WATER OPERATION.
- 70% OF THE ENERGY DEMAND IS FOR PUMPING.
- VFD INVERTERS, CONTROLLERS, SCADA CAN CONTRIBUTE A LOT FOR COST REDUCTION.

### Tokyo International Airport (Haneda Airport)



#### Energy/Water consumption metering/billing system

- For 3 Terminal Buildings
  - 2 Domestic Terminals
  - 1 International Terminal
- 4,000 measured points for Electricity and Water usage
- Products: Remote I/Os, Power Meters, Metering servers, PLC, BACNET communication

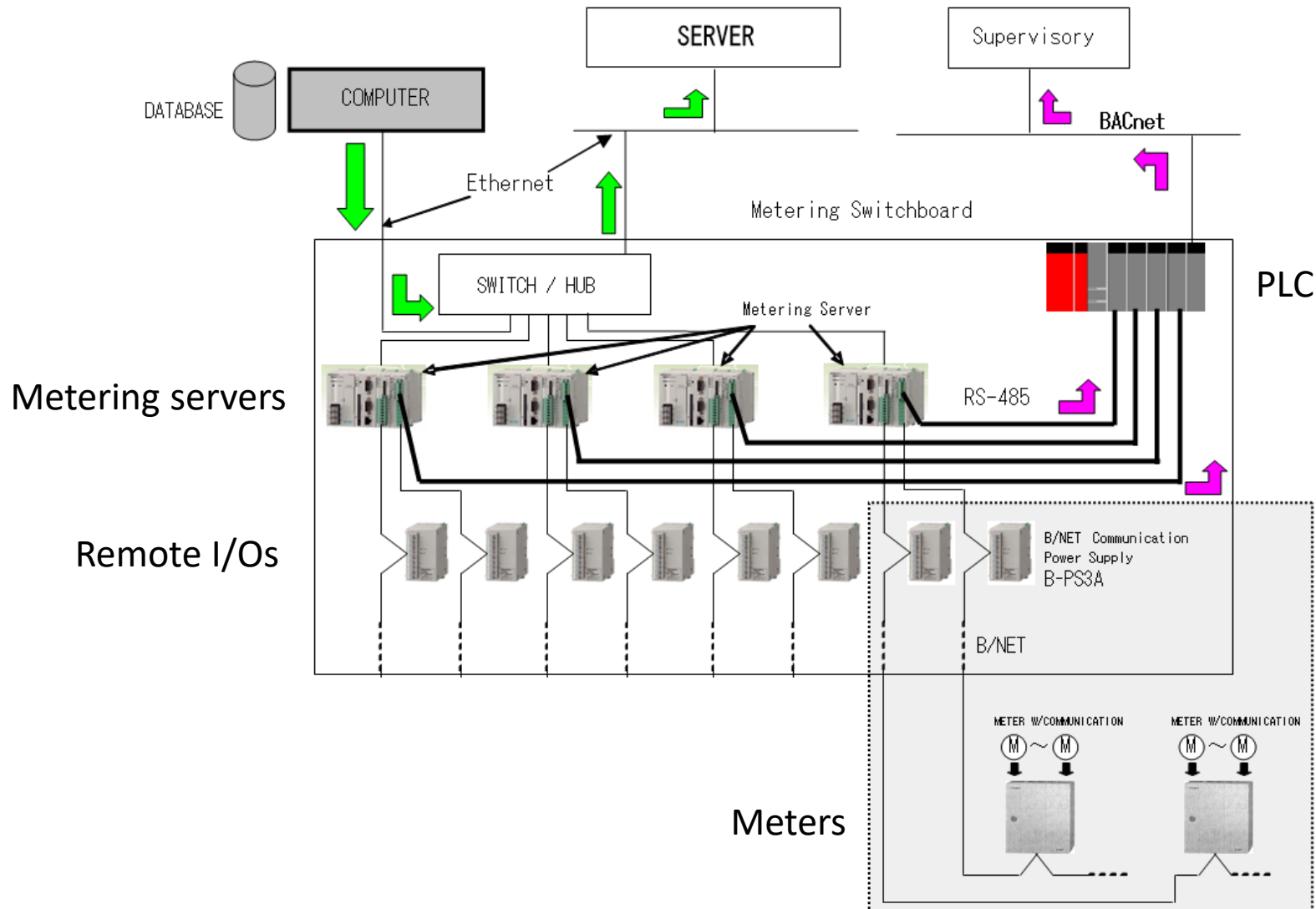
#### BENEFITS FOR AIRPORT

- AUTOMATED ELECTRICITY/WATER METERING AND BILLING SYSTEM.
- TIME SAVING/COST SAVING WITHOUT MANUAL METERING & BILLING.
- MISTAKE FREE BILLING TO TENANTS ETC.

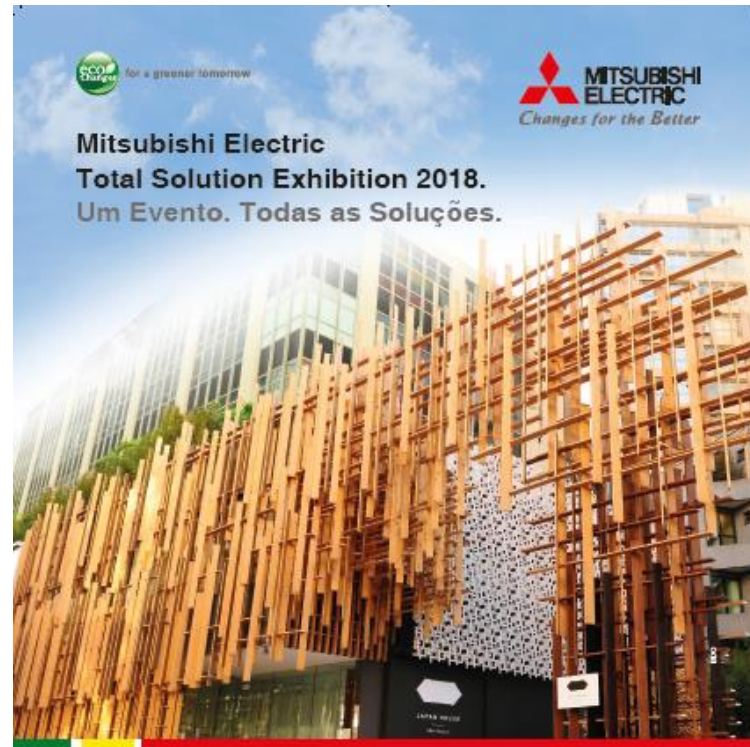


## 2-3. EnMS for airports

### Tokyo International Airport (Haneda Airort)



# Energy Saving Solution is Mitsubishi Electric!



Hugo Miyazaki | Gendare Tsukaki | Biruta Tachikawa

A Mitsubishi Electric apresenta a **Total Solution Exhibition 2018**, uma exposição com suas mais importantes tecnologias disponíveis no mercado brasileiro. Venha conhecer as Soluções Prediais, de Automação Industrial e Economia de Energia e de Infraestrutura Social que, através de inovação contínua, estão criando uma melhor qualidade de vida a todos os brasileiros. De 18 a 20 de Outubro na JAPAN HOUSE São Paulo, com a presença dos atletas da equipe brasileira de tênis de mesa, patrocinados pela Mitsubishi Electric.

[mitsubishielectric.com.br](http://mitsubishielectric.com.br)

**Juntos, criando uma melhor qualidade de vida**