



Core approaches to realize **Net Zero society by JICA – Energy efficiency field –**

(1) Global trend (direction)

(2) JICA's approaches

1) Realizing **Zero Energy Buildings (ZEB)**

2) **Changing boilers to heat pump**

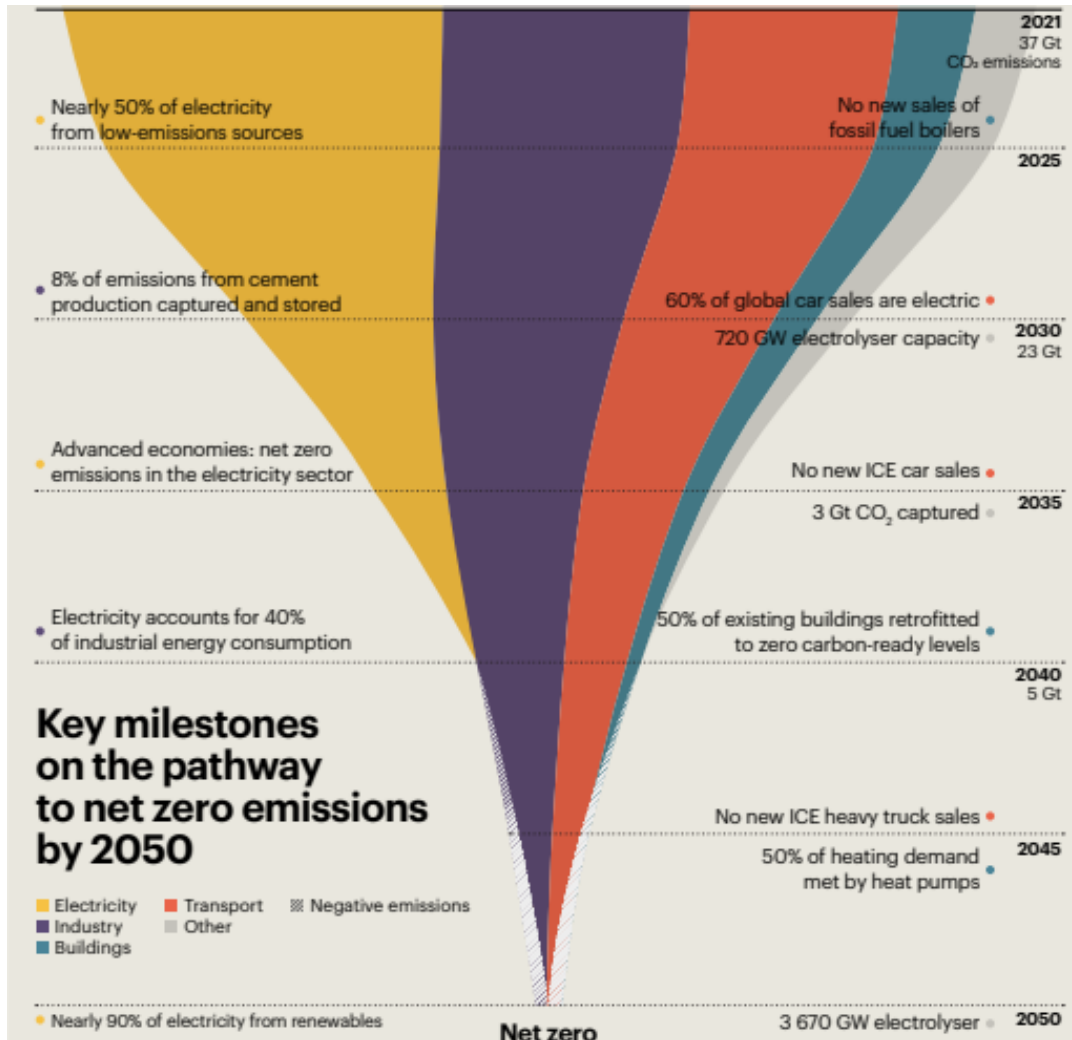
3) **Optimizing EV, RE, electricity quality, EEC and storage etc.**

10th March, 2023

Japan International Cooperation Agency

1. Global trend (direction)

1-1 Up-dated Net Zero Emission by 2050 milestone

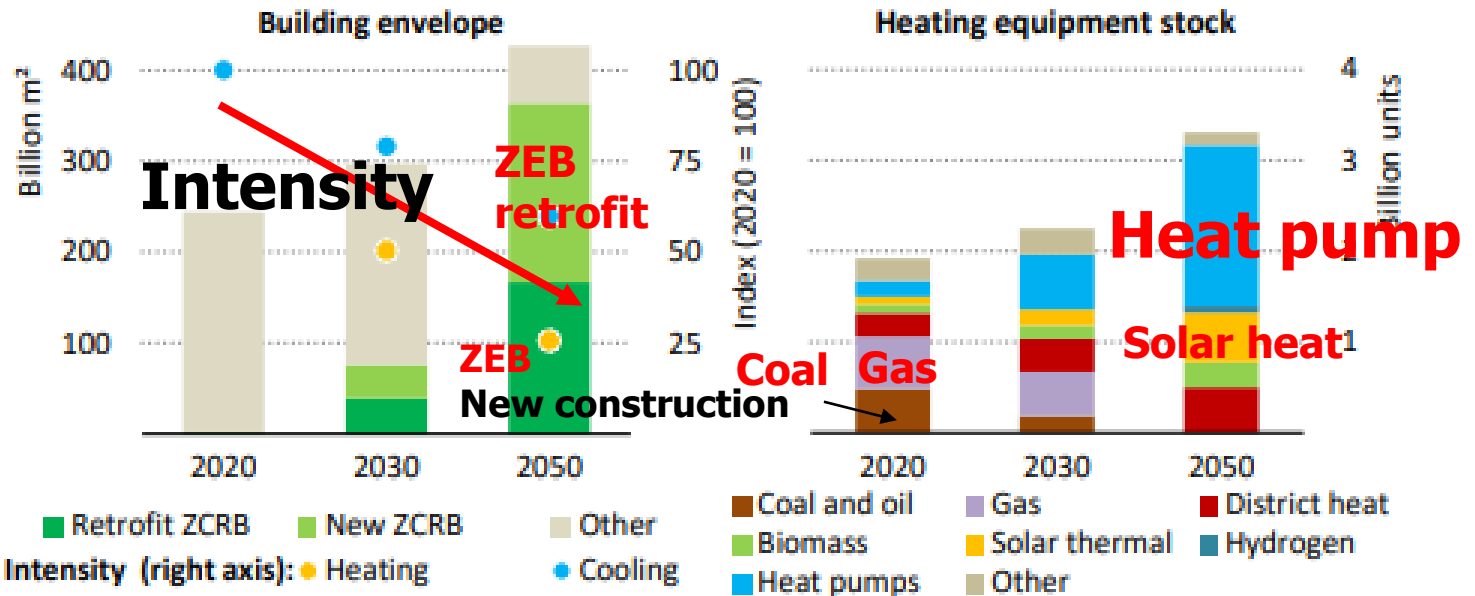


50% electricity by low emission
Stop boiler sales
⇒ Heat pump

Stop oil driven cars

Industrial Electrification ratio 40%
50% of existing building
⇒ ZEB-ready

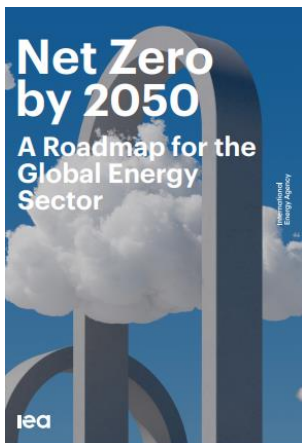
1-2 For buildings' heating, by IEA Net Zero Scenario



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By 2050, over 85% of buildings are zero-carbon-ready, reducing average useful heating intensity by 75%, with heat pumps meeting over half of heating needs

Notes: ZCRB refers to buildings meeting zero-carbon-ready building energy codes. Other for building envelope refers to envelopes that do not meet zero-carbon-ready building energy codes. Other for heating equipment stock includes resistive heaters, and hybrid and gas heat pumps.



1-3 ZEB ISO

- **ISO/TS 23764:2021**
- **METHODOLOGY FOR ACHIEVING NON-RESIDENTIAL ZERO-ENERGY BUILDINGS (ZEBs)**
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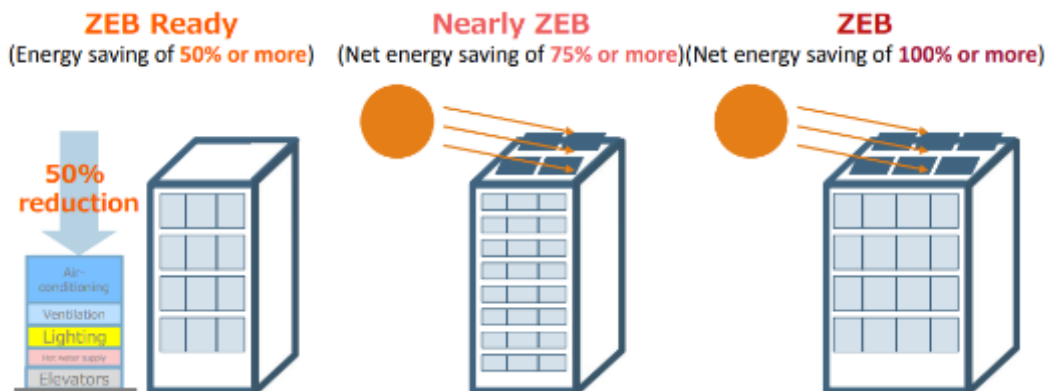
The building sector contributes nearly 40 % of all global greenhouse gas emissions.

ISO/TS 23764, Methodology for achieving non-residential zero-energy buildings (**ZEBs**), outlines a **step-by-step approach**.

STEP1 ZEB-ready: first condition = super energy efficiency

STEP2 nearly ZEB: Then, gradually introduce RE

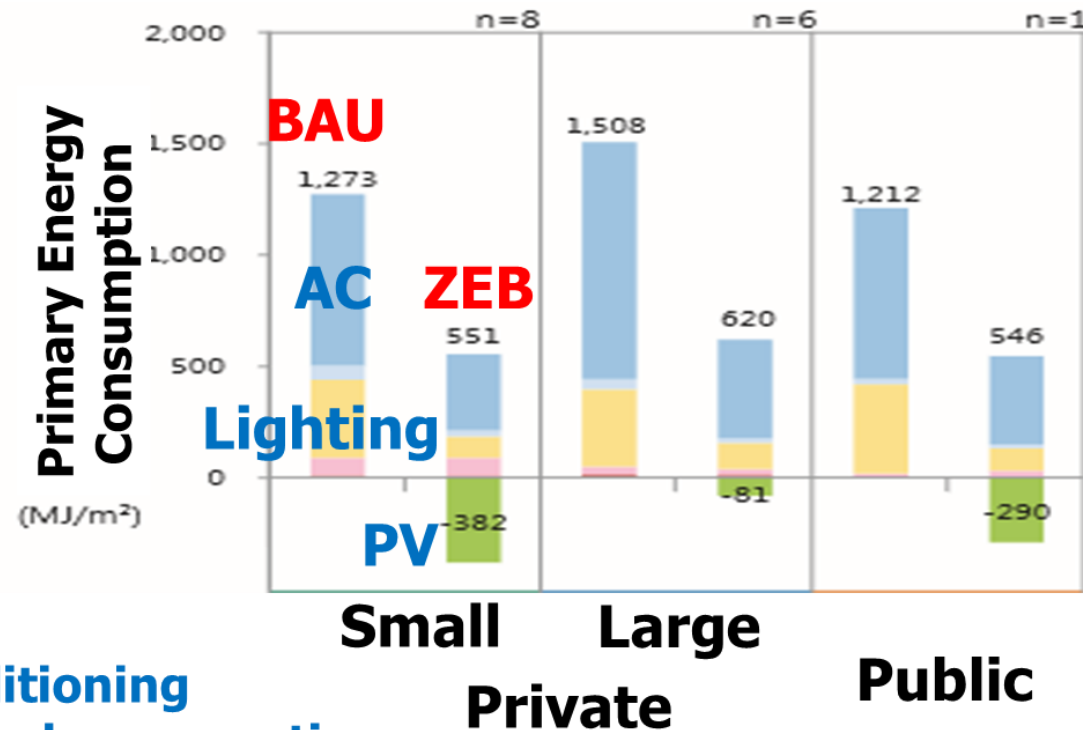
STEP3 (net) ZEB: Finally net Zero



Ref.2
Japanese ZEB
criteria

2-1. JICA approach 1: ZEB

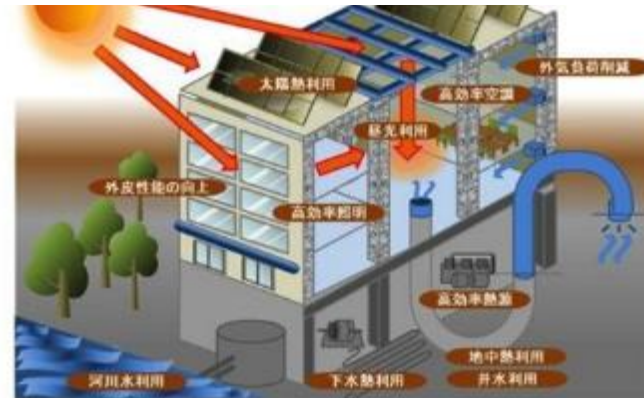
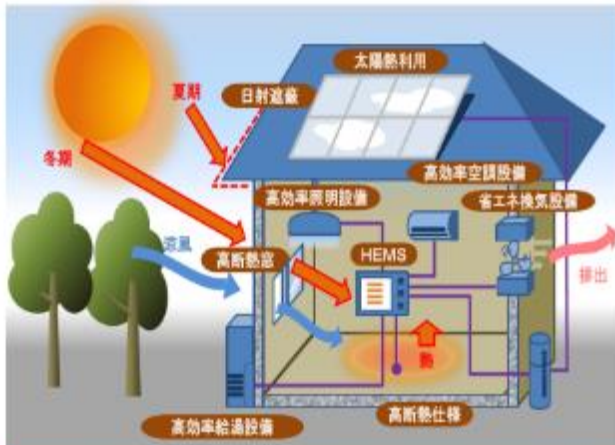
(1) Core technologies for ZEB are ACs, LED and PV
Typical Japanese ZEB (before and after)



Plus insulation, glass, ventilation, hot water supply, elevator, EMS, appliances

(2) Japan's New Approach : ZEB & ZEH 1

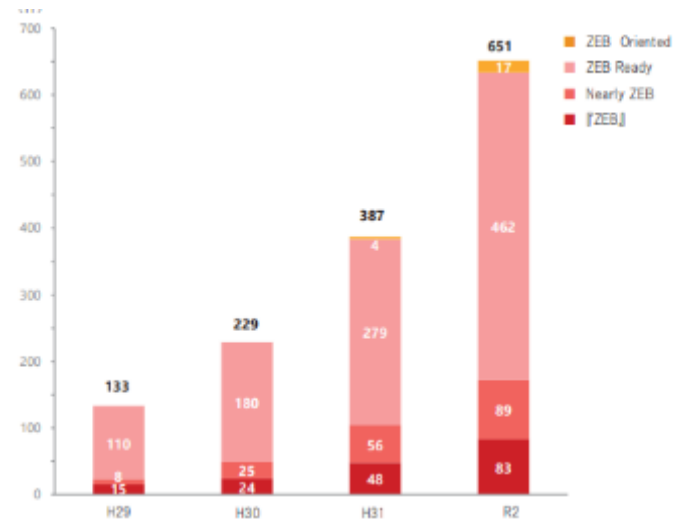
Up to 2030 average of new buildings should be ZEB (package of EC and RE)



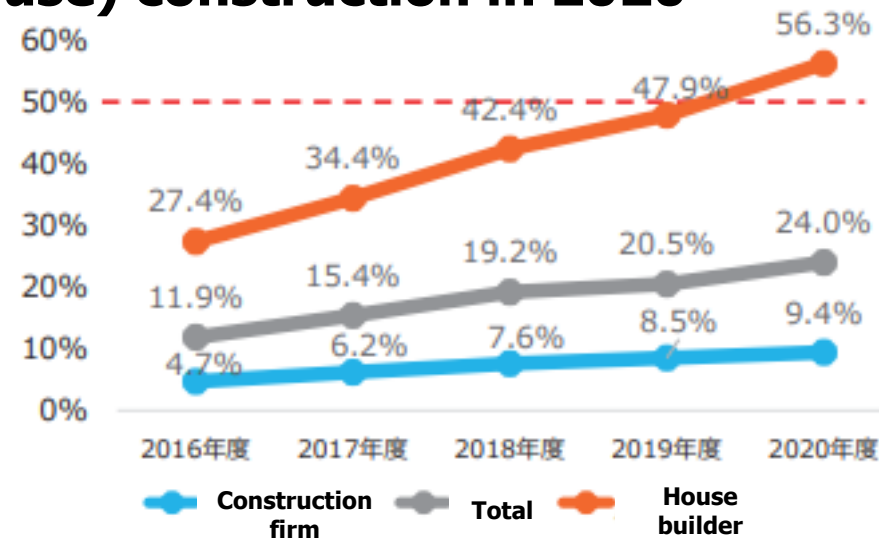
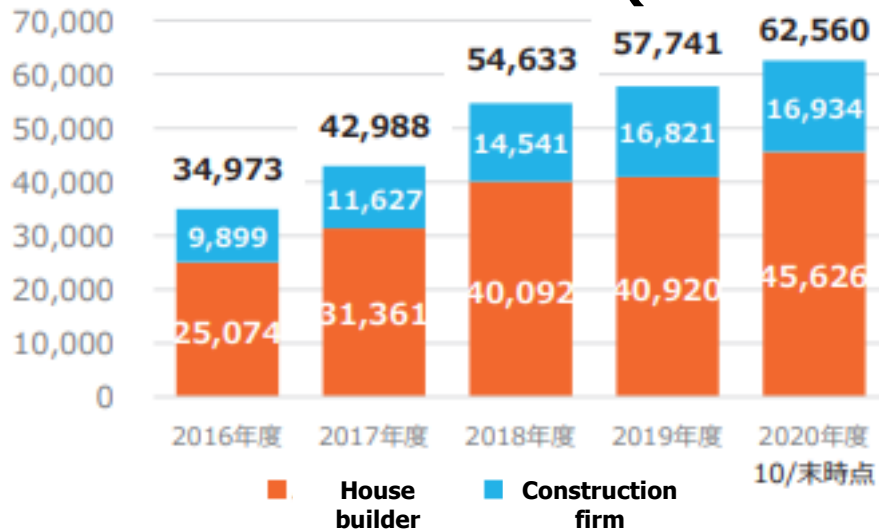
Up to 2030 average of new Houses should be ZEH

(3) ZEB, ZEH trend in Japan

Trend of ZEB planning in 2020



Trend of new ZEH (detached house) construction in 2020



Source: SII, Japan

(4) Progress in India for ZEB

1) JICA-EESL(CESL)-CII ZEB study (2021-22)

Energy audit for 10 Governmental buildings.

Larger potential and lower installation cost of PV.

CII has a program "Mission on Net Zero"



2) On October 20th , presentation in IGBC 2022 at Hyderabad (“Promoting ZEB in India”)



Progress in India for ZEB

1) JICA-ADVANTEC/EESL study (2020-23)

SDGs Business Model Formulation Survey with the Private Sector for

“Promoting effective energy use in buildings

by energy conservation and renewable energy package”

ADVANTEC 1) The Ito-machi project , obtained ZEB certification

Ito-machi Marche

Concept of Building

This building has enhanced outer skin performance and Low-E double glazing.

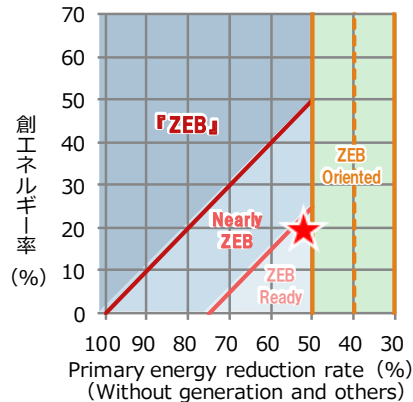
Energy is saved with efficient equipment (air conditioning, ventilation, lighting).

As power supply, solar power generation and lithium-ion storage battery are installed.

BEMS visualizes the energy consumption status and achieves operational efficiency improvement by tuning.

ZEB Rank

ZEB Ready



Ito-machi Hotel

(temporary name)

Concept of Bulding

This building has enhances outer skin performance and Low-E double galzing.

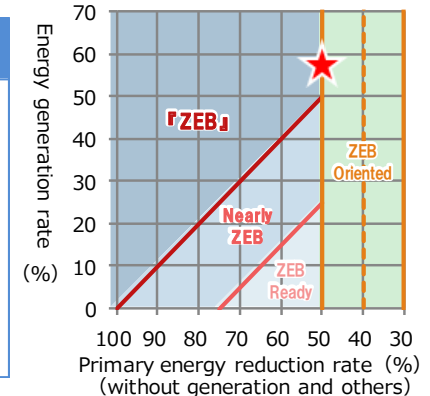
Energy is saved with efficient equipment (air conditioning, ventilation, lightning, water heat).

A power supply, solar power generation and lithium-ion storage battery are installed.

BEMS visualizes the energy consumption status and achieves operational efficiency improvement by tuning.

ZEB Rank

『ZEB』



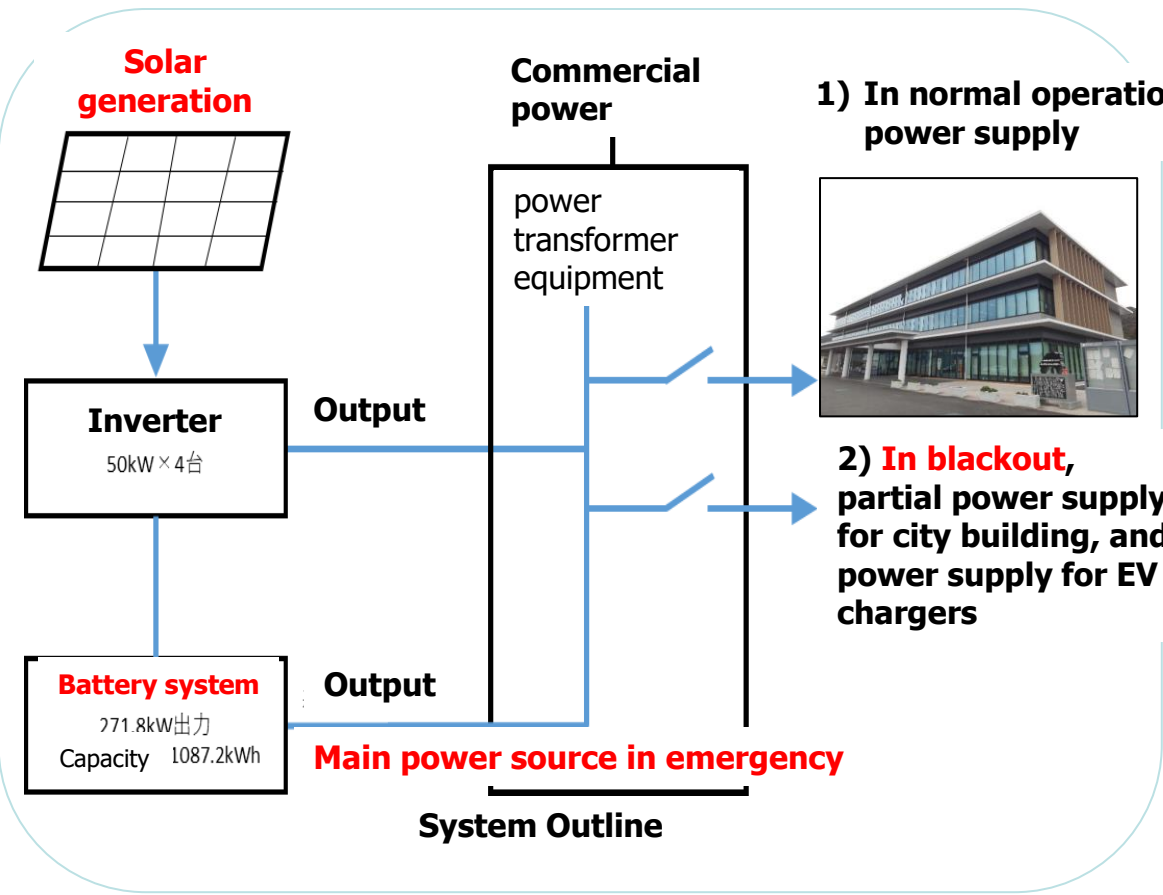
Marche



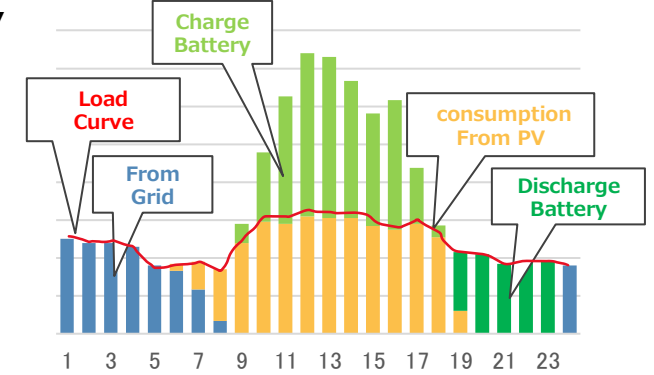
Hotel (under construction)



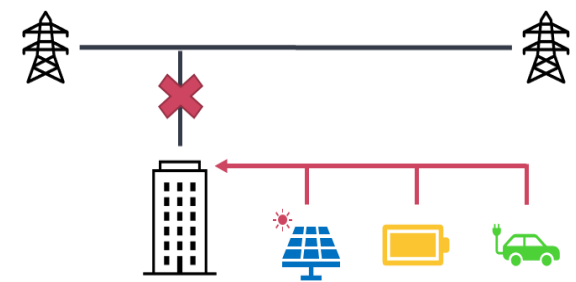
ADVANTEC 2) Solar + Battery project in **K City**, Power supply in blackout



Maximizing renewable energy consumption



resilience





EV Charger



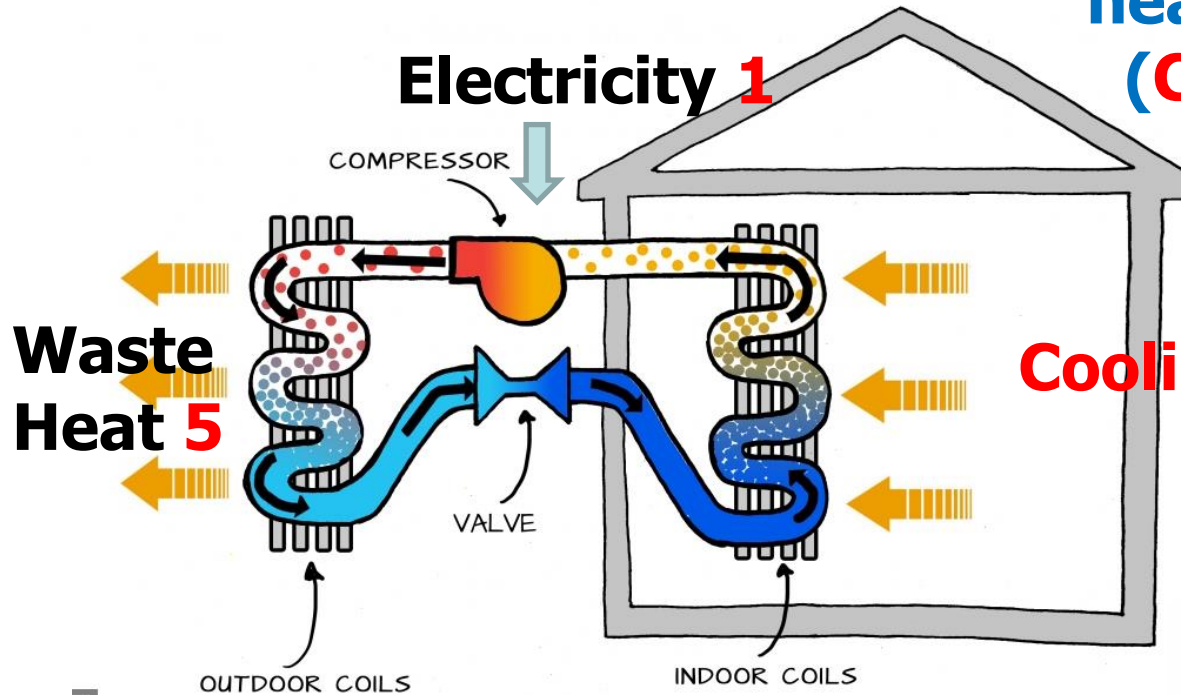
Solar Panels



Storage batteries and cubicles

2-2. JICA approach 2: From boiler to heat pump

(1) Heat Pump : Efficient cooling/ heating key technology (Change from boiler)

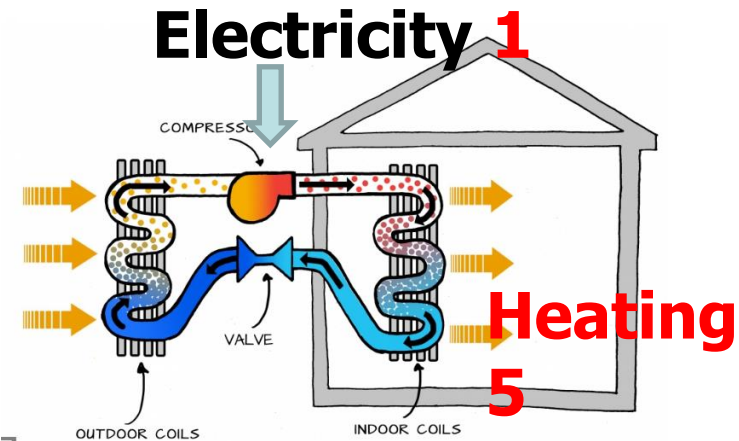


1+4=5
Cooling COP
= 4/1=4.0

Cooling 4

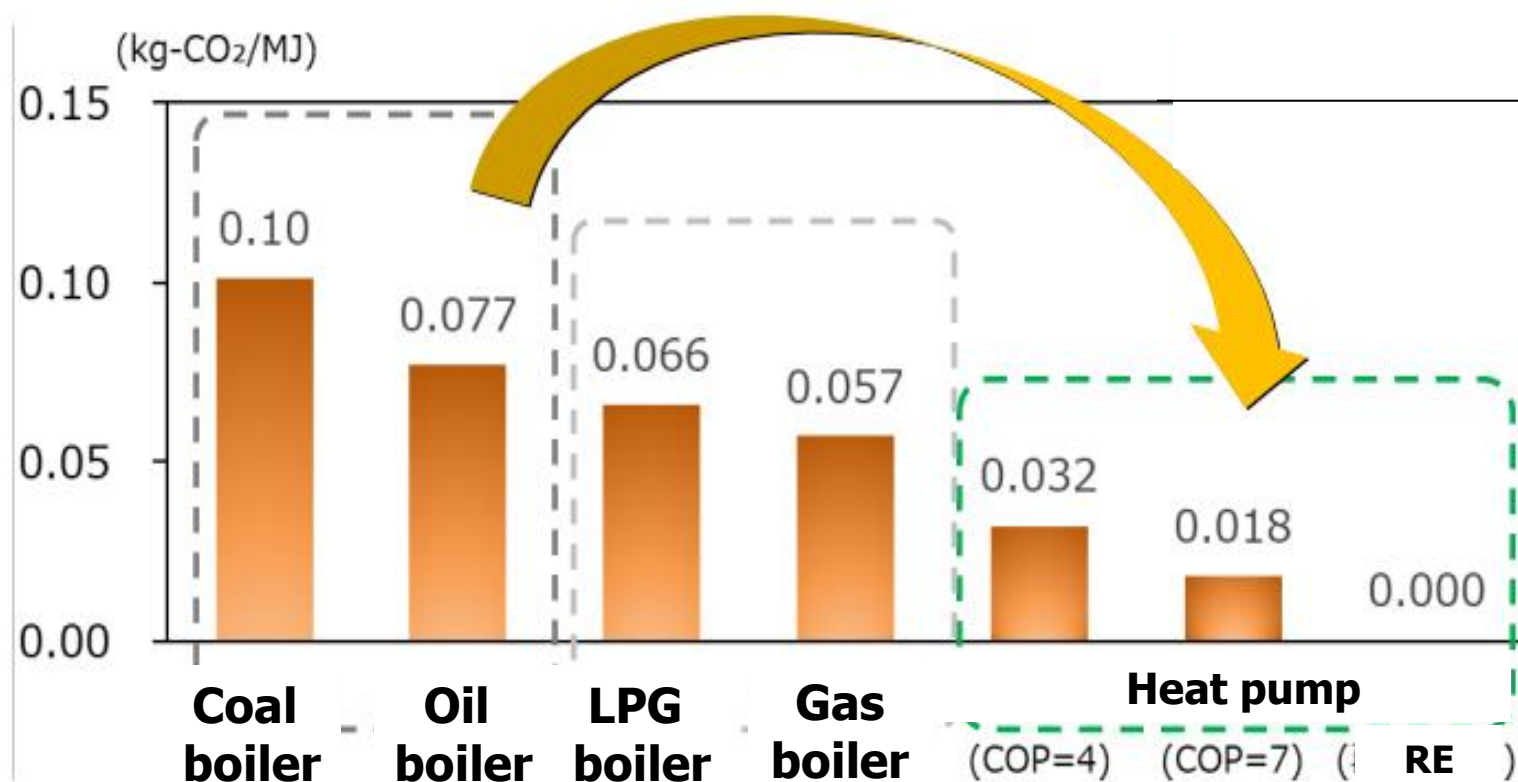
Heating COP
= 5/1=5.0

Heat gain = Cooling 4



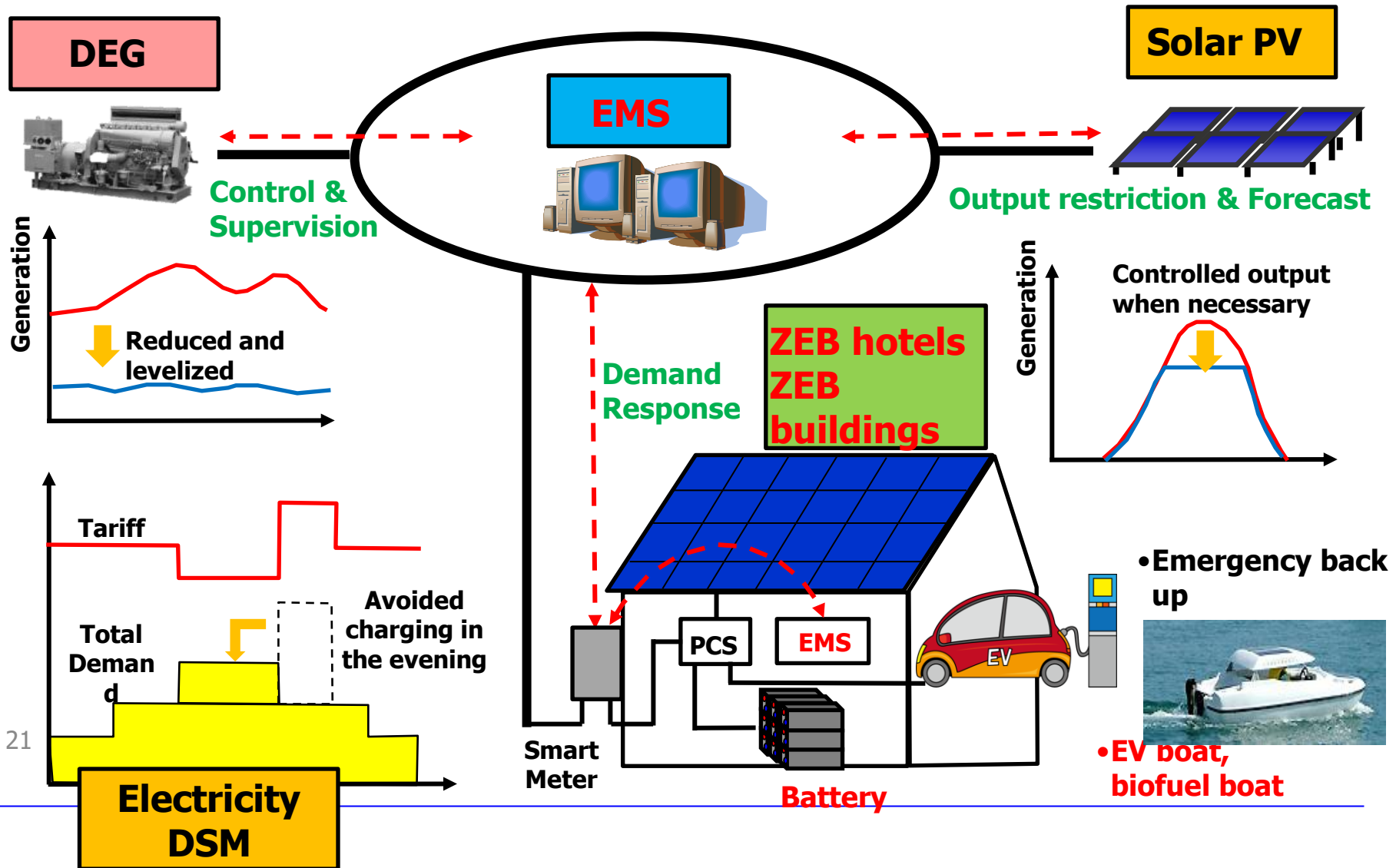
Ref. 1 Advantage of RE + heat pump package

CO2 emission per 1MJ by supply system



2-3. JICA approach 3: Comprehensive programs for EV

(1) RE, EEC & EV, ZEB ... Integrated plan (Galapagos)



Ref. 1 In Galapagos, introduction of EV (e-bike) is restricted, not to increase the evening electricity peak demand.

Typical daily electricity load curve in Galapagos

