ZEB practical approach and awareness accelerate EE&C

JASE-W - Japanese Business Alliance for Smart Energy Worldwide

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http://www.jase-w.org/english

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1. Background of ZEB dissemination

- The current energy efficiency measures cannot achieve COP21 requirements for reduction of global warming gas in Japan.
- The current Japanese E. E. Law for buildings does not have enough power to achieve the target for reduction of GHG in building sector. Therefore, the following target has been set in order to promote and disseminate high level energy efficient buildings, “ZEB Ready” though the continuous efforts to realize (net)ZEB

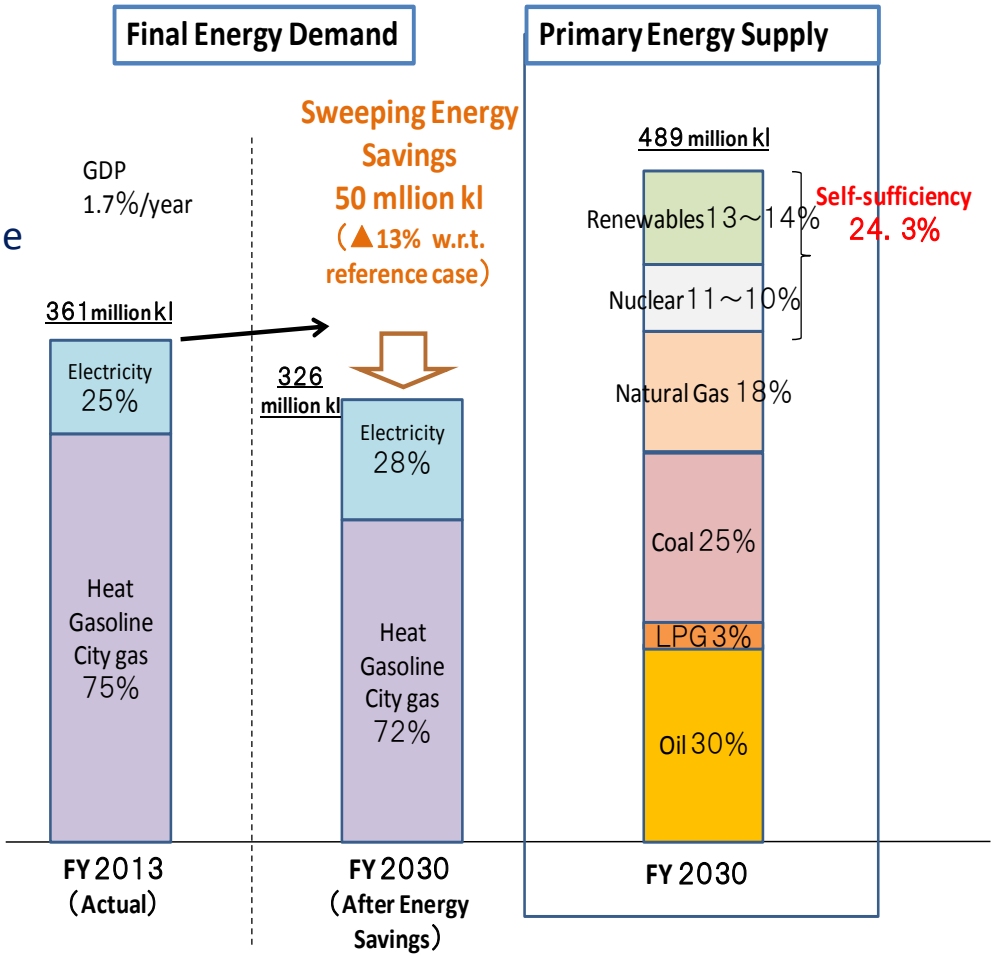
1. Realize ZEBs in newly constructed public buildings by 2020
2. Realize ZEBs in average newly constructed public and private buildings by 2030

1-2. Energy Supply/Demand Structure toward CO_2 Emissions Reduction Target in 2030

- While energy demand growth is projected in line with economic growth (**an average 1.7%**), energy efficiency is expected to improve as much as after the oil crises thorough energy conservation (**35% in 20 years**).

- **Energy supply/demand structure improvement** (energy self-sufficiency rate: 6% in 2014 ⇒**24.3%** in 2030)

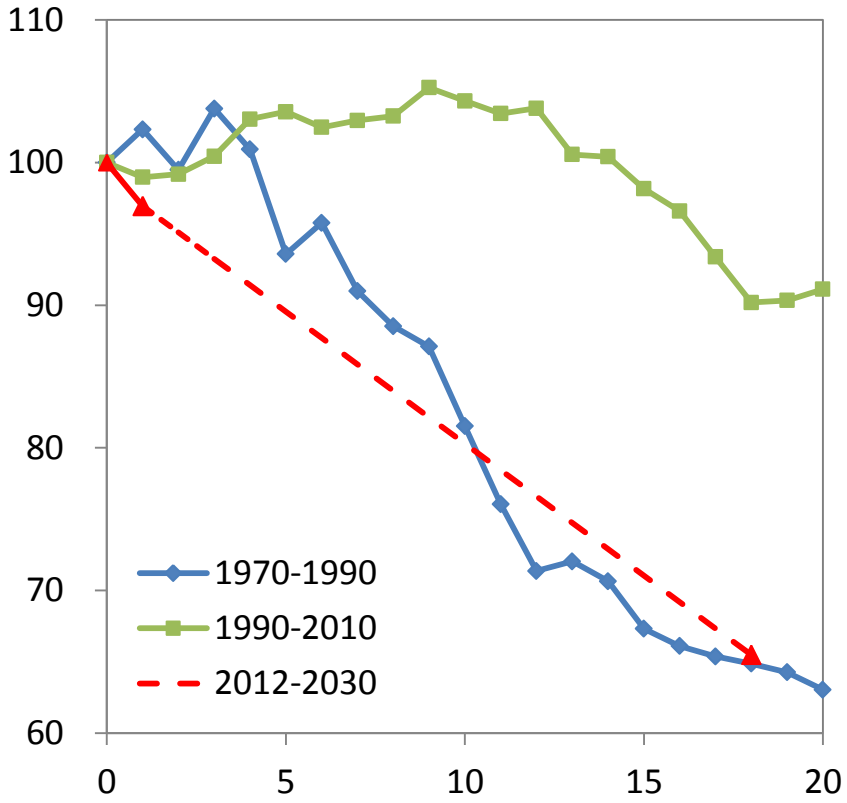
- **Japan's CO_2 emissions reduction target** (**26% CO_2 emissions reduction** in 2030 compared with 2013 level)



(Source) METI "Long-term Energy Supply/Demand Outlook" p.5 (July 16, 2015)

1-3. Need for Further Improvement of Energy Efficiency

【Improvement in Energy Intensity】



- Thorough energy conservation measures could save final energy demand by 13% to 326 million kl.
- Energy conservation measures would be accumulated to improve energy efficiency as much as just after the oil crises.

2. Practical Approach to ZEB

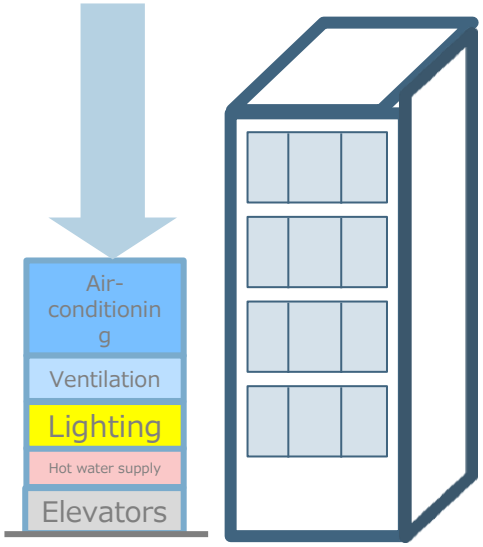
- If you pursue only net Zero Energy Building at planning and design stage, there are many difficulties on finance and technologies in order to realize such Zero Energy Buildings.
- **But once if you plan and design the building with the clear policy of "ZEB Family concept", you can realize ZEB by a step-by- step approach from "ZEB Ready".**
- "ZEB Ready" buildings can be designed, constructed and operated by use of not only advanced technologies but also other measures such as measurement, verification and management.

3. “ZEB family” Concept

The concept of ZEB has been expanded to “ZEB series” according to actual conditions. First step is to aim for super low-energy buildings which are defined as “ZEB ready”, and then aim for “ Nearly ZEB” and “(net) ZEB”.

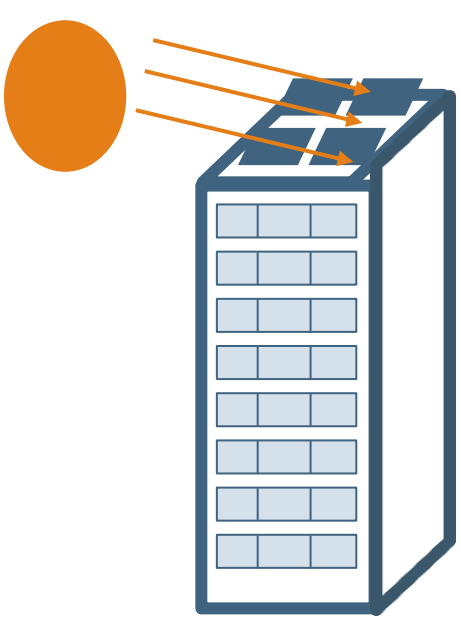
ZEB Ready

(Significant energy saving more than 50% from reference point)



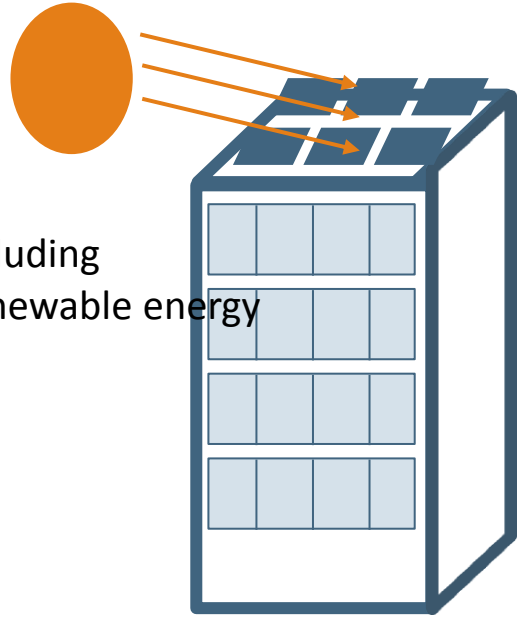
Nearly ZEB

(Net energy saving not reach 100% But more than ZEB Ready)

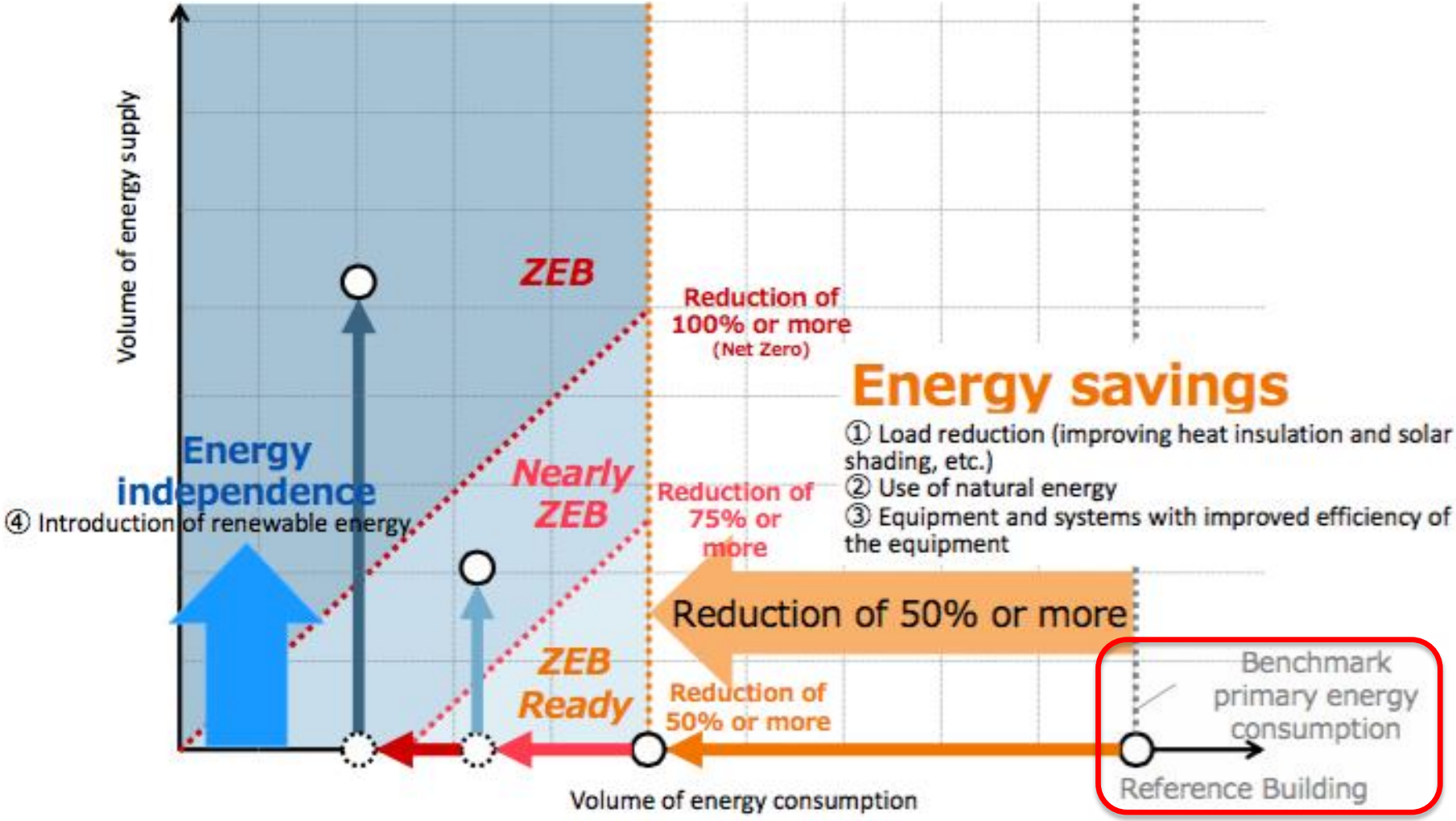


(net)ZEB

(Net energy saving of 100% or more)



3. “ZEB family” Concept
Definition and evaluation methods of ZEBs



4. Standardization of ZEB family concept

□We have decided that this step－by－step approach of “ZEB Family” concept should be disseminate as an International Standard (ISO) in the middle of 2017.

□We proposed this step-by-step approach standard to ISO TC205 WG2 (Design of energy-efficient buildings) in the International Inception Meeting in September 2018,and accepted as **ISO/PWI TR23764**. **This is the world`s first proposal focused on ZEB.**

□The proposal includes six core elements for standardization of this “ZEB Family” concept.

□This proposal of the ZEB standard is reflected to the new special submission category of the ASEAN Energy Award from 2019, confirmed in the **Joint Ministerial Statement The Fifteenth ASEAN+3 (China, Japan and Korea) Ministers on Energy Meeting 29 October 2018, Singapore.**

4. Standardization of ZEB family concept

Six Core elements for Standardization (ISO)

① **At planning stage,** to have clear policy to achieve ZEB by the three steps, ZEB Ready → Nearly ZEB → (net)ZEB, but not to achieve it by only one step to (Net) Zero Energy Building.

② **At the design stage,** to select proper materials and equipment, which are certified by the domestic standard or international standard, as much as possible.

③ **During construction,** to install the selected materials and equipment correctly according to the drawings and specifications.

④ **After completion of building,** to realize the energy consumption targeted at the design stage.

⑤ **After operation start,** to inspect actual energy consumption continuously (suitable times pre year) whether there is any difference of energy consumption between targeted at design stage and measured at actual operation.

⑥ **After completion,** to calculate the primary energy consumption periodically by using simulation software, if possible.

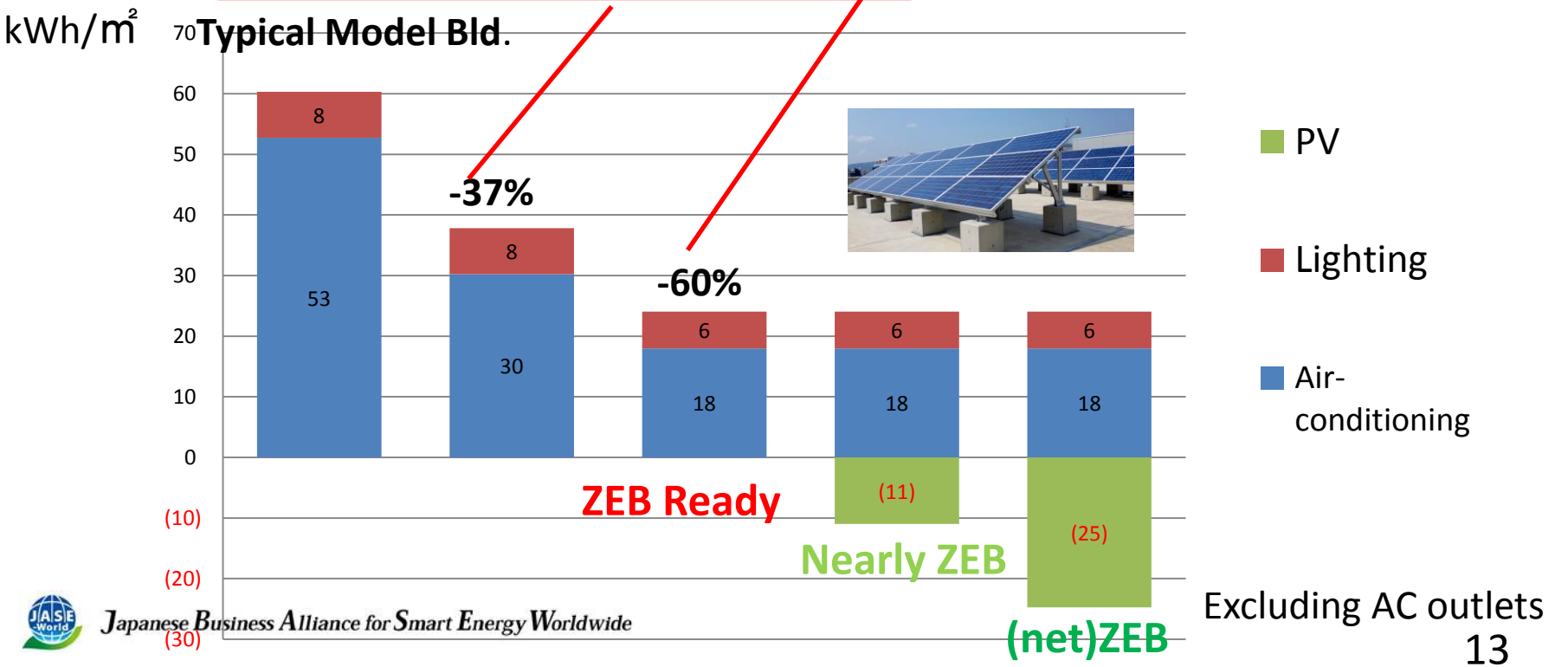
5. Simulated Case（1）
Typical office building in Myanmar

Improved design and materials

・Improvement of solar shading performance.
・single glass to single heat reflective green glass
・Improvement of heat insulation, etc.
・Air tight structure allows higher temperature setting

Improved facility engineering

・Added simple lighting control system
・Replaced existing air-conditioners with high efficient wall-mounted ones , etc.



Excluding AC outlets

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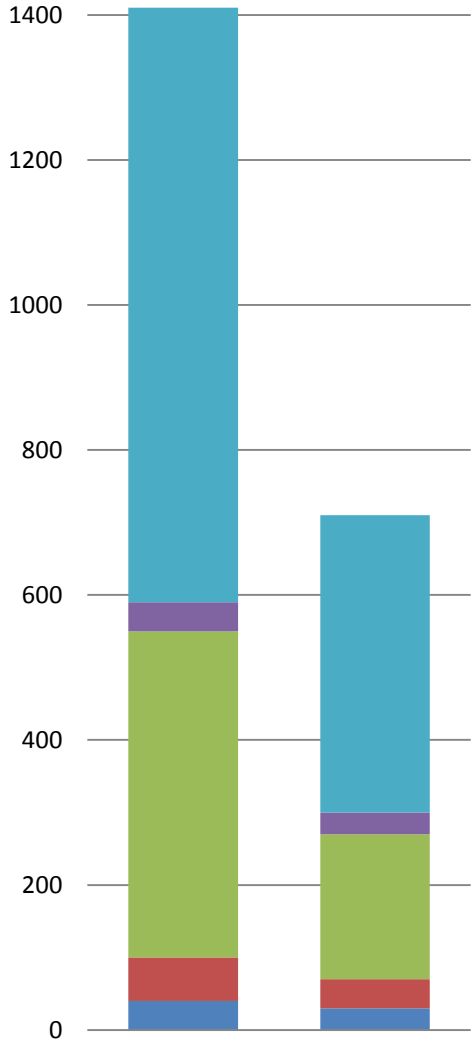
5. Simulated Case（2）

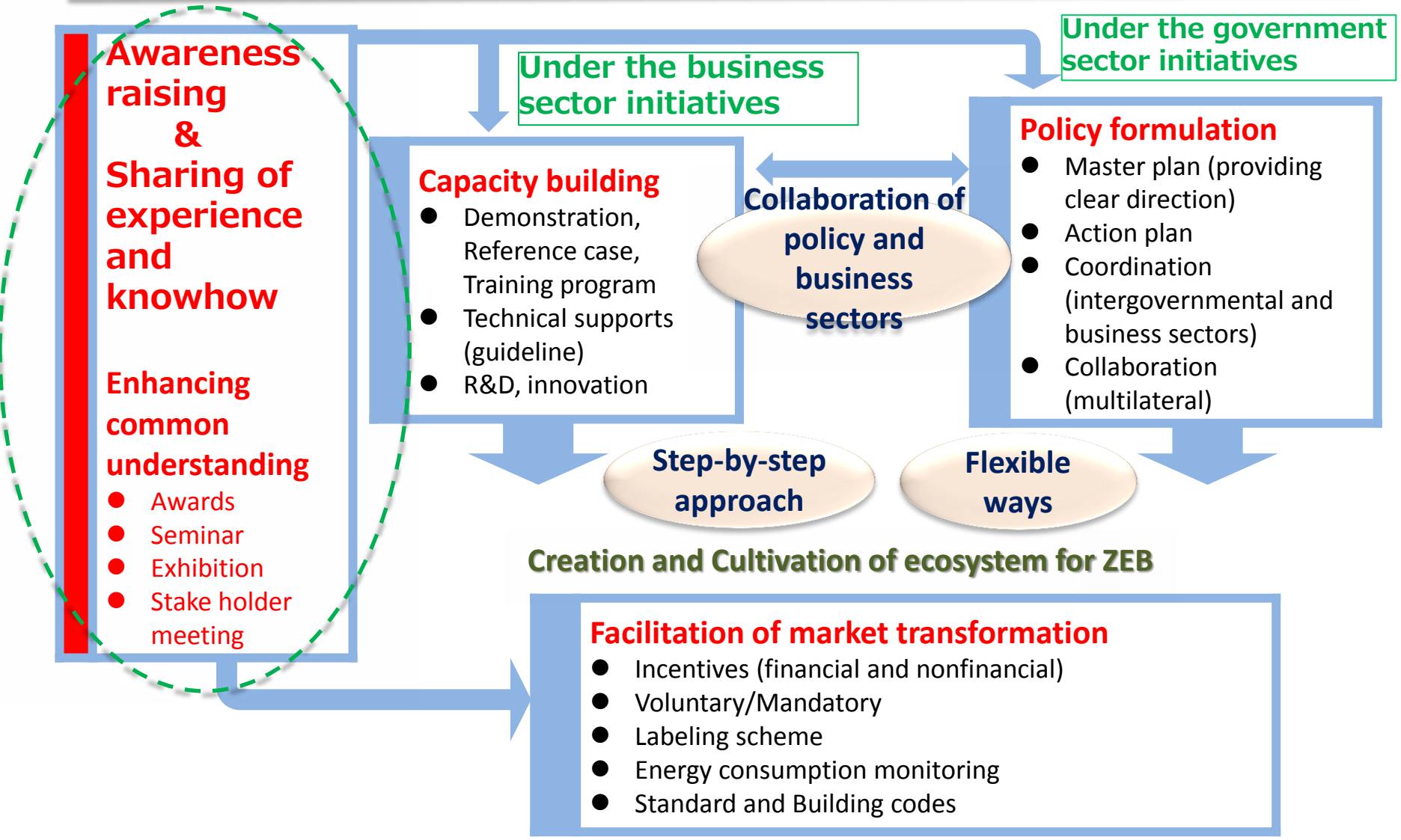
(Example of a calculation for a 10,000 m² office building in Japan(7-story)

	Equivalent to the 2013 Energy Saving Standard	Equivalent to ZEB Ready
Envelope	・Single layer 8 mm, etc. ・Roof insulation with 50-mm extruded polystyrene foam ・Wall insulation with 25-mm extruded polystyrene foam	• Low-E Double Glazing, full height, with horizontal eaves • Roof insulation with 50-mm extruded polystyrene foam • Wall insulation with 25-mm extruded polystyrene foam
Air-conditioning	・Air-cooled heat pump, EHP (electric heat pump) ・Secondary pump that controls a number of units and the revolving speed ・Constant air volume control etc.	• Air-cooled heat pump (controlling number of compressors), EHP • Small-flow pump that controls a number of units and the revolving speed • VAV control, outdoor air cooling, double fan, etc.
Ventilation	・Static pressure: 250 Pa ・Fan efficiency: 40% ・Without control etc.	・Static pressure: 250 Pa ・Fan efficiency: 40% ・High-efficiency motor, temperature control, etc.
Lighting	・HF-type appliances ・Without control etc.	・LED lighting ・Human sensor, daylight dimming control, etc.
Hot water supply	・ Localized electric hot water storage system ・ Without a hot water saving device ・ With 30-mm piping heat insulation	・ Localized electric hot water storage system ・ Automatic hot water supplying tap ・ With 30-mm piping heat insulation
Elevator	・ AVAF (Adjustable Voltage Adjustable Frequency) (without electric power regeneration)	• AVAF (Adjustable Voltage Adjustable Frequency)



6. Key Factor for ZEB Dissemination

The first step is Awareness raising and collaboration is important



Measures to promote ZEB in Japan
Specific Measures for Promotion of ZEB in Japan

Design guidelines through the ZEB demonstration project are available

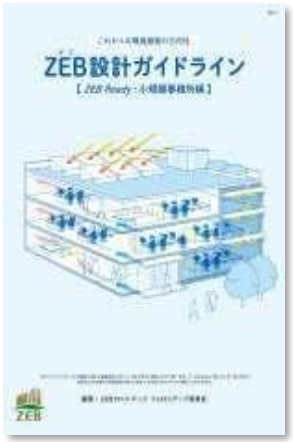
The techniques, methods, and costs for designing ZEBs should be clarified (ZEB designing guidelines for offices, schools, hospitals and so on).

Train engineers (ZEB planner program)

Train engineers capable of designing, calculating, diagnosing, and proposing ZEBs

ZEB Design Guidelines and ZEB Pamphlets series

ZEB Design Guidelines



ZEB Pamphlets

ZEB Planner Registration System

(Development of ZEB expert engineers, and management of voluntary action plan)

- To promote ZEB building business, design companies, design and construction companies, and consulting companies which have knowledge of energy saving buildings are **registered as ZEB Planners** and **establish consultation service** and **inform the general public them available**.
- **Disclosure of the list of ZEB Planners and their achievements on the website of the subsidy executive body**

Based on the registered information, it is planned to investigate further measures for Realization ZEB popularization.

How do I realize a ZEB?

Building owner

Consulta - tions

Support

ZEB Planner Consultation Center

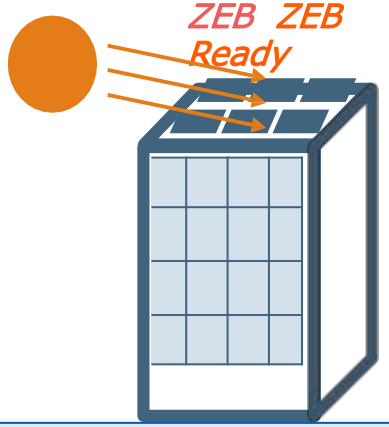
Design companie

Desig construction companie

Consulting companies,

Subsidies to be given to the ZEB Planner involved projects of various building uses.

『ZEB』 Nearly ZEB ZEB Ready



Information disclosure

- ZEB Planner information (Scope of work, supported area and building use, etc.)
- Voluntary activity plans to receive orders for ZEBs
- Actual planning for ZEBs, etc.
- List of ZEB Consultation Centers

No. of registered companies as of October 15, 2018: 125

(79 design companies, 59 design construction companies, 97 consulting companies * Each company can register multiple categories

7. Our support and collaboration

- **Awareness raising**

  ZEB Ready award in Special submission in ASEAN Energy Award and the guideline for judge was settled .

- **Technical seminar/Workshop in each country based upon requests.**

- **Capacity buildings planning and arrangement,**

  Policies & Technologies training in Japan

  We promoted EANS(Jan.2017), ENAS1(Sept.2018) & ENAS2(Jan.2019) in Tokyo supported by METI & AOTS

- **Funded by JAIF (we are under preparing to apply)**

Zero Energy Building newly added to ASEAN Energy Awards from 2019

The ASEAN Member States (AMS) agreed to add Zero Energy Building (ZEB) Ready as a new subcategory of the ASEAN Energy Awards under the Energy Efficient Building category, starting 2019. Representatives nominated by the ASEAN Energy Efficiency and Conservation Sub-sector Network (EE&C SSN) convened in Tokyo, Japan, to learn about the best practices of ZEB from Japan and to establish the evaluation criteria for this new category during the Energy Conservation Workshop under ASEAN-Japan Energy Efficiency Partnership (ECAP) 17.

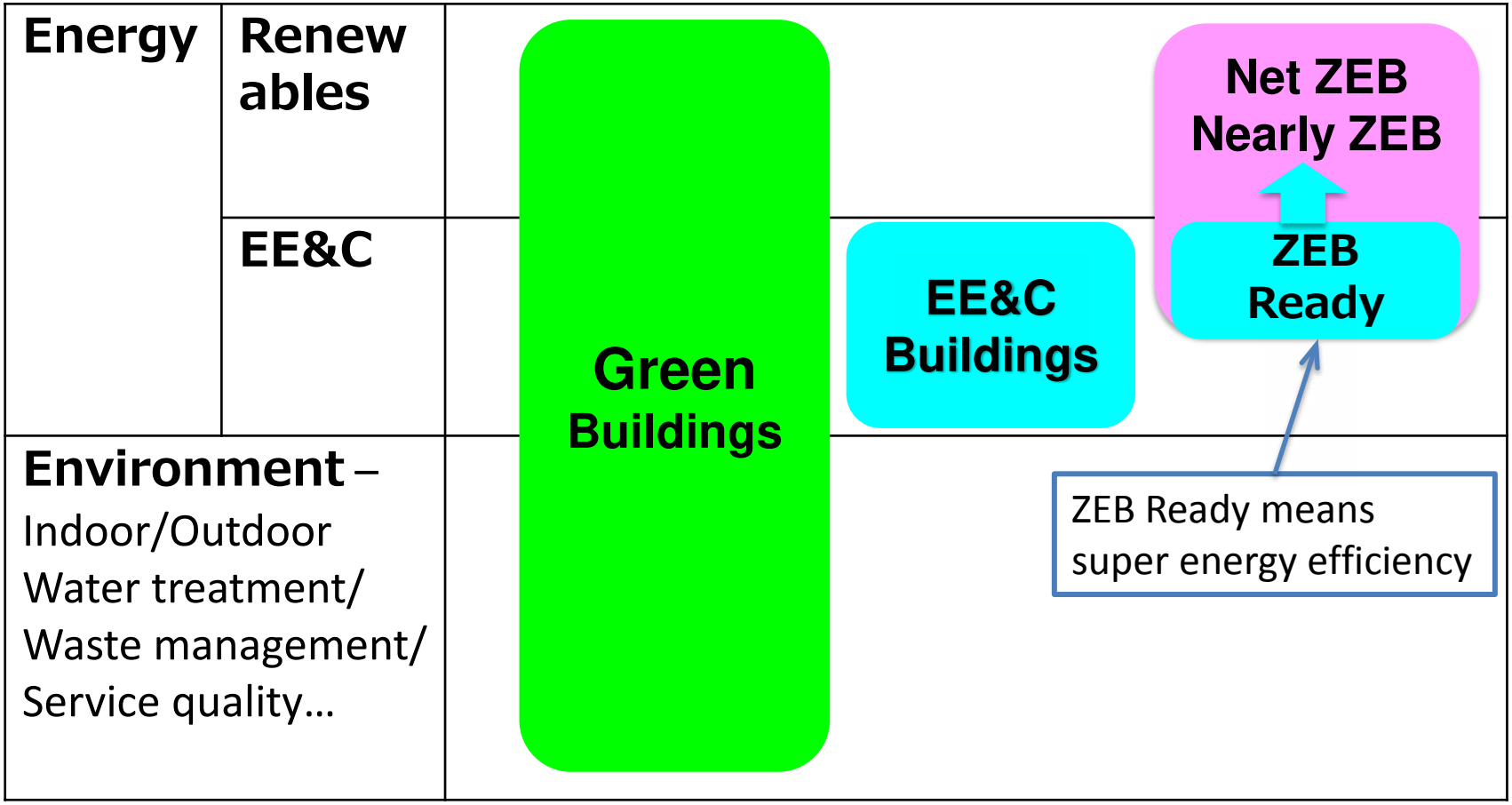
The ECAP 17 workshop was jointly organized by Energy Conservation Centre Japan (ECCJ) and ASEAN Centre for Energy (ACE) on 5-9 November 2018 in Tokyo, Japan. This five-day workshop consisted of lectures, site visit, knowledge exchange between AMS and Japan, and roundtable discussion.

Annex: Our supporting and collaboration plan

ZEB Ready(ZEB Family) Diffusion in ASEAN for EE

METI Policy of EE in ASEAN Region	★Regarding the countries of Asian region, introduction of energy conservation policies and systems in Japan and exchange of ideas with companies with excellent energy-saving technologies in Japan. ★It is concerned with improvement and enforcement of energy conservation policies and systems of counterpart countries. ★Aiming to cooperate in establishing systems & policies of each country to specifications promoting energy saving measures.			
	2017	**2018**	**2019**	**2020～**
JASE-W ～public-private collabolation～ Activities	・Proposal of ZEB family concept for AJEEP Inception meeting in KL. ・GAP analysis of ASEAN country for the possibility of ZEB. ・ Training program for private & public sectors in Japan（Dec.）	・Proposal of ZEB Ready special submission award at EE&C SSN. ・Seminar or workshop twice in ASEAN counties. ・Training progm for private & public sectors in Japan （Spet. And Jan.1019）	・Seminar or workshop twice in ASEAN counties.	・Seminar or workshop twice in ASEAN counties. →
ECCJ Activities	・ECAP14 ZEB awrd study for ASEAN ENERGY AWARD	・ ECAP17 Establishing the Guideline for ZEB award in ASEAN Energy Award	ZEB Technical traing	

Annex: Positioning of Green Building and ZEB Family



Thank you for your attention.