A proposal for additional screening criteria of ASEAN Energy Award

ZEB Family Concept

http://www.jase-w.org/english
The purpose of this Sub-Working Group:

To establish the ISO standard of ZEB family concept in order to disseminate ZEB in the world.

For the moment, it is important to establish the unified principle of ZEB family concept in ASEAN region.
A Proposal

Additional guideline for ASEAN Energy Award

The concept of ZEB is very useful for designing energy efficient building. We would like to introduce you ZEB Family concept and suggest you to apply to the assessment point for Asean Energy Award.

1. Take a step-by-step approach
2. Continuous energy management & monitoring
3. Clear roadmap to realize ZEB
1. Take a step-by-step approach

First step to ZEB is Energy Saving.

- To reduce energy consumption in cities, it is reasonable to build more energy efficient buildings than only one real ZEB.

**Design Phase**
- Building envelope
- Multi-layered Glass
- Efficient Air conditioners
- LED

**Operation**
- Controllers

• ZEB
• Energy efficient buildings
2. Clear vision to realize ZEB

- **Setting milestones to ZEB** is helpful to make issues clear and improve energy efficiency.

※ How to set the baseline is the issue for discussion
3. Continuous energy management & monitoring

• It is necessary to secure the performance as initially designed,

☑ By monitoring energy consumption continuously
☑ Through regular inspection
Additional guideline for ASEAN Energy Award
1. Set reasonable baseline and target

- In Japan, we set benchmarks in industrial and commercial sectors to accelerate energy savings. This initiative will cover around 70% of all industrial and commercial sectors.

<table>
<thead>
<tr>
<th>Category</th>
<th>Benchmark index</th>
<th>Goal</th>
<th>Target</th>
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<tbody>
<tr>
<td>Convenience store</td>
<td>Total amount of electricity</td>
<td>Energy Conservation Law</td>
<td>50% less?</td>
</tr>
<tr>
<td></td>
<td>consumption</td>
<td>level</td>
<td></td>
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</tbody>
</table>

**Industrial sector**

- 6 categories 10 areas
- Utility company
- Steal industry
- Oil refinery
- Paper Industry

**Commercial sector**

- 6 categories
  - Convenience store
  - Hotel
  - Department store
  - Rental Office
  - Supermarket
  - Shopping Mall
To promote ZEB Family in Japan...

2017 Energy Performance Standard
(Regulatory Requirement)
(e.g. for Office)

-20%
2 ★

-30%
3 ★

-40%
4 ★

-50%
5 ★
**ZEB Ready**

-75%
5 ★
**Nearly ZEB**

-100%
(Net Zero)
5 ★
**『ZEB』**

*Do not consider renewables injected into the grid (Only consider self-consumption)

*Consider renewables injected into the grid (“Net” ZEB)

✔ The Baseline is 2017 Energy Performance Standard.
✔ Labeling system for energy saving ⇒ BELS

✔ Japanese government announced “ZEB design Guideline”.
✔ The Energy consumption of ZEB Ready Office in Japan is approx. 185kWh/m².
## 2. Feasible Energy management plan

### Energy management Plan

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<tbody>
<tr>
<td>(The third party)</td>
<td>Operation of Air Conditioner, Ventilation, LED etc...</td>
<td></td>
<td></td>
<td>Until ... save ..%</td>
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</table>

### Inspection

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<tbody>
<tr>
<td>e.g. Green Building Committee</td>
<td></td>
<td>Every Year</td>
<td></td>
<td>e.g. Win the official award</td>
</tr>
</tbody>
</table>
3. Make a Roadmap to ZEB

- A roadmap to ZEB is useful for continuous energy savings.

- In 5 years:
  - Implementing Energy saving equipments
  - Optimizing AC Operation
  - Implementing Solar Power Energy

- In 10 years:
  - Completion of building
ZEB Family Concept in Japan
Energy Consumption Trends in Japan

- Real GDP: 1973→2014
  - 2.4 times

- Transportation sector
  - 1973→2014: 1.7-times
  - 1973→2014: 2.2-times

- Residential sector
  - 1973→2014: 1.2-times
  - 1973→2014: 2.0-times

- Commercial sector
  - 1973→2014: 2.4-times

- Industry sector
  - 1973→2014: 0.8-times

Sources: Comprehensive Energy Statistics” and “Annual Report on National Accounts.
Evolution of energy consumption by subsector of the commercial sector

(Note)
In the Comprehensive Energy Statistics, the methods to calculate the values were modified from FY 1990.

(Sources)
• The ZEB (Net Zero Energy Building) is receiving a lot of attention because it can minimize indoor energy consumption (e.g., in offices, schools, hospitals, hotels, etc.) and allow buildings to function independently in terms of energy during a disaster.

• Japan’s Strategic Energy Plan (adopted at the Cabinet Council in April 2014) establishes the following goals to realize and promote ZEBs:
  – **Realize ZEBs in newly constructed public buildings by 2020**
  – **Realize ZEBs in average newly constructed public and private buildings by 2030**

• To achieve the above goals, the [ZEB Roadmap Examination Committee](#), which is composed of scholars, experts, and professionals from developers, architects, and general contractors, has been established to examine (1) the definition and evaluation method of ZEBs, (2) the feasibility, and (3) measures to promote ZEBs.
Definition and evaluation methods of ZEB Family

- The goal is to achieve net zero energy consumption by creating energy (e.g., via solar power) while fulfilling the higher than 50% energy saving (ZEB Ready).
- However, the evaluation method should take into account that high-rise and large-scale buildings have limited rooftop areas, and consequently, limited energy production capabilities.
- If energy savings of at least 75% is achieved the Nearly ZEB status is granted. If energy savings of 100% or more is achieved, the ZEB status is granted.

* The method to determine 100% or 75% energy savings should follow the Energy Saving Standard. This rule should apply to air-conditioning, hot water supply, ventilation, lighting, and elevators. In addition, the production of renewable energy on site (inside the premises), including the part of electricity sold (only the surplus power sold), should be taken into account.
Definition and evaluation methods of ZEB Family

**Volume of energy consumption**

- **ZEB Ready**: Reduction of 50% or more
- **Nearly ZEB**: Reduction of 75% or more
- **ZEB**: Reduction of 100% or more (Net Zero)

**Energy Independence**

- **Energy savings**:
  1. Load reduction (improving heat insulation and solar shading, etc.)
  2. Use of natural energy
  3. Equipment and systems with improved efficiency of the equipment

**Volume of energy supply**

- **Reference Building**
- **Benchmark primary energy consumption**

① Introduction of renewable energy
Definition and evaluation methods of ZEB Family

• In the design phase of a ZEB, it is important to achieve energy savings by
  - Upgrading the building envelope, which has long life and is difficult to renovate
  - Improving the efficiency of the equipment
  - Maximizing the architectural planning method

so as to reduce by at least 50% compared to the existing Energy Saving Standards.

• The above energy saving rate should be evaluated at the design phase by the calculated value.

Ordinary buildings

ZEB Ready

50% reduction

Efficiently using energy

- High-efficiency air-conditioning
- High-efficiency ventilation
- High-efficiency lighting
- High-efficiency hot water supply
- High-efficiency elevators

* The calculation method should be consistent with the Energy Saving Standard. However, the 50%-higher energy saving rule applies to air-conditioning, hot water supply, ventilation, lighting, and elevators. In addition, reduction due to renewable energy should not be taken into consideration.
ZEB Family Concept
As Standards,
proposed at AJEEP Inception Meeting 2017
An agreement to promote ZEB Family Concept in ASEAN at AJEEP Inception Meeting

ADDITIONAL SESSION: INFORMATION SHARING ON ZERO ENERGY BUILDING (ZEB)

35. The representative of ECCJ presented Energy Efficiency for the Buildings for the Sustainable Development toward the Future 2050, which appears as ANNEX 20. The following key points were presented:


   b. ASEAN ZEB Dissemination Sub-Working Group

   c. Experience of ZEB in Japan and ZEB Family Concept

   d. To promote opinion exchange and collaboration among ECCJ, ASEAN ZEB Dissemination Sub-Working Group, AMS and ACE in order to disseminate ZEB Ready concept in ASEAN region.

   e. The JASE-W expressed their strong interest to establish a collaboration with ACE in promoting the ZEB in ASEAN through information sharing, capacity building and conducting a survey study on the ZEB development status in ASEAN region.
ZEB Ready is the First Step to Real ZEB

ZEB Family Concept

ZEB Ready
(Energy saving of 50% or more)

Nearly ZEB
(Net energy saving of 75% or more)

ZEB
(Net energy saving of 100% or more)
Coverage of the Standard

DESIGN

CONSTRUCTION

OPERATION & MAINTENANCE

INSPECTION EVALUATION

Building Design & Materials & Equipment

Energy Management & Performance Measurement (Monitoring)
Additional guideline for ASEAN Energy Award

1. Reduction of Energy Consumption to the target level* based on ZEB family concept.
   * A baseline has to be specified
2. Feasible plan for continuous energy management & monitoring system in order to apply ZEB family concept.
3. Clear step by step roadmap to realize ZEB in the future
Thank you for your listening
Please support us for dissemination of ZEB family concept in ASEAN region.