Current Situation of ZEB in Thailand

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Situation in Thailand

Typical Building
- High Energy Consumption
- Low Performance Equipment
- High Cost Operation

Energy Conservation Building
- Energy Saving
- High performance Equipment
- Low Cost Operation

It’s time to Change!
Thailand Integrated Energy Blueprint (TIEB)

EEP = Energy Efficiency Plan
PDP = Power Development Plan
AEDP = Alternative Energy Development Plan

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EE2; Building Energy Code (BEC)

Thailand TIEB 2015

2015-2036

Gas Plan
PDP
Smart Grid
Oil Plan
EEP 2015

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TIEB 2015

EE2; Building Energy Code (BEC)

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Energy Saving Target from BEC

- **Energy Saving Target from BEC**

  - Reference Building
  - BEC: Building Energy Code
  - HEPS: High Performance Standards
  - ECON: Economic Building
  - ZEB: Zero Energy Building

1. **2015 Reference (Ref.)**: 21 ktoe, 1,890 Buildings
2. **2019 BEC**: 186 ktoe, Enforced both gov bld & private bld.
3. **2025 HEPS**: 1,166 ktoe, 3,658 Buildings
4. **2031 ZEB ECON**: 546 ktoe, Enforced both gov bld & private bld.
5. **2036 ZEB**: 1,32 ktoe, 1,890 Buildings

- KTOE (Kilo-Tonne of Oil Equivalent)
## Net Energy Consumption

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Energy Consumption under Each Level of Energy Saving Capability (kWh/m²/y)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reference</td>
</tr>
<tr>
<td>Office building</td>
<td>219</td>
</tr>
<tr>
<td>Department store</td>
<td>308</td>
</tr>
<tr>
<td>Retail &amp; wholesale business facility</td>
<td>370</td>
</tr>
<tr>
<td>Hotel</td>
<td>271</td>
</tr>
<tr>
<td>Condominium</td>
<td>256</td>
</tr>
<tr>
<td>Medical center</td>
<td>244</td>
</tr>
<tr>
<td>Educational institution</td>
<td>102</td>
</tr>
<tr>
<td>Other general buildings</td>
<td>182</td>
</tr>
</tbody>
</table>

% Saving  
~ 20-25%  
~ 30-35%  
~ 60-65%  
~ > 70%

Ref: EEDP 2013  
Derived from Modeling each building type under each level of Energy Saving Capability
Building Energy Code

OTTV/RTTV

LPD

A/C

Hot Water

Renew
Status of building energy code implementation for new non-residential buildings

Reference: “Modernizing Building Energy Codes”, UNPD, 2018
Energy Efficiency Plan: Rules and Regulations

B.E. 1992 (revision B.E. 2007)
Effective from 06/2008

Decree on designated building
Effective from 12/12/1995

Decree on designated factory
Effective from 17/07/1997

Ministerial Regulations

Energy Management in designated buildings and factories
Effective from 20/11/2009

Persons Responsible for Energy (PRE)
Effective from 31/07/2009

Energy Management Auditors
Effective from 11/05/2012

Building Energy Code
Effective from 20/06/2009
*under revise 2019

High Energy Efficiency Standard for Equipments and Machinery
Effective from 08/04/2009

1992
• Focus on Engineering Solutions
• Low attention on Value of People

2007
• Integrate Energy Management System
• Systematic approach of energy conservation
Development of BEC

- ECP Act 1992
  - Designated building
  - Designated Factories

- ECP Act 2007 (Revised)

1983
1992
2001-2006
2007
2009
2010
2019

USAID + ASEAN
Research Energy Efficient
Building in Thailand

DEDE+DANIDA + AIT
Research Energy Efficient
Design guideline

DEDE released ministerial
regulation and noticed of
DEDE 2009

Set up BEC Centre

Revising min-Reg 2019

Min-Reg Noticed#1
Noticed#2
**Scope of BEC Law**

**BEC Ministerial Regulations** : version 2019

- **Enforcement new or retrofitted buildings of 9 buildings types which have total area ≥ 2,000 m²**
  
  (Draft Min Regulations 2019 Will start to force building size of 10,000 m² in the 1st year and reduced to the size of 5,000 m² in the 2nd year and 2,000 m² in the 3rd year)

To prescribe types and sizes of buildings and also standards, rules and procedures for designing of energy conservation building.

New or retrofitted buildings being constructed which have total area of all stories equal to 2,000 m² or more must be designed under the energy conservation requirements.
Implementation

• Revise Energy conservation Act and set standard for energy consumption on building design plan (Expect enforced start on 2020)
• Training and certified “Energy Conservation Building Auditor”
• Educate stakeholders such as Institute, building design engineer & architect
• Promote Energy efficiency Building Design (enforced gov-buildings, voluntary private buildings)
• Improve database system for encon building construction materials & appliances
• Promote BEC Award to public
Result of the Evaluation of Energy Conservation Building Design

- **Education**: 33.94% (263 Buildings)
- **Office**: 13.29% (103 Buildings)
- **Condominium**: 32.77% (254 Buildings)
- **Hotel**: 2.06% (16 Buildings)
- **Hospital**: 10.71% (83 Buildings)
- **Convention Hall**: 6.06% (47 Buildings)
- **Department Store**: 1.16% (9 Buildings)

**2009 - 2018**: 775 Buildings

- **Energy Saving 2009 - 2018**
  - 554.93 GWh/yr
  - 47.44 ktoe/yr
  - 1,942.24 M$/yr
  - Reduction CO₂: 321.86 tons

- **775 buildings**: 555 GWh/yr

- **625 buildings**: 421 GWh/yr
- **516 buildings**: 279 GWh/yr
- **426 buildings**: 219 GWh/yr
- **354 buildings**: 172 GWh/yr
- **271 buildings**: 137 GWh/yr
- **214 buildings**: 97 GWh/yr
- **144 buildings**: 67 GWh/yr
- **66 buildings**: 45 GWh/yr

- **67 GWh/yr**: 2009
- **67 GWh/yr**: 2010
- **67 GWh/yr**: 2012
- **97 GWh/yr**: 2013
- **137 GWh/yr**: 2014
- **172 GWh/yr**: 2015
- **219 GWh/yr**: 2016
- **279 GWh/yr**: 2017
- **421 GWh/yr**: 2018
Key measures in Building sector according to EEP2015

- Enforce BEC for Tall and large buildings first ($\geq 10,000\ m^2$) and down to small buildings ($2,000\ m^2$) in 3 Years

- Promote BEC Awards for gov & com new buildings

- Subsidy to retrofit Buildings break though BEC

- Pilot Net Zero Buildings For government Buildings
Future Development

ZEB in Thailand
“ZEB is the building with ZERO energy annual consumption”

\[ \text{Generation} - \text{Consumption} = \text{EROZ} \]

Econ
A very highly energy performing building with renewable energy generation covering most of its annual needs.

Zero Energy Building
A very highly energy performing building with renewable energy generation covering all of its annual needs.
ZEB in Thailand

Communication Affairs Division 2014, Khon Kaen University
Pilot Net Zero Buildings For government Buildings by DEDE

- 2019 study and design Phase (gov building 2,000 m²) In progress
- 2020 budget request (approx. 60 million baht/building)
- 2021-2022 construction & commissioning phase

Net ZEB target Criteria
- OTTV $\leq$ 20 W/m²
- RTTV $\leq$ 12 W/m²
- COP $\geq$ 5.45
- LPD $\leq$ 2 W/m²
- EUI $\leq$ 75 kWh/m² ASHRAE 2019
- PV Gen 98 % ZERO CODE 2018
1. Enforcement of the Ministerial Regulation

- Enforcement BEC standard
- Development of BEC auditor training
- Tightening BEC standard and step up

2. Supporting new & retrofit energy conservation building

- Energy building labels
- Financial support such as incentives, subsidy for new & retrofit building

3. Zero Energy Building

- Study ZEB criteria design, economic value and the climate change of Thailand
- Set Zero Energy Building strategy Plan

Target: Government and private new building total area ≥ 2,000 m²

9 types of new buildings

- In 2019, starting enforce with new buildings area ≥ 10,6,2019 m²
- DOWN to 2020: size in 3 years

2019
2020
2021

10,000 m²
5,000 m²
2,000 m²

Roadmap BEC to ZEB

- To support the new projects receive formal green building certification as LEED, TREES.
Thank you for your attention

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