Country Report (Thailand)

Coordinating Center for Energy Conservation Building Design
Department of Alternative Energy Development and Efficiency
Ministry of Energy

Ms. Kulsiri Sakprasith
Implement measures to promote energy efficiency in sectors with the goal to reduce energy intensity by 30%

**EEP 2015 Overview**

**EEP 2011 - 2030 = 25%**

- **EEDP 2011**
  - **2010** actual EI = 15.28 ktoe/billion baht
  - **2013** actual EI = 14.93 ktoe/billion baht

**EEP 2015 - 2036 = 30%**

- **2030** forecast EI (2030) = 11.0 ktoe/billion baht
- **2036** forecast EI (2036) = 10.7 ktoe/billion baht

**Concept**
- Combination of Compulsory & Voluntary Measures
- Performance-based Support
- Long-term Implementation

**Assumption:**
- GDP Growth 3.8%
- Population Growth 0.03%

**Final Energy Consumption (ktoe)**

- **BAU Case EI 15.28**
- **With EE Plan EI 15.28 → 14.93**
- **Target 56,142 ktoe**
- **Saving from the past & recent measures (EI 15.28 → 14.93) 4,442 ktoe**
- **Saving from EEDP 51,700 ktoe**

1. **Electricity 15%** (7,641 ktoe) = 89,672 GWh
2. **Heat 85%** (44,059 ktoe)
EEP 2015 Measures

3 Strategies – 10 Measures

Compulsory
- Enforcement of energy conservation standard in designated factory/building
- Building Energy Code
- Energy Standard and Labeling (HEPS/MEPS)
- Energy Efficiency Resources Standard (EERS)

Voluntary
- Financial Incentive
- Promotion of LED (Light Emitting Diode)
- Energy Saving Measures in Transport Sector

Complementary
- Research and Development in Energy Efficient Technologies
- Human Resources Development
- Promotion of Public Awareness on Energy Conservation
EEP 2015 Compulsory Measures

EE1 Energy conservation standard in designated factory/building

• Mandatory on Energy Management based on PDCA concept in Designated factory/building (>1000 kW or > 20 MJ/y) : 8,000 DFs
• Plan to strengthening for more enforcement by establishing energy efficiency standards and possible penalty (in the form of fee - based on energy consumption) for noncompliance.

EE2 Building Energy Code

• New buildings or retrofitted buildings being constructed which have a total area of 2000 square-meters or more must be designed under specified requirements.

EE3 Energy Standard and Labeling (HEPS/MEPS)

• Setting energy efficiency standard for equipment and machineries
  • MEPS - Minimum Energy Performance Standard (MEPS) is set to prevent import and production of sub-standard equipment.
  • HEPS – High Energy Performance Standard (HEPS) is given to equipment with high efficiency for promotion purposes.
• Regulating MEPS/HEPS via labeling (MEPS by TISI and HEPS by EGAT and DEDE)

EE4 Energy Efficiency Resources Standard (EERS)

• Utilities have obligations to help their customers reduce their energy consumption via various energy conservation measures.
EEP 2015 Voluntary Measures

EE5 Financial Incentive

- Main Financial incentives are;
  - Co-investing Scheme (ESCO Fund)
  - Soft Loan
  - Tax Incentive
  - Direct Subsidy
  - Energy Service Company (ESCO)

EE6 Promoting LED (Light Emitting Diode)

- Replacing street lights with LEDs
- Installation of LEDs in government buildings
- Promotion of LED in residential, commercial, and industrial sector via price mechanism

EE7 Energy Saving Measures in Transport Sector

- Remove subsidies for fossil-fuel to let market prices reflect the true cost of the fuel
- Increase efficiency in cars
- Improve efficiency in trucks and buses
- Improve the infrastructure of transport sector
## EEP 2015 Measures Summary

<table>
<thead>
<tr>
<th>Measures/Sector</th>
<th>Industrial</th>
<th>Commercial/ Governmental</th>
<th>Residential</th>
<th>Transportation</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE1 Energy conservation standard in designated factory/building</td>
<td>4,388</td>
<td>768</td>
<td></td>
<td></td>
<td>5,156</td>
<td>10.0</td>
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<tr>
<td>EE2 Building Energy Code</td>
<td></td>
<td></td>
<td></td>
<td>1,166</td>
<td>1,166</td>
<td>2.3</td>
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<td>EE3 Energy Standard and Labeling (HEPS/MEPS)</td>
<td>749</td>
<td>1,648</td>
<td>1,753</td>
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<td>4,149</td>
<td>8.0</td>
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<td>EE4 Energy Efficiency Resources Standard (EERS)</td>
<td>202</td>
<td>184</td>
<td>114</td>
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<td>500</td>
<td>1.0</td>
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<tr>
<td>EE5 Financial Incentive</td>
<td>8,895</td>
<td>629</td>
<td></td>
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<td>9,524</td>
<td>18.4</td>
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<tr>
<td>EE6 Promoting LED (Light Emitting Diode)</td>
<td>281</td>
<td>424</td>
<td>286</td>
<td></td>
<td>991</td>
<td>1.9</td>
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<tr>
<td>EE7 Energy Saving Measures in Transport Sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,0213</td>
<td>58.4</td>
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<tr>
<td><strong>Total</strong></td>
<td>14,515 (28.1%)</td>
<td>4,819 (9.3%)</td>
<td>2,153 (4.2%)</td>
<td></td>
<td>30,213 (58.4%)</td>
<td>51,700</td>
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</tbody>
</table>

Unit: ktoe
1. Enforcement of the Ministerial Regulation
- Enforcement BEC standard
- Development of BEC auditor training
- Tightening BEC standard

2. Supporting new energy conservation building
- Energy building labels
- Financial incentives, for example government funds or low interest personal loans
- To support the new projects receive formal green building certification as LEED, TREES.

3. Zero Energy Building
- Study green building design, economic value and the climate change of Thailand
- Zero Energy Building Plan
  - Target: Government and private new building total area ≥ 2,000 m²
  - 9 types of new buildings:
    - Envelop system
    - Lighting system
    - Air conditioning
  - In 2018, Starting enforce with new buildings area ≥ 10,2018 m²
  - Down to 2019: size in 3 years:
    - 10,000 m², 5,000 m², 2,000 m²
Building Energy Code Standard

- 9 types of new buildings
- Total area ≥ 2,000 m²

**Group 1:**
- Education
- Office

OTTV ≤ 50 W/m²
RTTV ≤ 15 W/m²
LPD ≤ 14 W/m²

8 Hours/day

**Group 2:**
- Theater
- Convention Hall
- Entertainment
- Department Store

OTTV ≤ 40 W/m²
RTTV ≤ 12 W/m²
LPD ≤ 18 W/m²

12 Hours/day

**Group 3:**
- Hotel
- Hospital
- Condominium

OTTV ≤ 30 W/m²
RTTV ≤ 10 W/m²
LPD ≤ 12 W/m²

24 Hours/day
BEC Standard

System compliance

1. Envelop system
   - PASSED
2. Lighting system
   - PASSED
3. Air conditioning system
   - PASSED
4. Hot water system
   - FAILED

Whole building compliance

- Designed
  - RTTV = 17
  - OTTV = 55
  - Lighting = 7
  - < 250,000 kWh/year
- Reference
  - RTTV = 15
  - OTTV = 50
  - Lighting = 14
  - ≤ 300,000 kWh/year

Hot water system

- PASSED
BEC Implementation

Since 2010

“Coordinating Center of Energy Conservation Building Design”

- To provide information to any government sectors, state enterprises, or project stakeholders regarding the evaluation procedures of building plans for energy conservation as required by the Ministerial Regulation
- To create collaborative networks between the government and private sectors to lay the foundation of energy conservation building design

Evaluation of energy conservation building
(2009 – 2017 = 500 building drawing plans)
BEC’s auditor training 2,000 persons
(Architect, Engineer and Building Owner etc.)
MOU with municipalities and universities
(Bangkok, Chiangmai, Pattaya etc.) (KU, TU, CMU, KMITL etc.)
Private network and professional associations
(Engineering institute, Siamese Architects)
(SCG, CPN, LPN etc.)

Development of prototypes for standard government conservation building drawing plans.
BEC Implementation

Result of the Evaluation

Only 32% of Private Building in Cooperation with the Promotion of BEC from 2009 to 2016

- Condominium: 21.40% (107 Buildings)
- Hospital: 11.20% (56 Buildings)
- Hotel: 2.80% (14 Buildings)
- Department Store: 1.00% (5 Buildings)
- Convention Hall: 9.40% (47 Buildings)
- Office: 14.80% (74 Buildings)

500 Buildings

Energy Saving 2009 - 2016

- Energy Saving: 278.81 GWh/yr
- Oil Equivalent: 23.83 ktoe/yr
- Cost Value: 975.84 Baht/yr
- Reduce CO2: 161.71 tons
BEC AWARDS 2017

Energy conservation Buildings in Thailand

For the energy conservation buildings passing every saving system.

Rewards in 2016-2017, 96 buildings

Excellent: >70%
Very Good: 50-70%
Good: 30-50%

Excellent 9, Very good 38, Good 49

Gamphatman Phalangnatsan
และอนุรักษ์พลังงาน
กระทรวงพลังงาน

BEC AWARDS 2017
1. Renewable Energy
2. Energy Efficiency
   - Building
     - Small and Medium Building Category (1)
     - BEC Category (6)
     - New and Existing Building Category (3)
     - Retrofitted Building Category (3)
     - Tropical Building Category (1)
   - Industry
   - Transportation
3. Personnel
4. Energy Creativity
5. Contributor of Efficiency Energy and Renewable Energy

TEA 2017: Evaluation of Thailand Energy Award Since 2000
www.thailandenergyaward.com
From AEA 2017, Thailand joined the event in 27 September 2017. There are 19 awards that Thailand entered. The awards are:

1. Renewable Energy
2. Energy Management in Building and Industry
   - Small and Medium Building Category (1)
   - Large Building Category (2)
3. Energy Efficiency Buildings
   - Retrofitted Building Category (2)
### Next step

<table>
<thead>
<tr>
<th>ปีก่อนหน้านี้ (B.C.)</th>
<th>Reference Building</th>
<th>Building Energy Code</th>
<th>High Performance Standards</th>
<th>Economic Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTTV (W/m²)</td>
<td>50</td>
<td>50</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>RTTV (W/m²)</td>
<td>15</td>
<td>10</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>LPD (W/m²)</td>
<td>14</td>
<td>10</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

*Group 1 Academy and office

<table>
<thead>
<tr>
<th>Split Type (EER)</th>
<th>Reference : Number 5’s label of EGAT*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air- cooled Chiller (kW/ton)</td>
<td>1.33</td>
</tr>
<tr>
<td>Water- cooled Chiller (kW/ton)</td>
<td>1.24</td>
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</table>

<table>
<thead>
<tr>
<th>Boiler</th>
<th>Efficiency (%)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>80</td>
</tr>
</tbody>
</table>

*EGAT = Electricity Generating Authority of Thailand
How to Increase the Number and quality of entries to AEA

1. Communicate with our targets
   - Show strength points of AEA.
   - Ensure buyer, tenant, owner of the building in terms of value for EEB.
   - Promote image in compliance with the law and how much the building is interested in the energy and environment.

2. Increase type of the prize eg. Personal including exclusive person and supporting person, Innovation/Research, Invention, Biofuel, Cogenerator. Everyone can learn the success of those who have succeeded from their visible examples easier than learning from the paper.

3. Increase the value of prize.
How to promote BEC/GBC in respective Countries by making use of the ECAP14

Participants can share everything that learn and share from this meeting to the stakeholders of each other and apply it.

- Training
- Exhibition, public documents, website.

How to develop ZEB concept in the Special Submission Category

ASEAN agreement of ZEB
- Conception
- Measurement/Scorecard
- Score in the Award

In part of Thailand, we have BEC program for evaluation of energy conservation building. And it can be developed as a program to be used under ZEB term.
THANK YOU

www.dede.go.th
www.2e-building.com
E-mail: