EE Standards and Labeling Programs in Thailand

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Department of Alternative Energy Development and Efficiency
Ministry of Energy, Thailand
Outline

1. Thailand Energy Situation and Policy
2. Framework of EE S&L
3. Promotion of EE Labels
4. Certification Process for Certification Marks
5. Financial Incentive Programs
Thailand Energy Statistics 2012

- Residential: 15.1%
- Transportation: 35.8%
- Commercial: 7.2%
- Agriculture: 5.2%
- Industry: 36.7%
According to government policy, at 23 Aug 2011 to reduce energy intensity by 25% within 20 years.

Energy use reduced by not less than 38,200 ktoe in 2030.

Final Energy Consumption (ktoe)

EI (2010) 15.6 ktoe/billion baht

EI (2030) 11.7 ktoe/billion baht

Average growth rate/year (2010-2030)

- GDP: 4.3%
- Population: 0.3%

*GDP_{2030} at constant price 1988 = 10,650 billion baht
**Abbreviations**

**DEDE:** Department of Alternative Energy Development and Efficiency  
**EGAT:** Electricity Generating Authority of Thailand  
**TISI:** Thai Industrial Standards Institute
Framework of EES&L measures

**MEPS**: Minimum Energy Performance Standard

- Both voluntary and mandatory program
- Collaboration between DEDE and TISI
- Draft Standards are set up by DEDE, but they are regulated by TISI.

**HEPS**: High Energy Performance Standard

- Voluntary program
- Collaboration between DEDE and EGAT
- Standards are set up by DEDE, and labelling programs are responsible by DEDE and EGAT
Energy Conservation Promotion (ECP) Act

- ECP Act was enacted in 1992.
- ECP Act B.E. 2550 (2007) (Issue NO.2) has been effective since June 2008.
In order to conserve energy in machinery or equipment and to promote the use of energy-efficient materials or equipment, the Minister, by and with the recommendation of the National Energy Policy Council, shall have the power to issue Ministerial Regulations on the following:

(1) the establishment of energy efficiency standards of machinery or equipment;

(2) the determination of machinery or equipment, according to which category, size, amount of energy consumption, power rating and level of energy efficiency, that are considered as high-efficiency machinery or equipment;

(3) the determination of materials or equipment to conserve energy, according to which category, quality and standard, that are considered as energy-efficient materials or equipment;

(4) the requirement for the manufacturers and the distributors of machinery or equipment to illustrate the level of energy efficiency.
The producer or distributor of high efficiency machinery or equipment, or materials to be used in the energy conservation programmes shall have the right to request for promotion and assistance as follows:

(1) exemption from paying surcharges under this Act;

(2) grant or subsidy from the Fund under Section 25.

Owners of factories, buildings, or government agencies and state enterprises which are not required to have energy conservation programmes under Clause one hereof, but desire to make provisions for energy conservation purpose, shall have the right to request for promotion and assistance under Clause one hereof. (ECP Act B.E. 2535)
The criteria of MEPS and HEPS

- MEPS fails ~3%
- HEPS passes ~20%
The Process of Setting Draft MEPS & HEPS

1 Year

- DEDE hires a consultant
- Setting the technical committee
- Research on market share / standards / testing methods / etc.
- Technical committee meeting
- Product sampling / Testing
- Public hearing
- Draft MEPS & HEPS

lites.asia Sharing Standards and Experiences – Jakarta, 24 April 2013
Ministerial Regulation & Ministerial Announcement
Draft HEPS to be legislated

Approved by:

TISI: Thai Industrial Standards Institute
NEPC: National Energy Policy Committee
OCST: Office of the Council of State of Thailand

Draft MEPS & HEPS

EE Standards Sub-committee

Ministry of Energy Law Committee

Cabinet

NEPC

OCST

Sign by Energy Minister

Announce in Royal Gazette
MEPS & HEPS

MEPS
1) Air Conditioners
2) Refrigerators
3) Self-ballasted lamps
4) Single-capped fluorescent lamps
5) Double-capped fluorescent lamps
6) 3-Phase motors
7) LPG stoves
8) Insulator
9) Diesel engines

HEPS
1) Air Conditioners
2) Refrigerators
3) Electric fans
4) Rice cookers
5) Chillers
6) Window glass
7) Electric water heaters
8) Electric pots
EE labeling by EGAT (Labeling No.5)

1) 1994 - Refrigerators
2) 1995 - Air conditioners
3) 1996 - Compact fluorescent lamps
4) 1998 - Low loss magnetic ballasts
5) 2001 - Electric fans
6) 2003 - Electric rice cookers
7) 2003 - Lighting fixtures
8) 2009 - T5 fluorescent lamps
9) 2009 - T5 electronic ballasts
10) 2009 - Oscillating fans
11) 2010 - Standby power for televisions
12) 2010 - Standby power for computer monitors
13) 2010 - T5 luminaires
14) 2011 - Electric pots
15) 2012 – Electric water heaters
16) 2012 – Ventilation fans
17) 2012 – Electric irons
18) 2012 – Washing machines
   (Top loading)
Compact Fluorescent Lamps, CFL : 1996

Efficacy Requirement – Lumen/Watt

<table>
<thead>
<tr>
<th>Input power range (W)</th>
<th>Day Light &gt; 4,400 K</th>
<th>Warm White ≤ 4,400 K</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 – 8</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>9 – 14</td>
<td>50</td>
<td>55</td>
</tr>
<tr>
<td>15 – 20</td>
<td>55</td>
<td>60</td>
</tr>
<tr>
<td>21 – 24</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>25 – 60</td>
<td>60</td>
<td>65</td>
</tr>
</tbody>
</table>
Compact Fluorescent Lamps: 1996

Testing Room

Input Control

Lumen Maintenance

Lumen Output
Electromagnetic Ballasts: 1998

Energy Efficient Ballast Labelling Programme

- ‘Safety Ballasts No 5’
  - Lower heat loss → Lower temperature
  - Diminish fire risk, and
  - Reduce heat load in air-conditioning rooms
- Ballast loss < 6 W with allowable minimum currents
  - Loss in standard ballasts = 10 W

<table>
<thead>
<tr>
<th>Ballast</th>
<th>36 W</th>
<th>18 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric current</td>
<td>≥ 0.398 A</td>
<td>≥ 0.343 A</td>
</tr>
</tbody>
</table>

Brand:
Model:
For thin tube (Watts):
High Efficiency Luminaire Labelling Programme

- Reduce number of fluorescent lamps by 30%
  - 3 → 2
  - Maintaining lumens and light quality
  - 9 Manufacturers participating in the programme
# Fluorescent lamp T5: 2009

**Testing standard:** TIS 236-2548

<table>
<thead>
<tr>
<th>Testing Details</th>
<th>Unit</th>
<th>28 W</th>
<th></th>
<th>14 W</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>≥ 5,000 K</td>
<td>&lt; 5,000 K</td>
<td>≥ 5,000 K</td>
</tr>
<tr>
<td>1. Flux (Rated Value)</td>
<td>lumen</td>
<td>2,600</td>
<td>2,660</td>
<td>1,120</td>
<td>1,200</td>
</tr>
<tr>
<td>2. Efficiency (at 100 hr)</td>
<td>Lumen/W</td>
<td>≥ 92</td>
<td>≥ 95</td>
<td>≥ 80</td>
<td>≥ 85</td>
</tr>
<tr>
<td>3. Lumen maintenance after 2,000 hr</td>
<td>%</td>
<td>≥ 92</td>
<td>≥ 92</td>
<td>≥ 92</td>
<td>≥ 92</td>
</tr>
<tr>
<td>4. Color Rendering Index :CRI</td>
<td>-</td>
<td>≥ 82</td>
<td>≥ 82</td>
<td>≥ 82</td>
<td>≥ 82</td>
</tr>
<tr>
<td>5. Mercury contain (RoHS)</td>
<td>mg</td>
<td>≤ 5</td>
<td>≤ 5</td>
<td>≤ 5</td>
<td>≤ 5</td>
</tr>
<tr>
<td>6. Life time</td>
<td>hr</td>
<td>≥15,000</td>
<td>≥15,000</td>
<td>≥15,000</td>
<td>≥15,000</td>
</tr>
<tr>
<td>item</td>
<td>description</td>
<td>28 W</td>
<td>14 W</td>
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<td></td>
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<td>------</td>
<td>------------------------------------------------------------------------------</td>
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<td>------</td>
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<td></td>
</tr>
<tr>
<td>1.</td>
<td>Input power</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>- single lamp</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- double lamps</td>
<td></td>
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<td>**</td>
<td>**</td>
<td></td>
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</tr>
<tr>
<td>2.</td>
<td>Constant light output at voltage change +10%</td>
<td></td>
<td></td>
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<td></td>
<td>**</td>
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<tr>
<td>3.</td>
<td>Power factor (PF)</td>
<td></td>
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<td>**</td>
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<td>4.</td>
<td>Total Harmonic Distortion (THDi)</td>
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<td>5.</td>
<td>Electrical circuit (for double lamp)</td>
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<tr>
<td>6.</td>
<td>Ballast lumen factor</td>
<td></td>
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<td></td>
<td>**</td>
<td>**</td>
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<tr>
<td>7.</td>
<td>Life time</td>
<td></td>
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<td>**</td>
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<tr>
<td>8.</td>
<td>Tested under De-activated lamp protection according to TIS 885-2551</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>9.</td>
<td>Endurance Tc=90°C</td>
<td></td>
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<td></td>
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<td></td>
<td>**</td>
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<tr>
<td>10.</td>
<td>Current Crest factor</td>
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<td></td>
<td>**</td>
<td>**</td>
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<tr>
<td>11.</td>
<td>Preheat Start</td>
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<td></td>
<td>**</td>
<td>**</td>
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</tr>
<tr>
<td>12.</td>
<td>Reference Standard</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>**</td>
<td>**</td>
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</tr>
</tbody>
</table>
(Luminaire for T5) : 2010

Energy efficiency criteria

<table>
<thead>
<tr>
<th>Louver Luminaires for T5</th>
<th>Lighting Out Ratio: LOR (%)</th>
<th>* Uniformity</th>
<th>* Unified Glare Rating (UGR)</th>
<th>* Illuminance (Lux)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 28 W</td>
<td>≥ 85</td>
<td>≥ 0.7</td>
<td>&lt; 19</td>
<td>≥ 500</td>
</tr>
</tbody>
</table>

*calculate by DIALUX program
Compact Fluorescent Lamps

- Together in conservation...

Famous footballers as project promoters
PR of energy labeling No.5
Campaigns of Labeling No.5

Delivery free CFL 800,000 lamps to end user
Campaigns of Labeling No.5

หลอดcury bulb 5
ประหยัดไฟฟ้า 80%
เพียงหลอดละ
55 บาท (13 วัตต์)
58 บาท (20 วัตต์)

EGAT yellow box
for low price of CFL
55 baht for 13 W
58 baht for 20 W
เดี่ยวเนินใครๆก็กลมใส่ใจวะ

ใครๆก็ใช้ฟื้นความกลมใส่ใจ
หลอดดีเอ็กซ์เรย์ 5 ปีมิเตอร์สิ่ง
ประหยัดถึง 80% (มีติดบ้านคงเลยได้)
อายุการใช้งานนาน 6,000 ชั่วโมง

หลอดดีเอ็กซ์เรย์ 5
สว่างเร็ว...คู่ใจจริง...
Advertising Campaign
### Engineering Estimate of DSM Program Impacts by EGAT

**Achieved to date (as of Dec 2012)**

<table>
<thead>
<tr>
<th>Program</th>
<th>MW</th>
<th>GWh</th>
<th>CO₂ (Ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting</td>
<td>928.4</td>
<td>5,120.6</td>
<td>3,127,030</td>
</tr>
<tr>
<td>- Fluorescent Tube (T8)</td>
<td>401.5</td>
<td>1,957.5</td>
<td>1,446,682</td>
</tr>
<tr>
<td>- Fluorescent T5 Program</td>
<td>122.3</td>
<td>557.8</td>
<td>296,964</td>
</tr>
<tr>
<td>- FTL (T5)</td>
<td>87.7</td>
<td>398.7</td>
<td>217,265</td>
</tr>
<tr>
<td>- ElecTronic Ballast T5</td>
<td>34.7</td>
<td>159.1</td>
<td>79,699</td>
</tr>
<tr>
<td>- CFL (before labeling)</td>
<td>10.0</td>
<td>57.2</td>
<td>42,295</td>
</tr>
<tr>
<td>- CFL (labeling 2008)</td>
<td>376.4</td>
<td>2,440.1</td>
<td>1,268,380</td>
</tr>
<tr>
<td>- Low-Loss Ballast</td>
<td>18.2</td>
<td>90.8</td>
<td>59,986</td>
</tr>
<tr>
<td>- HPSV Street Light</td>
<td>-</td>
<td>17.2</td>
<td>12,723</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>583.0</td>
<td>3,704.1</td>
<td>2,429,964</td>
</tr>
<tr>
<td>- 1 door</td>
<td>399.2</td>
<td>2,795.2</td>
<td>1,961,684</td>
</tr>
<tr>
<td>- 2 doors</td>
<td>183.8</td>
<td>908.9</td>
<td>468,280</td>
</tr>
<tr>
<td>Air Conditioner</td>
<td>1,188.5</td>
<td>7,313.3</td>
<td>4,262,260</td>
</tr>
<tr>
<td>Fan</td>
<td>51.5</td>
<td>449.3</td>
<td>228,487</td>
</tr>
<tr>
<td>Double oscillating fan</td>
<td>2.9</td>
<td>6.6</td>
<td>3,554</td>
</tr>
<tr>
<td>Rice cooker</td>
<td>19.9</td>
<td>26.5</td>
<td>13,546</td>
</tr>
<tr>
<td>Motor</td>
<td>0.2</td>
<td>1.2</td>
<td>909</td>
</tr>
<tr>
<td>Commercial</td>
<td>2.6</td>
<td>10.3</td>
<td>7,583</td>
</tr>
<tr>
<td>Standby - TV</td>
<td>0.7</td>
<td>2.3</td>
<td>1,279</td>
</tr>
<tr>
<td>Standby - Computer screen</td>
<td>-</td>
<td>2.3</td>
<td>1,241</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,777.6</td>
<td>16,636.5</td>
<td>10,075,853</td>
</tr>
</tbody>
</table>

**Cost Effectiveness of DSM Program**

- Estimated Total DSM Expenditures to Date: 4,588.6 Million baht
- Cost of Peak Demand Saving: 1,652.0 Baht/kW
- Cost of Energy Saving: 0.28 Baht/kWh

**Peak demand reduction in 2012 by month**
1. LPG Stoves
2. Insulator
3. Window Glass
4. VSD
5. Diesel Engines
6. Gasoline Engines
7. 3-Phase Motors
Product Certification Process for Certification Marks

1. Receipt of Application/ Documents Checking/ Registration (20 minutes)
2. Receipt of Application Fee (10 minutes)
3. Factorial Quality Control System Assessment & Product Sampling/ Report Preparation (30 days)
4. Inspection/ Testing/ Sample Handling/ Receipt of Test Report (Excluded)
5. Evaluation/ Conclusion/ Informing the Applicant of the Result (5 days)
6. Licence Preparation (7 days)

(Receipt of Application Period)

voluntary certification mark

mandatory certification mark
Financial Incentives

- Gov. co-investment program (ESCO Fund)
- Revolving Fund Program for EE&RE Projects
- Tax Incentives
- Direct Subsidy
1. **Gov. Co-Investing Scheme → ESCO Fund**

- **1,000 million Baht** allocated from Gov’s ENCON FUND
- **2 Fund Managers** assigned & given 2 years window of investment
- **5-7 years of investment** with mutual agreed exit clause
- **10-50% equity** holding with max. of 50 million Baht

**Equipment Leasing**
- 100% of total cost with max. 10 mill. Baht
- interest rate 4-6% (negotiable)
- Max. leasing period 5 years
- Apply for ESCO with share saving contract
2. Soft Loans → Revolving Fund

- **7,000 mill. Baht** allocated from Gov’s ENCON FUND & 95% subscribed
- 2-Stepped Loan mix w/ Bank’s Money (approx. 1:1)
- **Max. Interest Fix at 4%** (Bank pay 0.5% Int. to Encon Fund)
- **Max. 7 yr. loan period**
- **Max. 50 Mill. Baht / project**
- 11 major banks are participating

Funded by ENCON Fund

![Diagram showing the flow of funds](image-url)
3. Tax Incentive

1. Tax Incentive for EE products

- Cooperation program with Revenue Dept.
- **25% tax credit** from purchasing of EE products
- 19 products are announced for tax incentive; Mostly label 5 products

http://www.energy-tax.com/
4. Direct Subsidy 20:80

• For EE measures

• **Subsidy 20% of EE measures,**
  - maximum 3 million baht ($\approx USD 97,000$)
  - minimum 50,000 baht ($\approx USD 1,600$)

• To buy EE products

• Payback period $\leq$ 7 years
Thank you...