Thailand Power Development Plan (2010-2030)

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MINISTRY OF ENERGY

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Structure of Thailand Power Sector

Regulators

- **EGAT (44%)**
- **IPPs (38%)**
- **Imports (7%)**
- **SPPs (10%)**
- **VSPPs (<< 1%)**

- **EGAT Transmission System (100%)**

- **MEA (28%)**
- **PEA (71%)**
- **Other province (71%)**
- **BKK, NBI, SPK (28%)**
- **Egat Direct (1%)**
- **BKK/MEA/PEA**
- **SPPs Direct**
- **BKK/Rural**

**Note**: numbers in () are market shares; As of April 2014

- Electricity Generator Authority of Thailand (EGAT), Provincial Electricity Authority (PEA), Metropolitan Electricity Authority (MEA).
Power Generation – Installed Capacity

as May 2014

* May მაის

Total 33,379 MW

- EGAT, 14,708, 44%
- IPP, 12,742, 38%
- SPP, 3,525, 11%

Import/Exchange 2,405, 7%

Power Generation – Installed Capacity

- 2010: 39%, 15,558 MW
- 2011: 38%, 16,177 MW
- 2012: 46%, 17,215 MW
- 2013: 45%, 17,553 MW
- 2014*: 44%, 17,736 MW

* May 2014
Power Generation by Fuel Type

* Jan –April

- **Natural Gas**: 36,881,646, 57,728 GWh
- **Coal/Lignite**: 12,446,226, 22%
- **Oil**: 1,286,1%
- **Hydro**: 2,286,4
- **Import**: 3,962,7
- **RE**: 1,468,2%

**Total**: 72,728 GWh

* 2014*
Net Peak Generation Requirement (on EGAT system)

Net Peak Generation Requirement (on EGAT system)

20,000
22,000
24,000
26,000
28,000

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

$\text{May 2013 (26,598 MW)}$

$\text{Apr 2014 (26,942 MW)}$

2011 2012 2013 2014
Electricity consumption in each sector

* Jan – Apr

<table>
<thead>
<tr>
<th>User</th>
<th>Growth (%)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>▼ 4.2</td>
<td>22%</td>
</tr>
<tr>
<td>Small Enterprise</td>
<td>▼ 3.7</td>
<td>11%</td>
</tr>
<tr>
<td>Business</td>
<td>▼ 2.9</td>
<td>18%</td>
</tr>
<tr>
<td>Industrial</td>
<td>▼ 0.5</td>
<td>45%</td>
</tr>
<tr>
<td>Govt &amp; Non Profit</td>
<td>▼ 9.1</td>
<td>0.1%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>▲ 22.3</td>
<td>0.4%</td>
</tr>
<tr>
<td>Public Service</td>
<td>▲ 6.2</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>▲ 6.5</td>
<td>2%</td>
</tr>
</tbody>
</table>

GWh: Gigawatt-hours

2014*

Growth vs. Share comparison for different sectors.
23 Mar 2010: Cabinet approved **PDP 2010**

**Long-term Plan: 20 Years**

- Emphasize power supply security concurrently with environmental protection
- Give importance to public participation

**Supply Security**

- Proper percentage of power generation reserve of the country
- Diversification of fuel sources & types for power generation
  - Purchase from neighboring countries
  - Reduce dependence on natural gas

**Environmental Protection**

- Reduce GHG emission from new power generation facilities
- Promote RE generation in line with the 15-year RE Development Plan
- Improve energy efficiency (DSM)
- Promote efficient power generation, using Cogeneration System
PDP 2010 Revision

**Rev.1**
(30 Nov 2010)

- Higher load demand than forecasting
- IPP construction delay

**Rev.2**
(3 May 2011)

- Nuclear Power Plant Crisis in Japan

**Rev.3**
(19 Jun 2012)

- New government policy
- AEDP and EEDP launched
- New target in CO₂ emission

**Outcome:**
Reduce NPP
Accelerate SPP Cogeneration
Improve NG supply plan and infrastructure

**Outcome:**
Reduce Coal power plant, NPP
Increase RE
Increase NG power plant
Increase energy efficiency

**Outcome:**
Accelerate EGAT’s plant (Chana, Wangnoi)
Increase EGAT’s plant (North Bangkok)
Increase SPP Cogeneration

**Outcome:**
Reduce NPP
Accelerate SPP Cogeneration
Improve NG supply plan and infrastructure
### Generating Capacity

<table>
<thead>
<tr>
<th></th>
<th>PDP 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Capacity at end-2011</td>
<td>32,395</td>
</tr>
<tr>
<td>Increased (new) Capacity</td>
<td>55,130*</td>
</tr>
<tr>
<td>Decommissioned Plants</td>
<td>-16,839</td>
</tr>
<tr>
<td>Total Generating Capacity at end-2030</td>
<td>70,686</td>
</tr>
</tbody>
</table>

* No. of New Plants during 2010-2030

- **Nuclear Power Plant 1,000 MW**: 2,000 (2 plants)
- **Combined Cycle**: 25,451 (29 plants)
- **Clean Coal-fired**: 4,400 (5 plants)
- **Gas Turbine**: 750 (3 plants)
- **Co Generation**: 6,475
- **Renewable Energy (SPP, VSPP, EGAT)**: 9,481
- **Purchase from abroad**: 6,572

Unit: MW
Fuel Mix for Power Generation

MWh

- Diesel
- Renewable
- Fuel Oil
- EGAT-TNB
- Natural Gas
- Import Coal
- Lignite
- Nuclear

Year:
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030

Nuclear
Information in power development plan can be used as initial inputs for the sustainability assessment.
- Number of new power plants to be constructed
- Type of nuclear power plant to be introduced
- Political climate, including the energy policy, of the country

In turn, the results of the sustainability assessment can help identify the gaps needed to be fulfilled in order to follow the policy, or help improving the policy in order to achieve the sustainable power supply scheme.

Examples:
- The cost of nuclear is higher than coal but slightly lower than gas.
  ➔ The policy maker needs to seek for the advantages of the nuclear to offset the high cost, e.g., energy supply security.
- Total investment needed for construction of a nuclear power plant is larger than the investment limit.
  ➔ The policy maker can advise the government to make the NPP project a national project in order to reduce the investment risk.
Thank you
for your kind attention