Energy and Regulatory Overview of Thailand

Asia Pacific Energy Regulators Forum (APER)
1 August 2012, Washington D.C.
Dr. Pallapa Ruangrong
Energy Regulatory Commission of Thailand
# Outline

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<td>About Thailand</td>
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<td>Energy Regulatory Commission</td>
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ABOUT THAILAND

Population: 67 Millions

Customers: 18 Millions

- Residential: 16 Million, 33,217 Gwh
- Commercial/Industrial: 1.6 Million, 114,069 Gwh
- Free of Charge: - 2,033 Gwh, 149,319 Gwh

Transmission Network: 19,190 km

Rural Electrification: 99%

Access, Transmission and Distribution:
- Population access to electricity: 99%
- Urban Population access to electricity: 100%
- Rural Population access to electricity: 99.8%
- Distribution and transmission losses: 8%
- National Grid Coverage: 99%
- Reliability of electricity service: Occasional brownouts
Energy Industry Act 2007

Policy Maker  Regulator  Operator

Energy Regulatory Commission

1. Prof. Direk Lavansiri, Ph.D.  Chairman
2. Mr. Nopadon Mantajit  Commissioner
3. Mrs. Pallapa Ruangrong, Ph.D.  Commissioner
4. Mr. Thaksin Limsvan  Commissioner
5. Mr. Boonsong Kerdklang  Commissioner
6. Mr. Pisit Soontarerat  Commissioner
7. Mr. Sun Vithespongse  Commissioner

Duties


PARTICIPATION & CONSUMER PROTECTION: Service Standards and Service Extension, Power Development Fund, Regional Energy Consumer Committees

Utilization of Immovable Property: The Energy Network System Boundaries Announcement, the expropriation of property

Redress of Disputes and Lodging of Appeals

Disciplinary Procedures & Punishment
ERC Functions and Responsibilities

Power Sector
- Generation
- Transmission
- Distribution
- Retail
- System Operator

Natural Gas Sector
- Supply & Wholesale
- Transmission
- Retail & Distribution
- LNG terminal

Reliability & Security
Engineering Standard
Tariff
Competition
Quality Service Standard
Public Participation
Safety Standard
RE & EE Promotion
Thai Electricity Industry Structure

**Generation (% market share):**
- EGAT (45%)
- IPPs (42%)
- SPPs (10%)
- Imports (3%)
- VSPPs (<< 1%)

**Transmission:**
- EGAT (100%)
- PEA (66%)
- MEA (32%)

**Distribution:**
- User
- User

**Remarks:**
- EGAT = Electricity Generating Authority of Thailand
- MEA = Metropolitan Electricity Authority
- PEA = Provincial Electricity Authority
- IPPs = Independent Power Producers (Cap. sold to EGAT ≥ 90 MW)
- SPPs = Small Power Producers (Cap. sold to EGAT < 90 MW)
- VSPPs = Very Small Power Producers (Cap. sold to MEA/PEA < 10 MW)
- Govt. (policy framework)
- ERC (Regulation)
Electricity Industry: Enhanced Single Buyer

EGAT generators

IPPs
SPPs
VSPPs
International

EGAT
Transmission System Owner

Network System Operator & Single Buyer

MEA
Distributor
Retail Supplier

PEA
Distributor
Retail Supplier

Customers

Management and Accounting Separation

Electricity Licenses

Generation Licenses
258

Transmission Licenses
5

Distribution Licenses
58

Retail Licenses
55

System Operation Licenses
1

August 9, 2011
### Private power producers in Thailand (2010)

<table>
<thead>
<tr>
<th>Producers</th>
<th>Existing</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IPP</strong></td>
<td><strong>12,151.6 MW (10)</strong></td>
<td><strong>4,400 MW (4)</strong></td>
</tr>
<tr>
<td><strong>SPP</strong></td>
<td><strong>2,182MW (43)</strong></td>
<td><strong>5,114 MW (57)</strong></td>
</tr>
<tr>
<td><strong>VSPP</strong></td>
<td><strong>525 MW (206)</strong></td>
<td><strong>5,425 MW (1,167)</strong></td>
</tr>
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</table>

**Remark:** (   ) = numbers of firms

**IPP**
- **Gas:** 11%
- **Coal:** 89%

**SPP (Firm)**
- **Gas:** 14%
- **Coal:** 68%
- **Renewable:** 0%
- **Bunker oil:** 18%

**VSPP**
- **Gas:** 99%
- **Renewable:** 1%
### The Adder* for RE generator classified by types of RE

<table>
<thead>
<tr>
<th>Types of Renewable Energy</th>
<th>Former* Adder (Baht/kWh)</th>
<th>Current** Adder (Baht/kWh)</th>
<th>Additional for Diesel Substitution (Baht/kWh)</th>
<th>Additional for RE generators in the most 3 southern provinces (Baht/kWh)</th>
<th>Period (Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Biomass</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>- Installed Cap. &lt;= 1 MW</td>
<td>0.30</td>
<td>0.50</td>
<td>1.00</td>
<td>1.00</td>
<td>7</td>
</tr>
<tr>
<td>- Installed Cap. &gt;1 MW</td>
<td>0.30</td>
<td>0.30</td>
<td>1.00</td>
<td>1.00</td>
<td>7</td>
</tr>
<tr>
<td><strong>2. Biogas (all sources)</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>- Installed Cap. &lt;= 1 MW</td>
<td>0.30</td>
<td>0.50</td>
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<td>- Installed Cap. &gt;1 MW</td>
<td>0.30</td>
<td>0.30</td>
<td>1.00</td>
<td>1.00</td>
<td>7</td>
</tr>
<tr>
<td><strong>3. Waste (MSW and non-toxic industrial waste)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Fertilizer/Landfill</td>
<td>2.50</td>
<td>2.50</td>
<td>1.00</td>
<td>1.00</td>
<td>7</td>
</tr>
<tr>
<td>- Thermal Process</td>
<td>2.50</td>
<td>3.50</td>
<td>1.00</td>
<td>1.00</td>
<td>7</td>
</tr>
<tr>
<td><strong>4. Wind</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Installed Cap. &lt;= 50 kW</td>
<td>3.50</td>
<td>4.50</td>
<td>1.50</td>
<td>1.50</td>
<td>10</td>
</tr>
<tr>
<td>- Installed Cap. &gt; 50 kW</td>
<td>3.50</td>
<td>3.50</td>
<td>1.50</td>
<td>1.50</td>
<td>10</td>
</tr>
<tr>
<td><strong>5. Hydro (Mini/Micro Hydro)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Installed Cap. 50 kW - &lt;200 kW</td>
<td>0.40</td>
<td>0.80</td>
<td>1.00</td>
<td>1.00</td>
<td>7</td>
</tr>
<tr>
<td>- Installed Cap. &lt;50 kW</td>
<td>0.80</td>
<td>1.50</td>
<td>1.00</td>
<td>1.00</td>
<td>7</td>
</tr>
<tr>
<td><strong>6. Solar</strong></td>
<td>8.00</td>
<td>6.50</td>
<td>1.50</td>
<td>1.50</td>
<td>10</td>
</tr>
</tbody>
</table>

*The Cabinet’s resolution on Mar 24, 2009

**The Cabinet’s resolution on July 20, 2009: Apply to the projects that haven’t been accepted by the Power Utilities.

Ministry of Energy is in the process of setting new Feed-in Tariff.
RE power purchasing Status in Dec 2011 comparing to AEDP in 2021
The Power Development Fund

**Source of Fund**

- **Electricity Business Licenses**
  - Retail License
  - System Operation License
  - Electricity Generation License

**Fund**

1. Compensation and Subsidization for Licensees who provide universal service
2. Compensate through Ft
3. Develop and rehabilitate a community near Power Plant
4. Promote Renewable
5. Promote people participation
6. Fund management

**Cost per kWh**

- **Gas**
  - 0.01 Baht/kWh

- **Fuel Oil**
  - 0.015 Baht/kWh

- **Coal/Lignite**
  - 0.015 Baht/kWh

- **Renewable**
  - 0 – 0.02 Baht/kWh

- 0.005 Baht/kWh + ADDER

- 0.002 Baht/kWh

- From tariffs
- From Fines
- From Levy
Thai Electricity Tariff Structure

**Base Tariff**
- Fuel Cost: 2.2462 Baht/kwh (7.46 UScent/kwh)

**Fuel Adjustment Charge (Ft)**
- 0.9581 Baht/kwh (3.18 UScent/kwh)

**VAT 7%**
- 0.2243 Baht/kwh (0.745 UScent/kwh)

**TOTAL**
- 3.4286 Baht/kwh (11.39 UScent/kwh)

*Service fee not included

1 USD: 30 baht

**PTT**
- Gas Pipeline
- Gas Pipeline Development Plan

**Power Plant**
- Power Development Plan

**Transmission**
- Transmission Development Plan

**Distribution & Retail**
- Distribution Development Plan

**Power Purchasing Cost**
- 1 Fuel Cost (27%)
- 2 Power Purchasing Cost (72%)
- 3 Adder (1%)
- 4 Power Development Fund
Proposed Tariff Structure

- **EGAT**
- **IPPP/VSPP**
  - Capacity Payment
  - Energy Payment
  - Ancillary Service Payment

**WPPM**

**T**
- Allowed Return
- Depreciation
- O&M/ Admin Cost
- Cost of Network loss
- Connection cost

**D**
- U of S Capacity Charge
- U of S Energy Charge
- Connection Charge

**SB/SO**
- SB/SO Service Payment

**G**
- Imports
- EGAT
- IPP
- SPP

**T**
- CP / EP ตามหลักการ Avoided Cost
- CP / EP ตามหลักการ Allowed Revenue
- CP / EP ตามหลักการ Bidding Process
- CP / EP ตามหลักการ Avoided Cost

**D**
- ΔEP
- Δ 97(1)
- Δ 97(2)
- Δ 97(3)

**R**
- PDF 97(1)
- PDF 97(2)
- PDF 97(3)
- Adder/97(4)
- PDF 97(5)

**Ft adjustment**

**VA**

**T**

**WACC**
Power Generation: Installed Capacity in May 2012

- IPP 12,082 MW (38%)
- EGAT 15,010 MW (48%)
- SPP 2,174 MW (7%)
- Import/Exchange 2,185 MW (7%)

Total: 31,451 MW
Power Generation Units By Fuel Types

2011
148,144 kWh

- **Gas**: 106,556 kWh (71.93%)
- **Coal & Lignite**: 29,647 kWh (20.01%)
- **Hydro**: 7,945 kWh (5.36%)
- **Fuel oil**: 529 kWh (0.36%)
- **Diesel**: 2,291 kWh (1.55%)
- **Renewable**: 0 kWh (0.00%)

2030 (PDP 2010 R3)
300,380 kWh

- **Gas**: 201,161 kWh (66.97%)
- **Coal & Lignite**: 56,479 kWh (18.80%)
- **Hydro**: 6,941 kWh (2.31%)
- **Fuel oil**: 0 kWh (0.00%)
- **Diesel**: 21 kWh (0.01%)
- **Nuclear**: 16,046 kWh (5.34%)
- **Renewable**: 0 kWh (0.00%)
- **Fuel Oil**: 0 kWh (0.00%)
- **Renewable**: 0 kWh (0.00%)
- **Nuclear**: 0 kWh (0.00%)
- **Gas**: 0 kWh (0.00%)
- **Coal and Lignite**: 0 kWh (0.00%)
- **Hydro**: 0 kWh (0.00%)
- **Fuel oil**: 0 kWh (0.00%)
- **Diesel**: 0 kWh (0.00%)
- **Renewable**: 0 kWh (0.00%)
- **Nuclear**: 0 kWh (0.00%)

Thai Gas Industry Structure

Supply & Wholesale
- Gulf
- Import
- LNG
  - LNG Terminal
  - Gas Separation Plant
  - 4,470 mmscf/d

Transportation
- Pipeline
- Distribution and Retail

Distribution & Retail

Customer
- Electricity
- Industry
- NGV

PTT (Gas Procurement)
PTT (Gas Transmission)
PTT (Natural Gas Distribution)
AMATA NGD
**Thai Natural Gas Price Calculation Policy**

\[ P = WH + (S1+S2) + T \]

- **P** means natural gas price, Baht per million BTU
- **WH** means average gas price sent into gas system, Baht per million BTU
- **S1+S2** means remuneration for gas supply and distribution including contractual risks, Baht per million BTU
- **T** means gas transmission price, Baht per million BTU

**Source:** National Energy Policy Council (NEPC)

<table>
<thead>
<tr>
<th>Customers</th>
<th>Wellhead gas(WH)</th>
<th>Supply(S1+S2)</th>
<th>Transportation(T)</th>
<th>P = WH+S+T</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPP</td>
<td>274</td>
<td>11.476</td>
<td>21.8128</td>
<td>307.2888</td>
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<tr>
<td>EGAT</td>
<td>274</td>
<td>2.1525</td>
<td>21.8128</td>
<td>297.9653</td>
</tr>
<tr>
<td>IPP</td>
<td>274</td>
<td>2.1525</td>
<td>21.8128</td>
<td>297.9653</td>
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<tr>
<td>GSP</td>
<td>220</td>
<td>3.8500</td>
<td>9.7474</td>
<td>233.5974</td>
</tr>
</tbody>
</table>

**Source:** Office of The Energy Regulatory Commission (OERC)
TPA in gas transportation and LNG terminal will be next to be implemented.

TPA is the basis of introducing competition to the gas market. TPA will involve a changing of the gas industry to deliver competition. A set of rules in the form of an Access Code will be needed to underpin the TPA regime. Legislation and legal instruments are needed to implement TPA. ERC performs a central role in the introduction and monitoring of TPA. Time should be taken to implement full-scheme of TPA.
Development Plan of Gas Regulation

2012-2013

Account Unbundling
Account separation by regulated business and non-regulated business as well as by type of licenses

Fair and Transparent tariffs
Tariffs are needed to be set based on cost reflection, appropriate return on investment and efficiency operation

2013-2014

Gas Access Codes
- Codes will need to be drafted related to TPA in transportation and LNG terminal
- Roles of involved person are needed to be set

planned

Amendment to Current Legislation
Related legislation are needed to revise to support competition

Done
Conclusion

• The Energy Industry Act has opened the way for promoting more competition
• The Energy Regulatory Commission has authorities and responsibilities under the Act
• Achievements to date and in the near future include:
  – Accounting unbundling of the power and gas sectors with the issuance of licenses
  – Codes governance regime and ring-fencing of the system operator
  – Development of TPA in gas transportation
  – Retail Wheeling
  – Regulatory Impact Assessments
  – Major tariff review completed and preparations for a new tariff review in two years
  – Investigation of distributed generation and demand response/price response issues
  – preparation for a regulatory framework for smart grid
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