Thailand’s Wind Energy Status

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Ministry of Energy, THAI LAND
1. Population: 67.764 Million or 15.244 Million Households
2. Electrification Rate: 98.5% or 15.015 Million Households
3. Population Connected to Grid: 14.832 Million Households
5. Another (Diesel Gen): 3,565 Households
   (2010; 4MTHS = 53,564 GWH) (2011; 4MTHS = 52,365 GWH)
Electrical Energy Stakeholders

State Enterprise
EGAT : Electricity Generating Authority of Thailand
PEA : Provincial Electricity Authority
MEA : Metropolitan Electricity Authority

Government
DEDE : Department of Alternative Energy Development and Efficiency
EPPO : Energy Policy and Planning Office
ERC : Energy Regulatory Commission

Private
IPP : Independent Power Producer (>90 MW)
SPP : Small Power Producer (<90 MW)
VSPP : Vary Small Power Producer (<10 MW)
Thailand Renewable Energy Development

Committed to the development of low-carbon society

Government Funding
On R & D & D Activities

Encouraging Private-Led Investment

15 years RE-Development Plan

Target 20.3 % of RE in Total Energy Consumption
By 2022

Solar + Wind
500 + 800 = 1,300 MW

Small + Mini Hydro
320 MW

Bio Energy
- Biomass: 4,000 MW
- Biogas: 160 MW
- MSW: 120 MW

Biofuels
- Ethanol
- Biodiesel
- 20% Oil substitution

Supporting Schemes
- Feed-in Premium (“Adder”) on top of regular tariff
- BOI Tax incentives scheme (8 yr. Tax holiday)
- Some direct subsidy (10-30%) on Biogas, MSW, Solar-hotwater projects
- Soft Loans for RE+EE investments
- Government Co-investing scheme (“ESCO Fund”)

- Abundant Supply
- Market driven
- Pricing Strategy to promote high-RE-Fuels (E10, E20, E85 and B5)
“Adder” : Feed-in Premiums

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Adder (B/kWh)</th>
<th>Adder-VSPP (US Cents/kWh)</th>
<th>Special adder * (B/kWh)</th>
<th>Supporting period (Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VSPP</td>
<td>SPP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>q Biomass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Installed capacity &lt;= 1 MW</td>
<td>0.50</td>
<td>Bidding</td>
<td>1.67</td>
<td>1.00</td>
</tr>
<tr>
<td>- Installed capacity &gt; 1 MW</td>
<td>0.30</td>
<td></td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td>q Biogas (all categories of production sources)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Installed capacity &lt;= 1 MW</td>
<td>0.50</td>
<td>Bidding</td>
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<td>1.00</td>
</tr>
<tr>
<td>- Installed capacity &gt; 1 MW</td>
<td>0.30</td>
<td></td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>q Waste (community waste, not hazardous industrial waste, and inorganic waste)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- AD &amp;b LFG</td>
<td>2.50</td>
<td>2.50</td>
<td>8.33</td>
<td>1.00</td>
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<tr>
<td>- Thermal Process</td>
<td>3.50</td>
<td>3.50</td>
<td>11.67</td>
<td>1.00</td>
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<tr>
<td>q Wind power</td>
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<tr>
<td>- Installed capacity &lt;= 50 kw</td>
<td>4.50</td>
<td>15.00</td>
<td>1.50</td>
<td>10</td>
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<tr>
<td>- Installed capacity &gt; 50 kw</td>
<td>3.50</td>
<td>11.67</td>
<td>1.50</td>
<td>10</td>
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<tr>
<td>q Mini and micro hydropower</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>- capacity 50-200 kw</td>
<td>0.80</td>
<td>-No-</td>
<td>2.67</td>
<td>1.00</td>
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<tr>
<td>- capacity &lt; 50 kw</td>
<td>1.50</td>
<td></td>
<td>5.00</td>
<td>1.00</td>
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<tr>
<td>q Solar power</td>
<td>6.50</td>
<td>21.67</td>
<td>1.50</td>
<td>10</td>
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</tbody>
</table>

*Note: Special Adders for - Facilities in 3 Southern Provinces and/or Diesel-Gen. replacement on PEA system

*Base Rate = 2.60 B/kWh or 8.67 US Cents/kWh
# Status Using of Wind Energy in Thailand

## Private Investment

<table>
<thead>
<tr>
<th></th>
<th>Proposed Power Purchase</th>
<th>Acceptance Power Purchase</th>
<th>Signed PPA and Wait for COD</th>
<th>Already Power Purchase</th>
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<tbody>
<tr>
<td></td>
<td>Cases</td>
<td>MW</td>
<td>Cases</td>
<td>MW</td>
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<tr>
<td>VSPP</td>
<td>3</td>
<td>7.10</td>
<td>19</td>
<td>26.25</td>
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<td>SPP</td>
<td>10</td>
<td>755.00</td>
<td>4</td>
<td>280.00</td>
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<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>762.10</strong></td>
<td><strong>23</strong></td>
<td><strong>306.25</strong></td>
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## Demonstration Project by Government Agency

<table>
<thead>
<tr>
<th></th>
<th>Planned (MW)</th>
<th>Under Construction (MW)</th>
<th>Completed (MW)</th>
<th>Total (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDE</td>
<td>-</td>
<td>2</td>
<td>1.895</td>
<td>3.895</td>
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<tr>
<td>EGAT</td>
<td>18</td>
<td>-</td>
<td>2.7</td>
<td>20.7</td>
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<tr>
<td>PEA</td>
<td>6</td>
<td>-</td>
<td>1.75</td>
<td>8.75</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>6.345</strong></td>
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</tbody>
</table>

Isolating = 0.553 MW  
**Completed = 6.345 + 0.38 + 0.553 = 7.278 MW**
Wind Resource Potential
History of Thailand’s Wind Map

1. Asian Institute of Technology (AIT) 1981
2. King Mongkut’s Institute of Technology 1984
3. Department of Alternative Energy Development and Promotion (DEDP) 2001
4. World Bank 2001
5. Department of Alternative Energy Development and Efficiency (DEDE) 2010
2. King Mongkut’s Institute of Technology Suwantrakul et al. (1984)

4. World Bank (2001); TrueWind Solutions

Silpakorn University
With Karlsruhe University

Potential: Wind Speed 4.4 - 6.4 m/sec
Approx. 1,600 MW
Map of Wind Mast

Thailand Wind Mast

- Wind station at 40 m height
- Wind station at 90 m height

Totally
- 45 wind stations at 40 m height
- 53 wind stations at 90 m height
Electrical Generation
EGAT Wind Energy Project

Laem Promthep, Phuket
150 kW x 1 Set

Lumthaklong, Nakorn Ratchasima
1.25 MW x 2 Sets & 50 kW x 1 Set
DEDE Wind Energy Demonstration Project

Rama IX Pond , Pathumthani

Huasai , Nakorn Si Thammarat

5 kW x 5 Sets

1.5 MW

250 kW
PEA Wind Energy Project

Tao Island, Ko Samui, Surat Thani 250 kW

Sathing Phra, Songkhla 1.5 MW Gearless WTG
UNDER CONSTRUCTION & PLAN PROJECT (Complete in 2014)

**DEDE = 2.025 MW**

- Laemtachi, Pattani 1.5 MW x 1 Set & 250 kW x 1 Set
- Sa-Muang, Shiang-Mai 275 kW 2 Blades x 1 Set

**EGAT = 18 MW**

- Lumthaklong, Nakorn Ratchasima 1.5 MW x 12 Sets

**PRIVATE (Signed PPA) = 240 MW**

- Kao-Kor, Pechchaboon 60 MW
- Huai-Bong, Nakhonrajasima 90 MW x 2 Projects
Thank You For Your Attention

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