Renewable Energy Development in Malaysia: Overview of Renewable Energy Policy: Are We On The Right Track?

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Sustainable Energy Development Authority Malaysia
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Presentation Outline

1. Energy & Related Policies in Malaysia
   ➢ Current RE Targets & Growth

2. The National RE Policy & Action Plan
   ➢ Feed-In Tariff Concept


4. Sustainable Energy Development Authority Act 2011

5. Are we on the Right Track?

6. Current Status

7. Conclusion
Energy & Related Policies in Malaysia
Development of Energy Policies in Malaysia

National Petroleum Policy (1975)

National Energy Policy (1979)

National Depletion Policy (1980)

4-Fuel Diversification Policy (1981)

5-Fuel Policy (2001)
Related Policies

- Other related policies includes
  - Science & Technology Policy, 1986 (MOSTI)
  - Environmental Policy, 2002 (NRE)
  - Bio-Fuel Policy, 2005 (KPPK)
  - Green Technology Policy, 2009 (KeTTHA)
  - Climate Change Policy, 2009 (NRE)
Renewable Energy

Renewable Energy (RE) is any form of primary energy from recurring and non-depleting indigenous resources, such as agricultural produce, hydro-power, solar, wind, solid-waste, etc.
Renewable Energy Development in Malaysia

**8th Malaysia Plan (2001 - 2005)**
- RE as the 5th Fuel
- Implied 5% RE in energy mix

**9th Malaysia Plan (2006 – 2010)**
- Targeted RE capacity to be connected to power utility grid:
  - 300 MW – Peninsular Malaysia; 50 MW - Sabah
- Targeted power generation mix:
  - 56% natural gas, 36% coal, 6% hydro, 0.2% oil,
  - 1.8% Renewable Energy
- Carbon intensity reduction target: 40% lower than 2005 levels by 2020

**RE as of 31st December 2010**
- Connected to the utility grid: **63.45 MW (18.1% from 9th MP target)**
- Off-grid: >430MW (private palm oil millers and solar hybrid)
National RE Policy & Action Plan
Malaysian National RE Policy

Policy Statement:

- Enhancing the utilisation of indigenous renewable energy resources to contribute towards national electricity supply security and sustainable socio-economic development

Objectives:

- To increase RE contribution in the national power generation mix;
- To facilitate the growth of the RE industry;
- To ensure reasonable RE generation costs;
- To conserve the environment for future generation; and
- To enhance awareness on the role and importance of RE.
Strategic Thrusts of Malaysian National RE Policy

**Strategic Thrust 1:** Introduce Legal and Regulatory Framework

**Strategic Thrust 2:** Provide Conducive Business Environment for RE

**Strategic Thrust 3:** Intensify Human Capital Development

**Strategic Thrust 4:** Enhance RE Research and Development

**Strategic Thrust 5:** Create Public Awareness & RE Policy Advocacy Programmes
# Strategic Thrusts of National RE Policy

<table>
<thead>
<tr>
<th>THRUST 1</th>
<th>THRUST 2</th>
<th>THRUST 3</th>
<th>THRUST 4</th>
<th>THRUST 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Introduce Appropriate Legal Framework</td>
<td>• Create Conducive Business Environment for RE</td>
<td>• Intensify Human Capital Development</td>
<td>• Enhance RE Research and Development</td>
<td>• Create Public and Stakeholder Awareness &amp; RE Policy Advocacy Programmes</td>
</tr>
<tr>
<td>• Feed-in Tariff (FiT)</td>
<td>• Promote RE businesses – SME and manufacturing</td>
<td>• RE in Technical and Tertiary Curricula</td>
<td>• RE Research &amp; Development Action Plan – reduce cost of technology &amp; promote wider application</td>
<td></td>
</tr>
<tr>
<td>• RE Fund (Professional Fund Manager)</td>
<td>• Long term low interest financing</td>
<td>• RE Training Institutes and Centres of Excellence</td>
<td>• Coordination &amp; co-operation in technology &amp; economic research bet Government &amp; private sector</td>
<td></td>
</tr>
<tr>
<td>• FiT Implementing Agency</td>
<td>• Fiscal Incentives</td>
<td>• Pool of experts to fulfil local and overseas market</td>
<td>• Strong linkages bet local &amp; international research institutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Special Incentives for Locally Developed R&amp;D</td>
<td>• Fiscal relief for RE courses</td>
<td></td>
<td>• Periodic monitoring &amp; evaluation of RE</td>
</tr>
<tr>
<td></td>
<td>• Incentives to Promote Local Content</td>
<td>• Financial incentives for training programmes</td>
<td></td>
<td>• Effective &amp; continuous information dissemination</td>
</tr>
<tr>
<td></td>
<td>• RE Centre for SMEs</td>
<td></td>
<td></td>
<td>• Relationship with media, NGOs &amp; private entities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Demonstration &amp; awareness programmes in primary &amp; secondary schools</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Periodic monitoring &amp; evaluation of RE</td>
</tr>
</tbody>
</table>
Malaysian National RE Targets

<table>
<thead>
<tr>
<th>Year</th>
<th>Cumulative RE Capacity</th>
<th>RE Power Mix (vs Peak Demand)</th>
<th>Cumulative CO₂ avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>73 MW</td>
<td>0.5 %</td>
<td>0.3 mt</td>
</tr>
<tr>
<td>2015</td>
<td>985 MW</td>
<td>6%</td>
<td>11.1 mt</td>
</tr>
<tr>
<td>2020</td>
<td>2,080 MW</td>
<td>11%</td>
<td>42.2 mt</td>
</tr>
<tr>
<td>2030</td>
<td>4,000 MW</td>
<td>17%</td>
<td>145.1 mt</td>
</tr>
</tbody>
</table>

Note: RE capacity achievements are dependent on the size of RE fund

- Assumptions:
  - Feed-in Tariff (FiT) implemented
  - 15.6% compound annual growth rate (CAGR) of RE power capacity from 2011 - 2030
RE Policy & Action Plan: Targets

Cumulative RE Installed Capacity (& Ratio to Peak Demand)

- RE (RE Policy & Action Plan)
- RE (Business as Usual)

2015:
985 MW (6%)

2020:
2,080 MW (11%)

2030:
4,000 MW (17%)

2050:
21.4 GW (73%)

1090% increase of BAU

BAU 2050: < 2,000 MW
Key Success Factors for National RE Policy

The success of the National RE Policy and goals can be achieved when the following factors are put in place:

- **RE Act** which implements the **Feed-in Tariff** mechanism
- **RE Fund** to cover the cost of Feed-in Tariff (FiT) mechanism
- Establishment of a dedicated **Implementation Agency (RE Agency)**
Feed-In Tariff Concept
Feed-in Tariff (FiT)

- A mechanism that allows electricity produced from indigenous RE resources to be sold to power utilities at a fixed premium price for specific duration.

- Provides a conducive & secured investment environment for financial institutions to be comfortable providing loan with longer period (>15 years).

  ✓ Provides fixed revenue stream for installed system
  ✓ Only pays for electricity produced: promotes system owner to install good quality and maintain the system
  ✓ With suitable degression rate, manufacturers and installers are promoted to reduce prices while enhancing quality
Critical Elements for Effective FiT Mechanism

Guaranteed via the RE Act:

- Access to the grid is **guaranteed** – utilities legally obliged to accept all electricity generated by RE private producers
- Processes **streamlined & clear**
- FiT rates
  - ✔️ **high enough** to produce ROI + reasonable profit (not excessively)
  - ✔️ **fixed for a period** (typically 20 years) to give certainty & provide businesses with clear investment environment
  - ✔️ adequate "**degression**" to promote cost reduction to achieve “grid parity”
- Adequate **fund** is created to pay for the FiT rates & guarantee the payment for the whole FiT contract period
- Implementation by a competent agency for constant **monitoring, progress reporting and transparency**
Proposed Source of Fund for FiT

- 2011 - additional 1% collection from electricity bills
  - Every RM100/Month - additional RM1 for RE
  - Will not affect low income consumers (<300 kWh/mth)
  - Polluters pay concept
  - Encourages EE and DSM

- Additional 1% (proposed in 2012)

- RE fund only covers for incremental cost of FiT where TNB will bear the value of displaced cost of electricity supply.

- The **size of RE fund** will determine the **RE target** for Malaysia.
Management of FiT Mechanism & RE Fund

- Implementation and managing of RE Feed-in Tariff and reviews to be undertaken by a **Government agency with proper expertise and strong understanding of the FiT**
  - Sustainable Energy Development Authority Malaysia (SEDA Malaysia) - statutory body with legal powers

- RE Fund is to be managed by SEDA Malaysia

- The administrative cost in managing the RE Fund and other related transactional cost shall be paid from the interest generated from the RE Fund as determined by the Government

- The disbursement from the fund shall be efficiently and expeditiously managed
Renewable Energy Act 2011
Renewable Energy Act 2011

- To provide for the establishment and implementation of a special tariff system which is Feed-in Tariff System (FiT)
- To catalyse the generation of renewable energy and to provide for related matters

- Outlines provisions for:
  - FiT mechanism’s implementation
  - Establishment of RE Fund
  - SEDA Malaysia as implementing agency for FiT mechanism

- Comprises of 9 Parts and 65 Clauses
Part II - FEED-IN TARIFF SYSTEM

Section 3: Establishment of feed-in tariff system

✓ the connection to supply line connection points for the distribution of RE generated by renewable energy installations owned by feed-in approval holders;

✓ the priority of purchase and distribution by distribution licensees for renewable energy generated and sold by feed-in approval holders; and

✓ the feed-in tariff to be paid by distribution licensees to feed-in approval holders for such renewable energy
Section 4: Eligibility for participation in feed-in-tariff system

- proposes to generate renewable energy from a renewable energy installation $\leq 30$MW (or such higher installed capacity as may be approved by the Minister)

- meets such other criteria as may be prescribed by the Authority
Section 14: Priority of purchase and distribution

When a RE installation has been connected to a supply line connection point, a distribution licensee shall:

- as priority over the electricity generated from resources other than renewable resources
- purchase and distribute through the supply line the entire available quantity of RE generated by a RE installation owned by a feed-in approval holder (unless exempted by Authority with having regards to public and private safety).

- Any contravention is an offence and is liable to a penalty (fine < RM 1million)
Part IV – FEED-IN TARIFF

► **Section 16: Payment of feed-in tariff**

feed-in approval holder shall be paid the feed-in tariff by DL via a renewable energy power purchase agreement

FiT rates as in Schedule RE Act

► **Section 17: Degression of feed-in tariff**

FiT rate shall be reduced progressively each year based (applicable degression rate in Schedule)
Part V – RE Fund

Section 23: RE Fund

✓ A fund to be known as the “Renewable Energy Fund” is established and shall be administered and controlled by the Authority

✓ The Fund shall consist of—

- such sums as may be provided by the Parliament for the purposes of the Fund from time to time;

- such sums paid to the Authority under subsections 22(4), 24(1) and 24(5);
Sustainable Energy Development Authority Malaysia (SEDA Malaysia) Act 2011
Sustainable Energy Development Authority Malaysia (SEDA Malaysia) Act 2011

- To provide for the establishment of the Sustainable Energy Development Authority Malaysia (SEDA Malaysia)

- To provide for its functions and powers and for related matters.

- Comprises of 6 Parts and 49 Clauses

- Enforced on 1 September 2011
Part III – Functions & Powers of SEDA Malaysia

Section 15: Functions of SEDA Malaysia includes to:

- advise the Minister & Government Entities on all matters relating to sustainable energy
- to promote & implement national policy objectives for RE
- to promote, facilitate & develop sustainable energy
- implement, manage, monitor & review the Feed-In Tariff system
- implement sustainable energy laws including the Renewable Energy Act & recommend reforms
- promote private sector investment in sustainable energy sector
- measures to improve public awareness
- act as focal point on matters relating to sustainable energy & climate change matters relating to energy
Members of the Authority

Chairman: Tan Sri Dr Fong Chan Onn

Dato’ Mohd Salleh Bin Mahmud
Dr. Pola Singh
Dato’ Kok Soo Chon
Datuk Loo Took Gee
Dr. Kamariah Noruddin
Pn. Badriyah Hj Abd Malek
RE: Are We On The Right Track?
Risks and Impacts of Global Warming

Source: Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)
Importance of RE

Figure ES.2 Comparison of the World Energy Outlook 2007 450 ppm case and the BLUE Map scenario, 2005-2050

Global CO$_2$ Emission Reduction - Initiatives by Malaysia

15th Conference of the Parties of the UNFCCC (COP-15)

- **Copenhagen Accord**
  - a political commitment by parties & did not represent a treaty
  - urgent need to be translated into a legally-binding & strategic agreement

- **Malaysia’s commitment in COP 15**
  - voluntary conditional **40% reduction of carbon emission intensity** of GDP from 2005 levels by 2020;
  - reduction dependent on adequate **transfer of technology & finance** from developed countries;
Malaysia’s GHG Inventory Summary

- GHG emission increase 31% between 2000 - 2007
  - 223 – 292 million ton

- Per capita emission increased 19%
  - 9.1 - 10.8 ton per capita

- Highest contribution by energy sector - 47%
Current Status
Current Status

Readiness of FiT Implementation:

- **RE Act 2011** which implements the Feed-in Tariff mechanism and **SEDA Malaysia Act 2011** for the establishment of an implementing agency
  - Both Bills has been passed by Dewan Rakyat on 4\(^{th}\) & 5\(^{th}\) April 2011 respectively
  - passed by Dewan Negara on 27\(^{th}\) & 28\(^{th}\) April 2011 respectively
  - Received Royal assent 23\(^{rd}\) May 2011
  - Gazetted 2\(^{nd}\) June 2011
Current Status (Cont..)

Readiness of FiT Implementation:

- SEDA Act 2011 enforced 1\textsuperscript{st} September 2011
  Establishment of SEDA Malaysia

- RE Act 2011 to be enforced on 1 December 2011

- Gamma testing of e-FiT– 5-7\textsuperscript{th} November 2011;

- SEDA Malaysia office to be officially launched in 22\textsuperscript{nd} November 2011; and

- Advance from the Government RM300 mill to the Renewable Energy (RE) Fund for FiT implementation in 2011
<table>
<thead>
<tr>
<th>Technology / Source</th>
<th>2011/2012</th>
<th>2013</th>
<th>2014</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogas</td>
<td>30</td>
<td>30</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Biomass</td>
<td>75</td>
<td>70</td>
<td>60</td>
<td>205</td>
</tr>
<tr>
<td>Hydro</td>
<td>30</td>
<td>30</td>
<td>95</td>
<td>155</td>
</tr>
<tr>
<td>Solar</td>
<td>54</td>
<td>52</td>
<td>52</td>
<td>158</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>189</strong></td>
<td><strong>182</strong></td>
<td><strong>227</strong></td>
<td><strong>598</strong></td>
</tr>
</tbody>
</table>
8th September 2011 – Launching of SEDA Malaysia’s portal, [www.seda.gov.my](http://www.seda.gov.my) at IGEM 2011 by YAB Prime Minister
Conclusion
Potential Impact of National RE Policy by Year 2020

- Minimum **RM 2.1 billion savings of external cost** to mitigate CO2 emissions;
- Minimum **RM 19 billion of loan values** for RE projects, which will provide local banks with new sources of revenues (at 80% debt financing for RE projects);
- Minimum **RM 70 billion of RE business revenues** generated from RE power plants operation, which can generate **tax income of minimum RM 1.75 billion to Government**;
- > **50,000 jobs created** to construct, operate and maintain RE power plants (on the basis of 15-30 job per MW)
Challenges Ahead

- Initial FiT implementation problems – procedures, coordination with related agencies, distribution licensee’s role, FiT online system

- Expectations:
  - high amount of application – overwhelming
  - market excitement
  - government facilitation role

- Limitations:
  - manpower & capacity building
  - RE Fund
  - awareness of RE industry, financial institutions and the public at large
Thank You

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Galeria PjH
Level 9, Jalan 4B,
Persiaran Perdana,
Presint 4,
62570 Putrajaya,
Malaysia.
Phone : +603-8870 5895
Email: fit@seda.gov.my
Web: www.seda.gov.my
## RE Policy: Projected RE Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Cum Biomass (MW)</th>
<th>Cum Biogas (MW)</th>
<th>Cum Mini-Hydro (MW)</th>
<th>Cum Solar PV (MW)</th>
<th>Cum SW (MW)</th>
<th>Cum Total RE, Grid-Connected (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>110</td>
<td>20</td>
<td>60</td>
<td>9</td>
<td>20</td>
<td>219</td>
</tr>
<tr>
<td>2015</td>
<td>330</td>
<td>100</td>
<td>290</td>
<td>65</td>
<td>200</td>
<td>985</td>
</tr>
<tr>
<td>2020</td>
<td>800</td>
<td>240</td>
<td>490</td>
<td>190</td>
<td>360</td>
<td>2,080</td>
</tr>
<tr>
<td>2025</td>
<td>1,190</td>
<td>350</td>
<td>490</td>
<td>455</td>
<td>380</td>
<td>2,865</td>
</tr>
<tr>
<td>2030</td>
<td>1,340</td>
<td>410</td>
<td>490</td>
<td>1,370</td>
<td>390</td>
<td>4,000</td>
</tr>
<tr>
<td>2035</td>
<td>1,340</td>
<td>410</td>
<td>490</td>
<td>3,700</td>
<td>400</td>
<td>6,340</td>
</tr>
<tr>
<td>2040</td>
<td>1,340</td>
<td>410</td>
<td>490</td>
<td>7,450</td>
<td>410</td>
<td>10,100</td>
</tr>
<tr>
<td>2045</td>
<td>1,340</td>
<td>410</td>
<td>490</td>
<td>12,450</td>
<td>420</td>
<td>15,110</td>
</tr>
<tr>
<td>2050</td>
<td>1,340</td>
<td>410</td>
<td>490</td>
<td>18,700</td>
<td>430</td>
<td>21,370</td>
</tr>
</tbody>
</table>

### Assumptions:

1. **RE Technical potential:**
   - Biomass (EFB, agriculture): **1,340 MW** will be reached by 2028.
   - Biogas (POME, agriculture, farm): **410 MW** will be reached by 2028.
   - Mini-hydro (not exceeding 30 MW): **490 MW** will be reached by 2020.
   - Solar PV (grid-connected): **unlimited**.
   - Solid waste (RDF, incineration, sanitary landfill): projection of 30,000 tonne/day of Solid Waste as projected by KPKT, followed by 3% annual growth post 2024.
## Feed-in Tariff Rates

<table>
<thead>
<tr>
<th>Technology / Source</th>
<th>FiT Duration</th>
<th>Range of FiT Rates (RM/kWh)</th>
<th>Annual Degression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass (palm oil waste, agro based)</td>
<td>16</td>
<td>0.27 – 0.35</td>
<td>0.5%</td>
</tr>
<tr>
<td>Biogas (palm oil waste, agro based, farming)</td>
<td>16</td>
<td>0.28 – 0.35</td>
<td>0.5%</td>
</tr>
<tr>
<td>Mini Hydro</td>
<td>21</td>
<td>0.23 – 0.24</td>
<td>0%</td>
</tr>
<tr>
<td>Solar PV &amp; PP</td>
<td>21</td>
<td>0.85 – 1.78</td>
<td>8%</td>
</tr>
<tr>
<td>Solid waste &amp; Sewage</td>
<td>16</td>
<td>0.37 – 0.45</td>
<td>1.8%</td>
</tr>
</tbody>
</table>
# Quota of Solar PV

<table>
<thead>
<tr>
<th>Available MW installed capacity</th>
<th>2011/2012</th>
<th>2013</th>
<th>2014</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual (≤ 1MW)</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Non-individual (≤ 1MW)</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Non-individual (≥ 1MW)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>120</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
<td><strong>52</strong></td>
<td><strong>52</strong></td>
<td><strong>158</strong></td>
</tr>
</tbody>
</table>
Main sources of GHG Emission in Malaysia

<table>
<thead>
<tr>
<th>Sector</th>
<th>Sub-Sector</th>
<th>GHG Type</th>
<th>Emission million ton (CO$_2$ e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>Emission from power sector</td>
<td>CO$_2$</td>
<td>58,486</td>
</tr>
<tr>
<td>Energy</td>
<td>Transport</td>
<td>CO$_2$</td>
<td>35,587</td>
</tr>
<tr>
<td>Energy</td>
<td>Manufacturing &amp; construction</td>
<td>CO$_2$</td>
<td>26,104</td>
</tr>
<tr>
<td>MSW</td>
<td>Landfills</td>
<td>CH$_4$</td>
<td>24,541</td>
</tr>
<tr>
<td>Land use</td>
<td>Land use change &amp; forestry</td>
<td>CO$_2$</td>
<td>24,111</td>
</tr>
<tr>
<td>Energy</td>
<td>Fugitive emission</td>
<td>CH$_4$</td>
<td>21987</td>
</tr>
<tr>
<td>Industrial (process)</td>
<td>Mineral products</td>
<td>CO$_2$</td>
<td>9,776</td>
</tr>
<tr>
<td>country</td>
<td>targets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
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</tbody>
</table>
| Europe      | ▪ GHG reduction : 20% to 1990 level by 2020  
              | ➢ 20% electricity mix from RE sources by 2020                                                                                           |
| USA         | ▪ GHG reduction : 17% to 2005 level by 2020  
              | ➢ No national target- only state level                                                                                                 |
| Australia   | ▪ GHG reduction : 25% to 2000 level by 2020 (condition all parties agree to stabilise CO2 concentration below 450ppm)  
              | ➢ 20% electricity mix from RE sources by 2020                                                                                           |
| Japan       | ▪ GHG reduction : 25% to 1990 level by 2020                                                                                                                                                                |
| Korea       | ▪ GHG reduction : 30% from BAU by 2020  
              | ➢ 21% electricity mix from RE sources by 2050                                                                                             |
| Indonesia   | ▪ GHG reduction : 26% to 2005 level by 2020                                                                                                                                                                |
| China       | ▪ GHG reduction : 40%-45% to 2005 level by 2020                                                                                                                                                              |
| Malaysia    | ▪ 40% GHG intensity to GDP below 2005 by 2020 as per conditions                                                                                                                                              |