RENEWABLE ENERGY: CURRENT STATUS AND FURTHER DEVELOPMENT

8 MARCH 2016

PIHAK BERKUASA PEMBANGUNAN TENAGA LESTARI
Sustainable Energy Development Authority Malaysia
Integration of Smart Grid and Renewable Energy
Malaysia does not have specific Integration of Smart Grid with Renewable Energy Project.

► Smart Grid
  ▪ Currently under purview of Power Utility Company (i.e. TNB, etc) under their own initiatives
  ▪ Mainly on Smart Metering

► Renewable Energy (RE)
  ▪ Currently under purview SEDA Malaysia, a statutory body established through the Sustainable Energy Development Authority (SEDA) Act 2011
  ▪ Implements the Feed in Tariff (FiT) as provided under the RE Act 2011
RE Current Status
(as of September 2015)
## Cumulative Approved FiT Applications (30 September 2015)

<table>
<thead>
<tr>
<th>No</th>
<th>RE Sources</th>
<th>No. of Application</th>
<th>Capacity (MW)</th>
<th>% of total capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Biogas</td>
<td>90</td>
<td>158.18</td>
<td>13.90%</td>
</tr>
<tr>
<td>2</td>
<td>Biomass</td>
<td>37</td>
<td>348.79</td>
<td>30.65%</td>
</tr>
<tr>
<td>3</td>
<td>Small Hydro</td>
<td>36</td>
<td>279.64</td>
<td>24.58%</td>
</tr>
<tr>
<td>4</td>
<td>Geothermal</td>
<td>1</td>
<td>30.00</td>
<td>2.64%</td>
</tr>
<tr>
<td>5</td>
<td>Solar PV</td>
<td>7116</td>
<td>321.29</td>
<td>28.24%</td>
</tr>
<tr>
<td></td>
<td>Solar PV (Individual)</td>
<td>6536</td>
<td>60.55</td>
<td>5.32%</td>
</tr>
<tr>
<td></td>
<td>Solar PV (Community)</td>
<td>132</td>
<td>2.78</td>
<td>0.24%</td>
</tr>
<tr>
<td></td>
<td>Solar PV Non-Individual (&lt;500 kW)</td>
<td>338</td>
<td>61.01</td>
<td>5.36%</td>
</tr>
<tr>
<td></td>
<td>Solar PV Non-Individual (&gt;500 kW)</td>
<td>110</td>
<td>196.94</td>
<td>17.31%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>7280</strong></td>
<td><strong>1137.89</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
# Cumulative Applications Achieving Commercial Operations (30 September 2015)

<table>
<thead>
<tr>
<th>No</th>
<th>RE Resources</th>
<th>No of Application</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Biogas</td>
<td>9</td>
<td>17.23</td>
</tr>
<tr>
<td>2</td>
<td>Biomass</td>
<td>7</td>
<td>74.90</td>
</tr>
<tr>
<td>3</td>
<td>Small Hydro</td>
<td>5</td>
<td>18.30</td>
</tr>
<tr>
<td>4</td>
<td>Solar PV (Individual)</td>
<td>4180</td>
<td>41.05</td>
</tr>
<tr>
<td></td>
<td>Solar PV (Community)</td>
<td>51</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>Solar PV Non-Individual (&lt;500 kW)</td>
<td>206</td>
<td>31.91</td>
</tr>
<tr>
<td></td>
<td>Solar PV Non-Individual (&gt;500kW)</td>
<td>64</td>
<td>135.35</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>4522</strong></td>
<td><strong>319.55</strong></td>
</tr>
</tbody>
</table>
SOLAR PV

- 685kWp, Suria KLCC Sdn Bhd, Kuala Lumpur
- 8.0MWp, Cypark Suria (Pajam) Sdn Bhd, Pajam, Negeri Sembilan
- 646kWp, Robert Bosch (M) Sdn Bhd, Bayan Lepas
- 470kWp, Maglo Steel Service Centre, Shah Alam
Amcorp Power Sdn Bhd, Solar Farm 10.25MW at Gemas, Negeri Sembilan
Fortune 11 Sdn Bhd,
Solar Farm with Single Axis Tracker
5MWp
at Sepang, Selangor
Residential houses (3 to 10kWp)

BIPV extended car porch (3 kW)

BIPV car porch
Individual terrace house 12kWp at Seberang Jaya, PP
SMALL HYDRO

2.0MW, Amcorp Perting Hydro Sdn Bhd, Bentong, Pahang

3.2MW, I.S. Energy Sdn Bhd, Sg Rek, Kelantan
11.5MW, Kina Biopower Sdn Bhd, Sandakan, Sabah
BIOGAS

1.1MW, Felda Industri Sdn Bhd, Serting Hilir, Negeri Sembilan

2.0MW, Bell Ecopower Sdn Bhd, Batu Pahat, Johor
Issues from FiT implementation

- 2015 target of 985 MW fall short
  - on 30\textsuperscript{th} Sept 2015 only achieved 319.55 MW
  - Best case scenario for end 2015 is 400 MW, less than 50 % of target
- RE mix dramatically different from Plan
  - Instead of 65 MW PV by 2015, we already have 226 MW
  - Other technologies much lower than planned
- 2020 target of 2080 MW will fall short
  - Planned only 1464 MW by 2020 (if all commissioned!)
- 2025 target is 1657 MW
  - 2030 target of 4000 MW is sure to be completely off
- PV FiT will end in 2017
- Small hydro FiT will end in 2020
- Biogas/biomass FiT will end in 2025
Why? What happened?

- RE Fund too small
  - Only 1% from Dec 2011 and 1.6% from Jan 2014 of consumers’ electricity bills
  - Therefore only small quota can be released
  - Not reasonable to keep increasing the surcharge

- Small hydro projects have failed to kick off
  - Mostly due to finance problems
  - State Government delays/failures to approve river concession

- Less interest in biogas and biomass
  - FiT rates were found to be too low to be commercially viable
  - Increasing the bonus rates and stopping the degression in 2014 has resulted in a great interest in biogas/biomass and quota has been almost fully subscribed

- Great interest in solar PV
  - Higher FiT rates
  - Access to financing
  - Much lower risk since short construction time
Problems facing RE developers

■除 Feedstock issues
  ▪ Getting a steady and assured supply of EFB, padi husk, MSW, etc., at a reasonable price

■除 Grid connection issues
  ▪ Distance from Grid
  ▪ Technical issues like voltage rise and lack of local load due to remote location of RE plants, as well as high fault current
  ▪ Delays and other problems with utility connection at local level

■除 Finance
  ▪ Some pioneer failed and failing biomass and small hydro plants give a negative perception of RE
  ▪ Long lead time and security of feedstock issues, leading to higher risk

■除 Permits
  ▪ Delays and difficulties in getting State Government, Forestry Dept., DOE, and other agencies
How to achieve RE Plan targets or exceed them?

- The planned quota for biomass, biogas and small hydro will cater for most of the known resource that can be economically harnessed.

- Not much more can be targeted even if RE Fund was to be expanded.
  - Unless some new resource like geothermal or wind is found to be economically viable.

- The only resource with almost no limit is solar PV.
  - However, to continue with the FiT for expanding PV capacity will require ever increasing injection to the RE Fund, even with depressed FiT rates.
  - PV capacity needs to be increased through other mechanisms.
IMPLEMENTATION OF NEM AND USS
Potential for Net Energy Metering (NEM)

• As PV prices continue to fall, and electricity tariffs rise, it will make sense for more consumers to reduce their bills and hedge further increases in tariffs by installing PV on their rooftops, either on their own, or through PV leasing companies.
• Once a certain level of PV penetration under NEM is reached, Utility can be allowed to charge a fixed monthly amount to NEM consumers to compensate for the capital expenditure on the Grid connection.
• Loss to the utility due to reduction in sales will also be compensated by reduction in utility costs due to reduced T&D losses.
• The nation will gain due to reduction in use of subsidized gas, as well as some energy security and autonomy.
• Therefore, from commercial aspects alone, there will be a high penetration of PV under NEM mechanism.
• Technical issues to the Grid arising from high penetration of PV have well-established solutions.
Large Scale Solar (LSS)

- Plants will be spread out over Peninsula and Sabah and limited to max of 50 MW each
  - Will address the intermittency issues
  - Plant operators will need to provide day ahead generation projection based on sophisticated weather prediction models
- Interconnection at Transmission levels
  - Grid Code already amended to allow interconnection of PV plants at Transmission levels
- PV power coincides with daily peak demand
  - Will offset some OCGT and CCGT generation using subsidized gas
  - Review the need for future peaking plants using gas
- Overall generation costs should remain unaffected by addition of PV, probably some reduction if gas prices continue to increase
- Utility scale PV systems offer Grid support almost similar to conventional plants
- Provide some energy security to the country
Thank you

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