Moving ahead with the Green Revolution through Malaysia Green Attribute Tracking System (MGATS)

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## Malaysia’s strategy in RE

1. **Policy** - Aims to achieve **20% clean energy generation by 2030**
   - Supply Agreement with RE (SARE) aimed to increase RE growth by 500 MW
   - LSS 3 of 500 MW quota opened for bidding
   - NEM 1-on-1
   - Green Tariff

2. **Malaysia has made tremendous progress** in the past 1 year.

   - Supply Agreement with RE (SARE) aimed to increase RE growth by 500 MW
   - LSS 3 of 500 MW quota opened for bidding
   - NEM 1-on-1
   - Green Tariff

3. **We believe establishing a platform for REC in Malaysia** will further change the landscape and growth for RE

### What is REC

- **Renewable Energy Certificate (REC)** represents delivery of 1 MWh of renewable energy to the grid and all associated environmental benefits of displacing 1 MWh of conventional power

### How MGATS facilitate the market

- **MGATS can facilitate 2 methods of REC purchase**, ie. **Bundled** (also referred to as Green Tariff), and **Unbundled**.
- **Green Tariff** - MESTECC to launch **Green Tariff in Sept 2019**. MGATS is the registry that will track all green power in Malaysia
- **Unbundled REC** – TNBX received **500,000 MWh REC demand** requesting to purchase Malaysia’s REC from in & out of Malaysia. MGATS is able to facilitate purchase of REC
- **The vision is to collaborate with all utilities in ASEAN countries to establish an ASEAN platform**

### Platform key winning criteria

- Credibility of REC issued is key. Hence, tracking registry for Malaysia and ASEAN must meet CDP standard and RE100 best practice guideline which are paramount to buyers
- MGATS will facilitate customers to buy REC locally, whilst meeting international standard
What is Renewable Energy Certificates (REC)?

Markets with REC mechanism:
1. USA
2. Australia
3. India
4. UK
5. EU countries
What is Renewable Energy Certificates (REC)?

- Tradable, market-based instrument that represents renewable electricity generation
- Enable anyone, anywhere, to buy renewable energy
- Only the owner of the REC can claim the environmental benefits of the clean energy production
- RECs provide green power options in areas that may not be suitable for renewable resources, allowing renewable facilities to be located where they are the most efficient

Source: TNBX team research
Why REC?
Through REC, we make it easy for companies to source for renewable energy

What is RE100?
RE100 is a collaborative, global initiative uniting more than 100 influential businesses committed to 100% renewable electricity. (Majority of the companies have presence in Malaysia)

Renewable Energy Certificates (RECs) is the most popular approach, accounting for 85% of the total renewable electricity being obtained in the US.

Notable point: PPAs are becoming an increasingly popular option, expected to hold a greater share of the total for the next RE100 reporting cycle.
Why REC?
Through REC, we make it easy for companies to source for renewable energy

HSBC Malaysia targets 100% renewable energy sources by 2030

KUALA LUMPUR: HSBC Bank (M) Bhd is aiming to source 100% of its electricity from renewable sources by 2030, with an interim goal of 90% by 2025, in its stride to support a sustainable economy.

Group chief operating officer Andy Maguire said in 2011, HSBC set its target of achieving 25% renewable electricity by 2020, which it then revised to 40% in 2017.

“The experience we have gained in the renewable electricity market means we can now make a commitment to source 100% of electricity from renewable sources by 2030.

To be clear, though, Apple's announcement doesn't mean all of its facilities are directly connected to clean energy. Instead, in some cases the company is putting renewables back into the grid to offset the fossil fuels it uses up.

It also relies on renewable energy certificates (or RECs) for around 34 percent of its usage, while the rest is made up from its own projects.

Under the Malaysia Electricity Supply Industry 2.0 Reform, there are 5 methods of sourcing Green Electricity

**Green Tariff**
- Allows customers to consume 100% RE without having to contract or directly own an RE facility.
- An option for large electricity customers to help meet their sustainability and renewable energy goals.
- **Retailers retire the REC on behalf of customers**

**RE Certificate**
- An REC is an instrument that **certifies the bearer owns 1 MWh of electricity generated from a renewable energy resource**.
- **When traded on a platform, REC’s are used to purchase Green Attributes for consumers that buy energy from the Grid.**

**On- and Off-Site RE**
- Customers install RE facility on-site, e.g. rooftop solar for self consumption and buy/sell shortfall/excess electricity from the Grid.
- For RE facilities off-site, similar arrangement but with charge to wheel electricity from RE facility to customer site.

**Solar PPA/Leasing**
- Multiple financing plans with zero capital cost and option available for outright purchase.
- Tailor-made system to optimize cost savings.
- **Flexible tariff and tenure period**

**RE Trading**
- Generators can directly sell to large consumers through a wholesale market.

Source: TNB MESI 2.0
We estimate that Malaysia can unlock RM 15M REC market value/year

Assumptions: REC price is USD 1/MWh & voluntary market framework

RE plant capacity in Malaysia

<table>
<thead>
<tr>
<th>RE Plant</th>
<th>Quota Allocation (MW)</th>
<th>Plant Commissioned/Quota Assigned (MW)</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSS 1 &amp; 2</td>
<td>1065</td>
<td>460.5</td>
<td>ST</td>
</tr>
<tr>
<td>LSS 3</td>
<td>500</td>
<td>0</td>
<td>ST</td>
</tr>
<tr>
<td>NEM</td>
<td>500</td>
<td>39</td>
<td>SEDA</td>
</tr>
<tr>
<td>FIT</td>
<td>605</td>
<td>605</td>
<td>SEDA</td>
</tr>
<tr>
<td>SELCO</td>
<td>Not applicable</td>
<td>4</td>
<td>TNB Retail</td>
</tr>
<tr>
<td>Total</td>
<td>2669</td>
<td>1108</td>
<td></td>
</tr>
</tbody>
</table>

Estimation of REC market value per year

<table>
<thead>
<tr>
<th>RE by Fuel Source</th>
<th>Potential REC generated per year (MWH/year)</th>
<th>Estimated Price RM per REC</th>
<th>REC market value (RM/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>3,123,820</td>
<td>4.30</td>
<td>13,432,424</td>
</tr>
<tr>
<td>Biomass</td>
<td>127,970</td>
<td>4.30</td>
<td>550,271</td>
</tr>
<tr>
<td>Biogas</td>
<td>198,620</td>
<td>4.30</td>
<td>854,066</td>
</tr>
<tr>
<td>Mini hydro</td>
<td>69,421</td>
<td>4.30</td>
<td>298,510</td>
</tr>
<tr>
<td>Total</td>
<td>3,519,831</td>
<td></td>
<td>15,135,272</td>
</tr>
</tbody>
</table>
MGATS will ensure all players, namely RE generators, retailers and customers, to purchase Malaysia’s REC easily

Buy local REC, with the assurance that it meets international standard

1. For LSS 1, 2, and 3, Single Buyer is responsible in capturing energy generation data and energy payment. For LSS 1 & 2, green attributes belong to TNB and proceed of sales will be captured in IBR. For LSS 3, the green attributes may belong to asset owner pending decision from MESTECC.

2. Single Buyer, then, can register the RE plant data on MGATS.

3. There are also other sources of RE plant in Malaysia namely NEM, self consumption (SELCO) and Feed-in Tariff (FIT) plants that can also register the assets in MGATS.

4. Energy retailers in Malaysia can procure REC on behalf of their customers to bundled REC in the energy contract to offer as Green Tariff.

5. Customers also have the option to buy REC independently and directly from MGATS platform to meet their sustainability target.
Sample of Green Energy Certificate

Buy local REC, with the assurance that it meets international standard

TIGRs Certificate of Retirement

APX, Inc., in its capacity as operator and administrator of the TIGRs Registry, does hereby certify that on January 1, 2019 Renewable Energy Certificates (“RECs”) have been retired on the Registry on behalf of:

**Client ABC**
**Total RECs retired 4,500**

The Retirement consists of the following RECs:

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Project Type</th>
<th>TIGRs Serial Numbers</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MW Sample Hydro</td>
<td>Hydro</td>
<td>TIGR-456-SG-02-01-2018-450-1 to 1000</td>
<td>1,000</td>
</tr>
<tr>
<td>15 MW Sample Biomass</td>
<td>Biomass</td>
<td>TIGR-789-SG-01-01-2018-101-1 to 3000</td>
<td>3,000</td>
</tr>
</tbody>
</table>

**Retirement Reason Details:** RECs retired to meet 2018 corporate sustainability goals

**Retiring TIGRs Account Holder:** TIGRs Account Holder XYZ

Chairman, Energy Commission of Malaysia

Date __________________________

The Tradable Instrument for Global Renewables (TIGRs) Registry is an online platform purpose built to meet RE100 best practices guidelines and CDP standards for procuring and reporting purchases of renewable energy. The Registry is developed and managed by APX, leveraging more than 15 years of experience in environmental markets. For more information: www.apx.com
Key takeaways:

1. REC market open up RE growth by facilitating more investments towards planting RE plants

2. MGATS facilitates transactions that allow corporates to buy local REC with the assurance that it meets international standard through TIGRs certification

3. ASEAN countries with its abundance RE potential must collaborate to establish an ASEAN REC Platform
THANK YOU

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