Policy incentives for grid-connected renewable energy investment in ASEAN countries

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- Self-consumption only and Net metering schemes in ASEAN
- Trends of incentive/support schemes for grid-connected renewable energy investment in ASEAN
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- Summary
Excluding large hydro, Thailand had the largest increase in RE between 2006 and 2014.
Key incentives/supporting schemes for grid-connected RE implemented in ASEAN

- **Feed-in tariff (FIT) scheme**
  - Allows electricity producers or consumers to:
    - Receive *guaranteed* access to grid
    - Produce and sell all electricity generated to grid
    - Receive guaranteed *long-term* purchase agreements by grid operator of all electricity generated
    - Receive guaranteed premium rate payment for electricity

- **“Self-consumption only” scheme**
  - Allows electricity consumers to:
    - Connect to grid and
    - Produce electricity for own use only

- **“Self-consumption and selling excess electricity to grid” scheme (Net metering scheme)**
  - Allows electricity consumers to:
    - Connect to grid,
    - Produce electricity for own use
    - Sell excess electricity back into grid at a compensation rate
Comparison of key features of feed-in tariff, self-consumption only and net metering schemes

1. Feed-in tariff scheme
   - Produce and sell all electricity generated to grid
   - Earning electricity sales at a feed-in premium rate
   - Electricity producers or consumers:
     - Residential,
     - Community
     - Commercial (Corporates)
     - Industrial factories

2. Self-consumption only scheme
   - Produce electricity for own consumption only
   - Electricity bill savings from own generation
   - Electricity consumers:
     - Residential
     - Commercial (Corporates)
     - Industrial factories

3. Net metering scheme
   - Produce electricity for own consumption + sell excess electricity to grid
   - Electricity bill savings from own generation plus earning excess electricity sales at a compensation rate
   - Electricity consumers:
     - Residential
     - Commercial (Corporates)
     - Industrial factories
How corporates may interact with these support schemes

1. Feed-in tariff scheme

- Electricity producers or consumers
  - Residential, Community
  - Commercial (Corporates)
  - Industrial factories

2. Self-consumption only scheme

- Electricity consumers
  - Residential
  - Commercial (Corporates)
  - Industrial factories

3. Net metering scheme

- Electricity consumers
  - Residential
  - Commercial (Corporates)
  - Industrial factories

• Corporates may:
  - Invest in own RE systems to sell all electricity generated to grid under the FIT scheme
  - Invest in RE systems (e.g., PV systems) to produce RE electricity for own consumption through the self-consumption only scheme or for both own consumption and selling excess electricity to grid through the Net metering scheme
  - Purchase RE credits (RECs) from Electricity producers
  - Purchase RE electricity in liberalized markets, either directly from the wholesale market or from bilateral contracts.

→ Corporates’ purchase of RE power or RECs can help stimulate further investment for RE
Countries with key incentives for grid-connected renewables

1. Feed-in tariff scheme
   - Thailand, Malaysia, Philippines, Indonesia, Vietnam

2. Self-consumption only scheme
   - Thailand and Malaysia

3. Self-consumption and selling excess electricity scheme
   - Malaysia, Singapore, Philippines, and Vietnam (pilot stage)
## Comparison of feed-in tariff schemes in ASEAN countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Year started</th>
<th>RE Technologies covered</th>
<th>PPA period (years)</th>
<th>Rates/ Capacity limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>2007</td>
<td>6 RE: Biogas, Biomass, Small hydro, Solar PV, Waste, Wind</td>
<td>20, 25 (Solar)</td>
<td>-Rates vary by type, size, location</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2011</td>
<td>5 RE: Biogas, Biomass (incl. waste), Geothermal, Small hydro, Solar PV (ending in 2017)</td>
<td>16 (Biomass/ Biogas 21 (Geothermal/ Hydro/PV)</td>
<td>-Max capacity 30 MW -Only local resources -Rates vary by type, size, bonus criteria -6-month capacity quota for each RE</td>
</tr>
<tr>
<td>Philippines</td>
<td>2012</td>
<td>4 RE: Biomass, Run-of-river hydro, Solar PV, Wind</td>
<td>25</td>
<td>-Rates vary by type and size</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2012</td>
<td>4 RE: Biomass, Geothermal Small hydro, Solar PV (Tidal/ocean under review)</td>
<td>B-to-B negotiation 25 (Solar)</td>
<td>-Rates vary by type and location</td>
</tr>
</tbody>
</table>
Installed capacity (MW) of RE technologies under Malaysia FIT scheme

- Biogas (Landfill/Agri Waste)
- Biomass (Solid Waste)
- Small Hydro
- Solar PV
- Geothermal
- Total

2012 - 2016
<table>
<thead>
<tr>
<th>Country</th>
<th>Scheme Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td><strong>Self-consumption only scheme:</strong> for PV rooftop, no size limit</td>
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<td></td>
<td><strong>Net metering program:</strong> Started in Nov 2016</td>
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<td></td>
<td>- Limit of 100 MW/year during 2016-2020</td>
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<td></td>
<td>- Rooftop PV and ground-mounted PV, (residential &lt; 72 kWp, commercial/industrial consumers &lt; 1 MWp)</td>
</tr>
<tr>
<td></td>
<td>- Sell excess electricity at rate = displaced cost</td>
</tr>
<tr>
<td>Singapore</td>
<td><strong>Self-consumption plus selling excess electricity scheme:</strong></td>
</tr>
<tr>
<td></td>
<td>- Started in 2011, rooftop PV with no size limit (res. &amp; commercial)</td>
</tr>
<tr>
<td></td>
<td>- Sell excess electricity at market retail rate minus grid charge</td>
</tr>
<tr>
<td>Philippines</td>
<td><strong>Net metering scheme:</strong></td>
</tr>
<tr>
<td></td>
<td>- Started in 2013, rooftop PV, not &gt;100 kW (res. &amp; commercial)</td>
</tr>
<tr>
<td></td>
<td>- Excess electricity rate= blended generation cost (half of retail rate)</td>
</tr>
<tr>
<td>Thailand</td>
<td><strong>Self-consumption only scheme</strong> (100 MW pilot started in 2016)</td>
</tr>
<tr>
<td></td>
<td>- Only rooftop PV (0-10 kW for residential, 1MW limit for commercial/industrial)</td>
</tr>
<tr>
<td>Vietnam</td>
<td><strong>Net metering scheme</strong> (Pilot in Ho Chi Minh started in 2015)</td>
</tr>
<tr>
<td></td>
<td>- Only rooftop PV (residential, commercial, &amp; govt. building)</td>
</tr>
</tbody>
</table>
Trends of incentive/support schemes for grid-connected RE investment in ASEAN

**Rooftop PV**

- **Support scheme** *(e.g., FIT scheme)*
  - e.g., Thailand, Malaysia (rooftop PV)

- **“Less-support” scheme** *(e.g., self consumption only, net metering scheme)*
  - e.g., Singapore (rooftop PV)

- **Market-based scheme with no subsidy** *(e.g., Self-consumption and selling excess electricity to grid at market rate)*
  - e.g., Thailand, Malaysia, the Philippines (Solar farm, biomass), Indonesia (Solar, Geothermal)

**Larger-scale RE**

- **Support scheme** *(e.g., FIT scheme)*
  - e.g., Thailand, Malaysia, the Philippines (Solar farm, biomass), Indonesia (Solar, Geothermal)

- **Market-based scheme** *(e.g., auctioning)*
Electricity market in ASEAN

State-owned power utilities (vertical integration)
- Brunei
- Lao PDR
- Cambodia
- Myanmar

Private IPPs + state-owned power utilities
- Indonesia
- Thailand
- Malaysia
- Vietnam

Privatized power generation + independent grid operator
- Philippines
- Singapore

Regional electricity markets

(Still based on a single-buyer model)

Source: Based on IEA, Development Prospects of the ASEAN Power Sector, Towards an Integrated, Electricity Market, 2015
Summary

• Key support schemes implemented to stimulate investment of RE power generation in ASEAN include FIT scheme (for several RE technologies) Self-consumption only Scheme and Net metering scheme (mainly for solar PV)

• Corporates may interact with these supporting schemes through, for instance, investing in RE systems or purchasing Renewable Energy Credits (RECs) or RE power.

• Trends of incentives: seeing transition from FIT support scheme towards market-based scheme with no or less subsidy (e.g., self-consumption and selling excess electricity at market rate (solar PV) and auctioning (e.g., larger-scale PV, biomass/geothermal)

• Options for corporate procurement of RE power in ASEAN countries are based on available support schemes and the electricity market (regulated or liberalized electricity market)
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