Challenges and Opportunities For Doing Business in Solar PV Sector in SEA’s Largest Economy

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### ASEAN Socio-Economic Profile

<table>
<thead>
<tr>
<th>AMS</th>
<th>GDP (USD Billion) Current Value</th>
<th>GDP PPP Projection CAGR (%)</th>
<th>Population (thousand people)</th>
<th>Population CAGR 2016-2040 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016-2025</td>
<td>2016-2040</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>12.9</td>
<td>4.0%</td>
<td>1.0%</td>
<td>417</td>
</tr>
<tr>
<td>Cambodia</td>
<td>18.5</td>
<td>7.2%</td>
<td>6.2%</td>
<td>15,581</td>
</tr>
<tr>
<td>Indonesia</td>
<td>857.6</td>
<td>5.6%</td>
<td>4.5%</td>
<td>257,754</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>12.6</td>
<td>7.8%</td>
<td>6.3%</td>
<td>6,809</td>
</tr>
<tr>
<td>Malaysia</td>
<td>294.4</td>
<td>3.8%</td>
<td>3.1%</td>
<td>30,440</td>
</tr>
<tr>
<td>Myanmar</td>
<td>65.4</td>
<td>7.4%</td>
<td>6.8%</td>
<td>53,972</td>
</tr>
<tr>
<td>Philippines</td>
<td>289.5</td>
<td>7.4%</td>
<td>6.2%</td>
<td>100,735</td>
</tr>
<tr>
<td>Singapore</td>
<td>291.9</td>
<td>2.0%</td>
<td>2.0%</td>
<td>5,555</td>
</tr>
<tr>
<td>Thailand</td>
<td>395.7</td>
<td>3.9%</td>
<td>3.5%</td>
<td>68,003</td>
</tr>
<tr>
<td>Vietnam</td>
<td>193.4</td>
<td>6.8%</td>
<td>5.5%</td>
<td>91,706</td>
</tr>
<tr>
<td>ASEAN</td>
<td>2,432.0</td>
<td>5.4%</td>
<td>4.5%</td>
<td>630,971</td>
</tr>
</tbody>
</table>

**Source**: The 5th ASEAN Energy Outlook 2015-2040 (ASEAN CENTRE FOR ENERGY)
SEA TFEC Vs TPES By Country Share

TFEC Projections in Business as Usual by Country share

TPES Projections in Business as Usual by Country share

Source: The 5th ASEAN Energy Outlook 2015-2040 (ASEAN CENTRE FOR ENERGY)

Note:
TFEC: Total Final Energy Consumption
TPES: Total Primary Energy Supply
Indonesia has potential solar energy of up to 500 (GW) or seven times larger than the total installed electricity capacity in the country which is around 65 GW. Currently, the installed solar capacity in Indonesia is only at 325 megawatts (MW) from residential and utility scale.
MBOE = million barrel oil equivalent
kWh = kilo watt hour

12.1% Renewable energy mix in 2030 with business-as-usual scenario

26.1% Renewable energy mix in 2030 with intervention scenario

Data source: Ministry of Energy and Mineral Resources

Chart showing the Intervention Scenario and BAU Projection.
Why Solar Energy Investment is Not Moving in Indonesia?

Solar Regulatory
Solar Regulatory Problem in Indonesia

**MEMR Regulation No. 17/2013**

**MEMR Regulation No. 19/2016**

**MEMR Regulation No. 50/2017**

**MEMR Regulation No. 49/2018**

**MEMR Regulation No. 16/2019**

**MEMR Regulation No. 04/2020**

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**Note:** Revision and Improvement for Parallel charge and BOOT to BOO

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<table>
<thead>
<tr>
<th>Price Cap</th>
<th>FIT Introduction</th>
<th>Uncertain Time</th>
<th>Capping Price BPP</th>
<th>Parallel Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>• US$ 0.25/kWh (using modules with &lt;40% local content). • US$ 0.30/kWh (using modules with &gt;40% local content).</td>
<td>MEMR Regulation No. 17/2013</td>
<td>Range between US$ 0.145 – 0.25/kWh depending on project location.</td>
<td>Tariff should be lower than National supply cost of electricity (National BPP) or no more than 85% of local electricity supply cost (regional BPP) which ranges from US$ 0.048 – 0.144/kWh depending on the location.</td>
<td>Net metering scheme. Exported electricity will be offset with imported electricity from PLN. Exported electricity is valued at 65% for compensation. If export is higher, the balance can be accumulated for up to 3 months before it expires.</td>
</tr>
<tr>
<td>Local Content Requirement</td>
<td>MEMR Regulation No. 12/2017 Updated by No. 50/2017</td>
<td>Project size per developer is subject to a limit based on the available quota in the region.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOOT</td>
<td>MEMR Regulation No. 49/2018 – (Solar Rooftop)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deemed Dispatch in case of force majeure</td>
<td>Not regulated</td>
<td>Not regulated</td>
<td>In 2017, MEMR released several regulations concerning deemed dispatch. The latest issued was No 10/2018, where in case of force majeure (from natural disaster), PLN is not obligated to pay deemed dispatch to IPPs.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Tariff Based on Local BPP for Utility Scale Solar Power Plant is Not Attractive for Investor (MEMR 12/2017 AND 50/2017)

• Locations where the local BPP is higher than national BPP receive tariffs up to 85% of local BPP.

• The graph shows that areas with more attractive prices are located mostly in the Eastern part of Indonesia, where infrastructure such as roads and ports are not as well developed as the ones on Java-Bali island which leads to higher project costs.
Parallel Charges Illustration

MEMR Regulation 49/2018
Parallel Charge = 40 hours x installed capacity x electricity tariff
IF 10 MW = 40 hours x 10,000 kW x 0.07 – 0.1 USD/kWh
Total Monthly = 28,000 – 40,000 USD

REVISED BY MEMR Regulation 16/2019
Parallel Charge = 5 hours x installed capacity x electricity tariff
IF 10 MW = 5 hours x 10,000 kW x 0.07 – 0.1 USD/kWh
Total Monthly = 3,500 – 5,000 USD
Solar Regulatory in Malaysia
(Comparation Data from ACE)

2011 -2015
Market Creation

Feed in Tariff (2011-2016)

Almost 400 MW Installed

LSS Auction 1 (2017-2018)

LSS Auction 2 (2019-2020)

Net Metering

Peer to Peer trading pilot project

LSS auction 3 (tbc)

2016 -2020
Market Expansion Test

2018 onwards- New market based policies trials
Why Solar Energy Investment is Not Moving in Indonesia?

Unworkable Project Requirement
Unworkable Project Requirement

• High level of risk associated with land acquisition
• PLN doesn’t provide guidance regarding valuation of land
• BOOT increasing upfront cash requirement by rules out opportunity to Lease land

Local Content Regulation

• High threshold for using local content that makes it hard for the power sector to scale up.
• Main component with high local content is cost higher compared with non local content.
Built Own Operate Transfer Illustration

MEMR Regulation 50/2017 (BOOT)
IF , IPP in Bali Island, 10 MW, 20 years
Solar Power Investment = 10 x 800,000 USD/MW
Land Acquisition Cost (10,000 sqm/MW) = 10 x 10,000 x 100 USD/sqm
Total Cost = 8 million USD + 10 million USD
   = 18 million USD
Our IPP price should be 85% than current cost in Bali (6.81 cent) max.

End of contract we have to transfer power plant including with the land
(the land price will increase significantly)

REVISED BY MEMR Regulation 4/2020, back to BOO scheme
Why Solar Energy Investment is Not Moving in Indonesia?

Financing Problem
Financing Problem For Solar Project Investment in Indonesia

Financing is not the most critical barrier to building utility scale solar projects.

Major barrier is the non-existence of scalable projects with sufficient size to qualify for financing.

Minimum project size of 50 MW is needed to qualify for project financing. Anything below that level will need to rely on traditional corporate financing.
OPPORTUNITIES

• Improvement from New Regulation
  • MEMR Regulation 16/2019; demand of solar rooftop for industry and commercial is start to increase
  • MEMR Regulation 4/2020. BOOT scheme has been changed to BOO scheme every utility scale renewable energy project
• Draft of New President Regulation regarding NRE will change the tariff of NRE from 85% BPP become Feed In Tariff (already implemented on Waste To Energy)
• Indonesia has a huge population, more than 250 million of people, big market for industrial and residential solar rooftop
• Climate change and green energy awareness increasing in younger generation
THANK YOU