Assessing potential of power generation investment in ASEAN countries

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Abstract

The Association of Southeast Asian Nations (ASEAN) has been considered as one of the attracting regions for foreign direct investment. As developing nations are growing, they tend to consume more electricity and need more power generation, which becomes one of attractive businesses in this region. However, not many studies focus on an assessment of business environment of power generation and might deter unfamiliar investors from venture. Therefore, we assessed the relative attractiveness of power generation investment in this region in five aspects: economy, business, risk, infrastructure, and finance, which were taken up from the framework of the Global Infrastructure Investment Index. The assessment can provide an overview of strengths and weaknesses of power generation investment and serve as guidelines for investment decisions and policy making to investors and government in each ASEAN country.

Keywords: ASEAN; Business environment; Power generation investment

1. Introduction

The ASEAN, which comprises of Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam, has been identified as one of the fastest developing regions in the world, and by an establishment of the ASEAN Economic Community (AEC), a regional economic integration has been strengthen and brought interests from foreign investors [1]. To support the region’s economy growth, the needs for sustainable energy security have become significant and shall be considered when government makes policy [2]-[4]. One of the important contributors that enhance the region’s energy security is a private investment, from both domestic and abroad investors. To attract these investors, the region should develop solid guidelines that promote its energy business. Therefore, this study deploys available data to assess attractiveness for power generation investment in ASEAN countries through a quantitative method. The purpose of this work is to preliminarily screen for attractive markets abroad of power generation. Country screening is commonly accepted as the first step in analyzing foreign market entry [5].

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Market attractiveness, as a term found in portfolio analysis and market strategy planning, describes market growth and profit possibilities of an available market or industry; market attractiveness is affected by various factors. According to a number of studies that have investigated the various factors of international expansion [5]-[10], market potential, which depends on the market size, the market growth and the consumer purchasing power, is identified as one powerful factor affecting the market attractiveness. In addition, McKinsey & Company suggests that the most common factors affecting the market attractiveness are growth rate, market size, market profitability, market structure, product life cycle changes, changes in demand, trend of prices, macro environment factors, seasonality, availability of labor, market segmentation [11]. The attractiveness of foreign markets is also involved with economic, political, legal, regulatory, cultural and geographic of that country [5], [9]-[10], [12]. However, key factors that should be included to evaluate market attractiveness depend on company’s objectives of such evaluation [11].

To preliminarily assess attractiveness of international market, there are two main complementary approaches: country clustering and country ranking [5]. The former classifies countries in groups according to their similarity of commercial, economic, political, and cultural dimensions, while the later ranks countries from their overall market attractiveness, which is evaluated from different dimensions in respect to the considered market. The details of these two methods have been discussed in [5], [13]. For this study, the method of country ranking is selected because we aim to assess the relative attraction of ASEAN countries to power generation investors.

2. Methods

2.1. Framework

Since power generation business is relevant to infrastructure investment, this study assesses the attractiveness of power generation market under the framework modified from that of the Global Infrastructure Investment Index [14]. This framework focuses on the relative attraction in five aspects: economy, business, risk, infrastructure, and finance. By considering this framework, we chose indicators related to power generation investment under each aspect, and all indicators have the same weight in the assessment. However, due to limited data availability, we selected only twenty indicators which are available for all ASEAN countries from different years (2010-2015), as shown in Table 1. These indicators were used to assess an overall situation of power generation investment in the ASEAN region.

2.2. Data transformation

The assessment was done by using secondary data from national statistics and open source data. We collected the data set of each indicator, and then the data set was normalized on a linear scale of 1-5 as shown in (1).

\[ x'_i = 1 + (5 - 1) \left( \frac{x_i - \text{Min}_X}{\text{Max}_X - \text{Min}_X} \right) \]  

where, \( x'_i \) is normalized value based on 1-5 scale, \( x_i \) is value of the original data set \( X = [x_1 \ldots x_i] \). \( \text{Min}_X \) and \( \text{Max}_X \) are minimum and maximum value/scale of that original data set \( X \), respectively.

On the other hand, if indicators, such as variation of inflation, difficulty to get electricity, or tax rate, are inversely related with the scale, the reverse normalization can be calculated as shown in (2).

\[ x'_i = 1 + (5 - 1) \left( \frac{x_i - \text{Max}_X}{\text{Min}_X - \text{Max}_X} \right) \]  

Table 1. Indicators related to power generation investment for each aspect

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Code</th>
<th>Indicator</th>
<th>Year</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>E-1</td>
<td>Average GDP growth(^a)</td>
<td>2010-2014</td>
<td>[15]</td>
</tr>
<tr>
<td></td>
<td>E-2</td>
<td>Gross fixed capital formation</td>
<td>2014</td>
<td>[15]</td>
</tr>
<tr>
<td></td>
<td>E-3</td>
<td>Renewable market size(^b)</td>
<td>2012</td>
<td>[16]</td>
</tr>
<tr>
<td></td>
<td>E-4</td>
<td>Electricity market size growth(^c)</td>
<td>2010-2012</td>
<td>[16]</td>
</tr>
<tr>
<td>Business</td>
<td>B-1</td>
<td>Ease of doing business</td>
<td>2015</td>
<td>[15]</td>
</tr>
<tr>
<td></td>
<td>B-2</td>
<td>Government transparency</td>
<td>2012-2013</td>
<td>[17]</td>
</tr>
<tr>
<td></td>
<td>B-3</td>
<td>Legal framework in settling disputes</td>
<td>2012-2013</td>
<td>[17]</td>
</tr>
<tr>
<td></td>
<td>B-4</td>
<td>Electricity market structure(^d)</td>
<td>2013</td>
<td>[18]</td>
</tr>
<tr>
<td>Risk</td>
<td>R-1</td>
<td>Political stability</td>
<td>2014</td>
<td>[15]</td>
</tr>
</tbody>
</table>
3. Results and discussion

When considering all five aspects, Singapore, Malaysia and Thailand are the top three countries whose market is attractive for power generation investment among other ASEAN countries as shown in Fig. 1. Singapore’s market environments are fully developed as it has the open business environment, relatively low risks, available infrastructure and strong financial sector. The strengths of Malaysia are the mature infrastructure, low risk environment and ease of doing business. The strong points of Thailand in attracting investors are the electricity infrastructure, and financial environment.

The bottom three countries whose market is in the initial states are Myanmar, Cambodia and Vietnam. The strong point of these three country is their economy. However, since Myanmar has just recently opened its business to private sectors and foreign investors, it still lacks fundamental environments to nurture business growth. Quick government reforms and policymaking that create friendly business environment should stimulate its country development. Cambodia has weakness in its infrastructure from low government investment in the subject. However, the inland country is likely to develop its infrastructure relatively convenient than island counterpart. Vietnam is relatively risky on variation of inflation, which results from the rapid growth of country economy. Heighten controls on fiscal and monetary policy, combining with diversification of other industries and larger economy should contain the effect of unstable inflation.

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| R-2 | Variation of inflation$^a$ | 2012 | [17] |
| R-3 | Strength of investor protection | 2012 | [17] |
| R-4 | Public trust in politicians | 2012-2013 | [17] |

| Infrastructure | I-1 | Quality of electricity supply | 2012-2013 | [17] |
| I-2 | Population accessing to electricity | 2012 | [15] |
| I-3 | ASEAN network connectedness$^b$ | 2013 | [19] |
| I-4 | Difficulty to get electricity$^c$ | 2015 | [15] |

| Financial environment | F-1 | Availability of financial services | 2012-2013 | [17] |
| F-2 | Local equity market | 2012-2013 | [17] |
| F-3 | Incentives to investors | 2013 | [17] |
| F-4 | Tax rate | 2015 | [15] |

$^a$ Average GDP growth calculated from arithmetic average of five years of GDP, except that of Myanmar which was calculated from two years of GDP (2013-2014).

$^b$ Renewable market size was estimated from the proportion of renewable electricity net consumption to the total electricity net consumption. Renewable energy resources are defined according to the data source.

$^c$ Electricity market size growth is calculated from Compound Average Rate Growth (CARG) of three year of total electricity net consumption.

$^d$ Electricity market structure ranks from 1 to 5 (vertically integrated regulated utilities, single buyer model with IPPs, wholesale spot market, retail competition, and electricity futures market).

$^e$ Variation of inflation was estimated from variation of annual % change of inflation for four years.

$^f$ ASEAN network connectedness was estimated from the capacity of transmission lines connecting to other countries according to the plan of ASEAN power grid by 2030.

$^g$ Difficulty of access to electricity was assessed from time for customer to be connected to electricity supply.
All these three countries have potential to grow in generation business; however, key challenges for these relatively weak countries should be addressed. Investors may focus on the strengths and be aware of the weaknesses when making investment decision.

4. Conclusions

Due to the availability of data on ASEAN countries, we selected twenty indicators to assess attractiveness for power generation investment. With the limitation of data access, the twenty indicators, which can be acquired from the reliable and regularly updated data sources, are sufficient to provide an overview of strengths and weaknesses of power generation investment to investors and government. The results of the assessment can be served as guidelines for investment decisions and policy making. Notably, the assessment can be improved to be sophisticated by considering an impact of indicators on investment decision. For instance, if levelized cost of electricity, which is one of significant factors, is included in the assessment with a high weight, the results of assessment will change.

Each country in the region faces some challenges of its own. The common challenges are in the aspects of business, economy and finance. To foster the attractiveness for power generation investment in the region, ASEAN cooperation may come useful in addressing key concerns such as ease of doing business and legal framework and developing common guidelines for governments. In addition, economic environment could be improved by integrating more mature and less mature market together through transmission systems such as ASEAN Power Grid projects [1]. The integrated market with less restricted movement of money in the region can also facilitate variation of financial services.

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References


