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THE RENEWABLE ENERGY ACT 2011: A STUDY ON RENEWABLE ENERGY DEVELOPMENT IN MALAYSIA

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Abstract: *Energy security and energy threat are worldwide issues as fossil fuels are exhaustible due to the robust development and economic growth. Many countries across the border support the efforts for alternative energy generation to ensure their energy supply. An energy transition from unsustainable fossil fuel sources to renewable energy (RE) has been reflected by the promulgation of various law and policies in numerous regions and the establishment of the International Renewable Energy Agency (IRENA). Malaysia has also taken several measures to accelerate RE development including the enactment of the Renewable Energy Act 2011 (Act 725). This study focuses on the importance of RE in securing energy supply in Malaysia and discusses the implementation of the Renewable Energy Act 2011 in the country. This study adopts a doctrinal approach by analyzing existing RE law in Malaysia.*

Keywords: *Renewable Energy, Feed-in Tariff, Energy Security, Incentive*

Introduction

Fossil fuels have known to be heavily exploited for industrial sector that plays an important role in the economic expansion. This problem has subsequently led to the scarcity of sources and energy threat. Responsive to that, many countries have announced their renewable energy (hereinafter referred as "RE") generation goals and various measures were taken to increase RE generation. Several RE support policies and fiscal incentives were also introduced in low and middle-income countries in order to promote RE development (Baldwin et al., 2016). Moreover, the establishment of the International Renewable Energy Agency (hereinafter referred as "IRENA") has supported the international agenda in promoting RE generation and sustainable development. Up to date, this agency is keen to aid in various aspects including the adaptation of RE policies to attract investments, mechanisms to accelerate RE development,

technology transfer to support a clean energy system as well as knowledge sharing (IRENA, 2017).

In Malaysia's context, the national growth domestic product (GDP) and the Economic Transformation Program (ETP) have clearly reflected the important role of the energy sector in the country. The government is also committed to explore and exploit RE sources, to reduce carbon (CO_2) emission and to promote a sustainable and clean energy for the coming generation (Yatim et al., 2016). These were evidenced by the introduction of several RE related policies and various incentives to spur investment in RE generation simultaneously reverse the pattern of current economic development that is depending on fossil fuels (Yatim et al., 2016). Notwithstanding the continuous efforts made, the national RE contribution in the energy mix is not significant (Koh and Hoi, 2002) and Malaysia is yet to achieve RE target as embedded in the Fifth Fuel Diversification Policy 2001 and the National Renewable Energy and Action Plan 2009. It was also found that uncompetitive price of RE and limited private investment contributed to the failure (Bujang et al., 2016).

This paper focuses on the analysis of the Renewable Energy Act 2011 (Act 725) through a doctrinal approach in the light of promoting RE development for electricity generation in Malaysia. Prior the discussion on the RE law, this paper seeks to review renewables related policies in order to understand the development of RE law and policy in Malaysia. This paper further explores the functions of the Renewable Energy Act 2011 (Act 725) through the implementation of feed-in tariff (hereinafter referred as "FiT") to increase RE generation in Malaysia.

Literature Review

Definition and Concept of Renewable Energy for Electricity Generation

Every country including Malaysia needs a secured energy supply to support the need of growing population and industry. Despite the fact that Malaysia is blessed with numerous natural sources of energy, Malaysia were heavily relied on fossil fuels in which the availabilities are close to extinct. Nevertheless, the government has introduced laws and policies in order to safeguard energy security in the country (Munir et al., 2012). Energy security in a country refers to "affordability, reliability, and accessibility to the energy supply". Energy threat will lead to interrupt of energy supply and this occasion is normally due to the net-import dependency and the political instability (IEA, n.d.). Yet, the scenario has not much changed as fossil fuels, especially the natural gas is still dominating the national energy share. It was found that RE deployment is able to enhance energy supply and to cut energy import (Markovska et al., 2009).

Renewable energy (RE) is often used interchangeably with alternative energy, though the later one carries much broader meaning. The Renewable Energy Act 2011 defines renewable resources as "the recurring and non-depleting indigenous resources or technology as set out in the first column of the Schedule". Similarly, RE in the Energy Commission Act 2001 refers to non-exhaustible energy sources including biomass, hydropower, solar power, geothermal power, wind power, waves and tides. The main distinction between these two laws is that RE sources as in the first column of the Schedule confine to biomass, biogas, mini-hydro, solar photovoltaic and geothermal. Whether hydropower is renewable remains debatable, as there is growing concern about the negative impacts of hydropower construction (Egre and Milewski, 2002). While, the presence of strong support for hydropower advocates this energy as renewable on the basis of climate change mitigation (Yuksel, 2010). Apart from securing

energy supply of the country, RE has reduced greenhouse gas (GHG) emissions especially in the power sector (Manish et al., 2006). However, this paper does not intend to extend a discussion of the environmental aspect of RE.

Renewable Energy Support Mechanism

An adequate and effective instrument is vital in supporting RE development in a country. The economic based instruments are often adopted by many countries as in their energy policies, due to the reason that it attracts more private sector participation and penetrate more investment into the industry (Keyuraphan et al., 2012). There are several RE support mechanisms that have been successfully adopted in various jurisdictions including the feed-in tariff (FiT), renewable portfolio standards (RPS), the tendering system and net energy metering.

Of these instruments, FiT is the most preferred RE support mechanism by investors (Bürer and Wüstenhagen, 2009). This mechanism has been introduced for the different RE technologies, incentives for RE project implementers and financing schemes to support RE projects (ASEAN Centre For Energy, 2016). This mechanism was first adopted in the United State through the Public Utility Regulatory Policy Act and widely implemented by European countries. The Renewable Energy Act 2011 interprets FiT as "special tariff payable to feed-in approval holders in consideration for renewable energy generated and sold to a distribution licensee as specified in the third column of the Schedule".

Discussion

Development of Renewable Energy Policies in Malaysia

Exploration and exploitation of oil and gas have given rise to the country's GDP since the first exploration in Sarawak a way back in 1910 (Abdul Manan et al., 2015). Entangled with this, a number of significant laws and policies have been issued. The trend of earliest policies in Malaysia concentrated on petroleum development. For instance, the enactment of the Petroleum Development Act of 1974, the National Petroleum Policy 1975, the National Energy Policy 1979, National Depletion Policy 1980 and the Four Fuel Diversification Policy. On the contrary, the trend was shifted starting from 2000 with the introduction of the Fifth Fuel Diversification Policy. This step has taken Malaysia to another level and has led to great paradigm movement in the national energy sector as well as providing a sustainable energy for the future (Yatim et al.,2016).

Six years later, the National Biofuel Policy was established as one of the measures to combat environmental problems and to provide a sustainable transportation sector in the country. Nonetheless, several issues occurred and impeded the government's effort such as price volatility, limited infrastructures and lack of subsidies and supply (Bujang et al., 2016). On top of that, this policy has founded for the enactment of the Biofuel Industry Act 2007 (Act 666). To continue the Fifth Fuel Diversification Policy's aspiration, the National Green Technology Policy was launched in 2009. Through this policy, several incentives were provided for investors in order to increase RE generation in Malaysia (Ansari, 2011). Yet, the high cost of RE technology has encumbered the purpose of this policy (Fayaz et al., 2011; Almaktar et al., 2013). Realising the coming issues, the government has introduced the Green Technology Financing Scheme (GTFS). This scheme has successfully financially supported manufacturers and users of green technology (hereinafter referred as "GT") and also led to significant development of GT at the national level.

At the same time, the government has implemented the National Renewable Energy Policy and Action Plan (hereinafter referred as "NREP"). This policy aims to resolve the failure of achieving the RE target of 5% in the national energy share and Small Renewable Energy Project (hereinafter referred as "SREP"). The vision of this policy is to "enhancing the utilization of RE resources to contribute towards national electricity supply security and sustainable socio-economic development". This policy is seen as a tool to stimulate RE generation as well as protecting the environment for future generation (SEDA Malaysia). The most significant feature of this policy is that it has initiated to the establishment of the Renewable Energy Act 2011 (Act 725) (hereinafter referred as "RE Act").

The promulgation of the Renewable Energy Act 2011 (Act 725)

Tariff system is common in the energy and electricity sectors in Malaysia as it was previously implanted to support SREP in 2001. SREP was one of the earliest government's efforts to develop RE generation based on the solar photovoltaic (PV), biomass and biogas, mini-hydro as well as municipal solid waste. However, the program was called off as many projects were abandoned (Sovacool and Drupady, 2011). Several flaws of the program were identified such as partiality in the Renewable Energy Power Purchase Agreement (hereinafter referred as "REPPA"), the absence of enforcement, unattractive tariff rate and subsidies for fossil fuels (Ansari, 2011).

In light of the previous failure, the government strives to pursue RE goals through the introduction of various initiatives as in the NREP and the RE Act. FiT has been widely used in Europe and through RE Act 2011, FiT was to be implemented to incentivize for RE generation projects with installed capacity up to 30 MW. In respect of FiT implementation and monitoring program, a regulatory body was set according to the Sustainable Energy Development Authority Act 2011 (Act 726). This authority was named as Sustainable Energy Development Authority (hereinafter referred as "SEDA") to work along with the Ministry of Energy, Green Technology and Water (KeTTHA) and the Energy Commission (EC).

Though the RE Act 2011 is the main legislation to regulate FiT for RE generation in Malaysia, RE installation, generation and distribution are subject to the Electricity Supply Act Amendment) 2015. The Act encompasses a wide spectrum of regulation and licensing of the generation, transmission and distribution of electricity. On the other hand, the RE Act has a very limited scope as stated in the long title of the Act, "the purpose of the Act is for implementation of the feed-in tariff in RE generation". The FiT is applicable through Malaysia except for Sarawak. Apart from the RE Act 2011 and the Electricity Supply Act (Amendment) 2015, the Energy Commission Act 2001 also governs matters related to RE especially in regards to technical, safety and implementation of regulations related to the electricity sector.

Other important aspects are that only sources enumerated under Schedule to Section 2 of the Act eligible for the tariff and electricity generated under this program and the electricity is to be sold to distribution licensee at a fixed price for a stipulated duration as in the REPPA. Pursuant to Section 4 of the RE Act, any person or company of having RE installed capacity of not more than 30 MW are eligible to apply and once the approval is granted, they shall be known as feed- in approval holder (hereinafter referred as "FiAH"). Through this program, FiAH is qualified to supply clean and sustainable electricity to consumers through the national grid (Johari et al., 2013).

Another crucial issue pertaining FiT is that whether this program is one of the government subsidy programs. FiT related expenses are collectible from the public, therefore, it was not considered as a subsidy program, as opposed to the oil and gas industry. Previously, 1% fee (currently 1.6%) was charged to the consumer on the electricity bill (KeTTHA, 2011). SEDA is accountable to administer the RE Fund as in Section 17 (1) and (2) of the SEDA 2011 and also to spend the Fund's contribution in virtue of Section 25 of the RE Act 2011.

The implementation of the Renewable Energy Act 2011 (Act 725) and the feed-in tariff (FiT)

It was only seven years since the RE Act 2011 has been passed in Malaysia. It may be difficult to examine the efficacy of the Act. However, the effectiveness RE law and policy are vital to navigate RE development and to support the country's aspiration. Selection of effective RE support mechanisms is crucial to determine successful implementation of RE law. A country may adopt a single or several RE support mechanisms, and it should be applied accordingly to suit the local circumstances. Hence, it could be concluded that the effectiveness of RE Act 2011 depends on the effectiveness of FiT implementation.

As mentioned earlier, many European countries have successfully adopted FiT including Germany and Spain (García-Alvarez and Mariz-Pérez, 2012; Couture and Gagnon, 2010). FiT has also been implemented in many of Asia's countries including Thailand, Philippines, India, Japan and Korea. In Korea, FiT programme has successfully attracted many investments in PV and wind energy development and significantly led to the expansion of RE production in Korea (Park and Lee, 2014). Moreover, the Japanese Special Measures Concerning the Procurement of Renewable Energy has been revised to include the FiT mechanism for RE generation. This is one of the Japanese's government effort to reduce dependency on nuclear power after the Fukushima incident (Gao and Fan, 2014). While Southeast Asia's RE leader, Thailand's FiT was previously known as "Adder Programme" and the current FiT scheme has supported all RE technologies in Thailand except landfill gas power (Pita et al., 2015; Frank-Fahle and Morstadt, 2017). The Philippines has also implemented FiT for solar, biomass, wind, hydropower and ocean energies under the Philippines Renewable Energy Act 2008 (IEA, n.d.).

Successful implementation of FiT depends on several aspects including a guaranteed access to the grid, transparent FiT procedures, attractive Fit rates, a long-term fixed FiT rates, adequate FiT funds and last but not least an effective FiT framework and regulatory body. It was evidence that FiT has effectively attract huge investment in RE technology in Malaysia (ASEAN Centre For Energy, 2016). Data shows that the utilization of solar PV and biomass have been increased, after FiT implementation (ASEAN Centre For Energy, 2016). Apart from increasing RE generation, FiT was believed to promote a sustainable environment by supplying clean energy through RE generation (Johari et al., 2013).

Table 1 below illustrates application received by SEDA for RE generation as of 2015. While Table 2 specifies the cumulative approved application for RE generation as of 2015. Both tables show that investors and power producers have a vast interest in Solar PV installation compared to other RE technologies. Whereas geothermal received the least application as geothermal energy was only inserted in the Act in 2015 and only two places in Malaysia were found to have a potential for geothermal development which are Ulu Slim, Perak and Tawau, Sabah.

Table 1: Total Numbers of Application Received as of 2015 (Source: SEDA Malaysia)

RE Sources	Application No.	%	Capacity MW	%
Biogas	106	1.23	198.42	13.07
Biomass	56	0.65	545.25	35.92
Small Hydro	42	0.98	339.35	22.35
Solar PV	8,438	97.63	398.07	26.22
Geothermal	1	0.01	37.00	2.44

Table 2: Cumulative Approved Application Received According to Renewable Energy (RE) Sources as of 2015 (Source: SEDA Malaysia)

RE Sources	Application No.	%	Capacity MW	%
Biogas	92	1.24	164.02	14.21
Biomass	37	0.50	348.79	30.22
Small Hydro	36	0.48	279.64	24.23
Solar PV	7271	97.77	324.81	28.13

Table 3 below demonstrates energy generation from RE Projects from 2012 to 2015. As at 2015, solar PV contributed at one-third of the total RE generation, followed by biomass about 171.5 GWh. Though biogas contribution was not significant, yet the pattern of generation has been increased year to year. On the other hand, for a small hydro generation have been dropped since 2014.

Table 3: Energy Generation From RE Projects That Have Achieved Commercial Operation (2012-2015) (Source: SEDA Malaysia)

RE Sources	Energy Generation (GWh) 2012	2013	2014	2015
Biogas	-	29.26	47.48	54.40
Biomass	96.30	228.80	197.33	171.50
Small Hydro	7.23	91.43	64.45	52.63
Solar PV	1.34	53.92	177.36	243.42
Total	104.87	403.41	486.62	521.95

Since the RE Act 2011 was introduced, there is no major amendment has been made except for tariff revision and the inclusion of the tariff for geothermal energy in 2015. Some studies show that wind (Albani, 2013) and tidal energies (Sarawak Energy, n.d.; Samo et al., 2017) have potential to be exploited and subsequently will contribute in increasing RE share in the energy mix. However, up to now, there is no amendment made to embrace tariff for wind and tidal energy. Therefore, continuous feasibility studies should be commenced to evaluate the potential of these sources.

The weakness of the Renewable Energy Act 2011 (Act 725)

The major loophole in the Act is that the foundation of Act is limited for FiT implementation for RE generation. No other RE support mechanism implanted in the Act. Based on the above discussion, FiT is effective to develop RE in the country especially for a small-scale RE generation. Nonetheless, FiT failed to project a larger spectrum of RE generation as it seems to benefit only solar PV power producers and manufacturers. This was highlighted by the fact that only tariff quota for solar PV for the community is available, while another solar PV tariff quota

has been used up (SEDA, n.d.). Unfortunately, other RE technologies have not received similar attention under the FiT program.

The FiT was found to be unsustainable to support RE development in the long run due to fierce competition among RE technologies (Chang and Li, 2015). Thus, a supplementary mechanism is needed to comprehend the existing one and this assimilation will accelerate RE development in the country (Dong, 2012). It must be noted that each RE technology may require different mechanisms to be developed effectively and various mechanisms adopted will assist the country in case of the technology changes (Haas et al., 2011). Furthermore, the present FiT mechanism is found as lackluster as electricity costs increase and the public has to bear the cost.

To overcome the weakness of the RE Act 2011 and FiT, the government through the EC has introduced the Net Energy Metering (hereinafter referred as "NEM") programme on November 2016 and Large Scale Solar (hereinafter referred as "LSS") Photovoltaic Plant that adopts auctions system. Notwithstanding the latest programs, neither NEM nor LSS was regulated by the RE Act 2011. Section 50C of the Electricity Supply Act 1990 mandates the Energy Commission (EC) to issue the Guidelines Solar Photovoltaic Installation on Net Energy Metering Scheme and Guidelines on Large-Scale Solar Photovoltaic Plant For Connection to Electricity Networks. Both guidelines were supplemented under the Electricity Supply Act (Amendment) 2015 (Act A1501) and any FiAH under the RE Act 2011 is not eligible to participate in these programs.

Based on the current trend in Europe, many countries have started to deploy auctions/tendering system. This mechanism was found to be effective to reduce the cost of RE technology since it embarks competition between RE power producers. Germany has amended the German Renewable Energy Act 2017 by providing more rooms to implement auctions for RE projects. Through the new law, lower cost of RE generation can be achieved (IRENA, 2017) and able to accelerate the development of offshore wind farms (IEA, n.d.). With the introduction of LSS, perhaps, it is the right time for Malaysia to incorporate auctions in the existing RE Act 2011 and offers the system to other RE technologies.

Conclusion

Former United Nations Secretary-General, Ban Ki-Moon, has stated that "We all know that renewable energy is limitless and will last forever…It offers us great security and peace of mind…." (United Nations, 2016). Towards a sustainable energy development, the key findings show RE generation is significant in Malaysia's energy sector to support demand for economic growth. This energy transition will benefit the energy sector as a whole as well as the environment. Yet, regardless of political will for RE and numerous incentives are given, RE development is still slow.

Notwithstanding the insignificant RE contribution in the energy mix, the RE Act 2011 is able to address issues in SREP and effective to support solar PV generation at small scale. Though FiT was found to be an unsustainable mechanism to support RE development for a long-term, this mechanism is effective in establishing RE market in the country. To overcome failure in achieving RE targets, future amendments to the RE Act 2011 should be called. A broader objective should be included in the Act by incorporating other RE support mechanisms into the Act such as auctions/tendering system similar to the Germany RE law.

Further research on other untapped sources such as wind and tidal energies should be continued. With that Malaysia is able to add another RE potential to the energy profile. Benchmarking studies should also be conducted to analyze the suitable mechanisms in accelerating RE generation in which fits local circumstances. Regardless differences in the structure of framework for each mechanism, their ultimate goal is to support a sustainable energy generation and supply. Thus, the government also should be able to deliver a well-crafted legislation with sufficient and attractive incentives in order to accelerate RE development in Malaysia.

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