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**A COMPARATIVE STUDY ON LEGAL FRAMEWORKS  
ON RENEWABLE ENERGY IN MALAYSIA AND INDIA:  
TOWARDS THE COMMITMENTS  
UNDER THE PARIS AGREEMENT**

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**ABSTRACT**

Climate change has always been an agenda for the international community, individually and collectively, due to global warming and unusual weather conditions. The International Renewable Energy Agency (IRENA) believes that the adequate deployment of clean energy can achieve the targets of the Paris Climate Change Agreement. Many countries have shown their commitments to decrease their carbon

emission levels substantially, and they have done so by resorting to renewable energy sources. The renewable energy generation opens a viable door for climate change mitigation efforts. Both Malaysia and India are committed to fulfilling their obligations under the Paris Agreement. This comparative study evaluated the laws and policies related to renewable energy in Malaysia and India, as these countries progress towards their commitments under the Climate Change Convention (UNFCCC). This study operated under the comparative qualitative methodological framework and utilised secondary sources for analysis. Based on the comparative expositions, Malaysia can learn measures adopted by India to accelerate renewable energy development as well as reduce greenhouse gas (GHG) emission, which will prove beneficial to the country as well as comply with international conventions and agreements.

**Keywords:** Renewable energy, law, policies, climate change, sustainable development.

## INTRODUCTION

The ever-increasing supply and demand for energy have a substantial impact on climate change. This climate-changing pattern in the developing world is happening mainly because of the exploitation of fossil fuels. A transition in the energy sector from traditional fossil fuel-centred energy generation to environmentally friendly sources of energy will certainly help mitigate the menace of climate change, especially in developing and least-developed countries. This transition may be achieved only by reducing the demand for energy and increasing the generation of renewable energy (hereinafter referred as “RE”). However, reducing energy demand is not a good option due to many factors, including the economic factor. As a country develops, energy demand is projected to increase. Therefore, utilisation of RE is needed to successfully achieve the targets in climate plans by diversifying the energy mix of a country (IRENA, 2017).

Since excessive and inefficient consumption of energy contributes to carbon pollution, hence, effective management of natural resources, including renewable and non-renewable energies are additionally crucial factors for developing countries (Pittitpierre, 2015). A study indicated that restricted access to clean water resources is some kind

of human rights' abuse (Alsaadi et al., 2020). Therefore, the same formula shall apply to the right of a community to clean energy and environment. Due to emerging climate concerns, the Paris Agreement to the United Nations Framework Convention on Climate Change (hereinafter referred as "UNFCCC") was adopted on 12 December 2015 to boost a low carbon intensity future globally. This agreement is a milestone in global climate change governance and has attracted participation across the world, including all major emitters (Wilhite & Hansen, 2016).

The Paris Agreement is the first international agreement on climate change containing obligations for all countries (Dimitrov, 2016). This agreement works both horizontally and vertically, as climate governance is a concern across the border and also a responsibility of every state. Thus, there is a need for meaningful policy integration despite the involvement of government agencies and private institutions (Wilhite & Hansen, 2016). Via this agreement, developed countries have emphasised on mitigation and adaptation, financial assistance, technology transfer and robust global transparency for national mitigation actions (Dimitrov, 2016). The Paris Agreement requires all parties to regularly report their commitments through their National Determined Contribution (hereinafter referred as "NDC") and all parties are obliged to implement new NDCs every five years to demonstrate their progress and expectations (Wilhite & Hansen 2016).

Based on the report by the Intergovernmental Panel on Climate Change (IPCC), many countries have extensively exploited RE to the best of their abilities as an effort to mitigate climate change (Edenhofer, 2011). Many successful RE policies in developed countries have been transplanted to developing countries with or without suitable modifications and followed to support renewably sourced electricity (Azuela & Barroso, 2012). It is pointless to dispute the position of RE against fossil fuels in terms of environmental advantages, as it leads to a positive impact on the reduction of greenhouse gas (hereinafter referred as "GHG") emissions (Manish et al., 2006).

Furthermore, RE is the best tool to be used to solve climate issues (World Future Council Hamburg, 2008) as RE generation leads to emissions reductions in the power sector as to compare to fossil fuel (IRENA, 2015). This indicates that one of the vital aspects of

the Conference of the Parties 21 (hereinafter referred as “COP 21”), climate negotiations in Paris was an initiative at a national level in which the municipal governments and local authorities also had to play a significant role in promoting utilisation of RE technologies on a large scale (IRENA, 2015).

Malaysia and India, members of the Tiger Club Economies, both signed the historic Paris Agreement to the United Nations Framework Convention on Climate Change (UNFCCC). The provisions of the Paris Agreement have imposed an increased burden on developing countries, including Malaysia and India, to take action on the reduction of GHGs in fostering climate change. A careful look at the provisions of the Paris Agreement will reveal that the universal principles of differentiated responsibilities and respective capabilities are retained in the Agreement, while developed countries continue to take the leadership role on the means of implementation. However, this bottom-up Agreement has included provisions for all countries in the world, i.e. developed, developing and least developed countries and imposes responsibilities on them to mitigate the effects of climate change.

Hence, this Agreement is not like the Kyoto Protocol to the UNFCCC, the provisions of which made only developed countries responsible for taking mandatory initiatives to reduce GHG. Nevertheless, in the Malaysian context, emission in the power sector contributed by natural gas-based power generation was estimated to be equivalent to 57 percent of the total power sector's emissions, followed by 40 percent of emissions caused by coal-based power generation (NREPAP, 2009). Similarly, in India, carbon dioxide (hereinafter referred as “CO<sub>2</sub>”) emissions in the country are rising at a rate of 4.8 percent because of their fossil-fuel based energy sector. Hence, although both countries are obliged to take actions against climate change, they have yet to achieve their target due to ineffective regulatory framework that can support renewable energy innovation and development.

To understand the regulatory measures and to recommend to both countries, this paper dwells explicitly on the following objectives:

1. To identify the existing legal frameworks that regulate the production of renewable energy in Malaysia and India; and

2. To analyse whether the real options existing within the legal frameworks are consistent with these countries' commitments towards the Paris Agreement.

This study adopted a qualitative approach, whereby the methodology employed was by way of analysis of the legislation related to renewable energy in Malaysia and India. The authors also conducted a descriptive analysis on the development of renewable energy through the study of scholarly articles, websites and reports.

## **RENEWABLE ENERGY DEVELOPMENT IN MALAYSIA**

Malaysia is geographically located immediately north of the Equator, and as a result, the country is fortunate to have abundant sunlight throughout the year. Besides, the geography of the country with the presence of mountains, sea, and a variety of other terrains, along with an adequate supply of biomass/biogas from palm oil wastes have positive impacts on the exploitation of RE sources. It is a matter of great concern that even with all these advantages, RE supplies only 2 percent of the total energy mix.

At present Malaysia' electricity is generated from hydropower, the only renewable energy that is produced, and which amounts to only 1.9 percent of total energy production. Nevertheless, hydropower has the potential to increase in the future. Although it is not so significant right now, solar PV also has strong potentiality as Malaysia receives plenty of sunlight all year (Fayaz et al, 2011). Solar home system (SHS) programmes have been in existence for more than two decades in remote areas. In 2001, solar-diesel PV hybrids were started in Pekan, Pahang and several remote islands in Peninsular Malaysia. The usage of SHS did not, however, get the estimated prevalence due to lack of access to the main grid in isolated areas since the expense of the connections are relatively higher (Fayaz et al., 2011). Therefore, although the government has made efforts to diversify energy sources through RE in the country and sought optimisation of energy usage as demonstrated from the outset of the Seventh Malaysia Plan until now, it has failed to actualise its destination concerning the RE exploitation (United Nations, 2012). Table 1 provides a brief discussion on the Malaysia Plans relating to the renewable energy sector:

**Table 1**

*Malaysia Plans on Energy Sector*

Malaysia Plan	Target on Energy Sector
Eighth Malaysia Plan (2001 – 2005)	<ul style="list-style-type: none"> <li>• RE was identified as the nation’s fifth fuel in the energy supply mix.</li> <li>• Several initiatives were introduced, namely Small Renewable Energy Power (SREP) Program, Biomass Power Generation and Demonstration (BioGen) Project, Malaysia Building Integrated Photovoltaic Technology Application (MBIPV)</li> <li>• The establishment of the Centre for Education and Training in Renewable Energy and Energy Efficiency (CETREE) was to promote Rutilisationon.</li> </ul>
Ninth Malaysia Plan (2006 – 2010)	<ul style="list-style-type: none"> <li>• More energy efficiency measures were made to reduce the wastage of energy and to optimise the energy usage by the construction of energy-saving buildings.</li> <li>• Biofuel and biodiesel utilisation were increased in line with the introduction of the Renewable Energy Policy and Action Plan.</li> </ul>
Malaysia Plan	Target on Energy Sector
Tenth Malaysia Plan (2011 – 2015)	<ul style="list-style-type: none"> <li>• The enactment of the Renewable Energy Act 2011 (Act 725) and the Sustainable Energy Development Authority Act 2011 (Act 726).</li> <li>• Feed-in Tariff (FiT) and Renewable Energy Fund and Sustainable Energy Development Authority (SEDA) were established.</li> </ul>
Eleventh Malaysia Plan (2016 – 2020)	<ul style="list-style-type: none"> <li>• Wide range of RE sources will be tapped for electricity generation, including wind and ocean energy.</li> <li>• Another alternative source like nuclear energy will also be considered to reduce dependency on fossil fuels.</li> </ul>

The National Green Technology Master Plan (2017-2030) was launched to assist in achieving the NGTP objectives and to position Malaysia as a green technology hub by 2030. The energy sector has become one of the strategic focuses of the plan, with respect to increasing RE generation and improving energy efficiency. Under this Plan, the new target for RE installation capacity is 20 percent in 2020, 23 percent in 2025 and 30 percent in 2030. However, the RE

contribution to the primary energy supply is still insignificant. Table 2 reflects the primary energy supply from 2014 to 2017, which shows that natural gas still dominates the contribution to the national energy mix.

**Table 2**

*Primary Energy Supply in Malaysia from 2014 to 2017 (SEDA, 2018)*

Year	Primary Energy Supply (ktoe) <sup>1</sup>				
	Crude oil	Natural gas	Coal and coke	Hydropower	Renewable energy <sup>2</sup>
2014	26765	40113	15357	3038	255
2015	24971	39364	17406	3582	282
2016	27757	37980	18886	4499	315
2017	27471	34217	20771	6240	328

Table 3 provides details on the annual power generation from biogas, biomass, small hydro, solar PV and geothermal sources, from 2012 to 2018. Since geothermal energy, as a renewable energy source, has been recognised under the Renewable Energy Act 2011 in 2015, no power generation has been recorded yet from such source.

**Table 3**

*Annual Power Generation (MWh) of Commissioned RE Installations (SEDA, 2018)*

Year	Biogas	Biogas (Landfill/agri-waste)	Biomass	Biomass (Solid waste)	Small Hydro	Solar PV
2018	3,723.50	52,082.29	58,553.20	2,892.53	245,522.33	103,004.12
2017	13,877.53	17,0654.26	231,087.26	17,245.12	72,029.79	391,133.22
2016	12,709.07	62,033.43	155,427.93	36,751.74	47,798.28	307,137.70
2015	16,988.66	41,122.39	197,207.62	18,090.07	55,406.38	260,432.29
2014	19,772.25	31,844.44	226,196.38	4,347.83	64,549.65	181,818.55
2013	12,962.68	9,804.10	209,407.59	11,144.25	73,032.12	50,437.38
2012	98.11	7,465.40	101,309.87	3,234.52	25,629.78	4,719.95

<sup>1</sup> Thousand tonnes of oil equivalent (ktoe)

<sup>2</sup> Comprise of Solar PV, biogas and biomass.

## **LEGAL FRAMEWORK RELATED TO RENEWABLE ENERGY IN MALAYSIA**

In 2009, the Malaysian government implemented the National Renewable Energy Policy and Action Plan (hereinafter referred as “NREPAP”) as a mechanism to achieve the target of renewable energy within the energy mix. Prior to the adoption of this policy, the Government’s goal was to generate at least 5percent of the country’s total electricity through renewable sources; nevertheless, such a target has never been achieved. Hence, this policy has been adopted to demonstrate the importance of utilising renewable resources, primarily to ensure a better environment in the future by increasing renewable energy generation (Bujang et al., 2016).

After Malaysia ratified the statute of International Renewable Energy Agency (hereinafter referred as “IRENA”) in 2010, the Renewable Energy Act 2011 (Act 725) was gazetted on 2 June 2011, representing the primary regulatory regime in Malaysia created to increase renewable energy generation as accommodated in a feed-in tariff (hereinafter referred as “FiT”) mechanism. In addition to the RE Act 2011, there are numbers of legislation which are either directly or indirectly concerned with RE, namely:

1. The Electricity Supply Act 1990 (Act 447);
2. The Energy Commission Act 2001 (Act 610);
3. The Sustainable Energy Development Authority Act 2011 (Act 726);
4. The Biofuel Industry Act 2007 (Act 666);
5. The Environmental Quality Act 1974 (Act 127);
6. The Income Tax Act 1967 (Act 53);
7. The Customs Act 1967 (Act 235);
8. The Sales Tax Act 1972 (Act 806);
9. The Excise Duty Act 1976 (Act 176);
10. Electricity Regulations 1994; and
11. Efficient Management of Electrical Energy Regulation 2008.

The application of the Electricity Supply Act 1990 is crucial to the development of the RE sector in Malaysia since all matters on installation of RE technology including licensing and registration as well as electricity tariffs are subject to the Act. Moreover, the



Large Scale Solar (LSS), Net Energy Metering (hereinafter referred as “NEM”) and Solar Photovoltaic for Self-Consumption (SELCO) are regulated by the Electricity Supply Act 1990. Apart from the Electricity Supply Act 1990, the Energy Commission Act 2001 and the Sustainable Energy Development Authority Act 2011 are also essential to establish and monitor the Malaysian Energy Commission and Sustainable Energy Development Authority (hereinafter referred as “SEDA”).

Moreover, the Biofuel Industry Act 2007 was designed to regulate the biofuel industry and to promote the mandatory use of Malaysia’s domestic palm biodiesel, which is referred to as Envo Diesel or B5. However, the focus of this Act is solely on the transportation sector. In the absence of a specific legislation on climate change and provision in the RE Act 2011, the Environmental Quality Act 1974 is a crucial regulation for managing environmental issues in Malaysia. Installation of RE technologies is subject to this Act as well as the Environmental Impact Assessment (EIA) so that it will not cause harm to the environment. Also, the Income Tax Act 1967 plays a vital role in supporting the RE sector, whereby two significant incentives were provided, namely the Investment Tax Allowance (ITA) and the Income Tax Exemption (ITE). The Customs Act 1967, the Sales Tax Act 1972 and the Excise Duty Act 1976 also provide tax exemptions for companies that promote environmental protection by purchasing pollution control machinery or equipment.

The primary role of the RE Act 2011 is to implement the FiT mechanism to the incentive for RE generation in Malaysia. Under the Act, solar photovoltaic, mini-hydro, biomass, biogas and geothermal are eligible sources for the application of feed-in-tariff. Since the RE Act 2011 came into force, no significant amendment has been undertaken except the amendment for including geothermal energy to the tariff scheme and increasing the tariff arrangement. Although FiT has been successfully implemented in many countries including European countries, Malaysia has yet to achieve extensive successful implementation of the FiT mechanism. It is rightly believed that FiT is only effective in establishing a market for RE and might not be able to expand the RE sector.<sup>3</sup>

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<sup>3</sup> A number of subsidiary legislations have been passed, including Renewable Energy (Feed-in Approval and Feed-in Tariff Rate) Rules 2011, Renewable Energy (Technical and Operational Requirements)

There are also several essential features of the FiT under the RE Act 2011. Section 4 (a) details that a person eligible to be a feed-in holder is someone “who produces renewable energy from a renewable energy installation, having an installed capacity of no more than 30 MW (or such a higher-installed capacity as may be approved by the Minister), and who meets other criteria that may be prescribed by the authority (SEDA)”.<sup>4</sup> The FiT rates were identified by the Net Present Value (NPV) analysis, the Payback Period (PBP) analysis and the degression rate analysis. Section 16 (1) of the Act provides that the distribution licensee will pay the feed-in approval holder (FiAH), as they enter into a Renewable Energy Power Purchase Agreement (REPPA). A 1.6 percent surcharge on electricity bills is imposed on consumers who use more than 300 kWh. Before January 2014, the surcharge imposed on the electricity consumers (above 300 kWh of usage) was 1 percent from the electricity bill.

Grid parity is crucial for the FiT scheme as provided in Section 21 of the RE Act 2011. This grid parity will only be achieved if the cost to generate electricity through RE sources is less than or on par with the cost required to generate power from fossil fuels. The cost of RE technologies is anticipated to decrease each year gradually. A satisfactory degression rate and systematic procedures for degression are desirable for encouraging cost reduction to achieve grid parity. (Albani, 2013).

After the accomplishment of grid parity, payment to feed-in approval holders (FiAH) will be based on the prevailing displaced cost for

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Rules 2011, Renewable Energy (REPPA) Rules 2011, Renewable Energy (Criteria for Renewable Resources) Regulations 2011, Renewable Energy (Allocation from Electricity Tariffs) Order 2011, Renewable Energy (Recovery of Moneys by Distribution Licensee) Rules 2011, and Renewable Energy (Administrative Fees) Rules 2011.

<sup>4</sup> Rule 3 of the Renewable Energy (Feed-in approval and feed-in tariff rate) Rules 2011, indicates specific criteria for eligible producers: (a) a Malaysian who must be at least 21 years old; (b) a foreigner who must be at least 21 years old (for the purpose of installing Solar PV with an installation capacity of 72 kWh); (c) a local company; (d) a local authority, such as the Local Government 1976; (e) a body incorporated under the law, other than the authority; (f) a registered society, as in the Societies Act 1966; (g) a co-operative society as in the Co-operative Societies Act 1993; (h) a firm as in the Partnership Act 1961, and (i) any person determined by the Authority (SEDA).

the remaining period of their renewable energy power purchase agreements, while tariff depression has been introduced to reduce the support costs to the feed-in holder (FiAH). The incorporation of depression serves to support technological advancement and to reduce the government's burden to subsidise RE projects. However, in exceptional circumstances, the FiT policy can include no depression rate, in order to draw greater investor interest (Albani, 2013). Section 17 of the RE Act 2011 explicitly states that the tariff rate shall be reduced on 1 January each year.

SEDA has been empowered to review the depression rate at least once every three years, according to Section 18. Paragraph 2 of the same provision allows reviews in accordance with Section 3 (3). This provision ensures that the FiAH safeguards their return, the cost to install and maintain RE technologies, and the efficiency of RE technologies (Ahmad et al., 2015). Besides, Section 17 (1) and (2) of the Sustainable Energy Development Authority Act 2011 provides a mandate to the Sustainable Energy Development Authority Malaysia (SEDA) for managing and supervising the RE Fund.<sup>5</sup>

The increase in the deployment of the wind and solar energy around the world reflects international interests in exploiting these sources, replacing conventional sources that are strongly linked with climate change effects. Although no provision in the Act has been mentioned regarding the environment, climate change and carbon reduction, according to Table 4, Malaysia has increased its cumulative carbon avoidance each year.

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<sup>5</sup> Section 23 (2) enlists sources of funds, from sums provided by the Parliament for the Fund's purposes. These sums are paid to the authority (SEDA) under sections 22 (4), 24 (1) and 24 (5) of the RE Act, including all monies derived as income from investments made from the Fund, including interest, and all other monies lawfully received by SEDA on behalf of the Fund. The expenditure from the RE Fund could be made in accordance with section 25 of the RE Act 2011, which is to be read together with sections 19 and 20 of the same Act. The distribution licensee can recover from the Fund the difference between the amount paid by the distribution licensee to the feed-in approval holder (FiAH), and cost which the distribution licensee would have had to incur in order to generate the same amount of electricity, as generated by the FiAH based on the prevailing displaced cost, and the administrative fees and other expenses incurred for administering the FiT.

Other than the laws and policies as mentioned earlier, Malaysia also adopted several support schemes to develop renewable energy and achieve its target for a green and sustainable future. In 2015, 52 countries had adopted net metering policies at the state level (REN21 Secretariat, 2016). According to this mechanism, utility companies are obliged “to pay consumers that create their electricity the same amount of money as they charge customers per megawatt” (Stoutenborough & Beverlin, 2008). Malaysia launched the Net Energy Metering (NEM) programme in November 2016. This programme is limited to solar photovoltaics (PV) as an initiative to complement the current FiT scheme. This program promotes self-generation and self-consumption of energy, as any excess electricity generated will be exported to the utility grid (TNB) and will be paid in terms of credit (SEDA, 2016).

NEM is mostly limited to energy generated from solar PV, as the panels and related technologies are available in the market and require less expertise to operate. Other than NEM, auctions were another scheme that was deployed by approximately 64 countries by the end of 2015 (REN21 Secretariat, 2016). Indonesia was the first ASEAN country that deployed auctions for solar PV and geothermal sources in 2013, while Singapore embarked on its first pilot auction program for solar PV in 2015. Auctions have been introduced in Malaysia to promote the development of Large Scale Solar (LSS) Photovoltaic Plant. Section 50C of the Electricity Supply Act 1990 (Act 447) empowers the Energy Commission (EC) to issue guidelines on a Large Scale Solar Photovoltaic Plant for Connection to Electricity Networks.

**Table 4**

*Carbon Avoidance Based on Renewable Energy Generation from 2012-2017 (SEDA, 2018)*

Year	Carbon avoidance (tonnes)
2017	2119564.19
2016	1578325.27
2015	1154558.33
2014	747977.62
2013	383286.50
2012	125883.18

## **RENEWABLE ENERGY ACTORS IN MALAYSIA**

Several important renewable energy actors play essential roles in the development of the RE sector in Malaysia, including:

1. The Ministry of Energy, Green Technology and Water (KeTTHA) (currently known as the Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC).
2. The Malaysia Energy Commission (EC).
3. The Sustainable Energy Development Authority (SEDA).

MESTECC's primary functions are to formulate policies and strategies as well as implementing plans for the electricity supply industry, promoting EE and RE, reviewing tariffs imposed by electricity utilities, and monitoring standards of service provided by electricity utilities. With the new government and ministry, MESTECC is also providing services relating to the NEM, FiT application, sustainable low carbon building assessment as well as carbon and water pollution control.

The Malaysia Energy Commission (hereinafter referred as "EC") has played a significant role in respect to the economic regulation, technical regulation and safety regulation in Peninsular Malaysia and Sabah. The EC aims to balance the needs of consumers and providers of energy to ensure safe and reliable supply at reasonable prices, protect the public interest, and foster economic development and competitive markets in an environmentally sustainable manner.

The EC's roles and functions are to promote the economy in generating, transmitting, distributing, supplying and using electricity. Its functions also include the reticulation and use of gas, promoting competition, enabling fair and efficient market conduct, and preventing the misuse of monopoly or market power in the electricity and piped-gas industries.<sup>6</sup> The EC's core business is mainly based on the electricity, energy efficiency and gas sectors. Section 14 of the EC Act 2011 has listed the functions and powers of the EC which include regulating all matters relating to the energy supply laws, promoting efficiency in all stages of energy supply and supporting RE development and the conservation of non-RE.

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<sup>6</sup> Section 3 (3) of the Competition Act 2010 (Act 712) excludes the jurisdiction of this Act on any commercial activity regulated under the Energy Commission Act 2011 (Act 610).

The Sustainable Energy Development Authority (SEDA) was established through the Sustainable Energy Development Authority Act 2011 (Act 726) to promote RE. Section 15 of the SEDA Act stipulates its functions as promoting and implementing the RE policy and sustainable energy, governing the FiT system as well promoting private sector investment in the sustainable energy sector. Nevertheless, the government has not yet outlined SEDA's future roles to monitor the development of the RE industry, taking into account the best practices of other countries. SEDA should first and foremost strive to attain the position of Malaysia being the principal expert in RE.

Once it is recognised and respected as the national expert on matters related to RE, SEDA would be in a stronger position to recommend and advocate policies, laws, and action plans designed to uplift the deployment and contributions of RE across the nation. It is also imperative that the implementation of any future RE policies be left under the purview of SEDA, without the undue influence of special interests groups, private-sector entities and national agencies. Also, SEDA should seek to conduct original scientific research and innovation efforts in the field of RE, particularly regarding the studies on the suitability and feasibility of specific RE technologies across the nation. Such action would assist in setting the stage for future diversification, bearing in mind the untapped potential of existing RE options.

## **RENEWABLE ENERGY DEVELOPMENT IN INDIA**

India has great potential and has resorted to harnessing several RE sources, including solar, wind, biomass, waste and hydropower. Emerging local industries for RE technology manufacturing, including for solar and wind, have made a substantial impact on RE development and has helped uphold the country's RE targets. The manufacturing industry for solar PV is supported by small companies with a total capacity of 1.38 GW<sup>7</sup> of solar cells and 2.75 GW solar module integration (PricewaterhouseCoopers, 2015). As far as wind energy development is concerned, the tax-credit scheme has attracted investment, especially in terms of private sector generation. With increased generation capacities from wind farms, wind-related

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<sup>7</sup> Gigawatt (GW) is a unit used for large power plants or power grids.

technologies have improved and matured. This achievement has driven the cost-effectiveness of RE based electricity, as the costs have started to drop since 2010. Therefore, by embracing advanced technology, increased energy output, and reduced capital costs can be accomplished (PricewaterhouseCoopers, 2015).

With a huge human population and a large percentage of rural citizens having limited access to electricity, the trend in electricity consumption is anticipated to increase swiftly. Industrialisation and rapid economic growth have triggered the amplified scenario of electricity consumption (Meisen, 2010). The accessibility and reliability of electricity supply are vital to support India's economic development and for enhancing lifestyle in the nation, which has pushed the government to improve electrification (Apostoli & Gough, 2016). The government has introduced off-grid or decentralised RE projects to meet the country's energy demands in rural areas.<sup>8</sup>

The government strives to achieve complete electricity access in its nation under the Eleventh Plan. The effort is demonstrated by the diversity of generation, where 24.6 percent is gained from the states, 31.3 percent from the central sector, while the private sector dominates 44.1 percent of the generation sector. Along with the National Action Plan on Climate Change hereinafter referred to "NAPCC"), the government has placed steadfast steps for the development of renewable energy RE. The central government has assisted in providing incentives and embarking on support programs for the states to achieve RE goals.

An example is grid-interactive renewable power projects, which are mainly navigated through private investment with the support of the Ministry of New and Renewable Energy (MNRE), but with tariff rates regulated by the state through the State Electricity Regulatory Commissions (SERC) (MNRE, 2017). Therefore, reforms in the Indian electricity sector will deliver significant impact to RE development, not only due to the involvement of two ministries including the Ministry of Power and the Ministry of New and Renewable Energy, but also the multifaceted relationship with state actors. The complexity

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<sup>8</sup> Distributed/decentralized renewable power projects using wind energy, biomass energy, hydropower and hybrid systems are being established in the country to meet the energy requirements of isolated communities and of areas which are not likely to be electrified in the near future.



continues through provisions under Article 48A of the constitution, which signify the state's obligation to protect and improve the natural environment (Kaladharan, 2016).

The Paris Agreement has demonstrated India's commitment to saving the world's climate, as India has firmly reiterated its commitment towards clean energy and reducing carbon emissions (Apostoli & Gough, 2016). The electricity generation sector contributed more than a quarter of India's GHG emissions, and this figure will continually increase by more than 3000 million tons by 2030. With an increasing pattern of coal-based generation and energy demand, India is more likely to face both environmental and health issues as there is a clear nexus between global warming and health problems. India's long-term commitment was reflected in its submitted NDC as it promised to reduce emission intensity around 33 percent to 35 percent by 2030 and increase non-fossil fuel electricity generation up to 40 percent by 2030 (Apostoli & Gough, 2016). This target will be achieved with assistance from the Green Climate Fund (GCF) in terms of technology transfer and finances and increasing investments in climate change mitigation measures (IEA, 2017).

## **LEGAL FRAMEWORK RELATED TO RENEWABLE ENERGY IN INDIA**

India has extensive RE policies at national and state levels. Several factors may have contributed to the auspicious RE development in the country, including technology advancement. Environmental factors also play a significant role in the increasing RE deployment in India. The rising number of RE installations could result in a substantial reduction in GHG emissions. Nonetheless, an effective policy that supports RE technology will be able to generate a massive difference in RE's share within the country's generation mix. India has introduced a vast range of energy policies at central and state levels.

Among the outstanding strategies are the Integrated Energy Policy 2006, the Strategic Plan for New and Renewable Energy Sector (2011-2017), the India National Policy on Biofuels 2015 and the Comprehensive Policy on Decentralized (Off-grid) Energy Generation Projects based on the New and Renewable Energy (Non-



Conventional) Energy Sources 2016. The Tariff Policy 2006 provides financial incentives through implementing feed-in tariffs and feed-in premiums.<sup>9</sup>

Apart from policies, a legal framework is undeniably crucial in regulating the electricity sector, as the broad sector covers generation, transmission and distribution divisions. A number of legislations were passed to support the Indian energy sector:

1. The Energy Conservation Act 2001.
2. The Electricity Act 2003.
3. The Damodar Valley Corporation Act 1948.
4. The Punjab Re-organization Act 1966.
5. The National Electricity Policy, Plan and Tariff Policy.
6. The Indian Electricity Rules 1956.
7. The Central Electricity Authority Rules 1977.
8. The Central Electricity Authority Regulations 1979.
9. The Electricity (Supply) Annual Account Rules 1985.
10. The Electrical Wires, Cables, Appliances and Accessories (Quality Control) Order 1993.

The Energy Conservation Act 2001 is an Act that promotes energy efficiency (hereinafter referred as “EE”) and conservation, and is applicable throughout India, except in the states of Jammu and Kashmir.<sup>10</sup> Chapter II of the Act provides for matters related to the establishment of the Bureau of Energy Efficiency and its governing structure. The Act further provides the bureau’s functions, detailed in Section 13, which includes promoting energy efficiency in processes,

<sup>9</sup> Apart from the above-listed policies, India has also presented numerous RE related policies and RE targets. These include the Gujarat Wind Power Policy 2016-2021, the Gujarat Waste to Energy Policy 2016, the Gujarat Small Hydel Policy 2016, the Maharashtra Renewable Energy Policy 2015 and others. The Strategic Plan for the New and Renewable Energy sector (2011-2017), has outlined specific implementation plans for every RE sector, including wind power, small hydro, biomass, biogas, waste-to-energy and solar PV (both on-grid and off-grid). Among the strategies adopted under this plan are growing financial assistance for small power plants’ projects for solar and biomass, enhancing the publicity for rural electrification entrepreneurs to receive banks’ financial aids or grant funds, and introducing other fiscal mechanisms, for instance the Risk Guarantee Fund.

<sup>10</sup> Section 1 of the Energy Conservation Act 2001 [No 52 of 2001] (India).

equipment and systems.<sup>11</sup> It also provides financial aid for organisations that promote energy efficiency.<sup>12</sup> The Act also empowers the Central Government to enforce the efficient use of energy and its conservation through 22 listed measures under the same Act, in consultation with the Bureau.<sup>13</sup> Penalties are also served in cases of non-compliance with Sections 14 or 15 of the Act, where the penalty's amount shall not exceed ten lakh rupees for each failure, and ten thousand rupees for every day during which such failures continue.<sup>14</sup>

The Electricity Act 2003 is another comprehensive legislation regulating matters on generation, transmission, distribution, commercialisation and the usage of electricity.<sup>15</sup> The Act also covers issues of the electricity industry such as competition, consumer rights and electricity supply, and electricity tariff. This Act further promotes the efficient use of energy and environmental protection. With the enactment of the Electricity Act of 2003, a national energy transition has been portrayed as law, which has made a distinct mark on renewable generation. The Act further authorises the State Electricity Regulatory Commissions (SERC) to regulate matters related to the tariffs (MNRE, 2018).

The Electricity Act 2003 echoed the transparency and accountability of the electricity sector. This policy pursued India's aspirations in the energy transition towards clean energy, and further stipulated mechanisms for supporting RE development, such as preferential tariffs from renewable electricity, which has assisted in achieving grid parity and competitive bidding when selling power to the distribution licensee. A year later, the National Tariff Policy (NTP) was created to both promote RE development in India and to assist central and state regulators in tariff determination. Moreover, the NAPCC has set a target for renewable energy purchase of about 15 percent by 2020.

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<sup>11</sup> Section 13 (2) (k) of the Energy Conservation Act 2001 [No 52 of 2001] (India).

<sup>12</sup> Section 13 (2) (m) of the Energy Conservation Act 2001 [No 52 of 2001] (India).

<sup>13</sup> Section 14 of the Energy Conservation Act 2001 [No 52 of 2001] (India).

<sup>14</sup> Section 26 (1) of the Energy Conservation Act 2001, [No 52 of 2001] (India).

<sup>15</sup> [No.36 of 2003]. The Act applies in all states in India except the states of Jammu and Kashmir, as stated in Section 1 (2) of the said Act.

Apart from that, there are several central and state policies which indicate specific goals for each renewable energy source, including the Biogas Power (off-grid) Program 2013 and the India National Policy on Biofuels 2015. To date, no statute on RE has been passed by the Indian government.

However, the draft of the RE Act 2015 has encapsulated the regulation of RE development, following other principles related to climate, environment and economy. The Act to be implemented is capable of limiting the use of fossil fuels, enhancing energy security and reducing emission intensity. This law is seen as a prevailing tool for assisting governments in carrying out national and international duties to grow the RE share in the generation mix, and to combat climate change. Like Malaysia and other countries, India has also adopted a versatile approach on RE support mechanisms, including FiT, tendering systems, renewable portfolio standards (RPS) and net metering. The Central Electricity Regulatory Commission (hereinafter referred as “CERC”) has issued guidelines on FiT rates and implementation in 2009. According to this regulation, all RE technologies are eligible for the tariff and the review of tariff rates, which would be conducted every three years, except for solar PV and solar thermal projects.<sup>16</sup>

Another critical aspect in the Indian FiT program is the duration for tariff payment, which is approximately 13 years for all RE technologies, excluding solar PV and solar thermal, as well as small hydro (IRENA, 2017).<sup>17</sup> Apart from this, there are several state policies on FiT for solar energy such as the Uttar Pradesh renewable energy Feed-in Tariff 2014–2019, and the Jawaharlal Nehru National Solar Mission (Phases I, II and III). Some Indian states have offered FiT schemes for biogas and biomass projects such as the Rajasthan Generic Tariff for Biomass and Biogas Plants 2014-15, the Uttar Pradesh Captive and Renewable Energy Tariff Regulations 2014-15, the Gujarat Biomass Feed-in Tariff Regulations 2013-2016, and also for wind power, such as the Andhra Pradesh Wind Feed-in Tariff Policy and the Gujarat Wind Feed-in Tariff. Although it was suggested that the FiT rates introduced by the Indian Central government are not attractive, they are still able to attract investors (Yamusa II, 2013).

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<sup>16</sup> Annual review for tariff rates.

<sup>17</sup> International Energy Agency 2017. Payment duration under the Feed-in Tariff (FiT) for solar is 25 years, and as for small hydro (below 5MW) is 35 years.

As auctioning and tendering systems have gained popularity in recent years, India has been actively engaged with solar auctions at the state and central levels, aligned with the country's aim to achieve approximately 100 GW solar generation by 2022 (IRENA, 2017). By 2017, the national onshore wind capacity auction was executed to boost onshore wind generation in India (IEA, 2017). In respect to net metering for solar PV, the states of Himachal Pradesh and Rajasthan successfully implemented this approach and encouraged other Indian states to adopt the same policy. As for RPS or quota policies, these have been widely applied in various Indian local jurisdictions (IRENA, 2017).

Several states in India have also adopted net metering.<sup>18</sup> All these laws and policies support the installation of solar PV systems, and participants are permitted to sell excess solar energy to the utility company. Other than that, India has initiated several economic instrument-based policies to accelerate RE development such as Renewable Energy Certificates system and the Accelerated depreciation tax benefit, specifically for wind energy (IEA, 2017).

## **RENEWABLE ENERGY REGULATORY ACTORS IN INDIA**

As the world's seventh-largest country, India has a diverse regulatory body with regards to energy and electricity. This section will discuss electricity regulatory bodies only. The electricity regulatory system in India involves both central and state levels.

The Ministry of Power mainly regulates the Indian electricity sector. whereby it in charge of matters of matters pertaining to the below (Indian Ministry of Power, 2017):

1. Enacting and regulating general policies in the electric power sector and other related issues.
2. All matters relating to hydro-electric power, other than projects below a 25 MW capacity, and thermal power, transmission

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<sup>18</sup> Examples of these include the Madhya Pradesh Net Metering Policy, the Bihar Net Metering Policy, the Uttar Pradesh Net Metering Policy, the Rajasthan Net Metering Policy 2015, the Odisha Net Metering Policy, the Punjab Net Metering Policy, the Karnataka Net Metering Policy, the Tamil Nadu Net Metering, the India Net Metering Policy and the West Bengal Net Metering Policy.

- and distribution systems, including research, development and technical assistance.
3. Regulating the Electricity Act 2003, the Energy Conservation Act 2001, the Damodar Valley Corporation Act 1948 and the Bhakra Beas Management Board, as provided in the Punjab Reorganization Act 1966;
  4. All matters relating to the Central Electricity Authority, the Central Electricity Board and the Central Electricity Regulatory Commission which involve rural electrification and power schemes on central and state levels.
  5. All matters concerning energy conservation and energy efficiency in the power sector.

The Ministry of New and Renewable Energy (hereinafter referred as “MNRE”) was established in 2006 to substitute the Ministry of Non-Conventional Energy Sources. MNRE is the crucial player which regulates all matters relating to new and renewable energy in India, assisting the country in developing renewable energy as a means of supplementing its energy requirements. Other organisations involved are the National Institute of Solar Energy (NISE), the National Institute of Wind Energy (NIWE), the Sardar Swaran Singh National Institute of Bio-Energy (SSS-NIBE), the Indian Renewable Energy Development Agency (hereinafter referred as “IREDA”), and the Solar Energy Corporation of India (SECI) (MNRE, 2017).

IREDA is a Government of India Enterprise, under the administrative control of MNRE. IREDA is a Public Limited Government Company, established as a Non-Banking Financial Institution in 1987. It is engaged in promoting, developing and extending financial assistance for setting up projects relating to new and renewable sources of energy, and supporting energy efficiency and conservation. IREDA's objectives are to aid EE and RE projects financially, to be a competitive institution, and to lead in providing resourceful monetary assistance to EE and RE projects (IREDA, 2017).

The CERC was established in 1998, under the Electricity Regulatory Commissions Act 1998. The State Electricity Regulatory Commissions were also instituted under the same Act. Throughout the Act, the government of India aims to rationalise the electricity tariff, to provide more transparent policies and to promote efficient and environmentally-friendly policies. The Electricity Act 2003 has

mandated that the CERC carry out its functions.<sup>19</sup> These include regulating the tariff of generating companies owned by the Central Government and other companies.

However, they are also subject to the specified clause which governs the interstate transmission of electricity and matters connected therewith, including tariff and licenses, to settle disputes among generating companies or transmission licensees, and impose levies for the Act's purposes. CERC is also involved in specifying the grid code and in managing the trading margin for the inter-state trading of electricity. Besides, CERC is also involved in the formulation of the National Electricity Policy and the Tariff Policy and in promoting activities in the electricity industry including investment. As for the State Electricity Regulatory Commissions, 27 State commissions are currently parked under this commission (CERC, 2017).

## **CONCLUSION**

When we compare Malaysia with that of the Indian laws and policies relating to RE generation, we find that both countries can learn from each other as they have many things in common. In some cases, India's strategies seem better for sufficient renewable energy development; whereas, in other cases, Malaysia provides better grounds to utilise renewable sources. Both India and Malaysia are under pressure from the world community to reduce carbon emission. India, despite having a high population and high energy demands, is trying its best to put greater emphasis on renewable sources. To ensure a sustainable green future and to meet an ever-increasing electricity demand, India is not only developing its renewable energy but also incorporating nuclear power generation to diversify its energy mix.

Malaysia has a high potential for solar energy, but the production of electricity from this source is insignificant. Coal-fired and gas-based power generations are still the primary sources of power generation. As far as FiT is concerned, the Malaysian law and practice are more appreciable than the Indian's. As for providing tax and cash incentives to renewable energy sources, Malaysia and India stand on the same page. The main problem in Malaysia is that the purchase price of electricity generated by independent power producers by renewable

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<sup>19</sup> [No.36 of 2003] Central Electricity Regulatory Commission, 2017.

means is not encouraging. In India, the price plus tax and cash incentives provided are, on the other hand, quite favourable.

In both countries, there is plenty of room to learn from developed countries. They also need financial and technological support to fulfil their commitments towards carbon reduction made under the Paris Agreement. Nevertheless, it is essential to note that India is much ahead of Malaysia concerning energy efficiency and conservation of energy. This scenario is evidenced by the existence of many companies competing in the market.

There are several identified areas in which Malaysia can learn from India. To move forward in energy transition, Malaysia needs to have insight into the RE industry. This insight may be derived from the experience of other countries, which are not different from Malaysia in terms of economy, technology and geography, but have performed better than Malaysia with regards to RE development. Malaysia can learn several lessons from India's RE sector, namely a specific ministry on RE, which shows the government's commitment to developing RE. Furthermore, significant key players that exist at both the central and state levels should enhance the transparency of each agency in its administration and avoid the arbitrary management of funds. Moreover, there is a need for specific policies for each RE source, as there is in India, for example the five-year plan for national wind energy, the national solar energy and the establishment of a specific organisation to financially support RE development such as IREDA in India.

Both countries have to go a long way on arduous pathways to keep their promises to reduce carbon emission. Both should further reduce their reliance on traditional sources of power generation and maximise wind, solar, hydro and biomass energy sources. India has nuclear energy and is trying hard to increase its contribution to the energy mix. India and Malaysia should also seriously work on having offshore windmills and underwater turbines, as these sources of energy have great potential in both countries.

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