

Sustainable Development Governance of the Energy Sector in Malaysia

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Abstract: The subject of this paper is about sustainable development governance, with a particular focus on the Malaysian energy sector. This paper starts by delving into how sustainable development is defined and perceived. The paper also discusses whether sustainable development is now ready to be considered a principle of law or whether it remains a concept. The link between sustainable development and governance, in particular how governance contributes to the objectives of sustainable development is explored subsequent to the themes above. Following a discussion exploring key principles, themes and concepts, a brief country profile is given to cast a picture of the stage of growth Malaysia is in and explain Malaysia's development. The energy sector is also then discussed along with the challenges of the key renewable energy sources utilised in Malaysia. The penultimate discussion involves Malaysia's strategy for the energy sector, including how it relates to the United Nation's Sustainable Development Goals. Malaysia's Sustainable Consumption and Production initiative, which is part of Malaysia's strategy for the energy sector, is also given focus. Rounding off the considerations made in this paper is an evaluation of possible theoretical approaches that give a framework view and understanding of how Malaysia may address its sustainable development challenges of the energy sector.

Keywords: Ecological Sustainability, Governance, Malaysia, Renewable Energy, Sustainable Development.

Introduction

This paper explores how good governance would influence sustainable development of the energy sector in Malaysia. The intention of the paper is to create tangibility and give shape to the sustainable development challenges faced by Malaysia's energy sector, as complexity of this subject area often means difficulty in dealing with each issue within sustainable development with clarity. The paper will conclude with a number of theoretical approaches suggested that may pave future initiatives relating to Malaysia's sustainable development governance of the energy sector.

Sustainable Development

Definition. Sustainable development has been described and interpreted in so many ways around the world. A widely accepted but ambiguous definition was suggested by the Brundtland report titled "Our Common Future" ("Brundtland Report") that defines sustainable development as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs(p.41)[8]". It is argued that part of the strength of the ambiguity in the definition provided by the Brundtland Report is that stakeholders, people or institutions that have interests in sustainable development, are able to apply the common values found in this definition to their specific circumstances(p.11)[31]. A thoroughly prescriptive definition would not be able to accurately respond to variability of circumstances.

One may find the term sustainable development and sustainability used synonymously in academic literature [2, see also 15]. The reason for this may be for ease of reference and one could suggest it is easy to assume they mean the same thing. However, there is a distinction in meaning between the two terms. An interpretation of sustainability is

that rather than perpetuating advancement, the term merely proposes a state of maintenance while sustainable development suggests advancement that simultaneously maintains the earth's ecosystem's integrity.

The researcher's emphasis on maintaining the ecosystem's integrity aligns with Klaus Bosselmann's perception of sustainable development[7] that sustainable development is only meaningful if related to the core idea of ecological sustainability(p.11)[7]. He elaborates that sustainable development does not call for a balancing act between the needs of people living today and the needs of people living in the future, nor for a balancing act between economic, social and environmental needs[7]. It calls for development based on ecological sustainability: development is ecologically sustainable if "...it tends to preserve the integrity and continued existence of ecological systems: it is unsustainable if it tends to do so otherwise."(p.53)[7]. What this means is that the core of "ecological sustainability" becomes a central point of reference that allows for the economic and social elements to remain operable. Ecological sustainability as the core element is what would allow the economic and social elements to thrive because we use the earth's natural resources (sustainably) taken from the ecosystem for development.

Over time, the focus of sustainable development has shifted towards the linkages between economic growth, social inclusion and ecological sustainability rather than intergenerational needs(p.17)[49]. This is evident in how the Sustainable Development Goals ("SDG") set by the United Nations("UN") were announced in "The Future We Want" where it was stated that "*The [Sustainable Development Goals] should address and incorporate in a balanced way all three dimensions of sustainable development and their inter-linkages.*" (Paragraph 246)[67]. The recognition that addressing the key issue of inter-linkages between economic growth, social inclusion and environmental sustainability in the SDGs is important due to the key role SDGs play in aligning sustainable development efforts globally through the endorsement of UN member countries including Malaysia[34]. This focus is said to be more practical as opposed to the definition of sustainable development as provided in the Brundtland Report. For example, it is hard to determine the needs of "the future generation" where that generation does not yet exist or how future issues will manifest. Given Malaysia's current developing country status and its aim to be a high-income country (Malaysia's targets are discussed further below), one would expect the changes Malaysia would undergo in future years would not be 100% anticipatable and therefore poses a challenge in predicting the needs of Malaysia's future generation. Ensuring the inter-linkages of the three dimensions are engaged is a feasible and practical goal. The present issues of economic growth, social inclusion and ecological sustainability are ascertainable in a way that the needs of the future generations are not.

Status. The status of sustainable development is also an aspect to consider. Bosselmann argues that sustainability can be defined as a fundamental principle of law. He argues that it has reached a stage of maturity that allows for an examination of its meaning and legal status, thus allowing it to be considered a fundamental principle of law(p.3)[7]. Bosselmann elaborates that sustainable development as a principle of law cause legal effects and can be enforced(p.44)[7]. However, in narrowing down the focus to Malaysia, sustainable development has not reached a matured stage where it can be defined or considered as a legal principle nationally.

If one considers the definition of law as a binding practice of a community[40] then there is insufficient consensus or common understanding among Malaysian stakeholders, individuals and interested parties about the meaning of sustainable development for it to be considered a principle of law. Malaysia is a multicultural country[26, see also 24]. Consequently, one would find a multitude of languages being spoken as a first language[18] and it may follow that the national language of Malaysia[42] spoken (assumed as the common language) with varying fluency. The meaning of sustainable development may be altered in the translation of the term between languages. There may be also be a difference in understanding between social classes, perhaps due to education as will be further discussed below.

A particular study aimed at getting local authority perspective titled "Understanding sustainable development concept in Malaysia" is pertinent to the focus of this paper[30]. The interviews were mostly conducted in the Malay language(p.445)[30]. The interview responses of respondents from selected Malaysian councils in this study indicated that understanding of the term sustainable development differs from one person to another(p.447)[30]. The study also suggested a need for a clearer definition of sustainable development in the Malay language as it became apparent during the interviews that individuals had difficulty understanding the Malay terminology for sustainable development, which is "*pembangunan mampan*"(p.449)[30]. Often, the interviewees of the study referred to sustainable development as "*a balanced development*" (*pembangunan seimbang* in Malay) to create understanding, especially among individuals who received less time in education(p.449)[30]. It is apparent there is a literal difference between "*pembangunan mampan*" and "*pembangunan seimbang*". The study suggested that usage of "*pembangunan seimbang*" is not reflective of the understanding of Malaysians at large regarding sustainable development[30]. Furthermore, it would not align with the aspiration of the government's sustainable development

agenda[30]. This lack of consensus or common understanding does not allow for agreed value setting or goal orientation, which in turn does not allow for a proper examination of the meaning of sustainable development. Until there is a consensus about what sustainable development means, sustainable development cannot be claimed to be a principle of law.

Furthermore, when reviewing the appearance of sustainable development in Malaysian law, it is evident the term has not been engaged to reflect the Malaysian context. As a brief example, 'sustainable development' in itself does not appear to be defined in Malaysian legislation reviewed but conceptual underpinnings may be found in the Malaysian 'Sustainable Energy Development Authority Act 2011'[44]. The 2011 Act defines sustainable energy as "*energy which, in its generation, provision and use, is such that it meets the needs of the present without compromising the ability of future generations to meet their needs, and includes renewable energy*(p.8)[44]". This definition appears to lift wording from the Brundtland Report definition of sustainable development, which is believed to be intentionally left vague so that it could be adapted with more prescription on a national level. This was not done in the case of the Sustainable Energy Development Authority Act 2011. Other acts, such as the Malaysian 'Renewable Energy Act 2011', require "*the need for sustainability...*"(p.11)[43] to be given due consideration even though the word 'sustainability' was not defined in the Renewable Energy Act 2011. Therefore, in the Malaysian context, sustainable development is more accurately viewed as a concept rather than a legal principle in that it appears as an abstract and generic idea[39] as opposed to bearing the characteristics a principle of law would have as described above.

Governance or Government

Many social scientists are encouraged to use the term governance instead of government because of its ability to cover the whole range of institutions and relationships involved in the process of governing[2]. By using the term governance instead of government, this recognises the empirical fact that more policies are implemented by a much wider array of public, private and voluntary organisations that would have traditionally been included in a purely governmental framework(p.52)[21]. One of the more obvious hallmarks of this trend towards greater governance is the appearance of more and more new modes of governance such as, for example, voluntary codes of conduct and best practices among international corporations(p.12)[2, see also 50]. This may indicate, at least in relation to policy setting, the importance of the government's policy setting function may be declining or overshadowed.

While some may offer the society-centric view that government may have progressively 'hollowed out' over time, others offer a state-centric view that while government may have weakened in the sense that it delivers fewer services, it remains the most dominant factor in society and a key site of accountability and legitimacy[36]. The sense of government remains strong in Malaysia in its influence and thus its delivery of governance. This is particularly true for the energy sector, taking electricity utility for example. Tenaga Nasional Berhad ("TNB") is the largest electricity utility company in Malaysia and one of the largest utility companies in the South East Asian region, with an asset base totalling RM110.7 billion[62]. TNB is a private company wholly-owned by the Malaysian government[63]. TNB monopolises electricity provision in Peninsular Malaysia [62] with its subsidiary being the main electricity provider in the east Malaysian state of Sabah[48]. This covers almost all states of Malaysia. At least in relation to Malaysian governance, any non-government action in policy and self-regulation is supplementary and does not eclipse the role of the Malaysian government in any way. It is clear the Malaysian government will play a central role in sustainable development governance of the energy sector. Nevertheless, for governance to be considered as good, both the public and private sector should be fully engaged. The trend towards more novel forms of governance is not just a coincidence. The responsibility of effective enforcement or the promotion of sustainable development should not lie with the public sector alone. In some respects, the private sector may be more able to govern its own activities due to better knowing its own activities and therefore having better self-monitoring capabilities. This aspect of requiring both public and private sector involvement in governance will be further discussed below.

In the last few years, good governance has gained recognition as a key component of sustainable development(p.16)[49] so far so that Jeffrey Sachs considers it the fourth dimension to sustainable development alongside with economic development, social inclusion and ecological sustainability. Recognition of the importance of good governance is evident in that it was one of 10 thematic groups explored in the Sustainable Development Solutions Network "Action Agenda for Sustainable Development"[58]. The theme of governance eventually found its way into UN SDG 16, which includes "*...effective, accountable and inclusive institutions...*"[68]. It is clear from the wording of SDG 16 that the focus is on governance and the wording encompasses all relevant institutions rather than just government bodies. Therefore, the public sector, private sector e.g. businesses and other stakeholders should commit to good governance.

The wording of SDG 16 in itself sets out what constitutes good governance. Other key experts such as Jeffrey Sachs, state that good governance for sustainable development includes transparency, accountability, access to information, participation, an end to tax havens, and efforts to stamp out corruption(p.413)[49]. Describing the qualities of good governance are well and good. However, there are different types of governments and different sets of governing principles around the world, so it would not be feasible to impose one set of political rules to dictate the implementations of the SDGs(p.424,)[49]. If the wording set out by the SDG and experts such as Jeffrey Sachs are considered guiding principles rather than prescriptive qualities, then these principles can be applied to Malaysia's specific circumstances. Thus, rather than universal prescriptions, there can be certain shared principles of governance for the public and private sectors.

The wording of SDG 16 is a good starting point to assess what the principles of good governance mean. Firstly, effective means the governance process achieves its intended outcomes. Secondly, accountability is the idea that governments will adopt specific goals and be responsible for following through what is needed to achieve those goals, to report on measures taken and to provide public assessments of progress towards those goals(p.424)[49]. That requires an additional feature that also transcends a specific government or corporate organisation, which is transparency. We as citizens, as key stakeholders and as the earth's inhabitants intent on achieving sustainable development can only hold government and business accountable for their actions if we know those actions and behaviours are(p.424)[49]. The third key is participation or in the wording of the SDG "inclusive institutions": the ability of citizens and of stakeholders such as businesses to participate in decision making. The ability to participate through public discourse, through public deliberations, and through hearings on regulation are all important(p.424)[49]. Given the importance of good governance in the pursuit of sustainable development, it follows that the theoretical approaches discussed below will heavily reflect and/or embody these principles of good governance.

Brief Country Profile of Malaysia

A paper about Malaysia's energy sector is not complete without a brief country profile of Malaysia detailing key aspects relating to energy. As research has evidenced that urbanisation(p.1)[53] is a major contribution to energy consumption, and population(p.40)[51] and economic activity(p.40)[51] affects energy consumption, this brief country profile of Malaysia covering these aspects are pertinent to understand Malaysia's energy sector.

Urbanisation. Urbanisation is defined as the process of regrouping large numbers of permanent residents in moderately small areas and as a result forming highly populated metropolises. Urbanisation has a wide effect on energy consumption due to massive housing rate increase, growth of investment and industrialisation among other factors(p.2)[53]. Due to urbanisation, Malaysia has the fourth-largest amount of built-up land in East Asia as of 2010[65]. The rate of urban population growth, about 4.0%(p.1)[53] a year, on average, was among the fastest in the region, surpassed only by Lao PDR, Cambodia (both of which have much smaller urban populations), and Vietnam[65].

Population. The total population of Malaysia, as revealed by the 2010 Population and Housing Census of Malaysia was 28.3 million[13]. Growth of the population is evident when contrasting the 28.3 million figure with the population figure of 23.3 million in 2000[13]. Besides the applicability of the explanation of the effects of urbanisation on energy consumption due to the close correlation between population growth and urbanisation, one can broadly state that a growing population rate may mean a growing demand for energy as well as a growing need to achieve energy security.

Economy. Malaysia is considered and generally viewed as an upper middle income economy[66]. However, although poverty is less than 1%, pockets of poverty remain and income inequality remains high relative to other developed countries: Malaysia's Gini coefficient of income inequality stood at 0.41 in 2014, compared with 0.31 and 0.33 in the Republic of Korea and Japan (both as of 2010), for example[66]. A clarification on Malaysia's understanding of poverty can be found on the Economic Transformation Programme website, where minister Idris Jala in explaining poverty defined the "poor" as people who "*fall short of certain standards of consumption which are deemed necessary to maintain 'decency' in society, for example, those who cannot afford healthcare and education. Households with average monthly incomes of less than RM760 in Peninsular Malaysia, less than RM1,050 in Sabah and less than RM910 in Sarawak are defined as poor*"[28]. To put these figures into perspective, the UK poverty threshold and poverty figures may be used as a comparison. The UK government use 60 per cent of median household income as the poverty 'threshold', which according to 2009 figures was 206 pounds per week[33]. After conversion to the British pound using a regular website currency converter as calculated on 13 August 2016[72], none of those monthly income figures stated by the minister Idris Jala amount over 202 pounds,

demonstrating how little the poor are considered to live on. Nevertheless, real income of the bottom 40 percent of Malaysian households increased by an average 6.3 percent per year between 2009 and 2012, compared to 5.2 percent for the average household, suggesting the benefits from growth were being shared[66]. Economically, Malaysia could be said to be doing well, with some issues still requiring resolution. It may be considered that Malaysia has made sufficient progress in alleviating poverty that some focus may be shifted to other aspects of development. If Malaysia seeks to achieve its aim to become a high income country by 2020[22], it is therefore right that focus is placed on sustainably developing its energy sector. The development of the energy sector provides benefits such as electrification of rural areas[6] along with more job opportunities[47].

Malaysia's Energy Sector

Fossil fuels enabled the breakthrough to an era of modern economic growth and what history reminds us of is how deeply challenging it is to move away from fossil fuels in the twenty-first century(P.172-173)[49]. The energy sources that have been central to global economic development for more than two centuries are now a clear and present danger to the world, because of the carbon dioxide they emit(P.173)[49]. Malaysia is no different from other countries in its reliance on fossil fuels to boost its development. According to the Malaysia Energy Statistics Handbook 2015 prepared by the Malaysian Energy Commission, Malaysia's 2013 energy supply comprised of 65.5% natural gas, 29.1% crude oil, 1.9% coal & coke, 0.5% biodiesel, 2.7% hydropower, 0.3% biomass, 0.0% biogas and 0.0% solar[56]. It is apparent from the statistics that fossil fuel still plays a dominant role in the supply of energy.

It is at this point that how sustainable development of the energy sector may manifest becomes apparent. The use of renewable energy sources are encouraged because they emit zero or low amounts greenhouse gasses("GHGs")[55] unlike fossil fuels. Therefore, one could say that based on the statistics above and to demonstrate sustainable development is making progress in Malaysia, further growth in renewable energy production could be encouraged so that renewable energy will have more of an impact in the promotion of sustainable development. However, renewable energy is only one part of the sustainable development strategy. Renewable energy alone will not ensure Malaysia's energy sector is 100% sustainable. Furthermore, sustainable development is inextricably linked to climate change goals, such as the reduction of greenhouse gasses. Therefore, some argue for deep decarbonisation to tackle systemic energy issues[59]. There will be at least three main "pillars" of deep decarbonisation. The first is energy efficiency, which means using much less energy per unit of Gross Domestic Product ("GDP") than now(P.176)[49]. The second is low-carbon electricity, meaning that we produce electricity with wind, solar, nuclear, or carbon capture and storage technologies, so that emissions of carbon dioxide per megawatt of electricity are drastically reduced(P.176)[49]. The third is to shift from burning fossil fuels to using electricity generated by a low-carbon source, a process called "fuel switching" or "electrification"(P.176)[49]. By addressing the three pillars of deep decarbonisation, one may be said to more wholly deal with challenges hindering sustainable development of the energy sector.

Renewable Energy Sources Utilised in Malaysia

Having had a brief outlook on Malaysia's energy sector, this paper now explores the renewable energy sources utilised and explored in Malaysia in more detail. This section will provide more information about the renewable energy sources used in Malaysia and the specific challenges Malaysia faces in promoting these sources. It therefore informs issues governance should target and particular theoretical approaches that may be used to address sustainable development challenges.

Biomass energy. Malaysia has a significant amount of biomass resources. There are five major sectors, of which wastes contribute to the biomass energy in Malaysia, which are oil palm cultivation (43.67%), forestry (wood) (30.56%), rubber cultivation, animal farming and urban wastes(P.4374)[52]. However, among these sources, palm oil wastes including biogas are the largest source of biomass in the country.

There are still major barriers to develop biomass technology extensively in the country such as lack of information relating to the use biomass as an alternative to generate electricity, risk probabilities associated with applying new technology, financial and monetary concerns of producing energy with higher cost compared with conventional energy generation, market demand, pace of commercialisation and deficiency in government policy to encourage and fascinate the communities and industries to use biomass(P.3370)[38]. Lack of expertise in the optimisation of biomass residue has also been stated to slow the progress of biomass utilisation in Malaysia(P.975)[45].

Palm oil. Given that the palm oil industry has been credited as the largest source of biomass in the country, the paper now turns specifically to the potential of palm oil. Palm oil biomass has excellent potential as a renewable energy source due to its high calorific value(P.1226-1227)[54]. In year 2006, Malaysia was the second largest

producer of palm oil with 15.88 million tonnes or 42% of the total world supply(P.1226)[54]. Information sourced from the Malaysian Palm Oil Board website on 11 August 2016 suggests Malaysia held on to its status as the second largest producer of palm oil[35]. With the growth of palm oil production in Malaysia, the amount of residue generated naturally shows a corresponding increase. One hectare of oil palm plantation can produce about 50 – 70 tonnes of biomass residue(P.1226)[54]. According to statistics, the oil palm biomass generated in Malaysia could potentially provide almost 20% of the energy demand in Malaysia(P.1227)[54].

Another key feature of palm oil is its potential as a biodiesel(P.975)[45]. Biodiesel is biologically produced from vegetable oil (such as palm oil) using a trans-esterification process(P.975)[45]. Malaysia designed a palm diesel programme in 1980 and the biodiesel based on palm oil, was programmed to have 5% palm oil and 95% diesel blended for vehicles and industries in 1982(P.975)[45]. The Government of Malaysia established the Malaysian Palm Oil Board in 2000(P.975)[45]. Its main objectives are to conduct and promote research and development in palm oil tree breeding, palm oil nutrition and potential oleo-chemical use(P.975)[45]. The Government of Malaysia involvement with the Malaysian Palm Oil Board demonstrates an interest in supporting and subsidising development of technology that will convert palm oil into biodiesel and lignocellulose into bioethanol(P.975)[45]. Palm based-biofuel refineries have been built with the intention to displace petroleum fuels and fuel domestic energy demands(P.975)[45]. An example of a Malaysian palm bio-fuel initiative is the off-grid electricity project that uses bio-energy with a capacity of 14 megawatts (“MW”) that was established in Kunak Sabah, Malaysia(P.975)[45]. These initiatives also provided opportunities to expand the capacity for rural electrification(P.975)[45].

Studies show that compared to the rainforest, palm oil plantations are a more effective carbon sink (an area of dry mass that is capable of absorbing harmful greenhouse gasses such as carbon dioxide)(P.1227)[54]. Expansion of the palm oil plantation does not always lead to deforestation and loss of biodiversity (a concern that promoting the use of palm oil also harms the environment) as most of the land areas used for new oil palm plantations are land previously used for agricultural crop plantation such as cocoa, rubber and coconut(P.1227)[54]. Given that Malaysia has already made substantial investment in the palm oil industry and is one of the largest palm oil exporters, using its existing capacities can only do more good than harm.

Hydropower. Another identified source is hydropower. Blessed with abundant streams and rivers flowing from highland areas, Malaysia has numerous sites with good potential as hydropower sites. The benefits are that it is a renewable energy source(P.1)[27] and it produces negligible amounts of greenhouse gases. In terms of long term prospects, it generates large amounts of electricity at low cost and generation can be adjusted to meet consumer demand(P.974)[45]. Furthermore, hydro-dams are multipurpose and are built primarily for socio-economic development such as irrigation, water supply and flood control(P.642)[41]. Hydropower is the only renewable energy source at present that is commercially viable in Malaysia(P.642)[41]. Malaysian government has launched the Small Renewable Energy Programme (“SREP”) in 2001 and to give an idea of mini hydropower activity in Malaysia, in 2009, there were 5 mini hydropower projects from 17 SREP participants(P.1)[27]. The SREP programme has since been suspended following the implementation of the Renewable Energy Act 2011(further discussed below)[57]. Official statistics on the Sustainable Energy Development Authority website states the “mini hydro” source is the third largest contributor among renewable energy sources[60]. Some barriers for mini hydro projects are initial capital investment costs that are higher than conventional power plant costs, as well as expensive transmission to the main grid(P.1)[27].

Solar energy. Solar energy or solar photovoltaic (“PV”) energy generation is a form of renewable energy that is clean, non-depleting and does not emit any greenhouse gas since it generates energy directly from the sun by means of photovoltaic effect(P.565)[11]. The tropical climatic condition in Malaysia is favourable for the development of solar energy due to abundant sunshine with the average irradiance per year of 1643 kWh/m²(P.565)[11]. However, one of the challenges of advancing solar energy as a renewable energy source is that PV modules are costly. In order to reduce the high cost of PV modules due to importation, the Malaysia Energy Centre carried out a project named Malaysia Building Integrated Photovoltaic (MBIPV) to incorporate PV grid-connected systems aesthetically into the building architecture and envelope(P.976)[45]. The project is aimed at creating necessary conditions that will, in turn, lead to sustainable and widespread application of BIPV. One of the activities undertaken under the MBIPV is a PV market induction programme, known as SURIA 1000(P.976)[45]. It started in September 2006 but only launched on the 22nd of June 2007. The programme affords the customer to bid for price rebates on PV systems(P.976)[45]. As at present, the utilisation of solar power systems in Malaysia are only limited to small food and beverage industries, upper middle class urban homes and solar water heating systems in hotels(P.976)[45]. Despite the tremendous potential of PV systems especially for rural areas in Malaysia, the price of PV module is still too expensive for mass production(P.976)[45].

Other sources of renewable energy. The renewable energy sources discussed above are the sources that are more promising and viable in Malaysia. One may question about the other renewable energy sources that have not yet been discussed and are conceivable, such as wind energy for example. Limited study has gone into Malaysia's wind energy potential such as the wind potential in Kangsar, Malaysia: it was determined that the wind turbine generation was not strong enough to generate electricity commercially(P.977)[45]. Major problems identified with wind energy expansion in Malaysia are a lack of expertise and insufficient technological advancement(P.978)[45]. Besides wind energy, there is also the consideration of tidal energy. Given that land-based renewable energy technology are facing limitations due to conflict of over land-use, the seas offer enormous open spaces where new energy technologies can be deployed(P.978)[45]. However, few and limited studies have been carried out on ocean-based energy sources in Malaysia(P.978)[45].

Summation of renewable energy challenges. It is clear Malaysia is not ready for a full shift from fossil fuels to renewable energy sources: more work needs to be done to move towards renewable energy sources. The challenges that Malaysia's renewable energy sector face are complex and will therefore require further assessment and goal setting in order to push renewable energy to gain more market share and utilisation. Clear targets and governance would help to reduce complexity and provide with an enabling environment for Malaysia to promote renewable energy as part of Malaysia's sustainable development of the energy sector. Each renewable energy source has unique challenges. However, it is apparent from reviewing the challenges of the renewable energy sources above that cost and/or initial capital required feature regularly. This means that governance focusing on an economic approach should be considered. Issues with a lack of knowledge or awareness of a particular energy source and its challenge may require an emphasis on participation in governance decision-making. Participation in decision-making may spark an interest in stakeholders to self-learn or familiarise oneself with knowledge about the target energy source. The theoretical approach section of this paper below will therefore explore these approaches.

Malaysia's Sustainable Development Targets for Energy

The 11th Malaysia Plan ("11th MP") is a strategic plan prepared by the Malaysian government that aims to push Malaysia towards being a "fully developed country" economically, politically and socially(P.1)[23]. It is a key document that sets out Malaysia's goals and in turn, provides the researcher with a benchmark for what sustainability targets need to be achieved within Malaysia's energy sector to ensure sustainability. "Embarking on green growth" is one of 6 "game changers" that was identified in 11th MP(P.31 of 372)[16]. It appears that under the "game changer" of "Embarking on green growth", Malaysia's energy sustainability efforts will be two-fold, targeting both renewable sources of energy and the efficiency of energy use(P.31 of 372)[16]. These targets align with UN SDG 7, which targets "Affordable & Clean Energy"[68]. In particular, they align with Target 7.2, which states that "By 2030, increase substantially the share of renewable energy in the global energy mix" and Target 7.3 which states that "By 2030, double the global rate of improvement in energy efficiency"[68]. It is not possible to claim that the 11th Malaysia Plan incorporated the SDGs nor is it reasonable to expect that the 11th MP specifically refer to the SDGs, given the fact that the 11th MP was released (on 21 May 2015) shortly before the SDGs were[16]. However, this observation brought attention to another important fact that at present, no specific references to the SDGs are made in key Malaysian governmental policies and strategies relating to energy sustainability. It may be that the SDGs, having only been published in September 2015, are relatively new and insufficient time has passed to reasonably expect Malaysia to incorporate the SDGs into key policies and strategies. One may also argue that the broadness of the wording of SDG 7 means a lot of Malaysian energy initiatives already align with SDG 7 even if no specific references are made to them. Nonetheless, in the spirit of good governance and clear commitment to the SDGs, it is recommended that future key policies and strategies relating to energy should expressly refer to SDG 7 and for such policies to state how initiatives reflect SDG 7 to show Malaysia's accountability to the UN SDGs.

The 11th MP also highlights previous achievements with the aim of building and strengthening those achievements. For example, the 11th MP states in 2009, the Malaysia government set a voluntary target of reducing the GHG emission intensity of its GDP by up to 40% compared to 2005 levels by 2020(P.160 of 372)[16]. Under the 10th Malaysia Plan, by the end of 2013, Malaysia had already achieved a 33% reduction(P.160 of 372)[16]. It is a target that this commitment to reduce greenhouse gases by up to 40% is reached during the span of the 11th MP. This is logically tied to the energy sector, which the 11th MP recognises as a major contributor to national GHG emissions, and in demonstrating accountability stated that Malaysia has taken steps to increase the use of clean and environmentally friendly sources(P.161 of 372)[16]. The Renewable Energy Act 2011 implemented the Feed-in Tariff ("FiT") mechanism to accelerate renewable energy growth in Malaysia, and since then renewable energy installed capacity has grown from 53 MW in 2009 to 243 MW in 2014(P.161 of 372)[16]. The aim of the

Renewable Energy Act 2011 is to accelerate contribution from sources such as solar photovoltaic, biomass, biogas and mini hydro in Malaysia's electric generation mix(P.164 of 372)[16]. As we have only reached the latter end of year 2016, it remains to be seen how successful the 2011 Act will be during the life of the 11th MP from 2016 – 2020.

To continue with the progress made in the energy sector, as identified in the 11th Malaysia Plan for 2016-2020, *“green growth will be a fundamental shift in how Malaysia sees the role of natural resources and the environment in its socio-economic development, protecting both development gains and biodiversity at the same time”*(P.161 of 372)[16]. To give effect to this strategy, Malaysia will focus on governance described as the “enabling environment” and this *“enabling environment will facilitate a shift in the economy, particularly in the private sector, towards more sustainable patterns of consumption and production”*. It is therefore clear that governance is given focus in tandem with renewed international interest in good governance. The Malaysian government's plan to further engage the private sector demonstrates a recognition of areas for improvement and also a recognition of good governance, in that both the private and public sector have to be fully engaged as previously discussed.

Sustainable Consumption and Production (“SCP”)

As discussed above, the 11 MP highlights SCP as one of its target areas. Unsustainable patterns of consumption and production have been identified as a major cause of environmental degradation way back in the 1992 Rio Earth Summit(P.18)[3]. To deal with the worrying scenario, Principle 8 of the Rio Declaration on Environment and Development declared that there was a need to reduce and eliminate unsustainable patterns of consumption and production, and to promote appropriate demographic policies to achieve sustainable development for a higher quality of life globally(P.18)[3]. Malaysia recognises the need to reduce and eliminate unsustainable patterns of consumption and production.

One Malaysian initiative relating to sustainable consumption and production is the study titled Sustainable Consumption & Production in Malaysia - A Baseline Study on Government Policies, Institutions and Practices (“SCP Baseline Study”). This study is pertinent as it is one of the few documents available that provides comprehensive information about SCP in Malaysia. This study, commissioned by the EU-Malaysia SCP Policy Support Programme, constitutes the first step in developing a national SCP programme to strengthen the country's policy and institutional framework on SCP, and will lead to the formulation of a comprehensive National SCP Policy Framework (P.7)[3]. Malaysia's current strategy is that in the mid-term, SCP will be incorporated into the 11th MP while for the long-term, it is targeted that Malaysia will have a SCP Policy Blueprint to guide the nation along the principles of SCP(P.7)[3]. The Malaysian SCP initiative demonstrates a move away from a stop gap approach towards more process driven governance with a specific framework in place.

In the SCP Baseline Study, ineffective enforcement was identified as one of the stumbling blocks in the implementation of regulations that supports SCP policy in Malaysia(P.12)[3]. The lack of financial, institutional as well technical capacity in government ministries and agencies, compound to the weaknesses in the evaluation and reporting of the results of policy implementation(P.12)[3]. To make progress, the SCP Baseline Study identified 6 SCP-related instruments that support SCP implementation. The instrument most relevant to this paper is the regulatory instrument(P.25)[3]. The regulatory instrument has occasionally been criticised as restricting technology when no incentives are given to the private sector to innovate(P.26)[3]. The SCP study purports that when the regulatory instrument provides for incentives, then it will support the economic instrument(P.26)[3]. The logic in this reasoning seems to propound an economic approach to promoting sustainable development, which will be further explored the section about theoretical approach below.

The SCP Baseline Study also highlighted voluntary instruments are usually contained in guidelines where its adoption is not compulsory. It used the example of voluntary instruments that were in place such as quoting the 10th Malaysian Plan at page 132: *“...energy efficiency in new buildings for new developments”*(P.67)[3]. One suggestion propounded by the study is a need to evaluate and upgrade the voluntary instruments to mandatory instruments. As the SCP initiative is an ongoing initiative, it appears that more detail about what the upgrades might be would be an improvement from the current approach. It may be that previous documents such as the 10th Malaysian Plan itself did not state the specific form of the voluntary instruments and therefore, as a work in progress, identifying where more clarity is needed in future analyses may be the next crucial step towards SCP policy building.

The SCP Baseline Study also highlighted Malaysia's recognition for mandatory instruments, using the example of the Malaysian Energy Commission's plans to introduce a mandatory approach to the setting up of the Minimum Energy Performance Standards (p.67)[3]. In relation to Minimum Energy Performance Standards, matters have moved on since the conclusion of the SCP Baseline Study in 2013. On 3 May 2014, the amendment to the

Electricity Regulations 1994 was gazetted by the Minister of Energy, Green Technology and Water Malaysia to give effect to the enforceability of Minimum Energy Performance Standards in Malaysia[17]. The amendment titled the Electricity (Amendment) Regulations 2013 “*incorporates the standards and requirements for the implementation and enforcement of the Minimum Energy Performance Standards for 5 domestic electrical equipments that are: Refrigerator, Air-Conditioner, Television, Domestic Fans and Lighting (Fluorescent, CFL, LED and Incandescent).*”[17]” It therefore appears that positive change in Malaysia is indeed taking place and there are now examples of enforceable measures that demonstrate the tangibility of SCP initiatives.

Theoretical Approaches

Having discussed the circumstances of Malaysia’s energy sector and Malaysia’s targets for it, the theoretical approaches to solving Malaysia’s sustainable development challenges may give clarity on how Malaysia may make progress with its governance of the energy sector.

Path Dependence: Understanding the Present System and How to Manage It. The theory of path dependence informs the energy sector governance approach[4]. A simple and neutral definition of path dependence(P.5)[12], is that it is the idea that decisions we are faced with depend on and are shaped by past knowledge trajectory and past decisions made.[19] Policy content (fossil fuel) is firstly addressed and distinguished from policy structure and mechanism (institutional arrangement will be discussed later below). For example, Malaysia is a fossil-fuelled economy(P.1)[10, see also 9], not different from many other economies[64]. The use of fossil fuel is so heavily embedded in Malaysian day to day use and economics (such as end-use electricity, import of crude oil to the use of motor fuel etc.) that it certainly influences current decisions to continue using them: use of fossil fuel is not something that can be ceased overnight. In pursuing a sustainable development path, Malaysia recognises the need for cleaner and renewable sources of energy. As previously mentioned, this is detailed in the 11th MP(P.1-14, 13 of 372)[16]. However, it appears a challenge would be Malaysia’s fossil fuel path dependence. This paper will address how Malaysia tackles this issue below.

Albert Weale suggests that path dependence affects the actual governance process itself. His view is that institutions are “...stickier than they are functionally required to be” and describes that path dependence exists when an institutional arrangement at one point of time makes it more likely that a similar or related institutional arrangement will exist at a later point in time, even when there is no functional need for similarity(P.65)[2]. The example Weale used that once a firm has established an initial advantage, it may not be vulnerable to competition because it can consolidate its position(P.65)[2], appears to be true for the Malaysian government. The ruling coalition has not changed since Malaysia gained independence in 1957. It may follow that as a political institution that continuously consolidates its position, the Malaysian government is not amenable to change of policy making or structures because of political incentives they may contain(P.65)[2].

However, while path dependence matters, it is not an absolute barrier to policy transfer and innovation. Regulatory styles can change. Weale’s study identified that transformation of policy systems towards new modes of governance illustrates features where historical traditions and the incentives they create can lose their grip(P.67)[2]. To deal with both path dependency of energy usage and the policy process, it is proposed that a transition management approach is used to overcome path dependency(P.5)[71].

Transition management as a concept is considered a deliberate approach to putting hands on the systems’ inherent dynamics: to influence the direction and speed of transitions by coordinating and enabling the processes that occur at different levels in a more systemic and evolutionary way(P.5)[71]. It aims at facilitating a more fundamental and long term reflection on sociotechnical system dynamics in order to overcome the myopic orientation of established policy-making processes(P.5)[71, see also 70]. This approach would reduce resistance and avoid shocks to change in energy sources and energy policy.

The Malaysian Fifth Fuel Policy is reflective of a transition management approach from a content perspective. Under the 8th Malaysia Plan for 2000 to 2005, a national strategic plan prepared by the Malaysian government, Malaysia introduced renewable energy as the targeted fifth source of fuel in 1999(P.2)[29]. A target of 500 MW out of the 20,000 MW total generation capacity by renewable sources was set in the 8th Malaysia Plan. However, for the first 10 years (2000–2010) only 41.5 MW planting up has been achieved, demonstrating an achievement far from the target(P.1)[37]. This policy appears to be reflective of a transition strategy. Rather than making ambitious targets to convert energy sources from fossil fuels to renewable energy in totality, Malaysia proposed a modest target of 5%. It is apparent there is an element of phasing out the use of fossil fuels. Failure to reach the transition target demonstrates more ambitious targets would have failed more spectacularly and in a way, shows the particular importance of transitioning and phasing out for targets to be achievable in the future.

Economic Approach. Taking the economic approach has merit as the path of least resistance in a capitalist society that we live in. The economic approach relies on market mechanisms. Market mechanisms for environmental policy tend to operate in one of two ways(P.108)[2].

Firstly, they may shape economic incentives directly through taxes and subsidies, thus creating incentives to behave in specific ways(P.108)[2]. Malaysia has taken steps to cut oil-based fuel subsidies[1, see also 20] and perhaps could go a step further in considering releasing renewable energy subsidy policies. There are no wide-scope policies for renewable energy subsidies that may complement “market-creating” initiatives such as Malaysia’s FiT system (explained below). The existence of renewable energy subsidies that will bring renewable energy prices to a competitive rate will encourage Malaysians to rely on such sources. Malaysia could even consider raising road or fuel taxes to deter the use of motor transport in preference for public transport in a bid for energy efficiency. This strategy has merit in light of the MRT project[32] that promises better means of public transportation in Malaysia. There are some ways to go before increased fuel tax measures would even be considered but it is an idea.

Alternatively, governments may create markets for environmental goods, such as through emissions trading, setting overall objectives and allocation of pollution rights, and allowing economic actors to decide how to respond through buying and selling additional permits(P.108)[2]. Malaysia created a market for environmental goods via its FiT system. Under the FiT system, both domestic and industrial users will be able to generate renewable electricity through renewable energy sources and sell it back to the national power grid at a premium rate[61]. It is argued that the concerns raised in the SCP Baseline Report discussed above that more incentives should be given to the private sector to innovate may be addressed with the FiT system. Certainly, the merits of an economic approach are not unnoticed by Malaysia. While the renewable energy market in Malaysia may not be the latest trend to surface, it may be said a reason why it is accepted and continues to be promoted is because it creates a new market for environmental friendly commodities rather than an effort to narrow existing markets. Broadly speaking, promoting renewable energy use allows for opportunities for new companies in the renewable energy sector to generate income, creates employment by virtue of increased job role availability and therefore, does not stifle economic development.

Reflectivity. A reflective approach to governance involves the deliberate configuring of social appraisal so as to address a complete range of possible policy options and explore exhaustively their respective possible consequences in order to determine the single most acceptable intervention(P.215)[2]. The main point is that it appears to require wide social participation, across different stakeholders such as individuals, governing bodies and institutions(P.2)[71] to “reflect” social appraisal. The downfall of applying a reflective approach to the Malaysian context is that one may not exact a reflective answer when seeking social appraisal. As discussed previously, there is a lack of and various interpretation of the meaning of sustainable development in Malaysia among stakeholders and interested parties, giving rise to a lack of common understanding to derive reflective decision forming. A solution to participation is assumed participation of a group via representation. The representatives will be government officials who are given access to sustainable development knowledge and training. One can then satisfy themselves that the representatives are best equipped to interpret the needs for sustainable development as well as the needs of the group they represent.

Cooperation and Cohesion in Decision Making. The next pertinent aspect is decision making. The foundational action principle of sustainable development is integrated decision making(P.259)[15, see also 14]. For decision making to be considered integrated, genuine cooperation and cohesion in decision making is needed. Without cooperation, there is also a risk that the essence of governance is reduced to the capacity of state and non-state institutions to deliver on the different goals and targets, rather than directing the overall sustainable development process(P.13)[69]. This leads to poor penetration of any intended sustainable development initiatives into a system. Perhaps one of the most representative examples of cooperative governing of the environment is Local Agenda 21, a strategy for implementing sustainable development at the grass-roots level(P.4)[25]. This is part of Agenda 21, which was adopted at the UN Conference on Environment and Development in 1992. Local Agenda 21 was developed in a public-private partnership in which the government decides on institutions, laws, administration and finances, and the private and voluntary sectors choose the agenda for sustainable development through their participation, service and practice(P.4)[25]. Malaysia as a signatory to Agenda 21 also implemented Local Agenda 21[5]. However, not all local authorities embraced Local Agenda 21 or actively promoted public participation in Malaysia[46]. It may be said that the lack of genuine cooperation, even if Local Agenda 21 is meant to be a cooperative governing initiative, is a reason for the failure of Local Agenda 21 in Malaysia. Nonetheless, Local Agenda 21 is a start towards cooperative governing. The failure(s) of Local Agenda 21 in Malaysia can be more

closely reviewed and the learning from this past experience can be taken to inform better integrated decision making in the future.

Conclusion

The earth is our home. There is truth in the term “anthropocene”, which is defined as our current, unprecedented epoch of the Earth in which the Earth’s physical change – climate, biodiversity, chemistry – is mainly driven by human activity (P.12)[49]. It is therefore only logical that it falls on us as the earth’s inhabitants to be accountable for our actions by ensuring that any development that we pursue is ecologically sustainable. Malaysia’s previous focus and achievements in eradicating poverty means that more focus can presently be put on reaching high income status by 2020. Naturally, the energy sector remains a key strategic focus of Malaysia, in line with the UN SDG 7 relating to energy. The role of good governance in ensuring sustainable development of the energy sector is pivotal to ensure Malaysia has the right enabling environment and governance processes in place to facilitate development. In order to perpetuate good governance, Malaysia could further improve by moving away from a stop-gap approach to a more process driven approach to governance. Initiatives such as the SCP demonstrate a positive move towards a more process driven governance in Malaysia is already taking place and thus shows promise that Malaysia is on the right course towards its sustainable development goals for the energy sector. The theoretical approaches proposed in this paper mirror the principles of good governance and in adopting these approaches in future initiatives, Malaysia may use this fact to demonstrate a commitment and accountability to the UN SDGs.

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