ENERGY POLICY-MAKING: A COMPARATIVE STUDY OF SOLAR POWER AND BIOFUEL POLICIES IN MALAYSIA

By

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Declaration Form

I, the undersigned hereby declare that I am the sole author of this thesis. To the best of my knowledge this thesis contains no material previously published by any other person except where proper acknowledgement has been made. This thesis contains no material which has been accepted as part of the requirements of any other academic degree or non-degree program, in English or in any other language.

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ABSTRACT

Oil rich Malaysia began its energy transition two decades ago, driven by a concern over depletion of fossil fuel resources. However, the implementation of a myriad renewable energy policies have yet to meet the expected outcome. The "disastrous" Net Energy Metering (NEM) policy to develop the solar power industry was launched in 2016 with little resistance, while the proposed B10 biodiesel mandate, introduced in 2015, was shelved due to opposition from stakeholders. Why is there a divergence in reception between the two policies? The comparative study on the policy processes found that powerful stakeholders with high intensity preference is likely to attain their policy preference. State-owned utility Tenaga Nasional Bhd (TNB), which controls the supply chain of electricity, is the single-most, powerful stakeholder in the solar power industry. It is able to push through the version of an NEM policy that safeguards its interests. The B10 biodiesel mandate policy, on the other hand, met with resistance from automakers and the logistics sector coalition. Subsequently, the implementation of the B10 mandate has been put on hold indefinitely. This study also found that there is a higher participation of stakeholders in the debate regarding the biofuel policy, which has led to a higher legitimacy for the proposed B10 mandate. However, the higher participation in debate seems to have acted as a double-edged sword - it has slowed down the implementation of the B10 mandate.

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List of Abbreviations

AAM	Automobile Association of Malaysia
AMH	Association of Malaysian Hauliers
BIPV	Building Integrated Photovoltaic
CEB	Central Electricity Board
CGN	China General Nuclear Power Corporation
CPO	Crude Palm Oil
DBKL	Kuala Lumpur City Hall
EC	Energy Commission
EGAT	Electricity Generating Authority of Thailand
EIA	Environmental Impact Assessment
ENGO	Environmental non-governmental organization
EU	European Union
FiAH	Feed-in approval holder
FiT	Feed-in Tariff
GDP	Gross Domestic Product

GoM Government of Malaysia

IPPs Independent Power Producers

IRR Investment Rate of Return

ITA Investment Tax Allowance

JAMA Japanese Automobile Manufacturers Association

LNG Liquefied natural gas

LSS Large-Scale Solar

MAA Malaysia Automotive Association

MBA Malaysian Biofuel Association

MBIPV Malaysian Building Integrated Photovoltaic

MEGTW Ministry of Energy, Green Technology and Water

MLP Multi-Level Perspective

MOSTE Ministry of Science, Technology and Environment (currently renamed as Ministry of Science, Technology and Innovation, MOSTI).

MPIA Malaysian Photovoltaic Industry Association

MPIC Ministry of Plantation Industries and Commodities

MPOB Malaysian Palm Oil Board

NBP	National Biofuel Policy
NEM	Net Energy Metering
NGOs	Non-governmental organizations
NREPAP	National Renewable Energy Plan and Action Plan
PME	Palm Methyl Ester
PMLOA	Pan-Malaysia Lorry Owners' Association
POME	Palm Oil Mill Effluent
PPA	Power Purchase Agreement
PSH	Prototype Solar House
RE/EE	Renewable Energy and Energy Efficiency
REF	Renewable Energy Fund
REPPA	Renewable Energy Power Purchase Agreement
RM	Malaysian Ringgit
SEB	Sabah Energy Bhd
SEDA	Sustainable Energy Development Authority
Solar PV	Solar photovoltaic
SPD	Social-Democratic Party

SREP	Small Renewable Energy Power
STS	Science, and Technology System
SWH	Solar Water Heaters
TNB	Tenaga Nasional Bhd
Uniten	Universiti Tenaga Nasional

Introduction

Political economy studies on renewable energy policies in Malaysia remains rare. However, it is crucial to understand the motives behind the policy choices made by the state. Six-decades of rule by the same ruling coalition - until the change of regime in the recent general election in May - had led the country's endowment from natural resources to be channeled towards subsidizing energy in the country. This has distorted the way energy is priced and consumed in Malaysia. The highly regulated and centralized energy sector offers little room for competition.

This political economic context has undermined the development of a budding renewable energy sector since Malaysia began its foray into enacting renewable energy policies two decades ago. One of the biggest reasons for this, as argued by Joshi (2018), is that the renewable energy policy is restricted to protect the interests of the country's largest utility provider, Tenaga Nasional Bhd (TNB), which controls the whole supply chain of electricity in Malaysia. In fact, it has been considered the most powerful stakeholder in the sector by many solar industry players.

Malaysia's renewable energy policy largely focuses on two areas: electricity, as well as transport and industry. The former is to increase the renewable energy mix in the total energy generation capacity and energy efficiency of the country, while the latter is to reduce the consumption of petrol and increase the usage of biodiesel.

The "disastrous" net energy metering (NEM) policy to develop the solar power industry was pushed through in 2016 with little resistance, while the proposed B10 biodiesel mandate has been on the back burner since 2015 due to stakeholders' opposition.

This study compared policy processes in the two sectors to understand the power dynamics between the relevant stakeholders. Stakeholders are defined as any party "with declared or conceivable interest in a policy concern" (World Bank 2018).

The net energy metering scheme allows a power generator to consume the electricity he or she has generated and sell the excessive electricity to the national electricity grid. The B10 biodiesel (a blend of 10% palm methyl ester, PME and 90% petroleum diesel) mandate makes it mandatory for road users with diesel or hybrid engines to use the biodiesel.

Both policies cut across the socio-economic aspect of the Malaysian society because the cost from the implementation of the policy will be passed on to the consumer. For example, a payment of a 1.6% surcharge of the total electricity bill will be collected from a household which has used more than 300kWh, to fund the renewable energy generator.

Scholars have reiterated the importance to include political perspectives in studying energy policy transition, because these policies do not come out of a vacuum but reflect the state's political goal. Hence, this study drew inspiration from the rich body of lobbying theory and the public participation theory to study the reasons behind the difference in speed of policy implementation for the solar power and biofuel sectors.

The study found that powerful stakeholders with high preference intensity is likely to attain its policy preference. In the solar power sector, TNB is a powerful stakeholder that could push through the NEM policy which safeguards its interests. In the biofuel policy, a stakeholder coalition consisting of the automaker and logistics sectors, is powerful and demonstrates a high incentive for mobilisation, because they face immediate impact from the implementation of the B10 mandate. The power of the stakeholder is relatively rated based on the extent the government requires their assistance in implementing the policy.

Another finding is that higher participation of stakeholders in the consultation process involving the biofuel sector did lead to a higher legitimacy of the proposed B10 mandate, but it slowed down the policy implementation, which allowed the stakeholder coalition to block the roll-out of the policy. The low engagement in the solar power policy, on the other hand, generated unhappiness among stakeholders.

Lastly, the research found that the salience of policy issues moved against the expectation of lobbying theory - that is, the more visible the issue, the more time is needed for policymakers to listen to all views on the issue. The solar power issue has a higher salience compared to the biofuel policy, but the NEM was enacted instead.

This thesis contributes in three ways: First, it uses the political economy theory to study the renewable energy policy in Malaysia which remains rare. This can fill the gaps of the existing renewable energy policy literature in Malaysia. Second, it contributes to the larger lobbying and participation theories, as the case studies of Malaysia shows an interesting divergence. Third, it serves as a case study of the energy transition agenda carried out by a fossil fuel-rich country to better understand the factors leading to policy changes.

The thesis faced one main limitation - that is of insufficient qualitative data from stakeholders' interviews due to non-responsiveness to interview requests. Also, only online resources were used. A mitigating factor for this potential bias is the fact that both the solar power and biofuel policies started generating interest around the 2000s when the internet had become a popular means of communication and sharing of ideas in Malaysia. Therefore, most of the relevant documents could be found online.

A further research area includes the energy efficiency and green technology policy areas, as well as a cross country comparative analysis on the energy transition path, such as comparing Malaysia and Indonesia's energy transition policies.

Chapter 1: Background and problem

This chapter will discuss the renewable energy policy in Malaysia and the problem lies with the existing policy. It is followed by the literature reviews on the lobbying and public participation theories. Finally, it moves on to discuss the research question and three hypotheses.

1.1 Case country context

Endowed with fossil fuel resources, Malaysia has developed into a middle-income economy. It even won a place in the group of countries that has escaped the resource curse (Stevens 2003). Since 1983, the government has spent billions from its public fund annually to subsidize the cost of energy, which has distorted the way energy is being priced and consumed. In the 61 years under the leadership of the National Front (*Barisan Nasional*), proceeds from the utilization of natural resources have been used to invest in the most expensive affirmative action programs: New Economy Policy (NEP); to buyoff electorates; to spend on unproductive state-sponsored projects; and, to pursue the coalition's agenda that has not been pro-growth (Doraisamy 2015).

Since 2014, the country became a net oil importer (Kok, 2015). Malaysia's proven oil reserves have dropped to 3.3 billion barrels in 2016 from 5.4 billion barrels in 2006, where its people and industries consumes more fossil fuel than they produced, where 829 barrels oil used a day against the production of 713 barrel per day. But it has a surplus production of natural gas at 73.8 billion cubic meters produced versus 43 billion cubic meters used in 2016 (BP 2017).

The state has foreseen the depletion of its natural resources and embarked on its path towards renewable energy transition for the last two decades. Energy transition in this context is defined

as “a change in the state of an energy system as opposed to a change in an individual energy technology or fuel source” (Grubler et. al. 2016, 18).

Looking at Malaysia’s history of renewable energy policies, renewables such as solar, biomass, biogas and so on were being included as the sources of power generation for the first time in the Five Fuel Policy (FFP) under the 8th and 9th Malaysian Plan (2000-2010); and palm oil-based biodiesel was also introduced under the National Biofuel Policy (NBP) in 2006.

Like many other countries, Malaysia's energy transition was primarily driven by an energy security concern, to meet the supply and demand of energy for consistent development. This is coupled with other goals including environmental concerns such as carbon dioxide reduction and renewable energy industry creation (NREPAP; NBP). The Five Fuel Policy was implemented as a response to the declining of oil reserves in the country. It aimed to reduce the imports of fossil fuel to meet the growing demand. Another objective was to develop a new industry powered by technology.

As Malaysia progressed, its total energy consumption has increased 3.7 times from 13.9 Mtoe in 1990 to 51.6 Mtoe in 2015 (IEA, 2018). A total of 156.8 TW/h electricity was generated in 2016, an increase of 4.4% between 2005 and 2016 to meet its energy needs (BP, 2017). However, almost 90% of the coal used in electricity generation in 2015 was imported (IEA, 2018). This dependency on oil and coal made the country vulnerable to global commodity price fluctuations.

The Five Fuel Policy failed to meet its target of 500MW installed capacity from renewables, as only 41.5MW was built until 2010, accounted for 8.3% of the total target, or 0.19% of total generation capacity (Goh and Lee 2010; Maulud and Saidi 2012) due to problems with regard to project viability (Maulud and Saidi 2012).

Subsequently, the National Renewable Energy Plan and Action Plan (NREPAP) passed in 2001 to implement the feed-in tariff (FiT) mechanism. The FiT mechanism allows the Feed-in Approval Holders (FiAHs) prior access to the national grid and sell the electricity they generate to the Distribution Licensees (DLs), which are Tenaga Nasional Bhd (TNB) and Sabah Energy Sdn Bhd (SESB), at a premium tariff and a long-term 21-year contract for solar and mini-hydro, as well as a 16-year contract for biomass and biogas resources. Although the FiT was able to boost the renewable energy to 551.15 MW, about 2.5% of total capacity, but still far from meeting the target to increase renewable energy consumption to 5% of total energy mix set by the government. It is targeted that by 2015, total capacity from renewable energy to reach 975MW or 6% of total peak electricity demand capacity and total electricity mix from renewables was targeted to reach 5.3 TWh/year or 5% of total electricity generated (NREPAP 2000).

The fastest growing solar PV was replaced by the net energy metering (NEM), which encourages power generator to consume the electricity they generated in situ and sell the excessive power to utilities in November 2016. The initial version of the NEM provided low buy-back rate and restriction was imposed on the installed capacity, it is deemed “disastrous” to the solar PV industry (MPIA interview 2018).

On the other hand, the biofuel policy launched in 2006 told a story of delayed policy implementation. The blending mandate begins with B5 (a blend of 5% palm methyl ester (PME) and 95% petroleum diesel) the subsequent B7 mandate (7% PME and 93% diesel) and the current proposed B10 mandate (10% PME and 90% diesel). The biofuel mandate policy was rolled out after the enactment of Biofuel Industry Act 2007, which is mandatory to the transportation and industry sector to follow.

Resistance from automakers, who expressed concerns over biodiesel causing plugged filters, the corrosion of fuel system and material inconsistency that affect the car warranty, was one of the main hurdles in implementing the policy. External challenges such as global oil price, crude palm oil price, also slowed the full roll-out of the B5 mandate, which took three years.

A glance on the background of both policy areas, the MPIA in the solar policy appeared to be unable to block the initial NEM policy but the automakers appeared to have succeed. Why is there a divergence in the two policy areas?

1.2. Literature Review

This research brings in the theories of lobbying and public participation to study policymaking in Malaysia's energy system. Lobbying theory analyses the competition among different interest groups in influencing policy outcome and winning factors for certain groups. Lobbying can be carried out inside the system through informal ties and consultations and/or outside the system through various ways such as shaping public opinion through media discourse or public protests. The theory of public participation assesses the level of participation in the policy-making, through indirect representation in the formal consultations by interest groups and elected legislators in the parliament.

1.2.1 Lobbying Theory

The question of who wins or loses in a lobbying race in the US and the European Union is a recurring topic of interest in the study of political science. Lobbying is defined as an attempt to influence government action through oral or written submissions, based on the lobbying law in 50 states in the United States (NCSL, 2017) with an aim to influence public policy (Mahoney 2007). Lobbying studies at the European Union level conceptualized lobbying as an exchange relationship in which the institution "trades influence for information, citizen support, and economic power" (Klüver 2013, 3). This illustrates a two-way communication between policymaker and interest groups: policymaker is not a neutral or passive receiver of policy lobbying effort but also actively seeking for policy issues that could get them re-elected (Baumgartner et. al 2009).

The study of lobbying attempts to understand who has the influence to achieve their intended policy outcome and the factors that make an interest group influential, namely i) the policy-making environment; ii) characteristic of interest groups: resource rich/poor; and their

strategies: individual or formation of coalition and lobbying inside or outside of the system; and iii) characteristic of the issues: level of salience, conflict and complexity of the issues.

Scholars have highlighted that the influence of interest groups is understudied, but the result is remain confusing (Baumgartner and Leech 1998, 13). This is mainly because of difficulties in measuring influence (Dür and De De Bièvre 2007; Mahoney 2007; Dür 2008; Klüver 2013) as well as the unclear definition of "success" (Klüver 2013). In Mahoney's transatlantic comparative empirical study on 47 policy issues, Mahoney (2007) used lobbying success as a way to gauge the influence of interest groups by measuring lobbying success in ordinal scale (attained none, some or all objectives). This is because she argued, policy outcome is not always a zero-sum game, but a situation where some groups gained some and lost some. Dür (2008) identified three methodological approaches: process tracing, assessing 'attributed influence' and gauging the degree of preference attainment to influence. Process-tracing – the most popular approach to measure interest group influence in the EU – identifies steps by which "causes affect the outcome" (Dür 2008, 562). 'Attributed influence' is measured by way of surveys, either self-assessment or peer assessment. Lastly, measuring the degree of preference attainment is sometimes done by comparing the groups' ideal outcome to the actual outcome and measured by the distance between the two points (Dür 2008). However, all three methods have their respective strengths and weaknesses. For example, process-tracing underestimates the influence of interest groups while the preference attainment method over-estimates it. Hence, the proposed methodological solution is triangulation, or combining different methods in one study to correct such biases.

Among the factors affecting the success of interest groups, the policy-making environment is believed to have an impact on lobbying success. Mahoney (2007) argued that in the EU, the European Commission has sole rights to initiate any policy process, and it is likely to lead to

policy outcome, while in the US, any congressperson can propose an initiative, but the proposal could be killed at various stages: the sub-committee stage, at the floor stage, and at the veto stage. If a proposal did not move forward during a two-year tenure of the Congress, it will cease automatically and must be re-introduced (Mahoney 2007, 39). There are hundreds of such initiatives introduced every year. This makes lobbying for change difficult in the U.S. Congress. This is confirmed by Baumgartner et. al. (2009)'s finding that "status quo is powerful" with most of the cases not undergoing any policy changes; but when changes occurred, chances of substantial policy shifts happening as opposed to marginal adjustments are greater (2009, 242). They argued that "the most important elements of structure has to do with the social nature of Washington's advocacy process, and the reality that policymakers move in herds, not individually" (2009, 252). This caused limited attention and less room to push for new issue items when other issues had taken up space.

The EU institutions, which are said to have a "democratic deficit" as policymakers are not directly elected, are less responsive to rich advocates as a source funding for election (Moravcsik 2002; Follesdal & Hicks 2006). On the other hand, legislators in the U.S. are driven by the goal for re-election, which is why they are constantly seeking for issues to gain political mileage and observing the moves of another legislator so that they can react accordingly (Baumgartner et. al. 2009). Government officers are also not neutral but policy advocates who work together with members from the same side (Baumgartner 2009, 14).

The EU has also actively opened up for participation to diffuse the "democratic deficit" concern and the multiple layers of government – local, regional, national and super-national - and highly fragmented European institutions also provide a plurality of access points to interest groups. For example, the White Paper on Governance or the Transparency Initiative (Kohler-Koch and Finke 2007). However, access points did not always translate into influence on policy (Klüver

2013). His empirical findings confirmed Persson (2007)'s finding that business group is generally better represented in the European Union policy-making compared to civil society organizations.

This brought us to the factor of interest groups' characteristics. Klüver (2013) conceptualized lobbying "as an exchange relationship in which the European institutions' trade influence for information, citizen support, and economic power" and a coalition consists of various interest groups that can provide the biggest aggregated goods will wins (2013,3). It is hypothesized that interest groups with ample financial resources achieve bigger successes compared to groups with few resources. However, research findings showed otherwise. Baumgartner et. al. (2009) and Kang (2015) found that money did not always lead to success, because policymakers are also looking for issues that could get them re-elected. For example, the resource-rich big banks always lose to credit unions, because the latter serves communities and was backed by a regulatory agency. Kang's (2015) study on the effect of lobbying on the energy system in the U.S. also confirmed the minor impact that lobby spending had on policy enactment. The author estimated that it costs US$3 million or more for a lobby group to increase success rate by 1.2 percentage points without competition from other groups. When there are competing lobby groups, 20% of the direct effects of lobbying canceled each other out.

On interest groups' strategy, Klüver's (2013) empirical study on assessing the influence of interest groups in the European institutions found that lobbying coalitions are the "decisive point" for understanding policy outcomes. A coalition that can offer the most aggregated information, political support and economic power to European policymakers has a higher probability of success. Baumgartner et al. (2009) also found that the "sides" formed by different

interest groups with the same policy goal are heterogeneous, and the groups that teamed up on one issue can be on different sides on many other issues.

The nature of the issue – in terms of salience, conflictual nature, and complexity – will also determine lobbying success. Studies showed that there is a negative correlation between the level of salience, conflict and complexity of the issue and lobbying success. The higher the salience of an issue, the more difficult it is for a group to win as policymakers need to listen to all sides (Mahoney 2007; Baumgartner et. al 2009). Similarly, if the issue is highly contested and opposed by different sets of lobbying groups. However, Klüver (2013) argued that his empirical study could not confirm these hypotheses, as none of these factors showed a systematic effect on lobbying success. Some scholars also hypothesized that interest groups have a greater influence on a technical and highly complex issue because policymakers value the group's expertise and information but there is insufficient empirical support for this explanation (Smith 2000; Woll 2007) .

1.2.2. Public Participation

This section will discuss the body of research on public participation in general and participation in energy policy in particular: the definition, benefits and disadvantages, and challenges of implementation.

Public participation is a process of public engagement with the government through direct or indirect involvement or representation by stakeholders who have vested interests in a policy (Quick & Bryson, 2016), by which their “concerns, needs and values” are being taken into account in the governmental and corporate decision making (Creighton J. L., 2005, p. 7). It is also increasingly becoming “part of the very definition of democracy” (Creighton J. L., 2005, p. 1). Citizen participation into decision making processes also means “the redistribution of power that enables the have-not citizens, presently excluded from the political and economic

processes, to be deliberately included in the future" (1969, 216); as well as a strategy for the have-nots to have a say in information sharing, policy agenda setting, allocation of tax resources and implementation of programs (1969, 216).

Wampler (2012) argued that direct participation of citizens into complex policy-making processes is the "most significant innovation of the 'third wave' of democratization", especially in developing world (2012, 666). Through direct participation, citizens or local residents take part in the decision-making process directly, such as in the participatory budgeting processes to decide on the budget or project in a city or municipality. Meanwhile, for indirect participation, the citizen, public, or residents in a locality are represented by an elected representative, through non-governmental organizations (NGOs), business associations, resident associations, and so on (Quick & Bryson, 2016).

Public participation in policy processes serves a few purposes: i) fulfilling legal obligations; ii) incorporating the ideals of participatory democracy; iii) promoting social justice; iv) informing the public; v) understanding public problems and generating solutions; and vi) producing good policies, plans, and projects (Bryson, Quick, Slotterback, & Crosby, 2013).

One of the prominent conceptualizations of participation is Arnstein (1969)'s eight-levels "ascending ladder". The 'nonparticipation' category (manipulation and therapy) placed at the lowest rung of the ladder, moving up to "tokenism" (informing, consultation and placation) and the top is citizen power (partnership, delegated power, and citizen control). She also warned of the "simplification" of this ladder, as both "have-nots" and the "powerful" are not monolith but consist of diverging views, competing interests, significant cleavages and splintered subgroups (1969, 217).

It is believed that public participation enables better policy outcomes that are pro-public as the administrators could obtain complete information, but it remains challenging to translate it into

a meaningful process (Irvin and Stansbury 2004). Public-government trust could also be built through this engagement.

On the other hand, the process is costly and might not yield the expected good outcome as a result of competing and opposing political interests due to imbalance representation. Smith and McDonough (2001) presented a bleak reality when participants from 53 focus groups about natural resources decision-making in Michigan, expressed their unhappiness over the unequal representation and felt that their voice were not heard by the authority. This echoes the question whether the actors who are able and willing to participate in the process are themselves a manifestation of power differences among various stakeholders. Cooke and Kothari (2001) pleaded for the need to understand the workings of power in participatory development. They warned that the acts and processes of participation through knowledge sharing, negotiating power relationships, political activism and so on "can both conceal and reinforce oppressions and injustices in their various manifestation" (Cooke and Kothari 2001,13). Besides, the public or community is not a monolith but consists of people with personal interests, self-selecting themselves in the process sometimes to represent their personal interest and not to push for public interest (Creighton J. L., 2005, 页 12).

Quick and Bryson (2016) highlighted three key themes in participation theories: i) legitimacy of the process especially in terms of representation; ii) diversity and inclusiveness of the process of engagement; and iii) the benefits and challenges in implementing public participation in governance.

They argued that legitimacy is “the most contested features” in public participation. Not only that participation has to include sufficient and diverse stakeholders, but it also has to be procedurally fair and able to produce a feasible outcome. Measures must also be put in place so that marginalized group could also influence the outcome. A lack of legitimacy could

hamper the implementation of the policy, as well as undermine trust and build support against the outcome (Quick & Bryson, 2016, p. 4).

Although public participation strives to put "people" at the center of the process, it is not always a platform where the participants could really deliberate and influence the policy outcome (Quick and Bryson 2016). In most cases, government agencies retain their rights to make the final decision (Creighton J. L., 2005, p. 12). This is contrary to the decentralized nature of the participatory budgeting process, first introduced in Porto Alegre, Brazil in 1988, which allows the citizen to decide on the spending priorities in the city. The success story of Porto Alegre can be attributed to a supportive local government with strong political will to allocate funding for the projects and a robust civil society. The renowned case had successfully engaged 20,000 people a year in 1992 from the initial number of fewer than 1,000 citizens in the first two years (1989-1990) during the process (Wampler, 2007, p. 24).

One of the important practical reasons for broad-based participation is for policymakers to gather information, especially on a complex and technical issue. This further strengthens the imbalance of power between the experts and layman, with technical expert knowledge (Scott 1998, Yanow 2004) always placed above the lay knowledge (Ozawa and Susskind 1985; Fischer 2000). Not all technical experts believe the participation process should be opened. Expert knowledge with regards to the energy system is particularly crucial in a nation’s energy transition.

1.2.2.1.Public Participation in Energy policy

Environmental concerns and energy security have driven countries to embark on energy transition from fossil fuel towards low carbon energy systems by utilizing renewable resources (Lipp 2007) . The complexity of the transition can be observed from the conceptualization of

the national energy transition as a co-evolution of three types of system, energy flow and markets, technology diffusion and energy-related policies (Cherp et al. 2018). This cuts across the domains of economy, sociology of technology, science, and technology system and politics. To ensure the success of this transition, it requires a paradigm shift in energy policy supported by a myriad of sectors and stakeholders at local and national level. Public participation can legitimate the policy change to deal with the political resistance from the "deep incumbency" such as those from the fossil fuel-based energy system (Johnstone et al. 2017). Hence, new actors should be included to provide a balance to the "historical vested interests that have been seen to influence energy policy development until now" (Adams et al 2011, 2551).

The literature on public engagement in energy policy or STS has looked at the interaction between the science and the community of policymakers; as well as at the communication between the general public and stakeholders. In this regard, the role of the expert in the policy-making process is in the center of the discussion. Harry Collins and Robert Evans (2002, 2003 and 2007) represent the group who see science as "an agent of culture" and question the public's challenges to expertise, while scholars like Sheila Jasanoff (2003) and Brian Wynne (2003, 2007) believe in greater public participation and criticize expert autonomy (Durant 2010). Fast (2016) argues that public participation is prone to creating barriers between scientific expertise and local expertise. However, Holmes and Scoones (2000) argue that participatory methods are a necessary complement to the scientific expertise by increasing the dimensions to be considered in the process. As pointed out by Adams et al. (2011), the traditional top-down approach, where only the select few provide their input, was insufficient to deal with the complexity of energy transition.

1.2.3. Lobbying and participation in policy making in Malaysia

Lobbying and participation in policymaking in Malaysia is an extremely understudied area. Lobbying is often mentioned in existing studies as a way for interest groups to put forward their idea to the government and to gain public support through social campaigns for policy change. However, there is very little work on the influence of interest groups and winning factors in lobbying. The plausible explanations include a lack of data and methodology to measure influence or success, as well as a closed-door policy-making process that make it difficult to understand stakeholders' political and economic dynamics. A study by Mohd Rusli and Cheh (1999) on tactics used by environmental groups in Malaysia in influencing policy decisions showed that most groups engage policymakers within the system through presenting research results and viewpoints, contacting government officials directly and lobbying, meanwhile the Automobile Association of Malaysia (AAM) established to provide auto breakdown service to members, prefers indirect tactics such as public campaigns, grassroots lobbying and using media as a channel to express their voice to the decision-makers (1999, 74). These insights related to AAM differed from Dür and Mateo (2016)'s findings that business interest groups in the EU are more inclined to focus on inside lobbying than other types of groups. Muhd Rusli and Cheh (1999) also found that financial resources, membership size, and number of staff and their expertise determined the choice of strategy. The most influential factors are size of membership and staff expertise. Geographical distribution of the members also played a role in selecting a tactic. They argued that AAM chose indirect tactics because their 100,000 members are scattered around the country and their resources could be harnessed for the association's campaign activities (1999, 75).

Brown, Hawa Ali and Wan Muda's (2004) study during the transition of power after Abdullah Ahmad Badawi took over from Mahathir Mohamad as prime minister in 2003, looked at the

policymaking environment in Malaysia and described it as as "inward-looking with a highly centralized and authoritarian government" (2004, 16). While the rich body of lobbying theory can provide a deeper look in the exchanges between groups and between groups and policymakers in Malaysia, it is inconclusive whether broad-based, inclusive participation by interest groups could lead to good policy outcome that could meet the state's goal or for the betterment of the people's quality of life. This is because policy-making and implementation remain a complex and ongoing process (Baumgartner et. al. 2009).

It is with this realization that the theory of public participation is included in this research to provide a more complete picture of the policy-making process in Malaysia, especially in the energy sector.

The existing studies on public participation in environmental policy in Malaysia mainly focus on local government planning (Suzie Mat Nurudin et.al 2016) and on the environmental impact assessment (EIA) process of the development project (Maishara & Zulhabri 2016) to fulfill the legal requirement under the law.

This reflects the reality on the ground where direct public participation into policy process is limited. However, citizens can make their voice heard through civil society organizations, business groups or elected representatives.

Malaysia is a constitutional parliamentary system, where the general election will be held once every five years. However, the country was ruled by the same coalition, the National Front, for the last six decades with little accountability and lack of transparency. The National Front had managed to hold on to its two-thirds majority in the 222-seat parliament for most parts of the six decades in power. In the 2008 general election, 82 members of the opposition were elected, breaking the National Front's hold on two thirds of the parliament. Nevertheless, bills tabled were normally passed despite the fanfare.

The political representative who is deemed to have an influence on policy may not be powerful in a quasi-authoritarian state such as Malaysia. As a representative democracy, Malaysians rely on their elected representatives to bring their concerns and aspirations to parliament, but it is unclear what the executive does with such information. For comparison, the nuclear phase-out in Germany in the early 2000s was legislated by the 'red-green' coalition government and represented the interest of both the wind power sector and the coal industry represented by the Social-Democratic Party (SPD) (Cherp et al. 2018); in Malaysia, the effort by state assemblypersons to highlight the public health concern over the management of radioactive waste from the rare earth plant in Kuantan, Pahang, coupled with citizen protests, and petition submissions to the government at the state and national level, failed to force the government to revoke the license given to the Australian Lynas Corp Ltd (Yoon 2014). While it impacted the National Front's popularity, it took two general elections for a regime change to happen. For the first time, Malaysians experienced the change of government following the 14th General Election held on May 9 this year.

This research can fill the gaps in the existing literature by studying renewable energy policymaking through theories of lobbying and participation as means to society having access to policy-making processes. The research intends to discover the reasons behind the divergence in decision-making processes, with the stakeholders in the solar policy pushing through the NEM policy while the stakeholders in the biofuel policy succeed in blocking the B10 mandate.

1.2. Research question and hypotheses

In this section, I will discuss the rationale behind the country of choice and the selection of case studies.

Malaysia was chosen for the case study because it is a fossil fuel-rich country that had recently become net importer of oil products due to depletion of production and growing demand. Driven by energy security concerns, the nation is currently looking into energy transition by developing its renewable energy sector to reduce dependency on coal and oil to generate electricity and support the transportation industry.

The country has been under the governance of the National Front for the last six decades. The centralized and quasi-authoritarian policy environment makes Malaysia an interesting case to study as how the powerful stakeholders are able to push through, or even, block policy reforms.

The existing body of studies on Malaysia's renewable energy policies, describe the historical trajectory of these policies and challenges (Oh et al. 2018; Yatim et. al. 2016), or particular sub-policy such as the Small Renewable Energy Power (SREP) program (Sovacool and Drupady 2011) and FiT mechanism (Wong et. al. 2015; Ahmad et. al 2015). There are only several cross-country comparative studies on Malaysia's renewable energy policy (Rahman, Saat and Abdul Wahid 2016; Mukherjee and Sovacool 2014; Er 2011; Mofijur et. al. 2015). The existing comparative studies were mostly cross-countries comparisons in one policy area, such as comparing the biofuel policy in Indonesia, Malaysia, and Thailand (Mukherjee and Sovacool 2015), or the Feed-in tariff policy between Germany and Malaysia (Ahmad, Saat and Abdul Wahid 2016).

Political economy studies on energy policies in Malaysia remain rare. Since energy transition policy changes did not happen in a vacuum, but driven by the state's political agenda, it needs

to be studied from a political economy perspective, not only from the dominant perspective of economic health and technology history (Cherp et. al 2017; Fouquet, 2010; Kander et. al., 2013).

Scholars have highlighted the need to include political perspective in the study of energy transition in addition to the large body of work on the economic, technological and sociological dimensions of energy transition (Meadowcroft 2009, 2011; Geels 2014; Cherp et al. 2018; Jonstone 2017; Breetz and Stones 2017) .

The politics of energy transition is often linked to the socio-technical study, which focused on the history of the technological change: technological lock-in, lesson learning and diffusion, multi-level perspective (MLP) to discuss the emergence and diffusion of new technologies; as well as the challenges of energy system transition due to the inertia within the regime (Cherp et. al. 2018, 180). Cherp et. al.'s (2018) proposed a meta-framework to study a nation's energy transition from the techno-economic, socio-technical and political perspectives, and they reiterated the need to separate political perspective from the socio-technical analysis and broaden the political perspective to include the theory of political science such as political action, voters' preferences, public discourse and so on. They argued that it is "symptomatic" of some researches in their socio-technical research to include political regimes, policymakers and political strategies as part of the socio-technical systems, but this "runs the risk of over-simplifying the political phenomena by reducing them to a conflict over technological innovation: for example, between the change-resisting incumbents and on the change-seeking newcomers" (2018,184) as political science had developed theories to explain special interests, political will and public concerns that originates and goes beyond the energy system (2018, 185).

The policy areas selected in this study are related to the electricity and transportation sectors. This is because Malaysia's renewable energy policy focuses on two key areas: electricity, and transportation and industry. For the electricity sector, the key strategy is to increase the generation of electricity using renewable resources, and energy efficiency; while in the transport and industry sectors, the focus is to use biodiesel to reduce usage of oil. Both policies also cut across the socio-economic aspect of the society because the cost of the policy will be passed on to the end consumers.

I would like to argue that the political economic context in which the renewable energy policy has been shaped in Malaysia is highly affected by the fact that it is a fossil-fuel producers for two reasons: First, the windfall from the natural resources is used to subsidize the energy sector, which in turn distorts the pricing of the energy in the country; Second, the six-decade long rule of the one-coalition system has undermined check-and-balance mechanisms in the policy-making process, where powerful stakeholders could pursue their own policy preferences at the expense of public interest.

This thesis studies the policies in the electricity and transport sectors as well as the stakeholders involved in the processes. Stakeholders are defined as any party "with declared or conceivable interest in a policy concern" (World Bank 2018). The policy change in these two policy areas showed an interesting divergence. The net energy metering (NEM) policy to develop the solar power in the country was push through while the policy to implement the B10 biodiesel (a blend of 10% palm methyl ester, PME and 90% petroleum diesel) was blocked by stakeholders.

In brief, the NEM policy originated from the U.S. and it is adopted globally to encouraged private investment in renewable technology. In theory, the policy encourages power generators to self-consume the energy and sell the excessive energy to the grid, but the buy-back rate and rollover periods are key to the success of the policy. The policy, if design properly could boost

the renewable energy generation. The biofuel policy studied in this research imposed mandatory use of the B10 biodiesel on diesel vehicle users. More than 60 countries around the world imposed a similar mandate to encourage usage of biodiesel in place of petrol. The B10 mandate proposed in Malaysia is not only to encourage usage of renewable fuels but also to utilize the crude palm oil (CPO) stockpile to provide price support to the commodities. The B10 mandate will use 1.22 million tons of CPO (Bernama 2015).

Are the policy processes in the abovementioned two sectors comparable? Arguably, the electricity and transport sectors have a very different set of stakeholders and the technologies used are very different in nature, but the policy-making processes are comparable, as both involve indirect participation through closed-door stakeholders' consultations and the passing of the law in a democratically-elected parliament.

As the larger policy framework for both sectors were already in place, the understudied policy adjustments are usually carried out by agencies under the respective ministries after consultations with stakeholders. This is because the laws provide the legal framework for the ministry to enact regulations or guidelines for policy implementation and adjustments.

The scope of this study will be on the initial version of the NEM policy launched in November 2016 to develop the solar power sector and the B10 palm oil-based biodiesel mandate for the transportation sector announced in 2015.

However, this thesis is not a study about the sectors, but a study on how the relative distribution of the stakeholders' power and policy preference intensity effect the timeline of policy change. The theories of lobbying will be used to examine the relative distribution of the power and preference intensity among stakeholders in the two policies. The public participation theory will study whether higher level of engagement lead to higher legitimacy, which in turn will improve timeliness of policy implementation.

Research Question:

Why does the speed of the solar power policy implementation diverge from the biofuel policy?

1.3.1. Hypotheses

H1: The relative distribution of power and preference intensity among stakeholders in the solar power and biofuel policies are likely to affect the speed of the policy implementation.

The lobbying theory has tried to answer what makes a stakeholder win in a policy process and why does the stakeholder win. The stakeholder's success is often assessed by the policy environment or institutions in which the policy is made; the characteristics of the stakeholders: resources or strategy; and the characteristic of the issue: level of salience or conflicts of the issue.

In order to understand the reason behind the quicker implementation of the solar power policy compared to the biofuel policy, it is important to map out the stakeholders and assess their level of power by taking into account the political and financial resources they have, and their policy preference intensity. When stakeholders have ample resources at their expense and wanted the policy to be implemented, they will use their resources to mobilize support for the policy. If the stakeholder has more resources, but they don't feel strongly about the issue, they will not take any action. According to Klüver (2013), since lobbying is an exchange relationship between policymaker and the stakeholders, the stakeholders or a coalition of stakeholders that could provide the aggregated goods needed by the policymakers will have a higher likelihood to exert influence in policy making process.

In order to test this hypothesis, the importance of the level of cooperation required by the government from the stakeholder(s) to implement the policy will be used as an indicator. It is

expected that the stakeholder that the government needs the most will have a greater likelihood to decide the speed of the policy implementation. The dependent variables in this study is the timeliness of the policy implementation, that is, when is the policy being implemented. This is measured by the speed of the policy implementation comparing the two policy areas.

H2: The higher level of stakeholders' engagement leads to higher legitimacy, which in turn will increase the speed of the renewable energy policy implementation.

Public participation theory seeks to understand to what extent the level of public engagement with policymakers will lead to a better policy outcome. It is expected that higher engagement will lead to a better policy outcome, but the relative power among the interest groups could lead to an imbalanced representation, for example in technical issues, the views of an expert is given the priority to the lay knowledge.

Although legitimacy is the most contested feature in public participation, when policymakers make efforts to engage with the stakeholders, it is expected that the legitimacy of the policy will be increased and this in turn could lead to better implementation of the policy (Quick and Bryson 2016). However, more engagements with stakeholders also means more time and resources spent on the process and may slow down the policy implementation. As the number of meetings increase, it allows more opportunities for stakeholders to delay or block the policy change. In this line of reasoning, it seems that although the legitimacy of the policy proposal has increase, but it might slow down the speed of policy implementation.

In testing this particular hypothesis, the level of engagements in the two renewable energy policy processes, collected through qualitative interviews with stakeholders, will be compared with the policy outcome – the solar power policy being push through but the biofuel policy

being block – and to find out whether more engagement leads to the speed of the policy being implemented.

H3: The salience of the policy issues leads to likelihood of policy implementation.

The salience of a policy issue determines the visibility or attention it attracts, or the risks of it escalates into a controversy. The visibility of the issue could also be influence by the strategy adopted by the stakeholders. Some of them may decide to lobby from the outside of the system. Stakeholders who are advocates for policy change, the visibility of the issue could generate more attention and could be useful to gain support to push for change, while stakeholders who do not want a policy change would prefer the issue to remain under the radar (Baumgartner et. al. 2009). Where the public salience is high, it is more difficult for policymakers to decide because they need to hear the views from all the stakeholders (Mahoney 2007).

In this study, the salience of the solar power and biofuel policies will be assessed by frequencies the word came up from the searches in local online media and the Malaysian Parliament's *Hansard*.

1.2. Methodology

The data for this thesis has been collected from qualitative interviews conducted with eleven government officials, industry players from both the solar photovoltaic and the biofuel sectors, members of parliament, non-governmental organizations and journalists to assess the attributes of the closed-door consultation and the dynamics between interest groups in these policy-making processes. The interviews were carried out between March to May 2018, through online phone calls and email correspondences. The interviewees were chosen based on the author's own stakeholder analysis.

The interview method was chosen because these consultation meetings were held behind closed doors and what transpired in these meetings could not be disclosed. Only stakeholders who worked closely with the relevant ministry or government agencies were invited to present their views. Due to time constraints and non-responsiveness of most stakeholders, the policy-making process uncovered through the interviews in this thesis might not be sufficient to present the whole picture of the policy-making process.

Additionally, content analysis was carried out on publicly accessible official records, as follows:

i) Government documents on legislations related to the policy in order to understand the historical trajectory of the policy process and government's positions;

ii) Parliamentary records such as written questions, parliamentary *Hansard*, statements by members of the government and legislators during debates to understand the level of indirect participation in policy-making and the salience of the policy issue;

iii) Media reports to track the position of stakeholders in the policy, and also to assess salience.

Only online resources were used. A mitigating factor for this potential bias is the fact that both the solar power and biofuel policies started generating interest around the 2000s when the internet became popular, hence most of the relevant documents could be found online.

Chapter 2: Empirical analysis

2.1. The context of energy transition in Malaysia

Low carbon energy transition is the shift from a fossil fuel-based energy system to renewable sources of energy which releases less greenhouse gases into the atmosphere during the process of energy generation (Cherp et. al. 2018). Endowed with rich resources of fossil fuel, Malaysia did not roll out the nation's low-carbon energy transition through public policy until the early 2000s.

This is about 30 years late compared to many developed countries in Europe, which had already begun to experiment on ways to reduce its reliance on fossil fuel imports, driven by environmental and energy security concerns following the global oil crisis in the 1970s. Malaysia, a middle-income country with a gross domestic product (GDP) per capita of US$9506 in 2016 (World Bank 2018), used ten years to experiment with the Small Renewable Energy Program (SREP) which failed (Sovacool and Drupady 2011). It later drew lessons from the Germany's famous feed-in tariff (FiT) system in 2010. Since its introduction in Malaysia, the FiT has boosted electricity generation by renewables significantly but still falls short of the target set by the government.

The fact that Malaysia is an oil and gas producer has affected the way energy is priced and consumed in the country. Heavily subsidized oil at the pump and below market prices natural gas supplies to independent power producers (IPPs) not only crimp the profits of national state oil company Petroliam Nasional Bhd (Petronas), but also poses challenges to the nation's energy transition from coal and gas-based power generation to renewable energy.

To understand how and why this came to be, one needs to go back in time to 1992. One of the key historical incidents that led to a major shift in the power industry was a 48-hour power

outage across the country in September of that year. It forced the government to reckon with the limitations of an energy industry that was monopolized by one entity - the national utility company Tenaga National Bhd (TNB). Subsequently, the monopoly was broken, giving birth to the first independent power producers (IPPs), YTL Power, and other first-generation IPPs. But this positive development came with a catch. TNB had signed a 21-year Power Purchase Agreement (PPA) with these IPPs at a fixed price of 16 sen per kWh ($0.4 cent) of generated electricity, an increase of 100% to the TNB price (Khairie Hisham 2014). As a consequence, the price of electricity had increased to 23 sen per kWh ($0.58 cent).

In early 2018, the government announced that it would spend RM929.37 million (US$234 million) to maintain the tariff for the first half of 2018. It is a significant cost to bear. This does not include the costs of supplying fossil fuel at 29% discount of market prices to the IPPs. This was borne by the national oil company, Petronas. (Lim 2018).

In the oil sector, energy subsidies were provided by the government since 1983, and "are now an intense political issue" (IISD 2013, 4). Faced with record-low crude oil prices, the government announced in 2014 that it would remove oil subsidies and the price of petrol at the pump would be determined by a managed float mechanism. The mechanism entails that the prices of petrol would be reviewed on a monthly basis and determined by a 10-day average of fuel prices in international traded markets, plus fixed profit margins for refineries and retailers (Chan 2014). Before the rationalization of oil subsidies in 2014 to a managed float mechanism, the government spent about RM 29 billion (US$ 7.29 billion) a year on fuel subsidies at the pump in 2013. However, the government also reportedly still spent hundreds of millions on fuel subsidies after the rationalization measure (Annuar 2017). After the General Election of 2018, which saw the Opposition coalition (*Pakatan Harapan*) come to power for the first time in Malaysia since Malaya gained independence in 1957, it is expected that the *Pakatan*

Harapan-led government will reinstate the fuel subsidy, as stated in the coalitions' election manifesto. Pakatan Harapan consists of four political parties: The National Trust Party (Amanah), Malaysian United Indigenous Party(Bersatu), Democratic Action's Party (DAP) and People's Justice Party (PKR).

In summary, Malaysia's energy sector is highly subsidized. The tariff of electricity generation, transmission and supply; and the oil price at the pump does not reflect the actual cost of energy, resulting in pricing distortion that has had an impact on the development of the renewable energy sector, rendering renewable energy as relatively expensive compared to traditional fossil fuel.

2.2. The historical development of renewable energy policy in Malaysia

Malaysia's fossil fuel resources have been in decline since the 2000s. The nation's proven oil reserves dropped to 3.3 billion barrels in 2016 from 5.4 billion barrels in 2006 (BP 2017). The country's oil production has also begun to decline, after reaching a peak production of 842,600 barrels per day in 2003, due to maturing fields (EIA 2017). Although dry gas production has increased steadily for the past two decades, reaching 2.2 trillion cubic feet (Tcf) in 2015, and was estimated to rise to approximately 2.4 Tcf in 2016, about half of the gas produced was consumed domestically and the rest was exported in the form of liquified natural gas (LNG). The power sector accounted for 55% of the gas consumption in 2015, followed by the industry sector at 20% and non-energy sector at 18% (EC 2017).

Driven by energy security concerns, Malaysia began to look for alternative resources to ensure ample energy supply to meet the national demand for development. Other drivers for the renewable energy quest include tapping into the potential of new technologies to create a new industries and jobs; and environmental concerns. As a signatory of the Kyoto Protocol and Paris Agreement, Malaysia pledged to reduce its greenhouse gas emissions intensity (per unit of GDP) by up to 45% by 2030 (30% unconditionally, 15% with international support) compared to its emissions intensity of GDP in 2005 (GoM 2015).

2.2.1. Renewable policy in the electricity sector

Since 2001, the government of Malaysia (GoM) launched a Five-Fuel Policy under the 8th Malaysian Plan (2001-2005) to use hydro, natural gas, coal, oil, as well as renewable energy and energy efficiency (RE/EE) for electricity generation. Subsequently, in 2005, the Malaysian Building Integrated Photovoltaic (MBIPV) project was launched to integrate solar PV in building designs. The project intended to promote long-term cost reduction and sustainability

of the technology. With a focus on the market development of the BPIV technology, the project also enhanced the nation's capacity in three areas: i) policy and awareness; ii) technical competency and market enhancement; iii) technology development and support (Oh et. al. 2018). Although this project only achieved 1.5MW capacity, it was considered a success because it laid the groundwork for the introduction of the new legislation and regulatory framework for a sustainable PV market, namely the FiT mechanism (Oh et. al. 2018).

In 2010, the government drafted and passed the National Renewable Energy Plan and Action Plan (NREPAP) to set up a legal framework – Renewable Energy Act and Sustainable Energy Development Authority Act. The "forward-looking and convergent" policy would also be recognized as "a convergence of energy, industrial and environmental policies" (MEGTW 2010). The key feature of the NREPAP was the FiT mechanism.

The Sustainable Energy Development Authority (SEDA) would implement the FiT mechanism and managed the Renewable Energy Fund (RE Fund) to pay the tariff to the power generator. The source of the fund was a 1.6% surcharge (adjusted from the initial 1%) imposed on the consumer who used more than 300kw/h a month. This surcharge rate was lower than the 2% proposed in the NREPAP. In a parliamentary meeting in 2015, MEGTW minister Maximus Johnity Ongkili had stated that the government did not plan to increase the surcharge rate to 2%, but stopped short of providing any reason for the decision (Parliament Malaysia 2015, 81).

The introduction of FiT in 2011 has indeed increased the RE generation in Malaysia. In 2017, a total of 551.15 MW of RE installed capacities was accumulated since the FiT commencement date under the mechanism, with the largest portion of 367.81MW generated from solar photovoltaic (solar PV) sources, followed by biomass (80.9MW), biogas landfill/agriculture waste (49.76MW), small hydro projects (30.30MW), biomass solid waste (15.9MW) and biogas (6.48) (SEDA 2018). However, RE only accounted for the 3.5% of total electricity

installed capacity and 3% of the total generation capacity as of January 15, 2018 (MEGTW 2018). This is still far from the government's target to expand the RE energy mix to 9% in 2020 (MEGTW 2010).

Two problems have been hindering the success of the FiT mechanism in boosting power generation from renewable energy sources. First, the surcharge rate for the RE Fund is low and to ensure that the fund is sufficient, a quota for new feed-in approvals is imposed every six months over the next three years. This has limited the participation of the public in this mechanism (SEDA 2018). For instance, in the highly competitive individual solar PV category, SEDA received a total of 4,425 applications equivalent to 40.73MW but only a total of 15MW was allocated for the 2016 quota and another 15MW for 2017 (SEDA 2017). The reason for capping the capacity for each RE category was that Malaysia's electricity market was regulated, hence the funding source for FiT is limited. (SEDA 2018).

Second, the feed-in tariff for the solar PV category was high at €ct 14/kWh as of Jan 1, 2018 (SEDA 2018), higher than German's €ct 8.91 – 12.70/kWh in the Renewable Energy Act 2017 (EEG), depending on the installed capacity (RES Legal. 2017). The premium tariff would be paid by the high electricity users.

Based on a back-of-the-envelope calculation, a solar power generator can get 70% more revenue from the same amount he or she generated compared to the electricity bill. Individual solar PV generator can achieve a return of investment between 6 and 7 years, while the generator would sign a Renewable Energy Power Purchase Agreement (REPPA) with the utility for a period of 21 years.

The former minister Ongkili had said that RE fund "seems to be exhausted faster than expected" due to the huge interests from solar players, hence the fund could no longer support new projects without increasing the FiT contribution from consumers (Ongkili 2016). The

government implemented the net energy metering (NEM) mechanism to replace the FiT for solar power, as well as the large-scale solar (LSS) mechanism on Nov 1, 2016, with a target to achieve an installed capacity of 500MW between 2016 and 2020.

2.2.1.1. Solar

Situated near the Equator, Malaysia enjoys monthly solar radiation of about 400–600 MJ/m2. The nation has long proved to have great potential for solar power utilization. However, the expensive cost of the solar technology, lack of technical capacity and specific regulatory frameworks are among the hurdles for the technology's diffusion in Malaysia.

For example, in the early stages of adoption, solar power was used for heating purposes such as Solar Water Heaters (SWH), solar pool heating, solar assisted drying system, solar space heating and cooling, ventilation, solar air conditioning and solar refrigeration (Haris 2009). For the SWH, the high initial cost and unsuitable rooftop structure for installation hindered the development of this application, and most households favored electricity water heaters (Mekhilef et. al. 2012, 391).

The photovoltaic technology was introduced in Malaysia in the 1980s for the purpose of rural electrification and communication. Inspired by the German Rooftop and Japanese Sunshine Program, TNB began experimenting with the grid-connected PV system in 1998: six projects with a capacity ranging between 2.8kWp and 3.8 kWp were installed during 1998 and 2002. One of these projects involved the construction of single-story houses installed with 3.6 kWp PV in October 1999 and later, the Prototype Solar House (PSH) project in 2002 which was funded by the Ministry of Science, Technology and Environment, or MOSTE (currently renamed as Ministry of Science, Technology and Innovation, MOSTI).

All these experiments paved the way for the MBIPV project which subsequently laid the foundation for the FiT mechanism and subsequently, successfully boosted the deployment of the solar PV system in Malaysia. Currently, solar PV accounted for 67% of the total renewable energy capacity in 2017 (SEDA 2018).

The subject of the study in this thesis – the NEM - was launched in November 2016 with the aim to increase an additional of 500MW installed capacity from 2016-2020.

Under the NEM, the electricity generated by the solar PV will be consumed in-situ and the excess electricity would be exported and sold to the utilities at a prevailing Displaced Cost prescribed by the EC. The credit would roll over for a maximum of 24 months and net-off at a prevailing Displaced Cost. Customers of TNB in Peninsular Malaysia and SESB in Sabah and Labuan could apply for the mechanism (SEDA 2016). An inspection shall be carried out on the site as a requirement for the approval of the project.

Three years after the launch of the policies, the take-up rate remains low, with only 8.69MW capacity approved for Peninsular Malaysia and Sabah as of end-January 2018. An industry representative interviewed for this thesis described the initial NEM policy as “disastrous”. The program is unattractive financially to investors. The then Serdang Member of Parliament Ong Kian Ming said in March this year, low return of investment provided little incentive for private investment (Ong 2018).

Despite the challenges, the outlook for Malaysia’s solar power deployment remains positive and is encouraged by the global consumption of solar energy. In 2016, solar photovoltaic (solar PV) became the fastest growing fuel in the world, achieving 50% growth to reach over 74 GW in deployment. This was supported by a massive deployment in China and around the world. China accounted for half of the solar PV that came online in 2016, driven by a sharp decrease in cost and policy support. The auction prices of solar PV also reached a record low at

$30/megawatts per hour (MWh) (IEA 2017, 3). China is estimated to become the global renewable energy leader in the next five years. If China could resolve the challenges with renewable subsidies and grid integration, its deployment of solar PV could grow rapidly. The International Energy Agency forecasted that solar PV in China could reach a total of 320 GW by 2020. Combined with possible policy and regulatory advancements in other key countries such as India, Japan, and the U.S., the cumulative capacity of world solar PV could almost triple to 880 GW by 2022 (IEA 2017). The U.S. remains the second largest growth market for renewables, driven by new onshore wind and solar capacities, precipitated by state-level policy for distributed solar PV (IEA 2017).

2.2.2. National Biofuel policy

Biofuel is produced from animal fats, recycled greases and most commonly, vegetable oils such as soybean, corn, rapeseed, sunflower, cottonseed, palm oil, etc. Currently, there are four generations of biodiesel. The first-generation biofuels are produced from food crops by extracting the oils from plants to use in biodiesel or producing bioethanol through fermentation from sugar or starch. This is the most popular type of biodiesel used in the EU. But there have been heated discussions on the usage of food for fuel (Biofuel 2018a). In light of this discussions, the second-generation biofuels are produced from non-food crops, and it is considered advanced biofuel. The feedstock of second-generation biofuels, such as switchgrass, are grown to act as direct biomass (Biofuel 2018b). Third-generation biofuel refers to biofuel derived from algae, which has lower resource input and higher yield compared to the other second-generation feedstock. It was previously categorized as the second-generation biofuel but was later moved to a separate category. Algae also has other advantages - its ability to directly produce ethanol, butanol and even gasoline and diesel fuel Biofuel, 2018c). The fourth-generation biofuels - photobiological solar fuels and electro-fuels — uses

a synthetic biology method to produce fuel. The novel method used includes converting solar energy into fuel using infinite, cheap and widely available raw materials. This is still an emerging research area that is expected to bring significant breakthroughs in the field of biofuels (Aro 2016).

Globally, biofuels are expected to represent over 90% of total renewables in road transport by 2022 to achieve decarbonization in the sector. The IEA forecasted that biofuel production will grow by over 16% over the period of 2016 - 2022, driven mainly from the rising demand for transport fuel, availability of feedstocks and an enabling policy environment in Asia. The encouraging biofuel policy in Brazil, U.S., and India is expected to contribute to this growth (IEA 2017,6).

Malaysia's biofuels are produced using palm oil as feedstock and from non-edible oil sources such as Jatropha. Production of ethanol in Malaysia is derived from Palm Oil Mill Effluent (POME), but production volume is negligible due to high cost (USDA 2017). This thesis will focus on palm oil-based biofuel. The biofuels are used in the transport sector as burning fuel for boilers in manufacturing plants, construction machines and generator sets (Abdul-Manan, Baharuddin and Lee 2015).

Since 2006, Malaysia's government has implemented the National Biofuel Policy (NBP) to develop palm oil biodiesel aimed at reducing reliance on fossil fuel for a cleaner environment, develop a new market for palm oil, research, and development for biofuel technology. The Biofuel Industry Act was passed in 2007 to provide a regulatory framework for the industry's development. The NBP was formulated after extensive stakeholder consultations based on research findings by the Malaysian Palm Oil Board (MPOB) since 1982 (MPIC 2006).

The policy focuses on the blending of palm oil with petroleum diesel into biodiesel. In 2006, the *Envo* diesel – a blend of 5% processed palm oil and 95% petroleum-derived diesel – was

introduced. The *Envo* diesel has lower production costs because it uses refined palm oil. However, diesel engine makers had concerns about plugged filters, corrosion of the fuel system and material inconsistency. This was later replaced with the B5 mandate, a blend of 5% palm methyl ester (PME) and 95% petroleum diesel. The initial plan was to roll out B5 in 2008, but its launch was delayed to 2011. It took another three years (end of 2014) to fully implement B5 in Peninsular and East Malaysia (USDA 2017). On Jan 1, 2015, the B7 mandate – a blend of 7% PME and 93% petroleum diesel- was rolled out for the transport sector.

The success of the biofuel policy in Malaysia is very much dependent on crude palm oil (CPO) and oil prices, as the CPO is the main input for biodiesel in Malaysia. For example, the rising CPO price in 2006 has caused the construction of only 14 plants to be completed in 2008, although 92 licenses were issued in 2006 and 2007 (Lopez and Laan 2008). It is also worth noting that CPO and crude oil price data shows that the vegetable oil appears to have the same trajectory as petroleum (Priyati and Tyers 2016). In the absence of subsidies, biodiesel becomes economically viable when the CPO prices are low and the petroleum prices are high (Lopez and Laan 2008).

Here lies the dilemma: if the CPO price is low, this gives an incentive for the blender to increase biodiesel production, which will drive up the consumption of palm oil, resulting in a higher CPO price and making it economically unfeasible to produce more palm-oil based biodiesel. Kapusta and Lajdová (2016) showed that a 1% increase in palm oil price resulted in a 0.32% increase on biodiesel price from 2005 to 2015.

In the earlier stages of the biodiesel introduction, the government provided financial support and fuel subsidies to biofuel producers. In August 2008, Minister Kohilan Pillay had stated that the *Envo*diesel would be subsidized like petroleum diesel (Lopez and Laan 2008). A total of RM300 million was also allocated to assist the construction of a biodiesel plant. Besides, the

eligible company can also enjoy an Investment Tax Allowance (ITA) - a tax exemption of 100 percent of statutory income for a period of 10 years - after it received “Pioneer Status” under the Promotion of Investment Act 1986. A tax credit of 100 percent on qualifying capital expenditure incurred within five years of the start of plant operations was also provided.

Unlike Indonesia which collects a palm oil export levy since 2015 to fund the price difference between biodiesel and petroleum diesel in order to protect the interests of Indonesian consumers and encourage the usage of biodiesel, Malaysia does not have a direct subsidy program to support the biofuel producer. The removal of fuel subsidies in 2014 also meant that all the costs of biofuel production are passed on to the consumer.

It appears that the Malaysian government has a pricing formula that would be adjusted according to the movement of the CPO price. This formula will cover the variable cost, operating cost and also include a certain profit margin of the biofuel producer, but this formula is not disclosed publicly (R. Unnithan interview, 2018). Currently, the utilization rate of these biofuel production plants is at a low level of about 30% (Azman and Willey 2017).

In 2015, the government announced that it would roll out the B10 mandate to replace the B7 mandates in the transport sector in July, but car makers expressed concerns over the viability of the B10 biodiesel with vehicle engines, which could lead to a void of warranty. MPOB had claimed that B10 biodiesel has been tested on-the-road since Jan 2013, involving 25 vehicles, reaching as much as a 100,000 kilometers mileage in 2015 without any problems (Gho 2015). The logistics industry also urged the government to halt the implementation because it feared that the B10 biodiesel would not be compatible with the engine of trucks (Amarthalingam 2016). Subsequently, the government decided to halt the policy’s implementation and consult with stakeholders again.

The implementation of the policy was later postponed to January 1, 2017, but it has not yet been implemented as of May 2018. This is despite calls of the Malaysian Biofuel Association (MBA) for the government to roll out the B10 mandate, stating that the government needed the "political will" to do so (Wong and Amarthalingam 2018). In response, former MPIC minister Mah Siew Keong reiterated the government's commitment to implement the policy (Zainuddin 2017).

The back-and-forth point of views of stakeholders - car makers, logistics industry, biofuel blender and the government – in the media showed that stakeholders are using the media to influence government's decision.

2.3. Stakeholder analysis and interests

Stakeholder analysis is crucial to understand the political dynamics within the policy-making process in the energy system. For the electricity sector, the MEGTW and government agencies such as SEDA, the regulator EC, utility providers such as TNB and SESB, power generators such as existing IPP players and the solar PV players are among the key stakeholders; meanwhile in the biofuel sector, the MPIC and government agencies such as MPOB, the biofuel producer, automakers represented in different groups, logistics, industries, consumer groups and car drivers are among the key stakeholders. Interestingly, MP who showed interests in the issues and environmental group was not invited for consultations.

There are far less stakeholders in Malaysia. The fewer number of stakeholders in Malaysia may provide interest groups access points to policymakers, but this may not translate into influence. For comparison, the number of the stakeholders participated in the National Community Solar Partnership launched during the Obama administration consisted of more than 110 companies, organizations, and universities that represented 25 states.

2.3.1. Electricity Sector: Solar

2.3.1.1. Ministry of Energy, Green Technology and Water (MEGTW)

The MEGTW was formed when the Malaysian Cabinet was reshuffled in April 2009. It was formerly known as the Ministry of Energy, Water and Communications in 2004, which was restructured from the Ministry of Energy, Communications & Multimedia in 1998. Green Technology was incorporated in the ministry following the reshuffling, in addition to the existing portfolio of energy and water. The ministry shoulders the responsibility to plan, formulate policies for energy, water, and green technology programs. It also drafts related laws

and tables them to Parliament for approval. The minister also answers any questions related to the ministry in Parliament. However, this question and answer exchange is mostly for the members of Parliament to obtain information from the minister and provide certain feedback from the constituent. It is unclear if such information is taken into consideration when a policy is formulated.

Interest

The MEGTW has to ensure there is safe and sufficient energy supply at a reasonable price. As the energy sector in the country is subsidized, issues such as subsidy removal or electricity tariff increases are sensitive. Hence, the ministry is required to juggle the overall fiscal policy direction of the government to reduce subsidies and pass on the cost to the consumer, which could affect the ruling coalition at the polls in the middle of 2018, and subsidizing the electricity tariff so that it does not burden consumers.

It also implements a policy that is in-line with the larger energy security goal of the federal government at the time, such as to meet the target of increasing electricity generated from renewable energy to 5%, of the total electricity generated by 2020.

2.3.1.2. Energy Commission (EC)

The EC is the regulator for the energy sector, especially the electricity and piped gas supply industries in Peninsular Malaysia and Sabah. It was a statutory body formed under the Energy Commission Act 2001 and commenced its function in 2002. The commission's key focus is to ensure stable electricity and gas supply at reasonable cost and safety. Its role includes three areas: Economic Regulation to ensure a fair and efficient market conduct to avoid misuse of monopoly or market power in the electricity and piped gas sectors; Technical Regulation to ensure security, reliability, efficiency and quality of supply in both sectors; and Safety

Regulation to shield industry, consumer and public from risks arising from generation, transmission and distribution of electricity and piped gas (EC 2018).

It also handles the open bidding process of the LSS. Although the process of bidding is lauded as transparent, industry players have complained that many of the projects were awarded through direct negotiation.

Interest

The function of the EC is to be the regulator for the electricity and piped gas sector. It focuses on the technicality of a certain policy and prepares guidelines as well as enforcement of those policies. Its interests are to ensure a stable supply of energy at a reasonable price and safety.

It is claimed that there are many "TNB sympathizers" or former TNB employees in the EC, who advocate for the views of TNB and reject certain views of other stakeholders that they deem not feasible from the TNB's perspective (Solar industry players interview 2018).

2.3.1.3. Sustainable Energy Development Authority (SEDA)

SEDA is a statutory body established under the Sustainable Energy Development Authority Act 2011. SEDA implements the FiT mechanism, which is mandated under the Renewable Energy Act 2011 and the NEM (SEDA 2018). It also manages the Renewable Energy Fund (REF). Its key role is to advise the MEGTW and government agencies on issues relevant to renewable energy policies. It also promotes renewable energy policies and programs to the general public and engages with stakeholders on issues in the area.

Interest

The SEDA's key role is to implement the FiT and NEM. Its interest is to meet the target set by the government on the renewable energy mix. The guidelines related to the FiT and NEM policies have to be approved by the EC.

2.3.1.4. Tenaga Nasional Bhd (TNB) and Sabah Energy Sdn Bhd (SESB)

TNB is the largest utility provider in Malaysia. It was established as the Central Electricity Board (CEB) in 1949 and is the owner of power stations, both transmission and distribution of the system. After Malaya achieved independence from the British, it was later launched as the National Electricity Board of the States of Malaya (NEB) in 1965. The NEB completed the National Grid's full connection in the Peninsular Malaysia in the 1980s. The National Grid was later interconnected to the network of the Electricity Generating Authority of Thailand (EGAT) and with Singapore. The government decided to privatize and rename it as TNB in September 1990 (TNB 2018). The company was later listed on the stock market and became one of the 30 index-based companies for the FBMKLCI index. It has a market capitalization of RM83 billion (US$ 20.8 billion), but the government remains the largest shareholder of the company.

As mentioned earlier, after the power outage in 1992, the utility's position as the sole power generator in the country was taken away, and the large bulk of the electricity in the country was generated by IPPs. However, because of its role as "custodian of the National Grid", TNB is deemed as the most influential stakeholder by other interest groups. It holds the key to the transmission and distribution of the power generated using renewable resources. It is also the sole importer of coal and gas to supply to the IPPs (Solar industry players interviews 2018).

In December 2016, TNB launched its 10-year plan to focus on renewable energy and global expansion (TNB 2016). It also commenced the construction of its first LSS plant in 2017 with a capacity of 50MW, which is scheduled to begin operations in November 2018.

Sabah Energy Sdn Bhd (SESB) is an 80% owned subsidiary of TNB, with the Sabah state government owning 20% of the remaining shares. Established in 1998, SESB generates, transmits and supplies electricity to consumers in the whole state of Sabah and the Federal Territory of Labuan.

Interest

As a public listed utility company, TNB has to generate value for its shareholders through its business strategy. It manages the transmission grid and distributes electricity to consumers. It owns the Distribution License to sign power purchase agreements with renewable energy generator or IPPs. It acts as the sole importer of gas and coal used as fuel for power generation by the IPPs. It also works together with the SEDA to implement the FiT and NEM policies. Lastly, it also participates in the bidding for LSS projects. Because TNB wears many hats, coupled with a highly regulated electricity sector, TNB is perceived as the "monopoly" in the electricity sector in Malaysia.

The technological hurdles in dealing with the intermittence of renewable energy, and the need to ensure there is a sufficient base load for energy supply while increasing renewable energy production accords the utility company huge bargaining power.

However, TNB is not a unified entity as many people perceive. Within TNB, there are different divisions that are competing for resources. These divisions include generation, grid,

distribution, energy services, single buyers, research, renewable energy and so on. Hence, it does not have a coherent voice (MPIA interview 2018).

Officers at the provincial level are slow to connect the renewable energy system to the national grid. This is due to information not being passed down from the TNB headquarters to the provincial level. Therefore, local officers are unsure if it is safe to connect the renewable energy system to the grid. This also slows down the deployment pace.

2.3.1.5. Malaysian Photovoltaic Industry Association (MPIA)

The MPIA represents the interests of the industry players in the solar photovoltaic energy in Malaysia. Modeled after the European Photovoltaic Industry Association, its vision is to reform and democratize the electricity generation and distribution in the country, to develop solar PV as a competitive and mainstream source of electricity, and lastly to attain the highest level of professionalism, knowledge, and competency in the industry (MPIA 2018). The MPIA is vocal in expressing their views on policy issues, either through engagement with the government agencies within the system, or through outside strategies such as through media statements or participation in conferences. For example, it teamed up with academics from the Universiti Tenaga Nasional (Uniten) to do a technical review on the NEM policy by the government and successfully persuaded the government to adjust the policy.

Interest

MPIA's interest is to obtain the policy outcome that is conducive for the development of the solar PV industry. For example, updating guidelines according to the development of the technology, streamlining an application process that often translates into unnecessary costs.

The breaking up of the monopoly in the electricity industry and the grid resolution could accelerate the deployment of the solar PV.

2.3.1.6. Independent power producers (IPPs)

As mentioned in the earlier section, the IPPs generates the bulk of electricity in Peninsular Malaysia. Most of the power purchase agreements (PPAs) signed by TNB with the first-generation of the IPPs established in the 1990s have expired. A brief research on the strategy employed by these IPPs in the renewable energy sector showed that the YTL Power International Bhd focuses on its fossil fuel-based power generation business overseas (YTL Power International 2018). Malakoff Corp Bhd, a subsidiary of the state-owned enterprise MMC Corporation Bhd, will expand its business into renewable energy such as solar, hydro, biogas and any other sustainable energy domestically and overseas. This is in addition to its existing water and power generation businesses (Malakoff 2017). Lastly, for the Edra Global Energy Bhd, which was formed after the merger and acquisition exercise of three IPPs in the country, was acquired by China General Nuclear Power Corporation (CGN) in March 2016. Edra already has begun the construction of a 50MWac photovoltaic plant in Kedah, which is targeted to be completed in 2017 (Edra 2016).

Interest

Most of the IPPs are also expanding their business into the renewable energy sectors domestically or overseas. Since their PPAs are either expired or expiring, it is in their interest to look for other projects so as to maintain their revenue streams. However, for the IPPs, even with the LSS policy, which awarded projects with a capacity between 1MW to 50MW, the expected revenue generated from solar farms is relatively small compared to the commercial

fossil fuel-based power plant, despite a high investment return rate (IRR). It is expected that the conventional fossil-fuel based power generation business will remain as their core business, with a slowly increasing portfolio in the renewable energy area.

2.3.1.7. Consumer groups

Currently, Malaysia doesn't have any consumer group that is working on the issues related to renewable energy.

2.3.1.8. Member of Parliament

Legislator who are concern with the issue related to renewable energy generation will be a good ally for other stakeholders. So far, only Ong Kian Ming has actively raising the issues in the parliament. This was the election promises he made in the 13th General Election. He felt that not many MPs interested in the issue. Ong engaged with MPIA and SEDA informally and will raise issues related to the industry in the parliament, however he felt that the minister might not take his view into consideration (Ong interview, 2018).

Interest

It is in Ong's interest to see more renewable energy being deployed in the country. And when he is seen as honoring his election pledge, he can gain good will from the voters.

2.3.1.9. Environmental Group

Center for Environment, Technology and Development Malaysia (CETDEM) is an environmental group that concern about renewable energy and sustainable environment in Malaysia. Despite established for more than 20 years, the group was not invited for consultation.

Interest

The group support the NEM policy as it believed it is cheaper compared to FiT and can encourage more generation. But the group against palm oil-based biofuel (CETDEM Interview 2018).

2.3.2. Biofuel Sector and Interests

2.3.2.1. Ministry of Plantation and Domestic Industry (MPIC)

The MPIC, formerly known as the Ministry of Primary Industries, is set up in 2004 to handle cash crops such as rubber, oil palm, cocoa, forestry, pineapple, tobacco and minerals such as tin at the early days. Its main focus is on oil palm plantation, and Malaysia is the second largest exporter of the crude palm oil, accounting for about 40% of the world's market share. The MPIC's main functions are the formulation of policies and strategies for the overall development of the plantation and the commodity sectors as well as to supervise the ministry's agencies on the management and implementation of relevant programs (MPIC 2018).

The MPIC has been the champion for the biofuel policy. It formulated the National Biofuel policy in 2006. The main goal is to utilize palm oil stockpiles to support the CPO price, which in turn will support thousands of palm oil smallholders. It is also tasked with developing the biofuel industry to reduce the dependence on petroleum and increase production for the export market. The MPIC has conducted a total of 15 stakeholder meetings on the B10 as early as 2015. The ministry has the final say in deciding the roll-out date of the B10 policy, with a clear roadmap and direction of the implementation.

Interest

It is in the interest of the MPIC to develop the biofuel sector to roll out the B10 mandate so that the biofuel blender can increase their utilization rate. This will increase the utilization of palm oil and possibly export biodiesel. However, Malaysia is faced with huge competition in the international market, especially from Indonesia which has increased its biodiesel production by funds collected from its palm oil export levy. The tariff and nontariff barriers in the export market for Malaysian biodiesel such as the anti-palm lobby in the EU and the U.S. make export uncompetitive. The MPIC has reiterated its commitment to implement the B10 mandate, but the timing of the roll-out has yet to be decided. However, the ministry is said to lack "political will" to roll out the program (The Edge 2018). Another explanation is that the government has other issues to handle and does not want to add more issues.

2.3.2.2. Malaysian Palm Oil Board (MPOB)

The MPOB is the premier government agency in research and development on palm oil-based biodiesel as early as 1984 and managed to develop its own biodiesel technologies, including winter-grade palm biodiesel technology. The MPOB implements policies and development programs for the oil palm industry. Other functions include conducting research and development; promote and commercialize research findings, as well as provide technical, advisory and consultancy services to the palm oil industry.

Interest

The MPOB supported the B10 biodiesel mandate policy and reiterated that the B10 biodiesel blend did not have any adverse effect on the engines of vehicles, contrary to concerns raised by automakers. As the board only implemented policies mooted by the MPIC, the MPOB does not have a huge influence in affecting policy outcome.

2.3.2.3. Automakers

The automotive industry is mostly represented by the Malaysia Automotive Association (MAA) and the Japanese Automobile Manufacturers Association (JAMA). The MAA was formed in 1960 to represent and protect the interests of its members and communicate industry issues and its position on these issues to the public (MAA 2018). JAMA was formed in 1972 and comprises Japan's fourteen manufacturers of passenger cars, trucks, buses and motorcycles (JAMA 2018). Both associations have expressed concerns over the negative impact of the B10 blend on vehicle engines (Ramanujam 2016).

The car manufacturers are perceived as influential stakeholders because consumer will listen to their advice, as it will ensure the warranty of vehicle engines.

Interest

To the automotive industry, it is in their interest to push the government to scrap the B10 biodiesel policy because it may adversely affect the engines of the vehicles they produce.

2.3.2.4. Logistics sector

The logistics sector is represented by the Association of Malaysian Hauliers (AMH) and the Pan-Malaysia Lorry Owners' Association (PMLOA). Both these organizations have also urged the government to call off the B10 policy. The AMH, formed in 2002, represents more than 100 haulier company members and lobbies for legal or policy matters related to the container haulage sector. The PMLOA represents lorry owners in the country.

The AMH had said that “there was anxiety in the usage of B10 in trucks, due to uncertainty leading from an alleged scant research”; while the PMLOA said the owners would need to modify their engines to use the B10 fuel, which will incur a higher costs of adjusting the engine (Amarthalingam 2016).

Interest

It is in the interest of the logistics sector to push for the non-implementation of the B10 policy because their members may incur higher cost for adjusting the engine.

2.3.2.5. Malaysian Biofuel Association

Established in 2008, the MBA is the only industry association that represents the interests of the biodiesel industry. It currently has 17 members located in Peninsular and East Malaysia. The association's top priority is to work with the government and its agencies to implement the mandatory biodiesel blending target. It is involved in forging co-operation between biodiesel players, and between the industry and the government. It also promotes the palm biodiesel domestically and globally.

The MBA supported the B10 policy because it can boost the biodiesel industry, of which most of the production plants are currently at the low utilization rate of 30%. When the utilization rate increases, the supplier and the transport sectors will also benefit, which in turn can spur the economy. It can also increase the usage of palm oil, which will positively impact palm oil prices. Lastly, the increase of biodiesel usage can reduce greenhouse gases, which can support the government's bid to meet its climate target.

Interest

As mentioned before, it is in the interest of the MBA for the government to roll-out the B10 policy.

2.3.2.5. Petroleum companies

The petroleum companies will handle the logistics of the biodiesel supply to different parts of the country. In the initial phase of the launching of the B5 program in June 2011, the government secured the cooperation of five petroleum companies such as Petronas Trading Berhad, Shell Malaysia Trading Sdn. Berhad., Esso Malaysia Berhad, Chevron Malaysia Berhad and Boustead Petroleum Marketing Sdn. Berhad (MPIC 2015). Petronas, Royal Dutch Shell, Chevron, Petron and BHP would be blending diesel with PME at 35 blending depots throughout Malaysia. The blending facility, funded by government through MPOB, can handle the blending of B10 (Chow 2016). The petroleum companies have not openly stated their position on the policy.

Interest

It would be in the interest of the petroleum companies to implement the policy as it requires little adjustments on its facility.

2.3.2.6. Malaysia Automotive Institute

Malaysia Automotive Institute (MAI) is an agency under the Ministry of International Trade and Industry (MITI). It serves as a coordination centre and think tank for the nation's automotive industry. It recommends incentives to the government for car makers and drafts automotive policies.

Interest

The MAI expressed that the introduction of the B10 mandate requires further consideration (Gho 2016). Although MAI is a government agency, it is in its interest to stand with automakers, because its mandate is to serve the automotive industry.

2.4. Hypotheses and Analyses

The policy process in Malaysia has been described as "inward-looking" with a "highly centralized and authoritarian government" (Brown, Hawa Ali and Wan Muda 2004, 16), where policy-making is based on small-group consultations, held behind closed doors, for policymakers and stakeholders to exchange information. However, a comparative study on the speed of policy implementation in the solar power and biofuel policy processes found a diverging trend between the two policy areas despite both falling within the same policy-making environment. Why? Drawing from lobbying and public participation theories, the three hypotheses below attempt to provide some explains.

2.4.1. Hypothesis 1

Hypothesis 1: The relative distribution of power and preference intensity among stakeholders in the solar power and biofuel policies are likely to affect the policy implementation.

A huge body of lobbying scholarship in past decades have been trying to figure out why some interest groups succeed in attaining their preferred outcome. One explanation is that the source of power of an interest group lies in its ability to offer the information needed by policymakers (Baumgartner et. al 2009). Klüver (2013) conceptualized lobbying in the EU as an exchange relationship in which the institution "trades influence for information, citizen support, and economic power" (2013, 3). This hypothesis will assess the power of interest groups and how their preference intensity mobilized their lobbying action. In this analysis, power will be measured by how much the government requires their assistance in implementing the policy. The preference intensity will be assessed based on the effect of the policy initiative on their interest, which will determine how likely they are to respond to the policy change (Corduneanu-Huci, Hamilton and Ferrer, 2013).

The dependent variable in this hypothesis is policy implementation, that is, whether the policy change is being implemented or being blocked.

To begin, the solar power and the biofuel policy processes showed different stakeholder dynamics. In the solar power policy, there is a single, powerful stakeholder: state utility TNB, which would like to maintain its political economic interests. In the biofuel policy, there are a few powerful stakeholders: automakers and logistics players that stand to be affected negatively by the implementation of B10. The following analysis will explain why these stakeholders obtained their intended policy goal.

Solar power policy

As mentioned in the stakeholder analysis in the previous section, the many hats - power generation, transmission and distribution; sole importer of coal and gas for IPPs; renewable energy project developers etc. - worn by TNB make it the most influential stakeholder in the electricity sector.

This is particularly true in the context of the mixed-approach policy that the Malaysian government adopted - maintaining fossil fuel-based power generation while developing the renewable energy sector at the same time - in its low-carbon energy transition to meet the state's energy security goal. This can be explained by the highly regulated and centralized structure of the electricity sector, where TNB has been situated in the center since the development of the renewable energy policy in 2011. Because of its importance in ensuring sufficient and safe electricity supply at a reasonable price to consumers, TNB is the incumbent in the energy sector, and its interests have long been entrenched in the energy system.

One would ask - why does TNB want the NEM, which will increase solar power deployment in the country? There are two plausible explanations: First, its largest shareholder is the Malaysian government, which held a 52% stake through state investment funds Khazanah Nasional Bhd, Employees Provident Fund Board, Amanah Saham Bumiputera and Retirement Fund Incorporated as at Oct 12, 2017 (TNB 2017), hence it has to fulfil its obligation towards the state; second, the share of the renewable energy mix in the country is still small, and it is unlikely to challenge its position.

TNB has been able to shield itself from the direct challenge of the budding solar power industry. Since the implementation of the FiT policy, renewable energy capacity quotas have been imposed on the to safeguard TNB's interest. Joshi (2018) argued that when the amount of renewable energy increases, the electricity market share of TNB on the Peninsular Malaysia, and SESB on Sabah will decrease, therefore it is possible that TNB had an influence on the imposition of quotas, given the enormous weight it held. This could lead to potential conflict of interest between SEDA, which is tasked to boost renewable energy, and TNB, whose aim is to secure its market share and maximize profit (Joshi, 2018).

In light of this, it is worth taking a closer look at Joshi's insights on the flawed NEM policy that actually provides disincentives for potential investors and benefits TNB. Joshi (2018) cited low financial incentives, the forfeiture of amassing credits after 24 months, and high installation cost as the reasons of the policy failure. He argued that the FiT and NEM policies implemented since 2011 and 2016, respectively, "serve to protect the DLs (Distribution Licensees), particularly TNB" (2018, 33). The SEDA has officially admitted that the NEM's capacity quota capped at 100 MW per annum was to protect TNB's revenue (Augustin 2015). "Such an admission indicates that the NEM scheme is operating under the regulatory capture of TNB" (Joshi 2018).

Interviews with stakeholders also confirmed the enormous influence enjoyed by TNB, and that the utility is "the monopoly" in the electricity sector and it dictates the price it wants (Tunku Akmaluddin interview, 2018). Some expressed that although the EC is tasked with regulating the electricity sector, it often makes decisions that would safeguard TNB's interests, as some officers were previously from TNB and are "TNB sympathizers" (solar industry players interviews, 2018).

For comparison, the MPIA was the only association representing the solar PV industry players' interests. It was an important stakeholder for the government to obtain information related to the technology and policy that is conducive for the development of the sector. However, the information held by MPIA was not exclusive, and SEDA could provide similar research results about the technology or draw lessons from international best practices. Although the launch of the NEM did not create a positive impact on the development of the industry, the NEM did not have sufficient power to stop the policy change by the government.

Preference intensity

To assess the preference intensity of the stakeholders, I created a table to compare their resources, preference intensity and their willingness to mobilize for or against the policy reform (Corduneanu-Huci, Hamilton & Ferrer, 2013). However, I did not assign a specific score for the section as proposed by Corduneanu-Huci, Hamilton & Ferrer (2013); instead, I assigned three categories: low, medium and high.

(Table 1: Comparison of Stakeholders Preference and Resources in Solar Policy here)

The table showed that the ministry, government agencies and TNB had high preference intensity for the policy to be pushed through and they also had high incentive for mobilization. However, for MPIA, it had high preference intensity and incentive for mobilization *against* the policy change, as the policy does not provide investors with sufficient financial incentives to purchase MPIA's products and services. For consumers, they had the lowest intensity preference and incentive for mobilization, as they consisted of different individuals with different interests, with most unaware of solar PVs or unable to afford to install the system, thus, making it harder to mobilize themselves together for or against the policy change.

In sum, TNB had the biggest power among all the stakeholders because the government required its assistance to implement the NEM policy, and the policy change was in its interest. It also had high preference intensity and incentive to push through the policy. This in turn led to the implementation of the solar power policy.

Biofuel policy

The biofuel policy, on the other hand, shows a different picture. The automakers were considered the most powerful stakeholder group in this policy. Interviews with stakeholders confirmed that the automakers played key roles during the consultation process and opposed the use of biodiesel on concerns that it would clog up car filters. The government needed the assurance from the automakers that the warranty of the engine would not be void if motorists used the B10 biodiesel, hence it had to reach an agreement with the automakers. Another stakeholder, the logistics sectors, though not as powerful, also wanted the policy halted. Concerns over the biodiesel on car engines on the automakers' part and the extra cost incurred to upgrade engines on that of the logistics companies brought them together. This group of stakeholders can be identified as a lobbying coalition with the same policy goal. Kluver (2013)

posited that a lobbying coalition consists of interest groups that lobby for the same policy objective in the same direction, as the aggregated information supply, citizen support, and economic power of the coalition have a positive effect on exerting influence. Where the B10 policy was concerned, the automakers and the logistics players faced immediate impact from the rolling out of the policy, as its implementation was mandatory once launched. Hence, they had high preference intensity and high mobilization for the policy to remain at the B7 mandate status quo.

For comparison, MBA was the only group representing the interests of the biodiesel producers, hence it was crucial for the government to hear its views. Despite the group having the same policy preference as the government and the MPOB's, it was unable to provide an aggregated benefit that was required by the automakers-logistics coalition. Even the MBA president himself admitted that the association had a medium level of influence over the policy outcome, and MBA "can only express our views" (Unnithan interview, 2018).

Preference intensity

To assess the preference intensity and incentive for mobilization of the stakeholders, a similar table is created for comparison.

(Table 2: Comparison of Stakeholders Preference and Resources in Biofuel Policy here)

The table showed that the ministry and MPOB had high preference intensity and incentive to push through the policy reform, but the automaker and logistics sectors had high preference intensity and incentive to block the policy. MBA had high preference intensity and medium/high incentive to mobilize for the policy change.

In sum, the coalition of the automakers and logistics players comprised the crucial sectors that the government needed to implement the policy, thus rendering them powerful compared with

the other stakeholders. They also had high intensity preference, which incentivized them to mobilize against the policy change, as their sector would be immediately affected by the mandate. Although their policy preference was different from the government's, they were powerful enough to be able to block the implementation of the biofuel policy.

From the above analyses for the solar power and biofuel policies, part of the hypothesis is confirmed, that is, powerful stakeholders and high intensity preference led to policy implementation in the solar power policy, but a similar policy was blocked in the biofuel policy consultations. This, however, confirmed the lobbying theory that powerful stakeholders with high intensity preference can attain their policy preference.

However, the two sectors showed different traits. On the one hand, there is a single, powerful stakeholder in the electricity sector that could push through a policy that suited its preference to safeguard its financial interest while meeting its obligations as a state-owned enterprise. On the other hand, there is a coalition of stakeholders - a powerful automaker and a relatively less powerful logistics sectors - that shared the same policy preference and wanted to block the policy change proposed by the state. As the government required their cooperation to implement the policy, they successfully blocked the policy implementation. Despite the divergence in the two policy processes, the finding is in line with the literature that powerful stakeholders, whether a single monopoly or a coalition, can attain their policy preference.

2.4.2. Hypothesis 2

Hypothesis 2: A higher level of stakeholder engagement will lead to higher legitimacy, which in turn will increase the speed of the renewable energy policy implementation.

Legitimacy is considered the "most contested feature" in public participation in policy-making. It requires sufficient and diverse representation, as well as procedural fairness to produce feasible policy outcome. A genuine effort to engage in problem-solving is crucial if a decision has the potential to be controversial (Creighton 2005). A lack of legitimacy will hinder the implementation of the policy (Quick and Bryson 2016). In order for the government to obtain the legitimacy in implementing its policy, the citizen must be given an opportunity to participate in the decision-making process and to have their views taken into consideration. Also, the government must be willing to hear the will of the public. Hence, it is expected that higher citizen participation leads to higher legitimacy although not all the citizens may obtain their preferred policy outcome.

In the context of Malaysia, broad-based direct citizen participation is absent in the policy-making process; instead closed-door meetings are held and joined by a small cluster of stakeholders representing their interests, where they can make their case and provide expert information needed by the government to make its decision.

In assessing the legitimacy of the participation processes in the two policies, the analysis will measure: i) the level of engagement with the stakeholders via the number of meetings; ii) the level of diverse representation via the number of groups; and iii) the ratings of industry players from MBA and MPIA on the inclusiveness of the processes. The limitation of this assessment is that not all the stakeholders are included.

The dependent variable in this hypothesis is the speed of policy implementation, that is, whether the policy change was sped up or slowed down by the higher level of engagement and increased legitimacy. The policy outcome will be compared with the policy that has a higher legitimacy, to confirm whether it sped up or slowed down the policy implementation.

Solar PV policy

Interviews with the regulator EC, government agencies SEDA, MPOB and industry players MPIA and MBA showed a divergent trend between the two policies. In the electricity sector, several meetings were held among the government agencies and the utility companies, TNB and SESB, in 2014 to discuss the implementation of the NEM. This grid inter-connection committee consisted of representative from the ministry, EC, TNB, SESB, and experts who had been working closely with SEDA. At the committee level, three meetings were held to discuss the NEM. The EC was later instructed by the ministry to deal with the technicalities of the policy (SEDA interview 2018). There were 12 meetings called to discuss the issuing of guidelines for the NEM policy (EC interview 2018).

At the stakeholder level, only one workshop was held in February 2015. Eleven stakeholders joined the workshop, including the EC, TNB, SESB, SEDA, MPIA, Federation of Malaysian Manufacturers (FMM), a solar expert partner from University Teknologi Mara and others (Interview SEDA 2018). The stakeholders were chosen based on SEDA's recommendation, but the meeting was chaired by the EC. Subsequently in end-October 2015, the NEM was launched, but it did not immediately attract reactions from the solar PV industry players, as the industry agreed in principle that the NEM in theory is a good policy in the long run, even though the Malaysian version of the NEM disincentivized investors (Joshi 2018). Although industry players felt that the policy had been forced down on them, they had little choice but to put up with the decision and figure out ways to make the best out of the situation (Solar PV player interviews 2018).

Biofuel Policy

For the B10 biofuel policy, a total of 15 stakeholder meetings were held to discuss the implementation of B10 since the launch of B7 in 2015. These meetings involved a wide range of stakeholders, including petroleum companies, car dealers and manufacturers, Malaysia

Automotive Association (MAA), Japanese Automobile Manufacturers Association (JAMA), FMM, MAI, MBA, and government agencies e.g. Road Transport Department, Department of Environment (DoE), Ministry of Finance (MoF), MEGTW etc. The MPIC drafted policies with regard to palm biofuel, while the minister was to make his decision after he was satisfied that issues related to the implementation of B10 had been ironed out (MPOB interview 2018).

The meetings aimed to achieve consensus regarding the logistics of supply, quality control, economics and vehicle warranties when it comes to the B10 implementation. Even after the announcement of the minister of the date of the launch of B10 in 2015 and the resistance by the automakers and logistics sector, the MPIC managed to organize five meetings. The meetings were chaired by the top management in MPIC and MPOB. Representatives from the Biofuel Unit in MPIC came to such consultations to listen to stakeholders on improvements to the draft policy. The minister and Director General of MPOB had also been chairing high-level consultations with captains of the relevant industries.

The consultations discussed two main issues, namely the price of the biodiesel and engine warranty, both of which have a direct impact on users. The discussions were geared towards how the government could implement the B10 mandate holistically in Malaysia through discussions on the logistics of supply, economic feasibility and suitability of use in the current Malaysian diesel engine technology available. The focus of this implementation had been to reduce the emission of greenhouse gases and other pollutants from the automotive and industrial sectors.

The meetings followed a formal format that allowed presenters to express their views and stakeholders to comment and offer suggestions. The consultations encouraged all stakeholders to give their views and suggestions to further improve the ongoing implementation of higher biodiesel blends. The average two-hour-long sessions allowed attendees ample time to give

their take on the mandate. MPIC and MPOB also collected written responses from stakeholders when needed.

During these meetings, some stakeholders were prepared, while others were not. Most stakeholders were supportive of the government's endeavor in the B10 mandate with some reservations. They were also eager to share their views on how environment protection comes at a cost. MPIC and MPOB ensured that the stakeholders were aware of the objectives of each consultation to help them come prepared with their views. The meetings led to actions taken to address issues that hindered the implementation of the B10 mandate.

The meetings also increased the level of understanding between the government and the industry, which showed that everyone could work together to achieve a higher goal that benefitted all stakeholders (MPOB interview 2018). Industry players from MBA also said that the meetings were inclusive and effective for stakeholders to express their opinion, although the association was not able to obtain its preferred outcome, that is, the roll out of the B10 mandate.

MPIC also coordinates among ministries on the B10 implementation, as renewable energy policy falls under the jurisdiction of MEGTW, and to enhance cooperation with the Ministry of International Trade and Industry, as the said ministry deals with importation of vehicle types and incentives. Contribution of carbon dioxide reduction is under the Ministry of Natural Resources and Environment. Interviewees were of the view that if the government had a clear direction and roadmap for the biofuel sector, the other stakeholders such as automakers would follow suit. The consensus among the various heads of ministries on the macro policy at the top level could smooth out implementation of the B10 program (MPOB interview 2018).

Interviewees believed that the delay in the B10 program implementation was because "the government needs to be democratic and ensure that the wide variety of stakeholders, who are

looking to support and benefit from the mandate, are able to accept its implementation" (MPOB interview 2018).

Assessment of legitimacy

The description of the consultation processes for the two policy areas showed that the biofuel policy had a higher level of engagement, as opposed to the solar PV policy. There were 15 stakeholder meetings held to discuss the B10 mandate, as opposed to one stakeholder meeting for the NEM. Although the number of stakeholders who participated in the biofuel policy was more than that of the solar power policy, for both policies, they could be divided into only two main groups: government agencies and industry players; the civil society and consumer groups were missing from both policies. Hence, it can be argued that the diversity of the views presented in the two policy-making processes was similar and limited. Lastly, on the inclusiveness of the consultations, industry players from MBA gave a rating of 9 (1 being the lowest and 10 being the highest score), while industry players from MPIA gave ratings of 5-6 (MBA and MPIA interviews 2018). The results of the three indicators are summarized in the table below:

(Table 3: Assessment of legitimacy here)

The assessment confirmed the hypothesis that there is higher legitimacy in the biofuel policy because of higher participation. This is reflected in the high score given by MPIA, despite the association not getting its preferred policy outcome, that is, the roll out of the B10 mandate. However, the high-legitimacy policy process slowed down the policy implementation.

2.4.3. Hypothesis 3

Hypothesis 3: The salience of the policy issues leads to likelihood of policy implementation.

The level of salience of a policy issue is expected to have a negative impact on the lobbying success of an interest group. This is because as the salience of an issue to the public increases, it becomes more difficult for policymakers to listen to one advocacy group (Mahoney 2007; Baumgartner et. al. 2009).

To measure the public salience of the solar power and biofuel issues in the media and the Parliament, I conducted searches on an online media in Malaysia and the Hansard of the Parliament of Malaysia. I chose these two different platforms because the frequency of the news appearing on local news sites can serve as an indicator of the extent that the public was informed about the issues; similarly, the number of times that words related to the policy issues appeared in the Hansard reflects how often the issues were brought up in the legislative branch.

The selected media is *The Star Online*, a general news site operated by the Star Media Group. *The Star Online* was chosen because it has the highest circulation in Malaysia, and access to its website is free of charge.

Further, I used the date of the 12th General Election, held on March 8, 2008, as a breaking point, because the watershed election had for the first time broke the two-thirds majority of the then ruling coalition *Barisan Nasional* in Parliament, and 82 opposition legislators were elected as opposed to 21 before the elections. This break puts the law-making environment in the Parliament at a constant.

In addition, the Biofuel Industry Act (BIA) was passed in the Lower House after the second and third readings on April 12, 2007. A total of three MPs debated the bill, while another 13 MPs raised questions and made comments during the debate.

The second and third readings of the Renewable Energy Act 2011 were held in the Lower House on March 31, 2011. A total of 15 MPs participated in the debate and another 12 MPs raised questions and voiced their comments during the whole-day debate. This bill was enacted to set up the regulatory framework for the implementation of the FiT for solar, biomass, biogas and mini-hydro, not exclusively related to solar.

Search Results

For searches on the media, before the breaking point, the keyword "Malaysia solar" generated 5 news articles, "Malaysia biofuel" returned with 11 news articles, and "Malaysia biodiesel" came up with 19 news articles; after the breaking point, the respective figures were 74, 16 and 36. This showed that the issues of biofuel and biodiesel were reported relatively more often that of solar before the 2008 breaking point, while issues related to solar were more reported after 2008, compared with biofuel and biodiesel news. The search results are summarised in the table below:

(Table 4: Keyword search result in The Star online)

The search result on *The Star Online* showed that news related to biofuel and biodiesel were reported more often compared with solar before 2008, but news on solar appeared more in the media after 2008 election.

Searches were also conducted in the Hansard record of the Lower House on the Malaysian Parliament website before and after the 12th General Election, using both English and Malay keywords - "solar", "biofuel", "biodiesel", "*Biobahan api*" (biofuel in Malay). The results

showed that the word "solar" came up 128 times, "biofuel" 17 times, "biodiesel" 69 times, "*biobahan api*" twice before the 2008 elections; the respective figures were 382, 10, 41 and 15 post-elections. The search result from the Parliament is summarized in the table below:

(Table 5: Keyword search result in Parliament Hansard)

The searches in the Parliament Hansard showed that the word "solar" came up more often than the other words in Parliament both before and after the 2008 general election.

Solar was less reported in the media but mentioned a lot by MPs in the Parliament before 2008. The media and the Parliament Hansard showed the same trend after the 2008 elections, with solar appearing more than biofuel and biodiesel. This means that biofuel and biodiesel were more visible in the media before the 2008 elections. An explanation for this is that the development of biodiesel is closely linked to the palm oil sector. Malaysia is the second largest exporter of palm oil, thus any incident that could affect the crude palm oil price would be newsworthy. After the 2008 elections, issues related to solar gained more salience with the public, compared with biodiesel.

The Hansard, however, showed that solar had more salience with the MPs, compared with biodiesel both before and after the elections.

As the solar power policy was launched in 2016 and the biofuel policies were proposed in 2015, the analysis on the salience of the issue will focus on the period after the 2008 General Election. The results showed that solar was more salient than biodiesel. As the theory expected that the more salient the issue, the more difficult it is for policy-makers to push it through, as it needs to listen to more stakeholder views, the finding of this research is contrary to the hypothesis in that the solar policy was implemented although the issue was more salient, while the biofuel policy was blocked by stakeholders despite the issue being less salient.

Conclusion

This thesis examines why the speed of implementation in the solar power policy diverges from that of the biofuel policy in Malaysia. The two policies were chosen because they comprised the key policy efforts by Malaysia to move to a low-carbon energy system. Drawing from the lobbying and participation theories in political science, this study confirms that powerful stakeholders with high intensity preference are likely to attain their policy preference.

The two policy areas showed an interesting divergence. In the solar policy, there is a single powerful stakeholder, TNB, that could push through the policy change, while in the biofuel policy, a stakeholder coalition consisting of players from the automaker and logistics sectors with the same policy goal successfully blocked the policy change.

This thesis also proved that higher stakeholder participation leads to higher legitimacy. The biofuel policy has more stakeholder engagements and is viewed as more inclusive by industry players, compared with the solar policy. However, while higher engagement leads to higher legitimacy, it slows down the speed of policy implementation.

Lastly, this research found that the salience of the policy issue leads to high speed of policy implementation. This is against the expectation that the more salient the issue, the more difficult it is for a policymakers to come to a decision and policy change, hence slowing down implementation. In this particular comparative study on the solar and biofuel policies in Malaysia, the power and preference intensity of the stakeholders are better fit to explain the divergence in the two policy areas.

This thesis contributes in three ways: First, it uses the political economy theory to study the renewable energy policy in Malaysia, which is rarely undertaken. This can fill in the gaps in existing renewable energy policy literature in Malaysia. Second, it contributes to the larger

lobbying and participation theories, as the case studies of Malaysia showed an interesting divergence. Third, it serves as a case study of the energy transition carried out by a fossil fuel-rich country to better understand the factors that lead to policy change.

Further studies on other policy areas such as energy efficiency or green technology could deepen the understanding of the energy transition in Malaysia. Another area of study is the energy transition of fossil fuel-rich countries and how powerful actors resist or embrace policy change.

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Appendices

Table 1: Comparison of Stakeholders Preference and Resources in Solar policy

Stakeholder	Benefit from reform?	Resource	Intensity of Preference	Incentive for mobilization (Resource x intensity)
Ministry of Energy, Green Technology and Water	Yes	high	high	high
Energy Commission	Yes	high	high	high
Sustainable Energy Development Authority	Yes	medium	high	high
Tenaga Nasional Bhd	Yes	high	high	high
Malaysian Photovoltaic Industry Association	No	medium	high	high

Independent Power Producers	No	high	low	medium
Environmental group	Yes	low	high	medium
Consumer	No	low	low	low
MP	Yes	medium	high	medium/high

Source: author

Table 2:Comparison of Stakeholders Preference and Resources in biofuel policy

Stakeholder	Benefit from reform?	Resource	Intensity of Preference	Incentive for mobilization (Resource x intensity)
Ministry of Plantation Industry and Commodities	Yes	high	high	high
Malaysian Palm Oil Board	Yes	high	high	high
Automakers	No	high	high	high
Logistics sector	No	medium	high	high

Malaysian Biofuel Association	Yes	Low/medium	high	Medium/high
Petroleum companies	Yes	high	medium	medium
Malaysia Automotive Institute	No	high	medium	medium
Environmental group	No	low	high	medium
Consumer group	No	low	low	low
MP	Yes	medium	high	Medium/high

Source: Author

Table 3: Assessment of Legitimacy

	Number of stakeholders meeting	Diversity of stakeholders	Inclusiveness of consultation score
Solar policy	1	2	5-6
Biofuel policy	15	2	9

Source: Interviews, 2018

Table 4:Keywords Search result in The Star Online

	Solar	Biofuel	Biodiesel
Before 2008 election	5	11	19
After 2008 election	74	16	36

Source: *The Star Online*

Table 5:Keywords Search result in the Parliament Hansard

	Solar	Biofuel	Biodiesel	Biobahan
Before 2008 election	128	17	69	2
After 2008 election	382	10	41	15

Source: Malaysian Parliament website