

BARRIERS TO RENEWABLE ENERGY DEVELOPMENT: FIVE FUEL POLICY IN MALAYSIA

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ABSTRACT

Since the year 2000 in Malaysia, national government has identified appropriate implementation strategies for the development and utilisation of renewable energy sources. A target of obtaining 5% of the total energy supply from renewable sources was set, although it has not yet been reached. A lot of studies were carried out about potential technological, economic, social, or politics barriers to renewable energy development in Malaysia. Although important, there is a necessity for multi aspect investigation of these barriers. By applying a theoretical framework, this paper seeks to examine expert perceptions and understanding of the barriers to renewable energy development in Malaysia. This study shows that barriers to renewable energy cannot be explained only by one factor in separation. The results of this study indicate that, the intention to use renewable energy is influenced by the cost of renewable energy technology. From the analysis of the opinions of the respondents, it can be said that best way to overcome these barriers is that the government should play a powerful leadership.

Key words: Renewable energy policy, Barriers, Malaysia

1. INTRODUCTION

In the Malaysian context, utilization of renewable energy (RE) as the fifth fuel has been intensified since 2000 to supplement the supply from conventional energy sources. In this respect, the fuel diversification policy, which comprises oil, gas, hydro and coal, has been extended to include RE in the 8th Malaysian plan (2001-2005), and the government set itself a target of obtaining 5% of its energy from renewable sources by 2005. However, this policy ended up reaching only 0.3% of the target by the year 2005 [1]. The notion was followed in the 9th Malaysia Plan (2006-2010); again, the target of obtaining 5% of RE in the country's energy mix was set. Nonetheless, the RE goal once again was not achieved, and so far, only 8.3% of the target has been reached [2].

An objective of this study is to identify and critically determine the most important barriers to renewable energy and the potential interactions between those barriers in Malaysia. To do so, a series of semi-structured interviews were conducted with 55 energy experts, including 18 academic staff members and 37 members of Energy Companies. In this paper we apply the AKTESP theoretical framework, introduced by Trudgill [3], to examine the barriers to renewable energy development policy in Malaysia.

2. STATEMENT OF PROBLEM

As a member of the Association of South East Asian Nations (ASEAN), Malaysia has had a consistent performance of gross domestic product growth from the period of 1970 to 2013 [4]. The total final energy consumption of Malaysia grew at an annual average growth rate of 7%, from approximately 14.5 Million tons of oil equivalent (Mtoe) in 1990 to 45.6 Mtoe in 2007 [5], and it is expected that in 2020, the total final energy consumption will reach 116 Mtoe, based on an annual growth rate of 8.1% [6]. The rate of increase in carbon emissions in Malaysia is also one of the highest in the world: Malaysia ranks as the third highest worldwide, with average annual growth of 4.7% from 1970 to 2008 [7]. In the business as usual scenario, Malaysia's CO₂ emissions from fuel combustion is projected to increase by 3%, from 43.7 million tons of Carbon equivalent (Mt-C) in 2007 to 86 Mt-C in 2030 [8]. Considering the impact of economic growth on energy consumption [9], meeting the ever-increasing demand for energy in a sustainable manner is essential to boosting the country's competitiveness and resilience in the 21st century [10].

The government of Malaysia has formulated numerous energy related policies in order to meeting the ever-increasing demand for energy in a sustainable manner. A case in point is fuel diversification policy (1981-1999) which result in fuel switch for electricity generation. As a consequences of this policy the share of oil in the mix was reduced tremendously, while the portion of gas markedly increased (see Fig. 1).

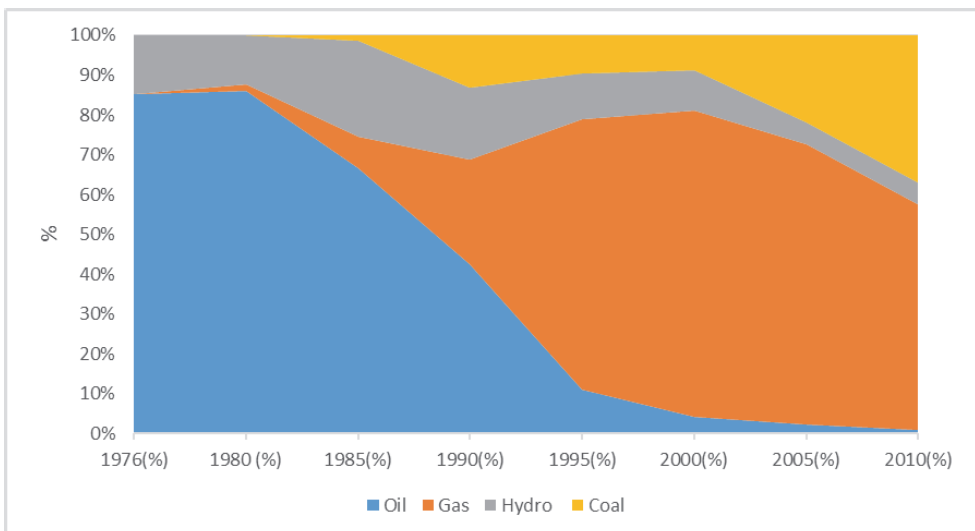


Figure 1 : Energy Mix in Malaysia, 1976-2010 (%). Sources: APEC energy statistics 2009 & 2010

Considering the fact that Malaysia faced a growing rate of energy demand (see Fig. 2), to providing adequate and sustainable energy and reduce the emission of greenhouse gases, in 2001, the government of Malaysia broadened the country's four fuel energy policy, which addressed oil, gas, coal and hydro, by adding renewable energy as the fifth fuel.

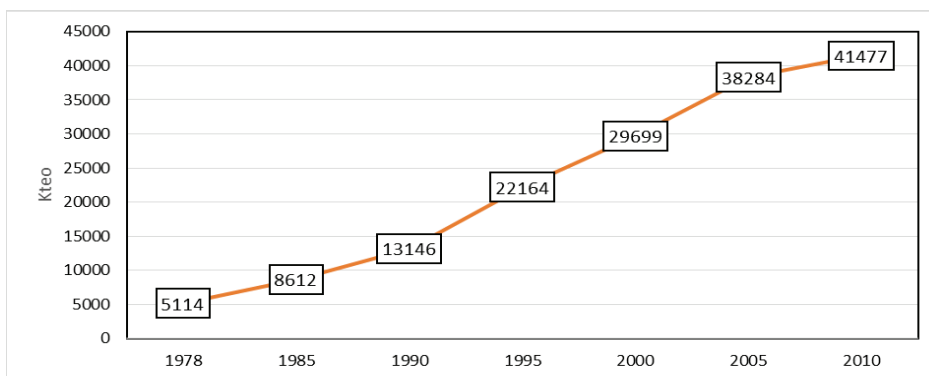


Figure 2. Final energy demand for Malaysia, 1978-2010.

Source: Malaysian energy information HUB.

The Five fuel policy under the 8th Malaysian plan aimed to generate 5% of the country's energy from renewable sources by 2005. The development and utilisation of RE was further intensified in the 9th plan period.

Under the 8th and 9th Malaysian plans, the Malaysian government took several steps to explore and promote the use of renewable energy as an alternative fuel source. In this regard, more than 800 million USD were invested in new renewable energy production (13). However, the renewable energy projects that were implemented under the five fuel policy failed to achieve their goals.

Comparing the total primary energy supply in 2000 and 2009 clearly illustrates that within these 10 years, Malaysian dependency on fossil fuels has not changed, with the country only switching among different types of fossil fuels (see Fig.3).

It is evident that the RE Policy implemented in the 8th and 9th Malaysian plans did not obtain their targets. Failure to achieve the targets of RE policy in Malaysia between 2000-2010 was clearly declared in the 10th Malaysian plan, which indicated that: although Malaysia has multiple renewable energy sources, such as biomass, biogas, and mini-hydro and solar, despite vigorous initiatives, the renewable target set out under the Ninth Plan period was not achieved [11]. This situation poses a question regarding what type of barriers are associated with the failure of RE policy in Malaysia.

Addressing this question is indispensable because learning from past experiences is a fundamental necessity for promoting the development of renewable energy.

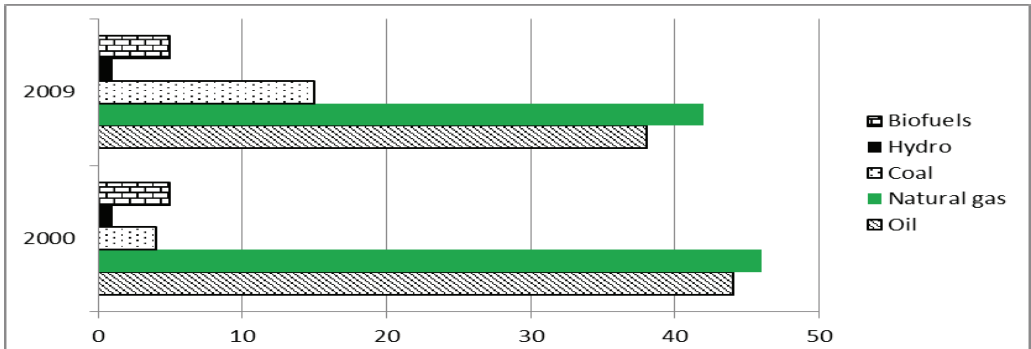


Figure 3: Primary energy supply in Malaysia, 2000-2009. Sources: The 3rd ASEAN energy outlook: 2011.

3. DISCUSSION

This section provides details about the barriers to implementing renewable energy policy in Malaysia between 2000 and 2010 from the AKTESP perspective. The frequency of citation (FC) of these barriers is shown in Fig. 4. It is apparent from the FC in this Figure that political and economic barriers are the most significant ones.

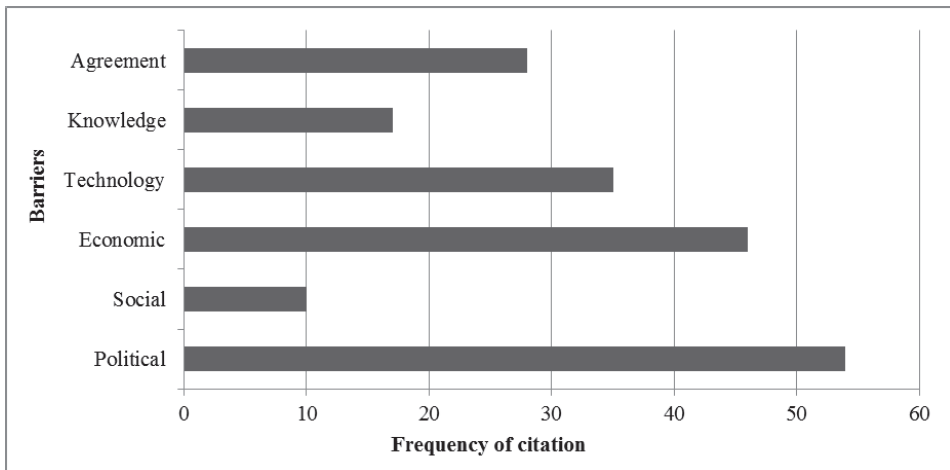


Figure 4: frequency of citation for each AKTESP barrier. Note that some of the 68 academic staff members who were interviewed did not answer all the questions.

3.1. Lack of Agreement

Some respondents revealed that barriers to reaching agreement evidently exist in Malaysia. Those who considered disagreement as a barrier listed two examples in this category. One example involved disagreement among decision-makers over the most effective course of action to find an alternative source of energy to fossil fuel based energy. Although the government of Malaysia proposed different policies related to renewable energy, it seemed that among government members, there was no unity and consensus over these policies.

The other example of a disagreement barrier that overlaps with political barriers is linked to poor communication and lack of harmony among different institutes and departments involved in planning and implementing renewable energy. It is important to note that in the period of 2000 to 2010, at least 7 major ministries and departments were involved in renewable energy planning. Note that “When responsibility for renewable energy policies and planning is divided among the departments, this can result in poor communication and thus a lack of commitment to push forward the renewable energy policy” [12].

3.2. Lack of knowledge

Few respondents reported knowledge as a barrier that prevents RE policy in Malaysia from being successful. Those who agreed about the existence of knowledge barriers listed some items. The absence of knowledge and skill among the professionals and technicians in the renewable energy was considered as a barrier in this group. The lack of awareness by probable users in Malaysia resulted in the lack of demand and marketing for this technology. Without the availability of marketing, the local market for renewable energy was not attractive for the private sector. Thus, there was no intention from the private sector to financially support renewable energy. One respondent mentioned that “In terms of knowledge and understanding about renewable energy issues, there was a tension between the federal government on one hand and the state and local governments on the other hand. “Another participant indicated that “national agencies may provide Renewable Energy policy goals, strategies, funding, and assistance, but the majority of the required day-to-day relationships and actions to apply policies to the target people must come from the state and local level. However, there was no communication of knowledge among these government stages, and thus, the renewable energy polices failed during their implementation.”

3.3. Technology barriers

A number of the interviewees identified technology-related barriers as an impediment factor to prevent Malaysian RE policy from reaching its target. As a result of these barriers, on one hand, there is no demand for developing this type of energy among people, and on the other hand, in regard to implementation, the policy government and private sector have no intention to spend money for further development.

The lack of cutting edge technology is a further barrier reported by some respondents. One interviewee illustrated that “when Malaysia decided to move toward renewable energy in 2000, RE technology in Malaysia was in its infancy, and further

development largely depended on massive transfers of relevant technologies from developed countries, which has yet to occur.” As a sign of this lack of technology commitment, one respondent referred to the Malaysian PM Speech at the U.N. Climate Change Conference 2009 in Copenhagen and highlighted that “the Malaysian prime minister in 2009 clearly asserted that Malaysia needed access to a massive transfer of technology, including RETs for addressing climate change, which meant that during the years before 2009, the absence of green technology for renewable energy in particular was evident in Malaysia.” The lack of technical standards is also considered one of the technology related problems. The identification of existing barriers due to the technical standards in Malaysia is consistent with those of [13], who found that the lack of standards was a significant technology related barrier among the majority of ASEAN members. Note that this barrier is a common challenge for RET-importing countries [14].

3.4. Economic Barriers

Most interviewees agreed that economic barriers to the advancement of RETs existed in Malaysia and led to the failure of RE policies. In the economic realm, four barriers were listed by interviewees: subsidies, tariff issues, cost and pricing, and bank financing. Providing subsidies for fossil fuels was one of the key economic related barriers mentioned by the contributors. It is widely believed that as long as fossil fuels are subsidised or that their prices fail to reflect their ecological costs, renewable energy sources will not be commercially feasible.

The present findings are consistent with other research, which found that subsidies impede the diffusion of RETs [15, 16]. Table 2 provides more details about fuel subsidies in Malaysia between 1990 and 2010. Note that in 2007, energy subsidies in Malaysia exceeded 8 billion USD, which was ranked second in the ASEAN region (after Indonesia) [13].

Table 1: Fuel Subsidies in Malaysia from 1990 to 2010.

Year	Total subsidies (RM million)	Of which: fuel subsidies (RM million)	Total government expenditure (RM million)	Total government	
				Total subsidies	Fuel subsidies
1990	494	27	35,715	1.4	0.1
1995	612	123	50,624	1.2	0.2
2000	4,824	3,170	84,488	5.7	3.8
2005	13,387	10,984	128,278	10.4	8.6
2010	23,106	9,605	204,426	11.3	4.7

Source: [18].

Tariff-related barriers are another type of economic barrier cited by the respondents.

The difficulty to obtain bank financing has also been mentioned by interviewees as an economic barrier. Collectively, the interviewees indicated that economic barriers hampered the development of renewable energy during the 8th and 9th Malaysian plans. All in all, in terms of economic barriers, the economic ethos of Malaysia was

not supportive for renewable energy, especially for providing a balance between costs and benefits.

3.5. Social barriers

The lack of social acceptance for renewable energy in Malaysia was considered as a barrier by a few of the respondents. Note that although social acceptance as a part of renewable energy technology implementation has largely been neglected in the eighties, recently, it has been increasingly recognised as a potential barrier to the achievement of renewable energy targets [17].

The multi-cultural nature of Malaysian society was also mentioned as one of the social issues for developing RE. In regard to gaining public support for any policy, including RE policy, taking the multi-cultural factor into account increases the chance of success of gaining such support. One of the interviewees highlighted this issue and indicated that the “multi-cultural factor can either be a social barrier or a driver of their implementation. Unfortunately, during the 8th and 9th developing plan, this factor had no place in the plan and implementation of RE policy.”

3.6. Political barriers

In this study, similar to the economics barrier, the majority of interviewees agreed that political barriers were an issue that caused the failure of RE policy in Malaysia. The respondents revealed that developing renewable energy in Malaysia required a fundamental system change, but government failed to play its role in making this necessary change. In the political category, weak plans and unrealistic targets in terms of the implementation of renewable energy were also addressed by the respondents. For example, one interviewee argued that “setting a 5% target for renewable in energy in the 8th Malaysian plan was unrealistic and so ambitious.” Another interviewee mentioned that the “Malaysian government placed priority on one policy in theory, and another in practice.” As a sign of the low priority for Malaysian government to develop RETs, one respondent highlighted the small environmental R&D (Research and Development) budget and noted that “after announcing the five fuel policy and setting the 5% target for Renewable energy, it was predicated that the government budget appropriations for environmental R&D would increase, but we faced the opposite situation. In 2002, total R&D expenditure in Malaysia was 0.69% of the GDP, while in 2006, this figure declined to 0.64% of the GDP.” Note that in the energy sector, government R&D programmes and R&D pursued by utilities play a vital role in developing RE technology [19].

4. CONCLUSION

This study set out to determine the barriers leading to the failure of renewable energy policy in Malaysia between 2000 and 2010.

The findings from this study made several contributions to the current literature of the barriers to renewable energy development in Malaysia. They include:

- i. Technology barriers, including inherent barriers to RE (e.g., wind), the lack of advanced technology, and the absence of technical standards.
- ii. Economic barriers, including subsidies for fossil fuels, tariff-related barriers, the

- high cost of producing renewable energy, and the difficulty to obtain bank financing.
- iii. Agreement barriers, including disagreement among decision makers and poor communications among different departments.
 - iv. Political barriers, including the government's failure to play a powerful leadership role for the necessary changes, weak R&D, unclear relationship among the three levels of governments, feeble and unrealistic renewable energy targets.
 - v. Knowledge barriers, including the lack of knowledge and skill among the technicians and the lack of awareness among people and end-users.
 - vi. Social barriers, including the lack of public acceptance and the multi-cultural nature of Malaysia.

This study indicated that failure of the five fuel policy in Malaysia is a multi-aspect phenomenon. The important point is therefore not to cling to one or two barriers but to use the groups of barriers to explain this failure. This study also revealed the interrelationship of the barriers to renewable energy development in Malaysia.

One of the most important lessons is the requirement of overcoming of both economic and political barriers, which according to the respondents, are the two most significant barriers.

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