

**A PRELIMINARY SURVEY OF KNOWLEDGE AND EXPECTATIONS ON
RENEWABLE ENERGY AMONG MALAYSIAN UNIVERSITY ACCOUNTING,
BUSINESS AND ECONOMICS STUDENTS**

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Abstract

Present students are future business and government leaders. As such, it is important to examine their knowledge and expectations regarding sustainable renewable energy. A questionnaire survey was carried involving a total of 207 students in accounting, business and economics fields in a Malaysian university. While a majority of the students answered correctly on questions related to renewable energy knowledge, there are those who did not. Accordingly, only 41.5% of respondents indicated their level of knowledge in renewable energy to be good or better. For expectations, most respondents agreed for countries to produce and utilise both renewable and non-renewable sources of energy but a significant percentage (39%) disagreed on building nuclear plants. A majority of the students also indicated willingness to pay for clean energy and renewable energy at home. The results of this research can be used by stakeholders in improving students' knowledge and exposure to renewable energy through changes in the curriculum to include topics and assignments related to renewable energy or incorporating activities related to renewable energy in the campus environment.

Keywords: Renewable Energy, Sustainability, University Students, Knowledge, Education

1.0 INTRODUCTION

Uptake of renewable energy in Malaysia is still quite low compared to others in particular developed countries. As reported in a local Malaysian newspaper, the Minister of Energy, Science, Technology, Environment and Climate Change stated that only 2% of energy in 2018 in the country is from renewable source (Goh, 2018). The bulk of the energy is from non-renewable sources such as gas and coal. For gas, the gas reserves in Malaysia is expected to last until 2061 based on a report in a local Malaysian newspaper (Harun, 2017). As for coal, the supply is expected to last until the end of the century (Harun, 2017). Therefore, the country needs to look into other sources of energy in particular renewables ones. In fact by 2030, the target of the Energy, Science, Technology, Environment and Climate Change Ministry is to have 30% of renewable energy in the country's energy mix (Goh, 2018).

While 2051 and the turn of the century may still be a long way, we should look into the knowledge and expectations of the future leaders of government and business of the country. With that in mind, this research was conducted to explore the knowledge and expectations of non-science undergraduate students who will be part of the future generation of leaders. Findings can be used the appropriate parties to increase the use of renewable energy sources in the country in the years to come.

2.0 LITERATURE REVIEW

In general, Malaysian undergraduate students enrolled in non-science faculties or academic programs come from non-science stream in their secondary or pre-university education and may not be very well exposed to the idea and knowledge on non-renewable energy as compared to their counterparts in science and technical faculties or academic programs. The students in the latter type of faculties or programs are more likely to be from science stream in their secondary or pre-university education. Topics on renewable energy would probably be taught in science or technical classes or courses at the secondary, pre-university or university level for these students.

While some research on environmental knowledge of students have been carried out in Malaysia such as Esa (2010) and Harun, Lim and Othman (2013), limited studies have been carried out specifically on renewable energy. Some survey questions related on renewable energy can be found in the other research but these mainly gauged the level of respondents' general knowledge rather than the specific knowledge and expectations. Research by Lay, Chow, Treagust and Chandrasegaran (2013) indicated that low level of renewable energy knowledge among secondary school students. In contrast, more research relating to students renewable energy knowledge have been carried out in other countries particularly developed ones.

As a result of the preliminary review of literature in Malaysia, this research was designed to explore the following:

- a) The level of knowledge on renewable energy among non-science undergraduate university students in Malaysia.
- b) The expectations on renewable energy of non-science undergraduate university students in Malaysia.

3.0 METHODOLOGY

Respondents

The respondents for the research were drawn from undergraduate students population enrolled currently enrolled in the Faculty of Business, Economics and Accountancy (FPEP) at Universiti Malaysia Sabah, Kota Kinabalu, Malaysia. A majority of the students are from Malaysia with a small number from other countries such as the People’s Republic of China, South Korea, Brunei Darussalam and Indonesia, among others.

Instrument

Data collection for this research adapted a questionnaire used by from Zyadin, Puhakka, Ahponen, Cronberg and Pelkonen (2012) which was conducted a similar research on higher secondary school students in Jordan. Some slight changes were made to include additional energy types available in Malaysia. The questionnaire was only made available on--line using Google forms to keep printing costs to a minimum.

4.0 FINDINGS

The following part of this article will present and discuss the results of the survey conducted.

Demographic Profile

A total of 207 student respondents completed the on--line questionnaire. The number represents 7.8 percent of the total undergraduate student population enrolled currently enrolled in the Faculty of Business, Economics and Accountancy (FPEP) at Universiti Malaysia Sabah, Kota Kinabalu. Total undergraduate students currently enrolled in the faculty as at 2018 is 2,677.

These respondents are students from nine of the ten degree programs offered in the Faculty of Business, Economics and Accountancy (FPEP) at Universiti Malaysia Sabah. The breakdown is provided in Table 1 below.

Table 1: Distribution of Respondents under Each Academic Program in FPEP

Program	Frequency	Percent (%)
Accounting	77	37.2
Entrepreneurship	1	0.5
Planning and Development Economics	25	12.1
Financial Management and Banking	6	2.9
Financial Economics	18	8.7
Hotel Management	36	17.4
Marketing	1	0.5
Human Resource Economics	27	13
Tourism Management	16	7.7
TOTAL	207	100

The total student respondents represented all years of studies (Year 1 until 4), more female than male students (consistent with the general make up of Malaysian institutes of higher learning) and a majority coming from Malaysia (more than 90%) with a few from other countries. The majority of the students live in metropolitan and urban areas (52.6%) as compared to rural area (47.4%). Table 2 below states the detailed analysis.

Table 2: Descriptive Analysis of Respondents' Year of Studies, Gender, Nationality & Hometown

	Frequency	Percent (%)
Year of studies		
Year 1	71	34.3
Year 2	117	56.5
Year 3	5	2.4
Year 4	14	6.8
Gender		
Male	50	24.2
Female	157	75.8
Nationality		
Malaysia	191	92.3
China	13	6.3
Brunei Darussalam	2	1
Others	1	0.5
Hometown (location)		
Metropolitan (Above 1 million of population like Kuala Lumpur)	25	12.1
Urban	86	41.5
Rural	96	46.4

The first section of the questionnaire examined the respondents understanding whether the type of energy stated is renewable or non-renewable.

While the majority of the respondents correctly identified renewable energy types (biomass fuel, geothermal, solar, wind and hydropower) and non-renewable energy types (coal, fossil oil, natural gas and nuclear) from between 64.3 percent to 87.4 percent of the respondents, there were respondents who failed to identify the correct type from between 12.6 percent to 35.7 percent of the respondents. This is a concern as understanding of the type will be important in their acceptance of renewable energy. Ideally, all respondents should be able to correctly identify the types of renewable or non-renewable energy sources if the information or knowledge is taught to them either in school, pre-university or university. Interestingly, for biodiesel fuel, the percentage of respondents identifying this type of energy as renewable or non-

renewable is almost split in the middle, i.e. 47.8 percent of the respondents answering that it is renewable and 52.2 percent of the respondents answering that it is non-renewable. The name itself may be confusing to the respondents. Diesel is a type of fuel oil from fossil fuel sold in service stations in Malaysia and across the world. The detailed breakdown is in Table 3 below.

Table 3: Students’ Understanding of Sources of Renewable Energy

Energy	Renewable		Non--renewable	
	Frequency	Percent (%)	Frequency	Percent (%)
<i>Biodiesel fuel</i>	99	47.8	108	52.2
<i>Biomass fuel</i>	133	64.3	74	35.7
<i>Coal</i>	54	26.1	153	73.9
<i>Geothermal</i>	133	64.3	74	35.7
<i>Hydropower</i>	180	87.0	27	13.0
<i>Fossil oil</i>	45	21.7	162	78.3
<i>Natural gas</i>	74	35.7	133	64.3
<i>Nuclear</i>	67	32.4	140	67.6
<i>Solar</i>	181	87.4	26	12.6
<i>Wind</i>	170	82.1	37	17.9

Note: Italicised energy sources are renewable.

The next section of the questionnaire tests the respondents’ further understanding of renewable energy using statements on the renewable energy sources identified in the earlier section.

The respondents answers indicate better in knowledge related to the more popular or known types of renewable energy such as solar, wind and hydropower with close to 90 percent of the respondents agreeing or more with the statements as compared to the least popular or known types of renewable energy with 25 to 48.8 percent of the respondents responding “Don’t know” to “Strongly disagree”. This may indicate respondents knowing only whether the type of energy is renewable or not and nothing more. The detailed breakdown is presented in Table 4 below

Table 4: Students’ Further Understanding of Renewable Energy

Statement	Percent (%)				
	Strongly agree	Agree	Don’t know	Disagree	Strongly disagree
Sunshine is utilised to produce electricity	39	49.5	5.7	5.2	0.5
Wind turbines are utilised to produce electricity	45.7	42.9	9	1.4	1
Geothermal energy is the earth’s internal heat	26.8	45.7	26.3	1	0
Bioenergy is the energy produced from plant biomass	26.9	48.1	22.6	1.9	0.5
Biodiesel is fuel produced from plant oils	19	41	29	7.6	3.3
Bioethanol is fuel produced from fermenting biomass	18.2	33	46.4	1.4	1
Hydropower is the energy from rivers and oceans	37.7	50.2	6.8	4.8	0.5

The next section of the questionnaire gauges the respondents’ expectations on current and future production.

Most respondents indicated agreement to utilising renewable sources (96.6 percent) and processing organic wastes to produce energy (92.8 percent) and a significant percentage of respondents indicated disagreement to continuing producing or importing oil and gas (26.6 percent) and building nuclear plants (39.1 percent). This may indicate that the respondents supporting utilisation of renewable energy sources and to certain extent opposing utilisation of non--renewable energy sources. The detailed breakdown is provided in Table 5 below.

Table 5: Students’ Expectations on Energy Production

Statement	Percent (%)				
	Strongly agree	Agree	Don’t know	Disagree	Strongly disagree
Countries to continue producing/import oil and gas	18.7	43.5	12.1	20.1	5.6
Countries to utilize the renewable energy resources	59.1	37.5	3.4	0	0
Countries to process organic waste to produce energy	56	36.8	4.3	1.4	1.4
Countries to build nuclear plant	14.2	25	21.7	22.6	16.5

The following section looks into the respondents’ perception towards renewable energy on a personal level.

The data show that most respondents agree to spend on clean energy (73.6 percent) and installing solar panels in their homes (98 percent). The findings may encourage relevant parties such as electricity providers to introduce such services (clean energy) and facilities (solar panels) for these future consumers. Table 6 below breaks down the level of agreement of the respondents.

Table 6: Students’ Perception towards Investment in Renewable Energy

Statement	Percent (%)				
	Strongly agree	Agree	Don’t know	Disagree	Strongly disagree
Pay additional money to receive clean energy in my home	26.4	47.2	12.7	12.7	1
Install solar panel in my home if I can afford it	53.1	44.9	1.4	0.5	0

The final section of the questionnaire asks respondents to rate their knowledge on renewable energy.

Only 41.5 percent of the respondents rated that their knowledge is good and above. The remaining 58.5 percent of the respondents rated their knowledge from “Don’t Know” to “Very Weak”. The ratings provided by the respondents may indicate the knowledge they are exposed to through their education and may signify more contents related to renewable energy should be included in their curriculum either at school, pre--university and university level. This is consistent with the findings on knowledge in the earlier research by Lay, Chow, Treagust and Chandrasegaran (2013) for secondary school students. Table 7 below provides the detail of the ratings by the respondents.

Table 7: Knowledge of Renewable Energy among Students

Level	Frequency	Percent (%)
Very weak	10	4.8
Weak	66	31.9
Don’t know	45	21.7
Good	81	39.1
Very good	5	2.4

5.0 CONCLUSION

This research is limited in nature as the respondents were sampled from a single faculty in a public institution of higher learning. However, it is hoped that the results of this research can be used by stakeholders in improving students’ knowledge and exposure to renewable energy and its utilisation.

Some actions that can be done include the following:

- a) Changing or improving the curriculum to include topics and assignments related to renewable energy in relevant course/classes taken by students at secondary, pre-university and university levels.
- b) Incorporating activities related to renewable energy in the campus environment.
- c) Encouraging investment in renewable energy facilities in the university campus such as installation of solar panels on buildings or street lights and where possible, mini wind turbines and mini hydropower generator.
- d) Promoting utilisation of renewable energy among students through outreach programs by relevant government authorities.

The next possible action of this research is to extend the research to other non-science faculties and other institutions of higher learning and to undertake a more detailed analysis of the findings.

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