MJFAS
Malaysian Journal of Fundamental and Applied Sciences

RESEARCH ARTICLE

Willingness to Pay for Green Electricity Derived from Rainwater Harvesting at University Community

Siti Nor Fazillah Abdullah[a], Mohd Khairul Amri Kamarudin[a,b*], Wan Norazilawanie Tun Ismail[a], Nadzifah Yaakub[c], Muhammad Firdaus Asyraf Abdul Halim Yap[d], Ahmad Shakir Mohd Saudi[e], Ismafatin Nabilah Ismail[b]

[a]Faculty of Applied Social Science, University Sultan Zainal Abidin, Gong Badak Campus, 21300, Terengganu, Malaysia; [b]East Coast Environmental Research Institute, Gong Badak Campus, University Sultan Zainal Abidin, 21300 Kuala Nerus, Terengganu, Malaysia; [c]Faculty Bioresources and Food Industry, Besut Campus, University Sultan Zainal Abidin, 22200 Besut, Terengganu, Malaysia; [d]Faculty of Innovative Design and Technology, Gong Badak Campus, University Sultan Zainal Abidin, 21300 Kuala Nerus, Terengganu, Malaysia; [e]Water Engineering Technology Center, University of Kuala Lumpur, 1016, Jalan Sultan Ismail, 50250, Kuala Lumpur, Malaysia

Abstract The evaluation of public opinion toward different energy sources is crucial for planning future renewable energy development projects. This study provides an assessment of public knowledge, attitudes, and perceived behavioural control with regard to their financial support for rainwater hydroelectricity. Using a cross-sectional approach, this study collected data from 101 UniSZA community using a set of questionnaires. *Kruskal–Wallis* tests and *regression analysis* were the statistical tools employed in the analysis. The results showed that no sociodemographic factor was found to be significantly affecting the willingness to pay (WTP). Based on the outcomes of the regression analysis, perceived behavioural control was found to be the most significant factor influencing the WTP for rainwater hydroelectricity. Meanwhile, knowledge and attitudes had no effect on WTP. The results also show that, when it comes to their WTP, 51.5% of participants agreed, while 48.5% of participants disagreed somewhat or strongly disagree. This indicates that, although participants support the use of renewable energy sources, they will hesitate if the cost of using renewable energy is higher than the conventional sources. This study highlights the importance of identify the desire of community towards rainwater hydroelectricity prior to the project is implemented.

Keywords: Attitude, knowledge, rainwater hydroelectricity, renewable energy, willingness to pay.

***For correspondence:**
mkhairulamri@unisza.edu.my

Received: 01 Aug. 2024
Accepted: 03 Feb. 2025

Introduction

The growing world population has resulted in a notable increase in power demand. Studies suggest that by 2040, the demand for electricity will have increased by 28% [1]. In fact, most countries in the world have developed based on the availability of consistent and sufficient electricity, mostly generated from fossil fuels. The extensive use of conventional energy sources for producing electricity has led to serious pollution problems like the greenhouse effect, ozone layer depletion, and other health-related effects. There is broad agreement among climate experts that carbon gas emissions from human activity are accelerating global warming [2]. Through generation capacity expected to rise annually, the relationship between power use and CO^2 emissions has been identified as the third-largest contributor [3]. Atmospheric carbon dioxide concentrations increased by 0.74°C on average throughout the last century. This rise was from 278 parts per million prior to industrialization to 412 parts per million in 2019 [4]. One of the best ways to turn the energy crisis and global warming into a new industrial opportunity is to outfit oneself with environmental technologies. A good instance of this is the commitment to protecting the environment through the production of eco-friendly, renewable electricity. Global initiatives have begun to develop renewable energy solutions utilizing present infrastructure in light of the dual concerns of a rising energy crisis and climate change, particularly is primarily driven by the use of fossil fuels for electricity generation [5,6].

Despite significant advances in renewable energy technologies and global measures to combat climate change, the integration of renewable energy solutions into existing infrastructures is still insufficient. This inadequacy is particularly evident in regions that rely extensively on fossil fuels, where economic, technological, and policy barriers prevent widespread adoption of sustainable energy options [7]. Furthermore, there is still an immediate requirement for innovative and cost-effective technology that can handle energy demands while also reducing carbon emissions. The purpose of this study is to analyse public knowledge, attitudes, and perceived behavioural control in relation to financial support for rainwater hydroelectricity systems. By studying these elements, the study hopes to discover important motivators and obstacles to public support for such sustainable energy solutions.

Literature Review

Currently, there is a commitment by the Malaysian government to improve the stake of renewable energy, therefore it is essential to investigate the acceptance of hydroelectricity from rainwater as renewable energy. The WTP is a critical aspect in directing the development of appropriate policies for the country to meet its ambitious renewable energy goals. A number of studies focus on the maximum amount in funds that consumers are ready to set aside for the further development of renewable energy resources in their residential areas Recent studies indicate that young adults in Poland exhibit a higher WTP for brands that invest in renewable energy, suggesting a growing trend among younger demographics to support sustainable initiatives [8]. This aligns with findings in Slovenia, where greater WTP for environmentally sustainable power sources correlates with increased knowledge of green energy and adherence to societal standards [9]. Such insights highlight the role of education and social values in shaping consumer preferences for renewable energy. Conversely, research from Nigeria emphasizes that individuals' desire to pay for sustainable energy sources is significantly influenced by their understanding of renewable energy. This underscores the importance of awareness and education in driving WTP across different contexts.

As opposed to Ntanos *et al*. (2018) [10] research, it was found that the primary reason for purchasing a renewable energy system is the desire to protect the environment. Muhammad *et al*. (2021) [6] also supported this research, finding in his Turkish study that those who are highly conscious about the environment tend to pay more for renewable energy. Further supporting this notion, Dogan and Muhammad (2019) [5] identified several factors influence WTP for green energy in Turkey, including age, household income, gender, and environmental consciousness. These data demonstrate the multidimensional character of WTP and its reliance on a variety of demographic and psychological variables.

Based on the comprehensive literature review, the WTP has been identified plays a crucial role in directing relevant policies that are intended to accomplish the country's aspirations regarding renewable energy. Because of this discrepancy, the present study explores the WTP which participants of the UniSZA community have attributed to the use of rainwater hydroelectricity as a feasible alternative energy source. Understanding public knowledge, attitudes, and perceived behavioural control concerning financial support for rainwater hydroelectricity might help to identify the primary motivators and impediments to public support for renewable energy projects, which provides significant insights for developing community-based interventions.

Materials and Methods

Questionnaire Development

A questionnaire with items on awareness, knowledge, attitudes toward renewable energy, subjective norms, perceived behavioural control, environmental concern, government engagement, intention, and readiness to pay was designed and developed. However, this study will focus only on knowledge, attitude and perceive behavioural control, considering the literature stresses that these three factors considerably influence the willingness of individual to acquire an eco-friendly product [11]. Answer options to questions in the survey consisted of 5-point Likert scales from 1 (strongly not agree) to 5 (strongly agree).

Data Collection

The UniSZA community and members of the general public who are affiliated with UniSZA are included in the selection criteria for participants in this survey. Their selection was based on their active participation in UniSZA's mission to advance sustainability and green campus projects. At the initial level, 300 questionnaires were given out to all institutes and faculty members at UniSZA, nonetheless only 101 were completed adequately. The data was collected between January and February 2024. Before data was collected using the survey instrument, a pilot study was executed. It was place on the UniSZA campus and included 30 participants. A reliability assessment was performed for the pilot project, which resulted in a significant Cronbach's alpha coefficient of 0.976, indicating strong internal consistency within the dataset (Table 1). Before conducting the questionnaire, it was evaluated by 5 experts in renewable energy and survey methods to ensure its content validity. This review assisted in identifying any confusing or leading questions, ensuring that the items accurately measure what they were designed to test [12]. The pilot sample enabled it to be possible to calculate the ratios, standard deviations, variances, and ratios for each variable. Descriptive statistics were used to analyse the sociodemographic data. An analysis of variance (ANOVA) was used to compare willingness to pay variable across different demographic groups. All statistical analyses were carried out with SPSS program 26.0 (SPSS Inc., Chicago, IL, USA).

Table 1. Reliability test result

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.958	.958	45

Analysis of Variance of the Demographic Variables on WTP for Rainwater Hydroelectricity

The influence of a number of demographic variables, such as age, gender, income, marital status, education level, and employment status on the WTP for rainwater hydroelectricity is investigated in this study. To figure out if there are any statistically significant or noteworthy differences depending on participant demographics and WTP, a one-way ANOVA is utilised. Due to the demographics in the study violating assumptions regarding homogeneity of normality and variance, a non-parametric ANOVA analysis known as the Kruskal-Wallis test is performed [6]. This test is used to evaluate differences between variable groups when the P value has a significance level of less than 5%.

Results and Discussion

Bio-Data of Participants

The demographic variables that were taken from the participants in the survey included age, gender, marital status, education level, occupation, and monthly income. A summary of these variables is shown in Table 2. According to the statistics in the table, 71.3% of the participants claimed to be married, and 65.3% of the participants were female which were dominant compared to the males. The participants in the survey ranged in age from 26 to 40. With regard to education, all of the participants seem to fall into the moderate to highly educated category, since they have all completed high school education and above. Approximately 94.1% of the participants are government employees, as the questionnaires were distributed within UniSZA. The monthly income for 76.2% of participants ranged from RM1501 - RM3859, which can be categorize that most of participants are under B40. Most of the participants, or 76.2% of them, had monthly incomes between RM1501 and RM3859, indicating that they are categorized as B40 [13].

Table 2. Demographic and socioeconomic characteristics of the participants

Demographic Features		Percentage (%)
Age		
	19-25	5.9
	26-40	81.2
	41-59	12.9
Gender		
	Male	34.7
	Female	65.3

Demographic Features		Percentage (%)
Marital Status		
	Married	71.3
	Single	28.7
Education		
	SPM / STPM / Matriculation / Certificate	28.7
	Diploma	21.8
	Bachelor Degree	35.6
	Master / PHD	13.9
Occupation		
	Self-employed	1
	Government	94.1
	Housewife	1
	Unemployed	3
	Others	1
Income		
	< RM1500	5
	RM1501 - RM3859	76.2
	RM3860-RM8319	15.8
	≥ RM8319	3

Influence of Age on WTP for Rainwater Hydroelectricity

Age is a common variable evaluated in WTP studies. A prior study revealed a statistically significant association between participants' ages and their WTP [14]. The *Kruskal–Wallis* test was used to analyse differences across age groups (≤18, 19-25, 26-40, 41-59, and ≥60). The results, as shown in Table 3, demonstrate no significant changes in WTP between age groups. This suggests that aging has no effect on WTP for rainwater hydroelectricity. This study contradicts with the findings of Ayodele *et al*., (2021) [4] who discovered that older people are more willing to pay for renewable energy sources than younger people. The disparity could be attributed to contextual variations, such as the socioeconomic features of the research populations, and cultural attitudes toward environmental issues. this study suggests a more uniform perception of rainwater hydroelectricity across age groups within the sampled community.

Table 3. Kruskal-Wallis test results of age variable for WTP for rainwater hydroelectricity

	WTP for Rainwater Hydroelectricity
Kruskal Wallis H	6.858
Degree of freedom	2
P value	0.32
Number of Observation	101

The Kruskal-Wallis test yielded a P-value greater than 5%, indicating that there was no statistically significant difference in the mean age groups' WTP for rainwater hydroelectricity

Influence of Gender on WTP for Rainwater Hydroelectricity

The majority of research analysing gender show that female participants had a higher WTP than male participants. This assumption is consistent with the idea that women prioritize investments that improve home comfort and quality of life [6]. The significant difference based on participants' gender was inspected and the result of Kruskall-Wallis found no statistically significant relationship between gender and WTP for rainwater hydroelectricity as presented in Table 4. This is supported by a previous study conducted by [4], which found no statistical significance between gender and WTP for renewable energy in Nigeria.

Table 4. Kruskal-Wallis test results of gender variable for WTP for rainwater hydroelectricity

	WTP for Rainwater Hydroelectricity
Kruskal Wallis H	0.719
Degree of freedom	1
P value	0.396
Number of Observation	101

The Kruskal-Wallis test yielded a P-value greater than 5%, indicating that there was no statistically significant difference in the gender WTP for rainwater hydroelectricity

Influence of Marital Status on WTP for Rainwater Hydroelectricity

The possible correlation between the marital status of participants and WTP for rainwater hydroelectricity was assessed by looking at the respective scores of their marital status. The result of Kruskal-Wallis revealed that there is no significance difference between the marital status on WTP for rainwater hydroelectricity (p value > 0.05) (Table 5). This finding, supported by Szakály *et al*. [15] research, shows that the willingness to accept renewable energy was not statistically significantly influenced by marital status, necessitating further investment.

Table 5. Kruskal-Wallis test results of marital status for WTP for rainwater hydroelectricity

	WTP for Rainwater Hydroelectricity
Kruskal Wallis H	0.999
Degree of freedom	1
P value	0.318
Number of Observation	101

The Kruskal-Wallis test yielded a P-value greater than 5%, indicating that there was no statistically significant difference in the gender WTP for rainwater hydroelectricity

Influence of education on WTP for rainwater hydroelectricity

Education level also has an impact on WTP for renewable energy, implying that participants with more education show higher WTP for renewable energy [16]. Higher education is expected to increase awareness of the need for power supply sustainability and the financial costs associated with such safeguards [4]. In line with the results of this study, which show no significant variations in WTP for rainwater hydroelectricity among various educational levels according to the Kruskal-Wallis test as display in Table 6, Yoo and Kwak [17] study on WTP for green electricity in Korea also found no evidence of a positive correlation between education and WTP.

Table 6. Kruskal-Wallis test results of level of education for WTP for rainwater hydroelectricity

	WTP for Rainwater Hydroelectricity
Kruskal Wallis H	4.469
Degree of freedom	3
P value	0.215
Number of Observation	101

The Kruskal-Wallis test yielded a P-value greater than 5%, indicating that there was no statistically significant difference in the gender WTP for rainwater hydroelectricity

Influence of Employment Status on WTP for Rainwater Hydroelectricity

In this study, employment status of participants for rainwater hydroelectricity was evaluated based on their work situation. According to the findings, there was no statistically significant correlation found between the WTP for rainwater hydroelectricity and employment position (Table 7). The employment profile of a person may depend on their educational background. Since the study found no statistically significant differences in the WTP for rainwater hydroelectricity between educational levels, a similar pattern was expected for employment status.

Table 7. Kruskal-Wallis test results of employment status for WTP for rainwater hydroelectricity

	WTP for Rainwater Hydroelectricity
Kruskal Wallis H	6.020
Degree of freedom	4
P value	0.198
Number of Observation	101

The Kruskal-Wallis test yielded a P-value greater than 5%, indicating that there was no statistically significant difference in the gender WTP for rainwater hydroelectricity

Influence of Income on WTP for Rainwater Hydroelectricity

The vast majority of studies show that WTP is positively connected to income. According to the obtained result, there is no apparent difference among the income levels of participants regarding their WTP for rainwater hydroelectricity (Table 8). In line with a study by Borchers *et al.* [18], presents that the willingness of an individual to pay is not affected by their income. Yet, this contradicts the majority of the research studies which indicate that WTP is favourably influenced by income [4; 19; 17]. The study focuses on rainwater hydroelectricity, which may not appeal to participants as much as more familiar renewable energy sources such as solar or wind. According to research, consumers frequently exhibit higher WTP for these sources due to perceived benefits and better familiarity, implying that the type of renewable energy under consideration has a substantial impact on WTP [20].

If respondents perceive rainwater hydroelectricity as a necessary or vital service rather than a luxury, their WTP may not differ considerably with income level. This could indicate a weaker income elasticity for this particular energy source compared to others [11]. Higher-income individuals may prefer investments in more visible or impactful renewable technology, whereas low-income individuals may prioritize immediate economic concerns above long-term environmental advantages. This gap may result in a scenario where WTP does not significantly differ across income levels for specific sources of renewable energy [12]. The demographic profile of the study's participants can also play a vital influence [21]. Since this study was conducted at UniSZA, an institution that prioritizes environmental sustainability, staff members are well-versed in the university's emphasis on supporting renewable energy sources. The university's activities and attempts to increase awareness of this goal have motivated the campus community to actively contribute to its achievement.

Table 8. Kruskal-Wallis test results of income for WTP for rainwater hydroelectricity

	WTP for Rainwater Hydroelectricity
Kruskal Wallis H	3.699
Degree of freedom	3
P value	0.296
Number of Observation	101

The Kruskal-Wallis test yielded a P-value greater than 5%, indicating that there was no statistically significant difference in the gender WTP for rainwater hydroelectricity

Level Of Knowledge, Attitude and Perceived Behavioural Control for Rainwater Hydroelectricity Development in Unisza

To meet the goals of the research, it is essential to investigate the knowledge, attitude, and perceived behavioural control over rainwater hydroelectricity in the study area. The mean values of these variables were determined using descriptive analysis. The results show, as shown in Figure 1, that knowledge of rainwater hydroelectricity had the highest mean score of 4.00. In close succession were attitude (3.90) and perceived behavioural control (3.67). These findings showed that knowledge of the benefits of rainwater hydroelectricity marginally outpaced perceptions of behavioural control and attitude. It appears that participants were well attentive of the advantages of using rainwater to generate electricity. Excluding perceived behavioural support, which is at a moderate level, the study findings show that the levels of knowledge, attitude, and perceived behavioural control are high. The largest standard deviation (0.669) in perceived behavioural control suggests that the magnitude of the standard deviation may have an impact on the moderate degree of perceived behavioural control. This points to a wider range of responses from the mean, indicating a higher degree of variation in the views and actions of the participants.

This finding can be concluded that these variables have moderate to high level among the participants. Since this study was carried out on university campus, it is related to the role that educational institutions have had in highlighting the importance of renewable energy for people and the environment, aligned with UNISZA's involvement in the university's Green Campus initiative. Previous study stated that university campuses incorporate environmentally friendly infrastructure and engage in instructional activities related to sustainable development [22].

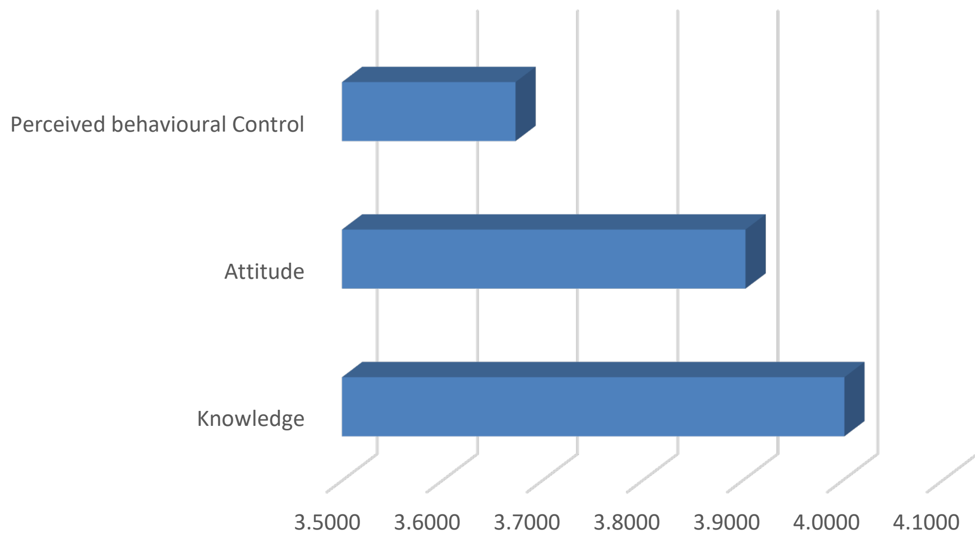

Figure 1. Level of knowledge, attitude and perceived behavioural control for rainwater hydroelectricity development among participants

The Results of Regression Analysis

The research used a linear methodology, assessing the impact of the investigated factors on WTP by regression analysis. Table 9 illustrates the relationship between the dependent variable of WTP for rainwater hydroelectricity and the factors of desire to pay for rainwater hydroelectricity (knowledge, attitude, and perceived behavioral control). The findings demonstrate the statistical significance of the tested model (sig = < 0.001; F = 13.167). The regression analysis of the data shows that only perceived behavioural control appears to be the strongest predictor for WTP for rainwater hydroelectricity in this study. Nevertheless, there was no statistically significant evidence supporting the effects of knowledge and attitude on WTP for rainwater hydroelectricity. This result is a little unexpected considering that it was anticipated that the WTP would also have a significant effect on attitude and knowledge. Masrahi *et al*. [23] highlights five factors: values, attitudes, behaviours, awareness, and demography that influence consumers' willingness to spend more for environmentally friendly items. About 48.5% of the participants somewhat disagree and below compared to 51.5% of participants agreed (refer Figure 2). According to the study, the majority of participants are aware of and supportive of efforts being made to employ renewable energy sources, but they encounter obstacles when it comes to their willingness to make larger investments. Their primarily moderate-income sources and sense of financial strain from prospective cost rises connected to the utilization of renewable energy sources may also be factors in this. This finding supported by other study by Liobikienė *et al*. [24] stated that Malaysians will embrace the renewable energy sources if the adoption of it will cut the expenses.

Table 9. Regression analysis of the WTP for rainwater hydroelectricity

Independent variables	Standardized Coefficients Beta	T	Significance
Knowledge	0.143	1.393	0.167
Attitude	0.072	0.569	0.571
Perceived behavioural control	**0.400**	**3.326**	**0.001**

Dependent variable: WTP
Method: Enter (significant results are in bold)

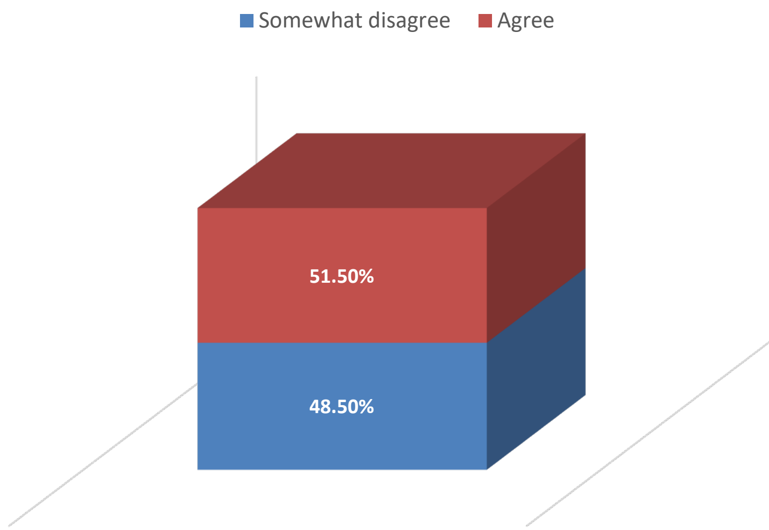

Figure 2. The participants' opinions about WTP for rainwater hydroelectricity

The lack of considerable influence from knowledge and attitude may indicate greater socioeconomic constraints encountered by participants. The study found that, while many participants are aware of and support renewable energy initiatives, their willingness to invest financially is hampered by reasons such as moderate income and concerns about rising costs connected with renewable energy adoption. According to Masrahi *et al*., (2021) [23], beliefs, attitudes, behaviours, awareness, and demographic variables all influence consumers' willingness to pay for environmentally friendly items. This current study supports this view, but they also imply that perceived behavioural control may be a more immediate factor in circumstances where financial restrictions are common. According to Liobikienė *et al*. (2021) [24] , Malaysians are more likely to use renewable energy if it saves them money. This implies that, while there is broad support for renewable measures, actual financial considerations have a considerable impact on WTP.

Financial restrictions are constantly highlighted in the literature as a significant impediment to the adoption of renewable energy technologies. For instance, Ouedraogo (2019) [25] research emphasizes the effectiveness of RE in the region has been hampered by a number of reasons, including a poor institutional framework and infrastructure, high initial capital expenditures, ineffective diffusion tactics, a lack of experienced people, poor baseline information, and inadequate maintenance service. Similarly, research on residential power generation using rainwater show that while there is promise for small-scale hydro projects, large initial capital costs can inhibit investment despite long-term benefits [26]. Another study by Shao *et al*. (2018) [27] imply that enhancing environmental preferences cannot be achieved solely through economic growth, as the relationship between income and WTP is complex and context-dependent.

Conclusions

Public understanding of and willingness to invest in a new renewable energy source greatly increases the effectiveness of target accomplishment. Addressing this challenge entails investigating the key parameters impacting the WTP for rainwater hydroelectricity and determining their significance in a local context in the research area. The purpose of this study is to investigate the factors that influence the WTP for rainwater hydroelectricity. The findings show that the UniSZA community is aware of the importance of renewable energy and is concerned about it. Yet they encounter obstacles when it comes to the requirement of raising their budget for investments in energy resources. The result also emphasizes the importance of the perceived behavioural control aspects as a really important parameter in all three polls, it was the strongest single predictor to the WTP for rainwater hydroelectricity in the study area. Contrary to expectations, knowledge and attitudes had no effect on the WTP for rainwater hydroelectricity. For the project to be completed successfully, the difficulties that the community faces must be the main emphasis of this study.

Conflicts of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

Acknowledgement

This research has been carried out under Geran Dalaman Penyelidikan Universiti RG010 (UniSZA/2023/KELESTARIAN/10) provided by Universiti Sultan Zainal Abidin (UniSZA).

References

[1] Hussein, O., Mustafa, F. F., Ghaeb, N. H., & Sabry, A. H. (2021). Design and development of a new portable roof gutter for electricity production. *Eastern-European Journal of Enterprise Technologies, 1*(8–109), 17–24. https://doi.org/10.15587/1729-4061.2021.225350

[2] Achebe, C. H., Okafor, O. C., & Obika, E. N. (2020). Design and implementation of a crossflow turbine for Pico hydropower electricity generation. *Heliyon, 6*(7), e04523. https://doi.org/10.1016/j.heliyon.2020.e04523

[3] Sulaima, M. F., Dahlan, N. Y., Yasin, Z. M., Rosli, M. M., Omar, Z., & Hassan, M. Y. (2019). A review of electricity pricing in Peninsular Malaysia: Empirical investigation about the appropriateness of enhanced time of use (ETOU) electricity tariff. *Renewable and Sustainable Energy Reviews, 110*(August 2018), 348–367. https://doi.org/10.1016/j.rser.2019.04.075

[4] Ayodele, T. R., Ogunjuyigbe, A. S. O., Ajayi, O. D., Yusuff, A. A., & Mosetlhe, T. C. (2021). Willingness to pay for green electricity derived from renewable energy sources in Nigeria. *Renewable and Sustainable Energy Reviews, 148*(May), 111279. https://doi.org/10.1016/j.rser.2021.111279

[5] Dogan, E., & Muhammad, I. (2019). Willingness to pay for renewable electricity: A contingent valuation study in Turkey. *Electricity Journal, 32*(10), 106677. https://doi.org/10.1016/j.tej.2019.106677

[6] Muhammad, I., Shabbir, M. S., Saleem, S., Bilal, K., & Ulucak, R. (2021). Nexus between willingness to pay for renewable energy sources: Evidence from Turkey. *Environmental Science and Pollution Research, 28*(3), 2972–2986. https://doi.org/10.1007/s11356-020-10414-x

[7] Giest, S., & Mukherjee, I. (2018). Behavioral instruments in renewable energy and the role of big data: A policy perspective. *Energy Policy, 123*(September), 360–366. https://doi.org/10.1016/j.enpol.2018.09.006

[8] Wiśniewska, A., Liczmańska-Kopcewicz, K., & Pypłacz, P. (2022). Antecedents of young adults' willingness to support brands investing in renewable energy sources. *Renewable Energy, 190*, 177–187. https://doi.org/10.1016/j.renene.2022.03.098

[9] Hojnik, J., Ruzzier, M., Fabri, S., & Klopčič, A. L. (2021). What you give is what you get: Willingness to pay for green energy. *Renewable Energy, 174*, 733–746. https://doi.org/10.1016/j.renene.2021.04.037

[10] Ntanos, S., Kyriakopoulos, G., Chalikias, M., Arabatzis, G., & Skordoulis, M. (2018). Public perceptions and willingness to pay for renewable energy: A case study from Greece. *Sustainability (Switzerland), 10*(3). https://doi.org/10.3390/su10030687

[11] Laroche, M., Bergeron, J., & Barbaro-Forleo, G. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *Journal of Consumer Marketing, 18*(6), 503–520.

[12] Sen, V. (2023). Residential consumer's willingness to pay for renewable energy: Evidence from a double-bounded dichotomous choice survey from India. *Journal of Renewable Energy and Environment, 10*(2), 56–69. https://doi.org/10.30501/jree.2022.314713.1302

[13] Malik, S. A., & Ayop, A. R. (2020). Solar energy technology: Knowledge, awareness, and acceptance of B40 households in one district of Malaysia towards government initiatives. *Technology in Society, 63*(May), 101416. https://doi.org/10.1016/j.techsoc.2020.101416

[14] Aldy, J. E., Kotchen, M. J., & Leiserowitz, A. A. (2012). Willingness to pay and political support for a US national clean energy standard. *Nature Climate Change, 2*(8), 596–599. https://doi.org/10.1038/nclimate1527

[15] Szakály, Z., Balogh, P., Kontor, E., Gabnai, Z., & Bai, A. (2021). Attitude toward and awareness of renewable energy sources: Hungarian experience and special features. *Energies, 14*(1), 1–25. https://doi.org/10.3390/en14010022

[16] Zhang, L., & Wu, Y. (2012). Market segmentation and willingness to pay for green electricity among urban residents in China: The case of Jiangsu Province. *Energy Policy, 51*, 514–523. https://doi.org/10.1016/j.enpol.2012.08.053

[17] Yoo, S. H., & Kwak, S. Y. (2009). Willingness to pay for green electricity in Korea: A contingent valuation study. *Energy Policy, 37*(12), 5408–5416. https://doi.org/10.1016/j.enpol.2009.07.062

[18] Borchers, A. M., Duke, J. M., & Parsons, G. R. (2007). Does willingness to pay for green energy differ by source? *Energy Policy, 35*(6), 3327–3334. https://doi.org/10.1016/j.enpol.2006.12.009

[19] Gao, L., Hiruta, Y., & Ashina, S. (2020). Promoting renewable energy through willingness to pay for transition to a low carbon society in Japan. *Renewable Energy, 162*, 818–830. https://doi.org/10.1016/j.renene.2020.08.049

[20] Azlina, A. A., Bakar, S. A., Kamaludin, M., & Ghani, A. N. (2022). Willingness to pay for renewable energy: Evidence from high wind and wave energy potential areas. *Jurnal Ekonomi Malaysia, 56*(1), 59–70.

[21] Shakeel, S. R., & Rahman, S. ur. (2018). Towards the establishment of renewable energy technologies' market: An assessment of public acceptance and use in Pakistan. *Journal of Renewable and Sustainable Energy, 10*(4). https://doi.org/10.1063/1.5033454

[22] Abdullah, S. N. F., Mohd Khairul Amri Kamarudin, N. A. W., Purba, N., & Sanopaka, E. (2024). Enhancing quality of life in the campus community: The effectiveness of the green. *PLANNING MALAYSIA: Journal of the Malaysian Institute of Planners, 22*(1), 241–255.

[23] Masrahi, A., Wang, J. H., & Abudiyah, A. K. (2021). Factors influencing consumers' behavioral intentions to use renewable energy in the United States residential sector. *Energy Reports, 7*, 7333–7344. https://doi.org/10.1016/j.egyr.2021.10.077

[24] Liobikienė, G., Dagiliūtė, R., & Juknys, R. (2021). The determinants of renewable energy usage intentions using the theory of planned behaviour approach. *Renewable Energy, 170*, 587–594. https://doi.org/10.1016/j.renene.2021.01.152

[25] Ouedraogo, N. S. (2019). Opportunities, barriers, and issues with renewable energy development in Africa: A comprehensible review. *Current Sustainable/Renewable Energy Reports, 6*(2), 52–60. https://doi.org/10.1007/s40518-019-00130-7

[26] Phani Kanth, B., Ashwani, & Sharma, S. (2012). Household power generation using rainwater. *The International Journal of Engineering and Science (IJES), 1*(2), 77–80. www.theijes.com

[27] Shao, S., Tian, Z., & Fan, M. (2018). Do the rich have stronger willingness to pay for environmental protection? New evidence from a survey in China. *World Development, 105*, 83–94. https://doi.org/10.1016/j.worlddev.2017.12.033