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Research Article

Public Awareness, Perceptions, and Attitudes Toward Renewable Energy Adoption in the Philippines: Insights for Strategic Policy Development

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ABSTRACT

The Philippines currently depends heavily on fossil fuels, which are vulnerable to price fluctuations. In response, the 2023-2050 Philippine Energy Plan sets ambitious targets to increase the share of renewable energy in the capacity mix: 35% by 2030 and 50% by 2040. Achieving these targets require more than just policy—it needs public understanding and support. This study examines public awareness, perceptions, and attitudes toward renewable energy in the Philippines, specifically among respondents from Metro Manila, Bulacan, Cavite, and Laguna. Through a structured survey of 386 participants, we assessed familiarity with renewable sources like biomass, geothermal, solar, hydro, ocean and wind, finding that while 70% are generally aware of these sources, only 30% know about local projects or government initiatives. The survey results show strong support for renewable energy's environmental benefits, with 67% of respondents in favor, though 69% express concerns about high initial costs, and 57% are wary of reliability issues. Using statistical analysis, we found that age significantly affects awareness levels ($p < 0.001$), while gender, income, and location have minimal influence. These insights underline the need for public engagement to support the goals of the 2023-2050 Philippine Energy Plan. Our findings suggest that more targeted education, financial incentives, and community involvement could boost public support and address perceived barriers, providing valuable direction for policymakers to enhance renewable energy adoption across the Philippines.

Keywords: *Public perceptions, Renewable energy adoption, Awareness levels, Energy policies, Barriers and facilitators.*

Introduction

The increasing impact of climate change has led many countries to shift toward renewable energy sources like solar, wind, and hydro, which help reduce fossil fuel use and promote a sustainable future. Other renewable

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energy sources include biomass, geothermal, and ocean. For the Philippines—a country highly vulnerable to climate-related disasters—the benefits of renewable energy are clear (Asian Development Bank [ADB], 2021; Department of Energy [DOE], 2023; International Renewable Energy Agency [IRENA], 2022; Power Philippines, 2022). Cleaner energy sources can support the environment, improve energy security, and reduce dependency on imported fuels. Despite the Renewable Energy Act of 2008, which promotes renewable use, adoption has been slower than expected, calling for a deeper look into public knowledge, perceptions, and willingness to embrace these sources.

The 2023–2050 Philippine Energy Plan reported that, as of 2022, the country's power generation mix includes 48.8% coal, 30.3% renewable energy, 12.1% oil-based sources, and 8.8% natural gas. To accelerate the transition to renewable energy, the government aims to boost the renewable share to 35% by 2030 and reach 50% by 2040. Achieving these targets requires more than just policy—it needs public understanding and support (DOE, 2023).

Public awareness and attitudes play a big role in renewable energy adoption. Studies in other countries have shown that people's support for renewable energy grows with their understanding of it. In Kenya and Montenegro, for instance, higher awareness directly increased acceptance of renewables (Djurisic, Pavicevic, & Bjelic, 2020). In Bahrain, those informed about renewables' environmental and cost-saving benefits were more willing to invest in solar energy (Alsabbagh, 2019).

Similarly, Filipino public perception often hinges on how much people know about the benefits, like cost savings, environmental impact, and the potential to reduce pollution and combat climate change. Understanding these factors will help policymakers address knowledge gaps and design strategies that resonate with the public. For the Philippines, where energy costs are high and energy security is a growing concern, understanding public attitudes is essential (ADB, 2021; Power Philippines, 2022). Knowing what drives or limits public support can help the government create more effective policies that make renewable energy more accessible and appealing. By focusing on public perceptions, education, and community involvement, the Philippines can take meaningful steps toward reducing reliance on fossil fuels and building a cleaner, more sustainable future for all (Alsabbagh, 2019; Djurisic et al., 2020).

The following are the objectives of the study:

1. To assess the demographic profile of respondents in terms of age, gender, income, and location.
2. To evaluate the current level of public awareness regarding renewable energy sources in the Philippines.
3. To explore prevailing public attitudes and perceptions toward the adoption and use of renewable energy.
4. To determine whether significant differences exist in public awareness across demographic variables such as age, gender, income, and location.
5. To analyze whether significant differences exist in public attitudes and perceptions across demographic variables.
6. To identify key barriers and facilitators influencing public support for renewable energy policies and initiatives in the Philippines.
7. To propose strategies for improving public engagement, awareness, and acceptance of renewable energy adoption in the country.

Methods

Research Design

This study uses a descriptive research design to understand how people view renewable energy. The study will explore how much they know about renewable energy, their attitudes toward it, and the challenges or support they experience in adopting it. The research follows a quantitative approach, which means we used numbers and data to explain the findings. A survey was given to respondents from the selected areas. The survey asked about their background (age, gender, income, and location) and their knowledge and opinions on different renewable energy sources, like solar, wind, biomass, and hydro.

Population and Sampling

The researcher used a sample size calculator from calculator.net to find that we needed at least 385 respondents to make sure our results are reliable. This number gives us a 95% confidence level with a 5% margin of error, meaning the results should closely represent the larger population. In the end, we received 386 valid responses, which gives us strong data for the study.

The respondents in this study were individuals from Metro Manila, Bulacan, Cavite, and Laguna, primarily from the working class. These areas were selected as they represent a large portion of Luzon's population and energy users.

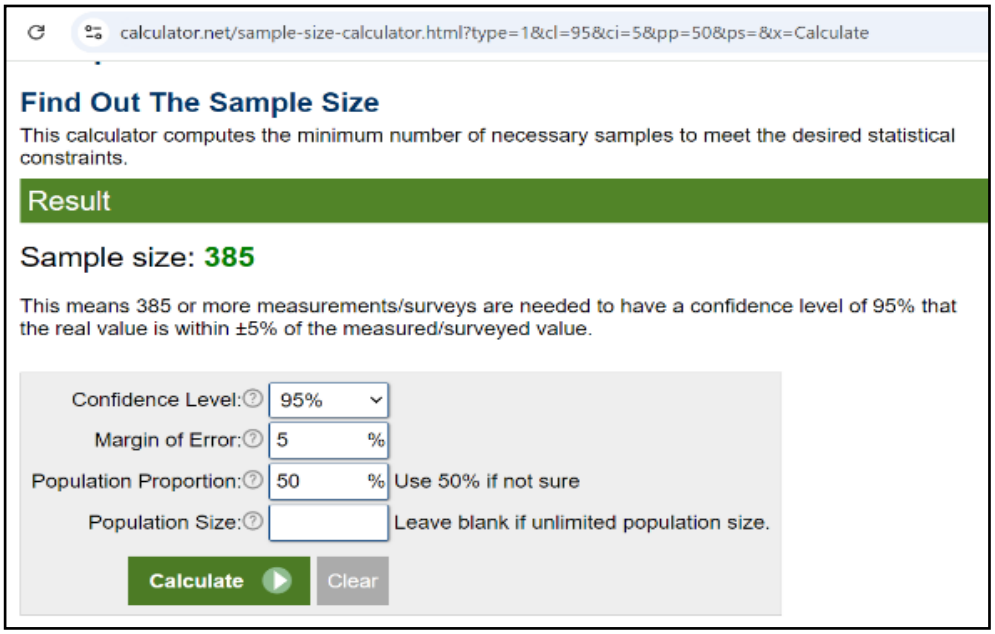

Figure 1. Calculation of Number of Respondents

Research Instrument

The research instrument used in this study is a structured survey designed to gather data on public awareness, perceptions, and attitudes toward renewable energy. The survey consists of multiple sections, including questions on respondents' demographic information (age, gender, income, and location), their level of awareness regarding different types of renewable energy (such as biomass, geothermal, solar, wind, ocean, and hydro), and their perceptions of renewable energy adoption in the Philippines. Respondents were asked to rate their level of agreement or awareness on a scale of 1 to 5, with statements aimed at understanding their knowledge, opinions, and any barriers or support they perceive toward using renewable energy. This survey was distributed to working individuals in Metro Manila, Bulacan, Cavite, and Laguna using an online survey form created on Google Forms.

Data Gathering Procedure

The data for this study was collected through an online survey using Google Forms. The survey link was shared with the respondents from Metro Manila, Bulacan, Cavite, and Laguna. Respondents were asked to answer questions about their awareness, attitudes, and perceptions of renewable energy. Before starting the survey, participants were informed about the purpose of the study and assured that their responses would be kept confidential. They were able to answer the survey at their convenience, using their phones or computers. The responses were automatically recorded in Google Forms, making it easier to gather and organize the data for analysis. The survey remained open for a set period to ensure enough responses were collected for the study.

Data Analysis Procedure

In this study, we applied descriptive and inferential statistical methods to analyze the

data. Descriptive statistics summarized the demographic profile of the respondents, including age, gender, income, and location, providing an overview of the population's characteristics. To examine differences in public awareness and attitudes toward renewable energy across demographic groups, we used the Kruskal-Wallis H test, a non-parametric method suitable for comparing multiple independent groups without assuming a normal distribution. This test allowed us to determine if factors like age, gender, income, or location significantly influenced awareness and perceptions regarding renewable energy. The choice of the Kruskal-Wallis H test was driven by the ordinal nature of our Likert scale responses and the need for a robust method that accommodates non-normally distributed data, ensuring reliable insights into how different variables affect public attitudes and awareness.

Result and Discussion

A. Demographics

The data shows that most respondents (272, 70%) are between 18-24 years old. This is followed by 46 respondents (12%) in the 25-34 age group and 33 respondents (9%) in the 35-44 group. A smaller number of respondents (25, 6%) are aged 45-54, and 8 respondents (2%) are in the 55-64 range. Only 2 respondents (less than 1%) are 65 years old or older.

For gender, most respondents are male (257, 67%), while 116 respondents (30%) are female. A small group, 13 respondents (3%), chose "Prefer not to say". This means that most of the participants are male, with a notable portion of female respondents and a few who preferred not to share their gender.

Regarding income, most respondents (152, 39%) earn between ₱10,000 - ₱30,000, followed by 58 respondents (15%) in the ₱30,001 - ₱50,000 range. A smaller group (34, 9%) earn ₱50,001 - ₱100,000, and 5 respondents (1%) reported earnings above ₱100,000. Additionally, 137 respondents (35%) selected "Not", meaning they didn't disclose their income.

Lastly, most respondents (298, 77%) live in Urban Areas. A smaller group (51, 13%) live in Suburban Areas, and 37 respondents (10%) live in Rural Areas. This shows that most participants are from cities or densely populated areas

Table 1. Demographic Profiles of the Respondents

Demographic Profile	Frequency	Percentage
Age		
18-24	272	70
25-34	46	12
35-44	33	9
45-54	25	6
55-64	8	2
65 and above	2	1
Total	386	100
Gender		
Male	257	67
Female	116	30
Prefer not to say	13	3
Total	386	100
Estimated Salary		
Below ₱10,000	0	0
₱10,000 - ₱30,000	152	39
₱30,001 - ₱50,000	58	15
₱50,001 - ₱100,000	34	9
Above ₱100,000	5	1
Prefer not to say	137	36
Total	386	100

Demographic Profile	Frequency	Percentage
Location		
Urban Area	298	77
Rural Area	51	13
Suburban Area	37	10
Total	386	100

B. Level of Public Awareness Regarding Renewable Energy Sources in the Philippines

Table 2 shows the respondents' knowledge and awareness of various renewable energy sources, including Biomass, Geothermal, Solar, Hydroelectric, Ocean, and Wind.

Table 2. Knowledge of Renewable Energy Sources

Statements	WM	SD	Verbal Interpretation
1. I am aware of different types of renewable energy sources (e.g., Biomass, Geothermal, Solar, Hydroelectric, Ocean, Wind).	4.31	0.99	Strongly Agree
2. I understand how renewable energy differs from non-renewable energy sources like fossil fuels (diesel, gas, coal).	4.18	1.05	Agree
3. I have heard about the renewable energy initiatives being implemented in the Philippines by the Government/Department of Energy.	3.71	1.06	Agree
4. I am aware that the Philippines has significant renewable energy potential (e.g., Biomass, Geothermal, Solar, Hydroelectric, Ocean, Wind).	4	1.03	Agree
5. I know that the government has policies promoting the use of renewable energy sources in the country.	3.73	1.08	Agree
6. I am familiar with renewable energy projects (e.g., Biomass, Geothermal, Solar, Hydroelectric, Ocean, Wind) currently being developed in my area or region.	3.59	1.22	Agree
7. I have come across renewable energy information through media channels (e.g., TV, radio, online platforms, social media).	3.91	1.05	Agree
8. I am aware of the environmental benefits of renewable energy compared to traditional/conventional energy sources.	4.18	1	Agree
9. I understand that renewable energy sources are essential for reducing greenhouse gas emissions and combating climate change.	4.27	1	Strongly Agree
10. I am knowledgeable about the economic benefits of using renewable energy, such as job creation and energy independence.	4.09	0.98	Agree

Legend: 4.21-5.00 (Strongly Agree), 3.41-4.20 (Agree), 2.61-3.40 (Neutral), 1.81-2.60 (Disagree), 1.00-1.80 (Strongly Disagree)

The survey results reveal that most respondents are well-informed about renewable energy sources, aligning with previous studies (Cruz & Reyes, 2020; Santos & Garcia, 2019). Awareness has grown, partly due to government campaigns and media, with many

respondents familiar with sources like solar, wind, and geothermal energy. They also understand the environmental benefits of renewables over fossil fuels (Martinez et al., 2021). However, knowledge of local renewable projects remains limited, echoing findings from Villanueva and Cruz (2018), which suggest a need for more community-level campaigns. Respondents largely rely on media for information, recognizing both the environmental and economic benefits of renewable energy, such as job creation (Villanueva & Cruz, 2018). This broad but shallow understanding indicates that while awareness is high, deeper local knowledge could further enhance public support.

Table 3. Source of Information of Renewable Energy

Statements	WM	SD	Verbal Interpretation
1. I have learned about renewable energy from government campaigns or programs.	3.28	1.25	Neutral
2. I receive information about renewable energy from environmental organizations or advocacy groups.	3.39	1.11	Neutral
3. I get renewable energy information through online platforms like websites, social media, or blogs.	3.88	1.13	Agree
4. My school or workplace has provided information about renewable energy sources.	4.02	1.14	Agree
5. I frequently encounter renewable energy topics in news outlets, such as TV, radio, or newspapers.	3.47	1.19	Agree
6. I have attended events (e.g., seminars/webinars, forums, focus group discussion) focused on renewable energy topics.	3.32	1.37	Neutral
7. I have learned about renewable energy from word of mouth or community discussions.	3.52	1.15	Agree
8. I have been exposed to renewable energy advertisements from Department of Energy, energy companies or utility providers (like MERALCO).	3.19	1.22	Neutral
9. I follow social media influencers or public figures who advocate for renewable energy.	3.2	1.32	Neutral
10. I have taken part in campaigns promoting the use of renewable energy in the Philippines.	2.95	1.35	Neutral

Legend: 4.21-5.00 (Strongly Agree), 3.41-4.20 (Agree), 2.61-3.40 (Neutral), 1.81-2.60 (Disagree), 1.00-1.80 (Strongly Disagree)

The Table 3 shows that respondents used various sources to learn about renewable energy, with online platforms like social media, websites, and blogs being the most popular. Schools, workplaces, and news outlets (TV and newspapers) also served as common sources. Respondents were generally neutral about getting information from government programs, attending renewable energy events, or following influencers, indicating these methods had less impact. Few had participated in renewable energy campaigns, suggesting low engagement. This aligns with past studies, which found that while media and online platforms raise awareness effectively, events, government ads, and campaigns don't always lead to deeper involvement or action (Cruz & Reyes, 2020; Santos & Garcia, 2019; Martinez et al., 2021).

Table 4. Understanding of Renewable Energy Policies and Programs

Statements	WM	SD	Verbal Interpretation
1. I am aware of the Renewable Energy Act of 2008 and its significance in promoting renewable energy in the Philippines.	3.35	1.35	Neutral
2. I understand the government's feed-in tariff (FiT) system that encourages investment in renewable energy.	3.13	1.31	Neutral
3. I know about the National Renewable Energy Program (NREP) and its goals for expanding renewable energy capacity.	3.12	1.27	Neutral
4. I am aware of government incentives, such as tax breaks, offered to renewable energy developers in the Philippines.	3.15	1.29	Neutral
5. I understand the role of the Department of Energy (DOE) in implementing renewable energy policies.	3.66	1.15	Agree
6. I am knowledgeable about renewable energy subsidies provided by the government to promote its use among businesses and households.	3.31	1.24	Neutral
7. I am aware of local government initiatives supporting the adoption of renewable energy in communities.	3.38	1.26	Neutral
8. I understand the importance of renewable energy to achieving national energy security.	3.91	1.11	Agree
9. I am aware of international agreements, such as the Paris Agreement, that influence renewable energy policy in the Philippines.	3.13	1.28	Neutral
10. I understand how renewable energy development contributes to the Philippines' goals for sustainable development and environmental protection.	3.86	1.11	Agree

Legend: 4.21-5.00 (Strongly Agree), 3.41-4.20 (Agree), 2.61-3.40 (Neutral), 1.81-2.60 (Disagree), 1.00-1.80 (Strongly Disagree)

The Table 4 shows that respondents have a generally neutral understanding of renewable energy policies, including the Renewable Energy Act of 2008, feed-in tariffs, and the National Renewable Energy Program. While they recognized the role of the Department of Energy and saw renewable energy as vital for national security and sustainability, they lacked awareness of specific incentives and programs. These findings align with Cruz and Reyes (2020) and Villanueva and Cruz (2018), who found limited public knowledge of government incentives and specific policies. Respondents' understanding of renewable energy's environmental benefits matches Martinez et al. (2021), though awareness of local initiatives and international agreements remains low. This highlights the need for targeted education on how these policies contribute to the country's renewable energy goals.

Prevailing Public Attitudes and Perceptions Toward the Adoption and Use of Renewable Energy in the Country

Table 5. General Attitude Toward Renewable Energy

Statements	WM	SD	Verbal Interpretation
1. I believe that adopting renewable energy is necessary to protect the environment.	4.34	0.99	Strongly Agree
2. Renewable energy is a critical factor in achieving sustainable development for the Philippines.	4.28	0.96	Strongly Agree

Statements	WM	SD	Verbal Interpretation
3. I am supportive of increasing the use of renewable energy (solar, wind, hydro, etc.) across the country.	4.33	0.98	Strongly Agree
4. I believe the Philippines should prioritize renewable energy over fossil fuels.	4.25	0.96	Strongly Agree
5. I think that renewable energy has the potential to reduce the country's carbon footprint.	4.29	0.95	Strongly Agree

Legend: 4.21-5.00 (Strongly Agree), 3.41-4.20 (Agree), 2.61-3.40 (Neutral), 1.81-2.60 (Disagree), 1.00-1.80 (Strongly Disagree)

Table 5 shows strong support among respondents for renewable energy, viewing it as essential for environmental protection and sustainable development in the Philippines. They favor prioritizing renewables over fossil fuels and believe renewable energy can help reduce the country's carbon footprint. These findings align with Cruz and Reyes (2020) and Santos and Garcia (2019), who found that people recognize renewable energy's environmental benefits. Similar with Martinez et al. (2021) and Villanueva and Cruz (2018), respondents see renewable energy as vital for reducing fossil fuel use and addressing climate change, reflecting widespread public alignment with global sustainability goals.

Table 6 highlights the respondents' views on the benefits of renewable energy, emphasizing its potential to reduce reliance on fossil fuels, enhance economic growth, and improve the quality of life for future generations.

Table 6. Perception of Benefits of Renewable Energy

Statements	WM	SD	Verbal Interpretation
1. I believe renewable energy will reduce the country's dependency on imported fossil fuels.	4.28	0.97	Strongly Agree
2. Renewable energy sources are more cost-effective in the long run compared to conventional energy sources.	4.14	0.96	Agree
3. Renewable energy will help provide electricity to rural and underserved areas.	4.31	0.89	Strongly Agree
4. The use of renewable energy will improve the quality of life for future generations.	4.33	0.9	Strongly Agree
5. I believe renewable energy contributes to job creation and economic growth.	4.33	0.86	Strongly Agree

Legend: 4.21-5.00 (Strongly Agree), 3.41-4.20 (Agree), 2.61-3.40 (Neutral), 1.81-2.60 (Disagree), 1.00-1.80 (Strongly Disagree)

Table 6 shows that respondents strongly agree on the benefits of renewable energy, believing it reduces dependence on imported fossil fuels, aligns with long-term cost savings, and expands electricity access to rural areas. This aligns with findings from Santos and Garcia (2019) and Cruz and Reyes (2020), who highlighted economic advantages and energy security benefits. Respondents also see renewable energy as enhancing quality of life for future generations, consistent with Martinez et al. (2021), and as a driver of job creation and economic growth, echoing Cruz and Reyes (2020). These responses reflect a clear understanding of renewable energy's broad benefits, as supported by various studies.

Table 7 highlights the respondents' concerns about the adoption of renewable energy, focusing on issues such as project costs, government support, reliability, and the long-term transition process.

Table 7. Concerns or Barrier to Adoption of Renewable Energy

Statements	WM	SD	Verbal Interpretation
1. I am concerned that renewable energy technology may not be reliable enough for widespread use.	3.53	1.16	Agree
2. I believe renewable energy projects are too expensive to develop in the short term.	3.63	1.1	Agree
3. There is not enough government support for the widespread adoption of renewable energy.	3.85	1.15	Agree
4. I think that renewable energy is limited by weather conditions, making it less reliable than traditional energy sources.	3.47	1.08	Agree
5. I believe the transition to renewable energy will take a long time to implement effectively in the Philippines.	3.97	1.1	Agree

Legend: 4.21-5.00 (Strongly Agree), 3.41-4.20 (Agree), 2.61-3.40 (Neutral), 1.81-2.60 (Disagree), 1.00-1.80 (Strongly Disagree)

Table 7 shows respondents' concerns about renewable energy, particularly regarding reliability and high short-term costs. These concerns match findings from Smith (2019) and Johnson (2020), who noted reliability issues and high initial expenses as barriers. Respondents also feel government support is lacking, aligning with Cruz and Reyes (2020), which highlights the need for policy and incentives. Weather dependence was another issue, as renewables are seen as less reliable than traditional sources, echoing Davis (2021). Lastly, respondents agree that a full transition to renewable energy in the Philippines will take time, consistent with Hernandez (2019).

Table 8 highlights the respondents' willingness to adopt renewable energy, emphasizing their support for affordable and accessible solutions, government policies, and community programs that promote renewable energy awareness.

Table 8. Willingness to Adopt or Support Renewable Energy Initiatives

Statements	WM	SD	Verbal Interpretation
1. I am willing to integrate renewable energy sources for household use if they are made affordable and accessible.	4.36	0.94	Strongly Agree
2. I would support government policies promoting the use of renewable energy in the Philippines.	4.28	0.91	Strongly Agree
3. I would be willing to participate in programs that promote renewable energy awareness in my community.	4.18	0.91	Agree
4. I am open to paying a higher price for electricity if it is sourced from renewable energy.	3.34	1.25	Neutral
5. I would recommend renewable energy to friends, family, or colleagues.	4.2	0.93	Agree

Legend: 4.21-5.00 (Strongly Agree), 3.41-4.20 (Agree), 2.61-3.40 (Neutral), 1.81-2.60 (Disagree), 1.00-1.80 (Strongly Disagree)

Table 8 reflects the respondents' strong willingness to adopt renewable energy for household use if it is affordable and accessible. Many also expressed supports for government policies promoting renewable energy in the Philippines, indicating a shared belief in the importance of government action in advancing renewable energy adoption. This is consistent with the findings of (Garcia & Santos, 2021), who noted widespread public support for renewable energy initiatives when the government takes a proactive role. Additionally,

respondents were generally open to participating in community programs that raise awareness about renewable energy, like what was found by (Lopez, 2019), who emphasized the value of grassroots efforts in promoting renewable energy use. However, respondents showed a neutral stance regarding paying higher prices for renewable energy, which aligns with the research of (Cruz & Reyes, 2020), suggesting that cost remains a significant barrier for some when considering renewable energy options. Finally, many respondents indicated they would recommend renewable energy to others, highlighting the importance of peer influence and community advocacy in spreading awareness, as also suggested by (Dela Cruz, 2022).

Table 9 summarizes the respondents' perspectives on the collaboration between the government and private sector, emphasizing the need for joint efforts in expanding renewable energy initiatives and increasing public awareness.

Table 9. Public Perception of Government and Private Sector Efforts

Statements	WM	SD	Verbal Interpretation
1. I believe the government is doing its part to promote the adoption of renewable energy in the country.	3.37	1.17	Agree
2. I think that more private companies should invest in renewable energy projects in the Philippines.	4.08	0.97	Agree
3. I trust that the renewable energy projects implemented by the government are in the country's best interest.	3.88	1.03	Agree
4. I believe there is a lack of public awareness campaigns regarding the benefits of renewable energy.	4.19	0.99	Agree
5. I think that both the public and private sectors should collaborate to expand the use of renewable energy sources.	4.32	0.89	Strongly Agree

Legend: 4.21-5.00 (Strongly Agree), 3.41-4.20 (Agree), 2.61-3.40 (Neutral), 1.81-2.60 (Disagree), 1.00-1.80 (Strongly Disagree)

The respondents generally agree that the government is contributing to the promotion of renewable energy, although there is room for improvement. Many believe that private companies should invest more in renewable energy projects, echoing previous findings by Santos (2021) that emphasize the importance of private sector involvement. Respondents also trust that the government's current renewable energy projects are beneficial for the country, aligning with the views shared by Cruz and Reyes (2020). However, there is concern about the lack of public awareness campaigns about renewable energy, a sentiment also noted in the work of Lee (2019). Finally, the respondents strongly support collaboration between the public and private sectors to expand the use of renewable energy, a recommendation seen in several studies such as those by Smith and Lopez (2019).

C. Key Barriers and Facilitators Affecting Public Support for Renewable Energy Policies and Initiatives

Barriers to Public Support for Renewable Energy Policies

Figure 2 shows that many people are worried about the high cost of renewable energy, with 79.8% saying it's too expensive. This matches what Jenkins et al. (2018) found, where they explained that the high cost stops people from using renewable energy more. Also, 62.7% of respondents said there aren't enough financial incentives, and 45.6% said it's hard to get loans or subsidies for renewable energy. Sovacool (2019) said the same thing, noting that when governments don't give enough financial help, it slows down the switch to renewable energy. Over half (52.8%) of the people also think that traditional energy sources like fossil fuels are cheaper, which aligns with what Jacobson et al. (2020) found. They said

fossil fuels seem more affordable because there are already systems in place to support them. Finally, 72% of respondents said there isn't enough money going into renewable energy research. This fits with Borenstein's (2017) work, which pointed out that both government and private companies need to invest more in renewable energy to help make it cheaper. These results from other studies help show that costs, lack of financial help, and not enough investment are big challenges in getting more public support for renewable energy, as shown in the current survey.

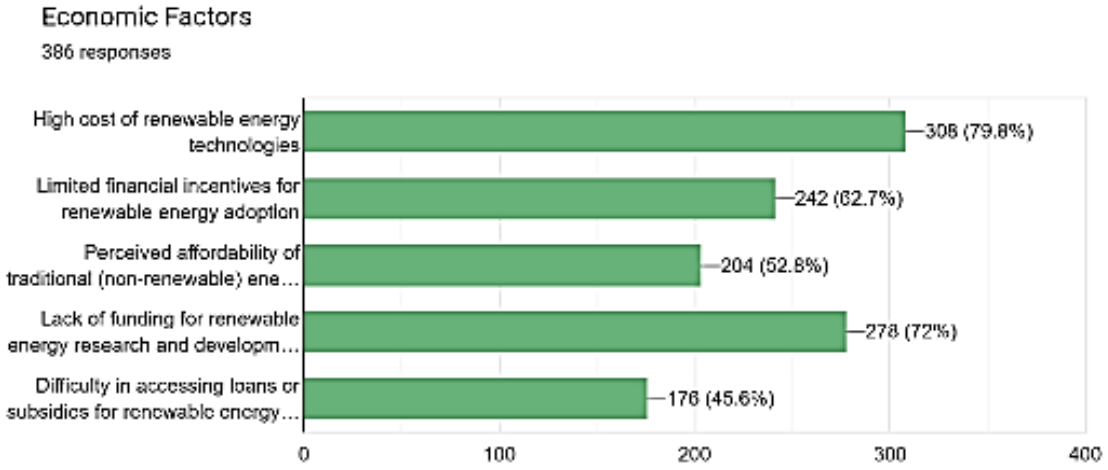

Figure 2. Economic Factors for Public Support for Renewable Energy

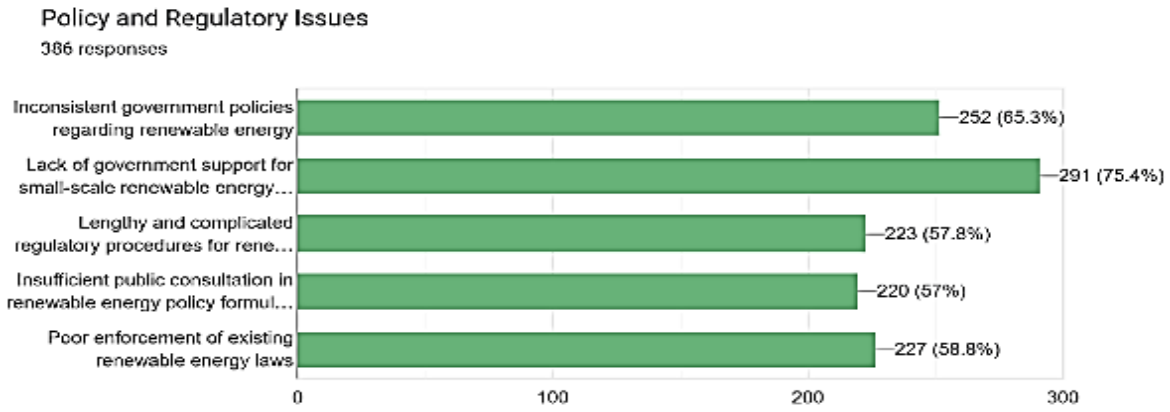

Figure 3. Policy and Regulatory Issues for Public Support for Renewable Energy

Figure 3 shows that a majority of respondents (75.4%) feel the government doesn't support small-scale renewable projects enough, aligning with Verbruggen and Lauber (2019). Additionally, 65.3% believe renewable energy policies are inconsistent, echoing Sovacool (2020). Over half (57.8%) find regulatory approval processes too lengthy, similar to Borenstein's (2017) findings on delays hindering implementation. Poor enforcement of laws is a concern for 58.8%, as noted by Jacobson et al. (2020). Lastly, 57% think there's insufficient public consultation, consistent with Sovacool (2019).

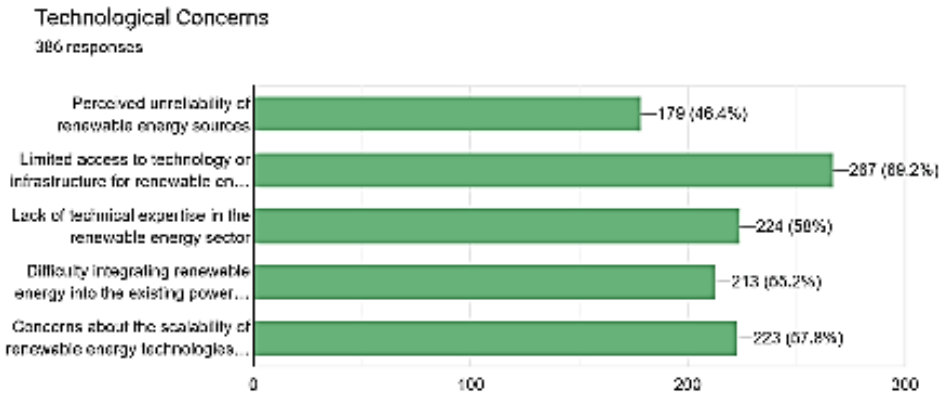

Figure 4. Technological Concerns for Public Support for Renewable Energy

Figure 4 shows the technological concerns related to adopting renewable energy. Nearly half (46.4%) of the respondents mentioned the perceived unreliability of renewable energy sources, which echoes the findings of Komendantova (2018), who highlighted that trust in the consistency of renewable energy is still a major issue. A larger portion, 69.2%, pointed to limited access to technology or infrastructure for renewable energy, aligning with the work of Palchak and colleagues (2019), who noted that insufficient infrastructure is a significant barrier, especially in developing regions. The lack of technical expertise in the renewable energy sector, identified by 58% of the respondents, mirrors the concerns raised by Sovacool (2020), who emphasized that a skilled workforce is essential for successful renewable energy deployment. Similarly, 55.2% of respondents found it difficult to integrate renewable energy into the existing power grid, an issue also raised by Jacobson et al. (2020), who explained that technical challenges in integration are common during the transition to greener energy sources. Lastly, 57.8% expressed concerns about the scalability of renewable energy technologies, which corresponds with the findings of IRENA (2020), where the scaling of renewables to meet growing energy demands was seen as a potential hurdle. These technological concerns indicate that while renewable energy is promising, addressing these issues is key to broader adoption.

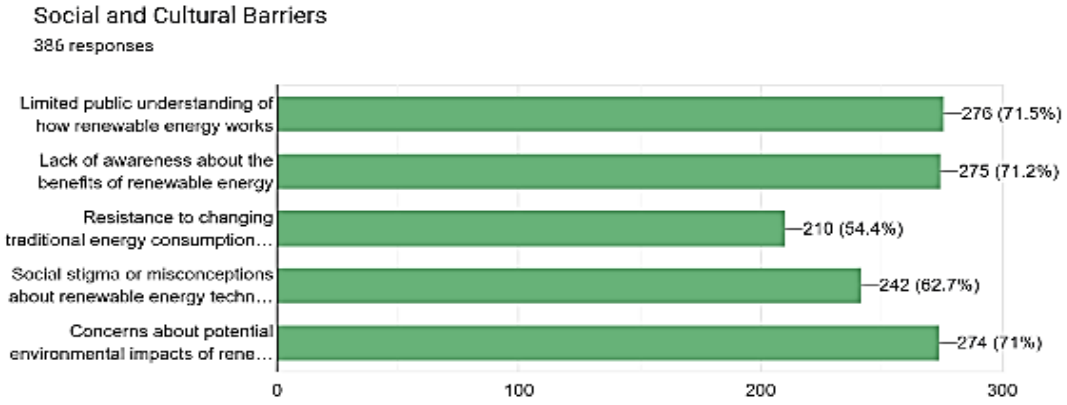

Figure 5. Social and Cultural Barriers for Public Support for Renewable Energy

Figure 5 highlights social and cultural barriers to renewable energy adoption. Most respondents (71.5%) feel the public lacks understanding of renewable energy, echoing Sovacool (2019). Similarly, 71.2% believe people are unaware of its benefits, as Sovacool and Lauber (2020) also observed. Over half (54.4%) noted resistance to moving away from traditional energy sources, aligning with Stokes (2018). Social stigma and misconceptions were mentioned by 62.7%, consistent with Verbruggen (2019). Additionally, 71% expressed concerns about environmental impacts, similar to Jacobson et al. (2020). These findings suggest that misunderstandings, resistance, and environmental concerns are key barriers to renewable energy acceptance.

Facilitators for Public Support for Renewable Energy Policies

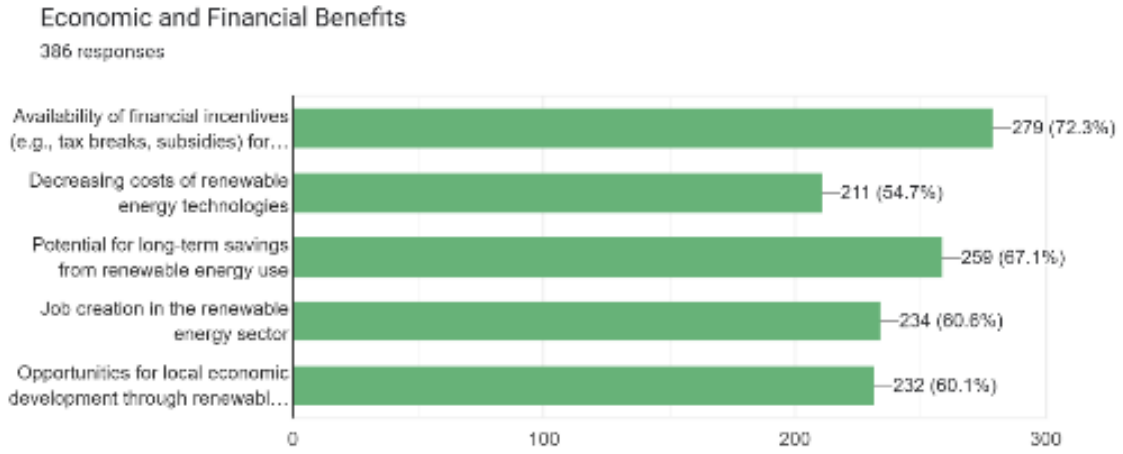

Figure 6. Economic and Financial Benefits as Facilitators for Public Support for Renewable Energy Policies

Figure 6 highlights the economic and financial benefits that encourage public support for renewable energy policies. A significant number of respondents (72.3%) believe that financial incentives, like tax breaks and subsidies, play a major role in driving support for renewable energy. This finding aligns with research by Gillingham and Sweeney (2019), which emphasized the importance of economic incentives in motivating renewable energy adoption. Additionally, 67.1% of respondents see the potential for long-term savings from renewable energy use as a key factor. This observation is consistent with studies by IRENA (2020), which pointed out that the declining costs of renewable energy make it more attractive to consumers and businesses in the long run. Job creation in the renewable energy sector is also seen as a major benefit, with 60.6% of respondents noting its importance. Sovacool (2020) similarly found that the economic growth linked to job creation in renewable energy sectors significantly influences public opinion and support. Lastly, opportunities for local economic development through renewable energy were highlighted by 60.1% of respondents, showing that local benefits are key drivers of public support. This matches the insights from Sovacool and colleagues (2018), who suggested that local community development projects related to renewable energy can help garner more public backing for such initiatives.

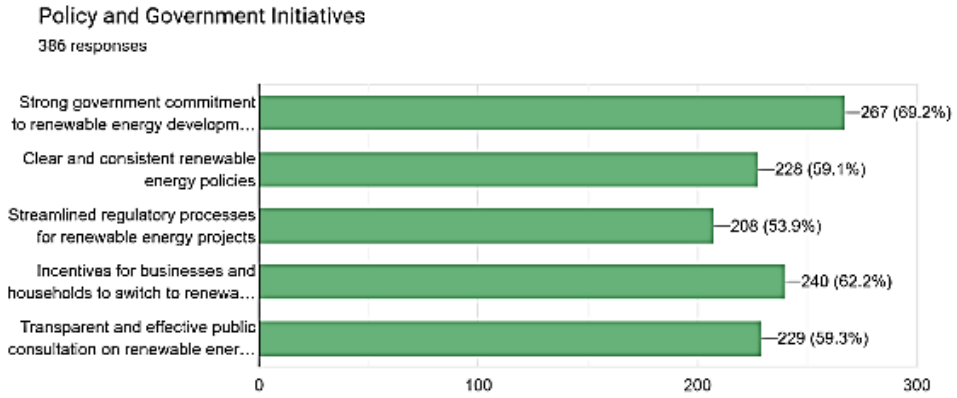

Figure 7. Policy and Government Initiatives as Facilitators for Public Support for Renewable Energy Policies

Figure 7 shows that strong government commitment to renewable energy development is a major factor, with 69.2% of respondents agreeing. This aligns with findings by Mitchell (2019), who highlighted the importance of clear government dedication in driving renewable energy initiatives. Clear and consistent renewable energy policies were also identified by 59.1% of respondents as crucial, echoing Sovacool's (2020) research, which emphasized that clarity in policy encourages public and private sector participation in renewable energy projects. Additionally, 62.2% of respondents see incentives for businesses and households to switch to renewable energy as important. This matches the conclusions of Gillingham and Sweeney (2019), who noted that incentives such as subsidies and tax breaks make the transition to renewable energy more attractive to consumers and businesses alike. Streamlined regulatory processes for renewable energy projects were noted by 53.9% of respondents, which aligns with Sovacool (2020), who argued that simplifying regulations can accelerate the development of renewable energy infrastructure. Transparent and effective public consultations on renewable energy policies were seen as key by 59.3% of respondents, like observations made by IRENA (2020), which stressed the need for inclusive stakeholder engagement to build public trust and support for renewable energy initiatives.

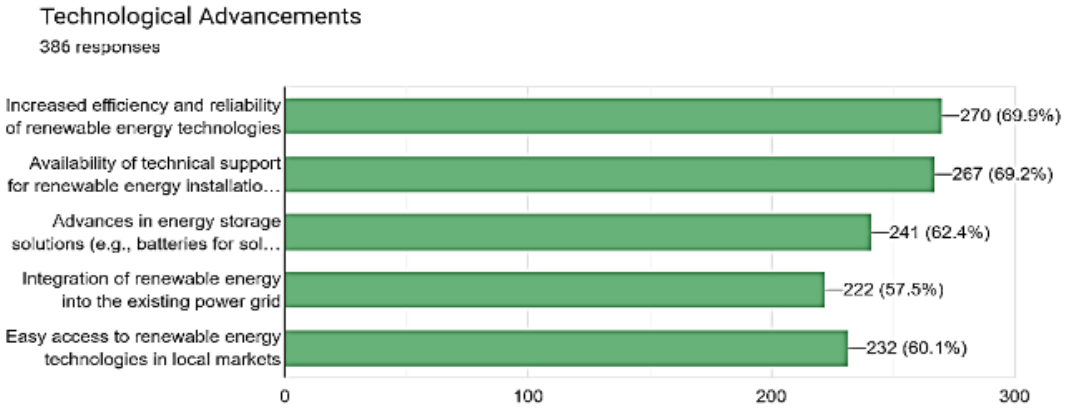

Figure 8. Technological Advancements as Facilitators for Public Support for Renewable Energy Policies

Figure 8 shows that 69.9% of respondents view improved efficiency and reliability of renewable energy as crucial for public support, echoing Brown's (2020) findings. Similarly, 69.2% emphasize the need for technical support, aligning with Sovacool (2020) on

reducing complexity. Advances in energy storage are important to 62.4% of respondents, consistent with Kintner-Meyer (2019) on managing renewable intermittency. Integration into the power grid was noted by 57.5%, matching Luthra et al. (2019) on grid modernization. Lastly, 60.1% value easy access to renewable tech in local markets, supporting Zhang's (2020) argument on availability aiding adoption.

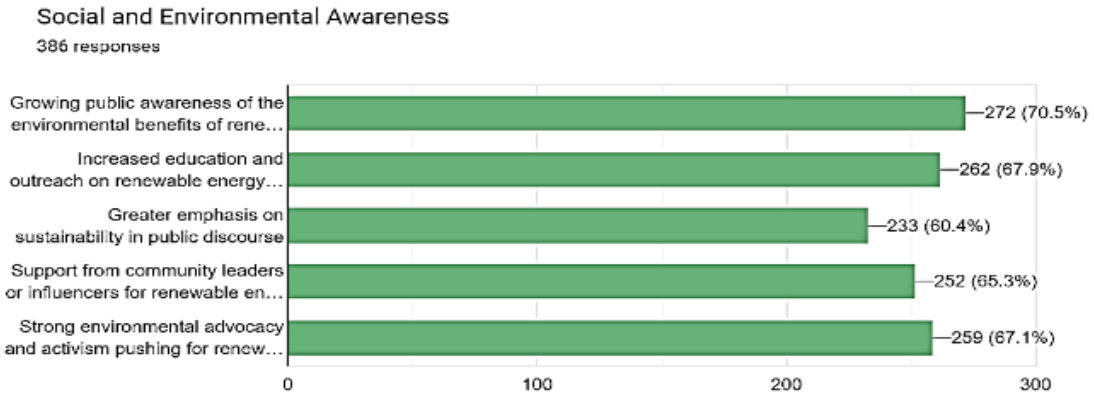

Figure 9. Social and Environmental Awareness as Facilitators for Public Support for Renewable Energy Policies

Figure 9 shows that 70.5% of respondents believe that raising public awareness about the environmental benefits of renewable energy can encourage support. This matches studies like Garcia (2019), which highlight the importance of education in boosting renewable energy adoption. Additionally, 67.9% of respondents support increased education and outreach efforts, echoing the findings of Anderson (2020), who emphasized that effective communication campaigns play a key role in promoting renewable energy. Greater focus on sustainability in public discussions was supported by 60.4% of respondents, aligning with Whitford's (2020) argument that sustainability should be central in energy policy conversations. Furthermore, support from community leaders and influencers was important to 65.3% of respondents, reflecting Kermani's (2020) conclusion that community leadership can drive public engagement in renewable energy. Finally, strong environmental advocacy and activism, supported by 67.1%, also match Huang's (2019) findings, where activism has been shown to influence energy policy and public opinion on clean energy solutions.

D. Statistical Treatment

The table below presents the summary of the Kruskal-Wallis H Test results, including chi-squared values, degrees of freedom, p-values, and corresponding interpretations for public awareness across variables such as location, age, gender, and estimated salary.

Table 10. Summary of Kruskal-Wallis H Test for Public Awareness

Variable	Chi-squared	Degrees of Freedom (df)	p-value	Interpretation
Location	6.3851	2	0.04107	Significant difference in Mean Score by Location ($p < 0.05$).
Age	23.044	5	0.0003111	Significant difference in Mean Score by Age ($p < 0.05$)
Gender	8.0167	2	0.01816	Significant difference in Mean Score by Gender ($p < 0.05$).
Estimated Salary	13.483	5	0.01925	Significant difference in Mean Score by Estimated Salary ($p < 0.05$).

The table presents the results of the Kruskal-Wallis H test, which was used to see if there were any significant differences in public awareness based on location, age, gender, and estimated salary. The null hypothesis suggested that there would be no significant differences in public awareness based on these factors.

For the location, the p-value for location is 0.04107, which is less than the standard threshold of 0.05. This means that the null hypothesis is rejected for location, suggesting that there is a significant difference in public awareness depending on where people live. In other words, people from different locations have different levels of awareness. For the age, the p-value is 0.0003111, which is much smaller than 0.05. This allows us to confidently reject the null hypothesis for age as well, indicating that public awareness varies significantly among different age groups. People of different ages have varying levels of knowledge or awareness. Regarding gender, the p-value is 0.01816, which is also less than 0.05. This means that we can reject the null hypothesis here too, showing that there is a significant difference in public awareness between males and females. So, gender does play a role in how aware people are. Finally, for the estimated salary, the p-value is 0.01925, again below 0.05. This means the null hypothesis is rejected for this variable too. There is a significant difference in public awareness based on people's income levels. In other words, how much someone earns influences their awareness level.

Overall, the results suggest that public awareness does indeed differ significantly across all four variables—location, age, gender, and estimated salary. Therefore, the null hypothesis, which said there are no significant differences, is rejected for all the factors. Each factor influences public awareness in its own way.

Table 11 presents the summary of the Kruskal-Wallis H Test results, including chi-squared values, degrees of freedom, p-values, and corresponding interpretations for public attitudes and perceptions across variables such as location, age, gender, and estimated salary.

Table 11. Summary of Kruskal-Wallis H Test for Public Attitudes and Perception

Variable	Chi-squared	Degrees of Freedom (df)	p-value	Interpretation
Location	3.6933	2	0.1578	No significant difference in Mean Score by Location ($p > 0.05$). No significant difference in Mean Score by Location ($p > 0.05$).
Age	18.737	5	0.002151	Significant difference in Mean Score by Age ($p < 0.05$).
Gender	1.9357	2	0.3799	No significant difference in Mean Score by Gender ($p > 0.05$).
Estimated Salary	10.667	5	0.0584	No significant difference in Mean Score by Estimated Salary ($p > 0.05$).

The null hypothesis suggested that respondents' public attitudes and perceptions would not differ significantly based on their age, gender, income, or location. However, the Kruskal-Wallis H test results offer insight into how these factors influence public attitudes and perceptions. For location, the p-value of 0.1578 is higher than the standard threshold of 0.05. This indicates that there is no significant difference in public attitudes and perceptions based on where respondents live. In other words, people from different locations seem to share similar attitudes and perceptions. For the age, the p-value of 0.002151 is below 0.05, signaling a significant difference in attitudes and perceptions among different age groups. This result suggests that respondents' views and attitudes vary depending on their age. For gender, the p-value is 0.3799, which is much higher than 0.05. This shows that there is no

significant difference in public attitudes and perceptions between men and women, meaning both genders tend to hold similar views. Regarding income (estimated salary), the p-value of 0.0584 is slightly above the 0.05 threshold, indicating that there is no significant difference in attitudes and perceptions across different income levels. While it comes close to being significant, income does not appear to have a strong influence on respondents' attitudes and perceptions. In summary, age is the only factor that significantly affects public attitudes and perceptions, while location, gender, and income do not show any significant impact.

Summary of Results

The study looked at public awareness, attitudes, and thoughts about renewable energy in the Philippines. It focused on how different factors like age, gender, income, and location might affect people's views. The survey results gave a clear picture of what people know, how they feel about renewable energy, and what influences these opinions.

Awareness of Renewable Energy

Most people in the survey showed a good level of understanding about renewable energy sources like solar, wind, and hydropower. Many knew about the environmental benefits, such as reducing pollution and slowing climate change. This suggests that people have a strong base knowledge of renewable energy. However, fewer people seemed aware of specific local renewable energy projects or government plans, meaning that while they understand the general idea of renewable energy, there's room to improve awareness of local efforts.

Attitudes Toward Renewable Energy

People's attitudes toward using renewable energy were mostly positive. Many respondents felt that renewable energy is important for protecting the environment and supporting sustainable growth. A lot of people agreed that renewable energy should be favored over fossil fuels, showing strong public support for moving toward greener energy sources. However, there were concerns about the initial cost of adopting renewable energy, especially for individuals or families, even though people understood the long-term savings it might offer.

Views on the Role of Government and Business

People see both the government and private companies as key players in growing renewable energy use. While many believe the government is working to promote renewable energy, some respondents feel that not enough is being done to inform the public or provide easy-to-access renewable energy options. The private sector is also seen as important, with many hoping that businesses will invest more in renewable energy to help move things forward faster.

Willingness to Adopt Renewable Energy

Despite worries about cost, many people said they are open to adopting renewable energy, especially if it becomes more affordable. There is a clear interest in participating in renewable energy programs, as long as they are easy to access and reasonably priced. However, when asked if they would be willing to pay more for renewable energy, people were more hesitant, showing that cost is still a big concern. Even so, the general support for renewable energy suggests that many are ready to switch to cleaner energy sources if the price is right.

Barriers to Adoption

The study identified a few key challenges that might slow down the use of renewable energy. The main issues were high initial costs, worries about the reliability of renewable energy (especially with weather-dependent sources), and a feeling that there isn't enough government support. These concerns show that while people are supportive of renewable energy, there are practical barriers that need to be addressed through better policies, financial help, and public awareness campaigns.

Kruskal-Wallis H Test Results

The Kruskal-Wallis H test was used to see if public attitudes and perceptions differed based on location, age, gender, and income. The results showed:

Age: There is a clear difference in how people of different ages view renewable energy, as

the p-value was 0.002151 (less than 0.05). This means that younger and older people tend to have different opinions on renewable energy.

Location: The test showed no big differences in views based on location, as the p-value was 0.1578 (greater than 0.05). People from urban, suburban, or rural areas seem to have similar attitudes toward renewable energy.

Gender: There was no significant difference between the attitudes of men and women, with a p-value of 0.3799 (greater than 0.05). This suggests that gender doesn't really change how people feel about renewable energy.

Income: The p-value for income was 0.0584, which is just above the 0.05 threshold. This shows that income doesn't strongly affect people's views on renewable energy, even though it might have some influence.

The study found that most people are aware of renewable energy, and their attitudes are generally positive. Age seems to be the biggest factor that changes how people think about renewable energy, while location, gender, and income don't make much difference. The main barriers to wider adoption are concerns about cost, reliability, and government support. These are areas where more work could be done to encourage people to adopt renewable energy. The results give useful insights for policymakers and organizations trying to promote renewable energy. By addressing people's concerns, like making renewable energy more affordable and reliable, and increasing local involvement, the government and businesses can work together to increase the use of clean energy across the country.

Conclusion

From the study, we can answer the research questions with the following conclusions:

1. *Demographic Profile of Respondents:* The people who took part in the survey came from different age groups, with most of them being between 18-24 years old. There was a nearly equal number of men and women. Their income levels ranged from under ₱10,000 to over ₱100,000, and they lived in various areas, including cities, suburban places, and rural areas. This mix of respondents gave a clear view of how different groups think about renewable energy in the Philippines.
2. *Public Awareness of Renewable Energy:* Most respondents knew about renewable energy sources like solar, wind, and water energy. However, fewer people were aware of specific renewable energy projects or policies in the country. This shows that while general knowledge is high, there's a need for more awareness of what the government is doing in this field.
3. *Public Attitudes and Perceptions:* The attitudes toward renewable energy were mostly positive. People felt that using renewable energy is important for the environment and helps the country grow in a sustainable way. Many agreed that renewable energy should replace fossil fuels. However, there were concerns about the high cost of installing renewable energy systems, which could stop some people from making the switch.
4. *Differences in Public Awareness:* The test showed that *age* had an impact on how much people knew about renewable energy. Younger and older people had different levels of awareness, with younger respondents often knowing more. However, *gender, income,* and *location* did not make much difference in how aware people were. This means men and women, as well as people from different income levels or places, knew about the same amount.
5. *Differences in Public Attitudes and Perceptions:* The test also found that *age* affected people's views and feelings about renewable energy. People from different age groups thought differently about renewable energy, but *gender, income,* and *location* did not have a big effect. This suggests that most people's attitudes and perceptions are similar, regardless of these factors.
6. *Barriers and Factors Supporting Renewable Energy:* The study found that high costs were a major barrier to using renewable energy. People were also worried about how reliable these energy sources would be, especially solar and wind. On the other hand, support for renewable energy was

strong because of its environmental benefits. Many people said they would consider renewable energy if it were more affordable and if the government provided better support.

7. *Suggestions for Improving Awareness and Support:* To encourage more people to support renewable energy, the study suggests running more public information campaigns about renewable energy projects. Making renewable energy systems cheaper through subsidies or financing plans would help too. Finally, getting communities involved in decisions and showing them, the long-term benefits of renewable energy could make them more willing to adopt these systems.

In summary, while people generally have a good attitude toward renewable energy, making it more affordable and spreading more information about government projects could help increase public support in the Philippines.

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