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Research article

Decision-Making Factors for Installing a Solar Roof Top System of 10 kWp in Thailand

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Abstract: This research aims to investigate the factors influencing the purchase of insurance for solar rooftop systems with a capacity of not more than 10 kilowatts. The sample consists of 513 households that install such systems nationwide. To use convenient sampling online and analyze the data using descriptive statistics. It is necessary. And the standard control sets the significance level at 0.05. The research report found that the sample group examined efficiency (62.4%), individuals aged 40–50 years old (44.5%), frequency (53.2%), system operation (38.4%), and an average monthly income of 50,000 baht (37.6%). The average rate is 4.63 (SD = 0.13). Consider reviewing the overall purchase by the respondent, who is reviewing the insurance for the first time, to ensure the organization supports the repair or replacement of products annually.

Keywords: Solar Roof Top; Insurance; Solar PV panel installation; Marketing mix; Service decision

1. Introduction

Electrical energy is a crucial factor in performing various daily activities. The current electricity demand tends to increase in both the industrial sector, the business and administrative sectors, and households. In addition, most people are aware of the importance of the global warming problem and have begun to pay more attention to alternative energy sources. Alternative energy sources, such as hydroelectric power, wind power, and solar power, can help mitigate the adverse effects and pollution that harm the environment. Therefore, current electricity producers and service providers are more interested in electricity production, product production, and various services related to alternative energy [1].

Solar energy is a renewable energy that can be naturally regenerated. It is clean and has high potential. The use of solar energy can be divided into 2 types: using solar energy to generate electricity and using solar energy to generate heat (drying technology and hot water production technology). The most popular technology for using solar energy to generate electricity today is solar PV or what is known as solar PV. Solar energy is one of the renewable energy sources that has received significant support, as it is well-suited for Thailand, which experiences strong sunlight almost year-round. The government has set a target for the solar cell power generation project at 3,286 MW. The government has established a clear strategic plan to promote the installation of

solar PV rooftop power generation systems, including a measure to buy back electricity from residential groups that can generate electricity from sunlight. The electricity buyback rate is 1.68 baht/unit for 10 years, and there is a connection cost to the electricity grid with PEA of 8,500 baht (this price does not include 7% VAT and does not cover the cost of installing the Solar PV Rooftop system). Additionally, special criteria are in place for reducing the cost of connecting to the grid and related equipment for those interested in joining the project. Electricity generation from renewable energy is considered a technology that can help the country reduce fuel imports from abroad. It is also the use of clean energy, which is environmentally friendly and helps create energy security for the country. Solar PV on the roof of the house to produce electricity for own use (Rooftop PV system) is an electricity generation technology suitable for both city and rural houses, reducing electricity costs for homeowners. It also helps reduce the electricity shortage during peak load periods. It serves as a good starting point for promoting and expanding the business of electricity generation from rooftop solar energy, which can be widely adopted in the household sector to create benefits for electricity users and support national policies [2].

Therefore, those interested in such business must give more importance to the solar cell system, as most people's behavior when deciding to install solar cell energy is a key factor. And what are the reasons that make people decide to install or not install solar cell energy? What factors affect consumers' decisions to invest in solar cell energy? Siripoj studied the factors affecting the decision to install A solar power generation system for residential houses of consumers in Chiang Mai Province and found that the overall marketing mix factors that affect the decision to install a solar power generation system for residential houses of consumers in Chiang Mai Province are at the highest level, with most respondents giving importance to price, distribution channels, products, physical characteristics, marketing promotion, personnel, and processes, respectively [3]. Factors of decision to install a solar power system for residential homes by using the Analytic Hierarchy Process from experts in the energy business, 20 samples, and also collecting information about the satisfaction of various factors, 400 samples from consumer groups, to provide complete information. The results of the study were as follows: The most important main factor of decision is the reliability factor, with an importance factor level of 38.94%, and the most important sub-factor is the service quality factor. The primary factor that follows is the marketing mix, with a 34.17% importance level, and the most significant sub-factor is the price factor. From processing, the Consistency Ratio is based on the principle of comparison in the Analytic Hierarchy Process, and it ensures the satisfaction of both the expert group and the consumer group [4]. From the study of demographic factors and marketing mix factors (7Ps) that affect the decision to purchase solar cells of retail electricity users in Nonthaburi Province, it was found that the demographic factors of gender, age and occupation that are different affect the decision to purchase solar cells of retail electricity users in Nonthaburi Province with statistical significance at the .05 level of significance. In addition, the marketing mix factors of product, price, promotion, and physical environment, which differ significantly, affect the decision to purchase solar cells for retail electricity users in Nonthaburi Province at the .05 level of significance [5].

Currently, the solar power generation system installed on the roof and various buildings has started to require additional solar rooftop installations. However, there are still concerns about the impact of the installation, particularly in terms of electrical fires in the house due to the installation, as well as the cleaning of the panels, which can affect the system's efficiency. These concerns, therefore, affect the decision not to install the Solar rooftop system. Therefore, insurance for the Solar Roof Top System is another option that can alleviate concerns and encourage homeowners to install the System. Currently, no company has taken action on this matter, so customers' concerns persist.

From the problems mentioned above, the researcher has studied the factors affecting the decision to purchase insurance for the insured Solar Rooftop System with a size not exceeding 10 kWp in Thailand. The objective is to survey the insurance purchasing behavior of individuals with solar rooftop systems to understand their needs and attitudes towards purchasing insurance for systems with a size not exceeding 10 kWp. This will be used to develop, improve, and enhance the solar cell system, including services, to better respond to the needs of consumers.

Research objectives

1. To survey the needs of users and those who have never used Solar Roof Top system services of no more than 10 kWp in Thailand.

2. To study the marketing mix factors (7Ps) that affect the decision to purchase insurance for installing a Solar Roof Top system with a size not exceeding 10 kWp.

Expected benefits

1. To enable entrepreneurs to understand the marketing mix factors (7Ps) that affect the decision to use a Solar Roof Top system service of no more than 10 kWp, and to be able to use this research as a database for planning, developing strategies, improving, and expanding services.

2. To enable operators to know the factors in deciding to use the Solar Roof Top system and the trends of users of the Solar Roof Top system, and to use the information to think and analyze in determining the strategies of the Solar Roof Top system to meet the needs of users.

3. To inform entrepreneurs about demographic factors, occupations, and average monthly income, which influence their decision to use the Solar Roof Top system or not, to use as a database for improving, developing, and planning future service strategies.

2. Materials and Methods

The statistical method is divided into four steps as follows:

1. Collection of data is the collection of news, information, or facts required from the population with characteristics that are consistent with the needs. The collection and compilation of this data is considered to be the most important step in statistical methodology Because collecting data that is less reliable will result in the results of analysis and interpretation being of low reliability Therefore, this step requires planning for data collection, control of the data collection process, and thorough inspection of the data to ensure it can be analyzed.

2. Data presentation is a presentation of collected statistical data for dissemination to the general public to understand and prepare data for further analysis. There are various ways to present data, depending on the type of data and its volume.

3. Analysis of data. It involves analyzing the collected data and processing it in accordance with the established objectives, hypotheses, and research questions. For example, this involves comparing the difference in means between two populations using the Z or t test, and comparing the difference between the means of more than two populations. By using the variance test, the test statistic is F, which is used to test the relationship between qualitative variables. Alternatively, X2 is used to test the relationship between two sets of quantitative data, such as using correlation analysis, testing influence, forecasting, or using regression analysis. Additionally, advanced multivariate statistics, including MANOVA, canonical analysis, factor analysis, and discriminant analysis, can be employed. Processing can be done by hand or with a computer. Currently, there are ready-made statistical programs that can help analyze data efficiently and quickly, and can be used at every step, such as SPSS for Windows, MINITAB, and SAS. The processing can be done manually or by computer. Currently, there are ready-made statistical programs that can help analyze data efficiently and quickly, and can be used at every step, such as SPSS for Windows, MINITAB, and SAS.

4. Interpretation or conclusion of data. It involves using the results from the analysis to draw a conclusion. Written as a report of results, such as t = 3.1, what does it mean? Is there a difference between the means of the two population groups? The value R = -0.85 indicates a significant relationship. How much or little? What direction is there? This requires further study to acquire the necessary knowledge.

Theories and concepts related to marketing mix factors (7PS)

The marketing mix refers to the variables or marketing tools that can be controlled and manipulated. Companies often use them together to meet the needs and wants of their target customers. Traditionally, the marketing mix consisted of only four variables. These include product, price, product distribution location or channel, and promotion. Later, three additional variables were developed. It consists of People, Physical Evidence, and Process to align with the important concepts of modern marketing, especially in service businesses. Therefore, together they can be called the 7Ps marketing mix.

2.1 Product aspect refers to things that the company offers for sale to generate interest through consumption or by using services that can make customers satisfied. This satisfaction may come from tangible or intangible aspects, such as design, packaging, smell, color, price, brand, product quality, and the reputation of the manufacturer or distributor.

2.2 Price refers to the amount of money that must be paid to receive the company's products, goods, or services, or it may be the total value that the customer perceives to receive benefits from using the products, goods, or services that are worth the amount paid. Which customers use to compare prices that have to be paid out with value. What customers will receive in return for the product. If the value is higher than the price, the customer will make a buying decision. However, the business should consider the following factors when determining its pricing strategy: the market situation, conditions, and forms of competition, as well as direct and indirect costs.

2.3 Distribution channels refer to the distribution channels of products or services, including methods for delivering those products or services to consumers to meet demand. Specific criteria must be considered to determine the target group and through which channels products or services should be distributed to consumers to be most effective.

2.4 Promotion refers to marketing communication tools to create motivation, thoughts, feelings, needs, and satisfaction in products or services. This will be used to motivate target customers to want the product or remind them of it. It is expected that marketing promotions will have an influence on feelings, beliefs, and behavior in buying products or services, or may involve communication to exchange information between sellers and buyers. However, a combination of various marketing communication tools must be used.

2.5 Personnel refers to employees who work to benefit various organizations, including business owners, top executives, middle executives, lower executives, general employees, housekeepers, etc. Personnel are considered an important part of the marketing mix, as they are the ones who think, plan, and operate to drive the organization in the strategic direction. Additionally, personnel play another important role in forming relationships with and interacting with customers, which is crucial in ensuring customer satisfaction.

2.6 Process aspect refers to activities related to procedures and practices in the service that are offered to service users to provide services correctly and quickly. In each process, there can be numerous activities, depending on the organization's structure and operational methods. If the various activities within the process are linked and coordinated, the overall process will be efficient, resulting in customer satisfaction.

2.7 Physical characteristics refer to things that customers can experience from choosing the organization's products or services. It is a creation of outstanding and high-quality differences, such as store decoration, the clothing of store employees, the way they interact with customers, and fast service. These things are necessary for business operations, especially service businesses that should create quality.

Related research

Kamontip Yubol [6] said: The objective of the research study was: 1) to study the marketing factors affecting the decision to install a solar roof among people in Bangkok, and 2) to study the relationship model of marketing factors affecting the decision to install a solar roof among people in Bangkok. The study population consisted of individuals in Bangkok who had installed solar roofs. A total of 400 people were surveyed using questionnaires and statistical processing, including Frequency Distribution, Percentage, Mean, and Standard Deviation. The results of hypothesis testing used the Pearson product-moment correlation coefficient and Multiple regression analysis. The research results show that:

Most respondents were female, 222 people amounts to 55.5%, 31 - 40 year of age, 150 people amounts to 37.5%, graduated with bachelor's degree, 302 people amounts to 75.5%, worked in Government officials/state enterprise employees, 145 people amounts to 36.2% and average incomes 20,001 – 30,000 Baht, 171 people amounts to 42.7%

The marketing factors affecting the decision to install a solar roof among people in Bangkok were found to be the highest. The most critical factors were product, physical evidence, place, process, promotion, price, and people, in that order. A study on the decision to install solar roofs among people in Bangkok found that the overall level was the highest. Customers provided the most opinions in terms of purchasing decisions, post-purchase behavior, evaluation of alternatives, and searching for information, respectively.

Hypothesis testing revealed that the marketing factors affecting the decision to install a solar roof among people in Bangkok were statistically significant at the 0.01 level. The main factor influencing the decision to install a solar roof for people in Bangkok was price. The following ranking was promotion, people, product, place, and physical evidence, in that order. The least factor was process. The marketing factors affecting the decision to install a solar roof for people in Bangkok can be predicted with about 85.3 percent accuracy, with the statistical significance at the level of 0.05.

Siriphon Sriwirat [7] stated that this study aimed to examine the factors affecting customers' decision-making in Chiang Mai Province regarding the installation of home solar power systems. Samples for this study were identified among 400 individuals who expressed interest in and had the decision-making authority to install solar power systems in their homes in Chiang Mai. Data were analyzed by descriptive statistics: frequency, percentage, mean, and standard deviation (S.D.), and the inferential statistics: T-test to compare differences between the means of two sample groups and One-Way Analysis of Variance: ANOVA to compare means of more than two groups of variables.

The findings showed that most respondents were female, under 30 years of age, and employed as employees or private individuals. Their educational background was a bachelor's degree or its equivalent. They held the status of owners of a single-attached three-story house, and 3-4 members resided in the house. They mostly used electricity between 6:00 p.m. and 12:00 a.m.

Results of the study showed that in an overview, service marketing mixed factors, which affected decision-making of customers in Chiang Mai province towards installing home solar power systems at the highest level and on which they paid the highest level of concern were price, place, product, physical evidence, promotion, people, and process, respectively.

Conceptual framework of the research

From the study of research data, theories, and various articles mentioned above, the researcher has used information from the literature review to determine the conceptual framework of the research to be used as a guideline for conducting research on the factors of decision making in purchasing insurance for installing a Solar Roof Top system of no more than 10 kWp., using information on marketing mix factors (7Ps) that influence the decision making in purchasing insurance for installing a Solar Roof Top system of no more than 10 kWp.

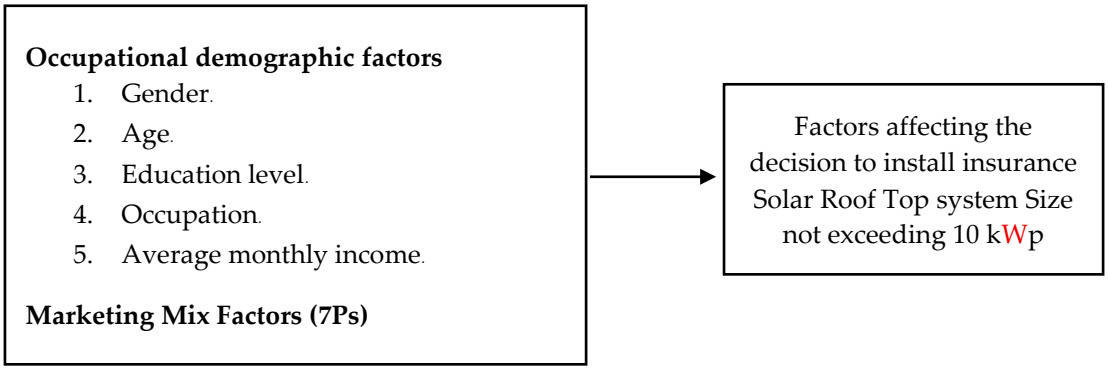

Figure 1. Research Framework

3. Research Methodology

This research is survey research, which has the following details:

The study of "Factors affecting the decision to purchase insurance for installing a Solar Roof Top system of no more than 10 kWp" is quantitative research. It is survey research. Use questionnaires to collect data, analyze statistical data using ready-made programs, and summarize research results to present them in the form of tables and lectures.

3.1 Population and sample group

The target population for this research study is the population residing in Thailand, specifically the consumer group that decides to purchase solar PV in Thailand, comprising 513 households across all regions of the country.

3.2 Creation of research instruments

The research instruments used in this study were questionnaires, which were used to collect data. The data collection instruments for this study were questionnaires on the marketing mix, focusing on the decision-making factors in purchasing insurance for installing a Solar Rooftop system of no more than 10 kWp. These

questionnaires were developed by the researcher based on a review of the relevant literature to address the research objectives. By dividing the details of the questionnaire into 3 parts, the details are as follows:

Part 1 is a question about the personal characteristics of the respondents, including gender, age, educational status, and monthly income.

Part 2 Information on marketing mix factors (7Ps) for solar cell systems for Solar Roof Top systems, size not exceeding 10 kWp.

Part 3 is a question about Part 3: Information, specifically creating an insurance business model and a solar cell system for small Solar Rooftops.

For data analysis in sections 2 and 3, the questionnaire employed a rating scale in the form of a Likert Scale, allowing respondents to select only one answer. There were 5 levels of scores, using an Interval Scale type of data measurement level. The scoring criteria were as follows:

A score of 5 means the most
A score of 4 means a lot
A score of 3 means moderate
A score of 2 means little
A score of 1 means the least

3.3 Checking the quality of research tools

Testing Tools from the questionnaire created for the study. The researcher has tested for reliability and confidence of the questionnaire as follows: 1) Take the designed questionnaire to ask for advice from an advisor, and consider and check the accuracy of the content. 2) Take the questionnaire that has been checked and has suggestions from the advisor, edit and improve the questionnaire to make it more accurate, complete, and cover more content. 3) The questionnaire was used to find the quality of the instrument, and the researcher tested its reliability by finding the Cronbach's Alpha Coefficient with a ready-made statistical program. If the reliability of the questionnaire is greater than or equal to 0.70, it is considered reliable. The researcher therefore used the questionnaire to calculate the reliability using the method above and obtained the Cronbach's Alpha Coefficient (0.83).

3.4 Data collection

The researcher developed and refined the questionnaire until it reached a high quality and then used Google Forms to distribute the questionnaire link through various online channels to a sample of 513 households that had decided to purchase solar PV in Thailand. The collected questionnaire was checked for accuracy and completeness. Then save the information and analyze the data.

3.5 Data Analysis

Once the data on factors influencing the decision to install a solar rooftop system with a capacity not exceeding 10 kilowatts has been collected completely and sufficiently, the researcher will analyze the data using Microsoft Excel. Descriptive statistics, including frequency distribution, percentage, mean, and standard deviation, will be used to summarize and describe the general characteristics of the data obtained from the sample group.

4. Results and Discussion

1. Demography group

From the analysis of the questionnaire data, it was found that the sample group had a higher proportion of males than females, with 62.4% males, 33.9% females, and 3.7% unspecified gender. Most of the sample group were 40-50 years old, accounting for 44.5 percent, and had a bachelor's degree, accounting for 53.2 percent of the sample group. Most of them worked as employees of private companies, accounting for 38.4 percent, and the majority had an average monthly income of less than 50,000 baht, which comprised 37.6 percent of the sample group.

Table 1. Data of the demographic respondents

Category	Respondents (%)
Gender	
Male	320 (62.4)
Female	174 (33.9)
Not specific	19 (3.7)
Age	
Lower than or equal to 40 years	147 (28.6)
41-50 Years	228 (44.5)
51-60 Years	127 (24.7)
More than 60 years	10 (1.9)
Marital status	
Married	308 (60)
Single	147 (28.7)
Widowed/divorced/separated	58 (11.3)
Highest level of education	
Undergraduate	48 (9.4)
Bachelor's degree	273 (53.2)
Master's degree or above	192 (37.4)
Occupation	
Business Owner	160 (31.2)
Civil servants/state enterprises	108 (21.1)
Private employees	197 (38.4)
Students	13 (2.5)
Other	35(6.8)
Average family monthly income	
Below 50,000 baht	193 (37.6)
50,001 – 100,000 baht	179 (34.9)
100,001 – 150,000 baht	69 (13.5)
150,001 baht or more	72 (14)
Resident location	
North	90 (17.5)
Northeast	66 (12.9)
Middle	237 (46.2)
East	47 (9.2)
South	73 (14.2)

Personal factors that affect the decision to purchase insurance for installing a Solar Roof Top system of no more than 10 kWp are as follows:

Categorized by gender, age, and education, it can be concluded that gender, age, and education have different effects on the decision to choose insurance for installing a Solar Rooftop system. And it affects choosing to get solar cell insurance. People with less than a master's degree are worried about deciding to install solar PV. People with lower education levels than a master's degree are more concerned about deciding to install solar PV than those with a master's degree, who think that installing solar PV will be worthwhile and that the benefits will be received from its use, including the service provider's reliability and truthful information.

Classified by monthly income, it can be concluded that there are groups of consumers with different monthly incomes. It affects the decision-making factors in selecting insurance for installing a Solar rooftop system. The products are different. It was found that consumers with a monthly income of less than 50,000 baht and those with an income of more than 50,001 baht exhibit different market factors when choosing solar cell products. Due to the high price of the product

2. Marketing mix factors

From the analysis of data on marketing mix factors (7Ps) that affect the decision to purchase Solar Sell for the installation of a Solar Roof Top system size not exceeding 10 kWp.

Table 2. Mean and Standard Deviation of Market Factors Affecting the Decision to Purchase Insurance for the Installation of Solar Rooftop Systems with a Capacity of Up to 10 kWp.

Marketing mix factors	$\bar{x}$	SD	level
1. Product factors			
Solar Cell panels and Inverters are brands that must have distributors in Thailand.	4.74	0.50	the most
Materials and equipment must comply with installation standards.	4.95	0.24	the most
Installation companies require their installers to receive installation training from a reliable institute or organization.	4.95	0.24	the most
2. Price factors			
The insurance price should be calculated based on the quality of the products selected for installation, including PV, Inverters, and equipment that meet electrical standards, as well as the business credit of the installer.	4.53	0.70	the most
The price of insurance should be calculated based on the reliability and experience of the installer.	4.63	0.55	the most
The price of the insurance should be calculated based on the warranty period provided by the installer.	4.54	0.73	the most
3. Factors related to distribution channels			
It is convenient and easy to contact, with immediate responses available through various channels, including Facebook, Line, telephone, and Email.	4.58	0.68	the most
The service location looks trustworthy.	4.56	0.70	the most
The service location provides knowledge and training for solar cell system installers. for homes to help make decisions, buy additional insurance	4.59	0.68	the most
4. Marketing promotion factors			
There are various advertising channels, such as Facebook, Line@, YouTube, and Email, among others.	4.47	0.78	a lot
There are discounts, promotional prices, free maintenance services, and free panel cleaning for 2 years, among other benefits.	4.60	0.71	the most
There is a request for a parallel electricity permit at a special price.	4.60	0.71	the most
5. People factors			
The staff can provide accurate, quick, and straightforward advice on insurance premium rates.	4.59	0.68	the most
The staff are polite and speak nicely.	4.67	0.59	the most
The staff are knowledgeable and experienced in providing solar power generation system services and guaranteeing solar cell systems for residential homes.	4.70	0.62	the most

Table 2. Mean and Standard Deviation of Market Factors Affecting the Decision to Purchase Insurance for the Installation of Solar Rooftop Systems with a Capacity of Up to 10 kWp. (Continue)

Marketing mix factors	$\bar{x}$	SD	level
6. Physical environmental factors			
Entrepreneurs must provide the public with helpful information.	4.55	0.67	the most
The entrepreneur guarantees a physical store where you can visit and view the product before making a purchase decision.	4.58	0.71	the most
Entrepreneurs have access to standard and reliable tools.	4.67	0.61	the most
7. Service process factors			
Insurance operators must be reliable and have a good image.	4.65	0.61	the most
Insurance operators must have experience in underwriting various types of insurance.	4.63	0.64	the most
The insurance operator must be able to meet your needs exactly as you want, with flexibility like the insurance.	4.60	0.62	the most
Total	**4.63**	**0.13**	**the most**

From Table 2, it is found that the factors affecting the decision to choose insurance for installing a Solar Rooftop system with a size not exceeding 10 kWp are overall at the level that most significantly affects the purchase decision ($\bar{x}$ = 4.63), at the highest level. When considering each aspect, it was found as follows:

Product factors at the highest level. Consumer groups who have purchased solar cell products believe that the brand must be reliable, the product must be of high quality, and it must meet a certified standard (TIS), which influences their decision to purchase Solar Sell and their choice of insurance for installing a Solar Rooftop system.

Price factors are at the highest level. Groups of consumers who have previously purchased solar cell products believe that the price of the product is commensurate with its quality. And it is worth it, as it affects the decision to buy solar and choose to get insurance for installing a solar rooftop system.

Distribution channels at the highest level. Groups of consumers who have previously purchased solar cell products believe that the place of sale is a reliable source of information. This affects the decision to choose to buy solar panels and opt for insurance for installing a Solar Rooftop system.

Marketing promotions at the highest level. A group of consumers who have previously purchased Solar sell products commented that providing information and product recommendations affects their decision to choose Solar sell and opt for insurance for installing a Solar Rooftop system.

The staff at the highest level. Service affects the decision to install a Solar rooftop system. The company's delivery process is fast and accurate. After-sales service is provided. The company's product installation process is correct. The technicians are experienced and have received thorough training.

Physical environment at the highest level. The solar power generation company provides a warranty after delivery. The solar power generation company provides a convenient service.

The service process is at the highest level. The personnel who influence the decision to choose the Solar Roof Top system, the employees of the solar power generation system company, provide excellent service and have polite manners, smiling and dressing well, which makes them look trustworthy. The company's employees possess good knowledge and ability regarding solar power generation systems.

5. Conclusions

The marketing factors that affect the decision to purchase solar energy and choose insurance for installing a Solar Rooftop system with a size not exceeding 10 kW. Include product, price, location, and marketing promotion. The researcher can discuss the results of each aspect as follows:

1. Seven marketing mix factors influence the decision to install Solar Sell. Overall, it is at the highest level. Consumers make purchase decisions based on product quality, user manual, and long service life. There are promotions for low-priced purchases, discounts, and installment plans. There are gifts and a website. This finding is consistent with the research of [8], which studied the marketing mix factors from the customer's perspective that influence the decision to purchase scientific equipment online. The research results found that factors affecting the purchase decision include product safety, a price appropriate for the product quality, cash on delivery, fast contact channels for ordering, timely information updates, quick contact, warranty for damaged products, receiving the correct product, and speedy delivery.

2. Different statuses and incomes affect the decision to buy solar cell products. Different occupations affect the decision. Because the price of the product is relatively high, it affects the decision to buy. While different occupations have other knowledge about the product, it is a factor that affects the decision to buy. This finding is consistent with the research of [9], which analyzed factors affecting the social acceptance of rooftop solar power generation projects. The study found that income and occupation are related to the acceptance of household solar power generation systems. The most important factor influencing the decision to accept is the reduction of global warming. The guidelines for creating acceptance found that the entrepreneur's sales promotion measures are the most important, such as insurance or compensation for damages caused by natural disasters and after-sales service, especially maintenance, including tax deduction measures.

Therefore, most people are still concerned about deciding to install a Solar Roof Top system due to the contractor's work standards and the quality of materials and equipment used to install solar panels on the roof, which can cause "fires". Most contractors lack sufficient knowledge and understanding of electrical safety. In addition, homeowners who install Solar Rooftop systems often lack the budget to hire consultants to oversee the installation. The installation of Solar Rooftop systems should be designed and installed by an electrical engineer who is an expert in solar cell system installation, directly from a relevant agency. Quality equipment should be used to install solar cell systems on the roof. Additionally, annual maintenance is necessary to ensure that the solar panels and other equipment continue to function safely and without damage during operation. Including being able to check various protection systems, to ensure it is still in a safe condition, and can be protected in the event of an emergency

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References

[1] Kanokphan, N. Factors affecting the decision to install solar PV and solar rooftops of small electricity users in the metropolitan area. Mahidol University, Thailand, **2018**.

[2] Sriwirat, S., Factors affecting consumers' decision to install solar power generation systems for residential homes in Chiang Mai Province. *Chiang Mai University Journal of Business Administration* **2021**, *7*(3).

[3] Sriwirat, S., Factors affecting the decision to install a solar power generation system for residential homes of consumers in Chiang Mai Province. *Chiang Mai University Business Journal* **2021**, *7* (3).

[4] Thisopha, C., Influencing the Decision to Install a Solar Power System for Residential Homes by Using Analytic Hierarchy Process. *Interdisciplinary Research Journal: Graduate Studies l* **2019**, *8*(2). https://doi.org/10.2139/ssrn.3552406

[5] Chimpae, S. FACTORS AFFECTING THE DECISION TO USE SOLAR CELL OF RETAIL ELECTRICITY CONSUMERS IN NONTHABURI. Ramkhamhaeng University, Thailand.

[6] Yubol, K. MARKETING FACTORS AFFECTING THE DECISION TO INSTALL SOLAR ROOF OF PEOPLE IN BANGKOK. Ramkhamhaeng University.

[7] Sriwirat, S., Factors Affecting Decision to Install a Solar Power System for Residential Homes of Consumers in Chiang Mai Province. *Chiang Mai University Journal of Business Administration* **2021**, *7*(3).

[8] Ariyadetch, M., The Marketing Mix in Customer Perspective Which Influence the Buying Decision of Science Equipment Products in Online Customers. *Journal of Modern Learning Development* **2020**, *5*(5), 100-111.

[9] Suppanich, P. Analysis of Factors for Social Acceptance of Solar Rooftop Project. Chulalongkorn University, **2014**.