SOLAR HEATER SYSTEM IMPLEMENTATION AS A FRONT STEP IN OVERCOMING THE GLOBAL WARMING ISSUES : CASE STUDIES IN SEBERANG PERAI SELATAN, PENANG.

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ABSTRACT : The major purpose of this study on solar heater system implementation in Seberang Perai Selatan, is to identify the level of preference and satisfaction from questionnaires answered by the respondents   (the residents equipped with the solar heater system package) and the residents who stay around the case studies area, on the implementation solar heater in the residential housing properties.

The importance of the solar heater system implementation in overcoming the global warming and the efforts of the society in playing part of the role in overcoming the global warming.

As part conclusion of the work, to describe that even in the urban planning, by implementing the package comes with energy saver such as solar heater system in supplying hot water through the solar panels absortion of the direct sunlights without consumption of the electricity supply ,this has bring cost savings , reduction of the kilowatts electricity supplies and overall environmental heat to the mankind.

D.M., (2008) claimed that solar power still untapped in Malaysia, more awareness and renewable energy plans shall be carried out by the authorities and the public societies , as possible future positive impacts come from our current positive actions.

Keyword : Solar Heater, Sunlight, Electricity, Awareness

1.0 Introduction

The global warming issues and the non-renewable energy resources issues require our immediate attention, as the heating of the global temperatures and many of the subsequent negatives environmental issues might arise.

Many parties have play their role in overcoming the global warming issues includes public societies and the housing developers.

The residential housing project in Seberang Perai Selatan, Penang has been selected in conducting the survey which includes the solar heater system as part of their efforts and concern on this global warming issues.

As parts of the urban planning, it is the developers and the urban planners role in producing the sustainable urban development environment.

Hence, the solar heater system has been as part of the residential housing package, beside a marketing tool, it is also part of creating global warming issues awareness among the housing developers and residents, and this package has boosted a positive responds from the residents around the area.

Although the solar power especially in the solar heater system and the global warming issues strongly discussed, but still not strong enforcement and action in implementing the solar heater as part of the efforts in overcoming the global warming issues; this statement has been reaffirmed by D.M., (2008) as solar power still untapped.

2.0   Methodology

In this research, the study was carried out in determine the factors contributing to the respondents in implementing the solar heater system in their household as part of the efforts in overcoming the global warming issues. This research covered Seberang Perai Selatan (S.P.S) , Penang area.

The respondents being selected through sampling selection around the Seberang Perai Selatan (S.P.S) area and the criteria in selection of respondents as following :

respondents with solar heater system implementation in household and residents around S.P.S, Penang area.

From the case studies, 100 questionnaires on three separate types have been sent out for collection of data, the three types of questionnaires as follows :

i). Respondents perception of solar heater system implementation

ii). Level of satisfaction

iii). Respondents characteristics in S.P.S, Penang

Out of 100 questionnaires consist of 15 variables, only 69 questionnaires received.

The first type of information on the respondent's perception on the solar heater system implementation from the factors list as per table 1:

Table 1: Potential factors
(factors that taken into consideration survey in this project)

Model	Potential factors	Method
1	The supply, Product Quality , Availability of the product, Price Transparency , durability of the product-, Delivery Speed , Post service cost incurred(a)	Enter

a All requested variables entered.
b Dependent Variable: Satisfaction Level

The second type of informations consists level satisfaction and the usage on solar heater system & third type on the respondents' characteristics which take into consideration family size, gender, household income and location of the respondents' residential from the survey area.

2.1   Flow Chart of the Study

This study was conducted based on the flow chart shown in Figure 1.0

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│  │ Problem Statement  │ ───→ │     Objective        │ ←──┐      │
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│                                         ↓                 │      │
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│                              │ Respondents & Site    │    │      │
│                              │ determine             │    │      │
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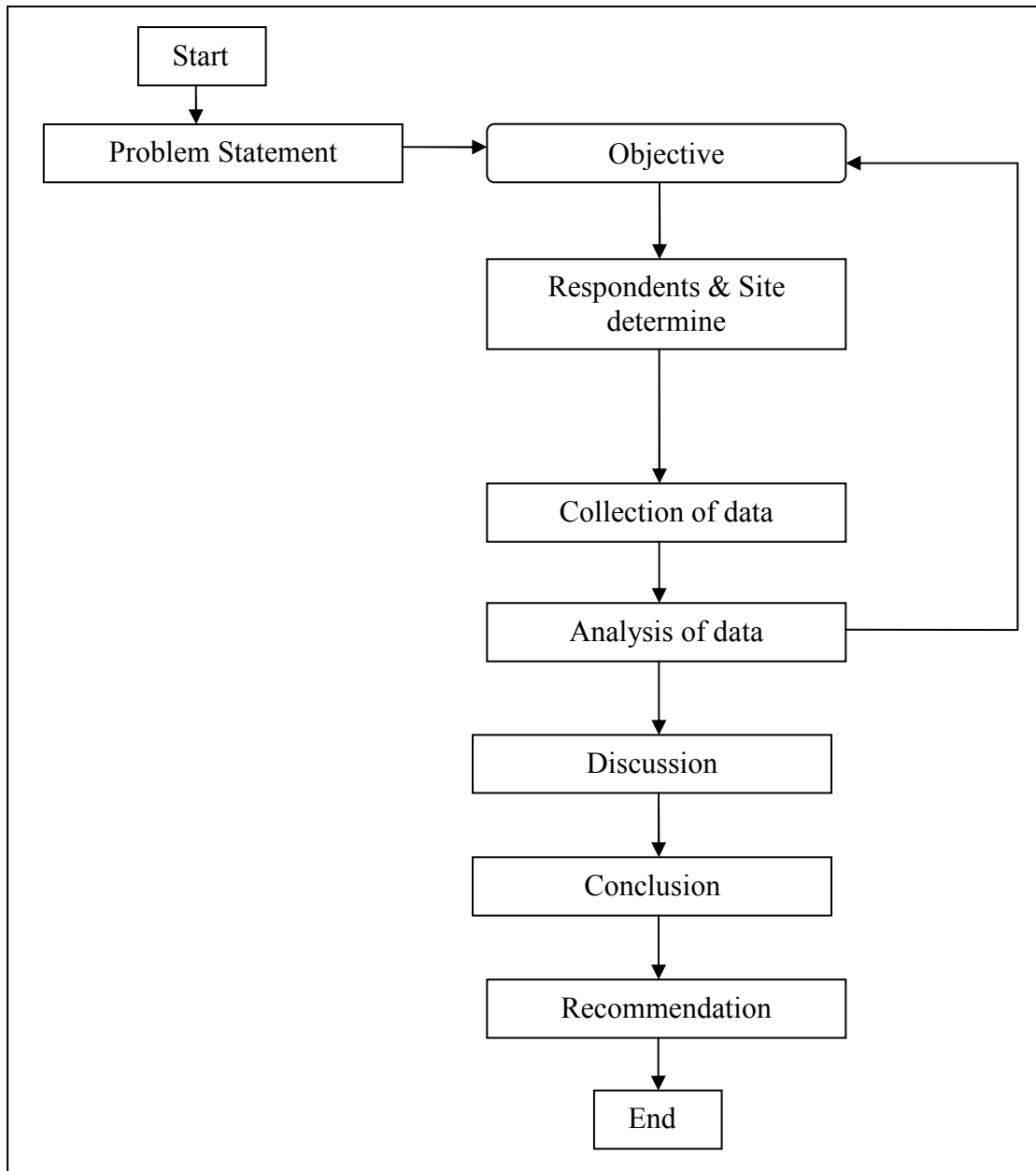
Figure 1.0: Flowchart shows research of the study

Figure 2.0 : Installation of the solar heater system parts in progress

Figure 3.0 : The household in Seberang Perai Selatan, Pulau Pinang which
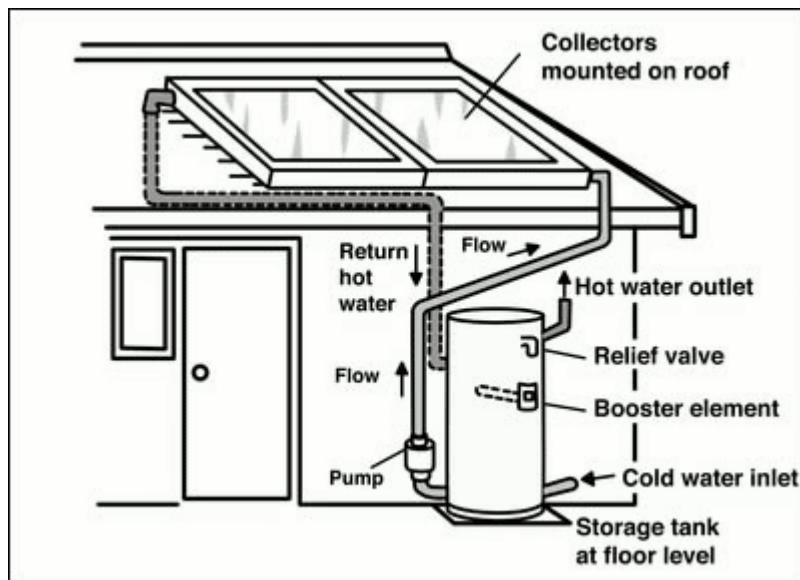
implemented the solar heater system

Figure 4.0 :source
http://www.resourceefficiency.org/index.php?option=com_content&task=vie
w&id=49

3.0 RESULTS AND DISCUSSION

In this study, the data were collected through the 69 questionnaires received with the 15 variables.

To analyze what are the factors contributing most in influencing the residents in implementing solar heater system in their household, as front step in overcoming global warming.

The respondents' conditions include the size of family and income may act as one of the major factors. In the current economic status, Ronnie, (2008) mentioned that currently increase price of oil which is the primary economic cause, the public should move towards the alternatives sources of energy. With that implications, economic status, awareness play a major role and authorities or the public should approach in decision making with the environmental friendly awareness on the solar power topics.

Table 2: Potential factors

Variables Entered

Model	Variables Entered	Method
1	The supply, Product Quality , Availability of the product, Price Transparency , durability of the product-, Delivery Speed , Post service cost incurred(a)	Enter

a All requested variables entered.
b Dependent Variable: Satisfaction Level

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.419(a)	.175	.081	1.1139

a Predictors: (Constant), The supply, Product Quality , Availability of the product, Price Transparency , durability of the product-, Delivery Speed , Post service cost incurred

Table 4. ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.084	7	2.298	1.852	.093(a)
	Residual	75.684	61	1.241		
	Total	91.768	68			

a Predictors: (Constant), The supply, Product Quality   , Availability of the product, Price Transparency   , durability of the product-, Delivery Speed , Post service cost incurred
b Dependent Variable: Satisfaction Level

Table 5. The final Model Obtained from Regression Model
Coefficients(a)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5.190	2.516		2.063	.043
Price Transparency	.485	.149	.415	3.263	.002
Delivery Speed	-.103	.164	-.081	-.628	.532
Product Quality	.121	.161	.095	.751	.456
Availability of the product	-.164	.185	-.115	-.887	.379
Post service cost incurred	.015	.124	.018	.121	.904
durability of the product-	-.044	.158	-.036	-.281	.780
The supply	-.094	.146	-.085	-.647	.520

The result of the regression model were shown in table 3, 4 and 5.The tables summarize the coefficients standard error, r-square, the corresponding coefficient estimates, t statistics, and the statistical significant test for each estimated coefficient.

From the result, each variable correlation with the dependent, the satisfaction level were determined by the confidence intervals a true correlation of zero.

From the result, variables delivery speed, availability of the product, durability of the product and the supply show negative correlation with the dependent variable, the satisfaction level..

From the t-statistic (t) result above, the significance of the slope, only three respondents' perception attributes produce positive slope in regression model. They were price transparency, Post service cost incurred and product quality.

Table 6. Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	Product Quality , Price Transparency , Delivery Speed(a)	.	Enter

a All requested variables entered.
b Dependent Variable: Satisfaction Level

Table 7. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.397(a)	.158	.119	1.0904

a Predictors: (Constant), Product Quality , Price Transparency , Delivery Speed

Table 8. ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.485	3	4.828	4.061	.010(a)
	Residual	77.283	65	1.189		
	Total	91.768	68			

a Predictors: (Constant), Product Quality , Price Transparency , Delivery Speed
b Dependent Variable: Satisfaction Level

Table 9. Summary

Model	Variable entered	Sig. (2-tailed)	r-squared	Pearson Correlation	t	Sig.
1	Product Quality	0.328	0.158	0.120	3.318	.010(a)
	Price Transparency	0.002	0.158	0.367	-.787	
	Delivery Speed	0.997	0.158	0.00	.855	

a Predictors: (Constant), Product Quality , Price Transparency , Delivery Speed
b Dependent Variable: Satisfaction Level

R=0.397, Sig. = 0.10(a)

Table 10.   Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.733	1.708		2.185	.032
	Price Transparency	.465	.140	.398	3.318	.001
	Delivery Speed	-.123	.156	-.097	-.787	.434
	Product Quality	.128	.150	.100	.855	.396

a Dependent Variable: Satisfaction Level

Three variables, consists of product quality, price transparency and delivery speed have been selected to test the correlation between the dependent variable, the satisfaction level. The result of the regression model were shown in table 6, 7, 8 , 9 and 10.

From the result, R valued at 0.397, it shows that the three variables have a positive relationship between the dependent variable, the satisfaction level. When Price transparency with reasonable pricing, the delivery speed within the satisfaction scope and the product quality within the acceptance scope, the respondents' perception towards satisfaction level is acceptable.

The correlation coefficient of 1.0 for product quality and satisfaction level indicates that these two variable are very strongly and positively correlated.

While for the variable delivery speed with correlation coefficient of -0.97, ,these two variable are very strongly and negatively correlated. An decrease in satisfaction level, the dependent variable will lead to an increase in delivery speed. This may happen due to the awareness of the product supplier after receiving feedback on the product delivery speed scale, and this may subsequently caused the increase the level of the services in terms of delivery speed. The supplier of the solar heater may increase more

manpower and cut down the transportation of the product or delivery hours in meeting the buyer's satisfaction.

4.0 CONCLUSIONS

This study was carried out and it shows that factors includes price transparency, product quality and etc contributing to the people in decision making on the implementing the solar heater in their household. Beside that, this study indirectly create more awareness on highly discussed global topics on global warming around respondents' residential area.

As the global warming issue has been widely discussed and solar heater system implementation as one of the renewable energy which can reduce the carbon emission to the environment, many people starts pay attention to the solar power product especially in the solar heater system.

As a conclusion, further studies and further discussion on the result to be carried out to determine the major factors which contribute in the decision making by the respondents in implementing the solar heater system in their household. Beside that, the government should work together with industry player to carry out more Research & Development (R&D) to produce more economy solar panels, to support and provide better demands.

5.0   REFERENCES

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