



## HOW ENVIRONMENTAL CONCERN, WARM GLOW, AND FINANCIAL IMPACT DECISION OF ADOPTING SOLAR PV

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### Abstract

*The research objective was to determine the significant impact of the environment concern, warm glow, and financial benefits towards Indonesia Power's consumers motivation in using solar PV. The data was taken by questionnaire, with a sample size of 91 respondents, all consumers are solar PV users in Jawa Timur. The analysis was conducted by using SPSS with a single and multiple regression analysis method. The result indicates that the environmental concern, warm glow, and financial benefits have significant impact towards the motivation in adopting solar PV in Indonesia. Thus, the results can help Indonesia Power to foster and promote renewable Energy specifically solar PV. Furthermore, the research can help solar PV producers in how they can better promote their products.*

**Keywords:** solar PV, motivation, environmental concern, warm glow, financial, household consumers.

### INTRODUCTION

The rapid growth of technology has provided many benefits for human lives likewise the technology currently allowed to open huge number of different opportunities, enormous number of new technological innovations has been widely developed and launched from various field. A report from Mckinsey Global Institute in 2013, notify that they identify 12 technologies that could drive a massive economic transformation and potentially a disruption in the future. One of the emerging technologies from the other 12 technologies that they point out is renewable energy.

Instead of using fossil fuels to produce electricity and such, renewable energy taking

advantage of the unlimited energy sources found on Earth, that are somewhat unlimited and can last indefinitely. Many adopters are interested in renewable energy, the reduction of renewable energy cost can help motivate more people to adopt renewable energy. This is because as of 2018, renewable energy hit the lowest price cost for new power generation, and the decreasing cost will continue until 2020 and soon will also decrease in other countries (IRENA, 2018). Indonesia is one of the countries that invested in renewable energy technologies, it was recorded that the country as a whole spend over \$771 million in 2018, with the main activity in geothermal.

Topic of renewable energy has started to surface, followed by recent news and trends for environmental concern making renewable energy even more favorable in Indonesia. This is a great cause, seeing that the country has a vast potential for renewable energy. To help normalize and push the usage of renewable energy, in particular solar PV, the government has released a new regulation (Government's

#### ARTICLE INFO

##### Article history:

Received: 23 February 2021

Accepted: 26 April 2021

##### Email Addresses:

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Regulation) in PP 79/2014 about the Policy of National Energy (*Kebijakan Energi Nasional*), that overlook the country's target of using renewable energy in 2025, which targeted for 23% total use of renewable energy in that year. This means that the government wants to push the agenda of using solar PV or any other renewable energies, as Indonesia has a big potential energy that can be produced by natural sources. This regulation also initiates the calculation for electricity bills for customers of INDONESIA POWER with rooftop solar PV installations.

The research specifically focus only on the household's consumers (Category R or *Residential*) due to the fact that they take the majority number of solar PV users in Jawa Timur and the only category that more data can be taken given the number of users. Since this study will analyze the household consumers, based on the data provided by Indonesia Power, as of March 2020 there are over 116 number of residents that have had install solar PV in their house which at the same time are still connected to Indonesia Power grid (Figure 1). This number is the second largest in Indonesia which preceded by DKI Jakarta with the total of 444 solar PV users in the area.

Furthermore, from the data provided by Indonesia Power, gives prove that households that invest in solar PV are those who are considered rich or the upper class, due to the fact that the amount of voltage in each household. This fact is not unusual seeing that the price of investing in solar PV in Indonesia is still considered expensive and due to the fact, that during nighttime solar PV is unable to produce any energy thus the households still need to be connected to the electricity offered by Indonesia Power.

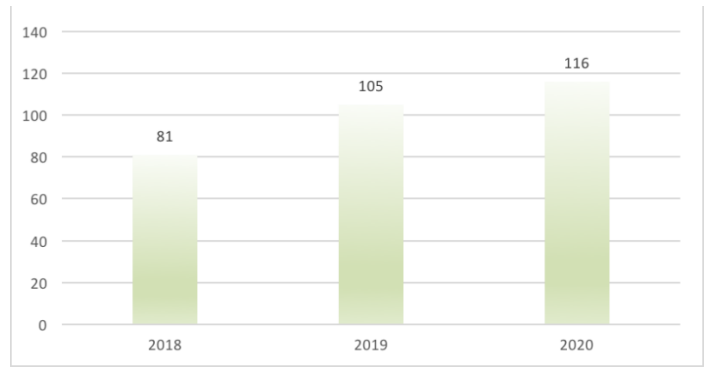


Figure 1. Numbers of Indonesia Power East Java household consumers (category R) that use solar PV from 2018-2020

Source: Company data, 2020.

This brings out the issue and question on why are these people are still interested in investing in Solar PV even with the price of the systems that is considered pricey and the fact that the energy produced by solar PV is not worth the amount of money they put in using them and with many downsides such as solar PV are unable to produce any energy if the weather is cloudy or rainy which made them still depends on Indonesia Power electricity in the end. With that in mind, it is still not cleared yet on what is the motivation that drive a person to eventually using solar PV. Since in Indonesia, these phenomena have not yet been thoroughly explored on the reason that motivates these users in adopting solar PV.

However, despite the expensive cost and other barrier factors, there is still a potential for these numbers to grow in the future, since solar PV has a great potential in Indonesia with the local authority has also created campaigns to support renewable energy. For example, Indonesia Power provides Green Smart Power marketing products program, where consumers can choose a package of combination containing solar PV, broadband internet, IPTV, CCTV, and smart building. Furthermore, the company has also started to enabling consumers to customize their products according to their needs, for example consumers can determine the needs for KwP and are allowed to request different grade of PV. The cost is indeed more expensive, and it is not yet favorable as using conventional energy,

despite that many users are already decides to install it. Hence, this study aims to find the significant motivations that able to drive consumers to use solar PV and to use the result to better aim and strategize the next step in using renewable energy.

### **LITERATURE REVIEW**

#### **Environmental Concern**

Environmental concern can be defined as the level of concern one give towards the environment around them. Franzen and Mayer (2010) stated that environmental concern can be defined as the people's awareness of the state of the current nature that is threatened because of overuse and pollution by humans (as cited in Zahari & Esa, 2016). Most people who has a high level of concern toward the environment will be more active or seek towards to use green products, that includes using renewable energy.

As stated in one of the research found about this topic, it is said it does indeed can affect or drive people to 'green buying' (Sun et al., 2020). This view is also supported in another research, as cited in Zahari & Esa (2016) stated in a research done by Bang (2000) indicate that customers who is concern about the environment would be more likely to use environmental products or services in their lives. In another study, Arroyo & Carrete (2018) cite multiple resource studies by Killbourne & Pickett (2008) and Aziz *et al* (2017), which supports the argument that the higher the environmental concern, the increase likely for pro-environmental behaviors, which includes the use of renewable energy, the latter research also confirms that environmental concern can support or motivates installation of solar PV.

However, several found studies has contradict views from the previous arguments. For example, Schelly (2014) argues that environmental concern does not sufficient enough to support the installation of solar PV, despite that it seems to be more of a common sense of a person to install solar PV if they have more concern towards the environment as it is not the case sometimes. Although in the

same research it is found that environmental concern still holds over 64% of the reason of adaptation. In another research, it is said that even though environmental concern does seem to have an effect on adopting solar PV, however this factor holds the lowest score or the least important factors (Walters, Kaminsky, & Huepe, 2018).

Thus, the research explores the relationship between the variable of environmental concern toward the use of solar PV by the consumers of PLN, the more significance or the higher the level of environmental concern one has, then the higher probability of that person to use solar PV in their household. In addition, the research also wants to find out whether or not the environmental concern factor is significance since there are several studies that are contradict with those who confirms it has a significance.

#### **Warm Glow**

Second factor that will be used is the warm glow feeling of an individual. Warm glow itself can be understood as the effect of positive emotional feeling for an individual who uses renewable energy, these positive feelings includes such as the feeling of pride from helping the environment by using clean and reusable energy (Sun et al. 2020). In addition, in the same study, it is also mentioned that there are some households that may feel the pride knowing that they are the producers of green energy in the neighborhood. This pride feelings came in the form of using green energy that can be easily translated to help in contribute in protecting the environment and preventing for any more harm done to the environment in the future.

Hence, the effect of warm glow will be used to explore the environmental variable. As the effect has a correlation between saving the environment (by using renewable energy) and the prestige that comes from it.

#### **Financial**

Economic aspect in the research will concern about personal financial investment and saving on adapting solar panels.

Motivation on finance and economic commonly seen as a key factor to early adaptors of renewable energy (Bergek and Mignon, 2017). People commonly estimated a rational analysis on the part of the consumers which involves weighting various costs and benefits while purchase of the product.

Previous study in Texas found that the majority of solar panels owners determined payback period to install the solar panels (Rai & McAndrews, 2012). In other words, the general interest in energy, belief that installation on solar panel is financially prudent investment. Other study also found that financial factor, including the expected return on investment does have a significantly positive impact on influencing solar adoption (Dharsing, 2016). But on the other side, a research also found financial investment is not significantly an important factor on motivating them in economic factor, for these homeowners' economic factors related on the timing of life events were more important than calculated return on investment or payback period (Schelly, 2014).

**Conceptual Framework**

As stated beforehand, it is believed that there are several motivations that can drive a customer to decide to adopt renewable energy (that includes solar PV), and there are many researches done before to prove or found evidence of several motivators that can drive a person to adopt renewable energy or solar PV. These motivators ranging from the environmental factors (such as one's concern over the environment) to the financial benefits in the future of having solar PV (i.e., the reduce of cost in the future, etc.).

Thus, looking at the previous study done to investigate the phenomena, there are three motivators that will be used in the research to find whether it is significance in motivating Indonesia Power's customers in using solar PV. The three motivations are environmental concern (Zahari & Esa, 2016; Sun et al., 2020), warm glow (Sun et al., 2020), and financial (Dharshing, 2016; Rai & McAndrews, 2012). These motives are all inspired by the previous

research that is done before, and it is suited for the condition of the research takes place, which is in Jawa Timur.

Furthermore, the authors suggest the following hypotheses based in the research, with a conceptual framework of it in Figure 2.

H<sub>1</sub>: Environmental concern has a significant impact towards the motivation of using solar PV in Indonesia.

H<sub>2</sub>: Warm glow effect has a significant impact towards the motivation of using solar PV in Indonesai.

H<sub>3</sub>: Financial factors has a significant impact towards the motivation of using solar PV in Indonesia.

H<sub>4</sub>: Environmental concern, warm glow, and financial have a significant impact towards the motivation of using solar PV in Indonesia.

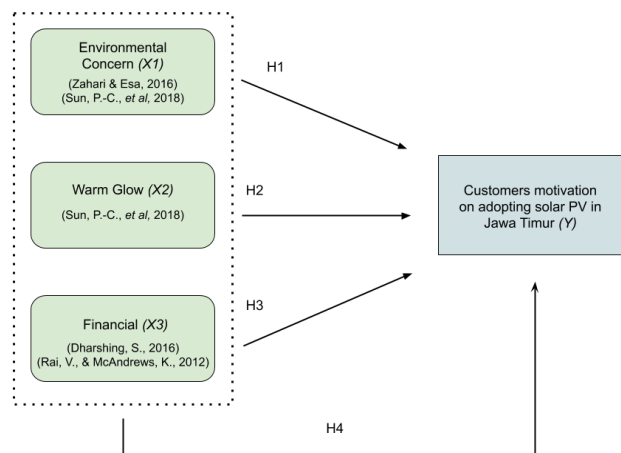


Figure 2. Conceptual Framework  
Source: Authors (2020)

**MATERIALS AND METHODS**

The research is conducted using questionnaire as the method of taking the samples and then using IBM SPSS as the tool for analysis. Authors obtain sample size of 91 respondents, in which all of them are registered solar PV users in the Indonesia Power's database. The questionnaire consists of a four Likert scale, namely: 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree). The respondents will answer based on their feelings regarding the statement given in the question.

Five dimensions will be used to measure the environmental concern variable. These dimensions are; 1) concerned about the overall environment, 2) concerned about the quality of the environment, 3) concerned about waste, 4) concerned about the environment when deciding to purchase something, and 5) energy awareness. These dimensions are adopted from Zahari & Esa (2016) and Zimmer et al (1994). For warm glow, three measurements will be used: 1) feelings of good by help protecting the environment, 2) feelings of contributing to the well-being of hummanity and nature, and 3) feeling better because they do not harm the environment. These measurements are adopted from Hartmann & Apaolaza-Ibáñez (2012). Lastly, two measurements will be used to measure the financial variable, namely: 1) evaluation of financial benefits and 2) focusing on the economic rationale for PV adaption. Two variable measurements are adopted from Dharsing (2016) and Rai & McAndrews (2012).

After distributing the questionnaire, the data will undertake several tests to determine the validness of the variables before continuing to the single and multiple regression analysis in SPSS. Which are the classical assumption tests, that includes heteroscedasticity test, normal distribution test, multicollinearity, and autocorrelation, that must be done as it is the pre-requirement before doing the regression analysis.

Furthermore, the study will use a 95% confidence level, with a 5% level of error. The research results predict that there will be 5% chance of error in the data. Hence, all alphas that will be used in the test conducted in this study, will use the value of 0,05.

**RESULTS AND DISCUSSIONS**

**Demographics Result**

After collecting the data, the total sample size collected is 91 respondents, that comes from different groups, which can be seen in the summarized table below. The result indicates that most users are categorized in a middle to upper class, which in several studies already talked about how socio-economic can determine the use of solar PV. Where the majority of users have an income of around Rp 10.000.000 up to Rp 30.000.000 or US\$700, - up to US\$2000, - per month.

According to research conducted in the city of Mexico by Arroyo and Carrete (2019) on motivational drivers for the adoption of green energy, it is stated that academic level of respondents is highly correlated with the socioeconomic level where all of their respondents in high socioeconomics neighborhood have a university degree. From this research result, majority of users came from an educated background, with over 57 respondents (62,6 %) holds a bachelor’s degree. Furthermore, people decision to invest in solar PV highly depend on the socioeconomic, where the higher the level the more likely people would consider investing.

Table 1. *Respondents’ Profile*

Item	Details	Frequency	Percentage
<b>Age</b>	< 30 years old	7	7,7 %
	31 – 40 years old	30	33 %
	41 – 50 years old	43	47,3 %
	> 50 years old	11	12,1 %
<b>Gender</b>	Women	31	65,9 %
	Men	60	34,1 %
<b>Education</b>	SMA/SMK	7	7,7 %
	D1	11	12,1 %
	S1	57	62,6 %
	S2	15	16,5 %
	S3	1	1,1 %
<b>Profession</b>	Government Employee	11	12,1 %

	Private Company Employee	22	24,2 %
	Entrepreneur	30	33 %
	State Owned Company Employee	11	12,1 %
	ABRI/POLRI	2	2,2 %
	Professionals	10	11 %
	Others	5	5,4 %
<b>Income</b>	RP 10.000.000 – RP 30.000.000	62	68,1 %
	RP 30.000.000 – RP 40.000.000	16	17,6 %
	RP 40.000.000 – RP 50.000.000	6	6,6 %
	> RP 50.000.000	7	7,7 %
<b>Power</b>	1300 – 2200 VA	51	56 %
	3500 – 5500 VA	21	23,1 %
	6600 – 131000 VA	19	20,9 %
<b>Electricity</b>	< RP 1.000.000	54	59,3 %
<b>Expense per Month</b>	RP 1.000.000 – RP 2.000.000	19	20,9 %
	RP 2.000.000 – RP 3.000.000	10	11 %
	RP 3.000.000	8	8,8 %
<b>Length of using solar PV</b>	< 6 months	16	17,6 %
	6 months – 1 year	20	22 %
	1 – 2 years	29	31,9 %
	> 2 years	26	28,6 %

Source: Authors (2020)

### Single Regression Analysis Results

#### *Environmental Concern*

After distributing the questionnaire, 91 respondents are obtained, and the result of the data are summarized in Table 2.

Table 2. Summary of Questionnaire Result

Variables	Item	Details	Frequency	Percentage
<b>Environmental Concern (X1)</b>	I am concern with the current overall environmental state in Indonesia	Strongly Disagree	0	0 %
		Disagree	2	2,2 %
		Agree	51	56 %
		Strongly Agree	38	41,8 %
	I am concern with the current quality of the environment in Indonesia	Strongly Disagree	1	1,1 %
		Disagree	1	1,1 %
		Agree	50	54,9 %
		Strongly Agree	39	42,9 %
	I am concern with the waste produced in Indonesia	Strongly Disagree	0	0 %
		Disagree	5	5,5 %
		Agree	49	53,8 %
	I look into the environmental impact of the product/services before purchasing it	Strongly Agree	37	40,7 %
		Strongly Disagree	1	1,1 %
		Disagree	4	4,4 %
		Agree	47	51,6 %
		Strongly Agree	39	42,9 %

## How Environmental Concern

<b>Warm Glow (X2)</b>	I feel good for using solar PV because they help to protect the environment.	Strongly Disagree	0	0%
		Disagree	4	4,4%
		Agree	50	54,9%
		Strongly Agree	37	40,7%
	With rooftop PV installation, I have the feeling of contributing to the well-being of humanity and nature.	Strongly Disagree	0	0%
		Disagree	6	6,6%
		Agree	48	52,7%
		Strongly Agree	37	40,7%
	I feel better for using solar PV because they do not harm the environment.	Strongly Disagree	0	0%
		Disagree	4	4,4%
		Agree	52	57,1%
		Strongly Agree	35	38,5%
	I feel better in compare to others because I use solar PV	Strongly Disagree	4	4,4%
		Disagree	10	11%
		Agree	47	51,6%
		Strongly Agree	30	33%
<b>Financial (X3)</b>	I use solar PV in order to reduce electricity bill	Strongly Disagree	13	14,3%
		Disagree	20	22%
		Agree	37	37,4%
		Strongly Agree	24	26,4%
	After using solar PV I feel that it really help me reduce the electricity bills	Strongly Disagree	17	18,7%
		Disagree	16	17,6%
		Agree	39	42,9%
		Strongly Agree	19	20,9%
	I am aware that in the future all source of conventional energies (oil, gas, coal, etc) will eventually wore out.	Strongly Disagree	0	0%
		Disagree	0	0%
		Agree	45	49,5%
		Strongly Agree	46	50,5%
<b>Motivation on using Solar PV (Y)</b>	I am aware that we need to change into renewable energy for future sustainability	Strongly Disagree	0	0%
		Disagree	1	1,1%
		Agree	41	45,1%
		Strongly Agree	49	53,8%
	I think Solar PV is a good long-term financial investment.	Strongly Disagree	5	5,5%
		Disagree	20	22%
		Agree	39	42,9%
		Strongly Agree	27	29,7%

Source: Authors (2020)

From the result we obtained the result with a value of significance 0,00 which is smaller than  $\alpha$  of 0,05 and is supported by the value of T.statistic of 5,669 which is larger than T.table

of 1,67, therefore we can conclude that there is a significant impact between environmental concern toward motivation toward using solar PV in Jawa Timur. value at Furthermore, with R square of 0,257, we conclude that 25,7% of environmental concern can explain the variation of motivation toward using solar PV in Jawa Timur on 74,3% variation is explained by other variables.

This support previous research conducted in India by Kesari, Atulkar and Pandey (2018) which stated that environmental concern factors have a significant positive impact towards customer intention to adopt solar photovoltaics technology. Hartmann and Apaolaza-Ibáñez (2012), found the same results where environmental concern has a positive influence toward the purchase intention of renewable energy in Spain. A study done in Lahore, Pakistan, also support this argument, stating that the reduction of pollution or the economic benefit is the most significant driver to use solar PV (Qureshi et al., 2017).

Arroyo and Carrete (2019) found that environmental consciousness has a positive influence on the intention to purchase an individual PV system in both the short and medium terms although it has a low impact towards the motivation in Mexico. Ugulu (2020) also support this finding based on their research in Urban Nigeria, where it stated that it has evidence where environmental concern can sometimes be exaggerated.

Research in Taiwan by Sun et al. (2020) found that environmental concern does not have an impact towards the motivation of using solar PV. In addition, similar research in Malaysia has the same results where the environmental concern does not have an important role in the decision of adopting solar PV (Zahari & Esa, 2015). Additional study of the use of solar PV in Malaysia by Haslina (2018), states that despite the environmental concern participates to motivate users to adopt solar PV, it is still ranked less important compared to other factors.

Hence despite there are several studies that contradict with this study result, household

consumers in Jawa Timur has a strong environmental concern. Where it is evident that the respondents are mostly leaning towards agreeing that environmental concern are a significant aspect in their motivation to purchase solar PV. This correlates with the finding from other different studies where the environmental concern is proven to have an important role in the decision to use solar PV (Kesari et al., 2018; Hartmann & Apaolaza-Ibáñez, 2012; Qureshi et al., 2017).

#### *Warm Glow*

After conducting the test using SPSS, the variable has a significant value of 0,00 which is less than the value of alpha, 0,05. In addition, the result also yields a value of T Statistics 8,867 which is larger than the calculated T Table of 1,66. This result implies that warm glow has an effect in the motivation of using solar PV. Furthermore, it can be seen that the coefficient of determination or the value of R square ( $R^2$ ) has a value of 0,469, hence it can be concluded that there is only 46,9% of warm glow variable that can explain the motivation of Indonesia Power customers using solar PV and over 53,1% variation is explained by other variables.

Based on the result, the warm glow variable has a significant impact towards customers' motivation in using solar PV in Indonesia. This result is supported by several previous studies before. For instance, in a study of the intention of solar PV installation in Taiwan by Sun et al. (2020), found that warm glow effect does increase the likely of customers using or deciding to install solar PV. The research also stated that several solar PV users may take pride because of knowing that they can produce renewable energy from it. This statement is also aligned with the findings based on one of the questions that were asked to the respondents. Over 51,6% respondents' answers 'agree' and 33% respondents' answers 'strongly agree' to the statement that by using solar PV, users feel better than others (who does not use solar PV). Only 11% of the respondents' answers 'disagree' and 4,4% respondents answers with 'strongly disagree'



to the statement. Meaning that most solar PV users in Indonesia do take pride knowing that they are using solar PV and able to produce green energy themselves.

There is also another research regarding the effect of warm glow done by Hartmann and Apaolaza-Ibáñez (2012) in Spain. It is also quite interesting that Hartmann and Apaolaza-Ibáñez findings correlate with this. This research finds that the warm glow also has a significance impact in the purchase intention of green energy for the customers. This means that the more people feel good from helping or protecting the environment, then the higher chance for them to purchase and use green branded energy.

Lastly, another research also supports this finding, the research was conducted in Finland by Karjalainen & Ahvenniemi (2019). Which the authors summarize that Finland solar PV users find pleasure knowing that they are producing energy that produce less pollution. Although the research does not entirely focus on the motivation to adopt solar PV but analyze the post buying experience, it implies that adopters do get the warm glow benefits from using solar PV, which correlates with what is found in Indonesia.

### *Financial*

Based on the SPSS analysis result, we obtained the value of sig is 0,00 which is smaller than 0,05 and is supported by the value of t statistics of 8,297 which is larger than t table of 1,66. Furthermore, financial variable results for coefficient of determination with the SPSS analysis authors found a value of 0,436 for the R square ( $R^2$ ) therefore it can be concluded that 43,6% of finance can explained the variation of motivation of adopting solar PV and 56,4% valuation is explained by other variables.

Therefore, it is concluded that there is a significant effect on financial factors on the intention toward using solar PV. As the finding of this research that the financial has a significant impact toward the motivation of adapting solar PV, according to Walters, Kaminsky and Huepe (2018) a research in

Santiago, Chile and they found that the financial motivation (e.g. subsidies) and financial barriers (e.g., high upfront costs) factors considered the most important factors in influencing adoption of Solar PV. Other research in Nigeria by Ugulu (2020) found that high initial cost and lack of finance in households have been shown as one of the most important factors in deciding to purchase solar photovoltaics. In India, a research also found that finance and interest are key determinant of the decision to adopt PV, and it is possible that interest could be a stronger predictor of decision than finance (Peter, Dickie & Peter, 2005).

In California, USA, financial as a mean of saving money and gain returns place in the top driver for adopting solar PV (Nath, 2016). Lastly, a research in Australia also highlight the same findings, where in that study, researchers took sample from both and adopters. The result found that both groups put financial factor as the main motivator, putting an emphasis on wanting to reduce electricity bill as well as concern that they have on the electricity price that can increase in the next years (Bondio et al., 2018).

Thus, the result in the research is supported by several established research that conducted from several countries before. Where users are driven by financial factor, where they want to reduce their monthly electricity bill. Same as solar PV users in Indonesia also feels the same thing, where most of them use and has a perspective that solar PV able to help them reduce their monthly bill for electricity.

### **Multiple Regression Analysis**

After conducting the multiple regression analysis in SPSS, the result indicates a value of coefficient of determination or R square ( $R^2$ ) of 0,666, this means that there is a 66% where the three independent variables, can predicts the dependent variable and only 34% variation is explained by other than the three variables mentioned before. With the result of  $R^2$  is bigger than 60%, the regression model fits the data.

## CONCLUSIONS

The research aims to analyze the significant impact of the three variables, environmental concern, warm glow, and financial benefit as the motivators of Indonesia Power's household consumers in adopting solar PV. The research takes sample of 91 respondents all came from solar PV users who is still using PLN electricity (on-grid). The result indicates that each of the three variables all have significant impact in the decision to adopt solar PV, this result came in from using the single regression analysis. In addition, when the three variables combined to test as the predictors of the dependent variable using the multiple regression analysis, the result indicates that the environmental concern, warm glow, and financial motivator have a significant impact towards the motivation on using solar PV, where the financial motivator is the most significant one with the highest value compared to the others. These findings suggest the importance of the three variables in determining the decision to adopt solar PV. Hence, the company, solar PV Vendors, as well as the government should take note of these to better motivate users in planning to use solar PV.

## Recommendation

For Indonesia Power as they are still currently rely on third party providers of solar PV system who act as an installer of the technology for the consumers, Indonesia Power need to start providing their own PV system where they would not only produce the panel and install it but they can also do the maintenance of the system. In addition, Indonesia Power can provide exclusive membership where those who use Indonesia Power's PV product would receive benefits such as free maintenance or reparation and would receive some sort of membership only token or card to increases the chances of other people wanting to invest in solar PV.

Providers of solar PV can also push their marketing strategy to focus on the three factors in this study, since it is proven that it has a positive relationship with the decision to

adopt solar PV. By emphasizing on the three variables mentioned before, users are more likely to be motivated and decides to use the technology.

Lastly, for policy makers, the government can create an appropriate subsidize policy to attract new potential users. In addition, the government must provide more incentive to boost the adoption thus will increases the chances of them being motivated on investing in the technology. Government can also create national campaigns or programs regarding the use of renewable energy and solar PV in general to increase the potential users' knowledge about solar PV and in the meantime can also reduce the uncertainty or to clear up any misinformation regarding it. In addition, the government can also help create and promote a community where all of the household's energy are produced by solar PV where the neighbors can cooperate with each other and share the cost of installation and maintenance cost of a larger PV system.

## Limitation and Future Studies

Future studies are suggested using variables that have not yet been explored in this study. For example, the role of peer effect towards the motivation on using solar PV. In addition, the factor of government role or incentives given to solar PV users should also be analyzed to find if it has a significant impact in the motivation or the decision to use solar PV, since it has not yet been explored in this research. Other variables that can be used for next research is the reliability of solar PV providers or suppliers such as whether the suppliers are trusted or whether people already put their trust in the suppliers or not. Lastly, variables such as awareness, technical knowledge and familiarity of solar PV can also be studied in order to see whether those variables can be an issue and have effects on the motivation in adopting solar PV.

Next studies should also cover solar PV users in different cities in Indonesia, since this study only took place in one province or area and there may be a chance that the result is different if compared to other cities in

Indonesia. This is done to better analyzed and to compare in the variation of motivations of users in different cities or areas and so that the readers able to improve their knowledge regarding solar PV users in Indonesia.

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