Evaluation study of electrical energy usage using prayer models on post payment for electric customers household

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Abstract. This study aims to find solutions for saving electricity consumption in households. This electricity consumption savings need to be done because it is seen from the supply side management, the availability and limitations of natural resources, especially for fossil materials that are widely used in power plants, are decreasing in number, not to mention the issue of potential CO2 emissions polluting the environment due to activities at this power station. Whereas seen from the demand side management, the savings in electricity consumption will reduce electricity expenditure for the consumer community, especially household customers. The method of research is carried out with a survey in the field. Respondents were divided into two groups, namely the experimental group from prepaid electricity customers and control groups from postpaid electricity customers. By applying the same load to the control group with the experimental group, then the level of accuracy is measured. Samples taken randomly. From the data generated in the analysis of whether there are significant differences in the experimental group can bring changes in electricity consumption in the control group. Furthermore, from the results of data analysis can be used to draw conclusions. This is where there will be benefits to be gained, namely a new concept of how to use electricity that is economical. and this concept is ready to be implemented in the community, through a community service program, which is certainly very useful for stakeholders and published through international seminars and made as a supplementary textbook for electrical power installation courses.

1. Introduction
The need for electrical energy every year has increased very rapidly, this is in line with the rapid development of modern equipment technology which all use electricity as the driving force, both in the industrial sector and in the household sector, as well as in other sectors. In the household sector, the addition of power to each residential house has always experienced a very significant increase, especially in the installation of household appliances that require large power, such as air conditioning, dispensers, magic com, refrigerators, sterica, and so on. As a result of this additional power, the impact of this large power will cause electricity bill payments to increase from the consumer side as well as the provision of substantial electricity from the provider side. From the consumer side, PT PLN has always provided electricity payment monopoly as a pre-paid electricity payment model. Some advantages with this prepaid electricity is: PLN gets fresh money from consumers, while consumers have not enjoyed the electricity, not to mention the accuracy of the electrical energy measuring instrument used and the grounding system used in imperfect installations will cause electrical leakage which in turn causes the electricity pulse to run out quickly, even if not used. Therefore, this research is only limited to the level of accuracy of the use of prepaid models compared to postpaid, which is technically very determined by the level of accuracy of the measuring instrument used.
Some research that has been done before, among others: about efficiency is influenced by the quality of lighting installations installed. The quality in question is in accordance with PUIL 2000, [7] so that it will guarantee security for the environment, because it has met the established standards [1]. In the period of 10 years after the electricity installation is used, there will be a decrease in the price of insulation resistance, earth resistance, addition of load points and installation safety, which is 72% which is not feasible, while the remaining 28% is still suitable for use [2]. In another study using the standard 220 K ohm, the price of isolation prisoners from 42 houses sampled was only 26 that were feasible, while 12 houses were not feasible and 4 houses needed further study [3]. The improper use of electrical installations can lead to fires, so that electrical installations must comply with PUIL standards and be inspected by the competent authorities, so that they meet reliable, safe and environmentally friendly [4]. In terms of the use of electricity, the prepaid model as a form of migration from postpaid electricity has not been much done by the public, because the costs incurred are not small to buy credit token, which has an impact on the economy [5].

Area Semarang from 2011 to 2015 there was an increase in the total number of electricity customers of 255,606 customers, Pre-paid electricity customers experienced an increase of 326,529 customers, while postpaid electricity customers decreased by 70,923 customers. From these data there is an increase in prepaid electricity customers, this is due to a company policy that requires new electricity customers to use prepaid electricity not because of migration from post-paid to pre-paid. While the decline in postpaid customers also does not mean that migration to pre-paid, there are also those who stop being customers. In the last 5 years, only 5% of the total postpaid customers have migrated to prepaid [6][7].

From some of these studies it turns out that all have different points of understanding. Likewise, with what researchers will do, that the research that researchers will do has some substance differences and is an update from some previous researchers.

2. Research methods
The methods used are: Field survey method, by making pre-paid and post-paid electricity customer data collection instruments. Based on the type of variables studied. The variables observed

a. The independent variable is the power installed in the customer's home for the R2 or 900 VA category
b. The dependent variable is the cost of electricity usage every month that the customer must pay.

The sample taken was electricity customers from PLN with 900 VA power. The sample area taken is: around the Tembalang area. Data collection methods are carried out by conducting a survey in the field of PLN electricity customers with a power of 900 VA. The data collected is the amount of electricity used every month with an indicator of the amount of electricity usage that must be paid by the customer. Data analysis methods are carried out in a qualitative comparative way. It means that the data obtained is compared to the amount of expenses incurred between prepaid electricity customers and postpaid electricity. Next conclusions are drawn.

3. Results and discussions
Data of research results are presented in table 1 and 2. Table 1 shown prepaid bill and table 2 shown post paid bill.

Table 1. Prepaid electricity bill payment data for 900 VA Power.

| Number respondent | Customer number | ID | The account is paid (Rupiah) |
|-------------------|----------------|----|-----------------------------|
| 1                 | 525010067789   |    | 362,151                     |
| 2                 | 522511124533   |    | 227,973                     |
| 3                 | 522040724069   |    | 125,000                     |
| 4                 | 181500113781   |    | 488,840                     |
Table 2. Post paid electricity bill payment data for 900 VA Power.

| Number respondent | Customer ID number | Amount paid (Rupiah) |
|-------------------|--------------------|---------------------|
| 1                 | 524020442703       | 688.261             |
| 2                 | 537514514212       | 269.349             |
| 3                 | 524020294989       | 536.472             |
| 4                 | 539411106535       | 347.490             |
| 5                 | 537515388924       | 108.355             |
| 6                 | 518011617234       | 256.560             |
| 7                 | 523520335742       | 144.000             |
| 8                 | 523504681973       | 100.000             |
| 9                 | 522040298382       | 91.168              |
| 10                | 515090388625       | 218.618             |
| 11                | 523013247853       | 204.002             |
| 12                | 545521550569       | 95.842              |
| 13                | 523080845239       | 328.736             |
| 14                | 514510507011       | 177.490             |
| 15                | 522560433763       | 58.052              |

Amount | 3,389,135
Average | 225,942

Table 3. Value data obtained as prepaid and postpaid electricity costumer.

| Prepaid customers | Prepaid electricity value | Postpaid customers | Postpaid electricity value |
|------------------|---------------------------|--------------------|---------------------------|
| Highest value    | 488.840                   | Highest value      | 688.261                   |
| Lowest value     | 76.588                    | Lowest value       | 91.168                    |
| Average value    | 225,942                   | Average value      | 241,626,33               |
From the data in tables 1 and 2, data is obtained in table 3. It turns out that in prepaid electricity customers compared to pre-paid lower postpaid electricity customers, it means that prepaid electricity customers are cheaper than postpaid electricity.

4. Conclusions
That it turns out that electricity usage for customers who use electric tokens or pulses is cheaper than customers who use postpaid. Because the sample was taken randomly, this conclusion is likely to be temporary, meaning that this research can still be continued by using a cluster sampling system, where respondents are grouped into R1 until R5. In the study the sample was taken at 900 VA customers. because the data obtained by most customers in the study area uses 900 VA, so there is still the possibility of further development for customers with greater money power.

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