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**Article**

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# Consumer Behavior in Using Prepaid Electricity Systems in the Covid-19 Pandemic Period in Makassar City, Indonesia

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**ABSTRACT**

The COVID-19 pandemic throughout 2020, made many community activities carried out at home. Thus, people are believed to use a lot of electrical energy for activities at home. The government has implemented various efforts in order to save energy by the community. However, the visible phenomenon is that the use of electrical energy in households is still high. This study aims to determine the behavior of prepaid electricity consumption during the COVID-19 pandemic, which is carried out descriptively quantitatively, with a sample of 100 people through the snowball sampling technique. Collecting data through questionnaires and then tested using the Cochran Q-test method. The results show that the behavior displayed by prepaid electricity consumers in consuming electricity during the Covid-19 pandemic is summarized as follows (1) Electricity is used to carry out activities at home, starting from gardening, in the kitchen, getting entertainment, studying, and working, (2) Electricity is used to support business opening shops during the COVID-19 pandemic, (3) The use of large electricity due to the large number of family members (4) The habit of forgetting to turn off electricity when leaving the house (5) Use of electricity to turn on the air conditioner all day long.

**Keywords:** Consumer Behavior, Prepaid Electricity, Household Sector, The COVID-19 Pandemic
**JEL Classification:** C42, D10, M00, O30

## 1. INTRODUCTION

Population growth in the city of Makassar is currently increasing greatly, this is accompanied by economic growth. Small and medium enterprises are also growing, and are very dependent on electricity supply. This condition causes the demand for electricity to be higher, on the other hand, the community also needs it for daily household needs. Thus, it requires a supply of electricity from the government, considering that the government is the only provider of electricity in the city of Makassar, Indonesia.

For consumers or people in the city of Makassar, the presence of electricity at home is one of the benchmarks for the level of life and social status. The large number of electricity needs is a symbol of ownership of modern products used by home owners. The development of information technology has an impact on the increasing needs of the community, both for household users, small and medium industries, especially large companies. According to Semuel, (2014), electricity users who are identified as the highest using electrical energy come from the industrial sector, but that does not mean that households use only a little of electrical energy. Meanwhile, there are limitations and scarcity of this resource. In Indonesia, the electricity supply is carried out by the state electricity company, namely PT. State Electricity Company (PLN) Persero.

According to Chahaya, (2005), the source of electrical energy currently used in Indonesia is a source of fossil energy (petroleum,

coal, and natural gas), to generate electric current. On the other hand, the use of fossil energy sources can cause air pollution which has an impact on the quality of life and public health. Furthermore, according to Chahaya, (2005), the resulting pollution elements are carbon dioxide ($CO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), and nitrogen oxides (NOx). The $CO_2$ gases that are produced in every fossil fuel combustion, in fossil-based power plants are a source of $CO_2$ emissions which account for 21% of all $CO_2$ emissions produced. Meanwhile, this sector continues to grow in line with the electricity needs, especially in developing countries. Fossil fuels are non-renewable energy resources and the process of their formation takes millions of years, so that these resources can run out which can lead to an electrical energy crisis. In fact, according to Handayani et al., (2017), the consumption of non-renewable energy tends to be excessive and continues to threaten environmental sustainability and contradicts the value of social justice in Indonesia.

PT. PLN (Persero) in anticipating this, has implemented a disincentive program by increasing electricity rates. There is a difference in the cost of using electrical energy through an increase in tariffs when using energy at peak loads, namely from 18.00 to 22.00 at night, but this has not been able to reduce the use of electrical energy in Makassar city. Meanwhile, the company that handles electrical energy is only carried out by the state-owned electricity company, namely the State Electricity Company or PT. PLN (Persero), as a company that has an obligation to meet the needs of the community's electrical energy. This is stated on the basis of electricity law, namely: Law No. 20 of 2002 concerning electricity and Government Regulation No. 10 of 1989 concerning the supply and utilization of electricity. Regulation of the Minister of Mining and Energy No.2 P/451/M.PE/1991 concerning the relationship between the holder of electricity business power for the public interest with the community.

Meanwhile, according to the Tempo newspaper (2019), every year, there is an increase in electricity demand for consumption by the community of around 5000 MW, while the State Electricity Company (PLN) is only able to provide an additional electricity supply of around 4000 MW each year. Until now, there is still an increase in the demand for electricity from the community, such as households, industry, commercial and general businesses, all of which still exceed the supply from PT PLN. This means, there is a deficit of 1000 MW of electricity supply per year. Lack of electricity supply makes parts of Indonesia often subject to rotating blackouts, and this condition generally occurs outside Java, such as Sumatra, Kalimantan and Sulawesi, including the Province of South Sulawesi, which has a capital city in Makassar.

According to Mualim, (2018) in the Warta Ekonomi daily, in the first half of 2018, public electricity consumption in Indonesia reached 112.46 TeraWatthour (TWh) or grew 4.7%, and during January-June 2018, the largest electricity consumption still came from from the household sector with a portion reaching 42.25% or reaching 47.5 TWh. KataData.co.id, reports that nearly half of the country's electricity is purchased by households. Furthermore, according to Lidwina, (2020) who wrote in the online newspaper Databoks.co.id, national electricity consumption continues to increase, where in 2015 consumption was only 910 kilowatt hours (kWh) per capita, then increased to 1,084 kWh/capita in 2019. Based on data Ministry of Energy and Mineral Resources - Republic of Indonesia (ESDM), Indonesia's electricity consumption in 2017 reached 1,012 Kilowatt per Hour (KWH)/capita, up 5.9 percent from the previous year. Furthermore, the Ministry of Energy and Mineral Resources stated that the projected electricity consumption per capita in 2018 is 905 Kilo Watt hour (kWh)/capita and this figure will increase to 1,147 kWh/capita in 2022, and continue to increase to 1,501 kWh/capita by the end of 2027.

Seeing these conditions, people must be wise in consuming electrical energy, but existing data shows that electricity consumption is still too high and has not yet made electricity savings, even according to Antara News that people's electricity consumption in 2011 increased by 15% from the prediction of PT. PLN Persero for the regions of South Sulawesi, West Sulawesi and Southeast Sulawesi. The imbalance between the level of consumption and the estimated demand has been the cause of blackouts in several areas in the city of Makassar, which is the capital city of South Sulawesi Province. Thus it can be interpreted that the largest electricity consumption is carried out by households for daily consumption. The increasing need for electrical energy for households in Indonesia must be balanced with the availability of electricity. For this reason, the government needs to take significant action to meet the availability of electricity (Romadhoni and Akhmad, 2020). One of the policies is to implement a prepaid system in reducing household electricity consumption (Karim et al., 2021; Nugroho et al., 2017).

Apart from raising electricity rates, PT. Since 2010, PLN has also been intensifying the use of prepaid electricity. Until 2014, the number of prepaid customers using prepaid electricity was 13.1 million consumers. Beating South Africa, and currently Indonesia is listed as the largest prepaid electricity user in the world (liputan6.com/) (Wahyuni, 2014). However, during the COVID-19 pandemic, which began to increase in February 2020, it had an impact on the use of electrical energy. According to Manohar and Raju, (2021) that the Covid-19 Pandemic had an impact on rising oil and energy prices. Meanwhile, Rachmawati, 2020) who wrote in the Pikiran Rakyat newspaper, stated that the electricity consumption of household customers during the work from home (WFH) period which continued with the large-scale social restriction (PSBB) policy in West Java (West Java) increased by 13%-20% per month. On the other hand, industrial electricity consumption fell 40%, business fell 20%, social and government each fell 10%. Bahmanyar et al., (2020), also stated that there are differences in electricity consumption in Europe comparing Spain, Italy, Belgium and the UK, with differences in the leniency of the lockdown that was carried out. Thus, it is interesting to trace the behavior of people's electricity consumption with the presence of prepaid electricity during the COVID-19 pandemic, especially for people in the city of Makassar, which is one of the largest capitals in Eastern Indonesia.

The occurrence of the COVID-19 case throughout 2020, made many community activities carried out from home. It is

not surprising that household electricity consumption is also increasing. To reduce the large consumption of electricity, the government through the State Electricity Company (PT. PLN) imposed a new electricity tariff increase by cutting electricity rates for 450 VA class customers and subsidizing 900 VA, and even getting free tokens. The purpose of giving tokens is to encourage people to save electrical energy. However, this phenomenon can be seen even though there have been changes in policy, but the use of electrical energy in households is still high.

The objective of this research is to determine consumer behavior in using prepaid electricity systems. By knowing the behavior of consumers in consuming prepaid electricity, it can be useful for the government through PT PLN regarding policies in controlling the waste of electrical energy as well as the development of products and services from the prepaid electricity system.

## 2. LITERATUR REVIEW

### 2.1. Consumer Behavior

According to Kotler and Keller (2012), "Consumer behavior is a study of how an individual, group, or organization/company conducts activities to select, buy, use, and dispose of products (goods, services, ideas, or experiences) in order to meet needs. and their wishes. study how individuals, groups and organizations select, buy, use, and dispose of goods and services, ideas, or experiences in order to satisfy their needs and desires." Meanwhile Leon and Kanuk (2010), states that consumer behavior is the way a person spends time, money and effort in consuming, including decisions about what to buy, why the product is purchased, when it is done. Purchases, where purchases are made, and how often are purchases made, and how often the products are used.

From these definitions, it can be described that consumer behavior in buying or consuming goods and services influences their decisions about the desired product. In consuming, people get stimuli both from the environment and from the product itself. Kasnaeny et al., (2013), citing the opinion of McCarthy and Perreault Jr. (1988: 139) that consumer buying behavior is an effort that comes from the desire to satisfy needs, and that effort is motivated by stimulation, which is then responded to and influenced by psychological, social, and environmental variables when buying, and leads to a buying decision. or don't buy.

The stimuli received by consumers can come from the marketing mix, where the marketing mix will have an impact on psychological variables that affect consumer behavior, namely motivation, perception, learning, attitude, lifestyle. Meanwhile, other stimuli come from social influences. These social influences come from family, social class, reference groups, and culture. Other influences come from the reasons for purchase, time and echo about the product (Kotler and Keller, 2012; Solomon et al., 2007). Other factors that can influence consumer behavior in making purchases for consumption are demographic factors (age, gender), income, occupation, education, family size, and religion, race, generation, nationality and social class) (Shih et al., 2015). While Mihic, (2010) states that there is an influence of situational factors that underlie consumer behavior in buying products. Situational factors are factors that come from where a person is shopping, or the environment in which consumers make contact with certain visual stimuli in the form of products and promotions, which lead to unplanned purchases.

### 2.2. Electrical Energy

Electrical energy is an important source of human needs and must be fulfilled to turn on equipment, furniture and other objects that must be moved and require electrical energy to function. On the other hand, electrical energy also plays an important role in driving the wheels of the economy, because large and small industries require electrical energy so that company activities can run efficiently and effectively. This is supported by Hoang, (2021), that financial developments and electricity consumption have a strong and positive influence on economic growth. Energy according to Eugene C. Lister, is the ability to do work, energy is stored work, or as the ability to do business Wahid et al., (2014), and electrical energy is one of the types of energy that can be converted into heat energy, which necessary for human life (Cokelez and Yurumezoglu, 2009).

To measure electrical energy, a tool called a kWh-meter is used, while for measuring electrical power it is called a watt-meter. The virtue of electrical energy is that it is needed to drive equipment, especially household equipment, where the energy stored is measured in one ampere (A), the Volt (V) is a unit for measuring electric voltage. The provisions are the need for electric power consumption in Watts (W), which functions to drive motors, lighting, heat, cool or to move back a mechanical device to produce other forms of energy. The amount of electricity used by households during one month is called electricity consumption, which is measured using the number of kWh (Al Rasyid, 2020).

### 2.3. Energy Consumption in Indonesia

Electrical energy can be generated from various sources such as water, oil, coal, wind, geothermal, nuclear, solar, and others. It is estimated that in Indonesia, 90% of electricity generation comes from fuel oil and coal. The large amount of electricity consumption in Indonesia shows a symptom of an energy and fuel crisis. For this reason, efforts to save energy or create alternative energy are needed, which are not only useful for savings but also to reduce the impact of emissions from excessive use (Al Rasyid, 2020).

### 2.4. Prepaid Electricity

The State Electricity Company launched prepaid electricity in 2010, where consumers make payments and purchase electricity at the beginning or before use. The government hopes that this system will be able to save on the use of electrical energy. This system is like when purchasing prepaid credit for cellphone users, where customers buy a certain amount before using electricity (Azwar, 2012).

The prepaid electricity system is a service provided by the government in overcoming surges in electricity consumption, as well as many complaints about meter reading errors by officers which have an impact on the large amount of electricity bill payments. With a prepaid electricity system, consumers can adjust the amount they want to use themselves, can check and recharge

themselves. This condition is different from the postpaid electricity system, where consumers only know the amount of usage when they arrive at the bill payment counter.

## 3. RESEARCH AND METHODS

The research population is all prepaid electricity users who live in the city of Makassar. The size of the population, then the determination of the number of samples is based on the cluster random sampling technique, which ultimately determines 100 selected samples from each regional group, where the determination of the number of samples is based on the representation of each Makassar city area, namely 25 respondents from the North Makassar Region, 25 respondents came from the East Makassar region, 25 respondents came from the West Makassar area, and 25 respondents came from the South Makassar area. Furthermore, the selected sample is given a questionnaire with measurements using a Binary scale.

### 3.1. Analysis Method

To answer the research problem, an analysis was carried out using a mix method approach (qualitative and quantitative) with a sequential exploratory design, namely first conducting research with a qualitative approach through interviews to find the research variables. The results of the interviews will be grouped into variables, then compiled into a research questionnaire. The questionnaire is measured with a Binary scale with a value of 1 if the answer is "Yes" and a value of 0 if the answer is "no."

The variables to be tested are based on the findings of preliminary research through interviews, namely:

X1: The behavior of using electricity to get entertainment while staying at home due to the Covid-19 pandemic
X2: The behavior of using electricity to do more activities in the kitchen during the Covid-19 pandemic
X3: The behavior of using electricity to open a business at home due to loss of work
X4: The behavior of using electricity for gardening activities while at home due to the Covid-19 pandemic
X5: The behavior of using electricity to turn on the air conditioner when more at home
X6: The behavior of using electricity to clean the house
X7: Behavior using electricity for all activities for 24 hours
X8: prefer it if the lights are on all day long
X9: The behavior that often forgets to turn off electricity when leaving the house
X10: Large use of electricity due to the large number of family members

Then to answer the main problem, namely how the behavior of prepaid electricity use during the COVID-19 pandemic, a quantitative descriptive approach was used using the Cochran Q Test analysis tool. The Cochran Q Test is used to find out what attributes are considered valid, that is, the respondents think they agree with the existing statements. The use of this analysis tool is to strengthen the statements that have been obtained through interviews regarding consumer behavior in consuming prepaid electricity, as well as to find out the order of the statements that are considered the most representative. In this analysis, the researcher removed the attributes that were considered invalid based on the statistical criteria used.

$$Q = \frac{(k-1)(k\sum_i^k C_i^2 - (\sum_i^k C_i))}{k\sum_i^n Ri^2 - \sum_i^n Ri^2}$$

Where
k: Number of Attributes studied
Ci: total respondents in column variable i
n: Number of Respondents
Ri: Total Respondents at I Line Observation
The hippothesis to be tested is:
Ho = there is no difference of opinion on the statement (all have the same opinion)
Ha = There are differences of opinion on the statement
If the significant value> 0.05 then accept Ho reject Ha
If the significant value ≤ 0.05 then reject H0 Accept Ha

## 4. RESEARCH RESULTS

### 4.1. Data and Model Testing

To test the feasibility of the indicators on the research questionnaire, validity and reliability were tested, where if the significance value of the validity test shows a value <0.05 then all research indicators are declared worthy of research, meanwhile if the Cronbach alpha value> 0.60 then all indicators research is stated to be reliable.

Based on Table 1, it shows:

Based on the results of the feasibility test of the research indicators, it shows that all research indicators have a significance value <0.05 and a Cronbach Alpha value> 0.60. Thus the research indicators are valid for use in this study.

### 4.2. Results of the Cochran Q Test Analysis

There are 10 variables tested in this study, where the ten variables were obtained through collecting opinions through field interviews with selected respondents. To find out whether all variables are findings that answer the research problem, the Cochran Qtes analysis uses the following results:

Based on the statistical results (Table 2) that have been tested on 100 samples (N=100), the calculated Q value is 473,097 with a significance value of 1,000, which means that there are no differences of opinion regarding the variables tested. This means that respondents stated that all of the variables tested were recognized as the reasons behind their behavior in consuming prepaid electricity. To find out the most important variables behind the behavior in consuming prepaid electricity during the Covid-19 pandemic, it was done by looking at the largest value obtained from the variable ranking. The rating values are shown in table

**Table 1: Instruments and model feasibility tests**

| No | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | X10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Validity | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Realibility | 0.67 | | | | | | | | | |

**Table 2: Statistical results**

| Test Statistic | Result |
|---|---|
| N | 100 |
| Cochran's Q | 473.097a |
| Asymp. Sig | 1.000 |

**Table 3: Variable ranking order**

| Variabel | Point | Description |
|---|---|---|
| X4 | 88 | The behavior of using electricity for gardening activities while at home due to the COVID-19 pandemic |
| X1 | 87 | The behavior of using electricity to get entertainment while staying at home due to the COVID-19 pandemic |
| X8 | 84 | prefer it if the lights are on all day long |
| X2 | 82 | The behavior of using electricity to do more activities in the kitchen during the COVID-19 pandemic |
| X3 | 63 | The behavior of using electricity to open a business at home due to loss of work |
| X10 | 59 | Large use of electricity due to the large number of family members |
| X9 | 58 | The behavior that often forgets to turn off electricity when leaving the house |
| X5 | 23 | The behavior of using electricity to turn on the air conditioner when more at home |
| X6 | 17 | The behavior of using electricity to clean the house |
| X7 | 9 | Behavior using electricity for all activities for 24 h |

3, which shows the sequence of consumer behavior in consuming prepaid electricity during the covid-19 pandemic. This order is based on the similarity of responses from respondents regarding the proposed variables.

These results indicate that most respondents stated that during the COVID-19 pandemic, the people's consumption behavior was as follows:

1. The community consumes the most prepaid electricity to support their gardening activities by using electric tools to fill their spare time while working from home. This is stated by the majority of respondents (88%), that the large amount of free time due to government policies to stay at home causes people to seek activities so that they are not saturated with gardening or caring for plants, so that they unconsciously consume a lot of electrical energy to run related machines. gardening activities. The community, as long as they are required to stay at home, try to find ways to fill the time gap by doing what they like but have not done optimally, for example gardening
2. The behavior shown is not only limited to gardening activities, but also using prepaid electricity to get entertainment while staying at home (87%). People use prepaid electricity to listen to music, watch TV, and get other entertainment from electronic devices at home, in order to avoid feeling bored during the time they spend at home alone. Meanwhile, 82 out of 100 respondents also used electricity to do more activities in the kitchen during the COVID-19 pandemic. Thus it can be concluded that prepaid electricity consumption is widely used to find activities that match people's interests in filling the time during the prohibition to leave the house
3. Reduced activities outside the home and the need to work/study from home, causing people to not care about their electricity consumption, as seen from their habit of turning on lights all day long, even in bright weather conditions (84%). This condition, according to respondents, did not only occur during the COVID-19 pandemic, but because their habitual behavior was difficult to change where they felt more comfortable when the lights were on, some even felt bothered if they had to turn on or turn off the lights repeatedly. This condition is exacerbated by the habit of forgetting to turn off the lights when they are no longer used (58%). The habit of always leaving electricity on even though it is not used makes people wasteful in using electrical energy, which will have an impact on the availability of the country's electrical energy. According to its designation, tokens are actually enforced in order to control electricity use by the community, but the facts in the field have not shown much positive because there are still behaviors that cannot save energy
4. During the COVID-19 pandemic, many people lost their jobs as employees and entrepreneurs, as a result of the closure of their businesses and offices. The large number of small household scale businesses has sprung up, making electricity consumption also increasing. The behavior of using electricity to open a business at home due to job loss (X3) was stated by 63 respondents. Thus, during the COVID-19 pandemic, people became creative in fulfilling the necessities of life for themselves and their families, but it had an impact on the large purchase of tokens for prepaid electricity due to the equipment used and lighting for their business stalls
5. The number of family members also forms a large electricity consumption behavior. Each individual in each family has different activities, and generally uses electrical energy. For example, there are those who listen to music, cook, work, garden, and have school activities from home online simultaneously, making electricity consumption increase. In addition, the hot weather conditions in the city of Makassar make the use of air conditioning equipment to work continuously. With a large number of family members, and each having a private room, electricity consumption increases. 53 out of 100 respondents stated that the number of family members determines their prepaid electricity consumption.

Based on these findings, it can be said that the aim of the government to divert postpaid electricity to prepaid electricity is to make people save energy. However, the conditions during the COVID-19 pandemic, where people were active at home, made electricity consumption also high. This happens to support business activities and other activities to reduce burnout due to lockdowns. The results of this study also strengthen the findings of Al Hakim et al., (2021) which state that there is an increase in electricity rates due to working from home, where people do many activities that were not carried out before the COVID-19 pandemic. Likewise by Butler et al., (2016), which states that electrical energy is very much used for human daily activities.

Seeing this condition, it is necessary for the government to continue to socialize the need for energy saving, as well as for consumers to always check their usage, especially the wasted

electricity usage due to personal habits, namely often forgetting to turn off electrical devices when not in use. It appears that the public's understanding of the function of prepaid electricity is not comprehensive, so there is still a waste of electrical energy during the Covid-19 pandemic.

## 5. CONCLUTION AND RECOMMENDATION

Based on the results of the calculation of Cochran Qtest, it shows that the behavior of prepaid electricity consumption in people in the city of Makassar, Indonesia shows ten (10) behaviors, namely the behavior of using electricity for gardening during activities at home, using electricity to get entertainment while at home only (listening to music, watching television, playing games, and social media). Other behaviors are accustomed to turning on lights all day long, using electrical energy for activities in the kitchen during the COVID-19 pandemic, using electric energy to open a home business in the form of a grocery store or food stall. The large use of electricity is also supported by the large number of family members in one house, the habit of always forgetting to turn off the lights when leaving the house or room, air conditioning that works all day due to hot weather, and the need to clean the house using electronic devices.

The recommendations put forward are:

1. PT. PLN still needs to intensify the socialization of energy saving, even in the midst of the COVID-19 pandemic conditions, in a way that is easily understood by the people who live at home during the COVID-19 pandemic
2. PT. PLN needs to choose a personal approach to be able to change the behavior of customers who often forget to turn off electricity when it is not used, in order to save the availability of electrical energy, considering that the public has not comprehensively understood the importance of saving energy for human survival
3. For future research, it is expected to carry out further testing of the findings of this study to see their effect on household expenditure, or to test in other areas in Indonesia.

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