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INTERFERENCE ANALYSIS OF POSTPAID KWH METERS ACCORDING TO STANDARD OPERATIONAL PROCEDURES AT PT. PLN ULP HELVETIA MEDAN INDONESIA

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ABSTRACT

In this work, we report that various electronic device are continuously being developed to support human life. The scale also varies, ranging from simple household appliances to heavy industrial equipment. In the process of collecting household electrical power, a kWh Meter is needed to simplify and minimize employee errors in inputting data on household and industrial electricity usage in the Medan City area. In its operation, operational and non-operational disturbances often occur such as congestion at the kWh meter, fire at the kWh meter, and other unavoidable disturbances. In overcoming disturbances that occur in kWh Meters, Inspection and Maintenance of kWh meters can be carried out, especially on digital / Postpaid kWh Meters. This report contains the type of kWh that is often used, the components in the kWh meter, the types of disturbances that often occur in the kWh meter, the impact on the damage to the kWh meter, and how to overcome these types of disturbances.

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Keywords: Kwh Meter, Maintenance, Postpaid.

INTRODUCTION

Various electronic equipment continues to be developed to help human life. The scale also varies, from simple household appliances to heavy industrial equipment. kWh Meter is a tool used in measuring electrical power both in industry and households (Kolakoti et al., 2021). In the process of collecting household electrical power, a kWh Meter is needed to simplify and minimize employee errors in inputting data on household and industrial electricity usage in the Medan City area. In its operation, operational and non-operational disturbances often occur such as congestion at the kWh meter, fire at the kWh meter, and other unavoidable disturbances (Logan et al., 2020). In overcoming disturbances that occur in the kWh Meter, inspection and maintenance of the kWh meter can be carried out, especially on digital/Postpaid kWh Meters. kWh meters that are commonly used are usually the type of induction kWh meters in calculating household electrical power (Prayogi et al., 2021). Currently, the kWh meters commonly used by PLN are analog kWh meters, but along with the times they began to change analog kWh meters into digital kWh meters.

The line of business of PT. PLN (Persero) Helvetia Customer Service Unit is to provide services to consumers related to customer administration (customer service function), such as new connection services, additional power, meter recording, and

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account sales. The Helvetia Customer Service Unit also performs the function of managing and maintaining the electric power distribution network (wiring function) on the side of the Medium Voltage Network (MVN) and Low Voltage Network (LVN), including in dealing with disturbances in the Helvetia sub-district.

Problems that are usually identified on postpaid meters, we need to admit are still one of the obstacles at this time, usually what makes us confused include the appearance of writing, disconnection, or checking on, the LCD screen (Solem et al., 2015). Often, we are confused by the indication or warning code (Baldi et al., 2018). Many customers ask what causes kwh to always display a check letter (Hamdani et al., 2022). We need to understand that there are several things that can cause notification of problems with prepaid electricity meters, including the difference in electricity flow in the phase and neutral conductors (Khozain & Ahmadiyah, 2021; Samonto et al., 2021). The prepaid meter has a feature that measures the incoming and outgoing electric current. If the electric current that enters through the phase conductor is 2A, then the electric current that comes out through the neutral conductor is also 2A. If there is a difference of a certain value, the words "check" will appear on the prepaid meter.

Previous research from Wibisono et al., (2017) stated that several disturbances occurred in Kwh meter disturbances caused by the decreased performance of build operate transfer (BOT) or outsourcing to third parties and rental models. However, this still supports the implementation of smart meters by PLN Bali. A similar study was also carried out by Ask et al., (2018) but only designed a Smart Prepaid-Postpaid Energy Meter with Alarm and Theft Control with the results obtained in the form of a Smart Prepaid-Postpaid, which is very good to use and following existing energy meter features. Rabbani et al., (2020) also observed that households consuming 100-300 Kwh accounted for nearly 51% of the total household arrears.

Disturbances still occur but can be resolved through the IoT program to minimize the disturbances that occur. Based on previous research, it is known that there are many ways to overcome interference with Postpaid Kwh meters. So this research focuses on finding answers to interference analysis of postpaid kwh meters according to standard operating procedures at PT. PLN (Persero) ULP Helvetia in Medan Indonesia.

LITERATURE REVIEW

Postpaid electricity is an electricity usage transaction that uses a postpaid electronic meter with payment at the end (Jaiswal & Thakare, 2022). Postpaid electricity customers use the amount of electricity needed and used by postpaid electricity service customers, calculated using a postpaid electronic meter (Sugianto et al., 2018). Every month meter readings are carried out which function in the implementation, preparation and control of reading activities, recording and recording the meter position numbers for measuring instruments kWh meters, maximum Kva meters for each customer as well as reading and recording time switch instructions. After that, the meter data that has been recorded and sent to the account creation function, then checks the results of the meter reading and corrects meter reading errors, reports according to the field and will later issue an electricity account resulting from electricity usage every month, and payment will be made at the end to PT. PLN according to the electricity consumption used by customers (Hudiono et al., 2020).

Various customer service programs are carried out to keep customers from switching to other service companies. Migration or movement of customers has a significant influence on service provider companies. Migration also has three categories of influencing factors, namely push effects, pull effects, and mooring effects (Salunkhe et al., 2022). The driving effect is a factor that motivates and encourages customers to leave or stay away from the original service provider. Withdrawal effects are positive factors that attract customers or migrants to new service providers or their destinations, while mooring effects are factors that hinder the movement of service providers.

According to Nafees, (2017), dividing migration into two, namely internal migration and external migration. Internal migration is customer migration that occurs within the scope of the same company. Broadly speaking, this type of migration still provides benefits for the company because it is still within the same company scope even though with different units. While external migration is the migration of customers to alternative service providers outside the company. Customer migration can occur when customers are dissatisfied with the services that have been provided, so that when there is a new service that provides better service, the customer wants to move in order to get service satisfaction.

We must admit that technical problems or indications appearing on the LCD screen of postpaid meters are still one of the current problems. Usually, what makes us confused is the appearance of used, disconnected, or checked text on the LCD screen. Often we need clarification with these indications or warning codes. Many customers ask what causes kWh always to display check writing. We need to understand that several things can cause problem notifications on postpaid electricity meters, including differences in the flow of electricity in the phase and neutral conductors. The postpaid meter has a feature that measures incoming and outgoing electric currents. If the electric current that enters through the phase conductor is 2A, then the electric current that comes out through the neutral conductor is also 2A (Nafees, 2017). If there is a difference in a particular value, the words "check" will appear on the postpaid meter.

Furthermore, there is a connection between the neutral and grounding wires that need to follow the provisions of the postpaid meter, too often letting the electricity pulse empty continuously when recharging the next time (Hudiono et al., 2020). The kWh meter from PLN could be better because it always displays a check. It can also be due to the installation of the kWh experiencing looseness in the sensor cover, which causes this disturbance to always occur in the kWh meter and excessive usage loads.

An indication appears in the form of the words "check" of course, there is a problem that has occurred and must be resolved so that you can enter the pulse code that you have purchased again. The following is how to deal with indications of kWh checks for customers via service number 123 (Zinaida & Isnawijayani, 2022).

Contact a PLN officer via No. 123, which begins with the area code. Feel free to call in the middle of the night because this service operates 24 hours a day. Once connected. The operator will first ask what the customer's complaints are about, and then we answer that there is a problem with the electricity meter that says check. Before calling, prepare the meter number on the meter because usually the operator always asks or asks for the meter number . In addition, the operator will ask for your name, complete home address, and the same telephone number you can call. Then the operator will provide us with a complaint report number as proof that our complaint has been recorded in the PLN database (Zinaida & Isnawijayani, 2022). The operator will say that there will be officers from PLN who will come to our house to check and repair if there is damage.

METHODS

The implementation of this activity was carried out at PT. PLN (Persero) ULP Helvetia Medan, there are several activities carried out, among others, Installation of 1-phase kWh Meters, checking substations, rejuvenating customer data, Inspection along feeders, learning and using the centralized meter record application and various other activities that support the distribution process at PT. PLN (Persero) ULP Helvetia Medan. In this practical work activity, there are several special tasks given during practical work activities and I got a topic about Standard operating procedures for postpaid kWh meter disturbances at PT. PLN (Persero) ULP Helvetia in Medan city area. In the practical work activities carried out, we observed the workings of the electric power distribution system at PT. PLN (Persero) ULP Helvetia in the Medan city area as well as disturbances that often occur in the distribution of

electricity, especially in postpaid kWh Meter disturbances by customers.

Figure 1. The connecting substation at PT. PLN (Persero) ULP Helvetia Medan

RESULTS AND DISCUSSION

Various disturbances that arise in the Medium Voltage Air Line network are one of the problems that are the focus of the network maintenance section. With so many disturbances, of course, it will cause a big risk to the performance of the operation of the electric power distribution system and the quality of service loads on the customer side, for this reason, disturbances that often occur in the Medium Voltage Air Line network need to be well understood, in addition to safety for mankind and the environment to worry about (Christensen et al., 2021; Levitt et al., 2022).

On the problem of rejuvenating customer data which aims to improve customer service and service orientation standardization of operations and databases. Rejuvenation of customer data at PT. PLN (Persero) ULP Helvetia Medan using the Centralized Customer Application (AP2T). In this AP2T application, there are several services, including customer ID recording 2. Customer name data collection 3. Meter recording 4. New partner application 5. Customer complaint registration 6. Power change request 7. Customer data change request.

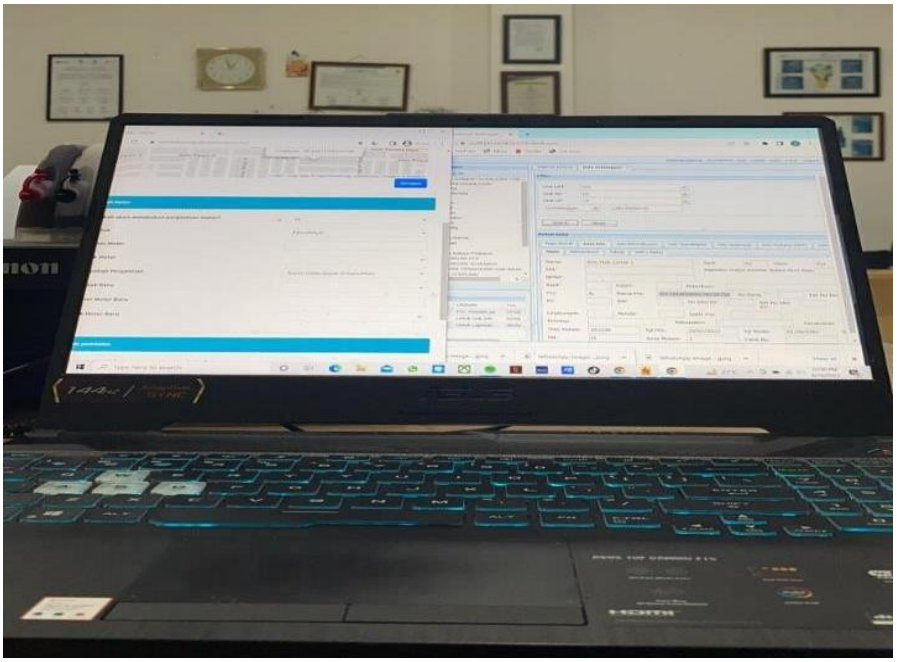

Figure 2. Integrated customer service application (AP2T)

Furthermore, in the operation of the electric power distribution system, disturbances often occur that cannot be avoided, especially in the medium voltage air network system (Prayogi et al., 2022). These disturbances can be in the form of short circuits between phases, reduced equipment reliability, increased loads, lightning strikes, and other disturbances that cause the electrical energy distribution system at the disrupted. While doing our work, we inspect and maintain the snuggle area, Medan City, and North Sumatra.

The activity we carried out was in the form of checking the cables on the JTM system which identified interference in the form of broken cables caused by lightning strikes. Lightning strikes that occur cause currents that can endanger humans and cause the operating system to disrupt the distribution of electrical energy which has an impact on the work of the Ground Fault Relay (Logan et al., 2020). This cable-breaking fault is identified because of the large number of broken neutral wires so that the ground current becomes smaller than the standard operating current of the installed protection equipment setting. The following is a check of the medium-voltage air network system in the Medan City area.

Figure 3. Medium voltage air network inspection and checking

The observation activities carried out also analyzed the use of the meter note application (ACMT). The use of ACMT is carried out with the aim of estimating the billing process and reducing officer errors in recording customer electricity bills. In ACMT there are various aspects that need to be inputted, among others, the type of kWh Meter and the amount of electricity used in the monthly deadline (Yu et al., 2020). Estimated total bills can be done using the ACMT application by calculating all power usage multiplied by the price of electricity in the local area.

The supporting factors in carrying out this observation are as follows: 1. In addition to carrying out industrial practice activities in the room, also conducting field practice where the author can see firsthand the problems that occur. 2. Occupational Health and Safety equipment used when conducting field practice is very important. 3. The existence of a Centralized Record Meter Application and a Centralized Customer Service Application assists Record Meter employees in managing and monitoring customer electricity account data, so that errors that occur in the field can be identified and resolved.

Customer data that needs attention can be seen through the number of kWh meter usage where customers use electricity for one month which is called the turn-on hours. On Hours is a parameter to determine how much power is delivered to the customer for various types of power. On Hours is the ratio of kWh usage in one month divided by connected power (kVA).

Figure 4. ACMT application display

The Basic Price of Electricity is the selling price of electricity charged by the government to PLN customers. The term Basic Electricity price can also be referred to as the price of electricity or the price of electricity (Prayogi, 2022). PLN has subsidized and non-subsidized customer price categories. For non-subsidized customers, PLN applies the Tariff Adjustment mechanism (price adjustment). Price Adjustment is applied every month according to 3 factors, namely: changes in the rupiah exchange rate, fuel prices, and monthly inflation. With the price adjustment mechanism, electricity prices adjust to market conditions (Jongwanich et al., 2019). The basic price of non-subsidized electricity as of March 2020 is IDR 1467.28/kWh. For the R-1/900 VA-RTM group that has just experienced the revocation of the subsidy, the price is slightly lower, namely Rp. 1352/kWh.

The use of electrical energy in industry and households uses the Kilo Watt-Hour (kWh) unit because the tool used to measure energy in industry and households is known as a watt-hour meter and the amount of electricity bills is usually based on the numbers listed on the kWh meter. every month for now (Langella et al., 2016). To improve service quality, factors that need to be considered include identifying the main determinants of service quality, managing customer expectations, managing service quality evidence, educating consumers about services, developing a quality culture, creating automating quality, following up on services, and developing information systems service quality (Wu et al., 2021). Providing good service to customers aims to provide satisfaction to customers. Satisfaction can be interpreted as a feeling of pleasure or disappointment of a person who appears after comparing his perception/impression of the performance (or results) of a product and the expectations of satisfied customers can form loyalty for customers and things This will provide benefits for the company in the long run.

CONCLUSION

In summary, the tasks of Meter Recording are planning a meter reading schedule, preparing meter reading implementation activities, carrying out meter readings as well as monitoring, checking, evaluating, and following up on meter reading results. The preparation process of meter reading requires some data that needs to be prepared/brought by Cater Officers to carry out meter reading tasks including uniforms, identity and letter of assignment for cater officers, and work equipment. Monitoring data on the number of customers whose meter readings have been carried out. Then the supervisor verifies the data from the customer meter readings that are included in the criteria group that must be verified.

Author's declaration

Authors' contributions and responsibilities

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation and discussion of results. The authors read and approved the final manuscript.

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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