Jurnal Ilmiah Teknik Informatika dan Elektro (JITEK), 2(2) 2023: 85-88,
DOI: 10.31289/jitek.v2i2.2894

Jurnal Ilmiah Teknik Informatika dan Elektro (JITEK)

Available online http://jurnalmahasiswa.uma.ac.id/index.php/jitek

Study Development of Chitosan and NanoDot (CNDs) as Chemosensors for Contact Oil Damage Detection Rising Electricity Costs at Home Against Leakage Currents and Current Theft

Yenny Agnes Angela Turnip, Indri Dayana, Habib Satria, & Moranain Mungkin
Engineering Faculty, Universitas Medan Area, Indonesia

Abstract

The research aims to Study development of chitosan and nanodot as chemosensor for contact oil damage of rising electricity costs at home against leakage currents and current theft. This study it can be concluded that the leakage current with applicable experiments in the field is to unplug all equipment connections to the plug, turn off all switches, record the meter on the KWh meter, leave it for 2 hours, record the KWh meter again, compare the first record with the second record, if there is a difference value between the first recording and the second recording then the leakage current is proven to occur.

Keywords: Rising electricity costs; leakage currents ; current tleft.

***How to Cite**:* Yenny Agnes Angela Turnip, Indri Dayana, Habib Satria, & Moranain Mungkin. (2023). Study development of Chitosan and NanoDot (CNDs) as chemosensors for contact oil damage detection rising electricity costs at home against leakage currents and current theft. *Jurnal Ilmiah Teknik Informatika dan Elektro (JITEK), 2(2) 2023: 85-88,*

**E-mail: dayanaindri@gmail.com* *ISSN 2830-4543 (Online)*

INTRODUCTION

Electricity theft is still a big problem that still occurs in Southeast Asian countries, especially in Indonesia. Many people can lose money due to the theft of electricity by irresponsible persons.The smart grid, one advanced energy technologies of interestherein, involves the widespread adoption of digital meters,sensors and controllers to provide improved quality andresiliency of the electric grid by remote monitoring and controlof all aspects of electricity transmission and distribution (T&D).As a byproduct of the smart grid is that electricity theft can bemitigated to some degree by improved monitoring, improvedmeters, and improved record keeping.Energy harvesting is a discipline which aims to extractambient energy from the environment.

Through various approaches, energy harvesting enables the powering of devices without relying on batteries that must be replaced. Energyharvesting thus have broad interest, ranging from applications such as remote weather monitoring stations to internet of things (IoT) technologies located throughout houses. However,concerns arise due to recent, award winning, developments inenergy harvesting include that of [2], work that extracts energyfrom the T&D without being billed.However, to understand the electricity theft implications ofenergy harvesting and the limitations of smart meters, one musthave interdisciplinary knowledge since these concerns spandomains. This requires some background knowledge in non-technical fields [3].

The first mode can come from the customer himself. The goal is to reduce electricity bills but still with the same power. The customer will replace the electric meter's Miniature Circuit Breaker (MCB) intentionally .The goal is to have higher electric power but pay the same cost.This second method of stealing electricity is also very likely to be carried out by the customer himself. The customer will trick the kWh meter (electricity meter) by lowering the jumper wire between terminals 1 and 3. The third is a combination of the first and second mode. The last way to steal electricity is to directly take electricity from the source, namely Public Street Lighting (PJU). How to take illegal electricity is mostly done by street vendors or street vendors who are naughty

MATERIALS & METHODS

The method used in this qualitative research is an experimental approach that aims to find certain conditions after being influenced under controlled conditions. The data collection practice is divided into 2 for The effect of the magnetic field there is a straight conductor wire against the electric current in the solar panel as much as 10 data and The effect of the magnetic field there is a circular conductor wire against the electric current in the solar panel as much as 10 data then processed.

RESULT & DISCUSSION

The first way to calculate electricity costs is to know in advance the electricity tariff class in your home. As you know, in Indonesia there are several types of electricity tariff groups based on power limits, including 900 VA, 1,300 VA, 2,200 VA, 3,300 VA, 4,400 VA, 5,500 VA, and 6,600 VA and above.

Different power limits will also affect different basic electricity tariff groups. For example, for 900 VA electricity, the basic electricity rate that you have to pay is 1,352 per kWh. For those of you who use the 1,300 VA-5,600 VA group and above, the basic electricity tariff that must be paid is IDR 1,467.28 per kWh.

The second way to calculate electricity costs is to check and record all the equipment in the house that requires electricity. For example at home you use a variety of equipment below:

1 washing machine, 350 watts of electricity.
1 refrigerator, 350 watts of electricity.
1 iron, 300 watts of electricity.
1 TV, 80 watts of electricity.
1 air conditioner, 800 watts of electricity.
1 vacuum cleaner, 500 watts of electricity.
10 lamps, 25 watts of power each.
3. Estimating the Use of Electrical Equipment

Calculation of this estimate is based on the estimated duration of use of electrical equipment each day. The following is an example of estimating electricity use from the data above:

a. 1 washing machine with 350 watts of electricity, used an average of one hour per day, so the total use is 350 watts.
b. 1 refrigerator with 350 watts of electricity, generally on for 24 hours. So the estimate is 350 x 24 = 8,400 watts.
c. 1 iron with an electric power of 300 watts, for example, if the average usage is 1 hour per day, then the power used is 300 watts.
d. 1 TV with 80 watts of electricity, use 5 hours a day. Then the estimate is 80 x 5 = 400 watts.
e. 1 air conditioner with 800 watts of electricity is used per day for at least 10 hours, so the estimated power usage is 800 x 10 = 8,000 watts.
f. 1 vacuum cleaner with 500 watts of electricity, used an average of 1 hour per day, so the power is 500 watts.
g. 10 lamps, 25 watts of power each, burn for 12 hours. Then the estimated total power usage is 10 x 25 x 12 = 3,000 watts.

Calculation of the estimated use of electric power, of course, can vary depending on the usage in your home. If there are several pieces of equipment that are not used daily, then you can calculate them by first making an average, then calculating the estimated daily usage.

The next step for calculating the cost of electricity in your home is to add up all the estimated usage of electrical equipment in your home. Based on the data above, the amount of electricity used in one day in your home is 350 watts + 8,400 watts + 300 watts + 400 watts + 8,000 watts + 500 watts + 3,000 watts = 20,950 watts.

To calculate electricity costs you need to convert watts to kilowatts per hour or kWh. The trick is to divide the total power usage by 1,000, or 20,950 : 1,000 = 20.95 kWh.

This number can then be used to calculate the estimated daily cost of electricity in your home, by multiplying it by the basic electricity rate according to the class you use at home. If your basic electricity rate is 1,352 per kWh, then simply multiply 20.95 kWh by 1.352 to get a result of Rp. 28,324.4.

To calculate the estimated cost of electricity in a month, all you have to do is multiply it by 30, which is 28,324.4 x 30 = 849,732 rupiah.

This estimate could be lower or higher, depending on the electricity usage in your home. After the steps are used, do the following steps

1. Check all the electrical devices in your home and calculate them according to the previous steps. If there is a difference, this should be suspected of electricity theft occurring.
2. The way to find out, turn off all lights and electronic devices for 5-10 minutes. If the numbers on the meter box are still moving fast, it could be an indication of electricity theft in your home. Immediately contact the nearest PLN office for follow-up
3. The leakage current with applicable experiments in the field is to unplug all equipment connections to the plug, turn off all switches, record the meter on the KWh meter, leave it for 2 hours, record the KWh meter again, compare the first record with the second record, if there is a difference value between the first recording and the second recording then the leakage current is proven to occur.

CONCLUSION

This study it can be concluded that the leakage current with applicable experiments in the field is to unplug all equipment connections to the plug, turn off all switches, record the meter on the KWh meter, leave it for 2 hours, record the KWh meter again, compare the first record with the second record, if there is a difference value between the first recording and the second recording then the leakage current is proven to occur. The author would like to thank the Foundation Internal Fund (DIYA) for financial support with Grant No. 1815/LP2M/03.1.1/VI/2023. We also thank the Medan Area University for supporting this research.

REFERENCES

A. J. Veldhuis and A. H. M. E. Reinders, "Reviewing the potential and cost-effectiveness of off-grid PV systems in Indonesia on a provincial level," Renewable and Sustainable Energy Reviews, vol. 52. 2015.

A. J. Veldhuis and A. H. M. E. Reinders, "Reviewing the potential and cost-effectiveness of grid-connected solar PV in Indonesia on a provincial level," Renewable and Sustainable Energy Reviews, vol. 27. 2013.

K. B. Adam, M. Ramdhani, and E. Suhartono, "A technical and economic analysis of solar PV with local tariff policy in Indonesia," in IOP Conference Series: Materials Science and Engineering, 2020, vol. 830, no. 3.

H. E. Colak, T. Memisoglu, and Y. Gercek, "Optimal site selection for solar photovoltaic (PV) power plants using GIS and AHP: A case study of Malatya Province, Turkey," Renew. Energy, vol. 149, 2020.

P. Unahalekhaka and P. Sripakarach, "Reduction of Reverse Power Flow Using the Appropriate Size and Installation Position of a BESS for a PV Power Plant," IEEE Access, vol. 8, 2020.

M. Järvelä, K. Lappalainen, and S. Valkealahti, "Characteristics of the cloud enhancement phenomenon and PV power plants," Sol. Energy, vol. 196, 2020.

P. H. A. Veríssimo, R. A. Campos, M. V. Guarnieri, J. P. A. Veríssimo, L. R. do Nascimento, and R. Rüther, "Area and LCOE considerations in utility-scale, single-axis tracking PV power plant topology optimization," Sol. Energy, vol. 211, 2020.

A. Sharma, S. Pandey, and M. Kolhe, "Global review of policies & guidelines for recycling of solar pv modules," International Journal of Smart Grid and Clean Energy, vol. 8, no. 5. 2019.

A. S. D. Rai, K. Shratriya, and A. Kurchania, "Solar panel cleaning device," Int. J. Recent Technol. Eng., vol. 8, no. 3, 2019.

S. Syafii, N. Novizon, W. Wati, and D. Juliandri, "Feasibility Study of Rooftop Grid Connected PV System for Peak Load Reduction," Proceeding Electr. Eng. Comput. Sci. Informatics, vol. 5, no. 1, 2018.

H. Satria, "Pengukuran Parameter Sistem PV Power Plant Tersambung Pada Jaringan Tenaga Listrik Berdasarkan Real Time Clock," Setrum Sist. Kendali-Tenaga-elektronika-telekomunikasi-komputer, vol. 9, no. 2, 2020.

Syafii, Wati, Novizon, and D. Juliandri, "Economic feasibility study of rooftop grid connected PV system for peak load reduction," in International Conference on Electrical Engineering, Computer Science and Informatics (EECSI), 2018, vol. 2018-October, doi: 10.1109/EECSI.2018.8752957.

B. Uzum, A. Onen, H. M. Hasanien, and S. M. Muyeen, "Rooftop solar pv penetration impacts on distribution network and further growth factors—a comprehensive review," Electronics (Switzerland), vol. 10, no. 1. 2021.

S. Sathiracheewin, P. Sripadungtham, and S. Kamuang, "Performance analysis of grid-connected PV Rooftop, at Sakon Nakhon Province, Thailand," Adv. Sci. Technol. Eng. Syst., vol. 5, no. 4, 2020.

D. Wang et al., "A method for evaluating both shading and power generation effects of rooftop solar PV panels for different climate zones of China," Sol. Energy, vol. 205, 2020.

Y. N. Chanchangi, A. Ghosh, S. Sundaram, and T. K. Mallick, "Dust and PV Performance in Nigeria: A review," Renewable and Sustainable Energy Reviews, vol. 121. 2020.