MULTIFINANCE
Jurnal Ekonomi, Manajemen Dan Perbankan
Altin Riset Publishing
http://altinriset.com/journal/index.php/multifinance
E-ISSN: 3024-8175
Vol. 2, No. 1 Juli 2024

ELECTRICAL INSTALLATION AND POWER SAVING HOUSEHOLD

[*1]Zainul Mufid, [2]Mustafa
[*1]Universitas Bina Sarana Informatika, [2]STP ARS Internasional
Email: [*1]zmufid@gmail.com, [2]musafadec@gmail.com

Abstract
This research aims to analyze compliance with the implementation of POJK 51 of 2017 This study aims to analyze the practices of electrical installation and energy-saving strategies in households. The research method used is a literature review involving the analysis of various literature sources and related research. The study found that improper electrical installation practices can increase the risk of fire and electrical disturbances. The use of energy-efficient labeled electrical appliances and smart home technology has been proven effective in reducing energy consumption in households. Factors such as public awareness of the importance of energy efficiency and the availability of information on energy-saving technologies also influence consumer behavior in choosing electrical appliances and managing energy use in households. Understanding these findings is expected to produce useful recommendations for researchers and practitioners in efforts to improve energy efficiency and electrical installation safety in households.

Keywords: Installation, electrical power, household

Abstrak
Penelitian ini bertujuan untuk menganalisis praktik pemasangan instalasi listrik dan strategi penghematan energi di rumah tangga. Metode penelitian yang digunakan adalah kajian pustaka yang melibatkan analisis berbagai sumber literatur dan penelitian terkait. Hasil kajian menunjukkan bahwa pemasangan instalasi listrik yang tidak sesuai standar dapat meningkatkan risiko kebakaran dan gangguan listrik. Penggunaan peralatan listrik berlabel energi efisien dan teknologi rumah pintar telah terbukti efektif dalam mengurangi konsumsi energi di rumah tangga. Faktor-faktor seperti kesadaran masyarakat tentang pentingnya efisiensi energi dan ketersediaan informasi tentang teknologi hemat energi juga memengaruhi perilaku konsumen dalam memilih peralatan listrik dan mengatur penggunaan energi di rumah tangga. Dengan memahami temuan ini, diharapkan dapat dihasilkan rekomendasi yang berguna bagi peneliti dan praktisi dalam upaya meningkatkan efisiensi energi dan keselamatan instalasi listrik di rumah tangga.

***Kata kunci**: Intalasi, daya listrik, rumah tangga*

Introduction

Household electrical installations are an important aspect of modern life that require special attention in their design and installation as the safety, efficiency, and reliability of electrical systems are crucial, given the potential hazards that non-compliant installations can pose. In addition, with the growing awareness of energy efficiency and environmental sustainability, saving electrical power in households has become a top priority for many families and policymakers. According to Asrori et al. (2021), household electrical installation is a process that requires careful planning and adherence to established safety and efficiency standards. Based on the Indonesian National Standard (SNI) and

guidelines from the Indonesian Engineers Association (PII), electrical installations must be planned and installed by experts who have competency certification. This is important to ensure that the electrical installation not only functions properly but is also safe for use by the occupants of the house. Some of the important components involved in household electrical installations include distribution panels, cables, switches, sockets, and safety devices such as fuses and MCBs (Miniature Circuit Breakers) (Maduretno, 2020).

In addition, electrical installations require a distribution panel which is the main control center of the household electrical installation. Sumarno et al. (2023) explain that this distribution panel functions to distribute electricity from the main power source, such as an electricity meter, to various circuits in the house. In choosing a distribution panel, it is important to consider its capacity to match the household's electricity needs. The distribution panel must also be properly installed and well-connected to all electrical circuits in the house. Cables are another important component in household electrical installations. Cables are used to connect various electrical devices, such as lights, electronic devices, and sockets, to the main power source. Choosing the right cable is important to avoid overheating and fire. In addition, the cable must also be properly installed and well insulated to prevent leakage of electric current.

Other components are switches and sockets and these are the components that allow users to control the flow of electricity to various devices and lights in the house. Switches are used to turn on and off lights or electrical devices, while sockets are used to connect electrical devices to electrical circuits (Ahmad Fahriannur & Yuli Hananto, 2023). The selection of quality switches and sockets that are suitable for household needs is very important to maintain the safety of the occupants of the house. Safety devices such as fuses and MCBs (Miniature Circuit Breakers) are very important components in household electrical installations. These safety devices are tasked with protecting electrical circuits from overcurrents or short circuits that can cause fire or damage to electrical devices. Fuses work by disconnecting electricity when the current exceeds the specified capacity, while MCBs automatically disconnect electricity when a short circuit or overcurrent occurs. The selection and installation of these safety devices must be done carefully by applicable safety standards.

Apart from these components, according to Hajar & Julianti, (2021), several other factors need to be considered in the installation of household electrical installations. One of them is the selection of the type of electricity source used, whether from the PLN network or renewable energy sources such as solar panels. The selection of this type of electricity source will affect the design and selection of appropriate electrical installation components. In the process of installing household electrical installations, it is important to involve experts who have sufficient knowledge and experience in this field. They must follow applicable safety and efficiency standards and have competency certifications that guarantee the quality of their work. In addition, it is necessary to periodically inspect and test the electrical installations to ensure that they are functioning properly and are safe to use (Harahap et al., 2022). To increase awareness of the importance of safe and efficient electrical installations, the public also needs to be educated on how to use electricity wisely and safely. This can be done through socialization campaigns and counseling about the dangers of electricity and how to avoid them. Thus, it is expected to create a safe and comfortable household environment for all residents.

Previous studies have shown that errors in electrical installation can cause fires, electric shocks, and damage to electronic equipment. For example, a study conducted by Rustandi, (2020) in Jakarta showed that 30% of household fires were caused by non-standard electrical installations. Therefore,

an in-depth understanding of the correct installation procedures and selection of high-quality materials are essential to mitigate such risks. Saving electrical power in households can be achieved through various strategies, including the use of efficient electrical appliances, the application of smart technology, and changes in consumer behavior. Based on research by Rondonuwu et al. (2023), the use of energy-efficient labeled appliances (e.g., Energy Star labeled appliances) can reduce electric power consumption by 20-30%. In addition, the application of smart home technology that allows automatic regulation of electricity usage based on needs also has the potential to save power significantly. Another study by Syahid et al. (2021) identified that lighting is one area where substantial savings can be achieved. The use of LED lights compared to traditional incandescent lights can reduce electricity consumption by up to 80%. In addition, the installation of motion sensors and timers to automatically control lighting can further improve energy efficiency.

This research has significant differences compared to previous studies in several key aspects. First, the focus of this research is more on household electrical installations and practical power saving. Previous research tends to provide an overview of the energy efficiency or safety of electrical installations without emphasizing real applications in the household environment. Therefore, this study makes a more direct and measurable contribution toward improving energy efficiency awareness and practices at the household level. Secondly, this study takes a holistic approach that includes analysis of the technical, user behavior, and social impacts of proper electrical installation and use of energy-saving strategies. In contrast, previous studies may have tended to focus on technical aspects alone without considering the social context and human behavior that influence the effectiveness of the proposed solutions. Third, this study places greater emphasis on the practical applicability of the research findings and recommendations. This is reflected in concrete recommendations such as stricter regulations and incentives to encourage the adoption of energy-efficient technologies. Previous studies may tend to provide conclusions without providing concrete directions for further actions that can be taken by policymakers or the general public.

This research aims to analyze the technical aspects of household electrical installations and identify effective methods to save electrical power consumption. The main focus of this research is to understand how proper installation design can improve energy efficiency and reduce electricity costs without compromising comfort and functionality.

Research Method

The research method used in this research is qualitative research, qualitative research is a research method used to be used to understand social phenomena in depth. Qualitative research not only describes the phenomenon but also seeks to understand the meaning and context of the phenomenon (Unaradjan, 2019). This type of research is a literature study research that researchers conduct by collecting, studying, and analyzing references or sources obtained in writing or in the form of writing such as books, journals, articles, documents, and other sources of information that are significant to the topic/title under study. Then the researcher analyzes and concludes to find answers to what the researcher is researching.

Result and Discussion

Based on a literature analysis to understand and compile research findings on electrical installation and energy saving in households through the literature review method, the researcher investigated various literature sources, scientific articles, and related research. Through an in-depth analysis of the existing body of knowledge, several key findings were identified, providing an in-

depth understanding of the challenges, solutions, and potential in improving energy efficiency at the household level.

Electrical Installation Standards and Procedures

Previous studies have highlighted the importance of adherence to standards and procedures in household electrical installations. According to Diarja & Anwar, (2024), complying with the Indonesian National Standard (SNI) and guidelines from the Indonesian Engineers Association (PII) is an important step to ensure the safety and quality of electrical installations. This finding confirms that non-standard electrical installations can increase the risk of fire and electrical faults that could potentially harm household occupants.

Risks and Impacts of Poor Electrical Installations

Lasera & Wahyudi's (2020) study highlights the risks and negative impacts caused by poor or non-standard electrical installations. The researchers found that installations that do not comply with standards can often cause electric shock, damage to electronic equipment, and even fire. This emphasizes the urgency of paying attention to the quality of electrical installations in households to prevent potential hazards for home occupants.

Effects of Using Energy-Efficient Appliances

Several studies have highlighted the positive effects of using electrical appliances labeled as energy efficient in reducing energy consumption in households. According to Yusuf et al. (2023), replacing traditional incandescent bulbs with LED bulbs can reduce energy consumption by up to 80%. These findings confirm the importance of choosing energy-efficient electrical appliances to reduce electricity bills and environmental impact.

The Role of Smart Home Technology in Energy Saving

The application of smart home technology has also been proven effective in helping households save energy. Several studies have shown that the implementation of automation systems to control lighting, cooling, and water heating can significantly reduce energy consumption (Ramin, 2023). For example, the use of smart thermostats that regulate room temperature based on the time of day and the habits of the home's occupants can save up to 15% energy.

Factors Influencing Consumer Behavior

In addition, research findings also highlight the factors that influence consumer behavior related to energy use in households. According to Hambali et al. (2020), awareness behavior about the importance of energy efficiency and the availability of information about energy-saving technologies can influence consumers' decisions in choosing electrical appliances and managing their energy use.

Recommendations for Improving Energy Efficiency in Households

Based on these findings, several recommendations can be proposed to improve energy efficiency in households:

1. Tighten regulations on household electrical installations to ensure compliance with safety and efficiency standards.
2. Encourage the use of electrical appliances labeled as energy efficient through tax incentives or subsidy programs.
3. Educate the public on the benefits and latest technologies in energy saving through public campaigns and training programs.
4. Encourage the development and adoption of smart home technologies that can help optimize energy use in households.

The findings in this study are by several theories, namely.

A. Electrical Installation Standards and Safety Theory

The finding that non-standard electrical installations can increase the risk of fire and electrical faults is directly related to the theory of electrical installation standards and safety. This theory states that the application of appropriate standards in the design, installation, and maintenance of electrical installations is important to ensure the safe use of electricity in households (Pramudita et al., 2022). Non-compliance with these standards can result in equipment damage, fire, and even injury to householders. The standards not only aim to ensure that electrical installations function properly but also to protect householders from various risks associated with electricity use. One of the main risks that can be avoided by implementing the standards is the risk of fire. Electrical installations that do not meet the standards can cause short circuits or overheating which can eventually result in a fire in the household.

In addition to the risk of fire, non-compliance with electrical installation standards can also cause electrical disruptions that can interfere with the daily activities of home residents. Electrical disturbances such as sudden blackouts or sudden disconnection of electricity can disrupt various electronic devices and household activities that require electricity, such as cooking, using electronic equipment, and lighting. According to Ismail et al. (2020), The theory of electrical installation standards and safety emphasizes the importance of planning, installing, and maintaining electrical installations that comply with established standards. This includes the selection of quality electrical installation components, proper wiring selection, correct installation, and the use of appropriate safety devices. In addition, the theory also emphasizes the importance of engaging experts who have knowledge and experience in electrical installations to ensure that all processes are carried out properly.

In this context, it is important to understand that electrical installation standards are not only set to meet legal requirements but also to protect the safety and security of electricity users. Non-compliance with electrical installation standards is a serious offense that can have fatal consequences. Therefore, every step in the design, installation, and maintenance of electrical installations must be carefully carried out under the applicable standards. One important aspect in the application of electrical installation standards is the selection of appropriate installation components. Components such as distribution panels, cables, switches, and sockets must be selected based on household needs and by applicable standards. For example, in cable selection, it is important to consider the capacity of the current to be passed as well as the environment where the cable will be installed to avoid overheating or damage due to environmental factors.

The selection of the distribution panel is also an important step in planning the electrical installation. The selected distribution panel must be able to accommodate a sufficient number of circuits to meet household electricity needs and be equipped with an adequate protection system. This aims to protect electrical circuits from overcurrent or short circuits that can cause fire or damage to electronic equipment. In addition to component selection, the electrical installation process also plays an important role in ensuring user safety and security. Installation must be done carefully by applicable standards and guidelines to avoid errors that could cause safety risks. Installation of cables, switches, sockets, and other components must be done by experts who have adequate knowledge and experience in electrical installation.

The use of safety devices such as fuses and MCBs (Miniature Circuit Breakers) is also an important step in protecting electrical installations from various risks. Fuses and MCBs work by disconnecting electricity when there is a short circuit or excess current that can cause damage or fire. Therefore, the selection and installation of these safety devices must be done carefully by applicable

standards. In addition, regular maintenance of electrical installations is also very important to ensure that they continue to function properly and are safe to use. Maintenance includes regular checks on all components of the electrical installation, replacement of worn or damaged components, and repairs if problems are found. Regular maintenance can prevent damage or failures in electrical installations that could result in safety risks.

Understanding the theory of electrical installation standards and safety and applying them properly in the design, installation, and maintenance of household electrical installations, is expected to reduce the risk of fire and electrical disturbances that can endanger the occupants of the house. In addition, proper application of electrical installation standards can also increase the efficiency of electricity use and reduce the overall maintenance and maintenance costs of electrical installations. Therefore, all parties involved in household electrical installations need to understand and apply these standards properly for the safety and comfort of home occupants.

B. Energy Efficiency Theory

The finding that the use of electrical appliances labeled as energy efficient can reduce energy consumption in households is related to the theory of energy efficiency. This theory emphasizes that the use of more energy-efficient technologies and appliances can reduce overall energy consumption (Patabang et al., 2023). This principle says that by using more efficient electrical appliances, households can reduce their electricity bills while still maintaining comfort and functionality. The importance of energy efficiency in the use of electrical appliances in households cannot be underestimated. Energy efficiency is a concept related to using less energy to achieve the same or even better results. In the context of using electrical appliances, energy efficiency can be measured by how efficient the appliances are in converting electrical energy into desired outcomes, such as lighting, cooling, heating, or operating electronic equipment.

Citarsa et al. (2024) explain that electrical equipment labeled as energy efficient is equipment designed and manufactured with the latest technology that optimizes energy use. For example, LED lights, inverter air conditioners, front-loading washing machines, and other electronic appliances that have an energy-efficient label have been shown to consume less energy than conventional models. This is because these appliances use more advanced and efficient technology in converting electrical energy into the desired output. The use of electrical appliances labeled energy efficient can provide various benefits to households. One of them is energy and electricity cost savings. By using more efficient appliances, households can significantly reduce their energy consumption, which in turn will reduce monthly electricity bills. This can be a significant financial savings in the long run for households.

Additionally, the use of energy-efficient labeled electrical appliances can also help reduce a household's carbon footprint. Lower energy consumption also means lower greenhouse gas emissions into the atmosphere. Thus, the use of more efficient electrical appliances can help protect the environment and reduce the impact of climate change. In addition to the energy and cost-saving benefits, electrical appliances labeled as energy efficient also typically perform better than conventional models. For example, LED lights are not only more energy efficient, but they are also brighter and have a longer lifespan than conventional incandescent bulbs. This makes using more efficient electrical appliances not only an environmentally friendly choice but also a better choice in terms of quality and convenience.

However, while the use of electrical appliances labeled as energy efficient has many benefits, there are still some factors to consider before replacing all old appliances with more efficient models. One of them is the initial investment cost, which may be higher for purchasing energy-efficient

appliances. Although in the long run, the electricity cost savings may exceed the initial investment cost, it may take time for some households to adjust to the cost. In addition, the availability of electrical appliances labeled as energy efficient can also be an issue, especially in less developed regions (Balisranislam et al., 2021). Some appliance models may not be available in the local market or may be too expensive for some households. Therefore, the government and appliance manufacturers need to work together to increase the availability and accessibility of energy-efficient labeled appliances to the public.

In addition, public education and awareness are also important to increase the adoption of energy-efficient appliances. The public needs to be provided with information on the benefits of using more efficient electrical appliances as well as how to choose and use these appliances correctly. Thus, it is expected to create a culture of wiser and more sustainable energy use in the community. To improve energy efficiency in the use of electrical appliances in households, the government can also play an important role through policies and regulations that support the use of energy-efficient labeled electrical appliances. This can include tax incentives, subsidies, or regulations that encourage manufacturers and consumers to switch to more energy-efficient electrical appliances.

C. Consumer Behavior Theory

The finding that factors such as awareness about energy efficiency and the availability of information about energy-efficient technologies can influence consumer behavior in choosing electrical appliances and managing energy use in households, is related to the theory of consumer behavior. This theory states that consumer behavior is influenced by several factors, including knowledge, attitudes, and social norms. In this context, raising public awareness about the importance of energy-saving and providing information about energy-saving technologies can stimulate more sustainable consumer behavior (Meliala et al., 2021). According to Dewi, (2022), knowledge is one of the main factors that influence consumer behavior in terms of energy use and selection of electrical appliances. The higher a person's level of knowledge about energy efficiency and energy-saving technologies, the more likely they will choose more efficient electrical appliances and manage energy use in the household more wisely. Therefore, efforts to improve people's knowledge about the importance of energy efficiency and energy-saving technologies can be an important first step in changing consumer behavior.

In addition to knowledge, attitudes also play an important role in shaping consumer behavior related to energy use. A positive attitude towards energy efficiency and energy-saving technologies can encourage a person to prefer efficient electrical appliances and reduce unnecessary energy consumption in the household (Wardany et al., 2021). Therefore, it is important to campaign for positive attitudes toward energy efficiency through education and socialization to the public. In addition to knowledge and attitudes, social norms can also influence consumer behavior related to energy use. If using energy sparingly and efficiently is considered a behavior that is valued and followed by the surrounding community, then individuals will tend to be more motivated to follow the norm. Therefore, creating a culture that supports efficient and frugal energy use can be an effective step in changing consumer behavior.

In raising public awareness about energy efficiency, the role of education and information is crucial. Education on the importance of energy saving and energy-efficient technologies can start from the primary school level and be continuously improved at higher education levels. In addition, public campaigns and information programs organized by the government, non-governmental organizations, and companies can help raise public awareness about the importance of efficient energy use (Abidin et al., 2021). In addition to raising awareness, the availability of information about

energy-efficient technologies is also very important in changing consumer behavior. Clear and easily accessible information about energy-efficient appliances, energy certifications, and potential energy savings can help consumers make wiser decisions when purchasing new appliances. Therefore, the government and manufacturers need to provide comprehensive information on energy-efficient technologies to the public.

In addition to education and information efforts, incentives can also be used to encourage more sustainable consumer behavior in terms of energy use. For example, providing tax incentives or subsidies for the purchase of electrical appliances labeled as energy efficient can be an effective stimulus for consumers to choose more efficient appliances (Winjaya et al., 2022). In addition, incentive programs such as a program to exchange old appliances for new, more efficient ones can also help accelerate the adoption of energy-efficient technologies. In regulating energy use in households, awareness about appropriate energy consumption patterns is also very important. For example, practices such as turning off electrical appliances that are not in use, using electrical appliances wisely, and performing regular maintenance on appliances can help reduce overall energy consumption. Therefore, it is important to continuously raise public awareness of practices that can help reduce energy consumption in households. In addition, the use of technology can also help in managing energy use in households. For example, the use of smart meters and smart home technology can help consumers monitor and control their energy consumption more effectively. With these technologies, consumers can see their energy consumption patterns in real time and identify areas for improvement in energy use.

Conclusion

Based on the findings and discussion above, it can be concluded that important findings have been identified. First, non-compliant electrical installations can increase the risk of fire and electrical faults. Second, the use of electrical appliances labeled as energy efficient can significantly reduce energy consumption. Third, factors such as public awareness about energy efficiency and the availability of information about energy-saving technologies can influence consumer behavior in choosing electrical appliances and managing energy use in households. Based on these findings, several recommendations can be made for future researchers in this field. First, further research can be conducted to understand in depth the impact of non-standard electrical installations on the safety and comfort of household residents. Second, further research on the use of energy-efficient technologies and the factors that influence consumer behavior could provide deeper insights into ways to improve energy efficiency in households. Third, comparative research between different energy-saving strategies could also provide a more comprehensive understanding of the effectiveness of each approach. By digging deeper into these findings and implementing the proposed recommendations, it is hoped that future researchers can make a more significant contribution to efforts to improve energy efficiency in households and create a more sustainable environment for the future.

References

Abidin, Z., Bachri, A., & Laksono, A. B. (2021). Sosialisasi K3 Kelistrikan Rumah Tangga dan Upaya Penghematan Energi Di Desa Kuluran Kecamatan Kalitengah Kabupaten Lamongan. *Jurnal Altifani Penelitian Dan Pengabdian Kepada Masyarakat*, *1*(4), Article 4. https://doi.org/10.25008/altifani.v1i4.172

Ahmad Fahriannur, A. F., & Yuli Hananto, Y. H. (2023). Instalasi Sistem Penghematan Energi Listrik Mesin Pendingin di Agen Sosis Kecamatan Sukowono Kabupaten Jember. *INSTALASI SISTEM*

PENGHEMATAN ENERGI LISTRIK MESIN PENDINGIN DI AGEN SOSIS KECAMATAN SUKOWONO KABUPATEN JEMBER, *1*(3), Article 3.

Asrori, A., Harijono, A., Faizin, A., Dani, A., & Kriswitono, K. (2021). APLIKASI HOME SOLAR SYSTEM SEBAGAI PENERANGAN UNTUK TPQ AL-MURTADHO DI KOTA MALANG. *Jurnal Penelitian Dan Pengabdian Kepada Masyarakat UNSIQ*, *8*(1), Article 1. https://doi.org/10.32699/ppkm.v8i1.1499

Balisranislam, B., Harahap, P., & Lubis, S. (2021). Perancangan Alat Inverator Energi Listrik Menggunakan Simulink Matlab. *Jurnal Rekayasa Material, Manufaktur Dan Energi*, *4*(2), Article 2. https://doi.org/10.30596/rmme.v4i2.8069

Citarsa, I. B. F., Wiryajati, I. K., Satiawan, I. N. W., Suksmadana, I. M. B., Supriono, & Ramadhani, C. (2024). PENYULUHAN PENGGUNAAN LISTRIK RUMAH TANGGA SECARA AMAN DAN HEMAT DI DUSUN CEMARA, DESA LEMBAR SELATAN, KECAMATAN LEMBAR, KABUPATEN LOMBOK BARAT. *Jurnal Pepadu*, *5*(1), Article 1. https://doi.org/10.29303/pepadu.v5i1.4011

Dewi, R. P. (2022). PERBANDINGAN ENERGI LUARAN PLTS ATAP TERHADAP KONSUMSI ENERGI SKALA RUMAH TANGGA DENGAN DAYA LISTRIK 1300 VA. *Power Elektronik : Jurnal Orang Elektro*, *11*(2), Article 2. https://doi.org/10.30591/polektro.v12i1.3634

Diarja, R. D. W., & Anwar, U. (2024). PENERAPAN RAMBU KESELAMATAN DAN KESEHATAN KERJA (K3) SEBAGAI PEMENUHAN HAM NARAPIDANA. *TOPLAMA*, *1*(2), 73–81. https://doi.org/10.61397/tla.v1i2.64

Hajar, I., & Julianti, S. N. (2021). Kapasitas Kapasitor Koreksi Faktor Daya Pada Pelanggan Rumah Tangga 6600 VA. *SUTET*, *11*(2), 94–104. https://doi.org/10.33322/sutet.v11i2.1576

Hambali, H., Astrid, E., Hendri, H., & Islami, S. (2020). Penyuluhan dan Pelatihan Instalasi Listrik Rumah Tangga bagi Masyarakat di Nagari Pauh Duo Nan Batigo Kecamatan Pauh Duo Kabupaten Solok Selatan. *JTEV (Jurnal Teknik Elektro Dan Vokasional)*, *6*(1), Article 1. https://doi.org/10.24036/jtev.v6i1.107664

Harahap, R., Armansyah, A., Sudaryanto, S., Pramudia, D. T., & Rian, A. F. (2022). *Keselamatan Pemakaian Energi Listrik Rumah Tangga Yang Benar di Desa Bandar Rahmat Kecamatan Tanjung Tiram Kabupaten Batu Bara | Harahap | JET (Journal of Electrical Technology)*. https://jurnaltest.uisu.ac.id/index.php/jet/article/view/5389

Ismail, I., Martini, N., & Akhmad, Z. (2020). Penyuluhan Keselamatan Instalasi dan Peralatan Listrik Rumah Tangga di Desa Galengdowo Kecamatan Wonosalam Kabupaten Jombang. *Journal Community Service Consortium*, *1*(1), Article 1. https://doi.org/10.37715/consortium.v1i1.3268

Lasera, A. B., & Wahyudi, I. H. (2020). Pengembangan Prototipe Sistem Pengontrolan Daya Listrik berbasis IoT ESP32 pada Smart Home System. *Elinvo (Electronics, Informatics, and Vocational Education)*, *5*(2), Article 2. https://doi.org/10.21831/elinvo.v5i2.34261

Maduretno, T. W. (2020). Efektifitas Model Problem Based Learning Sebagai Bentuk Aplikasi Teknik Instalasi Listrik Dalam Kehidupan Masyarakat. *Jurnal Dharma Pendidikan STKIP PGRI Nganjuk*, *15*(01), Article 01.

Meliala, S., Putri, R., Saifuddin, S., & Sadli, M. (2021). *Perancangan Penggunan Panel Surya Kapasitas 200 WP On Grid System pada Rumah Tangga di Pedesaan | Meliala | JET (Journal of Electrical Technology)*. https://jurnaltest.uisu.ac.id/index.php/jet/article/view/3544

Patabang, S., Leda, J. M., & Ramadhan, S. (2023). PENYULUHAN PENGGUNAAN ALAT PENGHEMAT DAYA LISTRIK PADA RUMAH TANGGA. *Batara Wisnu : Indonesian Journal of Community Services*, *3*(3), Article 3. https://doi.org/10.53363/bw.v3i3.220

Pramudita, R., Ardiansyah, N. P., Rizqulloh, M. A., Saputra, W. S., Abdullah, A. G., Elvyanti, S., Hasbullah, H., Haritman, E., Wahyudin, D., Kustiawan, I., Budi, A. H. S., Somantri, M., & Pawinanto, R. E. (2022). PENYULUHAN DAN PELATIHAN PENGGUNAAN LISTRIK HEMAT ENERGI DI LINGKUNGAN SMK NEGERI 1 CISARUA. *Jurnal Ilmiah Teknologi Infomasi Terapan*, *9*(1), Article 1. https://doi.org/10.33197/jitter.vol9.iss1.2022.958

Ramin, M. (2023). PENTINGNYA KOMUNIKASI PUBLIK DALAM PEMASARAN PRODUK. *TOPLAMA*, *1*(1 September), Article 1 September. https://doi.org/10.61397/tla.v1i1.31

Rondonuwu, A., Wenas, A., & Mandagi, A. (2023). PEMASANGAN PEMBANGKIT TENAGA SURYA UNTUK INSTALASI RUMAH (SOLAR HOME). *Central Publisher*, *1*(4), Article 4. https://doi.org/10.60145/jcp.v1i4.84

Rustandi, A. (2020). *Monitoring Arus Dan Daya Listrik Dengan Sistem Notifikasi Dari Smartphone Pada Instalasi Listrik Rumah Tangga Berbasis Internet Of Things (Iot)* [Other, Universitas Komputer Indonesia]. https://doi.org/10/UNIKOM_ADE%20RUSTANDI_BAB%204.pdf

Sumarno, E., Juhana, J., & Setiawan, J. (2023). Implementasi Light Emitting Diode Sebagai Penerangan Jalan Umum Yang Hemat Daya. *ASPIRASI : Publikasi Hasil Pengabdian Dan Kegiatan Masyarakat*, *1*(6), 273–283. https://doi.org/10.61132/aspirasi.v1i6.422

Syahid, S., Riyadi, A. H., & Badruzzaman, Y. (2021). PEMBERDAYAAN IBU-IBU PKK DESA PENGEMPON KECAMATAN SRUWENG KABUPATEN KEBUMEN MELALUI PELATIHAN SAFETY DAN EFISIENSI PENGGUNAAN LISTRIK RUMAH TANGGA. *Jurnal Hilirisasi Technology kepada Masyarakat (SITECHMAS)*, *1*(1), Article 1. https://doi.org/10.32497/sitechmas.v1i1.2230

Unaradjan, D. D. (2019). *Metode Penelitian Kuantitatif*. Penerbit Unika Atma Jaya Jakarta.

Wardany, K., Pamungkas, M. P., Sari, R. P., & Mariana, E. (2021). Sosialisasi Dasar Teknik Instalasi Listrik Rumah Tangga di Kelurahan Kecamatan Trimurjo. *Sasambo: Jurnal Abdimas (Journal of Community Service)*, *3*(2), Article 2. https://doi.org/10.36312/sasambo.v3i2.394

Winjaya, F., Darmawan, A., Puspitasari, M. D., & Wibowo, A. P. E. (2022). Sosialisasi Keamanan dan Keselamatan dalam Penggunaan Listrik di PPI Madiun. *Jurnal Pengabdian Kepada Masyarakat Semangat Nyata Untuk Mengabdi (JKPM Senyum)*, *2*(1), Article 1. https://doi.org/10.52920/jkpmsenyum.v2i1.58

Yusuf, T. I., Tolago, A. I. T. A. I., Dako, R. D. R., Wiranto, I., Salim, S., Dako, A. Y., & Hidayat, I. (2023). Peningkatan Kesadaran Masyarakat dalam Menggunakan Peralatan Listrik serta Pemasangan Instalasi Listrik yang Aman dan Hemat Energi. *Jurnal Pengabdian Pada Masyarakat Eldimas*, *1*(2), Article 2. https://doi.org/10.37905/ejppm.v1i2.12