



Improving Energy Efficiency for Culinary MSMEs in Legok Village Through Electrical Management Training

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ABSTRACT

This community service aims to empower MSMEs in the culinary sector in Legok Village, Tangerang, Banten, through efficient electricity management training. Legok Village, which is famous for its traditional culinary, faces problems in managing electricity consumption. Various electrical equipment used for culinary production needs to be managed properly to save energy. The training method includes two stages, namely theory and practice. The first stage provided participants with materials on the basics of energy saving, selection of electrical equipment, and strategies for reducing daily electricity consumption. In the second stage, participants simulated energy monitoring using an excel calculator that had been designed by the resource person, as well as interactive discussions. The results of the training showed an increase in participants' knowledge and awareness of energy management. Before the training, 53% of the 19 participants had limited understanding. Afterward, 57.9% of participants reported an increase in knowledge, with 31.6% experiencing significant improvement. Participants' satisfaction with the training method that combined theory and practice was very high, indicating that the training was effective.

Keywords: Culinary, Electrical Equipment, Electricity Consumption, Energy Saving, Electricity Costs.

ABSTRAK

Pengabdian masyarakat ini bertujuan untuk memberdayakan UMKM sektor kuliner di Desa Legok, Tangerang, Banten, melalui pelatihan pengelolaan listrik yang efisien. Desa Legok yang terkenal dengan kuliner tradisionalnya menghadapi permasalahan dalam mengelola konsumsi listrik. Berbagai peralatan listrik yang digunakan untuk produksi kuliner perlu dikelola dengan baik untuk menghemat energi. Metode pelatihan meliputi dua tahap, yaitu teori dan praktik. Tahap pertama memberikan peserta materi tentang dasar-dasar penghematan energi, pemilihan peralatan listrik, dan strategi pengurangan konsumsi listrik harian. Pada tahap kedua, peserta melakukan simulasi pemantauan energi menggunakan kalkulator excel yang sudah didesain oleh narasumber, serta diskusi interaktif. Hasil pelatihan menunjukkan peningkatan dalam pengetahuan dan kesadaran peserta terkait pengelolaan energi. Sebelum pelatihan, 53% dari 19 peserta memiliki pemahaman yang terbatas. Setelahnya, 57,9% peserta melaporkan peningkatan pengetahuan, dengan 31,6% mengalami peningkatan yang signifikan. Kepuasan peserta terhadap metode pelatihan yang menggabungkan teori dan praktik sangat tinggi, menunjukkan bahwa pelatihan ini efektif.

Kata kunci: Kuliner, Peralatan Listrik, Konsumsi Listrik, Penghematan Energi, Biaya Listrik.

INTRODUCTION

In an era increasingly demanding efficiency and sustainability, wise energy utilization has become a crucial factor for business success, including in the Micro, Small, and Medium Enterprises (MSME) sector (Iswanti et al., 2022; Samuel, 2014).



MSMEs in the culinary sector in Legok Village, Tangerang, Banten, are key drivers of the local economy, offering a diverse range of traditional food and beverage products (Fianty et al., 2023; Saputri et al., 2023). However, in their daily operations, these MSMEs face issues related to electricity consumption management. The electrical equipment used, from heaters and coolers to other culinary production tools, is vital for maintaining the quality of their products. Unfortunately, many business operators in this village lack adequate knowledge on how to manage electricity usage efficiently, resulting in high electricity costs that often burden their profitability.

Energy efficiency is not only important for reducing operational costs but also impacts the sustainability of small businesses in the modern era (Gennitsaris et al., 2023; Herce et al., 2024). Economically, reducing energy costs can provide a competitive edge for MSMEs. Additionally, energy efficiency aligns with global efforts to reduce carbon emissions and preserve environmental sustainability (Khan et al., 2022; Kumar et al., 2023; Yang et al., 2023). Therefore, efficient energy management training is necessary for MSMEs in Legok Village to ensure the continuity and growth of their businesses in the long term.

MSMEs in the culinary sector in Legok Village face significant challenges related to energy consumption in their daily operations. Electrical equipment such as ovens, electric stoves, refrigerators, and lighting are essential for maintaining product quality. However, without adequate understanding of energy consumption management, many MSMEs in the village experience inflated operational costs that reduce profit margins. The inability to monitor and control energy use effectively can lead to excessive and inefficient electricity consumption, further straining small businesses that already face numerous challenges.

On the other hand, energy efficiency is key to enhancing business sustainability (Chen et al., 2024; Jiao et al., 2023; Uhunamure & Bouchenine, 2024). Efficient energy use means achieving the same or better results with less energy consumption, yet many MSMEs lack access to or knowledge of technologies and practices that can help them achieve this. Effective energy management, involving planning and controlling energy use, is also often not systematically implemented by MSMEs (Prashar, 2019). Without good management, small businesses in Legok Village are likely to face rising electricity costs and avoidable energy waste. Moreover, energy conservation, which involves efforts to reduce overall energy consumption, is still not a priority for many business operators in the village. The lack of awareness about the importance of saving energy not only impacts operational costs but also environmental sustainability, as energy savings contribute to reducing carbon emissions.

The primary goal of this community service initiative is to empower MSMEs in the culinary sector in Legok Village through practical training and the implementation of efficient energy management technologies. This initiative aims to help business operators address challenges in managing their electricity consumption, thereby reducing the operational costs that often burden them. By improving energy efficiency, MSMEs can enhance their profitability and business sustainability, while also contributing to environmental impact reduction (Rahman et al., 2020).

The approach used in this initiative includes training for MSME operators in Legok Village on efficient energy management techniques, counselling on the importance of energy conservation, and the implementation of energy consumption monitoring systems. This method is relevant and effective as it provides practical knowledge that MSMEs can apply in their daily activities. By understanding energy usage, MSMEs can estimate energy consumption during food and beverage production processes.

The anticipated benefits of this initiative for MSMEs in Legok Village include reduced electricity costs, improved operational efficiency, and increased business competitiveness (Sutadji & Tjiptady, 2020). The training and technologies implemented will equip MSMEs with the ability to manage energy consumption more effectively, supporting their long-term business sustainability. By reducing reliance on inefficient energy, MSMEs can strengthen their market position and achieve more stable and sustainable growth.

This initiative is also relevant to global issues such as sustainability, energy efficiency, and carbon emission reduction. Efforts to reduce inefficient energy consumption in MSMEs not only enhance profitability but also contribute to global goals of reducing carbon footprints. By promoting wiser energy use, MSMEs in Legok Village contribute to environmental preservation and support global climate change mitigation efforts.

METHODS

The implementation method for this community service program begins with the identification and data collection of MSMEs in the culinary sector in Legok Village, where target MSMEs are detailed and documented. Following this, an energy needs analysis is conducted to understand the energy consumption patterns and specific requirements of each participating MSME. Based on the analysis results, the team develops a training program plan, including training materials and counselling sessions. This series of activities is illustrated in Figure 1.

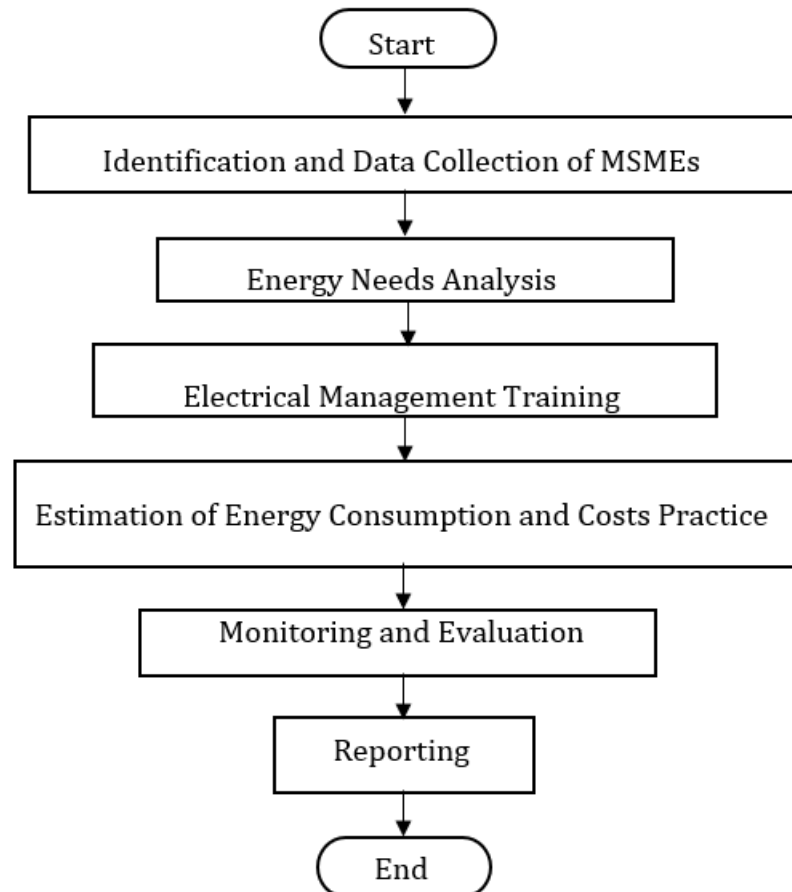


Figure 1. Flowchart for the Implementation of Electricity Management Training Activities

The next phase is the execution of energy management training, where MSMEs receive practical training on energy efficiency techniques. Counselling on energy conservation is also provided to increase business operators' awareness of the importance of saving energy in daily operations (Tjiptady, 2020). Subsequently, practice sessions are held to estimate electricity consumption. This helps them forecast electricity expenses during the production process, using Excel tools and associated mathematical equations.

After the practical sessions, an evaluation of the training results and MSMEs' performance in managing energy is conducted. This stage is crucial to ensure that the goals of the community service are met and to provide valuable feedback to the MSMEs. Finally, a comprehensive report is prepared, encompassing the entire process and results of the program, and disseminated to stakeholders to highlight the positive impact of the initiative.

RESULTS AND DISCUSSION

The electricity management training was conducted on Monday, July 29, 2024, with 19 participants. The session began with a presentation on fundamental energy management concepts, followed by practical exercises using Excel to apply these concepts in real-world scenarios. The training was led by Fahmy Rinanda Saputri, a

lecturer in Engineering Physics at UMN, and held in a UMN classroom equipped with PCs to facilitate hands-on practice. Aimed at MSME operators, the training introduced various techniques for managing and optimizing energy consumption.

During the classroom session, participants actively engaged in both the theoretical and practical components of the training. The theoretical discussion provided a solid foundation on the principles of energy management, while the practical exercises allowed participants to use Excel for data analysis and energy consumption estimation. Figure 2 is shown the cover of material and practical material for electrical analysis. The interactions during the training encouraged questions and discussions, creating a collaborative learning environment observable in Figure 3.



Figure 2. Material of Training (a) Cover of Training Material in power point file (b) Electrical Data Analysis in Excel File

The culinary MSMEs (Micro, Small, and Medium Enterprises) in Legok Village, Tangerang, Banten, display a wide range of product offerings, each requiring different types of electrical equipment to support their production processes. The variety of products, from traditional snacks to processed foods, dictates the specific tools each business utilizes.

For example, the "Sosis Solo, Bolgumer" enterprise relies on a blender, fan, and mixer, while "Kerupuk Pasir" only requires a sealer for packaging. The "Tendang Tanamo" business, which produces rendang (spiced meat), utilizes more specialized equipment including a blender, hand sealer, showcase, and a water dispenser.

Another business, "D'Joti Kitchen," which offers various food items like nasi goreng, peyek, and tahu bakso, employs a range of electrical devices such as a blender, electric oven, mixer, freezer, sealer, and refrigerator. Similarly, the "Pempek 23 Bicek Dinda" operation, which specializes in pempek (fish cake), tekwan, and beverages, uses a blender, freezer, refrigerator, vacuum machine, and sealer.

On the other hand, some MSMEs have more minimal electrical needs. For instance, "Lagie Snack" primarily uses a cassava grater, while "Berkah Hanco Mulia," involved in more diverse activities, utilizes sewing machines, cutting machines, a sealer, lamps, and fans. This data indicates that the electrical equipment needs among

these MSMEs are varied and tailored to the specific demands of their respective businesses.



Figure 3. Training Situation in the Class

The evaluation of the training indicated a high level of participant satisfaction and an improvement in understanding of energy management. Feedback showed that the combination of theoretical instruction and practical application significantly enhanced their ability to manage energy consumption more effectively. Participants reported acquiring valuable skills in using Excel for energy management, which they hope to apply in their businesses to reduce costs and increase efficiency.

Figure 4 shows the evaluation results indicating that 53% of the 19 participants had very limited knowledge of electricity management before the training. After the training, Figure 5 reveals that 57.9% of participants reported an increase in their knowledge of electricity management, and 31.6% indicated a significant improvement in their knowledge following the training.

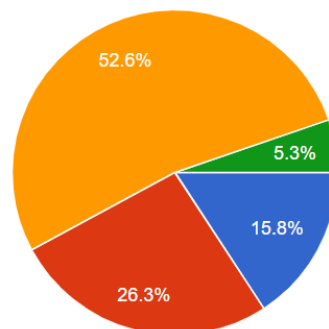


Figure 4. Results on Electricity Management Knowledge Before the Training

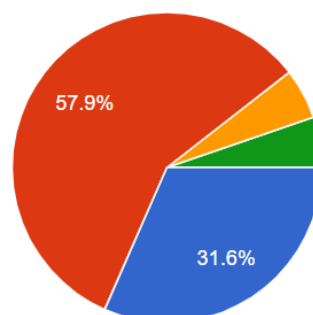


Figure 5. Results on Electricity Management Knowledge After the Training

The teaching method used in the energy management training for culinary SMEs in Legok Village has shown satisfactory results, as reflected in the post-training evaluation. A total of 63.2% of participants stated that the teaching method was effective, while 36.8% rated it as very effective as is shown in Figure 6.

The training was conducted in a classroom at Universitas Multimedia Nusantara (UMN), equipped with computers (PCs), allowing participants to access Excel and directly apply the theories learned through practical calculations of energy consumption and electricity costs. Before the practical session, participants were first given theoretical explanations covering household energy needs, as well as energy requirements for food and beverage production. They were also introduced to renewable and non-renewable energy sources, and the concept of energy management.

This approach, which combines both theoretical instruction and practical application, proved to be effective, as evidenced by the participants' feedback. By first understanding the basic concepts of energy needs and management, participants were better prepared and able to apply this knowledge in practice, particularly in using Excel for energy calculations. The post-training evaluation confirmed that this teaching method successfully enhanced participants' understanding significantly and provided them with skills that can be directly applied to their business operations.

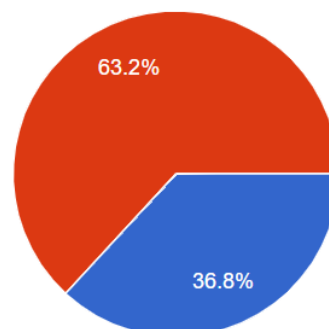


Figure 6. Results on Electricity Management Knowledge After the Training

The last session of this community service activity was a group photo that shown in Figure 7. The group photo taken in the UMN garden served as a way to mark the successful completion of the training program. It recognizes and appreciates the efforts of all parties involved, from the participants to the trainers and activity team, and highlights their contributions to the success of the program. In addition, it serves as a tool for promotion and documentation, which can be used in reports, promotional materials, and shared with stakeholders and the wider community to showcase the impact of the program. By capturing these moments, the photos also help build a sense of community and shared achievement among participants, strengthening the connections made during the training (Centre, 2018; Purcell, 2009). Furthermore, these photos can inspire future participants and other MSMEs to engage in similar programs and improve their culinary business practices.



Figure 7. Photo Documentation

The training successfully achieved its objectives by providing both theoretical knowledge and practical skills in electricity management to MSME operators. Positive feedback and improvements observed during the evaluation indicate the effectiveness of this approach. By integrating theoretical and practical elements, the training has equipped participants with the tools and confidence needed to manage their energy consumption more efficiently, which in turn contributes to the sustainability of their businesses.

CONCLUSION AND RECOMMENDATION

The electricity management training conducted for micro, small, and medium enterprises (MSMEs) in the culinary sector in Legok Village has shown satisfactory results and effectively achieved its objectives. Based on quantitative data, before the training, 53% of the 19 participants had very limited knowledge of electricity management. After the training, 57.9% of participants reported an improvement in knowledge, and 31.6% reported a significant improvement. The training evaluation indicated high satisfaction levels among participants with the theory and practice presented. This suggests that the approach used, which combined theory and practice, successfully enhanced participants' understanding and provided tangible benefits in managing energy consumption.

Through this training, MSME operators in Legok Village are now better equipped to address issues related to efficient energy management. They are expected to reduce operational costs, improve efficiency, and support the sustainability of their businesses. Additionally, this training contributes to global efforts to reduce carbon emissions and preserve environmental sustainability by promoting better energy management practices.

To ensure the sustainable implementation of the energy management techniques learned, it is recommended that participants continue applying these practices in their operations, supported by periodic additional training to measure their effectiveness. Additionally, ongoing outreach on energy conservation should be conducted to reinforce the understanding and practices applied. Collaboration with

third parties, such as MSME associations or government agencies, will also expand the program's impact, allowing more MSME actors to benefit.

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