

## The Assembly and Installation of Solar Powered Public Street Lights (PJU) at Panti Asuhan Putri Aisyiah Dau Malang

Gumono<sup>1</sup>, Sugeng Hadi Susilo<sup>2</sup>, Agus Setiawan<sup>3</sup>, Asrori<sup>4</sup>

<sup>1234</sup> Politeknik Negeri Malang, Indonesia

 [sugeng.hadi@polinema.ac.id](mailto:sugeng.hadi@polinema.ac.id)

Abstract	Article Info
<p>The paper discusses the problem of increasing security for residents in panti asuhan putri aisyiah dau malang area, Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency. One of the most important is lighting. The installation of public street lighting is still minimal, so it is far from meeting security and safety standards. In order to ensure the availability of safe and reliable street lighting, training on the assembly of solar-powered street lighting (PJU) was conducted at panti asuhan putri aisyiah dau malang, Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency. Prior to the assembly process for street lighting, a brief training was conducted on the assembly of solar-powered PJU lampposts and their installation, for residents at panti asuhan putri aisyiah dau malang Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency., so that he has skills that can be developed. The result of the PKM is an increase in the knowledge and skills of the residents of the panti asuhan putri aisyiah dau malang in the field of fabrication and installation of solar-powered PJU lights. In addition, the installation of 3 Solar Powered PJU lights that are safe and reliable, and have an impact on increasing environmental security and residents' activities at night in the panti asuhan putri aisyiah dau malang.</p>	<p><b>Article History</b>            Received :            October 30 2021            Revised :            November 02, 2021            Accepted :            November 16, 2021</p> <p><b>Keywords:</b>            Public Street            Lighting, Solar Cell            Lamps, Lamp Posts</p>

Published by Yayasan Payungi Smart Madani  
 Website <https://journal.payungi.org/index.php/ijcep>  
 This is an open access article under the CC BY SA license  
<https://creativecommons.org/licenses/by-sa/4.0/>



### INTRODUCTION

Panti asuhan putri aisyiah dau malang Jl. Insiyur Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency is located in an area that is relatively higher than other areas in the city of Malang. Even so, this area is included in the northern region that is developing in the city of Malang because it is close to the city of Batu. With the increasing number of immigrants, there are excesses, both positive and negative. One of the negative excesses is the safety factor. To improve security for residents in the Panti asuhan putri aisyiah dau malang area, Jl. Insiyur Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency, one of the most important things is lighting. The installation of public street lighting actually already exists but is still minimal, it will be easy to provoke the occurrence of crime. The installation of perfunctory street lighting, which is only attached to a wall or tree with a wire, so it is very dangerous if a short circuit occurs, especially when entering the rainy season like today.

With the conditions as described above, to improve the skills of the residents of the Panti asuhan putri aisyiah dau malang Jl. Insiyur Soekarno II no. 4 RT 01 RW 01

Dadaprejo Village, Junrejo Subdistrict, Malang Regency, and in order to ensure the availability of safe and reliable street lighting, training was conducted on assembling public street lighting. Prior to the assembly process for street lighting, a brief training was conducted on assembling solar-powered PJU lampposts and their installation by a teacher at the State Polytechnic of Malang. This activity has a positive impact on residents around the Aisiyah Dau Women's Home Malang, universities and local governments, especially Batu City, socially and environmentally. This is because Solar Powered Public Street Lighting is a cheap and economical alternative to be used as a source of lighting electricity because it uses a free and unlimited energy source from nature, namely solar energy (Kementerian ESDM, 2016; Lui, 2014; Rajab, et al., 2017). Solar-powered street lighting uses solar panels with a service life of up to 25 years, which functions to receive sunlight (light) which is then converted into electricity through the photovoltaic process (A. J. B. Siqueira, et al., 2019; Li, et al., 2010). Then stored in the battery so that it does not require a supply from the PLN, it can automatically start up in the afternoon and turn off in the morning with easy and efficient maintenance for years. Overall this system is designed to provide general lighting with renewable energy sources, free of maintenance costs, and long economic life.

Solar street lighting generally uses LED (Light Emitting Diode) lamps which have less power and are more efficient. The use of hi-power type LED lights that are very bright, energy efficient, and durable. The life of the LED lamp can reach 50,000 hours with a DC (Direct Current) power source (M. Sahori, 2011). Long lamp replacement intervals also mean reduced frequency and reduced maintenance operational costs for lamp replacement costs. The batteries used for solar street lighting are VRLA and Deep Cycle types (M. Hidayat, 2020; Ali, et al., 2016). By using this device, you already have your own energy source without depending on other parties, saving fuel, and being environmentally friendly. Solar-powered public street lighting operates independently and does not require an inter-pole network cable so that its installation is very easy, practical, economical, and of course it can avoid power outages (C. R. Sandro Putra, 2016). With a quick and easy installation system, solar street lighting can be a quick solution in overcoming the needs of public street lighting (P. W. Gautama, 2021).

Therefore, it is necessary to learn and practice the manufacture and installation of solar cells for the children of the Aisiyah Dau Orphanage, so that they become more aware and understand about solar cell technology, so as to form a generation that is not technologically stuttering. So solar cell technology is one step closer to unlocking the full potential of photovoltaic as a clean, affordable and sustainable energy source. "Because each part of the light has features that correspond to a particular material and device properties, it is possible to diagnose the characteristics by simply 'looking at it', rather than touching it thereby avoiding possible damage.

During the day, sunlight is converted into electric current by solar panels. The electric current is supplied to the battery through the SCC (Solar Charge Controller) as a current regulator and keeps the battery from over-discharging (Bappenas, 2018). At night, the light will turn on by taking the electrical energy stored in the battery during the day. The electric current from the battery to the lamp flows through the SCC so that the electric current remains stable (<http://www.pln.co.id/?p=12187>). The lighting in question is a complete unit consisting of a light source (lamp/luminaire), optical elements (reflector, refractor, diffuser). Electrical elements (connectors to the power supply, etc.), a support structure consisting of support arms, vertical trusses and lamp post foundations (P. . W. Gautama, et al., 2021).

In planning the installation of street lighting, it must be in accordance with the standards and provisions that have been applied. In Indonesia, this provision is called SNI (Indonesian National Standard) (C. R. Sandro Putra, 2016). The pole is the component used to support the lamp. Several types of poles used for street lights are iron poles and octagonal poles. Based on the Indonesian National Standard (SNI 7391:2008) Specifications for Street Lighting in Urban Areas, street light poles can be divided into 3, namely single arm, double arm, and armless. While the type of light source, public street lighting can also be divided into 3 (three) types, namely mercury lamps, sodium lamps (A. J. B. Siqueira et al, 2019).

With the Situation Analysis as described above, partner problems can be formulated as follows:

- a. How to improve the knowledge and skills of the residents of the Panti asuhan putri aisyiah dau malang, which is not bright enough so that lighting needs to be installed?
- b. What are the specifications for the solar cell lamp needs that will be given to the residents of the Panti asuhan putri aisyiah dau malang?

## **METHOD**

The implementation of PKM activities is carried out at the Panti asuhan putri aisyiah dau malang which is located at Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency. The orphanage's name is Elfin Rakhmawati's mother. Implementation time starts from April 1, 2021 to November 15, 2021. The methods that will be carried out in this PKM activity include:

1. A field survey to study the existing problems and then provide an offer on Training on Solar Powered Public Street Lighting (PJU) Assembly.
2. The next activity is the preparation of proposals for proposed activities to the P2M Technical Implementation Unit of the State Polytechnic of Malang.
3. After obtaining approval, welding training activities are carried out with Solar Powered Public Street Lights (PJU) products

## **RESULTS AND DISCUSSION**

Based on the activity evaluation design, the stages of the science and technology application service activities along with the achievement of success indicators are described as follows:

### **1. Coordination**

On 3 and 5 May 2021, the service team coordinated with the administrators of the Aisyiah Dau Malang women's orphanage as the location for installing solar cell lights. The service team synchronizes the schedule with the caretaker of the orphanage, what materials are needed. From the results of the coordination, the service team prepared a solar cell system package. The service team carried out community service for 4 meetings including training on what solar cells are, training on assembling electrical circuits.

### **2. Training and installation of solar cell lights around the Panti Putri Aisyiah Dau**

Due to the constraints of the ongoing PPKM, the process of installing the lights for the Public Prosecutor was a bit late, but finally it could be completed at the end of August 2021. Delivery and training for the installation of 3 solar cell packages. The implementation was carried out on August 28, 2021. This training was attended by members and administrators of the Aisyiah Dau Orphanage.



Figure 1 Handing over the chell solar lamps to the caretakers and orphanage children



Figure 2. orphanage children helping in the installation of lights



Figure 3. The team is installing solar chell lights at the Panti location



Figure 4. One of the positions for installing solar chell lights at the Panti location



Figure 5. The first training on assembling chell solar lights at the Pant



Figure 6. The second training of solar chell lamp assembly in Pant



Figure 7. The final pose of the second training session on installing solar chell lights at Pant  
Putri Aisiyah Dau

This service involves all members of the orphanage as well as the caretaker of the Aisiah Dau Women's Home. They are enthusiastic about participating in the training and installation of solar cell lights, for them the technology is environmentally friendly.

This service is different from others, because the target of the activity is members of the women's orphanage who are still young, with the hope that later they can transmit knowledge to friends, family and other groups.

His enthusiasm for learning the assembly and installation of solar cells that were installed convinced him of the benefits of this activity at the Aisyah Dau Women's Home. Which in the end has an impact on their knowledge, environmental safety and become an example for other women's homes around them.

The benefits obtained from the Training for the Installation of Solar Street Lights (PJU) at the Panti asuhan putri aisyah dau malang Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency are:

1. Residents of Panti asuhan putri aisyah dau malang Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo Subdistrict, Malang Regency gained knowledge and skills in the fabrication and installation of solar-powered PJU lamps.
2. Environmental security and residents' activities at night in the Panti asuhan putri aisyah dau malang Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency is getting better.

## CONCLUSION

The conclusion of the Solar Powered Public Street Lighting Assembly Training activity at the Panti asuhan putri aisyah dau malang Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency are: Improving the knowledge and skills of the residents of the Panti asuhan putri aisyah dau malang Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency in the field of fabrication and installation of solar-powered PJU lights. The installation of 3 safe and reliable Solar Powered PJU lights, each of which requires a 2 m high lamp post, 200 W LED lights with DC 12V voltage, 50 WP Solar Panels, this has an impact on increasing environmental security and residents' activities in at night in the Panti asuhan putri aisyah dau malang, Jl. Engineer Soekarno II no. 4 RT 01 RW 01 Dadaprejo Village, Junrejo District, Malang Regency.

## REFERENCES

- Ali, A. S., Zanzinger, Z., Debose, D., & Stephens, B. (2016). Open Source Building Science Sensors (OSBSS): A low-cost Arduino-based platform for long-term indoor environmental data collection. *Building and Environment*, *100*, 114-126.
- A. J. B. Siqueira *et al.*, "Energi & Kelistrikan," *J. Chem. Inf. Model.*, vol. 53, no. 9, pp. 1689–1699, 2019.
- C. R. Sandro Putra, "Perencanaan Pembangkit Listrik Tenaga Surya Secara Mandiri Untuk Rumah Tinggal," *Semin. Nas. Cendekiawan*, vol. 6, no. 1, p. 23.4, 2016.
- Kementerian ESDM, "Jurnal Energi," 2016, [Online]. Available: [https://www.esdm.go.id/assets/media/content/FIX2\\_Jurnal\\_Energi\\_Edisi\\_2\\_171\\_12016\(1\).pdf](https://www.esdm.go.id/assets/media/content/FIX2_Jurnal_Energi_Edisi_2_171_12016(1).pdf).
- Liu, G. (2014). Sustainable feasibility of solar photovoltaic powered street lighting systems. *International Journal of Electrical Power & Energy Systems*, *56*, 168-174.
- Li, D. H., Cheung, K. L., Wong, S. L., & Lam, T. N. (2010). An analysis of energy-efficient light fittings and lighting controls. *Applied Energy*, *87*(2), 558-567.
- M. Sahori, "Perancangan Pembangkit Listrik Tenaga Surya Sebagai Catu Daya Lampu Lalu Lintas Di Pekanbaru," *Skripsi*, 2011.
- M. Hidayat, A. T. Ismail, P. Studi, T. Elektro, F. Teknik, and U. M. Makassar, "Perancangan Penerangan Jalan Umum Tenaga Surya ( Solar Cell ) Untuk Alternatif Penerangan Kampus," 2020.
- Rajab, Z., Khalil, A., Amhamed, M., & Asheibi, A. (2017, March). Economic feasibility of solar powered street lighting system in Libya. In *2017 8th International*

- Renewable Energy Congress (IREC)* (pp. 1-6). IEEE.
- Siqueira *et al.*, "Energi & Kelistrikan," *J. Chem. Inf. Model.*, vol. 53, no. 9, pp. 1689–1699, 2019.
- Sandro Putra, "Perencanaan Pembangkit Listrik Tenaga Surya Secara Mandiri Untuk Rumah Tinggal," *Semin. Nas. Cendekiawan*, vol. 6, no. 1, p. 23.4, 2016.
- P. W. Gautama, F. Ketenagalistrikan, and D. A. N. Energi, "Perencanaan Pembangkit Listrik Tenaga Surya ( Plts ) Sistem Off Grid Dengan Kapasitas 2 Kwp Pada Instalasi Menara Suar Bulukumba Perencanaan Pembangkit Listrik Tenaga Surya ( Plts ) Sistem Off Grid Dengan Kapasitas 2 Kwp Pada Instalasi Menara Suar Bulukum," 2021.
- [Bappenas, "Indonesia PPP Handbook 2018," pp. 1–176, 2018, [Online]. Available: [https://www.bappenas.go.id/files/PPP Book/PPP Book 2018 FINAL.pdf](https://www.bappenas.go.id/files/PPP%20Book/PPP%20Book%202018%20FINAL.pdf).
- PT PLN, "35,000 MW for Indonesia (35.000 MW untuk Indonesia)," *PT PLN*, 2015, [Online]. Available: <http://www.pln.co.id/?p=12187>.
- P. W. Gautama, F. Ketenagalistrikan, and D. A. N. Energi, "Perencanaan Pembangkit Listrik Tenaga Surya ( Plts ) Sistem Off Grid Dengan Kapasitas 2 Kwp Pada Instalasi Menara Suar Bulukumba Perencanaan Pembangkit Listrik Tenaga Surya ( Plts ) Sistem Off Grid Dengan Kapasitas 2 Kwp Pada Instalasi Menara Suar Bulukum," 2021.

---

**Copyright holder :**

© Gumono, Sugeng Hadi Susilo, Agus Setiawan, Asrori (2021)

**First Publication Right :**

International Journal of Community Engagement Payungi

**This article is licensed under:**

**CC-BY-SA**

