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WORK FROM HOME: POWER SUPPLY POLICY IN LANGKAI VILLAGE, CENTRAL KALIMANTAN

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ABSTRACT

Currently, everyone is advised to keep their distance from each other and for workers to start working from home (WFH) which is a new thing for most people in Indonesia. It affects the use of electrical energy in connection with the use of electrical equipment in the household sector. Thus, the use of power plants with fossil energy sources will increasingly produce by-products such as air pollutant, which may affect the health of the environment and society, especially during this COVID-19 outbreak. To reduce dependence on fossil energy sources, it can be done by using new renewable energy sources such as environmentally friendly solar energy. One form is the use of rooftop solar power plants (Rooftop PLTS). The use of Rooftop PLTS also reduces greenhouse gas emissions, so that air pollution can be minimized. Thus, WFH can run according to health goals simultaneously, namely avoiding the impact of the pandemic and air pollution.

Keywords: *renewable energy, rooftop power supply, greenhouse gases, work from home*

INTRODUCTION

The COVID-19 pandemic that has hit almost all countries has caused changes in the work pattern of human life, including in terms of consumption of electrical energy. Human habits to interact with each other such as social activities or

working in offices are starting to be limited and even avoided. To anticipate the spread of the COVID-19 outbreak, the World Health Organization (WHO) has issued guidelines for preventing the transmission of COVID-19 (WHO, 2020).

The city of Palangka Raya which is the capital of Central Kalimantan Province is also a city that has been impacted by the COVID-19 pandemic. One of the steps taken by the Government to break the chain of distribution of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) that causes COVID-19 in Palangka Raya City is to issue a policy of restricting government and private office workplaces by implementing WFH, including learning activities carried out online. such as through the Central Kalimantan Governor's Circular and the Palangka Raya Mayor's Circular. Thus, the implementation of work is mostly done at home, both for employees of learning activities.

To produce electrical energy, of course, requires natural resources that are used as fuel for power generation. Based on the 2015 national energy electricity mix data contained in the National Energy General Plan document (Presidential Regulation of the Republic of Indonesia Number 22 of 2017 concerning the General National Energy Plan, 2017), most of the electrical energy used in the electricity sector is still dominated by coal (56.1 %), natural gas (24.9%) and fuel (8.6%), so that the portion of new and renewable energy in the national energy mix in the electricity sector only reaches 10.5% of total production. Thus, the use of power plants with fossil energy sources will increasingly produce waste or by-products such as pollutants or air pollutant substances where air pollutants certainly affect the health of the environment and society (Murhaini and Ludang, 2020; Permana and Ludang, 2020; Sintha et al., 2020), especially during this COVID-19 outbreak. Therefore, to reduce dependence on fossil energy sources, it can be done by using new renewable energy sources such as environmentally friendly solar energy. One form of utilization of solar energy is the use of rooftop solar power plants (Rooftop PLTS).

This study focuses on the use of Rooftop PLTS, with the aim of saving electricity consumption from the electricity company (PT. PLN Persero) as well as contributing to efforts to reduce greenhouse gas emissions produced by fossil fuel power plants.

IMPLEMENTATION STRATEGY

Government policy

To control and anticipate the impact caused by the COVID-19 outbreak, the Government issued several policies to suppress the spread of the COVID-19 outbreak, one of which is the Large-Scale Social Restrictions (PSBB) where the legal basis for this policy is the Law. Number 6 of 2018 concerning Health

Quarantine. The PSBB was first implemented on April 10, 2020 in Jakarta and then followed by other regions (Ristyawati, 2020).

Several regulations issued by the Government related to the implementation of the PSBB are Government Regulation Number 21 of 2020 concerning Large-Scale Social Restrictions in the Context of Accelerating Handling of Corona Virus Disease 2019 (COVID-19), Government Regulation in Lieu of Law Number 1 of 2020 concerning State Financial Policy And Financial System Stability for Handling the 2019 Corona Virus Disease Pandemic and/or in Facing Threats That Endanger the National Economy and/or Financial System Stability and Minister of Health Regulation Number 9 of 2020 concerning Guidelines for Large-Scale Social Restrictions in the Context of Accelerating Handling of Corona Virus Disease 2019 (COVID-19). By mechanism, a region can be determined by PSBB if it meets the requirements as stated in Government Regulation Number 21 of 2020 in Article 2, which must be with the approval of the minister who carries out government affairs in the health sector and must be based on epidemiological considerations, effectiveness, magnitude of threat, support from sources resources, political considerations, operational technical, social, economic, political, cultural and defense and security considerations. The conditions that must be met by regions to be able to determine PSBB status are also emphasized through Minister of Health Regulation Number 9 of 2020 where an area (province/city/regency) must meet the following requirements: the number of cases and/or deaths caused by disease has increased and spread significantly to several regions and found epidemiological links to similar events in other countries or regions (Ristyawati, 2020).

For the City of Palangka Raya which is the capital of Central Kalimantan Province, PSBB has been established through the Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/MENKES/294/2020 dated May 7, 2020 concerning the Establishment of Large-Scale Social Restrictions in the Palangka Raya City Region, Central Kalimantan Province in the Context of Acceleration Handling Corona Virus Disease 2019 (COVID-19) which was then followed up by the City of Palangka Raya by issuing Palangka Raya Mayor Regulation Number 7 of 2020 dated May 10, 2020 concerning Guidelines for the Implementation of Large-Scale Social Restrictions in the Context of Accelerating Handling of Corona Virus Disease 2019 (COVID-19). 19) In Palangka Raya City where PSBB is implemented during the longest incubation period and can be extended if there is evidence of spread.

The Work From Home policy is one of the policies taken by the Government in order to break the chain of transmission of the COVID-19 outbreak. The Work From Home policy itself has been implemented in Palangka Raya City through circulars issued by the Central Kalimantan Provincial Government and the Palangka Raya City Government such as the Central Kalimantan Governor Circular

Number 800/568/IV.1/BKD dated 27 March 2020 concerning Extension of System Adjustments. The Work of State Civil Apparatus in Efforts to Prevent the Spread of COVID-19 in the Central Kalimantan Provincial Government and the Circular Letter of the Mayor of Palangka Raya Number 880/89/BKPSDM.PK2PA.02/IV/2020 dated April 1, 2020 concerning Amendments to the Circular Letter of the Mayor of Palangka Raya Number 880/70/BKPSDM.PK2PA.02/III/2020 concerning Adjustment of the Employee Work System and in Efforts to Prevent the Spread of Corona Virus Disease (COVID-19) in the Palangka Raya City Government.

This Work From Home policy certainly affects work patterns as experienced by State Civil Apparatuses, which so far have a conventional work system turning into an online work system (Darmawan and Atmojo, 2020). The same thing also happens in the private sector where there are companies that also implement work from home schemes for their employees (Mungkasa, 2020).

Rooftop PLTS

Research shows that the roof area of the building can be used as an area for the installation of PLTS as a source of electrical energy by Tarigan and Kartikasari (2017). Based on the Minister of Energy and Mineral Resources Regulation Number 49 of 2018, jo. Minister of Energy and Mineral Resources Regulation No. 13 of 2019, jo. Minister of Energy and Mineral Resources Regulation No. 16 of 2019 which regulates the use of the Rooftop Solar Power Generation system by consumers of PT. The State Electricity Company (Persero), Rooftop PLTS is a process of generating electrical energy using solar modules installed on the roof, walls or other parts of the consumer building of PT. PLN (Persero) which is then distributed through the consumer electricity connection PT. PLN (Persero). The Rooftop PLTS component consists of solar panels, inverters, imported export kWh meters, electrical connections and safety systems.

If the exported electrical energy is greater than the imported electrical energy in the current month, the excess electrical energy can be calculated as a deduction from the next month's bill, with the excess calculated to be accumulated for a maximum of 3 months. For the calculation of the export of electrical energy for Rooftop PLTS customers, it is calculated at 65% of the export kWh value recorded on the export-import kWh meter.

In terms of investment, maintenance and profits, Rooftop PLTS also promises to be used as a source of future electrical energy (Ramadhan and Rangkuti, 2016). According to existing regulations, the capacity of Rooftop PLTS that is allowed to be installed is a maximum of 100% of the total connected power capacity of PLN customers, where the capacity of Rooftop PLTS is determined by the total capacity of the inverter.

The following (Table 1) are summary of some of the previous studies that have been studied by the author as supporting material for its application.

Table 1. Summary of previous research results

Research focus and results	References
Design of a hybrid solar power plant system with PLN electricity grids for urban homes: The PLTS and PLN hybrid systems designed in this study have a one-way working principle, namely PLTS only works when PLN is not working and vice versa where the system is designed to meet 30% of household electrical energy from the overall load, and the remaining 70% supplied from PT. PLN (Persero).	Bien *et al.* (2008)
The potential and role of PLTS as future alternative energy in Indonesia: Sunlight has the potential to be used as a source of energy for power generation as an unlimited resource, environmentally friendly and available throughout the region. Therefore, a development strategy is needed in order to be able to integrate PLTS into the national electricity system.	Boedoyo (2012)
Potential alternative energy sources to support national electricity: Alternative energy potentials such as hydropower, wind, geothermal, and biomass can be used to reduce dependence on fossil energy where the existing potential is adjusted to the availability of alternative energy potential in the region.	Agung (2013)
Planning a Solar Power Plant on the roof of the Harry Hartanto Building, Trisakti University: The results of the design using 312 units of solar panels with a capacity of 300 Wp and 5 units of inverters with a capacity of 20 kW installed in an area of 855 m2 will produce electricity of 131,232.1 kWh/year which requires an investment of Rp. 2,869,777,544 and maintenance of Rp. 28,697,775 per year. Based on the calculation of Return On Investment (ROI), the Pay Back Period will be achieved for 8 years 5 months and the Net present value (NPV) is positive. With an average lifespan of solar panels of up to 25 years, this design can generate income for the long term.	Ramadhan and Rangkuti (2016)
Analysis of Balang Lompo Island Solar Power Plant: The results of this study indicate that the installed PLTS power capacity is greater than the calculated PLTS load measurement results. This shows that PLTS has the potential to be used as a source of electrical energy.	Hafid *et al.* (2017)
Analysis of the potential of the campus building roof as a location for placing solar panels as a source of electricity: Research analysis shows that the area of the roof of the campus building of 10,353 m2 can be used as an area for the installation of PLTS as a source of electrical energy where the potential for electrical power generated is 2.03 MWp.	Tarigan and Kartikasari (2017)
Design of Solar Power Plants, Faculty of Engineering, UHAMKA: The average daily solar radiation intensity of 4.8 kWh/m2 in Indonesia has the potential as a source of electrical energy if PLTS is built. The PLTS system designed at UHAMKA will cover the electricity needs of 10% of the electricity supply needs of PLN of 56.72 kWh.	Roza and Mujirudin (2019)
The photovoltaic concept is integrated on the grid with the STT-PLN Building: In terms of performance ratio, which is a measure or quality of a system based on	Hasanah *et al.* (2019)

annual electrical energy output, Rooftop PLTS which is synchronized with the PLN electricity network has a performance ratio of 81% so that it is technically feasible to realize.	
Potential for reducing greenhouse gas (GHG) emissions in online home learning activities: carbon footprint analysis: The simulation results of the calculation of the potential for reducing greenhouse gas emissions in online learning activities at home at universities during the COVID-19 pandemic, the results of the GHG emission reduction of 749,868 kg for a simulation of 100 classes/year.	Ismail *et al.* (2020)

LOW IMPACT SOURCES

Greenhouse gases

Greenhouse gases (GHG) are gases that can absorb and emit infrared radiation, causing the effect of greenhouse gases in the earth's atmosphere, both naturally occurring and anthropogenic (Directorate General of Electricity, 2018). Greenhouse gases are actually produced by natural processes that occur around us such as the respiration process of living things, but with increasing human activities, the amount of greenhouse gases in the atmosphere is increasing where the content of these greenhouse gases in addition to affecting human health can also cause global warming problems. and climate change.

To deal with this, in 1992 an Earth Summit was held in Rio de Janeiro, Brazil which resulted in the United Nations Framework Convention on Climate Change (UNFCCC). Subsequently, the Government of Indonesia ratified the convention by issuing Law of the Republic of Indonesia Number 6 of 1994 concerning Ratification of the United Nations Framework Convention on Climate Change, in which countries that ratify this convention are required to make an inventory of data. greenhouse gases nationally. In 2007, the 13th climate change convention was held in Bali with an agreement in the form of long-term cooperation between developed and developing countries to reduce greenhouse gas emissions. As a form of support, the Government of Indonesia stated a commitment (non-binding) to reduce emissions by 26% on its own or 41% with international support in 2020 from Business as Usual (BAU) during the G-20 country meeting in Pittsburgh, United States of America. September 25, 2009. Furthermore, at the 17th climate change convention in Durban in 2011, resulted in an agreement on the obligation for developing countries (non-Annex 1) to submit a biennial update report (BUR) and a National Communication document (National Communication) during the climate change convention.

At the 17th climate change convention in Paris in 2015, Indonesia has committed to reduce GHG emission levels by 29% with its own efforts and 41% with international support by 2030 from Business as Usual (BAU) as stated in the Nationally Determined Contribution (NDC), first as part of the Paris Agreement. As

a follow-up to the Paris Agreement, the Government of Indonesia has ratified it by issuing Law No. 16 of 2016 concerning Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change. In order to implement these commitments and obligations, Presidential Regulation Number 61 of 2011 concerning the National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK) and Presidential Regulation Number 71 of 2011 concerning the Implementation of the National Greenhouse Gas Inventory have been stipulated.

Following up on this, the Central Kalimantan Provincial Government has issued Central Kalimantan Governor Regulation Number 36 of 2012 concerning the Regional Action Plan for Reducing Greenhouse Gas Emissions (RAD - GRK) which mandates monitoring, evaluation, and reporting to determine the achievement and target of reducing gas emissions. greenhouse. The data is compiled with other regional data so that the results of monitoring, evaluation and reporting (PEP) are national which are used as material for inventory and verification of emission achievements from emission reduction activities in accordance with the mandate of Presidential Regulation no. 71 of 2011 concerning the Implementation of the National Greenhouse Gas Inventory. In accordance with the agreement at the 17th climate change convention in Durban, the information is then submitted to the climate change convention in the form of a biennial report and a National Communication document.

The current COVID-19 pandemic has resulted in changes in human work patterns that limit face-to-face meetings and are mostly done online (Malaini et al., 2021; Olberto et al., 2020), such as work from home or online learning activities at home which have the potential to reduce greenhouse gas emissions. if previously learning activities were carried out at schools or campuses. The implementation of work from home also has an impact on increasing household electrical energy consumption, but on the contrary, there is a decrease in electricity consumption in offices, shopping centers and industry.

GHG reduction

According to BAPPENAS (2015), mitigation activities from the use of on-grid and on-grid renewable energy include the construction of power plants using renewable energy sources including PLTS, PLTB, PLTMH, PLTM, Hybrid PLT, Biomass PLT (from palm shells) and PLTS PJU. The difference in mitigation activities for the use of on-grid and off-grid renewable energy lies in the distribution system of electrical energy and the location of power plants where for the utilization of on-grid renewable energy, electrical energy is distributed through the PLN interconnection system and the location of power plants must be affordable by the PLN interconnection system, while the use of renewable energy off grid, electrical energy is not distributed through the PLN interconnection

system and power plant locations are far from or not covered by the PLN electricity grid.

The following are the assumptions used in the construction of new renewable energy plants based on the agreement of the National Working Group on Energy-Based Sector (Table 2).

Table 2. Assumptions used in renewable energy development

Mitigation Activities	Assumption of operation in a year	Number of hours in a year	Number of hours of operation in a year
PLTM	70 %	7.860	6.132
PLTMH	70 %	7.860	6.132
PLTB	20 %	7.860	1.752
PLTS	20 %	7.860	1.752
PLT Hybrid	20 %	7.860	1.752
PLTS PJU/Traffic Lights	20 %	7.860	1.752
PLT Biomass (Palm Shell)	90 %	7.860	7.884

CONCLUSION

The roof area of the building can be used as an area for the installation of PLTS as a source of electrical energy. The use of renewable energy off grid, electrical energy is not distributed through the PLN interconnection system and power plant locations are far from or not covered by the PLN electricity grid. This system is consumer handling and does not depend on business entities, so that the community can choose a power supply according to local capabilities. For this reason, it is recommended the need for socialization and training for the community.

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