Indonesian Journal of Innovation Studies
Vol. 25 No. 1 (2024): January
DOI: 10.21070/ijins.v26i1.1035 . Article type: (Innovation in Social Science)

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ISSN 2598-9936 (online), https://ijins.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

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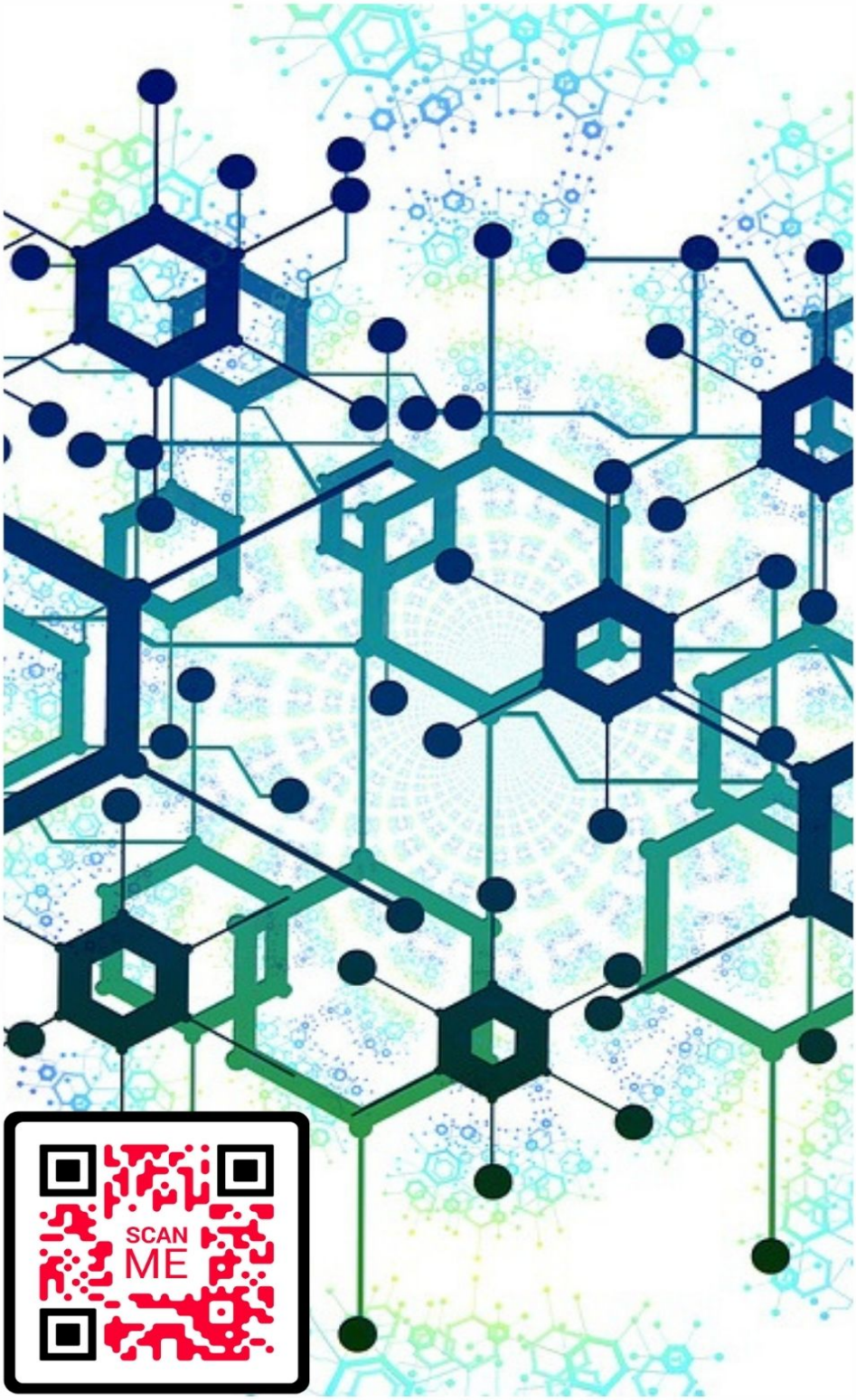
Vol. 25 No. 1 (2024): January
DOI: 10.21070/ijins.v26i1.1035 . Article type: (Innovation in Social Science)

ISSN (ONLINE) 2598-9936



INDONESIAN JOURNAL OF INNOVATION STUDIES

PUBLISHED BY

UNIVERSITAS MUHAMMADIYAH SIDOARJO

ISSN 2598-9936 (online), https://ijins.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Indonesian Journal of Innovation Studies
Vol. 25 No. 1 (2024): January
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Vol. 25 No. 1 (2024): January
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ISSN 2598-9936 (online), https://ijins.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

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ISSN 2598-9936 (online), https://ijins.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

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The Legality of Rooftop Solar Power Generators Utilization to Fulfill Energy Need

Legalitas Pemanfaatan Pembangkit Listrik Tenaga Surya Atap untuk Memenuhi Kebutuhan Energi

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Abstract

This legal writing examines the utilization of new and renewable energy as an environmentally friendly approach to electricity consumption. New and renewable energy (EBT) encompasses various primary sources such as solar (PLTS), geothermal (PLTP), water (PLTA), wind (PLTB), etc. To meet the high demand for electricity, harnessing energy from sunlight is explored as an alternative power generator. Utilizing buildings' roofs for solar cell installation is a common practice. However, challenges arise including the initially high investment for purchasing solar cell components, batteries for energy storage, inverters, and installation costs. Despite these challenges, the monthly operational costs are minimal. The government, through Regulation of the Minister of Energy and Mineral Resources of the Republic of Indonesia Number 26 of 2021 concerning rooftop solar power systems, supports the legal framework of this which is linked to the electricity grid held by the license holders for electricity supply for public purposes. Furthermore, rooftop solar power systems can be on-grid with the national electricity network (jaringan PLN) to meet energy needs when the installed capacity is below the electricity demand of the consumers. This writing employs a research method with a normative juridical approach by examining literature through a doctrinal perspective. The research results focus on the legality, requirements, and processes involved in the construction of rooftop solar power plants, detailing considerations across various factors before deciding to establish them, including the procedures, regulations, and agreements when integrating rooftop solar power systems into the national electricity network managed by the state electricity company.

Highlights:

- High Initial Investment: Discusses the challenges related to the upfront costs of purchasing solar components, batteries, inverters, and installation despite minimal operational costs.
- Government Support: Emphasizes the role of government regulations, such as Regulation Number 26 of 2021, in supporting and providing a legal framework for rooftop solar power systems connected to the national electricity grid.
- Integration with National Grid: Highlights the on-grid capability of rooftop solar power systems, enabling them to supplement energy needs and aligning with the capacity of the national electricity network managed by the state electricity company (PLN).

ISSN 2598-9936 (online), https://ijins.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

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Keywords: Legality, Solar Cell, New and Renewable Energy (EBT), On-Grid.

Published date: 2024-01-10 00:00:00

Indonesian Journal of Innovation Studies
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Introduction

The rapid technological advancement in Indonesia which has led to an increased demand for energy is playing a crucial role in boosting economic activities. Effective energy management is essential based on the principles of sustainable development.[1] Energy is defined as the capacity to produce power from natural elements like the sun, wind, water, steam, etc., which adheres to the law of conservation of energy which states that energy cannot be created or destroyed but can transform from one form to another. This law was established by the British physicist James Prescott Joule. Energy already exists in the universe, and we can convert it to meet our needs in various forms.[2] Indonesia relies on both conventional and renewable energy sources. Renewable energy which is derived from natural sources such as the sun, wind, geothermal heat, and water, is sustainable. These sources are chosen by society as an alternative to meet household electricity needs due to their environmental friendliness, carbon neutrality, absence of air pollution, and contribution to the country's economy. Renewable energy is not only sustainable but also the cleanest energy. Indonesia possesses a renewable energy potential of 441.7 GW, showcasing a significant opportunity for sustainable energy utilization.[3]

The state electricity company (Perusahaan Listrik Negara or PLN) has also planned for the development of new and renewable energy in the Electricity Supply Business Plan (RUPTL) 2021-2030, with a capacity building plan of 40.6 GW, including 20.9 GW (51.5%) from renewable energy sources. This is a challenge to meet the electricity needs of the Indonesian people by constructing environmentally friendly power plants as a foundation to achieve zero carbon by 2060.[4] In the 2022 annual report, the share of power generation from new and renewable energy sources in the electricity system was reported at 13.14%.[5] This marks a significant breakthrough of PT PLN in supporting the government's program to create environmentally friendly green energy. It is hoped that Indonesia's economic growth will be significant enough to ensure optimal absorption of the newly constructed power plants during their operation.

There are various types of renewable energy, including wind energy (PLTB), geothermal energy (PLTP), hydropower (PLTA), solar energy (PLTS), and more. The most abundant and inexhaustible source of energy is sunlight, which is able to be converted into electrical energy through solar cells for everyday use. Solar power, with solar cells as its main component, converts sunlight into direct current (DC) electricity. Part of this energy is stored in batteries for backup during nighttime when there is no sunlight. Some of the energy is converted using inverters to transform DC into alternating current (AC), making it usable for electronic devices. The demand for electrical energy in society is increasing.[7] The electricity consumption in Indonesia is rising consistently over the past three years: 243.538 TWh in 2020, approximately 257.63 TWh in 2021, and 273.76 TWh in 2022, showing a continuous increase of over 5 percent.[8] This indirectly indicates economic growth across various sectors and an improvement in electrification ratios, reflecting PT. PLN's commitment to electrify remote villages throughout Indonesia.

The improvement of Indonesian society’s prosperity is usually in line with the increasing demand for electrical energy due to the higher economic status of the community which is reflected in the purchase and use of electronic devices. Therefore, rooftop solar power (PLTS atap) can be an alternative energy solution to meet this growing demand. The utilization of rooftop solar power is considered innovative because the monthly usage costs are minimal. However, maintenance costs may arise for component replacement or battery issues. Several challenges are encountered in the field, including the initially high investment value for purchasing solar cell components, batteries for energy storage, inverters, and installation costs. In addition to these considerations, there are legalities that must be fulfilled before constructing rooftop solar power systems. It's essential to choose a reputable installer with competence and legality to ensure that the construction meets the standards of the Operation Eligibility Certificate (SLO) and has a sufficiently long lifespan to avoid inflated maintenance costs in the future. For rooftop solar power systems connecting to the grid of PT. PLN, there are specific regulations regarding legality that need to be met and adhered to. Coordination and gathering information from relevant authorities are necessary before undertaking the construction of rooftop solar power systems.

Research Questions

Based on the background outlined above, the research questions are as follows:

1. What is the legality of rooftop solar power generators in the utilization of new and renewable energy?

2. What are the regulations for rooftop solar power generators connecting to the grid of PT. Perusahaan Listrik Negara?

Methods

The legal research method aims to study the characteristics of legal research, both normatively and empirically. The research method used in this study is the normative method, where it is interpreted as legal research within the framework of norms, principles, theories, philosophies, and legal rules to find solutions or answers to legal issues, such as legal gaps, norm conflicts, or norm ambiguities. Normative research with a statutory approach,

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which attempts to uncover the meaning and interpretation of legal texts, is employed. This includes grammatical interpretation, interpretation based on legal systems, authentic interpretation, argumentum a contrarium, and various other methods of interpretation.

The legal materials in this normative research are divided into primary legal materials and secondary legal materials. Primary legal materials used include the Presidential Regulation of the Republic of Indonesia Number 112 of 2022 Regarding the Acceleration of Development of Renewable Energy for Electricity Supply, the Minister of Energy and Mineral Resources Regulation Number 16 of 2019 concerning the Second Amendment to the Minister of Energy and Mineral Resources Regulation Number 49 of 2018 concerning the use of rooftop solar power system by consumers of PT. PLN, Ministerial Regulation Number 26 of 2021 regarding rooftop solar power system connected to the electricity network for business license holders providing electricity for public interest, Ministerial Regulation Number 49 of 2018, Minister of Energy and Mineral Resources Regulation Number 49 of 2018 concerning the use of rooftop solar power systems by consumers of PT. PLN and power purchase agreement for photovoltaic electricity. Secondary legal materials include books and articles in journals related to new and renewable energy.[9]

The technical data analysis method used in this research is descriptive data analysis. This technique involves interpreting sentences to provide an overview of the collected data, aiming to explain the researched data and obtain answers to the stated research questions.

Results and Discussion

A. The Legality of Rooftop Solar Power Generations in the Utilization of the New and Renewable Energy

The new and renewable energy is regulated in the article 33 verse 3 UUD (Constitution) 1945 which states "Earth, Water, and Natural Resources contained therein are controlled by the state and utilized to the greatest extent for the prosperity of the people." This is regulated in the constitution because these resources are intended for the prosperity of the people, where new and renewable energy is deemed to be more beneficial than detrimental. New and renewable energy sources are abundant, inexhaustible, and can be utilized sustainably. [10] One of the goals of utilizing renewable energy is as a form of decarbonization, shifting from fossil fuels to more environmentally friendly renewable energy sources.

As of July 2023, data from the Ministry of Energy and Mineral Resources indicates that the utilization of new and renewable energy has reached only 12.7 GW or around 15% of the total power plants of 84.8 GW.[11] This percentage is still far from the government's target of 23% by 2025. According to Government Regulation Number 79 in 2014 on National Energy Policy, Article 9 (f), the target for the percentage of new and renewable energy usage is set at 23% in 2025 and an increased target of 31% by 2050. This government regulation aims to position new and renewable energy sources as crucial elements in accelerating the availability and equitable distribution of national energy.[12]

One form of renewable energy is solar energy. Solar energy is obtained from the processing of sunlight. Solar energy can be an alternative power source besides coal and oil. As it is non-polluting and inexhaustible, it makes solar energy reliable.[13] Indonesia, with its tropical climate, is well-suited for harnessing solar energy. The current trend in the demand for electrical energy is the use of rooftop solar power generators.

A rooftop solar power system is a process of generating electricity using photovoltaic modules that can be installed on the roof of the customer's building. The main component is solar cells, which convert sunlight into direct current (DC). Part of this energy is stored in a battery for backup during the night when there is no sunlight. Another portion is converted using an inverter, which transforms DC into alternating current (AC) to meet the electricity supply needs for operating electronic devices in homes or offices. The single-line diagram for the Rooftop Solar Power System is detailed as follows:

ISSN 2598-9936 (online), https://ijins.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

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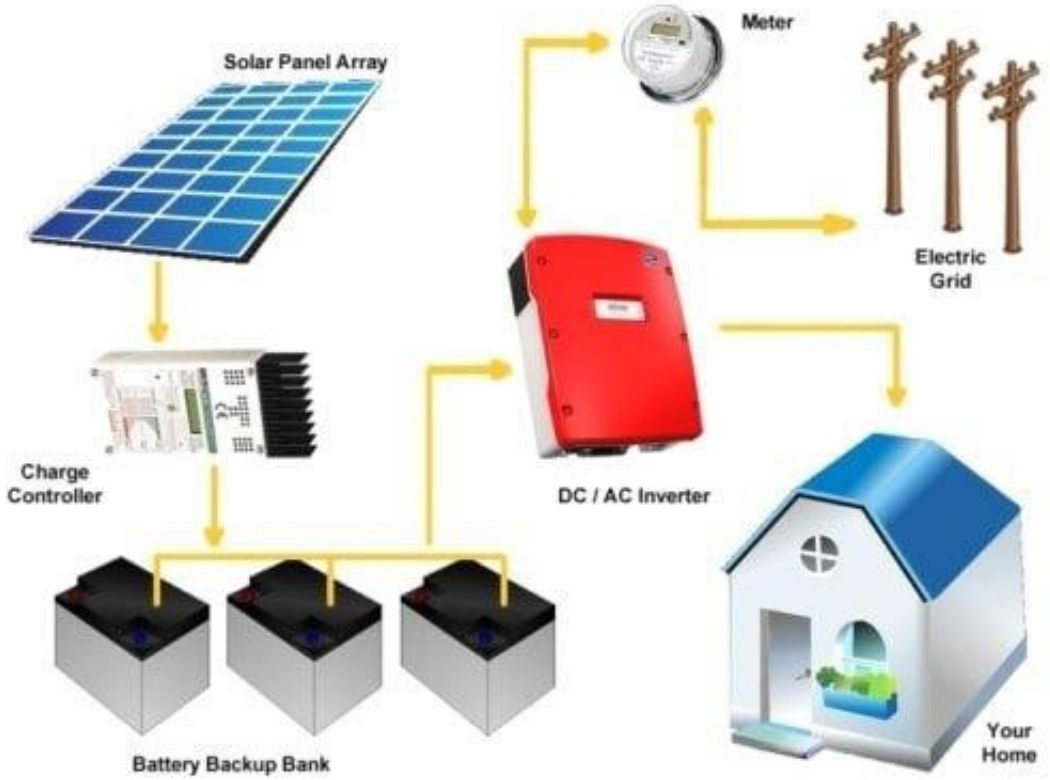

Figure 1. *Single Diagram of Rooftop Solar Power Generator*

In the utilization of rooftop solar power systems, there are several considerations that attention. These include the initially high investment value, routine maintenance costs for component and battery replacements in case of damage, the availability of electrical infrastructure by PT. PLN near the location of the rooftop solar power system for cost comparison, especially if it will be connected to the grid with the national power company. In this scenario, the rooftop solar power system can serve as the main supply or backup energy. For the environmentally friendly utilization of rooftop solar power for personal use, there is a need for improved service quality in the construction and installation of rooftop solar power systems. This improvement should take into account the legality of the system and address any potential force majeure situations. The customers of rooftop solar power system can be individuals or legal entities installing the system, which is then connected to the electricity system operated by the holder of the electricity supply license, namely IUPTLU (Business License for Electricity Supply for Public Purposes), such as PT. PLN as the legal entity. In the legal context, a legal entity (such as PLN) interacting with an object protected by the law (such as customers with PLTS Atap) results in rights and obligations for both parties. These rights and obligations exist within a legal relationship to provide legal protection to all parties involved. Legal protection aims to ensure and guarantee that the rights and obligations of each legal entity are recognized and protected by the law.[14]

According to Philipus M. Hadjon, legal protection can be distinguished into two types:

1. Preventive Legal Protection: This type of legal protection is provided by the government with the aim of preventing violations before they occur. It involves legal regulations to prevent a violation and sets limitations on performing certain obligations.

2. Repressive Legal Protection: This is the final form of protection, involving compensation, fines, imprisonment, and additional penalties given when a dispute has occurred or a violation has been committed.

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From the perspective of preventive legal protection, the government has enacted specific laws and regulations regarding rooftop solar power systems. These legal regulations are used to govern the utilization of rooftop solar power generators for personal or corporate purposes, requiring legality through a Power Purchase Agreement (PJBL) between the Holder of the Electricity Supply Business License for Public Purposes (IUPTLU), such as PT. PLN, with potential customers of the rooftop solar power generators.

In the context of utilizing rooftop solar power generators, the construction and installation of this system must be accompanied by a Certificate of Operation Eligibility (SLO). The Certificate of Operation Eligibility is a formal recognition that the electrical power installation can function in accordance with specified standards. During the examination and testing phase, the customers must meet the SLO requirements and be assisted by businesses in the electricity sector. Additionally, the customers must provide a statement of responsibility regarding the safety aspects of the electrical installation, including the product certificates, the valid factory warranties, the competency test results from distributor technicians, and the documents related to the maintenance of the power generation installation.

In the utilization of Rooftop Solar Power Systems (PLTS Atap), ensuring security is crucial after the installation of the system. This involves ensuring that the installation of the PLTS Atap system complies with the Indonesian National Standards (SNI), as stipulated in Article 4 of the Minister of Energy and Mineral Resources Regulation Number 26 of 2021 regarding Rooftop Solar Power Generation Systems connected to the electricity network, operated by the holder of the electricity supply business license for public purposes.

However, Regulation Number 26 of 2021 does not provide detailed regulations regarding technical aspects, which are essential for ensuring the implementation of the regulation. The implementation of these technical aspects which enhance the system's service, efficiency, and safety can effectively mitigate the potential cost increases. Harmonization efforts are needed to be done by the relevant ministries in encompassing technical, financial, and safety aspects of electrical power, to ensure a cohesive approach and effective implementation.

Force majeure provides protection for a party unable to fulfill its obligations due to unforeseen circumstances beyond intentional or negligent actions. This protection is invoked when there are losses caused by unexpected events such as floods, shipwrecks, tsunamis, volcanic eruptions, and earthquakes. If force majeure occurs in the installation, all losses and costs resulting from force majeure conditions are the responsibility of the affected party.

If force majeure persists for 30 calendar days, both parties must reach an agreement regarding the continuation of the previously established agreement. This is because the electricity provider has an obligation to continuously supply electricity to customers according to the agreed-upon capacity and specifications, both during off-peak hours (LWBP) and peak hours (WBP), unless force majeure has occurred. In the event of force majeure, the customer has the right to claim compensation or damages from the electricity provider.In case both parties experiencing force majeure agree not to resume the Power Purchase Agreement for Photovoltaic Electricity (SPJBTL), they must notify each other in writing.

B. The Regulations of Solar Power System Which is On-Grid with the Network of PT PLN

Solar power systems are classified into two categories: standalone systems (off-grid PV plant) or commonly known as standalone PLTS, and grid-connected systems (grid-connected PV plant). When PLTS is combined with other types of power generators, it is referred to as a hybrid system. According to the Minister of Energy and Mineral Resources Regulation Number 26 of 2021 regarding rooftop solar power systems connected to the electricity network, operated by the holder of the electricity supply business license for public purposes, Article 10 addresses the licensing for rooftop solar power generators customers undertaking the construction and installation of rooftop solar power systems with a total capacity exceeding 500 kW, connected to one power generation system. They are required to have a business license for electricity supply for personal use. [15]

After obtaining the license, solar power generators customers must report to the Minister/Governor for a one-time installation through the integrated service and reporting system for rooftop solar power systems electronically. The application for the construction and installation of rooftop solar power systems is directed to the General Manager of the Main Unit and must meet the specified administrative requirements. According to Article 14(2) of the Minister of Energy and Mineral Resources Regulation Number 16 of 2019, the second amendment to the Regulation of the Minister of Energy and Mineral Resources Number 49 of 2018 concerning the utilization of rooftop solar power systems by consumers of PT PLN, the system is built connected on-grid to the PT PLN, incurring a monthly capacity charge. When customers have a rooftop solar power system connected to the PLN network, there are several requirements that must be fulfilled to submit an application.[16] This application is addressed to the General Manager of the Distribution/Main Unit/Area of PT PLN and must be accompanied by the following administrative and technical requirements:

1. Customer ID Number & Customer Name

2. National Identity Number (NIK)

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3. Tax Identification Number (NPWP)

4. Complete customer address, coordinates (Tagging), and email address

5. Already a PLN customer (postpaid)

6. Installed capacity of the rooftop solar power system (PLTS Atap)

7. Designated business entity

8. Technical specifications of the equipment to be installed

9. Single Line Diagram (SLD)

10. Possession of an operational permit for PT PLN customers undertaking the construction and installation of a Rooftop Solar Power System with an installed capacity > 500 kVA (Electricity Supply Business License/IUPTL).

Ownership of a SLO (Sertifikat Laik Operasi) for rooftop solar power system installations is subject to the following conditions:

1. Capacities up to 500 KW are considered part of the SLO for the utilization of electric power installations.

2. Capacities exceeding 500 KW are treated as a separate component of the SLO for the utilization of electric power installations.

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Figure 2. *The Procedure for Applying for On-Grid Rooftop Solar Power System*

The figure above explains in detail the procedure for customers of PT PLN who wish to apply to establish a rooftop solar power system. It starts with the initial application processed by the customer, followed by an evaluation and verification by PT PLN regarding the completeness of the required documents, checking if they are in accordance. If the documents are still incomplete, the customer will be informed to fulfill the deficiencies. However, once the documents are complete and approved by PT PLN, the construction and installation of the rooftop solar power generators will be carried out by a competent business entity. Subsequently, the customer will manage to get a Certificate of Operation Eligibility (SLO), issued by the Technical Inspection Institute (LIT). After the installation and declared safe with the SLO as evidence, PT PLN will install the Export-Import KWH Meter as a measurement tool for transactions between the customer and PT PLN. This serves as the basis for calculating the electricity bill for each month.[17]

According to the description, the process of applying for a rooftop solar power system by customers of PT PLN can be divided into several stages:

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a. Customer Application:

The customer submits an application to establish a Rooftop Solar Power System.

b. Evaluation and Verification by PLN

PLN evaluates and verifies the completeness of documents submitted by the customer. If there are deficiencies, information is provided to the customer to complete them.

c. Approval and Permit:

After complete and approved by PLN, permission for the construction and installation of the Rooftop Solar Power System is granted.

d. Construction and Installation:

Competent businesses carry out the construction and installation of the Rooftop Solar Power System.

e. Management of the Certificate of Operation Eligibility (SLO):

The customer manages the SLO issued by the Technical Inspection Agency (LIT).

f. Installation of Import-Export KWH Meter:

PLN installs the Import-Export KWH Meter as a measuring tool for transactions between the customer and PLN.

g. Electricity Bill Calculation:

The KWH Meter is used as the basis for calculating the amount of the electricity bill each month.

After the customer's application has been approved by PT PLN and the technical permission has been issued by the Local Unit Manager, just before the installation of the Import-Export KWH meter, the signing of the Power Purchase Agreement for Photovoltaic Electricity (Surat Perjanjian Jual Beli Tenaga Listrik Photovoltaik or SPJBTL) takes place. This agreement outlines the rights and obligations of each party, both the rooftop solar power system customer and PT PLN. There are several provisions set by PT PLN for the customers, including the following:

a) The installed capacity of rooftop solar power systems is limited to the contracted power with PT PLN. This means customers are not allowed to install the rooftop solar power generators with a capacity higher than the contracted power with PT PLN to minimize the potential for recorded exported kWh exceeding the recorded imported kWh.

b) The exported electricity from the rooftop solar power generators is calculated based on the value recorded on the Import-Export kWh meter multiplied by 65%. This means that PT PLN will compensate 65% of the recorded electricity value on the Export kWh, which is deducted from the imported kWh value consumed by the customer.

c) The monthly electricity calculation is based on the difference between the imported kWh value and the exported kWh value. If the exported energy is greater than the imported energy, it will be considered a deduction from the electricity bill for the following month. The billing amount for the customers is based on the minimum operating hours of 40 hours multiplied by the connected power.

d) Any surplus considered in point c is accumulated for a maximum of 3 months, and if there is still a surplus, it will be eliminated.

In addition, the Power Purchase Agreement for Photovoltaic Electricity (SPJBTL) specifies that PT PLN has the obligation to purchase any excess electricity generated by the customers in case of default. Forms of default include (a) fulfilling obligations but not on time, (b) not fulfilling obligations, either delayed or impossible to perform, (c) fulfilling obligations imperfectly, meaning the performance is not as it should be.[2] This applies to both the customer and PT PLN. Customers are prohibited from increasing the total capacity of the rooftop solar power generators inverters beyond the connected power. The business entity must provide a minimum 1 (one) year warranty from the construction or installation of it. Sanctions and compensation forms are outlined for each party involved, including temporary suspension of electricity distribution without prior written notice. If payment is not made, a warning letter for termination will be issued.

The Ministry of Energy and Mineral (ESDM) is currently revising Regulation of the Minister of Energy and Mineral Resources (Permen ESDM) Number 26 of 2021 regarding rooftop solar power generators to address rules on the export of electricity generated by the consumers with rooftop solar power generators. The revision will stipulate that consumers cannot sell their electricity to PT PLN. Furthermore, the upcoming regulation will eliminate the capacity limitation of the rooftop solar power generators based on the contracted power with PT PLN, considering the current oversupply of electricity in the PT PLN network. It is advised that customers install the rooftop solar

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power generators with capacity according to their needs, and the generated electricity will be used to meet their own energy needs without exporting to the PT PLN network.

Conclusion

a. The government's efforts to manage Renewable Energy Power Plants, including solar rooftop power plants, aim to utilize environmentally friendly green energy that is sustainable. Through the detailed regulations provided by the Minister of Energy and Mineral Resources of the Republic of Indonesia, namely Regulation No. 26 of 2021 regarding Solar Rooftop Power Plants connected to the PT PLN's electricity network, the legality, force majeure considerations, and fundamental rules for establishing these solar power plants for both individuals and businesses are well-defined.

b. For on-grid solar power plants connected to PT PLN's electricity network, technical permits issued by the Regional Distribution Unit's General Manager are required, and they must meet predefined criteria. The maximum capacity for installed solar rooftop power plants is determined by the contracted capacity with PT PLN. The calculation for exported kilowatt-hours (KWh) is based on the recorded values of the Export-Import kWh meter multiplied by 65%. Monthly calculations are based on the difference between the Import kWh and Export kWh values. Accumulated calculations are maintained for up to 3 months, and any remaining balance is nullified.

c. However, discussions on revising Regulation No. 26 of 2021 have emerged, particularly regarding the removal of exported kWh for solar rooftop power plant customers. This potential revision aims to encourage customers to install solar capacities aligned with their power needs, and the removal of the capacity limit, previously tied to the contracted power with PLN, is under consideration.

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