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A Glimmer of Sunshine For Indonesian Rooftop Solar PV Projects

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Background

A lot of multinational companies have pledged to go 100% renewable for their power needs (e.g., see www.re100.org), and Indonesian consumers are becoming increasingly conscious of their own carbon footprints. With this development, the Indonesian Government and PLN have felt increasing pressure over recent years to find ways to accommodate rooftop solar PV plants in the existing Indonesian electricity framework. This is both in a physical sense of how such rooftop solar PV projects can be accommodated within PLN's existing grid infrastructure and its constraints, and also how to accommodate such projects within Indonesia's complex regulatory framework governing the generation and sale of electricity.

In a number of other jurisdictions around the Asia Pacific region, the ability of consumers or industrials to develop their own rooftop solar PV projects and sell excess electricity into the grid is a relatively straightforward exercise. This is the case particularly in markets such as Australia and Singapore where the electricity sector has undergone substantial liberalization over the past decade.

However, in Indonesia, PLN is still effectively the monopoly buyer of power. The task of trying to fit these rooftop solar PV projects (which are effectively mini-IPP projects selling power to PLN) into the Indonesian legal framework has been a significant challenge. The Indonesian electricity regulations heavily regulate the way in which PLN should buy power from private producers and what price PLN should pay for that power.

The Minister of Energy and Mineral Resources (MEMR) recently issued Regulation No. 49 of 2018 (Reg 49) as a first attempt at seeking to specifically regulate rooftop solar PV projects, and how they can find their way onto the PLN grid system.

Previous framework

The Indonesian electricity regulatory framework has long allowed energy consumers to develop, own and operate their own captive power plants for their own use. Captive power plant owners are also allowed to sell any excess power generated from their plants to PLN.

Specifically for rooftop solar PV installations, PLN has had an internal regulation since 2013 that has accommodated the export of power from rooftop solar PV into the PLN grid. The 2013 regulation merely provided that where power was exported to the PLN grid from rooftop solar PV installations:

- the kWhs of power exported would be credited against the relevant PLN invoices

- where the kWhs exported exceeded the kWhs imported from the PLN grid, then the owner of the solar PV installation would not receive payment for that excess, but instead that excess would carry forward to subsequent months until it was utilized

Accordingly, under this 2013 regime, owners of solar PV installations were effectively selling their power to PLN for 100% of the PLN tariff category which was applicable to that customer.

However, in 2017, the Government introduced a regulation that imposed parallel operation charges on owners of captive power plants that wished to also remain connected to the PLN grid to supplement electricity supply or for the provision of back-up supply. Those parallel operation charges are connection charge, capacity charge, normal energy charge and emergency energy charge.

The MEMR has now issued Reg 49 as a means to more specifically regulate the integration of rooftop solar PV systems with the PLN grid.

Who and what does Reg 49 apply to?

PLN customers

Reg 49 is applicable to all PLN customers (i.e., anyone who purchases power from PLN, including household and industrial customers) who want to develop rooftop solar PV power plants. Reg 49 defines a "solar rooftop power plant system" as a power generation process using solar PV modules installed and mounted on rooftops, walls, or other parts of buildings owned by the PLN customer and that supplies power through that PLN customer's electricity connection system.

Accordingly, Reg 49 is clearly only applicable to PLN customers, and therefore does not apply to any power consumer located in an area that is not a PLN business area, for example:

- a customer in Batam within PLN Batam's electricity business area (Wilayah Usaha Ketenagalistrikan)
- a customer located within Cikarang Industrial Estate where the holder of the electricity business area is PT Cikarang Listrindo Tbk., and not PLN

Similarly, if a consumer is located within the PLN electricity business area, but has decided to go completely off-grid (e.g., a remote mine that is located within PLN's electricity business area, and runs only solar PV panels and diesel gensets), that consumer is not a PLN customer for the purpose of Reg 49. Therefore, the development of rooftop solar PV by that consumer will fall outside the scope of Reg 49.

For all of these non-PLN customers, Reg 49 only requires that the rooftop solar PV power plants installed by these customers be operated in accordance with prevailing laws and regulations (e.g., to obtain an operational license if the plant's capacity exceeds 200 kVA), and the owner must submit a report to the EBTKE.

Ground-mounted captive solar PV projects

Based on the above definition of "rooftop solar power plant system" in Reg 49, any solar project owned by a PLN customer that is not installed on the roof or wall (e.g., a project where the solar panels are installed on an empty plot of land owned by the customer or any third party) should not be subject to Reg 49.

From a strict reading of Reg 49, it seems that a ground-mounted solar PV installation should fall outside the scope of Reg 49, even where the relevant PLN customer wants to export excess power from that installation into the PLN grid system.

However, in the MEMR's press release dated 28 November 20181 the MEMR indicated that Reg 49 is applicable to any solar project developed by a PLN customer (regardless of how the solar PV modules are mounted) as long as the plant is connected to the PLN grid.

Solar PV projects not exporting power to PLN (off-grid projects)

Article 14(1) of Reg 49 states that PLN industrial customers can install and build rooftop solar PV plants in accordance with Reg 49, either on-grid or off-grid.

This means that if an industrial customer wants to build an off-grid solar project (i.e., where the plant is not connected to the PLN grid and is merely being used to meet the energy needs of that industrial customer), the customer nevertheless has to comply with the requirements of Reg 49. These include the requirements to obtain PLN's prior approval for the system design and to be subject to a cap on installed capacity. This does not seem to be logical, as a completely off-grid system has no interface with the PLN grid system, and accordingly PLN should have no interest at all in the system design or capacity.

Despite the wording of Reg 49, which suggests that it does apply to off-grid projects, the MEMR press release and explanation from PLN and MEMR's officials during a public socialization session on Reg 49 in late November indicate that the requirements under Reg 49 will not be applicable for off-grid solar projects. The reason is that there is no interface risk with the PLN grid system for these projects.

What are the requirements and constraints under Reg 49?

PLN's approval of solar PV system

As with any other captive power plant using any other fuel source, the owner of a captive power plant where the capacity exceeds 200 kVA must obtain an Operation License. In addition, the plant, like any other electricity installation, is also subject to the Certificate of Worthiness (referred to by its Bahasa Indonesia acronym, SLO). Also, for projects falling within the scope of Reg 49, a PLN customer must also obtain approval from PLN before it can start to build and install the solar rooftop power plants.

[1] https://www.esdm.go.id/en/media-center/news-archives/tingkatkan-penggunaan-listrik-ebt-ini-aturan-plts-atap-bagi-konsumen-pln

Reg 49 requires the application to PLN to be made in a prescribed form, and completed with administrative requirements and technical requirements (details on installed capacity, technical specification of the equipment and single-line diagram). PLN will review the application and issue its approval within 15 business days after receipt of the complete application. If during that review PLN determines that the application has not yet fulfilled all of the requirements, PLN will send a written notice to the customer within two business days after its review and the customer will have 15 business days to complete the application.

Limit on capacity of solar PV system

The maximum capacity of the rooftop solar power plant is 100% of the customer's connected capacity and is calculated based on the total capacity of the inverter.

So, for example, an industrial customer that is in the 30,000 kVA category of the PLN tariff will be entitled to install a solar PV power plant with a maximum capacity of 30MW (assuming a power factor of 1).

Energy export and import calculation

Under the 2013 PLN internal regulation, for every kWh of power exported to the PLN grid, the PLN customer was given credit equal to 100% of the applicable PLN customer tariff. There was no cap on the export quantity; any unused credit in a month could be rolled forward to set off future PLN invoices and there was no time limit for the set-off.

Under Reg 49, as of 1 January 2019, any energy exported by the customer to the PLN grid will be discounted (in kWh terms) by 35%. So, for example, if in one month a customer who is in a tariff band of IDR 1,500/kWh exports 100 kWhs of electricity to PLN, and also imports 100 kWhs from the PLN grid system, then for that month the customer will still have to pay to PLN for an amount equal to:

i. 100% of the energy imported, that is 100 kWhs sold by PLN x IDR 1,500

LESS

ii. 65% x 100 kWhs exported to grid x IDR 1,500

which will be a total of IDR 52,500

The reason why only 65% of kWhs will be attributed in the calculation of the exported energy is because based on a 2017 audit of PLN by the State Audit Board (BPK), BPK determined that power generation costs represented 62% of the total cost of PLN running the electricity system. This means that 28% of the tariffs that PLN collected is attributed to line losses and the cost of transmitting and distributing the energy. For this reason, the Government has rounded the costs to 65%, which is also determined as the "price" at which PLN pays a customer for power delivered by that customer to PLN at the customer's premises.

If the exported energy (after the 35% discount) is higher than the imported energy in a single month, the difference will become a credit which can be set off against the customer's electricity bill in subsequent months falling within the

same calendar quarter. Any credit remaining at the end of the relevant calendar quarter cannot be rolled over into the future and will be cancelled.

Under the current PLN tariff regulation, all post-paid PLN customers are subject to a minimum "take-or-pay" payment of 40 hours every month. In samples of calculations provided by PLN during the public meeting on Reg 49 in late November, PLN indicated that the credit to be applied to reduce the customer's electricity bill will not cause the PLN customer to pay less than the minimum monthly take-or-pay obligation. So a PLN customer with a rooftop solar PV plant will still have to pay the minimum monthly take-or-pay obligation. This is in addition to the parallel operation charges that will be applied to industrial customers with a solar rooftop plant connected to the PLN grid.

Examples of how the accounting for these imports and exports work are set out in the Attachment.

PLN will install a new import-export meter for customers developing rooftop solar PV projects covered under Reg 49, with the cost borne by the customers.

Who can be appointed as an installation contractor?

Reg 49 states that the construction and installation of rooftop solar PV power plants must be done by:

- business entities having IUJPTL (electricity support business license) for construction and installation of solar rooftop power plants
- institutions, owned by the central government or local government, that have the line of business of renewable power plant construction and installation

This is not a new requirement. Even before Reg 49 was issued, it was already very clear that any contractor doing construction and installation of power plants must possess certain licenses to do so, including but not limited to IUJPTL.

However, Reg 49 further states that the entities will be published on the website of the Directorate General of New and Renewable Energy (EBTKE). This raises the question of whether all IUJPTL holders having the necessary qualification to do construction and installation of solar plants will be listed on the EBTKE's website, or whether there are any additional criteria that need to be fulfilled to be included in the list. The MEMR officials' explanation in the public meeting in late November indicates that contractors that have the necessary licenses and qualification are allowed to do the construction and installation, even if they are not included in the list published by EBTKE.

Do grid-connected captive solar PV users need to pay Parallel Operation Charges?

Reg 49 states that rooftop solar PV projects will not be subject to PLN's parallel operation charges except for on-grid rooftop solar PV projects of industrial customers.

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Parallel operation charges are fees that PLN charges to its customers or other integrated IUPTL holders that want to connect their power plant to the PLN grid for the purpose of securing additional supply (i.e., over and above their own captive power generation) or backup supply (e.g., in the event that their captive facilities are down).

The parallel operation charges consist of:

- a connection charge - this is usually paid when a customer is first registered as PLN customer
- a capacity charge - this is payable irrespective of whether or not any energy is actually drawn from the grid by the customer
- an energy charge - this consists of a normal energy charge and an emergency energy charge based on the quantity of energy actually used by the customer

Under MEMR Regulation No. 1 of 2017, which governs PLN's parallel operation, the capacity charge is calculated based on a formula of:

captive plant's net dependable capacity (MW) x 40 hours x PLN's tariff

However, PLN has the discretion to determine a higher or lower capacity charge than what is determined in the above regulation. Considering that solar projects have more limited production hours compared to baseload power plants, PLN may lower the capacity charge element of the Parallel Operation Charge.

Conclusion

Although the issuance of Reg 49 had been eagerly awaited as being a key to unlock the rooftop solar potential that exists in Indonesia, a close look at Reg 49 reveals that it really does little to move the market.

Under Reg 49, the requirement to obtain PLN's approval for the design and construction of the solar PV system is now expressly laid down in a regulation. However, even before the issuance of Reg 49, any customer who wanted to sell excess power to PLN would need to get PLN comfortable with the interface issues that existed before PLN agreed to buy.

Clearly the effective 35% discount on the power exported is a step back from the previous 2013 regime. But this discount arrangement (where the exported power is effectively priced at a lower value than the imported power) is in line with how other markets have dealt with the export of rooftop solar PV power.

With the continued decline of battery storage prices, in the long run it is possible that this regulation will ultimately play a significant role in the uptake of rooftop solar PV in Indonesia, as more consumers utilize batteries as a way to maximize their self-consumption of solar generated power.

ATTACHMENT

SAMPLES OF CALCULATION OF EXPORT/IMPORT ENERGY

1. Where the exported energy (after 35% discount) is lower than the imported energy from the PLN grid

Assuming a PLN customer with connected capacity of 200 kVA and tariff of IDR 1,200 /kWh in January

Energy calculation

- Export energy recorded in the meter = 10,000 kWh
- Credited export energy (65% × 10,000 kWh) = 6,500 kWh
- Import energy = 15,000 kWh

Minimum take-or-pay obligation

= 40 hours x connected capacity × PLN tariff/kWh
= 40 hours x 200 kVA × IDR 1,200
= IDR 9,600,000

Tariff payable for import kWh

= 15,000 kWh × IDR 1,200/kWh
= IDR 18,000,000

Maximum bill deduction in the relevant month

= Tariff payable for import kWh − minimum take-or-pay obligation
= IDR 18,000,000 − IDR 9,600,000
= **IDR 8,400,000**

Credited export energy (IDR)

= Credited export kWh PLN tariff/kWh
= 6,500 kWh × IDR 1,200/kWh
= IDR 7,800,000 → less than the cap of IDR 8.4 million

Amount paid by the customer to PLN (excluding the monthly fixed charge/*biaya beban* and parallel operation charges)

= [Tariff payable for import kWh + 3% tax (PPJ) + stamp duty] − export kWh (IDR)
= [IDR 18,000,000 + (3% × IDR 18,000,000) + IDR 6,000] − IDR 7,800,000
= IDR 18,546,000 − IDR 7,800000
= IDR 10,746,000

2. Where the exported energy (after 35% discount) is higher than the imported energy from the PLN grid

Assuming a PLN customer with connected capacity of 200 kVA and tariff of IDR 1,200/kWh in January

Energy calculation

- Export energy recorded in the meter = 20,000 kWh
- Credited export energy (65% × 20,000 kWh) = 13,000 kWh
- Import energy = 12,000 kWh

Minimum take-or-pay obligation

= 40 hours x connected capacity × PLN tariff/kWh
= 40 hours x 200 kVA × IDR 1,200
= IDR 9,600,000

Tariff payable for import kWh

= 12,000 kWh × IDR 1,200/kWh
= IDR 14,400,000

Maximum bill deduction in the relevant month

= Tariff payable for import kWh − minimum take-or-pay obligation
= IDR 14,400,000 − IDR 9,600,000
= **IDR 4,800,000**

Credited export energy (IDR)

= Credited export kWh × PLN tariff/kWh
= 13,000 kWh × IDR 1,200/kWh
= **IDR 15,600,000 → higher than the cap of IDR 4.8 million, so only IDR 4.8 million deduction can be applied in this month's bill.**

Amount paid by the customer to PLN (excluding the monthly fixed charge *Ibiaya beban* and parallel operation charges)

= [Tariff payable for import kWh + 3% tax (PPJ) + stamp duty] − maximum bill deduction
= [IDR 14,400,000 + IDR 432,000 + IDR 6,000] − IDR 4,800,000
= IDR 10,038,000

Remaining credit

= Export kWh (IDR) − maximum bill deduction
= IDR 15,600,000 − IDR 4,800,000
= IDR 10,800,000 → can be carried forward to February and March.

3. **Where the exported energy (after 35% discount) is lower than the imported energy from the PLN grid, and there is a remaining credit from the previous month**

Assuming a PLN customer with connected capacity of 200 kVA and tariff of IDR 1,200/kWh in March, with a remaining credit of IDR 11,000,000 from the previous month

Energy calculation

- Export energy recorded in the meter = 5,000 kWh
- Credited export energy (65% × 5,000 kWh) = 3,250 kWh
- Import energy = 20,000 kWh

Minimum take-or-pay obligation:
= 40 hours x connected capacity × PLN tariff/kWh
= 40 hours x 200 kVA × IDR 1,200
= IDR 9,600,000

Tariff payable for import kWh
= 20,000 kWh × IDR 1,200/kWh
= IDR 24,000,000

Maximum bill deduction in the relevant month
= Tariff payable for import kWh − minimum take-or-pay obligation
= IDR 24,000,000 − IDR 9,600,000
= **IDR 14,400,000**

Credited export energy (IDR)
= Credited export kWh × PLN tariff/kWh
= 3,250 kWh × IDR 1,200/kWh
= IDR 3,900,000

Credited export energy (IDR) + remaining credit from previous month
= IDR 3,900,000 + IDR 11,000,000
= IDR 14,900,000 → higher than the cap of IDR 14.4 million, so only IDR 14.4 million deduction can be applied in this month's bill. The remaining balance of IDR 500,000 cannot be carried forward to April.

Amount paid by the customer to PLN (excluding the monthly fixed charge *Ibiaya beban* and parallel operation charges)
= [Tariff payable for import kWh + 3% tax (PPJ) + stamp duty] − maximum bill deduction
= [IDR 24,000,000 + IDR 720,000 + IDR 6,000] − IDR 14,400,000
= IDR 10,326,000