***Analysis of Market Characteristics and Promotion Strategy of Rooftop PV in Indonesia***

[Fajar Nurrohman Haryadi, PT PLN (Persero) Research Institute, +622179973774, fajar.haryadi@pln.co.id]

[Dzikri Firmansyah Hakam, PT PLN (Persero) Research Institute, School of Business and Management ITB, dzikri.f@pln.co.id]

[Shochrul Rohmatul Ajija Faculty of Economics and Business, Airlangga University, shochrul-r-a@feb.unair.ac.id]

## Introduction

Solar panel technology achieved grid parity between 2013 and 2020 in some developed countries (Yan, Yang, Elia Campana, & He, 2019). The occurrence of grid parity means the time at which the kWh electricity costs generated by solar panels are the same as the costs generated from conventional electricity (R. Bhandari & Stadler, 2009). If this spreads to developing countries, it means that the potential for developing solar panels will be even higher in this year, including Indonesia. One of the parties that will be significantly affected is PLN as the state-owned electricity company.

With the grid parity, PLN needs to take action in dealing with this disruptive technology. PLN needs to enter the PV Rooftop market as an anticipation of the decline in sales of PLN's main business, namely conventional electricity due to the rapid growth of the PV Rooftop business. The reason behind the importance of PLN in entering the PV Rooftop market is that there has been an increase in PV Rooftop users by 36.7% since January 2019 in Jakarta (PLN, 2020). Moreover, PLN can encourage the acceleration of the target of achieving the use of the EBT level of 23% in 2025 and as a solution to meet customer demand for Green Energy. Because in reality, not all Indonesians consume conventional energy, some of them have switched to green energy. So, this is the right time for PLN to take a role to meet their needs. Based on this background, a more in-depth study is needed to analyze how the characteristics of the PV Rooftop market in Indonesia, the current position of PLN in the PV Rooftop market in Indonesia, and the benefits for each customer who installs PV Rooftop by knowing the amount of converted kWh savings.

 This study focuses in examining market characteristics and promotion strategy of rooftop pv in Indonesia. Based on the literature review conducted by the author, currently there are no research that analyzed the market characteristics and promotion strategy both in household and industry size especially in Indonesia. Therefore, this study is the first study that examines the characteristics and promotion strategy of rooftop pv in Indonesia.

## Methods

This research uses qualitative and quantitative approaches. The qualitative approach was carried out by means of focus group discussions, questionnaires, and in-depth interviews with related informants or resource persons. Qualitative research (semi-structured, in-depth interview) editors generalize the results of the entire population, but will have the aim of collecting data that supports the phenomenon under study (Neuman, 2014). While the quantitative approach is used to analyze data from the survey results using descriptive statistical analysis.

## Results and Conclusions

From 323 respondents, overall the largest respondents came from Jakarta, male, age range 21-30 years, has house which is located in the middle of the city, graduated from bachelor’s degree, has 4 household members, the majority work as entrepreneurs, monthly income is less than 5 million, has a form of an individual company, the type of business is service business, and the distance from the business location to the city center is as far as 1-5 kilometers. As for users of PV Rooftop Existing, both from the household and industry side, it shows that the largest respondents come from Bali and Jakarta.

The use of rooftop solar electricity or PV Rooftop can provide benefits in the form of savings, namely a reduction in electricity bills from PLN. Based on the results of the factor analysis, the reason why customers install PV Rooftop is due to cultural factors, environmental awareness, technological knowledge and loyalty. The consumer satisfaction of PV Rooftop users, both household and industrial, can be seen from several indicators, most of which show high satisfaction with the use of PV Rooftop. On the point of customer satisfaction, it is also clearly explained that 78% of respondents claim to be satisfied with the PV Rooftop services they have. The PV Rooftop business model plan that will be offered by PLN includes three packages, including the Sapphire, Ruby, and Emerald packages. Each package has different benefits and types of services. Based on the results of the SWOT analysis, PLN is in a very strong position because apart from having very good strength, PLN also has ample opportunities to expand the rooftop solar PV project. The strategy that can be applied in this condition is an aggressive strategy because PLN has a great opportunity to become a market leader. PLN can carry out an aggressive strategy by carrying out vertical integration and diversifying conglomerates.

## References

Neuman, W. L. (2014). Social Research Methods:Qualitative and Quantitative Approaches (Seventh). United States of America: Pearson Education Limited.

Bhandari, R., & Stadler, I. (2009). Grid parity analysis of solar photovoltaic systems in Germany using experience curves. Solar Energy, 83(9), 1634–1644. https://doi.org/10.1016/j.solener.2009.06.001

Yan, J., Yang, Y., Elia Campana, P., & He, J. (2019). City-level analysis of subsidy-free solar photovoltaic electricity price, profits and grid parity in China. Nature Energy, 4(8), 709–717. <https://doi.org/10.1038/s41560-019-0441-z>

Kaiser, H. F. (1960). Directional statistical decisions. Psychological Review. https://doi.org/10.1037/h0047595

Kobayakawa, T., & Kandpal, T. C. (2014). Photovoltaic micro-grid in a remote village in India: Survey based identification of socio-economic and other characteristics affecting connectivity with micro-grid. Energy for Sustainable Development, 18(1), 28–35. https://doi.org/10.1016/j.esd.2013.11.002

Lee, J., Chang, B., Aktas, C., & Gorthala, R. (2016). Economic feasibility of campus-wide photovoltaic systems in New England. Renewable Energy, 99, 452–464. https://doi.org/10.1016/j.renene.2016.07.009

Lupu, A. G., Dumencu, A., Atanasiu, M. V., Panaite, C. E., Dumitracu, G., & Popescu, A. (2016). SWOT analysis of the renewable energy sources in Romania - Case study: Solar energy. In IOP Conference Series: Materials Science and Engineering. https://doi.org/10.1088/1757-899X/147/1/012138Mulaik, S. A. (2010). Foundations of Factor Analysis, Second Edition. Chapman and Hall/CRC; 2 edition (September 25, 2009).

Nurunnabi, M., Roy, N. K., & Mahmud, M. A. (2018). Investigating the environmental and socioeconomic impacts of grid-tied photovoltaic and on-shore wind systems in Bangladesh. IET Renewable Power Generation, 12(9), 1082–1090. https://doi.org/10.1049/iet-rpg.2017.0751

PT PLN. (2020). Listrik Langit Biru PV Rooftop by PLN Disjaya.

Raupach-Sumiya, J. (2017). Marketing Renewable Energy in Japan (pp. 375–397). https://doi.org/10.1007/978-3-319-46427-5\_19

Rehman, S., Ahmed, M. A., Mohamed, M. H., & Al-Sulaiman, F. A. (2017). Feasibility study of the grid connected 10 MW installed capacity PV power plants in Saudi Arabia. Renewable and Sustainable Energy Reviews. https://doi.org/10.1016/j.rser.2017.05.218

Setyawati, D. (2020). Analysis of perceptions towards the rooftop photovoltaic solar system policy in Indonesia. Energy Policy, 144. https://doi.org/10.1016/j.enpol.2020.111569

Sommerfeld, J., Buys, L., & Vine, D. (2017). Residential consumers’ experiences in the adoption and use of solar PV. Energy Policy, 105, 10–16. https://doi.org/10.1016/j.enpol.2017.02.021