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The Role of *Electrifying Agriculture* Marketing in Electricity Sales, Customer Growth, and Power Addition at PLN ULP Lakawan

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Abstract

This study aims to analyze the influence of Electrifying Agriculture marketing on electricity sales, customer growth, and power addition at PT PLN (Persero) ULP Lakawan. The Electrifying Agriculture program is a marketing strategy for the productive sector that is directed to increase electricity utilization in the agricultural sector through economic value creation and operational efficiency. This research is based on Marketing Management Theory which emphasizes the importance of value creation and demand management in generating market responses. This study uses a quantitative approach with a survey method through the distribution of questionnaires to customers in the productive sector, especially the agricultural sector. The sampling technique used Stratified Random Sampling with a sample of 100 respondents determined using the Slovin formula. The data obtained was analyzed using the Structural Equation Modeling method based on Partial Least Squares (SEM-PLS). The results of the study show that Electrifying Agriculture marketing has a positive and significant effect on all dependent variables. The influence on electricity sales has a coefficient of 0.819 with a t-statistic value of 13.001 and a p-value of 0.000. The influence on customer growth has a coefficient of 0.730 with a t-statistic value of 8.610 and a p-value of 0.000. Meanwhile, the effect on power addition has a coefficient of 0.802 with a t-statistic value of 10.057 and a p-value of 0.000. The conclusion of this study shows that Electrifying Agriculture marketing plays a strategic role in increasing electricity consumption in the agricultural sector, expanding the customer base, and encouraging an increase in customer power capacity at PLN ULP Lakawan.

Keywords: Electrifying Agriculture Marketing, Electric Power Sales, Customer Growth, Power Addition, SEM-PLS

1. Introduction

The development of renewable energy is also necessary, as Indonesia has committed to achieving net-zero emissions (NZE) by 2060 or sooner in accordance with the Updated Nationally Determined Contributions document, which requires a significant transformation in the energy mix through green technologies. Currently, Indonesia still relies on fossil fuels to meet its energy demand for power generation. Coal, natural gas, and oil have the highest portions of around 87% according to a report in 2019. The use of renewable energy accounts for only a small portion of about 13% of Indonesia's total national energy generation, although Indonesia is in an area with great potential and extensive resources for solar, wind, geothermal, and hydroelectric energy. Solar energy has the greatest potential among renewable energy sources. Indonesia's geographical position brings great potential for solar energy, with an average daily solar radiation of 4.8 kWh/m² and around 1,752 kWh/m²/year [1].

The development of information technology encourages various companies, including State-Owned Enterprises (SOEs), to improve the efficiency and quality of services to the community. In the electricity supply sector, improving service quality is an important factor in supporting customer growth and electricity energy consumption. Along with the increasing national electricity demand, especially from the industrial and productive sectors, the number of PLN customers experienced a year-on-year growth of 4.4% to reach 79 million customers in the 2010-2020 period [2]. This growth shows a significant expansion of energy needs, so that improving the quality of services and marketing strategies is an important aspect in encouraging the optimization of electricity utilization, including in the agricultural sector, through programs such as *Electrifying Agriculture.*

PLN ULP Lakawan is a service unit located in an area with agrarian characteristics and dominated by household customers and small-scale productive sectors. This condition makes ULP Lakawan have great potential in the development of *the Electrifying Agriculture (EA)* program. However, empirically, there are several phenomena that show that this potential is not fully optimal. Next Graph of the number of customers of PLN ULP Lakawan on Figure 1.

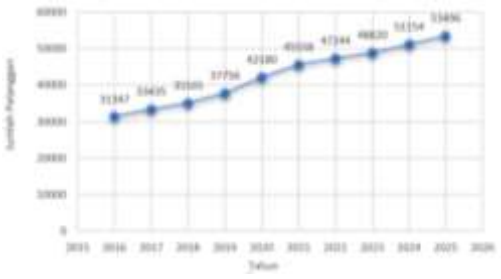

Figure 1.Graph of the number of customers of PLN ULP Lakawan

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Based on the graph of the number of customers of PT PLN (Persero) ULP Lakawan for the 2016-2025 period, there is a consistent trend of customer growth from year to year. In 2016, the number of customers was recorded at 31,347 customers and continued to increase to 33,435 customers in 2017 and 35,165 customers in 2018. This growth continued in 2019 with the number of customers reaching 37,756. A significant increase occurred in 2020, where the number of customers jumped to 42,180 customers. Furthermore, the number of customers continues to increase to 45,558 customers in 2021, 47,244 customers in 2022, 48,820 customers in 2023, 51,154 customers in 2024, to reach 53,496 customers in 2025 [3]. In addition to the growth in the number of customers, the growth of electric power sales and power additions also shows an upward trend over the past five years, as seen in the following Table 1.

Table 1. Growth in Power Addition and Electricity Sales 2021-2025

Year	Total Power Gain (VA)	Total Sales (kWh)	Total Sales (Rp)
2021	45.282.800	38.388.990	32.984.187.956
2022	48.651.000	38.805.282	37.992.022.983
2023	52.209.300	38.062.741	37.888.433.796
2024	57.392.800	44.435.437	44.915.728.383
2025	62.526.300	48.307.183	44.652.323.249

Based on the table, it can be seen that the total power addition increased from 45,282,800 VA in 2021 to 62,526,300 VA in 2025. Similarly, total electricity sales increased from 38,388,990 kWh to 48,307,183 kWh in the same period. In general, this data shows a growth in the need for electrical energy in the Lakawan area. However, this increase does not specifically reflect the contribution of the agricultural sector as the focus of the *Electrifying Agriculture program*. Although the data shows an increase in the total addition of power and electricity sales in aggregate, the increase does not automatically reflect the optimization of electricity consumption in the productive sector, especially the agricultural sector as the focus of the program *Electrifying Agriculture*. Structurally, this growth still has the potential to be dominated by the non-productive sector, so the contribution of the agricultural sector to improving unit performance has not been fully optimal. Research conducted on ULP Lakawan shows that the implementation of organizational strategies still tends to be top-down and is not completely based on local needs [4]. This has an impact on the lack of optimal adaptation of strategic programs to the socio-economic conditions of the service area. In context *Electrifying Agriculture*, this condition can cause the marketing approach used to be not fully in accordance with the characteristics of farmers, agricultural MSME actors, and other productive customers in the Lakawan area.

Research conducted at PT PLN ULP Lakawan Enrekang Regency shows that the level of satisfaction of postpaid electricity customers based on the *Customer Satisfaction Index (CSI)* reached 84.48% which is included in the category of very satisfied [5]. Nevertheless, the results of the analysis *Importance Performance Analysis (IPA)* In the study, it was revealed that there are still service attributes that are priority for improvement, especially in the aspect of the appearance of officers who use official identification cards and the ease of customers in contacting PLN when complaints occur [5]. This condition shows that there is a gap between the level of importance and the actual performance of services at ULP Lakawan. This phenomenon becomes important in the context of marketing *Electrifying Agriculture*, because the success of increasing electricity sales, customer growth, and power addition is not only determined by promotional strategies and offering economic value to the agricultural sector, but also greatly influenced by customer perception of service quality and ease of access to communication with ULP. Thus, even though the level of customer satisfaction in general is relatively high, there is still room for service improvement that has the potential to affect the effectiveness of productive electricity marketing in the PLN ULP Lakawan area.

Previous research on PLN ULP East Medan shows that promotional factors, customer needs, and power addition programs have an effect on increasing electricity sales. This confirms that marketing strategies have a real contribution to the growth of electricity consumption. Meanwhile, research conducted by [6] about the implementation of the Program *Electrifying Agriculture* at PT PLN (Persero) UP3 Parepare shows that the program has a positive influence on increasing electricity sales, although it does not directly impact the company's performance, but through increasing sales as an intermediate variable.

Research on other ULPs shows that the quality of service greatly determines the satisfaction and performance of the unit [7] [8]. If associated with Lakawan, then the quality of service and marketing strategy are inseparable factors in improving sales performance. If the service is not optimal or the marketing approach has not touched the real needs of farmers and agricultural business actors, then the *Electrifying Agriculture* It has the potential to be just an administrative program with no significant impact on increased sales and increased power. This study uses Marketing Management Theory as the main theoretical foundation in explaining the relationship between marketing strategies *Electrifying Agriculture* with increased power sales, customer growth, and power addition. This theory was developed by [9] which explains that marketing is a social and managerial process in which individuals and groups obtain what they need and want through the creation, offering, and exchange of value.

According to [10], marketing management carries out all marketing functions with the aim of generating satisfaction for the parties involved, both consumers and organizations. Marketing management is basically demand management that seeks to create and manage demand from various diverse consumer desires. The concept of marketing states that the key to achieving organizational goals is to satisfy the needs and wants of

the target market. These needs and desires are met by marketers through the creation of products or services that are able to provide value and benefits, so that consumers' lives become easier and more efficient. Marketing management occurs when at least one party in the potential exchange process actively thinks about and designs a means to get the desired response from the other party.

Based on Marketing Management Theory, this study views that the success of the *Electrifying Agriculture* program is not only determined by the availability of electricity infrastructure, but also by the effectiveness of marketing strategies in building value perceptions and encouraging customer decisions to use and increase the utilization of electricity. Therefore, this theory is the conceptual basis for analyzing the relationship between *Electrifying Agriculture* marketing and electricity sales, customer growth, and power addition at PLN ULP Lakawan.

The main contribution of this study is to empirically test the extent of the marketing role of *Electrifying Agriculture* in increasing electricity sales, customer growth, and additional power at PLN ULP Lakawan as an operational unit of electricity service providers in agricultural areas. This study seeks to explain how the marketing strategy of the productive sector, especially in the agricultural sector, is able to encourage an increase in electricity consumption and strengthen sales performance at the customer service unit level. In addition, this study also examines the extent to which increasing electricity sales plays a role as a mechanism that bridges the implementation of *the Electrifying Agriculture* program with improving unit operational performance, especially in the form of customer growth and increased power.

2. Research Methods

This study uses four variables, namely one independent variable and three dependent variables. The free variable in this study is Electrifying *Agriculture* (X) Marketing. The bound variables in this study consisted of Electricity Sales (Y1), Customer Growth (Y2), and Power Addition (Y3). This research is a quantitative research with an explanatory approach, which aims to explain the causal relationship between *Electrifying Agriculture* marketing to electricity sales, customer growth, and power addition at PLN ULP Lakawan. The explanatory approach is used because this study seeks to test the direct influence of independent variables on dependent variables empirically through hypothesis testing.

This research was carried out at PLN ULP Lakawan which is under the Customer Service Implementation Unit (UP3) of the relevant work area. The research objects are agricultural sector customers and customers involved or potentially involved in the *Electrifying Agriculture program*, as well as sales performance data and power addition in the Lakawan ULP area. Population is a generalized area consisting of objects or subjects that have certain qualities and characteristics that are determined by researchers to be studied and then conclusions are drawn [11]. The population in this study is all PLN ULP Lakawan customers who are actively registered, both household, business, and productive sector customers, with a total of 53,496 customers. This population was chosen because all of these customers have the potential to be targeted for program implementation and development *Electrifying Agriculture* and contributing to the sale of electricity and additional power in the Lakawan ULP area. The determination of the number of samples in this study uses the Slovin formula, as explained by [12], which is used to calculate the minimum sample count when the characteristics of the population are not yet known for sure. The sample size is determined based on the error rate (*Error Rate*) set, where the smaller the error rate used, the greater the number of samples required. The Slovin formula is:

$$\boldsymbol{n} = N / (1 + N \times e^2)$$

Description n = sample size; N = population size 53,496 Customers; e = tolerable error rate (e.g. 10%). The results of the calculation showed that the number of samples was 99.8, which was then rounded to 100 respondents. Thus, the number of samples used in this study is 100 PLN ULP Lakawan customers. This number is considered representative to describe the condition of the population with an error rate of 10%. The sampling technique in this study uses probability sampling techniques with a simple random sampling approach, so that each customer has the same opportunity to be selected as a respondent. In this study, a questionnaire will be distributed to customers who meet the research criteria, especially customers who know or have been exposed to *the Electrifying Agriculture* program and power uptake services, so that they can provide relevant information related to the role *of Electrifying Agriculture* marketing in electricity sales, customer growth, and power addition at PLN ULP Lakawan.

After the sample number is determined, the sampling technique used is probability sampling with *the Stratified Random Sampling* approach. This technique was chosen because the agricultural sector customer population has inhomogeneous characteristics, both in terms of business type and connected power capacity. Therefore, the population is first divided into several strata based on these characteristics, then the number of samples is distributed proportionally to each strata. Furthermore, respondents in each strata are selected at random so that each customer in their group still has the same opportunity to be selected as a respondent.

In this study, hypothesis testing was carried out with equations *Structure Equation Modeling (SEM)* assisted in using SmartPLS as software to calculate the relationship between variable indicators. SEM using SmartPLS explains whether there is a relationship between research variables. The results obtained from the test hypothesis are temporary. In this study, hypothesis testing was carried out for direct and

indirect hypotheses. The results of the test hypothesis can be seen directly from the coefficient of the one-way path between the constructions connected by the arrow lines. The statistical test used is the T-test using the provisions of the One Tail Test. Meanwhile, the results of indirect statistical tests can be done by bootstrap procedure on SmartPLS. The parameters of the test results can be viewed indirectly from the table of indirect effects and total effects on SmartPLS automatically [13].

3. Results and Discussion

Evaluation of measurement models (*Outer model*) is used to determine whether the data that has been collected from respondents has met the validity and reliability requirements based on the relationship between indicators and variables. The following is an image of the outer model in this study using *Software* SmartPLS 4.0 on Figure 2.

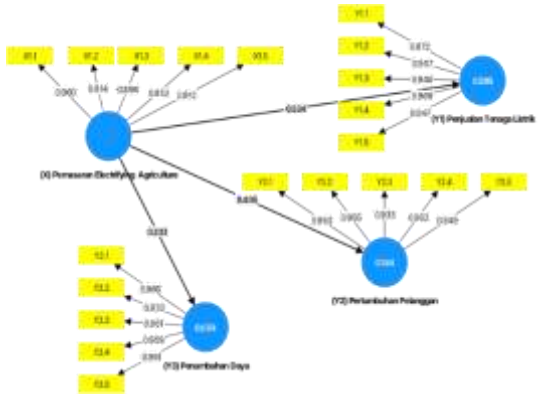

Figure 2. Outer Model

Based on the results of the measurement model test, all indicators in each variable show an outer loading value above the minimum limit of 0.70 so that it is declared to meet the criteria of convergent validity. A high loading value indicates that each indicator is able to reflect its construct strongly and consistently. Thus, all indicators in the variables of Electrifying Agriculture Marketing (X), Electricity Sales (Y1), Customer Growth (Y2), and Power Addition (Y3) were declared valid and suitable for use in further analysis. Next Construct Reliability and Validity on Table 2.

Table 2. *Construct Reliability and Validity*

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
(X) Marketing of Electrifying Agriculture	0,919	0,921	0,939	0,756
(Y1) Electricity Sales	0,919	0,923	0,939	0,754
(Y2) Customer Growth	0,923	0,927	0,942	0,765
(Y3) Power Addition	0,914	0,917	0,936	0,745

Based on the results of the measurement model test, all indicators in each variable show an outer loading value above the minimum limit of 0.70 so that it is declared to meet the criteria of convergent validity. A high loading value indicates that each indicator is able to reflect its construct strongly and consistently. Thus, all indicators in the variables of Electrifying Agriculture Marketing (X), Electricity Sales (Y1), Customer Growth (Y2), and Power Addition (Y3) were declared valid and suitable for use in further analysis.

The results of the reliability and validity test of the construct show that all variables in this study have met the criteria required in the SEM-PLS analysis. The Electrifying Agriculture (X) Marketing variable has a Cronbach's Alpha value of 0.919, Composite Reliability (rho_a) of 0.921, and Composite Reliability (rho_c) of 0.939, with an Average Variance Extracted (AVE) value of 0.756. All of these values are above the minimum limit of 0.70 for reliability and 0.50 for AVE, so the construct is declared to be very reliable and has good convergent validity. The Electricity Sales variable (Y1) showed Cronbach's Alpha value of 0.919, Composite Reliability (rho_a) of 0.923, and Composite Reliability (rho_c) of 0.939, with AVE of 0.754. This value shows that the indicators in the Y1 variable have a very strong internal consistency and are able to explain the construct variance optimally.

Furthermore, the Customer Growth (Y2) variable has a Cronbach's Alpha value of 0.923, Composite Reliability (rho_a) of 0.927, and Composite Reliability (rho_c) of 0.942, and an AVE value of 0.765. These values indicate an excellent level of reliability and validity. The Power Addition variable (Y3) also showed very adequate results, with Cronbach's Alpha value of 0.914, Composite Reliability (rho_a) of 0.917, and Composite Reliability (rho_c) of 0.936, and AVE value of 0.745. Based on these results, it can be concluded that all constructs in this study are declared reliable and valid, so they are suitable for use in structural model testing and hypothesis testing. Next R square on Table 3.

Table 3. *R Square*

	R-square
(Y1) Electricity Sales	0,671
(Y2) Customer Growth	0,532
(Y3) Power Addition	0,644

The results of the structural model test showed that the R-square value for the Electricity Sales variable (Y1) was 0.671, which means that 67.1% of the variation in electricity sales could be explained by the Electrifying Agriculture Marketing variable. The remaining 32.9% was influenced by factors outside the research model. The R-square value for the Customer Growth (Y2) variable is 0.532, which indicates that 53.2% of the variation in customer growth can be explained by Electrifying Agriculture's marketing, while 46.8% is influenced by other variables. Meanwhile, the R-square value for the Power Addition variable (Y3) is 0.644, which means that 64.4% of the variation in power addition can be explained by Electrifying Agriculture marketing. The remaining 35.6% was influenced by other factors outside the research model.

Hypothesis testing in this study was carried out using

the bootstrapping method on the SEM-PLS model to determine the significance of the relationship between variables. The test results showed that all relationships between variables had a p-value of less than 0.05, so it could be statistically significant. Next Bootstrapping on Table 4.

Table 4. *Bootstrapping*

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
(X) Electrifying Agriculture Marketing -> (Y1) Electricity Sales	0,819	0,823	0,063	13,001	0,000
(X) Marketing Electrifying Agriculture -> (Y2) Customer Growth	0,730	0,732	0,085	8,610	0,000
(X) Marketing Electrifying Agriculture -> (Y3) Power Addition	0,802	0,802	0,080	10,057	0,000

Based on the results of the analysis, Electrifying Agriculture (X) Marketing has a positive and significant effect on Electricity Sales (Y1) with a line coefficient value (Original Sample) of 0.819, a t-statistic value of 13.001, and a p-value of 0.000. The positive coefficient value shows that the more effective the marketing of Electrifying Agriculture, the more electricity sales at PLN ULP Lakawan will increase. Furthermore, Electrifying Agriculture Marketing also has a positive and significant effect on Customer Growth (Y2) with a coefficient value of 0.730, a t-statistical value of 8.610, and a p-value of 0.000. These results show that an effective marketing strategy in the Electrifying Agriculture program is able to encourage an increase in the number of customers in the agricultural sector.

In addition, Electrifying Agriculture Marketing has a positive and significant effect on Power Addition (Y3) with a coefficient value of 0.802, a t-statistic value of 10.057, and a p-value of 0.000. These findings show that the successful marketing of the Electrifying Agriculture program not only has an impact on increasing sales and number of customers, but also encourages customers to increase their electric power capacity according to the operational needs of agricultural businesses. Based on these results, it can be concluded that all hypotheses in this study are accepted, because the t-statistical value is greater than 1.96 and the p-value is less than 0.05. This shows that Electrifying Agriculture Marketing has a positive and significant influence on Electricity Sales, Customer Growth, and Power Addition at PLN ULP Lakawan.

The Influence of Electrifying Agriculture Marketing on Electricity Sales. The results of the study show that Electrifying Agriculture Marketing has a positive and significant effect on Electricity Sales. These findings further strengthen the relevance of Marketing Management Theory which emphasizes that organizations create value through strategies that are able to meet customer needs and generate market response in the form of increased purchases. From a marketing management perspective, the success of a marketing strategy is reflected in the increase in sales volume in response to the perceived benefits of customers. The results of this study show that effective Electrifying Agriculture marketing is able to increase the electricity consumption of the agricultural sector, so that the first hypothesis (H1) is declared acceptable and supports the basic assumptions of marketing management theory regarding the importance of value creation in driving demand.

This research is in line with [14], which states that the increase in the number of customers and energy consumption is the main indicator of electricity distribution performance. In addition, [15] It shows that the expansion of electricity access in rural areas significantly increases energy demand and electricity consumption volume. In the context of Electrifying Agriculture, marketing strategies that emphasize cost efficiency, ease of service, and increased agricultural productivity have been proven to be able to increase the intensity of electricity use.

However, the results of this study differ from several studies that state that the increase in electricity sales is more influenced by macro factors such as economic growth, electricity tariffs, and distribution network expansion, rather than by direct marketing strategies. This difference can be explained by the context of research focusing on the productive sector of agriculture at the customer service unit (ULP) level. In this context, a marketing approach that is directed at the real needs of farmers is a strategic factor so that its influence on electricity sales becomes more real.

The Influence of Electrifying Agriculture Marketing on Customer Growth. The results of the study show that Electrifying Agriculture Marketing has a positive and significant effect on Customer Growth. These findings are in line with Marketing Management Theory which emphasizes that effective market penetration and value communication strategies are able to increase awareness, interest, and decision of potential customers. In this perspective, marketing not only aims to increase sales, but also expand the customer base through value creation and ease of access to services. With the acceptance of the second hypothesis (H2), this study strengthens the relevance of marketing management approaches in driving the growth of productive sector customers.

This research is in line with [16], which shows that customer growth contributes to the improvement of the stability and performance of the power distribution unit. It also states that the number of subscribers is a key indicator of service expansion and successful market penetration [14]. In the context of Electrifying Agriculture, the ease of new installations, program

socialization, and the delivery of productive electricity benefits have been proven to be able to attract new customers from the agricultural sector.

The Influence of Electrifying Agriculture Marketing on Power Addition. The results of the study show that Electrifying Agriculture Marketing has a positive and significant effect on Power Addition. Although the value of the coefficient of influence is smaller than the other variables, this result still shows statistical significance. These findings are in line with Marketing Management Theory which states that the success of a marketing strategy is not only measured by the acquisition of new customers, but also by the increase in the intensity of product use by existing customers. In the context of electricity, the increase in the intensity of use is reflected in the customer's decision to make power additions. With the acceptance of the third hypothesis (H3), this study strengthens the view that effective marketing is able to encourage an increase in energy consumption capacity.

The concept of electrification in the agricultural sector has also received significant attention. [17] In its systematic review explained that *Electrifying Agriculture* It is a sustainable approach that is able to increase agricultural productivity, energy efficiency, and the economic value of farming. The agricultural electrification program is considered not only to have a technical impact, but also to encourage changes in energy consumption behavior in the agricultural sector [18], Emphasizing that the use of electricity in farmers' households is directly correlated with the scale of business and the level of agricultural productivity. This means that the greater the agricultural production activity, the higher the demand and consumption of electricity used. These findings reinforce the argument that marketing strategies that encourage productive electricity utilization will have an impact on increasing energy demand in a sustainable manner. Thus, marketing *Electrifying Agriculture* In this study, it is positioned as an independent variable that plays a role in influencing the consumption behavior of customers in the agricultural sector, which ultimately has an impact on electricity sales, customer growth, and power addition at PLN ULP Lakawan. This research is in line with [19] [20], which shows that increased customer economic activity correlates with increased connected power. When customers feel the productivity benefits of using electricity in agricultural activities, the need for power capacity will increase as the scale of the business grows.

4. Conclusion

Based on the results of research and discussion on the influence of Electrifying Agriculture Marketing on Electricity Sales, Customer Growth, and Power Addition at PLN ULP Lakawan, it can be concluded as follows Electrifying Agriculture Marketing has a positive and significant effect on Electricity Sales. This shows that an effective marketing strategy, through ease of service, socialization of the benefits of productive electricity, and offering economic value to the agricultural sector, is able to increase the consumption of electrical energy (kWh). When customers feel operational efficiency and increased business productivity, there is an increase in the intensity of electricity use which has a direct impact on increasing the volume of electricity sales at PLN ULP Lakawan. Electrifying Agriculture Marketing has a positive and significant effect on Customer Growth. These findings show that marketing strategies aimed at the productive sector of agriculture are able to expand the customer base through market penetration and value creation. The ease of new installations, the delivery of program benefits, and approaches that are in accordance with the characteristics of the agricultural area contribute to the increase in the number of agricultural sector customers at PLN ULP Lakawan. Electrifying Agriculture Marketing has a positive and significant effect on Power Addition. This shows that marketing strategies are not only able to attract new customers, but also encourage existing customers to increase their connected power capacity in response to the increased operational needs of the business. Although the effect is relatively small compared to sales and customer growth, these results still show that marketing has contributed to the increase in the intensity of energy consumption of the productive sector. Overall, this study shows that the success of increasing electricity sales, customer growth, and power addition at PLN ULP Lakawan is not only determined by the availability of electricity infrastructure, but also greatly influenced by the effectiveness of the marketing strategy of the productive sector. Marketing Management Theory, which emphasizes value creation and demand management, has proven to be relevant in explaining the increase in electricity consumption in the agricultural sector through the Electrifying Agriculture Program.

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