

# Service Quality Improvement Using Lean Six Sigma: Case Study of PT PLN (Persero) Unit Layanan Pelanggan (ULP) Perbaungan

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## ABSTRACT

PT PLN (Persero) ULP Perbaungan as a provider of electricity must be able to provide service quality that meets customer wants and needs. Service improvement can be done by analyzing identification of the causes of critical to quality and making improvements. The methodology used in improving service quality is lean six sigma with the DMAIC principle (Define, Measure, Analyze, Improve and Control). Define stage is used to determine critical to quality, measure to calculate gap service quality, baseline variables and attributes, sigma level and DPMO (Defects Per Million Opportunities), analyze is done to find the root cause that becomes waste. After determining the attributes that become the highest waste three gaps and the largest DPMO, the small sigma level is then improved in improving the quality of service to customers. Sigma level measurement using the lean six sigma method shows that the level is still at 2.67 and is still far from the 6 sigma target with a DPMO value of 121011.69. Detail dimensions of service quality in the main priority hierarchy are improved based on the calculation of the smallest sigma value, the highest DPMO, the biggest negative gap between satisfaction and expectation is starting from the first reliability, followed by responsiveness, then assurance, empathy, and finally tangible, while attributes are being the three main priorities to be repaired is electricity is rarely extinguished at my location, then the attributes of PLN officials quickly overcome the disturbances that occur, then the PLN always notifies information before a power outage is carried out.

**Keywords:** Service Quality, Lean Six Sigma, DMAIC, DPMO

## INTRODUCTION

According to Kasali (2017), in his book on "Disruption" states that at present all industries are fighting against new opponents who enter with a business model that is different from what has been so far. They move in unique, invisible patterns, directly from door to door consumers (online), and unconsciously their sudden growth is large and even very large. PT PLN (Persero) is the largest state-owned enterprise in Indonesia that provides electricity business for the public interest.

Based on Law No. 30 of 2009 concerning Electricity, the position of PLN is no longer the Holder of the Electricity Business Authority (PKUK), but currently only as a Holder of Electricity Business License (PIUTL) for public interests where BUMN is given the first priority (first right of refusal) electricity. The consequence of this rule is that PLN is no longer an electricity monopoly company and new competitors will emerge that can disrupt the stability of the National Electric Company. Maintaining the continuity of the business process of

PLN must be able to maintain the quality of service in delivering electricity to customers.

Gasperz (2011) states that the key to competition in the global market is total quality, which in this case includes emphases on product quality, cost / price quality, service quality (service quality), quality of delivery (delivery quality), quality of spirit (morale quality) and possibly other forms of quality that continue to grow in order to provide continuous satisfaction to customers so as to create customer loyalty. In the service industry, service quality is known.

In serving PLN customers Perbaungan has not been able to carry electricity continuously because there is still a blackout. Table 1.1 shows Customer Report data due to outages entering the system via Call Center 123. Complaints that enter the system occur because there is a problem in the PLN network that supplies the customer's electricity needs. Of all complaints that have been 100% resolved but there are still those that exceed the Service Level Agreement (SLA) specified. SLA for response time is 45 minutes while recovery time is 180 minutes.

**Table 1 Response and Recovery Time Customer Complaints Due to 2017 Outages**

NO	Month	Report				Response Time							Settlement					
		Total	Already Complete		Not Finished		Hour				Report	Total	Hour				Report	
			Total	%	Total	%	Total	Average	Maximum	Minimum			>SLA?SLA	Total	Average	Maximum		Minimum
1	JANUARY	57	57	100%	0	0%	57	67.4	0-06:42:00	0-00:01:24	16	41	57	78.49	0-06:45:45	0-00:06:09	9	48
2	FEBRUARY	35	35	100%	0	0%	35	14.8	0-01:40:50	0-00:01:09	1	34	35	25.89	0-01:49:34	0-00:01:48	0	35
3	MARCH	38	38	100%	0	0%	38	12.8	0-00:45:17	0-00:01:04	0	38	38	18.24	0-01:07:05	0-00:02:10	0	38
4	APRIL	49	49	100%	0	0%	49	11.1	0-01:13:04	0-00:01:09	2	47	49	19.59	0-01:53:17	0-00:02:59	0	49
5	MAY	60	60	100%	0	0%	60	16.1	0-05:56:00	0-00:00:48	2	58	60	20.32	0-05:57:13	0-00:01:34	1	59
6	JUNE	50	50	100%	0	0%	50	17.9	0-01:28:45	0-00:00:41	7	43	50	23.18	0-01:56:12	0-00:02:01	0	50
7	JULY	25	25	100%	0	0%	25	13.6	0-00:49:30	0-00:03:13	1	24	25	19.08	0-00:51:13	0-00:04:31	0	25
8	AUGUST	21	21	100%	0	0%	21	14.1	0-01:07:04	0-00:04:04	1	20	21	20.9	0-01:07:30	0-00:06:12	0	21
9	SEPTEMBER	51	51	100%	0	0%	51	14.7	0-02:54:40	0-00:01:42	1	50	51	21.31	0-02:55:22	0-00:01:53	0	51
10	OCTOBER	54	54	100%	0	0%	54	17.0	0-00:53:20	0-00:00:48	3	51	54	22.37	0-01:22:17	0-00:01:49	0	54
11	NOVEMBER	49	49	100%	0	0%	49	22.6	0-03:04:10	0-00:02:08	4	45	49	30.47	0-03:05:40	0-00:02:31	1	48
12	DECEMBER	54	54	100%	0	0%	54	19.0	0-01:37:27	0-00:00:48	2	52	54	23.8	0-01:38:12	0-00:02:13	0	54
	TOTAL	543	543	100%	0	0%	543	20.1	0-06:42:00	0-00:00:41	140	503	543	26.97	0-06:45:45	0-00:01:34	11	532

**Source: Integrated Complaints and Complaints Application (APKT) PLN**

During 2017 there were 543 complaints. Complaints that are responded to under 45 minutes are 503 customers while over 45 minutes are 40 customers. Complaint resolution under 180 minutes 532 customers while over 180 minutes as many as 11 customers. Identifying the voice of the customer (Voice of the Customer) in the process of determining the quality improvement program is recommended mapping the process through information and product flow from suppliers to customers. To improve service quality, service levels / levels need to be measured. Measuring the level of service quality is done through lean six sigma. According to Firdian et al. (2012) service quality of PT PLN (Persero) Dinoyo Malang Network Service Unit (UPJ) still reaches level 2 sigma so that it is still far from the

expectation of 6 sigma. In connection with the above problems, then some basic questions to find answers are customer satisfaction with service quality at PT PLN (Persero) ULP Perbaungan. The purpose of this study is to analyze service quality and analyze the attributes that need to be developed PT PLN (Persero) ULP Perbaungan in formulating policies that must be done in an effort to improve service quality with lean six sigma.

**LITERATURE REVIEW**

Conceptually lean six sigma can be applied to both goods and services, because what is emphasized in the application of lean six sigma is the improvement of the quality system through eliminating any waste in the process so as to increase added value and provide satisfaction to customers.

Thus what needs to be considered in the development of quality systems in the process of improving services is on the development of a quality system consisting of: quality system design and planning, quality system control, and quality system improvement.

### **Dimensions of Service Quality**

In the research conducted by Parasuraman, Zeithaml, and Berry in 1988 there were 5 (five) dimensions of service quality which were later better known as Service Quality (Servqual), including:

1. Tangibles (physical evidence), namely matters relating to the attraction of physical facilities, equipment, and materials used and can be seen directly by the customer.
2. Reliability (i.e.), namely the ability to provide accurate and reliable services since the first time delivering services to customers.
3. Responsiveness, namely the willingness and readiness of service providers to help customers responsively, and be able to deal with customer complaints quickly.
4. Assurance (guarantee), namely ability, politeness, credibility and security to customers from personnel serving customers.
5. Empathy (empathy), namely the willingness to understand customer needs, act in the interests of customers, and the attention to customers.

The five dimensions of service quality are generally dimensions perceived by customers when a service is provided by a service provider.

### **Lean Six Sigma**

Lean Six Sigma is a combination of lean and six sigma which can be defined as a business philosophy, systemic and systematic approach to identifying and eliminating waste or non-value added activities through continuous radical improvements to reach the level of six sigma, by flowing products and information using a pull system from internal and external customers to pursue excellence and

perfection in the form of only producing 3.4 defects for every one million opportunities or operations. Lean and Six Sigma integration will improve business and industry performance through increased speed and accuracy. The lean approach aims to reveal Non Value Added and Value Added and make Value Added flow smoothly throughout the value stream processes, while Six Sigma will reduce the variation of Value Added (Gaspersz, 2011).

From a measurement perspective, six sigma represents a level of quality where the most errors are 3.4 defects per million possibilities. If the company has reached level 6 sigma, it means that in the process there is an opportunity for disability or making mistakes 3.4 times out of 1,000,000 possibilities. The methodology used in improving service quality is lean six sigma with the DMAIC principle (Define, Measure, Analyze, Improve and Control). Define stage is used to determine critical to quality, measure to calculate service quality gap, baseline variables and attributes, level sigma and DPMO, analyze is done to find the root cause that becomes waste.

### **MATERIAL AND METHODS**

Research on improving service quality by using lean six sigma was carried out at PT PLN (Persero) ULP Perbaungan. The study was conducted in October 2018 to April 2019.

The population of the region has a group of customers consisting of Households (R), Social (S), Business (B), Industry (I), Government (P), Traction (T), Bulk (C) and Special Services (L ) totaling 50,839. In Table 3.1 below shows the population and sample numbers in the Distribution Area for the customer groups R, S, B, I and P. According to the Krejcie-Morgan table for the number of samples with a population of 50,839 are 382 samples (Krejcie & Morgan, 1970) with a level of trust 95%. Rule of thumb made by Roscoe (1975) states that the number of samples 30 to 500 is suitable for all studies. The Krejcie-Morgan table form is very simple, easy to use, because

functionally it only consists of two important columns, namely columns for population size (N) and columns for sample size (n). PLN customer sampling for the R, S, B, I and P categories uses the Proportionate Stratified Random Sampling. So that the number of samples taken in this study is a minimum of 384 respondents.

The type of data used in this study is primary data, which is in the form of data obtained from respondents' answers examined in various questions. Primary data collection is obtained through surveys of PLN customers through the distribution of questionnaires. And Secondary data through documentation studies, namely collecting and studying the data that has been available through the Integrated Customer Service Application system (AP2T) and the Complaints and Complaints Application Complaints (APKT) PLN.

## RESULTS AND DISCUSSION

### Validity Test Results and Reliability Test

The test results for the validity of the question items for the 30 questionnaires that have been distributed to respondents are valid because they have a calculated r value  $(0.377-0.789) > r$  table  $(0.361)$ . The results of the reliability testing show that all variables in the study have a fairly large Cronbach Alpha coefficient  $(0.654-0.832)$  which is  $> 0.60$  so that all measuring concepts for each variable from the questionnaire are reliable, which means that the questionnaire used in this study is reliable questionnaire.

### Analysis Results based on Dimensions

The value of the gap between expectations and satisfaction from customers of PT PLN (Persero) ULP Perbaungan on the reliability dimension has the largest negative gap value which is  $-0.594$  as shown in Table 4.4. This means that the dimensions of reliability still cannot meet consumer expectations and need to take steps to improve the process.

### Gap analysis seen from attributes

The attributes that show the biggest gap are in Rel17, Rel20 and R13, namely electricity is rarely extinguished at my location, PLN

officers are quick to deal with the disturbances that occur, and the PLN always notifies information before a power outage is carried out. The biggest gap value in the tangibles dimension is attribute T1 or question T1, namely the National Electricity Company (PLN) which has modern equipment of  $-0,543$ . Whereas the attribute with the smallest gap value is the question T5, that is, the PLN service is carried out according to the promised time of  $-0.250$ .

The biggest gap value of empathy attribute is the question E9, namely PLN considering the desires and needs of customers of  $-0,578$ . While the smallest gap value is the question E7, namely PLN has pleasant operating hours as needed at  $-0.360$ .

The biggest gap value of the responsiveness attribute is the R13 attribute, namely the PLN officer is quick to deal with the disturbances that occur at  $-0.813$ . While the smallest gap value is the attribute R12, namely PLN officers are always ready to help at  $-0.375$ .

The biggest gap value for reliability attributes is the REL17 attribute, that is, electricity is rarely extinguished at my location of  $-0.885$ . While the smallest gap value is the REL15 attribute, namely PLN providing its services as the first priority of  $-0.410$ .

The biggest gap value of Assurance is the REL17 attribute, namely electricity is rarely extinguished at my location of  $-0.885$ . While the smallest gap value is the REL15 attribute, PLN provides its service as the first priority of  $-0.410$ .

### Importance Performance Analysis (IPA)

IPA is used to see important attributes and influence customer satisfaction as shown in Figure 3. This analysis will be used later to show which attributes are in Quadrant I so that continuous service improvements are carried out.

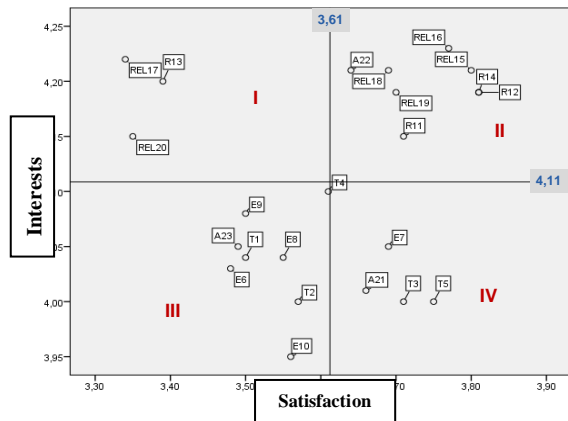


Figure 1. Diagram of Importance Performance Index

Based on Figure 1 can be explained as follows:

1. Quadrant I: R13, Rel17 and Rel20 which shows attributes that affect customer satisfaction, including service attributes that are considered very important, but PT PLN (Persero) ULP Perbaungan has not been able to carry out according to the customer's wishes so that they are disappointing or dissatisfied.
2. Quadrant II: A22, R11, R12, R14, Rel15, Rel16, Rel18, and Rel19, which shows the basic service attributes that have been successfully implemented by the company, therefore it must be maintained and considered very important and satisfying. This requires the company to be able to maintain its position.
3. Quadrant III: attributes A23, E6, E8, E9, E10, T1, T2 and T4, which show some service quality attributes that are less important for customers, and their implementation by ordinary companies is biased. Considered less important and less satisfying. Increasing these attributes can be reconsidered because the effect on the benefits felt by customers is very small.
4. Quadrant IV: attributes A21, E7, T3, and T5, which indicate factors that are less important for customers, but the implementation is excessive. It is considered less important but very satisfying in its implementation. The attributes included in this quadrant can

be reduced so that the company can save costs.

## Medote Lean Six Sigma

### Define

Define is the phase to determine the problem, set customer requirements and build a team, project objectives, as well as the implementation time that is to the entire management of PT PLN (Persero) ULP Perbaungan starting from managers, supervisors, assistant supervisors, staff to employees.

### Measure

Phase measure is measuring the current level of importance obtained from measuring the gap between customer expectations and satisfaction in servqual analysis and sigma level. The results of the measurement phase include:

1. The results of the baseline calculation at the outcome level seen from the dimensions have the leveligma between 2.57 - 2.79. This shows that the service quality of PTPLN (Persero) ULP Perbaungan has an average sigma level of 2.67 with DPMO 211011.69 and a satisfaction level of 87.9% as shown in Table 2.
2. From the results of the Basel calculation in Table 3, the importance of the outcome level of each attribute is known that the ULP Perbaungan service is still in the sigma of 2.31-3.03. While the average DPMO is 121011.69 and the average achievement of service satisfaction is 87.9% of all attributes in the 5 dimensions of quality.

Table 2. Baseline calculations at the outcome level seen from the dimensions

No	Attribute	Gap	Satisfaction Level	DPMO	Sigma Level
1	Reliability	-0,594	85,9%	141412,14	2,57
2	Assurance	-0,497	87,9%	121459,14	2,67
3	Tangible	-0,400	90,1%	99292,54	2,79
4	Responsiveness	-0,501	88,0%	119880,42	2,68
5	Emphaty	-0,501	88,2%	117866,00	2,69
	Average		87,9%	121011,69	2,67

Based on Table 2 there are three attributes that show the smallest sigma value and the largest DPMO are Rel17, R13 and Rel20. At the next stage, Analyze and Improve Phase focused on the priority of analysis

and improvements made on the three attributes.

**Table 3 Baseline Calculations at The Outcome Level are Seen From Attributes**

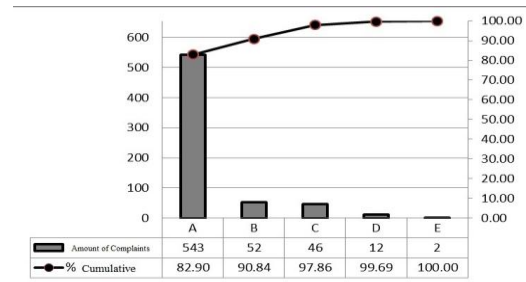
No	Sigma Level	DPMO	Attribute	
1	2,31	209715,6	Electricity rarely goes out in my location	REL17
2	2,37	193452,4	The PLN officer is quick to deal with the disturbances that occur	R13
3	2,37	192168,7	The PLN always notifies information before a power outage is carried out.	REL20
4	2,57	141630,9	PLN considers wants and needs	E9
5	2,59	138888,9	The PLN officer consistently behaved politely to me	A23
6	2,59	138251,7	PLN gives personal attention to me	E6
7	2,60	136579,6	I feel safe using PLN's electricity	A22
8	2,61	134282,2	The National Electricity Company (PLN) has modern equipment	T1
9	2,66	123662,3	The frequency of power outages as promised.	REL18
10	2,67	121287,1	PLN has employees who provide personal attention	E8
11	2,68	118902,4	Views related to services (such as registration forms, electricity accounts etc.) are visually attractive	T4
12	2,69	117471,7	The length of the power outage is as promised.	REL19
13	2,73	108747,0	PLN strives to work freely with errors (electricity account calculation)	REL16
14	2,74	108057,5	PLN's facilities physically look attractive	T2
15	2,75	106024,1	In PLN service I don't spend much time waiting	R11
16	2,79	98734,2	PLN employees show understanding of my special needs	E10
17	2,80	97329,4	PLN provides its services as a first priority	REL15
18	2,84	90149,3	The PLN officer quickly responded to my request	R14
19	2,84	89552,2	The PLN officer is always ready to help	R12
20	2,85	88888,9	PLN has pleasant operating hours as needed	E7
21	2,85	87960,1	The PLN officer can be trusted	A21
22	2,96	71875,0	PLN officers or employees look neat	T3
23	3,03	62500,0	PLN services are carried out according to the promised time	T5

**Analyze**

This phase is the phase of finding and determining the root cause of a problem. Solving problems faced by ULP Perbaungan using Pareto diagrams and causal diagrams.

Pareto diagram

Data for pareto diagrams are obtained from complaints that enter the Integrated Complaints and Complaints Application System (APKT) via 123 Call Center, then described in the form of a pareto diagram of customer complaints as shown in Figure 2.



**Figure 2. Pareto diagram of customer complaints**  
Source: Processed data 2019 (APKT 2017)

**Information:**

- A. Power outages
- B. Payment administration services, installation of new installations, power changes and re-installation
- C. Meter checking service
- D. Electrical quality, tools and network repair are not good
- E. Report on abuse of electric power

The Pareto diagram illustrates the most complaints that consumers feel disturbed due to frequent power outages, which are 543 complaints. Then in the second position of complaints in ULP Perbaungan namely administrative payment services, installation of new pairs, power changes and re-installation. This shows that the ULP PLN has not been able to provide satisfaction to customers regarding the continuity of electricity reliability.

**Cause and Effect Diagram**

Cause-Effect is used in analyzing the gap value, the largest DPMO and the smallest sigma level. The attribute to be analyzed is that electricity is rarely extinguished at my location, PLN officials are quick to deal with the disturbances that occur, and the PLN always notifies information before a power outage is carried out. In other words there is still a power outage that occurs to the customer, there are

still delays in overcoming the disruption that occurs, and information on power outages that have not been notified. The Rel17 attribute, which is electricity is rarely extinguished in my location, has a large gap

value and DPMO and a small sigma level. A power outage effect diagram is shown in Figures 3, 4 and 5.

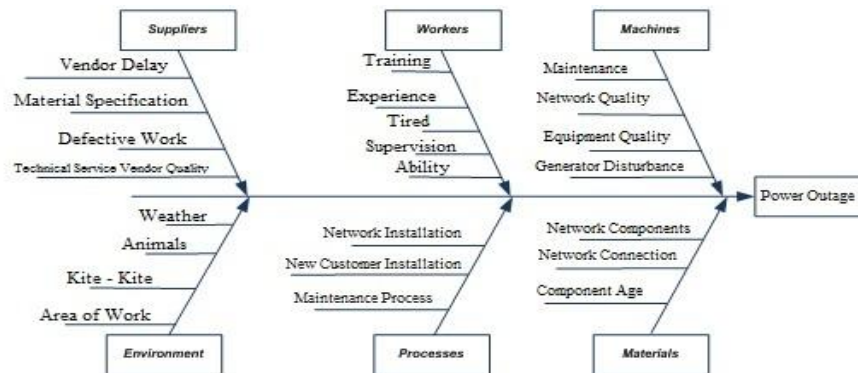


Figure 3. Electricity Cause-Effect Diagram

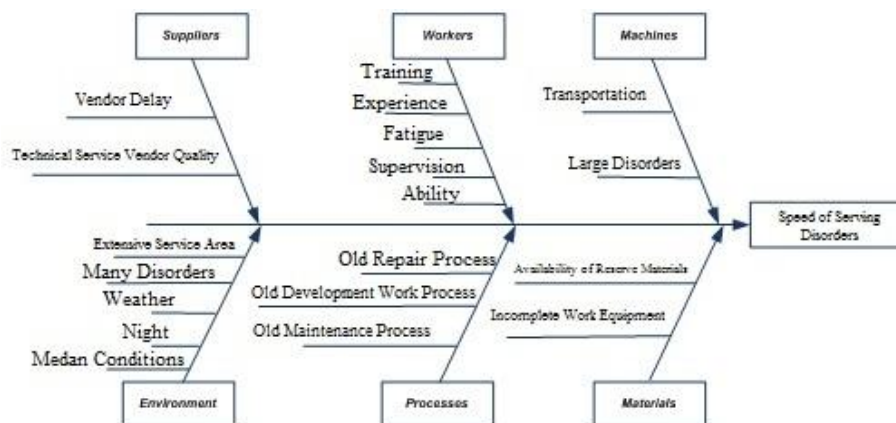


Figure 4. Late Cause-Effect Diagram Overcoming Disorders

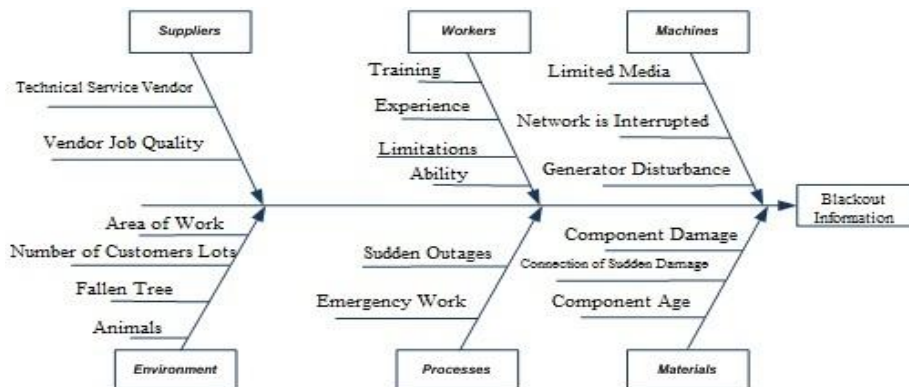


Figure 5. The Cause-Effect diagram has no Electricity Outage Information

## **Improve**

In the analyze phase, it is known that the cause of the quality problem is identified, it is necessary to determine the action plan (action plan) to carry out the improvement of process capability. Lean is used as a systemic and systematic approach to identify and eliminate waste or non value adding activities, namely defects in the form of blackouts, information on electricity outages not yet available, and waiting for delays in overcoming disturbances. The design is in the form of a proposed quality improvement for each potential CTQ and experimental design, so that it is expected to improve the quality performance produced by the process by decreasing the DPMO value and increasing the sigma level value. Action for Improvement is done on suppliers, workers, machines, environments, processes, and materials.

Improvements are made to suppliers by conducting vendor management to build strategic partners to strengthen the business of both parties in accordance with the Service Level Agreement (SLA) in contracts and cooperation in implementing continuous improvement (join improvement).

Improvements in workers are increasing HR competency and certification of HR competencies and establishing Yantek Academy for the development of technical service partner work partners, increasing the number of technician employees to support the repair and maintenance process with an effective and efficient amount and increasing supervision of PLN electricity network repair work. Improving the quality and quantity of preventive maintenance and replacing old networks or equipment based on priority level is an improvement on machines. Improvements in environmental factors are carried out by improving the quality of the network and clean network environment so that it is not easily affected by the weather, installing shields on open networks, making preventive actions to call for prohibiting kite play near the network, conducting

preventive maintenance or installing network protectors, the increase in the number of technician employees because of the extensive work area to support the repair and maintenance process with an effective and efficient amount. Controlling the network installation process, new customers, material so that quality work outputs and implementing reward and punishment towards the executor of the work in accordance with the agreed work contract are improvements to processes. Furthermore, repairs to materials are carried out by increasing preventive maintenance to replace materials that are not suitable for use.

## **Control**

It is the last operational stage in the lean six sigma quality improvement project, making measurement plans and designs so that the good results of team improvement can be sustainable, namely by always monitoring and correcting, if it has started to decline then repairs are carried out (Manggala, 2005). At this stage the results of quality improvement are documented and disseminated, best practices that are successful in improving the standardization process and are used as standard work guidelines, as well as ownership and process responsibilities, which means lean six sigma ends at this stage, then lean six sigma project in other areas of the process or business organization it is defined as new projects that must approach the DMAIC cycle. In this way there will be an increase in integration, instrumentalization, learning, and sharing or transfer of new knowledge (Gaspersz, 2002).

## **DISCUSSION**

Based on the results of the analysis that PT PLN (Persero) as a power provider has not been able to provide service quality that satisfies customers. This can be seen from the results of measuring the level of service quality still at the level of 2.76 sigma so that it is still far from the level 6 sigma. The lowest service quality dimension is



reliability of 2.56 while the lowest sigma level attribute is electricity is rarely extinguished in my area of 2.31.

Service improvement can be done by analyzing identification of the causes of critical to quality and making improvements. The methodology used in improving service quality is lean six sigma with the DMAIC principle (Define, Measure, Analyze, Improve and Control). Define is used to determine critical to quality, measure to calculate service quality gap, baseline variable and attribute level sigma and DPMO, analyze looks for root cause which becomes waste, namely defect of power outages. Once determined to be the highest waste gap and the largest DPMO, the smallest sigma level is then improved in increasing customer satisfaction. Expectations of measurement, analysis and efforts to improve service quality are carried out so that the level of customer satisfaction sigma PT PLN (Persero) ULP Perbaungan can be improved. Lowering the gap between perceptions and interests, improving service quality, reducing the value of DPMO, increasing the value of six sigma, reducing waste on the distribution of electricity.

### **Managerial Implications**

Continuous improvement is important for management to improve service quality. PT PLN (Persero) ULP Perbaungan as a provider of electricity must be able to provide service quality that meets customer wants and needs. If service quality improvement is not carried out, customer complaints will occur. Sigma level measurement using the lean six sigma method shows that the level of service quality sigma is still at 2.67 so it is still far from the level 6 sigma. This shows that PLN Perbaungan has not been able to provide services that satisfy customers. The process that becomes critical to quality is that PLN has not been able to fulfill the services expected by customers with evidence that there are still voice of customer complaints that enter through call center 123 are still high. Service improvement can be

done by analyzing identification of the causes of critical to quality and making improvements. The methodology used in improving service quality is lean six sigma with the DMAIC principle (Define, Measure, Analyze, Improve and Control). Define stage is used to determine critical to quality, measure to calculate service quality gap, baseline variables and attributes, level sigma and DPMO, analyze is done to find root cause that becomes waste, namely defect of power outages, no information on suppression, and waiting in the form of slow processing handling disorders. After determining the attributes that become the highest waste three gaps and the largest DPMO, the small sigma level is then improved in improving the quality of service to customers.

Detail dimensions of service quality in the main priority hierarchy are improved based on the calculation of the smallest sigma value, the highest DPMO, the biggest negative gap between customer satisfaction and expectations is starting from the first reliability, followed by responsiveness, then assurance, empathy, and finally tangible. The attributes that are the three main priorities are corrected based on importance performance analysis, the smallest sigma value, the highest DPMO, the biggest negative gap between satisfaction and expectation is electricity is rarely extinguished at my location, then the PLN officer attributes quickly overcome the disturbance, then the PLN always informs before a power outage is carried out. To achieve the goal of improving service quality, management uses resources and carries out managerial functions to achieve continuous improvement.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Conclusion**

The calculation of sigma level and analysis shows that the service quality of PTPLN (Persero) ULP Perbaungan is still not able to provide maximum satisfaction to customers. It is seen that the calculation of

the level of service quality sigma is still far from the target of achieving 6 sigma. Sigma level measurement using the lean six sigma method shows that the sigma level is still at 2.67 with a DPMO value of 121011.69. Attributes with 3 (three) smallest sigma levels that become waste that will become the main priority in improvement, namely defects in the form of blackouts, notification of information on electricity outages do not yet exist, and waiting for delays in overcoming the disturbances that occur. From the service quality of PTPLN (Persero) ULP Perbaungan still revolves around level 2, this shows that the quality of service from PLN is still far from the target level 6 sigma

### Recommendations

1. It is recommended that the PT. PLN (Persero) ULP Perbaungan can increase customer satisfaction by improving service quality, and with this research the unit can see the results of the study as a reference for decision making and which attributes are the top priorities in repairs.
2. It is expected that further research can develop again both in terms of the dimensions of quality used, attributes that become measurements, and methods and tools in analyzing the quality of services available at PTPN (Persero) ULP Perbaungan.
3. As well as for PLN ULP Perbaungan itself, you should continue to make measurements both of the PLN agency itself and the independent parties who are indeed authorized to measure the quality of public services from PTPLN

(Persero) Perbaungan Customer Service Unit.

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