Risk Evaluation of The Use of The Umbrella Contract for The Construction Project for Medium Voltage Distribution in South Surabaya Region Using The Expected Monetary Value

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Abstract—**In the program for accelerating the distribution of electricity to users, also known as the getting electricity program by PT. PLN Persero. Specifically, the distribution of the South Surabaya region has accelerated programs with vendors with a new contract system, namely the umbrella contract system. Where is based on the performance of the umbrella contract system in 2018 it has the potential risks that influence during the implementation process of this umbrella contract takes place. Using the stages of risk identification, risk assessment, and calculating the EMV (expected monetary value) analysis method to analyze each important risk event and its risk response. First, a preliminary survey was conducted to identify the risks that significantly influence the umbrella contract with the respondents who played an important role in the implementation of the umbrella contract. In the assessment of each risk, it is found that the risks that have an important influence during the umbrella contract process take place. Expected monetary value is used to analyze the contingency costs that need to be prepared from each risk variable based on the risk response or risk mitigation carried out during the implementation of the umbrella contract The result obtained in this study there are 4 risks need to be concern during implementation of umbrella agreement cause had great impact for the project cost.**

Keywords— **Risk evaluation, Framework agrement, expected monetary value, risk response.**

I. INTRODUCTION

THE INCREASING rate of economic and industrial growth and increasing population in Indonesia causes the amount of electricity demand in Indonesia continues to increase. PT PLN Persero recorded electricity sales in 2018 reaching 232.43 TWh which increased by 5.14% [1]. Based on data from the Strategic Plan of the Directorate General of Electricity in 2015-2019 to continue to meet the national electricity demand, there are 37 power plant construction projects with a total capacity of 35,000 MW [2] .These umbrella contracts have different characteristics, umbrella contracts have a longer time span in general, then the two contract makers can work with several different suppliers with the same agreement [3].

The umbrella contract maximizes the opportunity between the two parties for the opportunity that will occur when the contract is in progress. The advantage of this umbrella contract can reduce costs, time efficiency in the effort to choose suppliers and monitor every transaction that occurs [4].

Can be seen figure 1 the flow of the umbrella contract where the master contract as the parent of SPBJ (Letter of Goods and Services Orders) then PK (Work Orders) then WO (Working orders) is a flow for marketing work programs for non-marketing using only SPBJ.

In this research, we will evaluate the risk of using umbrella contracts, which aim to prepare a cost contingency plan. By using the expected monetary value (EMV) method, it can analyze the value of each risk event to determine the best budget that needs to be prepared based on the probability and impact caused [5]. With this method, it is expected to be able to do the best contingent cost budgeting for the implementation of the umbrella contract system in the medium voltage electricity distribution network project, especially in the south of Surabaya.

II. METHOD

This research will use the expected monetary value approach to simplify the risk analysis process in the umbrella contract and analyze the results of data processing through a good risk management process so that it can perform risk responses properly [6]. Expected monetary value approach method for calculating the estimated amount of contingent costs needed in carrying out risk responses from implementing umbrella contracts.

A. Risk Identification

At this stage, the preliminary risks will be identified based on literature and secondary field data which will then be conducted a preliminary survey of the respondents responsible as implementing umbrella contracts. Based on 38 risk variables that have been identified the risks that are relevant to the implementation of the umbrella contract (see Table 4) are the risks that are relevant to the umbrella contract.

B. Risk Assessment

After identifying the risks, risk assessment analysis will be carried out based on the probability and impact of each risk variable. Risks are assessed based on PI matrix data (see Table 3) and probability and impact information (see Table 1) and (see Table 2).

Figure 1. Framework agreement flow for contractor.

Tabel 1.
Probability

Level	Categories	Information
1	Very Low	Risk very rarely to occured (<20%)
2	Low	Risk rarely to occured (21-40%)
3	Medium	The probability risk to ocure is same level with no to occure(41-60%)
4	High	High posibility risk to occur (61-80%)
5	Very high	Risk always to occur (81-100%)

Table 2.
Impact for cost

Level	Categories	Information
1	Very Low	Risk have no impact for the project cost
2	Low	There is impact <2% for the project cost
3	Medium	There is impact 3%-5% for the project cost
4	High	There is impact 5-10% for the project cost
5	Very high	There is impact >10% for the project cost

From the results of the risk assessment the values of risks are included in the high and medium risk categories (see Table 5).

C. Expected monetary value

Expected Monetary Value (EMV) is a weighted probability of overall output which helps to provide an explanation for risks that need more attention and need to be processed in the plan risk responses process

$$EMV = Probability \times Cost\ Impact \qquad (1)$$

D. Risk response

Risk contingency strategies and expert opinion, there are specific strategies for responding to positive and negative risks in the project. There are four types of strategies to respond to negative risks: avoid, transfer, mitigate, accept [5].

III. RESULT AND DISCUSSION

From the analysis of the identification of risks obtained from the respondents (see Table 4), the analysis was conducted with the respondents involved by distributing questionnaires to 13 experienced respondents. From the results of risk identification, a risk assessment with the respondents is then obtained (see Table 5).

The next step is to analyze the EMV by u

sing existing data on the project along with expert judgment and obtained values such as (see Table 6). Cost impact is obtained from project documents and the risk threshold is determined by respondents with a nominal value of more than 50 million.

Tabel 3.
Matrix PI

P/I	1 Very Low	2 Low	3 Medium	4 High	5 Very High
1 Very Low	Very Low	Very Low	Low	Low	Medium
2 Low	Very Low	Low	Low	Medium	Medium
3 Medium	Low	Low	Medium	Medium	High
4 High	Low	Medium	Medium	High	High
5 Very High	Medium	Medium	High	High	High

Table 4.
Risk Variabel

No.	Risk Code	Risk Variabel
1	R1	The contractor gets a price agreement when the bid winner of the auction is negotiated
2	R2	An estimation error occurred during contract planning
3	R3	Clear information and certainty regarding the procedure for payment and the conditions for payment
4	R4	Clear information and certainty regarding matters which are obligations of the first party
5	R6	Clear information and certainty regarding the limits of liability and loss that are borne by the contractor
6	R7	Clear information and certainty regarding taxes that are the responsibility of the contractor
7	R10	Clear information and certainty regarding the provisions on the imposition of sanctions and fines due to delays
8	R14	Inaccurate information and volume of work in the contract
9	R28	Delay and unavailability of MDU (Main Basic Material)
10	R33	Problems with the locals

Table 6.
Expected monetary analysis

No.	Risk Code	Risk Variabel	Risk Level
1	R1	The contractor gets a price agreement when the bid winner of the auction is negotiated	Medium
2	R2	An estimation error occurred during contract planning	Medium
3	R3	Clear information and certainty regarding the procedure for payment and the conditions for payment	High
4	R4	Clear information and certainty regarding matters which are obligations of the first party	Medium
5	R6	Clear information and certainty regarding the limits of liability and loss that are borne by the contractor	Medium
6	R7	Clear information and certainty regarding taxes that are the responsibility of the contractor	Medium
7	R10	Clear information and certainty regarding the provisions on the imposition of sanctions and fines due to delays	Medium
8	R14	Inaccurate information and volume of work in the contract	High
9	R28	Delay and unavailability of MDU (Main Basic Material)	High
10	R33	Problems with the locals	Medium

Then the risk response will be carried out from the results of the EMV analysis, the risk response is carried out based on the risks selected from the EMV analysis results then discussed with the respondents to carry out the following risk response plan is the result of the risk response (see Table 7).

IV. CONCLUSION

Based on the results of this study in analyzing the risk of umbrella contracts using EMV, there are 4 important risks that need to be given more attention, namely R1, R3, R14 and

Table 7.
Risk Responses

No.	Risk Code	Risk Response
1	R1	Follow the anwizing before the contract is carried out and discuss with the procurement committee to provide input
2	R3	Conduct clarification during the process before the contract is signed to get an explanation of the articles that are unclear, especially the article of payment with the procurement paniata
3	R14	Conduct surveys and assist the planning team in conducting surveys in the field
4	R28	provide information about materials that are not available

R28. Where the results of the risk analysis obtained the appropriate risk response from the discussion.

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