

THE PROPOSED OF VENDOR SELECTION IN GOODS PROCUREMENT USING FUZZY ANALYTICAL HIERARCHY PROCESS (FAHP) METHOD AT PT. PERTAMINA HULU ENERGI OFFSHORE NORTH WEST JAVA (PHE ONWJ)

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Abstract—Along with the change in the strategic system in the government that changed the scheme of contracts for oil and gas products from Cost Recovery to Gross Split in the oil and gas company, like Pertamina Hulu Energi Offshore North West Java (PHE ONWJ), the company is required to be more effective and efficient in carrying out its operational activities. This is especially true in goods procurement activities, such as maintaining vendor performance, since a good performance from the vendor will have a direct impact on company operations.

The objective of this research is to get a vendor performance appraisal design in choosing the best vendor in procurement phases by using Fuzzy Analytical Hierarchy Process (FAHP) method.

The results of this research contained 12 main criteria, 19 sub-criteria at the procurement phase, 11 sub-criteria in the after-procurement phase, the vendor performance appraisal proposal form, and come by the best vendor in the Subsea Tanker Rail Hose (16", 15BAR) is Vendor B who has been registered in APDN, DPM, and CIVD PHE ONWJ with the final value during the procurement process in the amount of 86.792% and the final value after procurement in the amount of 85.910%.

Keywords—Fuzzy, FAHP, PHE ONWJ, Vendor Performance

I. INTRODUCTION

Pertamina Hulu Energi Offshore North West Java (PHE ONWJ) is one of the best oil and gas companies in Indonesia. Companies are required to be more effective and efficient in carrying out their operational activities, especially in procurement activities along with the change of strategic system in the government that change the scheme of oil and gas production sharing contract from Cost Recovery to Gross Split. Therefore, Pertamina Hulu Energi ONWJ (PHE ONWJ) need to pay attention to some problems in company, that is [1]:

1. HSSE accidents and incidents by the supplier's employees in the project at PHE ONWJ by 90% so that vendor performance is not yet optimal. This causes PHE ONWJ to incur a huge cost.
2. When vendor selection does not pay attention to accident history data, there is no suggestion of design in assessing vendor's performance, etc.
3. The results of the Performance Review Meeting (PRM) is considered more objective so that the decision is less accurate because PHE ONWJ applies Performance Review Meeting (PRM) to review supplier performance data between the company and the supplier through discussions that produce value and finalized by corrective action agreed to improve performance.
4. Pertamina Hulu Energi ONWJ has not proposed the design of performance appraisal for vendors in which there are criteria and sub-criteria calculated in appraisal of vendor performance, especially vendor assessment starting from in process before procurement, when procurement, until the process is finished with vendor appraisal for each commodity in the long run.

From these problems it is of course necessary to reduce the accident rate of HSSE and other incidents to all workers in PHE ONWJ by taking into account accident history's data on vendor performance and creating a vendor performance appraisal plan in selecting the best vendor that match the criteria and sub-criteria required by company. The proposed vendor performance appraisal is expected to combine with Performance Review Meeting (PRM) method that has been used by PHE ONWJ with the aim to improve performance and get the best vendor, and can reduce accident rate and reduce the cost caused by problems in this research [2]:

According to research, work performance is the most important criterion in human resource management [3] and with the assessment of human resources will certainly

improve the performance of human resources in an organization or company [4]:

To improve vendor performance in order to get the best vendor, company's required a method to make it easier to analyze in determining criteria and to assess vendor.

One common method used in completing Multi Criteria Dimension Making is Analytical Hierarchy Process (AHP). But in this research will be done with advanced method of AHP that is by Fuzzy Method - Analytical Hierarchy Process (FAHP). FAHP or Fuzzy - Analytical Hierarchy Process is an analytical method developed from AHP. However in this case Fuzzy AHP is considered better in describing a vague decision than AHP although AHP is commonly used in dealing with qualitative and quantitative criteria [5].

This study requires data from experts from the interviews, theories, and the policies of the company, the governance guidance on procurement of goods, previous studies, and other references which can certainly be sources in determining the criteria and sub-criteria for obtaining an output. In this research the output resulted from the proposed design performance appraisal to vendors that can be implemented in subsequent procurement projects in oil and gas company to get the best vendor.

II. FUZZY ANALYTICAL HIERARCHY PROCESS METHOD

Here are the completion steps of Fuzzy Analytical Hierarchy Process (FAHP) [6]:

1. Determining criteria and sub-criteria for vendor performance assessment
2. Create a hierarchical structure of selected criteria and sub-criteria
3. Assessment of Respondents Experts

At this stage is to assess the relative importance of each criterion and sub-criteria that have been determined in pairs. This assessment was obtained by providing the first questionnaire to the expert respondent to be assessed and the results of the assessment were collected to determine the importance of each of the main criteria. The result data of the respondent was changed to Triangular Fuzzy Number (TFN).

TABLE I. TRIANGULAR FUZZY NUMBER (TFN)

DEFINITION	LIKERT SCALE	TFN	LIKERT SCALE	TFN
Just as important	1	(1, 1, 1) if diagonal, (1, 1, 3) others	1/1	(1/1, 1/1, 1/3) if diagonal, (1/1, 1/1, 1/3) others
	2	(1, 2, 4)	1/2	(1/4, 1/2, 1/1)
A little more important	3	(1, 3, 5)	1/3	(1/5, 1/3, 1/1)
	4	(2, 4, 6)	1/4	(1/6, 1/4, 1/2)
More important	5	(3, 5, 7)	1/5	(1/7, 1/5, 1/3)
	6	(4, 6, 8)	1/6	(1/8, 1/6, 1/4)
Very important	7	(5, 7, 9)	1/7	(1/9, 1/7, 1/5)
	8	(6, 8, 10)	1/8	(1/10, 1/8, 1/6)
Absolutely important	9	(7, 9, 11)	1/9	(1/11, 1/9, 1/7)

4. Determine the comparison of matrix in pairs between criteria and sub-criteria on a TFN scale by taking the average value of the respondent for the criteria and sub-criteria associated with the objectives.

5. Consistency Test on pairwise comparison data $Maxk (lik lkj) \leq Mink (Uik Ukj)$, untuk for all $i, j, k = 1, 2, 3, \dots, n$
6. Determining the Value of Fuzzy Synthetic Extent (Si)

Here is a formula to determine the value of Fuzzy Synthetic Extent (Si):

$$S_i = \sum_{j=1}^m M_{ji}^j \otimes \left[\sum_{i=1}^n \sum_{j=1}^m M_{ji}^j \right]^{-1}$$

In this case, to get the value of Fuzzy Synthetic Extent (Si) needs to be done calculation phases. The first stage is to

calculate, $\sum_{j=1}^m M_{gi}^j$, is:

$$\sum_{j=1}^m M_{gi}^j = \left(\sum_{j=1}^m l_j, \sum_{j=1}^m m_j, \sum_{j=1}^m U_j \right)$$

The purpose of the above formula is to sum up the value of each Triangular Fuzzy Number (TFN) group from the matched matrix of each pair of criteria and sub-criteria. The next step is to sum all the values of TFN from each criteria or sub-criteria that is by the formula:

$$\sum_{i=1}^n \sum_{j=1}^m M_{gi}^j = \left(\sum_{i=1}^n l_j, \sum_{i=1}^n m_i, \sum_{i=1}^n U_i \right)$$

The last phase is to get this formula $\left[\sum_{j=1}^n \sum_{j=1}^m M_{gi}^j \right]^{-1}$ by calculating the inverse vector, so that it is obtained:

$$\left[\sum_{i=1}^n \sum_{j=1}^m M_{gi}^j \right]^{-1} = \left(\frac{1}{\sum_{i=1}^n U_i}, \frac{1}{\sum_{i=1}^n m_i}, \frac{1}{\sum_{i=1}^n l_j} \right)$$

7. Determining the Vector Values (V)

If the results obtained on each fuzzy matrix with

$$M_2 = (l_2, m_2, u_2) \geq M_1 = (l_1, m_1, u_1),$$

then the vector value can be formulated as follows:

$$V(M_2 \geq M_1) = \sup[\min(\mu_{M_1}(x), \min(\mu_{M_2}(y)))]$$

or can be stated on:

$$V(M_2 \geq M_1) = \begin{cases} 1, & \text{if } m_2 \geq m_1, \\ 0, & \text{if } l_1 \geq \mu_2, \\ \frac{l_1 - \mu_2}{(m_2 - \mu_2) - (m_1 - l_1)}, & \text{lainnya} \end{cases}$$

the goal is to get a comparison result between Fuzzy Synthetic Extent (Si) with its minimum value against each of its Criteria and Sub-criteria.

If the result of a fuzzy value is greater than k with M_i ($i = 1, 2, \dots, k$), then the vector value can be set by:

$$V(M \geq M_1, M_2, \dots, M_k) = V(M \geq M_i) \text{ dan } V(M \geq M_2) \text{ and } V(M \geq M_k) = \min V(M \geq M_i)$$

Assume that:

$$d'(A_i) = \min V(S_i \geq S_k) \text{ for } k = 1, 2, \dots, n; k \neq i.$$

Then we can get the value of the weight of the vector with:

$$W' = (d'(A_1), d'(A_2), \dots, d'(A_n))^T$$

Where $A_i = 1, 2, \dots, n$; n is element decision.

8. Determining the Default Ordinate Value/ Normalization of Vector Values (d')

After that it can be normalized from the equation of the value of the vector weight by the formula:

$$W = (d(A_1), d(A_2), \dots, d(A_n))^T$$

Where W is a non-fuzzy number.

III. RESEARCH METHODS

Pertamina Hulu Energi Offshore North West Java (PHE ONWJ) is one of the best oil and gas companies in Indonesia. Companies are required to be more effective and efficient in carrying out their operational activities, especially in procurement activities along with the change of strategic system in the government that change the scheme of oil and gas production sharing contract from Cost Recovery to Gross Split. Therefore, Fuzzy AHP requires criteria and sub-criteria that will be used as a vendor performance appraisal proposal form to obtain the best vendor suggestions that match the needs of PHE ONWJ.

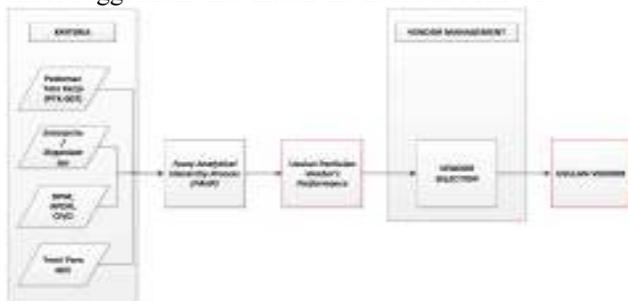


Fig. 1. Conceptual Model

The criteria and sub-criteria required by PHE ONWJ are derived from several sources referring to the Working Procedure Guidelines Number: PTK-007 / SKKMA0000 / 2015 / S0 Second Book of Third Revision in the guidelines on the implementation of goods and services SKK Migas, Book of Appreciation of Domestic Products APDN), List of Providers of Goods / Services (DPM), Centralized Integrated Vendor Database (CIVD), PHE ONWJ internal policies and other literature sources to suit company needs. After obtained criteria and sub-criteria it will be processed by using Fuzzy AHP method. The weighting result of this FAHP method is used for the vendor performance appraisal proposal form. After that, the proposal form is implemented

into a project and used to select vendor (vendor selection) and will get the best vendor proposal obtained from the assessment results using the proposal form.

IV. RESULT AND DISCUSSIONS

The total number of criteria in this study were 12 main criteria with 30 sub-criteria. There are 3 stages of procurement of goods in this research that is pre-procurement stage, during procurement process, and after procurement. In the pre-procurement stage there are 3 main criteria, 6 main criteria at the stage of procurement, and 3 main criteria at the stage after procurement.

The main criteria processed in this research by using Fuzzy Analytical Hierarchy Process (FAHP) method is Health Safety and Environmental Protection (K3LL), Domestic Component Level (TKDN), Documentation, Response, Quality of Human Resources, and Flexibility at the current stage procurement and the main criteria of quality, quantity, and delivery of goods are the main criteria in the after procurement stage. While in the pre-procurement stage only not done calculation using FAHP method.

IV.1 Weighting Analysis Main Criteria Prior to Procurement (Pre-Procurement)

The main criteria in the pre-procurement stage are Appreciation of Domestic Products (APDN), List of Providers of Goods / Services (DPM), and Centralized Integrated Vendor Database (CIVD). All three vendors in this phase are criteria that are very important and obligatory in the project implementation activities of procurement of goods and services before the project is running to find out whether the vendor has not registered or registered in APDN, DPM, and CIVD PHE ONWJ follow a project within the company, of course can only be taken into consideration of Pertamina Hulu Energi ONWJ in choosing a vendor.

IV.2 Weighting Analysis Main Criteria Phase At Procurement (Procurement)

The Table 2 describes the priority of the main criteria of the procurement phase and in the weighted criteria analysis at this phase of procurement describes some of the main criteria that have a great influence on this research.

TABLE II. THE RESULT OF THE PRIORITY OF THE MAIN CRITERIA AT THE PROCUREMENT PHASE.

CRITERIA	PRIORITY WEIGHT	RANK
K2 (K3LL)	27.0%	1
K3 (TKDN)	16.5%	2
K1 (DOKUMENTASI)	15.2%	3
K4 (RESPON)	15.0%	4
K5 (KUALITAS SDM)	14.8%	5
K6 (FLEKSIBILITAS)	11.6%	6

A. K3LL

The International Labor Organization (ILO) and the World Health Organization (WHO) Committee on Occupational Health in 1990 have outlined the limits and objectives of occupational health, including:

1. Providing maintenance of health level improvement at the highest level both physical, mental, and social welfare of the working people in all circles.
2. Prevent the occurrence of public health disorders resulting from the conditions or circumstances of its working environment.
3. Providing protection for workers in employment and factors that endanger their health.
4. Creating and maintaining workers in an appropriate work environment with physical and psychological abilities.

Based on Law no. 1 year 1970 (UU No. 1 tahun 1970), aiming for the community and the work environment to be safe, healthy and prosperous which will ultimately increase productivity all-round the most important thing in the Act is a prevention system, and OSH devices in a business unit, in the workplace, the right of duties, responsibilities, sanctions and coaching work [7].

According to internal PHE ONWJ, K3LL is the biggest weight due oil and gas companies such as PHE ONWJ highly uphold the value of Health Safety and Environmental Protection (K3LL) which is evident from the characteristics of the company's operations that have a high risk, making K3LL as an important aspect for the company due:

1. HSSE accidents and incidents by the supplier's employees in the project at PHE ONWJ reach 90% so that the safety of the worker is of primary concern with the aim that workers are free from accidents or occupational diseases so as to carry out their duties productively. If it is implemented properly then the performance of the vendor in cooperation with PHE ONWJ will be optimal and cause PHE ONWJ does not need to spend a very big cost of the problem
2. When the vendor selection does not pay attention to the accident history data, there is no design proposal in assessing the performances of the complete vendor.

So, in this case PHE ONWJ want to minimize accident rate not from internal PHE ONWJ only but the employees of supplier who follow project in PHE ONWJ. In accordance with strong commitment in achieving Health, Safety, Security, and Environmental Protection (K3LL) that excel in PHE ONWJ. The commitment is set forth in the K3LL Policy established on June 1, 2015. In 2016 a review has been conducted, thus issuing the ONE Policy on 1st April 2016 and K3LL and Quality Commitments on June 1, 2016 through the approval of PHE ONWJ's President / General Manager and HSSE VP. Quality and K3LL Commitment aims to achieve continuous improvement of performance, without incident, sustainable business oriented. Quality and K3LL Commitment conforms to Maslow's Hierarchy of Needs at the level of safety needs where the supplier employee working on the PHE ONWJ project should feel secure while working on a project owned by PHE ONWJ itself thus the performance provided by the supplier's employees will be at the same level maximum [8]. With the maximum performance level of each supplier employee, this will certainly form a good vendor performance for PHE

ONWJ and help make decisions which vendor selection to use.

The commitment calls for all line managers and workers to be deeply committed [9]:

1. Give first priority to aspects of Safety, Occupational Health and Environmental Protection (K3LL).
2. Identify potential hazards and reduce the risks as low as possible to prevent incidents.
3. Using the best technology to reduce the impact of operations on people, assets and the environment.
4. Making Safety, Health Work and Environmental Safeguards performance in the assessment and appreciation of all workers.
5. Increase the awareness and competence of workers in order to carry out the work properly and safely.
6. Create and maintain harmonization of relationships with stakeholders around business activities to build mutually beneficial partnerships.

But in this case, the policy that has been issued in the form of commitment on quality and K3LL in PHE ONWJ and other Pertamina subsidiary has not been implemented maximally and PHE ONWJ is aware that every business activity especially in the energy field has the potential to have an impact / danger risk that can be negative or fatal to workers, assets, and the environment. Efforts are being made to minimize these impacts.

Therefore it can be concluded that:

1. Bearing in mind that policies and commitments can only be drafted by a separate standard by PT. Pertamina (PERSERO), PT. Pertamina Hulu Energi (PHE) and SKK Migas because PHE ONWJ is a subsidiary of Pertamina Hulu Energi itself, so the writer can only provide for K3LL program in the form of six commitment points which is applied to the responsibility of all workers and contractors working in the company's work area this should only be realized maximally and always be warned about the importance of K3LL in the company and for all workers and parties who cooperate in the project in PHE ONWJ to achieve the target PHE ONWJ every year that is zero fatality. In this case it can be answered that the K3LL criterion is very important and get the highest rating in the vendor performance appraisal on PHE ONWJ
2. The need to pay attention to accident history data of each vendor when vendor selection and all project activities to be considered in a project against the vendor.

B. TKDN

Domestic Component Level (TKDN) is highly considered in detail by PHE ONWJ because PHE ONWJ company has applied TKDN value reaching approximately 70 percent by 2014. This figure is higher than national TKDN of 56.42 percent in the period of January-November 2014 PHE ONWJ continues to encourage increased TKDN so that every year continues to increase according to Project Senior Manager of PT. Pertamina Hulu Energi Offshore

North West Java (PHE ONWJ), Taufik Adityawarman. Until now the level of local content in PHE ONWJ approximately 60-70 percent. But from the side of contractors and vendors had to catch it in real terms [10].

TKDN is very important because it can provide multiplier effect that gives benefits to the local industry. Although technology in oil and gas industry is rare and must be imported. Local technology that will be utilized is the thing to administer, for example taxation. Another example is the use of banks applied in PHE or in Pertamina. PHE ONWJ has implemented a contract using a national bank to channel payments to stakeholders. This helps though not very significantly.

Therefore, PHE ONWJ must be detailed and have a fairly high standard in choosing a vendor when viewed from the minimum percentage of TKDN as required by KKKS or standard against other contracts in order to get a good vendor and can give benefits to the local industry and raise country income.

C. Flexibility

The main criterion of flexibility gets the lowest importance rating with weight of 11.6%. Although the weight of the flexibility criterion is lower than other criteria, but flexibility remains important in vendor performance appraisals. But in this study, flexibility is an activity that is more emphasized to additional activities in case of something unexpected and the availability of goods. These activities are not always the case, but most likely something unexpected can happen at any time and is needed.

D. The Other's Main Criteria

The main criteria that have a value that has no significant difference is Documentation of 15.1%, Response of 15.00%, and Human Resource Quality of 14.8%. In this case PHE ONWJ is concerned with all criteria, but can be reviewed on the main criteria K3LL and TKDN that have enough value

because PHE ONWJ focuses more on improving K3LL and TKDN in PHE ONWJ without reducing the value of any other criteria. The main criteria that have a value that has no significant difference is Documentation of 15.1%, Response of 15.00%, and Human Resource Quality of 14.8%. In this case PHE ONWJ is concerned with all criteria, but can be reviewed on the main criteria K3LL and TKDN that have enough value

because PHE ONWJ focuses more on improving K3LL and TKDN in PHE ONWJ without reducing the value of any other criteria.

IV.3 Weighting Analysis Main Criteria Phase After Procurement

The Table III describes the results of the priority criteria of the post-procurement primary phase and on the weighted criteria analysis in the after-procurement phase and will explain some of the key criteria that have a great influence on this research.

TABLE III. THE RESULT OF THE PRIORITY OF THE MAIN CRITERIA AT THE AFTER PROCUREMENT PHASE.

CRITERIA	PRIORITY WEIGHT	RANK
K1 (KUALITAS)	35.2%	1
K3 (PENGIRIMAN)	33.4%	2
K2 (KUANTITAS)	31.4%	3

The main criterion of quality has the greatest weight and the main criterion of quantity has the smallest weight in this stage although it does not have a significant difference between each criterion. This criterion is needed and considered important by each respondent / expert judgment, so that in the calculation using Fuzzy Analytical Hierarchy Process (FAHP) method we get the priority weighting that approached between each criteria at this stage.

In this case PHE ONWJ will assess the quality of the goods produced by the vendor whether the goods come in accordance with the Purchasing Requisition (PR), the goods there defect or all goods have the appropriate quality, whether the goods are packaged as possible and in accordance with procedures PT. PHE ONWJ as well as the quality of the required documents can be met well.

Assessment related to the quantity of goods provided by the vendor that is on Quantity Criteria in this stage is certainly important in assessing the performance of the vendor whether the quantity of goods coming in accordance with the Purchasing Requisition (PR) and the quantity of documents requested company is in accordance with the requirements.

Criteria Delivery at this stage is said to be important because at this stage the evaluator / expert judgment requires the results of the assessment in the form of goods sent as goods delivered to destination in accordance with the Promised Date, the frequency of delivery of goods in accordance with the procedures at PHE ONWJ. Then, the goods are delivered accurately, without any amount of excess or less because if excessive, the company will not be responsible for replacing or sending excess items. However, if items shipped in less quantities will inevitably hinder the ongoing project at PHE ONWJ and will be given consideration in the vendor's performance assessment. In addition, the accuracy of the submitted documents must be issued in a valid and accurate manner, the vendor must inform first if there is a change of delivery schedule, and the vendor will immediately arrange a replacement shipment in case of defect or non-conformity to the goods.

IV.4 Weighting Analysis Main Criteria Phase After Procurement

After obtaining the weight of each of the main criteria and sub-criteria of the research, the proposed assessment form for the vendor performance in PHE ONWJ was obtained. The PHE ONWJ vendor performance assessment proposal form is a proposal form that is designed in accordance with the form of the form generally in the company and has the criteria and sub-criteria as the valuation in accordance with the ONWJ internal agreement with special reference in the oil and gas industry and other literature studies. The weight of each criterion and sub-criteria is listed in this proposal form to make it easier to calculate the vendor's performance appraisal.

Expert respondents (experts judgment) who can use the proposal form in this study are experts who have been involved in the procurement process of goods and performance against vendors. Here are the respondents related to the research experts in the division of PSCM Pertamina Hulu Energi ONWJ:

1. *Goods Procurement Operations Manager*
2. *Goods Procurement Operations Assistant Manager*
3. *Performance Manager*
4. *SCM Compliance Supervisor*
5. *SCM Performance Supervisor*
6. *Senior Procurement Analyst*
7. *Procurement Analyst*
8. *Procurement Specialist*
9. *Market Assessment Analyst*
10. *Procurement Administrator*

Here are the provisions on the proposed design of vendor selection procurement in PHE ONWJ:

1. Proposed form is a new form of procurement vendor appraisal design. Certainly can be used for:
 - a. Supplier has never been and will follow the project in PHE ONWJ so that expert judgement / evaluator can only judge from outside reference by considering supplier performance in a project in all Pertamina / Pertamina Hulu Energi subsidiaries and considering the existence of a meeting in the form of presentation to the experience of following project outside.
 - b. Vendors have join the project and working with PHE ONWJ and have been registered with CIVD PHE ONWJ, so the expert judgement / evaluator can judge from previous experience and vendor history in following previous project at PHE ONWJ. In this case, any expert judgement / evaluator can consider based on vendor performance in the project within the scope of PHE ONWJ company.
2. This vendor form can be reused after getting the best vendor to reassess vendor performance when getting a project in PHE ONWJ.
3. The results of this vendor form documentation of the vendors who have followed a project in PHE ONWJ and will be considered to choose the best vendor in the future.
4. Form is designed and can be filled in Microsoft Excel form and in manual form. Forms designed in Microsoft Excel will be easier in getting the end result automatically.

IV.5 Analysis of the Proposed Performance Vendor Rating Form

From the result of the tenth evaluation of expert judgment / evaluator it can be concluded from Figure 11 that Vendor A has been registered in APDN, DPM, and CIVD PHE ONWJ, and has the final value of the procurement process of 84.049% and the final value after procurement of 84.158%. Vendor B has been registered in APDN, DPM, and CIVD PHE ONWJ, and has a final value in the procurement process of 86.792% and final value after procurement of 85.910%. While Vendor C has been

registered in APDN, DPM, and CIVD PHE ONWJ, and has a final value during the procurement process of 79.114% and the final value after the procurement of 81.633%.

Vendor B is the best vendor in vendor performance assessment reviewed from history in following a project at PHE ONWJ so Vendor B can work with PHE ONWJ in Subsea Tanker Rail Hose procurement project, 16 ", 15 Bar in December 2017.

VENDOR: A

PRE - PROCUREMENT	APDN	DPM	CIVD
	YES	YES	YES
PROCUREMENT	84.049%		
AFTER PROCUREMENT	84.158%		

VENDOR: B

PRE - PROCUREMENT	APDN	DPM	CIVD
	YES	YES	YES
PROCUREMENT	86.792%		
AFTER PROCUREMENT	85.910%		

VENDOR: C

PRE - PROCUREMENT	APDN	DPM	CIVD
	YES	YES	YES
PROCUREMENT	79.114%		
AFTER PROCUREMENT	81.633%		

Fig. 2. Overall Result of Performance Vendor

Although Vendor B gets the highest final value, it can be observed that the final value of Vendor A, Vendor B, and Vendor C is not very different from the difference of 2% - 6% only. In this case it can be seen that every vendor has a pretty good and rigorous performance. Each vendor has been registered in APDN, DPM, and CIVD. CIVD PHE ONWJ is a collection of databases from every registered vendor and has been working on procurement projects with internal PHE ONWJ. Therefore, PHE ONWJ has experience in cooperation with each vendor in a project, and of course PHE ONWJ has a high standard in selecting vendors in each project in PHE ONWJ so that the final score of performance appraisal vendor does not have significant difference.

Each vendor does not have a significant difference value, but Vendor B still has added value according to expert expertise / expert respondents in PHE ONWJ internal based on previous projects. In this case Vendor B will be reassessed in the implementation of the procurement project using a vendor performance appraisal form with the aim of obtaining additional documentation as a vendor's consideration in subsequent projects.

IV.6 Managerial Implications

From result of data processing and analysis in this research hence proposed to PT. Pertamina Upstream Energy Offshore North West Java (PHE ONWJ) for:

1. Using the vendor performance appraisal proposal form and following the provisions on the proposed design of vendor procurement selection in PHE ONWJ which has been described in analysis of the proposed form of performance vendor rating form.
2. The proposed form of vendor performance assessment in this study can be used in conjunction

with the previously used method with Performance Review Meeting (PRM) to review supplier performance between the company and the supplier through discussions that result in value and finalized by agreed improvement actions to improve performance and get more detailed results than ever before.

3. Taking into consideration all the criteria and sub-criteria of this study is mainly addressed to K3LL and TKDN to projects and work in PHE ONWJ such as maximizing HSE commitments and policies within the company and increasing TKDN value by using domestic components in PHE ONWJ and each vendor who will and have cooperated with PHE ONWJ.
4. If there is the same final result on the selection of vendors using the proposal form in this research, it can use the method used PHE ONWJ is Performance Review Meeting (PRM) that can consider the vendor based on the history of the vendor itself.

V. CONCLUSION

1. There are 12 main criteria in the three assessment phases in this research ie pre-procurement, during procurement process, and after procurement. Criteria obtained from the assessment of respondents in the pre-procurement stage is Appreciation of Domestic Products (APDN), List of Goods / Services Provider (DPM), and Centralized Integrated Vendor Database (CIVD). The criteria at the time of the procurement process are Documentation, Occupational Health and Environmental Protection (K3LL), Domestic Component Level (TKDN), Response, Human Resource Quality, and Flexibility. After procurement criteria are Quality, Quantity, and Delivery.
2. There are 19 sub-criteria at procurement stage and there are 11 sub-criteria at after procurement stage,.
3. Vendor A has been registered in APDN, DPM, and CIVD PHE ONWJ, and has a final value during the

procurement process of 84.049% and the final value after procurement of 84.158%. Vendor B has been registered in APDN, DPM, and CIVD PHE ONWJ, and has a final value in the procurement process of 86.792% and final value after procurement of 85.910%. While Vendor C has been registered in APDN, DPM, and CIVD PHE ONWJ, and has a final value during the procurement process of 79.114% and the final value after the procurement of 81.633%.

Getting the best vendor in December 2017 project in the purchase of Subsea Tanker Rail Hose (16 ", 15BAR) ie Vendor B has been registered in APDN, DPM and CIVD PHE ONWJ, and has a final value in the procurement process of 86.792% and final value after procurement amounted to 85.910%

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