SMART APPROACH TO DETERMINE SOLUTION OF COAL QUALITY DISCREPANCY IN COAL-FIRED POWER PLANT PROJECT UNDER BINDING PROJECT FINANCE SCHEME (Case Study: PT SBT)

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ABSTRACT

*PT Semangat Berjuang Terus ("**PT SBT**") as the developer of the coal-fired power plant with capacity 2 x 950 MW ("**the Project**") under the project finance scheme was experiencing an issue with the coal suppliers that have been engaged under the Coal Supply Agreement ("**CSA**") where coal suppliers could not provide conforming coal under the specification in CSA. This condition caused the coal suppliers are entering an event of default and it caused PT SBT to go into an event of default under agreement with financial lenders that potentially affect the eligibility to obtain a loan to complete the Project construction. This paper is intended to find the root cause, provide alternative solutions, and a recommendation towards the problem caused by coal quality non-conformity. Using Why-Tree and KT Problem Analysis, the Author identifies the root cause of coal quality non-conformity issue is the CSA terms are not applicable to accommodate the practice of coal supply arrangement for the Project. Based on the Simple Multi-Attribute Rating Technique (SMART) analysis method involving key persons from the PT SBT which comes from the technical, finance, legal, procurement, and operation side, requesting Lenders waiver to utilize the available coal that acceptable by the Contractor, despite the event of default under CSA, is the best option to maintain the eligibility to obtain the loan and complete the construction. Furthermore, PT SBT shall amend the CSA to mitigate the event of default which occurred because the coal quality will never meet the contract requirement*|

Keywords – *coal, decision, discrepancy, power, SMART*

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INTRODUCTION

As the coal-fired power plant, an Independent Power Producer (IPP) company (anonymously named PT Semangat Berjuang Terus ("**PT SBT**")) must engage with reliable coal suppliers to maintain the sustainability of the project for the 25 years operation time before handed over to PT Electric Indonesia ("**PT EI**") under the terms Build-Own-Operate-Transfer that regulated in Power Purchase Agreement ("**PPA**"). PT SBT is going under on Project Finance Scheme to develop a coal-fired power plant with a capacity 2 x 950 MW (the "**Project**") where it is defined as a long-term infrastructure, industrial projects, and public services using a non-recourse or limited recourse financial structure. The debt and equity used to

finance the project are paid back from the cash flow generated by the project (Hayes, 2021). Under the Project Finance scheme, engagement and procurement of coal are highly regulated under the terms stated in the PPA and Common Terms Agreement ("**CTA**") between PT SBT and Financial Lenders ("**Lenders**"). The Project Finance is defined as a long-term infrastructure, industrial projects, and public services using a non-recourse or limited recourse financial structure. The debt and equity used to finance the project are paid back from the cash flow generated by the project (Hayes, 2021). According to Esty and Christov in 2002, project finance involves the confluence of structural decisions (separate legal incorporation, unique capital structure, extensive contracting among participants, etc.). With this condition, certainly, the action that will be made especially towards the document which is critical for the sustainability of the project requires a holistic analysis of the impact among related agreements.

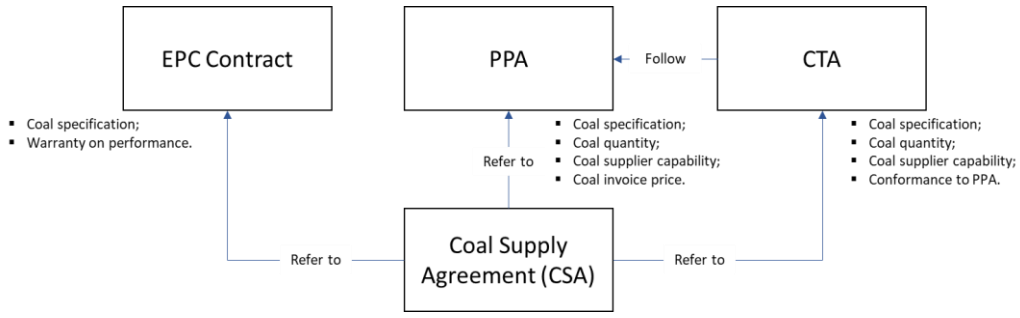

Figure 1 The relationship between project documents

Despite the loan issue, PT SBT also facing a potential equipment warranty void claim by the Contractor that engaged with PT SBT. Contractor claims the initial coal from PT Batu Coal ("**PT BC**") is not conforming with the EPC Contract coal specification which potentially causes the performance of the equipment shall be compromised and may not be performed as committed by the Contractor. However, Contractor explain the coal from another primary coal supplier, PT Gali Coal ("**PT GC**"), is still technically acceptable, and the Contractor will maintain a warranty if PT GC coal is being used for commissioning.

The root cause is identified using the Why-Tree and KT Problem Analysis which later found there is a mismatch between the expected coal quality in CSA terms with the real coal quality that can be supplied by PT BC and PT GC as the coal suppliers for PT SBT. Furthermore, the Author used the Simple Multi-Attribute Rating Technique (SMART) to analyze the alternative solution which has the biggest benefit for PT SBT.

Problem Analysis is the skill that is needed to explain any situation in which an expected level of performance is not being achieved and in which the cause of the unacceptable performance is unknown (Kepner & Tregoe, 1981). Why-Tree and KT Problem Analysis are some methods that could be used to identify the root cause of a problem.

For the decision-making analysis, SMART is a multi-criteria decision-making method developed by Edward in 1977 (Risawandi & Rahim, 2016). The SMART method is proposed for the decision-making process because this method can be used to analyze and compare the criteria that have values and each criterion have weights that describe its importance towards others.

This paper discussed the alternative solutions that PT SBT may choose to mitigate the impact that cause by the coal quality non-conformity that affects both financial and technical aspects. The objectives are to identify the root cause of the coal quality discrepancy issue in

the Project and later to identify what is the best alternative solutions that apply to achieve the priority goal of PT SBT. Finally, the author will provide the recommendation for the action that should be taken to ensure the continuity of the Project and find a practicable long-term solution for the Project.

The gap of this research is the evaluation of attributes, the weighing of attributes according to the preferences, and scoring of performance of options is done by the Author through perceiving interactions that occurred among the decisions makers and the Author when conducting Decision Analysis using SMART.

RESEARCH METHODS

Data is collected from the signed PPA document, CTA document, CSA document with PT BC, CSA document with PT GC, e-mail correspondences among internal and external parties involved in the coal issue, meeting/discussion among PT SBT Internal, PT EI, legal counsel, and engaged coal suppliers. Other than that, the Author used regulations of the Government of Indonesia and public news and article.

Data is analyzed using Why-Tree and KT Problem Analysis to identify the root cause, furthermore using SMART, the data is calculated and weighed to find the preferable alternative solutions.

RESULT AND DISCUSSION

Using the Why-Tree (Figure 2) and KT Problem Analysis, the Author through data analysis based on the existing documents, e-mail correspondences, meetings and discussion with various stakeholders, found the root cause of the coal quality discrepancy is inconsideration during the final tuning of CSAs document from both coal suppliers regarding the definition of PSC Rejection Limits for the coal cargo that causes less flexibility in terms of the coal quality to be shipped to PT SBT.

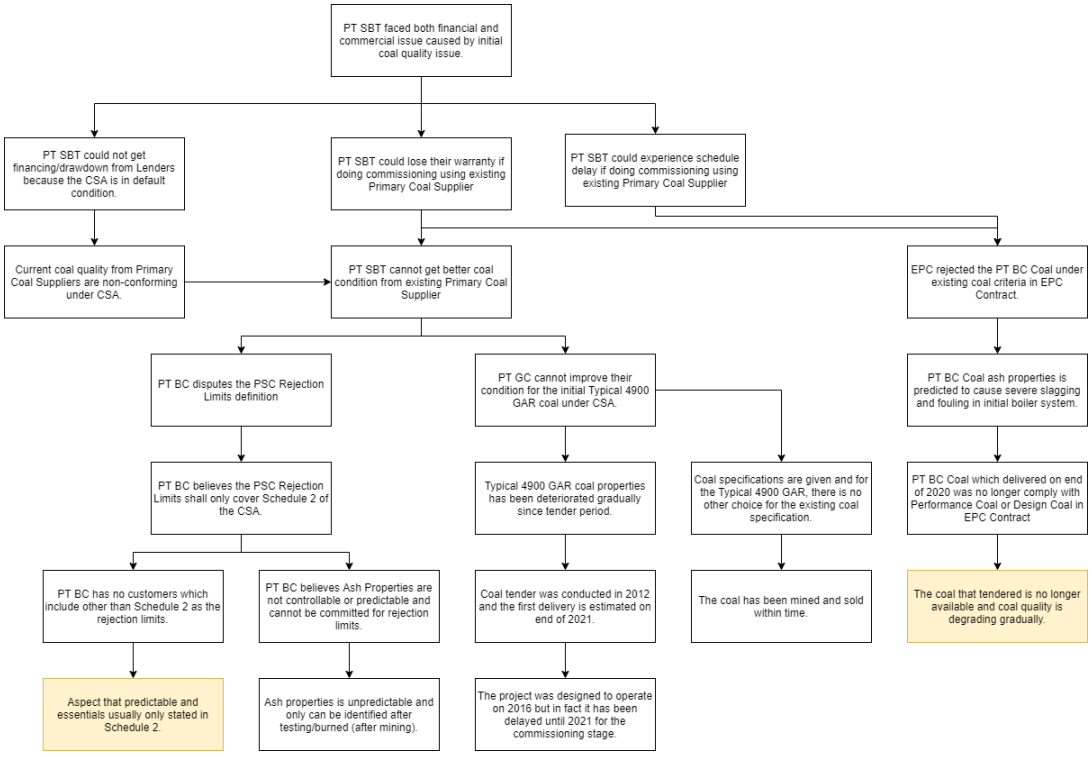

Figure 2 Why-Tree for the Coal Quality Discrepancy Issue of PT SBT

Table 1 below shows the Kepner-Tregoe Problem Analysis for the coal quality discrepancy issue which can observe the further impact caused by the non-conformity of coal quality issue.

Table 1 KT Problem Analysis for Coal Quality Discrepancy Issue

Name of Problem: Initial coal from both Primary Coal Supply is non-conforming under the Coal Supply Agreement (CSA) of each supplier. This condition causes the coal supplier is under coal quality failure in its rejection limits and any default in CSA also means default in CTA to Lenders. Default under CTA means PT SBT as the borrower cannot obtain drawdown/financing in order to complete the construction of the Project. In addition, only one coal supplier that acceptable from EPC Contract approach, other coal supplier coal is considered outside the EPC Contract specification and may affect the equipment warranty.

Specification	Is	Is Not	Distinctions	Changes
What:				
Object	Coal quality of both coal suppliers for the rejection limits.	Coal quantity	The abundance of coal and reserves are secure; however, the coal quality is non-conforming contractually under CSA.	The time difference between the tender until the first delivery of coal that took 8 – 9 years cause the tendered coal quality is no longer available.
Deviation	The coal quality is not conforming with the rejection limits.			
Where:				
Object:	Certificate of Analysis of PT BC and PT GC.	CSA documents	For PT BC case, other IPPs usually do not include ash properties as rejection limit.	In PT SBT Project Finance scheme and past agreement, the CSA is stipulating the mandatory for ash properties to be the rejection aspects for coal cargo. For the Total Sulphur, although in other project there is relaxation, but Total Sulphur is known to have stricter obligation to be followed as rejection aspect.
Place:	Each supplier CSA.		For PT GC case, other IPPs experience similar problem with Total Sulphur issue, but not in terms of ash properties.	
When:				
Time	In 2020 and 2021.	When tender process occurred in 2012.	The coal suppliers are still comfortable with the coal quality that stated in CSA. However, in 2020 we found coal suppliers were not expecting ash properties to be	The construction progress of the Project that delay and no one aware about (1) the coal is deteriorated within time and (2) coal suppliers and PT SBT has different

Specification	Is	Is Not	Distinctions	Changes
			rejection limit for coal cargo.	understanding about rejection limits.
How Much:				
Trend	Coal quality for commissioning and operation stage. Cause problem towards financing process from Lenders. May potentially cause schedule delay for commissioning or losing equipment warranty.			

Possible Causes:	**The most possible causes:**
1. The urges to execute CSA quickly in the past since the project was a national strategic project. 2. The coal suppliers were expecting the concept of rejection is similar with other CSA and concentrate more on the negotiation of transport cost. 3. The inconsideration on coal quality issue when project construction is delayed.	1. The inconsideration of coal quality rejection limit coverage during CSA finalization and its applicability. 2. The inconsideration of impact which cause by construction delay to the availability of conforming coal.

Verification:
To ensure the obligation for the coal quality rejection limits is applicable in practice and what is the initial coal availability in the market which suitable for the Project.

KT Problem Analysis Conclusion:
PT SBT and Coal Suppliers did not aware that the terms in contractual cannot be fully applied especially compared to other IPPs condition. In addition, the inconsideration of coal quality deterioration was not being observed and discussed far before commissioning stage when the Project delay has been occurred.

Under the KT Problem Analysis, the Author is able to identify that PT SBT and the coal suppliers were not aware that terms in each CSAs cannot be fully applied. This condition was missed out between the period of the construction started until the first coal delivery schedule.

Based on the SMART decision-making method, the Author is able to describe five (5) alternatives for the solution related to the impact caused by coal quality discrepancy which are (1) maintain right under CSA and asking coal suppliers to improve their coal quality, (2) find other coal suppliers, (3) negotiate with Contractor to accept the available coal from initial coal suppliers, (4) amend the CSA to adjust certain coal specification to avoid event of default, and (5) request Lenders waiver to utilize the available coal that acceptable by Contractor despite the event of default under CSA documents. This decision shall be made by the President Director which received a final recommendation from the section named Project Management Team that foreseen the construction activity in a broad point of view.

The Author then took a weighted average of the values from attributes assigned to the alternative solutions. As shown in Table 2 below, the Authors identify the biggest aggregate

benefit for the alternative solutions based on the criteria calculated to provide the biggest benefit for the PT SBT.

Table 2 Total Aggregate Benefit for The Alternative Solutions

No.	Decision	The Project Schedule	Equipment Warranty	Coal Availability	Compliance under PPA	Compliance under CTA	Total Aggregate Score	Aggregate Benefit (%)
1.	Maintain right under CSA then **pushing PT BC and PT GC to improve their coal quality** so that it will comply with each CSA and avoid default under CSA.	740.74	1185.19	345.68	1777.78	2345.68	6395.06	63.95
2.	**Find other coal suppliers** which conform with the EPC Contract and PPA coal specification at least during commissioning stage.	493.83	1333.33	518.52	1580.25	2345.68	6271.60	62.72
3.	**Negotiate with Contractor** to accept the available coal from both Primary Coal Suppliers	493.83	740.74	1728.40	1580.25	2111.11	6654.32	66.54
4.	**Amend each CSA** using certain adjustment of rejection limit that acceptable technically so that PT BC and PT GC will no longer be in default condition.	493.83	888.89	1382.72	1777.78	2345.68	6888.89	68.89
5.	**Request for Lenders waiver to utilize the available coal that acceptable by Contractor** despite the	2222.22	1037.04	1469.14	1481.48	1876.54	8086.42	80.86

No.	Decision	The Project Schedule	Equipment Warranty	Coal Availability	Compliance under PPA	Compliance under CTA	Total Aggregate Score	Aggregate Benefit (%)
	default under CSA documents at least during commissioning stage							

In Table 2, the author identifies that the solution with the highest aggregate benefit is Request for Lenders waiver to utilize the available coal that acceptable by Contractor despite the default under CSA documents at least during commissioning stage. The alternative solutions has 80.86% score which is the highest among others after calculating the weighted value of each criteria and alternative solutions.

In order to provide more comprehensive reference to the decision maker, then the Author calculate using the Benefit and Cost analysis. For the case of PT SBT related to the coal quality discrepancy issue, the cost of each alternative will go to the time consumption to make the decision and every alternative solution, if not taken timely and properly, might cause further implications that cannot be presented yet in terms of value. With this condition, the Author considers the cost for all decisions is similar.

Using sensitivity analysis, as shown in Table 3 below, the Author was able to analyze the further aggregate benefits towards the alternative solution by excluding the Contractor related attribute in the calculation such as the Project is on schedule and there is no concern in equipment warranty.

Table 3 Sensitivity Analysis Result

No.	Decision	The Project Schedule	Equipment Warranty	Coal Availability	Compliance under PPA	Compliance under CTA	Total	Aggregate Benefit (%)
		0.00	*0.00*	*28.57*	*32.65*	*38.78*		
1	Maintain right under CSA then **push PT BC and PT GC to improve their coal quality** so that it will comply with each CSA and avoid default under CSA.	-	-	571.43	2,938.78	3,877.55	7,387.76	73.88
2	**Find other coal suppliers** which conform with the EPC Contract and PPA coal specification at least during commissioning stage.	-	-	857.14	2,612.24	3,877.55	7,346.94	73.47

No.	Decision	The Project Schedule	Equipment Warranty	Coal Availability	Compliance under PPA	Compliance under CTA	Total	Aggregate Benefit (%)
		0.00	*0.00*	*28.57*	*32.65*	*38.78*		
3	**Negotiate with Contractor** to accept the available coal from both Primary Coal Suppliers	-	-	2,857.14	2,612.24	3,489.80	8,959.18	89.59
4	**Amend each CSA** using certain adjustment of rejection limit that acceptable technically so that PT BC and PT GC will no longer be in default condition.	-	-	2,285.71	2,938.78	3,877.55	9,102.04	91.02
5	**Request for Lenders Waiver to utilize the available coal that acceptable by Contractor** despite the default under CSA documents at least during commissioning stage	-	-	2,428.57	2,448.98	3,102.04	7,979.59	79.80

After excluding the Contractor related attribute which are Project Schedule and Equipment Warranty, Table 3 shows the calculation of alternative solution by amending each CSA is the alternative solution with the biggest aggregate benefit. This alternative solution could solve the issue related to the event of default in CSA and also CTA which cause PT SBT to be secure enough to obtain loans from Lenders.

CONCLUSION

Using the Why-Tree and KT Problem Analysis, the Author finds the inconsideration during the final tuning of both CSAs from coal suppliers in regard to the definition of PSC Rejection Limits for the coal cargo cause less flexibility in terms of the coal quality to be shipped to PT SBT and after 8 – 9 years since the tender year, the requirement is not applicable for the long-term coal supply agreement implementation.

From all the alternative solutions, using SMART decision-making method, the President Director of PT SBT shall apply for Lender's waiver to utilize the available coal that is acceptable by Contractor because it is able to facilitate both opinions which have strong concern in terms of compliance towards CTA, PPA, and CSA, while the waiver, which likely to be provided by Lenders as long as Contractor can assure the warranty is maintained, can help PT SBT maintaining the cash flow to complete the construction of the Project. This solution is considered able to facilitate the technical side to complete the construction stage of the Project without creating a significant impact on the Project schedule while maintaining eligibility to gain a loan. In the end at the long term, PT SBT needs to conduct study

technically and amend the content of CSA to be more flexible in terms of coal quality without neglecting critical technical factors.

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