

THE IMPACT OF ADDITIONING ESG FACTORS IN THE FINANCIAL MODEL IN POWER PLANT DEVELOPMENT CAN BE CATEGORIZED AS A BURDEN OR BENEFIT IN PT XYZ

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ABSTRACT:

The Indonesian government has set a roadmap to achieve a carbon neutral energy transition by 2060. In supporting this program, PT XYZ as a power generation company is focusing on building new power plants. Current power plant development only focuses on conventional concepts, namely price affordability and security of supply. However, in achieving a carbon neutral energy transition, it is necessary to add the pillar of acceptability. This acceptability pillar can be applied in the development of new projects by considering ESG factors (Environmental, Social, and Governance) which has an impact on the project's financial model. With the assignment allocation of 130 power generation projects from state own enterprise to PT XYZ assubholding, the author's suggestion is that PT XYZ should conduct a comprehensive study that evaluates the impact of ESG factors on financial model. This consideration aims to support the transition program net zero emission, preventing environmental damage, allocating budgets efficiently, ensuring the long-term stability of the company's BPP, and maximizing company value. Although there are some opinions that consider ESG to be a burden, this research aims to evaluate or analyze that ESG is not a burden but a benefit for the development of new projects. The method used is to consider significant ESG factors financial model projects, as well as assessing financial feasibility using methods such as Internal Rate of Return (IRR) and Net Present Value (NPV). This analysis takes into account the existence of limits on buying and selling prices set by state own enterprise (Persero) to prevent significant increases in BPP subsidies. Feasibility analysis of adding ESG factors to the construction of new generating projects provides the conclusion that ESG factors have savings benefits for PT XYZ.

Keyword : ESG Factors, BPP, Buying and Selling Electricity Prices, NPV, IRR

INTRODUCTION

In supporting this government program, the development of generating projects carried out by state own enterprise (Persero) and its subholdings including PT XYZ does not only focus on maximum profits but is in line with achieving NDC targets. This is stated in the 2021-2030 Electricity Supply Business Plan (RUPTL) published by state own enterprise (Persero), there is a target to carry out an energy transition with environmentally friendly technology in line with the transition program to net zero emission (Niu et al., 2022).

With the energy transition, the conventional concept of generating plants generally only focuses on 2 pillars, namely affordability (least cost) and security of supply (reliability), will move to the 3 pillars by adding acceptability (environmental consideration) in consideration of power plant development in accordance with RUPTL 2021-2030 (Kabeyi & Olanrewaju, 2022). Fulfilling all these pillars is a challenge for state own enterprise because currently many thermal projects need to be considered that electricity needs continue to increase but using renewable energy requires a longer time in planning until the plant is operational.

To obtain efficient tariffs, the government has made regulations through the Decree of the Minister of Energy and

Mineral Resources of the Republic of Indonesia (Kepmen ESDM 169/2021) No. 169.K/HK.02/MEM.M/2021 concerning the Amount of the Basic Cost of Supply (BPP) of State Own Enterprise (Persero) Generation in 2022, that the purchase of electricity by state own enterprise (Persero) is carried out referring to the amount of the basic cost of supply (BPP) national generation or in the local electricity system determined by the Minister (Adeko et al., 2022).

Research will be carried out where our company is the planner and executor of project development not only focusing on financial planning but also on business sustainability. In 2023, our company will build 130 assigned generator projects from the holding with various types of generators according to the RUPTL target (Halimanjaya, 2019). Integrated planning is required to map and optimize 130 projects with several integrated financial factors and ESG factors which influence project finances or several Financial Model items.

According to the author's observations, currently PT XYZ in developing new generators uses the NPV method conservatively and only focuses on reliable generators. As previously explained, the development of new generating projects has not yet considered ESG factors because several opinions stated that ESG is a burden or expense for the company. One of them is the opinion of Sullivan et al. (2015)

emphasize the importance of ensuring that sustainability costs do not exceed the company's available budget.

So in this research, the author conducted research that considers ESG Factors for the construction of new generating projects, and proves whether ESG Factors are a burden or benefit in its impact on financial model new generating project (Rusnaeni et al., 2023). In determining the buying and selling price of electricity, it will become the Basic Cost of Supply (BPP) for state own enterprise (Persero) so that the BPP amount can potentially increase significantly, which will increase the government's subsidy burden. So it is hoped that with these ESG factors, the construction of new power plants will not harm state own enterprise or PT

RESEARCH METHODS

The research was prepared using primary data and secondary data, including the following:

a. Data Primer

Conducting semi-structured interview data collection conducted with several interviewees who have expertise in the field thermal power plant, the interview aims to identify and validate factors that influence ESG factors, especially those related to emissions and efficiency engine, efficiency energy and consumable efficiency.

b. Data Secondary

Analyzing power plant projects through books, journals, theses and the internet. Study and analyze all regulations or provisions relating to electricity that currently apply in Indonesia

For a detailed explanation regarding data sources and an explanation of the primary and secondary data used can be seen in the table below:

Table 1
Primary and Secondary Data

Data source	Explanation	Data Description
WWF (2018) (Jechow, 2019)	Description of how ESG factors relate to financial model elements	Secondary
Regulations and journals and Self-Processed Data with several references	ESG Factor Analysis on the new power plant construction project at PT XYZ	Secondary and Primary
PT XYZ Consultant Data	Determining the assumptions in the financial model and the Project Cost value that will be used in analyzing the feasibility of building a new generator at PT XYZ	First
Semi-structured interview	Identify and validate ESG Factors that influence ABC project investments	First

Source: Has been reprocessed

RESULTS AND DISCUSSION

Analysis NPV and IRR on non ESG Factor

Cash flow calculations from 2023 to 2043 are carried out by calculation present

value with discount factor as big as Weighted Average Cost of Capital (WACC) namely 8.4%. Based on the analysis results NPV positive project then the project is feasible. According to the capital budgeting analysis, the calculation details are as follows:

Table 2
Investment Analysis non ESG Factor with funding

INVESTMENT ANALYSIS			
IRR Equity	%		10.40%
IRR Project	%		9.57%
WACC	%		8.40%
NPV	US\$		23,623,797
BCR			1.084
Discounted Payback Period		8 Tahun	7 Bulan
DSCR	X		1.45

Source: Author's Processed Data

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The conclusion is:

- a. Nilai IRR Equity 10.4%
- b. Nilai IRR Project 9.57%
- c. Discounted Payback Period is 8 years 7 months
- d. DSCR = 1.45 is greater than 1, then the company has sufficient funds to pay its debts and obligations.

Table 3

Investment Analysisnon ESG Factor without funding and the potential to not operate due to the AMDAL not having been issued

INVESTMENT ANALYSIS		
IRR Equity	%	12.30%
IRR Project	%	13.50%
WACC	%	10.30%
NPV	US\$	82,268,347
BCR		1.337
Discounted Payback Period	7 Tahun	2 Bulan

Source: Author's Processed Data

The conclusion is:

- a. Nilai IRR Equity 12.3%
- b. Nilai IRR Project 13.5%
- c. Discounted Payback Period is 7 years 2 months

issues that are taken into account in the analysis, selection and management of assets in ESG investments.

ESG factors have an influence on itemsfinancial model, Those that have a significant impact can be seen in the following picture:

ESG Factors

As per Kumar, et.al., 2023, World Bank (2018) defines activitiesESG Investing as “Environmental, social and governance

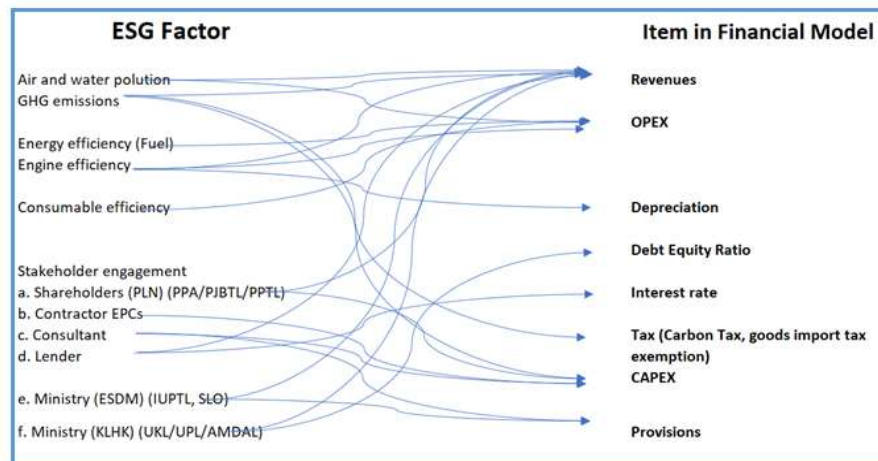


Figure 2. ESG factors have a significant impact on Financial Model

Source: Has been reprocessed

With the following explanation:

a. Air & Water Pollution

Air and water pollution occurs due to fuel quality that does not meet standards and engine conditions that are not well maintained. Therefore, the government is making efforts so that all power plants can meet standards related to water & water pollution. One of the government's efforts through the Indonesian Ministry of Environment and Forestry with the issuance of Ministerial Regulation No. 13 of 2021 aims to obtain emission data and information correctly, accurately and continuously using the CEMS system (continuous measurement of levels of emission parameters and water flow continuously).

These factors influence revenue and OPEX, expected to be there operation and maintenance. If it is good then the generator will not get

black proper so it can operate continuously.

b. GHG emissions

Gas emissions occur in the electricity generation industry as the largest contributor. In accordance with Ministerial Regulation No. P.15/MENLHK/SETJEN/KUM.1/4/2019 concerning Quality Standards for Thermal Power Plant Emissions, considering that thermal power plants have the potential to cause air pollution, it is necessary to control emissions.

From year to year the regulations are made increasingly stricter in the future, so company efforts are needed to be able to meet increasingly stringent emission quality standards.

Through Proper, the Ministry of Environment and Forestry with the issuance of Ministerial Regulation No. 1 of 2021. There are types of assessment criteria that will determine the proper ranking, which is the basis for the

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government to provide awards, guidance and law enforcement. Guidance is given to red proper participants and if they comply the status can be increased to blue. In accordance with Article 48 paragraph (1), law enforcement is given to black proper participants and will be carried out in accordance with the provisions of laws and regulations, even if the power plant cannot be operated.

c. Carbon Dioxide

State own enterprise has declared a roadmap to achieve net zero emission in 2060 by becoming clean power

company. Currently, the Indonesian Government's policy objective on 29 October 2021 is for the NDC to be implemented over a longer period of time. This policy consists of two instruments, namely trading instruments (ETS and crediting mechanism) and non-trading instruments (carbon tax and result based payment). Derivative regulations including the ESDM Ministerial Regulation regarding CCS/CCUS are still in the final drafting stage. The following is an illustration of Cap and Trade and Cap and Tax for CO₂:

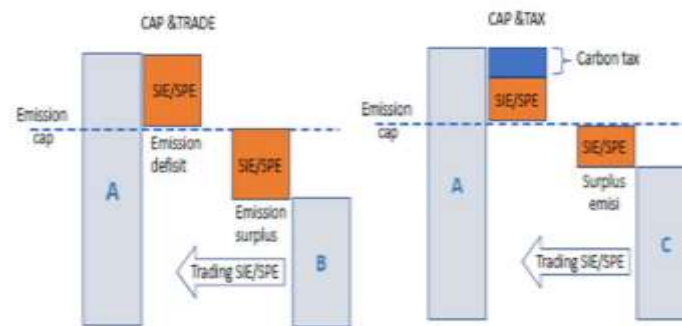


Figure 2. Illustration Cap & Trade and Cap & Tax

Source: Workshop related to the Carbon Capture Seminar 12 January 2023

At each generator there is a set emission cap, if the total emissions produced are higher then the generator experiences a deficit

emissions so that the generator has two options, namely to buy and sell CO₂ emissions and to pay the CO₂ emissions tax charged IDR 30,000/tCO₂ with detailed calculations below :

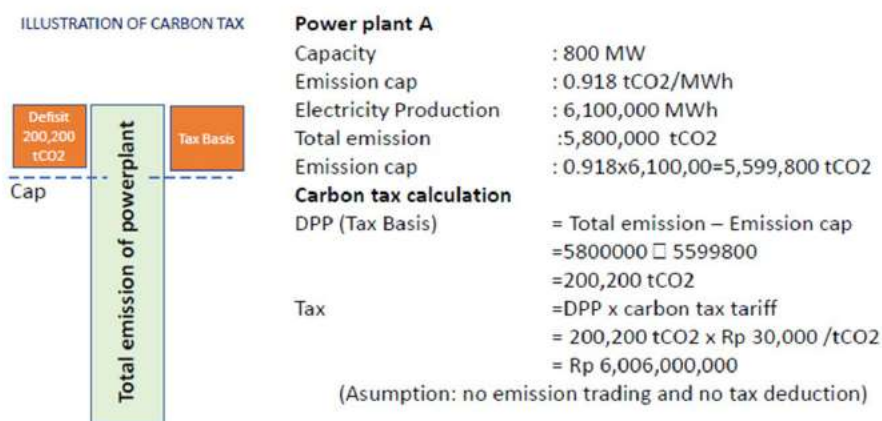


Figure 3. Illustration of Carbon Tax Calculation

Source: Workshop related to SeminarCarbon Capture January 12, 2023

d. Nitrogen Oxide (NO_x)

In accordance with Minister of Environment and Forestry Regulation No.P.15/2019, there is a NO₂ limit for PLTMG generators. The following is the data I got from calculating the estimated concentration of NO_x emissions from gas engines analyzed in the ICPEA 2023 international paper in accordance with regulatory limits in Indonesia (Reza et al., 2023).

e. Equipment Investment

In electricity generation, there is several equipment that can reduce GHG emissions. According to the interview results, special equipment is not needed for SO₂ emissions because the sulfur content in PLTMG tends to be low. To reduce NO_x emissions there is an equipment solution called Selective Catalytic Reduction (SCR), the SCR

equipment an investment of around 2.3% to 3.5% of the EPC Cost is required for a 10 MW to 30 MW PLTMG scale (this estimate was obtained from sources who have published journals related to SCR).

f. Energy Efficiency

According to the author's analysis, fuel quality determines generator efficiency, whether the specifications are appropriate or not out of specification then the energy that comes out will be efficient in producing electricity so that the electricity generator does not experience fines heat rate or SFC which is generally stated in the PPTL agreement due to fuel inefficiency. For fuel for the ABC project power plant, dual fuel (Oil and Gas) can be used. To achieve energy efficiency, it is hoped that gas can be used, which in addition to being cheaper, gas is also in accordance with research results that show greenhouse gas emissions. lower for gas compared

to fuel oil (Dr. Michael Wang et al. , 2012) (Wu & Zhang, 2017).

g. Engine Efficiency

Efficient operating patterns that occur continuously and the absence of start-stop generators can make the engine more efficient and less wasteful of fuel. To increase generator efficiency, innovation can be done, additional equipment or replacement of equipment, all innovations are adapted to generator conditions. So that power plants do not experience finesheatrate orSFC which has been agreed upon in the Electricity Supply Agreement (PPTL) due to inefficiencyengine in producing electrical energy.

h. Consumable efficiency

Arrangement Consumable efficiency regulated through state own enterprise directors' regulation No 0283.P/DIR/2016 concerning the use of state own enterprise electricity by non-state own enterprise electricity providers (Perdir 0283/2016) (Ten Cate, 2021). Consumable efficiency What is meant is own use, if the use itself in the implementation in the field exceeds the use compared to the planning that has been carried out previously, then it will have an impact on the financial model for 20 years.

In Perdir 0283/2016, personal use cannot be provided by the electricity provider itself, so electricity provided by state own enterprise is treated as a state

own enterprise customer and is subject to regular or premium rates in accordance with the applicable electricity tariff provisions. This will increase OPEX because it increases the expenses of electricity generation companies where the company only gets the ABD rate per kWh apart from the C rate for fuel. Pass through from state own enterprise. However, payments to state own enterprise are subject to regular rates, resulting in a difference in revenue generated and expenditure per kWh.

i. Stakeholder Engagement Holding (State Electricity Company (Persero))

State own enterprise (Persero), which is the Holding of PT . There are several obstacles in obtaining this agreement, including the discussion timeline which takes quite a long time, which can hinder the use of goods import tax exemption facilities. It is hoped that the PPTL/PPA/PJBTL can be completed soon or that the document will not be a requirement for utilizing the goods import tax exemption facility like state own enterprise considering that we are a subholding which aims to meet the electricity needs of the community and obtain tariff efficiency and considering that in the future state own enterprise will no longer build power plants, construction The generation will be carried out by subholding so that if the problem is not immediately mitigated,

there will be many projects that will be tariff inefficient due to not getting the import tax exemption facility for goods. In terms of the timeline for determining the PPTL/PPA/PJBTL is before the contract with the EPC Contractor. However, in field implementation of PPTL/PPA/PJBTL, this often occurs after a contract has been signed with the EPC Contractor, which can cause differences in the price planned by state own enterprise and the price set by the Owner. So it is not effective in setting tariffs because there is a process that is not in accordance with applicable procedures.

j. Stakeholder Engagement EPC Contractor

In the construction of new power plant projects, EPC Contractors and Owner has an interest in ensuring that the project schedule can run according to plan so that project costs are in accordance with the planned budget. However, in the implementation process, there are obstacles in the process of importing goods, where the Owner has an interest in utilizing the import tax exemption facility for goods which could potentially cause delays in the schedule because the process of utilizing this facility has various document requirements and the checking process also takes time. Therefore, there is a need for mutual cooperation and trust between the EPC Contractor and the Owner so that the

potential for non-transparency in the process of importing goods does not occur. Because documentation requirements are also inseparable from the role of the EPC Contractor, namely preparing a masterlist document which is used as one of the conditions for exemption from import tax on goods. In the author's analysis, apart from there being obstacles in utilizing the goods import tax exemption facility, there is also the potential for cost overruns caused by the Contractor's EPC or Owner delaying time in construction work and due to additional work requests that are not in accordance with initial planning, and the Contractor's EPC seeing opportunities to capitalize all types of work that can be capitalized.

k. Stakeholder Engagement Consultant

According to the author's analysis, consultants play an important role from planning to execution of power plant construction. Therefore, consultants have a potential conflict of interest if the consultant does not side with the Owner as an employer who requests the consultant's assistance so that they can provide assistance during the project planning stages, the tender process and supervise construction implementation. According to the author's analysis, in the tender assistance process there are several vulnerabilities, namely the existence of asymmetric information which may occur if the consultant tends

to one EPC contractor. The consultant's position in the tender assistance process should be neutral and not take sides with one of the EPC Contractors. During the construction stage, consultants must also not side with the EPC Contractor who will be constructing a new power plant project so that project implementation is in accordance with the Owner's needs and requests in accordance with the contract documents.

I. Stakeholder Engagement Lender

Currently, for the construction of new generating projects, lenders are generally interested in funding but there are several requirements that must be met because lenders are currently focusing on ESG and sustainability development where it is hoped that the company has fulfilled the environmental permit requirements and used fuel with lower emissions. Of course, if you pay attention to several factors and meet the lender's funding requirements, funding will be faster so that financial closing will occur immediately and the project can be executed immediately. And the advantage of funding obtained from these lenders is that you get a small interest rate compared to funding obtained from domestic investors or commercial banks.

As of March 2020, 3826 institutions worldwide had joined the principles of responsible investment and

considered ESG factors in their decision-making processes, compared to 734 institutions in 2010 (Yuan et al., 2022). There are studies that believe that ESG increases stakeholder trust in companies and reduces financing costs and ultimately increases CFP (Carbon Footprint).

Therefore, policies have been implemented to support environmentally friendly corporate or business behavior through generous financial incentives, including offering concessional interest rates that are lower than market interest rates and opening a "Green Channel" (Xiong, Yahui, et al., 2020).

m. Stakeholder Engagement Ministry (ESDM)

The role of the Ministry of Energy and Mineral Resources in power plant development projects is very large, namely:

1. Issue IUPTL if the AMDAL, KKPR, PPTL documents are complete.
2. Get exemption from import tax on goods if the IUPTL and Masterlist are issued by ESDM.
3. Issue SLO if IUPTL is issued. If there is no SLO, the generator cannot operate commercially.

With the ministry's role having a big impact on generation projects, it is hoped that project flexibility will impact electricity rates or even be equalized with state own enterprise so that

efficiency in project costs will be incurred. The provisions for import tax exemption on goods will be explained in more detail as follows:

1. Import Duty

Based on Minister of Finance Regulation no. 66/PMK.010/2015 concerning Exemption from Import Duty on Imports of Capital Goods in the Context of Building or Expanding the Electric Power Generation Industry for Public Interest in Article 3 (Tapparan, n.d.).

Electricity generation companies are included in the category of article 3 letter (c) above, where it is explained that electricity generation companies must be IUPTL holders and have an electricity purchase and sale agreement with state own enterprise. Because in the future, state own enterprise will no longer build power plants, so there is the potential for a buildup of dozens of projects that cannot take advantage of the goods import tax exemption facility and this will have an impact on electricity rates because it increases the CAPEX burden.

2. Import VAT

Based on PMK No.115/PMK.03/2021 concerning Procedures for Purchasing Facilities Exempt from Imposition of Value Added Tax on Imports in article 10

paragraph (1). The condition for issuing a Masterlist is an IUPTL, where the IUPTL itself is not required at the initial stage of plant construction. There are several problems due to non-synchronization timeline which is assumed by the ministry and developers, where the exemption from import tax on goods is generally carried out in advance when the project begins construction, while the IUPTL should be managed in parallel to obtain the required SLO after construction is completed where there is still a very long time to manage the IUPTL and SLO as operational requirements generator. So that IUPTL does not become an obstacle in the future because IUPTL processing can be parallel while waiting for construction to be completed.

One of the impacts if an electricity generation company is able to obtain a goods import tax exemption facility is that the company will be able to save 15% to 25% of the imported goods that will be used. The amount of goods import tax exemption is determined by whether the goods are included in the negative list or not. Because in the future, state own enterprise will no longer build power plants, so there is the potential for a buildup of dozens of projects that cannot take advantage of

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the goods import tax exemption facility and this will have an impact on electricity rates because it increases the CAPEX burden.

n. Stakeholder Engagement Ministry (KLHK)

In accordance with the funding requirements, the AMDAL document is one of the funding requirements for Lender that pays attention to ESG factors, so financial close can be published immediately if the document is complete according to the previous explanation in the subchapter Stakeholder Engagement Lender. However, if the AMDAL document is not issued immediately, then...financial close If it is not obtained immediately, there could be a delay in the project construction start target so that it cannot proceed according to the planning date.

According to the author's analysis, until now bureaucratic practices still

exist, namely that, among other things, intensive coordination is required between the various parties involved in its publication without considering what effects will result if the AMDAL is not immediately published. Even in the process, if there is a change in policy from the ministry during the AMDAL verification process, the impact could extend the publication time. Also, AMDAL documents are at risk of conflicts of interest, which can lead to conflicts between project developers, project competitors and communities around the affected locations.

A. State Own Enterprise Group Annual Expenditures And Savings

In calculations using ESG factors and without using ESG factors, the impact on management will be found, the impact on savings caused by differences in tariffs. PT With expenditure based on levelized rates in a year, the savings obtained are as follows:

Table 4
State Own Enterprise (Persero) expenses to PT XYZ for tariffs without ESG Factors

No	CF	Komp A	Komp B	Komp C	Komp D	Target Annual Power Sale (MWh)	Realisasi Annual Power Sale (MWh)	Total Pendapatan 20 tahun (Rp)	Total Pendapatan 1 tahun
1	100%	829,16	200,88	2.338,96	38,95	1.104.389,24	1.840.648,74	125.456.777.428.765,00	6.272.838.871.438,23
2	90%	829,16	200,88	2.338,96	38,95	1.104.389,24	1.656.581,87	112.911.099.685.888,00	5.645.554.984.294,41
3	80%	829,16	200,88	2.338,96	38,95	1.104.389,24	1.472.518,99	100.365.421.943.012,00	5.018.271.097.150,58
4	70%	829,16	200,88	2.338,96	38,95	1.104.389,24	1.288.454,12	87.819.744.200.135,20	4.390.987.210.006,76
5	60%	829,16	200,88	2.338,96	38,95	1.104.389,24	1.104.389,24	75.274.066.457.258,70	3.763.703.322.862,94
6	50%	829,16	200,88	2.338,96	38,95	1.104.389,24	920.324,37	66.520.272.369.445,50	3.326.013.618.472,27
7	40%	829,16	200,88	2.338,96	38,95	1.104.389,24	736.259,50	57.766.478.281.632,10	2.888.323.914.081,61
8	30%	829,16	200,88	2.338,96	38,95	1.104.389,24	552.194,62	49.012.684.193.818,80	2.450.634.209.690,94

Source: Has been reprocessed

Table 5
State Own Enterprise (Persero) Expenses to PT XYZ for Tariffs with ESG Factors

No	CF	Komp A	Komp B	Komp C	Komp D	Target Annual Power Sale (MWh)	Realisasi Annual Power Sale (MWh)	Total Pendapatan 20 tahun (Rp)	Total Pendapatan 1 tahun
1	100%	430,70	160,67	1.414,82	32,46	1.104.389,24	1.840.648,74	75.048.771.051.556,20	3.752.438.552.577,81
2	90%	430,70	160,67	1.414,82	32,46	1.104.389,24	1.656.583,87	67.543.893.946.400,60	3.377.194.697.320,03
3	80%	430,70	160,67	1.414,82	32,46	1.104.389,24	1.472.518,99	60.039.016.841.245,00	3.001.950.842.062,25
4	70%	430,70	160,67	1.414,82	32,46	1.104.389,24	1.288.454,12	52.534.139.736.089,30	2.626.706.986.804,47
5	60%	430,70	160,67	1.414,82	32,46	1.104.389,24	1.104.389,24	45.029.262.630.933,70	2.251.463.131.546,69
6	50%	430,70	160,67	1.414,82	32,46	1.104.389,24	920.324,37	39.701.394.415.816,10	1.985.069.720.790,80
7	40%	430,70	160,67	1.414,82	32,46	1.104.389,24	736.259,50	34.373.526.200.698,40	1.718.676.310.034,92
8	30%	430,70	160,67	1.414,82	32,46	1.104.389,24	552.194,62	29.045.657.985.580,70	1.452.282.899.279,04

Source: Has been reprocessed

Sensitivity Analysis

Table 5
Sensitivity Analysis ABC Project

No	Keterangan	EPC Cost	OM Cost	Debt Equity	Kapasitas 20 tahun (MWh)	CoD	CoE	WACC	IRR Equity	IRR Project	NPV	Tarif	Faktor ESG
1	Baseline 100% Equity	231.045.363,19	14.410.126,49	0% 100%	22.087.764,87	0%	10.303%	10.30%	12.30%	11.66%	27.701,348	3.102,48	a. Tanpa adanya pendanaan (Lender lebih berfokus pada faktor lingkungan) b. Tidak ada potensi klaim (EPC Kontraktor dan Owner bekerja sama dengan baik sesuai dengan perencanaan) c. Di asumsikan Engine baik baik saja (menjaga Efisiensi engine) d. Menggunakan bahan bakar minyak (Bahan bakar gas tidak mudah didapatkan atau efisiensi energy tidak termanfaatkan dengan baik)
2	Baseline	231.045.363,19	14.410.126,49	60% 40%	18.096.562,97	9.5%	10.303%	8.40%	10.40%	9.55%	22.008,415	3.002,40	a. Terdapat pendanaan dari Lender dengan rate yang konservatif b. Tidak ada potensi klaim dan EPC Kontraktor c. Di asumsikan engine baik-baik saja karena efisiensi engine terjaga d. Menggunakan efisiensi energy yang tidak efisien dengan menggunakan bahan bakar minyak
3	Tanpa Faktor ESG - Cost overrun	244.011.828,50	17.894.363,05	0% 100%	17.491.832,37	0%	10.303%	10.30%	12.30%	13.50%	102,268,347	3.407,96	a. Potensi Klaim EPC Kontraktor saat konstruksi sehingga CAPEX naik b. Tanpa ada pendanaan dari Lender sehingga WACC tinggi c. Engine tidak terjaga dengan baik sehingga emisi meningkat potensi proper hilam dan pembangkit tidak dapat beroperasi, sehingga kapasitas produksi
4	Tanpa Faktor ESG dan Pendanaan Konservatif	244.011.828,50	17.894.363,05	60% 40%	18.096.562,97	9.5%	10.303%	7.72%	9.72%	8.57%	17.363,202	3.037,40	a. Potensi Klaim EPC Kontraktor saat konstruksi sehingga CAPEX naik b. Terdapat pendanaan dari Lender dengan rate yang konservatif
5	Tanpa Faktor ESG	244.011.828,50	17.894.363,05	60% 40%	18.096.562,97	8.5%	10.303%	7.95%	9.95%	8.90%	19.518,961	3.049,67	c. Engine tidak terjaga dengan baik sehingga emisi meningkat potensi proper hilam dan pembangkit tidak dapat beroperasi, sehingga kapasitas produksi (revenue) berkurang dalam setahun dan biaya OM meningkat
6	Tanpa Faktor ESG	244.011.828,50	17.894.363,05	60% 40%	18.096.562,97	9.0%	10.303%	8.17%	10.17%	8.23%	21.508,694	3.061,87	Terdapat pendanaan dari Lender dan Biaya OM sesuai Baseline
7	Tanpa Faktor ESG	244.011.828,50	17.894.363,05	60% 40%	18.096.562,97	9.5%	10.303%	8.40%	10.40%	9.67%	23.623,707	3.074,49	NPV = 0
8	Dengan Faktor	297.016.350,35	14.410.126,49	80% 40%	22.087.764,87	4%	10.303%	5.92%	7.92%	6.38%	11.435,964	2.056,21	Biaya OM naik akibat penambahan peralatan investasi
9	Tanpa Faktor ESG dengan faktor	244.011.828,50	17.894.363,05	60% 40%	18.096.562,97	9.5%	10.303%	8.40%	8.23%	8.40%	-	3.021,99	NPV = 0
10	Dengan faktor	297.016.350,35	15.700.266,97	60% 40%	22.087.764,87	4%	10.303%	5.92%	7.92%	6.38%	11.435,964	2.056,21	NPV=0
11	Dengan faktor	297.016.350,35	15.700.266,97	60% 40%	22.087.764,87	4%	10.303%	5.92%	7.92%	6.38%	11.435,964	2.056,21	Biaya OM naik akibat penambahan peralatan investasi
12	Dengan faktor	297.016.350,35	17.894.363,05	60% 40%	18.096.562,97	4%	10.303%	5.92%	10.02%	6.70%	13.863,417	2.106,07	Batasan atas

Source: Processed Author's Data

The table above shows several analyzes used to test and understand the extent to which changes to certain variables or assumptions

can affect the results or output of a model, projection, or business decision.

Table 6
Comparison and Savings between rates without ESG Factors and with ESG Factors

No	CF	Pendapatan 1 tahun no ESG Factors	Pendapatan 1 tahun tanpa ESG Factorss	Penghematan 20 tahun
1	100%	6.272.838.871.438,23	3.752.438.552.577,81	50.408.006.377.208,40
2	90%	5.645.554.984.294,41	3.377.194.697.320,03	45.367.205.739.487,60
3	80%	5.018.271.097.150,58	3.001.950.842.062,25	40.326.405.101.766,70
4	70%	4.390.987.210.006,76	2.626.706.986.804,47	35.285.604.464.045,90
5	60%	3.763.703.322.862,94	2.251.463.131.546,69	30.244.803.826.325,00
6	50%	3.326.013.618.472,27	1.985.069.720.790,80	26.818.877.953.629,40
7	40%	2.888.323.914.081,61	1.718.676.310.034,92	23.392.952.080.933,70
8	30%	2.450.634.209.690,94	1.452.282.899.279,04	19.967.026.208.238,10

Source: Has been reprocessed

Based on the comparison table, the savings that occur are very significant, namely at a CF of 60%, the state own enterprise Group can make savings of IDR 30 trillion over 20 years.

CONCLUSION

From the results of savings calculations, state own enterprise in an agreement using CF=80% can save expenses of around IDR 2 trillion in 1 year, and cumulatively during the agreement period it can make savings of IDR 30 trillion. State own enterprise benefits from savings in 1 year of IDR 2 trillion, which can be used to add new plants equivalent to building plants with a capacity of around 100 MW. Therefore, the ESG factor is not a burden for the state own enterprise Group, in fact it can benefit and get savings. What has not been taken into account in this study is foreign exchange risk and CO2 levels which can be used for carbon trading so that companies get benefits from surplus CO2 which can be sold which provides added value. Further research can

be carried out to see possible results that have not been taken into account in this study.

BIBLIOGRAPHY

- Adeko, R., Ermayendri, D., & Marwanto, A. (2022). Karakteristik Kualitas Air Sumur Gali di Kecamatan Muara Bangkahulu melalui Analisis Data Daya Hantar Listrik, Total Dissolved Solid (Tds), pH, dan Suhu. *Jurnal Mitra Rafflesia*, 14(2), 104–120.
- Halimanjaya, A. (2019). The political economy of Indonesia's renewable energy sector and its fiscal policy gap. *International Journal of Economics, Finance and Management Sciences*, 7(2), 45.
- Jechow, A. (2019). Observing the impact of WWF earth hour on urban light pollution: A case study in Berlin 2018 using differential photometry. *Sustainability*, 11(3), 750.
- Kabeyi, M. J. B., & Olanrewaju, O. A. (2022). Sustainable energy transition for renewable and low carbon grid electricity generation and supply.

- Frontiers in Energy Research*, 9, 1032.
- Niu, X., Zhan, Z., Li, B., & Chen, Z. (2022). Environmental governance and cleaner energy transition: Evaluating the role of environment friendly technologies. *Sustainable Energy Technologies and Assessments*, 53, 102669.
- Reza, A. M., Chariri, F., Yurwendra, A. O., Prakoso, A. A., & Rifaldi, M. (2023). Combustion Consumables Cost Analysis in 110 MW gross CFB type CFPP Biomass Co-firing Application. *2023 IEEE 3rd International Conference in Power Engineering Applications (ICPEA)*, 208–213.
- Rusnaeni, N., Gursida, H., Sasongko, H., & Hakim, D. R. (2023). Financial performance, capital structure, and firm's value: The moderating role of dividend policy. *Journal of Business, Social and Technology (Bustechno)*, 4(1), 1–15.
- Tapparan, E. M. D. (n.d.). *Indonesian Renewable Energy Policy and Investment Opportunities*. Directorate General of New, Renewable Energy and Energy Conservation
- Ten Cate, L. N. dos S. (2021). *Quem recebe e que diferença fazem?: um estudo sobre alocação de emendas orçamentárias individuais nos municípios brasileiros*.
- Wu, Y., & Zhang, L. (2017). Can the development of electric vehicles reduce the emission of air pollutants and greenhouse gases in developing countries? *Transportation Research Part D: Transport and Environment*, 51, 129–145.
- Abbas, S. A. (2018). Entrepreneurship and information technology businesses in economic crisis. Abbas, SA, 682-692.
- Adebisi, K. I. (2018). Entrepreneurship Revolution, Skill Acquisition, and Entrepreneurial Intention of Undergraduate Students of the Colleges of Education in North Central Nigeria. *KIU Journal of Social Sciences*, 4(2), 131-137.
- Adebusuyi, A. S., Kolawole, S. O., Abu, H. S., Adebusuyi, O. F., & Ajulo, A. A. (2021). Predicting entrepreneurial and professional career mindsets in young Nigerian adults. *Journal of Entrepreneurship in Emerging Economies*.
- Adesola, S., den Outer, B., & Mueller, S. (2019). New entrepreneurial worlds: Can the use of role models in higher education inspire students? The case of Nigeria. *Journal of Entrepreneurship in Emerging Economies*.
- Adike, A. J., Anosike, P. U., & Wang, Y. (2021). Two-sided Institutional Impacts and Informal Entrepreneurship Motivation in Nigeria. *Journal of Entrepreneurship and Innovation in Emerging Economies*, 23939575211045488.

- Adu, I. N., Boakye, K. O., Suleman, A. R., & Bingab, B. B. B. (2020). Exploring the factors that mediate the relationship between entrepreneurial education and entrepreneurial intentions among undergraduate students in Ghana. *Asia Pacific Journal of Innovation and Entrepreneurship*.
- Aigbedion, E. (2021). Preparing Nigerian Youth for Self-Employment (Doctoral dissertation, Walden University).
- Ajose, O. A. (2021). Entrepreneurship Training and the Intention to Start New Ventures Among Selected Undergraduates in South-West, Nigeria (Doctoral dissertation, Kwara State University (Nigeria)).
- Ajzen, I. (1988). «Attitudes, personality, and behavior. Milton Keynes», Open University Press.
- Ajzen, I. (2002). «Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior». *Journal of Applied Social Psychology*, 32(4), 665–683.
- Akwaowo, R. (2021). Entrepreneurial Competency and Competitive Advantage of Hotels in Nigeria. Available at SSRN 3912459.
- Al Issa, H. E. (2021). Advancing entrepreneurial career success: the role of passion, persistence, and risk-taking propensity. *Entrepreneurial Business and Economics Review*, 9(2), 135-150.
- Anjum, T., Farrukh, M., Heidler, P., & Diaz Tautiva, J. A. (2021). Entrepreneurial Intent: Creativity, Entrepreneurship, and University Support. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), 11.
- Anjum, T., Sharifi, S., Nazar, N., & Farrukh, M. (2018). Determinants of entrepreneurial intention in perspective of theory of planned behaviour. *Management theory and studies for rural business and infrastructure development*, vol. 40, no. 4, p. 429-441.
- Antonicic, J. A., Antonicic, B., Gantar, M., Hisrich, R. D., Marks, L. J., Bachkirov, A. A., & Kakkonen, M. L. (2018). Risk-taking propensity and entrepreneurship: The role of power distance. *Journal of Enterprising Culture*, 26(01), 1-26.
- Anwar, I., Jamal, M. T., Saleem, I., & Thoudam, P. (2021). Traits and entrepreneurial intention: testing the mediating role of entrepreneurial attitude and self-efficacy. *Journal for*

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