



## An Evaluation and Proposed Strategies for PT XYZ Tbk's Green Bond

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**ABSTRACT:** Environmentally friendly projects could be funded by green bond. The most recent company that issued green bond is PT XYZ Tbk. The company has 112.2 MW gap to their hydro power plant capacity target. Moreover, the green bonds issued has higher coupon than other green bonds in Indonesia. This research aims to find the issue's cause, the effect of green bonds issuance on company valuation, and recommendations for next green bonds issuance. Compared with benchmarks in Indonesia and some issuers abroad, PT XYZ Tbk's has no Environmental, Social, and Governance (ESG) rating and the green bond has lower credit rating than other issuers. The value of PT XYZ Tbk increases by 2.35% after issuing green bond, calculated using Discounted Cash Flow valuation technique. For successful future green bond issuance, PT XYZ should increase its credit rating, mitigate risk related to hydro power plant condition, and get ESG rating.

**KEYWORDS:** Company Valuation, Cost of Capital, Credit Rating, ESG Rating, Green Bond.

### INTRODUCTION

Global warming is the proof of changing climate. Since the industrial revolution, anthropogenic emissions of greenhouse gases (GHGs), such as CO<sub>2</sub>, NH<sub>4</sub>, and N<sub>2</sub>O filled up the atmosphere [1]. Human-induced forest burning to open up new land for business activity also contributes negatively to carbon emission. Research shows that cumulative emissions impact from deforestation fires in Indonesia and Brazil was 3.7 (±0.4) and 1.9 (±0.2) Gt CO<sub>2</sub>eq in 2019 and 2020, respectively [2]. Forster et. al in 2023 have done research on key climate indicators and it shows that human-induced warming reached 1.14°C averaged over 2013 – 2022 and 1.26°C in 2022 [3].

One of the pioneers of international forum that concerns climate change and energy transition is Conference of the Parties (COP). It is one of the governing bodies in United Nation Framework Convention on Climate Change (UNFCCC). All states that are parties in COP review the implementation of the convention. The first COP meeting was held in Berlin, Germany in March 1995 [4]. In 2015, during COP 21 held in Paris, it was stated that parties should held global average temperature increase below 2°C above pre-industrial level and pursue effort to limit temperature to 1.5°C above pre-industrial levels [5]. Another decision made is for developed countries to help developing countries to implement the convention by realizing technology in their movement for creating cleaner future. To use the technology, developing countries should have the funds. This is where developed countries are asked to provide financial help for developing countries.

In 2022, Indonesia also succeeded to conduct G20 meeting in Bali that also encourage nations to reduce environmental pollution, like air pollution. The G20 meeting produce Bali Leader's Declaration which include the Bali Energy Transitions Roadmap. The G20 Energy Transition Working Group relies on three priorities. The first priority is securing energy accessibility. The second priority is scaling up smart and clean energy technologies. Lastly, the third priority is advancing clean energy financing [6]. Based on those two international forum decisions, financing is one of the main parts to make energy transition and cleaner future happens. If there is lack in financing, all energy transition and net-zero path initiative will not be achieved. Based on stakeholders, we know financing can be divided into public financing and private financing. Based on the structure, there are also two types of financing to raise capital, debt and equity based financing [7].

### BUSINESS ISSUE

Currently, PT XYZ Tbk has two operating Hydro Power Plants (HPPs). The first is in Java island, and the second operating HPP Sulawesi island. PT XYZ Tbk also has HPP with status in-construction,. Another HPP of PT XYZ Tbk is still in "construction preparation" status. Besides that, PT XYZ Tbk also has energy supplies inside PLN's list of selected providers. From the information above it is known that PT XYZ still has a gap of of energy supplies. This research aims to observe the action that have been taken



by and profile of some successful green bond issuers in Indonesia and abroad, analyze the impact of green bond issuance to PT XYZ Tbk's company valuation, and recommend strategies for next green bond issuance for PT XYZ Tbk. These are the research scope : the focus is on green bonds not green sukuk or other green financing financial instruments, the focus is on corporate green bonds, not sovereign green bonds. Moreover, the research scope is on publicly listed green bonds not privately placed green bonds. The main research object is PT XYZ Tbk. This research will be limited to data access which mainly comes from secondary data.

## LITERATURE REVIEW

### A. Green Bond Definition

There are many interpretations and definitions of green bond. The following are several definitions from some huge institutions. Green bond, according to The International Capital Market Association (2021), is any type of bond instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects and which are aligned with the four core components of the Green Bond Principles (GBP) [8]. Green bonds were created to fund projects that have positive environmental and/or climate benefits [9]. Green bond is a remarkable and innovative financial instrument that aid to move private capital to solve climate challenge by driving capital into low-carbon emission and renewable energy project [10]. Lastly, according to Indonesian Financial Services Authority in 2017, green bond is debt securities that the issuance proceed used to finance or refinance part or whole environment based business activity. All definitions above agree that green bond is a debt financial instrument that are determined to finance or refinance environmental improvement or green projects.

### B. Green Projects

The International Capital Market Association (ICMA) in their Green Bonds Principles in 2021 mentioned some eligible projects categories, such as renewable energy, energy efficiency, pollution prevention and control, environmentally sustainable management of living natural resources and land use, terrestrial and aquatic biodiversity, clean transportation, sustainable water and wastewater management, climate change adaptation, circular economy adapted products, production technologies and processes, and/or certified eco-efficient products, and green buildings [8]. Indonesian Financial Services Authority in green bond regulation in 2017 also mentioned the same categories of green projects as ICMA.

### C. External Reviews

Types of external reviews are mentioned by Asian Development Bank in 2021, such as second party opinion (SPO), verification or assurance, certification, and scoring or rating. SPO is a report from specialized consultant who provide opinion on issuer's bond label, sustainability, or green narrative [11]. External reviews are effective signaling tools for issuers in the financial industry, and an SPO has the most effectively signals the credibility and quality of greenness information based on research [12]. However, a research [13] shows contrary result with [12] research. A research shows that there is no effect of greenness ratings on green bond liquidity for financial institutions and other public issuers besides municipalities [13].

### D. ESG Score/ Rating

ESG score / rating is a quantitative measure of a company's Environmental, Social and Governance performance. It is different from Corporate Social Responsibility (CSR). CSR is a voluntary actions of a company to improve the society and environment [14]. ESG score / rating are meant to reduce the risk of investment. It reflects the risk that are exposed to the company's business activity [15]. ESG score / rating has an effect on green bond. It significantly reduces the green bond premium. Companies that are willing to strive to get ESG score is rewarded with lower cost of capital [16]. ESG rating significantly affect the pricing of green bond [17]. A research done by [18] support their hypothesis that ESG ratings significantly reduce cost of capital of a firm that issue green bond. However, the effect emerge from the "G" aspect, the governance aspect.

### E. Credit Rating

Bond are also susceptible to default risk. To measure such risk, some companies act as the assessor and become what is called as credit rating agencies. Related to green bond, credit rating has an important role to make a green bond issuance successful. It is stated that credit rating is one of the important factors that will attract investors [19]. Credit ratings reflects risk of the company whether company can pay the interest rate to the investor or not. Another research also stated that higher credit rating have inverse relationship with green premium [20]. Credit rating has negative relationship with yield spread of corporate green bond [21].



**F. Green Premium**

Green bond has one special financial characteristic, the green premium or greemium. means that investors are willing to get lower yield by investing in green bonds compared to conventional bonds. Negative green premium in primary or secondary market means that green bonds are traded with lower yields than conventional bonds [22]. A research using propensity score matching approach stated that on primary market, green bonds spread have 35-40 basis points lower than the conventional bonds. On secondary market, the effect of green premium is also highly significant [23]. The green premium can reduce financing cost for at least 15 basis points [24].

**G. Valuation**

Valuation is a process that link risk and return to determine the worth of an asset [7]. Discounted Cash Flow (DCF) technique is discounting all future expected cash flow of an asset with a rate that reflects the riskiness of the cash flow. The main objective of this valuation is to find the intrinsic value of an asset. The type of valuation that will be conducted in this research is firm valuation. The following is the general equation of firm value [25]:

$$\text{Value of the firm} = \sum_{t=1}^{t=n} \frac{\text{CF to the firm}_t}{(1 + \text{WACC})^n}$$

where;

n = Life of the asset

CF to the firm<sub>t</sub> = Expected cash flow to the firm in period t

WACC = Weighted Average Cost of Capital

Cash flow calculation that will be used is the cash flow for the firm or usually mentioned as free cash flow to the firm (FCFF).

Free Cash Flow to the Firm (FCFF) = EBIT(1 – Tax rate) + Depreciation – Capital expenditure – Δ Working capital

Thus, the value of the firm after calculating the cash flow ending will be as following [25]:

$$\text{Value of the firm} = \sum_{t=1}^{t=n} \frac{\text{FCFF}_t}{(1 + \text{WACC}_{hg})^t} + \frac{\text{FCFF}_{n+1}}{(\text{WACC}_{st} - g_n)} \times \frac{1}{(1 + \text{WACC}_{hg})^n}$$

where;

hg = high growth

st = stable growth

t = time period

The last part of the equation is usually called as terminal value. The growth is different than the growth rate that has been used in the previous cash flow projection. It is usually lower assuming that the company is already at the stable state.

The discount rate that will be used in the discounted cash flow valuation comprises of cost of debt and cost of equity. It is called as weighted average cost of capital (WACC).

$$\text{Weighted Average Cost of Capital} = k_e \left[ \frac{E}{(D+E)} \right] + k_d \left[ \frac{D}{(D+E)} \right]$$

Cost of equity is a rate of return investors require on an equity investment in a firm [25]. It can be estimated using Capital Asset Pricing Model (CAPM). The formula of cost of equity is as following,

$$\text{Cost of Equity} = R_f + \beta (R_m - R_f)$$

$$\text{Cost of Equity} = R_f + \beta (\text{Equity Risk Premium})$$



where;

Rf = Risk Free Rate

$\beta$  = beta (risk of the investment to market portfolio)

Rm = Expected Market Return on the Market

The beta that is used in this research is fundamental beta (bottom-up beta). Comparable companies will be used to find the unlevered beta and then it will be relevered using PT XYZ Tbk's ratio of debt to equity.

$$\text{Unlevered beta business} = \frac{\text{Beta}_{\text{comparable firms}}}{\left[1 + (1-t) \times \left(\frac{D}{E}\right)_{\text{ratio comparable firms}}\right]}$$

$$\text{Relevered beta} = \text{Unlevered beta} \times \left[1 + (1-t) \times \left(\frac{D}{E}\right)\right]$$

The expected market return on the market is calculated using the implied equity risk premium. It is the forward looking estimate rather than the historical calculation of market return [25].

$$\text{Expected Cost of Equity} = \sum_{t=1}^{t=n} \frac{\text{Expected Dividends}}{(1+r)^t} + \frac{\text{Expected Dividends}_{n+1}}{(r-g_n)} \times \frac{1}{(1+r)^n}$$

$$\text{Implied Equity Risk Premium} = \text{Expected Cost of Equity} - \text{Risk Free Rate}$$

Where;

r = expected cost of equity

gn= growth rate

## METHODS

The research begins with identifying the problem and research objectives. To support this new research, literature review was performed. The way to find factors that will make a green bond successful is by collecting the data and analyzing the data. Data collection and data analysis method will be explained below. Those results will be synthesized into strategies to for the next green bond issuance of PT XYZ Tbk.

In this research, data collection will be conducted for secondary data. Secondary data collection will be done by observing news and reports from reputable sources and obtaining information from green bonds and bonds prospectus. Another secondary data also acquired from reputable websites of bond market indexes and corporates' website. Secondary data from reports also help to answer why the amount of green bond issuance are low in Indonesia. The bonds information from prospectus are going to be used for coupon rate, price, and issuance amount calculation that help to recommend green bond issuance for PT XYZ Tbk. Lastly, reports, news, and another research are used for content analysis to recommend strategies to PT XYZ Tbk for successful green bond issuance.

Benchmarking is the process of finding information from other resources, other standard, best practices outside internal organizations and compare the data to internal conditions. It is a helpful tool to improve internal conditions if a gap is found in the benchmarking analysis [26]. In this research benchmarking will be used to find the information from successful corporate green bond issuer in Indonesia and abroad. Furthermore, it is not only the strategies that will be observed, but also the financial information of the green bond issued.

Not everything that are stated in the reports, publication, news, or other media are useful to the research objectives. An analysis method to extract all important and relevant data is needed to make the research clearer. Content analysis is the right method for this. Content analysis systematic analysis of textual material especially important for educational research [27]. However, content analysis does not only limited to text material, but it can also be used for audio files. Content analysis use categorization and coding for manifest (explicit) and latent (implicit) meaning in the media [28]. Credible reports, news, and other media are going to be analyzed to know the external environment factors that affect green bonds issuance.



The valuation process is based on discounted cash flow models which has been explained in int the introduction. The valuation is done for PT XYZ Tbk. because XYZ Tbk is a subsidiary of PT XYZ Tbk. and PT XYZ Tbk has just publicly traded in 2022, so there is a limitation in public data regarding the financial data of PT XYZ Tbk.

**RESULT AND DISCUSSION**

To suggest the strategy to improve the issuance of green bonds at PT XYZ Tbk, we must know the best practices from the other issuers who have been successful in issuing green bonds. The method that can be used is called benchmarking. the first step of the benchmarking process, is to set criteria must for the benchmarking process [29]. Or in simple words, what to benchmark. The criteria that will be used comes from the previous research. The criteria are green bond’s use of proceed [30], external review [31], issuers ESG score [30], and issuer’s credit rating [19].

After determining benchmarking criteria, selection factors should be determined to know the benchmarks. The benchmarks for Indonesian green bond issuers are companies that has issued green bonds, because there are still few of them. So, all companies that have issued green bonds can be included in this research. And the selection factor have been set due to research scope, that is the corporate green bonds that have been publicly issued in Indonesia. Due to vast numbers of green bond issuers abroad, for the benchmarks that are overseas companies, other selection factor has been set. The additional selection factor is oversubscription. Oversubscription is the result of increased demand of green bond due to the worth (value) that consumers-investors attribute to environmentally sustainable products [32]. Therefore, the companies that will be used as benchmarks are those with has high number of oversubscriptions. Due to time limitation, the number of overseas green bond issuers as the benchmarks are three companies.

**Table 1. Benchmarks of Indonesian corporate green bond issuers**

Issuer	Issuance Year	Issuance Location	Green Bond Listing Type
PT Sarana Multi Infrastruktur (SMI)	2018	Indonesia	Publicly Listed
PT Bank Negara Indonesia (Persero) Tbk	2022	Indonesia	Publicly Listed
PT Bank Rakyat Indonesia (Persero) Tbk	2022	Indonesia	Publicly Listed
PT Bank Mandiri (Persero) Tbk	2023	Indonesia	Publicly Listed

**Table 2. Benchmarks from overseas corporate green bond issuers**

Issuer	Issuance Year	Oversubscribed	Green Bond Listing Type
SK Battery America	2021	9 times	Publicly Listed
E.ON SE	2022	8 times	Publicly Listed
Abu Dhabi Future Energy Company PJSC (Masdar)	2023	5.6 times	Publicly Listed

Benchmarks from Indonesian companies that has issued green bond completely can be seen in table 1. It consists of PT Sarana Multi Infrastruktur (SMI), PT Bank Negara Indonesia (Persero) Tbk, PT Bank Rakyat Indonesia (Persero) Tbk, and PT Bank Mandiri (Persero) Tbk. Table 2 shows the benchmarks from overseas corporate green bond issuers that match the benchmark criteria. Those are SK Battery America, E.ON SE, and Abu Dhabi Future Energy Company PJSC (Masdar).

PT Sarana Multi Infrastruktur (SMI). The net proceeds from SMI’s green bond issuance is 100% used to refinance 3 green projects. Two of which are for mini hydro power plant and the other for Light Rapid Transit [33]. PT Bank Negara Indonesia (Persero) Tbk (BNI) will use the proceed for renewable energy, sustainable transportation, waste to energy and waste management, and sustainable natural resources and land use [34]. The green bond proceeds of PT Bank Rakyat Indonesia (Persero) Tbk (BRI) is used for renewable energy and management of biological natural resources & sustainable land use, and MSME sector financing [35]. PT Bank Mandiri (Persero) Tbk (Bank Mandiri)’s use of proceed is allocated to sustainable water & wastewater management, energy efficiency, green building, renewable energy, clean transportation, and eco-efficient adapted products [36]. SK Battery America, which issued green bond in 2021, use 100% of the green bonds proceed to invest in electric vehicles (EV) battery production facilities in Georgia, USA [37]. E.ON SE (E.ON) will finance their electricity networks, renewable energy, energy efficiency, and





clean transportation projects with green bonds proceed that they got [38]. Masdar, which issued green bond in 2023, will use their green bond proceed to solar power, wind power, transmission and distribution of electricity, and energy storage [39].

PT XYZ Tbk, issued green bond in August 2023, use the green bond proceed to refinance green projects and to be allocated to company's working capital. Based on the analysis above, it can be concluded that all the benchmarks and PT XYZ use the proceed to fund eligible projects or green projects that are included in ICMA Green Bond Principles. The Indonesian corporate green bond issuers and PT XYZ also already comply to Financial Services Authority Regulation No. 60/POJK.04/2017 that mandated to use at least 70% of the proceed to finance green eligible projects [40].

Regarding external review, SMI's green financing framework got rank of Medium Green, the second-best rank in Shades of Green scale created by Cicero [41]. Sustainalytics remarked that BNI's green bond framework is already aligned with Green Bond Principles and ASEAN Green Bond Standards [42]. BRI engaged SDGs Hub UI to give Second Party Opinion (SPO) for their green bond framework. BRI got a score 5 out of 6, in a scale from 0 to 6 means environmentally friendly / sustainable [43]. Sustainalytics remarked that the Bank Mandiri Sustainability Bond Framework is credible, impactful and aligns with the four core components of the Green Bond Principles, Sustainable Bond Principle, and Sustainable Bond Guide [44]. Cicero classified SK Innovation's (parent of SK Battery America) green financing framework as medium green in the Shades of Green scale created by Cicero. This is the second best classification in newest 3-rank Shades of Green. Sustainalytics remarked that E.ON's green bond framework is credible and impactful and aligns with the four core components of the Green Bond Principles 2021 and EU Taxonomy [45]. Moody's Investors Services give score SQS1 to Masdar's green bond framework. The score means that the framework is excellent, the alignment is categorized as best practices, and the contribution to sustainability is high [46].

PT XYZ Tbk got their Second Party Opinion from SDGs Hub UI, the same institution that gives Second Party Opinion to BRI. PT XYZ Tbk got a score of 5.6 out of 6, in a scale from 0 to 6. This green bond framework is categorized as environmentally friendly / sustainable. The analysis in this section shows that PT XYZ also got high score, from a reputable Indonesian Second Party Opinion institution too. Therefore, what PT XYZ did in this benchmark criteria is already the same with the best practices of corporate green bond issuers.

The third factor is ESG Score/ Rating. SMI got rating 3 in the ESG rating by Fitch Ratings which means that SMI has very low impact to the ESG rating [47]. BNI's ESG Rating from Sustainalytics is 21.35. BRI's ESG Rating is 18.84. Bank Mandiri's ESG Score is 28.18 [48]. BNI and Bank Mandiri are considered to have moderate ESG risk, and BRI is considered to have low ESG risk. SK Innovation (SK Battery America's parent company) got a score of 36.7 [49]. It is considered high risk because SK Innovation is a company that engage in oil and gas production. even though the subsidiary, SK Battery America who issued green bond, provide renewable energy solution by producing electric vehicle battery. E.ON got 17.6 in their ESG ratings, this shows that the company has low ESG risk according to Sustainalytics assessment [50]. Masdar, has a ESG score provided by Moody's Investors Services. It got CIS-1, the best rating in Moody's Investors Services's ESG score scale [51]. To the date of writing, PT XYZ Tbk hasn't got ESG Score / ESG rating assessed by any institution. If compared with benchmark, this is one factor that PT XYZ Tbk's hasn't done. This finding should be noted by PT XYZ Tbk. The company should attain the ESG score / ESG ratings to increase investor trust.

All the benchmarks Indonesian corporate green bond issuer in this research (SMI, BNI, BRI, and Bank Mandiri) got idAAA ratings from Pefindo. It means that those issuers have the capacity to meet its long-term financial commitments on the debt security, relative to other Indonesian issuers. SK Battery America's green bond that is issued in 2021 is rated Baa3 by Moody's. It is still categorized as Investment Grade although in the bottom grade of Investment Grade to Moody's scale. E.ON's green bond is rated Baa2 by Moody's and BBB by S&P. Masdar's green bond is rated A2 by Moody's and A+ by Fitch Ratings. All benchmarks in this research are categorized as investment grade in their green bond credit ratings. However, due to difference in issued currency, overseas benchmarks cannot be compared to PT XYZ Tbk's green bond credit ratings. Therefore, the comparable ones is the Indonesian corporate green bond issuers.

PT XYZ Tbk got idA(pg) rating from Pefindo regarding their newly issued green bond. This rate is 2 level lower than all Indonesian corporate green bond issuers who got idAAA rating by Pefindo. This is one of the main reason why coupon that PT XYZ Tbk's



offering in their green bond is the highest among Indonesian corporate green bond issuers. This findings must be noted by PT XYZ Tbk to be improved in the next issuance so that the company can offer green bond with lower coupon rate.

Two scenarios will be compared to arrive at the company valuation. The first is Base Case, where PT XYZ Tbk still using current loan scheme to fund their green projects. The second scenario is Green Bond, where PT XYZ Tbk have already issued green bond for their green projects financing/refinancing. For this research, the focus is company valuation. The first component is the weighted average cost of capital (WACC) which will be used as discount rate. It contains cost of equity and cost of debt. Cost of equity is calculated using Capital Asset Pricing Model (CAPM). Based on Capital Asset Pricing Model formula, we need 3 components. Those are risk-free rate, beta, and market risk premium. The risk free rate used in this research is based on 10-year Indonesian government bond yield retrieved on 2023, October 13 with value of 6.9409% [52].

To calculate bottom up beta, regression beta of comparable firms are needed to calculate industry beta. The company’s chosen to be compared are PT Kencana Energy Lestari Tbk, PT Sky Energy Indonesia Tbk, PT Adaro Energy Indonesia Tbk, PT Bukit Asam Tbk, and PT Cikarang Listrindo Tbk. Only PT Kencana Energy Lestari Tbk that is a company that has pure business similarity with PT XYZ Tbk. There is no other similar companies such as PT Kencana Energy Lestari Tbk to PT XYZ Tbk. So, the other comparable companies are those who engage in renewable energy in Indonesia and already had regression beta based on Pefindo Beta [53].

**Table 3. Unlevered beta calculation**

Companies	Regression Beta	Tax	Debt/Equity Ratio	Unlevered Beta
PT Kencana Energy Lestari (KEEN)	0.464	12.91%	77.13%	0.278
PT Sky Energy Indonesia (JSKY)	0.765	24.53%	6.50%	0.729
PT Adaro Energy Indonesia Tbk (ADRO)	1.646	19.70%	24.79%	1.373
PT Bukit Asam Tbk (PTBA)	1.327	20.77%	39.56%	1.010
PT Cikarang Listrindo Tbk (POWR)	0.704	10.53%	81.92%	0.406

The next step after collecting all regression beta of comparable companies is to take the effect of debt / financial leverage from each beta. The regression beta ranged from 0.464 – 1.646. The data for tax and debt to equity ratio in table IV.13 are obtained from each companies’ annual report and financial statements. The unlevered beta are shown on the rightmost column of table IV.13. The average of unlevered beta is 0.759. This is the unlevered industry beta. Unlevered industry beta is multiplied (relevered) by PT XYZ Tbk’s financial leverage. The tax applied is 22% as Indonesian corporate tax [54] and PT XYZ Tbk’s debt to equity ratio of 1.15, which results in 1.443 as PT XYZ Tbk’s beta.

**Table 4. Assumptions for implied equity risk premium**

Items for Implied Expected Cost of Equity	Value
Base year Cash Flow	Rp 550.40
Growth Rate	5.20% for 2024 5.00% for the next 9 years
Terminal Growth Rate	3.85%
Period	10 years

The expected cash flow for base year, Rp 550.40 is average dividends from all companies in the last 12 months (Trailing 12 Months) in IHSG [55]. The growth rate of IHSG for 2024 is 5.20% and then decreases to 5.00% for the next 9 years ahead based on economic growth rate prediction [56]. The terminal growth rate, 3.85%, is the average between average inflation target from Bank Indonesia (2022), 3.00% and the lower limit of Bank Indonesia’s prediction for Indonesia’s GDP prediction in 2024, 4.70% [57][58]. The estimated period is 10 years, the same projected period for PT XYZ Tbk’s valuation and government bond yield chosen. The expected cost of equity is 12.795% and it should be subtracted by risk free rate (6.9409%) to result in implied equity risk premium



value at 5.8541%. With all components already been calculated, the cost of equity of PT XYZ Tbk can be calculated using CAPM formula. PT XYZ Tbk’s cost of equity is 15.3884%.

The cost of debt for Base Case is the weighted average of long term loan interest rate of PT XYZ Tbk can be seen in detail in table IV.15. The JIBOR 3 months rate is 6.73714%, which is retrieved at 13 October 2023 [59]. Meanwhile for Green Bond, the cost of debt is also weighted average of issued green bond’s coupon rate. The detail of green bond’s weight can be observed in table IV.16. The cost of debt for Base Case is 11.13% and the cost of debt for Green Bond is 9.53%.

The market value of equity is calculated by multiplying numbers of shares (2,928,495,000 shares) by the stock price. The market value of equity for PT XYZ is Rp 2,064,588,975,000.00. To calculate market value of debt, the method is by looking at the companies’ debt as a huge bond, with the book value of debt as face value and interest rate as coupon, the period is the weighted average of period of the long term debt, and the discount rate is the cost of debt that has just been estimated [25]. The assumptions are stated in table 5. After all information is obtained, the cost of capital can be calculated. The weighted average cost of capital for Base Case is 14.24% and Green Bond is 13.90%.

**Table 5. Assumptions for market value of debt**

Assumptions	Base Case (IDR)	Green Bond (IDR)
Book Value of Debt	500,094,683,518.00	500,357,429,629.00
Interest Expense	37,790,013,536.51	33,576,033,518.62
Period	6.36 years	2.12 years
Cost of Debt	11.13%	9.53%
Market Value of Debt	428,232,237,892.71	477,023,282,629.51

The base year to calculate free cash flow to the firm (FCFF) is 2023 and the data for base year is obtained by trailing 12 months method. The revenue growth is based on hydropower plant capacity and target for PT XYZ Tbk’s plan. Ten years ahead, it is assumed that PT XYZ Tbk already have 200 MW capacity of hydropower plant and all of them already operating. The current operating capacity is only 17.4 MW, so the revenue estimation is a comparison between current revenue and ten years ahead with 200 MW. The average construction period 3 years, by looking at Tomasa HPP. In 2024, the capacity increased by 15.4 MW (10 MW Yaentu and 5.4 MW Kukusan). If construction for PLN begins in 2024. It will finish in 2027. PT XYZ Tbk’s capacity increased by 55 MW. If the remainder 112.2 begins at 2026, if finishes at 2029. Total operating hydropower plants 200 MW starts at 2030. The growth within is calculated using compound annual growth rate. The end towards terminal perpetuity growth is decrease of CAGR.

Operating Margin is calculated from the %age of revenue. However, the operating margin target in 2033 and forward is from PT Kencana Energy Lestari Tbk as reference who already in the business longer than PT XYZ Tbk, with 52.99% of operating margin [60]. The depreciation is calculated as %age from fixed asset. The growth of fixed asset follows the capacity projection that will be owned by PT XYZ Tbk. capital expenditure and changes in working capital is calculated as %age of revenue and the proportion is assumed will be the same for 10 years ahead. The working capital calculation is non cash current liabilities subtracted by current liabilities.

For green bond scenario, there is monitoring cost annually. The estimation of the monitoring cost is \$5000-\$7000 annually [61]. In this valuation calculation, the average was taken, the \$6000 annually for monitoring cost. This is the monitoring cost for each green bond. For PT XYZ Tbk, there are two green bonds with different maturity. Therefore the calculation is included and affect operating income after tax until maturity. The difference of cash flow can be seen in table 6.

**Table 6. Free cash flow to the firm calculation for PT XYZ Tbk**

Year	Free Cash Flow to the Firm (FCFF)	
	Base Case Scenario	Green Bond Scenario
2023 (Trailing 12 Months)	61,117,016,040.74	61,117,016,040.74





2024	105,572,276,037.54	105,423,779,637.54
2025	149,739,542,265.76	149,591,045,865.76
2026	197,918,320,079.29	197,769,823,679.29
2027	263,696,976,566.42	263,622,728,366.42
2028	212,105,848,123.47	212,031,599,923.47
2029	593,990,363,345.21	593,990,363,345.21
2030	109,534,018,878.94	109,534,018,878.94
2031	1,285,669,210,229.12	1,285,669,210,229.12
2032	1,533,755,142,990.68	1,533,755,142,990.68
2033	1,678,043,869,895.56	1,678,043,869,895.56
Terminal Growth (Perpetual)	1,630,994,038,083.82	1,630,994,038,083.82

**Table 7. Discounted cash flow (DCF) calculation for PT XYZ Tbk's valuation**

Items	Base Case	Green Bond
Terminal Value	16,779,107,641,798.60	17,347,203,454,752.80
Sum of FCFF's PV	2,263,870,615,909.63	2,311,542,186,255.31
PV of Terminal Value	4,433,489,458,073.73	4,583,595,581,216.65
Value of Operating Asset	6,697,360,073,983.36	6,895,137,767,471.95
(+) Cash	72,409,068,736.00	72,409,068,736.00
(-) Debt	(428,232,237,892.71)	(477,023,282,629.51)
Value of Equity	6,341,536,904,826.65	6,490,523,553,578.44
Numbers of Shares	2,928,495,000.00	2,928,495,000.00
Intrinsic Value/Share	2,165.46	2,216.33
Price	16,779,107,641,798.60	17,347,203,454,752.80

The summary of discounted cash flow calculation is shown in table 7. After getting all information needed, we take the present value of expected cash flow and terminal value using the appropriate discount rate. The discount rate used is weighted average cost of capital for each scenario. The present value of free cash flow to the firm and present value of terminal value is added together into value of operating asset. After that we add back cash and subtract the debt to know the intrinsic value of equity. For both scenarios, the numbers of shares is the same. The value of equity is divided by numbers of shares. The intrinsic value per share with Base Case scenario is Rp 2,165.46 and intrinsic value per share for Green Bond scenario is Rp 2,216.33. If compared with price of the stock in , PT XYZ Tbk is undervalued. However, the main point in this analysis is to prove that by issuing green bond, the value of the company will increase compared to not issuing green bond. The result proves that by issuing green bond, PT XYZ Tbk value/ share increased by 2.35% compared to company's value per share with conventional financing for their green projects.

**Table 8. Summary of PT XYZ Tbk's Capital Structure**

Debt Ratio	Beta	Cost of Equity	Cost of Debt (after-tax)	Cost of Capital	of Enterprise Value
0%	0.9066	12.25%	5.95%	12.25%	Rp 3,602,508,104,137
10%	0.9852	12.71%	5.95%	12.03%	Rp 3,642,252,013,829
20%	1.0834	13.28%	5.95%	11.82%	Rp 3,682,882,638,595
30%	1.2097	14.02%	6.08%	11.64%	Rp 3,717,149,585,019
40%	1.3781	15.01%	6.37%	11.55%	Rp 3,733,642,793,384
50%	1.6138	16.39%	6.52%	11.46%	Rp 3,753,213,000,305
60%	1.9674	18.46%	6.68%	11.39%	Rp 3,766,139,628,302



70%	2.5567	21.91%	6.68%	11.25%	Rp 3,794,867,761,493
80%	3.7354	28.81%	6.97%	11.34%	Rp 3,775,946,311,460
90%	7.2713	49.51%	14.44%	17.95%	Rp 2,796,398,162,421

**BUSINESS SOLUTION**

To push the next green bond’s offering, PT XYZ Tbk should increase their credit rating and prepare for ESG rating. In terms of financial aspect, to get higher rating, PT XYZ should improve their financial performance and strengthen their credit enhancement. There are two sides to increase EBTIDA margin by increasing revenue and reduce expenses. For revenue side, PT XYZ Tbk should assess the reason of decreasing other services revenue and implement marketing plan to promote their services that will increase their revenue from other services. On expenses side, company increasing efficiency in their cost of revenues and reducing unnecessary operating expenses such as unnecessary professional expenses, business trips, and others operating expenses. To strengthen their credit enhancement, after PT XYZ Tbk improve their financial performance, they should search for the full guarantor of their next green bond issuance. The alternatives are using pledge cash collateral and standby letter of credit.

Based on optimal capital structure calculation, PT Arkora Hydro Tbk’s maximum value is achieved when debt to capital ratio is 70%. With increasing debt to capital (company’s leverage), there must be an increasing risk related to company. For future bond issuance, cost of debt ranged from 6.68% to 7.80% which is obtained from the green bond coupon of PT Sarana Multi Infrastruktur Tbk will be the base of decision on how much the green bond amount should be released, considering that the interest that should be paid by PT Arkora Hydro Tbk. The green bond amount that should be released by PT Arkora Hydro Tbk, using the optimal capital structure and comparison with book value of equity, is Rp 1,010,627,340,478. With that amount, the coupon that should be paid annually (with quarterly coupon payment terms like current PT Arkora Hydro Tbk’s green bond) is ranged from Rp 69,219,935,941.85 to Rp 81,164,799,662.86.

PT XYZ Tbk should prepare their company for ESG score or ESG rating assessment. Having an ESG score or ESG rating will increase investors trust towards PT XYZ Tbk and the green bond issued. The company should establish the internal ESG team, prepare the documents needed, assess the exposed company risk, do audit simulation, prepare for the ESG rating fee, and lastly to recheck and apply for the ESG rating assessment. Regarding their exposure to hydrological conditions, PT XYZ Tbk should explore new safe locations for their upcoming projects while implement their risk management to maintain safety of existing hydro power plants. PT XYZ Tbk could explore opportunity to issue in other countries such as Singapore who is the leader in green bond market in ASEAN. This also can improve PT XYZ Tbk’s oversubscription green bond issuance. Another alternative to get additional for green project financing beside green bond is through carbon trading.

**CONCLUSION AND RECOMMENDATION**

Based on the analysis, successful corporate green bonds issuers use their green bonds proceed to finance their green projects. Those green projects comply to the standards and regulation in the country where the green bonds are issued. Issuers should get their green bond framework reviewed by the experts through second-party opinion. The issuers also has ESG score / ESG ratings that reflect medium to minimum risk to the environment, social, and governance aspects. Green bond issuer’s credit rating and especially the green bond’s credit rating is imperative too for the success of green bond issuance.

PT XYZ Tbk has not got their ESG ratings and got lower green bond credit ratings compared to the benchmarks in Indonesia and overseas. The impact of green bond issuance will increase PT XYZ Tbk’s value through valuation analysis. Based on the benchmark analysis and company valuation analysis, it can be concluded that if PT XYZ Tbk could get higher rating and reached oversubscribed in their green bond issuance (and hence, got their green bond coupon rate lower), their will have lower cost of debt and company value will increase. The flow of thinking is to get higher credit rating that leads to green bond oversubscription, so that PT XYZ can have enough funding for their green projects with lower cost of capital. Solutions has been proposed to make successful next green bond issuance by PT XYZ Tbk.

For future research, the author suggests to assess the impact of PT XYZ Tbk issuance to the whole green bonds issuance in Indonesia. How the green bond issuance can inspire other public or private companies in private sectors to increase green bond issuance that



can improve environment and deter climate change in Indonesia. The focus can be for private sectors because up to today, the issuance is dominated by government related entity.

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