Optimal Capital Structure for Indonesian State-Owned Electricity Company

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Keywords: Public Finance, Capital Structure, Maximizing Company Value, Weighted Average Cost of Capital.

Abstract: Electricity is important in our lives since it is crucial for our basic needs. Along with the inclining population numbers each year, the demand for the electricity also inclining. However, electricity business needs huge amount of investments since the plant and the operational cost are not cheap. There are several funding sources that are possible, it could be inside or outside Indonesia. included as capital-intensive business, business in electricity sector needs massive investments. The source of the funding may vary, it could be from outside or inside Indonesia. In Indonesia, the company that appointed by the government to generate, transmit and distribute electricity is PT PLN Persero. The company itself needs to know their combination of the debt and equity that could generate maximum value of the company or it is known as its optimal capital structure. The theory that is based in this research is the theory from Gitman and Zutter (2015) that said that to maximize firm value we need to maximize the firm's weighted average cost of capital (WACC). From the calculation of the model used in this research, it is obtained weight combination of 20% domestic cost of equity, 39.66% domestic cost of debt and 40.34% global cost of debt.

1 INTRODUCTION

Indonesia is known as one of the most populated country in the world. The population growth in Indonesia is stable and projected it is increasing every year. Electricity is becoming one of our basic needs. However, population doesn't play direct part in electricity demands but it can't be denied that the two things is correlated. Along with the growth of the population, the electricity demands are increasing every year. In that matter, Indonesian government tried to fulfill the demand to provide electricity in the country. PT PLN Persero is a state-own company that has been appointed by the government of Indonesia to generate, transmit and distribute electricity in the country. To do so, the company needs huge amount of investment therefore it is categorized as capital-intensive business. Thus, it is important for the company to find its optimal capital structure. By determining the company optimal capital structure, the company could achieve their maximum value.

There are several methods to determine a company's optimal capital structure, according to Gitman and Zutter (2015), the capital structure at which the weighted average cost of capital is minimized will maximize the firm's value. In that matter, we can determine the maximum firm value by minimizing its weighted average cost of capital. In order to do so, in this research will be used the help of SOLVER tools in Excel. The weighted average cost of capital will be minimized and then the combination of weights will be obtained and those weights will be the optimal capital structure of the company.

The source of the fund may vary, it could be from inside Indonesia or even outside the country. Therefore, there are 3 variables that will be included in the research which are Domestic Cost of Debt (Kd D), Domestic Cost of Equity (Ke D) and Global Cost of Debt (Kd G). Since, the government is trying to maintain control of the company, the equity that may come from outside thenam country is excluded from the calculation. However, there are some limitations on this research, which are the project is limited to the risk of the IDR/USD exchange rate and inflation rate of Indonesia and United States and will assume that the global debt will be from United States and will be using USD currency. Other limitation is that the time period of the research will be only 2 years which is

Nirbaya, M. and Prasetyo, A.
Optimal Capital Structure for Indonesian State-Owned Electricity Company.
DOI: 10.5220/0008436007290737
In *Proceedings of the 2nd International Conference on Inclusive Business in the Changing World (ICIB 2019)*, pages 729-737
ISBN: 978-989-758-408-4

from 2017-2018. On those two years period then the author divides each year quarterly, which means due to the consistency, all of the data will be presented in 8 period of data which are 2018.Q4; 2018.Q3; 2018.Q2; 2018.Q1; 2017.Q4; 2017.Q3; 2017.Q2; and 2017.Q1.

Based on the calculation it is obtained weight combination is 20% domestic cost of equity, 39.66% domestic cost of debt, and 40.34% global cost of debt. The structure means that majority of the funding source should be obtained from global debt or debt that comes from outside the country which is 40.34% and other than that 20% of the funding should be funded from domestic equity or equity that comes from the country and 39.6% should be funded from global debt or debt that acquired from inside the country.

2 LITERATURE REVIEW

2.1 Optimal Capital Structure

Optimal capital structure is a financial measurement that firms use to determine the best mix of debt and equity financing to use for operations and expansions. This structure seeks to lower the cost of capital in order the firm is less dependent on creditors and more able to finance its core operations through equity. It is stated on Gitman and Zutter (2015) that when the company aims to decide its value centered on capital structure then the manager must be concerned about risk and return. If the owner already knows the risk then the company could determine the level of return that can pay off the risk. The company can arrange the optimum level of debt to reach the optimal capital structure. According to Gitman and Zutter (2015), the capital structure at which the weighted average cost of capital is minimized, thereby maximizing the firm's value. In that matter, we can determine the maximum firm value by minimizing its weighted average cost of capital.

2.2 Markowitz Portfolio Theory

In the early 1960s, the investment community talked about risk, but there was no specific measure for the term. To build a portfolio model, however investors had to quantify their risk variable. The basic portfolio model was developed by Harry Markowitz (1959), who derived the expected rate of return for a portfolio of assets and an expected risk measure. Markowitz said that the variance of the rate of return was a meaningful measure of portfolio risk under a reasonable set of assumptions. Stated in Brown and Reilly (2009), the Markowitz model is based on several assumptions regarding investor behaviour:

1. Investors consider each investment alternative as being represented by a probability distribution of expected returns over some holding period.
2. Investors maximize one-period expected utility and their utility curves demonstrate diminishing marginal utility of health.
3. Investors estimate the risk of the portfolio on the basis of the variability of expected returns.
4. Investors base decisions solely on expected return and risk, so their utility curves are a function of expected return and the expected variance (or standard deviation) of returns only.
5. For a given risk level, investors prefer higher returns to lower returns. Similarly, for given level of expected return, investors prefer less risk to more risk.

3 METHODS

The main idea of this research is to find out optimal capital structure of the company. The researcher wants to know the optimal capital structure by analyzing from several factors. The first step is to analyze the company's condition by analyzing internal and external factors in order to find the optimal capital structure for the electricity companies in Indonesia. The purpose of the analysis of internal financial condition of the company is to observe the company's current financial condition because it will affect policy decision making and also the company strategy in the future. The analysis of macro conditions using Porter's Five Forces to get the understanding of industry's characteristics. The next step is to calculate the optimal capital structure which is the combination of debt and equity whether from domestic or global, to get the maximum value of the company and also to get the minimum cost of capital.

4 RESULTS AND DISCUSSION

4.1 Financial Analysis

4.1.1 Debt Ratio

The debt ratio is a financial ratio that measures the extent of a company's leverage. The debt ratio is defined as the ratio of total debt to total assets, expressed as a decimal or percentage.

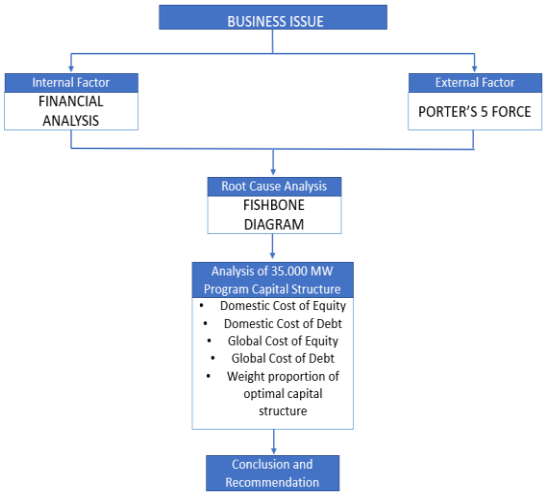

Figure 1: Research Framework.

According to Gitman and Zutter (2015), the debt position of a company indicates the amount of other's people money being used to generate profits. The higher debt a company uses in relation to its total assets, the greater its financial leverage. Financial leverage refers as the magnification of risk and return through the use of fixed-cost financing, such as debt and preferred stock. On that matter, the more the debt use, the higher risk the company owned as well as higher potential returns. Debt ratios vary widely, PT PLN Persero as capital intensive business, having much higher debt ratios than other company at other industries. The debt ratio measures the proportion of total asset that financed by the company.

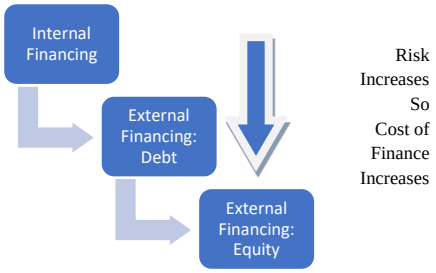

Figure 2; Pecking Order Theory.
Source: Myers and Majluf, 1984

In a sense, the debt ratio shows a company's ability to pay off its liabilities with its assets. Based on the formula above, the calculation of PT PLN Persero debt ratio is shown in the figure below

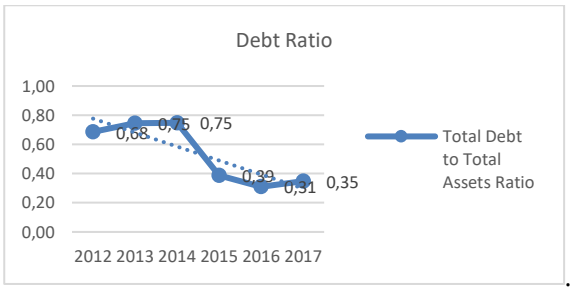

Figure 4: Debt Ratio of PT PLN Persero.

Based on the figure above, we can see that PT PLN Persero tends to decrease each year. A lower debt ratio usually implies a more stable business with the potential of longevity because a company with lower ratio also has lower overall debt. We can see that the company performance based on the debt ratio is getting better each year shown by it decreasing number of the ratio. A debt ratio 0,35 in the last 2017 means that the company has only 35% liabilities of its total assets. It means that PT PLN Persero only financed 35% of its assets with debt, which is good compared in 2014, when the company debt ratio is 0,75 which means that in that year, the company financed 75% of its asset with debt. The debt ratio is a one of a fundamental solvency ratio because creditors are always concerned about being repaid. Companies with higher debt ratios are better off looking to equity financing to grow their operations.

The other ratio is debt to equity ratio. The debt to equity ratio is a financial liquidity ratio that compares a company's total debt to total equity. The debt to equity ratio shows the percentage of company financing that comes from creditors and investors. Based in the formula above, the debt to equity ratio of PT PLN Persero from the period 2012-2017 are shown on the figure below:

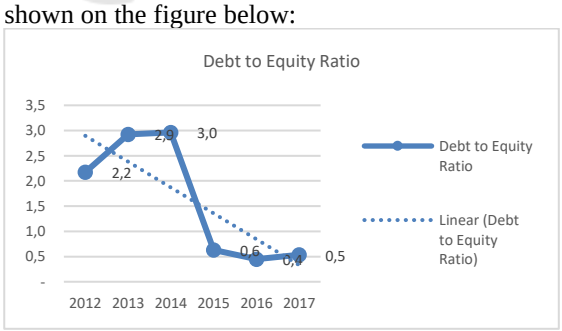

Figure 3: Debt to Equity Ratio of PT PLN Persero.

Based on the figure above we can see that the debt to equity ratio in 2017 is 0,5 and in 2016 0,4. The trend on the ratio is declining. Debt to equity ratio of 0,5 in 2017 means that there are half as many

liabilities than there is equity. A lower debt to equity implies a more financially stable condition. Creditors view a higher debt to equity ratio as risky because it shows that the investors have not funded the operations as much as creditors have. In 2016 the company has better debt to equity ratio which is 0,4 means that only 40% of its assets is financed by debt but generally speaking, the trend of the ratio itself is decreasing.

4.2 Porter's 5 Forces

a. Threat of new entrants

The first one is threat of new entrants. It refers to the threat new competitors to existing businesses. Porter believed that the possibility of new entrants had a significant part to play in developing and changing the competitive dynamics of any industry. The threat may change the competitive environment and directly impacts the profitability of an existing firm. Electricity sub sector is Indonesia is still primarily owned by the government through PT PLN Persero, by that matter the threat of new entrance is low. Even it is possible for private sector to penetrate electricity industry in Indonesia but the control of the sector is still owned by PT PLN Persero. Private sector is only allowed to become a generator provider and then PT PLN Persero buy the electricity supplies that has been generated by the generator to fulfill electricity demands through an agreement called PPA (Power Purchase Agreement). So, private sector is not allowed to distribute and transmit the electricity. The impact is the market share of the electricity is fully owned by PT PLN Persero and it is really hard for the new entrance to penetrate Indonesia unless there is a change in regulation. Even the private sector is able to penetrate, their ability to generate profit through this sector is limited because the government has full control of the sector.

b. Threat of substitution

Porter's threat of substitutes definition is the availability of a product that the consumer can purchase instead of the industry's product. A substitute product can be from other industry that offers similar benefits to the consumer as the product produced by the firms within the industry. Electricity does not have substitute but it can be generated from different sources of energy but the cost of switching into that substitutes such as solar panel, gas etc. is high. Currently, majority of the electricity production is generated from coal. In this matter, the threat of substitution is low.

c. Bargaining power of buyer

Bargaining power of buyer refers to the pressure consumers can exert on businesses to get them to provide higher quality products, better customer service and lower prices. The presence of strong power of buyer may reduce the profit potential in the industry. Buyers could increase competition among the industry by forcing down prices and bargaining for improved quality and those acts could result diminished industry profitability. There are several groups of buyers for electricity sector, which are households, business, industrial and others. All of which has medium bargaining power since the generation, distribution and the transmission of the electricity still owned by PT PLN Persero but the basic electricity tariff is an important concern for the citizen because it is considered as one of their basic needs and the government as the protector of the citizen can not be increasing the tariff as they want to. The tariffs are charged in such a way as to not create problems for the citizen as the customers as well as for the companies in the business and industrial group.

d. Bargaining power of supplier

Bargaining power of supplier is the mirror image of the bargaining power of buyers and it refers to the suppliers could pressure the companies by raising the prices, lowering their quality or reducing the availability of their products. However, a strong supplier can make an industry more competitive and decrease profit potential for the buyer. There are several sources to generate electricity such as coal, natural gas, geothermal and water. Coal generated 101.244 GWh from 164.366 GWh total non-fuel generated electricity. As stated above, currently coal is the major fuel to generate electricity. Coal is one of limited resources so the coal suppliers are in dominant position. But because electricity sector is hold by the government, the government itself have their own intervention to make the coal supply meet its demand to generate

national electricity demands. So, in this matter, bargaining power of supplier is medium.

e. Rivalry among existing competitors

The intensity of rivalry among competitors in an industry/sector refers to the extent to which firms within an industry put pressure on one another and limit each other's profit potential. Again, in this sector, because the sector is fully owned by the government by regulation, the rivalry among existing competitors is low. The rivals against PT PLN Persero are the IPP (Independent Power Producers), but the existence of the IPP itself is not fully into the game since they are only allowed to produce the electricity and sell it to PT PLN Persero. But it doesn't close the opportunity in the future, the government could change the regulation so the rivalry could intensify.

4.3 Root Cause Analysis

To help understanding problem in this research, we use Root Cause Analysis. Root cause analysis could help us tracing a problem back to its origin and help us to get to the true underlying cause of the issue. There are several types of RCA and in this research fishbone diagram tool is used. Fishbone diagram, also called cause and effect diagram is a visualization tool for categorizing the potential causes of a problem in order too identify its root causes (Rouse, 2015).

On the fishbone diagram below, we can see that the problem that might occur is that low value of the company. It might occur because of several root causes. Defining the root causes can be seen on the fishbone diagram shown below.

As we previously mentioned that the company needs huge amount of investment and it may lead to wrong decision in determining source of investment whether it is from domestically or globally outside the country. Other than that is the capital structure, we need to find the optimum capital structure to find the combination of the debt and equity that is the most optimal to generate maximum value for the company. Next root cause is that ignorance to the risk that might occur to each of the cost that might end up in failure of the cost minimizing and all of the root causes could effect to the low value or not optimal value of the company.

4.4 Domestic Cost of Equity (Ke D)

There are several approaches to determine a company cost of equity. In this section we are going to calculate the cost of equity that will occur if the funding source comes from inside of the country. One of the approaches is using the CAPM formula that is mentioned on the previous chapter. To calculate using those formula we need to know the Risk-Free Rate (Rf), Beta (β) and Risk Premium (Rm-Rf). The risk-free rate is from Indonesia Government 10 Year Bond Yield which is 8.07%. For the beta of the company, because PT PLN Persero is not publicly traded, we then used comparable public companies as proxy. From the calculation we found that the beta of the company of the proxy that we are going to use is 0,36. The beta is less than 1 which means that the company market price is theoretically less volatile than the market. Last variable that we need to know is risk premium. The Risk Premium is the difference between the expected return on the market with the risk-free rate of return. For calculating risk premium, we need to know the return on the market which we use the IHSG return to determine the return of the market. From those data, we could find the Domestic Cost of Equity (Ke D) but apparently the result of the Ke D is really low which is 7,95%. (Full calculation data can be seen on the Appendix). It is against the Pecking Order Theory which is stated that the managers follow the hierarchy to choose sources of finance.

The pecking order theory starts from the asymmetry of information in the company or the unequal distribution of the information. Generally, the managers have more information about company's performance, prospects and risks compared with the creditors or investors. It is not possible for the investors or creditors to know everything about the company. Thus, there will always be some amount of information asymmetry in a company. According the theory, the cost of equity should be higher than cost of debt. So, in this matter the author tries to calculate cost of equity with different approach.

Cost of equity is the return a company requires to decide if an investment meets capital return requirements, hence we are going to use the comparable public company in electricity sector ROE as the proxy of cost of equity calculation. On the table below is shown the calculation of the company's ROE which we are going to use it as the domestic cost of equity (Ke D). Based on the table we could conclude that the domestic cost of equity (Ke D) is 21.34%.

Table 1: Domestic Cost of Equity (Ke D).

Period	Ke D
2017.Q1	21.92%
2017.Q2	24.48%
2017.Q3	21.17%
2017.Q4	26.26%
2018.Q1	18.48%
2018.Q2	16.83%
2018.Q3	20.25%
2018.Q4	21.31%
Average	**21.34%**

Source: Analysis, 2019

4.5 Domestic Cost of Debt (Kd D)

As stated by Damodaran, to determine cost of debt, we can use the rating of the company and a typical default spread on bonds with that rating. In this case, PT PLN Persero hold AAA rating from Pefindo. Based on the historical yield of the similar rating, averagely the yield of the bond with the similar rating is 7.2%, so we can conclude that cost of debt of the company is 7.2%.

Table 2: Domestic Cost of Debt (Kd D).

Period	Kd L
2018.Q4	8.25%
2018.Q3	8.00%
2018.Q2	7.15%
2018.Q1	6.47%
2017.Q4	6.52%
2017.Q3	6.77%
2017.Q2	6.99%
2017.Q1	7.45%
Average	**7.20%**

Source: Analysis, 2019

4.6 Global Cost of Equity (Ke G)

It is previously mentioned above that source of fund may vary and it could be from equity that obtained globally (outside Indonesia) but for PT PLN Persero the equity should be fully funded domestically or from inside the country because the company is currently the only company that could distribute, generate and transmit electricity in Indonesia. The government of Indonesia wants to keep the ownership of the company so they could monitor and control the electricity tariff without intervention from other parties. Based on that matter, the calculation of the global cost of equity (Ke G) is excluded from the formula.

4.7 Global Cost of Debt (Kd G)

Another assumption that we made on this final project is that, PT PLN Persero acquires fund from debt that performed outside Indonesia. The company's cost of debt is dependent on the interest rate that it pays when borrowing funds. The interest rate that it pays is equal to the risk-free rate at the time it borrows funds, along with a credit risk premium that compensates creditors for accepting credit (default) risk when extending credit to the company. As part of the international money market financing decision, a company need to consider both the market interest rate that will be paying on its debt and the likely exchange rate change during the period its debt is outstanding, (Madura, 2007).

To calculate the cost of debt, the formula is shown below:

$$Rf = ((1+iF) * (1+eF)) - 1$$

Rf = the effective financing rate
iF = the market interest rate
eF = the expected (percentage) change in the foreign currency against the firm's home currency.

In this research, we are using the United States of America as proxy. To determine the market interest rate, we use the Fed Rate from the US, in November 2018, the US Fed Rate is 2.2%. From the formula we can obtain the global cost of debt (Kd G) which is 2.17% and the calculation as follow:

Table 3: Global Cost of Debt (Kd G).

Period	Kd G
2018.Q4	4.78%
2018.Q3	3.26%
2018.Q2	3.12%
2018.Q1	1.95%
2017.Q4	1.45%
2017.Q3	1.52%
2017.Q2	0.96%
2017.Q1	0.33%
Average	**2.17%**

Source: Analysis, 2019

4.8 Risk Measurement (Standar Deviation and Variance)

One of the best-known measures of risk is the variance, or standard deviation of expected returns. We consider the variance and standard deviation as one measure of risk because the standard deviation is the square root of the variance. It is a statistical measure of the dispersion of returns around the expected value whereby a larger variance or standard deviation indicates greater dispersion. The idea is that the more disperse the expected return, the greater the uncertainty of future returns.

In this final project, we need to measure all of the risk of the cost of capital by calculating standard deviation and variance of domestic cost of capital and global cost of capital. The result of the calculation is shown below.

Table 4: Variance and Standard Deviation Calculation.

Period	Ke D	Kd D	Kd G
2018.Q4	21.31%	8.25%	4.78%
2018.Q3	20.25%	8.00%	3.26%
2018.Q2	16.83%	7.15%	3.12%
2018.Q1	18.48%	6.47%	1.95%
2017.Q4	26.26%	6.52%	1.45%
2017.Q3	21.17%	6.77%	1.52%
2017.Q2	24.48%	6.99%	0.96%
2017.Q1	21.92%	7.45%	0.33%
Average Cost	**21.34%**	**7.20%**	**2.17%**
Variance	**0.091528%**	**0.004325%**	**0.021064%**
STDV	**3.025359%**	**0.657621%**	**1.451352%**

Source: Analysis, 2019

4.9 Optimal Capital Structure

The objective of this final project is to determine the optimal capital structure of PT PLN Persero. To obtain it we are using SOLVER tools in Excel. Based on the theory that lower WACC means higher firm value, on the solver we minimize the WACC to obtain the appropriate weight of the cost of equity and cost of debt (domestic), with the constraint of the maximum risk of the company that willing to afford is the standard deviation or the risk of the global cost of debt.

The weight of investment both from inside and outside the country is regulated in Presidential Regulations Number 44/2016. It is stated that for the energy sector especially the electricity sub-sector, the maximum foreign investment is 95%. Other constraint we are using is Debt Equity Ratio that is stated in Minister of Finance Regulation No. 169/PMK.010/2015 which regulates the limitation of debt equity ratio is 4:1. The regulation is becoming one of the constraints as well. Based on the constraints mentioned above, below is the formula of the WACC.

95%(Wd Kd G) + 5% (Wd Kd D + We Ke D)

The result of the calculation with the formula above is shown below:

Table 5: Calculation Result of WACC.

WACC	7.999%
Variance	0.021%
Standard Deviation	1.451%

Source: Analysis, 2019

On the result of the calculation above, we can see that from minimizing the WACC using SOLVER in Excel to obtain maximum value of the firm, we got 7.999% of the WACC, which means that the minimum WACC that we can obtain is 7.999%. WACC basically is the rate that a company is expected to pay on average to all its security holders to finance its assets so in this final project we can conclude that PT PLN Persero to obtain the maximum firm's value the minimum cost that the firm is need to pay is 7.999%.

The result of the WACC is a combination of the weight of each the costs, which is domestic cost of equity, domestic cost of debt and global cost of debt. Those weights are later made as the optimal capital structure of PT PLN Persero. The result of the calculation of the weight is shown below.

Table 6: Optimal Capital Structure of PT PLN Persero.

Cost of Capital	Weights
Ke D	20.00002%
Kd D	39.66114%
Kd G	40.33894%
Total	100.00%

Source: Analysis, 2019

Based on the data shown above we can conclude that to obtain the minimum WACC of PT PLN Persero these weights above are the combination of the proportioned weight that must be met, these weights are then concluded as the company's optimal capital structure. The optimal capital structure of a company is defined as the proportion of debt and equity that result in the lowest weighted average cost

of capital (WACC) of the firm. The result of the weight combination is 20% domestic cost of equity, 39.66% domestic cost of debt and 40.34% global cost of debt. The structure means that majority of the funding source should be obtained from debt whether it is obtained from inside the country or debt that comes from outside the country and 20% of the fund should be obtained from equity that comes from inside the country.

Based on the calculation, we can obtain the number for the optimal combination of debt and equity is 80% debt and 20%% equity. From those weight proportion, we later could analyze the current capital structure of the company and how much fund we should obtain to reach the optimal capital structure. Before analyzing further to the calculation of the proposed optimal capital structure, we need to calculate the amount of capital expenditure needed for the latest PT PLN Persero program which is 35.000 MW program. The program will be needed 1.127 billion rupiah and the company only obligated to fund or to build 8.911 MW from the 35.000 MW. From the data we can calculate the approximate fund needed to fund the program. The calculation of the proposed optimal capital structure and the current capital structure of the company can be seen on the table below.

Table 7: Position of Capital Structure.

Program 35 000 MW	1,127,000.00
1 MW	32.20
PLN (8911 MW)	286,934.20
Total debt and equity	1,621,892.20

Description	Current Capital Structure		Proposed Capital Structure	
	2017	Percentage (%)	Percentage (%)	2017.F
Liability	465,541.00	34.87%	80.00%	1,297,516.36
Equity	869,417.00	65.13%	20.00%	324,379.09
Total	1,334,958.00	100.00%	100.00%	1,621,893.82

Source: Analysis, 2019

From the table above we can see that, PT PLN Persero current capital structure is consists of 65.13% of equity and 34.87% of debt. The amount of the equity is 864,417 billion rupiah and the amount of the liability is 465,541 billion rupiah. Based on the calculation of the optimal capital structure, to reach the optimal capital structure we proposed we need to obtain 831,975 billion rupiah of debt and we need to lower the amount of our equity to the amount of 324,374 billion rupiah. Total of the capital with the proposed optimal capital structure is becoming 1,632,893 billion rupiah and it is acquired from the number of the previous total capital accumulated with the capital expenditure needed for 35.000 MW program. After acquiring those numbers than we could calculate the gap that the company should fulfill to comply with the optimal capital structure that we already calculated.

Table 8: Fund Should be Obtained.

Ke D	20.00%	324,378.76
Kd D	39.66%	643,260.97
Kd G	40.34%	654,254.08
Total		1,621,893.82

Source: Analysis, 2019

From the data we can calculate the amount of debt that the company should obtain to comply with the optimal capital structure which is 1,297,516 billion rupiah and it is consist from 643,260 billion rupiah debt from inside the country and 654,254 billion rupiah debt from outside the country. For the equity, the company should reduce their equity to the amount of 324,378 billion rupiah.

4.10 Risk Analysis

From the calculation of the optimal capital structure, we can conclude the majority of the funding sources should come from debt that obtained globally or domestically. In that matter, we should consider that the number might have not be met by the company since it is relatively harder to obtain debt from outside the country rather than from inside the country. To overcome that possibility that may happen, the company should look for efficient funding scheme alternatives through foreign and domestic business partnerships. Indonesia known as not the world's most business-friendly country (reflected by the weak ranking in the World Bank's Doing Business Index), therefore the company as the sole provider in the electricity sector in Indonesia could propose simpler funding scheme to increase ease in doing business in Indonesia especially in electricity sector. Other than that, because based on the optimal capital structure the company need to obtain debt from outside the country, it is important for the company to fix PT PLN Persero's rating. Currently the company's 10-year bond rated Baa3 from Moody's, BB from S&P and BBB- from Fitch. Thus, it is important to mend the rating considering of the funding source should be obtained from debt outside the country.

5 CONCLUSION

Based on the analysis that performed on the previous chapter, we could conclude that to maximize firm

value, it is important to find the optimal capital structure. Optimal capital structure indicates the best debt-to-equity ratio for a firm that maximizes its value. The optimal capital structure for the firm is determined as that capital structure for which the company's weighted average cost of capital is the lowest, because when the WACC is minimized, the value of the company or shareholder wealth is maximized. Based on Pecking Order Theory, cost of debt is cheaper than the cost of equity, as debt is less risky than equity, the required return needed to compensate the debt investors is less than the required return needed to compensate the equity investors. In this project we are inspired with the Markowitz Portfolio Theory which basically stated that optimal asset allocation seeks to maximize potential returns while minimizing risk.

PT PLN Persero as provider of the electricity in Indonesia seeks for huge investments since it is also categorized as capital-intensive business. Other than that, the company needs to maximize the value of the company to satisfy the shareholder's wealth. This is the reason why, PT PLN Persero needs to determine their optimal capital structure. Since the company needs massive investments, assuming that the funding sources is not only from inside the country but also outside the country. Based the calculation performed, it is obtained the optimal capital structure is:

1. 20% from equity acquired inside the country.
2. 39.66% from debt acquired from inside the country.
3. 40.34% from debt acquired from outside the country.

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