INVETSMENT ANALYSIS WHICH RELEVANCE MEASUREMENT FOR GOVERNMENT COMPANY (BUMN) - CASE OF COAL POWER GENERATION

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ABSTRACT

Equity-based approachMIRRismorerealisticwhen usedinoperational decision-making of a state-owned enterprises(SOEs). Investment decisionin the SOEs is verystrategicbecause theircapitalizationscale is material enough, having a considerable impact onthe state budgetand influencingeconomicgrowthand public welfare. The approachused thus far is a project-basedIRR which mayreflectunrealistic conditionas*businesspractices* occurringin thebusiness world. The IRRapproach has a weaknessbecause it does notaccount for*surpluscash inflow*as a sourceof fundwhich is in realityusedto financenewprojects, acceleratethe paymentof debt, andcanbe usedfor the company's operational activity. MIRRapproach accounts forbenefitgainsoversurplus cash inflow based uponreinvestrate in accordance with thefield selected. Calculation of cash flow thatis morerealisticinfeasibility analysis should beequity-based asreality occurringin thebusiness world. The calculationdone thus far is stillusing project basis so it does notreflectrealistic conditionbecausethe owners ofthe project onlyinvest capitalina relativelysmallamount, for example, about 30% -35%, the restis financedby banks, while thedebtandinterestpayments arefinancedby the internalcapabilities of the investment concerned, so thata realisticcash outflowislimited toequityinvested by theowners. The size ofthe investmentreturn ofthe ownersshould be based onthe fundspentby the owner, notbased onthe overall valueof the investment. The management ofstate-owned enterprises(SOEs) in the futureis comingto realizethe importance ofchanging an approachtowardsa morerealistic one, so as to boostthe performance ofSOEsin questionandprovide added values tostakeholders.

Keyword : Capital budgetng, capital structure, opportunity income

BACKGROUND

Most investment decisions are made using *time value of money* approach through net present value (NPV), benefit-cost ratio (B/C ratio), and internal rate of return (IRR).Investment evaluation techniques will be formulated mathematically in the following discussion. NPV

indicator is obtained from the deduction of the *present value of cash inflows* (PVCI) by *present value of cash outflows* (PVCO). Investment plan is considered feasible if the NPV ≥ 0. B/C ratio indicator is obtained from PVCI divided PVCO and declared feasible if the B/C ratio≥ 1. IRR Indicator is the discount rate that results in NPV = 0 or PVCI = PVCO, and declared feasible if IRR ≥ cost of capital or gain required. A development in the uses of IRR indicates weakness of this indicator because it is less realistic. IRR indicator does not consider the surplus cash inflow which can generate additional returns or benefits. IRR formulation is adjusted to reflect more realistic condition through *modified internal rate of return* (MIRR) indicator. Some investment decision-making process sometimes doesn't distinguish between internal and external sources of funds in the calculation of feasibility, giving rise to unrealistic condition in describing the level of feasibility. Internal sources of funds or investor equity as part of a cash outflow are used for financing investment whose returns will be taken into account by the owners. Calculation without distinguishing source of fund or project basis but calculate the overall value of the project which will be returned through the return of investment for life of investment can raise some issues: (a) the use of bank loans is relatively short compared with the life of the investment, for example, the life of the investment is 30 years while bank loan period is only 7-8 years, so that a project is feasible according to the indicators mentioned above but it is not feasible in term of the cash flow as there is a deficit in net cash flow (NCF) during the installment period or not able to pay the amortization and interests due. (b) the feasibility indicator resulting from certain circumstances is smaller or less feasible, but in fact it is quite feasible because of the relatively small investor equity, for example, 30% - 35% of the investment value, while 65% - 70% of the bank loan financing is done through surplus cash inflow generated. Surplus cash inflow during the period of the amortization can be charged to the buyer in the price mechanism, then adjusted after the debt is paid off, as showed in the case studies of electricity purchase by the PLN (state-owned electricity company) from private electricity company or independent purchasing power (IPP) as reported in *Financial Management of the PLN in the Current and Future Times* (Aminullah Assagaf, 2014) and *Investment Feasibility Analysis in Power Generation - Application of Steam Power Plant* (Aminullah Assagaf, 2009). When the debt is financed by cash flow investment, this also means that if the debt is paid off after 7-8 years in the future, then the 30% - 35% of equity investment will become 100% or total assets will be owned by investor, doubling about three times compared with equity invested by the owners. Based on these descriptions, this study tries to investigate and recommends a more realistic alternative by evaluating investment and determining its feasibility based upon MIRR method, equity-based investment financing, and considering the net cash flow. Implementation of this study is highly relevant to the State Owned Enterprises (SOEs), especially in planning investments related to (a) co-operation of private companies, in terms of natural resource management, business partnerships and long-term purchases. Financing using loans of the bank or other financial institutions will be much easier when working with the SOEs; therefore, private equity investment should be taken into account for a balanced benefit of the parties. Indicators in feasibility analysis must be used properly as this may cause a harm on the part of SOEs unilaterally. (b) the calculation of the burden of subsidy with regard to the feasibility level taken into account by the SEOs so many profitable potentials are managed by SOEs to reduce subsidies, but because the data used for analysis are less realistic, so they are handed over to another party. The SOE lost opportunity income or cost savings to reduce the burden of subsidies that became rampant. For examples, in some case studies, management of natural resources such as gas, coal, fuel oil, and other natural resources is handed over to another party. When natural resources are managed by

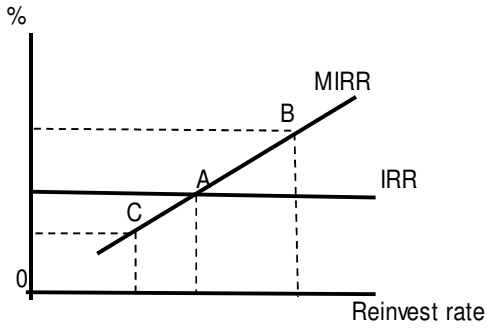
the SOEs, this is financially very beneficial to help ease the burden of subsidies. Investment planning will be very feasible when using equity-based MIRR approach. SOEs will have no difficulty in the use of banking funds as government as the shareholders would be fairly decent from the banking side. c) determination of the price that will be charged to the public. When using a project approach, the price charged is higher than equity approach due to difference in levels of investment feasibility. Thus, equity-based MIRR approach produces lower price thereby reducing the burdens of the public. The lower price will drive demand or consumption, meaning that additional capacity and operational expansion are required. The lower price may also encourage the growth of the increased SOEs business scale, at the same time creating multiplier effects in terms of the growth of other business sectors, employment opportunities and economic growth or *augmented rate of growth*. The problem raised in this study is how to convince the stakeholders that the IRR approach and project-based financing used are less relevant as they do not depict realistic conditions in the calculation of the investment or project feasibility.

LITERATURE REVIEW AND RESERACH HYPOTHESIS

Study on the use of the concept of the *time value of money* is mostly done with the NPV, B/C ratio and IRR approaches, but MIRR approach is rarely used, primarily because of the complexity of the opportunity to do reinvest and level of profitability or return predicted from existing opportunity probabilities. For ease of calculation, then the hypothesis is used in determining the *return* as the *reinvest rate*. Reinvest rate is determined using the assumed rate of return in line with the field of business chosen. For example, investment in the banking field uses the *return free risk* (Rf) such as deposit interest, certificates of Bank Indonesia (SBI), and the interest rate of savings. Each business line has a variable rate of return, thus the reinvest rate will depend on the assumption of business sectors chosen such as trade, property, construction, energy, and others. Here are some relevant studies related to the discussion as showed this site (a) www.ligasekarwangi.blogspot.com on 19 October 2009 with the title of the *Modified Internal Rate of Return*, stating that the MIRR (Modified Internal Rate of Return) is the criteria for investment feasibility by modifying the IRR method in assessing the feasibility of an investment project. Using this method, return rate equates the PV terminal cash flow to investment values. MIRR assumes that all positive cash flows invested will return to the limit on last year of the project. All negative cash flows are discounted. Efficiency level of project MIRR is consistent with the present worth ratio as showed in this site (b) www.proapod.com with the title of *What IRR, MIRR and FMRR Each Provide to Real Estate Investors,* stating that the MIRR approach makes the assumption that negative cash flows generated during the life of the investment would be financed at a "finance rate", and positive cash flows can be reinvested and earning interest at a "reinvestment rate", (c) as showed in site below www.investopedia.com with title of *IRR v. MIRR Valuation Methods*, stating that in terms of IRR v. MIRR valuation methods, MIRR is the better choice as it gives a much clearer view on what a company stands to either gain or lose in terms of an upcoming project or purchase. The IRR is more of an optimistic view of returns, while the MIRR is a realistic view. This does not mean that the IRR is obsolete or it cannot be used. In fact, using both in conjecture with a project could be beneficial, as long as you compare and contrast both results.

Based on literature studies mentioned above, the hypothesis put forward in this study is the need to make changes in the investment decision approach in order to obtain a more realistic results. Implementation of MIRR approach and calculation of equity-based cash outflow are more relevant to determine the feasibility of investment. Meanwhile, net cash

flow is used to see internal ability of the projects for settlement of external financing obligations. In comparison, the IRR and MIRR approaches can be described as a graph, where reinvest rate (Rr) determines the amount of MIRR while IRR is constant as surplus cash inflow is accumulated passively.



Point A shows that when Rr is equal to the IRR, then MIRR = IRR. When reinvestment is done in more profitable sectors or Rr is greater than the IRR, the MIRR> IRR, otherwise if reinvestment is less profitable where Rr is smaller than the IRR, the MIRR <IRR. In a more realistic business practices, the surplus cash inflow of investment will be used again for new investments or for more profitable reinvestment, thus providing additional benefits over the planned investment. Furthermore, the IRR calculation ignores reality and just takes into account the cash inflow and cash outflow limited to the scope of the project concerned.

RESEARCH AND METHODOLODY

The methodology of analysis in this study is done using a formulation as in *Intermediate Financial Management* (Eugine F. Brigham and Phillip R. Daves, 2007) as explained below,

(a) Net present value (NPV), where free cash flow (FCFt) or cash flow (CFt) is cash flow of both cash inflow or cash outflow from time to time during the life of the investment of the n, r as the discount rate,

$$\text{NPV}= [\frac{FCF1}{(1+r)^1} + \frac{FCF2}{(1+r)^2} + \frac{FCF3}{(1+r)^3} + \ldots\ldots\ldots + \frac{FCFn}{(1+r)^n}] - Initial\ Cost$$

$$\text{NPV} = \text{CF0} + \frac{CF2}{(1+r)^2} + \frac{CF2}{(1+r)^2} + \frac{CF3}{(1+r)^3} + \ldots\ldots\ldots + \frac{CFn}{(1+r)^n}$$

$$NPV = \sum_{t=0}^{n} \frac{CFt}{(1+r)^t}$$

(b) Internal rate of return (IRR), where IRR is discount rate that results in NPV = 0 or PVCI is equal to PVCO,

$$\text{NPV} = \text{CF0} + \frac{CF2}{(1+IRR)^2} + \frac{CF2}{(1+IRR)^2} + \frac{CF3}{(1+IRR)^3} + \ldots\ldots\ldots + \frac{CFn}{(1+IRR)^n} = 0$$

$$NPV = \sum_{t=0}^{n} \frac{CFt}{(1+IRR)^t} = 0$$

(c) Modified internal rate of return (MIRR) as the discount rate that results in NPV = 0 or PVFVCI is equal to PVCO,

$$\sum_{t=0}^{n} \frac{COFt}{(1+r)^t} = \frac{\sum_{t=0}^{n} CIFt(1+r)^{n-t}}{(1+MIRR)^n}$$

To illustrate the calculation mechanism and relationship between NPV, IRR and MIRR, here are the examples of the hypothetical data of cash inflow (CI) in 1-5 year, respectively; 14,000, 15,000, 16,000, 17,000, 18,000, while the cash outflow (CO) as initial investment is 55,000 and the discount rate of 10% to describe some simulation relationship between NPV, IRR and MIRR.

a) Comparison of the results of the calculation as seen in the following table shows the NPV 4.933, IRR 13.30%, and MIRR 14.02%. This means that a contract requiring the internal rate of return at 14% is not feasible with IRR but feasible with MIRR approach. Similarly, the purchase contract that requires an internal return of 13.5%, the use of IRR requires the price increase, while the MIRR recommend price reduction. In this case, it is necessary to use the MIRR approach as not to harm the buyer or consumer unilaterally, the owner of the investment gets a more realistic information and management take a more informed decision.

NPV, IRR, MIRR

TH	CI	CO	NCF	DF 10%	PVCI	PVCO	NPV
0		55.000	(55.000)	1,000	-	55.000	(55.000)
1	14.000		14.000	0,909	12.727	-	12.727
2	15.000		15.000	0,826	12.397	-	12.397
3	16.000		16.000	0,751	12.021	-	12.021
4	17.000		17.000	0,683	11.611	-	11.611
5	18.000		18.000	0,621	11.177	-	11.177
Total	80.000	55.000	25.000	-	59.933	55.000	4.933
		IRR	13,30%		Finance rate		10%
		MIRR	14,02%		Reivest rate		15%

b) IRR generates NPV = 0 as seen in the following table, which is the IRR of 13.30% indicating the discount rate and generating NPV = 0 or PVCI = PVCO by 55,000. This suggests that the investment is conceived as feasible if the IRR is greater than the cost of capital, which also means that the discount rate greater than the IRR will result in a positive NPV or profitable investment.

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IRR

TH	CI	CO	NCF	DF 13,30%	PVCI	PVCO	NPV
0		55.000	(55.000)	1,000	-	55.000	(55.000)
1	14.000		14.000	0,883	12.357	-	12.357
2	15.000		15.000	0,779	11.685	-	11.685
3	16.000		16.000	0,688	11.001	-	11.001
4	17.000		17.000	0,607	10.316	-	10.316
5	18.000		18.000	0,536	9.641	-	9.641
Total	80.000	55.000	25.000	-	55.000	55.000	-
		IRR	13,30%		Finance rate		10%
		MIRR	14,02%		Reivest rate		15%

c) MIRR generates NPV = 0 as indicated in the following table. The calculation requires reinvest rate (Rr) data corresponding to the sectors chosen and this affects the amount of MIRR level to be achieved. MIRR of 14.02% is the discount rate that results in NPV = 0 or PVFVCI = PVCO by 55,000.

MIRR > IRR — Reinvest rate > IRR

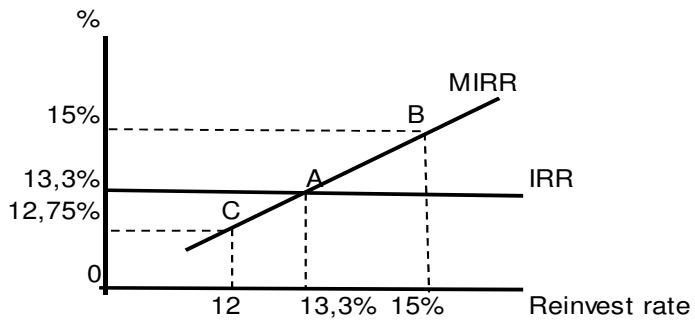
TH	CI	CO	NCF	FVCI 15%			DFPV	PV(FVCI)	PVCO	NPV
				n	DFFV	FVCI	14,02%			
0		55.000	(55.000)				1,000	-	55.000	(55.000)
1	14.000		14.000	4	1,75	24.486	0,877	12.704	-	12.704
2	15.000		15.000	3	1,52	22.813	0,769	11.836	-	11.836
3	16.000		16.000	2	1,32	21.160	0,675	10.978	-	10.978
4	17.000		17.000	1	1,15	19.550	0,592	10.143	-	10.143
5	18.000		18.000	-	1,00	18.000	0,519	9.339	-	9.339
Total	80.000	55.000	25.000	10	-	106.009	-	55.000	55.000	0
		IRR	13,30%		Finance rate		10%			
		MIRR	14,02%		Reivest rate		15%			

If reinvest rate of 15% is greater than the IRR of 13.30%, then the MIRR is greater than the IRR, and so on when Rr is smaller than the IRR, the MIRR is less than the IRR, and when Rr is equal to the IRR, the MIRR is equal to the IRR.

d) MIRR is greater than the IRR, with the same calculation but using Rr of 12% smaller than the IRR, then MIRR of 12.75 is less than the IRR of 13.30%.

e) MIRR is equal to the IRR using Rr of 13.30% or equal to the IRR, then the MIRR of 13.30% is equal to the IRR.

Simulation of the above can be illustrated in the following chart,



RESEARCH AND DISCUSSION

Case Studies Selected

The implementation of the IRR technique and equity base will use projection data from steam power plant (PLTU) developed by a private power company that sells its products to the PLN using project-based cash flow analysis as showed in *Investment Feasibility Analysis in Power Generation- Application of Steam Power Plant* (Aminullah Assagaf, 2009), and as reported in *Financial Management of the PLN in the Current and Future Times* (Aminullah Assagaf, 2014). This discussion will make a comparison between the project-based cash flow analysis and equity-based cash flow. MIRR and IRR approaches are used in both analyses. Regarding this calculation, the level of relevance and reality in the business world can be compared, as well as the financial impact in operation of SOEs can be demonstrated.

MIRR approach is more realistic in investment decisions

Results of the simulation in appendix 1 of project-based cash flow analysis showed that NPV = 16.518, IRR = 11.13%, and MIRR = 13.77%. This shows that the MIRR approach in investment decisions is more realistic, especially because surplus cash inflow used in business practice will be used again to support investment and routine operational activity of the companies that may generate benefits. Benefit of the use of surplus cash is received from the return of investment and can be used operationally to accelerate debt repayment if the cost of capital on the loan is greater than the expected return of the investment. Such benefit is a part of the investment plan that should be reckoned. In the IRR approach, benefit is not considered, while the MIRR is calculated through reinvest rate (Rr) indicator. The higher achievement of Rr, the higher the achievement of the MIRR, even greater than the IRR. Conversely, if Rr achieved is less than the amount of the IRR, the MIRR is also smaller than the IRR achieved. When Rr is as large as the IRR, the MIRR achieved is equal to the IRR. Business practices as assumed in the calculation of the IRR is almost certainly no longer found in the business world, including state-owned enterprises (SOEs) such as the State Electricity Company (PLN). The returns obtained from the investment of PLN will be used again for new investment or for fulfillment of operational needs so no need to seek new loans to meet their financing needs, thereby saving the cost of capital for financing categorized as reinvest rate. In addition, PLN and other SOEs generally still use the IRR approach for analysis of investment decisions. The management of SOEs such as PLN adopts MIRR approach in investment decisions. The purchase of electricity from private power companies still uses the standard IRR and even uses the project base, the opportunity of PLN for cost savings of electricity purchase can be calculated simply when using the IRR approach and equity-based cash flow. In contrast, the private power companies get significant benefits allowing them to make an expansion after the debt is paid off as IPP which has been in operation at this time.

Equity-based cash flow approach is more realistic in investment decisions

The results of the simulation in appendix 2 of the equity-based cash flow analysis showed NPV = 116.970, IRR = 30.06%, and MIRR = 18.43, suggesting that the equity approach produces greater MIRR than the project-based approach only reaching 13.77%. Equity-based cash flow approach in the business practice is more realistic as the project owners just invest their capital which is relatively smaller, and then the rest is financed by banks. Furthermore, the investment on its own pays off the debt, so it can be stated that the investment actually only requires a relatively small capital. For example, case studies demonstrate that some private power companies only provide funds of 30% - 35% for financing of steam power plant (PLTU), the rest of about 65% - 70% is financed by the banks. If the simulation of the project takes into account the cost of investment at100% or including banking funds, then certain standard IRR is

used to determine rates of electricity sold to PLN, thereby the results can certainly be greater than the rates calculated based on equity-based cash flow approach. Compare the results of simulation in appendix 1 with IRR of 11.13% for using project-based cash flow, and with the same data but using equity-based cash flow approach, then IRR = 30.06%. Thus the rates agreed by PLN and private power companies are much cheaper when using equity-based calculation. The state-owned enterprises (SOEs) should adopt a concept of equity-based investment decision analysis because the realization of investment that occurred thus far also used equity-based calculation including the cooperation between PLN and private power companies.

Consequences of IRR and project-based cash flow approaches

When a state-owned enterprise (SOE) remains using the traditional calculation models which are unrealistic as aforesaid, then the consequences are (a) the harm to the company for buying at higher price, (b) in the partnership/cooperation, the SOEs only get relatively small benefit or small share of benefit, (c) increasing the burden of subsidies due to transaction calculated based upon project-based IRR, (d) providing significant gains to the private companies, including foreign companies cooperating with SOEs, (e) increasing cost of the project due to the investment value calculated by IRR which is relatively smaller especially when the construction project is done by private company. This weakness will happen continually if the management of SOEs does not immediately make changes in the approach used in evaluating the project. Nationally, investment in the SOEs is so material compared with investment in the private sector. SOE investment also significantly influences the economic growth and welfare of many people, so it is worth considering any weaknesses in the process of calculation as explained above. Hopefully the management of SOEs in the future would be more responsive in assessing anything which is of financial or economic importance that can improve the performance of the company, reduce the burden on state finance and improve the welfare of people.

CONCLUSION AND LIMITATION OF THE STUDY

Conclusion

Regarding the description given above it can be concluded that

a. many investment decisions are made using the IRR approach, while the weakness of this approach is already recognized as unrealistic as business practices that occur in the business world.
b. MIRR approach has refined drawbacks in IRR by taking into account of the reinvest rate (Rr) in utilizing surplus cash inflow.
c. The calculation of investment-cash flow uses project-based approach so that the value of the resulting rate of returns (IRR and MIRR) is relatively smaller. The consequence would be detrimental to one of the parties and tend to define greater price to achieve a greater return.
d. Realistic cash flow approach is equity-based because it is more realistic given the business practices that occur in the business world. This approach tends to be more beneficial to both parties and price level is relatively small compared with the project-based cash flow approach.
e. Management of state-owned enterprises (SOEs) needs to adopt equity-based investment analysis and use MIRR indicator as a correction of the IRR calculation.

Limitation of Study

This study is limited by the availability of data and references presented in the public media. When sufficient information is available, the implementation of the MIRR and equity-based cash flow approaches can be presented more perfect. State-owned enterprises (SOEs) can internally implement those approaches because detailed information is available to obtain a more realistic analysis results.

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ANALISIS CASH FLOW - BASE ON PROJECT **Lampiran : 1**

Th	CI	CO	NCF	Akum Cash Inflow (CI)				DF	PVCI	PVCO	NPV
				Awal	CI	Bng&CcI	Akhir	10%			
0	-	138.952	(138.952)					1,000	-	138.952	(138.952)
1	-		-					0,909	-	-	-
2	-		-					0,826	-	-	-
3	19.096	-	19.096		19.096		19.096	0,751	14.347	-	14.347
4	19.272	-	19.272	19.096	19.272	22.011	16.356	0,683	13.163	-	13.163
5	19.441	-	19.441	16.356	19.441	22.011	13.787	0,621	12.071	-	12.071
6	19.604	-	19.604	13.787	19.604	22.011	11.380	0,564	11.066	-	11.066
7	19.760	-	19.760	11.380	19.760	22.011	9.129	0,513	10.140	-	10.140
8	19.907	-	19.907	9.129	19.907	22.011	7.025	0,467	9.287	-	9.287
9	20.046	-	20.046	7.025	20.046	22.011	5.060	0,424	8.502	-	8.502
10	20.176	-	20.176	5.060	20.176	22.011	3.225	0,386	7.779	-	7.779
11	20.295	-	20.295	3.225	20.295		23.520	0,350	7.113	-	7.113
12	20.403	-	20.403	23.520	20.403		43.923	0,319	6.501	-	6.501
13	20.500	-	20.500	43.923	20.500		64.423	0,290	5.938	-	5.938
14	20.583	-	20.583	64.423	20.583		85.007	0,263	5.420	-	5.420
15	20.653	-	20.653	85.007	20.653		105.660	0,239	4.944	-	4.944
16	20.708	-	20.708	105.660	20.708		126.368	0,218	4.507	-	4.507
17	20.748	-	20.748	126.368	20.748		147.116	0,198	4.105	-	4.105
18	20.770	-	20.770	147.116	20.770		167.886	0,180	3.736	-	3.736
19	20.774	-	20.774	167.886	20.774		188.660	0,164	3.397	-	3.397
20	20.759	-	20.759	188.660	20.759		209.419	0,149	3.086	-	3.086
21	20.723	-	20.723	209.419	20.723		230.142	0,135	2.800	-	2.800
22	20.664	-	20.664	230.142	20.664		250.806	0,123	2.539	-	2.539
23	20.583	-	20.583	250.806	20.583		271.389	0,112	2.299	-	2.299
24	20.475	-	20.475	271.389	20.475		291.864	0,102	2.079	-	2.079
25	20.341	-	20.341	291.864	20.341		312.205	0,092	1.877	-	1.877
26	20.179	-	20.179	312.205	20.179		332.384	0,084	1.693	-	1.693
27	19.985	-	19.985	332.384	19.985		352.369	0,076	1.524	-	1.524
28	19.760	-	19.760	352.369	19.760		372.129	0,069	1.370	-	1.370
29	19.500	-	19.500	372.129	19.500		391.629	0,063	1.229	-	1.229
30	19.203	-	19.203	391.629	19.203		410.832	0,057	1.101	-	1.101
31	18.868	-	18.868	410.832	18.868		429.700	0,052	983	-	983
32	18.491	-	18.491	429.700	18.491		448.191	0,047	876	-	876
Total	602.268	138.952	463.315		602.268	154.076	-	-	155.470	138.952	16.518

Sumber : Studi kasus investasi PLTU 1x10 MW (data diolah)

Catatan : MIRR = 13,77% Rr = 15%

IRR = 11,13% NPV = 16.518

ANALISIS CASH FLOW - BASE ON EQUITY **Lampiran : 2**

Th	CI	CO	NCF	Akum Cash Inflow (CI)				DF	PVCI	PVCO	NPV
				Awal	CI	Bng&Ccl	Akhir	10,00%			
0	-	38.500	(38.500)					1,000	-	38.500	(38.500)
1	-		-					0,909	-	-	-
2	-		-					0,826	-	-	-
3	19.096	-	19.096		19.096		19.096	0,751	14.347	-	14.347
4	19.272	-	19.272	19.096	19.272	22.011	16.356	0,683	13.163	-	13.163
5	19.441	-	19.441	16.356	19.441	22.011	13.787	0,621	12.071	-	12.071
6	19.604	-	19.604	13.787	19.604	22.011	11.380	0,564	11.066	-	11.066
7	19.760	-	19.760	11.380	19.760	22.011	9.129	0,513	10.140	-	10.140
8	19.907	-	19.907	9.129	19.907	22.011	7.025	0,467	9.287	-	9.287
9	20.046	-	20.046	7.025	20.046	22.011	5.060	0,424	8.502	-	8.502
10	20.176	-	20.176	5.060	20.176	22.011	3.225	0,386	7.779	-	7.779
11	20.295	-	20.295	3.225	20.295		23.520	0,350	7.113	-	7.113
12	20.403	-	20.403	23.520	20.403		43.923	0,319	6.501	-	6.501
13	20.500	-	20.500	43.923	20.500		64.423	0,290	5.938	-	5.938
14	20.583	-	20.583	64.423	20.583		85.007	0,263	5.420	-	5.420
15	20.653	-	20.653	85.007	20.653		105.660	0,239	4.944	-	4.944
16	20.708	-	20.708	105.660	20.708		126.368	0,218	4.507	-	4.507
17	20.748	-	20.748	126.368	20.748		147.116	0,198	4.105	-	4.105
18	20.770	-	20.770	147.116	20.770		167.886	0,180	3.736	-	3.736
19	20.774	-	20.774	167.886	20.774		188.660	0,164	3.397	-	3.397
20	20.759	-	20.759	188.660	20.759		209.419	0,149	3.086	-	3.086
21	20.723	-	20.723	209.419	20.723		230.142	0,135	2.800	-	2.800
22	20.664	-	20.664	230.142	20.664		250.806	0,123	2.539	-	2.539
23	20.583	-	20.583	250.806	20.583		271.389	0,112	2.299	-	2.299
24	20.475	-	20.475	271.389	20.475		291.864	0,102	2.079	-	2.079
25	20.341	-	20.341	291.864	20.341		312.205	0,092	1.877	-	1.877
26	20.179	-	20.179	312.205	20.179		332.384	0,084	1.693	-	1.693
27	19.985	-	19.985	332.384	19.985		352.369	0,076	1.524	-	1.524
28	19.760	-	19.760	352.369	19.760		372.129	0,069	1.370	-	1.370
29	19.500	-	19.500	372.129	19.500		391.629	0,063	1.229	-	1.229
30	19.203	-	19.203	391.629	19.203		410.832	0,057	1.101	-	1.101
31	18.868	-	18.868	410.832	18.868		429.700	0,052	983	-	983
32	18.491	-	18.491	429.700	18.491		448.191	0,047	876	-	876
Total	602.268	38.500	563.768		602.268	154.076	-	-	155.470	38.500	116.970

Sumber : Studi kasus investasi PLTU 1x10 MW (data diolah)

Catatan : MIRR = 18,43% Rr = 15%

IRR = 30,06% NPV = 116.970