

## FINANCIAL ANALYSIS

1. **General Methodology.** Financial analysis of the project has been undertaken in accordance with Asian Development Bank (ADB) guidelines.<sup>1</sup> The purpose was to determine the financial sustainability of the proposed investments for the transmission of 1,500 megawatts of power from Java to Bali to be executed by the State Electricity Company (PLN).<sup>2</sup> The analysis was performed using cash flow analysis by projecting future revenue and cost streams from the project based on certain assumptions. Since this is a new project, all cash flows are incremental. The future stream of net incremental cash flow is discounted to its present value, and the financial internal rate of return (FIRR) and financial net present value (FNPV) are calculated on an after-tax basis in real terms. The weighted average cost of capital (WACC) is determined based on the source and cost of financing, which is then used as a benchmark to compare with the FIRR. The project is considered financially viable if the FIRR exceeds the project's cost of funds as measured by the WACC. Sensitivity analysis was conducted to establish the robustness of the project FIRR to changes in various parameters.

2. **Framework for Financial Analysis.** The framework for the financial analysis consists of the project investment the project investment and operating plans. The project cost estimates include information from the technical analysis of expected annual capital expenditures during implementation, including civil works, equipment, environmental and social impact mitigation costs, project management and consultancies, training, and physical contingencies. The project operating plan provides projections of expected revenues and operating costs throughout implementation. The financing plan identifies sources of debt and equity financing of the project, including the amount of equity contribution from the government and/or PLN.

3. **Assumptions.** The following assumptions were used in carrying out the financial analysis:

- (i) **Exchange rate and inflation.** An average exchange rate of Rp11,200 per US dollar has been assumed for the base year 2013. For the later years, the exchange rate has been calculated on the basis of purchasing power parity (PPP), which assumes that the annual change in exchange rate is proportional to the ratio of the local and foreign inflation indexes.
- (ii) **Capital costs.** The total base capital cost of the project (excluding price contingencies and financing charges during implementation) is estimated at \$360.3 million, inclusive of physical contingencies of \$32.8 million. The financing plan comprises the following: ADB ordinary capital resources (\$209.2 million), ASEAN Infrastructure Fund (\$23.3 million), and the Government of Indonesia (\$127.7 million).
- (iii) **Implementation period.** Construction of the project will commence in April 2014 and will be completed in March 2018.
- (iv) **Economic useful life.** The operating life of the project is assumed to be 25 years, and revenues from the sale of energy are estimated to flow from April 2018 to March 2043.

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<sup>1</sup> ADB. 2005. *Financial Management and Analysis of Projects*. Manila.

<sup>2</sup> PT (Persero) Perusahaan Listrik Negara.

- (v) **Tax.** The corporate income tax rate for Indonesia of 25% is assumed to apply throughout the life of the project.

4. **Incremental Costs.** The incremental fixed operating cost of the transmission interconnection was assumed to be 1.5% of the capital costs and is a typical rate for evaluating power transmission investments. The incremental variable cost was based on the levelized cost of electricity of a coal fired power plant, given that most of the energy transfer from the Paiton end of the connection in Java will be from base load coal-fired electricity. The levelized cost of coal-fired electricity is assumed to be \$103/megawatt-hour<sup>3</sup> in 2013 prices or Rp1,153/kilowatt-hour, excluding transmission operating costs, which are separately calculated. The asset is depreciated over 25 years on a straight-line basis for the purpose of tax calculations.

5. **Benefits.** The incremental revenue assumes that PLN will continue to obtain a government subsidy based on total revenue (tariff and subsidy) set at an assumed 5% margin over the total operating costs (including taxes, interest cost, and depreciation).<sup>4</sup> This has been the approximate basis of subsidy used by the government in the past and is assumed to continue. The financial benefits to PLN will accrue from the incremental sales of 2,089 gigawatt-hours in 2018, increasing to a maximum of 10,512 gigawatt-hours/year from 2029 onwards when the transmission connection will be operating at full capacity. This is the incremental volume of electricity that was assumed to go into the system and was taken into account in the financial analysis.

6. It should be noted that a conservative basis was used in the financial analysis. A significant economic benefit from this project is based on savings achieved by replacing existing 526 megawatts of diesel electricity in Bali with electricity transmitted from coal-fired power plants in Java. However, while it is an economic benefit, this does not translate to financial benefits for PLN since the tariff subsidy mechanism is such that the subsidy will be accordingly reduced, thus negating the financial benefits to PLN from the diesel savings. In the financial analysis, it was conservatively assumed that the subsidy mechanism will continue to be in place throughout the term of the project. While this benefit from diesel savings has been evaluated as part of the financial sensitivity analysis (paragraph 11), it has not been included as a financial benefit to PLN in the base case.

7. **Weighted Average Cost of Capital.** The WACC is calculated as the weighted average cost of equity and debt used to fund the project. The cost of equity is calculated on the basis of the capital asset pricing model, which provides a methodology for estimating the required equity return as a function of the relative risk of the investment. According to the capital asset pricing model, the cost of equity is the rate of return on a risk-free investment such as government bonds, plus a risk premium appropriate for the project. Therefore, the cost of equity for a higher risk project is higher than that having a lower level of risk. The bases and assumptions and calculation of PLN's cost of equity are in Table 1.

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<sup>3</sup> United States Energy Information Administration. 2011. *Annual Energy Outlook 2011*. Washington, DC.

<sup>4</sup> According to the 2012 PLN annual report, the Government of Indonesia has provided an electricity subsidy to its customers through PLN. The procedure for the calculation and payment of this electricity subsidy for budget years 2012 and 2011 is based on the Regulation of Minister of Finance of the Republic of Indonesia No. 111/PMK.02/2007 dated 14 September 2007, which has been amended by Regulation No. 162/PMK.02/2007 dated 17 December 2007. The electricity subsidy is computed as the negative difference between the average sales prices (Rp/kilowatt-hour) of each tariff category less the cost of electricity supplies on the voltage for each tariff category multiplied by the electricity sales volume (kilowatt-hours) of each tariff category. The subsidy also includes a margin. For example, based on the Approval Letter of Budget Performance List, the electricity subsidy for budget year 2012 amounted to Rp90,076,230 million, which includes a 7% margin above the costs of supplied electricity.

**Table 1: Perusahaan Listrik Negara (PLN) Cost of Equity<sup>a</sup>**

Item	Cost of Equity
Risk Free <sup>b</sup>	5.40%
Market Expected Rate of Return <sup>c</sup>	8.80%
Market Risk Premium	3.40%
Beta <sup>d</sup>	0.84
Cost of Equity	8.30%

<sup>a</sup> The cost of equity has been calculated on the basis of the capital asset pricing model.

<sup>b</sup> The yield on 10-year Government of Indonesia bonds has been used as risk-free rate. The current yield on 10-year government bonds is 5.44%.

<sup>c</sup> The country risk premium for Indonesia has been used as the market expected rate of return as PLN is a wholly owned government company. (Source: Aswath Damodaran, January 2013).

<sup>d</sup> As PLN is not a listed company, the beta for electricity utility companies in the US has been used as proxy for the beta of PLN. The asset beta (unlevered beta) for 56 electricity utilities companies in the US is around 0.47. The equity beta of PLN has been computed to be 0.84 considering the debt equity ratio of 1.06 and corporate tax rate of 25% in Indonesia.

Source: Asian Development Bank.

8. The nominal cost of debt is taken as 20-year fixed London interbank offered rate swap rate with lenders' spread and maturity premium, if applicable, and government on-lending margin. A tax rate of 25% is assumed. The inflation rate used to adjust the nominal values to real values is based on the long-term price escalation factors used by ADB. Given the estimated costs of equity and debt and the relative proportions of equity and debt in the project capital structure, the WACC is calculated at 2.49% (Table 2).

**Table 2: Weighted Average Cost of Capital**

	Loans		Equity	Total
	ADB	AIF	PLN	Total
A Amount (\$ million)	209.2	23.3	127.7	360.3
B Proportion of Financing	58.07%	6.48%	35.45%	100.00%
C Nominal Cost	4.50%	6.00%	8.26%	
D Tax Rate	25.00%	25.00%	0.00%	
E Nominal Cost Adjusted by Tax, $C \times (1-D)$	3.37%	4.50%	8.26%	
F Inflation Rate	1.80%	1.80%	4.10%	
G Real Cost Adjusted by Tax, $(1+E) \div (1+F) - 1$	1.54%	2.65%	4.00%	
H Cost of Type of Capital (B x F)	0.90%	0.17%	1.42%	2.49%
<b>WACC (%)</b>	<b>2.49%</b>			

ADB = Asian Development Bank, AIF = ASEAN Infrastructure Fund, ASEAN = Association of Southeast Asian Nations, PLN = Perusahaan Listrik Negara, WACC = weighted average cost of capital.

Sources: ADB and PLN estimates.

9. **Cost Benefit Analysis.** Incremental costs and benefits in constant June 2013 prices were estimated over the life of the project and used as the basis of calculating the project's FIRR. The project cost and project net cash flows were based on constant June 2013 prices for the evaluation period (2014–2042). The project costs comprise all incremental capital expenditures, excluding financial charges during implementation and price contingencies. The operating expenditures are incremental expenses, excluding depreciation, interest expense, and price contingencies. After tax cash flows were used in the evaluation assuming a corporate tax rate of 25%.

10. The post-tax FNPV of the projected incremental cash flows discounted at WACC of 2.49% is Rp6,736 billion. The 10.5% post-tax real FIRR of the project is higher than the WACC of 2.49%, confirming that the project is financially viable. The results of the financial analysis are in Table 3.

**Table 3: Financial Evaluation Table  
(Rp billion)**

Year	Capital	Cost	Revenue	Cash	Tax	Net Cash
1	417			(417)		(417)
2	1,282			(1,282)		(1,282)
3	1,311			(1,311)		(1,311)
4	894			(894)		(894)
5	457	2,455	2,822	(89)	48	(138)
6		2,803	3,193	390	54	336
7		3,528	3,966	438	66	372
8		4,259	4,746	487	78	409
9		5,049	5,588	539	91	448
10		5,902	6,498	596	105	491
11		6,823	7,480	658	121	537
12		7,818	8,542	724	137	587
13		8,892	9,688	796	155	640
14		10,052	10,926	873	175	699
15		11,306	12,263	957	196	762
16		12,167	13,182	1,015	210	805
17		12,167	13,181	1,014	210	804
18		12,167	13,180	1,013	210	803
19		12,167	13,179	1,012	209	802
20		12,167	13,178	1,011	209	802
21		12,167	13,178	1,011	209	802
22		12,167	13,178	1,011	209	802
23		12,167	13,178	1,011	209	802
24		12,167	13,178	1,011	209	802
25		12,167	13,178	1,011	209	802
26		12,167	13,178	1,011	209	802
27		12,167	13,178	1,011	209	802
28		12,167	13,178	1,011	209	802
29		12,167	13,178	1,011	209	802
			<b>FNPV =</b>			<b>6,736</b>
<b>WACC 2.49%</b>			<b>FIRR =</b>			<b>10.5%</b>

FIRR = financial internal rate of return, FNPV = financial net present value, WACC = weighted average cost of capital.

( ) = negative.

Sources: Asian Development Bank and Perusahaan Listrik Negara estimates.

11. **Sensitivity Analysis.** A sensitivity analysis was conducted to ascertain the impact of changes in project variables on base case FNPV and FIRR, including (i) increase in capital costs, (ii) delay in implementation of project, (iii) increase in operating costs, (iv) decrease in sales, and (v) diesel savings included as part of financial benefits. The results indicate that FIRR greater than the WACC is achieved under most scenarios (Table 4). The project is not very sensitive to increase in capital costs and delay in implementation but is highly sensitive to power sales decline and operating cost increase. If diesel savings are included as part of financial benefits (i.e., assuming the tariff subsidy mechanism does not apply), the FIRR of the project

increases to 36.9% from 10.5% in the base case, and the FNPV rises to Rp35,245 billion from the base case FNPV of Rp6,736 billion. This indicates the significant value (FNPV of Rp29 trillion) that is foregone by PLN as a result of the government subsidy mechanism and not operating as a commercial enterprise.

**Table 4: Financial Internal Rate of Return and Financial Net Present Value Base Case and Sensitivity Analysis**

Variables	Change	FIRR			FNPV	FNPV	
		FIRR	SI <sup>a</sup>	SV <sup>b</sup> (%)		SI <sup>a</sup>	SV <sup>b</sup> (%)
1 Base case		10.5%			6,736		
2 Capital cost overrun	10%	9.6%	1.13	89	6,330	0.60	165.94
3 2-year delay in benefits		10.2%	FIRR lower by 0.3%		5,940	FNPV lower by 11.8%	
4 Power sales decline	(5%)	3.5%	(17.43)	(5.77)	583	(18.27)	(5.47)
5 Operating Cost Increase	5%	4.3%	15.41	6.53	1,086	16.78	5.96

FIRR = financial internal rate of return, FNPV = financial net present value, SI = sensitivity indicator, SV = switching value.

( ) = negative.

<sup>a</sup> The ratio of the percent change in the FIRR to the percent change in a variable.

<sup>b</sup> The percent change required in a variable for the FIRR to become zero.

Sources: Asian Development Bank and Perusahaan Listrik Negara estimates.