

# **CHAPTER 12**

## **ECONOMIC ANALYSIS**

## **CHAPTER 12 ECONOMIC ANALYSIS**

### **12.1 Objective of Economic Analysis**

In general, the nation must carry out a variety of projects in various fields for its economic development. In developing countries like Tanzania, it is necessary to develop and expand their basic infrastructures, including electric power facilities, water supply systems, and roads. However, since all the necessary investments cannot be made at the same time because of limited funds, it is indispensable to choose good projects.

In the three cities of Dar es Salaam, Arusha, and Moshi that are the subject of the Study, a demand for electric power is rapidly growing and it is of urgent necessity to develop and expand substations and transmission/distribution networks. On the other hand, the obsolescent facilities, insufficient equipment capacities, etc. have caused various problems, such as frequent power failures and voltage fluctuation. Therefore, there is no doubt that this project is extremely important. However, a quantitative analysis must be made to determine whether or not to carry out the project in preference to other projects.

To evaluate a particular project, economic analysis and financial analysis are made. Economic analysis is carried out to evaluate the validity of the project from the standpoint of the national economy, and financial analysis to evaluate the profitability of the project. In this chapter, the validity of this project shall be quantitatively evaluated from the standpoint of the Tanzanian economy.

### **12.2 Method of Economic Analysis**

#### **12.2.1 Basic Policy**

In the economic analysis of a particular project, it is common practice to study the differences in benefit and cost between two cases—one in which the project is executed and one in which it is not executed. The benefit of a project means the goods/services created or the costs reduced by execution of the project. In this project, the increase in electricity supply brought about by execution of the project shall be regarded as the benefit, and the investment cost and the increase in cost of operation and maintenance incurred by the investment shall be regarded as the cost. The project covers the three cities mentioned above. However, since the electric power systems of Arusha and Moshi are linked together, the two cities shall be treated as one area (the Arusha, Kilimanjaro area). Therefore, the economic analysis shall be carried out for the two areas—Dar es Salaam and Kilimanjaro.

#### **12.2.2 Evaluation Method**

In this Study, economic internal rate of return (EIRR), which is commonly used in economic analyses, shall be adopted as an indicator of economic evaluation. EIRR is the discount rate that makes the sum of annual net flows zero (net flow means inflow (benefit) minus outflow (cost)). It is given by the following equation:

$$\sum_{i=1}^n \frac{\text{Net Flow}_i}{(1+R)^{i-1}} = 0$$

where, n denotes calculation period (years) and R denotes discount rate.

### 12.2.3 Scope of Evaluation (Alternative Plan)

In this economic analysis, the following two cases shall be considered.

- Investment to cope with the peak load shall be made so as to avoid the overload operation of transformers, transmission lines, etc. (Case-A, or the base case).
- The overload operation of transformers and transmission lines shall be allowed. Concretely, an additional transformer shall be installed when the maximum load reaches 120% of the capacity of the existing transformer, and construction of a new substation shall be postponed one year unless the construction work is already under way (Case-B).

## 12.3 Premises

The major premises for the economic analysis are described below.

### (1) Price base and exchange rate

In this study, economic evaluation shall be made based on the constant price of 2001 when the field surveys were carried out, and inflation is not incorporated. The following currency exchange rate for prevailing in the second half of 2001 is applied.

1 US\$ = 900 Tanzania shillings

In countries in which there is a large difference between the official exchange rate and the real exchange rate, a shadow exchange rate or market rate is employed in the economic analysis. In Tanzania, the official and other rates were unified into single rate in August 1993. Since then, the exchange rates have been daily determined based on the supply-demand balance. In this study, therefore, the shadow exchange rate shall not be considered.

### (2) Calculation period

The economic lives of distribution facilities, which are used by TANESCO for a calculation of the annual amount of depreciation is 30 years for overhead lines (11 kV and 33 kV) and 60 years for substations. The economic lives of many other devices are 30 to 60 years. Therefore, the period to be covered by the economic analysis was decided to be 30 years or the shortest economic life of facility. Since the objective of the study is to investigate the rehabilitation and expansion plan to meet the electricity demand up until 2010, in this economic analysis, the supply of electricity (benefit) in and after 2011 would be the same as that in 2010.

### (3) Concept of benefit

In the economic analysis of an electric power project, the long-run marginal cost is commonly used as an economic price. As TANESCO's long-run marginal cost, London Economics Ltd. worked out 9 US cents/kWh in 1993. Since then, it has been used as the

base cost. However, this long-run marginal cost, calculated about 10 years ago, does not always seem to reflect the present situation. The total cost of generation, transmission, and distribution in 2000 was 9.33 US cents/kWh, whereas it was 8.85 US cents/kWh in 1993. In the Study, therefore, the 1993 long-run marginal cost (9 US cents/kWh) multiplied by the rate of increase of total cost shall be used as the long-run marginal cost (9.60 US cents/kWh).

Needless to say, in order to increase the sales of electric power, it is necessary to increase the amount of electricity generation. In countries and areas where all the power stations are similar to one another in terms of the cost of generation, the average unit cost of generation will not change much even if the amount of power generation increases a little. However, in countries like Tanzania, where electricity is generated mainly by hydroelectric power stations and shortages of electricity are covered by thermal power stations, which differ in the cost of generation from hydroelectric power stations, it is extremely difficult to predict the change in generation cost caused by an increase of electricity generation. In the Study, therefore, it was decided to divide the total cost of generation, transmission, and distribution into the "cost of distribution" and the "cost of generation and transmission", and to use the above long-run marginal cost multiplied by the proportion of distribution cost to the total cost as the long-run marginal cost of distribution. By using data obtained from TANESCO (see Table 12.1) through Deloitte & Touche, the long-run marginal cost of distribution was calculated by the method described below.

- As the direct cost (cost of sales, excluding depreciation), the figures shown in Table 12.1 were directly used.
- Since the depreciation had been distributed to "generation/transmission", "distribution," and "others," the portion distributed to "other" was redistributed to generation/transmission and distribution according to their respective shares in depreciation.
- Since the administration expense consists largely of personnel expenses of the administrative department, it was distributed to generation/transmission and distribution according to their respective shares in personnel expenses.
- The other expenses are mainly those related to equipment, such as interest and exchange losses. They were distributed to generation/transmission and distribution according to their respective shares in depreciation.

The calculation results are summarized in Table 12.2. As is evident from the table, the proportion of distribution cost to total cost has been fluctuating year by year. This is due to the fact that the cost of generation widely varies according to rainfall. Since the power source configuration with hydropower as the principal source will remain unchanged for some time, the proportion of distribution cost to total cost should continue fluctuating year by year. In this study, therefore, it was decided to use not the figure in 2000, but the total cost (US\$ 9.60/kWh) multiplied by the average proportion of distribution cost in the past five years (25.33%), that is, US\$ 2.43/kWh, as the distribution cost (benefit).

CHAPTER 12 ECONOMIC ANALYSIS

Table 12.1 Change in TANESCO's cost structure (Unit: TSch Million)

Particulars	1996	1997	1998	1999	2000
<b>Cost of sales</b>					
Generation and Transmission	21,844	38,047	17,002	28,331	51,350
Distribution	4,024	4,210	4,969	9,282	10,408
Depreciation	32,935	35,189	39,932	41,622	38,783
Total	58,803	77,446	61,903	79,235	100,541
<b>Operating Expenses</b>					
Administration Expenses	15,840	20,645	25,929	29,605	37,559
Provision for Doubtful Debts	13,285	4,513	11,168	1	22
Interest on Loans	6,849	6,383	14,796	15,487	13,918
Exchange Fluctuation Loss	19,673	▲182	17,634	29,969	▲12,66
Provision for Obsolete	120	106	1,127	0	4
Stocks	55,767	31,466	70,654	72,063	2,549
Total	1,164	5,236	1,254	1,931	41,383
<b>Non-Operating Income</b>					1,919
	113,406	103,676	131,303	149,367	
<b>Total Cost</b>	1,829	1,701	1,718	1,748	140,005
<b>Energy Sold (in GWh)</b>	62.01	60.96	76.42	85.46	1,857
<b>Cost per kWh</b>	587	613	654	731	75.41
<b>Av. Exchange Rate for US\$</b>	10.57	9.95	11.68	11.68	808
<b>Cost per kWh (in US Cents)</b>					9.33

Source: Deloitte & Touche

Table 12.2 Study of cost structure by department (Unit: TSch Million)

Particulars	1996	1997	1998	1999	2000
<b>Generation &amp; Transmission</b>					
Cost of Sale excl.	21,844	38,047	17,002	28,331	51,350
Depreciation	25,765	28,912	30,481	31,453	31,879
Depreciation	8,549	11,519	13,495	15,276	19,532
Administration	30,324	4,589	33,18	30,625	1,566
Others	86,482	83,067	94,161	105,689	104,327
Total					
<b>Distribution Cost</b>	4,024	4,210	4,969	9,282	10,408
Cost of Sale excl.	7,170	6,277	9,451	10,169	6,904
Depreciation	7,291	9,126	12,433	14,329	18,027
Depreciation	8,439	996	10,288	9,901	339
Administration	26,925	20,609	37,142	43,682	35,678
Others					
Total	113,406	103,676	131,303	149,367	140,005
<b>Total Cost</b>	23.74%	19.88%	28.29%	29.24%	25.48%
<b>% of Distribution Cost</b>					25.33%
			<b>Average of 5 Years</b>		

## 12.4 Project Cost

### 12.4.1 Construction Cost

The costs of construction in each of the two cases are shown in Tables 12.3 and 12.4. The construction costs shown in tables exclude import duties and other taxes, which are the transfer item in economic analysis.

Table 12.3 Summary of construction costs (Case-A)

Dar es Salaam		(Unit: Thousand US\$)										
Year	Substation			Transmission			Distribution			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2002	20,270	3,032	23,302	11,671	1,310	12,981	3,683	17	3,700	35,624	4,359	39,983
2003	12,530	1,887	14,417	3,503	761	4,264	4,999	23	5,022	21,032	2,671	23,703
2004	13,845	2,094	15,939	11,060	3,250	14,310	5,181	24	5,205	30,086	5,368	35,454
2005	2,962	454	3,416	834	98	932	1,920	9	1,929	5,716	561	6,277
2006	6,047	915	6,962	1,102	168	1,270	2,360	11	2,371	9,509	1,094	10,603
2007	2,439	369	2,808	520	61	581	508	2	510	3,467	432	3,899
2008	877	131	1,008	0	0	0	674	3	677	1,551	134	1,685
2009	4,994	754	5,748	0	0	0	643	3	646	5,637	757	6,394
2010	0	0	0	0	0	0	0	0	0	0	0	0
Total	63,964	9,636	73,600	28,690	5,648	34,338	19,968	92	20,060	112,622	15,376	127,998

Arusha, Kilimanjaro		(Unit: Thousand US\$)										
Year	Substation			Transmission			Distribution			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2002	12,047	1,594	13,641	3,610	424	4,034	2,578	11	2,589	18,235	2,029	20,264
2003	4,516	685	5,201	4,195	493	4,688	2,682	12	2,694	11,393	1,190	12,583
2004	1,509	231	1,740	1,341	158	1,499	742	3	745	3,592	392	3,984
2005	662	100	762	7,916	2,352	10,268	1,406	7	1,413	9,984	2,459	12,443
2006	5,700	855	6,555	8,018	2,364	10,382	0	0	0	13,718	3,219	16,937
2007	1,684	254	1,938	0	0	0	1,666	8	1,674	3,350	262	3,612
2008	0	0	0	0	0	0	1,045	5	1,050	1,045	5	1,050
2009	2,707	401	3,108	0	0	0	0	0	0	2,707	401	3,108
2010	0	0	0	0	0	0	0	0	0	0	0	0
Total	28,825	4,120	32,945	25,080	5,791	30,871	10,119	46	10,165	64,024	9,957	73,981

Table 12.4 Summary of construction costs (Case-B)

Dar es Salaam		(Unit: Thousand US\$)										
Year	Substation			Transmission			Distribution			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2002	16,062	2,400	18,462	10,600	1,196	11,796	2,725	13	2,738	29,387	3,609	32,996
2003	9,646	1,448	11,094	2,619	655	3,274	4,192	19	4,211	16,457	2,122	18,579
2004	16,192	2,449	18,641	11,542	3,307	14,849	4,635	22	4,657	32,369	5,778	38,147
2005	2,238	339	2,577	636	77	713	1,401	7	1,408	4,275	423	4,698
2006	6,054	915	6,969	1,279	188	1,467	2,462	11	2,473	9,795	1,114	10,909
2007	3,470	531	4,001	493	58	551	2,824	13	2,837	6,787	602	7,389
2008	800	123	923	163	19	182	242	1	243	1,205	143	1,348
2009	1,916	284	2,200	451	53	504	1,190	6	1,196	3,557	343	3,900
2010	2,592	393	2,985	70	8	78	0	0	0	2,662	401	3,063
Total	58,970	8,882	67,852	27,853	5,561	33,414	19,671	92	19,763	106,494	14,535	121,029

Arusha, Kilimanjaro		(Unit: Thousand US\$)										
Year	Substation			Transmission			Distribution			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2002	11,909	1,571	13,480	1,303	153	1,456	2,883	13	2,896	16,095	1,737	17,832
2003	3,330	508	3,838	2,618	307	2,925	1,850	9	1,859	7,798	824	8,622
2004	1,324	200	1,524	3,884	456	4,340	1,268	5	1,273	6,476	661	7,137
2005	1,509	231	1,740	9,096	2,491	11,587	1,406	7	1,413	12,011	2,729	14,740
2006	5,793	870	6,663	7,916	2,352	10,268	361	2	363	14,070	3,224	17,294
2007	569	85	654	263	31	294	1,045	5	1,050	1,877	121	1,998
2008	1,684	254	1,938	0	0	0	1,045	5	1,050	2,729	259	2,988
2009	0	0	0	0	0	0	621	3	624	621	3	624
2010	0	0	0	0	0	0	0	0	0	0	0	0
Total	26,118	3,719	29,837	25,080	5,790	30,870	10,479	49	10,528	61,677	9,558	71,235

### 12.4.2 Operating Expenses

It was assumed that construction of substations and transmission lines would be

completed at the end of each year and that the cost of their maintenance would be incurred from the next year on. The cost of maintenance was assumed to be 0.5% of the construction cost for substations and 0.7% of the construction cost for transmission lines. The costs of maintenance of distribution facilities were assumed as shown in Table 12.5.

Table 12.5 Maintenance costs of distribution facilities (Unit: Thousand US\$)

Year	Dar es Salaam		Kilimanjaro	
	Case-A	Case-B	Case-A	Case-B
2002	130	96	90	101
2003	306	243	185	166
2004	488	406	211	210
2005	556	455	261	260
2006	639	452	261	273
2007	657	641	320	310
2008	681	650	357	347
2009 and after	704	692	357	369

## 12.5 Benefit of Project

The primary purpose of this project is to allow for stable supply of electric power enough to meet the ever-increasing demand by expanding facilities which have inadequate capacities or which are overloaded and by renewing obsolescent facilities. In the Study, therefore, the increase in power supply from the base year of 2001 was assumed as the benefit of the project. Forecast amounts of power supply are studied in Chapter 4 "Power Supply and Demand." They are summarized in Table 12.6. The amount of benefit in each year in the base case (Case-A) shall be obtained by multiplying the increase in energy sold shown in Table 12.6 by the unit price of US\$ 2.43/kWh calculated previously. As already mentioned, the amount of benefit in 2011 and each of the subsequent years shall be assumed to be the same as in 2010.

Table 12.6 Power supply forecast (Case-A) (Unit: GWh)

Year	Dar es salaam		Kilimanjaro	
	Energy Sold	Increase in Energy Sold	Energy Sold	Increase in Energy Sold
2001	1,354.68	--	330.39	--
2002	1,466.54	111.86	369.90	39.51
2003	1,565.51	210.83	406.81	76.42
2004	1,671.50	316.82	441.79	111.40
2005	1,781.11	426.43	475.09	144.70
2006	1,889.49	534.81	506.86	176.47
2007	1,995.33	640.65	536.32	205.93
2008	2,105.57	750.89	567.02	236.63
2009	2,220.31	865.63	598.96	268.57
2010	2,339.83	985.16	632.23	301.84

In Case-B, by contrast, the equipment investment plan has been formulated on the premise that the overload operation of transformers and transmission lines is overlooked for some extent as mentioned earlier. Actually, in Tanzania, there are not a few transformers and transmission lines, which have been in overload operation. It does not seem that the overload

operation of those transformers and transmission lines will completely disappear in the foreseeable future. Although overload operation of electrical facilities is a major cause of power stoppage and voltage fluctuation, it is impossible to predict the frequency of power stoppage or the degree of voltage fluctuation quantitatively. In Case-B, therefore, economic analysis shall be made on the premise that load shedding is effected when an overload occurs. The estimated increases in power supply in Case-B were obtained by the following method.

- It was assumed that TANESCO's annual load duration curve shown in Figure 12.1 could meet the load duration of all substations up until 2010.
- A formula of the annual load duration curve assuming the peak load of the year as 1 was obtained linear regression analysis (see Figure 12.2).
- The substations that were supposed to be overloaded due to delayed expansion and the years in which they would be overloaded were predicted.
- For each of the above substations, the amount of electric power exceeding the rated capacity in each year was estimated by using Figure 12.2 (see Table 12.7). The power factor used in the calculation was set at 0.8.

Table 12.7 Amounts of electric power exceeding rated capacities (Unit: MWh)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
<b>Dar es Salaam</b>										
Mbezi	--	--	--	--	--	6	343	--	--	349
Bahari Beach	--	3	11	170	678	--	--	--	--	858
Ilala	--	--	277	1,383	--	--	138	1,043	--	2,845
Kariakoo	--	--	--	--	--	11	170	678	--	858
Sokoine	678	--	--	--	--	--	--	--	--	678
TOL	--	--	--	--	--	--	--	11	170	180
Kurasini	386	1,078	--	--	--	--	--	--	--	1,463
Mbagala	--	53	--	--	--	--	--	--	--	53
Tandale	480	--	--	--	--	--	--	--	--	480
FZ III	575	--	--	--	--	--	--	--	--	575
Msasani	--	6	631	--	--	--	22	--	--	670
Chang'ombe	--	--	--	1	80	433	--	--	--	513
<b>Total</b>	<b>2,118</b>	<b>1,140</b>	<b>919</b>	<b>1,553</b>	<b>758</b>	<b>449</b>	<b>673</b>	<b>1,732</b>	<b>170</b>	<b>9,512</b>
<b>Kilimanjaro</b>										
Themi	--	--	--	--	--	2	129	--	--	131
Usa River	--	--	--	--	--	--	--	24	354	379
Kiyungu	--	--	--	--	--	--	--	105	1,926	2,031
Machame	29	--	--	--	--	--	--	--	--	29
<b>Total</b>	<b>29</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>129</b>	<b>129</b>	<b>2,281</b>	<b>2,570</b>

The amounts of power supply in Case-B, estimated with consideration given to load shedding, are shown in Table 12.8. The amounts of energy sold in and after 2011 shall be the amount of energy sold in 2010 plus the amount of load shedding in the same year since an additional equipment investment is planned to be made in 2010.

ANNUAL LOAD DURATION CURVE 1999

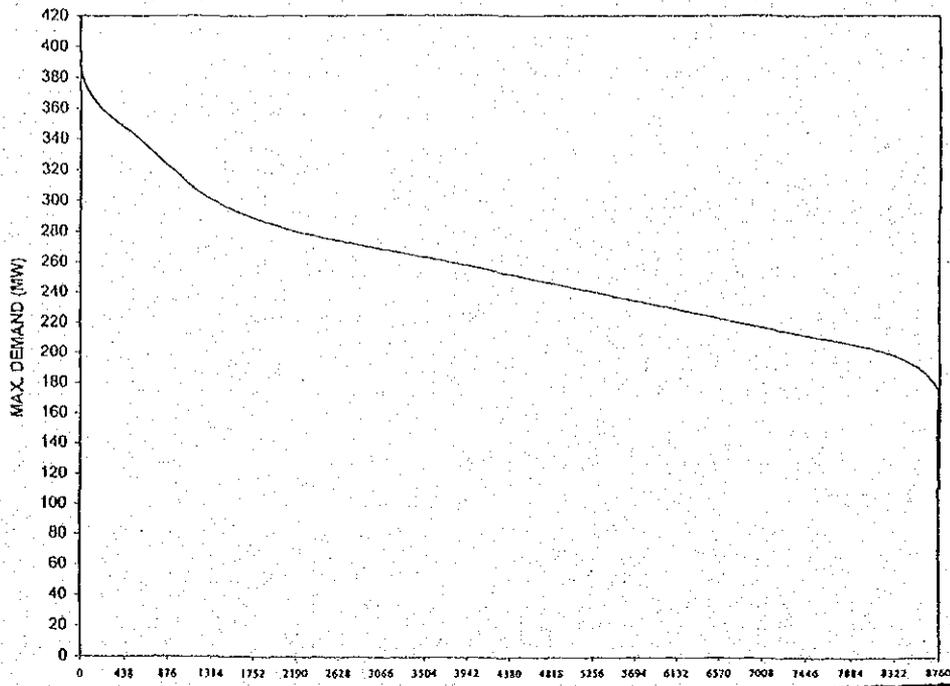


Fig. 12.1 TANESCO's annual load duration curve

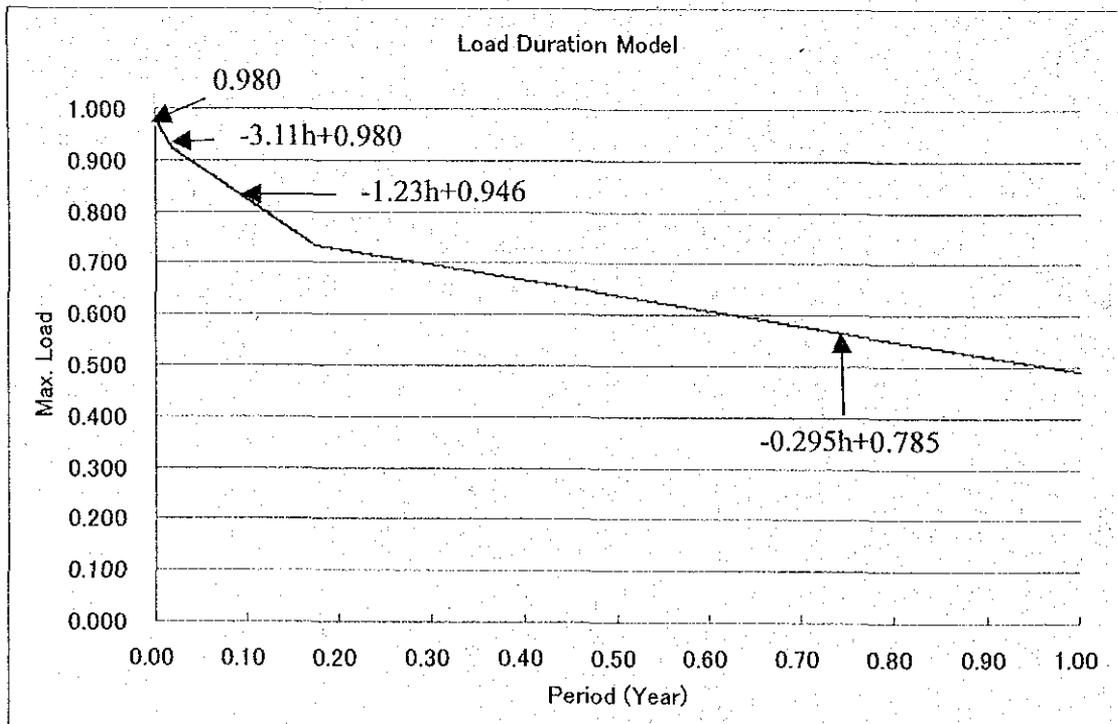


Fig. 12.2 Load duration model

Table 12.8 Estimated amounts of power supply (Case-B) (Unit: GWh)

Year	Dar es salaam				Arusha, Kilimanjaro			
	Energy Demand	Load Shedding	Energy Sold	Increase in Energy Sold	Energy Demand	Load Shedding	Energy Sold	Increase in Energy Sold
2001	1,354.68	--	--	--	330.39	--	--	--
2002	1,466.54	2.12	1,465.40	109.74	369.90	0.03	369.87	39.48
2003	1,565.51	1.14	1,564.37	209.69	406.81	0.00	406.81	76.42
2004	1,671.50	0.95	1,670.55	315.87	441.79	0.00	441.79	111.40
2005	1,781.11	1.55	1,779.56	424.88	475.09	0.00	475.09	144.70
2006	1,889.49	0.76	1,888.73	534.05	506.86	0.00	506.86	176.47
2007	1,995.33	0.45	1,994.88	640.20	536.32	0.00	536.32	205.93
2008	2,105.57	0.67	2,104.90	750.22	567.02	0.13	566.89	236.50
2009	2,220.31	1.73	2,218.58	863.90	598.96	0.13	598.83	268.44
2010	2,339.83	0.17	2,339.66	984.99	632.23	2.28	629.95	299.56

## 12.6 Results

### 12.6.1 Economic internal rate of return (EIRR)

In the following four cases, EIRRs were calculated based on the benefits and costs mentioned above. The calculation sheets are given at the end of this chapter. The calculated EIRRs are as follows:

- Dar es Salaam area (Case-A): 14.73%
- Dar es Salaam area (Case-B): 15.92%
- Kilimanjaro area (Case-A): 7.19%
- Kilimanjaro area (Case-B): 7.72%

### 12.6.2 Sensitivity Analysis

The economic evaluation of a project is based on assumptions, which can change according to changes of political, social, and economic situations in the future. In the Study, therefore, the following parameters were varied and their effects on the project were evaluated. The evaluation results are summarized in Table 12.9.

- Amount of benefit
- Cost of construction

Table 12.9 Summary of sensitivity analysis results

## 12.7 Summary of Economic Analysis

In this Study, the economic evaluation was made of only the direct benefits of the project that can be expressed quantitatively. The calculated EIRR in the Arusha and Kilimanjaro area was not more than about 7%, whereas the figure in the Dar es Salaam area was as large as around 15%. These results may be considered natural since in local cities where the population density is low and the electricity consumption per user is small, the amount of energy sold (direct benefit) relative to the cost is necessarily smaller than that in Dar es Salaam. The cost per kWh (the sum of investment costs and operating expenses divided by the amount of energy sold) in the Arusha and Kilimanjaro area was about 1.8 times

that in the Dar es Salaam area.

On the other hand, supplying adequate amount of high-quality electric energy on a stable basis is indispensable for the development of local industry and the improvement of living standard of local people. By solving the problem of voltage fluctuation, for example, it becomes possible to get rid of such troubles as the reduced life and the malfunction of an electrical appliance caused by voltage fluctuation. Taking these and other indirect benefits into consideration, the project is judged worthy of being carried out not only in the Dar es Salaam area but also in the Kilimanjaro area.

A comparison between Case-A (an investment is made so as to cope with peak demands) and Case-B (load shedding is effected, but an investment to cope with peak demands is not made) showed that Case-B would give a higher EIRR. It may be said, therefore, that although making the investment to cope with peak demands is most desirable, load shedding is worthy of earnest discussions in view of limited funds, etc.

# **CHAPTER 13**

# **FINANCIAL ANALYSIS**

## CHAPTER 13 FINANCIAL ANALYSIS

### 13.1 Purpose of Financial Analysis

In the economic analysis made in the preceding chapter, the project validity was evaluated from the viewpoint of the national economy. Although electricity is a basic infrastructure indispensable for national life, an execution of an electric power project, which is not financially viable, will cause various problems sooner or later. Thus, in this chapter, financial profitability and the effect of execution of this project is on the financial condition of TANESCO was evaluated quantitatively, assuming that the project is an independent project,

### 13.2 Method of Financial Analysis

#### 13.2.1 Basic Policy

The purpose of this project is to rehabilitate and expand the existing distribution facilities. In case of rehabilitation projects, it is very difficult to accurately estimate the cost of the existing facilities related to the project, while electricity will be supplied by both the existing and the newly invested facilities. In this financial analysis, in order to avoid the above difficulties, an increase in power supply accompanied with the new investment was regarded as sales revenue of this project. The investment cost and an increase in operation/administration cost incurred by execution of the project was regarded as a cost of this project.

#### 13.2.2 Evaluation Method

In this financial analysis, the financial statements shown below were prepared to evaluate the profitability and cash flow of the project. In addition, in order to quantitatively evaluate the project profitability from the financial viewpoint, financial internal rate of return on investment (FIRROI) and financial internal rate of return on equity (FIRROE) were calculated. FIRROI is the internal rate of return on investment based on the premise that all the funds required for the project are covered by own fund. It is used to judge the profitability of the project itself. FIRROE is the internal rate of return on invested funds (equity) under a assumed financing plan (debt equity ratio, loan conditions).

- Income statement
- Cash-flow table

The following two cases were evaluated in the financial analysis.

- Equipment investment appropriate to any increase in peak load in order to avoid overload operation of transformers, transmission lines, etc. (Case-A, or the base case).
- Overload operation of transformers, transmission lines, etc. is allowed for some time. Concretely, any transformer is expanded at the time when the maximum load reaches 120% of its capacity, and construction of new substations, except for the ones under consideration, shall be postponed one year (Case-B).

### 13.3 Premises

The major premises for the financial analysis are described below.

#### (1) Price base and exchange rate

The financial analysis was conducted on the fixed price in 2001 when the field survey was conducted, and inflation is not incorporated. All calculations were made in U.S. dollars, and costs estimated in local currency were converted to U.S. dollar by using the exchange rate in the second half of 2001 shown below.

1 U.S. dollar = 900 Tanzania shillings

#### (2) Calculation period

The calculation period for the this financial analysis shall be 30 years.

#### (3) Sales revenue

In Tanzania, the tariff was revised on May 1, 2002. In the this financial analysis, therefore, the estimated average of the new power rates, or 7.92 U.S. cents/kWh, shall be used as the basis for calculation of sales revenue. Concretely, the sales revenue payable to the distribution sector shall be calculated by multiplying the cost ratio of the distribution portion (25.33%, same as used in economic analysis) by the above unit price. The sales revenue calculated in this way is 1.80 U.S. cents/kWh. In the economic analysis, load shedding was taken into account. In the financial analysis, however, it shall be left out of consideration since the duration of load shedding is not so long as to significantly affect the project profitability. Therefore, the electricity sold in both Case-A and Case-B becomes as shown in Table 13.1.

Concerning the rate of bill collection, it was assumed that 90% of the bills can be collected in view of the fact that the rate of bill collection has been increasing in recent years (national average 87% in 2000) thanks to the efforts of TANESCO and the spread of LUKE meters, LUKE meters are going to be introduced to the offices of government agencies in the near future, and "non-payment" of the bills by the government agencies will no longer be overlooked with the power sector reform near at hand.

#### (4) Depreciation

In accordance with the accounting rules of TANESCO, the amount of annual depreciation was calculated by the straight-line method (residual value: 0). The economic-life of facility used to calculate depreciation are as follows:

- Substations: 60 years
- Transmission/distribution lines: 30 years

Table 13.1 Estimated amounts of Energy Sold (Unit: GWh)

Year	Dar es salaam		Kilimanjaro	
	Energy Sold	Increase in Energy Sold	Energy Sold	Increase in Energy Sold
2001	1,354.68	--	330.39	---
2002	1,466.54	111.86	369.90	39.51
2003	1,565.51	210.83	406.81	76.42
2004	1,671.50	316.82	441.79	111.40
2005	1,781.11	426.43	475.09	144.70
2006	1,889.49	534.81	506.86	176.47
2007	1,995.33	640.65	536.32	205.93
2008	2,105.57	750.89	567.02	236.63
2009	2,220.31	865.63	598.96	268.57
2010	2,339.83	985.16	632.23	301.84

**(5) Tax**

In accordance with the Tanzanian taxation system, the corporation tax will be 30% of the profit before tax deduction.

**(6) Operation cost**

It was assumed that construction of substations and transmission lines would be completed at the end of each year and that the cost of their maintenance would be incurred in the next and subsequent years. The maintenance cost was assumed to be 0.5% of the construction cost for substations and 0.7% of the construction cost for transmission lines. The maintenance cost for distribution lines was estimated as shown in Table 13.2.

Table 13.2 Maintenance Cost of Distribution Lines (Unit: Thousand US\$)

Year	Dar es Salaam		Kilimanjaro	
	Case-A	Case-B	Case-A	Case-B
2002	130	96	90	101
2003	306	243	185	166
2004	488	406	211	210
2005	556	455	261	260
2006	639	452	261	273
2007	657	641	320	310
2008	681	650	357	347
2009 and after	704	692	357	369

**(7) Financing plan**

At this point in time, the sources of funds for the project are not fixed yet. In any cases, TANESCO will find it impossible to raise the necessary funds (foreign currency, in particular) on the market for itself. In this financial analysis, therefore, it was assumed that the necessary foreign currency would be provided by soft loans from foreign countries and that the local currency would be covered by own funds of TANESCO.

In Tanzania, the most favorable loans conditions offered by foreign organizations are: interest rate, 0.75% per annum; grace period, 10 years; and repayment period, 30 years. Normally, however, the soft loan is not provided directly to TANESCO but through the government of Tanzania, and loan condition from the government to TANESCO is not so favorable. In general, the terms of loans from the Tanzanian

## CHAPTER 13 FINANCIAL ANALYSIS

government to TANESCO are: interest rate, 8% per annum; grace period, 3 to 7 years; and repayment period, 20 to 30 years. Since the profitability of the project was not estimated to be so high, the following terms of loans in-between the two shown above were set in this financial analysis. In addition, it was assumed that a short-term loan (interest rate: 8% per annum) would be introduced if shortage of funds occurred during operation of the facilities.

- Interest rate: 3% per annum
- Grace period: 7 years
- Repayment period: 25 years from end of grace period.

### (8) Construction cost

The construction costs in the two assumed cases are shown in Tables 13.3 and 13.4. In view of the fact that no import duties had been imposed on substation/distribution facilities, etc., which TANESCO imported in the past, the import duties were assumed to be zero. The interest on loans during construction period was not amortized but treated as a cost since the period of each construction work is not longer than one year. Therefore, the said interest is not included in the construction costs shown below.

Table 13.3 Summary of Construction costs (Case-A)

Dar es Salaam (Unit: Thousand US\$)

Year	Substation			Transmission			Distribution			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2002	20,270	3,032	23,302	11,671	1,310	12,981	3,683	17	3,700	35,624	4,359	39,983
2003	12,530	1,887	14,417	3,503	761	4,264	4,999	23	5,022	21,032	2,671	23,703
2004	13,845	2,094	15,939	11,060	3,250	14,310	5,181	24	5,205	30,086	5,368	35,454
2005	2,962	454	3,416	834	98	932	1,920	9	1,929	5,716	581	6,277
2006	6,047	915	6,962	1,102	168	1,270	2,360	11	2,371	9,509	1,094	10,603
2007	2,439	369	2,808	520	61	581	508	2	510	3,467	432	3,899
2008	877	131	1,008	0	0	0	674	3	677	1,551	134	1,685
2009	4,994	754	5,748	0	0	0	643	3	646	5,637	757	6,394
2010	0	0	0	0	0	0	0	0	0	0	0	0
Total	63,964	9,636	73,600	28,690	5,648	34,338	19,968	92	20,060	112,622	15,376	127,998

Kilimanjaro (Unit: Thousand US\$)

Year	Substation			Transmission			Distribution			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2002	12,047	1,594	13,641	3,610	424	4,034	2,578	11	2,589	18,235	2,029	20,264
2003	4,516	685	5,201	4,195	493	4,688	2,682	12	2,694	11,393	1,190	12,583
2004	1,509	231	1,740	1,341	158	1,499	742	3	745	3,592	392	3,984
2005	662	100	762	7,916	2,352	10,268	1,406	7	1,413	9,984	2,459	12,443
2006	5,700	855	6,555	8,018	2,364	10,382	0	0	0	13,718	3,219	16,937
2007	1,684	254	1,938	0	0	0	1,666	8	1,674	3,350	262	3,612
2008	0	0	0	0	0	0	1,045	5	1,050	1,045	5	1,050
2009	2,707	401	3,108	0	0	0	0	0	0	2,707	401	3,108
2010	0	0	0	0	0	0	0	0	0	0	0	0
Total	28,825	4,120	32,945	25,080	5,791	30,871	10,119	46	10,165	64,024	9,957	73,981

Table 13.4 Summary of Construction costs (Case-B)

Dar es Salaam (Unit: Thousand US\$)

Year	Substation			Transmission			Distribution			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2002	16,062	2,400	18,462	10,600	1,196	11,796	2,725	13	2,738	29,387	3,609	32,996
2003	9,646	1,448	11,094	2,619	655	3,274	4,192	19	4,211	16,457	2,122	18,579
2004	16,192	2,449	18,641	11,542	3,307	14,849	4,635	22	4,657	32,369	5,778	38,147
2005	2,238	339	2,577	636	77	713	1,401	7	1,408	4,275	423	4,698
2006	6,054	915	6,969	1,279	188	1,467	2,462	11	2,473	9,795	1,114	10,909
2007	3,470	531	4,001	493	58	551	2,824	13	2,837	6,787	602	7,389
2008	800	123	923	163	19	182	242	1	243	1,205	143	1,348
2009	1,916	284	2,200	451	53	504	1,190	6	1,196	3,557	343	3,900
2010	2,592	393	2,985	70	8	78	0	0	0	2,662	401	3,063
Total	58,970	8,882	67,852	27,853	5,561	33,414	19,671	92	19,763	106,494	14,535	121,029

Kilimanjaro (Unit: Thousand US\$)

Year	Substation			Transmission			Distribution			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2002	11,909	1,571	13,480	1,303	153	1,456	2,883	13	2,896	16,095	1,737	17,832
2003	3,330	508	3,838	2,618	307	2,925	1,850	9	1,859	7,798	824	8,622
2004	1,324	200	1,524	3,884	456	4,340	1,268	5	1,273	6,476	661	7,137
2005	1,509	231	1,740	9,096	2,491	11,587	1,406	7	1,413	12,011	2,729	14,740
2006	5,793	870	6,663	7,916	2,352	10,268	361	2	363	14,070	3,224	17,294
2007	569	85	654	263	31	294	1,045	5	1,050	1,877	121	1,998
2008	1,684	254	1,938	0	0	0	1,045	5	1,050	2,729	259	2,988
2009	0	0	0	0	0	0	621	3	624	621	3	624
2010	0	0	0	0	0	0	0	0	0	0	0	0
Total	26,118	3,719	29,837	25,080	5,790	30,870	10,479	49	10,528	61,677	9,558	71,235

## 13.4 Analysis Results

### 13.4.1 Financial Statements

The financial statements prepared are attached hereto. As is evident from the financial statements, under the assumed financing conditions, in case of the project in Dar es Salaam, shortage of fund will not occur in both Case-A and Case-B. On the other hand, under the assumed conditions, financial situations of the project in Arusha and Kilimanjaro are not so good in both Case-A and Case-B, while an introduction of additional fund (short-term loan) is not required. Thus, in order to carry out the planned projects in Arusha and Kilimanjaro, it is necessary that the terms of financing should be more favorable than the assumed ones.

### 13.4.2 FIRROI/FIRROE

The values of FIRROI and FIRROE calculated based on the above terms are shown in Table 13.5. Concerning the project in Dar es Salaam, the value of FIRROE is very large, whereas the before-tax FIRROI is only approximately 10%. This result is due simply to the small proportion of owned funds to the total amount of investment (about 10%), which brought about a leverage effect. With respect to the project in Arusha/Kilimanjaro, the calculated values of FIRROI and FIRROE suggest that the profitability is low.

Table 13.5 Calculated Values of FIRROI/FIRROE

	Dar es Salaam (Case-A)	Dar es Salaam (Case-B)	Arusha, Kilimanjaro (Case-A)	Arusha, Kilimanjaro (Case-B)
FIRROI (b/Tax)	10.5%	11.6%	3.9%	4.4%
FIRROI (a/Tax)	7.9%	8.6%	2.9%	3.2%
FIRROE (b/Tax)	61.1%	81.5%	16.7%	22.3%
FIRROE (a/Tax)	42.4%	51.8%	8.5%	12.7%

### 13.5 Sensitivity Analysis

Financial evaluation of any project is based on assumptions, which can vary according to political, social, and economic changes in the future. Therefore, the following parameters were varied to evaluate their effects. The results of this sensitivity analysis are as shown in Tables 13.6 and 13.7.

- Power rates
- Construction cost

Table 13.6 Summary of Sensitivity Analysis Results (Dar es Salaam)

	Case-A		Case-B	
	FIRROI(b/Tax)	FIRROE(a/Tax)	FIRROI(b/Tax)	FIRROE(a/Tax)
<b>Construction Cost</b>				
+ 20%	8.5%	30.8%	9.4%	37.7%
+ 10%	9.5%	36.1%	10.4%	44.0%
± 0%	10.5%	42.4%	11.6%	51.8%
-10%	11.8%	50.3%	13.0%	62.0%
-20%	13.3%	60.8%	14.7%	76.2%
<b>Sales Revenue</b>				
+ 20%	13.0%	57.2%	14.3%	71.2%
+ 10%	11.8%	49.7%	13.0%	61.1%
± 0%	10.5%	42.4%	11.6%	51.8%
-10%	9.2%	35.4%	10.2%	43.1%
-20%	5.8%	28.3%	8.7%	34.7%

Table 13.7 Summary of Sensitivity Analysis Results (Arusha/Kilimanjaro)

	Case-A		Case-B	
	FIRROI(b/Tax)	FIRROE(a/Tax)	FIRROI(b/Tax)	FIRROE(a/Tax)
<b>Construction Cost</b>				
+ 20%	2.4%	No Return	2.8%	No Return
+ 10%	3.1%	No Return	3.5%	4.1%
± 0%	3.9%	8.5%	4.4%	12.7%
-10%	4.9%	16.6%	5.3%	21.1%
-20%	6.0%	25.3%	6.5%	30.8%
<b>Sales Revenue</b>				
+ 20%	5.9%	22.4%	6.4%	27.5%
+ 10%	4.9%	15.9%	5.4%	20.3%
± 0%	3.9%	8.5%	4.4%	12.7%
-10%	2.9%	No Return	3.3%	3.0%
-20%	1.2%	No Return	2.1%	No Return

In addition to the above sensitivity analysis, the terms of financing were varied to evaluate their effects. In the case of Dar es Salaam, there were no financial problems in the base case, hence as a reference case, these terms were considered: interest rate, 8% per annum; grace period, 5 years; and repayment period, 20 years (general terms the Tanzanian government applies when re-lending foreign soft loans to TANESCO). For Arusha/Kilimanjaro, interest rate of 1% per annum, grace period of 10 years, and repayment period of 30 years were assumed as a reference case. The results of this sensitivity analysis are as described below.

In Dar es Salaam, in Case-A, shortage of funds (US\$ 285 thousand) occurs in the year of 2004 due to the increase in annual interest payment ascribable to the higher interest rate and shorter repayment period. The after-tax FIRROE is 11.8%. In Case-B, shortage of funds does not occur, excepting US\$250 thousand in 2005 and US\$10 thousand in 2010. The after-tax FIRROE in this case is 16.8%.

In Arusha/Kilimanjaro, in both Case-A and Case-B, shortage of funds does not occur at all thanks to the decrease in annual interest payment attributable to the lower interest rate and longer repayment period. The after-tax FIRROE is 31.1% in Case-A and 35.2% in Case-B.

### 13.6 Summary of Results of Financial Analysis

Although the electricity tariff was revised on May 1, 2002, it is still lower than the cost. Therefore, it is difficult to hope for a respectable profitability even with rehabilitation projects, which are generally higher in profitability than new facility construction projects. The results of the this financial analysis indicate that if favorable terms of loans are applied, the planned projects are financially viable, although very high profitability cannot be expected.

Concerning the projects in Dar es Salaam, no financial problems occur in the base case (interest rate: 3% per annum, grace period: 7 years, repayment period: 25 years). On the other hand, in the reference case assuming the average terms the Tanzanian government applies when re-lending foreign soft loans to TANESCO (interest rate: 8% per annum, grace period: 7 years, repayment period: 25 years), it is necessary for TANESCO to secure additional funds.

In the case of Arusha and Kilimanjaro, financial situation is not so good even in the base case. In order to carry out the planned projects in Arusha and Kilimanjaro, it is necessary that the loans should be made on terms which are close to the most favorable terms currently applied in Tanzania. If the local currency continues declining in value and the power tariff are kept at the current low levels, it must be said that the projects planned in Arusha and Kilimanjaro can hardly be carried out, unless the facilities are constructed by using a fund without the obligation of repayment.

It should be noted once again here that the comparatively large values of FIRROE obtained under certain conditions are due simply to the small proportion of own funds to the total amount of investment.

## Dar es Salaam: Case-A

(1/2)

FIRROI (before Tax) = 10.5%      FIRROE (before Tax) = 61.1%  
 FIRROI (after Tax) = 7.9%        FIRROE (after Tax) = 42.4%

(Unit: Thousand US\$)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>&lt; Profit &amp; Loss Statement &gt;</b>															
Energy Sold (GWh)	111.9	210.8	316.8	426.4	534.8	640.7	750.9	865.6	985.2	985.2	985.2	985.2	985.2	985.2	985.2
Sales Revenue	2,244	4,230	6,356	8,555	10,729	12,852	15,064	17,366	19,764	19,764	19,764	19,764	19,764	19,764	19,764
<b>Cost &amp; Expense</b>															
Operation & Maintenance Cost	130	513	797	1,045	1,152	1,213	1,256	1,284	1,312	1,312	1,312	1,312	1,312	1,312	1,312
Depreciation	0	944	1,494	2,410	2,563	2,800	2,883	2,923	3,040	3,040	3,040	3,040	3,040	3,040	3,040
Interest on Long-term Loan	0	1,069	1,700	2,602	2,774	3,059	3,163	3,210	3,336	3,268	3,164	3,053	2,931	2,804	2,676
Interest on Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	130	2,526	3,991	6,058	6,488	7,073	7,302	7,416	7,688	7,620	7,516	7,405	7,283	7,156	7,028
Net Profit before Tax	2,114	1,703	2,365	2,497	4,241	5,780	7,762	9,950	12,075	12,143	12,247	12,358	12,481	12,607	12,736
Income Tax	634	511	709	749	1,272	1,734	2,329	2,985	3,623	3,643	3,674	3,708	3,744	3,782	3,821
Net Profit after Tax	1,480	1,192	1,655	1,748	2,969	4,046	5,433	6,965	8,453	8,500	8,573	8,651	8,737	8,825	8,915
<b>&lt; Cashflow Table &gt;</b>															
<b>Source of Fund</b>															
Profit after Tax	1,480	1,192	1,655	1,748	2,969	4,046	5,433	6,965	8,453	8,500	8,573	8,651	8,737	8,825	8,915
Depreciation	0	944	1,494	2,410	2,563	2,800	2,883	2,923	3,040	3,040	3,040	3,040	3,040	3,040	3,040
Equity	4,359	2,671	5,368	561	1,094	432	134	757	0	0	0	0	0	0	0
Long-term Loan	35,624	21,032	30,086	5,716	9,509	3,467	1,551	5,637	0	0	0	0	0	0	0
Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	41,463	25,840	38,603	10,435	16,134	10,745	10,002	16,282	11,493	11,540	11,613	11,691	11,776	11,865	11,955
<b>Application of Fund</b>															
Investment (Foreign Portion)	35,624	21,032	30,086	5,716	9,509	3,467	1,551	5,637	0	0	0	0	0	0	0
Investment (Local Portion)	4,359	2,671	5,368	561	1,094	432	134	757	0	0	0	0	0	0	0
Increase in Account Receivable	224	423	636	855	1,073	1,285	1,506	1,737	1,976	1,976	1,976	1,976	1,976	1,976	1,976
Repayment of Long-term Loan	0	0	0	0	0	0	0	1,425	2,266	3,470	3,698	4,079	4,217	4,279	4,505
Repayment of Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	40,207	24,126	36,090	7,132	11,676	5,184	3,191	9,556	4,243	5,446	5,675	6,055	6,194	6,256	6,481
Cash Surplus	1,255	1,714	2,514	3,303	4,458	5,561	6,810	6,726	7,250	6,094	5,938	5,636	5,583	5,609	5,474
Cashflow (ROI before Tax)	▲ 38,093	▲ 20,410	▲ 30,531	377	▲ 2,099	6,455	10,617	7,952	16,475	16,475	16,475	16,475	16,475	16,475	16,475
Cashflow (ROI after Tax)	▲ 38,728	▲ 20,921	▲ 31,240	▲ 372	▲ 3,371	4,721	8,288	4,967	12,852	12,832	12,801	12,767	12,731	12,693	12,654
Cashflow (ROE before Tax)	▲ 2,469	▲ 446	▲ 2,145	3,491	4,637	6,863	9,005	8,954	10,873	9,737	9,613	9,343	9,327	9,391	9,294
Cashflow (ROE after Tax)	▲ 3,104	▲ 957	▲ 2,854	2,742	3,364	5,129	6,676	5,969	7,250	6,094	5,938	5,636	5,583	5,609	5,474
Outstanding Loan	35,624	56,656	86,742	92,458	101,967	105,434	106,985	111,197	108,931	105,461	101,763	97,684	93,467	89,187	84,682

(Unit: Thousand US\$)

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
<b>&lt; Profit &amp; Loss Statement &gt;</b>																
Energy Sold (GWh)	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	14,777.4
Sales Revenue	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	296,454
<b>Cost &amp; Expense</b>																
Operation & Maintenance Cost	1,312	1,312	1,312	1,312	1,312	1,312	1,312	1,312	1,312	1,312	1,312	1,312	1,312	1,312	1,312	19,685
Depreciation	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	45,599
Interest on Long-term Loan	2,540	2,405	2,270	2,135	2,000	1,865	1,730	1,594	1,459	1,324	1,189	1,054	919	784	648	23,917
Interest on Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6,893	6,758	6,622	6,487	6,352	6,217	6,082	5,947	5,812	5,676	5,541	5,406	5,271	5,136	5,001	89,201
Net Profit before Tax	12,871	13,006	13,141	13,276	13,411	13,547	13,682	13,817	13,952	14,087	14,222	14,357	14,493	14,628	14,763	207,253
Income Tax	3,861	3,902	3,942	3,983	4,023	4,064	4,105	4,145	4,186	4,226	4,267	4,307	4,348	4,388	4,429	62,176
Net Profit after Tax	9,010	9,104	9,199	9,293	9,388	9,483	9,577	9,672	9,766	9,861	9,956	10,050	10,145	10,239	10,334	145,077
<b>&lt; Cashflow Table &gt;</b>																
<b>Source of Fund</b>																
Profit after Tax	9,010	9,104	9,199	9,293	9,388	9,483	9,577	9,672	9,766	9,861	9,956	10,050	10,145	10,239	10,334	231,219
Depreciation	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	82,896
Equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,376
Long-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112,622
Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	12,050	12,144	12,239	12,333	12,428	12,523	12,617	12,712	12,806	12,901	12,996	13,090	13,185	13,279	13,374	442,113
<b>Application of Fund</b>																
Investment (Foreign Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112,622
Investment (Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,376
Increase in Account Receivable	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	51,219
Repayment of Long-term Loan	4,505	4,505	4,505	4,505	4,505	4,505	4,505	4,505	4,505	4,505	4,505	4,505	4,505	4,505	4,505	95,513
Repayment of Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6,481	6,481	6,481	6,481	6,481	6,481	6,481	6,481	6,481	6,481	6,481	6,481	6,481	6,481	6,481	274,730
Cash Surplus	5,568	5,663	5,757	5,852	5,947	6,041	6,136	6,230	6,325	6,420	6,514	6,609	6,703	6,798	6,893	167,383
Cashflow (ROI before Tax)	16,475	16,475	16,475	16,475	16,475	16,475	16,475	16,475	16,475	16,475	16,475	16,475	16,475	16,475	16,475	296,715
Cashflow (ROI after Tax)	12,614	12,573	12,533	12,492	12,451	12,411	12,370	12,330	12,289	12,249	12,208	12,168	12,127	12,087	12,046	197,621
Cashflow (ROE before Tax)	9,430	9,565	9,700	9,835	9,970	10,105	10,240	10,376	10,511	10,646	10,781	10,916	11,051	11,186	11,322	251,100
Cashflow (ROE after Tax)	5,568	5,663	5,757	5,852	5,947	6,041	6,136	6,230	6,325	6,420	6,514	6,609	6,703	6,798	6,893	152,007
Outstanding Loan	80,178	75,673	71,168	66,663	62,158	57,653	53,148	48,643	44,139	39,634	35,129	30,624	26,119	21,614	17,109	-/-

Dar es Salaam: Case-B

(1/2)

FIRROI (before Tax) = 11.6%      FIRROE (before Tax) = 81.5%  
 FIRROI (after Tax) = 8.6%      FIRROE (after Tax) = 51.8%

(Unit: Thousand US\$)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>&lt; Profit &amp; Loss Statement &gt;</b>															
Energy Sold (GWh)	111.9	210.8	316.8	426.4	534.8	640.7	750.9	865.6	985.2	985.2	985.2	985.2	985.2	985.2	985.2
Sales Revenue	2,244	4,230	6,356	8,555	10,729	12,852	15,064	17,366	19,764	19,764	19,764	19,764	19,764	19,764	19,764
<b>Cost &amp; Expense</b>															
Operation & Maintenance Cost	96	418	659	905	1,010	1,154	1,187	1,235	1,250	1,265	1,265	1,265	1,265	1,265	1,265
Depreciation	0	792	1,227	2,187	2,301	2,549	2,728	2,758	2,851	2,903	2,903	2,903	2,903	2,903	2,903
Interest on Long-term Loan	0	882	1,375	2,346	2,475	2,768	2,972	3,008	3,080	3,105	3,011	2,912	2,801	2,682	2,562
Interest on Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	96	2,092	3,261	5,439	5,786	6,471	6,888	7,001	7,180	7,273	7,179	7,080	6,970	6,851	6,730
Net Profit before Tax	2,148	2,138	3,095	3,116	4,943	6,381	8,176	10,365	12,583	12,490	12,584	12,683	12,794	12,913	13,033
Income Tax	644	641	928	935	1,483	1,914	2,453	3,109	3,775	3,747	3,775	3,805	3,838	3,874	3,910
Net Profit after Tax	1,504	1,497	2,166	2,181	3,460	4,467	5,723	7,255	8,808	8,743	8,809	8,878	8,956	9,039	9,123
<b>&lt; Cashflow Table &gt;</b>															
<b>Source of Fund</b>															
Profit after Tax	1,504	1,497	2,166	2,181	3,460	4,467	5,723	7,255	8,808	8,743	8,809	8,878	8,956	9,039	9,123
Depreciation	0	792	1,227	2,187	2,301	2,549	2,728	2,758	2,851	2,903	2,903	2,903	2,903	2,903	2,903
Equity	3,609	2,122	5,778	423	1,114	602	143	343	401	0	0	0	0	0	0
Long-term Loan	29,387	16,457	32,369	4,275	9,795	6,787	1,205	3,557	2,662	0	0	0	0	0	0
Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	34,500	20,868	41,540	9,066	16,670	14,404	9,800	13,913	14,722	11,647	11,712	11,782	11,859	11,942	12,027
<b>Application of Fund</b>															
Investment (Foreign Portion)	29,387	16,457	32,369	4,275	9,795	6,787	1,205	3,557	2,662	0	0	0	0	0	0
Investment (Local Portion)	3,609	2,122	5,778	423	1,114	602	143	343	401	0	0	0	0	0	0
Increase in Account Receivable	224	423	636	855	1,073	1,285	1,506	1,737	1,976	1,976	1,976	1,976	1,976	1,976	1,976
Repayment of Long-term Loan	0	0	0	0	0	0	0	1,175	1,834	3,129	3,300	3,691	3,963	4,011	4,153
Repayment of Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	33,220	19,002	38,783	5,553	11,982	8,674	2,854	6,812	6,873	5,105	5,276	5,668	5,939	5,987	6,130
Cash Surplus	1,279	1,866	2,757	3,513	4,688	5,730	6,945	7,101	7,849	6,542	6,437	6,114	5,920	5,955	5,897
Cashflow (ROI before Tax)	▲ 31,072	▲ 15,190	▲ 33,086	2,096	▲ 2,263	3,024	11,022	10,494	13,475	16,522	16,522	16,522	16,522	16,522	16,522
Cashflow (ROI after Tax)	▲ 31,717	▲ 15,832	▲ 34,014	1,161	▲ 3,746	1,109	8,569	7,385	9,700	12,775	12,747	12,717	12,684	12,648	12,612
Cashflow (ROE before Tax)	▲ 1,685	385	▲ 2,092	4,025	5,057	7,042	9,255	9,867	11,223	10,289	10,212	9,919	9,758	9,829	9,807
Cashflow (ROE after Tax)	▲ 2,330	▲ 256	▲ 3,021	3,090	3,574	5,128	6,802	6,758	7,448	6,542	6,437	6,114	5,920	5,955	5,897
Outstanding Loan	29,387	45,844	78,213	82,488	92,283	99,070	100,275	102,657	103,485	100,356	97,057	93,365	89,403	85,392	81,238

## Dar es Salaam: Case-B

(2/2)

(Unit: Thousand US\$)

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
<b>&lt; Profit &amp; Loss Statement &gt;</b>																
Energy Sold (GWh)	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	985.2	14,777.4
Sales Revenue	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	19,764	296,454
<b>Cost &amp; Expense</b>																
Operation & Maintenance Cost	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	1,265	18,977
Depreciation	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	43,552
Interest on Long-term Loan	2,437	2,309	2,182	2,054	1,926	1,798	1,670	1,543	1,415	1,287	1,159	1,031	904	776	648	23,139
Interest on Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6,606	6,478	6,350	6,222	6,095	5,967	5,839	5,711	5,583	5,456	5,328	5,200	5,072	4,944	4,817	85,668
Net Profit before Tax	13,158	13,286	13,413	13,541	13,669	13,797	13,925	14,052	14,180	14,308	14,436	14,564	14,691	14,819	14,947	210,786
Income Tax	3,947	3,986	4,024	4,062	4,101	4,139	4,177	4,216	4,254	4,292	4,331	4,369	4,407	4,446	4,484	63,236
Net Profit after Tax	9,210	9,300	9,389	9,479	9,568	9,658	9,747	9,837	9,926	10,016	10,105	10,194	10,284	10,373	10,463	147,550
<b>&lt; Cashflow Table &gt;</b>																
<b>Source of Fund</b>																
Profit after Tax	9,210	9,300	9,389	9,479	9,568	9,658	9,747	9,837	9,926	10,016	10,105	10,194	10,284	10,373	10,463	238,160
Depreciation	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	2,903	78,365
Equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,535
Long-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	106,494
Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	12,114	12,203	12,293	12,382	12,472	12,561	12,651	12,740	12,830	12,919	13,008	13,098	13,187	13,277	13,366	437,554
<b>Application of Fund</b>																
Investment (Foreign Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	106,494
Investment (Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,535
Increase in Account Receivable	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	1,976	51,219
Repayment of Long-term Loan	4,260	4,260	4,260	4,260	4,260	4,260	4,260	4,260	4,260	4,260	4,260	4,260	4,260	4,260	4,260	89,152
Repayment of Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6,236	6,236	6,236	6,236	6,236	6,236	6,236	6,236	6,236	6,236	6,236	6,236	6,236	6,236	6,236	261,401
Cash Surplus	5,878	5,967	6,057	6,146	6,236	6,325	6,415	6,504	6,593	6,683	6,772	6,862	6,951	7,041	7,130	176,153
Cashflow (ROI before Tax)	16,522	16,522	16,522	16,522	16,522	16,522	16,522	16,522	16,522	16,522	16,522	16,522	16,522	16,522	16,522	305,462
Cashflow (ROI after Tax)	12,575	12,536	12,498	12,460	12,421	12,383	12,345	12,306	12,268	12,230	12,191	12,153	12,115	12,076	12,038	203,394
Cashflow (ROE before Tax)	9,825	9,953	10,081	10,209	10,336	10,464	10,592	10,720	10,848	10,975	11,103	11,231	11,359	11,486	11,614	263,687
Cashflow (ROE after Tax)	5,878	5,967	6,057	6,146	6,236	6,325	6,415	6,504	6,593	6,683	6,772	6,862	6,951	7,041	7,130	161,618
Outstanding Loan	76,979	72,719	68,459	64,199	59,940	55,680	51,420	47,160	42,900	38,641	34,381	30,121	25,861	21,602	17,342	-/-

## Arusha, Killimanjaro: Case-A

(1/2)

FIRROI (before Tax) = 3.9%      FIRROE (before Tax) = 16.7%  
 FIRROI (after Tax) = 2.9%      FIRROE (after Tax) = 8.5%

(Unit: Thousand US\$)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>&lt; Profit &amp; Loss Statement &gt;</b>															
Energy Sold (GWh)	39.5	76.4	111.4	144.7	176.5	205.9	236.6	268.6	301.8	301.8	301.8	301.8	301.8	301.8	301.8
Sales Revenue	795	1,533	2,235	2,903	3,540	4,131	4,747	5,388	6,055	6,055	6,055	6,055	6,055	6,055	6,055
Cost & Expense															
Operation & Maintenance Cost	118	310	395	464	539	704	751	751	766	766	766	766	766	766	766
Depreciation	0	448	781	885	1,287	1,742	1,830	1,865	1,917	1,917	1,917	1,917	1,917	1,917	1,917
Interest on Long-term Loan	0	547	889	997	1,296	1,708	1,808	1,840	1,899	1,863	1,823	1,772	1,703	1,631	1,557
Interest on Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	118	1,305	2,064	2,345	3,122	4,154	4,389	4,455	4,582	4,546	4,506	4,455	4,386	4,314	4,240
Net Profit before Tax	674	228	171	558	418	▲ 22	358	933	1,473	1,509	1,549	1,601	1,669	1,741	1,815
Income Tax	202	68	51	167	125	0	107	280	442	453	465	480	501	522	544
Net Profit after Tax	472	160	119	391	293	▲ 22	251	653	1,031	1,056	1,084	1,121	1,168	1,219	1,270
<b>&lt; Cashflow Table &gt;</b>															
Source of Fund															
Profit after Tax	472	160	119	391	293	▲ 22	251	653	1,031	1,056	1,084	1,121	1,168	1,219	1,270
Depreciation	0	448	781	885	1,287	1,742	1,830	1,865	1,917	1,917	1,917	1,917	1,917	1,917	1,917
Equity	2,029	1,190	392	2,459	3,219	262	5	401	0	0	0	0	0	0	0
Long-term Loan	18,235	11,393	3,592	9,984	13,718	3,350	1,045	2,707	0	0	0	0	0	0	0
Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	20,736	13,191	4,884	13,718	18,516	5,332	3,131	5,626	2,948	2,973	3,001	3,037	3,085	3,136	3,187
Application of Fund															
Investment (Foreign Portion)	18,235	11,393	3,592	9,984	13,718	3,350	1,045	2,707	0	0	0	0	0	0	0
Investment (Local Portion)	2,029	1,190	392	2,459	3,219	262	5	401	0	0	0	0	0	0	0
Increase in Account Receivable	79	153	223	290	354	413	475	539	606	606	606	606	606	606	606
Repayment of Long-term Loan	0	0	0	0	0	0	0	729	1,185	1,329	1,728	2,277	2,411	2,453	2,561
Repayment of Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	20,343	12,736	4,207	12,733	17,291	4,025	1,525	4,376	1,791	1,934	2,334	2,882	3,016	3,058	3,166
Cash Surplus	393	455	677	985	1,225	1,307	1,606	1,250	1,158	1,039	667	155	69	78	21
Cashflow (ROI before Tax)	▲ 19,669	▲ 11,513	▲ 2,367	▲ 10,294	▲ 14,290	▲ 598	2,472	991	4,684	4,684	4,684	4,684	4,684	4,684	4,684
Cashflow (ROI after Tax)	▲ 19,871	▲ 11,581	▲ 2,418	▲ 10,461	▲ 14,416	▲ 598	2,364	711	4,242	4,231	4,219	4,204	4,183	4,161	4,139
Cashflow (ROE before Tax)	▲ 1,434	▲ 667	336	▲ 1,307	▲ 1,868	1,045	1,709	1,129	1,600	1,492	1,132	635	570	600	565
Cashflow (ROE after Tax)	▲ 1,636	▲ 735	285	▲ 1,474	▲ 1,994	1,045	1,601	849	1,158	1,039	667	155	69	78	21
Outstanding Loan	18,235	29,628	33,220	43,204	56,922	60,272	61,317	63,295	62,109	60,781	59,053	56,776	54,365	51,912	49,351

## Arusha, Killimanjaro: Case-A

(2/2)

(Unit: Thousand US\$)

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
<b>&lt; Profit &amp; Loss Statement &gt;</b>																
Energy Sold (GWh)	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	4,527.6
Sales Revenue	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	90,830
<b>Cost &amp; Expense</b>																
Operation & Maintenance Cost	766	766	766	766	766	766	766	766	766	766	766	766	766	766	766	11,491
Depreciation	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	28,754
Interest on Long-term Loan	1,481	1,404	1,327	1,250	1,173	1,096	1,020	943	866	789	712	635	559	482	405	14,141
Interest on Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4,164	4,087	4,010	3,933	3,856	3,779	3,703	3,626	3,549	3,472	3,395	3,318	3,242	3,165	3,088	54,386
Net Profit before Tax	1,892	1,969	2,045	2,122	2,199	2,276	2,353	2,430	2,506	2,583	2,660	2,737	2,814	2,891	2,967	36,444
Income Tax	568	591	614	637	660	683	706	729	752	775	798	821	844	867	890	10,933
Net Profit after Tax	1,324	1,378	1,432	1,486	1,539	1,593	1,647	1,701	1,754	1,808	1,862	1,916	1,970	2,023	2,077	25,511
<b>&lt; Cashflow Table &gt;</b>																
<b>Source of Fund</b>																
Profit after Tax	1,324	1,378	1,432	1,486	1,539	1,593	1,647	1,701	1,754	1,808	1,862	1,916	1,970	2,023	2,077	35,777
Depreciation	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	1,917	51,011
Equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,957
Long-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64,024
Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3,241	3,295	3,349	3,403	3,456	3,510	3,564	3,618	3,671	3,725	3,779	3,833	3,887	3,940	3,994	160,768
<b>Application of Fund</b>																
Investment (Foreign Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64,024
Investment (Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,957
Increase in Account Receivable	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	15,849
Repayment of Long-term Loan	2,561	2,561	2,561	2,561	2,561	2,561	2,561	2,561	2,561	2,561	2,561	2,561	2,561	2,561	2,561	53,087
Repayment of Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	142,917
Cash Surplus	75	128	182	236	290	344	397	451	505	559	613	666	720	774	828	17,851
Cashflow (ROI before Tax)	4,684	4,684	4,684	4,684	4,684	4,684	4,684	4,684	4,684	4,684	4,684	4,684	4,684	4,684	4,684	47,774
Cashflow (ROI after Tax)	4,116	4,093	4,070	4,047	4,024	4,001	3,978	3,955	3,932	3,909	3,886	3,863	3,840	3,817	3,794	32,431
Cashflow (ROE before Tax)	642	719	796	873	950	1,026	1,103	1,180	1,257	1,334	1,411	1,487	1,564	1,641	1,718	23,237
Cashflow (ROE after Tax)	75	128	182	236	290	344	397	451	505	559	613	666	720	774	828	7,894
Outstanding Loan	46,790	44,229	41,668	39,107	36,546	33,985	31,424	28,863	26,302	23,742	21,181	18,620	16,059	13,498	10,937	-/-

## Arusha, Killimanjaro: Case-B

(1/2)

FIRROI (before Tax) = 4.4%      FIRROE (before Tax) = 22.3%  
 FIRROI (after Tax) = 3.2%      FIRROE (after Tax) = 12.7%

(Unit: Thousand US\$)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>&lt; Profit &amp; Loss Statement &gt;</b>															
Energy Sold (GWh)	39.5	76.4	111.4	144.7	176.5	205.9	236.6	268.6	301.8	301.8	301.8	301.8	301.8	301.8	301.8
Sales Revenue	793	1,533	2,235	2,903	3,540	4,131	4,747	5,388	6,055	6,055	6,055	6,055	6,055	6,055	6,055
Cost & Expense															
Operation & Maintenance Cost	101	244	327	415	518	660	703	734	734	734	734	734	734	734	734
Depreciation	0	370	593	806	1,268	1,733	1,789	1,856	1,877	1,877	1,877	1,877	1,877	1,877	1,877
Interest on Long-term Loan	0	483	717	911	1,271	1,694	1,750	1,832	1,831	1,802	1,766	1,715	1,647	1,577	1,504
Interest on Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	101	1,096	1,637	2,132	3,058	4,087	4,242	4,422	4,443	4,414	4,377	4,327	4,259	4,189	4,116
Net Profit before Tax	692	437	597	771	483	44	505	965	1,613	1,641	1,678	1,729	1,797	1,867	1,940
Income Tax	207	131	179	231	145	13	152	290	484	492	503	519	539	560	582
Net Profit after Tax	484	306	418	540	338	31	354	676	1,129	1,149	1,175	1,210	1,258	1,307	1,358
<b>&lt; Cashflow Table &gt;</b>															
Source of Fund															
Profit after Tax	484	306	418	540	338	31	354	676	1,129	1,149	1,175	1,210	1,258	1,307	1,358
Depreciation	0	370	593	806	1,268	1,733	1,789	1,856	1,877	1,877	1,877	1,877	1,877	1,877	1,877
Equity	1,737	824	661	2,729	3,224	121	259	3	0	0	0	0	0	0	0
Long-term Loan	16,095	7,798	6,476	12,011	14,070	1,877	2,729	621	0	0	0	0	0	0	0
Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	18,316	9,298	8,148	16,085	18,900	3,762	5,131	3,156	3,006	3,026	3,052	3,087	3,135	3,184	3,235
Application of Fund															
Investment (Foreign Portion)	16,095	7,798	6,476	12,011	14,070	1,877	2,729	621	0	0	0	0	0	0	0
Investment (Local Portion)	1,737	824	661	2,729	3,224	121	259	3	0	0	0	0	0	0	0
Increase in Account Receivable	79	153	223	290	354	413	475	539	606	606	606	606	606	606	606
Repayment of Long-term Loan	0	0	0	0	0	0	0	644	956	1,215	1,695	2,258	2,333	2,442	2,467
Repayment of Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	17,911	8,775	7,360	15,030	17,648	2,411	3,463	1,807	1,561	1,820	2,301	2,864	2,939	3,048	3,073
Cash Surplus	405	522	788	1,055	1,252	1,351	1,668	1,350	1,445	1,206	751	224	196	136	162
Cashflow (ROI before Tax)	▲ 17,220	▲ 7,486	▲ 5,453	▲ 12,543	▲ 14,626	1,060	582	3,491	4,715	4,715	4,715	4,715	4,715	4,715	4,715
Cashflow (ROI after Tax)	▲ 17,427	▲ 7,617	▲ 5,632	▲ 12,774	▲ 14,771	1,047	430	3,201	4,232	4,223	4,212	4,197	4,177	4,156	4,134
Cashflow (ROE before Tax)	▲ 1,125	▲ 171	306	▲ 1,443	▲ 1,827	1,243	1,561	1,636	1,929	1,698	1,254	742	735	696	744
Cashflow (ROE after Tax)	▲ 1,332	▲ 302	127	▲ 1,674	▲ 1,972	1,230	1,409	1,347	1,445	1,206	751	224	196	136	162
Outstanding Loan	16,095	23,893	30,369	42,380	56,450	58,327	61,056	61,033	60,077	58,863	57,168	54,910	52,576	50,134	47,667

(Unit: Thousand US\$)

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
<b>&lt; Profit &amp; Loss Statement &gt;</b>																
Energy Sold (GWh)	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	301.8	4,527.6
Sales Revenue	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	6,055	90,830
<b>Cost &amp; Expense</b>																
Operation & Maintenance Cost	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	11,015
Depreciation	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	28,158
Interest on Long-term Loan	1,430	1,356	1,282	1,208	1,134	1,060	986	912	838	764	690	616	542	468	394	13,679
Interest on Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4,042	3,968	3,894	3,820	3,746	3,672	3,597	3,523	3,449	3,375	3,301	3,227	3,153	3,079	3,005	52,852
Net Profit before Tax	2,014	2,088	2,162	2,236	2,310	2,384	2,458	2,532	2,606	2,680	2,754	2,828	2,902	2,976	3,050	37,978
Income Tax	604	626	649	671	693	715	737	760	782	804	826	848	871	893	915	11,393
Net Profit after Tax	1,410	1,461	1,513	1,565	1,617	1,669	1,721	1,772	1,824	1,876	1,928	1,980	2,031	2,083	2,135	26,585
<b>&lt; Cashflow Table &gt;</b>																
<b>Source of Fund</b>																
Profit after Tax	1,410	1,461	1,513	1,565	1,617	1,669	1,721	1,772	1,824	1,876	1,928	1,980	2,031	2,083	2,135	38,315
Depreciation	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	49,714
Equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,558
Long-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61,677
Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3,287	3,339	3,390	3,442	3,494	3,546	3,598	3,650	3,701	3,753	3,805	3,857	3,909	3,960	4,012	159,265
<b>Application of Fund</b>																
Investment (Foreign Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61,677
Investment (Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,558
Increase in Account Receivable	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	15,849
Repayment of Long-term Loan	2,467	2,467	2,467	2,467	2,467	2,467	2,467	2,467	2,467	2,467	2,467	2,467	2,467	2,467	2,467	51,016
Repayment of Short-term Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3,073	3,073	3,073	3,073	3,073	3,073	3,073	3,073	3,073	3,073	3,073	3,073	3,073	3,073	3,073	138,100
Cash Surplus	214	266	318	370	421	473	525	577	629	681	732	784	836	888	940	21,165
Cashflow (ROI before Tax)	4,715	4,715	4,715	4,715	4,715	4,715	4,715	4,715	4,715	4,715	4,715	4,715	4,715	4,715	4,715	51,546
Cashflow (ROI after Tax)	4,111	4,089	4,067	4,045	4,023	4,000	3,978	3,956	3,934	3,912	3,889	3,867	3,845	3,823	3,800	35,125
Cashflow (ROE before Tax)	818	892	966	1,040	1,114	1,188	1,262	1,336	1,410	1,485	1,559	1,633	1,707	1,781	1,855	28,028
Cashflow (ROE after Tax)	214	266	318	370	421	473	525	577	629	681	732	784	836	888	940	11,607
Outstanding Loan	45,200	42,733	40,266	37,799	35,332	32,865	30,398	27,930	25,463	22,996	20,529	18,062	15,595	13,128	10,661	-/-