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ECPIE: AN ENERGY CONSERVATION PROJECT INVESTMENT EVALUATION MODEL

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ABSTRACT

ECPIE: AN ENERGY CONSERVATION PROJECT INVESTMENT EVALUATION MODEL

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ECPIE is a computer program designed to assist in evaluating the financial/economic performance of energy conservation projects in industrial and commercial applications. The program is designed to run on the IBM Personal Computer and IBM-compatible equipment such as the COMPAQ personal computer.

ECPIE automatically performs three separate analyses of a conservation project:

1. **A financial analysis** of project performance based on traditional cash-flow analysis principles. The financial analysis computes the financing requirements and after-tax cash flows associated with a project using information supplied by the user regarding project financial structure, taxation, and the cost of debt and equity financing. In addition, the financial analysis performs six sensitivity analyses on variables that are important determinants of the financial performance of a project -- namely, project capital cost, value of energy savings, cost of debt financing, operating expense, marginal tax rate, and financial structure. For both the base case and the sensitivity analyses, the following financial performance measures are computed: internal rate of return on after-tax cash flow, present value of cash flows at the user's specified target return on equity, length of time from project initiation to breakeven or simple payback.

2. **A social cost/benefit analysis** in which the user may supply cost and price values (social values) that differ from those used in the financial analysis. This analysis ignores the effects of taxes and financial structure on

project performance and evaluates the economic performance of a project from the standpoint of society. The following measures of economic performance are computed in the social cost/benefit analysis: ratio of operating period net benefits to development period costs, present value of net benefits at the user's specified social discount rate, and the length of time for the project's cumulative net benefits to become positive.

3. **A foreign currency requirements analysis** that evaluates the net use (or generation) of foreign currency by a project. Using information supplied by the user regarding the fraction of project cost and revenue accounts that involve a reduction or displacement in foreign currency use, ECPIE computes the net foreign currency required in the development period, the net foreign currency required (or displaced) in the operating period, the present value of the net foreign currency requirement of the project, the ratio of operating period reduction in foreign currency use to development period requirements, and the length of time required for the project's cumulative net foreign currency use to become negative.

In this paper, we describe ECPIE and its inputs and outputs, and present an example of an ECPIE analysis.

ECPIE: AN ENERGY CONSERVATION PROJECT INVESTMENT EVALUATION MODEL

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Numerous studies have documented the availability of high-quality conservation investments in commercial and industrial applications that, however, remain unexploited despite their apparent high financial returns. Undertaking such projects would benefit the financial performance of the energy users' enterprises and would contribute to improved economic efficiency and welfare for the countries that possess the conservation opportunities. Among the reasons cited for the failure of energy users to implement available investments is the difficulty of performing consistent and accurate financial/economic analyses of conservation opportunities.

The difficulty of evaluating the economic/financial merits of energy conservation projects hinders both the willingness and ability of energy users to undertake desirable conservation projects. The plant engineers and energy managers who are most familiar with conservation opportunities frequently lack the expertise or time to perform the kind of analyses that will persuade higher management to endorse a conservation project. In addition, the financial managers -- who could present sound, persuasive financial analysis -- are usually too removed from the engineering/design/performance considerations of a project to provide as accurate an appraisal of expected financial performance. Thus, too often it is difficult to promote and gain approval for good conservation projects within the enterprises that possess the opportunities.

In addition to making difficult the selling of a conservation opportunity within a firm, the difficulty of preparing a good financial analysis may also limit the ability of a firm to undertake a project in cases where external financing is required. If banks or other providers of project capital are not shown a well-documented and strong financial analysis, they may be reluctant to extend credit for a project, or may require burdensome terms that will restrict a firm's ability to finance other investment activities. On the other hand, if a firm can demonstrate security of project revenues (i.e., energy

savings) and document the quality of financial performance, creditors may be willing to extend credit on a project-financed basis and thus not encumber the firm's other assets.

Recognizing such difficulties in developing energy conservation investments, Hagler, Bailly & Company developed **ECPIE**, a highly "user-friendly" microcomputer program that is designed to assist in evaluating and documenting the financial/economic merit of energy conservation projects in industrial and commercial applications. ECPIE was developed under the sponsorship of the United States Agency for International Development for use in developing countries for analyzing energy conservation opportunities. However, because of the flexibility offered by the model in structuring an analysis, ECPIE may be used in almost any economic/institutional setting. In the following sections of this paper, we give a brief overview of ECPIE's features, describe the inputs to and outputs from an ECPIE analysis, and present an example of an ECPIE project analysis.

What Is ECPIE?

ECPIE is an energy conservation project investment evaluation model that is designed to run on the IBM Personal Computer and IBM-compatible equipment such as the COMPAQ personal computer. ECPIE was written in the Microsoft advanced BASIC language and requires a minimum of 64K program-addressable memory to run. Various versions of the program are available to match specific hardware configurations, depending on memory size and the availability of hard disk storage.

ECPIE was designed with the goal of being highly "user-friendly," and, to a large degree, the model is self-documenting. That is, the procedures for entering, editing, and reviewing data; creating and retrieving analysis files; and performing and reporting analyses are explained on the computer screen as the user proceeds through the program. Indeed, the model effectively provides a tutorial in the principles of project financial analysis.

ECPIE automatically performs three separate analyses of a conservation project:

1. **A financial analysis** of project performance based on traditional cash-flow analysis principles. The financial analysis computes the financing requirements and after-tax cash flows associated with a project using information supplied by the user regarding project financial structure, taxation, and the cost of debt and equity financing. In addition, the financial analysis performs six sensitivity analyses on variables that are important determinants of the financial performance of a project -- namely, project capital cost, value of energy savings,

cost of debt financing, operating expense, marginal tax rate, and financial structure. For both the base case and the sensitivity analyses, the following financial performance measures are computed: internal rate of return on after-tax cash flow, present value of cash flows at the user's specified target return on equity, and length of time from project initiation to breakeven or simple payback.

2. **A social cost/benefit analysis** in which the user may supply cost and price values (social values) that differ from those used in the financial analysis. This analysis ignores the effects of taxes and financial structure on project performance and evaluates the economic performance of a project from the standpoint of society. The following measures of economic performance are computed in the social cost/benefit analysis: ratio of operating period net benefits to development period costs, present value of net benefits at the user's specified social discount rate, and the length of time for the project's cumulative net benefits to become positive.

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The results of these analyses may be viewed on the computer screen or printed as a pre-formatted financial/economic feasibility report. To print ECPIE results requires a printer capable of printing in standard 80-column and compressed text modes. Printers currently supported in ECPIE's printer output menu include the Epson FX, RX, and MX series and compatibles (e.g., Star Micronics), and the Okidata Microline series and compatibles. Additional printer options can be readily added to the program. The printed reports should be useful in determining project feasibility and in arranging the financing needed for viable projects.

ECPIE offers the user a high degree of flexibility in setting up a project analysis. An analysis may be conducted on a yearly, quarterly, or monthly basis. Also, because the financial and social cost/benefit

6

values and analyses are kept separate in the model, the user may use different currency bases for the financial and social cost/benefit analyses. For example, the financial analysis may be conducted in current currency values (i.e., including the effects of inflation on price changes) while the social cost/benefit analsyis may be conducted in constant currency values (i.e., excluding the effect of inflation on price changes). In addition, the income tax structure embedded in the model is fairly general: a variety of different depreciation methods are available, and as many as five schedules may be used at once to depreciate user-specified fractions of the capital outlay accounts; tax rates may vary over time; an investment tax credit may be taken; and development period outlays, including interest, may be expensed or capitalized for tax purposes.

ECPIE's Inputs and Outputs

The data inputs for ECPIE are separated into three files:

- Initialization data
- Financial and tax data
- Cost and revenue data.

The **initialization data** include a description of the project, the project's schedule and the time framework for the analysis, and information on the persons or organizations performing and receiving the evaluation. The specific items in the initialization files are:

- Project name
- Project location
- Company name
- Company contact, title
- Telephone number
- Report/analysis preparation responsibility
- Project description
- Time interval for analysis (i.e., year, month, or quarter)
- Time period for beginning of analysis
- Time period for beginning of operations
- Number of time periods for analysis
- Monetary unit for analysis.

The **financial and tax data** describe the financial structure of the conservation project, the cost and terms of debt and equity financing, and the structure of taxation. The specific data inputs that are requested include:

- Debt fraction of development cost

- Interest rates for development and operating period cost

7

- Tax treatment of development period interest
- Debt repayment period
- Principal moratorium period
- Required return on equity
- Social discount rate
- Tax rate (may vary over time)
- Depreciation method and schedules (choose from five methods; up to five schedules at once)
- Investment tax credit.

ıe cost and revenue data include information on the expected costs, ıvenues, and operating performance of a project. Taken together, ıese data will determine the economic/financial performance of the oject. The cost and revenue data are grouped into three categories: ıvelopment period cost data, operating period cost data, and energy-ılated benefits/cost data. The specific data accounts for each cate-ıry are as follows:

- Development period cost data:
  - design/engineering costs
  - direct capital costs
  - indirect development period costs
- Operating period cost data:
  - operating and maintenance costs
  - other operating period costs
- Energy-related benefits/cost data:
  - quantity of energy saved
  - price of energy saved
  - quantity of energy consumed
  - price of energy consumed
  - quantity of energy sold
  - price of energy sold.

For each of these eleven cost and revenue data accounts, the following data may be requested (as relevant):

8

- Fraction of development period outlay expensed
- Fraction of development period outlay depreciated over selected schedules
- Fraction of outlay or revenue requiring or displacing foreign currency use
- Physical units for energy quantities.

Both private market and social cost/benefit values may be provided for the monetarily valued accounts. During the data entry sequences, data may be entered as a single value that is constant for all relevant time periods, a single value that changes at a constant exponential rate for all relevant time periods, or individual values by time period.

In addition to entering these "expected case" values, the user may also specify six sensitivity analyses on the following variables:

- Direct development cost
- Value of energy saved or sold
- Operating and maintenance expense
- Interest rate on project debt
- Percent of capital cost that is debt-financed
- Marginal tax rate.

For each sensitivity analysis, the selected variable is varied from the expected case value according to the user's specification.

ECPIE provides an extensive array of outputs for its three modes of analysis: financial analysis, social cost/benefit analysis, and foreign currency usage analysis. These outputs were selected with the goals of: assisting firms in evaluating the viability of, and gaining financing for, conservation projects; assisting financial institutions in deciding whether to support projects and in structuring favorable repayment terms for both the financial institution and the firm undertaking the conservation investment; and assisting government officials in assessing the contribution of a project to a country's economic welfare and, on the basis of such assessments, deciding whether to grant special assistance to projects. Below, we list (with brief definitions) the important analytic results that are calculated and reported by ECPIE. The list is organized by the different analysis modes. Many of ECPIE's outputs are reported on a time-period-by-time-period basis in a "spreadsheet" format; outputs that are reported in this way are labeled with SS (for spreadsheet) in parentheses.

Financial Analysis Results

The important results calculated in the financial analysis include:

- **Total Capital Cost:** the sum of design/engineering cost and direct capital cost for the entire development period.

- **Total Direct Development Period Cost:** the sum of total capital cost and total development period interest.

- **Total Indirect Development Period Cost:** the total of indirect development cost for the development period.

- **Financing Requirement (SS):** the sum of design/engineering cost, direct capital cost, and development period interest, which must be financed in each period through a combination of debt drawdown and equity contribution.

- **Debt, both by time period (SS) and totaled for the entire development period:** the drawdown of construction debt that is needed to finance the project at the specified debt financing fraction.

- **Total Equity, both by time period (SS) and totaled for the entire development period:** the equity contribution required to finance the project at the specified debt financing fraction. The equity contribution and debt drawdown are scheduled over the development period in such a way that the debt component of the project's financing requirements (i.e., the sum of direct capital cost, design/engineering cost, and development period interest) exactly matches the debt fraction in each time period of the development period.

- **After Tax Cash Flow (SS):** the actual change in the cash position of the equity investor in each of the project analysis periods. Cash flow analysis differs from earnings or income analysis in that non-cash expenses (i.e., depreciation) are not deducted from cash revenues while non-tax-deductible (but real cash) outlays (i.e., equity contributions and repayments of debt principal) are deducted from cash revenues. The net cash flows are presented in a detailed spreadsheet format, which includes supporting detail regarding costs, revenues, and taxes. The formula for computing cash flow in the development period is:

  CASH FLOW = - (EQUITY CONTRIBUTION + INDIRECT DEVELOPMENT PERIOD COST) - INCOME TAX.

Note: The equity contribution is calculated in the financing requirements analysis in such a way as to cover all project capital outlays, interest charges, and expenses that are not covered by the drawdown of project debt. Therefore, these items do not appear in the cash flow calculation. Income tax will usually be negative in the development period.

The formula for computing cash flow in the operating period is:

CASH FLOW = VALUE OF ENERGY SAVED + VALUE OF ENERGY SOLD - VALUE OF ENERGY CONSUMED - OPERATING AND MAINTENANCE EXPENSE - INTEREST ON PROJECT DEBT - OTHER OPERATING PERIOD EXPENSE - TAXES - REPAYMENT OF DEBT PRINCIPAL.

- **Present Value of After-Tax Cash Flow at XX.X%:** the cumulated value of all project cash flows that have been discounted to the beginning of the development period at the user's specified target after-tax return on equity. This value is a measure of the increase in the equity investor's net worth that could be expected from undertaking the conservation project.

- **Internal Rate of Return:** the after-tax return on equity that causes the present value of after-tax cash flows to equal zero. This value is a measure of the project's financial performance per dollar of equity invested.

- **Cumulative Cash Flow Becomes Positive in XXXX:** the time period in which the cumulative, undiscounted cash flows from the project first turn from negative to positive; the point at which the equity investor will have recovered his cash equity investment. Unless the project has a cash flow pattern in which cash flows subsequently become negative and cause the cumulative cash balance to become negative, the project should be "in the black" from this point forward.

- **Number of Months/Quarters/Years from Beginning of Outlays to Simple Payback:** the length of time required for the project's cumulative cash flow to become positive; the "payback period."

- **Number of Operating Period Quarters with Negative Cash Flow:** an indicator of the financial stability/strength of the project. If a project experiences negative cash flow during the operating period, the cash losses will

11

have to be made up from some cash source, and difficulty may be experienced in making debt principal payments.

Social Cost/Benefit Analysis Results

The important results calculated in the social cost/benefit analysis include:

- **Development Period Cost, both by time period (SS) and totaled for the development period:** the undiscounted outlay in the development period measured in social values; a measure of the amount of current consumption that must be delayed to undertake the conservation project. The social cost/benefit analysis does not consider such items as taxes, depreciation, and interest payments as costs.

- **Net Benefits in Operating Period, both by time period (SS) and totaled for the entire period:** the undiscounted net benefits (i.e., benefits less costs) during the operating period measured in social values; a measure of the gross increase (i.e., not net of project development costs) in society's consumption capability as a result of undertaking the project. The net benefits, both for the development and operating periods, are presented in a detailed spreadsheet format.

- **Present Value of Net Benefit Stream at XX.X%:** the cumulated value of all project net benefits that have been discounted to the beginning of the development period at the user's specified social discount rate. This value is a measure of the increase in society's net consumption ability or welfare that could be expected from undertaking the conservation project.

- **Ratio of Operating Period Net Benefits to Development Period Costs:** the conservation project's benefit/cost ratio; a measure of the return to society per dollar of current consumption that is delayed to undertake the conservation project.

- **Cumulative Net Social Benefits Become Positive in XXXX:** the time period in which the cumulative, undiscounted net social benefits from the project first turn from negative to positive; the point at which society will have broken even on the project.

Foreign Currency Usage Analysis Results

The important results calculated in the foreign currency usage analysis include:

- **Foreign Currency Usage/Displacement ($S):** calculated by multiplying the foreign currency content of an individual account (e.g., the fraction of direct capital cost that involves foreign currency purchases) by the value of the account as used in the financial analysis. The values for individual accounts are added by time period to calculate the total foreign usage requirement for each period. Positive values imply foreign currency use; negative values mean that the cumulative effect of the transactions is to reduce foreign currency requirements.

- **Foreign Currency Requirement in Development Period:** the undiscounted sum of foreign currency needs for the development period.

- **Total Foreign Currency Requirement in Operating Period:** the undiscounted sum of foreign currency needs for the operating period (often negative).

- **Total Foreign Currency Requirement for Analysis Period:** the undiscounted sum of foreign currency needs for both the development and operating periods.

- **Present Value of Foreign Currency Requirement at XX.X%:** the discounted sum of foreign currency needs for both the development and operating periods. The present value of foreign currency requirement is computed using the user-specified social discount rate.

- **Cumulative Foreign Currency Use Becomes Negative in XXXX:** the time period in which the cumulative, undiscounted foreign currency requirements of the project first turn from positive to negative; the point at which the project will have paid its way in terms of foreign currency use.

Example of an ECPIE Analysis

To illustrate ECPIE, we present the results from an analysis that was undertaken on behalf of the Sri Lanka Tyre Corporation (SLTC). The project involves rehabilitating the boiler system at SLTC's production facility located at Kelaniya, just outside Colombo. In this effort, which was conducted jointly by personnel from the Sri Lanka Energy

Efficiency, Demand Management, and Conservation Task Force and Hagler, Bailly & Company, we analyzed five technical options for improving energy use efficiency at the SLTC plant. These options ranged from simply replacing the existing oil-fired boiler system to installing various configurations of multi-fuel-capable boiler and turbine/generating systems. The analysis we present here is for the installation of a multi-fuel boiler burning wood and oil with a backpressure turbine to generate electricity for in-plant use.

In the analysis, the costs of the boiler and turbine/generating systems were combined to give a total capital cost (including design and engineering but excluding construction period interest) of Rs.42.9 million. The projected installation period was from the third quarter of 1984 through the fourth quarter of 1985, including time for project shakedown and testing. Full operation was scheduled for the first quarter of 1986. The analysis was conducted on a quarterly basis for 10 years, with the last analysis period being the second quarter of 1994.

The analysis of energy-related costs and benefits involved accounts for energy savings (i.e., the reduction in oil consumption), energy consumption (i.e., the wood consumed as replacement for oil), and energy "sales" (i.e., the electricity produced for in-plant use and valued at its replacement price). Thus, the project has two revenue accounts -- the energy savings and energy sales accounts -- and one energy-related cost account.

The important data assumptions for the analyses (aside from project costs and revenues) are summarized as follows:

- The financial and foreign currency requirements analyses are conducted in current monetary values; the social cost/benefit analysis is conducted in constant monetary values as of mid-1984

- General inflation is assumed to be 10 percent annually, with oil and electricity prices growing at a real rate of 2 percent (i.e., approximately 12 percent in current monetary values)

- The target after-tax nominal return on equity for SLTC is 20 percent

- The real social discount rate is 10 percent

- Debt fraction of project capitalization is 60 percent

- Interest rate during project development and operating periods is 14 percent; interest is accrued and paid during the development period

- Project debt is to be repaid in 32 equal installments beginning in the second year of project operation

- All design/engineering costs and development period interest charges are expensed for tax purposes

- Fifty percent of project equipment and installation cost is depreciated, straight-line, over 4 years, and 50 percent is depreciated, straight-line, over 8 years

- Net income from the project is taxed at the marginal rate of 50 percent; net losses from the project (i.e., during the development period) are assumed to be charged against the firm's current taxable income and thus create a tax offset at the rate of 50 percent

- The foreign currency content of specific accounts is as follows: engineering/design cost, 76 percent; equipment and installation cost, 68 percent; operating and maintenance expense, 67 percent; oil saved, 90 percent; wood purchases, 0 percent; and electricity production, 70 percent

- The valuation of specific accounts for the social cost/benefit analysis is as follows: imported oil, 75 percent of current posted price (i.e., 0.75 x Rs.4,922/tonne = Rs.3,602/tonne, fourth-quarter 1984); wood, Rs.500/tonne through 1990 and Rs.700/tonne thereafter; electricity, 175 percent of current market (i.e., 1.75 x Rs.2/kWh, fourth-quarter 1984), but not escalating; other imported goods are valued at their purchase price less any tariff; and any domestically produced goods and services are valued at 90 percent of the local price.

The results from the analyses of this project option are attached as Exhibit 1. To summarize, these analyses indicate that the project could be expected to have an internal rate of return on after-tax cash flow of 53.1 percent with a present value of cash flow, discounted at 20 percent, of Rs.20.1 million (current Rs., assuming general inflation at 10 percent and a project start of third-quarter 1984). Simple payback would be achieved 13 quarters after the beginning of project outlays, or in the third quarter of 1987.

The social cost/benefit analysis indicates that the project could be expected to achieve a present value of net social benefits, discounted at 10 percent, of Rs.9.6 million (constant Rs. at mid-1984) and an operating period net benefit/development period cost ratio of 1.98. The foreign currency analysis shows that the project would achieve a net reduction in foreign currency requirements of Rs.141 million (current Rs. discounted at 10 percent). The ratio of operating period

15

reduction in foreign currency use to development period use of foreign currency is 9.02.

Exhibit 1

CONSERVATION PROJECT FINANCIAL EVALUATION

BOILER PLANT REHABIITATION #3

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October 23, 1984

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TABLE OF CONTENTS

Summary Project Information	Page 1
Summary Results of Financial Analysis	Page 2
Development Period Financial Summary	Page 3
Project Financial Analysis	Page 4
Summary Results Of Sensitivity Analysis	Page 8

LIST OF ABBREVIATIONS USED IN THIS REPORT:

CAP: Capital
DVL: Development
ENG: Engineering
IND: Indirect
PRD: Period
RQRD: Required
Q: Quantity
OPER & MAINT: Operating & Maintenance

SUMMARY PROJECT INFORMATION

Project Name: BOILER PLANT REHABIITATION #3

Project Location: KELANIYA, SRI LANKA

Company: SRI LANKA TYRE CORPORATION

Company Contact: MR. PALITA SUBASINGHE, SENIOR POWER ENGINEER

Telephone: 521-241

Project Description:

This study is concerned with replacing an inefficient boiler plant with a cogeneration system consisting of a multi-fuel fired boiler and a back-pressured steam turbine. The boiler would be fired on a mixture of 85% wood/15% oil. Boiler operating efficiency would be improved from 54% to about 75%.

Start of Project Development: 3q/1984

Start of Project Operation: 1q/1986

SUMMARY RESULTS OF FINANCIAL ANALYSIS

BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)

PROJECT SCHEDULE
DEVELOPMENT STARTS: 3q/1984
OPERATIONS START: 1q/1986
LAST TIME PERIOD IN ANALYSIS: 2q/1994

DEVELOPMENT PERIOD COSTS
TOTAL DIRECT CAPITAL COST: 42900
TOTAL DIRECT DVL PERIOD COST (includes interest): 45766
TOTAL INDIRECT DVL PERIOD COST: 0

FINANCIAL STRUCTURE
DEBT FRACTION: 60.0%
TOTAL DEBT REQUIRED: 27460
TOTAL EQUITY CONTRIBUTED: 18307

DEBT TERMS
DEVELOPMENT PRD INTEREST RATE: 14.0%
OPERATING PERIOD INTEREST RATE: 14.0%
OPERATING PERIOD DEBT TERM: 32 QUARTERS
DEBT MORATORIUM PERIOD: 3 QUARTERS

MARGINAL TAX RATE: 50.0%

FINANCIAL PERFORMANCE

TARGET AFTER TAX RETURN ON EQUITY: 20.0%
PRESENT VALUE OF AFTER TAX CASH FLOW
AT 20.0%: 13043
INTERNAL RATE OF RETURN: 43.3%
CUMULATIVE CASH FLOW BECOMES POSITIVE IN 4q/1987.

MBER OF QUARTERS FROM BEGINNING OF OUTLAYS TO SIMPLE PAYBACK: 14
NUMBER OF QUARTERS IN OPERATING PERIOD
WITH NEGATIVE CASH FLOW: 0

DEVELOPMENT PERIOD FINANCIAL SUMMARY
BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)

TIME PERIOD	3q/1984	4q/1984	1q/1985	2q/1985	3q/1985	4q/1985
ENG/DESIGN COST	253	859	830	1589	1357	2197
DIRECT CAPITAL COST	10608	6397	8262	7635	2055	858
DVL PRD INTEREST AT 14.0%	0	228	385	584	790	878
TOTAL FINANCING RQRD	10861	7484	9477	9808	4202	3933
EQUITY CONTRIBUTED	4344	2994	3791	3923	1681	1573
DEBT REQUIRED	6517	4490	5686	5885	2521	2360
CUMULATIVE EQUITY	4344	7338	11129	15052	16733	18307
CUMULATIVE DEBT	6517	11007	16693	22578	25100	27460
CUMULATIVE CAPITAL	10861	18345	27822	37631	41833	45766
DVL COST EXPENSED	253	859	830	1589	1357	2197
DVL COST DEPRECIATED	10608	6397	8262	7635	2055	858
INDIRECT DVL COST	0	0	0	0	0	0
CUMULATIVE IND COST	0	0	0	0	0	0

FINANCIAL ANALYSIS BY TIME PERIOD
BOILER PLANT REHABIITATION #3
All Monetary Values In: Rs(000)

TIME PERIOD	3q/1984	4q/1984	1q/1985	2q/1985	3q/1985	4q/1985	1q/1986	2q/1986	3q/1986	4q/1986
PROJECT REVENUES										
ENERGY SAVED (TONNES OF OIL)	0	0	0	0	0	0	1050	1050	1050	1050
PRICE ENERGY SAVED	0.00	0.00	0.00	0.00	0.00	0.00	5.67	5.83	6.00	6.17
VALUE ENERGY SAVED	0	0	0	0	0	0	5953	6126	6302	6483
ENERGY SOLD (MWH ELECTRICITY)	0	0	0	0	0	0	414	414	414	414
PRICE ENERGY SOLD	0.00	0.00	0.00	0.00	0.00	0.00	2.30	2.37	2.43	2.50
VALUE ENERGY SOLD	0	0	0	0	0	0	952	980	1008	1037
TOTAL REVENUE	0	0	0	0	0	0	6907	7105	7310	7520
BEFORE TAX COSTS										
ENERGY USED (TONNES OF WOOD)	0	0	0	0	0	0	4130	4130	4130	4130
PRICE ENERGY USED	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.69	0.71	0.73
VALUE ENERGY USED	0	0	0	0	0	0	2792	2859	2928	2998
DVL PRD EXPENSE	253	859	830	1589	1357	2197	0	0	0	0
DVL PRD INTEREST	0	228	385	584	790	878	961	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	0	0	0	0	0	0	1328	1362	1398	1434
OTHER OPER PRD COST	0	0	0	0	0	0	0	0	0	0
OPER PRD INTEREST	0	0	0	0	0	0	0	961	961	961
DEPR & AMORT	0	0	0	0	0	0	1679	1679	1679	1679
TOTAL COST	253	1087	1215	2173	2147	3075	6759	6861	6965	7072
TAXABLE INCOME	-253	-1087	-1215	-2173	-2147	-3075	147	244	344	448
INVESTMENT TAX CRED	0	0	0	0	0	0	0	0	0	0
INCOME TAX	-127	-544	-608	-1087	-1074	-1538	74	122	172	224
AFTER TAX OUTLAYS										
DEBT PRINCIPAL	0	0	0	0	0	0	0	0	0	0
EQUITY CONTRIBUTED	4344	2994	3791	3923	1681	1573	0	0	0	0
TOTAL AFTER TAX OUTLAYS	4344	2994	3791	3923	1681	1573	0	0	0	0
AFTER-TAX CASH FLOW	-4218	-2450	-3183	-2837	-607	-36	1753	1801	1851	1903
CUMULATIVE CASH FLOW	-9933	-16610	-24762	-32886	-35864	-38442	-36700	-34938	-33157	-31357

FINANCIAL ANALYSIS BY TIME PERIOD
BOILER PLANT REHABIITATION #3
All Monetary Values In: Rs(000)

TIME PERIOD	1q/1987	2q/1987	3q/1987	4q/1987	1q/1988	2q/1988	3q/1988	4q/1988	1q/1989	2q/1989
PROJECT REVENUES										
ENERGY SAVED (TONNES OF OIL)	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
PRICE ENERGY SAVED	6.35	6.53	6.72	6.92	7.11	7.32	7.53	7.74	7.97	8.20
VALUE ENERGY SAVED	6669	6861	7058	7261	7470	7684	7905	8132	8366	8606
ENERGY SOLD (MWH ELECTRICITY)	414	414	414	414	414	414	414	414	414	414
PRICE ENERGY SOLD	2.58	2.65	2.73	2.80	2.89	2.97	3.05	3.14	3.23	3.32
VALUE ENERGY SOLD	1066	1097	1129	1161	1194	1229	1264	1300	1338	1376
TOTAL REVENUE	7736	7958	8187	8422	8664	8913	9169	9433	9704	9982
BEFORE TAX COSTS										
ENERGY USED (TONNES OF WOOD)	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130
PRICE ENERGY USED	0.74	0.76	0.78	0.80	0.82	0.84	0.86	0.88	0.90	0.92
VALUE ENERGY USED	3071	3145	3221	3298	3378	3459	3543	3628	3716	3805
DVL PRD EXPENSE	0	0	0	0	0	0	0	0	0	0
DVL PRD INTEREST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	1471	1509	1548	1588	1629	1671	1714	1759	1804	1851
OTHER OPER PRD COST	0	0	0	0	0	0	0	0	0	0
OPER PRD INTEREST	961	944	927	909	890	871	851	831	809	787
DEPR & AMORT	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679
TOTAL COST	7181	7277	7374	7474	7576	7680	7787	7896	8008	8122
TAXABLE INCOME	554	681	812	948	1088	1233	1382	1536	1696	1861
INVESTMENT TAX CRED	0	0	0	0	0	0	0	0	0	0
INCOME TAX	277	341	406	474	544	616	691	768	848	930
AFTER TAX OUTLAYS										
DEBT PRINCIPAL	479	496	513	531	550	569	589	609	631	653
EQUITY CONTRIBUTED	0	0	0	0	0	0	0	0	0	0
TOTAL AFTER TAX OUTLAYS	479	496	513	531	550	569	589	609	631	653
AFTER-TAX CASH FLOW	1477	1524	1572	1622	1673	1726	1781	1838	1896	1956
CUMULATIVE CASH FLOW	-29537	-27697	-25838	-23959	-22060	-20141	-18202	-16242	-14263	-12263

24

FINANCIAL ANALYSIS BY TIME PERIOD
BOILER PLANT REHABIITATION #3
All Monetary Values In: Rs(000)

TIME PERIOD	3q/1989	4q/1989	1q/1990	2q/1990	3q/1990	4q/1990	1q/1991	2q/1991	3q/1991	4q/1991
PROJECT REVENUES										
ENERGY SAVED (TONNES OF OIL)	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
PRICE ENERGY SAVED	8.43	8.67	8.92	9.18	9.44	9.72	9.99	10.28	10.58	10.88
VALUE ENERGY SAVED	8854	9108	9370	9639	9916	10201	10494	10796	11106	11425
ENERGY SOLD (MWH ELECTRICITY)	414	414	414	414	414	414	414	414	414	414
PRICE ENERGY SOLD	3.42	3.52	3.62	3.72	3.83	3.94	4.05	4.17	4.29	4.41
VALUE ENERGY SOLD	1416	1456	1498	1541	1586	1631	1678	1726	1776	1827
TOTAL REVENUE	10269	10564	10868	11180	11502	11832	12172	12522	12882	13252
BEFORE TAX COSTS										
ENERGY USED (TONNES OF WOOD)	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130
PRICE ENERGY USED	0.94	0.97	0.99	1.01	1.04	1.06	1.09	1.11	1.14	1.17
VALUE ENERGY USED	3897	3991	4087	4186	4287	4390	4496	4604	4715	4829
DVL PRD EXPENSE	0	0	0	0	0	0	0	0	0	0
DVL PRD INTEREST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	1898	1948	1998	2050	2103	2157	2213	2270	2329	2389
OTHER OPER PRD COST	0	0	0	0	0	0	0	0	0	0
OPER PRD INTEREST	764	741	716	691	665	638	610	580	550	519
DEPR & AMORT	1679	1679	560	560	560	560	560	560	560	560
TOTAL COST	8239	8358	7361	7486	7614	7744	7878	8014	8154	8297
TAXABLE INCOME	2031	2206	3507	3695	3888	4088	4295	4508	4728	4955
INVESTMENT TAX CRED	0	0	0	0	0	0	0	0	0	0
INCOME TAX	1015	1103	1754	1847	1944	2044	2147	2254	2364	2478
AFTER TAX OUTLAYS										
DEBT PRINCIPAL	676	699	724	749	775	802	830	860	890	921
EQUITY CONTRIBUTED	0	0	0	0	0	0	0	0	0	0
TOTAL AFTER TAX OUTLAYS	676	699	724	749	775	802	830	860	890	921
AFTER-TAX CASH FLOW	2019	2083	1589	1658	1728	1801	1876	1954	2034	2117
CUMULATIVE CASH FLOW	-10242	-8201	-6139	-4056	-1953	172	23797	25751	27785	29901

FINANCIAL ANALYSIS BY TIME PERIOD
BOILER PLANT REHABIITATION #3
All Monetary Values In: Rs(000)

TIME PERIOD	1q/1992	2q/1992	3q/1992	4q/1992	1q/1993	2q/1993	3q/1993	4q/1993	1q/1994	2q/1994
PROJECT REVENUES										
ENERGY SAVED (TONNES OF OIL)	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
PRICE ENERGY SAVED	11.19	11.52	11.85	12.19	12.54	12.90	13.27	13.65	14.04	14.44
VALUE ENERGY SAVED	11753	12091	12439	12796	13164	13542	13931	14332	14743	15167
ENERGY SOLD (MWH ELECTRICITY)	414	414	414	414	414	414	414	414	414	414
PRICE ENERGY SOLD	4.54	4.67	4.80	4.94	5.08	5.23	5.38	5.54	5.69	5.86
VALUE ENERGY SOLD	1879	1933	1989	2046	2105	2166	2228	2292	2358	2425
TOTAL REVENUE	13633	14025	14428	14842	15269	15708	16159	16623	17101	17593
BEFORE TAX COSTS										
ENERGY USED (TONNES OF WOOD)	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130
PRICE ENERGY USED	1.20	1.23	1.26	1.29	1.32	1.35	1.38	1.41	1.45	1.48
VALUE ENERGY USED	4945	5065	5187	5312	5440	5571	5705	5843	5984	6128
DVL PRD EXPENSE	0	0	0	0	0	0	0	0	0	0
DVL PRD INTEREST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	2451	2514	2579	2646	2714	2784	2856	2930	3006	3083
OTHER OPER PRD COST	0	0	0	0	0	0	0	0	0	0
OPER PRD INTEREST	487	454	419	383	346	308	269	228	185	141
DEPR & AMORT	560	560	560	560	560	560	560	560	0	0
TOTAL COST	8443	8592	8744	8900	9060	9223	9390	9560	9175	9353
TAXABLE INCOME	5190	5433	5683	5942	6209	6485	6769	7063	7926	8240
INVESTMENT TAX CRED	0	0	0	0	0	0	0	0	0	0
INCOME TAX	2595	2716	2842	2971	3104	3242	3385	3532	3963	4120
AFTER TAX OUTLAYS										
DEBT PRINCIPAL	953	986	1021	1057	1094	1132	1171	1212	1255	1299
EQUITY CONTRIBUTED	0	0	0	0	0	0	0	0	0	0
TOTAL AFTER TAX OUTLAYS	953	986	1021	1057	1094	1132	1171	1212	1255	1299
AFTER-TAX CASH FLOW	2282	2290	2380	2474	2570	2670	2773	2879	2708	2821
CUMULATIVE CASH FLOW	32103	34393	36773	39247	41817	44487	47260	50139	52847	55668

24

SUMMARY RESULTS OF SENSITIVITY ANALYSIS
BOILER PLANT REHABIITATION #3

BASE OR EXPECTED CASE

PRESENT VALUE OF AFTER TAX CASH FLOW
AT 20.0%: 13043
INTERNAL RATE OF RETURN: 43.3%
CUMULATIVE CASH FLOW BECOMES POSITIVE IN 4q/1987.

DIRECT DEVELOPMENT COSTS 20% GREATER THAN EXPECTED

PRESENT VALUE OF AFTER TAX CASH FLOW
AT 20.0%: 9693
INTERNAL RATE OF RETURN: 35.6%
CUMULATIVE CASH FLOW BECOMES POSITIVE IN 2q/1988.

DIRECT DEVELOPMENT COSTS 20% LESS THAN EXPECTED

PRESENT VALUE OF AFTER TAX CASH FLOW
AT 20.0%: 16394
INTERNAL RATE OF RETURN: 53.3%
CUMULATIVE CASH FLOW BECOMES POSITIVE IN 3q/1987.

ENERGY SAVINGS/SALES 20% GREATER THAN EXPECTED

PRESENT VALUE OF AFTER TAX CASH FLOW
AT 20.0%: 26676
INTERNAL RATE OF RETURN: 61.3%
CUMULATIVE CASH FLOW BECOMES POSITIVE IN 2q/1987.

ENERGY SAVINGS/SALES 20% LESS THAN EXPECTED

PRESENT VALUE OF AFTER TAX CASH FLOW
AT 20.0%: -590
INTERNAL RATE OF RETURN: 18.6%
CUMULATIVE CASH FLOW BECOMES POSITIVE IN 3q/1989.

INTEREST RATES 4 POINTS HIGHER THAN EXPECTED

PRESENT VALUE OF AFTER TAX CASH FLOW
AT 20.0%: 11598
INTERNAL RATE OF RETURN: 41%
CUMULATIVE CASH FLOW BECOMES POSITIVE IN 1q/1988.

0% OF DIRECT DEVELOPMENT COST DEBT FINANCED

PRESENT VALUE OF AFTER TAX CASH FLOW
AT 20.0%: 2043
INTERNAL RATE OF RETURN: 21.5%
CUMULATIVE CASH FLOW BECOMES POSITIVE IN 3q/1989.

SOCIAL VALUE AND FOREIGN CURRENCY REQUIREMENTS ANALYSES

BOILER PLANT REHABIITATION #3

Prepared for:
MR. PALITA SUBASINGHE
SRI LANKA TYRE CORPORATION
KELANIYA, SRI LANKA

Prepared by:
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October 23, 1984

28

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TABLE OF CONTENTS

Summary Project Information	Page 1
Summary Results Of Social Value And Foreign Currency Requirements Analyses	Page 2
Social Value Analysis	Page 3
Foreign Currency Requirements Analysis	Page 7

LIST OF ABBREVIATIONS USED IN THIS REPORT:

CAP: Capital
DVL: Development
ENG: Engineering
IND: Indirect
PRD: Period
RQRD: Required
Q: Quantity
OPER & MAINT: Operating & Maintenance

SUMMARY PROJECT INFORMATION

Project Name: BOILER PLANT REHABIITATION #3

Project Location: KELANIYA, SRI LANKA

Company: SRI LANKA TYRE CORPORATION

Company Contact: MR. PALITA SUBASINGHE, SENIOR POWER ENGINEER

Telephone: 521-241

Project Description:

This study is concerned with replacing an inefficient boiler plant with a cogeneration system consisting of a multi-fuel fired boiler and a back-pressured steam turbine. The boiler would be fired on a mixture of 85% wood/15% oil. Boiler operating efficiency would be improved from 54% to about 75%.

Start of Project Development: 3q/1984

Start of Project Operation: 1q/1986

SUMMARY RESULTS OF SOCIAL VALUE AND
FOREIGN CURRENCY REQUIREMENTS ANALYSIS

BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)

PROJECT SCHEDULE
DEVELOPMENT STARTS: 3q/1984
OPERATIONS START: 1q/1986
LAST TIME PERIOD IN ANALYSIS: 2q/1994

SOCIAL DISCOUNT RATE: 10.0%

SOCIAL VALUE RESULTS

TOTAL DEVELOPMENT PERIOD COST: 38442

TOTAL NET BENEFITS IN OPERATING PERIOD: 59064

PRESENT VALUE OF NET BENEFIT STREAM AT
10.0%: -648

RATIO OF OPERATING PERIOD NET BENEFITS
TO DEVELOPMENT PERIOD COSTS: 1.5

CUMULATIVE SOCIAL BENEFITS BECOME POSITIVE IN 4q/1990.

FOREIGN CURRENCY REQUIREMENTS RESULTS

FOREIGN CURRENCY REQUIRED IN DEVELOPMENT PERIOD: 34549

FOREIGN CURRENCY REQUIRED IN OPERATING PERIOD: -275204

PRESENT VALUE OF FOREIGN CURRENCY REQUIREMENT AT
10.0%: -120464

OPERATING PERIOD REDUCTION IN FOREIGN CURRENCY REQUIREMENTS/
DEVELOPMENT PERIOD FORIEGN CURRENCY REQUIREMENT: 8.0

CUMULATIVE FOREIGN CURRENCY USE BECOMES NEGATIVE IN 4q/1984.

(Positive values mean the project is a net user of foreign currency; Negative values mean the project is a net generator of foreign currency.)

SOCIAL VALUE ANALYSIS BY TIME PERIOD
BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)
Taxes And Interest Not Considered In This Analysis

TIME PERIOD	3q/1984	4q/1984	1q/1985	2q/1985	3q/1985	4q/1985	1q/1986	2q/1986	3q/1986	4q/1986
PROJECT BENEFITS										
ENERGY SAVED (TONNES OF OIL)	0	0	0	0	0	0	1050	1050	1050	1050
PRICE ENERGY SAVED	0.00	0.00	0.00	0.00	0.00	0.00	3.69	3.71	3.73	3.75
VALUE ENERGY SAVED	0	0	0	0	0	0	3876	3896	3915	3934
ENERGY SOLD (MWH ELECTRICITY)	0	0	0	0	0	0	414	414	414	414
PRICE ENERGY SOLD	0.00	0.00	0.00	0.00	0.00	0.00	3.50	3.50	3.50	3.50
VALUE ENERGY SOLD	0	0	0	0	0	0	1449	1449	1449	1449
TOTAL BENEFITS	0	0	0	0	0	0	5325	5345	5364	5383
PROJECT COSTS										
ENERGY USED (TONNES OF WOOD)	0	0	0	0	0	0	4130	4130	4130	4130
PRICE ENERGY USED	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50
VALUE ENERGY USED	0	0	0	0	0	0	2065	2065	2065	2065
ENG/DESIGN COST	247	837	788	1476	1231	1865	0	0	0	0
DIRECT CAP COST	9686	5840	7364	6648	1747	713	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	0	0	0	0	0	0	1518	1518	1518	1518
OTHER OPER PRD CST	0	0	0	0	0	0	0	0	0	0
TOTAL COST	9933	6677	8152	8124	2978	2578	3583	3583	3583	3583
NET BENEFIT STREAM	-9933	-6677	-8152	-8124	-2978	-2578	1742	1762	1781	1800
CUMULATIVE NET BENEFITS	-9933	-16610	-24762	-32886	-35864	-38442	-36700	-34938	-33157	-31357

SOCIAL VALUE ANALYSIS BY TIME PERIOD
BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)
Taxes And Interest Not Considered In This Analys

TIME PERIOD	1q/1987	2q/1987	3q/1987	4q/1987	1q/1988	2q/1988	3q/1988	4q/1988	1q/1989	2q/1989
PROJECT BENEFITS										
ENERGY SAVED (TONNES OF OIL)	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
PRICE ENERGY SAVED	3.77	3.78	3.80	3.82	3.84	3.86	3.88	3.90	3.92	3.94
VALUE ENERGY SAVED	3954	3974	3993	4013	4033	4053	4073	4093	4114	4134
ENERGY SOLD (MWH ELECTRICITY)	414	414	414	414	414	414	414	414	414	414
PRICE ENERGY SOLD	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
VALUE ENERGY SOLD	1449	1449	1449	1449	1449	1449	1449	1449	1449	1449
TOTAL BENEFITS	5403	5423	5442	5462	5482	5502	5522	5542	5563	5583
PROJECT COSTS										
ENERGY USED (TONNES OF WOOD)	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130
PRICE ENERGY USED	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
VALUE ENERGY USED	2065	2065	2065	2065	2065	2065	2065	2065	2065	2065
ENG/DESIGN COST	0	0	0	0	0	0	0	0	0	0
DIRECT CAP COST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	1518	1518	1518	1518	1518	1518	1518	1518	1518	1518
OTHER OPER PRD CST	0	0	0	0	0	0	0	0	0	0
TOTAL COST	3583	3583	3583	3583	3583	3583	3583	3583	3583	3583
NET BENEFIT STREAM	1820	1840	1859	1879	1899	1919	1939	1959	1980	2000
CUMULATIVE NET BENEFITS	-29537	-27697	-25838	-23959	-22060	-20141	-18202	-16242	-14263	-12263

SOCIAL VALUE ANALYSIS BY TIME PERIOD
BOILER PLANT REHABILITATION #3

All Monetary Values In: Rs(000)
Taxes And Interest Not Considered In This Analysis

TIME PERIOD	3q/1989	4q/1989	1q/1990	2q/1990	3q/1990	4q/1990	1q/1991	2q/1991	3q/1991	4q/1991
PROJECT BENEFITS										
ENERGY SAVED (TONNES OF OIL)	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
PRICE ENERGY SAVED	3.96	3.98	4.00	4.02	4.04	4.06	4.08	4.10	4.12	4.14
VALUE ENERGY SAVED	4155	4175	4196	4217	4238	4259	4280	4301	4322	4344
ENERGY SOLD (MWH ELECTRICITY)	414	414	414	414	414	414	414	414	414	414
PRICE ENERGY SOLD	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
VALUE ENERGY SOLD	1449	1449	1449	1449	1449	1449	1449	1449	1449	1449
TOTAL BENEFITS	5604	5624	5645	5666	5687	5708	5729	5750	5771	5793
PROJECT COSTS										
ENERGY USED (TONNES OF WOOD)	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130
PRICE ENERGY USED	0.50	0.50	0.50	0.50	0.50	0.50	0.70	0.70	0.70	0.70
VALUE ENERGY USED	2065	2065	2065	2065	2065	2065	2891	2891	2891	2891
ENG/DESIGN COST	0	0	0	0	0	0	0	0	0	0
DIRECT CAP COST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	1518	1518	1518	1518	1518	1518	1518	1518	1518	1518
OTHER OPER PRD CST	0	0	0	0	0	0	0	0	0	0
TOTAL COST	3583	3583	3583	3583	3583	3583	4409	4409	4409	4409
NET BENEFIT STREAM	2021	2041	2062	2083	2104	2125	1320	1341	1362	1384
CUMULATIVE NET BENEFITS	-10242	-8201	-6139	-4056	-1953	172	1492	2833	4196	5579

SOCIAL VALUE ANALYSIS BY TIME PERIOD
BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)
Taxes And Interest Not Considered In This Analysis

TIME PERIOD	1q/1992	2q/1992	3q/1992	4q/1992	1q/1993	2q/1993	3q/1993	4q/1993	1q/1994	2q/1994
PROJECT BENEFITS										
ENERGY SAVED (TONNES OF OIL)	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
PRICE ENERGY SAVED	4.16	4.18	4.20	4.22	4.24	4.26	4.28	4.30	4.33	4.35
VALUE ENERGY SAVED	4365	4387	4409	4431	4453	4475	4497	4519	4542	4564
ENERGY SOLD (MWH ELECTRICITY)	414	414	414	414	414	414	414	414	414	414
PRICE ENERGY SOLD	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
VALUE ENERGY SOLD	1449	1449	1449	1449	1449	1449	1449	1449	1449	1449
TOTAL BENEFITS	5814	5836	5858	5880	5902	5924	5946	5968	5991	6013
PROJECT COSTS										
ENERGY USED (TONNES OF WOOD)	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130
PRICE ENERGY USED	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
VALUE ENERGY USED	2891	2891	2891	2891	2891	2691	2891	2891	2891	2891
ENG/DESIGN COST	0	0	0	0	0	0	0	0	0	0
DIRECT CAP COST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	1518	1518	1518	1518	1518	1518	1518	1518	1518	1518
OTHER OPER PRD CST	0	0	0	0	0	0	0	0	0	0
TOTAL COST	4409	4409	4409	4409	4409	4409	4409	4409	4409	4409
NET BENEFIT STREAM	1405	1427	1449	1471	1493	1515	1537	1559	1582	1604
CUMULATIVE NET BENEFITS	6985	8412	9861	11332	12824	14339	15876	17436	19017	20622

FOREIGN CURRENCY REQUIREMENTS BY TIME PERIOD
BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)
Positive Values Indicate Use Of Foreign Currency
Negative Values Indicate Generation Of Foreign Currency

TIME PERIOD	3q/1984	4q/1984	1q/1985	2q/1985	3q/1985	4q/1985	1q/1986	2q/1986	3q/1986	4q/1986
VALUE ENERGY SAVED	0	0	0	0	0	0	-5359	-5513	-5672	-5835
VALUE ENERGY SOLD	0	0	0	0	0	0	-667	-686	-705	-726
ENG/DESIGN COST	189	643	622	1190	1016	1645	0	0	0	0
DIRECT CAP COST	8021	4837	6247	5773	1554	649	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	0	0	0	0	0	0	892	915	939	963
ENERGY CONSUMED	0	0	0	0	0	0	0	0	0	0
OTHER OPER PRD CST	0	0	0	0	0	0	0	0	0	0
INTEREST PAYMENTS	0	172	291	441	597	663	726	726	726	726
NET FOREIGN CURRENCY REQUIRED	8210	5652	7159	7404	3167	2957	-4408	-4558	-4712	-4871
CUMULATIVE FOREIGN CURRENCY REQUIRED	8210	13862	21022	28425	31592	34549	30141	25583	20871	16000

FOREIGN CURRENCY REQUIREMENTS BY TIME PERIOD
BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)
Positive Values Indicate Use Of Foreign Currency
Negative Values Indicate Generation Of Foreign Currency

TIME PERIOD	1q/1987	2q/1987	3q/1987	4q/1987	1q/1988	2q/1988	3q/1988	4q/1988	1q/1989	2q/1989
VALUE ENERGY SAVED	-6002	-6175	-6352	-6535	-6723	-6916	-7114	-7319	-7529	-7746
VALUE ENERGY SOLD	-747	-768	-790	-813	-836	-860	-885	-910	-936	-963
ENG/DESIGN COST	0	0	0	0	0	0	0	0	0	0
DIRECT CAP COST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	988	1014	1040	1067	1095	1123	1152	1182	1212	1244
ENERGY CONSUMED	0	0	0	0	0	0	0	0	0	0
OTHER OPER PRD CST	0	0	0	0	0	0	0	0	0	0
INTEREST PAYMENTS	726	713	700	686	672	658	643	627	611	594
NET FOREIGN CURRENCY REQUIRED	-5035	-5216	-5402	-5594	-5792	-5995	-6205	-6420	-6642	-6871
CUMULATIVE FOREIGN CURRENCY REQUIRED	10965	5749	346	-5248	-11040	-17035	-23240	-29660	-36303	-43174

FOREIGN CURRENCY REQUIREMENTS BY TIME PERIOD
BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)
Positive Values Indicate Use Of Foreign Currency
Negative Values Indicate Generation Of Foreign Currency

TIME PERIOD	3q/1989	4q/1989	1q/1990	2q/1990	3q/1990	4q/1990	1q/1991	2q/1991	3q/1991	4q/1991
VALUE ENERGY SAVED	-7968	-8197	-8433	-8675	-8924	-9181	-9445	-9716	-9995	-10283
VALUE ENERGY SOLD	-991	-1020	-1049	-1079	-1110	-1142	-1175	-1208	-1243	-1279
ENG/DESIGN COST	0	0	0	0	0	0	0	0	0	0
DIRECT CAP COST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	1276	1309	1343	1377	1413	1449	1487	1525	1565	1605
ENERGY CONSUMED	0	0	0	0	0	0	0	0	0	0
OTHER OPER PRD CST	0	0	0	0	0	0	0	0	0	0
INTEREST PAYMENTS	577	559	541	522	502	481	460	438	416	392
NET FOREIGN CURRENCY REQUIRED	-7106	-7349	-7598	-7855	-8120	-8392	-8672	-8961	-9258	-9564
CUMULATIVE FOREIGN CURRENCY REQUIRED	-50280	-57629	-65227	-73082	-81202	-89594	-98266	-107227	-116485	-126050

FOREIGN CURRENCY REQUIREMENTS BY TIME PERIOD
BOILER PLANT REHABIITATION #3

All Monetary Values In: Rs(000)
Positive Values Indicate Use Of Foreign Currency
Negative Values Indicate Generation Of Foreign Currency

TIME PERIOD	1q/1992	2q/1992	3q/1992	4q/1992	1q/1993	2q/1993	3q/1993	4q/1993	1q/1994	2q/1994
VALUE ENERGY SAVED	-10578	-10882	-11195	-11516	-11847	-12188	-12538	-12898	-13269	-13650
VALUE ENERGY SOLD	-1316	-1353	-1392	-1432	-1474	-1516	-1559	-1604	-1650	-1698
ENG/DESIGN COST	0	0	0	0	0	0	0	0	0	0
DIRECT CAP COST	0	0	0	0	0	0	0	0	0	0
INDIRECT DVL COST	0	0	0	0	0	0	0	0	0	0
OPER & MAINT EXPENSE	1647	1689	1733	1778	1824	1871	1919	1969	2020	2072
ENERGY CONSUMED	0	0	0	0	0	0	0	0	0	0
OTHER OPER PRD CST	0	0	0	0	0	0	0	0	0	0
INTEREST PAYMENTS	368	342	316	289	262	233	203	172	140	107
NET FOREIGN CURRENCY REQUIRED	-9879	-10204	-10538	-10882	-11236	-11600	-11976	-12362	-12760	-13170
CUMULATIVE FOREIGN CURRENCY REQUIRED	-135929	-146133	-156670	-167552	-178788	-190388	-202363	-214725	-227485	-240655