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RENEWABLE ENERGY RESOURCES

FIELD TESTING

DRAFT FINAL

PRE-RFP MARKET/ECONOMIC ASSESSMENT FOR FIELD TEST NO. 4 HELWAN TEXTILE

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AND

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1. EXECUTIVE SUMMARY

An economic analysis was performed to evaluate a proposed Solar Industrial Process Heat (IPH) and Waste Heat Recovery System for the textile finishing industry at Helwan Spinning and Weaving Company at Helwan, near Cairo.

A collector system of area 4200 sq.ft. was evaluated. Because of differences in assumptions in cost estimation, EEA and Lockwood Greene Engineers submitted separate cost estimates.

The Lockwood Greene Engineers estimates were based on a 4,000 sq.ft. collector area with a variable cost of $60.00/sq.ft. and a fixed cost of $39,180 with an energy savings of 325 barrels of oil equivalent.

EEA estimates provided data for 4200 sq.ft. of collector area. Two sets of collector prices were provided; $25.81/sq.ft. for the REFT project and $22.21/sq.ft. for locally manufactured collector systems. Fixed cost estimates were $23,995 and $17,430 for each collector price category, respectively. The EEA estimates showed an energy savings of 348 barrels of oil equivalent.

A benefit cost analysis methodology was employed to perform the economic analysis.

A $20.00/barrel of No. 6 light heating oil was used as the price of energy saved by using the solar thermal system. This price was escalated at 2% per year. Also, a sensitivity analysis was performed by varying the price of oil and/or collector prices.

The economic analysis considered the following scenarios:

- A 4000 sq.ft. collector area at a price of $60.00/sq.ft. (U.S. case)
- A 4200 sq.ft. collector area at prices of $25.81/sq.ft. and $22.21/sq.ft.
- A Waste Heat Recovery System.
- A 4,200 sq.ft. collector area priced at $30.00 per sq.ft. combined with a waste heat recovery system.

Results of the economic analysis showed that none of the candidate solar thermal systems are economically viable.

A sensitivity analysis was also performed by varying collector prices and the price of oil. Results of the sensitivity analysis indicated that the flat plate collectors will not be economical unless prices fall to $22.00/sq.ft., at a price of oil $40 per barrel.

A separate analysis was also carried out on the economic performance of the solar thermal system combined with the Waste Heat Recovery System. Results of the analysis showed that the combined system was economically viable.

The design, operation, maintenance, and repair experience with solar thermal systems that will be obtained through this field test to form a strong technical base for the design and application of other renewable energy technologies is an important factor which has not entered into the benefit cost calculation in this report. These additional factors need to be considered seriously in the go-no-go decision of this field test.

2. INTRODUCTION

The Egyptian Electricity Authority (EEA), the United States Agency for International Development (USAID/Cairo), and a group of U.S. Consultants form a team responsible for the performance, conduct and management of the Renewable Energy Field Testing (REFT) Project whereby eleven systems are field tested for renewable energy applications in Egypt.

These field tests include the use of solar thermal, photovoltaic and grid connected wind farm systems for industrial process heat, water pumping, ice making, desalination, and grid connected electricity generation.

The project has broad objectives to investigate selected renewable energy options to:

- Comprehensively strengthen Egyptian technical and institutional capabilities in the full spectrum of renewable energy planning and decision-making for technologies and applications.

- Develop and sustain an Egyptian renewable energy infrastructure through the establishment of data bases, information systems and organizations that effectively serve both the public and private sectors.

- Design, install, operate and evaluate a series of renewable energy field tests which utilize commercially available technologies in applications having potential for widespread use in Egypt.

- Conduct a formal management and technical training program, both on-the-job and specialized, and establish an intensive information dissemination program.

The Market/Economic Analysis Task is one of the supporting activities that will provide useful information for the accomplishment of the proposed project objectives. The Market/Economic Analysis Task is set up to accomplish the following objectives:

- Evaluate the economic performance of candidate renewable energy technology/application systems in the field test program in the Egyptian economy.

- Identify non-technical bottlenecks that could be encountered in the dissemination and wide use of renewable energy technologies.

- Estimate the market environment in Egypt under which the supply of and the demand for preselected renewable energy technologies will be transacted.

- Identify policy issues such as energy prices, incentives, tariffs and regulations that could be modified, instituted and/or removed to enhance the establishment of a true economic cost of energy resources.

- Determine the economic environment under which investment decisions could be made for the widespread use of similar renewable energy technologies in Egypt.

- Train Egyptian counterparts with the capability of performing market and economic assessments of similar energy projects.

The Market/Economic Analysis Task is performed in two parts. The first part is the Pre-RFP Market/Economic Analysis. This activity will perform a site specific Market/Economic analysis of a particular field test in order to provide decision makers both at EEA and USAID/Cairo with information on the financial and economic viability of the proposed field test. This information is required as one of the pieces of information for a go-no-go decision on the issuance of an RFP.

The second part performs a market/economic analysis of specified renewable energy technologies throughout Egypt in industrial sectors represented by the eleven field tests.

This report represents the first part, the Pre-RFP Market/ Economic analysis for a field test designed to test the technical and economic viability of the use of solar industrial process heat (IPH), and a waste heat recovery system for textile bleaching.

3. BACKGROUND

The proposed site for Field Test # 4 - Textile finishing at the Helwan Spinning and Weaving Company at Helwan near Cairo.

Helwan Spinning and Weaving Company is a large textile plant, finishing a variety of fabrics. The finishing operation consists of a series of chemical treatments involving hot and cold washes followed by dyeing and bleaching processes. The hot wash, dye, and bleach washers are currently brought to and held at the desired temperature range by direct sparging with steam (hand-valve adjustments).

Objectives of Proposed Field Test Site for IPH System

The primary objectives of this field test are to provide EEA with practical working experience using Solar Thermal Industrial Process Heat and to provide system design and operational training for Egyptian engineers for the purpose of assessing and implementing similar projects throughout Egypt. This field test will evaluate the viability of solar thermal industrial process heat, with waste heat recovery system for textile finishing.

The application of solar IPH, and waste heat recovery system for textile finishing at Helwan Textile will serve as a demonstration of the capability of the combined technology of

industrial process heat to reliably supply significant amounts of energy at other textile finishing facilities. It is important that this field test be designed to distinguish between the performance of the solar IPH and the performance of the waste heat recovery systems so that each can be evaluated for other applications.

4. ECONOMIC ANALYSIS

Objective

The objective of this analysis is to evaluate the economic viability of a solar thermal system for providing industrial process heat for textile finishing at the Helwan Spinning and Weaving Company at Helwan and to determine whether or not an investment in this field test would result in the acquisition of useful information and know-how, not only technical, but also managerial and institutional, so that such experiences could be duplicated throughout the economy of Egypt.

Research Methodology

The method of analysis selected for accomplishing the above objective is the standard benefit cost analysis used in project evaluation. A benefit cost analysis involves first the pooling of anticipated benefits and costs (direct and indirect) resulting from the project throughout its economic life. The streams of benefits and costs are then expressed in present value terms using a common numeraire (a discount rate).

From this, the following evaluation characteristics can be calculated.

The Net Present Value (NPV) is the difference between the sum of the discounted stream of benefits and the sum of the discounted stream of costs, discounted by a given discount rate.

The Payback Period is the number of years it takes a project to generate sufficient benefits to cover its cost, or the number of years it takes the net present value to change from a negative to a positive value.

The Internal Rate of Return (IRR), sometimes called the economic rate of return, is that discount rate that would equate discounted benefits to discounted cost or reduce the net present value to zero.

Benefit-Cost Ratio (B/C). This is the ratio obtained by dividing the discounted value of all project benefits by the discounted value of project costs.

Simple Payback. This is a rule of thumb method used by investors to see if a particular financial venture is worth investing in or not. The simple payback is calculated by summing up all capital and operating costs and dividing that sum by the value of the first full year's benefit. In the private sector in most industrialized countries a simple payback of 3 to 5 years is expected. With renewable energy technology, a simple payback of 7-9 years is usually admissible.

Assumptions

The economic analysis of the IPH system is based on the following assumptions:

- All energy conversions are made into barrels of oil equivalent where one metric ton is equivalent to US 7.33 barrels.

- Price of oil is valued at US$20/barrel of No. 6 light heating oil escalated at 2% per year. This price level may not be indicative of the price of oil that is rapidly changing at present. It should be noted that the analysis in this study is to look at what may happen in the long-run during the 1980s and 1990s. As such, the analysis should not be affected by what happens to commodity prices in the spot market in the very short-run. A revision of the price of oil in the analysis may be appropriate when the price level stabilizes.

- A discount rate of 10% is used. This is the opportunity cost of money used in international lending agencies such as the World Bank.

- Hardware is assumed to have a salvage value of 10% at the end of the life of the system.

- The system is expected to have a life of 20 years.

- Some hardware items are purchased in Egypt. An exchange rate of L.E. 1.35 = US$ 1.00 is used. All prices are in constant US$ 1985.

Data Base

Two sets of cost estimates were used in this analysis. The first set of data was provided by Lockwood Greene Engineers for a 4,000 sq.ft. collector area (see Appendix B).

On the basis of the best available information, Lockwood Greene Engineers have provided the following cost estimates:

Collector Size	4,000
Prices	
Variable cost	$60.00/sq.ft.
Fixed cost	$39,180
O + M cost	2% of total cost
Salvage value	4.2% of total cost
Energy savings	325 barrels of oil
Construction period	10 months
System life	20 years

The second set of data was provided by EEA for a collector size of 4200 sq.ft. The EEA cost estimates also show two types of prices. The first set shows a price of $25.81 per square foot

of collector. This price is to be used for collectors purchased for the REFT Project. The second set shows a price of $22.21 per sq.ft. which is to be used when evaluating IPH application elsewhere in Egypt (see Appendix C).

Cost estimates provided by EEA are as follows:

Collector Size	4200 sq.ft.
Prices	
Variable cost	$22.21/sq.ft. (local) $25.81/sq.ft. (REFT)
Fixed cost	$17,430 (local) $23,995 (REFT)
O + M cost	2% of hardware cost
Salvage value	4.2% of capital cost
Energy savings	348 barrels of oil
Construction period	10 months
System life	20 years

Analysis and Results

The economic evaluation of the IPH system for textile finishing was performed by examining the following sets of assumptions:

1. A 4200 sq.ft. collector area at a price of $30/sq.ft.
2. A 4200 sq.ft. collector area at prices of $ 25.81/sq.ft. and $22.21/sq.ft.
3. A Waste Heat Recovery System.
4. A 4200 sq.ft. collector area priced at $30 per sq.ft. combined with waste heat recovery system.
5. A sensitivity analysis at different collector prices and varying prices of oil.

Table 1 presents the input data based on cost estimates provided by Lockwood Greene Engineers. These estimates are based on a collector system purchased from the U.S. at a price of US$60/sq.ft. Output results for this analysis is presented in Table 2.

Input data for the base line analysis are presented in Table 3. All base line analyses were performed assuming a price of $20.00/bbl of oil. The economic evaluation of all systems was made using a discount rate of 10% although system performances are examined at varying discount rates ranging from 0% to 20%, at 2% intervals (see Appendix A).

Table 4 presents results of the base line analysis. As shown in this table, the 4200 sq.ft. solar collector systems at all collector prices do not pay during its economic life. The solar collector system at a price of $30/sq.ft. has a simple payback of 22 years which is longer than the life of the system.

The net present value at 10% discount rate is negative for the baseline case with collector price $30/sq.ft. and price of oil $20/bbl, indicating that the financial benefits accruing to the project will not be able to offset the cost of acquisition and operation of the system during its economic life span. The net present value at different level of discount rate and varying prices of oil is presented in Figure 1.

TABLE 1

ECONOMIC ANALYSIS OF IPH SYSTEM

FIELD TEST # 4 - HLEWAN TEXTILE

DATA INPUT - U.S. CASE

(Collector Price US$ 60/sq.ft., Price of Oil $20/bbl)

I T E M S	SOLAR ONLY	WASTE HEAT RECOVERY	COMBINED SYSTEM
Capital Cost ($)	227,348	567,958	845,306
O + M ($)	4,765	11,359	16,906
Salvage Value ($)	11,649	23,854	35,503
Energy Savings (bbl)	325	11,048	11,737
Construction Period (Month)	10	10	10
System Life (Yrs)	20	20	20

Source: LBII estimates based on Engineering cost data provided by Lockwood Greene Engineers.

TABLE 2

ECONOMIC NALYSIS OF IPH SYSTEM

FIELD TEST # 4 - HELWAN TEXTILE

RESULTS - U.S. CASE

(Collector Price US$60/sq.ft.; Price of Oil US$ 20/bbl)

I T E M S	SOLAR ONLY	WASTE HEAT RECOVERY	COMBINED
Energy Savings (bbl)	325	11,048	11,373
Simple Payback (Yrs)	43	3	4
Payback Period (Yrs)	None	4	6
Net Present Value @ i = 10 %	($251,325)	1,568,793	1,310,681
Internal Rate of Return (IRR %)	- 8.34	42.20	28.43
B/C Ratio @ i = 10 %	0.21	3.37	2.33

Source: LBII estimates based on Engineering cost data provided by Lockwood Greene Engineers.

TABLE 3

ECONOMIC ANALYSIS OF IPH SYSTEM

FIELD TEST # 4 - HELWAN TEXTILE

DATA INPUT - BASELINE ANALYSIS

(Collector Price US$ 30/sq.ft.)

I T E M S	SOLAR ONLY	WASTE HEAT RECOVERY	COMBINED SYSTEM
Capital Cost ($)	149,995	567,958	717,953
O + M ($)	2,520	11,359	13,879
Salvage Value ($)	6,300	- 0 -	6,300
Energy Savings (bbl)	348	11,048	11,396
Construction Period (Month)	10	10	10
System Life (Yrs)	20	20	20

Source: LBII estimates based on cost data provided from EEA and Lockwood Greene Engineers.

TABLE 4

ECONOMIC ANALYSIS OF IPH SYSTEM

FIELD TEST # 4 - HELWAN TEXTILE

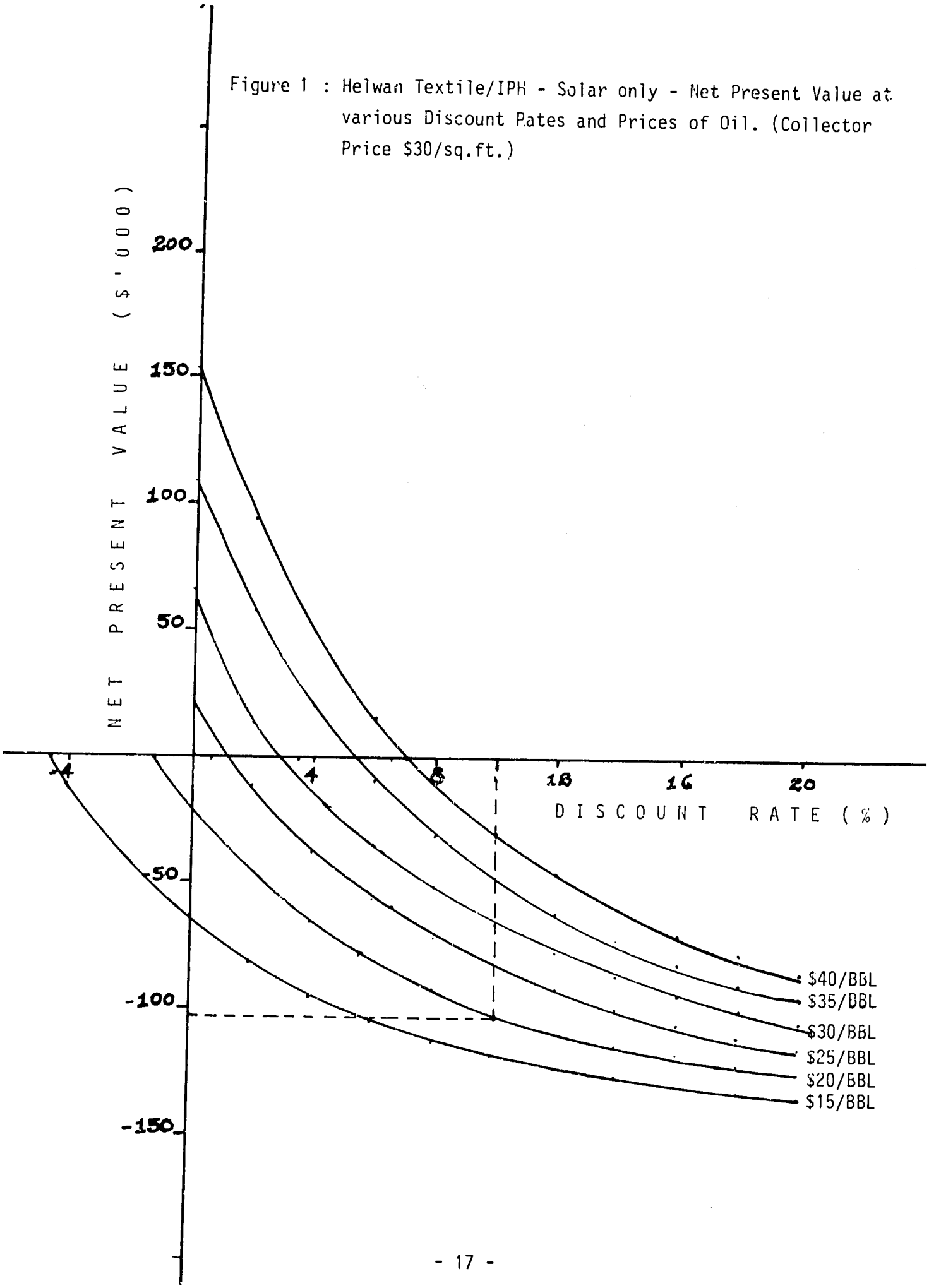
BASELINE ANALYSIS RESULTS

(Collector Price $30/sq.ft.; Price of Oil US$ 20/bbl)

I T E M S	SOLAR ONLY	WASTE HEAT RECOVERY	COMBINED
Energy Savings (bbl)	348	11,048	11,396
Simple Payback (Yrs)	22	3	3
Payback Period (Yrs)	None	4	5
Net Present Value @ i = 10 %	($100,633)	1,565,248	1,464,614
Internal Rate of Return (IRR %)	- 1.24	42.20	34.02
B/C Ratio @ i = 10 %	0.41	3.35	2.75

Source: LBII estimates based on cost data provided by EEA and Lockwood Greene Engineers.

Figure 1 : Helwan Textile/IPH - Solar only - Net Present Value at various Discount Rates and Prices of Oil. (Collector Price $30/sq.ft.)



The internal rate of return (IRR) is significantly lower than the 10% economic rate of return expected to cover the cost of credit.

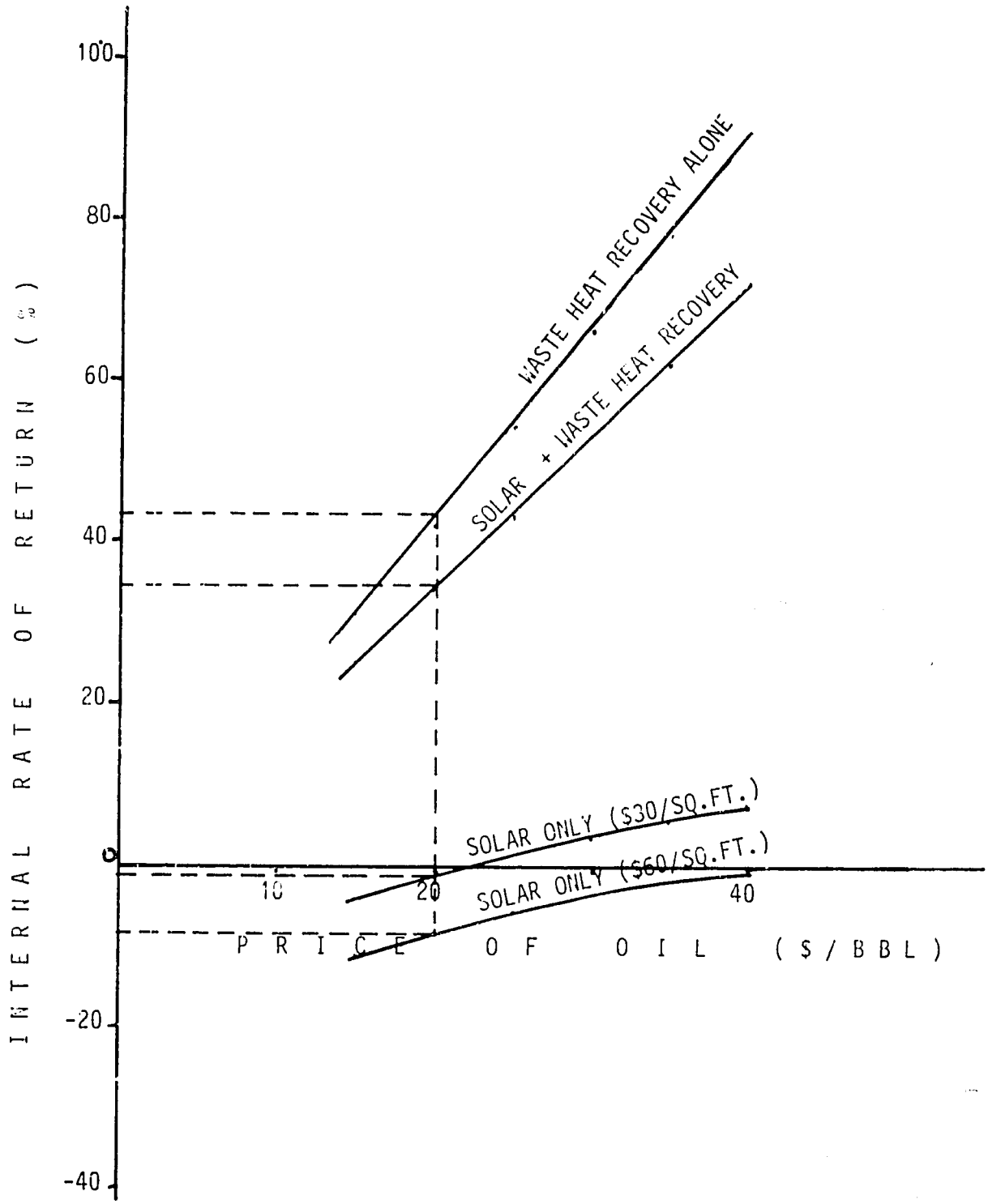
The waste heat recovery system on the other hand, shows positive results. The system pays for itself in four years.

The internal rate of return for the waste heat recovery system is very high: 42.20% indicating very high economic gains to be realized by installing this system.

The Application Review for Field Test # 4 examines solar thermal together with a waste heat recovery system as a unit that will be installed at Helwan Textile. Accordingly, an economic evaluation of the combined solar thermal plus the waste heat recovery system was performed.

The input data used for this analysis is presented in Table 3. Results of the economic analysis for the combined system are presented in Table 4. As shown in Table 4, the combined system is economically viable. The payback period for the combined system is five years with an Internal Rate of Return (IRR) of 34.02%. Figure 2 presents a graphic representation of the internal rate of return (IRR) for the output results presented in Table 4.

Figure 2 : Helwan Textile - Internal Rate of Return at different Prices of Oil for Waste Heat Recovery and Combined Solar and Waste Heat Recovery Systems (Collector Price $60 and $30/sq.ft.)



It is very clear from Table 4, that the economic performance of the combined system is lower than that of the waste heat system, indicating the dampening effect of the poor economic performance of the solar thermal system.

It should be pointed out that there is no functional relationship between the technical or economic performance of solar thermal and waste heat recovery systems. One can install the solar thermal all by itself or in combination.

As discussed earlier, the proposed 4200 sq.ft. solar thermal system is not economically viable at a collector price of $30/sq.ft. and price of oil $20/barrel. A separate analysis was performed using a $20/barrel price of oil and collector prices of $30, 25, 22, and 20/sq.ft. Results of the analysis is presented in Table 5.

As shown in Table 5, the solar thermal system is not economically viable at all collector prices. The system does not pay for itself during its life span. Even at the lowest collector price ($20/sq.ft.) the benefits derived from the system can only cover 58% of the cost incurred (B/C ratio 0.58) during the life of the system.

An additional sensitivity analysis was performed for each collector price level and varying prices of oil. As shown in

TABLE 5 - ECONOMIC ANALYSIS OF IPH SYSTEM - FT#4/HELWAN TEXTILE
SENSITIVITY ANALYSIS WITH DIFFERENT COLLECTOR PRICES
(Price of Oil US$ 20/BBL)

ITEMS	COLLECTOR PRICE $20/sq.ft.	$22/sq.ft.	$25/sq.ft.	$30/sq.ft.
Energy Savings (bbl)	348	348	348	348
Simple Payback (Yrs)	16	16	19	22
Payback Period (Yrs)	None	None	None	None
Net Present Value @ i = 10%	($51,604)	($55,919)	($76,694)	($100,633)
Internal Rate of Return - IRR %	2.66	2.16	0.46	- 1.24
B/C Ratio @ i = 10 %	0.58	0.56	0.48	0.41

Source: LBII estimate based on engineering cost data provided by EEA and Lockwood Greene Engineers.

Tables 6 - 9, the solar thermal system will start showing positive economic results if collector prices are between $20 and $22/sq.ft. and oil prices increase to $35 - $40/barrel. It is very unlikely to find a situation where one can have a decline in the price of collectors while having a simultaneous increase in the price of oil. Since collectors are manufactured from products such as plastic, glass, aluminum, etc., which are energy intensive, a decline in collector prices can only be realized with a decline in the price of energy.

Figures 3 and 4 show graphic representations of the internal rate of return (IRR) and payback period, respectively, for different prices of collectors and varying prices of oil.

A year by year cash flow for 36 different scenarios are presented in Appendix A, Tables A1 - A36.

TABLE 6 - ECONOMIC ANALYSIS OF IPH SYSTEM - FT#4/HELWAN TEXTILE
SENSITIVITY ANALYSIS WITH DIFFERENT PRICES OF OIL
(Collector Price US$ 20/sq.ft.)

ITEM	PRICE OF OIL					
	$15/bbl	$20/bbl	$25/bbl	$30/bbl	$35/bbl	$40/bbl
Energy Savings (bbl)	348	348	348	348	348	348
Simple Payback (Yrs)	21	16	12	10	9	8
Payback Period (Yrs)	None	None	None	None	None	None
Net Present Value @ i = 10%	(69,179)	(51,604)	(34,029)	(16,454)	1,120	18,695
Internal Rate of Return - IRR %	- 0.57	2.66	5.40	7.87	10.14	12.29
B/C Ratio	0.43	0.58	0.72	0.87	1.01	1.15

Source: LBII estimate based on engineering cost data provided by EEA and Lockwood Greene Engineers.

TABLE 7 - ECONOMIC ANALYSIS OF IPH SYSTEM - FT#4/HELWAN TEXTILE
SENSITIVITY ANALYSIS WITH DIFFERENT PRICES OF OIL
(Collector Price US$ 22/sq.ft.)

ITEM	PRICE OF OIL					
	$15/bbl	$20/bbl	$25/bbl	$30/bbl	$35/bbl	$40/bbl
Energy Savings (bbl)	348	348	348	348	348	348
Simple Payback (Yrs)	21	16	13	11	9	8
Payback Period (Yrs)	None	None	None	None	None	None
Net Present Value @ i = 10%	(73,494)	(55,919)	(38,344)	(20,769)	(3,194)	14,381
Internal Rate of Return - IRR %	- 1.08	2.16	4.91	7.35	9.61	11.72
B/C Ratio	0.42	0.56	0.70	0.84	0.97	1.11

Source: LBII estimate based on engineering cost data provided by EEA and Lockwood Greene Engineers.

TABLE 8 - ECONOMIC ANALYSIS OF IPH SYSTEM - FT#4/HELWAN TEXTILE
SENSITIVITY ANALYSIS WITH DIFFERENT PRICES OF OIL
(Collector Price US$ 25/sq.ft.)

ITEM	PRICE OF OIL					
	$15/bbl	$20/bbl	$25/bbl	$30/bbl	$35/bbl	$40/bbl
Energy Savings (bbl)	348	348	348	348	348	348
Simple Payback (Yrs)	25	19	15	12	11	9
Payback Period (Yrs)	None	None	None	None	None	None
Net Present Value @ i = 10%	(94,268)	(76,694)	(59,119)	(41,544)	(23,969)	(6,394)
Internal Rate of Return - IRR %	- 2.63	0.46	3.04	5.32	7.39	9.32
B/C Ratio	0.36	0.48	0.60	0.72	0.84	0.96

Source: LBII estimate based on engineering cost data provided by EEA and Lockwood Greene Engineers.

TABLE 9 - ECONOMIC ANALYSIS OF IPH SYSTEM - FT#4/HELWAN TEXTILE
SENSITIVITY ANALYSIS WITH DIFFERENT PRICES OF OIL
(Collector Price US$ 30/sq.ft.)

	PRICE OF OIL					
ITEM	$15/bbl	$20/bbl	$25/bbl	$30/bbl	$35/bbl	$40/bbl
Energy Savings (bbl)	348	348	348	348	348	348
Simple Payback (Yrs)	29	22	17	14	12	11
Payback Period (Yrs)	None	None	None	None	None	None
Net Present Value @ i = 10%	(118,208)	(100,633)	(83,058)	(65,484)	(47,909)	(30,334)
Internal Rate of Return - IRR %	- 4.25	- 1.24	1.24	3.39	5.34	7.14
B/C Ratio	0.31	0.41	0.51	0.62	0.72	0.82

Source: LBII estimate based on engineering cost data provided by EEA and Lockwood Greene Engineers.

Figure 3 : Helwan Textile/IPH - Solar Only - Internal Rate of Return at Different Prices of Oil and varying Collector Prices.

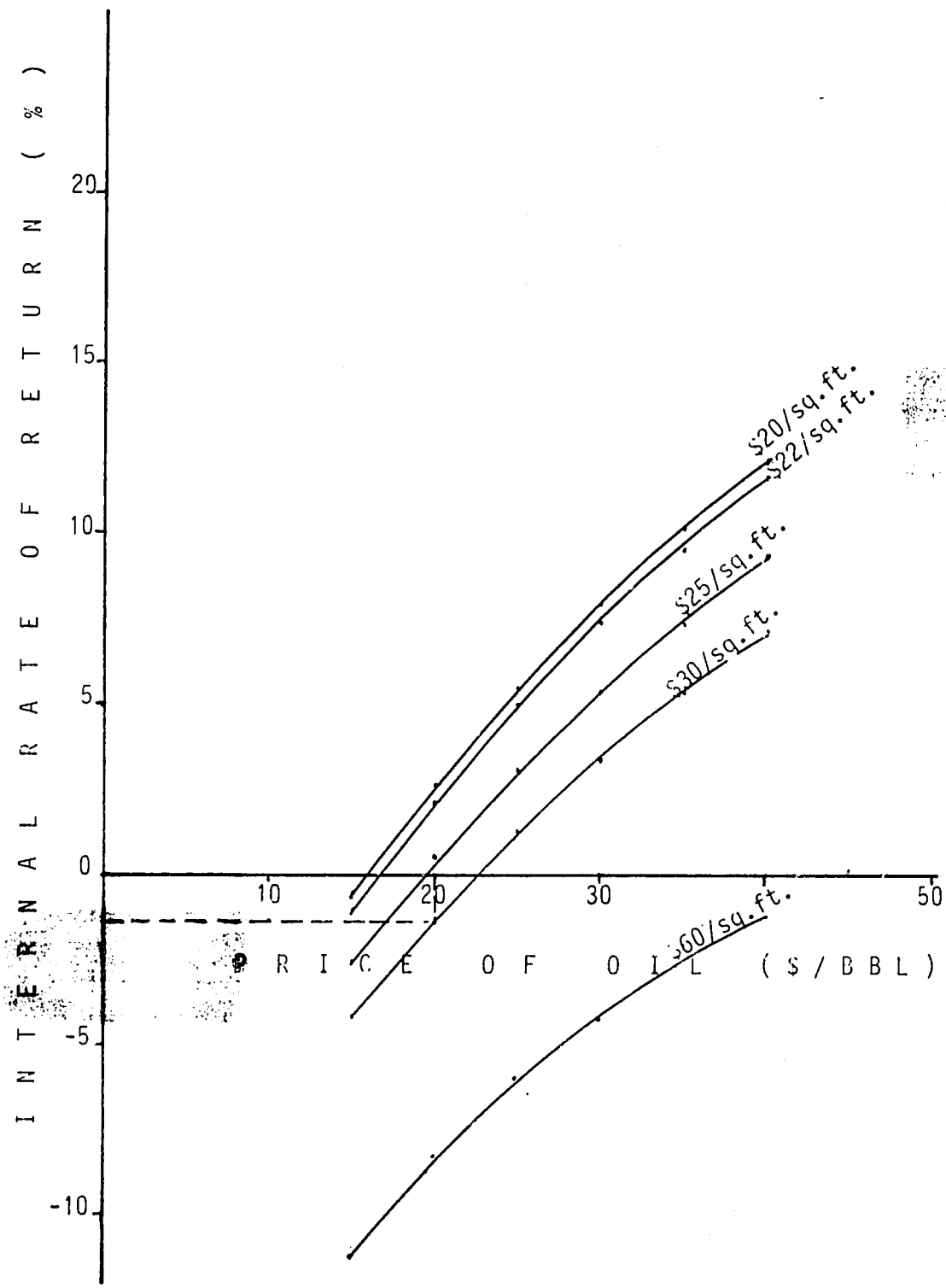
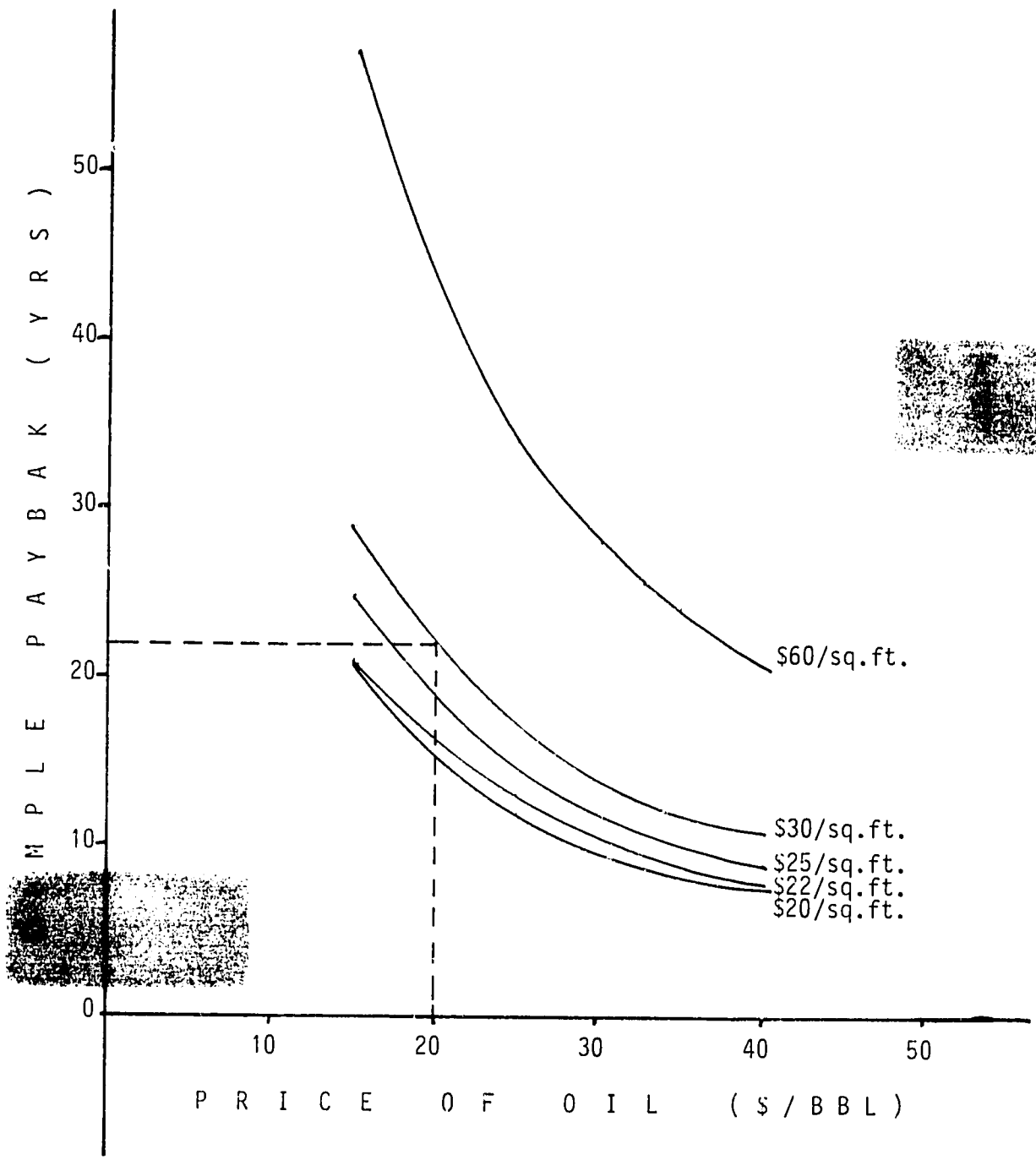


Figure 4 : Helwan Textile - Solar Only - Simple Payback at Different Prices of Oil and varying Collector Prices.



5. CONCLUSION

The economic analysis performed on the proposed IPH Field Test at Helwan Textile showed that the 4200 sq.ft. flat plate collector system was not economically viable.

However, the analysis indicated that when the solar thermal system was evaluated in combination with the waste heat recovery system, the project was economically viable. This favorable performance was caused not because of improvement made in economic efficiency by the solar thermal system, but rather because the economic efficiency of the waste heat recovery system is so strong that it more than offsets the poor performance of the solar thermal system.

It should be emphasized that this analysis did not cover an evaluation of the complete array of solar thermal systems, such as solar collectors for domestic hot water, etc. The analysis was limited to the application of flat plate collectors for application in industrial process heat of a given temperature range. Therefore, implications drawn from this analysis should not be applied to other solar thermal uses.

The economic analysis has revealed some interesting and important economic, technical, institutional and policy issues.

It is clear that the proposed flat plate collector system on its own, cannot be expected to bring about positive economic returns given current collector prices. Therefore, it is necessary that:

- Investigations be made in the technical field to determine if the efficiency of the system could be improved without increasing system cost.
- The supply side of the collector market be prepared to manufacture and supply collector systems that are cost effective.
- Policy makers be cognizant of the fact that the price of flat plate collectors must decrease by almost 60% compared to the best case scenario as used in this study (from $30/sq.ft. to $10/sq.ft.) in order for industrial consumers to find it attractive to invest in solar thermal technology. Since the market, and thus the solar thermal industry, is at its infancy in Egypt, policy makers and the public sector have to play a lead role in removing barriers and providing the appropriate fiscal and/or regulatory incentives to enhance the manufacture and widespread use of solar thermal technology.

It is the overall objective of the Renewable Energy Field Testing Project to investigate selected renewable energy options to:

- Comprehensively strengthen Egyptian technical and institutional capabilities in the full spectrum of renewable energy planning and decision-making for technologies and applications.

- Develop and sustain an Egyptian renewable energy infrastructure through establishment of data bases, information systems, and organizations that effectively serve both the public and private sectors.

- Design, realize, and evaluate the performance of a series of field tests which utilize commercially available technologies in applications having potential for widespread use in Egypt

- Complete formal managerial and technical training, both on-the-job and specialized, and an intensive information dissemination program.

The design, operation, maintenance, and repair experience with solar thermal systems that will be obtained through this field test to form a strong technical base for the design and application of other renewable energy technologies is an important factor which has not entered into the benefit cost calculation in this report. These additional factors need to be considered seriously for the go-no-go decision.

APPENDIX A

TABLE A-1

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $30/SQ.FT.- PRICE OF OIL $15/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$149,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$149,995	$420	$15.00	0	$0	58	$870	$150,415	($149,545)	($149,545)	($149,545)	($149,545)	($149,545)
2		$0	$2,520	$15.30	0	$0	348	$5,324	$2,520	$2,804	($146,848)	($146,948)	($146,995)	($147,041)
3		$0	$2,520	$15.61	0	$0	348	$5,431	$2,520	$2,911	($144,157)	($144,453)	($144,590)	($144,721)
4		$0	$2,520	$15.93	0	$0	348	$5,540	$2,520	$3,020	($141,473)	($142,056)	($142,321)	($142,571)
5		$0	$2,520	$16.24	0	$0	348	$5,650	$2,520	$3,130	($138,797)	($139,755)	($140,1[illegible])	($140,582)
6		$0	$2,520	$16.56	0	$0	348	$5,763	$2,520	$3,243	($136,131)	($137,548)	($138,169)	($138,742)
7		$0	$2,520	$16.89	0	$0	348	$5,879	$2,520	$3,359	($133,477)	($135,431)	($136,274)	($137,040)
8		$0	$2,520	$17.23	0	$0	348	$5,996	$2,520	$3,476	($130,835)	($133,403)	($134,490)	($135,468)
9		$0	$2,520	$17.57	0	$0	348	$6,116	$2,520	$3,596	($128,208)	($131,460)	($132,812)	($134,015)
10		$0	$2,520	$17.93	0	$0	348	$6,238	$2,520	$3,718	($125,595)	($129,600)	($131,235)	($132,674)
11		$0	$2,520	$18.28	0	$0	348	$6,363	$2,520	$3,843	($122,999)	($127,820)	($129,754)	($131,437)
12		$0	$2,520	$18.65	0	$0	348	$6,490	$2,520	$3,970	($120,420)	($126,117)	($128,362)	($130,256)
13		$0	$2,520	$19.02	0	$0	348	$6,620	$2,520	$4,100	($117,859)	($124,489)	($127,055)	($129,243)
14		$0	$2,520	$19.40	0	$0	348	$6,753	$2,520	$4,233	($115,317)	($122,932)	($125,829)	($128,273)
15		$0	$2,520	$19.79	0	$0	348	$6,888	$2,520	$4,368	($112,795)	($121,445)	($124,679)	($127,379)
16		$0	$2,520	$20.19	0	$0	348	$7,025	$2,520	$4,505	($110,293)	($120,025)	($123,601)	($126,556)
17		$0	$2,520	$20.59	0	$0	348	$7,166	$2,520	$4,646	($107,812)	($118,669)	($122,590)	($125,798)
18		$0	$2,520	$21.00	0	$0	348	$7,309	$2,520	$4,789	($105,354)	($117,374)	($121,642)	($125,101)
19		$0	$2,520	$21.42	0	$0	348	$7,455	$2,520	$4,935	($102,918)	($116,139)	($120,754)	($124,459)
20		$0	$2,520	$21.85	0	$0	348	$7,605	$2,520	$5,085	($100,504)	($114,961)	($119,923)	($123,869)
21		($6,300)	$2,520	$22.29	0	$0	348	$7,757	($3,780)	$11,537	($95,239)	($112,486)	($118,208)	($122,673)
		$143,695	$50,820		0	$0	7,018	$130,239	$194,515	($64,276)				

TABLE A-1 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$149,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$149,995
Construct Time	10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,520 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Salvage Value	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$15.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Enrgy Savngs	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return -4.25%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$130,239	$194,515	($64,276)	0.67
2%	$105,270	$187,381	($82,111)	0.56
4%	$86,548	$181,787	($95,239)	0.48
6%	$72,307	$177,355	($105,048)	0.41
8%	$61,319	$173,805	($112,486)	0.35
10%	$52,725	$170,933	($118,208)	0.31
11%	$49,126	$169,701	($120,575)	0.29
12%	$45,912	$168,585	($122,673)	0.27
13%	$43,032	$167,571	($124,539)	0.26
14%	$40,443	$166,647	($126,204)	0.24
15%	$38,108	$165,804	($127,695)	0.23
16%	$35,997	$165,032	($129,034)	0.22
18%	$32,342	$163,674	($131,332)	0.20
20%	$29,303	$162,522	($133,219)	0.18

TABLE A-2

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $30/SQ.FT. - PRICE OF OIL $20/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) 4%	8%	10%	@ i = 12%
0	Acquisition	$149,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$149,995	$420	$20.00	0	$0	58	$1,160	$150,415	($149,255)	($149,255)	($149,255)	($149,255)	($149,255)
2		$0	$2,520	$20.40	0	$0	343	$7,029	$2,520	$4,573	($144,852)	($145,015)	($145,092)	($145,166)
3		$0	$2,520	$20.81	0	$0	348	$7,241	$2,520	$4,721	($140,487)	($140,567)	($141,190)	($141,403)
4		$0	$2,520	$21.22	0	$0	348	$7,386	$2,520	$4,866	($136,161)	($137,105)	($137,534)	($137,939)
5		$0	$2,520	$21.65	0	$0	348	$7,534	$2,520	$5,014	($131,875)	($133,419)	($134,110)	($134,753)
6		$0	$2,520	$22.08	0	$0	348	$7,684	$2,520	$5,164	($127,631)	($129,905)	($130,903)	($131,822)
7		$0	$2,520	$22.52	0	$0	348	$7,838	$2,520	$5,318	($123,428)	($126,553)	($127,901)	($129,128)
8		$0	$2,520	$22.97	0	$0	348	$7,995	$2,520	$5,475	($119,267)	($123,359)	($125,092)	($126,652)
9		$0	$2,520	$23.43	0	$0	348	$8,155	$2,520	$5,635	($115,150)	($120,314)	($122,463)	($124,376)
10		$0	$2,520	$23.90	0	$0	348	$8,318	$2,520	$5,798	($111,076)	($117,414)	($120,004)	($122,285)
11		$0	$2,520	$24.38	0	$0	348	$8,484	$2,520	$5,964	($107,047)	($114,651)	($117,705)	($120,365)
12		$0	$2,520	$24.87	0	$0	348	$8,654	$2,520	$6,134	($103,063)	($112,021)	($115,555)	($118,601)
13		$0	$2,520	$25.36	0	$0	348	$8,827	$2,520	$6,307	($99,123)	($109,516)	($113,545)	($116,983)
14		$0	$2,520	$25.87	0	$0	348	$9,004	$2,520	$6,484	($95,230)	($107,132)	($111,667)	($115,497)
15		$0	$2,520	$26.39	0	$0	348	$9,184	$2,520	$6,664	($91,382)	($104,864)	($109,913)	($114,133)
16		$0	$2,520	$26.92	0	$0	348	$9,367	$2,520	$6,847	($87,580)	($102,705)	($108,273)	($112,882)
17		$0	$2,520	$27.46	0	$0	348	$9,555	$2,520	$7,035	($83,824)	($100,652)	($105,743)	($111,735)
18		$0	$2,520	$28.00	0	$0	348	$9,746	$2,520	$7,226	($80,114)	($98,699)	($105,313)	($110,682)
19		$0	$2,520	$28.56	0	$0	348	$9,941	$2,520	$7,421	($76,451)	($96,842)	($103,978)	($109,717)
20		$0	$2,520	$29.14	0	$0	348	$10,139	$2,520	$7,619	($72,835)	($95,076)	($102,732)	($108,833)
21		($6,300)	$2,520	$29.72	0	$0	348	$10,342	($3,780)	$14,122	($66,390)	($92,046)	($100,633)	($107,369)
		$143,695	$50,820		0	$0	7,018	$173,652	$194,515	($20,863)				

TABLE A-2 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$149,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$149,995

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,520 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$20.00 /bbl (yr. 1)
Oil Escalat.	3.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return -1.24%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$173,652	$194,515	($20,863)	0.89
2%	$140,360	$187,381	($47,021)	0.75
4%	$115,398	$181,787	($66,390)	0.63
6%	$96,409	$177,355	($80,946)	0.54
8%	$81,759	$173,805	($92,046)	0.47
10%	$70,299	$170,933	($100,633)	0.41
11%	$65,502	$169,701	($104,199)	0.39
12%	$61,216	$168,585	($107,369)	0.36
13%	$57,376	$167,571	($110,195)	0.34
14%	$53,924	$166,647	($112,723)	0.32
15%	$50,811	$165,804	($114,992)	0.31
16%	$47,997	$165,032	($117,035)	0.29
18%	$43,123	$163,674	($120,551)	0.26
20%	$39,071	$162,522	($123,451)	0.24

TABLE A-3

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $30/SQ.FT.- PRICE OF OIL $25/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$149,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$149,995	$420	$25.00	0	$0	58	$1,450	$150,415	($148,965)	($148,965)	($148,955)	($148,965)	($148,965)
2		$0	$2,520	$25.50	0	$0	348	$8,874	$2,520	$6,354	($142,955)	($143,082)	($143,189)	($143,292)
3		$0	$2,520	$26.01	0	$0	348	$9,051	$2,520	$6,531	($136,817)	($137,482)	($137,791)	($138,085)
4		$0	$2,520	$26.53	0	$0	348	$9,233	$2,520	$6,713	($130,649)	($132,153)	($132,748)	($133,307)
5		$0	$2,520	$27.06	0	$0	348	$9,417	$2,520	$6,897	($124,954)	($127,084)	($128,037)	($128,924)
6		$0	$2,520	$27.60	0	$0	348	$9,606	$2,520	$7,086	($119,130)	($122,261)	($123,637)	($124,903)
7		$0	$2,520	$28.15	0	$0	348	$9,798	$2,520	$7,278	($113,378)	($117,675)	($119,529)	($121,216)
8		$0	$2,520	$28.72	0	$0	348	$9,994	$2,520	$7,474	($107,699)	($113,315)	($115,694)	($117,836)
9		$0	$2,520	$29.29	0	$0	348	$10,193	$2,520	$7,673	($102,092)	($109,169)	($112,114)	($114,736)
10		$0	$2,520	$29.88	0	$0	348	$10,397	$2,520	$7,877	($96,557)	($105,228)	($108,774)	($111,896)
11		$0	$2,520	$30.47	0	$0	348	$10,605	$2,520	$8,085	($91,095)	($101,483)	($105,656)	($109,293)
12		$0	$2,520	$31.08	0	$0	348	$10,817	$2,520	$8,297	($85,706)	($97,925)	($102,748)	($106,907)
13		$0	$2,520	$31.71	0	$0	348	$11,034	$2,520	$8,514	($80,388)	($94,544)	($100,035)	($104,722)
14		$0	$2,520	$32.34	0	$0	348	$11,254	$2,520	$8,734	($75,142)	($91,332)	($97,505)	($102,720)
15		$0	$2,520	$32.99	0	$0	348	$11,479	$2,520	$8,959	($69,968)	($88,282)	($95,146)	($100,897)
16		$0	$2,520	$33.65	0	$0	348	$11,709	$2,520	$9,189	($64,866)	($85,385)	($92,946)	($99,208)
17		$0	$2,520	$34.32	0	$0	348	$11,943	$2,520	$9,423	($59,835)	($82,634)	($90,895)	($97,671)
18		$0	$2,520	$35.01	0	$0	348	$12,182	$2,520	$9,662	($54,875)	($80,023)	($88,984)	($96,264)
19		$0	$2,520	$35.71	0	$0	348	$12,426	$2,520	$9,906	($49,985)	($77,544)	($87,202)	($94,976)
20		$0	$2,520	$36.42	0	$0	348	$12,674	$2,520	$10,154	($45,165)	($75,191)	($85,542)	($93,797)
21		($6,300)	$2,520	$37.15	0	$0	348	$12,928	($3,780)	$16,708	($37,540)	($71,607)	($83,058)	($92,065)
		$143,695	$50,820		0	$0	7,018	$217,065	$194,515	$22,550				

TABLE A-3 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$149,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$149,995

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,520 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Salvage Value	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$25.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 1.24%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$217,065	$194,515	$22,550	1.12
2%	$175,450	$187,381	($11,931)	0.94
4%	$144,247	$181,787	($37,540)	0.79
6%	$120,511	$177,355	($56,844)	0.68
8%	$102,198	$173,805	($71,607)	0.59
10%	$87,674	$170,933	($83,058)	0.51
11%	$81,877	$169,701	($87,824)	0.48
12%	$76,520	$168,585	($92,065)	0.45
13%	$71,720	$167,571	($95,851)	0.43
14%	$67,405	$166,647	($99,242)	0.40
15%	$63,514	$165,804	($102,290)	0.38
16%	$59,996	$165,032	($105,036)	0.36
18%	$53,904	$163,674	($109,770)	0.33
20%	$48,839	$162,522	($113,683)	0.30

TABLE A-4

For Case of:FIELD ETST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $30/SQ.FT. - PRICE OF OIL $30/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$149,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$149,995	$420	$30.00	0	$0	58	$1,740	$150,415	($148,675)	($148,675)	($148,675)	($148,675)	($148,675)
2		$0	$2,520	$30.60	0	$0	348	$10,649	$2,520	$8,129	($140,859)	($141,148)	($141,285)	($141,417)
3		$0	$2,520	$31.21	0	$0	348	$10,862	$2,520	$8,342	($133,146)	($133,997)	($134,391)	($134,767)
4		$0	$2,520	$31.84	0	$0	348	$11,079	$2,520	$8,559	($125,537)	($127,202)	($127,961)	($128,675)
5		$0	$2,520	$32.47	0	$0	348	$11,301	$2,520	$8,781	($118,032)	($120,748)	($121,963)	($123,095)
6		$0	$2,520	$33.12	0	$0	348	$11,527	$2,520	$9,007	($110,629)	($114,618)	($116,371)	($117,984)
7		$0	$2,520	$33.78	0	$0	348	$11,757	$2,520	$9,237	($103,329)	($108,797)	($111,157)	($113,304)
8		$0	$2,520	$34.46	0	$0	348	$11,992	$2,520	$9,472	($96,131)	($103,270)	($106,296)	($109,020)
9		$0	$2,520	$35.15	0	$0	348	$12,232	$2,520	$9,712	($89,034)	($98,023)	($101,765)	($105,097)
10		$0	$2,520	$35.85	0	$0	348	$12,477	$2,520	$9,957	($82,039)	($93,042)	($97,543)	($101,507)
11		$0	$2,520	$36.57	0	$0	348	$12,726	$2,520	$10,206	($75,144)	($88,315)	($93,608)	($98,220)
12		$0	$2,520	$37.30	0	$0	348	$12,981	$2,520	$10,461	($68,348)	($83,829)	($89,941)	($95,213)
13		$0	$2,520	$38.05	0	$0	348	$13,240	$2,520	$10,720	($61,652)	($79,571)	($86,525)	($92,461)
14		$0	$2,520	$38.81	0	$0	348	$13,505	$2,520	$10,985	($55,055)	($75,532)	($83,343)	($89,944)
15		$0	$2,520	$39.58	0	$0	348	$13,775	$2,520	$11,255	($48,555)	($71,700)	($80,379)	($87,641)
16		$0	$2,520	$40.38	0	$0	348	$14,051	$2,520	$11,531	($42,153)	($68,065)	($77,619)	($85,534)
17		$0	$2,520	$41.18	0	$0	348	$14,332	$2,520	$11,812	($35,846)	($64,617)	($75,048)	($83,607)
18		$0	$2,520	$42.01	0	$0	348	$14,619	$2,520	$12,099	($29,635)	($61,347)	($72,655)	($81,845)
19		$0	$2,520	$42.85	0	$0	348	$14,911	$2,520	$12,391	($23,519)	($58,247)	($70,426)	($80,234)
20		$0	$2,520	$43.70	0	$0	348	$15,209	$2,520	$12,689	($17,496)	($55,306)	($68,351)	($78,761)
21		($6,300)	$2,520	$44.58	0	$0	348	$15,513	($3,780)	$19,293	($8,691)	($51,167)	($65,484)	($76,761)
		$143,695	$50,820		0	$0	7,018	$260,478	$194,515	$65,963				

TABLE A-4 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$149,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$149,995
Construct Time	10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,520 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$30.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savngs	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 3.39%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$260,478	$194,515	$65,963	1.34
2%	$210,540	$187,381	$23,159	1.12
4%	$173,097	$181,787	($8,691)	0.95
6%	$144,614	$177,355	($32,741)	0.82
8%	$122,638	$173,805	($51,167)	0.71
10%	$105,449	$170,933	($65,484)	0.62
11%	$98,253	$169,701	($71,448)	0.58
12%	$91,824	$168,585	($76,761)	0.54
13%	$85,064	$167,571	($81,507)	0.51
14%	$80,885	$166,647	($85,761)	0.49
15%	$76,217	$165,804	($89,587)	0.46
16%	$71,995	$165,032	($93,037)	0.44
18%	$64,685	$163,674	($98,989)	0.40
20%	$58,607	$162,522	($103,915)	0.36

TABLE A-5

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $30/SQ.FT.- PRICE OF OIL $35/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$149,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$149,995	$420	$35.00	0	$0	58	$2,030	$150,415	($148,385)	($148,385)	($148,385)	($148,385)	($148,385)
2		$0	$2,520	$35.70	0	$0	348	$12,424	$2,520	$9,904	($138,862)	($139,215)	($139,382)	($139,543)
3		$0	$2,520	$36.41	0	$0	348	$12,672	$2,520	$10,152	($129,476)	($130,511)	($130,992)	($131,449)
4		$0	$2,520	$37.14	0	$0	348	$12,926	$2,520	$10,406	($120,226)	($122,251)	($123,174)	($124,043)
5		$0	$2,520	$37.89	0	$0	348	$13,184	$2,520	$10,664	($111,110)	($114,413)	($115,890)	($117,266)
6		$0	$2,520	$38.64	0	$0	348	$13,448	$2,520	$10,928	($102,128)	($106,975)	($109,105)	($111,065)
7		$0	$2,520	$39.42	0	$0	348	$13,717	$2,520	$11,197	($93,279)	($99,920)	($102,785)	($105,392)
8		$0	$2,520	$40.20	0	$0	348	$13,991	$2,520	$11,471	($84,562)	($93,226)	($96,898)	($100,204)
9		$0	$2,520	$41.01	0	$0	348	$14,271	$2,520	$11,751	($75,976)	($85,878)	($91,416)	($95,458)
10		$0	$2,520	$41.83	0	$0	348	$14,556	$2,520	$12,036	($67,520)	($80,857)	($86,312)	($91,117)
11		$0	$2,520	$42.66	0	$0	348	$14,847	$2,520	$12,327	($59,192)	($75,147)	($81,559)	($87,148)
12		$0	$2,520	$43.52	0	$0	348	$15,144	$2,520	$12,624	($50,991)	($69,732)	($77,134)	($83,519)
13		$0	$2,520	$44.39	0	$0	348	$15,447	$2,520	$12,927	($42,917)	($64,599)	($73,015)	($80,201)
14		$0	$2,520	$45.28	0	$0	348	$15,756	$2,520	$13,236	($34,968)	($59,732)	($69,181)	($77,168)
15		$0	$2,520	$46.18	0	$0	348	$16,071	$2,520	$13,551	($27,142)	($55,118)	($65,613)	($74,395)
16		$0	$2,520	$47.11	0	$0	348	$16,393	$2,520	$13,873	($19,439)	($50,745)	($62,292)	($71,860)
17		$0	$2,520	$48.05	0	$0	348	$16,721	$2,520	$14,201	($11,857)	($46,600)	($59,201)	($69,544)
18		$0	$2,520	$49.01	0	$0	348	$17,055	$2,520	$14,535	($4,396)	($42,672)	($56,326)	($67,427)
19		$0	$2,520	$49.99	0	$0	348	$17,396	$2,520	$14,876	$2,948	($38,949)	($53,650)	($65,492)
20		$0	$2,520	$50.99	0	$0	348	$17,744	$2,520	$15,224	$10,174	($35,421)	($51,161)	($63,725)
21		($6,300)	$2,520	$52.01	0	$0	348	$18,099	($3,780)	$21,879	$20,159	($30,727)	($47,909)	($61,457)
		$143,695	$50,820		0	$0	7,018	$303,891	$194,515	$109,376				

TABLE A-5 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$149,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$149,995
Construct Time	10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,520 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$35.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Enrgy Savngs	342 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 5.34%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$303,891	$194,515	$109,376	1.56
2%	$245,630	$187,381	$58,249	1.31
4%	$201,946	$181,787	$20,159	1.11
6%	$168,716	$177,355	($8,639)	0.95
8%	$143,078	$173,805	($30,727)	0.82
10%	$123,024	$170,933	($47,909)	0.72
11%	$114,628	$169,701	($55,073)	0.68
12%	$107,128	$168,585	($61,457)	0.64
13%	$100,408	$167,571	($67,163)	0.60
14%	$94,366	$166,647	($72,281)	0.57
15%	$88,920	$165,804	($76,884)	0.54
16%	$83,994	$165,032	($81,038)	0.51
18%	$75,465	$163,674	($88,208)	0.46
20%	$68,375	$162,522	($94,147)	0.42

TABLE A-5

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $30/SQ.FT.- PRICE OF OIL $40/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$142,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$142,995	$420	$40.00	0	$0	58	$2,320	$150,415	($148,095)	($148,095)	($148,095)	($148,095)	($148,095)
2		$0	$2,520	$40.80	0	$0	348	$14,198	$2,520	$11,678	($136,666)	($137,282)	($137,478)	($137,663)
3		$0	$2,520	$41.62	0	$0	348	$14,482	$2,520	$11,962	($125,806)	($127,026)	($127,592)	($128,132)
4		$0	$2,520	$42.45	0	$0	348	$14,772	$2,520	$12,252	($114,914)	($117,300)	($118,397)	($119,411)
5		$0	$2,520	$43.30	0	$0	348	$15,067	$2,520	$12,547	($104,188)	($108,077)	($109,817)	($111,437)
6		$0	$2,520	$44.16	0	$0	348	$15,369	$2,520	$12,849	($93,627)	($99,332)	($101,839)	($104,146)
7		$0	$2,520	$45.05	0	$0	348	$15,676	$2,520	$13,156	($83,230)	($91,042)	($94,412)	($97,481)
8		$0	$2,520	$45.95	0	$0	348	$15,990	$2,520	$13,470	($72,994)	($83,182)	($87,500)	($91,388)
9		$0	$2,520	$46.87	0	$0	348	$16,309	$2,520	$13,789	($62,918)	($75,732)	($81,057)	($85,818)
10		$0	$2,520	$47.80	0	$0	348	$16,636	$2,520	$14,116	($53,001)	($68,671)	($75,081)	($80,728)
11		$0	$2,520	$48.76	0	$0	348	$16,968	$2,520	$14,448	($43,240)	($61,979)	($69,510)	($76,076)
12		$0	$2,520	$49.73	0	$0	348	$17,308	$2,520	$14,788	($33,634)	($55,636)	($64,327)	($71,825)
13		$0	$2,520	$50.73	0	$0	348	$17,654	$2,520	$15,134	($24,181)	($49,626)	($59,505)	($67,940)
14		$0	$2,520	$51.74	0	$0	348	$18,007	$2,520	$15,487	($14,880)	($43,932)	($55,019)	($64,391)
15		$0	$2,520	$52.78	0	$0	348	$18,367	$2,520	$15,847	($5,729)	($38,537)	($50,846)	($61,148)
16		$0	$2,520	$53.83	0	$0	348	$18,734	$2,520	$16,214	$3,274	($33,425)	($46,965)	($58,186)
17		$0	$2,520	$54.91	0	$0	348	$19,109	$2,520	$16,589	$12,131	($28,583)	($43,354)	($55,480)
18		$0	$2,520	$56.01	0	$0	348	$19,491	$2,520	$16,971	$20,844	($23,996)	($39,997)	($53,008)
19		$0	$2,520	$57.13	0	$0	348	$19,881	$2,520	$17,361	$29,414	($19,651)	($36,874)	($50,751)
20		$0	$2,520	$58.27	0	$0	348	$20,279	$2,520	$17,759	$37,843	($15,536)	($33,970)	($48,689)
21		($6,300)	$2,520	$59.44	0	$0	348	$20,684	($3,780)	$24,464	$49,008	($10,288)	($30,334)	($46,153)
		$143,695	$50,820		0	$0	7,018	$347,304	$194,515	$152,789				

TABLE A-6 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$149,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$149,995

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,520 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$40.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 7.14%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$347,304	$194,515	$152,789	1.79
2%	$280,720	$187,381	$93,339	1.50
4%	$230,796	$181,787	$49,008	1.27
6%	$192,818	$177,355	$15,463	1.09
8%	$163,517	$173,805	($10,288)	0.94
10%	$140,599	$170,933	($30,334)	0.82
11%	$131,004	$169,701	($38,698)	0.77
12%	$122,432	$168,585	($46,153)	0.73
13%	$114,751	$167,571	($52,819)	0.68
14%	$107,847	$166,647	($58,800)	0.65
15%	$101,622	$165,804	($64,181)	0.61
16%	$95,993	$165,032	($69,039)	0.58
18%	$86,246	$163,674	($77,428)	0.53
20%	$78,143	$162,522	($84,379)	0.48

TABLE A-7

For Case of:FIELD TEST #4 - HELWAN TEXTILE/WASTE HEAT RECOVERY (PRICE OF OIL $15/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$587,958												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$587,958	$1,833	$15.00	0	$0	1841	$27,620	$589,851	($562,231)	($562,231)	($562,231)	($562,231)	($562,231)
2		$0	$11,359	$15.30	0	$0	11048	$169,034	$11,359	$157,675	($390,620)	($356,235)	($338,890)	($401,450)
3		$0	$11,359	$15.61	0	$0	11048	$172,415	$11,359	$161,055	($241,715)	($258,156)	($265,785)	($273,057)
4		$0	$11,359	$15.92	0	$0	11048	$175,863	$11,359	$164,504	($95,471)	($137,567)	($142,191)	($155,565)
5		$0	$11,359	$16.24	0	$0	11048	$179,381	$11,359	$168,022	$48,155	($4,056)	($27,430)	($49,185)
6		$0	$11,359	$16.56	0	$0	11048	$182,968	$11,359	$171,609	$189,205	$112,728	$79,126	$43,191
7		$0	$11,359	$16.89	0	$0	11048	$186,628	$11,359	$175,269	$327,722	$223,177	$173,060	$136,987
8		$0	$11,359	$17.23	0	$0	11048	$190,360	$11,359	$179,001	$463,748	$327,623	$263,916	$217,958
9		$0	$11,359	$17.57	0	$0	11048	$194,167	$11,359	$182,808	$597,325	$426,389	$355,198	$291,792
10		$0	$11,359	$17.93	0	$0	11048	$198,051	$11,359	$186,692	$728,492	$519,781	$434,373	$359,115
11		$0	$11,359	$18.28	0	$0	11048	$202,012	$11,359	$190,653	$857,290	$608,090	$507,878	$420,500
12		$0	$11,359	$18.65	0	$0	11048	$206,052	$11,359	$194,693	$983,759	$691,591	$576,117	$476,469
13		$0	$11,359	$19.02	0	$0	11048	$210,173	$11,359	$198,814	$1,107,938	$770,542	$639,465	$527,500
14		$0	$11,359	$19.40	0	$0	11048	$214,376	$11,359	$203,017	$1,229,855	$845,191	$698,272	$574,026
15		$0	$11,359	$19.79	0	$0	11048	$218,664	$11,359	$207,305	$1,349,578	$915,771	$752,852	$616,445
16		$0	$11,359	$20.19	0	$0	11048	$223,037	$11,359	$211,678	$1,467,116	$982,501	$803,536	$655,118
17		$0	$11,359	$20.59	0	$0	11048	$227,498	$11,359	$216,139	$1,582,514	$1,045,589	$850,574	$690,375
18		$0	$11,359	$21.00	0	$0	11048	$232,048	$11,359	$220,689	$1,695,810	$1,105,235	$894,236	$722,517
19		$0	$11,359	$21.42	0	$0	11048	$236,689	$11,359	$225,330	$1,807,039	$1,161,623	$934,764	$751,819
20		$0	$11,359	$21.85	0	$0	11048	$241,423	$11,359	$230,064	$1,916,237	$1,214,932	$972,381	$778,531
21		$0	$11,359	$22.29	0	$0	11048	$246,251	$11,359	$234,892	$2,023,439	$1,265,328	$1,007,296	$802,881
		$567,958	$229,073		0	$0	222,801	$4,134,711	$797,031	$3,337,680				

TABLE A-7 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$567,958
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$567,958
Construct Time	10 months

Operating and Normal Maintenance Costs:

Operating Cost	$11,359 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	$0 /period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$15.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	11048 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 31.01%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$4,134,711	$797,031	$3,337,680	5.19
2%	$3,342,020	$755,587	$2,586,433	4.42
4%	$2,747,662	$724,224	$2,023,439	3.79
6%	$2,295,532	$700,138	$1,595,394	3.28
8%	$1,946,703	$681,376	$1,265,328	2.86
10%	$1,673,853	$666,557	$1,007,296	2.51
11%	$1,559,620	$660,307	$899,314	2.36
12%	$1,457,578	$654,697	$802,881	2.23
13%	$1,366,136	$649,645	$716,491	2.10
14%	$1,283,940	$645,083	$638,857	1.99
15%	$1,209,831	$640,951	$568,880	1.89
16%	$1,142,817	$637,197	$505,620	1.79
18%	$1,026,777	$630,653	$396,124	1.63
20%	$930,302	$625,165	$305,137	1.49

TABLE A-8

For Case of:FIELD TEST #4 - HELWAN TEXTILE/WASTE HEAT RECOVERY (PRICE OF OIL $20/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$567,958												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$567,958	$1,893	$20.00	0	$0	1841	$36,827	$569,851	($533,025)	($533,025)	($533,025)	($533,025)	($533,025)
2		$0	$11,359	$20.40	0	$0	11048	$225,379	$11,359	$214,020	($327,235)	($334,858)	($338,461)	($341,935)
3		$0	$11,359	$20.81	0	$0	11048	$229,887	$11,359	$218,528	($135,195)	($147,505)	($157,859)	($167,726)
4		$0	$11,359	$21.22	0	$0	11048	$234,485	$11,359	$223,126	$73,163	$23,619	$3,778	($8,310)
5		$0	$11,359	$21.65	0	$0	11048	$239,174	$11,359	$227,815	$267,901	$197,070	$155,379	$125,871
6		$0	$11,359	$22.08	0	$0	11048	$243,958	$11,359	$232,599	$453,080	$355,373	$309,805	$257,854
7		$0	$11,359	$22.52	0	$0	11048	$248,837	$11,359	$237,478	$646,762	$505,024	$443,855	$388,167
8		$0	$11,359	$22.97	0	$0	11048	$253,814	$11,359	$242,455	$831,007	$646,494	$566,272	$497,842
9		$0	$11,359	$23.43	0	$0	11048	$258,890	$11,359	$247,531	$1,011,876	$780,227	$683,747	$597,815
10		$0	$11,359	$23.90	0	$0	11048	$264,068	$11,359	$252,709	$1,189,426	$906,644	$790,920	$688,944
11		$0	$11,359	$24.38	0	$0	11048	$269,349	$11,359	$257,990	$1,363,714	$1,026,144	$890,387	$772,010
12		$0	$11,359	$24.87	0	$0	11048	$274,736	$11,359	$263,377	$1,534,799	$1,139,102	$982,699	$847,725
13		$0	$11,359	$25.35	0	$0	11048	$280,231	$11,359	$268,872	$1,702,736	$1,245,874	$1,068,369	$916,738
14		$0	$11,359	$25.87	0	$0	11048	$285,835	$11,359	$274,476	$1,867,579	$1,346,799	$1,147,876	$979,640
15		$0	$11,359	$26.39	0	$0	11048	$291,552	$11,359	$280,193	$2,029,383	$1,442,193	$1,221,659	$1,036,973
16		$0	$11,359	$26.92	0	$0	11048	$297,383	$11,359	$286,024	$2,188,202	$1,532,360	$1,290,131	$1,089,229
17		$0	$11,359	$27.46	0	$0	11048	$303,331	$11,359	$291,972	$2,344,088	$1,617,584	$1,353,673	$1,136,856
18		$0	$11,359	$28.00	0	$0	11048	$309,397	$11,359	$298,038	$2,497,093	$1,698,134	$1,412,638	$1,180,264
19		$0	$11,359	$28.56	0	$0	11048	$315,585	$11,359	$304,226	$2,647,268	$1,774,267	$1,467,356	$1,219,825
20		$0	$11,359	$29.14	0	$0	11048	$321,897	$11,359	$310,538	$2,794,663	$1,846,222	$1,518,131	$1,255,881
21		$0	$11,359	$29.72	0	$0	11048	$328,335	$11,359	$316,976	$2,939,326	$1,914,229	$1,565,248	$1,288,740
		$567,958	$229,073		0	$0	222,801	$5,512,948	$797,031	$4,715,917				

TABLE A-8 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$567,958
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$567,958
Construct Time	10 months

Operating and Normal Maintenance Costs:

Operating Cost	$11,359 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	$0 /period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$20.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	11048 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 42.20%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$5,512,948	$797,031	$4,715,917	6.92
2%	$4,456,027	$755,587	$3,700,440	5.90
4%	$3,663,550	$724,224	$2,939,326	5.06
6%	$3,060,709	$700,138	$2,360,571	4.37
8%	$2,595,604	$681,376	$1,914,229	3.81
10%	$2,231,804	$666,557	$1,565,248	3.35
11%	$2,079,494	$660,307	$1,419,187	3.15
12%	$1,943,437	$654,697	$1,288,740	2.97
13%	$1,821,515	$649,645	$1,171,869	2.80
14%	$1,711,920	$645,083	$1,066,837	2.65
15%	$1,613,108	$640,951	$972,157	2.52
16%	$1,523,756	$637,197	$886,559	2.39
18%	$1,369,035	$630,653	$738,382	2.17
20%	$1,240,402	$625,165	$615,238	1.98

TABLE A-9

For Case of:FIELD TEST #4 - HELWAN TEXTILE/WASTE HEAT RECOVERY (PRICE OF OIL $35/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$557,958												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$557,958	$1,833	$25.00	0	$0	1841	$46,033	$559,851	($523,818)	($523,818)	($523,818)	($523,818)	($523,818)
2		$0	$11,359	$25.50	0	$0	11048	$281,724	$11,359	$270,365	($263,851)	($273,480)	($278,031)	($282,421)
3		$0	$11,359	$26.01	0	$0	11048	$287,358	$11,359	$275,999	($8,574)	($35,855)	($49,933)	($62,395)
4		$0	$11,359	$26.53	0	$0	11048	$293,105	$11,359	$281,747	$241,797	$185,805	$161,748	$138,146
5		$0	$11,359	$27.06	0	$0	11048	$298,968	$11,359	$287,609	$487,646	$393,206	$358,188	$320,927
6		$0	$11,359	$27.60	0	$0	11048	$304,947	$11,359	$293,588	$728,955	$593,017	$540,493	$487,517
7		$0	$11,359	$28.15	0	$0	11048	$311,046	$11,359	$299,687	$965,802	$785,871	$709,649	$639,347
8		$0	$11,359	$28.72	0	$0	11048	$317,267	$11,359	$305,908	$1,198,266	$965,365	$866,628	$777,725
9		$0	$11,359	$29.29	0	$0	11048	$323,612	$11,359	$312,253	$1,426,427	$1,134,065	$1,012,297	$903,839
10		$0	$11,359	$29.88	0	$0	11048	$330,085	$11,359	$318,726	$1,650,359	$1,293,508	$1,147,467	$1,018,774
11		$0	$11,359	$30.47	0	$0	11048	$336,686	$11,359	$325,327	$1,870,139	$1,444,197	$1,272,895	$1,123,521
12		$0	$11,359	$31.08	0	$0	11048	$343,420	$11,359	$332,061	$2,085,839	$1,586,613	$1,393,280	$1,218,980
13		$0	$11,359	$31.71	0	$0	11048	$350,288	$11,359	$338,929	$2,297,533	$1,721,205	$1,497,274	$1,305,375
14		$0	$11,359	$32.34	0	$0	11048	$357,294	$11,359	$345,935	$2,505,293	$1,848,406	$1,597,479	$1,385,255
15		$0	$11,359	$32.99	0	$0	11048	$364,440	$11,359	$353,081	$2,709,189	$1,968,616	$1,690,456	$1,457,502
16		$0	$11,359	$33.65	0	$0	11048	$371,730	$11,359	$360,370	$2,909,289	$2,082,220	$1,776,726	$1,523,340
17		$0	$11,359	$34.32	0	$0	11048	$379,163	$11,359	$367,804	$3,105,663	$2,189,578	$1,856,771	$1,583,337
18		$0	$11,359	$35.01	0	$0	11048	$386,747	$11,359	$375,388	$3,298,377	$2,291,034	$1,931,039	$1,638,010
19		$0	$11,359	$35.71	0	$0	11048	$394,482	$11,359	$383,123	$3,487,497	$2,386,910	$1,999,947	$1,687,831
20		$0	$11,359	$36.43	0	$0	11048	$402,371	$11,359	$391,012	$3,673,088	$2,477,512	$2,063,881	$1,733,230
21		$0	$11,359	$37.15	0	$0	11048	$410,419	$11,359	$399,060	$3,855,214	$2,563,130	$2,123,199	$1,774,600
		$557,958	$223,073		0	$0	222,801	$6,891,186	$797,031	$6,094,154				

TABLE A-9 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$567,958
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$567,958
Construct Time	10 months

Operating and Normal Maintenance Costs:

Operating Cost	$11,359 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	$0 /period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$25.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savngs	11048 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 53.68%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$6,891,186	$797,031	$6,094,154	8.65
2%	$5,570,033	$755,587	$4,814,446	7.37
4%	$4,579,437	$724,224	$3,855,214	6.32
6%	$3,825,886	$700,138	$3,125,748	5.46
8%	$3,244,505	$681,376	$2,563,130	4.76
10%	$2,789,755	$666,557	$2,123,199	4.19
11%	$2,599,367	$660,307	$1,939,061	3.94
12%	$2,429,296	$654,697	$1,774,600	3.71
13%	$2,276,893	$649,645	$1,627,248	3.50
14%	$2,139,900	$645,083	$1,494,816	3.32
15%	$2,016,385	$640,951	$1,375,435	3.15
16%	$1,904,695	$637,197	$1,267,498	2.99
18%	$1,711,294	$630,653	$1,080,641	2.71
20%	$1,550,503	$625,165	$925,338	2.48

TABLE A-10

For Case of:FIELD TEST #4 - HELWAN TEXTILE/WASTE HEAT RECOVERY (PRICE OF OIL $30/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$567,958												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$567,958	$1,993	$30.00	0	$0	1841	$55,240	$569,851	($514,611)	($514,611)	($514,611)	($514,611)	($514,611)
2		$0	$11,359	$30.60	0	$0	11048	$338,069	$11,359	$326,710	($200,467)	($212,102)	($217,602)	($222,906)
3		$0	$11,359	$31.21	0	$0	11048	$344,830	$11,359	$333,471	$107,846	$73,798	$57,994	$42,935
4		$0	$11,359	$31.84	0	$0	11048	$351,727	$11,359	$340,368	$410,431	$343,991	$313,717	$285,202
5		$0	$11,359	$32.47	0	$0	11048	$358,761	$11,359	$347,402	$707,392	$539,342	$550,998	$505,533
6		$0	$11,359	$33.12	0	$0	11048	$365,937	$11,359	$354,578	$999,829	$840,661	$771,162	$707,180
7		$0	$11,359	$33.78	0	$0	11048	$373,255	$11,359	$361,895	$1,284,841	$1,068,717	$975,443	$890,527
8		$0	$11,359	$34.46	0	$0	11048	$380,720	$11,359	$369,361	$1,565,525	$1,284,236	$1,164,984	$1,057,608
9		$0	$11,359	$35.15	0	$0	11048	$388,335	$11,359	$376,976	$1,840,978	$1,487,904	$1,340,846	$1,209,862
10		$0	$11,359	$35.85	0	$0	11048	$396,101	$11,359	$384,742	$2,111,293	$1,680,371	$1,504,014	$1,348,604
11		$0	$11,359	$36.57	0	$0	11048	$404,024	$11,359	$392,665	$2,376,563	$1,862,251	$1,655,404	$1,475,031
12		$0	$11,359	$37.30	0	$0	11048	$412,104	$11,359	$400,745	$2,636,879	$2,034,124	$1,795,862	$1,590,236
13		$0	$11,359	$38.05	0	$0	11048	$420,346	$11,359	$408,987	$2,892,331	$2,195,536	$1,926,178	$1,695,213
14		$0	$11,359	$38.81	0	$0	11048	$428,753	$11,359	$417,394	$3,142,007	$2,350,013	$2,047,082	$1,790,869
15		$0	$11,359	$39.58	0	$0	11048	$437,328	$11,359	$425,969	$3,388,994	$2,495,039	$2,159,253	$1,878,030
16		$0	$11,359	$40.38	0	$0	11048	$446,075	$11,359	$434,716	$3,630,376	$2,632,079	$2,263,321	$1,957,451
17		$0	$11,359	$41.18	0	$0	11048	$454,995	$11,359	$443,637	$3,867,238	$2,761,573	$2,359,859	$2,029,818
18		$0	$11,359	$42.01	0	$0	11048	$464,096	$11,359	$452,737	$4,099,661	$2,883,934	$2,449,441	$2,095,757
19		$0	$11,359	$42.85	0	$0	11048	$473,378	$11,359	$462,019	$4,327,726	$2,999,553	$2,532,539	$2,155,838
20		$0	$11,359	$43.70	0	$0	11048	$482,845	$11,359	$471,486	$4,551,514	$3,108,802	$2,609,631	$2,210,580
21		$0	$11,359	$44.58	0	$0	11048	$492,502	$11,359	$481,143	$4,771,101	$3,212,031	$2,681,150	$2,260,459
		$567,958	$229,073		0	$0	222,801	$8,269,423	$797,031	$7,472,391				

TABLE A-10 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$567,958
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$567,958

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$11,359 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	$0 /period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$30.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	11048 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 55.55%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$8,269,423	$797,031	$7,472,391	10.38
2%	$6,684,040	$755,587	$5,928,453	8.85
4%	$5,495,325	$724,224	$4,771,101	7.59
6%	$4,591,063	$700,138	$3,890,925	6.56
8%	$3,893,406	$681,376	$3,212,031	5.71
10%	$3,347,706	$666,557	$2,681,150	5.02
11%	$3,119,241	$660,307	$2,458,934	4.72
12%	$2,915,155	$654,697	$2,260,459	4.45
13%	$2,732,272	$649,645	$2,082,627	4.21
14%	$2,567,880	$645,082	$1,922,796	3.98
15%	$2,419,662	$640,951	$1,778,712	3.78
16%	$2,285,634	$637,197	$1,648,437	3.59
18%	$2,053,553	$630,653	$1,422,900	3.26
20%	$1,860,603	$625,165	$1,235,439	2.98

TABLE A-11

For Case of: FIELD TEST #4 - HELWAN TEXTILE/WASTE HEAT RECOVERY (PRICE OF OIL $35/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$567,958												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$567,958	$1,892	$35.00	0	$0	1841	$64,447	$569,851	($505,405)	($505,405)	($505,405)	($505,405)	($505,405)
2		$0	$11,359	$35.70	0	$0	11048	$394,414	$11,359	$383,055	($137,083)	($150,724)	($157,173)	($162,391)
3		$0	$11,359	$36.41	0	$0	11048	$402,302	$11,359	$390,943	$224,366	$164,446	$165,920	$148,266
4		$0	$11,359	$37.14	0	$0	11048	$410,348	$11,359	$398,989	$579,066	$501,176	$465,687	$432,258
5		$0	$11,359	$37.89	0	$0	11048	$418,555	$11,359	$407,196	$927,138	$800,478	$743,807	$691,039
6		$0	$11,359	$38.64	0	$0	11048	$426,926	$11,359	$415,567	$1,268,704	$1,083,305	$1,001,841	$926,842
7		$0	$11,359	$39.42	0	$0	11048	$435,464	$11,359	$424,105	$1,603,881	$1,350,564	$1,241,238	$1,141,707
8		$0	$11,359	$40.20	0	$0	11048	$444,174	$11,359	$432,815	$1,932,784	$1,603,107	$1,463,340	$1,337,491
9		$0	$11,359	$41.01	0	$0	11048	$453,057	$11,359	$441,698	$2,255,529	$1,841,743	$1,659,336	$1,515,865
10		$0	$11,359	$41.83	0	$0	11048	$462,118	$11,359	$450,759	$2,572,227	$2,067,235	$1,860,562	$1,678,434
11		$0	$11,359	$42.66	0	$0	11048	$471,361	$11,359	$460,002	$2,882,987	$2,280,305	$2,037,912	$1,825,542
12		$0	$11,359	$43.52	0	$0	11048	$480,788	$11,359	$469,429	$3,187,919	$2,491,635	$2,202,444	$1,951,492
13		$0	$11,359	$44.39	0	$0	11048	$490,404	$11,359	$479,045	$3,487,129	$2,671,870	$2,355,093	$2,084,450
14		$0	$11,359	$45.28	0	$0	11048	$500,212	$11,359	$488,853	$3,780,722	$2,851,620	$2,495,686	$2,196,483
15		$0	$11,359	$46.18	0	$0	11048	$510,216	$11,359	$498,857	$4,068,793	$3,021,462	$2,623,050	$2,298,559
16		$0	$11,359	$47.11	0	$0	11048	$520,420	$11,359	$509,061	$4,351,463	$3,181,939	$2,749,916	$2,391,563
17		$0	$11,359	$48.05	0	$0	11048	$530,829	$11,359	$519,470	$4,628,812	$3,333,567	$2,862,967	$2,476,299
18		$0	$11,359	$49.01	0	$0	11048	$541,445	$11,359	$530,086	$4,900,944	$3,475,833	$2,967,842	$2,553,503
19		$0	$11,359	$49.99	0	$0	11048	$552,274	$11,359	$540,915	$5,167,955	$3,612,197	$3,065,131	$2,623,844
20		$0	$11,359	$50.99	0	$0	11048	$563,320	$11,359	$551,961	$5,429,939	$3,740,093	$3,155,381	$2,687,930
21		$0	$11,359	$52.01	0	$0	11048	$574,586	$11,359	$563,227	$5,686,989	$3,860,932	$3,239,101	$2,746,318
		$567,958	$229,073		0	$0	222,801	$9,647,660	$797,031	$8,850,629				

TABLE A-11 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$557,958
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$557,958

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$11,359 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	$0 /period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$35.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Enrgy Savngs	11048 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 77.85%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$9,647,660	$797,031	$8,850,629	12.10
2%	$7,798,047	$755,587	$7,042,460	10.32
4%	$6,411,212	$724,224	$5,686,989	8.85
6%	$5,356,240	$700,138	$4,656,102	7.65
8%	$4,542,307	$681,376	$3,860,932	6.67
10%	$3,905,657	$666,557	$3,239,101	5.86
11%	$3,639,114	$660,307	$2,978,808	5.51
12%	$3,401,015	$654,697	$2,746,318	5.19
13%	$3,187,650	$649,645	$2,538,005	4.91
14%	$2,995,860	$645,083	$2,350,776	4.64
15%	$2,822,940	$640,951	$2,181,989	4.40
16%	$2,666,573	$637,197	$2,029,376	4.18
18%	$2,395,812	$630,653	$1,765,159	3.80
20%	$2,170,704	$625,165	$1,545,539	3.47

TABLE A-12

For Case of:FIELD TEST #4 - HELWAN TEXTILE/WASTE HEAT RECOVERY (PRICE OF OIL $40/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$567,958												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$567,958	$1,892	$40.00	0	$0	1841	$73,553	$569,851	($496,198)	($496,198)	($496,198)	($496,198)	($496,198)
2		$0	$11,359	$40.80	0	$0	11048	$450,758	$11,359	$439,399	($73,698)	($83,347)	($95,744)	($103,877)
3		$0	$11,359	$41.62	0	$0	11048	$459,774	$11,359	$448,415	$340,886	$295,097	$273,847	$253,596
4		$0	$11,359	$42.45	0	$0	11048	$468,969	$11,359	$457,610	$747,700	$555,362	$517,656	$579,314
5		$0	$11,359	$43.30	0	$0	11048	$478,348	$11,359	$466,989	$1,146,884	$1,001,613	$936,616	$876,094
6		$0	$11,359	$44.16	0	$0	11048	$487,915	$11,359	$476,556	$1,533,579	$1,325,950	$1,232,520	$1,146,505
7		$0	$11,359	$45.05	0	$0	11048	$497,674	$11,359	$486,315	$1,922,920	$1,632,410	$1,507,032	$1,392,887
8		$0	$11,359	$45.95	0	$0	11048	$507,627	$11,359	$496,268	$2,300,043	$1,921,976	$1,761,696	$1,617,374
9		$0	$11,359	$46.87	0	$0	11048	$517,780	$11,359	$506,421	$2,670,080	$2,195,582	$1,997,945	$1,821,903
10		$0	$11,359	$47.80	0	$0	11048	$528,135	$11,359	$516,776	$3,033,160	$2,454,098	$2,217,109	$2,008,264
11		$0	$11,359	$48.76	0	$0	11048	$538,698	$11,359	$527,339	$3,389,412	$2,690,358	$2,420,421	$2,178,053
12		$0	$11,359	$49.73	0	$0	11048	$549,472	$11,359	$538,113	$3,738,960	$2,925,146	$2,609,026	$2,332,747
13		$0	$11,359	$50.73	0	$0	11048	$560,461	$11,359	$549,102	$4,081,927	$3,147,202	$2,783,987	$2,473,688
14		$0	$11,359	$51.74	0	$0	11048	$571,671	$11,359	$560,312	$4,418,436	$3,353,227	$2,946,289	$2,602,037
15		$0	$11,359	$52.78	0	$0	11048	$583,104	$11,359	$571,745	$4,748,604	$3,547,884	$3,095,848	$2,719,087
16		$0	$11,359	$53.83	0	$0	11048	$594,766	$11,359	$583,407	$5,072,550	$3,[illegible],799	$3,236,511	$2,825,674
17		$0	$11,359	$54.91	0	$0	11048	$606,661	$11,359	$595,302	$5,390,337	$3,905,562	$3,365,065	$2,922,780
18		$0	$11,359	$56.01	0	$0	11048	$618,795	$11,359	$607,436	$5,702,228	$4,059,733	$3,485,244	$3,011,250
19		$0	$11,359	$57.13	0	$0	11048	$631,171	$11,359	$619,812	$6,009,184	$4,224,840	$3,597,722	$3,091,950
20		$0	$11,359	$58.27	0	$0	11048	$643,794	$11,359	$632,435	$6,301,365	$4,371,383	$3,701,130	$3,165,280
21		$0	$11,359	$59.44	0	$0	11048	$656,670	$11,359	$645,311	$6,602,876	$4,509,833	$3,797,052	$3,232,177
		$567,958	$229,073		0	$0	222,801	$11,025,897	$797,031	$10,228,866				

TABLE A-12 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$557,958
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$567,958

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$11,259 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	$0 /period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$40.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	11043 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 90.60%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$11,025,897	$797,031	$10,228,866	13.83
2%	$8,912,053	$755,587	$8,156,466	11.79
4%	$7,327,100	$724,224	$6,602,876	10.12
6%	$6,121,418	$700,138	$5,421,280	8.74
8%	$5,191,208	$681,376	$4,509,833	7.62
10%	$4,463,608	$665,557	$3,797,052	6.70
11%	$4,158,988	$660,307	$3,498,681	6.30
12%	$3,885,874	$654,697	$3,232,177	5.94
13%	$3,643,029	$649,645	$2,993,384	5.61
14%	$3,423,840	$645,083	$2,778,756	5.31
15%	$3,226,217	$640,951	$2,585,266	5.03
16%	$3,047,512	$637,197	$2,410,315	4.78
18%	$2,738,071	$630,653	$2,107,418	4.34
20%	$2,480,805	$625,165	$1,855,640	3.97

TABLE A-13

For Case of:FIELD TEST #4 - HELWAN TEXTILE/SOLAR PLUS WASTE HEAT RECOVERY (PRICE OF OIL $15/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$717,953												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$717,953	$8,313	$15.00	0	$0	1899	$28,490	$720,266	($691,776)	($691,776)	($691,776)	($691,776)	($691,776)
2		$0	$13,879	$15.30	0	$0	11396	$174,259	$13,879	$160,480	($537,469)	($543,184)	($545,885)	($543,491)
3		$0	$13,879	$15.61	0	$0	11396	$177,846	$13,879	$163,967	($385,872)	($402,609)	($410,376)	($417,777)
4		$0	$13,879	$15.92	0	$0	11396	$181,403	$13,879	$167,524	($236,544)	($263,623)	($284,512)	($298,537)
5		$0	$13,879	$16.24	0	$0	11396	$185,031	$13,879	$171,152	($90,642)	($143,821)	($167,613)	($189,767)
6		$0	$13,879	$16.56	0	$0	11396	$188,732	$13,879	$174,853	$53,074	($24,819)	($53,044)	($90,551)
7		$0	$13,879	$16.89	0	$0	11396	$192,506	$13,879	$178,627	$194,245	$87,746	$41,737	($53)
8		$0	$13,879	$17.23	0	$0	11396	$196,356	$13,879	$182,477	$332,913	$194,220	$135,427	$82,491
9		$0	$13,879	$17.57	0	$0	11396	$200,283	$13,879	$186,404	$469,117	$294,929	$222,386	$157,776
10		$0	$13,879	$17.93	0	$0	11396	$204,289	$13,879	$190,410	$602,897	$390,181	$303,138	$226,440
11		$0	$13,879	$18.28	0	$0	11396	$208,375	$13,879	$194,496	$734,291	$480,270	$378,125	$289,063
12		$0	$13,879	$18.65	0	$0	11396	$212,542	$13,879	$198,663	$863,339	$565,474	$447,755	$346,174
13		$0	$13,879	$19.02	0	$0	11396	$216,793	$13,879	$202,914	$990,079	$646,054	$512,410	$398,257
14		$0	$13,879	$19.40	0	$0	11396	$221,129	$13,879	$207,250	$1,114,548	$722,259	$572,443	$445,753
15		$0	$13,879	$19.79	0	$0	11396	$225,552	$13,879	$211,673	$1,236,783	$794,325	$628,183	$489,066
16		$0	$13,879	$20.19	0	$0	11396	$230,063	$13,879	$216,184	$1,356,823	$862,476	$679,935	$528,562
17		$0	$13,879	$20.59	0	$0	11396	$234,664	$13,879	$220,785	$1,474,702	$926,921	$727,985	$564,576
18		$0	$13,879	$21.00	0	$0	11396	$239,357	$13,879	$225,478	$1,590,456	$987,860	$772,594	$597,416
19		$0	$13,879	$21.42	0	$0	11396	$244,144	$13,879	$230,265	$1,704,121	$1,045,484	$814,010	$627,360
20		$0	$13,879	$21.85	0	$0	11396	$249,027	$13,879	$235,148	$1,815,733	$1,099,971	$852,458	$654,662
21		($6,300)	$13,879	$22.29	0	$0	11396	$254,008	$7,579	$246,429	$1,928,200	$1,152,842	$889,088	$680,208
		$711,653	$279,893		0	$0	229,819	$4,264,950	$991,546	$3,273,404				

TABLE A-13 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$717,953
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$717,953

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$13,879 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$15.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	11396 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/89

Internal Rate of Return 24.95%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$4,264,950	$991,546	$3,273,404	4.30
2%	$3,447,290	$942,968	$2,504,322	3.66
4%	$2,834,211	$906,011	$1,928,200	3.13
6%	$2,357,838	$877,493	$1,490,346	2.70
8%	$2,008,022	$855,181	$1,152,842	2.35
10%	$1,726,576	$837,489	$889,088	2.06
11%	$1,608,747	$830,008	$778,739	1.94
12%	$1,503,450	$823,281	$680,203	1.83
13%	$1,409,168	$817,216	$591,952	1.72
14%	$1,324,383	$811,730	$512,652	1.63
15%	$1,247,940	$806,754	$441,185	1.55
16%	$1,178,815	$802,229	$376,585	1.47
18%	$1,059,119	$794,327	$264,792	1.33
20%	$959,605	$787,687	$171,918	1.22

TABLE A-14

For Case of:FIELD TEST #4 - HELWAN TEXTILE/SOLAR PLUS WASTE HEAT RECOVERY (PRICE OF OIL $20/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$717,953												
1	Transport	$0												
1	Construction	$0												
1	Interconnectio	$0												
1	Total	$717,953	$2,313	$20.00	0	$0	1899	$37,987	$720,266	($682,280)	($682,280)	($682,280)	($682,280)	($682,280)
2		$0	$13,879	$20.40	0	$0	11396	$232,478	$13,879	$213,599	($472,085)	($479,273)	($483,552)	($487,101)
3		$0	$13,879	$20.81	0	$0	11396	$237,128	$13,879	$223,249	($265,532)	($268,473)	($299,049)	($309,129)
4		$0	$13,879	$21.22	0	$0	11396	$241,871	$13,879	$227,992	($62,999)	($107,435)	($127,755)	($145,849)
5		$0	$13,879	$21.65	0	$0	11396	$246,708	$13,879	$232,829	$135,025	$53,651	$31,259	$1,118
6		$0	$13,879	$22.08	0	$0	11396	$251,642	$13,879	$237,763	$331,449	$225,458	$178,901	$136,031
7		$0	$13,879	$22.52	0	$0	11396	$256,675	$13,879	$242,796	$523,334	$373,471	$315,953	$259,039
8		$0	$13,879	$22.97	0	$0	11396	$261,808	$13,879	$247,929	$711,740	$523,135	$443,180	$371,190
9		$0	$13,879	$23.43	0	$0	11396	$267,045	$13,879	$253,166	$896,726	$553,913	$551,284	$473,439
10		$0	$13,879	$23.90	0	$0	11396	$272,385	$13,879	$258,506	$1,076,349	$783,230	$670,916	$566,659
11		$0	$13,879	$24.38	0	$0	11396	$277,833	$13,879	$263,954	$1,255,667	$911,492	$772,682	$651,646
12		$0	$13,879	$24.87	0	$0	11396	$283,390	$13,879	$269,511	$1,431,736	$1,037,081	$867,144	$729,123
13		$0	$13,879	$25.38	0	$0	11396	$289,058	$13,879	$275,179	$1,603,612	$1,136,358	$954,824	$799,755
14		$0	$13,879	$25.87	0	$0	11396	$294,839	$13,879	$280,960	$1,772,349	$1,239,666	$1,036,208	$854,144
15		$0	$13,879	$26.39	0	$0	11396	$300,736	$13,879	$286,857	$1,938,002	$1,337,330	$1,111,746	$922,840
16		$0	$13,879	$26.92	0	$0	11396	$306,750	$13,879	$292,871	$2,100,623	$1,429,655	$1,181,858	$976,347
17		$0	$13,879	$27.46	0	$0	11396	$312,885	$13,879	$299,006	$2,260,265	$1,516,922	$1,246,930	$1,025,121
18		$0	$13,879	$28.00	0	$0	11396	$319,143	$13,879	$305,264	$2,416,979	$1,599,436	$1,307,325	$1,069,581
19		$0	$13,879	$28.56	0	$0	11396	$325,526	$13,879	$311,647	$2,570,817	$1,677,425	$1,363,377	$1,110,108
20		$0	$13,879	$29.14	0	$0	11396	$332,036	$13,879	$318,157	$2,721,828	$1,751,146	$1,415,399	$1,147,048
21		($5,300)	$13,879	$29.72	0	$0	11396	$338,677	$7,579	$331,098	$2,872,937	$1,822,182	$1,464,614	$1,181,372
		$711,653	$279,893		0	$0	229,819	$5,665,600	$991,546	$4,595,054				

TABLE A-14 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$717,953
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$717,953

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$13,873 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$20.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savngs	11395 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 34.02%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$5,586,600	$991,546	$4,595,054	5.74
2%	$4,596,387	$942,968	$3,653,419	4.87
4%	$3,773,943	$901,011	$2,872,937	4.17
6%	$3,157,118	$877,493	$2,279,625	3.60
8%	$2,677,363	$855,181	$1,822,182	3.13
10%	$2,302,104	$837,489	$1,464,614	2.75
11%	$2,144,936	$830,008	$1,314,938	2.58
12%	$2,004,653	$823,281	$1,181,372	2.43
13%	$1,878,830	$817,216	$1,061,674	2.30
14%	$1,765,843	$811,730	$954,113	2.18
15%	$1,663,919	$806,754	$857,165	2.06
16%	$1,571,753	$802,229	$769,524	1.96
18%	$1,412,159	$794,327	$617,832	1.78
20%	$1,279,474	$787,687	$491,787	1.62

TABLE A-15

For Case of:FIELD TEST #4 - HELWAN TEXTILE/SOLAR PLUS WASTE HEAT RECOVERY (PRICE OF OIL $25/BBL)
Assuming Oil Escalation Rate of : 3.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	6%	10%	12%
1	Acquisition	$717,953												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$717,953	$2,313	$25.00	0	$0	1899	$47,483	$720,266	($672,783)	($672,783)	($672,783)	($672,783)	($672,783)
2		$0	$13,879	$25.50	0	$0	11396	$290,598	$13,879	$276,719	($409,707)	($416,562)	($421,220)	($425,712)
3		$0	$13,879	$26.01	0	$0	11396	$296,410	$13,879	$282,531	($145,491)	($174,337)	($187,723)	($200,480)
4		$0	$13,879	$26.53	0	$0	11396	$302,338	$13,879	$288,459	$110,948	$54,651	$23,000	$4,839
5		$0	$13,879	$27.06	0	$0	11396	$308,385	$13,879	$294,506	$382,693	$271,122	$230,152	$192,003
6		$0	$13,879	$27.60	0	$0	11396	$314,553	$13,879	$300,674	$609,825	$475,755	$410,846	$352,613
7		$0	$13,879	$28.15	0	$0	11396	$320,844	$13,879	$306,965	$852,423	$669,195	$590,120	$518,131
8		$0	$13,879	$28.72	0	$0	11396	$327,261	$13,879	$313,382	$1,090,568	$852,050	$750,934	$659,889
9		$0	$13,879	$29.29	0	$0	11396	$333,806	$13,879	$319,927	$1,324,335	$1,024,897	$900,182	$789,102
10		$0	$13,879	$29.88	0	$0	11396	$340,482	$13,879	$326,603	$1,553,802	$1,188,280	$1,038,694	$901,878
11		$0	$13,879	$30.47	0	$0	11396	$347,292	$13,879	$333,413	$1,779,043	$1,342,714	$1,167,239	$1,014,228
12		$0	$13,879	$31.08	0	$0	11396	$354,237	$13,879	$340,358	$2,000,134	$1,488,688	$1,286,532	$1,119,073
13		$0	$13,879	$31.71	0	$0	11396	$361,322	$13,879	$347,443	$2,217,146	$1,626,562	$1,397,238	$1,201,253
14		$0	$13,879	$32.34	0	$0	11396	$368,549	$13,879	$354,670	$2,430,151	$1,757,074	$1,499,974	$1,282,534
15		$0	$13,879	$32.99	0	$0	11396	$375,919	$13,879	$362,040	$2,639,220	$1,880,334	$1,595,310	$1,358,615
16		$0	$13,879	$33.65	0	$0	11396	$383,438	$13,879	$369,559	$2,844,423	$1,996,835	$1,683,780	$1,424,132
17		$0	$13,879	$34.32	0	$0	11396	$391,107	$13,879	$377,228	$3,045,828	$2,106,944	$1,765,875	$1,485,666
18		$0	$13,879	$35.01	0	$0	11396	$398,929	$13,879	$385,050	$3,243,502	$2,211,011	$1,842,055	$1,541,746
19		$0	$13,879	$35.71	0	$0	11396	$406,907	$13,879	$393,028	$3,437,512	$2,309,366	$1,912,745	$1,592,856
20		$0	$13,879	$36.42	0	$0	11396	$415,046	$13,879	$401,167	$3,627,923	$2,402,321	$1,978,339	$1,639,434
21		($6,300)	$13,879	$37.15	0	$0	11396	$423,346	$7,579	$415,767	$3,817,674	$2,491,523	$2,040,140	$1,682,535
		$711,653	$279,893		0	$0	229,819	$7,108,250	$991,546	$6,116,704				

TABLE A-15 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$717,953
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$717,953

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$13,979 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($5,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$25.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	11395 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 43.18%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$7,103,250	$991,546	$6,116,704	7.17
2%	$5,745,483	$942,968	$4,802,515	6.09
4%	$4,723,685	$906,011	$3,817,674	5.21
6%	$3,946,397	$877,493	$3,068,904	4.50
8%	$3,346,704	$855,181	$2,491,523	3.91
10%	$2,877,630	$837,489	$2,040,140	3.44
11%	$2,681,244	$830,008	$1,851,237	3.23
12%	$2,505,816	$823,281	$1,682,535	3.04
13%	$2,348,513	$817,216	$1,531,397	2.87
14%	$2,207,304	$811,730	$1,395,574	2.72
15%	$2,079,899	$806,754	$1,273,145	2.58
16%	$1,964,691	$802,229	$1,162,462	2.45
18%	$1,765,198	$794,327	$970,871	2.22
20%	$1,593,342	$787,687	$811,655	2.03

TABLE A-15

For Case of:FIELD TEST #4 - HELWAN TEXTILE/SOLAR PLUS WASTE HEAT RECOVERY (PRICE OF OIL $30/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$717,953												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$717,953	$2,313	$30.00	0	$0	1339	$56,980	$720,266	($553,285)	($553,285)	($553,285)	($553,285)	($553,285)
2		$0	$13,879	$30.60	0	$0	11395	$348,718	$13,879	$334,839	($341,338)	($353,250)	($358,887)	($364,323)
3		$0	$13,879	$31.21	0	$0	11396	$355,692	$13,879	$341,813	($125,301)	($150,201)	($176,397)	($191,832)
4		$0	$13,879	$31.84	0	$0	11396	$362,806	$13,879	$348,927	$264,894	$213,703	$185,756	$155,527
5		$0	$13,879	$32.47	0	$0	11396	$370,062	$13,879	$356,183	$569,361	$478,593	$429,034	$382,862
6		$0	$13,879	$33.12	0	$0	11396	$377,463	$13,879	$363,584	$853,200	$723,043	$654,791	$593,195
7		$0	$13,879	$33.78	0	$0	11396	$385,012	$13,879	$371,133	$1,181,512	$959,920	$864,285	$777,223
8		$0	$13,879	$34.46	0	$0	11396	$392,713	$13,879	$378,834	$1,459,395	$1,189,966	$1,053,688	$948,568
9		$0	$13,879	$35.15	0	$0	11396	$400,567	$13,879	$386,688	$1,751,944	$1,389,881	$1,239,081	$1,104,765
10		$0	$13,879	$35.85	0	$0	11396	$408,578	$13,879	$394,699	$2,022,254	$1,587,329	$1,405,472	$1,247,097
11		$0	$13,879	$36.57	0	$0	11396	$416,750	$13,879	$402,871	$2,301,419	$1,773,936	$1,561,796	$1,376,811
12		$0	$13,879	$37.30	0	$0	11396	$425,085	$13,879	$411,206	$2,568,531	$1,950,295	$1,705,921	$1,495,023
13		$0	$13,879	$38.05	0	$0	11396	$433,587	$13,879	$419,708	$2,839,579	$2,116,967	$1,839,653	$1,602,751
14		$0	$13,879	$38.81	0	$0	11396	$442,258	$13,879	$428,379	$3,097,952	$2,274,481	$1,953,739	$1,700,925
15		$0	$13,879	$39.58	0	$0	11396	$451,103	$13,879	$437,224	$3,340,439	$2,423,339	$2,073,674	$1,790,390
16		$0	$13,879	$40.33	0	$0	11396	$460,125	$13,879	$446,246	$3,583,223	$2,564,014	$2,185,702	$1,871,917
17		$0	$13,879	$41.18	0	$0	11396	$469,328	$13,879	$455,449	$3,831,391	$2,696,955	$2,284,821	$1,946,211
18		$0	$13,879	$42.01	0	$0	11396	$478,715	$13,879	$464,836	$4,070,026	$2,822,596	$2,375,786	$2,013,911
19		$0	$13,879	$42.85	0	$0	11396	$488,289	$13,879	$474,410	$4,304,208	$2,941,307	$2,462,113	$2,075,603
20		$0	$13,879	$43.70	0	$0	11396	$498,055	$13,879	$484,176	$4,534,018	$3,053,495	$2,541,279	$2,131,820
21		($5,300)	$13,879	$44.58	0	$0	11396	$508,016	$7,579	$500,437	$4,762,411	$3,160,864	$2,615,556	$2,183,698
		$711,653	$279,893		0	$0	229,819	$8,529,900	$991,546	$7,538,354				

TABLE A-16 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$717,953
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$717,953

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$13,879 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($5,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$30.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savngs	11835 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/13/85

Internal Rate of Return 52.55%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$8,529,900	$991,546	$7,538,354	8.60
2%	$6,894,593	$942,963	$5,951,612	7.31
4%	$5,669,422	$906,011	$4,762,411	6.26
6%	$4,735,677	$877,493	$3,858,184	5.40
8%	$4,016,044	$855,181	$3,160,864	4.70
10%	$3,453,155	$837,489	$2,615,666	4.12
11%	$3,217,493	$830,008	$2,387,485	3.88
12%	$3,005,980	$823,281	$2,183,698	3.65
13%	$2,818,335	$817,216	$2,001,119	3.45
14%	$2,648,765	$811,730	$1,837,035	3.26
15%	$2,495,879	$806,754	$1,689,125	3.09
16%	$2,357,629	$802,229	$1,555,400	2.94
18%	$2,118,238	$794,327	$1,323,911	2.67
20%	$1,919,210	$787,687	$1,131,524	2.44

TABLE A-17

For Case of:FIELD TEST #4 - HELWAN TEXTILE/SOLAR PLUS WASTE HEAT RECOVERY (PRICE OF OIL $35/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$717,953												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$717,953	$2,313	$35.00	0	$0	1839	$56,477	$720,266	($553,790)	($553,790)	($553,790)	($553,790)	($553,790)
2		$0	$13,879	$35.70	0	$0	11396	$406,837	$13,879	$392,958	($275,945)	($289,939)	($296,555)	($302,934)
3		$0	$13,879	$36.41	0	$0	11396	$414,974	$13,879	$401,095	$94,890	$53,935	$34,929	$15,815
4		$0	$13,879	$37.14	0	$0	11396	$423,272	$13,879	$409,394	$453,840	$378,925	$342,513	$303,215
5		$0	$13,879	$37.89	0	$0	11396	$431,739	$13,879	$417,860	$815,028	$585,055	$527,917	$573,773
6		$0	$13,879	$38.64	0	$0	11396	$440,374	$13,879	$426,495	$1,163,576	$870,330	$892,736	$915,777
7		$0	$13,879	$39.42	0	$0	11396	$449,181	$13,879	$435,302	$1,510,601	$1,050,644	$1,133,453	$1,035,315
8		$0	$13,879	$40.20	0	$0	11396	$458,165	$13,879	$444,286	$1,848,222	$1,509,831	$1,366,442	$1,237,287
9		$0	$13,879	$41.01	0	$0	11396	$467,328	$13,879	$453,449	$2,179,553	$1,754,865	$1,577,979	$1,420,428
10		$0	$13,879	$41.83	0	$0	11396	$476,675	$13,879	$462,795	$2,504,707	$1,985,378	$1,774,250	$1,587,317
11		$0	$13,879	$42.66	0	$0	11396	$486,209	$13,879	$472,329	$2,823,796	$2,205,158	$1,955,353	$1,739,394
12		$0	$13,879	$43.52	0	$0	11396	$495,933	$13,879	$482,053	$3,136,928	$2,411,902	$2,125,310	$1,877,373
13		$0	$13,879	$44.39	0	$0	11396	$505,851	$13,879	$491,972	$3,443,212	$2,607,271	$2,282,057	$2,004,250
14		$0	$13,879	$45.28	0	$0	11396	$515,968	$13,879	$502,089	$3,745,754	$2,791,888	$2,427,504	$2,119,315
15		$0	$13,879	$46.18	0	$0	11396	$526,287	$13,879	$512,409	$4,041,657	$2,966,343	$2,562,438	$2,224,164
16		$0	$13,879	$47.11	0	$0	11396	$536,813	$13,879	$522,934	$4,332,024	$3,131,194	$2,687,624	$2,319,702
17		$0	$13,879	$48.05	0	$0	11396	$547,549	$13,879	$533,670	$4,615,955	$3,286,967	$2,803,766	$2,405,755
18		$0	$13,879	$49.01	0	$0	11396	$558,500	$13,879	$544,621	$4,893,549	$3,434,161	$2,911,516	$2,486,077
19		$0	$13,879	$49.99	0	$0	11396	$569,670	$13,879	$555,791	$5,170,303	$3,573,248	$3,011,480	$2,558,351
20		$0	$13,879	$50.99	0	$0	11396	$581,064	$13,879	$567,185	$5,440,113	$3,704,671	$3,104,220	$2,624,205
21		($5,300)	$13,879	$52.01	0	$0	11396	$592,685	$7,579	$585,106	$5,707,148	$3,830,205	$3,191,192	$2,684,852
		$711,653	$279,893		0	$0	229,819	$3,951,551	$991,546	$8,960,004				

TABLE A-17 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$717,953
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$717,953

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$13,879 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$35.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savngs	11395 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 62.17%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$9,951,551	$991,546	$8,960,004	10.04
2%	$8,043,877	$942,968	$7,100,709	8.53
4%	$6,613,159	$905,011	$5,707,148	7.30
6%	$5,524,956	$877,493	$4,647,463	6.30
8%	$4,685,385	$855,181	$3,830,205	5.48
10%	$4,023,681	$837,489	$3,191,192	4.81
11%	$3,753,742	$830,008	$2,923,735	4.52
12%	$3,508,143	$823,281	$2,684,862	4.26
13%	$3,288,058	$817,216	$2,470,842	4.02
14%	$3,090,226	$811,730	$2,278,496	3.81
15%	$2,911,859	$806,754	$2,105,105	3.61
16%	$2,750,567	$802,229	$1,948,339	3.43
18%	$2,471,278	$794,327	$1,676,951	3.11
20%	$2,239,079	$787,687	$1,451,392	2.84

TABLE A-18

For Case of:FIELD TEST #4 - HELWAN TEXTILE/SOLAR PLUS WASTE HEAT RECOVERY (PRICE OF OIL $40/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	5%	10%	12%
1	Acquisition	$717,953												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$717,953	$2,313	$40.00	0	$0	1999	$75,973	$720,265	($644,293)	($644,293)	($644,293)	($644,293)	($644,293)
2		$0	$13,879	$40.80	0	$0	11396	$464,957	$13,879	$451,078	($210,564)	($235,528)	($234,222)	($241,545)
3		$0	$13,879	$41.62	0	$0	11396	$474,256	$13,879	$460,377	$215,080	$158,071	$145,255	$125,465
4		$0	$13,879	$42.45	0	$0	11396	$483,741	$13,879	$469,862	$632,786	$541,052	$493,269	$452,903
5		$0	$13,879	$43.30	0	$0	11396	$493,416	$13,879	$479,537	$1,042,696	$893,536	$825,799	$764,658
6		$0	$13,879	$44.16	0	$0	11396	$503,284	$13,879	$489,405	$1,444,951	$1,226,617	$1,130,681	$1,042,359
7		$0	$13,879	$45.05	0	$0	11396	$513,350	$13,879	$499,471	$1,839,690	$1,541,369	$1,412,620	$1,295,407
8		$0	$13,879	$45.95	0	$0	11396	$523,617	$13,879	$509,738	$2,227,042	$1,833,795	$1,674,195	$1,525,965
9		$0	$13,879	$46.87	0	$0	11396	$534,089	$13,879	$520,210	$2,607,162	$2,119,849	$1,915,875	$1,735,031
10		$0	$13,879	$47.80	0	$0	11396	$544,771	$13,879	$530,892	$2,980,160	$2,385,427	$2,142,028	$1,927,536
11		$0	$13,879	$48.76	0	$0	11396	$555,666	$13,879	$541,787	$3,346,172	$2,636,380	$2,350,910	$2,101,977
12		$0	$13,879	$49.73	0	$0	11396	$566,780	$13,879	$552,901	$3,705,325	$2,873,509	$2,544,596	$2,260,922
13		$0	$13,879	$50.73	0	$0	11396	$578,115	$13,879	$564,236	$4,057,746	$3,097,575	$2,724,482	$2,405,748
14		$0	$13,879	$51.74	0	$0	11396	$589,678	$13,879	$575,799	$4,403,556	$3,309,295	$2,891,270	$2,537,706
15		$0	$13,879	$52.78	0	$0	11396	$601,471	$13,879	$587,592	$4,742,875	$3,509,348	$3,045,001	$2,657,939
16		$0	$13,879	$53.83	0	$0	11396	$613,501	$13,879	$599,622	$5,075,824	$3,698,373	$3,189,546	$2,767,488
17		$0	$13,879	$54.91	0	$0	11396	$625,771	$13,879	$611,892	$5,402,518	$3,876,979	$3,322,711	$2,867,300
18		$0	$13,879	$56.01	0	$0	11396	$638,286	$13,879	$624,407	$5,723,072	$4,045,737	$3,446,247	$2,953,242
19		$0	$13,879	$57.13	0	$0	11396	$651,052	$13,879	$637,173	$6,037,598	$4,205,189	$3,560,846	$3,041,099
20		$0	$13,879	$58.27	0	$0	11396	$664,073	$13,879	$650,194	$6,346,208	$4,355,846	$3,667,160	$3,116,591
21		($6,300)	$13,879	$59.44	0	$0	11396	$677,354	$7,579	$669,775	$6,651,884	$4,499,545	$3,766,718	$3,186,025
		$711,653	$279,893		0	$0	229,819	$11,373,201	$991,546	$10,381,654				

TABLE A-18 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$717,953
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$717,953

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$13,879 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($6,300)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$40.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	11395 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 72.07%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$11,373,201	$991,546	$10,381,654	11.47
2%	$9,192,773	$942,968	$8,249,805	9.75
4%	$7,557,896	$906,011	$6,651,884	8.34
6%	$6,314,236	$877,493	$5,436,743	7.20
8%	$5,354,726	$855,181	$4,499,545	6.26
10%	$4,604,207	$837,489	$3,766,718	5.50
11%	$4,289,991	$830,008	$3,459,983	5.17
12%	$4,009,306	$823,281	$3,186,025	4.87
13%	$3,757,781	$817,216	$2,940,565	4.60
14%	$3,531,687	$811,730	$2,719,957	4.35
15%	$3,327,839	$806,754	$2,521,084	4.12
16%	$3,143,505	$802,229	$2,341,277	3.92
18%	$2,824,317	$794,327	$2,029,990	3.56
20%	$2,558,947	$787,687	$1,771,260	3.25

TABLE A-19

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $25/SQ.FT. - PRICE OF OIL $15/BBL)
Assuming Oil Escalation Rate of : 3.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$128,488												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$128,488	$352	$15.00	0	$0	58	$870	$129,838	($128,968)	($128,968)	($128,968)	($128,968)	($128,968)
2		$0	$2,110	$15.30	0	$0	348	$5,324	$2,110	$3,214	($125,877)	($125,991)	($126,045)	($126,098)
3		$0	$2,110	$15.61	0	$0	348	$5,431	$2,110	$3,321	($122,807)	($123,144)	($123,301)	($123,450)
4		$0	$2,110	$15.92	0	$0	348	$5,540	$2,110	$3,430	($119,758)	($120,422)	($120,724)	($121,009)
5		$0	$2,110	$16.24	0	$0	348	$5,650	$2,110	$3,540	($116,731)	($117,820)	($118,305)	($118,759)
6		$0	$2,110	$16.56	0	$0	348	$5,763	$2,110	$3,653	($113,729)	($115,333)	($116,038)	($116,686)
7		$0	$2,110	$16.89	0	$0	348	$5,878	$2,110	$3,768	($110,750)	($112,958)	($113,911)	($114,777)
8		$0	$2,110	$17.23	0	$0	348	$5,996	$2,110	$3,886	($107,797)	($110,691)	($111,916)	($113,019)
9		$0	$2,110	$17.57	0	$0	348	$6,116	$2,110	$4,006	($104,870)	($108,526)	($110,048)	($111,401)
10		$0	$2,110	$17.93	0	$0	348	$6,238	$2,110	$4,128	($101,969)	($106,461)	($108,297)	($109,912)
11		$0	$2,110	$18.28	0	$0	348	$6,363	$2,110	$4,253	($99,096)	($104,491)	($106,657)	($108,543)
12		$0	$2,110	$18.65	0	$0	348	$6,490	$2,110	$4,380	($96,251)	($102,613)	($105,122)	($107,284)
13		$0	$2,110	$19.02	0	$0	348	$6,620	$2,110	$4,510	($93,434)	($100,821)	($103,684)	($106,126)
14		$0	$2,110	$19.40	0	$0	348	$6,753	$2,110	$4,643	($90,645)	($99,114)	($102,340)	($105,062)
15		$0	$2,110	$19.79	0	$0	348	$6,888	$2,110	$4,778	($87,886)	($97,488)	($101,082)	($104,085)
16		$0	$2,110	$20.19	0	$0	348	$7,025	$2,110	$4,915	($85,157)	($95,938)	($99,905)	($103,185)
17		$0	$2,110	$20.59	0	$0	348	$7,166	$2,110	$5,056	($82,458)	($94,462)	($98,805)	($102,362)
18		$0	$2,110	$21.00	0	$0	348	$7,309	$2,110	$5,199	($79,789)	($93,057)	($97,776)	($101,605)
19		$0	$2,110	$21.42	0	$0	348	$7,455	$2,110	$5,345	($77,150)	($91,720)	($96,814)	($100,909)
20		$0	$2,110	$21.85	0	$0	348	$7,605	$2,110	$5,495	($74,542)	($90,446)	($95,916)	($100,271)
21		($5,438)	$2,110	$22.29	0	$0	348	$7,757	($3,328)	$11,085	($69,483)	($88,068)	($94,268)	($99,122)
		$124,048	$42,552		0	$0	7,018	$130,239	$166,600	($36,361)				

TABLE A-19 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$129,485
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$129,485

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,110 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($5,438)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$15.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Enrgy Savngs	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/13/85

Internal Rate of Return -2.63%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$130,239	$166,600	($36,361)	0.78
2%	$105,270	$160,680	($55,410)	0.66
4%	$86,548	$156,031	($69,483)	0.55
6%	$72,307	$152,344	($80,037)	0.47
8%	$61,319	$149,387	($88,068)	0.41
10%	$52,725	$146,993	($94,268)	0.36
11%	$49,126	$145,966	($96,839)	0.34
12%	$45,912	$145,034	($99,122)	0.32
13%	$43,032	$144,188	($101,156)	0.30
14%	$40,443	$143,417	($102,974)	0.28
15%	$38,108	$142,713	($104,604)	0.27
16%	$35,997	$142,068	($106,071)	0.25
18%	$32,342	$140,933	($108,591)	0.23
20%	$29,303	$139,971	($110,667)	0.21

TABLE A-20

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $25/SQ.FT. - PRICE OF OIL $20/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$120,486												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$129,486	$352	$20.00	0	$0	58	$1,160	$129,838	($128,678)	($123,673)	($123,678)	($128,678)	($128,578)
2		$0	$2,110	$20.40	0	$0	348	$7,099	$2,110	$4,989	($123,680)	($124,058)	($124,142)	($124,223)
3		$0	$2,110	$20.81	0	$0	348	$7,241	$2,110	$5,131	($119,136)	($119,659)	($119,901)	($120,132)
4		$0	$2,110	$21.22	0	$0	348	$7,386	$2,110	$5,276	($114,446)	($115,471)	($115,937)	($116,377)
5		$0	$2,110	$21.65	0	$0	348	$7,534	$2,110	$5,424	($109,610)	($111,484)	($112,233)	($112,930)
6		$0	$2,110	$22.08	0	$0	348	$7,684	$2,110	$5,574	($105,228)	($107,690)	($108,772)	($109,757)
7		$0	$2,110	$22.52	0	$0	348	$7,838	$2,110	$5,728	($100,701)	($104,080)	($105,538)	($106,855)
8		$0	$2,110	$22.97	0	$0	348	$7,995	$2,110	$5,885	($95,229)	($100,647)	($102,518)	($104,203)
9		$0	$2,110	$23.43	0	$0	348	$8,155	$2,110	$6,045	($91,812)	($97,381)	($99,699)	($101,762)
10		$0	$2,110	$23.90	0	$0	348	$8,318	$2,110	$6,208	($87,451)	($94,275)	($97,066)	($99,523)
11		$0	$2,110	$24.38	0	$0	348	$8,484	$2,110	$6,374	($83,144)	($91,323)	($94,608)	($97,471)
12		$0	$2,110	$24.87	0	$0	348	$8,654	$2,110	$6,544	($78,894)	($88,516)	($92,315)	($95,590)
13		$0	$2,110	$25.36	0	$0	348	$8,827	$2,110	$6,717	($74,698)	($85,849)	($90,174)	($93,855)
14		$0	$2,110	$25.87	0	$0	348	$9,004	$2,110	$6,894	($70,558)	($83,314)	($88,176)	($92,285)
15		$0	$2,110	$26.39	0	$0	348	$9,184	$2,110	$7,074	($66,473)	($80,905)	($86,315)	($90,838)
16		$0	$2,110	$26.92	0	$0	348	$9,367	$2,110	$7,257	($62,444)	($78,618)	($84,578)	($89,512)
17		$0	$2,110	$27.46	0	$0	348	$9,555	$2,110	$7,445	($58,469)	($76,445)	($82,957)	($88,293)
18		$0	$2,110	$28.00	0	$0	348	$9,746	$2,110	$7,636	($54,549)	($74,382)	($81,447)	($87,186)
19		$0	$2,110	$28.56	0	$0	348	$9,941	$2,110	$7,831	($50,684)	($72,422)	($80,038)	($86,168)
20		$0	$2,110	$29.14	0	$0	348	$10,139	$2,110	$8,029	($46,872)	($70,561)	($78,726)	($85,235)
21		($5,438)	$2,110	$29.72	0	$0	348	$10,342	($3,328)	$13,670	($40,634)	($67,629)	($75,694)	($83,818)
		$124,048	$42,552		0	$0	7,018	$173,652	$166,600	$7,052				

TABLE A-20 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$129,485
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$129,485

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,110 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Salvage Value	($5,438)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$20.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 0.46%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$173,652	$166,600	$7,052	1.04
2%	$140,360	$160,680	($20,320)	0.87
4%	$115,398	$156,031	($40,634)	0.74
6%	$96,409	$152,344	($55,935)	0.63
8%	$81,759	$149,387	($67,629)	0.55
10%	$70,299	$146,993	($76,694)	0.48
11%	$65,502	$145,966	($80,464)	0.45
12%	$61,216	$145,034	($83,818)	0.42
13%	$57,376	$144,188	($86,812)	0.40
14%	$53,924	$143,417	($89,493)	0.38
15%	$50,811	$142,713	($91,901)	0.36
16%	$47,997	$142,068	($94,071)	0.34
18%	$43,123	$140,933	($97,810)	0.31
20%	$39,071	$139,971	($100,899)	0.28

TABLE A-21

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPM (COLLECTOR PRICE $25/SQ.FT. - PRICE OF OIL $25/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$129,485												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$129,485	$352	$25.00	0	$0	58	$1,450	$129,838	($128,388)	($128,388)	($128,388)	($128,388)	($128,388)
2		$0	$2,110	$25.50	0	$0	348	$8,874	$2,110	$6,764	($121,664)	($122,125)	($122,239)	($122,348)
3		$0	$2,110	$26.01	0	$0	348	$9,051	$2,110	$6,941	($115,468)	($116,174)	($116,502)	($116,815)
4		$0	$2,110	$26.53	0	$0	348	$9,233	$2,110	$7,123	($109,134)	($110,519)	($111,151)	($111,745)
5		$0	$2,110	$27.06	0	$0	348	$9,417	$2,110	$7,307	($102,888)	($105,148)	($106,160)	($107,101)
6		$0	$2,110	$27.60	0	$0	348	$9,606	$2,110	$7,496	($96,727)	($100,047)	($101,508)	($102,843)
7		$0	$2,110	$28.15	0	$0	348	$9,798	$2,110	$7,688	($90,652)	($95,203)	($97,166)	($98,953)
8		$0	$2,110	$28.72	0	$0	348	$9,994	$2,110	$7,884	($84,661)	($90,503)	($93,121)	($95,337)
9		$0	$2,110	$29.29	0	$0	348	$10,193	$2,110	$8,083	($78,754)	($85,235)	($89,350)	($92,122)
10		$0	$2,110	$29.88	0	$0	348	$10,397	$2,110	$8,287	($72,932)	($82,090)	($85,835)	($89,134)
11		$0	$2,110	$30.47	0	$0	348	$10,605	$2,110	$8,495	($67,193)	($78,155)	($82,560)	($86,399)
12		$0	$2,110	$31.08	0	$0	348	$10,817	$2,110	$8,707	($61,536)	($74,420)	($79,508)	($83,895)
13		$0	$2,110	$31.71	0	$0	348	$11,034	$2,110	$8,924	($55,963)	($70,877)	($76,664)	($81,605)
14		$0	$2,110	$32.34	0	$0	348	$11,254	$2,110	$9,144	($50,471)	($67,514)	($74,016)	($79,509)
15		$0	$2,110	$32.99	0	$0	348	$11,479	$2,110	$9,369	($45,060)	($64,324)	($71,546)	($77,592)
16		$0	$2,110	$33.65	0	$0	348	$11,709	$2,110	$9,599	($39,730)	($61,298)	($69,250)	($75,836)
17		$0	$2,110	$34.32	0	$0	348	$11,943	$2,110	$9,833	($34,480)	($58,428)	($67,110)	($74,234)
18		$0	$2,110	$35.01	0	$0	348	$12,182	$2,110	$10,072	($29,309)	($55,706)	($65,118)	($72,767)
19		$0	$2,110	$35.71	0	$0	348	$12,426	$2,110	$10,316	($24,217)	($53,124)	($63,282)	($71,426)
20		$0	$2,110	$36.42	0	$0	348	$12,674	$2,110	$10,564	($19,203)	($50,676)	($61,535)	($70,199)
21		($5,438)	$2,110	$37.15	0	$0	348	$12,928	($3,328)	$16,256	($11,784)	($47,189)	($59,119)	($68,514)
		$124,048	$42,552		0	$0	7,018	$217,065	$166,600	$50,465				

TABLE A-21 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$129,486
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$129,486

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,110 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($5,438)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$25.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/88

Internal Rate of Return 3.04%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$217,055	$166,600	$50,455	1.30
2%	$175,450	$160,680	$14,770	1.09
4%	$144,247	$156,031	($11,784)	0.92
6%	$120,511	$152,344	($31,832)	0.79
8%	$102,198	$149,387	($47,189)	0.68
10%	$87,874	$146,993	($59,119)	0.60
11%	$81,877	$145,955	($64,039)	0.56
12%	$76,520	$145,034	($68,514)	0.53
13%	$71,720	$144,188	($72,468)	0.50
14%	$67,405	$143,417	($76,012)	0.47
15%	$63,514	$142,713	($79,199)	0.45
16%	$59,995	$142,068	($82,072)	0.42
18%	$53,904	$140,933	($87,030)	0.38
20%	$48,839	$139,971	($91,131)	0.35

TABLE A-22

For Case of:FIELD TEST #4- HELWAN TEXTILE/IPH (COLLECTOR PRICE $85/SQ.FT. - PRICE OF OIL $30/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$123,488												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$123,488	$352	$30.00	0	$0	58	$1,740	$123,838	($123,098)	($123,098)	($123,098)	($123,098)	($123,098)
2		$0	$2,110	$30.60	0	$0	348	$10,649	$2,110	$8,539	($119,687)	($120,191)	($120,325)	($120,474)
3		$0	$2,110	$31.21	0	$0	348	$10,852	$2,110	$8,752	($111,795)	($112,683)	($113,108)	($113,497)
4		$0	$2,110	$31.84	0	$0	348	$11,073	$2,110	$8,959	($103,822)	($105,556)	($106,354)	($107,113)
5		$0	$2,110	$32.47	0	$0	348	$11,301	$2,110	$9,191	($95,956)	($98,813)	($100,065)	($101,272)
6		$0	$2,110	$33.12	0	$0	348	$11,537	$2,110	$9,417	($88,226)	($92,404)	($94,233)	($95,929)
7		$0	$2,110	$33.78	0	$0	348	$11,757	$2,110	$9,647	($80,602)	($85,325)	($88,794)	($91,041)
8		$0	$2,110	$34.45	0	$0	348	$11,992	$2,110	$9,882	($73,092)	($80,559)	($83,723)	($86,571)
9		$0	$2,110	$35.15	0	$0	348	$12,232	$2,110	$10,122	($65,595)	($75,090)	($79,001)	($82,483)
10		$0	$2,110	$35.85	0	$0	348	$12,477	$2,110	$10,367	($58,413)	($69,904)	($74,604)	($78,745)
11		$0	$2,110	$36.57	0	$0	348	$12,726	$2,110	$10,616	($51,241)	($64,987)	($70,511)	($75,288)
12		$0	$2,110	$37.30	0	$0	348	$12,981	$2,110	$10,871	($44,179)	($60,324)	($66,701)	($72,201)
13		$0	$2,110	$38.05	0	$0	348	$13,240	$2,110	$11,130	($37,227)	($55,904)	($63,154)	($69,344)
14		$0	$2,110	$38.81	0	$0	348	$13,505	$2,110	$11,395	($30,384)	($51,714)	($59,854)	($66,733)
15		$0	$2,110	$39.58	0	$0	348	$13,775	$2,110	$11,665	($23,647)	($47,743)	($56,782)	($64,346)
16		$0	$2,110	$40.38	0	$0	348	$14,051	$2,110	$11,941	($17,017)	($43,978)	($53,922)	($62,164)
17		$0	$2,110	$41.18	0	$0	348	$14,332	$2,110	$12,222	($10,491)	($40,411)	($51,263)	($60,171)
18		$0	$2,110	$42.01	0	$0	348	$14,619	$2,110	$12,509	($4,070)	($37,030)	($48,789)	($58,349)
19		$0	$2,110	$42.85	0	$0	348	$14,911	$2,110	$12,801	$2,249	($33,827)	($46,486)	($56,684)
20		$0	$2,110	$43.70	0	$0	348	$15,209	$2,110	$13,099	$8,466	($30,792)	($44,344)	($55,162)
21		($5,438)	$2,110	$44.56	0	$0	348	$15,513	($3,328)	$18,841	$17,055	($26,749)	($41,544)	($53,210)
		$124,048	$42,552		0	$0	7,018	$260,478	$166,600	$93,878				

TABLE A-22 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$129,485
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$129,485

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,110 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($5,438)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$30.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/13/86

Internal Rate of Return 5.32%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$260,478	$166,600	$93,878	1.56
2%	$210,540	$160,680	$49,860	1.31
4%	$173,097	$156,031	$17,065	1.11
6%	$144,614	$152,344	($7,730)	0.95
8%	$122,538	$149,387	($26,749)	0.82
10%	$105,449	$146,993	($41,544)	0.72
11%	$98,253	$145,966	($47,713)	0.67
12%	$91,824	$145,034	($53,210)	0.63
13%	$85,064	$144,188	($59,124)	0.60
14%	$80,885	$143,417	($62,531)	0.56
15%	$76,217	$142,713	($66,496)	0.53
16%	$71,995	$142,068	($70,073)	0.51
18%	$64,685	$140,933	($76,249)	0.46
20%	$58,607	$139,971	($81,364)	0.42

TABLE A-23

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IRH (COLLECTOR PRICE $25/SQ.FT.- PRICE OF OIL $35/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	[illegible]	10%	12%
1	Acquisition	$129,485												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$129,485	$352	$35.00	0	$0	53	$2,030	$129,835	($127,808)	($127,8[illegible])	($127,808)	($127,808)	($127,808)
2		$0	$2,110	$35.70	0	$0	348	$12,424	$2,110	$10,314	($117,931)	($118,258)	($118,422)	($118,599)
3		$0	$2,110	$36.41	0	$0	348	$12,672	$2,110	$10,562	($108,125)	($109,203)	($109,703)	($110,179)
4		$0	$2,110	$37.14	0	$0	348	$12,926	$2,110	$10,815	($98,511)	($100,617)	($101,577)	($102,491)
5		$0	$2,110	$37.89	0	$0	348	$13,184	$2,110	$11,074	($89,044)	($92,477)	($94,013)	($95,443)
6		$0	$2,110	$38.64	0	$0	348	$13,448	$2,110	$11,338	($79,726)	($84,751)	($86,973)	($89,010)
7		$0	$2,110	$39.42	0	$0	348	$13,717	$2,110	$11,607	($70,553)	($77,447)	($80,422)	($83,129)
8		$0	$2,110	$40.20	0	$0	348	$13,991	$2,110	$11,881	($61,524)	($70,514)	($74,325)	($77,755)
9		$0	$2,110	$41.01	0	$0	348	$14,271	$2,110	$12,161	($52,638)	($63,944)	($68,552)	($72,844)
10		$0	$2,110	$41.82	0	$0	348	$14,556	$2,110	$12,445	($43,894)	($57,718)	($63,373)	($68,355)
11		$0	$2,110	$42.66	0	$0	348	$14,847	$2,110	$12,737	($35,289)	($51,818)	($58,482)	($64,254)
12		$0	$2,110	$43.52	0	$0	348	$15,144	$2,110	$13,034	($26,822)	($46,228)	($53,894)	($60,507)
13		$0	$2,110	$44.39	0	$0	348	$15,447	$2,110	$13,337	($18,492)	($40,932)	($49,644)	($57,084)
14		$0	$2,110	$45.28	0	$0	348	$15,756	$2,110	$13,646	($10,296)	($35,914)	($45,592)	($53,957)
15		$0	$2,110	$46.18	0	$0	348	$16,071	$2,110	$13,961	($2,234)	($31,161)	($42,015)	($51,100)
16		$0	$2,110	$47.11	0	$0	348	$16,393	$2,110	$14,283	$5,697	($26,655)	($38,596)	($48,490)
17		$0	$2,110	$48.05	0	$0	348	$16,721	$2,110	$14,611	$13,497	($22,394)	($35,416)	($45,107)
18		$0	$2,110	$49.01	0	$0	348	$17,055	$2,110	$14,945	$21,170	($18,354)	($32,460)	($[illegible],930)
19		$0	$2,110	$49.99	0	$0	348	$17,396	$2,110	$15,286	$28,715	($14,529)	($29,710)	($41,943)
20		$0	$2,110	$50.99	0	$0	348	$17,744	$2,110	$15,634	$36,136	($10,907)	($27,154)	($40,127)
21		($5,438)	$2,110	$52.01	0	$0	348	$18,099	($3,328)	$21,427	$45,915	($6,309)	($23,969)	($37,906)
		$124,048	$42,552		0	$0	7,018	$303,891	$166,600	$137,291				

TABLE A-23 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$123,486
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$123,486

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,110 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Salvage Value	($5,438)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$35.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/13/86

Internal Rate of Return 7.39%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$303,891	$166,600	$137,291	1.82
2%	$245,830	$160,880	$84,950	1.53
4%	$201,945	$156,031	$45,915	1.29
6%	$168,716	$152,344	$16,372	1.11
8%	$143,078	$149,387	($6,309)	0.96
10%	$123,024	$146,993	($23,969)	0.84
11%	$114,638	$145,966	($31,338)	0.79
12%	$107,128	$145,034	($37,906)	0.74
13%	$100,408	$144,188	($43,780)	0.70
14%	$94,366	$143,417	($49,050)	0.66
15%	$88,920	$142,713	($53,793)	0.62
16%	$83,934	$142,068	($58,074)	0.59
18%	$75,465	$140,933	($65,468)	0.54
20%	$68,375	$139,971	($71,596)	0.49

TABLE A-24

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $25/SQ.FT. - PRICE OF OIL $40/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	6%	10%	12%
1	Acquisition	$129,486												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$129,486	$352	$40.00	0	$0	58	$2,320	$129,838	($127,518)	($127,518)	($127,518)	($127,518)	($127,518)
2		$0	$2,110	$40.80	0	$0	348	$14,198	$2,110	$12,088	($115,834)	($115,325)	($115,528)	($115,724)
3		$0	$2,110	$41.62	0	$0	348	$14,482	$2,110	$12,372	($104,455)	($105,717)	($105,303)	($105,851)
4		$0	$2,110	$42.45	0	$0	348	$14,772	$2,110	$12,662	($93,195)	($95,665)	($95,790)	($97,849)
5		$0	$2,110	$43.30	0	$0	348	$15,067	$2,110	$12,957	($82,123)	($86,142)	($87,940)	($89,614)
6		$0	$2,110	$44.16	0	$0	348	$15,369	$2,110	$13,259	($71,225)	($77,119)	($79,707)	($82,091)
7		$0	$2,110	$45.05	0	$0	348	$15,676	$2,110	$13,566	($60,503)	($68,369)	($72,049)	($75,218)
8		$0	$2,110	$45.95	0	$0	348	$15,990	$2,110	$13,880	($49,956)	($60,470)	($64,927)	($68,939)
9		$0	$2,110	$46.87	0	$0	348	$16,309	$2,110	$14,199	($39,580)	($52,799)	($58,303)	($63,204)
10		$0	$2,110	$47.80	0	$0	348	$16,636	$2,110	$14,526	($29,375)	($45,532)	($52,142)	($57,956)
11		$0	$2,110	$48.76	0	$0	348	$16,968	$2,110	$14,858	($19,337)	($38,650)	($46,414)	($53,182)
12		$0	$2,110	$49.73	0	$0	348	$17,308	$2,110	$15,198	($9,465)	($32,132)	($41,087)	($48,313)
13		$0	$2,110	$50.73	0	$0	348	$17,654	$2,110	$15,544	$244	($25,959)	($35,134)	($44,823)
14		$0	$2,110	$51.74	0	$0	348	$18,007	$2,110	$15,897	$9,791	($20,114)	($31,530)	($41,180)
15		$0	$2,110	$52.76	0	$0	348	$18,367	$2,110	$16,257	$19,179	($14,579)	($27,249)	($37,854)
16		$0	$2,110	$53.83	0	$0	348	$18,734	$2,110	$16,624	$28,410	($9,338)	($23,269)	($34,816)
17		$0	$2,110	$54.91	0	$0	348	$19,109	$2,110	$16,999	$37,486	($4,376)	($19,569)	($32,043)
18		$0	$2,110	$56.01	0	$0	348	$19,491	$2,110	$17,381	$46,409	$321	($16,130)	($29,512)
19		$0	$2,110	$57.13	0	$0	348	$19,881	$2,110	$17,771	$55,182	$4,768	($12,934)	($27,201)
20		$0	$2,110	$58.27	0	$0	348	$20,279	$2,110	$18,169	$63,805	$8,378	($9,963)	($25,091)
21		($5,438)	$2,110	$59.44	0	$0	348	$20,584	($3,328)	$24,012	$74,764	$14,130	($6,394)	($22,60[illegible]
		$124,048	$42,552		0	$0	7,018	$347,304	$166,600	$180,704				

TABLE A-24 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$129,486
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$129,486

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$2,110 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($5,438)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$40.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savngs	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 9.32%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$347,304	$166,600	$180,704	2.08
2%	$289,720	$169,680	$120,040	1.75
4%	$230,795	$156,031	$74,764	1.48
6%	$192,818	$152,344	$40,474	1.27
8%	$163,517	$149,387	$14,130	1.09
10%	$140,599	$149,993	($9,394)	0.96
11%	$131,004	$145,955	($14,952)	0.90
12%	$122,432	$145,034	($22,602)	0.84
13%	$114,751	$144,188	($29,437)	0.80
14%	$107,847	$143,417	($35,570)	0.75
15%	$101,622	$142,713	($41,090)	0.71
16%	$95,993	$142,068	($46,075)	0.68
18%	$85,246	$140,933	($54,687)	0.61
20%	$78,143	$139,971	($61,828)	0.56

TABLE A-25

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPM (COLLECTOR PRICE $22/SQ.FT. - PRICE OF OIL $15/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$110,712												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$110,712	$311	$15.00	0	$0	58	$870	$111,023	($110,153)	($110,153)	($110,153)	($110,153)	($110,153)
2		$0	$1,866	$15.30	0	$0	348	$5,324	$1,866	$3,458	($106,828)	($105,951)	($107,009)	($107,065)
3		$0	$1,866	$15.61	0	$0	348	$5,431	$1,866	$3,565	($103,532)	($103,894)	($104,053)	($104,223)
4		$0	$1,866	$15.92	0	$0	348	$5,540	$1,866	$3,674	($100,266)	($100,978)	($101,303)	($101,609)
5		$0	$1,866	$16.24	0	$0	348	$5,650	$1,866	$3,784	($97,031)	($98,197)	($98,718)	($99,204)
6		$0	$1,866	$16.56	0	$0	348	$5,763	$1,866	$3,897	($93,828)	($95,544)	($96,293)	($96,992)
7		$0	$1,866	$16.89	0	$0	348	$5,879	$1,866	$4,013	($90,657)	($93,015)	($94,033)	($94,959)
8		$0	$1,866	$17.23	0	$0	348	$5,996	$1,866	$4,130	($87,518)	($90,605)	($91,914)	($93,091)
9		$0	$1,866	$17.57	0	$0	348	$6,116	$1,866	$4,250	($84,413)	($88,310)	($89,931)	($91,374)
10		$0	$1,866	$17.93	0	$0	348	$6,238	$1,866	$4,372	($81,341)	($86,122)	($88,077)	($89,738)
11		$0	$1,866	$18.28	0	$0	348	$6,363	$1,866	$4,497	($78,302)	($84,039)	($86,343)	($88,350)
12		$0	$1,866	$18.65	0	$0	348	$6,490	$1,866	$4,624	($75,299)	($82,055)	($84,722)	($87,020)
13		$0	$1,866	$19.02	0	$0	348	$6,620	$1,866	$4,754	($72,329)	($80,168)	($83,207)	($85,800)
14		$0	$1,866	$19.40	0	$0	348	$6,753	$1,866	$4,887	($69,394)	($78,371)	($81,792)	($84,630)
15		$0	$1,866	$19.79	0	$0	348	$6,888	$1,866	$5,022	($66,494)	($76,662)	($80,469)	($83,553)
16		$0	$1,866	$20.19	0	$0	348	$7,025	$1,866	$5,159	($63,630)	($75,035)	($79,234)	($82,710)
17		$0	$1,866	$20.59	0	$0	348	$7,166	$1,866	$5,300	($60,800)	($73,488)	($78,081)	($81,845)
18		$0	$1,866	$21.00	0	$0	348	$7,309	$1,866	$5,443	($58,005)	($72,017)	($77,004)	($81,053)
19		$0	$1,866	$21.42	0	$0	348	$7,455	$1,866	$5,589	($55,246)	($70,618)	($75,999)	($80,326)
20		$0	$1,866	$21.85	0	$0	348	$7,605	$1,866	$5,739	($52,523)	($69,288)	($75,060)	($79,650)
21		($4,650)	$1,866	$22.29	0	$0	348	$7,757	($2,784)	$10,541	($47,712)	($67,027)	($73,494)	($78,567)
		$106,062	$37,631		0	$0	7,018	$130,239	$143,693	($13,454)				

TABLE A-25 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$110,712
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$110,712

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,865 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,650)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$15.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return -1.08%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$130,239	$143,693	($13,454)	0.91
2%	$105,270	$138,405	($33,135)	0.76
4%	$86,548	$134,260	($47,712)	0.64
6%	$72,307	$130,976	($58,669)	0.55
8%	$61,319	$128,346	($67,027)	0.48
10%	$52,725	$126,218	($73,494)	0.42
11%	$49,126	$125,306	($76,179)	0.39
12%	$45,912	$124,479	($78,567)	0.37
13%	$43,032	$123,726	($80,695)	0.35
14%	$40,443	$123,043	($82,601)	0.33
15%	$38,108	$122,419	($84,310)	0.31
16%	$35,997	$121,847	($85,850)	0.30
18%	$32,342	$120,841	($88,499)	0.27
20%	$29,303	$119,988	($90,685)	0.24

TABLE A-26

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $22/SQ.FT. - PRICE OF OIL $20/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) 4%	8%	10%	@ i = 12%
1	Acquisition	$110,712												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$110,712	$311	$20.00	0	$0	53	$1,160	$111,023	($109,853)	($109,853)	($109,853)	($109,853)	($109,853)
2		$0	$1,855	$20.40	0	$0	348	$7,095	$1,855	$5,233	($104,831)	($105,017)	($105,106)	($105,191)
3		$0	$1,855	$20.81	0	$0	348	$7,241	$1,855	$5,375	($99,851)	($100,409)	($100,663)	($100,905)
4		$0	$1,855	$21.22	0	$0	348	$7,386	$1,855	$5,520	($94,954)	($96,027)	($95,515)	($95,975)
5		$0	$1,855	$21.65	0	$0	348	$7,534	$1,855	$5,658	($90,109)	($91,861)	($92,645)	($93,374)
6		$0	$1,855	$22.08	0	$0	348	$7,684	$1,855	$5,818	($85,337)	($87,901)	($89,032)	($90,073)
7		$0	$1,855	$22.52	0	$0	348	$7,838	$1,855	$5,972	($80,507)	($84,138)	($85,651)	($87,047)
8		$0	$1,855	$22.97	0	$0	348	$7,995	$1,855	$6,129	($75,950)	($80,582)	($82,516)	($84,275)
9		$0	$1,855	$23.43	0	$0	348	$8,155	$1,855	$6,283	($71,355)	($77,164)	($79,583)	($81,735)
10		$0	$1,855	$23.90	0	$0	348	$8,318	$1,855	$6,452	($65,822)	($73,937)	($76,845)	($79,405)
11		$0	$1,855	$24.38	0	$0	348	$8,484	$1,855	$6,618	($62,351)	($70,871)	($74,234)	($77,278)
12		$0	$1,855	$24.87	0	$0	348	$8,654	$1,855	$6,798	($57,941)	($67,960)	($71,915)	($75,326)
13		$0	$1,855	$25.36	0	$0	348	$8,827	$1,855	$6,961	($53,594)	($65,195)	($69,697)	($73,539)
14		$0	$1,855	$25.87	0	$0	348	$9,004	$1,855	$7,138	($49,307)	($62,571)	($67,630)	($71,904)
15		$0	$1,855	$26.39	0	$0	348	$9,184	$1,855	$7,318	($45,081)	($60,080)	($65,703)	($70,406)
16		$0	$1,855	$26.92	0	$0	348	$9,367	$1,855	$7,501	($40,916)	($57,715)	($63,907)	($69,036)
17		$0	$1,855	$27.46	0	$0	348	$9,555	$1,855	$7,689	($36,811)	($55,471)	($62,234)	($67,782)
18		$0	$1,855	$28.00	0	$0	348	$9,746	$1,855	$7,880	($32,766)	($53,341)	($60,675)	($66,634)
19		$0	$1,855	$28.56	0	$0	348	$9,941	$1,855	$8,075	($28,780)	($51,321)	($59,223)	($65,584)
20		$0	$1,855	$29.14	0	$0	348	$10,139	$1,855	$8,273	($24,853)	($49,404)	($57,870)	($64,624)
21		($4,550)	$1,855	$29.72	0	$0	348	$10,342	($2,784)	$13,126	($18,863)	($46,587)	($55,919)	($63,263)
		$106,062	$37,631		0	$0	7,018	$173,652	$143,693	$29,959				

TABLE A-26 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$110,712
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$110,712

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,866 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,650)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$20.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Enrgy Savngs	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 2.16%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$173,652	$143,693	$29,959	1.21
2%	$140,360	$138,405	$1,955	1.01
4%	$115,398	$134,260	($18,863)	0.86
6%	$96,409	$130,976	($34,567)	0.74
8%	$81,759	$128,346	($46,587)	0.64
10%	$70,299	$126,218	($55,919)	0.56
11%	$65,502	$125,305	($59,804)	0.52
12%	$61,216	$124,479	($63,263)	0.49
13%	$57,376	$123,728	($65,352)	0.46
14%	$53,924	$123,043	($69,120)	0.44
15%	$50,811	$122,419	($71,608)	0.42
16%	$47,997	$121,847	($73,851)	0.39
18%	$43,123	$120,841	($77,718)	0.36
20%	$39,071	$119,988	($80,917)	0.33

TABLE A-27

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $22/SQ.FT. - PRICE OF OIL $25/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$110,712												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$110,712	$811	$25.00	0	$0	58	$1,450	$111,023	($109,573)	($109,573)	($109,573)	($109,573)	($109,573)
2		$0	$1,866	$25.50	0	$0	348	$8,874	$1,866	$7,008	($102,835)	($102,084)	($103,202)	($103,315)
3		$0	$1,866	$26.01	0	$0	348	$9,051	$1,866	$7,185	($96,191)	($95,924)	($97,264)	($97,563)
4		$0	$1,866	$26.53	0	$0	348	$9,233	$1,866	$7,367	($89,542)	($91,076)	($91,729)	($92,344)
5		$0	$1,866	$27.06	0	$0	348	$9,417	$1,866	$7,551	($83,189)	($85,525)	($85,572)	($87,545)
6		$0	$1,866	$27.60	0	$0	348	$9,606	$1,866	$7,740	($76,826)	($80,258)	($81,765)	($83,154)
7		$0	$1,866	$28.15	0	$0	348	$9,798	$1,866	$7,932	($70,558)	($75,260)	($77,289)	($79,135)
8		$0	$1,866	$28.72	0	$0	348	$9,994	$1,866	$8,128	($64,382)	($70,518)	($73,118)	($75,459)
9		$0	$1,866	$29.29	0	$0	348	$10,192	$1,866	$8,327	($58,297)	($65,019)	($69,233)	($72,036)
10		$0	$1,866	$29.88	0	$0	348	$10,397	$1,866	$8,531	($52,303)	($61,751)	($65,615)	($69,019)
11		$0	$1,866	$30.47	0	$0	348	$10,605	$1,866	$8,739	($46,399)	($57,703)	($62,245)	($65,205)
12		$0	$1,866	$31.08	0	$0	348	$10,817	$1,866	$8,951	($40,584)	($53,854)	($59,108)	($63,632)
13		$0	$1,866	$31.71	0	$0	348	$11,034	$1,866	$9,168	($34,858)	($50,223)	($56,187)	($61,279)
14		$0	$1,866	$32.34	0	$0	348	$11,254	$1,866	$9,388	($29,220)	($46,771)	($53,468)	($59,127)
15		$0	$1,866	$32.99	0	$0	348	$11,479	$1,866	$9,613	($23,668)	($43,498)	($50,935)	($57,160)
16		$0	$1,866	$33.65	0	$0	348	$11,709	$1,866	$9,843	($18,203)	($40,395)	($48,580)	($55,352)
17		$0	$1,866	$34.32	0	$0	348	$11,943	$1,866	$10,077	($12,822)	($37,454)	($46,387)	($53,718)
18		$0	$1,866	$35.01	0	$0	348	$12,182	$1,866	$10,316	($7,526)	($34,666)	($44,345)	($52,216)
19		$0	$1,866	$35.71	0	$0	348	$12,426	$1,866	$10,560	($2,314)	($32,023)	($42,447)	($50,842)
20		$0	$1,866	$36.42	0	$0	348	$12,674	$1,866	$10,808	$2,816	($29,519)	($40,679)	($49,588)
21		($4,550)	$1,866	$37.15	0	$0	348	$12,928	($2,784)	$15,712	$9,987	($26,148)	($38,344)	($47,959)
		$105,062	$37,631		0	$0	7,018	$217,065	$143,693	$73,372				

TABLE A-27 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$110,712
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$110,712
Construct Time	10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,866 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,650)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$25.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 4.91%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$217,065	$143,693	$73,372	1.51
2%	$175,450	$138,405	$37,045	1.27
4%	$144,247	$134,260	$9,987	1.07
6%	$120,511	$130,976	($10,465)	0.92
8%	$102,198	$128,346	($26,148)	0.80
10%	$87,874	$126,218	($38,344)	0.70
11%	$81,877	$125,306	($43,429)	0.65
12%	$76,520	$124,479	($47,959)	0.61
13%	$71,720	$123,728	($52,008)	0.58
14%	$67,405	$123,043	($55,639)	0.55
15%	$63,514	$122,419	($58,905)	0.52
16%	$59,996	$121,847	($61,851)	0.49
18%	$53,904	$120,841	($66,938)	0.45
20%	$48,839	$119,988	($71,149)	0.41

TABLE A-28

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $22/SQ.FT. - PRICE OF OIL $30/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$110,712												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$110,712	$211	$30.00	0	$0	59	$1,740	$111,023	($109,283)	($109,283)	($109,283)	($109,283)	($109,283)
2		$0	$1,856	$30.60	0	$0	348	$10,549	$1,856	$8,733	($100,838)	($101,151)	($101,299)	($101,441)
3		$0	$1,856	$31.21	0	$0	348	$10,852	$1,856	$8,995	($92,521)	($93,438)	($93,864)	($94,270)
4		$0	$1,856	$31.84	0	$0	348	$11,079	$1,856	$9,213	($84,331)	($85,125)	($85,942)	($87,712)
5		$0	$1,856	$32.47	0	$0	348	$11,301	$1,856	$9,435	($75,255)	($79,190)	($80,498)	($81,715)
6		$0	$1,856	$33.12	0	$0	348	$11,527	$1,856	$9,661	($69,335)	($72,615)	($74,500)	($75,235)
7		$0	$1,856	$33.78	0	$0	348	$11,757	$1,856	$9,891	($60,503)	($65,382)	($68,917)	($71,224)
8		$0	$1,856	$34.45	0	$0	348	$11,992	$1,856	$10,126	($52,813)	($60,474)	($63,720)	($66,643)
9		$0	$1,856	$35.15	0	$0	348	$12,232	$1,856	$10,366	($45,239)	($54,873)	($58,684)	($62,456)
10		$0	$1,856	$35.85	0	$0	348	$12,477	$1,856	$10,611	($37,784)	($49,565)	($54,384)	($58,630)
11		$0	$1,856	$36.57	0	$0	348	$12,726	$1,856	$10,860	($30,447)	($44,525)	($50,197)	($55,133)
12		$0	$1,856	$37.30	0	$0	348	$12,981	$1,856	$11,115	($23,227)	($39,768)	($46,301)	($51,938)
13		$0	$1,856	$38.05	0	$0	348	$13,240	$1,856	$11,374	($16,123)	($35,251)	($42,577)	($49,018)
14		$0	$1,856	$38.81	0	$0	348	$13,505	$1,856	$11,639	($9,133)	($30,971)	($39,306)	($46,351)
15		$0	$1,856	$39.58	0	$0	348	$13,775	$1,856	$11,905	($2,255)	($26,916)	($36,170)	($43,914)
16		$0	$1,856	$40.38	0	$0	348	$14,051	$1,856	$12,185	$4,511	($23,075)	($33,253)	($41,588)
17		$0	$1,856	$41.18	0	$0	348	$14,332	$1,856	$12,466	$11,156	($19,436)	($30,540)	($39,654)
18		$0	$1,856	$42.01	0	$0	348	$14,619	$1,856	$12,753	$17,713	($15,990)	($28,017)	($37,797)
19		$0	$1,856	$42.85	0	$0	348	$14,911	$1,856	$13,045	$24,153	($12,725)	($25,670)	($36,101)
20		$0	$1,856	$43.70	0	$0	348	$15,209	$1,856	$13,343	$30,486	($9,634)	($23,489)	($34,552)
21		($4,550)	$1,856	$44.58	0	$0	348	$15,513	($2,784)	$18,297	$38,836	($5,708)	($20,759)	($32,855)
		$105,062	$37,631		0	$0	7,018	$250,478	$143,693	$116,785				

TABLE A-28 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt SEA

Capital Costs:

Acquisition	$110,712
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$110,712

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,865 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,650)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$30.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/13/85

Internal Rate of Return 7.35%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$260,478	$143,693	$116,785	1.81
3%	$210,540	$138,405	$72,135	1.52
4%	$173,097	$134,260	$38,836	1.29
5%	$144,614	$130,976	$13,638	1.10
8%	$122,638	$128,346	($5,708)	0.96
10%	$105,449	$126,218	($20,769)	0.84
11%	$98,253	$125,305	($27,053)	0.78
12%	$91,824	$124,479	($32,655)	0.74
13%	$86,064	$123,728	($37,664)	0.70
14%	$80,885	$123,043	($42,158)	0.66
15%	$76,217	$122,419	($46,202)	0.62
16%	$71,995	$121,847	($49,852)	0.59
18%	$64,685	$120,841	($56,157)	0.54
20%	$58,607	$119,988	($61,381)	0.49

TABLE A-29

For Case of: FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $22/SQ.FT. - PRICE OF OIL $35/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$110,712												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$110,712	$311	$35.00	0	$0	58	$2,030	$111,023	($108,993)	($108,993)	($108,993)	($108,993)	($108,993)
2		$0	$1,866	$36.70	0	$0	348	$12,424	$1,866	$10,558	($98,841)	($99,217)	($99,395)	($99,567)
3		$0	$1,866	$38.41	0	$0	348	$12,672	$1,866	$10,806	($88,851)	($89,953)	($90,465)	($90,952)
4		$0	$1,866	$37.14	0	$0	348	$12,926	$1,866	$11,060	($79,019)	($81,174)	($82,155)	($83,080)
5		$0	$1,866	$37.89	0	$0	348	$13,184	$1,866	$11,318	($69,344)	($72,854)	($74,425)	($75,887)
6		$0	$1,866	$38.64	0	$0	348	$13,448	$1,866	$11,582	($59,825)	($64,972)	($67,234)	($69,316)
7		$0	$1,866	$39.42	0	$0	348	$13,717	$1,866	$11,851	($50,459)	($57,504)	($60,544)	($63,312)
8		$0	$1,866	$40.20	0	$0	348	$13,991	$1,866	$12,125	($41,245)	($50,429)	($54,322)	($57,827)
9		$0	$1,866	$41.01	0	$0	348	$14,271	$1,866	$12,405	($32,181)	($43,728)	($48,535)	($52,817)
10		$0	$1,866	$41.83	0	$0	348	$14,556	$1,866	$12,690	($23,265)	($37,379)	($43,153)	($48,241)
11		$0	$1,866	$42.66	0	$0	348	$14,847	$1,866	$12,981	($14,495)	($31,366)	($38,149)	($44,051)
12		$0	$1,866	$43.52	0	$0	348	$15,144	$1,866	$13,278	($5,870)	($25,672)	($33,495)	($40,244)
13		$0	$1,866	$44.39	0	$0	348	$15,447	$1,866	$13,581	$2,613	($20,278)	($29,167)	($36,758)
14		$0	$1,866	$45.28	0	$0	348	$15,756	$1,866	$13,890	$10,955	($15,171)	($25,144)	($33,575)
15		$0	$1,866	$46.18	0	$0	348	$16,071	$1,866	$14,205	$19,158	($10,335)	($21,403)	($30,669)
16		$0	$1,866	$47.11	0	$0	348	$16,393	$1,866	$14,527	$27,224	($5,755)	($17,925)	($28,014)
17		$0	$1,866	$48.05	0	$0	348	$16,721	$1,866	$14,855	$35,155	($1,419)	($14,693)	($25,591)
18		$0	$1,866	$49.01	0	$0	348	$17,055	$1,866	$15,189	$42,953	$2,686	($11,638)	($23,375)
19		$0	$1,866	$49.99	0	$0	348	$17,396	$1,866	$15,530	$50,619	$5,572	($8,894)	($21,359)
20		$0	$1,866	$50.99	0	$0	348	$17,744	$1,866	$15,878	$58,155	$10,251	($6,298)	($19,516)
21		($4,650)	$1,866	$52.01	0	$0	348	$18,099	($2,784)	$20,883	$67,686	$14,732	($3,194)	($17,351)
		$106,062	$37,531		0	$0	7,018	$303,831	$143,693	$160,138				

TABLE A-29 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$110,712
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$110,712

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,855 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,650)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$35.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 3.61%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$303,891	$143,693	$160,198	2.11
2%	$245,530	$138,405	$107,225	1.77
4%	$201,946	$134,260	$67,686	1.50
6%	$168,716	$130,975	$37,740	1.29
8%	$143,078	$128,346	$14,732	1.11
10%	$123,024	$126,218	($3,194)	0.97
11%	$114,628	$125,306	($10,678)	0.91
12%	$107,128	$124,479	($17,351)	0.86
13%	$100,408	$123,728	($23,320)	0.81
14%	$94,366	$123,043	($28,677)	0.77
15%	$88,920	$122,419	($33,499)	0.73
16%	$83,994	$121,847	($37,853)	0.69
18%	$75,465	$120,841	($45,376)	0.62
20%	$68,375	$119,988	($51,614)	0.57

TABLE A-30

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $22/SQ.FT. - PRICE OF OIL $40/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$110,712												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$110,712	$311	$40.00	0	$0	52	$2,320	$111,023	($108,703)	($108,703)	($108,703)	($108,703)	($108,703)
2		$0	$1,866	$40.80	0	$0	348	$14,198	$1,866	$12,332	($96,845)	($97,294)	($97,492)	($97,592)
3		$0	$1,866	$41.62	0	$0	348	$14,482	$1,866	$12,615	($85,180)	($86,468)	($87,085)	($87,534)
4		$0	$1,866	$42.45	0	$0	348	$14,772	$1,866	$12,905	($73,707)	($76,282)	($77,369)	($78,448)
5		$0	$1,866	$43.30	0	$0	348	$15,067	$1,866	$13,201	($62,422)	($66,519)	($68,352)	($70,058)
6		$0	$1,866	$44.16	0	$0	348	$15,369	$1,866	$13,503	($51,324)	($57,329)	($59,968)	($62,396)
7		$0	$1,866	$45.05	0	$0	348	$15,676	$1,866	$13,810	($40,410)	($48,626)	($52,172)	($55,400)
8		$0	$1,866	$45.95	0	$0	348	$15,990	$1,866	$14,124	($29,677)	($40,385)	($44,924)	($48,011)
9		$0	$1,866	$46.87	0	$0	348	$16,309	$1,866	$14,443	($19,123)	($32,582)	($38,186)	($43,177)
10		$0	$1,866	$47.80	0	$0	348	$16,636	$1,866	$14,770	($8,746)	($25,193)	($31,923)	($37,851)
11		$0	$1,866	$48.76	0	$0	348	$16,968	$1,866	$15,102	$1,457	($18,198)	($26,100)	($32,989)
12		$0	$1,866	$49.73	0	$0	348	$17,308	$1,866	$15,442	$11,497	($11,575)	($20,688)	($28,550)
13		$0	$1,866	$50.73	0	$0	348	$17,654	$1,866	$15,788	$21,348	($5,306)	($15,557)	($24,497)
14		$0	$1,866	$51.74	0	$0	348	$18,007	$1,866	$16,141	$31,042	$329	($10,982)	($20,798)
15		$0	$1,866	$52.78	0	$0	348	$18,367	$1,866	$16,501	$40,571	$5,247	($6,636)	($17,422)
16		$0	$1,866	$53.83	0	$0	348	$18,734	$1,866	$16,868	$49,938	$11,555	($2,598)	($14,340)
17		$0	$1,866	$54.91	0	$0	348	$19,109	$1,866	$17,243	$59,144	$16,598	$1,154	($11,527)
18		$0	$1,866	$56.01	0	$0	348	$19,491	$1,866	$17,625	$68,192	$21,352	$4,641	($8,950)
19		$0	$1,866	$57.13	0	$0	348	$19,881	$1,866	$18,015	$77,085	$25,870	$7,882	($5,617)
20		$0	$1,866	$58.27	0	$0	348	$20,279	$1,866	$18,413	$85,825	$30,135	$10,892	($4,480)
21		($4,650)	$1,866	$59.44	0	$0	348	$20,684	($2,784)	$23,468	$95,535	$35,171	$14,381	($2,047)
		$105,062	$37,631		0	$0	7,018	$347,304	$143,693	$203,611				

TABLE A-30 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$110,712
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$110,712

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,665 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,650)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$40.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/15/85

Internal Rate of Return 11.72%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$347,304	$143,693	$203,611	2.42
2%	$280,720	$138,405	$142,315	2.03
4%	$230,795	$134,260	$96,535	1.72
6%	$192,818	$130,976	$61,842	1.47
8%	$163,517	$128,345	$35,171	1.27
10%	$140,599	$126,218	$14,381	1.11
11%	$131,004	$125,306	$5,699	1.05
12%	$122,432	$124,479	($2,047)	0.98
13%	$114,751	$123,728	($8,976)	0.93
14%	$107,847	$123,043	($15,196)	0.88
15%	$101,622	$122,419	($20,796)	0.83
16%	$95,993	$121,847	($25,854)	0.79
18%	$85,246	$120,841	($34,595)	0.71
20%	$78,143	$119,988	($41,846)	0.65

TABLE A-31

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IRH (COLLECTOR PRICE $20/SQ.FT. - PRICE OF OIL $15/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$107,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$107,995	$230	$15.00	0	$0	59	$870	$108,275	($107,405)	($107,405)	($107,405)	($107,405)	($107,405)
2		$0	$1,680	$15.30	0	$0	348	$5,324	$1,680	$3,644	($103,931)	($104,031)	($104,052)	($104,151)
3		$0	$1,680	$15.61	0	$0	348	$5,431	$1,680	$3,751	($100,433)	($100,815)	($100,992)	($101,181)
4		$0	$1,680	$15.92	0	$0	348	$5,540	$1,680	$3,860	($97,002)	($97,751)	($98,092)	($98,414)
5		$0	$1,680	$16.24	0	$0	348	$5,650	$1,680	$3,970	($93,608)	($94,833)	($95,381)	($95,891)
6		$0	$1,680	$16.56	0	$0	348	$5,763	$1,680	$4,083	($90,252)	($92,054)	($92,845)	($93,574)
7		$0	$1,680	$16.89	0	$0	348	$5,879	$1,680	$4,199	($86,934)	($89,408)	($90,475)	($91,446)
8		$0	$1,680	$17.23	0	$0	348	$5,996	$1,680	$4,316	($83,554)	($86,899)	($88,200)	($89,494)
9		$0	$1,680	$17.57	0	$0	348	$6,116	$1,680	$4,436	($80,412)	($84,493)	($85,191)	($87,722)
10		$0	$1,680	$17.93	0	$0	348	$6,238	$1,680	$4,559	($77,210)	($82,212)	($84,253)	($85,059)
11		$0	$1,680	$18.28	0	$0	348	$6,363	$1,680	$4,683	($74,046)	($80,043)	($82,452)	($84,551)
12		$0	$1,680	$18.65	0	$0	348	$6,490	$1,680	$4,810	($70,921)	($77,980)	($80,766)	($83,188)
13		$0	$1,680	$19.02	0	$0	348	$6,620	$1,680	$4,940	($67,835)	($75,018)	($79,192)	($81,900)
14		$0	$1,680	$19.40	0	$0	348	$6,753	$1,680	$5,073	($64,789)	($74,153)	($77,723)	($80,737)
15		$0	$1,680	$19.79	0	$0	348	$6,888	$1,680	$5,208	($61,782)	($72,380)	($76,351)	($79,672)
16		$0	$1,680	$20.19	0	$0	348	$7,025	$1,680	$5,345	($58,814)	($70,695)	($75,072)	($78,695)
17		$0	$1,680	$20.59	0	$0	348	$7,166	$1,680	$5,486	($55,885)	($69,094)	($73,878)	($77,800)
18		$0	$1,680	$21.00	0	$0	348	$7,309	$1,680	$5,629	($52,995)	($67,572)	($72,764)	($76,980)
19		$0	$1,680	$21.42	0	$0	348	$7,455	$1,680	$5,775	($50,144)	($66,127)	($71,725)	($76,229)
20		$0	$1,680	$21.85	0	$0	348	$7,605	$1,680	$5,925	($47,332)	($64,754)	($70,756)	($75,541)
21		($4,536)	$1,680	$22.29	0	$0	348	$7,757	($2,856)	$10,613	($42,488)	($62,477)	($69,179)	($74,441)
		$103,459	$33,880		0	$0	7,018	$130,239	$137,339	($7,100)				

TABLE A-31 (Contd.)

ASSUMPTIONS TABLE

BENEFIT-COSTS TABLE (Calculated)

Economic and Financial Analysis for Energy Investments -- Egypt EEA

10/19/95

Capital Costs:

Acquisition	$107,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$107,995

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,680 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,536)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$15.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

Internal Rate of Return -0.57%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$130,239	$137,339	($7,100)	0.95
2%	$105,270	$132,693	($27,423)	0.79
4%	$86,548	$129,037	($42,488)	0.67
6%	$72,307	$126,130	($53,823)	0.57
8%	$61,319	$123,795	($62,477)	0.50
10%	$52,725	$121,904	($69,179)	0.43
11%	$49,126	$121,091	($71,964)	0.41
12%	$45,912	$120,353	($74,441)	0.38
13%	$43,032	$119,683	($76,651)	0.36
14%	$40,443	$119,072	($78,629)	0.34
15%	$38,108	$118,514	($80,405)	0.32
16%	$35,997	$118,002	($82,005)	0.31
18%	$32,342	$117,102	($84,760)	0.28
20%	$29,303	$116,338	($87,034)	0.25

TABLE A-32

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $20/SQ.FT. - PRICE OF OIL $20/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$107,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$107,995	$280	$20.00	0	$0	58	$1,160	$108,275	($107,115)	($107,115)	($107,115)	($107,115)	($107,115)
2		$0	$1,680	$20.40	0	$0	348	$7,099	$1,680	$5,419	($101,904)	($102,097)	($102,188)	($102,276)
3		$0	$1,680	$20.81	0	$0	348	$7,241	$1,680	$5,561	($96,753)	($97,329)	($97,592)	($97,843)
4		$0	$1,680	$21.22	0	$0	348	$7,386	$1,680	$5,706	($91,690)	($92,800)	($93,305)	($93,782)
5		$0	$1,680	$21.65	0	$0	348	$7,534	$1,680	$5,854	($86,696)	($88,437)	($89,307)	($90,052)
6		$0	$1,680	$22.08	0	$0	348	$7,684	$1,680	$6,004	($81,751)	($84,411)	($85,573)	($86,654)
7		$0	$1,680	$22.52	0	$0	348	$7,838	$1,680	$6,158	($76,884)	($80,530)	($82,103)	($83,535)
8		$0	$1,680	$22.97	0	$0	348	$7,995	$1,680	$6,315	($72,085)	($76,845)	($78,852)	($80,678)
9		$0	$1,680	$23.43	0	$0	348	$8,155	$1,680	$6,475	($67,354)	($73,347)	($75,842)	($78,053)
10		$0	$1,680	$23.90	0	$0	348	$8,318	$1,680	$6,638	($62,691)	($70,027)	($73,027)	($75,569)
11		$0	$1,680	$24.38	0	$0	348	$8,484	$1,680	$6,804	($58,094)	($66,875)	($70,403)	($73,479)
12		$0	$1,680	$24.87	0	$0	348	$8,654	$1,680	$6,974	($53,564)	($63,884)	($67,959)	($71,474)
13		$0	$1,680	$25.36	0	$0	348	$8,827	$1,680	$7,147	($49,100)	($61,046)	($65,682)	($69,639)
14		$0	$1,680	$25.87	0	$0	348	$9,004	$1,680	$7,324	($44,702)	($58,353)	($63,561)	($67,961)
15		$0	$1,680	$26.39	0	$0	348	$9,184	$1,680	$7,504	($40,369)	($55,798)	($61,585)	($66,426)
16		$0	$1,680	$26.92	0	$0	348	$9,367	$1,680	$7,687	($36,100)	($53,375)	($59,744)	($65,021)
17		$0	$1,680	$27.46	0	$0	348	$9,555	$1,680	$7,875	($31,896)	($51,076)	($58,021)	($63,737)
18		$0	$1,680	$28.00	0	$0	348	$9,746	$1,680	$8,066	($27,755)	($48,897)	($56,435)	($62,562)
19		$0	$1,680	$28.56	0	$0	348	$9,941	$1,680	$8,261	($23,677)	($46,829)	($54,943)	($61,488)
20		$0	$1,680	$29.14	0	$0	348	$10,139	$1,680	$8,459	($19,662)	($44,869)	($53,566)	($60,505)
21		($4,536)	$1,680	$29.72	0	$0	348	$10,342	($2,856)	$13,198	($13,639)	($42,038)	($51,604)	($59,137)
		$112,459	$33,880		0	$0	7,018	$173,652	$137,339	$36,313				

TABLE A-32 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt EEA

Capital Costs:

Acquisition	$107,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$107,995

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,680 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,535)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$20.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/88

Internal Rate of Return 2.65%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$173,652	$137,339	$36,313	1.26
2%	$140,350	$132,693	$7,657	1.06
4%	$115,398	$129,037	($13,639)	0.89
6%	$95,409	$125,130	($29,721)	0.76
8%	$81,759	$123,795	($42,038)	0.66
10%	$70,299	$121,904	($51,604)	0.58
11%	$65,502	$121,091	($55,589)	0.54
12%	$61,215	$120,353	($59,137)	0.51
13%	$57,376	$119,683	($62,307)	0.48
14%	$53,924	$119,072	($65,148)	0.45
15%	$50,811	$118,514	($67,702)	0.43
16%	$47,997	$118,002	($70,006)	0.41
18%	$43,123	$117,102	($73,979)	0.37
20%	$39,071	$116,338	($77,266)	0.34

TABLE A-33

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $20/SQ.FT. - PRICE OF OIL $25/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$107,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$107,995	$280	$25.00	0	$0	58	$1,450	$108,275	($106,825)	($106,825)	($106,825)	($106,825)	($106,825)
2		$0	$1,680	$25.50	0	$0	348	$8,874	$1,680	$7,194	($99,908)	($100,154)	($100,285)	($100,402)
3		$0	$1,680	$26.01	0	$0	348	$9,051	$1,680	$7,371	($93,092)	($93,844)	($94,193)	($94,525)
4		$0	$1,680	$26.53	0	$0	348	$9,233	$1,680	$7,553	($86,373)	($87,849)	($88,519)	($89,150)
5		$0	$1,680	$27.06	0	$0	348	$9,417	$1,680	$7,737	($79,764)	($82,162)	($83,234)	($84,232)
6		$0	$1,680	$27.60	0	$0	348	$9,606	$1,680	$7,926	($73,250)	($76,768)	($78,313)	($79,735)
7		$0	$1,680	$28.15	0	$0	348	$9,798	$1,680	$8,118	($66,835)	($71,652)	($73,731)	($75,623)
8		$0	$1,680	$28.72	0	$0	348	$9,994	$1,680	$8,314	($60,517)	($66,001)	($69,455)	($71,852)
9		$0	$1,680	$29.29	0	$0	348	$10,193	$1,680	$8,513	($54,295)	($62,202)	($65,432)	($68,424)
10		$0	$1,680	$29.88	0	$0	348	$10,397	$1,680	$8,717	($48,172)	($57,841)	($61,759)	($65,280)
11		$0	$1,680	$30.47	0	$0	348	$10,605	$1,680	$8,925	($42,142)	($53,707)	($58,355)	($62,406)
12		$0	$1,680	$31.08	0	$0	348	$10,817	$1,680	$9,137	($36,207)	($49,788)	($55,152)	($59,780)
13		$0	$1,680	$31.71	0	$0	348	$11,034	$1,680	$9,354	($30,354)	($46,073)	($52,172)	($57,379)
14		$0	$1,680	$32.34	0	$0	348	$11,254	$1,680	$9,574	($24,614)	($42,553)	($49,399)	($55,185)
15		$0	$1,680	$32.99	0	$0	348	$11,479	$1,680	$9,799	($18,955)	($39,217)	($46,818)	($53,179)
16		$0	$1,680	$33.65	0	$0	348	$11,709	$1,680	$10,029	($13,387)	($36,055)	($44,417)	($51,347)
17		$0	$1,680	$34.32	0	$0	348	$11,943	$1,680	$10,263	($7,907)	($33,059)	($42,184)	($49,673)
18		$0	$1,680	$35.01	0	$0	348	$12,182	$1,680	$10,502	($2,515)	($30,221)	($40,105)	($48,143)
19		$0	$1,680	$35.71	0	$0	348	$12,426	$1,680	$10,746	$2,789	($27,532)	($38,173)	($45,746)
20		$0	$1,680	$36.42	0	$0	348	$12,674	$1,680	$10,994	$8,007	($24,984)	($36,375)	($45,459)
21		($4,536)	$1,680	$37.15	0	$0	348	$12,928	($2,856)	$15,784	$15,211	($21,598)	($34,029)	($43,833)
		$103,459	$33,880		0	$0	7,018	$217,065	$137,339	$79,726				

TABLE A-33 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt SEA

Capital Costs:

Acquisition	$107,935
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$107,935
Construct Time	10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,580 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,535)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$25.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 5.40%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$217,065	$137,339	$79,726	1.58
2%	$175,450	$132,593	$42,757	1.32
4%	$144,247	$129,037	$15,211	1.12
6%	$120,511	$126,130	($5,619)	0.95
8%	$102,198	$123,795	($21,598)	0.83
10%	$87,874	$121,904	($34,029)	0.72
11%	$81,877	$121,091	($39,214)	0.68
12%	$76,520	$120,353	($43,833)	0.64
13%	$71,720	$119,682	($47,953)	0.60
14%	$67,405	$119,072	($51,667)	0.57
15%	$63,514	$118,514	($55,000)	0.54
16%	$59,996	$118,002	($58,007)	0.51
18%	$53,904	$117,102	($63,198)	0.46
20%	$48,839	$116,338	($67,498)	0.42

TABLE A-34

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPH (COLLECTOR PRICE $20/SQ.FT. - PRICE OF OIL $30/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	6%	10%	12%
1	Acquisition	$107,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$107,995	$280	$30.00	0	$0	58	$1,740	$108,275	($106,535)	($106,535)	($106,535)	($106,535)	($106,535)
2		$0	$1,680	$30.60	0	$0	348	$10,649	$1,680	$8,969	($97,911)	($98,221)	($96,382)	($98,527)
3		$0	$1,680	$31.21	0	$0	348	$10,862	$1,680	$9,182	($89,422)	($90,259)	($90,793)	($91,207)
4		$0	$1,680	$31.84	0	$0	348	$11,079	$1,680	$9,399	($81,066)	($82,897)	($83,732)	($84,517)
5		$0	$1,680	$32.47	0	$0	348	$11,301	$1,680	$9,621	($72,843)	($75,826)	($77,161)	($78,403)
6		$0	$1,680	$33.12	0	$0	348	$11,527	$1,680	$9,847	($64,749)	($69,125)	($71,047)	($72,816)
7		$0	$1,680	$33.78	0	$0	348	$11,757	$1,680	$10,077	($56,785)	($62,774)	($65,358)	($67,711)
8		$0	$1,680	$34.46	0	$0	348	$11,992	$1,680	$10,312	($48,949)	($56,757)	($60,067)	($63,046)
9		$0	$1,680	$35.15	0	$0	348	$12,232	$1,680	$10,552	($41,239)	($51,056)	($55,144)	($58,784)
10		$0	$1,680	$35.85	0	$0	348	$12,477	$1,680	$10,797	($33,653)	($45,655)	($50,565)	($54,891)
11		$0	$1,680	$36.57	0	$0	348	$12,726	$1,680	$11,046	($26,190)	($40,539)	($46,306)	($51,334)
12		$0	$1,680	$37.30	0	$0	348	$12,981	$1,680	$11,301	($18,850)	($35,692)	($42,345)	($48,085)
13		$0	$1,680	$38.05	0	$0	348	$13,240	$1,680	$11,560	($11,629)	($31,101)	($38,662)	($45,118)
14		$0	$1,680	$38.81	0	$0	348	$13,505	$1,680	$11,825	($4,527)	($26,753)	($35,237)	($42,408)
15		$0	$1,680	$39.58	0	$0	348	$13,775	$1,680	$12,095	$2,458	($22,635)	($32,051)	($39,933)
16		$0	$1,680	$40.33	0	$0	348	$14,051	$1,680	$12,371	$9,327	($18,735)	($29,090)	($37,573)
17		$0	$1,680	$41.19	0	$0	348	$14,332	$1,680	$12,652	$15,082	($15,042)	($26,337)	($35,609)
18		$0	$1,680	$42.01	0	$0	348	$14,619	$1,680	$12,939	$22,724	($11,545)	($23,777)	($33,725)
19		$0	$1,680	$42.85	0	$0	348	$14,911	$1,680	$13,231	$29,255	($8,234)	($21,397)	($32,004)
20		$0	$1,680	$43.70	0	$0	348	$15,209	$1,680	$13,529	$35,677	($5,099)	($19,185)	($30,433)
21		($4,536)	$1,680	$44.58	0	$0	348	$15,513	($2,856)	$18,359	$44,060	($1,158)	($16,454)	($28,529)
		$103,459	$33,880		0	$0	7,018	$260,478	$137,339	$123,139				

TABLE A-34 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt SEA

Capital Costs:

Acquisition	$107,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$107,995

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,680 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,536)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$30.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 7.87%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$260,478	$137,339	$123,139	1.90
2%	$210,540	$132,693	$77,847	1.59
4%	$173,097	$129,037	$44,060	1.34
6%	$144,614	$126,130	$18,483	1.15
8%	$122,638	$123,796	($1,158)	0.99
10%	$105,449	$121,904	($16,454)	0.87
11%	$98,253	$121,091	($22,838)	0.81
12%	$91,824	$120,353	($28,529)	0.76
13%	$85,064	$119,683	($33,619)	0.72
14%	$80,885	$119,072	($38,186)	0.68
15%	$76,217	$118,514	($42,297)	0.64
16%	$71,995	$118,002	($46,007)	0.61
18%	$64,685	$117,102	($52,417)	0.55
20%	$58,607	$115,338	($57,731)	0.50

TABLE A-35

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPM (COLLECTOR PRICE $20/SQ.FT. - PRICE OF OIL $35/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$107,935												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$107,935	$280	$35.00	0	$0	53	$2,030	$108,275	($106,245)	($106,245)	($106,245)	($106,245)	($106,245)
2		$0	$1,680	$35.70	0	$0	348	$12,424	$1,680	$10,744	($95,915)	($95,297)	($95,478)	($95,553)
3		$0	$1,680	$36.41	0	$0	348	$12,672	$1,680	$10,992	($85,752)	($85,573)	($87,394)	($87,890)
4		$0	$1,680	$37.14	0	$0	348	$12,926	$1,680	$11,246	($75,755)	($77,540)	($78,945)	($79,885)
5		$0	$1,680	$37.89	0	$0	348	$13,184	$1,680	$11,504	($65,921)	($69,490)	($71,057)	($72,574)
6		$0	$1,680	$38.64	0	$0	348	$13,448	$1,680	$11,768	($56,249)	($61,482)	($63,781)	($65,897)
7		$0	$1,680	$39.42	0	$0	348	$13,717	$1,680	$12,037	($46,735)	($53,896)	($55,985)	($59,799)
8		$0	$1,680	$40.20	0	$0	348	$13,991	$1,680	$12,311	($37,381)	($46,713)	($50,569)	($54,230)
9		$0	$1,680	$41.01	0	$0	348	$14,271	$1,680	$12,591	($28,181)	($39,911)	($44,795)	($49,145)
10		$0	$1,680	$41.83	0	$0	348	$14,556	$1,680	$12,875	($19,134)	($33,469)	($39,334)	($44,501)
11		$0	$1,680	$42.66	0	$0	348	$14,847	$1,680	$13,167	($10,239)	($27,370)	($34,253)	($40,362)
12		$0	$1,680	$43.52	0	$0	348	$15,144	$1,680	$13,464	($1,492)	($21,596)	($29,539)	($35,391)
13		$0	$1,680	$44.39	0	$0	348	$15,447	$1,680	$13,767	$7,105	($16,129)	($25,152)	($32,858)
14		$0	$1,680	$45.28	0	$0	348	$15,756	$1,680	$14,076	$15,580	($10,953)	($21,075)	($29,632)
15		$0	$1,680	$46.18	0	$0	348	$16,071	$1,680	$14,391	$23,871	($6,053)	($17,285)	($26,687)
16		$0	$1,680	$47.11	0	$0	348	$16,393	$1,680	$14,713	$32,040	($1,415)	($13,753)	($23,999)
17		$0	$1,680	$48.05	0	$0	348	$16,721	$1,680	$15,041	$40,071	$2,975	($10,489)	($21,546)
18		$0	$1,680	$49.01	0	$0	348	$17,055	$1,680	$15,375	$47,964	$7,130	($7,448)	($19,306)
19		$0	$1,680	$49.99	0	$0	348	$17,395	$1,680	$15,716	$55,721	$11,053	($4,621)	($17,253)
20		$0	$1,680	$50.99	0	$0	348	$17,744	$1,680	$16,064	$63,346	$14,786	($1,994)	($15,397)
21		($4,535)	$1,680	$52.01	0	$0	348	$18,093	($2,855)	$20,955	$72,910	$19,281	$1,120	($13,225)
		$103,459	$33,880		0	$0	7,018	$303,891	$137,339	$166,552				

TABLE A-35 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments — Egypt SEA

Capital Costs:

Acquisition	$107,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$107,995

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,680 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,536)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$35.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	343 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/85

Internal Rate of Return 10.14%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$303,891	$137,339	$166,552	2.21
2%	$245,530	$132,593	$112,937	1.85
4%	$201,946	$129,037	$72,910	1.57
6%	$168,716	$126,130	$42,586	1.34
8%	$143,079	$123,798	$19,281	1.16
10%	$123,024	$121,904	$1,120	1.01
11%	$114,628	$121,091	($5,463)	0.95
12%	$107,128	$120,353	($13,225)	0.89
13%	$100,408	$119,683	($19,275)	0.84
14%	$94,356	$119,072	($24,705)	0.79
15%	$88,920	$118,514	($29,594)	0.75
16%	$83,994	$118,002	($34,008)	0.71
19%	$75,465	$117,102	($41,637)	0.64
20%	$68,375	$116,338	($47,963)	0.59

TABLE A-36

For Case of:FIELD TEST #4 - HELWAN TEXTILE/IPM (COLLECTOR PRICE $20/SQ.FT. - PRICE OF OIL $40/BBL)
Assuming Oil Escalation Rate of : 2.0%

Year		Capital Cost	Operating Cost	Cost of Oil $/Bbl.	Fuel Used (Bbl)	Fuel Cost	Saved Energy Equiv.	Value of Saved Energy	Annual Cost	Cash Flow Current $	Discounted Cash Flow (NPV) @ i = 4%	8%	10%	12%
1	Acquisition	$107,995												
1	Transport	$0												
1	Construction	$0												
1	Interconnection	$0												
1	Total	$107,995	$880	$40.00	0	$0	58	$2,320	$108,275	($105,955)	($105,955)	($105,955)	($105,955)	($105,955)
2		$0	$1,680	$40.80	0	$0	348	$14,198	$1,680	$12,518	($93,918)	($94,354)	($94,575)	($94,778)
3		$0	$1,680	$41.62	0	$0	348	$14,482	$1,680	$12,802	($82,082)	($83,383)	($83,994)	($84,572)
4		$0	$1,680	$42.45	0	$0	348	$14,772	$1,680	$13,092	($70,443)	($72,995)	($74,158)	($75,253)
5		$0	$1,680	$43.30	0	$0	348	$15,067	$1,680	$13,387	($58,999)	($63,155)	($65,014)	($66,745)
6		$0	$1,680	$44.16	0	$0	348	$15,369	$1,680	$13,689	($47,748)	($53,839)	($56,514)	($58,978)
7		$0	$1,680	$45.05	0	$0	348	$15,676	$1,680	$13,996	($36,687)	($45,019)	($48,614)	($51,887)
8		$0	$1,680	$45.95	0	$0	348	$15,990	$1,680	$14,310	($25,812)	($36,699)	($41,271)	($45,414)
9		$0	$1,680	$46.87	0	$0	348	$16,309	$1,680	$14,629	($15,123)	($28,765)	($34,445)	($39,505)
10		$0	$1,680	$47.80	0	$0	348	$16,636	$1,680	$14,956	($4,615)	($21,284)	($28,103)	($34,112)
11		$0	$1,680	$48.76	0	$0	348	$16,968	$1,680	$15,288	$5,712	($14,202)	($22,209)	($29,190)
12		$0	$1,680	$49.73	0	$0	348	$17,308	$1,680	$15,628	$15,865	($7,500)	($16,732)	($24,597)
13		$0	$1,680	$50.73	0	$0	348	$17,654	$1,680	$15,974	$25,842	($1,156)	($11,543)	($20,597)
14		$0	$1,680	$51.74	0	$0	348	$18,007	$1,680	$16,327	$35,648	$4,847	($6,912)	($16,855)
15		$0	$1,680	$52.78	0	$0	348	$18,367	$1,680	$16,687	$45,284	$10,529	($2,518)	($13,441)
16		$0	$1,680	$53.83	0	$0	348	$18,734	$1,680	$17,054	$54,754	$15,905	$1,564	($10,325)
17		$0	$1,680	$54.91	0	$0	348	$19,109	$1,680	$17,429	$64,059	$20,992	$5,358	($7,482)
18		$0	$1,680	$56.01	0	$0	348	$19,491	$1,680	$17,811	$73,203	$25,806	$8,881	($4,888)
19		$0	$1,680	$57.13	0	$0	348	$19,881	$1,680	$18,201	$82,188	$30,361	$12,155	($2,521)
20		$0	$1,680	$58.27	0	$0	348	$20,279	$1,680	$18,599	$91,016	$34,671	$15,196	($361)
21		($4,536)	$1,680	$59.44	0	$0	348	$20,684	($2,856)	$22,540	$101,759	$39,721	$18,695	$2,079
		$103,459	$33,880		0	$0	7,018	$347,304	$137,339	$209,965				

TABLE A-36 (Contd.)

ASSUMPTIONS TABLE

Economic and Financial Analysis for Energy Investments -- Egypt EEA

Capital Costs:

Acquisition	$107,995
Transportation	$0
Construction	$0
Interconnection	$0
TOTAL (Cap.)	$107,995

Construct Time 10 months

Operating and Normal Maintenance Costs:

Operating Cost	$1,580 /year
Operating Lifetime	21 years

Major Equipment Repair/Replacement:

Replace Cost	($4,536)/period
Replace Period	20 years

Benefit Parameters:

Price of Oil	$40.00 /bbl (yr. 1)
Oil Escalat.	2.0%/year
Energy Savings	348 bbl/year
Fuel Use	0 bbl/year

BENEFIT-COSTS TABLE (Calculated)

10/19/86

Internal Rate of Return 12.29%

Disc. Rate	PV of Benefits	PV of Costs	NPV	B/C Ratio
0%	$347,304	$137,339	$209,965	2.53
2%	$280,720	$132,593	$148,027	2.12
4%	$230,796	$129,037	$101,759	1.79
6%	$192,818	$126,130	$66,688	1.53
8%	$163,517	$123,796	$39,721	1.32
10%	$140,599	$121,904	$18,695	1.15
11%	$131,004	$121,091	$9,913	1.08
12%	$122,432	$120,353	$2,079	1.02
13%	$114,751	$119,683	($4,931)	0.96
14%	$107,847	$119,072	($11,225)	0.91
15%	$101,622	$118,514	($16,891)	0.86
16%	$95,993	$118,002	($22,009)	0.81
18%	$86,246	$117,102	($30,856)	0.74
20%	$78,143	$115,338	($38,195)	0.67

APPENDIX B

Preliminary Cost Estimates

Three (3) systems are considered appropriate for cost analysis. Cost estimates are preliminary for use in the Application Review/Conceptual Design portion of this project.

A. Waste Heat Recovery System

B. Solar Thermal Collection System.

Current $US (mid-1986) are applied, then escalated to mid-1987, the expected construction period, at 10 percent.

For cost assessment purposes, all material and supervision will be considered imported to Egypt. Labor costs will reflect some Egyptian rate influence, although certain installation procedures will require experienced labor not currently available in Egypt.

The average annual wage for the Egyptian construction industry in 1985 is 7800 LE, or $5,778 (US). ($1.35 LE per US $)

An average labor rate in the United States for construction services applicable to this project is estimated by the R. S. Means Company to be $21.77 per hour in 1985 (crew Q4). An estimated thirty percent imported labor, with seventy percent Egyptian labor, can be used for establishing a mixed labor rate average of $9.36 per hour (US). A labor cost modifier for wages becomes $9.36/$21.77, or 0.43.[1]

Equipment and system cost estimates and percentages are established by using R. S. Means Company Cost Data, 1985, and equipment suppliers' budget pricing estimates.

The solar cost data are determined in fixed-and variable-cost increments as required by the FCHART-4R program input format. A solar collection array size of 4,000 square feet (372 m^2) is estimated for use in determining the variable cost factor.[2]

COST ESTIMATE OUTPUT
A. WASTE HEAT RECOVERY SYSTEM

DESCRIPTION	SUBTOTAL	TOTAL
3 WAY WASTE WATER DIVERTING VALVES		
SUMP MATERIALS		
SUMP PUMP		
FILTER SCREEN		
SUMP PUMP LEVEL CONTROL AND VALVE		
WASTE HEAT STORAGE TANK		
WASTE HEAT STORAGE TANK PUMP		
STORAGE TANK LEVEL CONTROL AND VALVE		
WASTE HEAT EXCHANGER @ $12.00/1000 BTU		
SUB-TOTAL EQUIPMENT(MID-1986)	$160,900	
ESCALATION FACTOR	1.1	
TOTAL EQUIPMENT (MID-1987)		$176,990
FLOW INDICATORS AND GLOBE VALVES		
3 WAY PROCESS WATER BLENDING VALVES		
STEAM CONTROL VALVES		
PROCESS WATER TEMPERATURE CONTROLLERS		
SUB-TOTAL EQUIPMENT(MID-1986)	$71,400	
ESCALATION FACTOR	1.1	
TOTAL EQUIPMENT (MID-1987)		$78,540
PIPING COST @ (40% EQUIP COST)	0.40	$102,212
INSULATION COST @ (75% PIPING COST)	0.75	
SUB-TOTAL MATERIAL COST	$434,401	
LABOR COST (71.5% MATERIAL COST)	$310,597	
MODIFIER,LABOR MIX	0.43	
MODIFIED LABOR COST		$133,557
SUB-TOTAL MATERIAL + LABOR	$567,958	
TOTAL WASTE HEAT RECOVERY SYSTEM CONSTRUCTION COST		$567,958

B. SOLAR THERMAL COLLECTION SYSTEM
VARIABLE COST (MID-1987)

DESCRIPTION		
SOLAR COLLECTORS @ $10.00/FT2		
COLLECTOR AREA 4000 FT2		
COLLECTOR COST		
SOLAR CIRCULATING PUMPS		
SOLAR DISTRIBUTION PUMPS		
STRUCTURAL STEEL		
SOLAR CONTROLS		
INSTRUMENT AIR SYSTEM/PIPING		
LOW VOLTAGE CABLE		
EXCAVATION AND FOUNDATIONS		
ELECTRICAL		
TOTAL EQUIPMENT (MID-1986)	$105,500	
ESCALATION FACTOR	1.1	
TOTAL EQUIPMENT (MID-1987)		$116,050
PIPING COST @ (40% COLLECTOR COST)		$16,000
INSULATION COST @ (75% PIPING COST)	0.75	$12,000
TOTAL MATERIAL COST	$144,050	
LABOR COST (71.5% MATERIAL COST)	$102,996	
MODIFIER, LABOR MIX	0.43	
MODIFIED LABOR COST		$44,288
MATERIAL + LABOR	$188,338	
FREIGHT, DUTY, TAXES TO EGYPT @10%		$18,834
SUBTOTAL	$207,172	
SUBTOTAL	$207,172	
CONTINGENCY @ 15%		$31,076
TOTAL VARIABLE COST		$238,248
COST PER FT2	$60	

FIXED COST (MID 1987)

DESCRIPTION		
CONTRACTOR'S RENTAL SUPPLIES		
CONTRACTOR'S FACILITIES		
CONTRACTOR'S UTILITIES		
CONTRACTOR'S MATERIAL HANDLING		
CONTRACTOR'S CLEAN-UP		
DISMANTLING AND MOVING		
BOXING AND CRATING		
U.S. TRANSPORTATION		
SUB-TOTAL		$34,000
SUB-TOTAL	$34,000	
CONTINGENCY @ 15%		$5,100
TOTAL FIXED COST		$39,100

LGE COST BASED ON CURRENT FIELD TEST PROJECT

TOTAL VARIABLE COST	$238,248
TOTAL FIXED COST	$39,100
TOTAL SYSTEM CONSTRUCTION COST	$277,348

EEA COST DATA BASED ON CURRENT PROJECTS
USING IN-COUNTRY CONTRACTOR AND EQUIPMENT

VARIABLE COST @ $28.62/FT2	$28.62	
COLLECTOR SIZE (FT2)	4000	
TOTAL VARIABLE COST		$114,480
EEA FIXED COST		$26,757
TOTAL SYSTEM CONSTRUCTION COST		$141,237

CONSTRUCTION COST SUMMARY

A. WASTE HEAT RECOVERY SYSTEM	$567,958
B. SOLAR THERMAL COLLECTION SYSTEM	$277,348
TOTAL CONSTRUCTION COST A & B	$845,305

APPENDIX C

RENEWABLE ENERGY FIELD TESTING PROJECT (AID. 263-0123.2)

14 OCT 1986

To: Mr. Robert C. Springberg. LBTI

From: Dr. Talaat El Tahlawi, EEA
Anhar Hegazi, EEA

Anhar Hegazi
Oct/14/1986

Date: oct/14/1986

Subject: DATA for the ECONOMIC ANALYSIS of FT/4

Refference our discussion for the optimization of the Solar System of FT/4, which requires the reduction of the operating temperature of the Solar System to "40°C = 104°F" to enhance System efficiency. Kindly be informed that the following data are recomended for use by the Project economist for the Pre. R.F.P economic analysis

- Collector Area 4200 ft^{-2}
- net Annual Energy 1632.36 MMBTU
- Saving Boiler efficiency 76 % 444 BTU
- ANNUAL operating hours 3314 hrs.

14 OCT 1986

Cost figures are the same for the final report of FT#3 as agreed upon by all parties at Ismailia. A copy of such agreement is attached. Attached also is a copy of the FChart-UR run.

In addition the waste heat recovery system data has to be considered as by LGE/AR report.

It is our understanding that the economic analysis report will show the analysis for the integrated project, as well as individual systems "waste heat, solar system"

Thank You, Anhar Hegazy

ENVIRONMENTAL DATA AND THERMAL PERFORMANCE

ENVIRONMENTAL DATA

CAIRO
TILT ANGLE = 45.00 LATITUDE = 30.08
AZIMUTH ANGLE = 0

	HORIZONTAL SOLAR RAD	TILTED SOLAR RAD	AMBIENT AIR TEMPERATURE	WATER SUPPLY TEMPERATURE
	BTU/SQFT-DAY	BTU/SQFT-DAY	DEG F	DEG F
JAN	1329.	2122.	57.	58.
FEB	1606.	2180.	59.	56.
MAR	1931.	2174.	64.	58.
APR	2215.	2050.	70.	65.
MAY	2400.	1931.	77.	73.
JUN	2444.	1839.	82.	81.
JUL	2400.	1862.	82.	87.
AUG	2252.	1964.	83.	89.
SEP	2016.	2099.	79.	86.
OCT	1613.	2037.	75.	80.
NOV	1333.	2006.	67.	71.
DEC	1218.	2020.	60.	64.

THERMAL PERFORMANCE SPECIFIED COLLECTOR AREA = 4200.00 SQ.F.

	SOLAR FRACTION	INCIDENT SOLAR	COLLECTOR OUTPUT	SOLAR SYS OUTPUT	TANK LOSS	LOAD	TANK TEMP	TEMP OUT
	%	*	*	*	*	*	DEG F	DEG F
JAN	56.9	276.26	167.30	166.68	0.62	292.84	84	[illegible]
FEB	56.4	256.40	154.99	154.56	0.52	271.21	83	83
MAR	57.8	283.10	167.44	166.60	0.66	289.41	85	85
APR	61.6	258.25	149.15	148.23	0.82	240.55	89	89
MAY	68.3	251.38	135.84	134.76	1.13	197.34	94	94
JUN	80.7	231.75	115.19	113.65	1.54	140.78	100	100
JUL	95.2	242.18	107.06	104.68	2.32	109.42	103	103
AUG	100.0	255.75	100.76	97.40	3.26	97.40	120	120
SEP	100.0	261.46	113.16	110.17	2.94	110.17	116	116
OCT	89.2	265.23	137.88	135.99	1.87	152.43	101	101
NOV	71.8	252.72	144.92	143.72	1.15	200.15	95	95
DEC	60.8	263.03	156.43	155.64	0.81	256.16	88	88
YR	69.2	3100.81	1650.10	1632.36	17.66	2359.86		

* UNITS MMBTU ANNUAL OPERATING HOURS = 3314

1986

FT#3
Task 2.1

11/14/86

Final Cost figures to be used

	REFT	Local	
Variable	25.117	22.21	$/ft²
Fixed	23.995	17.43	17,430

(334/m²)

Actual local 330 – 350 $/m²

The overhead has to be considered for other project in a similar way as appropriate

14 May 86 All field test financial + economic analysis need to be calculated using similar methodologies particularly the consideration of non construction management overhead for items such as insurance, performance bon

السيد الاستاذ الدكتور / طلعت البلادي
المحترم

ارجو التفضل بالاحاطة ... الضرورة تصفية ذلك
على كافة المشروعات حيث تم تسعير
وصرف من الاعتماد الامن لمشروعات FT#3
فقط ... مستوى من التكاليف بشكل واضح
هذا احتسبت قيمة (overhead) كالتالي:
١٠٪ المعدات المورده من الخارج
١٥٪ المعدات المحلية

أ. أ. رجائي

وأ. أ. رجائي
سعاد فاتح الأرقعي
للتنسيق للرجوع الاستشارة
رئيس

المنظمة العربية للتنمية الصناعية
وادارة ... ١٠٨ ...
الموضوع
عدد المرفقات
الجواب

C-4