17-0005/020/06

PROPRIETARY

IMPERIAL OIL LIMITED
RESEARCH PROJECT SHEETS
OWN ACCOUNT
FOR 1980

COPY NO. 4

1980 RESEARCH PROJECT

1300 KESI	EARCH PROJECT	
 PLANNING GROUP Solar Energy 	PROJECT NO. NE-8	
 PRODUCT LINE Solar Heating 	NEW CONTINUING X	
• TITLE Liquid Collector Technology CATEGORY A B C D E F	BILLING Natural Resources Coord Solar Budget BUDGET (1980) 250 k\$	
• . ORIGINATOR/DEPT. Solar Research Gr	roup	
BUSINESS/TECHNICAL OUTLOOK		,
	ent liquid collector(s) is potentially a e future. Collectors are a large part ergy system installation.	
	. The second of	
• LONG RANGE OBJECTIVES/DEFINITION O	DF NEED	
Determine best liquid collector de business venture for Imperial in s	esign/systems for Canada to develop a new solar energy.	
• 1980 KEY RESEARCH OBJECTIVES		
1. Identify and quantify key liqu	uid collector design parameters.	
Build prototypes or buy comment evaluation.	rcially available models for performance	
4		
		_
2 Demonstrated excellent perfor	e liquid collector test facility.	

INCENTIVES/JUSTIFICATION

Canadian made collectors manufactured on a large scale could compete successfully.

4. Started to systematically evaluate key design parameters.

PRODUCT LINE

None

MAJOR OBJECTIVE

Determine best collector design/systems for Canada to develop a new business opportunity in solar energy.

RESEARCH COSTS - k\$

3 PRIOR YEARS 1978 1979 EST. 1979 BUDGET 1980 1981 1982 AT COMPLETED (YEAR)

PAYOUT (YEARS) k\$ BENEFIT (1st, 2nd, 3rd, YEARS AFTER COMPLETION)

KEY ASSUMPTIONS Program is at too exploratory a stage to meaningfully estimate benefits.

- Imperial programs will earn license free rights to Exxon solar technology.
- Imperial will decide on a solar business entry in 1983+.

IMPERIAL SCORIN	G					(WORLD MUTUAL PROJECTS)
CRITERIA PROFILE		IGHT-		uco.		POTENTIAL
		NG	<u>H I</u>	MED	<u>LO</u>	AREA HI MED
URGENCY	()				EXXON POLICY
SCOPE	()				
CONSISTENCY	()				
PROBABILITY OF SUCCESS	()				OPERATIONS SUPPORT
RESEARCH PERIOD	()				
RESEARCH COSTS	()				
COST TO EXPLOIT	()				
PAYBACK PERIOD	()				TECHNICAL KNOWLEDGE
BENEFIT: COST	()				
RESEARCH COMPATIBILITY	()				IMPERIAL INTEREST
TECHNICAL KNOWLEDGE	()				22.1001
		SCO	RE			

OTHER JUSTIFICATION

PROJECT RATING PRIORITY

BENEFIT COST RATIO

1980 RESEARCH PROJECT

•	PLANNING GROUP Solar Energy PROJECT NO. NE-9
•	PRODUCT LINE Solar Heating WEW F
•	TITLE A: C.11
	- Solar Budget
	(DICINATED 1997) 200 K\$
_	ORIGINATOR/DEPT. Solar Research Group
•	BUSINESS/TECHNICAL OUTLOOK
	Manufacture and sale of an efficient competitive air collector(s) vs liquid collector(s) is potentially a major new business venture, as air collectors can be made lighter and cheaper.
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•	LONG RANGE OBJECTIVES/DEFINITION OF NEED
	Determine best air collector design/systems for Canada to develop a new business venture for Imperial in solar energy.
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•	1980 KEY RESEARCH OBJECTIVES
	 Identify key air collector design parameters.
	2. Define prototype designs for performance evaluation.
•	CURRENT STATUS/RECENT ACCOMPLISHMENTS 1. Developed a computer simulation model of a duct-type air collector. 2. Screened design parameters using this model.
	 Screened design parameters using this moder. Designed a laboratory comparator for testing min-collectors.
	3. Designed a reserve s
_	INCENTIVES/JUSTIFICATION
•	Canadian made collectors manufactured on a large scale could compete
	successfully.

MAJOR OBJECTIVE Determine best collector design/systems for Canada to develop

a new business opportunity in solar energy.

ECONOMIC JUSTIFICATION TOTAL RESEARCH COSTS - kS 1980 1981 1982 AT COMPLETED 1979 BUDGET YEAR 3 PRIOR YEARS 1978 1979 EST. 200 50

PAYOUT (YEARS) k\$ BENEFIT (1st, 2nd, 3rd, YEARS AFTER COMPLETION)

Program is at too exploratory a stage to meaningfully estimate KEY ASSUMPTIONS benefits.

- Imperial programs will earn license free rights to Exxon solar technology.
- Imperial will decide on a solar business entry in 1983+.

IMPERIAL SCORING						(WORLD MUTUAL PROJECTS) POTENTIAL	
CRITERIA PROFILE		I GHT - NG	HI	MED	<u>L0</u>	AREA HI	MED
URGENCY	()				EXXON POLICY	
SCOPE	()					
CONSISTENCY	()					
PROBABILITY OF SUCCESS	()				OPERATIONS SUPPORT	
RESEARCH PERIOD	() .					
RESEARCH COSTS	()					
COST TO EXPLOIT	()					
PAYBACK PERIOD	()				TECHNICAL KNOWLEDGE	
BENEFIT: COST	()					
RESEARCH COMPATIBILITY	()				IMPERIAL INTEREST	
TECHNICAL KNOWLEDGE	()					
The Part of the All		SCORE					

OTHER JUSTIFICATION

PROJECT RATING

PRIORITY `

BENEFIT COST RATIO

1980 RESEARCH PROJECT

•	PLANNING GROUP	Solar Energy	PROJECT NO. NE-	10
•	PRODUCT LINE	Solar Heating	MEW	CONTINUING X
•	TITLE Chemical	Heat Storage	BILLING Natural	Resources Coord.
	CATEGORY A B	CDEF	BUDGET (1980)	Solar Budget 200 k\$

ORIGINATOR/DEPT. Solar Research

BUSINESS/TECHNICAL OUTLOOK

Annual heat storage could be the key to effective application of solar energy in the Canadian climate. Sensible heat storage in rocks or water is too bulky and costly to meet this need. Chemical heat storage can substantially reduce size and cost, and hence make annual heat storage possible.

LONG RANGE OBJECTIVES/DEFINITION OF NEED

Develop an annual heat storage system to transfer excess summer heat to winter use.

1980 KEY RESEARCH OBJECTIVES

- 1. Select salt mixes and eutectics for high transition heats at suitable temperatures for solar applications.
- 2. Multi-cycle test prime candidates.
- Encapsulate prime candidates for testing in fixed-bed heat exchange to develop a scale-up model.
- Explore other attractive heat storage techniques.

CURRENT STATUS/RECENT ACCOMPLISHMENTS

- Found salt mixes can be used to tailor temperature of phase transitions.
- Demonstrated polyethylene oxide prevented separation of glauber salts in a 50 cycle test.
- 3. Showed plastic encapsulated spheres of water (base case) gave excellent temperature stratification in storage.
- Selected and tested a eutectic for comparison of phase change behaviour with the base case.

INCENTIVES/JUSTIFICATION

Annual storage could eliminate (or reduce) the back-up system, as well as reduce the number of collectors needed and hence offset costs as well.

PRODUCT LINE None

MAJOR OBJECTIVE Develop an annual heat storage system to transfer excess summer heat to winter use.

RESEARCH COSTS - kS

3 PRIOR YEARS 1978 1979 EST. 1979 BUDGET 1980 1981 1982 AT COMPLETED (YEAR)

125 200

PAYOUT (YEARS) TO TOTAL (YEARS)

PAYOUT (YEARS) ks BENEFIT (1ST, 2nd, 3rd, YEARS AFTER COMPLETION)

KEY ASSUMPTIONS Program is at too exploratory a stage to meaningfully estimate benefits.

- Imperial programs will earn license free rights to Exxon solar technology.
- Imperial will decide on a solar business entry in 1983.

CRITERIA PROFILE	RING WEIGHT-				(WORLD MUTUAL PROJECTS) POTENTIAL
URGENCY SCOPE CONSISTENCY	ING () () ()	<u>HI</u>	<u>ME D</u>	<u>L0</u>	AREA HI MED EXXON POLICY
PROBABILITY OF SUCCESS RESEARCH PERIOD RESEARCH COSTS COST TO EXPLOIT	() () ()				OPERATIONS SUPPORT
PAYBACK PERIOD BENEFIT: COST RESEARCH COMPATIBILITY	()				TECHNICAL KNOWLEDGE
TECHNICAL KNOWLEDGE	()				IMPERIAL INTEREST
	SCORE				

OTHER JUSTIFICATION

PROJECT RATING PRIORITY