



<b>1. Project Data:</b>		<b>Date Posted :</b> 03/08/2005	
<b>PROJ ID:</b> P005589		<b>Appraisal</b>	<b>Actual</b>
<b>Project Name:</b> Solar Water Heating (GEF)	<b>Project Costs (US\$M)</b>	20.9	21.3
<b>Country:</b> Tunisia	<b>Loan/Credit (US\$M)</b>	7.3 grant	7.3 grant
<b>Sector(s):</b> Board: EMT - Renewable energy (100%)	<b>Cofinancing (US\$M)</b>	13.6	14.2
<b>L/C Number:</b>			
	<b>Board Approval (FY)</b>		95
<b>Partners involved :</b> Belgium	<b>Closing Date</b>	06/30/2004	06/30/2004
<b>Prepared by :</b>	<b>Reviewed by :</b>	<b>Group Manager :</b>	<b>Group:</b>
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<b>2. Project Objectives and Components</b>			
<b>a. Objectives</b>			
To assist the Recipient (Republic of Tunisia) in encouraging the substitution of renewable solar energy for fossil fuels in public and commercial private institutions so as to mitigate global warming by maximising CO 2 displacement and demonstrate the potential of solar water heating for reducing global warming . Note: this wording is from the Grant Agreement; the Project Document says : "...fossil fuels <i>in all sectors except agriculture and industry</i> and thus mitigate global warming by maximising CO2 displacement and demonstrate the potential replicability of the selected approach - SWH - for reducing global warming."			
<b>b. Components</b>			
1. Technical Assistance -for promotion, performance monitoring (of the equipment and the program), and administration of procurement and subsidies . \$ 0.7 million, at appraisal.			
2. Investment in Solar Hot Water (SWH) equipment by targetted users - the project provided subsidies to qualified beneficiaries at 35% of purchase price. \$ 6.6 million at appraisal.			
Two major changes were made to accelerate project implementation :			
a) allowing the use of "the normal commercial practices of the Beneficiary at a reasonable price ", rather than grouping of procurement into ICB packages; and			
b) extending the project scope to include "individual households."			
<b>c. Comments on Project Cost, Financing and Dates</b>			
Project costs were estimated on the basis of about 150 large public or commercial installations of \$200,000 each. Unit costs declined substantially during the project period, though only a small part of this is attributable to the project. The project finally financed 171 systems in the "tertiary" sector at an average cost of \$ 30,400 and 17,455 in the household sector at an average cost of \$ 1,220. The assumption that a 35% subsidy would be sufficient to attract beneficiaries to install SWH proved to be correct. The appraisal judgement that an extended implementation period (nine years) would be required was a little pessimistic, as the grant was fully disbursed two years before the closing date.			
<b>3. Achievement of Relevant Objectives:</b>			
This review finds that the change of focus to households was fully justified by the limited demand from the public and commercial private institutions and the unexpectedly high demand from the household sector . The modified project remained clearly directed at the underlying purpose of the grant : to encourage the substitution of renewable solar energy for fossil fuels. As available funds were fully utilized for this purpose and there is evidence that the SWH units financed are operating as planned, we can conclude that the project objective was fully achieved .			
<b>4. Significant Outcomes/Impacts:</b>			
<ul style="list-style-type: none"> <li>• public awareness campaign led to substantial demand from the household sector</li> <li>• 17,626 subprojects financed over a five year period, amounting to 51,060 m2 collector area (compared to</li> </ul>			

appraisal estimate of 50,000 m2)

- CO2 emissions reduced by 25,000 ton/yr (compared to appraisal estimate of 18,000 tons)
- eight suppliers of SWH systems established, of which two are also manufacturers
- indications that private sector sales will continue without subsidies
- monitoring and evaluation systems have ensured quality of project installations and restored reputation of SWH in Tunisia

## 5. Significant Shortcomings (including non-compliance with safeguard policies):

### Quality at Entry

As this was the first GEF project in the SWH area, there was little relevant experience on which to base the project. It appears that a decision to package all procurement for ICB may have shaped the project design (rather than *vice versa*) and even led to the targeting of the project to larger units, though the Project Document (PD) is not very clear on the latter point. The PD should have discussed alternatives to the selected project design, projected the expansion of natural gas, appraised the capacity of the implementing agency, and assessed risks more seriously (especially, technical risks and the availability of commercial finance to complement the project subsidies). It might also be argued that the project was not ready for implementation, as no list of applicants had been prepared by the time of Board presentation. No incremental cost analysis was done and the projected cost of avoided carbon emissions was a high \$23/ ton (though expected to be lowered by "multiplier effects" as the SWH market expanded). The ICR rates the quality at entry as unsatisfactory, primarily because of the failure to see the potential of the household sector and the cumbersome and unproductive procurement provisions.

### Quality of Implementation

After two years of little progress, the procurement issue was addressed through an amendment to the Grant Agreement allowing normal commercial practices. After a further two years, subsidies were extended to the household sector and implementation went into high gear. While these changes were handled well, some shortcomings may also be noted:

- there was no attempt to recalculate the subsidy needed to attract the interest of the household sector; in fact, the rapidity of sales suggests that a 35% subsidy left considerable consumers' surplus.
- although the ICR states that "As a result of good quality control and mechanisms for system maintenance the deployed solar water heaters will continue to operate in a satisfactory manner" and "in late 2004 all systems that were installed are in good working condition", no real evidence is cited and the ICR mission did not include an engineer. The change in focus to the household sector may well have increased operation and maintenance risks, including the problem of scaling (mineral deposits) discussed in the PD. Thus, project sustainability does not yet seem to be assured.
- with 11 supervision missions in 9 years, some with only one member, no Resident Mission and no use of procurement specialists, Bank supervision does not appear to have been fully adequate. Conversely, recorded administrative costs (which do not include some preparation costs) were a low 7.5% of the GEF grant.
- while the Bank showed flexibility in changing project processes that were not working, such decisions were unnecessarily delayed.

### Safeguards

At appraisal, the project was assigned Category 'C', which appears to have been appropriate, given that any negative environmental impacts of SWH would be very minor. However, the reasoning of the PD, which assigned Category 'C' because of the large positive environmental benefits was faulty. No other safeguard policies would have been triggered. Safeguard issues are not mentioned at all in the ICR.

6. Ratings:	ICR	OED Review	Reason for Disagreement /Comments
<b>Outcome:</b>	Satisfactory	Satisfactory	Might have been highly satisfactory, as all project targets were met or exceeded, within time and budget. However, some doubts remain on the ability of householders to operate and maintain SWH units, so as to ensure sustainability.
<b>Institutional Dev.:</b>	Substantial	Substantial	
<b>Sustainability:</b>	Likely	Non-evaluable	See above. Not enough information in the ICR to evaluate the sustainability of project investments.
<b>Bank Performance:</b>	Unsatisfactory	Satisfactory	The pioneering nature of the project, the

			Bank's willingness to make changes and the successful outcome more than offset the Bank's errors of judgement noted in Section 5.
<b>Borrower Perf .:</b>	Satisfactory	Satisfactory	However, the Government's continued subsidies to natural gas connections represent a major negative factor .
<b>Quality of ICR :</b>		Satisfactory	

**NOTE:** ICR rating values flagged with '\*' don't comply with OP/BP 13.55, but are listed for completeness.

**7. Lessons of Broad Applicability:**

1. Projects of a quasi-commercial nature like this need to be designed with considerable flexibility to allow for changing market conditions .
2. Even the extended implementation period of this project was not long enough to demonstrate clearly whether SWH can compete with fossil fuels, although there are indications that this will be the case in the medium term .

**8. Assessment Recommended?**  Yes  No

**Why?** As the first of its kind, the project potentially offers valuable lessons to later GEF operations . The assessment should focus, inter alia, on the ability of the Tunisian SWH industry to compete with fossil fuels without subsidy.

**9. Comments on Quality of ICR:**

The ICR which is generally complete and well balanced is satisfactory . The analysis of costs and competitiveness of SWH is particularly valuable. However, Section 10 was not used to highlight issues of concern to GEF, as suggested in their ICR guidelines.