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**DJIBOUTI ENERGY INITIATIVES:  
MID-TERM EVALUATION**

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**Conservation Component  
Draft Report**

Prepared for:  
**U.S. Agency for International Development  
Djibouti**

Prepared by:  
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The energy conservation potential in Djibouti is substantial and virtually untapped. Although energy prices are very high (electricity costs U.S. \$0.23/kWh) and the potential for energy savings quite large (20-30 percent of current consumption) through simple retrofits in the housing and commercial sector, little (if anything) is happening. There are three major reasons for the failure to conserve energy: a lack of awareness of conservation techniques and benefits in both the public and private sectors; a lack of technical ability to identify actions to be taken and implement projects; and a lack of support from government institutions.

To help Djibouti achieve significant foreign exchange savings through energy conservation, the USAID/VITA project should be redirected to building an institutional capability in energy conservation and developing energy conservation awareness and technical expertise in this area. The set of recommendations presented in Exhibit 1 can be implemented through mid-1987 at a total cost of \$424,000-\$550,000, depending on whether

**Exhibit 1****Energy Conservation Activities in Djibouti:  
Summary of Recommendations**

<u>Recommendation</u>	<u>Timing</u>	<u>Additional cost (\$ thousand)<sup>1</sup></u>
Short-term technical assistance (audits, training)	1985-1986	80
Technical training for technicians in retrofitting techniques	End 1985	15
Overseas training for heads of ISERST and Service de l'Energie (SDE)	Mid-1985	12
Retrofit prototypes/demonstrations (public and private buildings, industry)	End 1985/1986	100
Energy efficiency exhibition	End 1985	5
Directory of energy-efficient products and services	Mid-1985	10
Promotional campaign	Ongoing	60
Low-cost housing demonstration units	1985	120
Waste oil use	1985	7
Forms for new construction	End 1985/1986	<u>15</u>
<b>Total</b>		<b>424</b>
(Optional: long-term assistance to SDE <sup>2</sup> )		(+125)

In addition to contract expenditures.  
To be considered if SDE becomes fully operational.

optional institutional development is undertaken. Beyond the end of the project, USAID could consider providing continuous support through commodity programs (e.g., energy-efficient products such as insulation materials, efficient lighting), with associated technical assistance.

**PROJECT**

This report deals with the energy conservation activities undertaken or planned under the Djibouti Energy Initiatives Project (No. 603-0013) initiated in mid-1982. The project paper -- which was prepared in 1980 and early 1981 and accepted by REDSO in June 1981 -- set four objectives: (1) establish a number of "model sites" for demonstration of energy-saving technologies with installation of a few prototypes; (2) establish short-term training courses to industries; (3) make a contribution to the National Energy Assessment; and (4) develop a set of documents to study and promote conservation.

The last objective called for a series of activities aimed at saving energy in space cooling, industrial and rural development processes, and end uses. The anticipated results of these activities were to be "research, consultancy, training, and professional diffusion of technical studies and onsite demonstration processes on

how to save energy."\* The data needed to generate these results were to be obtained from: energy audits; short-term, on-site training sessions; fossil-fuel saving prototypes; and technical publications. Djibouti's National Higher Institute of Scientific and Technological Research (ISERST) would be the implementing agency. As part of this effort, the ISERST chief of the energy section was to take a "one month study tour to a number of countries having a proven track record in energy conservation."\*\*

In terms of resources, the chief of party (COP) was to be assisted by a short-term architectural consultant (2 man-months) and a U.S. architect/engineering (A/E) firm that would design and draw up plans for a model energy-saving building for Djibouti (ISERST's new earth science building).

The objectives were developed on the basis of four assumptions:\*\*\*

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\*Project Paper, page II/12.

\*\*Project Paper, Page II/13, last paragraph.

\*\*\*Project Paper, Page II/14.

- The GROD will in the long term determine a quantitative target for conservation.
- The National Energy Commission will be established, and the Directorate of Planning will provide limited but ongoing budget support enabling ISERST to undertake energy audits and set up demonstration sites.
- Other interested agencies will provide guidance and will agree to fund trainees for ISERST short-term training programs.
- The GROD will provide ISERST with a skilled Djiboutian mechanic for at least 3 years to assist the project engineer and architectural consultant in conducting energy audits; after the project is completed, the mechanic will be able to carry on conservation practices.

The overall budget for conducting all above-mentioned activities is estimated at \$238,000 for AID and \$101,000 for GROD, for a total of \$339,000 or 6.3 percent of total project cost (AID + GROD).

The project paper surprisingly considers industry as an important target for conservation efforts. Actually, the industrial sector is very small and limited to a handful of non-energy-intensive facilities. The residential and commercial sector constitutes a much more important target.

Project achievements as of December 1984 are summarized below in chronological order:

- Preparation of a manual on energy-conserving construction techniques for Djibouti by VITA architect consultant, Dan Dunham and Judy Hirsh.
  
- Completion of ISERST new building design and preparation of bid package by Dan Dunham and contracted architect Bernard Cazaban.
  
- Completion of 8-week consultancy by energy auditor, Seymour Jarmul, who trained counterpart staff and transferred metering equipment.

- Construction, together with the Ministry of Commerce, Transport and Tourism, of a ceramic stove using waste oil as a fuel.
- Completion of an air conditioning analysis for the ISERST building in collaboration with VITA home office and volunteers.
- Development of plans to design and build five to ten low-cost, energy-efficient housing units integrating results and recommendations from Jarmul's consultancy.
- Detailed analysis of the potential for conservation in all sectors and development of recommendations during the National Energy Assessment.
- Evaluation of energy-efficient light bulbs.
- Assistance to private sector in manufacturing bricks, to using waste oil as fuel substitute for energy-intensive cement bricks.

- Second consultancy of architect Dunham to review preliminary drawings for World Bank-sponsored housing project.

**PROJECT EVALUATION**

The in-country evaluation of the project conservation component was conducted by Alain Streicher, Vice President of Hagler, Bailly & Company (Energy Conservation Services Program contractor) between December 9 and December 19, 1984. The objectives of this evaluation component were to check project soundness, assess results to date, and recommend further steps for project success in the area of conservation.

During briefings in Washington given prior to the in-country mission, AID indicated to the evaluators that it was not envisioned to increase project funding beyond current obligations. AID also indicated that consideration should be given to enhancing the conservation component rather than the renewable component. Finally, AID made clear its interest in cooperating with other donor organizations to ensure that the project had a long-term effect.

**Objectives and Methodology**

With respect to conservation activities, the evaluation objectives were to:

- a. Appraise the appropriateness of activity focus and scope
- b. Identify activity characteristics
- c. Determine activity effectiveness to date
- d. Identify obstacles to project implementation
- e. Determine the need for changes in technical and budgetary requirements
- f. Make recommendations, given AID-imposed limitations
- g. Identify those elements of activities that other donor organizations might wish to support
- h. Recommend priority areas for possible future AID support upon project completion.

Specific TORs for the conservation specialist are provided in Appendix A.

A draft report was left at USAID/Djibouti prior to departure. A list of people interviewed and documents reviewed is presented in Appendix B.

### **ORGANIZATION OF THE REPORT**

In Chapter 2, detailed findings are presented and in Chapter 3, conclusions and recommendations are presented.

Based on numerous interviews conducted with all parties-at-interest and a review of existing documents, a substantive fraction of the energy conservation activities envisioned in the project paper appears to have been carried out.

However, several conservation activities remain uncompleted:

- Model sites with demonstration/prototypes  
(none)
- Short-term training course for industry (none)
- Assistance to industry (none)
- Trip of ISERST chief to several countries with good track record of conservation (no. yet made).

An estimated \$195,000 has been spent, compared with a budgeted total of \$238,000. The activities not yet

carried out could probably be completed with the remaining funds.\* Therefore, expenditures and achievements are roughly in accord.

The remainder of this chapter summarizes the evaluation findings along the following dimensions:

- Institutions
- Technical assistance
- Training
- Products (studies, reports, national energy assessment)
- Promotion

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\*Developing some model sites with demonstrations/prototypes would cost about \$20,000 if limited to lighting, insulation, and other housekeeping measures; one short-term training course and assistance to industry would cost not more than \$15,000, as the industrial base in Djibouti is very small; and the ISERST's chief trip would cost not more than \$7,000, for a total of about \$42,000.

- Private-sector role
- Financing and incentives
- Likely project impact.

The institutions will be reviewed in more detail than the other elements, given the influence they have on future conservation project succes.

### **INSTITUTIONS**

National institutions involved in conservation activities consist primarily of ISERST, Travaux Publics, the Ministry of Industry and its Service de l'Energie, Electricite de Djibouti (EdD), and the Ministry of Commerce, Transport and Tourism. Foreign and international institutions include the French Mission de Cooperation, the French Agency for Energy Management (AFME), and the World Bank. The major institutional problem facing energy conservation is the lack of commitment from the Ministry of Industry and Travaux Publics, without which significant results at the end use level and the national level are unlikely.

ISERST, the host institution, has become increasingly interested in energy conservation. Recognizing the limited short-term impact of renewable energy resources on the national balance of payments, ISERST's director is willing to consider refocusing the project on conservation activities. Within ISERST, the project director and two technicians have received training in energy conservation in buildings during Jarmul's consultancy, including audit training. Auditing instruments brought by Jarmul are kept at ISERST. Based on discussions held in-country, ISERST is apparently perceived by other institutions as the logical institution to conduct energy conservation activities in Djibouti.

Travaux Publics is concerned with conservation activities through its Direction de l'Urbanisme et du Logement for buildings and through its transportation division for the transportation sector. One technician from Travaux Publics participated in the training on energy conservation in buildings provided by Jarmul. There does not appear to be much top-level support for energy conservation activities, including building retrofit and establishment of norms and standards for new construction. A number of reasons were mentioned, including: uncertainty about the costs and benefits of

energy conservation measures, a lack of support in public and private sectors for such measures (energy has a very low priority despite its high cost), and a need for EdD to demonstrate its own commitment to energy conservation, by cutting its production costs and prices, before promoting energy conservation among users.

Service de l'Energie, a newly created, one-man operation within the Ministry of Industry, replaces what the project paper expected would be the National Energy Commission.\* It was not possible to meet with the Chef du Service de l'Energie (CSE) until the last day of the in-country mission to discuss the role of conservation in current and future national energy planning. During the short meeting held with the CSE, the need for long-term assistance to the Service was discussed. Unfortunately, the CSE had no work plan, staffing plan, or budget to support his request for assistance. Instead, he indicated that a plan would be available as soon as the National Energy Assessment report is reviewed by the government. Several representatives from various ministries and agencies -- most of whom were members of

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\*Such a commission was actually informally created and provided guidance during the National Energy Assessment.

the advisory committee created to coordinate Phase II activities of the assessment -- are currently reviewing the assessment report, and a series of meetings is planned for January and February to establish government priorities. Final government decision is expected by March. The Service de l'Energie could then have a well-defined mission, a work plan, a budget, and a staff (probably including one assistant to the CSE).

A meeting with the Minister of Industry, who is directly responsible for the Service de l'Energie, indicated clear priority on extending energy supply through EdD production modernization and expansion and development of national geothermal resources. According to the minister, energy conservation was a very complex business deserving lower priority and later consideration.

Electricite de Djibouti (EdD), the national electric utility, is very supportive of any effort serving the national interest, including energy conservation, and EdD's director has supported and will continue to support the AID/ISERST/VITA project. EdD is modernizing its production and distribution system through the installation of two new 15-MW diesel generating sets, the use of heavier diesel oil (recommended by the National

Energy Assessment), increased distribution voltage from 20 kV to 63 kV in some sections, and installation of advanced power factor improvement devices (recommended by the National Energy Assessment). In addition, EdD will benefit from favorable spot purchases of oil (1985 contracts will save FD 2,000 or \$12.00 per tonne of oil compared with 1984 prices). As a result, EdD is expected to reduce its operating costs by 25 to 30 percent, saving hundreds of millions of FD.

Since 1981, EdD has operated at a loss that has been covered by a subsidy; in 1982, for instance, the Subsidy was FD 450 million (U.S. \$2.6 million). Because of the strong interest of its director for energy efficiency improvements, EdD is willing to modify its current rate structure (declining blocks for commercial and industrial customers) for a more conservation-oriented structure with flat or increasing block tariffs. Revised tariffs will be proposed to the government in the first half of 1985. Because EdD has already done work in this area with help from the French EdF, it is unlikely to have urgent need of technical assistance in the future.

To promote energy conservation, Edd will provide institutional support to a customer-oriented auditing service. It is not in a position at present to offer financial assistance to customers willing to invest in conservation (e.g., rebate programs, cost sharing agreements). However, such aid could be an option by 1986. Unfortunately, the current Edd director will be retiring in June 1985, and it is uncertain whether his successor will place an equally high priority on demand management. Edd's interest in mitigating the effect of the summer peak loads and spreading loads more evenly among seasons and time of day is likely to continue. The National Energy Assessment indicated that assistance is needed in this area, and the French AFME has proposed to provide it. Collaboration between AID and AFME to provide technical assistance is acceptable to all parties.

The Ministry of Commerce, Transport and Tourism currently provides full support to the project in promoting the use of waste oil (lubricant) for ceramic kilns and other industrial applications. Although the ministry sees these efforts essentially in terms of stimulating new local business (there is currently no ceramic activity in Djibouti, mainly because of the high cost of

fuel), support to the use of waste oil for displacing currently imported oil falls into the USAID project scope. For example, Coubeche, the largest industrial complex in Djibouti (ice plant, Coca-Cola bottling plant) has indicated a strong interest in modifying its burners to use waste oil instead of diesel.

Fonds de Cooperation (FAC) and AFME, both French organizations, have indicated keen interest in collaborating with the project in various areas, including conservation, mainly for housing and electricity generation (EdD). Based on the findings of the National Energy Assessment, AFME has recently proposed to ISERST/VITA that it assist EdD in load management.

The World Bank is currently funding an economic planning project staffed by three foreign experts. The resident representative -- who was interviewed during the mission -- said that, to his knowledge, the bank was not considering funding any energy-related activity beyond its current geothermal project.

**TECHNICAL ASSISTANCE**

VITA's achievements in conservation have been mainly in line with project paper expectations, given AID's priorities on the completion of the ISERST building and the data base activities. A particularly successful activity has been Jarmul's consultancy. The training activities, the audits, the closing seminar, and the publication of his report titled "Reducing Energy Consumption in Buildings" were rated very highly by all people interviewed during the evaluation. The COP and his consultants have been successful in raising the awareness of the project leader and the ISERST director with respect to energy conservation activities.

**TRAINING**

Training in energy conservation has been limited to on-the-job audit training during Jarmul's consultancy.

**PRODUCTS**

In addition to Dunham's and Jarmul's reports, the major product has been the conservation component of the National Energy Assessment (NEA). The NEA focuses on EDD power factor improvement, a switch to heavier oil (which would cost \$2 million, but save in the first year \$3.3 million), and electricity conservation in buildings, for which the potential has been estimated at 20-30 percent on average in existing buildings and up to 50 percent in new buildings. Savings in the transportation sector are estimated at about 10 percent. The NEA also suggested: (1) setting up an audit team for buildings; (2) implementing one or two pilot projects in government office buildings; (3) establishing a loan program for conservation retrofits; (4) conducting a media campaign; (5) promoting energy-efficient new buildings by building several prototype houses and revising building codes; (6) retrofitting street lighting with high pressure sodium lamps; (7) government use of fuel-efficient vehicles; and (8) conducting a comprehensive road transport study. Most of these recommendations -- except those related to EDD, which are already being implemented, and that for the

27

loan program -- are sound, but they must be prioritized.

### **PROMOTION**

Little promotion has been done so far, except for a television presentation of Jarmul's findings in late 1983 and some articles in local newspapers on waste oil use. The distribution of the NEA report and the reports by Jarmul and Dunham, which will be completed by year end, could do much to raise the awareness of a variety of decision-makers in the government and the private sector. The reports clearly indicate potential savings of 20 percent to -- in a few cases -- 80 percent. Unfortunately, no follow-up or additional audits have been conducted by the trainees since Jarmul's departure. A brief survey of Djiboutian awareness of energy conservation measures showed that little, if anything, was known about the opportunities for conservation and their costs and benefits.

**PRIVATE-SECTOR ROLE**

The private sector should be a major beneficiary of the project through the implementation of conservation measures. To date, however, the private sector has not benefited; the project's scope is limited and the project has other priorities. Nonetheless, the private sector should enjoy significant gains. The search for energy-efficient air conditioning equipment for the ISERST building will probably continue to benefit the local supplier of the selected appliances (Philco). In addition, work done on the use of waste oil and local construction materials is likely to benefit a much larger private audience than the current private promoters of such use.

**FINANCING AND INCENTIVES**

Although private banks (e.g., Banque pour le Commerce et l'Industrie Mer Rouge) cannot provide attractive financing for energy conservation, a semi-government financing institution -- "Caisse de Developpement de Djibouti" (CDD) -- created in 1982 has the authority to provide financing for investments in energy

conservation for both the residential/commercial and the industrial sector with attractive terms (8-percent interest rate, grace period during construction) (see Appendix C). Moreover, CDD is willing to provide such financing.

The major energy consumers (the Coca-Cola plant, military installations, commercial buildings, and large air-conditioned houses) have sufficient financial resources to invest in conservation activities, which pay back generally in a few months. Nonetheless, they do not make such investments. One of the reasons is that a large fraction of Djiboutian high-income households do not pay for the electricity they use. Their bills (which often exceed \$1,000 per month) are paid as part of the expatriate fringe benefit package. Another reason is that most of the large energy-using houses are rented; thus, the owners are reluctant to invest in something that would not result in direct benefits to them (the demand for well-appointed housing exceeds supply).

**LIKELY PROJECT IMPACT**

If the project were to end now or to continue at the past rate, it would be unlikely to have any noticeable impact on Djibouti's balance of payments. A significant increase in the level of effort, especially in the information awareness and technical assistance areas, is necessary to achieve any meaningful improvement in the national energy situation.

21

Despite extremely high energy prices in Djibouti (gasoline costs about \$2.20 per gallon and electricity prices average U.S. \$0.23 per kWh), much energy is wasted. Roughly 25 percent of all energy currently used in Djibouti could be economically saved, with a payback of 1 year or less. This saving rate corresponds roughly to reduction in annual oil imports of 25,000 tonnes of oil equivalent (toe), which would be worth \$5 million. For a variety of reasons, including a failure by government institutions (except ISERST) to assign a high priority to conservation and a lack of awareness and interest on the part of energy users, energy is not being saved in Djibouti.

At this point in time, ISERST is seen as the most appropriate organization to lead a national effort. Unfortunately, ISERST is not in a position to enforce policy. Neither Travaux Publics nor the Service de l'Energie is likely to develop enough interest and ability in the short term to act in place of ISERST. Consequently, ISERST will have to continue to lead conservation efforts, at least until the Service de l'Energie

finalizes its work plan (hopefully during the second quarter of 1985).

The local private sector has little ability to (1) inform the public and the government about the benefits of energy conservation, and (2) implement retrofitting measures in the residential, commercial, and industrial sectors. Based on Jarmul's audits and on visits conducted during the evaluation, it is clear that retrofitting measures (housekeeping, insulation, change of equipment) have a very high payoff, generally between 1 month and 1 year, because the major source of energy to be saved -- electricity -- is very expensive.

According to Jarmul's study, investment costs for retrofitting vary between U.S. \$100 and \$1,000 for typical houses and individual offices, and between U.S. \$5,000 and \$25,000 for buildings such as retail stores and hotels. These investments are well within the reach of most users. Extrapolated nationwide, the audit results indicate that, for Djibouti as a whole, about U.S. \$2-\$3 million in investment would be needed. Of this amount, about U.S. \$300,000 would be earmarked for housing retrofitting, or roughly U.S. \$50,000 per year, assuming 6 years to capture the economic potential.

Even if the capital needed for retrofitting is not available in equity to the users, they can apply to Caisse de Developpement and obtain a loan at an interest rate of 8 percent. Therefore, financing is not seen as a problem in Djibouti. Identifying what has to be done and who can do it, and convincing people to do it are the real issues.

Other conservation activities considered within the project include promoting energy-efficient housing, promoting local building materials as a substitute for energy-intensive imported materials, and promoting the use of waste oil (mostly lubricant) as a fuel to replace imported oil.

The project calls for the construction of a number (five to ten) of energy-efficient housing units. As AID is contributing U.S. \$5.5 million to an IBRD-sponsored \$15 million housing project at Salines Ouest, attempts have been made to include some of the results of Dunham's research in the design of the houses. IBRD has not indicated yet if it would consider suggestions made by Dunham in November 1984 to the French architectural firm to modify initial designs that did not incorporate any energy efficiency aspects. In any case,

building the five to ten low-cost units either at ISEROT's site or at Salines Ouest is the best way of promoting the concept of energy-efficient housing.

The work on local building materials (brick) has reached the proof of concept stage, and other donor organizations, namely the National Women's Union and its German consultant (EESWOS), are willing to take over.

Finally, promoting waste oil in ceramic stoves and industrial boilers as a replacement for diesel was not originally part of the project paper, but was included later at AID's request. As an energy-saving effort, it is consistent with the project goal. However, as a means of promoting the development of a local ceramic industry (using cheap fuel), it is not within project guidelines.

Energy conservation demonstrations in buildings and in the industrial sector are fully justified for consideration during the remainder of the project.

EdD is striving to achieve considerable energy savings within the next 12-18 months. To this end, it is installing new generating units, power factor improvement

devices, and 63-kV lines, and it is planning a tariff revision, which is likely to provide additional incentives to users to save energy. The only area that EdD has not explored is load management, which would enable it to decrease the dramatic incidence of summer peaks and improve the reliability of the production system and future capacity expansion programs.

Lastly, with respect to the transportation sector, little has been done under the project.

Below, detailed recommendations are presented that will ensure project effectiveness in the area of energy conservation and lead to actual savings in imported oil, given the project constraints and AID-imposed limitations.

## **RECOMMENDATIONS**

### **General**

- The COP, in accordance with AID, should make conservation the project priority for the remainder of the project duration (cost: none).

**Institutions**

- ISERST should remain the leading institution for coordinating and implementing conservation activities, until Service de l'Energie and Travaux Publics demonstrate real interest, taking action to increase staffing and budgeting accordingly (cost: none).

**Technical Assistance**

- Given the recommended project reorientation, experience and interest in conservation should be among the criteria used in selecting a new COP (cost: none).
- Several short-term technical assistance missions in commercial and industrial energy audit practices and conservation project implementation, including demonstrations, should be planned for 1985 and 1986. A minimum of three ISERST technicians should be trained, both in classrooms and on the job, and should devote more than 75 percent of their time to energy

conservation activities (cost: \$50,000 in 1985 and \$30,000 in 1986).

- Long-term technical assistance should be provided to the Service de l'Energie when it has developed a strategy and budgeted the associated resources (cost: \$125,000).

### **Training**

- The ISERST conservation team and should receive more training in conservation starting in the first quarter of 1985. Topics should cover areas mentioned in the COP's training plan, Item B, page 8, focusing primarily on the building sector, with an introduction to industrial energy auditing for one or two team members. Representatives from T.P., the Ministry of Industry, and EdD should be encouraged to participate (cost: included above).
- One or two ISERST technicians and representatives from private construction/retail/installation companies should receive practical

training in retrofitting existing buildings and houses, including installing insulation and changing air conditioning systems (third and fourth quarter; cost: \$15,000).

- The head of Service de l'Energie and ISERST's conservation head should receive training in energy demand management in the United States (e.g., TVA or ADL course), preferably during the second quarter (second quarter 1985; cost: \$12,000).

### Outputs

- Five to ten detailed energy audits of selected public and private buildings should be conducted by the ISERST audit team, in coordination with EdD, under the guidance of a VITA specialist before the end of 1985. On the basis of the audit results and in collaboration with other concerned institutions, ISERST/VITA should select two to three sites at which to implement audit recommendations. The sites will then be used as demonstrations. By late 1985

and early 1986, each site may host several projects (e.g., lighting, insulation). One of the demonstrations should use solar panels to heat/preheat water (e.g., hospitals, laundry, or food processing plant) by late 1985 (cost: \$45,000 in 1985 and \$55,000 in 1986).

- ISERST/VITA should initiate/sponsor a national exhibition of energy-efficient appliances and equipment by mid-1985 (cost: \$5,000).
  
- A directory of energy-efficient services and products available in Djibouti should be prepared by ISERST/VITA by mid-1985 (cost: \$10,000).

### **Promotion**

- ISERST should ask the Minister of Industry and the Minister of Travaux Publics to co-sponsor a seminar aimed at raising awareness of energy efficiency among top-level government employees (first quarter 1985; cost: none).

- ISERST should, with assistance from VITA, develop an aggressive promotion program for 1985, including preparation of brochures, pamphlets, TV and radio spots, posters, stickers, and conferences (cost: \$30,000 in 1985, \$20,000 in 1986, and \$10,000 in 1987).
  
- ISERST should nominate a staff member to coordinate public relations activities (January 1985; cost: none).
  
- ISERST should play a key role in informing individuals and organizations about services available to them, including financing from Caisse de Developpement (cost: none).

**Other**

- ISERST should build five low-cost, energy-efficient houses at its site, which ISERST staff will monitor, and five at Salines Ouest to contribute to the IBRD-sponsored housing project (starting date: January 1985; cost: \$120,000).

- ISERST should continue promoting the use of waste oil for equipment that now burns premium fuels (1985-1986; cost: \$7,000).
  
- ISERST and Service de l'Energie should ask AFME for assistance in designing and implementing an energy conservation program in the transportation sector (second quarter 1985; cost: none).
  
- Each government organization (e.g., ministry, agency, commission) should have responsibility for energy expenditures. For example, each organization should appropriate a 1986 budget set at 95 percent of 1985 expenditures. Any request for additional funding should be fully documented. Any money left over can be used in the following year (cost: none).
  
- Travaux Publics should develop norms for energy efficiency in new construction and enforce them (cost: \$15,000).
  
- The Ministry of Industry should consider energy efficiency when reviewing proposals/bids for industrial projects (cost: none).

**Energy Conservation Specialist**

The Energy Conservation Specialist shall perform the following tasks:

- a. Evaluate the recommendations and work done in energy conservation to date under the project, prioritize possible future energy efficiency interventions, and provide budgetary options, given no additional support for the energy conservation after project implementation. Prioritize those interventions that have the greatest chance for success, given the Djibouti environment.
- b. Have primary responsibility for analyzing and evaluating all energy conservation activities.
- c. Collaborate with the Renewable Energy Specialist in evaluating recommendations and prioritizing possible interventions related to energy-efficient buildings and building materials.

- d. Make recommendations for technical assistance, training, commodities, energy conservation demonstrations, loan programs, etc., given project and mission program constraints.
  
- e. Evaluate and specify the technical and other criteria and interventions required to undertake the recommendations outlined in the Djibouti National Energy Assessment.

The Energy Conservation Specialist must be fluent in French and should have demonstrated experience in small electric power utility systems operation and maintenance, load management, and energy efficiency in the electric power sector, and end-use efficiency. A background in commercial/residential energy utilization efficiency and financing commercial/residential energy efficiency programs is also desirable.

## **Appendix B**

### **LIST OF CONTACTS**

**B.1**

USAID/ISERST: same as Mike Bess.

Electricite de Djibouti: Mr. Becquet (director).

Travaux Publics: Ali Sheick.

E.P.H.: Mr. Pellfigue.

Chambre de Commerce: Mr. Coubeche, Mr. Cinquin.

Banque du Commerce et de l'Industrie Mer Rouge: Mr. Pfumio.

Philco representative

Service de l'Energie: Mr. Oblik Carton.

Ministry of Industry: the Minister.

World Bank: Mr. Michael Seporara.

F.A.C.: Mr. Dominoni

Ministry of Commerce, Transport, and Tourism: Mr. Syad.

4