SIXTEENTH QUARTERLY REPORT

July - September 1986

DJIBOUTI ENERGY INITIATIVES PROJECT

USAID Contract No. 603-0013-C-00-2001-00

—

Submitted to

United States Agency for International Development

Djibouti

by

Martin Bush

Chief of Party

VOLUNTEERS IN TECHNICAL ASSISTANCE

Djibouti

October 1986

1. INTRODUCTION

This quarterly report covers the period from July to September 1986. It is the 16th quarterly report issued by the Energy Initiatives Project in Djibouti.

The sections which follow review the project activities underway during the reporting period.

2. ENERGY CONSERVATION

1. The energy conservation work is continuing although activities have been delayed by the usual summer slowdown and other interruptions. The Project team consisted of Abdulkarim and Ibrahim from ISERST, and Awad who is being trained for the Service de l'Energie. However, Ibrahim has recently been transferred to the ISERST Seismology laboratory at Arta, Abdulkarim was away on vacation during most of August, and Awad left the project in August to accept a permanent position with the Service de Cadastre--a situation which is very favorable for him, but a disappointment for the Project since Awad is one of the more capable of the Project technicians.

In addition, the national energy planning initiative, particularly the energy surveys organized by consultants Dominique Briane and Jose Gomez, have occasionally required all the technicians to participate, and these activities have also interrupted the energy conservation work.

In an effort to get back on track the project has taken on four young technicians for a 3-month trial period to work on the energy conservation program. The new technicians have been taught how to insulate refrigerators, how to install fluorescent lamps, and how to seal air-conditioning wall units. At the end of the probationary period, the best technician of the group will be employed by ISERST and will continue to work with the Project.

2. Several energy audits have recently been conducted. An energy analysis of the guest rooms at the Sheraton Hotel was performed at the request of the Ministry of Tourism. The Ministry was proposing to reduce the hotel's high electricity consumption (mainly for air-conditioning) by double-glazing the windows in the rooms. An energy analysis revealed that it would be far more cost-effective to insulate the outside walls of the rooms. A technical report has been written and submitted to the Minister.

Energy audits were also conducted of the main entrance areas of the hotel, and a study has been performed of the energy efficiency of the air-conditioning system in the building.

An audit was performed for the office of Notary Abdourahman by the Project energy conservation team and Ali Abdillahi, one of the Djibouti technicians trained in Reims earlier this year. The results of this audit showed several ways in which electricity consumption could be reduced.

The team was also requested to perform a detailed energy audit of the Imprimerie Nationale--a business which is one of the biggest consumers of energy in Djibouti. The Project team has visited the building and is in the process of recommending measures which will reduce the high level of energy use.

3. Several of the recommendations set out in an analysis of the Ecole Francaise performed earlier this year by the Project team have been adopted. The directors of this school reduced the number of air-conditioning units to be installed in the administrative building by half, and improved the circulation of air in two of their classrooms by installing vents in the walls to encourage natural ventilation.

4. The computer room at the ISERST seismology laboratory at Arta has been insulated by the project team. The laboratory will soon install a new computer, and the computer room will need to be almost constantly air-conditioned. The insulation techniques applied in this work were the techniques learned by the Project technicians during their training course in Reims. The payback period for this particular investment is estimated as 10 months.

5. The new team of technicians has continued work started earlier this year on the retrofitting of several Government buildings in the heart of Djibouti ville. Almost 130 air-conditioning units in the Cité Ministerielle have now been sealed into their wall openings. Office workers have also been shown how to adjust the thermostats on the units and how to clean the filters.

Assistance has also been provided to the Ministère de la Santé. Many of their medical refrigerators have been insulated, and the air-conditioners in several of the offices have been sealed.

6. The Project continues, with the help of ISERST, to push for the creation of an energy conservation fund to be used for the financing of a national energy conservation program in Djibouti.

The proposal is to use the profits accrued by Electricité de Djibouti (EdD) as a result of the fall in the price of petroleum to finance a national level energy conservation program which will lead to a significant and long-term reduction in energy demand, particularly of electricity.

Jean-Yves Garnier prepared a report, setting out the economic analysis of the conservation program, which showed that far greater individual household savings would result from the energy conservation program than would follow from a simple reduction in the price of electricity--which was the action that the Government was proposing.

After some debate, The Government officially approved the setting up of a National Energy Conservation Fund in June. A few weeks later the proposal was approved by the Assemblée National. This program will provide over half a million dollars for energy conservation retrofits to about 15,000 houses in Djibouti-ville. The technical work, which involves the insulation of several thousand domestic refrigerators and the replacement of several thousand incandescent lighting units, will be directed by the Project, and will require the supervision of as many as eighteen technicians working in the Quartiers for over a year.

A number of administrative steps still remain to be taken, however, but this national program should begin before the end of the year. The UNDP has expressed an interest in supporting this initiative. A proposal is being prepared for consideration by this agency.

7. Collaboration with the Djibouti Urban Development Project (PDUD) continues. The bids for the house for the Chef du Quartier 3 have been reviewed, and a builder has been selected. Fred Guymont, an engineer from USAID offices in Nairobi, was in Djibouti recently and recommended a number of revisions to the building contract.

The revised contract for the building of the prototype energy-efficient house was signed by ISERST and the Djiboutian contractor in August. However, the start of construction has been delayed by the general slowdown in government administrative operations during August and September.

A contractor has also been selected for the Balbala house and that contract should be signed shortly. However, construction of this prototype building cannot commence until title to the plot of land is formally awarded to ISERST.

Agreement has been reached with the Mission de Coopération of the French Government and the Ministère de la Santé on the financial arrangements concerning the construction of the annex to the Ambouli dispensary. This energy efficient building is being cofinanced by the Mission and by USAID. Construction should begin shortly.

8. Collaboration with the Ministère de la Santé has extended into other areas. The energy conservation team is advising the Ministry on the construction of a new wing for the hospital at Dikhil for tubercolosis patients. This annex will be built according to the principles of bioclimatic and energy-efficient building design being promoted by the Project.

The site for the new building was visited in late August to view the terrain. After examining the data on wind direction at the site, the Project team recommended that the building be oriented so as to maximize the natural ventilation of the hospital wards.

3. RENEWABLE ENERGY

1. Several initiatives are underway. One of the more interesting activities concerns the Project's technical assistance to a private farmer, Mr. Hassema, who owns several hectares of land out at Hanlé in the western part of the country. —

This farmer pumps as much as 250 m3 of water per day from a shallow well to irrigate his land. An economic analysis of the pumping options: Diesel engine , photovoltaic or wind, showed that a wind pump was clearly competitive with the more conventional motor pump alternative. One of the Project technicians presented the results of the study to the farmer, who is considering whether to purchase the windmill pump that we have recommended: a large Kijito windpump from Kenya, with a rotor diameter of 24 feet.

If Mr. Hassema decides to purchase this machine it will be by far the biggest windmill pump in Djibouti, and the first windpump to be privately owned and financed. The farmer has applied to the Caisse de Développement for a loan to cover the cost of this machine which, with freight from Kenya, will cost about $16,000

The selection of this machine was based on the estimated windspeed data for the site which was actually measured at Yobocki, about 15 kilometres away from Hanlé but on the same plain. A small anemometre installed for several weeks at the site confirmed that average windspeeds are greater than 4 m/s. The Climatronics unit at Yobocki has now been moved onto the farmer's land at Hanlé to record the long-term mean windspeed at the site, and to check again that windspeeds are sufficient to pump the required amount of water.

The Project has offered to assist Mr. Hassema with the necessary civil engineering work, and with the installation of the machine on the site at Hanlé. If this windmill is indeed purchased the Project will organize a short training program and public demonstration of

wind-powered water pumping at the time the windmill is installed and started up.

2. The renewable energy team has been checking up on some of the photovoltaic pumps in operation in Djibouti. Trips have been made to As Eyla and Obock to confirm that the pumps are working properly, to make any necessary repairs, and to collect data on pump performance. The AY MacDonald pump at Obock was returned to ISERST for examination because the water flow from the pump was found to be very low.

This pump was found to be almost completely plugged up with scale. The pump was dismantled, the impeller descaled and cleaned, and the pump now runs normally. It is clear that pumps operating in highly saline water need to be periodically descaled if they are to continue operating without problems.

An additional AY McDonald pump has been purchased by the Project and is now being tested at ISERST by the renewable energy team. The SEI floating pump, which was sent to Germany for repair in May, has been returned; this pump will be tested by the Project before being installed in the field.

3. The Project renewable energy team continues to provide technical assistance to government agencies, services and individuals interested in installing photovoltaic or wind powered water pumping systems. For instance, with assistance from the Project the Commissaire of Tadjourah has presented a proposal to the US Embassy for the installation of two photovoltaic pumps in the villages of Khalaf and Sagalou, and this proposal has been approved by the Embassy. Two photovoltaic pumping systems have been ordered from AY McDonald in the US.

Technical assistance has also been provided to the Commissaire of Obock for a photovoltaic pumping project in the village of Medeho. This project is also financed by the US Embassy.

The Aermotor windmill at Asa Gueyla has been repaired. This machine has been pumping steadily but had been leaking water through the stuffing box seal. The seal was replaced and the pump is now operating correctly.

4. The Commissaires of Tadjourah and Obock have agreed to the moving to more favorable sites of three of the big wind machines in their districts. These machines (the Aermotors at Khor Angar and Asaguenita, and the Humblot at Adailou) are in good condition but they are not doing much useful work at their present sites--either because the wells are almost dry or, in the case of Khor Angar, because the output from the windmill cannot meet the demand for water at that particular site.

The Aermotor windmill at Khor Angar will be moved to the agricultural gardens of the Service de l'Agriculture at Ambouli, close to the main road where it will be in full view. This site has been chosen because of its high visibility--at the present time few people in Djibouti ville can see a real windmill pump without travelling quite some distance. The nearest operating machine is at Aramadoule (Ali Sabieh) but the machine is not easy to locate.

The relocation of the windmills is to be carried out with the help of the French Army whose assistance has been offered by the commanding officer of the 5th Regiment. The details of this collaborative effort have recently been agreed upon. The first group of 30 men will be available to work for the Project in December. They will be put to work moving the windmills at Khor Angar and Asa Guenita to their new sites at Ambouli and Obock. The French soldiers will also dismantle, clean, and repaint the machines and the towers.

The second group will move the windmill at Aidailou to a site close to Tadjourah early next year. The third group will be deployed in the south of the country and will work to improve several rural wells that need to be deepened, or which require proper construction of the well shaft.

5. The agreement between the Association Francaise pour la Maitrise de l'Energie (AFME) and Total Energie Development (TED) has finally been signed after a delay of close to a year. Under the terms of this agreement, AFME will pay for 4 prototype photovoltaic pumps to be furnished by TED and donated to ISERST and the Genie Rural. The first of the TED floating solar pumps arrived in Djibouti in mid-September and is now under test.

A similar agreement between the Mission de Coopération of the French Government and the Genie Rural has also been signed. Under the terms of this second agreement the Genie Rural will receive ten photovoltaic pumps which will be tested by the Project before being placed in rural wells.

6. Several pieces of equipment have been received. The AY McDonald photovoltaic pump system for Medeho has arrived and has been tested. A submersible pump also manufactured by AY McDonald was delivered and is being tested by Project technicians. An Indian Mark II hand pump, ordered in August, has also been received.

4. INSTITUTIONAL DEVELOPMENT

1. The electrical laboratory in the Renewable Energy Building is being set up. Equipment and instruments have been purchased and installed, and the laboratory is gradually taking shape. When finished, the equipment will enable ISERST technicians to test and repair electrical and electronic equipment such as pump motors, photovoltaic system controllers, and inverters.

2. Training courses were run for two months at ISERST during August and September in collaboration with the instructors at the Lycée d'Enseignement Professionel (LEP). Classes in electrical and electromechanical principles and technology were given three evenings a week in the new electrical laboratory. Eight technicians (including Soulieman, Nabil, and Abdourahman Nour from ISERST) attended the classes. The instructors from the LEP continue to work with Project technicians on a part-time basis.

3. ISERST'S information specialist, Nader Abdulkarim, continues his training in english language and information sciences in the US. Nader will return to Djibouti at the end of the year.

4. The training of Yacob Nour, the energy planning assistant in the Service de l'Energie of the Ministère de l'Industrie, is going well. Yacob is working full time with the international team of energy experts.

5. ENERGY POLICY AND PLANNING

1. Professor Ioan Stancescu conducted his 2nd mission to Djibouti from June 15 until July 8. Professor Stancescu is the leader of the team of international energy experts now working with ISERST and the Energy Initiatives Project to formulate an Integrated National Energy Plan for the Government of Djibouti. The consulting team will also identify and present a comprehensive set of priority energy sector development projects which it is hoped will elicit financial support from the international donor agencies.

After several months of review and evaluation, an international team of experts has finally been assembled. The team members are listed below:

NAME	POSITION	AFFILIATION
Ioan STANCESCU	Senior energy analyst (team leader)	UN energy consultant based in Germany.
Arturo VILLAVICENCIO	Energy analyst	National Institute of Energy (INE), Quito, Ecuador.
Renato PUGNO	Economist	ElectroConsult, Milan, Italy.
Jose Flores GOMEZ	Transportation expert	GRECA associates, and Government of Mexico.
Mihai PETCU	Tariffication expert	Conseiller Technique to Government of Zaire at Kinshasa.
Dominque BRIANE	Rural energy expert	Association Bois de Feu, Aix-en-Provence, France.

The mission schedul's of each of the team members is as follows:

Consultant	june	july	aug	sept	oct	nov	dec
Stancescu	XX	X		X	X	XX	
Villavicencio				XXXX	XXXX		
Pugno				XX	XXXX	XX	
Gomez			XX	XX			
Petcu					XXXX		
Briane			XXX	X			

2. Besides the usual administrative arrangements, preparations for the arrival of the team of energy experts have focused on the organization of the data necessary for the modeling of energy demand over the short and long term using the MEDEE-S computer program--the computer program which has been developed by the Institut Economique et Juridique de l'Energie (IEJE) in Grenoble for the modeling of energy demand in developing countries. The data base has been brought up to date, while supplementary data have been sought out where these were lacking.

A particular focus was to gather information on the structure of household energy demand in the rural areas. Preliminary household surveys were conducted in Dikhil, Ali Sabieh, Tadjourah, and Obock, by Project technicians. Data were collected on the consumption of wood, charcoal, kerosene, and electricity, as well as supplementary information on how each house was constructed and whether elementary energy conservation principles were being followed.

3. The first member of the expert team to arrive in Djibouti was Dominique Briane, the expert on biomass utilization from the Association Bois de Feu in France. Briane's principal tasks were to determine more precisely the consumption of wood and charcoal in the country, particularly in the rural areas, and to recommend ways in which the utilization of biomass resources in Djibouti could be improved.

After a series of more detailed surveys in Tadjourah, Randa, As Eyla, Ali Sabieh, and Dikhil, conducted by Briane with the help of almost all the Project technicians, and using the results of the recent national census survey, to which the project appended a page on household energy consumption, a much more detailed picture of biomass energy consumption has emerged.

For the country as a whole, 1986 fuelwood consumption is estimated as 27,600 tonnes, with charcoal consumption running at 1,200 tonnes. The total amount of wood required for both biomass fuels is approximately 35,500 tonnes. These figures are significantly lower than previous estimates.

As far as deforestation is concerned, the situation does not appear to have critically affected the availability of fuelwood, although there are problems in the immediate vicinity of a number of district centres. Overgrazing by goats, rather than fuelwood collecting or the production of charcoal, is considered the principal cause of the declining forest resource base. These conclusions remain tentative, however, because the resource base has not yet been fully studied or inventoried.

Apart from recommending that work continue to survey both the biomass resource base, and the regional and seasonal variations in supply and demand, Briane also proposed that an improved method of charcoal production be introduced in Djibouti. The Project technicians have been shown how to make charcoal using a simple covered pit--a technique which doubles the efficiency of the crude technique used in Djibouti.

In a few weeks time when the national energy planning work is completed, and when the season for charcoal production is in full swing, Project technicians will demonstrate the new technique in one of the districts --probably Tadjourah where charcoal is produced in significant quantities. If that initiative is successful, the other Districts will be approached in turn.

Briane also supervised the testing of local kerosene stoves (which were found to be quite efficient), and demonstrated how to improve the efficiency of the traditional 3-stone fire by building a clay enclosure around the 3-stone base.

4. The expert on transportation sector planning, Jose Flores Gomez, arrived on August 16th from Mexico City. One of Gomez' main tasks was to study the transportation sector and to develop a much more detailed picture of the way the system is structured. Several quite detailed surveys have been conducted of vehicle numbers and types, fuel consumption, traffic densities, bus passengers per trip etc. The focus has been primarily on the operation of the urban transport system.

One recommendation which has been made is for the bus and minibus vehicles to be divided into two groups, each of which will operate on alternate days. The are several advantages to this arrangement but it remains to be seen whether this proposal will be accepted by the Government. The bus driver syndicates, however, support the idea.

Other recommendations presented in the report by Gomez include the setting up of a vehicle repair and maintenance center for buses and minibuses, the differential taxing of imported vehicles based on vehicle engine size, the revision of the present fuel pricing policy, the setting up of a documentation center which will collect and hold all the statistical data available on the transportation sector, and the preparation of a development plan for the urban transport system in Djibouti-ville.

5. The third energy expert, Arturo Villavicencio, arrived from Ecuador on September 4th after meeting with Team Leader Professor Ioan Stancescu and Renato Pugno (the economist provided by the UNDP), in Paris on September 2nd. Villavicencio is an expert on the MEDEE-S computer program which is being applied in Djibouti.

The MEDEE-S model requires a fairly comprehensive data base in order to run effectively. Supplementary data on energy consumption, population figures, household structure etc. have been taken from a recent census conducted by the Direction National de la Statistique (DINAS). Project personnel are assisting DINAS with the processing of the data collected during this survey.

6. The project economist, Renato Pugno, arrived in Djibouti on September 14th to start his 2 month mission, and Mihai Petcu, the expert on electricity tarification, arrived in Djibouti at the end of September. Pugno has started work on the economic analysis of the geothermal power development project now underway in Djibouti.

7. The organization of the national energy planning work and the Conference of Donors is being funded by USAID and the UNDP. The planning work is now estimated to cost approximately $189,000, a sum about evenly split between the UNDP and USAID.

The UNDP office in Djibouti officially signed the accord with the Government concerning this initiative on August 26th. Under the terms of this agreement the UNDP will finance the missions of Renato Pugno and Mihai Petcu. The UNDP will also purchase a computer, provide a secretary for 6 months, organize translation and interpretation services, and provide other office equipment.

8. After several weeks of long-distance communication between the Project team in Djibouti, Arturo Villavicencio in Quito, and the IEJE in Grenoble, the choice of a computer on which to run the MEDEE-S program was narrowed down to either an IBM-PC or a Bull Micral 60 machine.

Since IBM is not well established in Djibouti, in contrast to Bull who have an agent in town who can maintain the equipment as well as provide supplementary technical support, it was decided to opt for the Bull Micral 60 computer.

The computer was ordered from Bull in Paris the first week of August; they promised delivery before the beginning of September. However, two weeks later Bull advised their agent in Djibouti that there would be a delay in delivery of 4 weeks. No reason was given for the delay.

The UNDP representative in Djibouti asked the French Embassy to immediately telex Bull and to demand that they deliver the computer according to their original schedule. At the same time, the US Embassy in Djibouti was requested to ask the US Embassy in Paris to approve the export licence for the equipment without delay.

In the meantime, the UNDP loaned the Project one of their Bull Micral 30's to permit Villavicencio to at least set up the data files and check the program operation. The new Bull computer finally arrived at the end of September and is now being used by Villavicencio to run the MEDEE-S program.

6. OTHER RELATED ACTIVITIES

1. The amendment to the Project grant agreement was signed on September 14th by USAID and the Ministry of Foreign Affairs of the Government of Djibouti. The amendment increments project funds by $400,000 and extends the PACD to September 30, 1987. PIL No. 19 was signed by ISERST the same day.

7. PROBLEMS AND ISSUES

7.1 None at the present time.

8. NEXT QUARTER ACTIVITIES

8.1 The National Energy Plan will be presented to the Government for review. The Plan will also present the energy sector development projects recommended by the international team of energy experts.

8.2 The National Energy Conservation Program should begin. The Project will provide technical assistance to this Government program.

8.3 The construction of the prototype energy-efficient houses will commence.

8.4 The first photovoltaic medical refrigerator in Djibouti will be installed in the dispensary at Hol-Hol.

8.5 The large windmills at Khor Angar and Asa Guenita will be moved to their new sites.

8.6 The three photovoltaic pumps for the villages of Medeho, Khalaf, and Sagalou will be installed.

8.7 The rest of the TED photovoltaic pumps should be received by ISERST and will be tested by the Project before being installed in the field.

Copies: Anis Abdallah, ISERST
USAID / Djibouti
USAID / Mali - LESO
USAID / Khartoum, Sudan
USAID / Mogadishu, Somalia
USAID / Gaborone, Botswana
USAID / Maseru, Lesotho
VITA / Rosslyn
REDSO / Nairobi