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A FINAL EVALUATION OF

THE COSTA RICA ENERGY POLICY DEVELOPMENT PROJECT

USAID PROJECT NO. 515-0175

Submitted to:

USAID MISSION - COSTA RICA

Submitted by:

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TABLE OF CONTENTS

		Page
I.	FINAL EVALUATION OVERVIEW	1
	A. Project Description	1
	B. Mid-Term Evaluation	3
	C. Final Evaluation	4
	D. Evaluation Findings	5
II.	PROJECT DETAILS	14
	A. Project Objectives	14
	B. Project History	15
	C. Executing Agency	20
	D. Project Elements	24
III.	PROJECT STATUS AND EVALUATION ISSUES	28
	A. Introduction	28
	B. Accomplishment of Project Paper Goals and Expectations	33
	C. Project Elements	39
	D. Mid-Term Evaluation Results	46
	E. Development Impact	48
	F. Lessons Learned	49

TABLE OF CONTENTS

(continued)

		Page
Appendix A:	Bibliography	A-1
Appendix B:	Interim Project Evaluation Recommendations	B-1
Appendix C:	Final Project Evaluation Scope of Work	C-1
Appendix D:	People Interviewed During Final Project Evaluation	D-1
Appendix E:	DSE Goals and Objectives (1984, 1985 and 1986)	E-1
Appendix F:	DSE Professional Employees as of December 15, 1985	F-1
Appendix G:	DSE Reports and Publications	G-1
Appendix H:	Grant Supported Training Activities	H-1
Appendix I:	Details of DSE's Counterpart Contribution	I-1
Appendix J:	Detailed Descriptions of Two Project Funded Activities	J-1
Appendix K:	Common Abbreviations	K-1

I. FINAL EVALUATION OVERVIEW

I. FINAL EVALUATION OVERVIEW

A. Project Description

The USAID-funded Energy Policy Development Project was designed during late 1980 and early 1981. It was developed in response to the recognition that for Costa Rica to respond to the challenges of both an economic and an energy supply and demand crisis, their capacity to plan and manage the energy sector had to be strengthened.

The project had four elements: 1) Energy Sector Management Activities (principally involving the provision of a long-term project advisor); 2) Energy Research and Studies (covering subcontracts and short-term specialists); 3) Energy Planning Information (an information center and information sources); and 4) Training and Exchange (training inside and outside of Costa Rica). The project was funded by a $1 million USAID grant and there was to be a counterpart contribution of $350,000 by the Costa Rican Government. The counterpart agency in the government was the Direccion Sectorial de Energia (DSE) in the Ministry of Industry, Energy and Mines (MIEM). The agreement was signed in September 1981 and originally scheduled to be completed in September 1983. At the time of this final evaluation, DSE has calculated that their counterpart funding amounted to over 24 million colones. Using an exchange rate of 50 colones per dollar, this comes to over $480,000 U.S. Several problems including slowness in meeting conditions precedent, a change in government, and subcontractor and subcontracting delays required that the project completion date twice be extended at no increase in grant amount; first to June 1985 and finally to December 31, 1985. Over the course of the project the composition has changed, a number of activities identified in the project paper were eliminated while others were added. The four major project elements, however, remained the same and the new activities were easily categorized as fitting under one of the established elements. Table I-1 presents a summary of the initial, mid-term, and final project composition as well as the spending levels for each major element. Data in the column titled December 1985 were prepared by DSE and the Project Administrative

22

TABLE I-1

MAJOR PROJECT ELEMENTS AND BUDGET ($U.S.)

(USAID Portion)

	SEPTEMBER 1981 ORIGINAL		APRIL 1984 *1 MIDTERM EVALUATION		DECEMBER 1985 *2 FINAL	
	$	%	$	%	$	%
1. Energy Sector Management:						
Project Advisor	175,000		64,000		42,000.00	
Equipment and Office Supplies	13,000		13,000		43,975.29	
Local Rent	15,000		8,400		---	
Vehicle	12,000		14,700		15,906.38	
Personnel and Miscellaneous	10,000		15,500		17,429.65	
SUBTOTAL	225,000	22.5	115,600	11.6	119,311.32	12.1
2. Energy Research and Studies:						
Short-Term Technical Assistance	425,000		654,000		629,152.80	
Information Survey	20,000		20,000		62,000.00	
Computer Time	20,000		2,000		---	
Personnel and Miscellaneous						
SUBTOTAL	465,000	46.5	676,000	67.6	691,152.80	69.9
3. Energy Planning Information:						
Short-Term Technical Assistance	15,000		15,000		20,210.90	
Rent (Documentation Center)	15,000		10,000		---	
Documents and Equipment	60,000		60,000		28,687.28	
Study	10,000				---	
Personnel and Miscellaneous						
SUBTOTAL	100,000	10.0	85,000	8.5	48,898.18	4.1
4. Training and Exchange Program:						
Seminar and Workshop	25,000		13,000		58,653.75	
Exchange and Overseas	30,000		65,400		53,260.13	
Personnel and Miscellaneous					---	
SUBTOTAL	55,000	5.5	78,400	7.8	111,913.88	11.3
Project Evaluation	20,000		20,000		17,653.95	1.6
Contingencies and Inflation	135,000	15.5	25,000	4.5	---	
TOTAL	1,000,000	100.0	1,000,000	100.0	988,930.13	

*1 This includes funds committed but not necessarily disbursed as of March 31, 1984.

*2 Estimated using data as of November 1, 1985.

23

Assistant. This evaluation has not included any audit of these figures nor has there been a detailed examination of the allocation process. The figures are estimates and may change by the end of the project.

The Direccion Sectorial de Energia (DSE), was established in 1982 under a managing and administrative committee composed of the Ministry of Industry, Energy and Mines (MIEM); Refinadora Costarricense de Petroleo (RECOPE); Instituto Costarricense de Electricidad (ICE); and Servicio Nacional de Electricidad (SNE), was the project executing agency. DSE was established to provide the capacity to: 1) produce medium- and short-term national energy plans, 2) address short-term problems, and 3) carry out specific projects and investigations, especially in the areas of new and renewable energy and energy conservation. It presently has 14 professionals. In addition to the USAID project, it has had funding and support from the United Nations, France, OLADE, and Canada. It is negotiating for additional support from the World Bank, the Inter-American Development Bank, CEPAL, OLADE, and Costa Rican sources. The principal operating and salary budget comes from RECOPE while ICE and MIEM also contribute small amounts. Its operating budget has increased regularly since 1982 when it was approximately 5 million colones. In 1986, its budget will be approximately 24 million colones. In a little over three years, DSE has grown in size and influence to where it is a participant in many major energy sector policy matters. The USAID project has provided the major portion of outside funding and activity for the Direccion. Other donors and non USAID-funded activities are beginning to increase.

B. Mid-term Evaluation

The mid-term evaluation, originally scheduled for September 1983, was delayed until June 1984 in order to present a more complete set of project accomplishments. It was expected that the Government of Costa Rica and USAID would use that evaluation as one of the inputs to their process of deciding on future energy programs and cooperation. The stated purpose of that evaluation was "... to determine whether the activities being carried out by the project are adequately focused on meeting the purpose of the

project stated as follows: strengthen the Government of Costa Rica's capacity for energy sector planning." The evaluation, along with a series of meetings, was completed in May 1984. A final report was transmitted to USAID in June of 1984. Recommendations from that evaluation are presented in Appendix B.

C. Final Evaluation

The scheduling of the final evaluation during Christmas, employee vacation season, and prior to the completion of several elements funded by the project created problems. Furthermore, this scheduling problem coupled with the fact that DSE had not yet completed the National Energy Plan (1986-2006) (NPE) made reaching conclusions difficult. However, because of the cooperation of personnel from USAID, DSE and other government institutions and the author's familiarity with the project (both evaluations were performed by the same person) these difficulties could be overcome. The objective of this evaluation was the same as that quoted above for the interim evaluation. The specific requirements included:

- An in-depth evaluation to assess the role and accomplishments of DSE in the energy sector;
- A review of the major grant-funded activities; and
- An assessment of the impact of the interim evaluation.

The complete scope of work is presented in Appendix C. The evaluation was completed between December 1-15, 1985 and included discussions in Spanish and English with USAID, DSE, GOCR and major U.S. subcontractor personnel. A list of people interviewed is presented in Appendix D. Contract files, project progress reports and other documents and deliverables were also reviewed. A major focus of the project was institution building and strengthening. DSE, the manager and major participant in project activities, is less than four years old. The project was not begun in any meaningful way until November 1982 with the hiring of a senior project advisor. Thus the effective age of DSE is 3 years.

25

An analysis of the impact of institution building assistance to a new institution this early in its life must deal with many intangibles and rely on measuring incomplete growth. Attention was therefore placed on progress and potential with less than usual emphasis being given to actual accomplishments. Many objectives and goals of DSE are still valid and possible and the work completed up to now must be viewed as elements of a larger and longer term activity.

The report is organized into the following chapters: I) Evaluation Overview (including findings and recommendations), II) Project Details, and III) Evaluation Issues. This organization was selected to conform to requests of the USAID Mission to follow requirements contained in the scope of work and to facilitate inclusion of materials and descriptions already prepared and available.

D. Evaluation Findings

On the basis of a two week in-country working period in December 1985 and the knowledge gained from conducting the interim evaluation in June 1984, the following are the major findings and recommendations of this evaluation.

Findings

1. The stated project purpose, to strengthen the Government of Costa Rica's capacity for energy planning, has been achieved even though many of the objectively verifiable indicators of project goal achievement presented in the project paper have not and may never be met.

2. The nature of institutional development in energy planning attributable to activities funded by the USAID grant has been different and the amount has been less than was anticipated when the project was planned.

3. The objectively verifiable indicators of goal achievement presented in the project paper, especially the following two:

- A 6 percent annual growth rate in GDP during the 1985-1990 period; and
- By 1988 achievement of a decrease in the level of imported petroleum to 30 percent of total energy use.

were inappropriate and excessively ambitious for a $1 million energy planning and institution building grant, housed in a new ministry and managed by a new directorate staffed with young and mostly inexperienced personnel. The overall project objective should have been stated in terms of occurrences in the energy sector not the overall economy.

4. The major project accomplishments and contributions to the strengthening of Costa Rica's capacity for energy planning were substantial and include:

- Creation of a wholistic description and view of the energy sector and the acceptance of this by RECOPE, ICE, SNE, MIDEPLAN and others. This is a very important accomplishment and is one of the things necessary for achieving adequate energy sector planning and management.
- Adequate data for energy sector planning especially on demand and supply options. The one area where a weakness exists is on important energy sector issues.
- Trained and experienced energy planning professionals in sufficient numbers in MIEM, DSE, RECOPE, SNE, ICE, MIDEPLAN, MOTP, etc. to permit continued energy sector planning. DSE has a number of highly trained and experienced personnel capable of performing continuing energy planning.
- Good working relationships have been built between DSE and other institutions and this forms a basis for continued cooperation.

5. Some of the funding allocations, and thus priorities, shifted during the life of the project. These shifts resulted in more emphasis on providing planning tools, training personnel and studying demand side options. Less emphasis was placed on supply side options, issues and

27

feasibility studies. These shifts added to the difficulties in achieving project goals.

6. The short-term technical assistance paid for under the grant was almost entirely in the form of consulting contracts to U.S. firms for the major project studies. The effectiveness of this assistance was not what should be expected. There are many reasons for this but one reason in almost every case was that neither USAID nor the contractor was willing to do what was necessary or felt it important enough to assure that the work was completed in a timely manner. When each case is examined in detail it is evident that many factors contributed to this and each successive time extension could be justified as being reasonable, in the best interests of the project and not likely to cause major problems. It was the sum or totality of these individually defensible time extensions which has affected overall project achievement. The lateness in delivery of products has had some negative impacts on DSE and their ability to develop. Of the five major contracts awarded under the Grant ($605,524) two will not be completed by the project completion date (PACD) ($307,405), two are not yet completed but probably will be ($198,119) and one was completed in June 1984 ($100,000). All of these except one ($30,000) took at least 50 percent more time than was originally contracted for and one took 3 times as much as the fixed price contract stipulated. The overall grant was extended twice (a 39 percent time extension) and two of the supported projects may take at least 6 months after PACD to produce contractually required deliverables.

7. One of the major efforts of DSE during the project was to produce a National Energy Sector Plan (1986-2006). This was officially expected by October 1984, February 1985, November 1985 and most recently January 1986. The greatest disappointment (of the evaluator and unofficially of many in the Costa Rican energy sector) is that DSE could and should have been able to produce the PNE but hasn't as of yet and likely won't before some time in 1986. This is not a result of the grant nor lack of data, project outputs or trained personnel but was caused by many management, political and technical factors.

8. Other major efforts of DSE over the course of the grant were to complete several activities on their own including demand surveys and analyses, annually produce national energy balances, develop an energy information system and develop their own energy planning computer model. The annual energy balances have been completed for the years through 1985 and published through 1983; the energy information system is running and is very thorough; the energy planning model (MIPE) is working and was used to prepare the draft NPE and four of seven demand sector surveys and analysis reports have been or will soon be published. In these areas the performance of DSE has been very good.

9. DSE has evolved into a recognized information development and planning group especially in the areas of energy demand and renewable energy sources. They are also involved in contributing data and information to many issue discussion/resolution processes in the energy sector. They have not yet had any identifiable major direct impact on energy policy and until the PNE is issued their ability and status in this area is hard to evaluate.

10. The training and exchange activities have been very effective as measured by the type and number of people involved, the opinions of those trained and the impression of the training program held by others in the energy sector. The actual expenditure for training and exchange is twice what was programmed in the project paper and this money appears to have been very well spent.

11. The Documentation Center building has been completed; it is staffed by a qualified librarian and is open 4 hours per day. There are estimated to be over 10,000 volumes and they are used by many people.

12. The interim evaluation performed in June 1984 (18 months before the ultimate PACD) included a major section (7 pages) containing conclusions and recommendations (See Appendix B). The four recommendations specifically for USAID action during the grant period were adopted and two others covering post PACD actions are still valid and are included later as recommendations in this evaluation.

13. The 12 recommendations for DSE action were considered and of these, two were adopted completely (2, 8), four were implemented partially (1, 5, 6, 10) and six were rejected or not given sufficient priority to be implemented yet (4, 5, 7, 9, 11, 12). The implementation of some of these recommendations by DSE may have improved project performance but not substantially.

14. There were four other recommendations for joint USAID/DSE action of which the first three were not adopted. The fourth was a post PACD recommendation which is still valid. The adoption of these recommendations, especially the one relating to continued technical and management support, could have enhanced project and DSE performance.

15. The interim project evaluation did not address specific measures to deal with the end of project and contract completion problems which developed later.

Recommendations

The recommendations resulting from the final evaluation are included in the following categories:

- Actions by and support of USAID which are directed toward completing unfinished grant-funded activities and furthering the achievement of the goals of the project. These actions would normally require a project funding increase or grant extension but because of the timing and budget situation they must be done as follow-on activities.
- New funding and support initiatives which are logical next steps, supported by DSE and which meet current USAID and Mission CDSS policies and programs.
- USAID (both Mission and Washington) actions which will deal with or respond to some of the problems and general lessons learned.

The last of these categories includes a discussion of actions to address items which could be called lessons learned from this project.

Actions Directed Towards Completing Unfinished Grant Activities and Furthering Achievement of Project Goals

1. USAID should immediately define and enforce compliance with strict performance schedules for all contractors who have not fulfilled contract requirements. USAID should assure that final deliverables are of the highest quality and delivered as rapidly as possible. It is important that contractually required quantity and quality measures be applied in these cases.

2. USAID should consider the possibility of providing a technical and management advisor for one additional year to DSE. This advisor could be helpful in completing the acceptance and use of EnVest, contributing to the completion of DSE demand sector surveys and analyses, working on the draft pricing study to see that it is accepted and officially issued, helping complete the NPE and working to see that the results of the industrial energy conservation audit study are useful to DSE and the industries. When this is done, the sub-goals of the original project for each of the four elements will have been achieved. If USAID is not interested in funding a full-time advisor following the completion of this project, they should consider providing project specific short-term technical help for an additional year. This could be done through budgeting funds for 12-18 person-months of short-term technical assistance using the S&T/EY IQC or 8A contractors. This assistance could be directed to the several areas mentioned above and some of those defined in Appendix E (1985 Goals and Objectives).

New Funding and Support Initiatives for Logical Next Steps

1. As has been mentioned before, general programmatic energy and study support will continue to be a priority need for DSE and the energy sector. After the USAID project and the NPE is completed, DSE will have identified several major study needs and will have developed plans and funding requirements for these. DSE is considering requesting this form of USAID assistance in the future. Meeting major study needs can be in the form of study specific funding or by providing a fund which can be used for

several studies. Both of those mechanisms should be considered. Government institution building and energy planning are not priority support areas for USAID. However, funding for feasibility studies on subjects such as irrigation pumping energy needs and methodologies for enhancing the development and support of productive uses of rural electrification fall within USAID and GOCR priority areas.

2. USAID should also consider extending programmatic funding support to DSE and other public and private sector entities after the completion of this project in the areas of public information programs, senior personnel training and exchange programs and studies defining needs in areas of energy regulation, standard setting and compliance monitoring and financing.

3. As a follow-on to the industrial energy conservation project USAID should consider providing a loan or grant to help implement the results of the industrial energy conservation audits. This loan fund would help industries purchase capital equipment necessary to achieve recommended and economically appropriate energy conservation. The establishment and management of such a loan fund is not now within the area of responsibility of DSE, however, if USAID wishes to further strengthen DSE they should be involved. One good candidate for the institution to handle the fund would be the Costa Rican Private Investment Corporation which was established with help from the USAID Mission. The participation of the Industrial Chamber should also be considered but the importance of financial and loan management dictates that a financial institution have a major role.

4. As a follow-on to the transportation conservation measures demonstration project USAID should allocate funding for an expansion of the assistance. The funding would support expanded assistance to the transport sector, especially to truck transport firms to assure the broadest and most rapid introduction and adoption of energy saving measures and procedures.

Recommendations

1. Inappropriate or excessively ambitious project goals, especially for institution building projects such as this one should be avoided. Project goal setting should be taken seriously and there should be more frequent monitoring by USAID of project performance in relation to achievement of goals. The monthly progress report to USAID by the host country implementing agency should deal with this subject.

2. USAID project and contract managers should require timely contractor performance. When USAID contracts for services to be managed by host country professionals the U.S. contractors and consultants should be held to a standard of performance which is consistent with the contract. Time and money extensions and funding additions through Purchase Orders should not be granted without serious consideration of the implications to meeting project goals.

3. In order to assure timely and quality project performance senior management, either from the USAID Mission or in the form of a consultant, should be assigned to the project. Performance on this project highlights that this senior management presence is needed and could have been extremely valuable at the end of the project as well as the beginning.

4. Interim project evaluations should be made a part of a process whereby USAID and the host country agency are required to formally adopt, define approaches to accomplish and track compliance with recommendations.

5. Both interim and final project evaluations should be staffed by and involve active participation of at least two persons. One of these persons should be a USAID employee.

6. Fixed price contracts for the delivery of services should not be considered, especially where contractor performance is limited by inputs from others.

7. Evaluations and PACD's should not be scheduled for December. This is especially true when elements of the project may be completed very near the PACD.

8. Final evaluations of institution building projects should be scheduled at least three months after PACD. This is useful even 'f follow-on support is anticipated.

II. PROJECT DETAILS

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A. Project Objectives

In the USAID project paper (PP) signed at the end of September 1981, two gaps in the national energy planning process were identified. The first was a need for strengthening the entities responsible for planning and the second was a lack of pertinent information on which to base decisions, policies and strategies. The Energy Policy Development Project was designed to:

- Strengthen Costa Rica's existing energy planning institutions; and
- Complement the energy planning work already underway through more detailed study of the country's energy options.

The 1982 USAID Country Development Strategy Statement (CDSS) placed [illegible] on alternative energy (non-fossil fuel based) development, thus this area was also made an important part of the project. The project followed a science and technology project in which applied research in energy matters, industrial technology and the rational use of natural resources was emphasized. These were also mentioned as important elements to be considered by the Energy Policy Development Project. The 1985 CDSS does not directly address energy sector assistance.

The stated project goal was to help Costa Rica reestablish the dynamic growth of its economy. In order to assist in this process, the project was to focus on supporting the development of a comprehensive energy development plan, to provide for more efficient energy use and to investigate alternative sources of energy supply. These were all taken into consideration in developing the project and they can serve as part of the criteria set used in this evaluation.

B. Project History

In 1978, following a long period of stability and growth, the economy of Costa Rica began to experience problems. Between 1977 and 1980, the cost of imports of oil and oil products almost doubled. Investments in ICE also almost doubled over this same period. Thus, while the country was experiencing a painful downturn in its economy, it was seeing energy use, energy sector investment and foreign exchange expenditures rapidly increasing. For example, in 1979 over 50 percent of all energy consumed in Costa Rica was petroleum based and thus came from imports. Costa Rica still imports all fossil fuels (oil) and refines some in-country to produce oil products.

In response to the economic and energy crises, the Costa Rican Government began to initiate both short- and long-term actions. A formal energy sector was defined and a Government energy sector planning and management capability was created. The first effort in this area was the creation by decree of a Ministry of Energy and Mines (MOE) and an associated technical secretariat, the Executive Secretariat of Energy Sectoral Planning (SEPSE). This organization prepared a series of background reports on energy resources, uses and future options. One of their reports published in 1981, Alternativas de Desarrollo Energetico, provided the first information on energy sector activities. SEPSE worked with USAID to design this project and was designated as the Costa Rican Government's counterpart and the Grant implementing agency.

In late 1980, a Project Identification Document (PID) was produced by the USAID Mission in conjunction with SEPSE and was transmitted to AID/Washington for review. The PID was reviewed in Washington in early 1981 and as a result, several recommendations were made for the project development process.

In the middle of 1981 a Mission, LA Bureau and Consultant team worked with SEPSE and other Costa Rican Government personnel to produce the project paper. This paper was also submitted to Washington and reviewed and approved in September of 1981. The Energy Policy Development Project

consisted of several activities designed to help Costa Rica address its existing economic and energy crisis. The emphasis was on activities which would strengthen their capacity in National Energy Sector Planning.

The project was designed to be completed in September 1983 and was to be funded with a $1,000,000 USAID Grant and a $350,000 GOCR counterpart contribution. An important condition precedent in the Grant agreement was that only $50,000 could be disbursed until USAID was given evidence that at lease three new and highly qualified technicians had been added to the existing two-person SEPSE staff. Because of this condition, the slowness in initiating work, a change in Costa Rican Government and other minor problems, little was accomplished until the hiring of a Project Advisor in November 1982.

In early 1982, the MOE was dissolved because it had not had proper authorization, it had been operating as a ministry without portfolio, and in May 1982, the Government created a new Ministry combining industry, energy and mining sectors under one institution. The legislative assembly approved the appointment of a new minister and also created the DSE under this Ministry (MIEM) to be responsible for all national energy planning activities. DSE became the project executing agency and with the initiation of studies and hiring of a project advisor (Dr. Alvaro Umana) began to comply with the grant's condition precedent. At the time of hiring of the project advisor, less than $10,000 of Grant funds had been disbursed.

In December 1982, a Project Activity Plan was submitted by DSE to USAID. This plan included 5 major project financed studies to take place during the study and called for spending almost all of the $465,000 budgeted for energy research and studies. Work was started on some of these. However, only one, the Meta Systems Bioresource Use in Industry study, developed into a subproject activity. Other activities were substituted in an informal process between USAID and DSE as there were changes in interest and need within DSE and the energy sector. The four other original project activities were completed without Grant expenditures, postponed until later and/or after an initial effort were found to be unnecessary and were terminated.

By early 1983, it had become evident that, because of the initial delays in starting the project and complying with the condition precedent, the later problems with the timing of subcontracts and subcontractor performance and the late start of almost all grant funded activities, the project would not be completed by September 1983. It was agreed that a project extension was reasonable and in late 1983 a no-cost project extension until June 1985 was granted.

In addition to the above described activities, one other major subproject was initiated in late 1983. The adaptation of an existing energy investment model (EnVest) was subcontracted to Development Sciences, Inc. (DSI) of the USA. This and the Meta Systems contract were awarded on a non-competitive, sole source basis.

As can be seen in Table I-1 of Chapter I, the overall project funding categories have been retained throughout the project. Both the specific activities and funding levels have, however, changed a number of times. At the time of the mid-term project evaluation in June 1984, the project emphasis had changed to spending one half as much on energy sector management and twice as much as originally intended on energy research and studies. Expenditures on energy planning information and training and exchange programs, the two other major project elements, had remained almost unchanged.

The mid-term Project Evaluation Report was delivered to USAID in mid 1984. The USAID Mission transmitted this to DSE and in turn they distributed it to MIEM, RECOPE, ICE, SNE, and to senior DSE personnel. Discussions were held and some of the analyses and recommendations were adopted. At this time a long delayed contract for $190,000 U.S. for industrial energy conservation auditing and training was signed with Weston International. At the same time, the DSI EnVest Energy Planning Model Project was granted a no-cost project extension until the end of October 1984.

Two of the on-going project funded subcontracts were having problems at the time of the mid project evaluation. The DSI contract (funded at a level of $168,000) was delayed and there was some question whether they

could finish even by their new deadline. The Horquetas bioelectrification (gasification) project, partially funded by the project ($100,000) but managed by the USAID Central Bureau Energy Office, was behind schedule and no completion date was being predicted. In spite of the low level of spending and the problems, at that time it appeared that the project would be completed within the remaining time of one year.

By the end of 1984, both project advisors had left. The principal USAID funded Advisor, Dr. Alvaro Umana, (whose two year term was completed) was replaced and the other UN supplied advisor was not. It was decided by DSE that Dr. Umana's replacement should have administrative rather than technical and management experience. In January 1985, an administrative assistant, Ms. Ana Lizano, was hired for one year to assist DSE and USAID in administering the grant, arranging for publications and meetings and keeping track of progress on project activities. The DSE staffing and the Information Center Upgrading were completed. It was decided not to fund any additional subprojects including a planned alcohol-gasohol study and the development of electricity demand project methodology for ICE. Project focus was placed on the on-going activities, completion of additional demand sector surveys, transport energy conservation and training. DSE personnel also worked on completing the National Energy Plan (NPE) tentatively scheduled for delivery early in 1985. An add-on was made to the DSI Contract to provide computer hardware and software development to SNE to enhance their ability to analyze price requests from RECOP and ICE.

As 1985 progressed problems continued in the on-going EnVest, and Horquetas projects and the Industrial Energy Conservation audits began to experience problems. It was decided that a second no-cost extension to the grant was necessary and in April 1985 the project completion date was extended until December 31, 1985. The main purpose for this extension was to allow completion of the Horquetas project, the publication of study results and permit the delivery of products from the other contractors.

As a part of the Energy Planning Information Project element, DSE selected the Central American Institute of Business Administration (INCAE) to prepare and deliver a series of workshops and seminars covering

40

Integrated Energy Sector planning. Seven one to three day seminars were planned and delivered in May 1985 at INCAE near San Jose. The attendees included professionals from various government, cooperative and private organizations involved in Costa Rica's energy sector. The workshops and training sessions were each attended by between 15 and 80 high and mid-level professionals and were felt to be very valuable by almost everyone who attended.

The EnVest model was demonstrated in March but several deficiencies in the software required an extension to the end of August 1985. A further problem developed in the Horquetas project in that ICE had extended the grid to the community and now the bioelectrification demonstration would have to be made in a village which had access to 24 hour grid supplied power. The Costa Rican supplied components of this project, primarily civil works for the gasifier and distribution lines, had been completed for some time and awaited the long delayed delivery of the equipment to be supplied by the U.S. and Dutch subcontractors. Consideration was given to changing the nature of the demonstration to include grid interconnection of the gasifier and gasifier technology demonstration rather than a complete supply of electricity to the village by the gasifier.

The Industrial Energy audits and conservation training project had completed the in-country audits and some of the training. This activity was judged to be excellent but the U.S. contractor was not delivering audit reports on time. The delays in delivery of reports in English and Spanish were creating problems in that industries which had been audited were losing confidence in DSE's ability to deliver help and assistance. There were also requests from the U.S. contractor for additional funding. This contract was being handled out of the Panama contracting office with technical direction being handled in San Jose. The USAID Mission technical project manager left in July 1985, the Panama Contracting Officer left and was not immediately replaced and the delays became worse.

In the remaining project time DSE personnel worked on completing the analysis and publication of the surveys/studies of the energy sector. Although only one study, Residential Sector, has been published, reports on

the transport and animal raising sectors are expected to be published before January 1986. In other areas of DSE work, a preliminary draft of an executive summary of the National Energy Plan (1986-2006) is now being circulated to MIEM, ICE, RECOPE and SNE for comments. The general consensus is that it may not be finalized and issued officially until after the national elections in February 1986. If this is true, the nature and fate of the plan will be in the hands of the new government (either the same or a new party). Between July and December 1985, discussions and negotiations by DSE and USAID were held with DSI and Weston International to assure compliance with technical and contractual requirements of their contracts. DSI offered to supply additional services and EnVest documentation materials and to produce a series of deliverables prior to December 15, 1985. At the time of this evaluation, DSE was still waiting for some of these elements to be delivered but a final demonstration of the software and delivery of all contractually defined deliverables was scheduled for December 17 at DSE. Weston was finally offered and accepted a cost increase amounting to approximately $15,000. However, at this time the work completion date of their contract remains May 30, 1985. Weston International has not completed their work and continues without having a new termination date. The contract will likely be extended to December 31, 1985 but from telephone discussion during this evaluation with Weston, it is evident that they will not be able to meet contract deliverable requirements by that time. Unofficially, they expect to complete and deliver all reports in Spanish by March 1986. Additional discussions of overall project status and individual elements are found elsewhere.

C. Executing Agency

The Costa Rican executing agency for the project is the Direccion Sectorial de Energia (DSE). DSE was created in 1982 as an outgrowth of several reorganizations and responsibility shifts affecting energy sector management in the executive branch of the government. DSE, although organizationally under and a part of the MIEM, is administratively and financially controlled by RECOPE. DSE has a governing commission made up of the heads of (or their representatives) MIEM, RECOPE, ICE and SNE. This

commission, described in the constitution of the Industrial, Energy and Mines Sector, also manages the Costa Rican Energy Planning System. DSE, within this planning process, is charged with:

- Preparing a national energy sector development plan;
- Issuing annual energy sector operating plans;
- Establishing a permanent system of energy planning;
- Evaluating and guiding the development of Costa Rica's energy resources; and
- Initiating and supporting the saving and conservation of energy.

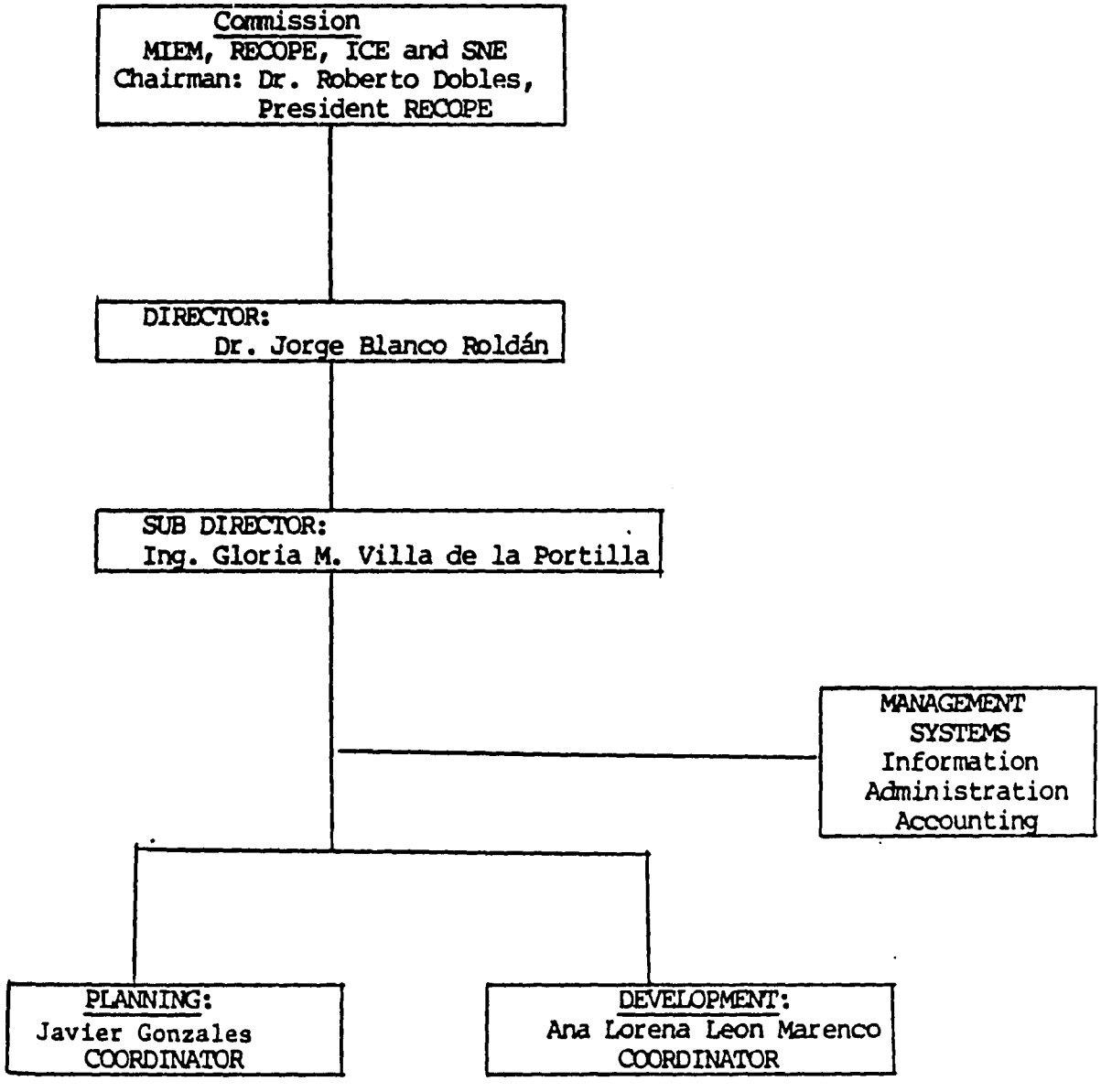
Following DSE's creation in 1982, as an outgrowth of a previous group, La Secretaria Ejecutiva de Planificacion Sectorial de Energia (SEPSE), DSE grew from three professionals to a high of 17. DSE is now organized as shown in Figure 1. However, a reorganization of DSE now being planned, the leaving of several professionals and the upcoming national elections could create several changes in the future.

The work of DSE has, from the start, been dominated by the USAID Grant. For instance, the USAID Grant has contributed over 50 percent of the agency's outside funding, paid for most of its subcontracted efforts and supplied office equipment and machinery as well as one of two full-time advisors. This substantial contribution is beginning to diminish and by early 1986 it will, unless replaced by other support, be depleted.

The DSE staff (see Appendix F for more details on the current staff) are still young and for the most part have only the planning experience gained at DSE in handling both energy and other sector planning responsibilities. The Director, Dr. Jorge Blanco, has been with DSE for approximately two years, having previously been a professor of Electrical Engineering at the University of Costa Rica. Most of the experience of the other personnel in DSE comes from short careers with RECOPE or ICE, their (maximum 4.5 years) experience with DSE or its predecessor organization and training financed at least in part by the Grant. The organization has

FIGURE 1

ORGANIZATION OF DSE



44

grown in size and influence during its short history and it is about to face another very demanding period of development. The production of a much delayed Sectorial Energy Plan (PNE) and its continuing management and coordination is one of the main pieces of work it was established and organized to accomplish.

The DSE has initiated many actions and activities, has completed a large number of reports (see a listing in Appendix G), and is being given both guidance and cooperation by others in government as it works towards completing the first Sectorial Energy Plan. The USAID Grant has been used to provide trained people, studies, information and data, analytical tools and short-term technical assistance to help in formulating the plan. The USAID project advisor worked almost as a senior DSE employee for two years, being useful to both grant and non-grant funded activities.

One unique aspect of DSE is its relationship with the Ministry, RECOPE and ICE. As the Government's energy planning and coordinating agency, DSE must manage, coordinate and work with the other agencies. However, it must have a perspective much broader than any of the others. Because its staff have been employees of RECOPE and ICE and administratively responsible to these organizations, there exists a potential for conflict. RECOPE and ICE have their own energy resource and/or supply sector specific responsibilities and perspectives. These very important but necessarily narrow responsibilities sometimes require that RECOPE and ICE must compete for scarce resources. Some people believe that this conflict is unproductive, especially when DSE must consider price setting requests to SNE or differences in demand or supply scenarios. The MIEM has placed a new funding arrangement before the National Legislature to eliminate this. As long as DSE and its staff adopt the national overall energy and sectorial perspective and the individual agencies don't interfere, the positive aspects of the arrangement would predominate. However, under the new arrangement being considered, funds, not people, would be given to DSE by RECOPE, ICE, SNE and others. The funds would then be used to hire personnel in DSE and several current problems could be avoided. One especially bothersome problem is differences in pay to current employees

45

caused by different agency pay scales rather than position, responsibility and longevity at DSE.

DSE is considering a reorganization in which its area of concern would be demand analysis, long- and mid-term energy sector planning, and issue definition and study. The area of new and renewable sources of energy and demonstration projects would be placed under a new directorate also in the MIEM. In spite of this change in focus, a substantial increase in operating budget for DSE is predicted for 1986. DSE is perceived to have been successful in most of its efforts to establish itself as a data producer and as a demand sector planning institution. It has not been able to make much headway in affecting energy supply institutions or overall policy. It has also not been able to bring critical issue solution options into focus or to have an impact on major problem solutions.

D. Project Elements

The four project elements shown in Table I-1 were developed on the basis of an understanding of and agreement upon what was necessary to strengthen the energy planning capability in Costa Rica. The early discussions and planning which lead to the project paper and the resultant project elements have, for the most part, proved to be accurate and on target. The project as it exists today had changed in funding priorities and some components but not major elements.

The first of the four elements, Energy Sector Management, has included the hiring of a project advisor and secretary and later a project administrative assistant, the equipment (with desks, chairs, typewriters, etc.) of much of the DSE office space, and the provision of other necessary supplies and material. The selection of a Costa Rican citizen as project advisor for two years resulted both in a knowledgeable and extremely well qualified person being hired and in savings in project expenditures due to lower support costs (per diem and living expenses). In this category, the original budget was reduced by almost 50 percent and mostly shifted to the second project element.

The second project element, Energy Research and Studies, was described in the Project Paper as filling "...critical gaps in energy data and analyses..." related to energy demand, supply and conservation. Further, the design of a national program aimed at increasing net energy supplies also required detailed prefeasibility studies of specific project options. Several possible studies or analyses were suggested in the Project Paper including a survey of energy sector data, a plan for energy analysis and studies on non-conventional fuels, energy conservation, hydroelectric power, conventional fuels and energy sector management. Under this category a number of studies have been initiated (see Table II-1 for details).

The studies which have been completed or are in the process of being completed correspond well with the concept of this element contained in the project paper. Previous descriptions of the project history have presented a picture of the inability of DSE and U.S. contractors to complete the work of this element on time. One characterization of this element which applies to almost every major activity is that each was delayed due to the inability of people or a firm performing work to meet either or both technical and delivery responsibilities. Delays by DSE in completing their studies can be both explained and excused in that they are a developing institution undergoing training and gaining experience. The delays by U.S. firms, while explainable, are more difficult to accept or excuse. In support of this position, a description of some of the problems with a few of the studies is presented in Chapter IV. Appendix J presents a detailed description of two of these studies.

The third major project element involves training and exchange programs. As of December 1, 1985, over 50 such activities have been completed or were pending (see Appendix H for a partial listing). These activities ranged from the slightly controversial English language training for DSE staff to the bringing of personnel to Costa Rica for seminars and technical assistance.

The fourth and final element involves the acquiring of energy planning materials and the creation of a Documentation Center (for material and

TABLE II-1

MAJOR GRANT FUNDED STUDY ACTIVITIES

ACTIVITY TYPES*	MAJOR ACTOR	DESCRIPTION	ACTUAL TIMING DURATION	COMPLETION	ESTIMATED OR ACTUAL COST $US	STATUS
A	Meta Systems	Biomass Use in Industry Prefeasibility Study	13 months	June 1984	100,000	Completed and published
A & C	Development Sciences	Adaptation of Model for Energy Sector Planning and Other Services (EnVest)	29 months	Dec. 1985	168,119	To be completed in Dec. 1985
B	Several	Bioelectrification Demonstration at Horquetas Costa Rica	?	?	100,000 Grant (570,000 Central Bureau)	To be completed after PACD
E & C	Weston International	Industrial Energy Conservation Audits Training and Reports	?	?	207,405	Estimated completion March 1986
C	DSE & Costa Rican personnel	Residential Energy Survey	30 months	Sept. 1985	---	Published
C	DSE & Costa Rican personnel	Other Surveys	?	Dec. 1985 or later	---	Four are still unfinished
C	Various	Training		Dec. 1985	110,000	---
C	DSE	Equipment Purchases		Dec. 1985	44,000	---
C	Alvaro Umana Ana Lizano	Project Advisor (salary & expenses) Administrative Assistant (salary & expenses)	3 years	Dec. 1985	50,000	---
C	Hagler Bailly	Transport Sector Conservation Assistance	4 months	Dec. 1985	30,000 Grant 80,000 Total	Expected completion December 1985
	Local Firm	Information Center Upgrading	4 months	Nov. 1984	17,000	In use

* ACTIVITY TYPES

A = Mission Subcontracted Study

B = AID/Washington subcontract with partial mission participation

C = Mission payment for expenses

D = Mission payments for equipment

E = Panama contract

48

reference storage, display and use). As of this date basic supplies and references have been acquired. A half-time librarian has been employed to organize and catalogue materials and publications and other materials are being received, catalogued and used. The official Documentation Center, a place to use this and other information, has been constructed adjacent to the MIEM building and grant funds were used for construction, decoration and equipping.

There are a number of other energy related activities being carried out by USAID contractors or DSE which affect or rely upon project elements and status. DSE is working with other funding agencies to develop other planning models, perform a gasification demonstration, and study renewable energy resource potential. USAID is also working with DSE and others (the Los Alamos Laboratory managed, LA Bureau project) on defining studies and projects to help strengthen national planning capabilities.

DSE is still committing a major portion of its resources to prepare a National Sectorial Energy Plan (1986-2006). Many inputs to this plan are project deliverables. The one major analytical planning tool which is still being developed, EnVest, was originally to be an analysis tool in the NPE preparation effort. The household and other energy sector data are very important to and necessary for this planning process. The first draft of the PNE being prepared by DSE staff was expected to be ready in October 1984 for review by RECOPE, ICE, SNE and MIEM staff. An approved and official plan was scheduled for formal presentation and release in February 1985. When this deadline was not met, a November 15, 1985 deadline was set and when this was exceeded a January 30, 1986 deadline was adopted. As was mentioned earlier it is very likely that this deadline will also be missed. The failure of DSE to produce this plan in a timely manner has been disappointing to those inside and outside DSE.

III. PROJECT STATUS AND EVALUATION ISSUES

III. PROJECT STATUS AND EVALUATION ISSUES

A. Introduction

The project paper states the goals and purposes of this grant to be the strengthening of the energy planning capability of the Government of Costa Rica. The evaluation scope of work requires that success in achieving this be examined as well as the status of major project elements, the interim evaluation recommendations, and the National Energy planning process. The emphasis in this evaluation is to determine what the grant funded activities have and have not contributed to DSE, to point out accomplishments and failures of these activities, to define the status of DSE in accomplishing what it and the project paper have described as goals and objectives and to investigate and discuss the future of DSE. While the focus will be 1) grant funded activities, 2) DSE and other Costa Rican institutions, and 3) USAID, most of the recommendations will be directed towards USAID. Additionally, the time period emphasized will be from the mid-term evaluation (June 1984) until now (December 15, 1985). It will be necessary to reconsider the early period of the project somewhat to allow completeness and some material from the previous evaluation will be repeated. In order to evaluate the project, a summary description of the status of the major project activities as of December 15, 1985 has been prepared. This summary, presented in the following bullets, describes what has been accomplished as well as what is left to do. One disturbing element of the project is that several important energy planning activities which were funded and/or supported by the grant will not be completed prior to the project termination date. The status of major project funded activities is as follows:

Energy Sector Management

- All components of this element were or will be completed by December 31, 1985. Spending is estimated to be 10 percent of the total project amount.

51

Energy Research and Studies

- The Biomass Use in Industry prefeasibility study was completed and published (1984) and one major follow-on activity, the cement company biomass fuel substitution project is underway.

- The Horquetas Bioelectrification Demonstration project will not be completed before the project ends and the gasifier and generator had just been delivered to Costa Rica. No completion date is projected but money allocated from the grant funds has been spent.

- The EnVest model has been revised and is about to be demonstrated to DSE. However, the project has taken three times its original 10 month duration and in this period other energy planning models have been developed/adopted by DSE for general use.

- An Energy Information System has been developed in DSE and it contains energy use data for all economic sectors. This is now used to present annual reports on energy use and to compile an annual energy balance. The system is on the IBM-PC hardware supplied as a part of the project.

- The Industrial Energy Conservation project contractor has not yet delivered even one final audit report in Spanish to DSE on an Industry (14 plus a summary report were due). Four were promised before the end of December and all have now been unofficially promised before the end of March 1986. Four draft reports in Spanish have been reviewed by DSE and their quality has been judged to be excellent.

- Three of the remaining 7 planned DSE managed demand sector surveys and analyses have been completed. One, the residential sector, has been published and three others were being published.

- A demonstration and information project for the transport sector funded by the USAID Central Bureau Energy Office and the project ($30,000) is underway and has generated a significant amount of information and interest. It is on time and will identify follow-on activities for DSE and others.

- Not all the components of this element will be completed by December 31, 1985. Spending in this element will be approximately 65 percent of the grant amount.

52

Energy Planning Information

- The documentation center construction was completed, a part-time librarian was hired, over 10,000 documents are catalogued and available and there are many users.

- Project reports and some general energy information brochures are available for distribution.

- The energy information system is available through the IBM-PC and an annual energy balance is produced by DSE.

Training

- The training of professionals in the energy field has been completed and many activities have been included. In-country and international training has been provided and it has been estimated that over 500 people were provided direct training and expenditures in this element amounted to 11 percent of the total grant.

In addition to the expending for directly funded activities as shown in Tables I-1 and II-1 the DSE counterpart funding contribution has been estimated as 23,145,823 colones. Using an average exchange rate of 50 colones per $1 U.S. this amounts to over $489,000 U.S. and exceeds the $350,000 U.S. requirement. Appendix I contains the details of how DSE arrived at this figure. The critical assumptions are the percentage participation estimates. The column on the sheet headed "Activity By Project" is the estimate of the percentage of total DSE employee time spent on each project. There are some questionable assumptions such as defining 15 percent participation on energy audits from 1982 through 1985 because the Weston International energy audit contract (the principal audit activity) did not start until the end of 1984 although preliminary work had begun in 1983 with the aid of U.S. consultants. The second questionable assumption is that there is no time allocated to the preparation of the National Energy Plan (NPE) and the 5 percent for the National Energy Balance represents the production of annual statistics on energy use. A third major assignment which can also be questioned is that the development of the Integrated Energy Planning Model (MIPE), DSE's own energy planning model, is not directly reflected in the description of activities on this sheet. DSE personnel indicate that audit training and planning occurred

early in the contract and later activities were greater than 15 percent thus this was an average involvement. They also state that MIPE, administration and NPE efforts are distributed over all activities.

There are also a number of factors which may balance the above seeming inequities. The budget figures used are only salaries paid by RECOPE and do not include salaries for the two ICE supplied people and costs incurred by other government agencies such as SNE or MIDEPLAN for their participation in surveys, studies or other project activities are also not included. Thus, while some of the percentage time allocations can be questioned as being too generous these are probably balanced by costs not included in the overall budget. It is important to note that by their own calculations DSE represents that 64 percent of their efforts over the 4 years of the project have been dedicated to activities funded by the project. From the information collected and discussions held during this and the previous evaluation it is easy to accept this as being a reasonable estimate.

The project paper contained a number of criteria and objectively verifiable indicators of meeting project goals. These, along with brief comments, are summarized in Table III-1. This Table appeared in the interim evaluation and has been adjusted slightly to serve for this report. In addition to these measures, the internally defined goals and objectives of DSE are also important to this evaluation process. Copies of goals and objectives from the 1984, 1985 and 1986 DSE budget submissions to MIEM are included in Appendix E. In these statements, the fundamental objective of DSE is described as being the creation, maintenance and operation of a permanent energy planning system which will assure efficient and ordered development of the sector. Additionally, in the 1985 budget the bringing to completion of a National Energy Plan (PNE) is mentioned while in the 1986 statement the emphasis is on implementing the PNE.

TABLE III-1

SUMMARY OF PROJECT PAPER LOG FRAME ENTRIES

ITEM		OBJECTIVELY VERIFIABLE INDICATORS	EVALUATION NOTES *
Goal:	Reestablish dynamic economic growth	A 6% per year GDP growth rate is achieved during 1985-1990.	Achievement also depends on many other non-project related activities.
Sub Goal:	Augment available domestic energy supply	Costa Rica's imported energy decreases by 1988 to 30% of total energy used.	Assumes this goal is held and supported by all other government actions.
Purpose:	Strengthen Costa Rica's capacity for energy sector planning	An energy sector plan is produced by end of 1983 and project results have an influence on energy policy and energy use.	Very directly connected to project activities. Also influenced by political factors.
Project Elements:			
1. Energy Sector Management		Adequate reports on planning data and analysis gaps.	This assumes, in part, that the supply of a project advisor, the provision of programmatic support, and setting of conditions precedent will stimulate activities.
2. Energy Research and Studies		Technical energy committee becomes active, review of energy supply options completed, and at least 5 prefeasibility studies and planning analyses completed.	Assumes USAID can contract in a timely manner, and implementing agency is organized and expanded rapidly.
3. Energy Planning Information		Information needs analyzed, and documents collected and organized.	
4. Training and Exchange Programs		Personnel in energy sector institutions are trained. Key energy planners participate in exchange programs.	No training plan was called for in project paper.

* These notes were made by the evaluator and were not a part of the Project Paper Log Frame.

B. Accomplishment of Project Paper Goals and Expectations

The goals and measures for the overall project as summarized in Table III-1 can be expanded and amplified by considering the following additional quotes from the project paper:

- "This project will 1) strengthen Costa Rica's existing energy planning institutions and 2) complement the energy planning work already underway through more detailed study of the country's concrete energy options." (Page 2 PP)

- "... the project will result in (long-term) benefits which can be analyzed in terms of energy cost savings, foreign exchange savings and reduced indebtedness, effects on other sectors, and environmental and other externalities." (Page 31 PP)

- "It is anticipated that outside consultants in conjunction with AID/W or regional personnel will participate in the two evaluations." (Page 41 PP)

- Important assumptions in the Project Design Summary Logical Framework include: "Technical assistance procured in a timely manner ... contract support procured in a timely manner." (Annex E, Page 5 of 5)

The achievement of a 6 percent per year GDP growth rate during 1985-1990 does not look possible. A rate of approximately 3 percent is much more likely. DSE's own estimates, even under their high growth rate scenario for PNE, are only 4.5 percent per year for the period (1986-2006). In the earlier years of this scenario the growth rate is nearer 3.5 percent. If anything, the project may help prevent future deterioration in GDP growth rates. The future of the economy is difficult to predict but the above project goal appears to be both inappropriate (for an institution building and study and research oriented project) and excessively optimistic. Had the project financed more supply option feasibility studies, issued analyses and implementation of conservation measures the GDP and energy savings impacts may have been easier to define, large and earlier in their arrival. This point will be made and discussed again later.

The impact of the project through augmentation of available domestic energy supply is easier to evaluate. Meeting the subgoal of decreasing

56

Costa Rica's imported energy by 30 percent by 1988 is possible but not likely. At the start of the project imported petroleum was approximately 50 percent of total energy use. DSE estimates for 1985 show this figure to be approximately 38 percent. Official projections were not available at DSE for the 1988 percentage because the PNE had not been finalized. However, unofficially, preliminary calculations show little anticipated decrease below 38 percent by 1988. Again, if more supply and conservation oriented activities had been initiated as part of the grant, the project impact might have been greater. There were four principal supply and conservation related activities, 1) the Biomass study, 2) the Industrial Energy Audit program, 3) the Horquetas Bioelectrification study, and 4) the Transportation Conservation Demonstration project (both of the latter being partially funded by project monies). Of the four, two will not be completed before December 31, 1985 (2 and 3), and all four have important demonstrated savings possibilities. However, even with maximum adoption of these possibilities the goal of decreasing imported energy by 30 percent would probably not be accomplished. The hydro and alcohol/gasohol studies previewed in the project paper were not done under project financing. The emphasis of project activities has been much more on planning and planning tools than on measures which could directly decrease or alter energy use patterns.

The third item in Table III-1 is the strengthening of Costa Rica's capacity for energy sector planning with indicators being the preparation of an energy sector plan by 1983 and project results having an influence on energy policy and use. The selected verifiable indicators may have been marginally met, though not in a timely manner. A partial preliminary draft of the PNE is being reviewed but it is very late and the final version will likely not be accepted and published until sometime after mid-1986. Components of the plan, especially data and information on energy supply, demand and resource state, are available but information on issues such as pricing, sector regulation and energy policy and strategy are not yet prepared or decided upon. The inability of DSE to produce a timely plan appears not, to any major extent, to be the fault of the USAID project.

The slowness in NPE preparation and acceptance is the result of a number of factors including:

- ...the National Energy Sector Plan for the period 1986-2006 is far from completed (in the area DSE may have significantly underestimated the amount of effort and time it will take to complete even a draft of the document)," (a quote from the mid-1984 Interim Evaluation, pp. 3).

- Management, organizational and coordinative difficulties within DSE during its development and growth. These include the inability to keep enough of the personnel in DSE and in other agencies coordinated and working in unison to produce a plan and an emphasis which focused on data production and responsiveness to others.

- Political forces which were interpreted by DSE as requiring much more data and analysis than the institution was capable of producing.

- There was little study or definition of energy issues especially pricing, regulation, financing and incentive mechanisms.

- The slowness of U.S. contractors in delivering planning and analysis tools (EnVest) or data (industrial energy conservation audits) which were inputs to or important for plan preparation.

With respect to project results having an influence (mostly indirectly and in the future) on energy use the indications are good. The Biomass study identified a number of opportunities for substituting biomass for conventional fuels in industry. One of these opportunities, wood use in the cement industry, has been further developed. At present a major cement plant has converted much of its fuel use to wood and the savings are impressive. Although the industrial energy conservation data are not yet available, preliminary data indicate major savings opportunities in several industrial groups. The transport energy conservation demonstration and training process now underway has shown that it is possible to reduce fuel use in bus and taxi fleets and personal passenger cars by 15 percent if drivers/owners adopt certain equipping, maintenance and driving procedures.

Thus, there are both actual (though small) and potential (much larger) savings and impacts on energy use as a direct result of project funded

activities. However, as was mentioned above, it is not likely that these will accomplish or lead to the expected 30 percent imported energy decrease by 1988. There will likely be other impacts from the Horquetas project and possible adoption of other recommendations in the Biomass study. It is not now possible to estimate what these will be.

The influence of the project on energy policy can not yet be demonstrated in any direct way. It is also difficult at this time to identify any direct impact which DSE had had on energy policy. The most significant policy role DSE has played has been as staff to MIEM and as advisor to others when issues of supply regulation or financing have arisen. In each of these cases, DSE's involvement has been behind the scenes and mostly through verbal communications and meetings. DSE has chosen not to issue public or final reports on major energy sector policy issues. As an example, since late 1983 two draft energy pricing studies have been available within DSE. However, DSE management could never develop the outside consensus or support which they felt was necessary to finalize these. They have also focused their policy impact efforts on the NPE and through this hope to define and consolidate sector policy.

In this project, U.S. contractors, USAID contracting and host government institutions (to a lesser extent) have performed at less than expected levels. This performance was to a certain extent caused by factors which were unexpected and/or outside the control of these parties. However, in the final analysis it was the combination of unrealistic expectations for the project (especially timing) by contractors and DSE which is the base cause of the problems. The original project was mostly institution building. With the addition of the EnVest modeling and based on final spending calculations, a minimum of 54 percent of the total project funds were spent on those project elements and activities which contribute to the institutional capabilities of Costa Rica. These include the total project categories of Energy Sector Management (12 percent), Energy Planning Information (5 percent), and Training and Exchange program (11 percent) as well as parts of Energy Research and Studies (26 percent). Additionally, the performance expectations for DSE turned out to be very ambitious. DSE was a new institution in a new Ministry with young and

relatively inexperienced personnel. There were many positive signs that DSE or its predecessor, SEPSE, could accomplish much but the project expectations were extremely ambitious even if everything went well.

The major accomplishments of the Grant funded support and project elements should and can be measured in terms other than those set out in the project paper. When institution building and strengthening is recognized as the logical purpose of this project, the project achievements can be more clearly qualified and quantified.

As the start of the project data and information on the elements of the energy sector were lacking, the sector was not viewed in a unified manner. Rather, it was handled as separate elements along separate institutional boundaries. Options, issues and potential achievements were poorly understood. In the slightly over 3 years of the grant period when DSE was active, this changed dramatically. The energy sector is now viewed as a whole with parts, but parts which are interrelated and which must be dealt with consistently. This is the most important and most widely recognized result of the grant and DSE's development and work. Although this was not previewed by the project paper as being an important result, it should have been. DSE has been able to deal with RECOPE, SNE, ICE, MIDEPLAN and the rest of the government and to have them understand and accept a wholistic view of the energy sector.

The second important accomplishment is that there are now enough data on energy demand and supply options (if not on energy issues) to understand and plan for the energy sector. DSE can deal with the other energy institutions in a knowledgeable way and these other institutions have access to a wealth of independently produced energy sector data. The energy information system, the annual energy balance, the energy surveys and MIPE outputs, to name a few, represent detailed and powerful elements of an energy sector data/information system. These are on a par in terms of quality with information held and published by the other energy sector supply institutions.

The third important output/result of the project is the trained and experienced professionals. Many employees of ICE, DSE, MIEM, SNE, RECOPE and MIDEPLAN as well as other institutions received energy related training outside Costa Rica. Many others from both the public and private sectors attended seminars and workshops in Costa Rica on energy related subjects. Probably the largest training input came from participation by DSE and other professionals in the studies and projects funded by the grant. As an example, even though the EnVest model was not delivered on time to be used in preparing the PNE the process of transferring it to DSE was very useful in training. The MIPE model now used by DSE has many elements similar to EnVest. Also, the energy planning process in DSE has benefited from contact with U.S. professionals and the pieces of software which have been delivered and are working. This is not necessarily sufficient justification for EnVest but it is one of its contributions.

The fourth important project output is the working relationships between DSE and other institutions. These relationships have been built as a result of project activities including the DSE demand sector surveys, the energy conservation audits, the national energy planning, etc. Personnel from many government, cooperative and private sector entities have worked with DSE and project subcontractors. There have also been planning meetings and issue discussions which further strengthened relationships.

If the above institution building focus and measures of success are accepted, the outputs and status of DSE is more understandable and acceptable. This is the way DSE, RECOPE, SNE and ICE management as well as others interviewed generally describe what DSE is and should be in the future. It is because of this as well as what was discussed above that the evaluation of the impact of the project can be positive even though the first three objectively verifiable indicators in the log frame have not been met. It is only the third general indicator, the production of an energy sector plan and, project results having influence on energy policy and energy use, which will likely be met.

C. Project Elements

Introduction: The data in Table I-1 on Major Project Elements and Budget portray the original design of the project, the mid-term status and the final allocations. There were major changes in funding in all categories. If some of the components funded as part of the Energy Research and Studies (ER&S) category were reclassified as being energy sector information tools the mix would be more like what was originally intended. For example, if EnVest, which was not originally conceived as a part of the overall project and which ended up substituting for supply or demand side feasibility or development studies, was reclassified the final amount of money spent on ER&S would be close to 46 percent of the total. While there were changes over the course of the project the most significant difference was that less work in energy demand and supply feasibility studies was done. The number and types of these projects were diminished. The following analysis presents information on each and the four major categories of the grant.

Energy Sector Management: Energy Sector Management activities were intended to develop adequate reports on planning data and analysis gaps. A partial list of project and general DSE reports is contained in Appendix G. An examination of this list plus the microcomputer based energy information system and the annual energy balances and energy sector status analysis represent a very extensive energy sector data base. There are still some elements missing especially energy sector issue papers. Discussions of pricing, financing, institutional coordination, and regulation would help illuminate the issues which must be addressed in order to coordinate and efficiently manage the energy sector. This is a critical element which DSE has not been able/willing to address or affect. It is also an area which is not addressed in the current preliminary draft of the NPE. With MIDE, MEDEE (a French energy planning computer model), EnVest and other models and the trained and experienced professionals, DSE does have the tools and resources to complete its planning analysis program. It appears to lack the desire, political support and/or expression of encouragement and help from others to do this. However, in the short time of its existence DSE has met the log frame criteria for this element.

Energy Research and Studies: This is the project category under which the major subcontracts and high visibility project activities were undertaken. Major efforts financed under this element include the Biomass Use in Industry Feasibility Study, the EnVest model, the Horquetas Bioelectrification Demonstration, the Industrial Energy Conservation Audits and the Implementation of Transportation Energy Conservation Measures study. Almost 70 percent of the project funds went into this category. The measures suggested in Table III-1 to verify accomplishments in this element have not been met. With a change from SEPSE to DSE the technical energy committee concept was integrated into DSE. DSE has focused mostly on demand analysis and demand reduction and has not looked much at supply options. The Horquetas project is not yet installed but the Biomass Study did result in one wood fuel substitution project. In general performance on the four studies mentioned above is poor in relation to timeliness with only one now completed and two others likely to be finished by the PACD. It will be useful to look in some detail at the reasons behind this poor performance on selected studies. Appendix J presents a review of the DSI EnVest Model transfer to DSE and the Weston International Industrial Audit project. The findings from this analysis in Appendix J in relation to the EnVest project are as follows:

- The transfer of the EnVest Model to DSE has taken 3 times as long as was contractually agreed to (30 vs. 10 months) and this along with other problems has made it have no direct usefulness to DSE in the past and possibly very little in the future.

- The Moroccan Version of the EnVest Model was not developed to the extent which DSI thought it was or represented it to be when they negotiated the contract.

- DSI was not able and/or willing to correct the deficiencies and deliver in a timely manner what was required in the fixed time and price contract without extensive time extensions.

- DSE did not supply the data and support which they agreed to when the contract was negotiated thus making translation and transfer of EnVest to Costa Rica very difficult.

- DSE decided to develop their own modelling approach (MIPE and other models) and did not place a high priority in seeing that EnVest was delivered.

- DSE technical and management personnel were never and are still not convinced that EnVest is the right energy policy/planning tool for Costa Rica.

On a more positive note, it appears that the EnVest transfer process helped DSE in the development of their model and in shaping their thinking about energy policy setting. When EnVest is delivered later this month and accepted by DSE, it may be used. This is very possible for EnVest I, a separate module which performs financial analysis of supply projects. This is one area of analysis which DSE does not now have the tools to perform. EnVest I may be very useful to DSE in this area in the future. One way this utility can be enhanced is for DSE to receive a small amount of support funding from some source to collect, develop and enter the data necessary to make EnVest I useable.

The course and selected details of the Industrial Energy Conservation Audit project also described in Appendix J portrays a different set of findings. These are:

- The original contracting process at USAID was delayed due to problems with handling of a late proposal and the work had to be rebid. This left a very short time to complete the project before the PACD.

- Contractor performance was excellent during the technical and early in-country parts of the work but report writing and translation problems have caused extended delays in completion of deliverables.

- Discussions and negotiations between USAID and Weston International over the additional funding and time have been drawn out and this issue may still not be resolved.

- Project/contract management at USAID or by the contractor has not been able and/or willing to expend the time and effort necessary to complete the project in a timely manner and before the PACD.

- Personnel changes in USAID project and contract management and an apparent lack of appreciation for the importance of a timely delivery of reports by Weston International are key elements of the problem.

- The delays in delivery of reports is adversely affecting the relationship between DSE and industries.

On a more positive note, the draft audits which have been reviewed are felt by all to be excellent and could be very useful in guiding industries to make economically viable conservation decisions. The training component of the project was also judged to be excellent and the trained auditors will be able to continue to help industries identify opportunities for energy conservation.

Two of the remaining three major contracts in this area are or have experienced problems. The Biomass in Industry Study performed by Meta Systems was accepted by DSE in mid-1984 and judged to be a valuable contribution. Although there were some misunderstandings and disagreements between DSE and contractor staff during the study, the study report (Volume 1) was published (after a thorough editing) in late 1984. The study identified and described a number of projects in industry where biomass should be substituted for other fuels. These projects are being considered for further support by DSE and one major project in the cement industry is underway. Data and analyses provided in the study will also be used by DSE in future planning and analysis activities. This contract also experienced delays and required a no-cost extension increasing its length by almost 50 percent.

The Horquetas Bioelectrification Study is a separate AID/Washington financed project in the energy area which DSE is coordinating and contributing some grant funding ($100,000 towards the purchase of equipment). The project is partially completed with the Costa Rican work, including substation and grid construction and forest management arrangements being completed in early 1984. The remaining parts of the project involve the procurement, shipping, installation, and testing of equipment for gasification and electricity generation. The demonstration of this type of renewable energy use is consistent with project goals and its successful accomplishment can produce positive results and establish a demonstration of a repeatable mechanism for reducing the national reliance on imported fuels. At the present time, based only on information and observations made in Costa Rica, the successful completion of the project is not assured. The gasification and generator, after a series of changes in contractors, which is being supplied by a U.S. and Dutch company, has

only just now arrived in Costa Rica. The installation, start-up, testing and initial operation will require several months.

The final major contracted study is one being performed under joint AID/Washington ($50,000) and grant ($30,000) funding. The study covering the demonstration of transportation energy conservation mechanism is being performed by the consulting company of Hagler Bailly. It was started in the middle of August 1985 and is scheduled to be completed by December 31, 1985.

The work is being done in Costa Rica and the data analysis and final report preparation are underway. It is very likely that a draft report will be completed by the PACD. The work and training has been well received and it appears that fuel savings will be realized in the transport sector. Follow on work by DSE and MOTP is also planned.

DSE initiated a number of surveys and studies to collect sectoral demand information. These included residential (households), transportation (residential), general transportation, industry, agriculture (crops), agriculture (animals and fowl), commercial and government sectors. At this time the Residential (households) sector data and analyses are published and the Transportation (residential), Agriculture (animals and fowl) and general transport reports are at the printers. These should be completed by December 31. The others are in various stages of preparation and no estimate is made as to when they will be completed and published.

In general, each of these major studies has or will provide data of significant utility. However, the emphasis in the project paper on supply options has been diminished with the inclusion of demand studies and planning tool development. Timely contractor hiring has been an issue especially in the Industrial Energy Audits contract; however, with the grant extensions this was not the most serious problem. This is a generic problem to all contracting and there are tools and mechanisms to minimize it.

Energy Planning Information: The information and data element as described in the Project Paper included needs definition, studies, material acquisition and the creation of a documentation and/or energy research center. The original budget for this activity was scaled down and the final spending will be approximately 50 percent of the project paper assignment and 5 percent of total project spending. A library of books, reports, magazines and other materials pertinent to the energy sector in Costa Rica has been developed; approximately 10,000 titles are catalogued and many more are being entered daily. Other reports and materials are held by individual DSE employees, most if not all of which are treated as personal property not provided with DSE or grant funding. The document center is constructed and equipped and staffed and is open 4 hours per day.

In general, the whole area of public information is not being addressed except in transport fuel conservation. This has not been made one of the major priorities of DSE and their efforts and attentions have been directed to other areas. While their publication list shows a number of publications, there are some important gaps. One of these is that data and results from major efforts such as the energy use surveys are not yet available.

DSE does not view public information programs as a major responsibility. They feel that they must give priority to other areas. The Log Frame criteria mention analysis of information needs and document collection and organization as verifiable indicators of achievement. An assessment of needs was performed, but it should be updated, especially considering the current role of DSE and its concomitant needs. Documents have been collected and organized, catalogued and are available for use in the library. Projects in other elements have contributed to information especially the transport energy conservation study which has had favorable news media coverage and which will produce general purpose brochures and pamphlets.

Training and Exchange Programs: The project sponsored training program has not changed much since the mid-term evaluation when it was described as both eclectic and opportunistic. It is eclectic in that while

DSE has a guiding training philosophy, there is no official annual training plan. Trainees and training opportunities appear to have been sought, encountered or brought to the attention of DSE, almost on a case by case basis. It is opportunistic in that it was often used to fund travel and per diem for people attending existing formal training programs sponsored by USAID and others. Both of these characteristics are consistent with the project paper and acceptable for a training program. Appendix H presents the type of training activities completed under the project. A number of training activities have been funded and twice as much was spent on training as was anticipated in the project paper. Training has been a mix of short-term activities involving one or two persons and larger seminars and workshops. These latter training activities, especially the industrial energy conservation, the INCAE policy and the transportation seminars were judged to be very beneficial by those who attended. This element, especially since the mid-term evaluation, has been very active and its contribution to energy planning is large in comparison to its funding level. There have also now been some exchange programs which was one of the log frame indicators of success. This element has been successful and has exceeded the expectations of the project paper.

Other Activities: The analysis of counterpart contribution to the grant presented in Appendix I and discussed earlier in this chapter identify those activities which DSE felt were grant supported. DSE included seven activities under USAID funding projects and six supported by others, but did not include the preparation of the PNE in either category. They have indicated that this was a major purpose of all work and that for accounting purposes effort towards this is included in each of the other 13 categories. The 1985 summary of objectives and activities (see Appendix E) states that DSE, working with others, has the responsibility to bring into being a national energy plan (PNE). DSE has not yet done this and, as has been discussed, this inability reflects a major weakness of the energy sector planning process in Costa Rica. DSE has completed and published two results of non-controversial projects and papers. They have not been able to complete or formally issue studies or reports on major energy sector issues. The pricing studies they have drafted have not been acceptable to others and have not been issued. With the PNE the

preliminary draft of the executive summary has not been accepted and will require revision, expansion and negotiation before it is issued. DSE still has some important development for it to be an institution able to coordinate and guide energy sector planning. If DSE continues to act in demand sector planning, information development and research studies it will still be an important and necessary (if incomplete) planning institution. DSE is considering a reorganization to officially make it more like the above. A more detailed operating program such as the one included in Appendix E for 1985 will be prepared early in 1986. DSE is also discussing or has already acquired outside funding support for a number of projects. A few of these include USAID (through Los Alamos) assistance and funding for the preparation of a macro model of the Costa Rican economy and a study of how to treat energy prices in the model, OLADE funding for management of the Latin American Program for Energy Cooperation and Sharing of Information and Planning/Analysis approaches, on-going OAS and French funding for gasification demonstrations, UNDP institutional support for consultants, etc. DSE has undergone a major change in staffing this last year with the departure of seven professionals. However, at the start of the new year these positions should be restaffed and a full component of professionals will be on hand to continue and expand the work of DSE.

D. Mid-Term Evaluation Results

The summary of recommendations from the mid-term evaluation are found in Appendix B. The process of considering and adopting or rejecting these included review and discussion in and among USAID, DSE and other energy sector institutions. DSE prepared a response to the evaluation which indicated what they were planning to do or had already done in areas treated by the recommendations. In several areas both USAID and DSE have adopted or attempted to implement the recommendations.

1. USAID requested that DSE report on host country counterpart contribution. However, only in December 1985 was a report made. A draft of this report, contained in Appendix C, confirms (what has always been

unofficially known) that DSE and GOCR has exceeded the necessary level of contribution.

2. DSE did not request the hiring of any additional contract services as was suggested and thus this recommendation to USAID was not adopted. DSE could have used help especially in completing their surveys, evaluations and the NPE. The recommended mechanism could have been helpful.

3. The remaining two recommendations pertaining to follow-on funding priorities are still valid. The USAID Mission did and is still working with AID/Washington to advance the Horquetas project.

There were eight specific recommendations in the interim evaluation pertaining to DSE. The first two suggesting studies be undertaken were considered and attempts were made to initiate these. However, for a number of reasons these studies were not funded. An alcohol study and project was completed outside the project. The third recommendation was that all efforts be made to assure success of the above to start Industrial Energy Conservation audit project. DSE did this, however, even with their diligence and USAID's efforts the contractor is very late in delivering audit reports.

Recommendations 4, 5, 6 and 7 suggest preparation of a training plan (4), a study on areas such as sector financing and regulation (5), the use of grant money to hire people to help accelerate evaluation of data (6), and the implementation of a strategy to encourage use of DSE held information resources (7). None of the above recommendations appear to have been adopted. In each case DSE felt that other areas were of more priority (4 & 5), what they were already doing was sufficient (7), or that what was suggested was not necessary (6).

There were also four more bulleted and two general (presented in paragraphs) recommendations for DSE consideration. The four recommendations presented in bullets covered increases in information dissemination (9), definition of outside funding needs (10), work priority settling and

-18

adoption of an internal project management system (11), and inclusion of a section on sector issues in the NPE (12). DSE has made efforts, primarily in the transportation sector, to develop and disseminate information. They also developed proposals to various funding agencies but apparently did not determine goals for the type and amount of outside funding needed for area 1985. The last two recommendations were not adopted. In both cases DSE management has stated that what they were already doing was sufficient. In the case of work priority setting and management it is worthwhile noting that they still continue to experience serious problems in completing major efforts such as the NPE, pricing studies and survey analyses. Part of the problem is apparently outside their control (political and approval) but much of it is also subject to internal management control.

The remaining two general recommendations addressed the need for a continuation of funding for outside technical and management assistance to DSE. Either an extension of the current advisor or the use of contractors was proposed. DSE rejected this recommendation and USAID accepted this rejection. Adoption of this may have allowed DSE and USAID to handle the post evaluation problems with completing work which have lead to the present situation. The final recommendation suggested a continuation of general programmatic and study support following completion of the project. This recommendation is still valid and is especially important since important goals, objectives and project elements will not be completed by the PACD.

E. Development Impact

The project was expected to directly contribute to the improvement of the economy in Costa Rica. This type of impact from an institution building project in one sector of the economy is difficult to verify. The more important development impact of this project will be the enhancement of planning and implementation of development projects as a result of the support provided to DSE and the training gained by professionals in other institutions. It will also be easier to evaluate development impact when the NPE is produced and after February 1986 when the elections have been

completed. The position and programs of the new government and DSE will reflect the success of the grant in influencing development.

F. Lessons Learned

There are a number of generally important lessons which can be learned from this project. Most of these are presented in the Findings and Recommendations Section of Chapter I. In order to highlight what appears to be the two most important they are repeated here. Even though Costa Rica has a very sophisticated and highly educated cadre of professionals and many of the institutions are very experienced it is still necessary to provide continuous technical and management support in development projects. In this particular project the project paper planning for the supply of a senior advisor for only two of the three project years appears to have been a mistake. This mistake was exacerbated by DSE in their management of the project. They adopted this project paper strategy during the last project year and also did not use recommended (mid-term evaluation) short-term technical and managerial assistance. The time was short and completion of elements was in doubt. However, DSE chose not to look outside for assistance and support. This is a common tendency in any agency in any country.

Because of the above it is important to emphasize the importance of continuous presence of technical and management advisory services, especially in institution building projects. The scheduling of services in the first project years overlooks the critical need for mature management judgment at project end. Very difficult resource management and technical judgments are made as a project is completed. This is often a period of stress, too little time and too much work, and of problems not encountered previously. The value of senior advisory capability at this time is easily equivalent to that at the start of a project. Therefore, the most important generally applicable lesson learned in this project is that technical and management assistance must be assured throughout a project.

In addition to this one major lesson, there is one other worth noting. The problems resulting from setting excessively ambitious goals and objectives are obvious in this project and the universality of this tendency is probably the second most important lesson learned. This is not uncommon in projects and is the result of many factors. Most people who write or review project papers are often not responsible for their execution. It is also well known that if projects, especially grants and those involving institution building are not described as producing significant results they will have a very difficult time being approved. These pressures as well as the enthusiasm of host country and USAID professionals in the beginning of a project preparation process tend to create very high performance expectations. This should be tempered or USAID should be willing to provide additional assistance, if necessary, to see that ambitious project expectations are met.

APPENDICES

APPENDICES

A. Bibliography

B. Interim Project Evaluation Recommendations

C. Final Project Evaluation Scope of Work

D. People Interviewed During Final Project Evaluation

E. DSE Goals and Objectives (1984, 1985 and 1986)

F. DSE Professional Employees as of December 15, 1985

G. DSE Reports and Publications

H. Grant Supported Training Activities

I. Details of DSE's Counterpart Contribution

J. Detailed Descriptions of Two Project Funded Activities

K. Common Abbreviations

APPENDIX A

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BIBLIOGRAPHY

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77

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APPENDIX B

INTERIM PROJECT EVALUATION RECOMMENDATIONS

APPENDIX B

EVALUATION CONCLUSIONS AND RECOMMENDATIONS

A. Findings and Conclusions

The first major finding of this evaluation is that the part of the project which is completed (a reasonable estimate is that 60 percent of the work is completed) has been done well, is consistent with the project paper expectations, and has helped improve the country's capacity to plan for the energy sector. However, there is much to be done, at least two and possibly three major study projects have yet to begin, the National Energy Sector Plan for the period 1986-2006 is far from completed (in this area the DSE may have significantly underestimated the amount of effort and time it will take to complete even a draft of the document), and the future role and necessary outside funding for DSE has only begun to be defined and sought out.

Of the project work remaining to be performed, two important studies are planned. The industrial energy conservation audit project has been well thought out, but there is a short time and much creative work to accomplish all that is expected. This study is very important if measurable energy savings are to result from DSE's work. The alcohol-gasohol study, originally a part of the early project work but postponed until now, could also bring important results. DSE has a good start in scoping the work, but must involve RECOPE and SNE in both the planning and execution if the study is to be useful and have policy impact. A study not yet planned, but which could be very important, is one with ICE to develop a methodology and complete projection of future electricity use. Traditional projection methods based on historic trends do not apply today in Costa Rica and a new approach is needed and wanted by ICE. These study efforts, if successful, will do much to enhance the energy planning capacity of the major energy institutions in Costa Rica.

The second major finding is that the area of public information, especially with respect to energy conservation and efficient use options, is not being given enough attention in this project. DSE should consider spending more effort and lending more support to this area. In addition to making available the residential sector energy use information which they have, they should consider commercial and transportation sector information and education programs. It is not necessary for DSE to be responsible for the implementation of these programs but they should define what is needed, who should handle the area and how can it be managed, funded and coordinated with other energy sector activities.

The third major finding is that DSE itself should be paying more attention to its near- and long-term future. Although their role as a planning and coordinating agency is well on its way to being established and widely accepted, there are a number of things which must be done if DSE wishes to maintain this role or to expand into other areas. Priorities and foreign capital support for next year as well as background information about legal bases and needs for authority to permit and support financing, regulation and implementation activities by DSE or others do not exist. Additionally, the need for more short-term general programmatic support funding, though expressed by many in DSE, may not be matched by willingness to supply this in the major foreign donor group. DSE needs to develop more information on specific needs and study or project scopes of work to increase their chances of being granted more of this type of support.

The training program has been effective as far as it has gone and many training activities have been funded. The two types of opportunities which have not been well exploited are senior personnel exchanges and long-term training. More consideration should be given to funding these types of training during the remaining months of the project. There has been very little short-term technical assistance funded under this project. That which has, has involved training and help in major studies. No short-term consulting technical help is being used at this stage in the National Energy Sector Plan development. This is also an area where more emphasis could be placed in the remaining months.

The documentation center, library and information program are just being put in place. When the center is completed, additional personnel support must be provided if this project element is to be effective and meet project expectations. At present, space limitations and the lack of a person directly involved in building and promoting use of the information resources of DSE has prevented exploitation of this resource.

The organization and administration of DSE, although unusual, appears to have had a positive rather than a negative effect. The payment of most of the salary and daily operating costs by RECOPE, with some contribution by ICE and the Ministry, has not created conflicting loyalties or unproductive organizational or technical biases in the DSE staff (the RECOPE contribution to DSE funding is shown in Appendix F). The DSE staff appear to feel that they are part of the energy planning and coordination group in the Ministry and they do not feel unduly influenced by being detached to DSE from RECOPE or ICE. It also appears that, to this point, neither ICE or RECOPE has exerted self-serving influence or applied pressure to those DSE staff on their payroll. The positive results of this unusual administrative mechanism include higher salary ranges for employees, especially those from RECOPE; an added interest in DSE work efficiency and quality by RECOPE and ICE; and a cooperative rather than competitive feeling among the three groups.

Up to now there have been no major conflicts in position between DSE and ICE or RECOPE, however, the potential for conflict is increasing. The national energy plan, the ongoing DSE energy pricing study, or the proposed gasohol study all offer potential areas where DSE could recommend policies, programs or projects with which RECOPE, ICE and/or SNE disagree. Because each of the above areas could have major and possibly negative implications to one of the other energy institutions, the practicality and utility of the unique DSE organization and administration arrangement will likely be strongly tested in the next several months.

There are also some existing legal questions concerning RECOPE's authority to fund DSE. If the present arrangement is deemed illegal or if conflict is brought about by DSE's planning, DSE's status and ability to

contribute may be significantly affected. DSE management as well as those from RECOPE, ICE, SNE and the Ministry must be cognizant of these potential problems and continue to work to keep DSE technically and politically independent and capable of meeting their goals and objectives.

The Project Advisor has become an integral part of the DSE becoming involved in all of its work. His performance and contribution is viewed by all as having been excellent. Because of this, he may have inadvertently prevented other DSE personnel from developing better relationships with some international funding agencies and sources of future support. This is not critical, but should be considered when looking to future efforts to find support.

As was stated in the first major finding, the project has, to this point, made good progress in meeting the goals and objectives of the Project Paper. There is much more to be done, but the staff and management of DSE has been well prepared to undertake the remaining work. A set of recommendations for future DSE actions has been developed and is presented in the following section.

B. Recommendations

The evaluation recommendations have been divided into three categories: 1) those activities and actions which DSE and AID should consider during the remaining project time, 2) those activities which DSE should consider to strengthen or formalize its position in the area of national energy sector planning and policy-making, and 3) other actions.

AID SHOULD:

1. Begin to record and report host country funding contributions to the project.

83

2. Consider all mechanisms open to them including IQC, Requirements and 8-A contractors for upcoming contracts. This can save time while still providing the quantity and quality of service necessary. Saving time in contracting is important if project completion by June 1985 is desirable.

3. Help DSE in planning for future training activities by helping them identify opportunities in Latin America and other countries to initiate senior-personnel exchange programs.

4. Consider providing a loan or grant to help implement the results of the industrial energy conservation audits. This loan fund would help industries purchase capital equipment necessary to achieve recommended and economically appropriate energy conservation. One good candidate for the institution to handle the fund would be the Costa Rican Private Investment Corporation now being established with help from the AID Mission.

5. Continue to encourage and provide support to Washington to clear up existing problems and accelerate work progress on the Horquetas and coal analysis projects.

6. Consider extending programmatic funding support to DSE after the completion of this project in the areas of public information programs, senior personnel training and exchange programs and studies defining needs in areas of energy regulation, standard setting and compliance monitoring and financing.

DSE Should:

1. Continue developing the scope of work for the alcohol-gasohol study. They should involve RECOPE and SNE personnel both in this development and later directly in the conduct of the study.

2. Develop, with ICE, a scope of work and then provide funding assistance, in developing and demonstrating a methodology for projecting future electricity use in Costa Rica.

3. Focus its attention and commit its best technical and management capability to the industrial energy conservation audit project. DSE should also officially invite ROCAP's regional industrial energy conservation contractors to actively participate in the audits.

4. Prepare a training plan defining what type of training is necessary and for whom. Both DSE and personnel from other institutions should be included in training.

5. Consider using grant money to define existing actors and their involvement as well as gaps in information, regulation, financing and implementation in the energy sector.

6. Use grant money to hire consultants to accelerate analysis and publication of results of residential energy survey and of other data from completed studies.

7. Implement a more active strategy of encouraging use of the library materials and the other data and information resources held by DSE.

8. Consider termination of English language training for personnel or provide more evidence that this is efficient and necessary.

In a more general and not necessarily project specific sense, DSE should consider implementing the following recommendations:

9. Pay more attention to information programs, including the development and dissemination of energy conservation information.

10. Define the amount and type of outside funding necessary to support their existence and development during the next few years and develop a strategy to obtain this funding.

11. Develop priorities for next years (1985) work. Implement a more sophisticated internal project management system which would include

monthly estimation and tracking of actual effort, expenditures, progress and problems.

12. Include in the national energy sector plan a section on sector institutional issues, regulation, financing and implementation of plans and projects.

DSE will face some serious technical, organizational and financial challenges in the near future. These are not unexpected and they have been the subject of much discussion prior to and during this evaluation. The future role and influence of DSE will be affected by how these challenges are engaged and resolved. In this regard, DSE and AID should pay special attention to the following items.

The AID and UN supplied advisors have been instrumental in shaping DSE and they have also been important contributors to the work of DSE. One advisor is leaving soon and thus the USAID project advisor will become more important. AID and DSE should consider using more short-term consulting help over the next year in order to meet the expanded and accelerated project work requirements and to compensate for the loss of the UN advisor. A second consideration should include the possibility of AID providing funding for an additional year of support for a technical advisor. The type of help needed in the year following the completion of this project will be much clearer upon the completion and acceptance of the national energy plan. At that time the type of technical and managerial needs at DSE will be better established and the qualifications for an advisor can be made explicit.

If AID is not interested in funding a full-time advisor following the completion of this project, they should consider providing project specific short-term technical help for an additional year. This could be done through budgeting funds for 12-18 person months of short-term technical assistance using the S&T/EY IQC subcontractors or a competitively selected single firm.

As has been mentioned several times, general programmatic and study support will continue to be a priority need for DSE. After the USAID project is completed, DSE will have identified several major study needs and will have developed work plans and funding requirements for these. DSE should consider requesting this form of AID assistance in the future. Meeting major study needs can be in the form of study specific funding or by providing a fund which can be used for several studies. Both of those mechanisms should also be considered.

87

APPENDIX C

FINAL PROJECT EVALUATION SCOPE OF WORK

ARTICLE I - TITLE

ENERGY POLICY DEVELOPMENT (PROJECT NUMBER 515-0175)

ARTICLE II - OBJECTIVES

The Contractor will conduct a final in-depth evaluation of AID Grant 515-0175. The evaluation is to determine whether the activities carried out by the Project were adequately focussed on meeting the purpose of the Project stated as follows: strengthen the Government of Costa Rica's capacity of energy sector planning.

ARTICLE III - STATEMENT OF WORK

The Contractor shall:

1. Undertake a final in-depth evaluation of the main components of the Grant:

   a. General progress toward strengthening of GOCR energy sector administration and management including the role of the Direccion Sectorial de Energia (DSE), as measured by:
      (1) its envolving status in the GOCR energy sector;
      (2) the quality of personnel;

   b. Selection and completion of prefeasibility energy technical studies.

   c. Effectiveness of the training and exchange activities.

   d. Progress toward completion of the Documentation Center.

   e. Effectiveness of short term technical assistance.

2. Examine overall achievement of established project objectives in relationship to increasing the GOCR's capacaity of carry out national planning the energy sector.

3. Address the interim evaluation recommendations and provide comments on actions taken.

APPENDIX D

PEOPLE INTERVIEWED DURING FINAL PROJECT EVALUATION

APPENDIX D

INTERVIEWS

PERSON	REPRESENTING	COMMENTS
Dr. Morton Gorden	DSI	In U.S.A.
Orlando Ramirez	DSI	
Alan Supko	Weston International	By telephone
Robert Kowalski	Hagler-Bailly	
Dr. Alvaro Umana	INCAE	Past Project Advisor
Dr. Roberto Dobles	RECOPE	
Mr. Teofilo De La Torre	ICE	
Mr. Lionel Fonseca	SNE	
Dr. Jorge Blanco	DSE	DSE Director
Ana Lorena Leon	DSE	
Mario Granados	DSE	
Ivannia Chinchilla	DSE	
Herman Hess	DSE	
Adriana Gavrido	DSE	
Ana de Lizano	DSE/USAID	Project Administrative Assistant
Herriburto Rodriguez	USAID	Project Officer
Ann Farrar	USAID	Program Analyst

APPENDIX E

DSE GOALS AND OBJECTIVES (1984, 1985 and 1986)

DIRECCION DE ENERGIA

OBJETIVOS Y METAS PARA 1984

La Dirección de Energía, conjuntamente con el Ministerio de Industria, Energía y Minas y el Instituto Costarricense de Electricidad tiene la responsabilidad de ejecución del Programa Nacional de Planeamiento y Desarrollo Energético cuyos objetivos generales son: - llegar a conformar un Plan Nacional de Energía y - consolidar un sistema de Planificación Energética permanente, que permita al país contar con una base sólida para la toma de decisiones para la buena marcha del sector.

De lo anterior se desprende los siguientes objetivos específicos para 1984:

1.- Completar las herramientas básicas de planificación.
2.- Completar la evaluación del potencial de recursos energéticos primarios del país.
3.- Aplicar políticas de uso racional y sustitución de energía para los diferentes sectores económicos.
4.- Plantear las bases para la definición de una política de precios.
5.- Formar un grupo de profesionales capacitados en los diferentes campos del sector energía.
6.- Intensificar las relaciones con organismos internacionales y países que brindan cooperación técnica.

Las metas a ser alcanzadas para el cumplimiento de los objetivos precedentes son:

1.- Elaborar el balance energético anual.

2.- Desarrollar los modelos econométricos de demanda, equipamiento, inversión y financiamiento.

3.- Realizar encuestas energéticas necesarias para determinar la demanda por uso final y energía útil para los distintos sectores económicos.

4.- Implementar un sistema de información energética computarizado mediante la elaboración de programas para el cálculo de la demanda, selección de inversiones y el análisis de los modelos. Además se deberá completar la base de datos correspondiente.

5.- Desarrollar una metodología de proyección de demanda energética por sectores económicos y tipo de energía.

6.- Análisis del informe presentado sobre el potencial de recursos biomásicos del país.

7.- Colaborar con otras oficinas que tienen la responsabilidad primaria de evaluación de recursos energéticos (petróleo, carbón, geotérmica, solar, etc.)

8.- Llevar a cabo un programa inicial de 20 auditorías energéticas en la industria.

9.- Continuar los esfuerzos y negociaciones que permitan constituir un Centro de Estudios Energéticos para la Industria.

94

10.- Continuar los proyectos específicos de utilización de fuentes nuevas y renovables, tales como, biodigestores, molinos de viento, gasificadores, en diferentes puntos del país.

11.- Continuar el estudio sobre sustitución parcial de los combustibles tradicionales por combustibles líquidos tales como alcohol y/o aceite de palma.

12.- Participar conjuntamente con la Dirección Forestal del MAG en los programas de utilización de biomasa forestal (leña).

13.- Continuar con el proyecto de energía rural segunda etapa, patrocinado por OEA-FRANCIA.

14.- Formulación de un programa de uso racional de energía en el sector transporte.

15.- Continuar con los estudios de costos de refinación y de producción de electricidad, que permitan conocer la situación real de los costos de la energía, base para la implementación de una política de precios.

16.- Instrumentar las bases para la definición de una política de precios de la energía.

17.- Elaborar un programa de capacitación para todo el sector.

18.- Optimizar el uso de los recursos financieros para la capacitación del personal.

19.- Revisar los diferentes convenios bilaterales que existan con el fin de aumentar la cooperación técnica para el sector.

20.- Revisión periódica del Acuerdo de San José.

21.- Participar en el análisis de la Ley de Hidrocarburos.

22.- Coordinar la comisión que evaluará las ofertas del oleoducto.

23.- Preparar un anteproyecto de creación de un Fondo Nacional de Energía.

24.- Coordinar las actividades de OLADE en Costa Rica.

25.- Realizar las funciones de Secretaría del Consejo Subsectorial de Energía.

DIRECCION DE ENERGIA

OBJETIVOS Y METAS PARA 1985

La Dirección de Energía, conjuntamente con el Ministerio de Industria, Energía y Minas y el Instituto Costarricense de Electricidad tiene la responsabilidad de ejecución del Programa Nacional de Planeamiento y Desarrollo Energético cuyos objetivos generales son: - llegar a conformar un Plan Nacional de Energía y - consolidar un sistema de Planificación Energética permanente, que permita al país contar con una base sólida para la toma de decisiones para la buena marcha del sector.

De lo anterior se desprende los siguientes objetivos específicos para 1985:

1.- Completar las herramientas básicas de planificación.
2.- Completar la evaluación del potencial de recursos energéticos primarios del país.
3.- Aplicar políticas de uso racional y sustitución de energía para los diferentes sectores económicos.
4.- Plantear las bases para la definición de una política de precios.
5.- Formar un grupo de profesionales capacitados en los diferentes campos del sector energía.
6.- Intensificar las relaciones con organismos internacionales y países que brindan cooperación técnica.

Las metas a ser alcanzadas para el cumplimiento de los objetivos precedentes son:

1.- Elaborar el balance energético anual.

2.- Desarrollar los modelos econométricos de demanda, equipamiento, inversión y financiamiento.

3.- Realizar encuestas energéticas necesarias para determinar la demanda por uso final y energía útil para los distintos sectores económicos.

4.- Implementar un sistema de información energética computarizado mediante la elaboración de programas para el cálculo de la demanda, selección de inversiones y el análisis de los modelos. Además se deberá completar la base de datos correspondiente.

5.- Desarrollar una metodología de proyección de demanda energética por sectores económicos y tipo de energía.

6.- Análisis del informe presentado sobre el potencial de recursos biomásicos del país.

7.- Colaborar con otras oficinas que tienen la responsabilidad primaria de evaluación de recursos energéticos (petróleo, carbón, geotérmica, solar, etc.)

8.- Llevar a cabo un programa inicial de 15 auditorías energéticas en la industria.

9.- Continuar los esfuerzos y negociaciones que permitan constituir un Centro de Estudios Energéticos para la Industria.

10.- Continuar los proyectos específicos de utilización de fuentes nuevas y renovables, tales como, biodigestores, molinos de viento, gasificadores, en diferentes puntos del país.

11.- Continuar el estudio sobre sustitución parcial de los combustibles tradicionales por combustibles líquidos tales como alcohol y/o aceite de palma.

12.- Participar conjuntamente con la Dirección Forestal del MAG en los programas de utilización de biomasa forestal (leña).

13.- Continuar con el proyecto de energía rural segunda etapa, patrocinado por OEA-FRANCIA.

14.- Formulación de un programa de uso racional de energía en el sector transporte.

15.- Continuar con los estudios de costos de refinación y de producción de electricidad, que permitan conocer la situación real de los costos de la energía, base para la implementación de una política de precios.

16.- Instrumentar las bases para la definición de una política de precios de la energía.

17.- Elaborar un programa de capacitación para todo el sector.

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19.- Revisar los diferentes convenios bilaterales que existan con el fin de aumentar la cooperación técnica para el sector.

20.- Revisión periódica del Acuerdo de San José.

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22.- Coordinar la comisión que evaluará las ofertas del oleoducto.

23.- Preparar un anteproyecto de creación de un Fondo Nacional de Energía.

24.- Coordinar las actividades de OLADE en Costa Rica.

25.- Realizar las funciones de Secretaría del Consejo Subsectorial de Energía.

100

DIRECCION DE ENERGIA

OBJETIVOS Y METAS PARA 1986

La Dirección de Energía desde su creación apoya las actividades de Planificación Energética Integral que desarrolla la Dirección Sectorial de Energía, formando parte de ella. En este sentido, su objetivo fundamental es la consolidación de un sistema de planificación energética permanente, que asegure el desarrollo del Sector en forma eficiente y ordenada.

Para alcanzar ese objetivo general, se plantea para el año 1986 los siguientes puntos:

1. Continuar el desarrollo y/o mejoramiento de las herramientas e instrumentos básicos para la planificación.

2. Completar la evaluación del potencial de recursos de energías nuevas y renovables.

3. Mantener un grupo capacitado de profesionales en el área de energía.

4. Velar por que se cumplan los programas establecidos en el Plan Nacional de Energía (PNE).

5. Mantener actualizado el PNE.

Para asegurar el cumplimiento de los objetivos específicos será necesario:

1. Mantener actualizados los balances energéticos nacionales, introduciendo las mejoras metodológicas necesarias para obtener una visión cada vez más completa de los flujos energéticos.

2. Mantener actualizada la información obtenida en las encuestas de demanda en cada sector.

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3. Introducir al Modelo Integrado de Planificación Energética (MIPE) utilizado para la elaboración del PNE, las mejoras posibles a fin de incluir en él nueva información.

4. Revisar continuamente las proyecciones de oferta y demanda de energía de modo que permitan la actualización del PNE.

5. Dar seguimiento a los programas de uso racional (industria, transporte) que hayan sido incluídas en el PNE analizando sus resultados y modificándolos de ser necesario.

6. Continuar con los estudios de sustitución de fuentes importadas por nacionales.

7. Continuar con el desarrollo de programas piloto o demostrativos de fuentes no convencionales.

8. Revisar, actualizar y analizar los resultados de la política de precio establecida en el PNE.

9. Llevar a cabo análisis contínuos de los aspectos financieros del sector, buscando opciones para afrontar los déficits y la redistribución de rentas en el propio sector.

10. Preparar los planes anuales operativos del sector.

11. Mantener y ampliar las relaciones y coordinación con la Dirección General Forestal y el Ministerio de Transportes para lograr la participación en proyectos conjuntos.

12. Mantener la coordinación entre las instituciones que realizan actividades concernientes al sector energía, evitando duplicidad de funciones.

13. Coordinar las actividades de OLADE en Costa Rica.

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APPENDIX F

DSE PROFESSIONAL EMPLOYEES AS OF DECEMBER 15, 1985

APPENDIX F

EMPLOYEES OF DSE

PERSON	INSTITUTION SUPPORTING EMPLOYEE	DATE OF EMPLOYMENT
Ing. Gloria Villa	ICE	May 1981
Ana de Lizano	USAID	January 1985
Lic. Carlos Luis Leiva	RECOPE	February 13, 1984
Hermann Hess	RECOPE	September 13, 1984
Fernando Alvarado	RECOPE	November 12, 1984
MSc. Adriana Garrido	RECOPE	August 1, 1982
Xinia Soto	RECOPE	July 1984
Ing. Giovanni Castillo	RECOPE	June 1, 1983
Dr. Jorge Blanco	RECOPE	October 1983
Ing. Javier Gonzalez	RECOPE	March 1984
Ing. Francisco Fera	RECOPE	May 1985
Ing. Anthony Araya	RECOPE	January 1985
Ing. Allan Chin-Wo	RECOPE	May 1984
Ing. Alexàndra Hernandez	RECOPE	August 1983
Lic. Ana Lorena Leon	ICE	May 1981
Bac. Mario Granados	RECOPE	March 1984
Bac. Abraham Vargas	RECOPE	November 1985
Ivannia Chinchilla (Bibliotecaria)	MIEM	1984

APPENDIX G

DSE REPORTS AND PUBLICATIONS

APPENDIX G

LISTA DE FOLLETOS PRODUCIDOS POR LA DIRECCION SECTORIAL DE ENERGIA:

Nº	NOMBRE DEL FOLLETO	HECHO POR
001	Uso de la energía y alternativas energéticas para la Industria y Agroindustria de Costa Rica	Ing. Fernando Caldas
002	Auditorías energéticas para la Industria y Agroindustria de Costa Rica	Ing. Fernando Caldas
007	Evaluación del Componente energético en los costos de los diferentes productos de consumo interno y externo	Ing. Oscar Solera ~~Ing. Julio Córdoba~~
008	El contexto económico	Hermann Hess A. Economista
009	Evolución de las ventas de hidrocarburos en Costa Rica 1978-1982	Hermann Hess A. Economista
010	Metodología para la proyección del consumo de hidrocarburos	Est. Juan Antonio Rodrígue; Hermann Hess A. Economista
012	Informe sobre el precio del alcohol	Hermann Hess A. Economista MSC. Adriana Garrido
013	Términos de referencia estudio consumo y precios de la energía	Hermann Hess A. Economista
014	Informe sobre situación actual de los fondos (Convenio de San José)	Hermann Hess A. Economista
015	Algunas consideraciones sobre variación de precios de los hidrocarburos	Hermann Hess A. Economista
018	Interconexión Eléctrica Intraregional	Ing. Ligia Mojica Ajún
021	El Sector Industrial y su Consumo energético	Ing. Gloria Villa
022	Lineamientos para la elaboración de informes técnicos	Ing. Milton Fonseca C.

LISTA DE FOLLETOS PRODUCIDOS POR LA DIRECCION SECTORIAL DE ENERGIA:

Nº	NOMBRE DEL FOLLETO	HECHO POR
023	Costa Rica: Antecedentes y perspectivas	MSc. Adriana Garrido
	de uso del alcohol para fines carburantes	
024	Final Project Report - Prelim. Industrial	Energy Mr. Robson
		Fernando P. Caldas
025	Estudio sobre el consumo y precios de la	Hermann Hess - Economist
	Energía	
026	Sistemas de Información	Ing. Milton Fonseca
028	Tablas de conversión, equivalencias y o-	Ing. Ligia Mojica Ajún
	tros datos útiles en el sector energía	
029	Los Precios de la Energía y la Política	Hermann Hess
	Energética Coyuntural	
030	Elementos sobre experiencia del alcohol	MSc. Adriana Garrido
	como carburante en Costa Rica	
031	¿Qué significa planificación energética?	Licda. Ana Lorena León

PUBLICACIONES DE LA DIRECCION SUBSECTORIAL DE ENERGIA DURANTE LOS AÑOS 82-83-84

Los números que no aparecen en la lista, son folletos que se han editado con circulación restringida, o están en proceso de elaboración.

FOLLETO Nº	FECHA	NOMBRE DEL FOLLETO	AUTOR
045	Dic.85	Encuesta Consumo Energético Sector Transporte (Público y de carga)	A. Hernández
046	Dic.85	Encuesta Consumo Energético Sector Pecuario	Frank Garro
047	Dic.85	Encuesta Consumo Energético Sector Transporte (Privado)	Frank Garro

...IVO Nº	FECHA		
032		Encuesta residencial de consumo energético Manual de codificación.	Ana Lorena
033		Modelo Programación lineal de la refinería	Ligia Mojica
034		Proyecto Electrificación del trasnporte en CR.	Alexandra Hernández
035		Propuesta de esquema módulo energético en CR.	Hermann Hess
036		Qué es la Dirección Sectorial de Energía?	Jorge Blanco
037		Evaluación Preliminar potencial bioenergético	Ana Lorena
038	set. 1984	Plan Anual Operativo del subsector energía 1985	Ana Lorena
039	Junio 1985	Utilización Recurso Bioenergéticos Meta Systems	Alan Poole/Rusell Da Lucia
040	julio 1985	Anuario Estadístico 1983	A. Hernández
041	Agosto 1985	Encuesta REsidencial Consumo Energético	Marta Obando
042	agosto 85	Consumo de Leña en el sector industrial	Gerardo Fonseca
043	octubre 1985	Diagnóstico del sector energía	Lorena León
044	Agosto 1984	Consideraciones sobre el proyecto hidroeléctrico Birrís - Ampliación de 16 MW	Fernando P. Caldas

109

APPENDIX H

GRANT SUPPORTED TRAINING

APPENDIX H

CAPACITACION/TRAINING

Name of Traveler	Date and Place of Work	Purpose of Travel
Oscar Solera	DIRECCION Sectorial de Energia 2/16/81	To attend the 5th session of training in Alternative Energy Technology in Gainesville, Florida, USA. Tickets only.
Adrian Flores	ICE 3/13/82	To attend the Energy Management Training Program. Tickets only. New York and Washington, D. C., USA. D. C., USA.
Eduardo Sibaja A.	Instituto Tecnologico de Costa Rica	To attend a seminar on wind energy in Texas, USA.
Roberto Dobles Rafael Carrillo Alvaro Umana	RECOPE SNE AID	To attend a conference about Energy Analysis, Planning, and Policy Development. Feb. 1983 Reston, Virginia, USA.
Fernando Pinto C.	DSE 7/5/83 through 9/16/83	Visit Georgia Tech. Technology Applications Laboratory and to attend Energy Conservation course at TVA.
Enrique Evans	ICE 7/11/83 through 8/12/83	To attend a course about Geothermal Energy in Denver, Colorado, USA.
Marco A. Gonzalez	ICE 5/9/83 through 6/10/83	To attend Organization and Operation of Rural Electric Distribution Systems course in Washington, D. C., USA.

Name of Traveler	Date and Place of Work	Purpose of Travel
Kenneth Bolanos	RECOPE 5/30/83 through 6/7/83	National Charcoal Program. Washington, D. C., USA.
Edgar Robles	ICE 6/27/83. Tickets only.	To attend Flood Predictions, Estimations and Forecasting course. University of Colorado, USA.
Javier Brenes	ICE 9/5/83 through 12/18/83	Westinghouse course about design of electricity systems.
Alvaro Umana Hector Ferro Jorge Monge	AID-All the charges ONU-Participation costs DSE-Participation costs	To attend XII World Energy Conference in New Delhi.
Hector Vargas F.	ICE 9/14/83 through 9/16/83	To attend a course about Computer Analysis of Electric Load Forecasting and Generation Capacity Expansion. Columbus, Ohio, USA.
Rafael Carrillo	SNE	To attend the Energy Planning course at Stony Brook, New York, USA.
Javier Sanchez Luis A. Barquero	ICE ICE 9/20/83 through 3/20/83	Course: Electricity Systems by Tennessee Valley Authority, USA.
30 participants Jose Joaquin Seco	Some institutions	Seminar about Energy. ITAN, Costa Rica
Oscar Acuna Leonel Fonseca	SNE SNE 11/1/83 through 17/1/83	Visit to study electronics production, refinery operation, and pricing of products. Miami, St. Louis, and Austin, USA.

112

Name of Traveler	Date and Place of Work	Purpose of Travel
Lourdes Quesada	RECOPE 10/15/83 through 11/15/83	Analysis of Coal Samples course by USGS in Reston, Virginia, USA.
Roger Solano	Instituto Tecnologico de Costa Rica. May 1983.	Energy Audit course by Tennessee Valley Authority, USA.
Bruce Dennis Manuel Echave	Laboratorio Los Alamos	Technical Assistance to ICE. Costa Rica.
Mark Benjamin	Seattle University	Technical Assistance to FANAL. Costa Rica.
Edgar Robles	ICE 6/24/83 through 6/30/83	To assist at the seminar "Erosion y Analisis of River Channelization" Colorado, USA.
Professor Gerald Sazama of Connecticut	San Jose. 5/2/83 through 5/27/83	Seminar about Energy Project Evaluation. Costa Rica. Twenty attendees.
Rex C. Crowder	Technical Services Public Utility Commission of Texas	Technical assistance to SNE. Costa Rica.
Mrs. Bodle English Instructor	Independent classes	English courses for DSE Personnel. 1983. Costa Rica.
L. Maes	4/3/84 Plane tickets.	To assist ICE in geothermal project. Costa Rica.
Dennis Burt	4/3/84	To assist ICE in geothermal project. Costa Rica.
Oscar Acuna	11/13/84	To attend "Decima Conferencia Latinoamericana de Electrificacion Rural," in Argentina.

113

Name of Traveler	Date and Place of Work	Purpose of Travel
Mario Amador	Compania Nacional de Fuerza y Luz - CNFL 85/04/22	To attend training course 140-12, Organization and Operation of Rural Electric Distribution Systems in Washington, D. C., USA.
Jose M. Blanco	83/10/27 Tickets Only	Master degree in energy at the University of Pennsylvania, USA.
Guillermo Rohrmoser	Compania Nacional de Fuerza y Luz. 3/22/85	Technical visit to Power and Light Co., Miami, Florida. USA.
Mario Hidalgo	ICE 3/22/85	Technical visit to Power and Light Co., Miami, Florida. USA.
Oscar Acuna	SNE 3/22/85	Technical visit to Power and Light Co., Miami, Florida. USA.
Alvaro Jaikel	RECOPE 4/16/85	Attend Annual Conference and Workshop on Alternative Energy and Cogeneration in the Caribbean Basin, Pavillon Hotel, Miami, Florida, USA.
Gerardo Fonesca	DSE 4/16/85	Attend Annual Conference and Workshop on Alternative Energy and Cogeneration in the Caribbean Basin, Miami, Florida, USA.
Jose Ruben Naranjo	RECOPE 4/16/85	Attend Annual Conference and Workshop on Alternative Energy and Cogeneration in the Caribbean Basin, Miami, Florida, USA.

Name of Traveler	Date and Place of Work	Purpose of Travel
Luis Llack y Ballardo Selva	ICE	Attend "International Workshop on Dam Failures," Purdue University, Indiana, USA.
Eduardo Longhi	SNE 85/05/17 Tickets only	Training at two power companies, a utility engineering firm and Georgia Institute of Technology, USA.
Antony Araya	DSE 85/09/19	Driver Energy Conservation Awareness Training (DECAT) Instructor, Las Vegas, Nevada, USA.

115

APPENDIX I

DETAILS OF DSE'S COUNTERPART CONTRIBUTION

APPENDIX I

ACTIVIDAD POR PROYECTO

	PROYECTO DSE/AID	PERIODO	% DE PART. ESTIMADO
1.	Auditorías Energéticas	1982/1985	15%
2.	Horquetas de Sarapiquí	1982/1985	5%
3.	Envest	1982/1985	10%
4.	Meta Systems	1982/1984	5%
5.	Transporte	1984/1985	5%
6.	Centro de Documentación	1984/1985	4%
7.	Encuestas	1982/1985	20%
	DSE/OTROS ORGANISMOS INTERNACIONALES		
8.	Prod. Energía FNRE	1982/1985	8%
9.	Energía eólica	1984/1985	0%
10.	Horno en Cementos del Pacífico	1983/1985	4%
11.	Energía solar	1985	4%
12.	Mercado eléctrico PNE	1983/1985	15%
13.	Bal. Energ. Nacional	1982/1985	5%
		TOTAL %	100%

PRESUPUESTO, DIRECCION DE ESTUDIOS ENERGETICOS

82-85

AÑO	CONCEPTO	PARCIAL	TOTAL
1982			₡5.085.440.00
	Servicios personales	₡2.286.730.00	
	Servicios no-personales	2.391.610.00	
	Materiales y suministros	281.540.00	
	Transferencias a instituciones.	125.560.00	
	Transferencias a personas.		
1983			₡9.725.446.00
	Servicios personales	₡4.511.067.00	
	Servicios no-personales	3.732.286.00	
	Materiales y suministros	849.000.00	
	Transferencias a instituciones.	633.093.00	
	Transferencias a personas		
1984			₡11.842.794.00
	Servicios personales	₡6.046.912.00	
	Servicios no-personales	3.741.903.00	
	Materiales y suministros	477.000.00	
	Transferencias a instituciones.	1.334.974.00	
	Transferencias a personas.	202.285.00	
1985			₡15.119.108.09
	Servicios personales	₡8.223.257.25	
	Servicios no-personales	3.953.7[illegible]58	
	Materiales y suministros	556.300.00	
	Transferencias a instituciones.	1.728.908.49	
	Transferencias a personas.	597.296.77	

CUADRO Nº 1

CONTRAPARTE NACIONAL EN PROYECTOS DE DONACION AID

COORDINADOS POR DSE

	GASTO POR PROYECTO	1982/1985	1982/1984	1984/1985	DSE Total
1	Auditorías Energéticas	6.265.918.00			
2	Horquetas	2.088.639.00			
3	Envest	4.177.279.00			
4	Meta Systems		1.332.684.00		
5	Transporte			1.348.095.00	
6	Centro de Documentación			1.078.476.00	
7	Encuestas	8.354.558.00			
	TOTAL PROYECTOS DSE/AID	20.886.394.00	1.332.684.00	2.426.571.00	24.645.649.00
	TOTAL EJECUTADO	¢24.645.649.00			

119

CUADRO Nº 2

CONTRAPARTE NACIONAL EN PROYECTO DE DONACION POR OTROS

ORGANISMOS INTERNACIONALES COORDINADOS POR DSE

	GASTO POR PROYECTO	1982/1985	1984/1985	1983/1985	1985	1985/1985
1.	Prod. Energía FNRE	3.341.823.00				
2.	Energía eólica		140.000.00			
3	Hornos en Cementos del Pacífico			1.467.494.00		
4.	Energía solar				604.764.00	
5.	Plan Nacional de Energía					5.503.102.00
6.	Balance Energético Nacional	2.088.639.00				
	TOTAL PROYECTOS/DSE ORGANISMOS INTERNACIONALES	₡5.430.463.00	140.000.00	1.467.494.00	604.764.00	5.503.102.00
	TOTAL	₡13.145.823.00				

120

APPENDIX J

DETAILED DESCRIPTION OF TWO PROJECT FUNDED ACTIVITIES

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DETAILED DESCRIPTION OF TWO PROJECT FUNDED ACTIVITIES

The Development Sciences Inc. (DSI) fixed price contract for transferring EnVest to Costa Rica was signed on August 21, 1983 and was to be completed approximately ten months later on June 30, 1984. The scope of work indicated that the contract was designed to take advantage of experience acquired by the specialists of Development Sciences, Inc., designers of EnVest, and the knowledge gained by the Costa Rican group during the evaluation of the system, which was carried out at the beginning of May 1983. The project was expected to:

a. Install the EnVest system (a microcomputer based energy planning model) in a maximum period of ten months;

b. Characterize energy sector projects and gather needed data and information concurrently with the installing of the data base into the computer and the model; and

c. Adjust the system in accordance with the needs and situation of Costa Rica, demonstrate the model and deliver a working model and detailed operation instructions.

The acquisition of an energy planning model was not previewed in the Project Paper. During a visit to the U.S. in early 1983 Costa Rican professionals from RECOPE and other institutions attended an AID-sponsored energy planning conference near Washington, D. C. At this conference they viewed a demonstration of a version of EnVest which was being used in Morocco on an AID-funded energy planning project. The model appeared to be very useful in creating and analyzing portfolios of energy projects. DSE had no planning model and because it seemed that the model could be useful in Costa Rica, preliminary discussions were held among AID, DSE and DSI. As a result of these discussions a demonstration of EnVest was scheduled for Costa Rica in May 1983. Following this demonstration it was decided by DSE and AID to adopt the EnVest approach and transfer the model to DSE for use as one of its energy planning tools. A fixed price sole source contract was negotiated with DSI for the delivery of the model and of associated hardware.

At the time of these discussions a version of EnVest was being used in Morocco which contained Moroccan data, was in French and was programmed for an Apple microcomputer. DSE wanted a version of EnVest which had Costa Rican data, the prompts and output were in Spanish and which ran on an IBM PC. The contract with DSI covered the process of accomplishing these changes but also stipulated that DSE be made responsible for some of the tasks (especially data collection and entering). This turned out to be one of the two major problems with the project. DSE did not perform as was intended and DSI claimed that without data they could not complete their requirements. DSE did not deliver the data or programming services promised and thus the EnVest model, as it now exists, has not been verified using Costa Rican data. Furthermore, for the model to be useful for energy planning a substantial amount of data collection and entry is required.

The second major problem was that the Moroccan version of EnVest was not as easily transferred to Costa Rica as was anticipated by DSI. EnVest required both additional development and improvement as well as the expected modification to IBM hardware and the addition of Spanish language prompts and output formats. In fact, as late as March 1985 (19 months after contract signing and 9 months beyond the original delivery time) EnVest still had major operational and performance problems.

During the course of the contract DSI asked for and was granted a no cost time extension and the final contract delivery date was set as August 31, 1985. Although a report and some of the promised deliverables were given to DSE in March 1985 these were not accepted.

When the model was demonstrated in March 1985 a number of problems with logic and the operation of subroutines were discovered. Additionally, documentation, user instructions and other items were found to be unacceptable. In a letter from Dr. Jorge Blanco, Director of DSE to Mr. Rodriquez of USAID dated May 28, 1985 these problems were summarized. Following receipt of this letter a number of discussions were held among all parties and although no new contract extension was granted it was agreed that DSI would make changes and improvements and deliver the required model and descriptions in the middle of December 1985.

DSI has continued to attempt to comply with the terms of their contract and will finally deliver and demonstrate a working model on December 17, 1985. Unless DSE has a change of attitude it is likely that even if the demonstration goes well they will not use the model in the future. DSE has developed their own energy planning model although they do need a project evaluation model. The EnVest project evaluation routines need a large amount of detailed information before they can be useful and DSE has not yet demonstrated the interest in doing this. The long delay in delivery of a final product has made the model much less useful to DSE than it was intended to be. The use of a fixed price contract with terms having DSI rely on the delivery of services from DSE turned out not to be cost efficient. It also created contract management problems and created unnecessary delays. In addition to this contracting problem DSI experienced problems with the software (EnVest) and were not able to perform the contract on time. DSI did not ask for a cost add on even though they claimed that the nonperformance of DSE in delivering data created problems for them and required that they do extra work.

Industrial Energy Audit Program Contract

The Industrial Energy Audit Program funded under the project was previewed during the project preparation as shown in the following quote from page 27 of the project paper:

> "Therefore, as recognized in the recommendations section of the "Alternativas de Desarrollo Energetico: Periodo 1981-2000" and from discussions with GOCR officials, a study of more rational use of industrial and agricultural energy and the substitution of electricity for oil in industry would be a high priority subproject. In addition to some pilot efforts to identify the technological possibilities and economic feasibility of conservation and fuel switching, the effect of fuel pricing policies merits special attention (e.g., subsidized bunker prices, switching to domestic or imported coal, etc.)."

The original attempt to initiate industrial energy conservation studies began in the middle of 1982 with the preparation of a detailed

scope of work by DSE with inputs from the Mission. This scope underwent several changes and was finally processed and advertised in the Commerce Business Daily in August 1983. The procurement was handled by the regional contracting office in Panama. The first set of responses were received and due to a problem in the handling of a late proposal USAID decided that the evaluation process had to be terminated and a new RFP issued. A new RFP was issued and in July 1984 a contract was signed with the firm of Weston International Inc. The project involved:

1) The conduct of 15 energy audits of Costa Rican industries and individual reports on each audit.

2) On-the-job audit training for a maximum of 8 Costa Rican professionals.

3) The offering of a one week audit design and demonstration course for 20 participants.

4) An overview report summarizing and synthesizing data collected in each audit to address broader industrial category findings.

Inspite of the delays in starting the project the early parts of the work was timely and of high quality. It also appeared that the project could be finished by the extended completion date of May 30, 1984. However, following completion of the audit visits, the training and the one week course progress slowed. Weston International also had been requesting additional funds in their progress reports. During this time the USAID Mission technical officer and the Panama contract officer had left and this created further problems.

By March 1985 Weston International and AID were discussing cost add-ons. However, nothing had been agreed to and no final audit reports (15 were done) had been delivered to DSE or the industries. Weston International was claiming that they needed additional funds to complete the project. These discussions and delays continued until USAID offered to increase funding by approximately $15,000 dollars. At the time of this evaluation Weston International had not officially accepted this and no new contract completion data had been set. This was inspite of the fact that

125

the Weston contract had officially terminated on May 30, 1985, they had still not delivered one final audit report (in Spanish) and they would obviously not finish their work by the PACD of December 31, 1985.

The three major problems with this contract included:

- Several early delays in starting the project which required that the work be done during the last project year.
- AID personnel changes which created discontinuities in project tracking and management.
- Inability or unwillingness of contractor to write and translate audit reports in a timely manner.
- No one at DSE was able or willing to convince Weston International to perform and AID to resolve the timing and funding problems in a timely manner.

This project needed someone to stimulate Weston and USAID at the end of the project. As it now stands the final project deliverables will not be received before the PACD. Weston personnel believe that all contract requirements can and will be met before the end of March 1986.

APPENDIX K

COMMON ABBREVIATIONS

APPENDIX K

COSTA RICAN AND OTHER INSTITUTIONS

CACM	Central American Common Market
CAEI	Center for Assistance in Energy in Industry
CATIE	Centro Agronomico Tropical de Investigacion y Ensenanza
CATSA	Central Azucarera del Tempisque S.A.
CODESA	Corporacion Costarricense de Dessarrollo S.A.
DGF	Direccion General Forestal, Ministerio de Agricultura y Ganaderia
DSE	Direccion Sectorial de Energia
GOC	Gobierno de Costa Rica
ICAITI	Instituto Centroamericano de Investigacion y Technologia Industrial
ICE	Instituto Costarricense de Electricidad
IDB	Interamerican Development Bank
IICE	Instituto de Investigaciones en Ciencias Economicas Universidad de Costa Rica
ITCR	Instituto Technologico de Costa Rica
MIEM	Ministerio de Industria, Energia y Minas
MIDEPLAN	Ministerio de Planificacion Nacional y Politica Economica
MOPT	Ministerio de Obras Publicas y Transportes
PEICA	Programa Energetico del Istmo Centroamericano, UNDP
RECOPE	Refinadora Costarricense de Petroleo, S.A.
ROCAP	Regional Office for Central American Programs (USAID)
SNE	Servicio Nacional de Electricidad
TRANSMESA	Transportes Metropolitanos S.A.
USAID	United States Agency for International Development