CONCLUSIONS AND RECOMMENDATIONS OF THE LATIN AMERICA AND CARIBBEAN REGIONAL ENERGY CONSERVATION SEMINAR (SEMINARIO SOBRE LA CONSERVACION DE ENERGIA)

Alajuela, Costa Rica
January 14-17, 1985

Sponsored by:

U.S. Agency for International Development (USAID)

Bureau for Latin America and the Caribbean

and

Bureau for Science and Technology
Office of Energy

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Hagler, Bailly & Company, Inc.
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HBC Reference No. 85-162

March 29, 1985

TABLE OF CONTENTS

The Seminar on Energy Conservation (Seminario Sobre la Conservacion de Energia) was held in Costa Rica from January 14 to 17, 1985. It brought together 68 delegates from the countries of Central and South America and the Caribbean, representatives of several international organizations, U.S. Agency for International Development energy officials, and contract staff from AID-supported energy projects in the region (see Appendices 1 and 2 for lists of attendees). The seminar was supported by the Bureau for Latin America and the Caribbean and the Office of Energy of the U.S. Agency of International Development and co-sponsored by the Costa Rican Ministry of Industry, Energy and Mines and the Instituto Centroamericano de Administracion de Empresas (INCAE).

At the three and a half day seminar, reports were given on active energy conservation projects in the region (Barbados, Jamaica, Central American region and Panama, Peru, Ecuador, the Dominican Republic, and Costa Rica). In addition, there were presentations on energy auditing, fuel substitution, and financing energy conservation. Although the seminar concentrated on the industrial sector, it also explored opportunities for energy efficiency improvements in the building and transportation sectors. See Appendix 3 for a complete list of papers and speakers.

All attendees agreed that the seminar offered a valuable opportunity to share experience and to learn from others engaged in similar activities. The AID-supported Regional Industrial Energy Efficiency Project (RIEEP), which is being carried out under the auspices of the Regional Office for Central America and Panama (ROCAP), has stimulated the beginning of a network of energy officials. The seminar acted to expand and advance the development of such a network, and could well lead to the establishment of the first regional association of energy conservation officials.

Attendees at the seminar urged continued efforts to share experience, to disseminate useful materials and resources throughout the region, and to seek support for similar seminars in the near future. During the final session of the seminar, conclusions and recommendations were presented and discussed. They were grouped into seven categories:

- General
- Audits
- Fuel substitution
- Financing
- Transport
- Buildings
- Operational.

In the following sections, we present the conclusions and recommendations from the final session, together with additional comments, conclusions, and recommendations that emerged during the seminar. We also provide abstracts for each of the papers presented at the seminar.

A full set or individual papers can be ordered using the form at the end of this report. The papers are available in both English and Spanish.

GENERAL CONCLUSIONS

- Energy conservation part of broader effort to improve overall efficiency
- Primary goal is foreign exchange savings
- Local currency devaluation negates savings from declining price of oil
- Market pricing necessary but not sufficient
- Government role critical as orchestrator
- Private sector best suited for implementation
- Alternative means needed to channel AID funds
- USAID activities are foundation for international funds
- More flexibility needed in project design and implementation
- Energy conservation should include cogeneration, fuel substitution
- Follow-up support critical to ensure permanent gain.

1. Energy conservation is part of the broader effort to improve overall efficiency and productivity.

Energy conservation must be viewed as one element in a comprehensive and balanced strategy to promote development and to enhance the efficiency and productivity of economies. As part of this broader effort, the first step government must take is the establishment of a national energy conservation plan that defines:

- Goals and strategies
- Government role in implementation
- Objectives and priorities for each sector and sub-sector
- Potential for implementation.

The plan should set broad guidelines that can be fine-tuned, through surveys, audits, and specific investments, as implementation develops. The plan should also be flexible and should encourage private-sector participation.

2. **The primary goal of energy conservation efforts is to realize foreign exchange savings.**

Energy conservation should have as its primary goal the saving of foreign exchange. This goal is fully consistent with the development objective of improving the international competitiveness of the productive sector in developing countries. Improved efficiency of energy use and the associated savings in foreign exchange can enhance competitiveness.

3. **Local currency devaluation negates the potential savings from the declining world oil price.**

Even though the world oil price has been falling, the drain on local economies is still severe because of the appreciation of the U.S. dollar and the resulting depreciation of other currencies. Because oil imports must be paid for in U.S. dollars, the price of imported oil has remained high or even increased.

4. **Market pricing is a necessary but insufficient condition to foster conservation.**

Market pricing of fuel and energy is a necessary but insufficient condition for the stimulation of energy conservation activities. If prices are subsidized, there is little economic incentive to save. If prices reflect the true costs of energy, there is still a need for technical and financial assistance to stimulate energy savings.

5. **The government's role is critical as an orchestrator.**

The government has a critical role as an orchestrator, planner, policy-maker, promoter, and initiator of energy conservation activities.

6. **The private sector is best suited for implementation.**

The private sector should be the principal implementing agent of energy conservation activities, to the extent feasible and possible. The most important role for the government, therefore, is to create the conditions that will motivate the private sector and enable it to implement energy savings projects. The government also has an essential role in ensuring the efficient use of energy resources by public-sector and parastatal enterprises.

7. **Alternative means should be sought to channel AID funds.**

Government banks and agencies should not be the sole recipients of AID and other donor agency funds. Projects might operate more efficiently and with better results if assistance went directly to private-sector end users. The ROCAP/ICAITI project is predominantly private sector and the Jamaica project works through the private banking system to promote energy conservation loans.

8. **USAID activities prepare a foundation for international donor agency project financing.**

The types of activities sponsored by USAID lay the foundation for the international lending institutions' activities, which are more project- and investment-specific. Training, audits, pilot and demonstration projects, and feasibility studies are necessary preliminary activities to qualify for international bank project financing.

9. **More flexibility is needed in project design and implementation in the region.**

This observation is directed especially toward AID. Because of a long design and approval period before project implementation, many developments occur that require project modification.

10. **Energy conservation should include cogeneration and fuel substitution.**

The concept of energy conservation should include cogeneration and fuel substitution. Opportunities should be sought in process industries to adopt cogeneration and fuel substitution, which can lead to both increased energy savings and higher overall productivity. Opportunities for cogeneration should also be sought in the power generation sector as well as the industrial sector.

11. **Follow-up support is critical to ensure permanent gains.**

It is not sufficient to conduct an audit and write a report with recommended savings. It is not even sufficient to provide support and assistance to implement the recommendations. Improvements in energy use and productivity only have meaning if they are in place for long periods of time. Follow-up monitoring and continued access to technical assistance are critical if any gains are to be permanent.

AUDITS

- Private sector has key role
- Government must stimulate market
- Subsidies needed in early years
- Consider implementation strategy before initiating audit
- Sensitivity and experience of auditor key to success
- Attention to people essential
- Confidentiality issue can be handled
- Level I audits needed for all "large" plants to scope and sell level II
- Level I requires highest skill
- Simple instruments usually sufficient
- Present results in financial terms
- Share experience
- More comprehensive analysis than level II audit often needed.

1. **The private sector has a key role in performing audits.**

Preparing and training key private-sector groups, such as industrial plant managers and consulting engineers, is necessary to ensure the development of long-term, sustained conservation capabilities in a country. Most of the conservation projects in the region are working to develop such groups.

2. **Governments must stimulate market.**

Initial government stimulation of the market for energy audits is usually necessary. The kind of overall national energy conservation planning recommended in General Conclusions is necessary to create an environment that will stimulate an interest in audits and promote the development of private-sector auditing firms.

3. **Subsidies needed in early years.**

In the early years of any program, some subsidy of energy audits may be required to demonstrate their value in promoting conservation. On the other

hand, alternative means of financing audits should be explored. If it is necessary to charge for an energy audit, payment could be made once the audited facility has begun to realize energy savings.

4. **It is important to consider the implementation strategy before initiating an audit.**

The auditor must take into consideration the financial and managerial implications of his recommendations if the audit recommendations are to be successfully implemented. (See also number 13.)

5. **The sensitivity and experience of the auditor are keys to success.**

The qualified auditor must be many things -- an engineer, a technician, a labor-relations expert, a salesman, and a psychologist. The skills and qualities of all of these different professions must be brought to bear in a successful audit.

6. **Attention to people is essential.**

An audit is not merely a technical exercise. Attention must be given to the managers and the workers in the audited facility and the ways they are likely to react to, accept, and implement audit recomendations.

7. **The issue of confidentiality can be handled.**

Although confidentiality is an important issue, it does not constitute an obstacle to auditing projects in Latin America and the Caribbean.

8. **Level I audits needed for all "large" industrial plants to scope and justify level II.**

Level I audits must be undertaken primarily to sell and provide scope for subsequent level II audits in the industrial sector. The level I or **preliminary energy audit** (PEA) is essentially a preliminary data gathering and analysis effort. It is also referred to as a "brief audit," "walk-through audit," "plant survey," or "plant visit." The PEA uses only available data, is completed without sophisticated instrumentation, and is conducted in a relatively short time frame. The level II or **detailed energy audit**, which must always be conducted **after** a PEA, is an instrumented survey followed by a detailed facility energy analysis. A detailed energy audit can take as little as 1 man-week or as much as several man-months. The level of effort depends to some degree on anticipated savings. The size of the plant, while "large," is relative, owing to variations from country to country and industry to industry. With respect to the buildings sector, the consensus was that a level II audit can be undertaken straightaway.

9. **Level I requires highest skill.**

If a level I audit is a prelude to a level II audit, then highly qualified people with considerable experience should conduct the level I audit. This approach is necessary for two reasons: to engender the confidence of plant management in the quality and performance of the auditor and to identify quickly significant savings opportunities. On the other hand, if many audits are to be conducted for the principal purpose of collecting data for national planning or for a national energy consumption data base, then more junior, less experienced professionals (or even engineering students) can carry out the assignment. These types of audits should more correctly be called surveys.

When true level I audits, not surveys, are intended, highly skilled and experienced auditors can realize accomplishments in addition to securing plant cooperation for a level II audit. With a skilled auditor, training (of plant personnel and private-sector audit-trainees) can actually take place during the audit. Immediate no-cost/low-cost measures can be identified and implementation initiated. Furthermore, the implementation of these initial measures can increase interest in a level II audit and subsequent capital investments.

10. **Simple instruments are usually sufficient for conducting audits.**

During the seminar, a working group of experienced auditors prepared basic and comprehensive lists of recommended audit equipment (see Exhibit 1). The minimum list of equipment will allow for approximately 70 percent of the measurements required of a level II audit. The more elaborate list of equipment allows for greater accuracy of measurement, and covers flow measurements that are not possible with the basic list of equipment.

11. **Results should be presented in financial terms.**

To present management with a convincing argument and to secure their support for implementation of conservation measures, energy savings must be expressed in both energy and monetary units.

12. **Share experience.**

Valuable lessons are learned during every training session, audit, and conservation project implementation. It is critical that these lessons be shared and mechanisms developed to disseminate information and experience throughout the region. It was suggested that a working group might be formed from among those who attended the seminars, with one representative from each country and/or organization. This working group could then meet annually to share experience and serve as a channel to disseminate information between meetings.

Exhibit 1

Lists of Recommended Equipment for Conducting Energy Audits and Approximate Costs

Equipment	Unit costs (in 1985 $ U.S.) Minimum items required	Comprehensive list
Gas analyzer, electronic/recording		2,500
Gas analyzer, chemical	400	
Spare parts for gas analyzer	50	50
Smoke test kit	70	70
Temperature indicator probes for above	275	275
- immersion	60	60
- 24-inch	60	60
- surface probe	80	80
Manometer -- 0-15 inch	30	30
Velometer and probes		750
Psychrometer -- electric		620
Psychrometer -- battery		250
TDS meter		150
Clamp-on ammeter amprobe	200	200
Infrared scanner		950
Power factor meter		390
Light meter		150
Stethescope		25
Ultrasonic flow meter		6,500
Non-contact, high-temperature infrared pyrometer		2,200
Hygrometer		250
Battery-powered drill and bits		75
Flow hood		1,200
Small uninterruptible power supply		400
Strobe tachometer		500
Signal recorder (3)		600
Subtotal	**$1,225**	**$18,335**
Spare parts	306	4,584
Total	**$1,531**	**$22,919**

13. Frequently, a more comprehensive analysis is needed than is typically provided in level II audits.

Because industrial plants and companies face many constraints that have a negative impact on energy use, it is often necessary to conduct a more comprehensive analysis than is generally provided in a level II audit. In this expanded analysis, financial and managerial problems should be identified that could inhibit the implementation of energy conservation recommendations.

FUEL SUBSTITUTION

- Potential for foreign exchange savings is large
- Opportunities exist for both small and large users
- Market structure and fuel prices key constraints
- Government policy role is critical
- Fuel substitution currently not considered in audits
- Current refinery mix is an obstacle.

1. **The potential for foreign exchange savings is large.**

   Because of the imbalance caused by the large quantity of imported oil used in the region and the easy availability of alternate local fuels, especially biomass, the potential for foreign exchange savings associated with fuel substitution programs in this region is very large.

2. **Opportunities exist for both small and large users.**

   Although most interest in fuel substitution has come from large energy users (e.g., cement plants), opportunities exist for both small and large users. Adequate technologies are being developed (e.g., small multifuel boilers, portable biomass gasifiers) and are available in the region.

3. **Market structure and relative fuel prices are key constraints.**

   The structure of the existing fuel market and the relative prices of fuels appear to be the key constraints to the development of this market.

4. **The government policy role is critical.**

   Without policy support from the national government, fuel substitution possibilities are not likely to develop. In addition, mechanisms must be in place to test and demonstrate the appropriateness of various technologies. The existence of "soft loans" for fuel diversification should not affect the need for rigorous feasibility studies to select the best technologies.

5. **Fuel substutition is not currently considered in audits.**

   It was concluded that few, if any audits, have systematically considered fuel substutition. One of the reasons for the failure to consider fuel substitution is the fact that it requires a much more sophisticated, detailed, and costly type of analysis than is generally performed, even in a level II audit.

Even though an audit never has as its objective a detailed evaluation of fuel substitution possibilities, it should at least identify potential opportunities. It was pointed out that the level II audits being conducted in Costa Rica do consider the possibility of fuel substitution.

6. **Current refinery product mix is often an obstacle to fuel substitution.**

Currently, refineries in the region have an excess of heavy fuel oil (bunker), so it is quite important to evaluate energy supply as part of any consideration of fuel substitution. In principle, no attempt should be made to substitute for fuels that are in surplus supply unless it is economically justifiable.

FINANCING

- Use existing credit lines
- Conservation financing limited by intermediaries' capabilities
- There is a role for innovative financing mechanisms:
  - applications limited
  - flexible repayment options attractive
  - pilot projects useful
- Examine revolving credit line issues:
  - foreign exchange repayment requirements
  - risk/management spread.

1. **Use existing credit lines.**

It was agreed that foreign exchange credit currently available for energy and industrial investment projects is not being fully used and therefore can be applied to energy conservation and fuel diversification projects. There is a need to educate banking officials so that they are inclined to use currently available funds for conservation loans.

2. **Conservation financing is limited by capabilities of financial intermediaries.**

All financing in the region -- not only conservation financing -- is limited by the capabilities, conditions, and current policies of local financial intermediaries. It is critical that the intermediaries express a willingness to support conservation activities. To obtain this support, intermediaries must be involved in planning and must be among the targets of promotional activities. Some projects are large enough to receive direct financing from international lending agencies and thus do not need to involve local financial intermediaries.

3. **There is a role for innovative financing mechanisms.**

- **Applications limited.** The applications of innovative financing mechanisms in the region are limited because of the general state of the economy, the level of development of the industrial sector, and the receptivity of financial intermediaries.
- **Flexible repayment options attractive.** Of the various mechanisms, the most attractive are likely to be those that offer flexible repayment options.

- **Pilot projects useful.** Even though it will take some time for innovative financing mechanisms to be accepted in the region, it is appropriate to develop pilot projects that can promote understanding of the concepts and demonstrate their usefulness.

4. **Examine revolving credit line issues.**

- **Foreign exchange repayment requirements.** Consideration should be given to denominating the repayment obligation on loans from international lending agencies in the currency of the borrowing country. If this action is not possible, other steps should be considered to reduce the risk to borrowers of fluctuating exchange rates.

- **Risk/management spread.** Concern was expressed that the risk/ management spread allowed to financial intermediaries for administering international loans might not be adequate to encourage these intermediaries to make loans for creditworthy projects.

TRANSPORTATION

- Potential savings can reach 20 percent
- First 10 percent achievable at low cost
- Comprehensive approach needed
- Demand elasticities and policy impacts not well understood
- Interfuel pricing requires study of supply, foreign exchange impacts
- Implementation complex and difficult.

1. **Potential energy savings can reach 20 percent.**

   Transportation should be given increased attention. The potential for savings in the region could be on the order of 20 percent or more. When looking at new programs in the transportation sector, the methodology that has been used in the commercial and industrial sectors should be considered (e.g., energy audits of fleets, training of fleet managers and vehicle operators).

2. **The first 10 percent of savings can be achieved at little or no cost.**

   As in the industrial sector, a substantial portion of potential savings -- maybe even 10 percent of the sectoral consumption -- can be achieved at a relatively low cost or even no cost.

3. **A comprehensive approach is needed.**

   Transportation energy efficiency improvements must be evaluated as part of a comprehensive transportation policy and strategy for the country.

4. **Demand elasticities and policy impacts are not well understood.**

   There is not enough known about demand elasticities and the impacts of taxation and other policy tools. To understand these topics, it is necessary to increase the exchange of information and to initiate studies on transportation energy efficiency.

5. **Interfuel pricing is complex and requires study of supply issues and foreign exchange impacts.**

   Interfuel pricing is quite complex and requires careful study of local supply issues, the oil refining configuration, and the foreign exchange impacts of the pricing strategy recommended. As with fuel substitution, interfuel

pricing in the industrial and transportation sectors must take account of supply/demand balances.

6. **Implementation is complex and difficult.**

Compared with industry, where it is possible to concentrate initially on a limited number of large users, the implementation of energy conservation measures in the transportation sector is quite complex because of the many people and organizations that are involved.

BUILDINGS

- Potential savings of 15 to 50 percent possible
- Significant differences from country to country in climate and energy infrastructure
- Examine Barbados and Jamaica experience for transfer to others
- Trend is toward inefficient building practices
- Necessary to work with architects and engineers
- Ownership is critical
- Perception of conflict between public and private welfare is false
- Need for awareness campaigns and regulations
- Issues of appropriate technology and materials need study.

1. **Potential savings of 15 to 50 percent are possible.**

Building energy conservation in the region has a savings potential of 15-50 percent.

2. **There are significant differences from country to country, especially in climate and energy infrastructure.**

The differences in climate and energy infrastructure from country to country are significant. They influence the level of potential savings and the determination of whether a building energy conservation program is justified. It was suggested that a regional survey be conducted -- country by country -- to assess the current level of building energy conservation activities and the appropriateness of initiating additional efforts.

3. **Examine Barbados and Jamaica experience for transfer to others.**

Despite differences from country to country, the experience of Barbados and Jamaica in implementing successful building energy conservation programs offers valuable lessons to all countries in the region. Barbados has successfully promoted the use of ceiling insulation. It has also conducted detailed analyses of typical building energy consumption to document savings after conservation measures have been adopted. In Jamaica, one of the country's prominent architects -- who is the president of the architects' association -- has become an advocate of energy conservation. In addition to designing energy-efficient buildings, he is carrying the message to his

colleagues. The support of such key individuals is necessary to stimulate interest.

4. **The trend is toward inefficient, not efficient building practices. It is crucial to consider new policies and programs to reverse the trend.**

The trend, however, is toward inefficient building practices and design. Policies and programs must be developed **now** to reverse this trend. Experience shows that it takes from 10 to 20 years to effect significant change in design practices. Work thus needs to begin immediately to reverse practices that will cause serious problems in the medium term.

5. **It is necessary to work with architects and engineers.**

It was agreed that the ability of architects and engineers to design energy-efficient buildings needs to be improved. Conservation efforts should be directed toward special audiences, e.g., colleges of engineering and architecture. Basic energy conservation rules of thumb should be developed that are easy for architects to follow. Requirements that ensure energy savings should be incorporated in existing building codes.

6. **Ownership is a critical factor.**

There is little submetering throughout the region, and thus no impetus for saving energy. Building owners simply pass on increased costs to tenants.

7. **There is a false perception that private and public welfare are in conflict.**

Some have expressed the view that the buildings sector presents a conflict between private-sector welfare (living in comfort) and public-sector goals (potential energy savings for the country as a whole). In fact, experience has shown that retrofitted energy-efficient buildings provide no less comfort than buildings that waste energy. Benefits, on the other hand, generally include more control over one's environment and lower utility bills.

8. **There is a need for awareness campaigns and efficient building regulations.**

Campaigns are needed to raise citizen awareness of building energy efficiency and to change behavior (e.g., turning off lights). Regulations can also contribute to achieving potential savings. Although regulations **do** exist in all countries, they need to be administered efficiently to promote conservation. Building review or approving agencies should establish norms and standards for saving energy in buildings.

9. **The issues of appropriate technology and materials for the region need careful study.**

Many countries in the region use technologies and materials that are not appropriate to their particular needs -- imports that are more appropriate to the country of export. These issues must be brought to the attention of

professionals in the region and greater technology transfer must be promoted as a means of identifying appropriate, cost-effective solutions.

OPERATIONAL CONCLUSIONS

- Additional workshops needed
- Basic conservation bibliography useful
- Regional network can contribute to conservation
- Promotional ideas and materials should be shared
- Role of private sector important
- Many can benefit from case studies.

1. **Other workshops needed on technical matters.**

   Additional workshops similar to the Energy Conservation Seminar would be highly beneficial. Subsequent sessions might focus on somewhat narrower topics (e.g., audits, financing) and perhaps have fewer attendees to promote greater exchange and experience-sharing.

2. **A basic conservation bibliography would be useful as a first step to building libraries of energy conservation materials.**

   There should be an effort to develop a comprehensive list of resources on energy conservation and to distribute this information throughout the region. Such an effort is already being made in many of the countries, and requires only a coordinator or synthesizer to succeed.

3. **A regional network of energy management professionals can contribute to greater efficiency and conservation.**

   This seminar has proved to be the nucleus for creating a regional energy network -- a coming together of those most involved in and, concerned about promoting, energy conservation. There is much interest in seeing that this network grows and thrives. It was suggested that the formation of a regional energy management association could continue the development of this network.

4. **Promotional ideas and materials should be more widely shared.**

   Promotional and energy awareness materials are available for many of the projects represented at the seminar. These materials could be of considerable benefit to other projects and countries throughout the region.

5. **Role of the private sector is quite important.**

There was much evidence throughout the seminar that the private sector has a key role to play in nearly all stages in implementing energy conservation programs.

6. **Many can benefit from the preparation of case studies.**

Everyone working on energy conservation can benefit from detailed discussions of other projects and experiences, especially efforts in small and medium-sized enterprises. INCAE, with IDB and USAID support, is engaged in developing and testing such case studies.

REGIONAL INDUSTRIAL ENERGY EFFICIENCY PROJECT (RIEEP)

by:

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The Regional Industrial Energy Efficiency Project (RIEEP) has been designed to reduce the balance of payments deficit of Central America and Panama, through a reduction in the industrial use of oil in the region. RIEEP's two principal goals are to demonstrate industrial energy savings and to promote further industrial energy conservation activities. Performing energy audits, on-site demonstrations, technical seminars, and other related activities is part of the industrial component of the program. The promotional aspect deals with creating awareness about conservation opportunities, providing motivation for the implementation of energy conservation activities, and providing extension services once these are under way.

Significant results have already been achieved, including 95 level I audits, 21 level II audits, 29 seminars, and innumerable promotional activities. Problems that the project has confronted include the current economic recession in the region, the shortage of financing to implement energy conservation measures, the issue of confidentiality of information acquired during audits, the need to build personal contact into all promotional activities, and the lack of available information in the region on energy conservation equipment. Among the early accomplishments are considerable exposure of the private sector to the opportunities to save energy, strengthening of the regional institutions implementing the project, and the identification of fuel savings in the range of $11-$25 million.

ENERGY SECTOR ASSISTANCE PROJECT

by:

David Keith
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The overall goal of the USAID/GOJ Energy Sector Assistance Project is to strengthen Jamaica's institutional capabilities and reduce its dependence on imported petroleum. The Ministry of Mining, Energy and Tourism considers energy conservation to have top priority as an energy resource. Thus, although several other GOJ institutions are involved in carrying out the project, the Energy Division of the Ministry of Mining, Energy and Tourism is the government organization charged

with the responsibility for planning and managing all the energy-related activities in the country. The project has two phases -- one aimed at the private sector and the other aimed at the public sector -- and four major components, each of which is divided into a number of subactivities. The specific purpose of the project is to train public-sector personnel to plan and manage energy development/utilization programs, to train a cadre of consulting engineers for conducting energy audits and retrofits, and to manage an information and public education program on energy conservation and the generation of energy from renewable resources. A major aspect of the project is the creation of an energy credit fund for energy conservation investments involving private-sector banks.

In this paper, a detailed outline of the Energy Sector Assistance Project and the progress made are presented. In addition, there is a discussion of the problems encountered in project implementation (e.g., host country underfunding, underexpenditure because of USAID reimbursement), the inadequacy of host country staffing, the focus of project design, the technical and engineering aspects, and the slow movement of energy credit fund loans. The paper also examines the lessons learned and the benefits to a large number of individual agencies and Jamaica as a whole.

INDUSTRIAL ENERGY CONSERVATION PROGRAM OF THE ENERGY CONSERVATION AND RESOURCE DEVELOPMENT PROJECT

by:

Eduardo Maal
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In 1979, the Dominican government created the Comision Nacional de Politica Energetica (the National Energy Policy Commission -- COENER) with the aim of establishing the outlines of an energy policy. This commission is made up of those state institutions that manage national and/or imported energy resources and representatives of the private and public industrial sectors. Since its inception, COENER has tried to assist the development of national or indigenous natural resources through such means as energy plantations, small hydroelectric stations, and wind and solar energy. Energy savings and conservation occur through the energy conservation program in the industrial sector, which is based on the results of an energy survey undertaken by COENER. If the private industrial sector implements the recommendations of the program, energy consumption is expected to drop by 25 percent, which will represent a reduction in the country's oil bill of U.S. $50 million per year.

The paper outlines the major activities of the Industrial Energy Conservation Program, which include: general planning and development of a detailed execution or performance plan; promotion of activities; selection and acquisition of portable measuring equipment; development of a computer data base on energy use; basic theoretical and practical training in energy auditing techniques; and basic detailed training at the university level in subjects and disciplines directly related to energy savings. It also clarifies the criteria established for the

selection of those industrial firms to be audited and concludes with an update of the program's status.

INDUSTRIAL ENERGY AUDIT PROGRAM FOR COSTA RICA (INTERIM REPORT)

by:

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Costa Rican industry must switch from reliance on imported petroleum to greater use of indigenous energy sources. Fortunately, Costa Rica has several major in-country energy sources, including hydroelectric power, fuelwood, and agricultural byproducts (e.g., rice hulls, coffee cascarila, bagasse). In the near term, however, it will be difficult for Costa Rican industry, especially non-agricultural subsectors, to switch to these alternative energy sources because of the large amount of capital required and the prevailing high interest rates on borrowed capital. For this reason, the Costa Rican government is establishing a program of energy audits and energy conservation for the industrial sector.

The program's basic scope of work consists of various elements of technical training and 15 energy audits of plants selected by the Costa Rican government as representative of major industrial subsectors. While involving short-term measures, the program emphasizes truly long-range objectives, such as providing energy consumption data for use by Costa Rican industry and the government in assessing current efficiency and future energy planning/policy analysis; identifying feasible energy conservation and energy substitution opportunities within each industrial subsector; and providing on-the-job training for the staff of the Direccion Sectoral de Energia and others so that they can continue energy-related activities.

PRESENTATION OF THE AID-INE PROJECT, ECUADOR

Prepared by:

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Instituto Nacional de Energia (INE)

Presented by:

Carl Duisberg
USAID/Quito

The paper focuses on the agreement on external credit and grants, named "Alternative Sources of Energy," which was signed by the governments of Ecuador and the United States in October 1981 as part of the "Promotion of Energy Savings" AID-INE Project. The agreement, which began to be executed by the National Energy Institute (INE) in December 1982, addresses the promotion of energy savings through the implementation of two subprojects: publicity campaigns and conservation

services. The objective of the publicity campaigns is to better inform the energy-consuming public of techniques and practices for more efficient use of hydrocarbons and electricity. To date, two campaigns have been initiated at the national level, the first aimed at automobile drivers and the second at the residential sector. The objective of the energy conservation services component is to provide specialized technical assistance on energy conservation. The services, which are targeted at both the supply and demand sectors, include energy audits, technical and economic prefeasibility studies, energy rationalization programs, and technical assistance in specific areas. In the paper, other Ecuadorian activities aimed at energy efficiency are summarized.

BARBADOS — WORLD BANK TECHNICAL ASSISTANCE ENERGY CONSERVATION PROJECT

Prepared by:

David Staples
DHR, Inc.

A number of energy conservation studies conducted in Barbados indicated that the country's conservation potential was not being realized, mainly because the proper institutional framework was lacking and the need for advisory and technical expertise was not being met. To correct these shortcomings, a World Bank-sponsored energy conservation project (to run from March 1983 to September 1985) has been undertaken. This paper describes the background, activities, and accomplishments of this project, which is but one component of the government's three-pronged energy development strategy. Continuing oil and gas exploration and development of alterrative energy sources constitute the other two components.

The World Bank project provides expert technical services, training, studies, and specialized equipment and technical literature to the government of Barbados to: strengthen institutional development; contribute to the formulation, implementation, and monitoring of an energy conservation policy and program; contribute to the identification and preparation of further projects for possible financing by the World Bank and/or other sources; and to complement and expand the World Bank-financed electric power project activities by following up on project study recommendations. Through DHR, Inc., the World Bank will assist in building up a national pool of expertise by preparing and conducting training courses in energy management and the more technical and specialized aspects of energy conservation; will advise and assist the government in the planning, coordination, and implementation of a national promotion, information, and motivation campaign; will provide energy audit services as part of the training and project identification activities; and will provide additional services for any special activities to be defined during project implementation.

ENERGY CONSERVATION PROGRAM IMPLEMENTATION: THE KEY SUCCESS FACTORS

by:

Henri-Claude Bailly
Hagler, Bailly & Company

The successful implementation of energy conservation, at the national as well as corporate level, requires the integration of many activities -- planning, engineering operations, maintenance, purchasing, accounting, and financial management, to name only a few. However, because there is more than one way to address these functions, successfully integrating them to accomplish a conservation program is a major challenge.

Five key elements are briefly discussed in this paper as an introduction to conservation program implementation. These elements, which transcend countries and industries and have been identified in most successful energy management programs, are: top-level support, effective organization, adequate management information system, financial assistance, and effective communications and feedback.

IMPLEMENTING AN ENERGY AUDITING PROGRAM

by:

Alain Streicher
Hagler, Bailly & Company

The paper first discusses the need for energy audits in industrial and commercial facilities to provide a baseline and an estimate of current energy efficiency. Next, two types of audits -- the preliminary energy audit (level I) and the detailed energy audit (level II) -- are described in detail, with their specific applications and requirements. Advantages and disadvantages of using a public or a private energy agency are also discussed. Other key issues, such as selection and certification of energy auditors in developing countries, the role of private consulting firms, report(s) structure and audience, fees and types of contracts, and the role of in-plant staff, are discussed at length. Finally, the need for audit follow-up and implementation of recommended measures is emphasized. Specific examples illustrating the various aspects of energy auditing in developing countries are provided.

FUEL DIVERSIFICATION

by:

Alain Streicher
Hagler, Bailly & Company

Fuel diversification, also called fuel substitution or fuel switching, is defined as conversion from an expensive energy source to a cheaper energy source with the aim of reducing energy costs while providing the same energy service and level of production. The paper first describes the need for fuel diversification and the differences between the private or financial perspective and the public or economic perspective, which can result in conflicts. After describing the typical technical, economic, and financial characteristics of fuel diversification projects, the paper focuses on the environmental and institutional issues, which are often more important. Several specific aspects of a fuel diversification project are discussed: market development, long-term fuel availability, system performance guarantees, and availability of qualified manpower to design, install, and operate the system.

AN OVERVIEW OF GOVERNMENT POLICIES FOR ENERGY CONSERVATION

by:

Pamela Lane Baldwin
U.S. Agency for International Development, Office of Energy

Governments have a positive national interest and role in programs to promote efficient use of energy in developing countries. It is in the interest of central governments to encourage energy conservation so as to maximize national economic growth and productivity, to minimize the economic burden of imported oil, to buy lead time with which to bring new energy supply capacity on-line, and to avoid political and social unrest associated with inadequate or interrupted energy supply. To be successful, a national energy conservation program requires a public-private partnership and a mix of strategies to address market, technical, institutional, political, and information bottlenecks impeding the efficient use of energy. The government role -- while limited to that of initiator, coordinator, promoter, and facilitator of conservation activities -- is critical to the success of such a program.

In addition to describing the direct policy roles -- pricing, taxation, trade, standard-setting, and financial regulation -- that a national government can undertake, this paper describes a range of additional activities for which government institutions are generally best suited. These include: planning and data gathering, analyzing energy consumption patterns, undertaking special studies of principal conservation targets and of policy issues; developing, enacting, and enforcing laws, regulations, and standards; channeling funds, technical assistance and training to non-government organizations; sponsoring research, development, and limited demonstrations of energy conservation technologies and practices;

mounting a strong public awareness, promotion, and outreach campaign; and finally, providing ongoing policy guidance, monitoring, and evaluation of the national energy conservation program.

ECONOMICS OF ENERGY CONSERVATION AT THE ENTERPRISE LEVEL

by:

Michael Fisher
Hagler, Bailly & Company

As policy-makers develop programs to encourage private-sector investment in energy conservation, they must be aware of the difference between public- and private-sector evaluation of investment opportunities. As a result of these differences, a private-sector project that appears beneficial from the public perspective may not be implemented because it is insufficiently attractive from the private-sector perspective. Thus, it is important for the government to implement programs that will prompt the private sector to value projects more as the public sector does.

In this paper, the general procedure by which private enterprises evaluate conservation projects is examined, the sources of difference in public- and private-sector evaluation of projects are highlighted, and the way in which private-sector evaluations may be affected by public policy is described. However, despite all the good intentions and sophisticated theories underlying the conservation programs of public policy-makers, private enterprise may still be reluctant to undertake energy conservation projects. In the final section of the paper, the reason for this reluctance is briefly examined.

REGIONAL INDUSTRIAL ENERGY EFFICIENCY PROJECT (RIEEP): PROMOTION AND EXTENSION COMPONENTS

by:

Francisco Segura
ICAITI

The Regional Industrial Energy Efficiency Project has been designed to reduce the balance of payments deficit in Central America and Panama through a reduction in the industrial use of oil in the region. RIEEP's two principal goals are to demonstrate industrial energy savings and to promote further industrial energy conservation activities. The promotional aspect deals with creating awareness of conservation opportunities, providing motivation for the implementation of energy conservation activities, and providing extension services once the activities are under way.

This paper presents the framework of the promotion and extension components of RIEEP. Aside from the importance of targeting specific industries, the success

of the promotion effort depends on: the development of a perspective on the project and a recognition of its objectives; consideration of the role of ICAITI in the region as well as its share of responsibility in the project's outcome; preparation of specific materials based on the present needs of the project; and establishment and development of relations with specialized mass media that will allow the diffusion of the project at industrial and other levels.

FINANCING ENERGY CONSERVATION INVESTMENTS: ISSUES AND TRADITIONAL APPROACHES

by:
Henri-Claude Bailly
and
Michael Fisher
Hagler, Bailly & Company

Foremost among the reasons for the slow implementation of energy conservation projects in developing countries, despite their high social and economic benefits, is the difficulty in securing financing. Several characteristics of conservation investments account for this difficulty and combine to create important obstacles to companies' willingness and ability to finance them, both from internal and external sources. To overcome these obstacles and promote the development of conservation projects, governments in both developed and developing countries have traditionally provided special financial incentives for conservation projects.

In this paper, the characteristics of energy conservation projects and their effect on financing are briefly discussed. Then, several incentives that have been used by governments to promote investment in conservation are reviewed. In this review, the application, advantages and disadvantages, and examples of use are provided for each incentive. Finally, some of the considerations in developing a comprehensive financial assistance program to promote investment in energy efficiency improvements are examined.

INNOVATIVE APPROACH TO FINANCING ENERGY CONSERVATION INVESTMENTS IN DEVELOPING COUNTRIES

by:

Michael Fisher
Hagler, Bailly & Company

A common barrier to undertaking conservation measures in developing countries is the limited ability or reluctance of energy users to acquire and deploy the capital needed to develop these opportunities. Industrial firms, for example, have had frequent opportunities in recent years to benefit from the use of new, more energy-efficient production technologies, but insufficient internal cash, combined with

an inability to raise debt or equity capital under favorable terms, have often prevented firms from funding these investments.

Confronted with such impediments to mobilizing capital for conservation investments, some financiers and entrepreneurs in industrialized countries have recently implemented five innovative arrangements for financing conservation and other energy-related investments: shared savings; joint venture arrangements; energy service agreements; variable payment loan; limited-term, guaranteed-payback loan. These five financing arrangements are the subject of the paper. For each arrangement, there is a description of structure and operation, a discussion of the distribution of risk between the energy user and the creditors/external investors, and an enumeration of the financial benefits that accrue to the energy user.

ECPIE: AN ENERGY CONSERVATION PROJECT INVESTMENT EVALUATION MODEL

by:

Michael Fisher
Hagler, Bailly & Company

ECPIE is a computer program designed to assist in evaluating the financial/economic performance of energy conservation projects in industrial and commercial applications. The program is designed to run on the IBM Personal Computer and IBM-compatible equipment such as the COMPAQ personal computer.

ECPIE automatically performs three separate analyses of a conservation project: (1) A financial analysis of project performance based on traditional cash-flow analysis principles. The financial analysis computes the financing requirements and after-tax cash flows associated with a project, using information supplied by the user. In addition, the financial analysis performs six sensitivity analyses on variables that are important determinants of the financial performance of a project. (2) A social cost/benefit analysis, in which the user may supply cost and price values (social values) that differ from those used in the financial analysis. This analysis ignores the effects of taxes and financial structure on project performance and evaluates the economic performance of a project from the standpoint of society. (3) A foreign currency requirements analysis that evaluates the net use (or generation) of foreign currency by a project.

In this paper, ECPIE and its inputs and outputs are described, and an example of an ECPIE analysis is presented.

NOTE: A diskette of the ECPIE model and a user's manual are available for U.S. $40; see explanation and order form at the end of this report.

COSTA RICA: OPPORTUNITIES FOR TRANSPORTATION ENERGY CONSERVATION

by:

Alexandra Hernandez
Costa Rica
Ministry of Industry, Energy and Mines
Direccion Sectoral de Energia

In this paper, the findings of the USAID/Energy Conservation Services Program mission to Costa Rica in June 1984 are reviewed. The mission surveyed energy consumption in the transportation sector and made recommendations on implementing an energy savings program.

The recommendations were: (1) the dissemination of energy conservation information, (2) vehicle efficiency improvement, (3) improvement of fuel quality and vehicle maintenance, (4) study of fuel conversion to electricity and fuel alcohol, and (5) improvement of energy use data.

BUILDING ENERGY CONSERVATION OPPORTUNITIES

by:

John Cable
Hagler, Bailly & Company

The situation in the buildings sector is similar to that which is often encountered in other major energy-consuming sectors: facilities and equipment are poorly designed, and where there is energy-efficient equipment, it is inadequately maintained and operated without regard to energy consumption. This situation prevails even though energy use within the buildings sector normally represents a significant portion of total energy demand in most countries. There is considerable evidence that cost-effective efficiency improvements in the buildings sector can achieve major economic gains.

Because it will take a number of years to integrate energy-efficient building design into the mainstream of design practice, and because of the highly diffuse character of the building sector, a policy framework needs to be established that will promote conservation initiatives and mobilize the relevant institutions to ensure effective implementation of these measures. This paper examines different country studies and outlines a building energy conservation program that focuses on the key elements that shape the buildings sector -- design, construction, and operation of buildings.

Appendix 1

List of Seminar Attendees Arranged by Country

1. Barbados

- Brinley D. Selliah
  USAID/Regional Development Office/Caribbean
- David Staples
  Ministry of Finance & Planning
- Kim B. C. Thompson
  Ministry of Finance & Planning

2. Costa Rica

- Juan Jose Castro
  Oficina de la OEA en Costa Rica
- Jose Joaquin Chacon
  Sol 2000 S.A.
- Luis Fernando Chanto
  Compania Nacional de Fuerza y Luz, S.A.
- Allan Chin
  Direccion Sectorial de Energia, Ministry of Industry, Energy & Mines
- Oscar Cato
  Universidad de Costa Rica
- Felix de Barco
  A/C Camara de Industrias de Costa Rica
- Phillipe Durand
  Oficina de la OEA en Costa Rica
- Javier Gonzalez
  Direccion Sectorial de Energia, Ministry of Industry, Energy & Mines
- Alexandra Hernandez
  Direccion Sectorial de Energia
- Jose Martinez
  INCAE
- Edgar Pereira
  INCAE

Appendix 1 (continued)

List of Seminar Attendees Arranged by Country

2. Costa Rica (continued)

- Oldemar Ramirez
  RECOPE
  Direccion Recursos Carboniferos

- Augustin Rodriguez
  Camara de Industrias de Costa Rica

- Heriberto Rodriguez
  USAID/San Jose

- Guillermo Selva
  INCAE

- Roger Sclano
  Instituto Tecnologico de Costa Rica

- Rogelio Sotela

- Alvaro Umana
  INCAE

3. Dominican Republic

- Francisco Batista
  Programa Conservacion de Energia Industrial

- Carlos Dalmau
  Programa Conservacion de Energia Industrial

- Jose A. deFrias
  Programa Conservacion de Energia Industrial

- Eduardo S. Maal
  Fluor Engineers

4. Ecuador

- Carl Duisberg
  USAID/Quito

Appendix 1 (continued)

List of Seminar Attendees Arranged by Country

5. **El Salvador**

- Jaime Gonzalez
  Asociacion Salvadorena de Industriales
- Roberto Ortiz
  Asociacion Salvadorena de Industriales

6. **France**

- Yves Chevalier
  Agence Francaise pour la Maitrise de l'Energie

7. **Guatemala**

- Luis A. Blanco
  Camara de Industria de Guatemala
- Jorge Bortscheff
  SIECA
- David Chavez
  USAID/ROCAP
- Carlos Arturo Dominguez
  OAS
- Rodolfo Espinoza
  ICAITI
- W. Ludwig Ingram
  ICAITI
- Julio Enrique Oboils
  PEEIR-SIECA
- Mario Ortiz
  ICAITI
- Mark Oven
  ICAITI
- Carlos Quintana
  Camara de Industria de Guatemala

Appendix 1 (continued)

List of Seminar Attendees Arranged by Country

7. Guatemala (continued)

- Francisco Segura
  ICAITI
- Raul Valdez
  SIECA

8. Guyana

- Frank Granger
  Caricom Secretariat

9. Haiti

- Clarence Kooi
  USAID/Haiti
- Louis A. O'Connor
  USAID/Haiti
- Wilfrid Saint Jean
  Ministry of Mines and Energy Resources

10. Honduras

- Taufic A. Andonie
  CONPACASA/DISA
- Dorcas C. de Gonzalez
  Asociacion Nacional de Industriales

11. Jamaica

- Franklin J. Ahimaz
  USAID/Kingston
- David A. Keith
  USAID/Kingston

Appendix 1 (continued)

List of Seminar Attendees Arranged by Country

12. Panama

- Roberto Lombana
  Sindicato de Industriales de Panama

- Celedonio Moncayo
  ICAITI-Panama

13. Peru

- Alfredo Oliveros
  ITINTEC

- Mario Quiroga
  USAID/Peru

- Donald Tarnawiecki
  Ministerio de Energia y Minas

14. United States

- Robert Archer
  USAID/Bureau for Latin America and the Caribbean

- Henri-Claude Bailly
  Hagler, Bailly & Company

- Pamela Baldwin
  USAID/Bureau for Science and Technology/Office of Energy

- John Cable
  Hagler, Bailly & Company

- Russell deLucia
  deLucia and Associates, Inc.

- Michael Fisher
  Hagler, Bailly & Company

- Gerald Schwinn
  Hagler, Bailly & Company

- Alain Streicher
  Hagler, Bailly & Company

Appendix 1 (continued)

List of Seminar Attendees Arranged by Country

14. United States (continued)

- Jack Vanderryn
  USAID/Bureau for Science and Technology

- Alan Zupko
  Weston International Inc.

15. International organizations

- Gustavo Calderon
  InterAmerican Development Bank

- Julio Gamba
  The World Bank

Appendix 2

List of Seminar Attendees and Addresses Arranged Alphabetically

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Taufic A. Andonie Director ANDI Miembro Comite Energetico Privadas: Convertidora Nacional de Papel y Distribuidora S.A. Telephone: 33-12-60/33-13-78 33-67-87/22-14-90 Telex: Bancatlan, HO	CONPACASA/DISA Apartado Postal #518 Tegucigalpa, D.C. Honduras
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Appendix 2 (continued)

List of Seminar Attendees and Addresses Arranged Alphabetically

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Appendix 2 (continued)

List of Seminar Attendees and Addresses Arranged Alphabetically

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Felix del Barco Delegado ICAITI en Costa Rica Instituto Centroamericano de Investigacion y Tecnologia Industrial Telephone: 232411 Telex: 2474 INDUSTRIA	A/C Camara de Industrias de Costa Rica Apartado Postal 10003 San Jose, Costa Rica
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Appendix 2 (continued)

List of Seminar Attendees and Addresses Arranged Alphabetically

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Jaime Gonzalez Delegado ICAITI El Salvador ICAITI Telephone: 23-77-88	Calle Liverpool y Calle Roma Col. Roma Asoc. Salv. de Ind. (ASI) El Salvador
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Appendix 2 (continued)

List of Seminar Attendees and Addresses Arranged Alphabetically

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Jose Martinez Programa de Energia INCAE Telephone: 41-22-55 Telex: 7040 ICAECR	Apartado #960 4050 Alajuela Costa Rica

Appendix 2 (continued)

List of Seminar Attendees and Addresses Arranged Alphabetically

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Appendix 2 (continued)

List of Seminar Attendees and Addresses Arranged Alphabetically

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Francisco Segura Subgerente de Promocion PEEIR-ICAITI Telephone: 31-06-31	Ave. La Reforma 4-47 Zona 10 Guatemala City, Guatemala

Appendix 2 (continued)

List of Seminar Attendees and Addresses Arranged Alphabetically

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Brinley Selliah General Engineer Telephone: 427-5814, 427-5152	USAID Regional Development Office/Caribbean P.O. Box 302 Bridgetown, Barbados
Guillermo Selva Director Adjunto-Programa de Energia INCAE Telephone: 41-22-55	Apartado 960 4050 Alajuela, Costa Rica
Roger Solano Ingeniero Mecanico Instituto Tecnologico de Costa Rica Telephone: 51-36-61	Apartado 159 Cartago, Costa Rica
Rogelio Sotela Energy Planning Consultant	Calle y Aves 2/4 San Jose, Costa Rica
David Staples Advisor World Bank Tech-Assistance Energy Conservation Project Ministry of Finance & Planning Telephone: (809) 427-9806	P.O. Box 4W Bridgetown, Barbados
Alain Streicher Vice President Hagler, Bailly & Company Telephone: (202) 463-7575	2301 M Street, NW Washington, DC 20037
Donald Tarnawiecki Secretario Tecnico del Consejo Nacional de Energia Consejo Nacional de Energia Ministerio de Energia y Minas Telephone: 41-08-19	Av. Las Artes S/N San Borja Lima, Peru
Kim B. C. Thompson Energy Auditor Telephone: 427-9806	Energy Conservation Unit c/o Ministry of Finance & Planning Bay Street, Bridgetown Barbados, W.I.

Appendix 2 (continued)

List of Seminar Attendees and Addresses Arranged Alphabetically

Name/title	Mailing address
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Jack Vanderryn Agency Director for Energy & Natural Resources Bureau for Science & Technology U.S. Agency for International Development Telephone: (703) 235-2243	Room 509 -- SA-18 Washington, DC 20523
Raul Valdez Consultor Experto en Energia SIECA Telephone: 682151	4a. Ave. 10-25, 14 Guatemala City, Guatemala
Alan Zupko, P.E. Engineer (Chemical & Energy) Weston International Inc. Telephone: (215) 692-3030 Telex: 83-5348	Weston Way West Chester, PA 19380

Appendix 3

List of Seminar Papers and Speakers

Monday, January 14, 1985

8:30 a.m. Workshop Orientation, Robert Archer and Pamela Baldwin, U.S. AID/W
8:40 a.m. Welcoming Remarks: Marc Lindenberg, Rector, INCAE
8:45 a.m. Opening Remarks: Dan Chaij, Director, U.S. AID/Costa Rica
9:00 a.m. Opening Address: Jorge Monge, Vice Minister, Ministry of Industry, Energy, and Mines

Session 1: Country Presentations: The purpose of this session is to review the experience and accomplishments of AID-assisted energy conservation projects throughout the region and thus to provide a base of information on energy conservation activities and to elicit questions and reactions from attendees. For each country project, there will be a brief paper followed by time for questions and discussion.

Moderator: Robert Archer, U.S. AID/W

9:30-10:45 **ROCAP** (Costa Rica, El Salvador, Guatemala, Honduras, Panama): Regional Industrial Energy Efficiency; presentation: 45 minutes; discussion: 30 minutes (Paper 1)

BREAK

11:00-12:15 **JAMAICA**; presentation: 30 minutes; discussion: 45 minutes (Paper 2)

LUNCH

1:45-2:45 **DOMINICAN REPUBLIC**; presentation: 25 minutes; discussion: 35 minutes (Paper 3)

2:45-3:45 **COSTA RICA**; presentation: 25 minutes; discussion: 40 minutes (Paper 4)

BREAK

4:00-4:45 **ECUADOR**; presentation: 20 minutes; discussion: 25 minutes (Paper 5)

4:45-5:30 **BARBADOS**-World Bank Project (tentative); presentation: 20 minutes; discussion: 25 minutes (Paper 6)

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Appendix 3 (continued)

List of Seminar Papers and Speakers

Tuesday, January 15, 1985

Session 2: **Program Implementation: Overview and Auditing**

Moderator: Henri-Claude Bailly, Hagler, Bailly & Company

8:00-8:20 **Introduction to energy conservation program implementation** (Henri-Claude Bailly, Hagler, Bailly & Company); presentation: 20 minutes (Paper 7)

8:20-10:15 **Implementing an energy audit program** (Alain Streicher, Hagler, Bailly & Company); presentation: 30 minutes (Paper 8)

Panel: Representatives from organizations carrying out audits; discussion: 85 minutes

BREAK

10:30-12:00 **Fuel diversification** (Alain Streicher, Hagler, Bailly & Company); presentation: 30 minutes (Paper 9)

Panel: Representatives on Costa Rica industry/biomass study; Representative on Jamaica energy cane project; discussion: 60 minutes

LUNCH

Session 3: **Program Implementation: Policy, Economics, and Information**

Moderator: Henri-Claude Bailly, Hagler, Bailly & Company

1:30-2:00 **Overview of government policies for energy conservation** (Pamela Baldwin, U.S. AID/W); presentations and questions: 30 minutes (Paper 10)

2:00-2:30 **Economics of energy conservation at the enterprise level** (Michael Fisher, Hagler, Bailly & Company); presentations and questions: 30 minutes (Paper 11)

BREAK

2:45-3:05 **Role of private-sector enterprises in energy conservation** (Ricardo Castillo, Guatemala Chamber of Industry); presentation: 20 minutes

3:05-4:00 **Panel:** Representatives from government and private-sector organizations, ICAITI, SIECA, banks, Chambers of Industry, World Bank, utilities

Appendix 3 (continued)

List of Seminar Papers and Speakers

4:00-5:15 **Promoting energy conservation programs** (Francisco Segura, ICAITI; Alvaro Umana, INCAE); presentations: 30 minutes; discussion: 45 minutes (Papers 12 and 13)

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Wednesday, January 16, 1985

Session 4: **Program Implementation: Financing**

Moderator: Alain Streicher, Hagler, Bailly & Company

8:00-9:00 **Financing energy conservation investments; issues and traditional approaches** (Henri-Claude Bailly, Hagler, Bailly & Company); presentation: 30 minutes; discussion: 30 minutes (Paper 14)

9:00-10:00 **Innovative financing of energy conservation investments in developing countries** (Michael Fisher, Hagler, Bailly & Company); presentation: 30 minutes; discussion: 30 minutes (Paper 15)

BREAK

10:15-12:00 **Panel:** Representatives from Jamaica, Dominican Republic, banking institutions; World Bank

LUNCH Gather in optional technical interest groups (e.g., financial policies for energy conservation; auditing equipment and procedures; promotion and information programs; technical training)

Session 4: **Program Implementation: Financing (continued)**

Moderator: Henri-Claude Bailly, Hagler, Bailly & Company

2:00-3:00 **ECPIE: An Energy Conservation Project Investment Model** (Michael Fisher, Hagler, Bailly & Company) (Paper 16)

BREAK

Session 5: **Program Implementation: Transportation and Buildings**

3:30-5:00 Session A: Moderator: Pamela Baldwin, U.S. AID)

Costa Rica: Opportunities for Transportation Energy Conservation (Alexandra Hernandez, MIEM/DSE) (Paper 17)

Appendix 3 (continued)

List of Seminar Papers and Speakers

3:30-5:00 Session B: Moderator: Henri-Claude Bailly, Hagler, Bailly & Company

Building energy conservation opportunities (John Cable, Hagler, Bailly & Company) (Paper 18)

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Thursday, January 17,1985

Sesssion 6: **Role of International Organizations; Conclusions**

Moderator: Robert Archer, U.S. AID/W

8:00-10:00 Other donor activities -- presentations by representatives from the (1) Inter-American Development Bank, (2) World Bank, (3) AFME-France, (4) Organizacion Latinoamericana de la Energia (OLADE), and (5) Organization of American States (OAS).

BREAK

10:30-12:00 **Workshop findings and recommendations** (Henri-Claude Bailly, Hagler, Bailly & Company)

12:00-12:15 **Closing remarks** (Robert Archer, U.S. AID/W)

Afternoon -- Field trip to Coopro Naranjo (coffee beneficiation facility)

Appendix 4
Order Form for Seminar Papers

Please send me a set of the papers from the Energy Conservation Seminar held in Costa Rica January 1985.

My preference is for the Spanish language version_____ English language version_____
I am interested only in the following papers:

Title	English	Spanish
Regional Industrial Energy Efficiency Project (RIEEP)	_____	_____
Energy Sector Assistance Project	_____	_____
Industrial Energy Conservation Program of the Energy Conservation and Resource Development Project	_____	_____
Industrial Energy Audit Program for Costa Rica (Interim Report)	_____	_____
Presentation of the AID-INE Project, Ecuador	_____	_____
Barbados -- World Bank Technical Assistance Energy Conservation Project	_____	_____
Energy Conservation Program Implementation: The Key Success Factors	_____	_____
Implementing an Energy Auditing Program	_____	_____
Fuel Diversification	_____	_____
An Overview of Government Policies for Energy Conservation	_____	_____
Economics of Energy Conservation at the Enterprise Level	_____	_____
Regional Industrial Energy Efficiency Project (RIEEP): Promotion and Extension Components	_____	_____
Financing Energy Conservation Investments: Issues and Traditional Approaches	_____	_____
Innovative Approach to Financing Energy Conservation Investments in Developing Countries	_____	_____
ECPIE: An Energy Conservation Project Investment Evaluation Model	_____	_____
Costa Rica: Opportunities for Transportation Energy Conservation	_____	_____
Building Energy Conservation Opportunities	_____	_____

Name:_____ **Title:**_____

Organization:_____

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ndustrial Energy Conservation Program of the Energy onservation and Resource Development Project		
ndustrial Energy Audit Program for Costa Rica (Interim Report)		
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Appendix 5

AVAILABILITY OF ECPIE MODEL

ECPIE is a computer program for evaluating energy conservation, fuel substitution, and cogeneration investments, and was developed as part of the USAID Energy Conservation Services Program. ECPIE analyzes the economic and financial performance and foreign currency usage of a project, automatically performs sensitivity analyses, and requires very little knowledge of a computer to use.

The program comes on a standard 5.25" diskette, is not copy-protected, and includes a detailed user's manual and sample data sets. To run the program, you will need:

- An IBM-PC, COMPAQ Personal Computer, or Wang PC. The program **may** run on other MS-DOS, IBM-PC-compatible machines; we can give you tips on how to make it run on other machines, but cannot guarantee success.
- A minimum of 60K addressable memory when DOS and Basic language are present in the computer.
- Microsoft or IBM-PC DOS 2.0, or a later version.
- Microsoft Advanced Basic 2.0 (sometimes called BASICA 2.0), or a later version.
- One disk drive; two are better.
- A dot-matrix printer capable of printing in pica (10-pitch) and compressed (17-pitch) character modes; the print menu currently supports Epson (and Epson-compatibles) and Okidata printers. If you don't have an Epson or Okidata, just supply some information about your printer and we will add it to the print options menu (see below).

The program will run fastest on machines with a hard disk **or** with 320K-plus memory and an electronic disk DOS feature.

To receive a copy of ECPIE and the user's manual, please complete the attached order form and return to the address on the form. Also include a check or money order for U.S. $40.00 to cover the costs of the diskettes, reproducing the manual, and shipping.

ECPIE ORDER FORM

Enclosed please find our payment of U.S. $40.00 for one copy of the ECPIE model and user's manual. Please ship to:

Name:_____

Organization:_____

Shipping address:_____

_____

_____

Telephone:_____ Telex:_____

Computer and Printer Information

Type of computer:_____

Memory size:_____

Type of printer:_____

If your printer is not an Epson or Okidata, please provide the following information.

Control codes -- e.g., CHR$(15) -- for:

Pica or 10-pitch character size:_____

Compressed or 17-pitch character size:_____

Carriage return:_____

Form feed:_____

For questions, please contact: Michael Fisher
Hagler, Bailly & Company
2301 M Street, NW
Washington, DC 20037
Telephone: (202) 463-7575
Telex: 710-822-1150 HABACO WSH

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