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CLOSE – OUT SHEET

This file is closed as of September 30, 1986

For further correspondence, please see vol. 9.

RECORDS MANAGEMENT SECTION

THE WORLD BANK / INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

INT 183/005

DATE: September 30, 1986

TO: Mr. Matthew S. Mendis, EGYPA

FROM: Bernard Montfort, Division Chief, EGYS1

THROUGH: Robert Saunders, Division Chief, EGYPA

SUBJECT: Ghana: Sawmill Residue Utilization Study
Terms of Reference

1. You are to arrive in Accra, Ghana on on before October 18, 1986 for a stay of approximately three weeks. Your primary purpose is to lead a mission to evaluate the technical and economic feasibility of increasing the use of wood industry residues as a fuel in Ghana. Specifically, you are to work with the appropriate Government of Ghana (GOG) officials, the two local Ghanian consultants, the three expert consultants from Sandwell Inc., and Mr. Charles Feinstein (EGYS1) in order to achieve the objectives outlined in the ESMAP Activity Initiation Brief issued on this subject in February 1986. While in Ghana, you are to become familiar with the relevant data, conditions and environment so as to direct and eventually critically review the resulting consultants' report on this project. Specifically, your responsibilities will be to:

(a) Meet, in Accra, with all the mission members to review the objectives, approach, expected outputs and schedule for the field work in Ghana, to finalize the work plan of the mission and to brief the members on their respective responsibilities.

(b) Introduce the mission members to the appropriate officials in the Ghana Ministry of Fuels and Power and the National Energy Board (NEB) and review with these officials the objectives of the project and the proposed work plan of the mission.

(c) Maintain liaison with NEB to ensure that all logistic and counterpart support for the mission, which was previously agreed by the NEB, is provided for.

(d) Coordinate with NEB to ensure that the mission members have access for data collection to both relevant Government agencies and selected wood processing industries. Also, coordinate with NEB to ensure that wood processing industries selected for detailed evaluation are informed in advance of the nature, purpose and intent of the mission's activities.

(e) Periodically review and evaluate the progress of the mission and provide general and technical guidance to the mission members so as to maintain and meet the objectives and schedule of the project.

(f) Prepare a summary of the preliminary findings and conclusions of the mission and discuss these with the NEB. Also be prepared to review the mission's findings and accomplishments with the UNDP and World Bank Resident Representatives and the CIDA representative at the Canadian High Commission.

2. Upon your return to Washington, you will report the results of your mission in a back-to-office report to be submitted no later than one week after your return.

cw & cc: Messrs. Berk (WA1DB); Davis (WAPEG)
cc: Messrs. Eccles, Husain, Bauer, Soto, Chaparro (WAP)
Isenman, Ijichi (WA1)
Weissman (EISVP);
Dervis (IND);
Hume, Bourcier, Ahmed (o/r), Dosik, Iskander, Ferroukhi (EGY)
Harland, Rothermel, Cox (UNDP)

MMendis:my

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: September 30, 1986

TO: Charles Feinstein, EGYS1

FROM: Bernard Montfort, Division Chief, EGYS1

SUBJECT: Ghana - Sawmill Residue Utilization Study
Terms of Reference

1. You are to arrive in Accra, Ghana on or before October 17, 1986, for a study of approximately 3 1/2 weeks. With the supervision and guidance of Matthew Mendis, project leader, you will be responsible for: (i) the overall economic and financial analysis of the options to increase the use of wood industry residues as a fuel in Ghana; (ii) integrating the consultant's reports and your own findings and recommendations into an ESMAP preinvestment report; and (iii) assisting the project leader in the overall coordination of the mission.

2. You will prepare the detailed economic and financial analysis necessary to make an overall economy-wide evaluation of the options (i.e. on-site or off-site combusion for steam,/electricity generation, briquetting, carbonization, pelletization) for improving the utilization of wood processing industry residues to substitute for imported fuel and/or in new applications. Specifically, you will:

(a) In consultation with the West Africa Country Programs office and the World Bank country economist resident in Accra, identify and collect data on the energy sector and the economy necessary to conduct a financial and economic analysis. For example, market and border prices of various fuels, transportation costs, market and shadow wage rates, shadow exchange rates, capital costs, etc.

(b) Establish the basic framework within which a comparative financial and economic assessment of the various options for increasing the use of wood industry residues are evaluated and ensure that a consistent set of financial and economic data and assumptions are used by the study team consultants in their analysis.

(c) Review the output of the local consultants hired to obtain basic data on the production of wood residues and on the patterns of energy consumption in the wood processing area to determine if they have met the requirements of the terms of reference.

(d) Work with the expatriate consultants on the main mission to financially and economically evaluate against the existing systems and practices the various options for increasing the use of the wood industry residues both in and around the processing plants, and in natural or processed form.

(e) Identify the local practices, governmental policies, and institutional arrangements that presently inhibit the efficient and expanded use of wood industry residues as a potential fuel in the industrial, commercial and household sector. Recommend short-term and long-term policy options that would promote the wider use of the wood industry residues as a fuel in Ghana.

(f) Determine the overall investment requirements, broken down by the foreign and local cost components, to implement both the proposed pilot projects as well as a full scale national program.

(g) Determine the cost/benefit of the individual pilot projects as well as a proposed national program to improve utilization of wood industry residues as a fuel to substitute for imported fuels and/or in new applications. Where options may be mutually exclusive due to alternative uses for wood residues, selection of project mix will be determined by maximization of net present value.

3. You will integrate the findings of the study team's consultants, your conclusions and recommendations into an ESMAP report for review by the mission leader. You should prepare a detailed outline of the report and designate, where possible, the expected input from each expert to facilitate the coordination of the consultants' work and input into the report. The report should, at a minimum, cover the following topics: background, purpose and objectives of the study; present availability and use of wood industry residues; present and projected surplus of wood industry residues; potential alternatives for use of wood industry residues as a fuel to substitute for imported fuel and/or in new applications; financial/economic evaluation and technical feasibility of these options, and a recommended program of action.

4. You will also assist the mission leader with the overall coordination of the mission and provide logistical support as needed. In particular, you will arrive in Ghana ahead of the rest of the mission to ensure that appointments with the government officials and field visits by team members and transportation means are appropriately arranged. You will also assist the mission leader in the drafting of an aide-memoire to the government, if it is decided that one is required.

CFeinstein:my

OFFICE MEMORANDUM

DATE: September 30, 1986

TO: Mr. Peter J. Neild, Biomass Conversion Specialist

FROM: Bernard Montfort, Division Chief, EGYS1

SUBJECT: ESMAP: Ghana: Wood Industries Residues Utilization Study
Terms of Reference

1. You are to arrive in Accra on or before October 18, 1986 for a stay of approximately three weeks. Your primary purpose is to work with the Bank's Mission Leader and other members of the mission in order to conduct a detailed technical and economic assessment of the feasibility of increasing the use of wood industry residues as a fuel in Ghana. You wil be primarily responsible for suggesting improvements, and identifying potential new techniques of processing/converting wood industry residues to increase the market potential for wood residues as a fuel in commercial/industrial enterprises and households in the vicinity of the wood processing industries.

2. Your specific responsibilities are outlined below:

(a) In conjunction with the study team's economist and the wood processing industry energy/residue expert you will establish and agree on the amount and type (sawdust/wood offcuts) of the wood industry residues available for conversion/processing for use as fuel;

(b) In conjunction with the study team's economist and the biomass combustion/energy application engineer you will identify and agree on the existing and potential demand for processed wood industry residues in commercial/industrial establishments and households in the vicinity of the wood processing industries;

(c) For selected major industrial and commercial establishments which have been identified as potential candidates for the use of wood residues, you will determine the technical feasibility and cost effectiveness of using processed wood residues such as wood chips, briquettes or charcoal, as opposed to the unprocessed wood residues such as sawdust or offcuts;

(d) Within the framework implied by the availability of wood residues and potential markets as determined in (a) and (b) above, you will investigate and recommend options for carbonization and briquetting of offcuts and sawdust to increase the use of wood industry residues as a fuel in Ghana;

(e) You will review and evaluate the current means of

carbonizing the solid wood residues and recommend options for improving conversion efficiency;

(f) You will also identify, review and evaluate the design, technical feasibility and financial viability of the existing and proposed briquetting projects in Ghana;

(g) In evaluating the carbonization and briquetting options you should:

(i) indicate equipment requirements, their costs and potential advantages;

(ii) identify storage and transportation requirements including material handling, packing and loading systems;

(iii) provide estimates of the capital, operating and maintenance costs; and

(iv) identify the institutional, training and monitoring activities that would be necessary to implement the recommended program.

(h) You will coordinate your efforts with the project's economist to evaluate the potential processing options you have identified and you will compare these processing options against other non-processing options.

(i) Based on your findings in (h), you will develop preliminary commercial scale plant designs for the carbonization and briquetting of wood industry residues for use as cooking fuel in households and as boiler/kiln fuel in commercial and industrial establishments.

3. While in Ghana, you may be requested by the Mission Leader to participate in verbal progress reports to officials of the Government of Ghana. You will also be requested to assist in the preparation of preliminary findings and conclusions to be presented in an aide-memoire to officials of the Government at the termination of the mission.

4. Within six weeks of your departure from Ghana you will prepare a complete report on your findings and to work with the rest of the study team to integrate these findings in a draft study report. Upon review of your inputs, you will be given an additional two weeks, if necessary, to revise your inputs to reflect comments received.

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: September 30, 1986

TO: Mr. Brian D. Hickman, Wood Processing Industries Energy/ Residue Expert

FROM: Bernard Montfort, Division Chief, EGYS1

SUBJECT: ESMAP: GHANA - Wood Industries Residues Utilization Study Terms of Reference

1. You are to arrive in Accra on or before October 18, 1986 for a stay of approximately three weeks. Your primary purpose is to work with the Bank's Mission Leader and the other members of the mission in order to conduct a detailed technical and economic assessment of the feasibility of increasing the use of wood industry residues as a fuel in Ghana. You will be primarily responsible for: verifying the availability of wood industry residues; indicating the quantities, characteristics and rates of production of thse residues; indicating the present use within as well as outside of the wood processing industries; indicating the amounts that are disposed of and the means and costs of disposal; estimating the future supply potential of these residues; outlining the energy requirements of the wood processing industries; and identifying additional onsite opportunities for residue use and providing preliminary technical design and cost estimates for the required systems.

2. Your specific responsibilities will be to:

(a) Review and verify the data on the supply of wood indusry residues collected in advance by the Bank's local Ghanaian consultants. In this regard you should develop a clear picture of the sources, types and characteristics of the residues available especially as it relates to their potential use as a fuel. You should also determine the location and distribution of the major sources of residues. Based on this information, you should develop a classification of the wood processing industries according to their potential as wood residue producers and also as energy consumers.

(b) Develop a profile on the production, use and disposal of wood industry residues in Ghana. Specifically, you should review the survey data collected by the local consultants and, based on your expertise and on selected site visits, you should develop definitive estimates of the quantities of wood residues produced in 1985 and estimated to be produced in 1986. Similarly, based on your site visits and your knowledge of the Ghanaian wood industry, you should estimate the types and quantities of residues used onsite for energy and non-energy purposes. Based on this, you should then determine the quantity of residues that are disposed of and the means and costs of their disposal.

(c) Develop profiles of the energy requirements at typically representative wood industries in Ghana and indicate to what extent these requirements are presently met with the use of available wood residues. In particular, you should provide estimates of the requirements for electricity, steam and direct process heat. You should then indicate the extent to which these energy requirements are currently met with wood residues and the extent to which they are met by other sources. In the case where wood residues are used, you should identify the types of systems being used to provide the energy. In the case where other sources of energy are used, you should identify the nature of these sources and indicate the cost of the energy provided by them.

(d) Working with the energy economist and focusing on the larger wood processing facilities, evaluate the relative economics of meeting electricity/process heat demands by cogeneration using wood residues, stand-alone diesel generation, or hydroelectric power from the national grid when grid extension costs are included. In addition, the technical and economic attractiveness of generating and selling electricity to other consumers or to the Electricity Corporation of Ghana, need to be evaluated.

(e) Based on the information developed in (c) and (d), you should identify opportunities to increase the onsite use of wood residues and improve the energy self sufficiency of the wood processing industries in Ghana. In this regard, you should clearly identify the options available. You should develop preliminary technical designs and cost estimates of systems required to increase the onsite utilization of the wood residues. In particular, special burners, boilers, gasifiers, and other wood combustion systems need to be evaluated against the present practice in Ghana. In conjunction with the energy economist, you should evaluate these options against the existing energy systems and practice. Based on the results of this exercise, you should identify potential pilot projects that would clearly demonstrate the technical and economic feasibility of increasing onsite wood residue utilization.

(f) Finally, you should identify the general development, training and infrastructure necessary to support the wider use of wood residues as a fuel in the wood processing industries. You should indicate the types of practices in the Ghana wood industries that inhibit the efficient and expanded use of wood residues as a fuel. You should identify the existing level of technical capabilities and compare this to the requirements that would be necessary if expanded use of wood residues is adopted. Based on this analysis, you should, in conjunction with the economist and the rest of the team develop both short

term and long term policy recommendations that will aid Ghana in promoting the economic and efficient use of wood residues.

3. Given the above, you are to work with the other members of the mission to integrate your findings within the overall context of the study. In particular, you are to assist in the writing of a report that will integrate the conclusions and recommendations of the other experts on the study team. The report must, at a minimum, provide:

(a) Information on the present and future supply and demand of wood industry residues in Ghana;

(b) A listing of the best technically and economically feasible options for increasing the onsite and offsite use of wood industry residues;

(c) Analysis of the proposed options with indications of their development priority;

(d) An indication of the short term and long term policy options that are necessary to promote the wider onsite use of the wood industry residues as a fuel;

(e) A clear strategy and program for follow-up including clearly defined pilot demonstration projects; and

(f) A definition of the technical assistance and investment requirements that are necessary for the implementation of the recommended program.

4. While in Ghana, you may be requested by the Mission Leader to participate in verbal progress reports to officials of the Government of Ghana (GOG). You will also be requested to assist in the preparation of preliminary findings and conclusions to be presented in an aide-memoire to officials of GOG at the termination of the mission.

5. Within six weeks of your departure from Ghana you will prepare a complete report on your findings and work with the rest of the study team to integrate these findings in a draft study report. Upon review of your inputs, you will be given an additional two weeks, if necessary, to revise your inputs to reflect comments received.

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: September 30, 1986

TO: Mr. Phillip Trees, Biomass Combustion/Energy Applications Engineer

FROM: Bernard Montfort, Division Chief, EGYS1

SUBJECT: ESMAP: Ghana: Wood Industries Residues Utilization Study
Terms of Reference

1. You are to arrive in Accra on or before October 18, 1986 for a stay of approximately three weeks. Your primary purpose is to work with the Bank's Mission Leader and the other members of the mission in order to conduct a detailed technical and economic assessment of the feasibility of increasing the use of wood industry residues as a fuel in Ghana. You will be primarily responsible for systematically identifying and evaluating the technical and economic merits of the major opportunities available to substitute available wood industry residues for other commercial fuels in nearby industries, commercial enterprises and households. You are also to evaluate the present means for process heat and electricity production/supply in the vicinity of the major wood processing industires with the aim of determining the economic potential for cogenerated electricity from available wood residues.

2. Your specific responsibilities will be to:

(a) Review and verify the data collected by the local consultants on the type, level and patterns of energy consumed by the wood processsing industries and other industries, commercial enterprises and households in the vicinity of the major wood processing areas of Ghana. Based on this information, you should develop a basic profile of the existing energy demand in and around the areas of the major wood processing industries with the objective of identifying potential options for increasing the use as a fuel of available wood industry residues. You should use this general data to select and focus your field visits and subsequent detailed data gathering.

(b) Identify the principal electricity and heat consuming industries in the vicinity of the wood processing industries that could be potential candidates for converting to the use of wood residues as a fuel. In this regard, you should identify, in the target regions, the major energy consuming systems currently using conventional fuels such as boilers, kilns, engine generators, drying systems, ovens, etc., that are candidates for possible conversion to wood residue fuels. You should obtain the

necessary technical, operational and economic data on these systems so as to facilitate evaluating the overall feasibility and desirability of their conversion.

(c) Identify the existing and potential electricity and joint power/process heat demands in the industries located in the vicinity of wood processing facilities. You should evaluate the technical and economic attractiveness of meeting these demands using wood industry generated electricity or wood residue fired local cogeneration. In conjunction with the wood processing industries expert, you should compare the wood residue-based options for electric power and heat supply with relevant conventional supplies including diesel-fired and extension methods.

(d) Work with the biomass conversion expert to identify potentially attractive end uses for processed or converted residues such as wood chips, briquettes and charcoal. Based on the information developed, you should identify specific opportunities to increase offsite use of wood residues as a fuel. In conjunction with the biomass conversion expert, you should develop preliminary technical designs and cost estimates of industrial and commercial systems required to increase the offsite use of wood residues. In conjunction with the energy economist, you should evaluate these options against the existing energy systems and practice. Based on the results of the analysis, you should identify specific pilot projects that would clearly demonstrate the technical and economic feasibility of increasing the onsite and and offsite use of wood residues as a fuel.

(e) Finally, you should identify the general development, training and infrastructure requirements necessary to support the wider use of wood residues as a fuel. You should indicate the types of practices in the potential industrial, commercial and household candidates that would presently inhibit the efficient and expanded use of wood residues as a fuel. You should identify the existing level of technical capabilities in the industrial and commercial sectors and compare this to the requirements that would be necessary for the expanded use of wood residues as a fuel. You should indicate the adequacy of the present infrastructure to support the expanded use of wood residues as a fuel. Based on this analysis, you should, in conjunction with the economist and the rest of the study team, develop both short term and long term policy recommendations that will aid Ghana in promoting the economic and efficient use of wood residues.

3. Given the above, you are to work with the other members of the mission to integrate your findings within the overall context of the study. In particular, you are to assist in the writing of a report that will integrate the conclusions and recommendations of the other experts on the study team. The report must, at a minimum, provide:

(a) Information on the present and future supply and demand of wood industry residues in Ghana;

(b) A listing of the best technically and economically feasible options for increasing the onsite and offsite use of wood industry residues;

(c) Analysis of the proposed options with indications of their developmental priority;

(d) An indication of the short term and long term policy options that are necessary to promote the wider use of the wood industry residues as a fuel;

(e) A clear strategy and program for follow-up including clearly defined pilot demonstration projects with preliminary equipment specifications and cost estimates; and

(f) A definition of the technical assistance and investment requirements that are necessary for the implementation of the recommended program.

4. While in Ghana, you may be requested by the Mission Leader to participate in verbal progress reports to officials of the Government of Ghana (GOG). You will also be requested to assist in the preparation of preliminary findings and conclusions to be presented as an aide-memoire to officials of GOG at the termination of the mission.

5. Within six weeks of your departure from Ghana you will prepare a complete report on your findings and work with the rest of the study team to integrate these findings in a draft study report. Upon review of your inputs, you will be given an additional two weeks, if necessary, to revise your inputs to reflect comments received.

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

INT/83/005

DATE: September 30, 1986

TO: Mr. Robin Bates, Acting Division Chief, EGYS2

FROM: Gabriel Sanchez-Sierra and Ignacio Rodriguez, EGYS2

EXT: 7-4547

SUBJECT: ESMAP: PARAGUAY - Supervision of Energy Planning Project
BOLIVIA - Energy Strategy Reconnaissance Mission

Paraguay

1. In accordance with its terms of reference, the mission visited Asunción on September 1-4, to supervise the completion of the first phase of the ESMAP Energy Planning Technical Assistance Project, and initiate the second phase. Oriented to improve the coordination of the energy sector, the ESMAP project financed by the UNDP country account was initiated in 1985 to strengthen the Energy Unit of the Secretaría Tecnica de Planificación (STP), to carry out technical and economic analyses for the National Energy Commission (NEC).

2. The first phase was very successful, with the completion of Paraguay's first National Energy Balance 1970-1984 and first household energy survey, initiation of an energy data base, and implementation of an internship program in Brazil for the STP energy staff. As a result of the work carried out in the first year, STP's position in Paraguay's energy sector has already improved considerably.

3. During the mission, a formal presentation of the energy balance report was made by STP to high Government officials and general managers of the energy institutions. Special mention should be given to the strong support received from the General Manager of the National Power Company (ANDE) who is considered in the country as the most informed and influential "actor" in the energy sector. The meeting was followed the next day by an Energy Balance Symposium to the technical staff of all the energy related institutions. This was a major achievement for improving the dialogue between STP and the energy institutions. Extensive press coverage was provided, and it was seen as a first step in improving the coordination of the energy sector in Paraguay. Annex 1 shows a copy of the "El Diario" newspaper clipping, and Annex 2 includes the list of participants in the presentation of the energy balance.

4. During the mission, the UNDP Project Document (Annex 3) for the second phase was prepared and discussed with the Resident Representative. UNDP has agreed to cover all expenses totalling US$97,000 (except ESMAP supervision costs) under the country's IPF account. The second phase is critical in continuing the strengthening of STP toward achieving the goal of addressing the energy issues more effectively under one central organization. The main activities under

the second phase are concentrated on analyzing energy pricing issues, studying impact of energy on the economy, setting up an energy data collection system, carrying out an energy workshops, and establishing energy policy guidelines. An effort will also be made in continuing a dialogue with the energy institutions, and involving them as much as possible in the project. The second phase is scheduled to be completed by September, 1987.

Bolivia

5. The mission visited La Paz on September 5-8, to determine the scope of the work for the energy strategy exercise. The Government of Bolivia is in the process of developing the first Energy Master Plan, and has asked the Bank for assistance. UNDP has agreed to finance the entire exercise (except ESMAP supervision costs) totalling US$160,000 under their IPF country account. A UNDP Project Document was prepared (Annex 4) and discussed with the Vice-Minister of Energy and the UNDP Resident Representative. A list of consultant candidates was also discussed and agreed with them. It was also agreed that the exercise should start as soon as possible because of the Government's objective to have an energy strategy proposal by the beginning of 1987.

6. This exercise will follow-up the work carried out by the Energy Assessment of April 1983, with an objective of prioritizing investment possibilities in the energy sector, improving the financial viability of the key energy institutions, and improving the coordination of the energy sector. The work on petroleum and electricity will be carried out in close coordination with EGYD2 and LAC. Bolivia is facing critical issues in: rapidly declining oil reserves while the country still has a vast unexplored potential; a large natural gas potential with a limited local market and a critical export agreement to Brazil still in negotiations; the need to review the electric power expansion program in light of the sharp economic recession; the fuel deficit situation of the Altiplano leading to desertification of the area; the financial crisis of the energy institutions; and the overall lack of coordination in the energy sector. According to these issues, a team of international and national consultants are being contracted. Work will start in La Paz on October 1 for a period of 6 months.

Distribution

Messrs. Moscote, Halperin (LCPEN); Zea-Barriga (LC2PB)
Hume, Saunders, Byer, Fish, Heron, Iskander, Khelil,
Bertelsmeier, Montfort, Dosik (o/r), Schmedtje (EGY)
Mendoza, World Bank Resident Representative, La Paz, Bolivia
Painter, UNDP Resident Representative, La Paz, Bolivia
Chang, UNDP Resident Representative, Asunción, Paraguay
Castillo, c/o UNDP Resident Mission, Asunción, Paraguay
Mmes. Gomez-Fernandini (LCPPS); Marshall, Javier (LC2PB)

IRodriguez/GSanchez-Sierra:svh

Presentaron balance energético

Fue durante un acto especial en la ANDE

Fue presentado el "Balance Energético Nacional - Años 1970-1984". Se trata de un documento calificado como el primer resultado del programa de actividades que se ha propuesto desarrollar, en el área de la planificación energética, la Secretaría Técnica de Planificación del Desarrollo Económico y Social, dependiente de la Presidencia de la República.

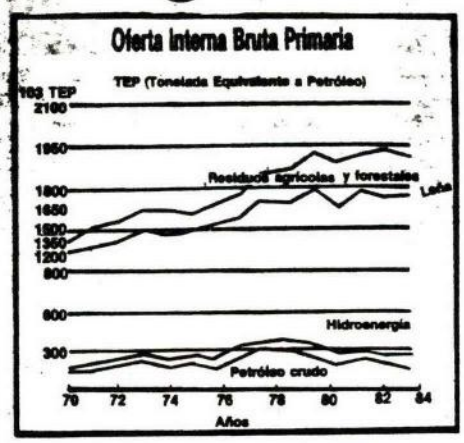
Para el efecto se cumplió un acto especial en el auditorio de la Administración Nacional de Electricidad (ANDE), al promediar la mañana de ayer. Asistieron calificados exponentes (autoridades y funcionarios superiores y técnicos) de los ministerios, cuyos objetivos guardan vinculaciones con las cuestiones energéticas.

Igualmente estuvieron los representantes de la mayoría de los entes y organismos oficiales del área energética; de las entidades binacionales Itaipú y Yacyretá; del sector privado (FEPRINCO y de la UIP); del Programa de las Naciones Unidas para el desarrollo (PNUD); del Banco Mundial (BM); del Banco Interamericano de Desarrollo (BID) y de la Oficina Nacional de Proyectos (ONP).

Sucesivamente se refirieron al alcance y proyección del Balance Energético Nacional el secretario ejecutivo de la SPT, Dr. Fulvio José Monges Ocampos, el representante residente del PNUD, Dr. Jerry Chang, y el Ing. Isaac Castillo, experto del BM. Finalmente, comenzó a ser distribuido el trabajo técnico que "es el punto de partida y la base sobre la cual descansa todo el proceso de planificación sectorial", según el Dr. Monges Ocampos.

"Nuestra acción inmediata será en este sentido —agregó Monges Ocampos— la formulación de políticas y de proyecciones alternativas de desarrollo sectorial a largo plazo, sobre la cual, evidentemente, habrá de sustentarse el desarrollo económico y social del futuro, de acuerdo con las precisas orientaciones del constructivo gobierno del presidente Stroessner".

A continuación, el Dr. Jerry Chang formuló igualmente oportunas consideraciones sobre el contenido del Proyecto PAR85/85/005, y finalmente el técnico del BM, Ing. Isaac Castillo. Este dijo que "más que una mera presentación de cifras, los balances energéticos son una presentación de datos coherentes orientada hacia la planificación, requisito indispensable para iniciar el proceso de planificación energética, que deberá concluir necesariamente con la elaboración de un Plan Nacional de Desarrollo Energético".



El estudio realizado por la Secretaría Técnica de Planificación revela la alta ponderación de la energía proveniente de recursos primarios del país. Explica que no debería sorprender este hecho, porque aún predominan las pequeñas industrias y las actividades de tipo artesanal. El gráfico ilustra este fenómeno.

Debernardi: "Damos poca importancia"

El presidente de la Administración Nacional de Electricidad, ingeniero Enzo Debernardi, refiriéndose al alcance y proyección del "Balance Energético Nacional - Años 1970 - 1984", presentado ayer por la Secretaría Técnica de Planificación de la Presidencia de la República," dijo que "en nuestro país, en general, solemos dar poca importancia a algo que no se traduzca inmediatamente en efectos materiales".

Luego agregó: "Sin embargo, tenemos que acostumbrarnos al pensamiento de que hay pasos previos que hay que dar. Pasos previos de estudios y de planificación. Este es uno de esos pasos previos; es decir, para reorganizar ese sector energético amplio.

"No de la energía eléctrica —continuó señalando— sino toda la forma de energía. Primero hay que tener un conocimiento acabado del mismo. Este documento está revelando que en el campo de la leña y el carbón, nuestro país es un gran consumidor a nivel popular. Por consiguiente, depende mucho de ese sector. Igualmente, quiere decir que hay que tomarlo en serio y alguien deberá pensar a este respecto".

Ing. E. Debernardi

Finalmente, el ingeniero Debernardi sostuvo: "Así como en el presente trabajo hay muchos otros indicadores que los sectores especializados pueden utilizar para mejorar su actuación, el Gobierno también puede usarlos para coordinar mejor todo ese conjunto de datos.

"Es una herramienta de trabajo. En ese sentido, no obedece a una finalidad por sí mismo, sino es un medio para que a través de él y del conocimiento que él nos dé, la situación energética de nuestro país se pueda planificar y, por consiguiente, así obtener resultados concretos", concluyó.

Monges: "En pos del programa energético"

La STP se impuso nuevas metas

El secretario ejecutivo de la STP, Dr. Fulvio José Monges Ocampos, dijo que "en el Paraguay existen algunos antecedentes de elaboración de los balances energéticos, de los cuales el más importante es sin lugar a dudas la experiencia realizada por el Comité Paraguayo de la Confederación Mundial de Energía desde 1974".

Fue al presentar oficialmente el "Balance energético nacional - Años 1970/1984", agregando que "en octubre de 1983, con la colaboración del PNUD y el BM se hizo posible que se reanudaran estos esfuerzos sobre bases más concretas. En esa ocasión se realizaron los balances energéticos que cubren el período 1976 a 1982, utilizando la metodología sugerida por la OLADE, esfuerzo donde también participó personal de la STP".

NUEVAS METAS

En otro momento, el Dr. Monges Ocampos señaló: "En este espíritu y en base a las recomendaciones de ese informe es que nace el proyecto conjunto PNUD-BM PAR/ 85/003 cuyo objetivo central es el de dotar al Gobierno del Paraguay de las herramientas básicas para la planificación energética, pero cuyo objetivo inmediato es el ordenamiento de toda la información sectorial y su sucesiva publicación".

Para concluir señalando: "Al terminar esta fase del proceso de la planificación energética, la STP se ha impuesto nuevas metas, a fin de capitalizar estas experiencias y ofrecer al país un plan global de desarrollo energético".

Dr. F.J. Monges O.

Castillo: "Coordinar mejor las políticas energéticas"

Consumo es uno de los más bajos

Ing. I. Castillo.

El ingeniero Isaac Castillo, experto del Banco Mundial, comenzó señalando que "a pesar de la reciente reducción de los precios del petróleo, los problemas del sector energía continúan siendo serios para la mayoría de los países en vías de desarrollo."

CONSUMO BAJO

Agregó que "el Paraguay posee ingentes recursos hidroeléctricos y de biomasa, que le garantizan una oferta abundante de energía para las próximas dos o tres decadas, sin embargo pese a la existencia de éstos, el consumo de energía per cápita es uno de los más bajos de América Latina".

Señaló luego: "Los principales aspectos que caracterizan la problemática energética paraguaya, se refieren básicamente a la formulación de una estrategia a largo plazo para el aumento del consumo de energía eléctrica; a la solución de los problemas relativos al creciente desequilibrio entre la oferta y la demanda de leña; al alto costo del petróleo, y a la necesidad de coordinar mejor las políticas energéticas globales".

Más adelante y refiriéndose al Balance Energético Nacional-años 1970 - 1984, el Ing. Castillo dijo: "El documento que se presenta es el primer resultado de las actividades de este Proyecto y es el fruto de más de seis meses de trabajo paciente de investigación, colección y sistematización de toda la información sobre la producción, importación, transformación y consumo de energía de los últimos 15 años".

Otra localidad de Itapúa tendrá luz eléctrica

[illegible] (ANDE) [illegible] inauguración de las [illegible] de energía y [illegible] de San Cosme y Damián así como [illegible] eléctrico nacional alimentado por las [illegible] de Acaray y de Itaipú.

Se constituirá de esa manera en la localidad N° 229, que será beneficiada con los adelantos y posibilidades del fluido energético. Con ese motivo la ANDE está ultimando detalles de la realización del ya tradicional acto en cuyo transcurso se brindarán detalles de las obras realizadas y financiadas con recursos propios. Como análogas ceremonias que se vienen sucediendo periódica y regularmente, el presidente de la ANDE, Ing. Enzo Debernardi, al frente de los directores y funcionarios superiores, acompañarán en el acto de referencia a las autoridades itapuenses y de San Cosme y Damián.

LISTA DE PERSONAS INVITADAS PARA LA PRESENTACION

INSTITUCION	NOMBRE
Ministerio de Relaciones Exteriores	1.- Efrain Dario Centurion
	2.- Dr. Oscar Cabello, Director de D.O.T.A.L.
Ministerio de Agricultura y Ganaderia	3.- Ing. Luis Pampliega, Director General
	4.- Ing. Pedro Calabrese, Director S.F.N.
Ministerio de Industria y Comercio	5.- Dr. Emilio Ramirez Russo Dir. Gabinete Tecnico MIC
	6.- Ing. Igor Fleischer, Sub Secretario de Industria
Ministerio de Obras Publicas	7.- Gral.de Div. Juan A. Caceres Ministro
	8.- Ing. Andres Gomez, Sub Secretario
Ministerio de Hacienda	9.- Gral. Cesar Barrientos, Ministro
	10.- Dr. Oscar Jacinto Ovelar, Sub secretario
PETROPAR	11 - Dr. Julio C. Gutierrez, Presidente
	12.- Dr. Desiderio Enciso, Director
	13.- Dr. Julio C. Schupp, Director
APAL	14.- Hans Werner Thielman, Presidente
ACEPAR	15.- Gral. Roberto Knopfelmacher, Presidente

	16.- Dr.Abelardo Brugada Saldivar Gerente General
Banco Central del Paraguay	17.- Dr. Jose Enrique Paez. Director
	18.- Dr. Carlos Knapps, Director
C.N.E.A.	19.- Dr. Jose D. Pecci, Presidente
Banco Nacional de Fomento	20.- Dr. Julio Regis Sanguina Presidente
Ferrocarril Carlos Antonio Lopez	21.- Ing. Miguel Angel Barrios, Presidente
U.I.P.	22.- Dr. Ubaldo Scavone Presidente
Gas Corona	23.- Sr. D. Jesus M. Pallares Presidente
ANDE	24.- Ing. Enzo Debernardi Presidente
	25.- Ing. Alcides Gimenez Jefe del Dto. Est.y Planes
ITAIPU	26.- Ing. Carlos Facetti Director
YACYRETA	27.- ING. Jorge Krisch Director
BID	28.- Sr. Don Ricardo Espinoza, Representante
	29.- Ing. Bernardo Abela, Especialista Sectorial
PNUD	30.- Dr. Jerry C. L. Chang, Representante Residente

	31.- Dr. Niels Brands, Representante Adjunto
BIRF	32.- Sr. Gabriel Sanchez
	33.- Sr. Ignacio Rodriguez
	34.- Ing. Isaac Castillo, Experto Residente
ANDE, ITAIPU, YACYRETA Y Comite Paraguayo de la W.E.C.	20 (veinte) tarjetas de inv.
STP	Dr. Fulvio Monges Secretario Ejecutivo y Funcionarios Superiores

P.N.U.D. S.T.P. W.B.

P R O Y E C T O P A R / 8 5 / 0 0 3

" PROGRAMA NACIONAL DE DESARROLLO ENERGETICO "

2ª FASE

Setiembre, 1986

Asunciòn, Paraguay

I N D I C E

PARTE I

JUSTIFICACION

Las actividades realizadas en el marco del proyecto PAR/85/003 "PLAN NACIONAL DE DESARROLLO ENERGETICO", actualmente en ejecuciòn, han logrado fortalecer tècnica e institucionalmente la recien creada Divisiòn de Energìa de la Secreataria Tècnica de Planificaciòn, (STP).

El personal de la Divisiòn de Energìa de la STP ha mejorado su capacidad tècnica y de ejecuciòn de proyectos ganando, ademàs, una gran experiencia y conocimiento del Sector Energètico del pais, mediante la realizaciòn de trabajo diario ha elevado su nivel acadèmico mediante curso de capacitaciòn dictados localmente o en el exterior.

La culminaciòn de la serie històrica de los Balances Energèticos han permitido un conocimiento profundo de realidad energètica del pais y de la elaboraciòn de una base automatizada de datos consistente y completa, elemento, este, indispensable sobre el cual descansa todo el proceso de planificaciòn sectorial.

Como actividad secundaria, dentro de la realizaciòn de los Balances Energèticos, se realizò una encuesta para determinar el consumo de las fuentes no comerciales de energìa, especialmente de leña, que revelò aspectos importantes de una dimensiòn del problema, hasta ahora poco estudiado. Esta actividad permitiò, ademàs, entrar en contacto directo con la realidad y la problemàtica energètica del poblador rural y poner a su justo nivel un problema que afecte a màs del 50% de la poblaciòn paraguaya: el consumo de leña.

A pesar de que el grupo nacional a crecido tècnica y administrativamente, todavìa no està en grado de asumir por sì solo las responsabilidades inherentes a la planificaciòn energètica sobre todo con miras a constituir en el nùcleo institucional del sector.

La planificaciòn es un proceso que requiere del conocimiento profundo de las inter-relaciones entre el sector energìa con los otros sectores econòmicos, los aspectos sociales y ambientales relacionados con las decisiones en materia de poli'tica energètica En el conocimiento sistemàtico y analìtico de la situaciòn energètica nacional se inició con la elaboraciòn de los Balances Energèticos y deberà continuar con la elaboraciòn de un Diagnòstico Sectorial para luego entrar en fase de previsiòn a largo plazo y concluir con unos lineamientos preliminares de politica energètica.

Con miras a la creaciòn de una Comisiòn Nacional de Energìa, se hace necesario que el grupo nacional de trabajo realice, completo, el ejercicio de planificaciòn.

Por esta razòn, la Secretarìa Tècnica de Planificación, ve necesario seguir fortaleciendo su unidad de energia estableciendo una segunda fase por el tèrmino de doce (12) meses, con miras a consolidad sus experiencias y proyectos, sus conocimientos en materia de planificación energètica.

ANTECEDENTES

La ejecución del Proyecto PAR/85/003, que concluirà a mediados de setiembre/86 ha permitido concluir las siguientes actividades:

a) La realización de la serie històrica de Balances Energèticos 1970-1984

b) La realizaciòn de una encuesta para determinar el consumo de leña y carbòn vegetal en los hogares y la industria

c) La instrumentación de una base de datos en computadora con toda la información de los Balances Energèticos

d) El adiestramiento del personal nacional, tanto local como en el exterior

Estas tareas han constituido la base y el inicio de todo el proceso de planificación que pretende concluir en su segunda fase con una versiòn preliminar de un Primer Plan Nacional de Desarrollo Energètico y con la institucionalización del Sector Energìa.

Al inicio del PAR/85/003, se era consciente, ya sea por parte del Gobierno del Paraguay que por parte de las agencias auspciantes de la necesidad de prolongar el proyecto al menos un año màs, a fin de que el grupo puediere consolidar sus experiencias y conocimientos sobre el tema.

La agencia ejecutora, el Banco Mundial, manifestò por escrito en su visita de supervisiòn de medio año (Office Memo, Abril 22/86. Ignacio Rodriguez), la necesidad de prolongar por un año màs las actividades del proyecto, con miras a consolidar la experiencia de la Divisiòn de Energìa de la STP. El PNUD por su parte, ha manifestado tambièn la necesidad de seguir apoyando a la STP en el àrea de la Planificaciòn Energètica y su disposiciòn en participar por el financiamiento de la segunda fase.

Esta necesidad se materializò a travès de un pedido formal por parte de la STP, a la Cancilleria de la Repùblica - CONCATE (nota No. 308/86. A, 21 mayo 1986) donde sustenta brevemente la necesidad de prolongar por doce (12) meses màs el proyecto PAR/85/003.

PARTE II

ELEMENTOS PRINCIPALES DEL PROYECTO

Objetivos Inmediatos

El objetivo general del Proyecto es seguir apoyando a la Secretaria Tècnica de Planificaciòn en materia de energìa en base a la experiencia y conocimientos adquiridos en el primer año de ejecuciòn; realizar las actividades necesarias para elaborar unos lineamientos preliminares de politica energètica. Esto permitirà a la STP, realizar el ejercicio completo de planificación energètica y mejorar sus conocimientos sobre las herramientas modernas de èsta àrea de la planificaciòn econòmica.

Esta tarea se realizarà mediante la elaboraciòn de un estudio analitico del sector energìa, que permitirà realizar un diagnòstico sectorial y un ejercicio de previsiòn a largo plazo de la demanda y oferta de energìa. Los conocimientos y experiencias adquiridos mediante el trabajo practico, seràn completados con cursos y seminarios que eleven el nivel academico del grupo nacional, que seràn dictados, tanto localmente como en el exterior.

Resultados

Los resultados que esperan alcanzar son:

a) Realizarà un diagnòstico del sector energìa que permita conocer las interrelaciones entre la energìa y el resto de la economìa.

b) Se realizarà un anàlisis de los precios y sus efectos en la sus tituciòn y el ahorro de energìa.

c) Se elaborarà de unos lineamientos preliminares de politica energètica en base a los resultados del punto b.

d) Diseño y ejecuciòn de un sistema bàsico de informaciòn energètica.

e) Se estableceràn los mecanismos necesarios para mejorar la coordinaciòn de las entidades estatales y privadas en la instrumentaciòn de la polìtica energètica.

f) Mejorar la capacidad tècnico-administrativo del personal nacional contraparte en evaluaciòn de polìticas energèticas.

Plan de Trabajo

El plan de trabajo se resume en las siguientes actividades:

a) Realizaciòn de un estudio sobre los precios de la energìa. Se determinarà el efecto de la variables precios en la formaciòn de la demanda y oferta energètica.

b) Realizar un estudio sectorial por fuente de energìa (petròleo, electricidad, biomasa) sobre las opciones de abastecimiento de

menor costo econòmico para el pais. Incluye dos encuestas a nivel industrial y residencial.

c) Se instrumentarà un modelo en computadora en base a la simplificaciòn o modificaciòn de modelos ya existentes buscando adecuarlos a las posibilidades de informaciòn del pais.

d) Establecimiento de un sistema bàsico de informaciòn energètica.

e) Se continuarà con el programa de pasantias y cursos en el exterior y con los cursos locales en tècnica de computaciòn.

f) Se analizaràn los problemas regionales de oferta y demanda de energia, el comericio internacional de energia y los problemas financieros sectoriales.

g) Se elaboraràn unos lineamientos preliminares en materia de politica energètica.

h) Se realizarà un Seminario de Evaluaciòn Econòmico y Financiera de Proyectos de Energia.

Insumos

Las contribuciones del PNUD:

a) El PNUD financiarà el puesto de un experto por doce meses por un valor de 0 dòlares, incluyendo honorarios, gastos de viajes y viaticos correspondientes.

b) Se ha asignado dòlares cinco mil (U$S 5.000) para la realizaciòn de encuestas sobre consumo energèticos por sectores.

c) Se adquiraran programas de computaciòn (software), sobre aspectos estadìsticos y econòmetricos ademàs de accesorios varios (disckette, cintas, etc.) por un total de dòlares dos mil (U$S 2.000).

d) Se ha asignado una partida de dòlares diez mil (U$S 10.000) para capacitaciòn tanto para pasantias en el exterior como para cursos o seminarios cortos.

e) Se sufragaran gastos varios durante la ejecuciòn del proyecto por la suma de dòlares 7.000 (U$S 7.000), que incluirà la impresiòn de documentos.

f) Se han asignado dòlares dos mil (U$S 2.000) para financiar gastos de viajes y viàticos del experto residente.

PRESUPUESTO DE LA ASISTENCIA PREPARATORIA: CONTRIBUCION DEL PNUD

(En Dòlares de los EE.UU.)

Pais: PARAGUAY
Titulo del Proyecto: Programa Nacional de Desarrollo Energètico
Nùmero del Proyecto: PAR/85/003/B/01/42

		TOTAL	
		m/h	US$
10.	PERSONAL DEL PROYECTO		
11.	Experto	12	63.000.-
17.	Apoyo Administrativo		4.000.-
19.	Total del Componente		67.000.-
32.	CAPACITACION		
39.	Total del Componente		17.000.-
42.	EQUIPO		
49.	No fungible		5.000.-
53.	IMPREVISTOS		8.000.-
99.	TOTAL GENERAL		97.000.-

1/ No incluye ningùn medio de transporte, sin embargo la Misiòn de Supervisiòn (Setiembre 86, -Ing. Ignacio Rodrìguez, Ing. Gabriel Sanchez Sierra) considera que para llevar a cabo la realización de las encuestas de los sectores residenciales (2000) e industrial (2000) seria conveniente asignar un vehìculo (doble tracciòn, 8 pasajeros) al proyecto. Costo estimado adicional US$ 12.000.-

PROGRAMA DE LAS NACIONES UNIDAS PARA EL DESARROLLO

COOPERACION CON REPUBLICA DE BOLVIA

Título : Planificación Nacional de Energía de Bolivia

Número : BOL/86/025

Duración: 6 Meses

Función Principal: Apoyo Directo

Función secundaria : Apoyo Institucional

Sector: 03. Recursos Naturales

Subsector: 0350 Energía

Organismo de Ejecución: Ministerio de Energía e Hidrocarburos

Organismo Int. de Ejecución: Banco Mundial

Fecha Estimada del Inicio: Septiembre de 1986

Aporte del Gobierno: En especie

Insumos del PNUD: $US160,000

El presente documento de proyecto y sus anexos constituyen el acuerdo entre los signatarios:

Firmado por:

En nombre del Gobierno de Bolivia	Fecha
En nombre de la Agencia Ejecutora	Fecha
En nombre del Programa de las Naciones Unidas para el Desarrollo	Fecha

PARTE I CONTEXTO LEGAL

Este documento es el instrumento al que se hace referencia en el Artículo I del Párrafo 1 del Acuerdo de Asistencia entre el gobierno de Bolivia y el Programa de las Naciones Unidas para el Desarrollo, firmado por las partes el 31 de octubre de 1974. El Organismo Gubernamental de Ejecución, Ministerio de Energía e Hidrocarburos debe, para los propósitos básicos del Acuerdo de Asistencia, entenderse como el Organismo Gubernamental de Cooperación descrita en tal Acuerdo.

PARTE II OBJETIVO DE DESARROLLO, ANTECEDENTES Y JUSTIFICACION

A. Objetivo de Desarrollo

Promover la planificación energética integrada para asegurar la utilización eficiente de los recursos energéticos del país y en manera consistentes con los objetivos y estrategias de desarrollo nacional.

El presente proyecto contribuirá al logro de este objetivo mediante la elaboración del Plan Nacional de Energía 1987-1992. El proyecto también aportará mediante la consolidación del proceso de planificación energética en el país.

B. El problema y sus antecedentes

RECURSOS

Bolivia es un exportador neto de energía y con relación a sus requerimientos tiene una gran base de recursos energéticos. Las reservas probadas de gas natural son de más de 5 billones de pies cúbicos, equivalentes a más de 45 años de producción al nivel actual, las reservas probadas de hidrocarburos líquidos (crudo y condensado) son limitadas en comparación y alcanzan aproximadamente 154 millones de barriles, equivalentes a aproximadamente 17 años de la actual producción. Las reservas en último término probablemente serán significativamente mayores, principalmente en cuanto al gas natural, ya que casi la mitad del territorio nacional tiene potencial hidrocarburífero, pero solo el 25% de este potencial ha sido explotado. Bolivia tiene en abundante potencial hidroeléctrico, calculado en aproximadamente 18.000 MW., del cual se han desarrollado 287 MW. Las reservas de carbón y turba son pequeñas y su uso está limitado al consumo residencial localizado. Los recursos de leña son considerables: los bosques cubren alrededor de la mitad del país, pero principalmente en las lanuras tropicales escasamente pobladas. Sin embargo existen zonas con problemas de deforestación localizada, hay indicios de recursos geotérmicos en las cordilleras oriental y central (aunque bastante alejados de los centros de consumo)

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y los primeros tres pozos exploratorios están siendo perforados con ayuda de Italia y el PNUD. Hay un potencial limitado de energía solar en el Altiplano y energía eólica en el Chaco, virtualmente sin utilización actualmente.

PRODUCCION Y CONSUMO

En 1984 la producción primaria neta de energía alcanzó 4.4 millones de toneladas equivalentes de petróleo (TEP) de las cuales el gas natural corresponde al 48.2%, el crudo y condensado al 24.7%, la leña al 20.7%, energía hidráulica en 4.1% y desperdicios agrícolas (bagazo) el 2.3%. La generación bruta de energía alcanzó a 1.646 GWh. 72.3% hidráulica y 27.7% térmica. 82% de la producción neta de gas natural se exportó a la República Argentina. El consumo de energía es bajo, a 0.4 TEP per capita anual (Argentina 1.8, Brasil 0.95, Perú 0.6); la composición por uso terminal es la siguiente: residencial, comercial y gubernamental 54.9% transporte 26.5%, minería e industria 19.6%.

INSTITUCIONES DEL GOBIERNO

El Ministerio de Energía e Hidrocarburos (MEH) es la institución del Gobierno responsable del sector energético. El MEH cuenta con tres Direcciones: La Dirección General de Hidrocarburos (DGH), La Dirección Nacional de Electricidad (DINE) y la Dirección de Planificación Energética (DPE). También supervisa a la empresa estatal de los hidrocarburos Yacimientos Petrolíferos Fiscales Bolivianos (YPFB) y a las compañias contratistas de operación (Tesoro y Occidental), así como las empresas generadoras de energía eléctrica, por ejemplo; la Empresa Nacional de Electricidad S.A. (ENDE), estatal y la empresa privada Compañia Boliviana de Energía Eléctrica (COBEE). El MEH es tambien responsable de la energía renovable (con excepción de la madera y el carbón, que están bajo la responsabilidad del Ministerio de Asuntos Campesinos y Agropecuarios) de la planificación energética. Las tarifas de energía eléctrica y los precios de los hidrocarburos y sus derivados son fijados por el Ministerio de Energía e Hidrocarburos.

PRINCIPALES PROBLEMAS QUE ENFRENTA EL SECTOR

En forma meramente enunciativa, y sin ningún grado de relación, se señalarán a continuación los aspectos que requieren la prioritaria atención en la formulación de la estrategia energética nacional:

SUBSECTOR HIDROCARBUROS

1. Esfuerzos para identificar nuevos mercados para el gas natural boliviano.

2. Medidas para alejar la amenaza de un déficit de petróleo, incluyendo proyectos para incrementar el abastecimiento a través de campos de condensado ya descubiertos y recuperación secundaria de petróleo por gas natural;

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3. Medidas para la administración de la demanda energética, incluyendo una política clara de precios absolutos y relativos de los derivados del petroleo.

4. Revisión de la política petrolera del sector, incluyendo la ley General de Hidrocarburos, a fin de atraer una mayor participación del sector privado:

5. YPFB requiere disponer de un mecanismo financiero apropiado que le permita realizar las inversiones prioritarias en el sub-sector de común acuerdo con la situación económica del país.

6. Contrarestar la pérdida del personal profesional de YPFB a través de una revisión de las políticas y de administración de personal, incluyendo una reforma de la estructura salarial:

SUBSECTOR ELECTRICO

- Completar la interconexión Cochabamba-Santa Cruz.
- Reelaborar el Plan Nacional de Expansión eléctrica en vista de la contracción de la demanda en los últimos años, usando criterios de mínimo costo es que evaluen en igualdad de condiciones, proyectos hidroeléctricos y termoeléctricos.
- Ajustar las tarifas elécticas a fin de permitir que las empresas perciban la tasa de retorno de 9% como se requiere por el Código de Electricidad.
- Dotar a ENDE de una estructura financiera adecuada.
- Incrementar la capacidad de generación, especialmente en Santa Cruz, Tarija y Trinidad.
- Solucionar la organización de la generación y distribución de energía eléctrica en La Paz.
- Desarrollar e implementar una estrategia clara con respecto a la electrificación rural.

SUBSECTOR NO TRADICIONAL Y OTROS

1. Necesidad de encarar la escasez de leña en el Altiplano.
2. Reforzar la capacidad del Ministerio de Energía e Hidrocarburos para la formulación de políticas energéticas y coordinar las actividades del sector.

A pesar de los graves problemas económicos, sociales y políticos que han afectado negativamente a la administración gubernamental durante los pasados años, las autoridades de Bolivia han adoptado medidas para hacer frente a los temas arriba detallados. La identificación de nuevos mercados para el gas natural, el desarrollo de campos de condesados recientemente descubiertos y la recuperación secundaria de petróleo han sido

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las prioridades máximas de YPFB y el Gobierno. No se han indicado nuevos proyectos hidroeléctricos y el Gobierno ha empezado a considerar medidas para atender la demanda de la leña. La nueva administración adoptó medidas en 1985 a fin de llevar los precios de la energía a niveles que fomentan al mismo tiempo su producción y conservación, y más recientemente solicitó asistencia a organismos internacionales a fin de revisar el marco legal y contractual de las actividades del sector privado.

El Banco Mundial está cooperando al Gobierno a través de financiamiento del PNUD en la reorganización y reorientación de YPFB y en revisión de la legislación petrolera. YPFB también ejecutará un estudio para revisar las políticas de personal y su estructura salarial como una base para cortar la pérdida de personal especializado. Finalmente, el MEH ha establecido una Dirección de Planificación Energética con el propósito de presentar un Plan Nacional de Energía para los próximos cinco años.

PARTE III ELEMENTOS PRINCIPALES DEL PROYECTO

A. Principales objetivos del Proyecto.

Los principales objetivos del programa Plan Nacional de Energía para Bolivia son:

1. Teniendo en cuenta las restricciones macroeconómicas y ambientales existentes, desarrollar de un marco conceptual integrado para la identificación evaluación y prioritización de las opciones de Bolivia en el empleo de sus recursos energéticos, incluye la consideración de:

   - Recursos de las diferentes fuentes energéticas
   - Infraestructura energética actual prevista en el país
   - La evolución de la demanda y requerimiento de mercado.

     Consumo

     Efectos multiplicadores en la economía

     etc.
   - Los aspectos regionales y sociales
   - Los aspectos financieros

2. Establecimiento de prioridades entre programas energéticos nuevos y actuales en base a consideraciones como :

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- Retornos financieros, económicos y sociales
- Contribución a la Balanza de Pagos
- Requerimiento de infraestructura
- Generación de empleos dentro y fuera de sector
- Competividad de industrias ascendentes y descendentes
- Costo de inversión vs. costo de operación
- Distribución regional
- Programa de implementación, etc.

3. Preparación de un Plan de implementación específico para la estrategía elegida.
   - Organización
   - Papel del Supremo Gobierno
   - Papel de las Regiones
   - Papel de las Empresas
4. Desarrollo de una Política crediticia y financiera de precios
5. Identificación de fuentes potenciales de financiamiento para el sector y sus diferentes proyectos y formulación de mecanismos de captación de recursos financieros y de empleo óptimo y coordinación de los mismos.
6. Diseño e implementación de sistemas de coordinación y control.
   - Del Plan Nacional de Energía
   - De su implementación
   - Del funcionamiento

./.

B. Resultados especiales del proyecto

- Realización de reuniones cada tres semanas entre el equipo técnico del proyecto y el Comité Supervisor, para informar sobre progreso en el desarrollo del marco conceptual integrado para definir y evaluar las opciones estratégicas del país.
- Resolución de "Trade-offs" económico, político y social que debería surgir.
- Definición de prioridades entre proyectos energéticos específicos, incluyendo exploración generación/producción, industrialización, distribución al por mayor y menor.
- Evaluación de los proyectos específicos en base a los criterios de evaluación arriba mencionados.
- Identificación de los pasos necesarios dentro de la implementación del plan de energía.
- Presentación de una evaluación crediticia y financiera y de precios.
- Definición de fuentes, opciones y montos de los requerimientos financieros ejecutar el Plan Nacional de Energía.
- Presentación de sistemas de coordinación y control.

C. Organización, Duración y Costos estimados del programa

1. Organización y Duración

Este proyecto requiere una coordinación muy estricta entre un equipo técnico, la Dirección de Planificación Energética y de los responsables del Ministerio de Energía e Hidrocarburos y Ministerio de Planeamiento y Coordinación.

La importancia y magnitud del proyecto establece que los responsables deben participar activamente del proyecto y ser del más alto nivel.

Se propone la siguiente estructura organizativa del proyecto.

./.

Se estima que la duración del proyecto será de 6 meses

2. INSUMOS DEL PNUD

a) Personal	Duración/Fecha
1. Un profesional internacional o nacional para dirigir el programa y proyecto.	Seis meses a partir de septiembre 1986.
2. Tres consultores internacionales en analisis de gas, Energías Rurales y análisis de costos marginales.	Diez meses/hombre a partir de septiembre 1986.
3. Consultores Nacionales serán designados dos a tres consultores para participar en el proyecto.	24 meses/hombre a partir de septiembre 1986.

Los consultores serán designados de acuerdo a los procedimientos de la agencia ejecutora.

b) Equipos

Se adquirirán dos micro-computadoras y su sofware y equipo asociado.

c) Varios

Comunicación, gastos de informes, realización de reuniones, etc.

INSUMOS DEL BANCO MUNDIAL

a) Personal

Una misión en agosto de la División Proyectos Petroleros.	1 mes/hombre
Personal de la División de Energy Assesment.	2 mes/hombre

INSUMOS NACIONALES

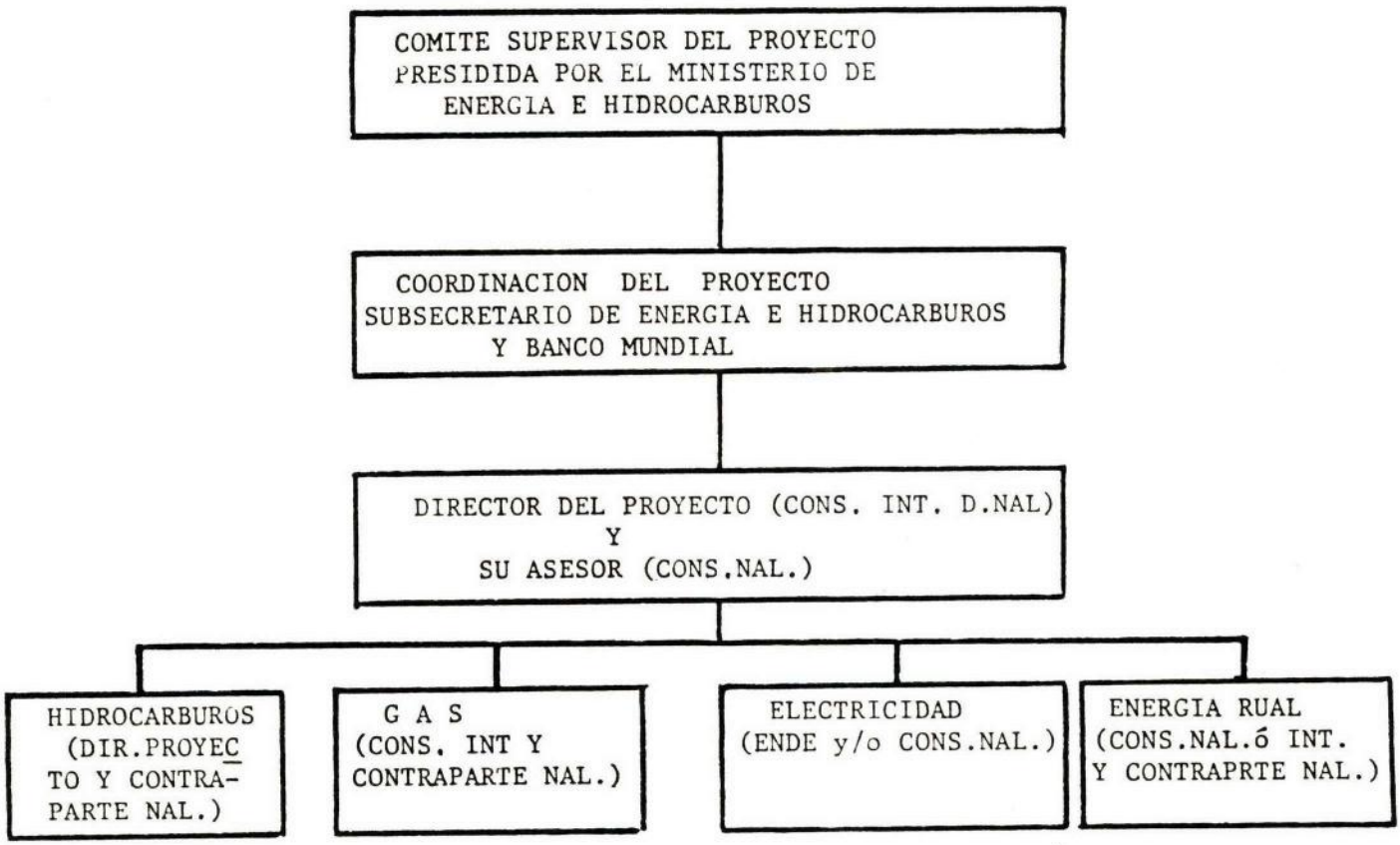
a) Personal

1. Equipo de contraparte destinado enteramente al proyecto.	18 meses/hombre
2. Apoyo secretarial	6 meses/hombre
3. Otro apoyo administrativo.	

PROYECTO: BOLIVIA

PLAN NACIONAL DE ENERGIA

ORGANIGRAMA



PROGRAMA DE LAS NACIONES UNIDAS PARA EL DESARROLLO PLAN DE TRABAJO DEL PROYECTO

Título del Proyecto : Plan Nacional de Energía

Número del Proyecto : BOL/86/025

Plan de Trabajo/Número de Revisión: "A" Fecha de preparación 23-VIII-86

Para el Periódo: de Septiembre de 1986 a Febrero de 1987.

Descripción	1986				1987	
	Sept.	Oct.	Nov.	Dic.	Ene.	Feb.
Elaboración Plan de trabajo final	X					
Objetivo N° 1	X	X	X			
Objetivo N° 2			X	X		
Objetivo N° 3		X	X	X	X	
Objetivo N° 4			X	X	X	X

PRESUPUESTO CORRESPONDIENTE AL APORTE

DEL PNUD (En dolares de EE.UU)

Título Plan Nacional de Energía

		TOTAL		1986		1987	
		m/h	$us.	m/h	$us	m/h	$us.
10.	Personal del Proyecto						
11.01	Director Programas	6	55.000*	3	28.000	3	27.000
11.02	Especialista de Gas	3	25.000*	3	25.000		
11.03	Experto costos Marginales	2	12.000*	2	12.000		
11.04	Experto Energia Rural	5	20.000*	3	12.000	2	8.000
17.	Consultores Nacionales	24	24.000	12	12.000	12	12.000
19.	Total del Componente	45	136.000	25	89.000	20	47.000
40.	Equipo						
42.	Equipo fungible		12.000**		10.000		2.000
49.	Total del Componente		12.000		10.000		2.000
53.	Varios y Contingencia		12.000		6.000		6.000
99.	Total General		160.000		105.000		55.000

* Incluye viáticos y pasajes

** 2 Pcs y Software

MARCO LOGICO

PLANIFICACION NACIONAL DE ENERGIA

OBJETIVO DE DESARROLLO	CRITERIOS DE EXITO	VERIFICACIONES
Promover la planificación integrada de la energía, incluyendo el uso eficiente de las diferentes fuentes energéticas en forma consistente con los objétivos y las estrategias y políticas de desarrollo del país.	Presentación del Plan Nacional de Energía 1987-1992 y adopción de las recomendaciones que resultan del Plan Nacional de Energía.	Implantación del Plan Nacional de Energía, mediante seguimiento sistemático.

OBJETIVO 1	CRITERIO DE EXITO	VERFICACIONES	FACTORES
Desarrollo de un marco concep - tual integrado para la identificación y evaluación de las opciones de Bolivia en el empleo de sus recursos energéticos, incluye la consideración de: - Recursos de las diferentes fuentes energéticas. - Infraestructura energética actual prevista en el país. - La evolución de la demanda y requerimiento de mercado. Consumo Efectos multiplicadores en la economía. Etc. - Los aspectos regionales y sociales. - Los aspectos financieros.	Intercambio exitoso de puntos vista entre los consultores, equipo nacional y autoridades del Ministerio de Energía e Hidrocarburos y presentaciones e informes.	Presentaciones e informes de avance de las acciones Elaboración y circulación de documentos de trabajo.	Demoras en la firma de contratos y gestiones administrativas.
RESULTADOS DEL OBJETIVO 1			
1.1. Realización de reuniones cada tres semanas para informar sobre progreso en el desarrollo del marco conceptual integrado para definir y evaluar las opciones estratégicas del país.	Aprobación de los informes y presentaciones de planes de trabajo	Documentos de trabajo y actas de las reuniones.	Disponibilidad de los participantes y consultores.

OBETIVO 1	CRITERIO DE EXITO	VERIFICACIONES	FACTORES
1.2 Resolución de "Trade-Offs" económico, político y sociales que deberán surgir.	Resolución de problemas presentados al Comité Coordinador.	Participación en las reuniones. Aprobación de los informes y/o conclusiones de las reuniones.	

OBJETIVO 2	RITERIO DE EXITO	VERIFICACIONES	FACTORES
Programas en base al trabajo dentro del objetivo 1, establecer prioridades entre inversiones energéticas nuevas y existentes en base a consideraciones como: . Retomos financieros, económicos y sociales. . Contribución a balanza de pagos . Requerimiento de infraestructura . Generación de empleo dentro y fuera del sector. . Generación de empleo dentro y fuera del sector . . Competividad de industrias ascendentes y descendentes. . Costo de emisión vs. costo de operación. . Distribución regional . Cronograma de implementación . Etc.	ración de proposiciones etas y su compatibili-n tencia interna entre iferentes proposicio	Informes y consultas con el Comité Coordinador. Presentaciones e informes de avance de las acciones.	Calidad de la información básica disponible.
REGULTADOS DEL OBJETIVO 2			
2.1 Definición de prioridades entre proyectos energéticos específicos incluyendo exploración, generación/ producción, industrialización, distribución al por mayor y al por menor.	de dichas prioridades los diferentes proenérgeticos.	Evaluaciones, comentarios y sugerencias de orden práctico y su transmisión a los consultores y al equipo de trabajo.	Disponibilidad del Comité Coordinador Deficiencias en el mecanismo de toma de decisiones.

OBJETIVO 2	CRITERIO DE EXITO	VERIFICACIONES	FACTORES
2,2 Evaluación de los proyectos específicos, en base a los criterios de evaluación arriba mencionados.			

OBJETIVO 3	CRITERIO DE EXITO	VERIFICACIONES	FACTORES EXT.
Preparación de un Plan de implementación específico para la estrategia elegida en particular: - Organización - Papel del Supremo Gobierno - Papel de las Regiones - Papel de las Empresas	Implementación del Plan a nivel del: - Supremo Gobierno - las Regiones - las Empresas - organizativo.	Documentos de trabajo y actas de reuniones. Decretos Supremos; otras políticas al nivel de regiones y empresas, y su implementación.	Voluntad política calidad del Plan de Implementación; Cambio de condiciones políticas imprevistas.
RESULTADOS DEL OBJETIVO 3			
Identificación de los pasos necesarios para la implementación del plan en forma de un documento para los niveles diferentes mencionados en el objetivo. (Cronograma del proceso de implementación)	Aceptación del Documento por parte del: - Gobierno - Regiones - Empresas al nivel organizativo.	Documento del Plan de Implementación.	Calidad de informaciones en el Plan.

OBJETIVO 4	CRITERIO DE EXITO	VERIFICACIONES	FACTORES EXT.
Desarrollo de una política crediticia y financiera y de precios.	Elaboración de criterios de una política crediticia y financiera deseada.	Informes de trabajo; consultas con consultores y grupos consultores. Informes del avance del trabajo.	Calidad de informaciones desarrolladas.
RESULTADOS DEL OBJETIVO 4			
Presentación de una política crediticia y financiera, y de precios.	Grado de aprobación de una política por grupos de decisiones relevantes.	Decretos Supremos; medidas dirigidas a la implementación de esta política.	Voluntad política.

OBJETIVO 5	CRITERIO DE EXITO	VERIFICACIONES	FACTORES EXT.
Identificación de fuentes potenciales de financiamiento para el sector y sus diferentes proyectos, y formulación de mecanismos de captación de recursos financieros y de empleo óptimo y coordinación de los mismos.	Elaboración de proposiciones concretas y su compatibilización.	Presentaciones e informes de avance de las acciones. Elaboración y circulación de documentos de trabajo.	Insuficiencia de datos sobre costos de inversión de los diferentes proyectos.
RESULTADOS DEL OBJETIVO 5			
Definición de fuentes, opciones y montos de los requerimientos financieros para ejecutar el Plan Nacional de Energía.	Empleo de los resultados de los objetivos 2 y 3 en la elaboración de políticas de financiamiento para la puesta en marcha del Plan Nacional de Energía.	Documentos de trabajo y actas de las reuniones del Comité Coordinador. Aprobación de las conclusiones de las reuniones.	Calidad de la información básica disponible.

OBJETIVO 6	CRITERIO DE EXITO	VERIFICACIONES	FACTORES EXT.
Diseño e implementación de sistemas de coordinación y control - del Plan Nacional de Energía - de su implementación - del funcionamiento	Implementación de sistemas de coordinación y control a los niveles mencionados.	Documentos y marco institucional relacionados al diseño y a la implementación de sistemas de coordinación y control.	Calidad de los sistemas desarrollados.
RESULTADOS DEL OBJETIVO 6			
Presentación de sistemas de coordinación y control.	Grado de coordinación y control: - del Plan Nacional de Energía - de su implementación - del financiamiento.	Desviación del plan original de implementación para el Plan Nacional de Energía.	Cambio de factores políticos.

INT/83/005

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

September 25, 1986

Mr. B. Paillat
Trans Energ
42 Rue Cambronne
75015 Paris
FRANCE

Subject: "Economie d'Energie dans l'Industrie Senegalaise
Etude de l'Environnement Institutionel"

Dear Mr. Paillat:

This letter is a follow-up to your two telexes dated September 12 and 19, to Mr. Saloum Cisse's comments on the subject referenced above, and to Mr. A. Megateli's telephone conversation with Mr. M. Malherbe on September 19. For your information, Mr. Megateli, who recently joined my division, has taken over the responsibility of ESMAP task manager on this important project. Based on the above exchanges, kindly find below our comments and suggestions on the draft report:

1. The report as structured and presented is acceptable to the World Bank. However, it does contain and in some instances duplicates information originating from previous reports written on the same subject. Nevertheless, we simply suggest that you keep it in its present form and proceed only with the changes suggested below and those requested by Mr. Cisse.

2. The report deals with the most relevant issues and addresses the subjects defined in the TOR. However, we feel that the analysis of the present institutional set up should have been a little more comprehensive. In other words, the organizational relationships and interactions between the various actors in the field of énergy utilization and energy conservation (whether at the policy formulation level or implementation level) should have been more clearly identified and analysed. For this reason, we believe the analysis you have on pages 4 to 9, 42 to 47, and the one on pages 82 to 91, including your diagram on page 91, needs to be reviewed. More specifically, we need to know the following:

    a. What are the organizational links between the various entities dealing with energy conservation and consumption?

    b. How are policies formulated and decisions made in these entities?

c. What are the characteristics of the implementation process in energy conservation and which problems, obstacles and constraints are encountered?

d. How to overcome these obstacles?

Based on this analysis, the present institutional set up should be evaluated, new options offered, and a clear-cut final recommendation made. A presentation of the arguments substantiating this recommendation would further help the reader to come up with his own conclusions.

3. Your brief analysis concerning the energy pricing policy (refer to pages 6 - 7, 28 - 33 and 62 - 64) presently pursued by the government and your assumptions and recommendations (refer to pages 33, 59 and 63) for "transparency" in fixing prices of energy in the future and in taking economic measures to promote energy savings is a key aspect and needs further elaboration. The issue is, as you know, quite complex, particularly in a climate of uncertainty, and its impact in the long and short term is very critical. However, we do feel that in the short term a more flexible and adjustable pricing structure in the light of the fluctuations of international energy prices is perhaps more advisable to promote new investments, entrepreneurship, and in general to alleviate any hindrance in the implementation of the new industrial policy. In the long run, and for the purpose of economic planning, prices of energy should perhaps be kept high to promote energy savings. For this reason, we do concur with Mr. Cisse's comments on the report (refer to page 1, paragraphs 5, 7 and 8; and to page 8, paragraph 3). We recognize, as he did, the importance and impact of energy pricing policy on the national economy of Senegal. We also agree that any future changes in the policy should be based on a careful analysis and study.

4. Based on your analysis and the present institutional arrangement, we are not convinced that a "Nouveau Bureau d'Economie d'Energies" (NBEE) is warranted at this stage. In our view, the present BEE is capable of carrying out the task at this stage, particularly if private consultants (local or foreign) are allowed to perform the audits needed. However, we feel that a more comprehensive assessment of the performance of the BEE is required. Perhaps some reorientation and a redefinition of the mission of BEE are required. More enquiries and discussions may be necessary to fully understand the decision-making process and the interrelations existing within the present institutional set up (refer to item 2 above). Your section concerning this aspect (pages 82 - 91, paragraph 2.4) should not leave any ambiguity or misconception in the mind of the reader. This is not the case as it is written now.

5. Your estimates of the potential savings in energy are reasonable and seem to concur with ours. However, they are based on the 1982 global energy balance for Senegal. Would it be possible to obtain more recent consumption data? If this is not possible, we would like you to check your figures again and update them during the survey that Mr. Grosmangin is conducting in Senegal.

6. We agree with the price you used to evaluate the potential savings in energy, i.e., 35,000 FCFA/TOE instead of 120,000 FCFA/TOE as suggested by Mr. S. Cisse. The arguments you presented in your telex dated September 12 are well taken.

7. Your remarks on page 94, last paragraph, concerning the guarantee desired by a few "interlocutors" to finance energy savings they would have identified, are appropriate. This aspect is under serious discussion by various governments and recipient countries and some progress may be expected, to eliminate or at least reduce the fears of donors, in the next few months.

8. Very often when you use energy consumption or savings figures, it is not very clear to us which year you are considering or referring to (e.g., p. 17, 19, etc.). Please make sure that this aspect is corrected. Furthermore, in a few cases you refer to tables and annexes (e.g., p. 51, p. 97) which do not exist. This information should be included in your next draft, particularly the copies of Law 83-04 and the proposed draft of "Arretes" and Decrees.

In addition to the above, we would like to make a few remarks concerning the comments made by Mr. Cisse which were forwarded to us on September 11, 1986. First, we think that all of his comments are quite acceptable and relevant, particularly those referred to on page 1, middle of page; page 3; page 6, in the comments section; page 7, middle of page. Second, his remarks (page 2, paragraph 8) concerning other potential savings outside the industry (transport and domestic), estimated at 26,000 and 2,700 TOE respectively, appear to be out of line with previous revised figures. Kindly check these estimates and give us your opinion. It appears that Mr. Cisse has taken these figures from the Energy Assessment Report on Senegal (Report 4182-SE of UNDP/World Bank). Mr. Verlet in his "Rapport mi-parcours" of August 1986 (page 30) evaluates them instead at 1,000 and 2,700 TOE for transport and habitat respectively. For the latter, Mr. Verlet includes in addition the tertiary sector. Third, it is still not clear whether the results of the "sensibilisation campaign" were quantified or not. Mr. Cisse's comments and your report statement on this issue seem to be contradictory (page 43 of report and page 5 of comments by Mr. Cisse). Fourth, there appears to be another contradiction between your second paragraph on top of page 45 and the comments of Mr. Cisse about it on page 6. Which

statement is more representative of the facts? Fifth, there also appears to be a contradiction between the comments of Mr. Cisse in the last two paragraphs of page 6 and your statements in your report on page 45, paragraphs 4 and 6.

Kindly let us know if you have any remarks or comments on the above.

Sincerely yours,

Bernard Montfort
Division Chief
Energy Strategy and Preinvestment
Division I
Energy Department

Cleared with and cc: Messrs. Floor (EGY); Mulckhuyse (CON); Ouahes (WAPEG)

AMegateli:bre

INT/83/005

25 SET. 1986

MINISTERIO DE ENERGIA Y MINAS

Lima, 25 SET. 1986

OFICIO N° 643-86-EM/CONERG

SEÑOR : Ulrich Thumm
Representante Residente
Banco Mundial

ASUNTO : Perú - Programa Propuesto de Divulgación de Cocinas Mejoradas en la Sierra.
PNUD/Banco Mundial/PASE.

REF. : Su carta N° 047/86

Tengo el agrado de dirigirme a Ud., para referirme al Informe "Programa Propuesto de Divulgación de Cocinas en la Sierra", elaborado en el marco del Programa Conjunto del PNUD/Banco Mundial de Asistencia para la Administración del Sector Energético.

Sobre este particular, debo comunicarle que el Consejo Nacional de Energía ha examinado el documento en referencia por lo que mucho estimaré tenga a bien disponer que el Proyecto Piloto propuesto considere las siguientes recomendaciones: a) concebir diseños de cocinas eficientes lo suficientemente sencillas, como para que los propios usuarios (área rural y pequeña urbana) se encarguen de su construcción con materiales locales de costo nulo; b) concebir un sistema de difusión y transferencia de los métodos constructivos - cuya viabilidad técnica y aceptabilidad social se hayan comprobado - basados fundamentalmente en premisas participatorias de la propia infraestructura socio cultural del ámbito de acción del Proyecto; c) revisar las premisas culturales, sociales y económicas que sustentan el trabajo destinado a introducir ollas y cacerolas de aluminio con fines de mejorar eficiencias en la cocción de alimentos; - d) dentro del documento del Informe : Programa Propuesto de Divulgación de Cocinas en la Sierra, definitivamente debe excluirse el Mapa-IRBD 17291, por cuanto no se está mostrando la delimitación fronteriza del Perú con los territorios de Ecuador y Colombia.

Hago propicia la oportunidad, para expresar a Ud., los sentimientos de mi especial consideración y estima.

Atentamente ,

LUIS CHANG REYES
Vice Ministro de Energía

INT/83/005

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

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September 24, 1986

Prof. Krishna Prasad
University of Technology
P.O. Box 513
5600 MB Eindhoven
The Netherlands

Dear Prof. Prasad: not enclosed

Please find enclosed the project document outlining the scope of work for the development and adaptation of kerosene stoves for Niger, as was discussed earlier by phone with Mr. Willem Floor.

The document is based on discussions that Mr. Floor had with Messrs. Bussman and Visser in Niger, as well as on the proposal made by the Niger project team. The major difference between the original proposal and the current document is that, in addition to the development of a high power-low cost kerosene stove, the work also includes upgrading existing stoves in accordance with the recommendations made by Messrs. Bussman and Visser in their Niger report.

We would be grateful if the work could start immediately and the report on this work could be received in Washington on IBM-PC diskette (Wordstar) or on paper not later than January 31, 1987.

Sincerely yours,

Bernard Montfort
Division Chief
Energy Strategy and
Preinvestment Division I
Energy Department

Attachment

WFloor/ha

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

INT (83/005

DATE: September 24, 1986

TO: Files

FROM: Charles Feinstein, EGYSI

SUBJECT: GHANA: Energy Assessment/ESMAP Mission

1. In accordance with my terms of reference dated September 2, 1986, I arrived in Accra on September 6 to (a) assist in the review with the Government of the Green Cover Energy Assessment Report and update the statistical information; (b) monitor the ESMAP Sawmill Residues Utilization project; and (c) follow-up on other areas of possible ESMAP involvement. The bulk of the mission's activities were concerned with task (a) and are described in the back-to-office report of the mission leader, Mr. J.U. Richter. This memo details the mission's activities as regards task (b), and also includes a brief evaluation of a candidate local consulting firm for the ESMAP Industrial Energy Efficiency Enhancement Project.

Meeting with Local Consultants

2. The mission traveled to Kumasi on Saturday, September 13 to meet with Messrs. Hagan and Ben-Dzam of Ru-Tek Consultants and Industries, Ltd. The consultants' recently submitted final report and the earlier completed interim reports were reviewed and discussed. In the mission's judgement, the data collection and compilation aspects of the consultants' work met or exceeded the expectations set out in their terms of reference. Coverage of the residue-producing wood industries as well as potential new industrial consumers of these wood wastes was essentially complete. Ru-Tek reported only minor difficulties in obtaining the sought-after information from the various industrial concerns, however, accuracy of the data is subject to verification by the expatriate consultants. The letter of introduction from the National Energy Board (NEB) facilitated their work substantially, and it is suggested that a similar letter be prepared for the main mission. The letter should emphasize the pre-investment, as opposed to survey, character of the main mission so as to avoid credibility problems with oft-visited sawmills.

3. Weaker areas of the report were in data analysis and in issues identification. The final report was somewhat lacking in Ghana-wide summary figures and cross-tabulations. However, these analyses were easily performed by the mission with the aid of a calculator. The tabulated figures provided interesting insights for defining the project's scope.

GHANA WOOD RESIDUE UTILIZATION
('000 tpy)

Waste Type	Use			
	Fuel @ Mill	Fuelwood/ Charcoal Prod.	Other: Furniture, Export, Fencing,etc.	Unused; Wasted
Offcuts/ Short Pieces	17% (8.4)	2% (1.0)	81% (40.0)	0% (0)
Slabs/Edgings	26% (36.1)	65% (90.3)	9% (12.5)	0% (0)
Veneer/Waste	100% (23.8)	0% (0)	0% (0)	0% (0)
Bouls	4% (0.7)	0% (0)	96% (16.2)	0% (0)
Slicer Boards	0% (0)	0% (0)	100% (1.6)	0% (0)
Sawdust	13% (7.8)	0% (0)	3% (1.8)	84% (50.7)

The only unused wood waste at present is sawdust (equal to about 51,000 tons per year, or about 13,000 toe/year when adjusted for energy content and conversion efficiencies); whether other residues such as slabs/edgings are being put to their highest and most economic use is a matter for further investigation. The consultants indicated that demand for process heat at the wood processing plants was largely determined by the type of sawmilling operations undertaken. Only mills handling veneer/plywood production require process heat. The primary mills ship their sawtimber undried, i.e., as it emerges from the plant. While these mills may be missing an opportunity to use a locally available energy source to gain value added in the form of higher grade sawn products, this possibility may lie outside the scope of the present study.

Issues Identification

4. Discussions with the local consultants were helpful in highlighting the following issues for the main mission's consideration:

(a) Under what circumstances will self-generation of electricity using wood wastes be economic? If installation of the infrastructure for wood waste-fired process heat proves economic (i.e., fuel feed systems, boilers), can the additional

incremental investment to also produce electricity (turbine/generators) be justified? A first-cut analysis suggests the priority ranking below:

		Process Heat Demand??	
		Yes	No
Present Electricity Source ???? ?	Diesel	1	3
	Hydro	2	4

The issue is complicated by the divergence of economic and financial costs and the timing of rural electrification grid extension. For example, where does Electricity Corporation of Ghana's (ECG) responsibility for industrial hook-ups end and where does the sawmills' begin?

(b) How and to what extent will increased on-site use of slabs/edgings affect domestic charcoal producers and fuelwood consumers?

(c) In the case of clustered sawmills (e.g., Kumasi area), are localized or centralized waste collection systems advantageous? If centralized, who will coordinate the collective action required? The mills themselves? A private waste collection entrepreneur? A briquette producer?

(d) What attitudinal and institutional barriers to project adoption exist in the sawmill industry and in the energy-consuming industries which are potential wood residue users? What should the role of government be in overcoming these barriers?

(e) What are the economics of sawdust briquetting, charcoaling and pelletizing? What is the size of the market and the optimum scale of operations? What product is more suitable for the indusrial sector? For the domestic sector? Can the Accra-Tema market be tapped, or are transport costs excessive?

(f) Are there alternative uses for sawdust, such as in production of particle board for the domestic market?

Main Mission Program

5. Based on the information provided by the local consultants and the identified issues, tentative programs for the three expatriate consultants were prepared and are presented as Attachment 1. As is indicated by the scheduling, the Wood Processing Industries Energy/ Residues Expert is estimated as requiring somewhat more than the budgetted three weeks.

Participation of Local Consultants in Main Mission

6. The terms of reference prepared for Messrs. Hagan and Ben-Dzam anticipated a modest role for them in the main mission, viz: "You shall join the rest of the project team during its field work in Ghana in September to: (i) discuss your survey results and assist in its analysis; and (ii) collect additional information as requested." The mission believes that the role of the Ru-Tek consultants could be usefully expanded to encompass:

(a) Prioritization and ranking of target sawmills and potential wood consuming enterprises using set criteria. Such criteria may include, in the case of sawmills, such factors as process heat demand, electricity demand, available wood waste, distance to electrical grid, wood and electricity demands in the surrounding area, age and condition of plant, present and future capacity utilization, and quality and attitude of management;

(b) Preparation of a detailed map of the target areas which would overlay information on location of sawmills and major industries, road networks, and present and future electrical grids;

(c) Liaison with sawmill and plant managers to ensure availability of key personnel during the mission specialists' visits and availability of accomodation at sawmill-owned guest houses in the isolated areas;

(d) Briefing of the expatriate consultants on the survey results and target sawmills/industries;

(e) Assisting the consultant team during the first phase of the main mission, including collecting additional information as required and accompanying team members on visits on the Akim-Oda and Kumasi areas.

Modification of the original terms of reference was discussed with the Ru-Tek consultants, who indicated their availability if so desired. Total time commitment is estimated at 10 days each, broken down as 4 days pre-mission preparations, 1 day for briefings and question/answer sessions, and 5 days for site visits. As the extension involves tasks that are in the main outside the original scope of their employment, additional compensation would be warranted. Total additional labor costs would amount to 20 man-days, or $1800 if translated at the earlier agreed upon rates.

Meeting with NEB

7. Following the mission's return from Kumasi, a meeting was arranged with Messrs. Denkyi and Opam of the NEB to brief them on the substance of the meeting with Ru-Tek and to review logistical requirements for the main mission. The NEB Executive Director expressed his firm support for the upcoming mission and verified the availability of two four-wheel drive vehicles on a full-time basis and an additional vehicle on a part-time basis.

Meeting with IMAS Ltd. Consultants

8. A meeting was arranged with Messrs. Appiah-Carr and Oduro-Achampong of Industrial and Management Services Ltd., a local firm based in Accra, in order to assess their suitability to perform industrial energy survey tasks preparatory to a future main mission in the Industrial Energy Efficiency activity. IMAS is currently performing transport analysis work financed by WAP and was recommended by the Bank's representative in Accra. The firm consists of 8 permanent staff (4 professionals) with backgrounds in general management, engineering, computer science, and systems analysis. In addition, 23 associate consultants with backgrounds in electrical and mechanical engineering, physics, math/statistics, and agricultural economics are available on an on-call basis. The firm was incorporated in 1980 and has performed feasibility, project appraisal and organizational studies for about 30 major clients in Ghana and for USAID as well. The firm appeared to have adequate data analysis capabilities, relying on Lotus 1-2-3 and custom written software. Based on the questioning, it was apparent that the principals interviewed did not have prior experience in industrial/energy surveys, however, this should not necessarily be taken as disqualifying. Given proper guidance as to methodology and expected output, the quality of their work could be quite good indeed, as evidenced in examination of the final report for the USAID Ghana seed project. The key factor would be the quality and experience of the specific individuals (likely an industrial engineer and a cost accountant/financial analyst) who could be recruited for the assignment. Many of the firm's associate consultants

come from backgrounds in the various state run industries, which could be a definite asset. To this end, IMAS was asked to submit CVs of suitable consultants and to prepare a representative list of target enterprises for an industrial energy survey. More information on the firm's performance in the IBRD sponsored transport sector work will be available from Mr. Pankaj (WAP) following his late October Ghana mission.

Follow-up Actions

9. The following tasks need to be done before initiation of the sawmill residues study main mission: (a) finalization of negotiations and contracting for the expatriate consultants; (b) modification/extension of terms of reference for the local consultants; (c) setting of criteria for prioritizing site visits to sawmills and industries, and confirmation of draft itineraries using same; (d) preparation of letter of introduction from NEB for facilitating site visits, and (e) communication and coordination with NEB regarding (a) - (d).

cc: Messrs. Richter (EGYS1); Mendis (EGYPA)

CFeinstein:my

TENTATIVE ITINERARY

Wood Processing Industries Energy/Residue Expert

Arrive Accra	Friday, Oct. 17
Rest day/Meetings with Bank staff	Saturday, Oct. 18
Briefing by local consultants	Sunday, Oct. 19
Meetings with NEB, VRA, ECG, MFP, FD, FC, etc.	Monday, Oct. 20 Tuesday, Oct. 21
Accra - Kumasi, Spec. Timber Prod. Mill	Wednesday, Oct. 22
Spec. Timber Prod. Mill; Kumasi sawmill #2	Thursday, Oct. 23
Kumasi Sawmill #2 (cont'd) Kumasi Sawmill #3	Friday, Oct. 24
Kumasi Sawmill #3	Saturday, Oct. 25
Kumasi - Mim	Sunday, Oct. 26
Mim Sawmill	Monday, Oct. 27 Tuesday, Oct. 28
Mim - Kumasi	Wednesday, Oct. 29
Kumasi - Sefwai / Wiawso	Thursday, Oct. 30
Gliksten Sawmill	Friday, Oct. 31 Saturday, Nov. 1
Sefwai / Wiawso - Samreboi	Sunday, Nov. 2
ATP Sawmill	Monday, Nov. 3 Tuesday, Nov. 4
Samreboi - Sekkondi / Takoradi	Wednesday, Nov. 5
Sekondi/Takoradi Sawmills	Thursday, Nov. 6 Friday, Nov. 7
Sekondi/Takoradi - Accra	Saturday, Nov. 8
Accra	Sunday, Nov. 9
Debriefing in Accra and departure	Monday, Nov. 10

TENTATIVE ITINERARY

Biomass Conversion Specialist

Arrive Accra	Friday, Oct. 17
Rest day/meetings with Bank staff	Saturday, Oct. 18
Briefing by local consultants	Sunday, Oct. 19
Meetings with MFP, NEB, FD, FC, Min. of Ind., etc.	Monday, Oct. 20
Accra-Oda; Chaowus, Ltd.	Wednesday, Oct. 22
Chaowus Ltd. (continued) Akim - Oda - Kumasi	Thursday, Oct. 23
Meeting with BRRI, FPRI	Friday, Oct. 24
Field visits in Kumasi, charcoal production	Saturday, Oct. 25
Kumasi - Sekondi/Takoradi	Monday, Oct. 27 through Tuesday, Oct. 28
Sekondi / Takoradi - Prestea Prestea Goldmines, Ltd.	Wednesday, Oct. 29
Prestea Goldmines (continued)	Thursday, Oct. 30
Prestea - Sekondi/Takoradi Hardwood Timber Prod. Ltd.	Friday, Oct. 31
Hardwood Timber (continued)	Saturday, Nov. 1
Sekondi - Takoradi - Cape Coast	Sunday, Nov. 2
Ankaful Brick Factory Cape Coast - Accra	Monday, Nov. 3
Bakers Association (Accra-Tema)	Tuesday, Nov. 4
Accra	Wednesday, Nov. 5
Debriefing in Accra and departure	Thursday, Nov. 6

TENTATIVE ITINERARY

Biomass Combustion/Energy Applications Engineer

Arrive Accra	Friday, Oct. 17
Rest day/meetings with Bank staff	Saturday, Oct. 18
Briefing by local consultants	Sunday, Oct. 19
Meetings with MFB, NEB, FD, FC, Min. of Ind., etc.	Monday, Oct. 20 Tuesday, Oct. 21
Accra - Kumasi	Wednesday, Oct.22 through
Site visits in Kumasi and surrounding area	Saturday, Oct. 25
Kumasi - Sekondi/Takoradi	Sunday, Oct. 26
Site visits in Sekondi/Takoradi and surrounding area	Monday, Oct. 27 through Friday, Oct. 31
Sekondi/Takoradi - Accra	Saturday, Nov. 1
Accra	Sunday, Nov. 2
Site visits in Accra-Tema area	Monday, Nov. 3 through Wednesday, Nov. 5
Debriefing in Accra and departure	Thursday, Nov. 6

INT 183/005

Extra copy
To LAC files.

OFFICE MEMORANDUM

DATE: September 23, 1986

TO: Messrs. R. Dosik, Chief, EGYS2 and B. Montfort, Chief, EGYS1

FROM: C.R. Poncia, G. Gaskin (EGYS2) and R. van der Plas (EGYS1)

EXTENSION: 75284

SUBJECT: JAMAICA: ESMAP Program - Mission to Jamaica
Back-to-Office Report

1. In accordance with our Terms of Reference of August 26, 1986, we visited Jamaica from September 1 through September 9, 1986 and met with representatives of the Ministry of Mining, Energy, and Tourism (MMET) and a wide range of other public and private sector agencies, as listed at Annex AI to the Aide Memoire attached as Annex A. The purpose of the mission was to finalize the proposed ESMAP projects with the Government of Jamaica (GOJ), including specific project descriptions, budgets and outline Terms of Reference.

2. In designing the ESMAP projects, the mission sought to ensure that they would (a) be within the limited administrative resources of GOJ, and (b) build on existing studies and/or facilities where appropriate, encourage a positive private sector response and focus on quantifiable results.

Summary

3. The mission proposes the following ESMAP projects:

Subject	Implementation Period	Cost a/ US$ Equivalent
Charcoal Cycle Improvement	11/86 - 10/87	60,000
Sawmill Waste	11/86 - 2/87	8,000
Demand Management		
a) Mgt.Inf.Syst.	01/87 - 12/87	50,000
b) Building Code	02/87 - 12/87	99,000
c) Domestic Appt. Standards	02/87 - 12/87	66,000
Total		283,000

a/ Excluding ESMAP supervision.

Full details are set out in the attached Aide Memoire.

Financing

4. The direct costs of the proposed projects would be financed by the Canadian International Development Agency (CIDA) out of the CS$610,000 (US$439,000 equivalent) earmarked by them for the Jamaica ESMAP Program. CIDA have also agreed in principle to finance the direct cost of the Jamaica Petroleum, Procurement, Refining and Distribution Report about to be issued in Blue Cover (BTOR dated September 22, 1986) at an approximate cost of US$45,000. The mission recommends (para. 10 below) that the balance of the CIDA funds, about US$110,000 equivalent, be retained for a possible project to assist Government develop an energy efficiency incentives and investment program, following resolution of the economic policy issues currently under review between GOJ, USAID, IMF, and IBRD.

Brief Description of Proposed Projects, with Rationale

5. The proposed Charcoal Cycle Improvement project is designed to introduce the casamance improvement to the traditional earthmound kilns, which are currently used in Jamaica for charcoal production, and would be implemented by the Department of Forestry of the Ministry of Agriculture, with the coordination of the Energy Division of MMET. These improvements are simple (revised wood laying and installing chimneys in the existing kilns, using scrap oil drums), the results significant (up to double yield and half production time), and the producers accessible. In the mission's view, focusing on charcoal production will achieve a positive short term improvement in energy efficiency. The project will be undertaken at about the same time as CIDA's forest assessment study which is now under preparation. Thereafter a longer-term household energy study may be appropriate.

6. The proposed Sawmill Waste Utilization project will assist the Forest Industry Development Corporation (FIDCO) to make charcoal out of its sawmill waste, which is currently discarded, which project would be implemented by FIDCO, with MMET coordination. Given the concentration of the waste wood and the available FIDCO resources, brick beehive kilns are recommended. At current charcoal prices, the kiln investment (about JS$100,000) should be recoverable within about six months from the startup of charcoal operations. Again this would be a positive, results-oriented short-term project, with a low economic cost.

7. Three energy demand management projects are proposed. The first is the preparation and issue of Energy Efficiency Standards as part of the Jamaica Building Code, which project would be implemented by the Ministry of Construction and the Jamaica Institutes of Architects and Engineers, with MMET coordination. The mission estimates that, at current electricity tariffs, the efficiency standards could result in savings, principally through reduced airconditioning load, of about $250,000 p.a. in the first year, rising to US$2.5 million p.a. by year 10 onwards (depending on the rate of new building). The increased costs of more efficient airconditioning equipment would be reduced by the smaller capacity required. While the net cost increase is not expected to be substantial, further financial and economic cost data is required and will be provided by MMET prior to project implementation.

8. The second demand management project proposed is the introduction of Domestic Appliance Energy Efficiency Labelling, which project would be implemented by the Jamaica Bureau of Standards (BOS), with MMET coordination. The USAID Energy Sector Program includes a BOS solar water heater efficiency testing laboratory, and procurement is now underway. The proposed ESMAP project would assist BOS to adapt this laboratory for a range of domestic appliance testing. Once the laboratory was operating, BOS, under its existing mandatory labelling authority, would then prescribe appliance efficiency labelling requirements, based on manufacturers' specifications and/or BOS laboratory testing. As indicated in para. 1.5 of Annex 5 of the Aide Memoire, potential gross savings resulting from increased efficiency domestic appliances in Jamaica could rise to US$5 million p.a., depending on the rate at which such appliances won market acceptance. Again, further financial and economic data on the costs of increased efficiency appliances is required and will be provided by MMET prior to project implementation. Given the success of efficiency labelling elsewhere (particulary the U.S. and Japan), the net benefits of the labelling program are expected to be substantial.

9. The third demand management project proposed is the improvement of the existing MMET Management Information System (MIS), which project would be implemented by the Jamaica Institute of Standards (IOS) and MMET jointly. Currently, PCJ and Jamaica Public Services provide petroleum product and electricity sales data to MMET which, in cooperation with PCJ Engineering, issues a periodic report on sectoral energy efficiencies. The report is not, however, prepared regularly, nor disaggregated by main consumer group. The mission's discussions with IOS indicate that it would be willing to cooperate with MMET by collecting disaggregated efficiency data under its regular data collection system. The proposed ESMAP project would assist MMET and IOS to design a simple MIS system, with requisite hardware and software, and to prepare a quarterly statistical report on energy consumption, prices and efficiency, including a summary of current efficiency trends and policies. This project should provide a reliable basis on which demand management policies can be formulated and their impact monitored, including the impact of the Energy Efficiency Standards and Domestic Appliance Labelling Projects referred to above.

10. In addition to the building and domestic appliance subsectors, the Jamaica industrial sector (excluding the bauxite industry, where efficiency levels are relatively high) offers substantial opportunities 1/ for increased energy efficiency. For this reason, the GOJ established in 1982 an Energy Credit Fund (ECF). The ECF was administered by the National Development Bank and the commercial bank network, and offered a total of US$8.4 million equivalent funds (of which USAID provided US$5.9 million) to qualifying industries at below-market interest rates. However, only about US$110,000 of this fund has been drawn down to date despite an extensive energy audit program, and the ECF

1/ Preliminary Report, January 1986, of the Jamaica Energy Conservation Task Force.

is now being wound down. It appears that favorable interest rates alone were insufficient to stimulate the requisite private sector conservation investment, given Jamaica's high customs and excise duty rates, lack of taxation incentives and unfavorable overall investment climate. These matters are, of course, currently under review between Government, USAID, IMF, and the Bank. If progress is made, the mission recommends that consideration be given to the possibility of an ESMAP efficiency incentives study.

11. The proposed ESMAP projects do not include the Electricity Cogeneration Study proposed by JPS. As indicated in the Aide Memoire (paras. 11-16) the mission was unable to substantiate the potential volume and type (firm or intermittent) of power supply to JPS from sugar producers, the cement factory or, indeed, the proposed 130 MW coal-fired generator set at Clarenden Alumina smelter. Pending clearer indication as to potential supply, the mission recommends that the proposed study (costing under present estimates in the neighborhood of $150,000) should be deferred.

Implementation

12. The proposed five ESMAP projects would be implemented by the agencies directly concerned -- Forestry Department, FIDCO, BOS, Ministry of Construction and MMET. While MMET would play a coordinating role, it would be directly responsible for only one project, the MIS improvement. Furthermore, project implementation would be phased, with the demand management projects start-up deferred until January and February 1987. The mission therefore considers that the ESMAP project implementation should not exceed available GOJ (and EGYS2) institutional resources.

Follow-up

13. AIBs for the proposed projects are now in preparation and will be circulated shortly. In the meantime, a proposed follow-up letter to the Permanent Secretary, MMET, is attached at Annex B and to CIDA at Annex C.

Distribution

Messrs./Ms.: Moscote, Halperin, Lambertini, Larrieu (o/r) (LCPEN)
Voyadzis, Delvoie, Robertson (LC2VC)
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Morgan (PPDES)
Langer (LOA)
Hume, Saunders, Iskander, Dosik (o/r), Byer, Floor,
Mian, Hristodoulakis (EGY)

cc: Ms. B. McSweeney, UNDP Res. Rep., Jamaica
Ms. D. Demers, Project Officer, Jamaica Section, CIDA, Ottawa

CAH:aim

AIDE MEMOIRE

JAMAICA - UNDP/IBRD ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME

1. Representatives of the Government of Jamaica, of various Jamaican public and private sector organizations and of the United Nations Development Programme (UNDP), Canadian International Development Agency (CIDA) and the World Bank met in Jamaica from September 1 - 9 1986. The meetings reviewed the proposed energy sector assistance to be provided to the Government of Jamaica under the UNDP/IBRD Energy Sector Management Assistance Programme (ESMAP) which is to be provided with the assistance of CIDA. A detailed list of those representatives is attached at Annex 1.

2. The ESMAP assistance was discussed under four headings - I Forestry Fuelwood, II Sawmill Waste Utilization, III Electricity Cogeneration and IV Energy Demand Management. The conclusions of these meetings and description of the proposed assistance to the Government of Jamaica in each of these four areas are now summarised.

3. I. FORESTRY/FUELWOOD

The meetings reviewed the current "charcoal cycle" covering wood sources (forest reserves, private wood lots and public land clearing areas), the production of charcoal through the use of traditional earthmound kilns, its transportation to Kingston and other urban centres and the wholesale and retail charcoal marketing.

4. As regards Jamaica's national wood resources, both forest reserves and privately owned wood, the Jamaica Forestry Department representatives explained that CIDA is preparing a project to conduct and finance a forest inventory survey, including an evaluation of utilization rates on both a sustainable and non-sustainable basis and of actual and prospective deforestation.

5. As regards charcoal production, the meetings agreed that the current system of charcoal production by private sector charcoalers using traditional earthmound kilns was inefficient, and that the introduction of low cost kiln improvements could increase the rate of charcoal production per unit of wood and cut down production time. The Bank mission indicated that the "Casamance kiln" could, in theory, double yield and halve production time. It explained that the improvement, which consisted of revised wood laying and installation of a kiln chimney using scrap metal drums, was cheap and quick and could easily be adopted by the traditional charcoalers.

6. Government and ESMAP representatives agreed that an ESMAP project should be undertaken to introduce improved kilns into the charcoal production process in Jamaica, thereby contributing to the more effective utilization of Jamaica's wood resources. It was agreed that the detailed design of the ESMAP project and its financial and economic evaluation should take

account, not only of the improved charcoal production yields and rates, but also of the impact of increased production on the charcoal price levels and on overall charcoal market conditions. The project should also examine (i) how to maintain the current price of charcoal and justify any increases, (ii) how to introduce some return for wood producers; and (iii) whether and if so, how to introduce a tax on charcoal.

7. It was agreed that the project would be coordinated by MMET, designed and implemented by the Forestry Department, with the assistance of an Energy Economist and Charcoal Specialist to be retained by the World Bank under ESMAP, with national staff and resources to be provided by GOJ. Provisional Terms of Reference and Cost Estimates are attached at Annex 2.

8. Government representatives also stressed the need for future studies, in addition to the CIDA forest inventory study, regarding the possibility of establishing new fuelwood plantations (now being considered by FAO as a part of the Tropical Forestry Action Plan) and research into the suitability for fuelwood production of alternate species. The Bank representatives explained the limits of available ESMAP resources, but agreed to give further consideration to these proposals.

9. The Bank mission also recommended that MMET and the Scientific Research Council (SRC) should examine the efficiency of both charcoal and kerosene cooking stoves, possibly with the assistance of the Bureau of Standards' proposed efficiency testing facilities (see para. 20 below). The mission confirmed its willingness to consider a study of stove efficiency under the ESMAP programme, if this should prove appropriate.

II SAWMILL WASTE UTILIZATION

10. The meetings between MMET, Forestry Department, FIDCO and IBRD representatives examined the possible economic utilization of the substantial wood residues generated each year by FIDCO as waste. The following ESMAP project was outlined(for which provisional Terms of Reference and Budget are attached at Annex 3.

Background

a) One large sawmill exists in Jamaica and several smaller scale operations. The large sawmill, Forest Industries Development Company Limited (FIDCO), is 100% Government owned and has a long term lease from the Government at a nominal rent of 23,800 ha of forest land. FIDCO maintains these forests and has projected an annual harvest of 40,000m^3 of logs until 1994 and thereafter 80,000m^3 per year. As a result, FIDCO has a large accumulation, particularly in the sawmill, of unused wood resources.

Availability of Wastes

b) FIDCO has three different types of wastes available, from: (i) clear cut operations to establish new pine plantations; (ii) logging operations in standing timber stock; and (iii) sawmill wastes. The wastes from (i) and (ii) are left in the forests to rot, or to be burned. The wastes from the sawmill are a nuisance due to the limited storage capacity and are burned or used as landfill. The wastes from (i) and (ii) are excluded from the calculation of benefits below; the current wastes from (iii) are estimated at 5,130m^3 of sawdust; 11,070m^3 of offcuts, slabs and edgings; and 810m^3 of bark per annum until 1994, and double thereafter.

Utilization of Wastes and Marketing

c) The Caribbean Development Bank conducted a study (December 1985) to evaluate the use of sawmill wastes to generate power for internal consumption and sale of surplus power to JPS. The CDB study report shows that the investment of US$3 million for equipment to generate electrical power from the sawmill residues would not be a viable option for FIDCO.

d) Alternative use of wastes could, among other things, be carbonization (charcoaling), densification (briquetting), and use of raw material (boiler fuel etc). However, before any conversion of these wastes is recommended, the potential market should be identified. As far as charcoal is concerned, the domestic market is well established with an approximate annual consumption of 50,000 tonnes. As far as sawdust briquettes are concerned, the domestic market and the industrial market (sugarmills; alumina; cement and lime production) are potential options. Export of charcoal or briquettes could also be considered.

Justification

e) If 60% of the solid sawmill wastes could be converted into charcoal, the estimated output would be more that 1000 tonnes of charcoal per year (equal to 40,000 bags of 55 lbs). This can be produced in four 35m^3 brick beehive kilns (conversion efficiency better than 25%, weight basis) which operate on a rotational basis. The estimated investments for kilns and

tools would be about J$100,000 (100% local currency) and the annual output would be J$400,000 with charcoal valued at a producer price of J$10 per 55 lbs bag. Two trained operators and at least two labourers would be employed fulltime.

Project Objectives

f) The objectives of the proposed project are threefold:

(i) to identify technically feasible and economically viable options to use FIDCO's forest residues and sawmill wastes;

(ii) to identify the size and location for potential markets of the converted wastes; and

(iii) to recommend a detailed plan for implementation to utilize the aforementioned wastes to the greatest extent, including budget, preferred equipment, outlay of factory, etc.

Project Follow Up

g) The FIDCO representatives confirmed that the charcoaling option was attractive to them since no foreign exchange was required. Assuming that the study confirms the financial viability of this option, they would expect to procede immediately with identification of investment funds and the construction of the requisite kilns. Alternatively, it is understood that CIDA has indicated its willingness to consider the financing of a briquetting plant if the ESMAP project establishes its viability.

III ELECTRICITY COGENERATION

11 (a) At separate meetings with MMET, JPS, FIDCO and JSH representatives, the Bank mission explained that the JPS cogeneration study proposal submitted by MMET and JPS to the Bank for financing under the ESMAP focused on the terms and conditions on which JPS would be prepared to purchase power from small producers, including purchase price, interconnection arrangements, standard form contracts, regulations and promotion.

(b) The Bank mission explained that, before proceeding with this study, ESMAP would need a preliminary assessment of the number of potential surplus power suppliers and the level of potential firm power (capacity) and intermittent power (energy)which might be available within a given price range. Only if this information were available, could the potential contribution of firm power to JPS, and the consequent savings in deferred capital investment[1] be assessed.

12. Potential power supplies to JPS (in addition to the possibility of 110 mw capacity from new facilites at Clarendon Alumina refinery, now under Government review) were examined. These included potential supply from:

(a) sugar estates, using bagasse;

(b) the Carib Cement Company;

(c) the FIDCO Sawmill; and

(d) various renewable sources, including biogas, ocean thermal, wind and solar.

13. As regards production from sugar estates, JSH representatives focused on the Frome and Monymusk Estates about to be rehabilitated under a proposed World Bank project. Other sugar estates were considered by JSA and MMET to be too small to be significant surplus power producers.(i.e. Appleton, Worthy Park, New Yarmouth, Long Pond and Duckenfield). MMET and JSH representatives explained that power could be produced at the Frome and Monymusk Estates.through high pressure (600 lbs. per sq. inch) or low pressure (200 lbs. per sq. inch) steam turbine generators. The high pressure alternative could provide at each estate up to 15 MW capacity and the low pressure of up to 3 MW. Frome has lower internal electricity demand than Monymusk, which has pumped irrigation.

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[1] See MONENCO - JPS Least Cost Power Generation Study October, 1985

Frome has a lower fibre content in its cane and a shorter cropping season (6 months compared to 7 months). On balance, JSH representatives indicated that at both estates a high pressure 15 MW system might produce about 42 GWh per annum surplus power and a low pressure 3 MW system about 7 GWh per annum surplus.

14. The JSH representatives explained that the proposed World Bank Sugar Rehabilitation Project included rehabilitation of the low pressure generation system at each estate, Frome and Monymusk. It was envisaged that, on rehabilitation, bagasse fueled power would be sufficient to meet the estate power requirements during the crop season, but no specific provision had been made for the supply of surplus power to JPS, nor provision made for baling or briquetting bagasse to permit year-round power generation. [1] To do this would require the installation (or, as in the case of Monymusk, the rehabilitation) of a condenser generator with associated cooling facilities and, if surplus power were to be provided on a firm basis, bagasse drying and baling facilities. JSH representatives indicated that a study was now approaching completion by BECHTEL regarding the installation of a new high pressure power generation system at Monymusk after the current rehabilitation was completed and Monymusk in full production.

15. As regards supply from the Carib Cement Company, JPS representatives believed that about 10 MW capacity might be available although not on a firm basis.

Supply from the FIDCO Sawmill was not regarded as viable (see para 10(c) above). Power supply from renewable sources could be economic but JPS/MMET representatives did not consider this likely at current fuel oil prices.

16. The Bank mission therefore requested that MMET and JPS should put together more detailed information on the potential level of supply from the Frome and Monymusk Estates (based on the BECHTEL Study when available) and from the Carib Cement Company. They confirmed their willingness to examine the JPS Cogeneration proposal further in the light of that information.

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1 The World Bank mission referred to the proposed IBRD Mauritius Sugar Rehabilitation Project including provision for bagasse drying and baling.

IV. DEMAND MANAGEMENT

Present Situation

17. Since the April 1985 Energy Assessment Report, progress has been made in some sectors in increasing energy efficiency. The main areas of improvement have been in the industrial sector but has been confined to the larger key sectors of alumina and cement. No disaggregated data is available on the other industrial sectors but macro level data suggest some operational efficiency improvement but little investment in new technology. 1/

18. Analysis of the available data indicates that energy pricing is at appropriate levels (with some distortion particularly for LPG and Kerosene) within the pricing structures. Pricing electricity at the macro level is estimated at -0.07. Thus an inelastic demand situation now exists which indicates that pricing is no longer a demand management option for further reduction in energy consumption, and that further energy reduction can only be achieved by the introduction of new technology. Poor performance in the domestic, commercial, small industry and transportation 2/ sectors indicates that investment in new technology will be a priority issue.

19. To assist in the investment of new technology by industry, Government, with USAID assistance, established in 1984 a US$8.3 million Energy Credit Fund (ECF) administered through the National Development Bank and the commercial bank network. However, the ECF has not been a success. To date only US$400,000 has been disbursed, and the ECF is now being wound down. Despite the relative attractive interest rates offered, industry response was weak reflecting concerns regarding high tariffs, lack of taxation incentives and the investment climate generally.

Proposed Government Strategy and the role of ESMAP.

20. In the short term, the Bank mission recommends that Government focus on improving energy efficiency in key low efficiency sectors, particularly domestic and commercial. To achieve positive results within a short time frame, the ESMAP program would assist Government;

(1) to finalise and publish a building code with minimum energy efficiency standards;

(2) to introduce energy efficiency labelling requirements for domestic appliances and complete the equiping of its energy, efficiency laboratory to undertake the testing of domestic appliances.

1/ (Preliminary Report January 1986 Energy Conservation Task Force).

2/ (Upgrading of the Kingston Metropolitian Highway systems is currently under implementation under a World Bank Project, so this subsector is not addressed under the proposed ESMAP projects).

Provisional discriptions and budget for these projects are set out in Annexes 4 and 5 respectively.

21. In the longer term, the Mission recommends that Government strengthen the statistical basis on which demand management policies can be formulated and national energy efficiency monitored. As recommended by the Energy Assessment Report, Government has now introduced a management information system (MIS) for this purpose. However, the MIS provides only highly aggregated data, thus inhibiting the development of detailed sector energy policies which can address the appropriate market distortions. The ESMAP program would assist Government to develop the MIS into an effective policy formulation and monitoring tool.

22. As indicated by the ECF experience, the successful promotion of private sector energy efficiency investment depends upon an attractive, fiscal and monetary policy environment for investment generally. Since the Government currently has these matters under active review, the Bank mission does not propose any specific initiative at this time under the ESMAP program. However, when Government program is complete, the mission proposesthat consideration be given to the inclusion in the ESMAP program of an Energy Efficiency Incentives study.

23. Details of the proposed project are set out in Annex 6.

24. The Bank mission explained that the proposed ESMAP projects had been designed to take into account available institutional resources in MMET and the other public and private sector organizations concerned. Thus MMET would undertake the overall coordination of all the proposed ESMAP projects through its Energy Division.[1] The kiln improvement project would be implemented by the Forest Department, and the sawmill waste utilization project would be implemented by FIDCO. On the demand management side, the domestic appliance efficiency labelling and testing project would be implemented by the Bureau of Standards, who would also implement the Building Code project, in close coordination with the Institute of Architects and Engineers. Finally the MIS project would be implemented by MMET directly, in close coordination with the Institute of Statistics (who would be responsible for data collecting) and with PIOJ and PCJ Engineering - Special Energy Projects, (who would be responsible for providing MMET with analytical support). As regard all projects, it was agreed that MMET should telex the Bank at the end of each calendar month a short summary of project implementation progress.

25. Again with institutional constraints in mind, the Bank mission suggested that implementation of the ESMAP projects under the coordination of MMET should be phased. Thus it was proposed that the kiln improvement and sawmill waste utilization projects should be commenced as soon as possible with consultants in place by November 1, 1986. While planning of the other projects should also begin straight away, the Bank mission suggested that the MIS Consultants should not start working until January 1, 1987. Finally it suggested that the consultants for the Building Code and Appliance Testing projects should start in February 1987.

26. The Bank mission indicated that the Aide Memoire had been prepared as a basis for the develoment of the ESMAP projects. On the Bank side, they indicated that Activity Initiation Briefs, including detailed terms of reference, would now be prepared for each proposed project and, following internal clearance, would then be submitted to the Government for comment. In the meantime, it was suggested that MMET might wish to circulate the Aide Memoire to the other agencies concerned, particularly PIOJ, Forest Department, FIDCO, the Bureau of Standards, the Statistical Institute and PCJ Engineering.

27. The Bank mission confirmed that UNDP and CIDA representatives had been briefed in full during the mission and that the Bank would, of course, continue to brief them as project implementation proceeded.

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1. Under the leadership of Mr. Nigel Grant, Director of Economic Planning and Mr. W. Boyne, Project Director.

VI. CONCLUSION

28. The Jamaica ESMAP programme would therefore comprise:

Subject	Implem. Period	ESMAP Contribution /1 US$ Equivalent
1. Kiln Improvement	11/86 - 10/87	60,000
2. Sawmill waste	11/86 - 2/87	30,000
3. Demand Management		
a) Building Code	2/87 - 12/87	99,000
b) Domestic app.	2/87 - 12/87	66,000
c) MIS	1/87 - 12/87	50,000
TOTAL		283,000

/1 Excluding ESMAP supervision costs.

29. As indicated above, consideration would be given to the possibility (financial and institutional resources permitting) of further ESMAP assistance to Government on (i) kerosene and charcoal stove efficiency and (ii) electricity cogeneration when further data has been collected by MMET, and (iii) energy efficiency incentives when Governments' current fiscal and monetary policy review is complete.

Date: September 9, 1986

Signed:

GOVERNMENT OF JAMAICA

WORLD BANK

JAMAICA - AIDE MEMOIRE
PROPOSED ESMAP PROJECTS

LIST OF PERSONS MET

1. MINISTRY OF MINING, ENERGY AND TOURISM - ENERGY DIVISION

N. Grant	-	Director Energy Economics Unit
D. Keith	-	Energy Conservation Adviser, USAID
H. Khan	-	UN Energy Economist
A. Lawson	-	Alternative Energy Engineer

2. MINISTRY OF FINANCE AND PLANNING

H. Milner	-	Financial Secretary
S. Tyndale	-	Director of Fiscal

3. MINISTRY OF PUBLIC UTILITIES AND TRANSPORT

Keith Bisnott	-	Advisory and Monitoring Unit
Roy Alexander	-	-do-
Fred Hudson	-	Transport Authority

4. MINISTRY OF AGRICULTURE - DEPARTMENT OF FORESTRY

R. Jones	-	Director
K. Porter	-	Research Officer
P. Virgo	-	- do -
D. Leslie	-	Marketing Officer

5. FOREST INDUSTRY DEVELOPMENT CO. LTD.

G. Symes	-	Managing Director
O. Evelyn	-	Manager Technical Services

6. MINISTRY OF INDUSTRY AND COMMERCE

P. Humphrey	-	Director
L. Mullings	-	Director

7. ENERGY POLICY STEERING COMMITTEE

J. Proudfoot	-	Chairman
T. Tuschak	-	Technical Secretary, USAID Planning Adviser to MMET

8. PLANNING INSTITUTE OF JAMAICA

T. James	-	Senior Engineer, Industry and Energy Division

9. JAMAICA PUBLIC SERVICE CO. LTD.

R. Miller	-	Manager System Planning Department
H. Higgins	-	Acting Director Engineering and Projects

10. PETROLEUM CORPORATION OF JAMAICA, ENGINEERING LIMITED

W. Ashby	-	Manager, Centre for Special Energy Studies

11. JAMAICA BUREAU OF STANDARDS

R. DaCosta	-	Head, Engineering
C. Broomfield	-	Head, Building and Associated Materials Dept.

12. STATISTICAL INSTITUTE OF JAMAICA

C. McFarlane	-	Director General
V. James	-	Director, Establishments Division
M. Bartley	-	Director Administrative Stats.
A. McKenzie	-	Director National Accounting Stats.

13. ENERGY CREDIT FUND/NATIONAL DEVELOPMENT BANK

L. Bailey	-	Manager ECF

14. COLLEGE OF ARTS, SCIENCE AND TECHNOLOGY/VOCATIONAL TRAINING DEVELOPMENT INSTITUTE

B. Silvera	-	(CAST)
I. Fowlin	-	(VTDI)

15. SCIENTIFIC RESEARCH COUNCIL

H. Lowe	-	Permanent Secretary
M. Anderson	-	Director, Research and Policy

16. JAMAICA SUGAR HOLDINGS

R. Campbell	-	Managing Director

17. TATE AND LYLE

J. Blanchard	-	Engineering Director

18. PRIVATE SECTOR-ORGANIZATIONS

P. McIntosh	-	Private Sector Organization of Jamaica
O. Pollack	-	Jamaica Chamber of Commerce
R. Chisholm	-	Small Business Association

19. PRIVATE SECTOR - TRANSPORT

L. Chin	-	C.L.C. Transport
G. Bloomfield	-	Bloomfield Jamaica - COSA
H. Grant	-	JMBA
C. Moore	-	Moore's Transport
G. Thomas	-	JMBA
R. Wilson	-	Stage Carriage Mini Bus Association
E. Milwood	-	JMBA
M. Smith	-	Moore's Transport

20. PRIVATE SECTOR - CHARCOAL

N. Gray	-	M.D. Graymill Engineering Company

21. INSTITUTE OF ARCHITECTS AND ENGINEERS

N. E. Isaacs	-	President, Institute of Engineers
B. Nelson	-	Past President, Institute of Engineers
O. P. Woodham	-	Past President, Institute of Engineers

FORESTRY/FUELWOOD (KILN IMPROVEMENT)

I. Terms of Reference

1. The Energy Economist and the Charcoal Specialist shall -

(a) review the current methods of charcoal-making and marketing in Jamaica, including -

(i) an analysis of the main geographical locations of charcoal-making;

(ii) a socio-economic profile of the charcoaling communities;

(iii) a review of their methods of collecting wood; and

(iv) an assessment of their current production costs, as well as of the whole marketing mechanism and the level of income of all those involved in the charcoal supply chain.

(b) identify appropriate charcoal kilns (in particular the Casamance kiln) for use in Jamaica, including -

(i) field testing and demonstration of those improved kilns which are considered to be the most appropriate ones for Jamaica;

(ii) developing and giving a training course in the construction and use of the identified kilns, which course inter alia will deal with subjects such as: the carbonization process, use and maintenance of the kiln, and analysis of the kilns' efficiency; and

(iii) determining acceptable investment and production costs of the kilns (including local availability of appropriate scrap materials for its construction), the availability of such materials to the local charcoal producers, as well as of appropriate incentive systems if necessary for the manufacturing and the adoption of the improved kilns.

(c) prepare an action programme including costs and implementation schedule, based on the results of (a) and (b), providing for the introduction of improved kilns into Jamaica, including -

(i) training and technical support requirements for charcoal producers to have them adopt more efficient charcoal conversion techniques;

(ii) appropriate government policies with regard to credit facilities, taxation measures and other incentives to promote the use of improved kilns;

(iii) an evaluation of the feasibility of linking the producers of fuelwood (as suppliers) to the charcoal producers; and

(iv) an analysis of the possible impact of the use of improved kilns on the output of charcoal production, retail prices of charcoal, incomes of the charcoaling communities and ways and means to monitor and regulate charcoal production and its market; and

(d) assist the Forest Department to implement the action programme, including the prescribed modification by about 40 charcoal producers of their kilns, and the training and assistance to those producers in the operation of the improved kilns, and to monitor the impact of such modification on charcoal production in Jamaica.

2. The two consultants, of whom the Energy Economist shall be the team leader, shall carry out the study over a period of about two calendar months during which about 36 days each shall be spent in Jamaica and about 10 days each in their home office. Within one month of the conclusion of their field work, the consultants shall submit a draft report to the World Bank for review, and then finalize their report taking into account the Bank's comments. The study shall be carried out under the supervision of the Bank in cooperation with the Forestry Department.

3. The Forest Department will provide staff (charcoal production trainers and enumerators), transportation, labour and raw materials (wood) as required for the carrying out the ESMAP project, including training of about 40 charcoal producers and the modification of their kilns.

4. Not later than 6 months following the conclusions of the consultants field work, the Forestry Department should prepare a report evaluating the results of the kiln improvement upon charcoal production in Jamaica.

II. BUDGET

		US$
1.	Fees	
	Energy Economist	
	36 (field) + 2 travel + 10 (home) x 400	19,200
	Charcoal Specialist	
	36 (field) + 4 travel x 300	12,000
	Local Surveyors	10,000
2.	Travel	
	2 rt.	2,800
3.	Per diem	
	72 (field) + 6 (travel) + 10 (home)	9,900
4.	Contingency (12%)	6,500
	Sub-total	60,400

ESMAP Supervision

1.	Staff time	10,000
2.	Travel 2 rt. Washington-Jamaica	1,500
3.	Per diem: 14 (field)	1,500
4.	Contingency (12%)	1,600
	Sub-total	14,600
	Grand total	75,000

SAWMILL WASTE UTILIZATION

I. Terms of Reference

1. The Technical Specialist should visit Jamaica for about six working days to examine the technical feasibility for FIDCO to utilise its forest residues and sawmill wastes, including briquetting, carbonizing and use as is. Together with the Economist, he should prioritize the different options according to economic and financial viability and determine the potential markets for the end-products, and potential macro-economic impacts.

2. In particular, the Technical Specialist should -

   (a) identify the different sources of waste, the quantities available over time, the potential end-products and their theoretical yields;

   (b) determine the best technical methods to convert the different types of wastes into the respective end-products;

   (c) identify the potential market for the different types of output, required changes before the output can be used, and assess potential macro-economic implications; and

   (d) design a detailed plan for implementation, including waste collection, conversion techniques, budget, manpower and equipment requirements, organizational structure, and factory outlay.

3. The Economist, who will be provided by MOA, PIOJ or MMET, should assist the Technical Specialist who will supply him with cost figures for the proposed technical options. The Economist should determine the best financial and economical options, and the financial implications for potential users of the carbonized, densified, or raw products, assessing their market acceptability.

4. In the design of the project, care must be taken to ensure that (i) the introduction of charcoal or briquettes into the market is not priced at levels injurious to other producers; and (ii) that only waste byproducts from normal sawmilling operations are used.

5. Reporting

   The Technical Specialist should prepare a draft final report, with the assistance of the Economist, and submit the same to ESMAP within three weeks after leaving Jamaica.

II. BUDGET

		Local US$	Foreign equivalent
1.	Technical Specialist		
	Fees		
	6 days field work in Jamaica		
	8 days reporting		
	2 days travel		
	total 16 days @ US$400/d		6,400
2.	Hotel and Subsistence		
	6 days field + 2 days travel		
	total 8 days		880
3.	Economist	600	
4.	Contingency (12%)	70	820
	Sub-total	670	8,100
	ESMAP Supervision		
1.	Staff time		3,000
2.	Travel (1 rt)		750
3.	Per diem (7 days)		750
4.	Contingency (12%)		500
	Sub-total		5,000
	Total	670	13,100

Financing

Technical Specialist's fees, travel and subsistence would be financed by ESMAP, as well as supervision costs; [illegible] the Economist's costs. Transportation and office space will be provided by FIDCO.

DEMAND MANAGEMENT - BUILDING CODE, ENERGY EFFICIENCY SECTION

1. Lead Ministry: Ministry of Mining, Energy and Tourism

2. Associated Ministries and Agencies

Bureau of Standards, Institute of Engineers, Jamaica Institute of Architects, Ministry of Industry and Commerce, Ministry of Construction.

3. Project Objectives and Justification

The project seeks to improve the energy efficiency of new buildings through publication and circulation of a National Building Code which will become a guide for design and construction. The energy efficiency standards would be developed in conjunction with the Jamaica Institutesof Architects and Engineers, and it is expected that they would quickly gain general acceptance. The standards would not therefore be mandatory.

Buildings constitute a very large percentage of the total energy use. Once buildings have been erected, efficiency improvements become difficult and costly. Initial efficient design is therefore critical.

The national building code would encourage Architects and Engineers to design energy efficient buildings by providing the required data and guidelines to do so.

It is estimated that at present some 30% of air-conditioning heat load could be avoided by shading designed into the building. Added to this some 20% of air-conditioned air is lost through infiltration around windows and doors. Of national power demand (excluding bauxite) air conditioners are estimated to account for about 30% on an annual basis at an estimated economic cost of US$9 million . A 50% improvement in air conditioner efficiency would therefore save up to $ 4.5 million p.a.

The cost of proper shading of buildings to reduce the air conditioning heat load and of the testing and certification of windows and doors to eliminate the excessive loss of air-conditioned air due to infiltration are shown below:

Equipment for Bureau of Standards Jamaica

DESCRIPTION	EQUIP COST	PUBLIC INFO/ STDS COST	CONSULTANT COSTS	TOTAL COST
Window Testing Chamber	28000	-	-	28000
Flowmeter Kit	4000	-	-	4000
Printing	10000	-	-	10000
Education	-	6000	-	6000
TOTAL				48000

International Consultant			
Travel 2 mission at US$1000	2000		
Substance at US$120	1680		
Fee 3 mnth/US$400/dy	24000	27680	
Local Consultants			
Technical Consultant 6 mth/US$100/dy	12000		
Legal Consultant 1 mth/US$100/dy	2000	14000	41680
SUBTOTAL		89680	
CONTINGENCY		8968	
TOTAL		98648	
		========	

4.4 Benefits and Costs

4.4.1 DATA = Office buildings in Kingston $25 - 30 \frac{kwh}{yr\ ft^2}$

Average = $27.5 \frac{kwh}{ft^2/yr}$

Fuel Oil at $6.2 \times 10^6 \frac{Btu}{BBL}$

JPS fuel generation = 94% (1986) (6% Hydro)
JPS losses = 15% (1986)
JPS heat rate = 11,500 Btu/kwh 1986

4.4.2 Assumptions = Building rate Lo 500,000 ft^2/yr

Hi 1,000,000 ft^2/yr

Energy saving building saves 30%

$27.5 \frac{kwh}{ft^2/yr}$ 0.30 = $8.25 \frac{kwh}{yr/\ ft^2}$

Fuel oil price US$15/bbl

4.4.3 Savings Estimate

$$Lo = \frac{500{,}000\ ft^2\ 8.25 \frac{kwh}{yrft^2}\ 11{,}500 \frac{Btu}{KWH}\ 0.94}{6.2 \times 10^6 \frac{Btu}{BBL}\ (1-0.15} = 8{,}461\ \frac{BBL\ per\ yr}{YR}$$

$Hi = 2 \times Lo = 16{,}922 \frac{BBL}{yr^2}$.

PROJECTIONS

After year	BBL/Yr. LO	Savings/$yr	BBL/Yr. Hi	Savings/$yr
1	8,461	126,900	16,922	253,800
2	16,922	253,800	33,845	507,700
5	42,305	634,500	84,610	1,269,000
10	84,610	1,269,000	169,220	2,538,000

Source: 1983/4 GOJ/USAID Energy Audits.

5. Further Project Preparation by MMET

5.1 Analysis of the financial feasibility of energy efficient building design indicates that the incremental cost of the energy-saving building could range from zero to 10%. Such a building can be expected to save approximately 30%, thereby returning the investor's incremental cost within five years.

As shown above, economic analysis of the benefits from a building code indicate potential gross foreign exchange energy savings of $125,000 - 250,000 per annum for the first year's new construction, compounding each year thereafter according to the rate of new construction. Therefore, after 10 years, annual savings would range between $1,250,000 - $2,500,000. Additional savings (not yet estimated) would result from the delayed need for expansion of the JPS power generation capacity.

5.2 Further economic analysis regarding the cost implications is required, and will be performed by MMET, and provided to IBRD for comments prior to project initiation. Increased economic costs will be largely local for A/E fees, concrete, and labour. Incremental foreign exchange costs for the efficient building would be reduced because of the smaller capacity of the air-conditioning system.

DEMAND MANAGEMENT - DOMESTIC APPLIANCES

ENERGY EFFICIENCY TESTING AND LABELLING

1.1 Lead Ministry

Ministry of Mining and Tourism

1.2 Associated Ministries

Bureau of Standards Jamaica

1.3 Background

1.3.1 The use of energy efficiency standards and appliance labelling has been widely used in industrialized nations as a mechanism to reduce energy consumption in the domestic and commercial sectors. The underlying economic rationale for the market intervention by government is centered on overcoming imperfect market knowledge and oligopoly supply situations.

1.3.2 The method of implementation has varied from mandatory legislation to self regulation by industry associations, the selected method being a function of many interacting market forces. Experience has shown that, once industry standards are published, reputable manufacturers and importers comply with the industry standard. However, some suppliers continue to sell the cheaper inefficient appliances to consumers who are unaware that the appliances are energy inefficient and not economic at the national level. Legitimate suppliers eventually pressure government to introduce legislation so that all can compete on an equal basis. Once legislated, the efficiency standards tend to become industry enforced and considered to be the minimum acceptable level. However, under the proposed project standards will be introduced on a voluntary basis.

1.3.3 The problem of energy efficiency standards for appliances in Jamaica was recognized during the World Bank/UNDP Energy Assessment. The present proposal is designed to focus on those appliances where the potential energy savings are the highest.

1.4 Project Justification and Benefits

1.4.1 In Jamaica, no basic guidelines, code or mandatory standards exist relative to appliance efficiency standards. Presently, appliances such as refrigerators, air conditioners, lighting and stoves

are of low efficiency1/, adding substantially to the growth and investment requirements in the power supply sector.

1.4.2 The Government, through the Bureau of Standards (BOS) with USAID assistance, has established laboratory and related facilities to test solar water heaters. However support for this activity will soon cease. The existing facilities can be easily modified to carry out a wide range of appliance testing and thus serve as a foundation for the introduction of an appliance labelling program and the development of a national code for energy efficient appliances. The use of available staff and facilities will mean a relatively short project lead time as the international consultants will prepare the draft testing standards.

1.4.3 Energy savings from increased efficiency from the introduction of energy standards and appliance labelling are expected to be significant in national terms.2/ The table below indicates estimated gross energy savings of up to US$5 million/annum resulting from full introduction of energy-efficient appliances in Jamaica.

1/ Discussions with the Institution of Engineers, Jamaica indicate that appliance efficiency levels in Jamaica are extremely low by world standards reflecting the lack of industry standards and high tariff barriers for the marginally more expensive high efficiency equipment. The high tariff duty adds substantially to the equipment cost and, at the private sector investment level, makes the appliance financially unattractive.

2/ The annual energy consumption of a Japanese refrigerator fell by 75% from 1973 to 1983; over the same period, the energy consumption of an average television set fell by 36%. Of more importance for tropical climates like that of Jamaica, the average performance of air conditioners has also significantly improved. Between 1973 and 1980 the average 2000 kcal/hr class air conditioner reduced its energy consumption by 39%.

Estimated Project Benefits

TECHNOLOGY	SECTOR	ASSUMPTIONS ANNUAL DEMAND bbl/yr.	% of Sector	Inc Effic %	Penetration Time Yrs	Bbl/Yr.	US$/Yr. @$15/Bbl
High-Efficiency A/C Units	Resid.	832500	5	30	5	12488	187320
-ditto-	C&I Elec	1642500	5	30	3	24638	369570
High-Efficiency Sm. Refrigerators	Resid.	832500	40	30	10	99900	1498500
-ditto-	C&I Elec	1642500	10	30	6	49275	739125
High-Efficiency Gas Stoves	Resid	645000	35	20	10	45150	677250
High-Efficiency Water Heaters	Resid.	832500	5	50	10	20813	312195
-ditto-	C&I Elec.	1642500	2	50	10	16425	246375
-ditto-	C&I Fuel	937500	5	50	8	23437	351555
High-Efficiency Elec. Motors	C&I Elec.	1642500	40	5	6	32850	492750
				TOTAL		324976	4874640

1.4.4 The major benefit of the program will be the reduction in electricity growth with attendant reductions in foreign exchange in the form of reduced oil imports and capital required for power investment. Thus, reduced public sector debt will be an important outcome for the government, lower energy costs for the domestic consumers, and more competitive cost structures for the commercial and industrial sectors.

1.4.5 The costs for the high efficiency equipment are still to be estimated in detail. However, preliminary economic analysis on selected cases by MMET has indicated the value to the economy of more rapid introduction of energy efficient equipment. For example, at US$15/bbl fuel oil prices, the economic rate of return is over 100% on the incremental cost for the importation of high efficiency window air conditioners (Energy Efficiency Ratio (EER) 10), rather than low cost units (EER 6). Similar results are expected for other high efficiency appliances, such as refrigerators, pilotless gas stoves, and electric motors. Further analysis of the net economic benefits of increasing appliance efficiency will be performed by MMET and submitted to IBRD for review, prior to the initiation of this project.

1.5 Project Implementation

1.5.1 As existing law requires appliances to be labelled, it will be administratively simple to include the energy efficiency requirements once the testing standard has been completed and the test facilities modified.

1.5.2 A priority list of appliances to be tested and labelled under the program will be prepared by the BOS with the assistance of consultants to be provided under the ESMAP Project, on the basis of national economic benefits.

1.5.3 A local consultant also to be provided under ESMAP will continuously coordinate the various private sector organizations which will be represented on a review committe under the auspices of the BOS. Thus, an important part of the project will ensure wide private sector participation.

1.6 Project Costs

1.6.1 Estimated project costs are shown in the following table:

Estimated Costs for Energy Standards and Labelling
(in US$ equivalent)

1.	Laboratory Equipment			
	Electrical Appliances	8000	8000	
	Air conditioners	4000	4000	12000
2.	Training and Promotion			8000
3.	Consultant Services			
	International Consultant			
	Travel 4 mission @US$1000	4000		
	Subsistence @US$120 for 33 days	4000		
	Fee 3 mnth/US$400/dy	24000		
	Local Consultants			
	Technical Consultant			
	6 mth/US$100/dy	12000		
	Legal Consultant			
	1 mth/US$100/dy	2000		46000
		Total		66000

1.7 Institutional Aspects

1.7.1 The project will be coordinated by MMET and implemented by the Bureau of Standards. No additional government staff are required to undertake and complete the project. Coordination of the private sector will be maintained by the local consultant who will provide support to the BOS and coordinate the private sector activities. The private sector will be heavily involved in the development of the standards and labelling program and the local consultant will maintain a coordinating linkage as well as ensuring the flow of international information from the main international consultant.

1.7.2 Consultants will be selected using World Bank procedures once the project has been approved. Suitable local consultants will be selected to carry out the necessary field work under the supervision of the international consultants.

BWS/Annex5

DEMAND MANAGEMENT - MIS

1. Lead Ministry: Ministry of Mining Energy and Tourism

2. Associated Ministries and Agencies

Statistical Institute of Jamaica.

3. Project Description

3.1 The Project comprises the establishment of an Energy Management Information System to be operated by the Energy Division of the MMET in conjunction with the Statistical Institute of Jamaica and the Planning Institute of Jamaica (PIOJ) and PCJ Center for Energy Studies.

3.2 The MIS will include:--

(i) the collection, by the Energy Division, of monthly energy demand statistics, with consumption of electricity and of each petroleum product disaggregated into sector, subsector and individual group demand;

(ii) the analysis of subsector and individual group energy efficiencies and trends in relative and absolute terms, in the light of prevailing economic conditions, and the comparison of such efficiencies against efficiencies outside Jamaica;

(iii) the formulation of appropriate demand management policy recommendations;

(iv) the monitoring of the impact of specific policies on the energy efficiency of target groups; and

(v) the issue by MMET within four weeks from the end of each calendar quarter of the above statistical information for each month in the quarter, and a summary of current energy efficiency trends and policies. /1

The project will be designed to optimize the use of available data, to limit the collection of new data to essential areas and to ensure that the energy efficiency analysis based on that data is focused on key policy areas.

3.3 To assist Government in the establishment and operation to MIS, the ESMAP Project will provide:

/1 Possibly to be issued as a supplement to the PIOJ Quarterly Economic Review.

(i) suitably qualified and experienced consultants to assist the MMET, PIOJ and the Statistical Institute in the design of the MIS system, in the initial collection of disaggregated supply data from PCJ and JPS, and demand data from the principal consumer groups, and in initial energy efficiency analysis and policy formulation; and

(ii) the provision of appropriate hard and software.

4. Benefits

The quality of any energy policy decision is essentially dependent upon the underlying statistics that support the policy implemented. It is expected that substantial investments in energy supplies could be deferred once energy demand patterns are established and the appropriate energy efficiency improvements introduced. Presently, substantial inefficiencies exists in the household sector. However, policy decisions to correct this are not possible due to the lack of detailed knowledge on how energy is consumed.

5. Staffing and Consultants

5.1 Staffing

No additional counterpart staff of the GOJ will be necessary for this project. A computer programmer/system analyst and a data processor are in place on the staff of the MMET.

Supervision of local and overseas consultants during field missions will be carried out by the Energy Economics Unit of the MMET while overall project supervision will be carried out by the World Bank.

Co-ordination with the Statistical Institute of Jamaica (STATIM) has been arranged by MMET and counterpart staff are available in SIJ.

5.2 International Consultants

International consultants ahve not yet been identified for this project. Contultants will be selected using World Bank procedures once the project has been approved. The international consultants will be responsible for ensuring the MMET system is compatible with information (in computer disk form) provided by STATIN.

5.3 Local Consultants

Suitable local consultants are available to carry out the necessary field work under the supervision of the international consultants.

6. Project Costs and Schedule

6.1 Costs

6.2 Equipment

Cost Estimate US$

International Consultants			US$
Travel	3 US$1000	3000	
Subsistance	[illegible]/dy	5000	
Fee	7 wk [illegible]/dy	[illegible]	25000
Local Consultants (2)			
Travel	$20/dy * 3 [illegible]	300	
Expenses		1[illegible]00	
Fee	4 [illegible]/con [illegible]	[illegible]	9000
Equipment			
Computer		5000	
Modem		500	
Printer		2000	
Computer Boards		1000	
Software		1000	9500
	Subtotal		44980
	Contingency 10%		4498
	Total		49478

7. Schedule

7.1 The total time for the project will be nine months and consist of three missions by the international consultants.

7.2 The first mission will consist of one week in which will allow for the review of the existing systems, initial consultation with GOJ and the local consultants and detail work plan for the following two missions. Equipment selection will be approved by the MMET prior to purchasing by the international consultant.

7.3 The second mission will consist of field work and installing the MIS on the MMET computer system. The system capability will be test run and evaluated to meet MMET requirements. Counterpart staff will be training in the operation of the MIS as well as selection and use of the resulting economic/ energy statistics in developing energy policy.

7.4 The final mission will entail review of the MIS after three months operation by MMET. The international consultants will remedy any deficiencies in the system and make any necessary suggestions to further develop the system.

The World Bank
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INTERNATIONAL DEVELOPMENT ASSOCIATION

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September 23, 1986

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Permanent Secretary
Ministry of Mining, Energy and Tourism
P.O. Box 495
2 St. Lucia Avenue
Kingston, Jamaica

Re: Jamaica - ESMAP Program

Dear Dr. Kirton:

May I thank you and your staff, particularly Mr. Nigel Grant and Miss Beulah Clarke, for the courtesy and helpfulness shown to Messrs. Poncia, Gaskin and van der Plas during their recent visit to Jamaica.

I am pleased that the mission was able to develop the proposed ESMAP program with you and your colleagues, as set out in the Aide Memoire of 9/8/86. As you know, certain minor textual changes were made at the last moment, and I therefore enclose for the record a further copy of the Aide Memoire, which I trust that you will find reflects those changes accurately.

We are now in the course of preparing Activity Initiation Briefs for the ESMAP projects proposed and, following the conclusion of their internal Bank review, we will write to you further regarding consultant terms of reference and selection and project implementation.

In the meantime, as arranged with Mr. Grant, I look forward to receiving the financial and economic cost analysis from MMET on the proposed Domestic Appliance Labelling and Building Code Projects (Annex A4, para. 5.2 and Annex A5, para. 1.4.5 of the Aide Memoire). In addition, perhaps you would let us know if the other agencies working with the mission in the preparation of the ESMAP projects -- particularly the Forestry Department, FIDCO, Bureau of Standards, Ministry of Construction, Institutes of Architects and Engineers, and Planning Institute -- have any comments on the final text of the Aide Memoire.

I believe that the proposed ESMAP projects should make a significant contribution in assisting the Government of Jamaica follow up the principal recommendations of the Energy Assessment Report, and I am looking forward to working with you and your colleagues in this regard.

Sincerely,

Robin W. Bates
Acting Division Chief
Energy Strategy and
Preinvestment Division II
Energy Department

Attachment: Aide Memoire

cc: Ms. B. McSweeney, UNDP, Jamaica
Ms. D. Demers, CIDA, Hull, Canada

CAH:JAM-a-2

STP - energy sector (assessment)

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

✓ F 337

JNT | A3 | 00J

September 23, 1986

Dr. T.M. Lillico
Calle Parcelas, 37
Las Maravillas
Ca'n Pastilla
Mallorca, Spain

Dear Dr. Lillico:

In response to your recent letter, it is my pleasure to forward to you a copy of the Sao Tome and Principe Energy Assessment Report. I should note that this report, which has been produced under the joint UNDP/World Bank Energy Sector Programme, has a restricted circulation and is being made available to you on a confidential basis as a backgound for your work with the OPEC Fund and African Development Bank. You have also asked for a copy of the energy assessment study for Comoros. Unfortunately, an assessment mission to Comoros has not yet taken place and this study is therefore not available.

We wish you every success in your work and appreciate your interest in the joint UNDP/World Bank Energy Sector Programme.

Yours sincerely,

Bernard Montfort
Division Chief
Energy Strategy and
Preinvestment Division I
Energy Department

Attachment

MAhmed:mdd

INT/83/005
9/23/86

Back to office report

THE WORLD BANK INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

INT 183/005

DATE: September 23, 1986

TO: Messrs. R. Dosik, Chief, EGYS2 and B. Montfort, Chief, EGYS1

FROM: C.R. Poncia, G. Gaskin (EGYS2) and R. van der Plas (EGYS1)

EXTENSION: 75284

SUBJECT: JAMAICA: ESMAP Program - Mission to Jamaica
Back-to-Office Report

1. In accordance with our Terms of Reference of August 26, 1986, we visited Jamaica from September 1 through September 9, 1986 and met with representatives of the Ministry of Mining, Energy, and Tourism (MMET) and a wide range of other public and private sector agencies, as listed at Annex AI to the Aide Memoire attached as Annex A. The purpose of the mission was to finalize the proposed ESMAP projects with the Government of Jamaica (GOJ), including specific project descriptions, budgets and outline Terms of Reference.

2. In designing the ESMAP projects, the mission sought to ensure that they would (a) be within the limited administrative resources of GOJ, and (b) build on existing studies and/or facilities where appropriate, encourage a positive private sector response and focus on quantifiable results.

Summary

3. The mission proposes the following ESMAP projects:

Subject	Implementation Period	Cost a/ US$ Equivalent
Charcoal Cycle Improvement	11/86 - 10/87	60,000
Sawmill Waste	11/86 - 2/87	8,000
Demand Management		
a) Mgt.Inf.Syst.	01/87 - 12/87	50,000
b) Building Code	02/87 - 12/87	99,000
c) Domestic Appt. Standards	02/87 - 12/87	66,000
Total		283,000

a/ Excluding ESMAP supervision.

Full details are set out in the attached Aide Memoire.

Financing

4. The direct costs of the proposed projects would be financed by the Canadian International Development Agency (CIDA) out of the CS$610,000 (US$439,000 equivalent) earmarked by them for the Jamaica ESMAP Program. CIDA have also agreed in principle to finance the direct cost of the Jamaica Petroleum, Procurement, Refining and Distribution Report about to be issued in Blue Cover (BTOR dated September 22, 1986) at an approximate cost of US$45,000. The mission recommends (para. 10 below) that the balance of the CIDA funds, about US$110,000 equivalent, be retained for a possible project to assist Government develop an energy efficiency incentives and investment program, following resolution of the economic policy issues currently under review between GOJ, USAID, IMF, and IBRD.

Brief Description of Proposed Projects, with Rationale

5. The proposed Charcoal Cycle Improvement project is designed to introduce the casamance improvement to the traditional earthmound kilns, which are currently used in Jamaica for charcoal production, and would be implemented by the Department of Forestry of the Ministry of Agriculture, with the coordination of the Energy Division of MMET. These improvements are simple (revised wood laying and installing chimneys in the existing kilns, using scrap oil drums), the results significant (up to double yield and half production time), and the producers accessible. In the mission's view, focusing on charcoal production will achieve a positive short term improvement in energy efficiency. The project will be undertaken at about the same time as CIDA's forest assessment study which is now under preparation. Thereafter a longer-term household energy study may be appropriate.

6. The proposed Sawmill Waste Utilization project will assist the Forest Industry Development Corporation (FIDCO) to make charcoal out of its sawmill waste, which is currently discarded, which project would be implemented by FIDCO, with MMET coordination. Given the concentration of the waste wood and the available FIDCO resources, brick beehive kilns are recommended. At current charcoal prices, the kiln investment (about JS$100,000) should be recoverable within about six months from the startup of charcoal operations. Again this would be a positive, results-oriented short-term project, with a low economic cost.

7. Three energy demand management projects are proposed. The first is the preparation and issue of Energy Efficiency Standards as part of the Jamaica Building Code, which project would be implemented by the Ministry of Construction and the Jamaica Institutes of Architects and Engineers, with MMET coordination. The mission estimates that, at current electricity tariffs, the efficiency standards could result in savings, principally through reduced airconditioning load, of about $250,000 p.a. in the first year, rising to US$2.5 million p.a. by year 10 onwards (depending on the rate of new building). The increased costs of more efficient airconditioning equipment would be reduced by the smaller capacity required. While the net cost increase is not expected to be substantial, further financial and economic cost data is required and will be provided by MMET prior to project implementation.

8. The second demand management project proposed is the introduction of Domestic Appliance Energy Efficiency Labelling, which project would be implemented by the Jamaica Bureau of Standards (BOS), with MMET coordination. The USAID Energy Sector Program includes a BOS solar water heater efficiency testing laboratory, and procurement is now underway. The proposed ESMAP project would assist BOS to adapt this laboratory for a range of domestic appliance testing. Once the laboratory was operating, BOS, under its existing mandatory labelling authority, would then prescribe appliance efficiency labelling requirements, based on manufacturers' specifications and/or BOS laboratory testing. As indicated in para. 1.5 of Annex 5 of the Aide Memoire, potential gross savings resulting from increased efficiency domestic appliances in Jamaica could rise to US$5 million p.a., depending on the rate at which such appliances won market acceptance. Again, further financial and economic data on the costs of increased efficiency appliances is required and will be provided by MMET prior to project implementation. Given the success of efficiency labelling elsewhere (particulary the U.S. and Japan), the net benefits of the labelling program are expected to be substantial.

9. The third demand management project proposed is the improvement of the existing MMET Management Information System (MIS), which project would be implemented by the Jamaica Institute of Standards (IOS) and MMET jointly. Currently, PCJ and Jamaica Public Services provide petroleum product and electricity sales data to MMET which, in cooperation with PCJ Engineering, issues a periodic report on sectoral energy efficiencies. The report is not, however, prepared regularly, nor disaggregated by main consumer group. The mission's discussions with IOS indicate that it would be willing to cooperate with MMET by collecting disaggregated efficiency data under its regular data collection system. The proposed ESMAP project would assist MMET and IOS to design a simple MIS system, with requisite hardware and software, and to prepare a quarterly statistical report on energy consumption, prices and efficiency, including a summary of current efficiency trends and policies. This project should provide a reliable basis on which demand management policies can be formulated and their impact monitored, including the impact of the Energy Efficiency Standards and Domestic Appliance Labelling Projects referred to above.

10. In addition to the building and domestic appliance subsectors, the Jamaica industrial sector (excluding the bauxite industry, where efficiency levels are relatively high) offers substantial opportunities 1/ for increased energy efficiency. For this reason, the GOJ established in 1982 an Energy Credit Fund (ECF). The ECF was administered by the National Development Bank and the commercial bank network, and offered a total of US$8.4 million equivalent funds (of which USAID provided US$5.9 million) to qualifying industries at below-market interest rates. However, only about US$110,000 of this fund has been drawn down to date despite an extensive energy audit program, and the ECF

1/ Preliminary Report, January 1986, of the Jamaica Energy Conservation Task Force.

is now being wound down. It appears that favorable interest rates alone were insufficient to stimulate the requisite private sector conservation investment, given Jamaica's high customs and excise duty rates, lack of taxation incentives and unfavorable overall investment climate. These matters are, of course, currently under review between Government, USAID, IMF, and the Bank. If progress is made, the mission recommends that consideration be given to the possibility of an ESMAP efficiency incentives study.

11. The proposed ESMAP projects do not include the Electricity Cogeneration Study proposed by JPS. As indicated in the Aide Memoire (paras. 11-16) the mission was unable to substantiate the potential volume and type (firm or intermittent) of power supply to JPS from sugar producers, the cement factory or, indeed, the proposed 130 MW coal-fired generator set at Clarenden Alumina smelter. Pending clearer indication as to potential supply, the mission recommends that the proposed study (costing under present estimates in the neighborhood of $150,000) should be deferred.

Implementation

12. The proposed five ESMAP projects would be implemented by the agencies directly concerned -- Forestry Department, FIDCO, BOS, Ministry of Construction and MMET. While MMET would play a coordinating role, it would be directly responsible for only one project, the MIS improvement. Furthermore, project implementation would be phased, with the demand management projects start-up deferred until January and February 1987. The mission therefore considers that the ESMAP project implementation should not exceed available GOJ (and EGYS2) institutional resources.

Follow-up

13. AIBs for the proposed projects are now in preparation and will be circulated shortly. In the meantime, a proposed follow-up letter to the Permanent Secretary, MMET, is attached at Annex B and to CIDA at Annex C.

Distribution

Messrs./Ms.: Moscote, Halperin, Lambertini, Larrieu (o/r) (LCPEN)
Voyadzis, Delvoie, Robertson (LC2VC)
Heidebroek, Beattie (LCPAB)
Morgan (PPDES)
Langer (LOA)
Hume, Saunders, Iskander, Dosik (o/r), Byer, Floor, Mian, Hristodoulakis (EGY)

cc: Ms. B. McSweeney, UNDP Res. Rep., Jamaica
Ms. D. Demers, Project Officer, Jamaica Section, CIDA, Ottawa

CAH:aim

AIDE MEMOIRE

JAMAICA - UNDP/IBRD ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME

1. Representatives of the Government of Jamaica, of various Jamaican public and private sector organizations and of the United Nations Development Programme (UNDP), Canadian International Development Agency (CIDA) and the World Bank met in Jamaica from September 1 - 9 1986. The meetings reviewed the proposed energy sector assistance to be provided to the Government of Jamaica under the UNDP/IBRD Energy Sector Management Assistance Programme (ESMAP) which is to be provided with the assistance of CIDA. A detailed list of those representatives is attached at Annex 1.

2. The ESMAP assistance was discussed under four headings - I Forestry Fuelwood, II Sawmill Waste Utilization, III Electricity Cogeneration and IV Energy Demand Management. The conclusions of these meetings and description of the proposed assistance to the Government of Jamaica in each of these four areas are now summarised.

3. I. FORESTRY/FUELWOOD

The meetings reviewed the current "charcoal cycle" covering wood sources (forest reserves, private wood lots and public land clearing areas), the production of charcoal through the use of traditional earthmound kilns, its transportation to Kingston and other urban centres and the wholesale and retail charcoal marketing.

4. As regards Jamaica's national wood resources, both forest reserves and privately owned wood, the Jamaica Forestry Department representatives explained that CIDA is preparing a project to conduct and finance a forest inventory survey, including an evaluation of utilization rates on both a sustainable and non-sustainable basis and of actual and prospective deforestation.

5. As regards charcoal production, the meetings agreed that the current system of charcoal production by private sector charcoalers using traditional earthmound kilns was inefficient, and that the introduction of low cost kiln improvements could increase the rate of charcoal production per unit of wood and cut down production time. The Bank mission indicated that the "Casamance kiln" could, in theory, double yield and halve production time. It explained that the improvement, which consisted of revised wood laying and installation of a kiln chimney using scrap metal drums, was cheap and quick and could easily be adopted by the traditional charcoalers.

6. Government and ESMAP representatives agreed that an ESMAP project should be undertaken to introduce improved kilns into the charcoal production process in Jamaica, thereby contributing to the more effective utilization of Jamaica's wood resources. It was agreed that the detailed design of the ESMAP project and its financial and economic evaluation should take

account, not only of the improved charcoal production yields and rates, but also of the impact of increased production on the charcoal price levels and on overall charcoal market conditions. The project should also examine (i) how to maintain the current price of charcoal and justify any increases, (ii) how to introduce some return for wood producers; and (iii) whether and if so, how to introduce a tax on charcoal.

7. It was agreed that the project would be coordinated by MMET, designed and implemented by the Forestry Department, with the assistance of an Energy Economist and Charcoal Specialist to be retained by the World Bank under ESMAP, with national staff and resources to be provided by GOJ. Provisional Terms of Reference and Cost Estimates are attached at Annex 2.

8. Government representatives also stressed the need for future studies, in addition to the CIDA forest inventory study, regarding the possibility of establishing new fuelwood plantations (now being considered by FAO as a part of the Tropical Forestry Action Plan) and research into the suitability for fuelwood production of alternate species. The Bank representatives explained the limits of available ESMAP resources, but agreed to give further consideration to these proposals.

9. The Bank mission also recommended that MMET and the Scientific Research Council (SRC) should examine the efficiency of both charcoal and kerosene cooking stoves, possibly with the assistance of the Bureau of Standards' proposed efficiency testing facilities (see para. 20 below). The mission confirmed its willingness to consider a study of stove efficiency under the ESMAP programme, if this should prove appropriate.

II SAWMILL WASTE UTILIZATION

10. The meetings between MMET, Forestry Department, FIDCO and IBRD representatives examined the possible economic utilization of the substantial wood residues generated each year by FIDCO as waste. The following ESMAP project was outlined(for which provisional Terms of Reference and Budget are attached at Annex 3.

Background

a) One large sawmill exists in Jamaica and several smaller scale operations. The large sawmill, Forest Industries Development Company Limited (FIDCO), is 100% Government owned and has a long term lease from the Government at a nominal rent of 23,800 ha of forest land. FIDCO maintains these forests and has projected an annual harvest of 40,000m^3 of logs until 1994 and thereafter 80,000m^3 per year. As a result, FIDCO has a large accumulation, particularly in the sawmill, of unused wood resources.

Availability of Wastes

b) FIDCO has three different types of wastes available, from: (i) clear cut operations to establish new pine plantations; (ii) logging operations in standing timber stock; and (iii) sawmill wastes. The wastes from (i) and (ii) are left in the forests to rot, or to be burned. The wastes from the sawmill are a nuisance due to the limited storage capacity and are burned or used as landfill. The wastes from (i) and (ii) are excluded from the calculation of benefits below; the current wastes from (iii) are estimated at 5,130 m^3 of sawdust; 11,070m^3 of offcuts, slabs and edgings; and 810m^3 of bark per annum until 1994, and double thereafter.

Utilization of Wastes and Marketing

c) The Caribbean Development Bank conducted a study (December 1985) to evaluate the use of sawmill wastes to generate power for internal consumption and sale of surplus power to JPS. The CDB study report shows that the investment of US$3 million for equipment to generate electrical power from the sawmill residues would not be a viable option for FIDCO.

d) Alternative use of wastes could, among other things, be carbonization (charcoaling), densification (briquetting), and use of raw material (boiler fuel etc). However, before any conversion of these wastes is recommended, the potential market should be identified. As far as charcoal is concerned, the domestic market is well established with an approximate annual consumption of 50,000 tonnes. As far as sawdust briquettes are concerned, the domestic market and the industrial market (sugarmills; alumina; cement and lime production) are potential options. Export of charcoal or briquettes could also be considered.

Justification

e) If 60% of the solid sawmill wastes could be converted into charcoal, the estimated output would be more that 1000 tonnes of charcoal per year (equal to 40,000 bags of 55 lbs). This can be produced in four 35m^3 brick beehive kilns (conversion efficiency better than 25%, weight basis) which operate on a rotational basis. The estimated investments for kilns and

tools would be about J$100,000 (100% local currency) and the annual output would be J$400,000 with charcoal valued at a producer price of J$10 per 55 lbs bag. Two trained operators and at least two labourers would be employed fulltime.

Project Objectives

f) The objectives of the proposed project are threefold:

(i) to identify technically feasible and economically viable options to use FIDCO's forest residues and sawmill wastes;

(ii) to identify the size and location for potential markets of the converted wastes; and

(iii) to recommend a detailed plan for implementation to utilize the aforementioned wastes to the greatest extent, including budget, preferred equipment, outlay of factory, etc.

Project Follow Up

g) The FIDCO representatives confirmed that the charcoaling option was attractive to them since no foreign exchange was required. Assuming that the study confirms the financial viability of this option, they would expect to procede immediately with identification of investment funds and the construction of the requisite kilns. Alternatively, it is understood that CIDA has indicated its willingness to consider the financing of a briquetting plant if the ESMAP project establishes its viability.

III ELECTRICITY COGENERATION

11 (a) At separate meetings with MMET, JPS, FIDCO and JSH representatives, the Bank mission explained that the JPS cogeneration study proposal submitted by MMET and JPS to the Bank for financing under the ESMAP focused on the terms and conditions on which JPS would be prepared to purchase power from small producers, including purchase price, interconnection arrangements, standard form contracts, regulations and promotion.

(b) The Bank mission explained that, before proceeding with this study, ESMAP would need a preliminary assessment of the number of potential surplus power suppliers and the level of potential firm power (capacity) and intermittent power (energy)which might be available within a given price range. Only if this information were available, could the potential contribution of firm power to JPS, and the consequent savings in deferred capital investment[1] be assessed.

12. Potential power supplies to JPS (in addition to the possibility of 110 mw capacity from new facilites at Clarendon Alumina refinery, now under Government review) were examined. These included potential supply from:

(a) sugar estates, using bagasse;

(b) the Carib Cement Company;

(c) the FIDCO Sawmill; and

(d) various renewable sources, including biogas, ocean thermal, wind and solar.

13. As regards production from sugar estates, JSH representatives focused on the Frome and Monymusk Estates about to be rehabilitated under a proposed World Bank project. Other sugar estates were considered by JSA and MMET to be too small to be significant surplus power producers (i.e. Appleton, Worthy Park, New Yarmouth, Long Pond and Duckenfield). MMET and JSH representatives explained that power could be produced at the Frome and Monymusk Estates through high pressure (600 lbs. per sq. inch) or low pressure (200 lbs. per sq. inch) steam turbine generators. The high pressure alternative could provide at each estate up to 15 MW capacity and the low pressure of up to 3 MW. Frome has lower internal electricity demand than Monymusk, which has pumped irrigation.

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[1] See MONENCO - JPS Least Cost Power Generation Study October, 1985

Frome has a lower fibre content in its cane and a shorter cropping season (6 months compared to 7 months). On balance, JSH representatives indicated that at both estates a high pressure 15 MW system might produce about 42 GWh per annum surplus power and a low pressure 3 MW system about 7 GWh per annum surplus.

14. The JSH representatives explained that the proposed World Bank Sugar Rehabilitation Project included rehabilitation of the low pressure generation system at each estate, Frome and Monymusk. It was envisaged that, on rehabilitation, bagasse fueled power would be sufficient to meet the estate power requirements during the crop season, but no specific provision had been made for the supply of surplus power to JPS, nor provision made for baling or briquetting bagasse to permit year-round power generation. [1] To do this would require the installation (or, as in the case of Monymusk, the rehabilitation) of a condenser generator with associated cooling facilities and, if surplus power were to be provided on a firm basis, bagasse drying and baling facilities. JSH representatives indicated that a study was now approaching completion by BECHTEL regarding the installation of a new high pressure power generation system at Monymusk after the current rehabilitation was completed and Monymusk in full production.

15. As regards supply from the Carib Cement Company, JPS representatives believed that about 10 MW capacity might be available although not on a firm basis. Supply from the FIDCO Sawmill was not regarded as viable (see para 10(c) above). Power supply from renewable sources could be economic but JPS/MMET representatives did not consider this likely at current fuel oil prices.

16. The Bank mission therefore requested that MMET and JPS should put together more detailed information on the potential level of supply from the Frome and Monymusk Estates (based on the BECHTEL Study when available) and from the Carib Cement Company. They confirmed their willingness to examine the JPS Cogeneration proposal further in the light of that information.

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[1] The World Bank mission referred to the proposed IBRD Mauritius Sugar Rehabilitation Project including provision for bagasse drying and baling.

IV. DEMAND MANAGEMENT

Present Situation

17. Since the April 1985 Energy Assessment Report, progress has been made in some sectors in increasing energy efficiency. The main areas of improvement have been in the industrial sector but has been confined to the larger key sectors of alumina and cement. No disaggregated data is available on the other industrial sectors but macro level data suggest some operational efficiency improvement but little investment in new technology. 1/

18. Analysis of the available data indicates that energy pricing is at appropriate levels (with some distortion particularly for LPG and Kerosene) within the pricing structures. Pricing electricity at the macro level is estimated at -0.07. Thus an inelastic demand situation now exists which indicates that pricing is no longer a demand management option for further reduction in energy consumption, and that further energy reduction can only be achieved by the introduction of new technology. Poor performance in the domestic, commercial, small industry and transportation 2/ sectors indicates that investment in new technology will be a priority issue.

19. To assist in the investment of new technology by industry, Government, with USAID assistance, established in 1984 a US$8.3 million Energy Credit Fund (ECF) administered through the National Development Bank and the commercial bank network. However, the ECF has not been a success. To date only US$400,000 has been disbursed, and the ECF is now being wound down. Despite the relative attractive interest rates offered, industry response was weak reflecting concerns regarding high tariffs, lack of taxation incentives and the investment climate generally.

Proposed Government Strategy and the role of ESMAP.

20. In the short term, the Bank mission recommends that Government focus on improving energy efficiency in key low efficiency sectors, particularly domestic and commercial. To achieve positive results within a short time frame, the ESMAP program would assist Government;

(1) to finalise and publish a building code with minimum energy efficiency standards;

(2) to introduce energy efficiency labelling requirements for domestic appliances and complete the equiping of its energy, efficiency laboratory to undertake the testing of domestic appliances.

1/ (Preliminary Report January 1986 Energy Conservation Task Force).
2/ (Upgrading of the Kingston Metropolitian Highway systems is currently under implementation under a World Bank Project, so this subsector is not addressed under the proposed ESMAP projects).

Provisional discriptions and budget for these projects are set out in Annexes 4 and 5 respectively.

21. In the longer term, the Mission recommends that Government strengthen the statistical basis on which demand management policies can be formulated and national energy efficiency monitored. As recommended by the Energy Assessment Report, Government has now introduced a management information system (MIS) for this purpose. However, the MIS provides only highly aggregated data, thus inhibiting the development of detailed sector energy policies which can address the appropriate market distortions. The ESMAP program would assist Government to develop the MIS into an effective policy formulation and monitoring tool.

22. As indicated by the ECF experience, the successful promotion of private sector energy efficiency investment depends upon an attractive, fiscal and monetary policy environment for investment generally. Since the Government currently has these matters under active review, the Bank mission does not propose any specific initiative at this time under the ESMAP program. However, when Government program is complete, the mission proposesthat consideration be given to the inclusion in the ESMAP program of an Energy Efficiency Incentives study.

23. Details of the proposed project are set out in Annex 6.

24. The Bank mission explained that the proposed ESMAP projects had been designed to take into account available institutional resources in MMET and the other public and private sector organizations concerned. Thus MMET would undertake the overall coordination of all the proposed ESMAP projects through its Energy Division.[1] The kiln improvement project would be implemented by the Forest Department, and the sawmill waste utilization project would be implemented by FIDCO. On the demand management side, the domestic appliance efficiency labelling and testing project would be implemented by the Bureau of Standards, who would also implement the Building Code project, in close coordination with the Institute of Architects and Engineers. Finally the MIS project would be implemented by MMET directly, in close coordination with the Institute of Statistics (who would be responsible for data collecting) and with PIOJ and PCJ Engineering - Special Energy Projects, (who would be responsible for providing MMET with analytical support). As regard all projects, it was agreed that MMET should telex the Bank at the end of each calendar month a short summary of project implementation progress.

25. Again with institutional constraints in mind, the Bank mission suggested that implementation of the ESMAP projects under the coordination of MMET should be phased. Thus it was proposed that the kiln improvement and sawmill waste utilization projects should be commenced as soon as possible with consultants in place by November 1, 1986. While planning of the other projects should also begin straight away, the Bank mission suggested that the MIS Consultants should not start working until January 1, 1987. Finally it suggested that the consultants for the Building Code and Appliance Testing projects should start in February 1987.

26. The Bank mission indicated that the Aide Memoire had been prepared as a basis for the develoment of the ESMAP projects. On the Bank side, they indicated that Activity Initiation Briefs, including detailed terms of reference, would now be prepared for each proposed project and, following internal clearance, would then be submitted to the Government for comment. In the meantime, it was suggested that MMET might wish to circulate the Aide Memoire to the other agencies concerned, particularly PIOJ, Forest Department, FIDCO, the Bureau of Standards, the Statistical Institute and PCJ Engineering.

27. The Bank mission confirmed that UNDP and CIDA representatives had been briefed in full during the mission and that the Bank would, of course, continue to brief them as project implementation proceeded.

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1. Under the leadership of Mr. Nigel Grant, Director of Economic Planning and Mr. W. Boyne, Project Director.

VI. CONCLUSION

28. The Jamaica ESMAP programme would therefore comprise:

Subject	Implem. Period	ESMAP Contribution /1 US$ Equivalent
1. Kiln Improvement	11/86 - 10/87	60,000
2. Sawmill waste	11/86 - 2/87	8,000
3. Demand Management		
a) Building Code	2/87 - 12/87	99,000
b) Domestic app.	2/87 - 12/87	66,000
c) MIS	1/87 - 12/87	50,000
TOTAL		283,000

/1 Excluding ESMAP supervision costs.

29. As indicated above, consideration would be given to the possibility (financial and institutional resources permitting) of further ESMAP assistance to Government on (i) kerosene and charcoal stove efficiency and (ii) electricity cogeneration when further data has been collected by MMET, and (iii) energy efficiency incentives when Governments' current fiscal and monetary policy review is complete.

Date: September 9, 1986

Signed:

....

GOVERNMENT OF JAMAICA WORLD BANK

JAMAICA - AIDE MEMOIRE
PROPOSED ESMAP PROJECTS

LIST OF PERSONS MET

1. MINISTRY OF MINING, ENERGY AND TOURISM - ENERGY DIVISION

N. Grant	-	Director Energy Economics Unit
D. Keith	-	Energy Conservation Adviser, USAID
H. Khan	-	UN Energy Economist
A. Lawson	-	Alternative Energy Engineer

2. MINISTRY OF FINANCE AND PLANNING

H. Milner	-	Financial Secretary
S. Tyndale	-	Director of Fiscal

3. MINISTRY OF PUBLIC UTILITIES AND TRANSPORT

Keith Bisnott	-	Advisory and Monitoring Unit
Roy Alexander	-	-do-
Fred Hudson	-	Transport Authority

4. MINISTRY OF AGRICULTURE - DEPARTMENT OF FORESTRY

R. Jones	-	Director
K. Porter	-	Research Officer
P. Virgo	-	- do -
D. Leslie	-	Marketing Officer

5. FOREST INDUSTRY DEVELOPMENT CO. LTD.

G. Symes	-	Managing Director
O. Evelyn	-	Manager Technical Services

6. MINISTRY OF INDUSTRY AND COMMERCE

P. Humphrey	-	Director
L. Mullings	-	Director

7. ENERGY POLICY STEERING COMMITTEE

J. Proudfoot	-	Chairman
T. Tuschak	-	Technical Secretary, USAID Planning Adviser to MMET

8. PLANNING INSTITUTE OF JAMAICA

T. James	-	Senior Engineer, Industry and Energy Division

9. JAMAICA PUBLIC SERVICE CO. LTD.

R. Miller	-	Manager System Planning Department
H. Higgins	-	Acting Director Engineering and Projects

10. PETROLEUM CORPORATION OF JAMAICA, ENGINEERING LIMITED

W. Ashby	-	Manager, Centre for Special Energy Studies

11. JAMAICA BUREAU OF STANDARDS

R. DaCosta	-	Head, Engineering
C. Broomfield	-	Head, Building and Associated Materials Dept.

12. STATISTICAL INSTITUTE OF JAMAICA

C. McFarlane	-	Director General
V. James	-	Director, Establishments Division
M. Bartley	-	Director Administrative Stats.
A. McKenzie	-	Director National Accounting Stats.

13. ENERGY CREDIT FUND/NATIONAL DEVELOPMENT BANK

L. Bailey	-	Manager ECF

14. COLLEGE OF ARTS, SCIENCE AND TECHNOLOGY/VOCATIONAL TRAINING DEVELOPMENT INSTITUTE

B. Silvera	-	(CAST)
I. Fowlin	-	(VTDI)

15. SCIENTIFIC RESEARCH COUNCIL

H. Lowe	-	Permanent Secretary
M. Anderson	-	Director, Research and Policy

16. JAMAICA SUGAR HOLDINGS

R. Campbell	-	Managing Director

17. TATE AND LYLE

J. Blanchard	-	Engineering Director

18. PRIVATE SECTOR-ORGANIZATIONS

P. McIntosh	-	Private Sector Organization of Jamaica
O. Pollack	-	Jamaica Chamber of Commerce
R. Chisholm	-	Small Business Association

19. PRIVATE SECTOR - TRANSPORT

L. Chin	-	C.L.C. Transport
G. Bloomfield	-	Bloomfield Jamaica - COSA
H. Grant	-	JMBA
C. Moore	-	Moore's Transport
G. Thomas	-	JMBA
R. Wilson	-	Stage Carriage Mini Bus Association
E. Milwood	-	JMBA
M. Smith	-	Moore's Transport

20. PRIVATE SECTOR - CHARCOAL

N. Gray	-	M.D. Graymill Engineering Company

21. INSTITUTE OF ARCHITECTS AND ENGINEERS

N. E. Isaacs	-	President, Institute of Engineers
B. Nelson	-	Past President, Institute of Engineers
O. P. Woodham	-	Past President, Institute of Engineers

FORESTRY/FUELWOOD (KILN IMPROVEMENT)

I. Terms of Reference

1. The Energy Economist and the Charcoal Specialist shall -

(a) review the current methods of charcoal-making and marketing in Jamaica, including -

(i) an analysis of the main geographical locations of charcoal-making;

(ii) a socio-economic profile of the charcoaling communities;

(iii) a review of their methods of collecting wood; and

(iv) an assessment of their current production costs, as well as of the whole marketing mechanism and the level of income of all those involved in the charcoal supply chain.

(b) identify appropriate charcoal kilns (in particular the Casamance kiln) for use in Jamaica, including -

(i) field testing and demonstration of those improved kilns which are considered to be the most appropriate ones for Jamaica;

(ii) developing and giving a training course in the construction and use of the identified kilns, which course inter alia will deal with subjects such as: the carbonization process, use and maintenance of the kiln, and analysis of the kilns' efficiency; and

(iii) determining acceptable investment and production costs of the kilns (including local availability of appropriate scrap materials for its construction), the availability of such materials to the local charcoal producers, as well as of appropriate incentive systems if necessary for the manufacturing and the adoption of the improved kilns.

(c) prepare an action programme including costs and implementation schedule, based on the results of (a) and (b), providing for the introduction of improved kilns into Jamaica, including -

(i) training and technical support requirements for charcoal producers to have them adopt more efficient charcoal conversion techniques;

(ii) appropriate government policies with regard to credit facilities, taxation measures and other incentives to promote the use of improved kilns;

(iii) an evaluation of the feasibility of linking the producers of fuelwood (as suppliers) to the charcoal producers; and

(iv) an analysis of the possible impact of the use of improved kilns on the output of charcoal production, retail prices of charcoal, incomes of the charcoaling communities and ways and means to monitor and regulate charcoal production and its market; and

(d) assist the Forest Department to implement the action programme, including the prescribed modification by about 40 charcoal producers of their kilns, and the training and assistance to those producers in the operation of the improved kilns, and to monitor the impact of such modification on charcoal production in Jamaica.

2. The two consultants, of whom the Energy Economist shall be the team leader, shall carry out the study over a period of about two calendar months during which about 36 days each shall be spent in Jamaica and about 10 days each in their home office. Within one month of the conclusion of their field work, the consultants shall submit a draft report to the World Bank for review, and then finalize their report taking into account the Bank's comments. The study shall be carried out under the supervision of the Bank in cooperation with the Forestry Department.

3. The Forest Department will provide staff (charcoal production trainers and enumerators), transportation, labour and raw materials (wood) as required for the carrying out the ESMAP project, including training of about 40 charcoal producers and the modification of their kilns.

4. Not later than 6 months following the conclusions of the consultants field work, the Forestry Department should prepare a report evaluating the results of the kiln improvement upon charcoal production in Jamaica.

II. BUDGET

	US$
1. Fees	
Energy Economist	
36 (field) + 2 travel + 10 (home) x 400	19,200
Charcoal Specialist	
36 (field) + 4 travel x 300	12,000
Local Surveyors	10,000
2. Travel	
2 rt.	2,800
3. Per diem	
72 (field) + 6 (travel) + 10 (home)	9,900
4. Contingency (12%)	6,500
Sub-total	60,400

ESMAP Supervision

1. Staff time	10,000
2. Travel 2 rt. Washington-Jamaica	1,500
3. Per diem: 14 (field)	1,500
4. Contingency (12%)	1,600
Sub-total	14,600
Grand total	75,000

SAWMILL WASTE UTILIZATION

I. Terms of Reference

1. The Technical Specialist should visit Jamaica for about six working days to examine the technical feasibility for FIDCO to utilise its forest residues and sawmill wastes, including briquetting, carbonizing and use as is. Together with the Economist, he should prioritize the different options according to economic and financial viability and determine the potential markets for the end-products, and potential macro-economic impacts.

2. In particular, the Technical Specialist should -

   (a) identify the different sources of waste, the quantities available over time, the potential end-products and their theoretical yields;

   (b) determine the best technical methods to convert the different types of wastes into the respective end-products;

   (c) identify the potential market for the different types of output, required changes before the output can be used, and assess potential macro-economic implications; and

   (d) design a detailed plan for implementation, including waste collection, conversion techniques, budget, manpower and equipment requirements, organizational structure, and factory outlay.

3. The Economist, who will be provided by MOA, PIOJ or MMET, should assist the Technical Specialist who will supply him with cost figures for the proposed technical options. The Economist should determine the best financial and economical options, and the financial implications for potential users of the carbonized, densified, or raw products, assessing their market acceptability.

4. In the design of the project, care must be taken to ensure that (i) the introduction of charcoal or briquettes into the market is not priced at levels injurious to other producers; and (ii) that only waste byproducts from normal sawmilling operations are used.

5. Reporting

   The Technical Specialist should prepare a draft final report, with the assistance of the Economist, and submit the same to ESMAP within three weeks after leaving Jamaica.

II. BUDGET

		Local US$	Foreign equivalent
1.	Technical Specialist		
	Fees		
	6 days field work in Jamaica		
	8 days reporting		
	2 days travel		
	total 16 days @ US$400/d		6,400
2.	Hotel and Subsistence		
	6 days field + 2 days travel		
	total 8 days		880
3.	Economist	600	
4.	Contingency (12%)	70	820
	Sub-total	670	8,100
	ESMAP Supervision		
1.	Staff time		3,000
2.	Travel (1 rt)		750
3.	Per diem (7 days)		750
4.	Contingency (12%)		500
	Sub-total		5,000
	Total	670	13,100

Financing

Technical Specialist's fees, travel and subsistence would be financed by ESMAP, as well as supervision costs; [illegible] the Economist's costs. Transportation and office space will be provided by FIDCO.

DEMAND MANAGEMENT - BUILDING CODE, ENERGY EFFICIENCY SECTION

1. Lead Ministry: Ministry of Mining, Energy and Tourism

2. Associated Ministries and Agencies

Bureau of Standards, Institute of Engineers, Jamaica Institute of Architects, Ministry of Industry and Commerce, Ministry of Construction.

3. Project Objectives and Justification

The project seeks to improve the energy efficiency of new buildings through publication and circulation of a National Building Code which will become a guide for design and construction. The energy efficiency standards would be developed in conjunction with the Jamaica Institutesof Architects and Engineers, and it is expected that they would quickly gain general acceptance. The standards would not therefore be mandatory.

Buildings constitute a very large percentage of the total energy use. Once buildings have been erected, efficiency improvements become difficult and costly. Initial efficient design is therefore critical.

The national building code would encourage Architects and Engineers to design energy efficient buildings by providing the required data and guidelines to do so.

It is estimated that at present some 30% of air-conditioning heat load could be avoided by shading designed into the building. Added to this some 20% of air-conditioned air is lost through infiltration around windows and doors. Of national power demand (excluding bauxite) air conditioners are estimated to account for about 30% on an annual basis at an estimated economic cost of US$9 million . A 50% improvement in air conditioner efficiency would therefore save up to $ 4.5 million p.a.

The cost of proper shading of buildings to reduce the air conditioning heat load and of the testing and certification of windows and doors to eliminate the excessive loss of air-conditioned air due to infiltration are shown below:

Equipment for Bureau of Standards Jamaica

DESCRIPTION	EQUIP COST	PUBLIC INFO/ STDS COST	CONSULTANT COSTS	TOTAL COST
Window Testing Chamber	28000	-	-	28000
Flowmeter Kit	4000	-	-	4000
Printing	10000	-	-	10000
Education	-	6000	-	6000
TOTAL				48000

International Consultant			
Travel 2 mission at US$1000	2000		
Substance at US$120	1680		
Fee 3 mnth/US$400/dy	24000	27680	
Local Consultants			
Technical Consultant 6 mth/US$100/dy	12000		
Legal Consultant 1 mth/US$100/dy	2000	14000	41680
SUBTOTAL		89680	
CONTINGENCY		8968	
TOTAL		98648	
		========	

4.4 Benefits and Costs

4.4.1 DATA = Office buildings in Kingston

Average = 27.5 $\frac{kwh}{ft^2/yr}$ 25 - 30 $\frac{kwh}{yr\ ft^2}$

Fuel Oil at 6.2 x 10^6 $\frac{Btu}{BBL}$

JPS fuel generation = 94% (1986) (6% Hydro)
JPS losses = 15% (1986)
JPS heat rate = 11,500 Btu/kwh 1986

4.4.2 Assumptions = Building rate Lo 500,000 ft^2/yr

Hi 1,000,000 ft^2/yr

Energy saving building saves 30%

27.5 $\frac{kwh}{ft^2/yr}$ 0.30 = 8.25 $\frac{kwh}{yr/\ ft^2}$

Fuel oil price US$15/bbl

4.4.3 Savings Estimate

$$Lo = \frac{500{,}000\ ft^2\ \ 8.25\ \frac{kwh}{yr\,ft^2}\ \ 11{,}500\ \frac{Btu}{KWH}\ \ 0.94}{6.2 \times 10^6\ \frac{Btu}{BBL}\ (1-0.15} = 8{,}461\ \frac{BBL\ per\ yr}{YR}$$

Hi = 2 x Lo = 16,922 $\frac{BBL}{yr^2}$.

PROJECTIONS

After year	BBL/Yr. LO	Savings/$yr	BBL/Yr. Hi	Savings/$yr
1	8,461	126,900	16,922	253,800
2	16,922	253,800	33,845	507,700
5	42,305	634,500	84,610	1,269,000
10	84,610	1,269,000	169,220	2,538,000

Source: 1983/4 GOJ/USAID Energy Audits.

5. Further Project Preparation by MMET

5.1 Analysis of the financial feasibility of energy efficient building design indicates that the incremental cost of the energy-saving building could range from zero to 10%. Such a building can be expected to save approximately 30%, thereby returning the investor's incremental cost within five years.

As shown above, economic analysis of the benefits from a building code indicate potential gross foreign exchange energy savings of $125,000 - 250,000 per annum for the first year's new construction, compounding each year thereafter according to the rate of new construction. Therefore, after 10 years, annual savings would range between $1,250,000 - $2,500,000. Additional savings (not yet estimated) would result from the delayed need for expansion of the JPS power generation capacity.

5.2 Further economic analysis regarding the cost implications is required, and will be performed by MMET, and provided to IBRD for comments prior to project initiation. Increased economic costs will be largely local for A/E fees, concrete, and labour. Incremental foreign exchange costs for the efficient building would be reduced because of the smaller capacity of the air-conditioning system.

DEMAND MANAGEMENT - DOMESTIC APPLIANCES

ENERGY EFFICIENCY TESTING AND LABELLING

1.1 Lead Ministry

Ministry of Mining and Tourism

1.2 Associated Ministries

Bureau of Standards Jamaica

1.3 Background

1.3.1 The use of energy efficiency standards and appliance labelling has been widely used in industrialized nations as a mechanism to reduce energy consumption in the domestic and commercial sectors. The underlying economic rationale for the market intervention by government is centered on overcoming imperfect market knowledge and oligopoly supply situations.

1.3.2 The method of implementation has varied from mandatory legislation to self regulation by industry associations, the selected method being a function of many interacting market forces. Experience has shown that, once industry standards are published, reputable manufacturers and importers comply with the industry standard. However, some suppliers continue to sell the cheaper inefficient appliances to consumers who are unaware that the appliances are energy inefficient and not economic at the national level. Legitimate suppliers eventually pressure government to introduce legislation so that all can compete on an equal basis. Once legislated, the efficiency standards tend to become industry enforced and considered to be the minimum acceptable level. However, under the proposed project standards will be introduced on a voluntary basis.

1.3.3 The problem of energy efficiency standards for appliances in Jamaica was recognized during the World Bank/UNDP Energy Assessment. The present proposal is designed to focus on those appliances where the potential energy savings are the highest.

1.4 Project Justification and Benefits

1.4.1 In Jamaica, no basic guidelines, code or mandatory standards exist relative to appliance efficiency standards. Presently, appliances such as refrigerators, air conditioners, lighting and stoves

are of low efficiency1/, adding substantially to the growth and investment requirements in the power supply sector.

1.4.2 The Government, through the Bureau of Standards (BOS) with USAID assistance, has established laboratory and related facilities to test solar water heaters. However support for this activity will soon cease. The existing facilities can be easily modified to carry out a wide range of appliance testing and thus serve as a foundation for the introduction of an appliance labelling program and the development of a national code for energy efficient appliances. The use of available staff and facilities will mean a relatively short project lead time as the international consultants will prepare the draft testing standards.

1.4.3 Energy savings from increased efficiency from the introduction of energy standards and appliance labelling are expected to be significant in national terms.2/ The table below indicates estimated gross energy savings of up to US$5 million/annum resulting from full introduction of energy-efficient appliances in Jamaica.

1/ Discussions with the Institution of Engineers, Jamaica indicate that appliance efficiency levels in Jamaica are extremely low by world standards reflecting the lack of industry standards and high tariff barriers for the marginally more expensive high efficiency equipment. The high tariff duty adds substantially to the equipment cost and, at the private sector investment level, makes the appliance financially unattractive.

2/ The annual energy consumption of a Japanese refrigerator fell by 75% from 1973 to 1983; over the same period, the energy consumption of an average television set fell by 36%. Of more importance for tropical climates like that of Jamaica, the average performance of air conditioners has also significantly improved. Between 1973 and 1980 the average 2000 kcal/hr class air conditioner reduced its energy consumption by 39%.

Estimated Project Benefits

TECHNOLOGY	SECTOR	ASSUMPTIONS ANNUAL DEMAND bbl/yr.	% of Sector	Inc Effic %	Penetration Time Yrs	Bbl/Yr.	US$/Yr. @$15/Bbl
High-Efficiency A/C Units	Resid.	832500	5	30	5	12488	187320
-ditto-	C&I Elec	1642500	5	30	3	24638	369570
High-Efficiency Sm. Refrigerators	Resid.	832500	40	30	10	99900	1498500
-ditto-	C&I Elec	1642500	10	30	6	49275	739125
High-Efficiency Gas Stoves	Resid	645000	35	20	10	45150	677250
High-Efficiency Water Heaters	Resid.	832500	5	50	10	20813	312195
-ditto-	C&I Elec.	1642500	2	50	10	16425	246375
-ditto-	C&I Fuel	937500	5	50	8	23437	351555
High-Efficiency Elec. Motors	C&I Elec.	1642500	40	5	6	32850	492750
				TOTAL		324976	4874640

1.4.4 The major benefit of the program will be the reduction in electricity growth with attendant reductions in foreign exchange in the form of reduced oil imports and capital required for power investment. Thus, reduced public sector debt will be an important outcome for the government, lower energy costs for the domestic consumers, and more competitive cost structures for the commercial and industrial sectors.

1.4.5 The costs for the high efficiency equipment are still to be estimated in detail. However, preliminary economic analysis on selected cases by MMET has indicated the value to the economy of more rapid introduction of energy efficient equipment. For example, at US$15/bbl fuel oil prices, the economic rate of return is over 100% on the incremental cost for the importation of high efficiency window air conditioners (Energy Efficiency Ratio (EER) 10), rather than low cost units (EER 6). Similar results are expected for other high efficiency appliances, such as refrigerators, pilotless gas stoves, and electric motors. Further analysis of the net economic benefits of increasing appliance efficiency will be performed by MMET and submitted to IBRD for review, prior to the initiation of this project.

1.5 Project Implementation

1.5.1 As existing law requires appliances to be labelled, it will be administratively simple to include the energy efficiency requirements once the testing standard has been completed and the test facilities modified.

1.5.2 A priority list of appliances to be tested and labelled under the program will be prepared by the BOS with the assistance of consultants to be provided under the ESMAP Project, on the basis of national economic benefits.

1.5.3 A local consultant also to be provided under ESMAP will continuously coordinate the various private sector organizations which will be represented on a review committe under the auspices of the BOS. Thus, an important part of the project will ensure wide private sector participation.

1.6 Project Costs

1.6.1 Estimated project costs are shown in the following table:

Estimated Costs for Energy Standards and Labelling
(in US$ equivalent)

1.	Laboratory Equipment			
	Electrical Appliances	8000	8000	
	Air conditioners	4000	4000	12000
2.	Training and Promotion			8000
3.	Consultant Services			
	International Consultant			
	Travel 4 mission @US$1000	4000		
	Subsistence @US$120 for 33 days	4000		
	Fee 3 mnth/US$400/dy	24000		
	Local Consultants			
	Technical Consultant			
	6 mth/US$100/dy	12000		
	Legal Consultant			
	1 mth/US$100/dy	2000		46000
		Total		66000

1.7 Institutional Aspects

1.7.1 The project will be coordinated by MMET and implemented by the Bureau of Standards. No additional government staff are required to undertake and complete the project. Coordination of the private sector will be maintained by the local consultant who will provide support to the BOS and coordinate the private sector activities. The private sector will be heavily involved in the development of the standards and labelling program and the local consultant will maintain a coordinating linkage as well as ensuring the flow of international information from the main international consultant.

1.7.2 Consultants will be selected using World Bank procedures once the project has been approved. Suitable local consultants will be selected to carry out the necessary field work under the supervision of the international consultants.

BWS/Annex5

DEMAND MANAGEMENT - MIS

1. Lead Ministry: Ministry of Mining Energy and Tourism

2. Associated Ministries and Agencies

Statistical Institute of Jamaica.

3. Project Description

3.1 The Project comprises the establishment of an Energy Management Information System to be operated by the Energy Division of the MMET in conjunction with the Statistical Institute of Jamaica and the Planning Institute of Jamaica (PIOJ) and PCJ Center for Energy Studies.

3.2 The MIS will include:--

(i) the collection, by the Energy Division, of monthly energy demand statistics, with consumption of electricity and of each petroleum product disaggregated into sector, subsector and individual group demand;

(ii) the analysis of subsector and individual group energy efficiencies and trends in relative and absolute terms, in the light of prevailing economic conditions, and the comparison of such efficiencies against efficiencies outside Jamaica;

(iii) the formulation of appropriate demand management policy recommendations;

(iv) the monitoring of the impact of specific policies on the energy efficiency of target groups; and

(v) the issue by MMET within four weeks from the end of each calendar quarter of the above statistical information for each month in the quarter, and a summary of current energy efficiency trends and policies. /1

The project will be designed to optimize the use of available data, to limit the collection of new data to essential areas and to ensure that the energy efficiency analysis based on that data is focused on key policy areas.

3.3 To assist Government in the establishment and operation to MIS, the ESMAP Project will provide:

/1 Possibly to be issued as a supplement to the PIOJ Quarterly Economic Review.

(i) suitably qualified and experienced consultants to assist the MMET, PIOJ and the Statistical Institute in the design of the MIS system, in the initial collection of disaggregated supply data from PCJ and JPS, and demand data from the principal consumer groups, and in initial energy efficiency analysis and policy formulation; and

(ii) the provision of appropriate hard and software.

4. Benefits

The quality of any energy policy decision is essentially dependent upon the underlying statistics that support the policy implemented. It is expected that substantial investments in energy supplies could be deferred once energy demand patterns are established and the appropriate energy efficiency improvements introduced. Presently, substantial inefficiencies exists in the household sector. However, policy decisions to correct this are not possible due to the lack of detailed knowledge on how energy is consumed.

5. Staffing and Consultants

5.1 Staffing

No additional counterpart staff of the GOJ will be necessary for this project. A computer programmer/system analyst and a data processor are in place on the staff of the MMET.

Supervision of local and overseas consultants during field missions will be carried out by the Energy Economics Unit of the MMET while overall project supervision will be carried out by the World Bank.

Co-ordination with the Statistical Institute of Jamaica (STATIM) has been arranged by MMET and counterpart staff are available in SIJ.

5.2 International Consultants

International consultants ahve not yet been identified for this project. Contultants will be selected using World Bank procedures once the project has been approved. The international consultants will be responsible for ensuring the MMET system is compatible with information (in computer disk form) provided by STATIN.

5.3 Local Consultants

Suitable local consultants are available to carry out the necessary field work under the supervision of the international consultants.

6. Project Costs and Schedule

6.1 Costs

6.2 Equipment

Cost Estimates: [illegible]

				US$
International Consultants				
	Travel	3 x US$1000	3000	
	Subsistance	$200/dy	5000	
	Fee	7 wk x $400/dy	[illegible]	25000
Local Consultancy (2)				
	Travel	$20/dy * 2 con. 10	[illegible]	
	Expenses		1000	
	Fee	4 week/con. US$20[illegible]/d	8000	9800
Equipment				
	Computer		5000	
	Moderm		500	
	Printer		2000	
	Computer Boards		1000	
	Software		1000	9500
		Subtotal		44980
		Contingency 10%		4498
		Total		49478

7. Schedule

7.1 The total time for the project will be nine months and consist of three missions by the international consultants.

7.2 The first mission will consist of one week in which will allow for the review of the existing systems, initial consultation with GOJ and the local consultants and detail work plan for the following two missions. Equipment selection will be approved by the MMET prior to purchasing by the international consultant.

7.3 The second mission will consist of field work and installing the MIS on the MMET computer system. The system capability will be test run and evaluated to meet MMET requirements. Counterpart staff will be training in the operation of the MIS as well as selection and use of the resulting economic/ energy statistics in developing energy policy.

7.4 The final mission will entail review of the MIS after three months operation by MMET. The international consultants will remedy any deficiencies in the system and make any necessary suggestions to further develop the system.

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
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(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

September 23, 1986

Dr. Allan G. Kirton
Permanent Secretary
Ministry of Mining, Energy and Tourism
P.O. Box 495
2 St. Lucia Avenue
Kingston, Jamaica

Re: Jamaica - ESMAP Program

Dear Dr. Kirton:

May I thank you and your staff, particularly Mr. Nigel Grant and Miss Beulah Clarke, for the courtesy and helpfulness shown to Messrs. Poncia, Gaskin and van der Plas during their recent visit to Jamaica.

I am pleased that the mission was able to develop the proposed ESMAP program with you and your colleagues, as set out in the Aide Memoire of 9/8/86. As you know, certain minor textual changes were made at the last moment, and I therefore enclose for the record a further copy of the Aide Memoire, which I trust that you will find reflects those changes accurately.

We are now in the course of preparing Activity Initiation Briefs for the ESMAP projects proposed and, following the conclusion of their internal Bank review, we will write to you further regarding consultant terms of reference and selection and project implementation.

In the meantime, as arranged with Mr. Grant, I look forward to receiving the financial and economic cost analysis from MMET on the proposed Domestic Appliance Labelling and Building Code Projects (Annex A4, para. 5.2 and Annex A5, para. 1.4.5 of the Aide Memoire). In addition, perhaps you would let us know if the other agencies working with the mission in the preparation of the ESMAP projects -- particularly the Forestry Department, FIDCO, Bureau of Standards, Ministry of Construction, Institutes of Architects and Engineers, and Planning Institute -- have any comments on the final text of the Aide Memoire.

I believe that the proposed ESMAP projects should make a significant contribution in assisting the Government of Jamaica follow up the principal recommendations of the Energy Assessment Report, and I am looking forward to working with you and your colleagues in this regard.

Sincerely,

Robin W. Bates
Acting Division Chief
Energy Strategy and
Preinvestment Division II
Energy Department

Attachment: Aide Memoire

cc: Ms. B. McSweeney, UNDP, Jamaica
Ms. D. Demers, CIDA, Hull, Canada

CAH:JAM-a-2

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
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Cable Address: INTBAFRAD
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September 22, 1986

Ms. Diane Demers
Canadian International Development Agency
Hull, Quebec
Canada

Dear Ms. Demers:

Re: JAMAICA - ESMAP Program

Further to our briefing meeting in Jamaica on September 7 and 8 last, I now enclose for your information a copy of my Back-to-Office report, together with the Aide Memoire as mentioned therein.

As you will see, we are now proceeding with the proposed ESMAP projects and I will keep you briefed as preparation proceeds. In the meantime, please so let me know if you have any comments on the proposed program.

Sincerely yours,

Christopher R. Poncia
Senior Energy Planner
Energy and Preinvestment
Division II
Energy Department

Enclosures

CRPoncia:rsl

INT 183 005

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

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Acting Division Chief
Energy Strategy and
Preinvestment Division II
Energy Department

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cc: Ms. B. McSweeney, UNDP, Jamaica
Ms. D. Demers, CIDA, Hull, Canada

CAH:JAM-a-2

Latin America

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION
Washington D. C. 20433
U.S.A.

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(1–86)

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DURATION OF CALL:	MINUTES

DATE: September 22, 1986

NUMBER OF PAGES: 6 (Including this page)

FROM: Masood Ahmed, Dep. Div. Chief, EGYS1 Extension 74219 Dept/Div., No. 352/50

TO: COMPANY/ORGANIZATION: United Nations Development Programme
CITY AND COUNTRY: New York, New York
FOR ATTENTION OF: Mr. Tim Rothermel

FAX NUMBER/
MACHINE TYPE: 2127509315

SUBJECT: Re: telex of Sept. 19, we are transmitting three projects for the consideration of Japan Government.

cc: Mr. Hume (EGY)

Transmission Authorized by: Mr. Bernard Montfort, Division Chief, EGYS1

Original to be returned to: Holly Mensing Room No.: D639

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UNDP/World Bank
Energy Sector Management Assistance Program

Malaysia
Power Sector Efficiency Audit

I. Introduction

1.1 The power entity of the State of Sabah, the Sabah Electricity Board (SEB), is facing a number of operational problems, and would benefit from technical assistance in formulating an action plan for operational efficiency improvement. SEB has requested the Energy Sector Management Assistance Program (ESMAP) for a detailed review of its operating practices in the form of a Power Efficiency Audit.

II. Background

2.1 SEB operates seven major power plants with a total installed capacity of 226.5 MW of which 94.5 MW is at the main Kota Kinabalu power plant. This station has two relatively large and new generating sets of 14.7 MW each, commissioned in 1982. Available data indicates a very high diesel consumption rate of over 400 gm/kWh for these two generators. The rest of the installed capacity of 65.1 MW at Kota Kinabalu power plant, consisting of a dozen 8.1 MW or less sets, is derated to 48.7 MW due to cooling problems caused by recirculation of hot air through the radiators. As a result of these problems, power generation at the Kota Kinabalu power station has dropped by 50% in 1984.

2.2 Power losses in SEB have been rising in the recent years. In 1984, the latest year for which data is available, power losses as percentage of gross generation were about 22.6%, up from 19.3% in 1982. The losses range from about 12% at Kudat station (less than 2% of total generation) to 27% at Labuan station (about 10% of total generation). Losses at the main Kota Kinabalu station (about 45% of total generation) have been around 20%.

2.3 Non-technical losses of SEB are estimated at 5-8% which represents about US$4.6 million at current oil prices. The value of technical losses is estimated at US$3.9 million.

III. Objectives

3.1 The objective of the Power Efficiency Audit is to define an economically feasible action program for operational improvements. More specifically it will:

(a) review the major generation facilities to identify areas where plant rehabilitation is economically justified and analyze the opportunities for improvement in maintenance practices;

(b) prepare a comprehensive action program to reduce non-technical losses, including an analysis of program costs, necessary equipment and software requirements;

(c) estimate the level and location of technical losses, determine their main causes, and prepare a practical, project-oriented program to reduce technical losses in the short and long run.

IV. Cost/Timing/Status

4.1 At the request of the SEB and the Government of Malaysia, a mission has been planned for October 1986, to implement the Power System Efficiency Study. The mission members include one power generation engineer, one transmission/distribution engineer, one commercial engineer, and one economist. Total duration of the mission will be about one month, and the total cost of the activity will be about US$100,000.

UNDP/World Bank
Energy Sector Management Assistance Program

Thailand
Lignite Development Study Project Proposal

I. Background

1.1 The recent Energy Assessment Report prepared under the joint UNDP/World Bank Energy Assessment Programme identified lignite as an important commercial energy source available to Thailand to reduce its heavy dependence upon imported energy (52% in 1982). Lignite is already an important fuel in power generation, but there is a need to formulate an overall program to expand exploration and development of lignite for non-power uses. The National Energy Administration has thus requested ESMAP assistance to identify the prospects for and issues involved in increasing lignite consumption and production over the medium to long term.

II. Aim and Scope of the Proposal

2.1 This activity will focus on the following issues:

(a) Prospective Lignite Supply and Demand - focusing on quantity and quality of mineable lignite reserves and the size of the potential market for lignite in industry;

(b) Economic Issues - evaluating the competitiveness of lignite as compared to alternative fuels on a delivered cost, useful energy basis; and

(c) Institutional Issues - reviewing mining regulations and the effect these have on lignite exploration and production, as well as the respective roles of the public and private sectors in lignite development.

III. Cost/Timing/Status

3.1 Preliminary estimates indicate that the study would cost about US$170,000, excluding the Government contribution. The bulk of these funds are likely to be provided by the UNDP from its country IPF for Thailand. A draft project document has been prepared and a mission is planned in late-October to finalize the project document and to agree upon the schedule for the subsequent work which is expected to begin by the end of the year.

IV. Documentation

4.1 Thailand: Issues and Options in the Energy Sector (report No. 5793-TH, September 1985).

UNDP/World Bank
Energy Sector Management Assistance Program

Syria
Power System Efficiency Audit

I. Objective

1.1 The objective of the Power System Efficiency Audit is to help Syria's Public Electricity Establishment (PEE) prepare a program of actions to reduce power system losses which are nearly one quarter of net electricity generation. These losses consist of: (a) non-technical losses due to statistical and metering errors as well as energy theft; (b) technical losses in the power distribution system related to system design criteria; and (c) losses in power generation due to lack of adequate thermal conversion efficiency monitoring, maintenance planning, and plant availability.

II. Background and Justification

2.1 The PEE power system consists of about 1700 MW of thermal and hydro plants. The need for a Power System Efficiency Audit was emphasized in the Syria Energy Assessment 1/ given losses in the PEE power system around 24% of net generation. The implementation of a vigorous action program to improve the efficiency of technical and commercial operations should enable PEE to reduce losses to about 10-15% of net generation. PEE already has formed a committee to work on loss reduction. The committee's main focus has been on the reduction of non-technical losses by checking the accuracy of substation metering and that of industrial and customers. In 1984, the committee was able to reduce losses by about 1% of net generation at a financial savings of in the order of US$3.7 million. For the implementation of improvements on a large scale, PEE requires the technical services and equipment to be provided under the Audit.

III. Scope of Work

3.1 The Power Efficiency Audit's scope of work is as follows:

(a) classify the power losses according to type, i.e. technical or non-technical (station service, technical loss, statistical error, metering error, theft and diversion);

(b) determine the amounts of the technical losses at various voltage levels;

1/ Syria: Issues and Options in the Energy Sector, May 1986.

(c) prepare a comprehensive, costed and scheduled program for reducing technical losses including optimizing real and reactive power dispatch, adding of capacitors, if required, changing design criteria, etc.;

(d) prepare a comprehensive action-oriented program for reducing non-technical losses including improvements in metering, billing and commercial operations;

(e) assess the capability of PEE for implementing the identified power loss reduction prospects and define any measures required to appropriately strengthen the institutional framework for subsequent implementation of a power loss reduction program;

(f) prepare a program to improve conversion efficiency of thermal plants, including changes of instrumentation, controls, training, etc.; and

(g) recommend supportive measures required for successful implementation of the power-loss reduction program.

IV. Cost and Timing

4.1 The total cost of the Audit is estimated at US$162,000 of which US$140,000 will be funded by UNDP from its country IPF, and US$22,000 by ESMAP core funds. Staffing will consist of 28 manweeks of ESMAP core staff and 25.5 manweeks of specialized consultant support--a power distribution engineer, a commercial engineer, a steam plant mechanical engineer and a steam plant efficiency manager. The equipment to be provided under the project consists of (a) an IBM PC-AT computer and accessories; (b) a Summagraphics Microgrid Digitizer; (c) Distribution Primary Analysis Software (DPA); and (d) software for accessing DPA data via the digetizer (DIG). The Audit is planned to begin the last week of October 1986, for a period of three weeks.

IATT/83/005

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

September 22, 1986

Ms. Diane Demers
Canadian International Development Agency
Hull, Quebec
Canada

see rept dated 9/23/86

Dear Ms. Demers:

Re: JAMAICA - ESMAP Program

Further to our briefing meeting in Jamaica on September 7 and 8 last, I now enclose for your information a copy of my Back-to-Office report, together with the Aide Memoire as mentioned therein.

As you will see, we are now proceeding with the proposed ESMAP projects and I will keep you briefed as preparation proceeds. In the meantime, please so let me know if you have any comments on the proposed program.

Sincerely yours,

Chris Poncia

Christopher R. Poncia
Senior Energy Planner
Energy and Preinvestment
Division II
Energy Department

Enclosures

CRPoncia:rsl

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BOOK OF TWO MESSAGES

- 355 -

1.

MS. MERIANO, MESSRS. SALZMANN AND WEBER

UNDEVPRO

LA PAZ, BOLIVIA

TLX NO. 2547 UNDEVPRO BV

2.

MR. GONZALEZ

MINISTRY OF ENERGY AND HYDROCARBONS

LA PAZ, BOLIVIA

TLX NO. 2625 BV

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TELEX NO.: BOOK OF TWO

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DRAFTED BY: G. Sanchez-Sierra:svh

EXTENSION: 7-4547

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TO MR. MARIO SALZMANN, DEPUTY RESIDENT REPRESENTATIVE, UNDEVPRO, LA PAZ, BOLIVIA. COPIES FOR INFORMATION TO MS. MERIANO (UNDEVPRO), MESSRS. WEBER (UNDEVPRO), AND GONZALEZ (MINISTRY OF ENERGY AND HYDROCARBONS), LA PAZ, BOLIVIA. RE: ESMAP BOLIVIA ENERGY STRATEGY WORK. WE ARE PLEASED TO INFORM YOU THAT ACCORDING TO OUR CONVERSATION ON SEPTEMBER 8 IN LA PAZ, AND WITH THE AGREEMENT OF THE BOLIVIAN GOVERNMENT, MR. G. RODRIGUEZ HAS BEEN SELECTED AS THE RESIDENT PROJECT MANAGER FOR THE ABOVE EXERCISE. HIS MOST RELEVANT POSITIONS HAVE BEEN AS GENERAL MANAGER OF THE LATIN AMERICAN ENERGY ORGANIZATION (OLADE), HEAD OF THE ENERGY PLANNING DEPARTMENT IN THE MEXICAN MINISTRY OF PLANNING, AND SENIOR ENERGY ANALYST FOR THE PUBLIC INVESTMENT OFFICE IN THE MEXICAN SECRETARY OF THE PRESIDENCY. HE HAS ALSO WORKED AS A CONSULTANT FOR THE WORLD BANK AND AS A PETROLEUM ENGINEER WITH PEMEX AND THE BRITISH PETROLEUM CO. REGARDS. GABRIEL SANCHEZ-SIERRA, EGYS2, ENERGY DEPARTMENT, WORLD BANK.

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TELEX NO.: BOOK OF TWO

DATE: 09/22/86

SUBJECT: ESMAP - BOLIVIA ENERGY

DRAFTED BY: G. Sanchez-Sierra:svh

EXTENSION: 7-4547

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cc: E. Gomez-Fernandini (LCPPS)

AUTHORIZED BY (Name and Signature): R. Bates, Acting Division Chief

DEPARTMENT: ENERGY

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BOOK OF TWO MESSAGES

1. MR. LAURENS HOPPENBROUWER
RESIDENT REPRESENTATIVE
WORLD BANK
BOGOTA, COLOMBIA
TLX N. 41308 CO

2. MS. D. MOLINA AND MR. E. ANGEL
INFRASTRUCTURE UNIT, DNP
BOGOTA, COLOMBIA
TLX NO. 45634 DNPBO CO

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UNDP - INT/83/005 - Energy Sector Management Assistance Programme [ESMAP] - Correspondence - 1984/1986 - Volume 8	30189798

Document Date	Document Type	
Sept. 19, 1986	Telex	

Correspondents / Participants
To: Mr. Laurens Hoppenbrouwer, Resident Representative
From: G. Sanchez-Sierra

Subject / Title
ESMAP - Colombia Energy Strategy

Exception(s)
Financial Information iv

Additional Comments

The item(s) identified above has/have been removed in accordance with The World Bank Policy on Access to Information or other disclosure policies of the World Bank Group.

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Kim Brenner-Delp	November 02, 2022

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UNDP - INT/83/005 - Energy Sector Management Assistance Programme [ESMAP] - Correspondence - 1984/1986 - Volume 8	30189798

Document Date	Document Type	
Sept. 16, 1986	Telex	

Correspondents / Participants
From: S. Bagheri and Kah Hie Lau (Chief, Trust Funds Division)
To: Kim

Subject / Title
UNDP INT/83/005

Exception(s)
Personal Information

Additional Comments

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Montfort, del Buono,	
Kayira, Hume, Taylor,	
Rothermel/Cox	
Mss. Sharkey, Owen	

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	FOR ACTION		PREPARE REPLY
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REMARKS:

I attach the package of materials which Mr. Dosik is taking to SIDA in connection with the US$2 million funding which SIDA has proposed for ESMAP. Let me take this opportunity to thank those of you who contributed the project "write-ups" for this package.

FROM:	ROOM NO.:	EXTENSION:
R. W. Bates	D-434	74107

Tentative Budget for Use of Proposed SIDA ESMAP Funding

First Priority

1. Tanzania: Peri-urban Woodfuels Supply Phase II. The study cost will not be known until Phase I has been completed and the content of Phase II discussed and agreed with government.

Budget:	Present best guess is US$ 350,000
Timing	May - June 1987
Scope:	Outline attached plus Aide Memoire describing progress of Phase I to date

2. Tanzania: Improvement of Efficiency of Energy Use in Tobacco Industry

Scope:	Outline attached
Budget:	US$ 150,000 plus cost of satellite remote sensing
Timing:	To be determined; not before spring 1987

3. Secondment of Forester

Job description:	Attached
Budget:	US$ 184,000
Timing:	As soon as possible

4. Zambia: Energy Sector Review

Scope:	Outline Attached
Budget:	US$ 450,000 of which half covered by IBRD
Timing:	To be determined with government but before end of CY 86 if possible

5. Zambia: Urban Household Energy Strategy

Scope:	AIB to be prepared but notes on content attached (as per Bates letter of July 15, 1986)
Budget:	Not known, possibly US$ 150,000
Timing:	To be determined

6. Botswana: Household Energy Strategy

Scope:	Outline Attached
Budget:	US$ 200,000 of which half covered by IBRD
Timing:	End CY 86

Budget:Bates:cse:NRN

Second Priority

7. Laos Energy Assessment

Scope:	Outline attached
Budget:	US$ 300,000
Timing:	To be determined

8. Zambia: Transport Sector Energy Demand Management Program

Scope:	Outline attached
Budget:	Not known, possibly US$ 100,000
Timing:	To be determined

9. Zambia: Power Sector Efficiency and Rehabilitation Audit

Scope:	Notes attached (as per Bates letter of July 15, 1986)
Budget:	To be determined, say US$100,000
Timing:	To be determined

10. Zambia: Industrial and Mining Energy Conservation/Substitution Options

Scope:	Notes attached (as per Bates letter of July 15, 1986)
Budget:	Not known, say US$ 100,000
Timing:	To be determined

11. SADCC: Household Energy Strategy

Scope:	Outline attached
Budget:	Not known, possibly US$ 575,000
Timing:	To be determined

Budget:Bates:cse:NRN

SUMMARY COSTING

	US$ 000s over a two-year period
First Priority	
1. Tanzania: Woodfuels Phase II	350
2. Tanzania: Tobacco Efficiency	150
3. Forester	184
4. Zambia: Energy Sector Review	225
5. Zambia: Household Energy	150
6. Botswana: Household Energy	100
Subtotal	1159
Second Priority	
7. Laos Assessment	300
8. Zambia: Transport Demand Management	100
9. Zambia: Power Efficiency	100
10. Zambia: Industrial and Mining Conservation	100
11. SADCC: Household Energy	575
Subtotal	1175
Grand Total	2,334

Budget:Bates:cse:NRN

ESMAP: Tanzania

Fuel Project Preparation

The fieldwork for Phase I of the study will begin on October 1, 1986 for four weeks in Tanzania. The study will focus on issues and options with respect to promoting peri-urban tree growing to supply woodfuels to the following centers: Dar es Salaam, Dodoma, Arusha/Moshi, and Mwanza/Shinyanga. A report on Phase I should be ready in March 1987. A meeting will then be held in Tanzania between the Government, ESMAP, and donors to agree on the final scope for Phase II which could proceed in May-June 1987. We currently envisage that Phase II will involve the formulation and justification of peri-urban tree growing projects (plantations, woodlots, agroforestry) centered around each of the above urban centers. Detailed project douments will be prepared in format which will facilitate rapid appraisal by prospective donors. The final estimate of Phase I costs (to be financed by CIDA) is US$150,000; and Phase II costs will probably be in the order of US$300,000-400,000. Phase II costs can only be firmed up after Phase I has been completed (i.e., in March 1987).

UNDP/WORLD BANK ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAM(ESMAP)

AIDE MEMOIRE

(RECONNAISSANCE MISSION TO TANZANIA, AUGUST 1986)

A. INTRODUCTION

1. This note concludes a World Bank reconnaissance mission by Mr. A. Armar, Energy Planner, which visited Tanzania from 7 - 15 August, 1986. The mission was fielded under the auspicies of the joint UNDP/World Bank Energy Sector Management Assistance Program (ESMAP) which is executed by the World Bank.

2. On the basis of prior discussions with representatives of the Government of Tanzania, ESMAP proposes to initiate a program of pre-investment studies in Tanzania to assist the Government to address critical constraints in the energy sector - primarily to alleviate growing shortages in the supply of woodfuels to the main consumers in urban centers and tobacco producing areas of Tanzania. The Energy Assessment Study on Tanzania 1/ identified the problem of woodfuel supply/demand imbalances and the increasing rate at which the country's natural forests and woodlands were being depleted as the most pressing energy sector issue.

3. The principal objectives of the reconnaissance mission was to hold discussions with representatives of Government Ministries to finalise the respective workprograms, timetables and logistical arrangements for two preinvestment studies which are planned for 1986/87 fiscal year. The proposed ESMAP sponsored activities will cover:

(a) identification, evaluation, and formulation of a comprehensive program to develop economically viable pre-urban fuelwood plantations to augment woodfuel supplies to Tanzania's major urban centers; and

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1/ Tanzania-Issues and Options in the Energy Sector 'Report No.4969-TA, dated November 1984

(b) formulation of an integrated program to upgrade the efficiency of energy use in the tobacco industry, with particular emphasis on woodfuel supply and use for tobacco curing.

4. The mission consulted with representatives of the Ministries of Energy and Minerals (MEM), of Natural Resources and Tourism (MNRT), and of Agriculture and Livestock Development (MOALD). Local representatives of bilateral and multilateral organisations (CIDA, FAO) were also consulted.

B. Peri-Urban Woodfuels Supply Study

5. The proposed pre-investment study on Peri-urban woodfuel Supply will be implemented by ESMAP in two phases. Phase 1 will evaluate the issues and options, and Phase 2, detailed project preparation work. Phase I is scheduled to begin by the first week of October 1986. Funding for Phase I of the study has been secured through a contribution from CIDA to the UNDP Energy Account.

6. Steering Committee and Counterparts

The Government of Tanzania will establish a Steering Committee comprising Senior Technical Directors/Advisors of the following Ministries to monitor the ESMAP study:

a) Natural Resources and Tourism
b) Energy and Minerals
c) Agriculture and Livestock Development
d) Finance and Economic Planning
e) Prime Minister's Office

A letter nominating members to serve on the Steering Committee has been sent by the Director of the Forestry Division (MNRT) to the Principal Secretaries of the respective Ministries. It was agreed that the Steering Committee will have discussions with the ESMAP team at the beginning and end of the field work during.October 1986. For day-to-day liason between the Govern-

ment and the ESMAP team, personnel from MNRT and MEM will be designated as counterparts. The likely counterparts were identified as Messrs. Kaale and Kilahama of the Forestry Division (MNRT), and Mr. Sawe of the Energy Department (MEM).

7. Target Areas for Fieldwork

It was agreed that the following four urban centers would be covered in the ESMAP study:

(a) Dar es Salaam
(b) Dodoma
(c) Arusha/Moshi
(d) Mwanza/Shinyanga

In the case of Dar es Salaam, special note would be taken of the recently completed study by the FAO/CP which was of similar scope to the proposed ESMAP study. Other factors to be considered included the possibility of increasing the use of agricultural residues to supplement woodfuel supplies in the Arusha/Moshi peri-urban area (ie, coffee husks), and the Mwanza/Shinyanga area (i.e. cotton residues). Data and information obtained as a result of ongoing studies by MEM on charcoal production and the use of charcoal and wood burning stoves would be incorporated in the analysis of the ESMAP team.

8. Workprogram for Fieldwork

The tentative work program for meetings and fieldtrips will be as follows.

First-week of Mission (from October 1, 1986): preliminary meetings will be held in Dar es Salaam with the Steering Committee, with designated counterparts, and with other representatives of Government agencies and organisations. These meetings will be combined as appropriate with a review of ongoing projects in Dar es Salaam area.

...../4

Second Week: field trips will begin by road to Morogoro and Dodoma to assess the situation in and around Dodoma. After a few days in Dodoma, the ESMAP team will continue the field trip by road to Shinyanga, and then to Mwanza by the end of the week.

Third Week: continuation of field trips from Mwanza at beginning of week across to the Arusha/Moshi area. The ESMAP team will return to Dar es Salaam by the end of the third week.

Fourth Week: the mission will continue meetings with representatives of Government agencies and organisations in Dar es-Salaam while evaluating the data and information gathered during the fieldtrips. Discussions to wrap-up the mission will be held towards the end of the fourth week. Prior to the final meeting with the Steering Committee, the ESMAP team will present an Aide Memoir outlining the missions preliminary findings and conclusions.

9. Transportation

About 2 or 3 four-wheel drive vehicles will be used for the field trips (by road from Dar es Salaam to Dodoma, Shinyanga, Mwanza, and Arusha/Moshi). ESMAP will provide funds to cover the costs of leasing the vehicles and for purchasing fuel. The MEM will assist in making arrangements for vehicles and for supplies of fuel to be reserved for the mission at Dodoma, Mwanza, and Arusha.

Composition of ESMAP Team

10. The ESMAP team for Phase I will comprise five consultants, two of whom will be locally recruited. Subject to agreement by ESMAP Management, the Consultants will be:

1) Mr. P. Ryan - Forestry Specialist
2) Mr. P. Rochon - Forestry Economist
3) Mr. L. Bailey - Energy Economist
4) Prof. B.C. Nindi - Rural Sociologist (Local)
5) Mr. G. Mbowe - Development Credit Specialist (Local)

The ESMAP team will be led by an Energy Planner/Economist from the World Bank. The final composition of the ESMAP team will be confirmed by telex prior to the arrival of the mission in October 1986.

C. Energy Efficiency in Rural Industries

11. On the basis of the mission's discussions with representatives of MEM and MOALD, it was agreed that the proposed study on energy efficiency in rural/agro-industries would focus exclusively on the tobacco industry. Tobacco is identified as one of the priority export crops for rehabilitation during the Economic Recovery Program.

Scope of Study

12. The mission drafted a paper outlining the proposed study's objectives, scope, and workprogram which was then reviewed by representatives of the MEM, MOALD, and the Tanzania Tobacco Processing and Marketing Board (TTPMB). Comments provided on the first draft were incorporated in the second draft which is attached. SIDA has agreed to fund the proposed study through ESMAP.

13. The draft terms of reference covers the additional task of evaluating the scope for minimizing energy losses at the Morogoro and Songea processing plants. TheEnergy Department of MEM will arrange a follow-up visit (during September, 1986) to the Morogoro Plant with a representative of the Tanzania Industrial Research and Development Organisation (TIRDO), to assess the merits of doing an Energy Audit of the plant during the October-December 1986 processing season. ESMAP will be informed of the findings as soon as possible. It was suggested during the mission's discussions with representatives of the TTPMB, that the scope of the proposed ESMAP study should be extended to cover economic merits of retroffiting diesel powered irrigation pumpsets at the remote Urambo seed multiplication farm, with solar powered pumps.

14. The mission agreed to incorporate the above two tasks in the proposed study provided the available funds were more than adequate to cover the main objectives regarding upgrading the efficiency of energy use for tobacco curing. The draft terms of reference would next be reviewed by ESMAP management and discussed with SIDA. A revised draft final version which will present more details on the background, scope, terms-of-reference, workprogram and budget for the proposed study will be sent to the Government shortly.

15. The tentative schedule is for ESMAP to initiate the proposed study, during the final quarter of 1986, by arranging for a resource assessment of tobacco producing areas using the SPOT Satellite remote Sensing System of Sweden. Subject to confirmation by ESMAP Management, fieldwork will begin in the latter half of January 1987.

Next Steps

16. The ESMAP mission for the proposed study on Peri-urban Wood-fuel Supply will begin fieldwork in Dar es Salaam by the 1st of October 1986.

17. A revised final draft on the workprogram for the proposed ESMAP study on up-grading the efficiency of energy use in the Tobacco industry will be sent to the Government by October 1986.

Amarquaye Armar

Energy Planner,
Energy Department
The World Bank.

15th August, 1986

UNDP/WORLD BANK ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

PRE-INVESTMENT STUDY ON IMPROVING THE EFFICIENCY OF ENERGY USE IN THE TOBACCO INDUSTRY TANZANIA

OBJECTIVES

1. The main objective of the proposed study is to assist the Government of Tanzania (GOT) to formulate a technically and economically viable plan of action to upgrade the efficiency of energy use for tobacco curing and processing in the country. The proposed study would inter alia evaluate previous initiatives by the GOT and other local organisations to upgrade the efficiency of woodfuel use for tobacco curing at the farm level as well as identify cost effective measures to minimize energy losses at the two tobacco processing plants. The present scope for promoting economic use of indigenous coal in the tobacco industry will be reviewed. Also options for augmenting woodfuel supplies in tobacco producing areas will be evaluated.

2. The principal objectives of the tobacco curing aspects of the proposed pre-investment study are:-

(a) to evaluate the impact of earlier initiatives to improve the efficiency of woodfuel use in tobacco curing in Tanzania and, to augment woodfuel supply in the tobacco producing areas by tree farming schemes;

(b) to identify economically and financially viable means by which the efficiency of woodfuel use for tabacco curing in Tanzania can be upgraded with minimal investments;

(c) to identify economically and financially viable means by which growing shortages of woodfuels in tobacco-producing areas can be alleviated;

(d) to evaluate the present technical scope for and economic viability of substituting wood with indigenous coal as the fuel for tobacco curing in parts of the country;

(e) to evaluate the capability of extension services to promote the adoption of improved techniques in tobacco producing areas;

(f) to identify the full range of GOT actions needed to address institutional, policy, pricing, and infrastructural constraints that may have hindered earlier efforts to upgrade tobacco curing methods;

(g) to formulate a least-cost strategy and comprehensive plan of action for upgrading tobocco curing methods, for alleviating shortages of woodfuels in tobacco producing areas,for and improving the quality and value of the country's tobacco output; and

(h) to formulate a strategy for mobilizing funds from both domestic and external sources to reactivate and expand efforts to upgrade tobacco curing methods in Tanzania.

3. The principal objectives of the tobacco processing plant aspects of the study are:-

(a) to evaluate through energy audits, the scope for minimizing process energy losses at the country's two tobacco processing plants at Morogoro and Songea;

(b) to evaluate the economics of fuel substitution with indigenous coal at the two plants (i.e. for raising process heat); and

(c) to formulate a plan of action combining cost effective housekeeping and investment measures to improve the overall efficiency of energy use at the two plants.

SCOPE WORK

Tobacco Curing

4. This aspect of the proposed study will consist of six main tasks as follows:

Task 1 Survey, Data collection and analysis, and Evaluation of earlier Programs;

Task 2 Assessment of options for upgrading the Energy Efficiency of Tobacco Curing Practies,

Task 3 Assessment of options for augmenting the supply of woodfuels in Tobacco producing areas;

Task 4 Evaluation of scope for substituting Woodfuels with indigenous coal;

Task 5 Identification of the Institutional, Policy, and Incentive framework for proposed program; and

Task 6 Formulation and Justification of Plan of Action for Tobacco

Task 1: Survey, Data Collection and Analysis, Evaluation of Earlier Programme

5. This task will cover:

(a) collection of data and information on the existing tobacco curing practies by type and scale of operation, and by producing region, the present situation regarding woodfuel supply demand in each of the major tobacco producing areas, production levels in the industry, and so on. Much of this data and information is available in the Ministry of Agriculture and Livestock Development (MOALD) as a result of recent studies on Export crop Rehabilitation Programs. Field surveys will be arranged to supplement and update currently available information;

(b) an assessment (by remote sensing techniques) of tree cover in tobacco curing areas. Arrangements will be made with the Swedish Space Corporation for use of the SPOT Satellite remote sensing system for this aspect of the pre-investment study;

(c) review of the main achievements, constraints, and shortcomings of earlier efforts by the erstwhile Tobacco Authority of Tanzania (TAT) to disseminate more efficient tobacco curing barns and furnace eg. the low profile barns, the Konde barn, and the JTS Jacket barns), and to train farmers and extension workers to adopt the improved practices.

Task 2: Assessment of Options for Upgrading the Energy Efficiency of Tobacco Curing Practices

6. This task will extend the analysis of technical packages used in the earlier initiative to cover a wider range of options. The comparative costs and benefits of alternatives for upgrading defforent aspect of tobacco curing operations will be determined in the Tanzanian context, with particular emphasis on:-

a) barn design,

b) furnance designs,

c) flue pipe systems; and

d) management of the curing process.

7. The primary objective is to identify an optimal approach as has been successfully implemented in neighbouring countries such as Malawi. In this regard, it is important to note that very significant reductions in woodfuel consumption per unit of cured tobacco leaf have been achieved mainly by introducing improved techniques for managing the curing process (eg. ventilation of barns, preparation of woodfuel, packing of barns etc.). The options will also be assessed in terms of economic viability and afford-ability to different scales of tobacco curing operations (smallholders, cooperatives, etc.) in Tanzania.

Task 3: Assessment of Options for Augmenting the Supply of Woodfuels in Tobacco Producing Areas.

8. This task will cover a evaluation of alternative approaches for alleviating shortages of woodfuel supply in the major producing areas. Specific issues to be addressed include the economic and financial implications on the tobacco industry of the proposal made as part of the tobacco component of the Export Crop Rehabilitation program that:-

(a) large scale tobacco producers should be required to establish tree plantations equivalent to either 50 ha. or 10% of the size of their respective tobacco plantations, and
(b) small-holders should be required to establish up to 4 ha. of woodlots per each 1 ha. of tobacco cultivated.

9. The economic and financial returns from each of several tree planting strategies for tobacco producing areas (ie, large plantations, communal plantations established by smallholders) will be evaluated based on investment profiles for appropriate technical packages (tree species, planting and cultivation methods, etc.). It had been envisaged that the program to accelerate tree farming in the target areas would be supplemented the establishment of tree nurseries (for preferred species such as Cassia Siamea, Gmelina Arborea, and Leucaena Leucocephala) in all the 14 Tobacco-producing Districts.

Task 4: Evaluation of the Scope for Substituting Woodfuels in Indigenous Coal.

10. This task will cover all assessment of the present scope for and implications for re-introducing the use of coal for tobacco curing in regions within possible economic radius of the existing coal mines (ie. the Ilima Colliery). Aspects to be evaluated include costs and requirements:-

(a) to retrofit or modify curing barns, and
(b) to rehabilitate transportation infrastructure related to coal movement.

11. Prior to 1979, large tobacco producers in the Iringa area like the members of the Southern Highlands Tobacco Growers Association (SHTGA), had used up to 680 tonnes of coal/annum for tobacco curing. The increasing costs of transporting coal from the colliery to the Iringa area, coupled with the unreliability of deliveries are the main factors which caused the formers to switch to the use of woodfuel. The present economics of coal use vis a vis woodfuel for tobacco curing will be determined.

Task 5: Indentification of Institutional Policy, Incentive Framework for Proposal Program.

12. This task will cover a general evaluation of the policy, institutional, and incentive framework that is embodied in the National Tobacco Component of the Export Crop Rehabilitation Programmes with the immediate objective of identifying factors which may inhibit the effective promotion and dissemmination of more energy efficient tobacco curing practices in Tanzania. Recommendations to alleviate such constraints will be formulated.

Task 6: Formulation and Justification of Plan of Action

13. The results of work done under the Tasks above will be integrated into a Plan of Action to upgrade the energy efficiency of tobacco curing practices in Tanzania. The Plan of Action will define and justify, in economic and financial terms, activities:-

(a) to test and demonstrate improved curing barns and curring techniques in selected areas;

(b) to rehabilitate tobacco curing extension schemes and services;

(c) to promote tree farming in the tobacco curing areas; and possibly;

(d) to substitute woodfuel with coal in some tobacco producing areas.

Details on each of the activities that could make up the proposed Plan of Action will be provided, indicating their relative priority, specific objectives, costs, economic and financial returns, financing options, the local manpower and skill development required, and possible implementation schedules. In the event that coal is determined to be competitive with woodfuels, the detailed scope of any additional pre-investment studies to promote coal substitution will be defined.

Tobacco Processing Plants

14. This aspect of the proposed study will consist of three main tasks as follows:

Task 1 Energy Audits of Tobacco Processing Plants at Morogoro and Songea;

Task 2 Evaluation of scope for fuel substitution with indigenous coal; and

Task 3 Formulation and justification of Energy Efficiency Plan of Action for Tobacco Processing Plants.

Task 1: Energy Audits of Morogoro and Songea Tobacco Processing Plants.

15. This task will consist of:

(a) collection of data on the types, technical specifications, and performance characteristics of equipment currently being used in the Morogoro and Songea tobacco processing plants; and

(b) energy audits focussing on boilers, furnaces, and electro-mechanical equipment.

The audit team will conduct measurements of energy use, combustion efficiency, power factor during the next processing season (i.e. during October - December, 1986). The datta and information collected during the audits will be evaluated and used as the basis for identifying energy efficiency measures that (i) can almost immediately be implemented with minimum investment (house-keeping measures); and (ii) will require further inputs of engineering and investments over medium term.

Task 2: Evaluation of Scope for Fuel Substitution with Indigenous Coal.

16. The technical and economic viability of fuel substitution with indigenous coal will be evaluated under this task. The Morogoro processing plant is equipped with the dual fired (fuel oil/coal) boilers. The infrastructural and logistics requirements to make coal competitive with fuel oil will be evaluated.

Task 3: Formulation and Justification of Energy Efficiency Plan of Action.

17. The findings of the studies and energy audits will be used to

define a plan of action for minimising energy losses at each plant. The recommended measures will be justifies in technical and economic terms, and may introduce inter alia:-

(a) improved fuel preparation and combustion practices;

(b) improve steam utilisation;

(c) improved heat recuperation;

(d) improve power factor of electro-mechanical equipment; and

(e) improved plant management, operation, and maintenance practices.

The results of the analysis of fuel substitution with coal will also be presented.

OUTPUT

18. The main output of the proposed pre-investment study will be a report (supplemented by technical annexes) which will present a full costed and phased plan of action for reactivating GOT efforts to upgrade tobacco curing practices in the country. The financial and economic justification for the plan of action, which may include pilot demostration projects, extension schemes, etc., will be provided in the report together with details on the nature, scope, and timing of technical and financial assistance needed from both domestic and external sources over a 5-10 year period, beginning in mid - 1987.

19. The report which will provide:

(a) an index of relevant economic financial, and technical information to facilitate the appraisal by prospective donors who may fund the implementation phase; and

(b) sufficient information on technical and organizational aspects to enable representatives of GOT and parastatals to effectively monitor and implement the plan of action.

ORGANISATION OF STUDY

20. The proposed study will be done under the overall supervision of ESMAP. A team of five specialists, led by an Energy Planner/Economist from ESMAP's staff, will be responsible for carrying out the activity. The specialists will be drawn from suitably qualified and experienced

consultants, a number of whom will be recruited locally in Tanzania. The Tanzania Industrial Research and Development Organisation (TIRDO) will be contracted by ESMAP to perform the preliminary energy audits of the Morogoro and Songea Tobacco Processing Plants. The expertise required for the study (excluding TIRDO's input) will include:-

a)	Energy Planner/Economist	10 man-weeks
b)	Tobacco Curing Specialist	5 man-weeks
c)	Tobacco Extensionist	6 man-weeks
d)	Forestry Economist	6 man-weeks
e)	Energy Conservation Specialist	5 man-weeks

21. The above ESMAP team will collaborate on a day-to-day basis during fieldwork in Tanzania with counterparts representing the Ministry of Energy and Minerals (MEM), the Ministry of Agriculture and Livestock Development (MOALD), and the Ministry of Natural Resources and Tourism (MNRT).

REPORTING REQUIREMENTS

22. Reporting arrangements for the proposed study are as follows:

(a) a detail briefing paper (referred to as an ESMAP Activity Initiation Brief) will be issued at least one month before the beginning of field work in Tanzania. The brief will be based on this paper and will incorporate the background, objectives, scope, terms of - reference, and the agreed workplan for the proposed pre-investment study. The brief will be made available to the Government of Tanzania, and interested donors, including SIDA who are funding the study.

b) at the end of the fieldwork, and prior to the ESMAP missions departure from Tanzania, an Aide Memoir will be prepared and presented to representatives of the Government of Tanzania. The Aide Memoir which will present the preliminary findings and conclusions of the ESMAP mission, will be used as the basis for discussions in Dar es Salaam to wrap up the field work, and will be used to solicit some feedback from the GOT counterparts.

c) about 2-3 months after the departure of the ESMAP mission, a draft final report of the study (referred to as an ESMAP Activity Completion Report) will be submitted to the GOT for review and comments. The draft report will incorporate the detailed analysis made by members of the ESMAP team on their respective assignments (submitted as separate technical working papers), and will have been reviewed and cleared within the World Bank.

d) the Activity Completion Report will be finalised and issued after the draft report has been discussed and cleared with the GOT. The final report will incorporate the comments and suggestions made by GOT. The report will be circulated to donors who may have expressed an interest in funding the technical assistance and investments defined under the agreed Plan of Action for upgrading the efficiency of energy use in the tobacco industry in Tanzania.

TENTATIVE BUDGET

23. The total cost of the proposed study is tentatively estimated to be US$ 150,000 exclusive of the costs for the satellite remote sensing assignment. The study will be funded by a grant from the SIDA through the UNDP Energy Account. The preliminary breakdown of costs is as follows:

Item		Estimated Cost (US $)
1. ESMAP staff	(10 man-wks)	10,000
2. Consultants	(30 man-wks)	68.000
3. ESMAP Management	(5 man-weeks)	5,000
4. Secretarial Services.	(7 man-weeks)	2,450
5. International Travel Expenses		20,000
6. In-Country Travel (Tanzania) Expenses		3,000
7. Subsistence Expenses (field work)		10,000
8. Reporting Expenses (printing Communications)		5,000
Sub-total		123,450
Contingencies (20%)		24,690
Grand Total		148,140

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

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ESMAP Energy Forester - Job Description

Duties and Responsibilities

Under the guidance of the Division Chief, you will be responsible for developing and supervising a program of preinvestment work in plantations dedicated for supply of woodfuels to households and industries. You will also initiate the development and trial of innovative technical packages of agroforestry and silvipastoralism to enable the integration, where required, of commercial woodfuels production with other uses of wood and with established cultural behavioral and social practice of local inhabitants. The physical environment of the tree plantings will range from high altitude semi-arid lands to moist lowland tropics. Specifically, you will:

1. Identify economic prospects for the establishment of fuelwood plantations in developing countries.

2. Identify opportunities to demonstrate through trials (which can lead to commercial applications) innovative technical packages of agroforestry, silvipastoralism or plantation and woodlot design and management to increase affordable fuelwood production, especially on marginal lands.

3. Prepare project briefs, terms of reference and requests for proposals for preinvestment work to develop projects to the next stage in the project cycle.

4. Liaise with governments and donors regarding funding of the preinvestment work and preparations required in advance of preinvestment studies.

5. Supervise consultants undertaking the preinvestment work, ensuring that the quality of the technical and economic analysis is acceptable and that contractors are taking advantage of the most recent developments in the fields concerned.

Qualifications/Requirements (including desirable skills, knowledge and abilities)

1. Master's degree or equivalent in forest production/forestry economics, and a working knowledge of land use planning methods.

2. At least ten years experience in energy forestry project design, in forest resource assessment, or in the design and evaluation of agroforestry and silvipastoral systems.

3. Well versed in socio-cultural aspects of subsistence agriculture.

4. A demonstrated ability to undertake timely and thorough analysis and to relate analytical results to policy and project issues.

5. Good communications and diplomatic skills. An ability to cooperate in a team of professionals of varying background, under difficult circumstances.

6. Reading and speaking knowledge also of French and/or Spanish is desirable.

6.6.86/MG:jb

POTENTIAL ESMAP ACTIVITY: ZAMBIA

Energy Sector Review

Background

1. Since the Energy Assessment report was issued in January 1983, Zambia has experienced a four-fold devaluation and a further deterioration in its external debt situation. Uncertainty as to the implications of these developments for the country's energy investment strategy, coupled with Zambia's relatively weak indigenous planning capability, is limiting donor assistance in the energy sector at a time when efficiency and continuity of energy supply and the minimization of energy imports are vital to economic recovery.

Proposed Technical Assistance

2. Technical assistance is proposed to assist the Zambian authorities in preparing an integrated energy sector investment program and associated package of policy measures. The external assistance would be complemented by extensive local inputs from Government, the energy supply organizations and the University of Zambia. This would ensure that the energy strategy was fully reflective of national conditions and had the support and commitment of concerned national institutions. To facilitate donor funding, recommended investment projects would be fully specified and brought to prefeasibility status.

3. The analysis would build on the Energy Assessment and two recent ESMAP activities: (a) an Energy Assessment Status Report (1985), which made a first attempt at outlining a sector strategy; and (b) an Energy Institution Development Assistance Project (1986), which recommends steps to streamline and strengthen energy policy and planning. It would include the following major tasks:

(a) estimation of the long-term evolution of energy demand, by major type of energy user (industry, mining, commerce, transport, agriculture, households and foreign consumers);

(b) definition of a least-cost energy supply strategy, based on the economic cost of alternative fuels (principally oil, power, coal and wood), which takes full account of economic inter-fuel substitution and conservation options.

(c) recommendations for appropriate energy prices and demand management measures.

4. Approximately 50 man-months of ESMAP staff, international and local consultant input would be required. Total cost is provisionally estimated in the range of US$400 - 500,000.

ZAMBIA

Urban Household Energy Strategy

Objective. Define a least-cost strategy for satisfying urban household energy needs, identify and bring to prefeasibility status justified projects and strengthen government capability to analyze household energy options.

Components. (a) survey of fuel use by representative household to establish pattern of energy demand by type of fuel and nature of use; (b) estimation of economic and financial cost of alternative fuels (fuelwood, charcoal, electricity, kerosene, etc.); (c) assessment of potential demand management options (improved stoves); and (d) specification of justified demand and supply projects (e.g. fuelwood production, charcoal efficiency, improved stoves, power connections) and recommended policy actions.

Comments

Addresses largest and most neglected source of energy demand and puts scattered, small-scale local initiatives (stoves, kilns, etc.) into more comprehensive framework.

Power Sector Efficiency and Rehabilitation Audit

Objective. Identify justified investments and operational improvements that would lead to more reliable and less costly power supply and improve ZESCO's cash flow.

Components. (a) analysis of size, economic and financial cost of technical and non-technical power losses and power supply interruptions; (b) identification and analysis of options for improving the efficiency and reliability of power supply; and (c) definition and costing of a justified program of rehabilitation and reinforcement investments and improvements in power system operating procedure.

Comments

Focuses an important but negelected component of energy supply system.

Industrial and Mining Energy Conservation/Substitution Options

Objective. Identify and bring to prefeasibility status justified investments in industrial and mining energy conservation and substitution, building on preliminary analyses by the Zambian Department of Energy.

Components. (a) analysis of public energy policy (pricing, tax policy, tariffs, investment incentives, publicity, technical assistance, etc.) to encourage efficient energy selection and use; (b) estimation of the current and prospective economic and financial costs of alternative energy supplies; and (c) on the basis of those costs, and building on existing analysis of conservation and substitution options, identification and prefeasibility analysis of justified conservation and substitution projects.

Comments

Addresses key issue of potential for efficient conservation/ substitution of imported energy which initial government analysis suggests is significant.

BOTSWANA: ESMAP

HOUSEHOLD ENERGY STRATEGY

1. Wood is the main source of energy for households in Botswana. Supplies are increasingly scarce around the major population centers in Eastern Botswana. Since the Fifth National Development Plan (NDPV), the Government of Botswana has initiated a number of studies and surveys to identify the scope of the woodfuels supply/demand problem and to evaluate options for alleviating the scarcity while maintaining the overall energy policy of reducing the country's dependence on imported energy.

2. An Energy Assessment study of Botswana was completed in September 1984 under the joint UNDP/World Bank Energy Sector Assessment Program. Since the completion of the Botswana Energy Assessment, several of the other energy activities pertaining to household energy use in the country have been concluded. These include:

(a) surveys of energy use in urban households by the Botswana Renewable Energy Technology Project (BRET);

(b) surveys of energy use and needs in rural communities by BRET and also by the National Insitute of Development and Cultural Research (NIR) in Gaborone;

(c) a study of electricity connection policy for residential consumers by ESMAP;

(d) a feasibility study by GTZ on a local coal washing plant to convert coal from a local colliery for use in commercial and household sectors; and

(e) studies by the Rural Industries Innovation Center (RIC) on identifying suitable wood- and coal burning stoves for households and institutions.

3. The current Sixth National Development Plan (NDPVI) has provision for further support and funding for these efforts under some five sub-programs: the Energy Technology Substitution Program; the Rural Energy Supplies Program; the Rural and Domestic Renewable Energy Technologies and Extension Services Program; and the Alternative Energy Development Program. As part of the follow-up to the Energy Assessment Study in Botswana, the World Bank has allocated staff resources (total of about 20 staff weeks) to ESMAP to formulate an integrated strategy and action program to address household energy constraints and opportunities in Botswana.

4. ESMAP requires additional cofinancing of the order of US$75,000-100,000 to cover supplementary fieldwork and surveys to be done

in Botswana as part of the Household Energy Strategy Study. It is envisaged that such work will focus on the collection and review of essential baseline data in the major population centers of Botswana, and will require close collaboration with local groups including researchers at the NIR.

5. ESMAP plans the following as the tentative work plan for the proposed Botswana Household Energy Strategy Study:

(a) a reconnaissance mission (November/December, 1986) to discuss and agree with GOB, the purpose and scope of the work which will focus on eliminating gaps and deficiencies in available data and information on the household energy issue, and extend the analysis of options to encompass the findings of the other studies and surveys. It is envisaged that the proposed work program will involve the use of locally based experts (e.g., from the NIR);

(b) initiation of fieldwork and surveys (possibly March/April, 1987) as soon as agreement had been reached with GOB in the scope and terms-of-reference for the overall effort, and when the required cofinancing has been secured;

(c) quarterly visits to Botswana by ESMAP staff and consultants to monitor, review, and guide the fieldwork and to maintain a dialogue with concerned agencies of the GOB; and

(d) a main mission by ESMAP staff and consultants in the second half of 1987 (i.e., when the survey and data collection phase was completed) to evaluate the results and to formulate a least-cost strategy in consultation with the GOB. A final draft report would be prepared after the main mission.

Mr. Dosik

Energy Assessment for Lao Peoples' Democratic Republic

While the scope of an energy assessment for Lao PDR would need to be agreed to during the visit of a reconnaissance mission, our current perception is that this study might best focus primarily on four issues:

(a) Electric power development for export and local use. The latter also would entail the question of drawing on large hydroelectric power schemes for export to also provide power for domestic use in surrounding areas versus development of small generation plants in these areas.

(b) Petroleum product supply, storage and distribution.

(c) Household/rural energy supply. This is linked to the more general issue of isolated local energy production/ supply systems versus the development of regional or national energy supply infrastructure.

(d) Priorities for strengthening the institutional framework for energy analysis and policy formulation, given the scarcity of skilled manpower and resources.

In analyzing the hydroelectric issues, the assessment team would draw substantially on the analysis pursued under phase I of the UNDP-financed and Bank-executed hydro study, and would need to cooperate closely with the experts preparing that study and the Mekong Secretariat. Hence, a main assessment mission might best proceed when the initial results of phase I of the UNDP study are in hand.

An official government request is expected but has not yet been received. Anticipated costs for the study are about US$300,000.

Bob Taylor
9/9/86

BTaylor:elv

POTENTIAL ESMAP ACTIVITY: ZAMBIA

Transport Sector Energy Demand Management Program

Background

1. Despite efforts to contain the growth of petroleum demand, Zambian petroleum imports have remained stubbornly at 17-20% of the total import bill since the late 1970s. As the largest consumer of imported petroleum products, the transport sector accounts for some 45% of total petroleum demand. Experience in other countries, accumulated under the Energy Sector Management Assistance Program (ESMAP), has confirmed the potential for substantial short-term energy savings in this sector through no or low-cost conservation measures, such as improved maintenance procedures, fuel system adjustments etc., and for savings in the longer-term through cost-effective new investment.

Outline of the Proposed Assistance

2. The proposed technical assistance project would analyze:

(a) the characteristics and relative importance of the various transport modes;

(b) current and projected fuel consumption and efficiency by type of consumer;

(c) government policies affecting energy use in transport.

3. Based on analysis of this information, the specialists would estimate the overall potential for energy savings in transport and draw up a list of recommended measures to improve energy efficiency. These would include both short-term actions which could be taken immediately (e.g., changes in operational procedures or policies, such as improved vehicle maintenance or modification of vehicle import duties) and longer-term approaches, involving relatively modest investments, which would be defined. In each case, the costs and benefits of the proposals would be clearly spelled out. A total of about eight man-months of consultant time would be involved at a cost of about US$100,000.

POTENTIAL ESMAP ACTIVITY: SADCC REGION

SADCC: HOUSEHOLD ENERGY STRATEGY STUDY

TABLE OF CONTENTS

I. BACKGROUND

1.1 In the aggregate the SADCC Region has abundant energy resources and aggregate energy supply exceeds aggregate energy demand. The main energy resources consist of biomass (fuelwood, charcoal, agriculture residues and agro-industrial residues), coal, hydro, gas and oil. However, this aggregate view clouds severe imbalances in the energy supply and demand relationships that exist in specific markets for particular energy forms, especially in the household energy subsector. These imbalances are attributable to the long distances between the sources of supply and the centers of demand, the associated transport costs, the underdeveloped systems of delivery, and lack of information about interfuel substitution opportunities. These supply/demand imbalances are particularly critical in the use of fuels in the household sector.

1.2 Woodfuels are the main source of household energy supply. Over the past five years, woodfuels have increased significantly as a proportion of total energy consumption. In 1984 woodfuels accounted for about 80% of total energy consumption in the region, and much of the demand originates from the countryside, where about 80% of the population reside. In the rural areas, household fuels are mostly non-monetarized.

1.3 In the urban areas, however, commercial fuels provide for an increasingly significant portion of the average urban household energy needs. Kerosene for cooking and lighting, as well as electricity, are becoming important components of the household energy budget, a trend that is likely to accelerate with rising incomes and demographic dynamics. In response to rapid population growth rates, urban centers

will continue to be a source of increasing petroleum product demand and residential electricity requirements.

II. SADCC HOUSEHOLD ENERGY STRATEGY

2.1 An explicit household energy strategy in the SADCC countries during the next five years will have to give a strong emphasis to urban areas, where:

(a) household fuel consumption is monetarized;

(b) cash incomes are more widespread;

(c) effects of concentrated urban fuelwood demand on deforestation are intensifying; and

(d) management of demonstration projects is less difficult than in the rural areas while, at the same time, the results should be transferable to the design of projects in the rural areas.

2.2 The long-term objective of the strategy is to minimize the cost to the SADCC economies of the supply of household cooking fuels and to reduce the share of the financial cost of cooking fuels in household budgets.

2.3 The first and most urgent step in implementing SADCC's household energy strategy is to reduce fuelwood consumption in selected urban areas. This requires a number of parallel activities:

(a) immediate investigation of the financial and economic viability of finding substitutes for fuelwood in urban households. The emphasis should be on substitution by kerosene and LPG in the short term, followed by a possible transition to coal and a greater penetration by electricity in the longer term. These investigations should be followed by pilot demonstration projects as soon as possible;

(b) large scale marketing of improved woodstoves in urban areas; and

(c) careful consideration of the scope for increased fuelwood pricing (including stumpage). These measures will increase the financial viability of improved woodstoves in urban areas and support the improved woodstove promotion projects region wide.

2.4 At the same time, there should be a continued effort to promote tree planting in rural areas. Tree planting should be an integral part of village agricultural activities to protect the soil; the additional fuelwood supply is an additional benefit.

2.5 The second phase of the household energy strategy should be to reduce fuelwood consumption in rural areas. This would involve extending the urban fuelwood conservation and substitution projects into semi-urban

and rural areas. The initial target areas should be those where there is a severe local wood deficit but sufficient cash income for a significant proportion of local households to purchase improved cookstoves and/or substitute fuels. Governments should aim to have suitable projects ready for financing and implementation within five years.

III. TERMS OF REFERENCE FOR TECHNICAL ASSISTANCE

3.1 The study will identify and articulate the key elements of a household energy strategy study for SADCC, including:

(a) more efficient use of fuelwood, e.g., promotion of improved woodstoves;

(b) development of viable alternative fuels for household cooking;

(c) financial and economic pricing of household fuels; and

(d) increased production of fuelwood.

3.2 In doing so, the study will start by examining carefully and then building on the existing information, studies, analyzes and other work which have been carried out in individual SADCC countries and for SADCC as a whole. One of the end products will be the provision of technical assistance to SADCC to help it prepare a household energy

project. This project should focus on alternative fuels for household cooking but should integrate and build on existing activities in improved woodstoves and forestry/agro-forestry.

Sub-project 1: Kerosene.

3.3 COMPONENT 1.1: Household Energy Survey

(a) review of household energy demand data available; and

(b) carry out complementary survey work, where necessary, to determine possible market demand for stoves and alternative cooking fuels over a range of likely prices.

3.4 COMPONENT 1.2: Preparation of Kerosene Pilot Project

(a) review of work completed on adaptation/development of suitable low-cost kerosene stoves in the selected SADCC target markets;

(b) production of prototype kerosene stoves and consumer testing in a representative sample of households in target areas;

(c) development and costing of methods for stove production by local artisans; and

(d) design and costing of a pilot project to promote kerosene stove production and marketing.

3.5 COMPONENT 1.3: Project Implementation

Sub-project 2: Coal and Residues

3.6 COMPONENT 2.1: Stove Development and Testing

(a) review of work completed, if any, on adaptation/development of low-cost stoves for: coal, lignite, coke, and agricultural residue briquettes;

(b) review of chemical and combustion analysis of all available grades of local coal, lignite, coke, and agricultural residues;

(c) completion of prototype stoves for each fuel, or groups of fuels, and consumer testing in a representative sample of households in target areas; and

(d) development and costing of methods for stove production by local artisans.

3.7 COMPONENT 2.2: Evaluation of Fuel Production and Marketing Systems

(a) coal: review and detailed costing of production options, including untreated coal, briquetting of fines and coking; development and costing of transport options for a range of target markets; evaluation of investment requirements for increased coal production; and

(b) agro-industrial residues: review and detailed costing of options for industrial and/or small-scale production of

agricultural residue briquettes; development and costing of transport and marketing options; evaluation of investment requirements.

Sub-project 3: Electricity

3.8 COMPONENT 2.3: Evaluation of Low Cost Electricity Household Supply

(a) review and detailed costing of electricity supply costs to households in the target markets, including proposals for revised standards of electricity supply distribution; and

(b) evaluate the incremental investment costs required to supply electricity to household at low cost.

3.9 COMPONENT 2.4: Pre-feasibility Comparison of Options

(a) review of results of components 2.1, 2.2, and 2.3; economic and financial comparison of household fuel costs in the target markets; formulation of production and marketing strategy (volumes and prices) for coal and agro-industrial residues, and for low cost electricity supply.

Composition of Experts

3.10 To carry out this work will require a team of international consultants besides ESMAP staff. The team will consist of a mission leader, marketing specialist, electricity pricing specialist, stove manufacturing specialist, improved kiln specialist, socio-economist, forestry specialist, forestry economist, and an energy economist.

Cost

3.11 The cost of the proposed study at this stage is highly tentative and needs to be refined in the course of a reconnaissance mission. Possible cost in the order of US$575,000. This includes provision for study related travel, consultancy fees, subsistence, field surveys and administrative cost.

INT 183 005

OFFICE MEMORANDUM

DATE: September 8, 1986

TO: Mr. Richard S. Dosik, Chief, EGYS2

FROM: Ian Hume, Assistant Director, EGYPS

EXTENSION: 76894

SUBJECT: Missions to Sweden, Norway and India, September 11-30
Terms of Reference

Sweden

You will visit Stockholm September 11 and 12 to continue the discussions with SIDA begun by Mr. Bates concerning a multi-year agreement for a contribution to ESMAP of some $1 m per annum. Your discussions will focus on:

(i) projects suitable for SIDA financing, based on a list of specific "starter" projects requested by SIDA;

(ii) the need to channel the SIDA contribution through UNDP;

(iii) ESMAP use of Swedish consulting services.

With respect to (ii) you will seek to overcome SIDA's reluctance to continue to use UNDP as a channel by stressing the joint World Bank/UNDP basis of ESMAP and the critical character of the financial and other support ESMAP receives from UNDP. As regards the use of Swedish consultants, you will make it clear that, while ESMAP seek to maximize the use of services from contributing countries, and is willing to discuss doing so in terms of possible targets, it can only commit itself to such targets informally and on a "best efforts" basis.

Norway

You will attend the Hydropower Development Seminar organized by the Export Council of Norway for September 16-19. As agreed with the sponsors, you will make a seminar presentation on the ESMAP program with particular emphasis on ESMAP's work on power efficiency audits. While in Norway, you will also visit the Ministry of Development Cooperation to discuss the status of its efforts to recruit a power engineer for secondment to ESMAP, and to determine their interest in financing the proposed Nepal small hydro development study.

India

You and Mr. Ernesto Terrado (EGYPA) will undertake a reconnaissance mission September 22-29 for the study of India's non-conventional energy program included in the FY87 sector work program. The objectives of the proposed study are to assess India's experience in non-conventional energy development, to evaluate prospects for commercialization of non-conventional energy on a broad scale and to

provide an overview of the sub-sector within which technical assistance through ESMAP and, possibly, other forms of Bank assistance can be considered. You will seek to reach agreement with the Department of Non-Conventional Energy sources and other concerned GOI agencies on terms of reference, including the specific areas on which the study should focus in order to be of greatest use to both the Bank and India.

Distribution:

Messrs. C. Ulrik Haxthausen (EDS20), C.R. Rao Sahib (EDS12), Pollak (ASAIN), Montfort, Saunders, Terrado, Bates (EGy) Rothermel/Cox (UNDP)

RSDosik/mpr

INT|83|005

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

September 4, 1986

Mr. Y. Kishi
Assistant Resident Representative
United Nations Development Programme
House 60, Road 11A
Dhanmondi R/A
Dhaka, Bangladesh

Dear Mr. Kishi:

ESMAP: Bangladesh - Solar Photovoltaic (PV) Application Study

In reference to your telex dated August 7, 1986, attached hereby please find the draft project document for this project. The principal objectives of the proposed study are to assess the extent of the potential market for high priority, technically and economically viable uses of PV systems in Bangladesh, and to recommend measures for realizing this potential. The study would be conducted by staff and consultants under the joint UNDP/World Bank Energy Sector Management Assistance Program (ESMAP).

We would appreciate receiving your comments and those of the Government at the earliest opportunity. We expect to be able to launch the study within 6-8 weeks of receiving your and the Government's approval.

Best regards,

Richard S. Dosik
Chief, Energy Strategy &
Preinvestment Division II

bcc: Messrs.: Miller (ASPED)
Herbert (World Bank/Resident Mission, Dhaka, Bangladesh)
Cox (UNDP, N.Y.)

UNITED NATIONS DEVELOPMENT PROGRAMME

Project of the Government of

BANGLADESH

PROJECT DOCUMENT

Title: Energy Sector Management Assistance Programme -- Bangladesh Solar Photovoltaics Applications Study

Number: _____ (from UNDP Resident Representative)

Duration: 12 months

Primary Function: Direct Support to the Ministry of Energy

Sector: (Govt. class) Natural Resource (UNDP class and code) 03.

Subsector: (Govt. class) Energy (UNDP class and code) 0350. (codes from UNDP Resident Representative and UNDP International Relations Department)

Government Implementing Agency: Ministry of Energy

Executing Agency: The World Bank (ESMAP)

Estimated Starting Date: Mid-October, 1986

Project Site: Dhaka

Government Inputs: in kind P10 UNDP Inputs: IPF, $110,000

This project document and its annexes constitute the agreement among the signatories.

Signed:

_____ _____

On behalf of the Government Date

_____ _____

On behalf of the Executing Agency Date

_____ _____

On behalf of the United Nations Development Programme Date

PART I. LEGAL CONTEXT

1.1 This project document shall be the instrument (therein referred to as a Plan of Operation) envisaged in Article I, Paragraph 2 of the Agreement between the Government of Bangladesh and the United Nations Development Programme concerning assistance under the special Fund sector of the United Nations Development Programme signed by the parties on July 12 and 31, 1972.

PART II. THE PROJECT

A. Development Objective

2.1 Energy development, in general, is designated a "core priority" in the Government's Second Five Year Plan (1981-1985). The major objectives being pursued by the Government of Bangladesh in the energy sector include improving efficiency of use and increasing the availability of renewable resources to meet the growing demand for energy in rural areas. Particular emphasis has been placed on substituting imported fuels with indigenous resources.

B. Immediate Objectives

The immediate project objectives are as follows:

(1) Assessment of technical and economic viability of various solar Photovoltaic (PV) applications, e.g., water pumping, rural telecommunications, educational TV, refrigerators for health centers, rural electrification and grid interfaced electrification. The assessment will be based both on the present (1986) and the projected (1991-1996) status of the PV technology.

(2) Estimation of the present and projected market size for each technically and economically viable application.

(3) Assessment of the prospects for the manufacture and/or assembly of PV cells/systems within the country. All relevant solar cell production technologies will be considered to respond effectively to the present and the projected market needs.

(4) Identification of policy measures, e.g., initiating a demonstration program and public information campaign, setting up of institutional mechanisms, financing, credits and incentives, waiver of custom duties on imported solar components.

(5) Development of a costed and time phased action plan for expanding the use of PV for technically and economically viable applications. Included in it will be estimates of priority investment needs and returns, including projects suitable for international financing.

C. Background and Justification

Background:

2.2 Energy consumption in Bangladesh is characterized by heavy dependence on traditional fuels, such as cow dung, rice straw and husk, tree leaves and twigs as well as sun light and wind. According to the Bangladesh Energy Study carried out in October 1982 under the UNDP/World Bank Energy Sector Management program, about two-thirds of the total energy consumed in Bangladesh comes from these traditional sources. This points out the overwhelmingly important role of traditional source of

energy for the Bangladesh economy. The importance of the traditional energy sources will increase as a result of emphasis on rural development. The Plan, therefore, emphasizes development of renewable energy resources, such as forests and other biomass, bio-gas, solar and wind energy.

2.3 The objectives for the development of renewable energy sources are:

(a) to achieve a system of balance between agriculture and energy emphasizing use of indigenous energy resources like solar energy;

(b) to improve efficiency of use and increase availability of new and renewable sources to meet the growing demand in rural areas;

(c) to aim at increasing technical capability in the field of new and renewable sources of energy development.

Bangladesh's per capita consumption of commercial energy is about 36 kg of oil equivalent per annum, about 90% lower than the population weighted average for all low-income countries. Total per capita consumption of energy is about 90 kg of oil equivalent per annum. Between 1976 and 1983, commercial energy consumption grew at about 5.8% per annum, while traditional energy showed relative stagnation, increasing at less than 1% per annum. In FY84, commercial energy consumption was about 3.4 million

tons oil equivalent, of which imported fuels, petroleum and coal, accounted for 37% and 5% respectively, natural gas 52%, and hydropower 6%. Consumption of natural gas, which accounts for about two-thirds of electricity generation, increased at 13.5% per annum between 1978 and 1984.

2.4 In the immediate future the energy balance can only be modified by measures to restrain the growth of energy demand through pricing of energy products and electricity, and complementary measures to promote energy conservation. Improvement of the energy balance in the medium to long term can only be achieved by the development of economically viable domestic energy resources, of which photovoltaics energy is an important resource.

2.5 The potential of using PV systems for various applications was identified by the joint UNDP/World Bank Energy Assessment Report. 1/ A follow-up mission under the auspices of the joint UNDP/World Bank Energy Sector Management Assistance Program (ESMAP) visited Bangladesh in April 1984 to review recent developments in the energy sector and identify priority pre-investment strategy projects. 2/ It was recommended that a feasibility study be carried out to investigate in detail the potential of using PV systems for various applications in the country.

1/ Joint UNDP/World Bank Energy Sector Assessment, Bangladesh: Issues and Options in the Energy Sector. Report No. 3873-BD October, 1982.

2/ Bangladesh: Energy Assessment Status Report, No. 015/84, April, 1984.

Justification:

Technical Viability of PV Systems

2.6 Today photovoltaics are considered to be a proven technology for certain applications. The sharp reduction in the cost of the PV cells and the associated development of amorphous silicon technology have combined to produce the PV cell at a cost of between $3-5 to $6 per peak watt. Advances in battery technology have improved the life and reduced the cost and weight of batteries. Advances in solid state electronics have lowered the cost and improved the reliability of D.C. - A.C. inverters. The applications of Photovoltaics in developing countries, has been demonstrated by projects undertaken by a number of international agencies. Some of these projects are:

(a) USAID: PV systems for remote medical centers in Colombia, Kenya, Botswana, Mali, and Egypt. Solar power refrigerator in Peru, Colombia, Dominican Republic, Guatemala, Honduras, Haiti, Guyana, Ecuador, and St. Vincent. Solar pumping systems in Mali and Upper Volta.

2.7 The collective experience of these international agencies is that properly designed and installed PV systems can be cost effective for use in developing countries for certain applications in remote areas that requires small amounts of power. The development of new types of D.C. motors using permanent magnets and variable voltage, promise trouble free operations of solar water pumps for more than ten years. Several such systems are already in use in several African countries and have not had

problems for many years. The life of storage batteries has been increased together with improvements in their reliability. The vast operational experience associated with remote PV system applications in the United States, Europe and the developing countries is testimony to the fact that PV is a mature and proven technology.

Availability of Solar Radiation in Bangladesh

2.8 Bangladesh offers attractive prospects for solar PV applications because of high incidence of solar radiation. Metereological data show that, at Dhaka (latitude 23° 43'N), the yearly average of daily sunshine hours is 7.6, with a maximum monthly average of 9.1 in November and a minimum of 4.8 in June. Despite the partial interruptions in summer by monsoons, solar energy is still abundantly available and can be used in various applications to displace commercial fuels or rapidly depleting traditional fuels.

Solar PV Applications In Bangladesh

2.9 The potential PV system applications in Bangladesh include:

(a) Water pumping: PV systems can be installed in conjunction with electrically driven pumps -- usually using D.C. motors for applications such as rural domestic water supply, water for livestock and irrigation for small land holdings. The PV systems are usually very simple consisting of PV array and its supporting structure; often no batteries or regulators are used.

(b) Telecommunications: PV systems can be used to supply electricity to rural telecommunication systems and also can be used to provide either a conventional land-line phone system or to provide VHF links to a central station.

(c) Refrigerators for vaccines: PV systems offer an attractive alternative to electric power refrigerators. Usually the electric refrigerators are run on an unreliable power supply or kerosene powered units which are costly to operate and maintain.

(d) Cathodic protection: The gas pipeline network in Bangladesh requires electricity for cathodic protection and radio telemetry. Typically small gas generators are used for providing electricity in isolated areas. PV systems offer a reliable and maintenance free alternative for this purpose.

(e) Education TV for rural areas: TV is increasingly being used as a tool for education in rural areas. In addition to using TV as a medium for education, it is also used to provide information to farmers on farm related issues (weather patterns, plant diseases, etc.) PV systems offer an economic alternative to the gas generators or dry cell batteries that are currently used for powering TVs.

(f) Rural electrification: Villages which are far from the grid are good candidates for rural electrification by PV systems. Rural electrification may be full scale -- including fans, cottage industries or limited to lighting at night only.

D. Outputs

(a) The primary direct output of this activity will be a detailed assessment of the prospects for economic application of PV systems in Bangladesh. The assessment will include a determination of market potential, local manufacturing/assembly capability, promising sites for applications within each country and recommendations of policy and specific actions which would facilitate the adoption of feasible applications. Preinvestment projects suitable for financing by the international donor countries will be identified, if warranted by the findings.

E. Inputs

(a) Government

The Ministry of Energy will provide the following inputs (in kind) during the life span of the project (12 months):

(i) Qualified professional and supporting staff who will constitute the national staff of the project.

(ii) Support services for the project staff, both international and national.

(iii) Office space for international staff.

(iv) Provision for maintenance and recurrent costs of equipment and materials provided under the project.

The monetary value of these inputs is estimated to be Bangladesh Takas 2,374,000. Details are shown in Table 1 (Part IV).

(b) UNDP Inputs

UNDP will finance through the country IPF the following inputs required for the project:

(i) UNDP Energy Account Inputs

o International experts	5 m/m	24,000
o Consultants		
Engineer - Solar PV	2.5 m/m	24,000
Economist - Energy	2.5 m/m	24,000
o Administration		3,000
o Mission costs including expert costs		20,000
o Reports		10,000
o Sundry		5,000
Total		$110,000

The total value of the UNDP Inputs amount to $110,000. Details are shown in Table 1 (Part IV).

2.10 The consultants will reflect among themselves the following expertise at the highest international standards.

(a) Thorough familiarity with the latest computer models used to predict PV systems output and develop PV system design for various applications;

(b) Familiarity with the state-of-the-art production technology of PV systems, their relevance to developing countries and associated costs; and also familiarity with the developments taking place in the PV systems technology in industrialized countries;

(c) Actual hands-on experience (or alternately a keen appreciation of problems involved especially in developing country applications) in installing and maintaining PV systems under actual operating conditions;

(d) Thorough understanding of economic methodologies used in evaluating PV systems and market projections on a country-wide basis;

(e) Knowledge of telecommunications; gas pipe line cathodic protection; battery storage; engineering design of photovoltaic

arrays (including support structure); variable voltage motor driven pumps; PV powered refrigerators and lighting systems, etc;

(f) Experience in developing countries and ability to accurately gauge program implementation and other related institutional capabilities;

(g) Ability to work with local counterparts; train them quickly, and manage fast, yet accurate field data collection; and

(h) Ability to assess the implications of proposed PV systems application with the social environments in the area.

F. Work Plan

2.11 The scope of work in this study will comprise a number of tasks which are discussed below. In these tasks the main emphasis will be placed on identifying economic applications of PV systems and developing, if warranted by the finding, a preinvestment project. The analyses in various tasks which pertain to the 1986-1991 time-frame will be based on technology available today. The analyses covering the 1991-1996 time period will consider projected developments in PV technology.

2.12 The methodology used by the consultants will comprise: (a) interviews with agencies and individuals in Bangladesh who would have a bearing on the development of PV systems technology in the country: (b) field visits to a number of potential sites for installing PV systems

for various applications, the sites visited by the consultants should constitute a large enough "sample" from which extrapolations can be made to arrive at reliable countrywide projections for the use of PV systems; and (c) field visits to a number of potential manufacturers of PV system components (such as support structure, electrical hardware); (d) analysis of field data through the use of latest computer simulation techniques; (e) development of recommendations; and (f) preparation of the consultant report.

Task 1: Solar Resource Assessment and Collection of Other Pertinent Information

2.13 The consultants will review the availability of solar radiation and other climatic data in the country, especially the remote areas where PV systems are most likely to be used. The assessment of resources will be based on a review of existing solar radiation and other climatic data from different meteorological stations in the country, the data collected by various national and international agencies (i.e., NOAA in the U.S.; U.S. Airforcebin Data, U.S. Aid., etc.). Through a review of the solar resource, and field visits, the consultants would identify prime areas of the country where PV systems can be used. The consultants would seek to identify a number of sites (probably three for each type of PV system application) for demonstration projects. Additional resource measurement may be recommended for areas which have good potential for the use of PV systems. Some of these sites may serve as candidates for future PV systems for various applications. Information from the agriculture sector (e.g., cropping patterns, crop types used, water requirements, crop rotation, land requirements for animal feed, social implications of alternative methods of water pumping) will also be collected.

Task 2: Market Potential Assessment

2.14 The consultants will assess the present (1986) and projected (1991-1996) market size for PV applications considered (para. 2.11). The 1991 market size will be based on today's PV technology so as to arrive at definitive -- albeit somewhat conservative estimates. The 1996 market size estimates will, however, take into consideration the projected developments in the PV systems technology.

Technical Performance Analysis, Production Costs and Economic Analysis

2.15 Of the sites visited in the field for potential PV systems applications, the consultants will perform a number of detailed computer simulations. In these simulations, the climatic data from a number of sites, electricity load/use profiles and other related technical characteristics of the concerned application. The characteristics of a number of viable PV systems will be studied, including subsystems (e.g., PV modules, batteries, controllers, water pumps, lamps, etc.). The simulations will predict the output of the PV systems (e.g., electricity or water for pumping systems), and fuel displacement potential under different operational scenarios. The number of simulations will be large enough to help determine in definitive terms the economic viability of PV systems on the one hand (para. 2.1.(1)) and draw reliable estimates of

the current and projected market sizes, for PV systems on the other (para. 2.1.(2).)

2.16 In designing an optimal PV system for a particular application, the installed cost is an important consideration in addition to the system's technical performance. The cost is in turn dictated by whether the components are imported, manufactured or assembled locally. The consultants will identify an optimal mix of imports, manufacture and assembly for various applications so as to arrive at the most cost effective system. The consultants will also identify a broad time-phased program for PV system applications in Bangladesh (para. 2.1.(5).) It is expected that in the beginning and, especially for the first few demonstration projects, almost all the components (except for support structures and battery enclosures which will be locally built) will be imported and with the passage of time, local assembly and perhaps even some local manufacturing may be found appropriate.

2.17 The consultants will determine for the simulated systems, relevant economic and financial rates of return. These analyses will determine the economic viability (or otherwise) of various PV system applications from the Government's standpoint and, where relevant, also from the consumer's standpoint. For those applications which are found cost effective and where consumer financing is needed, the consultants will develop viable loan packages, mutually acceptable to the consumer and the Government. One guideline that the consultants could use in this regard is that the monthly debt service will not exceed the savings in the fuel bill resulting from the installation of a PV system. The

consultants will also determine LRMC and SRMC of PV applications where appropriate.

2.18 The consultants will then combine the results of simulations with the data collected in the field and extrapolate to arrive at the current market sizes for different PV system applications. Also by using relevant growth projections for various applications, they will project the future market through 1996. The main information that will result from the present and projected market sizes will include (a) number, sizes, and tentative sites for various PV system applications (para. 2.11); and (b) the annual economic and retail costs of fuel displaced (current and projected) in the country.

Task 3: Discussion of Policy Issues

2.19 The successful introduction of PV systems in the country will need adoption of some policy measures by the Government. These could include for instance: the waiver of customs duties on components imported for PV systems; initiation of a demonstration program and information campaign to educate the public as to the technical and economic viability of consumer-related PV systems; identification of financing mechanisms to encourage the consumers (and in later years, also the producers of PV systems) and the associated institutional set-up to disburse the loans and collect revenues; identification of training and technical assistance needs related to installation, maintenance and

design; and in later years perhaps of local production needs, etc. The consultants will identify appropriate policy measures and make recommendations for their adoption.

Task 4: Preparation of an Action Plan

2.20 Development of a costed and time phased action plan for expanding the use of PV for technically and economically viable applications will be made. Included in it will be estimates of priority investment needs and returns, including projects suitable for international financing.

2.21 This action plan will ensure that the PV systems: are based primarily on tested commercial technology; could make a certain contribution to the sectors of its applications; and have the "model" value in that they have the potential of being replicated with necessary modifications at other sites in Bangladesh, leading to successful installation of the PV systems.

G. Framework for Effective Participation of National and International Staff

2.22 The activities necessary to produce the indicated outputs and achieve the project's immediate objectives will be carried out jointly by the national and international staff assigned to it. The respective roles of the national and international staff will be determined by their leaders and set out in a Framework of Effective Participation of National

and International Staff in the project. The respective roles of the national and international staff shall be in accordance with the established concept and purpose of technical cooperation.

H. Institutional Framework

The main Government agencies associated with the project will be the Renewable Energy and Energy Economics section of the Planning Commission, the Energy Division of the Ministry of Energy and Mineral Resources, the Energy Monitoring within the Ministry.

2.23 Responsibility for energy policies and programs in Bangladesh is dispersed over a number of agencies. The Ministry of Energy and Mineral Resources has overall responsibility for commercial energy. Operational responsibilities are vested in a range of public sector entities responsible for commercial energy supplies.

2.24 At present there is no institutional structure for the coordination of activities in the non-commercial energy sector. Various government agencies, including the Ministry of Agriculture and the Ministry of Local Government, Rural Development and Cooperatives, are responsible for non-commercial energy.

2.25 The Planning Commission, which is responsible for macroeconomic planning and produces the Five-Year Plans and Annual Development Plans (ADPs), is also responsible for the preparation of the master plan for energy.

PART III. SCHEDULES OF MONITORING, EVALUATION AND REPORTS

A. Tripartite Monitoring Reviews; Technical Reviews

3.1 The Project will be subject to periodic review in accordance with the policies and procedures established by UNDP for monitoring project and programme implementation.

3.2 The Project will also be subjected to periodic reviews in accordance with policies and procedures established by ESMAP for monitoring projects and studies.

B. Evaluation

3.3 The Project will be subject to evaluation, in accordance with the policies and procedures established for this purpose by UNDP. The organization, terms of reference and timing of the evaluation will be decided by consultation between the Government, UNDP and the Executing Agency concerned.

C. Progress and Terminal Reports

3.4 The mission could begin work within 6-8 weeks of the time funding becomes available and would be in the field about 3 weeks. The mission will be led by an ESMAP staff member and would also include 2 consultants.

3.5 The consultants will submit the first draft within 3 months of the completion of their field work by ESMAP, a final draft report will be submitted to GOB for review and approval 6 weeks later.

3.6 The consultant report will be presented in two parts: (a) a detailed technical report which will include all relevant analyses; and (b) a concise report preferably not exceeding 50 single spaced pages which would be written in the World Bank UNDP ESMAP format and where the findings of the technical report would be presented in clear and lucid language intelligible to a wide audience. Following review within the Bank and discussion with the GOB this report will be issued as an ESMAP document.

PART IV. BUDGETS

Table 1: PROJECTED BUDGET COVERING UNDP CONTRIBUTION (in U.S. Dollars)

Country :The People's Republic of Bangladesh
Project Number :
Project Title : Solar Photovoltaics Applications Study

			Total		1986		1987	
			m/m	$	m/m	$	m/m	$
10		PROJECT PERSONNEL						
	11	Intn'l Experts	5.0	24,000	5.0	24,000	-	-
	11.01	Engineer-Solar Pow.	2.5	24,000	2.5	24,000	-	-
	11.02	Economist - Energy	2.5	24,000	2.5	24,000	-	-
	13	Support Personnel	-	-	-	-	-	-
	13.01	Secretary	-	3,000	-	3,000	-	-
	15	Mission Cost	-	20,000	-	20,000	-	-
	19	Component Travel	10.0	95,000	10.0	95,000	-	-
50		MISCELLANEOUS						
	52	Reports	-	10,000	-	10,000	-	-
	53	Sundry	-	5,000	-	5,000	-	-
	59	Component Total	-	15,000	-	15,000	-	-
99		PROJECT TOTAL	10.0	110,000	10.0	110,000	-	-

INT/83/005

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
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(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

September 4, 1986

Mr. Y. Kishi
Assistant Resident Representative
United Nations Development Programme
House 60, Road 11A
Dhanmondi R/A
Dhaka, Bangladesh

Dear Mr. Kishi:

ESMAP: Bangladesh - Solar Photovoltaic (PV) Application Study

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We would appreciate receiving your comments and those of the Government at the earliest opportunity. We expect to be able to launch the study within 6-8 weeks of receiving your and the Government's approval.

Best regards,

Richard S. Dosik
Chief, Energy Strategy &
Preinvestment Division II

bcc: Messrs.: Miller (ASPED)
Herbert (World Bank, Resident Mission, Dhaka, Bangladesh)
Cox (UNDP, N.Y.)

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

INT/83/005

DATE: September 03, 1986

TO: A. Gulstone, Power Engineer, EGYS2

FROM: B. Montfort, Chief, EGYS1

SUBJECT: ESMAP: Togo - Mission Terms of Reference

1. You should proceed to Togo from Uganda (separate Terms of Reference) and arrive in Togo on or about September 15.

2. In Togo you should join the power system efficiency improvement mission comprising Messrs. Tedeschi, Nickson and Roeschli during its last week. You should assist with the Aide Memoire and attend the wrap-up meeting with the Government.

3. On your return to the office you should prepare a short back-to-office report.

Cleared with & cc: Messrs. Thiam (WA2); Sigwalt (WAPEG)

cc: Messrs. Skillings (WA2);
Bauer, Mena (WAPEG);
Fish, Heron, Dosik (EGY)

AGulstone:tla

FORM NO. 27 - OCR

* PAGE NO

WORLD BANK OUTGOING MESSAGE FORM Cable, Telex

F338

IMPORTANT—PLEASE READ INSTRUCTIONS BELOW BEFORE TYPING FORM

cc GH ENERGY SECTOR

Typewritten Character Must Fall Completely in Box!

PAGE	OF		OFFICIAL DEPT/DIV ABBREVIATION	MESSAGE NUMBER	TEST NUMBER (FOR CASHIER'S USE ONLY)
2	OF	2	EGYS1		

START HERE

BOOK OF THREE:

JNT/83/005

MR. STEPHEN GLOVINSKI

DEPUTY RESIDENT REPRESENTATIVE

UNDEVPRO

ACCRA, GHANA

974 —

TX 2195

MR. LEO DENKYI

EXECUTIVE DIRECTOR

NATIONAL ENERGY BOARD

MINISTRY OF FUEL AND POWER

ACCRA, GHANA

974 —

TX 2188

MR. S. CHOI

RESIDENT REPRESENTATIVE

WORLD BANK * 1392

ACCRA, GHANA

~~TX 2207~~

END OF TEXT

PINK AREA TO BE LEFT BLANK AT ALL TIMES

INFORMATION BELOW NOT TO BE TRANSMITTED

CLASS OF SERVICE: TELEX NO.: DATE: 9/2/86

SUBJECT: DRAFTED BY: EXTENSION:

CLEARANCES AND COPY DISTRIBUTION: AUTHORIZED BY (Name and Signature):

DEPARTMENT:

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Correspondents / Participants
From: C. Feinstein and Masood Ahmed, Deputy Division Chief
To: Stephen Glovinski, Deputy Resident Representative

Subject / Title
Ghana [Payment for ESMAP wood industries residue utilization study]

Exception(s)
Personal Information

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THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

✓F 338
cc GH ENERGY SECTOR
INT/83/005

DATE: September 2, 1986

TO: Messrs. J. U. Richter and Ch. Feinstein , EGYS1

FROM: M. Ahmed, Deputy Chief, EGYS1

SUBJECT: GHANA: Energy Assessment/ESMAP Mission - Terms of Reference

1. On or about 4 September 1986, you will proceed to Accra, Ghana for about one week. The purpose of the mission is (a) to review with the Government the draft green cover energy assessment report and to agree on a version to be issued under Blue Cover; and (b) to discuss with the Government feasible areas of ESMAP follow-up.

2. Mr. Richter will lead the mission and will have principal responsibility for evaluating with the Government the green cover energy assessment report and the options for further ESMAP activities. Mr. Feinstein will be responsible for updating the statistical information, monitoring the sawmill residues project and any follow-up while the mission is in the field.

Energy Assessment

3. You will evaluate with the Government the basic assumptions, analysis, and conclusions and recommendations of the draft green cover report, in particular as regards energy demand management, development options in the principal subsectors, institution building, and concomitant investment, financing and technical assistance requirements. You will also update the key information on energy pricing, energy production and consumption, and sector investment programs for incorporation into the Blue Cover report.

ESMAP

4. You will discuss with the Government areas of possible follow-up technical assistance under ESMAP. These include (a) updating of ECG's accounts manual and establishing a staff familiarization program, (b) energy efficiency enhancement in industry, (c) energy efficiency enhancement in transport, and (d) improving the efficiency of production, marketing and end-use of household energy.

5. You will monitor the progress on the ESMAP activity related to the more efficient energy use of sawmill residues. Time permitting, Mr. Feinstein will travel to Kumasi on or about 13 September for two days to review with the local consultants from Ru-tee their draft report on sawmill residues sources and uses.

6. On return to Washington, D.C. on or about 15 September 1986, you will prepare a brief back-to-office report. You will then proceed to finalize (a) the energy assessment report for Blue Cover issue and (b) ESMAP activity initiation briefs, as appropriate.

cw. & cc: Messrs. Davis (WAPEG), Berk (WA1DB)
cc: Messrs. Eccles, Husain, Bauer, Soto, Chaparro (WAP); Isenman, Berk, Ijichi (WA1); Weissman (EISVP); Dervis (IND); Hume, Bourcier, Montfort, Dosik, Iskander, Ferroukhi (EGY); Harland, Rothermel, Cox (UNDP)

JURichter/dah