エジプト・アラブ共和国

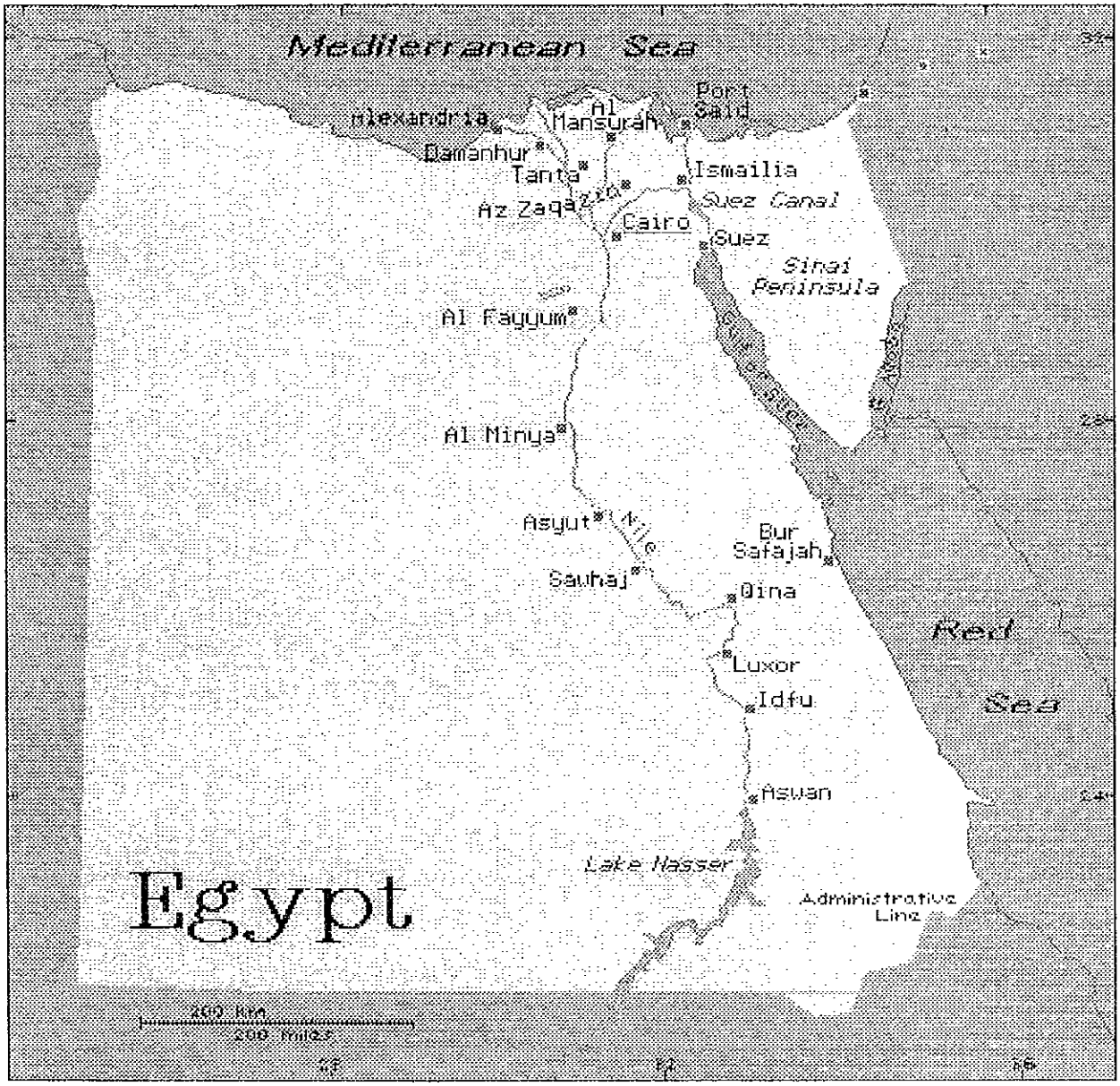
鉱工業プロジェクト選定確認調査

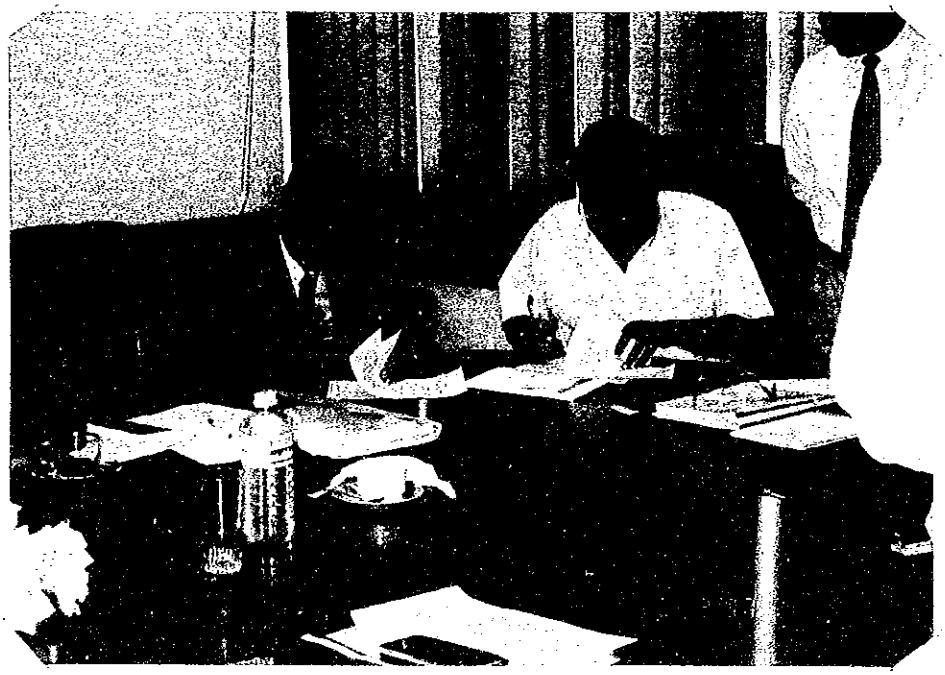
（最適省エネルギー技術普及計画）

調査報告書

平成９年９月

国際協力事業団


Mediterranean Sea
Alexandria
Al Mansurah
Port Said
Damanhur
Tanta
Ismailia
Az Zaqaziq
Suez Canal
Cairo
Suez
Sinai Peninsula
Gulf of Suez
Al Fayyum
Al Minya
Asyut
Nile
Bur Safajah
Sawhaj
Qina
Red Sea
Luxor
Idfu
Aswan
Lake Nasser
Egypt
Administrative Line
200 Km
200 miles



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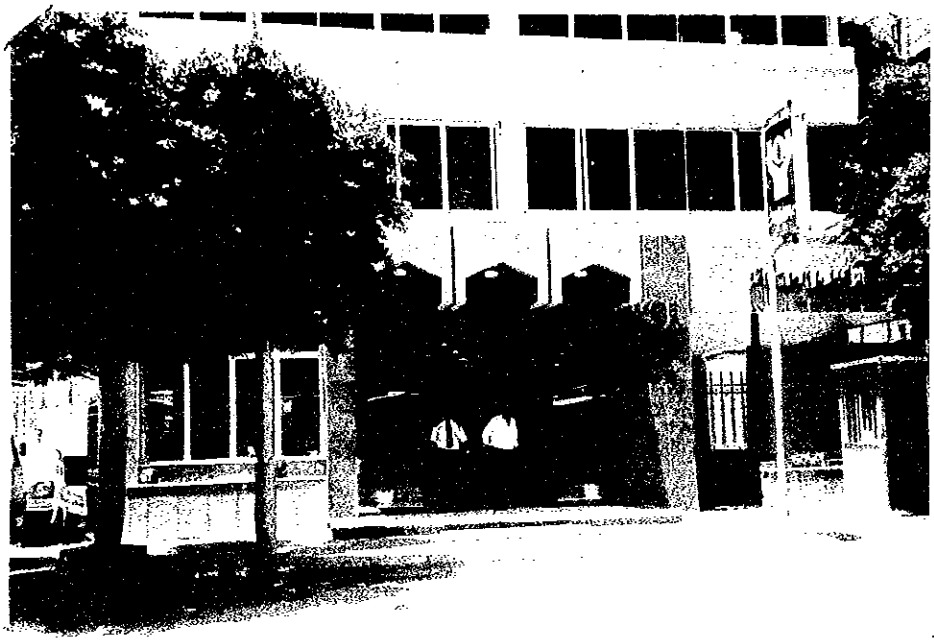
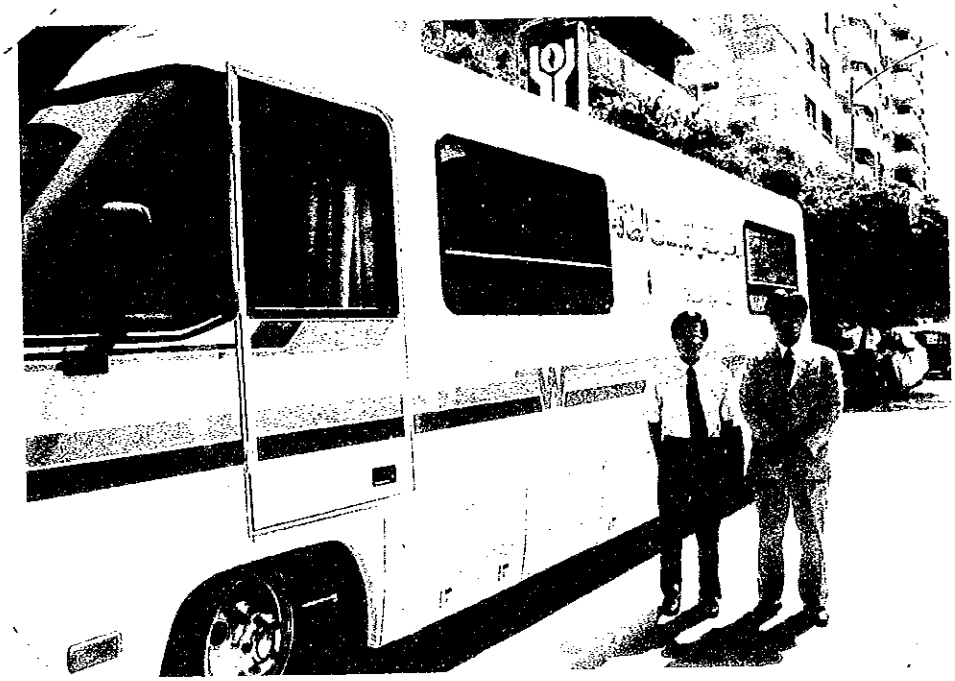
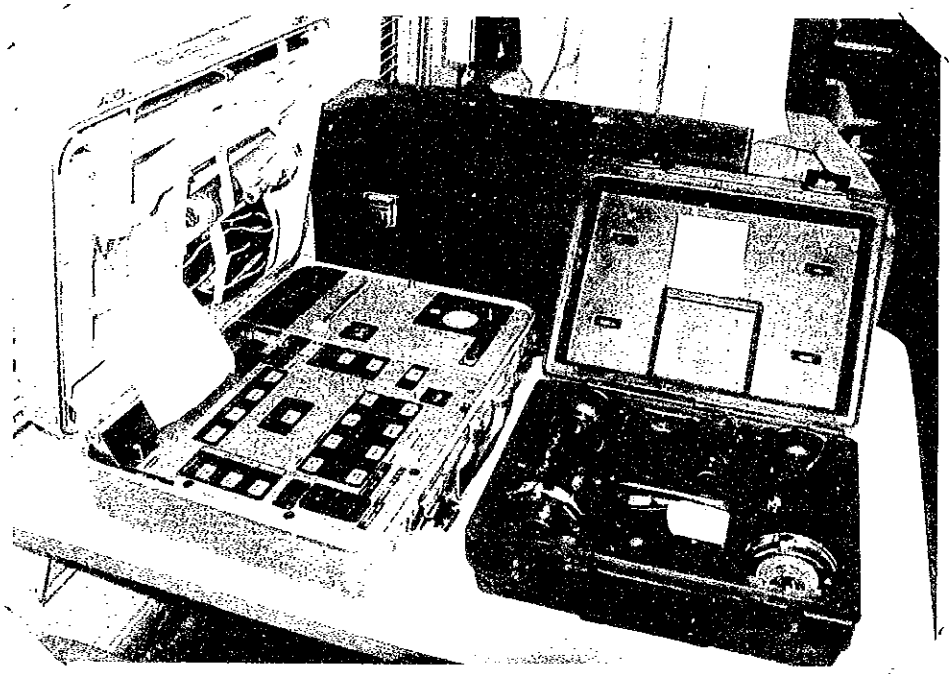


省エネルギー計画機構

省エネルギー計画機構



環境測定自動車



測定機器

エジプト・アラブ共和国

鉱工業プロジェクト選定確認調査

(最適省エネルギー技術普及計画)

調査報告書

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Ⅰ．概　要

１．要請の背景及び経緯

エジプト・アラブ共和国は天然資源を有しており、１９９５年度には石油は４、６７１万トンを生産し、２、０８６万トンを輸出することで約２０億ドルの外貨を獲得し、重要な国家収入になっているが、その埋蔵量は限られている。エジプト国は製鉄やセメント、自動車などの重工業を中心に錠業分野はエネルギー消費の半分を占めており、その需要は今後急速に伸びつつある。さらにエジプト国は１９９１年以来、包括的な構造調整プログラム（ERSAP）を通じてマクロ経済の建て直しに取り組んでおり、この流れの中でエネルギー部門については、石油、電力料金等エネルギー価格の引き上げ、補助金の削減等の政策決定を迫られており、省エネルギー対策が緊急に必要とされ、併せて長期のエネルギー計画を策定することが、重要な政策課題になっている。

かかる状況を背景として、エジプト国政府は日本政府に対して、エネルギー政策が経済に及ぼす影響、また逆に経済活動がエネルギー需要に与える影響等を分析するエネルギー経済モデルの策定を要請した。

これを受け、事業団は平成９年３月にプロジェクト選定確認調査団を派遣し、本件調査のカウンターパート機関である省エネルギー計画機構（OECP）と要請内容等について意見交換を行った。

２．調査目的

既に我が国に要請提出がなされている鉱工業部門の開発調査案件（最適省エネルギー技術ｓ普及計画）について、その要請の背景及び国家開発計画における位置付け等を調査し、今後の我が国の協力の可能性・範囲等を協議することを目的とする。

３．調査団派遣期間

１９９７年　６月１３日～　６月２３日（１１日間）

４．調査団構成

（１）千原　大海　　団長／総括
　　国際協力事業団国際協力専門員

（2）狩野　伊知郎　　エネルギー政策
　　海外コンサルタント企業協会
（3）青沼　祐二　　調査企画
　　国際協力事業団鉱工業開発調査部資源開発調査課

5．調査期間・日程（6月13日～6月23日:11日間）

日数	月　日	曜日	行　程	宿泊地
1	6／13	金	団員(1)：移動（成田 13:00－(JL407)－フランクフルト 18:00)	フランクフルト
2	14	土	団員(1)：移動（フランクフルト 10:45－(LH590)－カイロ 15:50)	カイロ
3	15	日	団員(1)：JICA事務所にて打ち合わせ 団員(2)及び(3)： 移動（成田 13:00－(JAL407)－フランクフルト 18:00)	(1)：カイロ (2)、(3)： フランクフルト
4	16	月	団員(1)：JICA事務所にて打ち合わせ 団員(2)及び(3)： 移動（フランクフルト 10:45－(LH590)－カイロ 15:50)	カイロ
5	17	火	午前：JICA事務所にて打ち合わせ、日本大使館表敬 午後：省エネルギー計画機構（OECP）打ち合わせ	カイロ
6	18	水	OECP協議	カイロ
7	19	木	OECP協議、M／M署名、 日本大使館報告、JICA事務所報告	カイロ
8	20	金	資料整理	カイロ
9	21	土	OECP、環境測定自動車視察	カイロ
10	22	日	移動（カイロ 9:00－(BA154) －ロンドン 12:05) （ロンドン 13:45－(BA005)－	機中泊
11	23	月	移動（　　－(BA005)－成田 9:10)	

6．主要面会者

（1）在エジプト日本国大使館
　山下　善太郎　　一等書記官

（２）国際協力事業団エジプト事務所

鈴木　信一	所長
不破　雅実	次長
玉林　洋介	担当所員

（３）省エネルギー計画機構（OECP : Organization for Energy Conservation and Planning）

Dr. Hani A. Alnakeeb	General Director for Planning and Actiong Chairman
Mr. Salah El-Touny	Director Energy Utilization Department
Mr. Adel Mahmound Ibrahim	Senior Economist / Manager of Energy Economics Department
Mr. Osama Kamal	Economist

（４）計画省（MOP : Ministry of Planning）

Mr. El-Sayed A Dohaia	第一次官

II. 協議内容及び結果

1．対処方針

(1) 調査の範囲・内容について

本年3月に実施されたプロジェクト選定確認調査時の協議結果を踏まえ、今次調査においては、より技術的な観点から調査の内容、範囲について先方と協議を行い、本格調査実施の可能性につき検討する材料とする。具体的な調査項目は下記の通り（別添質問票参照）。

○計量経済学的にエネルギーモデルを構築するために不可欠な「エ」国における過去（１５年から２０年程度）の経済社会関連データの有無、入手可能性、信憑性

○USAIDの協力により作られたというMITモデルの概要、問題点

○本件調査を通じ作成が期待されているエネルギーモデルの概要（インプット、アウトプット、シミュレートの方法論、対象年次等）

○本件調査の枠組み（モデルの作成のみを行うのか、あるいはモデルによる分析を通じてエネルギー政策政策やサプライサイドの個別プロジェクトの提言まで行うことが期待されているのか）

○OECPカウンターパートの技術レベル

○その他

(2) 案件の正式名称

当初TORにおいては、ミクロレベルの工場に対する省エネルギー技術普及計画の策定が要請内容に含まれていたが、本年3月に実施されたプロジェクト選定確認調査時の協議を通じ、先方の要請内容がむしろマクロレベルでのエネルギー経済モデルの構築に主眼をおいたものであることが明らかになった。従ってこれまで案件名として「省エネルギー技術普及計画」を使ってきたが、今次調査で本格調査のアウトプットにつき先方と合意を形成する過程で正式案件名についても協議することとする。

(3) 先方の受入体制

本件調査のカウンターパート機関はOECPであるが、効率的な調査実施のために他省庁の協力も得た方が望ましいという状況が予想されるところ、現地日本大使館、JICA事務所等とも打ち合わせの上、本格調査団の受入体制につき、ステアリングコミッティの設置の可能性等も含め協議することとする。

(4) 今後の流れ

今次調査はあくまでプロジェクト選定確認調査であり、本格調査の実施をコミットするものではない点を先方に対し明らかにした上で、本格調査の実施が決定した場合の流れをS/Wの実例を提示しつつ説明し、先方の理解を求めることとする。なお、今次調査においてS/W案は提示するものの、アンダーテイキング等の詳細な事項についての議論は案件採択決定後に派遣される事前（予備）調査団に委ねることとする。

(5) 短期専門家派遣要請との調整

本件調査に関連して、エジプト側より「省エネルギー計画」の短期専門家の派遣要請が上がっているところ、要請の背景、専門家に期待される業務内容（要請書にはエネルギー経済政策、人材育成、省エネルギーの普及の３点が挙げられている。）等につき聴取の上、本件と重複する部分については開発調査で統一的に協力する方向で対応を検討することとする（コンピューターを用いてモデルを作成するというような作業にはコンサルタントの方が適任と判断されるため）。

２．協議結果

(1) OECPは、「エネルギー最高会議」への技術支援を石油大臣を通じて行う機関であり、その予算は計画省へ申請し、計画省経由で受けている。

(2) 計量経済学的にエネルギー経済モデルを構築するために十分なエネルギー関連データがあり、またその社会経済的データは各省庁にあり、OECPが入手出来ることが判明した。

(3) USAIDによって、１９８６年にMITモデル、１９８８年にEDSIMモデルが供給された。しかし、前者は現在陳腐化したため全く使われておらず、後者はデータの更新性、政策への対応性などの面で問題がある。

(4) 日本側からはいつくかの国でJICAが開発調査を通じて実施してきたエネルギー経済モデルについて説明を行った。このモデルは扱い易さ、更新可能性、拡張可能性、あるいは省エネ環境問題などへ対応できるなど優れた点があるため、この手法でモデル開発を行うことで合意をみた。

(5) 本件は実施されならば、このエネルギー経済モデル構築のみの開発調査となる。

(6) OECPカウンターパートの技術レベルは、現にEDSIMモデルをしようしているため本調査が実施された場合に技術移転の相手として問題はなく、また、開発調査終了後自らでモデルの維持、更新ができる体制にある。さらにOECPにはエネルギー経済モデルの専従者が複数いるので、本調査実施に対しての受け入れ体制に特に大きな問題はない。

(7) 調査に際しては、OECPが責任を持って関係各省庁を集めたステアリングコミッティーを組織し、開催する。このステアリングコミッティーを通じて、データ収集の協力が行われ、またエネルギー経済的な予測結果の国家開発計画などへの反映を行う。

(8) 本調査のタイトルは、対処方針会議時点での「省エネルギー最適技術普及計画」からより実施内容を反映した「エジプトエネルギー経済モデル構築調査（The Study on Building Energy Economy Model for Egypt）」とすることに合意した。

(9) 帰国後、JICA本部及び関係省庁がこのプロジェクトについて議論し、本案件を採択した場合、事前調査団を８月末ないし９月中に派遣することで合意した。

3．団長所感

本開発調査は、イランエネルギー計画、インドネシア総合電力開発、ベトナム電力開発、モーリシアス長期エネルギー計画調査等の一部で適用された計量経済学手法によるエネルギー需要予測モデルの構築を専らの目的とする。したがって、調査の規模もこれら過去の調査の約50%程度に絞り、先方の要請を踏まえつつ、早期の結論を提示することを主眼とする。現在、エジプト国では、順調な経済成長を背景とした民営化、生活水準向上等の構造改革が進行中で、これを担う中長期の新たなエネルギー需給問題の分析が必要とされている。このためには、環境負荷の軽減、エネルギー利用の効率化、原油・天然ガスの戦略的な開発等のエネルギー問題を客観的に評価する道具立てが必要である。今回調査のポイントは二点ある。第一に、JICAの過去の調査経験と実績を生かす

モデル構築の要件を満たすエジプト国の社会・産業データの入手やアクセス保証が得られるのか、第二に、調査の成果がどのように社会経済開発の政策や行政に反映されるのかを確認することであった。前者については、要請先のOECPが、過去約20年間にわたる統計データをベースにした、より簡素なものとはいえ計量経済学的な手法のモデルの運用経験があること、OECPのボード構成がエネルギー有力省庁を全て網羅し、予算も大統領府から直接の配分かつ、報告はエネルギー最高諮問機関というように各省庁へのデータアクセスに中立的な立場が確保されていること（OECPは石油大臣を行政上の仲介者とするが石油省の管掌下ではない）等から、技術的にはカウンターパート条件を満たしている。一方、後者については、エジプト国の社会経済開発５ヶ年計画をローリングする計画省への関与がポイントとなる。これは、計画省との会見に続く、エジプト事務所のフォローアップにより確認された（添付事務所ＦＡＸ）。エジプトがイラン、トルコと並ぶ人口規模を擁し、知的にも歴史的にも中東全域に大きな影響力を持つ政治大国であることや、近年には環境問題にも多大の関心と行動を示しつつある一方、原油・天然ガス輸入を国をの有力な外貨獲得源とする資源国であること等を勘案するなら、エジプト国の中長期のエネルギー・環境さらには社会経済開発計画に関わるソフトインフラ整備へ貢献する意義は大きい。エジプトでは、1997年７月は次期５ヶ年計画の初年度にあたる。したがって、本協力は現在計画の見直しやその後の長期のエネルギー政策のシナリオ作成に利用されるツールとなる。そのため、出来るだけ早期に集中的に技術移転を行うことが肝要である。また、モデルの広範な活用を促すためには、カウンターパートと一体になった協力・技術移転体制を取りつつ調査を進め、自立発展性のあるモデル開発が望ましい。特に、技術移転では、OECPの言う過去にUSAIDが実施したMITモデルが殆ど活用されなかったという反省にも留意する対応が必要である。

４．本プロジェクト形成・実施についての所感（エネルギー政策担当）

（１）カウンターパートについて

エジプト政府カウンターパートであるOECPは「エネルギー大臣直属でエネルギー最高会議の技術支援を行う」と政府の中での役割も明確で、かつ人的に安定した組織（モビリティーが低い）であり、また技術レベルも途上国の中では比較的高いと見受けられる。

（２）データについて

計量経済学的エネルギーモデルを構築するのに十分なデータの蓄積があり、また社会経済データも各省庁から入手可能である。

（3）開発調査はモデルの提供のみ

OECP側は現在陳腐化している彼らのモデルでなく、とりあえず新しい分析ツールである「エネルギー経済モデル」のソフトとハードと訓練を一式欲しいという段階で、それを使ってエネルギー・経済変数の中の何をどう分析・シミュレーションし、エネルギー・国家政策の決定に役立てるかという具体的なイメージを現時点では持っていない。したがって、日本側はモデルの基本型を与え、それを彼らなりに応用できるような訓練を行うことを開発調査の中身とするのがよい。

（4）アラビア語の問題

データそのものはあるが、ほとんど全てのデータがアラビア語であるので、日本人コンサルタントが入力データをチェックする際にデータの項目の翻訳者（アラビア語から英語）が必要である。

（5）できれば産業関連表の活用

現地では、国家5ヶ年計画毎にかなり詳細な産業関連表がある。これを調査分析し、この中のデータがかなり信頼性のあるものならば、これらを使って基本モデルをベースにある程度省エネ効果、汚染物質の削減効果などの予測・シミュレーションを精緻にすることもできる。

（6）プロジェクト期間は短く

先方は2年以上をこのプロジェクトの期間として指定してきたが、このモデルはエクセルベースのかなり簡易なもので1年以内で確実に終了できるので、「M／M」にあるように短縮したスケジュールで十分である。

また、1年以上現地にコンサルタントがいると「新規データ入力」という新たな要請も出てくるので、早めに終了したほうがよいということもある。

（7）本プロジェクトの位置付け

この案件はエジプトと日本との間のエネルギー計画分野での技術協力のとっかかりとなるべきもので、1年間の協力期間中に、民活・省エネ・環境各分野などの専門家派遣、エネルギーマスタープラン作成、電力最適供給計画策定など様々な要望が現地側から出され、様々な案件に発展する可能性がある。

（8）中東の中でのエジプト

エジプトは中東の大国でかつ中心でもあるので、このエネルギー経済モデル作成やエネルギー計画策定という分野でこのようなプロジェクトを実施完了させれば、中東各国への同種の技術支援を普及させる第一歩となりうる（イランではすでに実施済み）。これには、日本としても中東のエネ

ルギー関連データを入手できるといったメリットもある。

（9）S／Wミッションの派遣

調査の技術面は今回の調査で詰めてきたので次回のS／W締結ミッションでは、事務的な面を事前に詰めておけば、比較的問題なく調印できると思われる。したがって、早期に次回ミッションを派遣し、S／Wの署名交換し、早期に本格調査実施に書かれる案件であるという感じがする。

5．1997年3月派遣時のプロジェクト選定確認調査における協議結果について
（本プロジェクト関係の抜粋）

・調査日程：1997年3月9日（日）～20日（木）　（12日間）

・調査団員構成：

団長・総括	辻　義信	JICA鉱工業開発調査部計画課長
副総括／産業公害	千原　大海	JICA国際協力総合研修所国際協力専門員
技術協力行政	加藤すみ子	通商産業省通商政策局技術協力課課長補佐
企画・調整	尾崎　洋二	JICA鉱工業開発調査部計画課職員

（1）協議経過

①　省エネルギー計画機構（OECP）との協議　　3月18日　PM

前日17日に予定していた協議が実施できなかったため、JICA事務所への報告の前に省エネルギー計画機構との協議を実施した。

冒頭調査団側より、ビデオ、パンフレットにて鉱工業分野の開発調査事業概要について説明の後、省エネルギー計画機構より今回要請についての趣旨説明があった。

要請は、計量経済的手法によるエネルギー経済モデルを作成することにその要請の主眼がある。ミクロレベルでの工場単位の省エネルギー診断については、企業側要望に従って適宜実施しており、本調査における要請の主眼ではないということであった。

調査団側としては本案件が

(1)　想定しているものが国家レベルでのエネルギー経済モデルである。

(2)　過去に鉱工業開発調査部資源開発調査課実施のイラン、モーリシアスのエネルギー計画プロジェクト、インドネシアの電力総合開発計画プロジェクトの手法とほぼ同様の手法であり、JICAでの実績があるソフト案件である。

以上のような状況を勘案する時、本案件はエジプト国全般のエネルギー政策構築のための道具作りを支援するという意義がある。

また、今後は９年度の出来るだけ早い時期に、例えばプロ形ミッション、或いは環境関連ミッションに省エネ団員を１名参加させて、プロ形調査的立場でモデル作成に必要不可欠な過去１５～２０年の経済・社会データの内容や、その他周辺情報を収集することを計画したい旨、先方省エネルギー省計画機構側と話し合った。

（２）団長所感

①　省エネルギー計画機構（OECP）　　３月１８日　　12:00～14:00

日程の関係で遅れていたが、本日訪問することとなった。

本省エネルギー計画機構は、エジプト国における電力、石油、天然ガスなどエネルギー資源全般について、エジプト社会経済開発計画に沿った、エネルギーの需要見通しなどについての技術的な総括部門であり、Supreme Council for Energy に対してテクニカルサポートを行う独立の組織である。行政上はその活動報告が石油大臣に送付されることになっている。

OECP側によれば、今回の要請はすでにUSAIDなどにより実施例のある工場単位での省エネルギー工場診断などミクロレベルでのエネルギー計画ではなく、計量経済的手法によるエネルギー経済モデルを作成することにその要請の主眼を置いている。これは、以前 USAID により実施した MITモデルの不具合によるものである（要詳細調査）。ミクロレベルについてはすでに企業側の要望に沿って、不十分とはいえエネルギーオーディットも適宜実施している。優先課題は、まず、エネルギーモデルの作成にある。

本案件は、当初日本の省エネルギーセンターが、研修員との協議により進められていたようであるが、結果的には、意図してものとは違った要請内容となっていると思われる。要請内容は

(1)　想定しているものが国家レベルのエネルギー経済モデルである。

(2)　過去の鉱工業開発調査部資源開発調査課が実施したイラン、モーリシアスのエネルギー計画プロジェクトやインドネシアの電力総合開発計画プロジェクトの手法とほぼ同様のもので、JICAでは実績のあるソフト案件である。

以上から、本案件はエジプト国全般のエネルギー政策の構築のための道具づくりに支援するという意義があり、今後の当該国のエネルギー分野の個別案件の位置付けにも寄与する優良な案件となる可能性が大きいものと思料される。

Minutes Of Meetings For
" The Study On Building Energy Economy Model For The Arab Republic Of Egypt " Between Organization For Energy Conservation And Planning And Japan International Cooperation Agency

The project Identification Study Team (hereinafter referred to as "the JICA Study Team") organised by the Japan International Cooperation Agency visited the Arab Republic of Egypt from June 15th to 23rd, 1997 for the purpose of discussing the proposal submitted by OECP regarding the study on building energy economy model with the Organisation for Energy Conservation and Planning (OECP) of the Arab Republic of Egypt (hereinafter referred to as "the Egyptian side")

In connection with the above, a series of discussions were held between the Egyptian side represented by Dr. Hani A. Alnakeeb, the General Director for Energy Planning of OECP and the Japaneese side headed by Mr. Hiromi Chihara, the Leader of the JICA Study Team.

The record should be understood as the basis of further discussions yet to be agreed upon between OECP and JICA for the purpose of formulating the JICA Development Study towards its implementation.

Cairo, June 19th, 1997

H. Chihara — Hani Alnakeeb

Mr. Hiromi Chihara
Leader,
Project Identification Study Team
Japan International Cooperation Agency (JICA)

Dr. Hani Alnakeeb
General Director for Energy Planning,
Organization for Energy Conservation and Planning (OECP)

The main results of the discussion are summarised below :

1. Counterpart Organization

(1) The Organization for Energy Conservation and Planning (OECP)

OECP is the direct counterpart organisation for the JICA to consult with each other in respect of any matter that may arise from or in connection with the study.

OECP has been established since 1983 by the Presidental Decree Number 112 with seperate responsibilities and operational authority, therefore an independant legal entity only reporting to the Minister of Petroleum. The objectives of OECP is to technically support by performing integrated energy economic planning and analysis to the Supreme Council for Energy, which is an advisory body of the Prime Minister.

(2) Steering Committee

OECP is responsible for organizing and holding the Steering Committee in connection with the study, so that the proper coordination and cooperation can be secured during the whole period of the study such as for data collection and development of the model. The Steering Committee may comprise ministries and agencies such as Ministry of Planning (MOP), Egyptian Electricity Authority (EEA), Egyptian General Petroleum Corporation (EGPC) and others appointed by the OECP who may concern the national and sectorial energy planning. OECP board of directors having representatives of such ministries and agencies: Committee of Energy and Industry(people's assembly), Egyptian General Petroleum Corporation (EGPC), National Bank of Investment, Ministry of Electricity and Energy, Ministry of Planning, Ministry of Finance, Egyptian Environmental Affairs Agency (EEAA), State Council and OECP.

2. Discussion on Energy Models

(1) MIT Model

The MIT model was built in 1986 with very little interaction with the OECP needs, when OECP was at an establishing stage. Therefore, MIT Model is unused recently since it has difficulty in obtaining the key energy policy indicators such as impact of energy conservation and green house gases and not suitable as a tool for tackling the economic reform policies.

(2) Energy Demand Simulation Model (EDSIM)

EDSIM was formulated in 1988 to estimate and simulate the energy demand in Egypt at several energy sectors. This model is in use, however it has several drawbacks: not easy to update, sectors are limited, graphical presentation cannot be made, can not predict the impact of energy demand on the economical growth rate and does not reflect the interaction between the energy sector and the rest of the economy,.....etc.

(3) Proposed JICA Model

Proposed JICA Model is of similar methodology as EDSIM, i.e. using econometric analysis, but with more updatability, expandability, user friendliness, reflecting the interaction between energy sector and the rest of the economy and giving the ability to handle the economic reform issues, in addition, the energy economy model (the model) can make simulation in relation to energy conservation and environmental pollution. Therefore the OECP has confirmed that the econometric type model presented by the JICA Study Team is the most appropriate for this study.

(4) Data Availability

OECP has provided with the JICA Team all the answers to the Questionnaire made by the JICA Team. The Team has recognised that the data required for the model are available at various Egyptian organizations and that those are obtainable through the OECP.

a) Data Collection

OECP is generally responsible for collecting all the data and information required for building the model.

b) Model Development

JICA is generally responsible for model development with the proper assistance of the OECP personnel who is to supply the adequate numbers of technical counterparts during the course of model development. So that on the job technology transfer can be best coordinated throughout the study period.

c) Training

JICA is responsible for training OECP counterparts such as by way of counterpart training in Japan as well. The details will be discussed later.

3. Formulation of JICA Development Study

(1) Methodology of Technical Cooperation

The development of energy model will be done by applying the scheme of the JICA Development Study, not by dispatching the short term JICA expert.

(2) Title of the Study

After a lengthy discussion on the energy model development, it is now considered better by both sides that the project title be re-modified to reflect more precisely the contents of the study, and the new title of the project is " The Study on Building Energy Economy Model for Egypt ".

(3) Objectives of the Study

The ultimate objective of the study is to establish a scientific basis for comprehensive enregy planning and to enhance the technical and computer capabilities of Egyptian counterparts through collaborative research work. It is to work towards a comprehensive plan for energy development with targets to be met by the year 2017. This study will contribute in the overall economic development in Egypt, since it will enhance the capabilities of OECP in energy planning and analysis and to handle the environmental issues.

(4) Duration of the Work

Both sides have agreed that this will finish within a period of 15 months, the main activities of which are outlined in the tentative schedule attached hereto.

(5) Dispatch of the Scope of Work (S/W) mission

Based on the findings on the proposed study, the JICA Tokyo and the concerned authorities will discuss the project, and if approved, the S/W mission will be sent to Egypt around the end of August / September 1997.

Note: enclosed a list of attendees and the work plan time schedule.

Attendees

JICA Study Team :

Mr. Hiromi Chihara, Leader
Mr. Ichiro KANO
Mr. Yuji AONUMA

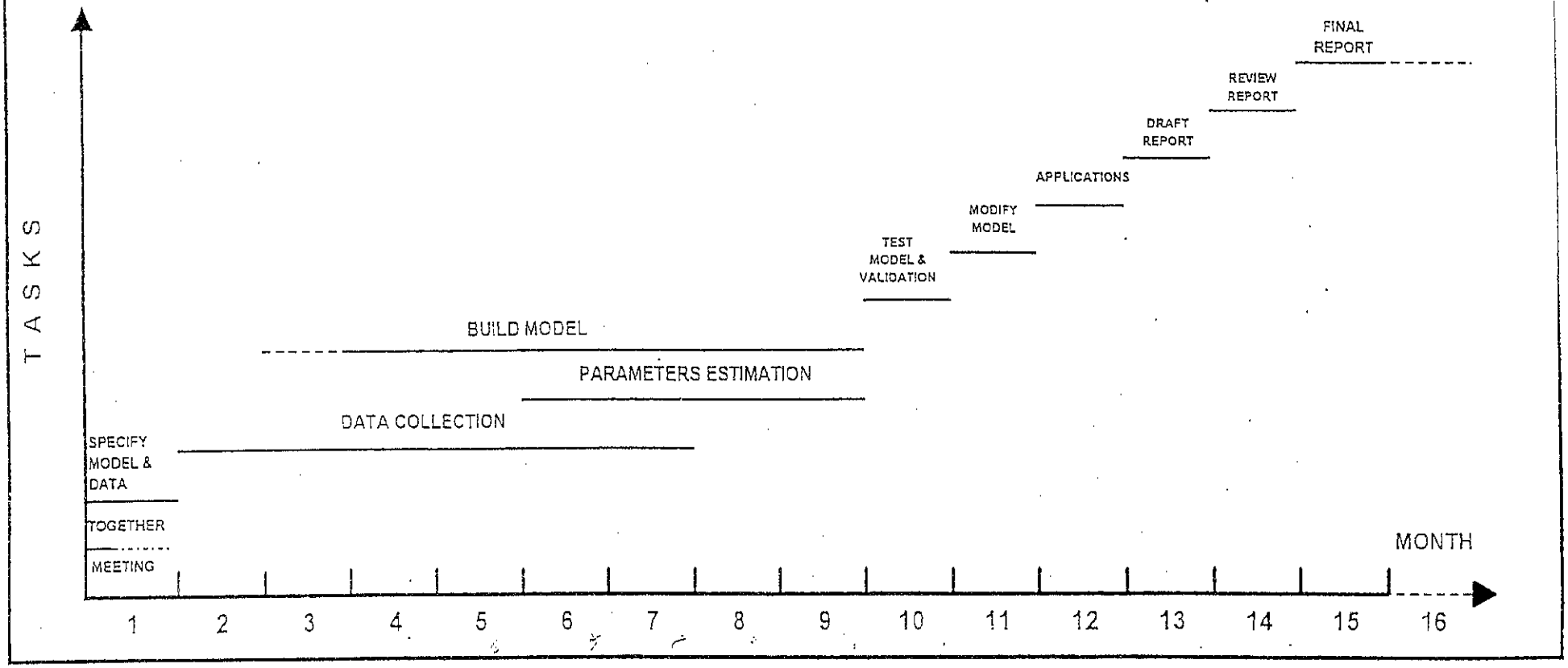
JICA Egypt Office :

Mr. Masami FUWA
Mr. Yosuke TAMABAYASHI
Mr. Mahmoud Abdel-Halim

Egyptian side :

Dr. Hani A. Alnakeeb, General Director of Energy Planning
Dr. Salah El-Touny, General Director of Energy Conservation
Mr. Adel Mahmoud Ibrahim, Senior Economist
Mr. Osama Kamal, Economist

PROPOSAL FOR WORK PLAN
AN ENERGY ECONOMY SIMULATION MODEL
FOR EGYPT



Ⅲ. 添付資料

1．質問票

2．要請書（Terms of Reference）

QUESTIONNAIRE to Organization for Energy Conservation and Planning (OECP)

The JICA term would like to again visit your office next month for a few days to learn if a JICA project can be made in life with your requests og consrtucting an energy economy simulation model for Egypt, which was sent to Mr.Suzuki, director, JICA Cairo office on Decernber 4, 1996.
We have learned from your paper entitled "Energy Pricing, a Tool to Enhance Energy Efficiency and Environmental Quality in Egypt", December 1996. by OECP, that you are employing a computerized energy medel called EDSIM. In the meanwhile what you are requesting for is another energy model. Thus we would like to place the following questions in advance, presuming that a proposed energy model and EDSIM are totally defferent.

on EDSIM (Energy Demand Simulation Model)

1. What kind of methodology the model is employing, econometrics, system dynamics, or else ?
2. What kind of data are inputted into the model ?
3. What is the final output ? Future demand estimation, optimum energy supply, or else ?
4. What kind of simulation can EDSIM do, on energy prices, economic growth, etc. ?
5. How EDSIM incorporates energy saving / efficiency factors into the model ?
6. What is the current status of the model ? If unused, why ?
7. What is the hardware and the software requested for EDSIM ?

on available data

8. Are your statistical data compiled by the fiscal year, no data by the calender year, i.e., January to December ?
9. How long can you obtain continuous data series, 20 years or more ?
10. Are your energy prices, consumer or wholesale, controlled by the government ?
11. How the energy prices at each distribution stage are determined ? Or in other word, what is the structure of energy prices ?
12. Are latest energy balance tables available? How about input-output tables, which may be utilized to estimate energy demand ?
13. What kind of hardware and software are available for the model construction at OECP ?

Energy Planning and Conservation Development in Egypt
Questionnaire to
Organization for Energy Conservation and Planning (OECP)
June, 1997
Answering JICA's Questions

A- Energy Demand Simulation Model (EDSIM) :

1. EDSIM was formulated in December 1988 to estimate and simulate the energy demand in Egypt in different consuming sectors. It is a dynamic model. There are five main energy consuming sectors as identified in EDSIM : Industry, Household / commercial, Transport, Agriculture and Government . The industrial and household / commercial demand is based on the multi-step approach . In the transport sector, the demand for gasoline and gas oil is estimated separately . Gasoline demand is estimated in two steps as derived from the demand for cars and other exogenous variables, while gas oil demand is estimated using the log-linear formulation . In the agriculture sector, the demand for electricity, kerosene and gas oil is aggregated as total demand, which is estimated using the log-linear formulation . The government sector captures the remaining components of demand and is assumed to grow at a fixed rate each year .

2. The base year energy consumption sector-wise, energy prices, sectoral GDP growth, inflation rates, and demand elasticity parameters (income, price and lag elasticity) are of the main input data..

3. The final output of the model is the future energy consumption by sector.

4. The EDSIM uses demand elasticity parameters (income, price and lag elasticity) to estimate future energy demand based on alternative pricing schemes such as escalating current domestic prices to economic levels . The model accounts also for the impact of exogenous changes as different economic growth rates, different population growth rates ... etc.

5. Energy saving / efficiency factors are not included in the EDSIM, but they are calculated outside the model .

6. EDSIM has been used in a lot of studies for the purpose of the estimates of projection of energy demand in Egypt and used also in preparing technical papers submitted to both local and international conferences .

7. EDSIM is installed on PC using GAMS .

B- Available data :

8. Starting 1981/82, statistical data compiled by the fiscal year . At the same time, calendar years are available too .

9. Data series are available for more than 20 years .

10. Yes, but due to the economic reform policies it is intended to reach the economic energy prices and then to be left to the market mechanism .

11. The energy prices are still determined by the government .

12. The latest energy balance is available for the year 1995/96 . Also, I/O tables are available for recent year.

13. A network of PC is available at OECP . As mentioned in our proposal that the output of this STUDY is the model which will be a powerful tool for Egypt (OECP) in energy planning and analyses, increase the capabilities of OECP staff in building, using modifying models, enhance the computer capabilities and facilities available at OECP by adding hardware and software suitable for such important STUDY, and encourage the fields of cooperation between the Egyptian and JAPANESE authorities.

* Note :

Enclosed is the presidential decree No. 112 for the year 1983 establishing the OECP. Reference is made to Article 2, item (c) concerning the availability of data needed . Also, DATA CHECK SHEET is enclosed too .

DATA CHECK SHEET

1.Social Index Data

Items	Content	Available	At where	Comment
Weather condition	Average atmospheric temperature (each place) Accumulative heating days (each place) Accumulative air conditioning days (each place)			
Population	Total Ratio of urban and rural communities Breakdown by region Of each age tier			
Household	Total Ratio of urban and rural communities Breakdown by region Of each age tier			
Rural communities electrification ratio	Usable electric power of each area			
Transport	Passenger · Aviation passenger transport quantity (person km, person, km) · Railway passenger transport quantity (person km, person. km) · Car passenger transport quantity (person km, person, km) · Bus passenger transport quantity (person km, person, km) · Vessel passenger transport qiantity (person km, person, km) Freight · Aviation freight transport quantity (ton km, ton, km) · Railway freight transport quantity (ton km, ton, km) · Passenger car freight transport quantity (ton km, ton, km) · Bus freight transport quantity (ton km, ton, km) · Vessel freight transport quantity (ton km, ton, km)			

Items	Content	Available	At Where	Comment
Infrastructure	Number of airports and number of arrivals and departures Railway length km Road length km Expressway length km Road paving km			
Number of Holdings	Airplane holdings (cargo, passenger plane, each) Railway rolling stock (cars) holdings (passenger, cargo use, each) Automobile holdings (passenger car, nationwide) Automobile holdings (passenger car, urban) Automobile holdings (passenger car, rural) Motorcycle holdings (nationwide) Motorcycle holdings (urban) Motorcycle holdings (rural) Truck holdings Bus holdings Vessel holdings (passengers, cargo use, each)			
Number of automobile License holders				
Business floor area	Office (office, bank) Commerce (wholesale/retail business, store, market) School and hospital Service industry (theatre, cinema)			
Collective residence household numbers (nationwide, urban, rural)	Tent Stone (brick) structure Clay structure Steel reinforced concrete Wooden apartment			
Single unit residence (Nationwide, urban, rural)	Tent Stone (brick) structure Clay structure Steel reinforced concrete Wooden apartment			

Items	Content	Available	At Where	Comment
Principle energy consumption machine and tools diffusion ratio or spread in numbers	Cow feces or noncommercial energy stove, unit in household use Charcoal stove diffusion ratio Wood chips stove diffusion ratio LPG stove diffusion ratio City gas stove diffusion ratio Electric stove diffusion ratio Oil heater diffusion ratio LPG heater diffusion ratio Oil lamp diffusion ratio or household numbers Electric lighting diffusion ratio or household numbers Refrigerator diffusion ratio Television diffusion ratio Air-conditioner (cooler) diffusion ratio			

2. Economic and Industry Data

Items	Content	Available	At where	Comment
GDE	GDE total GDE private consumption expenditure GDE public expenditure (government expenditure) GDE private fixed capital formation (private investment) GDE private fixed capital formation (government investment) GDE exportation GDE importation			
GDP	GDP total GDP primary industry section GDP secondary industry section GDP tertiary industry section GDP agriculture section GDP mining industry section GDP manufacture industry section GDP iron and steel industry GDP cement industry section GDP chemical industry section GDP other manufacturing industries			
GDP distribution income	GDP total GDP family budget disposable income GDP employer income GDP item by region			
Income per household in the rural communities				
Income per household in the urban region				

Items	Content	Available	At Where	Comment
Employee Population (number of employees by industry)	Employee population total Employee population of primary industry Employee population of secondary industry Employee population of tertiary industry Employee population of agriculture Employee population of mining industry Employee population of manufacturing industry total Employee population of iron and steel industry Employee population of cement industry Employee population of chemical industry Employee population of other manufacturing industries			
Price indicator	GDP deflator Private consumption expenditure deflator Wholesale price index Retail price index Exchange rate A rate of interest (The official rate)			
Energy price	Charcoal retail price Bituminous wholesale price Lignite wholesale price Crude oil export price Crude oil wholesale price LPG oil wholesale price LPG retail price Gasoline retail price Kerosene wholesale price Kerosene retail price Diesel wholesale price Diesel retail price Heavy oil wholesale price Natural gas original well price Natural gasindustrial use price			

Items	Content	Available	At Where	Comment
Energy price	Natural gas domestic use gas Electric power manufacturing use price Electric power operations use price Electric power domestic use price			
Principle Industry Production or Indicator	Agriculture, forestry and fisheries industry production index (base year index of 100) Agriculture main item production quantity (ton) Agriculture production index (base year; 100) Mining industry main item production quantity (ton) Mining industry production index (base year; 100) Manufacturing industry production (base year 100) Iron and steel industry main item production quantity (prg iron, crude steel, etc., ton) Cement industry production quantity (ton) Cement industry production index (base year 100) Chemical industry main item production quantity (ton) Chemical industry production index (base year 100) Construction industry index			
Principal energy consumption facilities number of holdings	Number of boiler holdings in each industry			
Tertiary industry economic indicators (by each industry)	Sales amount Burden value amount Number of employees			
Government economic indicator	Government expenditure amount Government budget Number of civil servants Energy purchase expenditure amount			

3. Energy Production Data

Items	Content	Available	At where	Comment
Energy production of each source (time series)	Charcoal production Coal production · bituminous coal production · lignite (brown coal) production Petroleum Production · Petroleum production · crude oil production · condensed (GIL) production Natural gas production Hydroelectric power generation quantity Noncommercial energy production			
Energy importation by each source (time series)	Charcoal importation Coal importation · bituminous coal importation · lignite coal importation Petroleum importation · raw petroleum imporation · petroleum products importation · condensed (NGL) importation Natural gas importation Electric power importation Noncommercial energy importation			
Energy exportation by each separate source (time series)	Charcoal exportation Coal exportation · bituminous coal exportation · lignite coal exportation Petroleum exportation Crude oil exportation Coal exportation · LPG exportation · gasoline exportation · jet fuel exportation · kerosene exportation · diesel fuel exportation			

Items	Content	Available	At Where	Comment
	· heavy oil exportation · heavy oil exportation · condensed (NGL) exportation Natural gas exportation Electric power exportation quantity Noncommercial energy exportation			
Peiroleum refining industry input/output (time series)	Raw petroleum treatment quantity Petroleum production quantity · LPG production · gasoline production · fuel peoduction · kerosene production · diesel production · heavy oil production			
Gas enterprises input/output (time series)	Investment in gas manufacturing enterprises Gas production quantity Gas consumption quantity for the propose of gas transportation (compressor use consumption)			
Supply data of electric power plants (time series)	Facilities, fuel consumption quantity, electric generation quantity · Coal heating power facilities at the fiscal year end (kW) · Coal heating power fuel consumptionquantity (bituminous, lignite) · Coal heating power electric power generation quantity (kWh) · Petroleum heating power facilities at the fiscal year end (kWh) · Petroleum heating power fuel consumption quantity (by fuel, crude oil, heavy oil, LPG, etc.) · Petroleum heating power electric power generation quantity (kWh) · Gas heating power at the fiscal year end (kW) · Gas heating power fuel consumption quantity · Gas heating power electric power generation			

Items	Content	Available	At Where	Comment
	· Hydroelectric power generation electric power generation quantity (kWh) On-site and transmission of electricity, consumption quantity of power supply (loss, kWh)			
Supply data of privately generated electricity (time series)	Power sources facilities (kW) Fuel imput Electric power generation quantity (kWh)			

4.Energy Consumption Data

Items	Content	Available	At where	Comment
Industry energy consumption of each industrial sector (time series)	Agriculture industry · Charcoal consumption quantity · Bituminous coal consumption quantity · Lignite coal consumption quantity · Petroleum consumption quantity (machine for farming use) · gas consumption quantity · Electric power consumption quantity · Noncommercial energy consumption quantity (agriculture waste, etc.) Mining industry · Charcoal consumption quantity · Bituminous coal consumption quantity · Lignite coal consumption quantity · Gas by-product, etc. of private consumption quantity Petroleum consumption quantity (variation for each product) · Electric power consumption quantity · Noncommercial energy consumption quantity Iron and steel industry · Charcoal consumption quantity · Bituminous coal consumption quantity · Lignite coal consumption quantity · Gas by-product, etc. of private consumption			

Items	Content	Available	At Where	Comment
	Quantity Petroleum consumption quantity (variation for each product) · Gas consumption quantity · Electric consumption quantity · Noncommercial energy consumption quantity Chemical industry · Charcoal consumption quantity · Bituminous coal consumption quantity · Lignite coal consumption quantity · Petroleum consumption quantity (variation for each product) · Gas consumption quantity · Electric power consumption quantity · Noncommercial energy consumption quantity Alminium manufacturing industry · Charcoal consumption quantity · Bituminous coal consumption quantity · Lignite coal consumption quantity · Petroleum coal consumption quantity (variation for each product) · Gas consumption quantity · Electric power consumption quantity · Noncommercial energy consumption quantity Manufacturing industry sum total · Charcoal consumption quantity · Bituminous coal consumption quantity · Lignite coal consumption quantity (variation for each product) · Gas consumption quantity · Electric power consumption quantity · Private generation and consumption quantity · Noncommercial energy consumption quantity Industrial section sum total of energy consumption quantity · Charcoal consumption quantity			

Items	Content	Available	At Where	Comment
	· Bituminous coal consumption quantity · Lignite coal consumption quantity · Petroleum consumption quantity · LPG consumption quantity · Gasoline consumption quantity · Kerosene consumption quantity · Heavy oil consumption quantity · Gas consumption quantity · Electric power consumption quantity · Private generation and consumption total · Noncommercial energy consumption quantity (agricultural waste, wood chips, etc.) · Energy consumption quantity total			
Transport total of energy consumption quantity (time series)	· Charcoal consumption quantity · Petroleum consumption quantity · Gasoline consumption quantity (passenger car, etc.) · Diesel consumption quantity (truck, bus) · Jet fuel consumption quantity (domestic airlines) · Heavy oil consumption quantity (ships, etc.) · LPG consumption quantity · Electric power consumption · Private generation and consumption quantity total			
Household sector total energy consumption quantity (time series)	· Charcoal consumption quantity · Petroleum consumption quantity · LPG consumption quantity · Kerosene consumption quantity · Heavy oil consumption quantity · Elecric power consumption quantity · Noncommercial energy consumption quantity (cow feces, wood chips, agricultural waste) · Possible energy reclamation consumption quantity (solar water heater, etc.)			

Items	Content	Available	At Where	Comment
	· Energy consumption quantity total Urban region household energy consumption quantity · Charcoal consumption quantity · Petroleum consumption quantity · LPG consumption quantity · Kerosene consumption quantity · Heavy oil consumption quantity · Electric power consumption quantity · Noncommercial energy consumption quantity (cow feces, wood chips, agricultural waste) · Possible energy conservation consumption quantity (solar water heater, etc.) Energy consumption quantity total			
	Rural region household energy consumption quantity · Charcoal consumption quantity · Petroleum consumption quantity · LPG consumption quantity · Kerosene consumption quantity · Heavy oil consumption quantity · Electric power consumption quantity · Noncommercial energy consumption quantity (cow feces, wood chips, agricultural waste) · Possible energy conservation consumption quantity (solar water heater, etc.) · Energy consumption quantity total			
Commercial sector total of energy consumption quantity (time series)	· Charcoal consumption quantity · Petroleum consumption quantity · LPG consumption quantity · Kerosene consumption quantity · Heavy oil consumption quantity · Electric power consumption quantity · Noncommercial energy consumption quantity (cow feces, wood chips, agricultural waste)			

Items	Content	Available	At Where	Comment
	· Possible energy conservation consumption quantity (solar water heater, etc.) · Energy consumption quantity total			
Government energy consumption quantity (time series)	· Charcoal consumption quantity · Petroleum consumption quantity · LPG consumption quantity · Kerosene consumption quantity · Diesel consumption quantity (including military consumption) · Jet fuel consumption quantity (including military consumption) · Heavy oil consumption quantity · Noncommercial energy consumption quantity (cow feces, wood chips, agricultural waste) · Possible energy reclamation consumption quantity (solar water heater, etc.) · Energy consumption quantity total			
Nonenergy use consumption quantity (time series)	· Lubrication oil, etc. · Others			

5. Natural Gas Data

(1) Consumers-related basic data

Items	Content	Available	At where	Comment
Household sector	Number of household by district Energy consumption per households by use such as cooking water-heating and space-heating, and by kind of energy such as natural gas, LPG and electricity. Monthly and hourly load of energy consumption by district			
Commercial sector	Number of premises of dominate commercial energy consumers by type such as hotel, restaurant, office building shops and school, and by district. Energy consumption by kind of energy and type of consumers. Monthly and hourly load of energy consumption by district			
Industrial sector	Number of industries by district type and product. Energy consumption by kind of energy and type of consumers. Monthly and hourly load factor of energy consumption by district			

(2) Gas supply system

Transmission system	Length of the transmission, pipeline route, diameter operation pressure, compressor station, regulator station, feeder line, SCADA system, gas storage system			
Distribution system	Length of the distribution network by district, length of the new distribution network by year operation system, in-house piping system, district regulator, gas storage system, SCADA system, gas-related regulations			

6. Electric Power

Items	Content	Available	At Where	Comment
General	1. National energy policy 2. Power development plan 3. Latest annual report 4. Organization chart			
Present status	1. Existing power plant 1 Termal power plant 1) Name of plant 2) Location 3) Type of plant 4) Type of fuel 5) Installed capacity (MW) 6) Unit capacity and number of units 7) Annual production energy (MWh) at end (MWh) (from commissioning year to date) at sending end (MWh) (from commissioning year to date) 8) Station service rate (%) [Peak and energy] 9) Construction cost by foreign and domestic, fund and its interest 10) Commission year and construction years (terms) 11) Detailed plant data by each unit i) Minimum operation level (MW) ii) Heat rate at minimum (kcal/kWh) iii) Heat rate at maximum (kcal/kWh) iv) Average incremental heat rate (kcal/kWh) (as the result calculated with ii) & iii) v) Domestic fuel cost (US cents/106 kcal) vi) Foreign fuel cost (US cents/106kcal) vii) Spinning reserve (%) viii) Foeced outage rate (%) For; (forced outage hours/ (8760-scheduled outage)) x 100% ix) Sheduled maintenance (days per year) x) Maintenance class size (MW)			

Items	Content	Available	At Where	Comment
	xi) Fixed operation (maintenance cost $kW-month) xii) Variable operation & maintenance cost $MWh) 1-2 Hydro power plant 1) Name of plant 2) Location 3) Type of plant (run of river, reservoir) 4) Installed capacity (MW) 5) Unit capacity and number of units 6) Annual production energy (MWh) at end (MWh) (from commissioning year to date) at sending end (MWh) (from commisiong year to date) 7) Station service rate (%) [Peak and energy] 8) Construction cost by foreign and domestic, fund and its interest 9) Commission year and construction years (term) 10) Detailed plant data i) Reservoir strage caoacity (m3 x 106) Total capacity Effective capacity ii) Head Total head (m) Effective head (m) iii) Maximum dischange (m3/sec) iv) Hydrological data a) inflow (MWh) b) minimum operation (MW) c) Available capacity (MW) v) Peak operation hours in nominal working day vi) Forced outage rate vii) Scheduled maintenance (days per year) 1-1' On going and planned thermal power plant Available data from 1-1 1) to 1-1 11)			

Items	Content	Available	At Where	Comment
	1-2' On going and planned hrdro power plant Available data from 1-2 1) to 1-1 10) 11) Connected substation · rated capacity (MVA) · voltage (kV) · No. of circuits · Construction cost · Commissioned year · operation and maintenance cost 2. Existing transmission lines 1) Name of transmission line 2) Rated voltage (kV) (phase to phase) 3) Distance (km) (from to) 4) Connected substation and/or power station 5) Number of circuits 6) Current capacity 7) Conductor a) type (for example, ACSR, HDCC, etc.) b) size (mm2) c) number 8) Construction cost 9) Commissioned year 10) Operation and maintenance cost 3. Existing substation 1) Name of substation 2) Location 3) Rated capacity (kVA) x banks 4) Rated voltage Primary (kV), Secondary (kV), Tertiary (kV) 5) Connected transmission line(s) 6) No. pf circuits 7) Construction cost 8) Commissioned year 9) Operation & maintenance cost 4. Electricity tariff data			

Items	Content	Available	At Where	Comment
	1) Electricity tariff system (include tariff table) 2) Electricity triff actually collected calssified by sectors (1980 to date) 3) Anticipated changes in tariff in the near furture 4) Unit price for unserved energy			
Power demand	1. Power demand forecast (1990-2010) 2. Method for power demand forecast 3. Power demand and supply balance (past 20 years) 4. Energy consumption classfied by each categories (agriculture, industry, commercial, etc.) 5. Energy consumption per a consumer classifies by each categories 6. Energy consumption classfies by each categories (past 20 years) 7. Load forecast predicted for each substation on a yearly basis in terms of power demand and annual energy demand 8. No. of household and No. of persons in one household 9. Annually duration curve (past ten years & forecast) 10-1 Monthly duration curve for each month (past ten years & forecast) 10-2 Daily load curve in each season 10-3 Weekly load curve in each season 11. Population & GDP (1970-2020) 12. Population & GDP classfied by sector (agriculture, industry, commercial etc.) 13. Population & GDP classified by areas 14. Load factor classfied by each categories Including total (past ten years and futture trend) 15. Major industry (location, capacity, output, income)			

Items	Content	Available	At Where	Comment
	16. Irrigation pump sets (location, capacity, development plan capacity) 17. Electrification policy			
Power system	1. Power system diagram covering the whole country (existing & proposed) 2. Map (scaled 1 : 10,000-500,000) on which power stations, power transmission lines and substations are drawn. It is preferable that the equipments which have not been commissioned yet but will be in operation in the selected furture years are also indicated 3. Power flow diagram at peak time and off peak in rainy and dry seasons (actural & forecast) 4. Impedance map (actural & furture) 5. Design criteria for hydro power plant, substation and transmission line and distribution line 6. Standard voltage (from super high voltage to low voltage) 7. Energy loss in transmission lines and substation classified by voltages 8. A map showing the supply area(s) and distribution route(s) from proposed sites 9. Targeted loss of load propability			
Data for financial and economic analysis	1. financial data 1) balance sheet (1980 to date) 2) Balance sheet (1991 to date) 3) A statement of profit and loss (1980 to date) 4) A statement of profit and loss (1991 to date) 2. Economic data 1) Construction cost for thermal, gas turbine and hydro power plants which are going to be commissioned 2) Operation and maintenance cost for above plants · number of plant staff · O&M cost (personnel expense, material cost)			

Items	Content	Available	At Where	Comment
	· Administration expenses · Others 3) Discount rate used for project evaluation 4) Data for cost estimation · Price escalation rate of construction materials during the last five years (%) · Escalation rate of labour cost during the last five years (%) · Land acquisition and compensation cost · Customs expenses, rate for imported tax duties 5) Fuel cost · Petroleum ($/l), (kcal/l) · Natural gas ($/l), (kcal/Nm3) · Diesel oil ($/l), (kcal/l) · Coal 6) Calorific value · Petroleum (kcal/l) · Natural gas (kcal/Nm3) · Diesel oil (kcal/l) · Coal 7) Standard facilities' life for depreciation · Htdro · Thermal · Diesel · Gas turbine · Transmission line · Distribution line · Substation 8) Retirement schedule of generation units 9) Data for cost estimation · Indigenous production for epuipment and materials · Unit price of construction materials (concrete works, excavation, embankment etc.) · Price escalation rate of construction materials during the past ten years. · Escalation rate of labour costs during the past			

Items	Content	Available	At Where	Comment
	ten years · Customs expenses, rate of imported taxes and duties · Inland transportation cost · Change of industrial water for power plant · land acquisition and compensation cost 10) Method for local hunds procurement · Interest rate · Repayment period (include grace period) · Method for depreciation · Salvage value 3. Connected transmission line 1) Name of transmission line 2) System on nominal voltage (kV) 3) Conductor (size mm3 type) 4) Number of circuites 5) Construction cost 6) Commissioned year 7) Operation and maintenance cost			

Energy Planning and Conservation Development in Egypt
Questionnaire to
Organization for Energy Conservation and Planning (OECP)
June, 1997
Data Check Sheet

Item	Available	At Where	Comment
1- Social Index Data	yes	OECP MET MOP CAPMAS EEA MOTC MOIA MOBS MOE MOH MOC MOI	All the sub-items are available
2- Economic and Industry Data	yes	OECP MOP CAPMAS EGPC EEA	All the subitems are available
3- Energy Production Data	yes	OECP EEA EGPC	All the subitems are available
4- Energy Consumption Data	yes	OECP EEA EGPC FOEI MOI MOTC CAPMAS	All the subitems are available
5- Natural Gas Data	yes	OECP EGPC	All the subitems are available
6- Electric Power	yes	OECP EEA NREA	All the subitems are available

ABREVIATIONS :

MOP : Ministry of Planning
CAPMAS : Central Agency for Public Mobilization and Statistics
EEA : Egyptian Electricity Authority
MOTC : Ministry of Transport and Communication
MOIA : Ministry of Internal Affairs
MOBS : Ministry of Basic Supply
MOE : Ministry of Education
MOH : Ministry of Health
MOC : Ministry of Culture
MOI : Ministry of Industry
OECP : Organization for Energy Conservation and Planning
EGPC : Egyptian General Petroleum Corporation
FOEI : Federation of Egyptian Industries
NREA : New and Renewable Energy Authority
MET : Meteorological Authority

Proposal for
" Energy Planning and Conservation Development in Egypt."

Submitted to :

Japan International Cooperation Agency (JICA)

1. Introduction.

The Organization For Energy Conservation and Planning (OECP), previously known as Organization For Energy Planning (OEP) has been established since 1983 by the presidential decree number 112 as a Government agency reporting to the minister of petroleum.

OECP is technically supporting the supreme council of Energy by performing integrated energy planning and analyses. The goal of these activities is to develop and implement energy programs that lead to rational energy resources utilization and to assure economic growth.

In early 1991, the Egyptian Government formulated a program of economic reform and structural adjustment (ERSAP). The ERSAP program focuses on three areas;

(i) Stabilization to restore macrocconomic balance and reduce inflation.

(ii) Structural adjustment to estimate efficient resource mobilization and allocation, and

(iii) Modification in current social policies to minimize the effect of economic reform on the poor.

The ERSAP program is composed of a comprehensive set of policy measures addressing most of the development problems facing Egypt.

In the light of the economic reform program, the Egyptian government formulated a five year development plan (1991/92 - 1996/97). This medium-term plan represents the third phase of a longer-term plan (1982 - 2002). While the two previous plans are directed to build the infrastructure required for expanding the productive base of the economy, the third medium-term plan focuses on achieving sustainable growth and applies several structural adjustment and economic reform policies, in accordance with the ERSAP. The plan includes a comprehensive set of development policies such as:

(i) Enhance the role of the private sector in the economy and reform the public sector enterprises.

(ii) Increase the volume of exports by improving the quality of output and reducing the cost of production in the business sector.

(iii) Reduce government development expenditure and prioritize the allocation of public sector investments.

(iv) Apply a privatization policy via the transfer of the ownership of some public sector enterprises to the private sector and

(v) Adopt a population policy aiming at reducing fertility via family planning measures.

An important component of both the ERSAP and the current five year development plan is concerned with the domestic energy policies. The government intends to adjust domestic prices of petroleum products and natural gas to reflect their internationally traded equivalents and to adjust electricity prices to cover long-term marginal cost. This programmed price increases is expected to reduce energy subsidies and then improve the performance of government savings, public sector resource gap as well as the current account deficit. Furthermore, the domestic consumption of energy, resulting from the expected price increases, would contribute to increase export earning from oil and products and increase the competitiveness of the different industries.

Given these recent developments in the Egyptian economy, as a whole, and the energy sector, in particular, the Organization for Energy Conservation and Planning (OECP) would necessarily need a flexible analytical tool (or model) that can be used to assess the impact of the recent energy-economy policies on the short and medium-term performance of the economy. The model should capture the interdependence between the energy sector and the rest of the economy. Furthermore, it would be extremely useful to study the effects of the changes in the world energy market on the short (one year) and medium (one to five years) term performance of the domestic economy.

2. Objectives of the Study.

The ultimate objectives of the study is to establish a scientific basis for comprehensive energy planning and to enhance the technical capabilities of Egyptian counterparts through collaborative research work. It is to work towards a comprehensive plan for energy development with targets to be met by the year 2025.

This study will contribute in the overall economic development in Egypt, since it will enhance the capabilities of OECP in energy planning and analyses and to handle the environmental issues such as GHG abatement measures.

3. Study Area.

The national territory of Egypt.

4. Scope of the Study .

The scope of the proposed study is detailed in 4.1 the work plan and 4.2 the output of the study with special emphasis on the following areas :

(i) Construct an economy-wide accounting framework based on the social accounting matrix (SAM) principles, to capture the linkages between the energy sector and the rest of the economy. The data collection, organization and testing effort is mainly devoted to update and expand the national accounting system in order to provide a comprehensive data base capable of analyzing energy-economic interactions.

(ii) Develop and implement an economy-wide energy interaction simulation model directed to assess the impact of domestic energy policies on the short (one year) and medium-term (one to five years) performance of the energy sector and the Egyptian economy in light of the Economic Reform and Structural Adjustment Program (ERSAP).

(iii) assist the researchers of the OECP in building, using or modifying the energy-economy simulation model to test alternative scenarios of energy-economy policies and assess their impact on the future path of the Egyptian economy.

(iv) The model should also be capable of predicating the energy demand pattern for the different consuming sectors based on different scenarios.

(v) The model should also be flexible enough to add more economic sector.

4.1 Work Plan of the Study.

The following are the main elements in the proposed work plan. The Egyptian counterparts should be involved in all steps of building and developing the model. This proposed work plan is estimated to take about 18 to 24 months:

- Get together meeting for the joint research team (JRT) composed of Japanese study Team (JST) and OECP researchers. (one week)
- Specify the analytical tool (model) and the data needed by the JRT. (one month)
- Data collection by OECP team in cooperation with some concerned authorities such as Ministry Of Planning (MOP) and Central Agency for Public Mobilization And Statistics (CAPMAS). (6 months)
- Parameters estimation by JRT. (4 months)
- Build and Develop the model by JRT. (6 months)
- Test Model and Model Validation by JRT. (2 months)
- Modify Model. (1-2 months)
- Experiments to apply the model for different scenarios by JRT. (2 months)

- Draft final report and presentation by Japanese Study Team (JST). (one months)
- Review the draft final report by OECP team. (one months)
- Final report by Japanese Study Team (JST). (one months)
- Seminar on the STUDY by JRT.

Enclosed is a diagram showing the above mentioned work plan and tasks.

4.2 Output of the Study.

The output of this STUDY is the model which will be a powerful tool for Egypt (OECP) in energy planning and analyses, increase the capabilities of OECP staff in building, using modifying models, enhance the computer capabilities and facilities available at OECP by adding hardware and software suitable for such important STUDY, and encourage the fields of cooperation between the Egyptian and JAPANESE authorities.

In particular, the development of that energy economy simulation model is expected to address a set of policy measures and development options and make reports dealing with issues such as:

- what would be the impact of rising domestic energy prices on demand pattern, GDP growth and public sector resource gap?
- what would be the outcome of a specific oil and natural gas policy?
- How can a technological change in energy production and consumption affects the performance of the production activities and other parts of the economy?
- What would be the impact of a planned substitution among energy products on demand for goods and services, sectoral value added and the socio-economic indicators?
- Energy policy-efficiency interactions.
- Will the economy be able to adopt to changes in world prices of oil?
- What would be the effects of the ERSAP policy measures on the performance of the domestic energy sectors?
- Environmental issues to be addressed (GHG abatement measures).
- Role of new and renewable energy sources in the fuel mix.

- Energy sector should be presented by at least four sectors crude oil, natural gas, petroleum products and electricity, in addition to others such as coal, new and renewable, atomic.....etc.

5. Period of study Work Schedule.

The study period lasts about (19) to (24) months, in accordance with the tentative schedule chart attached hereto.

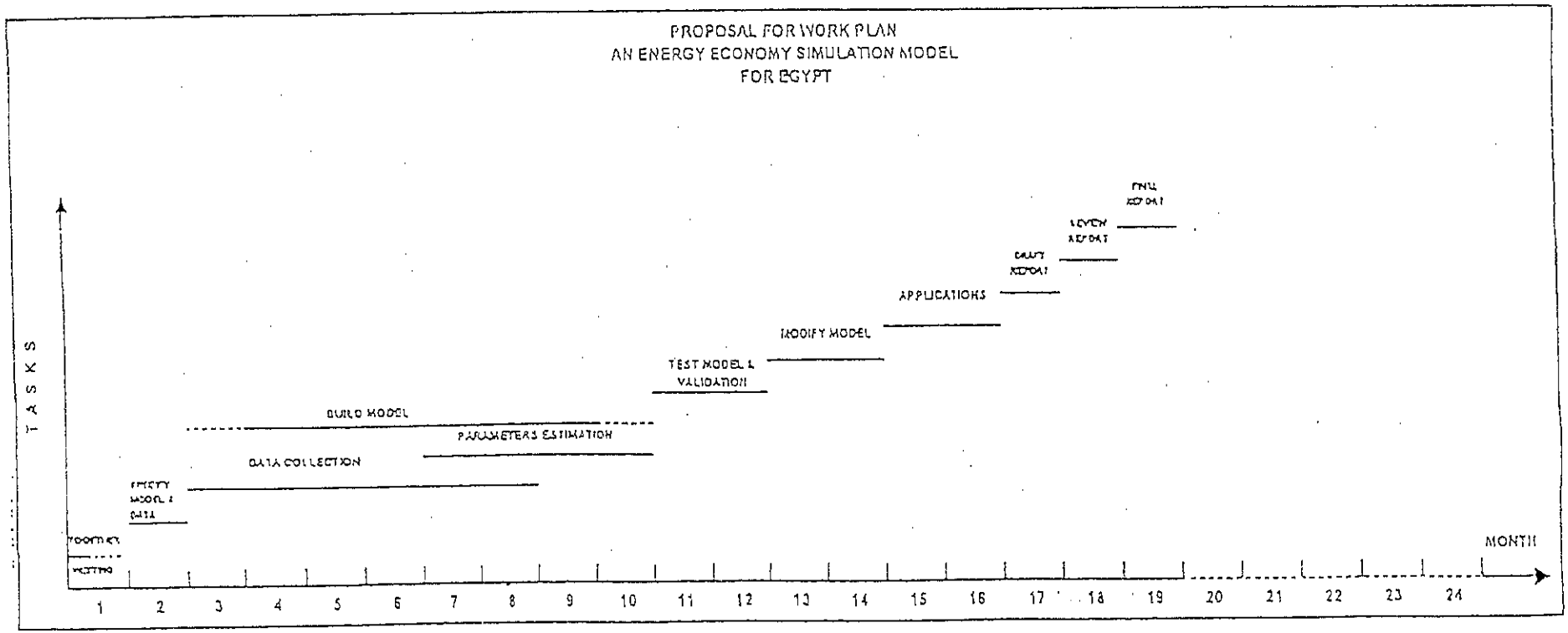
6. Resources and Budget .

A joint research team (JRT), composed of ECCJ and OECP researchers, will be formulated in addition to consultants and data specialists from other Egyptian institutions such as:

- → Ministry Of Planning (MOP)
- → Central Agency for Public Mobilization And Statistics (CAPMAS)
- → Egyptian General Petroleum Corporation (EGPC)
- → New and Renewable Energy Authority (NREA)
- → Egyptian Environment Affairs Agency (EEAA)
- → Others as needed

It is estimated that the Egyptian side will put about 85 man/month[1] , and that the JAPANESE side will put an effort about man/month. This accounts to a total budget of about US $. This STUDY will be financed mainly from the JAPANESE side and partly from the Egyptian side (OECP).

[1] Note: There are five days per week, eight hours per day. This is excluding travel and living costs.


PROPOSAL FOR WORK PLAN
AN ENERGY ECONOMY SIMULATION MODEL
FOR EGYPT
TASKS
BUILD MODEL
PARAMETERS ESTIMATION
DATA COLLECTION
TEST MODEL & VALIDATION
MODIFY MODEL
APPLICATIONS
MONTH
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AN ENERGY ECONOMY SIMULATION MODEL FOR EGYPT
PRELIMENARY BUDGET
1997 -1999

	JST *	OECP **	MAN/MONTH	MONTHLY RATE	'000 US$
PROJECT MANAGER		1			
A. RESEARCHERS					
- ECONOMISTS		2			
- MODEL SPECIALISTS		2			
- ENERGY EXPERTS		2			
- INPUT OUTPUT SYSTEMS					
B. CONSULTANTS					
C. RESEARCH ASSISTANTS (R.A)					
- COMPUTER SPECIALISTS		1			
- PROGRAMER		1			
- TECHNICAL SUPPORT		2			
D. ADMINISTRATION					
E. DATA COLLECTION					
F. COMPUTER & SOFTWARE					
G. PRINTING & MATERIALS					
H. MISCELLANEOUS					
TOTAL					

* JAPANESE STUDY TEAM
** ORGANIZATION FOR ENERGY CONSERVATION AND PLANNING