

トルコ国
エネルギー利用合理化計画
予備調査
報告書

1995年 5 月



国際協力事業団
鉦工業開発調査部
工業開発調査課

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I. プロジェクトの概要

1. 要請の背景・経緯

トルコでは第二次オイルショック以降、産業界及び一般に対する省エネルギー活動をおこなうために、研究を推進している。1981年には、そのための具体的な活動を行うために、エネルギー利用の合理化及び省エネルギー研究機関としてE I Eがその役割を負うこととなった。また、1993年には、E I Eのエネルギー資源調査局が「国家省エネルギーセンターに（NECC）に認定されている。

以降、E I EはUNIDOの協力による省エネルギー工場診断の実施や、世銀の借款（エネルギー診断バスの購入）による工場のエネルギー診断を実施してきた。

現在、E I Eはこれらの省エネルギーにかかる活動を実施し、ある程度の産業別省エネルギー診断手法を習得し、自主的な診断を行ってきただけではいるがこれらの活動をより効果的に行うためには、いまだに産業別の診断手法・診断プロセスが十分と言える状況にはない。また、上記省エネルギー活動のよりどころとなるべき省エネルギー関連法についても、過去に同法案が作成されたこともあったが、現在までに成立にはいたっていない。

このため、E I Eの活動をより充実したものにするために、本件分野にかかる日本の持つ豊富な経験と高度な省エネルギー診断技術等を必要として、今般の要請となった。

今次調査は、本件要請の背景、目的、内容等を確認し、あわせて我が方の調査実施スキーム等を説明するたためる予備調査として実施した。

2. プロジェクトの目的

トルコにおけるエネルギー利用の合理化を推進するために、以下の提言を行うための調査を実施する。

- 1) 製造業におけるエネルギー利用の合理化に関する国家政策・プログラムにかかる提言
- 2) 中小製造業にかかる、現有する製造プロセスの変更を伴わない、エネルギー利用の合理化を図るための技術的改善手法の提言
- 3) 中小製造業における省エネ活動のための技術ガイドラインの作成

3. 先方実施機関

エネルギー天然資源省所管、電力調査総局（E I E）

Diretorate-General Electrical Power Resources Survey and Development
Administration (EIE),

Ministry of Energy and Natural Resources

4. 調査対象地域

アンカラ及びトルコ内主要都市（イスタンブール、イズミール、アダナ）

II. 予備調査の概要

1. 予備調査の目的・内容

今次調査では、トルコ国の省エネルギー推進状況の実情を把握するとともに、JICAの開発調査スキームとして協力可能な範囲を策定するために

- 1) 本件調査の要請背景、要請内容の確認
- 2) 本格調査内容の協議
- 3) JICA調査スキームの説明
- 4) 国連資料、情報の収集

等を中心とした調査を実施した。

2. 団員構成：

- | | | |
|-----------------|--------------------------|-------|
| 1) 団長（総括） | JICA 鉱工業開発調査部計画課課長代理 | 十郎 正義 |
| 2) 団員（省エネルギー政策） | 通商産業省資源エネルギー庁省エネルギー対策室係長 | 但馬 敏郎 |
| 3) 団員（調査企画） | JICA 鉱工業開発調査部工業開発調査課 | 永江 勉 |

3. 調査実施期間：平成7年3月22日から平成7年3月31日まで（10日間）

【日程】

- 3月22日（水）成田⇒フランクフルト
- 23日（木）フランクフルト⇒アンカラ
- 24日（金）日本大使館表敬・打合わせ／計画庁、エネルギー天然資源省表敬
EIEとの打ち合わせ
- 25日（土）団内打ち合わせ
- 26日（日）資料整理
- 27日（月）EIEとの協議
- 28日（火）EIEとの協議、省エネルギー診断用資機材調査
- 29日（水）工場視察（SET CEMENT工場、OZGUR TICERBTUE S.A レンガ工場）
EIEとの打ち合わせ、M/M署名
- 30日（木）日本大使館報告／アンカラ⇒（フランクフルト経由）
- 31日（金）⇒成田

4. 主要面談者

トルコ側

| | |
|------------------------|--|
| Mr. Ali Altintas | Expert, SPO |
| Mr. Muammer Isikoglu | Under Secretary, MENR |
| Mr. Mustafa Menditci | General Director, Energy Dept. MENR |
| Mr. Mehmet Ates | Head, Planning Div. MENR |
| Mr. Tuncer Tuncay | Director General, EIE |
| Mr. Kemal Koman | Director, Energy Dept. EIE |
| Ms. Tulin Keskin | Manager, Energy Conservation Div. EIE |
| Ms. Peyman H. Yillikei | Electrical Power Resources Survey and Develop. Adm. EIE |

日本側

| | | |
|---------|---------------|------------|
| 都 甲 岳 洋 | 特命全権大使 | 在トルコ日本国大使館 |
| 平 岡 | 公使参事官 | ” |
| 本 山 昭 | 参事官 | ” |
| 坂 元 信 | 二等書記官 | ” |
| 多 田 智 | ” | ” |
| 岩 切 治 久 | J I C A 派遣専門家 | E I E |

Ⅲ. 調査結果

標記調査団は、3月24日から3月30日までの間、当初の予定通り、国家計画庁、エネルギー天然資源省、E I Eを訪問し、本案件の実施に向け協議を行った。

同調査団は、上記関係各機関との間で、本件要請の背景、目的、調査実施方法等につきト側コメントの聴取及び意見交換を行った。

調査の結果は以下の通り。

1. 国家計画庁 (S P O)

(3月24日 11:00 Mr. Ali Altintas 専門官、社会分野調整局)

冒頭、調査団側より本調査の目的、J I C A調査スキーム等の説明を行った後、先方より以下の通り説明がなされた。

- 1) エネルギー分野は、1995年の開発計画でも最重要課題とされており、この関連から省エネルギー推進事業についても重要な位置付けがなされている。この意味においても、本件開発調査の実施についてはS P Oとしても大きな期待を持っている。
- 2) 本格調査の実施に際し、事前に取り交わされるS/Wについては、E I Eは過去J I C Aとの間で、数多くの調査案件を実施していることからその内容、特にト側アンダーテキングについても承知しており、全く問題は無いものと考えている。また、同内容につき、他の省庁(大蔵省、外務省)との調整、確認も必要ないとの説明がなされた。

2. エネルギー天然資源省 (M E N R)

(3月24日 14:30 Mr. Muammer Ishikoglu 次官補)

冒頭、ト側より今回開発調査協力及びト国におけるJ I C Aの協力全般に対する謝意が述べられたあと、以下の通り説明がなされた。

- 1) 省エネルギー推進事業については、同省として重要課題として認識しており、今回調査対象となっている工業分野を始め、運輸、建物分野も含め、これからも積極的に取り組んでいくべき分野であると考えている。
- 2) 1995年から第7次5ヵ年計画が始まっているが、同計画が正式に発表されるのは本年6月頃になるものと見込まれる。同計画の中では、省エネルギー推進事業に係る具体的な計画については触れていないが、明文化のいかんにかかわらず、重要課題であるとの認識には変わりなく、今後M E N Rとしても積極的に取り組んでゆく方針である。
- 3) 省エネルギー事業の実質的な推進機関はE I Eであるが、M E N RにはE I Eを所管するエネルギー部があり、省エネルギーに関連する各関係省庁、大学、研究所との調整

業務を担当している。

- 4) 法令等の制作に関しては、本省がE I Eをその基本的な骨格、原案を策定する機関として定めており、E I Eの役割は重要なものとなっている。

E I Eにおける法令等原案制作の後、同案はエネルギー天然資源省に提出され、同省が関係各省との調整のうえ、施行に移されることになる。

3. 電力調査総局 (E I E)

(3月27日 Mr. Kemal Koman 他 E I Eエネルギー資源調査局長)

E I Eにおいては、本件開発調査の背景・目的、調査実施に係る具体的内容等につき、協議・情報収集を行った。結果は以下の通り。

- 1) E I Eは1935年にエネルギー天然資源省所管の特殊法人として設立されて以来主に水力発電に関連する調査・開発業務を実施してきた。1980年になって、UNIDOの協力による専門家派遣が行われ、特に工場における排熱の再利用をテーマにした調査を実施した。合わせて、エネルギー利用合理化に関連する業務の専任実施機関設立が必要であるとの同機関からの提言に基づき、E I Eがエネルギー天然資源省からの任命を受け、その業務を担当することとなり、新たに、Energy Resources Survey Departmentが設置された。

同エネルギー資源調査局は、①工業、②運輸・建築物、の2分野に係る省エネルギーを担当する2つのdivisionと③太陽光エネルギー及び、④風力エネルギーの研究開発を行う2つのdivisionの合計4つのdivisionから構成されている。

UNIDOとの共同プロジェクトの実施後、同局は省エネルギー推進事業を開始したが、その後1983年5月から1984年7月まで、及び、1988年8月から1991年1月までの計2回にわたり、世界銀行の借款による工業分野における工場のエネルギー診断事業を行い、合わせてE I Eに対する技術移転やエネルギー診断に必要な機材等の購入を行っている。

このように、現在に至るまで、過去、国際機関等の援助・協力のもとに、E I Eは省エネルギー推進のための活動を行ってきたが、これらは、主として、個別の企業のエネルギー診断事業であり、また、大工場をその対象としていたこと、さらに省エネルギー推進のための法令整備から事業実施に至るまでの系統だった枠組みづくりや、技術移転等には特に触れられていなかった。

このような背景から、今後ますます、重要課題となってゆくであろうエネルギー利用の合理化を推進するための法令・制度、実施組織のあり方、具体的な活動の実施方法にいたる大系をつくることが急務となっている。

この意味において、世界においてもトップレベルと認識されている省エネルギー政策

や省エネルギー技術を有する日本からの協力を有することは、トルコにとって非常に有益であるとの認識がなされている。

2) 今回の調査については、要請書に述べてある通り、以下の5つの項目をその主たる目的としている。

- ① 製造業におけるエネルギー利用合理化に係る政策・プログラムの提言、及び日本の現状紹介
- ② NECC組織・活動に係る提言
- ③ 中小規模のモデル工場における省エネルギー診断の実施
- ④ 対象工場サブセクターにおける省エネルギー診断手法・技術ガイドラインの紹介及び、日本の技術・手法の紹介
- ⑤ C/Pへの省エネ診断技術の移転

工場分野における省エネルギーの推進は、エネルギー資源調査局の重要課題のひとつであり、過去から事業を実施している。ただし、過去に実施した事業の対象は大工場が主体となっていたため、今後は中小工場に対する省エネルギー推進事業も実施してゆく必要がある。今回の調査では、このような背景から、特に、中小製造業に対象を絞り込んだ調査が望まれている。

3) 開発調査で要望している省エネルギー診断の対象工業サブセクターについては、エネルギー消費量、対象工場の数の多さ等の観点から省エネルギー効果の高いと思われる以下の5分野につき調査を実施したい旨EIEより要望がなされた。

- ① レンガ
- ② 繊維（綿織物等）
- ③ 金属（Steel-Rolling Mill, Arc Furnace）
- ④ 食品（食用油）
- ⑤ 化学（合成洗剤）

具体的な工場の選択は今後EIEが行うが、それらの位置する都市は、主としてイスタンブール、アダナ、イズミールの3都市になるものとの説明がなされた。

4) 本件調査のト側実施機関は、EIEのエネルギー資源調査部（1993年には、国家省エネルギーセンター〔NECC〕）であり、特に同部の工業省エネルギー課、運輸建築物省エネルギー課の2課が直接のC/P機関となる。

また、同2課におけるC/Pの構成は以下の通りとなっている。

| | |
|------------------------|-----|
| ・ Mechanical Eng. | 7名 |
| ・ Chemical Eng. | 4名 |
| ・ Electrical Eng. | 3名 |
| ・ Civil Eng. | 1名 |
| ・ Physical Eng. | 2名 |
| ・ Industrial Eng. | 3名 |
| ・ Technician(Electric) | 1名 |
| ・ Administration | 2名 |
| 計 | 23名 |

5) 省エネ政策・法令、制度の具現化に係るE I Eの役割については、その原案、素案をエネルギー天然資源省の指示のもとにE I Eが作成することとしており、その責務は重要なものとなっている。

E I Eで作成されたこれらの原案は、MENRのエネルギー部に提出され、さらにS P O等関係機関との調整の後、同省が施行することとなっている。

6) 本格調査の実施に際して、そのスムーズかつ効果的な実施を図るための、運営委員会の設置については、主として、S P O、エネルギー天然資源省及び工業省の代表者を参加させる方向でE I Eが検討することとした。

7) 調査用資機材に関し、E I E現有の工業エネルギー診断用機材の調査を行った。E I E側の用意した機材リストを基に調査を行ったが、全ての機材は比較的新しく、また、整備も良くなされており、いつでも使用出来る状態にあった。

現有機材の種類、使用目的、点数については、今後の調査で詳細に調べる必要があるが、E I E側の説明によれば、現有の機材ではほぼ全ての工業サブセクターをカバーすることが出来るとの認識をもっている。

省エネルギー診断バスについては、現在3台のバンタイプの車輛を有している。車内を機材収納用に改造しており、機材運搬のための十分なスペースが確保されている。

8) 省エネルギー診断事業に係る国際機関等との協力は過去、UN I D O、世界銀行、E Uとの間で実施されておりその内容は以下の通り。

① UN I D Oとの協力プロジェクト

本プロジェクトは、1980年10月から11月にかけて、鉄鋼、ガラス、アルミニウム、繊維の各産業にかかる大企業を中心にpre-audit を実施した。ハンガリーの専門家チ

ームで実施されたこのpre-audit は、工場の排熱の再利用を対象として行われ、その効果につき分析を行っている。また、同提言の中には、省エネルギー推進のための専属機関の設置についても言及しており、翌1981年にE I Eに専属機関（工業省エネルギー課、運輸・建築物省エネルギー課）が設置されている。

② 世界銀行借款による協同プロジェクト

同プロジェクトは、世銀の借款を基にE I Eに対する省エネ技術の移転及び各工業サブセクターの工場に対する省エネルギー診断、さらに、同工場改善に係る個別工場へのローンの供与を目的として、1983年5月から1984年7月までと、1988年8月から1991年11月までの2回にわたって実施された。第一回目においては鉄鋼、ガラス、製紙、繊維、火力発電所の5分野に係る11工場に対する省エネルギー診断を実施し、省エネルギーポテンシャルを分析した。

第2回目のプロジェクトにおいては23の工場に対するpre-audit を実施したのち、鉄鋼、セラミックス、耐火レンガ、フェロクローム、銅、セメント、醸造、化学、砂糖、繊維の分野から15の工場を選定し、省エネルギー診断を実施し、工場設備改善等の調査を行った。この結果、これらのうち5工場が最終的に世銀の融資のもとに工場の改善を行っている。

また、同プロジェクトにおいては、上記診断事業に加え、E I E C/Pの研修や、省エネルギー診断用測定機器、エネルギー診断バス、研修用バスの購入が行われた。

③ E Uとの協同プロジェクト

同プロジェクトは、E Uにおける省エネルギー推進活動の紹介及び、ト国工業、運輸、建築物に係るエネルギー利用状況の把握、統計データ等の整備等を中心としたエネルギー利用の現状把握を目的として、1994年10月から開始され、1995年7月に終了する予定である。

IV. 団長所感

1. トルコ国では、エネルギー資源の約50%を輸入に依存していることから、エネルギーを効率的に利用することは、近年のトルコ経済の落ち込みや財政収支の悪化に照らし、非常に重要なことと思料される。

特に過去数度にわたって実施されてきた5ヵ年計画により、農業国から工業国への転換を図ってきた結果、工業のGDPに占める割合が3割を越えてきているところ、今回、調査要請の対象となっている工業分野における省エネルギー事業の推進は、エネルギー政策上の重要な課題の一つとなっている。

この意味において同分野における我が国の協力は、その豊富な経験に鑑み時宜を得ており、その意義も大きいものと思料される。

2. ト側C/P機関である国家省エネルギーセンター（NECC）はその設立後14年以上を経過しており、その間、国際機関等の技術援助や資金協力により体制的には整いつつあるが、その活動内容については、その存在等が広くト国産業界に認知されていないこと、また、省エネルギー法等の整備がなされていないこともあり、産業界における省エネルギーに対する意識も高いものでは無いため、十分なものとはなっていない。

開発調査を実施するにあたっては、法令等の整備から省エネルギー実施機関の役割、活動内容等に至るまでごく細かな提言が必要となるであろう。

3. また、ト側は、開発調査協力を実施する中で、各工業サブセクターに対する省サブセクターに対する省エネルギー診断実施において診断手法に係る技術移転にも期待を寄せているところ、開発調査という協力の枠組みの範囲内で、その期待に応えることも重要である。

4. 調査用資機材については、ト側の説明では、エネルギー診断バスも含め、特に不足は無いとの認識を持っている。しかしながら、今後本格調査を実施するにあたっては、対象となる工業サブセクター、また、モデル工場の事業内容との関連から、不足すると考えられる測定機器等については、追加調達の可能性も含め、慎重な検討が望まれる。

V. 今後の方針

- 1) 今次予備調査の結果を踏まえ近々S/Wの締結を目的とした事前調査を実施する。
S/Wの内容については、Scope of the Study、Undertakingsについても今回先方関係機関との打ち合わせを行っており、概ねの合意を得ている。
今後、事前調査の日程が決った段階で先方に調査団派遣前に送付し、事前検討を行う旨双方で合意しているところ、S/Wドラフト作成後先方への同内容の紹介を遅滞なく行う必要がある。
- 2) 先方の説明では、本件調査のターゲット工業スケールを中小製造業である旨強調している。予備調査の時点では、先方トルコ側は中小製造業のエネルギー分野における実態を十分に把握していないように推察された。また、今次予備調査の実施時点において、トルコ側が、現在EUの協力のもとに同実態の把握に勤めている旨、説明があり、また、同調査が本年6月下旬頃に終了することから、事前調査時には同結果に関する情報の収集も行う必要がある。
- 3) 本件調査のアウトプットの一つとして、中小製造業5分野にかかるモデル工場に対する工場エネルギー診断の実施が含まれている。同エネルギー診断の実施に必要な測定器材については、先方にある程度のもものが整備されているが、事前調査時には、再度調査を行い、本格調査実施に際し必要と考えられる機材のリストアップを行うことが望ましい。
- 4) S/W作成時には、特に、調査工程の計画に関し、機材調達にかかる期間に十分配慮したうえで、現地調査、国内調査の割り振りを行う必要があるところ、この点留意が必要である。

資 料

March/0 , 1995

To whom it may concern;

It is a pleasure for me to inform you that the Japan International Cooperation Agency is planning to dispatch the Preparatory Study Team response to the request by the Government of Turkey on the study for the Rational Use of Energy in Industry in Turkey from March 23, 1995 to March 30 1995.

The main purpose of the visit of this team is

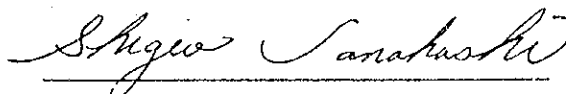
- 1) to grasp the background of the proposed study,
- 2) to clarify the objective of the proposed study
- 3) to collect related information and data on the study

through discussion with the personnels of the organizations concerned and by observation of the plants targeted.

In this connection, JICA has prepared the questionnaire attached hereto in order to smoothly collect necessary informations for the study. You are kindly requested to complete the questionnaire or prepare the necessary documents and submit them to the Study when it will visit your organization so as to make this survey fruitful.

Your kind cooperation would be very much appreciated.

Yours Sincerely,



Shigeo Tanahashi,

Managing Director,

Minining and Industrial Development

Study Department, JICA

Q U E S T I O N N A I R E

1. Present situation of energy conservation in Turkey and its status in the 7th - 5 years development plan

2. Energy Conservation Policy

1) Policy

2) Target

3) Promoting Organizations

4) Law, Regulations, Standards

5) Measures for promotion of energy conservation

(such as ; Assistance for investment

Commendation to excellent factories

Training programmes for engineers

Information services (publication, semminar,etc.)

4. Organization of Energy Conservation Department and their activities

1) Established date

2) Organization chart

3) Number of staff and their background

4) Activities in the past and future programes

5. Cooperation project of EIE with international organization

1) Detailed information on the project with UNIDO

(purpose, activities, targeted industrial sub-sectors, equipment, etc)

2) Output from the project mentioned 1) above and its evaluation

3) Detailed information on the project with World Bank

(purpose, activities, targeted industrial sub-sectors, equipment, etc)

4) Output from the project mentioned 3) above and its evaluation

5) Relationship between the past projects (UNIDO, World Bank) and the study requested to Japan

6. Detailed information on the 6 targeted industrial sub-sectors and 6 factories

1) Reason for selecting the 6 industrial sub-sectors (cement, food processing metallurgy, machinery, chemical industry, textile)

2) Present situation of targeted industrial sub-sectors

3) Outline of 6 selected factories

(Name, main product, number of employee, location, major problem of energy conservation etc.)

7. Equipment for energy audit in EIE

1) Name of the existing equipment

2) Specification of the equipment and its use

3) Present condition of those equipment

(well maintained, lack of spare parts, out of order, etc.)

8. Other information

1) Role of Energy Conservation Coordinating Board against the study.

QUESTIONNAIRE

8. Energy Situation

(1) Energy Supply (Results in the past 6 years and future prospect)

| Year | | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 2000 | 2010 |
|--------------------------------------|-----------------|------|------|------|------|------|------|------|------|
| Coal (1000t) | Production | | | | | | | | |
| | Import | | | | | | | | |
| Oil (1000t) | Production | | | | | | | | |
| | Import | | | | | | | | |
| Natural Gas (1000m ³) | Production | | | | | | | | |
| | Import | | | | | | | | |
| Power Generation (1000MWh) | | | | | | | | | |
| | Hydro | | | | | | | | |
| | Nuclear | | | | | | | | |
| | Fuel Combustion | | | | | | | | |
| | Import | | | | | | | | |
| Total Suply (1000toe) | | | | | | | | | |

(2) Energy Consumption (Results in the past 6 years and future prospect)

| Year | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 2000 | 2010 |
|-----------------------------|------|------|------|------|------|------|------|------|
| Agriculture | | | | | | | | |
| Industry | | | | | | | | |
| Transportation | | | | | | | | |
| Resident and Commercial | | | | | | | | |
| Total Consumption (1000toe) | | | | | | | | |

(3) Energy Price

- 1) Coal
- 2) Oil
- 3) Natural Gas
- 4) Electric

9. Gross National Product (GNP) and Gross Domestic Product (GDP) (in the past 6 years and future prospect)

| Year | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 2000 | 2010 |
|------------------------|------|------|------|------|------|------|------|------|
| Gross National Product | | | | | | | | |
| Gross Domestic Product | | | | | | | | |

10. Energy Situation of Industries

| Industrial sub-sectors | Number of Factories | | Ex-works Price | Energy Consumption | |
|-------------------------|---------------------|--------------|----------------|--------------------|-----------------|
| | Large Scale | Medium/Small | | Fuel (toe) | Power (1000MWh) |
| Foods, Food Processing | | | | | |
| Textile | | | | | |
| Wooden Goods | | | | | |
| Pulp/Printing | | | | | |
| Chemical | | | | | |
| Petroleum, Coal Product | | | | | |
| Plastics | | | | | |
| Rubber, Leather | | | | | |
| Ceramic, Glass, Cement | | | | | |
| Iron/Steel | | | | | |
| Nonferrous | | | | | |
| Machinery | | | | | |
| Metal Goods | | | | | |
| Utility | | | | | |
| total | | | | | |

Please note the definition of Large/Medium/Small Scale industries in Turkey

T. C.
ELEKTRİK İŞLERİ ETÜT İDARESİ GENEL MÜDÜRLÜĞÜ
REPUBLIC OF TURKEY
GENERAL DIRECTORATE OF ELECTRICAL POWER RESOURCES SURVEY AND DEVELOPMENT ADMINISTRATION

Our Ref : B.İS.İ.EİE.O.1300c/1781-4/157

Your Ref :

EİE İDARESİ GENEL MÜDÜRLÜĞÜ
ESKİŞEHİR YOLU 7. KM. 166
06520 ANKARA TÜRKİYE
CABLE : ELEKTRİKETÜT-ANKARA
TELEX : 44104 ETUT-TR
PHONE : (00312) 287 33 80
FAX : (00312) 287 84 31

28.03.1995


Japon International Cooperation Agency

Ref : Project Proposal on "Rational Use of Energy in industry"

Please find enclosed herewith the questionnaire requested by JICA team related to the subject project.

Best Regards

ECL. Questionare


Tuncer TUNCAY
Director General

QUESTIONNAIRE

1. PRESENT SITUATION OF ENERGY CONSERVATION IN TURKEY AND ITS STATUS IN THE 7th 5 YEARS PLAN:

7th 5 years plan is not issued yet.

The following wording related to energy conservation has been included in the 6th 5 years plan (1990-1994):

"Main objective in energy sector is to provide cheap, sustainable and good quality energy to all consumers in place and in time with the aim of supporting the economical and social development."

In the 6th Five year Development Plan it is also emphasized that from production to end use stage, efficient usage of energy will be encouraged.

2. ENERGY CONSERVATION POLICY

Policy and Target :

The energy policy of Turkey is mainly concentrated on assurance of energy supply; reliably, sufficiently, on time, in economic terms and in a way supporting and orientating the targeted growth and social developments.

Turkish Government focused its efforts on improvements in domestic production by utilizing public, private and foreign investments, and increasing the efficiencies by rehabilitation and acceleration of the existing construction programs to initiate new investments. Energy saving is another principle in Turkish Energy policy. Nevertheless Turkish energy strategy is aimed at satisfying the demand without hampering the economic growth. In order to meet this aim, along with enhanced recovery of the domestic sources, energy management, rational utilization and conservation of energy are also adopted as other elements of our national policy to secure the supply and to protect the environment.

To ensure these policy objectives, Turkish Government have been emphasising to spend its efforts on promotion of energy conservation on national scale and on an accelerated development of alternative energy resources since beginning of 80's. With this regard some activities and studies have been initiated within the Ministry of Energy and Natural Resources (MENR) and General Directorate of Electrical Power Resources Survey and Development Administration (EIE).

Promoting Organizations:

General energy policy is the responsibility of MENR. The SPO is responsible for overall economic planning and thus there is a close linkage between the two organizations. Recommendations for budgets and policy priorities are made by MENR but the SPO has the final authority. Within MENR there are two bodies involved directly in energy conservation policies and programmes, including the General Directorate of Energy Affairs (and its Energy Conservation Division) and related organization, EIE.

Other ministries and agencies with indirect involvement in energy conservation include, among others, the Ministry of Industry and Commerce, Ministry of Reconstruction and Resettlements, Ministry of Transportation, Turkish Scientific and Technical Research Council (TUBITAK) and Turkish Standards Institute.

Energy Conservation Regulations in Turkey :

No Energy Conservation Law is in enforcement in Turkey, but regulations have been used extensively, primarily in the building sector for new buildings and for building-related stoves and boilers.

EIE/NECC(National Energy Conservation Center) and Institute of Turkish Standards have agreed to revise the current building standard to increase energy efficiency in buildings in parallel to European Community studies.

A subcommittee is established with the contribution of the representatives from the University, Research Institute, Insulation Association and NECC. The studies are presently going on.

In Turkey there is not any enforcement for implementation of the identified projects in industry. However some industrial establishments have made their commitment to implement the energy conservation projects and they have even achieved much more than the identified potential.

To increase energy efficiency in industry NECC (National Energy Conservation Center) have prepared and sent a regulation to MENR for their views and implementation. With this regulation industrial establishments which their annual energy consumption is more than 2000 TOE will establish an energy management system in the plant. Energy audits will be completed in 3 years and audit results, implementation program and implementation results will be sent to NECC. Specific energy consumption of the production will be monitored by the plant and also sent to NECC.

Measures for Promotion of Energy Conservation :

EIE Energy Conservation Center is the main body which carries out promotion activities. Its main activities are as follows:

1. Energy Audits
2. Training program for plant engineers
3. Publications for industry, building and transport sectors
4. Data Base studies

3. ORGANIZATION OF ENERGY CONSERVATION DEPARTMENT AND THEIR ACTIVITIES :

Established Date, Organization Chart And Number Of Staff:

EIE is a State Economic Enterprise, established in 1935. The main tasks assigned to the EIE by its own Constitutional Law were to undertake the same studies for development of the national resources for electricity generation.

New tasks were assigned to the Administration in 1981 for rational utilization of energy resources, planning and development of new and renewable energy sources and energy conservation studies by the Ministry of Energy and Natural Resources. Energy Resources Survey Department which has four divisions as, Industrial Energy Conservation, Building and Transport Sectors Energy Conservation, Solar Energy and Wind Energy Divisions was established to fulfil these new tasks.

In December 1992, this department has been assigned as National Energy Conservation Center (NECC) by the Ministry of Energy and Natural Resources to increase the effectiveness of the activities and extend them overall the Country.

Organisation Chart Is Attached.

In EIE/NECC which conducts all above mentioned energy conservation studies, 20 engineers of various disciplines and supporting personnel such as economist and technician are employed.

Activities In The Past And Future Programs:

EIE /NECC has conducted its activities in the following categories:

Energy Audits (Energy Bus Program)

EIE Energy Audit Teams have conducted 35 energy audits in various plants of Turkish industrial sectors since 1990. Energy Bus Programs have been carried out to create energy conservation awareness in industry, to identify the energy saving potentials and to help the establishment of energy management in the plants. These

programs are implemented in four steps: previsit to plant, visit to plant (gathering data,taking measurements), analysis of results and report preparation. The reports are then sent to the plants.

Training Bus Program

Since 1993 EIE Energy Conservation Team has initiated a training program. In the scope of this program, EIE engineers have been visiting the plants and giving the seminars on the various energy conservation subjects such as energy management, insulation, boiler house combustion, electrical and steam systems to the technical personnel of the plant. Seminar notes and technical manuals on these subjects are provided for the participants.

Publications

This is a promotion activity and approximately 60 publications were published up to the present. Energy Conservation Newsletter, Technical Tips, Technical Manuals are a few to be mentioned. These publications have been mailed to total 2500 addresses. 1500 of these are major industrial establishments. Newsletter is a periodical publication now. On request new publications on various related subjects are also prepared.

Data Base

To monitor the energy consumption in industrial sector a data base program was established. Information on the energy consumption and production of approximately 700 industrial plants are compiled, evaluated and issued for the years of 1983, 1985, 1987, 1989, 1991 .

Policy Studies

EIE/NECC is currently in the process of developing the document on energy conservation strategy in Turkey. Relating to these studies, a project was initiated in collaboration with European Community in fall 1994. In the scope of this project a software is being prepared for implementation energy conservation measures in industry, building and transport sector. It is expected that the project will be completed in 1995.

4. COOPERATION PROJECT OF EIE WITH INTERNATIONAL ORGANIZATION:

International Projects of EIE

EIE has conducted several energy conservation projects since 1981.

The first project on energy conservation in Turkish industry was carried out in October-November 1980, in cooperation with UNIDO. The preaudits were executed at Iron and Steel, Glass, Aluminium and Textile Sectors and it was identified that approximately 247 000 TOE/year energy saving potential was available in the subject plants in those days.

The second energy conservation project which was financed by World Bank was carried out with the coordination of EIE between May 1983 and July 1984. The aim of this project has been to identify potential savings in selected 10 plants from four major energy intensive industrial sectors which are Iron and Steel, Glass, Pulp and Paper, Textile and Thermal Power Plant.

The program has also included the training of Turkish personnel so that similar future studies could be carried out.

Within the scope of Loan Agreement signed between the Turkish Government and World Bank, EIE has started another program on Energy Conservation in August 1988 and completed in January 1991.

Within the framework of this second World Bank project, in addition to the Industrial Energy Audits, a Technical Assistance Program aiming to improve the effectiveness of EIE studies were implemented. In this scope of Technical assistance program, necessary equipment and vehicles were purchased.

In addition to this program previously identified feasibility projects were implemented in four steel plants.

Preaudit and Industrial Energy Audits Studies

A total of 23 plants were visited from September through December 1988. The aim was to identify energy saving potentials and main problems of these plants.

After the evaluation of preaudit results 15 plants were selected for detailed energy audit and feasibility studies. These studies were carried out by 4 foreign firms with local partners.

These 15 plants were selected from Iron & Steel, Ceramics, Refractories, Ferrochrome, Copper, Cement, Brewery, Chemicals, Sugar and Textile subsectors

and their total energy consumption was 2.3 Million TOE in 1989 representing a share of 18.09 % of Industrial energy consumption in Turkey. In the evaluation of audit reports, total identified potential energy savings was found as 428.300 TOE or US \$ 102 Million. Average saving potential was defined as 18.4 %.

Transport Studies

Three short audits were carried out in Ankara municipal bus company and an intercity bus company and intercity truck firm to identify potential saving of road transportation.

Commercial Building Studies

Short audits of the EIE building and a hotel in Ankara were carried out and the reports were prepared. The potential for energy saving in the building sector appears substantial. For this reason various studies such as preparation of brochures, audit studies for demonstration, computer program application for energy efficient buildings, have been planned in building sector.

Relationship Between The Past Projects And To Study Requested To Japon

At the end of all these activities carried out until now by EIE, it has been identified that energy conservation potential in the Turkish economy appears to be large.

Industrial sector is the most important sector in terms of energy saving potential. Energy audits carried out so far during above mentioned projects has created energy saving conscious in Turkish industry, however, these studies have not covered all subsectors in Turkish industry.

With the study to be carried out in cooperation with Japan, it is planned to extend the audits in small and medium sized plants so as to cover all other subsectors not audited so far and to increase the experience of EIE audit team especially in process units of the plants.

5. DETAILED INFORMATION ON THE 5 TARGETED INDUSTRIAL SUBSECTORS:

The selected 5 subsectors (Brick, Food (Vegetable Oil), Metallurgy (Steel Rolling Mill and Arc Furnaces), Cleaning Material and Textile) are very important for Turkish industry. Reason for selecting these subsectors is that any energy audits were not conducted up to now in these subsectors.

Number of plants in brick sector is rather high. Although energy consumption is not very high, technology used in this sector is not very efficient.

Turkey is a considerable Vegetable oil producer in the world. This sector, cleaning material and textile sectors have a significant effect in Turkish Economy.

Metallurgy and Textile sectors are growing in Turkey. Number of plants is getting increased and energy consumption in Metallurgy sector is very high but technology used in the plants is not efficient.

Factories in 5 targeted subsectors are not defined yet but, contacts with industrial associations are going on .

6. ENERGY AUDIT EQUIPMENT

A list of existing equipment in EIE is attached.

7. OTHER INFORMATION

Role of Energy Conservation Coordinating Board:

The Board is strictly voluntary and has no authority over actions taken in other ministries and institutions. It holds the meetings on average every two months. Almost all related ministries and agencies participate in these meetings. The ECCB also includes the representatives from universities and private sector. NECC as a member of the board has a leading role in the Board studies.

The ECCB primarily coordinates the government's energy conservation awareness campaigns, including an annual Energy Week (the second week of January), publicity material, contests for school children, etc.

QUESTIONNAIRE

9. Energy Situation

(1) Energy Supply (Results in the past 6 years and future prospect)

| Year | | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 2000 | 2010 |
|--------------------------------------|------------------------------|---------|---------|---------|---------|---------|---------|----------|----------|
| Coal (1000t) (include Lignite) | Production | 52216 | 47428 | 46108 | 51431 | 48163 | 62609 | 119177 | 190269 |
| | Import | 2575 | 6941 | 11706 | 8266 | 6687 | 6041 | 4539 | 43539 |
| Oil (1000t) | Production | 2876 | 3717 | 4451 | 4281 | 3892 | 3701 | 1555 | 299 |
| | Import | 19987 | 20184 | 18864 | 20584 | 25729 | 22568 | 28376 | 39512 |
| Natural Gas (1000m ³) | Production | 174000 | 212000 | 203000 | 198000 | 200000 | 185000 | 185000 | 185000 |
| | Import | 2988000 | 3206000 | 4002000 | 4414000 | 4954000 | 6619000 | 19803000 | 30409000 |
| Power Generation (1000MWh) | | | | | | | | | |
| | Hydro | 17940 | 23148 | 22683 | 26568 | 33951 | 36907 | 44788 | 77921 |
| | Nuclear | - | - | - | - | - | - | - | 14035 |
| | Fuel Combustion (Thermal) | 34104 | 3439.5 | 37563 | 40774 | 39857 | 63523 | 104249 | 234163 |
| | Import | 559 | 176 | 759 | 188 | 213 | - | - | - |
| Total Supply (1000toe) | | 50440 | 53334 | 54624 | 57622 | 61018 | 62970 | 90083 | 155586 |

(2) Energy Consumption (Results in the past 6 years and future prospect)

| Year | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 2000 | 2010 |
|-----------------------------|-------|-------|-------|-------|-------|-------|-------|--------|
| Agriculture | 1841 | 1956 | 1976 | 1994 | 2445 | 2487 | 3680 | 5862 |
| Industry | 13219 | 14543 | 15181 | 15454 | 16526 | 19078 | 28681 | 57493 |
| Transportation | 8178 | 8773 | 8304 | 8545 | 10419 | 10726 | 14230 | 21722 |
| Resident and Commercial | 16055 | 15704 | 16261 | 17053 | 17498 | 18791 | 23896 | 33193 |
| Total Consumption (1000toe) | 39293 | 40926 | 41722 | 43046 | 46889 | 51082 | 70487 | 118270 |

(3) Energy Price

- 1) Coal (Lignite) 1750000 TL/ton
- 2) Oil b No 7691 TL/Kg
- 3) Natural Gas 5015 TL/Sm³
- 4) Electric 2500 TL/kwh

10. Gross National Product (GNP) and Gross Domestic Product (GDP) (in the past 8 years and future prospect)

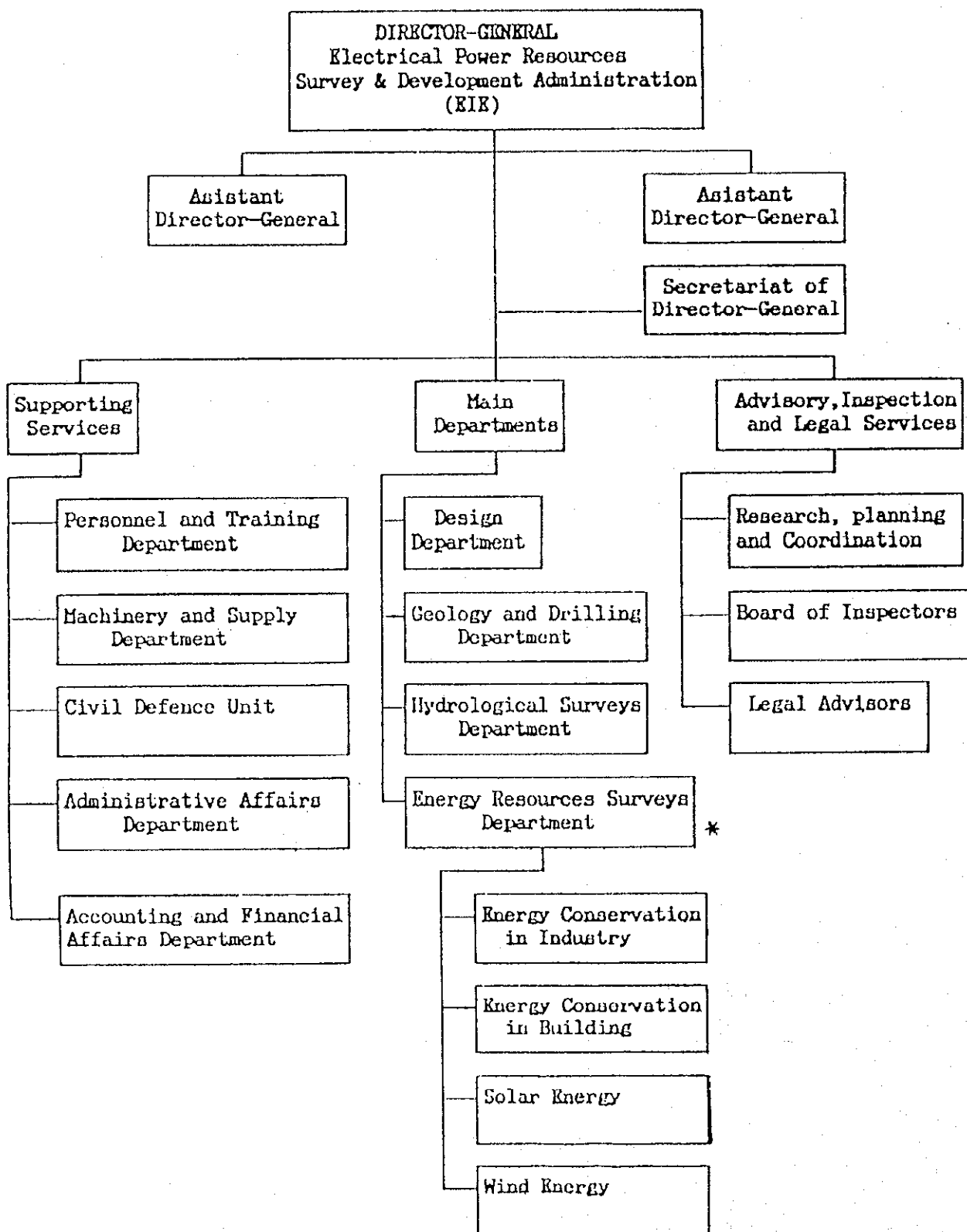
| Year | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 2000 | 2010 |
|------------------------|----------|----------|----------|----------|----------|------|------|------|
| Gross National Product | 107544.5 | 150757.8 | 150176.8 | 158156.7 | 172621.4 | | | |
| Gross Domestic Product | 106122.5 | 149195.0 | 149155.6 | 150655.8 | 171181.4 | | | |

11. Energy Situation of Industries *

| Industrial sub-sectors | Number of factories | | Ex-works Price | Energy Consumption | |
|--------------------------|---------------------|--------------|----------------|--------------------|-----------------|
| | Large Scale | Medium/Small | | Fuel (toe) | Power (1000MWh) |
| Foods, Food Processing | 162 | | | 965479 | 807.510 |
| Textile | 104 | | | 559207 | 1807.962 |
| Wooden Goods | 16 | | | 49921 | 103.602 |
| Pulp/Printing | 22 | | | 368985 | 1148.923 |
| Chemical | 82 | | | 1796185 | 2019.147 |
| Petroleum, Coal Products | | | | | |
| Plastics | | | | | |
| Rubber, Leather | | | | | |
| Ceramic, Glass, Cement | 114 | | | 2511677 | 3123.931 |
| Iron/Steel | 76 | | | 3891623 | 5708.452 |
| Nonferrous | | | | | |
| Metal Goods | 93 | | | 127795 | 1311.139 |
| Utility | | | | | |
| total | 663 | | | 10273872 | 16130.666 |

Please note the definition of Large/Medium/Small Scale industries in Turkey

* Above figures represents the plants with energy consumption over 700 TOE⁴ in 1991



* This Department was assigned as National Energy Conservation Center (NECC) by the order of Ministry of Energy and Natural Resources of the beginning of 1993.

THE LIST OF EQUIPMENT TO BE USED IN JAPAN PROJECT

ELECTRONIC STACK GAS ANALYSER

| Measuring Variables | Measuring Range | Quan. | |
|---------------------------------|-----------------|-------|---|
| Oxygen | 0-20.9% vol. | 3 | IMR 1200-PG |
| Carbonmonoxide | 0-200 ppm | | IMR 2010-P |
| Chimney Draught | 10 hpa | | |
| Air Temperature | 0-60 °C | | |
| Exhaust Gas Temperature | 0-650 °C | | |
| | | | |
| SULPHURDIOKSIDE MONITOR | | | |
| Measuring Variable | Measuring Range | 2 | |
| Sulphurdiokside | 0-2000 ppm | | TELEGAN SO2 MONITOR |
| | | | |
| INFRA-RED PYROMETER | | | |
| Measuring Variables | Measuring Range | 2 | |
| Temperature | 0-1000°C | | KANE MAY infratrace 1000 |
| | | | |
| INFRA-RBD PYROMETER | | | |
| Measuring Variables | Measuring range | 2 | |
| Temperature | 0-2000°C | | KANE MAY infratrace 2000 |
| | | | |
| ELECTRONIC TEMPRATURE INDICATOR | | | |
| Measuring Variables | Measuring Range | 4 | |
| Temperature | -50- +1200°C | | KANE MAY 457 X P |
| | | | |
| AIR VELOCITY METBR | | | |
| Measuring Variable | Measuring range | 2 | |
| Pressure | 0-2500 Pa | | MICROMANOMETER MP6KSR |
| Air velocity | 0-50 m/s | | |
| | | | |
| VANE TYPE ANEMOMETER | | | |
| Measuring Variables | Measuring Range | 2 | |
| velocity | 0.2-30m/s | | DIGITAL ANEMOMETER Rototherm DA 1000 |
| | | | |
| RELATIVE HUMIDITY METBR | | | |
| Measuring variables | Measuring range | 2 | |
| | | | KANE MAY |

| | | |
|--|---------------------|----------------------------|
| Temperature | 0- + 70 °C | |
| Humidity | 0- + 97 % RH | |
| CONDUCTIVITY RESISTIVITY METER (RUSSEL CD 800) | | 2 |
| TACHOMETER | | 2 |
| Measuring Variables | Measuring range | |
| RPM | 0-2000 contact typw | EXTECH Instruments |
| RPM | 0-9000 photo type | EXTECH microprocessor |
| LITH METER | | 2 |
| Measuring Variables | Measuring range | Type 3281 |
| Illumination level | 0-3000 lux | Yokogowa Hokushin Electric |
| COMPUTERIZED STEAM TRAP MANAGEMENT SYSTEM | | 2 |
| Ambient Operation Temperature | 0- + 40 °C | TVL Trap Man TM2 |
| Steam Trap Surface Temperature | 0- +255 °C | |
| ENERGY ANALYZER | | 2 |
| Specifacations | Ranges | VIP ME / VIP SYSTEMS |
| Voltages | 30- 600 V Ac | |
| Currents | 1 v Ac | |
| Frequency | 20-1000 Hz | |
| Clip-On Specifacations | | |
| Clip-On measuring range | 0.05- 1000 Amps | |
| INFRARED THERMOGRAPHY | | 1 |
| Spesifications | | AGBME 400 |
| Measurement range | -20- +500 °C | |
| High temperature filter | up to 1500 °C | |
| Operating temperature | -15- +55 °C | |

* For some equipment we have some problems such as lack of spare parts and calibration.

VIDEOS OF UK ENERGY EFFICIENCY OFFICE

1. Metering Matters
2. Managing Energy Small Firms
3. " " steam
4. " " Burners for Boilers
5. " " Oil and gasfired furnaces
6. " " Electric Motors
7. " " Compressed Air Services
8. " " Pipe Insulation
9. " " Refrigeration
10. Watch your waste
11. Heat Recovery

March 29, 1995

MINUTES OF MEETING
ON
JAPAN - TURKEY ENERGY CONSERVATION
PROJECT PROPOSAL

- 1) The delegation organized by JICA visited Turkey between 23-30 March 1995 for the purpose of discussing EIE's project proposal on "Rational Use of Energy in Industry".
- 2) In connection with above, meetings were held between EIE and JICA Teams.
- 3) During the visit of JICA delegation, in the meeting held on 27 March 1995, a submission on EIE activities of energy conservation was made by EIE side. Furthermore, "Discussion Paper" on preparatory study (Rational use of Energy in Industry in Turkey) prepared by JICA and questionnaire on EIE activities prepared by EIE were reviewed and some points needed to be clarified were discussed. Nearly all aspects were understood.
- 4) EIE side emphasized that the some items of "Undertakings by the Government of Turkey" were understood as follows:
 - a) On item 1-6, wording of "all areas" means allowed areas in the plants during field studies in the five selected plants and related organisations such as MENR, SPO, MI.
 - b) On item 1-7, wording of "..... all data and documents" were understood as available data and documents related to the plants of five sectors selected for this project and related organisations such as MENR, SPO, MI.

Meanwhile, relating to the undertakings by the Government of Turkey, an official confirmation on the scope of work will be taken from Ministry of Energy and Natural Resources MENR and SPO by EIE in writing before second mission dispatch from Japan.

- c) As for item 4-5 of vehicle, for the travel to the plants, the vehicles will be made available provided that number of audit teams and time schedule of the field study are defined in conform with EIE's audit facilities and notified to EIE in advance. For transportation between EIE building and Hotel, experts could exploit the EIE's staff buses free of charge. EIE may give a bus for the experts when possible.
- 5) JICA delegation has visited EIE Energy conservation laboratory and got information on audit equipment and vehicles in the second day of the visit.

In the third day, JICA delegation has visited two plants(Cement and Brick) around Ankara.

6) EİE proposed the following matters at the meetings :

Five audits will be conducted in the plants of brick, textile, metallurgy (steel rolling mill, arc furnaces), food (vegetables oils) and cleaning material sectors and recommendations will be extrapolated to the other plants of these selected small and medium size sectors.

Furthermore, general policy recommendations (such as regulation, standards, incentives, tax reduction and other measures) for rational use of energy in Turkish industry will be made.

Draft S/W for the project will be prepared and sent to EİE before second mission visit to Turkey. EİE will review the draft S/W and make the changes, if necessary and send their view to Japan. During the visit of second mission discussions on S/W will be made and S/W will be signed.

7. EİE side suggests that objective of the study should be changed as follows:

The wording of " in the field of industries in the republic of Turkey" be changed as " in the field of small and medium sized selected industries in the republic of Turkey".

JICA SIDE

Mr. Masayoshi JURO

Deputy Director, Planning Division,
Mining and Industrial Development
Study Department, JICA



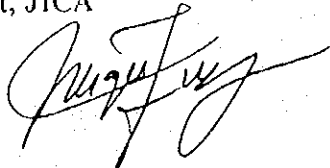
Mr. Toshio TAJIMA

Chief of Public Relations, Energy
Conservation Policy Planning Office,
Agency of Natural Resources
and Energy, Ministry of International
Trade and Industry



Mr. Tsutomu NAGAE

Industrial Development Study Division
Mining and Industrial Development, Study
Department, JICA



EİE SIDE

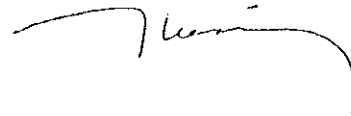
Mr. Kemal KOMAN

Head of Energy Resources Survey
Department



Mrs. Tülin KESKİN

Manager of Energy Conservation
Division



Mrs. Süheda GÜMÜŞDERELİOĞLU

Energy Conservation Expert



[DISCUSSION PAPER]

PREPARATORY STUDY

(RATIONAL USE OF ENERGY IN INDUSTRY)

IN

TURKEY

MARCH 1995

JAPAN INTERNATIONAL COOPERATION AGENCY

J I C A

1. INTRODUCTION

This Preparatory Study Team (hereinafter referred to as "the Team") is an official study team dispatched by the Japan International Cooperation Agency (hereinafter referred to as JICA), headed by Mr. Masayoshi Juro, Deputy Director of Planning Division, Mining and Industrial Development Study Department, JICA in response to the request made by the Government of Turkey on the Study for the Rational Use of Energy in Industry in Turkey.

The purpose of the dispatch of the Team is to obtain information and data through discussions with the authorities concerned of the Government of Turkey and surveys on the concerned organizations, so that the Team may be able to identify and clarify, with an additional analysis of the information and data in Japan, the background and the objective of the proposed development study.

In this regard, the Team includes experts in this field so that the discussions and surveys of the concerned organizations may be fruitful and also a questionnaire listing items of necessary information for the project has been sent to the Government of Turkey in advance to assist the Turkish officials concerned in their preparation for the meetings which will be held during the course of the study.

2. SCHEDULE FOR THE TEAM

- attached as Annex I -

3. MEMBER OF THE TEAM

- attached as Annex II -

4. JICA'S SCHEME FOR THE TECHNICAL COOPERATION

4-1. WHAT IS JICA ?

JICA was established in 1974 as the sole official agency to extend technical cooperation and promote capital grant assistance programme to the developing countries under the Japan International Cooperation Law.

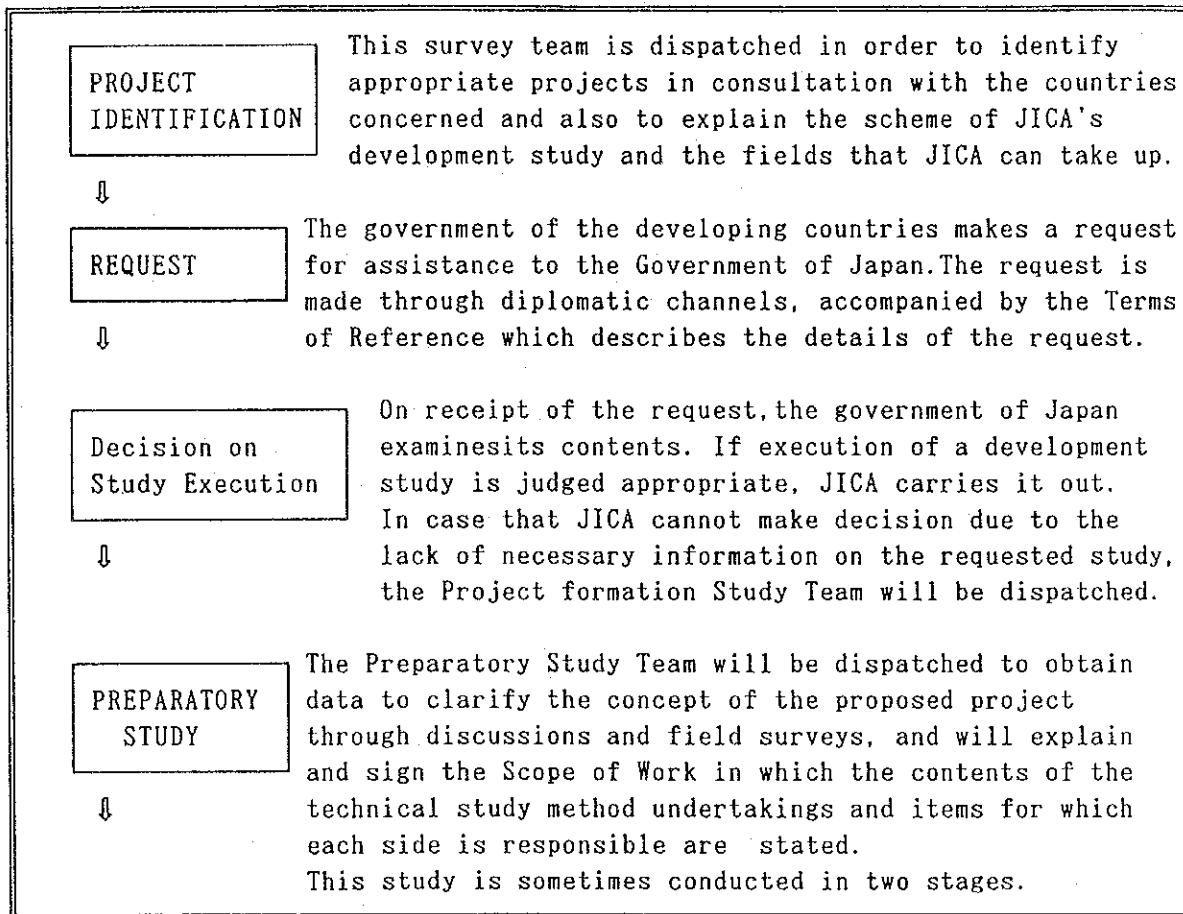
JICA's main cooperation activities which have been extended in the past and currently being extended in Turkey are the acceptance of personnel for technical training in Japan; the dispatch of Japanese experts; project-type technical cooperation; development studies; capital grant assistance program and so forth.

Further information on concerning JICA's activities is provided in the JICA brochure.

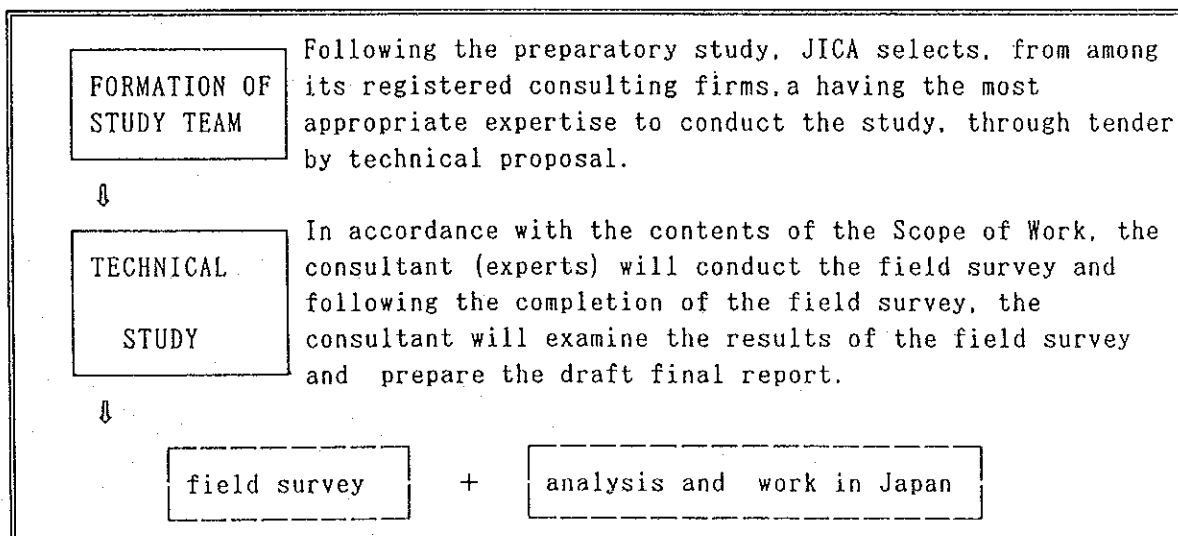
4-2. WHAT IS THE DEVELOPMENT STUDY ?

Normal Procedure for Implementation of the Development Study is shown as follows ;

I . FIRST STAGE



II . SECOND STAGE



PRESENTATION OF
DRAFT FINAL REPORT

JICA will dispatch the team for presenting and explaining of the Draft Final Report.

↓

SUBMISSION OF
FINAL REPORT

After presentation of the Draft Final Report, JICA will send the final report accepting comments from authorities concerned.

The Development Study will be completed on the submission of the final report.

↓

III. PROJECT IMPLEMENTATION

DECISION ON IMPLEMENTATION OF THE PROPOSED PROJECT

The plan which is formulated in the development study report is used by the recipient country to decide on the proposed project.

Then the government's decision is executed through its own funds or with financial aid from international organization and donor countries.

Basically, the Development Study comprises two stages.

Firstly the preparatory stage and secondly the study stage.

During the preparatory stage, the Team collects related information, data and discusses the fundamental items and conditions of the study with authorities concerned of the recipient country in order to prepare a scope of study.

The preparatory stage will be completed by the signing of "the Scope of Work". "The Scope of work" will be formulated in discussion with the Preparatory Study Team.

After signing of the Scope of Work, the technical study will begin to be conducted as the second stage.

4-3 WHAT IS A MASTER PLAN ?

A master plan study which formulates the basic development plan for mining, energy and industry is usually conducted from the standpoint of the sector as a whole or at the regional level.

It recommends policies, and formulates programmes or projects which are to be implemented as well as procedures for implementing them.

4-4 WHAT IS A FEASIBILITY STUDY ?

A feasibility study is conducted to examine the feasibility and viability of individual projects from the technical, social, financial, economic, administrative, institutional and environmental viewpoints, prior to making a decision on implementing the project and securing finance.

If the project is judged viable, the feasibility study recommends concrete procedures for project realization, such as the appropriate timing, scale of investment and so forth.

4-5 WHAT IS THE SCOPE OF WORK ?

The Scope of Work (S/W) is the document to be signed and exchanged by the Preparatory Study Team dispatched by JICA and the implementing agency of the Government of Turkey through the consultations between both sides.

Based on the items described in the Scope of Work, the Technical Study will be conducted by the team composed of experts in the necessary technical fields (called Consultant Team).

JICA will prepare the draft of the Scope of Work on the project in the Preparatory Study Team, and after consultations with the Turkish authorities concerned, the Scope of Work will be signed between the leader of the Preparatory Study Team and the Turkish representative.

4-6 HOW IS THE TECHNICAL STUDY IMPLEMENTED

The Technical Study is conducted by a consultant team composed of experts who have the requisite expertise in the technical fields covering the study items described in the Scope of Work.

The Technical Study will be carried out according to the three steps as follows:.

[First step]

Field surveys in Turkey will be carried out for collecting data, necessary information through visiting the organizations concerned, surveys at laboratories, industrial firms and literary study.

[Second step]

Following the field surveys, the data and information obtained during field surveys will be analysed by the team in Japan.

Based on the results of the analysis in Japan, the consultant team will prepare the draft final report.

[Third step]

The third step is the last step of the Technical Study. It is the step for presentation of the draft final report. The presentation session will be conducted in Turkey for about one week. During this session, the consultant team will explain the contents and concept of the draft final report and invite comments from the Turkish side.

The final report will be sent afterwards.

4-7 WHAT IS THE OUTPUT OF THE DEVELOPMENT STUDY ?

The final output of the Development Study is "the study report", which is made based on the field survey and contains the recommendations (we can say plans) from the institutional and technical viewpoints.

The report is expected to contribute to the purpose of the project.

In addition, technology transfer is also pursued during the course of the Technical Study. The Technical Study is conducted by Japanese experts in close cooperation with Turkish counterpart personnel.

Accordingly, Turkish counterpart personnel is expected to obtain concerned technology at certain level during the course of the Technical Study.

JICA also has a scheme to receive counterpart personnel for training in Japan.

Moreover, the consultant team is expected to hold a seminar during the course of the Technical Study. In the seminar, some experiences in Japan related to the project will be presented and other necessary technical informations will be introduced as well.

These activities mentioned above are another important output from the Technical Study. It is called "Technology Transfer".

4-8 THE IMPLEMENTING AGENCY AND THE RESPONSIBLE ORGANIZATION FOR THE PROJECT

When the Technical Study is conducted, the Technical Study Team needs counterpart organization which will conduct Technical Study together with the Japanese consultant team especially for the field survey.

In addition, on the occasion when the Preparatory Study Team will be dispatched, the representative of executive organization of the Government of Turkey will sign the Scope of Work.

On the other hand, the leader of Preparatory Study Team will sign the Scope of Work as the representative of JICA which is an implementing agency of the Government of Japan.

The primary role of the Turkish implementing agency is to cooperate and join the Technical Study and to provide necessary arrangements for the Technical Study as counterpart of Japanese consultant team.

Responsible organization is in charge of the Turkish undertakings which can't be covered by implementing agency, and make comments to the Technical Study Team as a representative of the Turkish Government.

4-9 UNDERTAKINGS OF THE GOVERNMENT OF TURKEY

The Government of Turkey is requested to undertake some contributions which will be confirmed at the time of signing the Scope of Work for smooth and effective implementation of the Technical Study.

On this occasion, the Japanese team will explain the contents of Turkish undertakings, so that the Government of Turkey is expected to take necessary actions to accept these undertakings by the time when the next Preparatory Study Team will be dispatched.

Items of undertakings will be stipulated in the Scope of Work.

5. EXAMPLE OF THE SCOPE OF WORK

The Team has prepared the example of the scope of work for the Study.

It is attached as Annex III.

[EXAMPLE]

SCOPE OF WORK
FOR
THE STUDY
ON
RATIONAL USE OF ENERGY IN INDUSTRY
IN
THE REPUBLIC OF TURKEY

AGREED UPON BETWEEN

MINISTRY OF ENERGY AND NATURAL RESOURCES
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Ankara. , 1995

DIRECTOR GENERAL,
EIE, MINISTRY OF ENERGY
AND NATURAL RESOURCES

REPUBLIC OF TURKEY

LEADER,
PREPARATORY STUDY TEAM,
JAPAN INTERNATIONAL
COOPERATION AGENCY,
JAPAN

[EXAMPLE]

SCOPE OF WORK
FOR
THE STUDY
ON
RATIONAL USE OF ENERGY IN INDUSTRY
IN
THE REPUBLIC OF TURKEY

AGREED UPON BETWEEN

MINISTRY OF ENERGY AND NATURAL RESOURCES
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Ankara, . 1995

LEADER,
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JAPAN INTERNATIONAL
COOPERATION AGENCY,
JAPAN

DIRECTOR GENERAL,
EIE, MINISTRY OF ENERGY
AND NATURAL RESOURCES
REPUBLIC OF TURKEY

[EXAMPLE]

I . INTRODUCTION

In response to the request of the Government of the Republic of Turkey (hereinafter referred to as "the Government of Turkey"), the Government of Japan decided to conduct the Study for Master Plan on the Rational Use of Energy in Industry in Turkey (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of Turkey.

The present document sets forth the scope of work for the Study.

II . OBJECTIVE OF THE STUDY

The objective of the Study is to contribute to the promotion and strengthening of the rational use of energy in the field of industries in the Republic of Turkey.

III . SCOPE OF THE STUDY

=== details will be discussed and decided at the next stage =====

IV . WORK SCHEDULE

The Study will be carried out in accordance with the attached tentative work schedule.

=== this part will be explained and attached at the next stage =====

V . REPORTS

JICA shall prepare and submit the following reports in English to the Government of Turkey in accordance with the attached tentative work schedule.

Ten (10) copies of the Inception Report

Ten (10) copies of the Progress Report

[EXAMPLE]

Twenty (20) copies of the Interim Report
Thirty (30) copies of the Draft Final Report
Thirty (30) copies of the Final Report

VI. UNDERTAKINGS BY THE GOVERNMENT OF TURKEY

1. To facilitate smooth conduct of the Study, the Government of Turkey shall take the following necessary measures :
 - 1-1 To secure safety of the Japanese Study Team (hereinafter referred to as "the Team").
 - 1-2 To permit the members of the Team to enter, leave and sojourn in Turkey for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees
 - 1-3 To exempt the members of the Team from taxes, duties and other charges on equipment, machinery and other materials brought into, and out of, Turkey for the conduct of the Study
 - 1-4 To exempt the members of the Team from income tax and charges of any kind imposed on, or in connection with, any emoluments or allowances paid to them for their services for the implementation of the Study
 - 1-5 To provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Turkey from Japan for the implementation of the Study
 - 1-6 To secure permission for entry into all areas concerned for the implementation of the Study.
 - 1-7 To secure permission for the Team to take all data and documents including photographs and maps related to the Study out of Turkey
 - 1-8 To provide medical service as needed. (Its expenses can be charged to the members of the Team.)
2. The Government of Turkey shall bear claims, if any arises against the member of the Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the Team members.

[EXAMPLE]

3. Ministry of Energy and Natural Resources shall act as a counterpart agency to the Team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. Ministry of Energy and Natural Resources shall, at its own expense, provide the Team with the following in cooperation with other organizations concerned :
 - 4-1 Available data and information related to the Study
 - 4-2 Counterpart personnel
 - 4-3 Suitable office space with necessary equipment in Ankara
 - 4-4 Credentials or identification cards
 - 4-5 Vehicles

VII. UNDERTAKINGS BY JICA

For the implementation of the Study, JICA shall take the following measures :

1. To dispatch, at its expense, a series of study teams to Turkey
2. To pursue technology transfer to the Turkish counterpart personnel in the course of the study

VIII. OTHERS

JICA and Ministry of Energy and Natural Resources shall consult with each other in respect of any matter that arise from, or in connection with, the Study.

Annex I

Tentative Schedule for the Team for the Study on the Rational Use of Energy
in Industry in the Republic of Turkey

| | | |
|-------|----------|--|
| March | 23 (Thu) | Arrival in Ankara, Turkey |
| | 24 (Fri) | Courtesy Call at State Planning Office Ministry of Energy and Natural Resources |
| | 25 (Sat) | Internal Meeting of the Study Team |
| | 26 (Sun) | - Holiday - |
| | 27 (Mon) | Discussion with EIE / Survey of Energy Conservation Facility |
| | 28 (Tue) | Discussion with EIE |
| | 29 (Wed) | Plant Survey |
| | 30 (Thu) | Report to the Japanese Embassy / Leave Turkey |

[EXAMPLE]

Scope of the Study

In order to achieve the above objective, the Study shall cover the following items:

1. Study on the energy situation in Turkey
 - 1-1. Government policy of the energy
 - 1-2. Present situation of the energy in Turkey
 - 1-3. Present situation of energy use in the industries (general)

2. Study on the promotion of rational use of energy in the industry
 - 2-1. Related laws and regulations
 - 2-2. Current programmes and activities for rational use of energy conducted by both the government and private sectors
 - 2-3. Evaluation of the programmes and activities for the rational use of energy mentioned 2-2 above
 - 2-3-1. Current programmes and activities
 - 2-3-2. Achievements of past activities
 - 2-3-3. Future plan/programms for promotion of rational use of energy

3. Study on the present situation of energy use in the factories in the several sectors of industry
 - 3-1. Outline of factory
 - 3-2. Situation of energy management
 - 3-3. Energy flow chart and production process
 - 3-4. Situation of major energy consuming equipment
 - 3-5. Identification of the problems in the factories

4. Recommendation on the promotion of the rational use of energy
 - 4-1. Government policy, law and regulation
 - 4-2. Executing organization to promote the rational use of energy
 - 4-3. Activities for the promotion of the rational use of energy
 - 4-4. Measures to promote rational use of energy in industry
 - 4-5. Countermeasures to solve the problems without changing the existing production process
 - 4-6. Expected effects after the implementation of master plan

5. Preparation of the reference of the technical guidelines in each sector for the promotion of the rational use of energy in industry

APPENDIX

TENTATIVE SCHEDULE OF THE STUDY

| CALENDER YEAR | 1995 | | | | | | | | | | | | 1996 | | | | |
|----------------|--------|----------|---|---|--------|---|---|----------|---|----|----|--------|------|-------|----|--|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | |
| Japanese F/Y | | | | | | | | | | | | | | | | | |
| PROJECT MONTH | | | | | | | | | | | | | | | | | |
| CALENDER MONTH | | | | | | | | | | | | | | | | | |
| WORK IN TURKEY | | ▬ | | | ▬ | | | ▬ | | | | | | ▬ | | | |
| WORK IN JAPAN | ▬ | | | ▬ | | | | | | ▬ | | | | | | | |
| REPORTS | △ IC/R | △ P/R(1) | | | △ IT/R | | | △ P/R(2) | | | | △ DF/R | | △ F/R | | | |

- Abbreviations
- IC/R: Inception Report
 - P/R : Progress Report
 - IT/R: Interim Report
 - DF/R: Draft Final Report
 - F/R : Final Report

JICA