

7. 実施協議調査団帰国報告会資料、R / D 及びミニッツ

イラン省エネルギー推進プロジェクト  
実施協議調査

帰 国 報 告 会 資 料

2002年11月27日

国際協力事業団  
鉦工業開発協力部鉦工業開発協力第二課

## 1 調査団派遣の背景・経緯

石油はイラン国の重要な輸出物であり、同国は外貨収入の75%以上を石油の輸出に頼っている。現在「イ」国内のエネルギー総消費量は、エネルギー総産出量の44%に達しており、石油消費量も増加傾向にある。今後エネルギー消費量の増加が年率約6%で推移すると、2018年にはエネルギー輸入国に転じる可能性もあり、エネルギーの効率的利用（省エネルギー）による石油輸出量の確保は同国における重要な課題となっている。

このため「イ」国政府は第3次5カ年計画期間（2000～2005年）において、（1）エネルギー価格への市場価格の導入、（2）省エネルギーの啓発と助言、（3）省エネに係るデモ・プロジェクトの実施、（4）省エネプロジェクトへの資金支援、および（5）法制度整備、等の施策の実施を検討している。また、最高指導者（ハメネイ氏）の2002年度の経済部門の一般政策方針では、経済保障や資源政策と同列に、エネルギー政策の中で省エネルギーの必要性についても言及している。

以上の背景のもと、「イ」国政府は特にエネルギー消費の約25%を占める工業セクターのエネルギー効率化に係る技術の移転と普及を目的とし、2000年11月、わが国に対しプロジェクト方式技術協力による「省エネルギーセンター設立計画」（要請書題名）を要請してきた。

これを受けて、わが国は2001年6月に第1次短期調査を実施し、「イ」国のエネルギー消費状況と要請の背景を調査し、2002年2月には第2次短期調査で、イランの省エネルギーに関する機関とそのアプローチについて整理した。同年7月の第3次短期調査では、本協力の内容についてさらなる調査を行い、同年9月の第4次短期調査では、主に機材調達に係る調査を行った。

## 2 調査団派遣の目的および調査内容

これまでの短期調査の結果を踏まえ、討議議事録（R/D）内容について、イラン側関係機関と協議・合意の上署名・交換する。

その他、協議で合意した事項をM/M（Minutes of Meeting）に取り纏め、署名・交換する。

## 3 調査団派遣期間

2002年11月9日（土）～11月18日（月）（日程は次ページ表のとおり）

調査日程

日順	月日	曜	行程	
			団長／協力企画	エネルギー管理団員
1	11月9日	土	東京 → (フランクフルト)	
2	11月10日	日	→ テヘラン (LH600 01:25着)、大使館打ち合わせ(13:00)、エネルギー省打ち合わせ(14:30)	
3	11月11日	月	エネルギー省協議 (08:30~14:00)	
4	11月12日	火	MPO表敬 (10:00)、石油省表敬 (14:00)	
5	11月13日	水	テヘラン (IR447 06:00発) → タブリーズ、アゼルバイジャンセンター視察、協議	
6	11月14日	木	タブリーズ → テヘラン (IR446 09:10着)、団内打ち合わせ	
7	11月15日	金	団内打合せ、ミニッツ作成作業	
8	11月16日	土	エネルギー省協議 (09:00)、修正作業、R/Dおよびミニッツ署名 (17:00)	
9	11月17日	日	エネルギー省協議 (09:00)、大使館報告 (13:30)、テヘラン (IR800 21:50発) →	エネルギー省協議 (09:00)、大使館報告 (13:30)
10	11月18日	月	→ 東京	テヘラン(TK1277 05:15) → イスタンブール → アンカラ (TK116 09:50)
11	11月19日	火		プロジェクト視察
12	11月20日	水		同上
13	11月21日	木		同上 アンカラ(TK123 10:40) → イスタンブール → フランクフルト →
14	11月22日	金		→ 東京

4 調査団員構成 (3名)

団長／総括	谷川 和男	JICA専門技術嘱託
エネルギー管理	芹沢 保文	川崎製鉄株式会社 (JICA派遣前業務委嘱中)
協力企画	宮川 朋子	JICA鉱工業開発協力部 鉱工業開発協力部 第2課

5 主要面談者

(1) 日本側

在イラン日本大使館

二階堂 幸宏	公使
守安 邦弘	二等書記官
田中 泉	JICA援助調整専門家

(2) イラン側

エネルギー省エネルギー効率促進局 (EEO)

Mr. S.M Sadeghzadeh	General Director
Mr. Massih Mohamadian	Deputy General Director
Mr. Kambiz Rezapour	Manager, Awareness & Training Group
Mr. Alireza Shirazi	Expert, Awareness & Training Group

イラン省エネルギー機構 (SABA)

Dr. Abdol Reza Karbassi	Managing Director
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アゼルバイジャン教育・研究センター

Dr. Khoshravan	Chancellor
Mr. Khalil Jannat Dust	Energy Group Leader
Mr. Ali Partoniya	Energy Group
Mr. Mohammad Valizade	Energy Group
Mr. Khalil Banan Ali Abbasy	Energy Group
Mr. Ali Zeraat pavar	Energy Group
Mr. R Khoshravan	Energy Group
Mr. Partovi	Interpreter

行政企画庁 (Managing and Planning Organization, MPO)

Mr. Majdeddin Ghiassi	Deputy General Director, Energy Bureau
Mr. Sepehri	Head of Gas Planning Group, Energy Sector

石油省 (Ministry of Oil)

Mr Farhad Nafisi	Manager, Energy Economic Planning
Ms Zarvani	Senior Expert, Deputy Ministry of Planning Affairs

イスファハン大学

Dr. Heidari	Staff, Advisor and Designer of NTCEM building
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7 調査・協議項目

調査項目	現状及び前回調査結果	調査方針	調査結果
1. プロジェクト基本計画			
1. プロジェクト名	Project on the Energy Management Promotion in Iran (イラン省エネルギー推進プロジェクト)	左記確認する。	左記確認した。
2. プロジェクト関係機関			
(1) 主管官庁	エネルギー省 (Ministry of Energy)	左記確認する。	左記確認した。
(2) 監督機関	エネルギー省	左記確認する。	左記確認した。
(3) 協力機関	プロジェクト開始後、イラン省エネルギー機構(SABA)は、その情報収集力などを活用して、訓練効果を実社会に反映させ、プロジェクトの成果を評価する、研修センターの内容を国内の産業界のニーズに合致するように協力するなど、プロジェクト効果増大のための活動を行う。	左記確認する。	<ul style="list-style-type: none"> <li>・左記確認した。</li> <li>・SABAはあくまでもEEOの監督下にあること、SABAが担当するプロジェクトの成果測定はSABAが主体的に行い、日本人専門家はあくまでもSABAの活動のチェックや助言にとどまることを確認した。</li> </ul>
(4) 実施機関 (部局)	EEO (政策部分) とアゼルバイジャンセンター (訓練部分) とする。	左記確認する。	左記確認した。
3. プロジェクト実施体制			
(1) 総括責任者 (Project Director)	EEO局長	左記確認する。	左記確認した。
(2) 実施協力者	SABA機構長	左記確認する。	左記確認した。
(3) 実施責任者 (Project Manager)	EEO局長 (政策部分) アゼルバイジャン教育研究センター所長	左記確認する。	左記確認した。
4. ターゲットグループ	<ul style="list-style-type: none"> <li>・工業セクターのエネルギー管理従事者。</li> <li>・優先順位は、契約デマンド 2MW または燃料と電力の両方を含んだ全エネルギー消費量が石油換算 2000m<sup>3</sup>/年以上の工場のエンジニア (B/S) レベルが対象。工場数は539。</li> <li>・ターゲットグループに含まれる業種は、セメント、繊維、アルミ、鋳物、製糖、セラミックなど。</li> </ul>	左記確認する。	<ul style="list-style-type: none"> <li>・左記確認した。</li> <li>・サブセクター毎のエネルギー使用量等について、後日送付ある予定。</li> </ul>
5. 技術移転範囲	・以下のとおり合意した。	左記確認する。	・左記確認した。

調査項目	現状及び前回調査結果	調査方針	調査結果
項目	1 エネルギー管理政策推進手法 2 エネルギー管理研修ユニット構築手法 3 産業部門のエネルギー管理専門家育成手法 4 事業所内における省エネ意識啓蒙促進手法 ・建築分野については、内容は、既存の建築物対象の省エネルギー実施方法と診断などとし、新たなコースは設置しない。熱コースは1日延長する。 ・テヘラン駐在の専門家は、上記1に関連して、省エネルギーを推進するためのインセンティブ造りや規制造商のアイデアなど、プロジェクト（訓練）がより実効性を持つような仕組み造りのアドバイスを実施する。		・専門家は、主として訓練の運営に関する技術移転を行う。プロジェクトの成果測定はSABAが主体的に行い、SABAが作成したレポートを参考に、訓練内容に反映させる。（データ収集および分析はSABAが行う。） ・訓練に必要なテキストその他については、イラン側が主体的に行い、日本人専門家は必要な資料その他を提供する。
6. 協力期間	4年間（2003年～2006年）	左記確認する。	左記確認した。
7. プロジェクトサイト	・以下のとおりとする。 テヘラン市（政策部分） タブリーズ市（訓練部分）	左記確認する。	左記確認した。
8. マスタープラン			
(1) 上位目標	・「エネルギーの効率的利用を通し、国内の産業分野のエネルギー管理が向上する。」 ・指標として、Specific Energy Consumption (SEC, [Energy consumption]/[product unit]) を活用し、産業サブセクター全体のSECの推移を指標とする。 ・SECにかかる調査は毎年SABAが実施。	左記確認する。	・左記確認した。 ・セクター毎に目標とするSECを入手し、PDMに添付した。
(2) プロジェクト目標	・「エネルギー管理訓練センターが産業部門の省エネに貢献する」 ・指標として、研修生が研修後に提出するレポート上で計算されたSECを活用する。ただし、計算上のSECなので、実態を反映したものではない。	左記確認する。	左記確認した。

調査項目	現状及び前回調査結果	調査方針	調査結果
	<ul style="list-style-type: none"> <li>・モニタリング方法としては、訓練生を送る工場からは、訓練前と訓練直後、6ヶ月後、および1年後にレポートを提出させ、各時点でのSECを報告させる。あわせて、投資活動（no-cost、low-cost、high-cost）についても報告させる。</li> <li>・日本側の提案で、SECに加えて短期的に調査可能な評価項目（工場で採用された研修生作成のレポートの数、省エネ融資を得ることができた工場数）を入れることを提案。イラン側に受け入れられた。今後も、プロジェクトの進捗に伴い、よりよい指標を検討し続けて行く。</li> </ul>		
(3) 成果	<ol style="list-style-type: none"> <li>1 訓練プロジェクトが広く効果を発揮できる様に、エネルギー管理の政策・行政体制が整備される</li> <li>2 C/Pが設備および機材の維持管理を行えるようになる。</li> <li>3 エネルギーに関わるエンジニアを対象とした理論的かつ実際のエネルギー管理訓練コースが維持・運営される。</li> </ol>	左記確認する。	左記確認した。
(4) 活動	<ol style="list-style-type: none"> <li>1-1 工業分野のエネルギー管理政策の実状を分析する。</li> <li>1-2 訓練センターでの実習を効果的にするよう、関係機関に対し効果的なエネルギー管理政策を提案する。</li> <li>1-3 国レベルの産業界のニーズに合致した訓練プログラムを提案する。</li> <li>1-4 エネルギー管理の普及活動を行う。</li> <li>2-1 設備および機材の維持に関する計画を立案・実施する。</li> </ol>	左記確認する。	左記確認した。

調査項目	現状及び前回調査結果	調査方針	調査結果
	<p>2-2 供与された機材・設備を設置する。</p> <p>2-3 機材の操作・保守管理の技術的訓練を行う。</p> <p>2-4 機材の操作・保守管理マニュアルを作成する。</p> <p>3-1 適切な訓練コース設置のための情報収集を行う。</p> <p>3-2 訓練カリキュラムを作成し、教材を準備する。</p> <p>3-3 アゼルバイジャンセンターにてC/Pへの訓練を実施する。</p> <p>3-4 訓練コースを実施する。</p> <p>3-5 訓練生の報告書（エネルギー診断書および改善計画）を精査し、修了証を発行する。</p> <p>3-6 卒業生のアフターケアをする。</p> <p>3-7 訓練コースの成果をモニターし、向上する。</p>		
<b>9. PCM</b>			
(1) PDM	・PDMに合意し、ミニッツに添付した。	左記確認する。	左記確認した。
(2) TSI（暫定実施計画）、PO（活動計画）、APO（年間活動計画）	・TSI、POおよびAPOについて合意した。	左記確認する。	左記確認した。
<b>10. 日本側措置</b>			
(1) 専門家（人数、分野）	<p>&lt;長期専門家&gt; チーフアドバイザー1名 業務調整員1名 省エネルギー（電気）1名 省エネルギー（熱）1名</p> <p>&lt;短期専門家&gt; 機材設置、ビルエネルギー管理、普及など。 ・省エネルギー政策専門家派遣期間は日本でのリクルート状況をみて決定。</p>	<p>・以下のように修正する。</p> <p>&lt;長期専門家&gt; チーフアドバイザー1名 業務調整員1名 <u>省エネルギー政策</u> 1名 省エネルギー（電気）1名 省エネルギー（熱）1名</p> <p>&lt;短期専門家&gt; 機材設置、ビルエネルギー管理、普及など。 ・専門家に期待される役割について再確認する。</p>	<p>・左記のとおりとなった。</p> <p>・A1フォームに記載すべき事項について説明し、合意した。追ってA1フォームの提出がある予定。</p> <p>・省エネルギー政策専門家に対してイラン側が期待する役割について、イラン側から提示があった。</p>
(2) カウンターパート研修	・2～3人/年間、分野はプロジェクトに関する技術的・管理的分野とすることで合意した。	<p>・左記確認する。</p> <p>・C/P枠増加には、具体的な研修内容が確定している必要がある。研修内容案は作</p>	<p>・左記確認した。</p> <p>・要望調査票を大使館とともに作成した。</p>



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	<ul style="list-style-type: none"> <li>・ EEO局長が交替したため、今年度1名枠は局長を準高級として受け入れる方針。</li> <li>・ 可能であれば1名枠を増やす。</li> <li>・ C/P研修とは別に、国別特設研修「省エネルギー政策コース」の目的と内容を紹介し、可能性についても伝達。これについては、来年度要望調査にのせる予定（田中援助調整専門家）</li> </ul>	<p>成済み。大使館と相談した上で、A2-3フォーム提出のタイミングなどもにらみながら受入人数・時期について検討する。</p>	
(3) 機材供与	<ul style="list-style-type: none"> <li>・ 合意した研修内容に必要な機材類について合意済み。さらに仕様案も合意。トルク測定装置についても、基本案は合意。</li> <li>・ 実習プラント施設のレイアウト案も提示した。これはイラン側で雇っているコンサルタントへ、案として提示される予定。なお、イラン側の予算執行手続の関係上、図面案はR/Dに添付が必要。</li> <li>・ JICAの調達制度（指名競争入札から一般競争へ変更となった）についてイラン側へ説明した。</li> <li>・ 計測機材のうち、熱線風速計のみ現地の代替機材がみつからないため、本邦調達を検討。その他の計測機器は、ほぼ現地調達が可能と思われる。</li> <li>・ 購入条件について、前払いや工場出荷時の支払いを要求するところがある。プロジェクトでは、エネルギー省の協力を得て、必ず引き渡し時に支払うよう交渉する必要がある。アフターケア契約なども、エネルギー省にて主体的に行ってもらった方がよい。</li> <li>・ コンピューターについては、貿易管理令非該当のもので技術的には十分であ</li> </ul>	<ul style="list-style-type: none"> <li>・ 供与機材内容を再確認する。</li> <li>・ 講義用のコンピューターについては、イラン側負担とするよう交渉する。（理由：端末にて使用するアプリケーションソフトについて正規版が入手できないため。）</li> <li>・ 実習用機材に接続されるコンピューター類については、機材の一部であり、保守の関係もあることから、当初予定どおり日本から供与する。</li> </ul> <p>注：米国社製の場合、正規版購入の際に、使用会社名／使用者／住所登録などが必要であり、イランは米国通商禁止国であるためにメーカーでも販売が不可となっている。ただし、業務上でイラン国に持ち込んだ場合は、購入者の責任での対応となる。</p>	<ul style="list-style-type: none"> <li>・ 講義用のコンピューターについては、イラン側負担となった。</li> <li>・ 交換条件として、イラン側が既に予算措置していた事務機器のうち、コピー機2台を日本側に供与して欲しいという要望があった。イラン側が考えていた機種は現地代理店からの購入が可能であり、アフターサービスもあるとのこと。</li> </ul>

調査項目	現状及び前回調査結果	調査方針	調査結果
	<p>り、かつ現地で購入することが可能。日本から輸出もできることになるが、本邦の業者がイラン向けの輸出を拒む可能性があるため、現地調達の可能性も探っておく必要がある。デスクトップコンピューターの現地調達は、現地組み立て品を購入することは可能。ラップトップコンピューターはドバイから輸入された物資が手に入る。</p> <ul style="list-style-type: none"> <li>・ソフトウェアについては、現地では正規ユーザー登録ができない（アメリカ商務省の許可がおりない）と思われる。JETROテヘラン事務所では日本で英語版のソフトを購入・登録して、イランで使用しているとのことであり、本プロジェクトでもその方式をとる可能性がある。</li> </ul>		
11. イラン側措置			
(1) ローカルコスト	<ul style="list-style-type: none"> <li>・実習設備建設費用について行政企画庁との協議結果を入手した。</li> <li>・人件費については、プロジェクト準備開始後2年間は暫定的にエネルギー省が支出。状況をみて暫定期間を調節する。</li> </ul>	左記につき、再度、EEOおよびアゼルバイジャンセンターとの役割分担を確認する。	<ul style="list-style-type: none"> <li>・EEOによれば、アゼルバイジャンセンターの運営費の半分はEEOから拠出されている。一方、アゼルバイジャンセンターによれば、運営費は全額センターにて措置されているとのこと。情報に差異があり、実状が確認できなかった。</li> <li>・しかしながら、EEOは、アゼルバイジャンセンターで経費が措置できない場合は適宜対応するという姿勢であることを確認した。</li> </ul>
(2) カウンターパート	<ul style="list-style-type: none"> <li>・専任C/Pのリストを入手し、ミニッツに添付。アゼルバイジャン教育・研究センターのエネルギーグループがカウンターパートとなる。機械工学教授2名、電気工学2名、土木工学1名。</li> <li>・給与は通常の予算で支払われるとのこと。予算額の情</li> </ul>	左記確認する。	<ul style="list-style-type: none"> <li>・左記確認した。</li> </ul>

調査項目	現状及び前回調査結果	調査方針	調査結果
	報は入手できなかった。		
(3) 建屋・施設等	<ul style="list-style-type: none"> <li>・センター内に事務室は多数あるため、専門家執務室を準備することは問題なし。</li> <li>・ユーティリティはイラン側が全て手配する。</li> <li>・実習施設は、現在、建築デザイン中であり、R/D署名後すぐに建築作業を開始する。</li> <li>・なお、建築図面は、R/D署名前に入手可能とのこと。(入札図書へ添付が必要)</li> </ul>	<ul style="list-style-type: none"> <li>・左記確認する。</li> <li>・建築図面を入手する。</li> </ul>	<ul style="list-style-type: none"> <li>・左記確認した。</li> <li>・建築図面について、現在までの構想を入手した。(ただし、講義室部分のみであり、機材設置部分についてはほぼ日本案のまま)</li> <li>・設計および建設に必要な条件や情報について、逐次JICAからEEOに対し提出する旨をミニッツに記載した。</li> </ul>
12. 合同調整委員会	<p>&lt;委員長&gt; EEO局長 &lt;イラン側&gt; EEO代表者 SABA機構長 アゼルバイジャン教育・研究センター長 石油省代表者 管理計画庁(MPO)代表者 鉱工業省代表者 &lt;日本側&gt; 長期専門家 JICA本部より派遣された者 日本大使館からはオブザーバーとして参加</p>	<ul style="list-style-type: none"> <li>・左記確認する。</li> <li>・各省庁の具体的部局もしくは氏名まで入手する。</li> </ul>	<ul style="list-style-type: none"> <li>・左記確認するとともに、委員の氏名を入手した。</li> </ul>
13. 協力期間中の日本側の特権・免責	<ul style="list-style-type: none"> <li>・R/D案を提示して、特権・免責事項や相手国側政府負担事項について説明の上、了承を得た。同内容の文をミニッツの別添に入れ、説明の上、理解を得た。</li> </ul>	左記確認する。	・左記確認した。
14. その他			
(1) プロジェクト開始までのスケジュール	<ul style="list-style-type: none"> <li>・2002年11月中旬までにR/D締結</li> <li>・2003年3月協力開始</li> </ul>	<ul style="list-style-type: none"> <li>・2003年3月協力開始</li> <li>・ただし、安全管理などやむを得ない状況で、開始が遅れる、もしくは、開始した後に一旦活動を停止する可能性がある旨はイラン側に伝え、理解を得る。</li> </ul>	<ul style="list-style-type: none"> <li>・左記確認した。</li> <li>・日本人専門家の安全管理の関係で、プロジェクト開始の遅れ、または、プロジェクトの一時停止もあり得ることについて、説明し、イラン側の理解を得た。</li> </ul>

## イラン省エネルギー促進プロジェクト実施協議調査団 団長所見

## 1. 調査概況

2000年11月に本件プロジェクトの正式要請を受理して以来丁度2ヵ年が経過したが、この間4度に亘る短期調査を実施し、かなりプロジェクトのイメージと実施スケジュールが煮詰まったところで今般実施協議調査という運びになった。11月4日にラマダンが始まったばかりの調査団派遣ということで、効率の悪さが懸念されたところであるが、エネルギー省エネルギー効率促進局(EEO)を中心とした関係機関の本件プロジェクトの早期実現に対する期待は高く、真面目にかつ誠意を以って対応してくれた。R/Dのサイナーでありプロジェクト・ダイレクターかつ合同調整委員会の委員長の任にあたるDr.Sadeghzadeh(サデジザデ)EEO局長は数ヶ月前に現局長に就任したばかりの人で、新進気鋭の優秀な局長であるが、若干頑ななところもあり、討議議事録(R/D)を含む協議は一部紛糾する場面もあったが、全般的にはほぼ当方の対処方針どおり進めることができた。ただし、関係機関の中で、予算執行官庁である行政企画庁(MPO)や強大な許認可権と資金力を誇る石油省の対応には権威主義的な側面が見え隠れしており、エネルギー省の対応振りとはかなりの温度差を感じた。

8日間の滞在中1日ではあったがプロジェクトサイトのTabriz(タブリーズ)を訪問し、アゼルバイジャン教育・研究センターおよび同敷地内に建設予定されているエネルギー管理訓練センター(NTCEM)のサイトを視察、同センター所長のDr.Khoshravan(コシュラバン)ほか5名のカウンターパート(予定)と意見交換を行った。同所長は過去4度にわたる調査結果を受けて、ようやくプロジェクト実施にこぎつける事ができたことを歓迎するとともに、わが国の本件協力に対し心より感謝する旨述べるところがあった。

16日、EEOにおいて、エネルギー省チチアン(Hamid Chichian)次官、二階堂公使他関係者が20名以上出席、サデジザデEEO局長と谷川団長の間で、R/Dおよびミニッツ(M/M)の署名・交換を了した。なお、本署名式にはテレビ(6チャンネル)取材があり、団長インタビューを受けた。この模様は同日、約5分間に亘り英語で放映されたことを付記しておく。

団長所見、留意事項等については以下のとおり。

## 2. 団長所見

## 1) 本プロジェクトの妥当性

実施機関がEEO(政策部分)とアゼルバイジャンセンター(訓練部分)の2箇所になっているが双方の緊密な連携が保たれば、夫々組織的にはしっかりしており、協力への取り組みも熱心であるので問題はないと思われる。また、カウンターパートも既に5名の候補者が決まっており、人材面での体制も出来上がっていると言える。財務面でもアゼルバイジャンセンターは、自己収入で現在自立できると思われるレベルなので、現状から判断して、本件プロジェクトの妥当性は十分にあると思われる。

## 2) イラン省エネルギー機構(SABA)との本プロジェクトの関係

SABAは産業界のエネルギー効率促進プロジェクトを育成・指導する機関で、工場診断等を実施している。

本件プロジェクトとの関係は協力機関（Cooperator）として位置付けられているが、実際にはエネルギー管理訓練センター（NTCEM）への研修員の選考・送り出し、産業ニーズを反映させるべく研修コース作成にかかる助言、研修修了証書への署名、研修修了者の研修効果のモニタリング・評価の実施（外部評価）などかなり実質的な部分を掌握している。このため、プロジェクト開始後、SABAがNTCEMの業務に良きにつけ悪しきにつけ、干渉してくることは十分予想される。

EEOはエネルギー管理の政策官庁なので上位官庁ではあるが、EEO、SABA、NTCEMの三者は必ずしも完全な縦の関係にはないと思われる。NTCEMとの関係では、EEOがアゼルバイジャン教育研究センターとNTCEM設立にかかる協定を締結することとなっている。アゼルバイジャン・センター長によれば独立採算で事業を実施しているとする自負もある。他方、EEOはプロジェクト実施に際し、SABAの協力を得なければならない立場にある。こうしてみると寧ろこの三者の関係は、見方によれば横の関係を保っていると考えられる。

本件プロジェクトの実施機関は政策部分はEEOで、訓練部分はアゼルバイジャンセンター、協力機関が先述のSABAとなっているが、プロジェクト実施面で三者がどう関わりあうのかが、現時点ではあいまいになっていて明確なイメージが掴めていない。今後はこの三者が如何に有機的に連携を保っていくかが課題となろう。反省点でもあるが、この三者によるR/D署名とすべきであったかもしれない。いずれにせよ今後のプロジェクトの成否はEEOの調整能力にかかっていると見えよう。

### 3) プロジェクト協力内容・範囲と日本人専門家のTOR (Terms of Reference)

本案件は省エネルギーの研修を通じて「エネルギー管理者」を育成する、所謂、人造りが柱になっており、トルコの案件（工場診断を主体）とは協力内容を異にしている。

プロジェクト協力内容は二つに大別される。一つはNTCEM（エネルギー管理訓練センター）が実施する研修とその内部評価で、二つ目がSABA（省エネルギー機構）が所管する外部評価（研修効果の測定・評価）であるが、わが方の協力は前者に重きを置くことで先方と合意した。従って、日本人専門家の業務内容は主としてNTCEMカウンターパートへの技術移転を直接業務とすることとし、他方SABAに対しては、SABAが実施する省エネにかかるデータ収集と分析及び評価レポートをチェックし、助言・指導をおこなうこととしてこれらをミニッツに記載した。

EEOとしてはSABAの行なう研修効果のモニタリング・外部評価も重要と位置付けている。研修修了者が夫々所属する職場及び工場に帰った後、研修結果が如何に省エネ改善に活かされているかをフォローするため、日本人専門家の協力を得たいと考えている。当方としてはその重要性はよく理解できるものの、専門家主導でこれに対応することは物理的に困難であり、かつ役務提供型の協力になる可能性もあるところから、上述のとおり協力範囲もしくは専門家のTORを整理した。なおSABAの活動内容もこれからのことで、SABAの組織面、実施体制等まだ不透明な部分もあり、SABAとの協力関係については、専門家の現地赴任後に関係者と協議しつつ段階的に詰めていく

こととした。

先方が提出する A1 に記載される日本人専門家の TOR/JOB DESCRIPTION についても、同ラインに沿って記入するよう指導した。

#### 4) 知的所有権の問題

パソコン用のアプリケーションソフトウェアについては、イランでは海賊版が出回っている。米国社製のソフトウェアは米国の輸出規制の関係で、その登録が難しいという現地事情から、単体で使用するラップトップ及びデスクトップコンピューターについてはイラン側で購入するよう申し入れその旨了解を得た。

他方、多くの実習用機材に見られるパソコン組み込み(pre-install)式のものについては、全体を構成する不可分のコンポーネントということで、これらについてはやむを得ず本邦より購送することとした。従って、後者の場合はそれらのソフトウェアについても本邦購送をせざるを得ない状況にある。

パソコンについては先方で購入すべく了解はしたものの、これに代えて当初先方で購入予定であった 2 台の複写機の供与について強い要請があった。交換条件というのも不合理な話ではあるが、パソコンにかかる当方の申し入れを先方に了解させるためには、先方のカウンターオファーはのまざるを得ないものとする。

#### 5) 安全対策

イラク情勢との関連については、数日前イラクが国連決議を受け入れ、危機回避に向け大きく前進し始めたばかりであるが、今後の見通しについて、大使館および田中援助調整専門家より情報収集を行なった。

今後のイラク側の対応が注目される場所であるが、そのことを除けば 9 月の湾岸安全調査ミッション及び田中専門家からのこれまでの報告内容に補足するような判断材料は今のところ特になく、現段階での即断は難しいが、たとえ対イラク武力行使があったとしてもイランへの余波は大きくはないと思われ、直接的・短期的な影響はないであろうというのが大方の見解である。

本件に関しては EEO 局長とも意見交換をしたが、同局長によれば懸念材料はあまり考えられず、イラン国への影響はないであろうとしている。これに対し、当方より JICA の安全対策にかかるスタンスを説明したところ、先方はこれに同意したので、専門家にかかる安全対策について「戦争、自然災害等の非常事態の発生時には、プロジェクトの実施時期の延期もしくはプロジェクト実施中であれば、事態が収拾するまで協力業務を一時的に見合わせることもありうる」旨ミニッツに記載した。

#### 6) 合同調整委員会の開催

EEO 局長が召集する本委員会は少なくとも年一回開催されることで双方合意した。同委員会のメンバーのなかには行政企画庁、石油省、鉱工業省、省エネルギー機構が含まれているが、横の連絡が必ずしも充分ではなく、その開催に際しては調整が難しいところがある。EEO 局長には本委員会の重要性を良く説明するとともに、定期的に開催することを申し入れおいた。

### 3. 留意事項・コメント等

#### 1) 先方負担によるNTCEM建設

最近MPOの予算執行承認（総コスト39万ドル）が下りたばかりである。現在設計図面を作成中で未完成であるが、この1～2ヶ月中には出来あがる予定である。2003年1月もしくは2月に着工の予定で、完成は同年7月頃の予定の由。

当方からの供与機材のうちミニプラントの据付けが予定されているので、荷重条件等建設・設計にかかる基礎条件・据付けのタイミングなどについては、わが方より提示・助言ならびに指導を行なうこととしている。

専門家チームも早ければ2003年3/4月には赴任する予定になっているので、本件建設の進捗状況についてはフォローできることになっているが、本邦購送予定の供与機材のタイミングとの兼ね合いがあるので、建築が大幅に遅延することのないように見守る必要がある。

#### 2) ローカルコストの措置

現在、5名いるカウンターパート（Academic Staff）の給与はエネルギー省から支給されているので問題ないが、今後増員が見込まれている3名については、最初の2年間程度はエネルギー省が手当てし、その後はセンターで手当てすることになっている。コシュラバン・センター長によれば、現在でも独立採算でやっていけるので問題ないとしているが、本件についてもフォローが必要であろう。

#### 3) 情報交換

省エネ政策担当の専門家を除く、チーフアドバイザー他の専門家は約600km離れたタブリーズ市に在住することになるため、在イラン日本大使館、EEO等との意思疎通を欠くことのないよう日頃から留意することが肝要であろう。また、タブリーズ市には在留邦人が現地人と結婚した人若干名を除けば皆無に近いこともあり、精神衛生上の観点からも、必要に応じ専門家が情報交換などの理由で、テヘランへ出張できるよう配慮すべきである。

#### 4) プロジェクトドキュメント

近年、R/D 署名時にプロジェクトドキュメントにも先方と署名交換することになったが、50ページ前後のボリュームにもなる。これにR/D およびM/M と添付書類のページ数を加えるとかなりのボリュームになる。これでは、先方関係者が一通り目を通すだけでも大変なことなので、いわゆるプロダクについては内容の簡素化若しくはページ数の縮小化を図る必要性を痛感する。また、本書を作成する側にも大きなロードが掛かっていることも考慮に入れると、簡略化は省エネにつながるものと思料される。

#### 5) 特権免除事項

先方よりR/DのAnnex IVの日本人専門家に対する特権・免除・便宜供与事項に関し、例えば、1.(1)の査証の発給については、一方的に日本人専門家だけのことが

記載されており、イラン側カウンターパートの場合においても同様に記載すべきだとの意見が出された。これに対し当方より、実際にはプロジェクトの C/P には問題なく発給されているので記載の必要はないが、R/D の定型である旨を説明しつつ、他のプロジェクトにおいても同一のパターンを採用している旨付言したところ、先方は理解を示し原案どおりとすることで合意した。

R/D 協議において他の文言についても同様に、記載内容が受入側の措置については詳細に記述されているが、日本側の措置についてあまり記述されていないとして、不平等だとするコメントもあった。

#### 6) エネルギー政策アドバイザーの資格要件

サデジザデ E E O 局長は数ヶ月前の異動で現在のポストに就いたばかりであるが、本件省エネルギー政策アドバイザーの T O R に対する考えかたが、サデジプール前局長とは異なり、多くを期待していて幅広いバックグラウンドを有する専門家をイメージしている。従って、当方よりいきなり A1 フォームを提出されても、資格要件を満足させる専門家がリクルートできるかどうか分からない旨説明し、現局長のイメージしている専門家の T O R についてメモを至急提出するよう申し入れたところである。

#### 7) 専門家の居住環境

聴き取り調査および今次調査で感じた点は、治安状況も割合良好との印象である。食事も日本料理、イタリア料理、中華料理等いろいろと選択肢もあり値段も手ごろなところかと思われる。飲み物もドバイに近いせい色々ありあまり不自由はしない。

以上



**RECORD OF DISCUSSIONS  
BETWEEN  
JAPANESE PROJECT DESIGN TEAM  
AND  
THE MINISTRY OF ENERGY OF  
THE ISLAMIC REPUBLIC OF IRAN  
ON  
JAPANESE TECHNICAL COOPERATION  
FOR THE PROJECT ON ENERGY MANAGEMENT PROMOTION**


The Japanese Project Design Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), visited the Islamic Republic of Iran from November 10 to 17, 2002, for the purpose of working out the details of the technical cooperation program concerning the Project on the Energy Management Promotion in the Islamic Republic of Iran (hereinafter referred to as "the Project").

During its stay in the Islamic Republic of Iran, the Team exchanged views and had a series of discussions with the Iranian authorities concerned with respect to desirable measures to be taken by both governments for the successful implementation of the Project.

As a result of the discussions, the Team and the Iranian Ministry of Energy agreed to recommend to their respective governments the matters referred to in the document attached hereto.

Tehran, November 16, 2002

  
Mr. Kazuo Tamigawa  
Leader  
Japanese Project Design Team  
Japan International Cooperation Agency  
Japan

  
Dr. S Mohammad Sadeghzadeh  
General Director  
Energy Efficiency Office  
Ministry of Energy  
The Islamic Republic of Iran

## THE ATTACHED DOCUMENT

### I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of the Islamic Republic of Iran will implement the Project on the Energy Management Promotion in cooperation with the Government of Japan.
2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.

### II. MEASURES TO BE TAKEN BY THE GOVERNMENT OF JAPAN

In accordance with the laws and regulations in force in Japan, the Government of Japan will take, at its own expense, the following measures through JICA according to the normal procedures under the Technical Cooperation Scheme of Japan.

#### 1. DISPATCH OF JAPANESE EXPERTS

The Government of Japan will provide the services of the Japanese experts as listed in Annex II.

#### 2. PROVISION OF MACHINERY AND EQUIPMENT

The Government of Japan will provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The Equipment will become the property of the Government of the Islamic Republic of Iran upon being delivered C.I.F. (cost, insurance and freight) to the Iranian authorities concerned at the ports and/or airports of disembarkation.

#### 3. TRAINING OF IRANIAN PERSONNEL IN JAPAN

The Government of Japan will receive the Iranian personnel connected with the Project for technical training in Japan.

### III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE ISLAMIC REPUBLIC OF IRAN

1. The Government of the Islamic Republic of Iran will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.
2. The Government of the Islamic Republic of Iran will ensure that the technologies and knowledge acquired by the Iranian nationals as a result of Japanese technical cooperation will contribute to the economic and social development of the Islamic Republic of Iran.

3. The Government of the Islamic Republic of Iran will grant in the Islamic Republic of Iran privileges, exemptions and benefits as listed in Annex IV and will grant privileges, exemptions and benefits no less favorable than those granted to the experts of third countries or international organizations performing similar missions, to the Japanese experts referred to in II-1 above and their families.
4. The Government of the Islamic Republic of Iran will ensure that the Equipment referred to in II-2 above will be utilized effectively for the implementation of the Project in consultation with the Japanese experts referred to in II-1 above.
5. The Government of the Islamic Republic of Iran will take necessary measures to ensure that the knowledge and experience acquired by the Iranian personnel from technical training in Japan will be utilized effectively in the implementation of the Project.
6. In accordance with the laws and regulations in force in the Islamic Republic of Iran, the Government of the Islamic Republic of Iran will take necessary measures to provide at its own expense:
  - (1) Services of the Iranian counterpart personnel and administrative personnel as listed in Annex V;
  - (2) Land, buildings and facilities as listed in Annex VI;
  - (3) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided through JICA under II-2 above; and
  - (4) Means of transport and travel allowances for the Japanese experts for official travel within the Islamic Republic of Iran.
7. In accordance with the laws and regulations in force in the Islamic Republic of Iran, the Government of the Islamic Republic of Iran will take necessary measures to meet:
  - (1) Expenses necessary for transportation within the Islamic Republic of Iran of the Equipment referred to in II-2 above as well as for the installation, operation and maintenance thereof;
  - (2) Customs duties, internal taxes and any other charges, imposed in the Islamic Republic of Iran on the Equipment referred to in II-2 above; and
  - (3) Running expenses necessary for the implementation of the Project.

#### IV. ADMINISTRATION OF THE PROJECT

1. The General Director of Energy Efficiency Office (hereinafter referred to as EEO ), the Ministry of Energy, as the Project Director, will bear overall responsibility for the administration and implementation of the Project.
2. The Managing Director of the Iranian Energy Efficiency Organization (hereinafter referred to as SABA ), the Ministry Energy will bear the responsibility for maximizing the effect of the Project activities under the responsibility of EEO.
3. The Chancellor of the Azarbaijan Higher Education and Research Complex (hereinafter referred to as the Azarbaijan Complex ), as the Project Manager, will bear overall responsibility for the smooth implementation of the training part of the project based on the policies that will be developed by the EEO.
4. The Japanese Chief Advisor will provide necessary recommendations and advice to the Project Director and the Project Manager on any matters pertaining to the implementation of the Project.
5. The Japanese experts will give necessary technical guidance and advice to the Iranian counterpart personnel on technical matters pertaining to the implementation of the Project.
6. For the effective and successful implementation of the Project, a Joint Coordinating Committee will be established whose functions and composition are described in Annex VII.

#### V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by two governments through JICA and the Iranian authorities concerned, at the middle and during the last six months of the cooperation term in order to examine the level of achievement.

#### VI. CLAIMS AGAINST JAPANESE EXPERTS

The Government of the Islamic Republic of Iran undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Islamic Republic of Iran except for those arising from the willful misconduct or gross negligence of the Japanese experts.

## VII. MUTUAL CONSULTATION

There will be mutual consultation between two governments on any major issues arising from, or in connection with this Attached Document.

## VIII. MEASURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of the Islamic Republic of Iran, the Government of the Islamic Republic of Iran will take appropriate measures to make the Project widely known to the people of the Islamic Republic of Iran.

## IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be for four (4) years from March 2003.

## X. OTHERS

Details of the Project will be clarified in the Minutes of Meeting.

ANNEX I	MASTER PLAN
ANNEX II	LIST OF JAPANESE EXPERTS
ANNEX III	LIST OF MACHINERY AND EQUIPMENT
ANNEX IV	PRIVILEGES, EXEMPTIONS AND BENEFITS FOR JAPANESE EXPERTS
ANNEX V	LIST OF IRANIAN COUNTERPART AND ADMINISTRATIVE PERSONNEL
ANNEX VI	LIST OF LAND, BUILDINGS AND FACILITIES
ANNEX VII	JOINT COORDINATING COMMITTEE

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1. Title of the Project  
The Project on the Energy Management Promotion
2. Overall Goal  
Through promotion of rational use of energy, enhancement of energy management in the industrial sector is achieved.
3. Project Purpose  
The National Training Center for Energy Management contributes to the energy management of the industrial sector.
4. Outputs of the Project
  - (1) Policies and administration structures for energy management of industrial sector are coordinated so that the contribution of the Project becomes effective.
  - (2) Iranian counterparts are able to operate and maintain the training facilities and equipment.
  - (3) Both theoretical and practical training courses for energy related engineers are maintained and managed.
5. Activities of the Project
  - (1-1) Analyze on-going policies of energy management in the industrial sector
  - (1-2) Propose effective policy for energy management to the relevant agencies so that the training in the center makes maximum effect
  - (1-3) Manage to offer training programs that best meet the needs of the industry and the nation
  - (1-4) Carry out necessary dissemination activities for energy management
  - (2-1) Elaborate a plan on maintenance of the facilities and equipment.
  - (2-2) Install facilities and equipment
  - (2-3) Carry out the technical training on its operation and maintenance
  - (2-4) Make rules and manuals for operation and maintenance
  - (3-1) Collect and analyze up-to-date information for appropriate training program
  - (3-2) Formulate curriculum for the training courses and prepare materials
  - (3-3) Implement the Iranian counterpart training in the National Training Center for Energy Management
  - (3-4) Implement the training courses
  - (3-5) Examine trainees reports (energy management audit and improvement plan) to issue certificates
  - (3-6) Take necessary action for the aftercare of the ex-trainees
  - (3-7) Monitor the efficiency of training courses and improve them

Annex II LIST OF JAPANESE EXPERTS

1. Long-term experts

- (1) Chief Advisor
- (2) Coordinator
- (3) Expert on Energy Conservation (Heat)
- (4) Expert on Energy Conservation (Electricity)
- (5) Expert on Energy Conservation Policy

2. Short-term experts

Short-term experts will be dispatched as necessary for the effective implementation of the Project.

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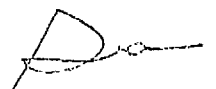


Annex III LIST OF MACHINERY AND EQUIPMENT

1. Equipment for energy conservation training (mini-plant)
2. Equipment for measurement
3. Equipment for training room

Note:

1. The above-mentioned equipment is limited to the equipment necessary for the transfer of technology by the Japanese experts.
2. The content, specifications and quantity of the above-mentioned equipment are shown in the Minutes of Meeting.
3. The detail specification of the above items may be subject to change and depends on the results of tender and budgetary limitation.





Annex IV      PRIVILEGES, EXEMPTIONS AND BENEFITS FOR JAPANESE EXPERTS

In accordance with the laws and regulations in force in the Islamic Republic of Iran, the Government of the Islamic Republic of Iran will take necessary measures to provide at its own expense for implementation of the technical cooperation.

1. Privileges, exemptions and benefits for the Japanese experts

The Government of the Islamic Republic of Iran will grant in the Islamic Republic of Iran the following privileges, exemptions and benefits.

- (1) Issuance of multiple visas which guarantee smooth entry into and sojourn in the Islamic Republic of Iran, upon application, free of consular fees.
- (2) Issuance of identification cards to secure cooperation of all governmental organization necessary for performance of the duties of the Japanese experts.
- (3) Exemption from income taxes and other fiscal charges, payable under the registration of the Islamic Republic of Iran, imposed on or in connection with any emoluments and allowances remitted from abroad.
- (4) Exemption from:
  - 1) Consular fees, customs duties, internal taxes and other charges of a similar kind, payable under the regulation of the Islamic Republic of Iran, as well as from the requirement of obtaining import licenses and certificates of foreign exchange coverage, imposed on i) personal and household effects, and (ii) one motor vehicle per each Japanese expert, which may be brought in from abroad or taken out of the Islamic Republic of Iran; and
  - 2) Import sales taxes, sales taxes and any other charges of a similar kind imposed on or in connection with the purchase therein of one motor vehicle per each Japanese expert who will not bring a car from abroad. (The motor vehicle mentioned above will be subject to payment of customs duties and other charges of a similar kind, payable under the regulation of the Islamic Republic of Iran, if it is subsequently sold or transferred therein to an individual or organization not entitled to exemption from such duties and taxes or similar privileges.)
- (5) Arrangement of such appropriate accommodations and medical care.

Above-described privileges, exemptions and benefits will be no less favorable than those accorded to experts of third countries and international bodies working in the Islamic Republic of Iran and their families.

2. Exemption from customs duties and other charges on equipment

The Government of the Islamic Republic of Iran will grant exemptions from consular fees, customs duties, internal taxes and other charges of a similar kind, payable under the regulation of obtaining import licenses or certificates of foreign exchange coverage, imposed on

- (1) the equipment referred to II-2 above, and
- (2) the equipment, machinery and material carried in by the Japanese experts for performance of their duties, which will remain property of the Government of Japan unless otherwise mutually agreed upon.

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ANNEX V LIST OF IRANIAN COUNTERPART AND ADMINISTRATIVE PERSONNEL

1. Counterpart personnel

- (1) Project Director
- (2) Project Cooperator
- (3) Project Manager
- (4) Mechanical Engineers
- (5) Electric Engineers

2. Administrative personnel

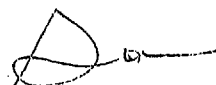
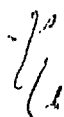
- (1) Accountant
- (2) Secretaries
- (3) Drivers
- (4) Other personnel

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Annex VI LIST OF LAND, BUILDINGS AND FACILITIES

1. Office space and necessary facilities for the Japanese experts and Iranian counterparts
2. Buildings, facilities and space necessary for the installation and operation of the machinery, equipment and materials to be provided by the Government of Japan
3. Lecture rooms and meeting rooms necessary for the transfer of technology
4. Other facilities mutually agreed upon as necessary for the implementation of the Project



Annex VII JOINT COORDINATING COMMITTEE

1. Functions

The Joint Coordinating Committee will meet at least once a year or whenever the necessity arises in order to fulfill the following functions:

- 1) To formulate the annual work plan of the Project;
- 2) To review the progress of the annual work plan;
- 3) To review and discuss major issues that may arise during the implementation of the Project; and
- 4) To discuss any other issue(s) pertinent to the smooth implementation of the Project.

2. Provisional Composition

(1) Chairperson: General Director, EEO

(2) Members of the Iranian side

- a. Representative of EEO
- b. Managing Director of SABA
- c. Chancellor of the Azarbaijan Complex
- d. Representative of Managing and Planning Organization
- e. Representative of Ministry of Oil
- f. Representative of Ministry of Industry and Mine

(3) Members of the Japanese side

- a. Chief Advisor
- b. Coordinator
- c. Experts
- d. Official(s) of the Embassy of Japan in the Islamic Republic of Iran and other personnel concerned to be assigned by JICA, if necessary.

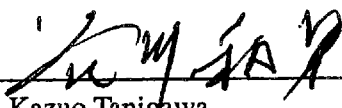
MINUTES OF MEETING  
BETWEEN  
THE JAPANESE PROJECT DESIGN TEAM  
AND  
THE MINISTRY OF ENERGY OF THE ISLAMIC REPUBLIC OF IRAN  
ON  
JAPANESE TECHNICAL COOPERATION  
FOR  
THE PROJECT ON ENERGY MANAGEMENT PROMOTION

The Japanese Project Design Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Kazuo Tanigawa, visited the Islamic Republic of Iran from November 10 to November 17, 2002, for the purpose of working out the details of the technical cooperation program concerning the Project on Energy Management Promotion (hereinafter referred to as "the Project").

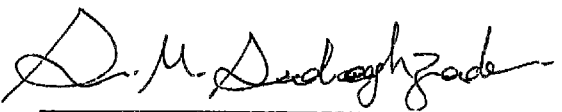
During its stay in the Islamic Republic of Iran, the Team exchanged views and had a series of discussions on the Project with the Iranian authorities concerned (hereinafter referred to as "Iranian side").

As a result of the discussions, both sides reached common understandings concerning the matters referred to in the document attached hereto as a supplement to the Record of Discussions.

Tehran, November 16, 2002



Mr. Kazuo Tanigawa  
Leader  
Japanese Project Design Team  
Japan International Cooperation Agency  
Japan



Dr. S. Mohammad Sadeghzadeh  
General Director  
Energy Efficiency Office  
Ministry of Energy  
Islamic Republic of Iran

## Attached Document

### 1. Sustainability of the Project

The Team observed that the Azarbaijan Higher Education and Research Complex (hereinafter referred to as "the Azarbaijan Complex") has been autonomous and self-sustained as an educational institute. Nevertheless, both agreed that for sustainability of the Project, it is still indispensable for the Azarbaijan Complex to have support from the Ministry of Energy and to increase self-income of its own.

### 2. Administration of the Project

Both sides confirmed duties of agencies concerned with the Project, i.e., Energy Efficiency Office (hereinafter referred to as "EEO"), Iran Energy Efficiency Organization (hereinafter referred to as "SABA"), and the Azarbaijan Complex, as described in the ANNEX 1.

### 3. Project contents

#### (1) Project activities and roles of the National Training Center for Energy Management, SABA and Japanese experts

Training and evaluation of the impact of the training are main activities of the Project. Running training programs and evaluation of training ("internal evaluation") are responsibilities of the staff members of the National Training Center for Energy Management (hereinafter referred to as "NTCEM"). Meanwhile, evaluation of the impact of the training ("external evaluation") is responsibility of SABA, under the supervision of EEO.

For running training courses, Japanese experts support the NTCEM counterpart personnel (hereinafter referred to as "C/P"). For evaluation of the impact of the training, SABA collects and analyzes the data and produces evaluation reports, while the Japanese expert team checks, advises and gives guidance to SABA.

#### (2) Plan of Operation and Annual Plan of Operation

Activities and contents stipulated in Plan of Operation and Annual Plan of Operation should be modified according to the situation in Iran in mutual agreement after the Project commences.

#### (3) Training curriculum

Training curriculum should be flexible and be updated continuously, based on the mutual consultation, according to the needs of the industrial sector in Iran after starting the training courses at the NTCEM.

#### (4) Training materials

Training materials for the training at the NTCEM, e.g. textbooks, are to be produced by the NTCEM C/P, while Japanese experts supply references and necessary information to support the NTCEM C/P.

### 4. Measures to be taken by the Government of Japan

#### (1) Dispatch of Japanese experts

Japanese experts will be dispatched at the official request with "A1 form". The contents of A1 form for long-term experts were discussed and agreed by both sides. The Iranian side will submit A1 forms for long-term experts to the Embassy of Japan immediately after signing of the Record of Discussions (hereinafter referred to as "R/D"). JICA will inform Energy Efficiency Office (hereinafter referred to as "EEO") of curriculum vitae of prospective experts in "B1 form" as soon as experts are recruited.

**(2) Counterpart training in Japan**

Approximately two (2) or three (3) C/P will be trained in Japan annually at the official request with "A2-A3 form". The Iranian side will submit A2-A3 form to the Embassy of Japan accordingly after signing of R/D.

**(3) Provision of Machinery and Equipment**

Because of the intellectual property right on computer software, the Government of Japan will not be able to provide personal computers as office appliances for lecture rooms. The Iranian side agreed to replace substitution computer sets with 2 (two) photocopiers. The Team agreed to convey the matter to the Government of Japan for approval.

Those machinery and equipment equipped with computers and software as inseparable components are provided by the Government of Japan.

**5. Measures to be taken by the Government of the Islamic Republic of Iran**

**(1) Budget allocation**

Necessary amount of local costs that is indispensable for smooth implementation of the Project will be borne by the Iranian side. Both sides confirmed that the Azarbaijan Complex would ensure the budget of running the Project.

**(2) Land, buildings and utilities**

The Iranian side will prepare the buildings, facilities, and utilities necessary for the implementation of the Project.

The building for the equipment will be established in the area designated in ANNEX 2, which is to be completed by June or July in 2003. The idea of layout is shown in ANNEX 3. The schedule and budget of the building for the equipment are shown in ANNEX 4. Necessary information and conditions for designing and construction will be offered from JICA.

**(3) Assignment of long-term counterpart personnel**

The Iranian side will assign C/P and administrative staff members.

Should the allocation of C/P be changed for either personal or administrative reasons, the Iranian side will immediately take necessary measures to assign appropriate number of personnel as C/P for the Project.

**(4) Offices for Japanese experts**

The office and necessary facilities for the expert of energy conservation policy at EEO in Tehran will be prepared by the time of dispatch of the expert.

Offices and necessary facilities for experts in the NTCEM, Tabriz will be prepared in the building of the Azarbaijan Complex by the time of dispatch of the expert.

**(5) Local transport for Japanese experts**

Local transport for Japanese experts in Tabriz will be prepared by the Ministry of Energy in the form of a commuter bus or any other suitable way.

**6. Joint Coordinating Committee (JCC) members**

For effective and successful implementation of the Project, a Joint Coordinating Committee (JCC) composed of the members appointed by both sides will be established and held at least once a year in Iran. The member list of JCC is attached as ANNEX 5.



## **7. Security of Japanese experts**

The Team explained and the Iranian side understood that in all cases of force majeure or contingencies affecting the implementation of the Project, such as war, natural disasters, etc., the start of the Project shall be delayed or the Project shall be suspended until the situation is recovered.

## **8. Project Document**

Both sides agreed the Project Document for justification of the Project and its implementation. The Project Document is attached as ANNEX 6.

## **9. Others**

- (1) The baseline data of Specific Energy Consumption (SEC) for verifiable indicators to the Overall Goal will be reviewed during the Project implementation and submitted by the Iranian side.
- (2) The updated data on energy consumption in each sub-sector in the Iranian industry will be submitted by the Iranian side.
- (3) More detailed job description expected by the Iranian side for the expert of energy conservation policy will be submitted by the Iranian side.

### **Annex List**

- 1. Duties of the agencies concerned with the Project**
- 2. Layout of the Project site**
- 3. Idea of layout of the building for the equipment**
- 4. Schedule and budget for building for the equipment**
- 5. Member list of Joint Coordinating Committee**
- 6. Project Document**
- 7. Attendants of the discussions**



### Duties of the agencies concerned with the Project

#### (1) Responsible Agency

EEO will bear the overall responsibility for a smooth implementation of the Project. The duties of EEO are as follows:

- To secure the budget for the Project
- To establish the NTCEM
- To supervise activities and development of the NTCEM, and;
- To develop a policy of energy management, making necessary coordination with the other Iranian authorities as required (Managing and Planning Organization, Ministry of Oil, The Iran Energy Efficiency Organization [SABA], etc).

#### (2) Cooperation Agency

The Iran Energy Efficiency Organization (hereinafter referred to as "SABA") is the cooperation organization of the Project, under the responsibility of the EEO. The duties of SABA are as follows:

- To advise on development of the NTCEM
- To coordinate activities of the NTCEM to meet the national needs
- To select trainees
- To conduct external evaluation of the training,
- To prepare evaluation reports of the Project for the Ministry of Energy, and;
- To seal-approve certificates for trainees

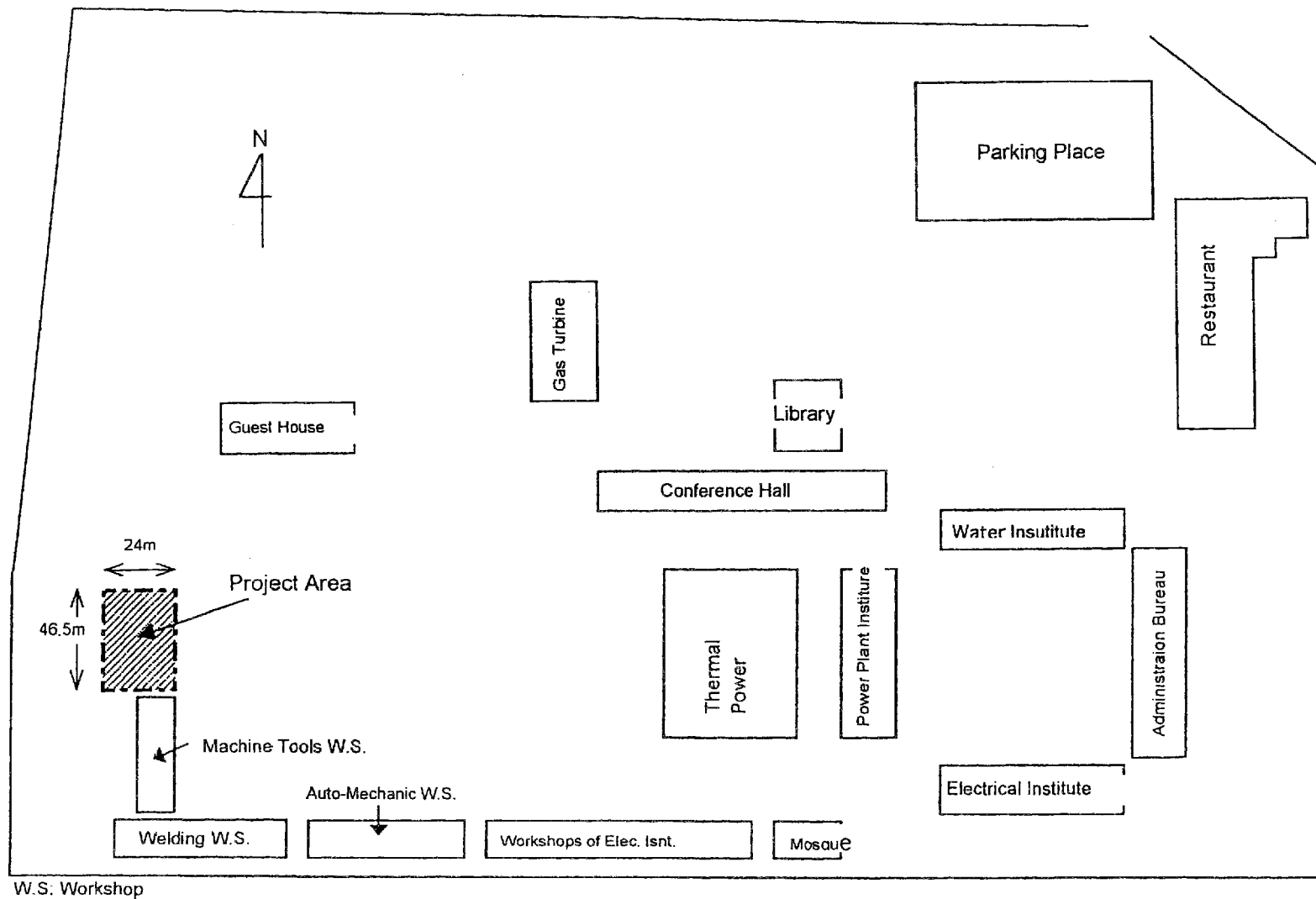
#### (3) Project Implementing Agency

The Azerbaijan Complex will be appointed by the Ministry of Energy as the implementing agency for counterparting with the JICA, and will bear the overall responsibility for the implementation of the training program, based on policies that will be developed by EEO. The duties of the Azerbaijan Complex are as follows:

- To execute the management of the NTCEM
- To prepare for food and accommodation of the trainees
- To make internal evaluation of the training courses, and;
- To issue certificates for trainees

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Azarbaijan Higher Education and Research Complex

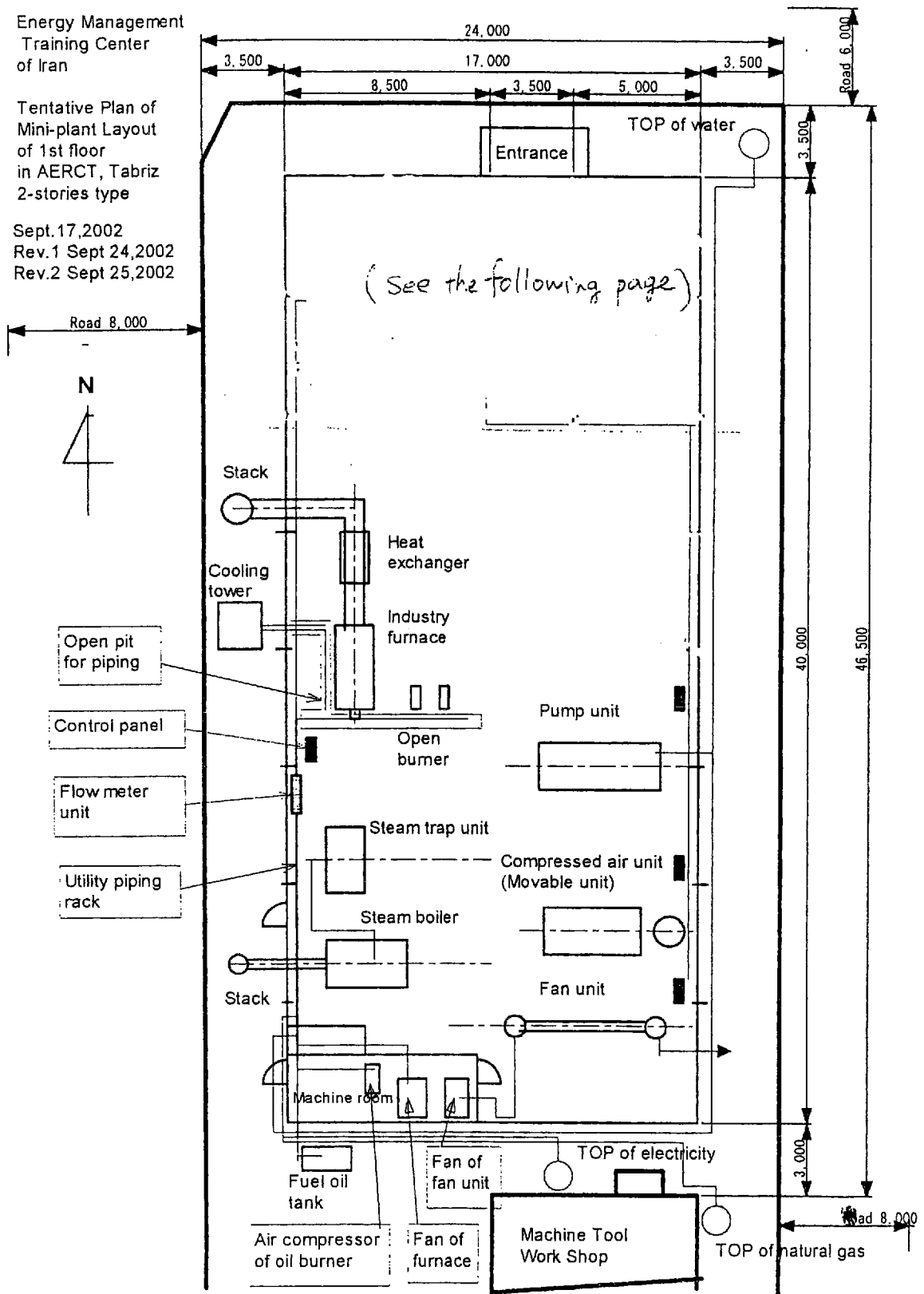
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Energy Management  
Training Center  
of Iran

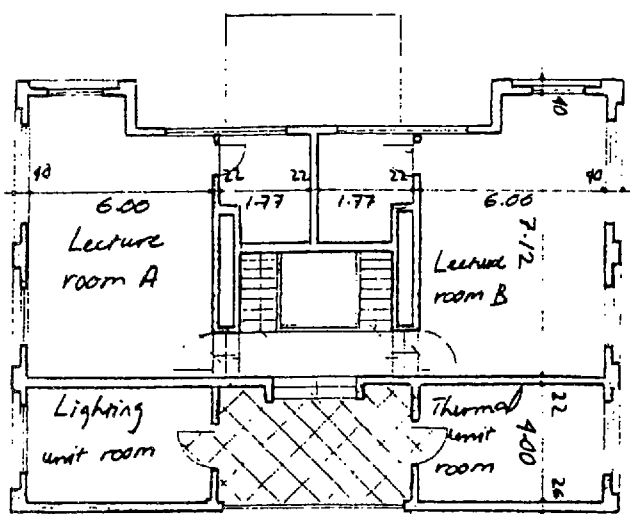
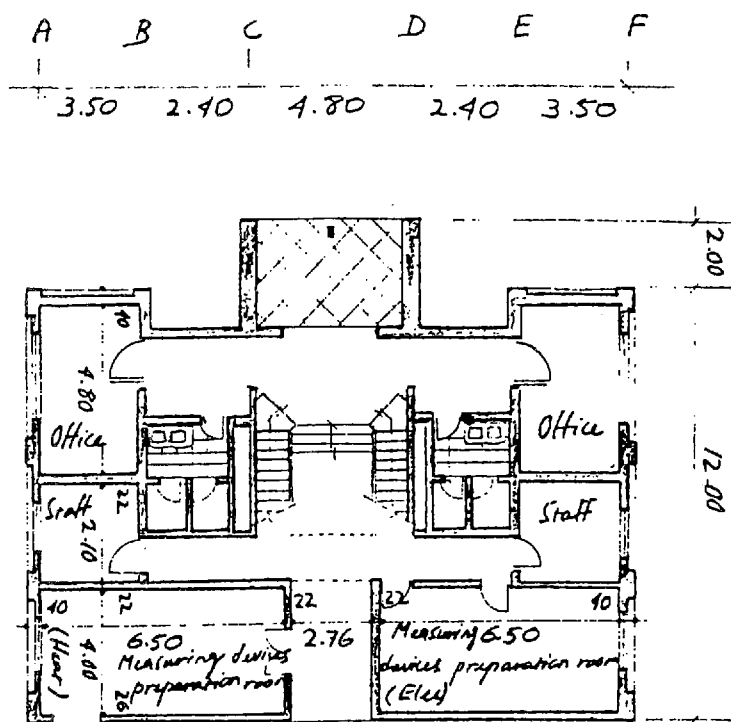
Tentative Plan of  
Mini-plant Layout  
of 1st floor  
in AERCT, Tabriz  
2-stories type

Sept. 17, 2002  
Rev. 1 Sept 24, 2002  
Rev. 2 Sept 25, 2002



Handwritten signature or initials.

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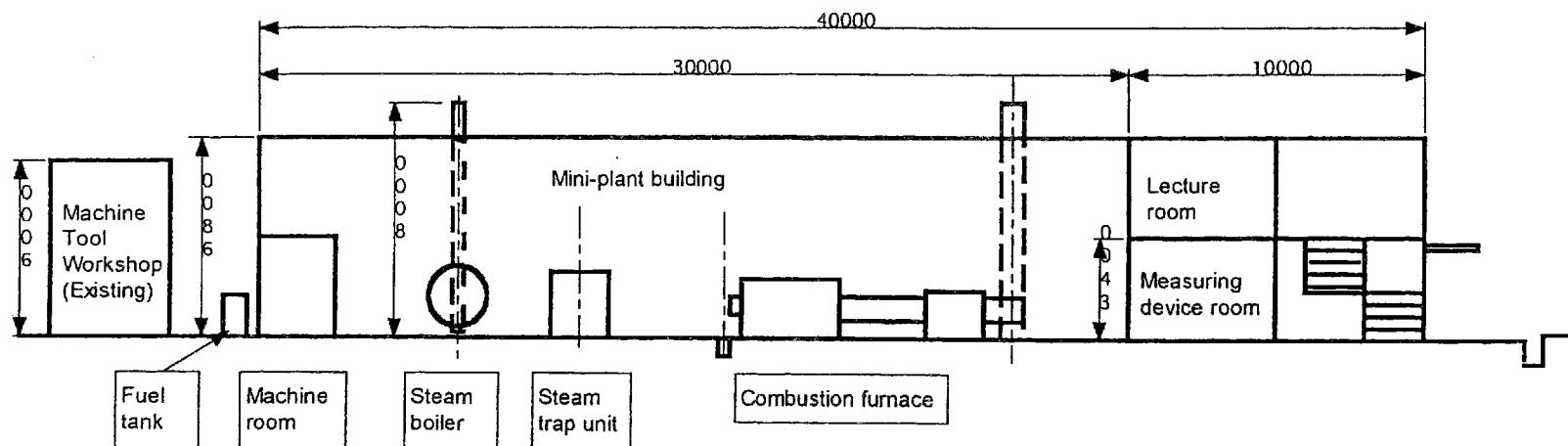
— Plan - Part A — First & Ground Floor —

— Scale: 1/200 — North ↑

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# Energy Mangement Training Center of Iran

Mini plant building plan in AERCT, Tabriz  
Section view



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ANNEX 4

Title of the Project:  
Construction of the National Energy Management Center

No	Activities	Percent of the activity	Cost (U\$)	Cost (Mrial)	Progress (%)			Total Progress
					Physical	Period of the Work		
					2002	2003	2004	
1	selection of consultation and contractors	5.54	21606	172.8	40	40	20	100
2	Land Preparation and Foundation	8.65	33735	269.9	100	-	-	100
3	Frame-work	39.1	152490	1219.9	20	80	-	100
4	Elaborate work	12.8	49920	399.4	2	98	-	100
5	Executive of mechanical and electrical installation	17.3	67470	539.8	-	40	60	100
6	Purchasing of necessary equipments	16.61	64779	518.3	30	30	40	100
<b>Total</b>		100	390000	3120.0	23.93	57.94	18.13	100

The Costs are Million Rial and U\$

by

Member List of Joint Coordinating Committee

1. Chairperson: Dr S. Mohammad Sadeghzadeh, General Director, EEO
2. Members of the Iranian side
  - (1) Mr. Kambiz Rezapour, Manager, Awareness & Training Group, EEO
  - (2) Dr. Abdol Reza Karbassi , Managing Director, SABA
  - (3) Dr. Khoshravan , Chancellor, the Azarbaijan Complex
  - (4) Mr. Sepehri, Head of Gas Planning Group, Energy Sector , Managing and Planning Organization
  - (5) Ms Zarvani , Senior Expert of Deputy Ministry of Planning Affairs , Ministry of Oil
  - (6) Dr. Panjehshahi, Adviser of Deputy Minister of Industry and Mining in Planning, Research and Technology, Ministry of Industry and Mining
3. Members of the Japanese side
  - (1) Chief Advisor
  - (2) Coordinator
  - (3) Experts
  - (4) Official(s) of the Embassy of Japan in the Islamic Republic of Iran and other personnel concerned to be assigned by JICA, if necessary.

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ANNEX 6

The Islamic Republic of Iran  
Ministry of Energy  
Energy Efficiency Office

Japan International Cooperation Agency

**Project Document**

**The Project**

**On the Energy Management Promotion**

**In the Islamic Republic of Iran**

November 16, 2002

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## **EXECUTIVE SUMMARY**

Iran is one of the biggest oil-producing countries, and its energy exports (oil and natural gas) earn 80% of foreign currency income. Domestic energy consumption has been growing rapidly in recent years, and a study calculated that Iran would become an energy importing country by 2018. The government of Iran has realized this critical scenario and wants to avoid the impending energy crisis by effective energy management and sustainable national development. The Japanese side has recognized the importance of transferring its technology, which has been acquired through energy crises, in order to maintain the balance in international energy demand-supply. After four rounds of preliminary study, both sides decided to implement this project basically as the Iranian side requested.

Project purpose, which should be achieved by the end of this project, has been set as "The National Training Center for Energy Management contributes to the energy management of the industrial sector." To attain this goal, the Japanese side undertakes dispatching experts, procurement of equipment, counterpart training in Japan and so on. The Iranian side is responsible for necessary human resources, land and building, project running cost etc. The responsible agency of this project in Iran is Energy Efficiency Office (EEO) of the Ministry of Energy, and the cooperation agency is Iran Energy Efficiency Organization (SABA). An energy management training program will be carried out at The National Training Center for Energy Management, which will be established in the premises of the Azarbaijan Higher Education and Research Complex, Tabriz.

Engineers related to energy management in factories are expected to participate in this training from throughout Iran. They will return to their factories to apply steady energy management, which may improve the energy efficiency of the manufacturing lines. The project will support the effort through sincere follow-up. In order to improve the incentives for the industrial sector to send trainees to the program, a JICA Expert will be dispatched to the Ministry of Energy and develop relevant legal and administrative systems.

This project plan has been appraised and judged as adequate in terms of five criteria i.e. relevance, effectiveness, efficiency, impact, and sustainability. Energy management is a priority issue in Iran, and Japan has gained considerable achievement in this field. This is a very reasonable project especially in the aspects of cost to benefit and repercussion effect.



*Project Document*



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## 1. INTRODUCTION

Iran is an oil producing country with a 9% share of the world oil deposit (90 billion barrel), and Japan imports 11% of its oil from Iran. Thus, Iran is an internationally important oil supply country. On the other hand, domestic energy consumption has been growing rapidly in recent years and a study calculated that Iran would become an energy importing country by 2018.

Iran is making efforts for the development of alternative energy such as atomic power and natural gas, as well as for the effective use of household energy consumption. Improper energy efficiency in the industrial sector has long been recognized in Iran. In contrast, the energy efficiency of Japan especially in the industrial sector has been much improved through two oil crises.

With this background, the Iranian government conveyed its request of international cooperation to the Japanese government on September 18, 2000. The proposed project aims for improvement of energy efficiency in the industrial sector of Iran. Upon receiving this request, the Japanese side made four rounds of preliminary studies and discussions, and finally in November 2002, both parties signed the Record of Discussion for this Project.

The main activity of this project is energy management training at the Azarbaijan Higher Education and Research Complex (the Azarbaijan Complex) that is under the Ministry of Energy. This project targets the engineers related to energy management in factories. The term of the project is four years. The project purpose is for ex-trainees to return to their factory to accomplish efficient energy management through their own activities.

The Azarbaijan Complex has been implementing various training and workshops with its sufficient staff and equipment. The Japanese team will transfer its training technology mainly in this complex. It will bear swift rewards in the industrial sector and contribute to the energy efficiency of the nation.

The present government of Iran needs intricate management in various issues such as the domestic political situation, economic embargo of USA, and unstable situation of its neighboring countries i.e. Afghanistan and Iraq. However, this project is expected to be the foundation of long-term prosperity of Iran and the region, as well as the groundwork of good relations between Iran and Japan.



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## 2. BACKGROUND OF PROJECT EXECUTION

### 2-1. GENERAL SITUATION OF IRAN

Iran is one of the biggest oil producing countries with oil deposits accumulating fifth in the world and second in natural gas. This country earns some 80% of its foreign currency from oil and related products. The first five-year national development plan started in January 1990, aimed to liberalize the economy with its first priority in reconstructing the nation exhausted by the Iran-Iraq war. This first national plan maintained 4% of annual economic growth per year and increased GDP by 30% within five years. On the contrary, it caused inflation of more than 20% per year and serious decrease in foreign currency reserve.

The second five-year national development plan, started in 1995, put importance on controlling inflation and improving foreign currency reserve. Unfortunately, with the economic embargo of United States, which started from 1995, and with a drop in oil price, foreign currency reserve worsened. However, the worst situation was avoided by rescheduling debt payment to foreign companies and rescuing loans from abroad. The foreign trade balance is improving after the oil price recovery in 1999.

Since April 2000, the third five-year national development plan (2000-2005) has been implemented with a goal to avoid the "oil mono-culture economy" and shift to a free economy system by promoting an economic structure adjustment policy and introducing foreign capital. Even though the concurrent five-year plan anticipated annual economic growth of 6%, oil export has decreased due to limited oil production with obsolete facilities and growth of domestic oil consumption. This is a disturbing factor for the national economy.

Table2-1.Major Economic Indicators

Iranian Fiscal Year	94	95	96	97	98	99
Real GDP growth rate (%)	1.6	4.5	5.8	3.4	1.6	2.4
Trade balance (100million US\$)	68.2	55.9	74.0	42.6	-11.7	62.2
Ordinary balance (100million US\$)	49.6	33.6	52.3	22.1	-21.4	47.3
Inflation of consumer price (%)	32.9	49.4	23.2	17.3	20.0	20.4

Resource: "Economic trend 4th quarter 99/00," Central Bank of Iran

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## **2-2. SITUATION OF THE TARGETED SECTOR**

### **(1) Policies relevant to Energy**

Energy became an important issue in the 1990's, since Iran began its economic recovery from the declined situation in the 80's. The five-year national development plans after 1990 have been emphasizing policies for rational use of energy and environmental conservation.

The first five-year national development plan, which started in 1990, included policies to achieve the best energy use. Energy conservation by various devices was encouraged. Prices of electricity, gas, and oil products were set at the marginal cost level. Favorable prices were applied to low-income households and the agriculture sector. On the other hand, excessive energy consumption was charged with progressive prices. Pricing policies to reduce energy consumption were introduced.

In the second five-year national development plan, more concrete policies were formulated to reduce energy consumption. These are as follows:

- 1) Formulating standards of energy consuming devices,
- 2) Applying a penalty in case the above standard is not observed,
- 3) Coordination of operation hours to cut the peak-time power consumption,
- 4) Formulation of seasonal regulation to reduce the energy consumption in the busiest months of factories,
- 5) Planning and implementing of loan program with low interest rate for energy conservation related investment,
- 6) Allocation of 2% energy revenue for the energy management studies by relevant authorities,
- 7) Formulation of standards for building energy consumption,
- 8) Promotion of energy conservation consciousness through mass media and school textbooks, and
- 9) Compulsory formation of energy managing group in bigger factories (electricity demand equal or more than 5 MW or with an annual energy consumption of more than 5000m<sup>3</sup> oil equivalent), and training of these energy managing group.

The third five-year national development plan is promoting the following policies to encourage conservation efforts of energy and environment.

- 1) Formulation of energy consumption standard for energy consuming devices and systems.
- 2) Regulation of working hours of the whole year and seasons,
- 3) Regulation of factory operating hours for every quarter,
- 4) Formulation of regulation for building design and construction, and



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- 5) Formulation of a rule to apply a penalty to business firms which exceed defined energy consumption and do not observe relevant regulations.

## (2) Energy Consumption Volume

Energy consumption in Iran showed little variation during the latter half of the 1980's, when the economic situation was deteriorated with Iran-Iraq war. However, domestic industry was revitalized during economic reconstruction after the war with policies relating to a market-oriented economy and economic reform such as deregulation. In this context, energy consumption realized 7-8% of annual growth after 1990, and has been maintaining 4-6% growth post-1995. In 1998, Iran marked 607 toe of primary energy consumption for every million US\$ of GDP (Energy Consumption Unit). This figure was 6 times of Japan, and 1.5-2.0 times of South-east Asian industrial countries.

Table 2-2 Energy Balance

Iranian Fiscal Year	1990	1995	1996	1997	1998
(Total Amount)	(1,000 million US\$)				
GDP (Trillion Rials)	10.7	13.9	14.7	15.1	15.4(187)
Primary Energy Supply*	506	730	763	819	844
Final Energy Demand*	397	555	593	633	651
Electricity Generation (1,000 million kWh)	59.1	85.0	90.9	97.7	103
(per one million Rials of GDP)	(toe/one million US\$)				
Primary Energy Supply*	47.5	52.5	52.0	54.2	54.7(607)
Final Energy Demand*	37.2	40.0	40.4	41.8	42.2(468)
Electricity Generation (WH/Rials)	5.5	6.1	6.2	6.5	6.7

\*Barrels Oil Equivalent per Million Rials

Source : Energy Balances of the Islamic Republic of Iran

Prepared by Energy Planning Bureau of the Ministry of Energy

As Iran consumes more energy per GDP, effective countermeasures to improve energy efficiency are necessary.

## (3) Necessity to Introduce Energy Management Technology

Since the direct energy consumption rate is bigger than the GDP growth as mentioned above, Iran is shifting to an extensive energy-consuming nation. With this trend, domestic oil consumption has been growing year by year. Oil exporting ratio was about 75% in early 1990's, decreasing to some 70% in 1994, and further reducing to some 65% after 1996.

In order for domestic oil consumption to earn more foreign currency, Iran is converting its domestic energy use to natural gas. As a simultaneous countermeasure, introducing technology

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for energy efficiency improvement is useful. Iran has made little progress in modernizing manufacturing sectors, and old-fashioned facilities and ineffective maintenance disturb energy efficiency. Therefore, significant project effects can be anticipated with countermeasures in efficient operational improvement that do not require large-scale investment.

### **2-3. STRATEGY OF IRANIAN GOVERNMENT**

On March 11, 2001, the supreme leader, Ayatollah Khameneie notified General Policies of Iran to judicature, administration and legislative authorities in different sector of economic security, energy, water resource, mining, national resources and transportation. The prospective project may contribute to the article A-7 of the General Policy i.e. "Energy efficiency and reduction of energy intensities."

The concurrent third five-year national development plan proposes the following policies in its article No.121 as substantial actions for energy issue;

1) Formulation of standard for energy consuming devices and systems

A committee organized with the Ministry of Energy, Ministry of Oil, Institute for Industrial Standard, Environmental Conservation Agency, and relevant authorities, formulates consumption standard.

2) Regulation on working hours for the whole year and seasons

The Ministry of Commerce, in collaboration with the Ministry of Energy and Ministry of Interior, proposes regulation of working hours of commercial and industrial sector, especially, rules concerning peak time electric power demand.

3) In case of electric power cut or energy restriction, consumers are exempted payment in proportion to the amount of the detriment.

4) A special committee proposes rules and regulations for the standard that is adapted for energy consumption reduction of public and private buildings, and promotes the rapid procedure. This committee consists of representatives from Ministry of Housing and Urban Development, Ministry of Interior, Ministry of Oil, Ministry of Energy, and Office of Planning and Finance.

Based on these five-year national development plans, the Ministry of Energy drafted "Law on Management of Energy Consumption" (Refer to 3-1.(1) for summary). In August 1999, this draft was approved by the main committee of the cabinet and submitted to the national assembly. For some contents of the expected law, such as rules of penalties and setting-up of inter-Ministries working group, "The Executive Regulation of the Paragraphs A,B,C,D" (see 3-1.(1) for detail) has been approved as a temporally basis until 2005. Enacting the draft law requires

political, not administrative, decisions, since clear demarcation between Ministry of Oil and Ministry of Energy should be defined for the implementation of the prospective law. It includes selection of factories for energy management and penalties for factories that perform poor energy management.

In this context, the Supreme Energy Council was established in 2001. This is established in order to coordinate energy matters including energy policy and merger of Ministry of Energy and Ministry of Oil, which was stipulated in the article 2, the third five-year national development plan. The Supreme Energy Council is not in active since the structure of professional committees is under discussion. Once it is in active, coordination in the execution of the Law on Management of Energy Consumption is entrusted to the Supreme Energy Council.

#### **2-4. RELEVANT ACTIVITIES BY GOVERNMENT AND OTHER ORGANIZATIONS**

##### **(1) Development Study by JICA**

- Study on energy development plan (1992-1994)  
Development of energy model and policy proposals
- Study on optimal energy use (1994-1997)  
Estimation of energy conservation potential in major manufacturing sectors, policy proposals, and technical transfer for energy audit

##### **(2) Group Training by JICA**

- Training in energy conservation (1996-2000)  
Training in policies and energy conservation technology

##### **(3) Collaborative Basic Study by New Energy and Industrial Technology Development Organization (NEDO, Japan)**

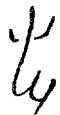
- Feasibility study on improving energy conservation for CO<sub>2</sub> reduction (1999-2000)
- Study on energy conservation at major oil refineries, steel factories, cement factories, and power plants

##### **(4) Technical Transfer by UN-ESCAP**

- Audit of Energy Conservation (1999-2001)  
Implementation of energy conservation audit for Teheran Cement, Iran Tractor Foundry, and a Sugar Factory. Technology transfer for audit.

##### **(5) Policy dialogue with EU**

- EU-Iran Energy Dialogue (2000)



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This aims for a comprehensive policy strategy for the development of the energy sector in Iran in the long term. One of the projects is to enhance competitiveness through sharing information of measures and experience of EU.



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### 3. PROBLEMS TO BE ADDRESSED AND CURRENT SITUATION

#### 3-1. INSTITUTIONAL FRAMEWORK FOR ENERGY ISSUES

##### (1) Energy Management System

Not only the Ministry of Energy but also another authorities (Ministry of Oil, Ministry of Housing, Ministry of Industry, Ministry of Agriculture, Ministry of Transportation, etc.) are dealing with the energy conservation activities that were prescribed in Article 121 of the law for the third five-year national development plan. Authorities and private organizations are making efforts to achieve energy conservation.

"The draft of proposed law on management of energy consumption," is related to energy management administration. The summary of the proposed law is as follows:

- This law aims to prevent waste of energy, improve productivity, conserve natural resources, support sustainable development, and minimize damage to the environment.
- Energy consumption standards for energy consuming devices, procedures, and systems shall be formulated, implemented, and supervised.
- Infrastructures and organizations concerning energy conservation shall be coordinated.
- Rules and regulations with penalties related to energy conservation shall be formulated for each sector (building, industry and service, transportation, energy manufacturing and supply)
- Load control and system coordination of power supply network shall be improved.
- Energy conservation education and training shall be promoted.

Article 12 of this proposed law prescribes that "All corporations with substantial energy demand, which the government defines separately, are bound to establish an energy management unit and take necessary actions concerning energy audit and regulations for effective energy use. Duties and roles of the energy management department are defined in the executive regulation for this article."

The proposed law is awaited approval by the Parliament and the Council of Guardians after the approval by the Cabinet.

By the time of the establishment of the proposed law, "The Executive Regulation of the Paragraphs A, B, C, D" attached to Article No.121 of the third five-year national development plan has been approved by the cabinet on December 4, 2001 and still in force now. The Article No.29 stipulates "Large scale industrial or commercial units with electricity demand equal or more than 5 MW or with an annual energy consumption of more than 5000m<sup>3</sup> oil equivalent are charged with creating an independent unit in their organization structures i.e. Energy Management Department."

At present, there are no rules or regulations that clarify qualification of energy managers and a qualifying procedure. However, the above article will be applied for the execution of energy conservation activities in factories and commercial buildings.

## **(2) Authorities for Energy Administration**

### **1) Ministry of Energy**

The Ministry of Energy was established in 1974 based on Law of Establishing the Ministry of Energy aiming at optimal use of energy and water resources and sufficient supply of them to industry, agriculture, urban areas, rural areas, and transportation sector. The major responsibilities include the followings:

- a) Research on all kinds of energy, long and short-term plan for resource exploitation, appraisal of energy demand of each sector, coordination of energy consumption
- b) Study on unused energies and their identification
- c) Formation of national policy concerning energy
- d) Coordination of activities of each agency concerning energy production, consumption, delivering and distribution
- e) Management of energy consumption and its efficiency
- f) Management of alternative energy consumption of industrial sector
- g) Arrangement of laws and regulations concerning energy production, consumption, delivery and distribution
- h) Information exchange and cooperation in science, technology, industry, and trading with foreign countries and international organization
- i) Construction planning and implementation of power plants, transmission network, and water purification plants
- j) Studying and identifying surface and underground water resources for the implementation of general water use plan with consideration of relevant policies
- K) Substantial study on underground water development and surface water control for the construction of necessary facilities and implementation of water use plan
- l) Construction and operation of water relevant facilities
- m) Water use management and enforcement of law and regulation
- n) Study and application of science technology for improved water resource use
- o) Execution of training for necessary human resource development
- p) Manufacturing and supplying equipment concerning water and power production, consumption, delivering and distribution

ANNEX 7-1 shows organizations relevant to this project in the Ministry of Energy.

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## 2) Energy Efficiency Office (EEO)

The Energy Efficiency Office was founded in 1994 as the leading authority on the matters of energy efficiency and has been playing a major role since then,

- a) Organization: Industry group, Building and Standard group, Transportation group and Awareness and Training group
- b) Staff: 15 personnel (include 3 temporary employees)
- c) Budget: 358,18 million Rials in 2001 (about US\$4.6 million, direct expense only)
- d) Functions: Its functions are as follows:
  - To prepare, set and conduct the necessary policies and guidelines for rational use of energy at the national level.
  - To promote energy management at the consumer level.
  - To design, supervise and cooperate in conducting training course on energy management at the national level.
  - To plan, conduct and supervise pilot and feasibility project for energy efficiency and to develop and improve research project in this regard.
  - To support the establishment of government and private institutes, and to offer technical and financial support for conducting energy efficiency project.
  - To edit, prepare and set energy efficiency standards and codes for equipment and process in aspect of economic and environmental impact.

## 3) Iran Energy Efficiency Organization (SABA)

The Iran Energy Efficiency Organization was founded in 1996 as an implementation agency for energy efficiency measures at the national level, which are decided by EEO.

- a) Organization: The headquarters is in Tehran. The branch offices are located in Esfahan, Mashhad, and other five cities (Arak, Tabriz, Ahvaz, Shiraz, and Tehran) are to be established.
- b) Staff: 60 in total, includes 35 engineers, 17 researchers, and 8 administration staff. 24 personnel are to be employed when the five branches are to be established.
- c) Budget: 100% financed by the government. The budget in 2000 was 5,000 million Rials (approximately US\$635,000)
- d) Function: Functions are as follow:
  - To identify energy saving potential, strategies and implement pre-feasibility and feasibility study on the consumer sectors for promotion of energy efficiency at the national level.
  - To consult energy efficiency issues,
  - To manage and implement the training and awareness activities for energy.
  - To proceed the research and development for energy efficiency standardization in process and equipment, and cooperate and coordinate with industries in this regard,.
  - To conduct environment impact assessment
- e) Training: More than 1000 personnel were trained by 1999. Four training courses were operated in 2000.

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- f) Activity to promote the low interest loan: SABA organize the seminar (4 times last year) to promote the low interest loan (four year loan with interest rate 18%, which is 23-27% in market) for the investment to promote energy conservation

### (3) Training Centers

There are five technical education and training centers under the Ministry of Energy as follows. The Azarbaijan Complex excels in electricity and electricity networking and has recently conducted energy management courses. The share of participants and evaluation scores of training courses for energy management stipulated in the second five-year plan are shown in the Table 3-1.

Table 3-1 Comparison of training centers under the Ministry of Energy

	Azarbaijan	Esfahan	Fars	Qarb	Khorasun
Share of Participants	25%	10%	15%	5%	15%
Evaluation by SABA (4point full)	3.5	2.7	3.0	2.5	3.0

The training courses scheduled at the major three centers in 2002 are given in Table 3-2.

Table 3-2 Training courses list at the major training centers

Name of Center	For B.S. holders	For Technicians	To earn B.S.	Total
Azarbaijan	94	76	48	218
Khorasun	35	103	22	160
Esfahan	27	111	25	163

### (4) Energy management activities related to Ministry of Oil

#### 1) Ministry of Oil

The ministry of oil has jurisdiction over the supply side of energy issues such as domestic natural gas supply, alternative fuel, and fuel pricing. It also deals with energy resource issues such as oil exportation and natural gas development, among public energy administration.

The Ministry of Oil is one of the members of a working group for energy conservation prescribed by the tentative administrative instruction of "The draft proposed law on management of energy consumption."

#### 2) Iran Fuel Consumption Optimizing Organization (IFCO)

The Iran Fuel Consumption Optimizing Organization, founded in 2000 under the National Iranian Oil Company and directly connected to the Ministry of Oil, is an organization for energy conservation promotion with a central focus on the supply side of energy. IFCO

performs the budget management, feasibility studies, operational management and evaluation in order to promote energy conservation in transportation, facility and building, and industry. The research and development are consigned to the Sharif Energy Research Institute and the training activities are consigned to the National Energy Institute.

### 3) Sharif Energy Research Institute (SERI)

The SERI is a research institute founded in 1999 with support from the Ministry of Oil and the Sharif Technical College. This institute conducts studies on energy-economy-environment models and energy information systems as well as improving laboratories and libraries. In addition to that, the master degree course of SERI conducts research on energy model, energy conservation and environmental technologies. SERI has experience as the cooperative agency of the Joint Implementation of Basic Study with the New Energy and Industrial Technology Development Organization (NEDO, Japan). The projects implemented by SERI from 1992 to 1999 are as follows:

- 1992-1994: Comprehensive Energy Development Plan of the Islamic Republic of Iran
- 1992-1994: Comprehensive analysis of energy development in the Islamic Republic of Iran (This project was implemented in cooperation with the Institute for Energy Economics in Japan (IEEJ) as the JICA Development Study.)
- 1995-1996: Analysis of Rational Use of Energy in the Socio-Economical Sectors of the Islamic Republic of Iran
- 1997: Reallocation Program of Subsidies for Energy Resource
- 1995: Model of Optimal Energy Recirculation Flow in Power Plants
- 1998: Optimization of Energy Recirculation Flow in Razi Petrochemical Complex
- 1998: Risk analysis of CO<sub>2</sub> emission
- 1998: Comprehensive Energy Management System in Iron and Steel Industry
- 1999: Model for energy recirculation flow in Aluminum Manufacturing

### (5) Supreme Energy Council

To coordinate energy efficiency activities by various actors, the Supreme Energy Council was established in 2001. The members are; Ministry of Oil, Ministry of Energy, Ministry of Economy and Finance Affairs, Ministry of Industry and Mines, Ministry of Agriculture, Atomic Energy Agency, Ministry of Environment Protection, and Management and Planning Organization as the Secretariat.

## 3-2. ISSUES TO BE ADDRESSED AND CURRENT SITUATION

The total domestic energy consumption covers 44 % of the total energy production. Oil consumption is still increasing since 36% of the population was less than 15 years of age at the start of 2000<sup>1</sup>. Some research says that Iran will have to import energy by 2018 if the annual

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<sup>1</sup> Economist Intelligence Unit 'Country Profile 2000 Iran'

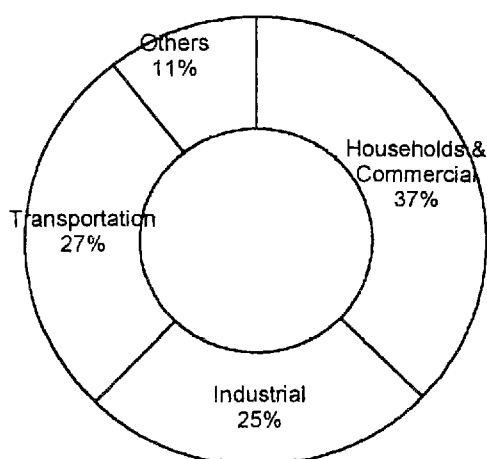


growth in energy consumption remains at 6%. Therefore, promotion of efficient use of energy (energy conservation) is a very important issue.

In general, it is important for energy management to diversify energy supply and to control energy demand: energy efficiency activities for demand control, development of oil-alternative energy for diversification of energy supply, effective energy production and distribution. In addition, other policies are also important, i.e., energy price setting such as energy price discrimination different sectors (industrial, households and commerce, transportation, etc.) to invoke incentives for energy efficiency, development of comprehensive legal structure, training of energy-related engineers, development of financial facilities like loan or tax reduction to promote energy efficiency.

The share in energy consumption by sectors is illustrated in Figure 3-1.

Figure 3-1. Share of Energy Consumption by Sectors



Source: Energy Balances of the Islamic Republic of Iran, 2000

There can be various approaches and projects to achieve energy management as mentioned above, which is an issue of national priority. Synergy effect is requested as an integration of effective efforts in each sector. Important energy management issues and current activities in Iran are as follows;

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**(1) Diversification of energy supply - Development of oil-alternative energy**

Iran is trying to switch from oil to natural gas as energy supply. The development of natural gas pipeline network reached 60% from 20% in twenty years ago. Development of nuclear energy power and wind power generation is also in progress.

**(2) Energy price setting**

Generally speaking, energy-management consciousness of the nation is not high since energy prices are kept low by government subsidy. Energy pricing policies should be conducted strategically.

**(3) Enhancement of legal system**

At present, "The draft of proposed law on management of energy consumption" has been submitted to Parliament and enactment is awaited. For the promotion of energy management in each corporation, it is important to clarify the duties and roles of the energy management units prescribed by the proposed law, and to define responsibility of the energy managers as the leading personnel in each energy management unit. The following measures are to be put into practice. These actions are expected to work effectively together with the training of energy management engineers.

- 1) Designation of factories and buildings as targets of energy management
- 2) Establishment of an auditing system for energy management
- 3) Penalties to factories and buildings that conduct insufficient energy management
- 4) Incentives such as tax reduction to factories that conduct good energy management
- 5) Public finance for the investment of energy management equipment

**(4) Efficiency improvement in energy producing and distributing sector**

Energy loss in thermal power plants, power transmission, and power transformation is 15%, while the international average is about 8%. Training to reduce this loss has been conducted.

**(5) Energy management measures in industrial sector**

Energy consumption efficiency in the industrial sector is often measured with Specific Energy Consumption (SEC). Iranian manufacture marks very high values with SEC. In other words, Iran consumes more energy per unit of product. Proper energy management in the industrial sector is a big issue for the sustainable development of Iran, as this sector is significant in supporting economic growth in the future. The government is trying to improve energy efficiency in the industrial sector through the training of engineers, controlling factories, offering incentives such as loan and tax reduction.



**(6) Energy management measures in transportation sector**

Though managing energy consumption of private and business motor vehicles is not easy, the government is planning to decrease consumption by fuel pricing, i.e. by reducing government subsidy to motor fuels.

**(7) Energy management measures in commercial sector and households**

Auditing of energy management of houses and commercial buildings, power efficiency tags on electric devices, reduction of government subsidy for stove oil (kerosene) shall be executed as energy management measures.

The cooperation project concentrates its efforts on energy management in the industrial sector. Since it easily identifies the target group and Japan has valuable experience, swift rewards are anticipated. Among the above mentioned items, item (5) and coordination of item (3) are included in the prospective project. However, the other items will improve national energy management ability if combined with energy management measures, to which this project will contribute.



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## **4. PROJECT STRATEGY**

### **4.1. PROJECT SELECTION**

Through the two energy crises in 1973 and 1978, the Japanese private and public sectors have made efforts in efficient energy management, and succeeded to improve energy efficiency especially in the industrial sector. Efforts for energy efficiency improvement in the industrial sector can make an impact within the short term, and Japan has acquired technical know-how for this issue.

Judging the Iranian situation from this point of view, effective energy management is not adapted to factories and buildings because of insufficient management technology, relevant experts, and energy management consultants. Interviews with large-scale energy consuming companies revealed that the importance of efficient energy management is well recognized but appropriate methodology is not available. The necessity for human development of high-quality energy management engineers has been identified.

Considering this situation, this project has been planned with the aim of energy efficiency improvement in the industrial sector. Human development of engineers related to energy management in factories as well as development relevant legal and administrative systems and coordination among relevant agencies will be carried out as project activities.

#### **(1) Human resource development of energy management engineers**

As planned in the Second Five-year National Plan, EEO and its five training centers are implementing training for energy management. This program trains 1200 persons every year. However, the practical aspect of this program is not sufficient. Therefore, it is necessary to commence a new training program with proper equipment and up-to-date contents.

There is no appropriate training for promoting consciousness of energy conservation in each company, which is an important role of energy managers. In order to develop high-quality energy managers who promote energy conservation activities in each company, it is important to set up a training center with suitable condition of instructors, curriculum, training facility and equipment, text books and so on.

This training for energy management engineers will be carried out in the National Training Center for Energy Management (NTCEM) which is established in the Azarbaijan Complex, Tabriz.

#### **(2) Development of relevant systems and coordination among related agencies**

Besides human resource development of energy managing engineers, increasing the incentive for the training participants and developing the working environment for the ex-trainees are also

placed as activities of this project. When policies mentioned in 3) development of legal systems (page 12) are applied, this energy manager training program should be incorporated. More specifically, if the energy manager training program is authorized as "national credited training" in the Energy Consumption Management Act, establishment of the energy management system of the industrial sector may be much promoted at the national level.

Not only the Ministry of Energy but also the other agencies (Ministry of Oil, Ministry of Housing, Ministry of Industry, Ministry of Agriculture, Ministry of Transport, etc.) are taking actions for the promotion of energy management. Cooperation among these agencies such as policy collaboration and exchange of information is inevitable.

These tasks, i.e. development of relevant systems and coordination among related agencies, are incorporated in the project to best adjust the role of the technical training course in the whole picture. A JICA expert of energy conservation policy to EEO mainly undertakes relevant activities.

#### **4-2. PROJECT STRATEGIES**

This project is carried out with the intention to improve the energy efficiency of the industrial sector by the technical dissemination of energy management in manufacturing businesses. Project strategies have been arranged for this training or human resource development project so that it can contribute effectively to the real business. The following five points are designed and incorporated for the project to better contribute to the industrial sector.

##### **(1) Project Purpose**

The project purpose was set as "The National Training Center for Energy Management contributes to the energy management of the industrial sector." The super goal has also been adjusted to this project goal. The original project title "National Training Center for Energy Management" was changed to "Energy Management Promotion." These changes were necessary because this project should not be concluded in the training center, but should be evaluated by "how it contributes to the real business."

##### **(2) Expert of Energy Conservation Policy**

An expert of energy conservation policy is to be dispatched to the EEO office, Tehran. In order to improve the energy efficiency of the industrial sector, the Iranian government is planning various actions such as designation of factories that should be audited, low interest loan for improving energy management abilities, tax reduction, and penalties to the factories with insufficient energy management capability. This policy planning progress measures significantly influence the activities of the NTCEM. The role of the prospective expert of energy conservation policy is to correctly adjust the function of training activity in the whole energy policy structure, and if necessary, to give advice to the training program so that it is

better incorporated in the energy policies. With this strategy, the contribution of the project activities to the whole energy policy structure can be optimized.

**(3) Qualification for Training Certificate**

After completing the training course, trainees go back to their factories and make a report for analysis and an improvement plan of energy management in their own factories. Only the trainees whose reports satisfy the qualification of the training center can get the training certificates. This will better motivate the ex-trainees to apply the training results to the real situation. The other merit is that training instructors can comprehend what goes on in the factories.

**(4) Cooperation with SABA**

To make training programs at the Azarbaijan Complex more reflective to the felt-needs at the industrial sector, the Project make the most of SABA's experience and information. For example, SABA staff members cooperate as lecturers on energy audit at the Center, while lecturers at the Azarbaijan Complex join energy audit conducted by SABA.

**(5) Aftercare of the ex-trainees**

To promote the cooperation between training center and factories where realistic energy management is performed, an aftercare system for the ex-trainees by the training instructors shall be established in the project. This will fortify the relationship between training and real business. Examples of the actual aftercare are consulting to the ex-trainees who have difficulties in actual activities, delivering information on factory managers who have successfully found solutions to specific problems, arranging excursions for specific topics, etc.

**(6) Evaluation, review, and improvement of the training course**

The contents of the training course should be reviewed and improved constantly considering the advice of the expert of energy conservation policy, feedback from industrial sector and ex-trainees, EEO, SABA, and others so that the training can best match the need of the real operation in the factories.



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## **5. BASIC PLAN OF THE PROJECT**

The basic plan of the project agreed by Japanese and Iranian sides is as mentioned in this chapter. Descriptions here are composed of the contents of Project Design Matrix (PDM, refer to ANNEX 7-2) and an explanation of them. **Bolded texts** in this chapter indicate quotation from the PDM. Tentative Schedule of Implementation, Plan of Operation, Annual Plan of Operation for the year 2003 are attached as ANNEX 7-3, 7-4, and 7-5.

### **Project title and other information**

Project title is set forth as **“The Project on the Energy Management Promotion in the Islamic Republic of Iran.”**

Project Location is **“Azarbaijan Higher Education and Research Complex for Water and Electrical Industry (AERCT) and EEO office in Tehran.”**

Target group of the project is **“Energy related engineers in industrial sector (Priority is given to larger factories with more than 2MW demand or 2000m<sup>3</sup> of oil equivalent energy consumption per year).”**

Project Period is **“From March 2003 to March 2007 (4years).”**

### **5-1. PROJECT PURPOSE**

The project purpose has been agreed as **“The National Training Center for Energy Management contributes to the energy management of the industrial sector.”** Factories where ex-trainees are working will be evaluated. Indicators of this evaluation shall be defined with calculated SEC in reports by the ex-trainees. SABA will make survey with SECs for evaluation. However, calculated SEC can be optimistic, other qualitative indicators are added to SEC. That is; numbers of ex-trainees reports accepted by the factories and number of factories which can obtain financial facilities for energy efficiency activities.

### **5-2. OVERALL GOAL**

The overall goal was set as **“Through promotion of rational use of energy, enhancement of energy management in the industrial sector is achieved.”** All the factories of the Iranian industrial sector shall be evaluated with area-specific SEC units – the same as in the evaluation of 5-1 above. The Iranian side is responsible for proposing each SEC.

Three important assumptions, which connect achievement of the project purpose to the fulfillment of the overall goal, were set up.

The first assumption is **“The Iranian Government keeps supporting the energy management activities.”** This assumption might not be fulfilled in case of warfare and political instability, which may discourage the government priority for energy management.

The second assumption is **"Energy cost does not become significantly cheaper."** Factors such as demand and supply, and subsidy decide the energy price in Iran. If the domestic energy price diminishes drastically in the future, it will hurt the motivation for energy management of the factory managers and might increase the SEC rate.

The third assumption is **"Economic condition does not worsen significantly."** A big depression makes the industrial demand smaller and factory's operation rate worse. This might result in an increase in SEC rates and disturb the achievement of the overall goal.

### **5-3. OUTPUT AND ACTIVITIES**

#### **(1) Output 1 and relevant activities**

Output1 was set as **"Policies and administration structures for energy management of the industrial sector are coordinated so that the contribution of the project becomes effective."** This output is expected to be achieved through the activities of a JICA expert of energy conservation policy dispatched to EEO.

Activity1-1. **"Analyze on-going policies of energy management in the industrial sector."** This means to collect up-to-date information on energy policy.

Activity1-2. **"Propose effective policy for energy management to the relevant agencies so that the training in the center makes maximum effect."** This is to rationally optimize the role of this training project in the whole energy policy structure by offering favorable treatment to ex-trainees and their factories or by proposing practical coordination with similar programs of the Ministry of Oil.

Activity 1-3 is **"Manage to offer training programs that best meet the needs of the industry and the nation."** This is an activity to improve the contents of the energy management training program corresponding to the framework of the related policies. The strategy is to arrange the working environment of the training program with Activity 1-2, and to make the training program evolve itself by this activity 1-3.

Activity 1-4 **"Carry out necessary dissemination activities for energy management."** The necessity of energy management shall be appealed through introduction of Japanese energy management policy by the expert of energy conservation policy and announcement of the training project progress and results.

#### **(2) Output 2 and relevant activities**

Output 2 was set as **"Counterpart (instructor of the training program) are able to operate and maintain the training facilities and equipment."** The four activities mentioned below make this output. An important assumption, which connects activities to the achievement of the





output, was set up as **“Machinery and equipment provided by the Japanese side obtain easy custom clearance.”**

Activity 2-1 **“Elaborate a plan on maintenance of the facilities and equipment.”**

Activity 2-2 **“Install facilities and equipment.”** These provided by the Japanese side will be installed as soon as the building for the practical training is completed.

Activity 2-3 **“Carry out the technical training on its operation and maintenance.”** This activity is to transfer the technology from Japanese experts to the Iranian counterpart.

Activity 2-4 **“Make rules and manuals for operation and maintenance.”** These rules and manuals may enable the Iranian side to operate and maintain the provided equipment by themselves.

### **(3) Output 3 and relevant activities**

Output 3 was set as **“Both theoretical and practical training for energy related engineers are maintained and managed continuously.”** This output aims for a situation in which training implementation is possible without any support from the Japanese side. The seven activities that are proposed to achieve this output are mentioned below. An important assumption, which connects project activities to the achievement of the output, was set up as **“Counterpart remain in the Center.”**

Activity 3-1 **“Collect and analyze up-to-date information for appropriate training program.”** Continuous effort is necessary to identify the energy management technology needed by the industrial sector. Since the energy related engineers from each factory are the clients of the project and they actually pay the tuition.

Activity 3-2 **“Formulate curriculum for the training course and prepare materials.”**

Activity 3-3 **“Implement the counterpart training in the Azarbaijan Complex.”** The Iranian instructors of the training center will directly train the target group, which is the energy related engineers from factories. Japanese experts will make technical transfer to the instructors as project counterpart personnel.

Activity 3-4 **“Implement the training courses.”** The Iranian instructors undertake this task in the training center with support from Japanese experts. For the specific program contents of the prospective three courses (General, Heat, and Electric courses), please refer the ANNEX 7-6.

Activity 3-5 **“Examine & evaluate trainee’s reports (energy management audit and improvement plan) to issue certificates.”**

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Activity 3-6 "Take necessary action for the aftercare of the ex-trainees." Upon request from ex-trainees who had difficulties in applying energy management to their factories, necessary support will be delivered for appropriate solutions.

Activity 3-7 "Monitor the efficiency of training courses and improve them." This corresponds to Activity 1-3. Constant effort is requested to supply the best training that meets the requirement of the energy management of the industrial sector.

#### **5-4. STRATEGIES OF PROJECT IMPLEMENTATION**

While training activities are conducted in the Azarbaijan Complex in Tabriz, it is important to collaboration between Tehran (EEO and SABA) and Tabriz (the Azarbaijan Complex) in order to make training programs responsible to the felt-needs at the industrial sector.

For training programs at the national level, the following approaches are taken.

- 1) The felt-needs at the industrial sector should be reflected in training programs through collaboration between SABA and the Azarbaijan Complex, by, e.g., personnel exchange and information exchange
- 2) An expert of energy conservation policy in Tehran advises EEO on cooperation system among agencies concerned in the Project, i.e., EEO, SABA and the Azarbaijan complex.

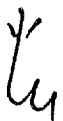
In addition, energy efficiency activities are promoted by advice by the expert of energy conservation policy on Japanese experience in energy efficiency, other than training, such as energy price setting or introducing incentive scheme for energy efficiency activities in the industrial sector.

#### **5-5. MONITORING AND EVALUATION**

As a means of verification of the performance of this project, opinions of factory managers and trainees are highly respected. Since a Japan-Iran joint evaluation team will be formulated for intermediate and final evaluation of the project, it is preferable that representatives of the Iranian industrial sector also join this committee.

#### **5-6. COMMITMENT OF IRANIAN COUNTERPART AGENCIES**

The Iranian side has committed to securing eight project instructors (counterpart personnel of the Japanese experts) by adding three in the Azarbaijan Complex. A site for the building that will accommodate project equipment has been obtained. The Iranian side explained that the budget for the building construction will be authorized as soon as the Record of Discussion is signed.



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## **5-7. INPUT**

### **(1) Input from Japanese side**

Japanese input is as follows:

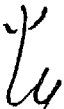
1. Dispatch of Personnel
  - 1) Long-term experts
    - Chief Advisor (48 man months)
    - Project Coordinator (48 man months)
    - Expert of Heat Energy management (48 man months)
    - Expert of Electric Energy Management (48 man months)
    - Expert of Energy Conservation Policy (period depends on recruitment in Japan)
  - 2) Short-term experts
    - Appropriate number of other experts will be dispatched as necessity arises (example of the technical fields: equipment installation, dissemination, teaching method, building energy management, etc.)
2. Training of counterpart in Japan (approximately 2-3 personnel per year)
3. Machinery and equipment as agreed in a list separately. (List is attached as ANNEX 7-7)

### **(2) Input from Iranian side**

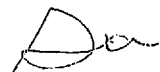
1. Personnel
  - Project Director
  - Project Manager
  - Project Coordinator
  - Professors (Candidates list is attached as ANNEX 7-8)
  - Staff for administration
  - Technical specialist (Associate instructors)
  - Secretaries
  - Drivers
2. Land, buildings, rooms, and facilities
  - Offices and necessary facilities for the Japanese experts and Iranian counterpart
  - Meeting rooms for the transfer of technology
  - Buildings, facilities and space necessary for the equipment to be provided by JICA
3. Local cost
  - Necessary budget to implement the project, including the in-land transportation and installation cost for the equipment.

## **5-8. ORGANIZATION FOR THE PROJECT MANAGEMENT AND IMPLEMENTATION**

There are three agencies in Iran that relate directly to this project, namely, EEO, SABA, and the Azarbaijan Complex, Tabriz



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EEO, as the responsible agency, undertakes budget allocation for the project implementation, establishment and management of the NTCEM, policy planning related to the energy management, coordination of relevant agencies, and so on. At the same time, EEO is an implementing agency of the project, since it implements policy planning and coordination of the relevant agencies with a expert of energy conservation policy from the Japanese side as part of the project activities.

SABA is the cooperation organization of the project. It undertakes advice to the NTCEM, coordination of the project activities, selection of trainees, evaluation of the training course, producing project evaluation report and submitting it to EEO, issuing certificates to the training participants.

The Azarbaijan Complex is the implementing agency that sets up the NTCEM in its premises for the execution of the training part of the project activity.

ANNEX 7-9 illustrates the structure of the project implementation. In addition, a joint coordinating committee will be formulated to meet at least once a year for effective management of the project. ANNEX 7-10 shows the prospective committee members.

#### **5-9. PRELIMINARY CONDITIONS AND OBLIGATIONS**

Pre-condition is set in PDM as "**Necessity of energy management will not be decreased.**" Besides this, the Japanese and Iranian sides agreed that the Iranian side is responsible for securing the budget for the building that will accommodate the equipment procured by the Japanese side, and for confirming the opinion of the industrial sector concerning the drafted contents of the training program.



## **6. OVERALL JUSTIFICATION OF THE PROJECT IMPLEMENTATION**

Is it appropriate to implement the agreed energy management promotion project? This chapter makes a diagnosis to answer this question from the point of view of overall appraisal. The five criteria (relevance, effectiveness, efficiency, impact, and sustainability) employed by the Organization for Economic Co-operation and Development (OECD), is used for this appraisal.

### **6-1. RELEVANCE**

#### **(1) Suitability as public/ODA project**

This project may have a big influence and good impartiality because it transfers technology to a national training and research institute and promotes training the human resource of the industrial sector on a large scale. The project target group is the Iranian industrial sector, more specifically, engineers related to energy management of large scale factories. Some 80% of the large scale factories in Iran are state owned enterprises, which have been managed in advantageous circumstances with energy subsidy and little competition.

However, in the long perspective, revitalization of the state enterprises and elimination of energy subsidy are expected, which spurs the factories to strengthen their competitiveness. Factory managers are much interested in appropriate energy management as it has a significant effect on cost reduction. Therefore, the project target group has a need for obtaining energy management know-how by training the engineers in charge.

Nevertheless, it is difficult for each factory to operate energy management training in terms of cost, scale, and expertise. A bigger effect in terms of economy, fairness, and technology can be anticipated through concentrated technical training by the public sector. Japanese technical cooperation to this project can make a big impact on Iranian society.

In addition to that, Iranian oil and natural gas are so-called public goods, and should be exploited over generations. Appropriate energy management can reach large beneficiaries, therefore, this project is to be supported by ODA for its public benefit and fairness.

#### **(2) Conformity to the Japanese ODA policies**

Japan has been making constant efforts to maintain a good relationship with Iran for the stability of Middle East region through solidity of this power. Especially, after the taking over of the current government, Japan kept its policy to support Iranian reformation efforts. The energy management promotion project will contribute to the sustainable development of the Islamic republic. For Japan, a big energy importing country, it is important to secure energy availability for the world for energy security of Japan.

**(3) Conformity to the needs of Iran**

Reduction of energy consumption is counted as one of the issues with national priority and mentioned in the General Policy Statement issued by the Supreme Leader, Ayatollah Khameneie. Specifically, this subject is to be prescribed in the prospective "Law on management of Energy Consumption," and promoted at a national level.

This project attempts to establish a training center where human resources are developed for support of this policy, to train energy managers in industrial sector, which may result in effective use of energy. The counterpart agency of this project, EEO in the Ministry of Energy is responsible for energy conservation in Iran. The Azarbaijan Complex, which is a research and training institute for energy issues under the Ministry of Energy, plays a major role in promoting related policy. This project deals with an issue of national priority and is implemented by the leading training institute under the responsibility of the authority in charge. Thus, this project meets the needs of Iran and the implementing institute is appropriately selected.

**(4) Advantage of Japanese technology**

Japan has high-level technologies in energy management and has achieved many international operation projects. Japanese energy-conservation measures in the industrial sector have been significantly promoted through two oil crises. As a result, the annual growth rate of energy consumption in the industry sector is as low as 0.1% from 1974 to 1998. Comparing with Iran, Japan needs much less energy per GDP (one million US\$). Japan marks 96 toe (Tons of Oil Equivalent) while Iran requires 1,037 toe.

Not only the industrial (manufacturing) sector, but also each household and business (commercial, service) sector as well as the transportation sector, consume energy. Nevertheless Japanese practice and technology for energy management have a great advantage in the industrial sector, and it is reasonable for Japan to cooperate in this field.

**6-2. EFFECTIVENESS**

**(1) Logic of the Project Plan**

The core activity of this project is technical training for energy related engineers in factories. The target group is supposed to be highly motivated to learn energy management technology. Hence, if technical training is executed appropriately, most likely, ex-trainees go back to their factories and make effort for proper energy management. Each industrial sector well recognizes the necessity of energy conservation but lacks technical personnel who can take action properly. Consequently this human resource development project has high effectiveness. Thus, the project purpose i.e. "The National Training Center for Energy Management contributes to the energy management of the industrial sector" should be accomplished without any major problem.

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The implementing agency, the Azarbaijan Complex, has been successful in training for years, and can organize a system for implementation of energy management training in collaboration of Japan with ease. The quality of the training program can be secured by putting importance on opinions of the target group (trainees and factory managers), by monitoring and evaluation, and by improving the program as necessary.

To reflect needs of industrial sectors to training programs, the Project make the most of industrial information of SABA, the cooperation agency of the Project by, e.g., personnel exchange between SABA and NTCEM. This system increases effectiveness of the Project.

### **(2) Setting Level of Project Purpose**

The purpose of this project was set up as "the National Training Center for Energy Management contributes to the energy management of the industrial sector." The performance of energy management in factories is directly evaluated as the indicator. This project purpose is rather ambitious when compared to similar JICA projects.

Project purposes of the conventional JICA technical training projects are mostly like "The training system of X institute is established," or "Technical training is executed in the Y institute." Very few of them are committed to the effects and contribution to the actual world.

This project purpose to be achieved was thus set at a higher level, which may require tough effort of the personnel concerned. However, this project purpose is considered attainable because the Azarbaijan Complex already has considerable capability, and the contents of the technology which are transferred from the Japanese side is clearly defined.

### **(3) If Important Assumptions are fulfilled for the Attainment of Project Purpose**

As important assumptions, five issues are listed namely, "The Iranian Government keeps supporting the energy management activities", "Energy cost does not become cheaper significantly", "Economic condition does not worsen significantly", "Counterpart personnel remain in the Center", and "Machinery and equipment provided by the Japanese side obtains easy custom clearance." There is a possibility that these issues are not satisfied. Priority of the energy conservation policy and the position of the training center may stay high since the deposit of oil in Iran is limited.

## **6-3. EFFICIENCY**

### **(1) Cost to Benefit/Result**

This project intends to make use of human resources and facilities of the Azarbaijan Complex that has long been active for years. The knowledge and technical level of the counterpart

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personnel is high enough for smooth technical transfer. Effective technical transfer is expected through long and short term JICA experts and through counterpart training in Japan.

The project will make optimal use of the existing facilities and equipment for the activities. Many items of the equipment provided by the Japanese side can be procured locally in Iran, and spare parts will be available during and after the operation of this project. A new building will be constructed at the expense of the Iranian side since the existing buildings are not spacey enough to accommodate all the equipment provided by Japanese side. This is the most economical alternative possible in the given situation.

The project site is expected to be a human resource development agency in the Law on management of Energy Consumption, which is under preparation. And this training program is anticipated to be an authorized course for national qualification. This is very preferable timing to start the project as legislation and technical transfer take place simultaneously.

Judging from the above situation, inputs and activities of the project will result in the expected three outputs as previously mentioned in Chapter 5-3. Since project activities include many ideas to achieve the project purpose, three outputs will make the project purpose happen without difficulties.

## **(2) Cost and Benefit**

10% of energy conservation can be anticipated without any new investment if the ex-trainees of the project go back to their factories and execute appropriate energy management<sup>2</sup>. In Iran, 2,200 factories with more than 50 employees consume 81% of energy consumption by the industrial sector<sup>3</sup>. If an energy manager is available in every factory of those 2,200 to save 10% of the energy consumption, the conservation effect would be \$US388 million per year<sup>4</sup> (based on the condition of crude oil price \$US20/barrel). This figure is much bigger than the expected project cost. This means that the project is an efficient public investment.

## **6-4. IMPACT**

### **(1) Possibility to achieve the overall goal**

There is a strong possibility for the overall goal to be achieved. This project will make a considerable impact to the Iranian socioeconomic situation. The achievement of the project

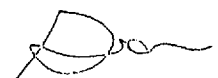
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<sup>2</sup> SABA

<sup>3</sup> EEO

<sup>4</sup> As a whole, Iran's energy consumption is  $4.72 \times 10^{15}$  Btu per year, and the industrial sector takes 27% of this i.e.  $1.27 \times 10^{15}$  Btu. If 10% of this is saved, it reduces  $1.27 \times 10^{14}$  Btu. With the other measuring units, this is equal to  $3.20 \times 10^{13}$  kcal, 3.2 million toe, and 23.7 million barrel. Even if the oil price is set very low as \$US20/barrel, the energy conservation effect would be \$US474 million/year.

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purpose is evaluated with the performance of the effective energy management in factories where ex-trainees work. This project planned that energy related engineers of all the major factories participate the training, therefore, the overall goal "Through promotion of rational use of energy, enhancement of energy management in the industrial sector is achieved" would be accomplished presumably.

## **(2) Socioeconomic Impact**

### **1) Impact on Relevant Policies**

Iranian government is now subsidizes oil fuel to decrease the economic burden of the people, which is promoting extensive energy consumption. The authorities well recognize that they should plan efficient use of energy, and are try to find a way to cut the subsidy for energy and raise the fuel price in medium or long term basis. In this context, the project that promotes proper energy management is match the government intention to normalize the energy price.

In addition to that, the Iranian Government is planning to privatize state owned factories, which requires competitiveness of each factory through effort for quality improvement of the products and for cost reduction. This project will make a positive impact in promoting the competitive capability of the industrial sector since appropriate energy management directly results in cost reduction.

### **2) Institutional Impact**

This training course would be approved as a national license program. If regulations make it compulsory that licensed personnel are assigned for energy management, each company will introduce prestigious treatment for accredited persons and this will further improve the level of the license holders. License holders should preliminarily examine application documents of loan for energy conservation investment; the Ministry of Energy is trying to organize such an administrative mechanism. Once realized, this may motivate factories to dispatch their engineers as trainees to this program.

### **3) Socio-cultural Impact**

The beneficiary of this project is the industrial sector, i.e. factories. Even though there are 30.000 factories in Iran, only 2.200 factories have more than 50 employees. These larger factories comprise only 7.2% of the total factory number, however, they employ 68% of the total work force and consume 81% of the total energy in the industrial sector. Thus, execution of energy management in the large scale factories involves many factory workers and dissemination of "Energy Management Culture." A big campaign for energy management in industrial sector may positively affect the energy management promotion in other sectors such as households and transportation.

In addition, agencies for power generation, transmission, water and sewage at city and village level are affiliated companies under the Ministry of Energy. These factories will send trainees

to the program corresponding to the instruction of the Ministry. This institutional structure may extend the energy management culture to every corner of the nation.

The project effect would continue in a sustainable manner as the training project in the Center for Energy Management Promotion will continue even after termination of the JICA cooperation.

#### 4) Technical Impact

Eight counterpart personnel are expected to obtain direct technical transfer from Japanese expert group. Engineers from factories that consume bigger energy will be accepted to the training program with priority. For example, a survey counted 539 factories with electricity demand equal or more than 2MW or with an annual energy consumption of more than 2000m<sup>3</sup> oil equivalent. The project may have trained a much larger number of trainees than this figure by the end of the four-year activities.

The training program has three courses i.e. general course, electricity course and heat course. Both theoretical and practical training will be carried out for the proper operation of equipment and facilities in factories. Trainees can also become skilled in energy management of factory and other buildings as the training curriculum partly includes building energy management.

#### 5) Economic Impact

Management effectiveness and profitability of each manufacturing sector may be developed through the promotion of proper energy management. As a result, domestic energy management will improve. This may reduce domestic oil consumption and increase the export portion. Thus, this project is anticipated to contribute favorably to the national economy and the international balance of payments.

#### 6) Other Impacts

In addition to the impacts mentioned above, promotion of energy conservation will significantly contribute to environmental conservation by decreasing energy consumption and CO<sub>2</sub> emission

### **6-5. SUSTAINABILITY**

#### **(1) Ability of Relevant Agencies**

The preliminary study found that the Azarbaijan Complex, the project site, has experienced relevant training courses under EEO, and has secured a budget for project execution. The prospective training course is billed to the participants and their companies may settle the payment. Sustainability concerning the ability of the relevant agency may be satisfied because



this training center will be authorized as a sole training implementing agency by laws and regulations.

**(2) Financial Situation of Iranian Side**

No additional cost is expected after completion of the JICA cooperation. As far as training contents meets the needs of industrial sector, demand for the training persists and it makes the program operation possible.

**(3) Social, Environmental, and Technical Acceptance**

The industrial sector, which is the beneficiary of the project, is very keen to reduce manufacturing costs and to strengthen competitive ability through proper energy management. Introducing ISO 9000 series and 14000 series is becoming popular among advanced factories; they have high motivation and skill to introduce advanced technology. Therefore, as far as the industrial sector evaluates this training program to have a positive effect, this project is continuously accepted socially, environmentally and technically.

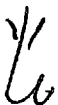
**6-6. OVERALL JUSTIFICATION OF THE PROJECT IMPLEMENTATION**

This project targets an issue of Iranian national priority and it is notable that Japan has already achieved many international cooperation in this issue. This project is very adequate in terms of cost to benefit and impacts. This international cooperation will result in a concrete cost reduction, which further enhances the importance of this issue. Moreover, improvement can be anticipated through further investment of human resources and machinery. The institutional system for the project, which is still under improvement, seems adequate. The project implementation is justifiable since there is the growing interest at the national level.

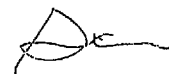
**6-7. ISSUES FOR FURTHER CONSIDERATION AND ATTENTION**

This project is so planned as to maximize the effect of energy efficiency in consideration of the domestic energy issue and needs of the Iranian industrial sector. However, the planning process of this project, so far, has gained no participation from the industrial sector. Programs prepared with best care and good intention, are not always accepted by beneficiaries. The plan for the training program also needs to be proposed to the beneficiaries to gain their opinions, and if necessary, should be modified accordingly. Project operation should aim for actual effectiveness in the industrial sector with tangible participation and support from the beneficiary side at every stage of planning, implementation, and evaluation.

In the early stage of the project planning, the Iranian side requested technical transfer of energy management concerning buildings and facilities (existing buildings and buildings to be constructed). However, the area of technical cooperation was designed as to limit to the energy

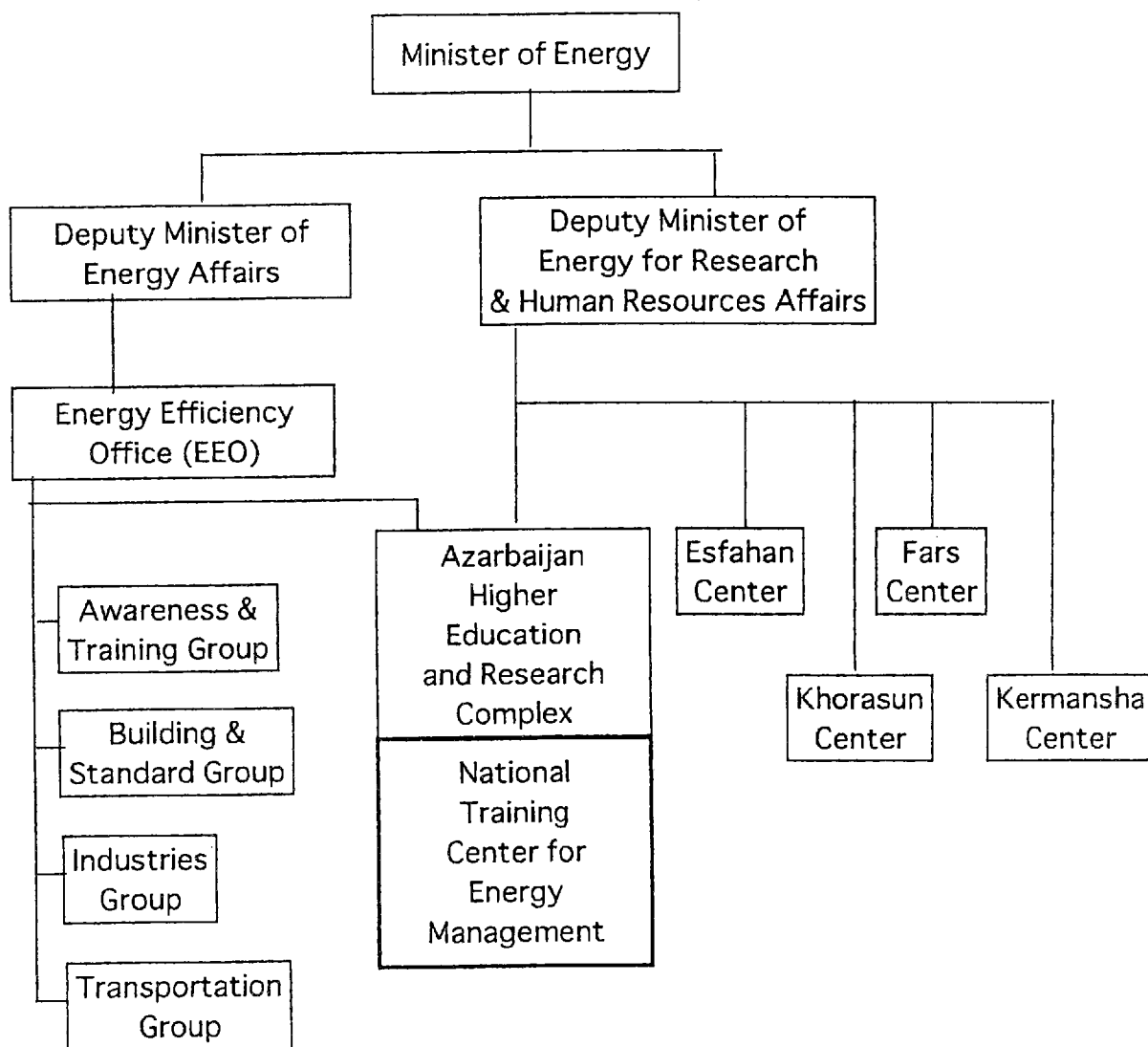


*Project Document*



management for existing factory buildings, within the cooperation capacity on the Japanese side into consideration. As a realistic compromise, it is agreed that heat course and electric course of the training program executed in the Center for Energy Management Training partly include the building energy management issue. Attention should be paid to the fact that the Iranian side still has strong concerns on the energy management of the building sector.

Organization Chart of EEO and Other Relevant Department  
in the Ministry of Energy



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Project Name: Project on Energy Management Promotion in the Islamic Republic of Iran

Project Area or Location: Azarbaijan Higher Education and Research Complex for Water and Electrical Industry (AERCT) and EEO office in Tehran

Target Group: Energy related engineers in industrial sector (Priority is given to larger factories with more than 2MW demand or 2000m<sup>3</sup> of oil equivalent energy consumption per year.)

Project Period: From March 2003 to February 2007 (4years)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
<p><b>Overall Goal</b> Through promotion of rational use of energy, enhancement of energy management in the industrial sector is achieved.</p>	SEC <sup>(*)1</sup> of each industrial sub- sector is improved to the extent defined separately <sup>(*)2</sup> by 2010.	Government statistics (by the Ministry of Energy)	
<p><b>Project Purpose</b> The National Training Center for Energy Management (NTCEM) contributes to the energy management of the industrial sector.</p>	<p>1 SEC<sup>(*)1</sup> of the factories where ex-trainees work is improved to the extent defined separately<sup>(*)2</sup> by the end of the project.</p> <p>2 Number of ex-trainees' proposals accepted by factories.</p> <p>3 Number of factories with ex-trainees which succeeded to obtain financial facilities for energy efficiency activities.</p>	<p>1 Records of audit for the factories where ex-trainees work (by SABA)</p> <p>2 Questionnaire (by SABA)</p> <p>3 Records of approved proposals for financial facilities</p>	<p>- The Iranian Government keeps supporting the energy management activities.</p> <p>- Energy cost does not become cheaper significantly.</p> <p>- Economic condition does not worsen significantly.</p>
<p><b>Outputs</b></p> <p>1. Policies and administration structures for energy management of the industrial sector are coordinated so that the contribution of the project becomes effective.</p> <p>2. C/P are able to operate and maintain the training facilities and equipment.</p> <p>3. Both theoretical and practical training for energy related engineers are maintained and managed.</p>	<p>1 NTCEM's activities meet the government policies and requirements of the industrial sector.</p> <p>2-1 C/P are able to utilize training facilities and equipment efficiently.</p> <p>2-2 C/P are able to maintain training facilities and equipment sufficiently.</p> <p>3-1 C/P are able to develop training materials and textbooks.</p> <p>3-2 C/P are able to implement training courses.</p> <p>3-3 Number of certified energy related engineers is increased.</p> <p>3-4 C/P are able to manage aftercare of the ex-trainees</p>	<p>1 Information from factory managers, ex-trainees, JICA experts, and EEO &amp; SABA officials</p> <p>2-1 Information from trainees and JICA experts</p> <p>2-2 Information from trainees and JICA experts</p> <p>3-1 Evaluation of developed training materials and textbooks by trainees</p> <p>3-2 Evaluation of training courses by the trainees</p> <p>3-3 List of certified engineers and evaluation by the factory owners</p> <p>3-4 Evaluation of ex-trainees who requested aftercare</p>	<p>- C/P remain in NTCEM.</p>

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Activities	Inputs		- Machinery and equipment provided by the Japanese side will obtain easy custom clearance.
	The Iranian Side	The Japanese Side	
1-1 Analyze on-going policies of energy management in the industrial sector 1-2 Propose effective policy for energy management to the relevant agencies so that the training in the center makes maximum effect 1-3 Manage to offer training programs that best meet the needs of the industry and the nation 1-4 Carry out necessary dissemination activities for energy management  2-1 Elaborate a plan on maintenance of the facilities and equipment 2-2 Install facilities and equipment 2-3 Carry out the technical training on its operation and maintenance 2-4 Make rules and manuals for operation and maintenance  3-1 Collect and analyze up-to-date information for appropriate training program. 3-2 Formulate curriculum for the training courses (three separate courses for general, heat and electricity) and prepare materials 3-3 Implement the C/P training in NTCEM 3-4 Implement the training courses 3-5 Examine & evaluate trainee's reports (energy management audit and improvement plan) to issue certificates 3-6 Take necessary action for the aftercare of the ex-trainees 3-7 Monitor the efficiency of training courses and improve them	1. Local personnel - Project Director - Project Manager - Project Coordinator - Professors - Administrative Staff - Technical specialists - Secretaries - Drivers  2. Land, buildings, rooms and facilities - Office & necessary facilities for the Japanese experts and Iranian C/P. - Meeting rooms for the transfer of technology. - Buildings, facilities and space necessary for the equipment and materials to be provided by JICA  3. Local cost - Necessary budget to implement the Project, including the in-land transportation and installation cost for the equipment.	1. Personnel 1) Long-term experts - Chief Advisor [48m/m] - Coordinator [48m/m] - Expert on Energy Conservation Technology (Heat) [48m/m] - Expert on Energy Conservation Technology (Electricity) [48m/m] - Expert on Energy Conservation Policy 2) Short-term experts Short-term experts will be dispatched as necessity arises.  2. Training of C/P in Japan Approx. 2-3 personnel per year  3. Machinery and Equipment as agreed separately	- Machinery and equipment provided by the Japanese side will obtain easy custom clearance.  <b>(Precondition)</b> - Necessity of energy management will not be decreased.

[\*1] Specific Energy Consumption (SEC) is defined as [Energy Consumption] / [Product Unit]. SEC varies with every different product.

[\*2] Goal of SEC improvement of each industry or factory is attached hereto.

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### SEPECIFIC ENERGY CONSUMPTION IN IRAN

NO.	Industry	NOW (2002)		TARGET (2009)	
		SECe <sup>★</sup>	SECf <sup>★★</sup>	SECe	SECf
1	<b>Cement</b>	<b>117</b> kwh/ton cement	<b>1000</b> kcal/kg clinker	<b>105.3</b> kwh/ton cement	<b>900</b> kcal/kg clinker
2	<b>Textile</b>	<b>0.98</b> kwh/m <sup>2</sup>	<b>4650</b> kcal/m <sup>2</sup>	<b>0.88</b> kwh/m <sup>2</sup>	<b>4180</b> kcal/m <sup>2</sup>
3	<b>Casting</b>	<b>2080</b> kwh/ton	<b>1890</b> MJ/ton	<b>1870</b> kwh/ton	<b>1700</b> MJ/ton
4	<b>Aluminium (profile)</b>	<b>1.4</b> kwh/kg	<b>17.9</b> MJ/kg	<b>1.25</b> kwh/kg	<b>16.1</b> MJ/kg
5	<b>Sugar</b>	<b>70.2</b> kwh/ton	<b>3.51</b> GJ/ton	<b>63.2</b> kwh/ton	<b>3</b> GJ/ton
6	<b>Ceramic tile</b>	<b>4</b> kwh/m <sup>2</sup>	<b>130</b> MJ/m <sup>2</sup>	<b>3.6</b> kwh/m <sup>2</sup>	<b>117</b> MJ/m <sup>2</sup>

★ Electrical specific energy consumption (kwh/production unit)

★★ Thermal specific energy consumption (fuel energy unit/production unit)

2



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Draft of Tentative Schedule of Implementation (TSI)

Annex 7-3

Project on Energy Management Promotion in the Islamic Republic of Iran

Calendar Year	2001				2002				2003				2004				2005				2006				2007					
Japanese Fiscal Year	2001				2002				2003				2004				2005				2006				2007					
Quarter	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	I	
Term of Technical Cooperation								▼																						●
Japanese Side																														
1. Dispatch of Survey System																														
1) First Survey Team	-																													
2) Second Survey Team				-																										
3) Third Survey Team							-																							
4) Fourth Survey Team							-																							
5) Technical Guidance Team											***												***							
6) Mid-term evaluation Team															***															
7) Evaluation Team																														***
2. Dispatch of Experts																														
1) Long Term Experts																														
a. Chief Advisor									●																					●
b. Coordinator									●																					●
c. Energy Conservation Technology (Heat)									●																					●
d. Energy Conservation Technology (Electricity)									●																					●
e. Energy Conservation Policy									●																					●
2) Short Term Experts																														
3. Training for C/P in Japan																														
4. Provision of Machinery & Equipment									●																					●
Iranian Side																														
1. Assignment of CP & Other Staffs									●																					●
2. Machinery & Equipment									●																					●
3. Space, Buildings & Facilities									●																					●
1) Office Room									●																					●
2) Training Building									●																					●
3) Utilities									●																					●
4. Allocation of Local Costs									●																					●

Note: Japanese fiscal year starts in April and ends in March.

Executed ——— Planned \*\*\*\*\*

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Project on Energy Management Promotion in the Islamic Republic of Iran

Activities	2003				2004				2005				2006				2007	Responsible Person	Input	
	Calendar Year				Calendar Year				Calendar Year				Calendar Year						Japanese Side	Iranian Side
	Japanese Fiscal Year				Japanese Fiscal Year				Japanese Fiscal Year				Japanese Fiscal Year							
	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3			4	
1. Policies and administration structures for energy management of industrial sector are coordinated so that the contribution of the project becomes effective.																				
1-1 Analyze on-going policies of energy management in the industrial sector	●																	PD	LE	CP
1-2 Propose effective policy for energy management to the relevant agencies so that the training in the center makes maximum effect	●																	PD	LE/SE	CP
1-3 Manage to offer the programs that best meet the needs of the industry and the nation	●																	PD/PC	LE/SE	CP
1-4 Carry out necessary dissemination activities for energy management	●																	PD/PC	LE/SE	CP
2. C/PS are able to operate and maintain the training facilities and equipment.																				
2-1 Elaborate plan on maintenance of the facilities and equipment	●																	PD/CA	LE	CP
2-2 Install facilities and equipment	●			●	●													PM/CA	LE/SE	CP
2-3 Carry out the technical training on its operation and maintenance					●	●												PM/CA	LE/SE	CP
2-4 Make rules and manuals for operation and maintenance	●						●											PM/CA	LE/SE	CP
3. Both theoretical and practical training for energy related engineers are maintained and managed.																				
3-1 Collect and analyze up-to-date information for appropriate training program	●																	PD/PC	LE	CP
3-2 Formulate curriculum for the training courses and prepare materials	●																	PC/PM/CA	LE/SE	CP
3-3 Implement C/P training in the National Training Center for Energy Management				●														PM/CA	LE/SE	
3-4 Implement the training courses							●											PC/PM/CA	LE/SE	CP
3-5 Examine and evaluate trainee's reports (energy management audit and improvement plan) to issue certificates	●																	PD/PC/PM/CA	LE/SE	CP
3-6 Take necessary action for the aftercare of the ex-trainees										●	●							PC/CA	LE	CP
3-7 Monitor the efficiency of the training courses and improve them												●						PC/CA	LE	CP

Iranian Side : PD-Project Director, PC-Project Cooperator, PM-Project Manager, CP-Counterpart personnel  
 Japanese Side : CA-Chief Advisor, PCR-Project Coordinator, LE-Long Term Expert, SE-Short Term Expert

**Project on Energy Management Promotion in the Islamic Republic of Iran**

1. Policies and administration structures for energy management in industrial sector are coordinated so that the contribution of the project becomes effective

Calendar Year Fiscal Year Month Term of Technical Cooperation	2003												2004						Responsible Person	Input	
	2003												2004							Japanese side	Iranian side
	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6					
1-1) Analyze on-going policies of energy management in the industrial sector																					
a. Collect the data for energy management	●	----->																PD	LE	CP	
b. Review the current energy management policies and programs	●	----->																PD	LE	CP	
1-2) Propose effective policy for energy management to the relevant agencies so that the training in the center makes maximum effect																					
a. Study and advise on establishing the legal status of the energy manager, the training center and the national qualification	●	----->																PD	LE/SE	CP	
b. Study and advise on incentives for participating the training courses	●	----->																PD	LE/SE	CP	
c. Advise on energy management policy	●	----->																PD	SE	CP	
1-3) Manage to offer training programs that best meet the needs of the industry and the nation																					
a. Grasp and analyze the needs in industrial sector	●	----->																PD/PC	LE/SE	CP	
b. Grasp and analyze the factor preventing energy management promotion	●	----->																PD/PC	LE/SE	CP	
c. Study and propose effective training programs	●	----->																PD/PC	LE/SE	CP	
1-4) Carry out necessary dissemination activities for energy management																					
a. Review the current dissemination activities	●	----->																PD/PC	SE	CP	
b. Study effective dissemination measures	●	----->																PD/PC	SE	CP	
c. Implement the dissemination activities (seminars, for example)							●	----->										PD/PC	SE	CP	
d. Appeal the training courses to industrial sector															●	----->		PD/PC	LE/SE	CP	

Iranian side : Project Director (PD), Project Cooperator (PC), Project Manager (PM), Counter Part (CP)

Japanese side : Chief Advisor (CA), Project Coordinator (PCR), Long-term Expert (LE), Short-term Expert (SE)



**Project on Energy Management Promotion in the Islamic Republic of Iran**

3. Both theoretical and practical training courses for energy related engineers are maintained and managed

Calendar Year Fiscal Year Month	2003												2004						Responsible Person	Input	
	2003												2004							Japanese side	Iranian side
	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6					
3.1) Collect and analyze up-to-date information for appropriate training program																					
a. Grasp and analyze technological level in industrial sector																			PD/CA	LE	CP
b. Identify the technical level of C/P and specify technology to be transferred																			PD/CA	LE	CP
3.2) Formulate curriculum for the training courses and prepare materials																					
a. Define target of the technical level to be attained by the trainees																			PD/CA	LE	CP
b. Formulate curriculum for theoretical and practical training																			PD/CA	LE	CP
c. Prepare training materials on the courses																			PM	LE	CP
3.3) Implement C/P training in the National Training Center for Energy Management																					
a. Implement technical transfer to C/P																			PM/CA	LE/SE	CP
3.4) Implement the training courses																					
a. Recruit appropriately qualified trainees																			PC/CA	LE	CP
b. Implement the training courses																			PM/CA	LE/SE	CP
3.4) Examine and evaluate trainees reports (energy management audit and improvement plan) to issue certificates																					
a. Establish a committee for certification																			PD	LE	CP
b. Set up a standard qualification for certificate holders																			PD/CA	LE	CP
c. Formulate necessary procedure for certification																			PC/CA	LE	CP
d. Prepare format for the report																			PC/CA	LE	CP



## Curriculum of Training Programs

## Practical Energy Conservation Training Course [General]

	1st Section	2nd Section	3rd Section	4th Section
Date	2 days	2 days	2 days	2 days
Subject	Basics of Energy Conservation	Thermal Energy Conservation	Electricity Energy Conservation	Energy Conservation of Boiler, Electricity Fee and Energy Management
Course Contents	<p><b>I . Importance of Energy Conservation</b></p> <ol style="list-style-type: none"> <li>1. Energy resources</li> <li>2. Global Warming Issue</li> <li>3. Energy Price</li> </ol> <p><b>II . How to Promote Energy Conservation</b></p> <ol style="list-style-type: none"> <li>1. Important points of energy conservation</li> <li>2. Steps for energy conservation</li> <li>3. Awareness and communication</li> <li>4. SEC</li> </ol> <p><b>III . Methods for Finding Energy Conservation Measures</b></p> <ol style="list-style-type: none"> <li>1. Methods for finding energy conservation measures</li> <li>2. ERP20</li> <li>3. SAVE</li> <li>4. Energy Conservation Map</li> </ol>	<p><b>I . Thermal Energy Conservation</b></p> <ol style="list-style-type: none"> <li>1. Energy conservation technologies and improvement cases Combustion, heat transfer, heat loss prevention, waste heat recovery</li> </ol> <p><b>II . Measurement Technologies in heat</b></p> <ol style="list-style-type: none"> <li>1. Operation of a furnace and measurement</li> <li>2. Instrumentation</li> <li>3. Temperature measurement</li> <li>4. Flow rate measurement</li> <li>5. Pressure measurement</li> <li>6. Exhaust gas measurement</li> </ol> <p><b>III . Introduction of Heat Balance</b></p> <ol style="list-style-type: none"> <li>1. Outline of heat balance</li> <li>2. Meaning of term</li> <li>3. Heat balance table</li> <li>4. Heat flow chart</li> </ol>	<p><b>I . Electricity Energy Conservation</b></p> <ol style="list-style-type: none"> <li>1. Pump Classification, characteristic, improvement measures (Impeller cut, Inverter control, valve control)</li> <li>2. Fan Classification, characteristic, improvement measures (inverter control, damper control)</li> <li>3. Compressor Classification, characteristic, improvement measures (Reducing discharge pressure, reducing pressure loss in pipes)</li> </ol> <p><b>II . Measurement of Electricity</b></p> <ol style="list-style-type: none"> <li>1. Measurement of current of motor</li> <li>2. Measurement of electric power of motor</li> <li>3. Remarks in measurement</li> </ol>	<p><b>I . Energy Conservation of Boiler</b></p> <ol style="list-style-type: none"> <li>1. Basics of steam, boiler and fuel</li> <li>2. Heat balance of boiler</li> <li>3. Energy conservation of boiler and steam</li> </ol> <p><b>II . Energy Conservation of Steam</b></p> <ol style="list-style-type: none"> <li>1. Basics of steam trap</li> <li>2. Reducing pressure loss in pipe</li> </ol> <p><b>III . Electricity fee</b></p> <ol style="list-style-type: none"> <li>1. Electricity fee system in each contract</li> <li>2. Demand controller system and improvement of power factor</li> </ol> <p><b>IV . Energy Management</b></p> <ol style="list-style-type: none"> <li>1. Cost management and energy intensity management</li> <li>2. Energy conservation checklist</li> <li>3. Energy conservation measures in building of factory and business</li> </ol> <p><b>V . Law</b></p> <p>Outline of Energy Conservation Law</p>
Practice	<p><b>Practice of Methods of Energy Conservation Map</b></p> <ol style="list-style-type: none"> <li>1. Energy flow at a model factory</li> <li>2. Drafting "Resource Map"</li> <li>3. Drafting "Finding Map"</li> <li>4. Drafting registration table</li> <li>5. Drafting theme formation table</li> <li>6. Drafting theme list</li> </ol>	<p><b>Practice of Combustion Technologies</b></p> <ol style="list-style-type: none"> <li>1. Points of combustion control: Air ratio, component of exhaust gas</li> <li>2. Ignition and extinction</li> <li>3. Measuring method of each parts</li> <li>4. Measuring component of exhaust gas</li> <li>5. Combustion load change</li> </ol>	<p><b>Practice of Pump and Compressor</b></p> <ol style="list-style-type: none"> <li>1. Pump <ul style="list-style-type: none"> <li>- Performance curve</li> <li>- Measurement of characteristics in inverter operation</li> <li>- Power saving measures and effect</li> </ul> </li> <li>2. Compressor <ul style="list-style-type: none"> <li>- Measurement of electric Power, flow rate and pressure</li> <li>- Measurement of pressure loss in hose</li> <li>- Measurement of leakage depending on hole diameter</li> </ul> </li> </ol>	<p><b>Practice on Steam</b></p> <ol style="list-style-type: none"> <li>1. Inspection of steam traps</li> <li>2. Steam pipe design and calculation of pressure loss</li> <li>3. Merit calculation of drain recovery</li> <li>4. Optimum steam traps selection</li> </ol>

## Practical Energy Conservation Training Course [Heat]

	1st section	2nd Section	3rd section	4th section
Date	2 days	2 days	3 days	3 days
Subject	Thermal energy conservation and management of combustion	Steam management and steam trap	Heat calculation and measuring techniques	Energy management, improvement cases and building energy management
Course Contents	<p>I. Thermal energy saving techniques</p> <ol style="list-style-type: none"> <li>1. Combustion, heat transfer, heat loss prevention, waste heat recovery</li> <li>2. Energy saving improvement cases <ul style="list-style-type: none"> <li>-Improvement through management of O<sub>2</sub> content in exhaust gas</li> <li>-Maintenance and improvement of efficiency of heat exchanger</li> <li>-Loss improvement through enhanced heat insulation</li> <li>-Improvement by preheating combustion air</li> </ul> </li> </ol> <p>II. Advantages and shortcomings of heavy oil and gas</p> <p>III. Combustion calculation</p> <ol style="list-style-type: none"> <li>1. Heating method through oxygen combustion</li> <li>2. Calculation of CO<sub>2</sub> emission amount</li> </ol>	<p>I. Energy saving of steam</p> <ol style="list-style-type: none"> <li>1. Meaning of energy conservation</li> </ol> <p>II. Management and improvement of steam system</p> <ol style="list-style-type: none"> <li>1. System management and energy conservation situation</li> </ol> <p>III. Effective use of steam</p> <ol style="list-style-type: none"> <li>1. Problem and improvement cases in each field of use</li> </ol> <p>IV. Measures in the area of steam use</p> <ol style="list-style-type: none"> <li>1. Basics and selection of steam traps</li> <li>2. Installation and management of steam traps</li> </ol> <p>V. Measures in recovery of drain</p> <ol style="list-style-type: none"> <li>1. Causes of stagnation in drain and measures</li> <li>2. Drain recovery system and system design</li> </ol> <p>VI. Engineering software practice</p>	<p>I. Selection of measurement equipment and method of measurement</p> <ol style="list-style-type: none"> <li>1. Energy conservation through measurement management</li> <li>2. Purpose of measurement and selection of measurement equipment <ul style="list-style-type: none"> <li>-Measurement of temperature, pressure, flow rate</li> <li>-Analysis of exhaust gas components (CO, CO<sub>2</sub>, O<sub>2</sub>)</li> </ul> </li> </ol> <p>II. Heat calculation and diagnosis</p> <ol style="list-style-type: none"> <li>1. Method of heat calculation <ul style="list-style-type: none"> <li>-Necessary data items and frequency of measurement</li> </ul> </li> <li>2. Data management and analysis of the situation <ul style="list-style-type: none"> <li>-Results-based diagnosis</li> </ul> </li> </ol> <p>III. Group Discussion</p> <ol style="list-style-type: none"> <li>2. Discussion on improvement measures</li> </ol>	<p>I. Energy conservation check list</p> <ul style="list-style-type: none"> <li>-Steam, compressed air and pump</li> </ul> <p>II. Thermal energy conservation improvement cases</p> <ol style="list-style-type: none"> <li>1. Combustion improvement, heat radiation improvement, heat transfer improvement, waste heat recovery</li> </ol> <p>III. Energy Conservation for boiler</p> <ol style="list-style-type: none"> <li>1. Basics on steam, boiler and combustion</li> <li>2. Energy Conservation of boiler</li> </ol> <p>IV. Energy management</p> <ol style="list-style-type: none"> <li>1. Cost management, energy intensity management</li> </ol> <p>V. Energy management of building</p> <ol style="list-style-type: none"> <li>1. Fundamental of Heat Transfer</li> <li>2. Calculation &amp; Designing Methods for Insulation, Lighting &amp; Air-conditioning in</li> <li>3. Insulation Method for Existence &amp; New Buildings</li> <li>4. Energy Audit in Building &amp; Energy check list</li> <li>5. Solar Energy Application in Building</li> <li>6. Energy National Code in Building</li> </ol> <p>VI. Energy conservation Law</p>
Practical exercise	<p>Optimum fire frame judgement and combustion adjustment practice</p> <ol style="list-style-type: none"> <li>1. Optimum fire frame judgement practice <ul style="list-style-type: none"> <li>-Shape of the fire frame, color and noise during operation</li> <li>-Combustion temperature, disposition of air, air ratio</li> </ul> </li> <li>2. Combustion adjustment practice <ul style="list-style-type: none"> <li>-From unstable combustion to optimum combustion</li> <li>-Adjustment practice by each participant</li> </ul> </li> </ol> <p>Gas explosion practice</p> <ol style="list-style-type: none"> <li>1. Gas explosion limitation and safe combustion adjustment</li> </ol>	<p>Steam trap practice</p> <ol style="list-style-type: none"> <li>1. Characteristics of each trap performance</li> <li>2. Measurement and performance judgement for each trap</li> </ol> <p>Air trap practice</p> <ol style="list-style-type: none"> <li>1. Theory, structure and judgement concerning performance</li> </ol> <p>Engineering software practice</p> <ol style="list-style-type: none"> <li>1. Steam pipe design, calculation of pressure loss and steam consumption</li> <li>2. Merit calculation of drain recovery</li> <li>3. Optimum steam traps selection</li> </ol>	<p>Heat calculation practice</p> <ol style="list-style-type: none"> <li>1. Gaining an introductory understanding of a furnace for practice</li> <li>2. Data collection on heat calculation <ul style="list-style-type: none"> <li>-Exhaust gas analysis</li> <li>-Measurements of temperature, pressure and flow rate</li> </ul> </li> <li>3. Data analysis <ul style="list-style-type: none"> <li>-Data compilation</li> <li>-Calculations (combustion calculation)</li> <li>-Drafting heat flow chart</li> </ul> </li> <li>4. Group presentation on heat calculation results</li> </ol>	<p>Inspection of energy saving facilities</p> <ul style="list-style-type: none"> <li>-O<sub>2</sub> control</li> <li>-Preheating combustion air</li> </ul>



Practical Energy Conservation Training Course [Electricity]

	1st section	2nd Section	3rd section	4th section	5th section
Date	2 days	2 days	2 days	2 days	2 days
Subject	Electricity energy conservation and measurement techniques	Energy conservation in compressors	Energy conservation in pumps and fans	Energy conservation in lighting and transformers	Load management
Course Contents	<p>I. Techniques for the use of power and energy conservation measures</p> <ol style="list-style-type: none"> <li>1. Techniques for use of power and points for improvement</li> <li>2. Energy conservation in transformation facilities                             <ul style="list-style-type: none"> <li>- Line loss and loss in transformer</li> <li>- Improvement in power factor</li> <li>- Insulation loss</li> </ul> </li> <li>II. Energy conservation methods from the actual cases                             <ul style="list-style-type: none"> <li>- Consolidation of units, change in capacity, intermittent operation</li> <li>- Improvement of operation ratio, use of cascades</li> <li>- Improvement in efficiency and less operation time</li> <li>- Reducing loss and change in originally set points</li> </ul> </li> <li>III. Basic knowledge about rotator for energy conservation                             <ol style="list-style-type: none"> <li>1. Electric circulation and electricity measurement techniques                                     <ul style="list-style-type: none"> <li>- Current, voltage, electric power, maximum demand and power factor</li> <li>- Safty of electricity</li> </ul> </li> <li>2. Induction motor                                     <ul style="list-style-type: none"> <li>- Performance and loss (Torque and speed)</li> </ul> </li> <li>3. Inverter control</li> </ol> </li> </ol>	<p>I. Energy conservation of compressor</p> <ol style="list-style-type: none"> <li>1. Type of compressor                             <ul style="list-style-type: none"> <li>- Turbo type, displacement type</li> </ul> </li> <li>2. Characteristic of compressor                             <ul style="list-style-type: none"> <li>- Flow rate, pressure, shaft and efficiency</li> </ul> </li> <li>3. Energy conservation method of compressor                             <ul style="list-style-type: none"> <li>- Calculation of flow rate, pressure and shaft power</li> <li>- Prevention of leakage and its effect</li> <li>- Pressure loss in pipe</li> <li>- Energy conservation machine</li> <li>- Energy conservation by control method</li> </ul> </li> </ol> <p>Number of unit control, number of rotation control Unloading control, assembly control -Introduction of energy conservation improvement cases</p>	<p>I. Energy conservation of pump and fan</p> <ol style="list-style-type: none"> <li>1. Type of pump                             <ul style="list-style-type: none"> <li>- Centrifugal, mixed, axial reciprecating, rotation</li> </ul> </li> <li>2. Characteristic of pump                             <ul style="list-style-type: none"> <li>- Pump head, characteristic curve, cavitation</li> </ul> </li> <li>3. Type of fan                             <ul style="list-style-type: none"> <li>- Multibrade, radial, turbo, axial, mixed</li> </ul> </li> <li>4. Characterisitic of fan                             <ul style="list-style-type: none"> <li>- Gas volume, system resistance curve, surging</li> </ul> </li> <li>5. Energy conservation method for pump and fan                             <ul style="list-style-type: none"> <li>- Measurement of pressure and flow rate</li> <li>- Measurement of voltage and current</li> <li>- Measurement of electric power</li> <li>- Valve control</li> <li>- Impeller cut</li> <li>- Speed control of rotation</li> </ul> </li> </ol>	<p>I. Energy conservation of transformer</p> <ol style="list-style-type: none"> <li>1. Transformer load and each losses</li> <li>2. Operation with number of unit control and energy conservation effect</li> <li>3. Introduction of energy conservation improvement cases</li> <li>II. Energy conservation of lighting                             <ol style="list-style-type: none"> <li>1. Type of lamp, luminous flux, economic calculation</li> <li>2. Layout of lamp and control method</li> </ol> </li> <li>III. Energy conservation of air-conditioning                             <ol style="list-style-type: none"> <li>1. Local and overall air conditioning and heat insulation effect</li> <li>2. Introduction of energy coservation improvement cases</li> </ol> </li> <li>IV. Electricity fee structure and demand management                             <ol style="list-style-type: none"> <li>1. Electricity fee structure</li> <li>2. Inspection control, operation and system</li> </ol> </li> <li>V. Energy management                             <ol style="list-style-type: none"> <li>1. How to promete energy conservation</li> <li>2. Energy conservation measures of building</li> </ol> </li> </ol>	<p>I. Demand control                             <ul style="list-style-type: none"> <li>- Load curve and deviation of load duration curve</li> <li>- Improvement of load factor</li> </ul> </p> <p>II. Power system parapmaters                             <ul style="list-style-type: none"> <li>- Analysis of reactive power</li> <li>- THD (Total harmonic distortion) analysis</li> </ul> </p> <p>III. Special loads                             <ul style="list-style-type: none"> <li>- Induction furnace</li> </ul> </p>
Practice	<p>Electricity measurement practice</p> <ol style="list-style-type: none"> <li>1. Measurement of voltage, current, resistance, electric power, power factor and load factor</li> <li>2. Measurement of pressure and flow rate</li> <li>3. Points in measurement of fan and pump</li> <li>4. Measurement practice of fan, pump and Motor torque</li> <li>5. Measurement data aquisition and analysis                             <ul style="list-style-type: none"> <li>- Explanation based on measurement results</li> </ul> </li> </ol>	<p>Practice in compressor</p> <ol style="list-style-type: none"> <li>1. Measurement of electric power, flow rate and pressure                             <ul style="list-style-type: none"> <li>- Setting of pressure and electric power</li> <li>- Pressure loss in pipe</li> <li>- Hole diameter, pressure and leak rate</li> <li>- Energy conservation in speed control of rotation</li> </ul> </li> <li>2. Measurement data analysis                             <ul style="list-style-type: none"> <li>- Explanation based on measurement results</li> </ul> </li> </ol>	<p>Practice in pump and fan</p> <ol style="list-style-type: none"> <li>1. Measurement of performance                             <ul style="list-style-type: none"> <li>- Electric power loss at minimum flow</li> </ul> </li> <li>2. Measurement data analysis and draft of performance curve                             <ul style="list-style-type: none"> <li>- Explanation based on measurement results</li> </ul> </li> </ol>	<p>Practice of lighting</p> <ol style="list-style-type: none"> <li>1. Electricity consumption of lamp and measurment of illuminance                             <ul style="list-style-type: none"> <li>- Incandescent lamp, fluorescent lamp, mercury-vapor lamp and others</li> </ul> </li> <li>2. Measurment of transformer loss                             <ul style="list-style-type: none"> <li>- Iron loss, copper loss and power factor improvement</li> </ul> </li> </ol>	

Equipment list

Annex 7-7

Training plant machinery and equipment

Sept. 23, 2002  
 Rev-1 Sept 24, 2002  
 Rev-2 Sept 25, 2002  
 Rev-3 Nov 11, 2002

No	Name of item	Description	Quantity	Remarks
1	Steam Boiler	Type: Flue tube boiler - Quantity: 1 set - Capacity: 900 kg/h or more - Pressure: 0.7 MPa - Fuel: Natural gas - Flue duct and Stack	1-set	
2	Industrial Furnace	Capacity : 200,000 kcal/h - Fuel: Natural gas - Furnace body with insulation and water cooling pipes - Waste heat recovery unit - Open burner of natural gas and oil: each 1 set - Flue duct and Stack - Cooling tower for furnace cooling jacket Measuring device: 1) 1-Flue gas analyser(CO/CO2) 2) 1-Flue gas oxygen analyser(O2) 3) 1-Sampling gas treatment unit 4) 1-Surface thermometer 5) 20-Thermocouple 6) 1-Digital hygrometer 7) 1-Deferential pressure meter 8) 1-Portable calibrator 9) 1-Laptop computer	1-set	
3	Steam trap training unit	Number of steam trap: 5 pcs Thermodynamic type, Tehrmostatics type and Mechanical type Cut-model of steam trap: 3 types Measuring device: 1) 3 - Steam trap checker	1-set	
4	Rotating machinery unit a) Fan unit	Fan unit: - Turbo fan with 11kW of high-efficiency type motor: 1-set, - Flow control damper, - Variable speed control of motor by inverter - Spare motor: 11kW of standard type: 1-set Measuring device: 1) 1 - Power meter 2) 4- Pitot tube 3) 1- Laptop computer 4) 1- Data logger	1-set	

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5	Rotating machinery unit b) Pump unit	Pump unit: - Volute pump with 5.5kW of high-efficiency type motor: 1-set, - Flow control valve, - Variable speed control of motor by inverter - Spare motor: 5.5kW of standard type: 1-set Measuring device: 1) 1- Power meter 2) 1- Oval flow meter 3) 1- Vortex flow meter 4) 1- Orifice type flow meter 5) 1- Portable supersonic flow meter 6) 1- Tachometer 7) 1- Torque measuring device for motor 8) 1- Laptop computer	1-set	
6	Compressed air unit	Compressed air unit: - Rotary type compressor of 2m <sup>3</sup> /min, 15kW with inverter control - Receiving tank: 1-set - Air header tank: 2 sets - Hose & nozzle Measuring device: 1) 1- Power meter 2) 1- Sound level meter 3) 1- Laptop computer	1-set	
7	Lighting unit	Lighting unit - Lamps and fixtures: Prepared by Iranian side - Control panel: Prepared by Iranian side Measuring device: 1) 3 - Luxmeter 2) Power meter: Use of "Portable AC power meter" and "Power analyzer"	1-set	
8	Electric power panel		1-set	

Measurement and analysis equipment

No	Name of item	Description	Quantity	Remarks
9	Portable thermometer	Temperature: -50 to + 600°C Thermocouple: K-type Probe: 1- surface contact, 1- round end	3-set	
10	Portable AC power meter	Measuring range: - Voltage: 200/600V - Current: 20/200A - Power: 20/200 kW - Frequency: 40-400 Hz	3-set	
11	Power analyzer	Measuring range: - Voltage: 150/600V AC, 60/600Vpk DC - Current: 100/500A - Harmonic wave analysis - Input: 4ch	1-set	
12	Flue gas analyzer	Measuring component: CO/CO <sub>2</sub> , O <sub>2</sub> - CO: 0 to 0.1/0.5 vol.% - CO <sub>2</sub> : 0 to 15 vol.% - O <sub>2</sub> : 0 to 10/25 vol.% Standard gas for calibration	1-set	
13	Sampling gas treatment unit	Sample gas: Flue gas Gas cooling device Filter device Capacity: Gas flowrate 0.4 litter/min or more	1-set	

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14	Hot wire anemometer	Measuring item: Gas speed and temperature - Gas velocity: 0 to 25 m/s - Gas temperature: 0 to 400°C	1-set	
15	Data logger	Displaying and recording device Input: DCV, ACV, Thermocouple, RTD, pulse No. of channel: 16-ch Display: Color LCD	3-set	

Office appliance for lecture

No	Name of item	Description	Quantity	Remarks
16	Lazer printer	Mono color	1-set	
17	Television receiver set	Display size: 34 or more	1-set	
18	Video cassette recorder	Universal type (NTSC, SECUM, PAL) Tape: VHS, With VCD(Video cassette disk) player	1-set	
19	White board	Panel: H900mm x W1330mm or more with copy function	2-set	
20	Video visualizer	Effective pixel: 440,000 Pixels or more	1-set	
21	Projecter for a lecture room	Brightness: 1000 ANSI Lumen or more	1-set	
22	Projecter for a conference room	Brightness: 3000 ANSI Lumen or more	1-set	
23	Photocopier	(SHARP SF2450, Aficio 220/270)	2-set	Specification is to be confirmed

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## Prospective Counterpart List (NTCEM)

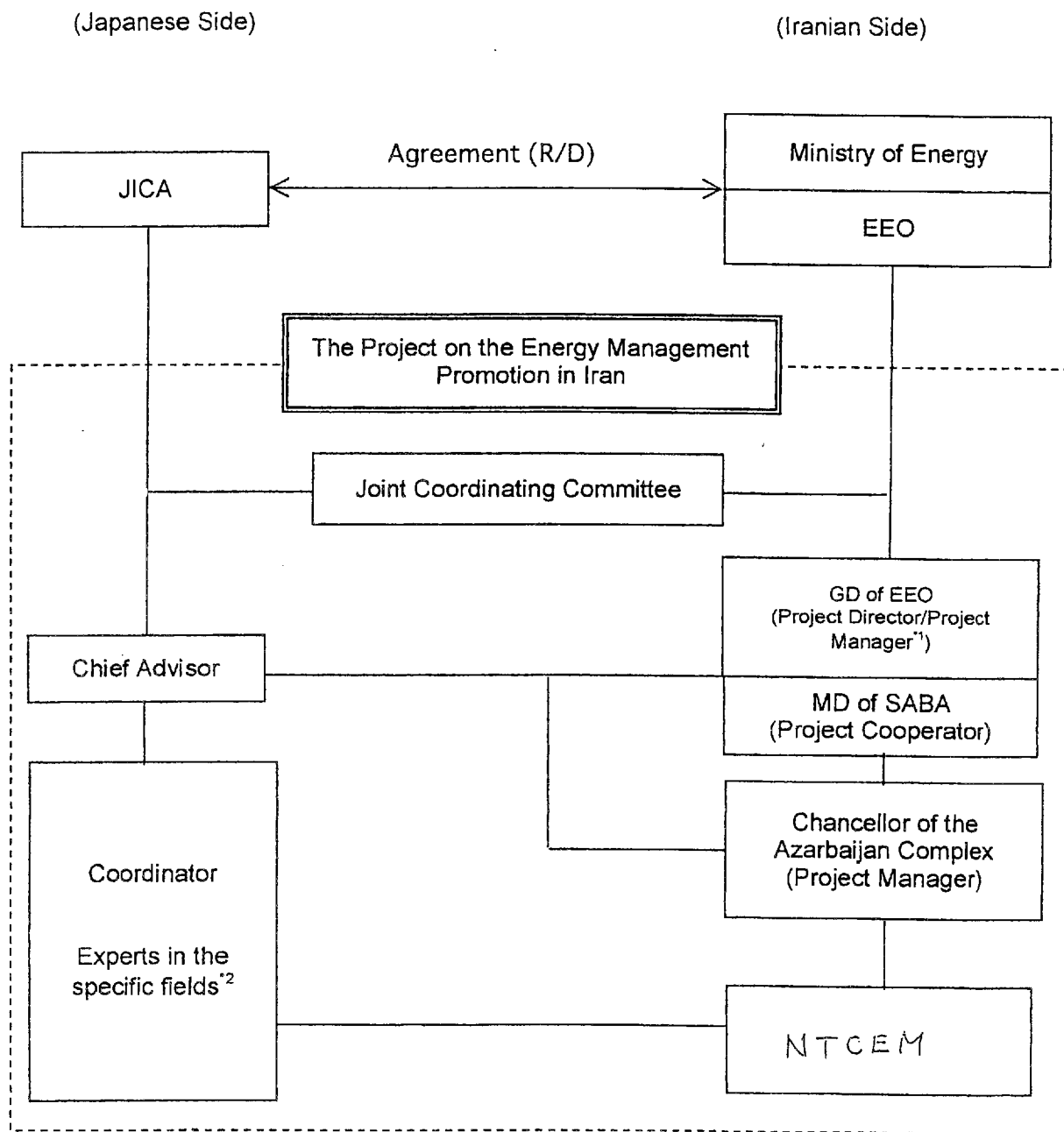
No.	Name	Certificate	Profession
1	Jannat Doust, Khalil	M.SC	Mechanical Engineer
2	Partounia, Ali	M.SC	Mechanical Engineer
3	Valizade, Mohammad	M.SC	Mechanical Engineer
4	Zeratparvar, Ali	M.SC	Electric Engineer
5	Banan Ali Abbasy, Khalil	Ph.D Candidate	Electric Engineer

\*Three (3) more counterparts will be assigned by the time of commencement of the Project.

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Organization Chart of Administration of the Project



\*1 The Project Manager of policy development part of the Project is General Director of EEO.

\*2 The counterpart to an expert of Energy Conservation Policy is General Director of EEO.

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Joint Coordinating Committee

1. Functions

The Joint Coordinating Committee will meet at least once a year or whenever the necessity arises in order to fulfill the following functions:

- (1) To formulate the annual work plan of the Project;
- (2) To review the progress of the annual work plan;
- (3) To review and discuss on major issues that may arise during the implementation of the Project;
- (4) To discuss any other issue(s) pertinent to the smooth implementation of the Project.

2. Provisional Composition

(1) Chairperson: General Director, EEO

(2) Members of the Iranian side

- a. Representative of EEO
- b. Managing Director of SABA
- c. Chancellor of the Azarbaijan Complex
- d. Representative of Managing and Planning Organization
- e. Representative of Ministry of Oil
- f. Representative of Ministry of Industry and Mine

(3) Members of the Japanese side

- a. Chief Advisor
- b. Coordinator
- c. Experts
- d. Official(s) of the Embassy of Japan in the Islamic Republic of Iran and other personnel concerned to be assigned by JICA, if necessary.

LIST OF ATTENDANTS

Iranian Side

Dr. S. Mohammad Sadeghzadeh  
General Director, EEO

Mr. Massih Mohamadian  
Deputy General Director, EEO

Mr. Kambiz Rezapour  
Manager, Awareness & Training Group, EEO

Mr. Alireza Shirazi  
Expert, Awareness & Training Group, EEO

Dr. Khoshravan  
Chancellor,  
Azarbaijan Research and Higher Education Complex

Mr. Khalil Jannat Dust  
Energy Group Leader,  
Azarbaijan Research and Higher Education Complex

Mr. Ali Partoniya  
Energy Group,  
Azarbaijan Research and Higher Education Complex

Mr. Mohammad Valizade  
Energy Group,  
Azarbaijan Research and Higher Education Complex

Mr. Khalil Banan Ali Abbasy  
Energy Group,  
Azarbaijan Research and Higher Education Complex

Mr. Ali Zeraat pavar  
Energy Group,  
Azarbaijan Research and Higher Education Complex

Mr. R. Khoshravan  
Coordinator & Energy Group,  
Azarbaijan Research and Higher Education Complex

Mr. Partovi  
Azarbaijan Research and Higher Education Complex

Mr. Majdeddin Ghiassi  
Deputy General Director  
Energy Bureau  
Management and Planning Organization



Mr. Sepehre  
Head of Gas Planning Group, Energy Sector  
Managing and Planning Organization

Mr. Farhad Nafisi  
Manager, Energy Economic Planning  
Ministry of Oil

Ms Zarvani  
Senior Expert of Deputy Ministry of Planning Affairs  
Ministry of Oil

Dr Heidari  
Staff of the University of Esfahan  
Advisor and Designer of NTCEM building

Japanese Side

Mr. Kazuo Tanigawa  
Leader, Project Design Team  
Senior Technical Advisor, Japan International Cooperation Agency (JICA)

Mr. Yasunori Serizawa  
Member, Project Design Team  
JICA Expert

Ms. Tomoko Miyagawa  
Member, Project Design Team  
Staff, Mining and Industrial Development Cooperation Department, JICA

Mr. Yukihiro Nikaido  
Minister  
Embassy of Japan in the Islamic Republic of Iran

Mr. Kunihiro Moriyasu  
Second Secretary  
Embassy of Japan in the Islamic Republic of Iran

Mr. Izumi Tanaka  
ODA Advisor  
JICA