

7-4 Institutional Functions

7-4-1 Pricing Policy

(I) Energy Price

1) Pricing

The pricing mechanism for setting prices of major energy products such as coal and electricity is that enterprises determine the prices and MENR approves. Coal prices are determined by the TKI and TTK. Taxes for coal were not included in prices until 1992. Electricity prices are set by the Turkish Electricity Generation and Transmission Corporation (TEAS) and the Turkish Electricity Distribution Corporation (TEDAS). The oil products prices have been set by refineries, importing companies and distributing companies, since 1989. Energy prices for industry in Turkey and OECD member nations are summarized in Table 7-2.

Table 7-2 Energy Prices for Industry in OECD Member Nations

	1981	1991	1992	1993	Unit: US\$/TOE
Turkey					
Natural Gas	-	151.9	149.3	173.7	156.4
Heavy Fuel Oil	292.8	186.8	171.4	159.5	125.8
Steam Coal	146.3	117.7	125.0	100.6	74.1
Electricity	715.4	971.3	1075.7	1102.8	891.0
OECD Europe					
Natural Gas	199.7	187.8	187.4	168.9	169.3
Heavy Fuel Oil	222.0	158.0	155.7	134.1	141.7
Steam Coal	131.2	153.2	164.2	147.1	155.9
Electricity	584.6	887.2	962.7	861.6	862.9
OECD					
Natural Gas	144.6	139.2	142.0	142.9	142.3
Heavy Fuel Oil	211.3	149.8	139.9	131.8	132.0
Steam Coal	91.9	95.4	107.7	96.9	97.5
Electricity	607.0	834.4	874.3	876.9	899.2

Source: Based on data from IEA (Energy Prices and Taxes)

2) Taxes on Energy

Since energy is convenient to tax and demand is relatively inelastic against price, energy tax is adopted as a measure to raise government revenue, permitting the raising of revenues without significant destruction of the tax base. Using energy taxes to influence the energy consumption pattern is fairly straightforward. As shown in Table 7-3, average prices and taxes for oil products are higher than those for other products such as coal, electricity and natural gas.

Table 7-3 Average Prices and Taxes (3rd Quarter 1995)

Unit:1,000 Turkish Lira

	Ex Tax Price	Excise Tax	VAT	%	Total Tax	%	Total Price
Heavy Fuel Oil, per ton							
for Industry	4,630	3,652	0	0	3,652	79	8,282
for Electricity Generation	4,630	3,652	0	0	3,652	79	8,282
Light Fuel Oil for Household per liter	8,320	10,976	2,894	15	13,870	167	22,190
Diesel Oil for Co., per liter	7,651	11,909	0	0	11,909	56	19,560
Premium Gasoline, per liter	10,058	16,177	3,935	15	20,112	100	30,170
Natural Gas, per 10 e7 k Cal							
for Industry	6,842	0	547	8	547	8	7,390
for Electricity Generation	6,953	0	556	8	556	8	7,510
for Households	8,470	0	678	8	678	8	9,147
Steam Coal, per ton							
for Industry	1,440	0	216	15	216	15	1,656
for Electricity Generation	720	0	108	15	108	15	828
for Household	2,300	0	345	15	345	15	2,645
Electricity, per kWh							
for Industry	3.22	0.52	0	0	0.52	16	3.74
for Household	3.08	0.15	0.49	15	0.64	21	3.72

Source: Based on data from IEA (Energy Prices and Taxes)

3) Subsidy

The energy price is based on the government determination system except for oil products. Price support subsidies are not available to energy industries such as electricity, coal and petroleum. As described in Table 7-4, the Turkish Government is trying to decrease assistance to coal producer; however, for example, IEA estimated that in 1995 the operating loss of coal producers was at 9,808,560 million TL and the deficit was covered by governmental assistance.

(2) Analysis

The study team considers that the free market price mechanism for energy products consisting of the production cost and reasonable profit is appropriate. It is obvious that the relation between product price and demand is a trade-off. Accordingly, from the energy conservation view, increase of energy price causes a decrease of energy consumption.

Particularly, a rise of energy price is effective to promote energy conservation in manufacturing industries. The managers of manufacturing industries are sensitive to the rise of energy price, since they are keenly aware of the increase of production cost of their product. Increase of the energy price also accelerates the development of domestic energy sources.

Table 7-4 Assistance to Turkish Coal Producer

Assistance Category (a)	Unit: Million TL									
	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995
I. ASSISTANCE INCLUDED IN PRODUCER SUBSIDY EQUIVALENT										
1) Direct aid to current production										
a) Investment grants	5 772	18 701	22 776	37 585	43 983	158 365	213 853	12 983	-	-
b) Aid to maintain a qualified workforce	336	610	1 095	2 344	3 506	6 070	-	-	-	-
c) Aid to promote sales of coal and coke	2 077	2 654	3 321	11 445	20 560	47 932	-	-	-	-
d) Deficit grant to help cover operating losses	4 555	25 094	30 670	60 477	41 578	1 353	3 317 011	2 826 924	2 081 582	9 808 560
						013				
Subtotal	12 740	47 259	57 852	111 831	109 627	1 565	3 530 864	2 839 907	2 081 582	9 808 560
						380				
2) Indirect aid to current production										
e) Excess deficit payments to miners pension fund	210	2 047	7 110	3 549	4 989	6 260	566 311	708 636	1 670 766	771 290
f) Grants to supplement miners holiday and sickness benefits	5 901	8 362	14 420	29 901	63 514	139 885	129 884	781 680	1 168 407	1 503 350
g) Excess payments by public electricity producers for domestically produced coal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	18 851	57 668	79 382	145 281	176 130	1 711	4 227 059	4 330 225	4 920 755	12 085 200
						625				
Total PSE	(36)	(67)		(69)		(410)	(616)	(394)	(165)	(264)
(million US\$)										
II. ASSISTANCE NOT BENEFITING CURRENT PRODUCTION										
1) Deficit payments to finance social security benefits (with respect to:)										
h) Old-age and survivors pension insurance	52 600	112 257	134	305 975	269 649	550 144	-	-	-	-
			635							
i) Disability pension insurance	325	924	883	1 552	3 247	3 836	7 873	11 550	45 700	58 540
j) Occupational disease payments	760	4 285	6 806	7 667	16 223	21 906	9 982	12 160	32 200	25 960
k) Social aid to retired miners	-	-	-	-	-	-	405 112	875 178	1 505 292	2 438 800
Total of Category II	53 685	117 466	142	315 194	288 119	575 886	422 907	898 888	1 545 155	2 523 300
			324							
(million US\$)	(103)	(137)		(149)		(138)	(62)	(82)	(52)	(55)

Aid received from the Treasury arising from differences between TTK's actual costs and market prices.

(a) Definitions of categories are given in Appendix D of *Coal Prospects and Policies in IEA Countries: 1987 Review* (Paris, OECD, 1988).

r Revised numbers shown in italics.

p Preliminary.

n.a. Not available.

Source: OECD, IEA (Energy Policies of IEA Countries) Adapted and updated from *Energy Policies of IEA Countries: 1993 Review* (Paris: OECD, 1994).

However, increase of the energy price greatly influences the whole economy of the nation. In industry, it causes decrease of competitiveness of products especially in the international market. Accordingly, energy price policy should be carefully treated and harmonized considering effects on social issues, industry, trade, etc.

However, as energy prices in Turkey are at the level of the average of OECD countries and trying to set energy price to be equal to the total of production cost and reasonable profit as in the pricing of coal, the study team supports the Turkish energy pricing policy.

7-4-2 Energy Conservation Laws and Regulation

(1) Energy Conservation Laws

Today, there are no laws or regulations in force except for the energy conservation regulation summarized in 7-4-2 (2) below. In 1981 a proposal for a new law concerning energy conservation was prepared by MENR and submitted to Parliament, but was never enacted.

A 'Regulation' relating to conservation of fuel consumption at heating and steam plants and reduction of air pollution' was issued but not effective now.

(2) Energy Conservation Regulation

- Regulation on Energy Efficiency Improvement at Industrial Plants -

A general outline of the regulation is abstracted as follows; the whole text is given in Appendix 7-2.

1) Purpose

To provide necessary arrangements to improve efficiency in the energy intensive industrial sector

2) Scope

The private and public industrial enterprises including mining exploitation and processing enterprises, and establishments which have annual energy consumption equal to or higher than 2,000 TOE

3) Legal Basis

This regulation is prepared in accordance with the law of Organization and Duties of Ministry of Energy and Natural Resources (MENR) and shall be under the authorization of Minister of MENR, EIB is responsible for implementation of this regulation in plants on behalf of MENR.

4) Measures for Improving Energy Efficiency

The plants will take necessary measures and make efforts to improve the efficient use of energy in various areas. Furthermore, these points shall also be taken into consideration when installing new plants, increasing production capacity or modernizing of the plants.

5) Energy Audits

Energy audits for identifying energy saving potentials and monetary savings of plants shall be conducted within 3 years from the issuance date of this regulation. Results of the audits shall be submitted as a report to the NECC.

6) Preparation of Energy Conservation Plans

Plant management will prepare energy conservation plans considering energy audits for minimizing energy losses and modernization.

7) Monitoring Energy Consumption

Plants will monitor energy consumption of 3 main products monthly and annually. Plant management will ensure purchasing of measuring equipment and these equipment will be periodically controlled and calibrated by TSI (Turkish Standards Institute) for monitoring.

8) Energy Control Committees and Energy Managers

Plants which have higher energy consumption in Category A (Table 7-5) will set up Energy Control Committee, and those in Category B (Table 7-5) will nominate an Energy Manager.

The Energy Manager shall also be responsible for keeping emission values within the Air Quality Protection Regulation limits.

9) Energy Management Certificate

NECC will organize Energy Management courses for the nominated technical staff of the plants to train in Energy Management or authorize the involved organizations to organize Energy Management Courses.

10) NECC

NECC will carry out energy audit and training programs, publications and promotion programs in order to increase industrial energy efficiency. During these activities the plants will cooperate with NECC to achieve more effective results.

Table 7-5 Energy Control Committees and Energy Managers

SECTOR	Category A	Category B
Sub-Sector	Energy Committee	Energy Manager
Metal Industry		
Iron and Steel Industry	> 50,000 TOE	50,000-2,000 TOE
Aluminum Industry	> 200,000 TOE	200,000-2,000 TOE
Copper Industry	Not Applied	≥ 2,000 TOE
Other Metal Industry	> 20,000 TOE	20,000-2,000 TOE
Soil Products Industry		
Cement Industry	> 50,000 TOE	50,000-10,000 TOE
Glass Industry	> 200,000 TOE	20,000- 2,000 TOE
Brick-Tile Industry	Not Applied	≥ 2,000 TOE
Ceramic Industry	> 30,000 TOE	30,000- 2,000 TOE
Other Earth Products	Not Applied	≥ 2,000 TOE
Chemical Products Industry		
Chemical Fertilizer	> 15,000 TOE	15,000- 2,000TOE
Petro-Chemical Industry	> 400,000 TOE	Not Applied
Main Chemical Production	> 15,000 TOE	Not Applied
Tire / Medical / Cleaning Mat. Prod /	Not Applied	≥ 2,000 TOE
Paint, Varnish, Lacquer / Other Chemical	Not Applied	≥ 2,000 TOE
Food Industry		
Sugar Production and Purification	> 40,000 TOE	40,000- 2,000 TOE
Animal oil prod. Industry	> 20,000 TOE	20,000- 2,000 TOE
Drink prod./ Tea prod / Flour prod	Not Applied	≥ 2,000 TOE
Dairy / Other Food Industry	Not Applied	≥ 2,000 TOE
Textile Industry		
Yarn-Weavings and Printing	> 20,000 TOE	20,000- 2,000 TOE
Rug and Carpet Industry	Not Applied	≥ 2,000 TOE
Weaving and Ready made Clothing Industry	Not Applied	≥ 2,000 TOE
Other Textile Industry	> 50,000 TOE	50,000- 2,000 TOE
Paper Industry		
Paper and Cellulose Industry	> 40,000 TOE	40,000- 2,000 TOE
Carton Industry	Not Applied	≥ 2,000 TOE
Metal Goods Industry		
Automotive Side Industry	Not Applied	≥ 2,000 TOE
Machine Manufacturing Ind.	Not Applied	≥ 2,000 TOE
Automotive Industry	> 50,000 TOE	50,000- 2,000 TOE
Endurable Consumption Goods Industry	Not Applied	≥ 2,000 TOE
Other Metal Goods Industry	Not Applied	≥ 2,000 TOE
Forestry		
Wood Industry	Not Applied	≥ 2,000 TOE

(3) Related Laws, Regulations and Standards

1) Air Quality Protection Regulation

In the Regulation on Energy Efficiency Improvement at Industrial Plants, it is regulated that the stack gas emissions shall be kept within the limit values specified in the Air Quality Protection Regulation published in the Official Gazette dated November 2, 1986 in line with the Environmental Law. When taking necessary measures and making efforts to realize efficient use of energy at existing plants, as much care as possible should be taken to minimize air pollutant emissions so as to reduce pollution of the environment.

2) Standards

The standards applicable to rational utilization of energy or energy conservation can be found at the Turkish Standards Catalogue 1995, published by the Turkish Standards Institute. Major standards related to energy conservation are as follows.

1. Boiler Economy and Thermal Requirements (TS 4040)
2. Instructions for Testing Boiler Capacity and Efficiency (TS 4041)
3. Thermal Insulation in Building (TS 825)
4. Fibrous Insulating Materials (TS 901)
5. Fuel Oil (TS 2177)
6. Gas Fuel Qualities (TS 11395)
7. Lignite Used for General Heating Purposes (TS 5788)

(4) Analysis

1) Energy Conservation Law

No energy conservation law is enforced yet in Turkey, though a new regulation issued by the Ministry of Energy and Natural Resources came into effect from November 11, 1995. This regulation is not a law involving penalties or incentives, but will promote nationwide energy conservation programs. A law on which nation-wide energy conservation measures can be based is still needed in order to execute energy conservation programs in an integrated manner. It is necessary for the government to express its commitment to energy conservation, and to formulate a law on which its various measures are to be based. Then government measures or incentive packages such as taxes, and loan to assist energy conservation programs would be applied more effectively.

In this connection, the study team reviewed the legislative situations in Japan and Germany.

Japan

According to the recommendations posted in 1977 by the Energy Conservation Subcommittee of the Advisory Committee for Energy, the Japanese energy conservation law was formulated mainly through the Ministry of International Trade and Industry (MITI). The law establishes a basic legal system for energy conservation measures in Japan. The law was enacted and became effective in 1979.

The 1979 Energy Conservation Law is the basis for current energy conservation policy. The aim of the Law is to reduce the growth of energy demand through increasing energy efficiency without unfavorably influencing economic growth. The Law authorizes MITI to develop voluntary standards for streamlining energy use in factories, to require large factories to develop energy management systems, to develop voluntary fuel efficiency standards for automobiles, and efficiency standards for certain appliances.

In recent years, a change in the Law became necessary in the light of drastic changes in the economic and social surroundings pertaining to energy matter and growing concern over the impact of mass energy consumption on the environment. The Law was partially revised in 1993 so as to establish a stable and adequate energy supply-demand structure capable of responding to the above changes through an expansion of measures to conserve energy.

Germany

When the first energy crisis occurred in 1973 and 1974, the Government launched national energy conservation programs followed by related laws and regulations. A 1974 investment bonus law for the promotion of funding of energy conservation projects in industry, a 1976 law for thermal insulation in buildings, a 1978 energy conservation equipment development program and so on.

The Government updated the thermal insulation decree, which went into effect on 1 January 1995, introducing a low energy building standard to cut heating requirements of new buildings by 30 %. An updated decree on heating appliances went into effect on 1 June 1994. It tightens regulations for more efficient operation of heating units through improved insulation of the equipment, and retrofitting and modernization of existing installations.

(Source: OECD Energy Policies of IEA Countries 1994 Review. JETRO Booklet (1980). And others)

2) Scope of Application of the Regulation for Medium- and Small-Scale Manufacturing Industries

The 'Regulation on Energy Efficiency Improvement in Industrial Plants' is applied to industrial establishments consuming energy equal to or more than 2,000 TOE annually. The number of establishments covered by this regulation is very small but the energy consumption covered is more than 70 percent.

The study team has tried to estimate average energy consumption at each establishment by size groups, based on the data:

1. Number of establishments and energy consumption in TL: Table 6-19
2. Total fuel use by type of fuel: Figure 6-7
3. Energy prices: IEA Energy Prices and Taxes
4. Calorific values: A table attached to the Regulation on energy efficiency improvement at industrial plants

Medium- and small-scale manufacturing industries are mostly small users of energy; some of them nevertheless are subject to the regulation (Table 7-6).

Table 7-6 Estimated of Energy Consumption at each Establishment by Group Size in 1992

Size group	Number of factories	Fuel TOE/factory	Electricity TOE/factory	Fuel + Electricity TOE/factory
1- 9	186,752	6.2	0.7	6.9
10- 49	7,973	569.3	66.3	635.6
50- 99	1,406	428.0	49.8	477.8
100-199	844	1,035.7	120.5	1,156.2
200-499	644	4,279.3	498.1	4,777.4
500-999	215	12,417.4	1,445.2	13,862.6
1000+	124	24,563.2	2,858.9	27,422.1

3) Standards

It is reported that the existing standard, Thermal Insulation in Building (TS 825), referred to in the Energy Conservation Regulation, is now being modified to increase energy efficiency in buildings and also to conform to related EC standards. The task is carried out among EIB, TSI,

TUBITAK and other authorities concerned.

The study team believes that similar steps to review existing standards should be taken in parallel with equivalent moves by other European Union (EU) member nations.

4) Qualification of Energy Manager

An energy-managed factory consuming 2,000 TOE or more energy annually is obligated to appoint an Energy Manager within 6 months to one year from data of the regulation becoming effective.

A notice of special seminars conducted by EIE for granting qualification Energy Managers was issued on August 31 1996 to establish an energy conservation system at each factory.

5) Preparation of non-Compulsory Standards, Guidelines

The Turkish Standard Institute is setting up standards for energy saving equipment with regard to boilers, heat insulation in buildings, etc. but not compulsory. Energy conservation guidelines or non-compulsory standards, showing quantitative targets for the energy efficiency improving measures itemized in Article 6 of the Regulation, should be prepared. The guidelines may help factory staff to conduct energy conservation measures and may help business operators to manage positive efforts for streamlining energy use at each factory, in such a manner as choosing better solutions adapted to given conditions.

EIE/NECC is strongly expected to take the initiative preparing these guidelines such as:

1. Control to lower the air ratio and the excess oxygen content in exhaust gas for the purpose of fuel combustion control in furnaces.
2. Control to raise the waste heat recovery rate up to the standard value for the purpose of effective recovery and utilization of waste heat in waste heat recovery equipment
3. Control to prevent the loss of heat that occurs as radiation, convection and conduction
4. Control to realize the effective operation control of combined heat and power generation and streamlining in conversion of heat to power or the reverse
5. Control to prevent electricity loss due to resistance, etc. and to keep the power factor at an adequate level at the electricity receiving end, together with TSI and other experts concerned.

The study team recommends that these guidelines be reviewed every 10 years to adjust to the change of technology, energy situation and so on. For reference, an outline of the laws concerning rational use of energy in Japan and some examples of Japanese guidelines are attached in Appendix 7-3.

7-4-3 Incentives

There are legal and administrative incentives which can be applied to promoting energy conservation but they are not known widely. The most popular legal incentives are tax credits and tax exemptions.

(1) Tax

Tax incentive possibilities in Turkey can basically be grouped in to two categories:

1. Investment Incentives,
2. Export Incentives,

The General Directorate of Incentives and Implementation of the Undersecretariat of Treasury and Foreign Trade (UTFT), is responsible for both the export and investment incentive systems in the country. The incentive policies are carried out in accordance with the guidelines set forth by the development plans and related annual programs, and serve to achieve the goals of the plans and programs.

Investment Incentives

One of the most important objectives of incentive measures is to increase investment in accordance with guidelines.

In order to reduce regional imbalances, investments in priority development regions are considered more important than others and are encouraged more than other investments. The government undertakes certain infrastructure investments in these regions. In these regions, investments, especially in the transportation and telecommunication sectors, are carried out by the public sector.

On the other hand, considering Turkey's application for full membership in the European Community, new investments as well as investments aimed at modernizing and expanding present ones that have competitive advantages are encouraged, based on various criteria such as research and development, energy saving, advanced technology, creating employment, activating natural resources, preventing environmental pollution, etc.

In order to achieve these goals, some incentive measures have been used. The major investment incentive measures are as follows:

1. Customs Duty Exemption
2. Investment Allowance
3. Credits
4. Tax, Duty and Charges Exemption
5. Financing Fund
6. Value Added Tax Compensation

Before 1990, investments without a Certificate were not eligible for incentive measures. Since 1990 an opportunity to benefit from some of the incentive measures, especially for small and medium sized investments, has been made available.

Details of tax incentives are described in Appendix 7-4.

(2) Loans

1) Preferential loan condition credit can basically be classified into two groups:

1. Turkish Development Bank Loan
2. HALK Bank Loan

Soft loans provided by the Turkish Development Bank are not available due to shortage of funds. HALK Bank Soft Loans for medium- and small-scale industry are applicable to investment for the modification of the plants aiming at energy conservation.

2) HALK Bank

HALK Bank, providing financial support for the purpose of contributing to the small- and medium-scale industries in the overall community, which is one of the mainstay and dynamic factors of national economy, is increasingly pursuing specialized banking.

In 1995, HALK Bank supported more than 200 thousand small and medium scale industries and more than 700 thousand tradesmen and craftsmen by providing them with medium term credit facilities with suitable limits and lower interest rates.

The loan condition of HALK Bank as of 1996 is as shown in Table 7-7.

Table 7-7 Loan Condition of HALK Bank

	Repayment	Grace period	Interest Rate
Working capital	4 Years		69-95% p.a.
Investment	6 Years	2 Years	69-95% p.a.
For Small industry	6 Years	2 Years	69-75%
Fixed assets up to 35 B TL or up to 100 Workers	6 Years	2 Years	85-95%
For Medium industry			110% p.a.
Fixed assets up to 70 B TL or up to 250 Workers	3 Years	1 Year	40% p.a.
For big industry			
For women and young entrepreneur			

Note: At approximately 85% p.a. of inflation rate

Source: HALK Bank

The prerequisite sought by HALK Bank in granting credit is the feasibility of the project. Credit requested by industries which fail to place sufficient collateral and which do not have enough financial corporate power is made available counter guarantees form the Credit Guarantee Fund Inc. established by participation of the Bank.

Taking into account the difficulties of small- and medium-scale enterprises in giving assurances, credit claims made by industries are accepted with the implementation of the measure in which the projects of applicant industries are assumed as a type of assurance, in other words as Self-Assuring Projects.

HALK Bank performs economic, technical and financial evaluations of individual industries and transfers information and projections required by them through its technical and managerial specialized staff both before and after the provision of credit, providing consulting services to small- and medium-scale enterprises where required.

(3) Analysis

The Treasury provides legal incentives such as customs duty exemption, tax exemption on wages of workers, value added tax compensation and credit that can be used for energy conservation

investments. Soft loans with an annual interest rate of 50 percent from the Turkish Development Bank are possible in principle but are presently not available due to lack of financial resources. For medium- and small- scale manufacturing industries, the loan with annual interest rate of 60-95 percent from HALK Bank is available. The incentives are not widely known and the application process is complicated.

Energy audits, seminars, training and technology introduction without charge, and information supply with reasonable charge, are recognized as incentives for manufacturing industries to promote energy conservation. Details of these incentives are discussed in section 7- 5 "Organization and Activities of EIE and NECC".

To make incentives for energy conservation promotion such as the tax credits and exemption, and loan incentives work more effectively, it would be useful to formulate an incentive package scheme such as tax credits and exemption, soft loans, energy audits without charge, information services and training, and extension activities.

Lack of skillful engineers, administrative staffs, information on legal and technology, and finance is observed in medium-and small-scale manufacturing industries, the package scheme is recommended as soon as possible to support implementation of their energy conservation works.

7-4-4 Awareness

One of the main requirement of energy conservation promotion is the enhancement of awareness and related activities such as promotion, publication and education. These are described in the following section "7-5 Organization and Activities of EIE/NECC".

7-5 Organization and Activities of EIE/NECC

7-5-1 Organization of EIE and NECC

EIE, the organization under MENR, became involved in energy conservation as early as 1980 and conducted various projects. EIE established its own energy conservation team backed up with the necessary equipment and vehicles to carry out various energy conservation activities in Turkey.

The number of personnel employed by the Administration is approximately 1,800. About thousand laborers working on a temporary basis are employed at provincial sites.

The Energy Conservation Division of EIE was nominated as a National Energy Conservation Center (NECC) of Turkey of MENR by the end of 1992. The organization of EIE and NECC are shown in Figures 7-12 and 7-13.

7-5-2 Energy Conservation Activities

In order to meet the country's energy demand from domestic sources, along with enhanced recovery of domestic sources, energy management, rational utilization and conservation of energy are adopted as elements of national policy to secure the supply and protect the environment. To ensure these policy objectives, energy conservation studies in Turkey have been ongoing for more than ten years. In this period, some ministries and organizations, and especially EIE/NECC's Industrial Energy Conservation Division, have been involved in these studies. This division initially conducted three Energy Conservation projects in collaboration with UNIDO and the World Bank and established its own energy conservation team with necessary equipment and vehicles to carry out individual energy conservation activities throughout Turkey.

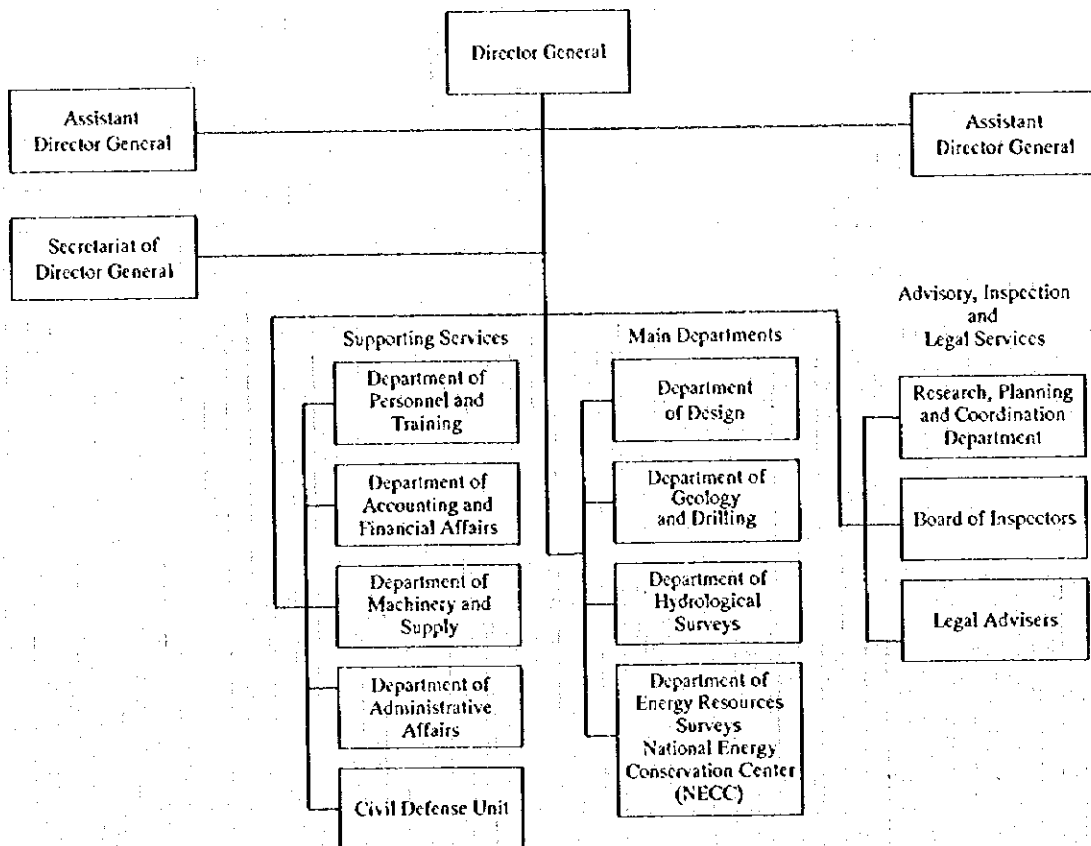


Figure 7-12 Organization Chart of EIE

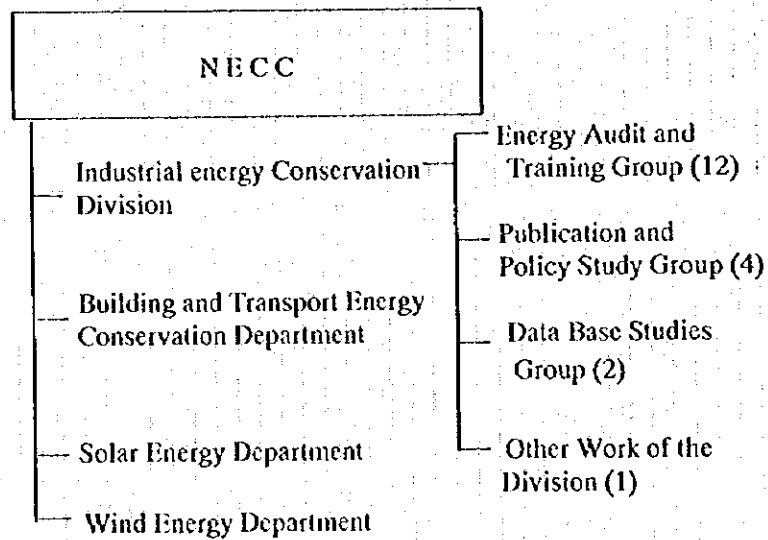


Figure 7-13 Organization Chart of NECC

(1) Relation, Communication and Awareness

There are no private companies, industrial associations or groups in the industrial sector, with which EIE has special relationships such as investing, sponsoring or giving donations, sending or accepting human resources. EIE holds no authorization right of approval or permission for the operation of a private company, industrial association or group.

EIE now has special relationships with private companies through the regulation on energy conservation and related programs:

1. Providing training bus program and energy bus program for private companies in industrial sector
2. Delivering Energy Conservation Newsletter and other publications
3. Conducting Energy Conservation Campaign
4. Sending inquiries about energy conservation issues to set up an energy data base system

1) Training Bus Program

In 1993 a training bus program was launched. In this program, engineers of the Center visit plants and give seminars in the bus on various energy conservation topics such as energy management, insulation, combustion, efficient use of electric and steam systems, to the technical personnel of the plants. In these programs seminar notes and technical manuals are provided for the participants.

2) Energy Bus Program

Energy Audit Teams have conducted 36 energy audits in various Turkish industrial plants since 1990. The Energy Bus Programs aim to create energy conservation awareness in industry, identify the energy saving potentials and help to establish energy management in the plants. The program includes:

1. A pre-visit to the plant,
2. A visit to the plant (gathering data and taking measurements),
3. Analysis of results,
4. Report preparation.

3) Publications

Within the scope of promotion activities, approximately 60 publications, such as technical booklets(9), research series(7), energy conservation series(5), energy management series(3), case study for energy conservation(2), series of energy conservation in buildings(4), energy report series(2), technical tips(28), brochures for energy conservation in vehicles(1), energy

conservation training publications(8) and magazines(news letter started publishing in 1988) have been issued. These publications have been mailed to a total of 2,500 addresses including 1,500 major industrial establishments. The Newsletter has become a periodical publication and other publications are prepared upon request from readers.

4) Energy Conservation Campaign

During Energy Week, held in the 2nd week of every January, an energy conservation campaign is held to promote the awareness of energy conservation. Activities during the energy week include exhibitions, conferences consisting of energy conservation programs, energy conservation implementation in several industries, and household and technical discussions. In addition, an awards ceremony for energy conservation among high schools is held.

(2) Study and Data Base

1) Policy Studies

The Center has been developing a national energy conservation strategy with the collaboration of EU. Within this project a computer model has been developed to forecast energy consumption in industry, residential buildings and the transport sector, under "business as usual" conditions and with the implementation of various energy consumption measures. Although this program was not specifically an environmental project, emission estimates for carbon dioxide, sulfur dioxide, nitrogen oxides and particles were also included as part of the computer program so as to estimate the effects of energy saving strategies on emissions.

The computer model developed in this project will be used as a tool to evaluate different technical options and to set up estimates of the energy benefits accruing from various energy conservation strategies. In order to do this, the model requires a comprehensive set of data. To increase energy efficiency in industry, as a result of studies, a regulation has been issued by NECC. With this regulation, industrial establishments that have over 2,000 TOE energy consumption have to establish an energy management system in plants to increase energy efficiency.

2) Data Base

To monitor energy consumption in the industrial sector, a data base program has been established. Every two years, information on energy consumption and production of the above mentioned 1500 industrial plants is compiled, evaluated and published. The results for 1983, 1985, 1987, 1989, 1991 have been published thus far.

7-5-3 Method for Selecting Factories to be Audited, and Auditing Procedure

As shown in Figure 7-14, after the request of an audit is sent from private companies to EIE/NECC, EIE /NECC sends a questionnaire to the company. If answer from the company is appropriate, EIE/NECC will send an engineer for the preaudit and to leave protocol documents.

After signing the protocol documents, EIE/NECC will evaluate the gathered data and information, and prepare for the execution of the energy audit, taking approximately one week.

Three engineers from EIE/NECC consisting of energy management, heat and electrical specialist are generally sent to a selected company for a five-days energy audit.

The items to be surveyed are:

1. Plant
Plant data such as foundation, location, main products, capital, working days, shifts, number of employees, type of processes, raw materials, etc.
2. Process
Process data such as main production units, production, process flow, etc.
3. Equipment
Boilers, production units, electricity, etc.
4. Energy consumption by type and by month
Consumption of electricity, liquid fuel, solid fuel, gases, total energy consumption and unit energy consumption
5. Energy cost analysis

Based on the survey, an energy audit report is prepared within one or two months after auditing. The report includes the results of auditing data and information, findings and recommendations consisting of potential of energy conservation, required investment cost, modification period and cost savings through energy conservation.

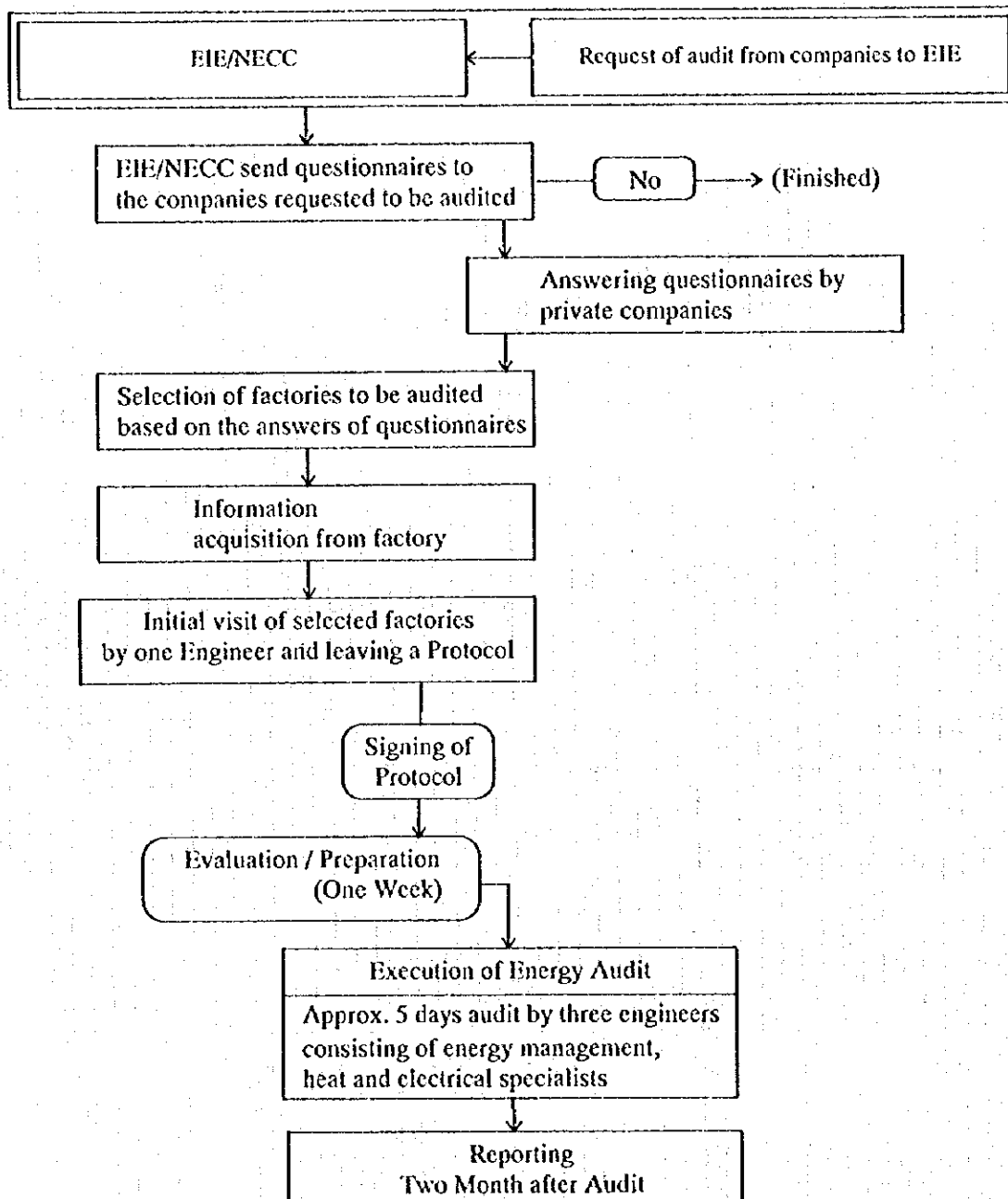


Figure 7-14 Procedure of Auditing

7-5-4 Analysis

(1) Organization and Role

The EIE/NECC, as an organization focused on energy conservation in Turkey, carries out consulting and training activities and also proposes policies for energy conservation for the industrial, housing, and transportation sectors. As mentioned in Figure 7-12 and 7-13, Department of Energy Resource Surveys of EIE and NECC's Industrial Energy Conservation Division are the main governmental organizations for energy conservation promotion to industries. The division consists of four groups, the energy audit and training group, the publication and policy study group, the data base study group and another work of the Industrial Energy Conservation Division. EIE is not allowed to establish a new department or division in NECC. However, to motivate officials of NECC to continue further energy conservation activities, it is one of options to enhance the mandate the organization, and to clarify duties and objectives of the groups.

However, the EIE/NECC's authority is weak as an organization, and it does not operate a factory, there is a limit to the technical information that can be accumulated.

On the other hand, energy conservation is carried out by the factories that actually consume the energy. Private companies tend not to open their internal information and to avoid outside intervention. Therefore, the energy conservation policies that the EIE/NECC is trying to implement are not moving ahead smoothly.

An issue that needs to be considered is the role of the EIE/NECC as an administrative body, with one possible alternative being to enhance its authority by making it a management supervisory organization. It is also hoped that the current energy conservation activities, namely education and consulting, can be further developed and enhanced.

(2) Energy Conservation Measures

1) Energy-Managed Factory Designation System

Turkey started an energy-managed factory designation system in November 1995. Factories annually consuming 2,000 TOE or more are designated as energy-managed factories are urged to effectively carry out energy conservation programs, and are held responsible for reporting their energy supply and consumption every year. This will help the designated factories to recognize their energy consumption, to analyze their energy consumption process-by-process and to

understand the causes for fluctuations in energy consumption. As a result this will lead them to take effective measures to conserve energy. At the same time, MENR will be able to analyze energy data thus made available to it and to use these data in formulating its policy for the industrial sector.

Medium- and small-scale manufacturing industries are mostly small energy consumers and fall outside the scope of the Regulation. In order to make this system more effective, it is necessary to revise the energy consumption reporting obligation scope of the Regulation downward to smaller manufacturing industries annually consuming 500 TOE or more energy. So the Regulation may cover 90 % or more of energy consumption.

2) Energy Manager System

It is important for a designated factory to have an energy manager and to enable these managers to play a key role in promoting energy conservation. According to the Regulation the energy manager is expected to fulfill the following roles.

1. To record energy used by his factory, collect data, analyze and examine the data, and formulate an energy conservation plan.
2. To receive energy conservation information as the representative of his factory, and at the same time to provide energy data, and give appropriate advice to the factory management for energy conservation plan.
3. To give guidance to various sections in the factory, and act as the central figure examining energy conservation measures and implementing them in the factory.
4. To keep emission values within the Air Quality Protection Regulation limits.

Because of their important duties, it is necessary that their position in society be held in high regard.

A system of designating energy-managed factories and energy managers will greatly contribute to nationwide energy conservation measures for the manufacturing industry sector. This system will also provide good examples for medium- and small-scale industries which are not designated as energy-managed factories.

3) Award for Energy Conservation

To increase business interest in energy conservation, award should be given to individual engineers or groups of employees or factories which have achieved excellent results in promoting energy conservation. It is considered necessary for MENR or NECC to publicly commend, about once a year and during Energy Week, factories which have achieved excellent results in

energy conservation, which made constant efforts in energy management, as well as manufacturers who developed highly effective energy conservation equipment during the year. This system will lead to the heightening of morale of people engaged in energy conservation.

4) Energy Conservation Training Center

In December 1992, EIE has been designated as a National Energy Conservation Center (NECC) by the MENR, in the field of manufacturing industries. It is advisable that EIE should be strengthened to have a training center equipped with a model plant to carry out practical energy conservation operations there and to have an energy data base system, especially for engineers at medium- and small-scale industries.

EIE, through the activities of the training center, will enable the engineers to use energy efficiently, and give them education in energy conservation techniques. EIE should start its activities in the industrial sector since energy conservation measures can bring about quick results there.

Instead of being confined to the industrial sector, the activities of the training center will proceed as the second step to expand into the transportation area, consumer-related area and so on. In this way EIE can promote energy conservation on a national level in a unified way.

(3) Energy Conservation Activities

1) Energy Audit

With the issuance of the Regulation on Energy Efficiency Improvement at Industrial Plants in November 1995, NECC has been assigned as the promoter of rational use of energy in the industrial sectors and is expected to assist factory energy managers to carry out energy audits at energy-managed plants in accordance with the Regulation. The energy audit of factories by energy specialists is effective for the promotion of energy conservation in individual factories.

(a) Simple Energy Audit

It would be advisable for EIE/NECC to conduct simpler energy audits at a huge number of medium- and small-scale plants, which are consuming less than 2,000 TOE annually and are not designated as energy-managed factories, and which may have no engineer specialized in energy conservation technology. In this case an energy audit shall be carried out in such a manner as merely to identify points to be improved, and to enable them to find ways to advance to the next step, thereby stimulating the factory engineers and management to become interested in energy

conservation. In this regard, the collaboration of KOSGEB will be essential in selecting plants to be audited if EIE/NECC plans to expand activity among medium- and small-scale industries.

(b) Paid Energy Audit

Paid energy audits at large energy-managed factory should be carried out where costly experts from outside are needed for precise and high level diagnosis and guidance.

2) Training

(a) Seminars

It is particularly important to spread technical information on energy conservation through periodicals and occasional seminars. EIE has been conducting a Training Bus Program to give seminars in the bus on various energy conservation topics such as energy management, heat insulation, combustion, and efficient use of electric and steam systems, for the technical personnel of plants.

Generally speaking, large-scale factories have high technical levels of their own and are active in collecting technical information. There may exist a shortage of engineers and technology at medium- and small-scale factories. Factory managers and staff members are not sufficiently aware of the need for energy conservation; they are concerned more about production and cost. In order to supplement medium- and small-scale factories' activities, it is important to hold energy conservation seminars for those in charge of energy management at factories which are not designated as energy-managed factories.

The study team would like to advise the holding of seminars concerning successful examples of energy conservation in real factories and to provide education in energy conservation to management and engineers of medium- and small-scale manufacturing industries, which are not designated as energy-managed factories. Publication of successful examples of energy conservation will be effective in leading those engineers to recognize the importance of energy conservation.

In this regard, the collaboration of KOSGEB is essential in holding joint seminars on energy conservation in order to improve awareness on energy saving among management and engineers. KOSGEB's Consulting and Quality Improvement Centers are responsible for providing consulting services, giving seminars to medium- and small-scale industries, aiming to improve their product competitiveness in such a manner as production cost reduction. EIE would sponsor and provide specialists on energy savings, while KOSGEB would plan the seminar

programs and provide the seminar halls in its Center office buildings throughout the country.

(b) Seminars to Qualify Energy Manager

Energy-managed factories, or factories annually consuming 2,000 TOE or more energy, are obligated to appoint energy managers in order to promote rational use of energy at the plants within 6 months to 1 year from the date of the regulation becoming effective.

EIE issued a notice dated August 31 1996 to hold seminars for granting qualification of energy managers to the participants based on the Regulation. The outline of the seminar will be as follows:

1. Scope: theoretical information, measuring equipment, practical studies, computer programs for calculation
2. Candidates: maximum 20 persons for every course
3. Period: not less than 2 weeks
4. Certificate: examination for the certification will be held at the end of the course and NECC will give the certificates.
5. Course fee: Participants shall pay.
6. Authorized organization will arrange the course, NECC will control the course.

The organization can apply to open a course; a Committee consisting of one member from MENR and two from NECC has the right to giving and canceling authorization to the organizations for holding a course.

In order to expedite deployment of energy managers in short years ahead, it would be advisable to introduce a state approved qualification system for energy managers, such as giving certificates to graduates of technology courses, and factory engineers with years of energy conservation experience.

(c) Energy Management Lessons for University Students:

EIE is planning to hold energy management lessons at engineering faculties of universities for the engineering students for half a year. Besides theoretical knowledge, they will conduct practical studies.

3) Provision of Technical Information

(a) Publications of Energy Conservation Magazine

The purpose of publishing an energy conservation magazine is to provide information to energy-

related personnel, and to provide an opportunity for the exchange of information. In order to promote energy conservation in the industrial sector, it is necessary for the Authority to constantly provide technical information on energy conservation to factory management and engineers, and to contribute toward increasing their energy conservation awareness by showing them successful cases of energy conservation and energy efficient equipment.

EIE is conducting various consulting activities for technical information on energy conservation as described in the previous clause such as publications of papers and magazines. At present, sufficient information on energy conservation is not provided to factory managers and engineers. Provision of the latest information will serve to upgrade the technical levels of factories and to stimulate them in their energy conservation activities. This is more true for a large number of medium- and small-scale manufacturing plants, which are consuming less than 2,000 TOE annually and are not designated as energy-managed factories. In this regard, the collaboration of KOSGEB is essential in providing publications of technical information on energy conservation in order to improve awareness of energy saving among medium- and small-scale industry management and engineers.

(b) Pocket Size Book

The study team would like to recommend the publication of a pocket-sized book, 'Energy Conservation Reference Book', illustrating related regulations, statistics, standards and other technical data, in order to enable factory staff members to easily access the needed information while they conduct energy conservation activities at their plants.

4) Data Base System

In order to effectively provide factories with technical information on energy conservation, it is necessary to establish a system by which the present situation and future trends in technology in various areas can be accurately grasped, and with which such information can be used effectively.

EIE has been developing an energy data base since 1990, gathering and sorting out information, and publishing energy conservation data and technology. However, it is necessary for EIE to further expand these activities by broadening its channels for the acquisition of international technical information on energy conservation, and by structuring its own data base. For this purpose it is advisable for EIE to promote permanent cooperative relations with overseas organizations for energy conservation. More information on energy conservation is expected to be gathered through the exchange of information with foreign countries in this way. The

information should be made public in a proper manner by EIE.

Recently EIE started compilation of a new data base system for plants annually consuming 500 TOE or more energy. The present data base system does not necessarily indicate the accurate status of energy consumption or energy conservation results in the whole range of manufacturing industries, by sectors/subsectors and by size groups.

It is necessary to establish proper and wide channels of information gathering, and increase public trust in it as a source of information to people and enterprises. In this regard, the State Institute of Statistics, Energy Statistics Division, was established in September 1995; and is working together with EIE as a member of the Energy Conservation Coordination Board (ECCB) in order to build an energy consumption data base in the manufacturing industry sector.

The study team expects that this division will play an important role in establishing an energy data base system collaborating with EIE's Industrial Energy Conservation Division. It would be also helpful to expand the scope of the Regulation to reporting its annual energy consumption to small energy consumers consuming 500 TOE or more annually, in order to strengthen the information gathering system, especially in smaller-scale industry.

5) Energy Conservation Campaign

To make the public aware of energy conservation, energy conservation exhibitions should be held regularly. It is important to hold exhibitions to introduce energy conservation equipment, and give explanations on the domestic and international energy situation. Public interest in exhibitions will be increased if they are held at about the same time of year regularly every year. It will increase effectiveness to hold the above-mentioned seminars and meetings for publication of successful examples concurrently with such exhibitions. EIE has been already sponsoring this kind of exhibition since 1995 and the study team expects to expand its activities year by year.

6) Organizing Energy Managers

In order to maintain and improve the quality of energy managers, it is necessary to organize them, provide them with updated technical information on energy conservation and train them in energy conservation technology through a training course conducted by EIE. Qualified energy managers shall be registered after energy managers are posted to factories at energy-managed factories. EIE should undertake the task of improving their quality and regulating the qualified energy managers.

At an organizational level, it is possible to provide them with information obtained by factory survey and foreign information on energy conservation, as well as to communicate government measures to them and to give specialized technical education. This group of energy managers also can perform as auditors or consultants for small-scale industries which are not designated as energy-managed factories.

7-6 Conclusions and Recommendations on Energy Conservation Policy and Activities

7-6-1 Basic Concept for Implementation of Energy Conservation in Industries

There are many problems to be solved and many measures to be introduced. In dealing with such situations it is very important that the basic concept be laid down first. Measures, strategies and action plans should be examined in light of the basic concept; otherwise, one is inclined to recommend what is most convenient and easy under a given circumstance rather than what is really right. The study team proposes to establish the following basic concept, for the study of medium- and small-scale industries:

Basic Concept for Recommendation

The recommendations for the study of policy and medium- and small-scale manufacturing industries will be based on the following basic concepts. The recommendations intend:

1. To promote rational use of energy in the manufacturing sector in a manner that will contribute to environmental conservation,
2. To enhance awareness of the importance of promoting rational use of energy among those who are associated with manufacturing and administration,
3. To improve the organizational setup of the government so that the roles of the responsible organizations may be clearly defined and so authorized as to implement their roles,
4. To organize an effective system of collecting and processing information of manufacturing industries, the medium- and small-scale manufacturing industries in particular, so that the government may adequately promote rational use of energy,
5. To identify and develop human resources, both in the public and private sectors, that will be needed to promote rational use of energy,
6. To prepare an effective and easy-to-access package of incentives and finance to encourage medium- and small-scale manufacturing industries to promote rational use of energy,
7. To pursue inexpensive but effective strategies and methods in policy implementation,
8. To seek policy measures which the industries will accept and cooperate with willingly,

9. To facilitate development and introduction of technologies that promote rational use energy, and
10. To establish a legal structure under which rational use of energy in the manufacturing sector may be effectively implemented.

7-6-2 Basic Approach to Policy Study

1) Basic Approach

The basic approach to policy study is illustrated in Figure 7-15.

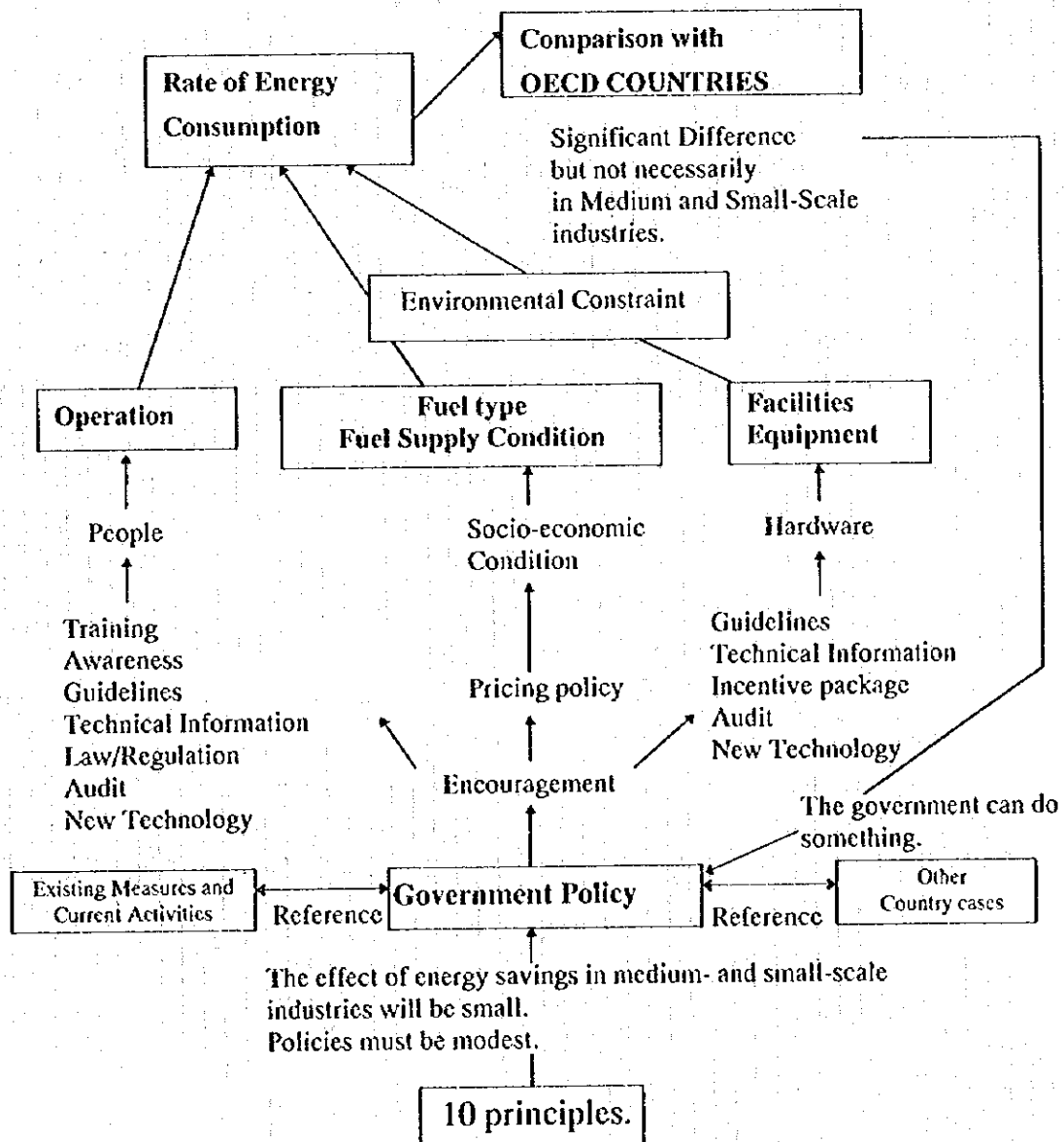


Figure 7-15 Basic Approach to Policy Study

2) Bottlenecks

According to the initial results of EIF/NECC's study carried out in 1980, 1983 and 1991, the potential for energy savings in manufacturing industry was estimated to be more than 20 percent. The Regulation on energy efficiency improvement at industrial plants is applied to those annually consuming energy equal to or more than 2,000 TOE.

As described in 7-3 of this report, the study team believes that more effort should be made for energy conservation of smaller scale factories which consume less than 2,000 TOE annually. In this regard a number of bottlenecks to smooth implementation of energy conservation seem to exist on the part of medium- and small-scale factories as listed below.

Bottlenecks in Medium- and Small-scale Manufacturing Industries

1. Lack of information

(1) Awareness

Insufficient recognition of the importance of energy savings among the top management and staff

(2) Technical knowledge and experience for technical staff to operate the factories efficiently

Lack of technical guidelines or targets for energy utilization equipment operations

Low confidence in new types of energy-efficient equipment both in terms of actual energy savings and reliability of operation

(3) Education

Lack of in-house educational system to accumulate energy conservation skills and improve those skills

2. Lack of technical staff to carry out energy audit by the factories themselves, or to take necessary measures to improve energy efficiency

3. Insufficient maintenance of energy consuming equipment, stemming from lack of awareness of the top management and lack of staff

4. Lack of funds for investment in energy efficient equipment

5. Lack of incentives for investment in energy conservation

7-6-3 Recommendations on Energy Conservation Including Government Measures to Promote Energy Conservation

Referring to the current situation of organization, energy conservation measures and activities taken in Turkey, recommendations on energy conservation are described in Table 7-8. The tables consist of present state, problems and analysis, recommendation, responsible organizations and priority. Recommendations are divided into three sections as shown below.

1. Institutional Functions and Measures
 - 1-1 Organization and functions
 - 1-2 Energy Conservation Laws and Regulations
 - 1-3 Preparation of Guidelines
 - 1-4 Incentives
 - 1-5 Energy Managed Factories
 - 1-6 Qualification of Energy Managers
 - 1-7 Energy Conservation Training Center
2. Organization and Role of EIE/NECC
3. Activities of EIE/NECC
 - 3-1 Energy Audits
 - 3-2 Dissemination of Technical Information on Energy Conservation
 - 3-3 Establishment of Energy Data Base System
 - 3-4 Energy Conservation Seminars for Medium- and Small- Scale Factory Management and Engineers

Among above mentioned recommendations, 1-1, 3) Planning, 1-3 Preparation of Guidelines, 1-4 Incentives and 1-7 Energy Conservation Training Center are separately highlighted and described in detail.

(1) Highlighted Recommendations

Highlighted recommendations are those extracted from Table 7-8 .

D) Planning for Rational Use of Energy

(a) Purpose

The energy conservation is increasing year by year in accordance with the development of industry. The energy saving potential for industry sector have been identified to be 30 percent. In order to promote energy conservation activities smoothly to achieve the potential, the formulation of program is important. The study team devised an action plan, on a tentative basis, to promote rational use of energy in medium- and small-scale industries as illustrated in Figure 7-16. This shows the improvement of model factories on a plan-do-see cycle to achieve better use of energy along with the measures EHE and concerned government organizations can take at the right time.

(b) Outline of Plan

The outline of plan is illustrated in Figure 7-16.

(c) Schedule

Start: 1998

- a) First Step (1998)
 - 1) Identification and Selection of Model Factories
 - 2) Implementation of Audit
 - 3) Formulation of Energy Conservation Plan based on Recommendation from Audit Results
- b) Second Step (1998 - 2000)
 - 1) Execution of the Plan at Model Factories
 - 2) Assessment of Results
 - 3) Recognition of Factories
- c) Third Step (2001 - and the year after)
 - Nationwide Execution

(d) Important Measures for Execution of Plan

Problems and measures are listed in the column of Figure 7-16. Among them, the followings are identified with the important measures for the execution of the plan considering the existing policy and measures in Turkey.

- 1) Preparation of Guideline
- 2) Preparation and legalization of the incentive package system

Besides them, the installment of energy conservation training center is recommended to foster engineers.

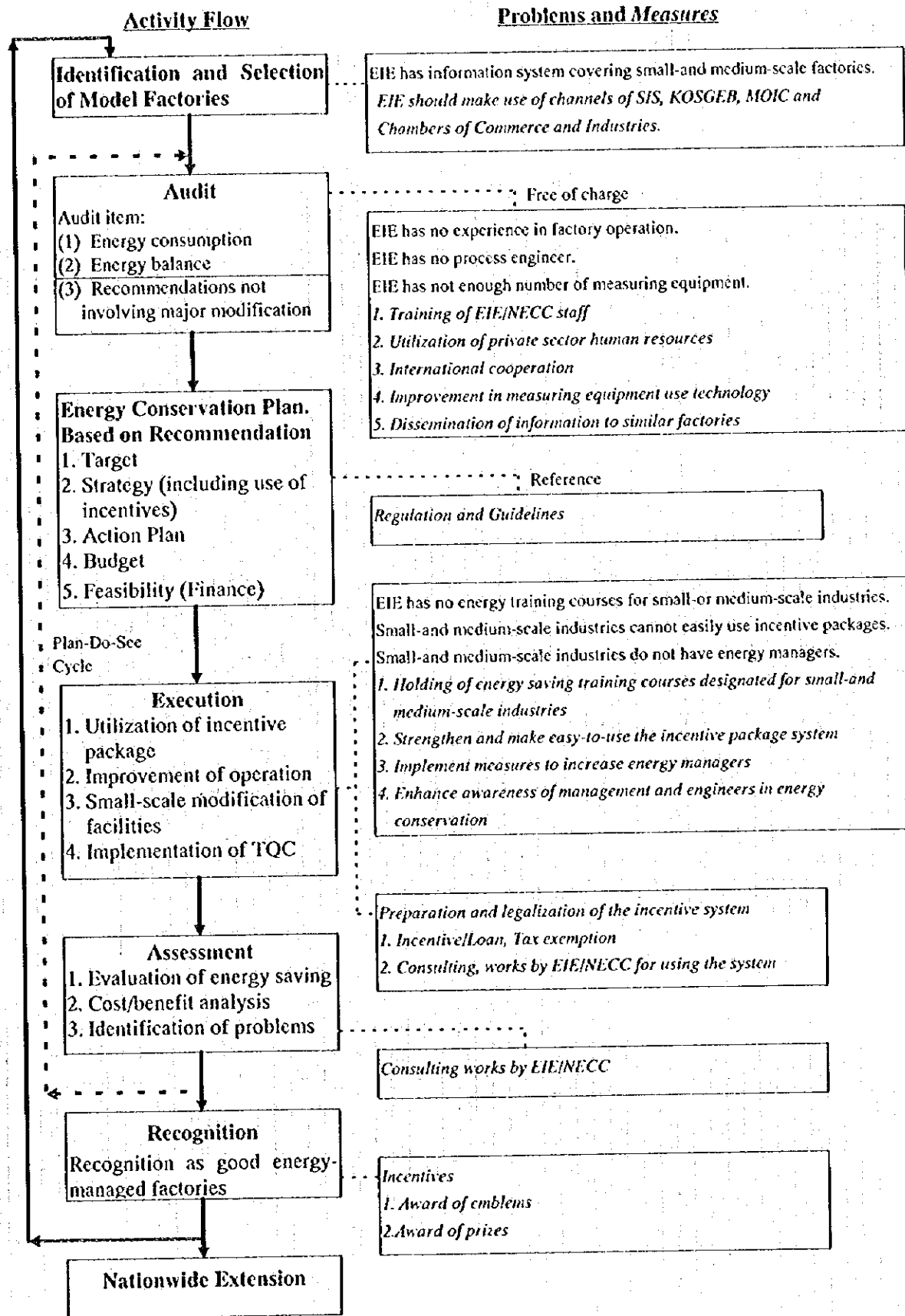


Figure 7-16 Plan for Rational Use of Energy

2) Plan for Preparation of non-Compulsory Guidelines

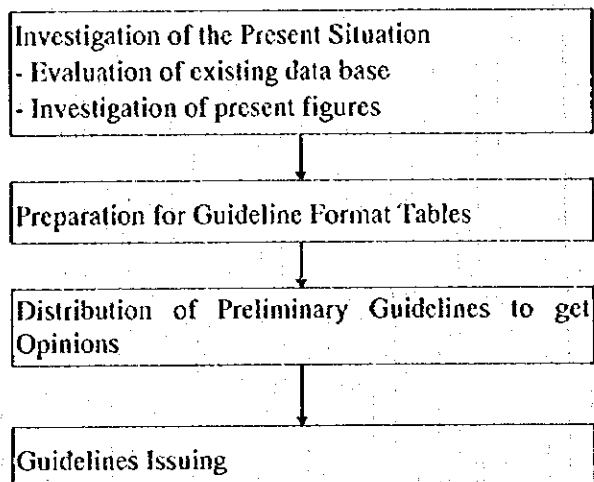
(a) Purpose

- a) Various non-compulsory energy conservation standards, or guidelines, showing quantitative targets for energy efficiency improving measures should be prepared. The guidelines may help factory staff to conduct energy conservation measures and may help business operators to manage positive efforts for the streamlining of energy use in each factory, in such a manner as choosing better solutions adapted to the given conditions including energy resources.
- b) The guidelines should be prepared in a manner that will contribute not only to energy conservation but also to environmental conservation.
- c) energy situation and so on.

(b) Guidelines to be Prepared

Rationalization Items - Eligible equipment	Guidelines to be prepared	
	Standard Value	Target Value
Rationalization of fuel combustion - Combustion equipment	- Air ratio for boiler - Air ratio for industrial furnace	- Air ratio for boiler - Air ratio for industrial furnace
Prevention of heat loss due to radiation, conduction, etc. - Heat use equipment	- Outer surface temperature for industrial furnace	- Outer surface temperature for industrial furnace
Recovery and utilization waste heat - Waste heat recovery equipment	- Exhaust gas temperature for boiler - Waste heat recovery ratio for industrial furnace	- Exhaust gas temperature for boiler - Waste heat recovery ratio for industrial furnace
Prevention of electricity loss due to resistance - Electricity use equipment	- Power factor at the receiving end	- Power factor at the receiving end

(c) Procedure



(d) Schedule

Start: 1997/Beginning

Duration: 20 months

1) Investigation of the Present Situation	6 months
2) Preparation for Guideline Format Tables	4
3) Distribution of Preliminary Guidelines to get Opinions	2
4) Evaluation and Preparation for Issuing the Guidelines	3
5) Guidelines Issuing	5

(e) Estimated Administrative Cost

1) Investigation of the Present Situation	
- Evaluation of existing data base	6 man-months
- Investigation of present figures	2
2) Preparation for Guideline Format Tables	8
3) Distribution of Preliminary Guidelines to get Opinions	1
4) Evaluation and Preparation for Issuing the Guidelines	2
Total cost: 19 man-month (US\$ 15,200)	

3) Plan for Incentive for Energy Saving Project

(a) Purpose

Many entrepreneurs, especially medium- and small-scale manufacturing industries are particularly suffering from shortage of funds for investment in energy conservation equipment. For medium- and small-scale manufacturing industries, the loan with annual interest rate of 60-95 percent is available. The treasury provides legal incentives such as customs duty exemption, tax exemption on wages of workers, value added tax compensation and credit that can be used for energy conservation investments. Energy audits, seminars, training and technology introduction without charge, and information supply with reasonable charge, are recognized as incentives for manufacturing industries to promote energy conservation.

To make incentives for energy conservation promotion such as the tax credits and exemption, and loan incentives work more effectively, it would be useful to formulate an incentive package scheme such as tax credits and exemption, soft loans, energy audits without charge and training. An incentive package for energy conservation investment is to formulate and apply to assisting these industries.

(b) Outline of Incentives

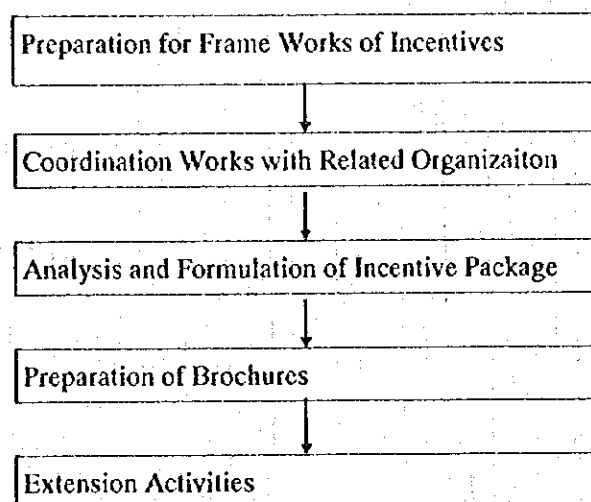
An idea of incentive package scheme is divided into following 4 items.

- 1) Legal incentives
Custom duty exemption, Investment allowance, Tax credit, Tax, duty and charges exemption, Value added tax compensation
- 2) Low interest finance with a system of endorsement for debt
- 3) Energy audit (free of charge)
- 4) Training

(c) Note

The legal incentives, and the low interest finance for medium- and small-scale manufacturing industries mentioned above are generally applicable to new investments. An incentive package scheme for energy conservation programs should be instituted combining the existing incentives to support implementation of energy conservation works of each industry.

(d) Procedure



(e) Schedule

Start: 1997

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1) Preparation for Frame Works of Incentives, Analysis and Formulation of Incentive Package and Coordination Works with Related Organization | 1997 |
| 2) Preparation of brochures and Extension Activities | 1998 and the yar after |

(f) Estimated Administrative Cost

- | | |
|--------------------------------------------------|--------------|
| 1) Preparation for Frame Works of Incentives, | 1 man-months |
| 2) Analysis and Formulation of Incentive Package | 3 man-months |
| 3) Coordination Works with Related organization | 2 man-months |
| 4) Preparation of Brochures | 2 man-months |
| 5) Extension Activities | 2 man-months |

Total administrative cost: 10 man-months (US\$8,000)

(g) Problems

- 1) The incentives are not widely known and the application process is complicated.
- 2) Lack of administrative staffs, information on legal and technology and finance is observed in medium- and small-scale manufacturing industries.
- 3) Soft loans with an annual interest rate of 50 percent from the Turkish Development Bank are possible in principle but are presently not available due to lack of finance sources.

4) Plan for Energy Conservation Training Center

(a) Purpose

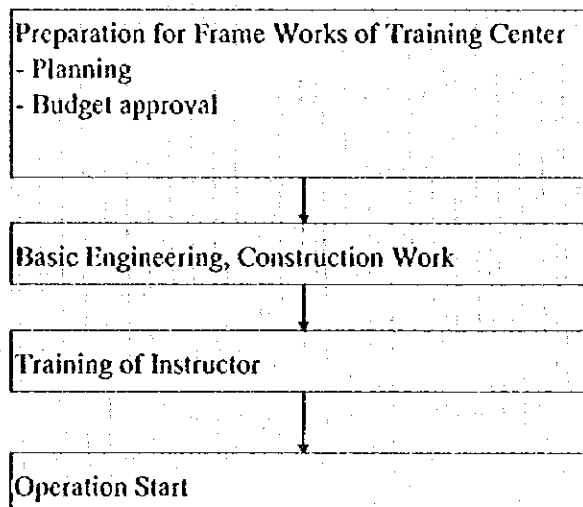
To foster engineers especially at medium- and small-scale industries to become aware of the need to use energy efficiently and educate them in practical energy conservation techniques.

(b) Outline of Training Center

- a) Training: 50-100 persons per year including foreign engineers
- b) Curricula: Energy management, Energy efficiency improvement in model plants, Insulation, Efficient use of electricity etc.
- c) Building: Conference room, Training room, Laboratory, Stock part, Administration room, Trainees room, Library, Model plant part, Cafeteria etc.
- d) Model plant: Boiler, Furnace, Motor, Piping, Heat exchanger, Insulation etc.
- e) Utility Facility: Electricity, Fuel
- f) Construction cost: Approximately 10 million dollars including
 - Modification of EIE building
 - Model plant
 - Utility
 - Analyzer
 - Computer
 - Office furniture
 - Books

Construction cost should be estimated after the framework study of training center.

(c) Procedures



(d) Schedule

1997- 1998 : Preparation work for frame works of training center

- Planning
- Budget Approval

1998- 1999 : Basic Engineering, Construction Work

1997- 1999 : Training of Instructor

2000 : Operation Start

(e) Estimated Administrative Cost

- 1) 1997: 6 man-month
- 2) 1998: 6 man-month
- 3) 1999: 40 man-month
- 4) 2000: 2 man-month for training supervisor
4 man-month for equipment preparation and maintenance
- 5) 2000-2003: 5 foreign technical advisors
- 6) 2000- : 10 persons from EIE

Total cost through 1) to 4): 56 man-month (US\$ 44,800)

(f) Problems

- 1) Priority among government projects
- 2) Budgeting for construction and maintenance
- 3) Estimation of number of trainees (Demand)
- 4) Coordination among other organization
- 5) Preparation of textbooks and technical information
- 6) Improvement of capability of trainers
- 7) Establishment of training system

(2) Recommendations on Energy Conservation Promotion

Present state, problems and analysis, recommendations, responsible organization and priority are summarized in Table 7-8.

Table 7-8 Recommendations on Energy Conservation Promotion
(1) Institutional Functions and Measures

Itemized conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority *
1) Effectiveness of the Organizational Structure	EIE/NECC has taken the leadership and responsibility for energy conservation activities among ministries, agencies and institutions.	The single window system is good, but it is necessary to coordinate among governmental and private organizations to promote energy conservation. There should be effective interdepartmental coordination of conservation activities.	In the industrial sector, the Ministry of Industry and KOSGEB have functions such as access to informative means, adoption of technological developments and training. Coordination among EIE/NECC, Ministry of Industry and KOSGEB is recommended to promote smooth and effective energy conservation in the industrial sector as well as enhancing awareness through the activities of ECCB.	MENR/EIE	A
2) Government Commitment	Financial sources for activities are needed.	In the government sector, the acquisition of extra budget for promoting an energy conservation program is difficult. For the measure to create a fund, expansion of existing scheme or creation of new monetary source is needed.	Strong political leadership and bureaucratic commitment are, however, the key to the success of government conservation activities. Strong political leadership with bureaucratic interest is expected to promote energy conservation in such a country that is highly dependent on a foreign supply of energy.	MENR	A
3) Planning	A general statement on energy conservation appeared in the seventh Five Year Development Plan (1996-2000) without specific target and priorities.	Energy conservation activities such as regulation, energy audit, energy bus program, publication have been instituted. An overall energy conservation program with well-defined quantitative targets, strategy, budget is not formulated.	An overall action program is recommended to formulate.	MENR/EIE/NECC	A

Note: * See the attached recommendation priority table.

Itemized energy conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
1-2 Energy Conservation Laws and Regulations	<p>No Laws at present</p> <p>-Related Regulation has been issued for major energy consumers in manufacturing industries.</p>	<p>In order to promote energy conservation, there is a need for a law on which nation-wide energy conservation measures can be based.</p> <p>The existing regulation does not cover the whole range of the industrial sector nor other sectors.</p>	<p>1) The scope of the Regulation should be expanded to small manufacturing industries consuming less than 500 TOE of energy. The Regulation should however limit the obligation of these small energy users to reporting their annual energy consumption with the cooperation of SIS.</p> <p>(Estimated administrative cost) 9 man-months, US\$6,300</p> <p>2) An energy conservation law which, of course, covers the manufacturing sector should be formulated. It is necessary for the government, government agencies, energy suppliers, energy equipment manufacturers and consumers to promote energy conservation from their respective standpoints, in an integrated way. Also, it is necessary for the government to express its commitment to energy conservation, and for it to formulate a law on which its various measures are to be based.</p> <p>(Estimated administrative cost) 12 man-months, US\$96,000</p>	MENR/EIE	B
					C

Itemized energy conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
1-3 Guidelines	<p>TSI has standards for energy consuming equipment:</p> <ul style="list-style-type: none"> - Boilers and stove - Heat insulation for buildings <p>It is required that an energy-managed factory endeavors to improve efficiency in energy consuming equipment.</p>	<p>Various non-compulsory energy conservation standards, or guidelines, showing quantitative targets for energy efficiency improving measures itemized in Article 6 of the Regulation, should be prepared.</p> <p>The guidelines may help factory staff to conduct energy conservation measures and may help business operators to manage positive efforts for the streamlining of energy use in each factory, in such a manner as choosing better solutions adapted to the given conditions.</p>	<ol style="list-style-type: none"> 1) To lower the intake air ratio, and excess oxygen content in exhaust gas to improve fuel combustion in furnaces, to the extent not increasing smoke generation, 2) To raise waste heat recovery rates up to standard values for promotion of effective waste heat recovery and utilization of equipment for such purposes, 3) To reduce heat loss that occurs in the form of radiation, convection and conduction, by applying heat insulation and other appropriate measures, 4) To improve operation of combined heat and power generation and to increase efficiency in the conversion of heat to power or the reverse, 5) To prevent electricity loss due to resistance and other causes and to keep power factors at adequate levels at electricity receiving end, in cooperation with TSI and other experts concerned. <p>These guidelines should be reviewed periodically every 10 years to adjust to the change of technology, energy situation and so on. (Estimated administrative costs is shown in the highlighted plan.)</p>	EIE	A

Itemized conservation measures	energy	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
<p>1-4 Incentives for introduction of energy efficient equipment</p> <p>- Taxation</p> <p>- Loan</p>		<p>The existing system is not known particularly in medium- and small- scale manufacturing industries.</p>	<p>Medium- and small- scale manufacturing industries are suffering from a shortage of funds for investment in equipment for improving energy efficiency.</p> <p>Government programs assisting these industries are urgently needed.</p>	<p>It is recommended to raise awareness of the existing measures such as low interest finance with a system of endorsement for debt, custom duty exemption, investment allowance, tax and duty exemption.</p> <p>An incentive package scheme should be instituted combining the existing incentives such as tax incentives, soft loans, energy audit and training.</p> <p>(Estimated administrative cost is shown in the highlighted plan.)</p>	EIE/NECC	A

Itemized conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
1-5 Energy Managed Factories	Factories annually consuming 2,000 TOE or more are designated as energy-managed factories, and held responsible for reporting their energy consumption every year.	<p>Medium- and small- scale manufacturing industries are mostly small energy consumers and fall outside the class responsive to the Regulation.</p> <p>It is necessary to obtain accurate information on trends in energy consumption and conservation patterns of these small consumers.</p>	<p>To revise the applicable scope of the Regulation downward to medium- and small-scale manufacturing industries which consume 500 TOE or more energy annually, so that the Regulation may cover 90% or more of energy consumption. The obligation should be limited only to reporting their annual energy consumption.</p> <p>At the same time, MENR will be able to analyze energy data thus made available to it, and to use these data in formulating its policy for the industrial sector.</p> <p>(Estimated administrative cost) The administrative costs are included in Item 1-2 Energy Consumption Laws and Regulation.</p>	MENR/EIE	B

Itemized conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
1-6 Qualification of Energy Managers	<p>Factories annually consuming 2,000 TOE or more energy are obligated to appoint energy managers in order to promote rational use of energy in plants.</p> <p>EIE regularly holds seminars on rational use of energy and energy conservation for granting qualification of energy managers to participants.</p> <p>A notice was issued on August 31 1996 on such seminars as a means of certifying energy managers.</p>	<p>The qualification system for an energy manager should be a socially authoritative one. Now, not all the energy-managed factories have enough qualified energy managers.</p> <p>Energy managers should be appointed at every energy-managed factory within 6 months to 1 year from the date of the Regulation becoming effective.</p>	<p>1) Promotion and expansion of the energy management courses conducted by not only EIE but also the authorized organizations, to train factory personnel to be assigned as energy managers. (Estimated administrative cost) 1 man-months x 4 courses/year x times/y, 20 man-months, US\$16,000</p> <p>2) Expediting deployment of energy managers in 3 years, it is advisable to introduce a state approved qualification system for energy managers, in such a way as by giving certificates to graduates of technology courses and to factory engineers with years of experiences in energy conservation.</p> <p>3) Qualified energy managers shall be registered after they are posted to energy-managed factories and EIE shall provide them with updated information obtained by factory survey and foreign information on energy conservation, as well as to communicate government measures and to give specialized technical education. They can perform as auditors or consultants for small-scale, not designated factories. (Estimated administrative cost of items 2) and 3)) 3 men x 2 weeks x 2 times/y 3 man-months, US\$2,400</p>	MENR/EIE	A
				EIE	A
				EIE	B

Itemized energy conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
1-7 Energy Conservation Training Center	<p>In December 1992, EIE was designated the National Conservation Center by the MENR, in (NECC) by the MENR, in the field of manufacturing industries</p>	<p>Management and engineers of medium- and small-scale manufacturing industries do not generally have good opportunities to be trained in the latest technology.</p> <p>Energy conservation activities for medium and small-scale industries should be concentrated in EIE/NECC.</p>	<p>EIE/NECC, should be strengthened by having a training center equipped with a model plant to carry out practical an energy conservation operations there and by developing an energy data base system, especially for engineers at medium- and small-scale industries.</p> <p>EIE, through the activities of the training center, will enable the engineers to become aware of the need to use energy efficiently and educate them in energy conservation techniques.</p> <p>EIE should start its activities in the industrial sector since energy conservation measures can bring about quick results there. Instead of being confined to the industrial sector, the activities of the center will expand into the transportation area, consumer-related area and so on.</p> <p>In this way EIE can promote energy conservation on a national level in a unified way.</p> <p>(Estimated administrative cost is shown in the highlighted plan.)</p>	MENR/EIE / NECC	B

(2) Organization and Role of EIE/ NECC

Itemized conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
2-1 Organization and Role of EIE/NECC	The EIE/NECC, as an organization focused on energy conservation in Turkey, carries out consulting and training activities and also proposes policies for energy conservation for the industrial, housing, and transportation sectors.	<p>EIE and NECC's Industrial Energy Conservation Division are the main governmental organizations for energy conservation promotion to industries.</p> <p>EIE is not allowed to establish a new department or division in NECC.</p> <p>The EIE/NECC's authority is weak as an organization, and it does not operate a factory, there is a limit to the technical information that can be accumulated.</p> <p>On the other hand, energy conservation is carried out by the factories that actually consume the energy. Private companies tend not to open their internal information and to avoid outside intervention.</p>	<p>1) The officials of NECC are recommended to further continue their energy conservation activities. One option is to expand their mandate and to clearly define responsibilities of given positions.</p> <p>(Estimated administrative cost) 1 man-months, US\$800 (Planning works only)</p> <p>2) Definition of the role of EIE/NECC as an administrative body is an important issue. One possible option is to intensify their authority by making it a management supervisory organization. It is also hoped that the current energy conservation activities, education and consulting, will be further developed and enhanced drawing upon international collaboration schemes.</p> <p>(Estimated administrative cost) 2 man-months, US\$1,600 (Planning works only)</p>	EIE/NECC	B
					A

(3) Activities of EIE/ NECC

Itemized energy conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
<p>3-1 Energy Audits</p>	<p>EIE has conducted, as of August 1996, free energy audits at 36 plants in industrial sectors since 1990. EIE is supposed to assist factory energy managers to carry out energy audits at their plants in line with the Regulation.</p>	<p>Analytic technology, engineers and equipment are not necessarily sufficient even in large-scale manufacturing industries. Medium- and small-scale industries are in much poorer condition. EIE should use human resources available inside and outside to cope with increasing needs for audits. More budget should be allocated to implementation of the energy audits. In 1994 and 1995, only one energy audit could be carried out, mainly because of government budget saving measures.</p>	<p>To conduct simpler energy audits mainly at medium- and small-scale factories not designated as energy-managed factory in the regulation, in order to make these factories interested in energy conservation. In this regard, the collaboration of KOSGEB is essential in selecting candidate plants worthy of being audited.</p> <p>2) (Estimated administrative cost) 1 man x 3 days/time x 30 factories/year 3 man months, US\$2,400</p>	<p>EIE</p>	<p>A</p>
			<p>3) Possibility of introducing paid energy audits at large energy-managed factory should also be studied where many human resources and costly experts from outside including overseas are needed for carrying out precise and high level diagnosis and guidance service. Designated plant management would be assured of energy audits for identifying energy saving potentials and monetary savings of the plant.</p>	<p>EIE</p>	<p>C</p>

Itemized conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
3-2 Dissemination of Technical Information on Energy Conservation	<p>EIE is conducting various consultative activities for energy conservation</p> <ul style="list-style-type: none"> - energy audits - seminars - publication of technical information: magazines, and papers - holding of exhibitions devoted to energy conservation - training programs 	<p>At present, sufficient information on energy conservation may not be provided to factory managers and engineers.</p> <p>Provision of latest technical information will serve to upgrade the technical levels of factories and to stimulate them in their energy conservation activities.</p>	<p>1) To continue the consulting activities of EIE/NECC and related organizations on one side, to intensify their activities on medium- and small-scale industries, on the other.</p> <p>To promote the latter and increase their awareness on energy conservation, collaboration of KOSGEB, with its nationwide network, should be utilized.</p> <p>2) To prepare a pocket-sized book, 'Energy Conservation Reference Book', illustrating related regulations, statistics, standards and technical data on heat management and electricity management, in order to enable factory staff to easily access the needed information while they are conducting energy conservation activities.</p> <p>(Estimated administrative cost) 3 man months, US\$2,400</p>	EIE/KOSGEB	B
				EIE	A

Itemized conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
3-3 Establishment of Energy Data Base System	<p>EIE has been developing an energy data base since 1990 gathering, sorting out information and publication of energy conservation data and technology.</p> <p>EIE started compilation of a new data base system for information of plants consuming annually 500 TOE or more energy.</p>	<p>The present data base system does not necessarily indicate the accurate status of energy consumption or energy conservation in the whole range of manufacturing industries, by sectors/subsectors and by size groups.</p> <p>It is necessary to establish proper and wide channels of information gathering, and increase public trust in it as a reliable source of information to people and enterprises.</p>	<p>1) To establish information service outlets, such as EIE's Industrial Data Base Evaluation Book</p> <p>In order to effectively provide factories with technical information on energy conservation, it is necessary to establish a system by which the present situation and future trends in technology in various areas can be accurately grasped, and with which such information can be used effectively.</p> <p>2) To strengthen the information gathering system, especially in smaller-scale industry, by expanding the scope of the Regulation to smaller energy consumers to report their annual energy consumption</p> <p>To broaden EIE's channels for the acquisition of international technical information on energy conservation by promoting cooperative relations with overseas organizations, then to make the information public</p> <p>3) To install an on-line information provision and retrieval system. (Estimated administrative cost) On-Going project</p>	EIE	A
				EIE	B
				EIE/SIS	C

Itemized conservation measures	Present State	Problems and Analysis	Recommendations	Responsible Organization	Priority
<p>3-4 Energy Conservation Seminars for Medium- and Small-Scale Factory Management Engineers</p>	<p>None dedicated to factories which are not designated as energy-managed factories.</p>	<p>There is a shortage of engineers and technology at medium- and small-scale factories. Factory managers and staff are not sufficiently aware of the need for energy conservation, because they are concerned more about production and cost.</p>	<p>To hold seminars concerning successful examples of energy conservation in factories and to give education in energy conservation to management and engineers of medium- and small-scale manufacturing industries, which are not designated as energy-managed factories.</p> <p>Publication of successful examples of energy conservation will be effective in leading those engineers to recognize the importance of energy conservation.</p> <p>In this regard, the collaboration of KOSGEB is essential in holding joint seminars on energy conservation in order to improve awareness of energy saving among management and engineers. KOSGEB's Consulting and Quality Improvement Centers are responsible to provide consulting services, seminars to medium- and small-scale industries, aiming to improve their product competitiveness in such a manner as production cost reduction is realized. The joint seminars would be thus operated, EIE sponsoring and providing specialists on energy savings. KOSGEB planning the seminar program and providing the seminar hall in its Center office buildings throughout the country.</p> <p>(Estimated administrative cost) 3 men x 3 days/time x 2 times/year 0.6 man-months. USS480</p>	<p>EIE /KOSGEB</p>	<p>A</p>

Recommendation Priority Table

Recommendation Item	Basic Concept	Existing or Not	Difficulty - Cost	Difficulty - Term	Importance	Urgency	TOTAL POINT	Priority Ranking
I. Institutional Functions and Measures								
Organization (1-1 1)	5	4	4	5	5	4	27	A
Government Commitment 1-1 2)	5	4	4	4	5	4	26	A
Planning 1-1 3)	5	4	4	4	5	4	26	A
Scope Expansion of the Regulation 1-2 1)	5	2	4	3	5	4	23	B
Formulation of Energy Conservation Law 1-2 2)	3	2	3	0	4	3	15	C
Preparation of non-Compulsory Guidelines 1-3	5	2	5	4	5	5	26	A
Incentive Package Scheme 1-4	5	4	3	4	5	5	26	A
Scope Expansion for Energy Managed Factory 1-5	5	2	4	3	5	4	23	B
Energy Management Course 1-6 1)	5	4	4	4	5	4	26	A
Deployment of Energy Manager 1-6 2)	5	4	4	4	5	5	27	A
Registration of Energy Managers 1-6 3)	5	2	4	3	4	3	21	B
Energy Promotion Center 1-7	4	2	3	3	4	4	20	B

Recommendation Item	Basic Concept	Existing or Not	Difficulty - Cost	Difficulty - Term	Importance	Urgency	TOTAL POINT	Priority Ranking
2. Organization and Role of EIE/NECC								
Motivation of NECC Officials 2-1 1)	5	3	4	3	4	4	23	B
Expansion of Role of EIE/NECC 2-1 2)	5	3	5	4	5	4	26	A
3. Activities of EIE/NECC								
Simple Energy Audits at Small Factory 3-1 1)	5	4	4	4	5	4	26	A
Introduction of Paid Energy Audits 3-1 2)	4	2	3	3	3	3	18	C
Information Service for Small Factory 3-2 1)	5	4	4	4	4	4	25	B
Publication of Pocket-sized Book 3-2 2)	5	3	5	4	5	4	26	A
Provision of Technical Data 3-3 1)	5	4	5	4	5	4	27	A
Strengthen the Data Gathering System 3-3 2)	4	4	4	3	5	4	24	B
On-line Information Provision, Retrieval 3-3 3)	4	3	2	3	4	2	15	C
Energy Conservation Seminars for Small Factory 3-4	5	4	4	4	5	4	26	A

Notes (1) Priority Ranking A : TOTAL POINT 30 - 25 points B : 24 - 20 points C : 19 - points

(2) Urgency Urgent, Short term : 5 - 4 points

Middle term : 3 points

Long term : 2 points

Appendix



Appendix 7-1 Coal, Petroleum and Natural Gas, and Electric Power Policies

(1) Coal Policy

Main policies in the Coal Sector are as follows:

1. Optimum production from coal resources capable of meeting the requirements of the country with the participation of the public and private sectors,
2. In the selection of new production projects, priorities that respond to the needs of the country in the shortest possible time with the most economic solutions, must be determined; thus the public and industries' fuel requirements shall be met in a balanced and timely way in addition to the requirements of the thermal power plants,
3. Attaching the necessary importance to coal technology; establishing drying and carbonization techniques in order to enrich low calorific valued lignites; commencing production of coke and metallurgical coke out of cokeable lignites,
4. Use must be made of such advanced technologies as gasification and liquefaction in order to prevent low quality solid fuels, both used in industry and heating, from causing environmental pollution.
5. Consideration of out-of-country coal resources as an alternative to oil importation both in the power sector and industry sector.

(2) Petroleum and Natural Gas Policies

Main policies in Petroleum and Natural Gas Sector are as follows:

1. Acceleration of exploration of petroleum and natural gas for the purpose of meeting petroleum and gas demand at the highest level through domestic production; and acceleration of exploration of natural gas, and encouraging the public sector, private sector and foreign exploration company to take part in the said exploration,
2. Expanded usage of secondary production methods such as gas and steam injection for attaining higher production from existing production fields,
3. Development of domestic alternative resources and creation of replacement resources, and where necessary importing coal and/or natural gas, thus attaining diversification of resources,
4. Increase of efforts for obtaining additional supply sources to expand the use of natural gas all over the country, and giving priority to the studies regarding transmission of natural gas in Turkish republics to Europe via Turkey,
5. Arranging the storage and distribution of products by considering the general transportation system and general power economy; diverting transportation from highways to pipelines; erecting refineries close to consumption centers to prevent unnecessary transportation,

(3) Electric Power Policy

Main policy in the electric sector is as follows:

1. To insure meeting the national requirement which shows a high rate of increase in proportion to economic and social development,
2. Restructuring of pricing on a sectoral basis in line with the principle that each sector should pay the price at the point where the service is provided,
3. To accelerate privatization in the electrical sector and to extend the activity of transfer of transmission and distribution facilities to concerned companies under a special statute,
4. To make such financial opportunities as the Electric Power Fund operable in order to encourage the private sector to participate both in production and in manufacturing of connected facilities,
5. To install Stack Flue Gas Sulfur Dioxide Elimination Units on all the existing and future projects, where they are deemed necessary depending on the results of analyses, in order to overcome damage which coal burning thermal power plants may inflict on the environment,
6. In the selection of new production projects, priorities, to respond immediately and bring economic solutions to the needs of the country, must be set and special care should be exercised in multiple fuel burning power plants
7. Considering that all of the country's thermal and hydraulic potential will be used in the 2000s, arrangements must be completed for early conversion to nuclear technology.
8. Existing transmission lines must be improved in order to obtain uninterrupted and high quality electric power.
9. Electricity exchange must be expanded by construction of the necessary infrastructure in cooperation with other countries in the region.

Appendix 7-2 Regulation on Rational Use of Energy

Official Gazette

11 Nov. 1995

Regulation

From the Ministry of Energy and Natural Resources

Regulation on Measures

to be taken to increase Efficiency in Energy Consumption of Industrial Establishments

Chapter 1

Objective, Scope, Legal Support, Definitions

Objective:

Article 1 - The objective of this Regulation is to set forth the arrangements needed to increase efficiency in the energy intensive industrial sector.

Scope:

Article 2 - This regulation covers private and state establishments which operate in the industrial sector covered by Chambers of Industry and Trade and those related to mining exploitation, which have annual energy consumption equal to 2000 TOE and over. The calculation methods for the conversion to TOE of fuels and electricity consumed are indicated in Article 5.

Legal Justification:

Article 3 - Present Regulation has been prepared in accordance with Article 10 (d) modified by the Decree Law dated 12/8/1993 No. 505 and Article 2 (b) of the Law on the organization and the Duties of the Ministry of Energy and Natural Resources No. 31.54 on ground of Article 28 of the latter.

Definition:

Article 4 - The following abbreviations have the meanings attached adjacent thereto.

- a) MENR - Ministry of Energy and Natural Resources
- b) EIE - General Directorate of International Energy Resource Survey and Development Administration,
- c) NECC - National Energy Conservation Center,
- d) TSI - Turkish Standards Institute
- e) FACTORY - Industrial Establishment
- f) TOE - Ton Oil Equivalent
- g) ENERGY - All petroleum products suitable for burning, natural gas, coal, lignite and all other coal products, and products bearing energy value and are produced as intermediate generated during production, and electricity
- h) SEC - Specific Energy Consumption
- i) AQP - Air Quality Protection Regulation

Regulation

Chapter 2

General Principles for Improving Energy Efficiency

The Energy Efficiency Calculation of Energy Consumption

Article 5 - The total energy consumption, all kinds of energy types generated by use of including all kinds of expended fuels and purchased semi finished products, raw material and/or energy, in one year in any factory between 1 January and 31 December or in 12 months including the campaign period for factories operating on campaign basis.

The annual consumption amount of each fuel and/or electricity shall be converted to TOE by means of the coefficients given in the following table and the annual total energy consumption figures shall be found by adding these TOE values.

Measures for Increasing Energy Efficiency:

Article 6- Factories shall make efforts to insure efficient use of energy by taking measures in the following categories.

A. Energy Efficiency Improving Measures in Existing Factories

Existing factories shall make efforts to improve their efficient use of energy by taking measures in the following categories:

- a) Provide the most efficient combustion of fuels by using the existing combustion system
- b) To obtain the highest efficiency in heating, cooling, air-conditioning and heat transfer

Table Lower Calorific Values and Coefficient for Conversion to TOE

Quantity	Energy type	Density	Calorific Value	Unit	Conversion Coefficient
1 ton	Coal		6,100	kCal/Kg	0.610
1 ton	Coke		7,200	kCal/Kg	0.720
1 ton	Briquette		5,000	kCal/Kg	0.500
1 ton	Lignite heating and Industry		3,000	kCal/Kg	0.300
1 ton	Lignite plant		2,000	kCal/Kg	0.200
1 ton	Elbistan Lignite		1,100	kCal/Kg	0.110
1 ton	Petrocoke		7,600	kCal/Kg	0.760
1 ton	Prina		4,300	kCal/Kg	0.430
1 ton	Shaving		3,000	kCal/Kg	0.300
1 ton	Scale		2,250	kCal/Kg	0.225
1 ton	Graphite		8,000	kCal/Kg	0.800
1 ton	Coke dust		6,000	kCal/Kg	0.600
1 ton	Mine		5,500	kCal/Kg	0.550
1 ton	Elbistan Lignite		1,100	kCal/Kg	0.110
1 ton	Asphaltite		4,300	kCal/Kg	0.430
1 ton	Wood		3,000	kCal/Kg	0.300
1 ton	Animal-Plant Waste		2,300	kCal/Kg	0.230
1 ton	Crude oil		10,500	kCal/Kg	1.050
1 ton	Fuel oil No.4		9,600	kCal/Kg	0.960
1 ton	Fuel oil No.5	0.920kg/l	10,025	kCal/Kg	1.003
1 ton	Fuel oil No.6	0.940kg/l	9,860	kCal/Kg	0.986
1 ton	Diesel oil	0.830kg/l	10,200	kCal/Kg	1.020
1 ton	Gasoline	0.735kg/l	10,400	kCal/Kg	1.040
1 ton	Kerosene	0.780kg/l	8,290	kCal/Kg	0.829
1 ton	Black liquer		3,000	kCal/Kg	0.300
1 ton	Naphta		10,400	kCal/Kg	1.040
1000 m ³	Natural gas	0.670kg/m ³	8,250	kCal/m ³	0.825
1 ton	Coke Gas		8,220	kCal/Kg	0.820
1000 m ³	Coke Gas	0.490kg/m ³	8,220	kCal/m ³	0.820
1 ton	Blast furnace gas		791	kCal/Kg	0.080
1000 m ³	Blast furnace gas	1.290kg/m ³	1,019	kCal/m ³	0.102
1000 m ³	Refinery Gas		8,783	kCal/m ³	0.878
1000 m ³	Accetylene		14,230	kCal/m ³	1.423
1000 m ³	Propane		10,200	kCal/m ³	1.020
1 ton	LPG		10,900	kCal/Kg	1.090
1000 m ³	LPG	2.477kg/m ³	27,000	kCal/m ³	2.700
1000 kWh	Electricity		860	kCal/kWh	0.086
1000 kWh	Hydraulic		860	kCal/kWh	0.086
1000 kWh	Geothermal		8,600	kCal/kWh	0.860

- c) To make the heat insulation conform to applicable standards and to minimize heat losses by properly insulating all heat generating, distributing and using units
- d) Waste heat recovery system
- e) To improve efficiency in conversion of heat to power
- f) To prevent losses in electricity consumption
- g) To improve efficiency in obtaining heat from electricity, consideration of Combined Heat and Power system
- h) To minimize the human factor through automatic control
- i) To spend maximum efforts to minimize air polluting emissions and to reduce waste so as not to pollute the environment

B. Energy Efficiency Improving Measures in New Factories

Measures specified in paragraph A of this Article shall be taken into consideration, starting from the project design stage, and additionally:

- a) Special attention shall be paid to the requirements of standardization and quality assurance system when selecting machinery offering the best technologies and efficiency.
- b) The factories shall be so designed as to provide the highest efficiency in heat insulation, and shall be built in full conformance with the implementation drawings.
- c) All measuring devices shall be supplied during the installation phase of the plant to make possible good monitoring and efficient use of energy.
- d) Necessary arrangements shall be made to minimize air polluting emissions; all necessary measures shall be taken to insure that production waste is reduced so as to cause the least hazard for the environment.
- e) Special care shall be paid to the Combined Heat and Power system.

Energy conservation audits:

Article 7 - Plant management shall make or have make energy audits in order to identify energy saving potential and monetary savings for the plant, to be secured by means of the precautions mentioned in Article 6 above. These studies shall start at the end of the first year following publication of the present Regulation and shall be completed by the end of the third year. The study results shall be sent by the plant to NECC. The plant may conduct this study by employing its technical capabilities, or it may assign the completion of the study to local or foreign engineering firms, universities or independent advisors.

Preparation of Energy Conservation Plants:

Article 8 - Considering energy audits results specified in Article 7 hereof, the plant management shall make 2 and 5 year plans considering capacity increases and modernization studies as well as production increases. Energy conservation plans such as boiler control, insulation, power

compensation, with repayment period of year or less shall be included in the 2-year plan. The 5-year plan shall include the investment of energy conservation plans with repayment period of 1-4 years. These plans shall be prepared and immediately implemented after the completion of energy conservation audits.

Monitoring of Specific Energy Consumption:

Article 9 - All plants shall monitor the SEC values of main products on a monthly and annual basis, using the following units; TOE/ton, KWH/Unit Product, Gcal/Ton, Gcal/m², Kcal/kg, etc.

In order to better follow up SEC values, the plant management shall ensure the purchase of the necessary measuring equipment within 1 year from the date of publishing of this Regulation and shall install the equipment in three years, and shall repair the existing equipment. In order to keep them in constantly calibrated and operating condition, it will be insured that they are calibrated at the Turkish Standard Institute periodically. Consider the use of a sufficient number of meters and measuring equipment in modernization, capacity increase and building new plants.

Chapter 3

Setting up Energy Management System at Plant

Setting up Energy Management System:

Article 10 - Factories with annual overall energy consumption equal to or greater than 2000 TOE shall form an energy Management System at the plant within 6 months to 1 year from the date of the Regulation becoming effective.

Energy Control Committee and Energy Manager:

Article 11 - In Table 2 on a Sectoral Basis. (Refer to Table 7-5 Energy Control Committees and Energy Managers)

Factories consuming energy at the level indicated in Category A or higher, shall set up an energy control committee.

Factories in Category B shall assign an Energy Manager.

Personnel who will be in charge of energy management at the factory will be required to hold the certificate of Energy Manager.

Characteristics of Energy Control Committee and Energy Manager:

Article 12 - The assigned Energy Manager who should be administratively attached to the plant should be well aware of the system and the process. The Energy Control Committee, operating under the coordination of the Energy Manager, is composed of the technical personnel in charge of operations of the main production units of the plant as well accounting and purchase personnel, etc. Energy Manager is not required to be a full time employee.

Article 13 - The duties, responsibilities and authority of the Energy Manager shall cover the following but not be limited thereto:

- a) To monitor and check all energy consumption records in the plant, to read meters, to follow up energy procurement, to determine the locations of measuring meters required at major production units and to arrange for the procurement and installation thereof
- b) To determine post- improvement indices for SEC Values in order to monitor separately each important production unit and the main products, to prepare, for presentation to top management, monthly reports summarizing SEC Values, energy costs and the production-energy consumption relation, to check and see whether it follows a course parallel to the energy of the local or foreign industrial products and to prepare alternative suggestions to

lower the energy intensity of these products

- c) To study the possibility of changing the fuel type and power tariff to provide financial advantage for the plant, and to prepare potential plans to be applied in case of energy supply interruptions
- d) To prepare an annual energy cost budget and to monitor the adherence thereto
- e) Through cooperation with plant personnel, equipment vendors and foreign advisors, to develop energy conservation projects including process changes, and make the necessary financial analyses to enable top management to make investments in connection with the matters analyzed
- f) To identify the value of the equipment for insuring more efficient operation of machinery and plants
- g) To insure that the prepared conservation projects are carried out from contracting phase to installation stage
- h) To insure communication between each level in the plant for the Energy Management Program, and to develop awareness and training programs to encourage all engineers and workers participating in the program
- i) To monitor the stack gas emissions and to insure within the limit values specified in Air Quality Regulation Published in the Official Gazette dated 2/11/1986 No.19269
- j) To insure that meters and similar equipment are periodically measured and calibrated every three years, and to prepare monitoring reports

Chapter 4

Matters Regarding the Issue of Energy Management Certificates

Energy Manager Courses and Certificate:

Article 14 - NECC shall establish short term courses to train the personnel to be assigned by the plants on energy Management subjects, and/or shall issue authorization to the training organizations to arrange these courses. NECC shall issue certificates after the examinations at the end of the said courses.

Scope of the Course:

Article 15 - An announcement containing the scope, fee, issuance of a certificate of proficiency, cancellation of this proficiency, and the rules of examination shall be prepared by the Ministry of Energy and Natural Resources. It shall be advertised in the Official Gazette within 6 months after the date of coming into force of the Regulation.

Instructor's Fee:

Article 16 - The EIE/NECC personnel to be assigned as instructors in the Energy Managers Course and in Energy Efficiency Training Programs shall be paid an instruction fee from the Budget of EIE. The instruction fees are indicated in the law No: 3803 Dated 21.5.1992 modifying Article 176 of the Turkish Civil Servants Act No.657.

The instruction fee to be paid to the instructors to be assigned by NECC from institutions and universities shall be in the amounts specified in the above laws and they shall be paid out of the instruction fees of these institutions, universities and the course fees to be collected by the plants.

Energy Conservation Class in Universities:

Article 17 - When an engineer who has received a semester of energy conservation education during his education in a university in line with the course specified in Article 15 hereof, applies to NECC with the necessary documents, he may be issued a certificate of Energy Manager at the cost of the document.

Chapter 5

Monitoring and Responsibilities

Monitoring:

Article 18 - The matters connected with present Regulation shall be followed in the structure of the General directorate of EIE and the result shall be reported to the following Ministry each year. These reports shall contain the failures observed by NECC and the recommendations made for the elimination thereof.

Monitoring Authority:

Article 19 - NECC is empowered to control whether or not the plants comply with the obligations set forth herein and to collect the data necessary to determine the efficiency of energy efficiency in the Plants as well as to follow up the operations on the spot at the plants.

Confidentiality of Information:

Article 20 - The confidentiality of the data shall be insured and the data and the investigation results shall never be announced as pertaining to a certain plant. They may be published as assessments pertaining to more than one plant or as sectoral assessments. However, information of interest of the country or public institutions may be published or used with the consent of the concerned institution.

Issue of Certificate of Authority for Energy Conservation Studies:

Article 21 - Where the energy audits in plants cannot be accomplished by the plants themselves, they shall be made by person(s) or institutions empowered by the NECC. At the end of these studies, reports in the format defined by NECC shall be prepared. Persons or institutions desiring to receive a certificate of proficiency for carrying out an audit must apply to NECC with documents describing the work they have completed in this respect and the personnel and equipment they are available. Those who are deemed satisfactory shall be issued a Certificate of Proficiency valid for 5 years. Reports prepared by persons and institutions not having a certificate of proficiency shall be deemed null and void.

Reporting of the Names of Persons Assigned as Energy Managers:

Article 22 - Names, CVs, addresses and phone numbers of the persons assigned as Plant Energy Managers authorized by the plant management shall be submitted to NECC within 6 months from the date of coming into effect of the present Regulation, and these data shall be maintained by NECC in a data base which is continuously updated. In case of removal of such persons or their resignation from their assigned posts a new officer shall be assigned immediately, and the data on the new manager shall be forwarded to NECC within 30 days from the date of

replacement.

Reporting of Energy Conservation Projects and Implementation Schedule:

Article 23 - Plants shall submit their projects connected with Energy conservation as required by reports of energy audits made under Article 7 hereof, as well as their plans for scheduling the implementation of energy conservation projects, to NECC within 4 years from the date of coming into force of this Regulation. Should the NECC find the plans prepared by the plants insufficient, then it may request their revision.

Reporting of SEC Values:

Article 24 - Plants shall submit the status of implementation plans mentioned in Article 8 hereof, and the annual average of the SEC values and performance in the year to NECC in the requested format in the month of February the following year for recording in the relevant data base.

Requesting Information for Bottlenecks in Implementation.

Article 25 - If NECC finds the implementation of the plan insufficient it may demand information from the plants on technical, financial and other bottlenecks for the purpose of increasing efficiency. In case of such a demand the concerned plant shall send the requested information to NECC within one month from the date of receipt.

Chapter 6

Miscellaneous Provisions

Other participation:

Article 26 - NECC carries out study, publication and promotion and training functions for increasing energy efficiency in industry. During these activities, the plants shall assist NECC in effective execution of the programs.

Responsibility of Implementation of the Regulation:

Article 27 - The top manager of the plant is responsible for the implementation of the Regulation and for the continuity of its implementation. Management shall make every effort for the success of implementation of the project by making all personnel in the plant aware of the Regulation and delegating responsibility to them in proportion to their scope of duty. The plant management is required to make the necessary arrangements to insure that the Energy Manager may carry out his duties effectively and to take into consideration the views and opinions of the Energy Manager.

Effectiveness:

Article 28 - This Regulation, which was also approved by the Government Accounting Bureau, shall come into force on the date of its publishing.

Execution:

Article 29 - The provisions of the Regulation shall be carried out by the Minister of Energy and Natural Resources.

Appendix 7-3 Outline of Japanese Law Concerning Rational Use of Energy and Some Examples of Guidelines

1 Outline of the Law Concerning Rational Use of Energy

(1) Objective

The objective of the Law is to specify the actions required for rational use of energy in factories, buildings and equipment and other actions necessary for comprehensively promoting the rationalization of energy use, and for ensuring the efficient utilization of fuel resources adapted to the socioeconomic environment at home and abroad, thereby contributing to the sound development of the nation.

(2) Energy Covered by the Law

For the purpose of the Law, "energy" refers to such fuels as oil, inflammable natural gas, and coal, as well as heat and electricity produced using these fuels as heat sources. Unlike past heat control laws, the Law covers electricity and a wider range of inflammable natural gas and oil so that it can fit more closely with the current energy use situation.

(3) Basic Policies and Obligations of Energy Users

The Minister of International Trade and Industry shall establish and announce basic policies aimed at comprehensively promoting the rationalization of energy use in respective areas, and general energy users must make efforts to rationalize their energy use with the basic policies in mind. The intention is to comprehensively promote energy saving by systematically compiling and announcing basic matters concerning measures to be taken by energy users and basic matters concerning measures for promotion of rational energy use.

(4) Measures for Factories

1) Measures for Factories

A characteristic feature of the energy consumption structure in Japan is that the industrial sector consumes large amounts of energy compared to Europe and America, accounting for over 50% of total energy consumption. Accordingly, it is important to aggressively promote the rationalization of energy use in factories and other industrial establishments. To this end, the Law provides for the following.

(a) Guidelines for business operators

The Minister of International Trade and Industry shall establish and announce guidelines for business operators who use energy in their factories and other business locations, concerning the rationalization of fuel combustion, matters relating to the recovery and utilization of waste heat

and energy saving targets, for proper and effective rationalization of energy use in factories and other business locations. It is intended that the basic policies serve as guidelines, to be referred to by business operators when they formulate concrete measures for proper and effective energy use in factories.

(b) Guidance and advice

When deciding that guidance or advice is necessary to ensure effective implementation of rational energy use in a factory, the Minister of International Trade and Industry or the minister with regulatory authority over the industrial sector to which that factory belongs may give its operator appropriate guidance or advice while taking into consideration the guidelines.

(c) Designated energy management factories

Concerning factories which are used for manufacturing and other businesses listed in the relevant Government Ordinance (mining, and supply of electric power, gas or heat) and which consume large amounts of fuel or electric power (consuming more than 3,000 kl of fuel per year in terms of crude oil or more than 12 GWh of electric power per year), the Minister of International Trade and Industry may designate any of them as a "designated energy management factory" since the promotion of rational energy use is particularly important in such factories. The operator of a designated factory shall appoint a certain number of energy managers in charge of activities for rational energy use and shall report the status of energy consumption every year to the Minister of International Trade and Industry and the minister with regulatory authority over the industrial sector to which that factory belongs.

Furthermore, if any factory not designated consumes as much fuel or electricity as a factory designated as above, the factory operator must report the status of energy consumption to the Minister of International Trade and Industry.

(d) Instructions, announcements and orders to prepare energy saving plans

If a designated energy management facility is judged to be in serious breach of energy saving guidelines, the Minister of International Trade and Industry and the minister with regulatory authority over the industrial sector to which said factory belongs may instruct the factory operator to prepare a rationalization plan, and if the operator does not obey the instructions, they can announce to that effect or give an order for taking action to respond to the instructions, after hearing the opinion of the council concerned.

2) Designated Examination Institution

Implement of the examination of energy managers (administration of the examination) can be performed by an organization designated by the Minister of International Trade and Industry (designated examination institution).

The Law provides for the procedures and criteria for the designation of an examination institution rules for administration of the examination and other rules concerning the formulation of work plans and budgetary plans, the selection of examiners for energy manager examination and the cancellation of designation. On April 18, 1984, the Energy Conservation Center, Japan was designated as the institution for state examination to qualify persons for energy management.

(5) Measures for Buildings

Most private and business office energy consumption in Japan occurs in buildings. Such measures as the insulation of buildings are highly effective for the rational use of energy. Thus, the Law provides for the following rules for rational energy use in buildings.

1) Obligations of building owners

Any person who intends to construct a building must take appropriate measures for prevention of heat loss through external walls, windows, etc. and for efficient utilization of energy for building facilities such as air conditioners, ventilation systems, lighting, water heaters and elevators, with the basic policies in mind, in efforts to contribute to the rationalization of energy use in the building.

In order to ensure proper and effective implementation of such measures, the Minister of International Trade and Industry and the Minister of Construction shall establish and announce standards which building owners should refer to in making decisions for rationalizing energy use in their buildings.

2) Guidance and advice

The Minister of Construction may, whenever necessary, give necessary guidance and advice on building design and construction to the owners of buildings other than private dwellings while taking into account the standards which the building owners should refer to in making decisions, and for private dwellings shall establish and announce guidelines for their design and construction in accordance with the standards which the building owners should refer to in making decisions. In addition to these rules, the Minister of International Trade and Industry may give insulation and other construction material manufacturers necessary guidance and advice for improving the insulation properties of their construction materials in order to ensure the improvement of the quality of insulation materials, which constitute a basic element in improving the total insulation of buildings.

3) Instructions for specific buildings

Furthermore, if the Minister of Construction deems that any building (not for dwelling) of 2,000 m² or more in total floor area is notably insufficient in the measures taken for rationalization of energy use in terms of the applicable standards, he can give necessary instructions to the building owner on the matters concerning design and construction work, and if the building owner does not comply, the minister can announce to that effect.

(6) Measures for Equipment

Another energy-consuming area consists of automobiles, air-conditioners and other equipment that require large amounts of energy. These machines and appliances are mostly purchased by general consumers after being produced systematically in large quantities. For rational energy use relating to such equipment, it is important to call for consumers' energy conservation effort in their use, but a more effective way is to improve energy efficiency at the production stage. The Law provides rules to follow in using equipment.

1) Obligations of manufacturers

Those who produce or import energy consuming equipment shall, with the basic policies in mind, ensure the rationalization of energy consumption by equipment by improving the energy efficiency of the equipment which they produce or import. Concerning automobiles and other equipment (passenger cars, air conditioners, fluorescent lights, television, copying machines, computers and magnetic disks as of December, 1994) as specified in the Government Ordinance, the Minister of International Trade and Industry (and also the Minister of Transport for automobiles) shall establish and announce standards for energy efficiency improvement which manufacturers should refer to in making decisions. Further, the Minister of International Trade and Industry may give necessary recommendations to manufacturers and importers where he considers that considerable improvement is needed in the energy efficiency of their specific products in view of the standards which they should refer to in making decisions, provided that the production or import volume for such products exceed a certain level (for example, more than 2,000 automobiles per year, or more than 500 air conditioners per year).

2) Labeling

Equipment such as that described above shall be marked to show its energy consumption efficiency so that general consumers can selectively purchase equipment having high energy consumption efficiency based on correct information. The Minister of International Trade and Industry (and also the Minister of Transport for automobiles) shall establish the labeling procedures to be followed by manufacturers etc. concerning energy consumption efficiency, labeling method, and other matters to be observed in labeling each item of specific equipment, and shall issue notification of them.

Furthermore, if the minister(s) deem(s) that the labeling does not conform to the notification, he(they) can give a recommendation to the manufacturer, etc., and if the manufacturer, etc. does not comply, the minister(s) can announce to that effect and give an order to take an action conforming to the recommendation.

(7) Activities of the New Energy and Industrial Technology Development Organization

In addition to its current activities, the New Energy and Industrial Technology Development Organization has also begun to (1) develop energy use rationalization technologies, (2) provide support for introducing energy use saving technologies, etc.

(8) Other measures

In addition to the above provisions, the Law provides other requirement for the government to make efforts concerning financial aid and tax incentive measures to promote rational energy use, measures to promote science and technology, and measures to deepen the awareness of consumers. The Law also specifies provisions concerning the submission of reports, on-the-spot-inspections, and penalties.

Further, the latest revision of the Law includes a provision that requires the review of these provisions whenever necessary to respond closely to changes in the international energy situation.

2. Example of Japanese Factory Guidelines for Rationalization of Energy Use

According to the Japanese Energy Conservation Law, the Minister of Industry and International Trade should establish and announce judgment criteria for industrial operators so as to promote appropriate and effective rationalization of energy use at factories. The first judgment criteria were set in 1979, immediately after the enactment of the Law, in order to lay down numerical standards. As a result of the policy revision in 1993, judgment criteria were revised and strengthened.

Some of the Japanese criteria are shown hereunder for the purpose of reference only in the preparation of the Turkish version, but not for recommendation. Care must be exercised to the difference between Japan and Turkey in energy situation in preparing the Turkish guidelines. The guidelines should be reviewed every 10 years to adjust to the changes of technology, energy situations and so on.

(1) Boiler

1) Air Ratio (Standard Value for Control, Measurement and Recording)

Equipment	Load (unit: %)	Air Ratio Value (Standard)				
		Solid Fuel		Liquid fuel	Gas Fuel	Blast Furnace By-product Gas
		fixed bed type	fluidized bed t.			
Electricity Power Boiler	75 - 100	-	-	1.05 - 1.2	1.05 - 1.1	1.2
Steam Boiler (30 t/h or more)	50 - 100	1.3 - 1.45	1.2 - 1.45	1.1 - 1.25	1.1 - 1.2	1.2 - 1.3
Steam Boiler (10 - 30 t/h)	50 - 100	1.3 - 1.45	1.2 - 1.45	1.2 - 1.3	1.2 - 1.3	-
Steam Boiler (5 - 10 t/h)	50 - 100	-	-	1.3	1.3	-
Steam Boiler (less than 5 t/h)	50 - 100	-	-	1.3	1.3	-

2) Air Ratio (Desired Value for Improvement of Equipment)

Equipment	Load (unit: %)	Air Ratio Value (Desired)				
		Solid Fuel		Liquid fuel	Gas Fuel	Blast Furnace By-product Gas
		fixed bed type	fluidized bed t.			
Electricity Power Boiler	75 - 100	-	-	1.05 - 1.1	1.05 - 1.1	1.15 - 1.2
Steam Boiler (30 t/h or more)	50 - 100	1.2 - 1.3	1.2 - 1.25	1.05 - 1.1	1.05 - 1.15	1.2 - 1.3
Steam Boiler (10 - 30 t/h)	50 - 100	1.2 - 1.3	1.2 - 1.25	1.2 - 1.25	1.2 - 1.25	-
Steam Boiler (5 - 10 t/h)	50 - 100	-	-	1.2 - 1.3	1.2 - 1.25	-
Steam Boiler (less than 5 t/h)	50 - 100	-	-	1.2 - 1.3	1.2 - 1.25	-

3) Exhaust Gas Temperature (Standard Value for Control, Measurement and Recording)

Equipment	Load (unit: %)	Exhaust Gas Temperature (Standard) unit:degree centigrade				
		Solid Fuel		Liquid fuel	Gas Fuel	Blast Furnace By-product Gas
		fixed bed type	fluidized bed t.			
Electricity Power Boiler	75 - 100	-	-	145	110	200
Steam Boiler (30 t/h or more)	50 - 100	200	200	200	170	200
Steam Boiler (10 - 30 t/h)	50 - 100	250	200	200	170	-
Steam Boiler (5 - 10 t/h)	50 - 100	-	-	220	200	-
Steam Boiler (less than 5 t/h)	50 - 100	-	-	250	220	-

4) Exhaust Gas Temperature (Desired Value for Improvement of Equipment)

Equipment	Load (unit: %)	Exhaust Gas Temperature (Standard) unit:degree centigrade				
		Solid Fuel		Liquid fuel	Gas Fuel	Blast Furnace By-product Gas
		fixed bed type	fluidized bed t.			
Electricity Power Boiler	75 - 100	-	-	135	110	190
Steam Boiler (30 t/h or more)	50 - 100	180	170	160	150	190
Steam Boiler (10 - 30 t/h)	50 - 100	180	170	160	150	-
Steam Boiler (5 - 10 t/h)	50 - 100	-	300	200	180	-
Steam Boiler (less than 5 t/h)	50 - 100	-	320	220	200	-

(2) Industrial Furnace

1) Air Ratio (Standard Value for Control, Measurement and Recording)

Equipment	Air Ratio (Standard Value)		
	Furnace Type		
	Continuous	Intermittent	Remark
Cast Melting Furnace	1.3	1.4	
Steel Ingots Heating Furnace	1.25	-	
Generous Metals Heating Furnace	1.25	1.35	
Metals Heat Treatment Furnace	1.25	1.3	
Oil Heating Furnace	1.25	-	
Thermal Cracking Furnace	1.25	-	
Cement Kiln	1.30	-	
Lime Kiln	1.30	1.35	
Drying Furnace	1.3	1.5	burner tip

2) Air Ratio (Desired Value for Improvement of Equipment)

Equipment	Air Ratio (Standard Value)		
	Furnace Type		
	Continuous	Intermittent	Remark
Cast Melting Furnace	1.25	1.3	
Steel Ingots Heating Furnace	1.2	-	
Generous Metals Heating Furnace	1.2	1.3	
Metals Heat Treatment Furnace	1.2	1.3	
Oil Heating Furnace	1.25	-	
Thermal Cracking Furnace	1.25	-	
Cement Kiln	1.25	-	
Lime Kiln	1.25	1.35	
Drying Furnace	1.3	1.5	burner tip

3) Waste Heat Recovery Ratio (Standard Value for Control, Measurement and Recording)

Exhaust Gas Temperature (degree centigrade)	Rated Heat Duty	Waste Heat Recovery Ratio (percent)
500 or lower	20 million kilo calories per hour or more	25
	5 - 20 million kilo calories per hour	25
500 - 600	20 million kilo calories per hour or more	25
	5 - 20 million kilo calories per hour	25
600 - 700	20 million kilo calories per hour or more	35
	5 - 20 million kilo calories per hour	30
	1 - 5 million kilo calories per hour	25
700 - 800	20 million kilo calories per hour or more	35
	5 - 20 million kilo calories per hour	30
	1 - 5 million kilo calories per hour	25
800 - 900	20 million kilo calories per hour or more	40
	5 - 20 million kilo calories per hour	30
	1 - 5 million kilo calories per hour	25
900 - 1,000	20 million kilo calories per hour or more	45
	5 - 20 million kilo calories per hour	35
	1 - 5 million kilo calories per hour	30
1,000 or higher	20 million kilo calories per hour or more	45
	5 - 20 million kilo calories per hour	35
	1 - 5 million kilo calories per hour	30

4) Waste Heat Recovery Ratio (Desired Value for Improvement of Equipment)

Exhaust Gas Temperature (degree centigrade)	Rated Heat Duty	Waste Heat Recovery Ratio (percent)
500 or lower	20 million kilo calories per hour or more	30
	5 - 20 million kilo calories per hour	30
500 - 600	20 million kilo calories per hour or more	30
	5 - 20 million kilo calories per hour	30
600 - 700	20 million kilo calories per hour or more	35
	5 - 20 million kilo calories per hour	30
	1 - 5 million kilo calories per hour	25
700 - 800	20 million kilo calories per hour or more	35
	5 - 20 million kilo calories per hour	30
	1 - 5 million kilo calories per hour	25
800 - 900	20 million kilo calories per hour or more	40
	5 - 20 million kilo calories per hour	35
	1 - 5 million kilo calories per hour	30
900 - 1,000	20 million kilo calories per hour or more	50
	5 - 20 million kilo calories per hour	40
	1 - 5 million kilo calories per hour	35
1,000 or higher	20 million kilo calories per hour or more	50
	5 - 20 million kilo calories per hour	40
	1 - 5 million kilo calories per hour	35

5) Outer Surface Temperature (Standard Value for Control, Measurement and Recording)

Furnace Inside Temperature (°C)	Wall-Surface Temperature (°C)		
	Ceiling	Side-Wall	Bottom
1,300 or higher	140	120	180
1,100 - 1,300	125	110	145
900 - 1,100	110	95	120
lower than 900	90	80	100

6) Outer Surface Temperature (Desired Value for Improvement of Equipment)

Furnace Inside Temperature (°C)	Wall-Surface Temperature (°C)		
	Ceiling	Side-Wall	Bottom
1,300 or higher	120	110	160
1,100 - 1,300	110	100	135
900 - 1,100	100	90	110
lower than 900	80	70	90

(3) Power Factor

The power factor at the receiving end shall be kept at 90% or more for transformer or electricity use equipment listed below.

Equipment	Rated Capacity (kw)
Squirrel-Cage Induction Motor	more than 100
Wound Rotor Induction Motor	more than 100
Crusible Induction Furnace	more than 100
Channel Induction Furnace	more than 100
Vacuum Induction Furnace	more than 100
Steel Manufacturing Arc Furnace	-
Oscillating Arc Furnace	-
Flash Butt Welding Machine	more than 10
Arc Welding Machine	more than 10
Rectifier	more than 10,00

APPENDIX 7-4 Tax Incentive

(1) Customs Duty Exemption and/or Importation according to Import Regime Decree

- a) Customs Duty Exemption to capital goods, machinery and equipment, spare parts and operating materials used in investments on project basis or education and research & development activities.
- b) Special Customs Duty Exemption to ship and ship building investments

(2) Investment Allowance

The main objective of this measure is to decrease the tax payments during the operational phase and hence to generate additional funds for the company's use. The measure is applicable to all income and corporate tax paying investors.

The rates of investment allowance vary between 30 per cent and 100 per cent depending on upon the geographic location, cost and type of investment.

An allowance of at least 30 percent of the investment during that year is generally available to all Incentive Certificate holders. For investments located in First Priority Regions and belonging to priority sectors, the allowance is greater, as much as 100 percent.

Investment allowance is a kind of tax exemption calculated as a percentage of the total fixed investment (excluding land and some certain expenditures etc.) which is deducted from cumulative taxable profits until the whole allowance is used.

(3) Credit

This incentive consists of possible credits to investors paid from "Encouragement of Investments and Services Providing Foreign Exchange Earnings Fund". The credit granted as a percentage of the total fixed investment depending on the regions and the sector of the investment to the eligible investments possessing Incentive Certificates. The credit is utilized via the Turkish Development Bank and other authorized banks; therefore the positive evaluation of the banks is also required.

(4) Taxes, Duties and Charges Exemption

Provided that the below rates of production are committed for exportation for 5 consecutive years after full capacity is reached, taxes, duties and charges are exempted from long term domestic investment credits, working capital credits and foreign credits.

(5) Financing Fund

A Financing Fund is not at application of an exemption or an exception, but it is an arrangement for tax deferment.

It is a fund to finance investments of organizations who have been continuing their activities and have concluded accounting period with profit regarding extension, renovation, modernization, improvement of quality and elimination of bottlenecks.

This incentive enables qualifying investors to postpone a percentage of their corporate tax to the following fiscal year in order to ease cash-flow difficulties. All capital companies and cooperatives having an incentive Certificate are entitled to this measure. Also, due to its nature, only those companies which have made a profit and have been in operation for a certain period of time can benefit from this measure.

(6) Exemption from Building and Construction Taxes

(7) Value Added Tax Compensation

The amount of the Value Added Tax (VAT) on locally supplied and imported new machinery and equipment (capital goods) that are part of a Global List (a list that is provided as part of the file about the feasibility of a project presented to the Undersecretariat at the application stage for an Incentive Certificate) that is prepared in line with an Incentive Certificate shall be compensated as follows:

For locally supplied machinery and equipment (capital goods) the VAT is compensated as in the form of an incentive premium.

For imported machinery and equipment VAT is deferred.

Table of Incentives

INCENTIVES	PRIORITY DEVELOPMENT REGIONS	NORMAL REGIONS		DEVELOPED REGIONS (Only special importance sectors are promoted)
		Within Industrial Belts Concept	Outside Industrial Belts Concept	
Invest. Allowance	Up to 100% might be increased.	Up to 100% can be increased	Up to 100% can be increased in Special Importance Sectors 30-100% in other sectors	Can be increased up to 100%
Customs Duty and Fund Exemption	100 %	100 %	100 %	100%
VAT Refund on Locally Procured Mac. And Equip. Credits	VAT + 10 points	VAT + 10 points	VAT + 10 points	VAT + 10 points
	Over the value of fixed investment; 50% in R. & D, Environment, RoRo, Airline, Motorway Transportation investments and financing of distribution and promotion expenditures. Up to 25% in domestic handicraft investments.			
VAT Defferal on Imp. Mac. And Equip.	Available	Available	Available	Available
Land Allocation	Available	Available	Not Available	Not Available
Providing Quality and Standard	All Payments to Turkish Standards Institution (TSI)	All Payments to TSI	All Payments to TSI	All Payments to TSI
Subsidy for Transp.	50% of outlays	Not Available	Not Available	Not Available
Electrical Energy Inc.	Up to 25% of Electricity consumption for 5 operational years.	Not Available	Not Available	Not Available
Financing Fund	Available	Available	Available	Available
Tax, Duty, Charges Exemption	Available	Available	Available	Available
Exemption from Building and Construction Taxes	Available	Available	Available	Available
Subsidy for External Letter of credit Expend.	50% of outlays	50% of outlays	50% of outlays	50% of outlays

Chapter 8 Factory Audit

Chapter 8 Factory Audit

Factory audits have been conducted on the four factories as has been agreed upon from the very initial stage of this study, representing each industrial sub-sector as shown below.

Henkel-Turyag A. S.: Detergent, Edible Oil and Fats
Dev Blok A. S.: Brick
Izmir Basma Fabrikasi A. S. (IBF): Textile
Izmir Demir Celik Sanai A. S. (IDC): Steel

These factory audits have been conducted stepwise from the first field survey to the fourth period of homework in Japan. The most essential steps of actual factory audits with measurement and analysis were done in the fourth field survey, talking about 10 working days each.

This chapter reports the following items covering four factories.

1. General procedure of factory audits
2. Major items of each factory audit

8-1 General Procedure of Factory Audits

The general procedure and items of factory audits are shown in Figure 8-1, and outlines of the procedure and schedule are as follows.

(1) Recognition of Current Condition

The following items are investigated in this step, during the first field survey (November and December, 1995).

1. Outlines of factory and production facilities
2. Operating modes and conditions
3. Total and unit consumption of energy
4. Energy flowchart
5. Energy prices of fuel, electricity and others
6. Flowsheet of major products
7. Energy management and conservation
8. Major energy consuming facilities

(2) Identification of Current Problems

The following items are reviewed and scrutinized during the first field survey, the first homework period in Japan and the second field survey (November, 1995-February, 1996).

1. Problems with major energy consuming facilities
2. Problems in energy consumption already recognized
3. Items requested for factory audit
4. Major items and points of factory audit
5. Others

(3) Formulation and Preparation of Factory Audit Plan

The following items were reviewed and formulated during the second field survey and the second homework in Japan (February and March, 1996). Regarding detailed confirmation of preparations in the IDC electric furnace, special experts were dispatched during the third field survey and the third homework period in Japan, in July, 1996.

1. Review and analysis of premises for factory audit
2. Formulation of detailed plan for factory audit (measurement and analysis, field investigation, deployment of measuring equipment and others)
3. Planning of personnel allocation and schedule for factory audit
4. Necessary preparatory work and modifications of equipment for factory audit
5. Others

(4) Factory Audit

This step was conducted cooperatively with members of EIE and each factory in the fourth field survey (August and September, 1996); major items were as follows.

1. Explanation and discussion of detailed factory audit plan with the factory
2. Confirmation of preparations (points of modification, sampling and measurement)
3. Deployment of measuring and analyzing equipment
4. Installation and calibration of measuring equipment
5. Analysis of samples in temporary laboratory
6. Monitoring of operating conditions of facilities
7. Measurement and collection of records of measurements and operation
8. Confirmation of detailed data and specifications of subject facilities
9. Identification of problems by observing operating conditions

10. Collection of relevant data, information and records
11. Others

(5) Identification of Problems Requiring Countermeasures

As a result of the actual factory audit, the following items were reviewed and analyzed during the fourth field survey and the fourth homework period in Japan (August-November, 1996).

1. Review and analysis of measurement results
2. Review and analysis of results of relevant data and information
3. Identification of problems and judgment of necessity for improvement
4. Scrutiny and formulation of items for improvement
5. Others

(6) Assessment and Recommendations

As the final step of the overall factory audit framework, the following items were assessed and formulated during the fourth homework period in Japan (August-November, 1996).

1. Calculation and analysis of the effect of energy saving
2. Examination and selection of proper countermeasures
3. Cost estimation of modification for countermeasures
4. Estimation and prediction of the effect of the countermeasures
5. Overall evaluation of countermeasures for energy conservation
6. Recommendation and attention of countermeasures for energy conservation

8-2 Major Factory Audit Items

There are various kinds of factories, representing each industrial sub-sector. There are also various types of energy consumption, such as thermal and electrical energy. Detailed procedures and results of each factory audit are presented in Chapter 9 through Chapter 12; major items of each factory audit are summarized here.

(1) Henkel-Turyag

1. Energy balance around steam boilers and steam turbine generator
2. Effective utilization of heat exchangers in sulfonation unit
3. Heat balance around spray dryer and hot air furnace

4. Improvement of steam condensate recovery system
5. Improvement of steam trap system
6. Improvement of thermal insulation system
7. Reduction of electricity consumption

(2) Dev Blok

1. Evaluation of quality of raw materials
2. Improvement of quality of molded body
3. Heat balance and performance of dryer
4. Heat balance and performance of tunnel kiln
5. Improvement of products quality
6. Improvement of electricity consumption

(3) IBF

1. Energy balance around steam boilers
2. Improvement of steam and steam condensate systems
3. Improvement of hot oil system
4. Improvement of water supply and drainage systems
5. Improvement of electricity consumption
6. Energy balance around open width bleaching machine
7. Energy balance around washing machine

(4) IDC

1. Heat input of electric arc furnace
Electric power, fuel oil, oxygen, carbon injection and others
2. Heat output of electric arc furnace
Exhaust gas, cooling water, surface heat loss, slag and others
3. Ambient conditions
Outdoor/indoor temperature, atmospheric pressure and humidity

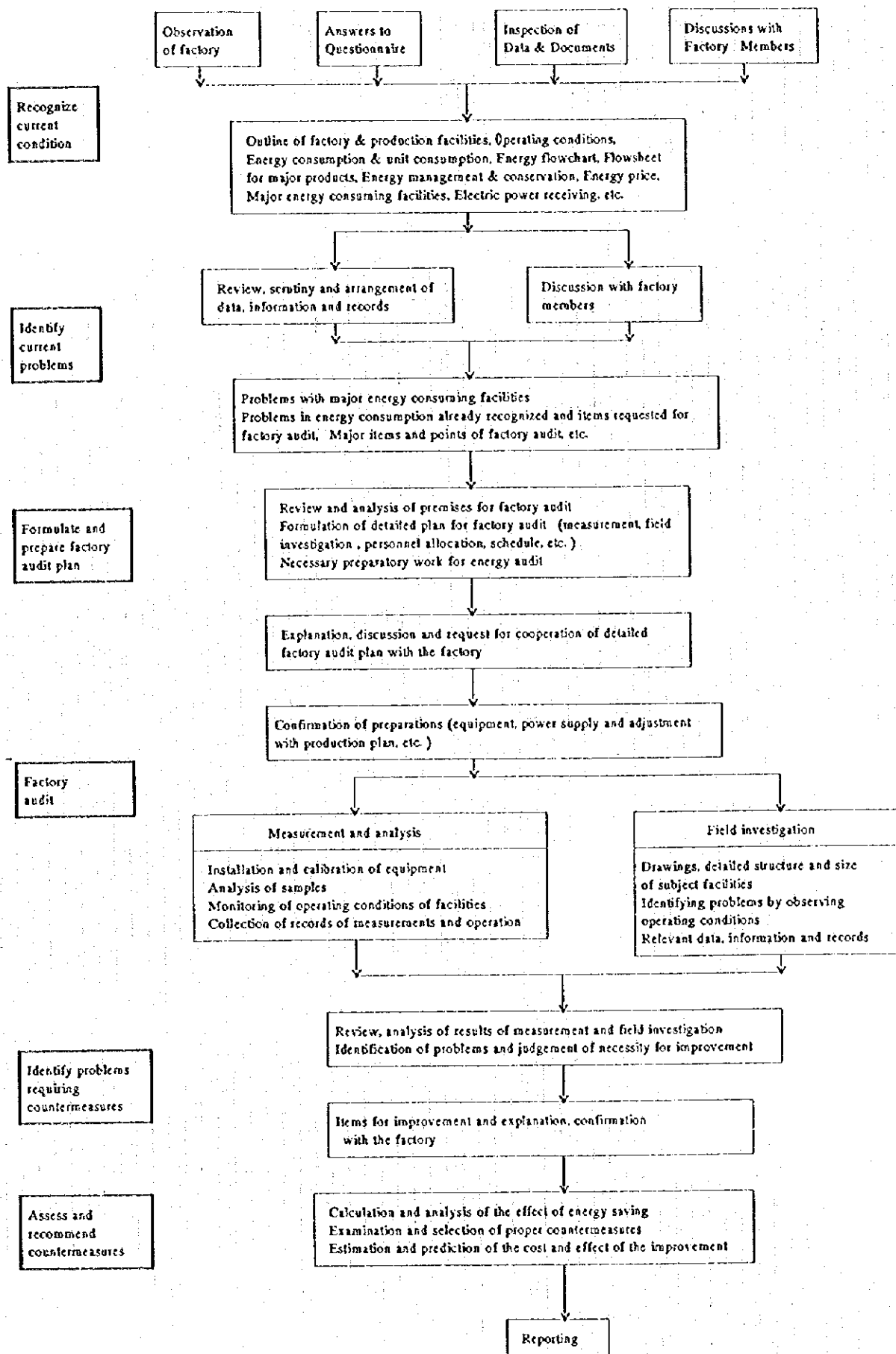


Figure 8-1 General Factory Audit Procedure