REGULATION

Issued by the Ministry of Energy and Natural Resources:

REGULATION ON INCREASING EFFICIENCY IN THE USE OF ENERGY RESOURCES AND ENERGY

SECTION ONE
Objective, Scope, Basis and Definitions

Objective

ARTICLE 1 – (1) The objective of this Regulation is to set out the principles and procedures applicable to increasing efficiency in the use of energy resources and energy for ensuring efficient use of energy, avoiding the extravagance of energy, alleviating the burden of energy costs on the economy and protecting the environment.

Scope

ARTICLE 2 – (1) This Regulation covers principles and procedures applicable to authorizing universities, professional chambers and energy efficiency consulting firms in managing and spreading energy efficiency services and activities; energy management practices; duties and responsibilities of energy managers and energy management units; training and certification activities relating to energy efficiency; energy audits and efficiency improvement projects; supporting efficiency improvement projects at industrial enterprises; voluntary agreements; demand side management; increasing energy efficiency in the generation, transmission, distribution and consumption of electricity; waste heat recovery in thermal power plants; open area enlightening; encouraging the use of alternative fuels such as bio-fuel and hydrogen; and administrative sanctions.

Basis

ARTICLE 3 – (1) This Regulation has been prepared under Article 2 of Law No. 2819 dated 14/6/1935 on the organization of Electricity Affairs Survey Administration; Articles 2 and 28 of Law No. 3154 dated 19/2/1985 on the Organization and Duties of Ministry of Energy and Natural Resources; Electricity Market Law No. 4628 dated 20/2/2001; and Energy Efficiency Law No. 5627 dated 18/4/2007.

Definitions

ARTICLE 4 – (1) –For the purposes of this Regulation, the following terms shall bear the following meanings:

a) Waste: Used tires, paint sludge, solvents, plastic materials, waste oil and other wastes that are approved for use as fuel by the Ministry of Environment and Forestry,

b) Ministry: Ministry of Energy and Natural Resources,

c) Building: Structures or groups of structures used for housing, service and commercial purposes,

ç) Building Owner: Owner of the building who has property rights on the building, its beneficiary owner if any, or in the absence of both, the real person or legal entity that acts as the owner of the building,

d) Building management: Real person or legal entity responsible for the operation and/o management of the building,

e) Training-audit-project certificate: The certificate issued by the General Directorate or authorized agencies for the execution of services like training, energy audit, consultancy, energy management and efficiency increasing project preparation in the categories of building, industry, heat-mechanics and/or electricity,

f) Electrical home appliance: Products consuming electricity like refrigerator, freezer,

air-conditioner, washing machine, washing machine with drier, oven, dish washing machine, thermo-siphon, electrical heater, bulb and fluorescent lamp, iron, television, computer, music players, etc.,

g) Industrial Enterprise: Any enterprise that operates and produces any type of good as affiliated with chambers of industry and commerce, chambers of commerce or chambers of industry and that has a total annual energy consumption of minimum 1,000 TOE, other than the licensees engaged in electricity generation activities,

ğ) Energy label: The document that contains information about the energy consumption levels of electricity-consuming equipment,

h) Energy audit: The surveys comprising data collection, measurement, assessment and reporting stages, aimed at increasing energy efficiency,

ı) Energy Efficiency: Decreasing energy consumption per unit service or product quantity, at buildings without compromising living standards and service quality, and at industrial enterprises without compromising production quality and quantity,

i) Energy Efficiency Services: Energy manager training, energy audit and efficiency increasing project preparation, project implementation and consulting services aimed at increasing energy efficiency,

j) Energy Intensity: The quantity of energy consumed to produce one unit of economic value,

k) Energy Manager: The person holding energy manager or training-audit-project certificate and responsible for performing energy management activities at the industrial enterprises and buildings,

l) Energy Manager Certificate: The certificate indicating eligibility for providing energy manager services,

m) Energy Management: The training, audit, measurement, monitoring, planning and application activities executed to ensure efficient use of energy resources and energy,

n) ENVER label: The certificate issued by the General Directorate to those who meet the minimum energy efficiency requirements defined in this Regulation,

o) General Director: General Director of Electrical Power Resources Survey and Development Administration,

ö) General Directorate: General Directorate of Electrical Power Resources Survey and Development Administration,

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p) Pay back Period: The period in which the investment costs in the designs prepared by industrial enterprises or by firms hired by them, for increasing energy efficiency in existing systems are recovered together with the savings foreseen in the projects,

r) Service contract: The contracts signed with industrial enterprises, building owners or managements for the provision of training, energy survey, efficiency increasing project and consulting services,

s) Public sector: Public agencies and enterprises and their subsidiaries, professional organizations having public legal entity status, universities and local administrations,

ş) Law: Energy Efficiency Law No. 5627,

t) Cogeneration: Generation of heat and electricity and/or mechanical energy at the same facility simultaneously,

u) Board: Energy Efficiency Coordination Board,

ü) Professional Chambers: Chamber of Electrical Engineers attached to the Association of Chambers of Architects and Engineers of Turkey and/or Chamber of Mechanical Engineers attached to the Association of Chambers of Architects and Engineers of Turkey,

v) Reference energy intensity: the average of the energy intensities of industrial enterprises in the last 5 years,

y) Firm: The energy efficiency consulting firms that have been granted authorization

certificates to perform energy efficiency services within the framework of the authorization agreements they have concluded with the General Directorate or authorized agencies,

z) TOE: Ton Oil Equivalent,

aa) Total construction area: Total of all areas on which the building is constructed, excluding the open terraces settling on the ground, forecourts, light holes, all kinds of ventilation shafts and eaves; in case of multiple independent buildings obtaining heat or electricity from the same center in the same campus, sum of the total construction areas of individual buildings,

bb) Implementation agreement: The agreement signed by firms for the implementation of EIP,

cc) EIP: Efficiency improvement project prepared for the implementation of measures identified through energy audit and recovery of energy saving potential,

çç) Authorization Certificate: The certificate issued within the framework of authorization agreement, by the General Directorate to universities and professional chambers, upon Board approval, for the execution of training, authorization and monitoring activities; and by the General Directorate or authorized agencies to firms for energy manager training, energy audit, consulting, energy management and EIP preparation and implementation activities,

dd) Authorized Agencies: The professional chambers and universities that have been authorized by the General Directorate, upon Board approval, for the execution of training, authorization and monitoring activities under the authorization agreement concluded.

SECTION TWO
Authorization, Monitoring and Supervision of Agencies and Firms

Authorization, Monitoring and Supervision of Agencies

ARTICLE 5 – (1) Authorization certificate shall be issued to agencies by the General Directorate upon Board approval for the provision of applied training and authorization of firms. These certificates shall be renewed every five years in accordance with the provisions of the Law and this Regulation. The procedures relating to the authorization certificates issued to firms by the agencies whose authorization certificates have not been renewed or have been cancelled shall be carried out by the General Directorate until the end of their duration.

(2) The authorization certificate issued to professional chambers shall be granted for the performance of activities at the chamber headquarters or any of its branches, depending on the request of the chamber as indicated during its application.

(3) Authorized agencies shall provide energy manager and training-audit-project trainings.

(4) Authorized agencies shall provide laboratory utilization support for the applied training part of the energy manager training programs organized by the firms that have authorized under the authorization agreements they have signed with firms.

(5) Authorization agreement shall be signed between the General Directorate and the universities or professional chambers approved by the Board for authorization, pursuant to the first paragraph. Following this agreement; class A authorization certificate shall be issued to the universities or professional chambers that wish to execute energy manager and training-audit-project trainings, and class B authorization certificates to universities or professional chambers that only wish to execute energy manager trainings.

(6) Universities and professional chambers shall apply to the General Directorate together with the following documents in April and October every year, in order to obtain authorization certificate or change the class of authorization certificate.

a) An application letter containing a commitment that it will provide the trainings covered by the class of requested authorization certificate, within the framework of the provisions in Annex-1 of this Regulation,

b) An electronic and a printed copy of the documents to be used in the trainings covered

by the class of authorization certificate,

c) Documents evidencing that the indoor areas, furniture, equipment, tools and laboratory facilities to be used for the training comply with the provisions in Annex-1 of this Regulation,

ç) The identification details and backgrounds of at least three people to work in the trainings covered by the class of requested authorization certificate, as well as their energy manager and/or training-audit-project certificates issued by the General Directorate.

d) Document indicating whether the activities covered by the authorization certificate will be executed at the chamber headquarters or at a specific branch,

(7) General Directorate shall establish an evaluation commission consisting of minimum three staff members and headed by a person at the level of department head at minimum, in January every year. The evaluation report containing the results of document and on-site examinations of the evaluation commission shall be submitted to the General Directorate for approval, within no later than thirty days after the date of application. The approved evaluation reports shall be submitted to the Board by the General Director in the first Board meeting after application. The Board shall decide to issue, modify or reactivate authorization certificate, or shall appoint a commission consisting of three people from the Board members, to make on-site examinations and report the results to the Board in its next meeting. The final Board decision relating to the issue, modification or reactivation of authorization certificate shall be taken in the second Board meeting after date of application, at the latest. Board decisions shall be notified to applicants by the General Directorate within fifteen days after Board meeting. Authorization certificate shall be issued to universities or professional chambers that provide and satisfy the documents and criteria listed in the sixth paragraph and are determined to be competent as a result of on-site examinations.

(8) Authorized agencies shall send an activity report they prepare to the General Directorate by the end of March every year. These reports shall be reviewed by the evaluation commission established pursuant to this Article. For the elimination of deficiencies detected on the basis of reports and on-site examinations, the related authorized agency shall be given the lead time it prefers, which shall not be longer than 6 months. During the requested period of time, the class of authorization certificate may be changed or the authorization certificate may be suspended through a Board decision. For the reactivation of suspended authorization certificates, documents relating to the problems leading to the suspension and to the elimination of these problems shall be submitted to the General Directorate together with an application letter. The documents submitted shall be evaluated according to the provisions of seventh paragraph. In case the documents are found to be unsatisfactory or in case an authorization certificate is suspended for minimum two times within its five-year duration, the authorization certificate of authorized agency shall be cancelled through Board approval.

(9) The complaints submitted to the Directorate by the energy managers certified by authorized agencies, industrial enterprises where they work, buildings, firms or by the clients of these firms, and the training evaluation forms filled in by the participants during trainings shall be evaluated by the General Directorate. Depending on the justifiability, number and impacts of complaints, the authorization certificate of authorized agency shall be cancelled through Board approval.

(10) The authorized agencies for which authorization certificate is issued, modified, suspended, re-activated or cancelled shall be announced on the website of General Directorate within five days following the completion date of these procedures.

(11) General Directorate shall organize a coordination meeting in December every year with the participation of authorized agencies, and a concluding report including developments, bottlenecks and suggestions for solution shall be published at the end of these meetings.

Authorization, monitoring and inspection of Firms

ARTICLE 6 – (1) Authorization certificates shall be issued by the General Directorate or

authorized agencies to Firms for the execution of energy efficiency services. These certificates shall be renewed every three years in the absence of any contradiction to the Law and this Regulation.

(2) The category of authorization certificates issued to Firms, which may be building, industrial sectors, heat-mechanics and electricity, shall be determined by the Firms according to the preference form during application.

(3) Firms shall provide the following services to industrial enterprises, building owners or managements:

a) Energy manager training, energy study and efficiency increasing project (EIP) preparation and implementation, consultancy and energy manager services for buildings, within the framework of service agreement.

b) Implementation of EIP with the assurance of energy saving amount, within the framework of Implementation Agreement,

(4) Firms shall apply to the General Directorate or authorized agencies together with the following documents in order to receive authorization certificate or change its category, in January and July every year:

a) An application letter containing a commitment that it will provide the energy efficiency services in line with the provisions of this Regulation,

b) One printed and one electronic copy of the documents to be used in energy manager trainings,

c) Firm's articles of incorporation including energy efficiency services and documents of registration with related chambers,

ç) A preference form indicating in which sectors the Firm will offer energy study, EIP implementation and consultancy services,

d) Documents certifying that the Firm complies with the provisions in Annex-1 of this Regulation regarding the energy manager trainings; the identification details and backgrounds of at least three people to work in the trainings, as well as their energy manager and/or training-audit-project certificates,

e) The identification details, backgrounds and training-audit-project certificates of the staff members to be commissioned or persons to be contracted in each authorization certificate category, at least two people each for study-project services,

f) For use in energy study services; contracts indicating that the Firm has the equipment with list and specifications provided in Annex-4 of this Regulation, and the contract indicating that such equipment may be used throughout the duration of authorization,

g) An application for modification for Firms which want to change their authorization certificate by updating their preferences under their existing authorization certificate,

ğ) ISO 17025 laboratory accreditation compliance certificate or a contract indicating that measurements will be carried out by procuring services from legal entities holding this certificate,

(5) Authorization certificate shall be issued for the Firms that completely submit the documents listed in paragraph 4 and satisfy the requirements under such documents, upon concluding an authorization agreement and the approval of General Directorate.. Authorization certificate shall also be granted to a firm that includes in its application file a document certifying that an application has been filed with the related agency or institution to obtain ISO 17025 laboratory accreditation compliance certificate. However, the authorization certificate of a firm that fails to obtain the ISO 17025 laboratory accreditation compliance certificate within one year following the date of authorization agreement shall be suspended. In case the 17025 laboratory accreditation compliance certificate cannot be obtained by the end of second year after the date of authorization agreement, the authorization certificate of related firm shall be cancelled.

(6) The applications of Firms shall be evaluated by the evaluation commission established by the General Directorate or authorized agencies. The result of evaluation shall be notified to the applicant with in thirty days following application date, at the latest. If the evaluation has been

performed by authorized agencies, the results shall also be notified to the General Directorate within thirty days at the latest.

(7) The firms that have received authorization certificate shall, by the end of January every year, submit its annual activity report to its authorizing agency. Any nonconformity detected in the activity report through on-site examinations shall be corrected by the firm within fifteen days. For the correction of any nonconformity observed in activities such as lack of certified staff and training facilities, lack of equipment required to be used in energy studies and calibration problems in the equipment used, the related firm shall be given a period which shall not be longer than six months, and the authorization certificate shall be suspended during this period. The authorization certificate of a firm whose certificate has been suspended for minimum two times in a period of three years shall be cancelled. The following principles and procedures shall be followed in re-activating suspended authorization certificates:

a) The firm shall submit to the General Directorate or authorized agency from which it has received its authorization certificate, the documents evidencing that the deficiencies leading to the suspension of authorization certificate have been eliminated, together with an application letter. The documents submitted to the authorized agencies shall be sent to the General Directorate within ten days for information.

b) The General Directorate or authorized agency which has issued the authorization certificate for the firm shall evaluate these documents together with on-site examinations, and shall re-activate the authorization certificate of the firm that has eliminated the deficiencies, within thirty days following the receipt of application letter. In case the documents submitted are found to be unsatisfactory, authorization certificate of the firm shall be cancelled.

c) The provisions in this paragraph, other provisions relating to cancellation of authorization and the provisions relating to settlement of disputes shall be included in the authorization agreement signed between the firm and the General Directorate or authorized agency.

(8) The firms which fail to prove, in the presence of its client and authorizing agency representatives, the energy saving amount guaranteed under the implementation agreement through pre-implementation and post-implementation measurements, shall be made public on the website of General Directorate or authorized agency that has issued the authorization certificate. The authorization certificate of a firm which has failed to fulfill commitments under maximum three implementation agreements shall be suspended for a period of one year.

(9) The firms whose authorization certificates have been issued, modified, suspended, re-activated or cancelled by authorized agencies shall be notified to the General Directorate by the related authorized agency within five working days following the completion of these procedures. Such data shall be posted on the website of General Directorate within five working days following the notification of such information.

(10) The saving amounts proven through measurements by firms within the framework of their implementation agreements shall be posted on the website of the authorizing General Directorate or authorized agency.

(11) The calibration certificates received from accredited national or international institutions for the calibration status and laboratory accreditation compliance of the equipment used by firms in their energy studies shall be submitted together with annual activity reports.

(12) Other facts detected in the monitoring and inspection of firms by authorized agencies, which constitute a violation of the provisions of this Regulation, shall be notified to the General Directorate by the related authorized agency within thirty days at the latest.

(13) In the energy studies conducted by firms at industrial enterprises and buildings, equipment calibrated and labeled by accredited national and international institutions shall be used.

Authorization certificate and certificate fees

ARTICLE 7 – (1) The authorization certificate and energy manager certificate fees and the portion of certificate fees that will be paid to authorized agencies as determined by the Board, which shall not be more than ten percent, in January every year shall be published by the General

Directorate as a communiqué in the Official Gazette. In order to obtain these certificates, firms shall pay the Board-determined portion of the energy manager certificate fee and authorization certificate fee to the General Directorate or authorized agency with which they have signed the authorization agreement. The authorization certificates of firms that do not pay these fees shall be cancelled.

SECTION THREE
Energy Management and Efficiency Increasing Measures

Energy management

ARTICLE 8 – (1) Under energy management, energy managers or energy management units shall perform the following activities:

a) Determine and promote the measures and procedures relating to the improvement of consumption habits and prevention of extravagance, and organize training programs as necessary.

b) Determine and coordinate the implementation of possible modifications on energy consuming systems, processes or equipment.

c) Conduct market researches regarding the preparation and implementation of energy studies and EIPs, prepare agreements and control implementation.

ç) Monitor the efficiency of energy consuming equipment, coordinate the timely performance of their maintenance and calibration.

d) Prepare and submit to senior management the plans, budget needs, benefit and cost analyses of energy needs and efficiency increasing practices.

e) Monitor and evaluate energy consumption and costs, produce periodic reports.

f) Take initiatives for the procurement and installation of meters and measurement equipment needed for monitoring energy consumption.

g) Monitor specific energy consumption, relationship between goods production and energy consumption, energy costs, and energy intensity of enterprise at industrial enterprises; prepare recommendations for improving them.

ğ) Explore the possibilities for changing energy composition and using alternative fuels; prepare measures for protecting environment, reducing emissions and not exceeding threshold values; coordinate their implementation.

h) Prepare alternative plans to reduce the use of petroleum and natural gas if requested by the General Directorate, to be implemented in case of energy supply interruption.

ı) Prepare the information required to be submitted to General Directorate by the end of every March pursuant to the Law, and submit it to the management for submission to the General Directorate.

Appointment of energy manager and establishment of energy management unit

ARTICLE 9- (1) Industrial enterprises with annual total energy consumption of 1,000 TOE and more shall appoint an energy manager from amongst their employees.

(2) The managements of commercial buildings and service buildings with total construction area of minimum 20,000 square meters or with total annual energy consumption of 500 TOE and more and the managements of and government buildings with total construction area of minimum 10,000 square meters or with total annual energy consumption of 250 TOE and more, or the owners of buildings in the absence of managements, shall appoint an energy manager or shall receive service from firms or energy managers.

(3) Energy management units shall be established in organized industrial zones under the responsibility of energy manager for the purpose of conducting studies for industrial enterprises with annual total energy consumption of less than 1,000 TOE. At least two technical staff members shall be employed in these units, apart from the energy manager.

(4)) At non-public industrial facilities with total annual energy consumption of 50,000 TOE and more, energy management unit shall be established under the responsibility of energy manager. In these units, at least one mechanical and one electrical or electrical-electronic engineer shall be

employed apart from the energy manager. Industrial enterprises which have, in their organizational structure, quality management units responsible for total quality studies and involving energy manager, may appoint these units as energy management unit.

(5)) The managements of industrial enterprises and organized industrial zones, and the owners or managements of buildings shall commission energy managers in accordance with the following periods, and shall notify the identification details, curriculum vitae, addresses and contact information of the energy managers they have commissioned to the General Directorate;

a) by 2 May 2009, for the industrial enterprises, organized industrial zones, commercial buildings, service buildings and public sector buildings already existing as of the effectiveness date of the Law,

b) within ninety days after receiving building usage permit, for the commercial buildings and service buildings for which building usage permit has been received after 2/5/2009 and which have a total construction area of more than 20,000 square meters, and the public sector buildings with total construction area of more than 10,000 square meters,

c) within ninety days for organized industrial zones and the commercial buildings, service buildings, public sector buildings and industrial enterprises that have received building usage permit or started operation or been established after 2/5/2009 and have been included in the scope pursuant to the provisions of eighth paragraphs based on the calculations made in January every year,

ç) changes of energy managers shall be notified to the General Directorate within thirty days.

(6) With regard to the commissioning of energy manager and the fulfillment of activities specified in Article 8, it is mandatory that the requested information and documents be provided and necessary conditions be fulfilled for the on-site examinations and inspection by the General Directorate.

(7) Energy managers shall be appointed from amongst persons with degree in the field of engineering for industrial enterprises; mechanical, electrical or electrical-electronic engineering for organized industrial zones; mechanical, electrical or electrical-electronic engineering or the mechanical or electrical departments of technical education faculties for buildings. Building owners or managements may procure services from firms or energy managers. The energy managers appointed or contracted at non-public sector industrial enterprises or buildings, with degree in the field of engineering, shall be required to be registered to the related Chamber of Engineering attached to the Association of Chambers of Engineers and Architects of Turkey.

(8) In the calculation of annual energy consumptions for the purpose of appointing energy managers or establishing energy managements units; the average of total annual energy consumptions in the last three years shall be taken as a basis. In the calculation of annual total energy consumption; , the amounts of any fuel and electrical energy consumed within the year shall be summed by converting them to TOE using the coefficients defined in Annex-2 of this Regulation. In converting the fuels not included in Annex-2 of this Regulation to TOE, the coefficients or values published by the International Energy Agency shall be taken as a basis.

Energy Efficiency Increasing Measures

ARTICLE 10 – (1) The following measures shall be taken into consideration with priority in the operation of existing facilities, establishment of new facilities, capacity increase and modernization activities, fulfillment of the duties of energy managers under this Regulation, in energy studies and EIPs:

a) efficiently burning fuels in burning systems through burning control and optimization,

b) obtaining highest efficiency in heating, cooling, air-conditioning and heat transfer,

c) making heat insulation according to standards on hot and cold surfaces; insulating all heat producing, distributing and using units in order to minimize undesired heat losses or gains,

ç) waste heat recovery,

d) increasing efficiency in converting heat to operation,

e) preventing losses in electricity generation,

f) increasing efficiency in converting electric energy to heat or mechanical energy,

ğ) minimizing human factor by applying automatic control practices,

g) being careful in the selection of inputs that will ensure uninterrupted energy supply,

ı) selecting machines from amongst technologies with high energy efficiency, by paying attention to the requirements of standardization and quality assurance system,

h) developing designs such that undesired heat losses or gains will be minimized, and ensuring that application is realized according to designs,

i) procuring and installing measurement equipment relating to energy efficiency at the construction and assembly stages,

j) analyzing renewable energy, heat pump and cogeneration practices,

k) using highly-efficient fittings and lamps, electronic ballasts and enlightenment control system for enlightenment purposes, and benefiting more from daylight,

l) satisfying the minimum efficiency criteria defined under the applicable legislation, for energy consuming or converting equipment.

m) using double glass systems with low-diffusion heat control coating in glazing.

SECTION FOUR
Training and Certifications

Energy manager trainings

ARTICLE 11 – (1) Energy manager certificate shall be given to the real persons who participate and succeed in the energy manager training programs organized by the General Directorate, authorized agencies or firms, who have a professional experience of minimum two years and who have graduated from the engineering or technical education faculties defined in the seventh paragraph of Article 9. The energy manager certificates issued by authorized agencies and firms shall be notified to the General Directorate within fifteen days following the date of issue. Energy manager certificates shall be prepared according to the format provided through the communiqué, separately for industrial enterprises and buildings.

(2) In energy manager training programs, the curricula defined in Annex-1 of this Regulation, as categorized according to buildings and industrial sectors and consisting of theoretical and/or practical courses shall be applied.

(3) The General Directorate shall issue energy manager certificates to persons who participate in the energy manager training programs organized by Turkish Armed Forces, Ministry of National Defense and National Intelligence Organization in cooperation with the General Directorate according to the provisions of this Regulation, and who have graduated from degree programs at minimum. Of the persons receiving energy manager certificate under this paragraph, those who have a degree equivalent to engineering or technical education faculties may work as energy manager at institutions other than those defined in this paragraph a case their public employment ends, and those with degree equivalent to engineering faculties may participate in training-audit-project trainings.

Training-audit-project trainings

ARTICLE 12 – (1) Training-audit-project certificate shall be issued to persons who have participated and succeeded in the training-audit-project training programs organized by the General Directorate or authorized agencies, who have minimum two years of professional experience and who have graduated from degree programs in engineering faculties. The training-audit-project certificates issued by authorized agencies shall be notified to the General Directorate within fifteen days following the date of issue. Training-audit-project certificates shall be prepared in the categories specified in the second paragraph of Article 6 of this Regulation.

(2) In training-audit-project training programs, the curricula defined in Annex-1 of this Regulation and consisting of theoretical and/or applied courses, shall be applied.

(3) The persons to provide training-audit-project training shall be required to be registered

to the related Chamber of Engineering attached to the Association of Chambers of Engineers and Architects of Turkey.

Monitoring and supervision of training programs

ARTICLE 13 – (1) The information about the training programs planned and implemented by the General Directorate, authorized agencies and firms shall be announced on the website of General Directorate.

(2) The General Directorate shall monitor on-site the training programs executed by the authorized agencies and the firms authorized thereby, and the authorized agencies shall monitor the training programs executed by the authorized firms. The measures for eliminating the deficiencies shall be notified to the related authorized agency or firm in writing. The implementation status of these measures shall be controlled by the General Directorate and/or related authorized agency.

Course and trainer fees

ARTICLE 14 – (1) The base and ceiling fees to be received from the participants of training-audit-project training programs to be organized in the following year, including Value Added Tax, shall be determined by the Board in December every year and shall be made public by the General Directorate on the website of the General Directorate.

(2) The procedures relating to the number of paid course hours of General Directorate staff appointed as trainer in training programs, the qualifications of those to be commissioned as trainer and the additional course fees to be paid to such staff shall be carried out according to Article 89 of Civil Servants Law No. 657 dated 14/7/1965.

SECTION FIVE
Subsidizing Efficiency Improvement Projects at Industrial Enterprises

Application

ARTICLE 15 – (1) The industrial enterprises which want their EIPs to be subsidized shall submit their projects prepared according to the principles specified in Annex-3 of this Regulation and prepared by firms, together with the energy study report prepared according to the same principles, to the General Directorate in January every year.

(2) An industrial enterprises may apply only for two EIPs to benefit from the subsidies. The industrial enterprises whose EIPs are approved by the Board for subsidy, cannot apply for the subsidization of a new EIP until the approval of the implementation report for their previous EIPs.

Evaluation

ARTICLE 16 – (1) EIPs shall be evaluated as follows:

a) General Directorate shall establish an EIP evaluation commission consisting of minimum five staff members headed by a person at the branch director level at minimum, in January every year to evaluate EIPs.

b) EIP evaluation commission shall perform then following works.

1) first request the applicant industrial enterprise to eliminate any deficiency or inadequacy determined in the project file. The industrial enterprise completes the deficiencies within thirty days.

2) check the saving potential, recovery methods, implementation costs and recovery periods under the project by conducting market researches.

3) notify to the applicant industrial enterprise the suggestions that may ensure greater saving and/or reduce project cost in the implementation of project.

c) The applicant industrial enterprise shall provide the necessary facilitation for the on-site examinations of evaluation commission, and if it accepts the improvement recommendations of the evaluation commission, shall submit the final project file to the General Directorate for the second time within thirty days.

ç) The EIPs deemed acceptable as a result of the evaluation of EIP evaluation commission, with recovery period of maximum five years and project cost of maximum 500,000 TL shall be determined as EIPs eligible for subsidy. The amount of subsidy that can be provided

to these projects through Board approval shall be calculated according to the following formula.

D = [20-(5/4) x (S-1)]/100 x M

D : Amount of subsidy (Turkish Lira)

M : Implementation cost specified in the project (Turkish Lira)

S : Payback period (Year), the recovery periods less than one year shall be completed to one year.

d) EIP evaluation commission shall rank the EIPs eligible for subsidy beginning from the EIP with highest score, based on the total scores calculated according to the following formula:

P = 0,6 x G + 0,4 x ETO

P : Total score

G : payback period normalized according to the shortest recovery period, on the basis of 100 scores,

ETO: energy saving rate score normalized according to the maximum electricity saving rate in total saving, on the basis of 100 scores.

(e) EIP evaluation commission shall determine the EIPs to be subsidized, beginning from the EIP with highest score in this ranking, and as limited to the subsidy budget allocated by the General Directorate. The EIPs determined as such shall be submitted to the Board for approval, by the General Directorate. The EIPs decided to be subsidized shall be publicized on the website of General Directorate within fifteen days and the applicants shall be notified thereof in writing. Applicants shall apply to the General Directorate to sign a contract within thirty days after the date of notification.

Implementation of subsidies

ARTICLE 17 – (1) EIP subsidies shall be implemented as follows:

a) The General Directorate shall conclude subsidy agreement with the owners of EIPs approved by the Board, according to the format posted on the website of General Directorate, after the approval of implementation agreement.

b) The subsidy payments for projects completed within the contract year shall be made within the related year. For projects completed in the following year, payment shall be made in proportion to the ratio of existing budget to the total amount of subsidy to be provided to these projects. No right and interest shall be claimed for payments effected as such.

c) The total available budget amount for EIP subsidies in the current year shall be publicized on the website of General Directorate.

ç) The legal entities whose EIPs are subsidized shall implement these projects at their enterprises within two years. The projects implemented beyond this period or implemented differently from the project design shall not be subsidized. On the condition that the implementation cost specified in the project design is not exceeded, the project components that result in lower energy saving than that envisaged in the project design shall be shall be regarded as implementation different from the project design.

d) The implementation reports containing information and images before and after project implementation, and prepared in accordance with the format specified by the General Directorate shall be sent to the General Directorate. Implementation results shall be controlled by the General Directorate on site.

e) The amount of subsidy to be applied shall be determined according to the following formula.

D = [20-(5/4) x (S-1)]/100 x (M-F)

D : Subsidy amount (Turkish Lira)

M : Implementation cost specified in the project (Turkish Lira)

S : Payback period(Years), Payback periods longer than six months shall be completed to one year.

F : Implementation cost of project components implemented differently from the

project design (Turkish Lira)

f) All payments under the subsidization of implementation projects following the General Directorate's approval of the implementation reports submitted to the General Directorate by the industrial enterprise, as a result of on-site examinations and controls.

SECTION SIX
Voluntary Agreements

Application and evaluation

ARTICLE 18 – (1) The legal entities which want to sign voluntary agreements with the General Directorate by committing to reduce energy intensity of any of its industrial enterprise by 10 percent on average in three years shall apply to the General Directorate by the end of January every year, by filling in an application form with format publicized on the website of General Directorate.

(2) Voluntary agreement applications shall be evaluated as follows.

a) General Directorate shall establish a voluntary agreement evaluation commission consisting of minimum three staff members of General Directorate, headed by a person at the branch director level at minimum, in January every year to evaluate the applications.

b) The applications of legal entities that have fulfilled their commitments under the voluntary agreements signed with the General Directorate earlier but have increased their energy densities in subsequent years shall not be evaluated.

c) The applications of legal entities that have failed to fulfill their commitments under voluntary agreements signed with the General Directorate, except for the force majeure conditions, shall not be evaluated foe a period of 5 years.

ç) The legal entities that have applied to the General Directorate shall complete, within thirty days, the deficiencies detected by the evaluation commission in the information required on the application form, and shall provide the necessary conditions for the on-site examinations of the commission.

d) The energy intensity of legal entities that have applied for voluntary agreement, in the years prior to the date of application, shall be calculated using the following formula:

Energy intensity = E / D

$E = E_t - E_d$

E_t = The enterprise's annual total energy consumption in TOE terms

E_d = The enterprise's energy consumption for general management and support services as expressed in TOE terms

$D = (1/ PPI) \times \sum (P_i \times F_i)$

D= The economic value of annual goods production, as expressed in thousand (1,000) Turkish Lira terms, in 2000 prices.

PPI = Producer price index of related sector

P_i = Amount of goods produced during the year

F_i = Market prices of goods produced during the year as expressed in thousand (1,000) Turkish Lira terms, in 2000 prices.

The voluntary agreement evaluation commission shall rank the eligible applications beginning from the highest score, based on the criteria of high reference energy intensity value and committed energy intensity reduction rate, according to the total scores calculated using the following formula.

P = 0,6 x REY + 0,4 x EYA

P : Total score

REY: Reference energy intensity score normalized according to highest value, on the basis of 100 points,

EYA: Committed energy intensity reduction rate score normalized according to the highest value, on the basis of 100 points,

f) The industrial enterprises with which voluntary agreements will be signed shall be determined through Board decision, beginning from the enterprise with highest score, according to the ranking made by the voluntary agreement evaluation commission.

g) By prioritizing the subsidies carried over from past years, payments shall be made in proportion to the ratio of current year total available subsidy budget to the total amount of subsidies for that year. No right or interest shall be claimed for payments to be made as such.

Signing voluntary agreements

ARTICLE 19 – (1) Following Board approval, the voluntary agreements between the General Directorate and industrial enterprises shall be prepared in accordance with the format publicized on the website of General Directorate, in line with the following principles.

a) Voluntary agreements shall take effect in January of the year following the year in which they were signed.

b) The applicant who is a party to the voluntary agreement shall provide the General Directorate with the information needed by the General Directorate to follow up the energy intensity at its industrial enterprise covered by the agreement. The General Directorate and persons acting on behalf of the General Directorate are obliged to keep the confidentiality of such information.

(2) The following force majeure conditions shall be taken into consideration in voluntary agreements:

a) In order to be able to consider an event a force majeure event, the party affected from the event must have paid due care and attention and taken all measures, but the event could not be prevented, avoided or eliminated, and this fact must have prevented the affected party from fulfilling its obligations. The following cases shall be regarded as force majeure event;

1) Natural disasters and epidemics,

2) Warfare, nuclear and chemical fall-outs, mobilizations, public riots, assaults, terrorist acts and sabotages,

3) Strikes, lock-outs and other civil servant and labor movements,

4) General economic crisis,

5) Specific force majeure conditions specified in the voluntary agreements.

b) In case a force majeure event reported by any of the parties prevails less than three months in a calendar year, the duration of voluntary agreement may be extended by maximum one year through a Board decision. In case the force majeure conditions prevail longer than three months, then the voluntary agreement shall be terminated.

Implementation of subsidies under voluntary agreements

ARTICLE 20 – (1) Of the energy consumed in the industrial enterprise by legal entities that have signed voluntary agreement, the energy generated at their facilities that convert wastes to heat and electrical energy using modern burning techniques, at cogeneration facilities manufactured in Turkey with total cycle efficiency of eighty percent and more or using hydro, wind, geothermal, solar or biomass resources, shall be deducted from the annual total energy consumption of the industrial enterprise for only one time in the calculation of energy intensity in case such facilities are commissioned during the term of agreement.

(2) The energy intensities of legal entities that have applied for voluntary agreement shall be calculated using the following formula during the term of agreement:

Energy intensity = E / D

$E = E_t - E_d - E_{yk}$

E_t = Enterprise's annual total energy consumption as expressed in TOE terms

E_d = Enterprise's energy consumption for general management and support services as expressed in TOE terms

E_{yk} = The energy generated within the year under the first paragraph, as expressed in TOE terms

$D = (1/ PPI) \times \sum (P_i \times F_i)$

D= Economic value of annual goods production as expressed in thousand (1000) Turkish Lira, in 2000 prices.

PPI= Producer prices index of related sector

P_i = Amounts of goods produced during the year

F_i = Market prices of goods produced during the year as expressed in thousand (1000) Turkish Lira, in 2000 prices .

(3) In the calculation of rate of decrease in energy intensity, the arithmetic mean of differences actualized every year against the reference energy intensity shall be taken as a basis.

(4) Twenty percent of the energy expenditures of the related industrial enterprise of legal entity that has signed a voluntary agreement with the General Directorate and has fulfilled its commitments, in the year when the agreement was signed, shall be financed from the General Directorate's budget if the General Directorate's budget is available, as limited to maximum 100,000 Turkish Liras.

(5) The payment plan of the subsidy to be applied shall be determined by the General Directorate at the end of voluntary agreement period, as limited to the General Directorate budget allocations. No interest payment or right can be claimed for delays in payments.

(6) In making payments, the energy expenditure invoices and payment documents approved by the certified financial advisors, revenues offices and tax offices in the year of agreement shall be taken as a basis.

(7) Information about the industrial enterprises that have signed voluntary agreements and industrial enterprises that have reduced or increased their energy intensities shall be publicized on the website of General Directorate.

SECTION SEVEN
Demand Side Management

Practice regarding labeling

ARTICLE 21 – (1) Energy efficiency (ENVER) labels shall be issued, within the framework of the following principles and procedures, to the legal entities that apply to the General Directorate on a voluntary basis with documents evidencing that energy label category is minimum B for refrigerators, air-conditioners and bulbs and that the efficiency value determined as a result of the test conducted on electrical motors according to TS 3206 EN 60034-2 is above the value specified in Annex-6 of this Regulation.

a) The format and fee of ENVER label shall be determined by the General Directorate and shall be publicized on the internet.

b) ENVER labels shall be issued exclusively for import batch in case of imported products, and as limited to the planned production quantity in case of products manufactured in Turkey.

c) The General Directorate may test samples selected from the ENVER labeled product group, or have such samples tested at an accredited laboratory. In case non-compliance is detected in these tests or it is determined that the ENVER labels are used inappropriately, the ENVER label practice shall be stopped and this fact shall be publicized by the General Directorate on the internet.

(2) The manufacturers and importers of electrical home appliances and boilers used for heating buildings shall notify to the General Directorate, in January every year, the amount of products they sold in the country, on the basis of energy label categories

Reducing demand for electric energy and power

ARTICLE 22 – (1) Retail sale licensees operating in the electricity market and the organized industrial zone directorates shall exert the following efforts to reduce the electric energy and power demands of their subscribers:

a) concluding agreements, on a voluntary basis, with industrial and commercial subscriber categories with high consumption values, so that they participate in the interrupted energy programs

and to shift their loads to other time periods as necessary,

b) organize campaigns for promoting the use highly energy-efficient electrical home appliances and tools present in the market, primarily including air-conditioners, refrigerators, lamps and bulbs, in cooperation with manufacturing companies or their associations or unions.

Outdoor enlightening

ARTICLE 23 – (1) Distribution licensees operating in the electricity market and municipalities shall undertake the following practices:

a) The criteria provided in Annex-5 shall be observed in the enlightening of roads. However, the limits provided in the tables may be exceeded taking into consideration the enlightening from the environs. The conformity of road enlightening projects to the limits, excluding the city entry and exit roads and motorways falling under the field of responsibility of Highways General Directorate, shall be inspected by related distribution licensees operating in the electricity market.

b) In the enlightening of roads;

1) High-pressure sodium vapor bulbs with transparent glass tubes shall be used in all in-city road, avenue, street and square enlightening.

2) Only low-pressure sodium vapor bulbs shall be used in areas where wild life must be protected and where the prevention of light pollution is of utmost importance as well as in the roads, streets and squares in the vicinity of astronomic observatories.

c) High-pressure mercury vapor and/or compact fluorescent bulbs shall be used in park and garden enlightening systems.

ç) Tube fluorescent lamps shall be used for enlightening with advertisement and landscape purposes. Such lamps cannot be used for enlightening roads, avenues, streets and squares.

d) The type armatures shall be selected according to the outer environment conditions.

Use of cogeneration, heat pump and solar energy systems in mass housing projects

ARTICLE 24- (1) The Mass Housing Administration shall primarily analyze the possibilities of using cogeneration and heat pump systems and solar energy in mass housing projects. The applications not exceeding ten percent of house cost shall be carried out.

Awareness raising activities

ARTICLE 25- (1) Public agencies and institutions shall organize promotion and awareness raising activities to contribute to the development of energy culture and awareness in the society, in coordination with the General Directorate, or shall provide contribution to the activities organized by the General Directorate.

(2) Legal entities selling electricity and/or natural gas under their licenses shall provide access on the internet to the monthly information regarding the consumption values of their subscribers in the pervious fiscal year, the consumption cost corresponding to these values and their peak consumptions, in comparison with the average values of the same consumer categories.

(3) The Ministry of National Defense, Ministry of National Education and related public agencies and institutions shall make the necessary arrangements to provide theoretical and practical information on basic concepts regarding energy and energy efficiency, general energy status of Turkey, energy resources, energy generation techniques, efficient use of energy in daily life, and importance of energy efficiency in climate change and environmental protection, in the course and education programs of military schools and soldier training centers, in the teaching programs of formal and extensive education institutions and in-service training programs of public agencies and institutions.

(4) The following awareness-raising activities shall be performed in the public sector:

a) In-service training seminars shall be organized to create awareness among employees on the reduction of energy consumption. Employees shall be informed about the energy consumption of places where they work.

b) Posters and bills warning the employees to turn off unused lamps and office equipment and promoting efficiency labels for electrical home appliances and bulbs shall be placed at points visible by everyone, such as cafeteria, conference hall, passages, etc.

c) Under the energy efficiency week activities organized in the second week of January every year;

1) Metropolitan municipalities shall take necessary measures awareness-raising activities such as conferences, exhibitions, fairs and contests in coordination with the General Directorate.

2) National Education Directorates shall take necessary measures energy efficiency promoting activities towards primary and secondary education students in every province.

ç) Energy efficiency clubs shall be established at primary education, secondary education and non-formal education institutions, and these clubs shall take necessary measures to ensure that club activities and the assignments and projects to be prepared by students during the year include energy efficiency-related subjects.

d) National Lottery General Directorate shall take necessary measures to ensure that the energy efficiency-related graphs and messages prepared by the Ministry be placed on the tickets of games of luck; and the Postal Services General Directorate on stamps, envelopes, boxes, etc.

(5) The General Directorate shall awareness-raising contests with or without prizes.

SECTION EIGHT
Implementations for Increasing Energy Efficiency in the Generation, Transmission and Distribution of Electric Energy

Energy management at electricity generation facilities

ARTICLE 26 – (1) Energy manager shall be commissioned at electricity generation facilities with installed power capacity of 100 MW and more.

(2) Legal entities with generation license shall, by the end of March every year, send the information in the format publicized on the website of General Directorate, including primary energy consumption, electricity generation, system cycle efficiency at minimum, to the General Directorate.

Increasing energy efficiency in the transmission and distribution of electricity

ARTICLE 27 – (1) In order to prevent the technical losses on the distribution system, the legal entities engaged in distribution activity in the electricity market shall abide by the provisions of Electricity Market Distribution Regulation published in the Official Gazette No. 25025 dated 19/2/2003.

(2) In order to prevent the technical losses on the transmission system and meet the efficiency criteria of transmission system in terms of parameters that affect the power quality such as voltage, frequency, harmonic, flicker strength, reactive and active power rates (Cos∅), outage, N-1, etc.; the legal entities engaged in transmission activity in the electricity market shall abide by the provisions of Electricity Market Grid Code published in the Official Gazette No. 25001 dated 22/1/2003.

Using efficiency increasing criteria and waste heat of thermal power plants

ARTICLE 28- (1) For inclusion in the minimum conditions to be required for licensing fossil fuel-fired electricity generation facilities, the net cycle efficiency values found by taking as a basis the minimum calorific value of fuel under full-load operation conditions of the power plant shall be published by the Ministry in the form of a communiqué in the Official Gazette in January every year, according to types of power plants.

(2) Studies shall be conducted for using the waste heat of thermal power plants primarily at buildings for heating and cooling purposes as well as in industrial, agricultural, water products, cold air warehouse and fresh water production sectors. The projects with recovery period of maximum 10 years shall be carried out through municipality and private sector cooperation.

(3) In opening mass housing areas to settlement, Municipalities and Mass Housing

Administration shall give priority to regions where central and local heating and cooling is possible through thermal power plant waste heat and shall take necessary measure for heat distribution infrastructure plans.

Cogeneration applications

ARTICLE 29- (1) In applications covered by sub-paragraph (b-3) of the first paragraph of Article 8 of the Law, sub-paragraph (a) of the first paragraph of Article 9 of the Law and Article 3 of Electricity Market Law No. 4628 dated 20/2/2001, the total cycle efficiency calculated according to the minimum calorific value of the fuel used by cogeneration facilities shall be required to be 80 percent at minimum.

Other provisions

ARTICLE 30- (1) Materials conforming to national and international standards shall be used in the generation, transmission and distribution of electricity.

(2) At the lignite extraction sites providing fuel to thermal power plants; coal washing, sifting, sorting, homogenization and enrichment processes shall be applied in order to improve lignite quality.

(3) Efficient burning techniques shall be used to ensure the efficient use of primary energy resource at coal-fired thermal power plants to be installed, and the power plant's installed power capacity shall be determined in a manner that will ensure maximum use of primary energy resource potential.

(4) In order to reduce internal consumption at thermal power plants, automation and protective maintenance practices as well as system rehabilitations for reducing faults and installing spare part and stock control system shall be carried out in a timely manner.

(5)) Provisions relating to efficiency increasing measures and reduction of technical losses shall be included in the specifications for the privatization of electricity generation and distribution facilities.

(6) Public agencies and institutions executing and/or supporting research and development activities shall prioritize the projects in the below-listed fields, and shall provide technical support together with the promotional activities for the implementation of projects concluded successfully.

a) Reducing the cost and increasing the performance of bio-fuels produced from local agricultural crops,

b) Techniques for producing bio-fuel and synthetic fuels from biomass resources,

c) Hydrogen generation techniques that may be economical using renewable energy resources such as hydro, wind, solar and geothermal energy.

SECTION NINE
Energy Efficiency Measures in the Public Sector

Energy studies

ARTICLE 31 – (1) Within three years from the effectiveness date of this Regulation, energy studies shall be conducted at public sector buildings and enterprises required to appoint energy managers, on all matters relating to heat isolation, heating, cooling and hot water systems, lift and enlightenment system at buildings, and the use of energy at production facilities, in the light of information posted on the website of General Directorate, and EIPs shall be prepared for the implementation of measures specified in these studies.

(2) A copy of energy study reports and EIPs prepared by public sector agencies and entities shall be sent to the General Directorate by the related public agency or entity.

Measures for increasing energy efficiency at buildings and enterprises belonging to the public sector

ARTICLE 32 – (1) The following measures shall be taken at the buildings belonging to the public sector, with regard to the use of heat energy:

a) Heaters shall be adjusted such that indoor ambient temperature will not exceed 22 ^{0}C during the heating season.

b) In new procurements, the air-conditioners shall be selected from amongst those with label category of minimum A. Cooling systems and air-conditioners shall not be run for cooling purposes when the outdoor ambient temperature is below 30 ^{0}C, and shall be adjusted such that indoor ambient temperature will not fall below 24 ^{0}C.

c) Aluminum folio coated heat isolation plates shall be placed between radiators and walls; front sides and top of radiators shall not be closed in order not to avoid heat flow.

ç) In order to avoid air leakage from windows, window seals shall be used.

d) Revolving doors and double doors shall be used at the main gates of buildings completely used by public agencies and institutions. In the case of double doors, the second door shall not open before the first one is closed.

e) Prior to every heating season, heating systems shall be maintained and controlled, as inclusive of boiler adjustments based on flue gas measurements.

(2) The following measures shall be taken at the buildings belonging to the public sector, with regard to the use of electrical energy.

a) For enlightening, compact fluorescent lamps shall be used in place of existing incandescent lamps, and fluorescent or led lamps with electronic ballast and high efficiency shall be used in place of fluorescent lamps with magnetic ballast.

b) Movement, heat or light sensitive control equipment shall be used in sections used for short periods of time.

c) In order to achieve better efficiency in enlightenment, fittings that significantly impair the permeability of light shall not be used, and highly reflective fittings shall be used instead.

ç) In building sections which include multiple light fittings for indoor enlightenment, an appropriate grouping shall be done for each fitting or sections which can utilize daylight more, such as parts close to windows, enabling separate manual or automatic daylight control.

d) In the purchase of computers, printers, photocopy machines and similar office equipment consuming electricity, the "*Energy Star*" mark shall be required and/or the minimum efficiency criteria specified in the applicable legislation shall be satisfied.

(3) The following measures shall be taken to ensure efficient and effective use of energy at the buildings, enterprises and industrial enterprises belonging to the public sector:

a) In boilers; combustion control and optimization, heat isolation, keeping the heat transfer surfaces clean, reuse of waste heat, increasing condense recovery in steam boilers and reducing blow-down losses,

b) In compressed air systems; minimizing the neutral operation time of compressors, ensuring that the air entering the compressor is dry, clean and cold, periodically checking leakages, using single-stage compressors instead of multi-stage compressors with interval cooling,

c) In heat energy distribution systems; isolating pipe systems together with valves and flanges and periodically checking isolation, ensuring distribution at the lowest possible pressure and temperature, regularly controlling and maintaining steam traps,

ç) In general process procedures; turning off the unused electrical devices and equipment, ensuring full capacity operation to the extent possible, analyzing whether the isolation of places with surface temperature of higher than 500 ^{o}C is economical, and applying those with economic recovery period of less than one year, reusing waste heats,

d) In drying processes; optimizing the amount of humidity in wastes gases, exploring mechanical dehumidification possibilities before heat drying, keeping isolators, heaters and filters clean, recirculating air where possible, reusing exhaust gases and waste heats,

e) In furnaces; ensuring isolation optimization and impermeability, minimizing the excess air provided for combustion, increasing efficiency in heat transfer through radiation and

transportation, making maximum capacity loading to the extent possible, using light materials as carrier, reusing waste heats and minimizing the period when the furnace covers are kept open for loading and unloading in intermittently running furnaces,

f) In electrical systems; ensuring power compensation at the central and/or local levels, using variable speed drivers in electrical motors at places where the load is variable, choosing electrical motors with appropriate capacity, prioritizing electrical motors with high energy efficiency category in case of new purchases, turning off the electrical equipment when they are not used, carefully following on electricity tariffs and not exceeding the contracted power, determining the electrical equipment to be turned off in case of peak load,

g) In air-conditioning systems; keeping the heater batteries and filters clean, reducing the out-of-control air leakages.

SECTION TEN
Obligation to Provide Information and Administrative Sanctions

Obligation to Provide Information

ARTICLE 33 – (1) Public agencies and institutions, owners and/or managers of industrial enterprises and buildings required to commission energy manager shall send to the General Directorate, in writing, the information relating to energy consumption in the format publicized on the website of General Directorate by the end of March every year, and shall enter them to the database of General Directorate via internet.

(2) They are required to provide any requested information and document and make available the required conditions for the on-site examinations and inspections to be performed by the General Directorate to confirm the accuracy of such information.

(3) The Ministry of Industry and Trade shall provide information support in the monitoring of the consumption information of all industrial enterprises by the Ministry. The Ministry of Public Works and Settlement, governorates and municipalities shall provide information support in the compilation of total construction area and energy consumption data of the buildings with total construction area of more than 10,000 square meters and with building usage permit issued.

Administrative sanctions

ARTICLE 34 – (1) As a result of the examinations and/or inspections carried by the General Directorate, the administrative sanctions provided in Article 10 of the Law shall be imposed on real persons and legal entities.

SECTION ELEVEN
Miscellaneous and Final Provisions

Regulation authority

ARTICLE 35- (1) The General Directorate shall be authorized to issue any sub-regulation to ensure the enforcement of this Regulation.

(2) The sample application letters referred to in Articles 5, 6, 11 and 12 of this Regulation and the format of energy manager and training-study-project certificates, activity report, authorization certificate and authorization certificate preference form shall be prepared by the Directorate General within sixty days following the effectiveness of this Regulation.

Inapplicable provisions

ARTICLE 36 – (1) The schools attached to the Ministry of National Education, the Ministry of National Defense and its affiliated institutions, Turkish Armed Forces and the Undersecretariat of National Intelligence Organization shall not apply provisions of the first, second, third, fourth, sixth and seventh paragraphs of Article 9 of this Regulation and the first paragraph of Article 33.

Annulled regulation

ARTICLE 37 – (1) The Regulation on Measures to be Taken by Industrial Facilities for Increasing Efficiency in Energy Consumption, which was published in the Official Gazette No.

22400 dated 11 November 1995, has been annulled.

Duty of General Directorate to authorize firms

PROVISIONAL ARTICLE 1 – (1) The activity of General Directorate to authorize firms within the framework of Article 6 of this Regulation shall expire if the number of authorized agencies exceeds ten as 2 May 2009. Otherwise, the activity of General Directorate to authorize firms shall continue until the number of authorized agencies reaches ten.

Authorization certificates, energy manager certificates and other provisions

PROVISIONAL ARTICLE 2 – (1) Energy manager certificate shall be issued, for free of charge, to those persons who apply to the General Directorate to renew their energy manager certificates issued prior to the effectiveness date of the Law.

(2) Within one year following the effectiveness of this Regulation at the latest;

(a) Energy manager certificate shall be issued to the General Directorate staff with minimum two years of experience in energy manager training and study activities. Training-audit-project certificate shall be issued to the General Directorate l staff who holds energy manager certificate and who has prepared EIP.

(b) Energy manager certificate shall be issued to the persons who have participated and succeeded in energy manager trainings organized towards industrial and building sectors prior to the effectiveness date of this Regulation, and who have completed a degree program at minimum.

(3) The energy manager certificate of those persons who have been granted energy manager certificate or participated and succeeded in energy manager trainings prior to the effectiveness date of this Regulation and who have minimum five-year experience in the sector, shall have the status of training-audit-project certificate in the authorization of firms for a period of one year from the effectiveness date of this Regulation. However, the firm's authorization certificate shall not be renewed if the energy manager certificates are not converted to training-audit-project certificate until the renewal of the firm's authorization certificate at the end of three years.

EIP applications for electrical motor systems

PROVISIONAL ARTICLE 3- (1) The initial applications field by industrial enterprises under Article 15 with a request for support for their EIPs aimed at increasing efficiency in electrical motor systems, shall be admitted from the effectiveness date of this Regulation till the end of January 2009.

Currency unit

PROVISIONAL ARTICLE 4- (1) For the term "Turkish Lira" used in this Regulation, the term "New Turkish Lira" shall be used as long as the latter is defined as the currency in circulation in the country pursuant to the provisions of Law No. 5083 dated 28 January 2004 on the Currency of the Republic of Turkey.

Effectiveness

ARTICLE 38 – (1) This Regulation shall take effect as of its publication date.

Enforcement

ARTICLE 39- (1) This Regulation shall be enforced by the Minister of Energy and Natural Resources.

Annex-1

ENERGY MANAGER AND TRAINING-AUDIT-PROJECT TRAININGS

1. Competences expected from the persons receiving energy manager certificate

The trainings shall be intended to equip the persons to receive energy manager certificate with the following competences:

a) ability to think analytically and to produce solutions rapidly,

b) be open to innovations and acquire the habit of following up the developments,

c) be self-confident and determined; ability to express oneself and convince counterparts,

ç) have knowledge of primary energy resources in the world and in Turkey, secondary energy types and supply-demand relations,

d) ability to distinguish between energy saving and energy efficiency,

e) know about the energy saving potential and how it can be forecast,

f) know about the energy intensity and specific energy consumption concepts across the country, in industrial sectors and at industrial enterprises, the calculation methodologies and trends,

g) know the way how energy management activities will be performed and reported,

ğ) have knowledge about the technical specifications and maintenance and operation procedures of the energy-consuming equipment and tools in the enterprise; know how energy losses and inefficiencies may occur with such equipment, how these losses and inefficiencies can be prevented and measured, and how measurement results will be interpreted,

h) know about the losses that may occur in buildings and heat-generating, storing and transporting systems, their measurement methods and isolation methods,

ı) know about the good habits that can ensure energy saving at buildings and enterprises, through simple measures,

i) know about the efficient production processes relating to his enterprise, the efficient energy-consuming products in the market, and their technical and economic characteristics,

j) ability to conduct feasibility studies for measures that require significant expenditure, which can ensure energy saving in buildings and increase efficiency in enterprises,

k) have extensive knowledge on energy audit and efficiency improvement project preparation methodologies.

2. Competences expected from persons receiving training-audit-project certificate

The trainings shall be intended to equip the persons to receive training-audit-project certificate with knowledge on energy study and EIP preparation methodologies, in addition to the competences of energy managers.

3. Curriculum and duration

The minimum curriculum and durations provided in Table-1 in Annex-1 shall be applied for the energy manager and training-audit-project trainings towards industrial enterprises and buildings. However, an alternative concentrated training program shall be prepared provided that total duration indicated in Table-1 in Annex-1 for each training programs, whereby heat-mechanics or electricity subjects will be focused, will be shortened maximum %20

4. Training methodology

4.1. Energy manager training

In training programs, minimum two different course programs shall be prepared, whereby heat-mechanics or electricity subjects will be focused, from the curriculum provided in Table-1 in Annex-1. Trainees shall attend the program they prefer.

The curriculum included in the coverage of training programs shall be applied as theoretical teaching followed by practical training. Classroom lectures or remote-training

courses may be applied for theoretical teaching. Practical training shall be applied in laboratory.

4.2 Training-audit-project training

Persons holding energy manager certificate may attend training-audit-project training. The training curriculum shall be applied as theoretical teaching followed by practical training. For implementing the training curriculum, classroom lectures or web-based remote training courses may be applied.

The trainee who succeeds in the examination shall conduct energy audit or EIP study at an enterprise or building within maximum three months following the completion of training. The report prepared regarding this work shall be submitted to the General Directorate or authorized agency which has executed the training, for evaluation.

4.3 Examinations

Examinations shall be held in classrooms and shall include questions which can measure the targeted competences as listed in Article 1 and 2 of this Annex-1. For the purposes of examination, an examination commission consisting of at least three persons from the trainers working in the training programs shall be established to prepare questions, hold exams, evaluate answer sheets, and notifying the results to the trainees. The exam results shall be recorded on a minute by the exam commission, and shall be notified to the trainees within seven calendar days following the date of exam.

The trainees who receive minimum 70 percentile points shall be entitled for energy manager certificate.

Engineers entitled for energy manager certificate may attend the training-audit-project training. The trainees who receive minimum 70 percentile point in the exam to be held at the end of training-audit-project training shall be deemed successful and such persons shall conduct energy audit and EIP study. Energy managers may perform energy audit and EIP study if they succeed in the training-audit-project exams, without attending training-audit-project training. The trainees who get minimum 70 percentile points in the energy manager and training-audit-project exams, and energy audit and EIP exercises, shall be entitled for training-audit-project certificate. Trainees who can not succeed the exam taken at the end of training program shall have right to take maximum one examination within one year without attending training-audit-project training.

Written objections to exam result and evaluation of energy audit and EIP report, shall be reviewed by the same commission and the result of such review shall be notified to the related trainee within five days.

5. Classroom lectures

Classroom lectures shall be performed in classroom with maximum capacity of 30 people, and equipped with computer supported projection system, board, trainer desk, document cabinets, with standard comfort temperature and enlightening.

The building in which the training is executed shall also include management rooms, trainer rooms, library, computer room for internet researches, resting spaces and minimum social facilities.

6. Laboratory

The laboratories in which applied training is performed shall at minimum include the equipment, tools and instruments which can perform operation/application, maintenance, measurement and analysis relating to burners and boilers of combustion systems, steam systems/traps, pump and compressor systems, industrial furnaces, compressed air systems, waste heat recovery systems, electric motors and variable speed driver applications, compensation applications, enlightenment systems, heating-cooling and air-conditioning

systems, drying systems, building and industrial isolation applications, as well as at least one technician who can use such equipment and tools.

Annex-1

Table-1: Curriculum and duration of energy manager and "training-audit-project" trainings

SUBJECT / CONTENTS	ENERGY MANAGER TRAINING MINIMUM DURATIONS (HOUR)		"TRAINING-AUDIT-PROJECT" TRAINING MINIMUM DURATIONS (HOUR)	
	INDUSTRY	BUILDING	INDUSTRY	BUILDING
PERSONAL SKILLS DEVELOPMENT TRAINING	**4**	**4**	**4**	**4**
- Analytical thinking and fast problem-solving skills				
- Being open to innovations and habit of following up developments				
- Being self-confident and determined; being able to express oneself and convince others				
- Team work				
GENERAL TRAINING	**4**	**4**	**4**	**4**
- Primary energy resources in the world and in Turkey, secondary energy types, and supply-demand developments				
- Sectoral energy consumption and tariffs in the world and in Turkey				
- Energy Efficiency Law and secondary legislation				
- Related agencies and institutions				
ENERGY EFFICIENCY TRAINING	**4**	**4**	**4**	**4**
- Energy saving and energy efficiency				
- Energy saving potential, energy intensity and specific energy consumption – concept, calculation, trends				
- Energy efficiency increasing measures in the industry–technical and economic characteristics				
- Energy saving measures in buildings–technical and economic characteristics				
- Energy and environment/environmental legislation, energy–environment relations, effects of fuel characteristics on air quality, measures and techniques for preventing air pollution, emission calculation methodologies.				

Annex-1

SUBJECT / CONTENTS	ENERGY MANAGER TRAINING MINIMUM DURATIONS (HOUR)		"TRAINING-AUDIT-PROJECT" TRAINING MINIMUM DURATIONS (HOUR)	
	INDUSTRY	BUILDING	INDUSTRY	BUILDING
ENERGY MANAGEMENT / GENERAL	**8**	**8**	**8**	**8**
- Duties of energy manager (target setting, awareness raising, planning, monitoring, data collection and reporting)				
- Economic analysis methodologies				
- Measurement techniques and equipment				
- Standards				
- Feasibility studies				
- Energy study and efficiency increasing project preparation – I (extensive information)				
ENERGY MANAGEMENT / HEAT – MECHANICS	**50**	**40**	**50**	**40**
- Energy and mass equivalences (Basic concepts, Sankey diagram formulae, psychometric diagram, applied example)				
- Combustion facilities, fuels and combustion (burners, flues, boilers, efficiency calculations, fuels, improvement of calorific values of fuels, conversion of fuels to TOE value, flue gas analyses, combustion formulae, combustion control and improvement)				
- Steam systems (concepts, steam systems, condense recovery, flash steam, steam traps, losses and leakages)				
- Heat isolation (calculation formula; isolation materials, selection of appropriate material, isolation at industrial facilities, isolation at buildings, pipe-valve and flange isolation, isolation in buildings, windows and glasses)				
- Industrial furnaces (furnace types, energy and/or mass balance in furnaces, operation and modernization, energy efficiency measures.)				

Annex-1

SUBJECT / CONTENTS	ENERGY MANAGER TRAINING MINIMUM DURATIONS (HOUR)		"TRAINING-AUDIT-PROJECT" TRAINING MINIMUM DURATIONS (HOUR)	
	INDUSTRY	BUILDING	INDUSTRY	BUILDING
-Heating, ventilation and air-conditioning (concepts, calculation and design of heating and cooling load in buildings, control systems)				
- Compressed air systems (compressors, control systems, distribution lines, compressed air quality, losses and leakages, waste heat usage)	Applied		Applied	
- Drying systems (drying concept / drying processes and application areas, psychometric calculations)				
- Use of waste heat (waste heat concept, waste heat sources, application areas of waste heat recovery equipment and systems, formulae-calculations, examples)	Applied	Applied	Applied	Applied
- Cooling	Applied	Applied	Applied	Applied
ENERGY MANAGEMENT / ELECTRICITY	**20**	**15**	**20**	**15**
- Electric energy – concepts and sizes (ampere, voltage, power and power factor, etc.				
- Efficiency in electric energy (generation, transmission, distribution, end user) and demand side management				
- Metering and monitoring of electric energy (electricity, scada systems, etc.)				
- Types, losses and efficiencies of power transformers				
- Reactive power, power factor and compensation practices, harmonics and filters	Applied	Applied	Applied	Applied
- Types, losses, efficiencies and common usage areas of electric motors (fan, pump, comp.)				
- Variable speed drivers, soft starters, and application areas	Applied		Applied	
- Efficient use of electric energy in enlightening (efficient fittings, control systems, etc.)	Applied	Applied	Applied	Applied
- Combined heat-power systems (cogeneration, trigeneration), types and efficiencies				

Annex-1

SUBJECT / CONTENTS	ENERGY MANAGER TRAINING MINIMUM DURATIONS (HOUR)		"TRAINING-AUDIT-PROJECT" TRAINING MINIMUM DURATIONS (HOUR)	
	INDUSTRY	BUILDING	INDUSTRY	BUILDING
- Efficient electrical home appliances and office equipment				
- Automation systems (industry and buildings)				
ENERGY AUDIT AND EIP PREPARATION TRAINING	**-**	**-**	**30**	**30**
- Energy audit (building, energy-intensive industrial sectors, heat-mechanics and electricity categories)				
Measurement devices, measurement techniques and standards				
- EIP preparation (building, energy-intensive industrial sectors, heat-mechanics and electricity categories)				
ADDITIONAL INFORMATION ON ENERGY EFFICIENCY TRAINING	**-**	**-**	**50**	**50**
- Energy efficiency				
- Energy management (general)				
- Energy management (heat-mechanics)				
- Energy management (electricity)				
TOTAL (*)	**80**	**75**	**160**	**155**

(*) Total duration of training is not the sum of durations given for each subject and content given in the table, but represents the minimum total duration of training since the training programs will be prepared such that heat-mechanics and electricity subjects will be addressed with greater focus within the framework of the first paragraph of Article 4.1 of Annex-1; and since only one of the minimum durations provided in the table will be observed for one of the heat-mechanics or electricity subjects in a training program while the other subject may be addressed superficially.

Annex-2

Minimum Calorific Values of Energy Resources and Coefficients for Conversion to TOE

Quantity	Energy Resource	Density	Minimum Calorific Value	Unit	TOE Conversion Coefficient
1 ton	Hard Coal		6.100.000	kCal	0.610
1 ton	Coke		7.200.000	kCal	0.720
1 ton	Patent Fuel		5.000000	kCal	0.500
1 ton	Lignite Heating and Industry		3.000.000	kCal	0.300
1 ton	Lignite-Fired Power Plant		2.000.000	kCal	0.200
1 ton	Elbistan Lignite		1.100.000	kCal	0.110
1 ton	Petro-coke		7.600.000	kCal	0.760
1 ton	Olive Pomace		4.300.000	kCal	0.430
1 ton	Wood Shavings		3.000.000	kCal	0.300
1 ton	Shell		2.250.000	kCal	0.225
1 ton	Graphite		8.000.000	kCal	0.800
1 ton	Coke Powder		6.000.000	kCal	0.600
1 ton	Mine		5.500.000	kCal	0.550
1 ton	Elbistan Lignite		1.100.000	kCal	0.110
1 ton	Asphaltite		4.300.000	kCal	0.430
1 ton	Wood		3.000.000	kCal	0.300
1 ton	Animal and Plant Waste		2.300.000	kCal	0.230
1 ton	Crude Oil		10.500.000	kCal	1.050
1 ton	Fuel Oil No. 4		9.600.000	kCal	0.960
1 ton	Fuel Oil No. 5	0,920 kg/l	10.025.000	kCal	1.003
1 ton	Fuel Oil No. 6	0,940 kg/l	9.860.000	kCal	0.986
1 ton	Gas Oil	0,830 kg/l	10.200.000	kCal	1.020
1 ton	Gasoline	0,735 kg/l	10.400.000	kCal	1.040
1 ton	Paraffin Oil	0,780 kg/l	8.290.000	kCal	0.829
1 ton	Black Liqueur		3.000.000	kCal	0.300
1 ton	Naphtha		10.400.000	kCal	1.040
1000 m^3	Natural Gas	0,670kg/m3	8.250.000	kCal	0.825
1 ton	Coke Gas		8.220.000	kCal	0.820
1000 m^3	Coke Gas	0,490 kg/m3	4.028.000	kCal	0.403
1 ton	Blast Furnace Gas		535.000	kCal	0.054
1000 m^3	Blast Furnace Gas	1,290 kg/m3	690.000	kCal	0.069
1000 m^3	Steelmaking Shop Gas		1,500,000	kCal	0,150
1000 m^3	Refinery Gas		8.783.000	kCal	0.878
1000 m^3	Acetylene		14.230.000	kCal	1.423
1000 m^3	Propane		10.200.000	kCal	1.020
1 ton	LPG		10.900.000	kCal	1.090
1000 m^3	LPG	2,477 kg/m3	27.000.000	kCal	2.700
1000 kWh	Electricity		860.000	kCal	0.086
1000 kWh	Hydraulic		860.000	kCal	0.086
1000 kWh	Geothermal		860.000	kCal	0.860

Annex- 3
ENERGY AUDIT AND EFFICIENCY IMPROVEMENT PROJECT (EIP) PREPARATION PRINCIPLES

1. Purpose of Energy Audit

Energy audit is conducted in order to determine energy saving potentials, energy wastes and greenhouse gas emissions, and to set out the related recovery or preventive measures with their technical and economic dimensions.

2. Scope of Energy Audit

The following audit profiles are addressed on an annual basis under energy audit:

- Input Profile: Types of energy entering the enterprise or building (natural gas, fuel oil, coal, electricity, steam/hot water, etc.), unit energy sizes (energy quantities borne by the unit weight of inputs in kWh terms or their volume), consumption quantity – time graphics.
- Waste Profile: Types (flue gas, hot gas/water, steam, etc.), formation reasons, quantity-time graphics of the recyclable energy wastes revealed by heating/cooling systems, energy cycle systems or production process.
- Loss-Leakage Profile: Energy quantities lost due to heat isolation inadequacies in buildings and equipment, steam/gas/water/fuel leakages in equipment, and non-conformities in electricity systems, and whose loss can be prevented.
- Inefficiency Profile: Energy quantities wasted due to application of energy-inefficient equipment or process and whose loss can be prevented.
- Extravagancy Profile: Energy quantities consumed in excess of needs in the areas of heating, cooling, enlightenment, office needs, etc. due to equipment in stand-by mode or running in vein.
- Emission Profile: Greenhouse gas quantities on the basis of energy types in the input profile.
- Energy Management Profile: The adequacy of energy manager/management unit in the enterprise, applied procedures, awareness level of employees, and energy management perspective of senior managers.

3. Energy Audit Methodology

The following studies shall be conducted in the process of Energy Audit:

- Preliminary Audit: The audit profiles in the enterprise or building will be analyzed using documents, interviews, observations and point-measurements as necessary. Prevention and/or recovery potentials will be determined, and the measures which can be taken for these potentials, the approximate costs and recovery periods will be determined. Recommendations will be developed for the elimination of inadequacies observed in the energy management profile. The activities deemed necessary to be included in the detailed study, and the activity program will be determined. Preliminary audit will be completed in maximum fifteen days together with the preliminary audit report.
- Preliminary Audit Briefing: A one-day preliminary audit briefing will be given to the executives, including the top management, of the enterprise and the employees to be determined by the top managers. This briefing will cover the benefits, costs

and general introduction of energy efficiency; model practices in the world and in Turkey; results of preliminary audit; and measures that may be taken. The useful documentation will be distributed. The questions of participants will be answered. It will be stated that detailed audit is needed and EIP may be prepared according to the results of detailed audit, asking for the decision of top management.

- Detailed Audit: Depending on the results of preliminary audit, measurements and calculations will be made under the enterprise conditions regarding the subjects deemed appropriate for inclusion in the scope of detailed audit. Prevention and/or recovery potentials will be estimated with an error probability of maximum +/- 10%. Using the results of preliminary audit and detailed audit, the applicable options of measures and economic characteristics will be analyzed. In this context, the most appropriate measures will be selected and the information providing guidance for further efficiency increasing projects will be set forth.
- Reporting: The formats of preliminary audit and detailed saudit reports will be specified in a communiqué to be published by the Ministry in the Official Gazette.

4. Efficiency Improvement Project (EIP)

- EIP will be prepared to ensure the implementation of necessary measures for eliminating energy wastes, losses and inefficiencies at industrial enterprises and buildings.
- The EIP will cover the technical information and drawings which are capable of providing guidance for the realization of project; technical specifications and manuals of goods to be purchased under the project; information regarding supply sources; training program and operational procedures that may facilitate the enterprise's ability to make utmost use of the project outputs; maintenance/repair and spare part information; equipment warranty information; project timetable; and project cost items.
- The EIP format shall be determined through a communiqué.

Table 1. Devices for which property or usage rights must be held for the authorization of firms and their characteristics

Name of Device	Purpose of Use and Characteristics	Authorization Certificate Category			
		Heat and Mechanics	Electrical	Building	Industry
Flue Gas Analyzer	For use in the measurement of flue gas components and temperature; ✓ portable, electronic, with automatic calibration feature, ✓ have rechargeable battery, and suitable for supply from battery or city power network, ✓ with a probe of minimum 75 cm length, ✓ ability to measure ambient temperature, ✓ ability to measure the following parameters in the flue gas: oxygen in the range of minimum 0% and maximum 25%, carbon monoxide in the range of minimum 0 ppm and maximum 10000 ppm, and temperature in the range of minimum -40 ^{o}C and maximum +1000 ^{o}C,	X		X	X
Flue Gas Analyzer Probe	For use in places which require a probe longer than 75 cm; ✓ minimum 100 cm long	X			X
Thermal Camera	For use in detecting heat losses; ✓ ability to capture real images and thermal images at the same time, ✓ ability to save thermal images in external memory cards and similar portable memories, ✓ wit reporting feature, USB interface computer software, ✓ replaceable battery	X		X	X
Thermal Conductivity Coefficient (U) Measurement Device	For use in measuring thermal conductivity coefficient; ✓ with special temperature measurement probe able to measure temperature at multiple points on wall surface, ✓ able to measure temperature and humidity on the other side of wall, ✓ able to calculate U value in W/m^{2}K terms,	X		X	

Annex-4

Name of Device	Purpose of Use and Characteristics	Authorization Certificate Category			
		Heat and Mechanics	**Electrical**	**Building**	**Industry**
Conductivity meter	For use in measuring the conductivity and temperature of various waters; ✓ Portable, electronic, and battery supply feature, ✓ Feature of measuring water temperature and ensuring temperature compensation during measurement, ✓ Automatic and manual scale selection feature, ✓ Feature of displaying conductivity at least in (µS/cm) and (TDS ppm) units, ✓ Measurement range between 0 µS/cm and 19,99 mS/cm,	X		X	X
Steam Trap Tester	For use in controlling steam traps of various sizes; ✓ portable, ✓ able to control steam traps of various types,	X			X
Infrared thermometer (Low Temperature)	For measuring the temperatures of hard-to-access areas such as revolving furnace, etc; ✓ temperature measurement range of minimum -30 ^{o}C and maximum +400 ^{o}C, ✓ portable, electronic and battery supply feature, ✓ Light emission coefficient adjustable (ε) between minimum 0,10 and 1,00.	X		X	X
Infrared Thermometer (High Temperature)	For measuring the temperatures of hard-to-access areas such as revolving furnace, etc; ✓ temperature measurement range of minimum +400 ^{o}C and +3000 ^{o}C, ✓ portable, electronic and battery supply feature, ✓ Light emission coefficient adjustable (ε)between minimum 0,10 and 1,00	X			X

Annex-4

Name of Device	Purpose of Use and Characteristics	Authorization Certificate Category			
		Heat and Mechanics	Electrical	Building	Industry
Electronic Thermometer	For use in measuring temperatures by connecting probes of various types, ✓ Portable, electronic and battery supply feature, ✓ Able to measure surface and ambient temperature ✓ with "hold" feature keeping the measured value on the display, in case of measurements in hard-to-access areas,	X	X	X	X
Surface Temperature Measurement Probe	For use in measuring surface temperatures; ✓ able to measure temperature between -60°C and +400°C, ✓ with spring type measurement probe to measure temperature on plain, uneven and inclined surfaces	X	X	X	X
Ambient Temperature Measurement probe	For use in measuring ambient temperatures; ✓ able to measure temperature between -60°C and +400°C	X	X	X	X
Temperature Measurement Probe	For use in measuring temperature in hard-to-access places like interior boilers, large tanks, etc.; ✓ minimum 100 cm long, ✓ able to measure temperature between -60°C and +1000°C	X	X	X	X
Temperature Measurement Probe	For use in measuring temperature by submerging in particulate materials; ✓ rod type ✓ able to measure temperature between -60°C and +400°C	X	X		X
Doppler Type Flow Meter	For externally measuring the quantity of dirty fluids passing from pipelines; ✓ portable and electronic,	X	X		X

Annex-4

Name of Device	Purpose of Use and Characteristics	Authorization Certificate Category			
		Heat and Mechanics	Electrical	Building	Industry
Ultrasonic Flow Meter	For externally measuring the quantity of clean fluids passing from pipelines; ✓ portable and electronic, ✓ automatic start and stop at adjusted hours, ✓ with rechargeable battery and suitable for supply from battery or city power network, ✓ with printer, and able to be connected to printer as needed, ✓ with apparatuses enabling measurement in pipes with diameter between 13 mm and 1200 mm, ✓ able to measure temperature between -40 and +200 ^{o}C	X	X	X	X
Electronic relative Humidity Meter	For use in measuring ambient temperature and relative humidity in various areas; ✓ portable, electronic and battery supply feature, ✓ able to display ambient dry thermometer temperature and relative humidity values at the same time, ✓ able to measure temperature between -20 °C and +70 °C, and relative humidity between 0% and 100%,	X		X	X
Manometer	For use in measuring flow quantities in canals, together with pitote tube; ✓ usable with pitote tube, ✓ portable and battery supply feature, ✓ the range of pressure values adjustable and/or selectable, to ensure sensitive reading,	X	X		X
Pitote Tube	For use in measuring the quantities of flow in canals in which air and low-pressure gases pass; ✓ classical type, L type ✓ minimum 1.5 m long	X	X		X
Curved Manometer	For use in measuring very small pressure values such as furnace inner pressure;	X	X		X

Name of Device	**Purpose of Use and Characteristics**	**Authorization Certificate Category**			
		Heat and Mechanics	**Electrical**	**Building**	**Industry**
Hot-Wire Air Speedometer (Device and Probe)	For use in measuring the quantity of flow in canals from which air and low-pressure gases pass; ✓ Portable, electronic and battery supply feature, ✓ With minimum 1.5 m. long probe, (this feature is not required for buildings.) ✓ Able to measure speed between 0 m/s and 20 m/s; and temperature between -20 °C and +70 °C for buildings, and between -20 °C and +200°C for others	X	X	X	X
Fan Type Air Speedometer	For use in measuring air or gas speed or flow quantity in the suction gates of air fans and exit gates of exhaust canals; ✓ Portable, electronic, and battery supply feature, ✓ With probes (measurement caps) in various diameters, ✓ With feature of measurement in multiple areas, and averaging, ✓ Able to measure speed between 0,25 m/s and 20 m/s,	X	X	X	X

Annex-4

Name of Device	Purpose of Use and Characteristics	Authorization Certificate Category			
		Heat and Mechanics	Electrical	Building	Industry
Electrical Energy Analyzer	For use in measuring electrical parameters in various areas; ✓ portable, electronic and battery supply feature, ✓ able to check its connections when turned on, (measurements ranges of current clamps, reverse connection, etc.) ✓ automatic start and stop feature at adjusted hours, ✓ measurement time range adjustable, ✓ have rechargeable battery, and suitable for supply from battery or city power network, ✓ able to save requested parameters to memory card in specified intervals, and to print out the recordings, ✓ with current and voltage transformers for medium voltage measurements ✓ with current clamps in sizes that can contain large busbars or thick cables ✓ in mono-phase and tri-phase systems; able to measure voltage (V), ampere (A), power factor (Cosφ), power (kw, kVA, kVAr), energy consumption (kWh, kVAh, kVArh), frequency (Hz) and harmonics, ✓ with software enabling that all parameters can be displayed and analyzed via computer.	X	X	X	X
Clamp Amperemeter	For use in measuring electrical parameters in various areas; ✓ portable, electronic and battery supply feature, ✓ with a clamp that can contain large busbars and thick cables, ✓ able to measure voltage (V), current (A) and power (kw), ✓ with True RMS measurement feature,	X	X	X	X

Annex-4

Name of Device	Purpose of Use and Characteristics	Authorization Certificate Category			
		Heat and Mechanics	**Electrical**	**Building**	**Industry**
Tachometer	For use in measuring the revolution numbers of revolving equipment and progress speeds of travelator, fabric, etc; ✓ Portable, electronic, and battery supply feature, ✓ Separate or combined types of contact and no-contact (optical) ✓ With equipment capable of measuring revolution number, revolution speed, progress rate, and similar parameters	X	X		X
Luxmeter	For measuring light levels in various areas; ✓ Portable, electronic, battery supply feature, ✓ With automatic or manual scale selection feature, ✓ Measurement range of minimum 0 lux and 100000 lux		X	X	X
Sound Level Meter	For use in measuring sound and noise levels in various areas; ✓ Portable, electronic, battery supply feature, ✓ With automatic or manual scale selection feature,	X	X		X
Data Recorder	For use in saving long-duration measurements; ✓ Able to save at least temperature, humidity and light flow measurement, ✓ Able to transfer the saved data to computer,	X	X	X	X

Annex-5

ENLIGHTENING CRITERIA

The enlightening categories and criteria required to be satisfied for safety and comfort for various types of roads are presented in the following tables.

Table 1. Enlightening categories for different types of roads

Description of road	Enlightening category
Divided roads, Express roads, motorways (entry and exits, connection roads, junctions, toll collection areas) Traffic density and road complexity level; High…… Medium……. Low……..	 M1 M2 M3
State and provincial highways (one-way or two-ways; junctions and connection roads and city passages and beltways included) Distinction according to traffic control and type of users; Weak…… Good…….	 M1 M2
In-city main routes (avenues and streets), ring roads, distribution roads Distinction according to traffic control and type of users; Weak…… Good…….	 M2 M3
In-city roads (main roads and connection roads for entry to and exit from settlement areas) Distinction according to traffic control and type of users; Weak…… Good…….	 M4 M5

Distinction; Allocated road where the lanes to be used by each type of traffic are precisely separated; e.g. bus roads, bicycle roads, etc.).
Connection road; The highway section connecting highways to each other near a junction, which is outside the junction area and allocated to one-way traffic.
Divided Road (One-Way Road); The road where vehicle traffic is only one-way.
Geometrical structure; The design shape of road according to its category (road width, number of lanes, horizontal and vertical inclination, design speed of road, etc.).
Two-way Road; The road where the vehicle traffic is two-way.
Complexity; involves the geometrical structure of road, traffic movement and visual environment. Factors to be taken into consideration are number of lanes, inclination of road, traffic lights and signs.
Junction; The common area formed by the intersection and connection of two or more roads.
Users; Motorized vehicles (trucks, buses, cars, etc.), non-motorized vehicles, pedestrians and animals.
Motorways; Access-controlled road allocated specifically for transit traffic, with passage and

exit forbidden except for certain points and conditions, where pedestrians, animals and non-motorized vehicles are not allowed in, but only available for use by permitted motorized vehicles, with traffic subject to special control.

Traffic safety; The Highway Traffic Law and applicable legislation issued under that law.

Traffic control; Horizontal and vertical signs and signalization, and traffic legislation. In the absence of above, traffic control is described as weak.

Traffic density; Movements of pedestrians, animals and vehicles on roads.

Annex-5

Table 2. Road enlightening criteria to be applied for various enlightening categories

Enlightening category	L (cd/m²)	U_o	U_l	TI (%) ≤
M1	2.0	0.4	0.7	10
M2	1.5	0.4	0.7	10
M3	1.0	0.4	0.5	10
M4	0.75	0.4	-	15
M5	0.5	0.4	-	15

U_o : Average uniformity: The ratio of the minimum flare of the partial areas to the average flare of the road, according to an observer located on the right o the road at a distance of ¼ of road width ($U_o = L_{min} / L_{ort}$).

U_l : Longitudinal uniformity: The ratio of minimum flare in partial areas along the mid line of each road lane to the maximum flare, according to an observer point located on the mid line of each lane ($U_l = L_{min} / L_{max}$).

TI : Relative Threshold Increase: The measure of decrease in visibility, caused by physiological glare. It is expressed as the ratio of difference between glare threshold ΔL_K under glare conditions and the glare threshold ΔL_e in the absence of glare, to ΔL_e ($TI = (\Delta L_K - \Delta L_e) / \Delta L_e$).

Table 3. Enlightening categories for various road types in areas with pedestrian traffic

Description of road	**Enlightening category**
Crowded pedestrian roads with high socio-economic and cultural importance	P1
High-traffic pedestrian and bicycle roads	P2
Medium-traffic pedestrian and bicycle roads	P3
Low-traffic pedestrian and bicycle roads	P4
Low-traffic pedestrian and bicycle roads in areas where natural environment, historical and cultural structure must be protected	P5
Very low-traffic pedestrian and bicycle roads in areas where natural environment, historical and cultural structure must be protected	P6

Table 4. Light level values recommended for pedestrian roads

Enlightening category	**Average light level (lux)**
P1	20
P2	10
P3	7.5
P4	5
P5	3
P6	1.5

Annex-6

Table 1: Minimum efficiency values to be required for electrical motors for which energy efficiency labels will be issued

Output power (KW)	1,1	1,5	2,2	3,0	4,0	5,5	7,5	11,0	15,0	18,5	22,0	30,0	37,0	45,0	55,0	75,0	90,0	≥ 90,0
Efficiency (%)	83,8	85,0	86,4	87,4	88,3	89,2	90,1	91,0	91,8	92,2	92,6	93,2	93,6	93,9	94,2	94,7	95,0	95,0