ENERGY EFFICIENY OF BUILDINGS IN TURKEY

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PREFACE

Although the countries how much importance they give, the societies that do not retrench, their ends will be bankrupt. The people should spend according to their revenues and they should avoid from overspending. Now, even in the countries that their export volume is in the level of trillion dollars , because of excess of internal consumption, their export does not meet their import, and, the crises have been lived.

The mortgage crisis is a starting of the crisis which the world of these days has not emerged, yet. In this mortgage crisis, the public of US, by becoming indepted more than their income, has bought goods and services that they will not pay ahead, thus, it has been laid the foundation of financial crisis.

Also in our country, unfortunately, using the sources efficient and productive, making savings; is much far from being sufficient, as both societal perception and application. In spite of all rightmined works of the goverment, for individuals by aspiring to a higher income group and making their expenditure according to that, without retrencing has caused to high borrowing, have dragged the individuals and our country to bottleneck.

I have a hunch that, when more and more awakening, generations will grow who know how to use the energy effective and efficient, without damaging the nature.

Meanwhile, I owe Dear Professor Doctor Hasan Hüseyin BALIK a debt of gratitude who help me in writing this book, and who denies his supporting to me.

I dedicate this book to my mother Ayşe Nurcan KÜNBÜL. So glad I have you, mother.

ABSTRACT

In this book, for the person and institutions, using energy efficiency in efficient and productive way have been aimed. In the most general case, the definition of the energy has been made and its types have been examined. Then, it has been handled the case of energy efficiency in the world and in our country, and, it has been mentioned about energy technologies.

Afterwards, the certification process of energy efficiency has been explained and, which institutions have certification authority, has been determined. Laws and regulations that are associated with energy efficiency, have been indicated , and, the interpreting of the laws has been made.

CHAPTER 1

INTRODUCTION

Energy, is the given name for capability (ability) to do work. It can be divided into two as potential and kinetic. Total energy in the nature, does not change in no case (circumstances). Energy is neither created from nothing nor removed from existed one. It can only transform from a kind of energy to the other one.

Here, during the transformation, it can be formed losses in the ways of heat or light. The operation of decreasing of these unwanted losses is called energy productivity. In fact, sinthe the existence of the universe, in this realized event, the losses were not considered important. The sources were plentiful, so, they were conpensated (met) the demand. When the prices of raw material are increased , the humans are noticed that these losses are important. In this way, the energy productivity has become transpired.

This crisis which has come down on top of the world, has compelled the humans to develop technologies that will make saving in production and consumption of energy. In production stage, in the power stations, formerly, the used water vapour was given from chimneys into atmosphere , but now, it is resent into boilers. Furthermore, technologies that will ensure that the raw materials will burn more effective, have been developed. In case that on the consumption side, at first, the materials (such as bulb, white objects, etc.) that have directly spent electricity, are provided to be more economical.

In Turkey, energy productivity has a history of 20 years, and the steps are taken too late. We have saved energy as much as 7 Keban barrages (dams) made, by replacing the bulbs by fluorescent lamps. Using A+ products in white objects (goods) are encouraged, and, it has been passing to the encouragement and taxation system, according to the productivity in the buildings.

My objective in writing this book, is to create a consciousness related to energy productivity in the head of Turkish society, and to encourage them to save (economize). As a country which has made energy imports, it is necessary for us to save during

production and consumption. I intended to awake the idea of the renewable resources in the head of people (public) that will be the future of the world and our country.

In the second Chapter, after making the definition of the energy, I mentioned that the energy can not be existed from nothing, and can not be removed from existence, the energy is conservation, that is, it is constant. While a kind of energy is transformed to another energy, the losses such as heat and light, are formed. Here, this event that we called as energy productivity, aims to minimize these losses. Also, in this chapter, I gave information about energy resourses, and, I explained the usage of energy in the world and in Turkey. Lastly, I made a general introduction about energy productivity.

In the third Chapter, after making an introduction to energy productivity, I explained that the productivity and saving how much importance have and become essential. After explaining the energy technologies, I discussed that how the productive and envirormentalist buildings can be made.

In the fourth Chapter, I explained the energy productivity in Turkey, the institutions which give energy identity certificate , and who can have and how they have this certificate. I discussed the existing law and regulations, and I interpreted them. I mentioned the 2023 vision of Turkish Republic power (goverment).

CHAPTER 2

ENERGY

Energy, working ability of a system or object, means generated power. Albert Einstein shown that energy is equivalent to mass with his well-known formula E=mc square [1]. Energy is conserved magnitude and it also may be transformed.This is and example of the most ordinary: the potential energy of water converted into electricity in hydroelectric power plants. This conversion process can not be exactly as in practice, occurs losses. The technical term is considered as the energy lost as heat spread around[1].

Forms of energy can be examined in two main titles. These are kinetic energy and potential energy [1].

Potential Energy: The energy of an object due to its location that is connected to other objects.

Kinetic Energy: Due to the movement of an object is called by kinetic energy [1].

There is a fixed value of the energy preserved in a closed system. Therefore, there is no change in energy [1].

My fundamental objective to write this section, is to be able to change viewpoints on our world, environment and energy of people, to be able to have a little more information about energy, ant to be able to make more savings by using the source effectively . Therefore, I will try to explain the usage of energy and energy efficiency, renewable and unrenewable energy kinds in the World and in Turkey.

2.1 Energy Sources

Energy sources, are the sources which provide generating of the energy in any way. The energy sources on the world, can be separated into two as conventional (classic) sources and alternative sources.

2.1.1 Renewable Sources

Renewable energy sources in an ongoing flow of energy derived from natural process of exiting energy. These resources are sunlight wind, hydropower, biological processes and geothermal.

In the most common renewable energy source is defined bye amount of energy equal to the energy source or rate of resource depletion renew itself more quickly. The most common renewable energy is which comes from the sun. Some form storage the solar energy and wind power. Renewable energy facilities, animals and humans can not be consumed by the persistent.

While theoretically edible fossil fuels, be exploited as a result of the use of facing the danger of extinction in the near future.

Renewable energy sources can be use directly or converted into energy in another form. Examples of direct use, equipment which works with solar energy, geothermal heating and water or wind mills.Examples of indirect usage wind turbine used to generate electricity or photovoltaic cells.

2.1.1.1 Wind

Wind power is the conversion of wind energy into a useful form of energy, such as using wind turbines to make electrical power, wind pumps for water pumping or drainage or sails to propel ships.

By the end of 2009 the worldwide capacity of wind power generators was 282,5 GW (Gigawatt). This means that twenty percent of the electricity used in the world. Wind power is being used commercially in 86 countries as of may 2012 [2].

Large-Scale wind forms connected to the electrical transmission system. Allocated to smaller facilities where the system uses the electricity produced. Some companies buy excess power produced in small plants. Wind energy is an alternative to fossil fuels as a power source because, abundant, renewable, receptive audience large, clean and during the operation does not causes the greenhouse effect [3].

Due to the effects of pollution and the environment however the image is frowned to build wind forms. Due to the fact that wind power can be used only when the wind happened that wind is irregular. Other resources are used according to the needs such as hydraulic management techniques. When provided the total demand fewer resources some of problems that come with it but the cost is lower.

2.1.1.2 Hydroelectric

Electrical energy produced by the power of water is called hydroelectric power. Hydro power plants are usually installed next to dams. So that the energy of fast-flowing water runs water turbines and that turbines runs that electricity generators.

Hydro electric power is using the power of the water energy. Six percent of the world's electricity is produced by hydroelectric power plants. Electricity generation is based on wing the potential energy of the water in hydroelectric power plants [4].

Water stored in dams, shall be liable to the turbine by injecting it into high. However the turbine starts rotating. This potential energy is transformed into mechanical energy in the turbine water. Voltage produced by the generator shaft by turning the generator with help of mechanical energy.

2.1.1.3 Solar

It is a clean and cheap energy source. Its most advantageous features are abundant and unlimited. Previously it is benefited from heating, nowadays; with the technological achievements as solar panels and photovoltaic batteries can be gotten electric energy from the solar energy by very cheap costs [5].

2.1.1.4 Agricultural Biomass

In the meaning of industrial biomass is related with to obtain fuel through biological materials which living or living in the near future or using them other industrial purposes. Generally it refers to plants or fiber that breeded for realizing biofuel and

vegetable-animal products which used to obtain heat and chemical. Generally they measured with their dry weights [6].

Sugarcane, sugar beet, corn, barley, linseed, sunflower, soybean, etc can breeded for producing biomass. Producing biomass became growing industry because of reducing oil dependence and fighting global warming.

Biomass is stored solar energy like oil and coal. Vegetables hold solar energy by the way of photosynthesis.

Using biofuel as fuel does not cause to a net carbon dioxide increase in the world atmosphere because it consist of carbon which occurs disintegration carbon dioxide in the atmosphere by vegetables. Therefore many people have the intention of using biofuel instead fossil fuel to prevent carbon dioxide increase in the atmosphere [6].

2.1.1.5 Geothermal

Geothermal is water, steam, and gas which including chemicals is created by the heat that accumulated in the earth various depths. Geothermal energy includes to benefit these geothermal resources and or the energy that they produce directly or indirectly.

Geothermal energy is new, renewable, sustainable, inexhaustible, cheap, trustable, eco-friendly, and national kind of energy.Renewable, sustainable, and inexhaustible energy source; it constitutes an equity for the countries like Turkiye are lucky in terms of geothermal energy; it is clean and eco-friendly, because of not using combustion technology, it produces near zero emission; it constitutes ideal conditions for greenhouse heating, house heating, industrial heating, agricultural heating; it is independent from meteorological conditions as wind, rain, sun, and etc.; its feature of ready for use; it is much cheaper than fossil energy or other energy resources; its exploration wells can be converted to production facilities or sometimes to reinjection areas; it is safe because of not carrying the risk of fire, explosion, and poisoning; it provides productivity more than %95; it needs much less facility areas compared to other types of energy production; because of its local character it is not affected from international conjuncture, international crisis or wars; it does not include problems as

transportation of coal, fuel-oil, and wood to the settlements so it provides ease of use to the people [7].

It is not affected by short term atmosphere conditions. Geothermal reserves which are created by the result of rain, snow, sea, and magma waters feeding porous, underground rocks, and fractured rock masses protect their renewable and sustainable features as long as groundwater and reinjection conditions carry on.

2.1.1.6 Tidal

Tide energy is renewable energy source that utilized from tide event in the sea. For utilizing this energy is used special turbines which produced tide event. The turbines can move two sides; as long as sea rise and fall it causes level difference in the sea. The turbines use these movements (level difference) for producing electricity. It is eco-friendly technology but not easy to use because of that it is not widespread technology.

2.1.2 Fossil Fuels

They are natural energy sources as coal, oil, natural gas that include hydrocarbon. They occur by the result of uncoiled dead organisms in the anoxic environment during million years. Fossil fuels find widespread area of usage in the industrial area.

In producing electricity generally the energy which occurs the result of burning fossil fuel is conveyed the turbines as power. In Old type of generators generally steam which occurs by the result of burning fossil fuels was used to turn the turbines, but in the new type of energy generators special gasses are used to turn turbines directly.

With the technological achievements in 20.th and 21.th centuries the needs of the energy thanks to fossil fuel are dramatically increased. Specially petrol becomes focus point in regional or worldwide conflicts. To overcome increasing energy demands, solution studies must focus on renewable energy sources [8].

2.1.3 Nuclear

Nuclear energy is an energy kind that obtained from atomic nucleus. It is related with Albert Einstein's $E=mc^2$ formula which expressed the transformation of mass to energy [1]. Nuclear energy was invented by French physicist Henri Becquerel when uranium substance placed with photo plaques, x ray beam recognized in the dark by accidently. Nuclear central's working principle is the energy that occurs when uranium gets fusion reaction, it causes so high temperature, with this high temperature steam can be heated and directed to turbines which are connected to electric generators. When high energized steam hit the turbines' vanes, it turns the turbines' shaft and causes to produce electricity. Consisting electricity is sent to consumers by conducting wires. Waste steam and pressure is sent to the thickener for reusing it. When it becomes water again, it is sent to heating unit again for becoming high temperatured steam. This loop carries on continuously [9].

Nuclear energy consists one of two reactions:

1.Fusion: Merge reaction of atomic parts.

2.Fission: Disintegration-Fragmentation of atomic nucleus constrainedly.

2.1.3.1 Fission

Fision is the name of the event in which the nucleus of atom in heavy radioactive substances splits into smaller parts as a result of being bombarded by neutrons. Atom bomb technology activities can be given as examples of fision.

As the result of entering into the fision reaction uranium decomposites and there releases large amounts of energy. To make this decompositon, the neutrons hit to the core of the uranium. This crash causes the fision reaction, which produces large amounts of energy. As the result of first occuring precipitating fision reaction, neutrons come out. These neutrons crash to the other uranium cores until making fision reaction in every atom core occure. The energy released can cause deaths if not controlled. There are units to keep the other neutrons and prevent them from entering into the reaction. Thus, a controlled fision chain can be possible [9].

2.1.3.2 Fusion

The nuclear reactions in which light radioactive atoms join each other and form heavier atoms are named as fusion. In fusion reactions more energy are produced than the energy produced in fision reactions. Solar flares are examples of fusion [9].

2.2 Using Energy

Since 1950, the world's population has been increased twice while the demand for energy has increased 6 times more. Today the world's population is estimated as 6.4 billion and according to United Nations it will become 7.2 billion in 2015 and 8.9 billion in 2050. Everyday more and more people will use energy. The developing countries like China will consume more and more energy [10].

In 2004, the world's primary energy consumption was 10.2 billion tons petrol energy equivalence. 37% of this energy comes from petrol, 27% of it from coal, 24% of it from natural gas, 6% of it from hydropower and 6% of it from nuclear energy. In 2003, these amounts were 39%, 24%, 24%, 6%, 6%. The amount of renewable energy in total energy consumption is estimated 1-2%. More than 60%of world's total energy need is supplied from petrol and natural gas, while fossil resources of petrol, natural gas and coal supply 85% of it. If the energy consumption tendency in last 30 years is analyzed, natural gas will be seen as the energy resource, the consumption of which has increased fastest. It is thought that this tendency will continue and amount of natural gas in total energy consumption will increase from 24% to 26% in the times between 2025 and 2030. In 2004,23% of the primary energy resources consumed by USA, 29 % by Turkey, Russia, Europe and Eurasia, 13.6% by China,6.5 % by Russia alone and 5 % by Japan. World's primary energy consumption has increased 4.3 % in 2004.This increase happened as 8.9 % in Asia-Pacific region where China locates. Coal has the highest increase with 6.3% ratio because of high petrol prices. Petrol consumption has increased 3.4 %, natural gas 3.3%, hydroelectric 5% and nuclear energy 4.4%. According to BP World Energy Statistics Report, Turkey has consumed 1% of the world's energy [10].

In the report which has been produced with the help of global data about all subfields of energy sector by BP, Turkey which has increased its energy consumption 9.2 % when

compared with one year before has been stated that it consumed 1 % of the world's energy [10].

By reaching 32 million tons with 5.8% increase in 2010, Turkey's role in world's consumption in this area is 0.8 %.Turkey which consumed 45.7 billion cubic meters in 2011 consumed 1.4 % of the world's consumption [10].

Turkey, which has 0,4 % of the world's coal production with 16.6 million tons of petrol equivalence last year, has increased its production 5,1% according to the numbers of 2010.In the same year Turkey consumed 32,4 million tons petrol equivalence coal with 5,1% increase in its coal consumption [10].

2.3 Energy Efficiency

Energy efficiency is the minimization of the amount of energy consumed without reducing the production amount and the quality and preventing economic development and social well-being.

Energy efficiency in a wider manner; gas, steam, heat, air, and avoiding the energy losses in electricity, evaluation of various waste recycling or without reducing the production of advanced technology to reduce energy demand, more efficient energy sources, advanced industrial processes, and the whole of increasing energy efficiency such as recoveries [11].

The most important factor in energy efficiency is energy conservation. Generally, the use of less energy, which is perceived as energy saving by quenching one of the two light bulbs, the waste energy assessment and amount of energy consumed by the inhibition of the current energy losses, will minimize the energy without compromising the quality and performance. Energy conservation is carried out in two ways. Firstly, using direct energy saving homes, cars and other latest technologies; changing concrete action in habits and daily behavior to use energy more efficiently Secondly, switching to indirect use of energy-saving will provide the goods available to last longer which will reduce the production of new goods, organizing settlements to minimize the energy

consumption, using technologies that require less energy, and switching to activities in the economy that does not consume direct material [11].

Energy, affects every aspect of our lives: provides light, heat, transport and fuel to other vehicles. However, we are at a time today where we have to think about the issues of the security of the energy supply and energy derived from the fossil fuels, and the impact it has on the environment [11].

If all of us do not change our consumption of energy and the shape of the production than we need to understand that we will be faced with irreversible environmental crisis, this means; in the future we will need to use renewable energy sources more and focus on energy efficiency more [11].

However, this is the beginning and we have a lot more work to do in order to spread the message about using energy wisely. Both the consumers and people who have a say in the social field, need to be convinced about the use and production of sustainable energy [11].

In order to reach our goals, the individual, society, industry representatives and public authority's needs to should join in for this effort. Even the smallest contribution to be made towards changing the scope of the energy will not be insignificant [11]

CHAPTER 3

ENERGY EFFICIENCY

3.1 Introduction

Our country which is under rapid development in industrial activities, orientation to new technologies, rise in the standard of living and increasing population, leading us to higher energy consumption every year. As of 2003, primary energy consumption reached 83.3 million tons of oil equivalents and 70% of the total power supply was met through imports. Due to the fast increase in demand, only 22% of the total energy supply in the year 2020 is expected to be met by domestic production. With limited resources in terms of energy sources in our country, the main goal is to provide sufficient, reliable and economical energy [12].

Efficient use of energy is one of the most important tools used in the realization of this goal.The concept of Energy Density is the relationship between the most reliable and accurate parameter in the definition of development, and the economic value of the energy unit produced. Tool that represent the amount of primary energy consumed all over the world and used commonly to follow and compare per gross domestic product output. Development uses less energy for more economic value.

The most basic indicator of ensuring efficient use of energy is to reduce the energy intensity. In our country, the average energy consumption per capita between the OECD countries is approximately 1/5's rate; however the energy density is twice the OECD average. Despite the studies conducted to date, energy density did not enter a downward trend. According to data from the International Energy Agency, the energy density in developed countries is between 0:09 to 0:19, and in our country its 0:38 without showing a decreasing trend demonstrates that this issue needs to be addressed seriously. Just with this number, it shows how much can be done to increase energy efficiency in Turkey [12].

In terms of the obligations of our country in the process of EU integration, this issue important. The Accession Partnership Document prepared in 2003 took place between

the short-term priorities for the harmonization of legislation on energy efficiency and development of applications on energy saving [12].

It has been a legal obligation to ensure efficient use of energy, implementation of the effective energy efficiency program, ease the burden of energy costs on the economy, and fulfill the international obligations with the creation of awareness on energy efficiency. In this context, the Energy Efficiency Law No. 5627, published in the Official Newspaper number 26510 on the 02 May 2007 and entered into force. With the enactment of the regulations observed, the significant changes made are as follows:

- The maximum amount of annual energy consumption of buildings (kWh/m2) will be determined.

- Building systems to be audited on a regular basis.

- Standards of thermal insulation in buildings will change according to the law.

- Each building will have an energy passport.

- Use of monitoring methods and systems in buildings.

Energy managers fulfilling activities regarding the energy management in industrial establishments and buildings shall be available within the scope of the law [12].

It is known that there is potential for energy saving around 20-30% in our country (Industrial $\geq$ 20%, Building and Service $\geq$ 30%, Transportation $\geq$ 20%). natural gas power plant investment of 6.5 billion TL can be prevented with 15% of electricity savings potential. Natural gas worth 3.0 billion USD per year may not be imported [12].

Oil and natural gas worth 1.4 billion USD per year will not be imported if 35% of the heating and cooling of buildings and businesses and 25% of transportation are saved [12].

Target determined by Energy Efficiency Act and Ministry of Energy and Natural Resources reduces energy intensity of Turkey by 15% by the year 2020. The objective also pave the way for more production of energy, energy investment needs and reduce

dependence on imports, as well as an important contribution to the protection of the environment shall be clean [12].

3.3Energy Technology

The energy technologies, nowadays, have been continuing to develop with dizzier speed.I will try to explain some of them as follows.

3.2.1 “Green” White Goods and Lamps

The energy efficiency of refrigerators and freezers have increased by about 75% in the past 30 years due to better insulation and high-efficiency compressors [13].

Efficient refrigerators in the U.S. have eliminated the need for 30,000 MW new power plants since 1973.Transition to electronic lighting ballasts in the workplace and institutional buildings [14].

Magnetic ballast fluorescent tube lambs in institutional buildings such as business place and government offices cause light flicker several times and even the sound that causes headache and efficiency is low. Tube fluorescent lamps with magnetic ballads being replaced with electronic ballads will save up to 30% of energy savings. The already low cost electronic ballads will pay back with the energy savings, and destroy the lights flicker and buzz. Also, by inserting reflectors in the fluorescent lamp slots, it is possible to direct the light going upwards to go down and which will make the eye-level enlightment more effective [14].

Replacing incandescent lamps with energy saving compact fluorescent bulbs:

Energy saving bulbs using the same amount of lighting as the incandescent bulbs consume between one-third and one-fifth electricity, therefore saving up to %80. Energy saving lamps cost much more than incandescent bulbs, but lives in average 10 times longer. An 18 W energy saving bulb worth 7 TL, saves energy up to 70 TL in 2012. Local governments, which are in direct contact with the public, could convince them to change the 5 most used incandescent bulbs in their household with energy saving bulbs. They can use creative methods to meet the cost for this procedure [14].

Installing motion sensor lights in the stairwell, hallway and in the hall:

Substantial savings can be achieved if lamps are only switched on during use. This can be done by installing motion sensor lights. The sensors will save energy by switching the lights on when there are movements than switching it back off when there is not. For example, these sensors could be installed in hallways at houses. In buildings, it could be installed in the lighting for the stairwells. Motion sensor lights are safer and more energy efficient compared to the old systems. The bulbs in halls can only turn on when there are people entering and exiting the building, which will save energy and be safer.

3.2.2 Energy Efficiency in Motors

Motors consume approximately half of the total electricity produced in Turkey and 2/3 of the electricity used in industry. A typical motor purchase price is 2% less than the total cost of the engine. Energy costs can be up to 98% of the total cost. In other words, a typical motor charges more than 50 times the cost of acquisition as the cost of energy consumed during its working life of 20 years. An average motor consumes energy equivalent to the cost of purchasing in 2 months.However, most of the factory managers are not aware of this [15].

3.2.3 Variable Speed Drives

In cases where the load is is variable as in application of fans, pumps, compressors and conveyors, it is possible to reduce electricity consumption by up to 50% by fitting variable speed drives (DHS) to the motors. A 25% energy saving in pump and fan systems in Turkey can correspond to 9 billion kWh of electricity and 1.4 billion TL cost saving per year. Municipalities responsible for water pumping stations in the city, farmers using submersible pumps for irrigation and sites that supply water from underground can benefit from the advantages provided by DHS. The cost of the DHS system can be several times the cost of the engine mounted. However, the DHS, has paid their installation costs by their energy savings in a short time by halving their energy consumption many times [15].

-150 ˚ C and 50 bar LNG Turbine 0:28 m^3 / h at 50 bar and 10 bar pressure drop LNG -150 ˚ C by changing the valve by a turbine:

-900 kW Power Generation

-$800,000/year saving

-Turbine price: $1 million

-Reimbursement: ~ 1 year

3.2.4 Thermal Insulation in Buildings

Thermal insulation in buildings is as important as the foundation of the building. How a house without a solid foundation is dangerous to us, it's the same danger with a house without insulation. Illnesses such as getting a cold will have damage on your budget. A house without insulation will use more natural gas and will cost more. However, if you just spend once, and get insulation, you will be able to see the advantages very soon. Here are a few clues about thermal insulation:

Even though it is not used much in Turkey, glass thickness is very important in buildings. Windows that are faced south must be thin; windows that are faced north must be thick. If all of the windows are thick, then we will not be able to take advantage of the sunlight. If all of the windows are thin, then we will not be able to take advantage of the coldness from the north. This is why, windows and their thickness are very important. It is vital to do these calculations before getting the windows put in. Do not have the same windows throughout the whole house and waste your money [16].

Speaking of windows, obviously use double-glazing for heat and sound insulation.

Replace your window bands every 2 years. Do not use cheap paste or window bands. It will be better not to use cheap thin window bands. Give importance to quality [16].

Subscribe to interior insulation pre-construction. Use special alloy foam.

Get to know the geography of your location for a better rooftop. If it is a windy area, do not get roof tiles. Use layover-roofing materials. If possible, use light colored material.

As you know, light colors attract and soak up the sunshine. The best sellers are dark colors, as it looks better; however, this is a mistake for the insulation.

Use carpets in the house. Carpets keep the temperature.

Do not just heat up one room, if the 4 walls are not heated, than the gas used goes to waste.

Do your heat programming with your upstairs and downstairs neighbors. If you heat your home, but your downstairs neighbor does not, then you will receive coldness from the floors. Do not use the heating at the same time, your opening and closing times should be spaced out in half an hour. If everyone's neighbors showed consideration, then they would be very helpful to thermal insulation [16].

CHAPTER 4

ENERGY EFFICIENCY IN TURKEY

4.1 Certification

Energy manager is defined as the person responsible to perform activities related to energy management in industrial enterprises and buildings and have education - research - project certificate.

4.2 Certification Authority

Energy efficiency is one of the important work carried out by our Chamber within the framework of electrical engineering professional discipline [17].

Better insulation of buildings, evaluation of energy performance of buildings, high-efficiency boilers and heating installation, production and use of cooling equipment, outdoor hot and cold surfaces, insulation and waste heat recovery, cogeneration techniques, use of facilities, the establishment of district heating and energy-efficient and environmentally compatible vehicles are some of the issues which are important in terms of energy efficiency. Our Chamber conducts training and certification activities [17].

Special emphasis was put on energy management training held by our chamber and our application after a period of intensive preparation was approved by the decisions made in the Ministry of Energy and Natural Resources Energy Efficiency Coordination Board (EVKK) meeting. Thus, our Chamber has been authorized on December 21, 2010 with "Class B Certificate of Authorization" to organize energy manager trainings [17].

4.3 Energy Performance Certificate

Energy Performance Certificate, is a document that shows buildings' energy consumption and carbon oscillation class. For all the buildings (existed buildings) that had taken construction permit before 1 January 2011, energy identity documents are

given by energy efficiency consulting companies. All of these buildings have to take their energy identity documents until the end of the year 2017. In case the buildings which have taken construction permit (new building) after the date 1 January 2011, had to be taken their energy identy documents in order to take construction usage permit document (settle) [18].

The most important topic that it must be paid attention, while energy identity document is taken, is the choice of the institution that will design the document. For the existed buildings, the institution that will design energy identity document, must be energy efficiency consultancy company (EVD) which is authorized by the head of department of Energy Ministry newable energy. In case of new buildings, Energy Identity Document Experts who are on duty as authorised project designer as EKB Expert and have trained by EVD companies, can design energy identity document (EKB). While you are taken your energy identity , do not forget to query, for existed buildings, Energy Efficiency Consultancy Company Authority; for new buildings, EKB Expert document [18].

When the situation of being differences between the values on Energy Identity document, and, the building that has owned the document, has been determined during the audits (controls) by the ministry; bringing the building in a suitable case at the leasest, within one year, is a legal obligation [18].

4.4 When Should I Take The Energy Identity Document?

In new buildings, in order to be taken permit (construction usage), energy identity document is an imperativeness. During the process from the date of construction certificate of approval to construction completed date, energy identity document must be provided [18].

For the new building, it has been given duration until the year 2017. Furthermore, it is necessary to representation the energy identity document in the operations of purchase and sale, and, renting. Building managers, who have exterior front coating made or who have it considered , can see the enhancement in the energy consumption classes. Moreover, it will be provided to have less tax taken from the constructions having

energy consumption is low, through that legal reforms (steps) will be made. In the sequel of this regulation, energy identiy document will be required from real state owners who want to make use of tax advantages. When all of these are considered, energy identity document must be provided without wasting time for the existed buildings [18].

4.5 The Interpretation of Law

The aim of this law is to increase the efficiency of the energy sources and energy for using energy effectively, preventing waste, easing the load of enery costs on economy. This law has included procedures and principles that will implemented oriented to making use of newable energy sources, improving energy consciousness throughout society, supporting and increasing energy efficiency in transport, distribution networks; and in the production , transmission, distribution and consumption stages, in the facilities of electrial energy, industrial managements and in buildings.

Six years have passed over the Energy Performance Law that entered into force , after publised in the official gazette on the date 2 May 2007. It gains importance for the sake of being assessable concrete outputs, answering the questions for what has done towards the aim and, how this process was fictionalize, how far distance was taken that are associated with energy density, to what stage is come at the generation and consumption of energy in our country, towards to energy that was used as productive and efficient. In Turkey, the concept of energy performance , and the studies of creating the legislation in this framework, had started in the years of 1190s, and, publishing the law had materialized in the year 2007. But these studies had done gropely , far from being scientific, the most important one, without internalization the topic , and without reflecting the required importance, so that, during the stage of implementation, it has been felt that the tens of new regulations, manifestos, the cancelling of regulations and notifications are needed to be done. Moreover, this necessity has been continuing, incessantly, a new regulation , a new bulletin is being published, in this field. This situation is an indicator that in which seriousness, this topic is tackled.

When the "Energy Performance Strategy Document (Certificate)" which had published in Official Gazette on the date 25 February 2012, has examined, a set of plans, applications, objectives had ordered under 7 main titles and lots of subtitles; the things that will be done and, results of 2023 that will be reached , had described. But determination at the beginning of the document is very impressive:

"In order to be able to create one unit of Gross Domestic Product (GSYİH), primary energy density of Turkey that expresses the amount of consumed energy, has decreased at the ratio of 0.24% , according to the value in the year 1998 , in the year 2008, with the prices of ABD dollar in the year 2000, according to of GSYİH series of the year 1998; this trend of decreasing has much increased in recent years by the effect of radical transformation movement that has encountered in the field of energy performance after 2007, all of these have been drawing the attention. In other respects, at the our country's electrical energy density, it has been seen that there is an increment of 1.83% on the yearly base, in the period 1998-2008, with the prices of ABD dolar in the year 2000, according to GSYİH series of the year 1998. This situation, has set forth that it is necessary to be given importance to the studies towards to decreasing the demand of electrical energy , in developing the cautions that are associated with energy performance, and, in a sense, the large part of increasing in the electrical energy consumption has originated from the non-production expenditures.

In the Energy density has not become any changes in ten years between 1998-2008, but, it has been said that an expectation of positive decreasing of 20% in 12 years between 2011-2023. Even this target, has been showing that this document (certificate) was how much far from the realty, and has shown that it has not gone beyond becuse of not knowing country's reality.

While the ratio of loss-leakage, in average, was about 17-18 in the energy transmission and distribution lines, there has not found a concrete target and action plan oriented to to be decreased at least to the developing countries' average , for the solution of this problem. The topic has been passing off by general discourses.

Because, political power has known that during privatizationprocess, especially, distribution companies, will not make an expenditure such as rehabilitation of

distribution lines. When examing the Strategy Document (Certificate) , the result that will be reached, is as follows:

Although the passed 17 years in the studies oriented to the concept of energy performance that has started in the second half of the years of 1990, it has been reached nowhere, and, it has not also been forseen to reach up to the years 2014-2015.
Because, the actions in this document (certificate) even the dates for passing to come into effect, are spreaded to durations such as 12 months, 24 months, 36 months, after the document has been published. This approach, not with understanding and planning, even today targeted things written in the document, have not materialized in 2023 or in 2071.

CHAPTER 5

CONCLUSION

Turkey has a serious energy problem , and this problem increases together with the economy of the developing country. The more increasing the production by opening new power stations is important, the more using the generated energy economically and productive is important.

I do not doubt that, this book will make our society more consicous in productive and effective usage of the energy. Our people have capacity to be able to make everything through national possibilities. As long as, in our society, let us encourage them and awake curiosity against science and technology. The goverment is planning taxation (inposition) according to the energy productivity of the new buildings that will be made . While it will take 75% taxation and give 125% incitement (encouragement) from a building of class A, it will take 125% taxation and give 75% incitement from a building of class D. In this table, even if the goverment will run against the loss of taxation, the winner will be our country.

If we mention about the vision of the power (goverment) of Turkish Republic , it is not realistic in our country in which this vision, between the years 1998-2008, without considering the density of the energy does not change, 20% recession expectation and the leakage ratio 17-18%, between the years 2010-2023 are present.

Consequently, without doubt, there are positive jobs that are made by the goverment, these are undeniable. But, even the objectives have spreaded to 12, 18, 36 months after publishing the vision. With this mentality, it is too difficult to be come up to even the objective (target) 2071, not to the target 2023.

APPENDIX A

Laws

This appendix contains the energy efficiency law.

2 May 2007 Wednesday Official Gazette Issue: 26510

LAW

ENERGY EFFICIENCY LAW

Law No. 5627 Adoption Date: 18/9/2012

PART ONE

Purpose, Scope and Definitions

Purpose

ARTICLE 1 – (1) The purpose of this Law is to increase efficiency in using energy sources and energy in order to use energy effectively, avoid waste, ease the burden of energy costs on the economy and protect environment.

Scope

ARTICLE 2 – (1) This law covers principles and procedures applicable to increasing and promoting energy efficiency in energy generation, transmission, distribution and consumption phases at industrial establishments, buildings, power generation plants, transmission and distribution networks and transport, raising energy awareness in the general public, and utilizing renewable energy sources.

(2) Outside the scope of this Law are those buildings which would have to change characteristics or appearances at an unacceptable level upon the implementation of measures for increasing energy efficiency, are used for operation and production

activities in the industrial areas, are used as worship places, have less then two years of scheduled period of utilization, are used less than 4 months in a year, have less than fifty square meters of usable area, those buildings or monuments under protection, agricultural buildings and workshops.

Definitions

ARTICLE 3 – (1) The following terms shall have the following meanings:

a) Ministry means the Ministry of Energy and Natural Resources,

b) General Directorate means the General Directorate of Electrical Power Resources Survey and Development Administration,

c) Board means the Energy Efficiency Coordination Board,

d) Public Sector means collectively the public agencies and institutions, professional organizations of the nature of a public institution, universities and local governments,

e) Chambers of profession means the chambers of electrical and mechanical engineers,

f) Company means energy efficiency consulting companies to be issued an authorization certificate to provide energy efficiency services under the authorization agreement concluded with the General Directorate or authorized institutions,

g) Authorized institutions means the chambers of profession and universities authorized by the General Directorate upon the approval of the Board to conduct activities of training, authorization and monitoring under the authorization agreement concluded,

h) TOE means Ton Oil Equivalent

i) Waste means used tires, paint sludge, solvents, plastics, waste oils approved by the Ministry of Environment and Forestry as fuel and other waste,

j) Building owner means the beneficial owner of the building, or the holder of usufruct if any, or in absence of both, any party acting as if the owner,

k) Industrial establishments means, except for the licensed entities engaged in electricity generation, those which have one thousand TOE or more of total annual energy consumption, operate in affiliation with a chamber of commerce and industry, chamber of commerce or chamber of industry, and produce any goods,

l) Energy identity certificate means the certificate that includes information on the minimum energy requirements, energy consumption classification, insulation characteristics, and efficiency of heating and/or cooling systems of a building,

m) Energy efficiency means reducing the energy consumption without causing any decline in the living standards and service quality in buildings, and production quality and quantity in industrial establishments,

n) Audit means works consisting of data collection, measurement, assessment and reporting phases conducted to identify possibilities to increase energy efficiency,

o) Energy efficiency services means consulting, training, audit and implementation services on energy efficiency,

p) Energy intensity means the amount of energy consumed to produce one unit of output,

q) Energy manager and certificate means the person who holds an energy manager certificate and is in charge of carrying out activities relating to energy management in the industrial establishments and buildings covered under this Law, and the certificate issued to energy managers by the General Directorate, authorized institutions and energy efficiency consulting companies,

r) Energy management means training, audit, measurement, monitoring, planning and implementation activities in order to ensure efficient use of energy sources and energy,

s) Payback period means the period of time in which the investment outlays needed in the projects the industrial establishments prepare, or procure the companies to prepare, in order to increase efficiency in their existing systems are recouped through savings projected in the projects,

t) Cogeneration means simultaneous generation of heat and electric and/or mechanical energy in the same plant,

u) Implementation agreement means an agreement made by the companies to realize the implementation of measures identified by audits,

v) Burning facilities means those facilities where fuels are burned and associated parts, and heat producing facilities including waste gas systems,

w) Authorization certificate means the certificate issued to universities and chambers of professions under the authorization agreements by the General Directorate upon the approval by the Board in order to engage in training, authorization and monitoring activities, and to the companies by the General Directorate, chambers of profession or universities to engage in training, audits, consulting and implementation activities.

PART TWO

Board and Authorizations

Energy Efficiency Coordination Board

ARTICLE 4 – (1) An Energy Efficiency Coordination Board shall be established to carry out energy efficiency studies within all relevant organizations all over the country, monitor its results and coordinate efforts. The General Directorate shall monitor the implementation of decisions made by the Board, and secretariat services.

(2) The Board shall, under the chair of the assistant undersecretary in charge of the General Directorate, consist of senior representatives, one from each of the Ministries of Interior, Finance, National Education, Public Works and Housing, Transport, Industry and Commerce, Environment and Forests, the Ministry, the Undersecretariat of the State Planning Organization, the Undersecretariat of Treasury, the Energy Market Regulatory Authority, Turkish Standards Institute, Turkish Scientific and Technological Research Institution, Turkish Union of Chambers and Commodity Markets, Turkish Union of Chambers of Engineers and Architects, and Turkish Association of Municipalities.

(3) The Board shall have the following functions, authorities and responsibilities:

a) Prepare national energy efficiency strategies, plans and programs, assess their effectiveness, coordinate their revision as necessary, taking and implementing new measures.

b) Steer energy efficiency studies carried out by the General Directorate, approve the authorization certificates issued by General Directorate to chambers of profession and universities in promoting energy efficiency services.

c) Approve the implementation projects prepared, or procured through the companies, by the industrial establishments which wish to benefit the practice under subparagraph (a) of the first paragraph of Article 8 and subparagraph (a) of the first paragraph of Article 9 and voluntary agreements under subparagraph (b) of the first paragraph of Article 8, and monitor results of the implementation.

d) Establish ad hoc specialty commissions by the participation from the relevant public agencies and institutions, universities, private sector and civil society organizations, with expenses covered from the General Directorate's budget, under the functions assigned to the Board and where it deems necessary.

e) Set the agenda of, and identify the participants in, the advisory committee meetings organized by the General Directorate every November by the participation of authorized institutions, companies, chambers of profession in the nature of public institutions and civil society organizations, and approve proposals for measures.

f) Set and publish the fees for authorization certificates and energy manager certificates every January.

(4) The Board shall ordinarily convene four times a year in March, June, September and December. Further, where the Chairman of the Board deems necessary, it may convene extraordinarily. The quorum for meeting is two thirds majority, and resolutions shall be passed by the majority of those present. Where votes tie, the Chairman shall have the casting vote.

(5) The Board Chairman and members shall be paid, from the General Directorate's Budget, attendance allowance for each day of meeting not to be more than four times a year, at the amount found by the multiplication of (2.000) index figure by the public servant's salary coefficient for those who hold a public function, and (3.000) index figure times the public servant's salary coefficient for those who do not hold a public function.

Authorizations

ARTICLE 5 – (1) Authorizations for the performance of energy efficiency services, and activities in this context shall be carried out under the following principles.

a) Actions for authorizations and authorization certificates are as follows:

1) Universities and chambers of profession shall be issued authorization certificates by the General Directorate upon the Board's approval for conducting practical training and authorizing the companies. Such certificates shall be renewed every five years unless procedures and principles as defined in this Law and associated regulations have been or are violated. Actions relating to authorization certificates issued to the companies by those institutions whose authorization certificates have not been renewed shall be handled by the General Directorate until the expiry.

2) The companies shall be issued authorization certificates by the General Directorate and/or authorized institutions for carrying out training, audit, consulting and implementation activities. Such certificates shall be renewed every three years unless procedures and principles as defined in this Law and associated regulations have been or are violated. The companies shall pay to the institutions or organizations with which they made authorization agreements the entire amount of the authorization certificate fee, and a portion not to be more than ten percent of the energy manager certificate fee as determined by the Board.

b) The authorized institutions and companies shall be announced to the public by the General Directorate.

c) The General Directorate, authorized institutions, companies and their officers acting on behalf of them are obliged to keep confidential the business secrets which they come to posses during their works relating to energy efficiency and which might damage business relations of their clients. Those under such obligation of confidentiality may not use such confidential information to their own benefits or third party benefits.

d) The General Directorate and authorized institutions shall carry out the following activities:

1) The General Directorate or authorized institutions issue authorization certificates to the companies, carry out training and certification activities for energy managers.

2) The authorized institutions shall monitor the activities of the companies to which they have issued authorization certificates, and report within thirty days to the General

Directorate any matters violating the provisions of the regulation to be issued by the Ministry for the implementation of this Law.

3) The General Directorate shall prepare or procure to prepare training programs, contests, short films and/or cartoons for awareness raising and information to be broadcast in television and radio channels.

4) Authorized institutions shall submit an annual activity report to the General Directorate.

e) The companies shall have the following functions:

1) Carry out training, certification, audit and consulting activities under service contracts made with industrial establishments, building owners or management.

2) Prepare projects for implementing the measures identified by energy efficiency audits.

3) Implement changes according to the projects under implementation agreements and guarantee energy savings quantity.

4) Submit an annual report to the authorizing institution.

f) A company which fails, in the presence of the representatives of the relevant industrial establishment and the authorizing institution, to prove the guaranteed commitment for the energy saving quantity under the implementation agreement made by measurements prior to and after the implementation shall be announced in the Internet website by the authorizing institution. The authorization certificate for a company which fails three such commitments shall be revoked with a possibility of renewal one year later.

g) The quantities of savings under the implementation agreements proved by the companies by measurements shall be announced in the Internet website by the authorizing institutions.

(2) A regulation to be issued by the Ministry shall lay down the principles and procedures for the issue of authorization certificate, qualifications required of institutions and companies to be authorized, matters relating to authorization certificates and energy managers, and authorizations, activities and functions under this Article.

PART THREE

Training, Awareness Raising and Implementations

Training and awareness raising

ARTICLE 6 – (1) Training and awareness raising activities shall be carried out under the following principles to promote effectiveness of energy efficiency services and energy awareness.

a) Within the framework of procedures and principles laid down by the regulation to be issued by the Ministry:

1) Theoretical and practical training programs shall be organized for the companies by the General Directorate and/or authorized institutions, and for the energy managers by the General Directorate, authorized institutions and companies.

2) The General Directorate or authorized institutions shall provide laboratory support to the training programs of the companies with which they have concluded authorization agreements.

b) In order to provide theoretical and practical information on the basic concepts relating to energy and energy efficiency, the general state of energy in Turkey, energy sources, energy generation techniques, efficient use of energy in daily life, importance of energy efficiency for climatic changes and environmental protection, the Ministry of National Defense conducts classes and training programs in military high schools and inductee training centers, and the Ministry of National Education shall make necessary arrangements in the course programs of formal and adult education institutions, and the public agencies and institutions shall make arrangements for their in-service programs.

c) The following activities shall be carried out to raise awareness of the general public for efficient use of energy.:

1) Television and radio channels making national and/or regional broadcast shall broadcast training programs, contests, short films and/or cartoons prepared or procured to prepare by the General Directorate between 07.00 and 23.00 hours not to be less than thirty minutes in total in a month under the awareness raising and information training

programs pursuant to Article 31 of the Law no.3984 dated 13.04.1994 on Establishment and Broadcast of Radios and Televisions.

2) Legal entities which sell electricity and/or natural gas under licenses shall offer the information on their consumption quantities and the corresponding costs for the previous fiscal year on a monthly basis to their customers in the Internet environment.

3) Producers and importers shall include a separate section for efficient use of appliance in terms of energy consumption in the user guide of appliances which must be sold accompanied by a user guide in Turkish as determined and announced by the Ministry of Industry and Commerce. The enforcement of this provision shall be supervised by the Ministry of Industry and Commerce.

4) The General Directorate shall organize an Energy Efficiency Week in the second week of every January in cooperation with the Ministry of National Education, Turkish Scientific and Technological Research Institution, Turkish Union of Chambers and Commodity Markets. Activities in this context shall be identified by the Board.

Implementations

ARTICLE 7 – (1) The following Implementations shall be realized to increase energy efficiency.

a) The following activities shall be carried out for energy management:

1) Industrial establishments shall nominate one of their employees as the energy manager. An energy management unit shall be established in the organized industrial districts to serve industrial establishments in the district each with less than one thousand TOEs of energy consumption.

2) The management, or in its absence the owners, of commercial buildings, service buildings or public sector buildings with at least twenty thousand square meters of construction area or with annual energy consumption at five hundred TOEs or more shall appoint an energy manager or procure service from energy managers.

3) In the industrial establishments not in the public sector and with annual energy consumption at fifty thousand TOEs or more, an energy management unit under the charge of the energy manager.

Those industrial establishments which have a quality management unit in the organization may appoint such unit as the energy management unit.

4) Principles and procedures relating to the functions and responsibilities of the energy managers and energy management units shall be laid down in a regulation to be issued by the Ministry. Principles and procedures relating to appointing an energy manager in the schools under the Ministry of National Education shall be laid down in a regulation prepared in cooperation with the Ministry and issued by the Ministry of National Education.

b) The following activities shall be carried out for monitoring, analysis and projection studies:

1) The General Directorate shall, in cooperation with authorized institutions, prepare and issue inventories and future projections for the development of energy efficiency in the country, industrial establishments and buildings by region and sector, and the General Directorate shall prepare and issue the annual reports containing facts and assessments for the public sector.

2) Industrial establishments and the owners and/or management of buildings which must employ an energy manager shall submit the required information to the General Directorate, and those public agencies and institutions which must employ an energy manager shall submit the reports in the format laid down the General Directorate and containing energy consumption information and own assessments by the end of every March. Industrial establishments shall allow access for the General Directorate for on-site examinations.

c) Buildings with a central heating system shall use systems that allow the distribution of heating costs based on the quantity of heat consumption by central or local heat or temperature control devices. Projects prepared contrary to this shall not be approved by the relevant authorities.

d) A regulation to be jointly prepared by the Turkish Standards Institute and the General Directorate and issued by the Ministry of Public Works and Housing shall lay down the principles and procedures for the energy performance in buildings that covers norms, standards, minimum performance criteria, data collection and control procedures on architectural design, heating, cooling, heat insulation, hot water, electrical installation

and lighting to be used in buildings used for residential purposes with total construction surface areas as indicated in the regulation, commercial buildings and service buildings. In case of acts contrary to the provisions of the regulation, the relevant administration shall not permit the utilization of such buildings.

e) An energy identity certificate shall be issued under the construction projects prepared according to the regulation to be issued by the Ministry of Public Works and Housing. The energy identity certificate shall, as a minimum, have the information on the building's energy requirements, insulation characteristics, efficiency of heating and/or cooling systems, energy consumption classification. The other information that must be included in the certificate and procedures and principles relating to the practice including the renewal of the certificate and existing buildings shall be laid down in a regulation to be jointly prepared with the Ministry and issued by the Ministry of Public Works and Housing. For buildings outside the adjacent areas and with less than one thousand square meters of construction surface area, it is not mandatory to have an energy identity certificate.

f) A regulation to be issued by the Ministry shall lay down the principles and procedures relating to increasing energy efficiency in the electric energy generation plants and transmission and distribution networks, demand side management, utilization of waste heat in thermal plants, open area ligthing encouraging alternative fuels such as biofuel and hydrogen.

g) A regulation to be jointly prepared with the Ministry of Industry and Trade and issued by the Ministry of Transport shall lay down the principles and procedures relating to reducing unit fuel consumption of vehicles manufactured in the country, raising efficiency standards in vehicles, generalizing mass transport, installing advanced traffic signalization systems for increasing energy efficiency in transport.

h) During the studies conducted at industrial establishments and buildings, it is mandatory to use devices calibrated and labeled by accredited national or international organizations.

i) Permission shall not be granted for the sale of those boilers and burners in the burning facilities, apartment heaters and combination boilers which do not meet the minimum

efficiency thresholds specified by the regulation to be jointly prepared with the General Directorate and issued by the Ministry of Industry and Commerce.

i) Principles and procedures for the classification and minimum efficiency specification of electric motors, air-conditioners, electrical home appliances and light bulbs shall be laid down in a regulation to be jointly prepared with the General Directorate and issued by the Ministry of Industry and Commerce, and those not meeting the minimum thresholds shall not be allowed to sell.

PART FOUR

Supports and Other Implementations

Supports

ARTICLE 8 – (1) Implementations relating to supporting energy efficiency implementation projects, reducing energy intensity, and research and development projects shall be carried out according to the following principles and procedures.

a) Energy efficiency implementation projects shall be supported according to the following principles:

1) Those implementation projects which are submitted by industrial establishments to the General Directorate, approved by the Board upon the affirmative opinion of the General Directorate, have a payback period of at most five years, and cost at most five hundred thousand Turkish liras by the project cost shall be subsidized up to twenty percent of the cost.

2) Legal entities with subsidized efficiency increasing projects shall implement such projects in their establishments within two years. Applications exceeding this time limit or implemented differently than the project shall not be subsidized. Implementation reports containing pre- and post-implementation information and images shall be submitted to the General Directorate. The General Directorate shall inspect the implementation results on site.

3) Principles and procedures relating to subsidizing the implementation projects for increasing energy efficiency shall be laid down in a regulation to be issued by the Ministry.

b) The following applications shall be realized for reducing energy intensity:

1) Twenty percent of the energy costs shall be paid for the year of agreement for the industrial establishments owned by natural or legal persons who make voluntary agreements with the General Directorate committing to reduce the energy intensity at least ten percent on the average within three years for the undertaking and who keep such commitment, considering the budgetary means and not to exceed one hundred thousand Turkish Liras.

2) Those natural or legal persons who, in their undertakings, keep their commitments under the item (1) of this subparagraph, but increase their energy intensity in later years may not make a second agreement with the General Directorate.

3) Energy generated by those natural and legal persons, who conclude voluntary agreements, from the energy consumed in the industrial establishments, in the heat and electric energy conversion facilities by modern waste burning techniques, in the cogeneration facilities described in the subparagraph (a) of the first paragraph of Article 9 and manufactured in the country or generated using hydraulic, wind, geothermal, solar and biomass sources shall not be taken into account in the calculation of energy intensity.

4) Changes in energy densities in the industrial establishments without voluntary agreements owned by natural or legal persons who own more than one industrial establishment shall be separately examined by the General Directorate.

5) Qualifications required in the industrial establishments for which voluntary agreements shall be concluded, methods of calculating energy intensity and other principles relating to voluntary agreements including forces majeures shall be laid down in a regulation to be issued by the Ministry.

c) Necessary appropriations shall be added to the budget of the General Directorate for subsidizing energy efficiency implementation projects and energy intensity reduction. Appropriations allotted and used for subsidies, projects subsidized, voluntary

agreements, industrial establishments that reduce or increase energy intensities, training and awareness raising activities shall be posted in the website of the General Directorate.

d) The Turkish Scientific and Technological Research Institution shall in priority subsidize research and development projects for increasing energy efficiency projects and utilizing new and renewable energy projects; and consult the opinion of the General Directorate for directing and assessing such projects.

Other implementations

ARTICLE 9 – (1) The following implementations shall be realized to increase energy efficiency:

a) Those projects which are prepared to increase energy efficiency in the existing systems of industrial establishments, approved by the Board and have minimum investment size above the threshold set by the Council of Ministers, and those cogeneration investments which achieve annual average efficiency values defined in the regulation to be issued by the Ministry based on the fuel types and technologies used shall be allowed by the Undersecretariat of Treasury to benefit from investment incentives.

b) For small and medium scale enterprises, training, audit and consulting services for energy efficiency procured by enterprises defined in the Law no.3624 dated 12.04.1990 on Establishment of the Directorate of Small and Medium Scale Industry Development and Support Administration shall be subsidized by the Directorate of Small and Medium Scale Industry Development and Support Administration. Principles and procedures for such practice shall be laid down in a regulation to be prepared jointly with the Ministry and issued by the Ministry of Industry and Commerce.

c) No fees shall be charged for authorization certificates and energy manager certificates of the companies established by the foundations.

PART FIVE

Administrative Sanctions and Miscellaneous Provisions

Administrative sanctions and application

ARTICLE 10 – (1) Administrative sanctions within the framework of the following principles shall be applied to natural or legal persons as a result of fact finding and/or inspections conducted by the bodies authorized to impose administrative fines under this Law.

a) The following cases require administrative sanctions:

1) Where the provisions of the regulation to be issued relating to authorizations under Article 5 are violated, the authorization certificates of institutions authorized according to principles and procedures laid down in the authorization agreement shall be revoked by the General Directorate upon the Board's approval, and the authorization certificates of the companies shall be revoked by the institution with which they have concluded agreements. Those institutions or companies with authorization certificates revoked shall not be re-issued certificates for at least five years. Agreements concluded with the companies by the authorized institutions with authorization certificates revoked shall be examined by the General Directorate, and those agreements not meeting the requirements of the regulation shall be cancelled. Those agreements that meet the requirements of the regulation shall be renewed by the General Directorate.

2) Where the information required under Articles 5, 7, 8, and 9 is not provided or access for examination is denied, thirty days shall be allowed to provide the required information and/or access. An administrative fine of ten thousand Turkish Liras shall be imposed if the information provided by the end of the time allowed is inaccurate or incomplete, or fifty thousand Turkish Liras if the information is not provided at all and/or the access for on-site inspection is denied.

3) An administrative fine of five hundred Turkish Liras shall be imposed where the other information required under this Law and relevant regulations except for the item (2) of this subparagraph is not provided accurately and as required.

4) Those who use to their self interests the trade secrets indicated in subparagraph (c) of the first paragraph of Article 5 shall be barred from serving in the organizations covered under this Law for a period not to be less than two years.

5) Provisions of the item (1) of this subparagraph shall apply to those companies which are reported to the General Directorate for having violated the provisions of this Law and issued regulations under the item (2) of the subparagraph (e) of the first paragraph of Article 5.

6) Provisions of the Law no.3984 shall apply to those who fail to observe the broadcast obligations specified in the item (1) of the subparagraph (c) of the first paragraph of Article 6.

7) An administrative fine of five thousand Turkish Liras shall be imposed to legal persons where the provisions relating to the item (2) of the subparagraph (c) of the first paragraph of Article 6.

8) Where the industrial establishments and building owners or management act contrary to the subparagraph (a) of the first paragraph of Article 7 and relevant regulation provisions, they shall be warned to remedy the violation. If the violation is not remedied within thirty days, an administrative fine of twenty thousand Turkish Liras shall be imposed to such industrial establishments and building owners or management.

9) The Ministry of Industry and Commerce shall impose an administrative fine of twenty thousand Turkish Liras to natural and legal persons who make sales contrary to subparagraphs (i) and (j) of the first paragraph of Article 7.

b) Except for the item (9) of the subparagraph (a) of this paragraph, the administrative fines shall be doubled if the same offense is repeated within one year from the administrative fine.

c) Where the amount of fines imposed on the industrial establishments, building owners or building management pursuant to items (2), (3) and (8) of the subparagraph (a) of this paragraph exceed twenty percent of the total energy expenditures of the previous fiscal year or five percent of the revenues in the balance sheet for the previous fiscal year of the fined natural or legal person, the lower of the fines shall be assessed as

calculated with respect to both thresholds provided that the balance sheet and energy consumption documents are shown within thirty days.

d) The General Directorate shall impose the administrative sanctions unless such sanctions are to be imposed by another public agency or institution under this Law.

e) The liability of legal persons for administrative fines shall be determined according to Article 65 of the Turkish Commercial Code no.6762 dated 29.06.1956.

Powers of the Ministry

ARTICLE 11 – (1) The Ministry is, in addition to the powers listed in other articles, authorized to:

a) Ensure, through the Board, the coordination of the enforcement, directing, monitoring, evaluation of obligations under this Law, planning and implementing of the measures to be taken.

b) Reduce to half or increase up to twice the numerical threshold values defined for the appointment of an energy manager or the establishment of an energy management unit under the subparagraph (a) of the first paragraph of Article 7.

c) Reduce to half or increase up to twice the project cost and subsidies provided to projects under the item (1) of the subparagraph (a) of the first paragraph of Article 8, and reduce to half or increase up to twice the energy intensity reduction rate and subsidy amount indicated in the item (1) of the subparagraph (b) of the first paragraph of Article 8.

Exceptions

ARTICLE 12 – (1) The Turkish Armed Forces, the Ministry of National Defense and affiliated organizations, and the Undersecretariat of the National Intelligence Organization are exempt from the provisions of the item (2) of the subparagraph (b) and (e) of the first paragraph of Article 7. Procedures and principles of implementation regarding the provisions under the subparagraph (a) of the same article shall be laid down by the said institutions.

ARTICLE 13 – Article 2 of the Law no.2819 dated 14.06.1935 on Establishing General Directorate of Electrical Power Resources Survey and Development Administration,

has been amended as follows:

"ARTICLE 2- The functions of the E.I.E. Administration are as follows:

a) Make measurements relating to assessing all energy sources with priority for hydraulic, wind, geothermal, solar, biomass and other renewable energy sources, prepare feasibility studies and exemplary implementation projects, develop pilot systems in cooperation with research organizations, local governments and civil society organizations, carry out promotion and consulting activities.

b) Provide awareness raising and training services relating to rational use of energy in industry and buildings, authorize and inspect universities, chambers of profession and legal persons to provide the same services, conduct the secretariat services for the Energy Efficiency Coordination Board.

c) Monitor, evaluate works made by the relevant ministries and bodies, develop measures and/or project proposals for effective and efficient use of energy in transport, electric energy generation plants, transmission and distribution systems.

d) Monitor and inspect the energy efficiency implementation projects and research and development projects approved by the Energy Efficiency Coordination Board.

e) Monitor and evaluate the occurrence of harmful waste and emissions of interest to the environment from the energy consumption points, prepare projections and proposals for measures.

f) Follow and evaluate works and developments on energy in the country and the world, set research and development goals and priorities for the needs and conditions of the country, conduct and procure to conduct research and development studies in this direction, disclose to the public the studies with economic analyses.

g) Ensure that all stakeholders of energy access accurate and updated information, make and update a national energy inventory, establish and operate a national energy information management center to support the planning, projection, monitoring and evaluation works.

h) Develop projections and proposals to utilize domestic and renewable energy sources and increase energy efficiency.

i) Make activities to raise energy awareness and utilize new energy technologies in the general public.

j) Make coordination between public agencies and institutions, universities, private sector and civil society organizations for effective and efficient cooperation on energy efficiency.

k) Make activities to inform and raise awareness of the general public on energy related matters.

l) Cooperate and exchange information with national and international organizations in other countries.

m) Form opinions, under the regulation to be issued by the Ministry, for the applications to obtain licenses for wind energy according to the Electric Market Law no.4628 dated 20.02.2001 and the Electric Market License Regulation issued based on this Law.

The E.I.E. Administration shall perform its functions under the following principles:

a) The E.I.E. Administration is authorized to require any information deemed necessary under its functions from natural and legal persons. Natural and legal persons must provide the information required. The E.I.E. Administration shall keep confidential the information and documents that might harm the national security, safety and economic interests, and business relations of natural and legal persons.

b) The E.I.E. Administration may be seconded, upon the consent of the relevant persons and their organizations, and the approval of the Minister, with personnel of adequate quantity and qualifications as required for the projects and research from the ministries and affiliated and associated organizations, universities and other public agencies and institutions for activities of preparing projects and other matters in the jurisdiction of the said Administration that require specialist knowledge. However, the term of work for the personnel so seconded shall not exceed two years and, in any case, the term of the project. Where the project term is longer than two years, the term of work for the said persons may be extended as long as the initial period upon the approval of the Minister. The personnel so seconded shall be considered at leave from their parent agencies, and all their remuneration, allowances, pays and increases and other financial and social benefits shall be paid by their parent agencies.

c) The General Directorate of E.I.E. Administration shall establish and operate hydrometric measurement stations and make drillings when performing its functions. A Strategy Development Division shall be established at the center. This Division shall perform functions listed in Article 60 of the Law no.5018 on Public Financial Management and Control.

d) Penalties specified in Articles 247 to 266 of the Turkish Penal Code no.5237 dated 26.09.2004 shall apply to offenses against the property and all assets of the E.I.E. Administration."

ARTICLE 14 – The following subparagraphs have been added to the third paragraph of Article 1 of the Electric Market Law no.4628 dated 20.02.2001.

"51. Cogeneration means simultaneous production of heat and electrical and/or mechanical energy in the same plant,

52. Micro-cogeneration plant means any cogeneration plant with installed power based on electric energy at 50 kilowatts or less,"

ARTICLE 15 – The following paragraphs added to the end of Article 3 of the Law no.4628.

"The relevant regulation shall lay down those natural and legal persons who establish cogeneration plants in order to meet self requirements only, at efficiency above the threshold set in the regulation to be issued in the Ministry, and are to be exempted from the obligation to obtain licenses and establish companies.

Those natural and legal persons who establish a production plant, in order to meet self requirements only, with installed power maximum at two hundred kilowatts based on renewable energy sources, and a micro-cogeneration plant are exempted from the obligation to obtain licenses and establish companies.

The Agency shall require security for existing generation licenses and license applications. Matters relating to obtaining security and appropriation of such securities shall be laid down in the relevant regulation."

ARTICLE 16 – The fourth and fifth paragraphs of Article 42 of the Condominium Ownership Law no.634 dated 23.06.1965 have been amended as follows.

"The heat insulation, the conversion the fuel system in the heating system, and the conversion of the heating system from a central system to an individual system or from an individual system to a central system upon the request of any of the condominium owners shall be decided by the majority of the number and land share of the condominium owners. However, unanimous vote by the number and land share of the condominium owners shall be required to convert the central heating system to an individual heating system for buildings with a total construction surface area of two thousand square meters or above. The expenses for common works on this matter shall be paid in proportion to the land share. Procedures and principles relating to distributing the heating costs in the central heating system shall be laid down in a regulation to be issued by the Ministry of Public Works and Housing.

Where it is decided to convert the heating system from central to individual or vice versa, the provisions of the management plan contrary to such decision shall be considered amended."

ARTICLE 17 – Article 6 of the Law no.5346 dated 10.05.2005 on Utilization of Renewable Energy Sources for Electric Energy Generation has been amended as follows.

"ARTICLE 6 – The following implementation principles shall apply to legal entities licensed for electric energy generation and trade from renewable energy sources under this Law:

a) Legal persons licensed for retail sale shall purchase electric energy according to principles laid down in this article from the RES certified plants which generate electric energy from renewable energy sources under this Law and have not completed ten years of operation.

b) The EMRA shall publish every year the information on the quantity of RES certified electric energy that could benefit from the practice under this Law.

Each of the legal persons licensed for retail sale shall purchase RES certified electric energy at the ratio of the electric energy quantity they sold in the previous calendar year to the total quantity of electric energy they sold in the country.

c) The price applicable to electric energy to be purchased under this Law shall be the country average electric wholesale price for the previous year set by the EMRA. However, this applicable price shall not be less than the Turkish Lira equivalent of 5 Euro Cents per kWh, and more than 5.5 Euro Cents per kWh. However, legal persons licensed for renewable energy sources may benefit the possibility above the threshold of 5.5 Euro Cents per kWh if such possibility does exist in the market.

Practice in this article shall cover plants commissioned prior to 31.12.2001. However, the Council of Ministers may postpone such deadline not to exceed two years provided that such postponement be promulgated in the Official Gazette by 31.12.1999."

ARTICLE 18 – Article 8 of the Law no.5346 has been amended as follows.

"ARTICLE 8- Where any property owned by the Forestry or the Treasury or under the possession of the State is to be used to generate electric energy from renewable sources under this Law, the Ministry of Environment and Forestry or the Ministry of Finance shall grant permission against a fee, grant lease, establish easement or give permission of use for the lands to be used for the plant, access roads, and the power transmission line up to the network. A discount of eighty five percent shall apply to the fees for permission, lease, easement or permission of use for the first ten years of the investment and operation periods of the plants to be commissioned by the end of 2011, access roads and the power transmission line up to the network. For forest lands, ORKÖY or Forestation Special Allotment Revenues shall not be charged."

Arrangement of regulations

PROVISIONAL ARTICLE 1 – (1) Regulations specified in this Law shall be issued within one year from the promulgation of this Law, and those regulations to be issued by the Ministry of Public Works and Housing under the subparagraphs (d) and (e) of Article 7 shall be issued within two years. Until such regulations are issued, the provisions of the existing regulations not contradicting this Law shall continue to apply.

Validity of existing authorization certificates and energy manager certificates

PROVISIONAL ARTICLE 2 – (1) Authorization certificates that have been issued by the General Directorate shall remain valid by their expiry. Energy manager certificates

that exist on the date of promulgation of this Law shall be renewed without fees within one year.

Provision of initial information for obligations

PROVISIONAL ARTICLE 3 – (1) All industrial establishments and the owners or management of buildings that have a total construction surface land of ten thousand square meters or above in the implementation projects prepared during the construction phase or in amended projects shall provide the required information to the General Directorate within three months following the promulgation of this Law in the format published in the website of the General Directorate within two months following the promulgation of this Law.

General Directorate's authorization function

PROVISIONAL ARTICLE 4 – (1) The activity of the General Directorate to authorize the companies under the item (2) of the subparagraph (a) of the first paragraph of Article 5 shall cease to exist if the number of authorized institutions exceeds ten within two years following the promulgation of this Law.

Otherwise, the authorization activity of the General Directorate shall continue until the figure reaches ten.

Training and awareness raising implementations

PROVISIONAL ARTICLE 5 – (1) Arrangements specified in the subparagraph (b) of the first paragraph of Article 6 shall be fulfilled by the relevant organizations within two years following the promulgation of this Law.

(2) Provisions of the items (2) and (3) of the subparagraph (c) of the first paragraph of Article 6 shall be implemented from the end of the first year following the promulgation of this Law.

Existing buildings and industrial establishments, buildings under construction and meeting minimum limits

PROVISIONAL ARTICLE 6 – (1) The subparagraph (c) of the first paragraph of Article 7 of this Law shall not apply to buildings existing or those under construction

and not granted permission of use prior to the promulgation of this Law for five years following the promulgation of this Law.

(2) The subparagraph (d) of the first paragraph of Article 7 of this Law shall not apply to buildings existing or those licensed for construction on the promulgation of this Law for ten years following the promulgation of this Law.

(3) The requirement to meet the minimum limits indicated in the subparagraphs (i) and (j) of the first paragraph of Article 7 shall not be required for three years following the promulgation of this Law.

PROVISIONAL ARTICLE 7 – (1) For the expressions of Turkish Lira in this Law, the expression New Turkish Lira shall be applied as long as the money in circulation in the country is the latter pursuant to the provisions of the Law no.5083 dated 28.01.2004 on Monetary Unit of the Republic of Turkey.

Effect

ARTICLE 19 – (1) Of this Law;

a) The item (8) of the subparagraph (a) of the first paragraph of Article 10 shall go into force to years after the promulgation,

b) All other provisions shall go into force on the date of promulgation.

Execution

ARTICLE 20 – (1) The Council of Ministers executes this Law.

1/5/2007

APPENDIX B

Regulations

This appendix contains the regulations.

PART ONE: Purpose, Scope, Support, Definitions and Abbreviations

Purpose

Article 1 - (Amended Article: 01/04/2010 - 27539 WPR\1.art)

(1) The purpose of this regulation is to regulate the procedures and principles for the use of effective and efficient energy in buildings and energy resources, prevention of energy waste and protection of the environment.

Scope

Article 2 - (Amended Article: 01/04/2010 - 27539 WPR\2.art)

(1) This Regulation on existing and new buildings in this Regulation covers;

a) calculation methods, standards and minimum performance criteria for the preparation and implementation of building projects and energy identity document related to building's energy use such as architectural design, mechanical, plumbing, lighting, electrical wiring,

b) Identification of energy regulation, building controls and audit activities authorizations,

c) Energy demand, cogeneration systems and renewable energy sources to meet,

ç) creation of building inventory and update across the country, education and awareness-raising activities towards the development of energy efficiency awareness of culture in the community,

d) Make applications to increase energy efficiency in a way that it will not affect the feature and appearance of the structure in line with this view by taking the views of Board of Protection of Cultural and Natural Heritage regarding measures and applications to increase energy efficiency of buildings registered as cultural property to be protected

(2) Buildings for production activities carried out in industrial areas, buildings, buildings with a planned lifetime less than two years, with a total useful area of 50 m2 in buildings, greenhouses, workshops, and individual heating and cooling is not required, which was built as a warehouse, arsenal, warehouses, barns, and stables are beyond the scope of this Regulation.

Support

Article 3 - (Amended Article : 01/04/2010 - 27539 WPR\3.art)

(1) This Regulation has been prepared based on subparagraph (ç) ve (d) of the first paragraph of Article 7 of the Law on Energy Efficiency No. 5627 dated 18.04.2008 and Article 30 / A of Decree on Provision Law on the Organization and Duties of the Ministry of Public Works and Settlement No. 180, dated 13.12.1983.

Definitions and Abbreviations

Article 4 - (1) The following terms on this Regulation mean;

a) Lighting energy consumption: the total energy spent on the building lighting,
b) Lighting load: The total installed power is used for lighting,,
c) Independent part: parts subject to the independent section according to the provisions of Condominium Law No. 634, dated 2.7.1965 on whether the main property itself is suitable for use,
d) Ministry: Ministry of Public Works and Settlement,
e) Building: can be used on its own, and people can enter and people can live, work, used for entertainment or to rest or worship and appropriate structure for the protection of animals and goods,

f) Building owner: natural or legal person or beneficial owner entitled to the property, if both are not available, building owner,

g) (Amended subparagraph: 01.04.2010 – 27539 WPR\4.art) Building manager: person appointed or elected or designated by the person providing building management according to the Condominium Ownership Act,

h) Individual heating: heating of independent section with heating energy from the heat source placed in the independent section,

i) Regional heating system: a central heating energy, system for deployment of neighborhood and large-scale settlements and heating of independent sections,

j) Regional sanitary hot water system: distribution of sanitary hot water to buildings and independent sections taken from the centre and system allowing use,

k) (Repealed subparagraph: 01/04/2010 - 27539 WPR\4.art)

l) Identification of energy: the minimum energy requirements and energy consumption of the building, insulation properties, and heating and / or cooling systems, the document that contains the information about the efficiency,

m) (Amended subparagraph: 01/04/2010 - 27539 WPR\4.art) Competent authorities to give energy identification: competent engineers and architects involved in the design of the building for newly designed buildings, energy efficiency consulting companies for existing buildings,

n) (Repealed subparagraph: 01/04/2010 - 27539 WPR\4.art)

o) (Repealed subparagraph: 01/04/2010 - 27539 WPR\4. art)

p) Energy management: person responsible for performing activities related to energy management in buildings and have certified energy manager certificate,

q) (Repealed subparagraph: 01/04/2010 - 27539 WPR\4. art)

r) Halogen lamp: two types of lamps with tungsten halogen and metal halogen including halogen gas,

s) Service buildings: public buildings, schools, churches, hospitals, health centers and other buildings allocated for similar purposes, social services buildings allocated for asylum or care of children or the elderly nd other buildings allocated for similar purposes, buildings allocated for cinemas and theaters,

meeting rooms, exhibit , museums, libraries, cultural buildings and sporting activities and similar purposes,

t) Heat pump: apparatus that provides transmission of energy available in soil, air and water at low temperature for heating and / or cooling of the building,

u) Related administration: municipality with the authority to grant building permits and metropolitan municipalities, governorships and other administrations,

v) Air-conditioning system: ambient air, humidity, cleanliness, and a combination of temperature and fresh air,

w) (Amended subparagraph: 01/04/2010 - 27539 WPR\4. art) Operator organization: organization responsible for the operation of mechanical and electrical systems,

x) (Repealed subparagraph: 01/04/2010 - 27539 WPR\4. art)

y) Cascade boiler system: boiler systems that have mechanical and electronic communications with each other and do not have shortage of boiler backup providing fuel-saving according to needs,

z) Boiler: pressure vessel that allows the transfer of energy released by burning the fuel to heat transfer fluid,

aa) Cogeneration: heat and electrical and / or mechanical energy production in the same facility at the same time,

bb) Mechanical installation: all of heating, cooling, ventilation, water supply and sewage, sanitary hot water, and fire-fighting systems that are in the field of mechanical engineering in construction works,

cc) Central heating system: system that allows heating of more than one independent section with the heating energy from a center,

dd) Central sanitary hot water system: system that provides the distribution and use of sanitary hot water received from the center in buildings and independent sections,

ee) Central cooling system: system that allows the cooling of multiple independent sections with the cooling energy from the center,

ff) (Repealed subparagraph: 01/04/2010 - 27539 WPR\4. art)

gg) Existing building: building under construction or completed with the construction permits received before this Regulation entered into force,

hh) Final energy consumption: total consumption of energy and electrical energy obtained from solid, liquid or gaseous fuels by the end user in the building, or independent section,

ii) (Repealed subparagraph: 01/04/2010 - 27539 WPR\4. art)

jj) (Repealed subparagraph: 01/04/2010 - 27539 WPR\4. art)

kk) Buildings for commercial purposes: buildings allocated for business centers, offices and other buildings for similar purposes, entertainment and shopping centers, hotels, motels, B & B and other buildings for similar purposeTSE: Türk Standardları Enstitüsünü,

ll) Renewable energy: energy obtained from non-fossil energy sources such as hydro, wind, solar, geothermal, biomass, biogas, wave, current and tidal,

mm) Annual energy consumption: the amount of heat energy for the building heating, sanitary hot water, cooling, electrical and lighting systems in terms of primary energy for the environment that must be given within one year,

nn) Annual heating energy requirement: a year heates from heating system

oo) Annual energy consumption: net amount of heat energy rewuired to be given in a year in primary energy for the building heating, sanitary hot water, cooling, electrical and lighting systems

pp) (Amended subparagraph: 01/04/2010 - 27539 WPR\4.art) Annual energy requirement for sanitary hot water: net amount of heat energy wasted in a year for hot water supply,

qq) Annual cooling energy requirement: net amount of heat energy to be removed from the refrigerated cooling system in a year,

rr) (Additional Subparagraph: 01/04/2010 - 27539 WPR\4.art) BEP-TR: software program used for the regulation of energy identity documents and allow access from the website of the Ministry,

ss) (Additional Subparagraph: 01/04/2010 - 27539 WPR\4.art) Energy efficiency in buildings: reduction of energy consumption without impairing the quality of standard of living and quality of services in the buildings,

tt) (Additional Subparagraph: 01/04/2010 - 27539 WPR\4.art) Primary energy consumption: total consumption of energies consumed to produce and distribute

energy obtained from solid, liquid or gaseous fuels and electrical energy consumed by the end user in the building, or independent section,

uu) (Additional Subparagraph: 01/04/2010 - WPR 27539 \ 4.art) Institutions and organizations to audit: authorities or institutions authorized by the Ministry to control, test and maintain building energy-consuming equipment and related reports according to the energy identification documents periodically as required by the standards,

vv) (Additional Subparagraph: 01/04/2010 - 27539 WPR\4.art) General lighting: lighting done with the purpose to meet the demands regardless of special needs such as emphasis, direction of lighting and different level of lighting under certain criteria throughout a volume,

ww) (Additional Subparagraph: 01/04/2010 - 27539 WPR\4.art) Security lighting: environmental lighting in order to provide control and oversight in terms of security of the building area in night conditions,

xx) (Additional Subparagraph: 01/04/2010 - 27539 WPR\4.art) Living area: all parts of the building which was built and used, walls, columns, skylights, entrance halls, outdoor projections, air shafts, roof, plumbing galeries and floors, non-commercial section and floors used as carparks for own needs of the building, fire escapes , elevators, floor terraces, boiler room, coal bunker, bunker, water tank and air pressure tank room,

yy) (Additional Subparagraph: 01/04/2010 - 27539 WPR\4.art) Major renovations: renovation of the building where the renovation costs exceed 25% of the property tax on matters that affect the energy consumption like the building facade, mechanical and electrical installations,

zz) (Additional Subparagraph: 01/04/2010 - 27539 WPR\4.art) Building area: all layers of floors being built including the basement, mezzanine and roof spaces and common areas except for the skylights.

PART TWO: Principles, Duties, Powers and Responsibilities

Principles

ARTICLE 5 - (1) (Amended: RG-1/4/2010-27539) design of new buildings, major renovations of existing buildings projects that require changes to the project, according to the characteristics of mechanical and electrical installation of the building changes are taken into account for the principles prescribed in this Regulation.

(2) Building, architectural, mechanical and electrical projects, other legal acts, as well as in terms of energy economy is not compatible with the requirements of this Regulation, the relevant building licenses are granted by the administration.

(3) The use of structures will not be permitted until the deficiencies identified by the relevant administration are corrected according to the project during the application of this Regulation in accordance with the principles.,

(4) (Amended: RG-1/4/2010-27539) The current states of Amended subparagraph 8a to the Turkish Standards will be taken as basis for matters that are not defined in this Regulation and need clarification, in the absence of such standards, the European Standards in Appendix 8b shall be taken as basis.

(5) (Amended: RG-1/4/2010-27539) The wavers on implementation of this project, construction, supervision and other issues will be sought by the Ministry.

(6) (Amended subparagraph: RG-1/4/2010-27539) In case of amendments of boiler changes in existing buildings, exterior walls, insulation, heating system, conversion between individual and central heating systems, installation of central cooling system, installation of cogeneration system or production of electricity from renewable energy, construction project is prepared in accordance with the provisions of this Regulation and it is approved implemented by the relevant administration permitting the use of structures.

(7) (Amended subparagraph: RG-1/4/2010-27539) It is essential to make necessary changes in accordance with the reflection of the minimum energy performance

implementations in the European Union countries in the scope of compliance with the European Union legislation in the implementation of this Regulation.

DUTIES, POWERS AND RESPONSIBILITIES

ARTICLE 6 - (1) The following are authorized and responsible for the implementation of the provisions of this Regulation;

a) The relevant authorities,

b) organizations authorized to issue identification Energy,

c) Investors' organizations,

d) building owners, building managers and energy managers,

d) The operator organizations

e) The employer or their representatives,

f) The design and application architects and engineers,

g) Implementing contractors and manufacturers,

i) (Amended: RG-1/4/2010-27539) energy advisor, consultant, project control to the natural or legal persons, entities involved in the making the building and issue of the energy performnace certificate and competent authorities, inspection bodies and business officials who are authorized to issue the energy performance certificate.

(2) buildings that are not constructed according to the provisions of the Regulation;

a) the project is incomplete or incorrect, or in the absence of standards, project designers, placed low or high according to the standards of the production in the absence of incomplete or incorrect, if any, and the contractor or construction firm building control provider, is responsible for the powers of the ratio.

b) If the system does not work according to business arising from the building owner, manager, or if there is an energy manager or operator is directly responsible for the organization.

c) The authorities are authorized and responsible to follow-up, identify and fulfill the responsibility.

(3) The authorities and organizations authorized to issue the identification of energy, projects and practices in accordance with the provisions of this Regulation, whether the checks.

(4) This Regulation without proper design and implementation of buildings or building use permit granting construction permits, the related authorities, the identification of energy regulation and, if the competent authorities shall be responsible for the construction supervision team.

PART THREE

Architectural Design and Architecture Building Applications in terms of Building Energy Performance

Architectural design in terms of the energy performance of buildings

ARTICLE 7 - (1) the architectural design of buildings, reconstruction and island / parcel, considering the state of heating, cooling, natural ventilation, lighting needs are kept to a minimum, sun, humidity and wind effects, taking into account the natural heating, cooling, ventilation and lighting facilities maximum level used.

(2) Architectural design issues that should be considered are listed below.

a) (Amended: RG-1/4/2010-27539) directing the buildings and interior spaces, solar, wind, humidity, rain, snow and other meteorological data, taking into account the unwanted heat gains and losses through the architectural solutions are kept to a minimum.

b) (Amended: RG-1/4/2010-27539) to be used in the building constantly living areas, solar heat and light and to take advantage of natural ventilation is placed in the most appropriate level.

c) (Amended: RG-1/4/2010-27539) Architectural details of the implementation project and the system, thermal insulation materials, and to the point with the details of the whole project to provide integrity, to ensure the continuity of the thermal insulation of the roof-to-wall, wall-window, wall- details of the base and the base-slab-wall composition is allowed to contain.

d) (Amended: RG–1.4.2010–27539) of the building in relation to the venue of the reports generated by investigating opportunities to use renewable energy sources, primarily architectural solutions are considered.

Architectural practices

ARTICLE 8 - (1) The outer shell of the existing building negatively affecting the energy performance of the building cannot be changed.

(2) (Amended: RG–1.4.2010–27539) In buildings with glazings in the rate of 60% or over of the total area of the vertical external surfaces with heat lost, it will be accepted to design the window system so it does not exceed (Up) 2.1 W/m2K of the thermal transmittance coefficient and the buildings will be considered to be in compliance with TS 825 Standard if the thermal conductivity coefficient is less than 25% of the recommended by the TS 825

Standard for other parts with heat loss. Thermal insulation for the building subject to project in question and the calculations are based on the principles and procedures as defined in TS 825. These calculations must be shown separately in the fulfillment of the conditions set out in this paragraph. In addition, during the summer, measures shall be taken during the design for unwanted solar energy gains.

(3) (Repealed RG–1.4.2010–27539)

(4) report is to be prepared for the thermal insulation of new buildings and existing buildings, the inner layer is formed from the surface to the surface structure and thermal insulation materials, affixed to the inner surface of the glass facade cladding thermal conductivity coefficient of the film layer, curtain glass façade of the building where the TS 825 standard, which is recommended in the climate can not be larger than the coefficient of thermal conductivity.

(5) (Repealed RG-1/4/2010-27539)

(6) (Repealed RG-1/4/2010-27539)

SECTION FOUR

Principles of Thermal Insulation, minimum air circulation and Sealing

Principles of thermal insulation of buildings

ARTICLE 9 - (1) The following requirements are complied with calculations of thermal insulation of buildings.

a) Annual heating energy needs of the building must be smaller than the limit specified in the standard TS 825.

b) The buildings adjacent to the heating energy requirement when calculating detached, detached adjacent to the outer wall of the side walls are regarded as remaining.

(2) Buildings outside air, soil, or with a low-temperature environments that separates the inner surfaces of the components of the structure, the minimum thermal insulation requirements specified in the standard according to TS 825 are isolated.

(3) forming the shell of building, wall, floor, balcony, console, floor, ceiling, roof, and window / wall joints to cause any thermal bridge isolated.The case of thermal bridges in existing buildings can not be eliminated, transferring heat from the heat loss due to thermal bridges account of coating the surfaces of EN ISO 10211-1, EN ISO 10211-2, EN ISO 14683 or EN ISO 6946 standard is based on the annual heating energy requirement taken into account when calculating.

(4) "Thermal insulation project" is not required for areas outside the municipal boundaries and adjacent area, the village population registered permanent residents of the village, the village built around the fields and hamlets over 2 floors and a total floor area of up to 100 m2 or smaller (open to the outside air balconies, terraces, stairs, passages, Except as bright, and so on) in this area with new buildings;

a) Structural components of the thermal conductivity coefficient, the TS 825 is smaller than or equal to the values specified in the standard building components,

b) The total window area, 12% of the heat lost in the outer wall area, less than or equal to

demonstration project, provided that in case of architectural structures and details, "thermal insulation project" is required. In this case, the above conditions provided a "heat-insulating report" regulation is sufficient.

(5) (Amended: RG-1/4/2010-27539) between independent parts of the building wall, floor and roof structural elements, such as resistor R is at least 0.80 m 2 K / W so that the insulation is applied.

(6) (Repealed RG-1/4/2010-27539)

(7) Matters specified in this Regulation shall be complied with TS 825 standard.

(8) In compliance with standard construction and insulation materials;

a) Building and insulation materials, thermal conductivity, account values are given in Appendix E TS 825, heat insulation project is calculated according to the values given here.

Building and insulation materials used in the construction of the building for the Official Gazette No. 24870 dated 08.09.2002, within the framework of the Construction Products Directive, Building and Insulating Materials CE conformity marking and declaration of conformity, or I, or to be licensed.

b) (Amended: RG-1/4/2010-27539) In case the values of the declared thermal conductivity values within the framework of the provisions of the first subparagraph are less than the values in Annex E of TS 825 and these values are wanted to be used in the calculations, it is necessary to document the declared values of thermal conductivity by an institute appointed espscially by the Ministry to use these values and calculations. If this certification yet, the calculations account the value of the thermal conductivity of the material rather than the declared values of TS 825 Appendix E is accepted. Assigned to the principles and procedures of the organization designated by the Ministry.

Thermal insulation project requirement

ARTICLE 10 - (1) The provisions of this Regulation are in accordance with the accounting method specified in the standard according to TS 825, prepared by qualified mechanical engineer "thermal insulation project" stages of the construction permit in accordance with zoning regulations for the installation project will be prompted with the relevant authorities.

(2) The heat insulation project shall include the following information;

a) heat loss, heat gain, gain / loss, gain utilization factor and the size of the monthly and annual heating energy demand, the TS 825 standard "Specific heat loss of the building" and "Annual Heating Energy Requirements" form of charts as in the examples given and schedules calculated annual heating energy demand (Q), TS 825 standard, the annual heating energy (qi) to be derived from the formula shown if greater than the limit,

b) Residential buildings used for purposes different from the calculations made in the building more than 4 ° C difference in temperature between the different sections of the building and the annual heating energy demand calculations to be made for more than one section, a schematic drawing of the boundaries of these departments, border measures and departments The temperatures on the show,

c) the outer surface of the heat lost in the building walls, ceiling and floor / upholstery materials used and the thickness of the order of the elements of these materials, wall, ceiling and floor / floor areas and elements of the "U" values are specified,

d) the type of window systems, the glass and the frame, the window areas and separately for all aspects of the "U" values are specified,

d) Specify the type of ventilation, mechanical ventilation is at stake, and the results of the calculations specified in the project report,

e) Heat insulation project, condensation from forming surfaces of the heat lost in the building as specified in TS 825 standard to verify the required drawings and calculations to give the project report,

f) all or individual sections of the existing buildings which will be based repair, modification, and eklemelerdeki for the departments that will be applied, according to TS 825 standard defined areas of heating degree days is equal to or smaller than the recommended thermal transmittance coefficients show that,

g) which will be based on existing buildings repair, modification and additions, as described in TS 825 standard condensation from forming on surfaces be made of the application to verify the required drawings and calculations.

Mechanical installation Basis of insulation

ARTICLE 11 - (1) (Amended: RG-1/4/2010-27539) buildings for heating, cooling, ventilation and air conditioning installations that affect energy use, such as used in the pipes, manifolds and gaskets, valves, ventilation and air conditioning ducts, sanitary hot water manufacturers and storage facilities, fuel tanks, and other mechanical equipment, so as to cause thermal bridge between the indoor temperature and the surface temperature difference of more than 5 ° C and condensation on the surface to be sealed.

(2) The following requirements shall be complied with in mechanical installation insulation calculations and applications.

a) (Repealed RG-1/4/2010-27539)

b) Mechanical installation of heat losses and gains occurring is calculated in accordance with prEN ISO 12241:2008.

c) (Repealed RG-1/4/2010-27539)

d) The channels in conditioned spaces, thermal resistance 0.6 M2K / W to be a little isolated. Thermal resistance and insulation of ducts to other areas in the 1.2 M2K / W to be a little isolated.

d) Mechanical installation of pipes and air-conditioning duct, ceiling pipes and channels with the distances between each other, the distance between the floor and the walls, calculations are made to not interfere with the application of the insulation thickness. Pipes and air conditioning ducts suspensions and permanent or fixed-supported bridges to support the formation of heat loss and heat are not allowed.

(3) Cold water pipes and cold fluid with the air-conditioning ducts and cooling installations, in order to prevent heat gain and the risk of condensation obtained from two different calculation method based on the thickness of the largest isolated from the outside. In order to prevent condensation and corrosion in the calculations, the surface temperature of the pipe and the canal, which falls below the dew point temperature of the insulation thickness are taken into account. Cold water pipes and cold fluid with the air-conditioning ducts and cooling installations open to the use of porous thermal insulation materials, exterior vapor barrier to prevent condensation are coated with a material.

(4) (Repealed RG-1/4/2010-27539)

(5) (Repealed RG-1/4/2010-27539)

(6) (Repealed RG-1/4/2010-27539)

Minimum Air Circulation and Sealing

ARTICLE 12 - (Amended: RG-1/4/2010-27539)

(1) Buildings, including the joints, can be heat transfer surfaces, cross-sections and / or hermetically sealing shafts provide a continuous and appropriate materials are used to prevent the passage of air. Indoor air quality in buildings without disturbing the controlled supply of fresh air is provided.

(2) Depending on the number of floors in the building accounts, building sealing, exterior windows, balcony doors and roof windows for leaks from the joint permeability values are used in the EN 12207 Standard. Insulated buildings with mechanical ventilation system, 50 Pascal pressure difference between the internal and external environments, the number of air changes to TS EN 13465 standard is used in calculations.

SECTION FIVE

Heating and Cooling Systems Design and Implementation Principles

Heating systems design principles

ARTICLE 13 - (1) The design of heating systems to be used in calculating the thermal transmittance coefficients are determined according to the conditions specified in Article 9.

(2) The heating system design calculations are based on standard 2164.

(3) (Amended: RG-1/4/2010-27539) In new buildings, building license, which is based on the total usage area of 2,000 m^2 and is made on the case of the central heating system.

(4) (Amended: RG-1/4/2010-27539) Area of 250 m 2 and an individual heating system on gas fuel with a detached buildings or sections of buildings used independently, or integrated condensing type heating devices used ekonomizerli devices.

(5) (Amended: RG-1/4/2010-27539) Temperature control equipments are used in the independent sections of the buildings heated with central heating system and control equipment are used in the heat centers based on internal and / or external temperature.

(6) (Amended: RG-1/4/2010-27539) In the event that temperature control equipments are used in the independent sections of the buildings with central heating systems, the heating pump groups are selected by the variable speed according to time, pressure or fluid flow rate.

(7) Systems providing sharing based on heating costs with central or local heating or heating with temperature control equipment in buildings with central heating systems.

(8) (Amended: RG-1/4/2010-27539) The chimney height and cross-sectional area of the heating system in buildings with central heating system are found by calculating the mass of the waste gas, waste gas temperature and according to the methods in TS 11389 EN 13384-1, TS 11388 EN 13384-2. The values on the manufacturer firm certifications are taken as basis in the hermetic or semi-hermetic natural gas devices.

(9) The boiler efficiencies of buildings with a central heating systemcannot be less than 75% in solid fuel boilers and less than 2 star (**) Regulation on Oil and Gas Fuelled New Hot Water Boilers published on the Official Gazzette on 5.6.2008 and numbered 26897 by the Ministry of Industry and Trade.

(10) placements of central heating systems are done according to TS 2192 standard and gas-fueled systems are based on the standard layout of the TS 3818.

(11) (Repealed RG-1/4/2010-27539)

(12) (Amended: RG-1/4/2010-27539) liquid or gas-fired forced-blown combustion systems to be used in central heating systems;

a) In the case of using forced draft burners for liquid fuel, burners are used;

1) is capable of heating systems up to 100 kW, but the air intake damper servo-controlled single-stage, two-stage or modulating control,

2) 100 kW to 1200 kW heating system is capable of two-stage or modulating control systems, with a capacity of 1200 kW and above only proportional control systems,

3) Burners are used for flue gas oxygen control system over 3000 kW systems,

b) In the case of gas-fired forced draft burners;

1) is capable of heating systems up to 100 kW, but the air intake damper servo-controlled single-stage, two-stage or modulating control,

2) 100 kW-600 kW heating system is capable of two-stage or modulating control systems with a capacity of 600 kW and above only proportional control systems,

3) Burners are used for flue gas oxygen control system over 3000 kW systems.

(13) (Amended: RG-1/4/2010-27539) boilers with a capacity of 500 kW and above water softening or conditioning systems that use or installed with both systems.

(14) (Repealed RG-1/4/2010-27539)

(15) (Repealed RG-1/4/2010-27539)

Heating systems, codes of practice

1. **ARTICLE 14** - (1) (Amended: RG-1/4/2010-27539) It is necessary to provide required air ventilation for the provision of clean air required by the type of fuel in heating center and dispose exhaust air.
2. (Amended: RG-1/4/2010-27539) Flue gas analysis and system maintenance to be carried out at least once a year, at the beginning of each operating period for liquid, gas and solid fuel central heating systems. A report was prepared containing system performance are stored to be presented to the relevant authorities.
3. (Amended: RG-1/4/2010-27539) Central heating systems, exhaust gas temperature monitoring by the operator or manager flue gas thermometer is calibrated to be used.
4. (Repealed RG-1/4/2010-27539)
5. (Repealed RG-1/4/2010-27539)
6. (Repealed RG-1/4/2010-27539)

7. In case temperature control equipments are used in the independent sections of existing buildings with central heating system, heating installation is selected by the variable speed according to the time, pressure or fluid flow rate of the heating pump groups.
8. (Amended subparagraph: RG-1/4/2010-27539) The flue gas heat loss limit values published in the Official Gazette No. 25699 dated 13.01.2005 Warming Air Pollution Control Regulation shall not exceed the specified limit values.
9. (Added: RG-1/4/2010-27539) The indoor temperature of the buildings with central heating system shall not fall below 15 ° C.

Cooling systems design principles

ARTICLE 15 - (1) (Amended: RG-1/4/2010-27539) Cooling requirement for non-residential buildings larger than 250 kW have central cooling systems designed.

(2) The refrigerants to be chosen for the design of cooling systems must conform to EN 378 series standards.

(3) (Repealed RG-1/4/2010-27539)

(4) (Repealed RG-1/4/2010-27539)

Cooling systems, codes of practice

ARTICLE 16 - (1) The cooling system must be set correctly according to thebusiness characteristics, and energy economy.

(2) (Repealed RG-1/4/2010-27539)

(3) (Repealed RG-1/4/2010-27539)

(4) (Repealed RG-1/4/2010-27539)

SECTION SIX

Ventilation and Air Conditioning Systems Design and Implementation Principles

Ventilation and air-conditioning systems design principles

ARTICLE 17 - (1) Ventilation and air-conditioning systems and the design of the TS 3419 complied with the relevant European Standards.

(2) (Amended: RG-1/4/2010-27539) In human foreseen in the heating and moistening of air blown through the period of the buildings, the absolute humidity of air blown from 10 grams to 1 kilogram of dry air, or to a lesser degree at an accredited institution can adjust the calibration is used by the controller.

(3) (Repealed RG-1/4/2010-27539)

(4) (Amended: RG-1/4/2010-27539) used for non-residential buildings;

a) A venue, special mechanical ventilation system in the absence of people in space space equipped with automatic system to ensure that the minimum indoor air quality.

b) the room temperature setting devices used in air conditioning systems.

c) on the basis Mahal with variable air flow control in air conditioning systems, to be attached to the system is provided with a variable flow fans.

(5) Air-conditioning systems, variable air flow variable, depending on the load of people to work in mechanical devices, equipped with internal air control.

(6) (Repealed RG-1/4/2010-27539)

(7) (Repealed RG-1/4/2010-27539)

(8) (Repealed RG-1/4/2010-27539)

(9) (Repealed RG-1/4/2010-27539)

(10) In the air flow ventilation and air conditioning systems of new buildings over 500 m3/h and higher, it is necessary to have heat recovery systems to be advantageous when taking into consideration the energy economy with initial investment and operating costs and have efficiency of minimum 50% in summer and winter working conditions by making the designs of the heat recovery systems.

These systems must have a by-pass assembly for seasonal transitions.

(11) The tenth paragraph of the study at the design stage for new buildings shall be constructed by the project owner and a report shall be submitted to the relevant authorities.

(12) The criteria required to increase the satisfaction of the thermal comfort and energy performance are determined according to the standards EN 7730 and 2164.

(13) Air-conditioning plants, seepage, and the heat transfer coefficient of thermal bridges must comply with EN 1886 standard.

Ventilation and air conditioning systems, codes of practice

ARTICLE 18 - (1) Operation and maintenance of ventilation and air conditioning systems are complied with TS 5895.

(2) The settlements of the ventilation and air-conditioning systems shall be complied with TS 3420 and relevant European Standards.

(3) (Repealed RG-1/4/2010-27539)

(4) (Repealed RG-1/4/2010-27539)

(5) Air ducts leak is determined and reported by the limits of EN 1507 and BS EN 12237.

(6) The time periods specified by the manufacturer of filtration systems are used in air handling units, and this situation is cleaned or replaced.

CHAPTER SEVEN

Sanitary Hot Water Preparation and Distribution Systems

Sanitary hot water preparation and distribution systems

ARTICLE 19 - (1) (Amended: RG-1/4/2010-27539) The arrangements of the sanitary hot water systems in buildings shall comply with TS EN 14336.

(2) Calculations required to determine the annual energy requirements of the sanitary hot water systems are done as given in prEN 15316-3-1.

(3) (Amended: RG-1/4/2010-27539) It is necessary to plan sanitary hot water system for non-residential buildings for accommodation purposes such as hotels, hospitals, dormitories and in sports centers on usage area of over 2000 m2 based on construction permits.

(4) The individual sanitary hot water preparation equipment used in the idependent sections shall have the thermal performance specified in TS EN 26 standards and central sanitary hot water preparation equipment shall have the thermal performance specified in TS EN 89 standards.

(5) (Amended: RG-1/4/2010-27539) Designs shall be made for the planning and preparation of sanitary hot water stored in the hot water systems, sanitary hot water temperature not exceeding 60 ° C. However, sanitary hot water stored to prevent the legionella effect is kept in the system at 60 ° C at the least for 1 hour per week.

(6) (Repealed RG-1/4/2010-27539)

(7) (Repealed RG-1/4/2010-27539)

(8) (Amended: RG-1/4/2010-27539) In case central plate heat exchangers are used in the central sanitary hot water preparation systems, storage tank are used as the storage system.

(9) (Amended: RG-1/4/2010-27539) Device, warehouse and distribution lines are insulated in a way so it does not go over 5 °C and it is controlled and reported by the operator of the building every year.

(10) (Amended: RG-1/4/2010-27539) If the sanitary hot water heat capacity remain below the lower limit of the boiler modulation study, a separate hot water boiler is installed in the summer.

(11) Accommodation buildings heating system uses steam for the production of hot water, hot water, producing a sudden quick and easy to use systems that do not need hot water storage.

CHAPTER EIGHT

Automatic Control

Automatic control

ARTICLE 20 - (1) (Amended: RG-1/4/2010-27539) Liquid and gas-fired boilers, combustion control, automatic control systems are installed.

(2) (Amended: RG-1/4/2010-27539) Each of buildings with central heating, air-conditioning and / or buildings with a cooling are equipped with automatic devices to regulate separately. With the exception of the residential buildings, spaces with different internal temperatures will allow adjustment of the automatic control system.

(3) (Amended: RG-1/4/2010-27539) Buildings used asresidential buildings with central heating system devices are equipped with automatic control systems for at least water control and outside air flow compensation.

(4) (Amended: RG-1/4/2010-27539) In buildings with central air conditioning system, automatic control system to control the set values must be present. These devices must

be able to set values in commercial buildings, according to the time in addition to the withdrawal of controls.

(5) With the exception of buildings used as a residences, lighting control time shall be in accordance with the light of day.

(6) (Amended: RG-1/4/2010-27539) Buildings on over 10.000 m2 area and have central heating, ventilation, air-conditioning systems and lighting systems are installed with computer-controlled automation systems.

(7) Sanitary facilities to be used in hot water circulation pumps are equipped with automatic operation equipment.

(8) (Amended: RG-1/4/2010-27539) Energies used for the lighting, heating, cooling and sanitary hot water needs of new buildings shall have designs that will allow for the measurement of energies that are used separately and appropriate measurement and monitoring systems shall be installed.

CHAPTER NINE

Electrical Wiring and Lighting Systems

Electrical and lighting systems

ARTICLE 21 - (1) The calculation method given in EN 15193 standard is used for the calculation of the share of the building's total lighting energy consumption..

(2) In order to make the most of daylight in buildings and avoid unnecessary artificial lighting;

a) (Amended: RG-1/4/2010-27539) Access keys are easily controlled by hand,

b) where there is the opportunity to benefit from daylight, daylight linked to the phone with photo electric switches, infrared, sonic and ultrasonic remote control switches,

c) there is no one on the spot automatic switch that closes the space is empty, and systems that can detect and artificial lighting,

d) One or several time adjustment keys are used.

(3) (Amended: RG-1/4/2010-27539) Timer or photo electric switches in conjunction with the light of day are used in buildings that require continuous lighting in working hours.

(4) (Amended: RG-1/4/2010-27539) General lighting lamps features for buildings according to the table is given in Appendix 2.

(5) (Amended: RG-1/4/2010-27539) Buildings other than the non-residential buildings shall have a device that allows the backlight to be turned on or off under the authority of all kinds of administrative staff including times when there are people inside. This device is not situated within the space, the crest is seen from the control facility must provide lighting condition. Different lighting levels for sporting purposes, and in the case of multi-purpose halls, at least two or more loci buildings with different uses, the basic level of lighting will allow only authorized personnel measures are taken to increase.

(6) (Amended: RG-1/4/2010-27539) In the same space, if the total installed power is over 200 W at the points of artificial light closer than 5 feet from a window opening, these points shall be contrelled independently regardless of other lighting control points.

(7) (Amended: RG-1/4/2010-27539) When natural lighting is adequate, artificial lighting with a timer or device that detects the presence of human does not have to start automatically.

(8) (Amended: RG-1/4/2010-27539) for the purpose of efficient use of electrical energy in buildings;

a) Except for special cases, not using incandescent lamps and preferring Class A and B electronic ballast-type tubular fluorescent, compact type fluorescent or sodium vapor lamps when the color temperature is not important,

b) Decorative lighting tools with high energy consumption not being used for general lighting,

c) the selection of study areas and distribution of fittings to provide adequate illumination levels,

d) Feasibility appropriate places, motion, heat, or the use of light-sensitive equipment, work environments, especially in stairways and toilets, sinks, places like the hallway and unnecessary uses sensors to prevent the use of lamps,

e) Choice of light-colored furniture and wall colors as fewer fittings and therefore less power consumption will provide the desired light levels,

f) the efficiency of luminaires and lighting paraphernalia rooms are required to be cleaned periodically to increase the level of light.

(9) (Amended: RG-1/4/2010-27539) Residential buildings, lighting, external lighting load energy requirement in addition to determining the interior of the building, with the exception of security lighting, outdoor lighting, load of the building is taken into account.

(10) (Amended subparagraph: RG-1/4/2010-27539) in the case of different lighting levels than the districts where the buildings and buildings used for residential purposes, will allow to increase the minimum level of lighting systems shall be installed by qualified personnel only.

(11) (Amended subparagraph: RG-1/4/2010-27539) electrical installation work, published in the Official Gazette No. 18565 dated 04.11.1984 Internal Electrical Installations Regulations and in accordance with the provisions of the relevant legislation are projected.

(12) (Amended subparagraph: RG-1/4/2010-27539) Residential buildings, electrical systems external to the matter in accordance with the relevant regulations, central and / or local level is power compensation.

CHAPTER TEN

(Amended episode title: RG-1/4/2010-27539)

Use of Renewable Energy Sources, Heat Pump and Cogeneration Systems

Renewable sources of energy, heat pumps, cogeneration and micro cogeneration systems (different title: RG-1/4/2010-27539)

ARTICLE 22 - (1) (Amended: RG-1/4/2010-27539) In order to meet the heating, cooling, ventilation, hot water, plumbing, electrical and lighting energy needs of new buildings and buildings on over twenty thound square meters as a whole or partial, systems such as renewable energy sources, air, soil or water source heat pumps, cogeneration and micro cogeneration are analyzed at the projection stage. One or more of these applications are done on the basis of unit prices unit prices published by the Ministry and the total cost to meet at least ten er cent of the building.

(2) (Repealed RG-1/4/2010-27539)

(3) (Repealed RG-1/4/2010-27539)

(4) (Repealed RG-1/4/2010-27539)

(5) the use of solar energy collectors are complied with EN 12975-1 and TS 3817.

(6) (Repealed RG-1/4/2010-27539)

(7) (Repealed RG-1/4/2010-27539)

Cogeneration systems

ARTICLE 23 - (Repealed RG-1/4/2010-27539)

CHAPTER ELEVEN

(Amended episode title: RG-1/4/2010-27539)

Business, Periodic Maintenance and Inspection

Operating and maintenance (title: RG-1/4/2010-27539)

ARTICLE 24 - (1) (Amended: RG-1/4/2010-27539) The operator of the building energy-efficient systems shall attend the trainings to be held by the relevant professional chambers in accordance with the principles and procedures determined by the Ministry and get a certificate.

(2) (Amended: RG-1/4/2010-27539) Maintenance, tests carried out with regards to the efficiencies of systems such as architectural, mechanical, electrical and lighting affecting the energy performance of the building within the scope of this Regulation and their periods are identified in the report prepared and approved during the design phase by the relevant administration. The building owner, manager, board and / or the energy manager is responsible for the timely and in proper manner performance of these tests and maintenance and modifications that will not go under the energy performance at the building design stage.

(3) (Amended: RG-1/4/2010-27539) It ensures that the system or equipment efficiencies are not lower that the design values by taking measures within the scope of periodic maintenance.

(4) (Amended subparagraph: RG-1/4/2010-27539) Other procedures and guidelines regarding periodic maintenance and tests are determined with a notification to be issued by the Ministry.

Audit institutions and organizations

Article 24 / A -) (Amended subparagraph: RG-1/4/2010-27539)

(1) The periodic inspections stated in relevant reports for the building's energy-consuming equipment and necessary inspections within the scope of this Regulation are

carried out by the Ministry and institutions and organizations authorized by the Ministry.

(2) The institutions and organizations that will carry out the audits will be trained according to the training criteria determined in the notification of the Ministry.

(3) The institutions and organizations will be responsible to the Ministry for the maintenance of activities. The Ministry monitors the activities of these organizations within the scope of the Regulation and, where necessary checks.

(4) In case it is determined that the energy performance certificate is not in compliance with the document issued by the Ministry after the building permit was issued after this Regulation has entered into force the building, at the latest within one year, shall be made available with the features of the energy performace document based on the project and construction permit. In this regard, natural or legal person is responsible for the construction of the building.

CHAPTER TWELVE

(Amended episode title: RG-1/4/2010-27539)

Energy Identity Documents, Information to be found on the Energy Identity Documents, Institutions Authorized to Give Energy Identity Documents

Identification of energy regulation (title: RG-1/4/2010-27539)

ARTICLE 25 - (1) (Amended: RG-1/4/2010-27539) The calculation method published in the decree issued by the Ministry is to be used for the issuance of the Energy Performance Certificates.

(2) (Amended: RG-1/4/2010-27539) Energy Performance Certificate is valid for a period of 10 years from the date of issue.

(3) (Amended: RG-1/4/2010-27539) Energy identity document shall be issued in the format and contents of Appendix 3.

(4) (Amended: RG-20/4/2011-27911) Energy Performance Certificates, to be prepared by the authority competent to issue Energy Performance Certificates. This document occupancy permits for new buildings to be offered under the relevant authorities. Energy Performance Certificates occupancy permits are regulated by the relevant authorities to buildings. Energy Identity Document and the information contained in the organization authorized to issue Energy Performance Certificate is responsible for the accuracy of this information.

(5) (Amended: RG-1/4/2010-27539) Energy Performance Certificate is to contain the information specified in Article 26 for new and existing buildings.

(6) (Amended: RG-1/4/2010-27539) A copy of the Energy Performance Certificate is to be given to the building owner, manager, board and / or energy manager and a copy shall be posted in a place easily seen in the entrance of the building.

(7) (Amended: RG-1/4/2010-27539) Energy Performance Certificate is renewed within a year to comply with this Directive in case any implementation is made to change the building's annual primary energy demand.

(8) (Amended: RG-1/4/2010-27539) Energy Performance Certificate's preparation is essential for the entire building. It can also, optionally, be issued for each independent section containing condominiums or different area of use.

(9) The Turkish Armed Forces, Ministry of Defense and its affiliates, the National Intelligence Organization and the adjacent area outside the buildings and buildings with a total construction area of 1,000 m2 or less regulation is not necessary for the Energy Performance Certificate.

(10) (Repealed RG-1/4/2010-27539)

(11) (Repealed RG-1/4/2010-27539)

(12) (Repealed RG-1/4/2010-27539)

(13) (Amended subparagraph: RG-1/4/2010-27539) Energy Performance Ceritificate is only issued by using BEP-TR by using the energy identity certificate is isued. BEP-TR access authorization is only given to the organizations authorized to issue identification.

However, this authority is used by real persons certified by the Misinstry in order to issue the energy performance certificate provided that they attend the trainings on behalf of the authority authorized to issue the certificate. In case these people leave the organizations and work in another institution also authorized to issue the energy performance certificates are entitled to access BEP-TR in the new organization with their written request without attending the training and certification program.

(14) (Amended subparagraph: RG-1/4/2010-27539) The competent authority on behalf of the organization and the organization's owner or manager of the relevant staff are jointly responsible for the regulation of the energy performance certificates.

(15) (Amended subparagraph: RG-1/4/2010-27539) Issuance of energy performce certificate is required for purchase, sale and leasing operations of the independent sections of buildings. During the sale or lease of the building or the independent section, the landlord or the tenant gives the buyer a copy of the energy performce certificate.

Information to be found on the Energy Identity Documents

ARTICLE 26 - (1) The folowing information shall be included in the the Energy Performance Document along with the building's energy needs, isolation facilities, heating and / or cooling system efficiency / effectiveness, and along with information about the building's energy consumption classification;

a) general information about the building,

b) Regulation and regulate the information

c) Building area (m2);

d) the intended use of the building,

d) building heating, cooling, climate, the amount of energy used for ventilation and sanitary hot water supply (kWh / year)

e) the amount of primary energy consumed annually by each type of energy (kWh / year)

f) uses per capita primary energy consumption of buildings, ranging from A to G according to the scale of a reference to the classification,

g) The final energy consumption, greenhouse gases created by the amount of usage per year (kg CO 2 / m 2-year)

i) use in buildings per capita greenhouse gas emissions, a reference scale ranging from A to G classification (kg CO 2 / m 2-year)

h) The building lighting energy consumption value,

i) (Amended: RG-1/4/2010-27539) based on the primary energy consumption, energy class

i) (Amended: RG-1/4/2010-27539) based on final energy consumption, CO 2 emissions class

j) (Amended subparagraph: RG-1/4/2010-27539) building utilization rate of renewable energy

shown.

Institutions Authorized to Give Energy Identity Documents

Article 26 / A - (Added: RG-1/4/2010-27539)

(1) (Amended: RG-20/4/2011-27911) Ministry announces the criteria of the exam which is done during and after the training of the engineers and architects who are employed in the authorized institutions to prepare Energy Identity Certificates on the application of this regulation. The trainings are given by the architecture, civil engineering, mechanical engineering, electrical engineering, electrical and electronic engineering departments of universities, Chamber of Architects, Chamber of Civil Engineers, Chamber of Mechanical Engineers, Chamber of Electrical Engineers and under the article 5627, by the authorized energy efficiency consulting companies in the field of building. After the trainings, those who are able to get 70 points or above in the exam carried out by the Ministry or by the request of the Ministry will be given the certificate to prepare energy identity certificate.

(2) Energy organizations authorized to issue the energy performance certificate shall have staff authorized to issue the certificate.

(3) (Amended: RG-19/2/2011-27851) Certificate of authority to regulate the energy performance certificate and professional associations who have been certified in the Free Consulting Engineers engineers or architects Or the engineer or architect within the respective legal entities possessing these characteristics, Energy Performance Certificates entitled to impose a new organization which will be considered buildings.

(4) The identification of energy to organize an on-site engineer or architect with authorization certificates containing Consulting Companies in Energy Efficiency, Energy Performance Certificates Authorized to existing buildings are considered established.

(5) Energy identity document to the competent authorities, professional liability insurance functions.

(6) Authorized to Issue Energy Performance Certificate Energy Performance Certificate which is given to organizations and institutions other than the relevant reports and void. This document is approved by the administrations concerned and reports.

(7) Energy authorized to issue identification documents with the regulation of the activities of these organizations is made by the control by the Ministry. The powers of those who are authorized to provide the identification of energy düzenlediklerinin misconduct or misleading documents to determine if the situation by the Ministry and the General Directorate of Electrical Power Resources Survey and Development Administration notified the relevant professional chamber and their rights until the end of the review and identification of energy regulatory powers of investigation is suspended. As a result of statements made by the Ministry, Independent Consultant and Engineer's license or certificate of authority under the Energy Efficiency Act are canceled or suspended three times in a year of those documents, the identification of energy regulatory authorities, will be canceled by the Ministry to not get a better one.

CHAPTER THIRTEEN

Annual Energy Needs

Annual energy consumption

ARTICLE 27 - (1) (Amended: RG-1/4/2010-27539) Heating, cooling, lighting and sanitary hot water needs of energy issues, in particular the principles and procedures related to the calculation of the annual energy needs by the Ministry is determined by a decree published in the Official Gazette.

(2) (Repealed RG-1/4/2010-27539)

(3) (Repealed RG-1/4/2010-27539)

(4) (Repealed RG-1/4/2010-27539)

(5) (Amended subparagraph: RG-1/4/2010-27539) BEP-TR method, which will be the identification of energy and more energy consumption in new buildings, class D and CO 2 emissions can not have.

CHAPTER FOURTEEN

Transitional and Final Provisions

Repealed Regulations

ARTICLE 28 - (1) published in the Official Gazette No. 27019 dated 10.09.2008 Thermal Insulation in Buildings Directive has been repealed.

ADDITIONAL ARTICLE 1 - (Added: RG-1/4/2010-27539)

(1) This regulation required under the energy needs of the building and lighting account for cooling energy standards issued by TSE

Determination of the Standards

PROVISIONAL ARTICLE 1 - (Repealed RG-1/4/2010-27539)

Declarations are removed

PROVISIONAL ARTICLE 2 - (Amended: RG-30/6/2010-27627)

(1) This regulation is needed within the scope of issues related to energy performance calculation methods papers by the Ministry, as of 01/01/2011 is removed.

Identification of energy given the existing buildings (title: RG-1/4/2010-27539)

PROVISIONAL ARTICLE 3 - (1) the existing buildings and buildings under construction and not yet received permission to use the building for ten years from the date of publication of the Law on Energy Efficiency in the Energy Performance Certificate is issued.

PROVISIONAL ARTICLE 4 - (Added: RG-1/4/2010-27539) (Amended: RG-30/6/2010-27627)

(1) Article 25 of this Regulation until the date will be 01/01/2011.

Enforcement

ARTICLE 29 - (1) This Regulation shall enter into force one year after the date of publication.

Execution

ARTICLE 30 - (1) This Regulation shall be executed by the Minister of Public Works and Settlement.

APPENDIX C

Certification

This appendix contains the certification.

OBLIGATION TO ASSIGN AN ENERGY MANAGER AT ENTERPRISES

Assigning a energy manager has been compulsory for some business according to Energy Efficiency Law No. 5627 entered into force once published in the Official Gazette on May 2, 2007 and Regulation on Increasing Efficiency in the Use of Energy Resources and Energy dated October 25, 2008 and numbered 27035. Establishments, Institutions and Businesses;

- In Industrial Plants;

- Energy manager to be assigned in companies with annual energy consumption of 1,000 tons of oil (TEP) and above,

- Energy management unit to be created under the energy manager's responsibility in companies with 50.000 TEP and over,
- Non-Residential Buildings;

- Energy manager to be assigned in commercial buildings with total construction area of at least 20,000 m2 or annual energy consumption of at least 500 TEP,

- Energy manager to be assigned in public buildings with total construction area of of at least 10,000 m2 or annual energy consumption of at least 250 TEP,

- Energy management unit shall be set up for companies located in Organized Industrial Zones (OIZ) and the annual energy consumption under 1.000 TEP to engage in businesses in OIZ,
- Electricity-generating plants with power of 100 MW and over must appoint an energy manager.

USAGE AREA OF ENERGY MANAGER CERTIFICATES

Under the current legislation, the following are the general framework of jobs certificate holders can do.

Engineers with Energy Management Certificate can work paid or as contracted consultants in Energy Efficiency Consulting companies, be designated as a full-time energy manager in industrial institutions, Organized Industrial Zones Energy Management Units and Power Generation plants. Productivity-enhancing projects (EIP) preparation and implementation services can be made by companies that have legal personality EVD.

Engineers with Energy Management Certificate and people with a degree from mechanical or electrical departments of technical education faculties can serve as a consultant to buildings obliged to appoint an energy manager.

SCOPE OF INDUSTRIAL / BUILDING ENERGY MANAGEMENT TRAINING

Two different trainings are held for the Buildings and Industry Energy Management. Persons who meet the application terms may participate in the training of their choice. Minimum training period for training conducted for 10 business days shall be 0 hours for industrial energy management, 75 hours for building energy management.Training is done as both theoretical and practical training.

The purpose of Energy Management training is to introduce people who have been trained the scope of energy management, gain the vision on energy efficiency, direct them for works to be carried out during energy management services and remind them methods and resources of information to help solve the problems. Before joining the training, the trainees' preliminary study from resources will increase the usefulness of the training program held for a short time and cover a variety of topics.

PRINCIPLES OF APPLICATION

Who Can Join

Accordance with relevant legislation, real participants from real or legal entities with degrees from engineering department for industrial enterprises, mechanical, electrical or electrical and electronics engineering for organized industrial zones and mechanical, electrical or electrical and electronics engineering or technical training schools for buildings.

Documents Required for Admission to Education

- Education Registration Certificate
- Energy Manager Data Sheet
- Proof of experience in the profession for at least two (2) years
- Room registration certificate for Engineers
- For engineers, proof that they have no debts
- 2 passport-size photographs
- Notarized diploma or output copy
- Education Fee Receipt (with the phrase Building and Industrial Energy Management Training Fee indicated)

Registration Procedure

- The candidates that wish to participate, are required to do their applications in the branch that will carry out the chosen energy management education.
- The registration process is carried out by the Branch Education Officer.
- Trainees that have not completed their registration fee is considered incomplete. EMO, is free to get other applicants if the payments are not fully made.

Education Fee

- The training fee is determined by the base fee approved by the Energy Efficiency Coordination Board (EVKK). Discount is provided for Chambers of Electrical Engineering (EMO) and Union of Chambers of Turkish Engineers and Architects (TMMOB) which wşll not be under the base fee. Certification fee is included in the

training price. Study notes, test sheets, all other documents are provided free of charge to trainees.

EXAM and CERTIFICATE

Exam

- During the exams, the documents that are given during training are based on all the information that are required by the energy manager, will be used for assessment and evaluation.
- The exam questions could be multiple choice, fill in the blanks, rearranging the article or problem solving.
- Notes are forbidden in the exams. In case additional information is needed, some extra information may be handed out. The trainees will need to have scientific calculators with them.
- The exam will take place on the last day of the training, in the training place. The exam questions are made and checked by the EMO Management Committee.
- In order to be successful in the exams, you will need to achieve at least 70 out of 100.
- The exam results will be given and will be written and sent to the Electrical Power Resources Survey and Development Administration (EIE).
- If any of the trainees are unsuccessful and fail their exams, without having to enter the training, they may retake their exam again – only once a year.
- According to the regulations, the trainees must enter 95% of their training, which will then receive "Energy Manager Certificate" after they are successful with their examinations. Trainees that are absence will not be able to enter the exam and the registration fee is non-refundable.

Energy Manager Certification

- At the end of the training, the trainees that have been successful will receive the following certificates - Building Energy Management Certificate - Industrial Energy Manager Certification

- Once the certificate number is given by EIE, the certificate is sent to the EMO branch of the province of the trainee by cargo and given against signature. Certification fees are based on the price determined by the decision of the EVKK.

APPENDIX D

Certification Authority

This appendix contains the certification authority.

WHAT IS ENERGY PERFORMANCE DOCUMENT (EKB) IN BUILDINGS?

According to "Energy Efficiency Law No. 5627" and "Energy Performance of Buildings Directive" issued accordingly, it is the document that contains information about the effective and efficient use of energy and energy resources in buildings, prevention of energy waste and protection of environment, classification of energy needs and energy consumption of the building in minimum, insulation properties, and the efficiency of heating and / or cooling systems.

*Energy Performance Document (*EKB), will use against all buildings apart from the ones as follows:

- Industrial areas carrying out production activities in buildings,
- Buildings with a planned lifetime less than two years,
- Buildings with total area of under 50 m^2,
- Greenhouses, Workshops,
- Buildings that are built as an individual such as warehouses, stables, barns and not requiring heating, cooling,
- Buildings that are outside the adjacent area with a total construction area of 1,000 m2 or less.
- Relevant authorities, energy agencies authorized to issue performance , investor organizations, building owners, building managers and energy managers, operator organizations, employer or their representatives, design and application architects and engineers, contractors, and manufacturers, consultants, natural or legal persons engaged in project control involved in making, using of the building, issuing of the energy performance card, entities authorized to issue the energy performance card, inspection bodies and business officials, officers are authorized and responsible.
- If the project is incomplete or incorrect or in the absence of standards, project designers shall be responsible; if the construction is incomplete or incorrect or in

the absence of standards, then the building control company and the contractor or construction firm shall be responsible within the rates of their power.

- If the system fails to work due to the business, the building owner, energy manager or operator organization is directly responsible.

- Relevant authorities are commissioned and authorized to follow, detect and fulfill the responsibility.
- The relevant authorities and organizations authorized to issue the energy performance document controls whether or not the projects and practices are in accordance with the provisions of this Regulation.
- If buildings that do not have design and implementation according to this Regulation are given building permit or construction permits, the related authorities, organizations authorized to issue the energy performance document and building inspection agencies, if any, will be responsible.
- *Energy Performance Certificate is* valid for a period of 10 years from the date of issue.
- *Energy Performance Certificates* are repared by the competent authority authorized to give the energy performance certificates and be approved by the administration. This document is an integral part of the certificate of occupancy permits for new buildings.
- A copy of the *Energy Performance Certificate* is retained by the building owner, manager, board and / or energy and the other copy will be hanged at the entrance of the building where it can be seen easily.
- *Energy Performance Certificate* will be renewed in a year in accordance with this Regulation if the primary energy need of the company is changed.
- It is essential that the *Energy Performance Certificate* is issued for the **entire building**. In addition, optionally, it shall be issued separately for each **independent section containing condominium or different use areas.**
- The relevant staff of the competent authority and owner or manager of the competent organization are jointly responsible for the issue of *energy performance certificate*.

- It is required to have energy performance certificate for works and operation regarding the **buying, selling and leasing** of the buildings and independent sections.
- A copy of the energy performance certificate of the landlord will be given to the **buyer** or **tenant** during the sale and lease of the building or independent section.
- Energy Performance Certificate is issued within ten years from the date of publication of Energy Efficiency Law (as of 02.05.2017) for existing buildings and buildings under construction without residential usage licence (issued immediately in case of Purchase - Sell).

How to determine the energy performance of buildings?

Determining the energy performance of a building;
a) Determination of the **annual energy consumption of the building per m^2**,

b) The calculation of the **CO2 emission** according to this value,

c) The comparison of these values compared to a **reference building,**

d) After the comparison, the building will be settled in the energy class between A-G.

What is the Building Energy Performance Calculation Method?

Method for calculating the energy performance of buildings (BEP-HY),

a) Evaluate the effect of all the parameters of the buildings energy efficiency consumption,

b) Has been determined to develop the **energy performance class**.

Calculation method is used to assess the energy performance of existing and new buildings in building typologies such as;

- **Housing,**
- **Offices,**
- **Educational buildings,**
- **Health facilities,**
- **Hotels and**

- **Shopping and Commercial centers.**

This calculation method consists of;

- **Comparison of energy performance of various design alternatives** for buildings in project stage,
- **Demonstration of the level** of standardized energy performance of **existing and new buildings,**
- **Implementation of energy efficiency measures** and evaluation in case **not implemented** through the calculation of energy demand in **existing buildings,**

This calculation method covers the following when assessing the energy performance of buildings;

- **Calculation of net energy amount** needed by the building for the building heating and cooling,
- **Determination of total heating and cooling energy consumption** of the building by taking into consideration the losses from the system installed to meet the net energy and system efficiency,

- Determination of **ventilation energy consumption**,
- Calculation of **lighting energy demand and consumption** for areas that do not benefit from sunlight or sunlight is not effective considering the effects of daylight in buildings,
- Calculation of the **energy consumption required for sanitary hot water**. This method of calculation was established by benefiting from the relevant **EU standards** and, where necessary, **ASHRAE and Turkish standards**. The method of calculation is "**simple-hour dynamic method**"

Simple-hour dynamic method calculates the building's heating and cooling systems needs and the net energy consumption necessary to meet these needs **on hourly basis.**

What happens in the calculation results?

As a result of calculation of the building's annual

- Heating
- Cooling
- Hot water

- Lighting
- Ventilation

Primary energy is determined by consumption. CO2 emissions are calculated based on these consumption values. The use of renewable energy sources are taken into account. The buildings calculated energy consumption and CO2 emissions compare values with the reference building.

What is a reference building?

A. Location and Climate Data

- Using the same climate data
- Having the same orientation
- It will be planned in the same place and in the same direction with the building to be actually done and have energy performance certificate issued and work twice for the data entered at once for both real and reference building with the same features of the calculation program,
- The climate data for the real and reference building will be applicable as the building is in the same place.

B. Geometry

- Plan and the roof will be the same type
- Number of floors and the total area will be the same
- It will be planned on the same geometry as the building actually built and have energy performance certificate and work twice for the data entered at once for both real and reference building with the same features of the calculation program,
- It will be planned to have the same coefficient and totals with the building actually built and have energy performance certificate and work twice for the data entered at once for both real and reference building with the same features of the calculation program.

C. Building shell

- The opaque and transparent standard components will be forced to meet the TS825 standards.
- The reference building shell shall comply with the minimum standards of TS825. There is nothing against the performance of energy held in the buildings that meet the minimum standard of TS825.

D. Mechanical systems

- It will own the minimum yield values and the characteristics defined in the system that is permitted by the legal regulations.
- The heating system chosen for the reference building is **natural gas**,
- **Central heating** system has been chosen for the reference building,,
- The system yields legal regulations (regulation and standards) permitted by the **minimum yield** and effectiveness have been selected for the reference building.
- The ventilation selected for the reference building is **natural ventilation**,
- The ventilation chosen for the reference non-residential building is **mechanical ventilation.**
- The cooling system selected for the reference building is the individual system,
- The cooling system selected for the reference non-residential building is the central system.
- In case the net energy requirement is not available in existing or any system that has been designed, than the characteristics of the system will be the same as the reference building.
- In case the calculated energy needed is insufficient in any current or projected system, the portion of the unmet need to meet by assigning an imaginary system. The properties of this imaginary system will be the same as the corresponding system.

E. Lighting system

- Lighting will have the parameters defined to a minimum
- Direct lighting system will be accepted according to the capacity.
- The volumes selected for the light reflection coefficient of the walls is (pD) 50%, the ceiling light reflection coefficient was determined as (pT) 70%.

- Artificial lighting of lamps used in the system:
- * for the residential buildings, 30% compact fluorescent lamps and 70% incandescent lamp is used
- * for the commercial buildings, 70% tube fluorescent lamps and 30% incandescent lamps are considered.
- The device type selected as a normal device is D group IP2X, the maintenance factor (MF) is 67% of the value.

F. Hot water system

- It will own the minimum efficiency value and the characteristics defined in the system according to the legal regulations permit.
- Natural gas water heater has been chosen for the reference buildings hot water system,
- Central hot water system has been selected for the refernce non-residential building,
- The minimum efficiency values have been selected for the reference building permitted by the regulations and standards for the selected systems.

G. Renewable energy and cogeneration system

- Renewable energy system and the absence of co-generation system have been accepted.
- It has been accepted that renewable energy or cogeneration system has not been used in the reference building,
- In the regulation, in the event of minimum rate for the use of renewable energy, it will be reflected in the reference building.

How do we do the Classification?

- The same calculations are made for an imaginary building, as it is made for a real building.
- The actual energy performances of the building are in proportion to the reference building when comparing the results.
- According to the obtained ratio, the buildings energy class is determined.
- As a result of this process, energy performance cards will be arranged for the buildings.

Building Energy Performance Classification?

- The reference has the same value as the building with an Ep value of 100,
- Moving to the upper limit of the reference building in the D class;

Energy class	Ep ranges
A	0-39
B	40-79
C	80-99
D	100-119
E	120-139
F	140-174
G	175-…

What is Building Energy Performance Software (BEP-TR)?

- BEP-TR is the national calculation method of the software.
- It is internet based software. The entered information is stored in a central database under the control of the Ministry. Thus, a detailed follow-up system database on buildings in Turkey is created.

What is Building Energy Performance Software (BEP-TR)?

- BEP-TR can only be used by registered users.
- Registered users of the system, the Ministry, local authorities, accredited Free Engineer Consultants or Energy Efficiency Consultant Company and EKB experts.

How do we use Building Energy Performance Software (BEP-EN)?

- The Ministry checks and defines all of the users and procedures in the system. They may intervene at any time, anywhere.
- Local authorities will check and approve new projects that belong to the EKB.
- Companies monitor and control the projects carried out by their employees and contractors.

- EKB experts use the calculation part of the software in order to organize the performance s of energy in the buildings.
- The Ministry gives individuals who have completed their training and succesfully passed their exams accredited Energy Performance Certificate (EKB) Specialists, their own usernames and passwords.
- Experts, enter their passwords on the software website and than enter the information belonging to the buildings.
- After the entered information is complete, the file is sent to the central database.
- The calculation is made by the central system. The certificates produced by the calculation are e-mailed to the EKB Specialist.

OTHER TOPICS

Job Security During the theoretical and practical training the trainees shall comply to all of the written and verbal instructions by the EMO officials. Trainees are responsible for any accidents and damages that is caused by their carelessness. The trainees have insurance against accidents and other trafic accidents during their course. The insurance is included in the training fee.

Accomodation The choice and cost of accommodation belongs to the trainees. EMO could help the trainees with their choice of accommodation. EMO is not responsible for the quality of the accommodation services.

Transportation Departures and arrivals for the practical training education program are provided by EMO

Food Lunch and snacks and refreshments given during training are included in the price of the training package

Additional Considerations • Detailed information on the Energy Management Trainining is on the following website; **http://www.emo.org.tr** • In case its needed, EMO has the right to change the dates of the planned training, cancel or add additional training during the year.

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BIOGRAPHY

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