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Energy efficiency

Energy efficiency measures include the measures and devices that contribute to the rational use of energy, economic saving and through which are performed the same or greater level of comfort.

As the most effective measures to increase energy efficiency are identified:

- a) Enacting and implementation of legislation for thermal protection and energy savings based on energy efficiency standards;

- b) Informing the public about energy efficiency through energy labels for buildings, energy labels for equipment and ensembles, practical manual for energy management in buildings;

- c) Stimulating of research and development of energy efficient technologies;

- d) Introducing the market with energy efficiency measures and actions to increase energy efficient materials, elements and the composition of the available devices on the market.

Some of the most successful energy efficiency measures depending on the cost of investments classifies as:

- â€¢ Free measures for energy efficiency

- â€¢ Energy efficiency measures of low investment costs

- â€¢ Energy efficiency measures of high investment costs

- â€¢ Long-term energy efficiency measures

The term free energy efficiency measures include all those which do not require the investment cost (or very low cost), but only engagement. Low-cost measures are those whose implementation does not exceed

the cash limit of approximately 150 EUR. Under the high investment cost measures are measures whose implementation ranges from 150-550 EUR. Long-term energy efficiency measures are measures which exceed the investment costs of 550 EUR.

FREE MEASURES FOR ENERGY EFFICIENCY

Regulation of thermostats on the central heating radiators

With regulation of thermostats on the central heating radiators, so that the temperature in the room is reduced by only 1 °C, you can save about 6% of energy for heating. The most of buildings and public spaces are characterized by overheating, which solves by the most inefficient way-by opening windows. Instead of simply reducing the flow of heat, it remains unchanged and the rooms are cooled by excessive ventilation.

Regulation of thermostats on the water heater

It is recommended to heat water in the boiler to a temperature not greater than 50 °C. Heating temperature can be set on the thermostat heater.

☒ Turning of the lights and power devices

In cases where the room is left for more than a few minutes, the lights must be off, and electrical appliances (televisions, computers, CD and DVD players, etc.) that are not currently in use.

Use a natural (day) light

Between the using of natural or artificial lighting, we should use the natural lighting.

Reasons are the following:

• Healthier climatic conditions on the premises

â€¢ More comfort

â€¢ Energy savings

â€¢ Money savings

â€¢ Reduced emissions of greenhouse gases in the atmosphere

â€¢ Lower consumption of limit fossil fuels

Useful tips when choosing a method of heating

When choosing a method of heating in any type of building is very important to study the factors of beneficial effects of devices or systems for heating. If the device or system has a performance factor less than 70%, it is recommended not to buy such devices, regardless of price or other performances.

It is important to emphasize that the use of devices with open flame for any purpose is extremely energy inefficient. Beneficial effect of an open flame is between 15 and 30%, which means that 70-85% of fuel goes into the chimney (in air). By comparison, energy efficient heating systems have a peak performance factor between 70 and 90%.

Cooling of buildings

It is recommended not to cool the room at a temperature lower than 26 °C. The difference between the set temperature on the air conditioner of only 1 °C (instead of 25 °C to cool on 26 °C) results with the saving of 9% of energy. Extremely irrational energetic move is to cool an empty room.

Ventilation of buildings

In order to save energy we should avoid a long term ventilation of the rooms during the winter months (requires a great amount of energy to reheat them) and continuous operation of mechanical devices for ventilation if there is no need for it.

Cover the windows at night

Through the windows, especially those with single-glazing heat losses are very large. Very simple but proven effective measure is to cover the windows with curtains at night and in periods when daylight is not necessary.

Showers and baths

In order to save energy on the one hand and water on the other, we recommend taking a shower instead of a bath. For a typical shower consumes only one-fifth the energy required for bathing in a bathtub.

Furthermore, using of energy-saving showers, sensors that interrupt the water flow and other significantly reduce the consumption of hot water.

☒ Water taps

Broken water taps should be repaired as soon as possible. By dripping of hot water lot of energy and water loses. It is important to tightly close the tip after use because drop by drop, large amount of water loses.

Benefits of energy of the Sun

A simple way of using solar energy is to open all the interior doors of the rooms in order to distribute heat to all parts of the building accessible.

HOUSEHOLD APPLIANCES

Refrigerators and freezers

Refrigerators and freezers should be set in the coolest place in the house, not near the stove or boiler. Their exposure to the Sun should be avoided if this is possible at all. It is important that between the back of the refrigerator or freezer and wall is enough space for ventilation to avoid overheating, which results an increase in energy consumption.

Recommendations for the energy efficient use of refrigerators and freezers:

â€¢ Do not keep the fridge open longer than necessary

â€¢ Shut well the refrigerator door

â€¢ Do not store in the freezer hot food (wait for it to cool)

â€¢ Timely defrosting of refrigerators and freezers conserve energy and prolong equipment life

Washing machines

It is recommended to choose the washing program with the lowest water temperature which is enough to wash the laundry well. It is energy efficient to wash a full drum of washing machine, then two half-filled drums.

Recommendation for energy efficiency cooking:

â€¢ Always put lids on the containers in which you cook- in this way, heat retains longer on one side and condensation of steam in the kitchen reduces on the other side

â€¢ When preparing coffee and tea heat only the necessary amount of water

â€¢ Always use the optimal circuit for heating the selected container

â€¢ Microwave ovens are more energy efficient than regular ovens

â€¢ When cooking on gas stoves make sure that the flame is not too strong and it does not circle around the vessels

â€¢ When hand washing dishes, after filling the sink with warm water close the drain, thus preventing the uncontrolled outflow of warm water

ENERGY EFFICIENCY MEASURES OF LOW INVESTMENTS COST (up to 150 EUR)

Short payback period is characteristic of energy efficiency measures of low cost (up to two years).

Isolation of doors and windows

It is recommended to insulate the doors and windows because in this way significantly reduce heat loss. Completing various cracks that may exist on the building, carried out when it suits the owner or users. Filling different cracks which may exist on the buildings carried out when it suits the owners or users.

☒ Recommendations for quality ventilation

When closing the air passage to avoid drafts and heat loss it is important to keep in mind that all devices with open flame for safety reasons require uninterrupted supply of fresh air, thereby kitchens, bathrooms and laundry room needs to be ventilated to avoid condensation.

Using time control switch (timer)

Timers are very useful additions to various systems and devices that allow us to use energy requirement (hot water, heating, etc) exactly when really needed. When we know in advance that we will not be few days in office or home, just make a timer that heating of water in the boiler or heating the room starts few hours before our scheduled return. It is irrational and actually throwing of energy to heat an empty room for days. It should be noted that if outside temperature is below zero it is not advisable to turn off the heat completely, but to warm the space on a very low temperature to prevent possible freezing of pipes and installations.

Setting the timer on the hot water cylinder to heat the water right for the time when hot water is needed to avoid the unnecessary heating of water which unused will start, depending on the quality of isolation tank, quickly or slowly to cool.

Installation of thermostatic radiator valve (TRV)

Experience shows that the installation of thermostatic radiator valve (TRV) can achieve energy saving of up to 20%.

Energy efficient lighting

Compact fluorescent (energy saving) light bulbs for the same intensity of light use only a fifth of electricity compared to ordinary (tungsten) light bulbs. It is recommended that in areas where is often using the artificial light (in average 2 or more hours per day) to use compact fluorescent light bulbs or fluorescent tubes.

Curtains and windows sills

Curtains from a compact material, especially if include a reflective layer, are more effective in reducing heat loss through the window than ordinary curtains. In order to prevent the circulation of air between the curtain and the window sills it is recommended that the curtain slightly fit on window sills, especially when on the wall below the window is radiator installed.

☒ Radiator protection

The recommendation is that behind the radiator located on the outer walls put reflective film or other type of insulation. If the radiator is below the window, window sill or a shelf above the radiator will reflect the warm air back into the room and thus reduce the heat loss through the window.

ENERGY EFFICIENCY MEASURES OF HIGH INVESTMENT COSTS (from 150 to 550 EUR)

Payback period is from 3 to 5 years.

The control mechanisms of the system for hot water heating

Many experiences have shown that replacement of the old mechanisms of control systems for heating and hot water in most cases economically viable measure. The new mechanisms of control should for sure have a separate programmer and thermostat on radiators and water heaters, which allows independent control system for heating and hot water as well as their on and off when needed.

If the heating system is equipped with optimizers, they allow the turning on in the last moment to raise the room temperature to the desired level, or turning off in the moment when the heating is no longer

necessary. Systems for heating and hot water, equipped with the aforementioned mechanisms of control are energy efficient systems to be applied whenever the financial opportunities allow, while having in mind that the payback period is maximum four years.

Heaters

It is recommended that when purchasing a radiator (heater) to make sure that it is not exaggerated, that is optimal output power for the space intended to be heated and is equipped with the thermostatic mechanism of control. It is important to note that electric heaters other than accumulations, consume electricity precisely when it is most expensive, and that they, primarily for economic reasons is desirable to avoid.

Close the chimney

It is important that the chimney can be one of the main reasons for drafts and heat loss, even when open flame is not in use. During windy days, cold air enters through the chimney and cause draft in a resident facility. Partial closure of chimneys that are not in use (opening for ventilation required to be left) will significantly reduce heat losses.

Maintenance of boiler plant

Regular maintenance of heating systems according to manufacturer's instructions is extremely important for its efficient operation. In cases of not maintenance of heating systems, the action of various factors affects in a reduction of energy efficiency which leads to the unnecessary loss of heat.

Use of energy efficiency appliances

☒ Energy efficient appliances use significantly less energy than standard and it is recommended that the purchase must take into account the consumption of the device, where is economically feasible to purchase appliances of energy class A (more recently A+ and A++) or eventually energy class B.

Energy labels are labels of energy efficiency, confirmation of the quality of the device based on the energy efficiency. Appliances according to energy consumption are divided into seven levels of energy efficiency

designated by letters from A to G (group A are the most energy efficient appliances).

The energy label allows users to effectively compare different device models according to energy efficiency, annual energy consumption and major performance and capabilities of the device.

LONG-TERM ENERGY EFFICIENCY MEASURES (investment costs are higher than 500 EUR)

Replacing boilers in heating systems

Experience shows that the boiler which is older than 10 years is energy-economically viable to replace. At the request of the EU Directive on Energy Performance of Buildings (2002/91/EC), all boiler in the heating systems which are older than 15 years, should be replaced. The most energy efficient is condensing boiler, and as such is recommended for heating systems, primarily in larger companies. When purchasing a new boiler it is recommended that you buy boilers with greater energy efficiency. From the point of energy savings combination boiler that is used for both space and water heating is proved to be satisfactory, and thus they do not need hot water tank heat losses are avoided which water tank causes no matter how well is isolated.

Solar systems for water heating

Typical solar systems for hot water in the households consist of solar collector surface standard 3 to 4 m² on the south-oriented roof and insulated hot water tank. Properly sized system for hot water, depending on the climatic conditions has to ensure 50 to 60 % of household needs for hot water, while the remaining requirements have to be provided in some conventional systems.

Although solar systems for hot water are still relatively expensive compared to conventional, they are the only valid option for the energy and environmentally sustainable future, and their massive use and prices would significantly declined.

THE ENERGY LABEL

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efficiency. Appliances according to energy consumption are divided into seven levels of energy efficiency designated by letters from A to G (group A are the most energy efficient appliances).

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Although the conclusions of numerous studies on the impact of energy labels on consumer behavior shows that the main criterion for selection of the product is the product market brand, price, size and functional characteristics of the device, however, energy efficiency labeling enabled easy comparison of home appliances on the market. Designation of energy consumption is a good stimulant to manufacturers to increase energy efficiency in order to avoid bad marking of products. If two devices are equal in all but the energy consumption, about 80% of consumers choice will be based on the energy label products.

Energy labels on household appliance

Home appliances and office equipment use more than a quarter of total electricity consumption in the Member States of the International Energy Agency (IEA) and beyond the energy consumption for transportation is the fastest growing sector of energy consumption. Energy efficiency of the devices is recognized as a way to primarily save money, because the same or higher level of service consumes less energy. By avoiding the generation of electricity fewer power plants has to be build and there is less need for land; less emissions into the environment through fossil fuel consumption and reduced emission of carbon dioxide which reduces the risk of climate change. Increase of market share of energy efficient devices can be achieved in several ways:

â€¢ Stimulation purchasing energy efficient products

â€¢ Suppressing buying inefficient products

â€¢ Stimulating research, development, manufacturing and market products that are more efficient than products currently on the market

Tree main mechanism to increase market share of energy efficient devices are identified:

Energy labels draw attention to the consumer and inform about energy consumption, cost and impact of devices on the environment. Standardization of energy labels and independent testing devices also protect against false claims, manufactures or retailers about energy consumption of the device. Accurate

information are given to consumers about energy consumption of the device which makes his decision to buy rational because it includes the price of the energy consumed during the lifetime of the system.

Energy standards bind device manufacturers to deliver only those devices that meet minimum energy efficiency levels. Devices that do not meet the energy efficiency standard must be technologically enhanced and for them it is needed to find other markets (markets that do not have a binding energy standard) or simply must stop producing them. The minimum standard must be determined so that the impact on reducing the total cost of the consumers and using the device without compromising its functionality. This provides a basic compromise between price and unit cost of its operation. Energy standard should be introduced when the buyer and user of the device is different person, for example landlord and tenant. No party uses a device completely so in the interest of landlord is the minimum purchase price of device and in the interest of tenants who pay the spent energy is higher energy efficiency of equipment so operating cost would be smaller.

Energy labels, standards and objectives have the best effect when used together with other measures of efficiency incentives, such as education, marketing promotion, financial incentives and investment in research and development.

☒ Energy labels are tasked to draw attention to the customer's energy consumption with other marketing device characteristics (price, trademark, design or color) and give simple information about energy consumption so equipment of different manufacturer can be compared. The label must be visually attractive and has to inform correctly.

The European Union in year 1992 launched the program "European Eco-label" to promote the products that have reduced environmental impact and provide complete, unambiguous and scientifically based information of the impact (Regulation of the European Parliament and Council 880/92). The program includes daily consumer products (except food, beverages and drugs) and until now includes twenty product groups. For devices for which is provided energy labeling European Eco-label in the form of a stylized flower is placed on the energy label.

☒ Energy labeling can be satisfactorily applied to office equipment and consumer electronics. Regulation 242/2001 of the European Parliament and the Council of the European Union to join the International Energy Star program, which in 1992 was initiated by U. S. Department of Energy and the Environmental Protection Agency in cooperation with device manufacturers. These are devices that meet certain specifications in the consumption of energy and have additional features that allow energy savings. Around a quarter of the best devices receive the ENERGY STAR label.

Energy standards in EU

Energy labeling is required for all major types of home appliances.

The first standard (Directive 92/42/EEC) introduced in the 1992 for the boilers for gas or heating oil has begun to be implemented until 1998. The introduction of other standards has initiated a unilateral initiative or the Member States. Netherlands in 1992 informed the European Commission of its intention to introduce minimum efficiency standards for refrigerators.

The Commission rejected the proposal with explanation that such a unilateral imposition of standards would disrupt the free European market, but the 1994 proposes energy standards which would apply to all member states.

Energy standard (Directive 96/57/EC of the Parliament and the Council), which removes from the market most devices in class D, E, F and G, was adopted on 3rd September 1996 with the application of the 3rd September 1999. Standard on minimum efficiency for fluorescent light bulbs passed on 2000. As there is no institutional framework that would give the Commissions the authority to introduce or complement energy standards for their introduction is the decision of the Council of Minister and Parliament. Therefore, the Commission has agreements with manufacturers more likely than the imposition of energy standards. Thus, in 1997 with the European Federation of Domestic Appliances Manufacturers (CECED) agreed to reduce average power consumption machine produced the 1994. In the first phase in 1997 were withdrawn from the production models of energy labels G, F, and E in 2000 and few models of label D.

The system of labeling energy-efficient devices in the European Union

Since June 2000 the European Union requires labeling of seven household appliances while standards exist for two and agreements for three types of devices. Energy labeling in the European Union started in some countries in the 1970s but in spite of various directives of the European Commission because of disorientation, controversy and opposition of some countries taking root in the 1990 when Denmark make a decision on the mandatory energy labeling of household appliances. Since such decision of one member of the European Union have an impact on the European market, Denmark has sought the opinion of the European Commission's harmonization with EU legislation. The European Commission has asked for postponement of implementation of the Act for a year to prepare a harmonized system of energy labeling for all EU countries. Directive 92/75/EEC on mandatory energy labeling of household appliances adopted in 1992 and the national parliaments of the obligations imposed by passing laws that will apply directives. From 1994 to 2002 eight directives for a variety of household appliances passed.

Bibliography:

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