

Energy saving at home

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Abstract: Last years much attention is paid to energy efficiency and conservation in organizations. But energy saving at industrial scale starts with heat energy saving, electricity and water in each apartment and every home. The article describes the basic rules of saving heat, electricity and water at home. Also described the means of promoting energy saving and energy efficiency among the population. Special attention is paid to the training of the population and advanced training of specialists at field of energy conservation.

Introduction

In recent years a lot of attention paid to energy efficiency and energy saving in Russia. Almost all the suggestions and ideas on energy saving are related to enterprises and organizations, including the budgetary [9-11, 19-24]. Nevertheless it is very important to teach energy savings of every citizen. We need begin saving energy and water in each apartment and every home. Consider the basic rules of saving energy and try to find the ways how to save water and energy at home.

Rules of saving heat, electrical energy and water at home

Savings of heat, electricity and water is not a rejection of comfort. It is providing the necessary living conditions through their rational use. For energy saving we need to calculate how much we consume. This is possible if you install metering devices in apartments. In our apartments is not technically difficult to organize the accounting of electric energy, gas, hot and cold water. Account of heat energy, we can provide using building-level heat meter.

Equipment houses and apartment buildings by metering devices of energy resources will allow [8]:

- pay only for the amount of energy that you have received;
- refuse to pay for the energy resources of low quality;
- effectively save on energy resources.

To install the building-level meters of energy resources must hold a general meeting of owners of premises in an apartment building with a view to deciding on the necessity of the above works, as well as the terms of payment of expenses for the installation of meters. Resolution of general meeting is formalized in the protocol and shall be brought to the attention of the managing organization.

Heat energy savings

Studies have shown that a lot of heat energy is lost through [8]:

- windows and doorways (40-50%);
- basements and attics (20%);
- exterior walls (30-40%).

To increase the heating capacity of radiators they should be clean inside and out. Over many years they are crammed inside by the sediments so the water can not penetrate. Radiators should be flushed.

If you cover the heaters by decorative panels or curtains, it can reduce the heating capacity on 10%. Coloring radiators oil paints reduces the heating capacity on 8%, and coloring by zinc oxide can increases the heating capacity on 3%.

Windows and doors should be warmed (or better change) since the main heat losses go through them.

Useful to cover the wall behind the radiator heating by heat-reflecting materials.

In winter window frames can glue paper. This should be done on the inner side and in calm weather. However it is better to use special sealing materials. Many of them are commercially available, and some are able to work a few years. They have been successfully used for thermal insulation of entrance doors (including metal doors).

Glazing of balconies and loggias lowers the total heat loss by 10%. Double doors also help conserve heat in the house.

Energy saving

At the apartment the energy is consumed for many targets. From year to year only increases energy consumption through the use of new appliances. Electric stoves, washing machines, dishwashers, computers, home theater and other home appliances consume a lot of electricity. Disabling unused devices from the network will reduce power consumption to an average of 300 kW·h per year.

The basic rules for saving energy [8]:

1. Cooking:
 - Use cookware with a thick bottom.
 - Use temperature of heating.
 - Stove must be in working condition.
 - To drink tea is best to use an electric kettle.
2. Storing food in the refrigerator.
 - Refrigerator is necessary to put on the coolest place of kitchen. Preferably near the outer wall, but in no case, not next to the stove.
 - The most economical mode for fridge is the temperature +5 °C and -18 °C for freezer. Increasing the temperature by one degree increases energy consumption by 5%.
 - Need to defrost the freezer in the formation of ice in it.
3. Heating of water. Most electric energy for water heating uses the dishwasher and washing machine. Reduce power consumption can be the next way:
 - Fill the washing machine completely.
 - Select the optimal mode.
 - More often use rinsing instead washing.
4. Lighting. Huge amounts of electricity goes to lighting. Lamps should be turn in areas where you are. Most efficient is use of local lights and point lighting. New energy-saving lamps save the electricity consumption and in due course pay back themselves, despite their higher cost.

Saving water

First of all need to fix the plumbing and all the water supply equipment. Often the water just flows without any benefit, but meanwhile [8]:

- if water drips from the tap – it is 24 liters per day or 720 liters per month;
- if water flows from the tap – it is 144 liters per day or 4,000 liters per month;
- if water flows into the toilet tank – it is 2000 liters per day or 60,000 liters per month.

Modern parts with metal-ceramic elements instead of rubber gaskets allow to forget about the eternal dripping from a faucet. With high reliability use them simply and easily.

Wash the dishes under running water twice wasteful. Except water also increase the consumption of detergents. More economical and more convenient to use the two stuffed shells (if it is possible). In one we can dissolve detergent, in other utensils are rinsed. Water consumption is reduced tenfolds, detergent is saving. Following these basic rules you can redistribute the money in family budget.

Education in the field of energy saving

Promotion of energy conservation and energy efficiency will allow to form a stable motivation to energy among consumers. For this can be used such means as: media (television, radio, newspapers, magazines), advertising space (banners, billboards, transport), Internet, printed products (leaflets, booklets, brochures), agitation in enterprises, organizations and institutions.

Low level of energy literacy can be improved by creating learning centers and also various training programs in schools, colleges, and universities. So the Civil Engineering Institute of St. Petersburg State Polytechnical University offers the following programs in this direction [15, 16]:

- International Master's program “Energy Efficiency and Sustainable Building”. During the course students will gain knowledge and skills in the design, construction and operation of energy-efficient buildings.
- Training courses on the program "Conducting energy audits to improve energy efficiency and conservation" (for professionals who already have a university degree). During the course students are introduced to the legal framework in the field of energy auditing, energy saving technologies, the methodology of energy surveys and development of energy certificate, with instrumental support energy audits affect economic issues.

Resume

Energy savings need to begin with compliance of rules of saving heat, electricity and water at home. It is important to create a stable motivation to energy saving among consumers. For this can be used such means as: media, advertising space, Internet, printed matter, propaganda work in enterprises, organizations and institutions, etc.

Thus, it is important to saving energy resources has become part of our mentality, industrial and consumer culture, the duty of every citizen.

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