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Recycling as a method to increase energy efficiency: problems and solutions

In the modern world the issue of energy saving and energy efficiency is one of the more challenging. While we often hear about energy saving, energy efficiency is not yet so well-known.

Energy efficiency is the field of knowledge combining engineering, economics, law and sociology. It means rational use of energy resources, achievement of economically feasible efficiency using existent power resources at the current level of technological development and observance of environmental requirements. Sometimes energy efficiency is called «the fifth type of fuel». First of all, it is a careful attitude to energy in any sphere and harmless energy production. Effective use of energy prevents wastage of resources and protects the environment.

Recycling is an excellent way to increase energy efficiency.

Recycling of metals.

Metals are perfectly suitable to recycling and are used to produce the products of the same quality, as initial product. Reprocessing of metal goods can preserve irreplaceable natural resources. Processing of tin and aluminum cans preserves about 95 % of the energy necessary to produce a new can from ore. The condition of scrap doesn't matter. Metal can be crushed, scorched or rusty. Practically all metals can be recycled. The exception is made for radioactive metals. Energy saved by recycling of a single aluminum can will be enough for 3 hours operation of a TV set. Processing of 1 ton of scrap iron saves 1,15 tons of iron ore, 635 kg of coal and 54 kg of limestone. Processing of scrap saves 75 % of the energy necessary to extract iron and produce steel from ore and is sufficient to provide 18 million houses with energy.

Recycling of a glass bottle saves as much electricity as that 100vt glow lamps can work for 4 hours. Some glass products can't be recycled. Glass is made of the same main materials (sand, ashes, soda and lime), but glass for windows or light bulbs has different additives and coatings. Therefore only bottles and jars are suitable for reprocessing.

Glass is one of the few materials which can be recycled multiple times without loss of quality.

Cardboard and paper are excellent materials for recycling. Each ton of the recycled paper keeps 17 trees alive. Producing paper from the recycled material needs 40 % less energy and 30 % less water.

Recycling waste paper is a multi-stage process aiming at extraction of paper fibers and other components of paper (such as mineral fillers) and using it as raw materials to produce new paper. Over time paper becomes yellow and usually to produce new paper products secondary fiber is mixed with the new fibers. Correct processing allows using practically all types of paper in the process. Some types of paper have a more difficult recycling path because they contain additives. For example, envelopes with plastic windows are not suitable for the process, first plastic should be removed first. Paper with a plastic coating can also become a problem.

The following types of paper are well-suited for recycling process:

- cardboard;
- dense paper;
- newspapers;
- magazines;
- advertising leaflets, small brochures;
- envelopes (without plastic windows);
- paper for copiers;
- writing paper.

Using recycled paper reduces energy consumption, however exact economy figures are disputed. U.S. Energy information administration claims that the economy of energy due to recycling in comparison with production of paper from virgin cellulose reduces energy costs by 40 % while the Bureau of the International Recycling claims that energy costs are decreased by 64 %.

A question arises: if we know all these statistical data showing that recycling solves not only problem of energy efficiency, but helps to decrease environmental pollution, why so little recycling is done in Russia?

Firstly, from the economic point of view it is very expensive due to sheer size of Russia: there are 85 Federal subjects in our country and vast distances. So, either transportation costs or costs of building multiple recycling factories shall be included in the calculations.

Secondly, only few people will hand over container for free and nobody will hand them over for cheap, and the state doesn't provide supportive policy to stimulate package return.

But it is possible to think over solutions to these problems, for example the problem of stimulation.

- Using systems implemented in other countries. The most effective solution to such situation was found in Greenpeace Australia. It is Container Deposit. It is a very simple system: price of the drink includes artificially high price of bottle, thus making about 10 % of the total price. To receive this deposit back the customer needs to return an empty bottle to shop. The principle of such system is “pollutant pays”: even if the person doesn't bring a bottle to shop, there will be somebody who will pick it up and receive money for it. Besides, the system makes the vendor responsible for the package which he makes and sells. This system works in South Australia for more than 30 years and it has impressive results. Today more than 80 % of all bottles are recycled. So, only in 2012-13 about 595 million bottles and cans were recycled that saved nearly 60 million dollars.
- Using social advertising. Social advertising is one of the brightest tools that make us pay attention to the most important problems, to think over the world we will live tomorrow.
- Using system of discounts on electricity. Energy is saved by recycling. State can introduce a standard system of discounts, which will be controlled by electronic cards and accounts. Everyone will have personal card, which keep information about tare brought by person for recycling. After achieving established level, person will be given a discount.

In our vast country a person generates on average about 445 kg of refuse per year, almost half a ton, why is this huge potential not put into raising energy efficiency?

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