Chapter 1

Energy and Energy Efficiency

ENERGY SOURCES

Originally, coal was the main source of energy. It remains so throughout the 18th century during the period of the rapid industry development. Later on, oil and naphtha began to be used as energy sources and their usage expanded especially in 19th century. A special feature of the above mentioned fossil fuels is their long creation period – requiring millennia. They are a result of rotting of different plant and animal kinds. In comparison to the period of their formation, the period of their utilization is far shorter. In accordance with a number of existing statistics about 2050 year it may be talked about a depletion of the liquid fossil fuels, also, the world coal supplies are considered to last within the next 200 years. Therefore, the development of nuclear power engineering is considered to be one of the alternatives to generate energy. Recently, the nuclear power energy generation has been denied in many countries because of the risks associated with its generation and because these risks have been confirmed by serious accidents throughout the World. The storage of worked nuclear waste is also a problem and risky. The renewable energy sources are another possibility to generate energy.

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Different kinds of energy sources known at present are shown in Figure 1. Significant achievements have been made in the 20th century. Many of them need additional supplies of energy. The needs are especially high in the developing countries.

The following questions are related to this point:

- How does the energy consumption change worldwide and what are the trends among branches and countries, and what are the future needs?
- What is the balance among the main energy sources, what are the forecasts for their development?
- How does the use of different energy sources reflect on the pollution of the environment?
- What are the possibilities to increase the energy efficiency of the different sources?
- Will the pollution of the environment continue and what should we expect for decreasing the harmful emissions?

The contemporary state and the forecasts for energy needs according to a specific kind of sources in the World are presented in Figure 2. It is evident that the necessity natural gas and other renewables keep on increasing. Detailed data for different countries can be found in (EIA, 2008).

Figure 3 shows the shares of the energy consumption per branches towards 2005 year (IEA, 2008). It is seen that the basic consumption of energy covers industrial needs – 33% and it should be mentioned that the household consumption follows it closely – 29%. In the third place is energy consumed for transportation – 26%. Based on the data provided by (IEA, 2008) there is an increase in the energy consumption of 23% between years 1990 and 2005. The biggest increase of energy consumption is in the branches of transportation and services – a total of 37%.

The energy consumption varies from country to country. In the following study, the countries are separated in two groups – members of Organization for Economic Co-operation and Development (OECD), and non members of this organization (non-OECD).

There are several aggregate energy indicators that show energy use divided per measure of activity that drives energy demand used in assessment of the final energy use amongst the countries. The most
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