

Abstracts Vol. 1 No. 3

Paulina ANCHIM, Joanna PIOTROWSKA-WORONIAK

*The “eco small coal” – a way towards cheaper and more ecological single-family house heating.
Part 1: The fuel and the boiler selection*

The paper aim is to present and compare modern, the most effective heat sources (max. power 20 kW) applied in the single-family houses. Only the conventional fuels were considered. Authors present the short characteristics of the chosen fuels and heat sources in dependence on the fuel kind, considering the pros and cons of the selected boiler rooms.

The heat values of selected fuels (pellets, wood, corn, energetic willow, coal, natural gas and propane-butane), and the costs of the heat unit generation, in comparison with the “eco small coal” (milled coal, grain diameter 8-25 mm, low contents of sulfur and ash) were shown in the paper.

Paulina ANCHIM, Joanna PIOTROWSKA-WORONIAK

The replacement of the oil-fired boiler room by the “eco small coal”-fired one supported by the unconventional heat source

The paper aim is to demonstrate the replacement of the existing oil-fired boiler by the “eco small coal”-fired one supported by the unconventional sources (solar collectors and heat pumps) to reduce the costs of heat generation in the single-family house. Two options of the modernization were taken under consideration. In the variant I the “eco small coal”-fired boiler works with the solar collectors supporting warm water heating, while in variant II the “eco small coal”-fired boiler room cooperates with the heat pump, in the parallel-duplex system, supporting central heating system. The total cost of proposed modernization and annual savings were presented in the paper.

Dorota KRAWCZYK, Paulina JAROMA

Technical and economic aspect in the central heating and warm usable water installation design in residential buildings

The paper aim is to discuss various types of the domestic central heating installations depending on the agent, distribution pipes and used materials. The advantages and disadvantages of different solutions, their technical and economic aspects, and utility possibilities were described. Investment was compared to the heating installations in various ways of implementation. The problems with the materials not being subject to recycling and solutions which help water use reducing both in central heating systems and warm usable water system were taken into consideration.

Dorota KRAWCZYK, Anna SOJKO-GIL

The influence of the building thermomodernisation on EP and EK efficiencies on the basis of kindergarten building

After many expert discussions and negotiations between countries in the European Union, the European Parliament and the Council of Europe decided to implement Directive 2002/91/EC on the Energy Performance of Buildings. This Directive orders to introduce the law to perform Energy Certificate for: new buildings, buildings which has been renovated and which will be for sale. As a result of the calculations is presented a graph of EP value for the building and the same building which requires the actual technical conditions. The differences between EP, EK and U for the same kinder garden located in Białystok, before and after modernization, are presented in the paper.

Andrzej KUCZAJ

Emission of organic compounds during biomass combustion

The aim of this paper was to analyse the emission of organic compounds during softwood pellets and their replacements (wheat straw pellet, peat/wood pellet, oats grains) combustion in the laboratory and during softwood pellets and softwood combustion in residential appliances (for pellets – burners, stoves, a boiler; for softwood – an old stove, an ecolabelled boiler). Literature measurements were done using gas chromatographic and mass spectrometric techniques. Measured emissions in the laboratory and in the appliances are assessed to be low, although during some stages of incomplete combustion some emissions were alarming. Replacements for softwood pellets gave rise almost to as low emissions as softwood pellets. It is proposed to use biomass combustion appliances on condition that the appropriate technology for

specific biofuel and the technology of high-efficiency combustion are chosen. This paper is based on the results of research of foreign authors, mainly Olsson's paper (2006).

Paweł ŁUKJANIUK, Katarzyna GŁADYSZEWSKA-FIEDORUK

Analysis of floor heating in passive and traditional houses

The aim of the paper is to present the analysis of floor heating in passive and traditional houses. In order to analyze the heating system in those two buildings it was necessary to make the calculations of annual heat demand. The calculations were made by means of the program Purmo OZC which allows us to make another important calculations for floor heating system using the program OVplan. The results and conclusions concerning the above analysis were presented in the paper.

Sylwia MIRONKO, Joanna PIOTROWSKA-WORONIAK

The profitability of electric power production from wind energy

Wind power belongs to category of renewable, and thus, environmentally friendly energy. Wind turbines produce energy without any kind of pollution.

Since wind turbines are free from any harmful discharge or emission into the environment, the government of Poland made a decision to continually increase consumption share from wind power. This will result in the erection of still more wind farms in Poland and thus protect the environment.

Through the use of this type of energy we have the opportunity to care for the environment and also save money, because the cost of wind turbine generator is practically disposable. The positive feedback from the customers of "green power" encourage investors to purchase of future solutions.

Wanda MOJKOWSKA, Katarzyna GŁADYSZEWSKA-FIEDORUK

Analysis of the heat losses for one-family house executed in two technologies

The paper subject is an analysis of heat losses for house executed in two technologies: traditional and passive house. At first theory about passive houses because of their innovative technology was described. Next heat infiltration coefficients for barrier in buildings were appointed and compared, so total heat losses calculation for these houses was possible. The calculations were carried out according to Polish standard PN-EN 12831. Passive houses are a chance for reducing energy consumption.

Jolanta NIEDZIELKO, Adrian TYSZKIEWICZ

Diversification in the fuel gas sector

The fuel market has been changed. The hesitancy of prices and environmental considerations force us to think about the most efficient type of fuel. Gas is an environmental friendly fuel. Because of the newest technologies it is generally approachable and used in the householders, industry and motorization. It is necessary to know the different kinds of gas and their properties in order to use them properly. The new gas poles are discovered – also in Poland. New technologies help or even let us extract gas from new places.

Urszula PISZCZATOWSKA, Mirosław ŻUKOWSKI

Characteristics of passive and active cooling systems by means of heat pump

Geothermal heat pumps are devices which use energy from the ground as an upper heat source for central heating and domestic hot water systems during the heating period. The first part of the paper focuses on applying these devices for the cooling of rooms in summertime. Implementation of this technology can be done in two cooling modes: passive or active. In the first case cooling is carried out by the direct use of cold water or soil. In this particular case there is no power consumption by compressor. The second possibility of implementation of cooling can be obtained by fan coil units or underfloor heating systems. The second part of the paper characterizes the integrated heating-cooling system, which is installed in the office building near Białystok. This system consists of heat exchangers, heat pump and air conditioning unit HPAC. System under consideration can operate both in the heating mode and as the passive and active cooling unit. This solution guarantees thermal comfort throughout all the year.



Tomasz Janusz TELESZEWSKI, Sławomir Adam SORKO

Modelling of transient heat conduction in walls with heating installations by means of the boundary integral equations method

The paper aim was to present a solution concerning heat conduction problem using boundary element method in walls with central heating. The boundary integral equation method is a numerical method for solving partial differential equations encountered in mathematical physics and engineering. Only the boundary distributions of the unknown functions or one of its derivatives were solved in this method. The boundary integral equation method is the reduction of the dimension of the solution space with respect to physical space by one unit. The boundary element method is an alternative to the finite difference method and the finite element method. Numerical solutions were compared with the results of the theoretical solutions. Examples of heat calculations were presented.