

PEPESEC Study Visit Report

Katowice

23rd – 24th April 2009

Summary

Over 2 days in April 2009 PEPESEC project partners visited the city-region of Katowice, Poland, to view practical examples of sustainable energy projects in the municipality of Katowice.

Despite the meeting with municipal authorities and a workshop addressing attitude towards the sustainable energy planning issues the visit shown a few good practice examples of high-quality developmental work, covering a wide range of practical applications.

The summarising conference, held during the last day of the visit, gave a good opportunity to exchange experience and present achievements of the project partners.

A) Study Tour, 23rd April

1) The Sewage treatment plant "Gigablok" Katowice "The use of methane for heat and electricity production"

The "Gigablok" Waste Water Treatment Plant receives raw sewage from a vast part of Katowice City. The rating capacity of the plant reaches 40 thousand m³ of sewage. The waste water treatment process involves anaerobic fermentation process that is the source of biogas containing mainly methane and carbon dioxide. This biogas has chemical composition and calorific value sufficient for combustion either in boiler burners or in piston gas engines.

This property of the biogas is used at the Plant to produce heat for technological purposes (to sustain the fermentation process) and for heating the administration and technical buildings at the plant. Despite heat also electricity is produced by means of a combined heat and power gen-set. The amount of produced electricity is sufficient to partly meet the power demand from the Plant and in that way to reduce power purchase from the National grid. This option makes it possible to reduce specific costs of waste water treatment.

The plant was co-financed from an EU grant and the plant meets restrictive requirements related to environmental impact.

Power generating with full capacity (target values): 280 kW_{el}, 413 kW_{th}.

Biogas yield – 300 m_n³/hr. Nowadays the plant is under the process of approaching its full capacity. The Guests visited the plant and they were informed in details in the technical and ecological aspects of the plant operation technology and mode. They visited the site with the fermentation tanks, the boiler room and the gen-set compartment in which electricity is cogenerated from biogas together with heat.

2) The Police School in Katowice

"A thermo modernization of buildings including RES utilization"

One of the didactic buildings at the Police School in Katowice was equipped with a Ground Heat Exchanger. The objective of this investment was to reduce costs of heating and air conditioning inside this building. The Ground Heat Exchanger is partly located underground and partly above the ground level, due to inconvenient circumstances of underground water environment.

The exchanger is filled with flushed river gravel. It is used for preparation of ventilation air prior to its intake into the building. The exchanger ensures sufficient capacity of air inflow and very good parameters of the air inflowing into the building downstream the exchanger. The air has very good parameters, such as temperature and humidity and is very clear in terms of microorganisms and airborne pollutants such as pollens.

The energy and economic analysis proven that the actual costs of air heating and cooling are significantly lower than in a typical heating /air conditioning system. Also power demand necessary to operate the system is much lower, because the pressure drop resulting from air flow through the exchanger is as low as ca 100 Pa, so that low power fans are sufficient to provide the building with sufficient amount of ventilation air downstream the ground heat exchanger.

Replacement of a typical heating / cooling system with the ground heat exchanger generates also ecological effects, including greenhouse gases mitigation, that result from significantly reduced use of energy.

The Guests were informed by the Commandant of the Police School about the history of the project and about benefits and advantages for the school that come out from this undertaking. The chief designer of the system gave more explanation about technical details and answered to some questions put by the visitors.

3) The Heat Energy Company - Tychy

"Modernization of a boiler room, Tychy-Wilkowyje, together with associated infrastructure"

The Tychy Heating Utility put into operation a new plant erected in the place of an old and completely used heating boiler station, recently demolished. The new plant is equipped with new generation coal boilers using high quality hard coal as a fuel. The new plant operates hard coal fired boilers 1,8 MW heating capacity, used only during the heating season. The combustion technology applied in the system ensures very significant reduction of airborne pollutants in comparison to the parameters of the old plant, presently not existing anymore. For example the particulates emission is reduced by 96%, carbon monoxide by 88%, carbon dioxide by 47%, sulfur dioxide by 55% and nitrogen dioxide by 45%. The new boilers ensure thermal efficiency of 83% in average. The plant provides heat to the customers, using newly constructed district heat network with pre-insulated tubes.

At the beginning of the visit, the Guests watched a technical movie showing the boiler plant and its technological details and after that they visited the boiler houses, tracking the entire technological process step-by-step. The plant operators explained details of the combustion system, ash removal and heat exchange node with automation.

4) The “Euro-Centrum” Industrial Park, Katowice - Ligota

The owner of this asset, the “ Euro-Centrum Group” focuses on developing technologies of recovering energy from alternative sources and energy conservation in buildings. The Group includes the following initiatives: Euro-Centrum Science and Technology Park, Euro-Centrum Industrial Park and Euro-Centrum Cluster of Energy Saving Technologies.

The Euro-Centrum Group invites companies, scientific and research centers, higher education institutions and sector associations to locate their offices in the objects of the Center. The Group cooperates closely with technical universities and other research oriented organizations in optimizing use of energy in order to contribute in the efforts on protecting the climate. The target audience of the Euro-Centrum Group are any business entities who want to develop innovative solutions and use of renewable energy and energy conservation in buildings. As a result of combining of business and science, practical development and implementation of energy efficiency in buildings can be fast and effective.

The site will host up to 80 companies, employing about 1000 persons. The Guests visited a newly erected passive building characterized with very good operating parameters related to energy demand, as well in respect of heating as of cooling (summer). The passive building is expected to show energy demand equal to 15 kWh/m² yearly, while classical buildings demand as much as 120 kWh/m² yearly.

The Guests met the Development Manager of the Center and listened to explanations given by the chief architecture-designer of the energy efficient building. The object was designed based on experiences acquired by similar organizations in Europe, especially in Graz, Austria.

C) Regional Conference, Friday 24th Oct

“How the climate change policy affect local energy planning process”

Held at the Metropolitan Association of Upper Silesia, this conference featured up to 30 delegates from the region. This provided a forum for information exchange and dissemination of progress on the PEPESEC project.

Conference Content and Speakers:

- Welcome speech - Mayor of Katowice City , Mr Piotr Uszok
- Metropolitan Association of Upper Silesia - Mr Piotr Popiel, "Characterization of the Union, the basic expectations of cities involved in energy planning and climate protection "
- Silesian Union of Municipalities and Districts – Mr. Ferdynand Morski, "Experience in the implementation of energy planning obligation and issues of climate protection in the Silesian towns "
- Institute for Sustainable Development in Warsaw – Mr. Andrzej Kassenberg, "Climate Challenges - the urban aspect"

- SKANE Energy Agency (Sweden) - Per-Johan Wik, "Energy Planning Process in Sweden"
- Manchester: Knowledge Capital (UK) - Simon Robinson – "The PEPESEC Project Vision"
- Polish Foundation for Energy Efficiency – Mr. Sławomir PASIERB, "The vision and the strategy of energy systems development in the City of Katowice"
- „Energoekspert „ Sp z o. o. – Mr. Adam Jankowski, "Assessment of the energy in the context of the new energy policy and climate policy"
- The City of Czestochowa – Mrs. Bożena HERBUŚ, "Collaboration and communication with local utilities - the condition of successful energy planning "
- Polish Foundation for Energy Efficiency - Szymon LISZKA, The City of Katowice - Daniel WOLNY, "Katowice – the city of sustainable energy"
- Summary - Questions and requests, End of the conference

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