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Promoting Energy efficiency to Local Organisations  
through dissemination Partnerships in Europe  
Best Actions for Collaboration in Countries  
for a High efficient Use of energy in Structural funds

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## Modernisation of heat supply system - Buczyna - Poland

The project concerns reduction of atmospheric pollution through modernisation of heat supply system in the town of Buczyna

Target Groups	Sector	Field
<ul style="list-style-type: none"> <li>- Local authority</li> <li>- Domestic consumers</li> </ul>	<ul style="list-style-type: none"> <li>- Energy supply</li> </ul>	<ul style="list-style-type: none"> <li>- Equipment / appliances</li> </ul>

### ANALYSIS

#### MOTIVATION & HISTORY

Buczyna City is located on the Silesia region. It has 3,5 thousands of inhabitants.

The town did not have an efficient heat supply system. The heat supply needs were served by small local coal-fired boiler houses and individual store heating systems.

The area which was subject to this project covered mainly old town centre and a one residential district. It was supplied by 16 boiler houses.

The capacity of the boiler houses in Buczyna varied from about 30 to 300 kW. Only two of them were larger. The heat transfer network was built on the traditional basis. Only a 80-metres sector was built according to the new, pre-isolated pipes technology (standard ISO 9000). Heat production control was manual. Basing on ambient temperature data the required temperature of network water was being established. This was being achieved by the control of the amount of fuel supplied to the boiler.

Only one boiler-house was equipped with cyclone - dust pollution abatement facilities. Other heat sources were not equipped with any pollution abatement facilities. As a consequence there was severe environmental damage and nuisance.

The town of Buczyna had discussed the various different possibilities of modernisation of the town's heating system for a few years. The possibility of building one large central heating system had been considered with regard to the largest boiler house of WPEC Opole.

Another idea was to build a central heating system based on biomass (straw) as the basic fuel. However, because of the Polish Oil and gas Joint Stock Company initiative aiming at natural gas supply to the town, and taking into consideration high economic costs or little ecological effectiveness of other variants, it had been decided to liquidate existing coal-fired boilers and to modernise the Buczyna heating system by means of gas-fired boiler houses.

#### PROJECT DESCRIPTION

The project, which lasted from 1997 till 1998 concerned the modernisation of the heat supply system of the town Buczyna by replacement of the coal-fired low-efficiency boiler houses with a new system of gas-fired boiler houses.

Implementation of the project involved the dismantling of 16 coal-fired boiler houses, the construction of a gas distribution system, the building of 8 modern gas-fired boiler houses, the additional construction of a small network of heat distribution connecting new gas boiler houses with groups of heated buildings and the optimisation of the complete heat distribution network.

In the project there was assumed that the power of the new gas-fired boilers would be equal to the power of the old coal-fired boilers, in this case 5.12 MW (16 local boiler houses).

It is worth to point out that beside the direct investment in the town there were prepared the public campaigns to promote efficient use of heat in Buczyna. They included

- articles in local, regional and national papers and magazines;
- radio and TV presentations
- information on ATMOTERM and other WWW pages



THE BOILER AT OKREZNA STREET BEFORE MODERNISATION



THE BOILER AT OKREZNA STREET AFTER MODERNISATION

## COST AND BENEFITS

### COST AND FUNDING

The project was funded with a grant of USD 450 000 (360 000 EURO) by Senter, which represents the Ministry of Economical Affairs of the Netherlands. A Polish contribution of USD 150 000 (153 000) EURO) was added to this sum by the Town Council of Byczyna and Opole District Heat Energy Enterprise (WPEC).

### BENEFITS AND BENEFICIARIES

The overall project will - by a conservative estimate - have a lifetime of at least 15 years and will result in a reduction in greenhouse gas emissions of 5900 tonnes/year, lower heat production costs and, at the same time, reduced local air pollution. Local benefits include elimination of sulphur dioxide (SO<sub>2</sub>) and dust particles and a significant reduction in nitrogen oxides (NO<sub>x</sub>) emitted by the new boilers. The predicted environmental benefits have already been verified by the first monitoring report, which was accepted by Joint Implementation Registration Centre.

### DETAIL INFORMATION ABOUT AIR POLLUTION

The air pollution causes by coal-fired boiler houses before modernisation:

- The emission of greenhouse gases:

CO<sub>2</sub> - 7370 Mg/year,

CH<sub>4</sub> - 8.79 Mg/year,

N<sub>2</sub>O - 0.163 Mg/year.

- The emission of other air pollution:

SO<sub>2</sub> - 53.8 Mg/year,

NO<sub>2</sub> - 7,8 Mg/year,

CO - 95.1 Mg/year,

dust - 66.2 Mg/year,

heavy metals, stable organic compounds.

The forecasts of the air pollution after modernisation of heat supply system by replacement with a new system of gas-fired boiler houses are very optimistic. The emission of greenhouse gases should decrease considerably. Particular emissions after modernisation is expected as follows:

CO<sub>2</sub> - 2173 Mg/year, it means decrease about 70%;

CH<sub>4</sub> - 0.23 Mg/year, it means decrease about 97%;

N<sub>2</sub>O - 0.001 Mg/year, it means decrease about 100%.

It is expected the considerable decrease of the emission of other air pollution also. Particular emissions after modernisation is expected as follows:

SO<sub>2</sub> - 0.009 Mg/year, it means decrease about 100%;

NO<sub>2</sub> - 0.97 Mg/year, it means decrease about 88%;

CO - 0.58 Mg/year, it means decrease about 100%;

dust - 0.008 Mg/year, it means decrease about 100%.

## PARTNERSHIP

## PARTIES INVOLVED

The project was carried out within the cooperation between Poland and the Netherlands.

From Dutch side three partners were involved:

- Senter International (The Hague) - the representative of Dutch Ministry of Economical Affairs,
- TNO-MEP (Apeldoorn) - part of TNO which is the largest fully independent research, development and consultancy organisation in the Netherlands,
- REMEHA (Apeldoorn) - a leading manufacturer of gas-fired heating boilers.

From the Polish side five main partners were involved:

- Byczyna Town Council,
- Opole District Heat Energy Enterprise (WPEC),
- ATMOTERM Ltd (Opole), one of the oldest Polish energy and environmental consulting firms,
- Brugman Polska Ltd. (Wroclaw) - a wholesale dealer with 6 offices in Poland. The main products of Brugman Polska were Remeha boilers and (Brugman)radiators,
- The Polish National Energy Conservation Agency (Warsaw).

For the special purposes as design and installation works subcontractors were included.

## RECOMMENDATIONS

### LESSONS LEARNED

The project has revealed certain lessons which it is useful to mention:

- the selection of well-balanced teams from both countries, specialised in specific areas within the project can contribute significantly to an undisturbed project progress and a successful result.
- the project has led to an attractive level of investment per avoided ton CO2. This can be taken into account for projects to be developed commercially.

## TO KNOW MORE

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## USEFUL INFORMATION

List of Internet sites

[KAPE / www.kape.gov.pl](#)

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