

# Reconstructing District Heating Plant in Sala

## *Regional Energy Agency Sala - Galanta, Slovakia*

### Summary

The project was carried out in order to increase energy efficiency of District Heating Plant Kukucinova in Sala, in south west of Slovakia. The total original installed capacity of 11 640 kW provided heat and domestic hot water to 2520 inhabitants of the town Sala. The project includes the total change of boilers and all equipment of heating plant and a switch from brown coal to natural gas. As a result the heating plant's efficiency was increased, the running cost and CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub> emissions were decreased. Furthermore the noise of heating plant that was a trouble for people living around is solved. There is also no need to supply heating plant with 740 trucks of brown coal per year. This is another contribution of the project to improvement of air in the town.

#### End-user area

- New buildings
- Refurbishment of buildings
- Transport and mobility
- Financial instruments
- Industry
- Legal initiatives (municipal regulations, directives, etc)
- Planning issues
- Sustainable communities
- User behaviour
- Education
- Other

#### Target Audience

- Citizens
- Households
- Property owners
- Schools and universities
- Decision makers
- Local and regional authorities
- Transport companies
- Utilities
- ESCOs
- Architects and engineers
- Financial institutions
- Other

#### Technical

- Energy efficiency
- Heating
- Cooling
- Appliances
- Lighting
- CHP
- District Heating
- Solar energy
- Biomass
- Wind
- Geothermal
- Hydro power
- Other

### Context

The town of Sala has 25 000 citizens. Two thirds of them live in housing estates that are supplied by heat and domestic hot water from three municipal heat plants and two private heat plants. All of them used brown coal as a fuel. However four heat plants were reconstructed and fuel was switch to natural gas. This lead to increase of district heating efficiency and emission decrease. The last heat plant which using brown coal was Kukucinova. It was necessary to modernise it not only because of its inefficient service and ecological problems but also because boilers were in bad conditions and out of date. The study of state of Heat plant Kukucinova was carried out in 2000. There were two alternatives how to solve existing state. The first alternative suggested connecting heat water distribution system Kukucinova with other heat plant and closing Heat Plant Kukucinova down. Second alternative suggested reconstructing Heat Plant Kukucinova in order to run efficiently. The owner (MenertTherm LLC) made a decision to reconstruct Heat Plant Kukucinova.

## Objectives

The direct objective of the project was to increase efficiency of running Heating Plant Kukucinova. Consequently by decreasing of CO<sub>2</sub> and SO<sub>2</sub> emissions and ash, quality of air in the city was improved. Moreover the noise of heat plant, caused mainly by ash fans was eliminated. The running costs were decreased greatly.

## Process

MENERT LLC carried out realisation project and also realisation itself in 2001. Four old brown coal boilers, type SLATINA V 2500U with heat power 2910 kW each, were replaced by two boilers VIESSMANN, type Vitomax with heat power 2600 kW and type Paromat Triplex RN with heat power 895 kW. The third new boiler is CKD DUKLA OW200 with heat power 2300 kW. The total new heat power of heating plant is 5 795 kW. New control system of boilers and other equipment (mix valves, pumps) was installed.

**Table No1 Comparison of efficiency before and after reconstruction**

	Before reconstruction	After reconstruction
Fuel	brown coal	natural gas
Heat value	17,45 MJ/kg	34,3 MJ/m <sup>3</sup>
Annual fuel consumption	3 528 ton	800 000 m <sup>3</sup>
Potential of heat in fuel	49 376 GJ	27 210 GJ
Annual heat production	34 677 GJ	24 000 GJ
Boilers efficiency	72,4 %	92 %
Heat Plant efficiency	70,2 %	88%

**Table No2 Comparison of emissions before and after reconstruction**

	Amount - before reconstruction (tons per year)	Amount - after reconstruction (tons per year)
Ash	2,032	0,104
SO <sub>2</sub>	83,261	0,012
NO <sub>x</sub>	10,584	2,02
CO <sub>2</sub>	6 198	1 560
CO	21,168	0,817

**Table No3 Comparison of running costs before and after reconstruction**

	Amount before reconstruction (SKK per year)	Amount after reconstruction (SKK per year)	Savings (SKK per year)
Fuel	6 520 000	6 110 000	412 000
Emissions fees	128 600	3 200	125 400
Electricity	756 999	272 159	484 840
Salaries			120 000
Repairs			350 000
<b>TOTAL</b>			<b>1 492 240</b>

## Financial resources and partners

Investment cost into project of reconstruction of Heat Plant Kukucinova was 6 300 000 SKK. Pay back period is 4,3 years calculated using current cost of heat in Sala.

Project partners :

- MENERT LLC.

## **Results**

A major benefit of this project is increase of boilers efficiency by 20%, consequently increase of heat plant efficiency by 18 %. Secondly, emissions of CO<sub>2</sub> were decreased 4 times, CO by 25 times, NO<sub>x</sub> 5,2 times, ash and SO<sub>2</sub> emissions were decreased almost to zero. Moreover running costs were decreased by 1 492 240 SKK per year. Noise of heat plant was eliminated too. Further the increase of noise and pollution by trucks that supply heat plant by coal was eliminated as well. Due to modern automatic control system Heat Plant Kukucinova is working efficiently now.

## **Lessons learned and repeatability**

The output of the project is increased heat plant efficiency, decreased emissions production and heat plant running costs that is always reached when fuel is switch from brown coal to natural gas.

### **Contact for more information:**

Organisation / Agency: Regional Energy agency Sala - Galanta  
Main contact: Igor Belovic  
Address: Dolna 5, 927 01 Sala, Slovakia  
Tel: +421 31 7706259  
Fax: +421 31 7706259  
E-mail: [rea@rea.sk](mailto:rea@rea.sk)  
Web Site: [www.rea.sk](http://www.rea.sk)