

<b>Setting</b>	
Country	Slovak Republic
Location	Zvolen
Project start date	January 2007
Project end date	July 2008
Technology keywords	Advanced technologies, High temperature technologies, Agricultural waste, Coal combustion, Forestry and energy crops
Host sector	Independent Energy Producer

### **Technical summary of the project**

Objective of the project	Partly replacement of brown coal fuel combustion with biomass.
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#### **Project description**

##### **Summary**

In June 2008 two coal-fired boilers in ZVTP (Zvolenská Teplárenská s.r.o., hereafter "ZVTP") Slovak Republic were retrofitted with a new cofiring system adopted to simultaneous burning of mix of coal with wood chips. Compliance with stringent emission standards was fulfilled. Process economy and reliability were improved dramatically as well. Project was partly supported by EU and partly from Government sources.

##### **Project History**

Major project incentives were problems of concentrations of SO<sub>2</sub> in flue gases exceeding national limits for greenhouse gases emissions introduced on January 1st, 2007. The Company therefore decided to solve this ecological problem by realization of the Project „Ecologisation of heat source by using co-firing of wood chips in ZVTP Inc.“ (further on „Project“) and applied for a non-recourse financial grant (NFG). In 2005 Government approved grant of 470 mil. Sk from the sources of the EU and the state budget as NFG, which originally represented 95% of capital costs of the Project.

On 24th April 2006 the Company made a contract for work with selected contractor Slovenské energetické strojárne Inc. Tlmače (further on „SES“). The Project implementation started immediately after the contract was signed, by realization of the first phase of the project, in which the following facilities were reconstructed:

The **K-01 boiler**, the facility for receiving, storage and internal transfer of wood chips to the combustion features of boilers, control system and automatic monitoring of combustion gases (AMC). The first phase was finished by complex examinations in March 2007. After this date the realization of a second phase of the Project started by reconstruction of **K-02 boiler**. The second phase was finished with complex examinations of K-02 boiler that took place in May 2008.

The switch of the fuel base for low-sulphur brown coal with a LHV of 13,5 MJ/kg required the change of combustion devices like main and stabilizing burners and pressure parts of the boiler. The combustion devices were supplemented with a band grate enabling combustion of wood chips. All peripherals of the boiler were reconstructed and it was provided with a modern control system SiemensSimatic.

The emissions are continuously monitored by AMC connected to the control system of the boiler and with remote data transfer to the internet website. Within the plant's reconstruction, the need for a boiler with a lower output has also been solved. The K-02 boiler was retrofitted for the lower output of 65 MW. This boiler will be mainly put to use during winter consumption peaks and in periods out of the main heating season. The primary objective of this project was to ensure fulfilment of stricter emission standards valid in the EU and the SR after 1st January 2008, which was demonstrated by complex examinations, complete emitting pollutants in sense of valid legislation.

Equally important goal of the reconstruction was to ensure longterm sustainable competitiveness in the open market with heat in the area of Zvolen. The achieved results confirm that this goal has been fulfilled, too.

**Before retrofit:** The content of sulphur in emitted flue gas was as high as 3.500 – 4.000 mg SO<sub>2</sub>/m<sup>3</sup>. This was causing serious environmental problems in the region. New national limits for greenhouse gases emissions are 1.700 mg SO<sub>2</sub>/m<sup>3</sup> and 600 mg NO<sub>x</sub>/m<sup>3</sup> with the effect from 1 January 2007. CHP has not been able to achieve them without substantial improvement of technology. Shift from lignite to low-sulphur content brown coal with co-firing of biomass has been identified economically the most feasible and environmentally acceptable solution. Two boilers, each of them with the output of 108 Mwt, were therefore retrofitted to co-firing of pulverized low sulphur content brown coal with biomass (wood chips). Biomass fuel share is up to 30% of the combusted fuel.

### *Environmental and social benefits*

<b>(Estimate of) Greenhouse Gases abated</b> (in metric tons of CO <sub>2</sub> -equivalent)	Annual: Up to and including 2012: 100,000 tCO <sub>2</sub> -equivalent Up to a period of 10 years: 100,000 tCO <sub>2</sub> -equivalent Up to a period of 15 years: 100,000 tCO <sub>2</sub> -equivalent
	<b>Other environmental benefits</b> Emissions after the reconstruction of boilers have complied the limits set in force after 1 January 2008, i.e. <ul style="list-style-type: none"> <li>• 1.400 mg SO<sub>2</sub>/m<sup>3</sup></li> <li>• 600 mg NO<sub>x</sub>/m<sup>3</sup></li> <li>• 250 mg CO/m<sup>3</sup></li> <li>• 50 mg fly ash/m<sup>3</sup></li> </ul>

<b>Number of reduction units</b>	Outlook for trading period 2008-2012 is 500,000 tCO <sub>2</sub> total
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**Socio-economic aspects:** Zvolen belongs to those cities in which there is long-term development of a system of central supply of heat (SCSH). The heat supply from SCSH brings reliability, safety, certainty of deliveries, comfort, regular maintenance, service and renewal of facilities in the price of heat and also lower loading of environment. In the last decade doubts were raised whether this way of central heating and preparation of hot service water was favourable for households, as well as deliveries of technological heat to industrial consumers. These challenges were met with the Municipal Energy Concept of Zvolen. The concept evaluated heat from SCSH as the most effective and as the most favourable for the final consumer. The experience from past years has proven these claims right. Zvolen belongs to cities with the lowest price of heat and the lowest heat consumption per equivalent residential unit.

<b>Methodology used</b>	Approved baseline methodology
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### *Economic data*

<b>Capital costs</b>	16.4 MEUR
<b>Financing scheme</b>	Non-recourse financial grant (NFG). In 2005 Government approved grant of 470 mil. Sk (15.6 MEUR) from the sources of the EU and the state budget as NFG, which originally represented 95% of capital costs of the Project.
<b>Financing organisation (if third party)</b>	N/A

***Project developer***

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***Host organisation***

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***Technology provider***

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