

RESOURCE EFFICIENT AND CLEANER PRODUCTION CENTRE

We strive for green industries in Ukraine

Case Study

METAL PROCESSING SECTOR: GAS CUTTING PLANT

COMPANY DESCRIPTION

This company is specialized in metal sheet cutting and processing. The business produces coppers and boilers for households with a power rating of up to 600 kW and gas torches and gas fired burners for metallurgical processes in metal processing industries like melting and heating with a power rating up to 17 MW. The company has 120 employees, processed 140 tons of metal and consumed 108 MWh of electricity, 960 MWh of gas, and 4'500 m³ of water in 2013.

PROCESS DESCRIPTION

The applied process to cut metal sheets is based on the use of a gas flame melting the metal as shown in Figure 1. This type of cutting results in considerable losses of metal, high consumption of gases mixture and negative impacts on the environment and human health. This type of cutting also requires specific handling efforts with regards to adjustments, finish grinding and other processing of parts because of low accuracy.

The enterprise has a complex 400 kVA electric substation. Gas is supplied to the enterprise from a medium pressure gas pipeline. The heating and hot water supply system is based on their own gasand-solid fired boiler.

The enterprise is equipped for a complete machine-building cycle that includes: bridge cranes and equipment for shearing, bending, conventional forming, turn-milling, welding, and metal painting. Overall a total of 137 units of equipment exist on site.



GOALS of the RECP PROJECT

Together with the management and process engineers the following goals and objectives for the analyzed processes were identified:

- Reduction of metal losses;
- Rust output reduction (dust and aerosols);
- Substitution of outdated technology equipment used in technological process (removing liquid gas, flame gas cutting plant replacement);
- Reduction of smoke and dust emissions to reduce ecological impact;
- Improvement of working places conditions through essential reduction of metal vapors (chromium, nickel, etc.)







*IMAGES references: http://labcowelding.com, http://www.pdssheetmetal.co.uk

OPTIONS AND IMPROVEMENTS

Table 1 summarizes the key financial and environmental performance parameters of the proposed improvement options. In May 2014 50% of implementation has been completed.

MEASURES	FINANCIAL				ENVIRONMENTAL	
	h	nvestments [€]	Savings [€/y]	Payback [y]	Energy [MWh/y]	Material [Units/y]
Good housekeeping and low priced measures	1.	3′500	1′000	3,5	-10,8	0
	2.	5′000	4′400	1,1	-220	-22 000 m³ of gas +54 tons of wood
Metal cutting installations		161′000	54'200	3	-955	-12 tons of metal
TOTAL		169'500	59′600	3,5	-1′185	See above

Table 1: COSTS AND BENEFITS OF PROPOSED MEASURES

Good housekeeping and low priced measures:

1. Installation of an automated utility metering system (3'500 EUR CAPEX), that allows to save 10% of electrical energy (-10,8 MWh/y).

2. Installation of a 120 kW wood-fired boiler, manufactured by the enterprise itself. It allows replacing consumption of 22'000 m³ of natural gas with 54 tons of local wood.

Metal cutting installations:

Replace outdated metal sheet cutting installation with a fibrous ytterbium laser. This allows decreasing work efforts by 30-35% and reduces waste and necessary improvement steps due to deviations by 5-8% of processing time. Modern equipment introduction results in a reduction of CO_2 emissions of about 70 tons CO_2/y . Reduction of metal waste from melted metal drops is estimated to about 600-750 kg/y.

FINANCING

For larger investments the third party funding might be needed. The RECPC is well aware of the requirements of financial institutions for project financing. In this case the third party funding from financial institutions of $100'000 \in$ has been sought.

FOR MORE INFORMATION

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