



NORSK ENERGI



The National Cleaner Production Center - Macedonia

CLEANER AND MORE COST EFFECTIVE INDUSTRY IN MACEDONIA

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ROUNDTABLE DISCUSSION

FROM ANALYSIS TO REALISATION

How to realise energy efficiency projects in Macedonian industry?



карпош

Ф-КА "КАРПОШ" А.Д. - СКОПЈЕ

FACTORY KARPOS JSC – SKOPJE

Information about the company

- The factory Karpos AD Skopje is established in 1948 and it is one of the oldest companies in the building and construction industry sector in the Republic of Macedonia. In 1991, the company Karpos AD was transformed into a company with 100 % private capital and today it is a joint stock company.
- The company operates a concrete factory and offers assembly services in the building and construction sector. Its offering includes prefabricated concrete elements, such as high-sized industrial structures and small structures from reinforced concrete; vibropressed and reinforced concrete pipes; reinforced concrete footbridge elements, such as piles, columns, decorative slabs, cable pipes and curbs; concrete haberdashery; transmission lines and substations, as well as sleepers.
- The company is certified according to the ISO 9001:2000 Quality Management System and ISO 14000. The present number of employees is slightly over 400.
- Control board and managing board are on the head of the company.

Energy consumption in the company

	2006	2007	2008		
Electrical energy	MWh	2112	2273	2680	
Light oil	t	195	230	240	
Heavy oil (mazute)	t	210	300	384	
Light oil for households	t	45	50	57	
Gasoline	t	10,2	11,5	11,2	
Pressure vessels	units				
- oxygen		28	28	28	
- acetylene		28	28	28	
Water	m ³	120000	118000	132000	
Hydraulic oil 46	l (litres)	4190	4190	4870	
Hydraulic oil 68	l	12100	12100	12650	
Hydraulic oil 100	l	1,0	-	-	
Compressor oil 150	l	2210	2000	2200	
Motor (engine) oil	l	10370	10377	12580	
Ekoform – oil rarefier - mixture of aliphatic and aromatic hydrocarbons	l	2520	800	1200	
Oil-lubricant for gear lever 90	l	2360	2360	2580	
Oil-lubricant for gear lever 140	l	650	650	660	
Antifreeze	l	565	580	620	

Energy efficiency options identified

- Assessment of the state of the equipment in the boiler plant.
- Progressive revitalisation of the existing equipment and replacement of the out-dated equipment in the central boiler plant and in the pipeline system: pumps and additional equipment, equipment for chemical and thermal water treatment, measurement-control devices, steam traps, valves etc., condensate reservoirs, equipment for fuel handling.
- The possibility for condensate return from the process of treatment of pre-stressed reinforced concrete elements with saturated steam, to the boiler room.
- Reduction of steam waste in the processes of treatment of concrete elements, by covering with some sort of hood.
- Rehabilitation of pipelines network for transportation of steam and condensate; insulation of the pipelines, replacement of valves, steam traps and other armature elements.
- The overall operation efficiency of the compressor units, large consumption of cooling water etc.
- Installation of measurement equipment, particularly flow-meters, on the lines to some production departments, to certain specific consumers etc., with the aim to monitor the regime of energy consumption (steam, water, compressed air, electricity etc.).
- The leakage of compressed air in the machines for concrete production.
- Discrepancies between the capacity of the existing boiler units and the consumers of technological steam. Namely, the bigger steam boiler has capacity of 10 tons of steam per hour, but, often, the demands for technology steam are just 2-3 t/h.

Estimated energy savings, cost savings and investment budget

Option	Estimated energy savings	Estimated cost savings	Investment budget	Simple payback period
New, container type, boiler plant	Heavy oil (mazute) saving 10% = 38 t/year 1)	38000 kg/year x 0.50 €/kg = 19000 €/year	About 70 000 Euro	Simple payback 3.7 years
New compressor unit	1) 2% electrical energy saving = 0.02x2680 = 54 MWh/year 2) 2) 3% electrical energy saving = 0.03x2680 = 80 MWh/year	1) 54000 kWh/year x 0.04 €/kWh = 2160 €/year 2) 80000 kWh/year x 0.04 €/kWh = 3200 €/year	About 6000 Euro	1) 2.78 years 2) 1.88 years

Estimated CO₂ reductions

- Emission of gaseous substances at the moment

	Substance	Quantity
1	Sulphure oxides, counted as SO ₂	max. ~ 8.5 t/annually
2	Nitrogen oxides NO _x (measured at flue gas track of the boiler Wanson B4-3A)	172 mg/m _n ³
3	Carbon dioxide CO ₂	~ 1270 t/annually
4		~ 0.5 t/annually

- The saving of heavy oil will be 10% or 38000kg/annually, so the emission of CO₂ will be also lower for 127 t/annually.

Challenges for implementation

- **New, container type boiler plant.** One of the ideas of the company management is procurement of a new container boiler station, with a boiler unit for rapid steam production, which is already included in the company's business plan for the second half of 2010. The possibility for quick starting and reaching nominal capacity of the boiler unit of this type makes it a good solution for such technology processes as in the factory "Karpos"..
- **New compressor unit.** Usually, investments in the system for compressed air, including procurement of new compressor units, are characterised with very short pay-back period.