



## ROMANIAN ENERGY EFFICIENCY FUND

### CASE STUDY: UNIO SA Satu – Mare (II)

<b>Project Name</b>	Rehabilitation of the Industrial Local Heating System
<b>Sector</b>	Industry
<b>Borrower</b>	Private enterprise "UNIO SA, Satu-Mare"
<b>Lender</b>	Romanian Energy Efficiency Fund
<b>Financing Starting Date</b>	January 2006
<b>Project Size/Loan Amount</b>	USD 257,000/206,000

#### Summary

UNIO Satu-Mare is one of the most important Romanian companies in the machine building industry, requiring important quantities of energy for heating the industrial halls. The 50 years old natural-gas fired boiler has a very low efficiency of about 60%. The annual operation cost for the old boiler and heating system was about USD 376,930. By investing USD 257,000 for the rehabilitation of heating system and installation of natural-gas radiant tubes with lower maintenance costs, the company is expected to save about USD 223,900 per year. The electricity consumption is expected to decrease with about 99% and the natural gas consumption with 42%.

The project is very profitable with an estimated Simple Payback Period of 1.1 years and an Internal Rate of Return of 87%. The project will also contribute to lower emissions of air pollutants, including green house gases such as CO<sub>2</sub>.

FREE has provided a 3-year USD 206,000 loan to UNIO Satu-Mare with a grace period of 9 months. A bank letter of guarantee, pledge on the radiant tubes and some auxiliary equipment and promissory notes were accepted as guarantees of the loan. The reimbursement of the loan will be made in quarterly equal installments according to the request of the company and to the cash flow of the project.

#### Description of the project

The actual heating system of two biggest production halls consists in natural-gas fired hot water boilers, ventilators and low efficiency heat exchangers. Before project implementation, the annual natural gas consumption for industrial local heating was about 1,423,500 Nm<sup>3</sup>, i.e. an equivalent of USD 260,489 and the additional annual electricity consumption was about 1,688 MWh, i.e. an equivalent of USD 116,441.

Previously, the heating system was equipped with a natural-gas fired hot water boiler CR-09 installed in the '60s and ventilators, the overall rated electricity power being 771 kW electrical motors. The overall operating efficiency is estimated at around 50-60%. Moreover, the maintenance costs were high and spare parts were difficult to find on the market. In average, the compressed air was supplied 12 h/day everyday in the heating season (November-April). The previous annual operating costs are presented in Table 1.

#### Aim of the project

A total of 111 THERMIGAS radiant tubes have been purchased and installed in the two largest production halls. The natural gas distribution network was extended and a new regulation and metering system was installed.

The main advantages of radiant tubes are:

- **High energy efficiency:** being under fully automatic control, the 111 radiant tubes operation will follow the local heating requirements of the two industrial production halls, minimizing natural gas and electricity consumptions;
- **Labor:** the radiant tubes operation is totally independent against the human assistance; hence, there is only need to provide unsystematic visual inspection to radiant tubes;

- **Maintenance:** the radiant tubes have no maintenance requirements and costs; no major overhauls are expected within the first ten years of operation.

#### Economic evaluation of the project

The radiant tubes, auxiliary equipment and estimated installation costs are detailed in Table 2.

#### Savings

The expected financial savings of the project are given below:

- **Electricity:** the replacement of old hot water boiler and ventilators with radiant tubes for industrial local heating will improve energy efficiency; electricity savings are estimated at about 99%, i.e. USD 115,100 per year.
- **Natural gas:** considering that the radiant tubes are operating 4 hours during one 8 hours shift, 3 shifts per day, thus the radiant tubes are in operation 12 hours/day; in these conditions, the natural gas savings are estimated at 42%, i.e. USD 108,800 per year.

The savings are summarized in Table 3.

#### Financial evaluation

The analysis of the cash flow for the next 20 years was estimated based on 2005/2006 energy prices. The evaluation of the feasibility of this project was performed taking into consideration the following criteria: Payback Period, Internal Rate of Return (IRR), and Net Present Value (NPV), based on a discount rate of 12%. The full financial analysis is given in Table 4.

Considering the total financial investment of USD 257,000 and the annual financial savings of about USD 223,900, the Simple Payback Period is estimated at 1.1 years with an IRR of 87%.

#### Financing

Financing of the investment program should be considered as an expression of the company decision makers to continue the sustained technological modernization program, reducing costs and improving quality. Implementation of updated technologies has been realized in the following sections of the factory: cutting, mechanical machining, welding, teething, heat treatment, surface protection and control.

Being aware of the large energy consumption in their manufacturing process and confronted with sharp increases of energy prices, the initial aim of the companies' activities was to reduce costs, mainly by replacing old, energy consuming machinery by modern, highly energy efficient equipment. Consequently, the management decided to invest USD 290,000 in air compressor station modernization and obtained from the Romanian Energy Efficiency Fund, a loan of USD 130,000 (45%), in addition to the company contribution of USD 160,000 (55%).

Continuing searching economic efficiency and profitability in agreement with the company's development objectives, the management decided to invest USD 257,000 in radiant tubes in



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order to replace the old heating system of two biggest industrial production halls. Considered as an investment project in energy efficiency increase, the management has applied to the only dedicated energy efficiency lending facility in Romania -- the Romanian Energy Efficiency Fund -- for a second loan of USD 205,600 (80%), in addition to the company contribution of USD 51,400 (20%).

### Expected Impact

With the new equipment, UNIO SA Satu Mare will be able to produce a better heating with reduced natural gas and electricity

input. Thus, the company will reduce its natural gas and electricity bills. The total energy savings, coming directly from natural gas savings and indirectly from electricity savings (as the electricity is generated in a fuel fired thermal power plant), will be of about 957 toe/year.

The reduction in natural gas and electricity consumption will cause a reduction in pollutant emissions (CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, dust particles). For instance, considering that the electricity is generated by heavy oil combustion, this reduction would be around 2,911 tons of CO<sub>2</sub>.

Table 1

Item	USD
Electricity	116,441
Natural gas	260,489
<b>Total</b>	<b>376,930</b>

Table 2

Item	USD*
Radiant Tubes and auxiliary equipment	133,200
Erection works for radiant tubes	38,000
Works for network extension and metering	73,500
Other expenses (engineering, design etc.)	12,300
<b>Total</b>	<b>257,000</b>

\* - The costs include import duty, customs storage charges and delivery to site, VAT excluded.

Table 3

Item	USD
Electricity	115,100
Natural gas	108,800
<b>Total</b>	<b>223,900</b>

Table 4

Item	Year										
	0	1	2	3	4	5	6	7	...	19	20
	kUSD	kUSD	kUSD	kUSD	kUSD	kUSD	kUSD	kUSD	kUSD	kUSD	kUSD
Initial investment	-257	-	-	-	-	-	-	-	-	-	-
Cash Flow	-257	223.9	223.9	223.9	223.9	223.9	223.9	223.9	223.9	223.9	223.9
Accumulated Cash Flow	-257	-33	191	415	639	863	1,086	1,310	...	3,997	4,221
Discount Factor	1	0.89	0.80	0.71	0.64	0.57	0.51	0.45	...	0.12	0.10
Present Value of the Cash Flow	-257	-57	121	281	423	550	664	765	...	1,392	1,415
Payback Period	1.1	years									
Discount Payback Period	1.3	years									
Net Present Value	1,415	kUSD									
Internal Rate of Return	87	%									

### FREE financing advantages

Main advantages of the FREE financing are:

- FREE is a unique Romanian financier in energy efficiency field;
- FREE is actively supporting the companies during the energy efficiency project analysis;
- FREE offers low cost financing for companies;
- FREE offers flexible and attractive ways to guarantee the loans;
- FREE facilitates the access of the companies for financing feasibility studies, energy audits etc.;
- FREE offers technical assistance.