



CASE STUDY: ORADEA COUNTY CLINIC HOSPITAL

|                                 |   |
|---------------------------------|---|
| <b>Project Name</b>             | Installation of new steam and hot water boilers fired with wooden pellets |
| <b>Sector</b>                   | Health  |
| <b>Borrower</b>                 | Public institution, County Clinic Hospital, Oradea                        |
| <b>Lender</b>                   | Romanian Energy Efficiency Fund   |
| <b>Financing Starting Date</b>  | September 2006  |
| <b>Project Size/Loan Amount</b> | USD 405,000 / 324,000   |

**Summary**

The County Clinic Hospital is the largest medical care center from Bihor County, and provides medical services for more than 200,000 inhabitants from Oradea city and 600,000 inhabitants from whole the county. The County Clinic Hospital is a 1,049-bed hospital and



provides 29 specialized clinical services. The hospital is structured in four different site locations: 'Stationary I', 'Stationary II', 'Specialized Ambulatory', 'External Infectious Diseases Department', and the Administrative Department.

The 'Stationary I' building is located in Oradea city, and was founded in 1987. The 'Stationary I' is a more than 700-bed hospital, structured in 19 specialized clinical departments. The building is structured in three different corps A1 and A2 (9-floor buildings) and A3 (a 5-floor building).

The heat sources in the 'Stationary I' hospital are a heat plant for steam generation, built in 1988, and a thermal substation connected to the municipal district heating system. The steam and the hot water are generated in three outdated ABA boilers fuelled with light fuel oil, with the rated capacity of 1 tone/hour and the active surface of 3.5 m<sup>2</sup> and the rated pressure of 16 bar.



The management of the hospital intends to dismantle two from three existing ABA steam boilers and to install new modern Binder type boilers fired with wooden pellets.

The proposed project aims to replace the outdated steam boilers with two new hot water and steam boilers fired with wooden pellets.

The Binder hot water boiler type RRK 1200 – 1650 will have the rated thermal power of 1.4 MW<sub>t</sub> and the Binder steam boiler type DK 400 – 600 will have the rated power of 0.5 MW<sub>t</sub>.

The fuel switch will significantly contribute to the total elimination of the light fuel oil consumption. The Simple Payback Period is about 5.6 years. Besides fuel savings the project leads to diminishing environmental pollution, especially diminishing CO<sub>2</sub>.

FREE has awarded the hospital with a loan of 324,000 USD with a maturity of 3 years and a grace period of 6 months. The loan was collateralized through an Agreement concluded with the Bihor County Council, stipulating a pledge on revenues to the County Council annual budget. The loan is reimbursed in equal quarter installments in relation with the hospital executive requirements and the available cash flow'.

**Description of the project**

The project consists in dismantling two from three existing outdated steam type ABA boilers fuelled with light fuel oil and in installing two new modern boilers fired with wooden pellets. The Binder boiler type RRK 1200 – 1650 will have the rated thermal power of 1.4 MW<sub>t</sub> and will generate hot water with the rated pressure 3 bar and the rated temperature 95°C for heating and the Binder boiler type DK



400 – 600 will have the rated power of 0.5 MW<sub>t</sub> and will generate steam with the rated pressure 7 bar and the rated temperature 120°C for sanitary purposes. For safety reasons, the current connection of the hospital to the municipal district heating system will be kept functional and operated only to the peak of the heat demand curve (during severe winter conditions).

**Aim of the project**

The aim of the project is to diminish the energy costs of the hospital, especially by total elimination of light fuel oil use for steam generation. The main features of the project are as follows:

- **Elimination of light fuel oil consumption.** By installing the new pellets fuelled boiler the hospital will completely eliminate the light fuel oil consumption. Thus, implementing the project the wooden pellets can exclusively be used for steam and for hot water generation for use and heating purposes.
- **Pollutant emissions reduction.** The reduction of light fuel oil consumption will lead to diminishing of CO<sub>2</sub> emissions.



**Economic evaluation of the project**

The project will be implemented between October 2006 and May 2007. The total cost of the project has been estimated at about USD 405,000. The investment is detailed in the Table 1.



**Savings**

After the project implementation the following savings are expected to be achieved:

- **Fuel.** The installation of the new boilers based on wooden pellets will lead to 199 tones of savings of light fuel oil.
- **Maintenance, salaries, etc.** The new equipment has reliability and is fully automated. Insignificant maintenance and personnel costs are required.

**Financial evaluation**

The cash flow analysis has been performed for the next 20 years based on the energy and fuel costs in 2005 and 2006. The project evaluation has been performed using the Simple Payback Period, Internal Rate of Return and Net Present Value calculated for and actualization rate of 12%. The financial analysis and results are presented in Table 2. Taking into account that the total investment is about USD 405,000 and considering the annual savings as presented in Table 2, the Simple Payback Period is about 5.6 years.

**Financing**

By implementing the project the hospital management intends to completely remove the light fuel oil use and to generate hot water and steam in high energy efficiency wooden pellets fired boilers.

Thus, the hospital's management decided to invest USD 405,000 for installation of new wooden pellets boilers for hot water and steam generation.

Being an energy efficiency project the hospital applied for a FREE loan of about USD 324,000 (80%), the hospital participation being of USD 81,000 (20%). The FREE loan is for 3 years, having a grace period of 6 months. The loan reimbursement will be made on a quarter rate basis.

**Expected Impact**

The light fuel oil savings have been estimated at 199 tones (187 toe equivalent). The reduction of light fuel oil consumption will also lead to diminishing environmental impact. Thus, the CO<sub>2</sub> emissions will be reduced by approximately 445 tones. The sulfur dioxide, NO<sub>x</sub> and dust emissions will also be reduced significantly.

Table 1

| Item  | USD*           |
|---|----------------|
| Wooden pellets fired hot water Binder boiler type RRK 1200 – 1650 with rated power 1400 kW (all related auxiliary equipment, pumps, heat exchangers, automation, erection works etc.) | 156,750        |
| Wooden pellets Binder steam generator type DK 400 – 600 with rated power 500 kW (all related auxiliary equipment, pumps, heat exchangers, automation, erection works etc.)            | 76,530         |
| Engineering & erection works and installations (including design, equipments, fittings etc.)  | 171,695        |
| <b>Total project</b>  | <b>404,975</b> |

\* - The figures include all import, customs taxes, etc, and do not include VAT.

Table 2

|                                | Year |       |      |      |      |      |      |      |      |      |       |
|--------------------------------|------|-------|------|------|------|------|------|------|------|------|-------|
|                                | 0    | 1     | 2    | 3    | 4    | 5    | 6    | 7    | ...  | 19   | 20    |
|                                | kUSD | kUSD  | kUSD | kUSD | kUSD | kUSD | kUSD | kUSD | kUSD | kUSD | kUSD  |
| Initial investment             | -405 | -     | -    | -    | -    | -    | -    | -    | -    | -    | -     |
| Cash Flow                      | -405 | 72    | 72   | 72   | 72   | 72   | 72   | 72   | ...  | 72   | 72    |
| Accumulated Cash Flow          | -405 | -333  | -261 | -189 | -116 | -44  | 28   | 100  | ...  | 966  | 1,038 |
| Discount Factor                | 1.00 | 0.89  | 0.80 | 0.71 | 0.64 | 0.57 | 0.51 | 0.45 | ...  | 0.12 | 0.10  |
| Present Value of the Cash Flow | -405 | -341  | -283 | -232 | -186 | -145 | -108 | -76  | ...  | 126  | 134   |
| Payback Period                 | 5.6  | years |      |      |      |      |      |      |      |      |       |
| Discount Payback Period        | 9.9  | years |      |      |      |      |      |      |      |      |       |
| Net Present Value              | 134  | kUSD  |      |      |      |      |      |      |      |      |       |
| Internal Rate of Return        | 17   | %     |      |      |      |      |      |      |      |      |       |

**FREE financing advantages**

Main advantages of the FREE financing are:

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