



## **PROMISE** Procurement in Municipalities for Integrative Solutions on Energy

### Case Study: Energy Efficiency Measures in Silistra, Bulgaria – Street Lighting, Boiler Reconstruction and Solar Thermal Installation

#### **Introduction**

Silistra is located on the bank of the Danube river, bordering Romania to the North. It is the 26<sup>th</sup> largest municipality in Bulgaria, with 66,500 inhabitants. Local industries include food and beverages, textiles, furniture, electronics, chemicals, pulp and paper industries, transport and tourism. The region is a major agricultural area. In 2000, the municipal budget totalled \$ 7.4 M, of which 53 % were subsidised by the State Budget, thus meaning that the municipality is highly dependent on state subsidies. The forecasted budgets for the period 2001 – 2003 range between \$4.8M and \$6.6M.

#### **Aims and Objectives**

As is the case in many Bulgarian municipalities, Silistra still uses obsolete inefficient mercury lamps for streetlighting. Heating practices in municipality-owned buildings also often involve inadequately trained personnel and obsolete equipment. For these reasons, the municipality recognised the need to improve heating and street lighting systems and increase comfort levels for its citizens. Preliminary audits and assessments revealed that municipal energy costs were rather high and totalled 9.4 % of the municipal budget in 2000.



*Inefficient mercury lamps ... and new energy efficient street lighting installed in Silistra*

Silistra Municipality contacted Electrotek for assistance in the engineering analysis, as there was no special energy department established in the local government administration. Electrotek developed several feasible energy conservation options, namely optimisation and renovation of street lighting, including replacement of nearly 65% of luminaries with new fixtures with energy efficient high-pressure sodium lamps, redesign of the system, installation of double tariff electricity meters and automatic controls.

Other recommended conservation measures referred to the heating systems of three municipally owned buildings, including a primary school for children from minority groups, a home for the elderly and the local government building. The energy efficiency measures included retrofitting of the inefficient diesel burners, integration of automatic controls for the heating systems, boiler change, general improvements to building insulation and weather proofing.

The design also included a solar hot water installation in the home for the elderly.



*Solar system for hot water production installed in the old people's house in Silistra*

### Finance

After completion of the engineering design, Electrotek prepared the bankable proposal and loan application to UBB for financing through the Development Credit Authority (DCA).. The total project cost is \$279 K, and includes 71% debt financing from United Bulgarian Bank (UBB) under the DCA guarantees and 29% municipal financing.

Electrotek undertook a detailed cash flow and risk analysis to determine the project's financial viability. Elektrotek analysed project cash flow, before maturity and five risk scenarios including cost overrun, start-up delay, energy prices risk, operational failure

and mismanagement and the worst scenario as a combination of the above. In all cases, the project showed insignificant sensitivity to the analysed risks e.g. a maximum increase of payback period to 2.53 years, maximum decrease of IRR to 61.1% and maximum decrease of NPV to \$ 301 K. Thus, the project generated enough cash service to the debt in all analysed risk scenarios.

### Benefits

**Environmental:** Calculation of the GHG emission reductions includes both emissions from gas oil burning boilers of the public buildings and national level emissions from electricity generation. The projected generated electricity and fuel savings will reduce CO2 emissions by 3,491 tones during its lifetime of 8 years and will lead to significant reductions of NOx, SO2 and dust emissions.

**Financial:** The project reduced annual municipal costs for street lighting by 59 % and for heating of the three buildings by 53 %. Project implementation resulted in reducing total municipal energy expenditures by 64.5 %. This project significantly reduced the municipal budget dependence from state subsidies by 2.6 %, which is a step towards long-term goals pursued by the local government.

**Social:** The project largely improved the comfort of residents in the elderly people facility and in the primary school for children from minority groups, both seriously under heated during winter months prior to the project implementation. The impressive street lighting retrofit reduced traffic accidents and crime rates at night and helped create a pleasant ambient environment of this harbor town. The project has another very essential benefit – the Municipality of Silistra became the owner of the first solar project to receive long term debt financing at commercial terms. This project has improved the image of the municipal management team enormously, and has increased the local citizens' confidence in the local government administration.

### Results and Lessons

- The project was launched in the summer of 2001 and construction was fully completed before the start of the 2001-2002 heating season.
- The project is a good example of how social programs and renewable energy utilization can be made bankable through energy efficiency.
- Electrotek assistance was crucial for the proper structuring of the project as it is very innovative for a municipal project, as well as for the bank.

For more information on this and other Bulgarian sustainable energy projects

contact ESD Bulgaria at [www.esdb.bg](http://www.esdb.bg).