1.1.16 Energy Management System in buildings - Zagorje ob Savi (SI)

The municipality of Zagorje ob Savi is in central Slovenia and has over 17.000 inhabitants. Its area spreads over 147 km^2 and is one of the most polluted cities in Slovenia. The pollution is caused by the city's long and continuing energy, industrial activities and local heating system operating on fossil fuels, as well as, by its natural geographic characteristics (very closed valley).

Zagorje ob Savi has made important steps towards sustainability. It adhered to the CoM initiative but the development of its SEAP is still pending. In the framework of the Green-Twinning project, ZRMK assisted the municipality in assessing technical aspects for the action "Energy Management System in buildings". Main purpose of the Energy Management System (EMS) in municipality of Zagorje ob Savi is:

- To measure and control energy flow
- To analyse data and define actions
- To optimize energy consumption
- To replace out-of-date energy accountancy
- Educate on responsible and environment friendly energy management

The EMS enables data integration of: oil fuel consumption, natural gas consumption, district heating system consumption, electricity consumption, solar power plant production, real time environmental data, Internal air monitoring (temperature, relative humidity, CO_2).

The system has large upgrade potential in areas of: weather forecast integration, building automation, energy flow control, street lightening control, etc.

The EMS is based on industrial quality control system for monitoring and remote control (SCADA system for supervisory control and data acquisition). It has permanent connection to remote stations via GPRS network with every minute refreshment of data. The system enables:

- Internal measurements: temperature, relative humidity, CO_2
- Energy related measurements: electrical energy (power, total), heating energy (power, total)
- Calculated values: average, min, max, etc.
- Online comparison with environmental data (outside temperature, humidity, global solar radiation)
- **Integration of environmental data from Slovenian environmental agency (ARSO)**, i.e. outside temperature and humidity, global solar radiation, etc.

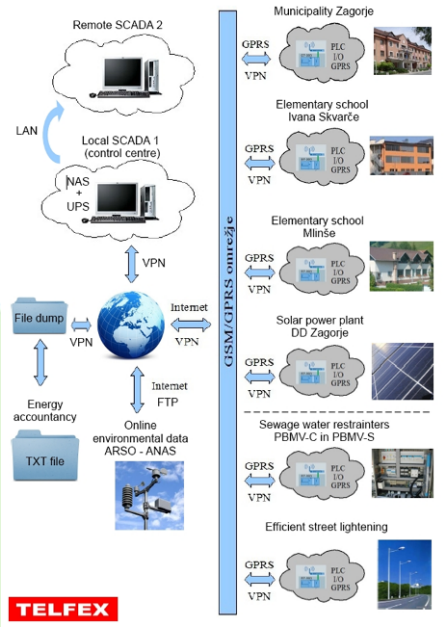

Figure 18 Scheme of the energy management system

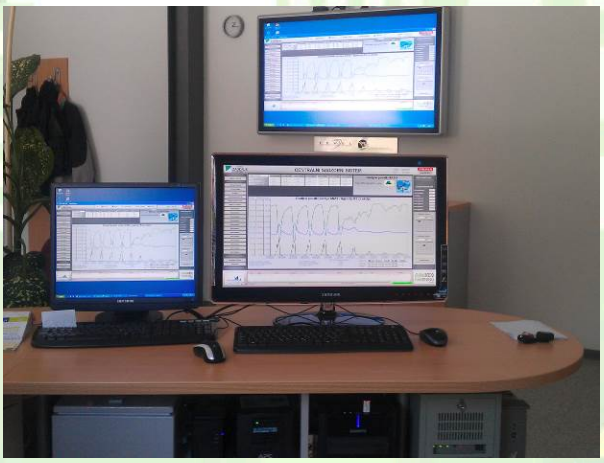

Figure 19 Control and energy management centre

Municipality of Zagorje ob Savi has plans for system upgrade and further increase of efficiency of energy utilizytion by: Graphical simulation of waste water facilities with remote control possibilities and Graphical simulation of energy efficient street lightening. Upgrades will add added value to already recognized benefits of energy management system:

- Energy flow control
- Analysis of data and definition of actions
- Optimisation of energy consumption
- Increased energy effectiveness
- Data disposition for every minute of the year
- Education and information capabilities of the system

However, the main benefit of the EMS is shown in responsible and environment friendly energy management - which definitely indicates sustainable character of development in municipality of Zagorje ob Savi.