



RAKOVICA – fulfilling renewable energy sources vision

Municipality Rakovica
(Croatia)

Summary

Rakovica municipality, due to its natural richness and geostrategic location has chosen guidelines of systematic management of energy consumption in public buildings, implementation of new technologies and education of local population with goal to preserve environment, implement RES and EE solutions and reduce energy costs. These guidelines can be recognized through range of projects which started or are anticipated to start in the period 2009/2010:

- Ecological business zone Grabovac
- District heating system for the centre of Rakovica using woody biomass
- Installation of a boiler using wood pellets in a local school
- Measurements of wind potential – location Metla
- Education of pupils about RES and EE

Foremost reasons guiding this approach are environmental protection (National park Plitvička jezera and Barać caves - the oldest caves in Croatia, are located nearby), relieve of local budget, increase of living standard and raising awareness about sustainable development and environmental protection.

For more detailed information please read below...



Short presentation of Municipality Rakovica

Rakovica municipality is situated in the central part of Croatia in the Kordun region and is the most southern part of Karlovačka County with population of 2.700 inhabitants. Rakovica is located approximately 120 kilometres from City of Zagreb, Croatian capital, in the south (southwest). The most important state roadway (D1), which connects Croatian north and south, passes through the municipality. This enables good connections with central and southern parts of Croatia. In the vicinity, there are many natural "oasis". The most important are NP Plitvička jezera, Barać caves, Korana River etc. Beside traditionally important sectors, such as forestry and agriculture, tourism is developing as an important economic sector primary due to NP Plitvička jezera and Korana River.



Sustainable energy development approach

Based on the initiative of the local administration and inhabitants and assistance of Energy institute Hrvoje Požar (EIHP) and local regional agency REGEA, the municipality started with the systematic implementation of projects and solutions through IEE MODEL framework. Projects will increase energy efficiency and share of RES and improve environmental protection. Municipality energy plan, which is in a development phase, contains several serious projects which will be described in the following text:

Ecological business zone Grabovac

Due to tourism development, there is a need for development of ecological business zone where healthy and ecological local products will be produced in traditional and autochthonous way and presented. This approach to ecological agriculture has been recognized through numerous requests. Thus, part of the municipality land has been transformed into ECO-ETNO zone. To comply with the requirements of sustainable development, traditional materials, such as wood and stones, will be used for construction. Installation of solar collectors for water heating and usage of woody biomass for heating is considered. Public lighting of the zone is designed to be highly efficiency and without light pollution. Public lighting will be developed through co-financing by the Environmental Protection and Energy Efficiency Fund (75.000 €)

District heating system using wood chips

Due to high need for the heat during winter period and inefficiency of existing individual heating systems, project team together with energy manager started with project of a local district heating system. This system would use biomass and waste wood from nearby forests and a local sawmill. The project is still initial phase. It is anticipated that the system will include all municipality buildings, few business and residential buildings. Moreover, there is a possibility to connect some business and other facilities (wood drying facility, fire department building etc.). Estimated boiler capacity would be around 1 MW (depending on the needs and number of beneficiaries), and the project costs would be 400.000-700.000 € (depending on the expansion of the network). It is planned to co-finance the project using local and EU funds. Local experts, experts from EIHP and REGEA will participate in the project. It is estimated that 30-50% savings will be achieved in comparison with existing heating system, also providing larger comfort.

School boiler on pellets

School building and accompanied sport hall have high heating demand. Present system is fairly inefficient and the costs are high (heating oil). Thus, replacement of existing boiler with modern option using pellets would increase efficiency of the system, reduce heating costs and local emission. It is estimated that by using wood pellets (biomass has *zero emission*) 100 tons of CO₂eq could be eliminated. In the case of the project implementation, the costs of the boiler replacement would be financed by Ministry of Regional Development, Forestry and Water Management of Republic of Croatia.



Measurement of the wind potential – Location Metla

One of the most promising opportunities for utilisation of renewable sources for electricity generation in Rakovica municipality is development of a wind farm. Wind measurements have been contracted this year and will last for approximately 24 months. Results will represent the base for development of wind power plants in the area.



Systematic education of pupils and promotion of RES and EE

Inspired by the IEE MODEL municipality intelligent energy days, the municipality has decided to conduct a programme of continuous education about RES, EE and environmental protection. First two days of intelligent energy were held in 2008 and 2009 and made an excellent foundation for the project "Returning to Roots". During the project, pupils will obtain information about alternative energy use, renewable energy sources, traditional energy approach, recycling, environmental protection etc.



Main achievements

In the short period a platform for sustainable energy and ecological development has been developed. Before beginning of the IEE MODEL project, heating oil and traditional wood furnaces have been used as a primary energy source. On the other hand, suggested projects offer opportunity to reduce energy expenses and emission by more than 200 t CO₂ eq. Moreover, during the projects better cooperation between municipality, local stakeholders and SMEs has been established.

Through the development of the ECO-ETNO business zone, an opportunity for all interested parties has been created to distribute their ecological and traditional products in ecological surroundings having low maintenance costs. Estimated savings in maintenance of such systems, in comparison to ones which are traditionally used in this area (heating oil), is 30-50%. Moreover, significant reduction of emission into environment is also achieved.

With prudent approach to municipality development, communication and education is also being improved at all levels, especially among school children. In continuation to *Municipal Intelligent energy days (MIED)* variety of education programmes have been conducted in cooperation with EIHP and REGEA.

Suggestions for other municipalities

Due to systematic approach to energy management, with goal of sustainable development, Rakovica has been recognized as shining example. These projects have been included in energy strategy of the Karlovačka County as a *Shining example* to other municipalities.

Essential guidelines for the development have followed national strategy by implementing its important parts in the future local energy plan through:

- o Reduced consumption of fossil fuels
- o Increase in share of renewable energy sources
- o Reduced specific consumption through increase of energy efficiency
- o Organization of energy office/manager responsible for local energy problems
- o Designing of energy database and elimination of legislative barriers
- o Increased cooperation with local stakeholders and SMEs
- o Development of educational and promotional programmes for RES and EE at all levels.

MODEL NATIONAL COORDINATOR FOR CROATIA Energy Institute Hrvoje Požar (EIHP)



Contact person: Vesna Rastovac
Position: Mayor deputy/Energy manager
Organisation: Rakovica Municipality
Address: Rakovica 6, 47 245 Rakovica, Croatia
Tel.: +385 (0) 47 784 011
Fax: +385 (0) 47 784 039
E-mail: opcina.rakovica@ka.t-com.hr
Web: <http://www.rakovica.hr/>

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