Category Demonstration and dissemination centre of RES and RUE

Case Study The project SMART HOUSE

Project cofinanced by

European Regional Development Fund

Lead Partner

Provincia di savona

Sustainable Construction in Rural and Fragile Areas for Energy efficiency

Category Demonstration and dissemination centre of RES and RUE

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Sustainable Construction in Rural and Fragile Areas for Energy efficiency

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Context

The project SMART HOUSE in Martjanci has been started in the year 2005. The XVIII century old building has been reconstructed into the contemporary specific regional Business incubator for headquarter of several development organizations, at the same time serving as **demonstration and dissemination centre of RES and RUE** not only for the Pomurje Region, but also for the whole Republic of Slovenia and cross-border area.

As a result the implementing project had an important impact on overcoming the existing regional barriers related to **energy sustainable development, environment protection, citizen's awareness, advisory and training support,** namely on:

- rise of awareness among the population about the use of RES & RUE measures,
- general increase of the energy production from RES,
- general improvement of the energy efficiency,
- significant reduction of GHG emissions,
- promotion of the natural materials use by reconstruction of buildings, rise of demand for RES & RUE appliances, equipment and installations on the consumer market,
- advisory services for individuals and enterprises about RES & RUE applications,
- trainings for the workers in the field of RES & RUE equipment and appliances installation, more new jobs creation.

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SCORE Sustainable Construction in Rural and Fragile Areas for Energy efficiency

Context

The **initiative** to establish a systematic demonstration and dissemination centre of RES & RUE in Pomurje belonged to the institution Bistra Hiša Martjanci. Lack of the citizens' awareness and informative gap related to energy efficiency and energy sustainable behavior in our rural region showed a high demand for the creation of such a centre called Smart House. For that purpose in 2004 it was chosen **an abandoned building** in Martjanci.

In general, the XVIII century house has not been utilized since more than 10 years. It was occupied by the post office and more before it was a public school, where every room in winter has been heated with stoves on wood. Besides that, this house is under historic preservation, including the unique nest of storks on its chimney, which is pretty symbolic for the Pomurje Region.

The **principal concept** of the old building reconstruction was presented at the Launching meeting between the project holder "Bistra Hiša" institution, architectures and energy experts. The competent energy analysis of the building has been performed. Afterwards it was decided to renovate the old school by using the majority of renewable and non-polluting energy supplies.

At the second meeting all the project key actors have presented their **particular projects** on the concept, including the ECO-installations (natural materials and components) that could be applied.

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And finally by the third meeting all the **project documentation** has been arranged, so that the very reconstruction has started in 2005 under the supervision of the Institute for the Protection of Cultural Heritage of Slovenia. The municipality Moravske Toplice showed an important support to the Smart House project and it has being acquainted with the whole proceedings of the reconstruction during its implementation.

The performed Energy analysis discovered that the XVIII c. old school had unsatisfactory thermal conditions. For this reason the building renovation has foreseen to obtain a higher level quality appliances and optimal energy efficiency improvements combined with natural materials, in addition utilizing the renewable energy sources, what actually have presumed two energy terms – RUE approach and RES approach:

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Description

Rational use of energy approach

thermal insulation of the building envelope in general :

-sealing the external walls (thickness extend, reed plates, loamy rough coating, wall heating);

-sealing the floors (thickness extend, sawdust, hemp, floor heating);

-thermal insulation of the sloped roof (wood fibers, cellulose, coconut fibers);

replacement of doors and windows (wood, 3-layer insulation glass, U=0,8 W/m2K);

application of saving and sensory bulbs / lamps;

high-grade energy efficient heating and ventilation systems **(HVAC system)**;

application of **class A** household appliances;

Installation of **automated control system** for measuring relevant energy parameters.

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Description

Renewable energy sources approach

-BDH system with a boiler 150 kW (including thermal connections to 6 neighbouring objects);
-heating pump 590 W (for warming water and heating);
-photovoltaic system 4,95 kW, surface 39,4 m2 (for electricity distribution to the national grid);
-solar collectors 40 m2 (for warming water and heating);
-ventilation system (passive) – well water from the yard;
-rainwater collector (for technological and sanitarian watering needs).

For the renovation purposes the Smart House project has received favorable credit in amount of 500.000 EUR from the public Ecological Fund of the Republic of Slovenia (credit – 85 %, own funding – 15%).

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Evaluation

The principal part of the reconstruction was completed in 2008; so that nowadays the Smart House is acting as a specific regional Business Incubator for headquarter of Development Agency Sinergija, Local Energy Agency Pomurje, Bistra Hiša, Community Foundation Pomurje, Life-long learning centre and a Regional crossing-point for NGOs in Pomurje. Depending on a company there are plenty of different activities taking place in there: different international seminars, trainings and advisory subjected to RES & RUE promotion, business info-point for enterprises, Open door Days strengthening the positive citizens' attitude towards sustainable use of available energy sources. Thus, the Smart House has actually become the leading promotion and education center of RES exploitation and RUE dissemination on the regional level and also important role on the national level (in Slovenia), as well as for the cross-border area.

Project benefits: After the renovation the Smart House has achieved the low-energy standards as for the building thermal transmissibility and thermal losses improvements that presented in the tables below:

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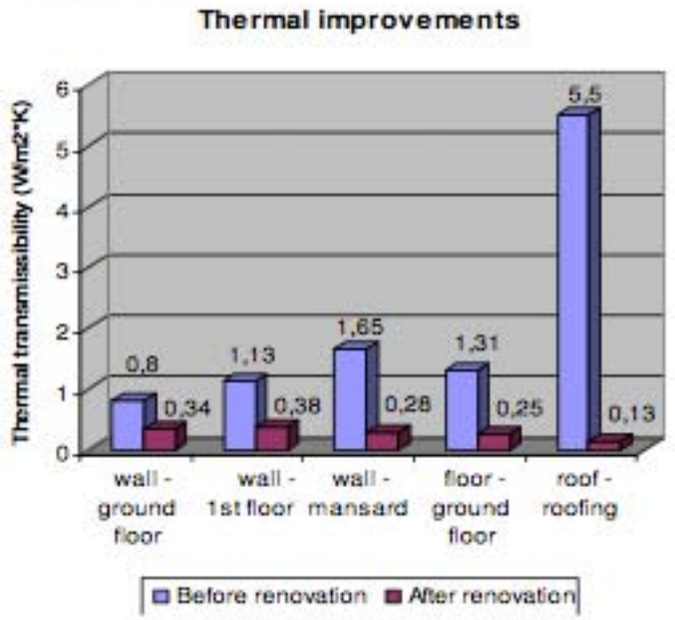
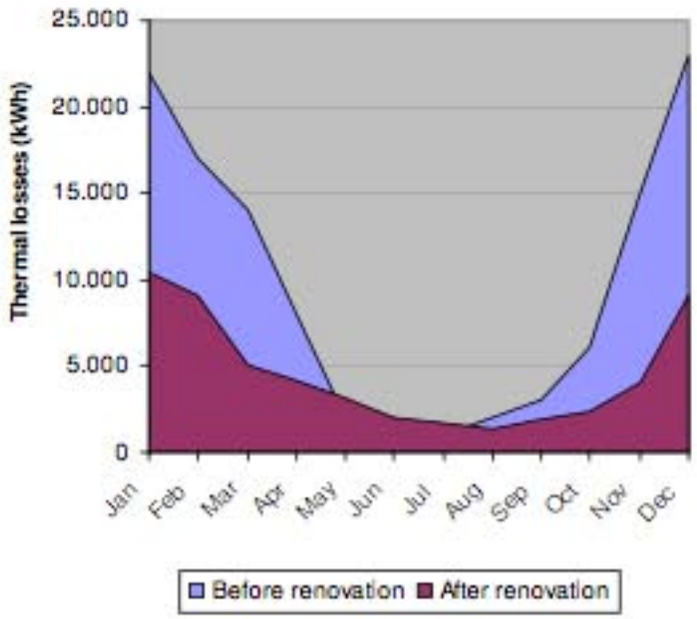
Evaluation





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Evaluation

Thanks to the renovation it became possible to save up to

61.338 kWh of the building thermal energy, which allowed decreasing of the light heating oil consumption from 8.000 l to 3.200 l per year, i.e. 12, 8 t of the CO2 emissions less! Furthermore, the installation of district heating system (BDH) in the Smart House for 6 local objects and by replacing the heating oil with wood chips, the Smart House will contribute up to 53,2 t of CO2 emissions reduction!

Economy background: The optimal energy efficiency improvements after the renovation has enabled to achieve heat energy savings of more than 55 %, which has provided good financial outcome in the light of long term savings.

Policy background: Aiming to the promotion of the up-todate energy efficiency measures and RES exploitation in general, the project Smart House has also followed the strategic goals of the National Energy Programme facilitating the implementation of the EU Directives on energy buildings performance (202/91/EC), Energy declaration, White paper objectives and Kyoto protocol requirements.

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Potential for transferability

The main suggestion for other municipalities or individuals, who are foreseen construction or renovation of low-energy buildings, is the motivation of citizens (investors) and decision makers that the energy-saving measures in buildings are playing crucial role. The strong and resolved project holder is needed, as well as the strong support by the local and national authorities. Locally produced energy from renewable sources is already playing and will play in future more significant part by the local oriented sustainable economic development. It can contribute casting share by increasing of local added value chain. Therefore the promotion and implementation of RES in local communities is and will remain very important.

To convince citizens and decision makers about the importance of energy efficiency measures and use of renewable energy sources – the existing shining example like Smart House (installations on this spot) can play the decisive role.

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Detailed description with technical information and pictures

Before:

With the renovation, the XVIII century old school has been turned into an energy sustainable office building.

After:

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Detailed description with technical information and pictures

- The building was renovated under the historical preservation
- On the building's chimney is one of the last nesting grounds for storks in Slovenia
- For the reconstruction also were used natural materials, such as: reed plates, straw and clay
- The majority of the building energy supplies are renewable and non - polluting

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Detailed description with technical information and pictures

➢The house was reconstructed under historic preservation measures.

➢There for the thermal insulation was put on the inner side of the wall.

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Case Study The project SMART HOUSE

Detailed description with technical information and pictures

By the thermal insulation of the external walls with 20 cm thick reed plates and thermal insulation plates – Styropor we achieved improvement of the thermal conductivity from:

- k,U = 0,8 W/m2*K to k,U = 0,34 W/m2*K (Wall in ground floor);
- k,U = 1,13 W/m2*K to k,U = 0,38 W/m2*K (Wall in first floor + wall heating);
- k,U = 1,653 W/m2*K to k,U = 0,28 W/m2*K (Wall in attic).

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Detailed description with technical information and pictures

We additional insulated the floor in:

- Ground floor with floor heating and in
- First floor and in attic with ground stalks of hemp and wooden floor.

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Detailed description with technical information and pictures

Thermal insulation of the roof with wood fibers, cellulose (old ground paper protected against fire) and coconut fibers

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Case Study The project SMART HOUSE

Detailed description with technical information and pictures

Other rational use of energy approaches:

- **replacement of doors and windows** (wood, 3-layer insulation glass, U=0,8 W/m2K);
- **application of saving and sensory bulbs / lamps**;
- high-grade energy efficient heating and ventilation systems **(HVAC system)**;
- application of **class A** household appliances;
- Installation of **automated control system** for measuring relevant energy parameters.

Renewable energy sources approach

- Planned a biomass distance heating system with a boiler 150 kW (including thermal connections to 6 neighboring objects with witch we will save **53,2 t of CO2);**
- Heating pump (for warming water and heating);

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Detailed description with technical information and pictures

Photovoltaic system 5, 16 kW, surface 35 m2 (for electricity distribution to the national grid witch annually produces 7.000 kWh of electric energy);

- Planned solar collectors 40 m2 (for warming water and heating);
- Ventilation system (passive) – well water from the yard;
- Rainwater collector (for technological and sanitarian watering needs).

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Detailed description with technical information and pictures

The building Smart House, serves also as:

➢a demonstration and dessimination center of renewable energy sources and rational use of energy (RES and RUE) for:

❖Citizens – they will be provided with first-hand information

❖Constructors, engineers, installers and other experts – creating new jobs

❖Manufactures of RES equipment – more market opportunities for them

➢as an example of best practice on local, regional and national level

Project cofinanced by

European Regional Development Fund

Lead Partner

- Province of Savona (ITALY)

Project Partner

- Region of South Aegean (GREECE)
- Read S.A. (GREECE)
- Local Energy Agency Pomurje (SLOVENIE)
- Agência Regional de Energia do Centro e Baixo - Alentejo (PORTUGAL)
- Official Chamber of Commerce, Industry and Shipping of Seville (SPAIN)
- Rhône Chamber of Crafts (FRANCE)
- Development Company of Kefalonia & Ithaki S.A. - Kefalonia (GREECE)
- Chamber of Commerce and Industry Drôme (FRANCE)
- Cyprus Chamber Of Commerce and Industry (CYPRUS)
- Chamber of Commerce & Industry Marseille Provence (FRANCE)

SCORE

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