

WP 4 Energy Supply

“Concept for EER of buildings and modernisation of the supply infrastructure”

Summary

Target area: Seminari Street, Rakvere, Estonia

March 2011



Baltic Union of Cooperative Housing Associations



Table of Contents

Summary.....	3
Imprint.....	8

Summary

The current document gives an overview about the technical circumstances and energy saving potential of the buildings in Seminari street, Rakvere, which is the target area in project Urb.Energy.

The evaluation of the buildings has proved that the current technical situation of the buildings in the target area is not energy efficient and that the buildings contain a huge potential for reducing energy consumption using comprehensive refurbishment of the buildings.

Energy performance of multistore living houses in Estonia as well in Rakvere, taking into account the historical background, is on average level. Average space heat consumption is close to 180 kWh/m² heated area annually. After comprehensive renovation the achievable target is about 60 kWh/m² annually, it means that about 100 kWh/m² is the reasonable saving potential. Based on natural gas produced heat the CO₂ avoiding potential is 20 kg CO₂ m² heated area annually.

Total cost for comprehensive renovation is around 130 EUR/m² per heated area. With the use of long term renovation loan and maximum investment support the energy saving cost will cover the loan and interest cost - so the yearly payment before and after renovation is the same for loan period, but indoor air quality and comfort standard with the value of apartment are much higher.

Energy supply

Seminari street locates in Rakvere city district heating area (DH area). DH area was set by Rakvere city government at the end of 2010. The aim of the DH area was to establish security for investments in DH systems and secure long term stability of heat MWh price.

Rakvere city as the signatory of Covenant of Mayors has set up plan how to increase the use renewable energy sources in the city area up to 20% from 2005 until 2020.

This plan foresees to increase share of renewable energy sources and Rakvere DH Company has made agreement with two boiler houses to use supplied heat produced from wood. Those boiler houses are investing to install CHP technology and heat will be sold to the Rakvere DH system. Therefore Seminari Street is one of the areas who will benefit from this. Heat produced from renewable sources gives higher security of supply, because the dependence from natural gas (Russian source) decreases.

The general plan foresees that nearly 50% of the heat consumed in Rakvere DH area will be produced from wood based fuels. This target should be reached at 2013.

At the same there are available investment support schemes for the end users. Credit and Export Guarantee Fund (KredEx) gives financial support for those flat owners

associations who have decided to make comprehensive renovation and go to the weighted energy label level 150 kWh/m² heated areas annually, corresponding the minimum requirements for energy performance of buildings. This target demands renovation of heating system, insulation of external walls and installation of heat recovered ventilation system. To design all this KredEx support is 90% of designing project cost and to ensure the quality of construction work under the designed renovation project, KredEx will support construction works technical inspection with the same share - 90% of inspection cost.

KredEx gives renovation investment support until 35% of investment cost for complex renovation. Own contribution from 65% of cost can be covered with special renovation loan up to 20 years with fixed maximum interest rate of 4,1%.

Comprehensive renovation means insulation of all external borders of building. Soviet time designed external borders heat transfer standard was about $U = 1 \text{ W}/(\text{m}^2\text{C})$.



1. *Photos. Example of unrenovated panel building and another panel building where comprehensive renovation has been finished*

With insulation the existing thermal bridges will be destroyed and the heat consumption of the building will decrease ($U = 0,2$).

To benefit from the heat consumption decrease the renovation or technical reconstruction of the existing heating system is relevant.



2. *Photos. Examples of different types of radiators in the buildings on Seminari street.*

All apartment radiators should be equipped with thermostatic valves to make possible individual regulation.

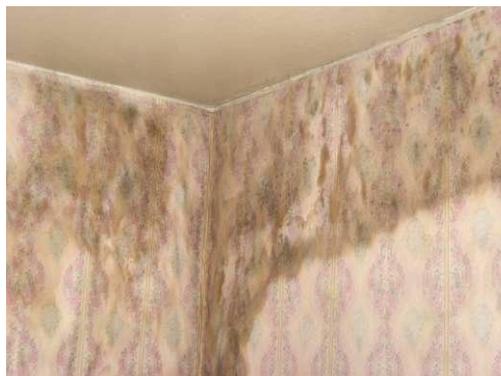
The existing heating system in Seminari street multistore apartment buildings is mostly 1-pipe system and needs technical renovation in most cases to 2-pipe system. To ensure the indoor comfort installing of thermostatic valves is preliminary.

Most of the flat owners have changed the old fashion wooden framed windows with plastic aluminium framed windows.



3. *Photos. Examples of old wooden framed and new plastic windows.*

This has lead to the lack of ventilation in rooms, because old fashioned windows have been designed as part of ventilation system and supplied the fresh air through the construction. New windows construction is fully tight and fresh air inflow is missing. This, together with thermal bridges, creates the indoor air quality problems.



4. Photos. Examples of thermal bridges and low quality of indoor climate in Seminari street buildings.

Renovation of the ventilation systems in these buildings is unavoidable. Modern technology gives opportunity to use equipment with heat exchange possibility. This technology enables heat to stay (about 80%) in the room and at the same time air changes. Recommended technology for multiflat apartment houses, using hot tap water produced centrally in heat substation, is the ventilation system with heat recovery by using heat pump. Heat from exhaust air will be transferred to the hot tap water.

An important precondition for starting with comprehensive renovation project in a flat-owners association is the awareness of the residents. BUCHA in cooperation with Estonian Union of Cooperative Housing Associations and KredEx has organised several training courses, conferences and information events during last 12 years.



5. Photo. Training session for managers of flat-owners associations in Rakvere

There is a need for constant information activities and awareness raising events for managers of the apartment associations as well as for the apartment owners. The best solution for activating the renovation activities in a certain area is to create a best practice. An existence of at least one nice, well renovated and cost-effectively managed apartment association causes a snowball effect in the neighbourhood. Residents of one living region communicate with each other and information about the

costs on heating and about living comfort will spread. This enables to explain the opportunities of comprehensive renovation in the most effective way.

According to the research implemented during the current project it could be said that potential for energy efficiency in Rakver Seminari street region is big. Basically it could be said that investments made for comprehensive renovation would mostly be paid back by the saved energy. There are also financing schemes available via KredEx.

The most important topic which has to be handled for activating the energy efficient refurbishment in this region is raising the awareness of the residents.

Imprint

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