



## Passive House Retrofit Best practice example No 1 from Lithuania



## KLAIPEDA (Lithuania)

**Maximal package of measures yields 65% energy savings**

**Living expenses after renovations almost remained the same**

**Attractive new look of the building, indoor comfort, reduced bills for heating**

### Project data

Location, address:	Debreceno str.31, Klaipeda
Region:	The Baltic sea region
Surroundings:	West of the country, close to the Baltic sea region
Climate:	Mild and humid
Heating degree days:	3445
Year of construction and renovation:	1972 (constructed); 2000 (renovated)
Typology:	Multifamily dwellings
No. of dwellings:	60 dwellings
Treated floor area:	3,171 m <sup>2</sup>
Owner:	Lelija Home Owners Association (further HOA)
Architect and Builder:	-
Costs of (energy) saving measures:	204.616 €, - per house (incl. VAT); 64,5 €/ per m <sup>2</sup>
Renovation financed by:	The owner, (governmental subsidy for energy saving measures (EPR) 45.922 €. )



Picture 1. Renovated façade of the Lelija dwelling.

### Objectives and Results

The Lelija HOA had an objective to implement the renovation of their buildings, improve building appearance, increase indoor comfort, reduce bills for the energy.

HOA had a task to renovate their building in two steps: 1) renovation of the heating system by installing balancing valves, replacement radiators in apartments, installation of thermostatic valves and dividers of heat amount on radiators, roof insulation, replacement of apartment and staircase windows, replacement of pipelines and fittings of cold-water supply system, ceiling insulation in the cellar and insulation of external side -walls. 2) The insulation works of external walls. Everything was implemented according to the planned schedule.

### Key renovation features

- External insulation of façades
- Insulation of roofs
- Replacement of windows
- Renovation of heating system,
- replacement of radiators, balancing valves
- installation of thermostatic valves and individual heat cost allocation system

## Technical details

### Before renovation

#### Constructions [U-values: $W/m^2K$ ]

- Non-insulated roof (most of dwellings) [0.75]
- Non-insulated cavity façades [1.15]
- Wooden window frames
- double glazing [2.56]

#### Installations

- Central heating, no individual regulation
- Old radiators

### After renovation

#### Constructions [U-values: $W/m^2K$ ]

- External insulation of roof [0.30]
- External insulation of cavity façades [0.3]
- New or adjusted insulation window frames
- new double glazing [1.9]

#### Installations

- installation of thermostatic valves and individual heat cost allocation system
- replacement of radiators
- renovation of heating system,

## Energy saving and monitoring

#### Energy consumption before renovation:

Delivered energy (space heating + Domestic Hot Water) 138 kWh/m<sup>2</sup>a

#### Energy consumption after renovation:

Delivered energy (space heating + Domestic Hot Water) 49 kWh/m<sup>2</sup>a

Saving on delivered energy: average 65%,

Energy consumption was monitored for one year after the renovation was finalised.

## Additional information

- According to the chairman of the association, "the cost of heating after renovation dropped by more than a factor of two. However, it depends on the residents themselves. Those who like to be comfortable, pay more, but there are also others who save much more because they prefer to live in a cool environment, or are extremely conscious about saving money and are sincerely happy about the possibility to make independent decisions concerning which room they want to heat and in which to close the handle to the permitted limit.
- This project was implemented by Energy Efficiency Pilot Project (EEPP).
- It was not an easy task to convince the residents to implement the renovation. At the meeting of members of the association passing the decision concerning renovation of the house was not an easy task. After a stormy and passionate discussion residents of the house decided to apply for a soft loan within the framework of EEH and to implement the measures envisaged in the project in two steps: first step was renovation of the heating system, and insulation of walls was implemented at the second stage of the project.

## Lessons learned and conclusions

- The decision to split the project into two stages reduced the financial burden of the loan.
- The costs of heating dropped by more than a factor of two. The individual cost allocation system let the residents of the dwelling regulate the preferred temperature in the dwelling.

## References

[1] [www.bkagentura.lt](http://www.bkagentura.lt)