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# Increasing energy efficiency

## ComAct educational materials

**ComAct** Community Tailored Actions for Energy Poverty Mitigation

## Energy efficient renovation of multi-family buildings

A multi-family building should undergo capital renovation about every 30 to 50 years, depending on the building quality and individual elements that need to be renewed. At the same time existing large prefabricated buildings, especially those in former socialist countries constructed between the 1950s and 1990s, today not only suffer from low structural quality but also from a severe maintenance and renovation backlog. These buildings show damages and deficiencies in their structure and fabric, technical installations and energy efficiency.

## What is a deep energy renovation?

Deep renovations are refurbishments that reduce both the delivered and final energy consumption of a building by a significant percentage compared with pre-renovation levels, leading to very high energy performance.

According to the European Commission's 2013 report on financial support for energy efficiency in buildings, 'deep renovation' can be considered as renovation that leads to significant (typically more than 60%) efficiency improvements. A deep renovation can also include non-energy-saving measures such as modernisation of electrical installations, plumbing or balconies. Non-energy renovations are often the entry point for energy efficiency renovations.

# Energy efficiency measures

## Measures to reduce heat conductivity

Thermal insulation of roof, attic

Thermal insulation of façade

Refurbishment of balconies

Thermal insulation of basement, basement ceiling and walls

Thermal insulation of pipes (heating and hot water system), fittings and heat exchangers in basement

Exchange of windows (in apartments and communal areas)

Replacement of exterior entrance doors

## Measures to renew and improve technical installations

Installation of automated heating unit

Replacement of heating boilers and equipment (pumps, regulation and control technology, etc.)

Hydraulic balancing of heating system

Replacement (modernisation) of heating system and installation of heating thermostats on radiators (possibly a remote element-by-element metering system) and replacement of one-pipe heating system with two-pipe system

Replacement (modernisation) of ventilation system, installation of ventilation system with heat recovery
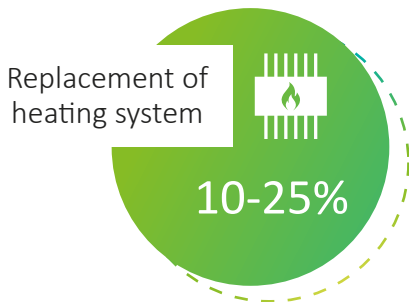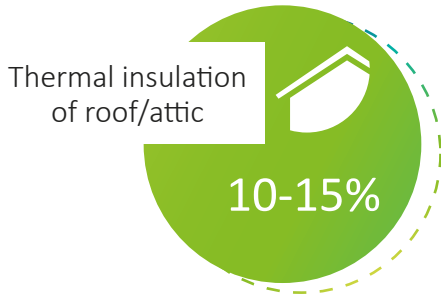
Replacement of drinking and hot water supply system

Exchange or modernisation of elevators

Replacement of lamps and light bulbs with energy efficient LED lighting, installation of motion detectors on stairwells

Use of renewable energy sources

# Technical measures and their impacts on energy efficiency: possible energy savings in existing buildings

Thermal insulation of roof/attic
**10-15%**

Thermal insulation of façade
**15-30%**

Thermal insulation of basement ceiling
**5-10%**

Replacement of heating system
**10-25%**

Exchange of windows, doors
**10-20%**

(source: dena)

# Not energy-saving, but technically necessary measures

Measures to modernise the building

Rehabilitation of roof structures

Major repairs or replacement of balconies, loggias

Replacement of plumbing fixtures

Repair of entrance hall and stairwells

Replacement of sewage system

Sanitation of outer walls of building

Replacement of electrical installations

Replacement of entrance doors to flats

Floor covering
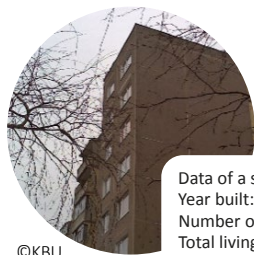
Postboxes

Outdoor installations

Tiling works

Painting works

# Individual refurbishment roadmap

Step by step to a modernised house: an example of an individual renovation roadmap based on a plan developed by ©BMWi.

Data of a sample building:
Year built: 1987 m.
Number of dwellings: 54
Total living area: 3490,40 m2

©KBU

Calculation for a household living in 60 m2 apartment.

## Actual state
**Energy class E+**

Current energy costs:
**1346,39 €/a**

Forecasted energy costs in few years:
**2422,8 €/a**

$CO_2$-Emissions
**209,90 t for whole building**

Primary energy demand:
**16335 kWh/a**

### Package of measures #1
- Insulation of basement`s ceiling
- Exchange of heating system
- Optimisation of heating distribution
- Exchange of water pipes

### Package of measures #2
- Roof insulation
- Smart heating control

### Package of measures #3
- Facade insulation
- Exchange of windows and doors
- Ventilation system with heat recovery

### Package of measures #4
- PV Installation

## Your future building
**Energy class A+**

Future energy costs:
**316 €/a**

$CO^2$-Emissions
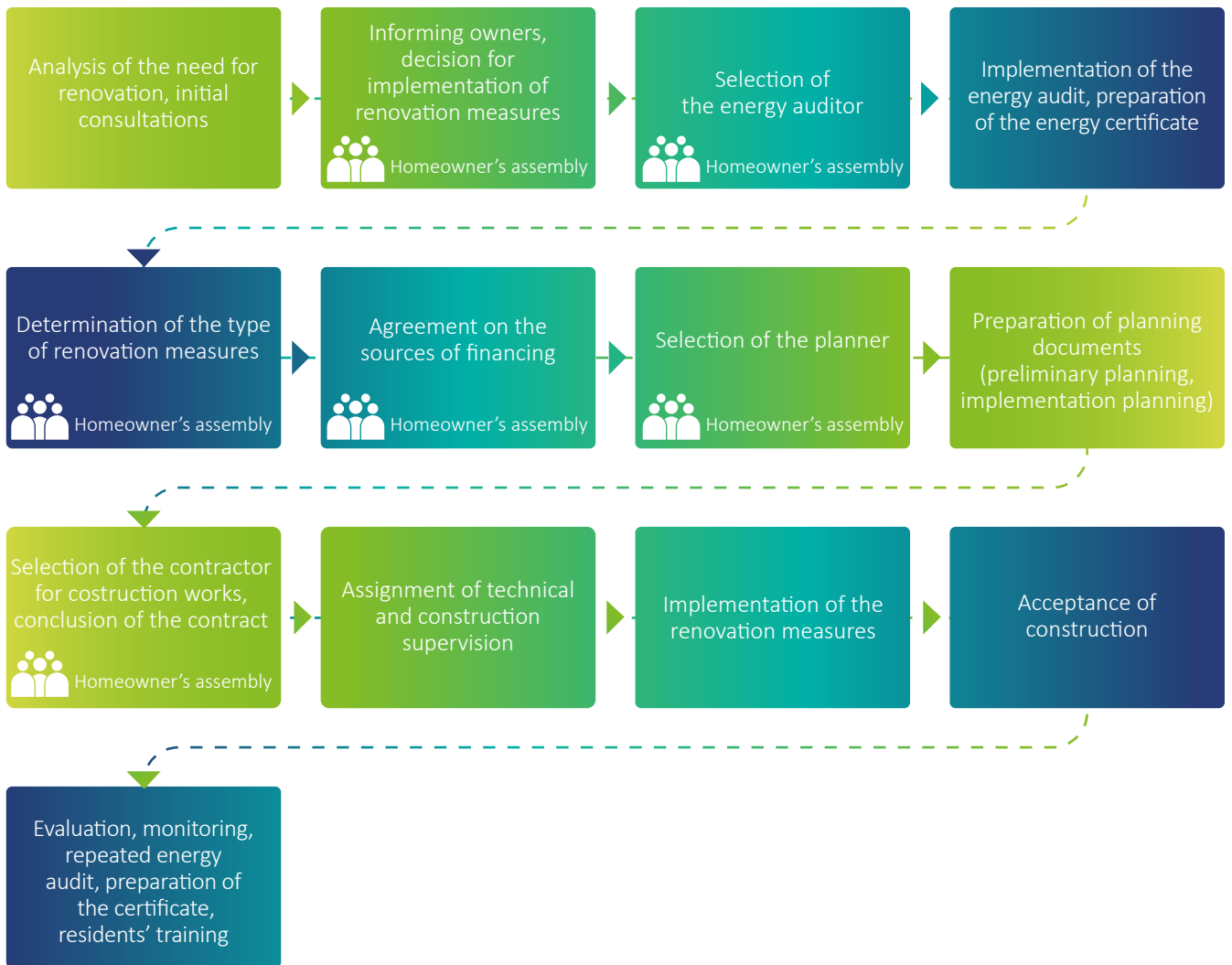**1 t for the whole building**

Primary energy demand:
**1900 kWh/a**

If a complete renovation "in one go" is not possible for financial or other reasons, an individual renovation roadmap is a good alternative. This is a plan of action for coordinated steps towards a deep energy renovation. The building and the need for renovation are considered as holistically as possible. Its preparation is preceded by a comprehensive structural and energy-related survey and consultation, while in-depth discussions are held with the homeowners so that the renovation roadmap is based on realistic assumptions and conditions.

The residents' financial resources and desired measures are fed into the plan and compared with the objective requirements for the overall condition of the building. Depending on the possibilities of the homeowners, the renovation can begin with concrete individual steps and systematically continue in further renovation steps (packages of measures). The most important prerequisite is that there is an overall renovation concept for the building behind all the steps and measures: they are coordinated and pursued with the aim of achieving a high-quality deep renovation in the long term.

This is important to avoid any lock-in effects through fossil fuel heating or stranded assets through renovation measures which later prove to be superfluous.

# Main stages of organisation and implementation of energy renovation of multi-family buildings

| Analysis of the need for renovation, initial consultations | Informing owners, decision for implementation of renovation measures **Homeowner's assembly** | Selection of the energy auditor **Homeowner's assembly** | Implementation of the energy audit, preparation of the energy certificate |

| Determination of the type of renovation measures **Homeowner's assembly** | Agreement on the sources of financing **Homeowner's assembly** | Selection of the planner **Homeowner's assembly** | Preparation of planning documents (preliminary planning, implementation planning) |

| Selection of the contractor for costruction works, conclusion of the contract **Homeowner's assembly** | Assignment of technical and construction supervision | Implementation of the renovation measures | Acceptance of construction |

| Evaluation, monitoring, repeated energy audit, preparation of the certificate, residents' training |

# Financing of energy efficiency measures

Homeowners can use the following funding sources to finance energy renovation projects:

| **Internal sources** | **External sources** |
|---|---|
| Own funds and savings of homeowners' association (repair/reserve funds) | International, national and local support funding programmes, revolving funds and bank loans |

You can find more information in the **Toolbox of financing models on the ComAct website.**
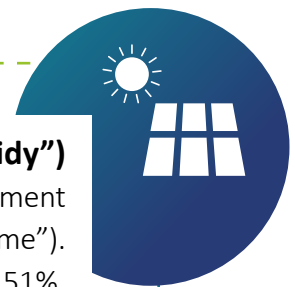
# Country-specific financial instruments: Lithuania

**Multi Apartment Building Renovation (Modernisation) Programme**
30% subsidy, 70% own contribution (can be loan from local bank);
100% coverage of renovation costs if the family receives heat subsidies.

**Extra support for solar/heat pumps ("RES subsidy")**
30% subsidy in addition to the 30% specified above (under "Multi Apartment Building Renovation (Modernisation) Programme").
This brings total subsidy to 51%.

**Small renovation**
Up to 30% subsidy for limited energy efficiency measures for households connected to district heating systems (renovation of hot water systems, centralised local heat distribution equipment – replacement of outdated equipment with automated heat distribution system etc.)

# Contacts

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