



Energy efficient rehabilitation – improvement of buildings and energy supply infrastructure

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Activities	Status (not started yet, just started, working on, almost finished, finished)	Description
Activity 1 <i>1 Analysis of energy efficiency of typical buildings and of the state of the energy supply infrastructure</i> <i>Analysis of energy efficiency in three typical buildings and suggested EER measures in Grodno target area</i> <i>1.1 Building inspection</i>	<p style="text-align: center;"><i>finished</i></p> <p style="text-align: center;"><i>finished</i></p>	<p><i>Consist of Germany energy saving agency works. Partners from Lida represented technical data concerning to selected buildings for analysis elaboration. There is a detailed description of a current energy situation in these buildings and refurbishment measures. Also there are cost calculations for every refurbishment option.</i></p> <p><i>The conclusion of outside protect construction situation for selected houses for two selected houses.</i></p>

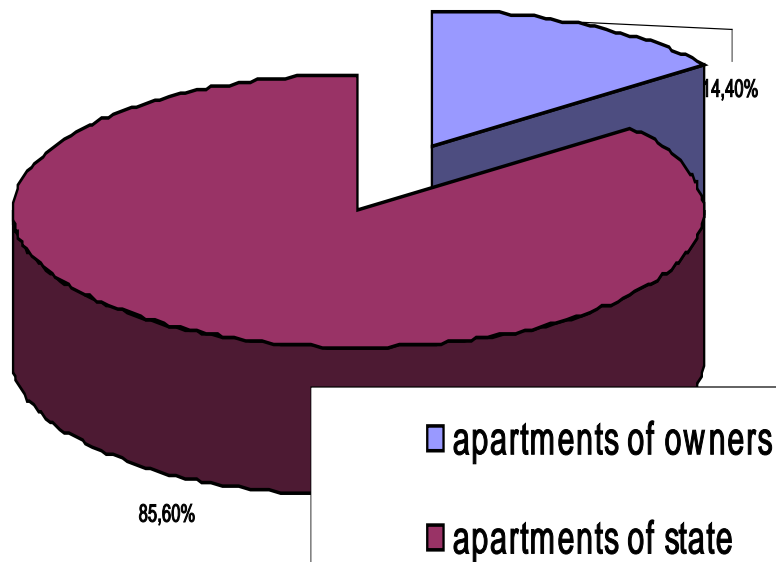
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<p>Activity 2 <i>Renovation plan documentation development</i></p> <p>Activity 3 <i>Implementation of modernization activities in the Grodno target area housing stock</i></p>	<p>working on</p> <p>working on</p>	<p><i>On the basis of German Energy Agency recommendation the refurbishment plan elaboration for selected houses with Belarusian norms and conditions. The plan will include several steps. First step will elaborate during this project</i></p> <p><i>During the project implementation it's planned to use practically some of gained results for one selected resident house refurbishment</i></p>

Residential buildings, (_Grodno TA_)

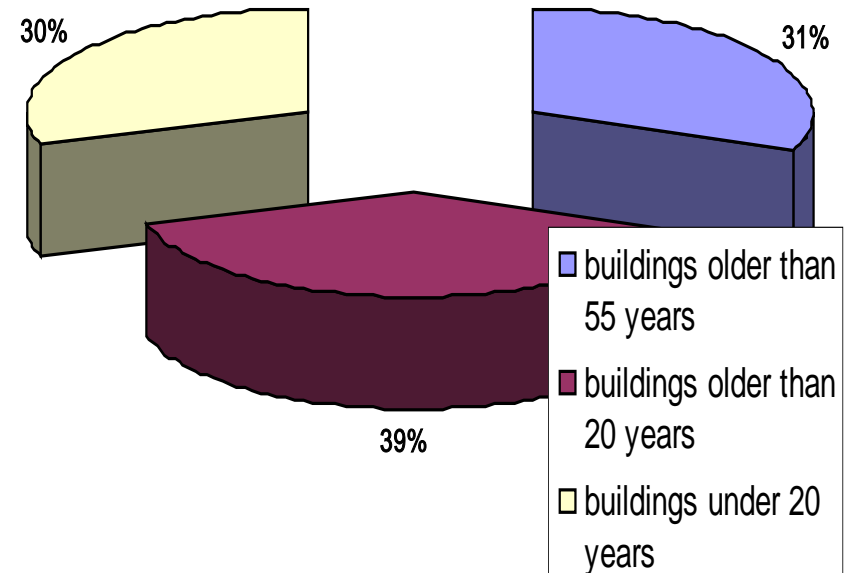
Number of multi-apartment buildings	2217
Number of apartments	28921
Total living and heating space, m ²	1 483 988 – living space 961 148 - heating space
The average living and heating space per apartment, m ²	51,3 – living space 33,3 – heating space
Share of owners / tenants	85,6% - apartments of owners, 14,4% - apartments of state 15% - tenants

Structure of multi-apartment buildings

Share of private and state apartments in multi - apartment buildings



Age of multi - apartments buildings



Residential buildings, (_Grodno_TA_)

- Typical building types – constructions, materials, number of floors and apartments:
 - *Type 1 (bricks buildings); the walls width is 51 sm, combined roof: warmth-keeping lagging, cement covering,*
 - *4 sheets of ruberoid;*
 - *Type 2 (prefabricated concrete slab buildings);*
 - *There are some series of prefabricated concrete slab buildings, there are 5,7,9 stories buildings*
 - *combined roof: warmth-keeping lagging, cement covering,*
 - *4 sheets of ruberoid;*

A typical bricks building



A typical prefabricated concrete slab building (improved layout)



Residential buildings (Grodno TA)

	<i>Type 1</i>	<i>Type 2</i>	Total
Number of buildings	247	288	535

Residential buildings, (_Grodno_TA_)

- The average annual energy consumption of multi-apartment buildings (kWh/m²)

Total heat consumption	<i>(The average annual heat consumption (hot water preparation and space heating) of multi-apartment buildings in your TA)</i>
Space heating	<i>(The average annual heat consumption for multi-apartment building space heating in your TA)</i>
Hot water preparation	<i>(The average annual heat consumption for hot water preparation for multi-apartment buildings in your TA)</i>
Electricity	<i>(The average annual electricity consumption of multi-apartment buildings in your TA)</i>

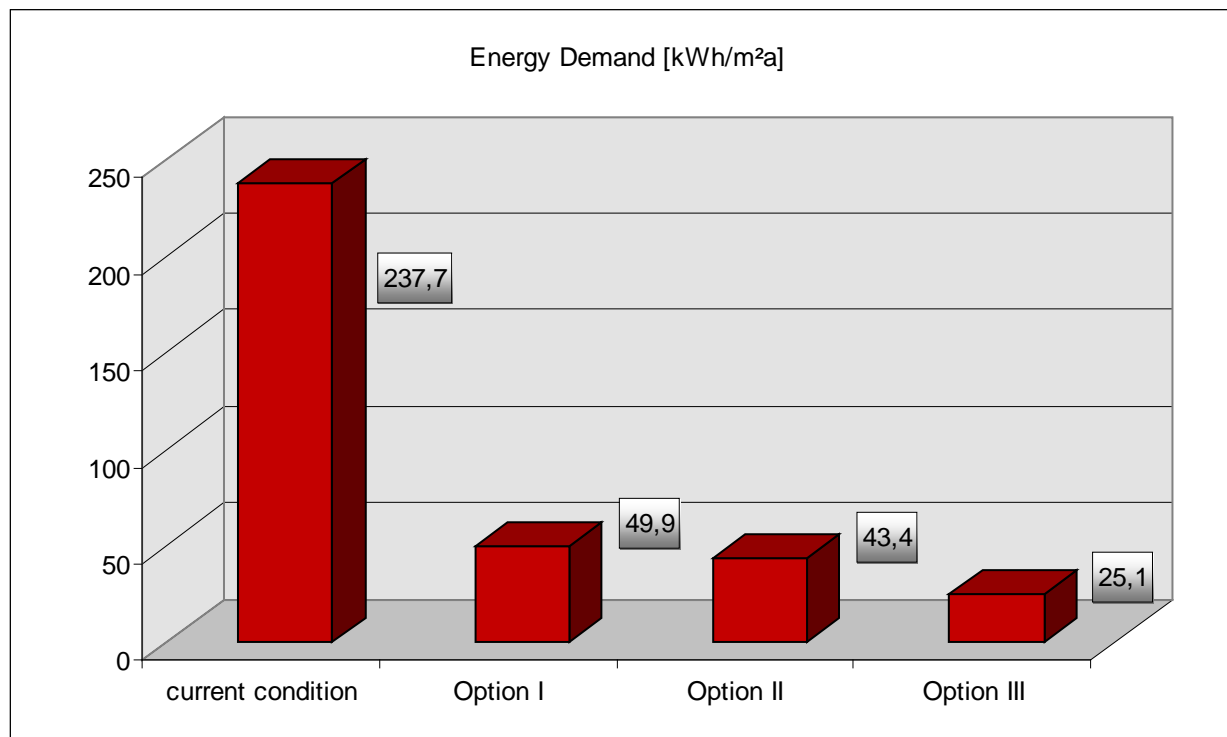
- Tariffs and costs:

	Tariff	Average annual costs per m²
Heat	<i>Space heating:</i> <i>0,02 euro /kW</i> <i>Hot water preparation:</i> <i>0,01 euro/kW</i>	<i>3 euro :space heating</i> <i>0,76 euro: hot water preparation</i> <i>3,76 euro : combined costs</i>
Electricity	<i>0,047 euro/kWh (The electricity tariff in Lida)</i>	<i>0,564 euro</i>

Residential buildings (Grodno TA)

- **The energy saving potential (kWh/m²/a, %):**
 - *The aimed final energy consumption of multi-apartment buildings after refurbishment is 25-30%;*
 - *The potential reduction of final energy consumption after multi-apartment building refurbishment is 90%.*
 - *The energy Agency of Investitionsbank Schleswig-Holstein elaborated an Energetic and economic examination*
 - *Selected energy-saving options and basis of calculation*
 - *For 3 selected houses for Grodno Target area*

Energy demand in three exemplary residential houses in Lida kWh/m²a primary energy



Public buildings, (_Grodno TA_)

- **Concepts and experience of public building refurbishment:**
 - *At present there are a lot of public buildings going to be refurbished and built.*
 - *By September 2010 sports town with Skating Palace, gym, tennis courts, soccer field, memorial of 2010 years of Christianity, sculptures will be built in Lida.*
 - *Castle refurbishment is also going on now.*
 - *Cinema, kindergarten, Recreation centre, swimming pool are being refurbished now.*
 - *The main goal of the refurbishment is the renovation of the external looks of the buildings. It is also planned to reduce energy consumption by 25-30%.*

Energy supply (_Grodno TA_)

- **The heat producers and suppliers:**
 - *Republican Unitary Enterprise “Grodnoenergo” – 82%*
 - *Lida Communal Service heat sources – 18%:*
 - *446 – Local heating facilities*
 - *Of these 134 – work on the natural gas*
 - *118 – combined (gas + local energy sources)*
 - *194 – local energy sources*
 - *7 – Local heating facilities*
- **The energy supply infrastructure:**
 - *Share of district heating 90 - 95%;*
 - *Share of individual heating 5 – 10%;*
 - *2 pipes system(District heating network / pipeline system in your TA);*
 - *Pipes system is reconstructing now. All pipes changing to (Status of modernization of energy supply system, energy losses before and after modernization, saving potentials in your TA);*
- **Heat loads:**
 - *Heat:372,16 kW for bricks 40-flats building;*
 - *90 kW for bricks 20-flats building;*
 - *Hot water: 236 kW for 60 flats building*

Energy supply (Grodno TA)

- **Energy sources:**
 - *Gas, local energy sources (fire wood, peat, sawdust);*
- **Cogeneration:**
 - *Cogeneration share now is near 3-4%; it is planned to increase the share of cogeneration energy, but depends on financial situation*
- **Renewable Energy Sources**
 - *Present time Renewable Energy Sources are not used in Lida and Grodno region. Nearest future it's not planned to use Renewable Energy Sources because of the next reasons:*
 - *There is no experience of RES using;*
 - *There is no confidence about there efficiency;*
 - *High cost.*

Stakeholders, (_Grodno_TA_)

- **The stakeholders involved in Urb.Energy project:**
 - *Grodno Oblast Housing Department and Lida Communal Service companies are involved in the project. They are the main suppliers of communal services and buildings management;*
 - *Every project period there are 1-2 seminars and some meetings with involved flat owners, tenants and other interested participants;*
 - *Also local authorities are involved to the project, journalists*

Current results, (_Grodno TA_)

- **The first results:**
 - *Buildings inspection for selected houses from Belarusian specialists;*
 - *Analysis of energy efficiency in three typical buildings and suggested EER measures in Grodno target area*
 - *The draft version of refurbishment plan elaboration;*
- **Urgent Problems:**
 - *There are a lot of differences in national construction and refurbishment rules and rules in other countries. There is no special financial instruments for housing refurbishment.*
 - *approaches planned to solve problems: gaining an experience from other countries about existing problems solutions and about possibilities for refurbishment measures financing.*