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Low-cost energy saving Techniques
by
Adam Gula

More about the Project:
http://www.inforse.org/europe/ECSE.htm
http://inforse.org/europe/ECSE_RU.htm

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Presentation at the study tour of the group of Belarus energy experts organized by INFORSE Europe
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The highest heat loss is there where is no money on energy saving
Main approaches
Use low cost measures to obtain the maximum savings
Example of low cost measures of energy saving

- Insulation of the windows
- Wall insulation
- Insulation of attics
- Suppress excessive window openings
- Heat reflective screens for radiator heating system
- Warming of the entrance doors in buildings
Insulation of the windows
Additional contour

- $U_1 = 5.1 \text{ BT/(m}^2\text{C})$
- $U_2 = 2.5 \text{ BT/(m}^2\text{C})$
Typical window

Additional third window
Glass blocks in the house
Wall insulation

Not transparent polycarbonate glass
Replacement of inefficient glazing

Insulated wall

Not transparent polycarbonate glass
• Changing the inefficient glazing
Insert of sandwich-panels
Insert of sandwich-panel number 1

Profile made from metal or plastic

Cavity

Decorative plaster

Heat insulator

Panel

Gypsum board
Insert of sandwich-panel number 2

- Gypsum board
- Decorative plaster
- Window
- Heat insulator
- Frame
Comparison of heat losses through windows

- Result of:
  - Air infiltration through leaks
  - Conduction and radiation through glass
Comparison of heat loss due to the window and air infiltration through leaks conductive glass

- Assumptions

- Room size – $S = 20m^2$
- Room height – $h = 2.8$ m
- Window area = $2.5$ m2
- Heat transfer coeff – $U = 2.6$ W / m2 K
- External temperature = $10$ C
- Internal temperature = $20$ C
- Temperature difference = $30$ K
Thermorenovation

- We will consider two cases:
  - Window seal is reducing the air change rate from 2 to 1
  - Replace windows with plastic - the same reduction in air change + reduced transfer coefficient U from 2.6 W/m²K to 1.3 W/m²K
Window sealing

• Sealing windows is much more cheaper way than to install a new ones and the energy saving is the same
Attic sealing
Insulation
Sealing walls
Examples of other methods
• Energy Efficiency Technique

• Thank you for your attention