Buildings with low carbon dioxide emission

Building renovation for reducing energy demand.

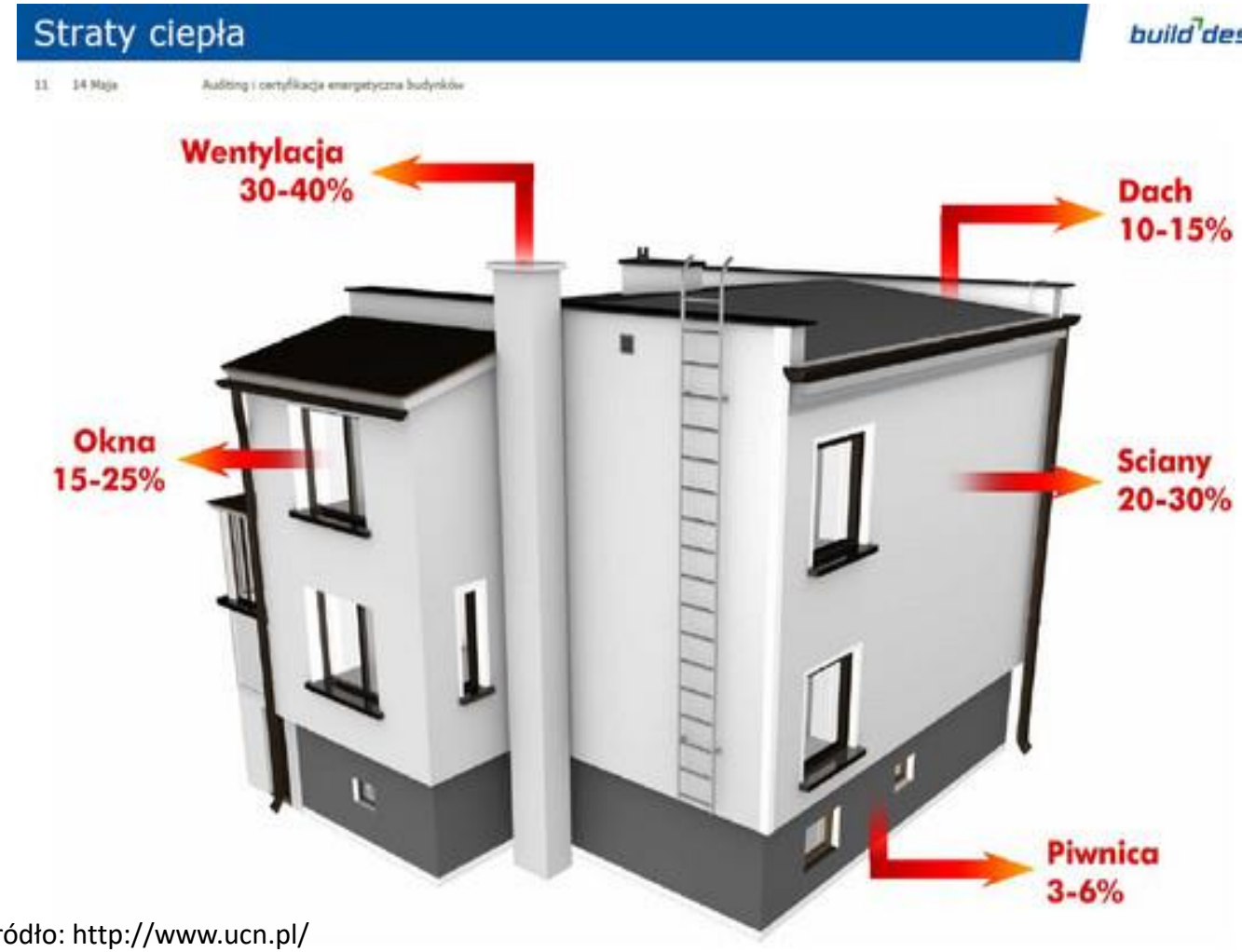
What is energy-efficient construction?

Energy-efficient construction is characterized by the kind of design technology and construction that makes it possible to gain high comfort of living and low energy consumption, which means low cost of exploitation. This is gained by the reduction of energy needed for heating and hot water, and the reduction of electrical energy used for lightning and ventilation.

What is energy-efficient construction?

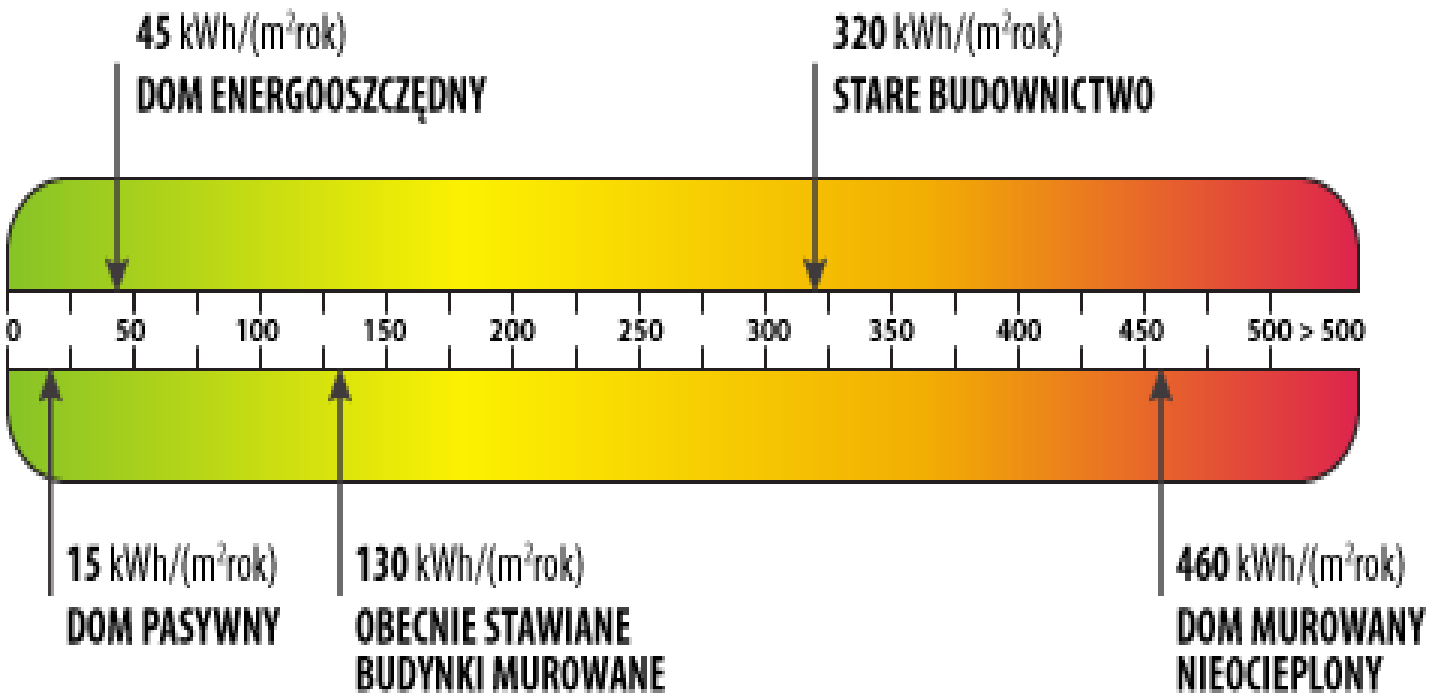
The reduction of heating energy is gained by the usage of the right insulation of the whole building, which means the insulation of walls, slab roofs, foundations, cellar ceilings and floors, window frames with high insulation parameters, elimination and avoidance of all thermal bridges, the preservation of the high tightness and regaining of the heat that escapes the building either with the heated air through ventilation, or through wastewater sewerage.

The percentage of heat loss of the building is illustrated in the picture below.



Źródło: http://www.ucn.pl/

Obliczeniowe zapotrzebowanie na nieodnawialną energię pierwotną



Źródło: www.dasa.com

What is thermo-modernisation?

Nowadays there is a tendency to design and build buildings by using energy-efficient technology, however, the older buildings with high heat losses require **thermomodernisation.**

Thermomodernisation stands for all changes in the structure of a building and the heating system that lead to the reduction of heat loss.

Energy audit

The correct **energy audit** of a building is crucial in any successful thermomodernisation investment.
An energy audit is an analysis of the given state of energy flows and evaluation of possible savings, but also the choice of optimal technical solutions allowing for the reduction of energy loss.

An energy audit is the basis of making the right decision as to what steps should be taken in a specific case.

Thermomodernisation

Exemplary thermomodernisation improvements to be made in buildings:

- external walls insulation
- insulation of slab roofs, attic ceilings
- cellar ceiling insulation
- replacement of window and door frames
- modernization of heating system
- modernization of water heating installation
- modernization of ventilation system

Thermomodernisation

Heating system modernisation includes:

- modernisation of thermal centers (the replacement of boilers for burning solid fuels for those with ”eco-pea coal” of the 5th class or gas boilers),
- the replacement of heaters and pipes, wires insulation,
- the installation of thermostatic valves and weather compensations,
- usage of renewable resources

Thermomodernisation

Thermomodernisation benefits:

- energy-savings
- heating costs reduction
- reduction of air pollution
- improvements in building's aesthetics and convenience

DROGA DO KOMPLEKSOWEJ TERMOMODERNIZACJI

The above procedures can be implemented fully or one by one depending on technical state of the building and owner's financial abilities.

Over the last decade the thermomodernisation of numerable public and residential buildings has been carried out in Rabka-Zdrój.

The thermomodernisation of buildings owned or co-owned by Rabka-Zdrój municipality in the Municipal Housing Department in Rabka-Zdrój.

In the years 2009 - 2011 the thermomodernisation of 10 buildings was carried out.
The works were financed by owners' financial resources and bank loans with thermomodernisation benefit.

The thermomodernisation included styrofoam insulation of external walls, slab roofs insulation, the replacement of window and door frames in staircases and cellars.

Furthermore, in the years 2013-2014 the central heating modernisation of two buildings was done:

- old gas boilers were replaced for condensing boilers with high efficiency, weather compensations and thermostatic valves in staircases and flats were installed.

Thanks to the renovations the heating costs were reduced by approx. 40%.

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The thermomodernisation of buildings owned by Rabka-Zdrój municipality.

1. **kindergartens and schools**

Gimnasium No. I

Primary School no. 2

Primary School no. 3

Primary School No. 4

Primary School and Gimnasium in Chabówka

Primary School and Gimnasium in Rdzawka

Primary School and Gimnasium in Ponice

2. „Śnieżka” („Snowflake”) cinema

3. Amphitheater

The thermomodernisation of multitenant buildings carried out by Housing Cooperative in Rabka-Zdrój.

In the years 2007-2008, thermomodernisation of 30 multitenant buildings was carried out.
The modernisation included – external walls insulation, ceiling and slab roofs insulation and the replacement of window and door frames.

Earlier, the Cooperative carried out the modernisation of all central heating boilers. The modernisation included the replacement of coal boilers for gas boilers for instance.

The thermomodernisation of multitenant buildings carried out by Housing Cooperative in Rabka-Zdrój.

Furthermore, the Housing Cooperative built an individual gas boiler-house for the shopping center and a new building in order to avoid large energy loss due to transportation from the boiler-house in neighbouring residential area.

The thermomodernisation of the majority of multitenant houses was also carried out together with the replacement of thermal centers.

The thermomodernisation of multitenant buildings carried out by Housing Cooperative in Rabka-Zdrój

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In sanatorium buildings– Thuberculosis and Lung Diseases Institute, holiday resorts and the hospital the heating modernisation was carried out, which included the replacement of solid fuels boiler for gas ones.

Some sanatorium buildings and resorts were thoroughly thermomodernised, which considerably reduced the amount of hazardous gases emissions into the air in the area of Rabka-Zdrój.

„Rabczański Zdrój” Spa – Uzdrowisko Rabka S.A.

Pavilion VI of the Tuberculosis and Lung Diseases Institute (formerly called „Nazareth") is an example of a full thermomodernisation that includes the installation of modern air conditioning and ventilation system with heat recovery.

A sanatorium building – Tuberculosis and Lung Diseases Institute

The thermomodernisation of other public facilities

Comprehensive School No. I

Railway Station
(housing the Public Library)

Police Station

Fire Brigade Station

The thermomodernisation of other public buildings

„Primavera”

The thermomodernisation of other public buildings

Cardiology Hospital Rabka Spa

The thermomodernisation of other public buildings

School for blind and partialy-sighted children

The intentions of Rabka-Zdrój in the field of further reduction of polluttion emissions from buildings.

On the 25th of November 2015 the City Council in Rabka-Zdrój introduced the **Plan of Low-carbon Economy for Rabka-Zdrój Municipality.**
The document gives the opportunity for planning the necessary actions which will lead, over a few years, to considerable improvement in the quality of air in Rabka-Zdrój. The document also makes it possible to gain grants from outside institutions for the necessary actions connected with the replacements of energy resources, the installation of renewable resources systems and thermomodernisation.

The intentions of Rabka-Zdrój in the field of further reduction of polluttion emissions from buildings.

Recently Rabka-Zdrój Municipality has submitted an application to Voivodship Fund for Environmental Protection and Water Management, a programme of low emission called „KAWKA", which will enable us to receive funds for changing energy resources and installing solar panels for heating water.

KAWKA programme is going to be implemented from **the 2nd quarter of 2016 until the 31st of December 2018** in Rabka-Zdrój municipality.

The intentions of Rabka-Zdrój in the field of further reduction of polluttion emissions from buildings.

Moreover, as part of programme „Ryś” („Lynx”) introduced by Voivodship Fund for Environmental Protection and Water Management in Krakow, individual concerned owners will be able, through application, to receive funds for house thermomodernisation.

Thank you for your attention !

Maria Nowacka, MSc

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