

RenovActive

VELUX®

Renovation concept for healthy and affordable living



Concept RenovActive

A house that provides comfortable and healthy living should be affordable and easy to reproduce. These are the main criteria for the RenovActive reconstruction project. Its main goal is to test construction principles of healthy and energy-efficient family houses, which at the same time provide maximum comfort to its inhabitants. The pilot project was implemented in 2016 in Anderlecht, Belgium. In 2019, the demonstration solution was also completed in Slovakia – the first RenovActive project in this area.

The main objective of this concept is to demonstrate the affordability of a renovation that meets the requirements of modern living including energy efficiency and a healthy indoor environment. RenovActive offers a smart way to significantly improve the quality of living in an ordinary house so that it can be available to a wide segment of the population.

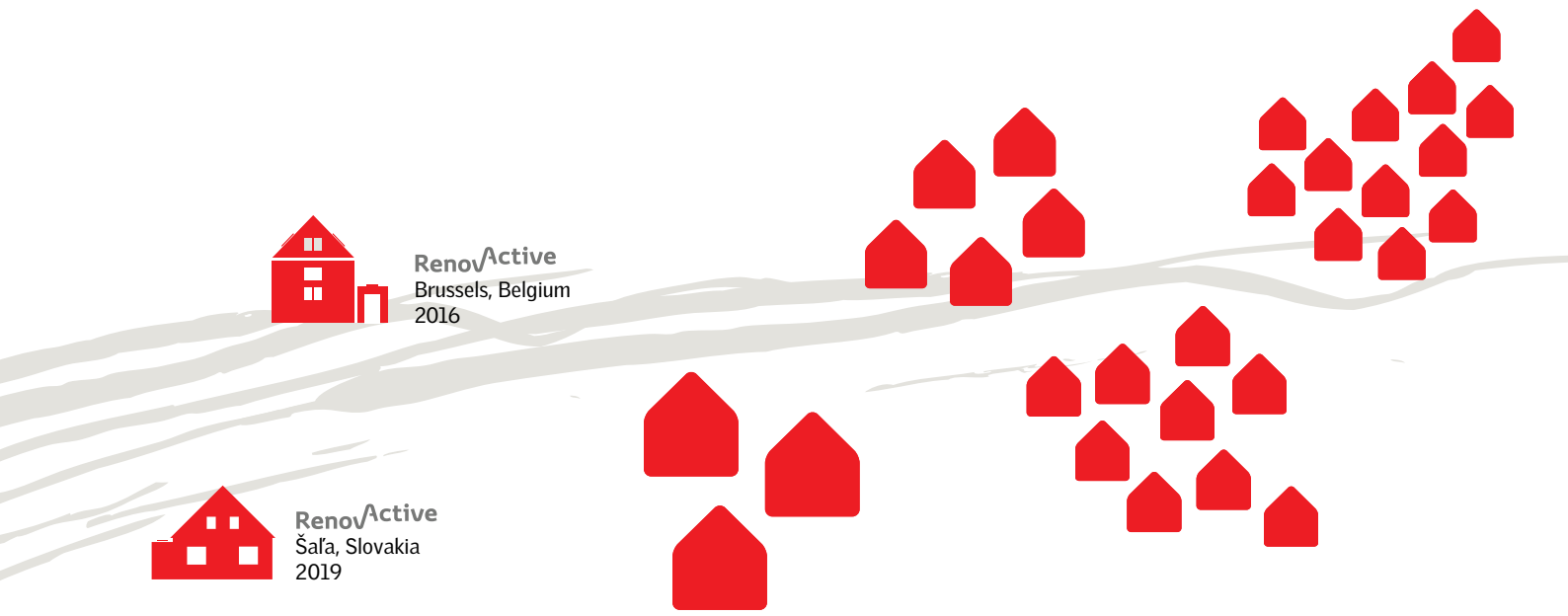


"Given that buildings consume 40% of energy and that 90% of existing buildings will still be here after 2050, it is necessary to increase the pace of healthy and sustainable building renovation to meet climate and energy goals. This very project leads the way to the future, serving as an inspiration to others."

Norbert Kurilla
State Secretary
Ministry of Environment of Slovakia



Renovation
Healthy living | Affordable | Reproducible



From prototype to stereotype

RenovActive project, which was implemented in the Slovak town of Šaľa, is easily replicable especially when renovating other houses. Its goal is to contribute to the start of the process of renewal of the aging housing stock in Slovakia.

Project stakeholders



Time for renovation

Half of today's residential buildings in Europe were built between 1945 and 1980, and their average age is constantly rising. If this trend continues, that would mean that 90% of buildings in use in 2050 are already standing today.

The operation of buildings accounts for 40% of energy consumption in Europe and ranks third on the list of polluters and CO₂ producers.

Studies show that around 80 million Europeans live in damp and unhealthy buildings. High humidity, insufficient insulation and rooms with limited daylight – all of these factors are known to increase the risk of allergies, cause illness and lead to mental discomfort.

It is time to look for new and innovative ways to renovate older buildings.



19%
insufficient
daylight

1.5x



23%
leaky roof

1.9x



20%
increased
humidity

2x



20%
cannot afford
adequate
heating

2.9x

20% of Slovak households don't have quality housing.

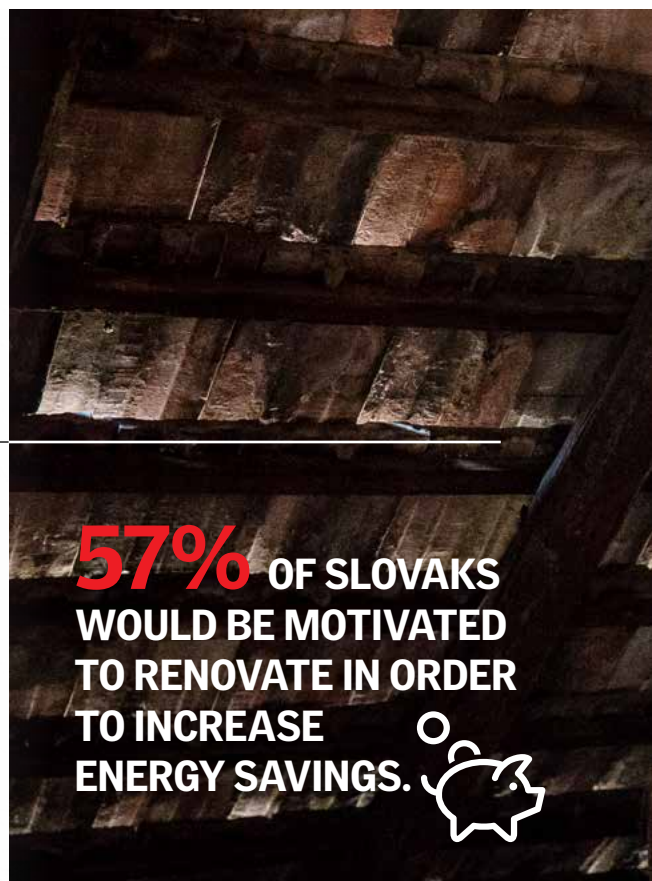
These households report **1.5–2.9x** more frequent health problems.



EVERY **SIXTH** SLOVAK
COMPLAINS ABOUT UNFIT
LIVING CONDITIONS.



58% OF SLOVAKS
WOULD BE MOTIVATED
TO RENOVATE IN ORDER
TO INCREASE COMFORT
OF LIVING.



57% OF SLOVAKS
WOULD BE MOTIVATED
TO RENOVATE IN ORDER
TO INCREASE
ENERGY SAVINGS.



50% of Slovaks live in an independent or terraced family house with 90% home ownership. Out of a total of 950,000 family houses, only 37% are renovated. 2.5% of family houses undergo partial renovation annually in Slovakia, and only 1.5% undergo comprehensive renovation. **Slovak households spend up to 14.5% of their income on housing-related energies – the highest in the EU.**

The main barriers that prevent renovations are defined by the “Buildings 2050” program. For example, there is low awareness among building owners and builders about the need to restore buildings to a high-quality standard. Another barrier is the lack of pilot projects that would show people why a complete renovation is important, what it will bring and how they should proceed. Slovaks often build and reconstruct by themselves, have only limited support from public resources and lack a systematic advisory tool.

The way to overcome these barriers can be the RenovActive concept, which offers Slovak builders experience in the field of complex renovations. RenovActive exemplifies smart practices that are easy to implement and visibly enhance the quality of existing buildings.



 **9/10**

**OF EXISTING BUILDINGS
WILL STILL BE
IN USE IN 2050.**



RenovActive – the first of many

Since the late 1990s, the VELUX Group has investigated how optimal energy efficiency can be achieved in combination with great indoor comfort and minimal environmental impact. Our efforts have led to the construction of dozens of demo buildings across Europe and North America, which combine low energy consumption with healthy indoor climate.

The RenovActive project is the latest part of this effort. Its goal is to create an easily replicable concept that, when completed, will become a template and inspiration for a similar type of renovation. By adhering to the seven principles of renovation, the same quality parameters can be achieved as in newly built houses, which can lead to improved health and increased comfort of the house occupants. The high potential and social significance of the RenovActive project confirms its feasibility and reproducibility even within a limited budget.

Main targets

- **Health and comfort:** a building should provide conditions which support health and provide comfort to its inhabitants.
- **Indoor climate:** a building should offer high daylight levels, protection against overheating and good indoor air quality via a direct demand-control operation.
- **Energy performance:** a building should achieve a high level of energy efficiency.
- **Environment:** a building has to minimize its impact on the environment.
- **Reproducibility:** the concept should be based on the use of commonly available technologies and materials.
- **Affordability:** renovation costs (including all technical equipment) should not exceed the set budget.



Quality building insulation



Thermal comfort
in winter and summer



Enough daylight



Fresh air



Acoustic comfort



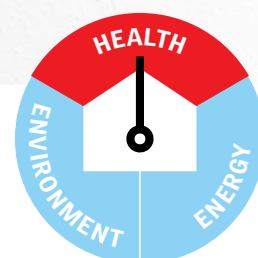
Non-toxic, durable and recyclable materials



Flexibility – simple functional changes of the building



Quality architecture
as a tool for fostering and reviving public spaces



Affordability

RenovActive aims to show the availability of renovation of an ordinary house into a healthy, energy-efficient and modern living space. Three variants of materials and technological solutions are designed to ensure the necessary functionality, and at the same time, to correspond to the financial possibilities of the owners of family houses.

All standards include solutions to all 7 renovation principles. The amount of renovation of individual building parts, the standard of materials and the use of technology are different.

STANDARD

The standard solution includes thermal insulation of the building envelope at the required level. The house has one bathroom; the ground floor remains without major modifications. The staircase is completed, and the attic is built. Standard materials are used.

STANDARD PLUS

The standard solution includes insulation of the building envelope at the level of recommended values, including floor insulation. The house has 2 bathrooms, both floors will be renovated. The attic is built. Standard Plus materials are used.

PREMIUM

Beyond Standard Plus, the Premium solution includes the use of renewable energy sources and premium materials. There is also an extension of the dining room.

Testing of operation

Upon completion of construction works and the family moving in, key parameters will be measured in cooperation with the Department of Civil Engineering of Slovak Technical University (STU) Bratislava to verify the functionality of the renovated house.

The square house phenomenon

A square family house is an exceptionally widespread type of building from the 1950s-1970s. They can be seen in the entire territory of Slovakia as well as in neighboring countries.



"A square house, where the Hučko family lives, is often found in its original state in every municipality in Slovakia. We are proud that the city of Šala will set an example for other Slovak municipalities."

Jozef Belický
Mayor of Šala



Specific house

The RenovActive Slovakia project was looking for a suitable house and a family. Dozens from all over Slovakia were interested in the reconstruction of their housing. Finally, they were narrowed down to five families, who had to present to a selection committee consisting of VELUX experts and representatives. In the end, the Hučko family from Šaľa was chosen.

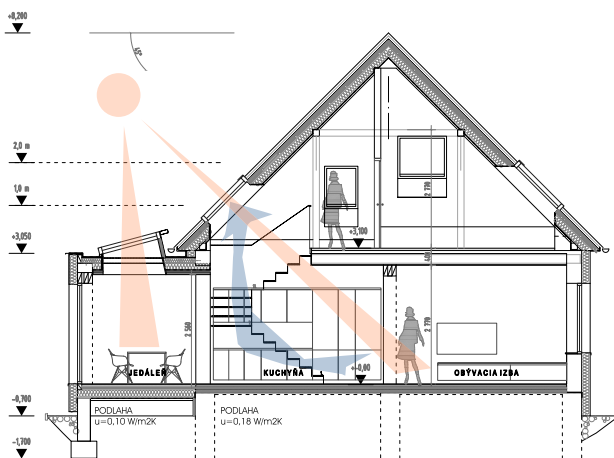




Our family

We are a young 4-member family from Šaľa – Dodo, Katka, Kristínka and Danielko. As lovers of nature, gardens, and permaculture, we do our part to reduce our carbon footprint by recycling, composting, and planting trees. We currently live in an apartment building, but we know that the ultimate dream is to live in a family house with a garden, where we can grow old together. As such, we'd like to renovate it into a modern home."

REZ POZDĹŽNY 1/50 PRINCÍP VETRIANIA A PRESVETLENIA



Looking for a solution

The constructional part of the project started with a two-round architectural challenge. Slovak architects participated by submitting their proposals for repeatable affordable renovation of a typical family house into an active standard. In the first round, the expert committee evaluated the fulfillment of the active house criteria, affordability and reproducibility of the design. Proposal should also contain seven replicable elements that combine affordable housing and comfort. Three proposals made it to the second round; one proposal received a wild card for its philosophical approach towards the RenovActive concept. In the second round, architects presented their work in progress. The commission unanimously identified the design of the architectural studio, Ddak, Doršic Doršicová, as the winner.



The expert committee was composed of:

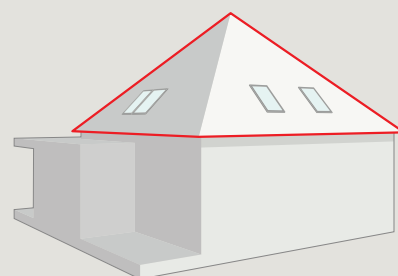
- Ing. arch. Ľubomír Závodný**
Architectural office Ľubomír Závodný,
- prof. Ing. arch. Robert Špaček, CSc.**
Faculty of Architecture STU v Bratislave,
- prof. Ing. Dušan Petráš, PhD.**
Faculty of Civil Engineering STU Bratislava,
- Ing. arch. Klára Bukolská**
Company architect VELUX,
- Lone Feifer**
Secretary General Active House Alliance.

Seven steps to an affordable renovation with regard to healthy living

The RenovActive Concept is based on healthy living principles and the seven most applicable and cost-effective solutions for renovation. Fulfilling these seven building principles will give existing buildings the ability to perform on the same level as newly built houses.

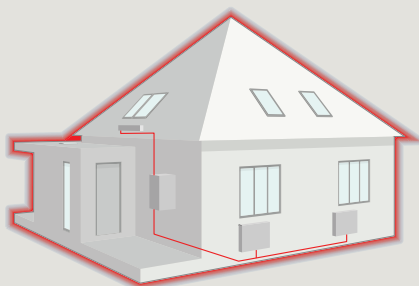
Depending on the existing building design and renovation budget, the different elements can be implemented to increase the level of daylight, improve ventilation, strengthen the external envelope, and expand the living space through densification or extension. The concept's modularity adapts to each house typology.

All seven principles of renovation have been implemented in Šafa in Slovakia, leading to comfortable and healthy living while keeping costs reasonable. The chosen solution can be applied to other hundreds of thousands of Slovak houses that need reconstruction.



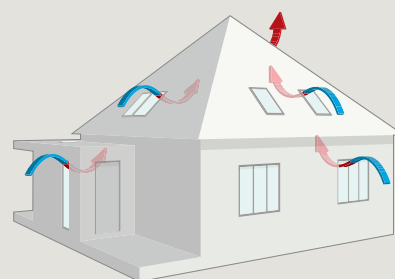
1

EXPANSION OF LIVING SPACE



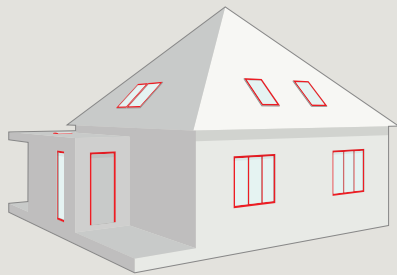
4

IMPROVED ENERGY EFFICIENCY



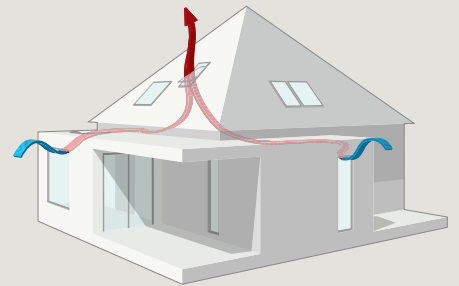
5

VENTILATION SYSTEM



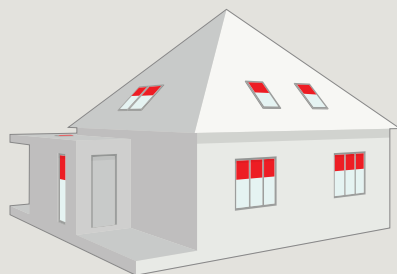
2

INCREASED WINDOW AREA



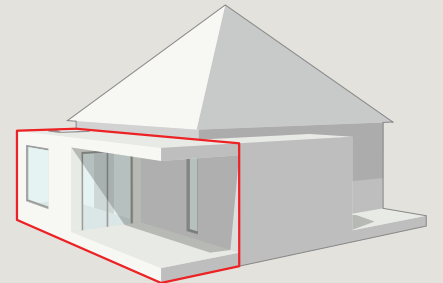
3

STAIRCASE SHAFT



6

DYNAMIC SUNSCREENING



7

PHASING



"We have been thinking for a long time how to start renovating this house. It is important for us to have as little carbon footprint as possible. However, we are a young family who wants to live in a modern way, and this reconstruction is tailored to our needs."

Jozef Hučko
House owner

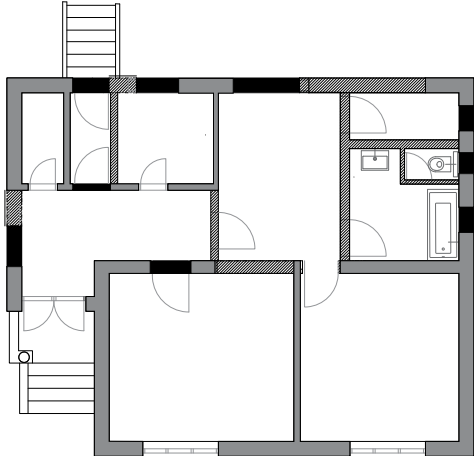


proposal

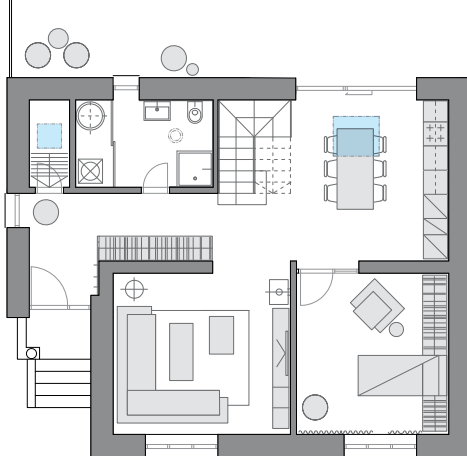
RenovActive is a concept of 21st-century modern living. It uses the existing potential of Slovak family houses awaiting reconstruction while preserving their visual identity. Applied construction works can be carried out at an affordable price and with maximum effect. The result of renovation is not only energy saving, but above all, increases the quality of the indoor climate and living standards. The basic feature of the chosen solution is its economic meaningfulness.



before



before



after

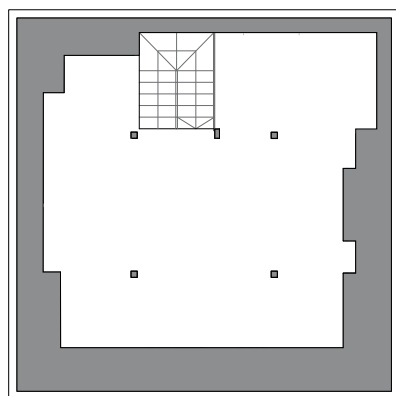


proposal

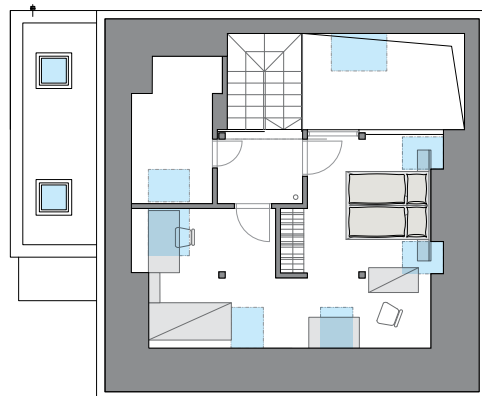
The RenovActive concept preserves the construction solution but gives it a modern twist. The original square house had two beautiful rooms - the front part with windows facing the street and the back part with several smaller rooms served mainly as service facilities. The residential heart of the house has now moved to the back of the house. Large glass areas and opening of the living space towards the garden connected the house with its surroundings. The result is modern living including all attributes we expect from a family home with a garden.



before



before



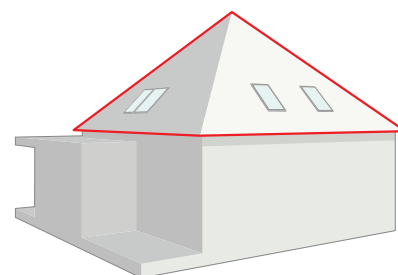
after



Electrically operated roof windows connected to the VELUX ACTIVE system



proposal



1

EXPANSION OF LIVING SPACE

Expanding the interior

By using the potential of the upper floor, the previously unused space has turned into a high-quality living space. Two new bathrooms were added, and the total usable space increased by 35% to 115 m² – from 2+1 to 4+1. Reconstruction of the attic has created a space with a lot of natural light, more efficient ventilation and better heat regulation. Increasing the living space by using the attic is a more cost-effective solution than an extension because we don't have to build the foundation, floor and roof.



before

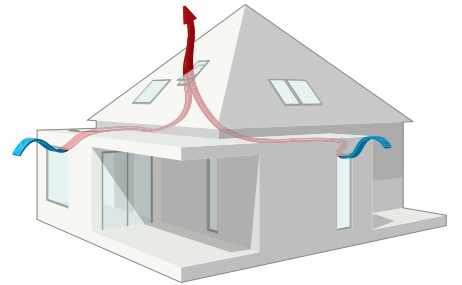


"Connecting the living space to the garden and opening it to the attic have given the house a completely new quality of living."

Martin Doršic
Project author



proposal



3 STAIRCASE SHAFT

Daylight and ventilation concept

An open stairwell guarantees enhanced daylight distribution and efficient airing via the stack effect. Daylight is distributed to all floors and central rooms of the home. Furthermore, the stack effect helps to expel humid exhaust air through the roof windows at the top of the staircase, while clean air fills the home via open doors and windows.

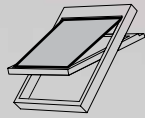


before



"I am so happy that we will have stairs at home. I'm excited about the pink blinds in my bedroom."

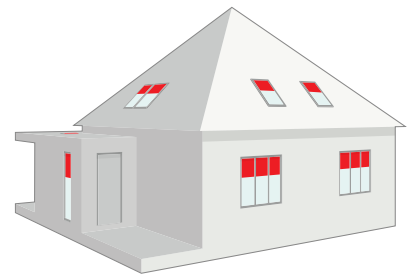
Kristínka Hučková
7-year-old future resident of the attic



EXTERNAL AWNING
Electrically operated
external sun screening



proposal



4

DYNAMIC SUNSCREENING

Third skin

A dynamic envelope is vital to ensure good indoor comfort. It maintains pleasant temperatures day and night regardless of the season. Dynamic external sun screening, e.g. awning blinds, reduces solar heating during summer.



before

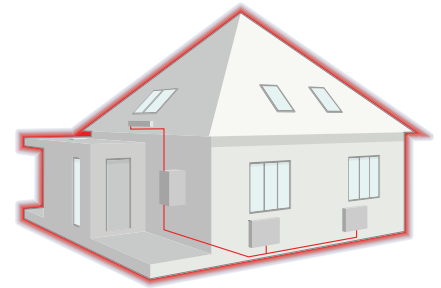


"We wanted a low-energy house. We now know that after the reconstruction, our house will consume 80% less energy."

Katarína Hučková
House owner



proposal



6 IMPROVED ENERGY EFFICIENCY

Envelope

The concept includes both façade and roof insulation. Improvement of house envelope parameters together with modern heating system optimizes energy parameters and increases thermal comfort of living. Compared to the original state, the total energy consumption is reduced by 80 percent.



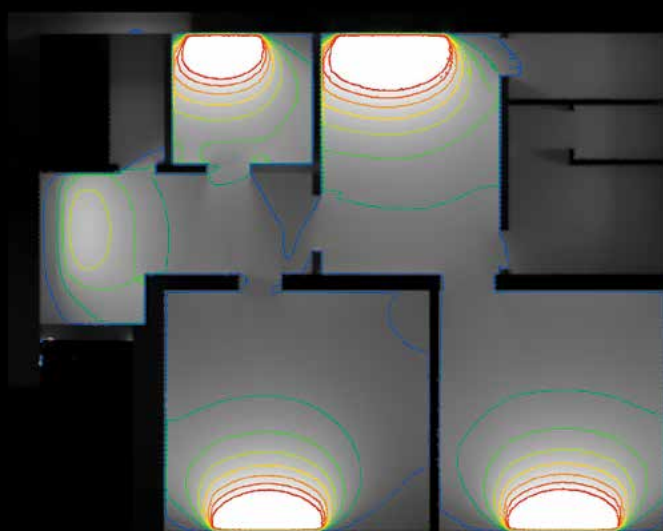
before

We need more light of the right kind at the right time

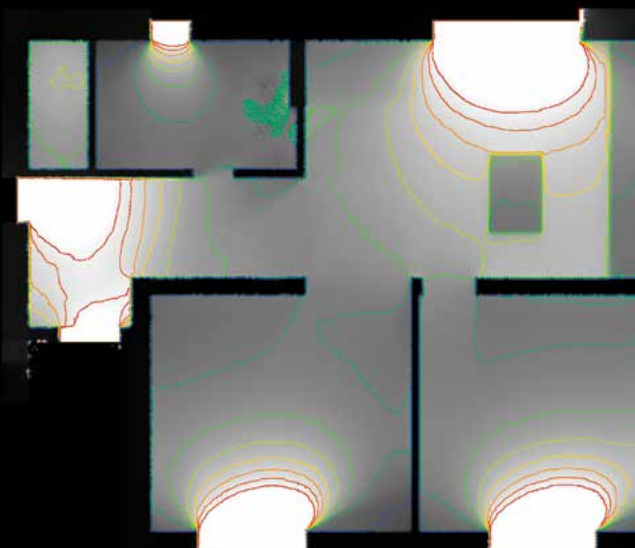


"Daylight has a significant impact on the human psyche, affecting our productivity, mood and well-being throughout the day."

Klára Bukolská
Architect VELUX



before



after

Daylight solution on the ground floor

Large façade windows and skylights increase the amount as well as the quality of daylight. A balanced layout of the windows ensures a pleasant and bright indoor environment with plenty of air in each room and on each floor.

Recommended lighting of individual rooms



Staircase
150 LUX



Dressing room
200 LUX



Bathroom
200 LUX



Kid's room
500 LUX



Kitchen
500 LUX



Dining room
300 LUX



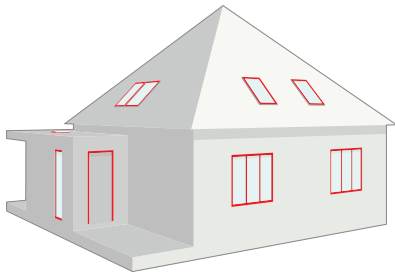
Living room
500 LUX



Bedroom
500 LUX



Office
500 LUX



2

INCREASED WINDOW AREA

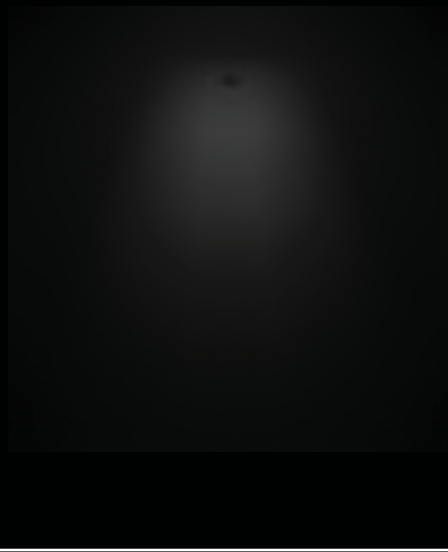
Daylight and view solution

Large façade and roof windows increase the level, and in particular, the quality of daylight. A balanced distribution of windows ensures a pleasant and bright indoor environment with plenty of air in every room and on every floor.

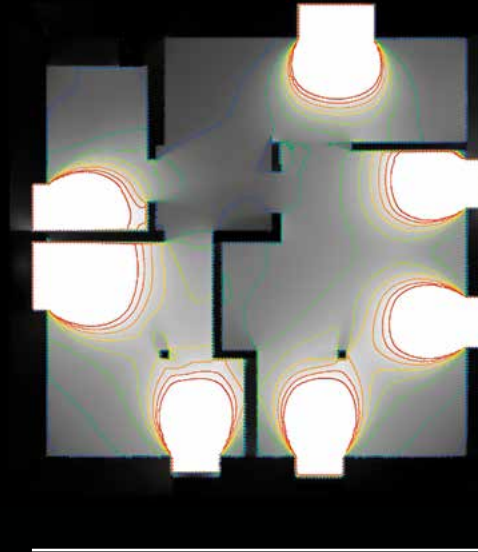
61%
OF RESPONDENTS SAY
THAT DAYLIGHT
AFFECTS
THEIR SLEEP.



75%
OF RESPONDENTS SAY
THAT DAYLIGHT
AFFECTS
THEIR PRODUCTIVITY.

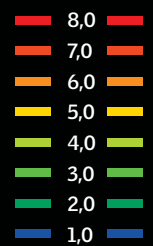


before



after

Daylight factor (DF) in %



Daylight solution in the attic

Large façade and roof windows increase the level, and in particular, the quality of daylight. A balanced distribution of windows ensures a pleasant and bright indoor environment with plenty of air in every room and on every floor.

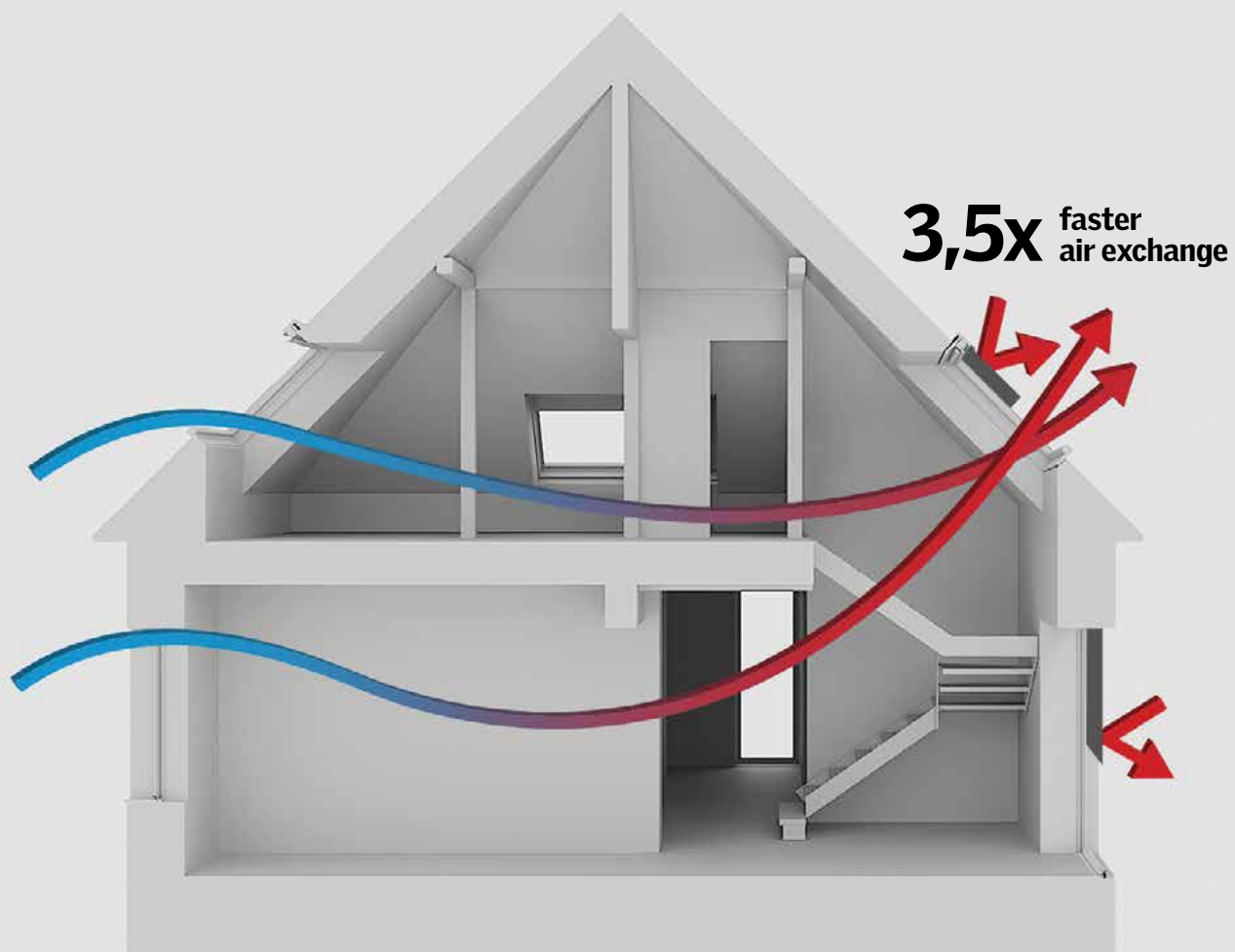
Improved backlighting by **40%**
Average value DF

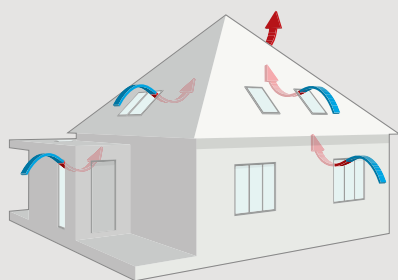
3/4 OF
RESPONDENTS SAY



THAT DAYLIGHT
AFFECTS
THEIR MOOD.

Ventilation system and heat protection



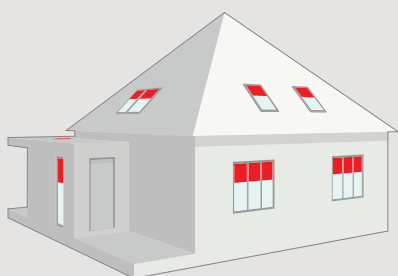


5

VENTILATION SYSTEM

Controlled ventilation

System opens the roof windows automatically based on sensor input. Fresh air is supplied by ventilation flaps located on the sides of the house not exposed to sunlight. Speed of air exchange is guaranteed thanks to the staircase shaft and transverse ventilation. Ultimately, ventilation is 3.5 times faster.



6

DYNAMIC SUNSCREENING

Third skin

A dynamic envelope is vital to ensure good indoor comfort. It maintains pleasant temperatures day and night regardless of the season. Dynamic external sun screening, e.g. awning blinds, reduces solar heating during summer.

Comfort thanks to automation



CO₂ Sensor-based technology



Daily ventilation



Smart heat protection



Easy departure



DIY installation



Say the word



VELUX ACTIVE Application

Monitor the climate in individual rooms and control your VELUX roof windows, shutters and blinds with the app on your mobile phone.

Main project partners



The Slovaktual STANDARD plastic windows from the energeto® 5000 profile provide plenty of daylight and energy savings. Security is provided by the Slovaktual D85 plastic entrance door which is based on the profile system aluplast 7000. Living space has been expanded both visually and physically by the HST 85 aluplast Premium lift and slide door.



Interior plaster for healthy living Baumit KlimaWhite actively regulates the humidity in the interior, thus maintaining not only stable humidity, but also air temperature. House insulation Baumit Star, in addition to energy savings, creates a stable indoor climate in winter as well as in summer and protects against mold.



2.5 million satisfied clients. 4.5 million closed contracts. 10 billion eur invested into housing. Your dreams of a new or renovated roof over your head are being fulfilled for almost 27 years by Prvá stavebná sporiteľňa. We're turning your housing into a home.



Bathrooms are fitted with complete JIKA equipment: from toilets and sinks to bathroom furniture, including concealed WC system for wall-hung WC. Compact and clear-design space was created with the help of Roca tiles.

Project partners



Ytong aerated concrete masonry was used for the partition walls as well as for the external walls. Ytong lintels were applied to load-bearing external walls. The tailor-made design of the staircase was made possible by the aerated concrete blocks.



Knauf system solutions for ceilings and residential attic in family houses meet all requirements that affect the quality of living. For residential attic and ground floor of the project, plasterboard ceiling with fire resistance REI30 has been applied.

Project sponsors



The KJG varnished angular gutter system in anthracite design and with a dimension of 333/100 mm was used for dewatering the pitched roof.



Boen wooden oak flooring was used in the kid's room and the bedroom in light natural shade. It has given the rooms in the attic a pleasant warm look and supports long durability of the floor.

Project stakeholders



The city of Šaľa took over the patronage of the RenovActive project. It sets an example among Slovak municipalities on how to start renovation processes.



SKGBC brings together companies that consider energy efficiency, sustainability and responsibility as part of their corporate philosophy and long-term development strategy.



The sloping roof protection was provided by the Bramac roof system using the Tegalit Protector tile in ebony black color. The reliability and functionality of the flat roof above the house entrance is ensured by the ICOPAL STANDARD solution with mPVC-based cover.



Mapei building chemistry products have been used in the system solution of the bathroom with regard to water protection. The color of the inner walls was adjusted with a coat of Dursilite. The floors were leveled with a cement coat of Topcem Pronto. The waterproofing system, Mapelastic, provided protection of the terrace from water.



An ecological mineral thermal insulation from the Unifit series was used to insulate the roof, which also ensures sound insulation and protects the roof from fire. The SMARTwall mineral façade board was used on the façade of the house, which thanks to its breathability, allows the house to breathe.



VELUX roof windows ensure healthy living full of daylight and fresh air. Opening roof skylights were used to illuminate the flat roof parts of the house. Natural light is supplied to the bathroom on the ground floor by a light guide. The intelligent VELUX ACTIVE system automatically controls the optimum indoor climate.



Fireplace stoves Schiedel Sirius 1 ensure thermal comfort, independence and family safety. The stove supplies an optimum amount of combustion air to the Schild Perimeter Smooth Air chimney, which is equipped with a separate supply pipe.



Ventilation with overframe self-regulating flap ventilator Renson Invisivent evo AKD helps to provide healthy and comfortable indoor environment. Overheating of the interior during warmer days can be avoided by shielding of the façade windows with external fabric blinds Renson Fixscreen evo 100 slim.



The heat in the house is provided by a single circuit heating system with boiler Bosch Condens and hot water tank Bosch WST for 120 L. Heating is regulated by the intelligent system, Bosch CT 200, and radiator thermostatic heads.



The functionality of the house operation will be verified by the measurement of key parameters, which will be carried out in cooperation with the Faculty of Civil Engineering of the Slovak Technical University in Bratislava.

Sharing experiences and materials

RenovActive does not end with the completion of the construction. We will eventually publish the documentation of the building, which can be used by any owner of any family house. We will present solutions in three financial categories. The phase of gathering experiences begins with the operation, monitoring and measurement of key parameters. The obtained data will be published gradually in the coming months. Follow the website www.renovactive.sk



RenoActive | **VELUX**

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Customer service



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#1

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