

RenovActive

A healthy and affordable
renovation concept

RenovActive

VELUX®



Company facts

The VELUX Group is owned by VKR Holding A/S, a limited company wholly owned by the foundations and family.

The VELUX Group's financial results are incorporated into VKR Holding's consolidated accounts.

40 sales companies around the world

17 production sites in nine countries

9,500 employees globally

2015 numbers (EUR)

2.4bn

VKR Holding revenue

268.7m

VKR Holding net profit



VE = ventilation

LUX = light



*Daylight and fresh air are essential
for our health and wellbeing.*



“One experiment is better than a thousand expert views.”

Villum Kann Rasmussen, approx. 1944

A decade of full-scale experiments



01 Torzhkovskaya Street

St Petersburg, Russia



02 Soltag

Copenhagen, Denmark



03 Átika

Bilbao, Spain



04 VELUXlab

Milan, Italy



05 VELUX House, COP15

La Rochelle, France



06 Home for Life

Aarhus, Denmark

07 Green Lighthouse

Copenhagen, Denmark



08 Sunlighthouse

Vienna, Austria



09 LichtAktiv Haus

Hamburg, Germany



10 Maison Air et Lumière

Paris, France



11 CarbonLight Homes

Kettering, UK



12 Osram Culture Centre

Copenhagen, Denmark



13 Guldberg School

Copenhagen, Denmark



14 Albertslund Solar Prism

Albertslund, Denmark



15 Russian Active House

Moscow, Russia



16 Solhuset

Hoersholm, Denmark



17 ISOBO Aktiv

Stavanger, Norway



18 Future Active House

Trondheim, Norway



19 Smith Residence

St. Louis, USA



20 De Poorters

Montfoort, the Netherlands



21 Healthy Home townhouses

Stjoerdal, Norway



22 Great Gulf Active House

Toronto, Canada



23 Langebjerg School

Fredensborg, Denmark



24 Green Solutions House

Roenne, Denmark



25 Active House

Rome, Italy



26 RenovActive House

Brussels, Belgium

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12, 13, 14,
16, 23, 24

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01

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RenovActive House – our prototype and proof of concept

Energy bill could be reduced by up to

50%

after renovation²



- ▶ First renovation project was implemented in a an old, run-down house in Anderlecht, Belgium
- ▶ Comprises all seven elements and is the first of 86 similar projects in the community
- ▶ Performed in partnership with Le Foyer Anderlechtois¹
- ▶ Designed by the architectural firm, ONO architectuur in Antwerp



ONO architectuur

PEUTZ

The project



RenovActive

- ▶ *A renovation of a three façade house dating back to the 1920s. The building was inhabitable due to its poor condition.*
- ▶ *The house belongs to social housing company Foyer Anderlechtois which owns 3,600 dwellings, including half of the 330 houses in the garden city where RenovActive is located.*
- ▶ *The floor area is extended from 80 m² to 95 m² and the attic is converted into 12,5m² living space, using roof windows to ensure plenty of daylight and ventilation.*

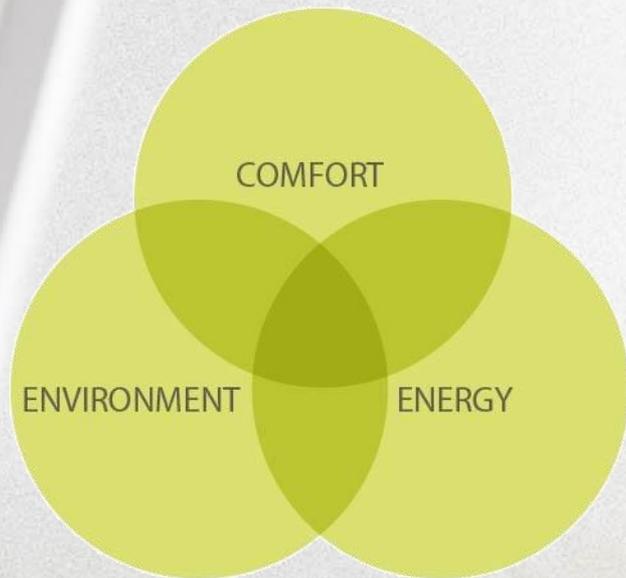
From one to many – RenovActive is being replicated widely

- ▶ The RenovActive concept is currently being applied on 86 houses in Anderlecht



- FA owned
- FA owned, chosen for renovation

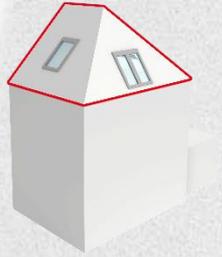
Active House principles



- ▶ Active House focuses on comfort, energy and environment
- ▶ Active House puts the inhabitants' wellbeing and the environmental impact on a level with strict energy requirements



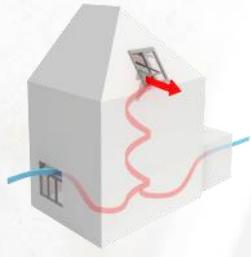
RenovActive - the 7 elements



Growing from within



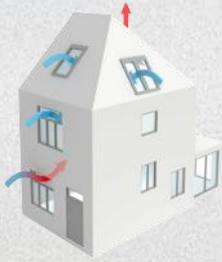
Daylight treatment



Respiratory channel



3rd skin



Hybrid breathing



Envelope upgrade



New life space



Renovation costs

The cost of the RenovActive concept corresponds to the budgetary framework of social housing organizations in Brussels and the requirements established under the Energy Performance of Buildings Directive (EPBD). Considering 30-50 replications, the cost for reproducing RenovActive is less than the Social Housing budget frame for reproduction.

Social housing association emphasises affordability



A primary reason for choosing the concept was to ensure that our social housing properties will remain affordable.

I think the focus on indoor comfort and human wellbeing is very positive and visionary. However, the improved energy performance and the ability to lower costs through replication is what makes the concept viable in the long run.

Bruno Lahousse, GM at Le Foyer Anderlechtois

Project timeline



A building stock in decline

Proper and viable renovation concepts are key to support an aging building stock



- ▶ Half of the current dwellings in Europe are built between 1945 and 1980
- ▶ A 30% decline in construction output since 2008 (Eurostat)¹
- ▶ 9 out of 10 existing buildings will still be in use by 2050 (EuroAce)²



In 2050

9 out of 10 of the existing buildings in Europe will still be in use.

Buildings is the sector with the biggest saving potential

- ▶ *Buildings account for 40% of total energy use in Europe. One important reason is that 75% of the European building stock today is not energy efficient. Energy renovation can cut the energy use by 80%*.*
- ▶ *Renovation programs also benefit public finances: Ambitious renovation investments can bring a return of up to €39 billion in 2020 and double that by 2030 to public finances if investments are maintained*.*
- ▶ *Furthermore, a good indoor climate contributes to Europeans' wellbeing, health, learning abilities and productivity.*

75%

of the European building stock today is not energy efficient

40%

of the total energy consumption in Europe is used in buildings

*www.renovate-europe.eu

The challenges of social housing associations



Need for
affordable
and flexible
solutions

- ▶ Ill-maintained homes are more common in rental properties due to tenants' lack of ownership
- ▶ Energy poverty means that nearly 11% cannot afford to heat their home sufficiently
- ▶ Incorrect behaviours, e.g. lack of regular airing and the drying of clothes indoors, lead to a bad indoor climate

Energy poverty is fatal for Europeans

- *An estimated **54 million Europeans** suffer from energy poverty, and even 45% of the Europeans say they keep temperatures too low in order to save money.*
- *Energy poverty is due to increasing prices, low income and energy inefficient homes **ultimately compromising** health and well-being.*
- *The current challenge is not to build or renovate to produce an energy efficient building, but to do so **at a reasonable cost**, so as to benefit as many people as possible and provide a large-scale solution to today's energy challenges.*

54m

suffers from
energy poverty

Unhealthy buildings influence our health

- ▶ *Bad indoor climate is linked to cardiovascular diseases and respiratory ailments*.*
- ▶ *Sick leave, treatment and lost productivity due to minor illnesses such as nose and throat infections and colds are costly to the European economies.*
- ▶ *Around 80 millions of Europeans currently live in damp or mouldy dwellings, and this poses a major challenge for the health, economy and well-being of society**.*
- ▶ *Unhealthy buildings contribute to these problems. Mould and damp dwellings nearly double the risk of developing asthma and allergy*.*

*Grün, G., & Urlaub, S, Fraunhofer, 2014.

**Eurostat, 2009-2013.

90%

of our time is spent indoors

(NEST project, Technical University of Berlin, 2007)

80m

of Europeans currently live in damp or mouldy dwellings

But are also expensive to society

- ▶ *Large numbers of Europeans suffer from health problems and low wellbeing every single day. This year's Healthy Homes Barometer demonstrates that our home is part of the problem.*
- ▶ *Europeans experience these health impacts from their home every day. The costs to society are high.*
- ▶ *For example, poor asthma control is responsible for significant work impairment with productivity losses adding up to €9.8 billion per annum in Europe**

**Grün, G., & Urlaub, S, Fraunhofer 2014*

The national productivity case for healthy homes: the UK as an example

No.1
reason for being
absent from work

21%
of all work days lost
due to minor illnesses

1.8 bio.
pounds of lost national
income in the UK
in 2013 alone



Energy Costs significantly reduced

	Before renovation	After renovation
U-values	no thermal insulation double glazing	very good thermal insulation low-e double glazing triple glazing on north
Net energy demand for heating	'700' kWh/m ² (*)	25 kWh/m ²
Primary energy consumption	'1300' kWh/m ² (*)	82 kWh/m ²
Ventilation	Not ok	Ok
Thermal comfort winter	Not ok	Ok
Thermal comfort summer	Ok	Ok
Energyclass	G	B
Energy cost for building services (no light, no plug loads)	5,000 €/year (*)	800 €/year

** This is theoretical energy consumption calculated for a whole house at a yearly average temperature of 19°C. In poorly insulated houses, the volume of the house is never heated as a whole, but only room by room. The people adapt the comfort level to reduce the energy cost.*

Source: Energy calculations report from Engineering agency Daidalos

What consumers can do – and how politicians should take action



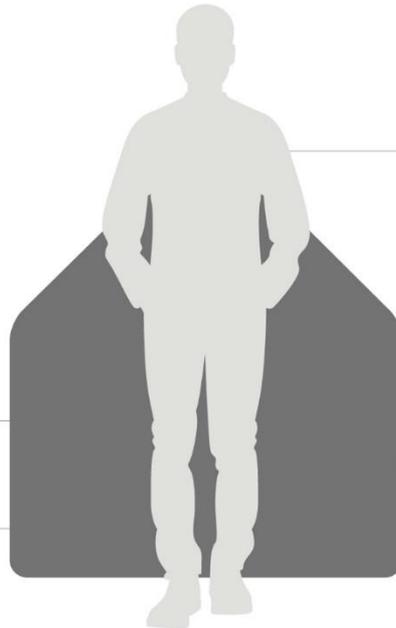
In order to get a healthier home, consumers can make changes in their behavior as well as invest in renovation of their home.

The decision makers can improve the state of health in society as well as the overall energy efficiency through ambitious framework legislation targeting buildings:

Consumer action

Behavioral action
(short term)

Renovation
(long term)



Regulatory action

What EU does now for health



Fruit and vegetables: Several EU Commission campaigns, legislation on nutrition and health claims on food (EC 1924/2006), member state tax on sugar and fat etc.



Avoiding tobacco: Top priority for the EU Commission for years, numerous anti-smoking campaigns in the EU and in member states, legislation on presentation and sale of tobacco (2014/40/EU), tax on tobacco (2010/12/EU) etc.



Dietary supplements: Legislation on labelling of food supplements and specific rules on vitamins and minerals in food supply (2002/46/EC).

What EU could do for health



Housing: Taking a dual view on buildings and health will be beneficial for all Europeans. For example: Energy Performance of Buildings Directive (EPBD) Energy Efficiency Directive (EED)

Policy can support

- ▶ *The **European renovation rate should be stimulated** to acknowledging the importance of non-energy aspects as drivers for renovation and for the health and well-being of Europeans.*
- ▶ *A revised legislation should provide guidance to Member States when setting **indoor climate requirements** in building codes based on the methods used in the new standards on daylight in buildings, indoor climate and calculation of natural ventilation.*
- ▶ *Implementation of EPBD is lacking, ensure that **Member States properly implement** the directive to the benefit of the people working and living in buildings.*
- ▶ *Ensure that specific and sufficiently **accurate calculations of comfort parameters are part of the performance evaluation in summer – and winter time** to allow accurate predictions of energy use.*
- ▶ *Energy Performance Certificates have been instrumental in raising awareness on the energy performance of buildings, but **EPCs have to evolve to include an evaluation of daylight and indoor climate** in order to deliver added value to home owners and tenants. We also suggest to make EPCs digital to increase transparency and availability.*

THANK YOU

VELUX®

Bringing light to life™