


In retrofits, the importance of using the right components in the right way cannot be underestimated. Passive House Components for new builds and retrofits, high quality and highly efficient by definition, are the way to go.

EuroPHit aims to significantly increase the quality and energy efficiency of one of the most common types of construction measures – retrofits carried out step-by-step over the course of years.

Coordinator:

Passive House Institute PHI DE 

Project Partners:

International Passive House Association iPHA DE 


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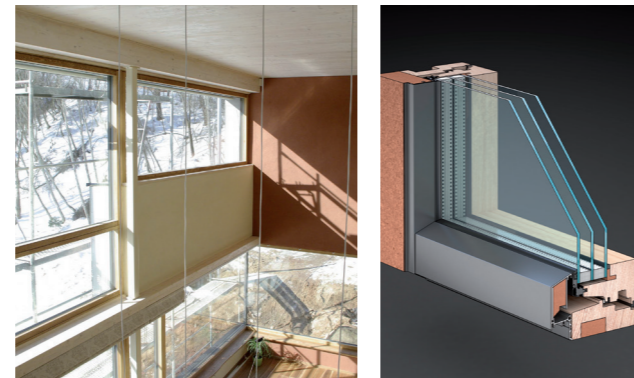
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An Opportunity for manufacturers

The products needed for building to the Passive House Standard aren't fundamentally different from conventional products on the market – they are simply designed with superior energy efficiency in mind. Achievement of the proper thermal qualities in a particular building component often doesn't take step-change innovation; even small changes in a product can have profound impacts on overall energy consumption, comfort and functionality. The development of the newest generation of Passive House Windows is one striking example as it is their thin but deep frames that make the Passive House Standard so much easier to achieve.

Much the same holds true for products designed to facilitate retrofitting to the EnerPHit Standard. Connection details used in energy retrofitting though, especially when carried out step-by-step, must not only be designed for high efficiency – they must also be made to tackle the often tricky situations that arise during renovation. With so much renovation to be done, this field offers a world of possibilities to manufacturers who are up to the challenge.

Thin and efficient – 3rd generation Passive House windows in Estonia's first Certified Passive House and frame detail (www.smartwin.eu).



Photos © Pro Passivhausfenster GmbH

The EuroPHit project

With the EnerPHit Standard as the goal and Passive House principles as the basis, EuroPHit applies knowledge on deep energy retrofits to the oft-overlooked yet critical area of step-by-step refurbishments. Key project outcomes include the elaboration of:

- Criteria and a certification scheme for retrofits aiming for the EnerPHit Standard over the course of years
- Financing models and market incentive programmes tailored to step-by-step retrofits
- Design concepts and sound guidelines for the development of suitable, high performance building components
- Specific energy balance tools for gradual energy retrofits
- Training materials and workshops focusing on the specific needs of step-by-step refurbishment

This latest research on step-by-step retrofits is being put to use in the variety of building case studies involved in the project – showing the way towards an increasingly high quality, energy efficient building stock.

Front and rear facade of a Brooklyn brownstone renovated to Passive House Standard, New York, USA.



Photos © Julie Torres Moskovitz, Fabrica718



Retrofitting for the energy revolution, one step at a time

Why we should focus on energy efficiency every time we renovate

If you're going to renovate a building, you've got an important question to face: am I doing the very best job possible for the long-haul, or will I find myself retrofitting my retrofit in 10 to 15 years' time?

Future-proofing the existing building stock is not a sprint, but a marathon. Take your time and carry out each step the right way.

Cheating energy efficiency while renovating is not a sensible use of limited resources. Get the best return on your investment by concentrating on energy efficiency each step of the way.

A building is a system. Retrofitting should be carried out according to a master plan so that measures taken in one phase do not have negative effects on other components down the line.

Future-proof

Any retrofit aims to prolong the life of the building. In so doing, the quality of the resulting structure, the comfort it provides and its future energy demands are not to be underestimated. Luckily, these aspects go hand in hand. Over the last two decades, this has been proven with tens of thousands of structures built to the Passive House Standard – the only international performance standard for extremely high energy efficiency in buildings.

Renovations according to Passive House principles are made possible by retrofitting to the EnerPHit Standard. Setting the EnerPHit Standard as the target for your renovation will ensure that the energy demands as well as the quality of your project are future-proofed.



Before and after images of a secondary school in Baesweiler renovated to Passive House Standard with funding from the KfW bank, which supports energy retrofits throughout Germany.



Photos © Rongen Architects

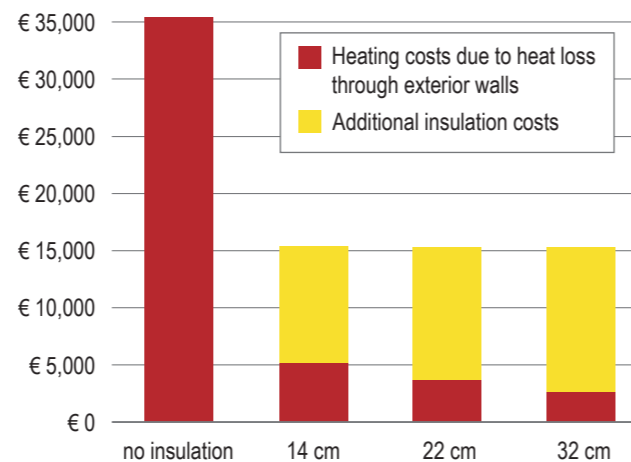
Step-by-step?

Each part of a building has its own life span. While the facade may be crumbling, the roof tiles may still be in great shape. Perhaps the heating system is shot, yet it will be another 20 years before the windows need to be replaced.

Renovation measures can be time and resource intensive, which is why they are typically only carried out when absolutely necessary. Once the facade has been newly insulated and painted, it will typically stay that way, for better or worse, for the next generation or two. At the same time, energy efficiency measures for any one part of the building are always most affordable when that part is already in need of renovation.

When it is time to refurbish a part of the building, do it with an eye to energy efficiency. Don't miss your chance to do it right from the start – step-by-step!

Facade renovation with various levels of insulation
Source: Proceedings of the 42nd Research Group (Arbeitskreis 42), 2013
Total costs over 20 years for a single family house



Return on investment

People often make the mistake of looking solely at the upfront costs of various renovation measures, for example, in deciding between energy efficient and standard windows or in determining the thickness of insulation to be applied. Those measures that are higher in quality and that offer superior energy efficiency typically cost more than quick fixes.

This simple calculation is misleading. It is more realistic to compare the costs of any energy efficiency measure per year and square metre with the amount it will save you in energy costs per year and square metre. This method reveals a telling truth: in most situations, the money saved on energy far outweighs the costs of implementing the measure on a per year and square metre basis – and this includes the costs of loans taken out for financing! The better the quality and higher the efficiency of the measure, the more dramatic the effect, which is why aiming for the EnerPHit Standard, right from the start, makes sense. The result of retrofitting measures carried out with energy efficiency as a priority: a risk-free, tax-free annual cash return for the life of the component replaced – often 30 to 50 years! You would be hard-pressed to find a bank or stock that would guarantee that type of return!



Concentrating on energy efficiency from the start not only brings solid returns, it also makes the use of renewables feasible: efficient buildings can do more with less meaning that renewables placed on small surface areas often suffice to affordably cover any remaining energy demand.

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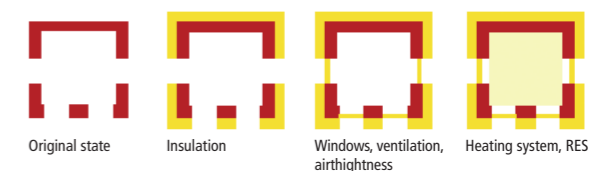
A sound approach to retrofitting

All too often, buildings are renovated haphazardly with conventional, typically poor quality approaches followed blindly because 'that's the way it's normally done'. Yet when we retrofit, we are not just improving aesthetics and reducing energy losses – we are also directly affecting a building's moisture balance, air-flow, surface temperatures and much more besides.

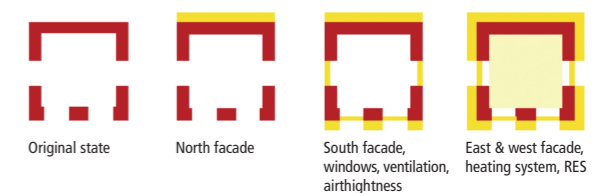
When conducting a deep retrofit, it is vitally important that the integrity of the building envelope not be compromised by inadvertently doing work not tested according to sound building science. Especially if many years lie between various renovation steps, a plan covering present and future steps is essential. Improving airtightness, for example, without taking the insulation and ventilation into account, may lead to otherwise avoidable moisture problems. A master plan thus should define the type, quality and order of measures to be taken.

Step-by-step retrofitting guided by a well-thought out plan is the safe way to proceed and will ensure that subsequent steps are not compromised by early interventions. The reward for steps carried out following an integrated plan: a future-proof, comfortable, sustainable building with consistently low running costs.

Example: component by component approach



Example: one facade at a time



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