EuroPHit

Retrofitting for the energy revolution,
one step at a time

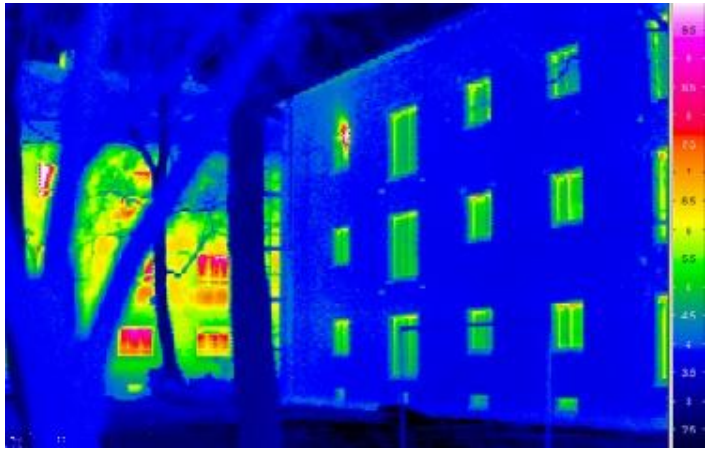
Co-funded by the Intelligent Energy Europe
Programme of the European Union

Passive House Institute

Agenda

EuroPHit

1. EuroPHit project background
2. Energy retrofits
3. Case studies and Observers
4. Products
5. Financing
6. EuroPHit trainings
7. Key past events
8. Key upcoming events
9. Join EuroPHit!



Co-funded by the Intelligent Energy Europe Programme of the European Union

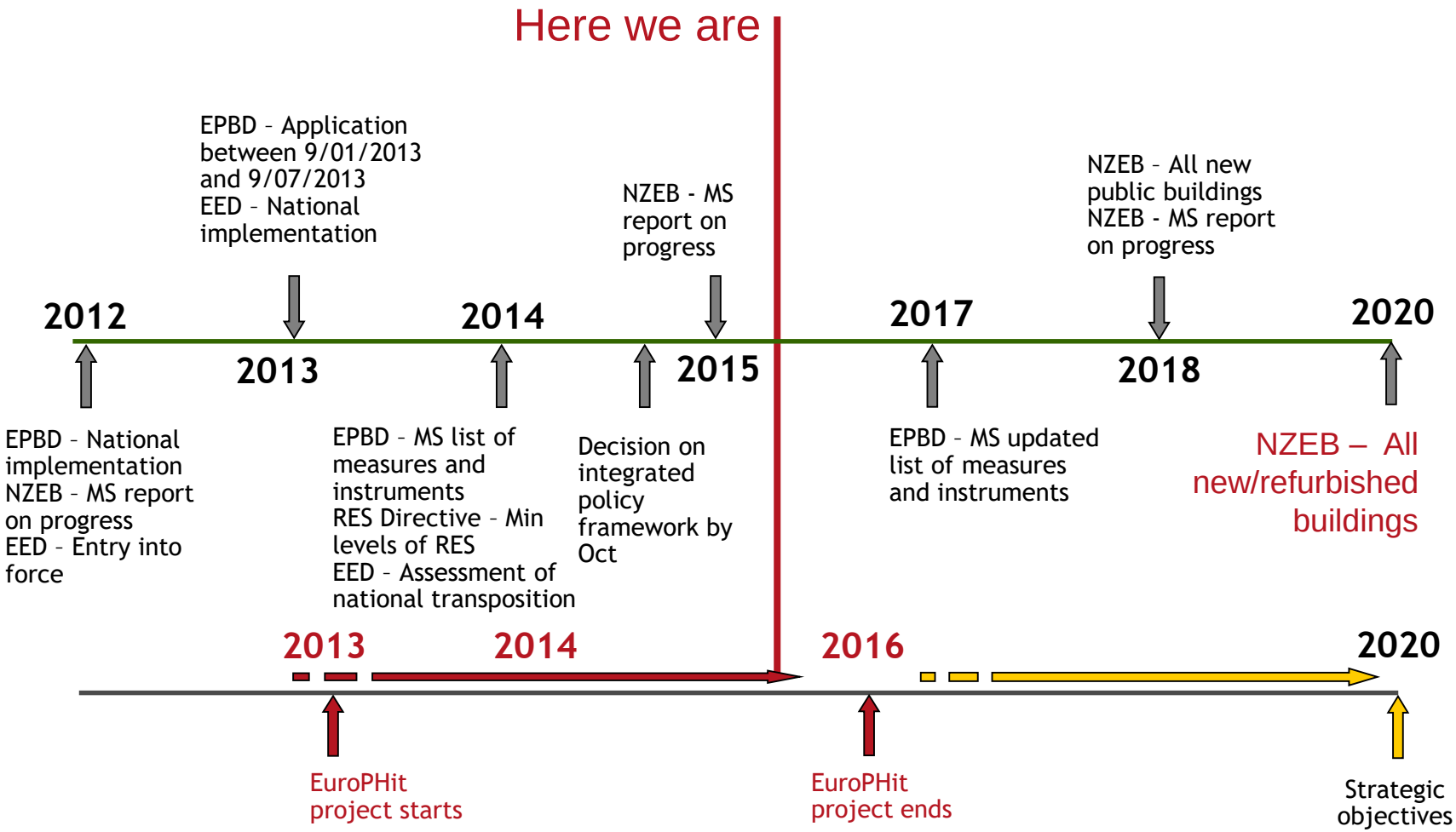
Passive House Institute

1. EuroPHit project background

Co-funded by the Intelligent Energy Europe Programme of the European Union

The policy background

EuroPHit



Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Reduce consumption!

EuroPHit

EU 2020 objective:

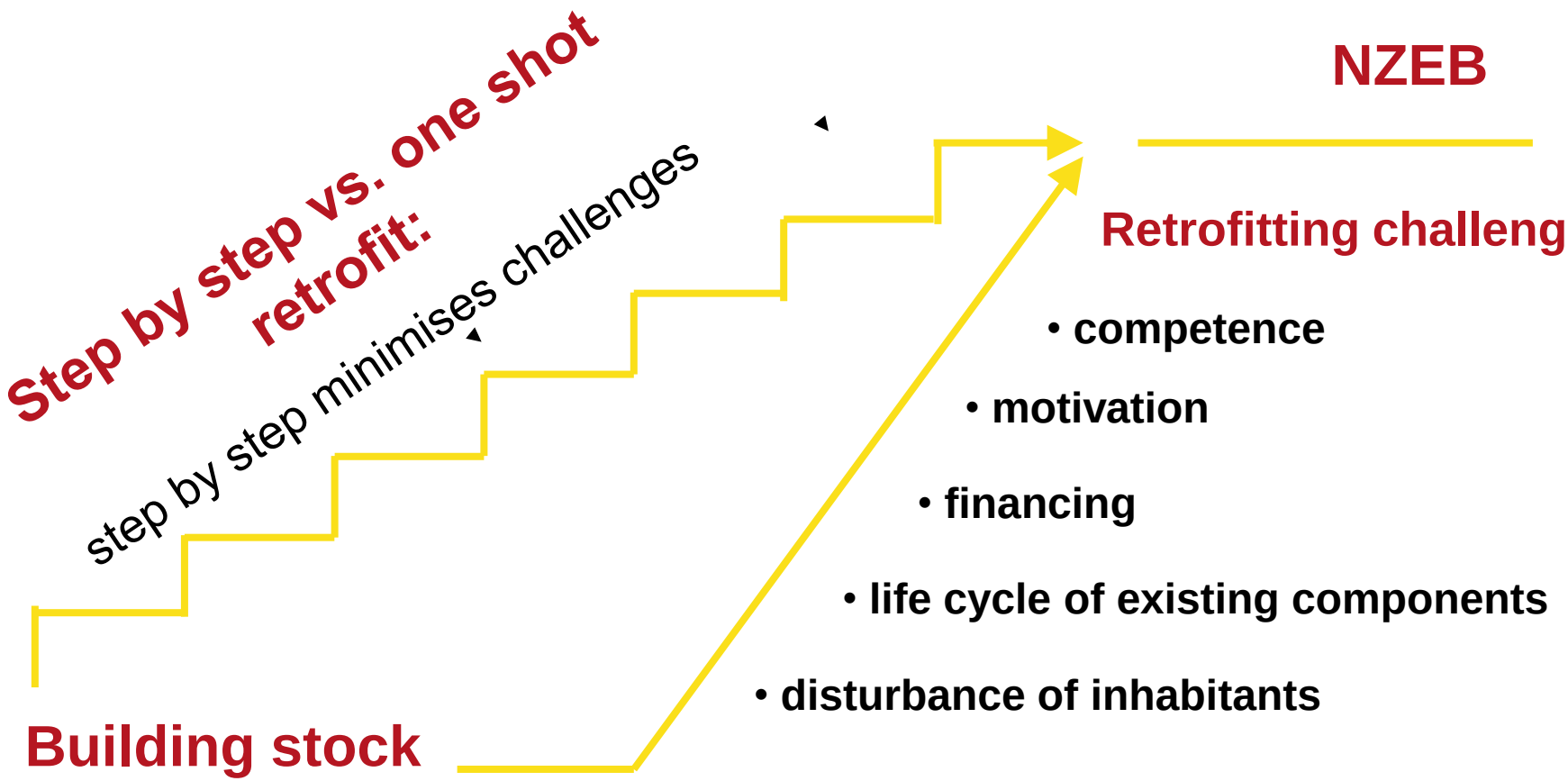
All new/refurbished buildings as NZEBs (Nearly Zero Energy Buildings)

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Reducing barriers

EuroPHit



Co-funded by the Intelligent Energy Europe Programme of the European Union

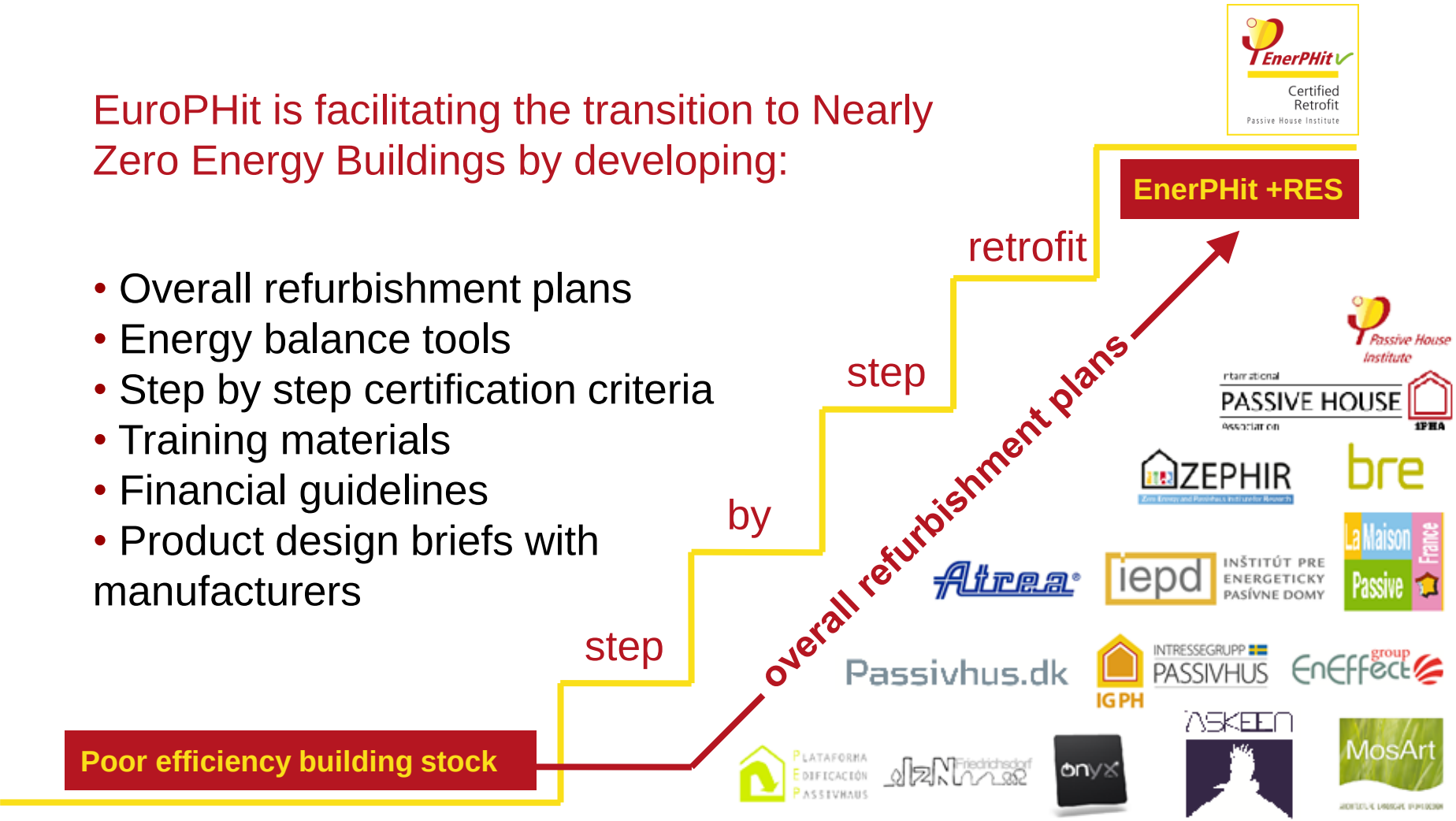
Passive House Institute

Improving the performance of step by step retrofits

EuroPHit

EuroPHit is facilitating the transition to Nearly Zero Energy Buildings by developing:

- Overall refurbishment plans
- Energy balance tools
- Step by step certification criteria
- Training materials
- Financial guidelines
- Product design briefs with manufacturers



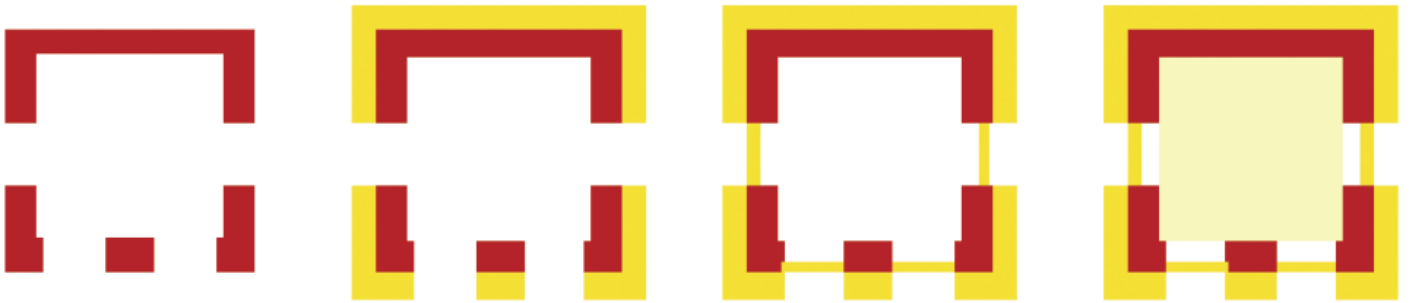
Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Many ways to go step by step

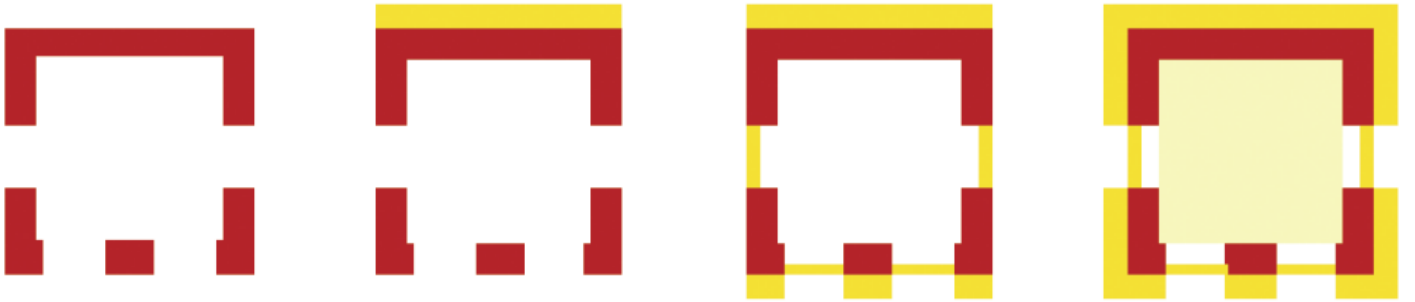
EuroPHit

Example: component by component approach



Original state | Insulation | Windows, ventilation, airthightness | Heating system, RES

Example: one facade at a time



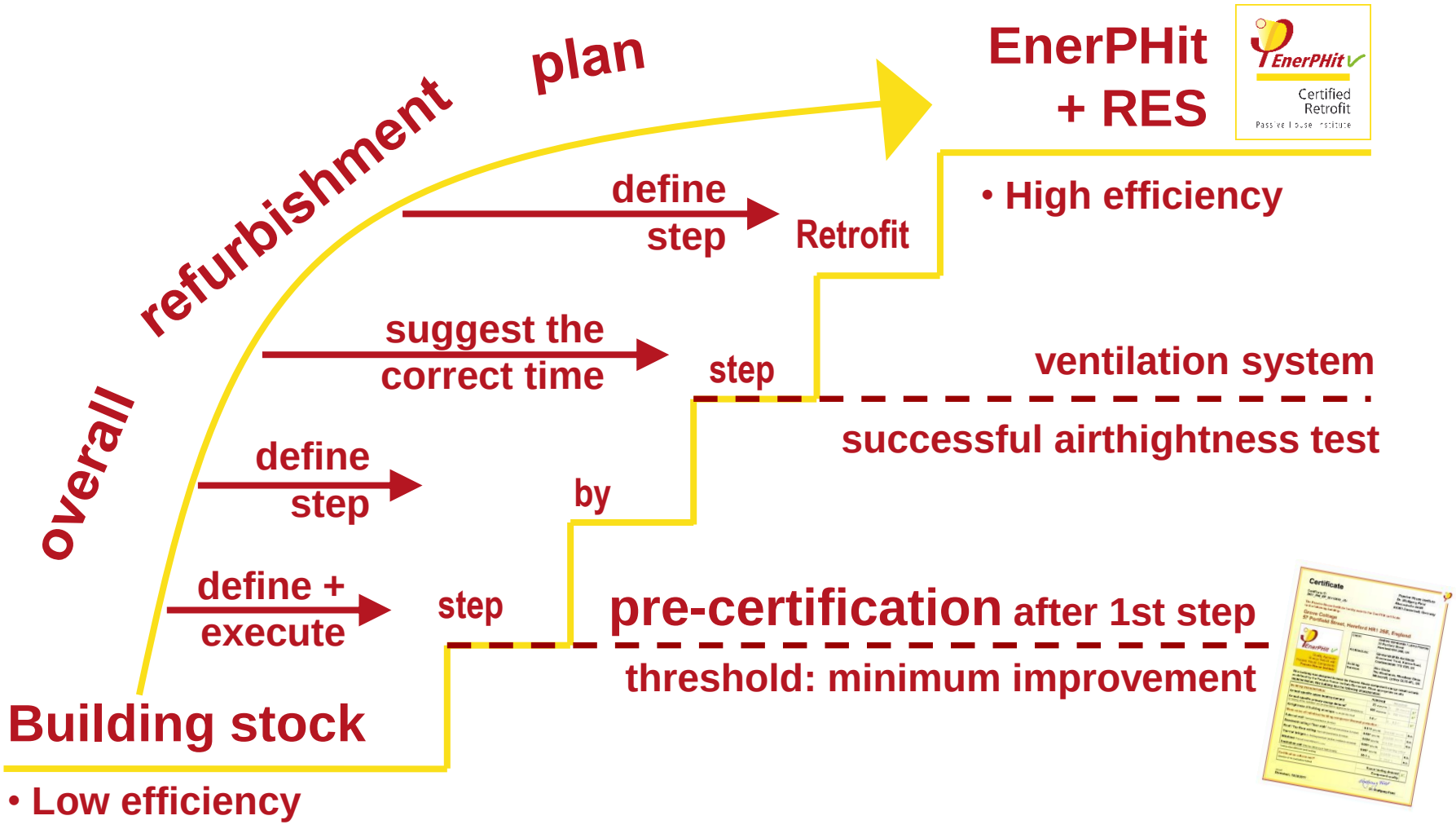
Original state | North facade | South facade, windows, ventilation, airthightness | East & west facade, heating system, RES

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Implementing deep retrofits step-by-step

EuroPHit

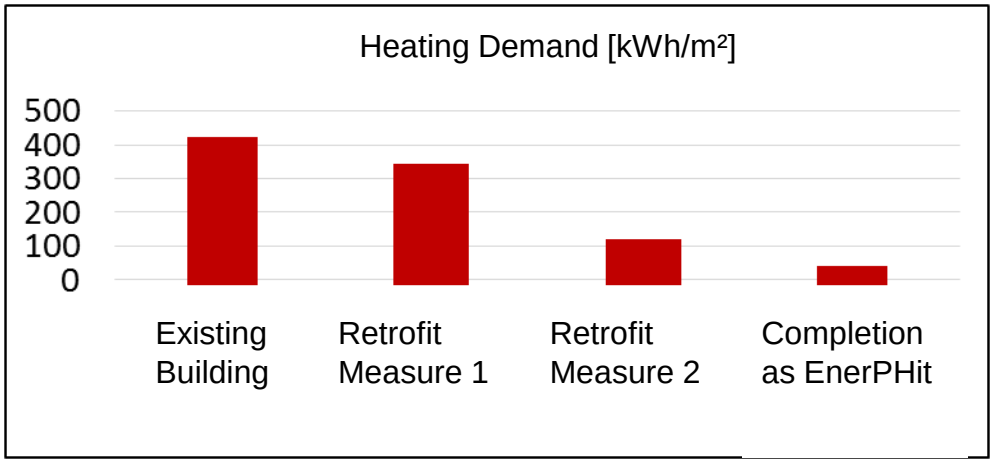


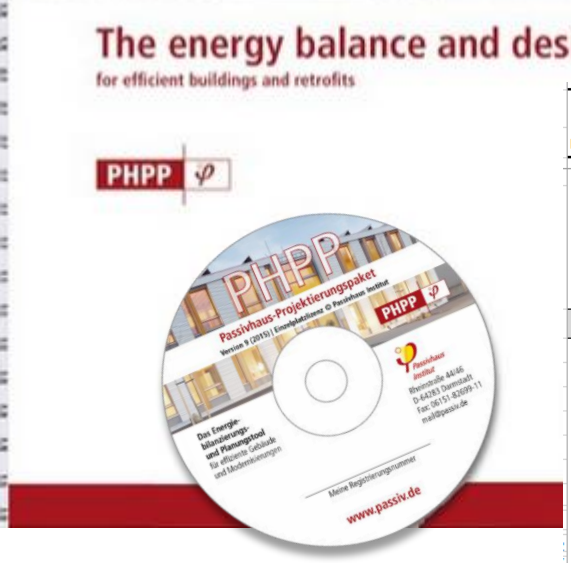
Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Energy balance calculation tool with features for step by step retrofits

EuroPHit





Variantenberechnung

Passivhaus mit PHPP Version 9.1

Passivhaus-Reihenendhaus / Klima: PHPP-Standard / EBF: 156 m² / Heizen: 61,7 kWh/(m²a) / Übertemperatur: 0,1 % / PER: 13,1 kWh/(m²a)

		aktiv				
aktive Variante wählen >>		3-Passivhaus mit WP	Bestand	Schlechter Wärmeschutz	Massiger Wärmeschutz	Passivhaus mit WP + Solarthermie
Ergebnisse	**Einheit**	3	1	2	3	4
Heizwärmebedarf	kWh/(m²a)	61,7	418,8	107,1	61,7	11,6
Heizlast	W/m²	36,3	175,1	62,1	36,3	9,5
Kühl- + Entfeuchtungsbedarf	kWh/(m²a)					
Kühllast	W/m²					
Übertemperaturhäufigkeit (> 25 °C)	%	0,1	2,9	1,6	0,1	1,0
PER-Bedarf	kWh/(m²a)	13,1	1131,0	255,9	13,1	33,3
Passivhaus Classic?	ja / nein	nein	nein	nein	nein	nein
Endenergie		-	-	-	-	-
Heizleistung Wärmeerzeuger	kW	8,7	30,3	12,7	8,7	4,5

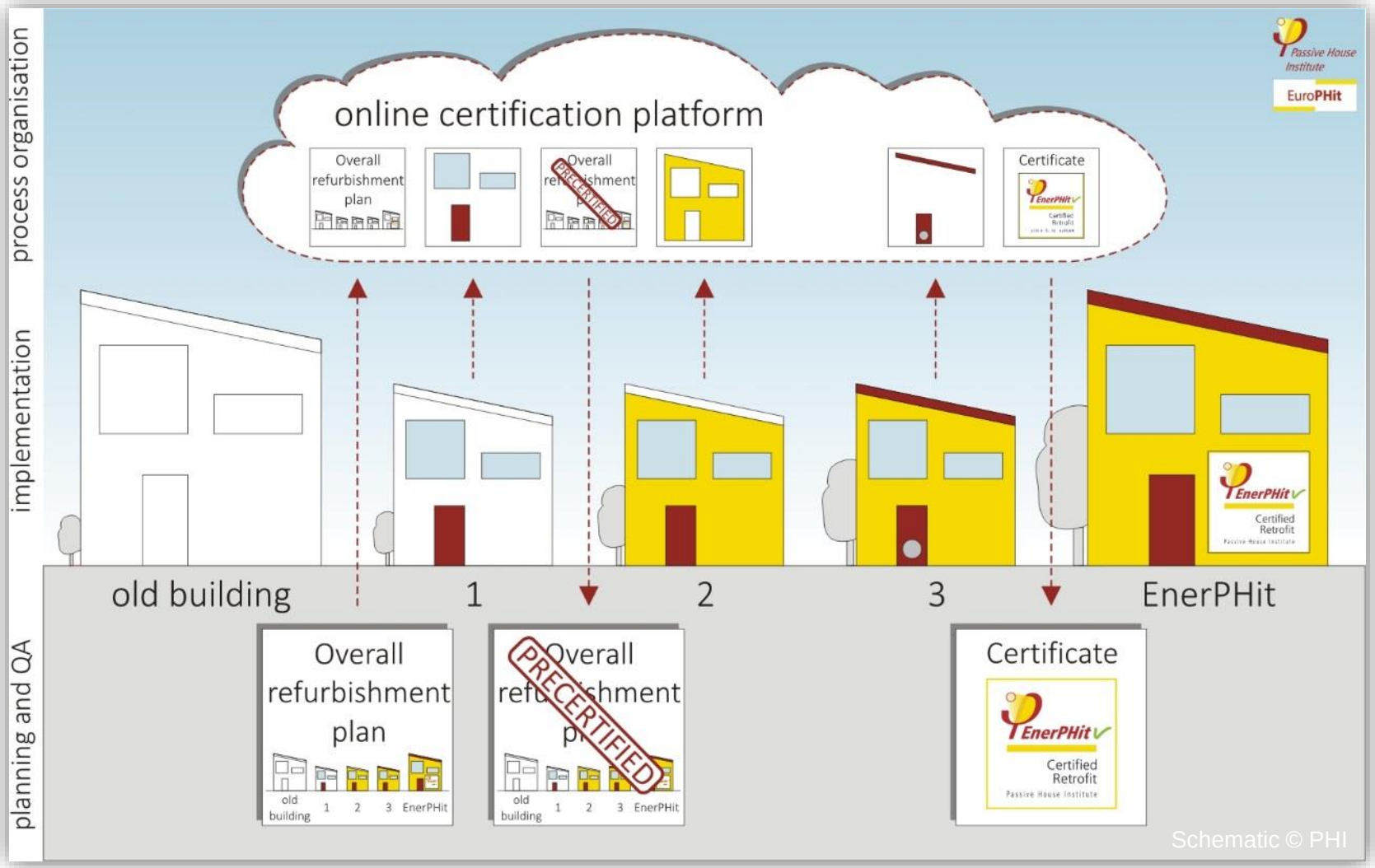
Co-funded by the Intelligent Energy Europe Programme of the European Union

www.europhit.eu

Passive House Institute

Pre-certification for stepwise retrofit

EuroPHit



Co-funded by the Intelligent Energy Europe Programme of the European Union

www.europhit.eu

Passive House Institute

Overall refurbishment plan

EuroPHit

Co-funded by the Intelligent Energy Europe Programme of the European Union

Overall refurbishment plan

EuroPHit

Co-funded by the Intelligent Energy Europe Programme of the European Union

Store projects on a Certification platform

EuroPHit

Hello certifier!
Logout

project.progress: 64.0

Pilot Project

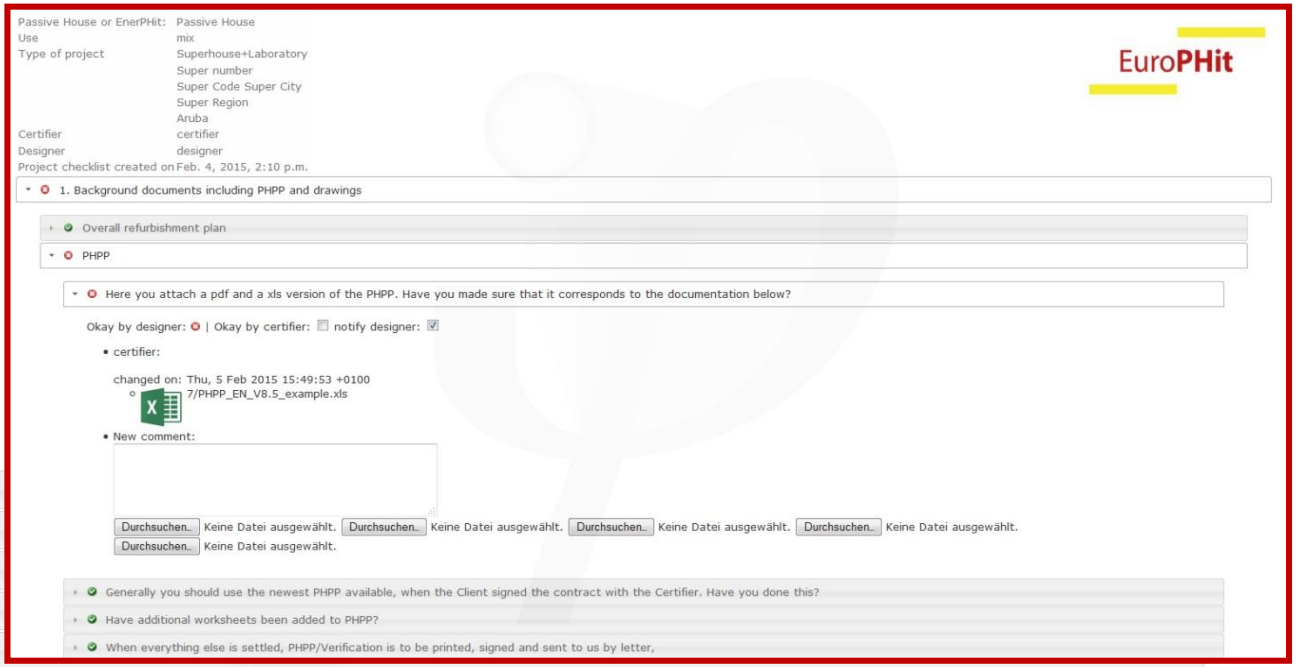
Passive House or EnerPHit:	Passive House
Use	mix
Type of project	Superhouse+Laboratory
	Super number
	Super Code Super City
	Super Region
	Aruba
Certifier	certifier
Designer	designer

Project checklist created on Feb. 4, 2015, 2:10 p.m.

- 1. Background documents including PHPP and drawings
- 2. Key characteristics
- 3. Constructions
- 4. Windows
- 5. Ventilation
- 6. Other mechanical services
- 7. Electrical efficiency
- 8. Indoor climate
- 9. Moisture, "Building Hazards", "Quality of building envelope"
- 1. Checks during construction

Submit!

64.0 % approved



Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

2. Energy retrofits: EnerPHit

Co-funded by the Intelligent Energy Europe Programme of the European Union

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

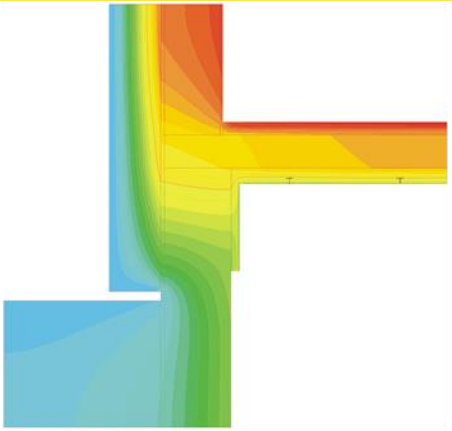
Gymnasium Baesweiler, Germany; Photos © Rongen Architekten

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House standard for energy retrofits?

EuroPHit

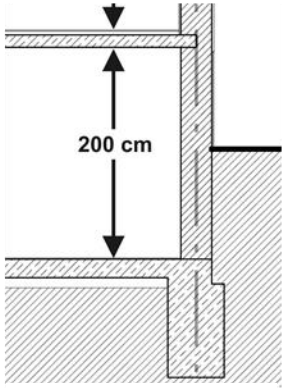
Unfavourable A/V ratio



Thermal bridges

Airtightness

Unfavourable window orientation



No space for insulation

Heritage protection restrictions

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

The Benefits of Retrofit

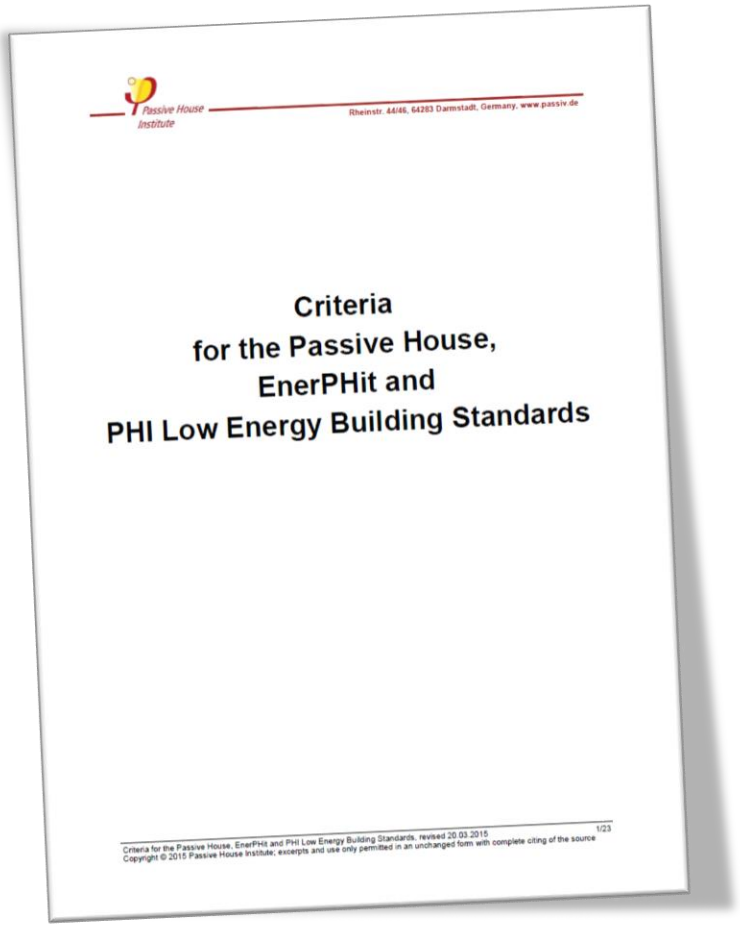
EuroPHit

- Reduce greenhouse gas **emissions**
- Energy savings = reduced energy **bills**
- Retain existing structure/materials
- Improved **thermal comfort**
- Indoor **environmental quality**
- Improved **health** of building occupants
- Community-wide improvements
- Uncover/repair existing **damage**
- Improved building **appearance**/durability
- Extend the useful life of the building
- Higher **re-sale** value
- Increase rental **income**
- Generate **economic/job opportunities**

Co-funded by the Intelligent Energy Europe Programme of the European Union

Criteria update

EuroPHit



PHI building criteria update 2015

- All PHI building energy standards combined in one document
- Verification according to Renewable Primary Energy (PER) demand and generation (optional)
- Classification as Passive House or EnerPHit Classic, Plus and Premium
- Criteria for all standards applicable worldwide
- Introduction of the new PHI Low Energy Building Standard
- **Pre-certification for stepwise retrofit**

EnerPHit
Certified Retrofit
Passive House Institute
classic | plus | premium

➢ **In effect for English-speaking users from late 2015 (Release of PHPP9 EN)**

Co-funded by the Intelligent Energy Europe Programme of the European Union

International EnerPHit criteria – 1st possibility

EuroPHit

or alternatively,
energy demand method:

Climate Zone according to PHPP	Heating	Cooling
	Max. heating demand	Max. cooling + dehumidification demand
	[kWh/(m²a)]	[kWh/(m²a)]
Arctic	35	equal to Passive House requirement
Cold	30	
Cool-temperate	25	
Warm-temperate	20	
Warm	15	
Hot	-	
Very hot	-	

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

International EnerPHit criteria – 2nd possibility

EuroPHit

building component method:

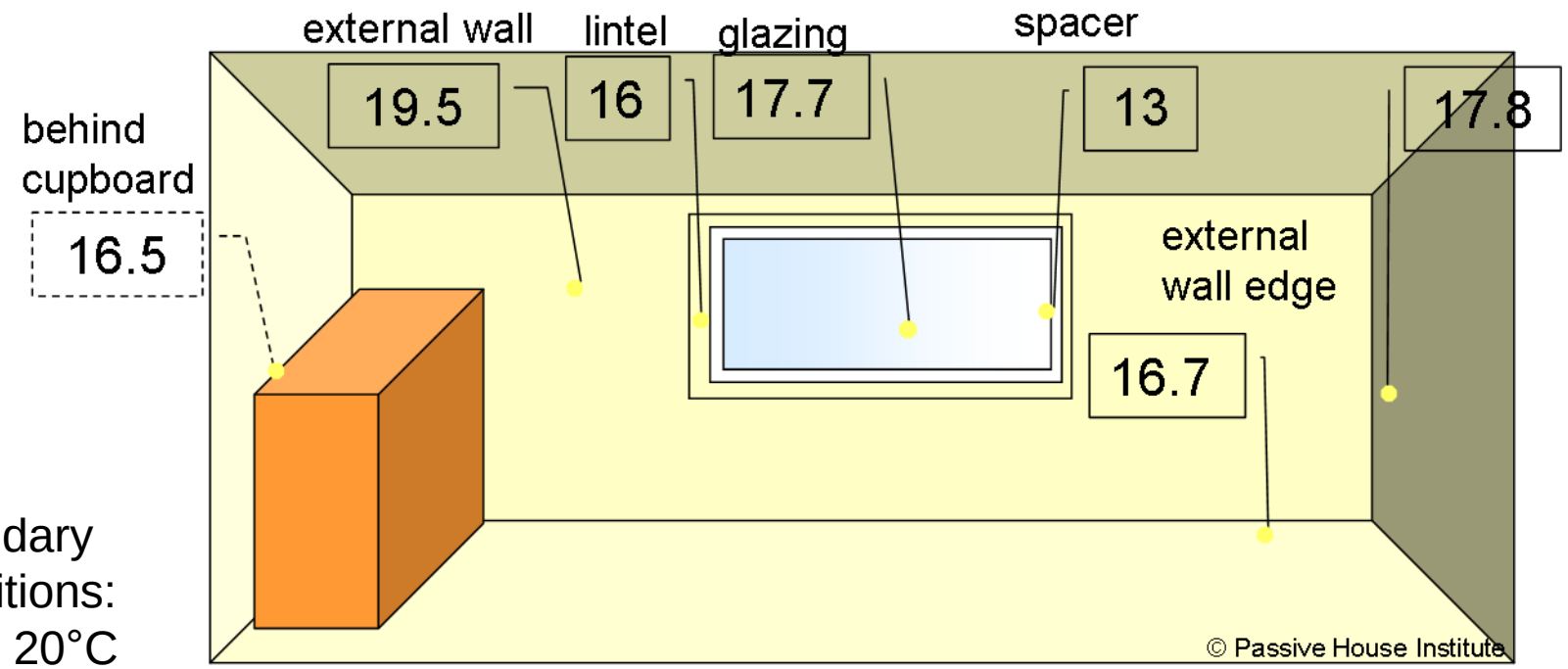
Climate Zone according to PHPP	Opaque envelope[1] against...				Windows (including exterior doors)					Ventilation	
	...ground	...ambient air			Overall[4]			Glazing	Solar load[5]		
	Insu-lation	Exterior insulation	Interior in-sulation[2]	Exterior paint[3]	Max. heat transfer coefficient ($U_{D/W,installed}$)			Solar heat gain coefficient (g-value), only if active heating present	Max. specific solar load during cooling period	Min. heat reco-very rate[6]	Min. hu-midity re-covery rate[7]
	Max. heat transfer coefficient (U-value)			Cool colours							
	[W/(m²K)]			-	[W/(m²K)]			-	[kWh/m²a]	%	
Arctic	Deter-mined in PHPP from project specific heating and cooling degree days against ground.	0.09	0.25	-	0,45	0,50	0,60	U_g - g*0.7 ≤ 0	100	80%	-
Cold		0.12	0.30	-	0,65	0,70	0,80	U_g - g*1.0 ≤ 0		80%	-
Cool-temperate		0.15	0.35	-	0,85	1,00	1,10	U_g - g*1.6 ≤ 0		75%	-
Warm-temperate		0,30	0,50	-	1,05	1,10	1,20	U_g - g*2.8 ≤ -1		75%	-
Warm		0.50	0.75	-	1,25	1,30	1,40	-		-	-
Hot		0.50	0.75	Yes	1,25	1,30	1,40	-		-	60 % (humid climate)
Very hot		0.25	0.45	Yes	1,05	1,10	1,20	-		-	60 % (humid climate)

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

EnerPHit retrofit:
20cm insulation + PH windows

EuroPHit



Boundary conditions:
-5°C; 20°C

- temperature of key surfaces greater than 16°C
- no mould problems, even behind furniture!
- internal relative humidity can reach 62% without fear of mould growth

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Airtightness counts

EuroPHit

You can achieve the same airtightness in a retrofit as you can in Passive House new builds with n50 values of 0.60 h-1 and less!

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Ventilation is key

EuroPHit

Ventilation always makes sense!

- **removing humidity lowers the risk of moisture damage!!!**
- an old building may have more pre-existing thermal bridges
- a retrofit will become much more airtight upon installing new windows
- occupants may not be used to opening windows regularly

If you install a ventilation system, invest in an efficient one!

Co-funded by the Intelligent Energy Europe Programme of the European Union

3. Case studies and Observer projects

Co-funded by the Intelligent Energy Europe Programme of the European Union

Case studies

EuroPHit

CS01 Home for the Elderly, County Dublin
CS02 Secondary School, Galway
CS03 Hotel, Valcanover
CS05 Social Housing, Courcelles
CS06 Social Housing, Liévin
CS15 Family Home, Tournon-sur-Rhone
CS08 Therapy Centre, Asturias
CS16 Single Family Home, Santander
CS10,CS11 Two Schools, Gabrovo
CS12 Family Home, Svartbäcksvägen
CS13 Rehab Workshop, Naestved
CS14 Council Apart. Block, Portsmouth

http://europhit.eu/casestudies

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Ireland

EuroPHit

CS 1: Rochestown Home for Elderly

Client: Dun Laoghaire Rathdown (DLR) County Council

Passive House Consultant: MosArt, Ireland, www.mosart.ie

CS 2: RosMuc Secondary School

Client: Vocational Educational Committee (VEC)

Passive House Consultant: MosArt, Ireland, www.mosart.ie

Italy, United Kingdom

EuroPHit

CS 3: Hotel-Restaurant Valcanover

Client: Maria Biasi and Monica Valcanover

Passive House Consultant: ZEPHIR, Italy, www.zephir.ph

CS 14: Wilmcote multifamily house (UK)

Client: Portsmouth City Council

Passive House Consultant: Sustainable By Design, Encraft, ECD Architects

France

EuroPHit

CS 5: Multifamily social housing in Courcelles-lès-Lens

Client: SIA Habitat

Passive House Consultant: not yet decided
www.lamaisonpassive.fr

CS 6: Social semi-detached houses in Auby

Client: SIA Habitat

Passive House Consultant: not yet decided
www.lamaisonpassive.fr

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

France

EuroPHit

CS 15: Single family house, Tournon sur Rhône

Client: Family André

Passive House Consultant: not yet decided
www.lamaisonpassive.fr

OP 4: Student house, Maison des Industries Agricoles et Alimentaires

Client: Association Maison des Industries Agricoles et Alimentaires

Passive House Consultant: Atelier D architecture & urbanisme durable
www.atelier-d.fr

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Spain

EuroPHit

CS 8: Therapy Center La Santina

Client: HH. MM. Capuchinos de España

Passive House Consultant: PEP, Nuria Díaz Antón / Anne Vogt
www.plataforma-pep.org

CS 16: Single family house Centón

Client: Cesar Blanco Sancibrián

Passive House Consultant: PEP, Nuria Díaz Antón / Anne Vogt
www.plataforma-pep.org

Bulgaria

EuroPHit

CS 10: Primary school “St.St. Kiril and Methodius”

Client: Municipality of Gabrovo

Passive House Consultant: Eneffect Group, www.eneffect.bg

CS 11: Primary school “Tsanko Dustabanov”

Client: Municipality of Gabrovo

Passive House Consultant: Eneffect Group, www.eneffect.bg

Sweeden, Denmark

EuroPHit

CS 12: Single family house (SE)

Client: Ville & Andrea Mäkinen

Passive House Consultant: IGPH Sverige AB, www.igpassivhus.se

CS 13:Tommerupvej 8B, Rehabilitation workshop building (DK)

Client: Næstved Kommune

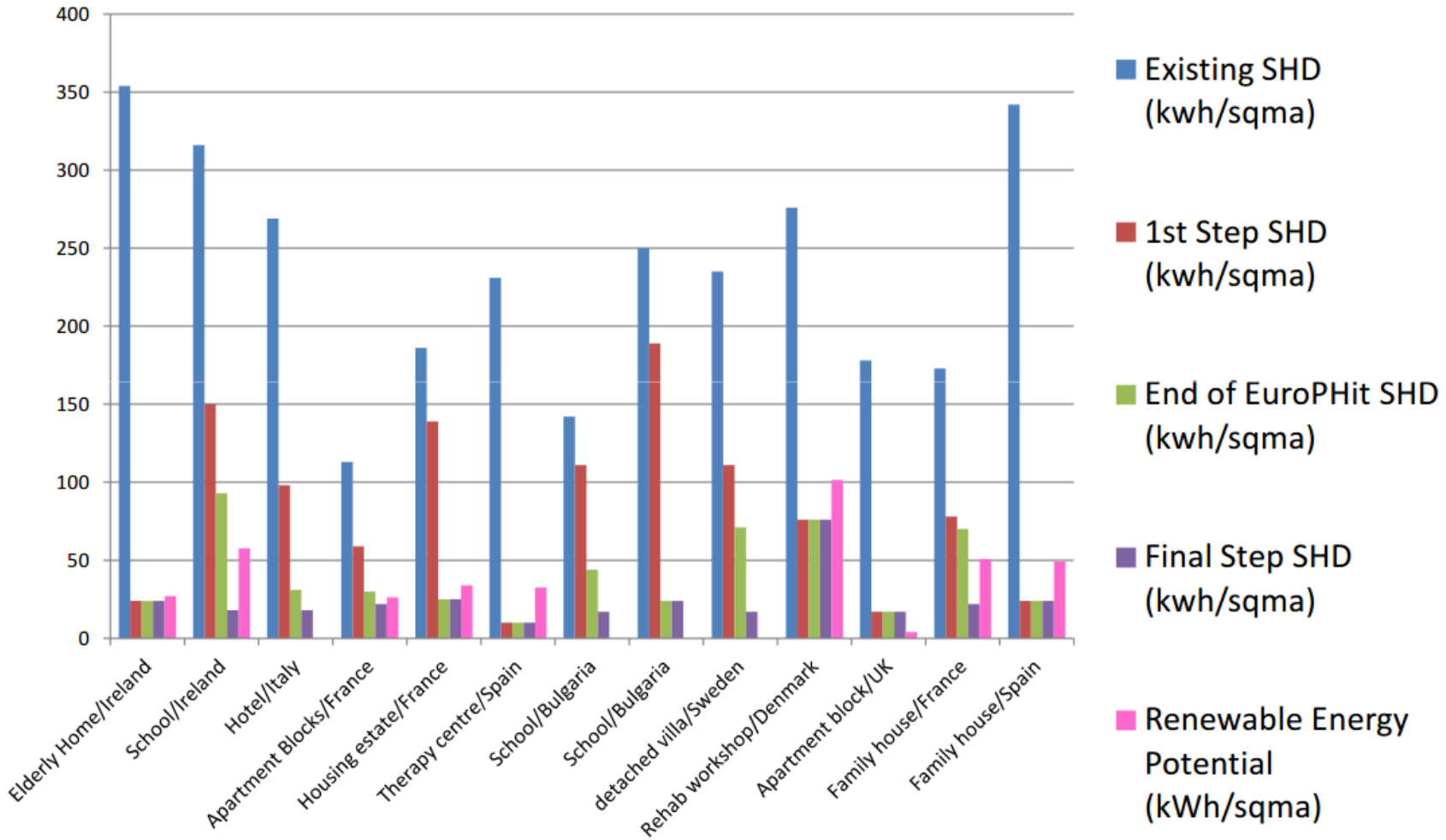
Passive House Consultant: Passivhus.dk ApS, www.passivhus.dk

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Case studies

EuroPHit



Overview of EuroPHit case studies performance, © MosArt, Passive House Academy

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Case studies

EuroPHit

Visit Case studies information on EuroPHit website and find out more about:

- Technical solutions
- Modernisation proposals and Current situation
- Efficient step-by-step improvement
- Photos from the construction site
- Technical details
- Contact informations

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Observers projects

EuroPHit

Call for observers projects

http://europhit.eu/observerprojects

→ Want to get involved in EuroPHit?

→ Do you have an old building in need of retrofitting?

→ Do you want to retrofit with a view to energy efficiency?

Even if you are only planning to make a single upgrade on the way to a step-by-step renovation, EuroPHit could help you.

We are interested in your experiences! Contact us to get involved!

EuroPHit Observer projects: Single family house in Lyon, France © LaMP; Family house in Zellingen am Main, Germany © PHI; Family house Stella Marris, Ireland © MosArt (from left to right)

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

4. Products

Co-funded by the Intelligent Energy Europe Programme of the European Union

Products for step-by-step refurbishment

EuroPHit

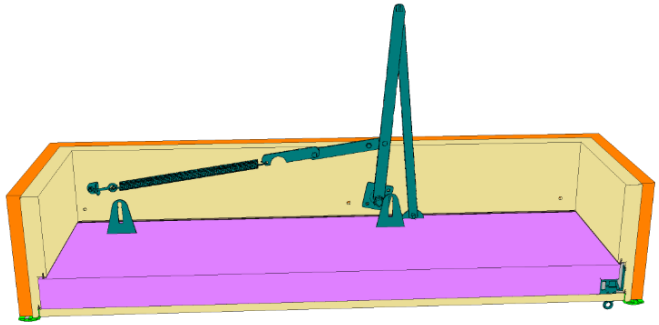


Figure © PHI

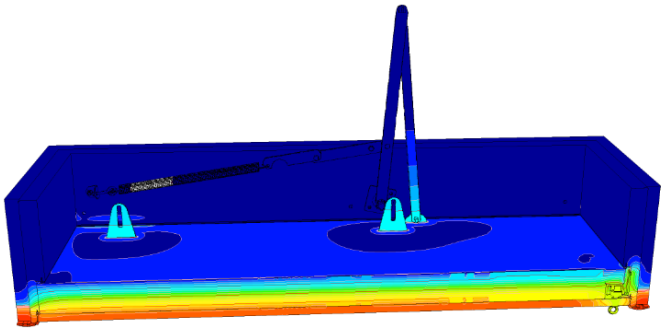
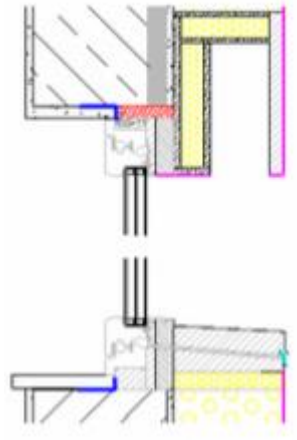


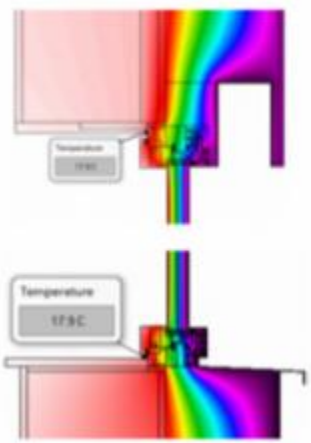
Figure © PHI

Co-funded by the Intelligent Energy Europe Programme of the European Union

Component AWARD 2015

EuroPHit





The main challenge in the Component Award 2015 for Passive House windows was that the product had to show a degree of flexibility since refurbishments are often carried out in a step-by-step manner.

Ideal windows had to deliver excellent results during the transitional period as well as after the completion of all refurbishment measures.

The cost effectiveness of the windows was assessed first and foremost, with a comparison of purchase costs with potential savings.

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Products for step-by-step refurbishment

EuroPHit

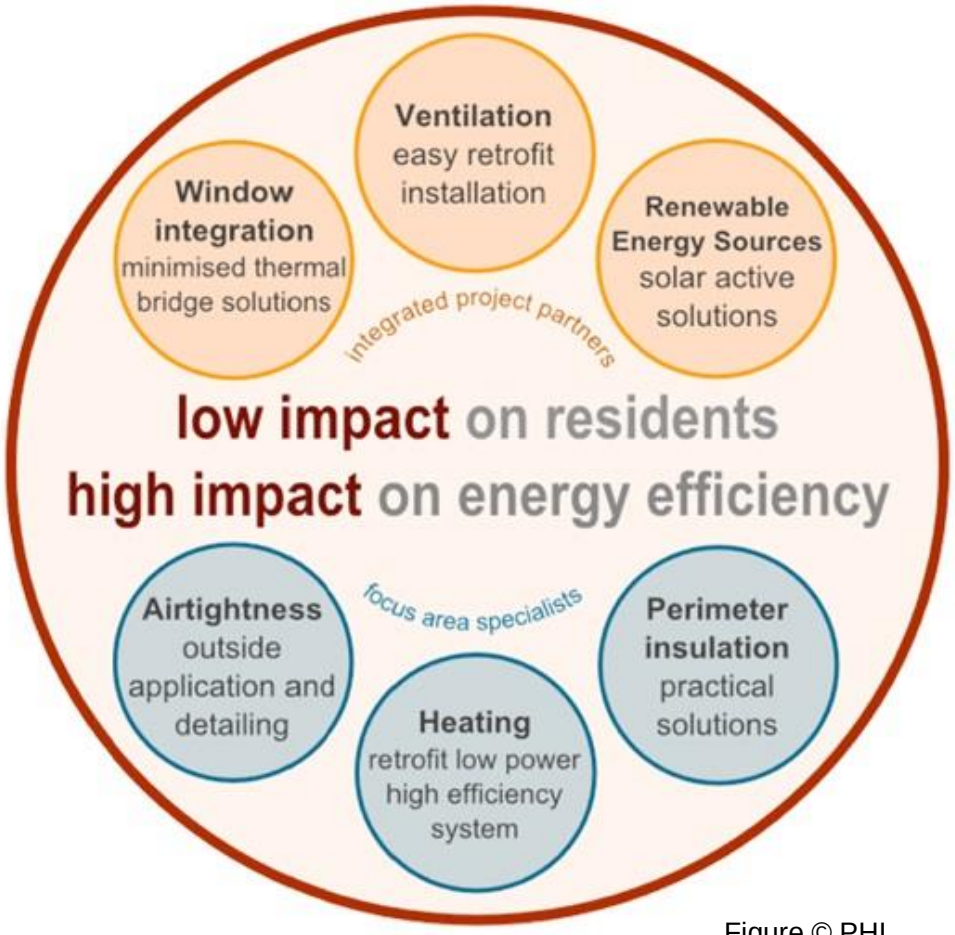


Figure © PHI

The right products

EuroPhit supports manufacturers in designing products that aid step-by-step renovation

Calling for

- Ideas for product suited to step by step retrofitting
- Manufacturers interested in working with EuroPHit on products

We want to hear from you!

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Component AWARD 2016

Cost efficient ventilation for residential buildings

- Refurbishment of multi-family houses
- 3 room apartment
  - ✓ Heat recovery unit
  - ✓ Ducting system
  - ✓ Installation and additional costs
  - ✓ Maintenance costs
- No preference for central or flatwise solutions
- Energy and cost efficient solutions for both types needed

COMPONENT AWARD 2016
Passive House Institute

Co-funded by the Intelligent Energy Europe Programme of the European Union

Component AWARD 2016

EuroPHit

Requirements: Certified Passive House Components

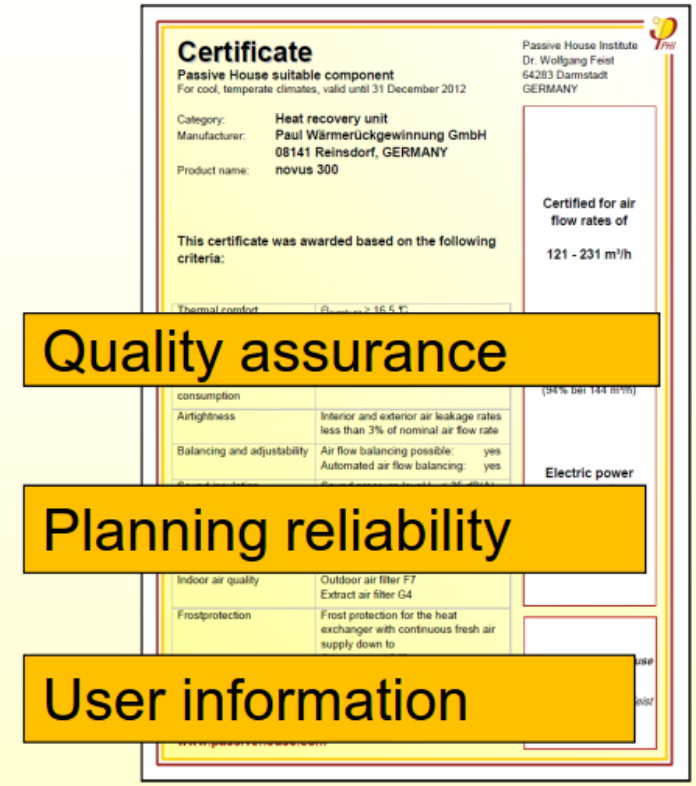
1. Hygiene criterion
   Outside air filter at least F7, Exhaust Filter at least G4

2. Comfort criteria
   Minimum supply air temperature: 16.5 °C @ -10°C outside air temperature

3. Efficiency criteria
   a. Heat: η_{HR} > 75 %
   b. Electricity (1): max. 0,45 Wh/m³
   c. Electricity (2): Standby: max 1 W

4. Control strategy
   Min. 3 ventilation level

5. Frost protection



http://europhit.eu/component-award-2016

5. Financing

Co-funded by the Intelligent Energy Europe Programme of the European Union

Financial case for retrofitting

EuroPHit

Annual payments

The annuity method

Example: investing in ETHICS insulation

- Initial costs of €106/m² minus €20/m² (no need to remove old plaster)
- 30 year loan, 2.5% interest; Payments at 4.8% annually (interest + principle)

Annual breakdown

- Total costs: €3.86/m²
- Total savings (heating): €6.79/m²
- Resulting profits: €2.93/m²

Result: an 8% tax free annual cash return

Attractive at current energy prices

Guaranteed, risk-free and tax-free return of 4 to 15% annually for 30 years!

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

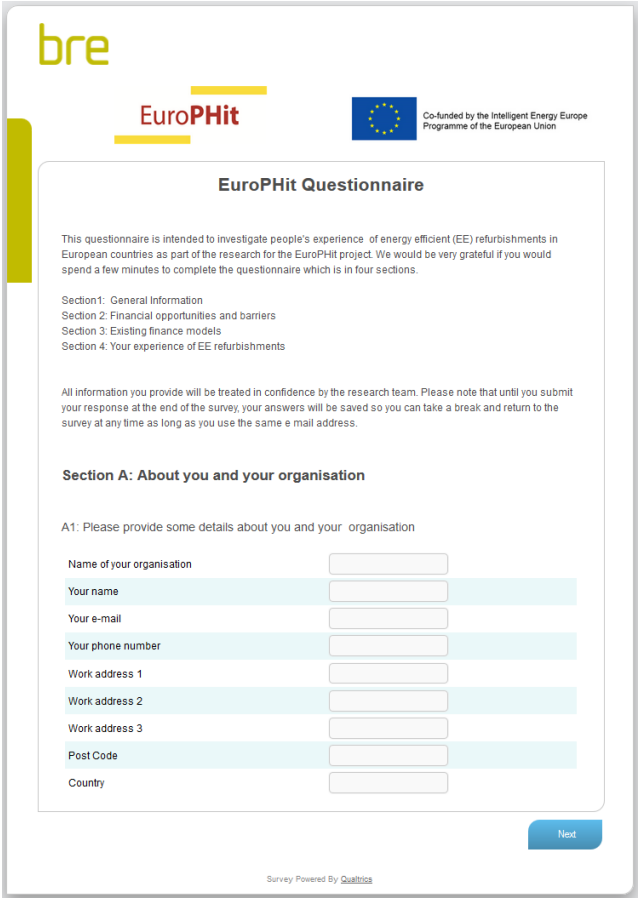
Proper financing

EuroPHit

Energy retrofits pay off!!!
…still, finding appropriate financing for the investment needed is key.

Photo © Images Money, TaxRebate.org.uk

EuroPHit is providing financial institutes with the information they need to offer appropriate financial products for step by step retrofits



Help guide EuroPHit's work today by completing the online financial survey for construction project managers, surveyors, financiers, and other stakeholders

Financial workshops

EuroPHit

Financial workshops held around Europe: in UK (top left), in Denmark (top right, middle bottom), in Ireland (bottom left), in Slovakia (bottom right); Photos © EuroPHit partners

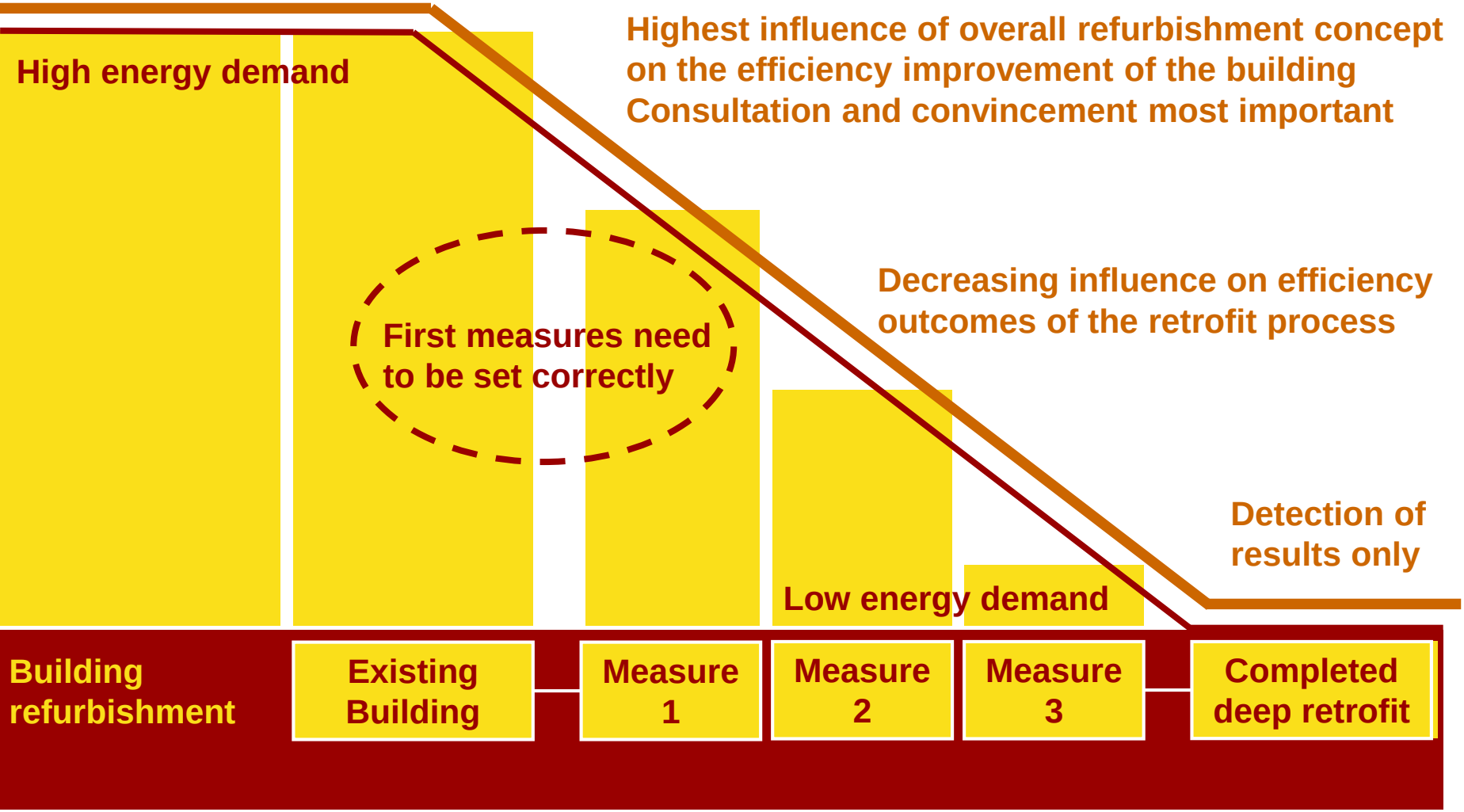
Co-funded by the Intelligent Energy Europe Programme of the European Union

www.europhit.eu

Passive House Institute

Better concepts for step-by-step financing

EuroPHit

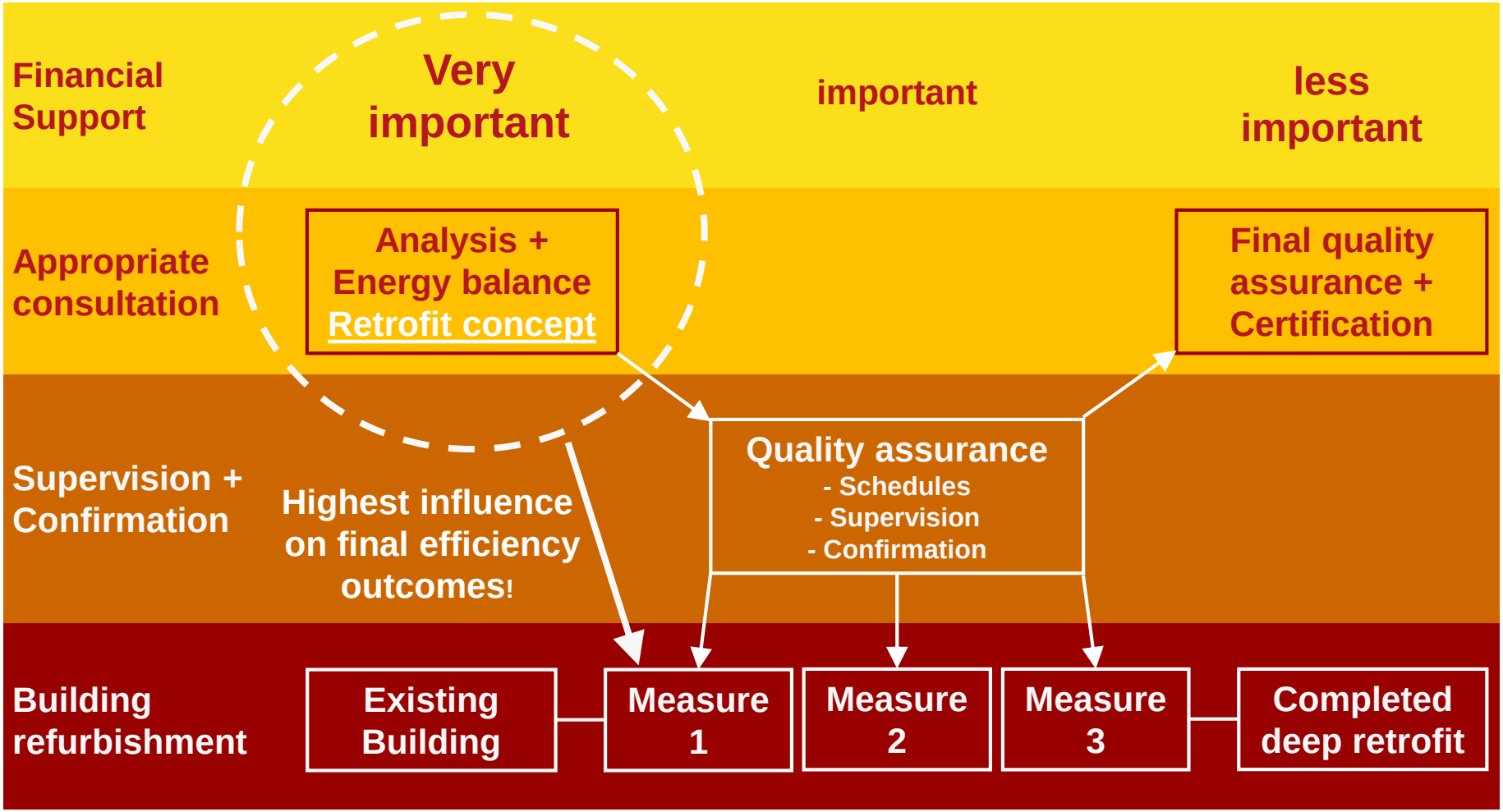


Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Financial focus on initial consultation

EuroPHit

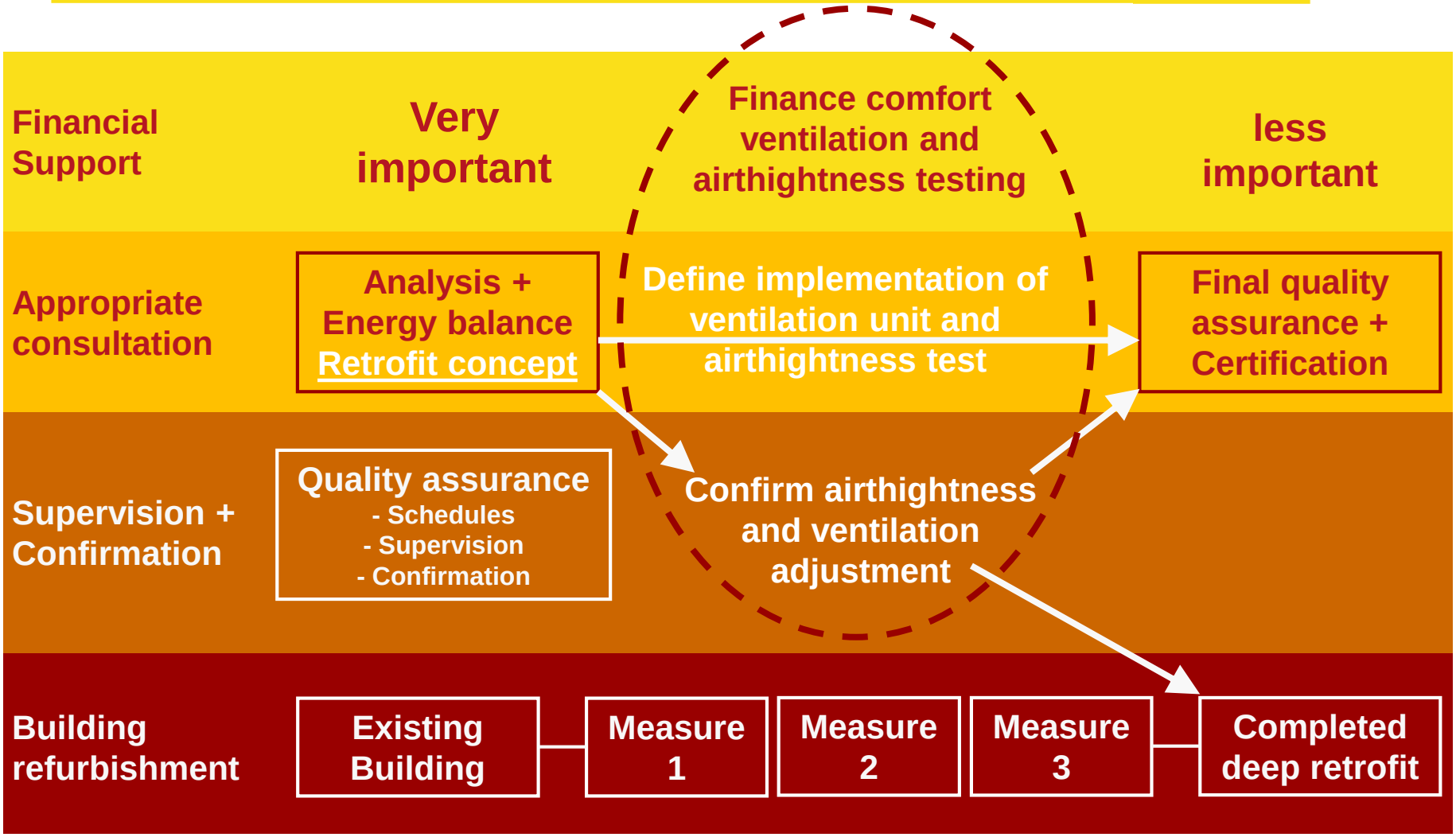


Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

Support unpopular measures

EuroPHit



Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

6. EuroPHit trainigs

Co-funded by the Intelligent Energy Europe Programme of the European Union

EuroPHit Trainings

EuroPHit

Trained professionals are invaluable!

EuroPHit training for designers and contractors with a focus on step by step retrofits

- Courses being rolled out across the EU wherever there is a EuroPHit case study
- A special course will be dedicated to the key topic of airtightness

Check the EuroPHit events calendar for more information!

Co-funded by the Intelligent Energy Europe Programme of the European Union

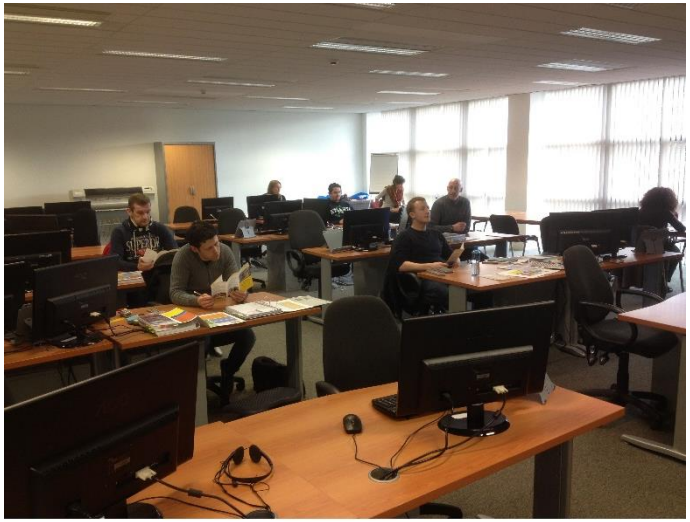
Passive House Institute

EuroPHit Trainings

EuroPHit

Outlines of the training materials for designers, tradespeople and airtightness installations are available for download on the EuroPHit website.

www.europhit.eu/downloads



CERTIFIED PASSIVE HOUSE TRADESPERSON

TRADESPERSON

DESIGNER

CERTIFIED PASSIVE HOUSE DESIGNER

Theoretical and practical training in dedicated PH labs in Madrid. Spain, Photos © PEP

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

7. Key past events

Co-funded by the Intelligent Energy Europe Programme of the European Union

10th International Passive House Days 2014

EuroPHit





PH Days 2014: 'Out of blue' Passive House in Wicklow (top left), Photo © Tomás O'leary; Passive House in the Bavarian village of Biburg-Alling (top middle), Photo © Justus Well; A residential building in Hamburg, certified to the EnerPHit Standard for refurbishment (top right), Photo © Markus Tollhopf; View of arear elevation of a Passive House in Dublin (bottom left), Photo © MosArt, The front view of a Passive House in Dublin, Photo © Niall Walsh

Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

ifeu AWARD, 2015

- A concept developed by PHI, and largely developed within EuroPHit project, for the energy-focused modernisation of buildings has won first prize in a competition. The award jury especially lauded the approach of a "refurbishment road map" with appropriate individual steps.

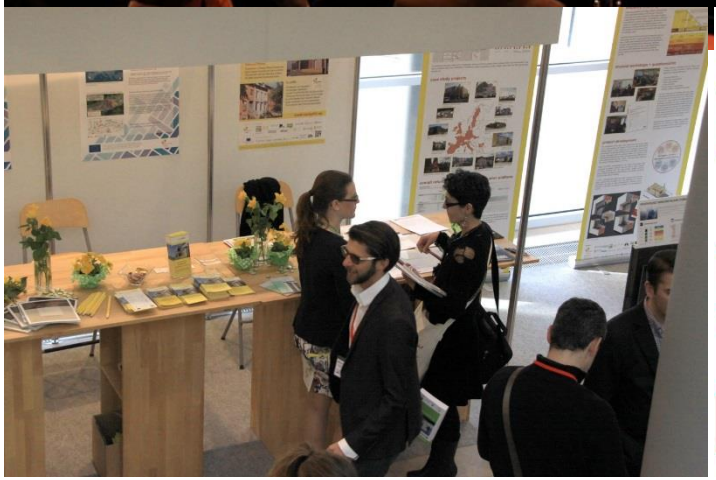
- The intent is to provide both a certification of such "overall road maps" as well as an energy assessment of the individual refurbishment steps in the planning tool PHPP.

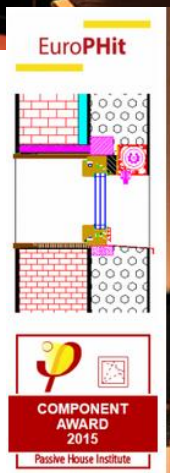
- The award was initiated by the Institute for Energy and Environmental Research in Heidelberg (ifeu).

Co-funded by the Intelligent Energy Europe Programme of the European Union

19th Passive House Conference, Leipzig 2015

EuroPHit





Photos © PHI

Co-funded by the Intelligent Energy Europe Programme of the European Union

www.europhit.eu

Passive House Institute

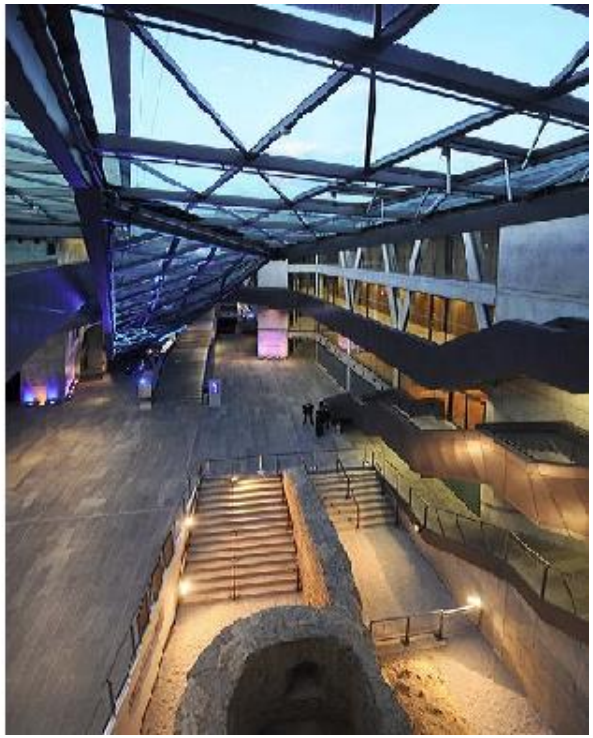
8. Key upcoming events

With step by step retrofit projects, EnerPHit refurbs and Passive House buildings taking part throughout the 11 partner countries and beyond!

www.passivehouse-database.org

20TH INTERNATIONAL PASSIVE HOUSE CONFERENCE 2016

22 – 23 April 2016
Darmstadt, Germany



Photos © Darmstadium

Passive House Institute

Including special sessions on step-by-step retrofits, EuroPHit project results, and more!

www.passivehouseconference.org

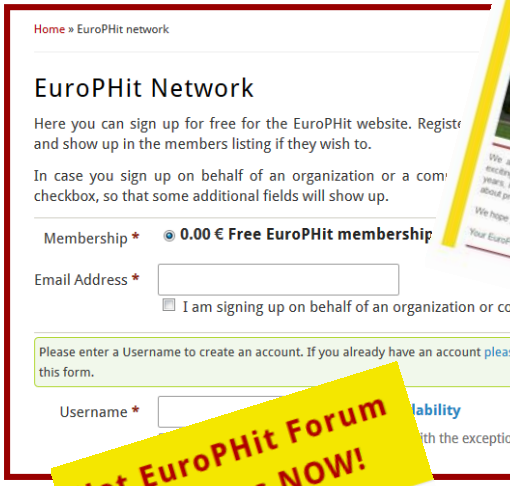
9. Join EuroPHit!

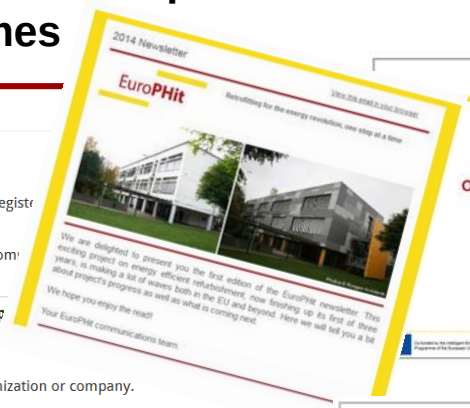
Co-funded by the Intelligent Energy Europe Programme of the European Union

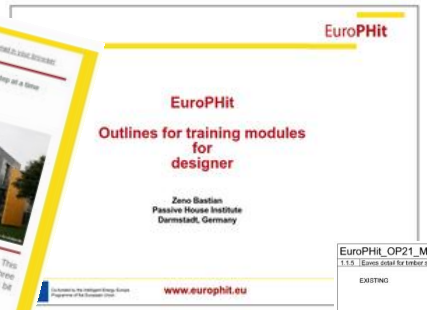
Getting involved

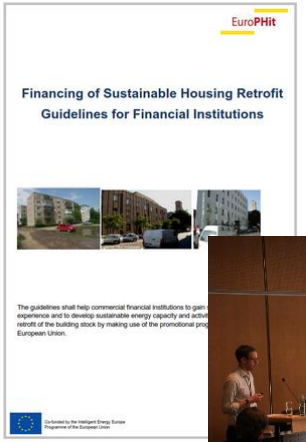
EuroPHit

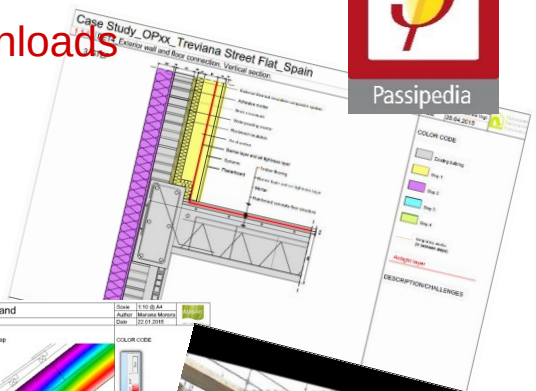
- Join the EuroPHit network for **FREE and get Forum acces** and **updates of the project outcomes**

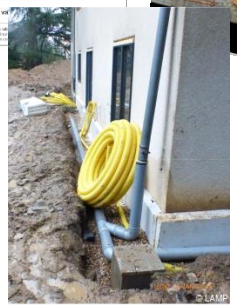


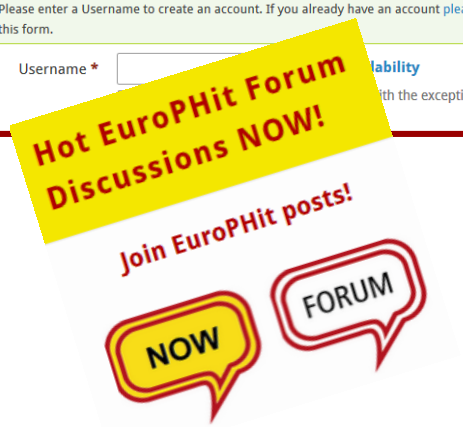












- Learn something new from EuroPHit outcomes

europhit.eu/downloads

- Contribute on our Forum with your questions and comments
- Attend one of our upcoming events: europhit.eu/events

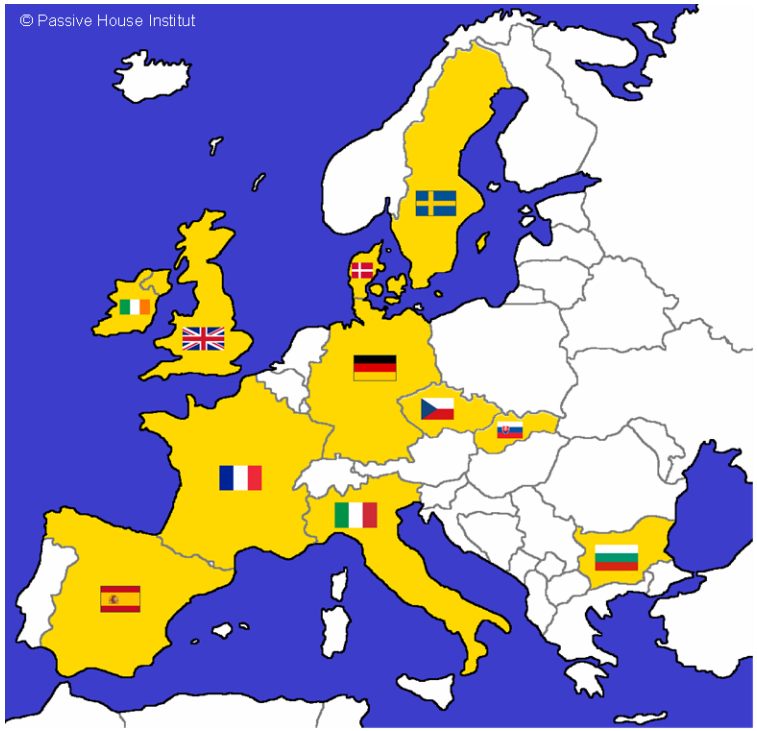
Co-funded by the Intelligent Energy Europe Programme of the European Union

Passive House Institute

EuroPHit

Thank you
for your attention

www.europhit.eu



Partners:

Passive House Institute

International PASSIVE HOUSE Association iPHA

ZEPHIR Zero Energy and Passivhaus Institute for Research

La Maison Passive France

Attea

bre

ASKEEN

MosArt

onyx

IG PH INTRESSEGRUPP PASSIVHUS

PLATAFORMA EDIFICACIÓN PASSIVHAUS

Passivhus.dk

Friedrichsdorf

iepd INŠTITÚT PRE ENERGETICKY PASÍVNE DOMY

group EnEffect

Supporters:

ENERGY EFFICIENCY AND RENEWABLE SOURCES FUND

CENTER FOR BÆREDYGTIGT BYGGERI

GEOCAPITA

Husbanken

NYESTVED

SAINT-GOBAIN

KfW Bankengruppe

Co-funded by the Intelligent Energy Europe Programme of the European Union