EuroPHit

Why retrofit and how to do it right

Speaker:
DI Jan Steiger, Passive House Institute

Bratislava 29.10.2014

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Why deep retrofit?

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IF you do it, do it right

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Quality renovation

...achieved with the
EnerPHit Standard

Prof. Dr. Wolfgang Feist
Universität Innsbruck and Passivhaus Institut

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Insulation: a demo project in Nürnberg

EuroPHit

Architekt/Photo: Burkhard Schulze Darup
Owner: WBG Nürnberg

Measures needed regardless of rennovation level

- scaffolding
- ~~removal of old plaster~~ **saved!**
- addition of new plaster
- insulation panels
- high quality new plaster

Keep the old plaster

Don't "save" money with thin insulation

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Accumulated PE of Insulation

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27.5 cm of insulation

→ Requires a primary energy INVESTMENT of 44 kWh/m²

but

→ Results in a primary energy SAVINGS of 5620 kWh/m²

*Energy savings are **128 times** the energy INVESTMENT*

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20 cm ETHICS with WLG 035

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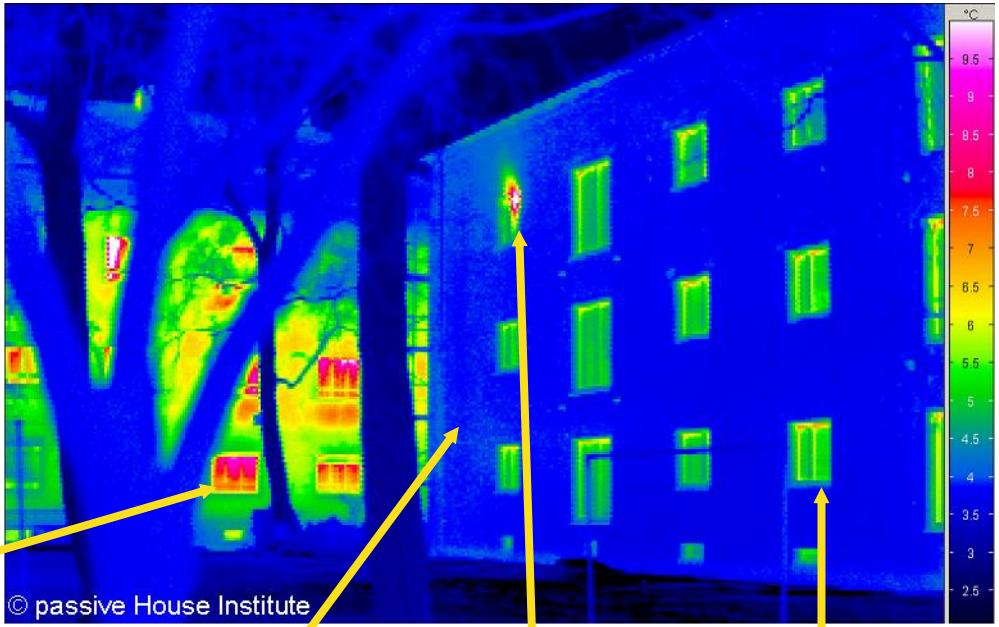

not insulated

completely insulated

tilted window

steel-anchor

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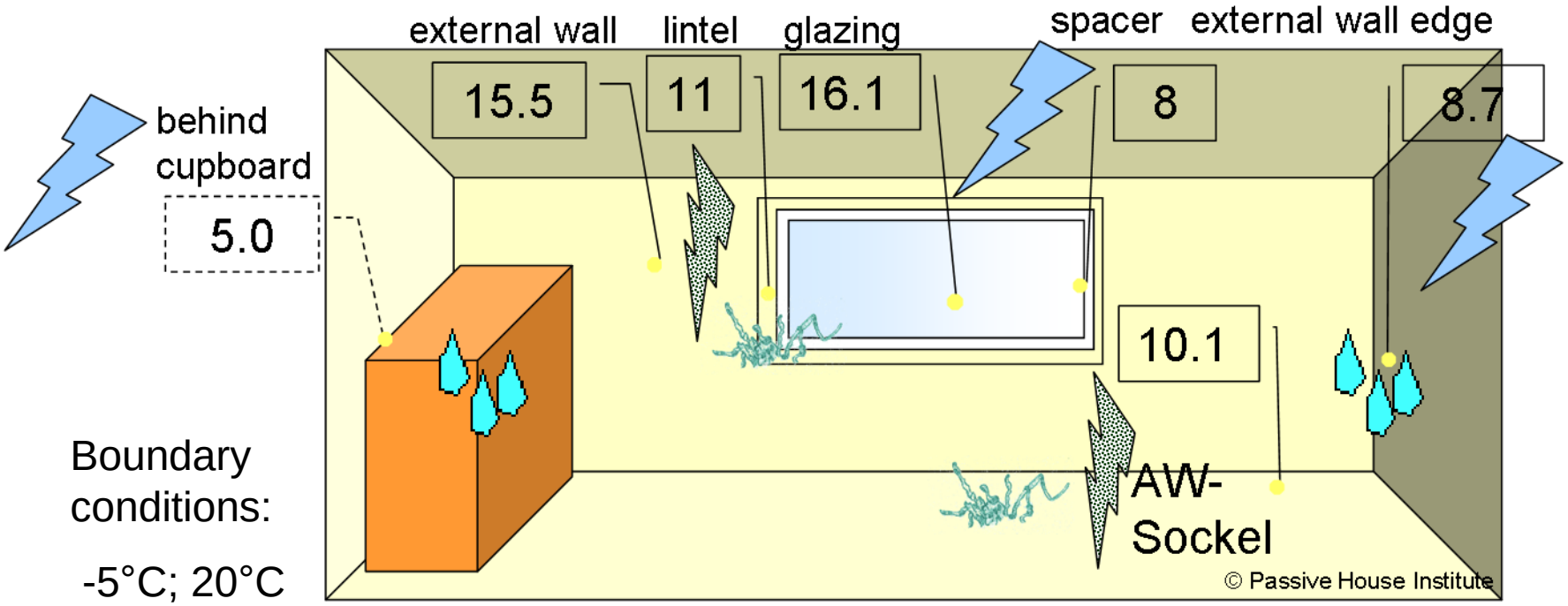
Existing situation: Uninsulated with new windows

EuroPHit



- temp of key surfaces = 9°C
- problem areas behind cupboard, on the edges and lintel
- internal relative humidity must be less than 38% to avoid mould growth

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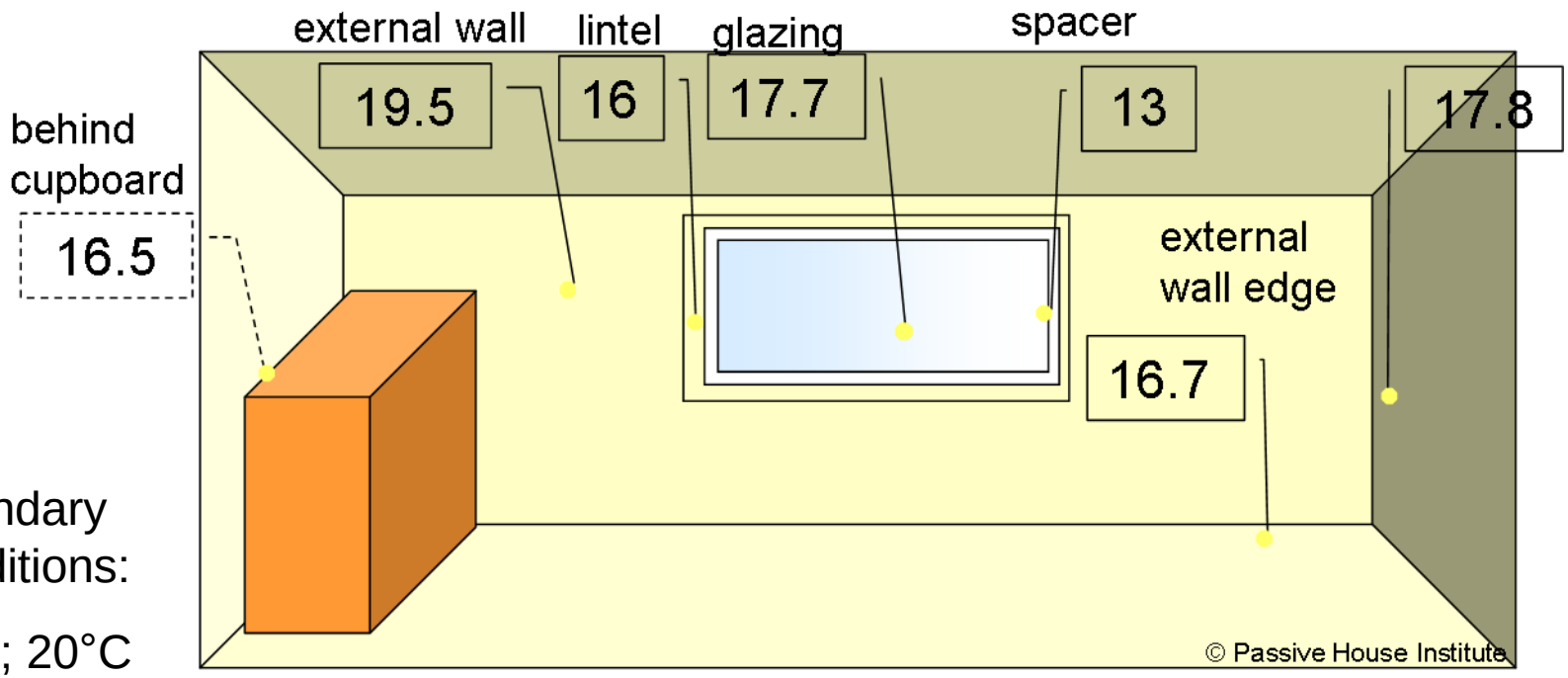
EuroPHit refurbishment with insulation 200 mm + new PH-windows

EuroPHit



Boundary conditions:

-5°C; 20°C

- temp of key surfaces greater than 16°C
- zero mould problems, even behind the cupboard!
- internal relative humidity can reach 62% without fear of mould growth

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When to change an old window?

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... if it's damaged
... if I already plan to renovate
... if I get it as a gift.

So, new windows only every 30+ years!

IF you do it, do it right!

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Why the better standard?

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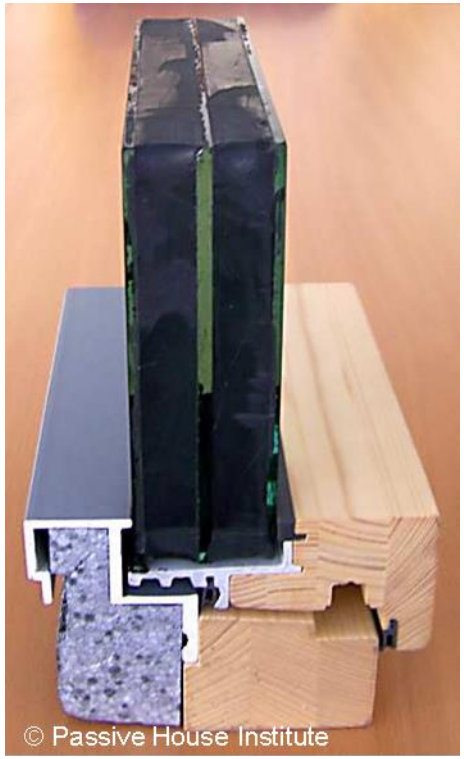
The contemporary window...
is an old one!



The window of the future…
has been available for years!

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If you do it...

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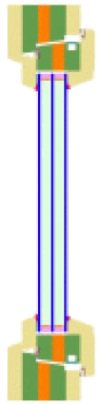
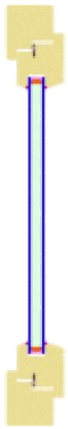
INVESTMENT in new windows:
The future standard may be a bit more expensive

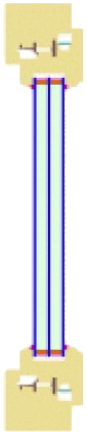
€411

+ €111



€300





€320/m²

+ €20

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…do it right.

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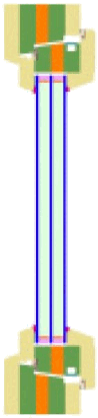
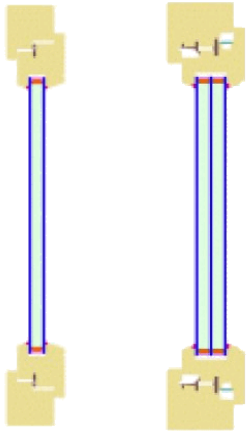
...but it saves twice the money !

€ 211 savings

101 kWh/a





no savings

€ 57 savings

27 kWh/a

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2014 Component award

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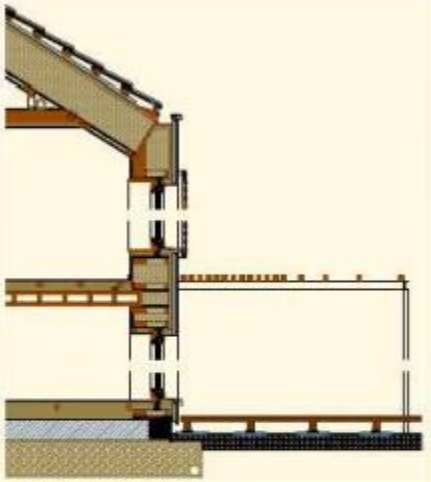
COMPONENT AWARD 2014



Living area:	155 m²
Heating demand:	14 kWh/(m²a)
PE-demand:	61 kWh/(m²a)
Airtightness (n_{50}):	0,2 1/h
Architects:	passivhaus-eco

www.passivhausprojekte.de: ID 1200

EuroPHit THE REFERENCE BUILDING

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2014 Component award

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The competing windows were compared to a "standard window" according to German legal standard EnEV:

Die teilnehmenden Fenster wurden untereinander und mit einem "Standard-Fenster" nach EnEV verglichen.

Standard window I *Standard-Fenster*

Glazing I Glas: Double, lowE coated I *2-fach Wärmeschutz*
Ug: 1.2 W/(m²K), **g:** 0.60
$U_{w,\ installed}$: 1,3 W/(m²K) (for a window size 1.23*1.48 m)

Prices (installed window, incl. VAT) I ***Preise*** *(eingebautes Fenster inkl. MwSt)*

Timber I Holz:	**387 €/m²**
Timber-Aluminum I Holz-Alu:	**449 €/m²**
PVC:	**298 €/m²**
Aluminum I Aluminium:	**449 €/m²**

EuroPHit REFERENCE WINDOWS

COMPONENT AWARD 2014 Passive House Institute

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2014 Component award

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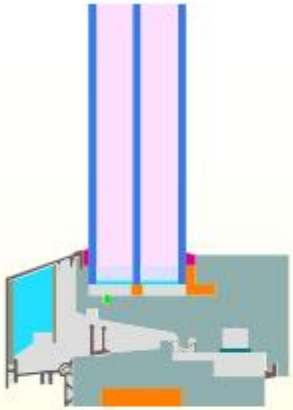

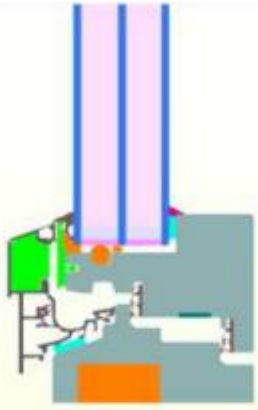

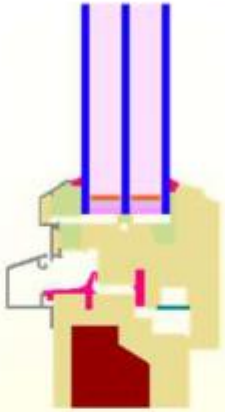

1 Lorber I pro PHf.	**1** Bieber I OPTIWIN	**2** Freisinger I OPTIWIN	**Prize**, Company
smartwin compact	FUTURA	Alu2Holz	Product
451	450	452	Price [€/m²inst.w]
24%	22%	20%	LCC savings [%]
288	246	214	Oil savings [l/m²]

Price: Investment costs for reference building [€/m² ins. Window]. **L**ife-**C**ycle **C**ost savings: compared to ref. case [%]. Oil savings: per m² window compared to ref. window (life-cycle 40 a)

EuroPHit **WINNERS: Timber-Aluminum** (18 participants)

COMPONENT AWARD 2014
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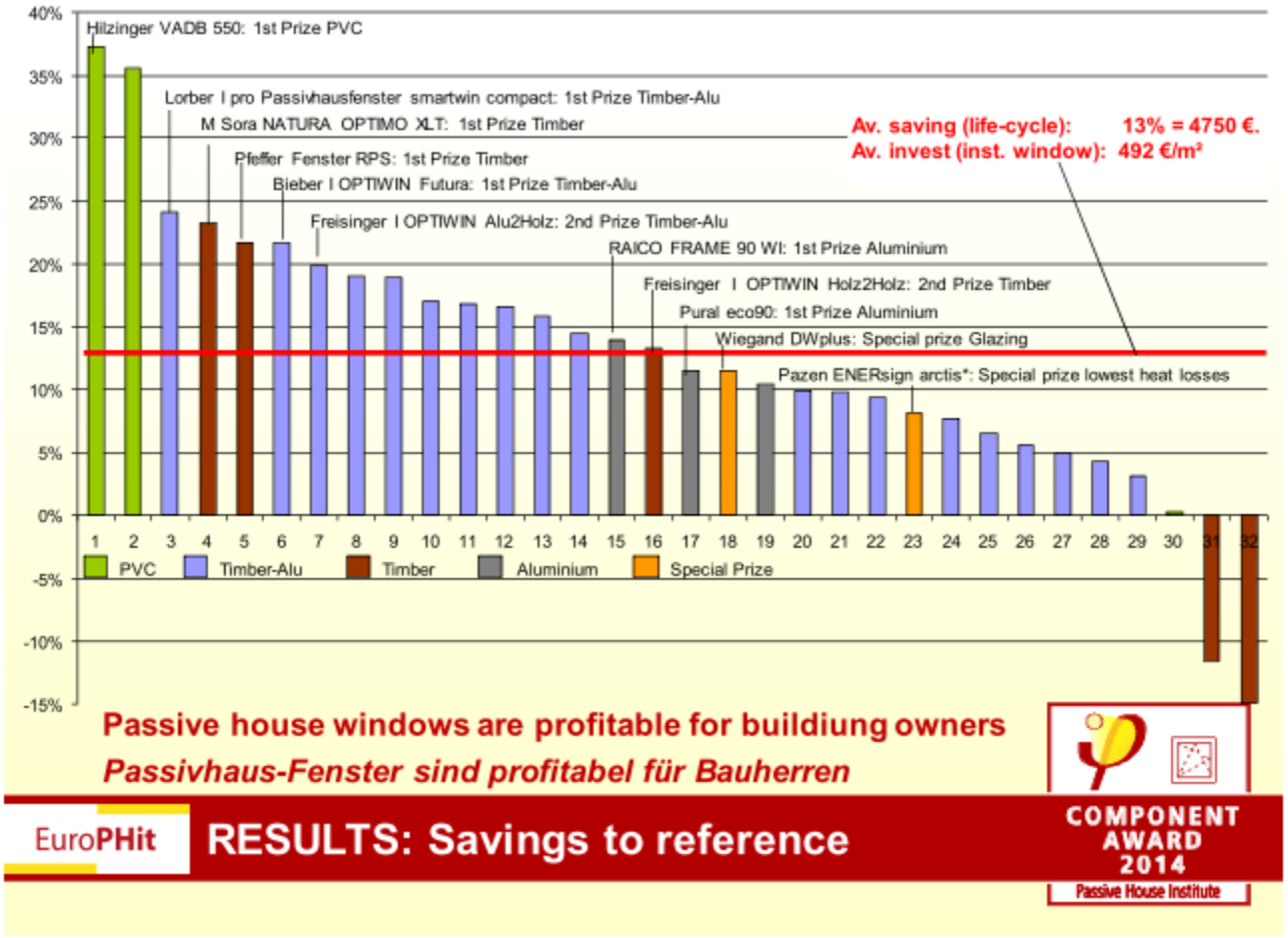
2014 Component award

EuroPHit



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Examples of the past

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Can it be done?

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Governmental offices - Expost in Bozen (IT)

EuroPHit

Before

After refurbishment 12 kWh/(m²a)

Client: Provincia Autonoma di Bolzano-Alto Adige, IT

Architect: Michael Tribus Architecture, IT

Completion: 2006

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SFH Groove Cottage
Hereford (GB)

EuroPHit

Before

After refurbishment 25 kWh/(m²a)

Client: Andrew Simmonds and Lorna Pearcey, GB

Architect: Simmonds.Mills Architects, GB

Completion: 2009

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Baaderstrasse 7, Munich (DE)

EuroPHit

Before

After refurbishment: 25 kWh/(m²a)

Client: Baaderstrasse GmbH&Co.KG, DE

Architect: Peter Fink Architekten GmbH, DE

Completion: 2012

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Listed office building – Becker in Rimbach (DE)

EuroPHit

Before

After refurbishment: 20 kWh/(m²a)

Client: Grundstücksgesellschaft Schlossstr. 9 Becker u. Martin GbR, DE

Architect: Peter Hinz, Planungsgruppe 7, DE

Completion: 2011

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Gymnasium Baesweiler - Energetische Sanierung (DE)

EuroPHit

Before

After refurbishment 15 kWh/(m²a)

Client: City of Baesweiler, DE

Architect: Rongen Architekten, DE

Completion: 2010

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Perspectives for existing buildings: EnerPHit retrofits

EuroPHit

Before

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Perspectives for existing buildings: EnerPHit retrofits

EuroPHit

...after

Zaman / GAG
Ludwigshafen

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Perspectives for existing buildings: EnerPHit retrofits

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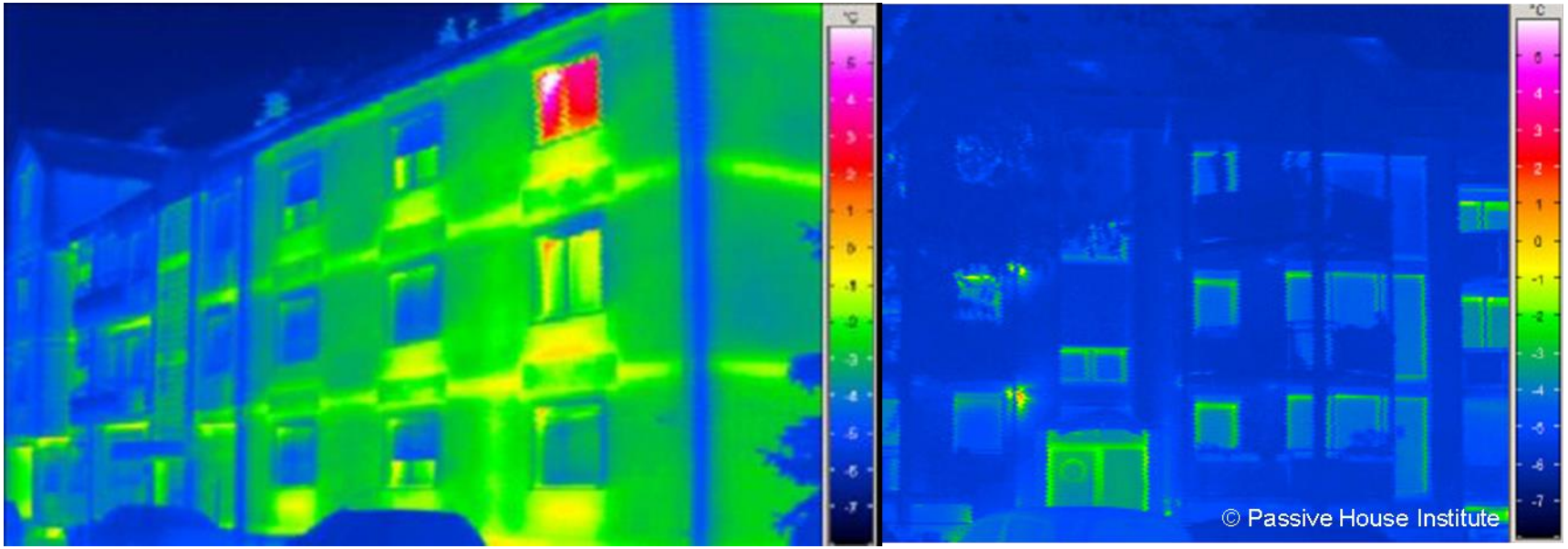

Before

...after

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Perspectives for existing buildings: EnerPHit retrofits

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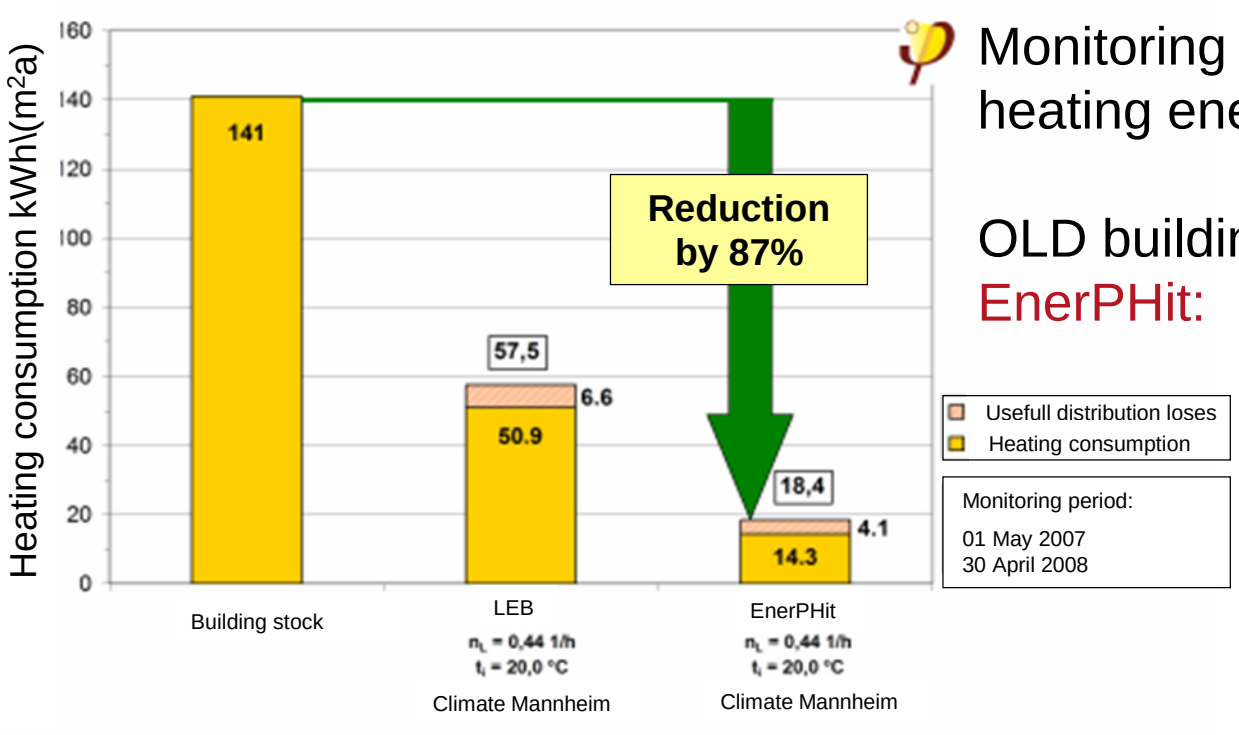
Up to 80% reduction in enery consumption possible!



Monitoring of heating energy consumption:

OLD building: 141 kWh/(m²a)

EnerPHit: 18.4 kWh/(m²a)

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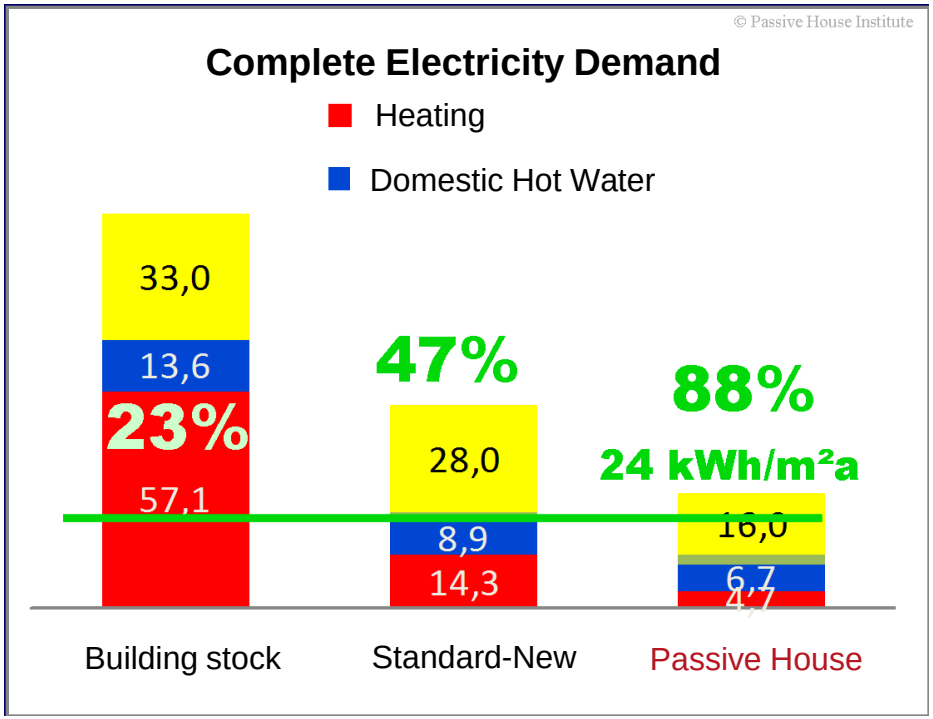
Supplying energy with PV

EuroPHit

Zaman / GAG Ludwigshafen:
16m² PV per 80m² dwelling

Only in a highly efficient building can the supply be (almost) completely covered by PV



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Mediocre improvements don't cut it!

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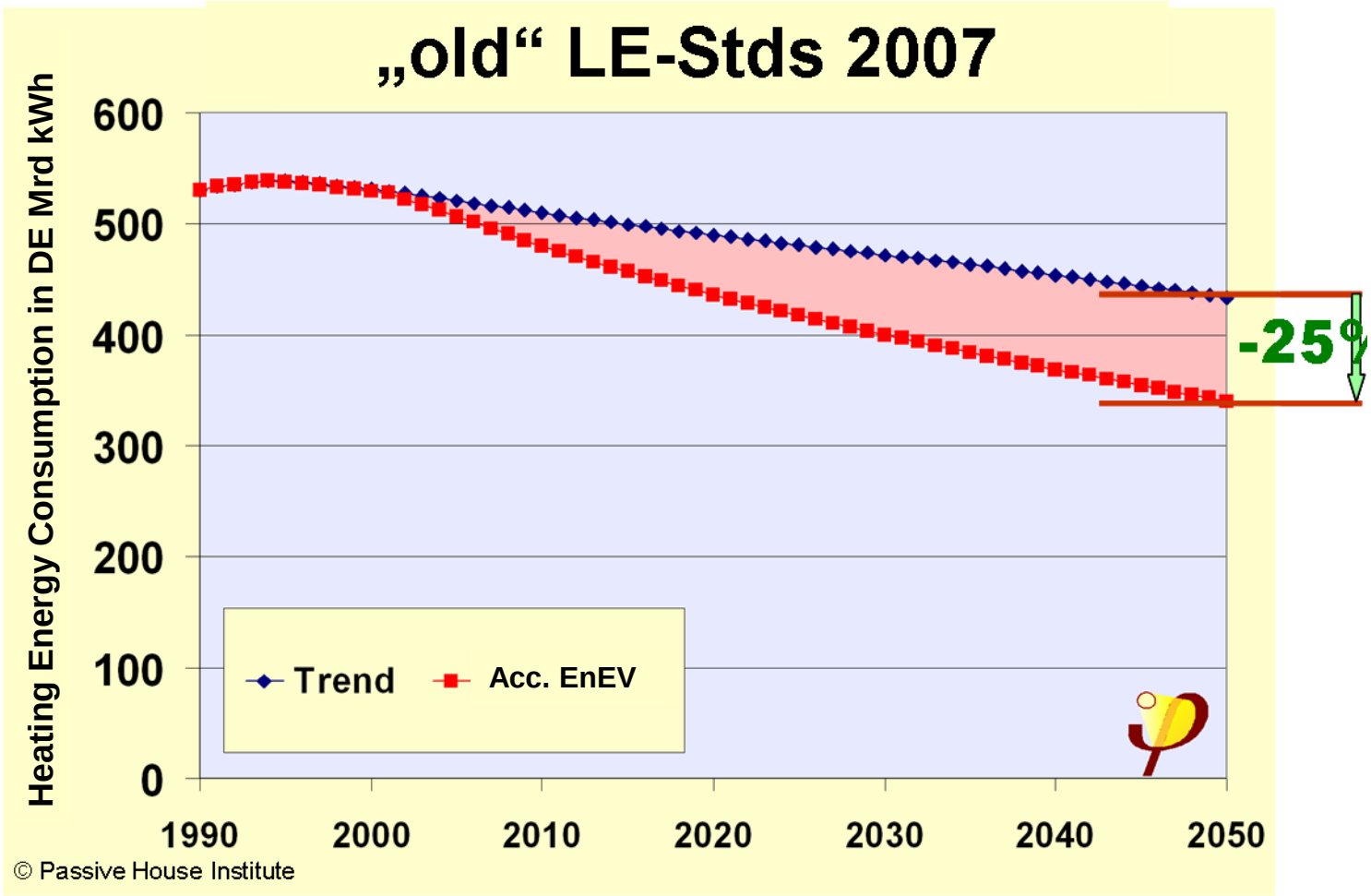

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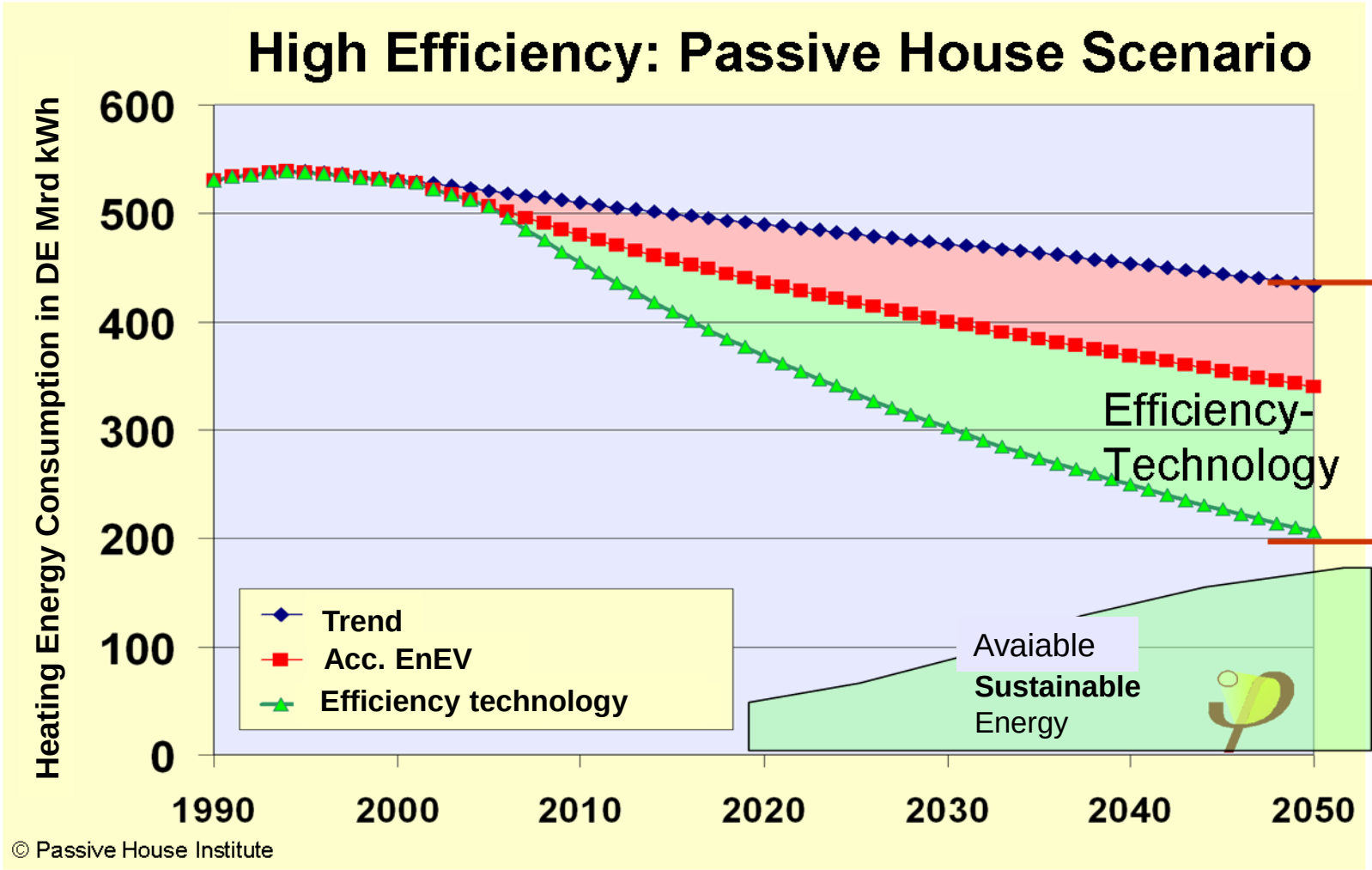
Only high efficiency makes a sustainable energy supply feasible

EuroPHit



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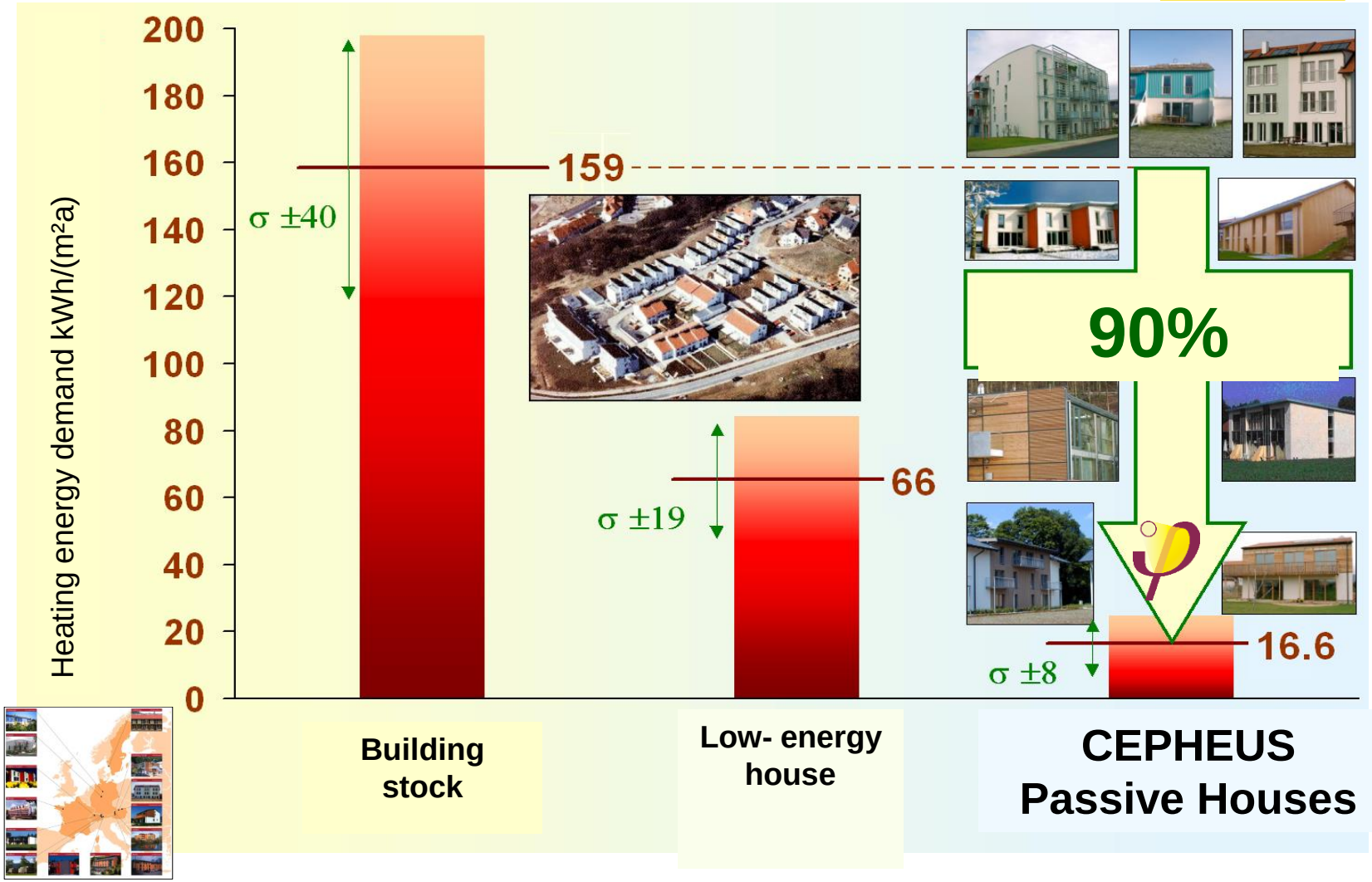
Comparison of consumption

EuroPHit



CEPHEUS = Cost Efficient Passive Houses as European Standard

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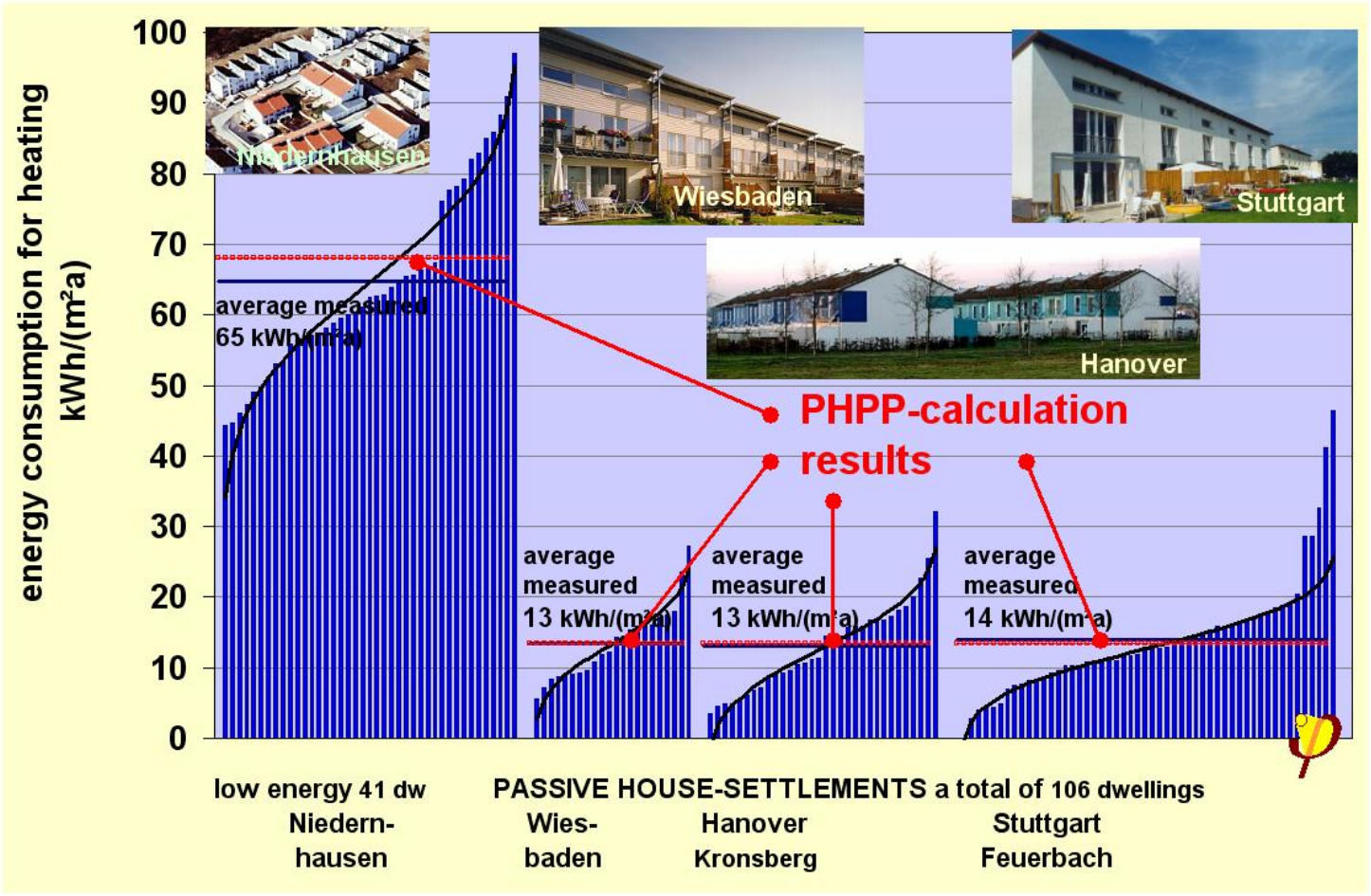
High accuracy of the PHPP calculation

EuroPHit

PHPP calculation compared with measured consumption:



Perhaps the world's most accurate energy balance design tool

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PHPP 9

EuroPHit

Das Energiebilanzierungs- und Passivhaus-Planungstool

für qualitätsgeprüfte Passivhäuser und EnerPHit-Modernisierungen

PHPP

Coming up late 2014

PHPP

Passivhaus Institut

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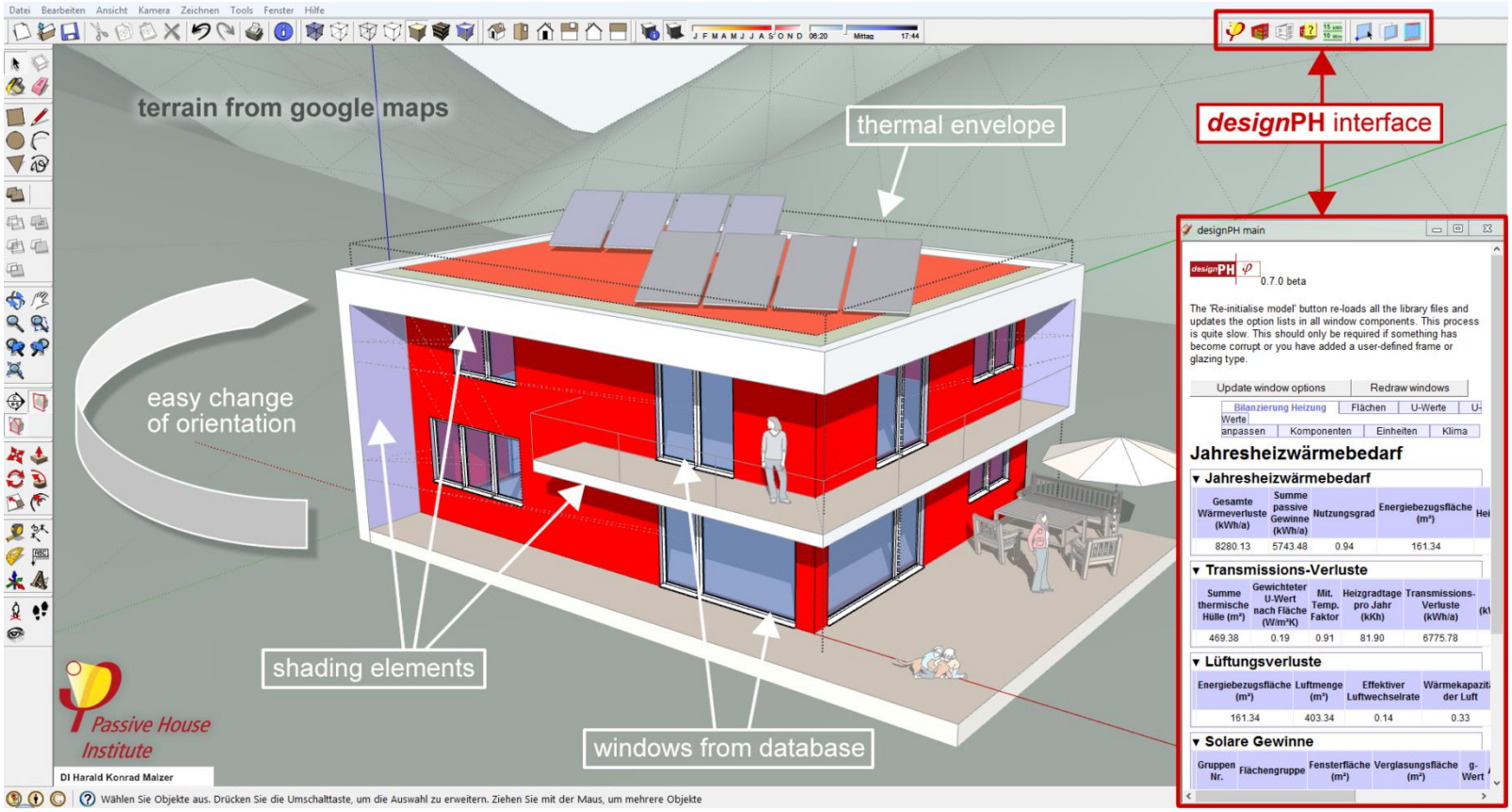
designPH

designPH
EuroPHit



it is the new 3D interface for PHPP

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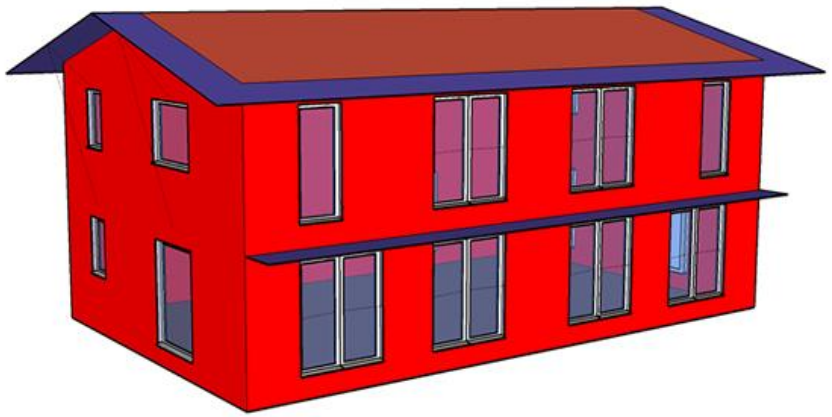
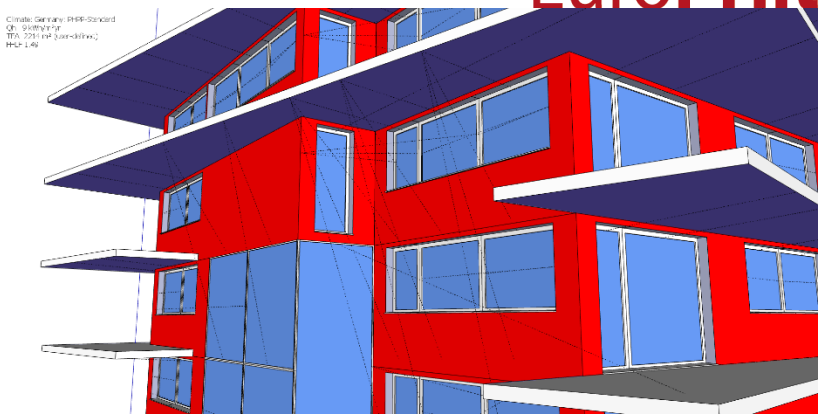
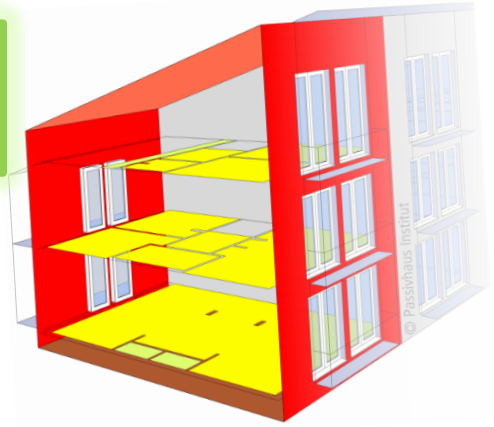
EuroPHit





whether simple design ... or complex facades ...

Climate: Germany: PHPP-Standard
Qh 15 kWh/m²yr
TFA 165 m² (user defined)
FHLF 2,90



designPH helps to design good passive houses

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Projects already on the way: PassREg **Passive House Beacons**

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PassREg

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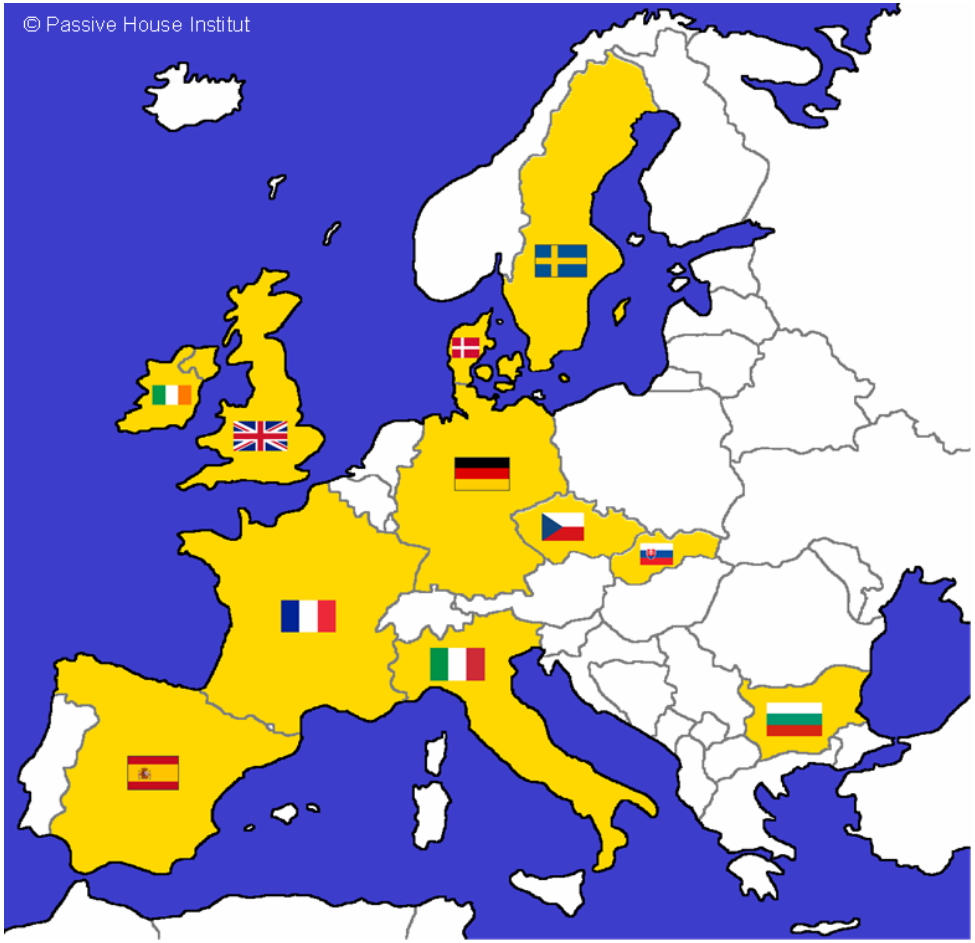

Thank you for your attention

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