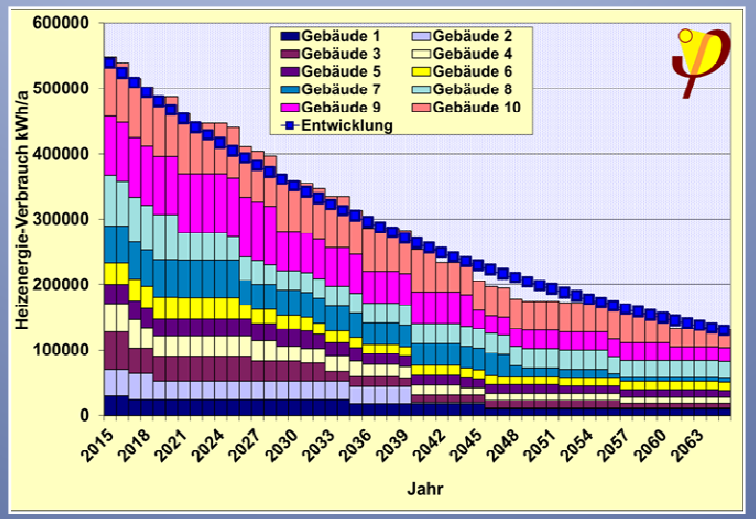
Sustainable Economy
… the Case for Passive House



Univ.-Prof. Dr. Wolfgang Feist
Universität Innsbruck und Passivhaus Institut

universität innsbruck

Passivhaus Institut

Passive House - Components

- **full functionality for the key purpose** of the Component
- **significantly improved energy efficiency** of the component compared to average quality, combined with
  - much better thermal comfort,
  - better protection of the structure,
  - better noise protection,
  - better air quality,
  - optimized connections to all other relevant components

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Building service
Gebäudetechnik

Total 193

Opaque envelop
Opake Gebäudehülle

Total 73

Transparent Components
Transparente Komponenten

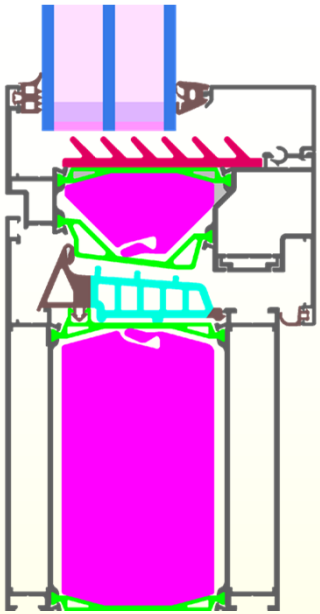
Total 266

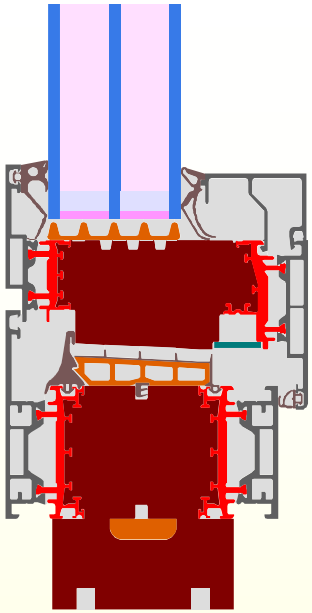
Availability

Story of success: Certified components 2014

COMPONENT CERTIFICATION
Passive House Institute

122 new components!





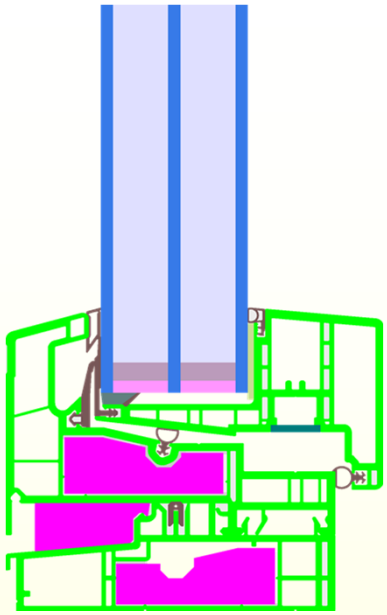
1 RAICO		**1** PURAL	**Price**, Company
FRAME 90 WI	***REFERENCE***	eco90	Product name
492	***449 €/m²***	540	Price [€/m²inst.w]
14%		12%	LCC savings [%]
185		230	Oil savings [l/m²]

Price: Investment costs for ref. building [€/m² inst. window incl. VAT]. **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: Aluminium (3 participants)

COMPONENT AWARD 2014
Passive House Institute



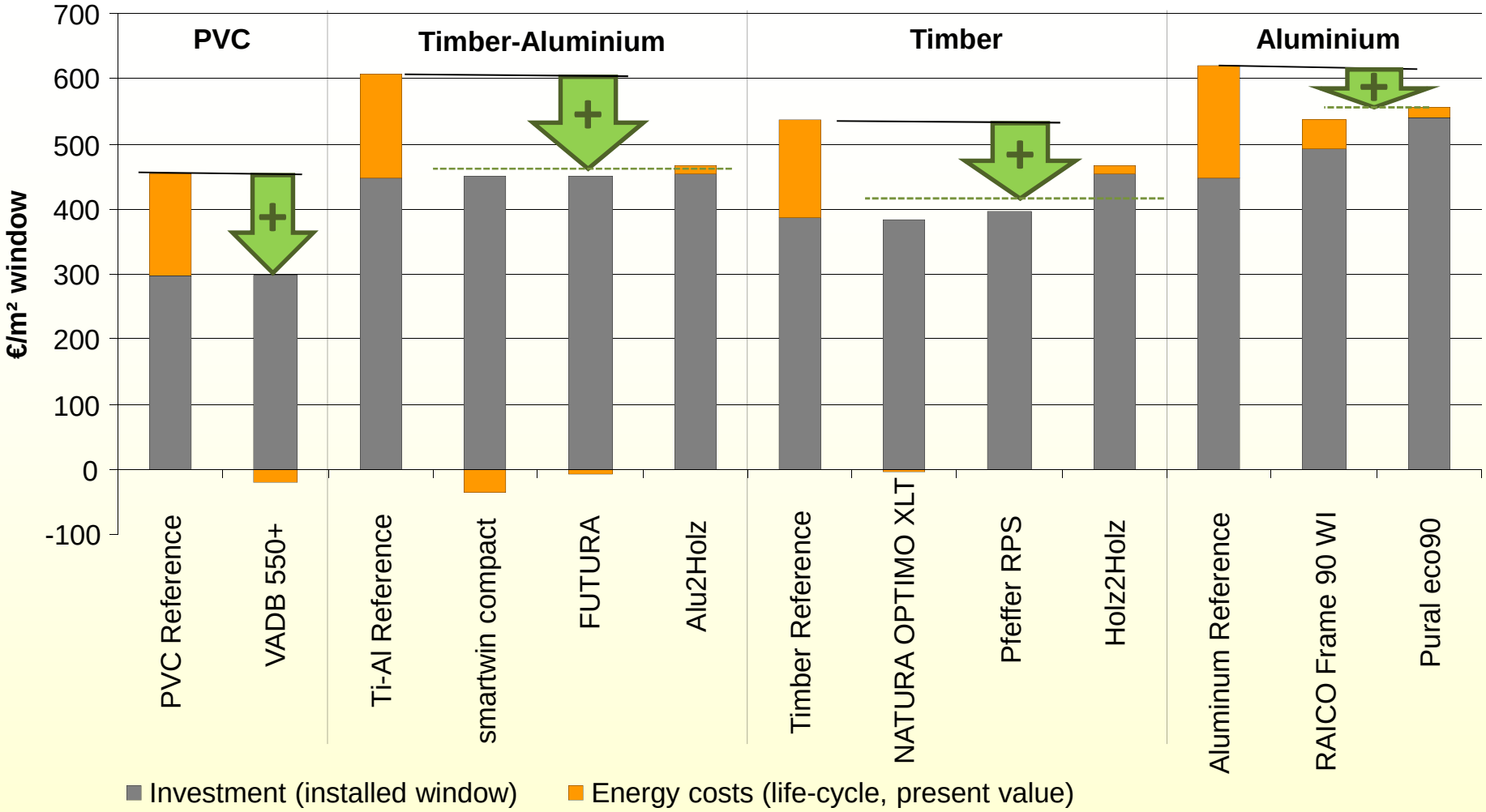
1 Hilzinger		**Price**, Company
VADB 550	***REFERENCE***	Product name
296	***298 €/m²***	Price [€/m²inst.w]
28%		LCC savings [%]
257		Oil savings [l/m²]

Price: Investment costs for ref. building [€/m² inst. window incl. VAT]. **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

WINNER: PVC (3 participants)

COMPONENT AWARD 2014
Passive House Institute



Passive House Advantage: better quality

cost reduced from the very beginning … less than 2.2 €Cent/kWh

Energy: won‘t be a problem any longer: it‘s an energy gaining window

EuroPHit

RESULTS: The winners

COMPONENT AWARD 2014

Passive House Institute

Rockwool Rockframe:

Improve windows towards Passive House

CERTIFIED COMPONENT
Passive House Institute

Transparent Components

Transparente Komponenten

ROCKWOOL®
DÄMMT PERFEKT & BRENNT NICHT

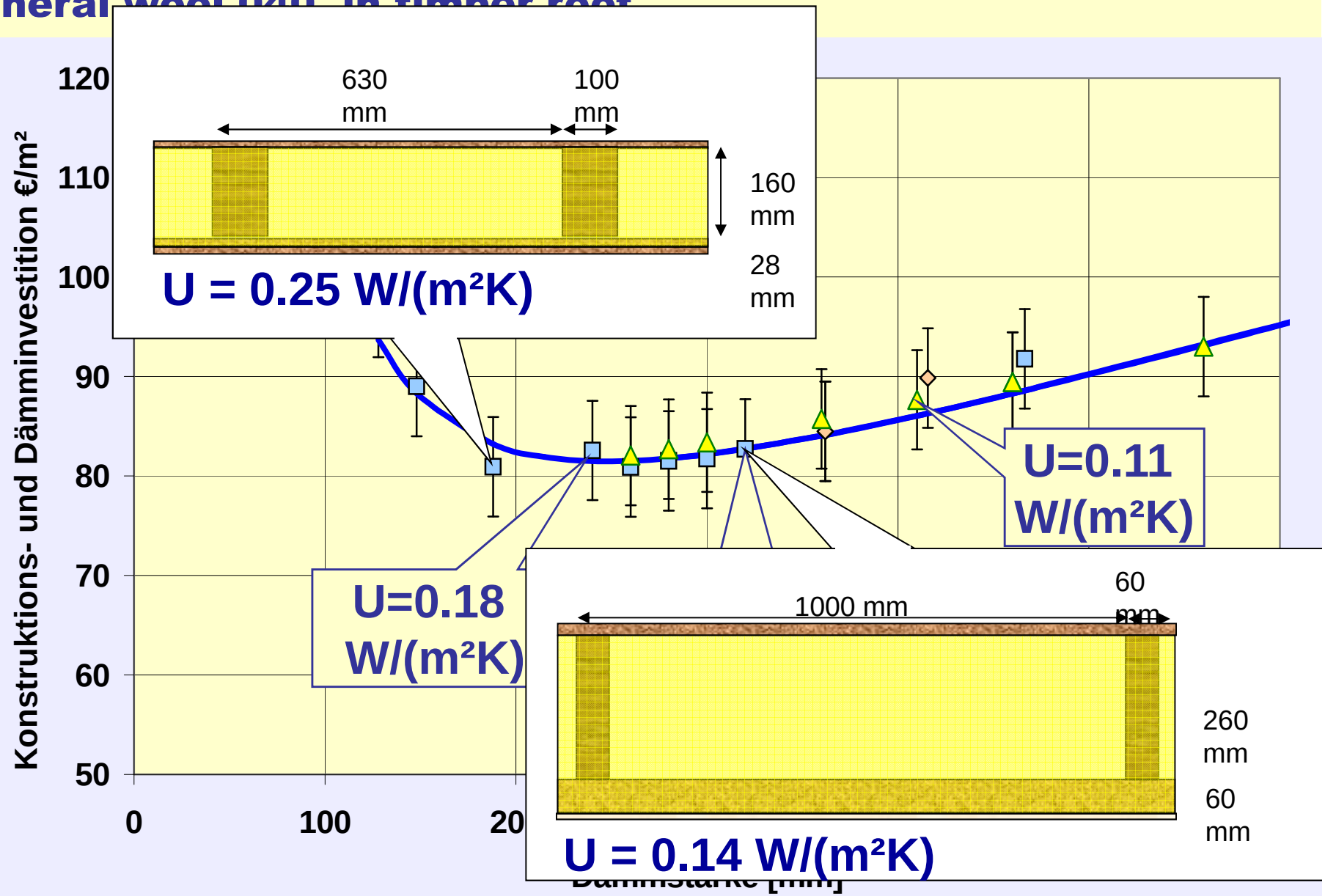
OUTSTANDING SOLUTIONS

Story of success: Certified components 2014

COMPONENT CERTIFICATION
Passive House Institute

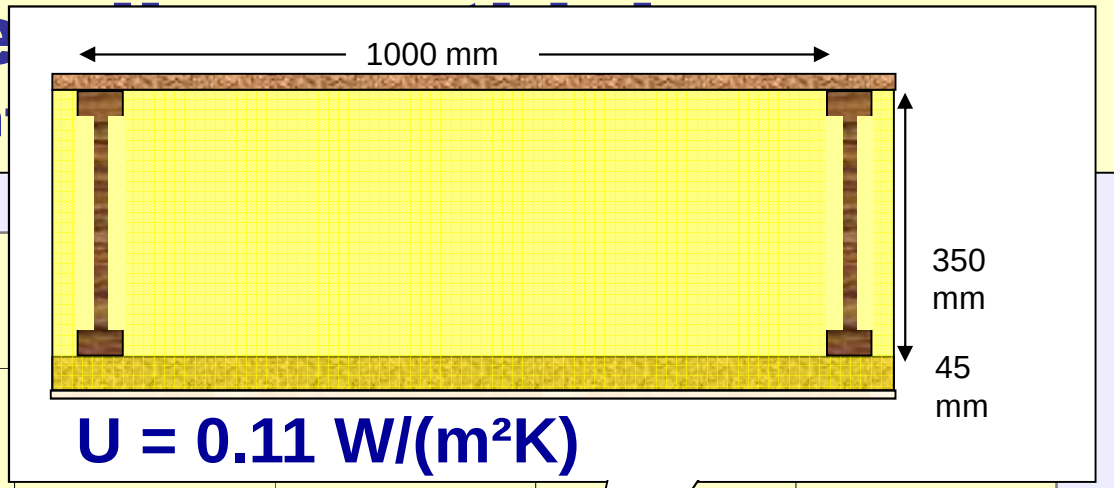
Investment depending on roof construction

Mineral wool 040 in timber roof



Investment depe

Mineral wool 040, differen



Konstruktions- und Dämminvestition €/m²

120
110
100
90
80
70
60
50

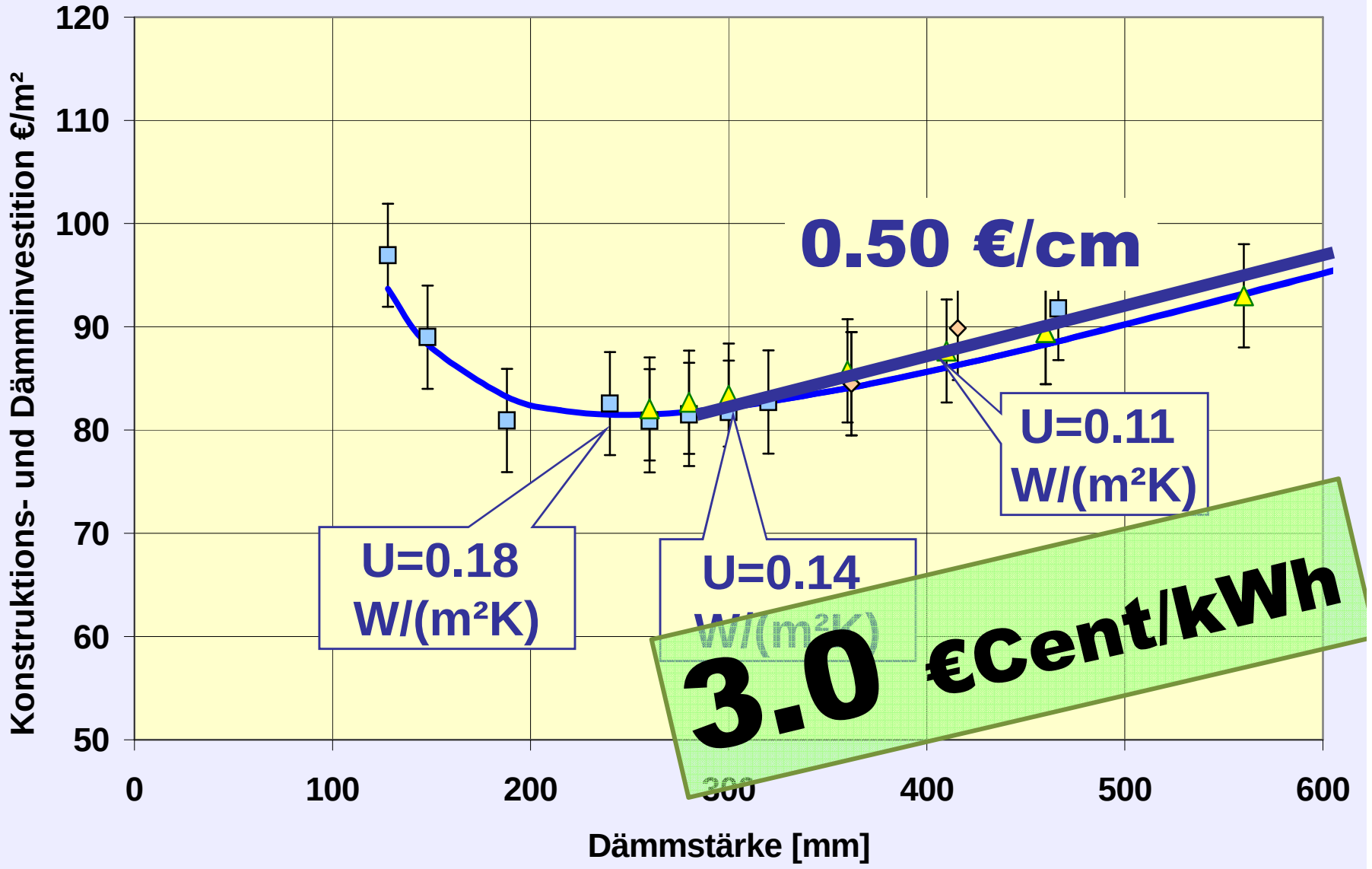
0 100 200 300 400 500 600

Dämmstärke [mm]

d /mm Dämmung						
R / m²K/W	0	2.5	5.0	7.5	10.0	12.5	15

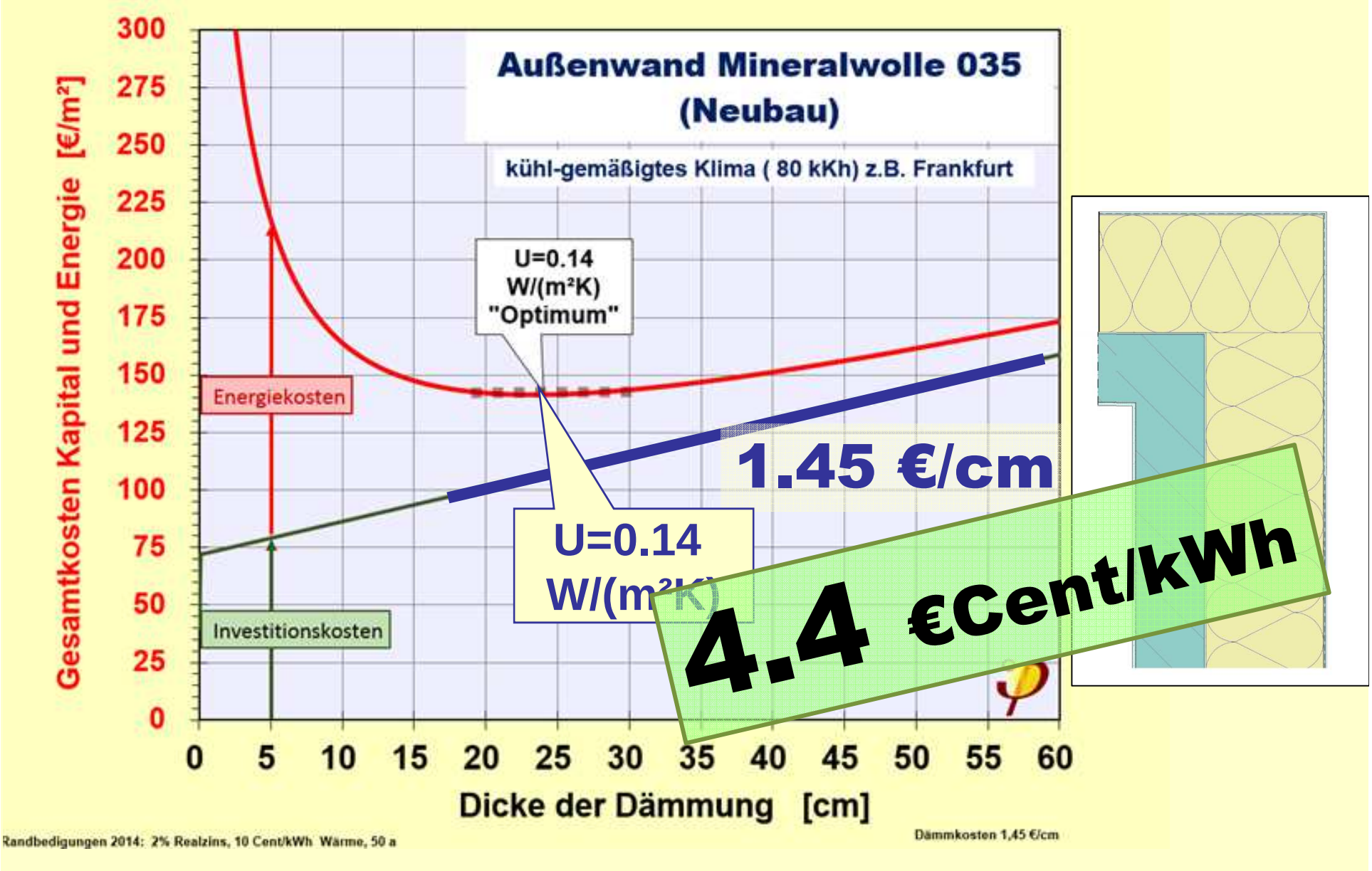
Investment and thickness

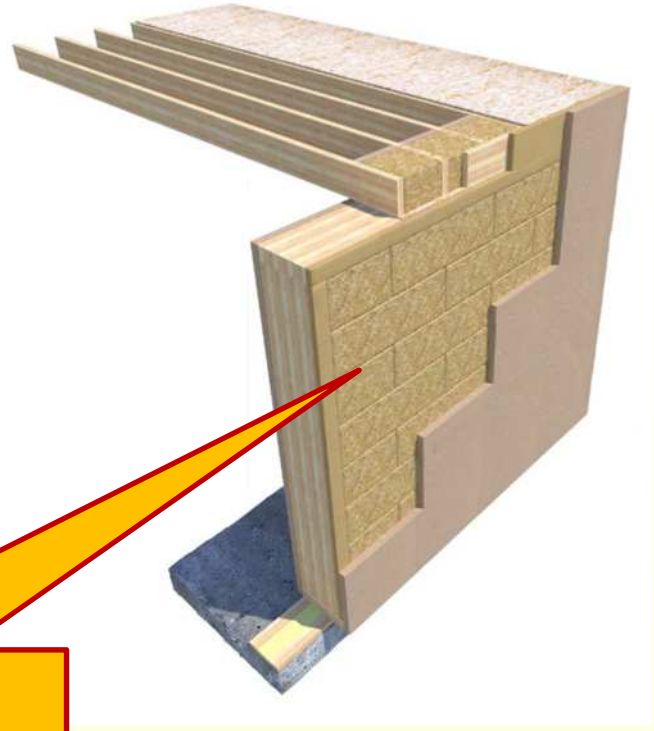
Mineral wool 040



Cost of insulating wall construction

Mineral wool 035, external wall construction





CERTIFIED COMPONENT
Passive House Institute

Opaque envelop
Opake
Gebäudehülle

Insulation from the fields:
1st certified building system with Straw bales

modcell®
helping you build a more sustainable future

OUTSTANDING SOLUTIONS: STRAW BALE

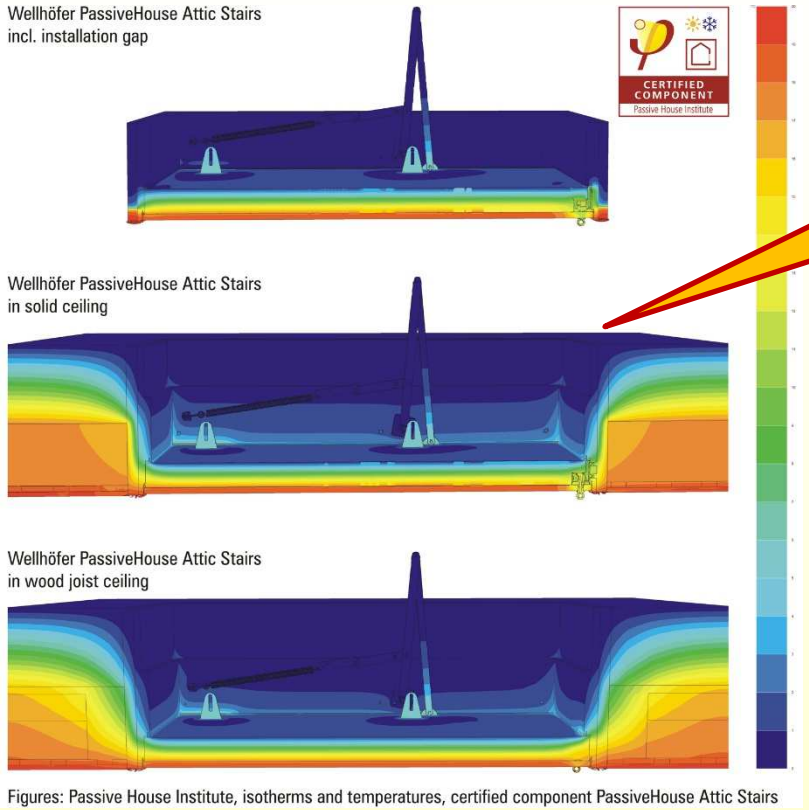
Story of success: Certified components 2014

COMPONENT CERTIFICATION
Passive House Institute

Wellhöfer Treppen GmbH: Passivehouse Attic stairs

First certified attic staircase

- U_D = 0,77 W/(m²K)
- $U_{D,installed}$ < 1,10 W/(m²K)



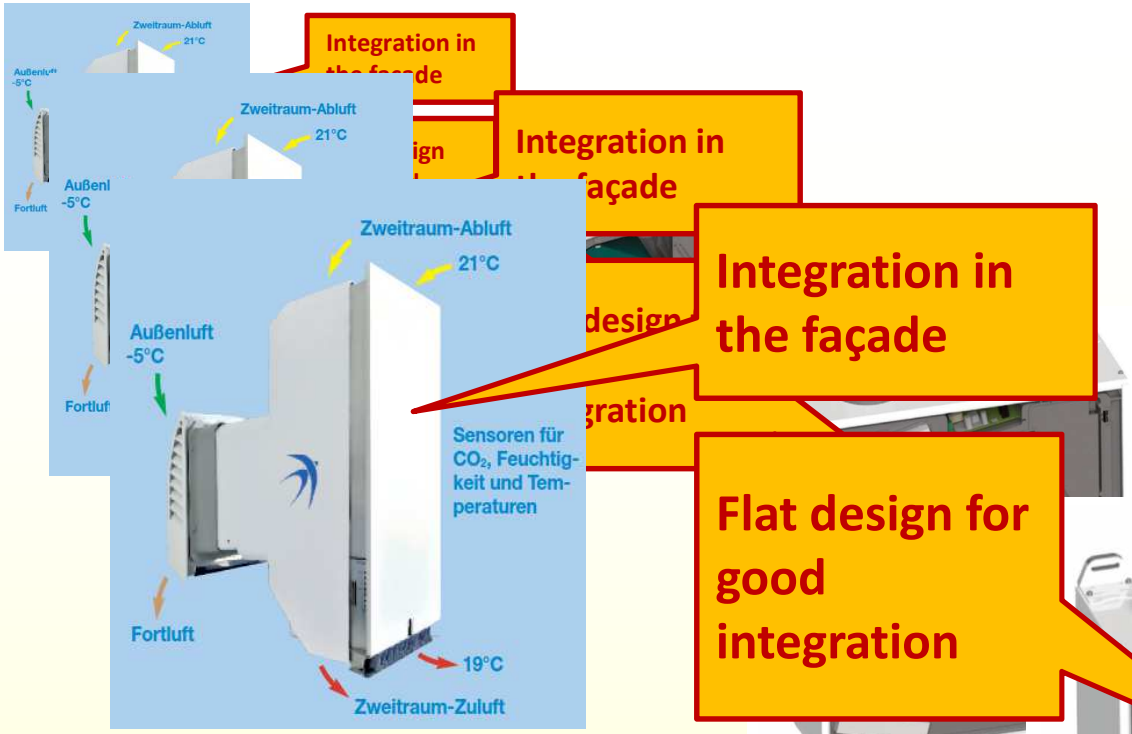
Figures: Passive House Institute, isotherms and temperatures, certified component PassiveHouse Attic Stairs

Passive House Attic Stairs
CERTIFIED COMPONENT
Passive House Institute
wellhöfer

Chances for Small Businesses

Story of success: Certified components 2014

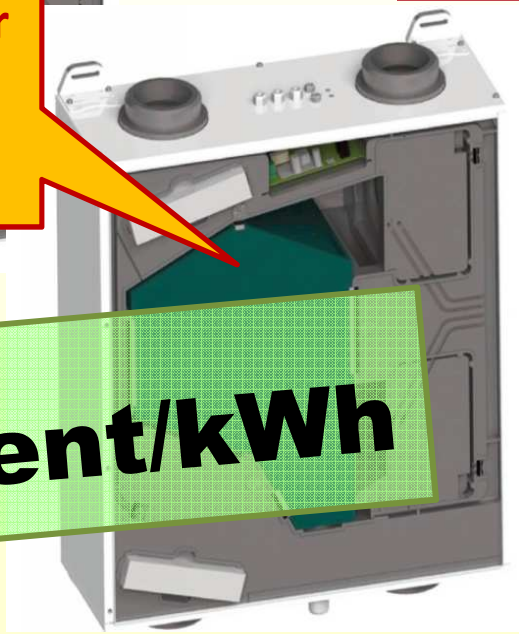
COMPONENT CERTIFICATION
Passive House Institute



Integration in the façade

Integration in the façade

Flat design for good integration



some 8 €Cent/kWh

CERTIFIED COMPONENT
Passive House Institute

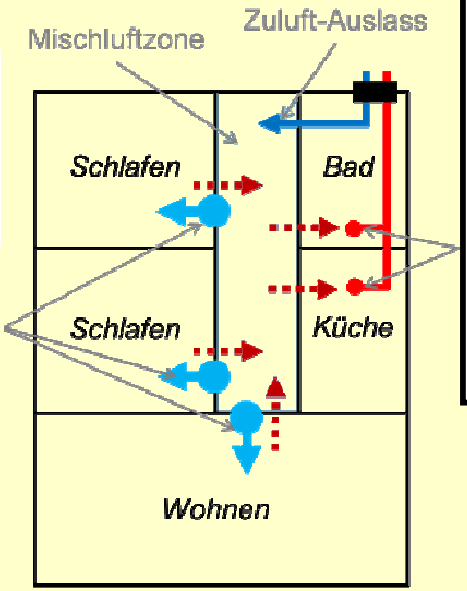
Building service
Gebäude-technik

VENTILATION heat recovey units

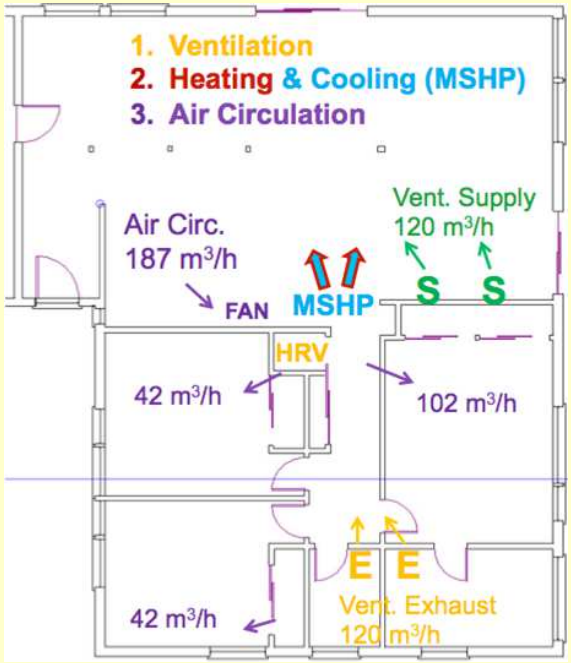
COMPONENT CERTIFICATION
Passive House Institute

Heating- and Cooling-Systems for Passive Buildings

- ✓ Möglichst einfache und platzsparende Lösungen gefragt
- ✓ → Kompaktgeräte
- ✓ Art der Wärmeverteilung egal
- ✓ Kleine Heizkörper, kurzes Verteilnetz, Zuluftheizung, Überströmer, eine Decke aktivieren



Elisabeth Sybille AG 9



Allen Gilliland AG 9

Keep it simple, stupid

Passive House - Components

- exeptional better energy efficiency: pays off for the whole investment
- But also: better thermal Comfort,
- Improved Connections
- regional production – can be done everywhere
- No limited ressources, sustainable
- Already now attractive to substitute fossil fuels

EASME
Executive Agency for SMEs

Univ.-Prof. Dr. Wolfgang Feist
Universität Innsbruck und Passivhaus Institut

Design a Passive House in 3D!

Passivhaus Institut

Passive House Institute

1. setup Sketchup and *designPH*

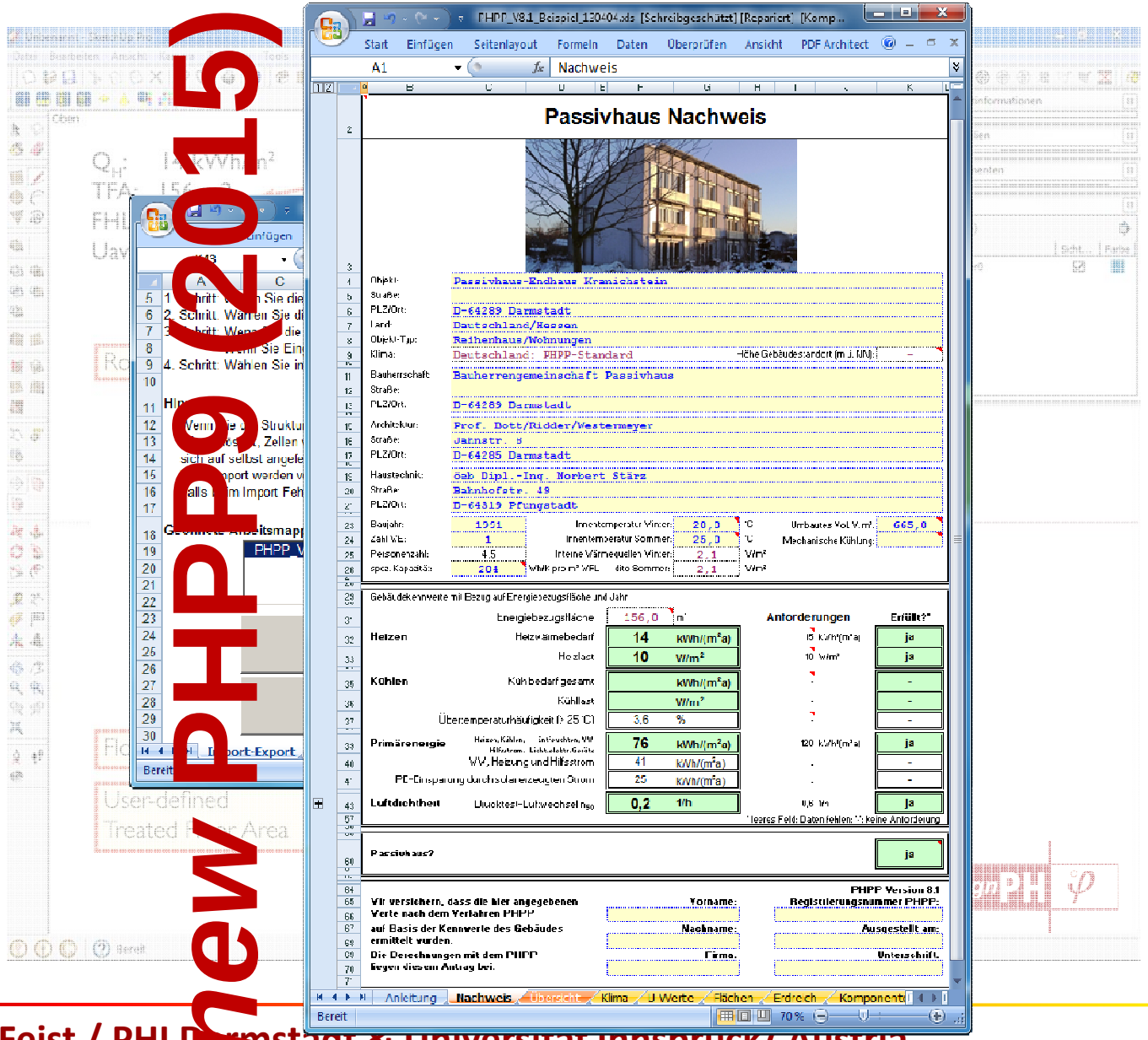
2. draw your project as usually

3. automatic recognition of temperature zones building elements and area groups

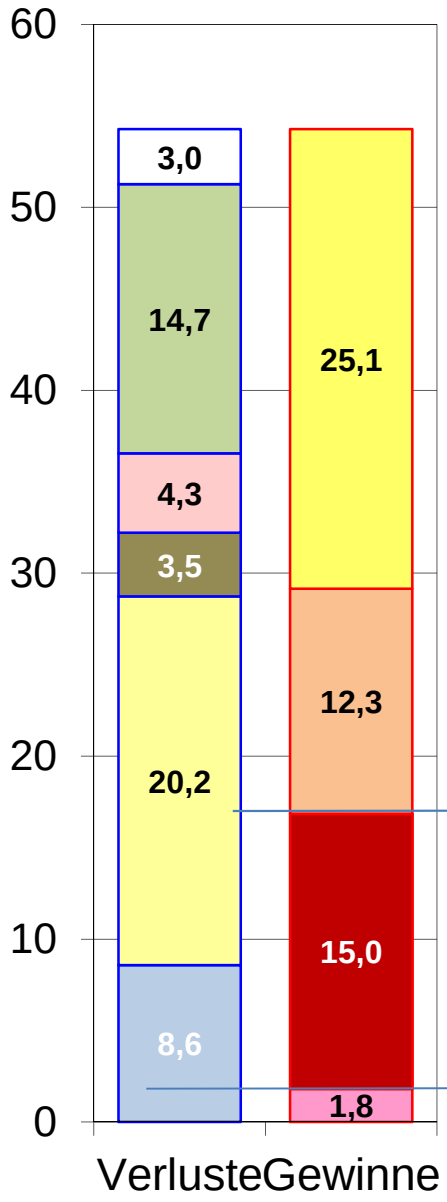
4. import data into PHPP

5. finetunig data in **PHPP**

designPH

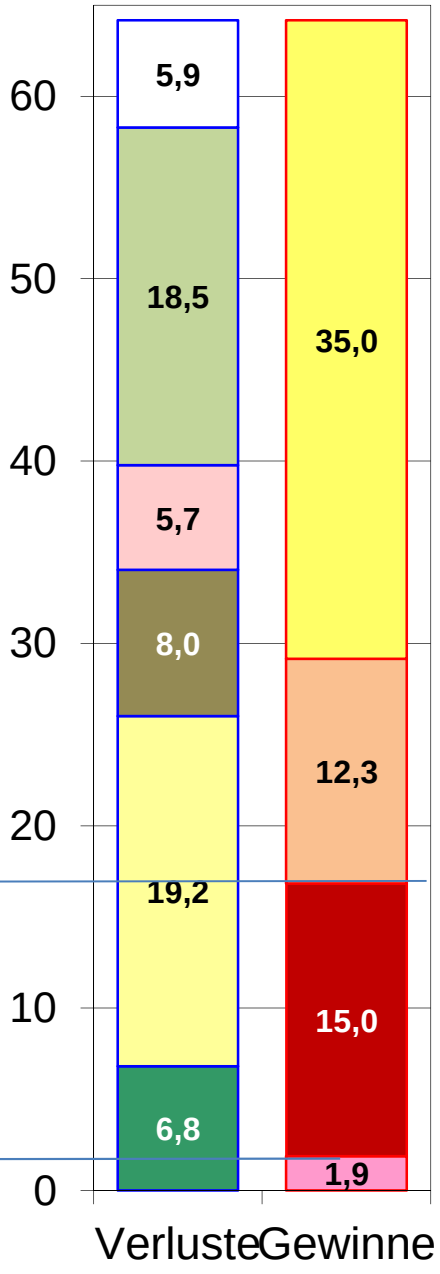


Heating Energy Balance (kWh/m²a)



Passive House, 1999

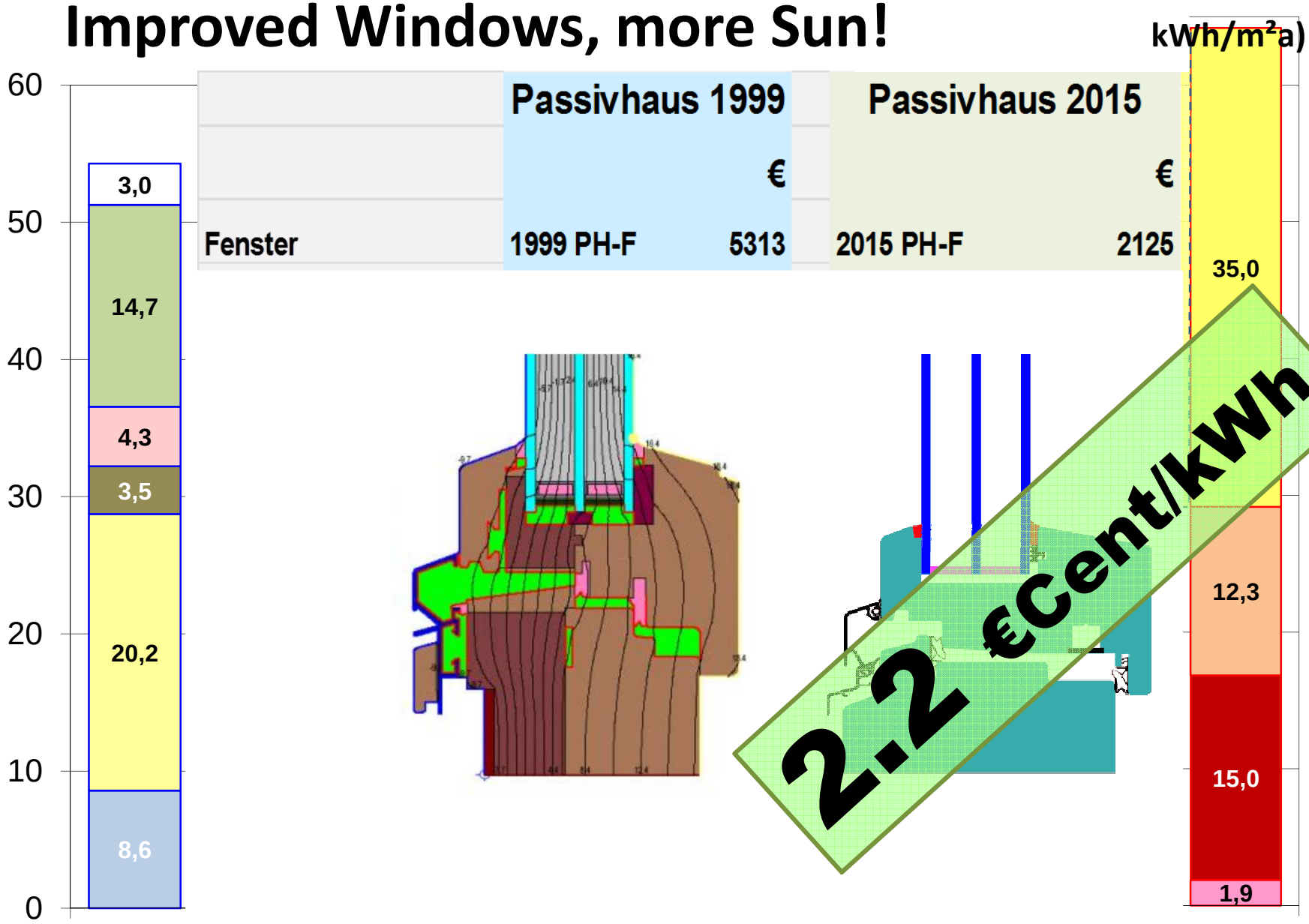
Equal annual heating requirement: 15 kWh/(m²a)



Passive House, 201

Improved Windows, more Sun!

	Passivhaus 1999		Passivhaus 2015	
		€		€
Fenster	1999 PH-F	5313	2015 PH-F	2125

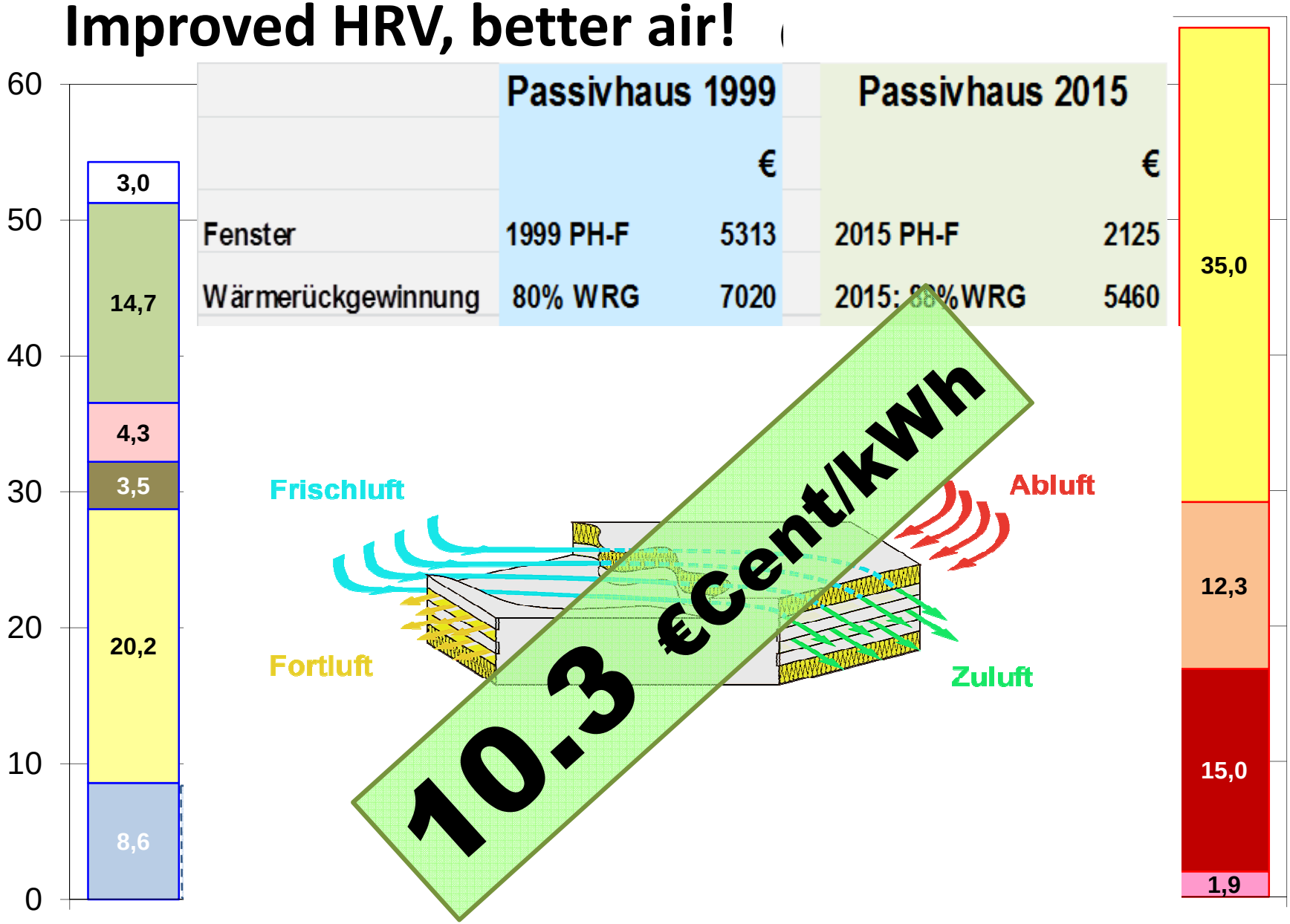


Passivhaus, 1999

Passivhaus, 2015

Improved HRV, better air!

	Passivhaus 1999		Passivhaus 2015	
		€		€
Fenster	1999 PH-F	5313	2015 PH-F	2125
Wärmerückgewinnung	80% WRG	7020	2015: 88%WRG	5460

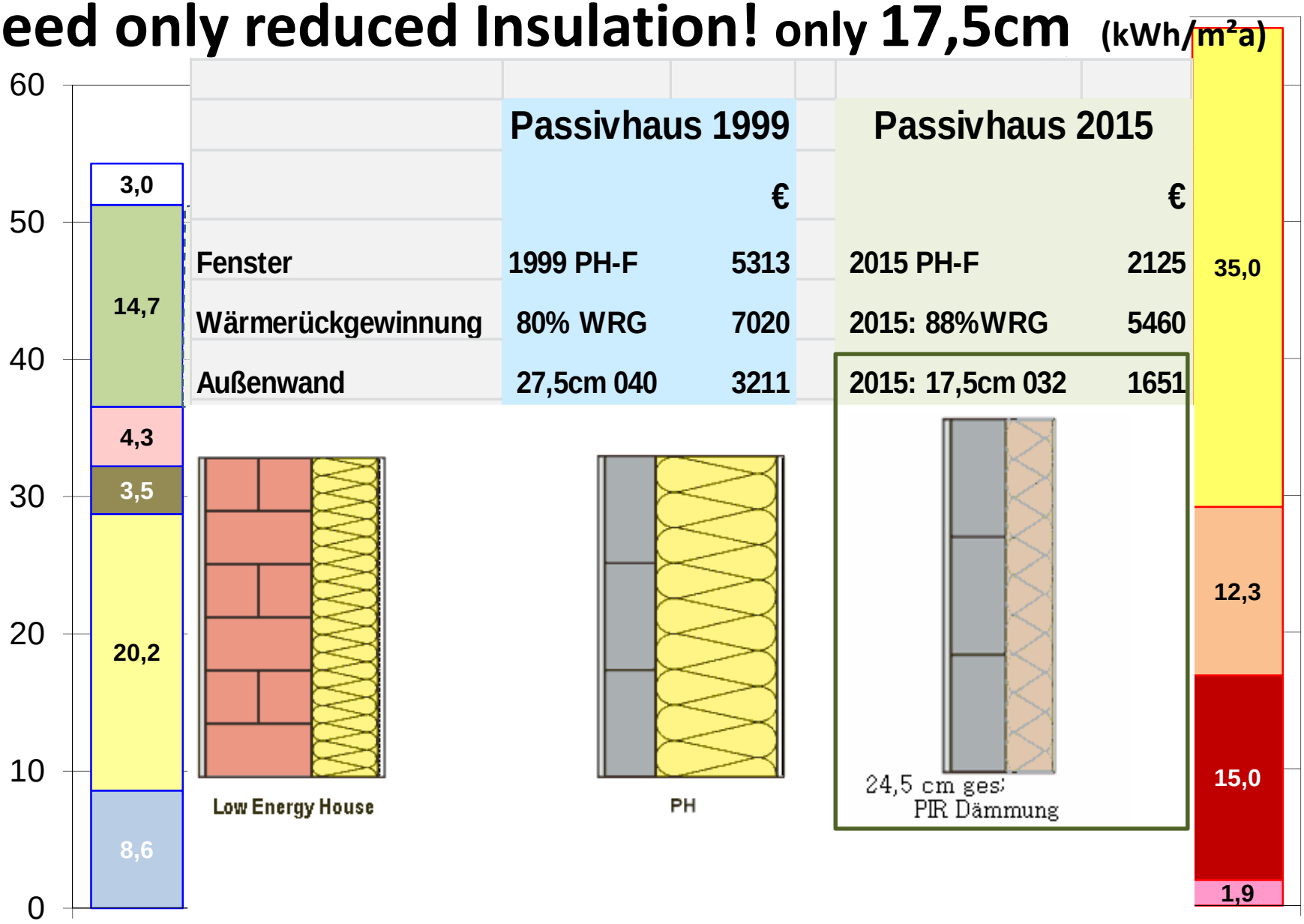


Passivhaus, 1999

Passivhaus, 2015

Need only reduced Insulation! only 17,5cm (kWh/m²a)

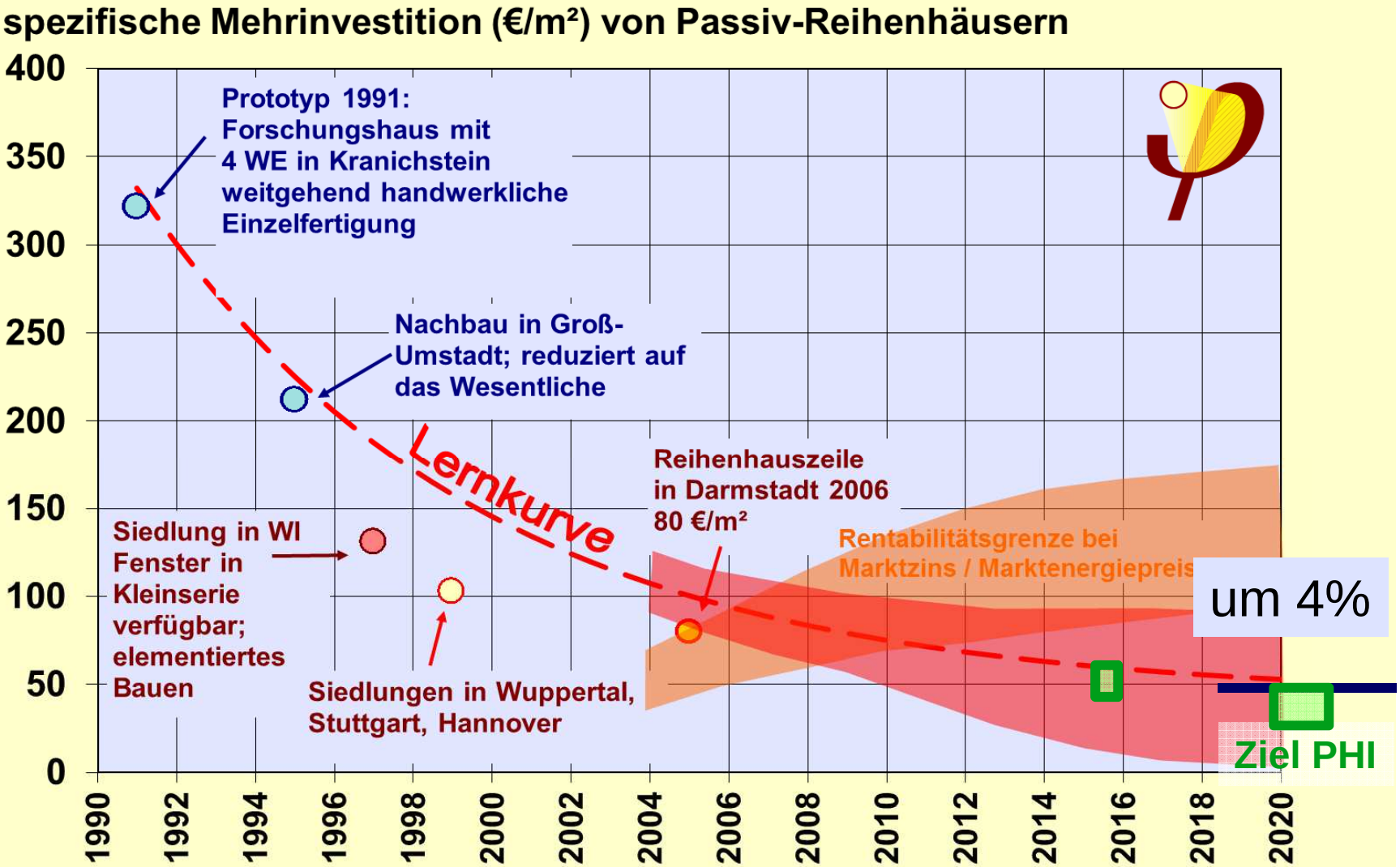
	Passivhaus 1999	€	Passivhaus 2015	€
Fenster	1999 PH-F	5313	2015 PH-F	2125
Wärmerückgewinnung	80% WRG	7020	2015: 88%WRG	5460
Außenwand	27,5cm 040	3211	2015: 17,5cm 032	1651



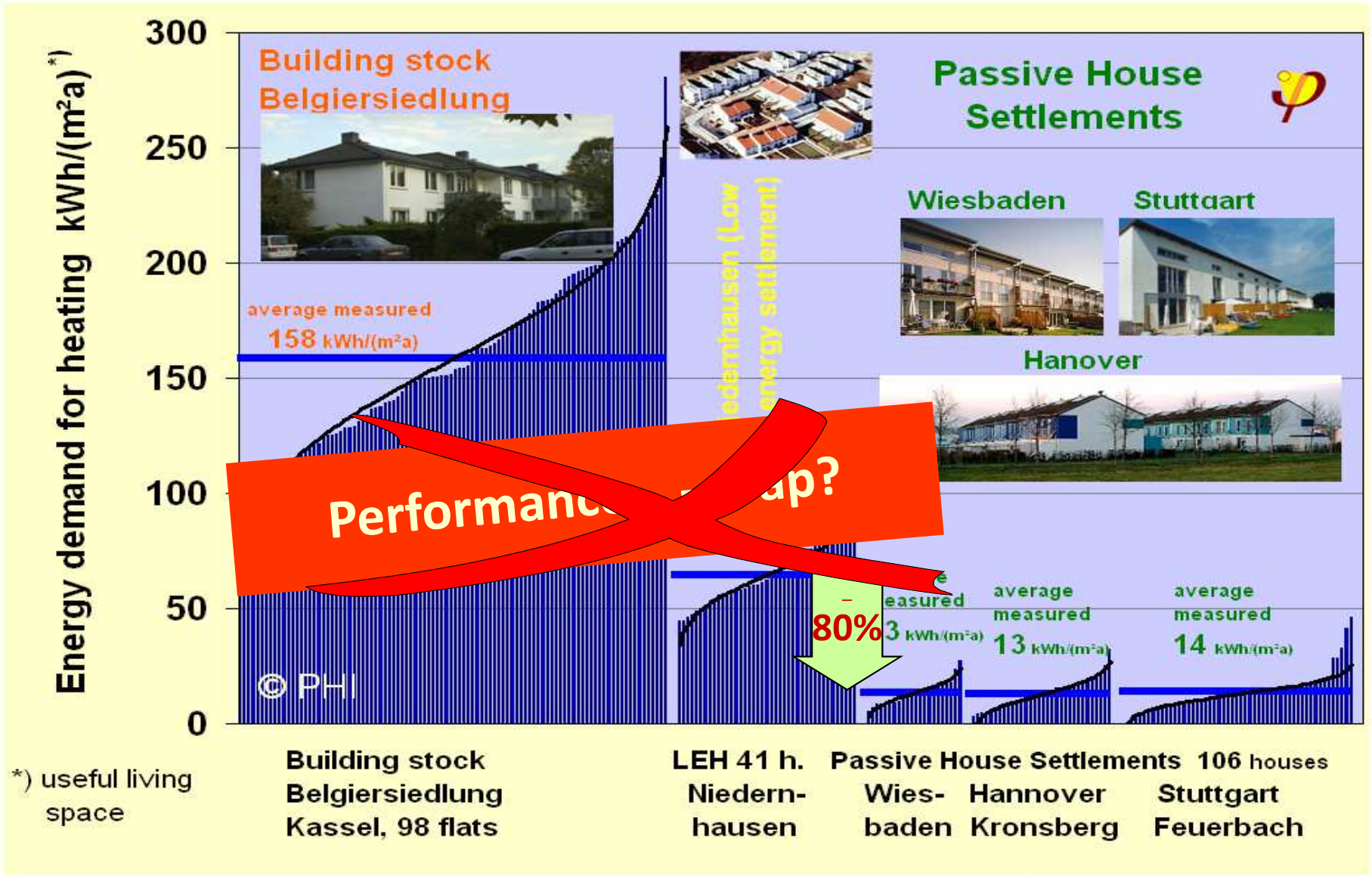
Passivhaus, 1999

Passivhaus, 2015

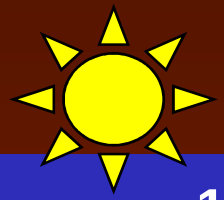
Learning curve

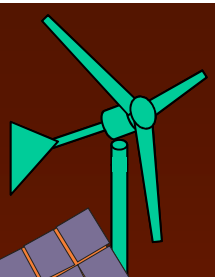


Umsetzung| *zuverlässig niedriger Heizenergieverbrauch*

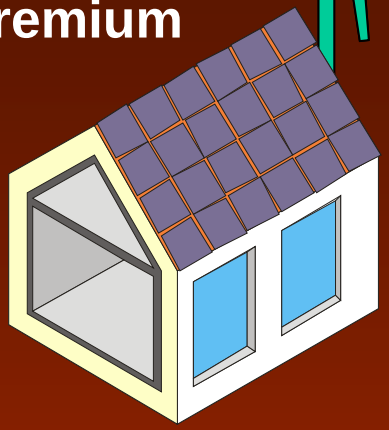


New Passive House Categories





premium

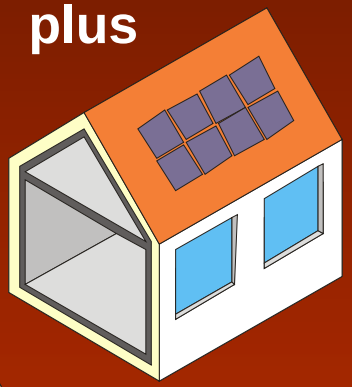


120

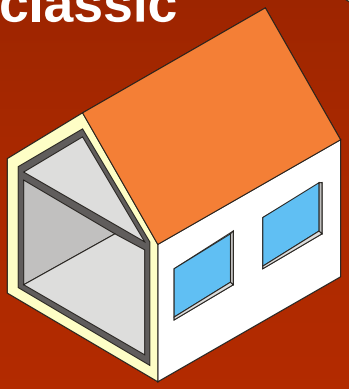
Energy Generation
$[kWh_{PER}/(m^2_{ground}*a)]$

60

plus



classic



30

45

Energy Demand
$[kWh_{PER}/(m^2_{tfa}*a)]$

60

Efficiency and Renewables – The Dream Team

Passive Houses all Around the Globe













19TH INTERNATIONAL PASSIVE HOUSE CONFERENCE 2015

Congress-Center Leipzig

17-18 April, 2015

with exhibition and framework programme

(15 – 19 April 2015)

Passivhaus Institut

IG PASSIVHAUS
Informations-Gemeinschaft Passivhaus Deutschland

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www.passivehouseconference.org