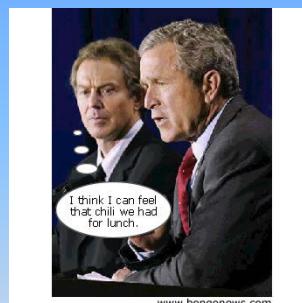


Passivehousing in Denmark! Isn't it about time?



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Seite 3

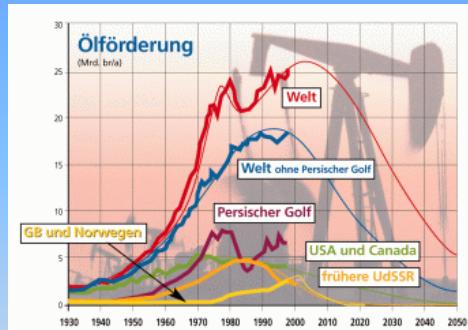


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Passive Houses in
Denmark?

Isn't it about time?

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**1 - Litre - Car:
April 2002**

80% less energy than normal cars

**1991: Passivehouse
= 1- Litre-House**

Uses 90% less energy than normal houses

- verifiable**
- comfortable**
- affordable**



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What is a Passive House?



A passive house is a building with such a low heat load that it can be heated by the anyway existing ventilation system.

Criteria 1: annual heat demand (requirement).
 Energy used for space heating is 15 kWh/(m² a)
 (normally 180!)

Criteria 2: heat load of the building is less than 10 W/m² (normally 100!)
 So the building is comfortable in the worst weather possible. The ventilation system must be able to heat the house. (max. 52 °C)

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What is a Passive House?

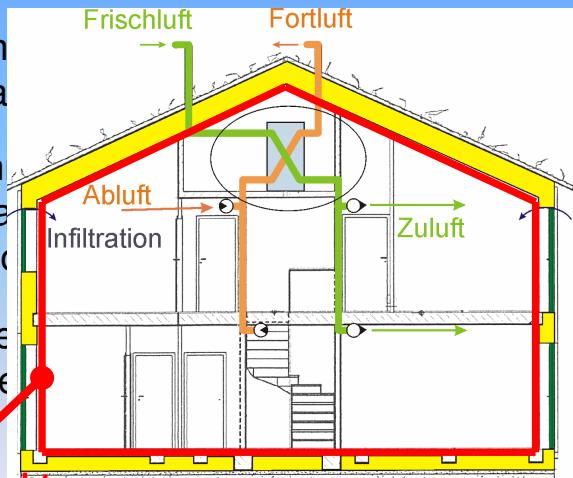


Criteria 3: primary energy demand
120 kWh/(m² a)

Criteria 4: Summer temperature (inside temperature less than 10% different from outside)

Criteria 5: Excellent air tightness
Blower Door Test

air tight construction (pen method)



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How to achieve a passive house?

Very good walls (U-value 0.1 – 0.15 W/(m² K)).

Compact building form (surface area to volume ratio)

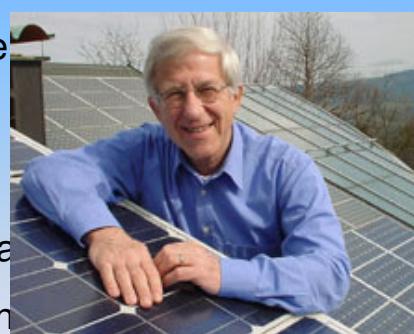
Very low thermal bridging

Excellent air-tightness

Thermally efficient glass and frame

Very good heat recovery with the

A good facing to the sun

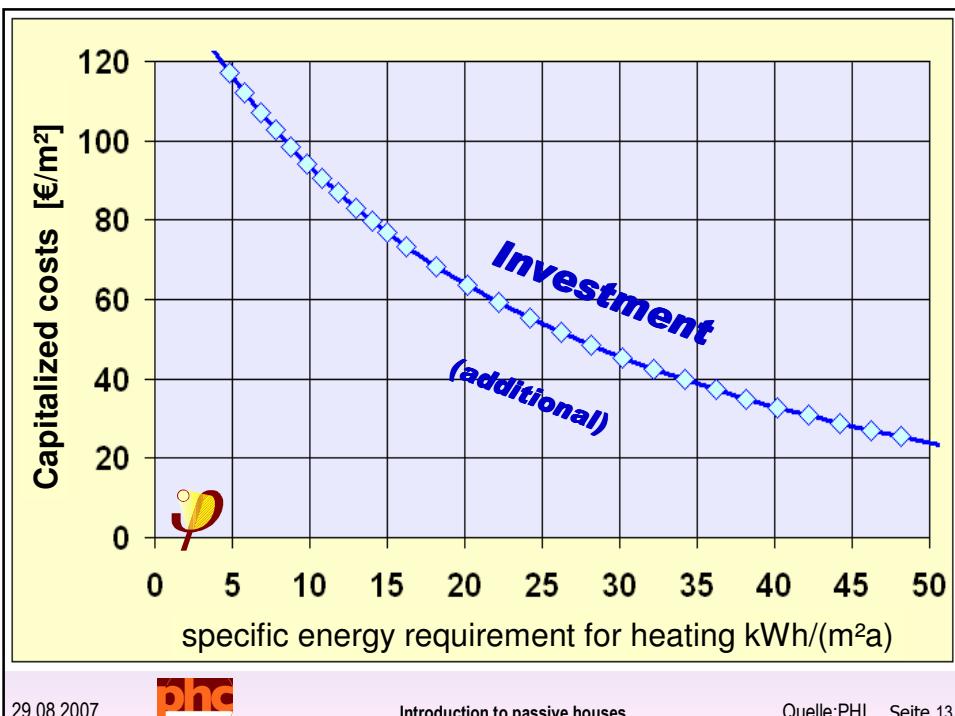


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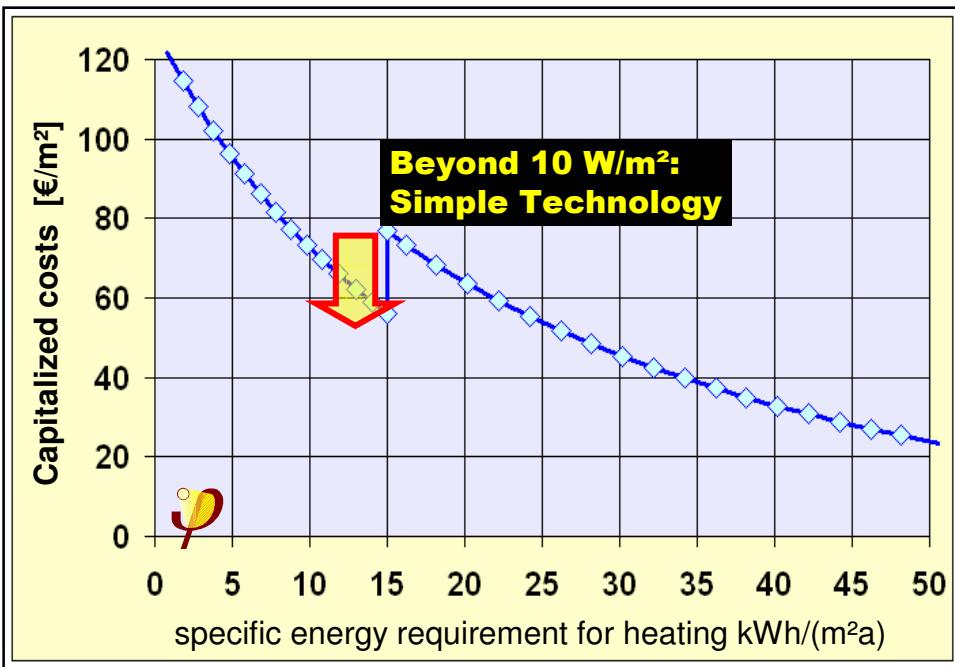


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Quelle: PHI Seite 13

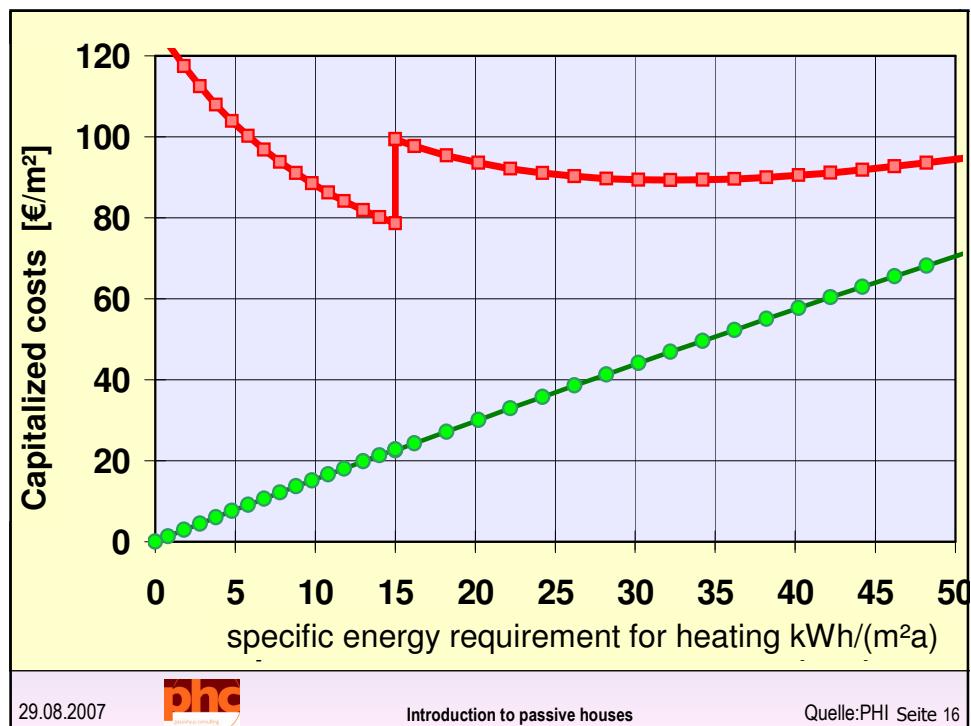
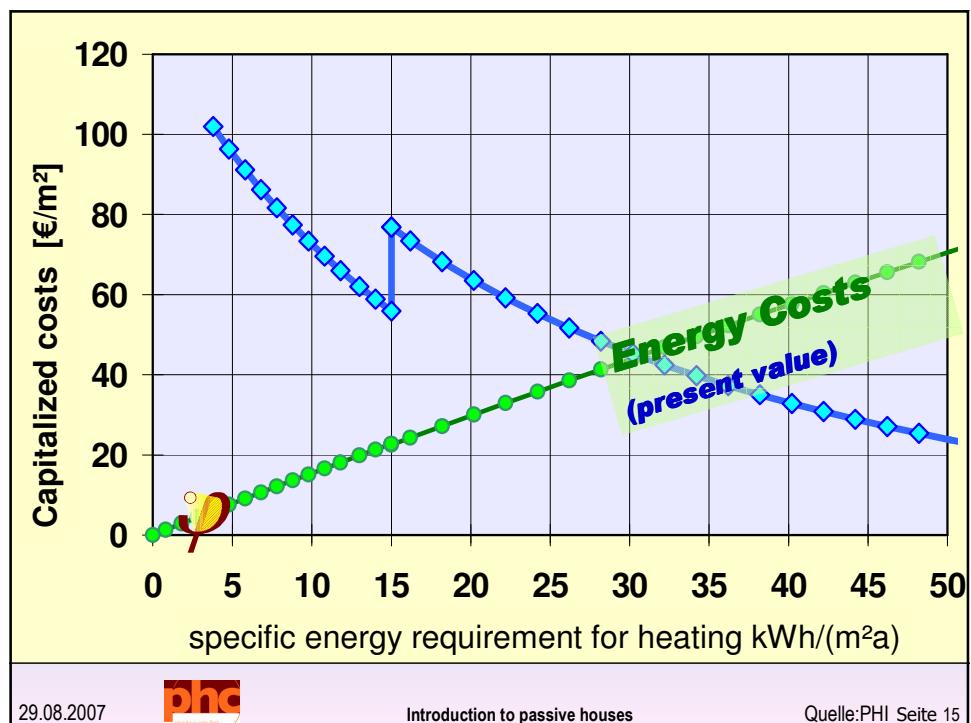


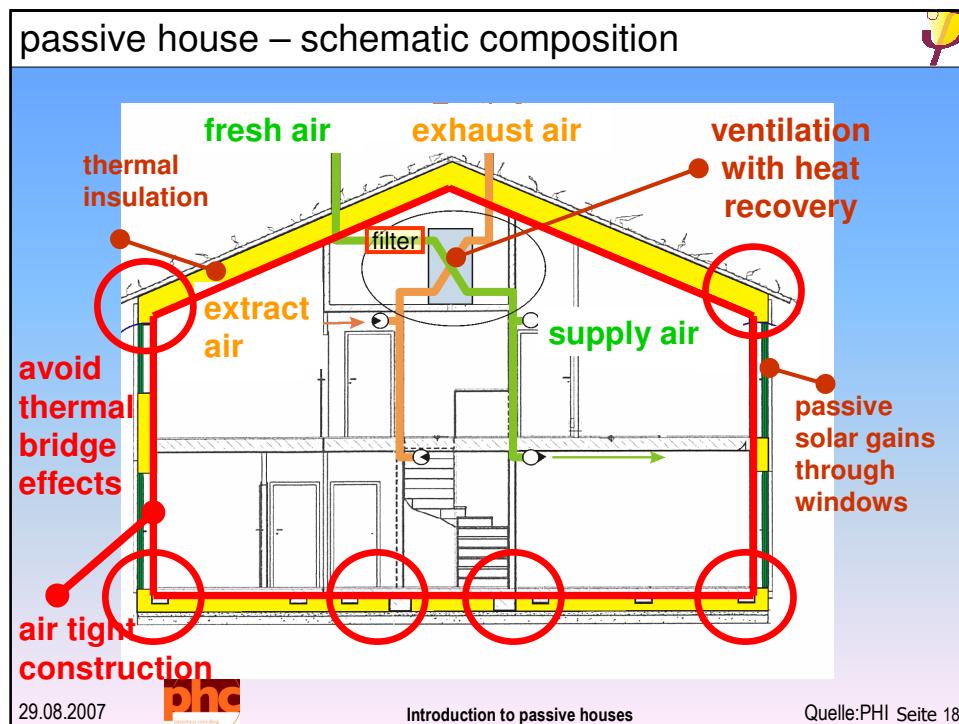
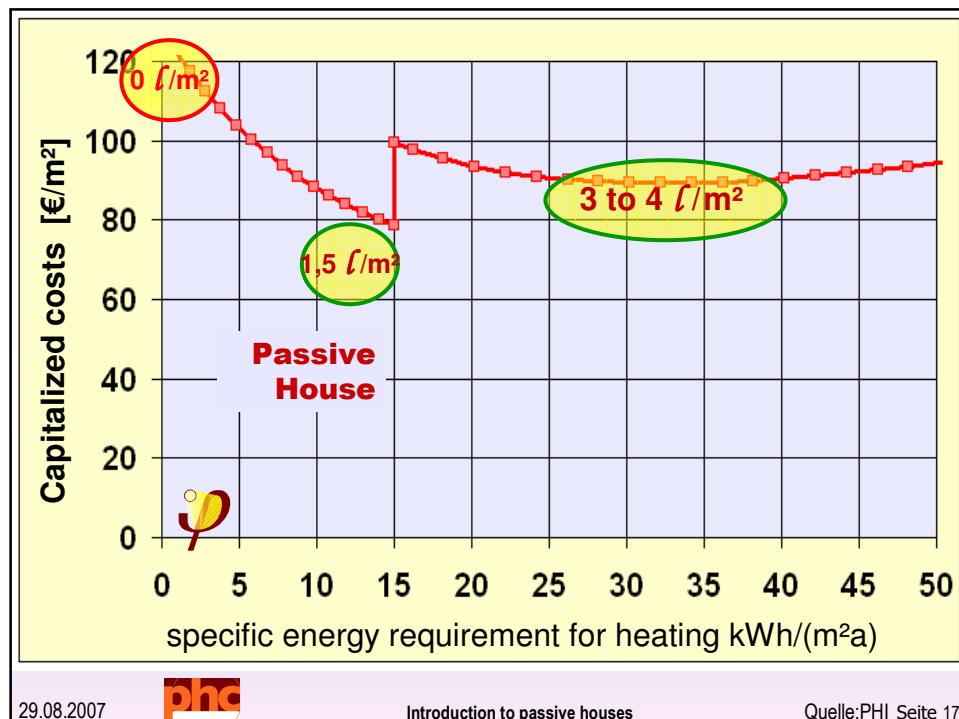
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Quelle: PHI Seite 14





Out of Nansens diary:
 Ventilation, insulation,
 air tight layer,
 tripple glazed windows
 „I think about leave out
 the stove. It only bars
 the way.“



Passivehouse in the year 1893
"Fram und Eis. Die norwegische Polarexpedition", Leipzig 1893

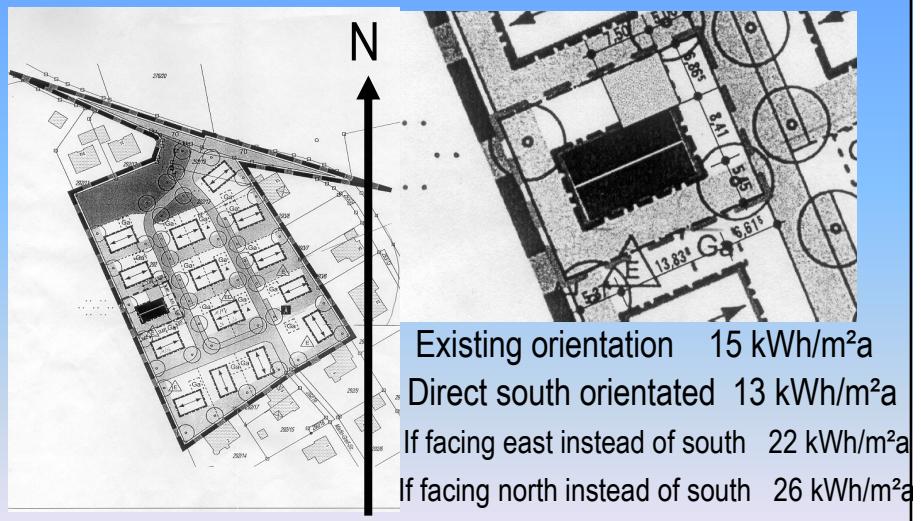
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The importance of facing to the sun!



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Building without thermal bridges



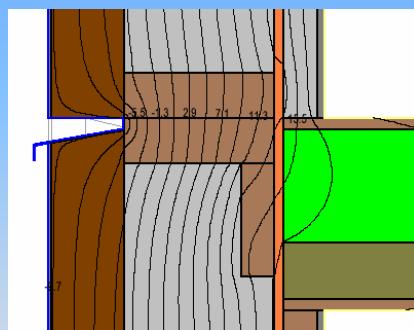
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Nobody should be imprisoned – even the energy???



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Cosiness: Radiation temperature - Asymmetric



Living room



- 10°C
outside air

22°C
inside

Living room:

In a new building?

In a rehabilitated old building?

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Quelle: Helmut Krapmeier Seite 23

Cosiness: Radiation temperature - Asymmetric



Old building



- 10°C
outside air

Cold surfaces on components by old buildings belong to a big temperature asymmetric.

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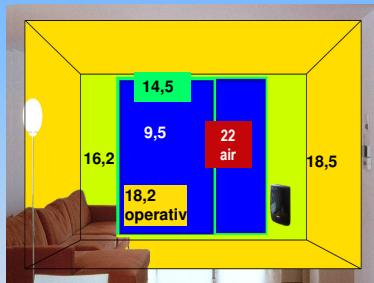
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Quelle: Helmut Krapmeier Seite 24

Cosiness: Radiation temperature - Asymmetric



Old building



Passive House



Cold surfaces on components by old buildings belong to a big temperature asymmetric.

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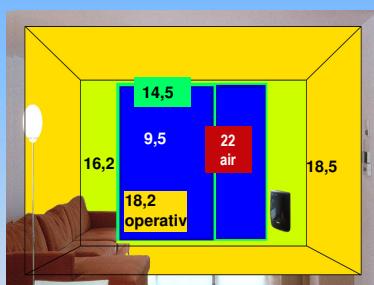
Introduction to passive houses

Quelle: Helmut Krapmeier Seite 25

Cosiness: Radiation temperature - Asymmetric



Old building



Passive House



Cold surfaces on components by old buildings belong to a big temperature asymmetric.

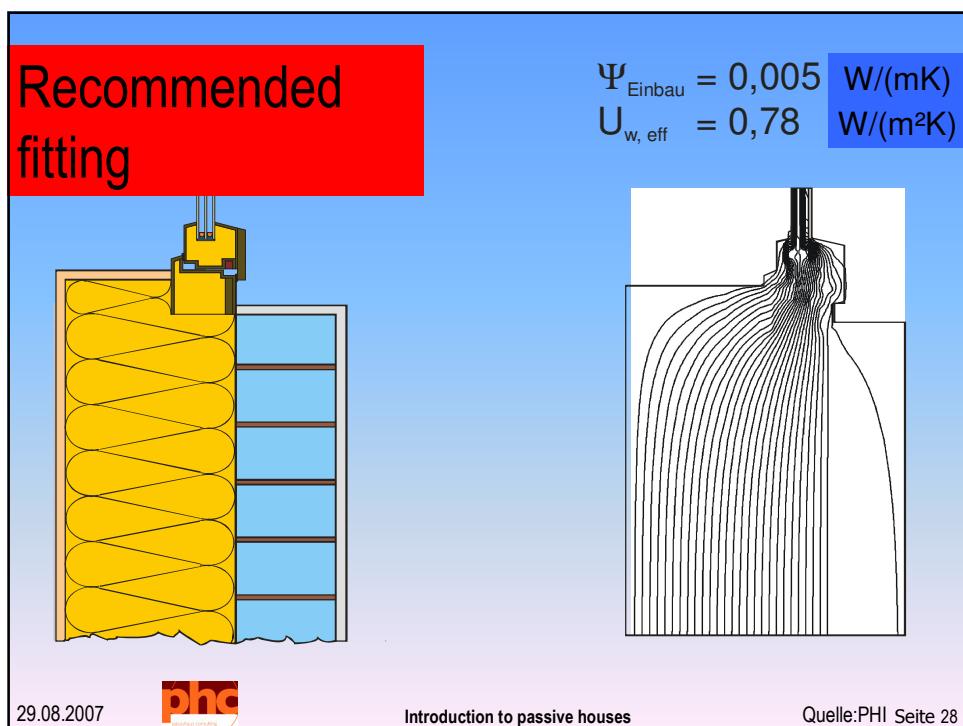
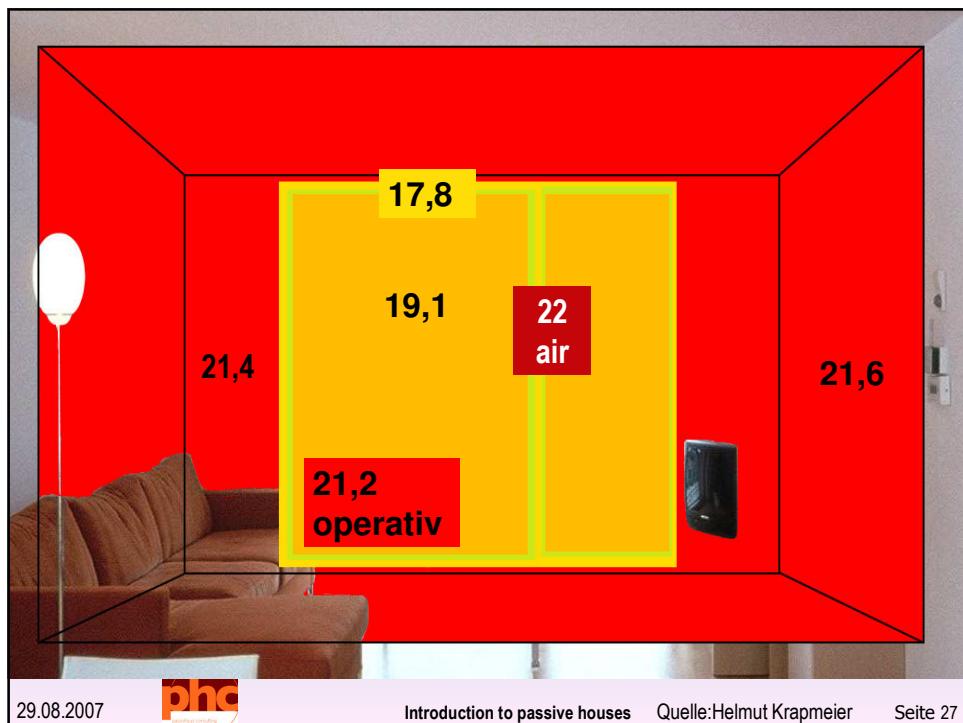
Different in Passive Houses: All walls and also the windows have nearly the same temperature. An excellent radiation climate.

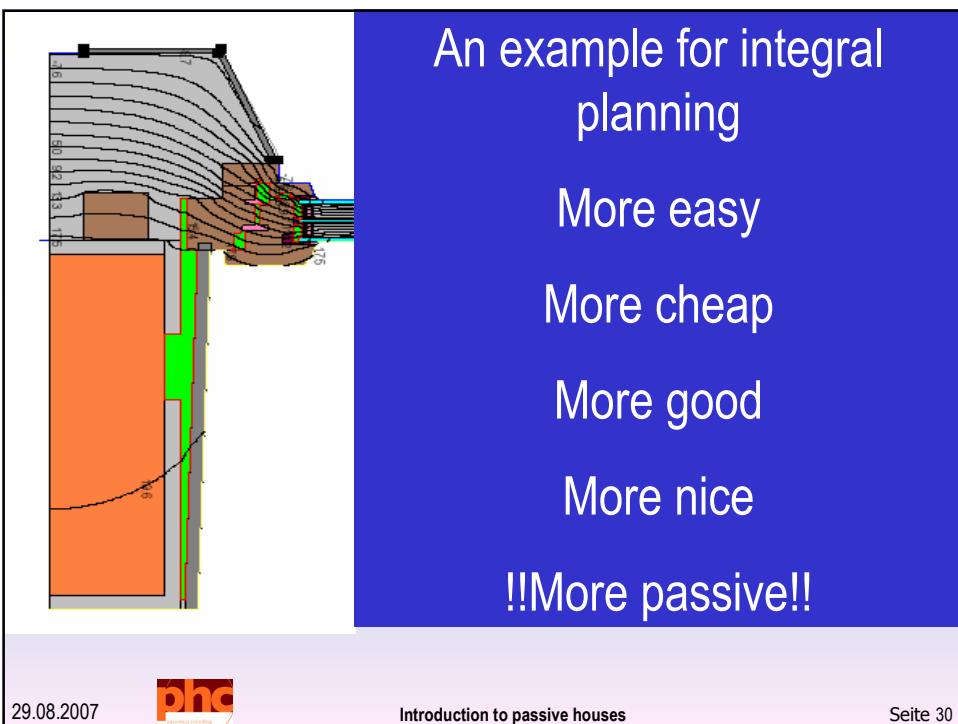
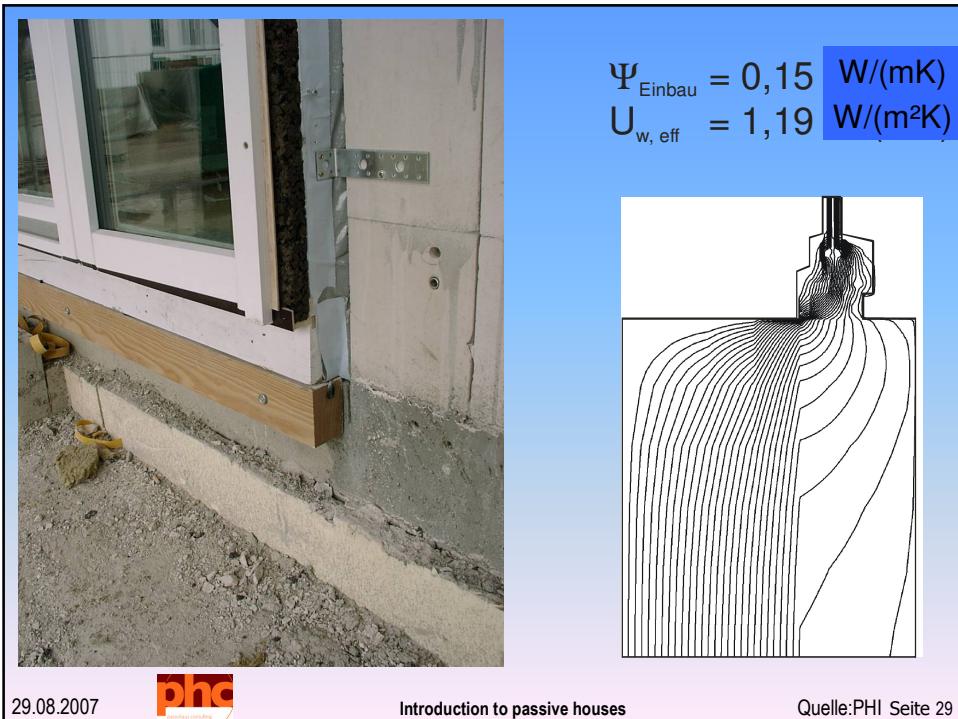
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Quelle: Helmut Krapmeier Seite 26





The additional costs of a PH at the example of the windows

Costs of the fitted windows

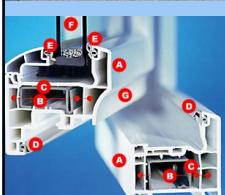
+

Credit for energy consumption of the windows
over 30 years

=

Defacto cost at the day of the fitting

This house with normal PVC-windows



Heat requirement
42kWh/m²a

Credit for energy
consumption of the
windows over 30
years:

7.050,- €

Assumption: 8 cent/kWh
incl auxiliary and real interest
rate of 4%
325.41 euros

Costs of the
fitted
windows:

9.676,- €

48.38m² windows
200,- € pro m²

Defacto costs
with energy

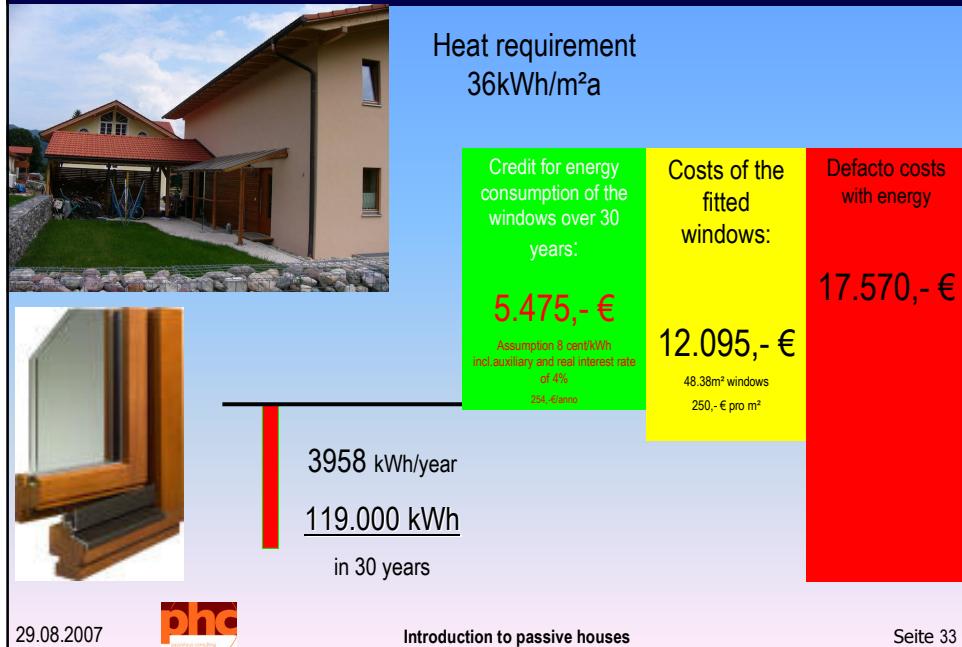
16.726,- €

5095 kWh/year

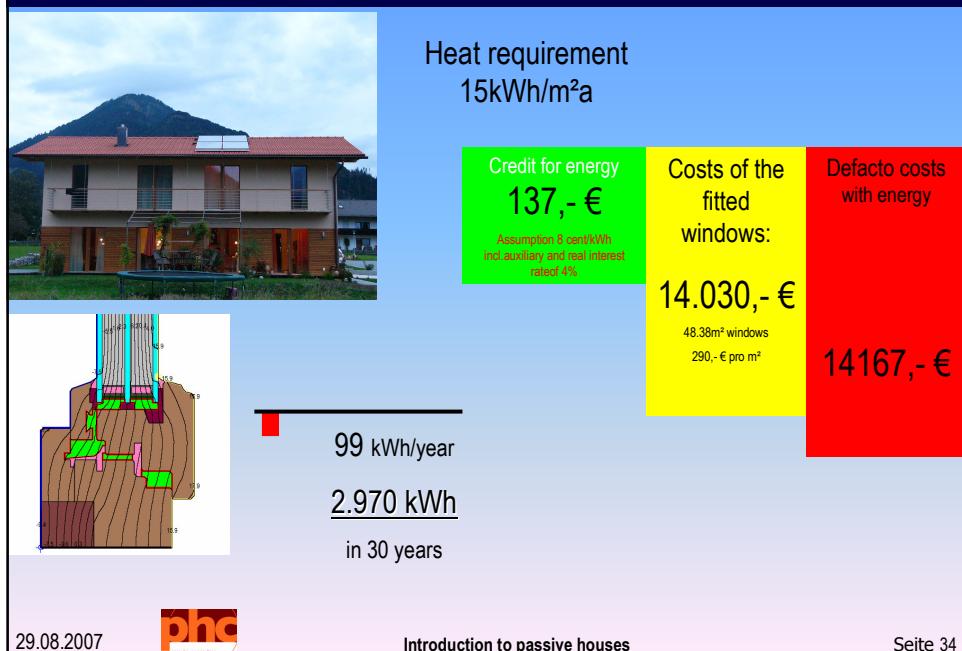
153.000 kWh

in 30 years

The same house with normal wood windows



The house with PH windows (certified fitting connection)



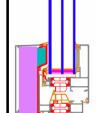
resume:

This passive house windows are at least

25% cheaper than „cheap“ PVC windows.

There are three groups of certified windows

The synthetic



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Coming from nature

nature
is
easy
true
and
nice

The agglutinated

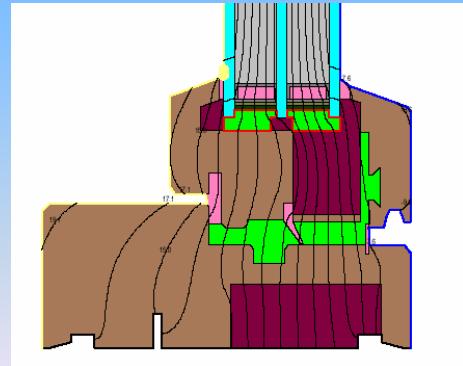


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..and what's going on with outside opening passive house windows??

Do you need them???



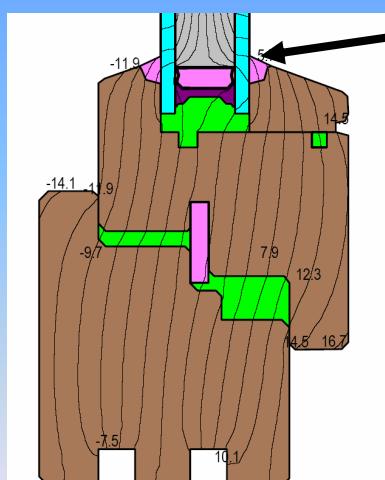
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Condensed water interior or exterior?



Below an U_g value of $1,0 \text{ W/m}^2\text{K}$
we have sometimes condensed
water on the outside of the pane.

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Use PHPP to avoid summer overheating!

Specific requirements with reference to the treated floor area.			
Treated Floor Area:	165,23 m ²	Applied:	Annual Method
Characteristic Space Heat Requirement:	14 kWh/(m ² a)	PH Certificate:	met?
Pressurization Test Result:	0,40 h ⁻¹	15 kWh/(m ² a)	<input checked="" type="checkbox"/> <input type="checkbox"/>
Specific Primary Energy Requirement (DHW, heating, aux. & household electricity):	kWh/(m ² a)	0,6 h ⁻¹	<input checked="" type="checkbox"/> <input type="checkbox"/>
Specific Primary Energy Requirement (DHW, heating and auxiliary electricity):	kWh/(m ² a)	120 kWh/(m ² a)	<input type="checkbox"/> <input type="checkbox"/>
Specific Primary Energy Requirement Conservation by solar-generated electricity:	kWh/(m ² a)		
Heat Load:	11,4 W/m ²		
Frequency of Overheating:	0,0%	over	25 °C

Summer comfort is a planning task!

The glass area depends on the situation of the individual building.

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Fresh Air for Comfort – Look to nature



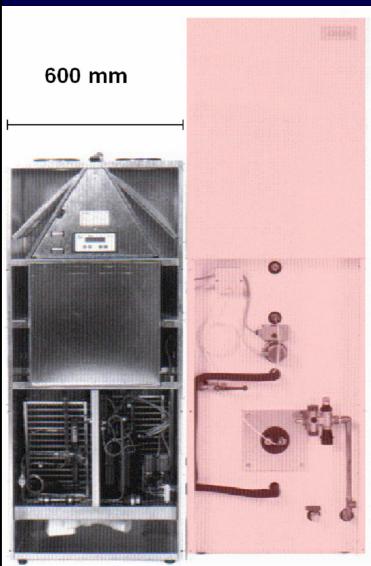
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Compact ventilation unit for passive houses



***One unit for
the entire
ventilation***

***Ventilation,
domestic hot
water and
space
heating.***



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And that is the difference

Energy autonomie

One family house
passivehouse 1
kWh/m²a
=> 1.5 m³ wood f
heating and dome
hot water /year



EU-Energiegipfel mit Putin
Freitag, 20. Oktober 2006 in Lahti, Finnland



Dependent on Putin

José Manuel Barroso, Jacques Chirac, Angela Merkel, Romano Prodi,
Tony Blair, Lech Kaczynski ... am Energiegipfel mit Putin

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CEPHEUS
cost efficient passive houses as european standards

CEPHEUS logo: A stylized orange and red graphic resembling a flame or a house outline.

Project locations and counts:

- Hannover: 32 Wohnhäuser
- Kassel: 60 Wohneinheiten
- Nebikon/Zürich: 17 Wohnhäuser
- Rennes: 40 Wohneinheiten
- Hörbeanz: 3 Wohnhäuser
- Wolfurt: 10 Wohneinheiten
- Dornbirn: 1 Feuerfeuerhaus
- Egg: 32 Wohneinheiten
- Göteborg: 20 Wohnhäuser
- Salzburg-Gnigl: 6 Wohneinheiten
- Steyr: 3 Wohnhäuser
- Horn: 1 Feuerfeuerhaus
- Hallein: 31 Wohneinheiten
- Kuchl: 23 Wohnhäuser

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CEPHEUS: Project in A - Hallein



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OFH Valletin; Biburg/Alling 2000



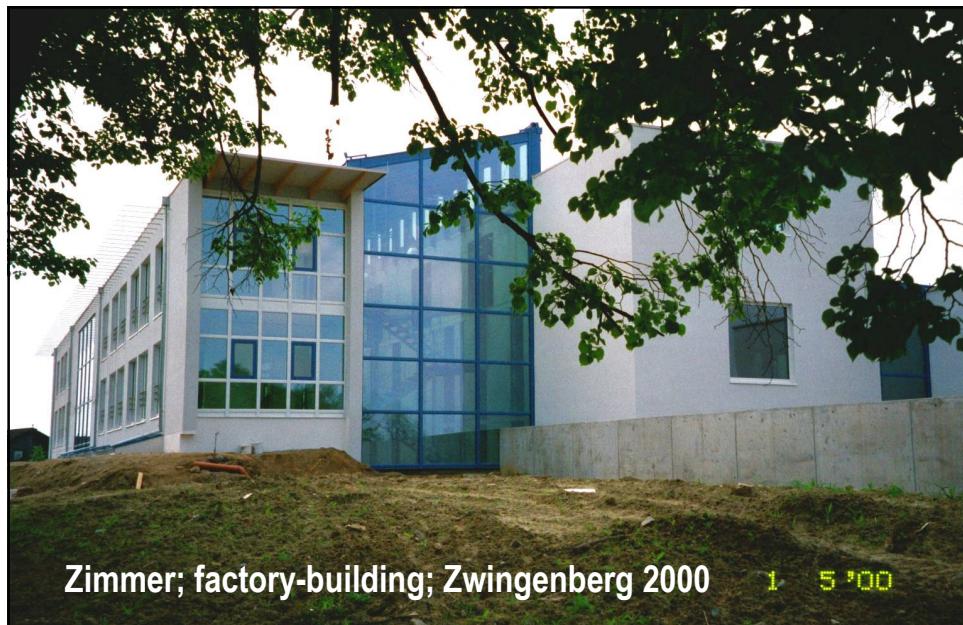
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Zimmer; factory-building; Zwingenberg 2000

1 5 '00

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Dalsant; Southern Tirol 2003

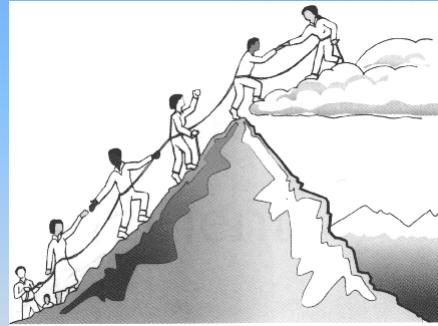
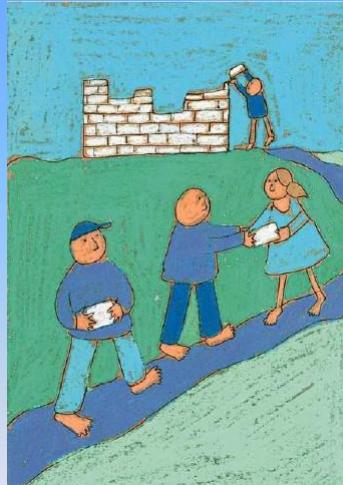
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Cooperation and networking



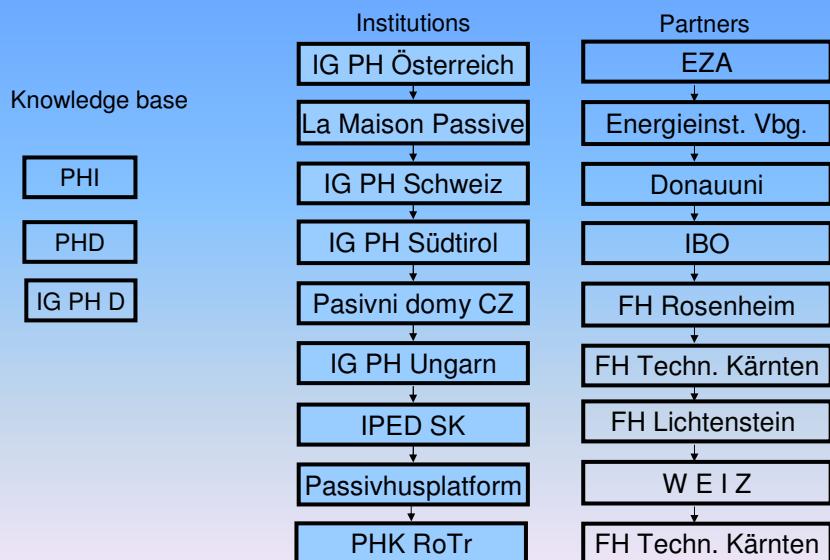
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Overview PH Scene

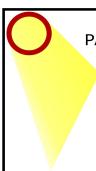


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Passive House circle as regional network in Germany



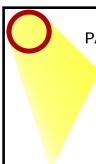
www.passivhauskreis.de

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The days of the Passive House 2006



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Internal meetings, touring exhibition and fairs



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IG Passivhaus Österreich
Netzwerk für Information, Qualität und Weiterbildung

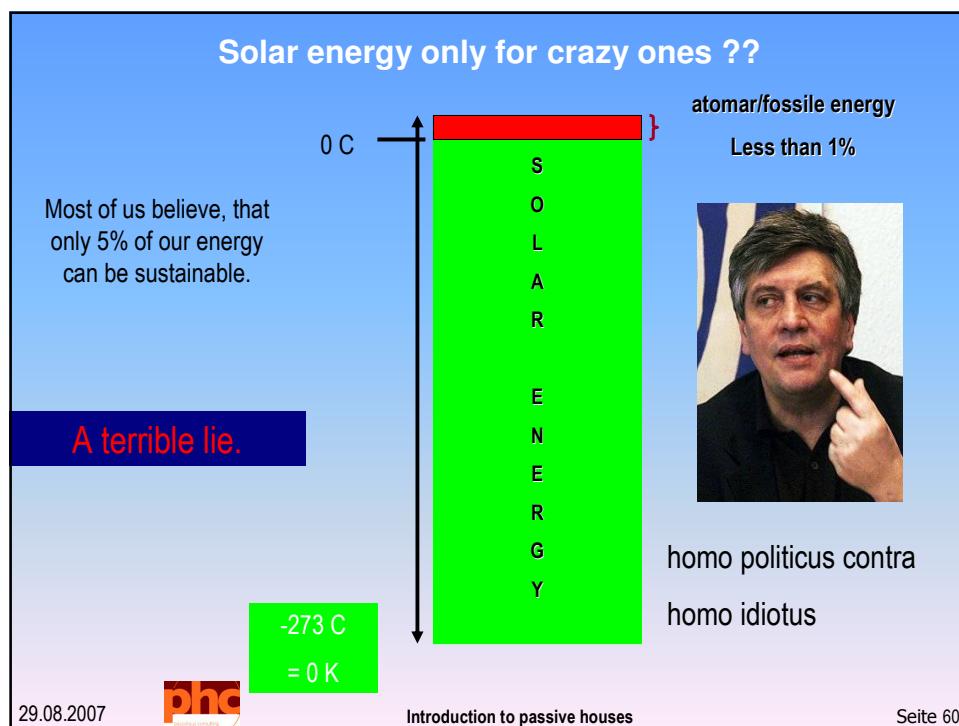
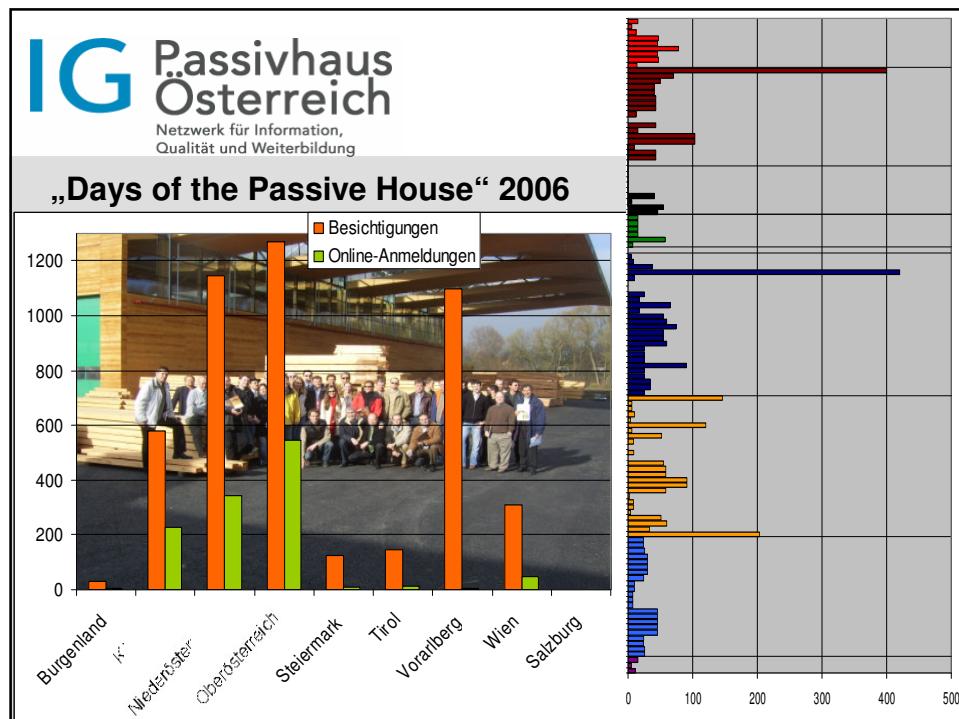


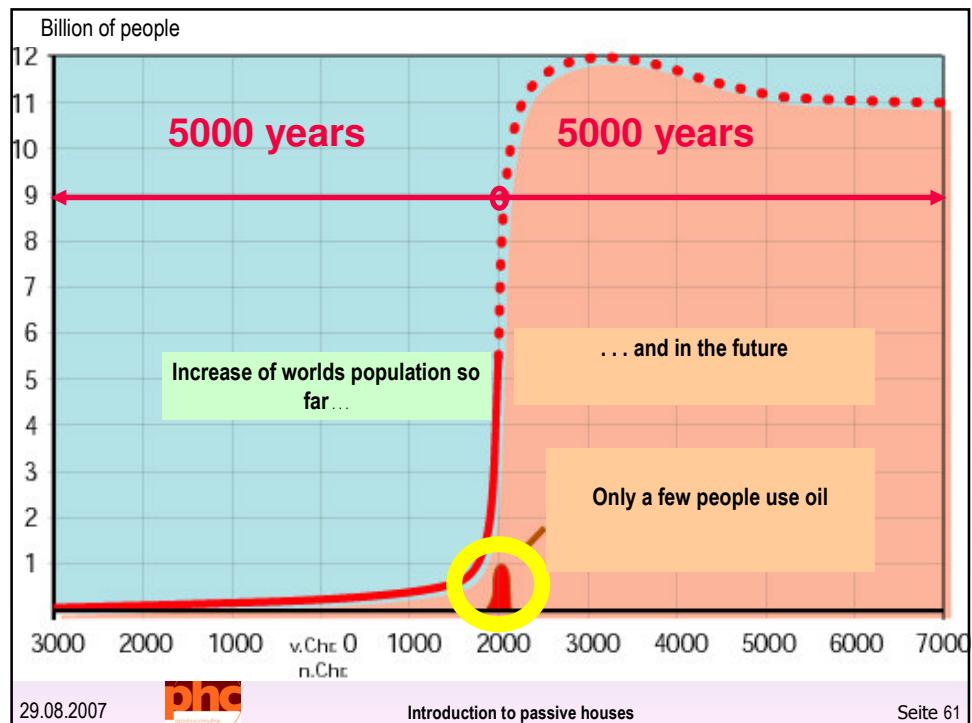
2006 4% des Neubauvolumens in Passivhausstandard
 <0,01% der Altbausanierung auf Passivhausstandard

2010 28% des Neubauvolumens in Passivhausstandard
 1% der Altbausanierung auf Passivhausstandard

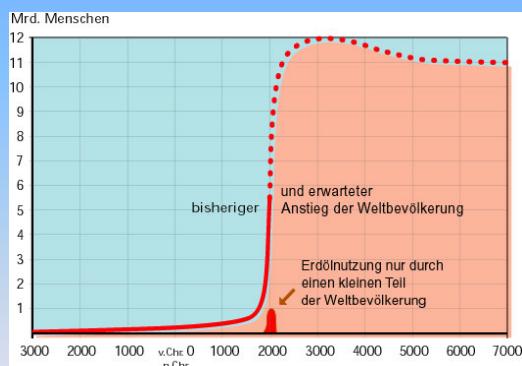
2016 98% des Neubauvolumens in Passivhausstandard
 10% der Altbausanierung auf Passivhausstandard







Energy Use is a Sign of How Inefficient a Country is



Every American citizen uses the amount of energy that would be produced by 110 humans.

One German needs 60

One Chinese 8

One Nepalese only one

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...How terrible...

... in the German and France forests alone, 46 million m³ of wood is left to rot each year.

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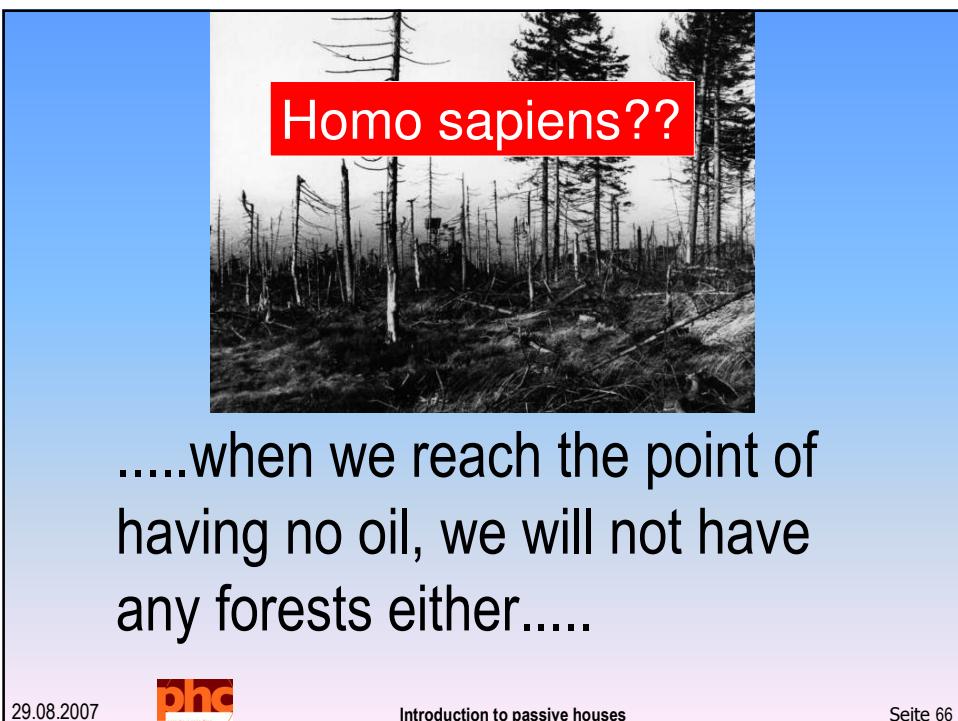
.....perhaps we must first
get rid of the oil.....

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.....when we reach the point of
having no oil, we will not have
any forests either.....

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The Oil-Saving Potential in Home Heating

. There are 15 billion m² of buildings in Germany and France to be heated

Currently, they need 18l/m² but it would be possible to reduce this to 1.5l/m²

=> Oil saving potential of 16.5 l/m²

■ This is equivalent to a 220,000 km channel of oil measuring 1m x 1m

This channel goes 6 times around the earth every year

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***The Passive House
is a big step in the
right direction
90% energy saving,
with up to 60% heated
by the sun***

- ***verifiable,***
- ***comfortable,***
- ***affordable***

***As long as a passive
house exists!***

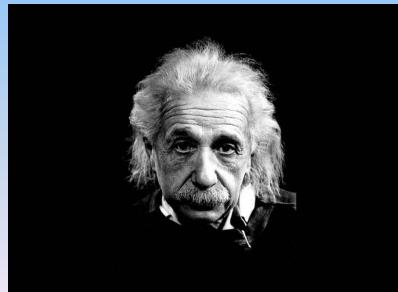
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A solution to the problems of every generation can only arise out of completely new thinking.



Albert Einstein

29.08.2007



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Seite 69

The sun brings 15,000 times more energy to us, than the 6 billion people need now.



Dr. Franz Alt

29.08.2007



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Let's go passive!

In Denmark!

It is time now!!!

**Passivehousing in Denmark!
It is time now!**

