



Smart buildings for Smart cities

Progettare una Passivhaus

Dr. Phys. Francesco Nesi



Progettare una Passivhaus

A cura di:
Francesco Nesi

**Zero Energy and
Passivhaus Institute
for Research**



ZEPHIR

Zero Energy and Passivhaus Institute for Research

Milano 20/10/2012

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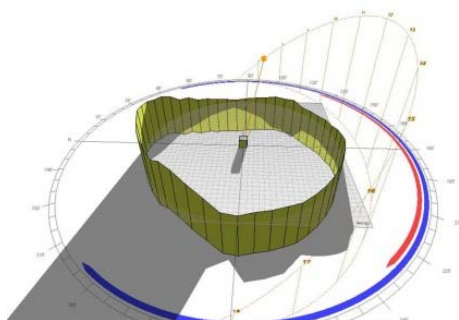
L'Istituto ZEPHIR è l'Affiliato
iPHA italiano.



**iPHA
Affiliate**



Certificazioni PH



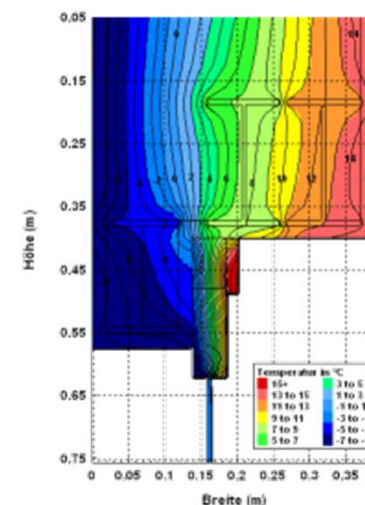
**Modellazione
bioclimatica**



Corsi PHPP, CEPH



Ricerca



**Calcoli
termo-igrometrici
dinamici**

Energy Performance of Building Directive (EPBD)

Direttiva 2010/31/EU del 19 maggio 2010



"When we want to adjust our economics and make them more resilient, can anyone come up with a better proposal than to address **energy efficiency**?"

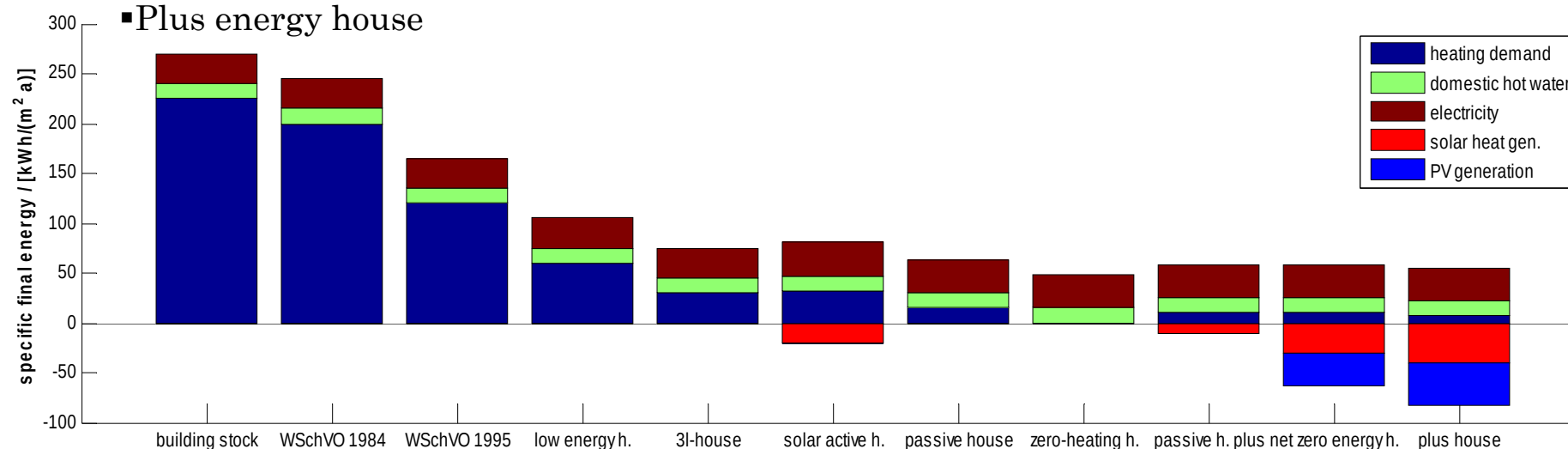
**Commissaria europea per
l'azione per il clima Hedegaard**

OBIETTIVO EUROPA 2013 – 2020: EDIFICI "PASSIVI" (energia "quasi zero")

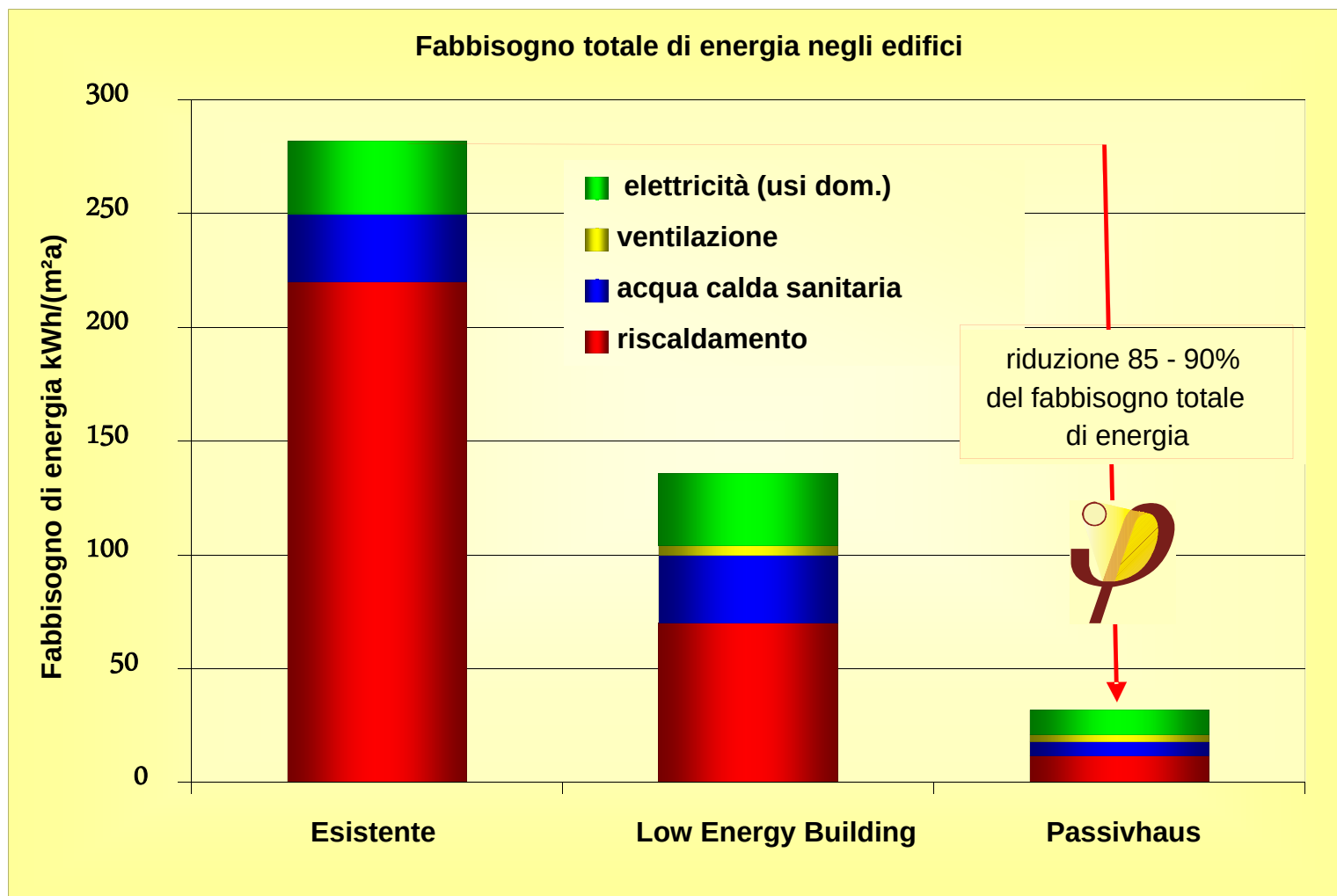
- (Ultra) low energy (3-l) house
- Solar house
- Passive house
- Zero heating house
- Net zero energy / self-sufficient house
- (solar) active house
- Passive house Plus
- Plus energy house

?
=

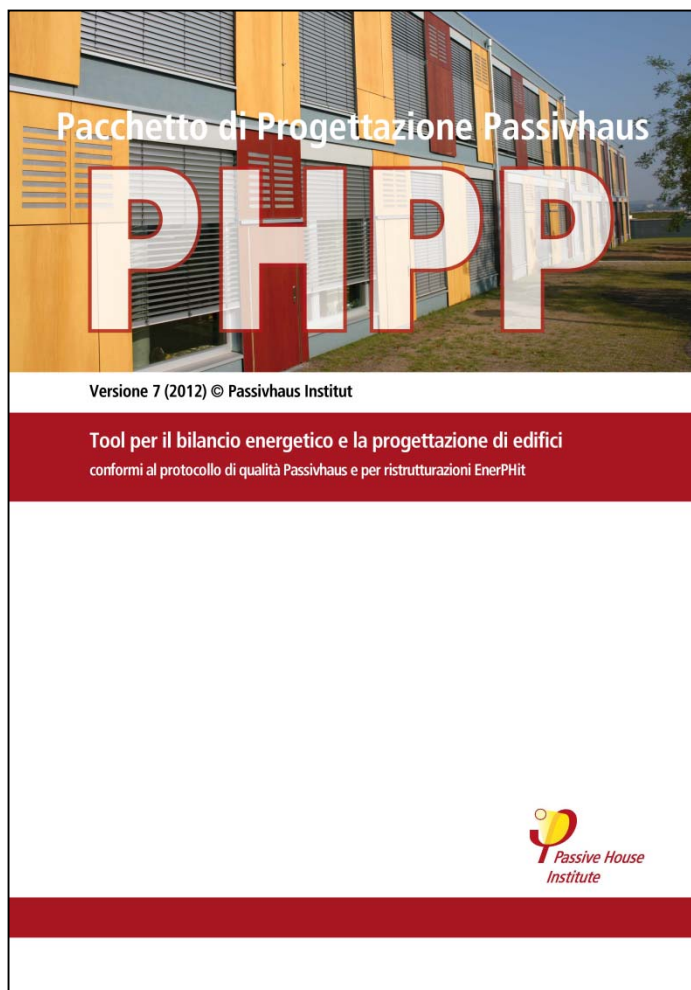
"Nearly Zero" Energy Building



Lo standard Passivhaus



Il Pacchetto di Progettazione Passivhaus



Nuova release PHPP 7 (2012) in Italiano!

Sono stati introdotti nuovi criteri Passivhaus che includono contributi per la **deumidificazione**

Si amplia enormemente la possibilità di progettare e realizzare le Passivhaus nel nostro clima!

DATI CLIMATICI SPECIFICI DELLA LOCALITÀ

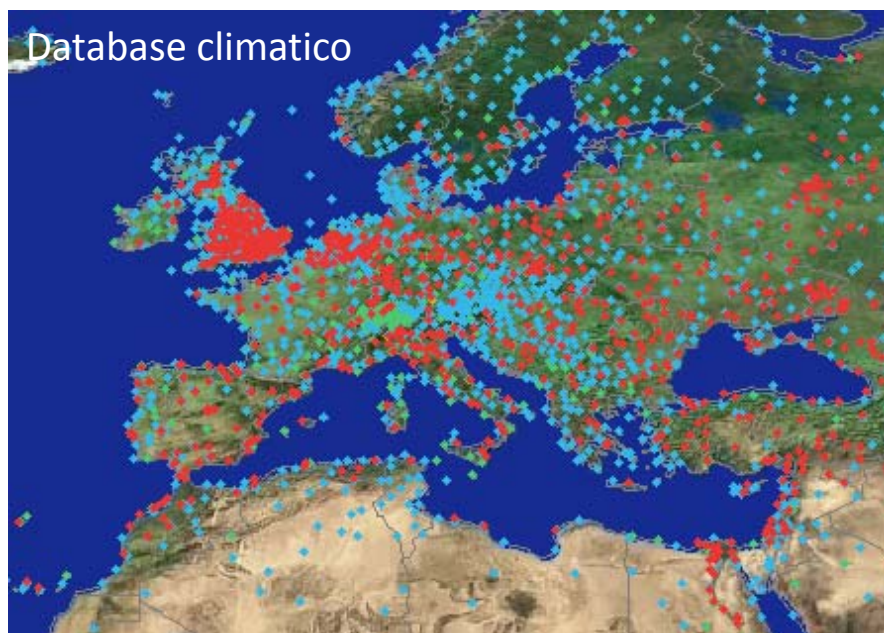
La progettazione di una Passivhaus richiede la completa integrazione dell'edificio nel contesto ambientale in cui è inserito.

Per questa ragione vengono utilizzati dati climatici di progetto specifici della zona, mediante l'utilizzo di stazioni meteo limitrofe o tramite l'interpolazione di due o più stazioni poste nelle vicinanze.

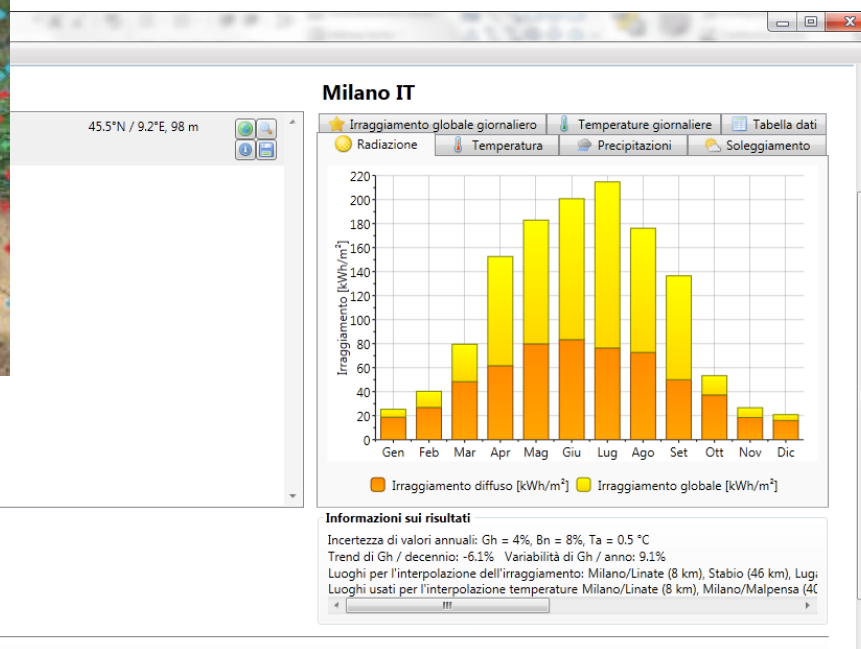
Vengono utilizzati quindi parametri ambientali che si avvicinano in maniera quasi perfetta alle condizioni climatiche del sito di progetto, tali da rendere le valutazioni energetiche il più precise possibile.

DATI CLIMATICI SPECIFICI DELLA LOCALITÀ - simulati

Database climatico



mefonorm 7



DATI CLIMATICI SPECIFICI DELLA LOCALITÀ – Passipedia (NASA)

passipedia

search

Go Search

International
PASSIVE HOUSE
Association

navigation

- Basics
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toolbox

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You are here: Welcome to Passipedia! » Planning » Calculating energy efficiency » PHPP - the Passive House Planning Package » Climate data tool

Climate data tool

Below you can retrieve climatic data in the [PHPP](#) data format for any location in the world except Antarctica. The data were developed on the basis of satellite data which were obtained from the NASA Langley Research Center Atmospheric Sciences Data Center POWER Project. Assessment and processing for the use within the PHPP took place at the Passive House Institute. We would like to thank Deutsche Bundesstiftung Umwelt and Saint-Gobain CRIR, who have supported part of this work.

The original satellite data have a resolution of one degree latitude (111 km) and one degree longitude (~79 km @ lat 45° [111 km * cos lat]), intermediate data are interpolated. Although a validation of each individual data set has not been performed, application of the data for orientational calculations can be recommended. Major inaccuracies may occur particularly in mountainous and coastal regions, however.

Using accurate climate data in the PHPP is imperative for reliable results in Passive House design. Using data from one source alone is not recommended as the climate data used should be carefully validated, e.g. through comparison with other sources. The Passive House Institute can provide the service to determine climate data for a specific location on the basis of a careful comparison between a number of sources. Typically, these sources include measured ground data, Meteonorm and data from NASA.

If you experience difficulties in importing the files directly into Excel, which may occur under certain circumstances, you may try to save the data as a CSV file and then open this file from Excel.

There are two ways of calculating the climate data:

- Select the desired position on the map (JavaScript required)
- Enter the latitude and longitude manually

The corresponding climate data for the selected position can be downloaded by clicking on "Calculate climate" and copied into the PHPP.

Search:

Passivhaus Institut, Darmstadt Go!

Latitude (north positive) 45.08

Longitude (east positive) 11.79

☐ Comma as a decimal separator

☒ Point as a decimal separator

☐ csv file separated by a semicolon

☒ csv file separated by a tab stop

Calculate

La progettazione Passivhaus

DATI CLIMATICI SPECIFICI DELLA LOCALITÀ - misurati

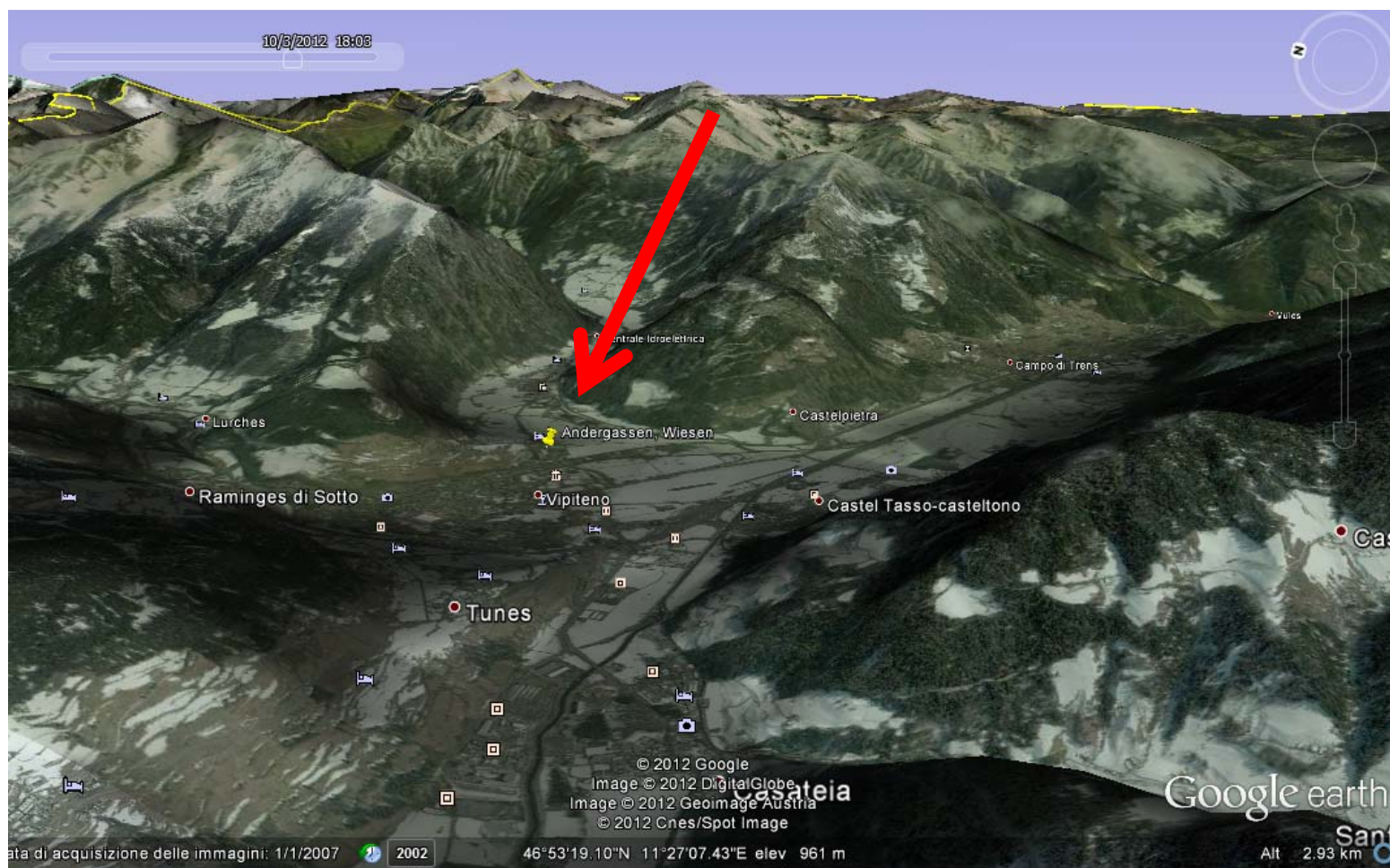


PROGETTAZIONE SOLARE DINAMICA

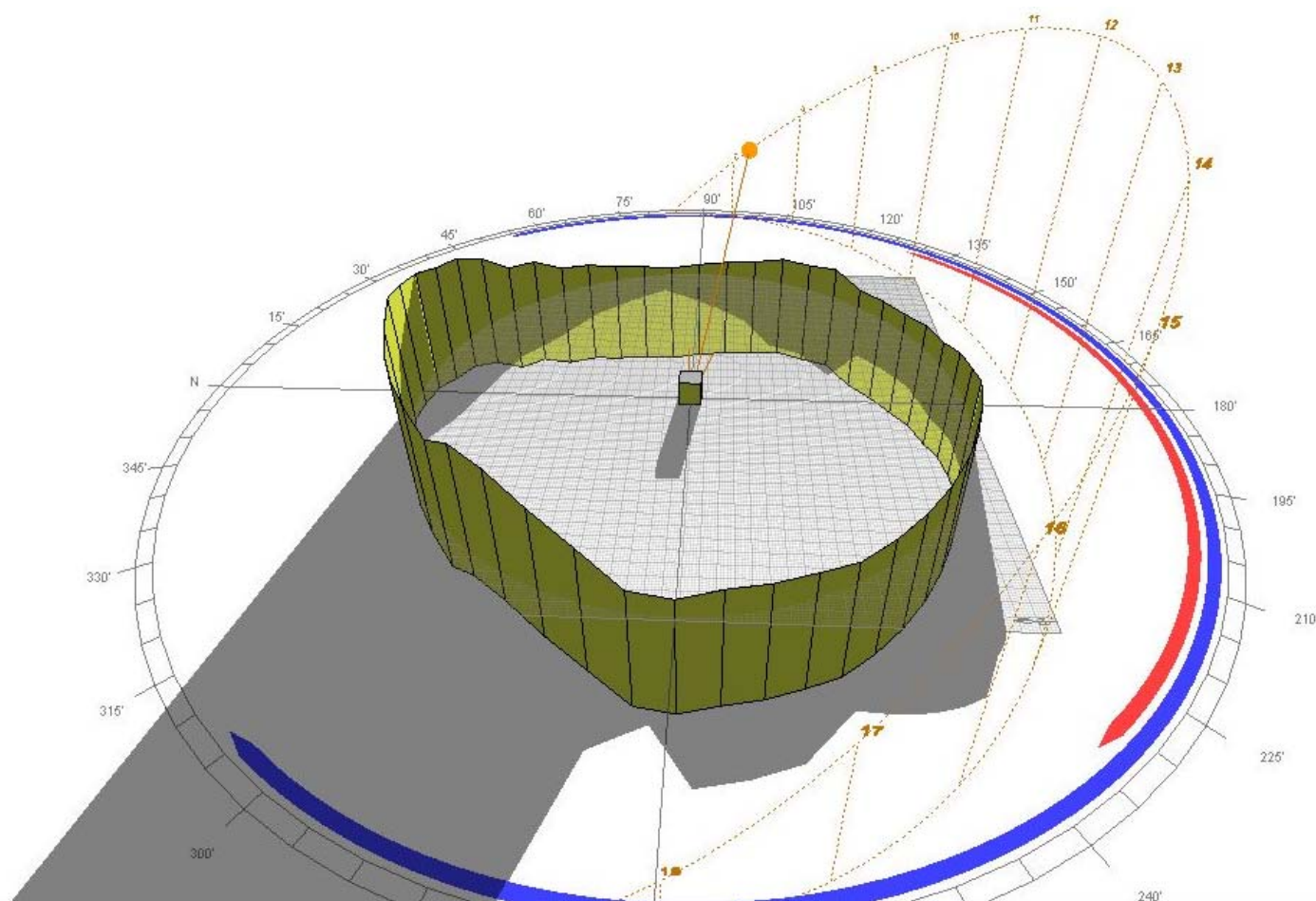
Un corretto dimensionamento ed orientamento delle superfici trasparenti è fondamentale per garantire all'edificio sia un comfort termico estivo, evitando situazioni di surriscaldamento, che un adeguato contributo gratuito nella stagione di riscaldamento che può arrivare fino al completo pareggio delle perdite di calore attraverso l'involucro.

L'edificio deve essere progettato all'interno del contesto reale di costruzione, valutando gli ombreggiamenti dovuti sia alla conformazione del territorio, che alla presenza di costruzioni limitrofe.

PROGETTAZIONE SOLARE DINAMICA – TERRENO

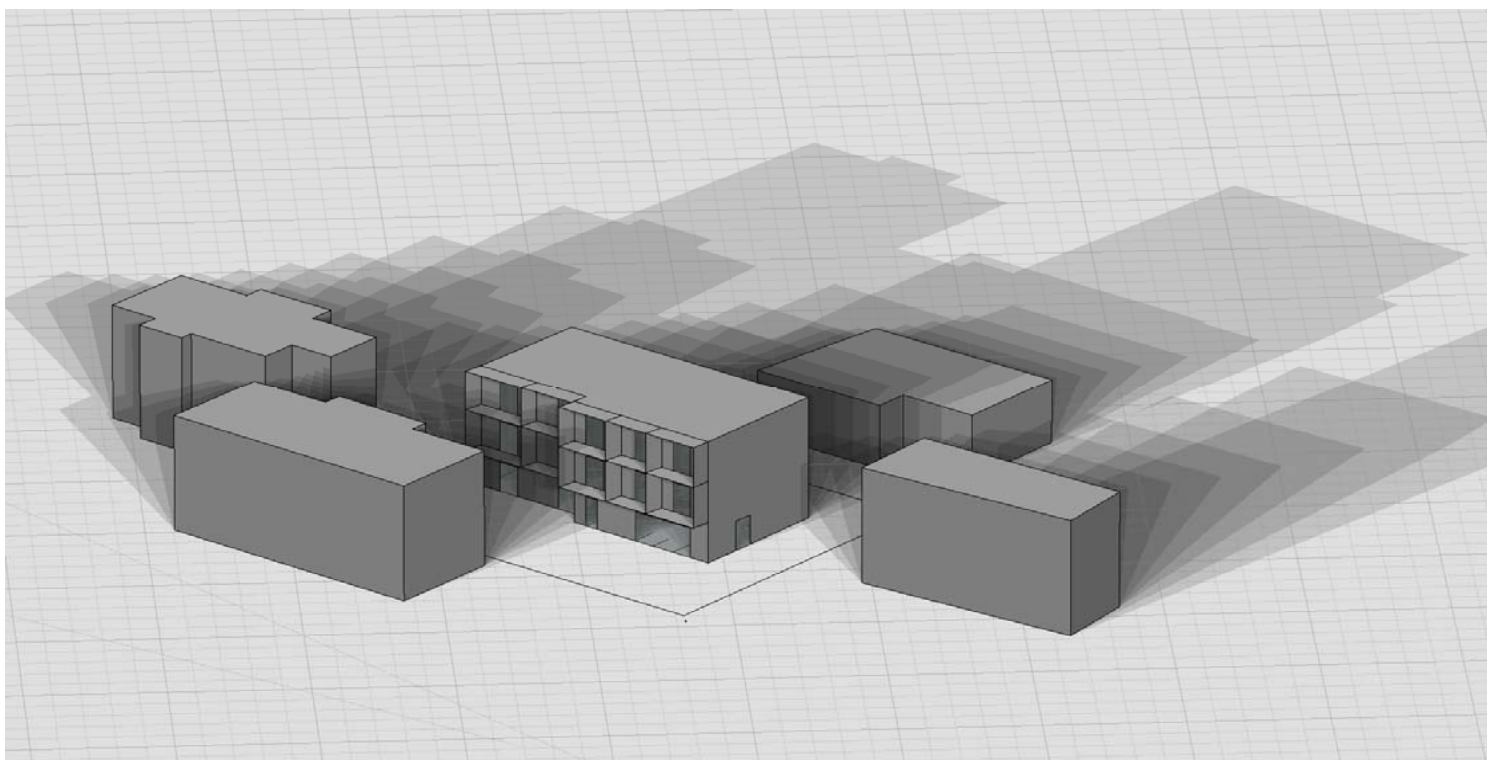


PROGETTAZIONE SOLARE DINAMICA – TERRENO



MODELLAZIONE DEL TERRITORIO – COSTRUZIONI

Range ombreggiamenti 21 dicembre



Componenti certificati PH...

Certificate
Passive House suitable component
for cool, temperate climate, valid until 31.12.2012

Category: **Window Frame**
Manufacturer: **OPTWIN GmbH**
6341 Ebbs, AUSTRIA
Product name: **Alphawin**

The following comfort criteria were used in awarding this certificate:

Given a U_g value of 0.70 W/(m²K) and a window size of 1.23 m by 1.48 m,

$$U_{W,inst} = 0.80 \text{ W/(m}^2\text{K)} \leq 0.80 \text{ W/(m}^2\text{K)}$$

Taking into account the installation based thermal bridges, and provided that the installation is, with regard to the thermal bridges, equal or better than shown in the data sheet, the window meets the following criterion.

$$U_{W,inst,td} \leq 0.85 \text{ W/(m}^2\text{K)}$$

Thermal data of the window frame

	U _f value [W/(m²K)]	Width [mm]	ψ _g [W/(mK)]	f _{Rsi-0.20} [-]
Spacer			Superspacer TriSeal*	
Bottom	1.00	90	0.024	0.74
Side/top	0.79	90	0.023	

* Spacers of lower thermal quality, especially those made of aluminium, lead to significantly higher thermal losses and lower temperature factors.

Further information see data sheet

www.passivehouse.com

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
GERMANY

Passive House Efficiency Class

phA
advanced component

phB
basic component

phC
certifiable component

not suitable for Passive Houses

telai delle finestre

Data Sheet OPTWIN GmbH, Alphawin

Manufacturer: OPTWIN GmbH
Wildbichlerstr. 1, 6341 Ebbs, AUSTRIA
Tel.: +43 5373/46046-0
Email: office@optwin.net, www.optwin.net

Bottom section

Isothermal

Description
Timber frame with insulation and external aluminium shell

Thermal data for the window frame

	U-value [W/(m²K)]	Width [mm]	ψ _g [W/(mK)]	f _{Rsi-0.20} [-]
Spacer			Superspacer TriSeal*	
Bottom	1.00	90	0.024	0.74
Side/top	0.79	90	0.023	

* Spacers of lower thermal quality leading to higher thermal losses and lower temperatures.

www.passivehouse.com

Passive House Institute Page 1/1

Certificate
Passive House suitable component
For cool, temperate climates, valid until 31 December 2012

Category: **Heat recovery unit**
Manufacturer: **Paul Wärmerückgewinnung GmbH**
08141 Reinsdorf, GERMANY
Product name: **novus 300**

This certificate was awarded based on the following criteria:

Thermal comfort	θ _{supply air} ≥ 16.5 °C at θ _{outside air} = -10 °C
Effective heat recovery rate	η _{heat ex} ≥ 75%
Electric power consumption	P _{el} ≤ 0.45 Wh/m³
Airtightness	Interior and exterior air leakage rates less than 3% of nominal air flow rate
Balancing and adjustability	Air flow balancing possible: yes Automated air flow balancing: yes
Sound insulation	Sound pressure level L _p ≤ 35 dB(A) based on a 4 m² equivalent absorption area not met Here L _p = 43.0 dB(A) Unit must be installed in a separate building services room.
Indoor air quality	Outdoor air filter F7 Extract air filter G4
Frostprotection	Frost protection for the heat exchanger with continuous fresh air supply down to θ _{outside air} = -15 °C

Further information can be found in the appendix of this certificate.

www.passivehouse.com

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
GERMANY

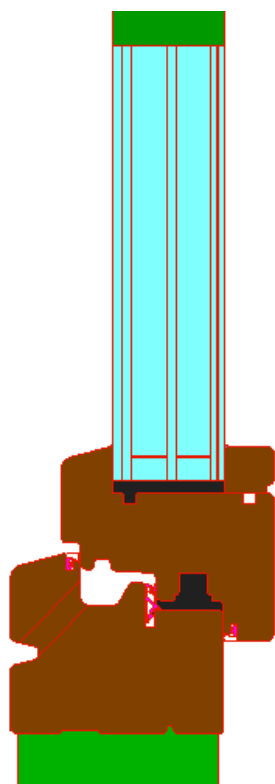
Certified for air flow rates of
121 - 231 m³/h

η_{heat ex}
93%
(94% bei 144 m³/h)

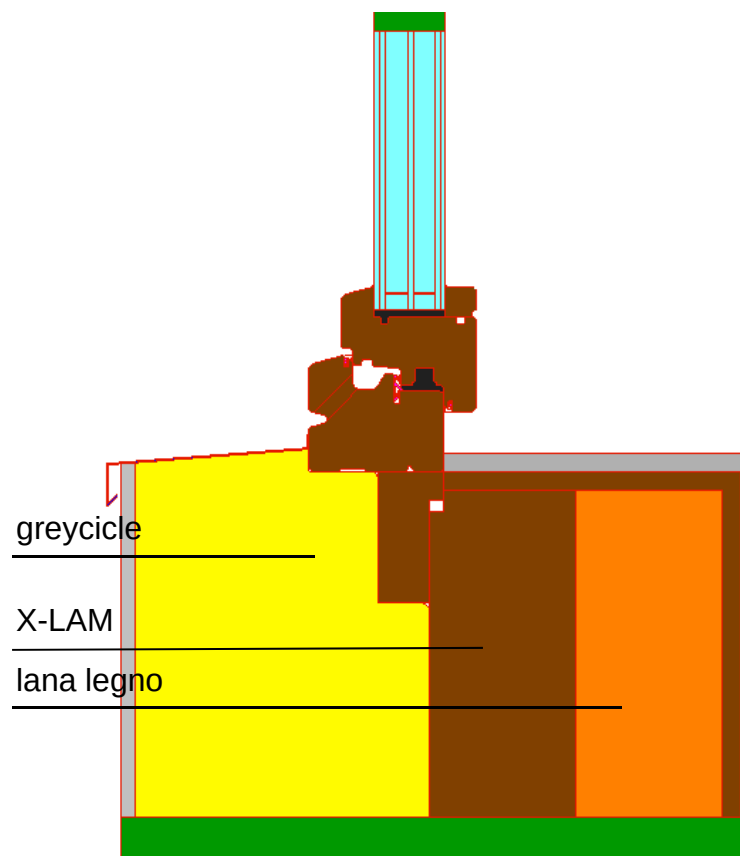
Electric power consumption
0.24 Wh/m³

impianti
di ventilazione

...e non certificati

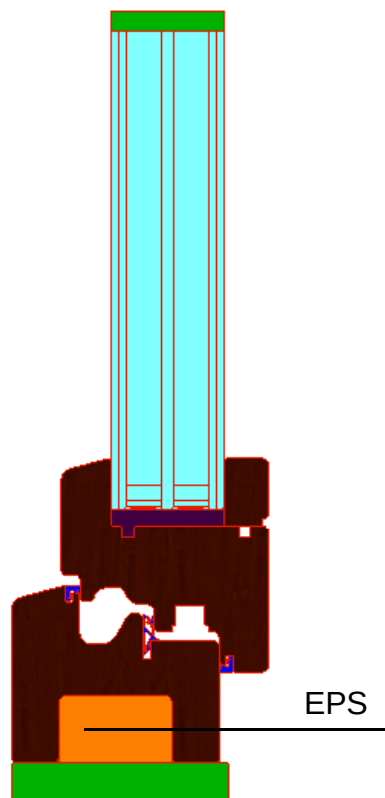


$U_f = 1.20 \text{ W/(m}^2\text{K)}$
spessore = 92 mm
altezza = 125.5 mm

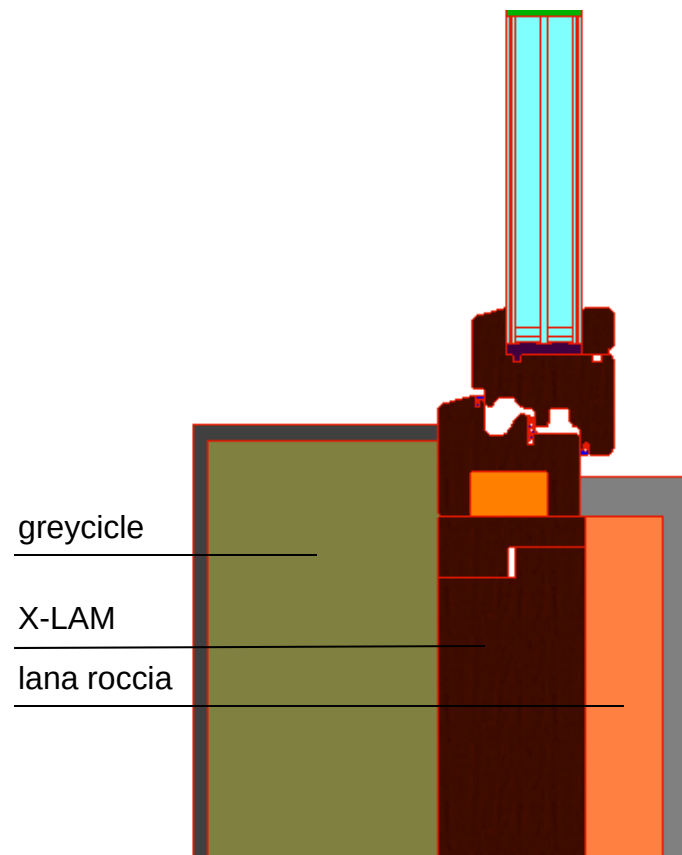


$U_{\text{parete}} = 0.099 \text{ W/(m}^2\text{K)}$
 $\Psi_{\text{inst}} = 0.032 \text{ W/(mK)}$

...e non certificati

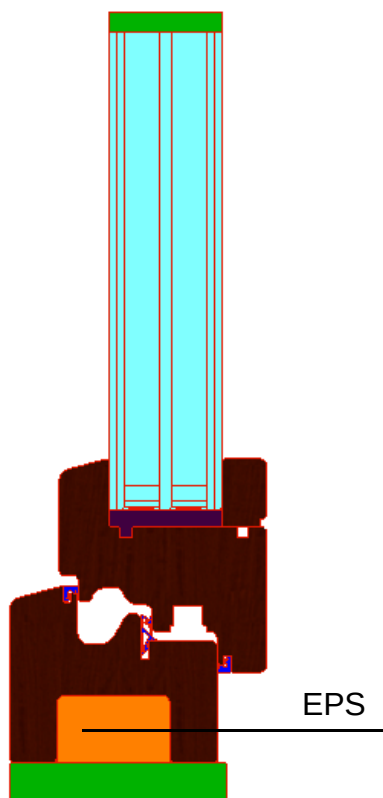


$U_f = 1.01 \text{ W/(m}^2\text{K)}$
spessore = 92 mm
altezza = 135.5 mm

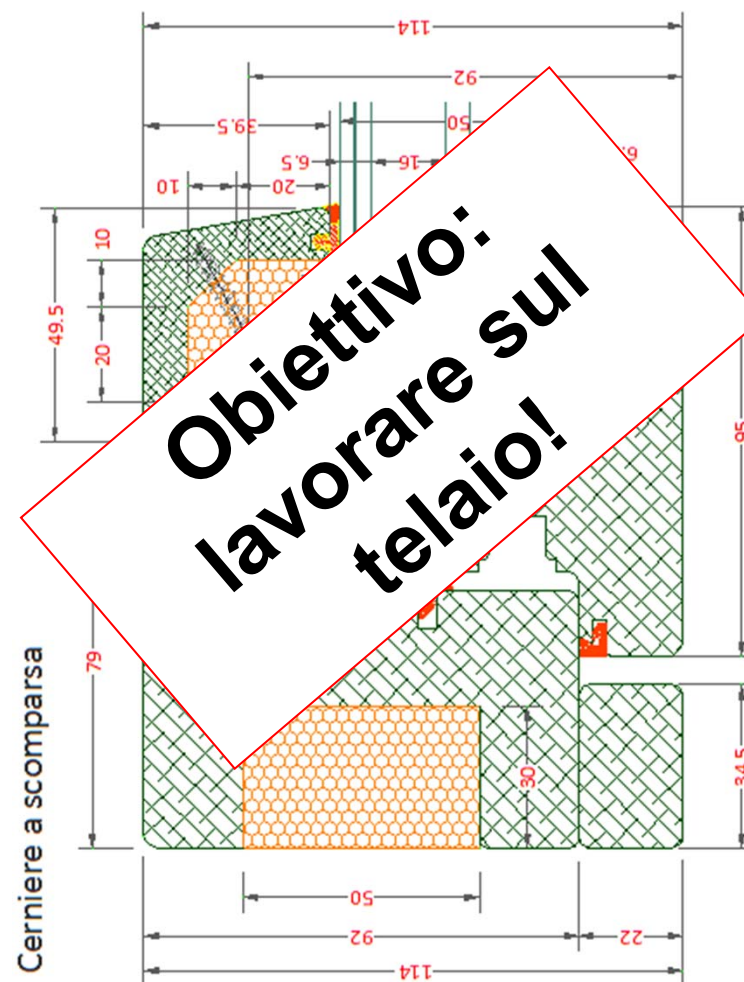


$U_{\text{parete}} = 0.122 \text{ W/(m}^2\text{K)}$
 $\Psi_{\text{inst}} = 0.014 \text{ W/(mK)}$

...e non certificati



$U_f = 1.01 \text{ W/(m}^2\text{K)}$
spessore = 92 mm
altezza = 135.5 mm



Uno dei punti geniali della Passivhaus



Uno dei punti geniali della Passivhaus

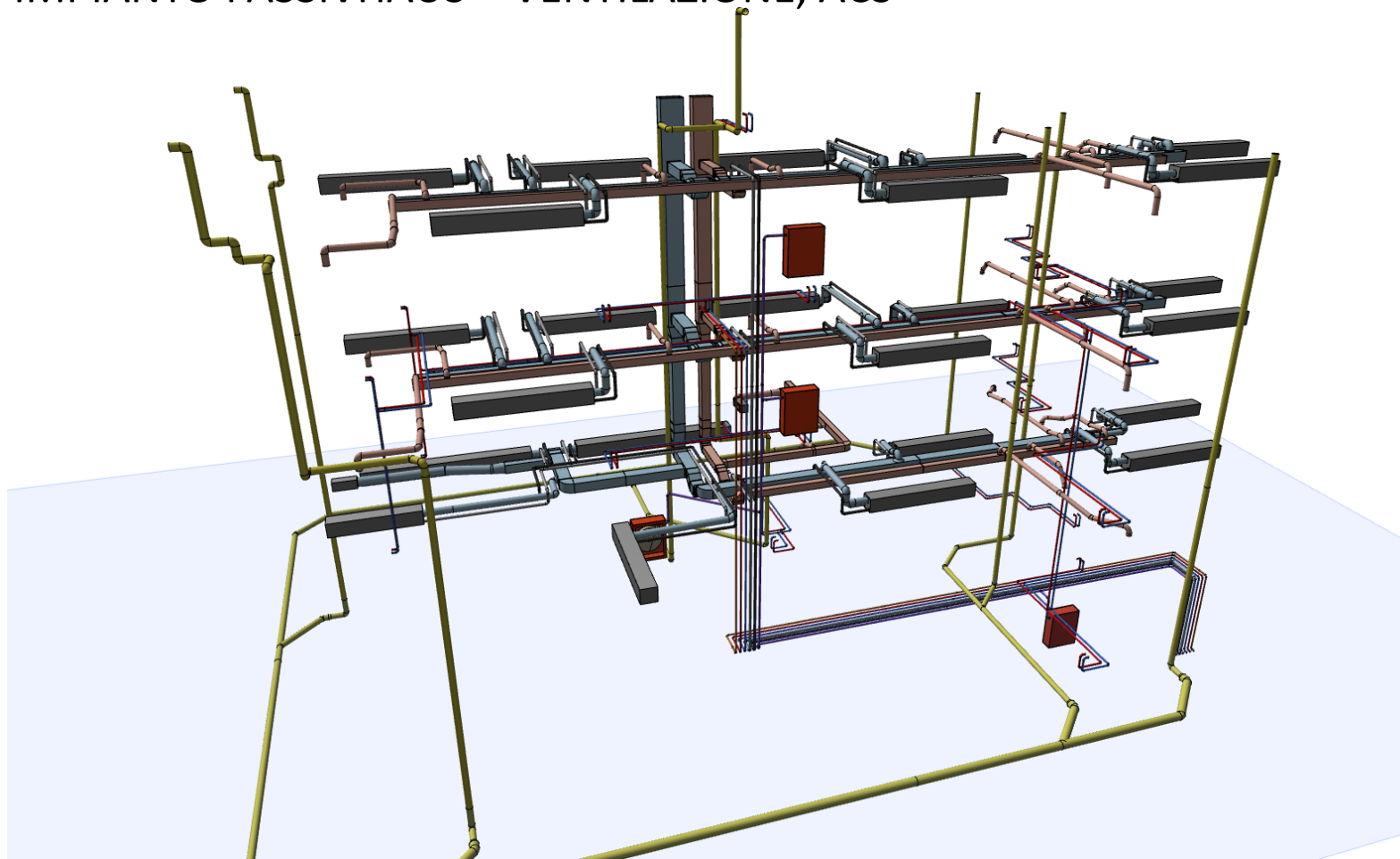


... anche nelle ristrutturazioni!

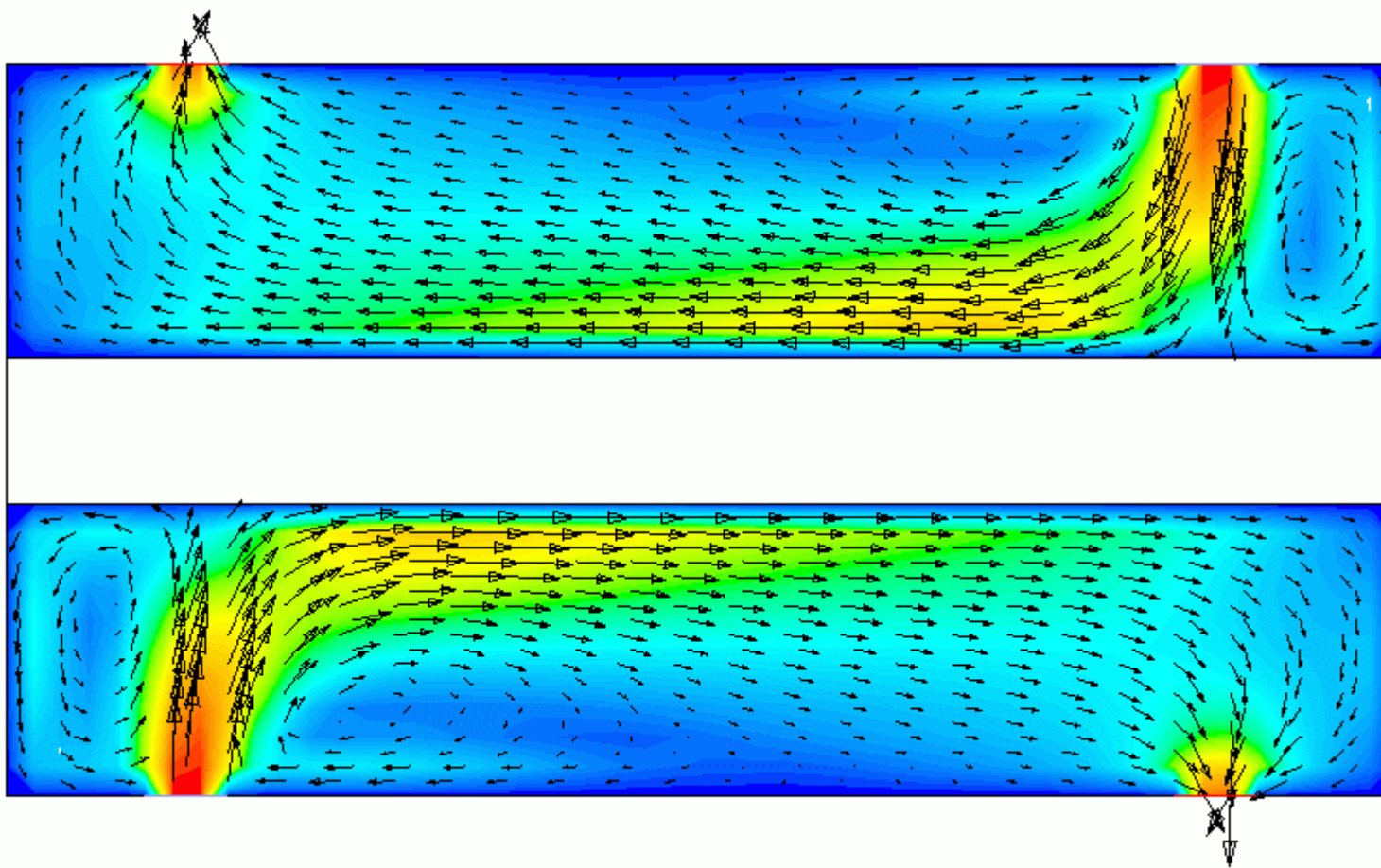


La progettazione Passivhaus

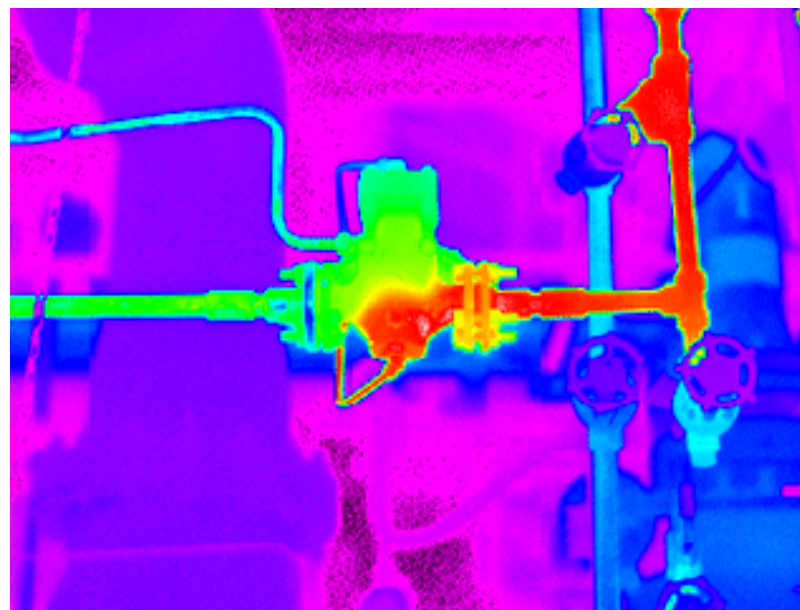
IMPIANTO PASSIVHAUS – VENTILAZIONE, ACS



IMPIANTO PASSIVHAUS – VENTILAZIONE – simulazione CFD

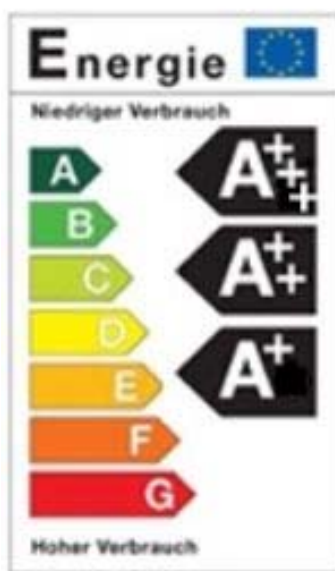


IMPIANTO PASSIVHAUS – DISTRIBUZIONE coibentazione dell'impianto di distribuzione



La progettazione Passivhaus

IMPIANTO PASSIVHAUS – COMPONENTI A BASSO CONSUMO



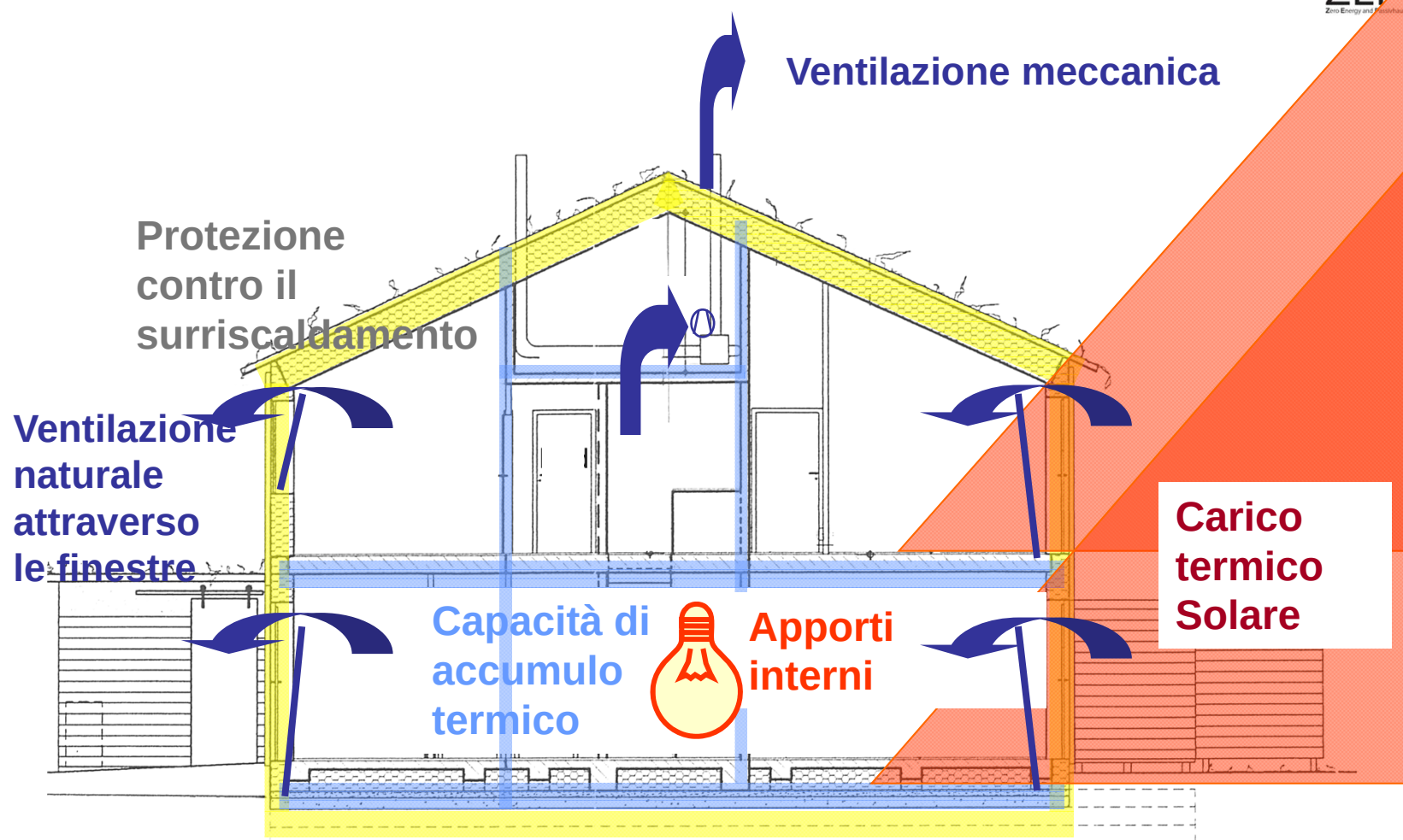
IMPIANTO PASSIVHAUS – ILLUMINAZIONE INNOVATIVA



Strategia estiva in una Passivhaus



Strategia estiva in una Passivhaus

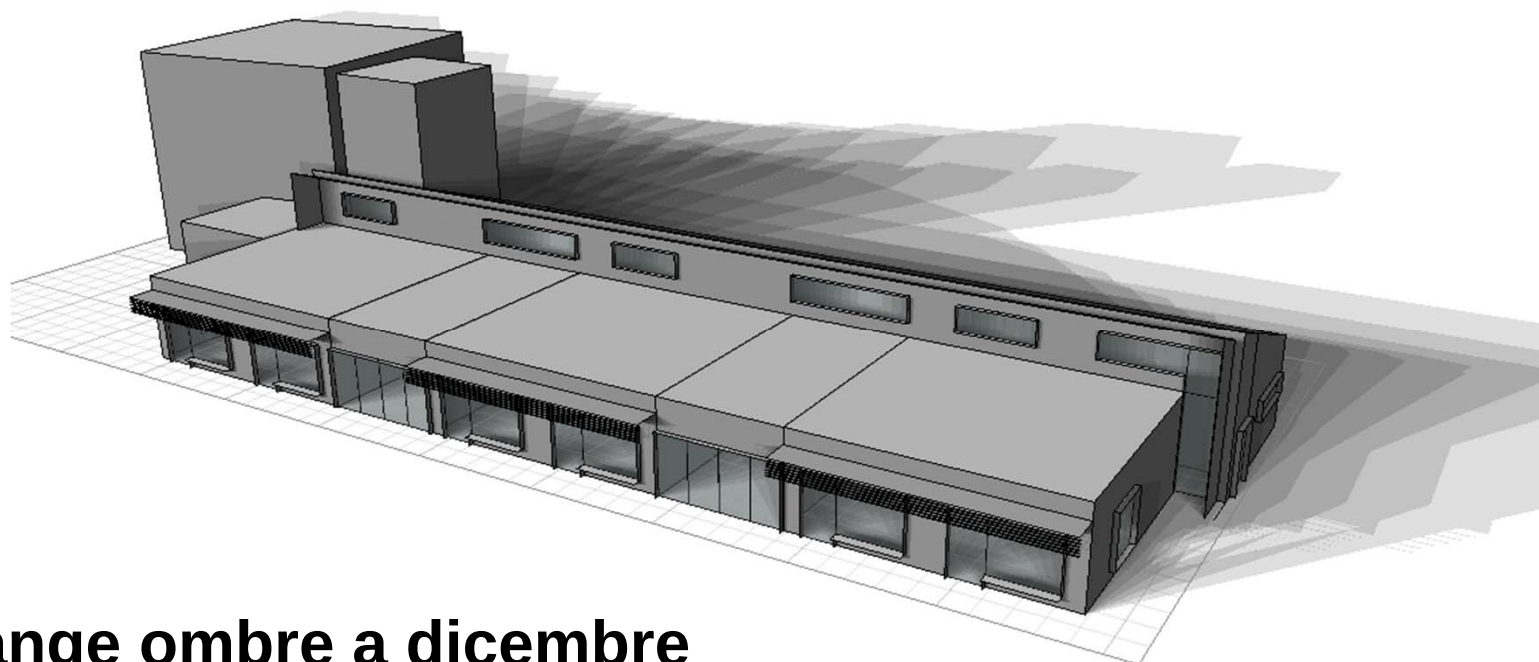


Strategia estiva in una Passivhaus

Progetto di un kindergarten passivo a Civezzano (TN)

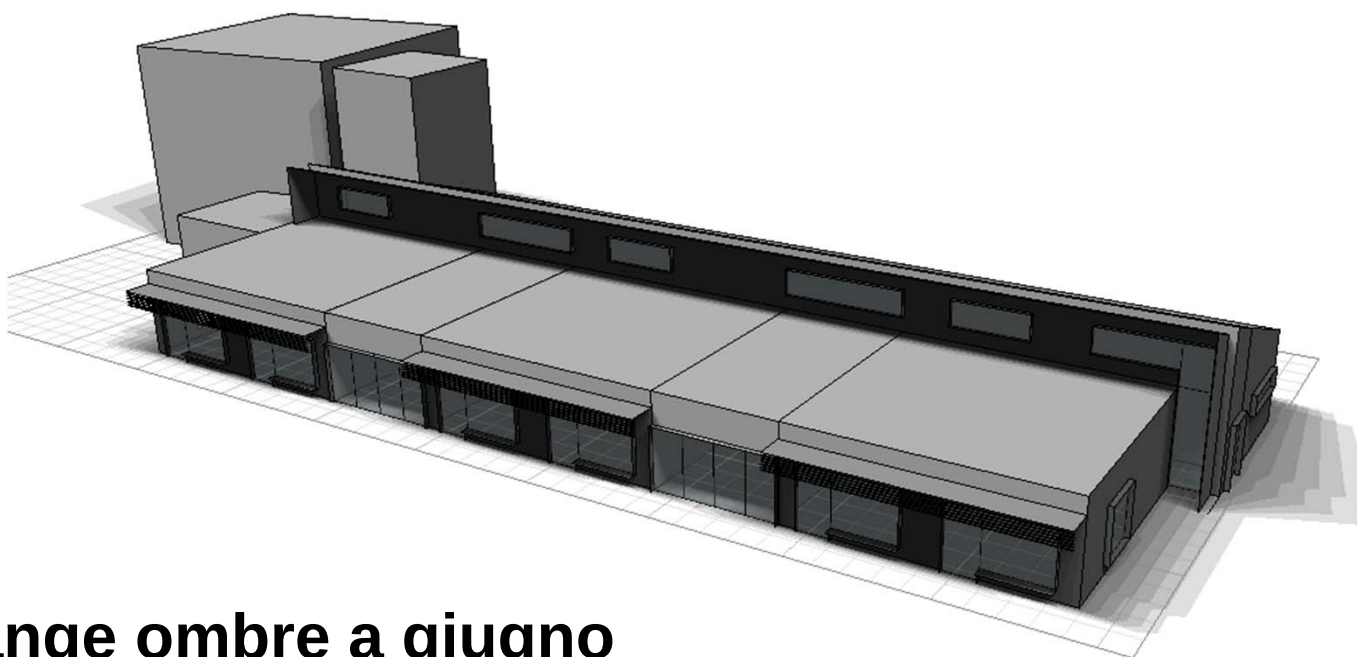


Strategia estiva in una Passivhaus



range ombre a dicembre

Strategia estiva in una Passivhaus



range ombre a giugno

Strategia estiva in una Passivhaus

Ombreggiare in maniera passiva ...



Strategia estiva in una Passivhaus

... o attiva



La Certificazione Passivhaus

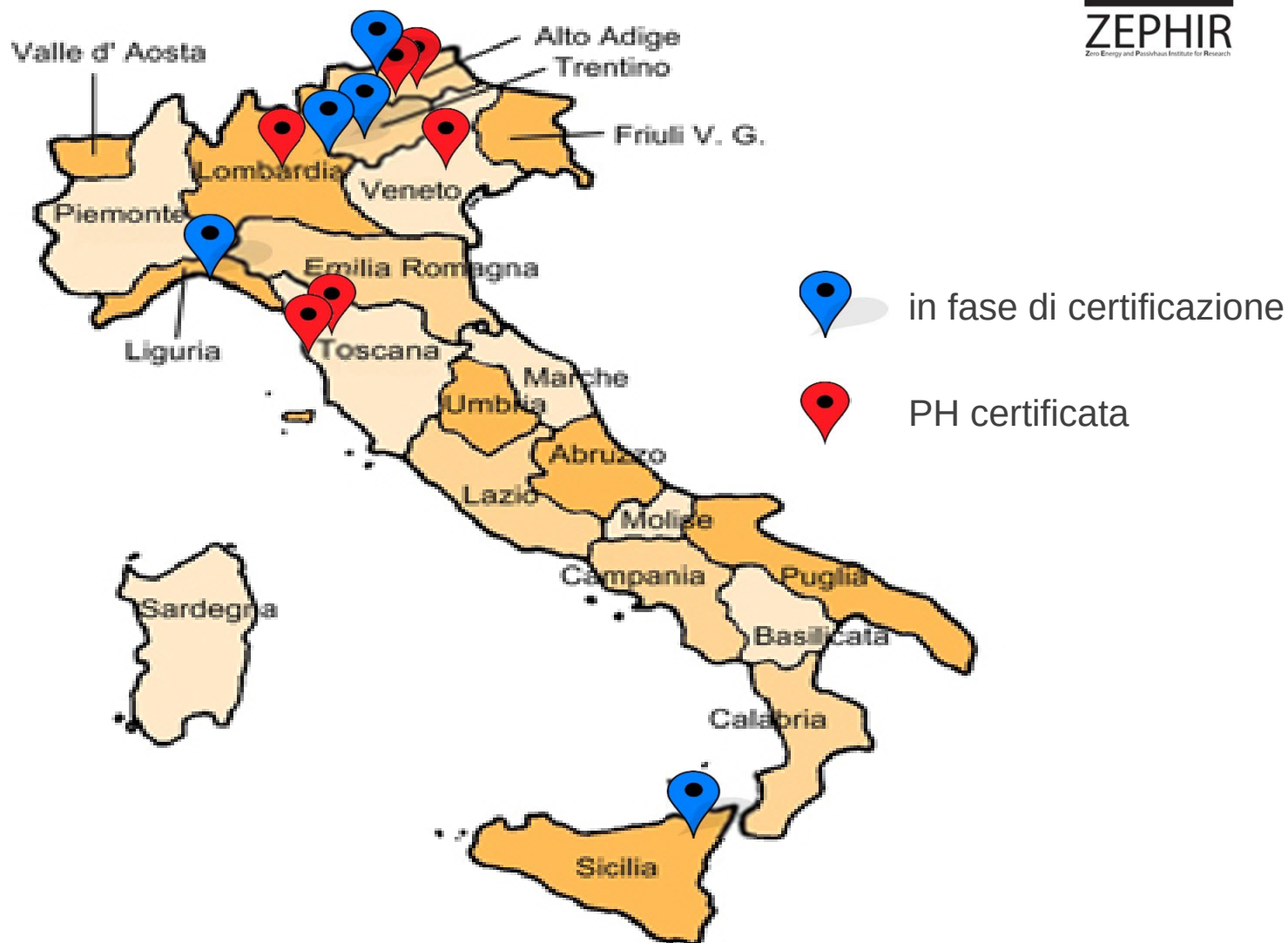


Certificazione Passivhaus
per edifici residenziali e non
residenziali

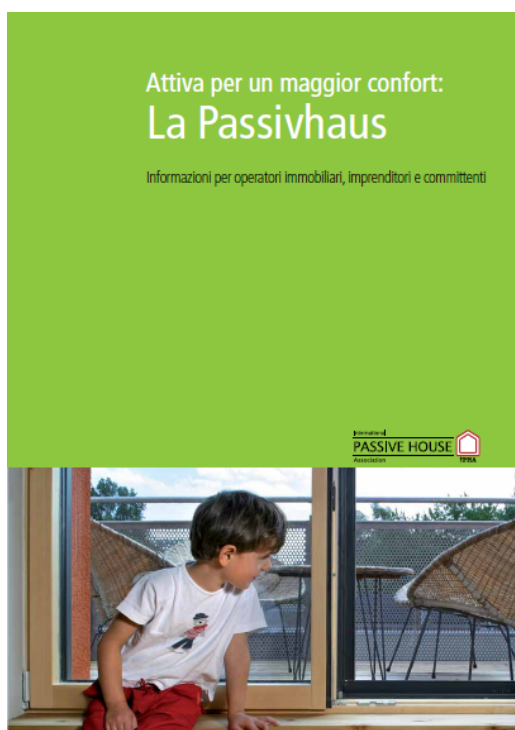


**Certificazione EnerPHit per
ristrutturazioni**
se non si riescono a raggiungere
nella pratica i requisiti definiti per lo
standard Passivhaus

La certificazione in Italia...?



Divulgazione sul tema Passivhaus



15.000 copie della nuova **brochure iPHA**
tradotta in italiano!

progetti presentati sulla brochure

distribuita presso il **modulo itinerante
Passivhaus** nello SmartVillage

Divulgazione sul tema Passivhaus





Divulgazione sul tema Passivhaus



International

PASSIVE HOUSE

Association



IG PASSIVHAUS
SÜDTIROL

Netzwerk für Information,
Qualität und Weiterbildung

IG PASSIVHAUS
Friuli Venezia Giulia

Segui le attività del Gruppo IG Passivhaus FVG e iscriviti su:
www.ape.fvg.it/passivhaus

IG Casa Passiva
Piemonte

CASA
ECO PASSIVA
SICILIA



GRAZIE PER L'ATTENZIONE !



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