

activehouse.INFO
NETWORK AND KNOWLEDGE SHARING

Active House

Edifici che producono più di quanto consumano

Presentato da:

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Contacts:

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General Secretary
Active House Alliance,

Active House

L'origine del progetto



Piano EU 2020

- 20% Riduzione CO₂
- 20% Energia rinnovabile
- 20% Efficienza energetica

Direttive sulle prestazioni energetiche degli edifici (2010)

- Edifici a energia quasi zero (NZEB)
- Piani nazionali di attuazione



Applicazioni a livello nazionale (2011=>)

- Interpretazione della normativa NZEB
- Metodologia di sviluppo
- Aggiornamento legislativo e dei requisiti edilizi

Active House

La situazione attuale



40% dell'energia mondiale

- viene utilizzata per il riscaldamento e il raffrescamento degli edifici
- il 90% del patrimonio edilizio attuale sarà ancora in uso nel 2050

Trascuriamo il 90% del nostro tempo

- all'interno di edifici,
- almeno il 30% degli edifici non offre un clima interno sano

Le sfide climatiche si giocano a livello globale

- le risorse sono limitate
- i rifiuti aumentano

È ora di agire!

Le tecnologie già esistenti possono fare la differenza!

Active House Alliance

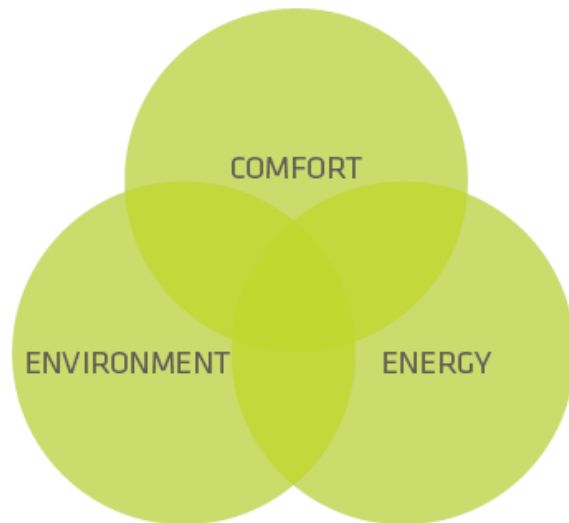
Partner e target groups



Active House: la visione

Edifici che producono più di quanto consumano

L'idea su cui si basa il concetto di Active House è quella di realizzare edifici che permettono una vita sana e confortevole a chi li abita, senza impattare in modo negativo sul clima.



Comfort

– *Crea condizioni abitative migliori*

Una Active House offre ai suoi abitanti un clima interno più sano e confortevole, apportando luce naturale e ventilazione. I materiali utilizzati non impattano negativamente sul comfort e sul clima interno.

Energia

– *Permette agli edifici di ottenere un bilancio energetico positivo*

Una Active House è un edificio ad alta efficienza energetica. Tutta l'energia necessaria al suo funzionamento deriva da fonti di energia rinnovabili integrate nell'edificio stesso o da vicini impianti collettivi di energia.

Ambiente

– *Ha un impatto positivo sull'ambiente*

Una Active House interagisce in modo positivo con l'ambiente circostante, inserendosi in maniera ottimale all'interno del contesto locale, grazie a un uso attento delle risorse e a un basso impatto ambientale durante il suo intero ciclo di vita.

Active House: approfondimenti

Edifici che producono più di quanto consumano

Criteri quantitativi

Classificazione: 1 (migliore) – 4 (accettabile)

Comfort

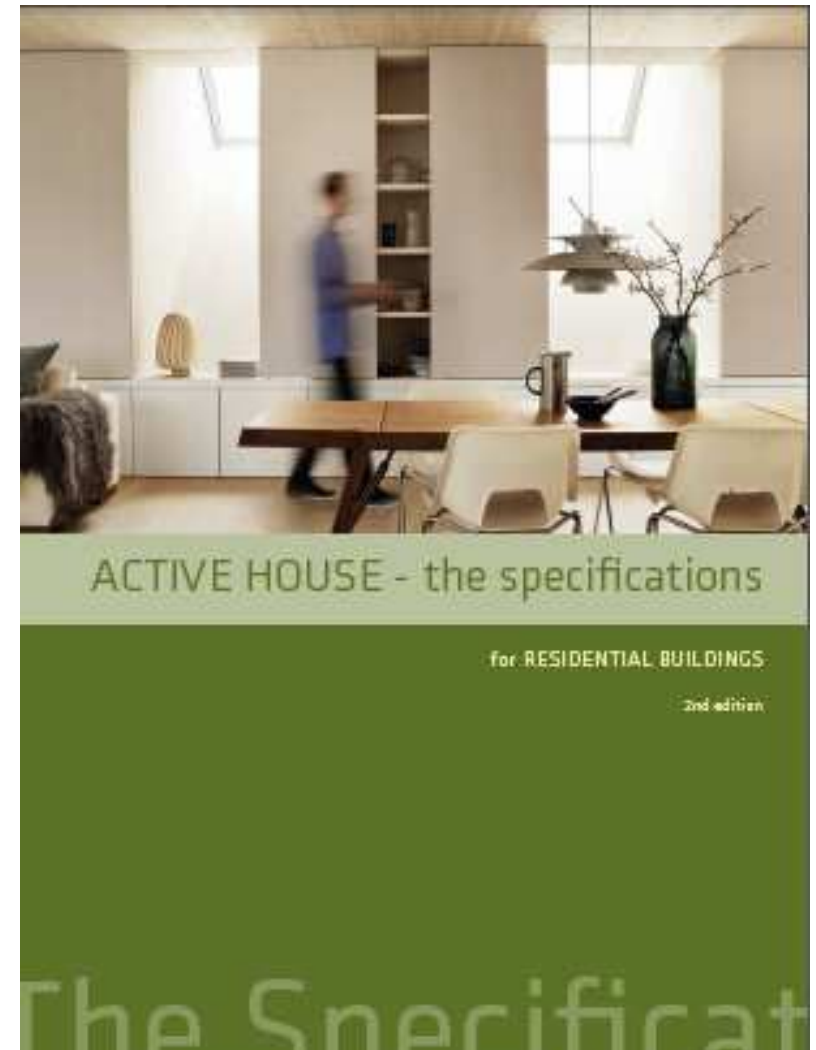
- Luce Naturale
- Temperatura degli ambienti
- Qualità dell'aria all'interno degli ambienti

Energia

- Consumo energetico
- Fornitura energetica
- Prestazione energetica

Ambiente

- Carico ambientale
- Consumo di acqua
- Edilizia sostenibile



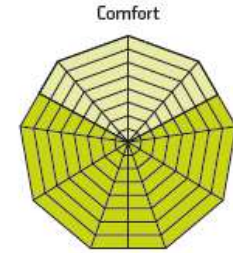
Active House: approfondimenti

Prestazioni nel diagramma radar



Active House: approfondimenti

Comfort



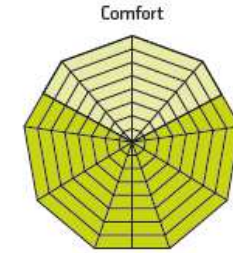
Trascurriamo il 90% del nostro tempo in ambienti chiusi; di conseguenza la qualità del clima interno ha un impatto significativo sulla nostra salute e sul nostro comfort.

Un clima interno sano è una caratteristica fondamentale di una Active House. Il design stesso dell'edificio deve permettere di ottenere buone condizioni di illuminazione naturale, un buon comfort termico e una buona qualità dell'aria. Per ottenere questi risultati è importante rispettare determinati dettagli costruttivi.



Active House: approfondimenti

Comfort



Luce Naturale

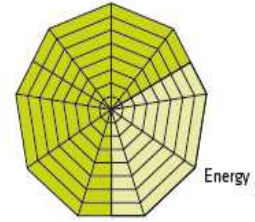
PARAMETER	VALUE	CRITERIA	SCORE
1.1.1 Daylight factor		The amount of daylight in a room is evaluated through average daylight factor levels on a horizontal work plane: 1. DF > 5% on average 2. DF > 3% on average 3. DF > 2% on average 4. DF > 1% on average Daylight factors are calculated using a validated daylight simulation program.	
1.1.2 Direct sunlight availability		For minimum one of the main habitable rooms, sunlight provision should be available between autumn and spring equinox: 1. At least 10% of probable sunlight hours 2. At least 75% of probable sunlight hours 3. At least 5% of probable sunlight hours 4. At least 2.5% of probable sunlight hours The evaluation is made according to British Standard BS 8206-2:2008 "Lighting for buildings – Part 2: Code of practice for daylight".	
TOTAL AVERAGE:			

Temperatura degli ambienti

PARAMETER	VALUE	CRITERIA	SCORE
1.2.1 Maximum operative temperature		The maximum indoor temperature limits apply in periods with an outside T_{oe} of 12°C or more. For living rooms, kitchens, study rooms, bedrooms etc. in dwellings without mechanical air conditioning and with adequate opportunities for natural (cross or stack) ventilation, the maximum indoor operative temperatures are: 1. $T_{\text{io}} < 0.33 \times T_{\text{oe}} + 20.8^\circ\text{C}$ 2. $T_{\text{io}} < 0.33 \times T_{\text{oe}} + 21.8^\circ\text{C}$ 3. $T_{\text{io}} < 0.33 \times T_{\text{oe}} + 22.8^\circ\text{C}$ 4. $T_{\text{io}} < 0.33 \times T_{\text{oe}} + 23.8^\circ\text{C}$ T_{oe} is the Running Mean outdoor temperature as defined in 'chapter 3.n External temperature, running mean of EN 15251:2007'. For living rooms etc. in residential buildings with air conditioning, the maximum operative temperatures are: 1. $T_{\text{io}} < 25.5^\circ\text{C}$ 2. $T_{\text{io}} < 26^\circ\text{C}$ 3. $T_{\text{io}} < 27^\circ\text{C}$ 4. $T_{\text{io}} < 28^\circ\text{C}$ For bedrooms (especially at night time), a 2°C lower value should preferably be used than indicated above as people are more sensitive to high temperatures when sleeping or trying to fall asleep. Also, in kitchens higher temperatures than indicated can be allowed periodically, e.g. during cooking activities. The system should be designed to achieve the values, the users can however choose other settings. Reference: EN 15251:2007.	
1.2.2 Minimum operative temperature		The minimum indoor temperature limits apply in periods with an outside T_{oe} of 12°C or less. For living rooms, kitchens, study rooms, bedrooms etc. in dwellings, the minimum operative temperatures are: 1. $T_{\text{io}} > 21^\circ\text{C}$ 2. $T_{\text{io}} > 20^\circ\text{C}$ 3. $T_{\text{io}} > 19^\circ\text{C}$ 4. $T_{\text{io}} > 18^\circ\text{C}$ The system should be designed to achieve the values, the users can however choose other settings.	
TOTAL AVERAGE:			

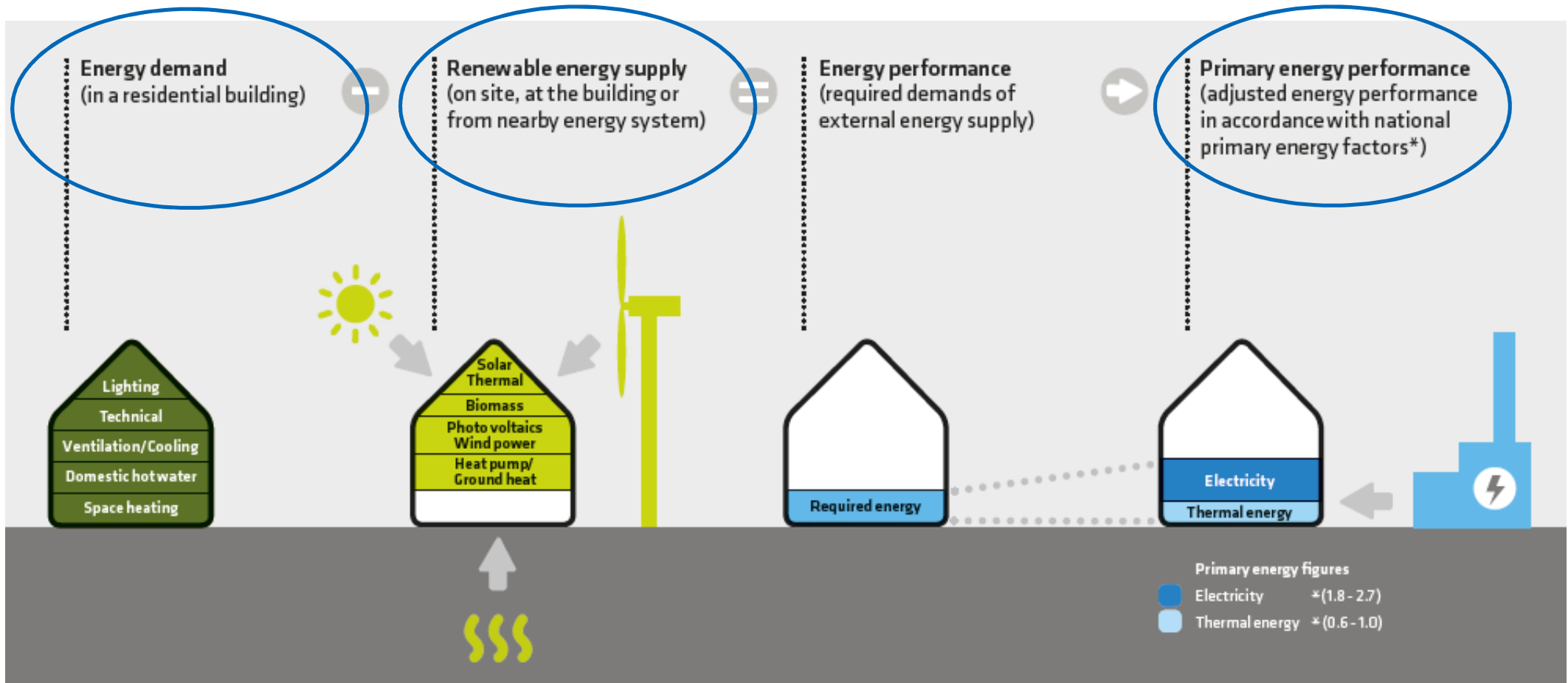
Qualità dell'aria negli ambienti

PARAMETER	VALUE	CRITERIA	SCORE
1.3.1 Standard fresh air supply		The fresh air supply shall be established according to the below limit values for indoor CO ₂ concentration in living rooms, bedrooms, study rooms and other rooms with people as the dominant source and that are occupied for prolonged periods: 1. 500 ppm above outdoor CO ₂ concentration 2. 750 ppm above outdoor CO ₂ concentration 3. 1000 ppm above outdoor CO ₂ concentration 4. 1000 ppm above outdoor CO ₂ concentration	



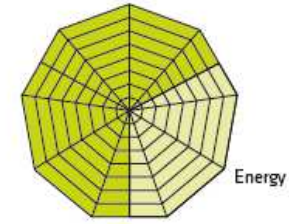
Active House: approfondimenti

Energia



Active House: approfondimenti

Energia



Consumo energetico

PARAMETER	VALUE	CRITERIA	SCORE
2.1 Annual energy demand		<ol style="list-style-type: none"> ≤ 40 kWh/m² ≤ 60 kWh/m² ≤ 80 kWh/m² ≤ 120 kWh/m² 	

Energia rinnovabile

PARAMETER	VALUE	CRITERIA	SCORE
2.2 Origin of energy supply		<ol style="list-style-type: none"> 100% or more of the energy used in the building is produced on the plot or in a nearby system ≥ 75% of the energy used in the building is produced on the plot or in a nearby system ≥ 50% of the energy used in the building is produced on the plot or in a nearby system ≥ 25% of the energy used in the building is produced on the plot or in a nearby system 	

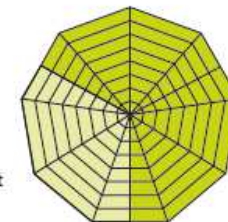
Prestazione energetica

PARAMETER	VALUE	CRITERIA	SCORE
Annual primary energy performance		<ol style="list-style-type: none"> ≤ 40 kWh/m² for the building 0-35 kWh/m² for the building 15-30 kWh/m² for the building ≥ 30 kWh/m² for the building 	

Active House: approfondimenti

Ambiente

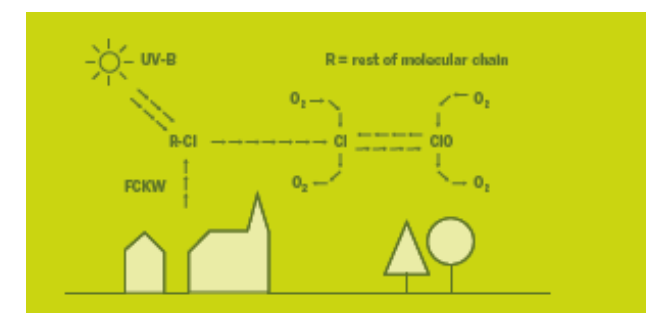
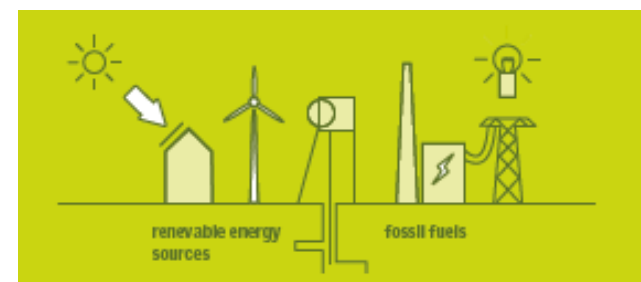
Environment



Le sfide che affrontiamo in ambito ambientale si giocano a livello locale, regionale e globale.

Nella progettazione di una Active House è importante che tali sfide vengano prese in considerazione. Soprattutto con l'obiettivo di ottenere una nuova generazione di edifici con un impatto positivo sull'ambiente.

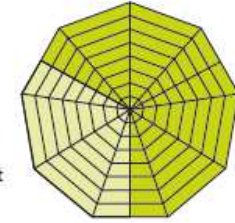
Già in fase di progettazione dovrebbero essere fatte delle considerazioni in merito a come le Active House utilizzano materiali edilizi e risorse.



Active House: approfondimenti

Ambiente

Environment



Carico ambientale

PARAMETER	VALUE	CRITERIA	SCORE
3.1.1 Building's primary energy consumption during entire life cycle		<ol style="list-style-type: none"> < -150 kWh/m²×a < 15 kWh/m²×a < 150 kWh/m²×a < 200 kWh/m²×a 	
3.1.2 Global warming potential (GWP) during building's life cycle.		<ol style="list-style-type: none"> < -30 kg CO₂-eq./m²×a < 10 kg CO₂-eq./m²×a < 40 kg CO₂-eq./m²×a < 50 kg CO₂-eq./m²×a 	
3.1.3 Ozone depletion potential (ODP) during building's life cycle.		<ol style="list-style-type: none"> < 2.25E-07 kg R_n-eq./m²×a < 5.3E-07 kg R_n-eq./m²×a < 3.7E-06 kg R_n-eq./m²×a < 6.7E-06 kg R_n-eq./m²×a 	
3.1.4 Photochemical ozone creation potential (POCP) during building's life cycle.		<ol style="list-style-type: none"> < 0.0025 kg C₂H₄-eq./m²×a < 0.0040 kg C₂H₄-eq./m²×a < 0.0070 kg C₂H₄-eq./m²×a < 0.0085 kg C₂H₄-eq./m²×a 	
3.1.5 Acidification potential (AP) during building's life cycle.		<ol style="list-style-type: none"> < 0.010 kg SO₂-eq./m²×a < 0.075 kg SO₂-eq./m²×a < 0.100 kg SO₂-eq./m²×a < 0.125 kg SO₂-eq./m²×a 	
3.1.6 Eutrophication potential (EP) during building's life cycle.		<ol style="list-style-type: none"> < 0.0040 kg PO₄-eq./m²×a < 0.0055 kg PO₄-eq./m²×a < 0.0085 kg PO₄-eq./m²×a < 0.0105 kg PO₄-eq./m²×a 	
TOTAL AVERAGE:			

Consumo di acqua

PARAMETER	VALUE	CRITERIA	SCORE
3.2.1 Minimisation of freshwater consumption during building's use		<p>Calculation is based on the national average water consumption per building per year</p> <ol style="list-style-type: none"> Improvement ≥ 50% (vs average) Improvement ≥ 30% Improvement ≥ 20% Improvement ≥ 10% <p>$\% = \frac{\text{National average} - \text{building consumption}}{\text{National average}} \times 100$</p>	

Edilizia sostenibile

PARAMETER	VALUE	CRITERIA	SCORE
3.3.1 Recyclable content		<p>By weight, the average of recycled content for all building materials (weighted by the proportion of the material in the building) could be:</p> <ol style="list-style-type: none"> ≥ 50% ≥ 30% ≥ 10% ≥ 5% <p>80% of the weight of the building should be accounted for. (In the recycled content, we take into account internal, pre-consumer and post-consumer recycling).</p>	
3.3.2 Responsible sourcing		<ol style="list-style-type: none"> 100% of the wood used is certified (FSC, PEFC) and 80% of the new material suppliers have a certified EMS 80% of the wood used is certified (FSC, PEFC) and 50% of the new material suppliers have a certified EMS 65% of the wood used is certified (FSC, PEFC) and 40% of the new material suppliers have a certified EMS 50% of the wood used is certified (FSC, PEFC) and 25% of the new material suppliers have a certified EMS 	
TOTAL AVERAGE:			

Active House: approfondimenti

Manuale sui dettagli tecnici

La seconda edizione del manuale può essere scaricato dalla homepage del sito Active House:

www.activehouse.info

Sono disponibili alcune copie.

Iscriviti alla newsletter:

www.activehouse.info



ACTIVE HOUSE - the specifications

for RESIDENTIAL BUILDINGS

2nd edition

The Specifications

Active House Alliance

Progetti in evidenza sulla homepage del sito



COMPLETION: 13 DECEMBER 2012
BOTTICELLI PROJECT - CASA ECO PASSIVHAUS
MASCALUCIA (CT) - SICILY, ITALY
Botticelli Project intends to diffuse concept of Active House building which focus the Third Industrial Revolution (3I)



COMPLETION: APRIL 2009
HOME FOR LIFE
LISTRUP, DENMARK
Home for Life is inspired by a traditional Danish 19th century home. Home for Life has a relatively small surface with many p...



COMPLETION: 2009
OSRAM CULTURE CENTRE
COPENHAGEN, DENMARK
A very attractive energy and indoor climate renovation of a former industrial building, now in use as a cultural centre as part of a neighbourhood renewal project.



COMPLETION: AUGUST 2011
CARBONLIGHT HOMES
KETTLEBANG, UNITED KINGDOM (GREAT BRITAIN)
The CarbonLight Homes provide bright, healthy living & efficiency and a respect for the environment. This project understanding of sustainable living...



COMPLETION: UNDER CONSTRUCTION
HOTT | HOUSE OF TOMORROW
STREKSEL, NETHERLANDS
HoTT is dutch's first building completely designed by Silmbouwen and Active House. The layout is based on residential program.



COMPLETION: OCTOBER 2009
SOLAR-ACTIVEHOUSE
KRAIG, AUSTRIA
Energy used for heating/hot water - whether its from wood, coal, oil or natural gas - has literally been burned up. A solution is the solar-activehouse



COMPLETION: MARCH 2012
DE POORTERS VAN MONTFOORT
MONTFOORT, NETHERLANDS
De Poorters of Montfoort are the first houses in the Netherlands to be built according to the principles of Active House, using a sustainable renovation by VELUX Group and Danfoss...



COMPLETION: SEPTEMBER 2009
HOUSE OF THE FUTURE
REGENSBURG, GERMANY
How will we live and heat our homes in the future? Regensburg, Germany impressively demonstrates it



COMPLETION: NOVEMBER 2010
SOLHUSET - DENMARK'S MOST CLIMATE FRIENDLY NURSERY
HØRSHOLM, DENMARK
Children in Hørsholm can now play in the most climate-friendly nursery in Denmark.



COMPLETION: JUNE 2012
ECO-ENERGY RETROFIT
BELFAST, UNITED KINGDOM (GREAT BRITAIN)
Retrofitting an 1896 solid wall terraced house within the Trias Energetics concept and Active House principles against a 1990 baseline



COMPLETION: SEPTEMBER 2011
ISOBO AKTIV - A HOUSE FOR TOMORROW
SANDNES, NORWAY
Jedarius was among the first in Norway to develop this category. ISOBO, was established in 2003. The new active design...



COMPLETION: OCTOBER 2010
SUNLIGHTHOUSE
PRESSAU, VIENNA, AUSTRIA
Sunlighthouse is Austria's first carbon-neutral single-family house. Nestled in a wooded, mountainous region, the home's sloping roof and architectural elements take full advantage of the sun to...



COMPLETION: NOVEMBER 2009
ENERGYFLEXHOUSE
TÅSTRUP, COPENHAGEN, DENMARK
EnergyFlexHouse is two one's family houses, each of 2 bedrooms, and the other building is a one family in...



COMPLETION: NOVEMBER 2010
LICHTAKTIV HAUS
HAMBURG, GERMANY
LichtAktiv Haus is an energy-efficient renovation of...



COMPLETION: SEPTEMBER, 2011
THE FIRST ACTIVE HOUSE IN RUSSIA
MOSCOW, RUSSIAN FEDERATION
The First Active House in Russia is designed to set a new standard for residential house construction in Russia. The house design is based on the Active House principles.



COMPLETION: 19.10.2012
GREAT GULF ACTIVE HOUSE
THOROLD, ONTARIO, CANADA
Great Gulf Active House was achieved through a collaboration of architects, the award-winning Toronto architecture firm committed to...



COMPLETION: 2012
LUMINA HOUSE
DLUGOSZKA, POLAND
Lumina House is an energy efficient, ecological so comfortable, intelligent, optimal and affordable new...



COMPLETION: DECEMBER 2012
TRANSFORMATION POORTERS VAN MONTFOORT
MONTFOORT, NETHERLANDS
- DE POORTERS VAN MONTFOORT - Light is an experience, air is the future and space makes living possible.



COMPLETION: 2009
GREEN LIGHTHOUSE
COPENHAGEN, DENMARK
Green Lighthouse is Denmark's first public CO2 neutral building, achieved through a close public/private partnership.



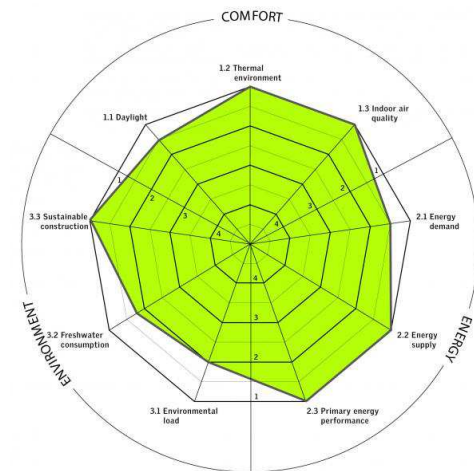
COMPLETION: APRIL 2012
NATURFREUNDEHAUS KNOFELEE
SCHWEEBISCHGRUB/KNOPELBERG 4-0852 HIRSCHWANG, AUSTRIA
The old hut burned down in April. New building is more friendly than the old one and more user-friendly for...



COMPLETION: 2011
VELUXLAB
MILAN, ITALY
VELUXLab is the first Italian nearly zero energy building in a University Campus. It is placed in Bovisio Campus of Politecnico of Milan and it is a new laboratory for research.

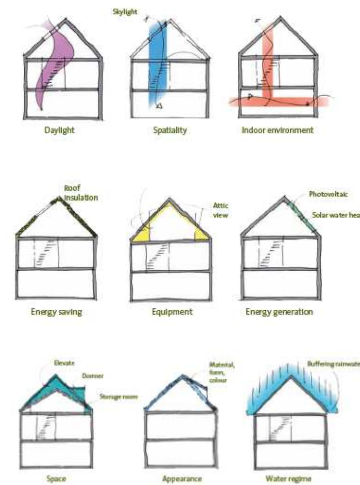
Active House

Great Gulf Active House



Active House

Ristrutturazione Montfoort



Project description

Building name:	De Poorters van Montfoort
Building type:	10 terraced single-family homes
Location:	Montfoort, the Netherlands
Active House evaluation basis:	Renovation
No. of storeys and areas	3 floors
Heated floor area:	Gross m ² 131 m ² Net m ² 122 m ²
Primary constructions:	Internal and external walls of bricks. Bearing interior walls of concrete. Concrete slabs.
Primary heating supply:	Electricity
Heating system:	Water-water heat pump supplemented by thermal solar collectors
Renewable energy:	Thermal solar collectors and heat pump for hot water supply and room heating. PV for electricity generation.



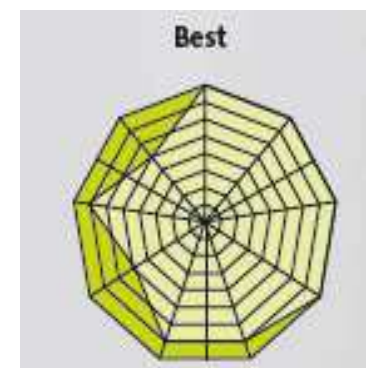
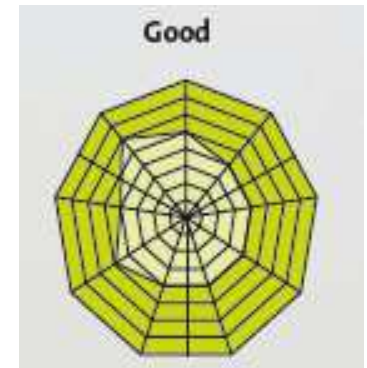
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Ristrutturazione Montfoort



The general Active House Radar is calculated based on the performance before and after the renovation.

- Calculation performance after renovation
- Calculation performance before renovation



Active House

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ISCRIVITI ALLA NEWSLETTER

NEWS & KNOWLEDGE

16. OCTOBER 2013

ACTIVE HOUSE COMES TO CANADA

NEWS | TIFFANY FUHLER

October 16: Opening of the Great Gulf Active House in Canada. It is built in Thorold, Ontario, a community located near the Niagara Region and roughly 90 minutes west from Toronto. This

13. OCTOBER 2013

FREE WEBINAR OCTOBER 24: MULTI-COMFORT HOUSE IN BELARUS

NEWS | TIFFANY FUHLER

Hear from the architect, Alexander Kucheravy, about his thoughts and process behind the design of the house. The Multi-Comfort House in Belarus is an international project implemented by SAINT-GOBAIN...

9. OCTOBER 2013

REHVA JOURNAL

NEWS | TIFFANY FUHLER

REHVA Journal is a technical, practical journal for the HVAC industry professionals. It is read by Designers, Consultants, Manufacturers, Investors, Mechanical Contractors, Sales and Representative...

8. OCTOBER 2013

NORDIC PASSIV HOUSE CONFERENCE OCTOBER 15-17 IN GÖTEBORG

NEWS | TIFFANY FUHLER

For the 6th time Nordic and European experts will present and discuss the latest developments, future possibilities and barriers to overcome within low energy buildings. This year the Nordic platform...

30. SEPTEMBER 2013

ENGLISH SYMPOSIUM IN BUDAPEST ON OCTOBER 30TH

NEWS | TIFFANY FUHLER

PROGRAM has been updated and is now complete. REGISTER for € 39,00. The topic of the symposium is the development of Nearly Zero-Energy buildings and the long term political targets for...

HIGHLIGHTS



COMPLETION: DECEMBER 2012

TRANSFORMATION POORTERS VAN MONTFOORT

MONTFOORT, NETHERLANDS

- DE POORTERS VAN MONTFOORT - Light is an experience, air is the future and space makes living possible.



COMPLETION: NOVEMBER 2010

SOLHUSET - DENMARK'S MOST CLIMATE FRIENDLY NURSERY

HØRSHOLM, DENMARK



NEWSLETTER

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ACTIVE HOUSE NEWSLETTER

15:2013
OCTOBER 2013



UPCOMING EVENTS

Join us on October 30: Symposium Sustainable comfort in buildings in Budapest!

The topic of this year's Active House symposium is the development of nearly zero-energy buildings and the long term political targets for sustainable buildings in Europe. The talks are divided into three sessions:

- political targets and the human need for sustainable buildings with healthy comfort
- an overview of the Hungarian experience and examples of local projects
- a presentation of the Active House specifications and examples of international green architecture.

The symposium will end with a plenary debate on sustainable buildings with focus on human well-being and comfort. Complete program. Participation fee: € 39,00. To register.

October 24: Webinar Multi-Comfort House in Belarus on the architect, Alexander Kucheravy, about his process behind the design of the house. The Multi-Comfort House in Belarus is an international project implemented by SAINT-GOBAIN, VELUX Belarus, and Karkasnyy Dom (Modern Frame House LLC) and designed by Belarusian architect Alexander Kucheravy. The house was opened for visitors on 23 May 2013. Find more information about the The Multi-Comfort House in Belarus here. Date and time: 24 October from 15.00 – 16.00 CET. Send us an e-mail at secretariat@activehouse.info if you wish to follow the webinar.



Nordic Passiv House conference

The Active House Alliance participates at the sixth Passivhus Norden conference where Nordic and European experts will meet, present and discuss the latest developments, future possibilities and barriers to overcome within low energy buildings. The conference will take place from October 15-17 and include a presentation by Carsten Østergaard Pedersen on the Active House vision for buildings.

NEWS

Active House open in Canada
The Great Gulf Active House in Canada opens on October 16. Niels Bohr Abramsen, the Danish ambassador to Canada will be the guest of honor at this official opening. Follow the building through LIVE updates. If you wish to attend RSVP to activehouse@greatgulf.com.



Active House Alliance nominated in Denmark

The national Danish radio and the newspaper "Information" launched a national project with the purpose of sharing knowledge about sustainable projects which are initiated by citizens, businesses and organisations. More than 400 projects were presented. The Active House Alliance made it to the final round as one of 27 projects.



CESBA

CESBA is on the one hand a methodology to assess existing and new buildings and on the other hand a framework of EU projects to reach higher convergence by a common process. Active House will participate in the next workshop to be organized in October on the 21-23 in Austria.



Sustainable Buildings: an EU Commission initiative

The European Commission wants to gather views and additional information on the possible introduction of EU wide measures to achieve better environmental performance of buildings. The Active House Alliance has given comments, input and additional information to the European Commission.

Busy summer

During the summer, the Active House Alliance gave presentations and organized side events at several European conferences on sustainable buildings. Among others: CLIMA2013 and SB13 both organized in Prague, The Ventilative Cooling conference in Athens, as well as being present at PLEA in Munich.



Grazie per l'attenzione!

Vuoi far parte dell'Alleanza e seguirne gli sviluppi?
www.activehouse.info

Contatta la segreteria:
secretariat@activehouse.info

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Bolzano, 16 aprile 2014

Il protocollo Active House in clima mediterraneo:

ricerche e sperimentazioni sviluppate nel laboratorio VELUXlab al Politecnico di Milano

Gabriele Masera – Politecnico di Milano



POLITECNICO DI MILANO

VELUX[®] lab



Non è la specie più forte o la più intelligente a sopravvivere ma quella che si adatta meglio al cambiamento.

*Charles Darwin, **L'origine delle Specie**, 1859*





Net Zero Energy Emissions

Net Zero Energy Emissions

Net Zero Source Energy

Net Zero Site Energy

Net Zero Source Energy

Net Zero Source Energy

Net Zero Site Energy

Net Zero Site Energy

Net Zero Energy Costs

Net Zero Energy Emissions

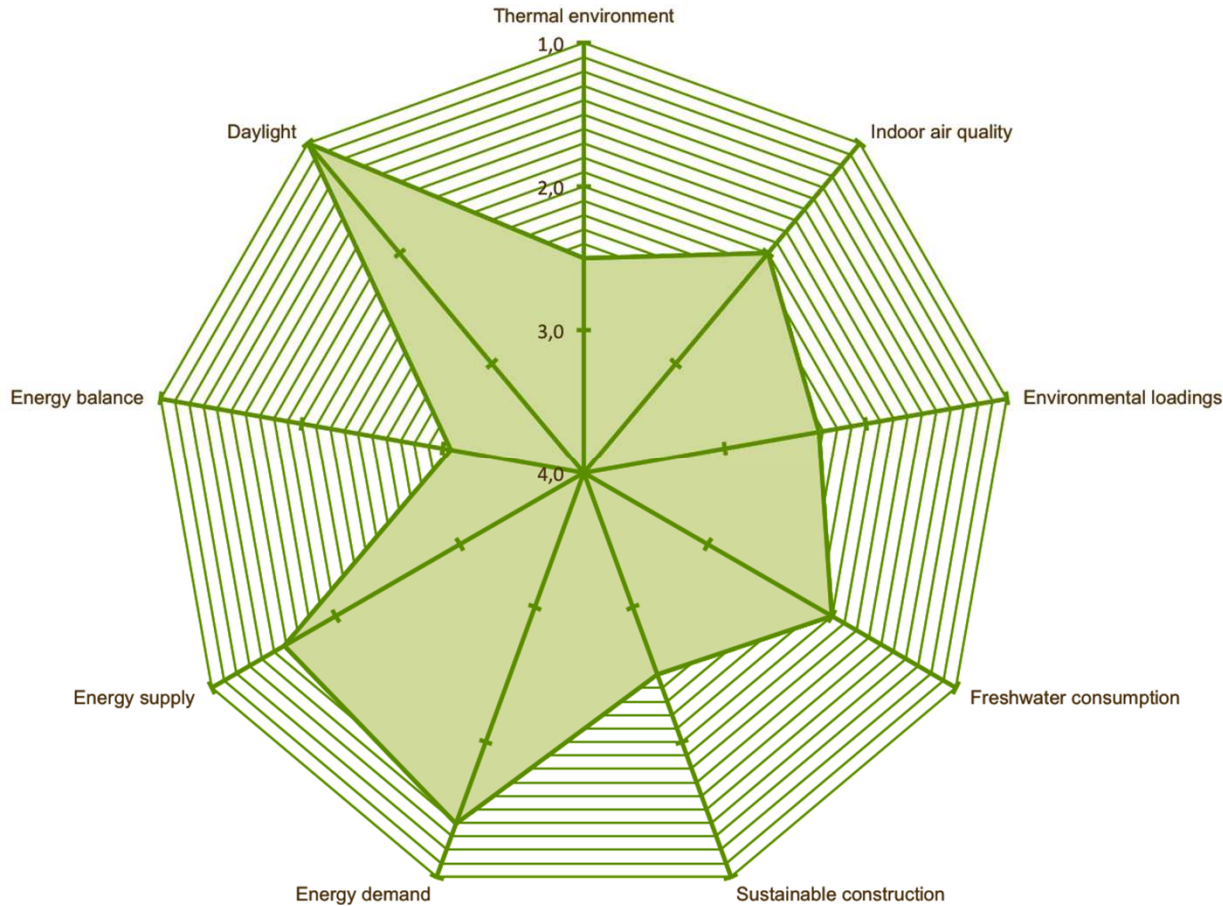
Net Zero Energy Costs

Net Zero Energy Emissions

Net Zero Energy Costs

Net Zero Site Energy

Dati Radar

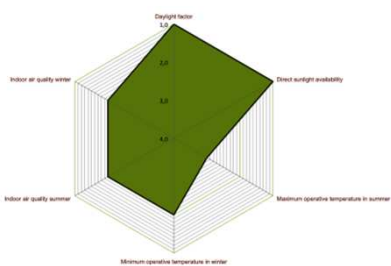


activehouse.INFO
NETWORK AND KNOWLEDGE SHARING

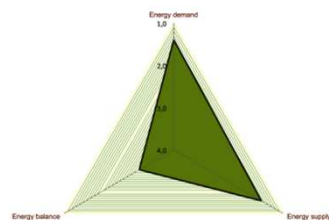
Primo edificio italiano "Net Zero Energy" inserito in un campus universitario

Prima Active House registrata in Italia

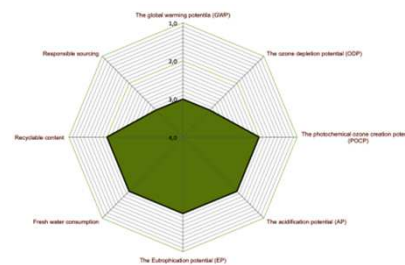
Comfort



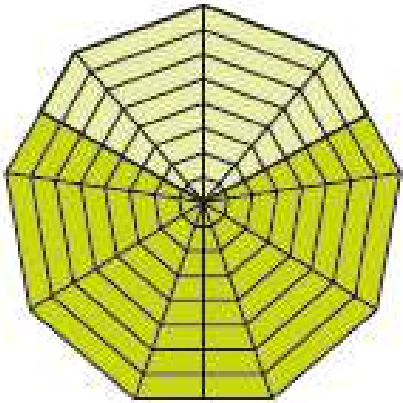
Energia



Ambiente



COMFORT





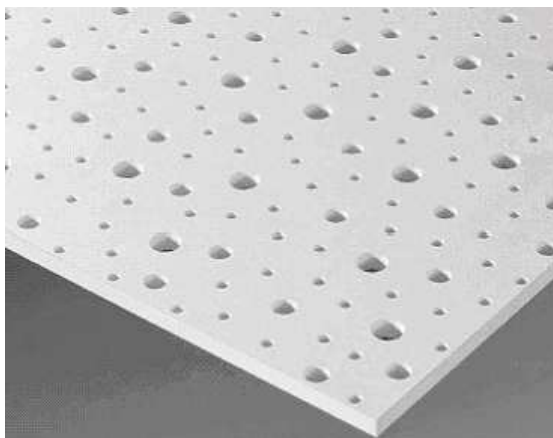
Componenti



Struttura in acciaio, solaio a pavimento in lamiera grecata e getto collaborante



Iper-isolamento in poliuretano, polistirene, in lana minerale e lana di legno



Pannello in gesso e zeolite KNAUF-CLENEO



Vetrata triplo vetro basso emissivo. Serramento a taglio termico SCHÜCO

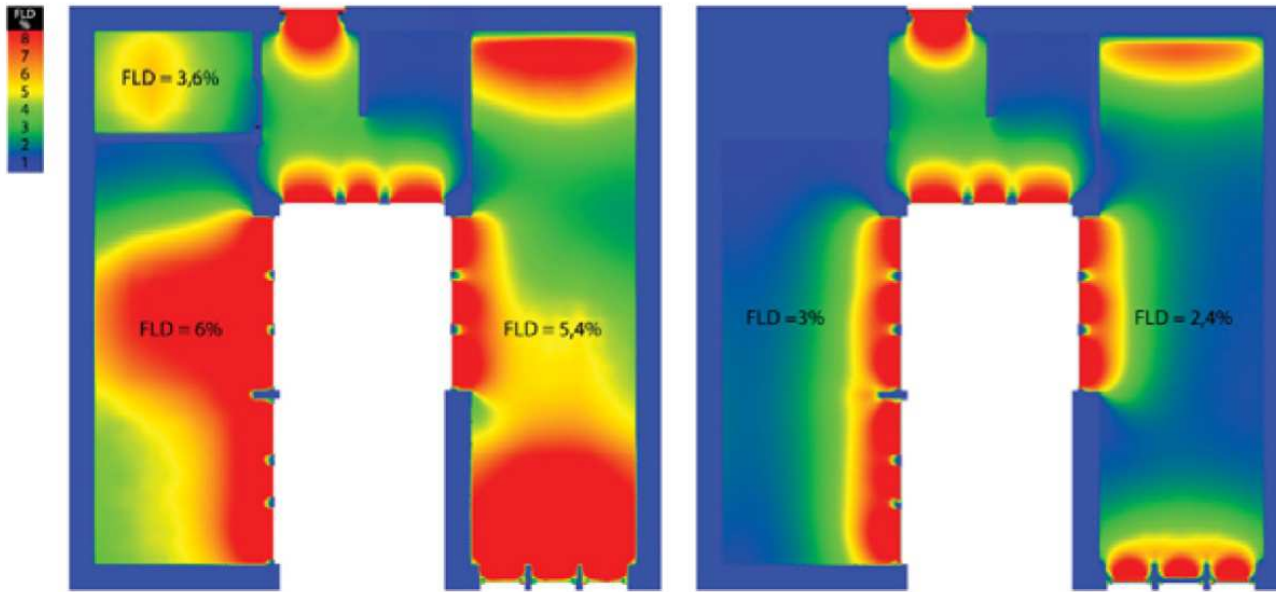


Finestre tetto VELUX ad alte prestazioni

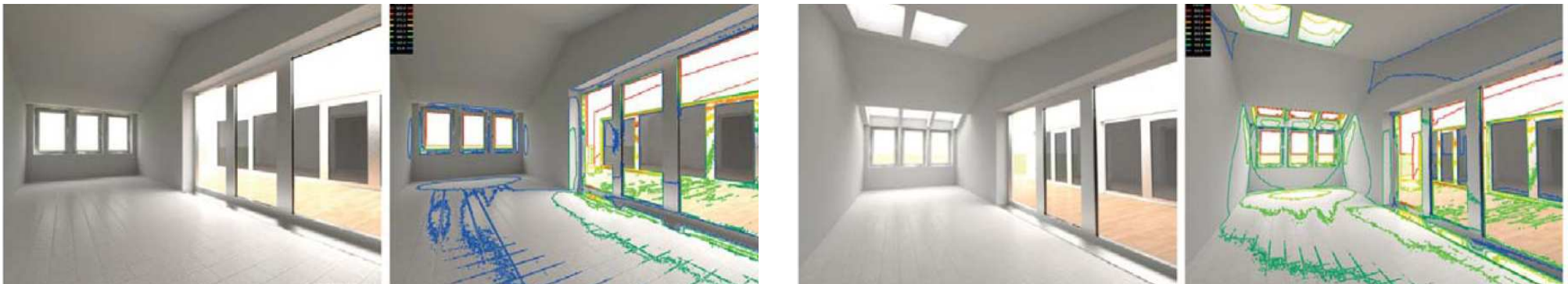
Controsoffitto "Knauf-Cleaneo"



Analisi illuminotecniche

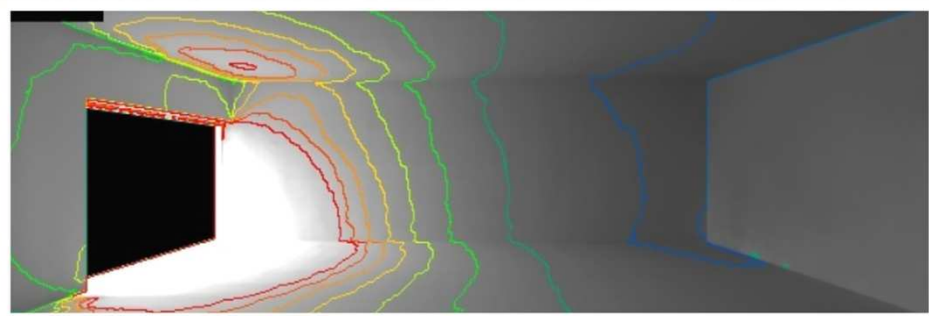


Fattore medio di luce diurna e Rapporto aeroilluminante. Nella situazione reale (a sinistra), la luce zenitale assicura alti valori di FLD (blu-verde scuro) e di RAI (0,10 minimo - Comune di Milano), rispetto alla situazione di studio (a destra) priva di aperture zenitali.

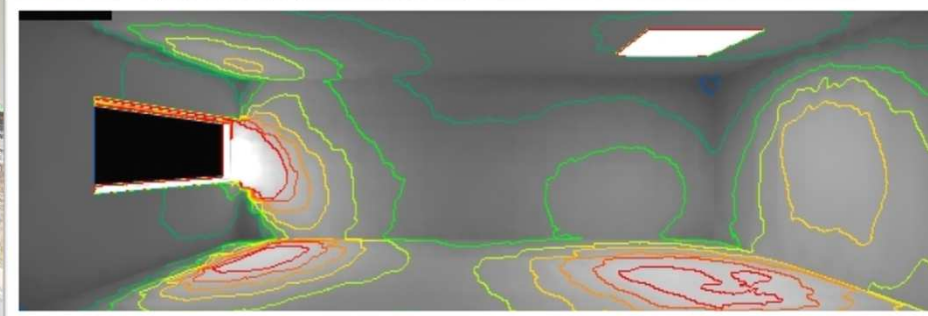


Luminanza. Il confronto della luminanza (21 Giugno - h 12:00) fra la situazione reale (in presenza di lucernari) e di studio (in assenza di lucernari), mostra come la luce zenitale renda i valori più omogeneamente distribuiti all'interno dei locali. Inoltre, il fenomeno dell'abbagliamento è ben controllato dai sistemi di schermatura posti all'esterno.

Distribuzione della luce con aperture zenitali



6m² superficie vetrata
154 lux medi



4m² superficie vetrata (-33%)
225 lux medi (+45%)

Agua de MARMORE



Team:

Luigi Ferrario
Camilla Massironi
Alice Schinella

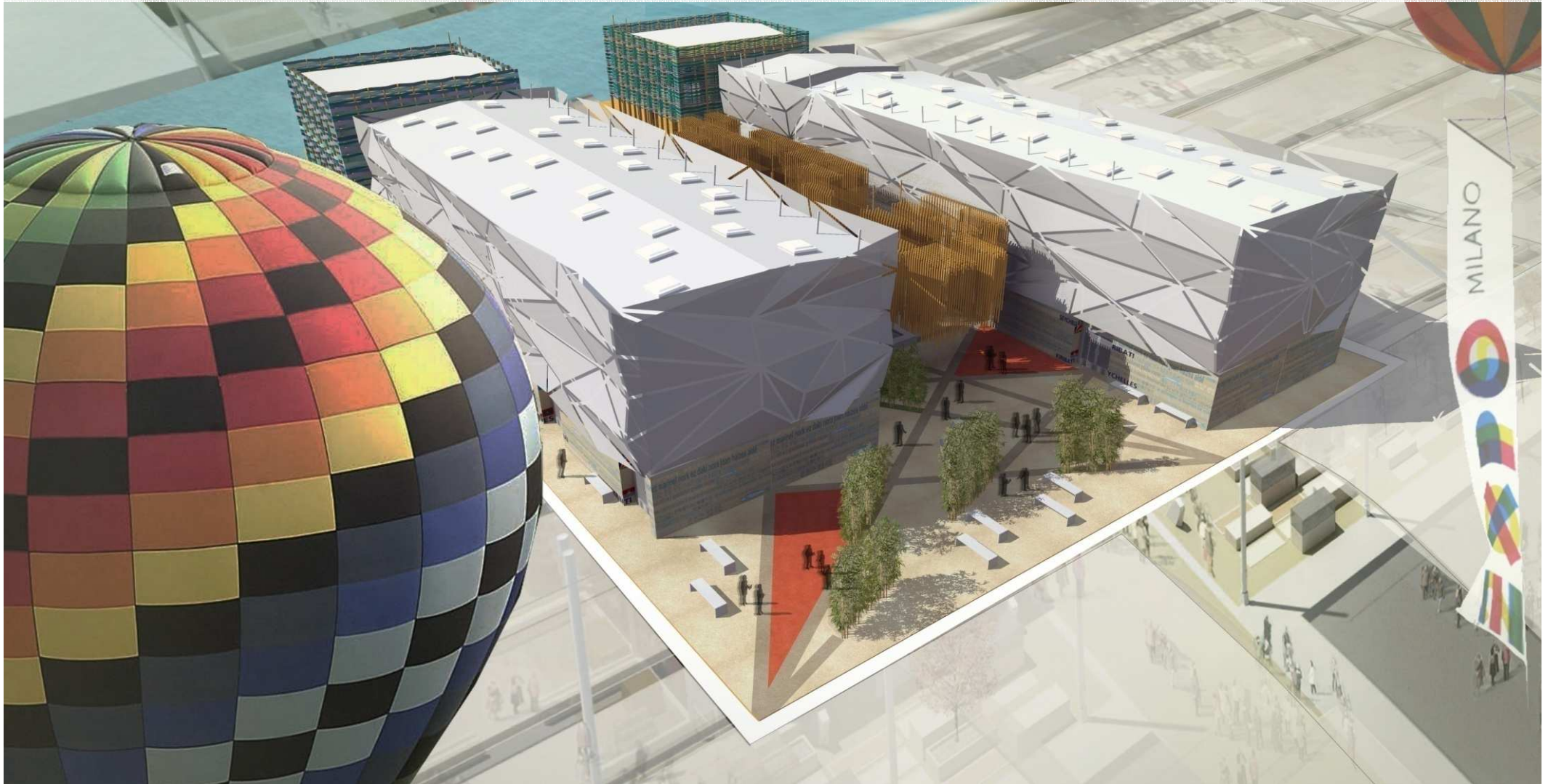


Fig. 3.4.58



Fig. 3.4.59





Team:

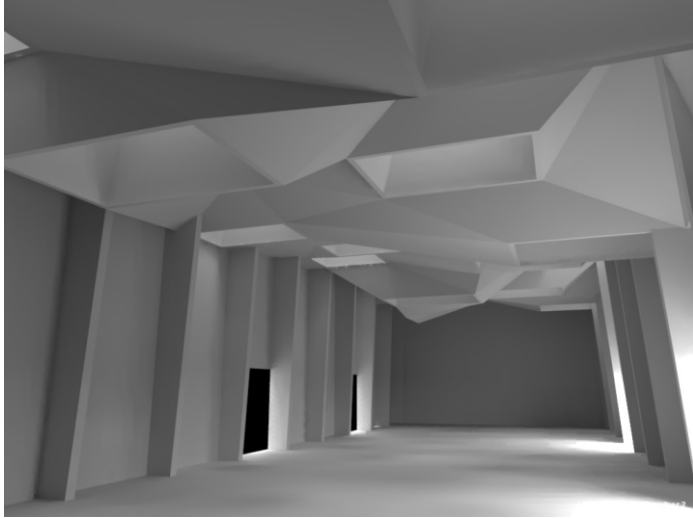


MILANO 2015

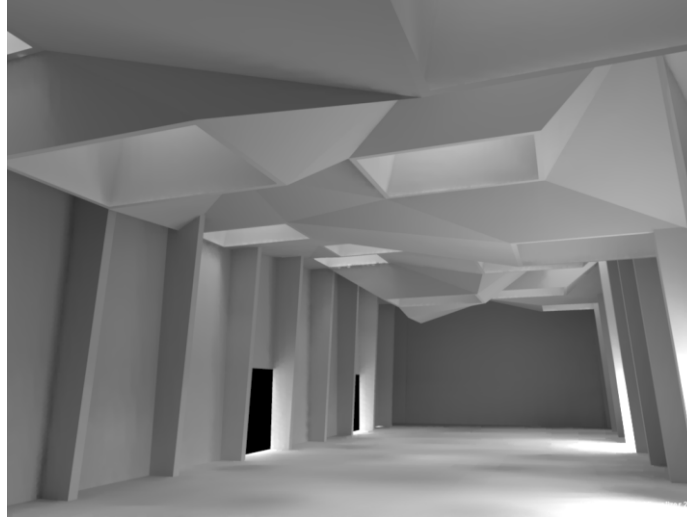
NUTRIRE IL PIANETA
ENERGIA PER LA VITA

Giuliana Iannacone
Andrea Vanossi
Paola Trivini
Valentina Gallotti
Chiara Valsecchi

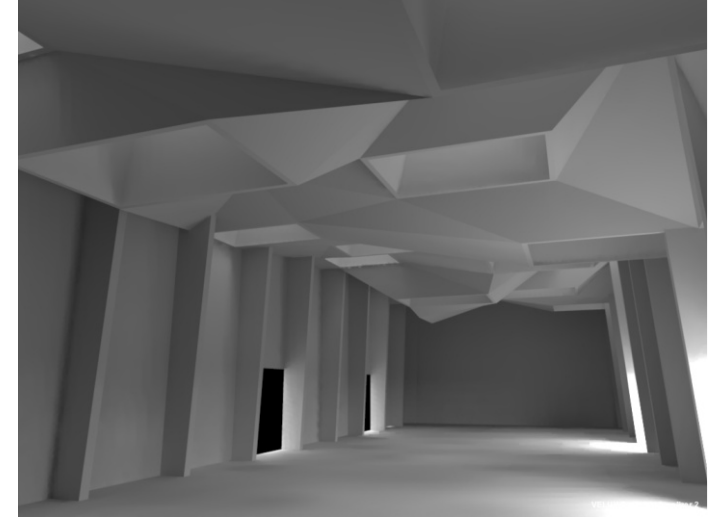
Analisi illuminotecniche



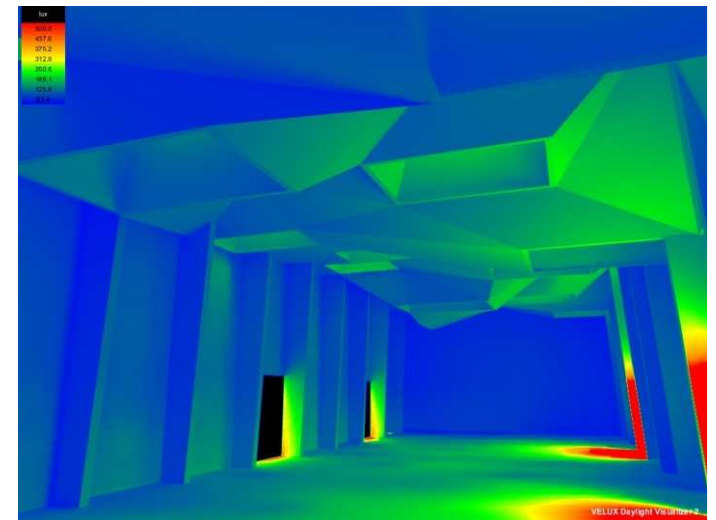
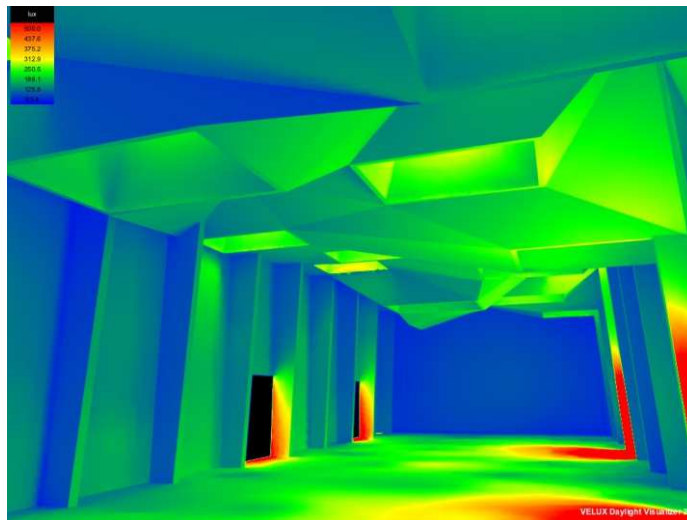
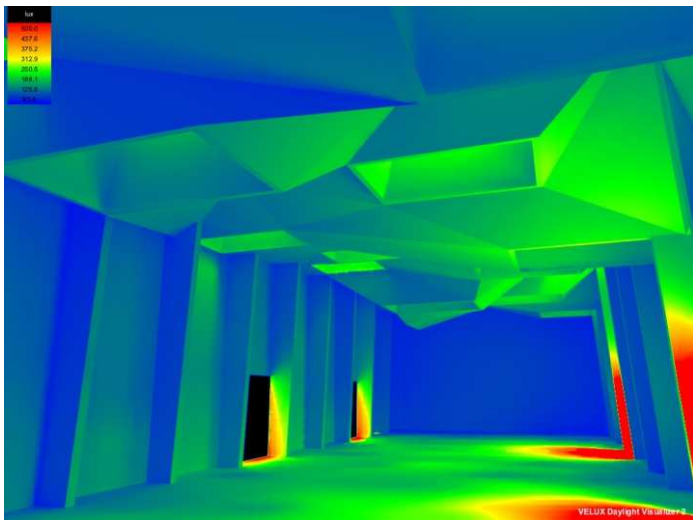
21 aprile



21 giugno



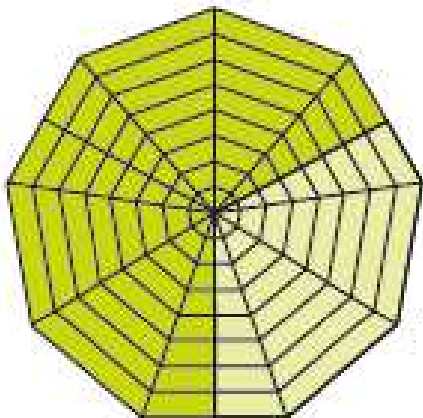
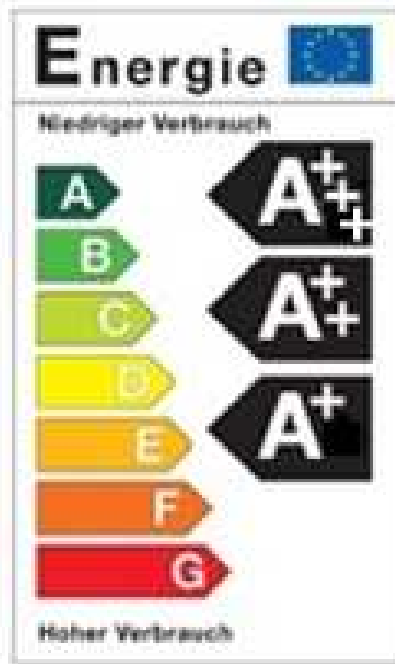
21 ottobre



ILLUMINANZA - Padiglione EST - Cielo parzialmente coperto

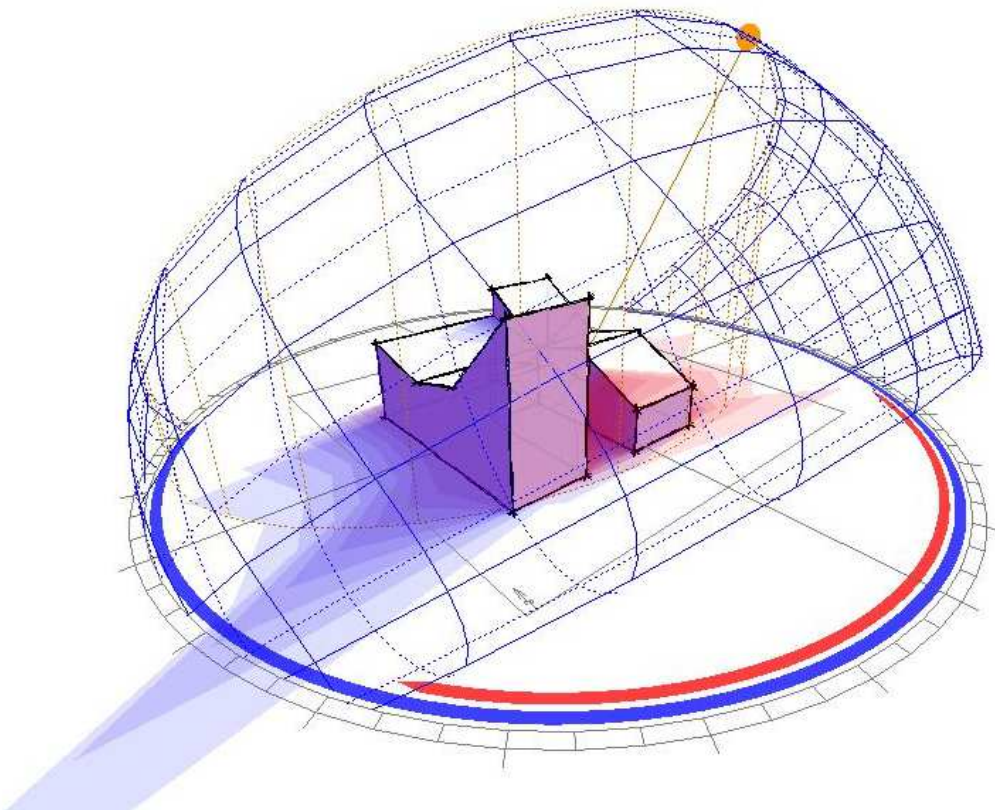
In condizioni di cielo coperto è possibile verificare ottimi livelli di illuminamento dell'intero spazio espositivo con valori di illuminanza omogenei e prossimi ai 250 lux. È quindi possibile verificare l'efficacia dei "Vulcani di luce" anche in condizioni meteo meno favorevoli.

ENERGIA

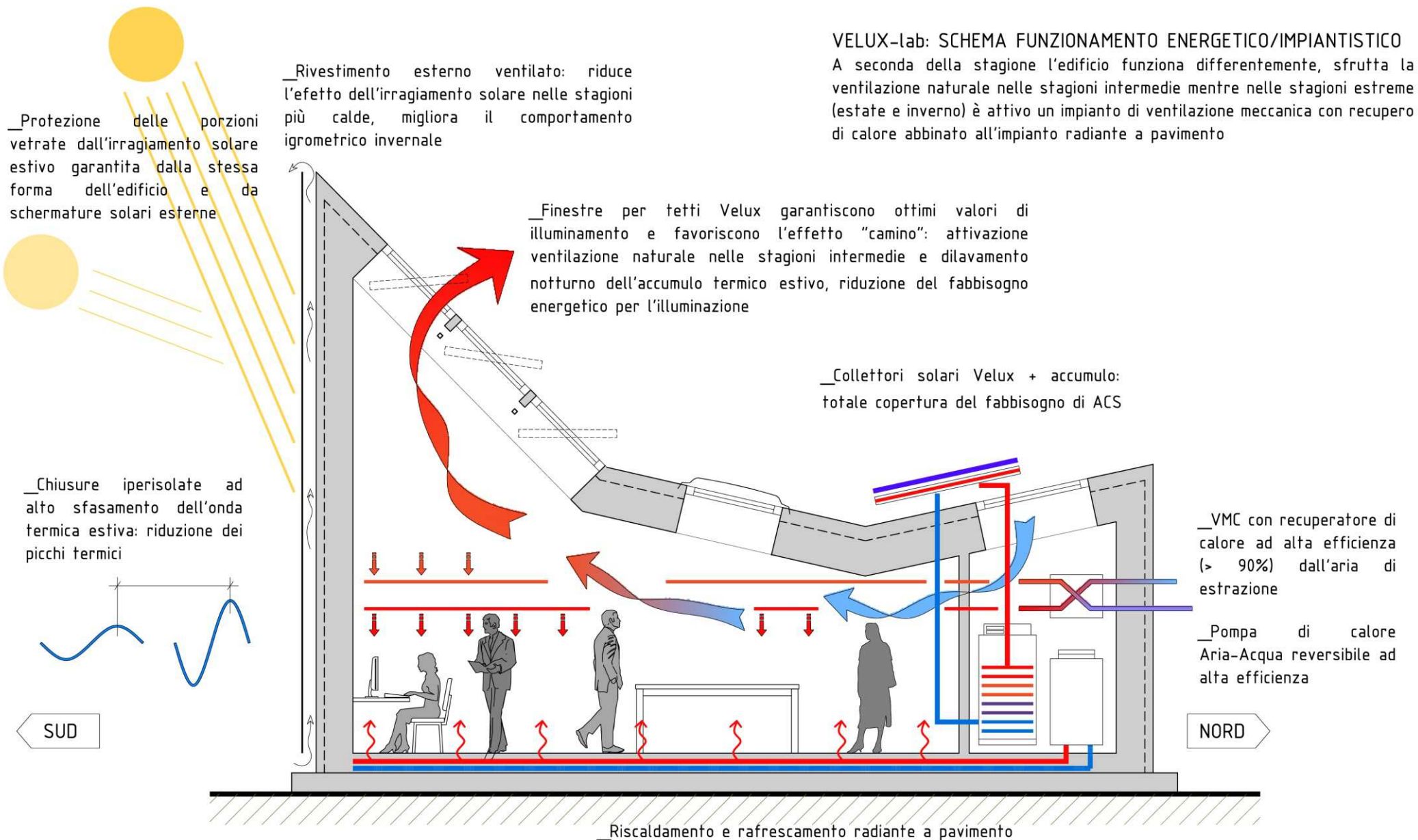


VELUXlab:

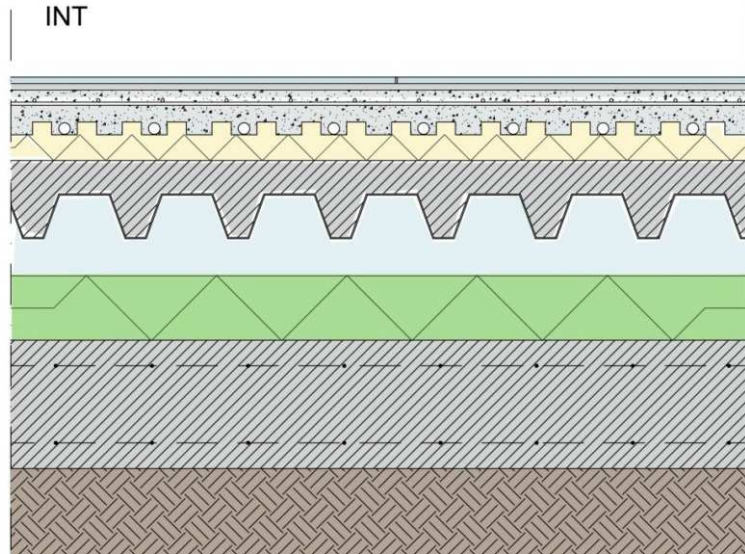
- _ ottimizzazione luce e ventilazione naturale
calcolo FLD
- _ ottimizzazione energetica
- _ rilevazione dati continua



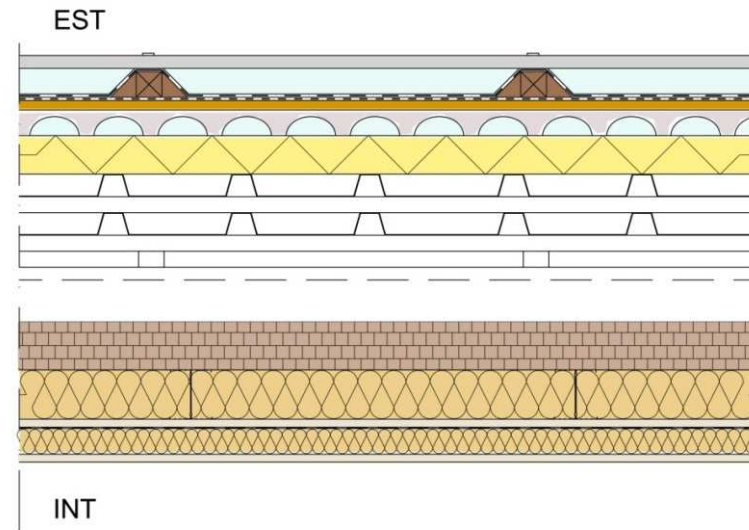
Schema energetico



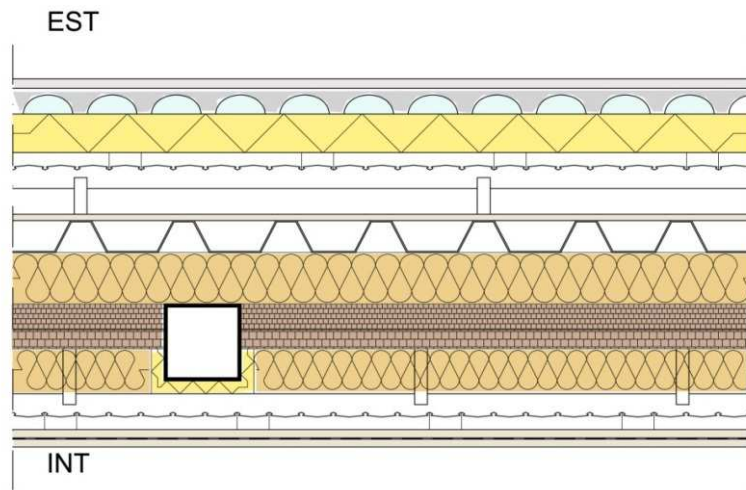
Prestazioni



▲ **Solaio controterra $U = 0.214 \text{ W/m}^2\text{K}$**
Ground floor slab



▲ **Copertura $U = 0.133 \text{ W/m}^2\text{K}$**
Roof



▲ **Chiusura esterna $U = 0.124 \text{ W/m}^2\text{K}$**
External wall



Impianti



Ventilazione meccanica (portata massima 470 m³/h) con recuperatore di calore (>90%)



Riscaldamento (90 W/m²) e raffrescamento (30 W/m²) radiante a pavimento

Pompa di calore aria-acqua (7 kW per riscaldamento, 6.1 kW per il raffrescamento). Solare termico (3 collettori solari, 160 l serbatoio di accumulo)



Sistema di monitoraggio Wireless



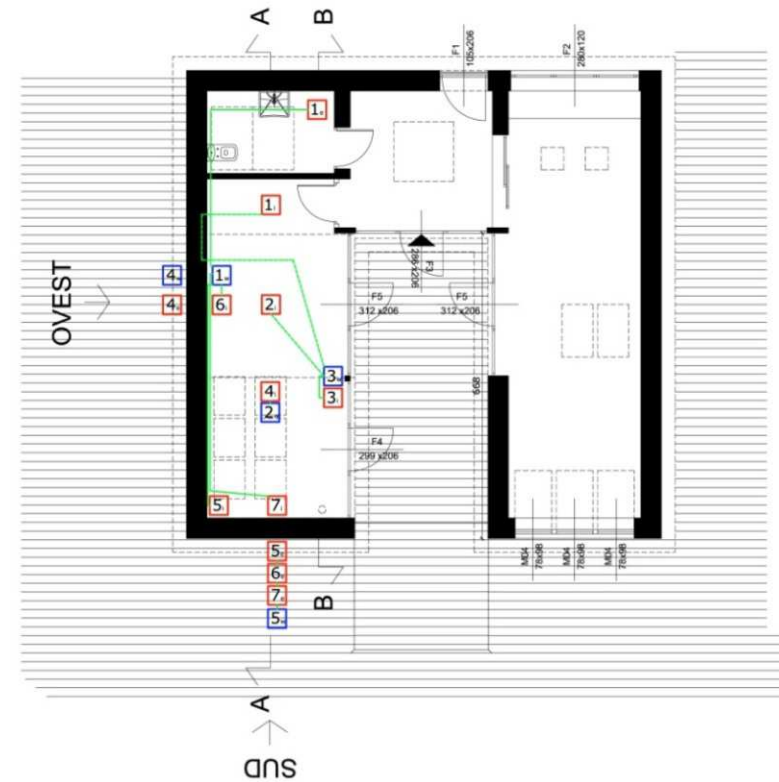
Politecnico di Milano
Dipartimento di Energia, Dipartimento BEST,
Dipartimento di Elettronica e Informazione

VELUX-LAB

Schema monitoraggio edificio, Scala 1:100

NOTE:

- Sonda 1e: sonda esterna sottopavimento, passaggio attraverso foro di scarico WC
- Ricevitore 1w: posizionato incassato in parete con cassetta di ispezione per manutenzione
- Ricevitore 2w: fissato direttamente sul telaio mobile del lucernario per seguirne l'apertura
- Ricevitore 3w: installato incassato nella controparete di rivestimento del pilastro ispezionabile
- Ricevitore 4w/5w: installato all'esterno incassato nello strato di finitura/zoccolatura dell'edificio ispezionabile
- Sonda 1i e 2i: sonde poste a soffitto a contatto della finitura interna, tracciamento cavi a controsoffitto, allineate alle sonde 2e e 3e
- Sonda 3i: sonda a contatto del vetro serramento fisso
- Sonda 4i: installata a contatto della vetrata interna del lucernario di copertura
- Sonda 5i: installata a contatto della superficie di finitura del pavimento
- Sonda 6i: installata a contatto della finitura interna parete ovest, allineata con la sonda esterna 4e
- Sonda 7i: installata a contatto della finitura interna parete sud, allineata con le sonde esterne 5e/6e/7e



LEGENDA:

Sonde di temperatura superficiale (termoresistenze PT100, classe A)

4 — Numero progressivo
i= superficie interna e= superficie esterna

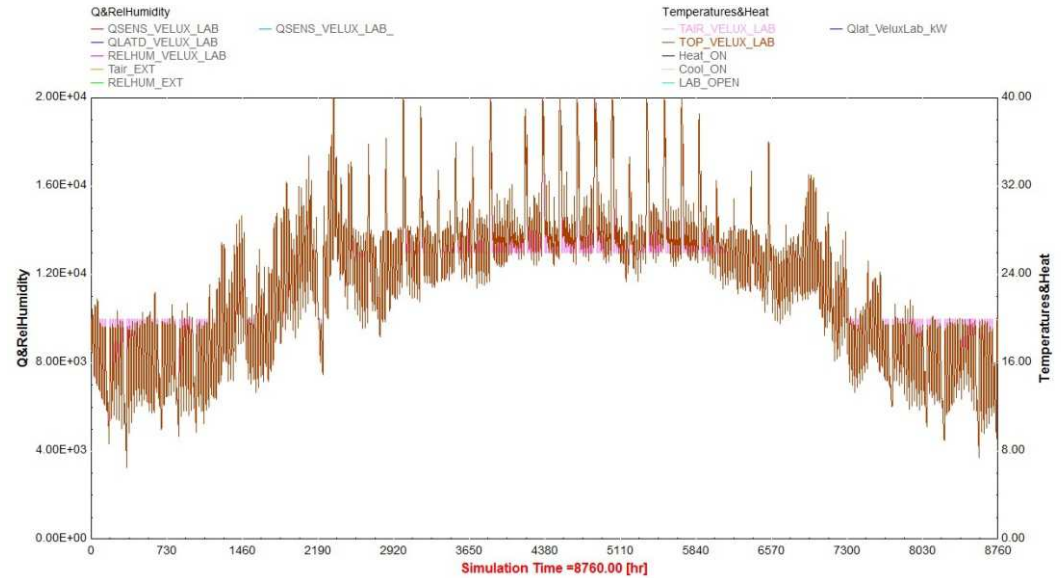
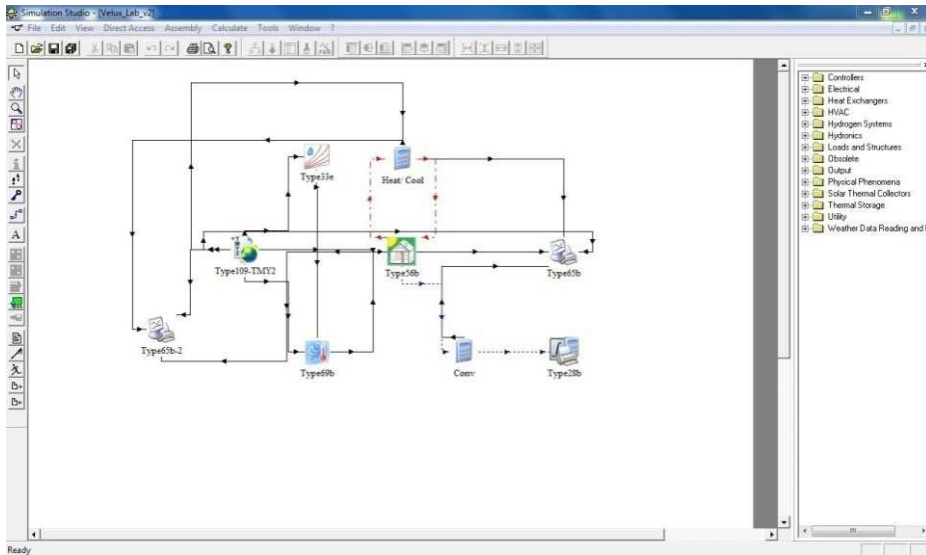
Ricevitori/trasmittitori senza fili

2_w — Numero progressivo
w= Wireless

ABACO:

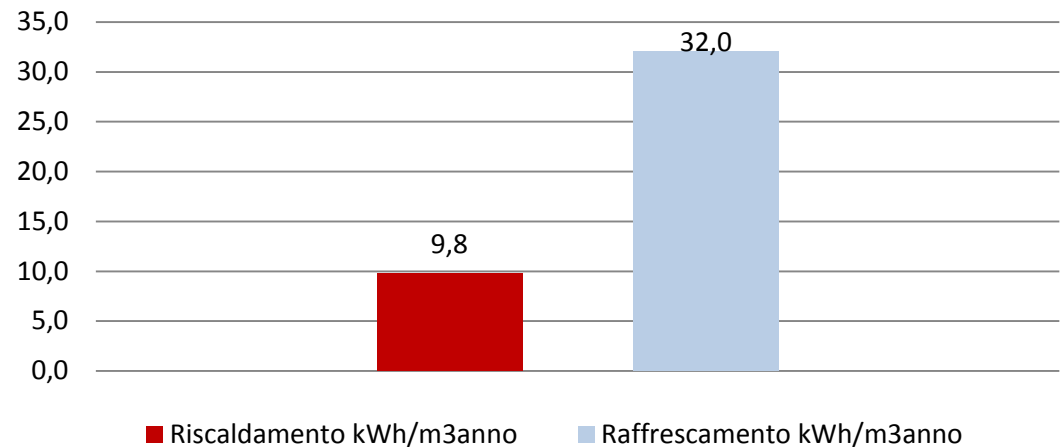
- n° 7 -Sonde di temperatura superficiale interna PT 1000
- n° 7 -Sonda di temperatura superficiale esterna PT 1000
- n° 5 -Ricevitori/trasmittitori wireless

Simulazioni energetiche e sistema di servizi

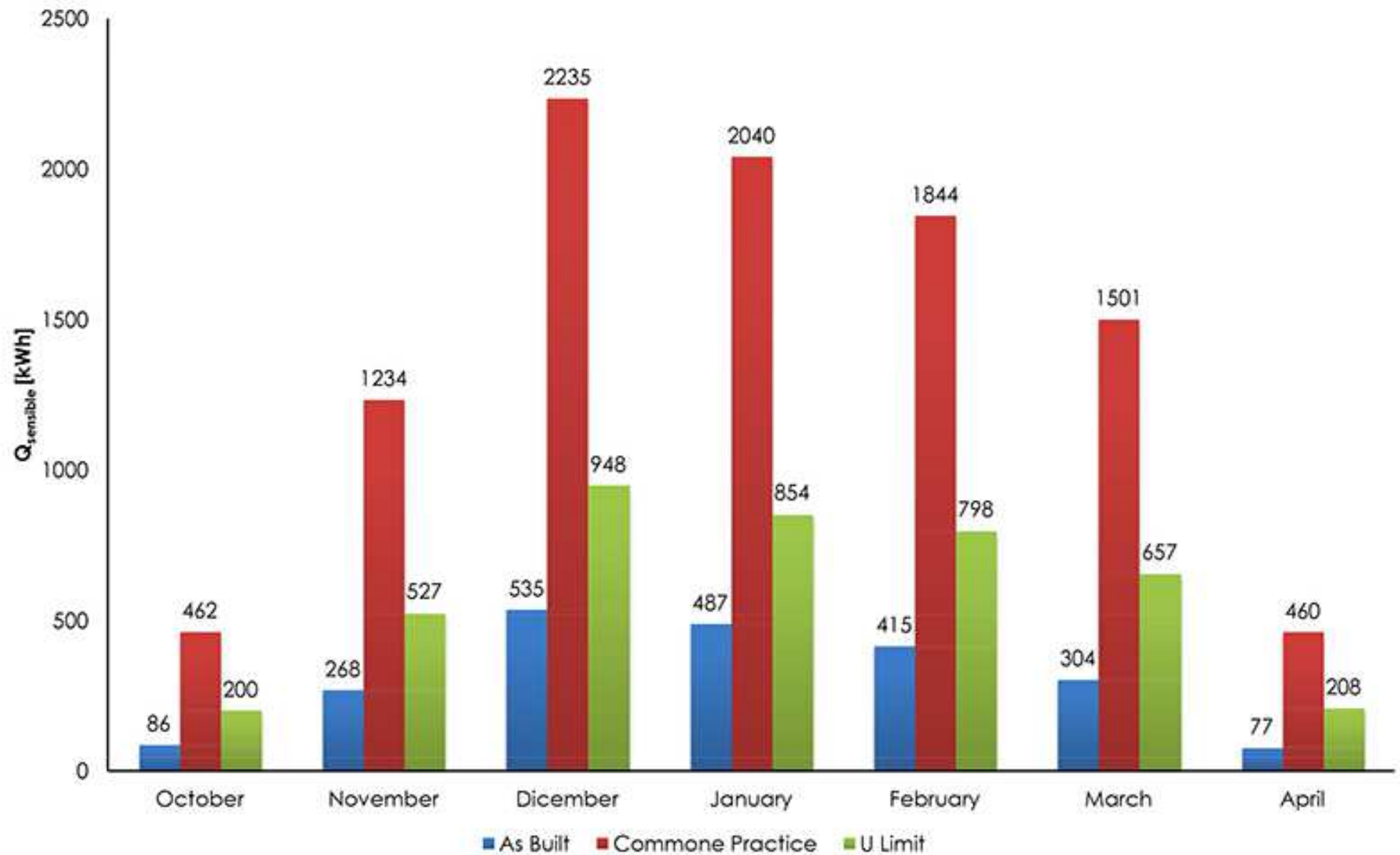


Valutazione energetica dell'edificio mediante simulazioni energetiche in regime dinamico svolte con il software **TRNSYS**.

Fabbisogno energetico senza apporti energetici da fonti rinnovabili



Fabbisogno energetico mensile _ VELUXlab Campagna sperimentale inverno 2013

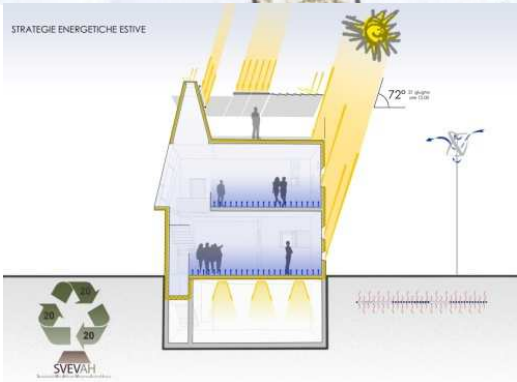




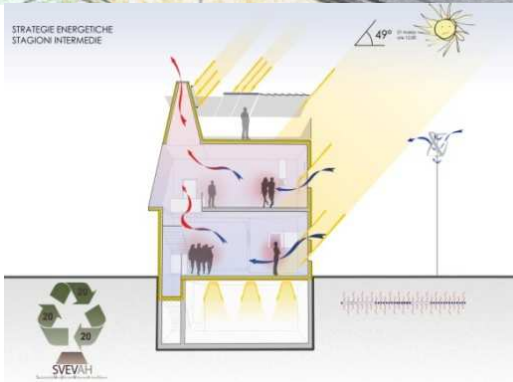
Arianna Brambilla (Politecnico di Milano – Aalborg University)



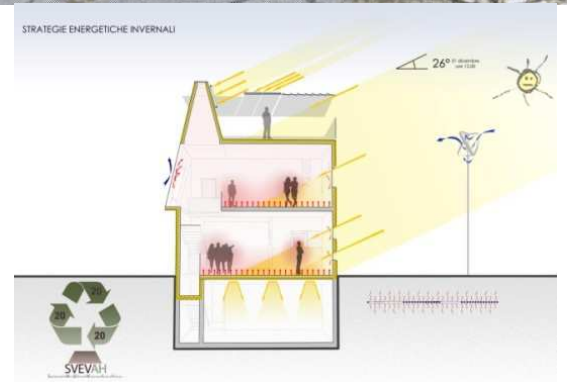
STRATEGIE ENERGETICHE ESTIVE



STRATEGIE ENERGETICHE STAGIONI INTERMEDIE



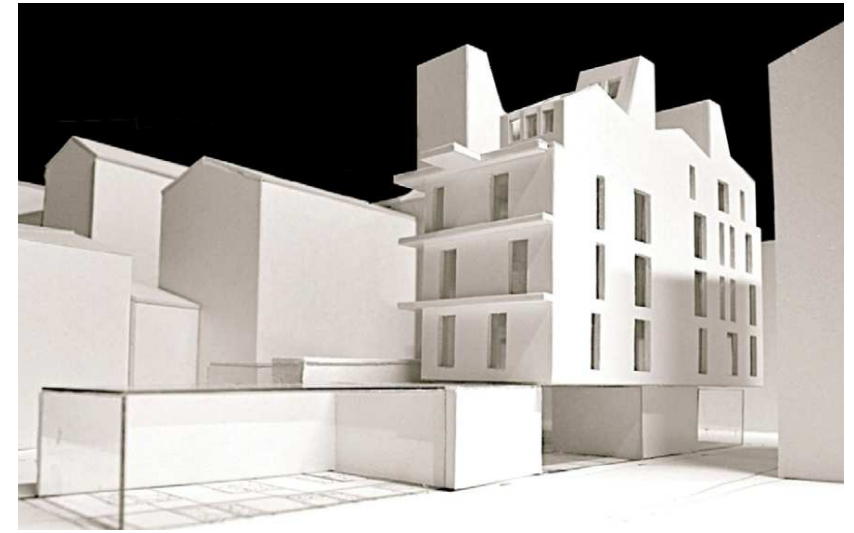
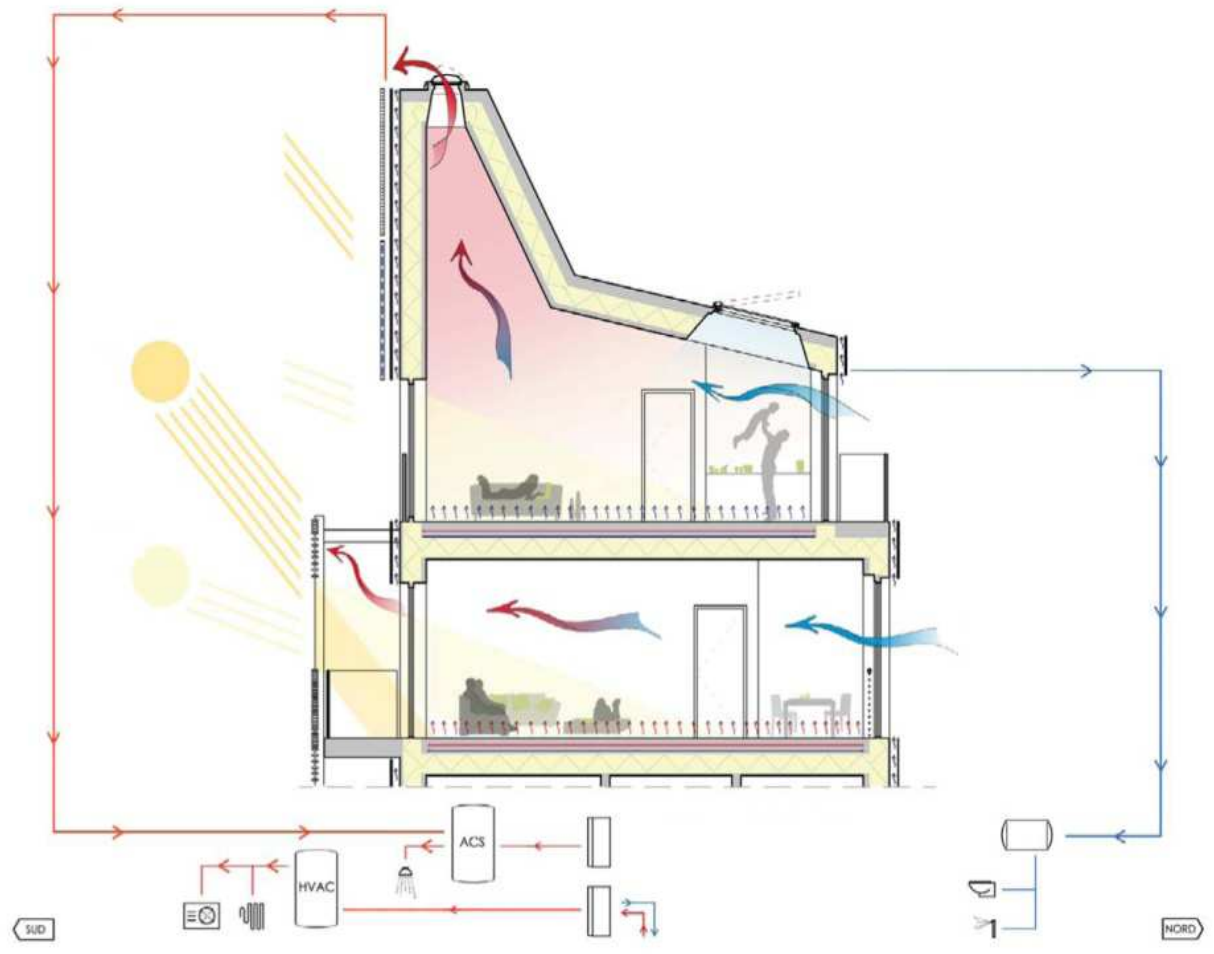
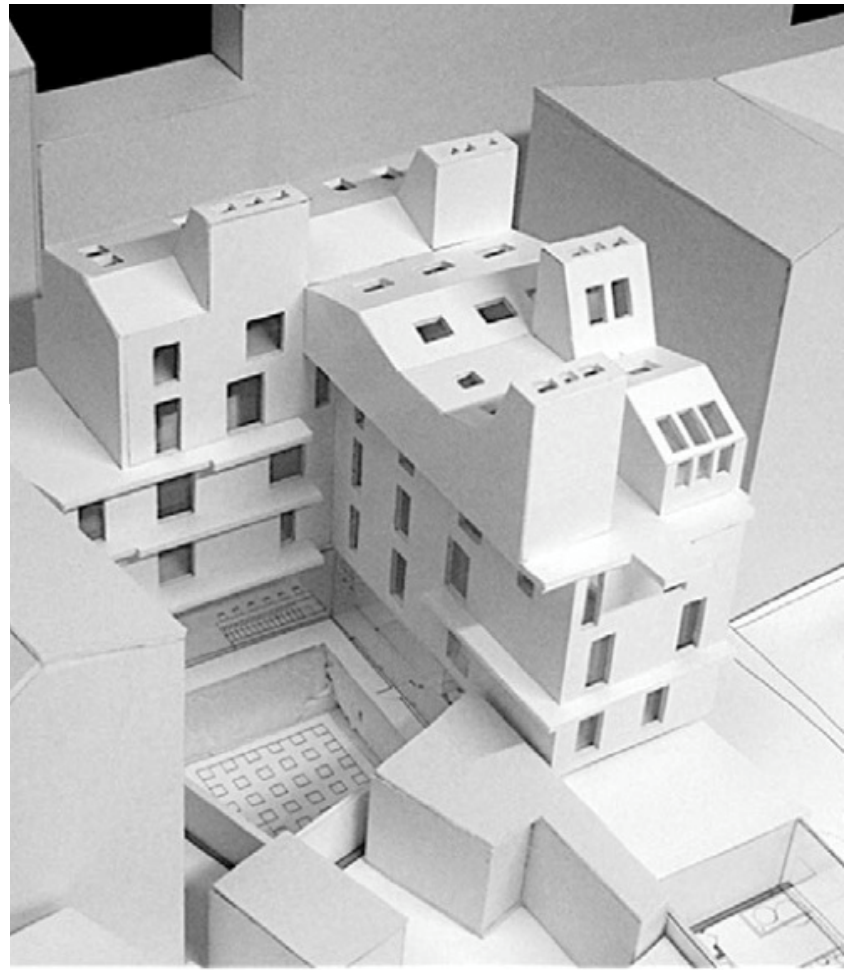
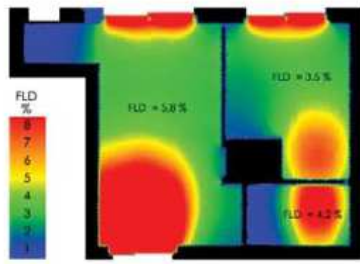
STRATEGIE ENERGETICHE INVERNALI



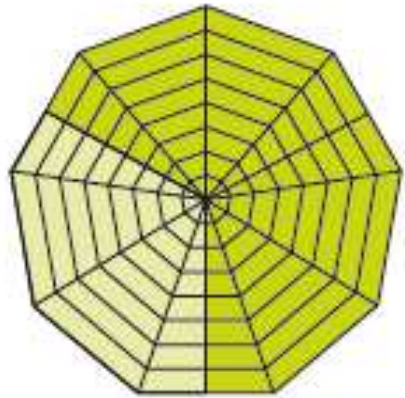


Team:

Nicola Falcone
Chiara Zanello
Valentina Zorzi



AMBIENTE



VELUXlab: Cantiere

Riuso dell' edificio



Bilbao 2007



Roma 2008



Milano, Rho Fiera, 2009



Politecnico di Milano, Campus Bovisa, 2011



1° Agosto 2011, h 6:00
Politecnico di Milano, Campus Bovisa



VELUXlab: inizio del cantiere



4 mesi di lavoro:
Più di 20.000 viti, 100 m³ di isolamento

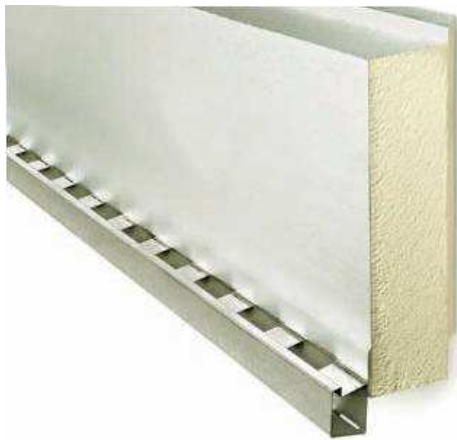
Materiali



Pannelli isolanti in fibra di legno



Pannelli isolanti in lana di roccia



Sistema isolante composto in poliuretano



Polistirene sbriciolato



Pannelli in OSB

POLITECNICO DI MILANO
VELUX lab

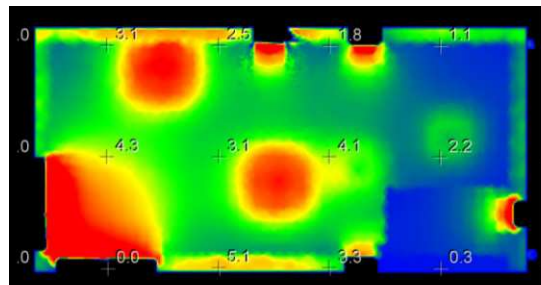
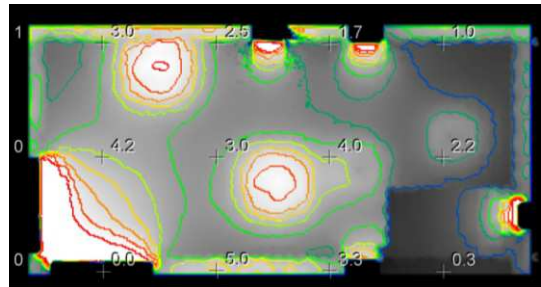




Prima Active House a Bergamo – Maison Verte



Analisi illuminotecnica







33

Araldite
MASCHERPA



BELLOTTI

SELDEN



GOTTHARDT
MAFFIOLETTI

TI-VIPIST

AIRTECH



VIADANA

CORE CORK

DSM



selcom

POLITECNICO DI MILANO

Si sente la necessità assoluta di muoversi.

E soprattutto di muoversi in una direzione particolare.

Una doppia necessità: muoversi e sapere in che direzione.

D.H. LAWRENCE, Mare e Sardegna





POLITECNICO DI MILANO
VELUX lab