

# edilportale® TOUR 2016

Efficienza energetica e comfort abitativo  
Tecnologie non invasive e sicurezza  
Sostenibilità economica e ambientale

in collaborazione con



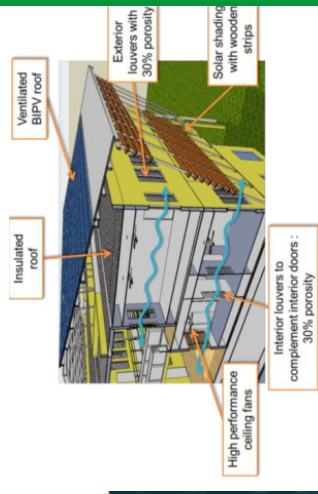
**Milano, 11 maggio 2016**

**Progettare edifici ad energia zero**

**Niccolò Aste**

***Politecnico di Milano***

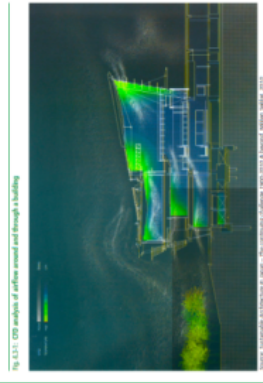




## SUSTAINABLE BUILDING DESIGN FOR TROPICAL CLIMATES

### Principles and Applications for Eastern Africa

**UN HABITAT**  
FOR A BETTER URBAN FUTURE



#### 4.4 EXISTING BUILDINGS

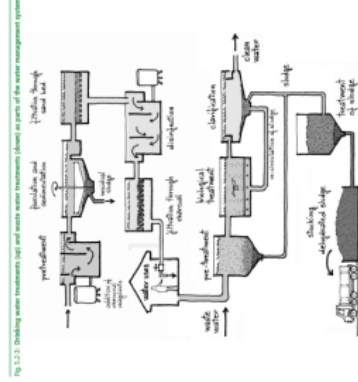
The existing buildings in SAC climate belt are engaged with BIPV, PV panels, a combination part of the building envelope, and a combination of the building envelope. This combination can be used to improve the building envelope performance.

Activity	Electricity consumption (kWh/m <sup>2</sup> /year)	CO <sub>2</sub> emissions (kg/m <sup>2</sup> /year)
Electricity consumption	1200	1200
CO <sub>2</sub> emissions	1200	1200
Electricity consumption	1200	1200
CO <sub>2</sub> emissions	1200	1200

#### 4.4.1 DEVELOPE IMPROVEMENT

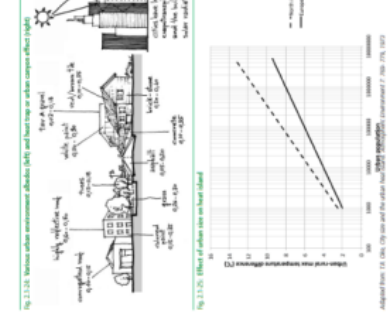
Buildings are included within the category of existing buildings. It is assumed to have an average carbon footprint. This indicator is given in the table below.

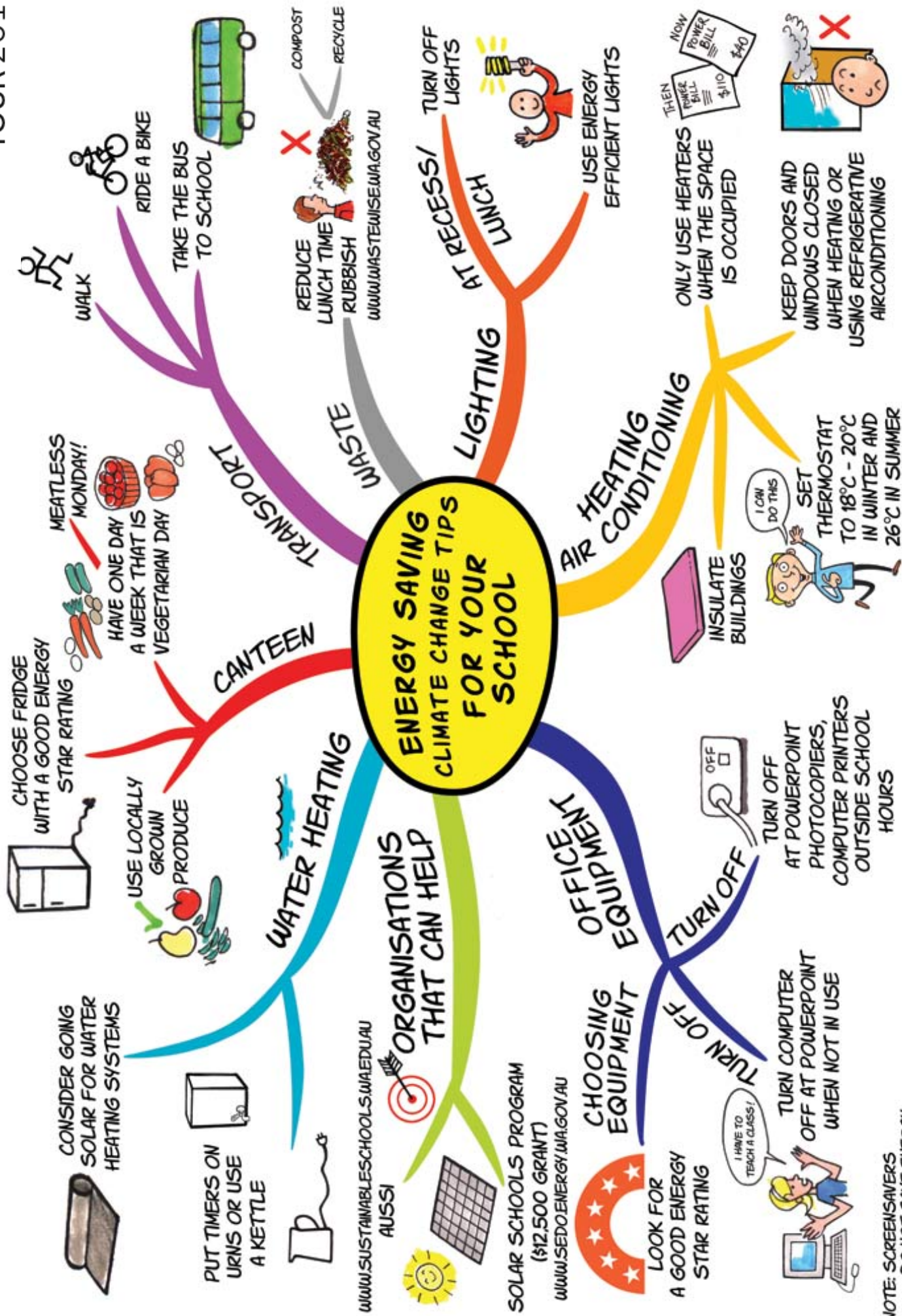
**High Rise**  
High-rise buildings are characterized by their height and density. They are typically found in urban centers and are often subject to strict building codes and regulations. High-rise buildings are often subject to strict building codes and regulations.



#### 3.1.8. Water reuse treatment (BIPV) and how to use in urban centers (Africa)

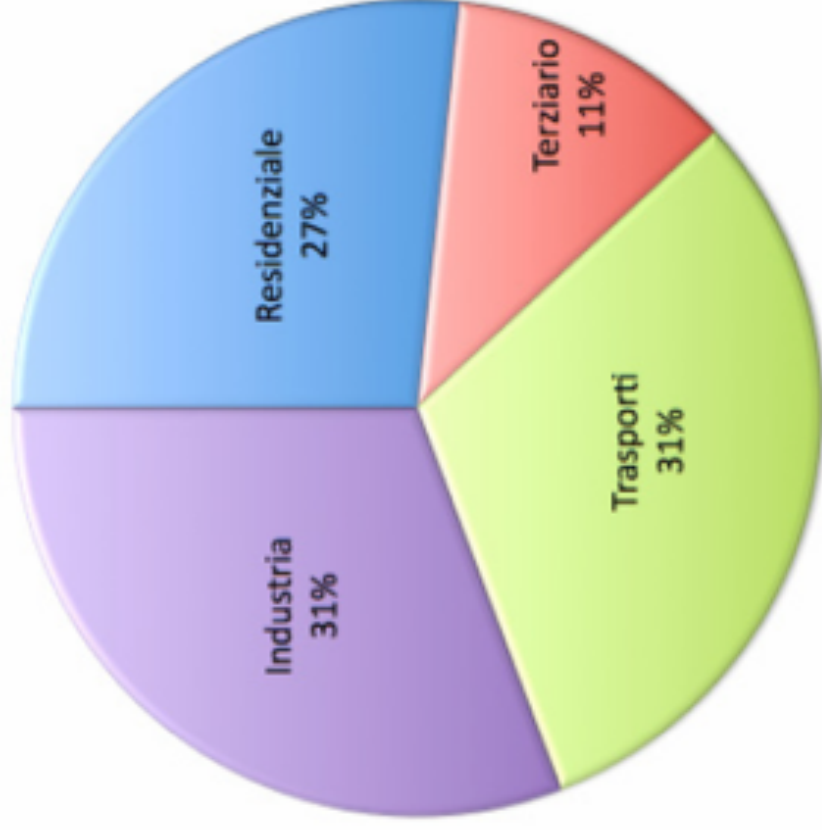
Water reuse treatment (BIPV) and how to use in urban centers (Africa) is a key component of sustainable building design. It involves the collection, treatment, and reuse of water from various sources, such as rainwater, greywater, and blackwater. This process helps reduce the demand for fresh water and minimizes the environmental impact of wastewater discharge.



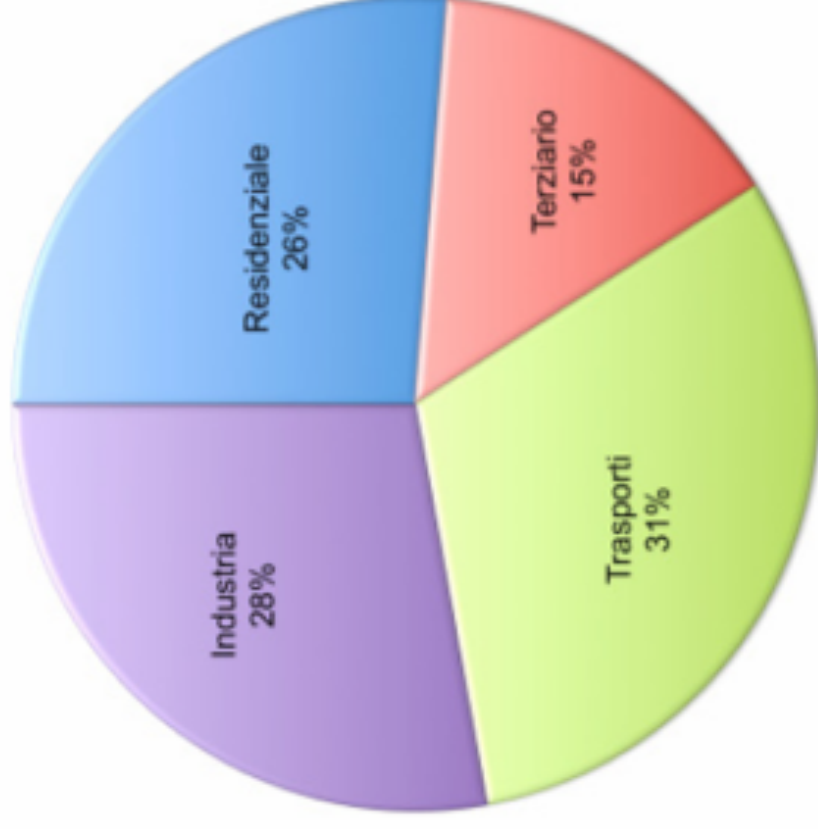


NOTE: SCREENSAVERS DO NOT SAVE ENERGY

# CONSUMI ENERGETICI FINALI

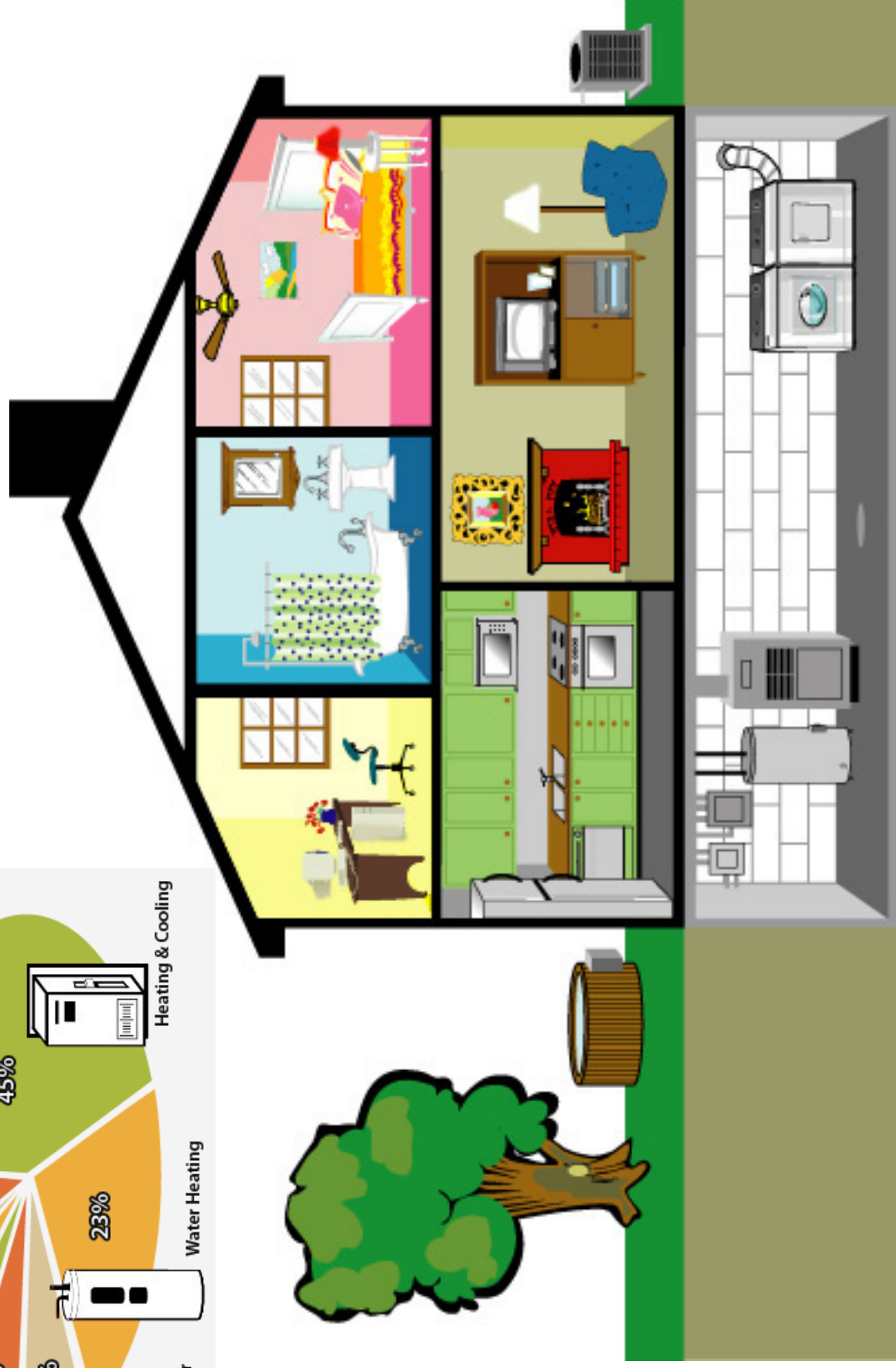
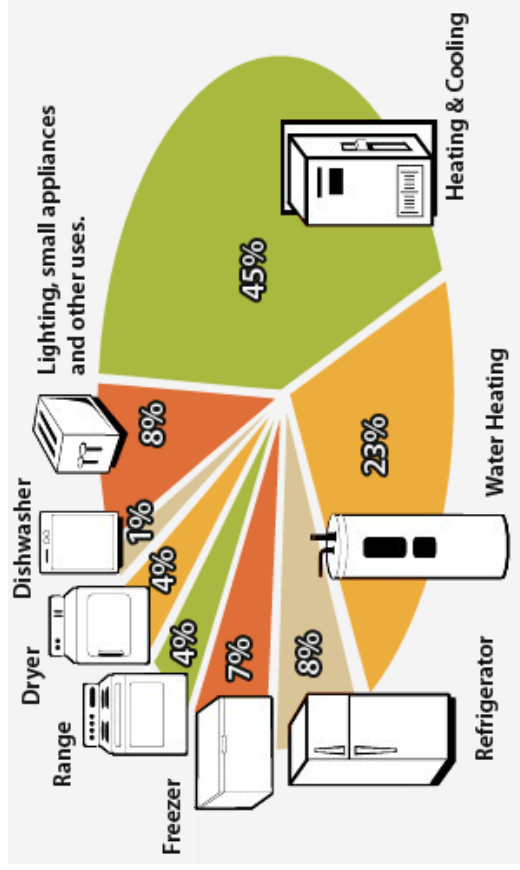


Europa



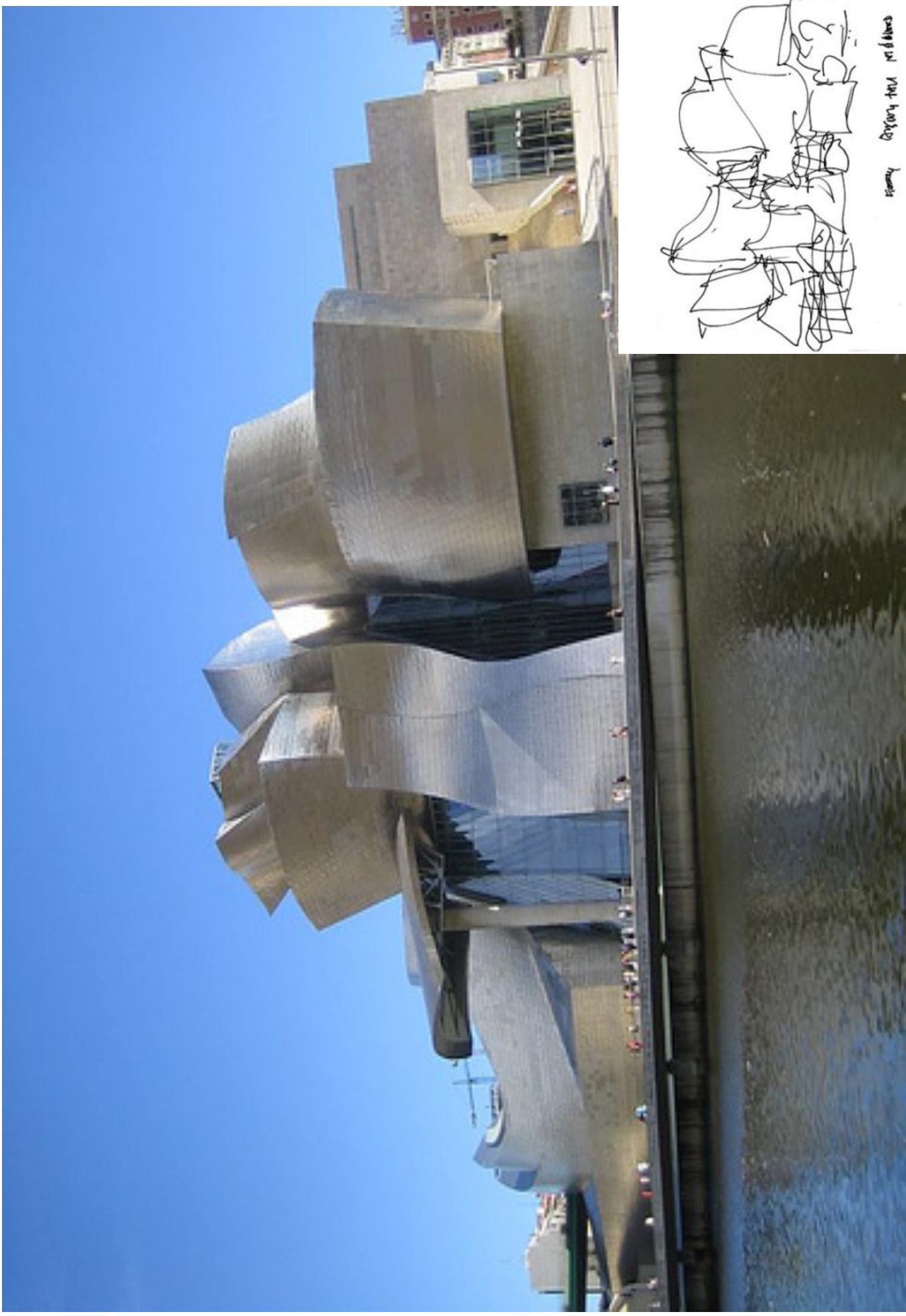
Italia

# ARCHITETTURA & ENERGIA (1)



# COS'E' L'ARCHITETTURA? (1)

**edilportale**  
TOUR 2016



sketch by Gregory Healey

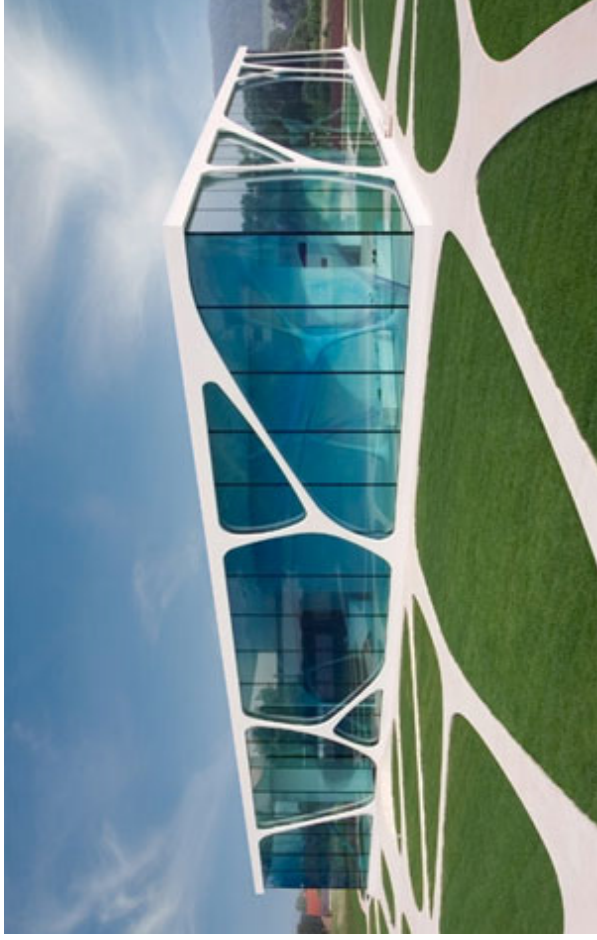
# COS'E' L'ARCHITETTURA? (2)

edilportale®  
TOUR 2016

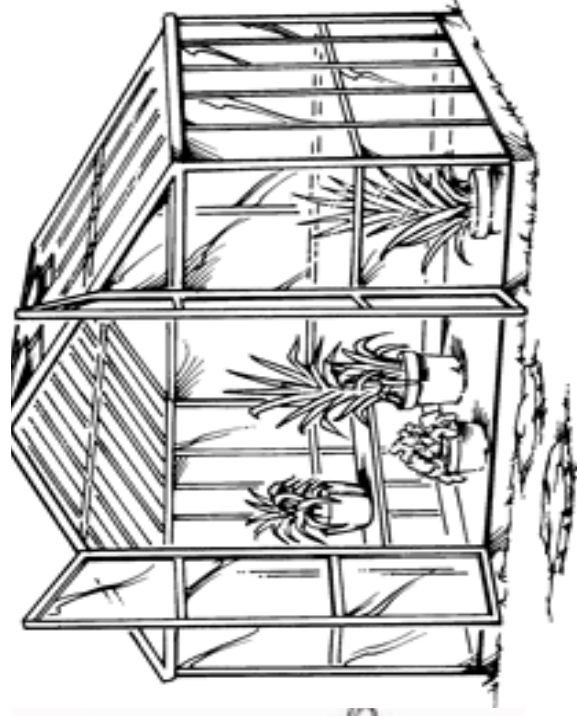
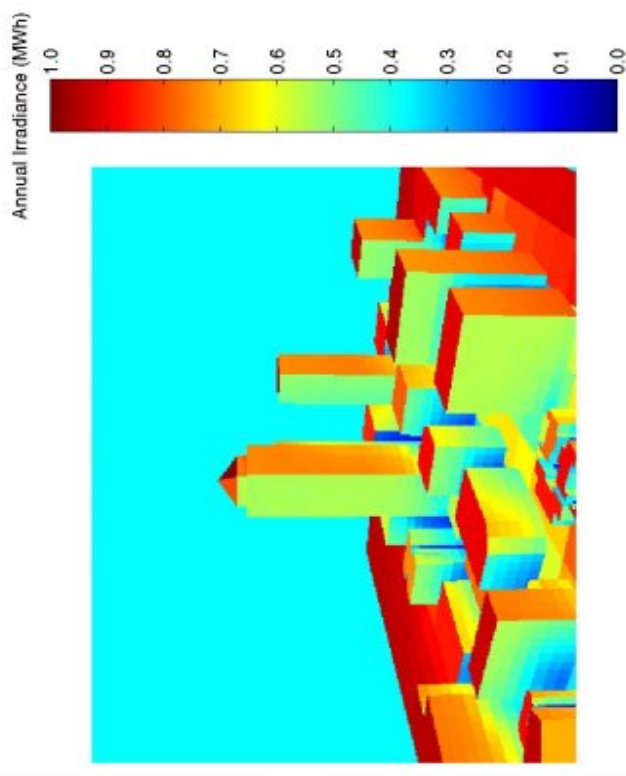
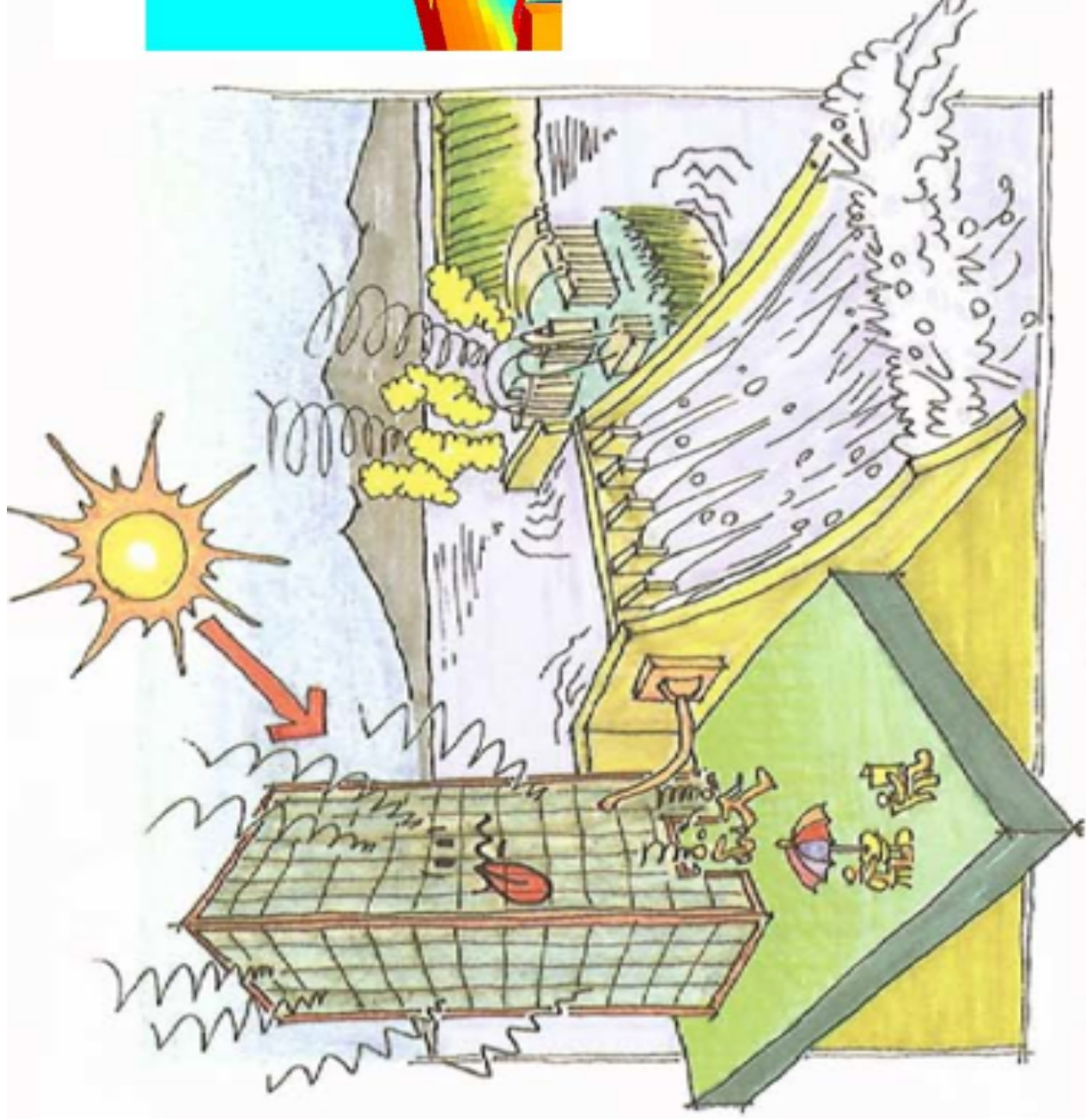


# ARCHITETTURA SOSTENIBILE (?)

edilportale®  
TOUR 2016

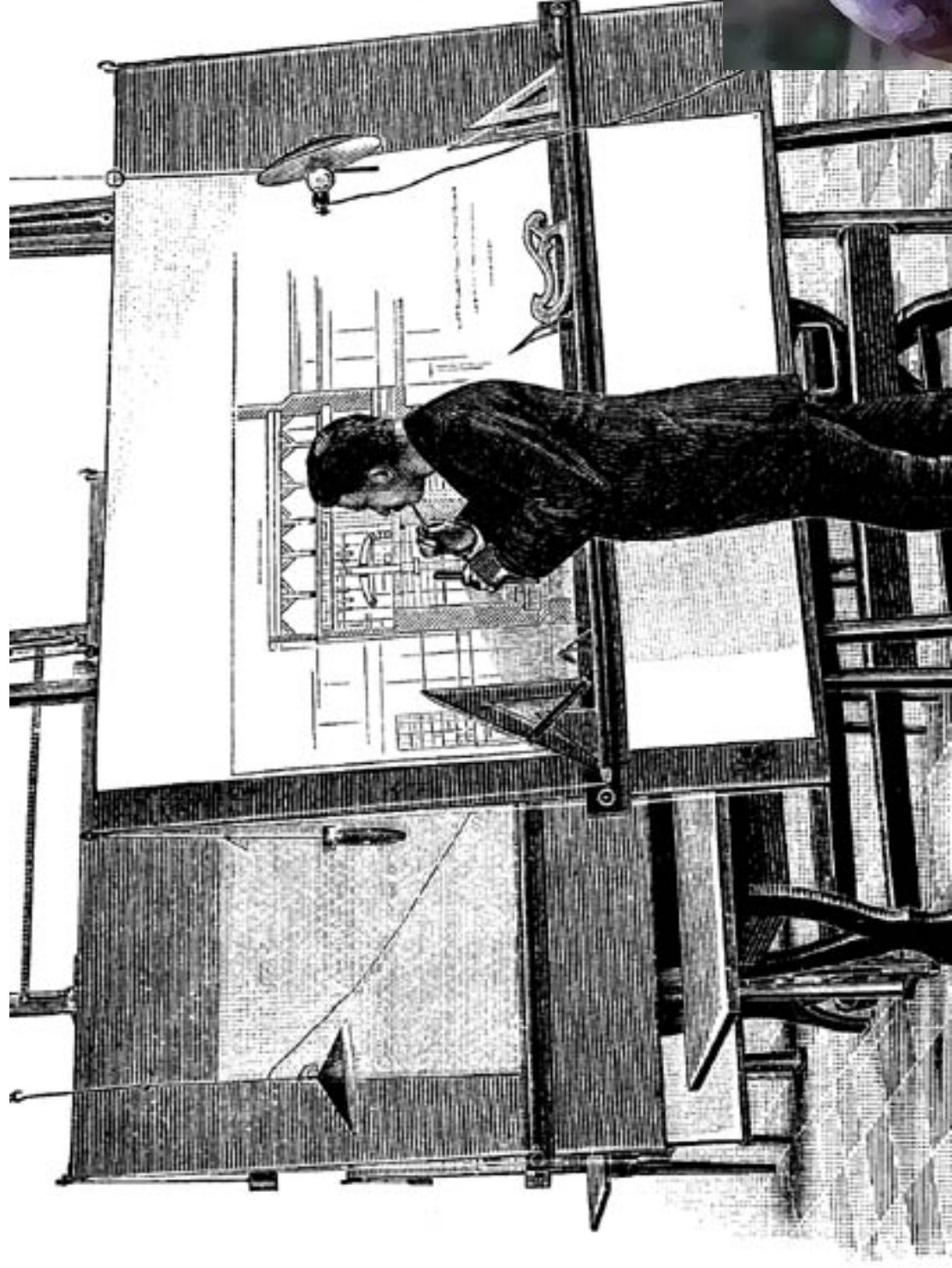






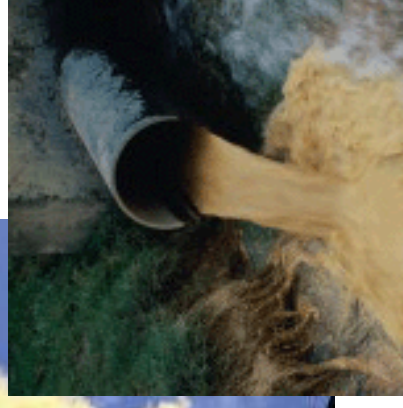
# LA RESPONSABILITA' DELL'ARCHITETTO

edilportale®  
TOUR 2016





# ITALIA: EDIFICIO “MEDIO”



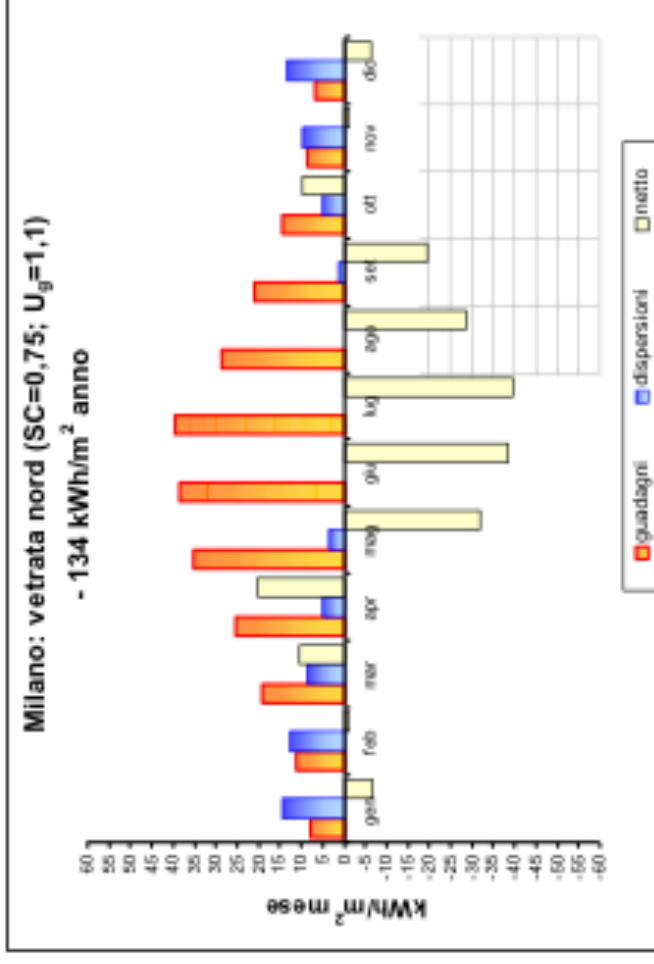
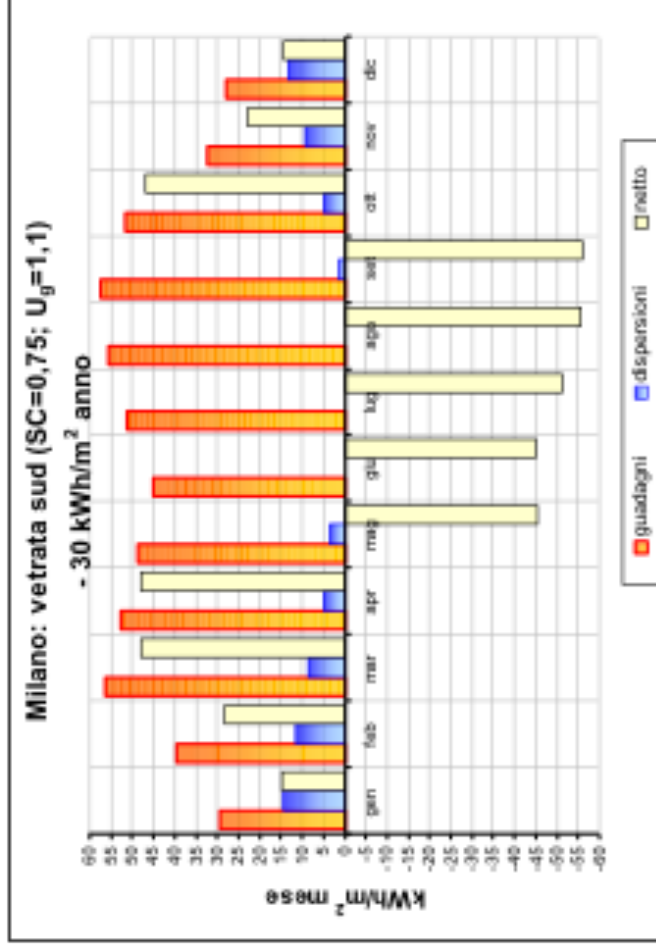
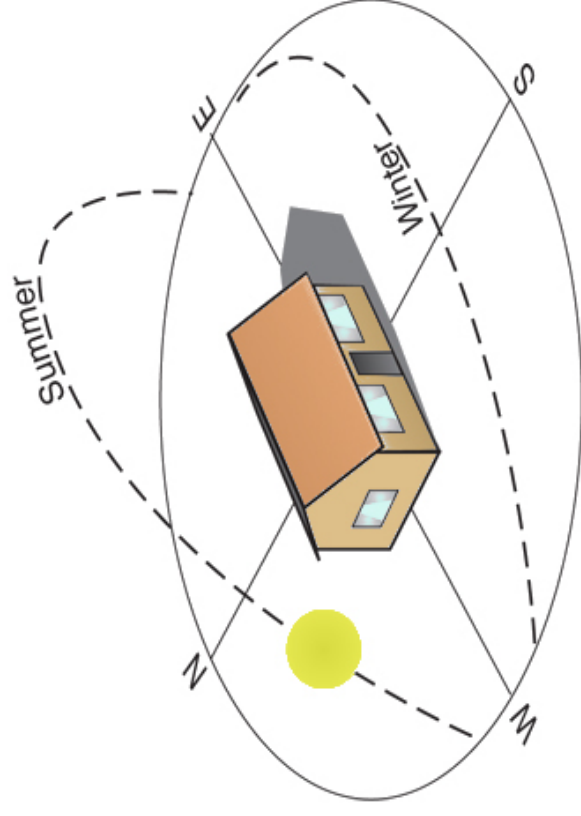
**Fabbisogno per riscaldamento: 110 kWh/m<sup>2</sup> anno**  
**Fabbisogno per ACS: 30 kWh/m<sup>2</sup> anno**  
**Fabbisogno app. elettriche: 40 kWh/m<sup>2</sup> anno**  
**Fabbisogno per climatizzazione estiva: ?**  
**Emissioni CO<sub>2</sub>: 70 kg/ m<sup>2</sup> anno**

**Bolletta media italiana**  
**Riscaldamento: 1000 €/anno**  
**Consumi elettrici: 500 €/anno**

# ITALIA: EDIFICIO “EFFICIENTE”

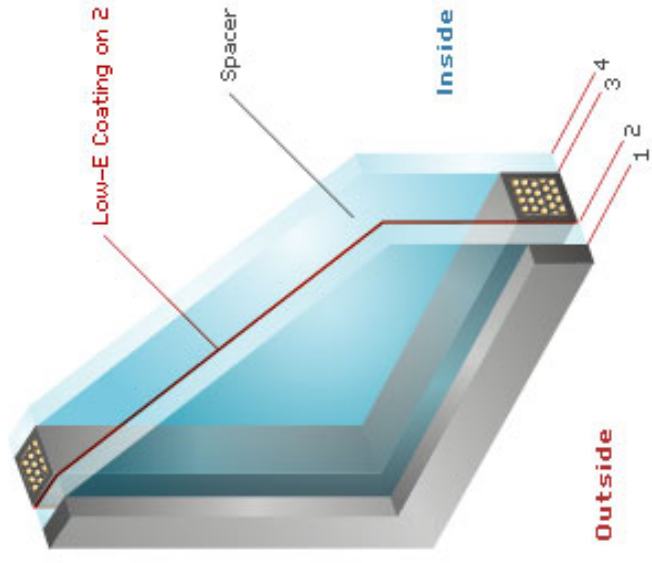
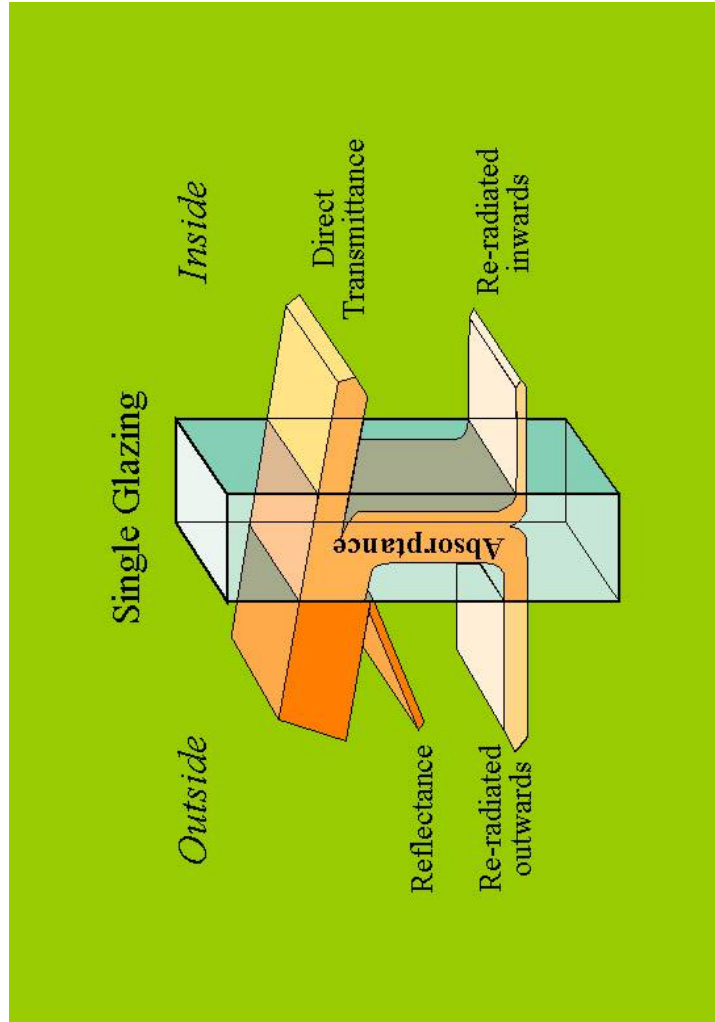
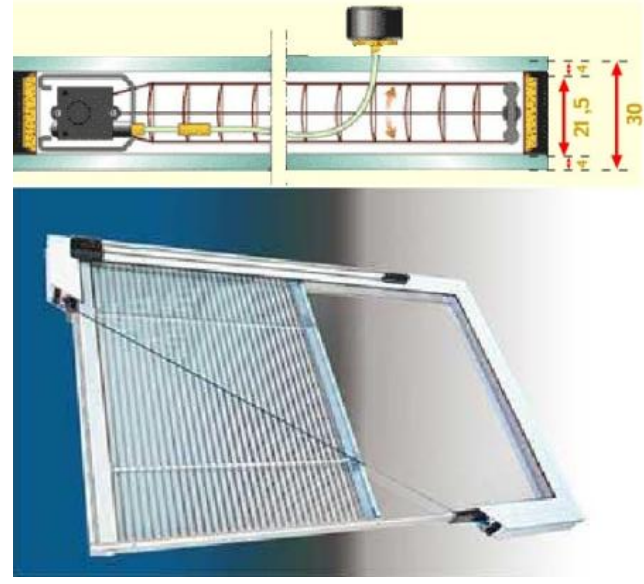
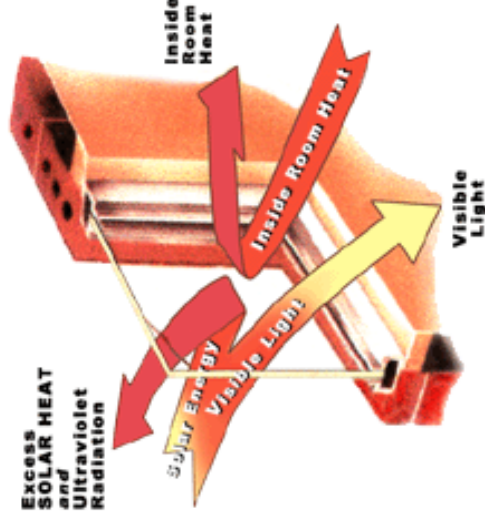
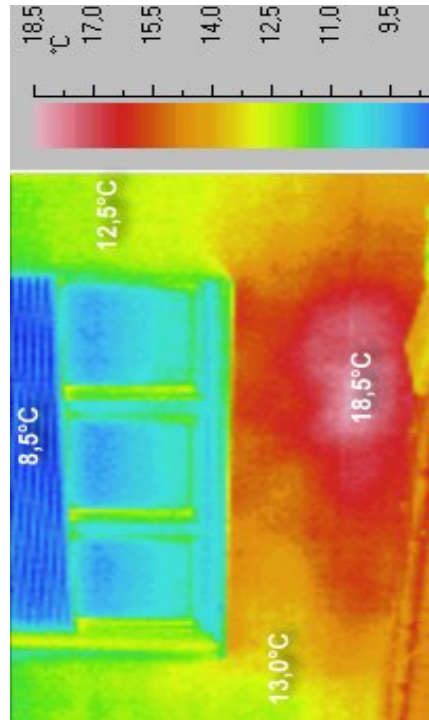


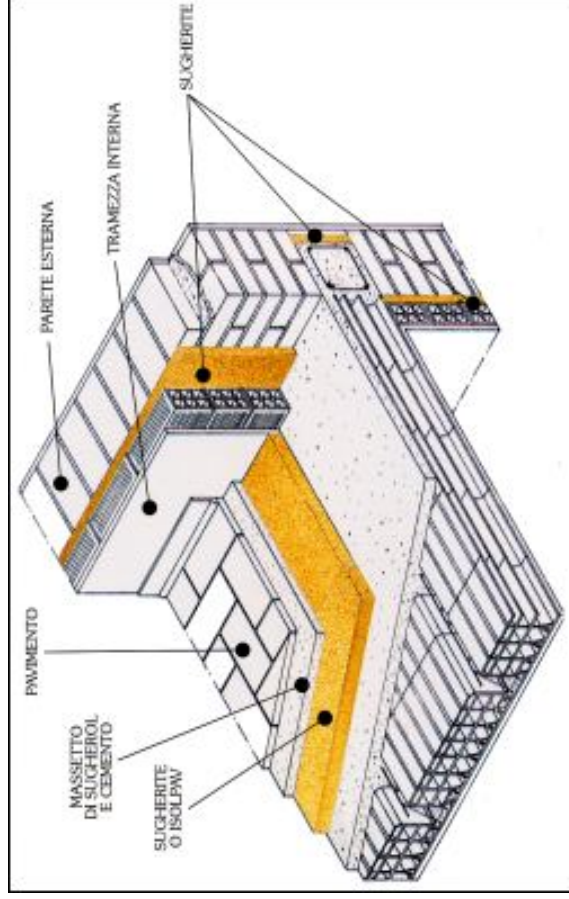
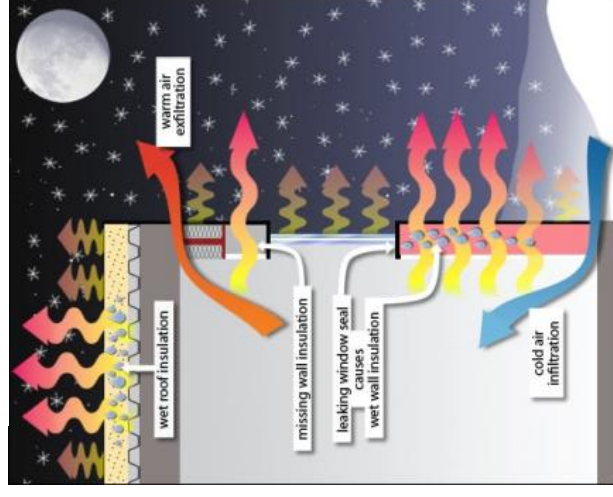
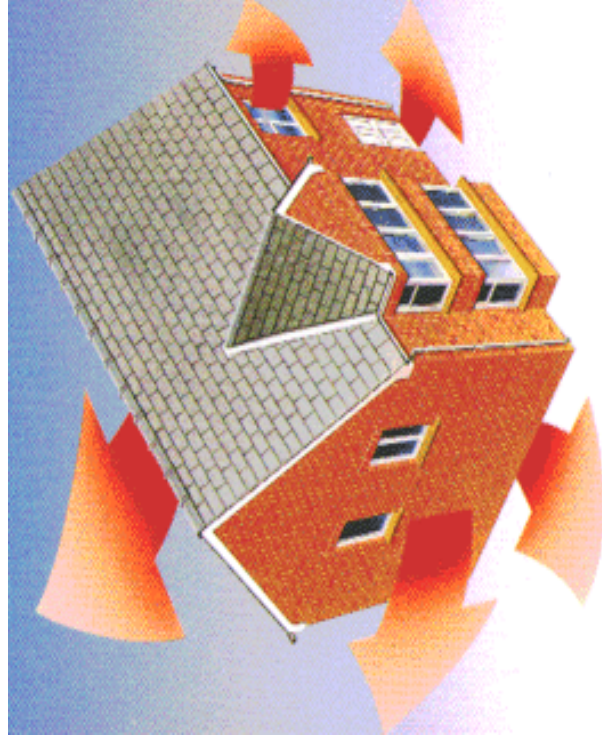
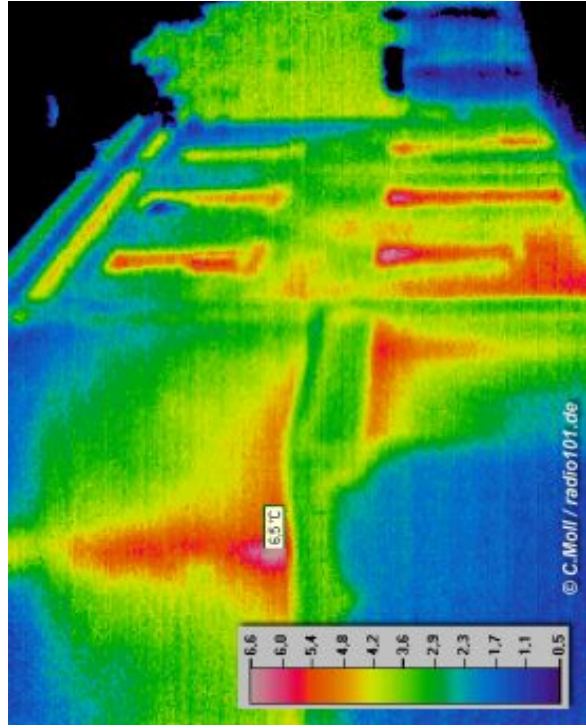
**Fabbisogno per riscaldamento: 25 kWh/m2 anno**  
**Fabbisogno per ACS: 25 kWh/m2 anno**  
**Fabbisogno app. elettriche: 20 kWh/m2 anno**  
**Fabbisogno per climatizzazione estiva: 30 kWh/m2 anno**  
**Emissioni CO2: 35 kg/ m2 anno**



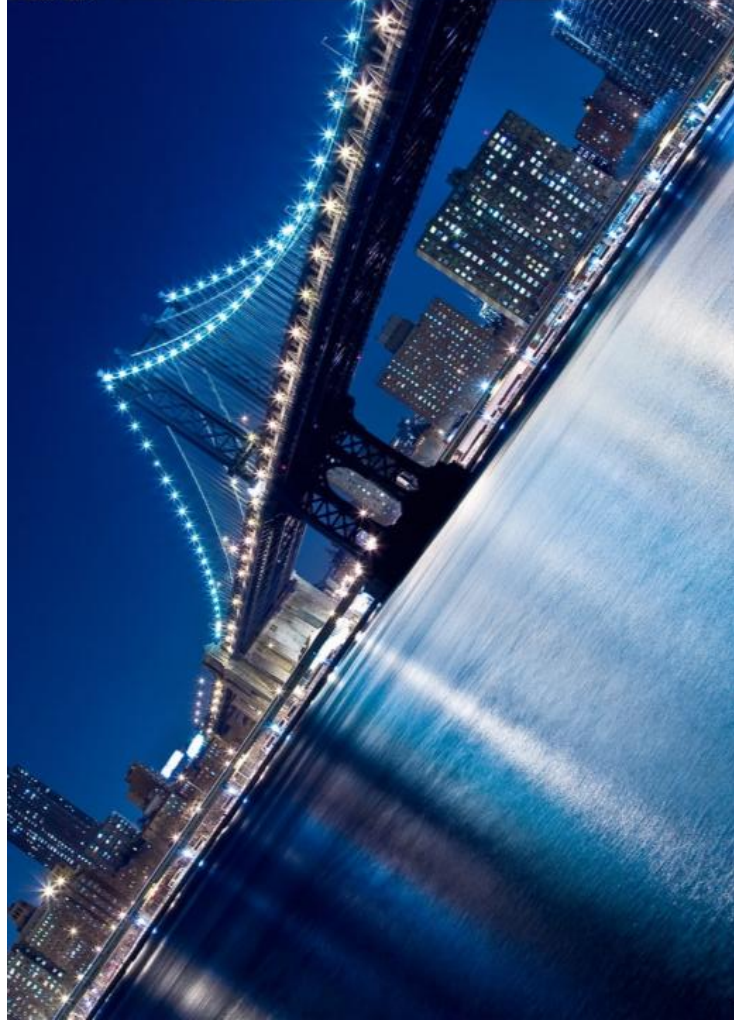
# INVOLUCRO TRASPARENTE

edilportale®  
TOUR 2016





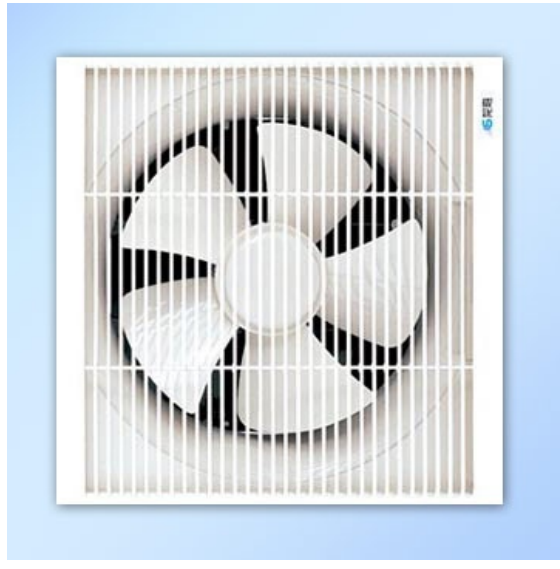
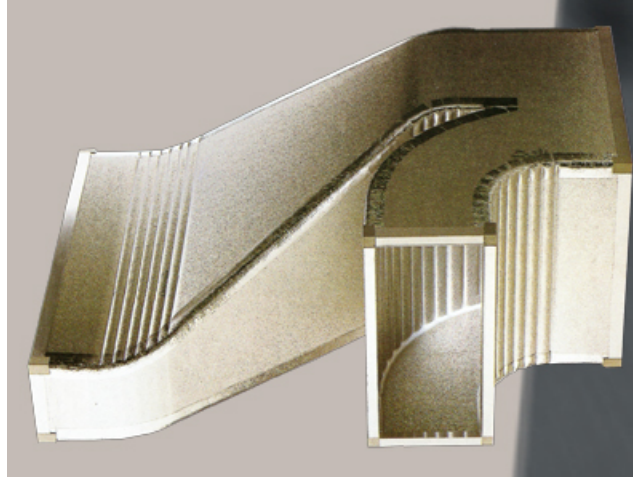
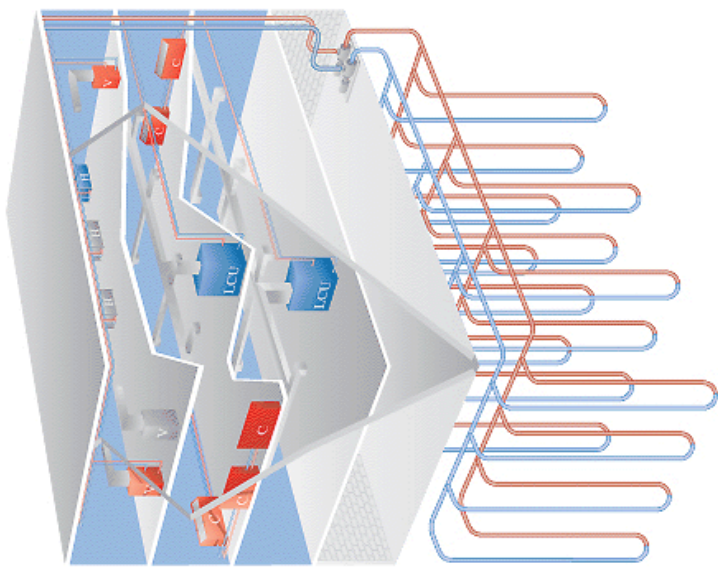
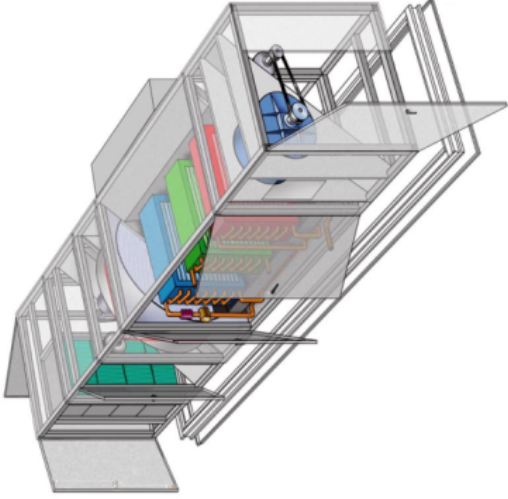
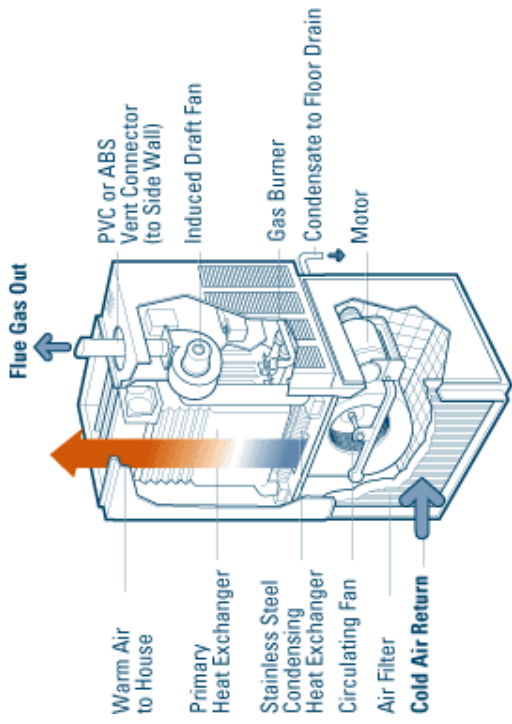


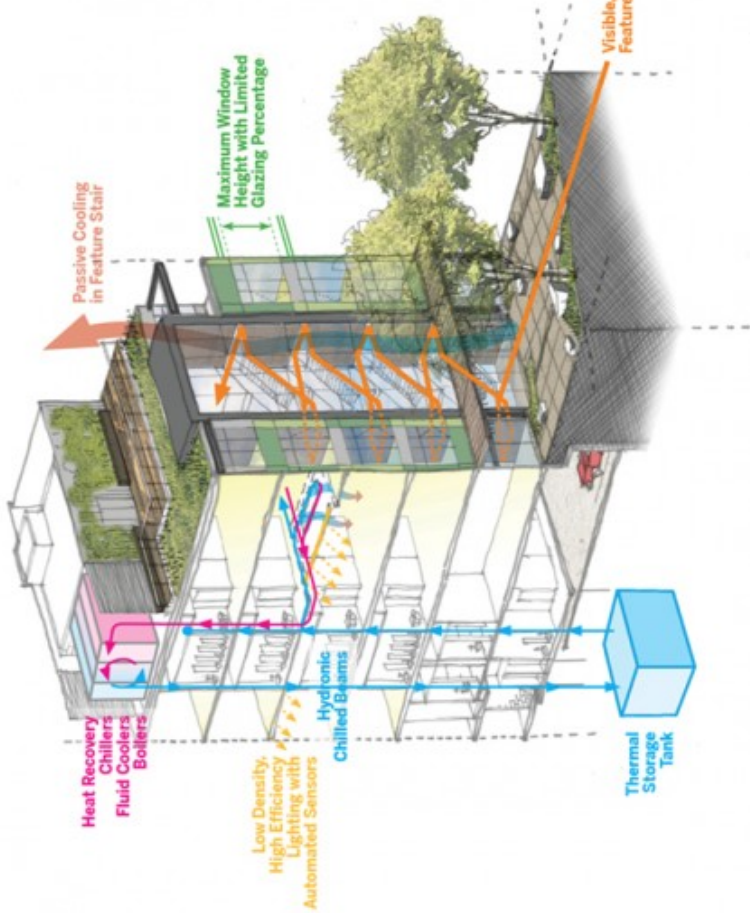
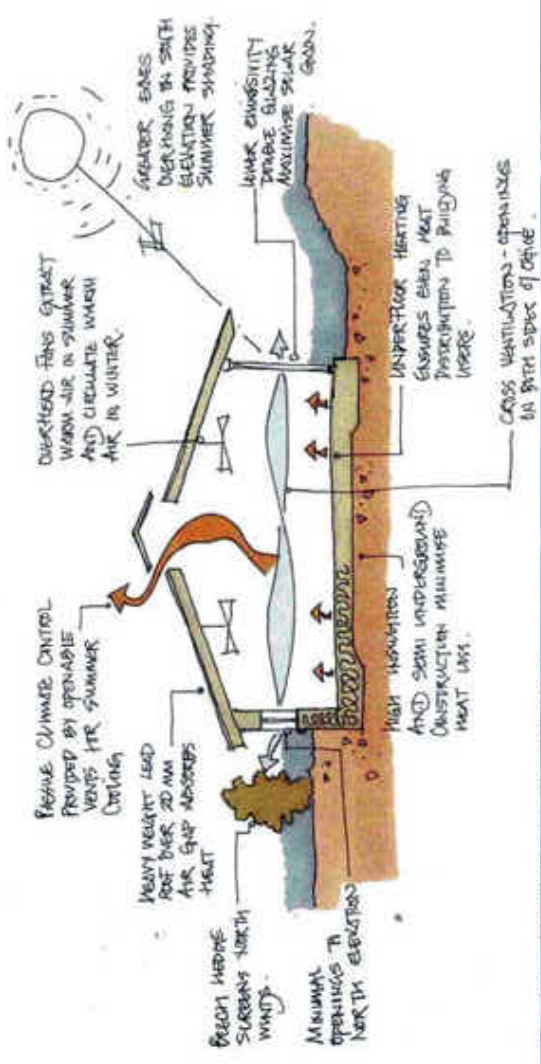


*Illuminamento medio di esercizio, temperatura di colore e indice di resa cromatica*

Tipo di locale, completo vano o attività	Valori di E <sub>v</sub> (lux)	Tonalità di luce	R <sub>a</sub>	Note
Corse: lettura	150-200-300	W	''	''
Aule: illuminazione naturale	500	W	''	''
Locali per esami: illuminazione generale	1000	W.I	''	''
Locali per esami: ispezioni localizzate	3000	W	''	''
Locali per esami: terapie intensive	1000	I	''	''
Chirurgia: illuminazione generale	1000	I	''	''
Chirurgia: illuminazione localizzata	3000-100000	I.C	''	''
Chirurgia: illuminazione localizzata	3000	I.C	''	''
Site ospedaliere: illuminazione generale	5000	I.C	''	''
Site ospedaliere: illuminazione localizzata	5000	I.C	''	''
Laboratori e Farmacie: illuminazione generale	500	I.C	''	''
Laboratori e Farmacie: illuminazione localizzata	1000	I.C	''	''
Locali per consulti: illuminazione generale	300-500-750	W.I	>90	''
Locali per consulti: illuminazione localizzata	1000	W.I	''	''
Spazi: illuminazione generale	300-500	W.I	80-90	300 lux: aule con sufficiente illuminazione naturale 500 lux: aule con sufficiente illuminazione naturale 80-90
Classi: illuminazione generale	300-500	W.I	80-90	''
Classi: disegno	500-750	W.I	>80	''
Aule universitarie: illuminazione generale	300-500	W.I	80-90	''
Aule universitarie: lavagna	500-750	W.I	''	''
Locali universitari: archivi per dimostrazioni	500-750	W.I	''	''
Locali universitari: uffici e sale per riunione d'area	300	W.I	''	''
Salte per assemblee	150-200-300	W.I	''	''
Uffici	300-500-750	W.I	''	''
Generali	500-750-1000	W.I	>80	''
Per diagnostici	300-500-750	W.I	80-90	''
Salte per riunioni	300	W.I	''	''
Con videotermini	300	W.I	''	''

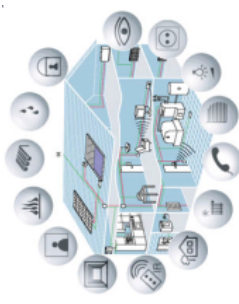
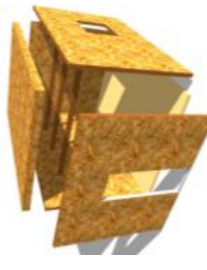
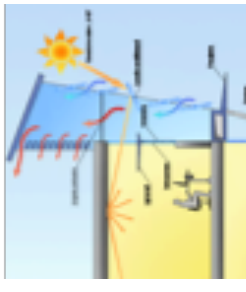
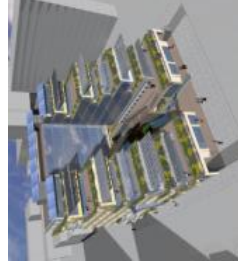
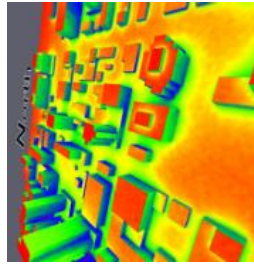
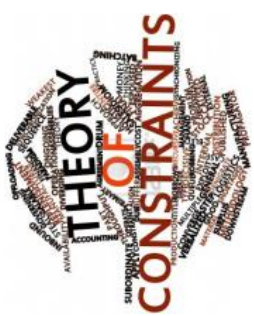
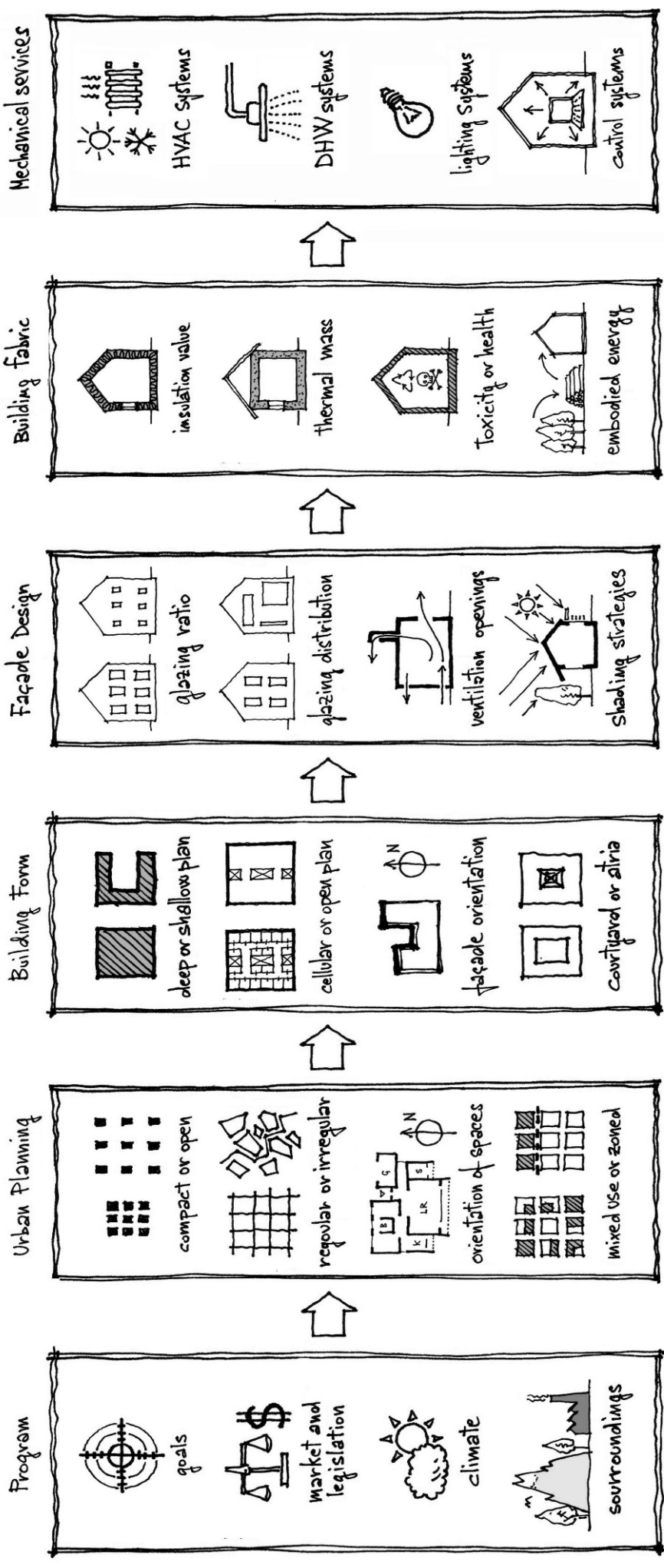
W=standard; I=intermedia; C=media (v. tab. 3.4.2)



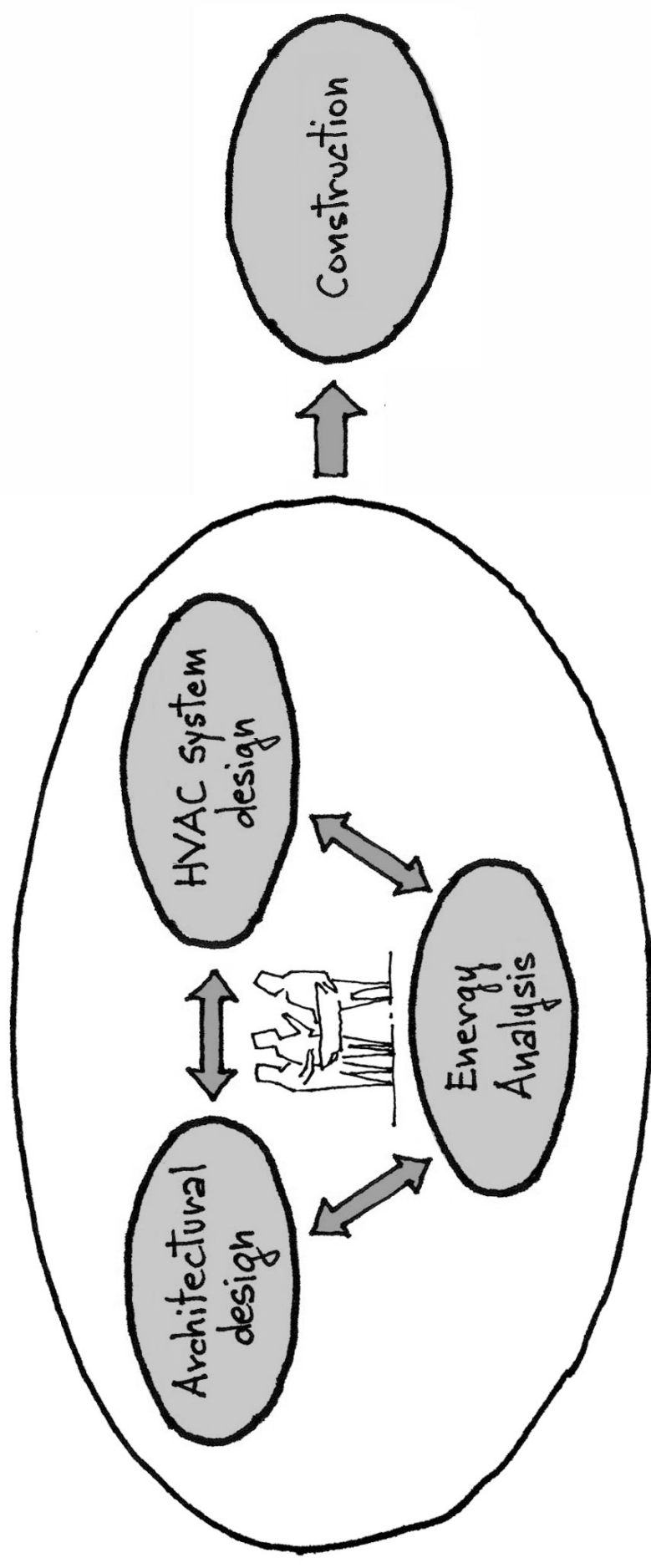
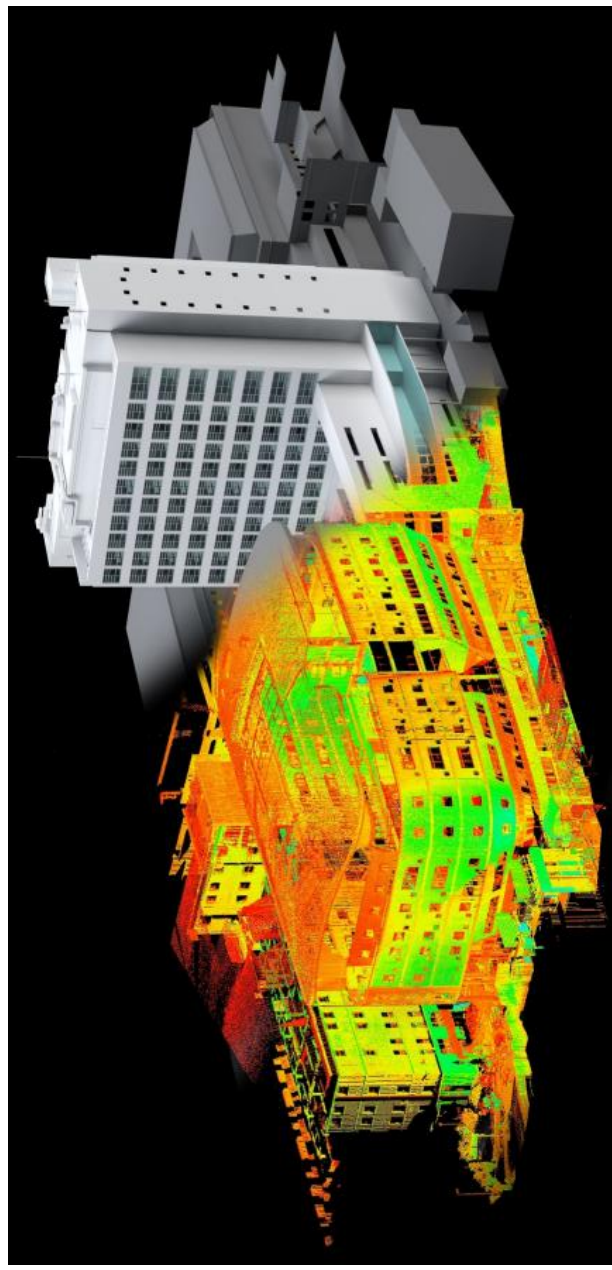
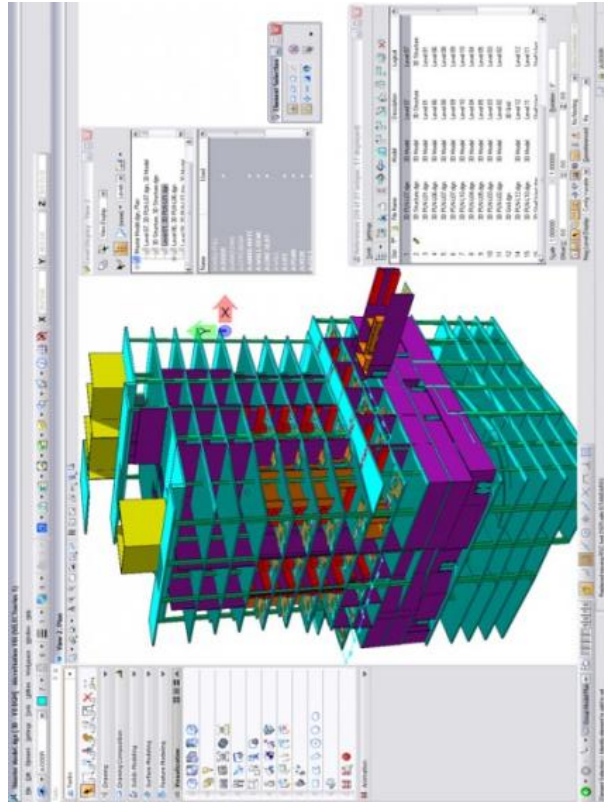




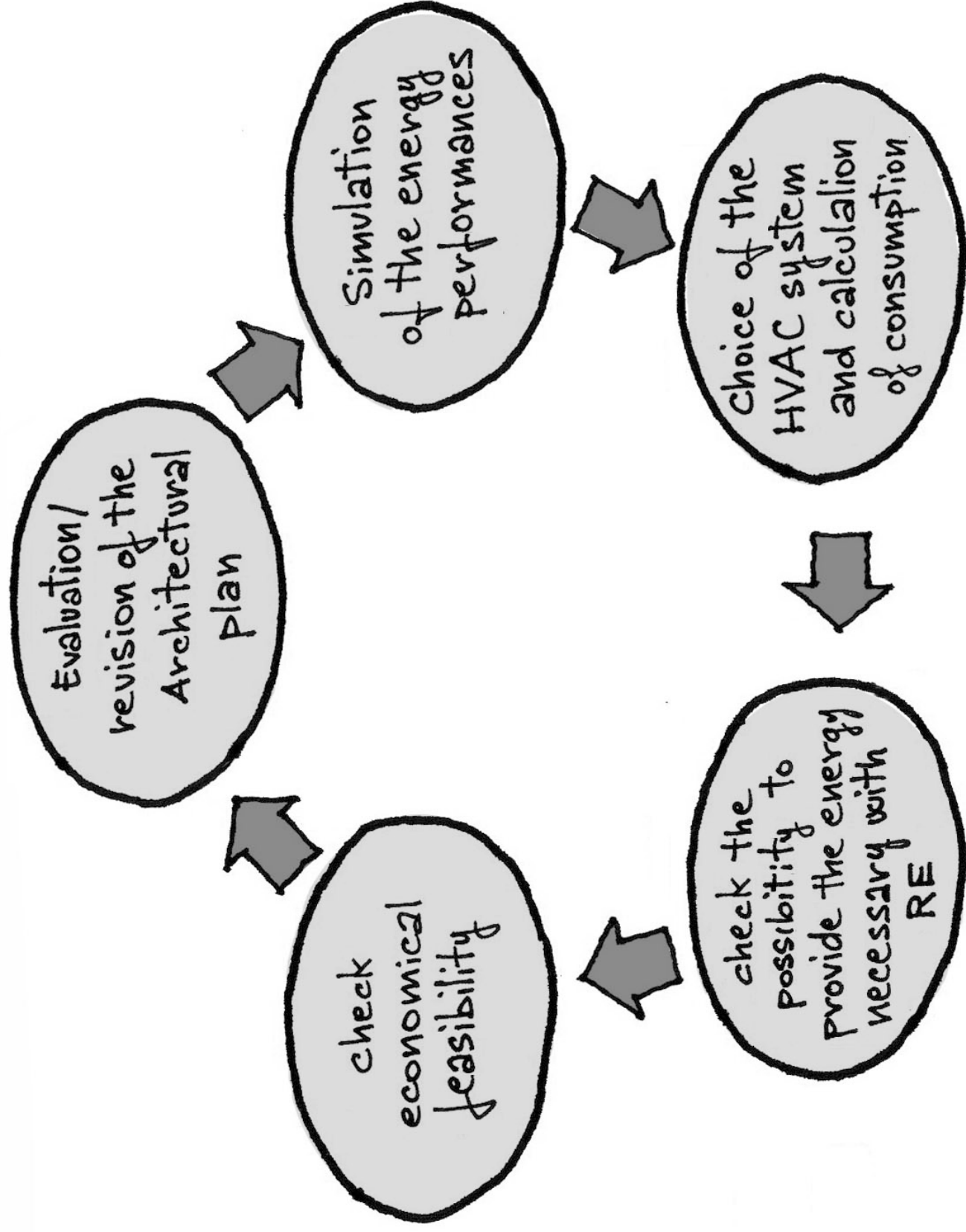
# APPROCCIO INTEGRATO (1)



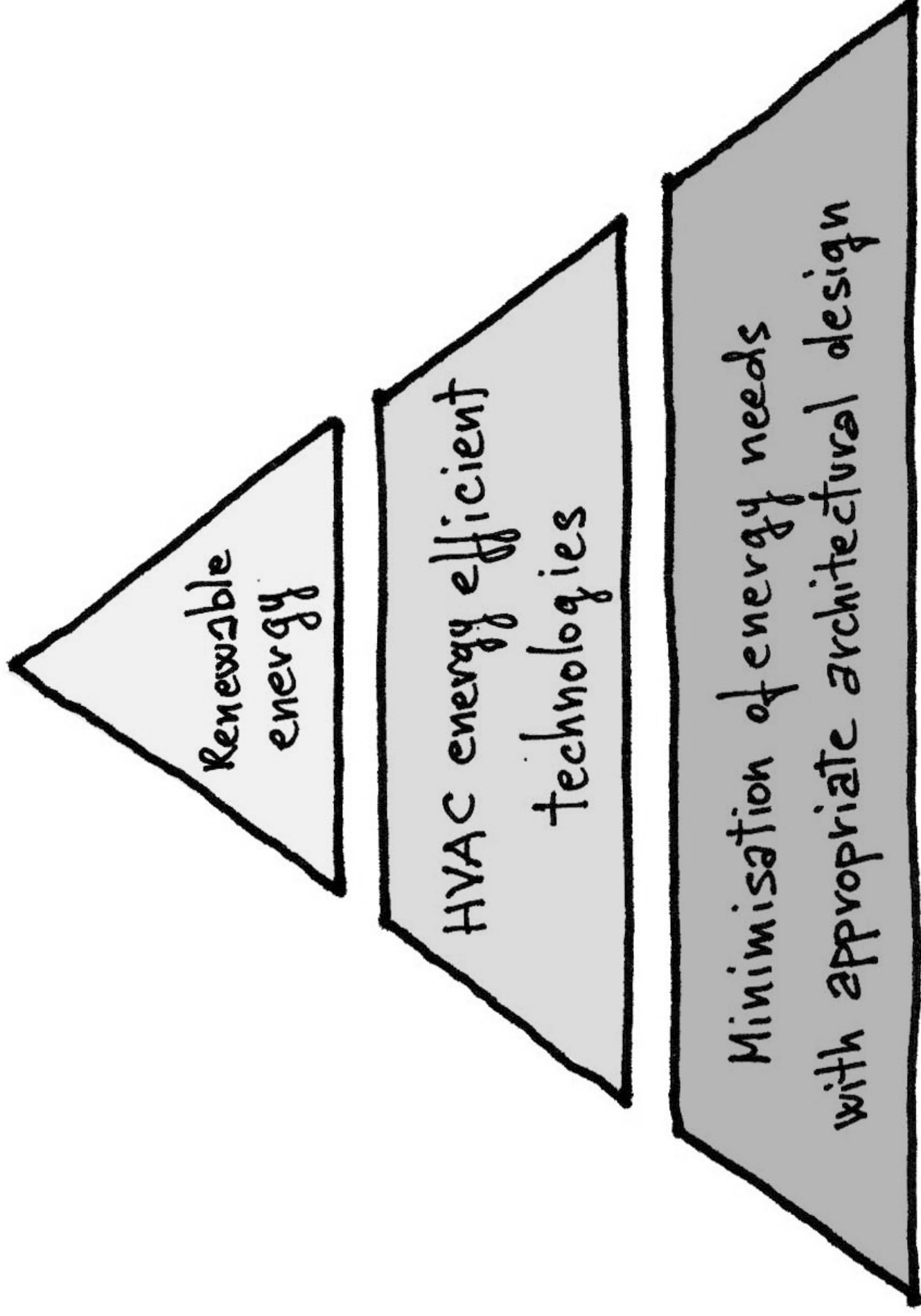
# APPROCCIO INTEGRATO (2)



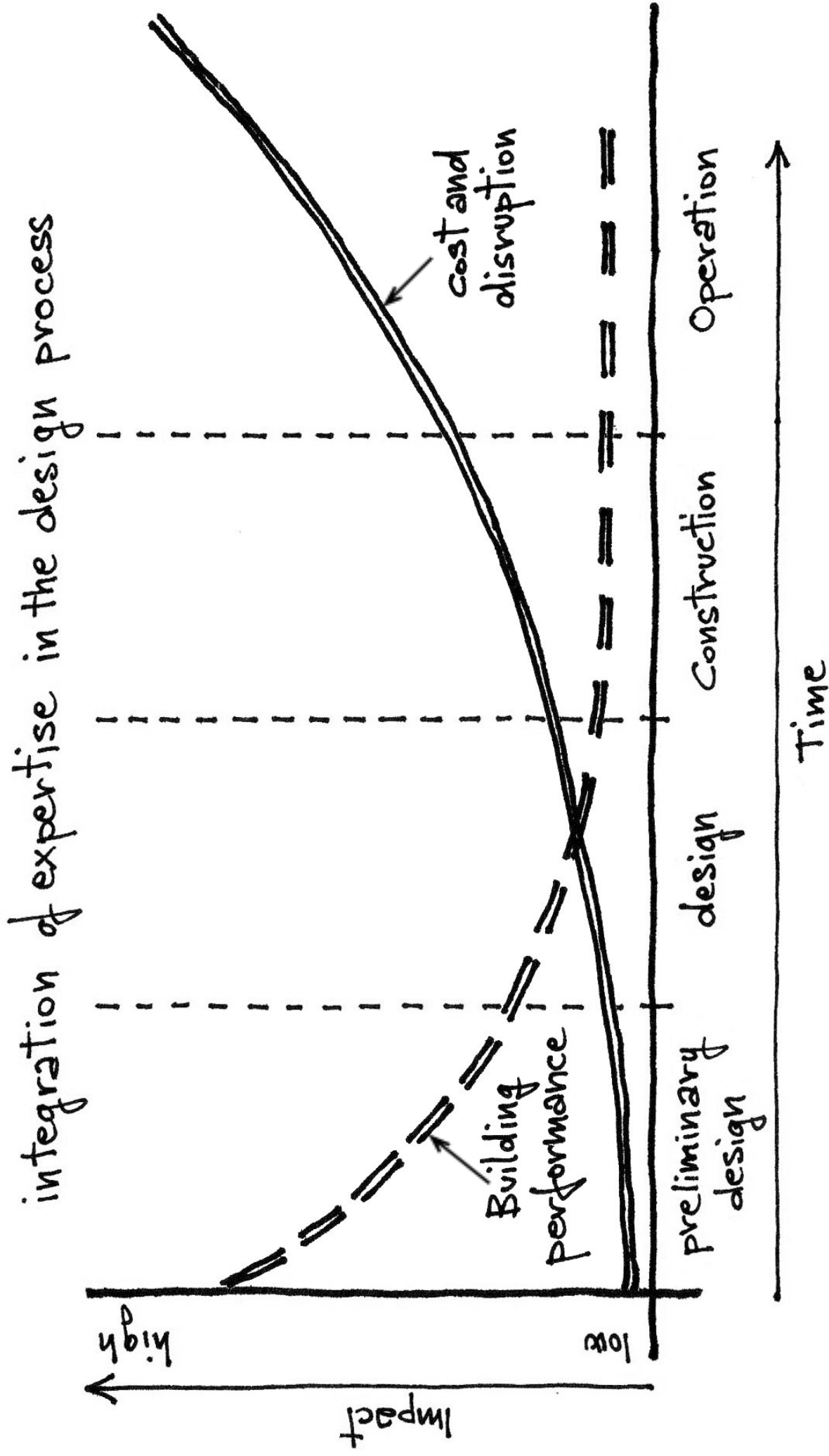
# APPROCCIO INTEGRATO (3)



# APPROCCIO INTEGRATO (4)







# Tecnologie per l'efficienza energetica

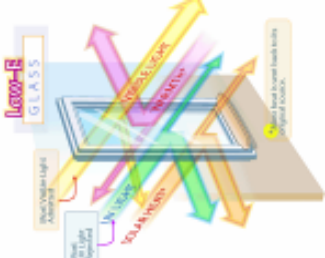
**edilportale**  
TOUR 2016



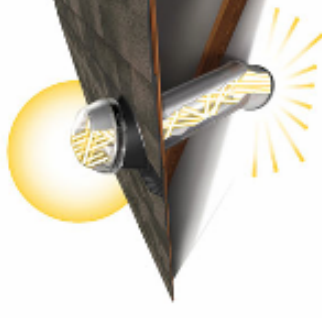
**Isolamento**



**Inerzia termica**



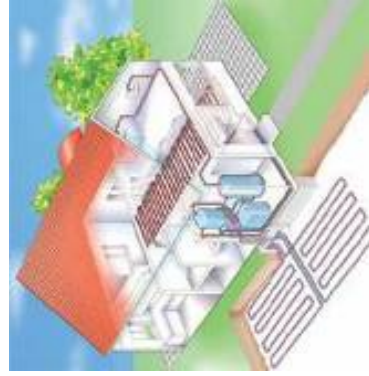
**Vetri selettivi**



**Daylighting**



**Controllo solare**



**HVAC**



**Elettrodomestici**



**Building control automation**



**Illuminazione**



**Fotovoltaico**



**Solare termico**

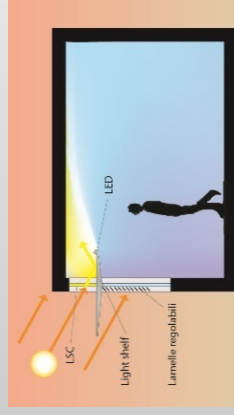
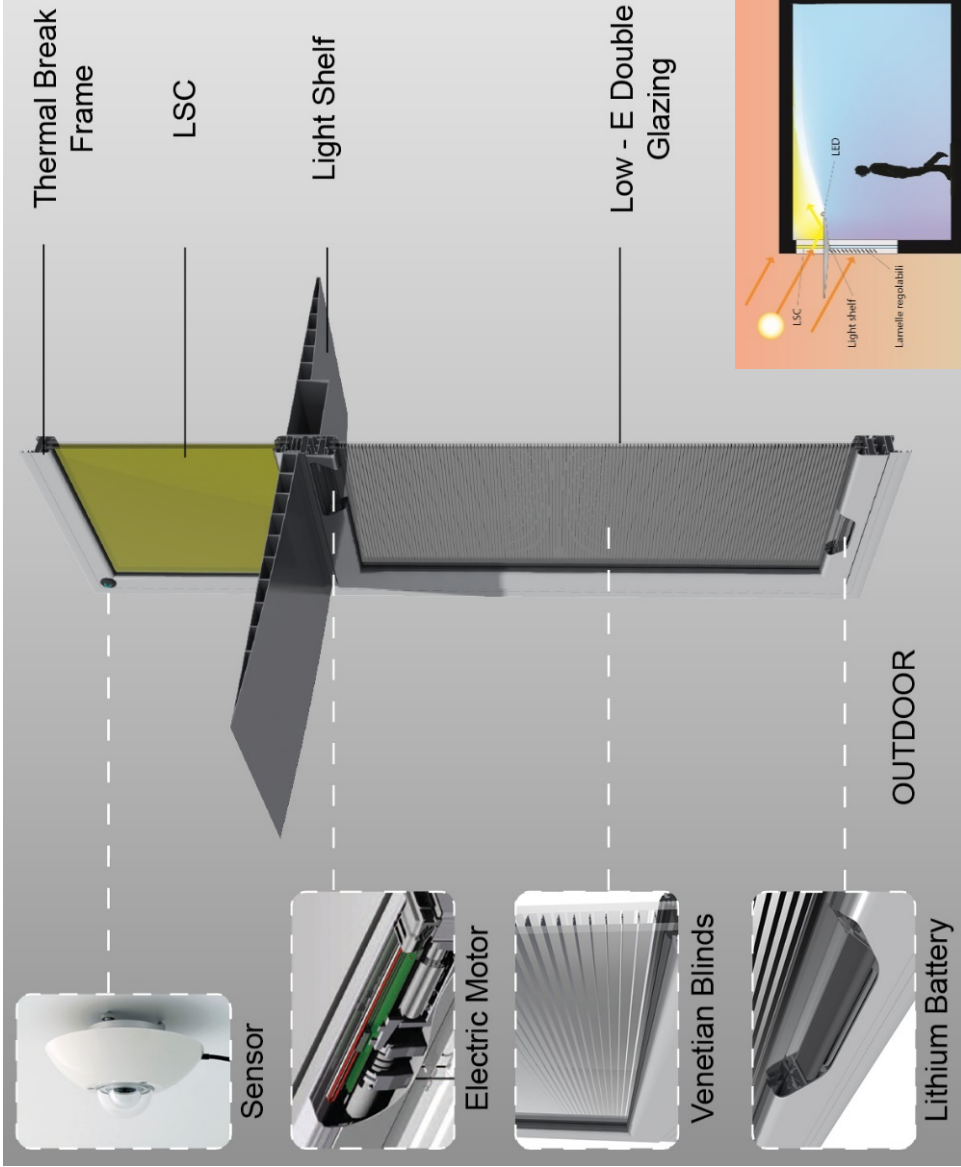


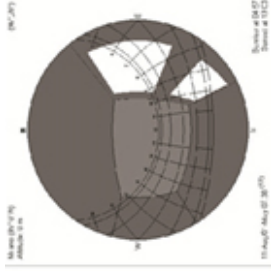
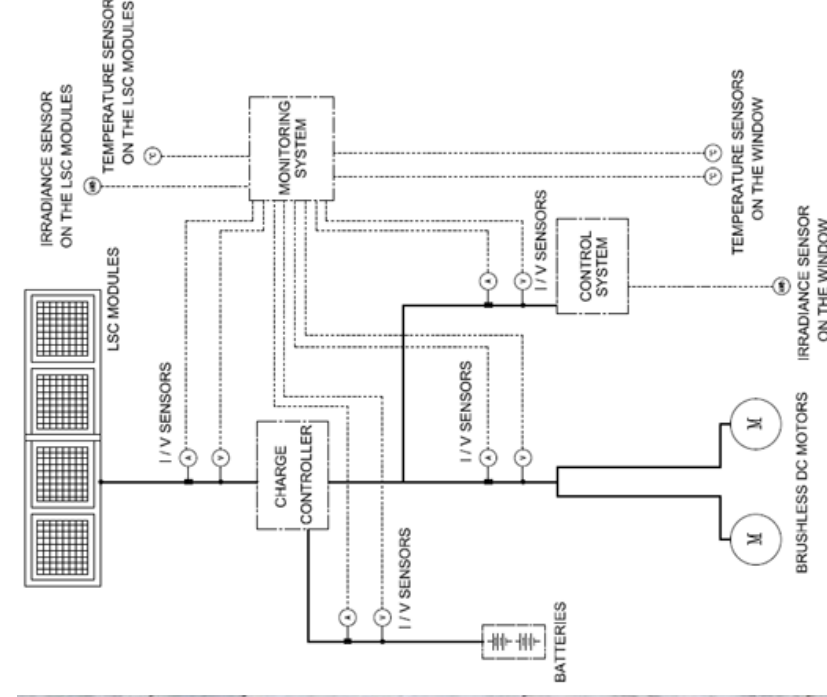
**Microeolico**



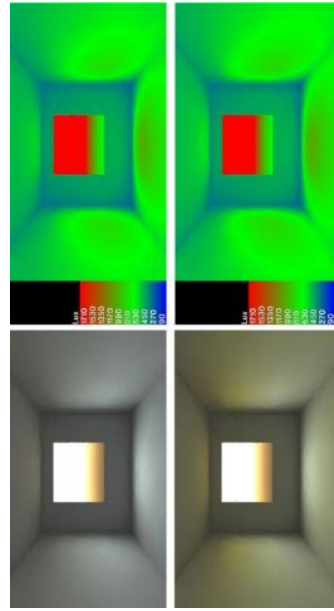
**Biomasse**

# SMART WINDOWS





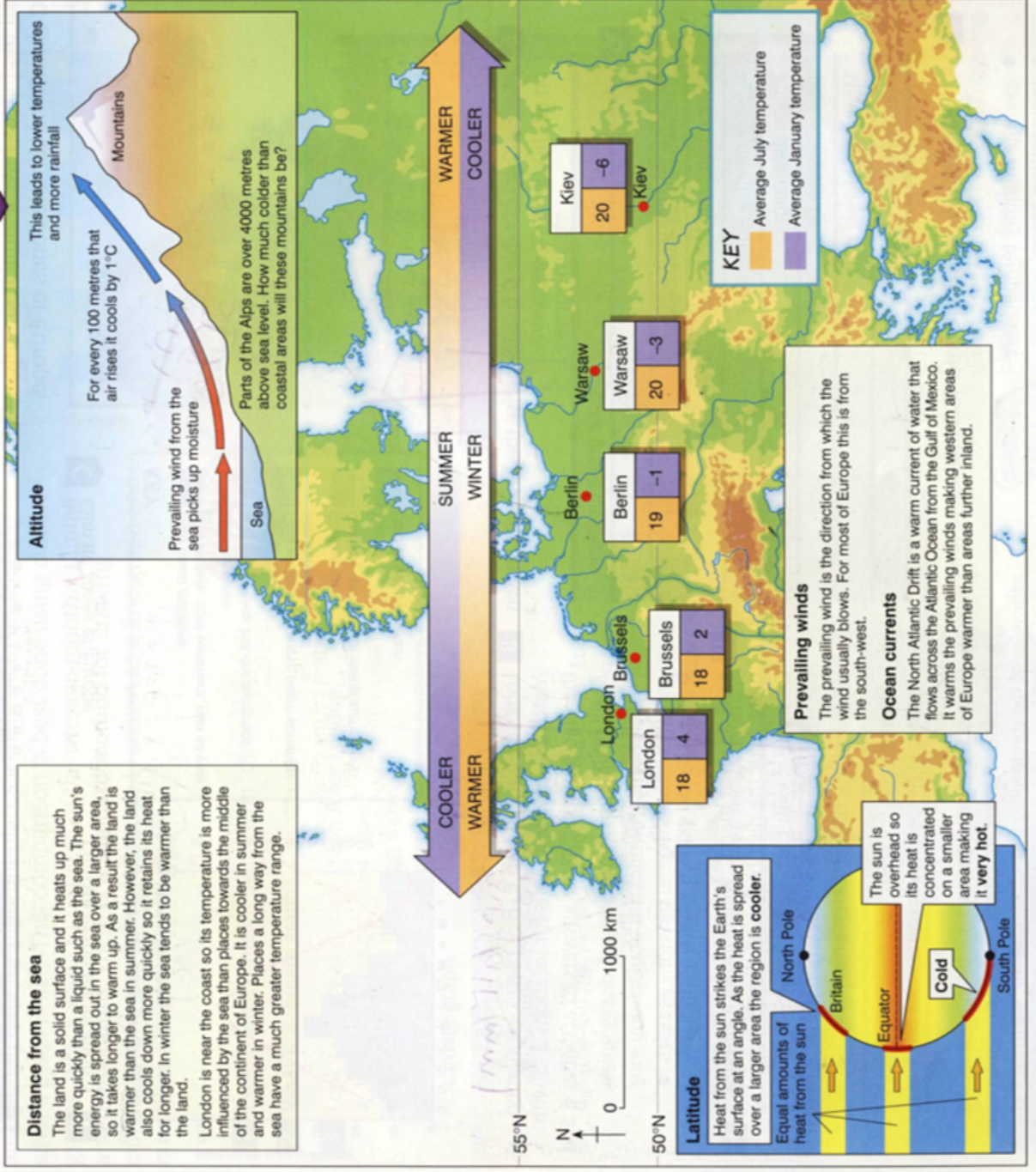
- 21 maggio 2013, ore 9,00
1. Posizione pannelli finestra: verticale e sovrappone con light up
  2. Esposizione solare: EST
  3. Situazione cielo: soleggiato



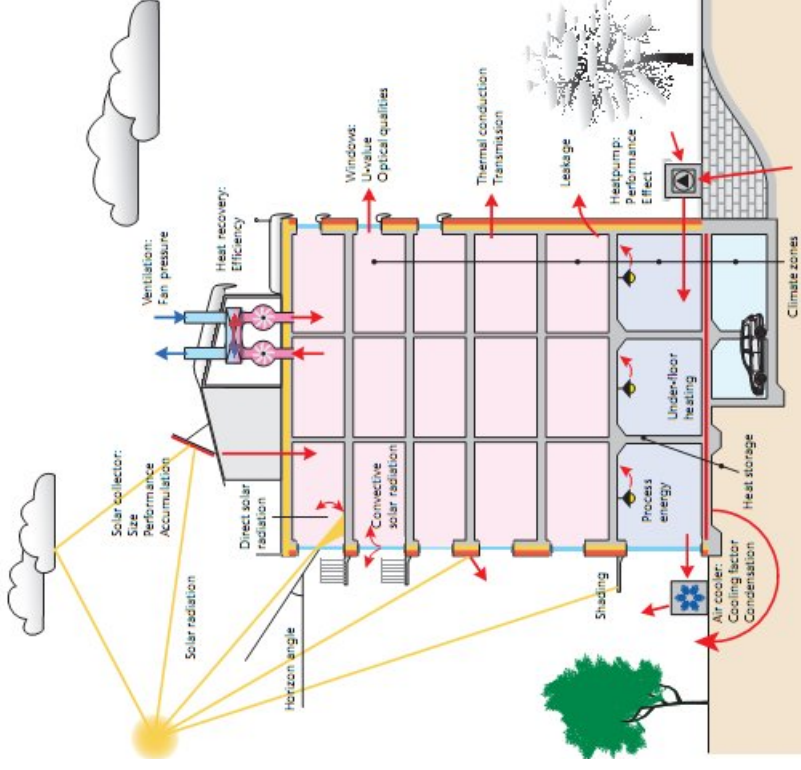
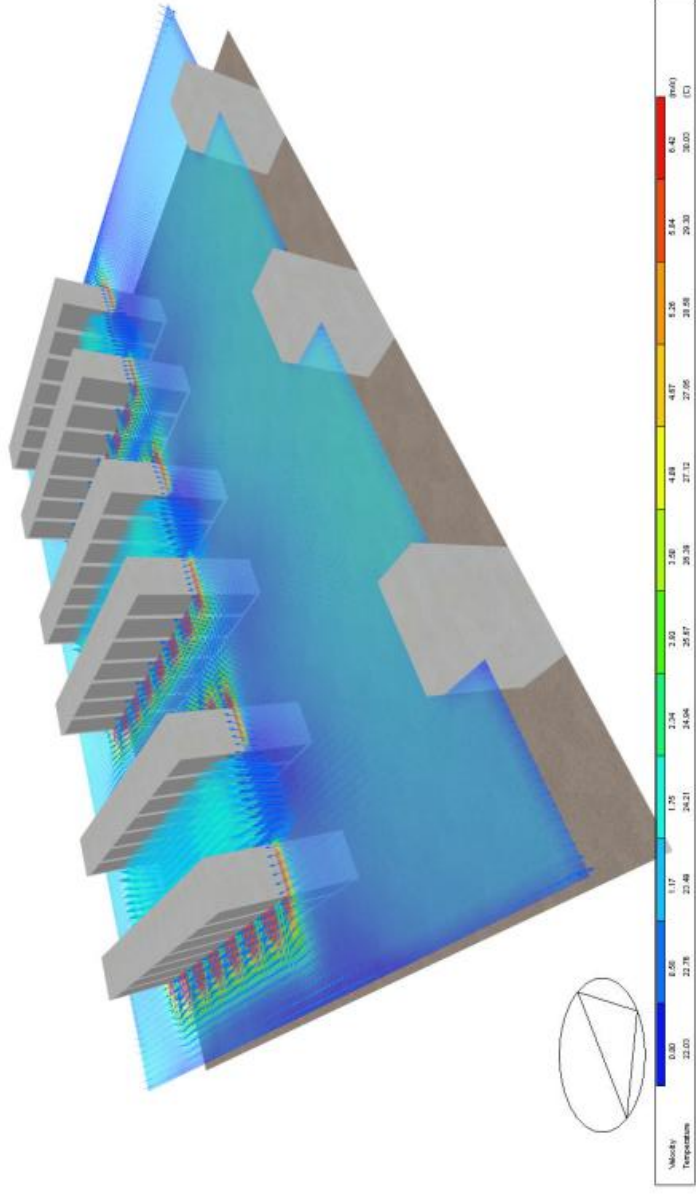
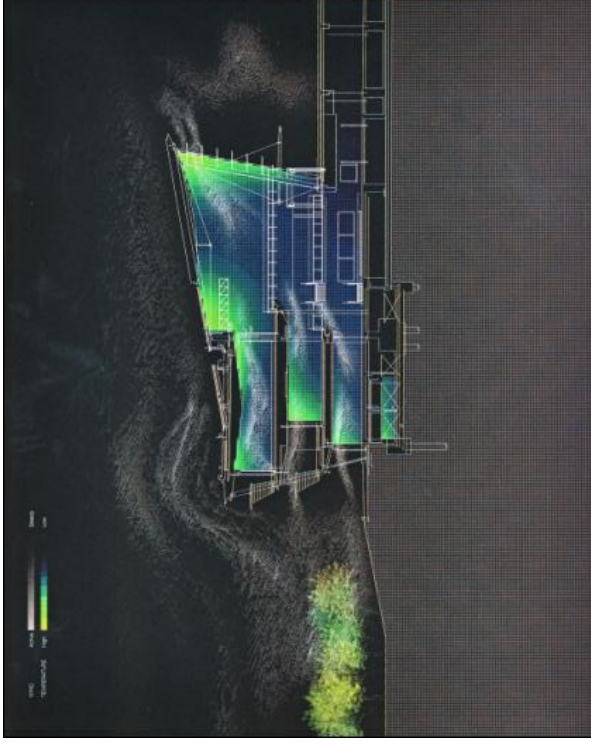
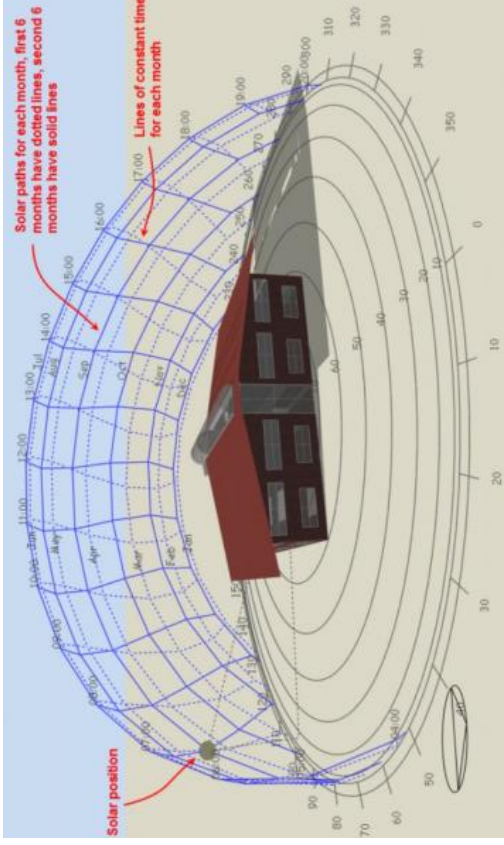
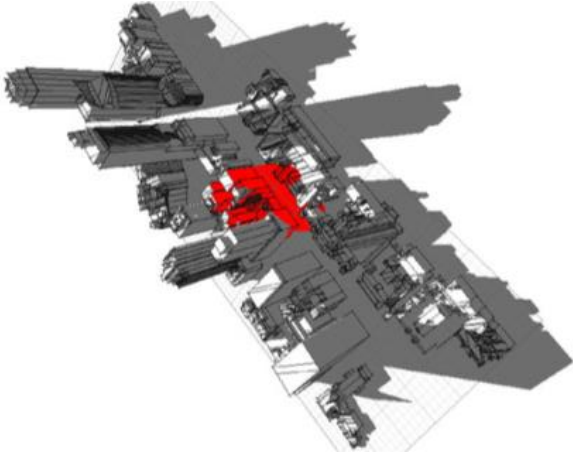
# ARCHITETTURA & CLIMA

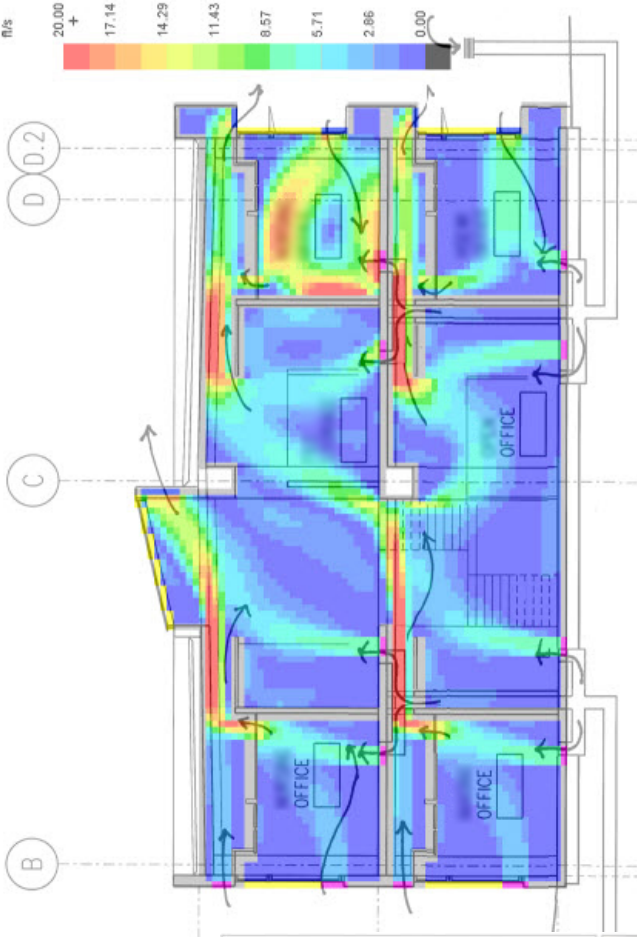
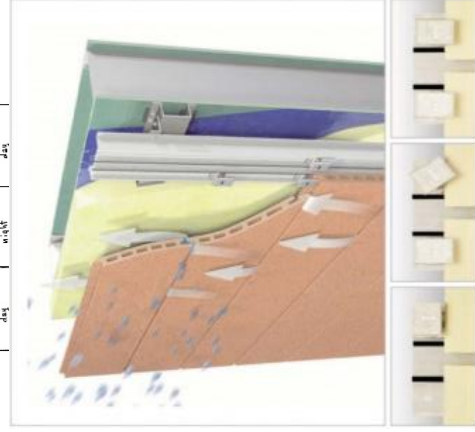
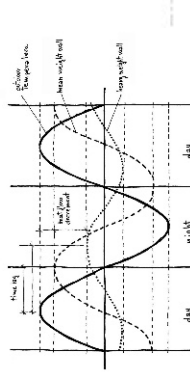
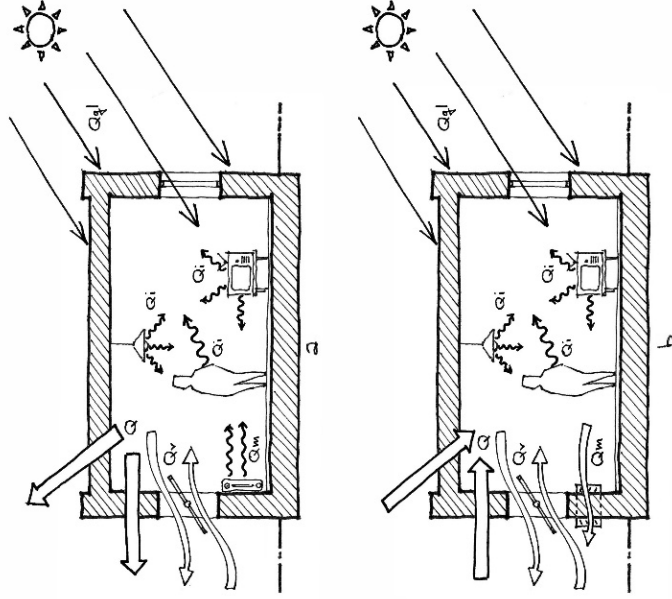
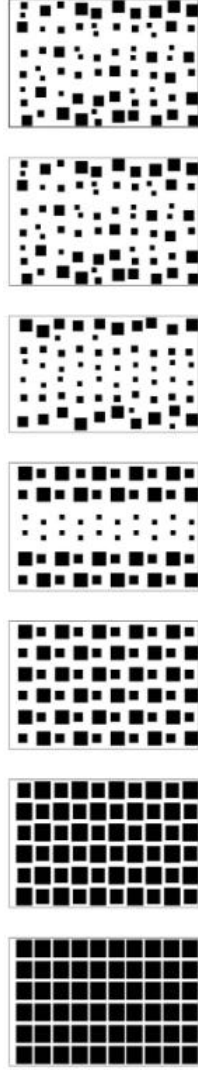
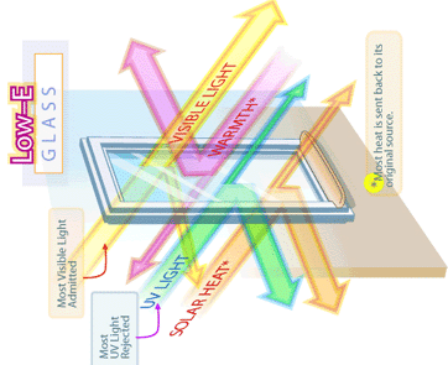
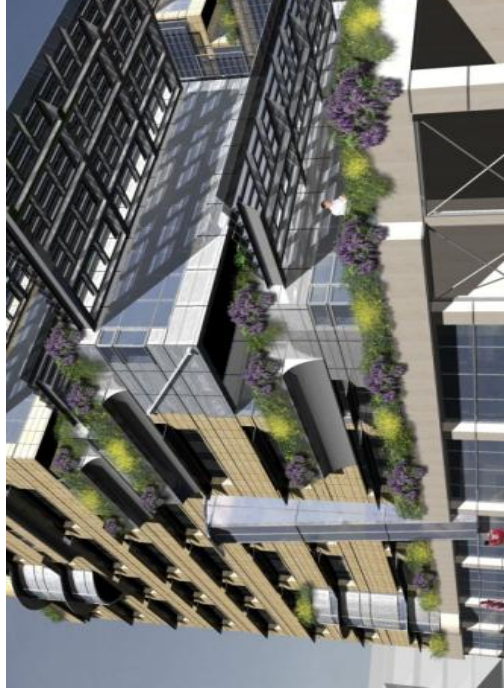
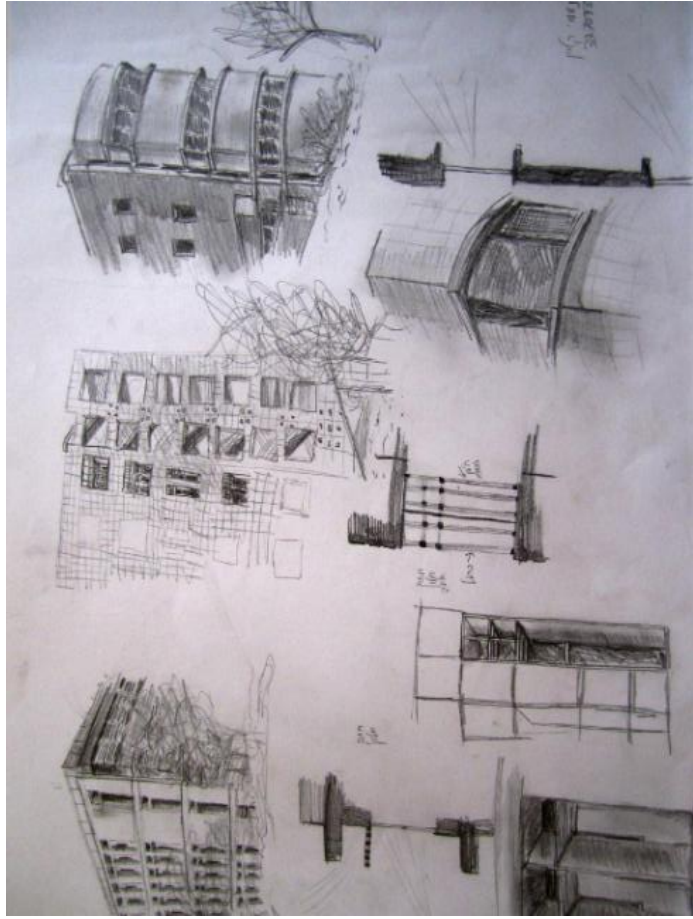
The pattern of climate for Europe is dependent on a number of factors which are explained on map A.

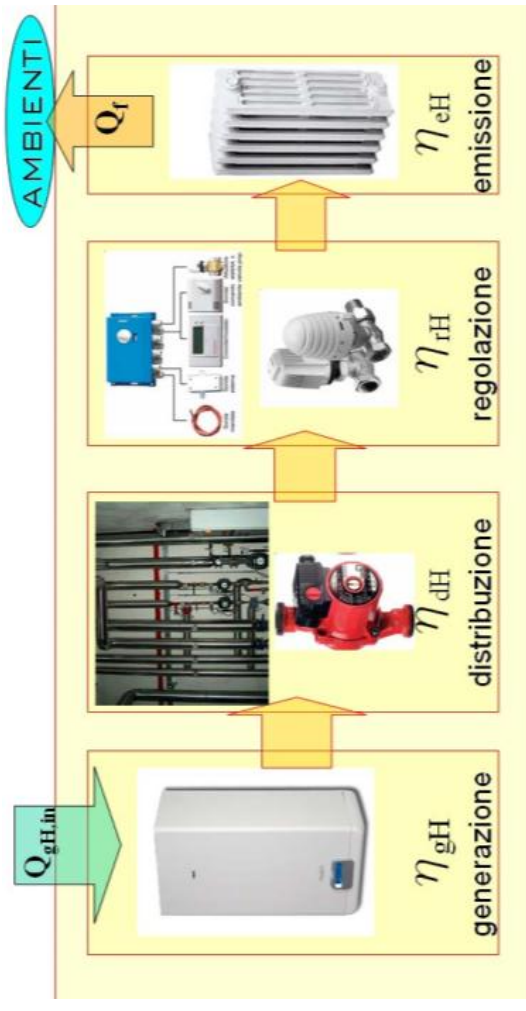
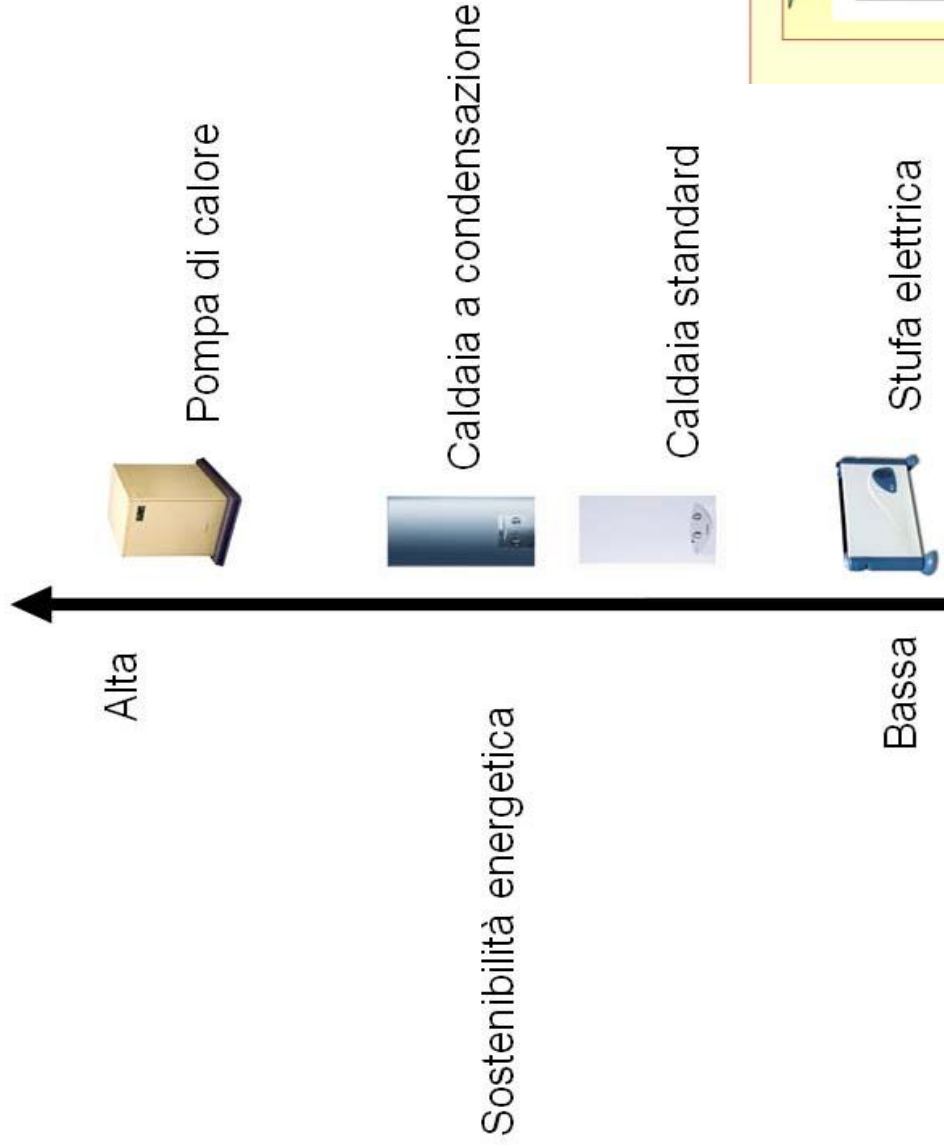
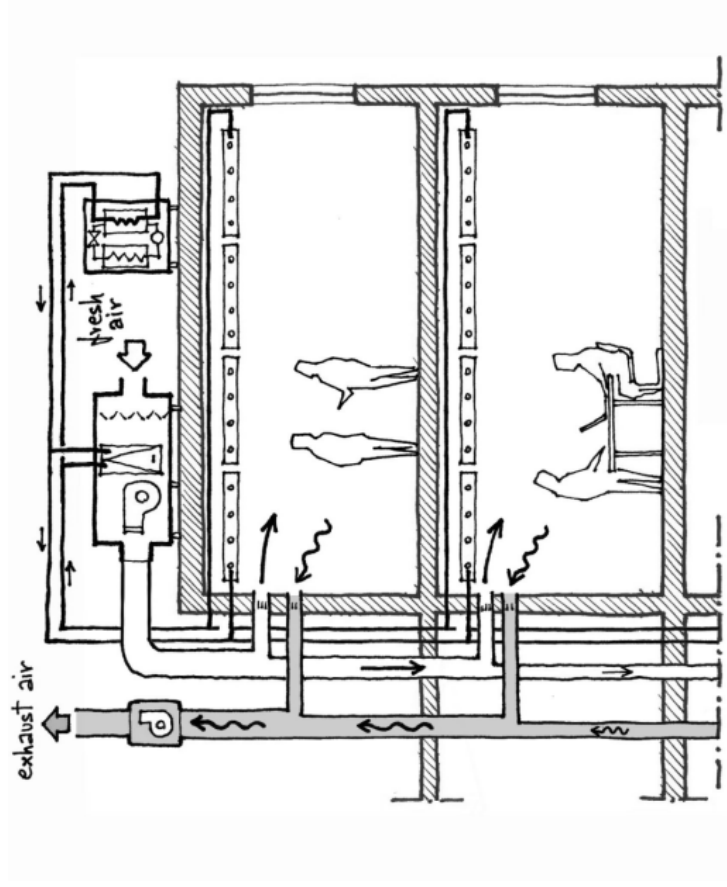
Factors affecting Europe's climate



# SISTEMA contesto-edificio-impianto

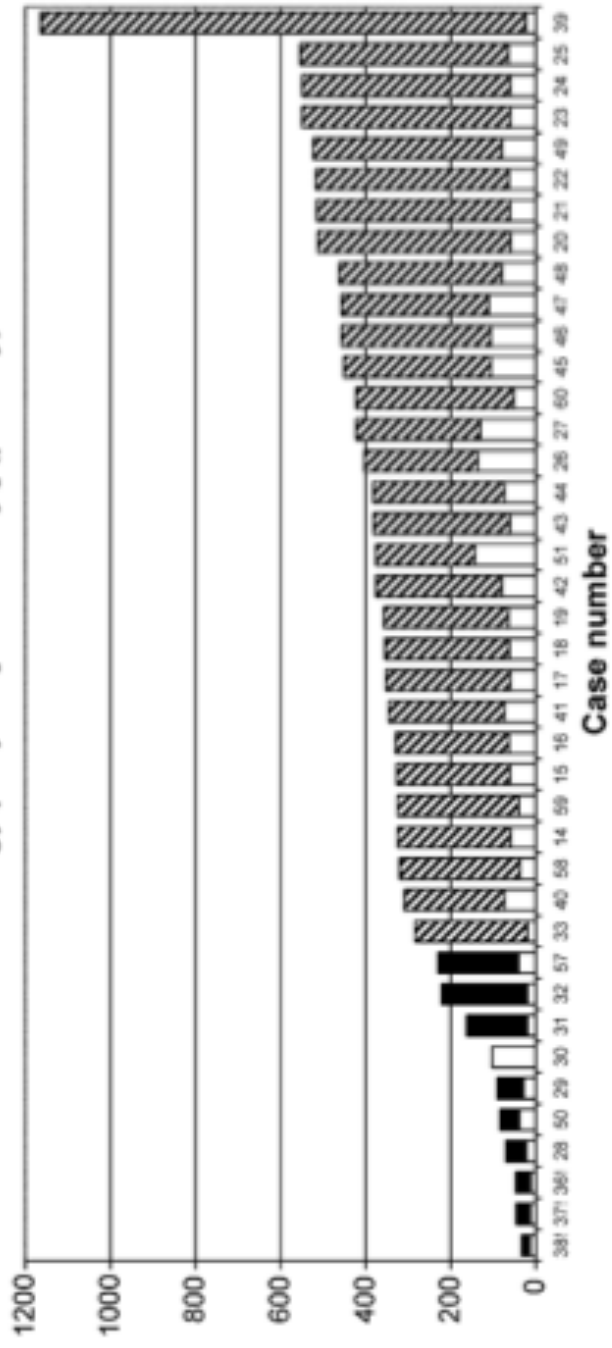




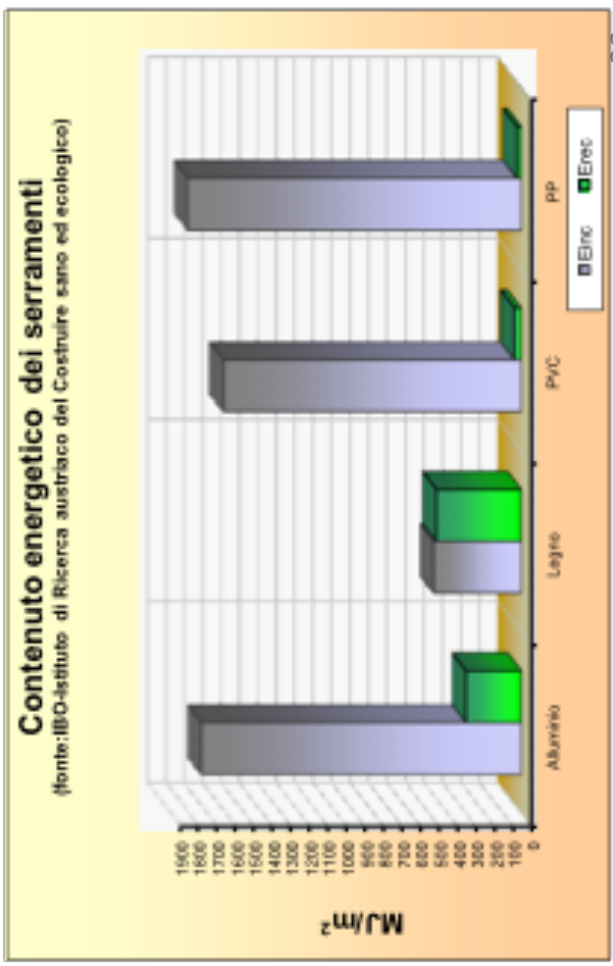
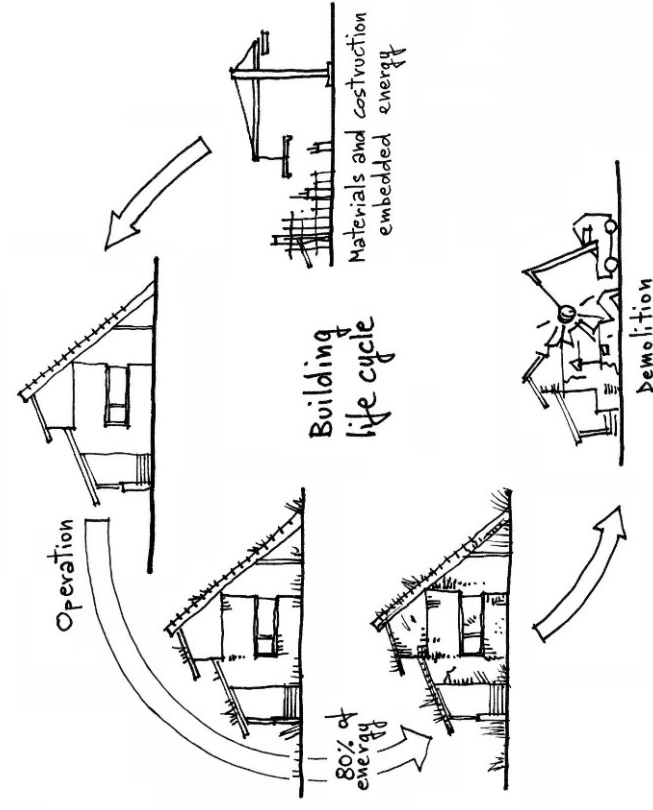
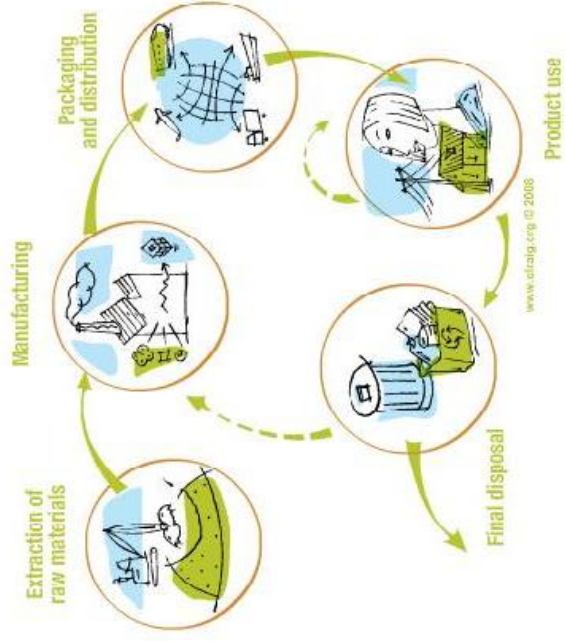




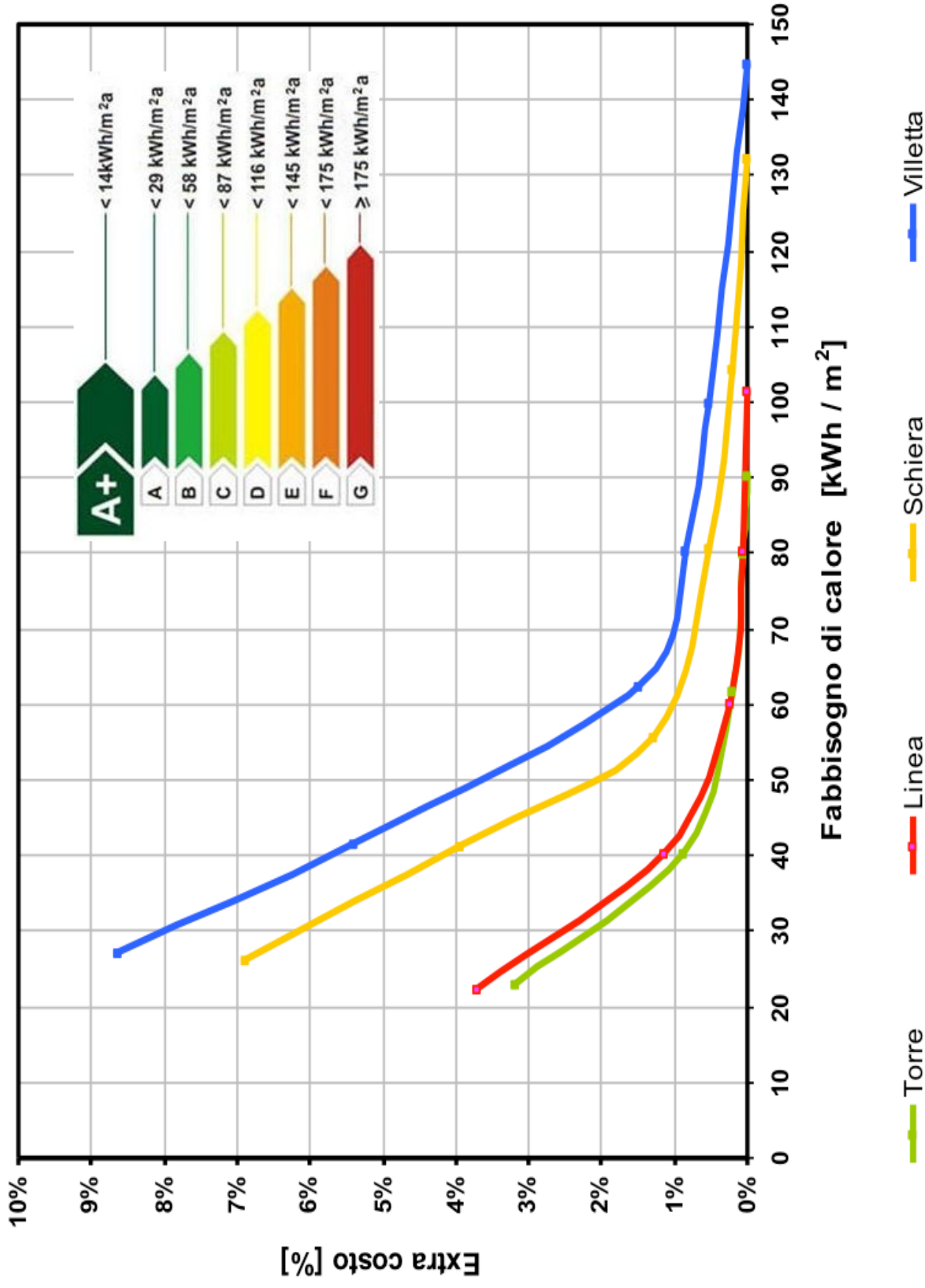
Total Energy per year [ kWh / m<sup>2</sup> y ] (primary)



■ Operating Energy, Low-Energy   ■ Operating Energy, Conventional   □ Embodied Energy

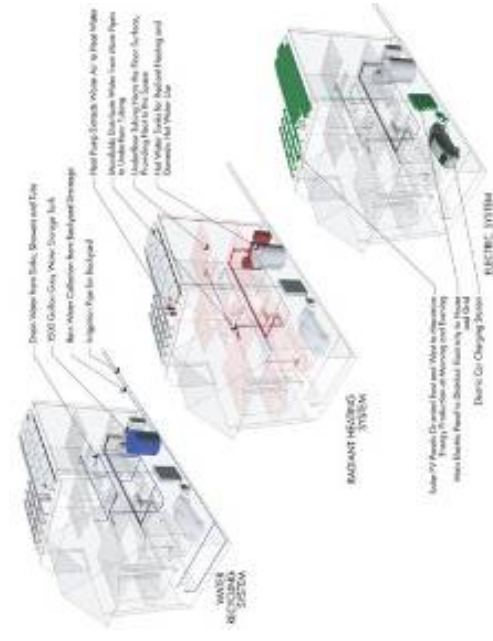
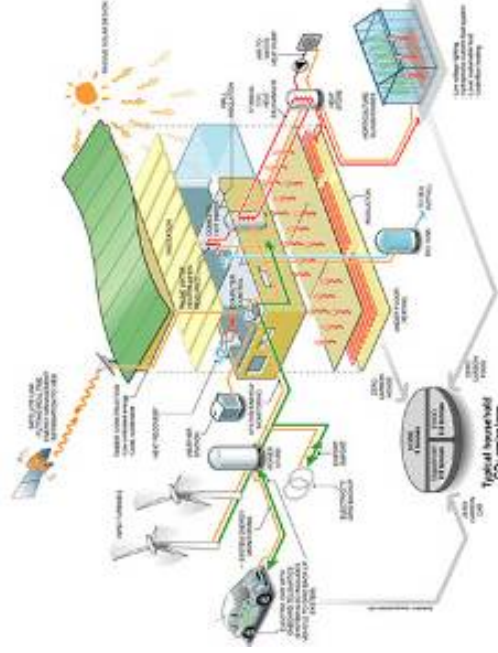


# CONSIDERAZIONI ECONOMICHE



# NET ZERO ENERGY BUILDING

***“Net Zero Energy Building means a building where, as a result of the very high level of energy efficiency of the building, the overall annual primary energy consumption is equal to or less than the energy production from renewable energy sources on site.”***



## Articolo 9 - Edifici a energia *quasi zero*

Gli Stati membri provvedono affinché:

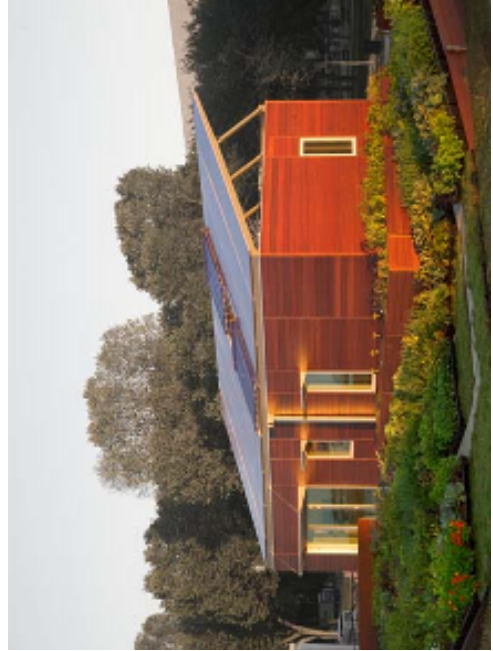
- a) entro il 31 dicembre 2020 tutti gli edifici di nuova costruzione siano edifici a energia quasi zero;
- b) a partire dal 31 dicembre 2018 gli edifici di nuova costruzione occupati da enti pubblici e di proprietà di questi ultimi siano edifici a energia quasi zero.

**NOTA:** «edificio a energia quasi zero»: edificio ad altissima prestazione energetica [...]. Il fabbisogno energetico molto basso o quasi nullo dovrebbe essere coperto in misura molto significativa da energia da fonti rinnovabili, compresa l'energia da fonti rinnovabili prodotta in loco o nelle vicinanze.

*1: Energy Performance of Buildings Directive*

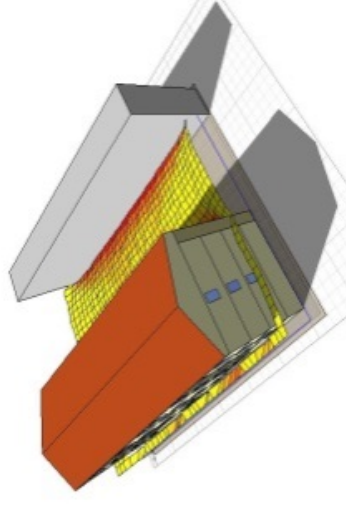
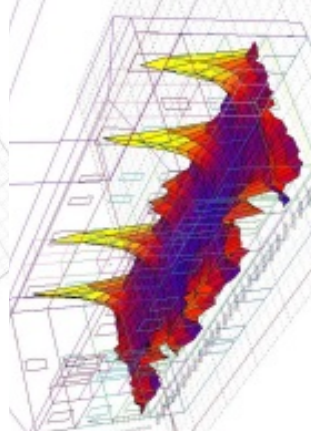
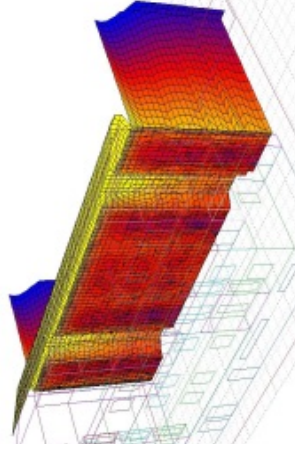
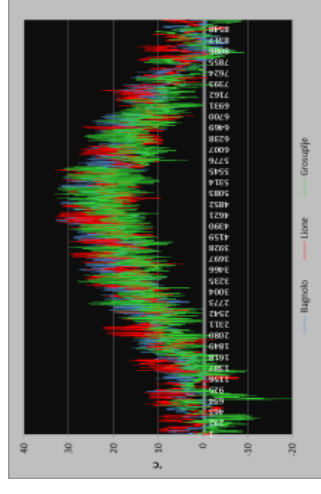
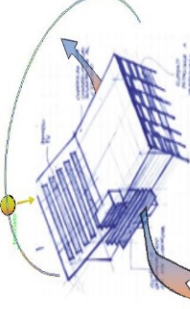
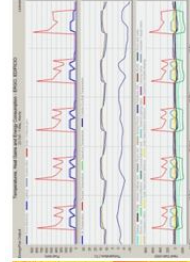
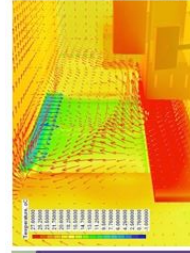
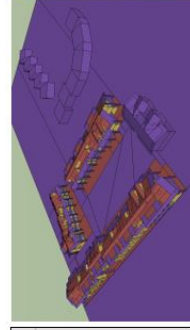
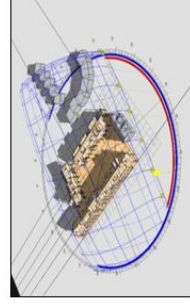
# ZERO ENERGY HOUSE

edilportale<sup>®</sup>  
TOUR 2016





# Zero Energy Buildings Summer School





***INFO: [energia-ambiente.abc@polimi.it](mailto:energia-ambiente.abc@polimi.it)***