edilportale TOUR 2016

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

in collaborazione con VELUX® tecnova group Innovative Green Building Solutions alubel tra la terra e il cielo

Cosenza, 10 marzo 2016

Progettare edifici ad energia zero

Niccolò Aste

Politecnico di Milano

SUSTAINABLE BUILDING DESIGN

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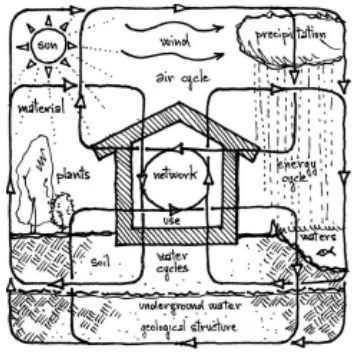
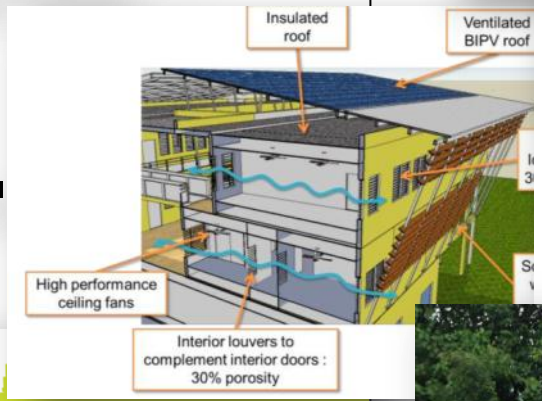
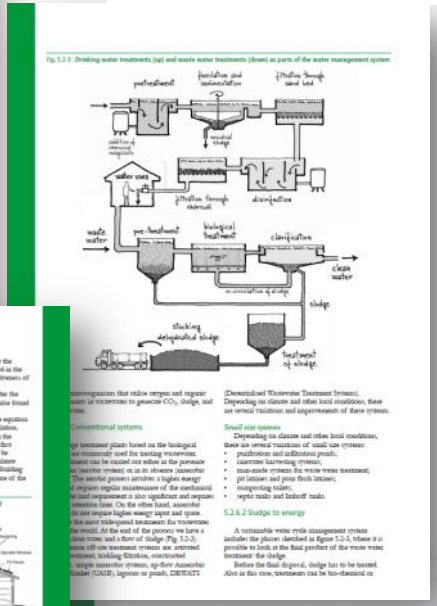


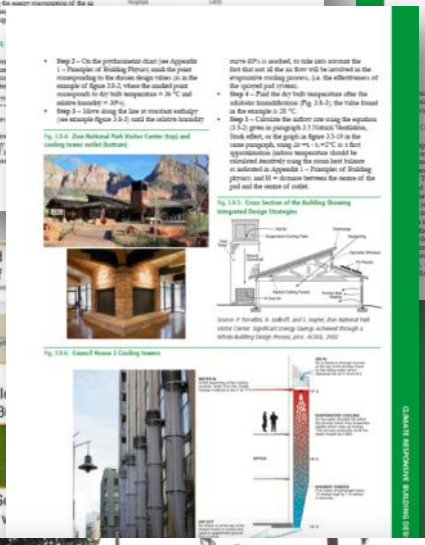
SUSTAINABLE BUILDING DESIGN FOR TROPICAL CLIMATES

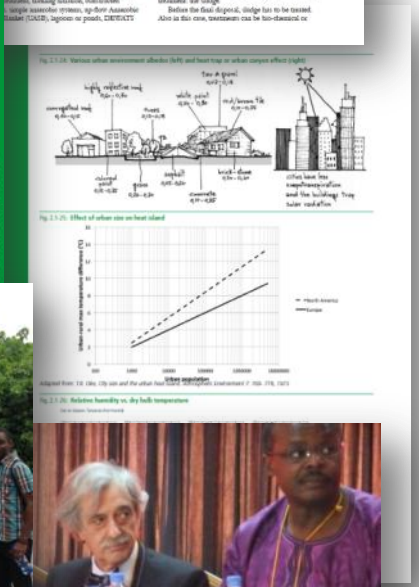
PRINCIPLES & APPLICATIONS FOR THE EASTERN AFRICA REGION

VOLUME I









UN HABITAT
FOR A BETTER URBAN FUTURE

http://unhabitat.org/books/sustainable-building-design-for-tropical-climates/

USI ENERGETICI

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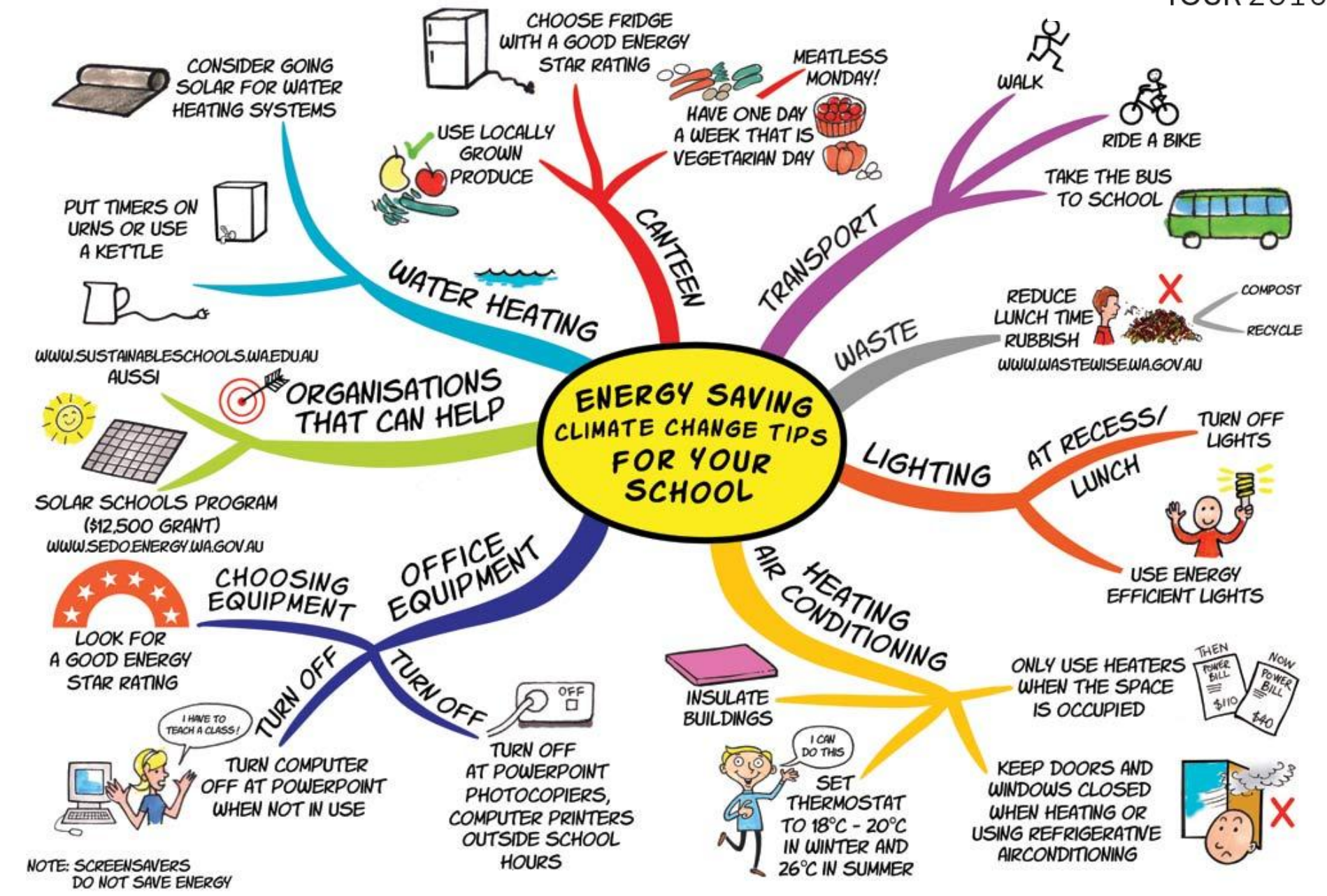
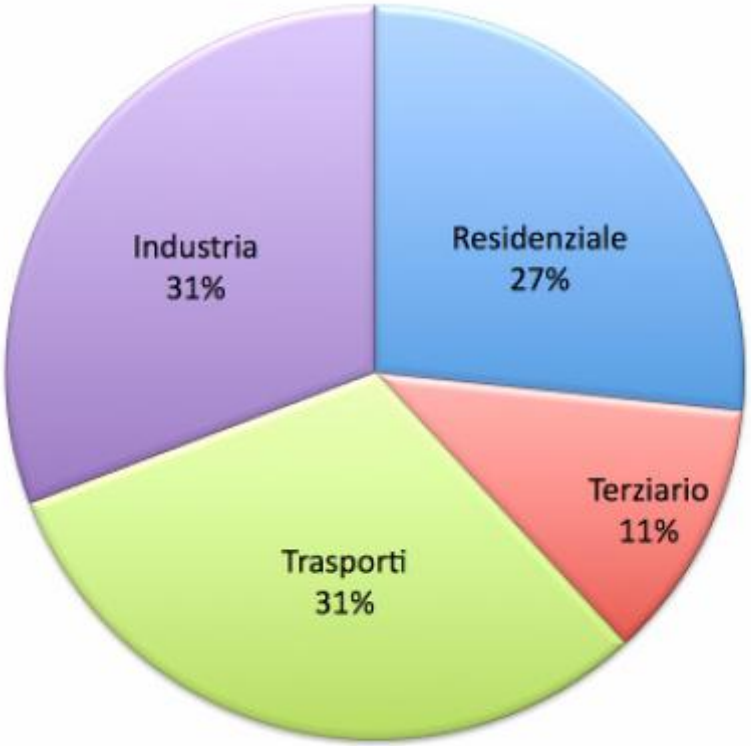
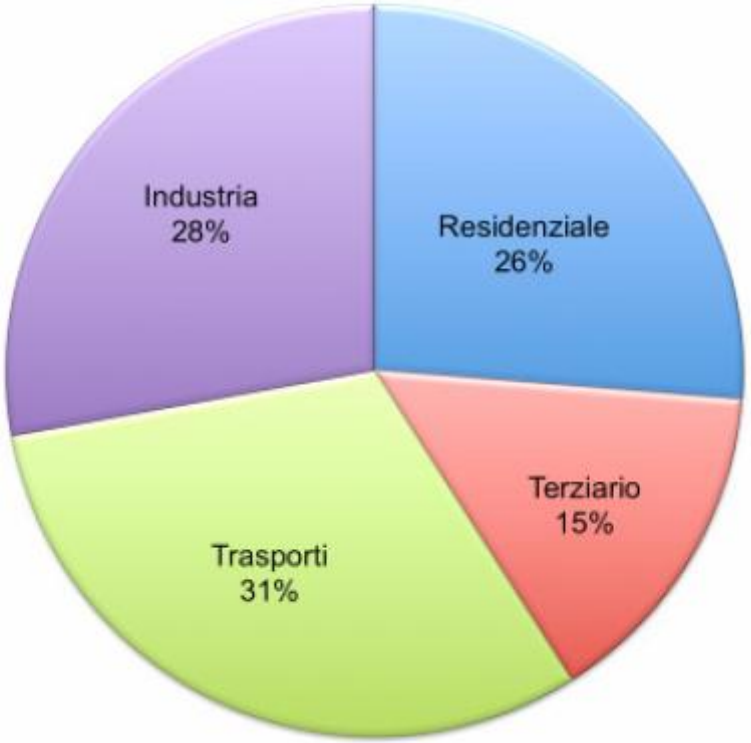


CONSUMI ENERGETICI FINALI



Europa



Italia

ARCHITETTURA & ENERGIA (1)

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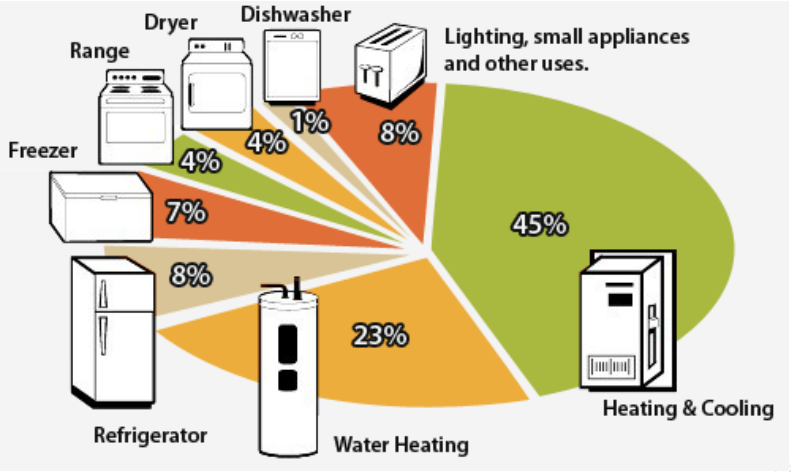

COS'E' L'ARCHITETTURA? (1)

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COS'E' L'ARCHITETTURA? (2)

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ARCHITETTURA SOSTENIBILE (?)

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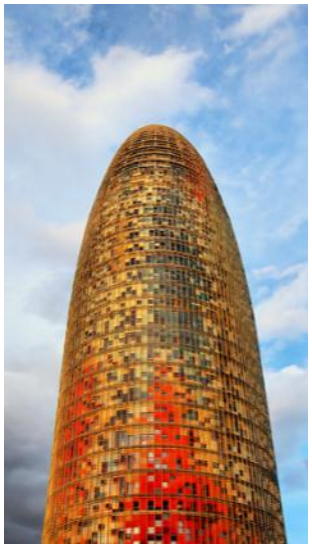

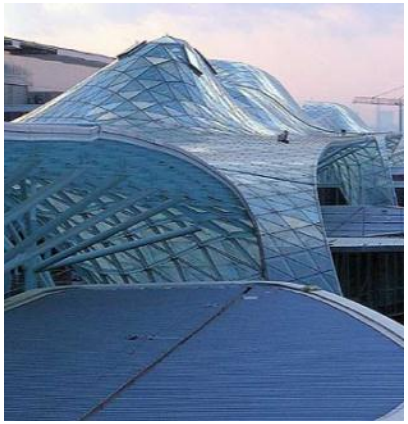

ARCHITETTURA INSOSTENIBILE

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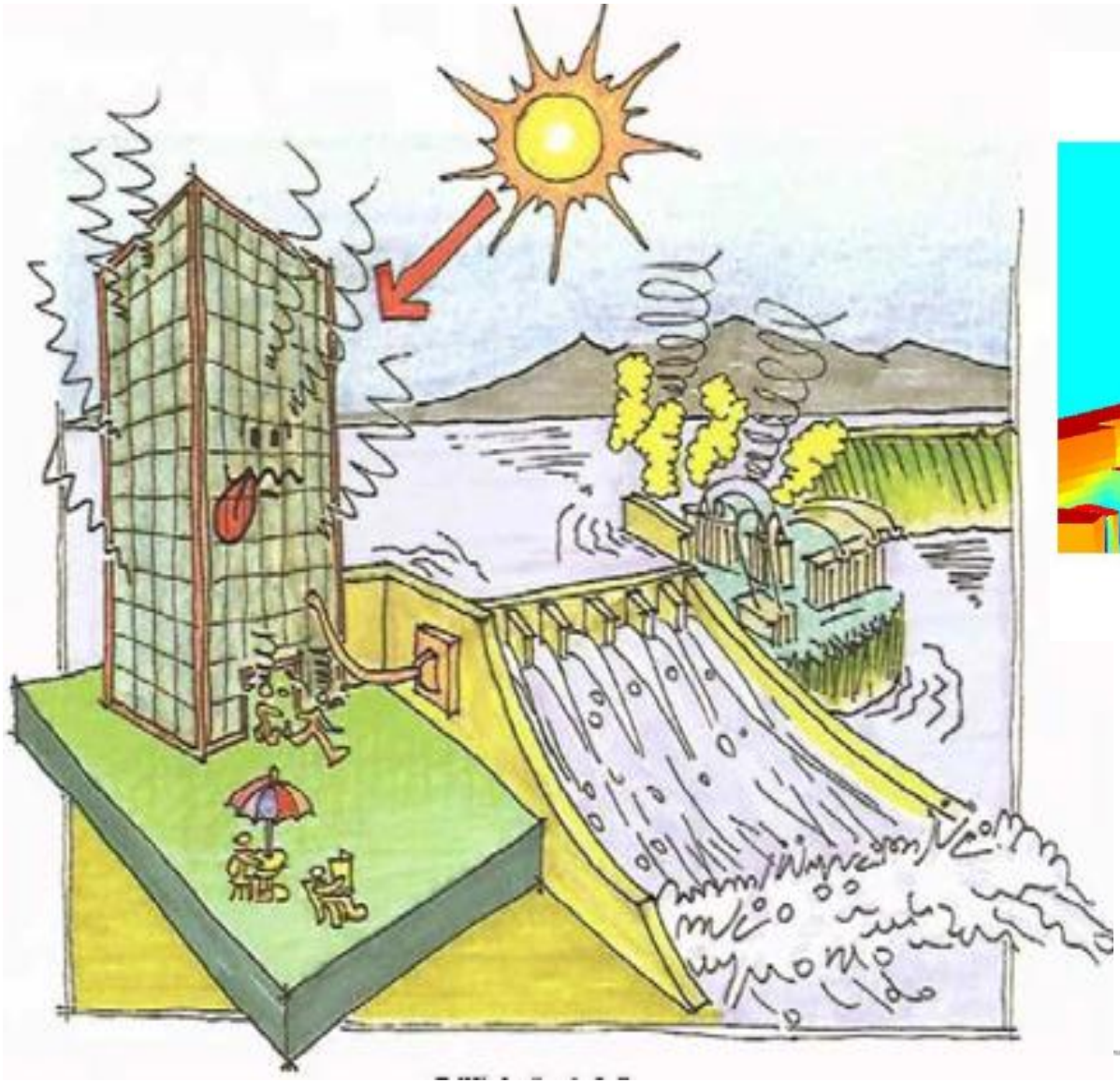

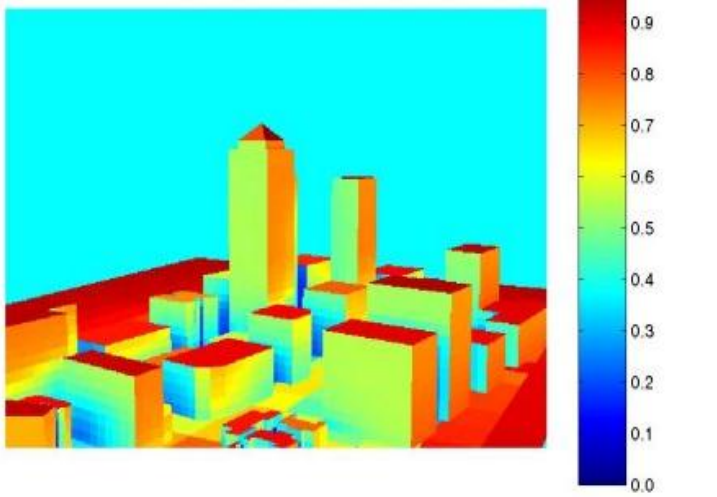

LA RESPONSABILITA' DELL'ARCHITETTO

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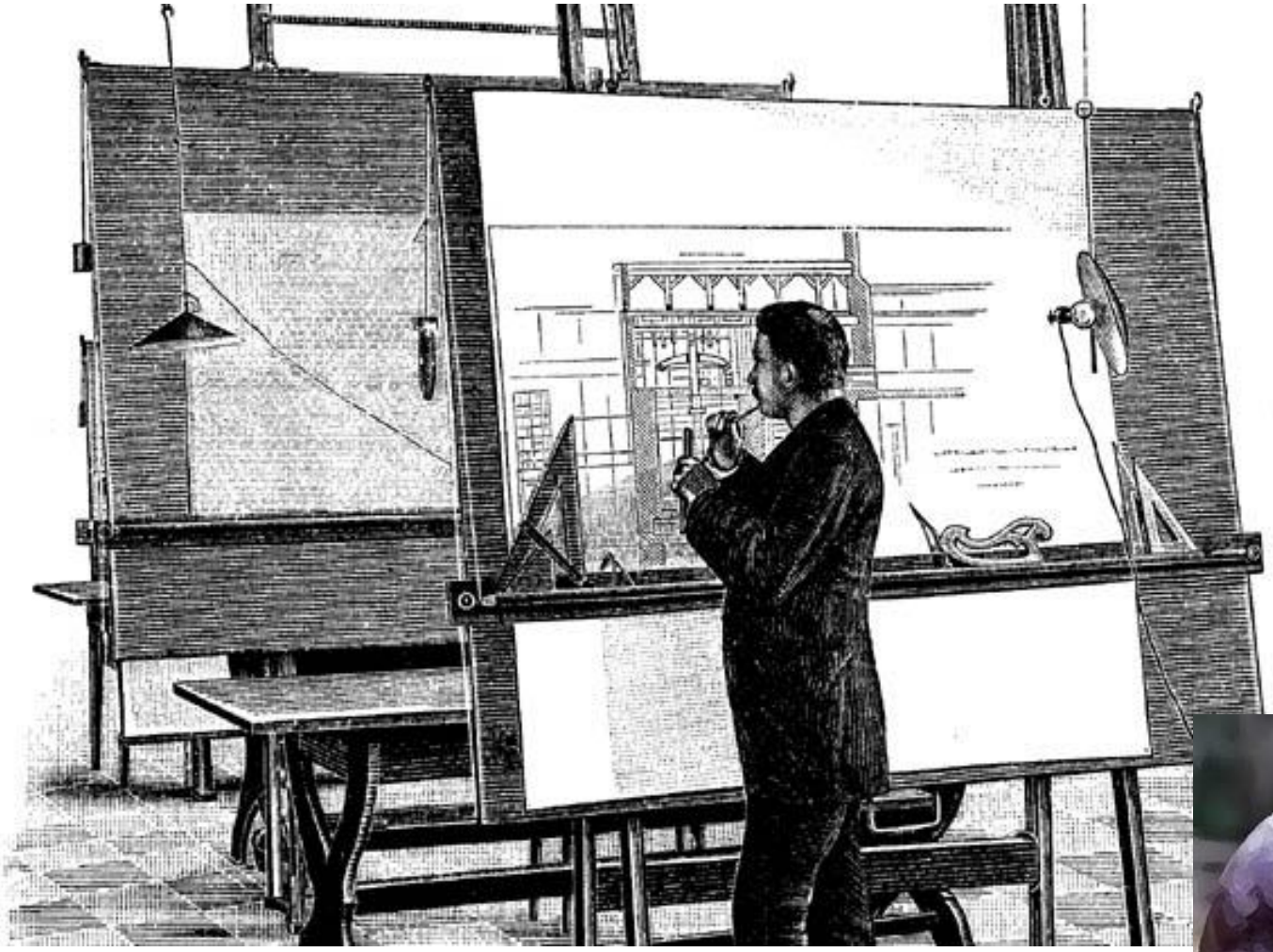
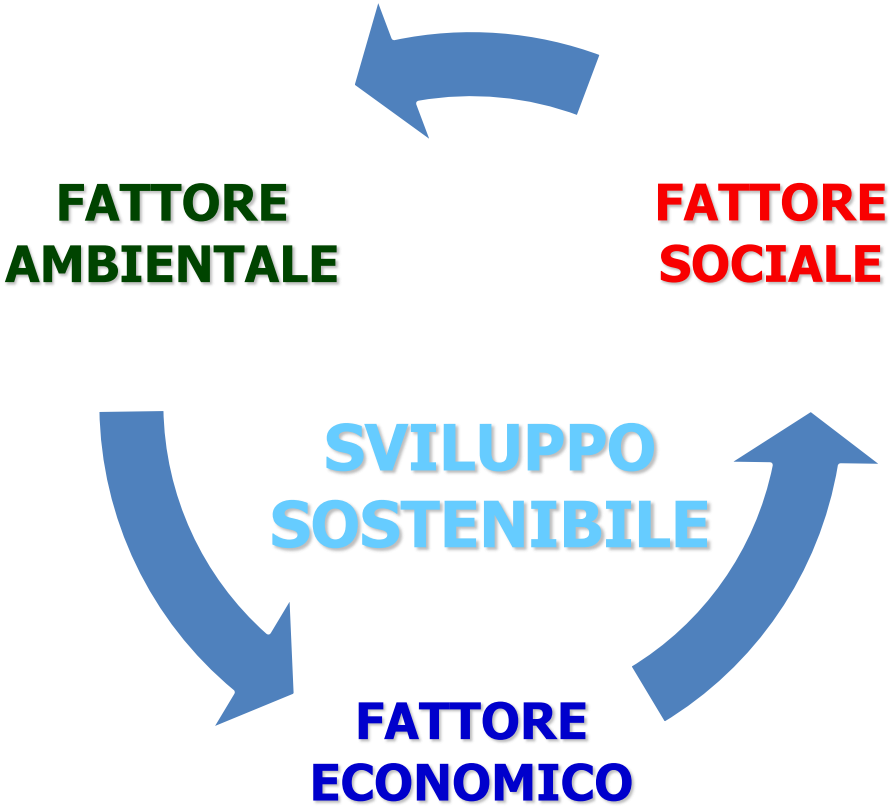


SOSTENIBILITA’



ITALIA: EDIFICIO “MEDIO”

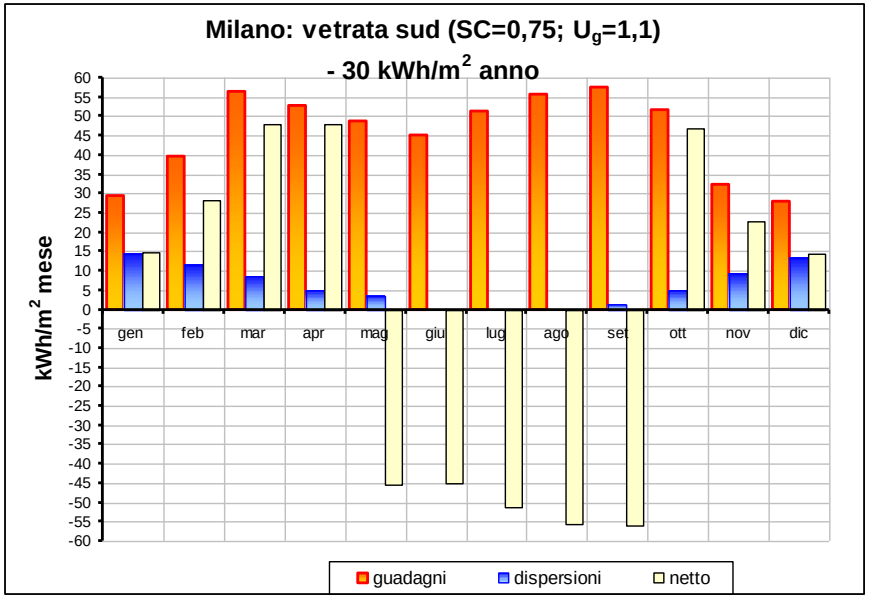
Fabbisogno per riscaldamento: 110 kWh/m² anno
Fabbisogno per ACS: 30 kWh/m² anno
Fabbisogno app. elettriche: 40 kWh/m² anno
Fabbisogno per climatizzazione estiva: ?
Emissioni CO_2: 70 kg/ m² anno

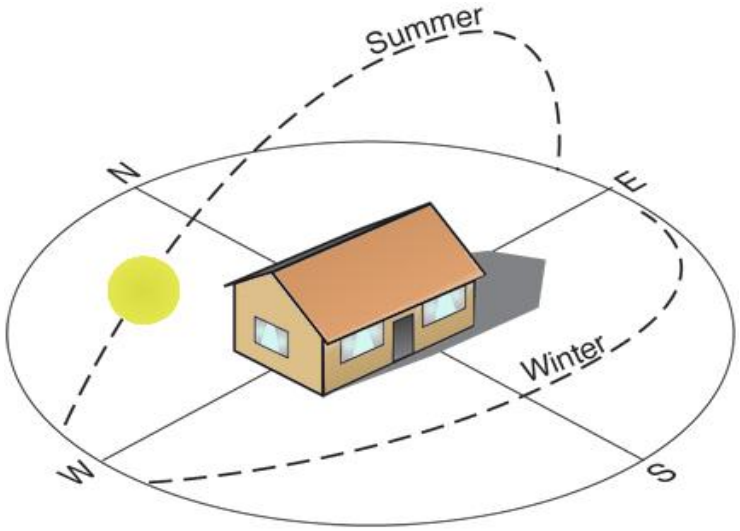
Bolletta media italiana
Riscaldamento: 1000 €/anno
Consumi elettrici: 500 €/anno

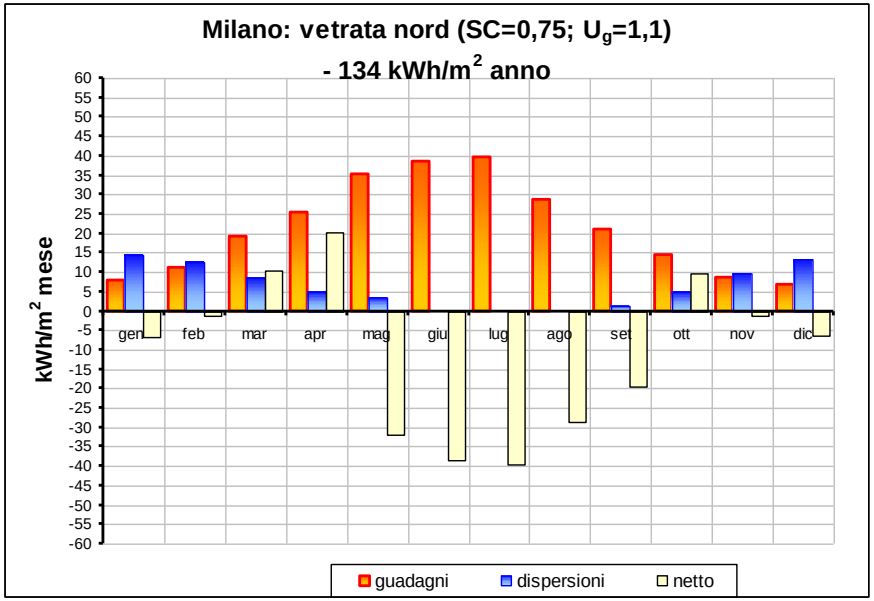
ITALIA: EDIFICIO “EFFICIENTE”

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 CO_2: 35 kg/ m² anno

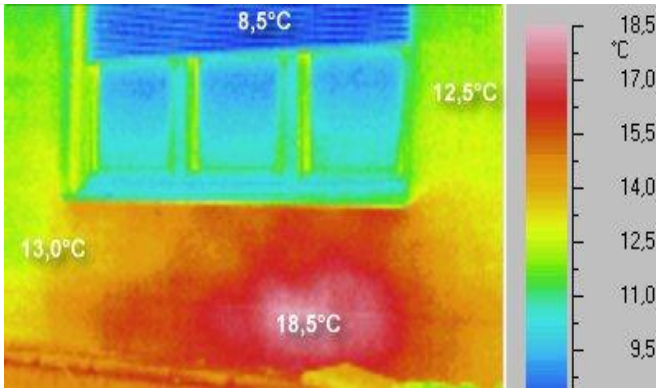
BILANCI ENERGETICI

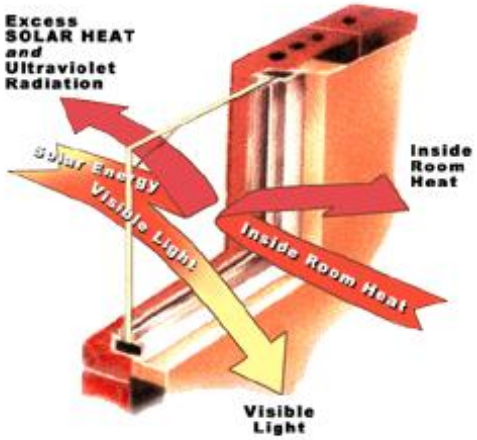


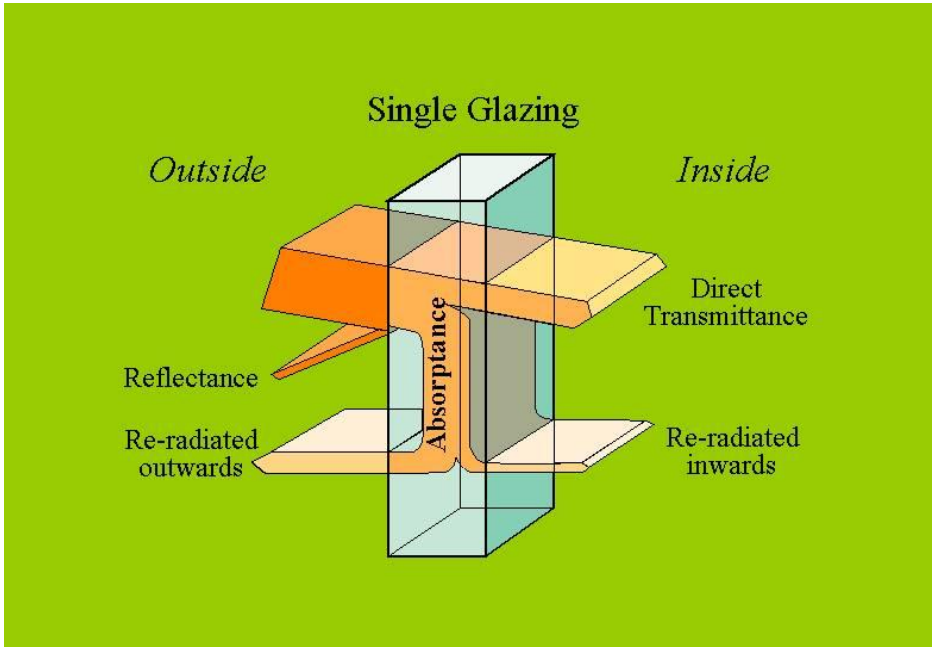


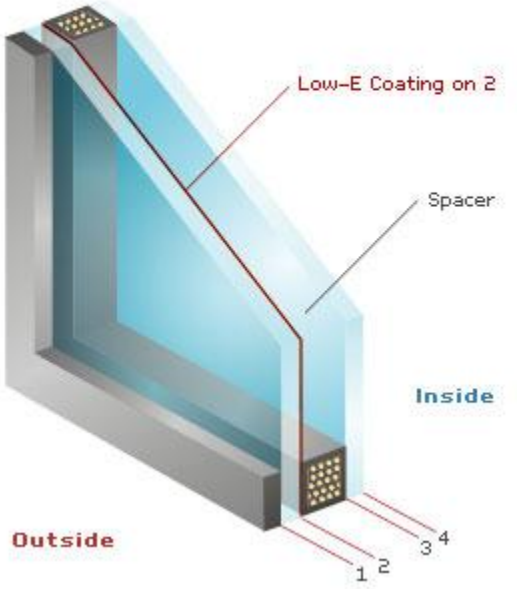


INVOLUCRO TRASPARENTE









INVOLUCRO OPACO

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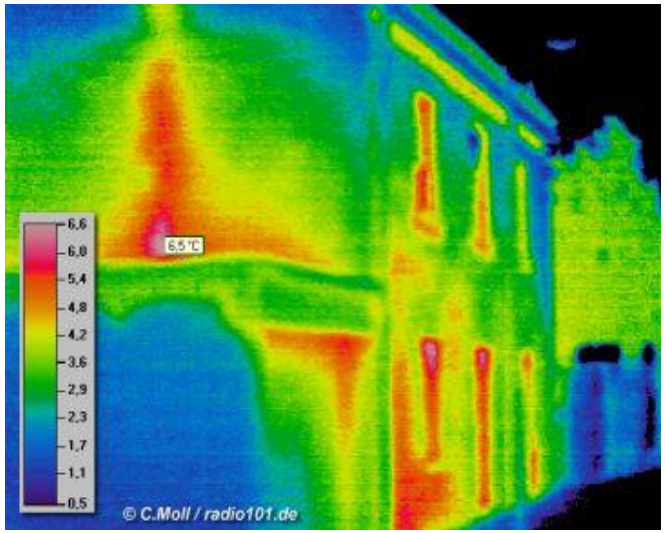

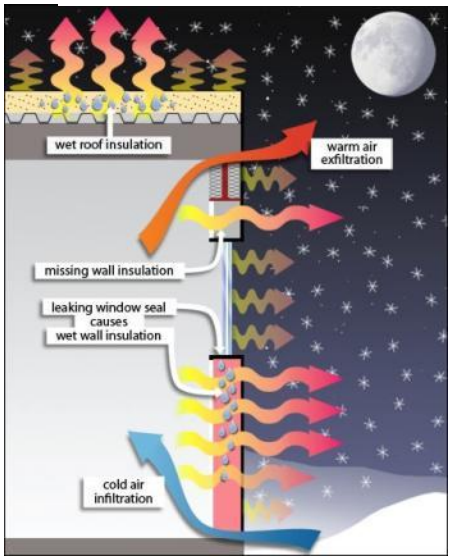

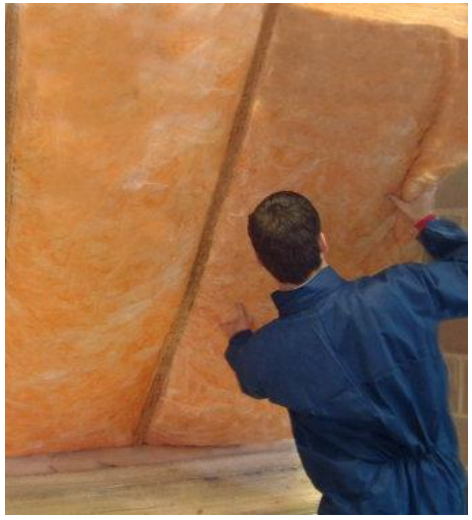

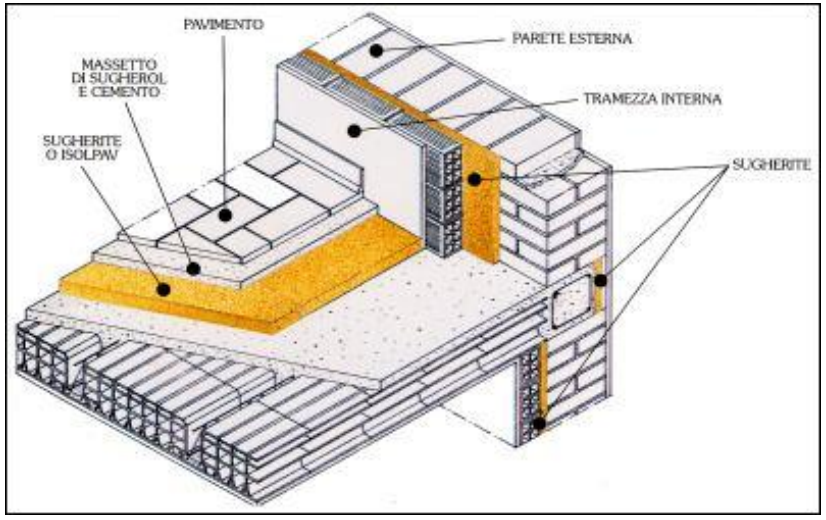

ILLUMINAZIONE ARTIFICIALE

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

Tipo di locale, compito visivo o attività	*Valori di E_m (lux)*	*Tonalità di luce*	*R_a*	*Note*
Corsie: lettura	150-200-300	W	"	
Corsie: illuminazione notturna	5	W	"	
Locali per esami: illuminazione generale	500	W	"	
Locali per esami: ispezioni localizzate	1000	W.I	"	
Locali per esami: terapie intensive	300	W	"	
Chirurgia: illuminazione generale	1000	I	"	
Chirurgia: illuminazione localizzata	20000-100000	I.C	"	
Sale autoptiche: illuminazione generale	1000	I.C	"	
Sale autoptiche: illuminazione localizzata	5000	I.C	"	
Laboratori e Farmacie: illuminazione generale	500	I.C	"	
Laboratori e Farmacie: illuminazione localizzata	1000	I.C	"	
Locale per consulti: illuminazione generale	300-500-750	W.I	>90	
Locale per consulti: illuminazione localizzata	1000	W.I	"	
Scuole				
Classe: illuminazione generale	300-500	W.I	80-90	300 lux: aule con sufficiente illuminazione naturale 500 lux: aule con insufficiente illuminazione naturale
Classe: lavagna	300-500	W.I	80-90	
Classe: disegno	500-750	W.I	>80	
Aule universitarie: illuminazione generale	300-500	W.I	80-90	
Aule universitarie: lavagna	500-750	W.I	"	
Aule universitarie: banchi per dimostrazioni	500-750	W.I	"	
Laboratori, officine e sale per l'istruzione d'arte	500	W.I	"	
Sale per assemblee	150-200-300	W.I	"	
Uffici				
Generici	300-500-750	W.I	"	
Per disegnatori	500-750-1000	W.I	>80	
Sale per riunioni	300-500-750	W.I	80-90	
Con videoterminali	300	W.I	"	

W = calda; I = intermedia; C = fredda (v. tab. 3.4.2)

IMPIANTI TERMICI

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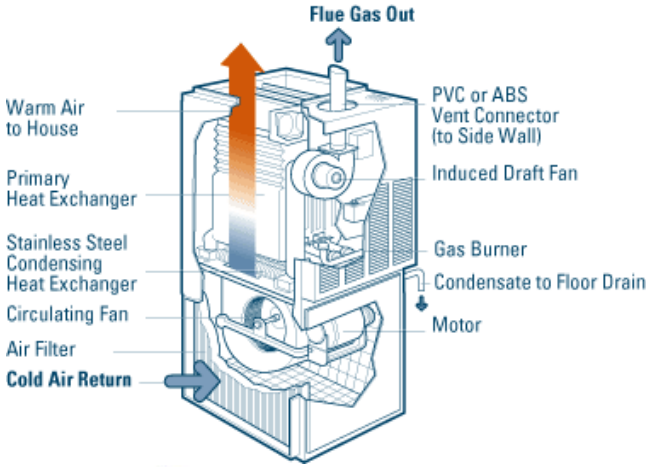

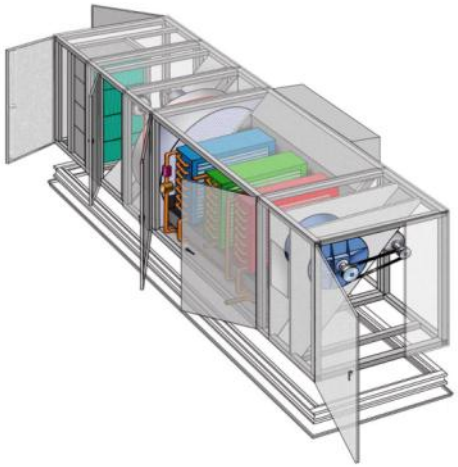

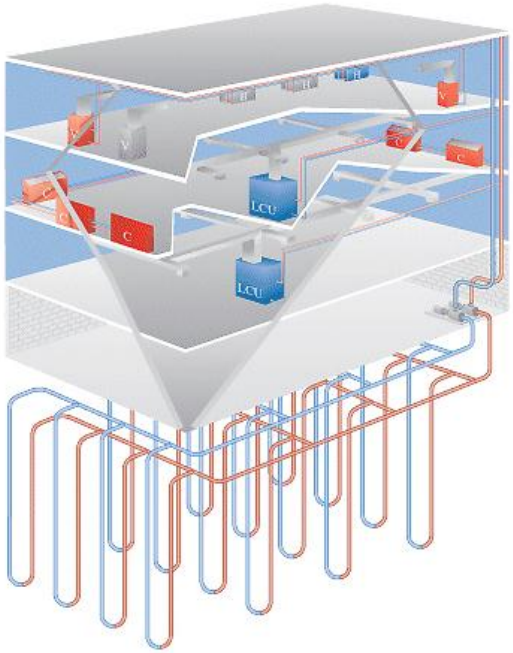

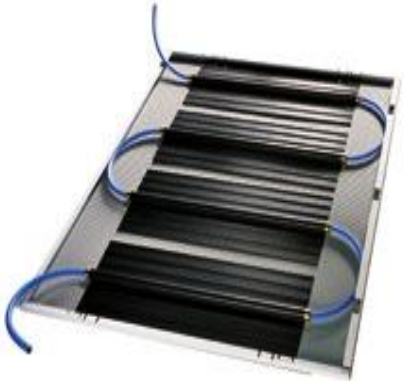

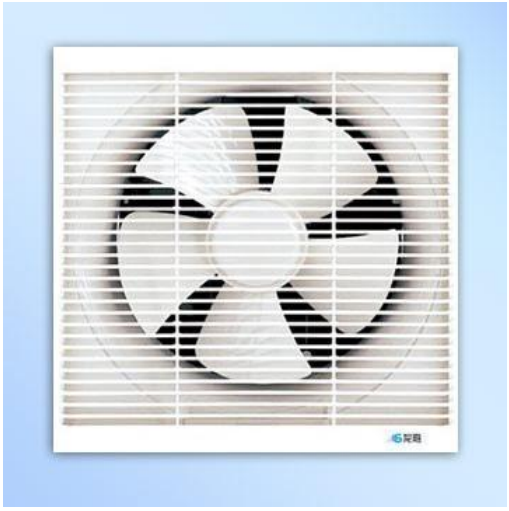

ARCHITETTURA SOSTENIBILE

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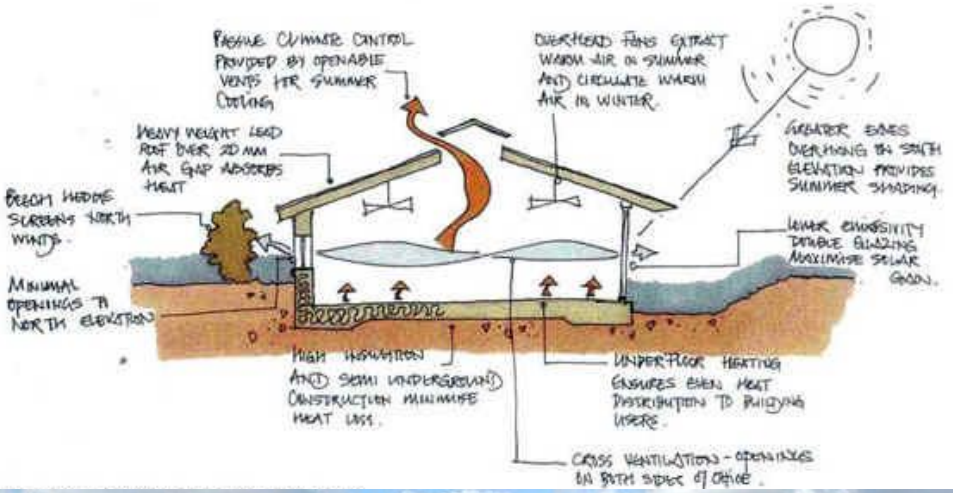

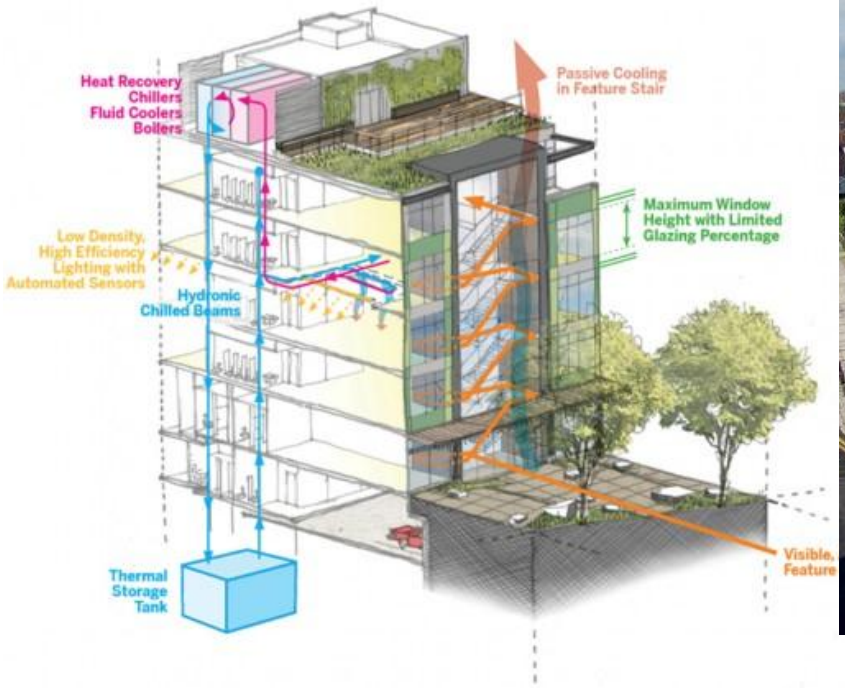

APPROCCIO CONVENZIONALE

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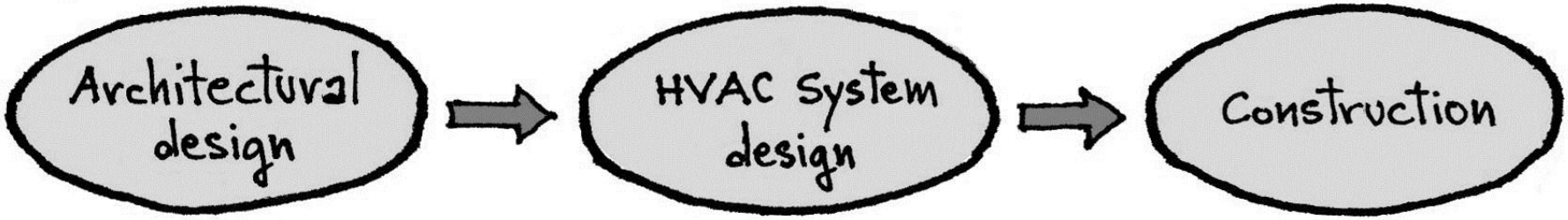

APPROCCIO INTEGRATO (1)

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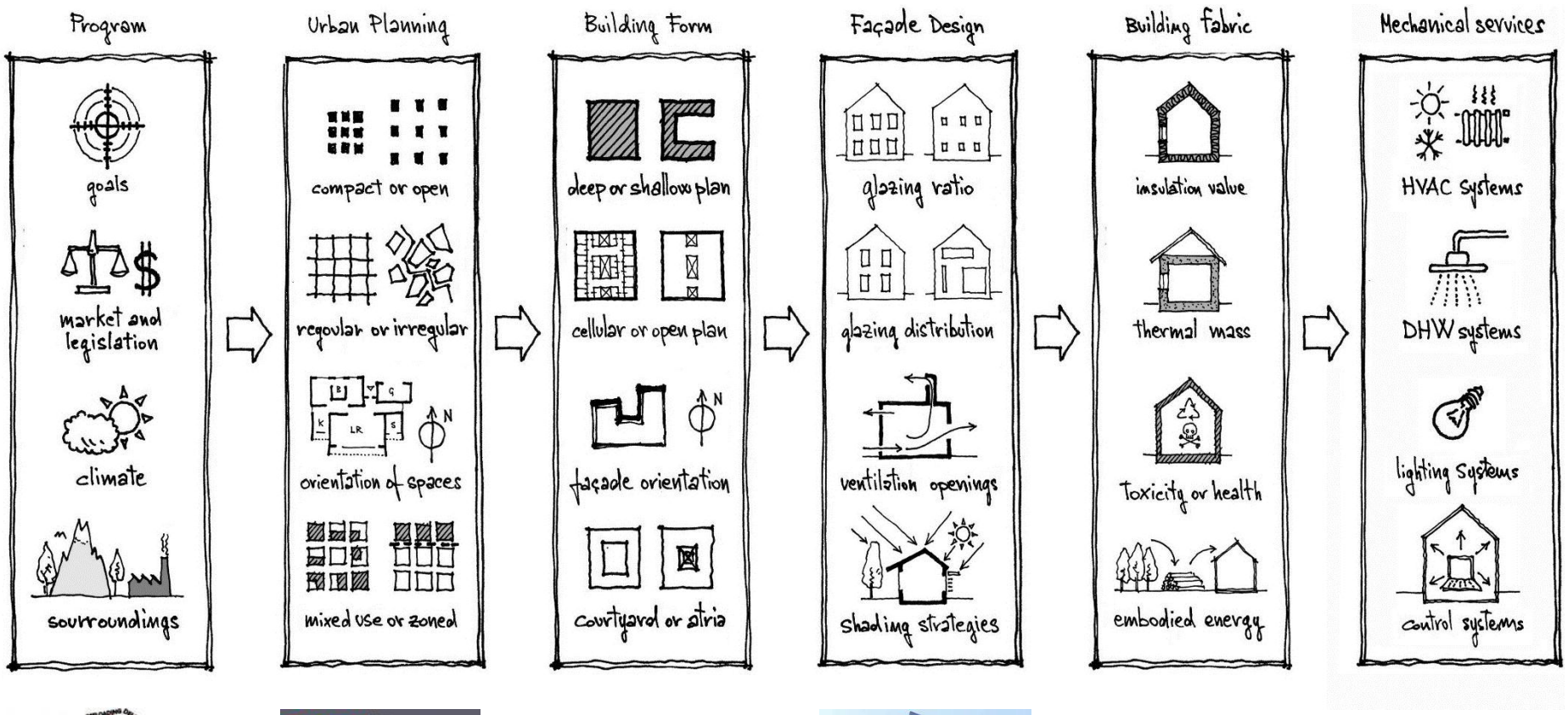

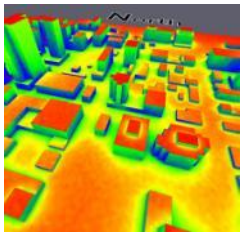

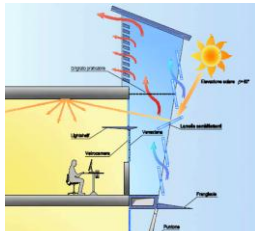

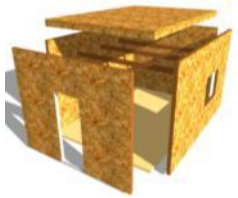

APPROCCIO INTEGRATO (2)

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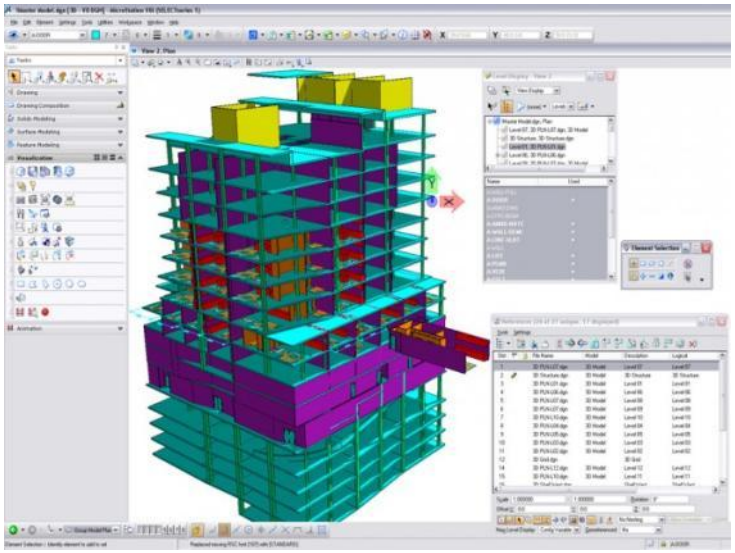
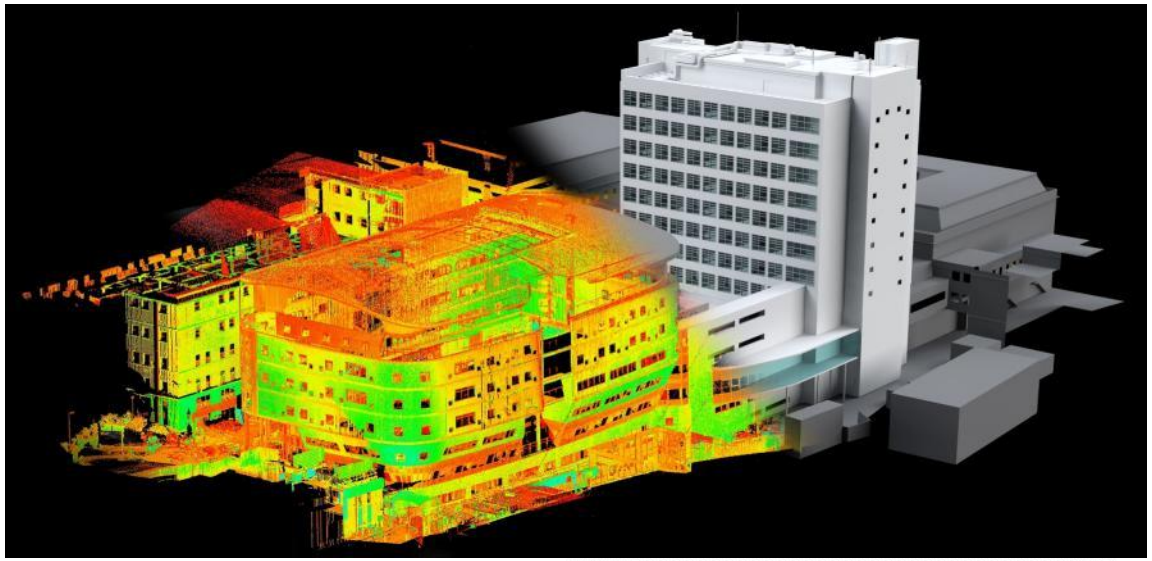
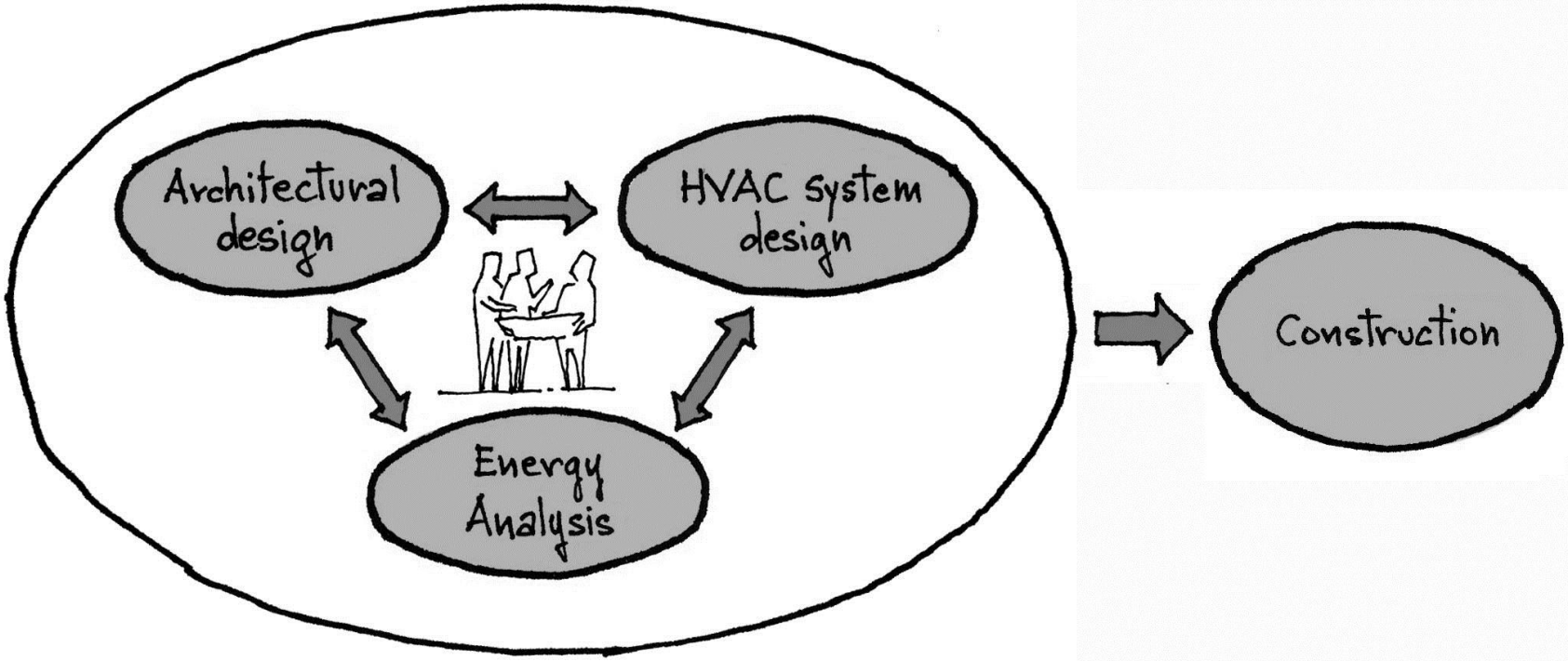
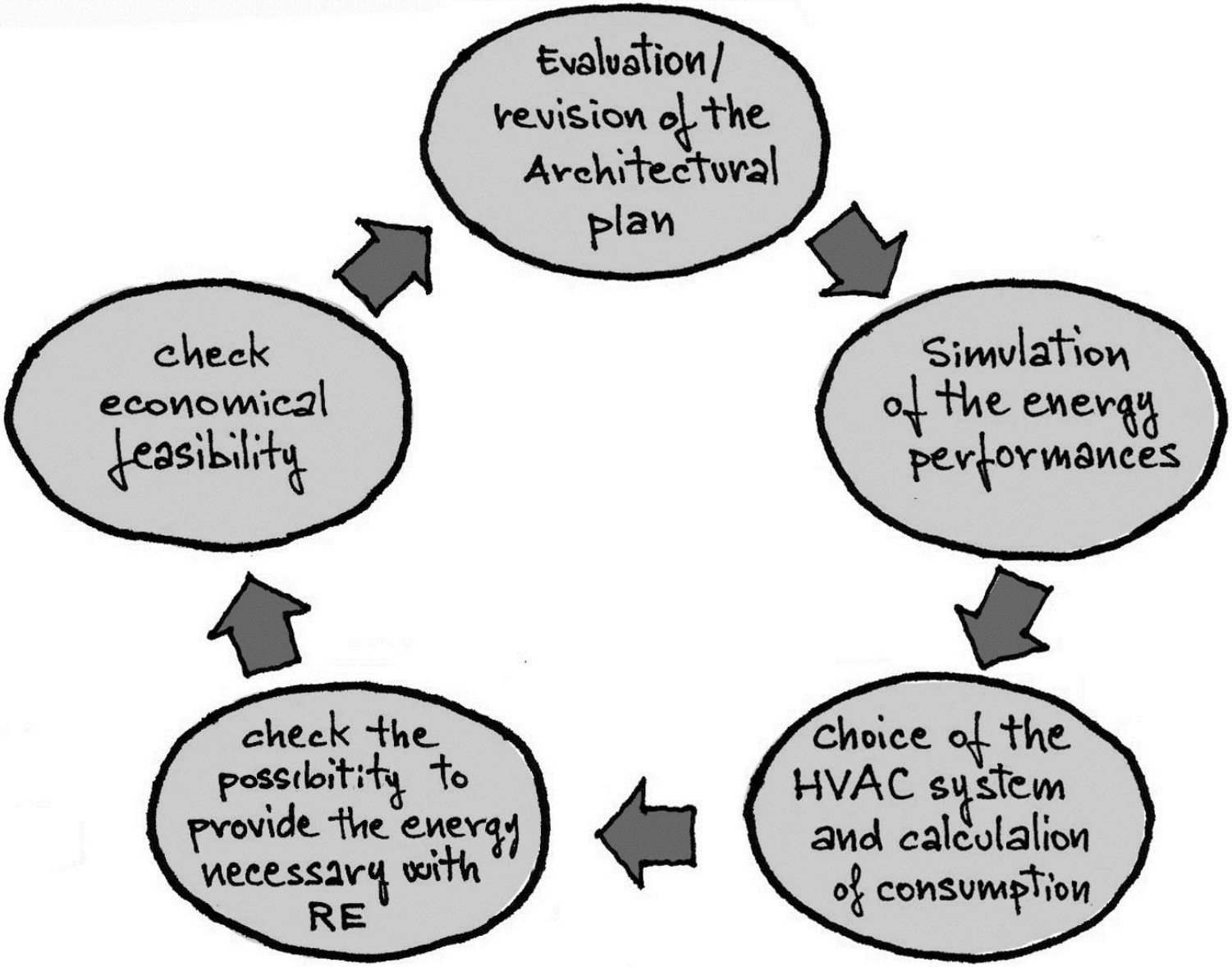






APPROCCIO INTEGRATO (3)



APPROCCIO INTEGRATO (4)

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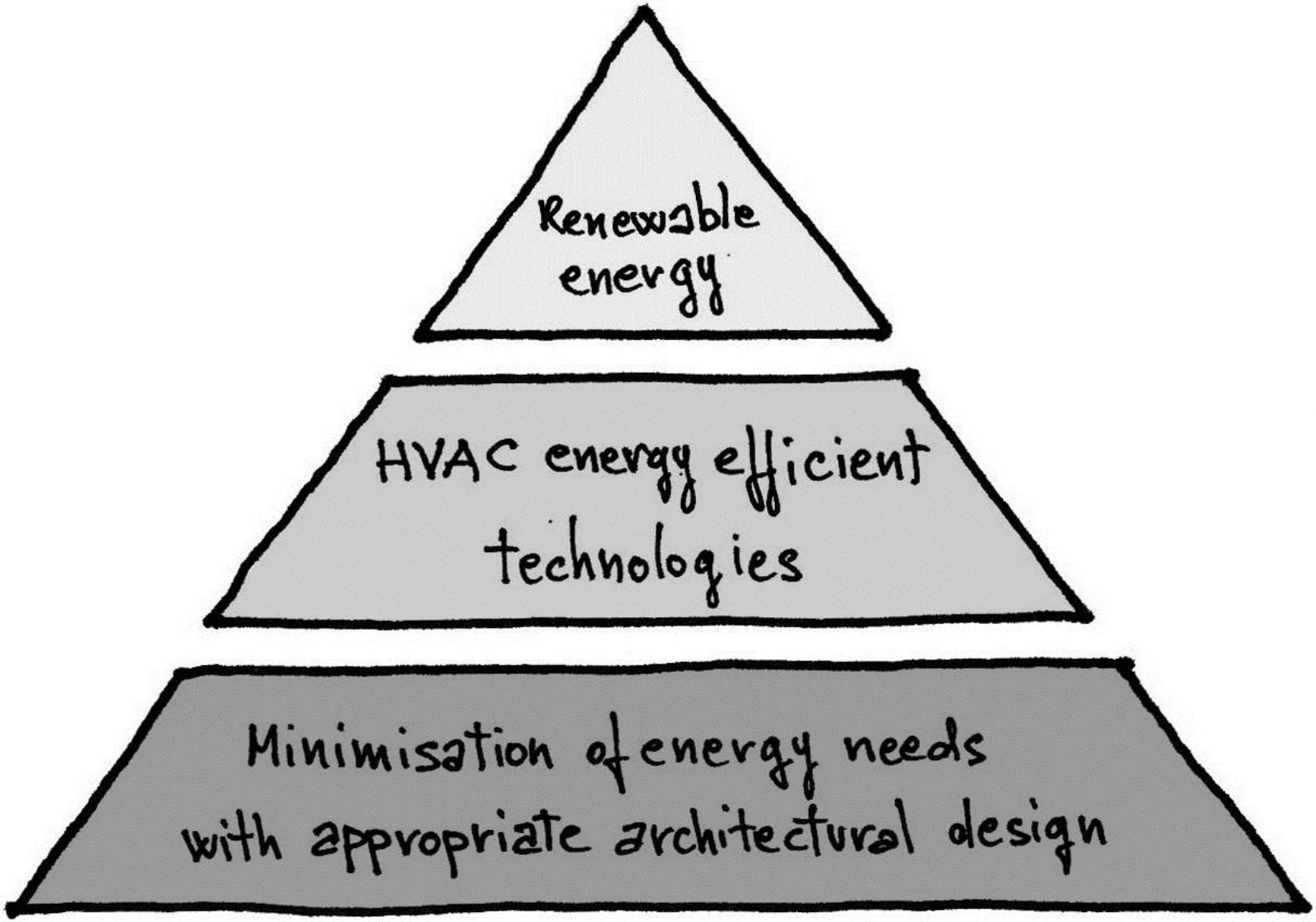

COMPETENZE ENERGETICHE

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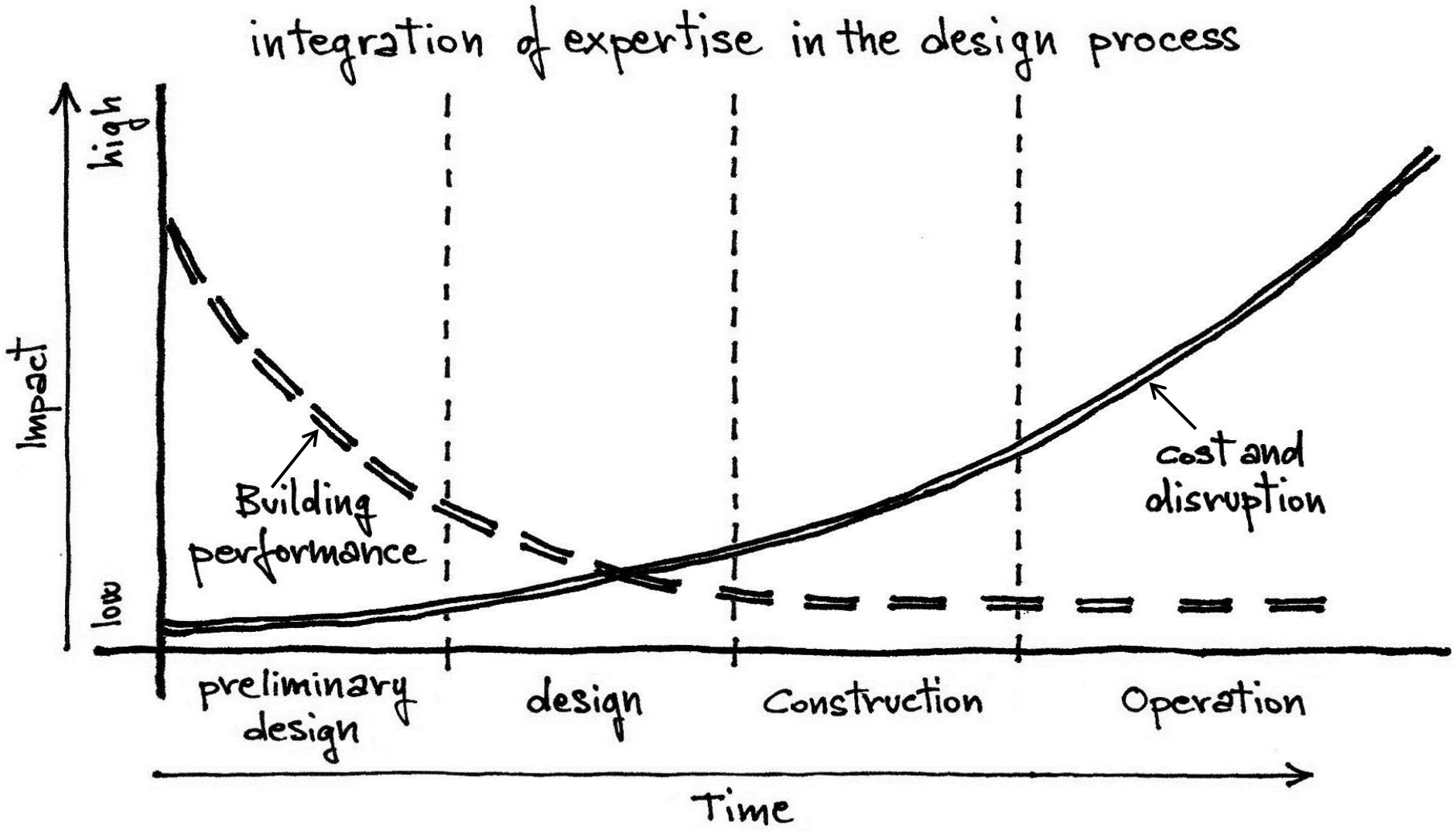

Tecnologie per l'efficienza energetica

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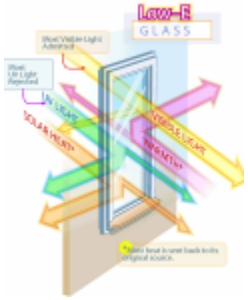
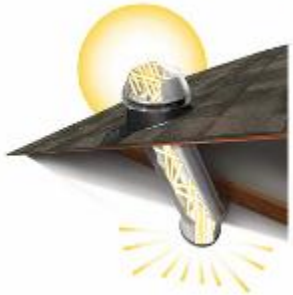
Isolamento

Inerzia termica



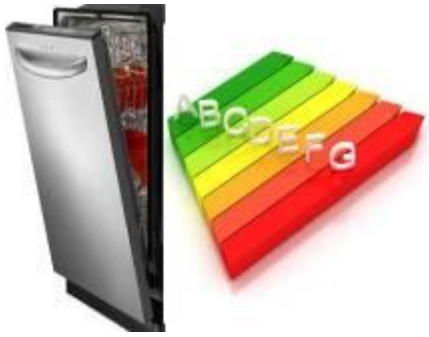
Vetri selettivi



Daylighting

Controllo solare

HVAC



Elettrodomestici

Building control automation

Illuminazione

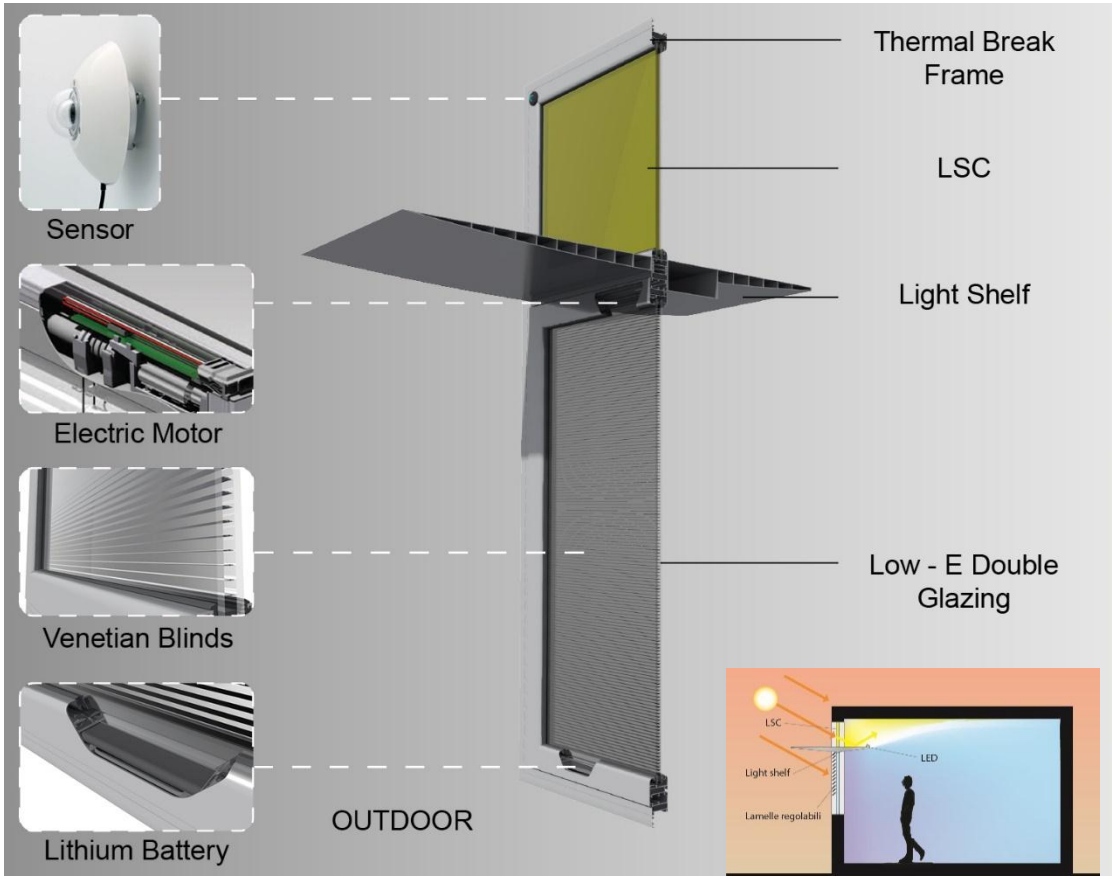
Fotovoltaico

Solare termico

Microeolico

Biomasse

SMART WINDOWS



RICERCA & SVILUPPO

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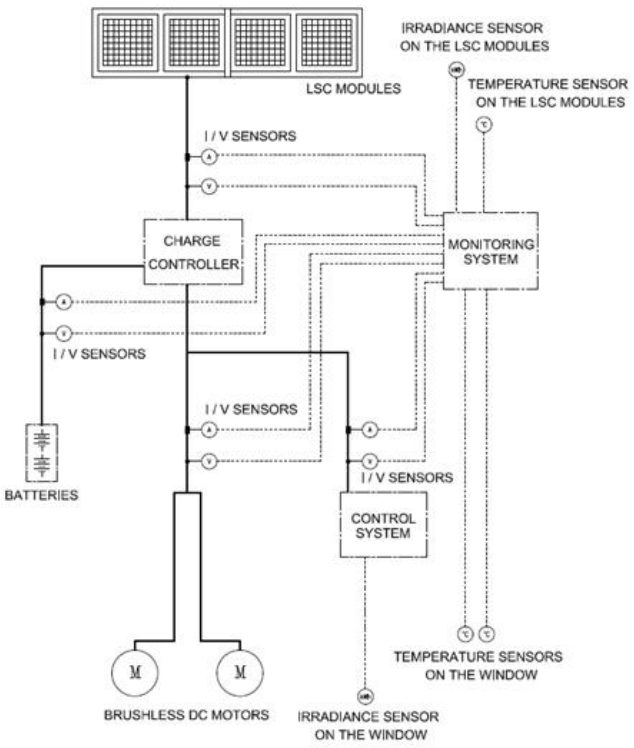

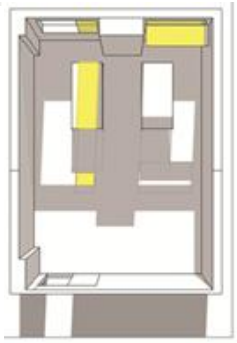

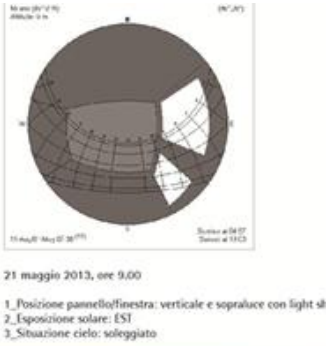

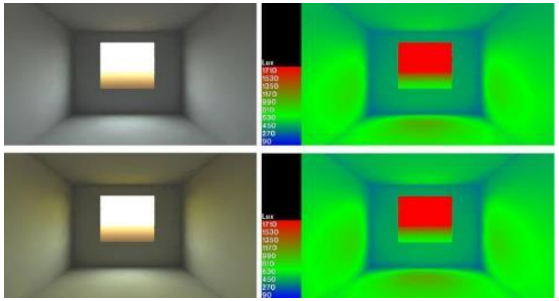

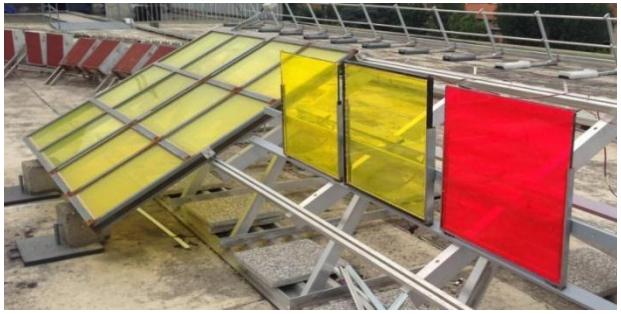

ARCHITETTURA & CLIMA

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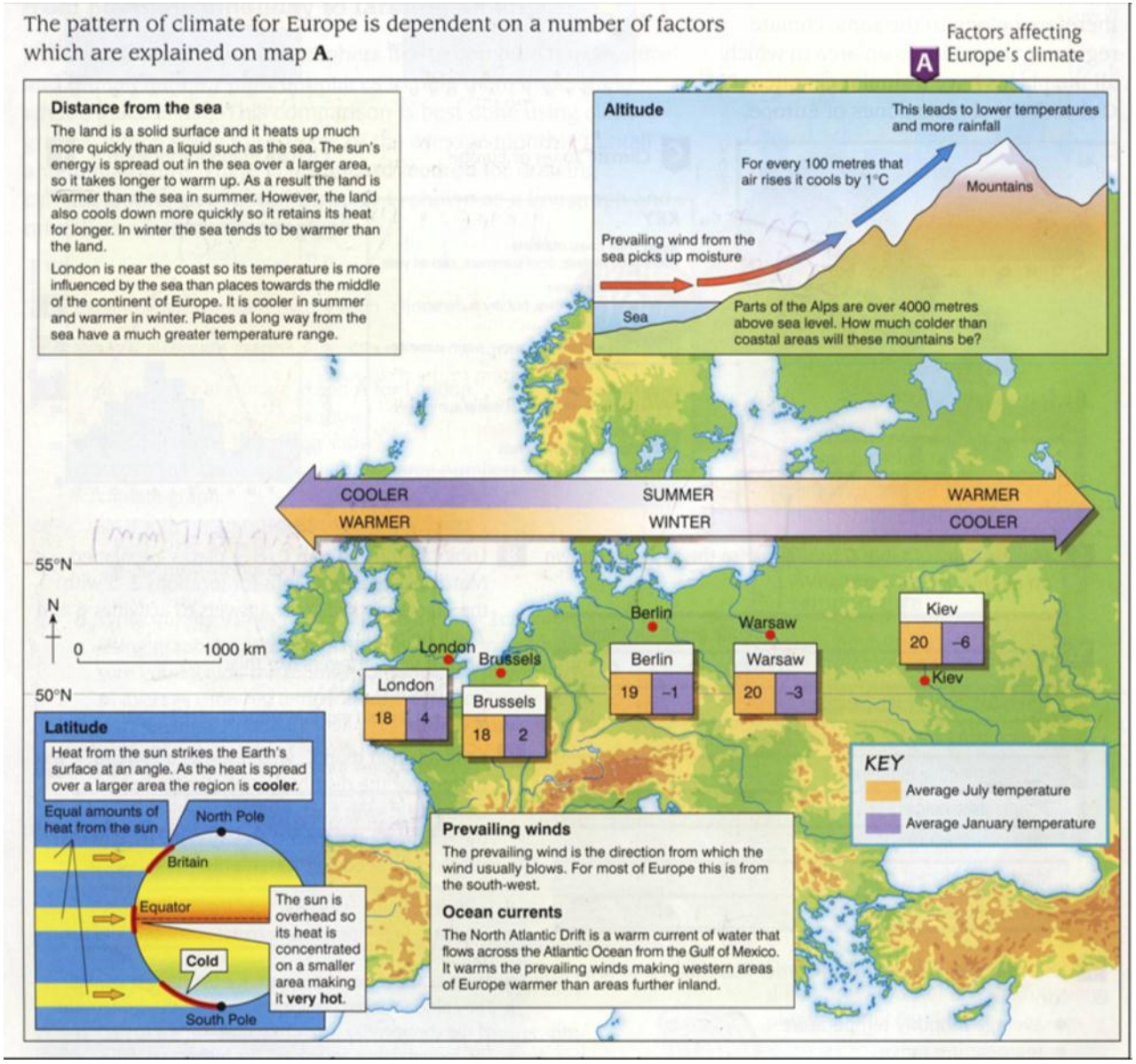
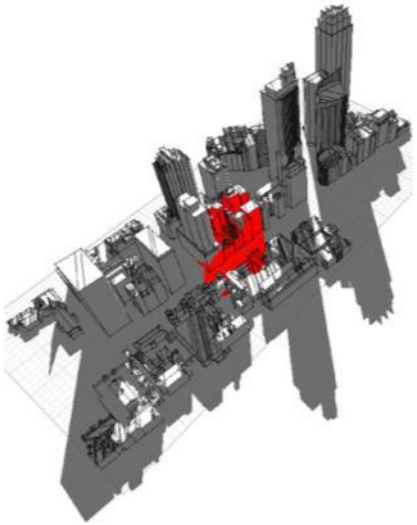
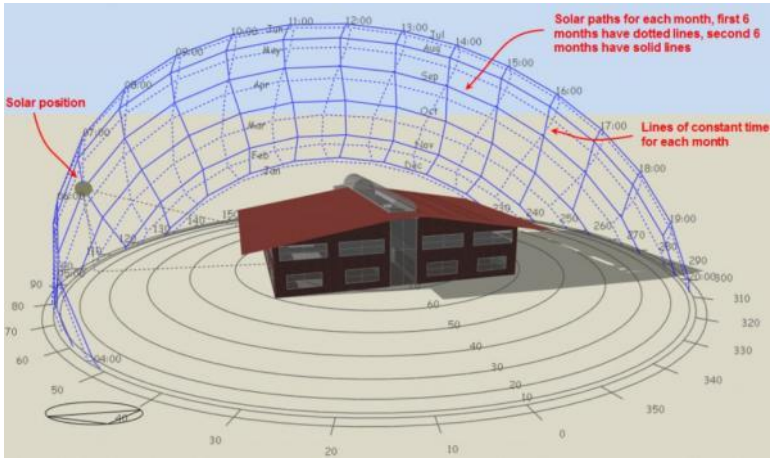
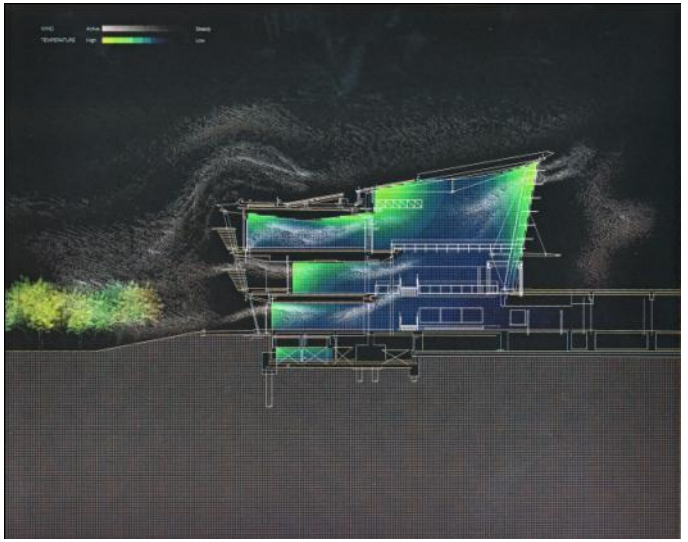
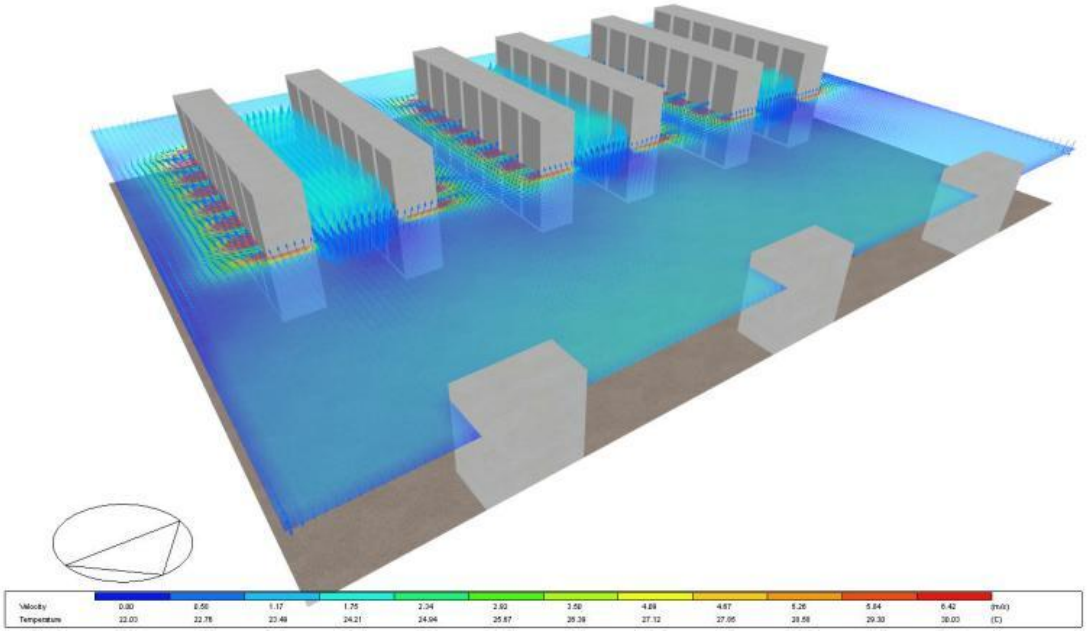


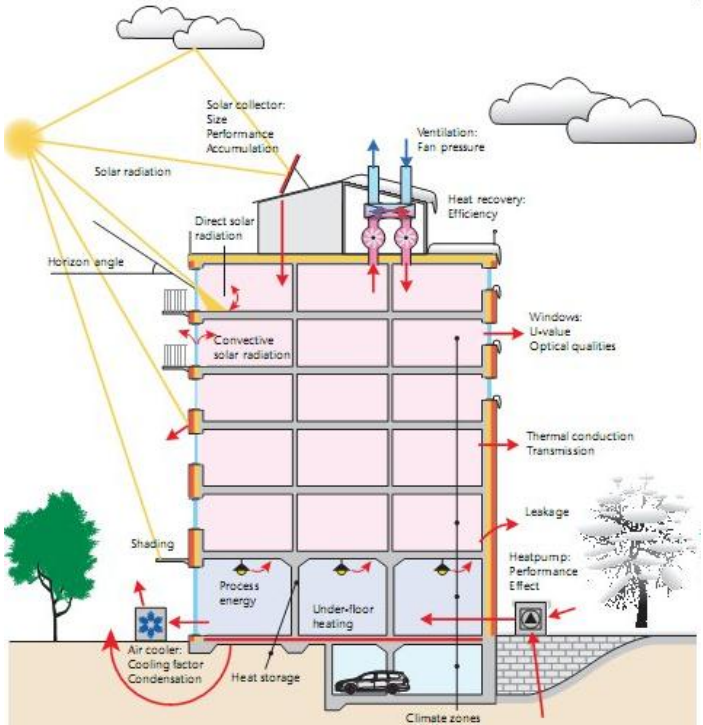
SISTEMA contesto-edificio-impianto











INVOLUCRO E MORFOLOGIA

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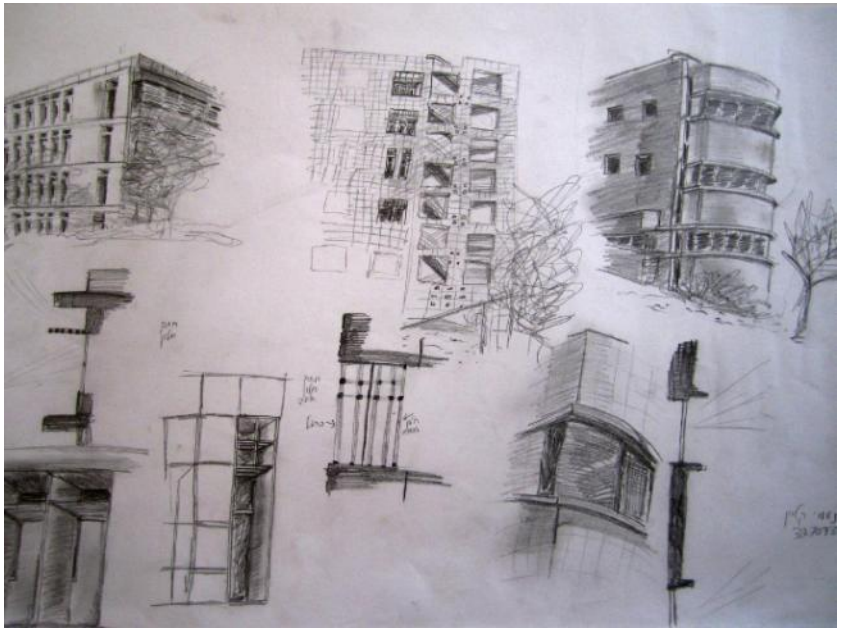

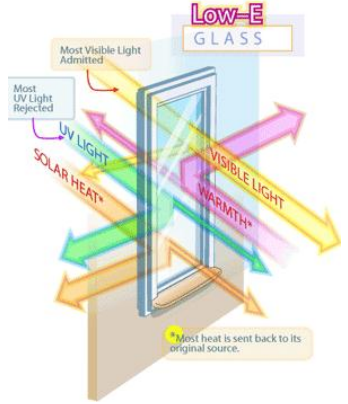

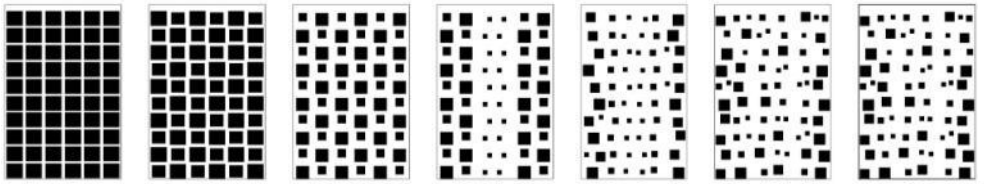

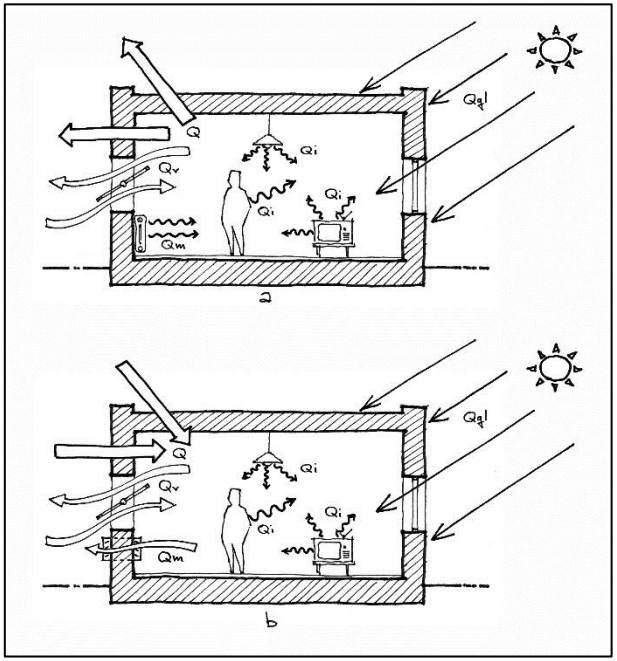

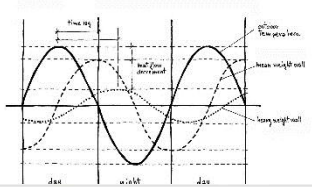

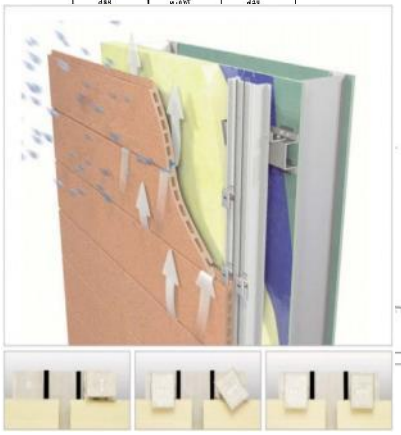

EFFICIENZA IMPIANTISTICA

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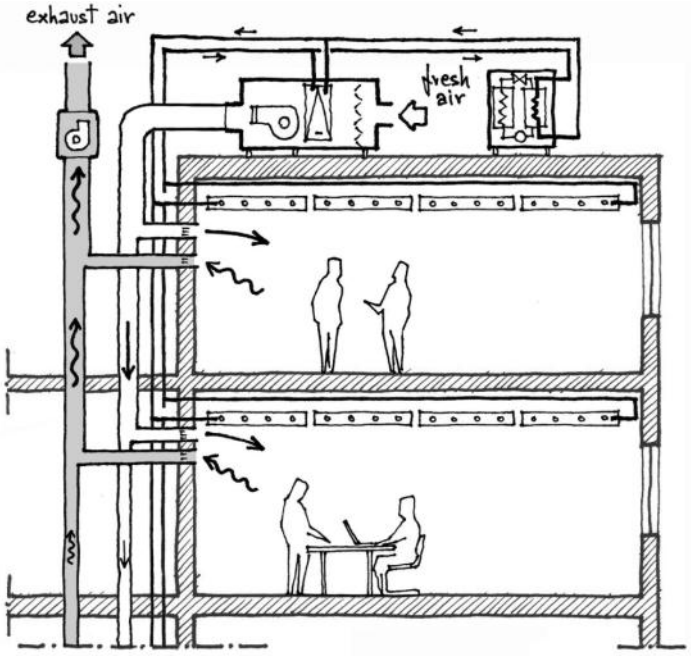

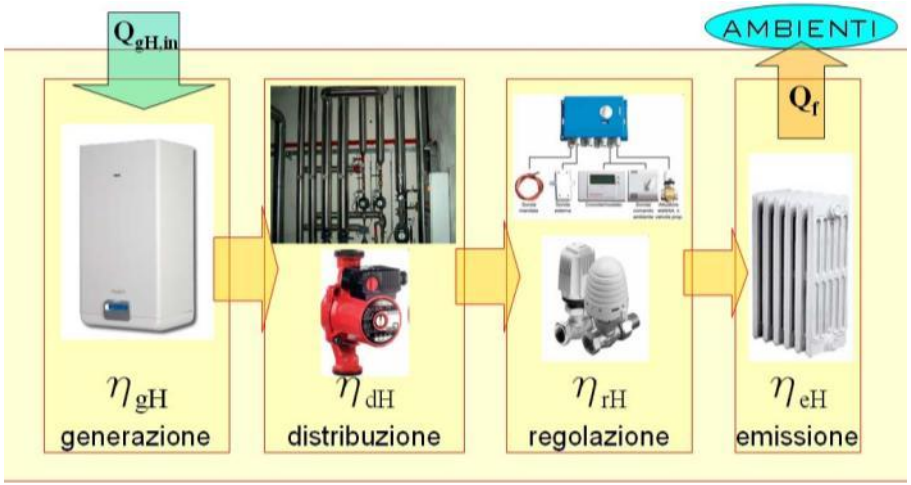

LIFE CYCLE

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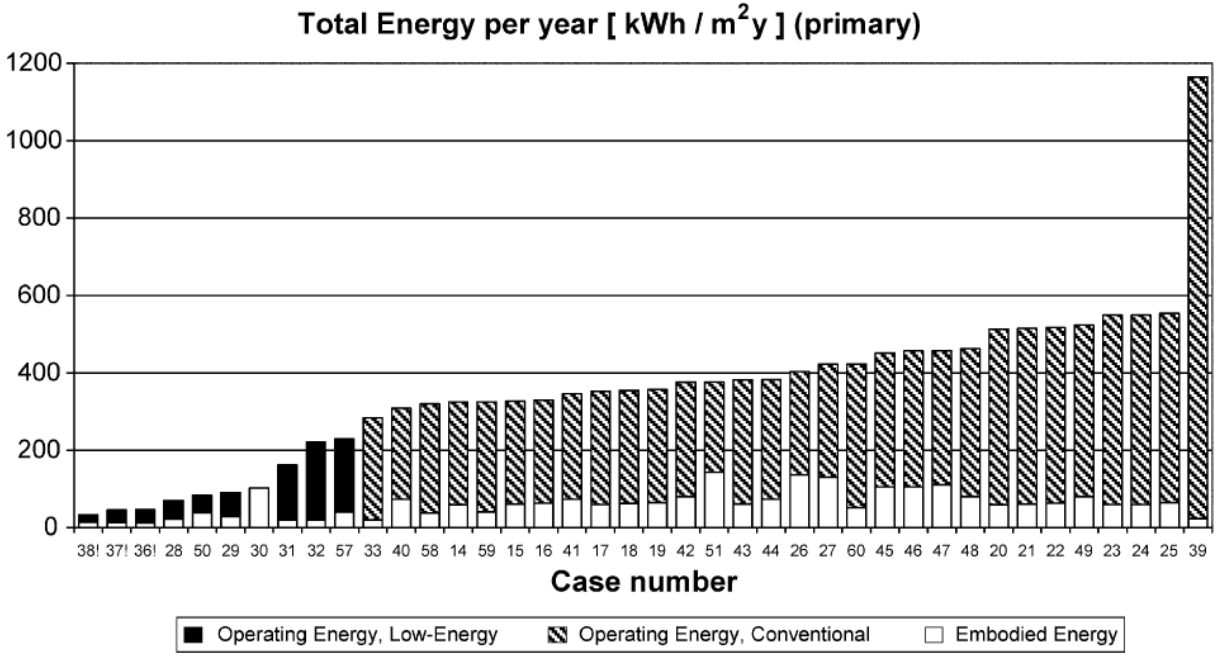

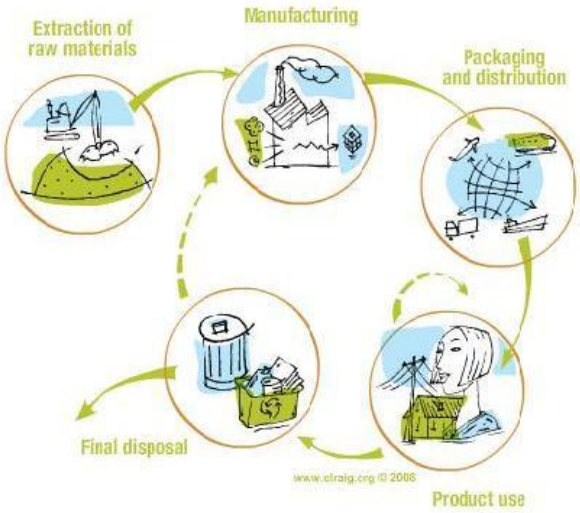

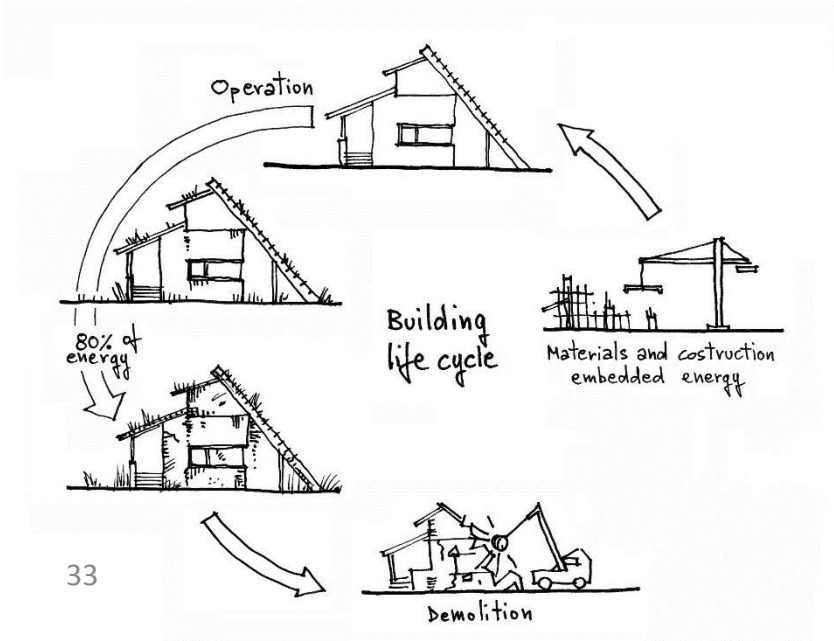

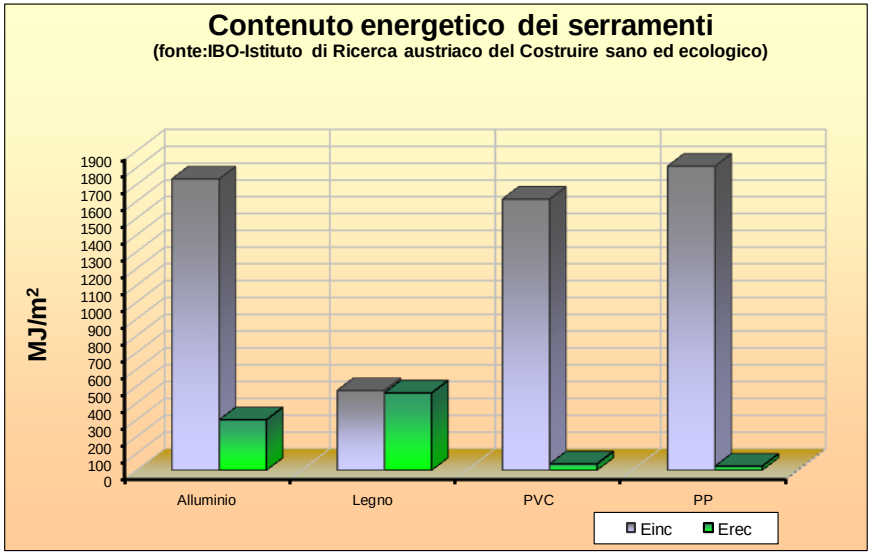

CONSIDERAZIONI ECONOMICHE

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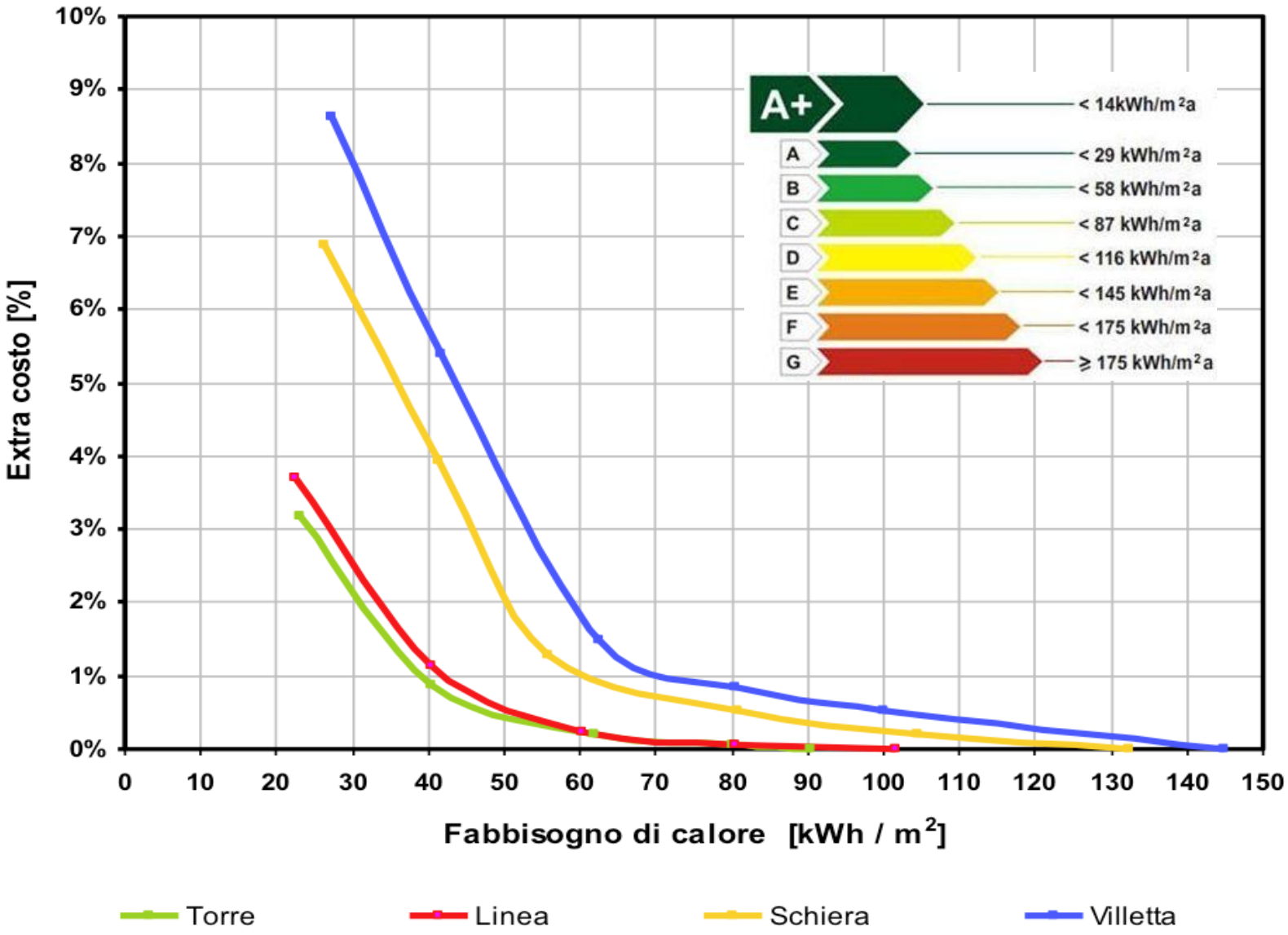

NET ZERO ENERGY BUILDING

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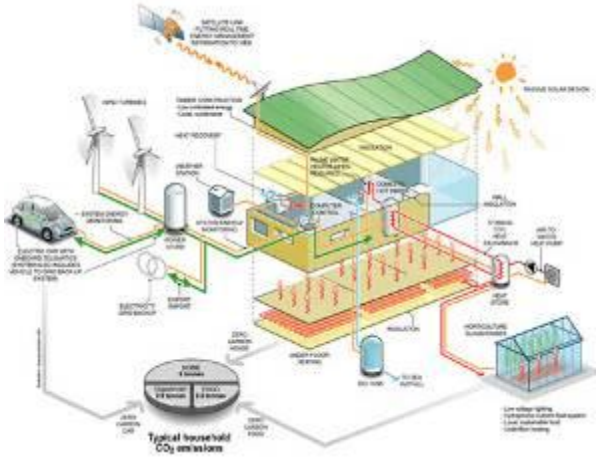
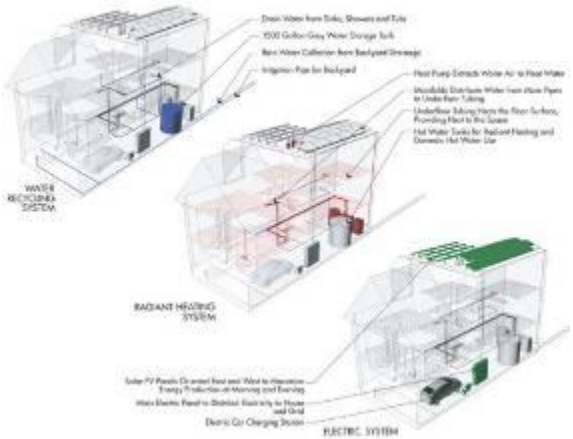
"Net Zero Energy Building means a building where, as a result of the very high level of energy efficiency of the building, the overall annual primary energy consumption is equal to or less than the energy production from renewable energy sources on site."





DIRETTIVA 2010/31/UE (EPBD[1] recast)

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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

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TerraCielo nZEB

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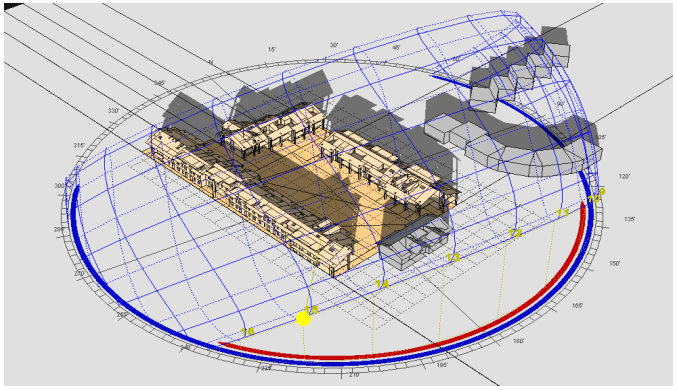
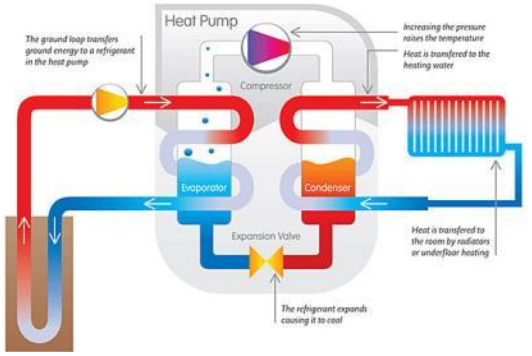
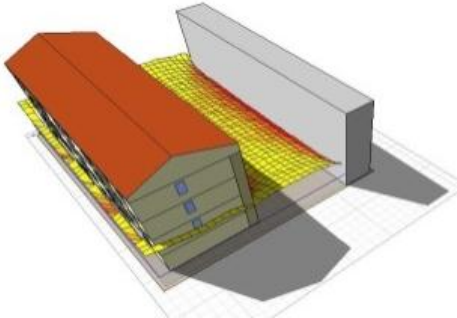


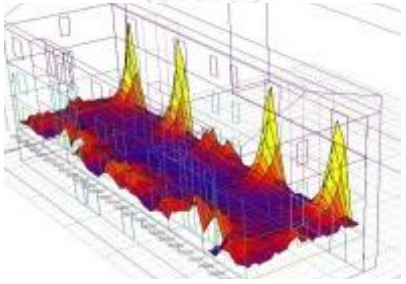


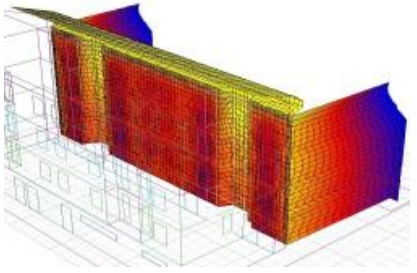
Zero Energy Buildings Summer School

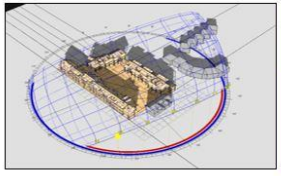
UN HABITAT
FOR A BETTER URBAN FUTURE

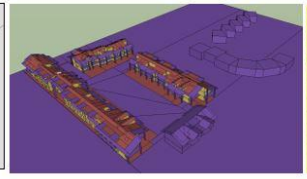
POLITECNICO MILANO

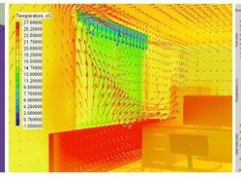


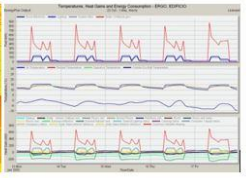


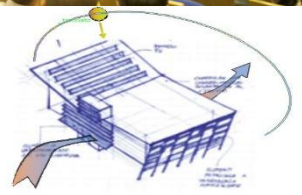


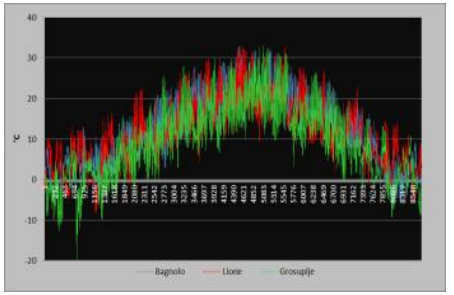












INFO: *energia-ambiente.abc@polimi.it*