



POLITECNICO
MILANO 1863

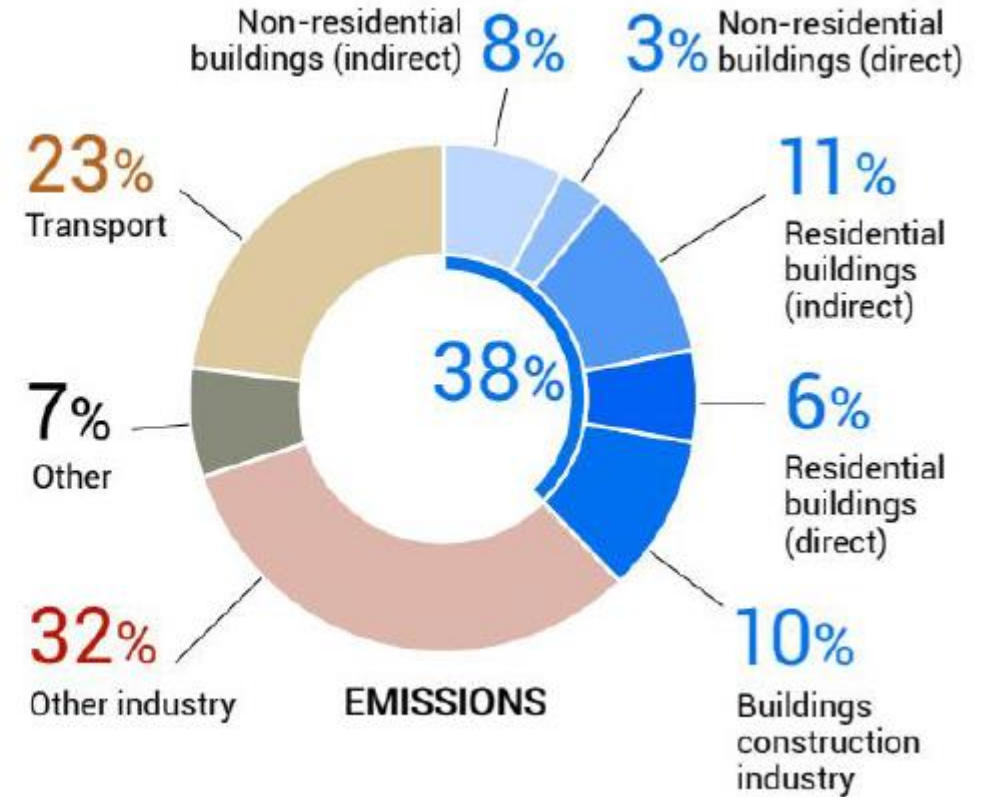
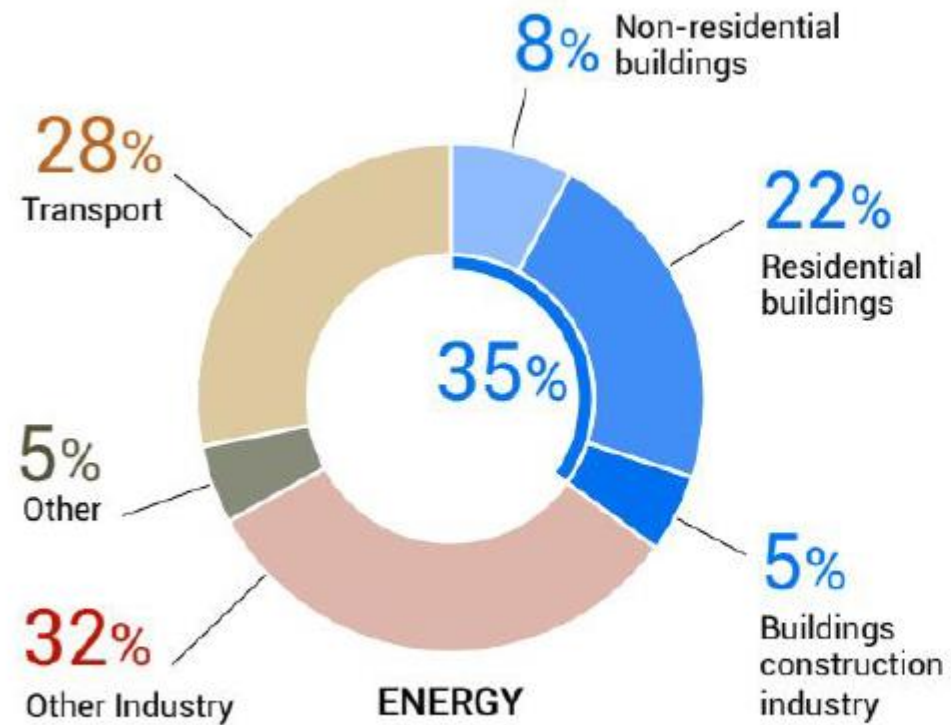
Architettura Sostenibile tra efficienza energetico-ambientale e greenwashing

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Dept. of Architecture, Built Environment and Construction Engineering

CLUB DONEGANI, Novara, 17 aprile 2023

ARCHITETTURA, ENERGIA, AMBIENTE



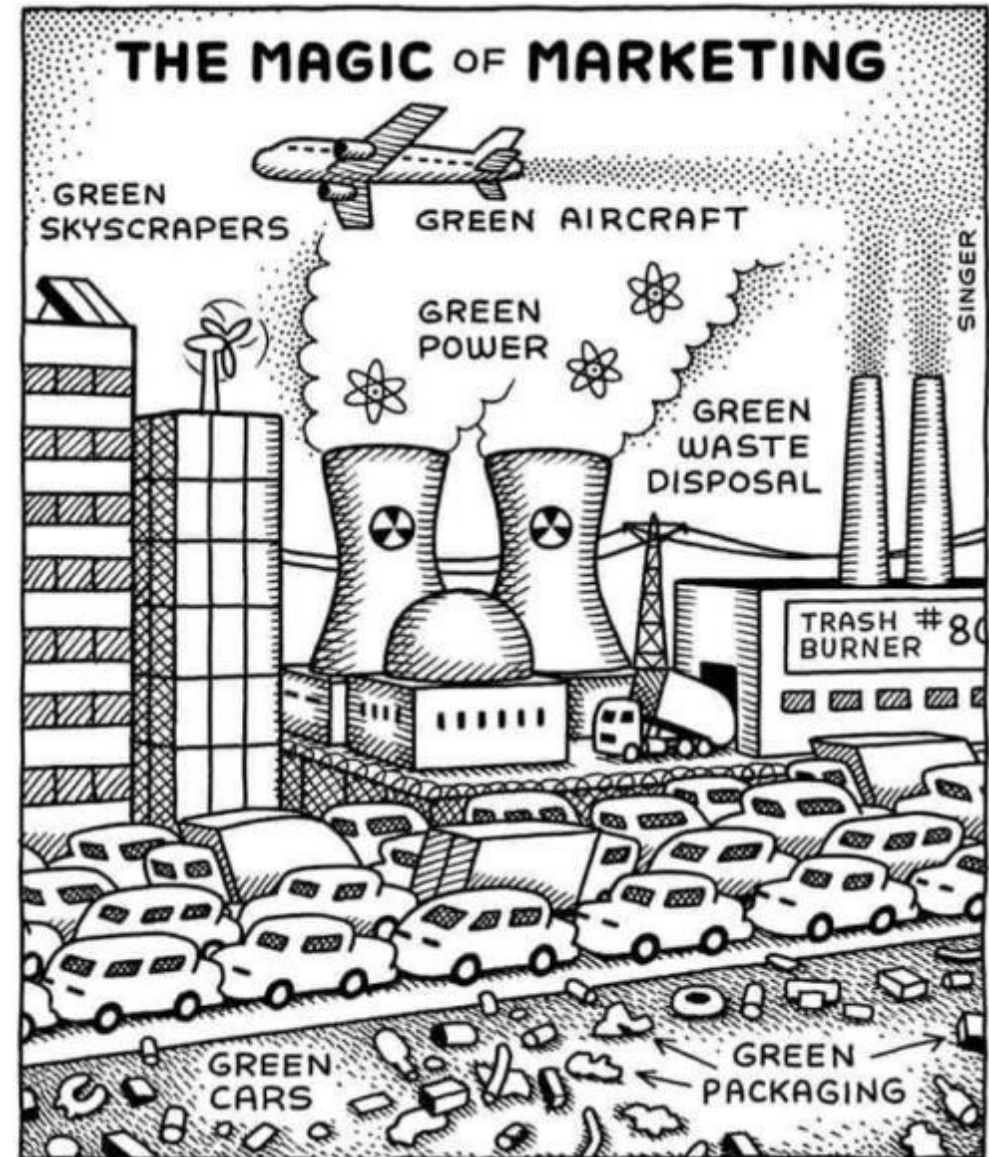
Sustainable design (at urban, township, site, building and product scales) is a **moral obligation** and the only ethically acceptable way to act.



Green Society

"La terra fornisce abbastanza per soddisfare i bisogni di ogni uomo, ma non l'avidità di ogni uomo."

Mahatma Gandhi



POLITECNICO MILANO 1863

SVILUPPO ED EDILIZIA SOSTENIBILE



Prima Giornata della Terra
Vermont, USA, 1970

“[Ecosviluppo:] un approccio allo sviluppo che mira ad armonizzare gli obiettivi sociali ed economici con una gestione sana dal punto di vista ecologico, in uno spirito di solidarietà con le generazioni future.”

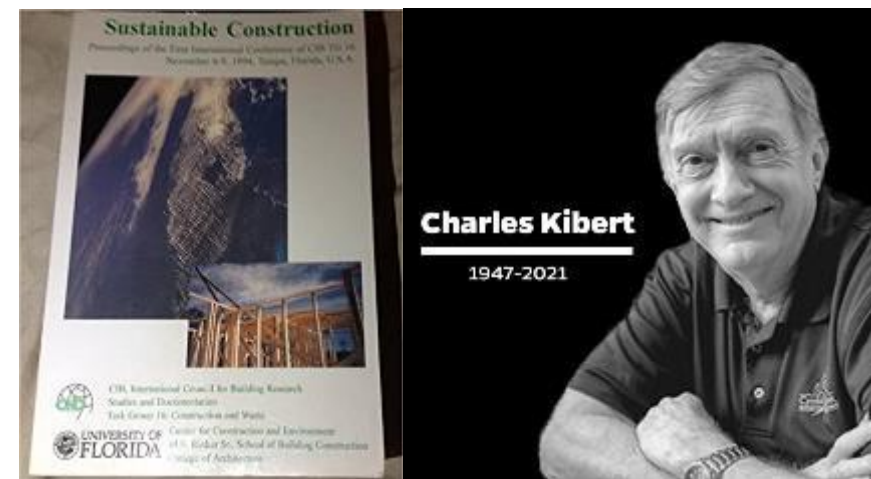
Ignacy Sachs (1978)



Bruntland Report
1987

“Lo sviluppo sostenibile è quello sviluppo che consente alla generazione presente di soddisfare i propri bisogni senza compromettere la possibilità delle generazioni future di soddisfare i propri.”

WCED(1987)



1st International Conference
on Sustainable Construction
Florida, USA, 1994

“Lo scopo di questo sforzo è di stabilire i criteri di sostenibilità per l'edilizia, definire le questioni e i principi dell'edilizia sostenibile e creare un modello per l'industria delle costruzioni da usare come strumento per capire e valutare approcci alternativi per raggiungere un ambiente costruito più sano dal punto di vista ambientale.”

Charles J. Kibert (1994)





TRADITIONAL HOUSES FROM AROUND THE WORLD

AN INFOGRAPHIC ABOUT VERNACULAR ARCHITECTURE

This infographic explores ten different homes spread over the globe that have been built according to the history and culture of said places.

The term "Vernacular Architecture" refers to an architectural style that is designed based on local needs, availability of construction materials and reflecting local traditions.



1 TEEPEE/TIPI

- LOCATION/IN-HABITANTS:** Great Plains and Canadian Prairies of North America's indigenous people of the Plains.
- THE PERIOD:** Tipi have been in use since prehistoric times. However, what we may think of as a modern campsite design came into much greater use once horses were introduced to many native tribes.
- CONSTRUCTION:** Conical-shaped tents, traditionally made of animal skins upon wooden poles with smaller flaps at the top of the structure.



2 IGLOO

- LOCATION/IN-HABITANTS:** Canada's Central Arctic and Greenland's Thule area.
- CONSTRUCTION:** Material: blocks of gathered snow.
- PARTICULARITIES:** Igloos gradually became shorter with time due to the compressive weight of the snow.



3 PALLOZA

- LOCATION/IN-HABITANTS:** Northwest Spain, Leonese Asturias.
- THE PERIOD:** Pre-Roman/Celtic.
- CONSTRUCTION:** Material: stone walls and conical and domed roof made of stalks of grain.
- PARTICULARITIES:** Some of these houses are featured in the Asturian and Celtic comics.



4 SWISS CHALET

- LOCATION/IN-HABITANTS:** Alpine Region, Switzerland.
- CONSTRUCTION:** Material: wood and has a gently sloping roof.
- PARTICULARITIES:** Originally, chalets were used as seasonal homes for dairy cattle which was to be brought up from the lowland pastures during the summer months. Since the onset of alpine and ski tourism, the term "chalet" changed to be applied generally to holiday homes, whether built in a strictly Alpine style or not.



5 TRULLI HOUSE

- LOCATION/IN-HABITANTS:** Grotto Valley, just outside of Alberobello.
- THE PERIOD OF ORIGIN:** Around 1800.
- CONSTRUCTION:** Material: dry stone, characteristic conic form on top of the roof.
- PARTICULARITIES:** In some cases, the conical structure has Christian symbols painted onto them.



6 PALAFITOS

- LOCATION/IN-HABITANTS:** Today mostly found in Chile, but they are found throughout South America.
- THE PERIOD:** Stilt houses are common around the world in the Mesolithic and Bronze Age. They have been present since pre-Columbian times.
- CONSTRUCTION:** Material: Wood, the houses are raised on pilos over surface of water or swampy soil.
- PARTICULARITIES:** This construction protects against risks of flooding and keeps out vermin.



7 ZULU BEEHIVE HUT

- LOCATION/IN-HABITANTS:** South Africa's Zululand area.
- CONSTRUCTION:** The structure is made from sticks, the binding and finishing is made with split reeds or grass.
- PARTICULARITIES:** The low door has the following function: To make the entrance to the house difficult to maintain food during winter, and to keep the interior cooler through the summer.



8 YURT/GER

- LOCATION/IN-HABITANTS:** Steppes of Central to Asian nomads.
- THE PERIOD:** Yurts have been present for at least 2000 years.
- CONSTRUCTION:** Yurts are portable. They are made from felt-covered poles and a felt roof. The structure is made of an assembly of wooden poles of wood or bamboo for walls.
- PARTICULARITIES:** The word "yurt" comes from the Turkic languages, whereas "Ger" is the Mongolian translation.



9 MINKA

- LOCATION/IN-HABITANTS:** Japan's dwellings of farmers, artisans, and merchants (non-samurai subject).
- THE PERIOD:** First appeared around 1600.
- CONSTRUCTION:** There are different styles of Minkas, but they all have a similar basic structure, roof structure and roof shape. They are all surrounded by local building techniques, and are built with materials that were abundant in the immediate locality. The size, construction and decoration of a minka was dependent upon its location, climate and social status of its owner.
- PARTICULARITIES:** The term "minka" loosely means "houses of the people" in Japanese.

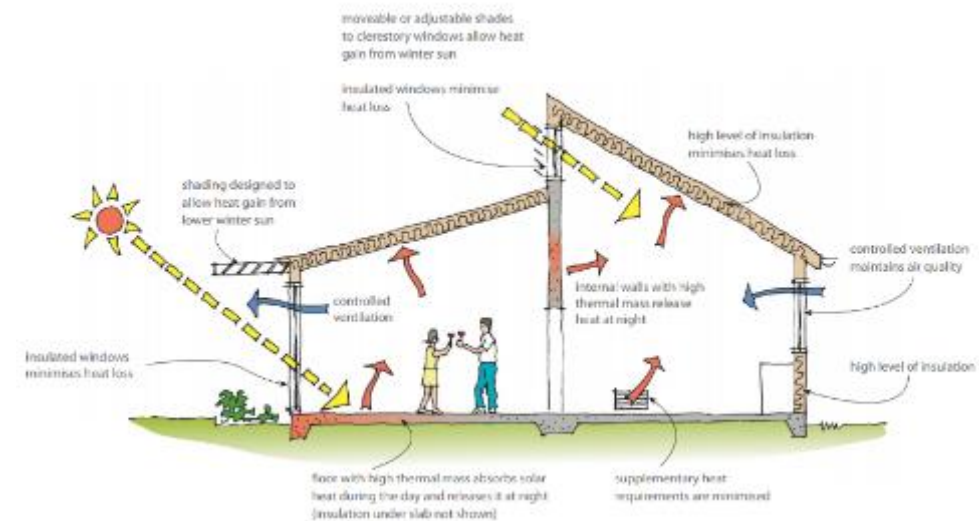
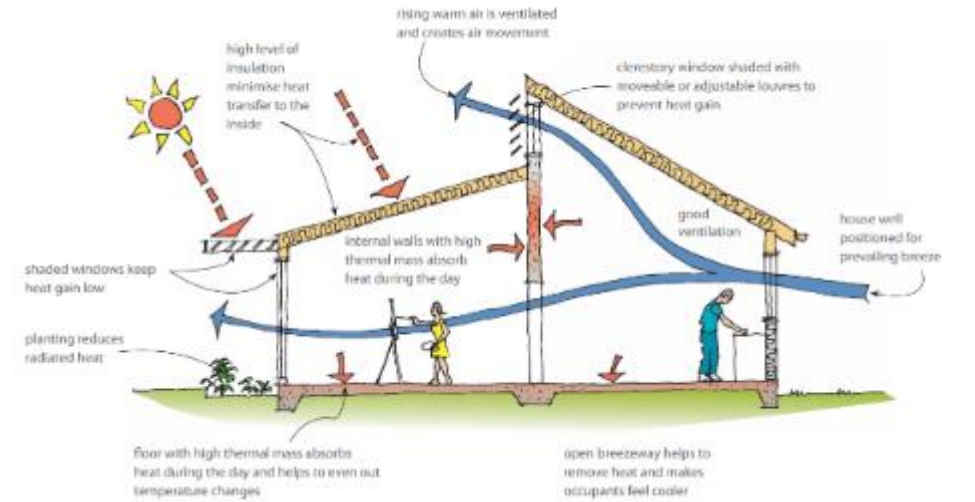
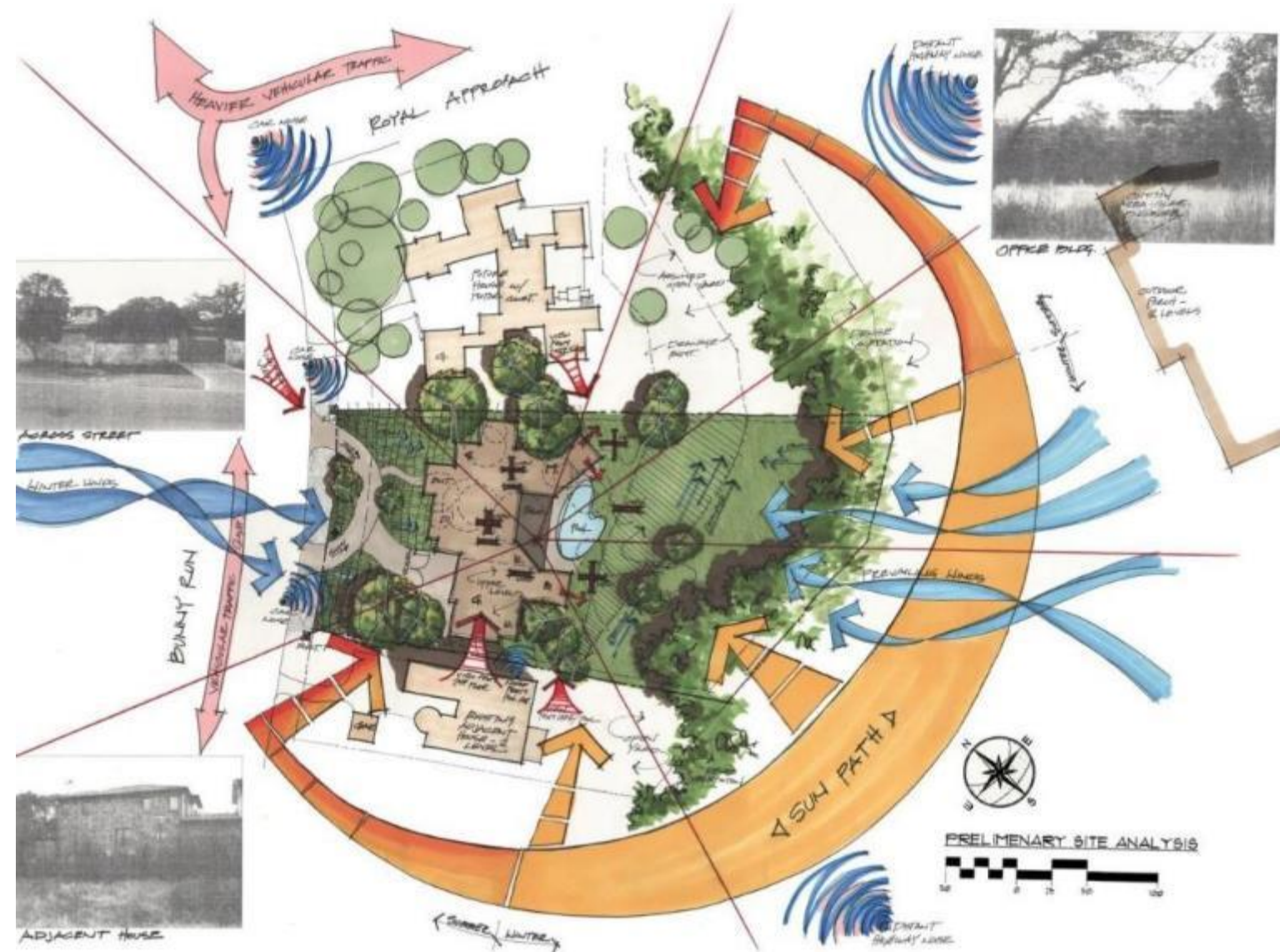


10 TONGKONAN

- LOCATION/IN-HABITANTS:** South Sulawesi, Indonesia's Toraja People.
- CONSTRUCTION:** Tongkonans have a distinctive boat-shaped and sweet wood saddleback roof. Use most of Indonesian Austronesian-based traditional architecture Tongkonan built on piles.
- PARTICULARITIES:** The houses are usually found in groups of ten or less.



PROGETTARE CON IL CLIMA



EDIFICIO CLIMATICAMENTE EQUILIBRATO

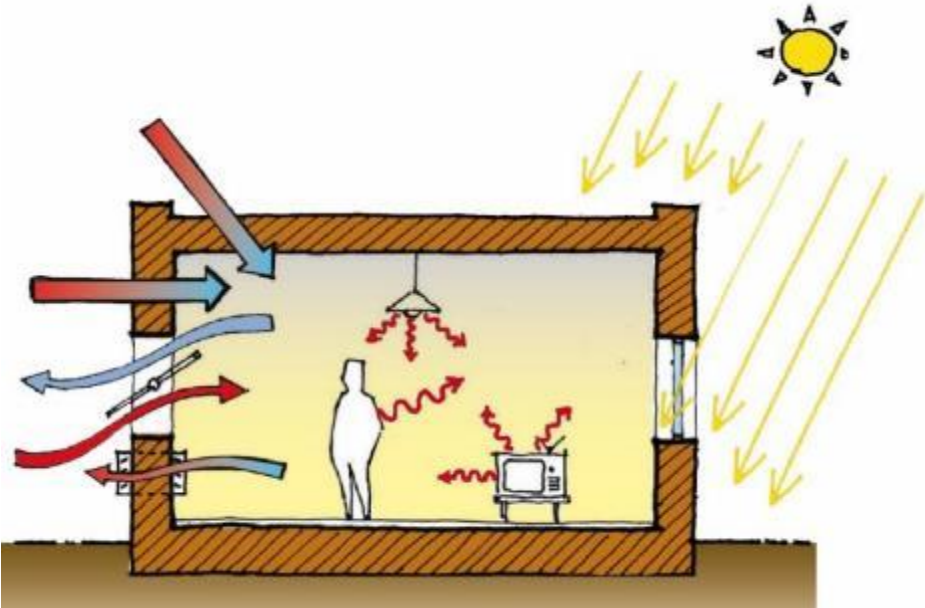
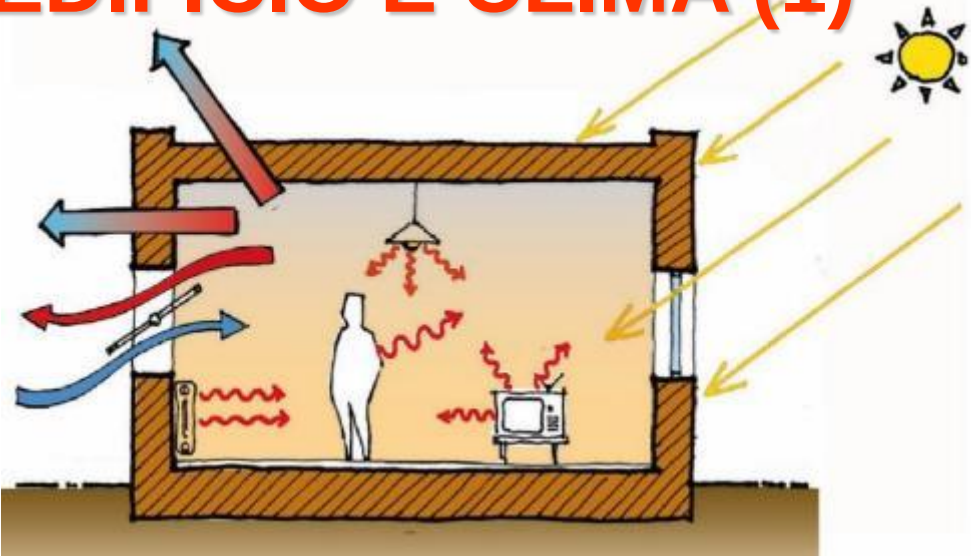
“Quando si sono compresi a fondo gli elementi climatici e i fabbisogni bioclimatici, è possibile calcolare l’equilibrio delle forze naturali che si può raggiungere in un edificio. Gli elementi desiderabili – come la radiazione solare per i periodi freddi, l’ombra per quelli caldi e la ventilazione per quelli umidi – possono essere messi in relazione alle esigenze specifiche.

La struttura [edilizia] ideale nella posizione ideale sarebbe in grado di mantenere le sensazioni fisiche totalmente entro la zona di comfort. Nella maggior parte dei casi, tuttavia, le sollecitazioni naturali sono troppo forti; i fattori che le compensano possono essere ostacolati dall’interazione dei componenti dell’edificio, limitati da considerazioni di ordine pratico, o semplicemente non essere disponibili quando se ne avrebbe bisogno. Comunque si dovrebbe ricorrere alla climatizzazione meccanica solo dopo aver utilizzato tutte le forze naturali. Anche se i risultati parziali devono essere amplificati con mezzi meccanici, un edificio che mantiene condizioni vicine ai requisiti fisiologici di comfort può essere definito climaticamente equilibrato.”

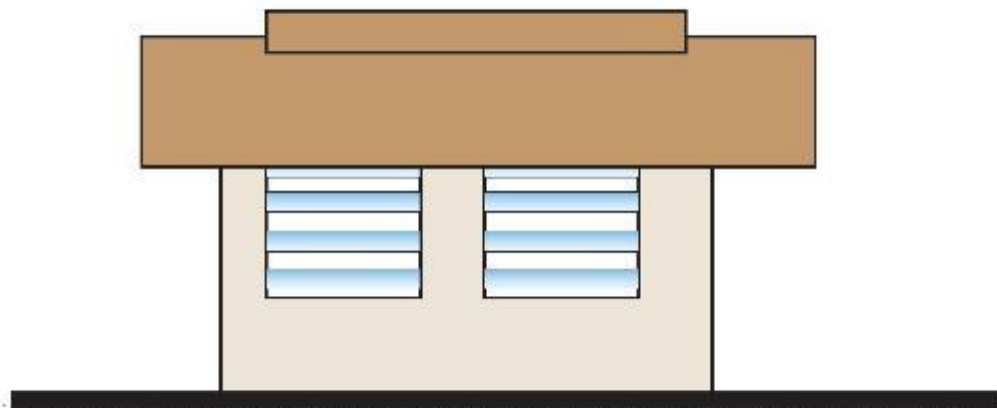
Victor Olgyay (1962)



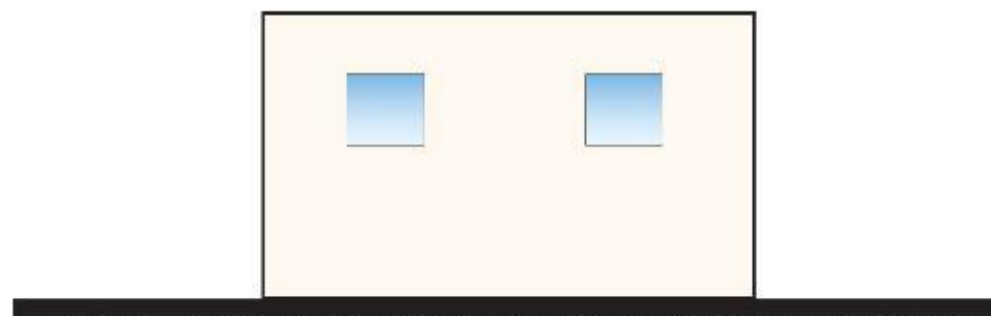
EDIFICIO E CLIMA (1)



SUGGERIMENTI: CLIMA CALDO TROPICALE e ARIDO



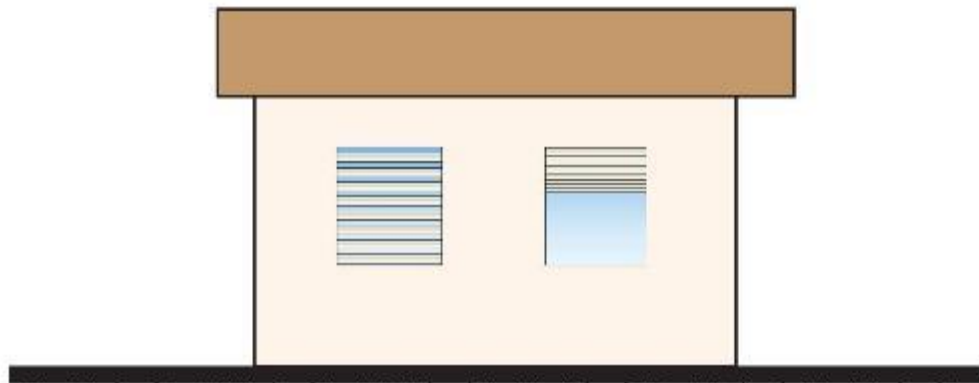
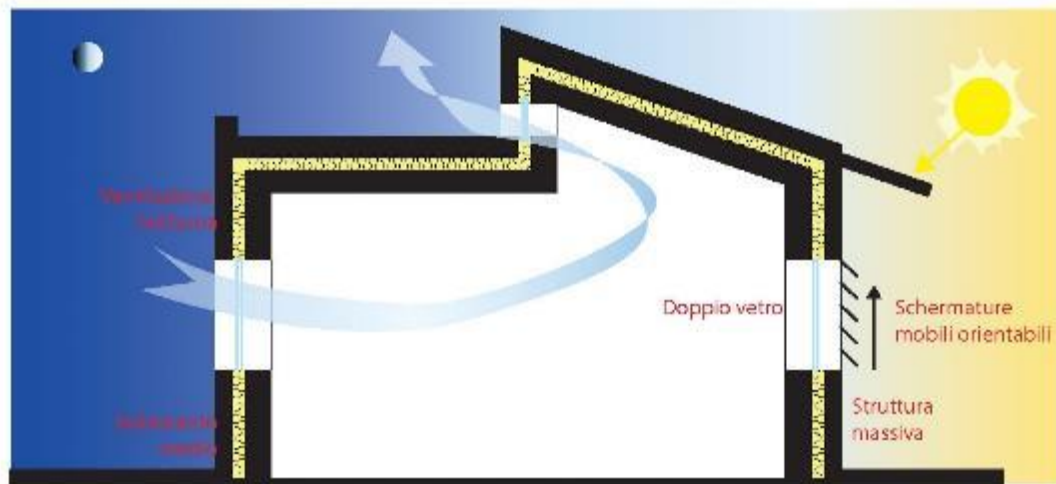
Tropicale



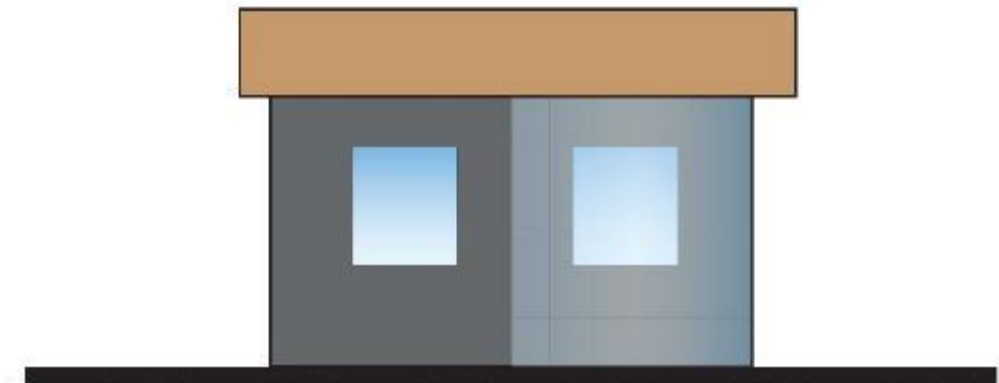
Arido



SUGGERIMENTI: CLIMA TEMPERATO e FREDDO



Temperato

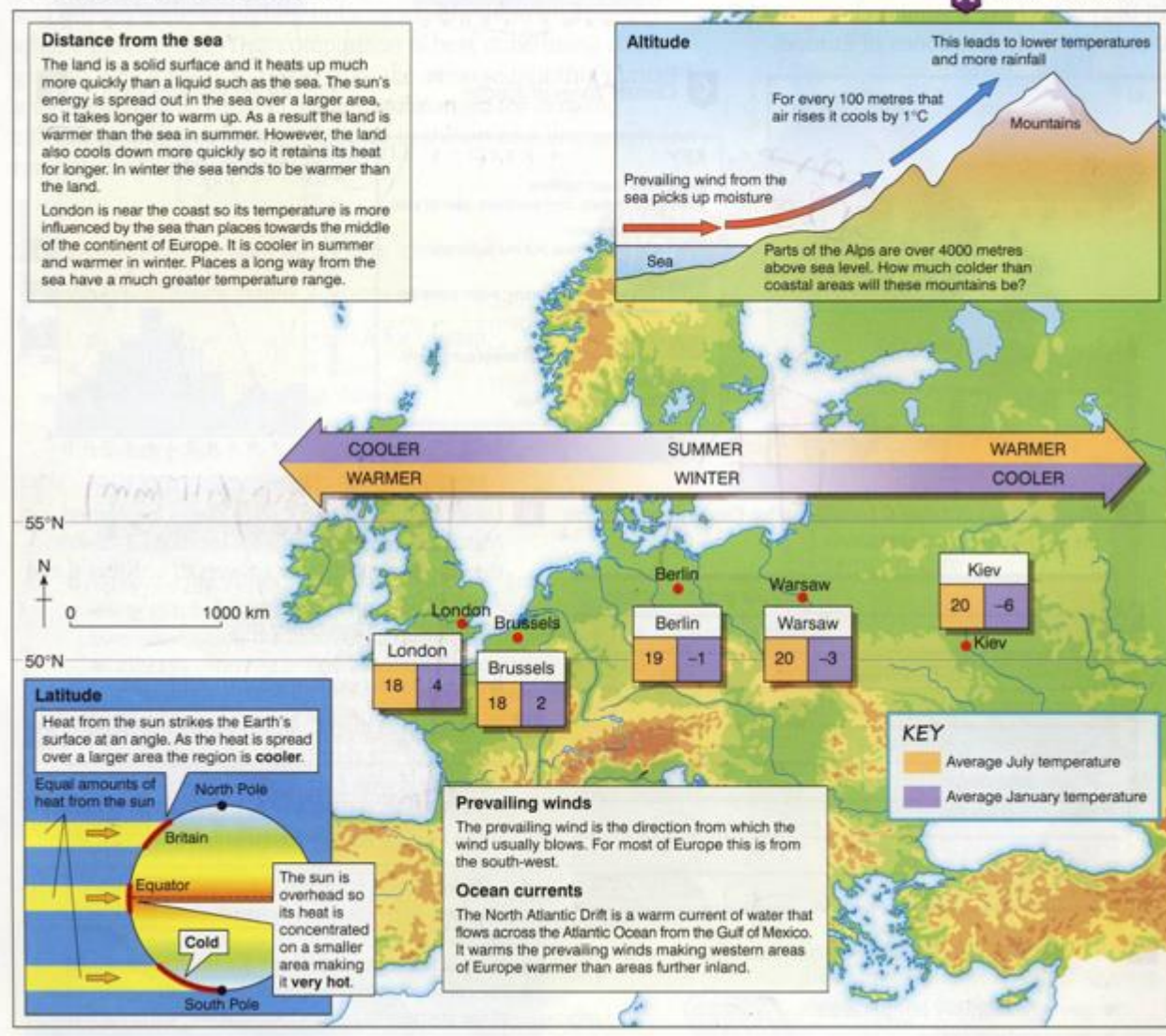


Freddo



EDIFICIO E CLIMA (2)

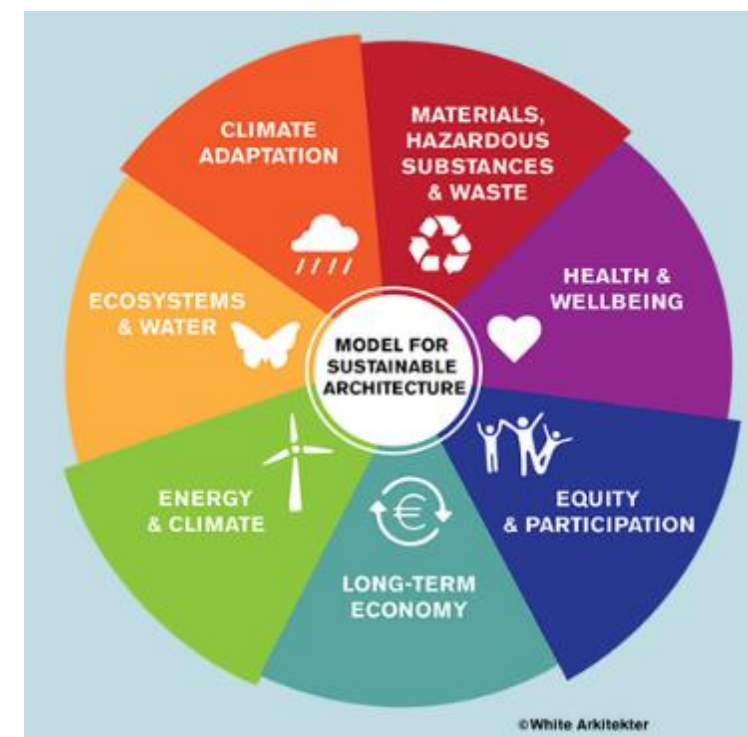
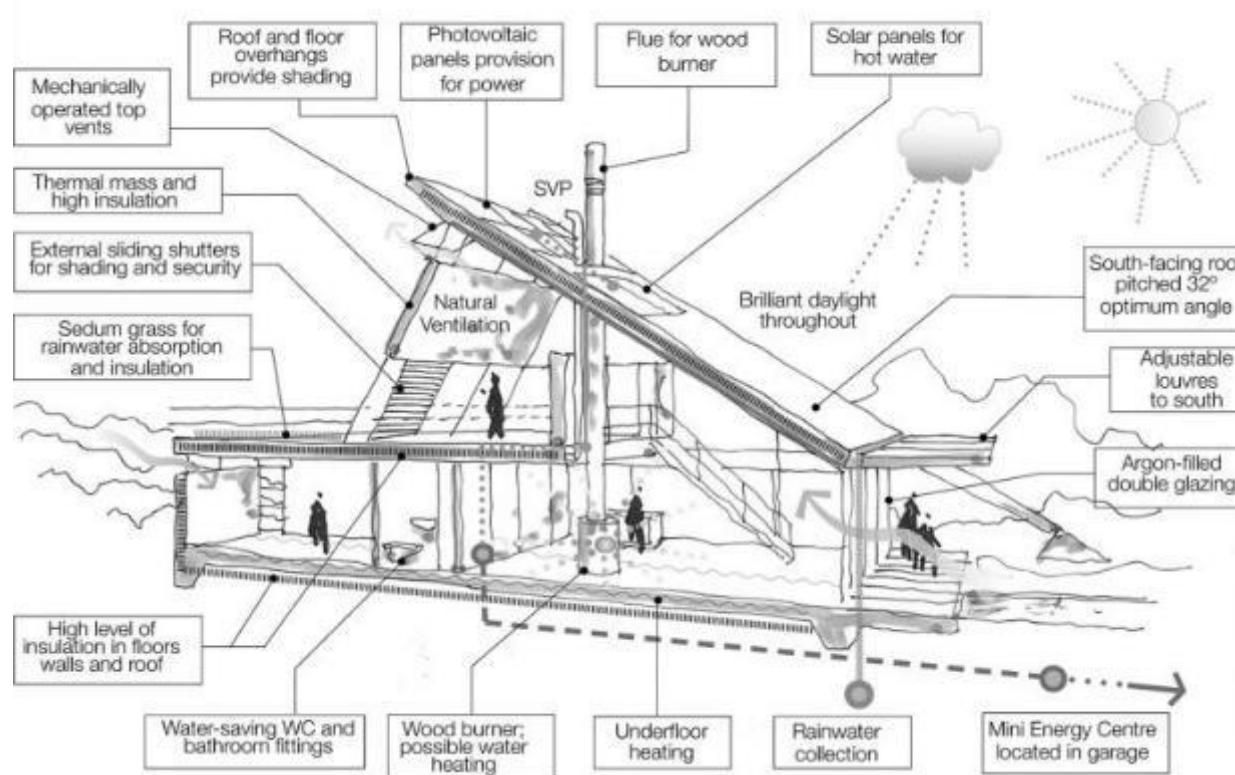
The pattern of climate for Europe is dependent on a number of factors which are explained on map A.



ARCHITETTURA SOSTENIBILE

L'Architettura Sostenibile si propone di limitare l'impatto ambientale del costruito, ponendosi come finalità progettuali il contenimento degli inquinanti, l'efficienza energetica, il miglioramento della salute, del comfort e della qualità della fruizione degli abitanti/utenti. Questi obiettivi sono raggiungibili mediante l'applicazione di metodologie, tecnologie e materiali appropriati.

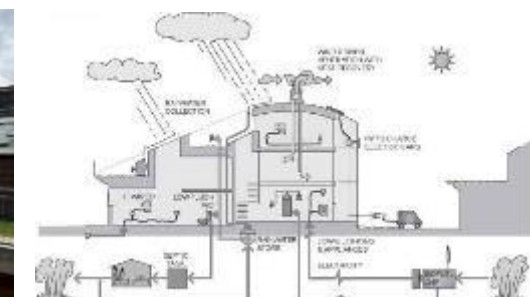
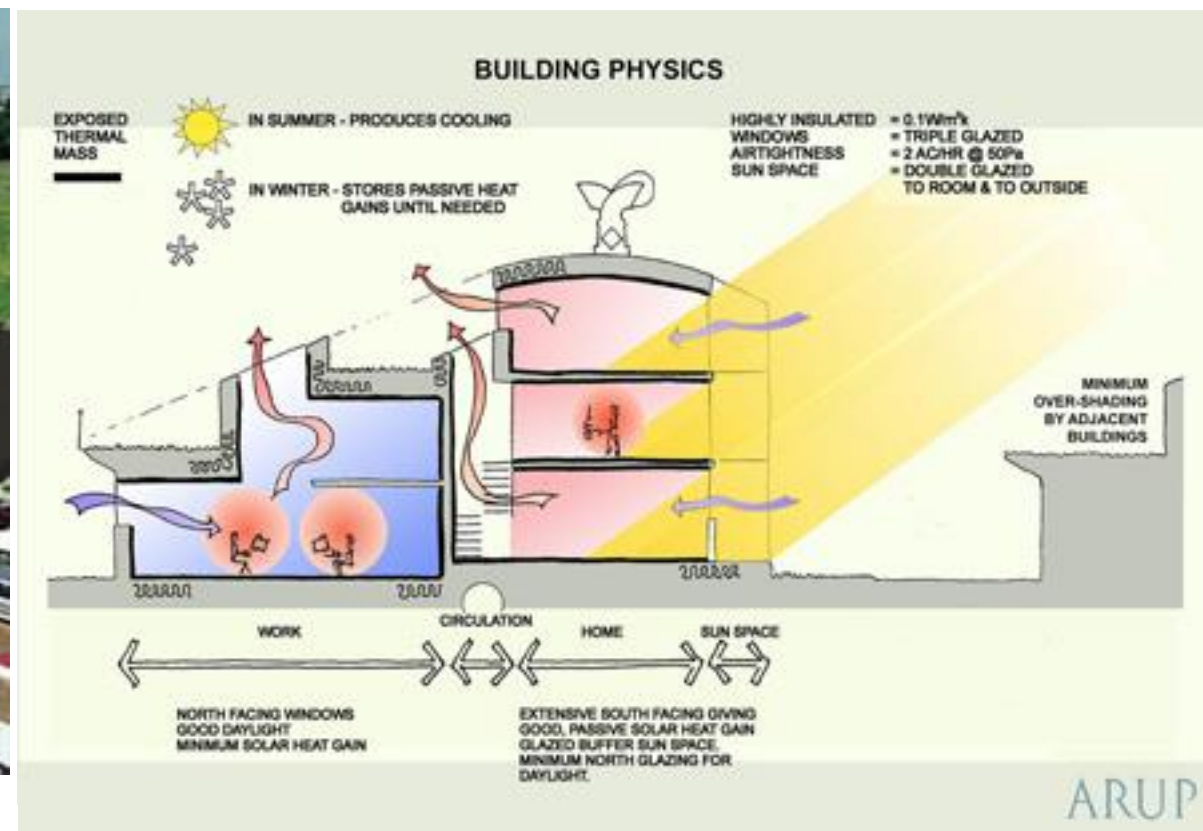
Il risultato finale consiste in una pratica edilizia in grado di soddisfare al meglio le necessità funzionali, tenendo conto fin dalle prime fasi del processo progettuale delle istanze ambientali e delle risorse naturali, senza arrecare danno o disagio all'ecosistema e dialogando armoniosamente con il contesto.



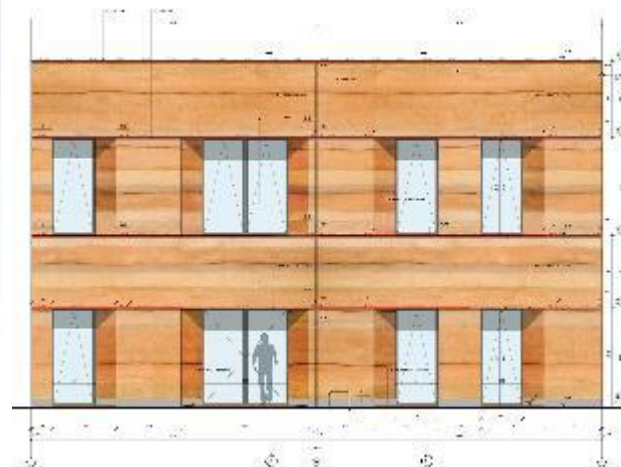
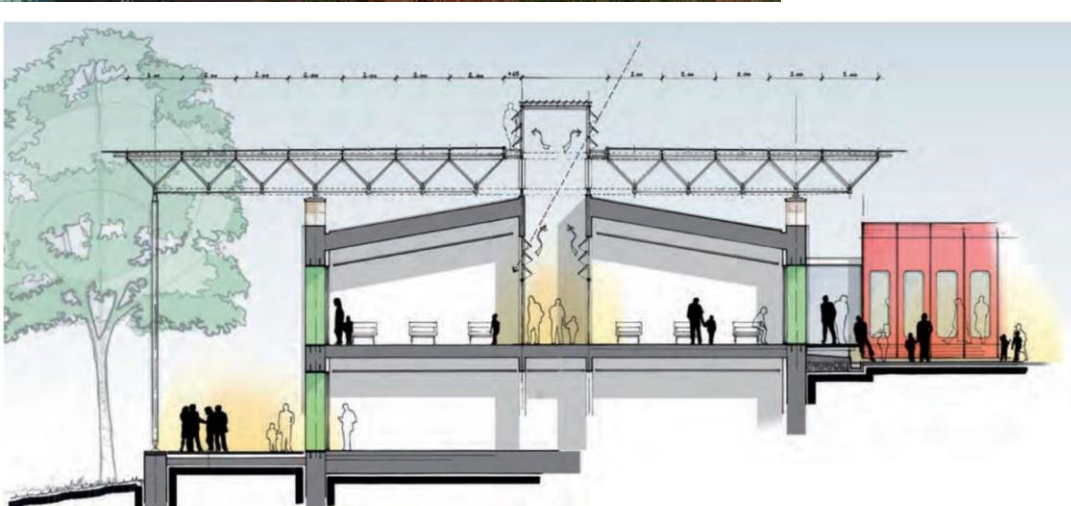
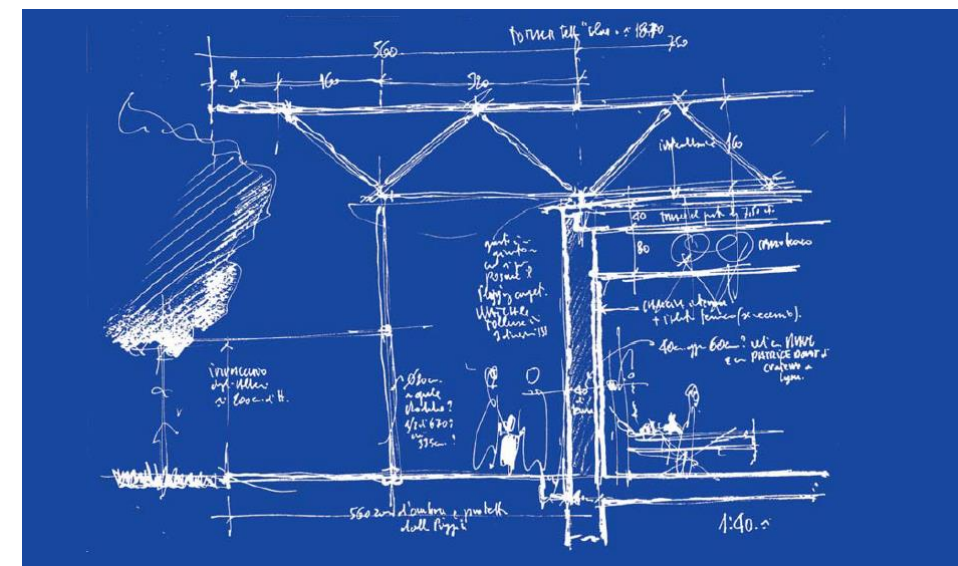
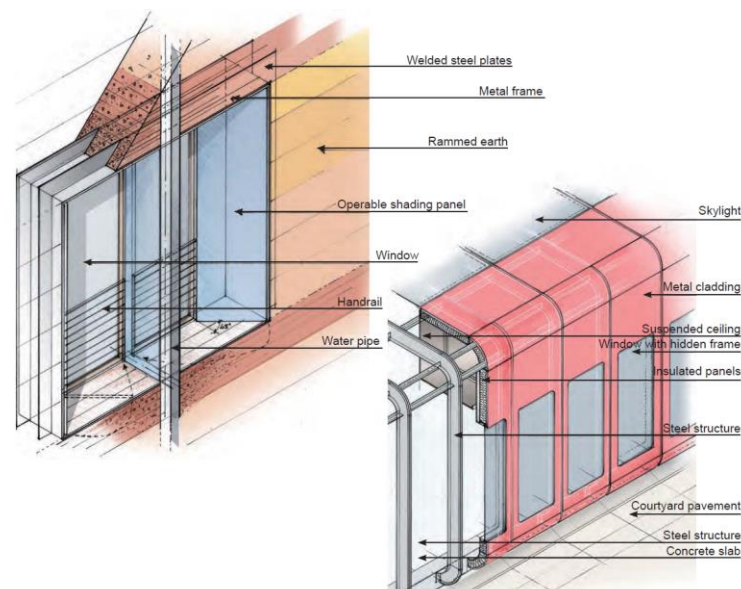
Fraunhofer Institute, SELF SUFFICIENT SOLAR HOUSE (1992)



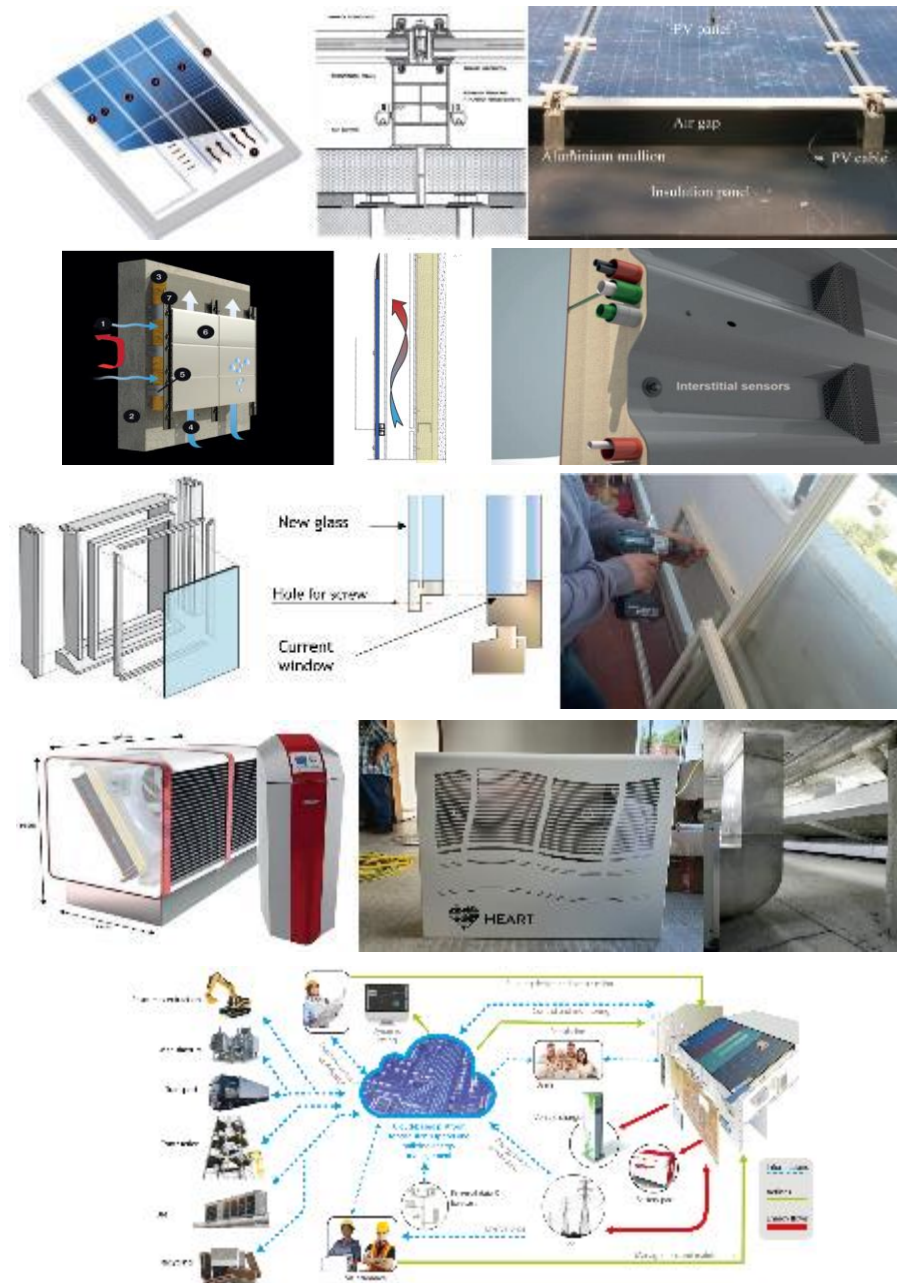
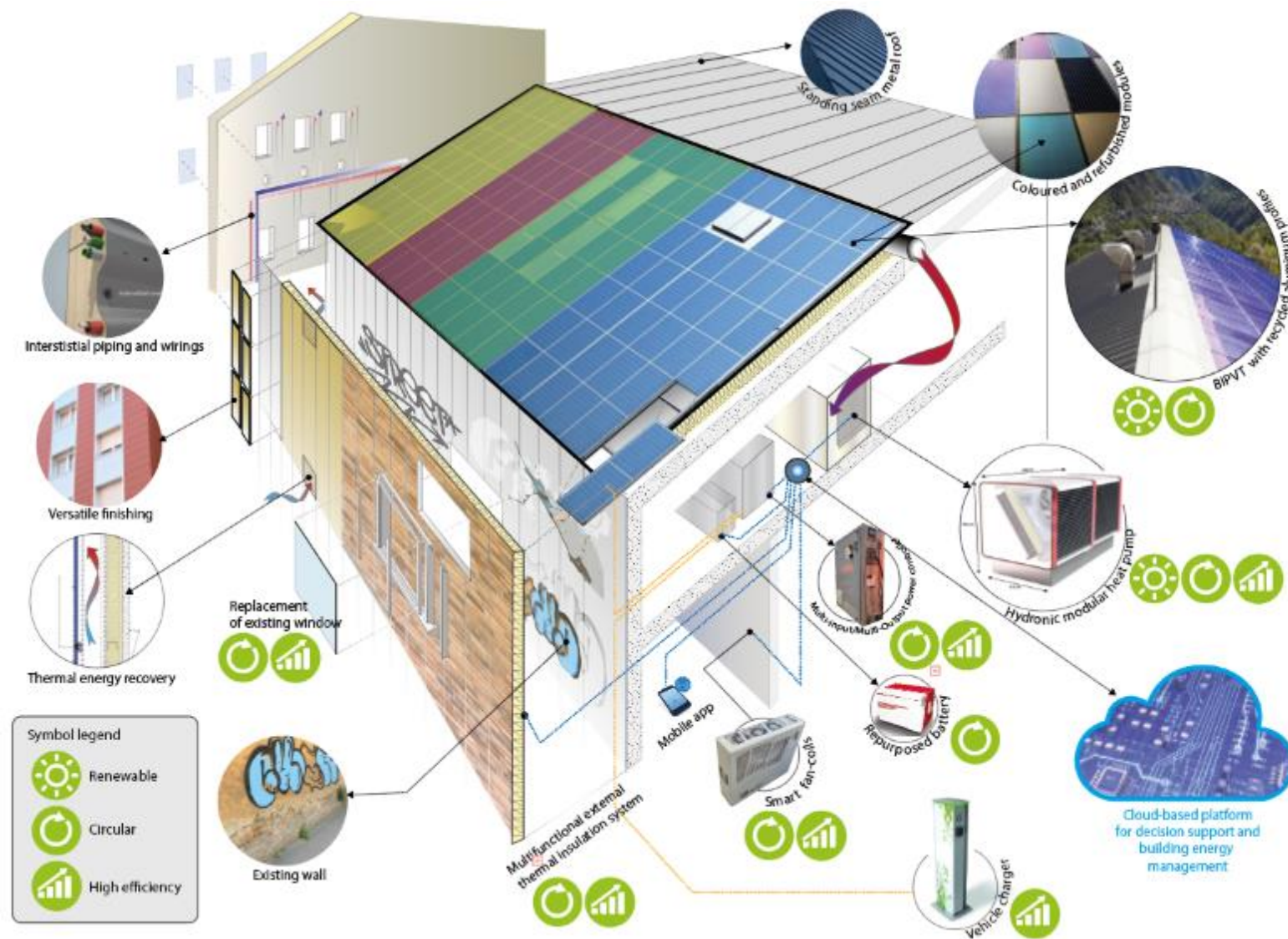
Bill Dunster, BEDDINGTON ZERO ENERGY DEVELOPMENT (BEDZED), Sutton (London), 2000-2002



Renzo Piano, CENTRE OF EXCELLENCE FOR PAEDIATRIC SURGERY Entebbe, UGANDA, 2017



PoliMI, RE-SKIN Project, 2022



GREENWASHING

“Oggi sembra che il sistema capitalista abbia integrato con successo gli argomenti ecologici per promuovere il proprio interesse. Cioè, per realizzare gli obiettivi ecologici, bisogna comprare certi prodotti, i nostri prodotti, piuttosto che altri.”

Andri Gerber (2010)

TOP 5 MOST RIDICULOUS 'GREEN' BUILDINGS *5 constructions that defeat the point of being green*

