



PROMOSSO DA



POLITECNICO
MILANO 1863



5 GIUGNO 2017

Festival dello Sviluppo Sostenibile

Politecnico di Milano | Piazza Leonardo da Vinci, 32 | Edificio 3 | Aula De Donato

Convegno

Città e Comunità Sostenibili. Le emissioni di CO₂ e le misure di mitigazione

Sostenibilità e ambiente costruito, risparmio energetico ed energie rinnovabili: il progetto Milano 4 You

Claudio Del Pero

Politecnico di Milano

PARTNER



MAIN MEDIA PARTNER



MEDIA PARTNER



CON LA COLLABORAZIONE DI

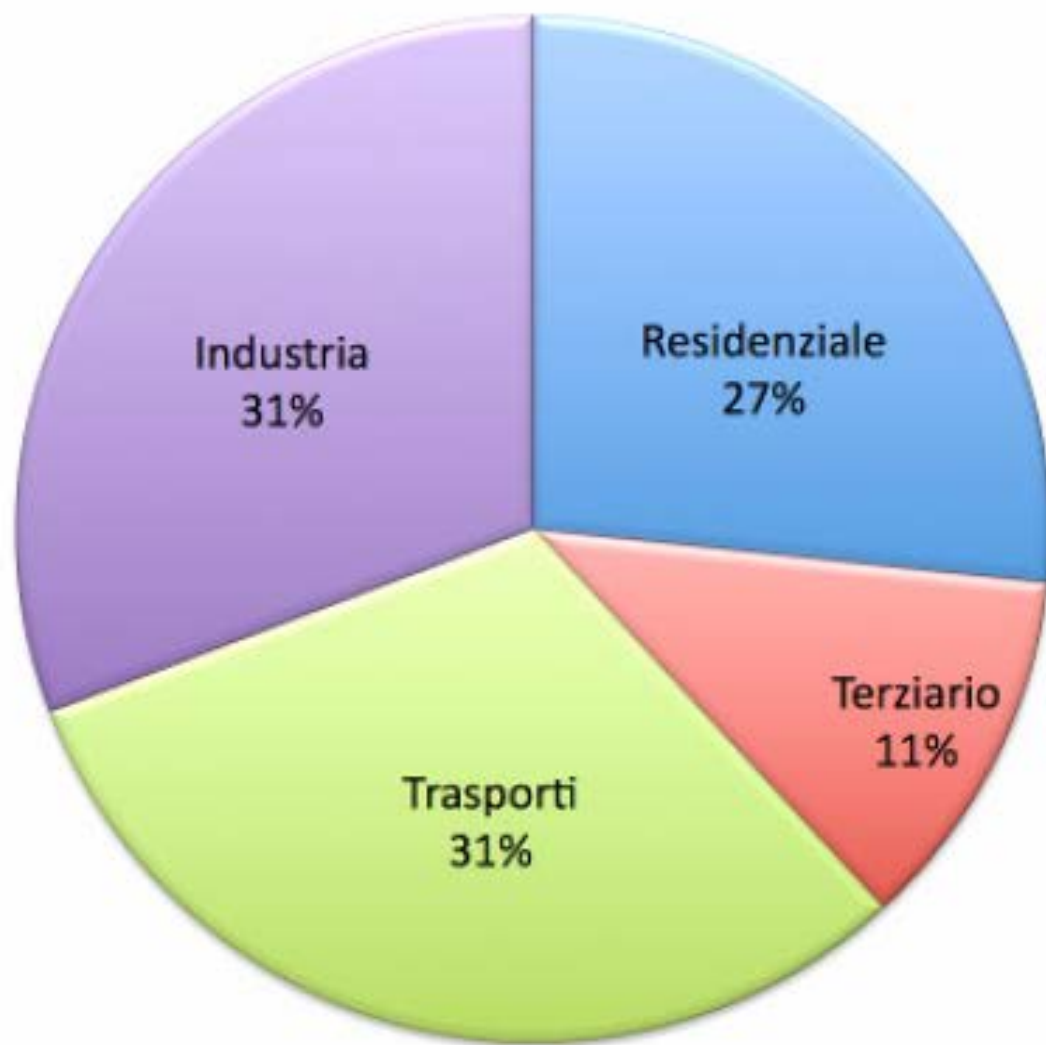


CON IL CONTRIBUTO DEL

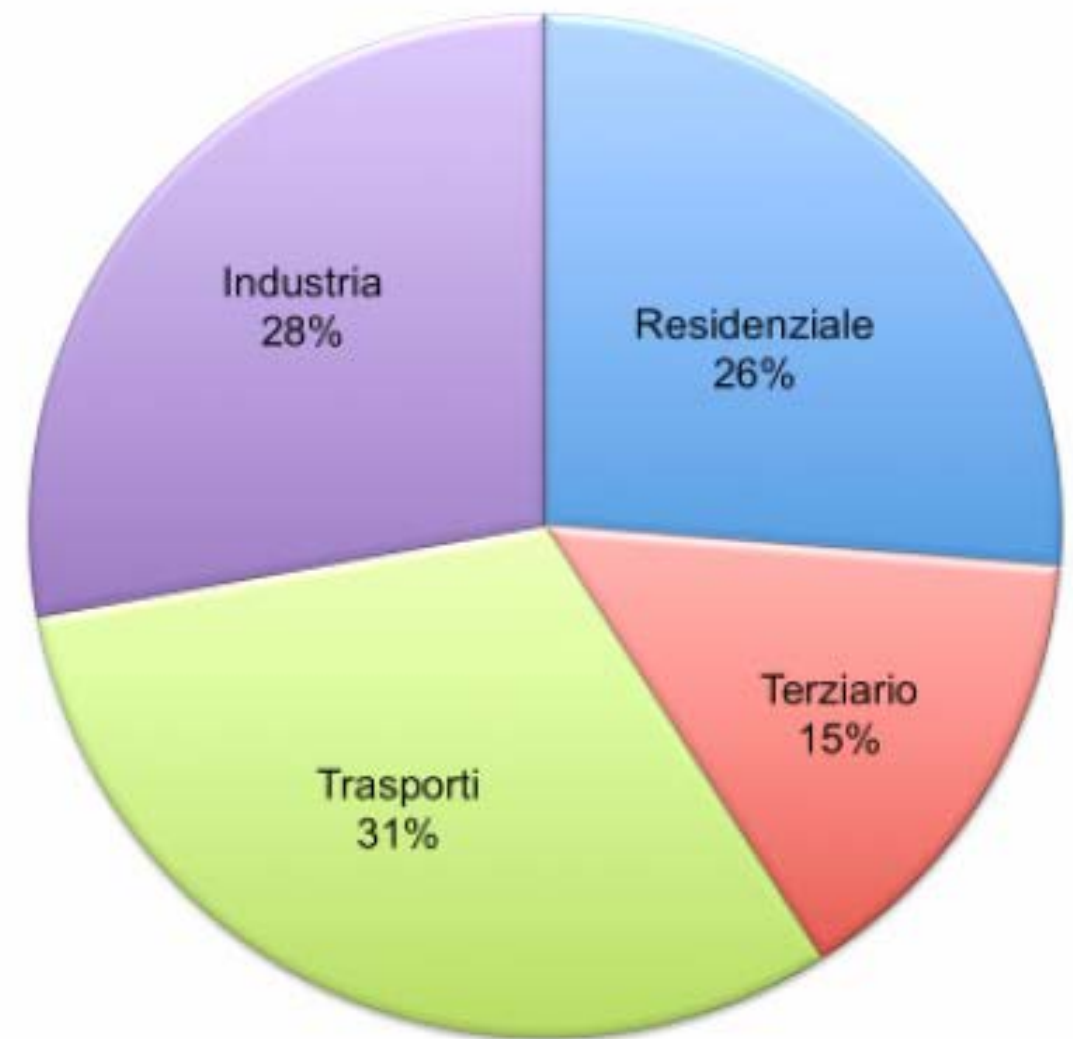


MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE

Consumi Energetici Finali

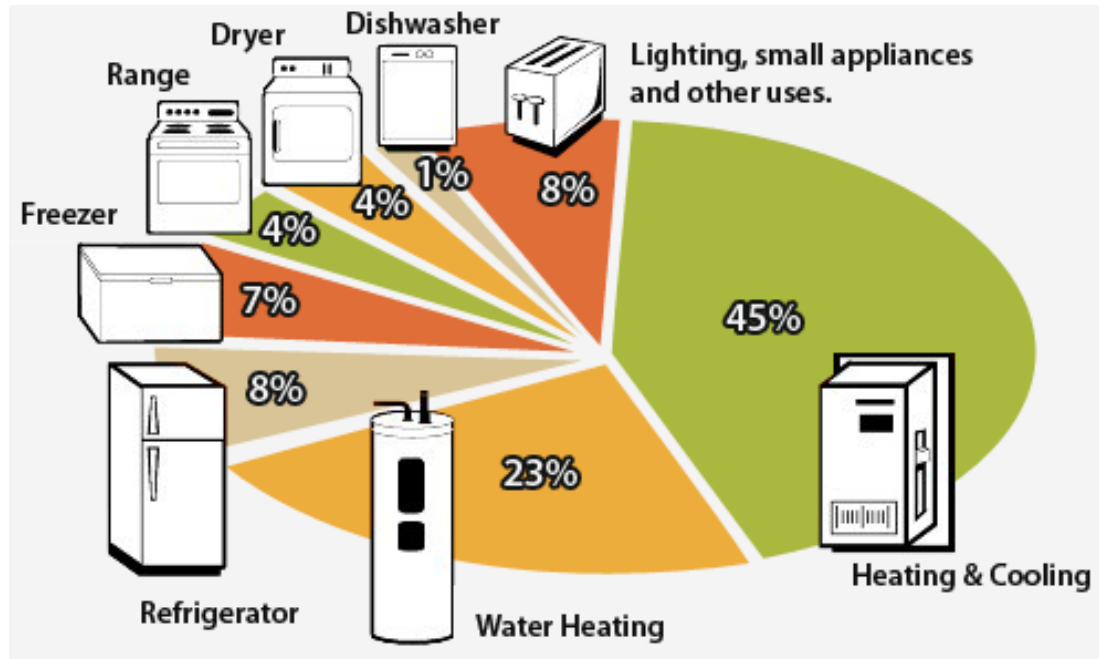


Europa

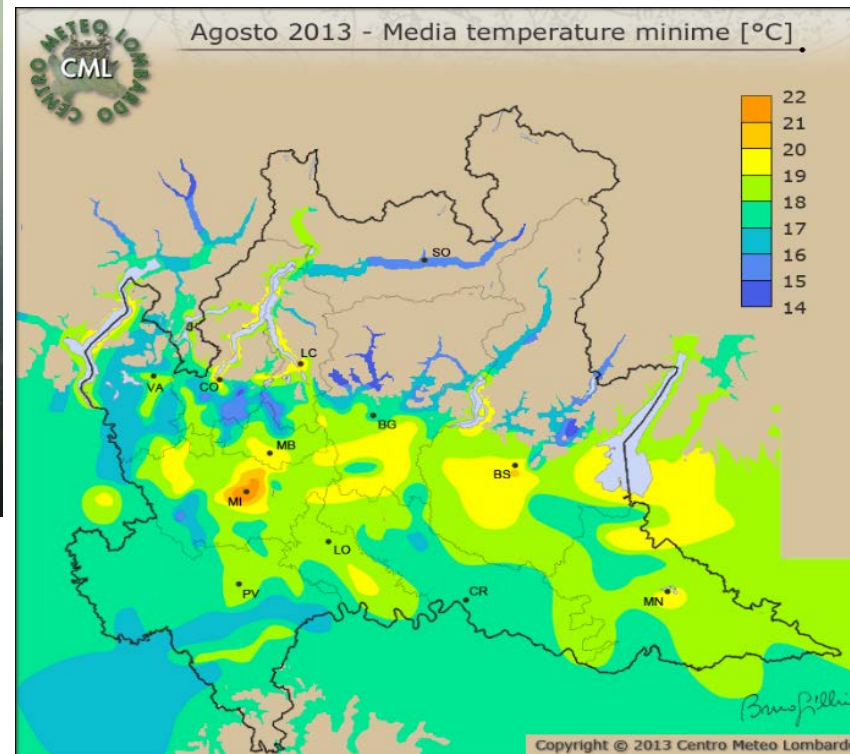


Italia

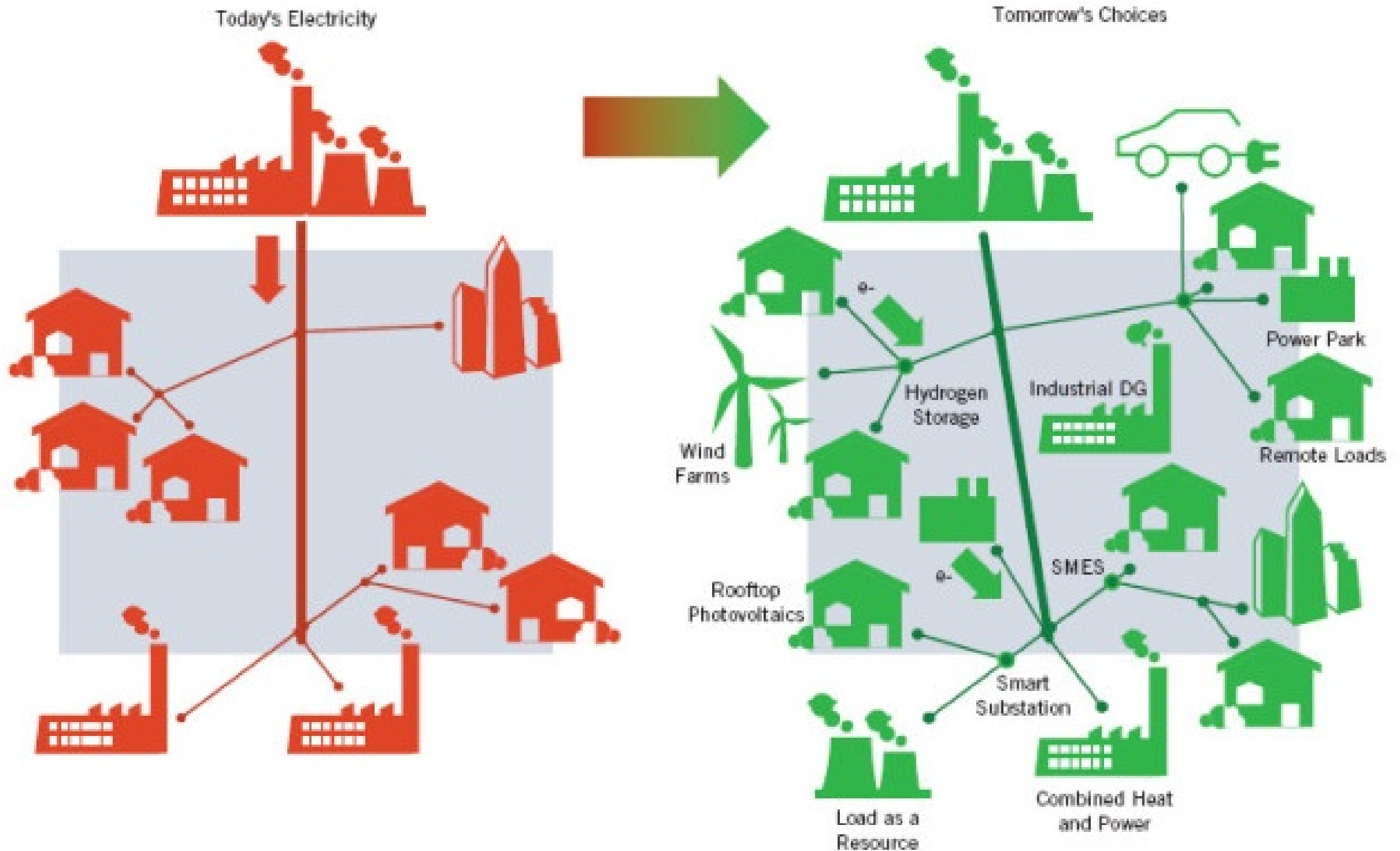
Architettura & Energia



Città, Clima & Energia



Generazione Distribuita



Smart Buildings e Smart City

SMART BUILDINGS MEET THE SMART GRID

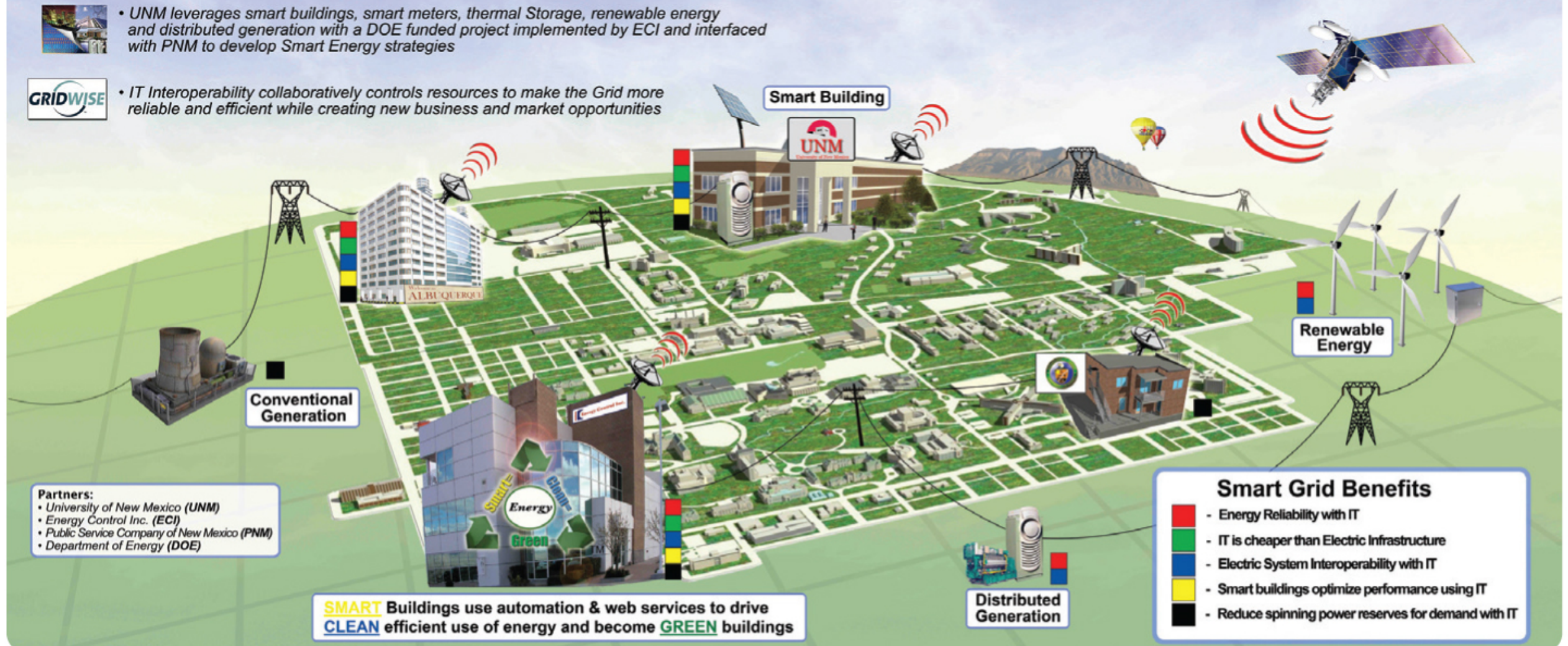
Energy Intelligence = (Today's Grid / Smart Buildings / Efficiency technologies / Renewables) + Information Technology (IT)



• UNM leverages smart buildings, smart meters, thermal Storage, renewable energy and distributed generation with a DOE funded project implemented by ECI and interfaced with PNM to develop Smart Energy strategies



• IT Interoperability collaboratively controls resources to make the Grid more reliable and efficient while creating new business and market opportunities



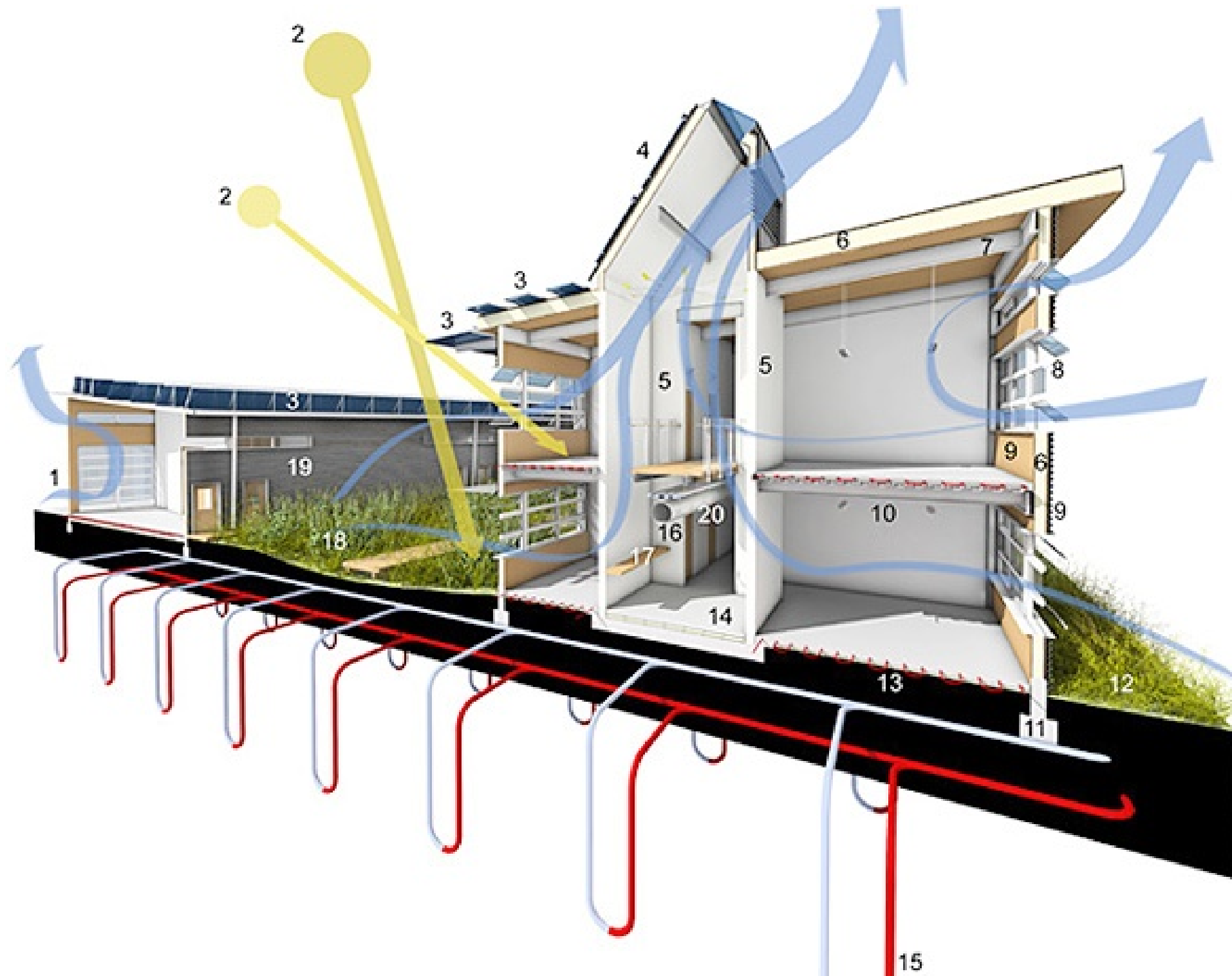
Partners:
 • University of New Mexico (UNM)
 • Energy Control Inc. (ECI)
 • Public Service Company of New Mexico (PNM)
 • Department of Energy (DOE)

SMART Buildings use automation & web services to drive **CLEAN** efficient use of energy and become **GREEN** buildings

Smart Grid Benefits

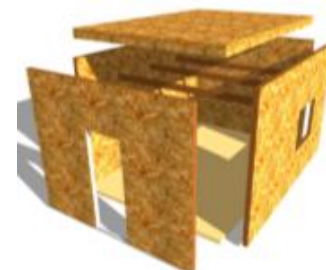
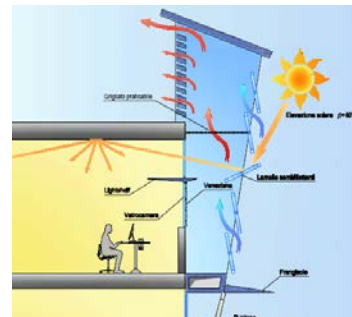
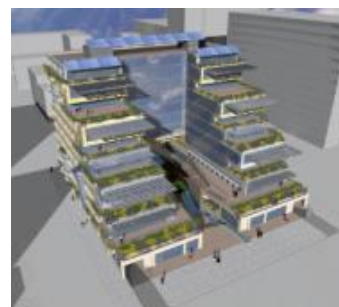
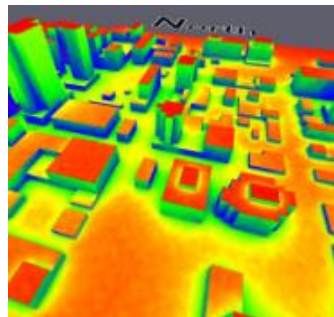
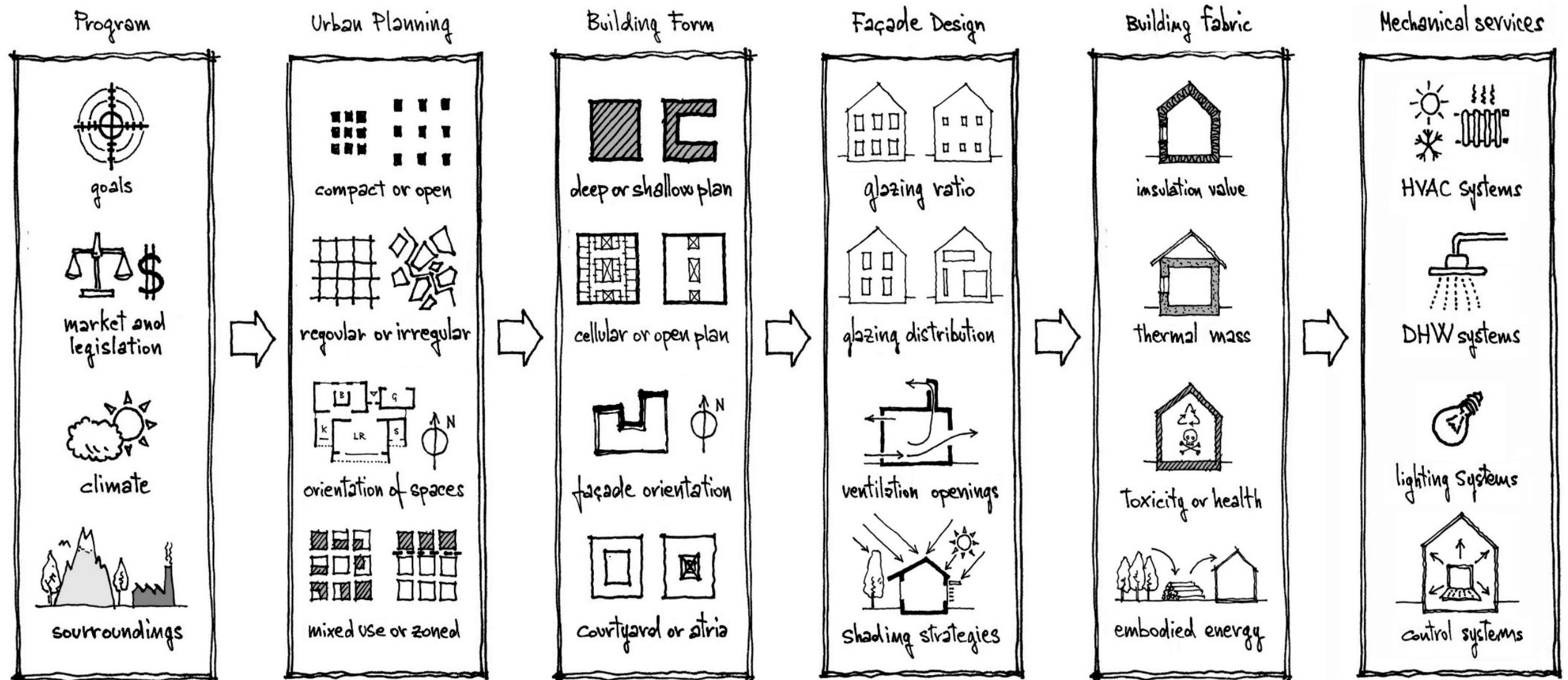
- - Energy Reliability with IT
- - IT is cheaper than Electric Infrastructure
- - Electric System Interoperability with IT
- - Smart buildings optimize performance using IT
- - Reduce spinning power reserves for demand with IT

Zero Energy Buildings

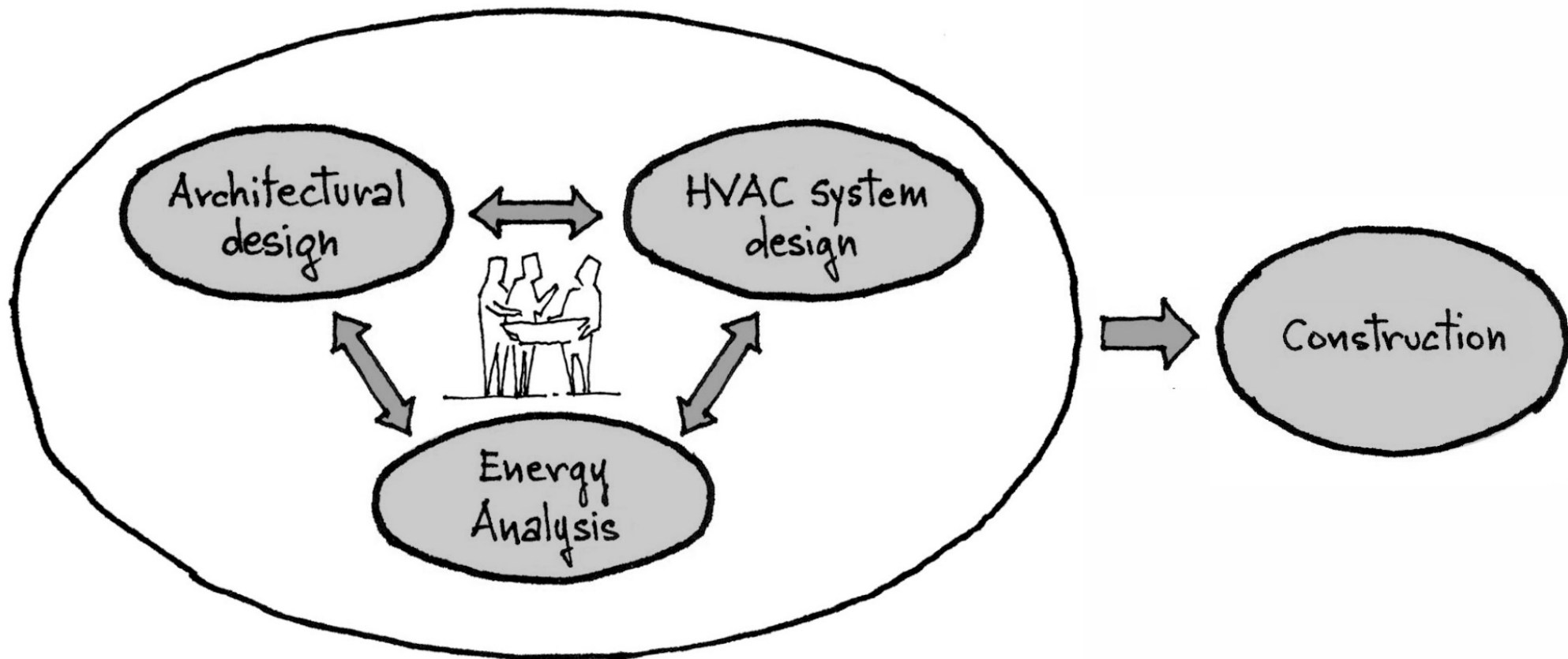
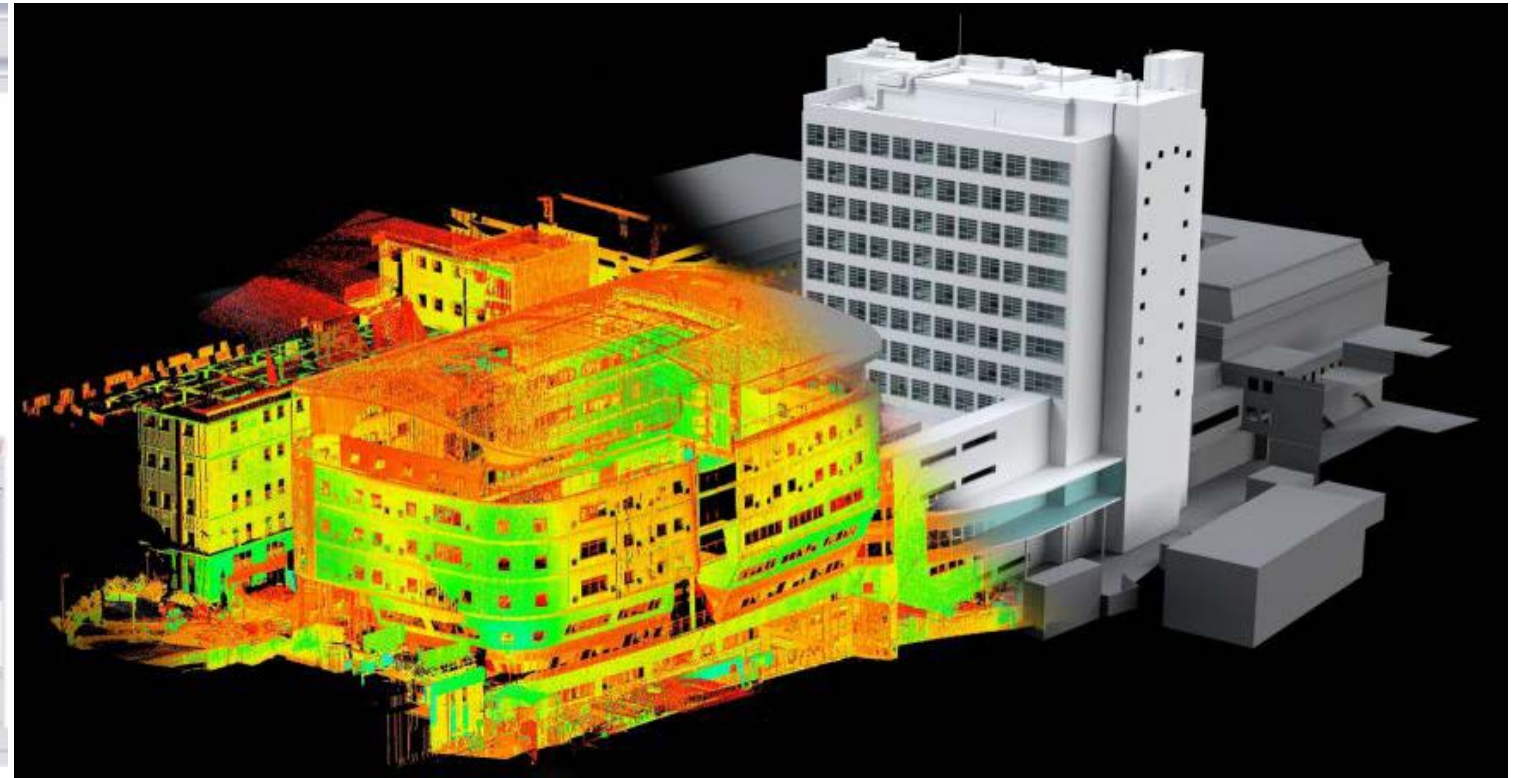
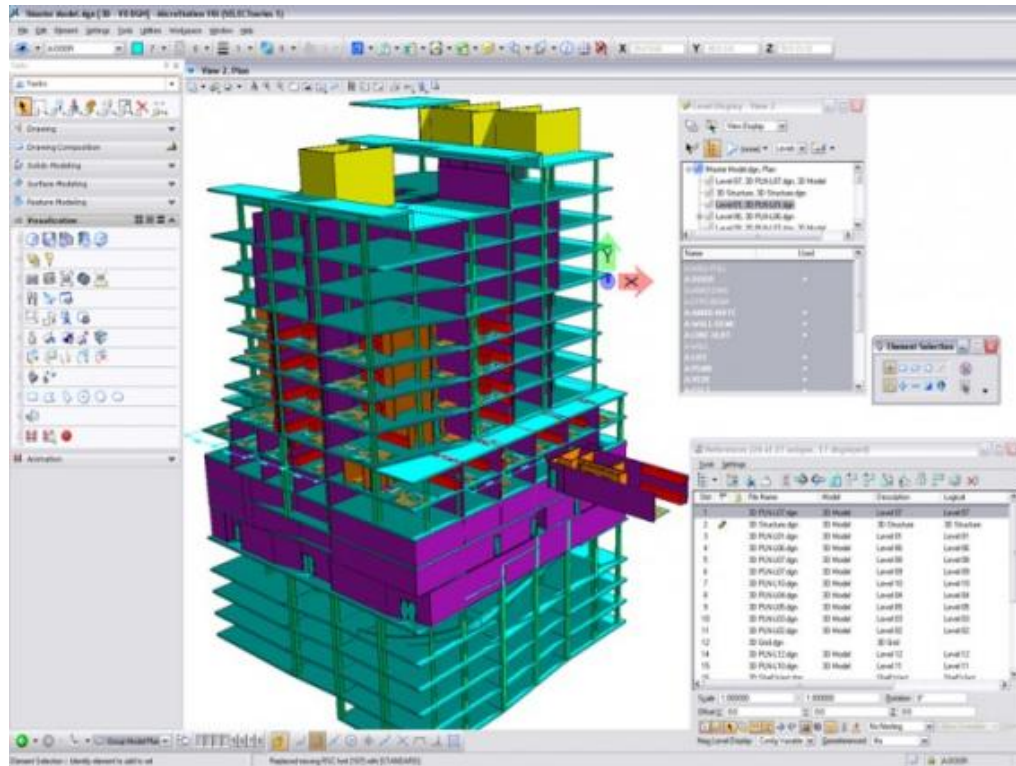


- 1.Porous concrete to maximize site stormwater infiltration
- 2.Optimized building orientation for active and passive solar capture
- 3.143 kW photovoltaic panel array
- 4.Solar thermal collectors (22 kW energy contribution)
- 5.Masonry shear cores provide daylighting, high thermal mass and stack-aided natural cooling (fan assist)
- 6.Structural insulated panel system
- 7.Modular structural steel frame to enhance building flexibility for changing user needs
- 8.Operable windows provide natural cooling and daylight harvesting
- 9.High recycled content, low VOC and regionally produced materials
- 10.High efficiency L.E.D. and fluorescent interior and exterior lighting
- 11.High fly ash content structural concrete
- 12.Reclamation of former Naval dumping facility site
- 13.Radiant in-floor heating and free cooling
- 14.Social gathering nodes encourage interaction and creative exchange of ideas
- 15.Geothermal heat exchangers
- 16.Exposed building systems to enhance user awareness and connection to resource use
- 17.FSC certified regional wood products
- 18.Bioretention area collects excess roof stormwater to achieve 65/10/0 low impact site stormwater strategy
- 19.Site stormwater collection and re-use
- 20.Heat recovery ventilation

Approccio Integrato (1)



Approccio Integrato (2)



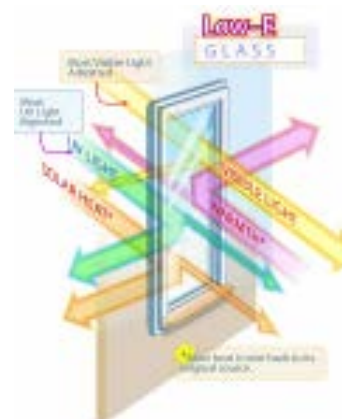
Tecnologie per l'efficienza Energetica



Isolamento



Inerzia termica



Vetri selettivi



Daylighting



Controllo solare



Elettrodomestici



Building Control Automation



Illuminazione



Fotovoltaico



Solare termico

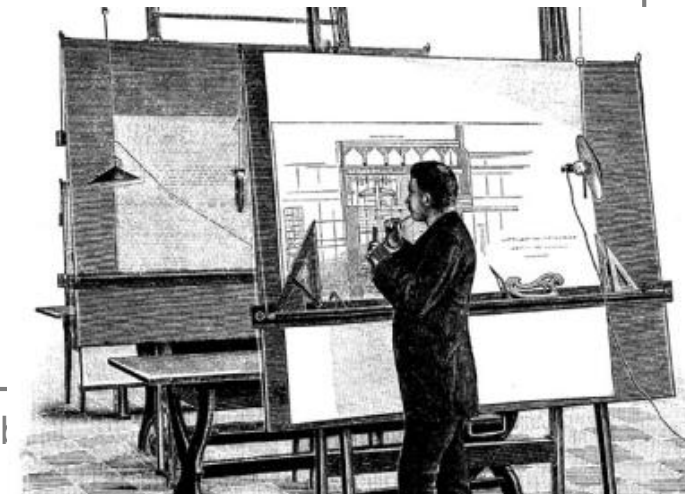
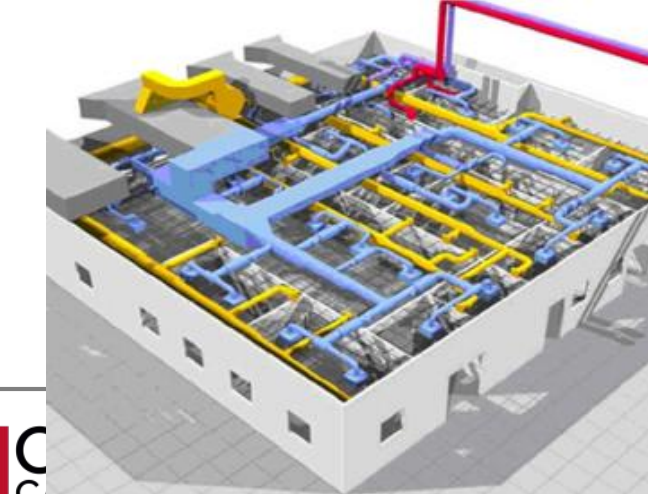
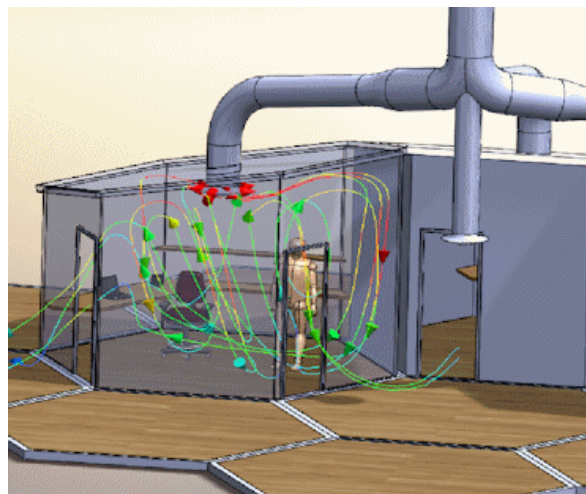
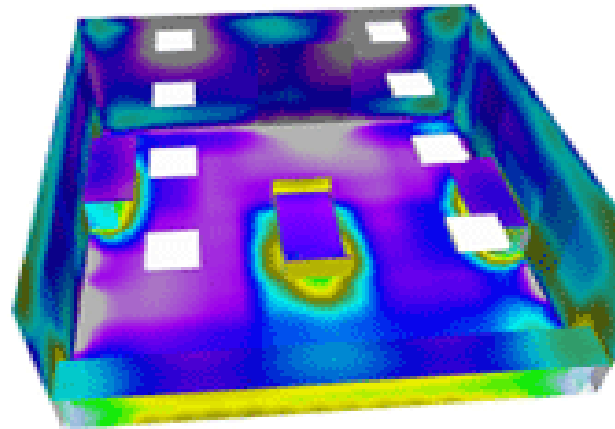
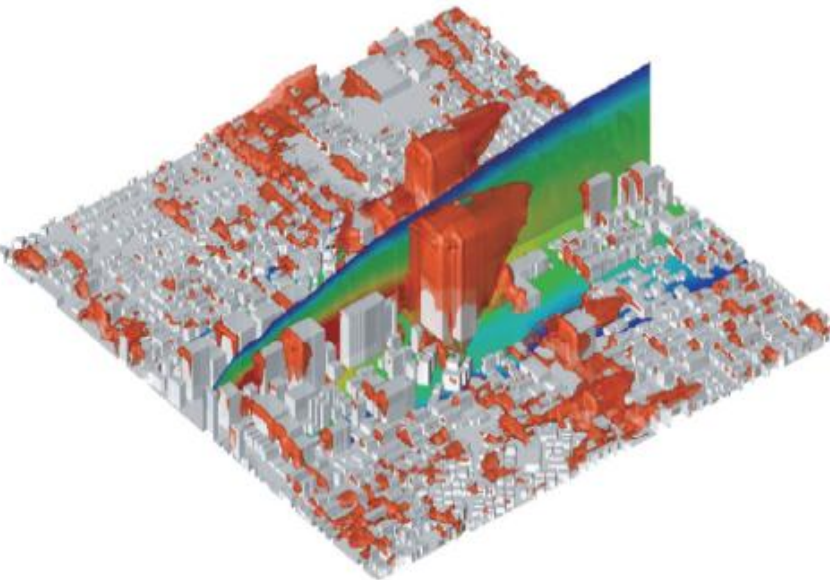
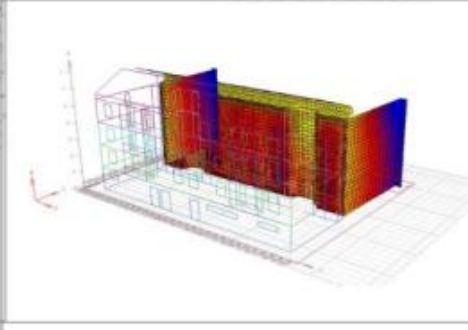
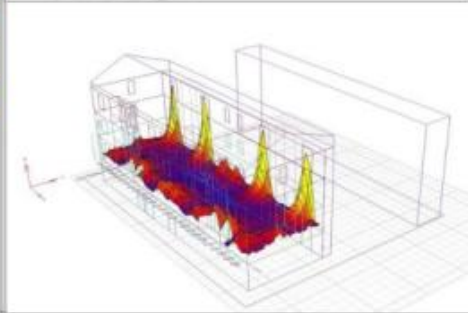
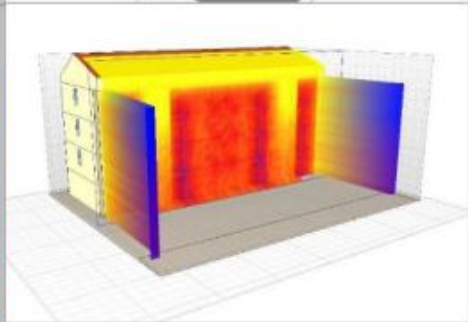
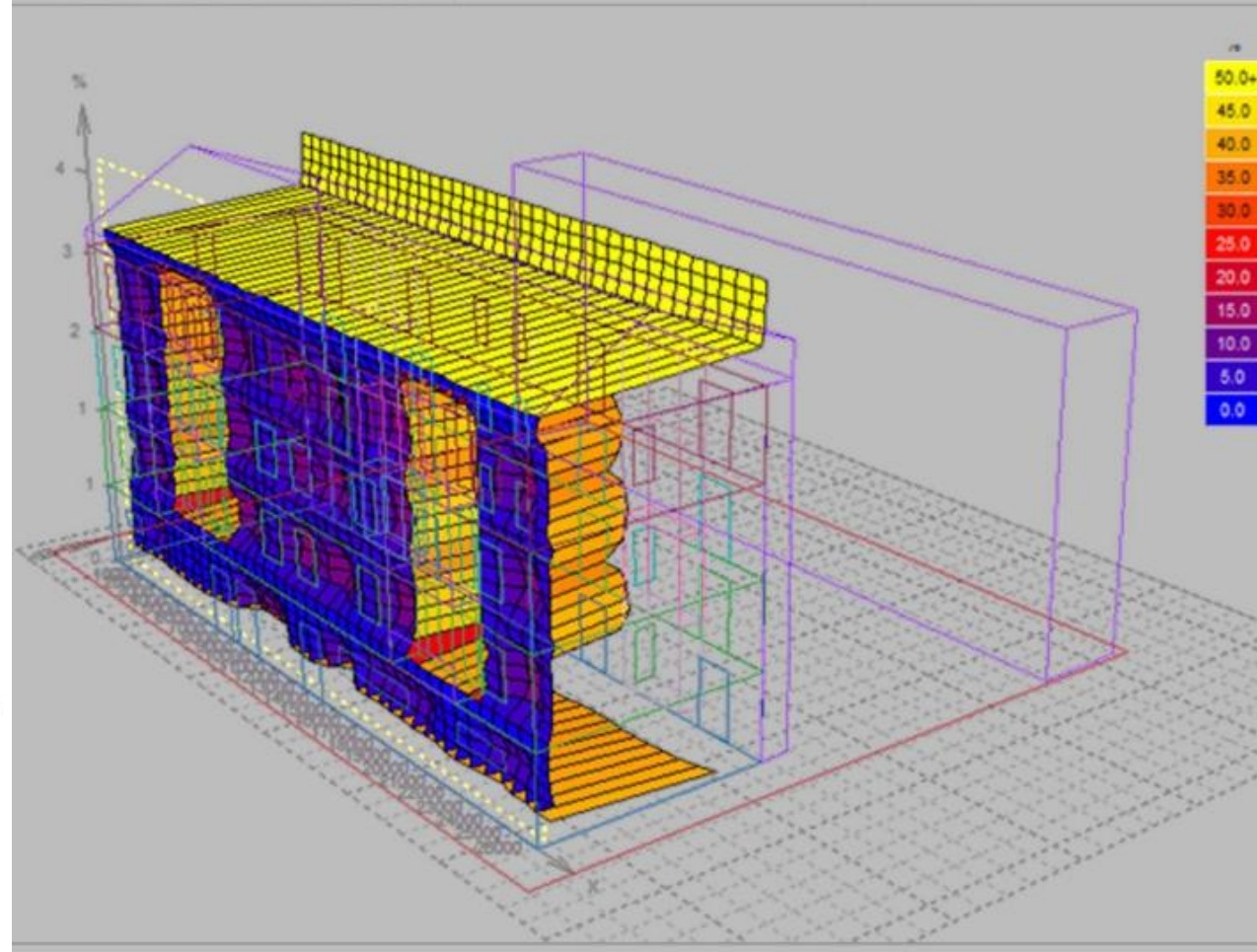
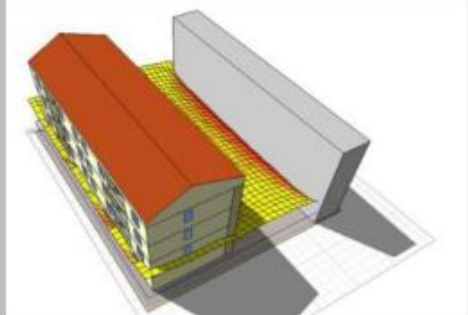
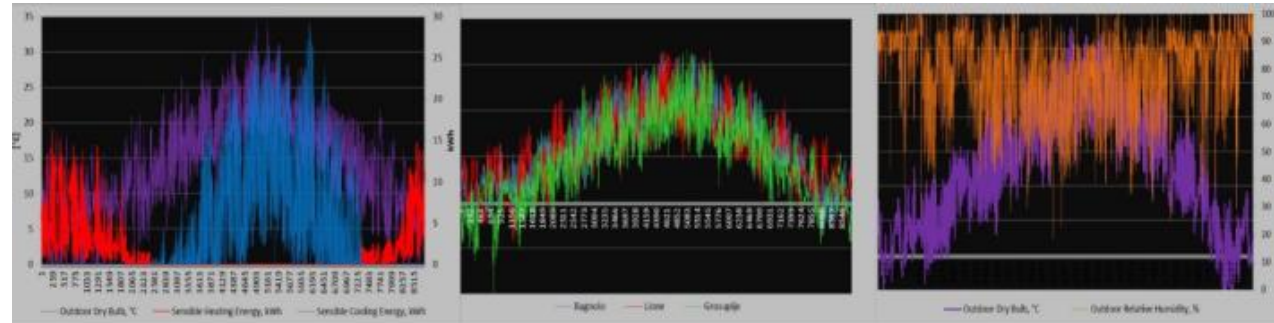
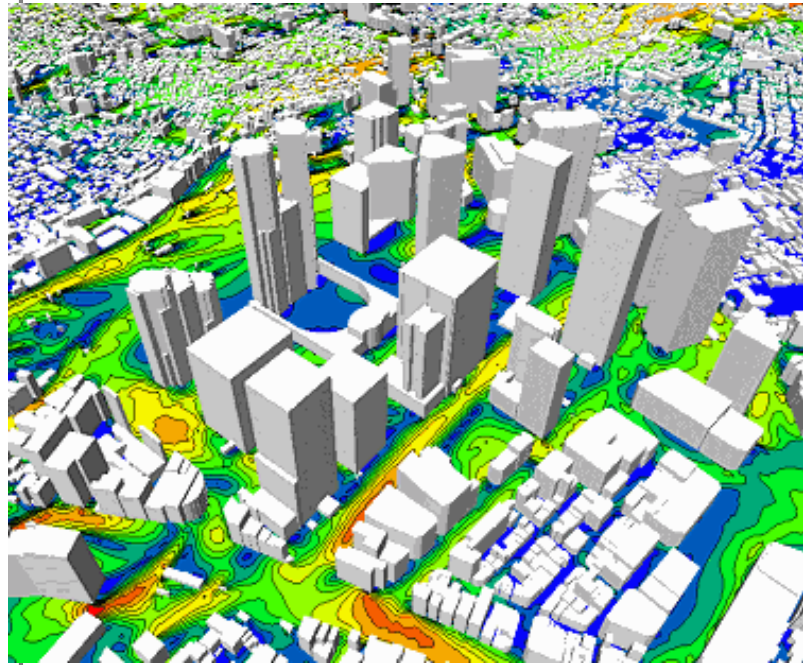


Geotermia

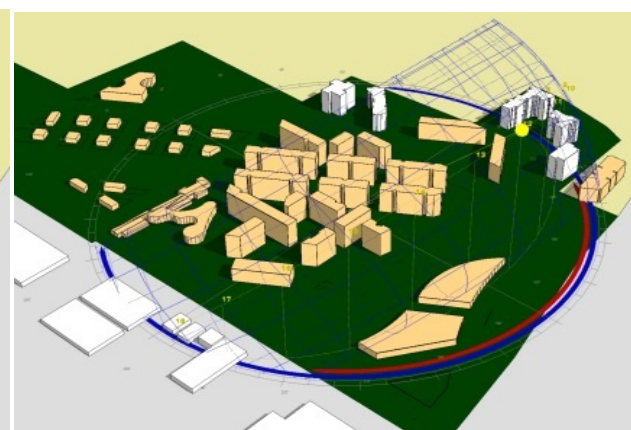
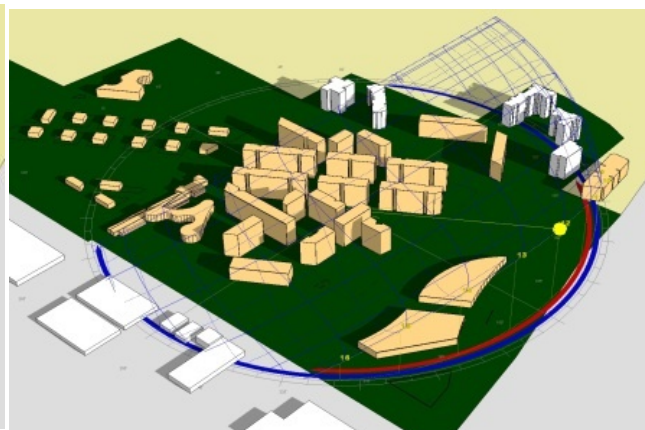
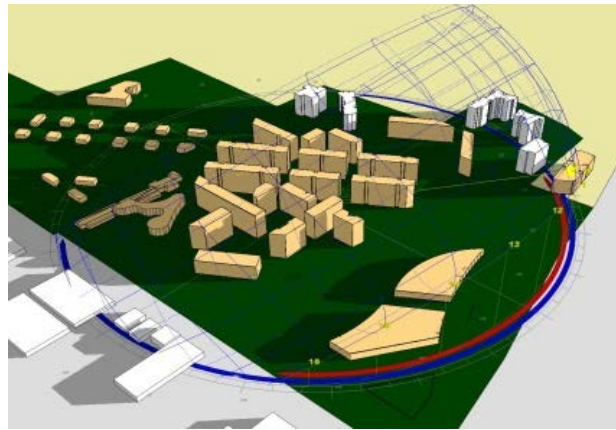
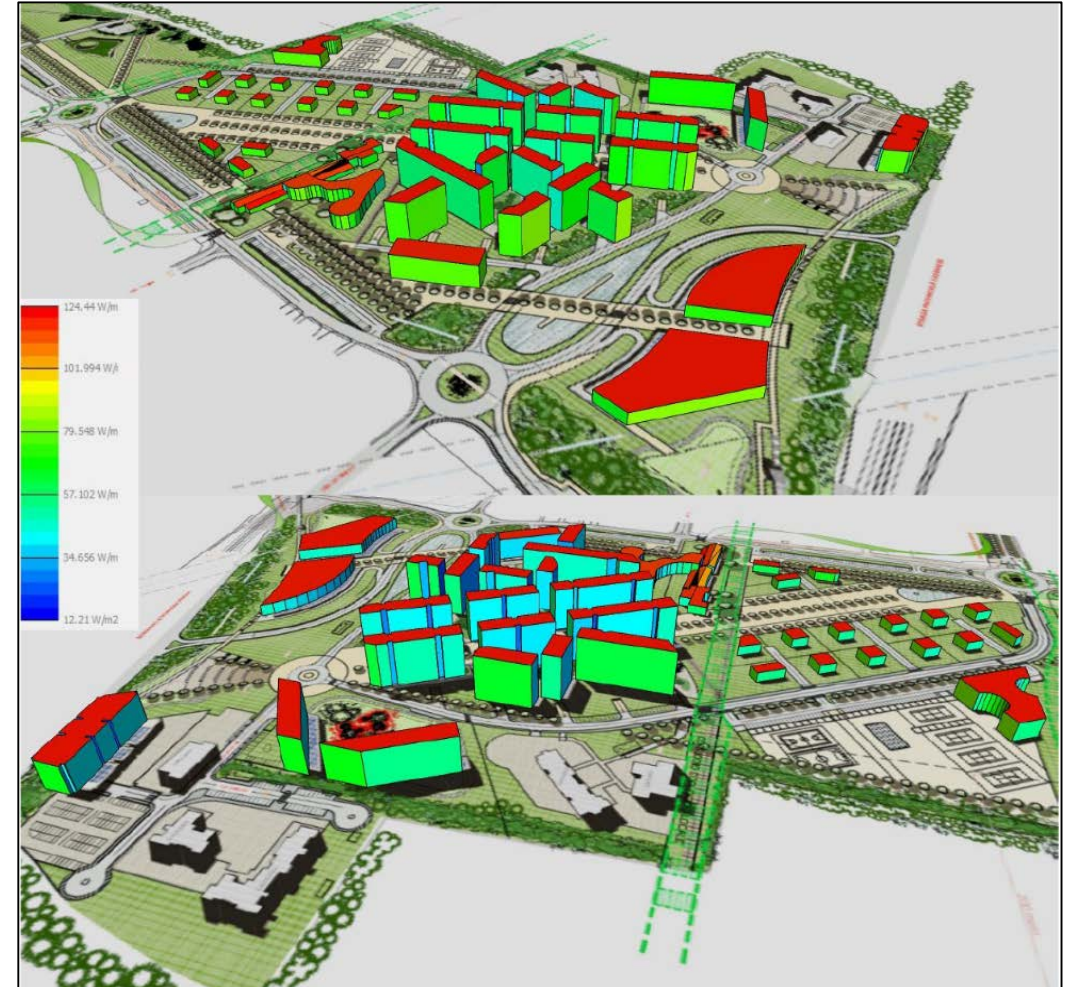


Biomasse

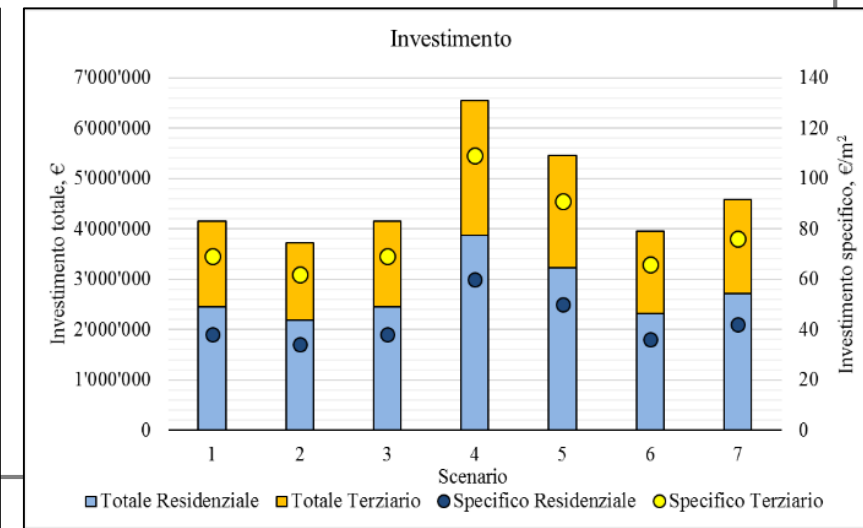
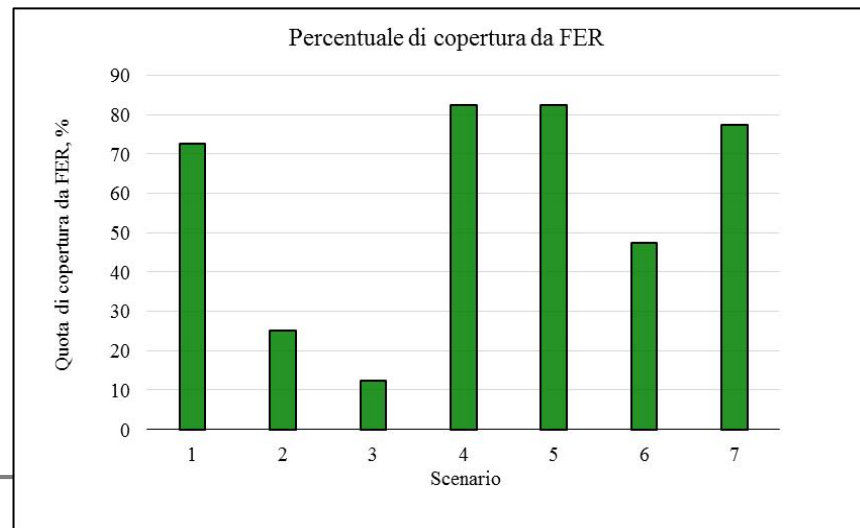
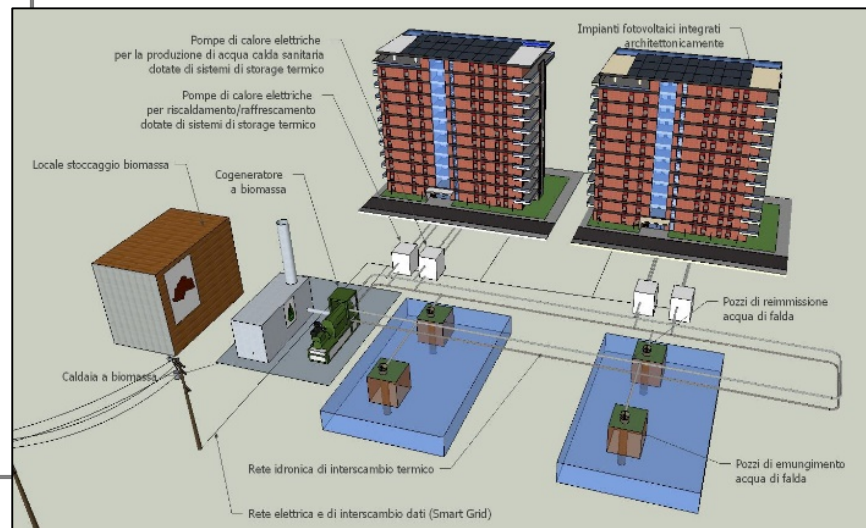
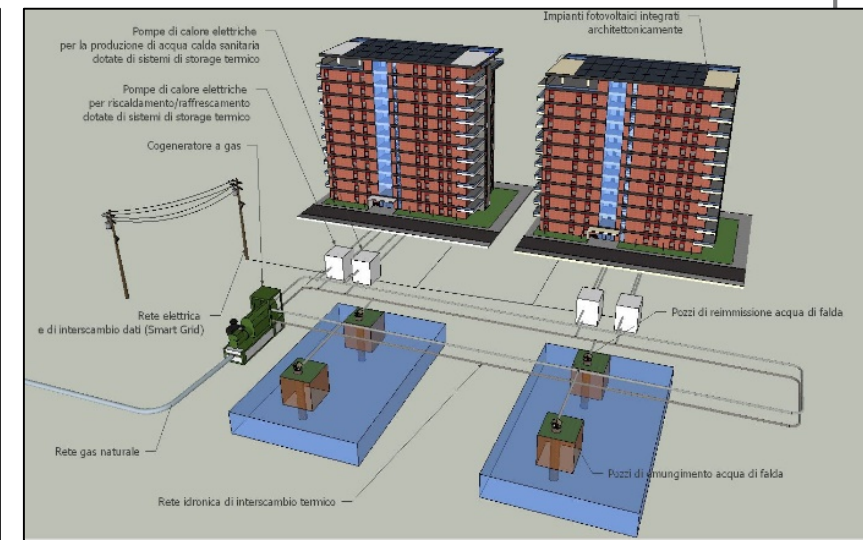
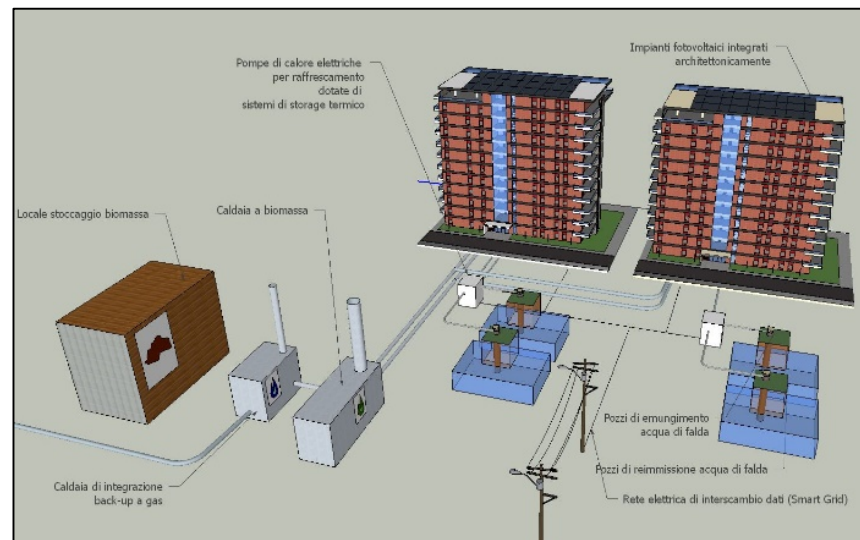
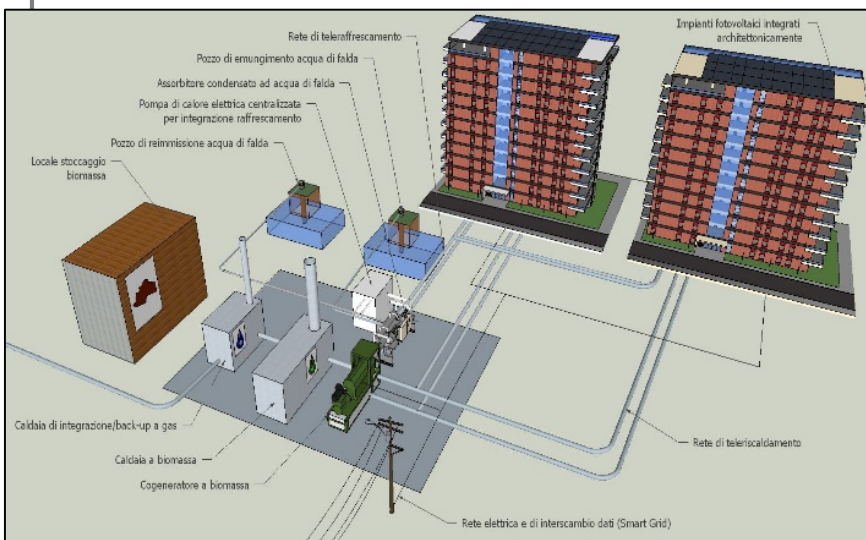
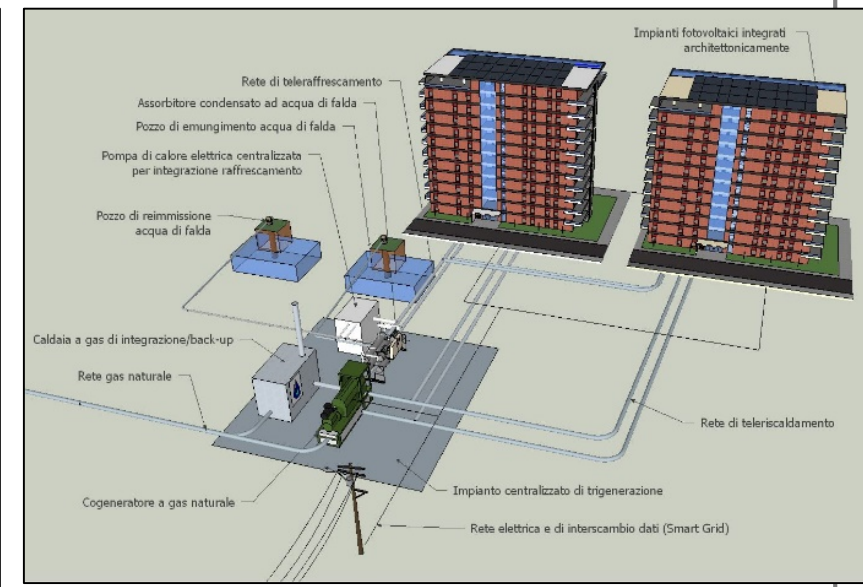
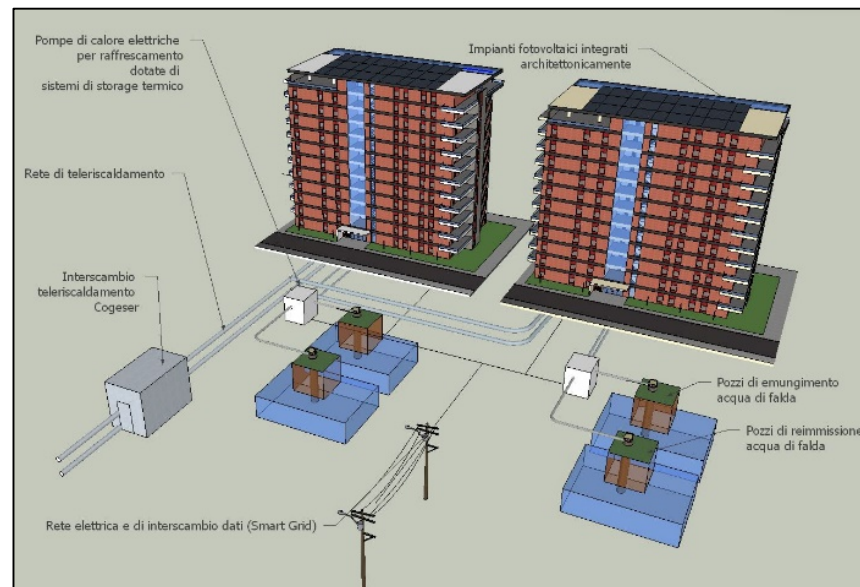
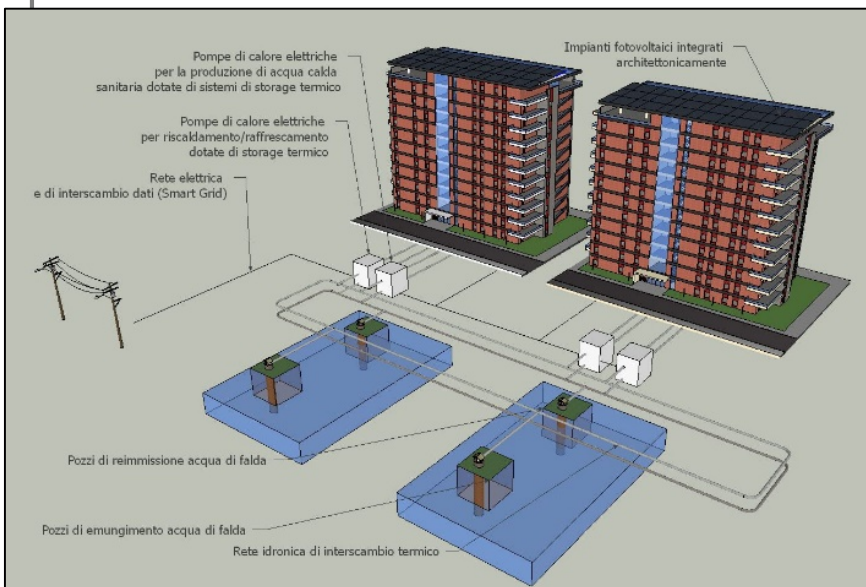
M4Y: Progettazione Energetica



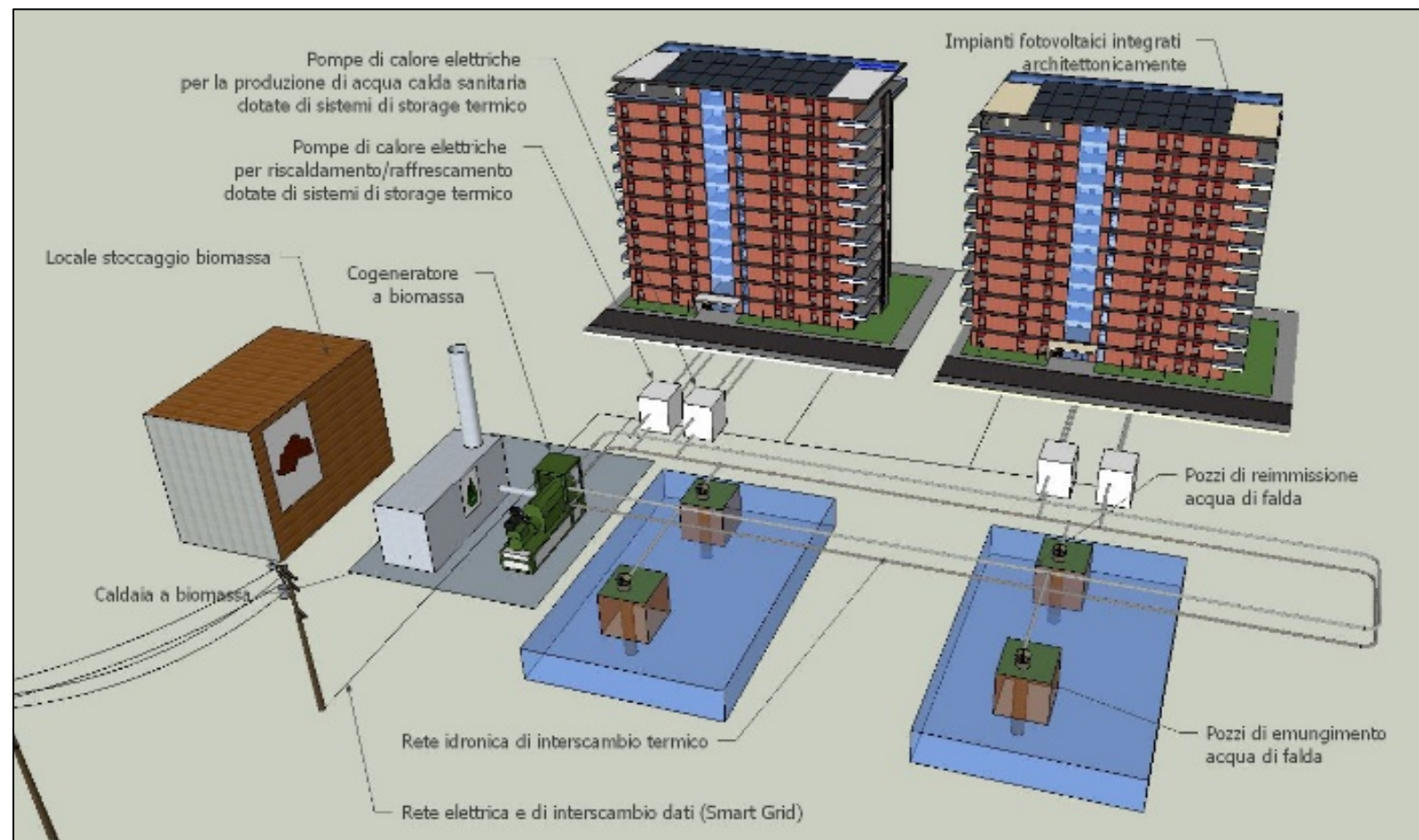
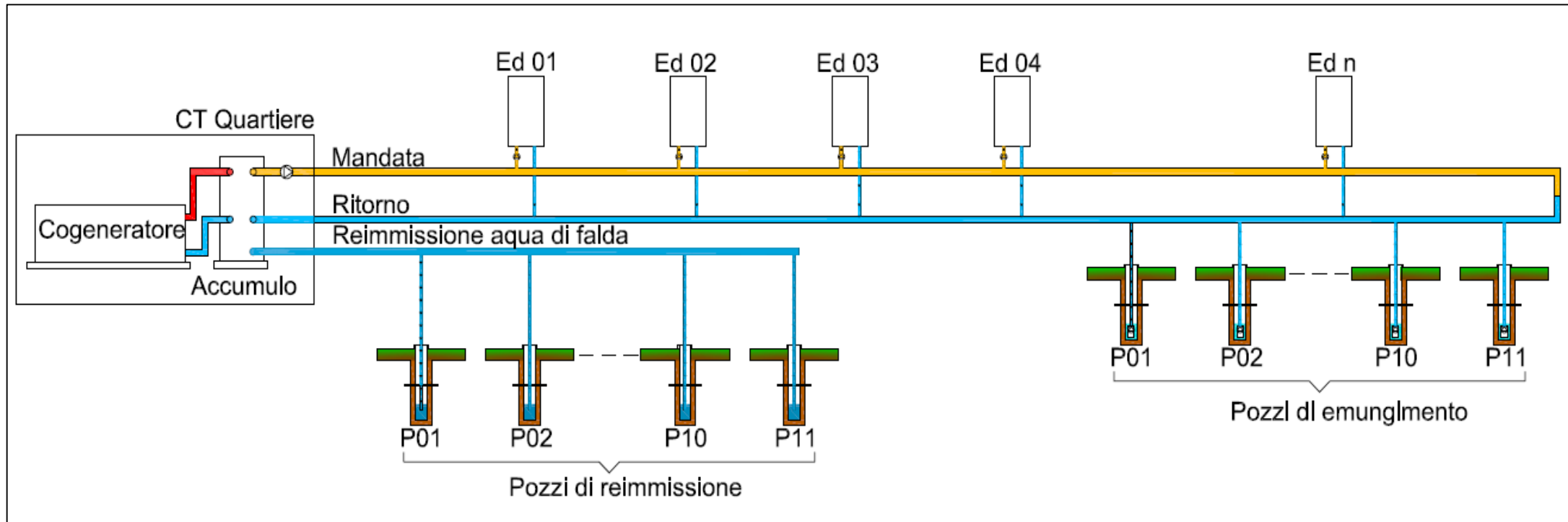
M4Y: Potenziale Solare



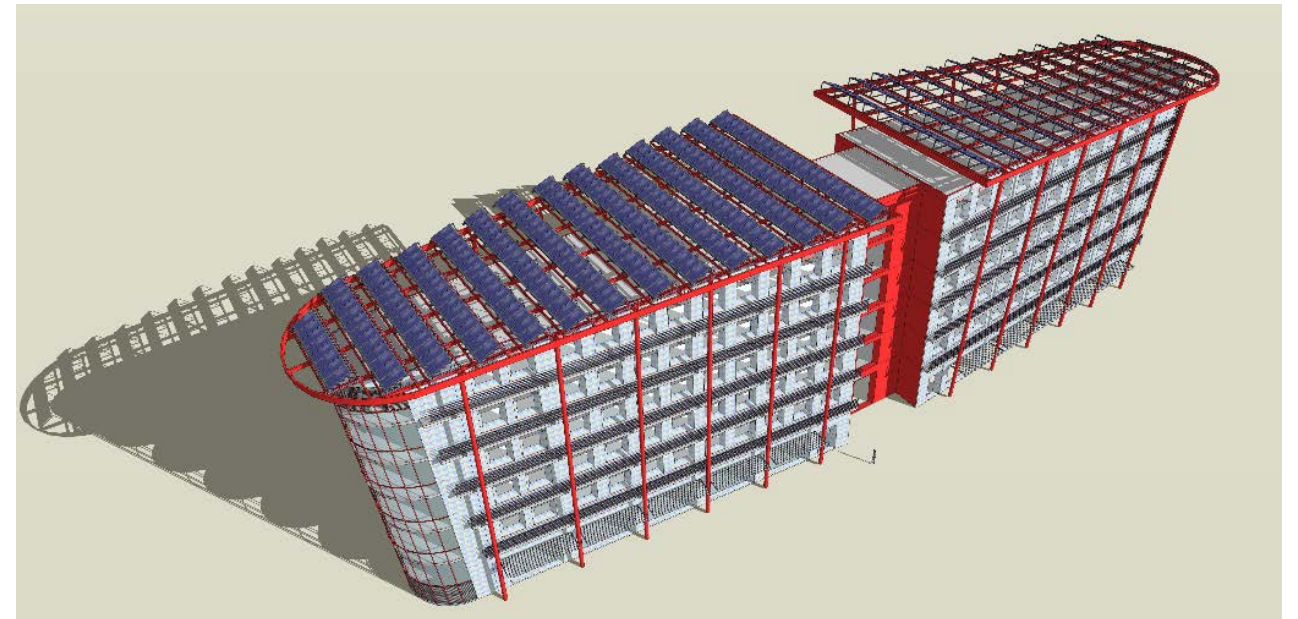
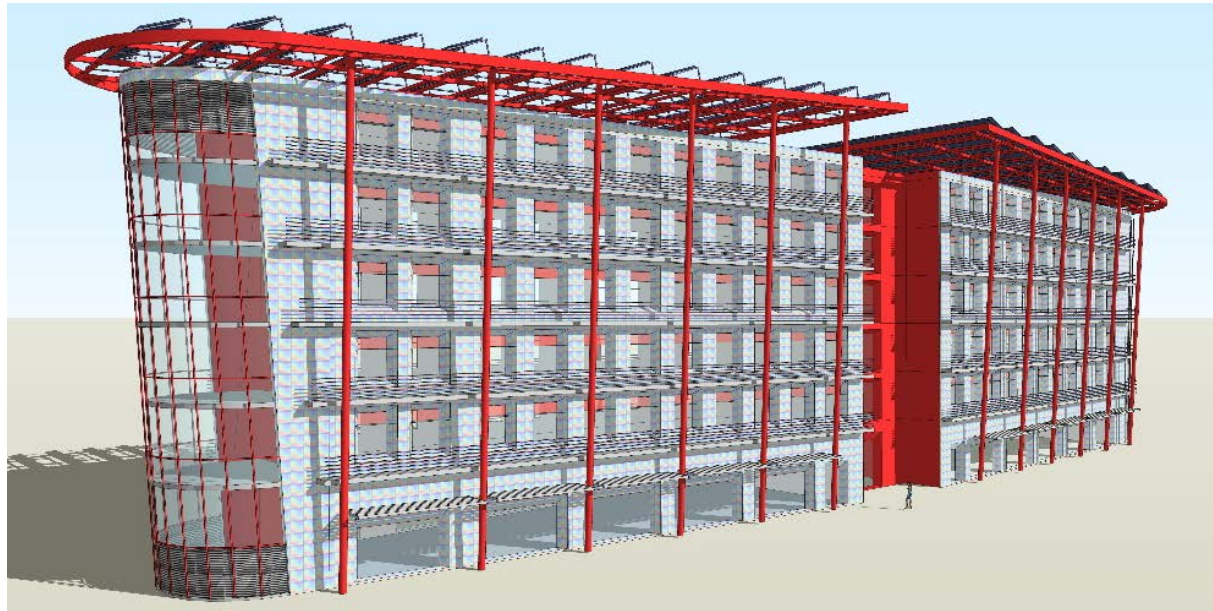
M4Y: Scenari Energetici



M4Y: Impianti Tecnologici



M4Y: Edificio Sperimentale



Copertura fotovoltaica

Smart Window

Sistemi di gestione e controllo



Involucro massivo e riflettente



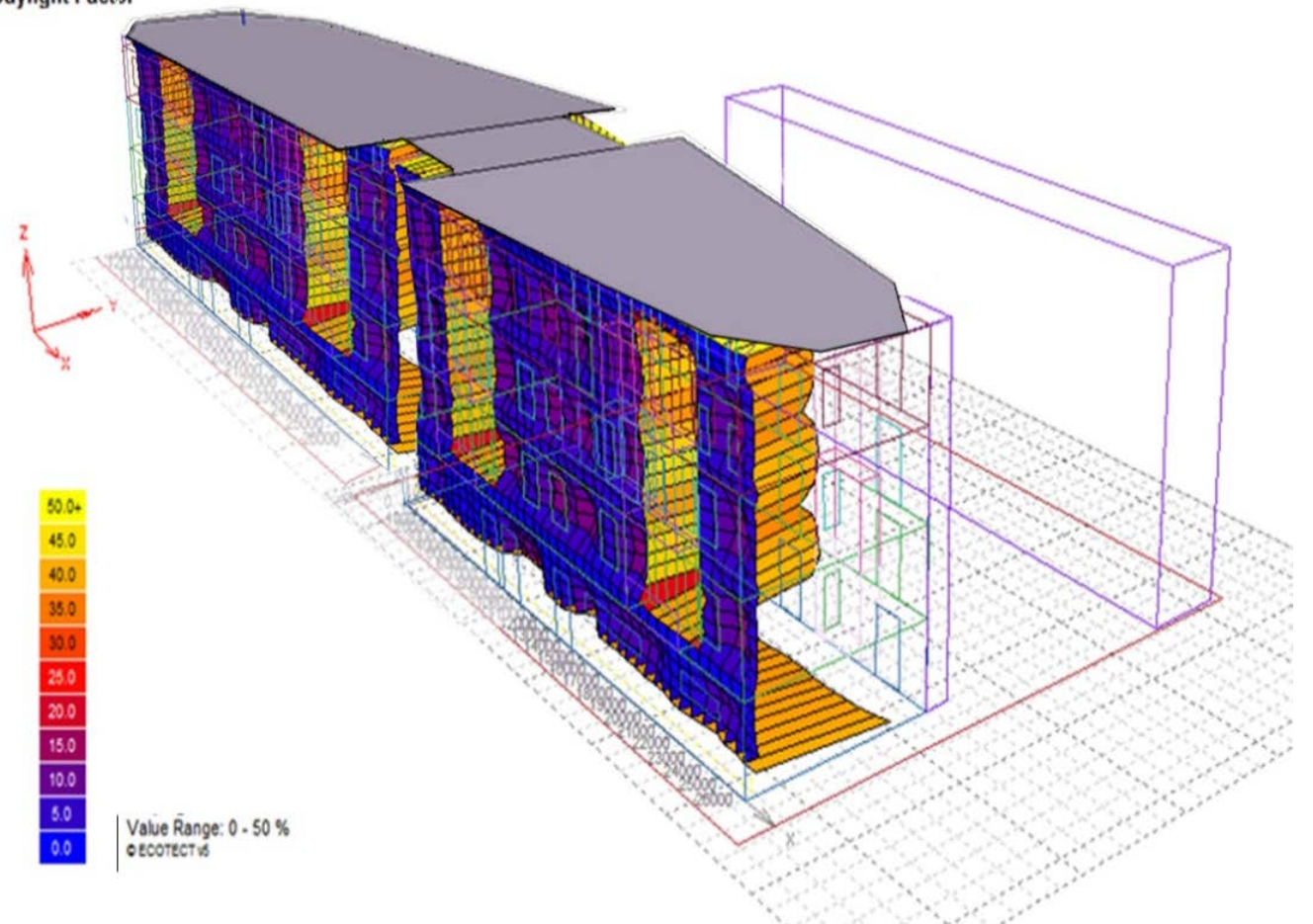
Struttura esterna



Sistemi di schermatura



Daylight Analysis
Daylight Factor



M4Y: Il Risultato Finale





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Grazie per l'attenzione