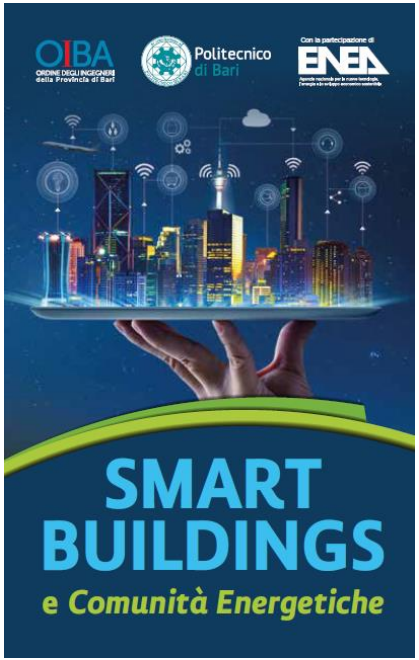
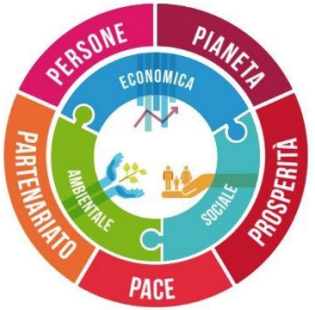


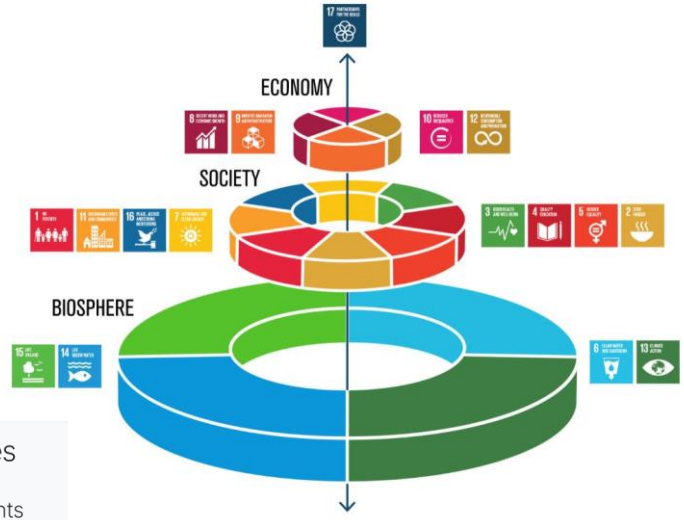
Il contributo degli edifici alla Sostenibilità delle Città: approccio metodologico olistico, sviluppi della Normativa Tecnica

ing. Pasquale Capezzuto
Presidente Commissione Tecnica UNI/TC058
“Citta, Comunità e Infrastrutture sostenibili”

Sviluppo Sostenibile

Global





Local

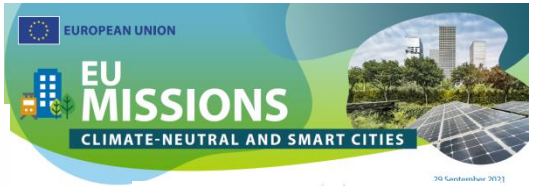
← Sustainable Development Goals

Goal 11: Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient and sustainable

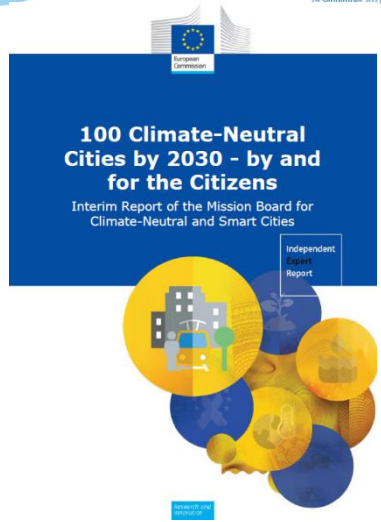
Policies Europee per la Transizione Verde e Digitale

Smart Readiness Indicator (SRI)



AN ACTION PLAN FOR THE RENOVATION WAVE:
COLLECTIVELY ACHIEVING SUSTAINABLE BUILDINGS IN EUROPE

URBAN EUROPE



EUROPE TOWARDS POSITIVE ENERGY DISTRICTS

La Transizione Digitale a sostegno

COMUNICAZIONE DELLA COMMISSIONE AL PARLAMENTO EUROPEO, AL CONSIGLIO, AL COMITATO ECONOMICO E SOCIALE EUROPEO E AL COMITATO DELLE REGIONI

Connettività per un mercato unico digitale competitivo: verso una società dei Gigabit europea

Proposta di

DECISIONE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO

che istituisce il programma strategico per il 2030 "Percorso per il decennio digitale"

COMUNICAZIONE DELLA COMMISSIONE AL PARLAMENTO EUROPEO, AL CONSIGLIO, AL COMITATO ECONOMICO E SOCIALE EUROPEO E AL COMITATO DELLE REGIONI

Bussola per il digitale 2030: il modello europeo per il decennio digitale

5G FOR SMART COMMUNITIES (5G4SC)

Global Gateway

Global Gateway
€300 bilioni tra 2021 and 2027

Smart Energy System


Renewable Energy

System Integration

Optimisation of renewable energy production and usage


Bi-directional EV-charging


Smart Home and Buildings


Greening the Grid

Seamlessly integrating energy devices and systems into smart homes, buildings and grids

Empowering consumers to become active stakeholders in the electricity ecosystem

Better managing fluctuating supply and demand creates a starring role for renewables

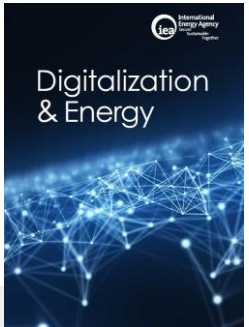
The green, resilient, secure and affordable energy system of tomorrow is digital

Digital technologies contributing to the energy system's transformation:

- Artificial Intelligence (AI)
- Internet of Things (IoT)
- Decentralised Edge Intelligence
- 5G Connectivity
- High-Performance Computing (HPC)
- Blockchain

COMUNICAZIONE DELLA COMMISSIONE AL PARLAMENTO EUROPEO, AL CONSIGLIO, AL COMITATO ECONOMICO E SOCIALE EUROPEO E AL COMITATO DELLE REGIONI

Digitalizzare il sistema energetico - Piano d'azione dell'UE



Smart Energy System
Buildings in URBAN Energy System

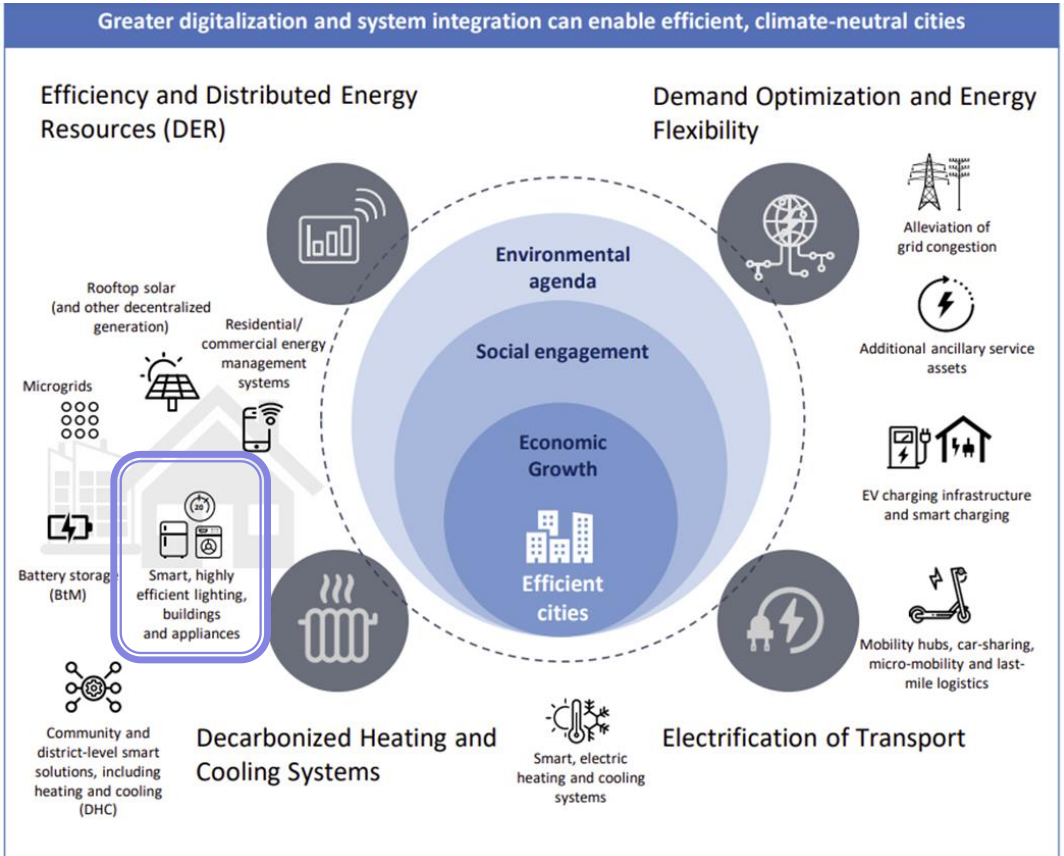
Decarbonization


Digitization


Decentralization


Electrification

Towards a decentralised, decarbonised and flexible energy system



Urban Energy systems

“integrated urban energy system”

Edifici : micro energy hubs

Connected Cities and Electrification

No Electricity
No Smart City

What is a smart building?

Smart building means different things to different people

Definizioni, componenti ➡ **sistemi di valutazione**

BPIE definition of a smart building (2017):

"A smart building is highly energy efficient and covers its very low energy demand to a large extent by on-site or district-system-driven renewable energy sources. A smart building

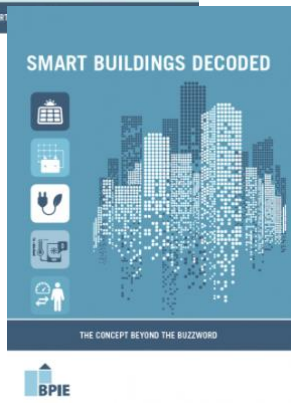
(i) stabilises and drives a faster decarbonisation of the energy system through energy storage and demand-side flexibility;

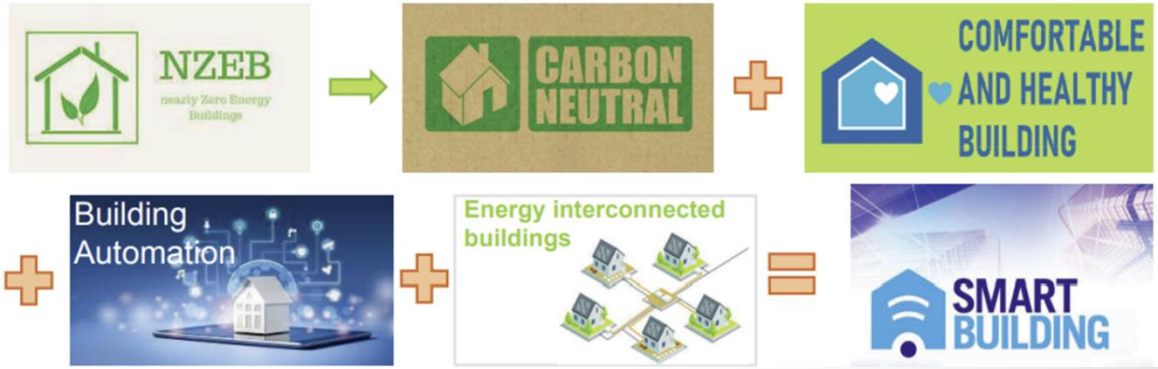
(ii) empowers its users and occupants with control over the energy flows;

(iii) recognises and reacts to users' and occupants' needs in terms of comfort, health, indoor air quality, safety as well as operational requirements.[1)]"

Building Performance Institute Europe

BPIE





Smart Buildings
Norme Tecniche Internazionali, Europee e Nazionali

- Automatic controls
- Energy management
- Cybersecurity
- Infrastructures
- Connectivity
- Digital technologies
- Smart appliances
- Interoperability
- Sustainability

CEN/TC 350 Sustainability of construction works
CEN/TC 247 Controls for mechanical building services

TECHNICAL COMMITTEES
ISO/TC 268
Sustainable cities and communities

ISO/TC 59
Buildings and civil engineering works

ISO/TC 184
Automation systems and integration

ISO/IEC JTC 1/SC 41 Internet of Things and Digital Twin

International Electrotechnical Commission

SyC Smart Energy
SyC Smart Cities Electrotechnical aspects of Smart Cities

IEC-ISO-ITU JOINT SMART CITIES TASK FORCE

UNI EN ISO 52120-1:2022

CEI TC 13-64-120-205-306-317

SG20: Internet of things (IoT) and smart cities and communities (SC&C)

Commissione UNI/CT 058 Città, comunità e infrastrutture sostenibili

SMART BUILDING in Standards and EU Projects

TECHNICAL COMMITTEES
ISO/TC 268
Sustainable cities and communities

DRAFT INTERNATIONAL STANDARD
ISO/DIS 37173

ISOSmart community infrastructure — Development guidelines for the information system of smart buildings

3.3 **smart building**
building that can **identify** and **adapt** to both expected and not expected **changes by effective use of data, information and communication technology** and to continually **improve prediction and action** in **response to the various needs of *building values, urban activities and urban operations***.

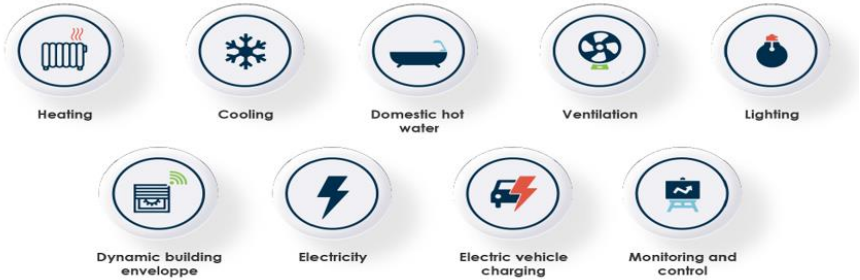
Smartness of a building **refers to the ability of a building or its systems to *sense, interpret, communicate and actively respond* in an efficient manner to *changing conditions* in relation to the operation of *technical building systems* or the *external environment (including energy grids*) and to *demands from building occupants.***

European Commission

Smart Readiness Indicator (SRI)

SMART Readiness Indicator

EPBD RECAST 2010/31 UE
DIRETTIVA (UE) 2018/844



Capacità di un edificio o di un'unità immobiliare di adattare il proprio funzionamento alle *esigenze dell'occupante e della rete e di migliorare l'efficienza energetica e la prestazione complessiva durante l'uso.*
(regolamento delegato (UE) 2020/2155 del 14 ottobre 2020)

Smart-ready services

Smart Built4EU
The European Smart Buildings Community

Evoluzioni del concetto di Smart Building

“An intelligent/smart building is one that doesn't make the occupants look stupid.”

Sam C M Hui Technological and Higher Education Institute of Hong Kong ·

EBC

IEA EBC - Annex 81 - Data-Driven Smart Buildings

EU4BET
EU for Buildings' Energy Transition

- Internet of Things sensors IOT
- Intelligent Building Management System IBEMS
- Artificial intelligence AI
- Augmented reality AR
- 5G

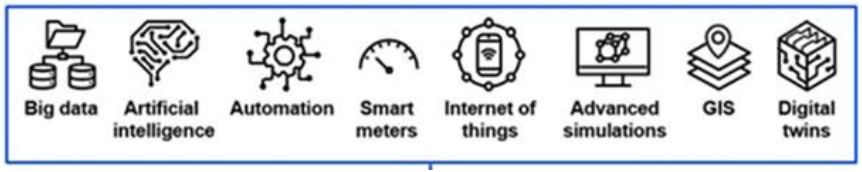
consentono allo Smart Building di controllare e ottimizzare le sue performances automaticamente o come supporto alle decisioni, con interfacce utente per controllarne le operazioni

SATO
OF BUILDING ENERGY

- Analytics
  - Prediction
  - Energy Savings Strategies
  - Operational Optimization

Smart2B

PRECEPT
Less Energy > Smarter Buildings



Smart Built4EU

applied sciences

MDPI

Editorial

Special Issue Cognitive Buildings

Lavinia Chiara Tagliabue [1,*] and Ibrahim Yitmen [2]

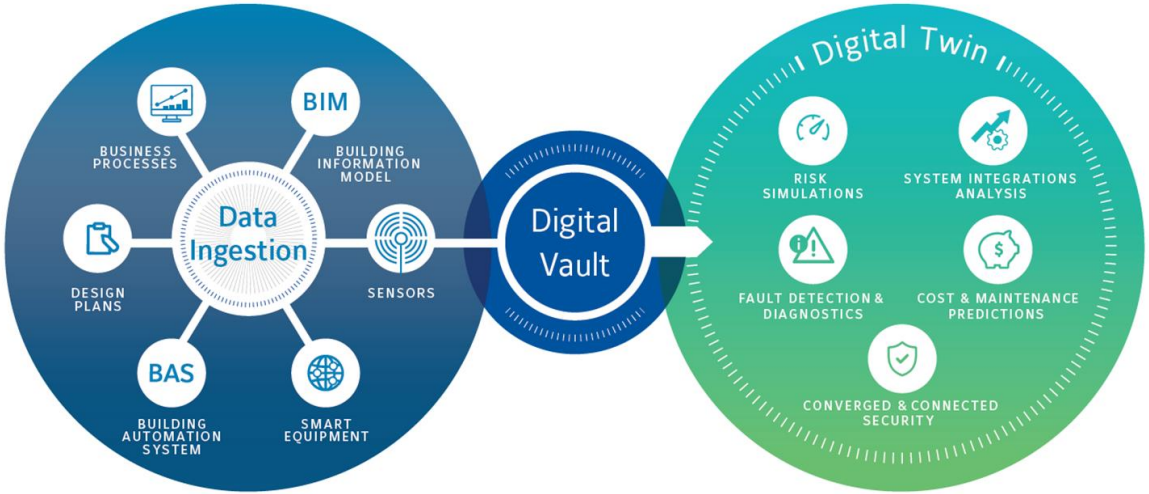
White Paper / Task Force 3 / Topic Smart buildings as flexibility providers to the electricity grids

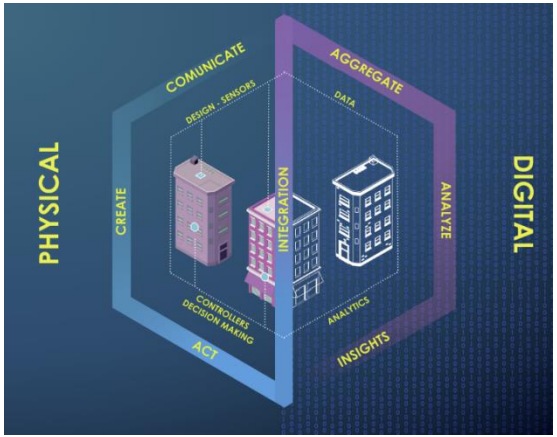
What if? BUILDING Digital Twin

ISO/IEC JTC 1/SC 41
Internet of things and digital twin

ISO/IEC AWI 30173
Digital twin — Concepts and terminology

«modello composto da un asset fisico, un avatar e un interfaccia»
[ISO/TR 24464:2020]





DIGITAL TWIN DEFINITIONS FOR BUILDINGS SPHERE

Buildings as a Service[1]

BaaS Buildings as a Service

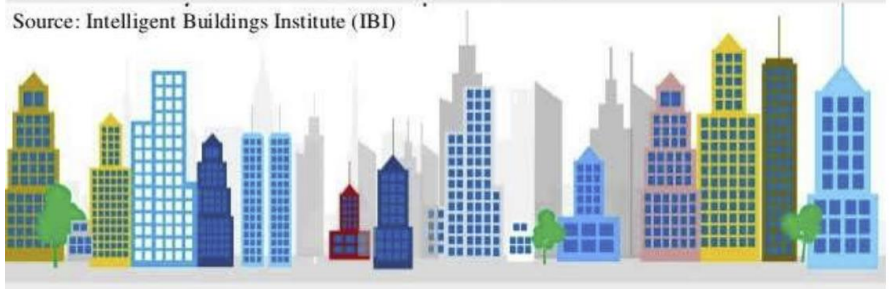
buildingSMART International

Edificio come **risorsa di servizi generati** per gli users non solo nell'edificio,
Edifici come **piattaforme di informazioni** e servizi personalizzati ai consumatori.

Smart Building:

A building that provides a productive and cost-effective environment through optimization of its four basic components - structure, systems, services and management - and the interrelationships between them."

Source: Intelligent Buildings Institute (IBI)



Sistema informativo di edificio

Smart community infrastructure — Development guidelines for the information system of smart buildings
ISO/DIS 37173

Services
Use the building connectivity and communication capacity to enable deployment of services

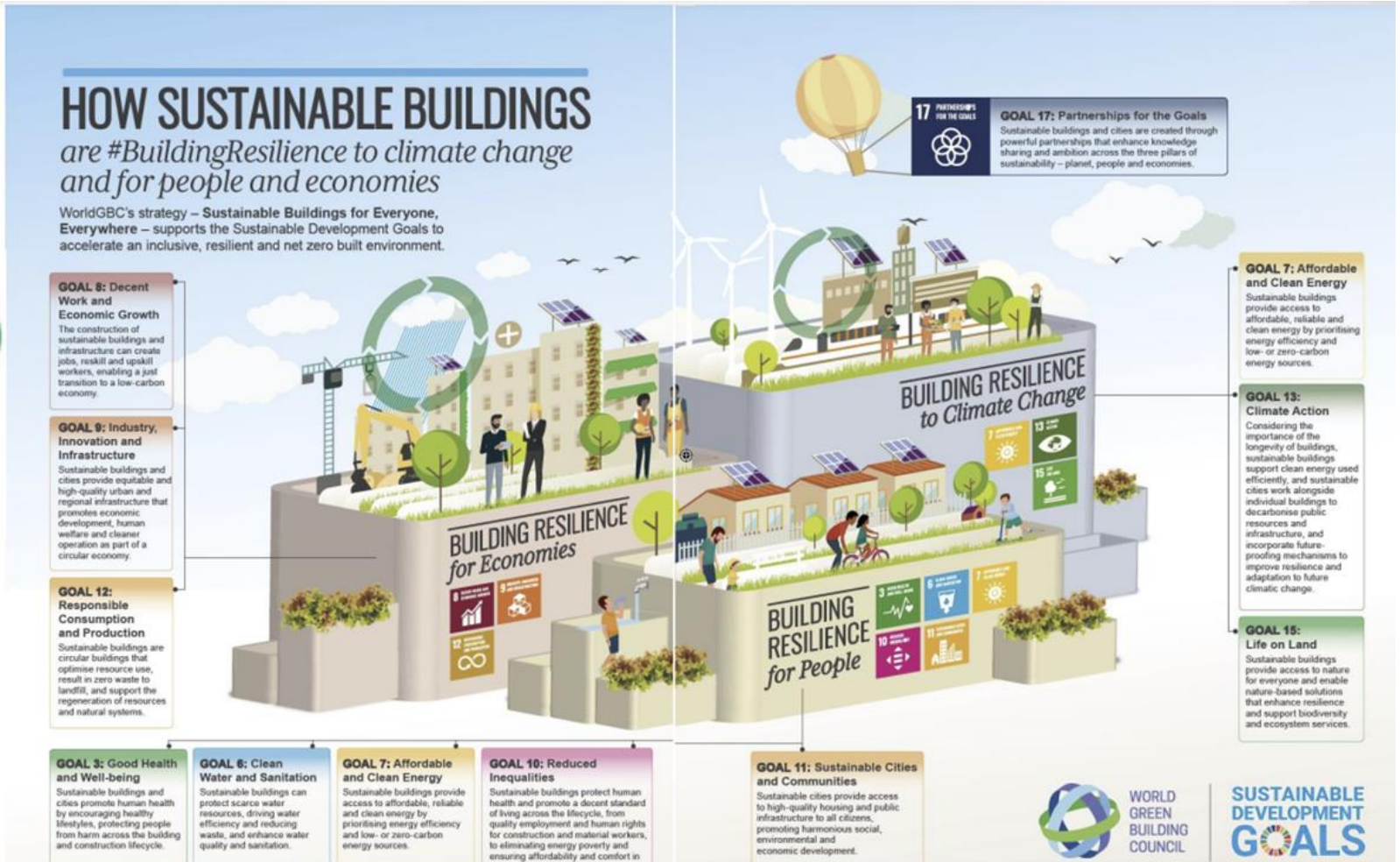
ENERGY SERVICES
SERVICES FOR BUILDING
SERVICES FOR OCCUPANTS

SBA SMART BUILDINGS ALLIANCE FOR SMART CITIES

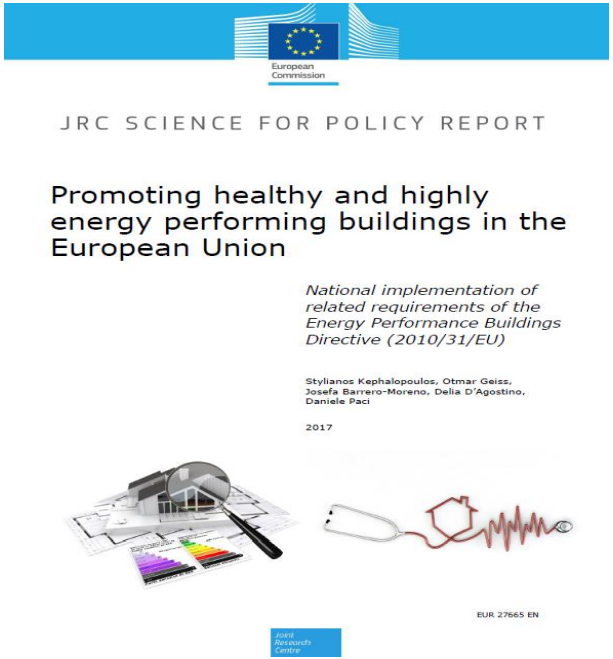
Fig. 1. Ecosystem Components technology of Smart Building

[1] Building-as-a-Service: "Theoretical Foundations and Conceptual Framework". MDPI, Adrian Wildenauer, Alex Mbabu, Jason Underwood, Josef Basl

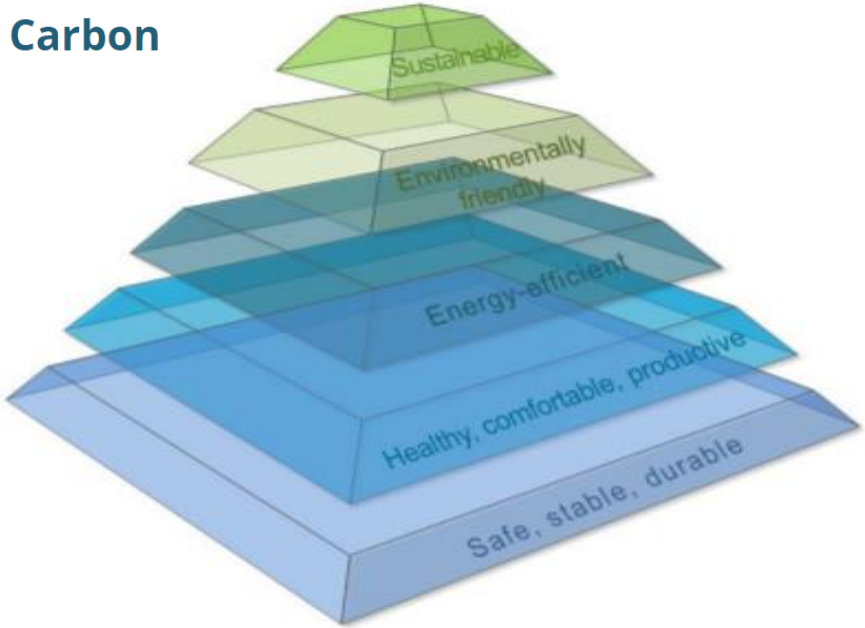
Contributo degli edifici alla Sostenibilità della Città



The holistic concept of Building's Sustainability



Whole-life Carbon



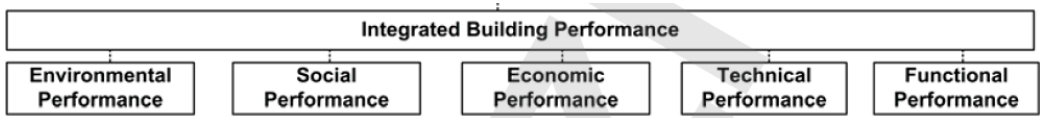
@porto university

Ventilation, IAQ, pollution sources, health and rational use of energy: a challenging interplay

Nuovi approcci: gli edifici nella Città Sostenibile

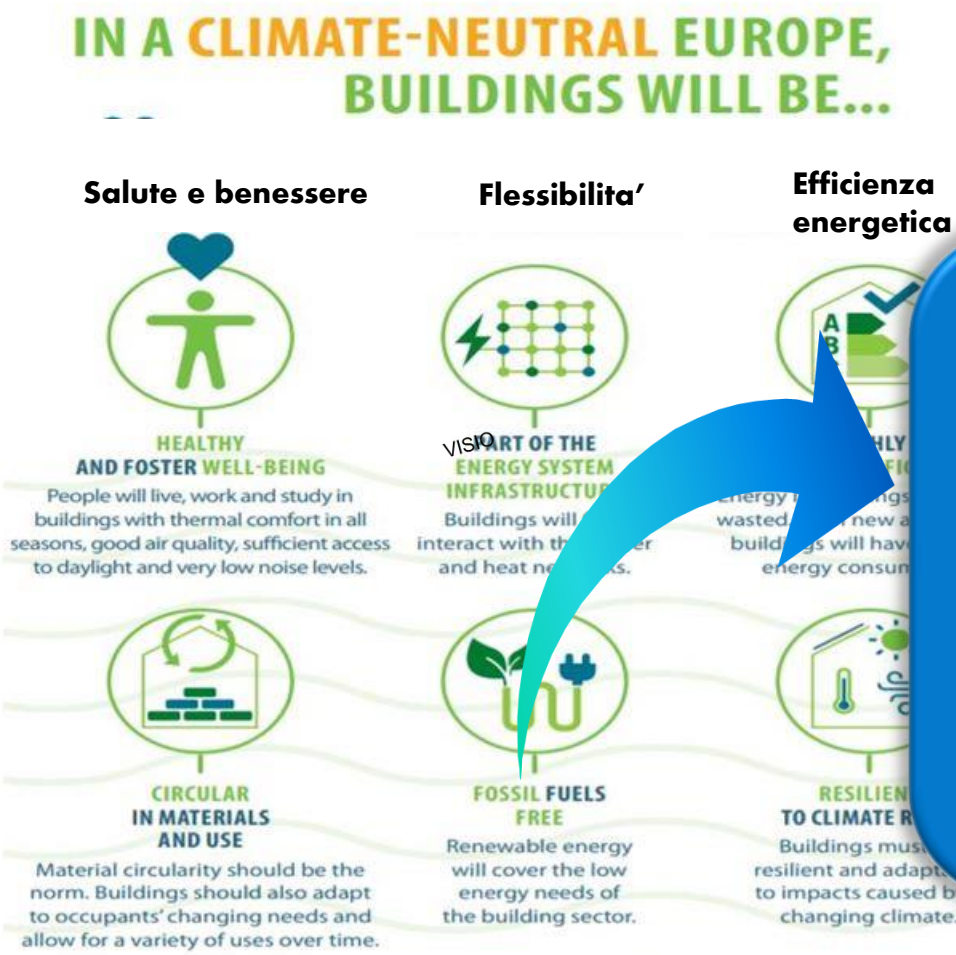
ISO 15392:2019
Sustainability in buildings and civil engineering works — General principles

Gli edifici sono sostenibili quando consentono le prestazioni richieste e la funzionalita' con minimo impatto sull'ambiente, **promuovendo il miglioramento negli aspetti economici, socio-culturali, ambientali a livello locale, regionale, globale.**



ISO 21931-1:2022 Sustainability in buildings and civil engineering works — Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment — Part 1: Buildings

UNI EN 15643:2021 "Sostenibilità delle costruzioni – Quadro di riferimento per la valutazione degli edifici e delle opere di ingegneria civile".



Proposta di DIRETTIVA DEL PARLAMENTO EUROPEO E DEL CONSIGLIO sulla prestazione energetica nell'edilizia (rifusione),14 marzo 2023

"edificio a emissioni zero": edificio ad altissima prestazione energetica, che contribuisce all'ottimizzazione del sistema energetico attraverso la flessibilità della domanda, nel quale qualsiasi fabbisogno residuo molto basso di energia è interamente coperto da:

- **fonti rinnovabili generate o stoccate in loco**
- **fonti rinnovabili generate nelle vicinanze non in loco e fornite attraverso la rete**
- **una comunità di energia rinnovabile**
- **energia rinnovabile e calore di scarto provenienti da un sistema efficiente di teleriscaldamento e teleraffrescamento**

da silos indipendenti a sistemi integrati e interoperabili

Approccio Olistico agli edifici nel ciclo di vita

Efficienza energetica
Sostenibilita'
Smartness
Bellezza
Resilienza
Salute, comfort, benessere
Adattivita' alla rete e agli utenti
Naturalità
Circolarita'
Zero emissioni
Qualita'

BUILDING

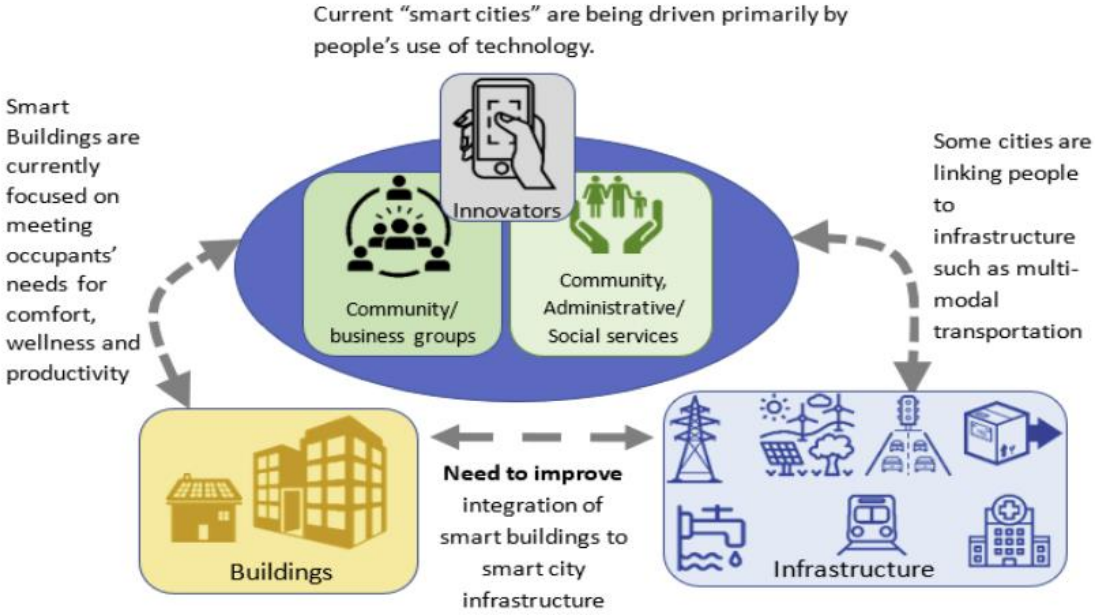
Positive Energy Districts and neighbourhoods transforming urban energy system

City

smart energy communities
Virtual Power Plants

Progetto di norma: «il contributo degli edifici alla sostenibilità
Approccio metodologico di riferimento e valutazione

Building2Building Buildign2Grid Buildings2City



Smart Buildings: a foundation for safe, healty & resilient cities "- NIST Global Cities Team Challenge (GCTC)
Smart Buildings Supercluster 2020

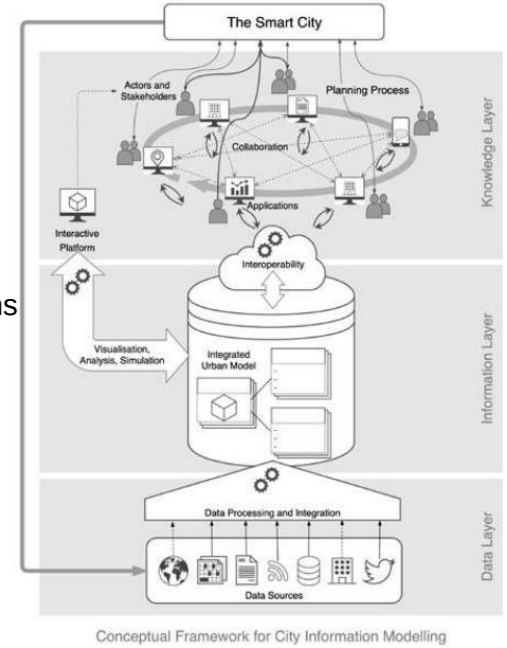
NIST NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY U.S. DEPARTMENT OF COMMERCE

Dati, energia, servizi, valore per la Città

smart city is as a distributed, open *mesh network* of connected smart buildings

IEC International Electrotechnical Commission

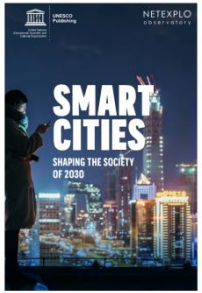
City information modelling and urban digital twins



Conceptual Framework for City Information Modelling

City digital twin

Smart Resilient Sustainable City



Approccio integrato e olistico

Data driven City, la valorizzazione dei dati

ADAPTIVE
SENSEABLE
EFFICIENT
Cities

Rio de Janeiro Centre of Operations, 2010

A TECHNO-CENTRIC CITY

Digital, A.I., IoT, cloud computing,
pervasive mobile networks,
big data systems,
urban platform, city digital twin , C.I.M.

Smart technologies
Smart infrastructures

Cyber Physical System

Sustainable City

ISO/TC 268
Sustainable cities and communities

CEN/TC 465 - Sustainable Cities and Communities

SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD

Commissione UNI/CT 058 Città, comunità e infrastrutture sostenibili

Grazie