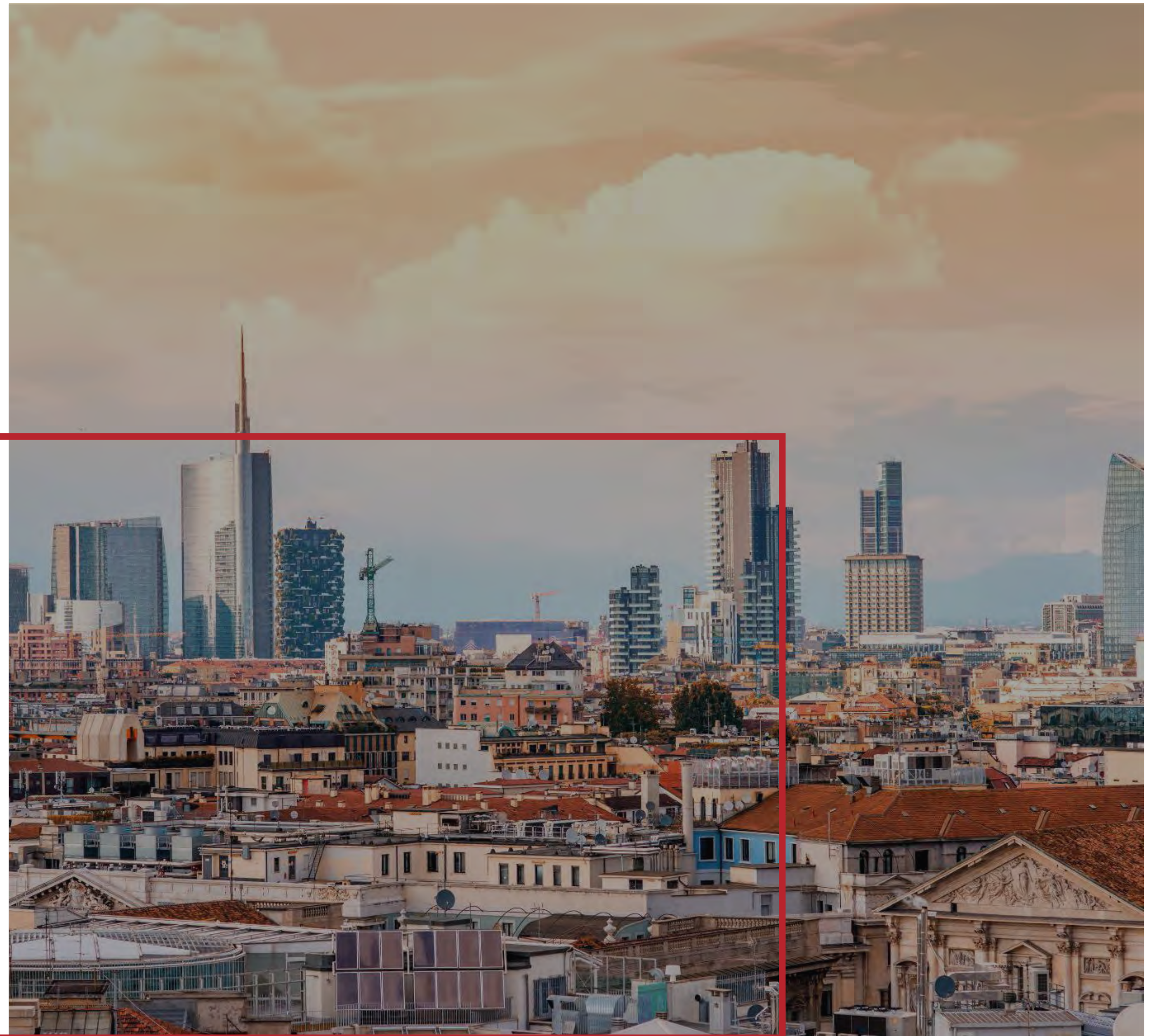




Digitalizzazione
degli immobili
tra SRI
e
Digital Building Logbook

Alessandro Lodigiani Andrea Costa
Febbraio 2024
KEY – GBC ITALIA



From Research to Market

R2M Solution

Founded
2012

People
100
5 branches

Offices
9
4 Countries

Research
82
R&D projects

Funds raised
423 M
Total R&D
Portfolio

First time EU
39
Organizations



Turnover: **€8 Million (2023)**

R2M Solution

Our Branches



Italy

R2M Solution s.r.l.
R2M Energy s.r.l.
Via F.lli Cuzio 42
27100 Pavia, Italy
P.IVA: IT04998380879

France

R2M Solution SAS
Les Galeries de Beaumon
06330 Roquefort-les-Pins, France
VAT: FR11828579367

Spain

R2M Solution Spain, S.L.
Calle Villablanca 85
28032 Madrid, España
VAT: ES B87348470

United Kingdom

R2M Solution Ltd.
Flat 4, 74 Holland Park
London, W11 3SL
VAT: GB259731081

From Research to Market

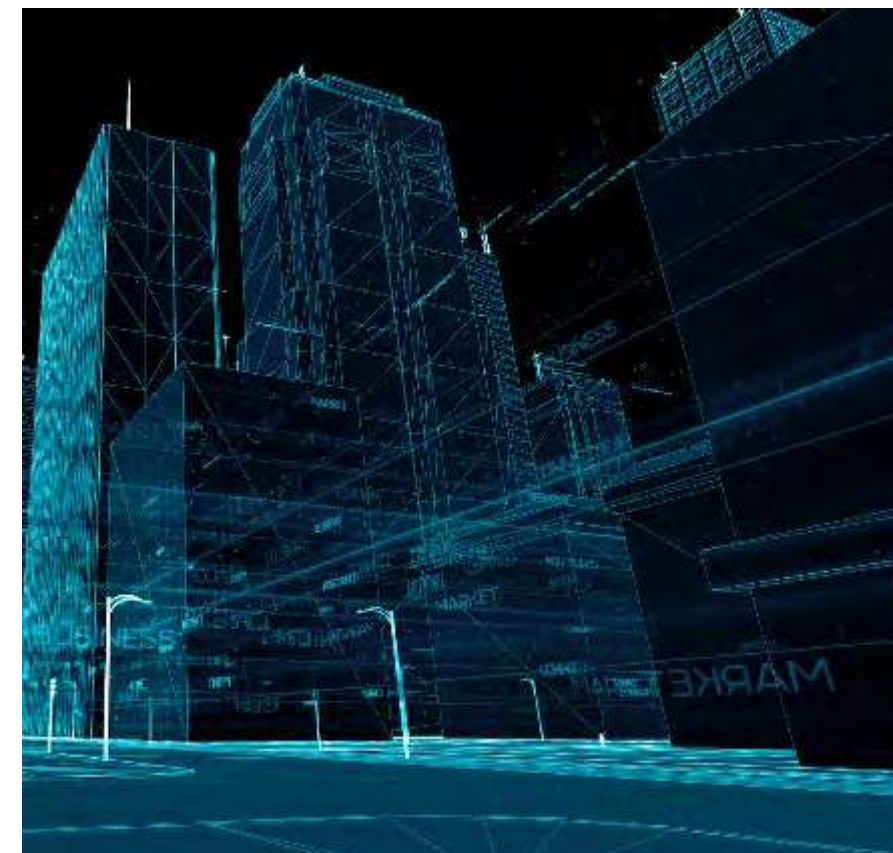
Our Journey

Innovation

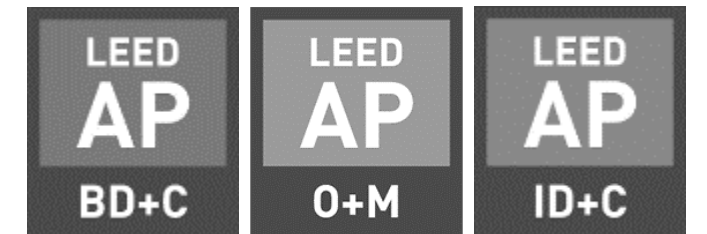


Innovative Products & Services

Real Estate
Digitalization
Sustainability
Smart Grid and Local Energy
Communities
(R2M Energy - ESCO)



Sustainability Consulting & Energy Services



Innovation Consulting



Sustainability Consulting



Innovative Products



Energy Services

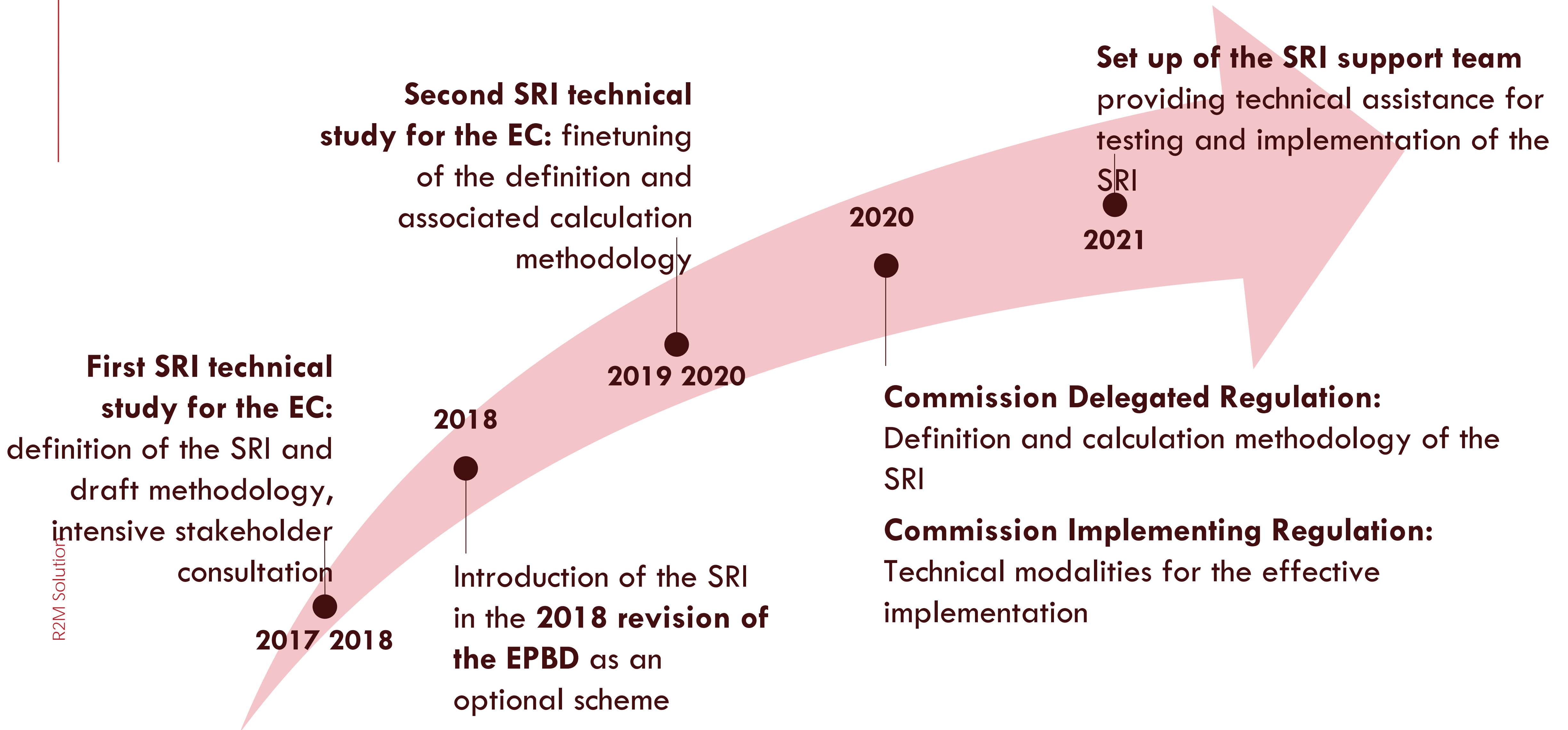


Smart Readiness Indicator (SRI)

Introduction to the SRI framework

- With the European Green Deal and the Renovation Wave, the European Union promotes the renovation of buildings, to help people cut their energy bills and energy use
- The 2018 revision of the European Energy Performance of Buildings Directive (EPBD) heavily emphasised the potential of smart technologies in the building sector, to improve both energy efficiency and the well-being of people
- EPBD thus introduced the concept of a **“Smart Readiness Indicator” (SRI): a common EU framework for rating the smart readiness of buildings**
- The SRI concept has then been developed in close cooperation with Member States and relevant stakeholders of the building value chain
- Member States are now officially invited to voluntarily implement the SRI (with optionally, a preliminary test phase)

History of the SRI

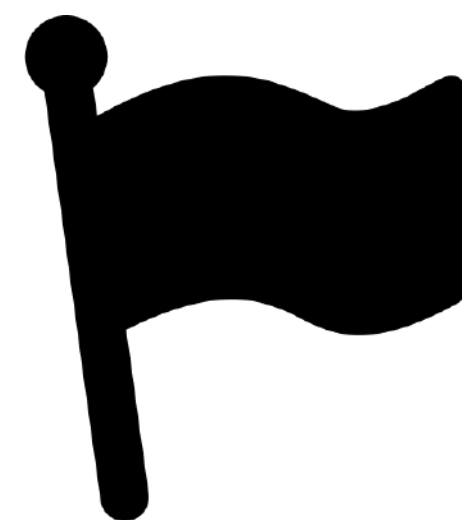


Present situation

Launch of test phases
by voluntary
countries

2022

R2M Solution



The decision to launch a test phase or implement the SRI belongs to EU Member States

Only where a government decides to do so, can formal SRI assessments be conducted

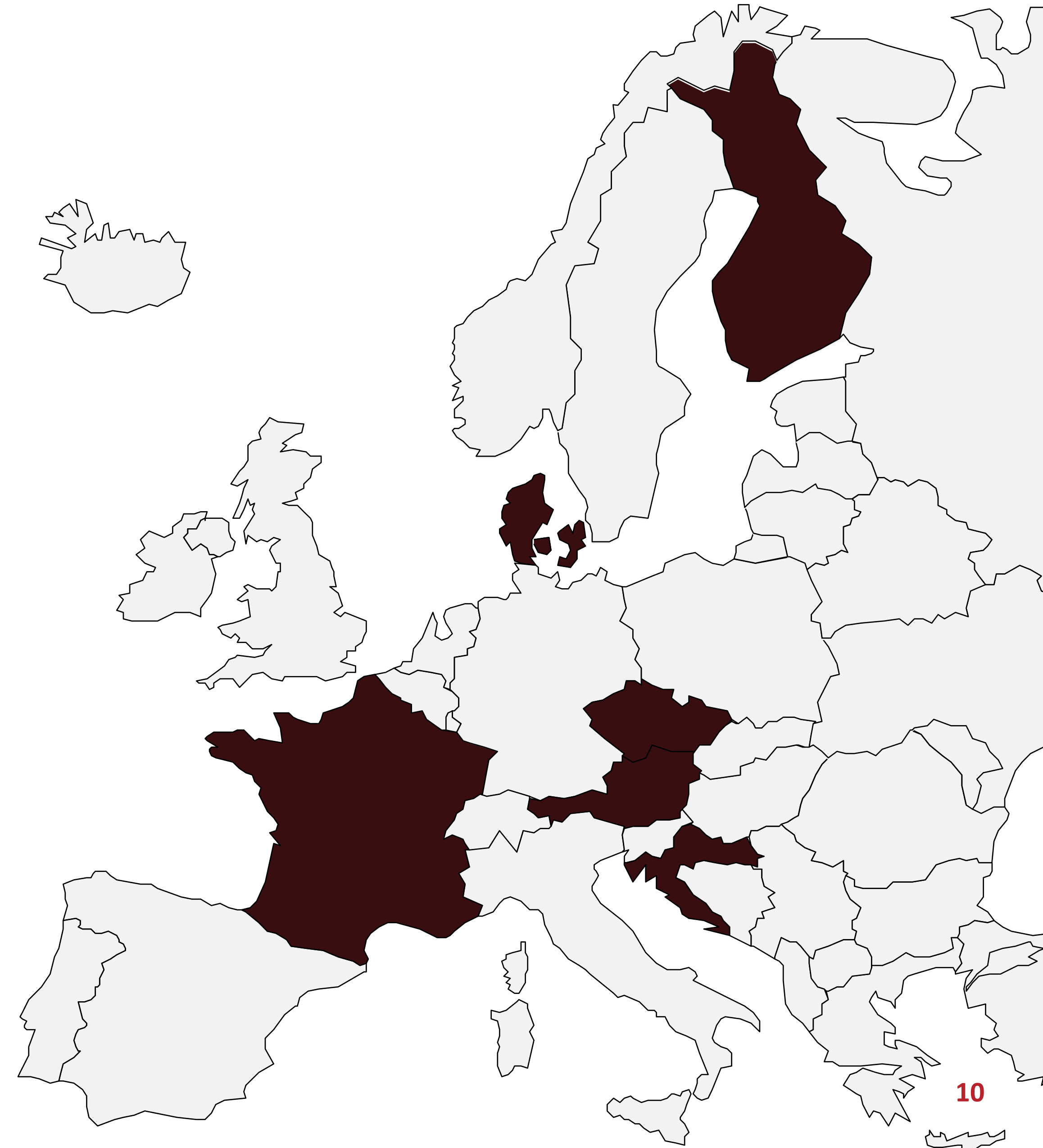


Private or research stakeholders not involved in official implementation or test phases are welcome to participate in discussions and to conduct informal SRI-related activities
However, no formal SRI certifications can be issued without prior Member State agreement

The ongoing test phases

Six countries volunteered:

	Austria
	Czech Republic
	Croatia
	Denmark
	Finland
	France



Required and optional features of the SRI at national level

**CORE OF THE SRI
METHODOLOGY -
REQUIRED**

Required and optional features of the SRI at national level



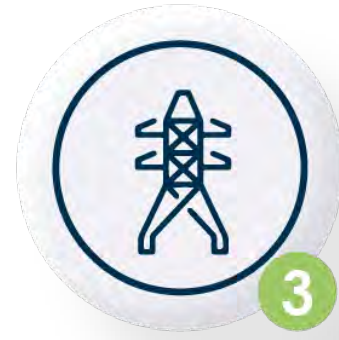
1

Optimise energy efficiency and overall in-use performance



2

Adapt their operation to the needs of the occupant



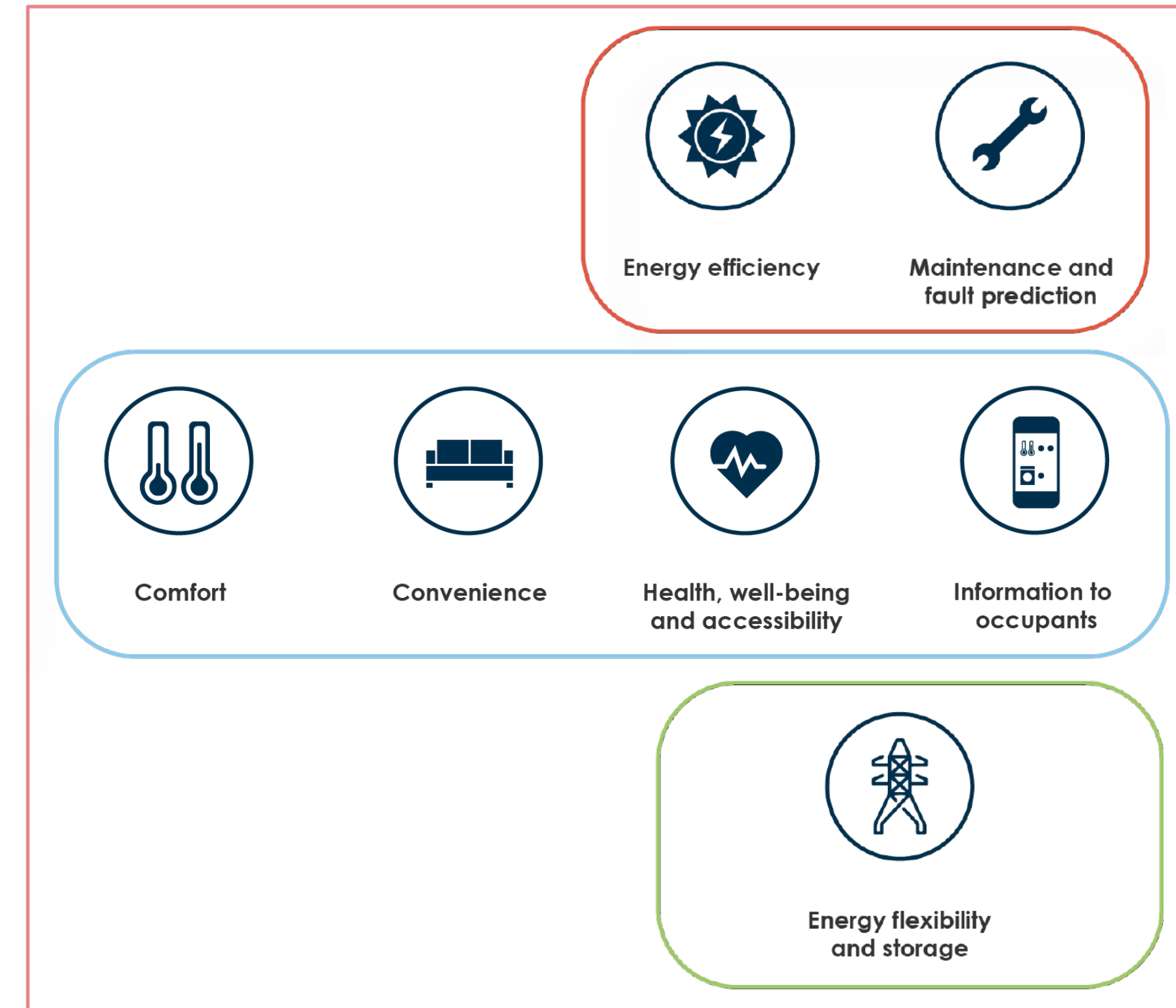
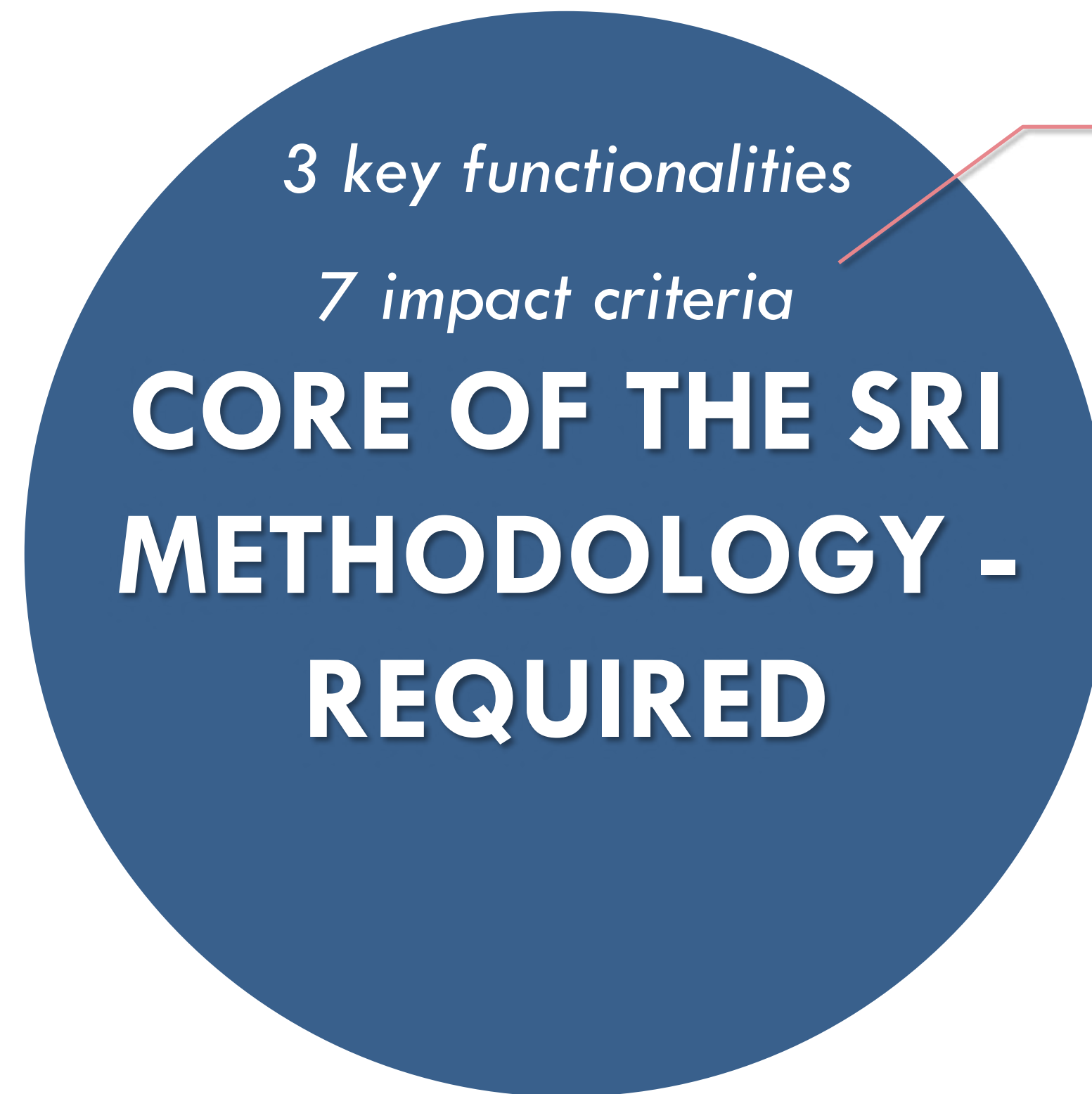
3

Adapt to signals from the grid (energy flexibility)

3 key functionalities

**CORE OF THE SRI
METHODOLOGY -
REQUIRED**

Required and optional features of the SRI at national level



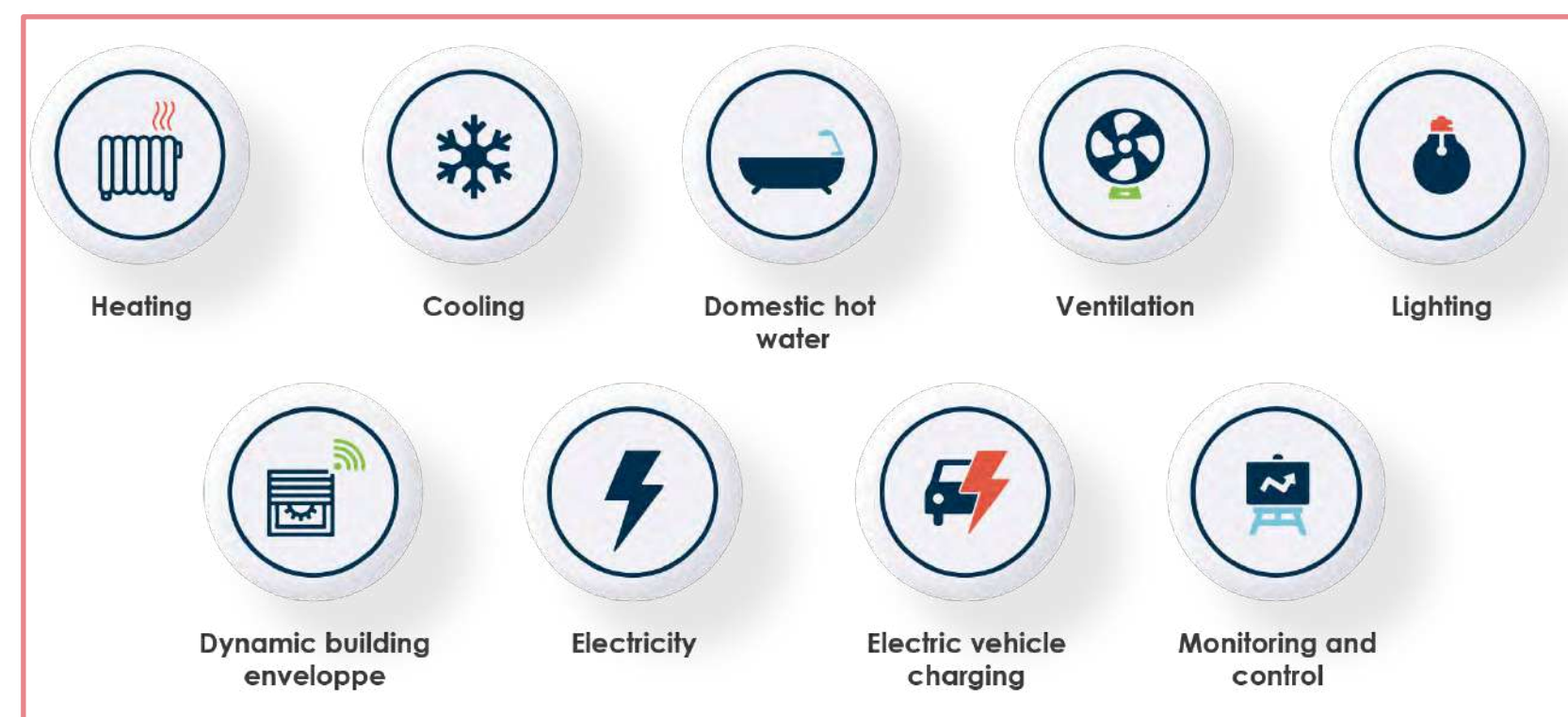
Required and optional features of the SRI at national level

3 key functionalities

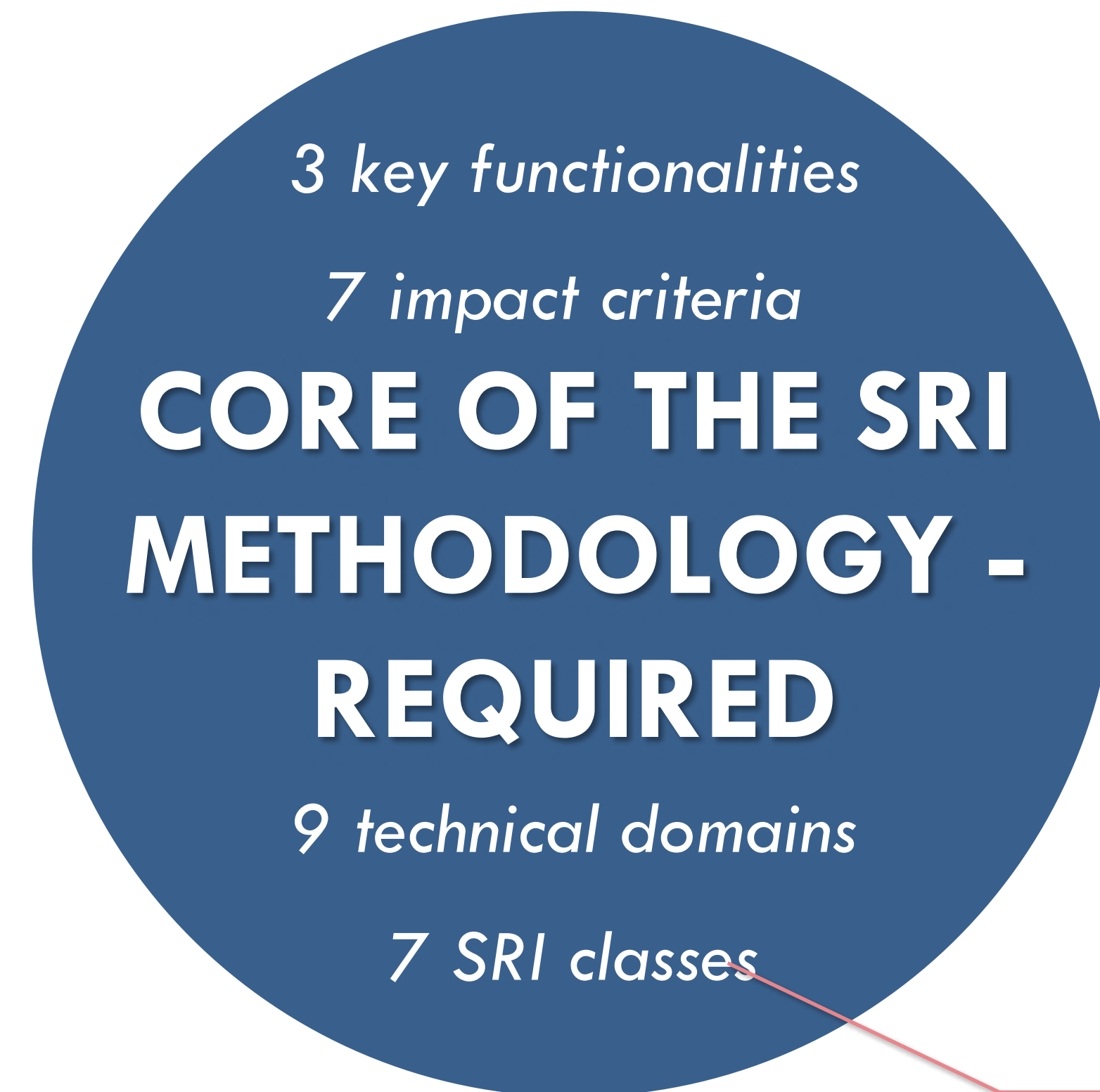
7 impact criteria

CORE OF THE SRI METHODOLOGY - REQUIRED

9 technical domains

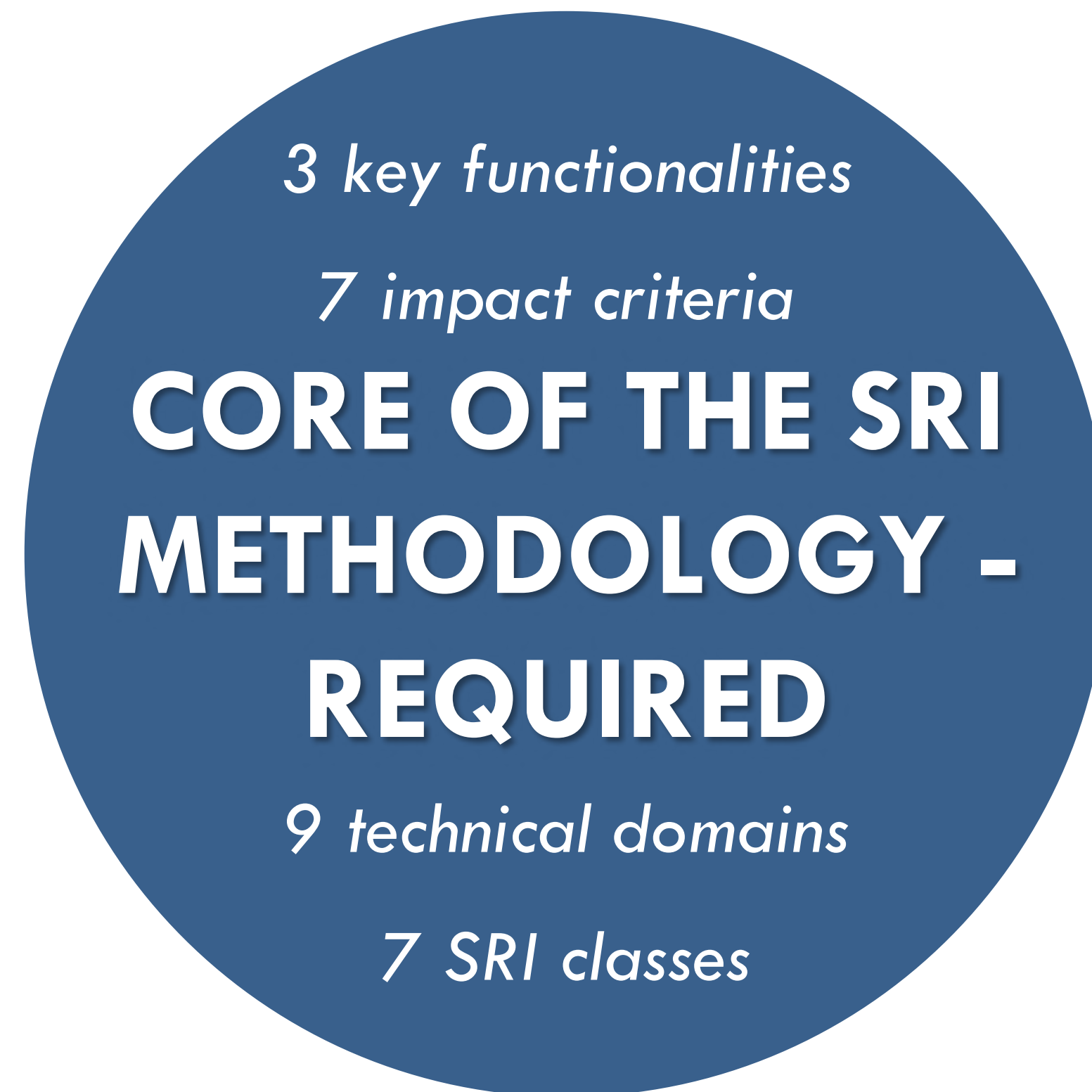


Required and optional features of the SRI at national level

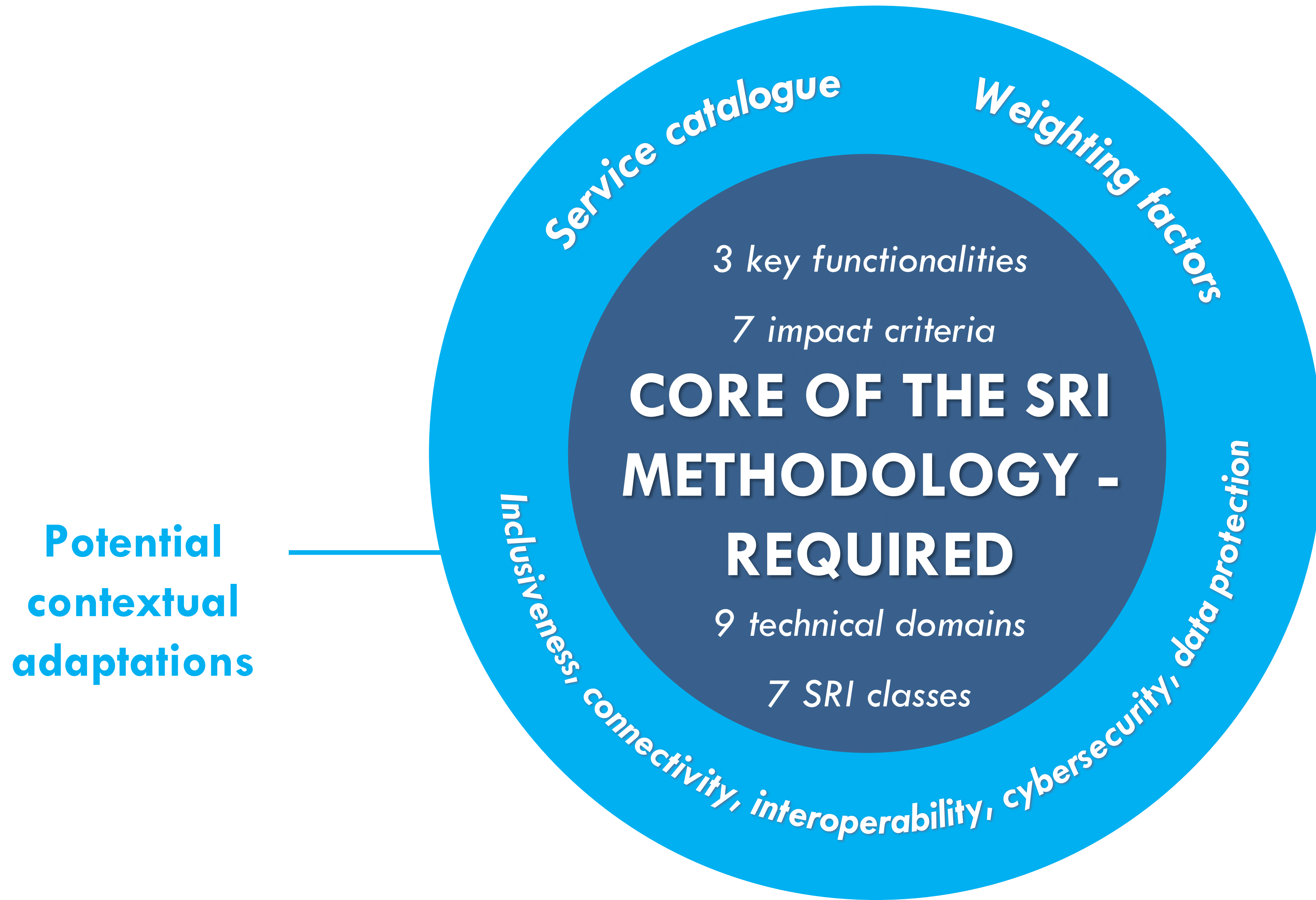


- SRI > 90%
- 80% < SRI < 90%
- 65% < SRI < 80%
- 50% < SRI < 65%
- 35% < SRI < 50%
- 20% < SRI < 35%
- SRI < 20%

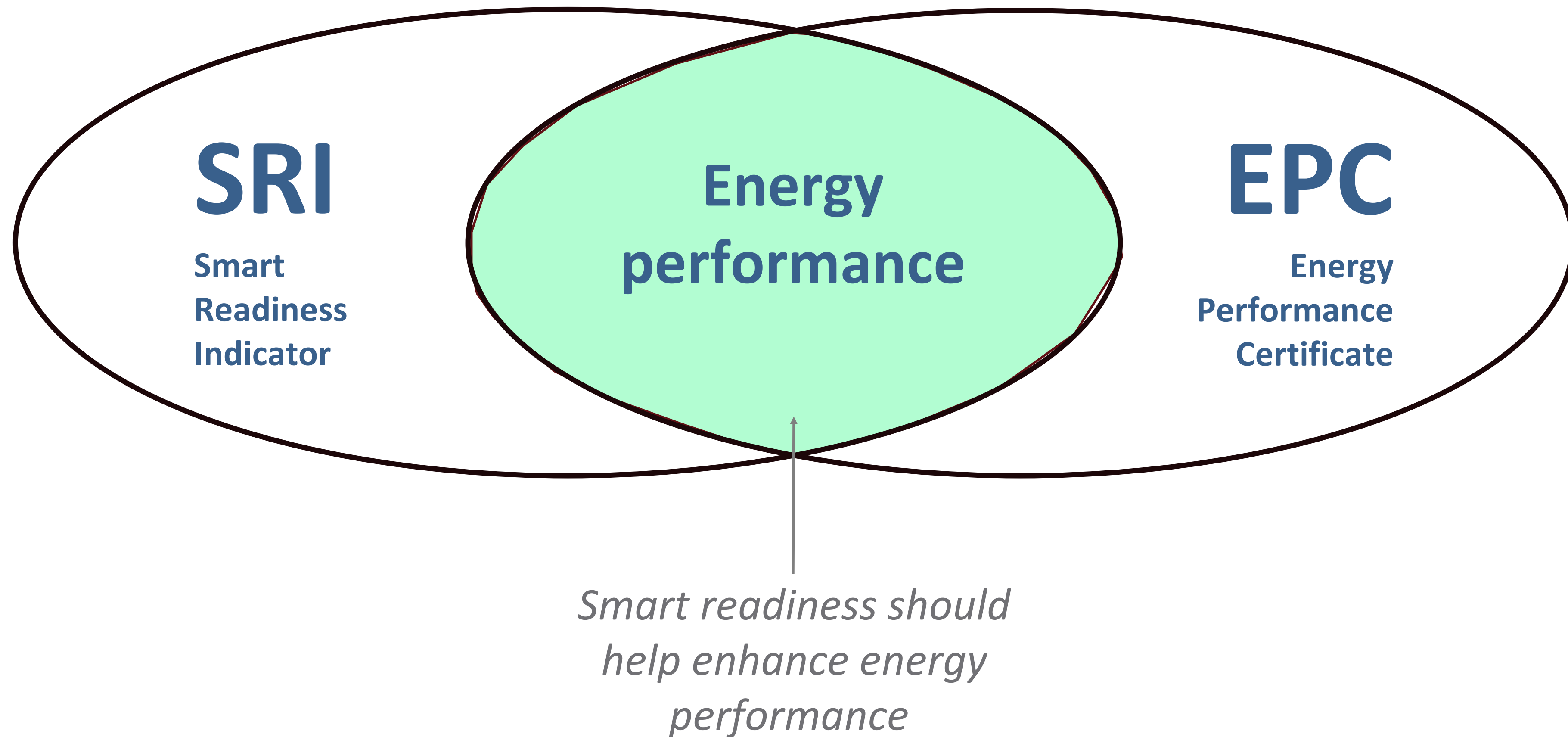
Required and optional features of the SRI at national level



Required and optional features of the SRI at national level



SRI vs EPC

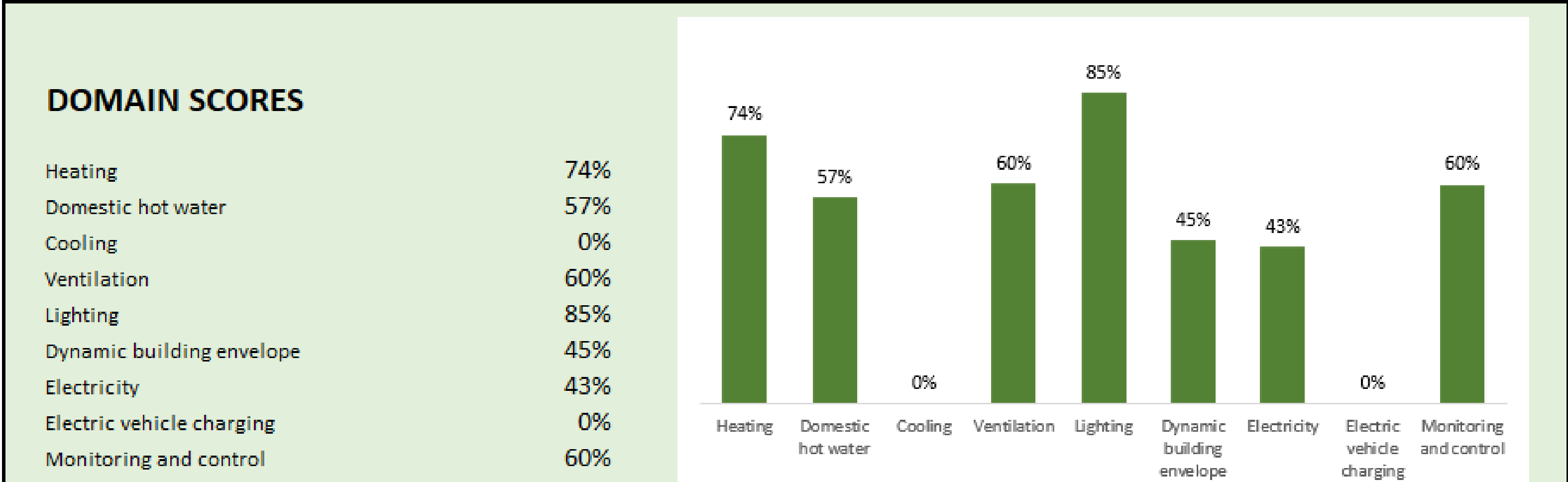
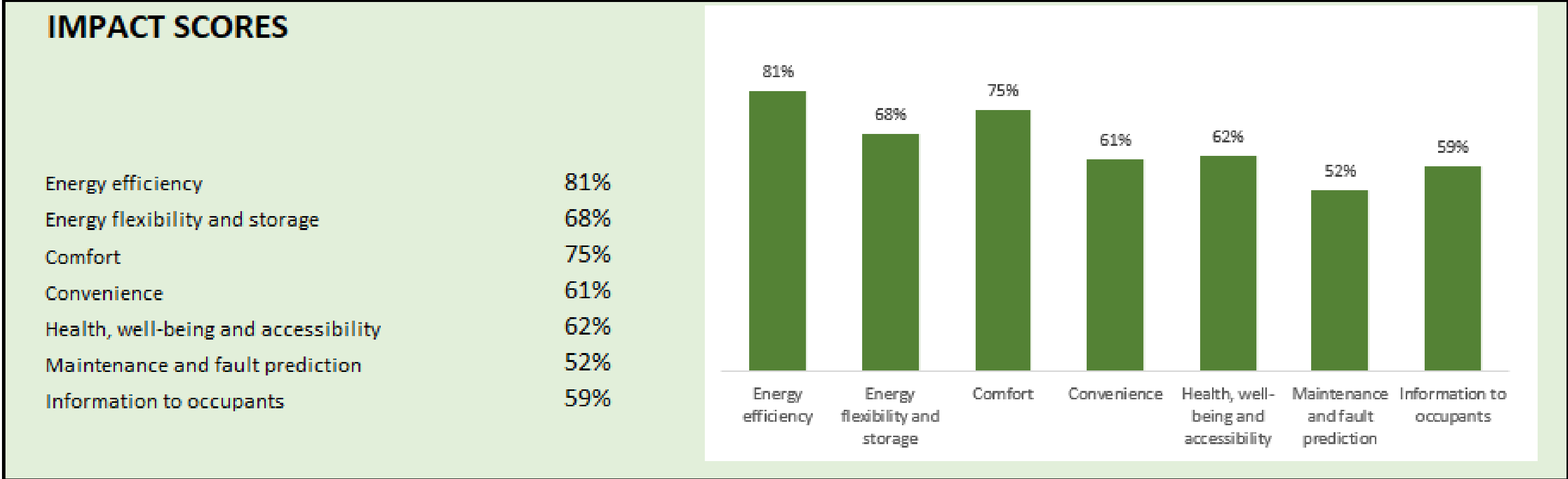


- Experts in charge of issuing EPCs are also competent for issuing SRI certificates
- Member States may couple the issuing of the SRI certificate with their EPC scheme

SRI RESULTS: NON-RESIDENTIAL BUILDING

9 technical domains 7 impact criteria

TOTAL SRI SCORE	67%	SRI CLASS	C
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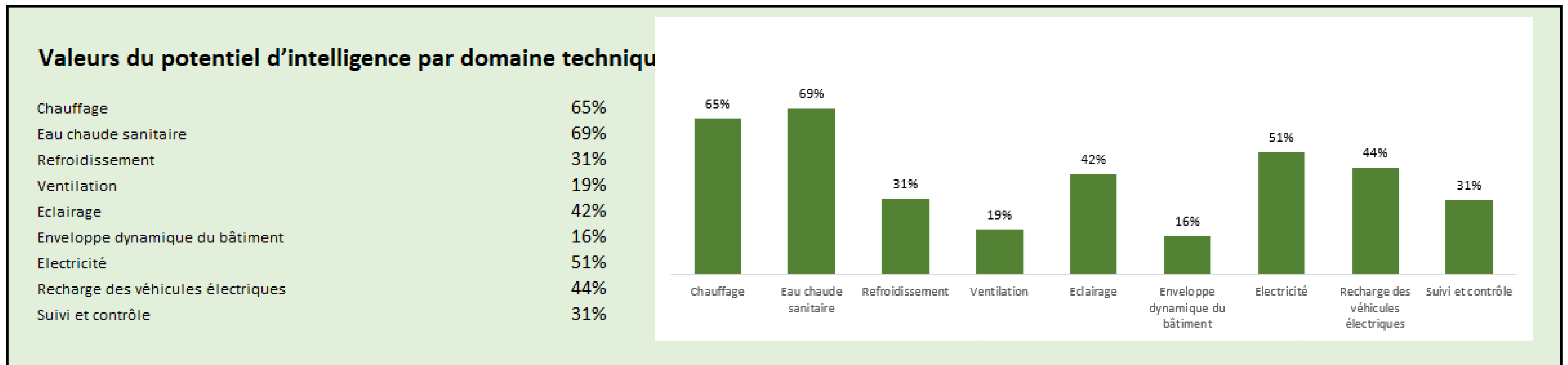
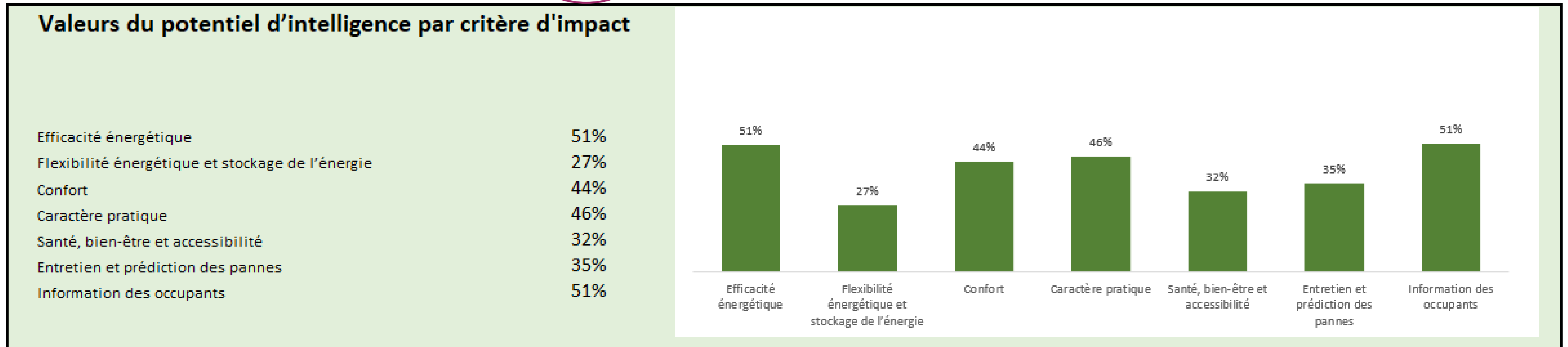


SRI RESULT : RESIDENTIAL BUILDING

7 impact criteria

9 technical domains

Valeur totale du potentiel d'intelligence	40%	Classe du potentiel d'intelligence	E
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DIGITAL BUILDING LOGBOOK

Digital & Sustainable Transition in Buildings

- **Objective**

- Digital and green transition for a more sustainable built environment and society, leaving no one behind

- **Focus on**

- Innovative Building and Digital Technologies
- Digitalisation in construction
- End Users

- **Topics**

- Energy Efficient Buildings
 - Innovative building components, Smart technologies, Sensors
- Data and information management and representation
 - Scan2BIM, 3DVM, BIM, Digital Twins, AR/VR
- Data management and monitoring
 - DBL, Dynamic EPCs, IEQ monitoring
- Capacity Building programmes

Research and Develop a DBL

**PREDICTING THE SUCCESS OR FAILURE OF A NEW PRODUCT
BASED ON WHAT ENGINEERS AND PROGRAMMERS ARE SAYING ABOUT IT.**

IF THEY SAY...	IT MEANS...
"IT DOESN'T DO ANYTHING NEW"	THE PRODUCT WILL BE A GIGANTIC SUCCESS.
"WHY WOULD ANYONE WANT THAT?"	
"REALLY EXCITING"	THE PRODUCT WILL BE A FLOP. YEARS LATER, ITS IDEAS WILL SHOW UP IN SOMETHING SUCCESSFUL.
"I'VE ALREADY PREORDERED ONE."	
"WAIT, ARE YOU TALKING ABOUT <UNFAMILIAR PERSON'S NAME>'S NEW PROJECT?"	THE PRODUCT COULD BE A SCAM AND MAY RESULT IN ARRESTS OR LAWSUITS.
"I WOULD NEVER PUT <COMPANY> IN CHARGE OF MANAGING MY <WHATEVER>."	WITHIN FIVE YEARS, THEY WILL.

source: <https://xkcd.com/1497/>

What is a Logbook?

- **Nautical:** a record of important events in the management, operation, and navigation of a ship
- **Industrial:** ... record state at the production plant, but it can also contain simple planning functions that notify personnel about upcoming maintenance activities
- **Transport:** ... to register driver and operator work time for commercial heavy vehicles
- **Amateur radio:** ... register their contacts and other radio operations
- **Scuba diving:** ... documents the experience of a diver by logging a diver's dives.
- **Health:** ...Patient records...

Summary: ... record used to record states, events, or conditions applicable to complex machines or the personnel who operate them

What is a Digital Building Logbook?

- **Divide and conquer**
 - Solve a complex problem by breaking the problem into smaller ones and solving them
- **Logbook**
 - (trusted and shared) repository of events, records, states...
- **Building**
 - construction, permits, models, BIM...
- **Digital**
 - web based, accessible, integrable, scalable...

A basic definition: common cloud based repository of building relevant data related to the life of a building

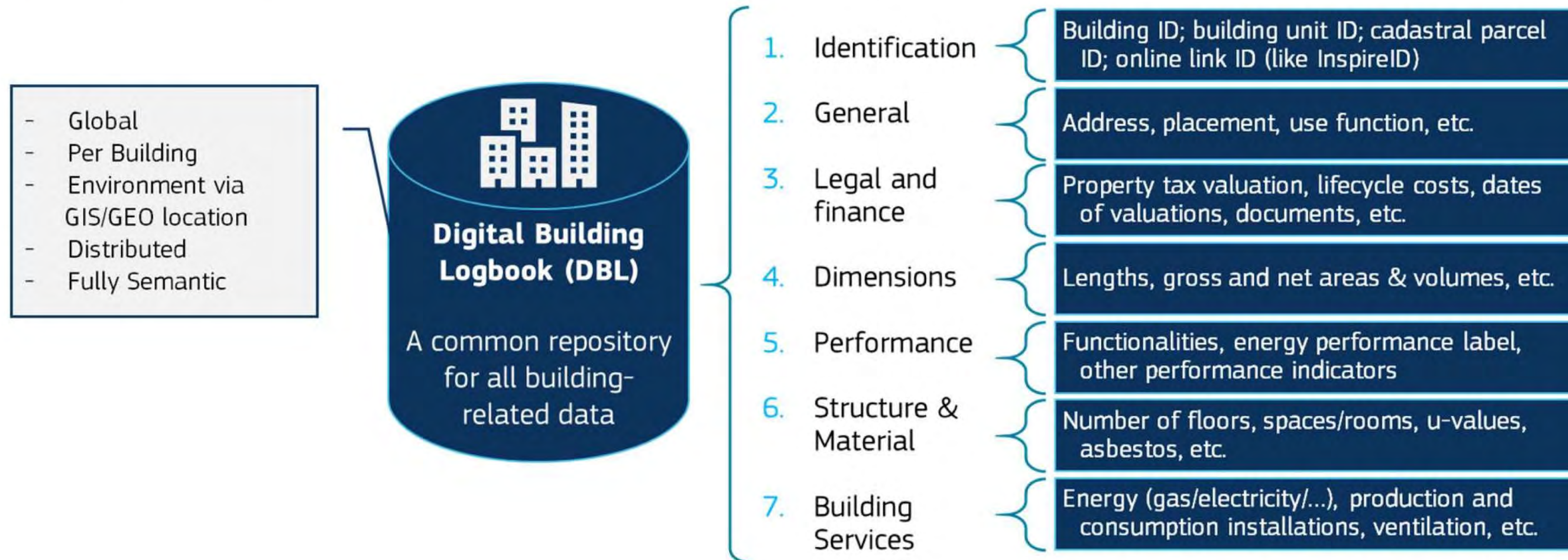
What is a Digital Building Logbook?

- EC: “ *a common repository for all relevant building data*. It facilitates transparency, trust, informed decision making and information *sharing* within the construction sector, among building owners and occupants, financial institutions and public authorities”
- Is this definition accepted?
 - We see a lot of emphasis in
 - Integration external sources
 - Calculate, estimate
 - Benchmarking and comparisons

source: E. Commission, E. A. for Small, M. sized Enterprises, S. Dourlens-Quaranta, G. Carbonari, M. De Groote, G. Borragán, S. De Regel, Z. Toth, J. Volt, J. Glicker, A. Lodigiani, M. Calderoni, T. Loureiro, R. Sterling, B. Vandeveld, C. Spirinckx, I. Kondratenko, N. Rajagopalan, O. Rapf, Study on the development of a European Union framework for digital building logbooks : final report, Publications Office, 2021. doi:doi/10.2826/659006.

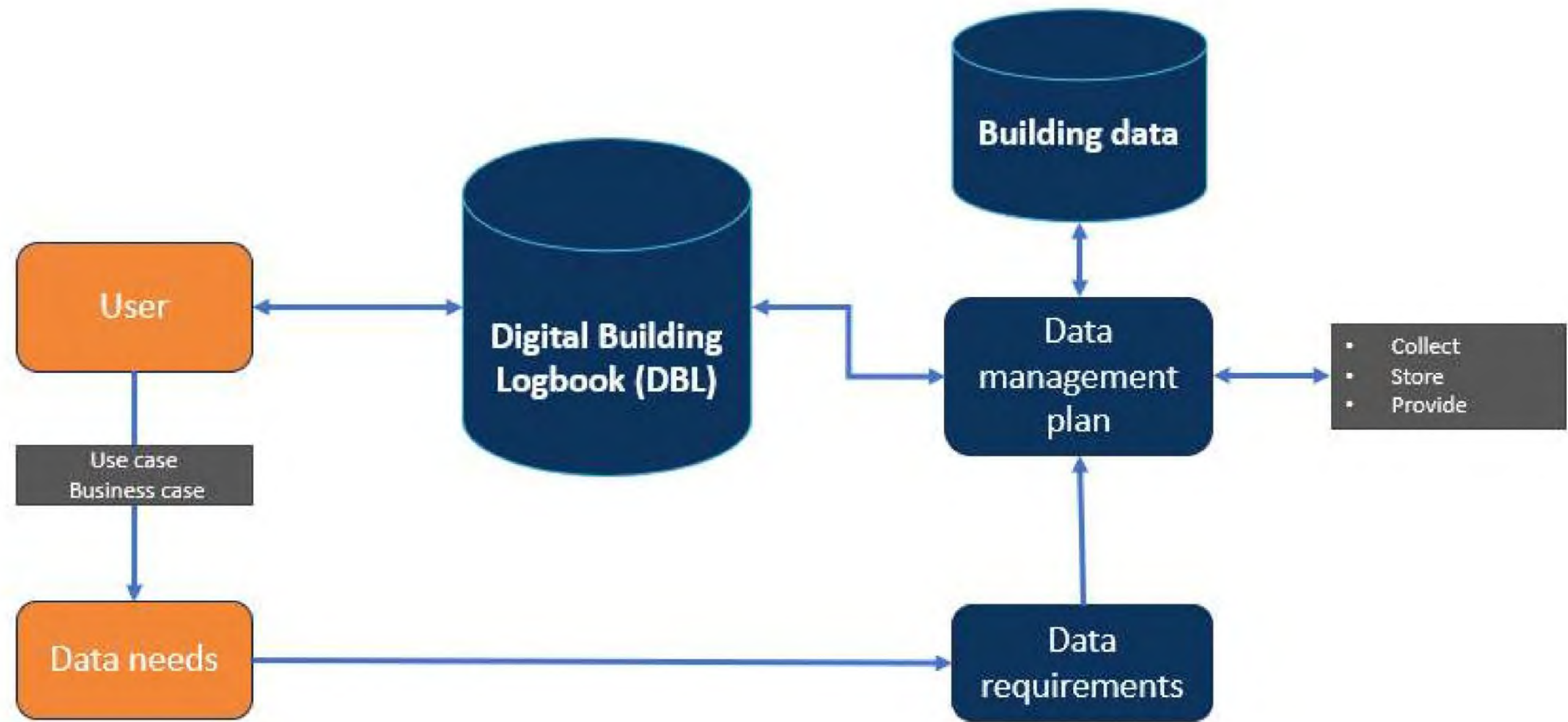
DIGITAL BUILDING LOGBOOK

Figure 1 Overview of the DBL framework



DIGITAL BUILDING LOGBOOK

Figure 2 DBL from the user's perspective



Are we sure this isn't something different?

- **CMS** - Construction Management Software
 - Software for managing the documentation and communication in construction projects
- **DT** - Digital Twins
 - virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning and reasoning to help decision making (IBM)
- **CDE** - Common Data Environment
 - Collaborative platform for storing and centralising BIM data and workflows
- **Others**
 - BMS - Building Management System
 - AMS - Asset Management System

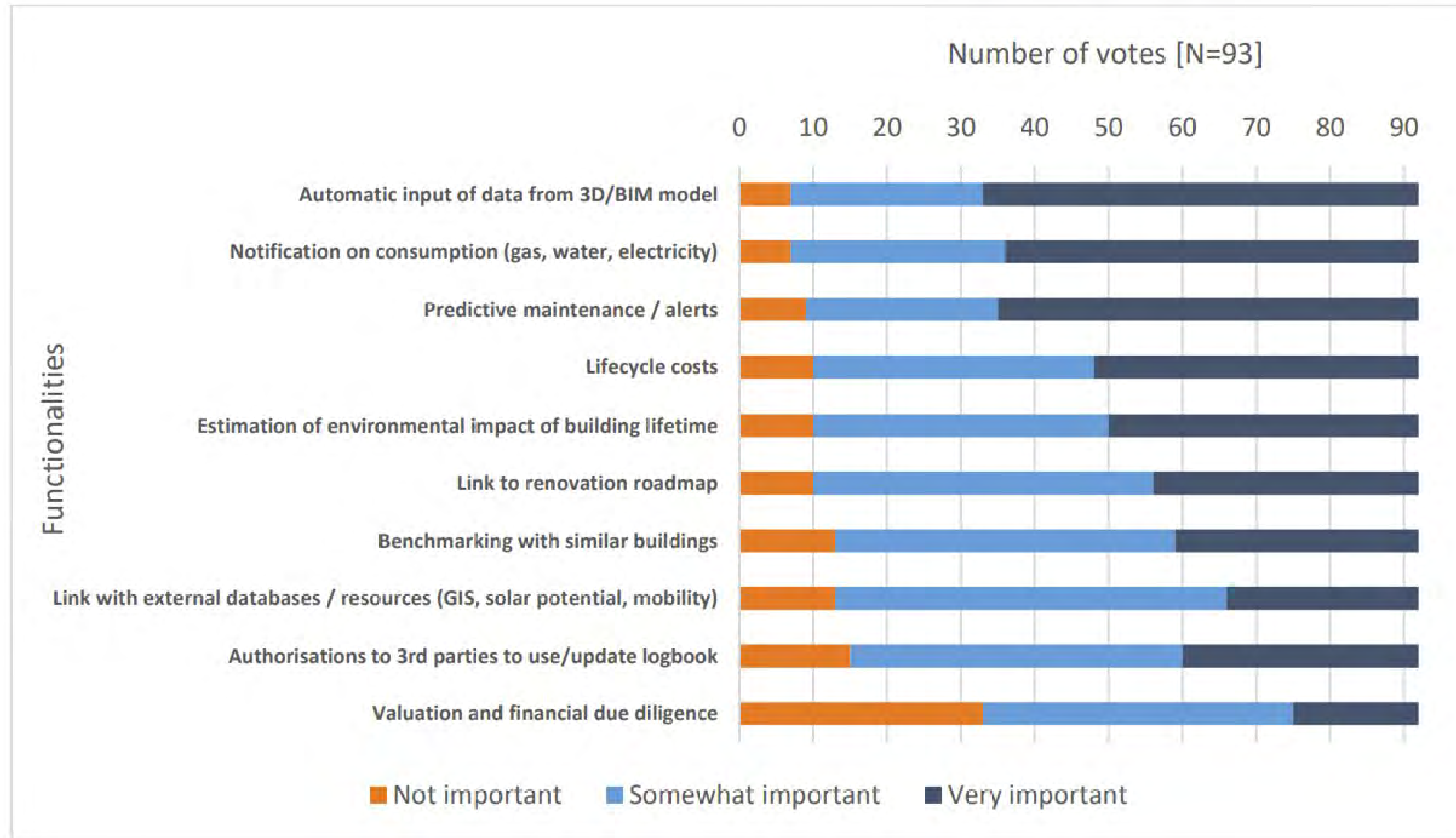
Is there any good example of a DBL?

- Repositories of documents / Shared folders (Dropbox)
- Solutions for construction that may be adapted as DBL
- Social Networks, Communities + Document repository

Best approach:

- Develop from scratch or integrate?
- Focus on the DBL or in the added value services?

What are the main functionalities of DBLs?



source: E. Commission, E. A. for Small, M. sized Enterprises, S. Dourlens-Quaranta, G. Carbonari, M. De Groote, G. Borragán, S. De Regel, Z. Toth, J. Volt, J. Glicker, A. Lodigiani, M. Calderoni, T. Loureiro, R. Sterling, B. Vandeveld, C. Spirinckx, I. Kondratenko, N. Rajagopalan, O. Rapf, Study on the development of a European Union framework for digital building logbooks : final report, Publications Office, 2021. doi:doi/10.2826/659006.

Data sources and types

- What does “all relevant data” means?
 - EPC
 - BRP
 - Models (IFC, 3DVM)
 - Permits?
 - Sensor streams?
 - Pictures, quotes, documents,
 - what about future data we don't know yet?
- Lack homogeneity or consensus in the data formats a DBL should support or use to represent the data collected

Users and stakeholders

- EC definition mentions
 - building owners and occupants
 - financial institutions
 - public authorities
- EC definition interviews considered
 - a) Demolition industry [1], building owners [2], finance [3] architects [4], digital services [4], engineers [4], contractors and craftspeople [7], construction material and products [13], public authority [18], research [30]
 - b) Building owner representatives [3], construction industry and manufacturers [2], suppliers of energy efficiency solutions [1], digital and data services providers [4], building automation and control [2], finance [1], real estate developer [1] and researchers [3].
 - Eight respondents have experience of implementing a version of a DBL, as a private [5] or public [3] initiative.

One DBL to rule all?

- Do we need a Word processor or just a powerful text editor?
 - More complexity, less clarity, less transparency
- Do we need another platform on the construction ecosystem or the DBL is just a functionality of other construction software?
- Is a DBL for public authorities and for building owners the same?
- Will we ever see meta-DBLs, which aggregate information from DBLs?
- Is the DBL really a repository of relevant data or is it just an excuse for rating, benchmarking and data analysis.

Digital Building Logbook

Our approach

Digital Building LogBooks - R2M Ecosystem



- Start: 01/07/2022 - End: 31/12/2025
- <https://www.chronicle-project.eu/>

- **Full name:** Building Performance Digitalisation and Dynamic Logbooks for Future Value-Driven Services
- Chronicle DBL is a cloud solution for storage, organisation and traceability of documents and relevant information about the life of the building.
- Integrate the logbook with the CDE for building data capturing in a dynamic way
- Methodology for regular data validation updates supported by blockchain technology for trust, transparency and data reliability
- Target user group is building owner

Digital Building LogBooks - R2M Ecosystem



- Start: 01/07/2022 - End: 31/12/2025
- <https://www.smartlivingepc.eu/en>

- Full name: Advanced Energy Performance Assessment towards Smart Living in Building and District Level
- Roadmap for linking EPCs and EPC data to the DBL, based on stakeholders' needs
- Innovative use cases for DBL and EPCs
- Literature review and market analysis

Digital Building LogBooks - R2M Ecosystem



- Start: 01/10/2022 - End: 30/09/2025
- <https://www.smartsquare-project.eu/>

- Full name: Smart Tools for Smart Buildings: Enhancing the intelligence of buildings in Europe
- SRI integration roadmap to digital logbooks with the aim to allow the future integration of the SRI ratings and its background information.

Digital Building LogBooks - R2M Ecosystem

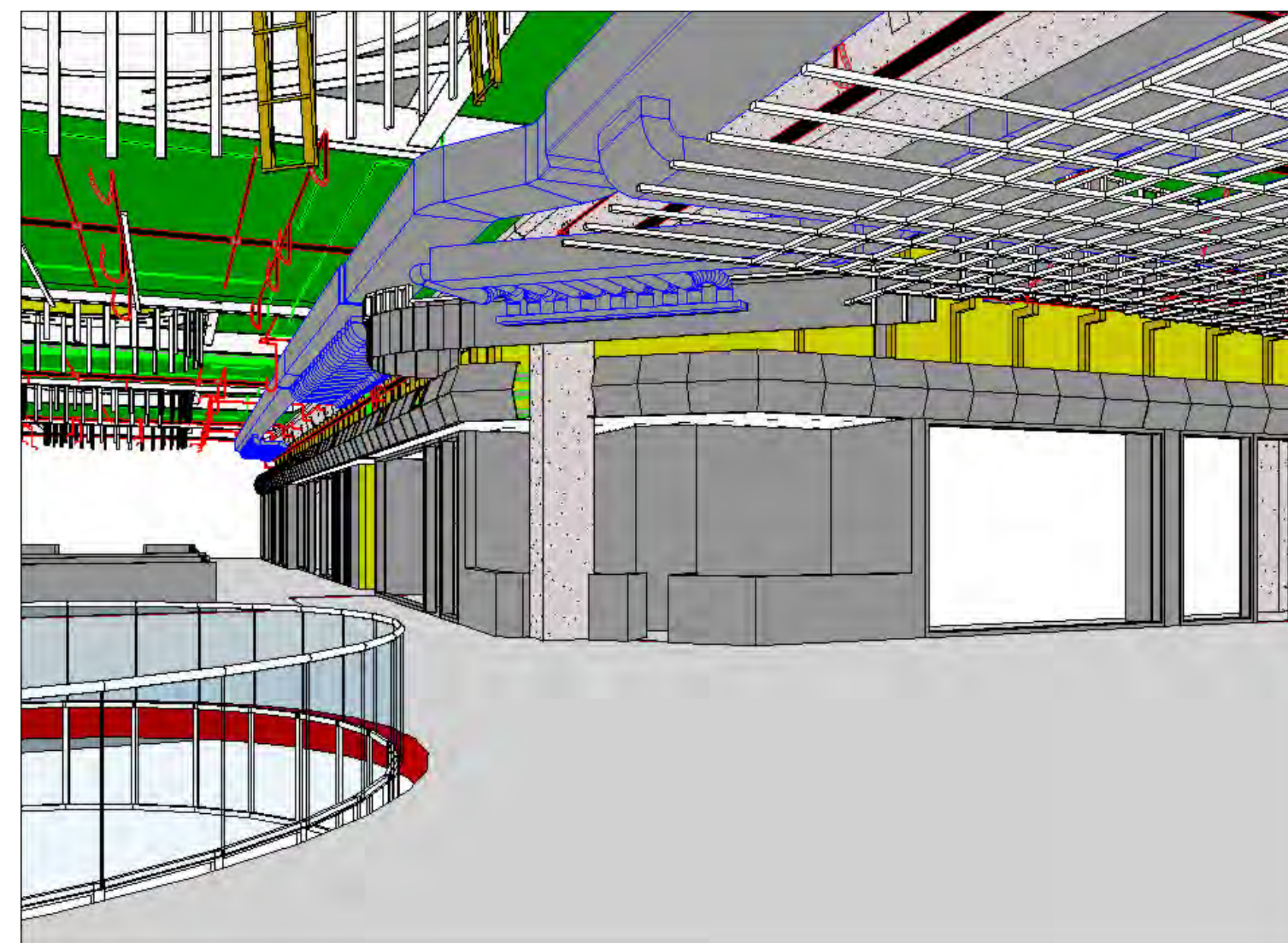
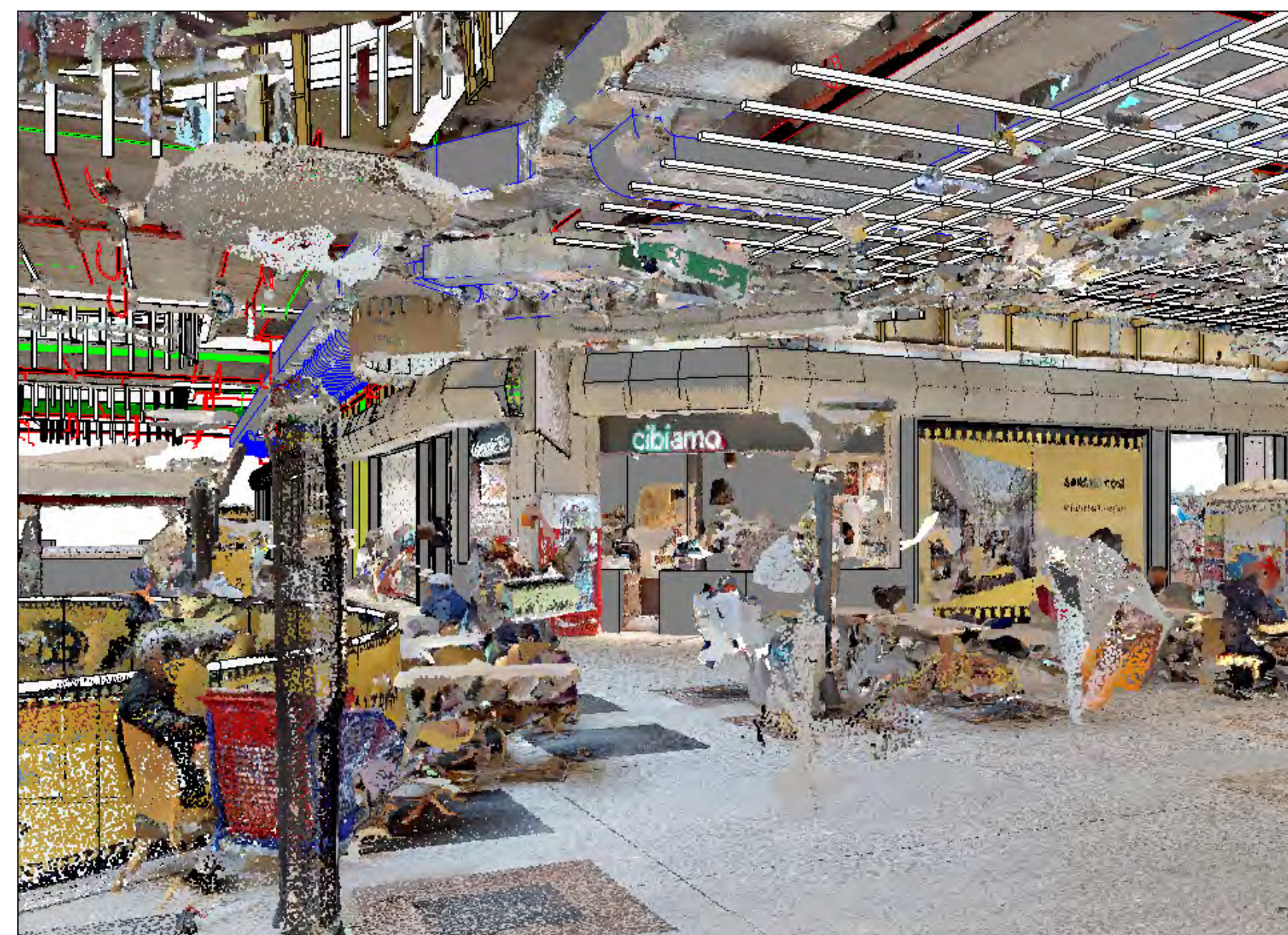
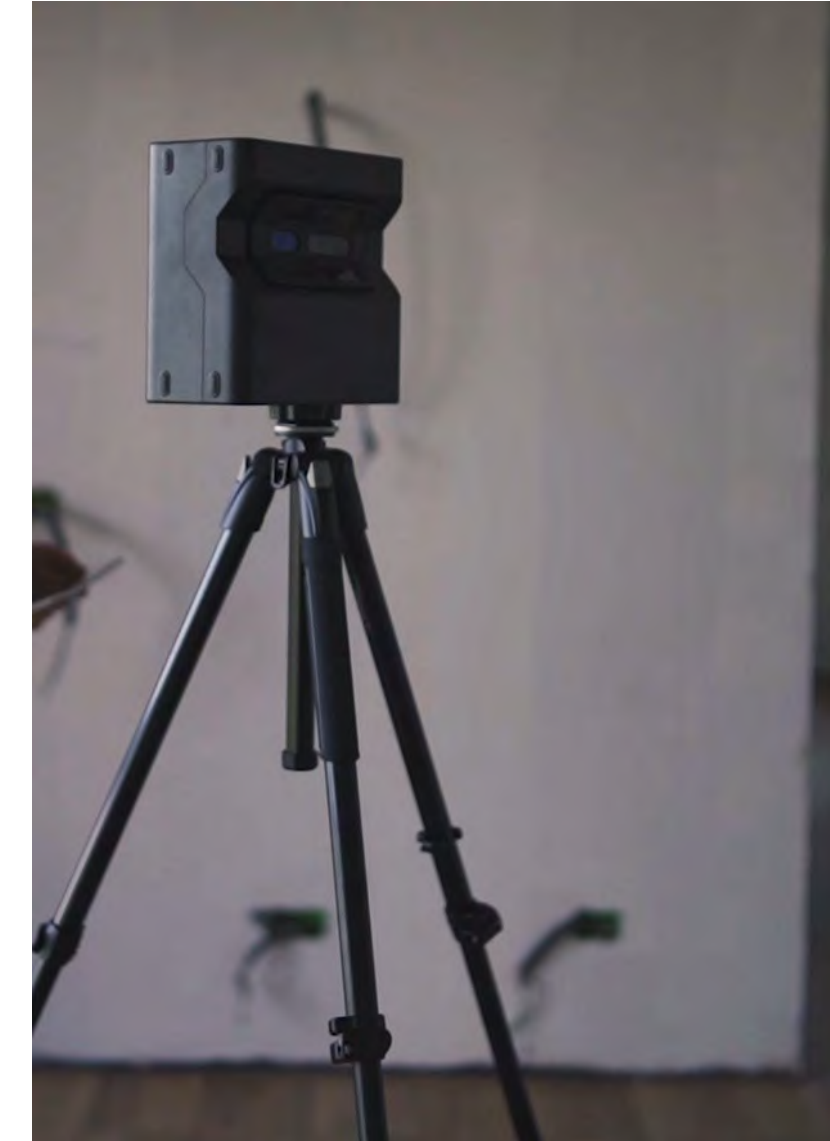
LEGOFIT

- Start: 01/10/2022 - End: 30/09/2025
- <https://www.smartsquare-project.eu/>
- Full name: Smart Tools for Smart Buildings: Enhancing the intelligence of buildings in Europe
- Residential Building BIM-based Digital Logbook
- Secure interoperable data governance framework for managing critical building data (materials used and energy performance)
- Integrate the logbook to the circularity passport

Le 7 sfide che saranno integrate tra BLOG & SRI

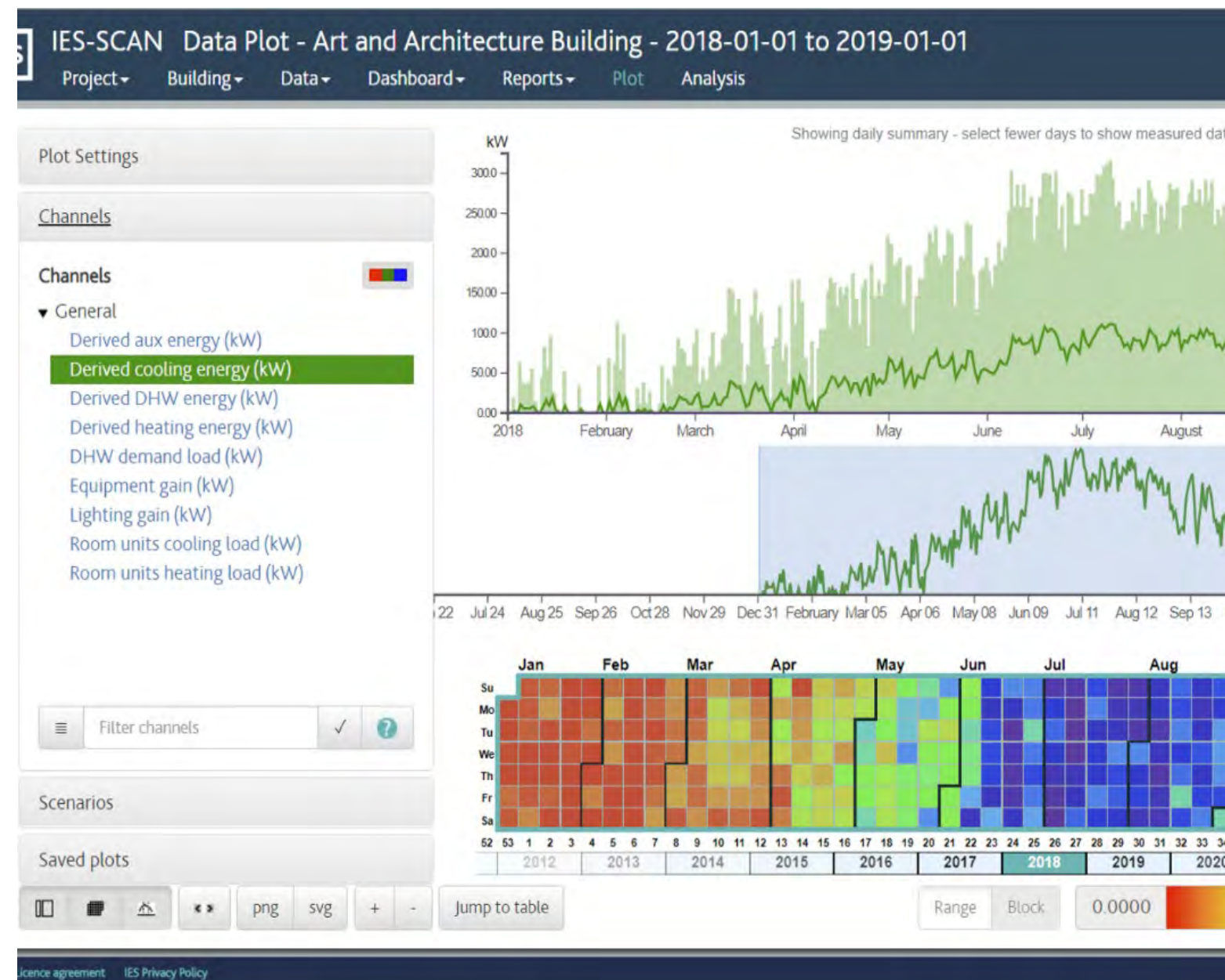
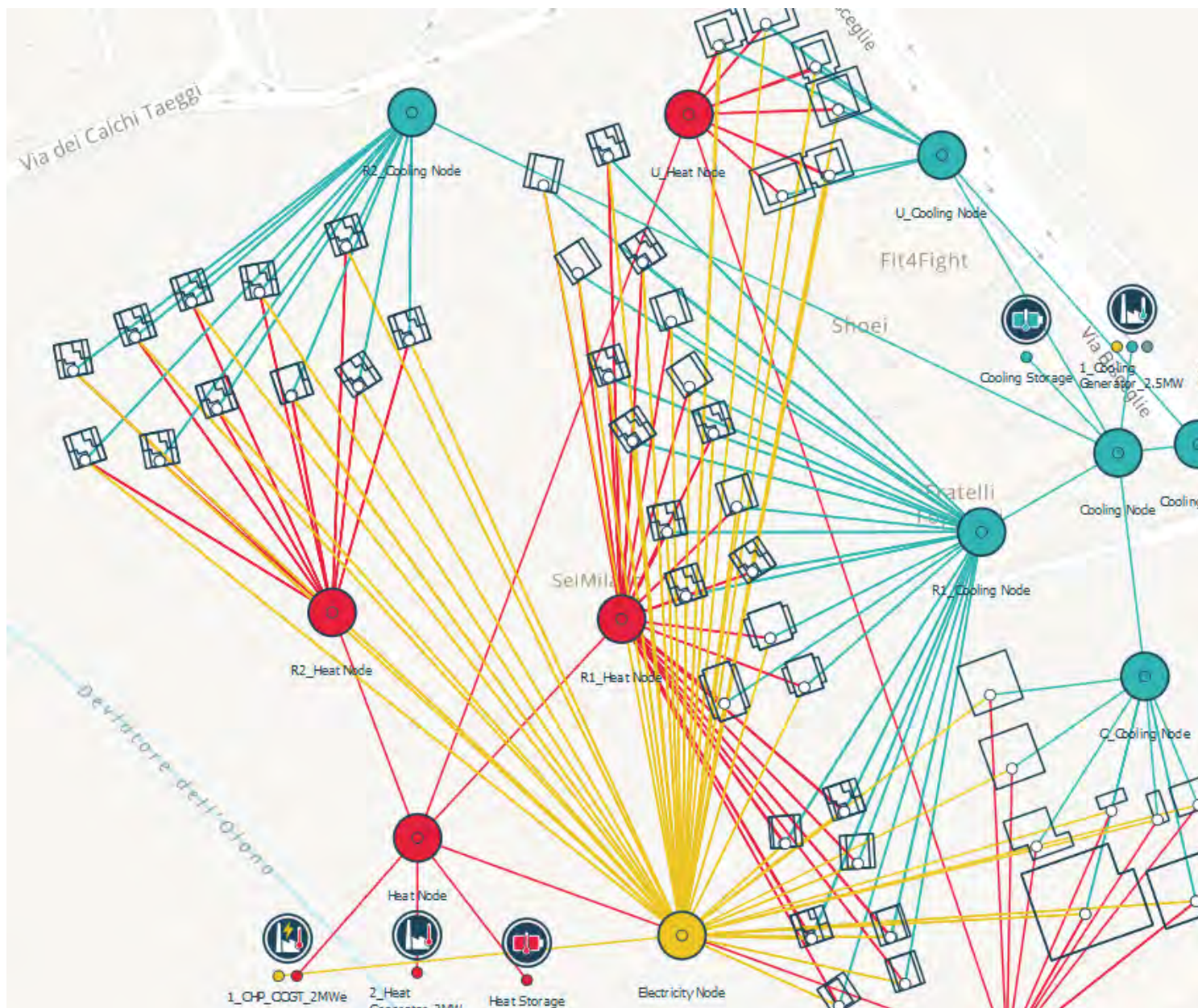
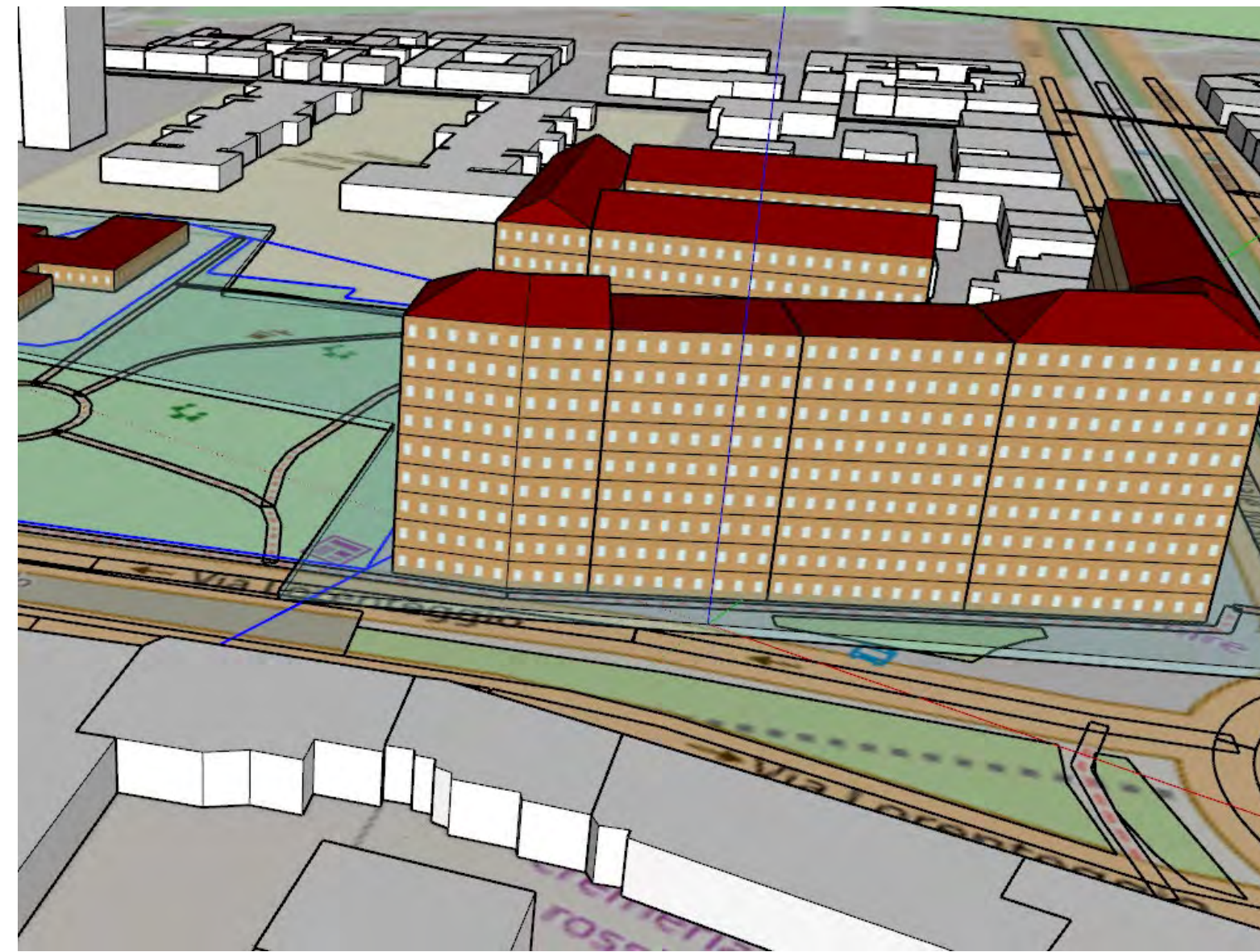
1° SFIDA	2° SFIDA	3° SFIDA	4° SFIDA	5° SFIDA	6° SFIDA	7° SFIDA
 <p>Matterport: Scanning 3D BIM interni ed esterni</p>	 <p>IES ICL: Intelligent Communities Lifecycle</p>	 <p>GREENPASS: Misurare l'impatto della vegetazione</p>	 <p>Zutec: Piattaforma per la gestione immobiliare</p>	 <p>BrainBox AI: Autonomous AI HVAC technology</p>	 <p>Onyx Solar: Vetro fotovoltaico per edifici</p>	 <p>Piattaforma software per lavoro ibrido</p>
DIGITALIZZAZIONE DEL COSTRUITO RAPIDA	SIMULAZIONI DINAMICHE EDIFICI DEI PARAMETRI ESG	INTEGRAZIONE E SIMULAZIONE DI NATURE BASE SOLUTION NEL REAL ESTATE	DIGITALIZZAZIONE DI TUTTE LE FASI DEL CICLO DI VITA DI UN EDIFICIO	APPLICAZIONE DELL'INTELLIGENZA ARTIFICIALE PER RIDURRE CONSUMI ED EMISSIONI	INTEGRAZIONE NELL'INVOLUCRO EDILIZIO DELLE TECNOLOGIE FOTOVOLTAICHE	SENSORISTICA, MONITORAGGIO QUALITA' ARIA e PRESENZE / PRENOTAZIONI

1 - digitalizzazione del costruito rapida



2 - simulazioni dinamiche edifici parametri ESG

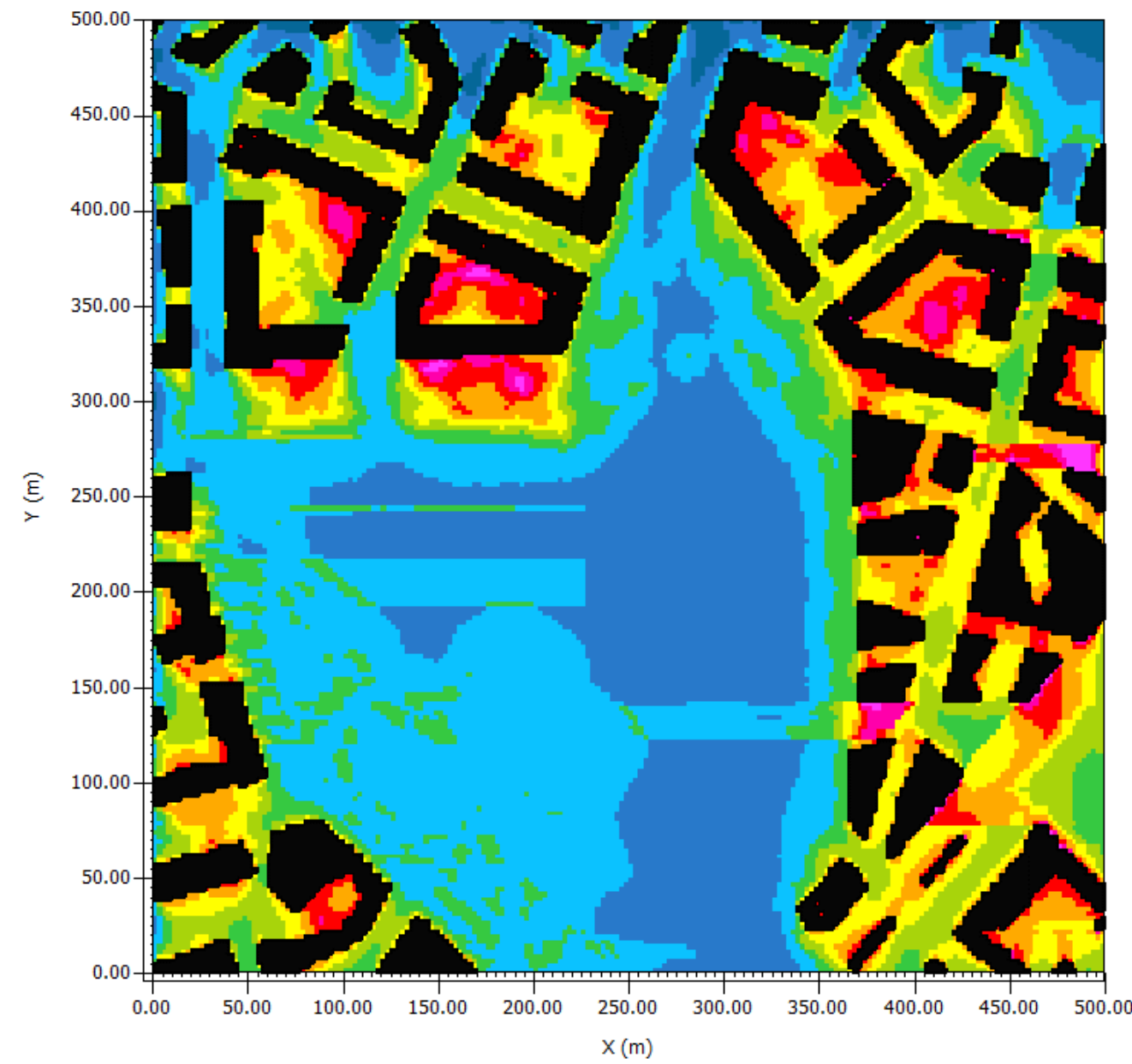
KEY - GBC ITALIA - R2M



42 R2M Solution

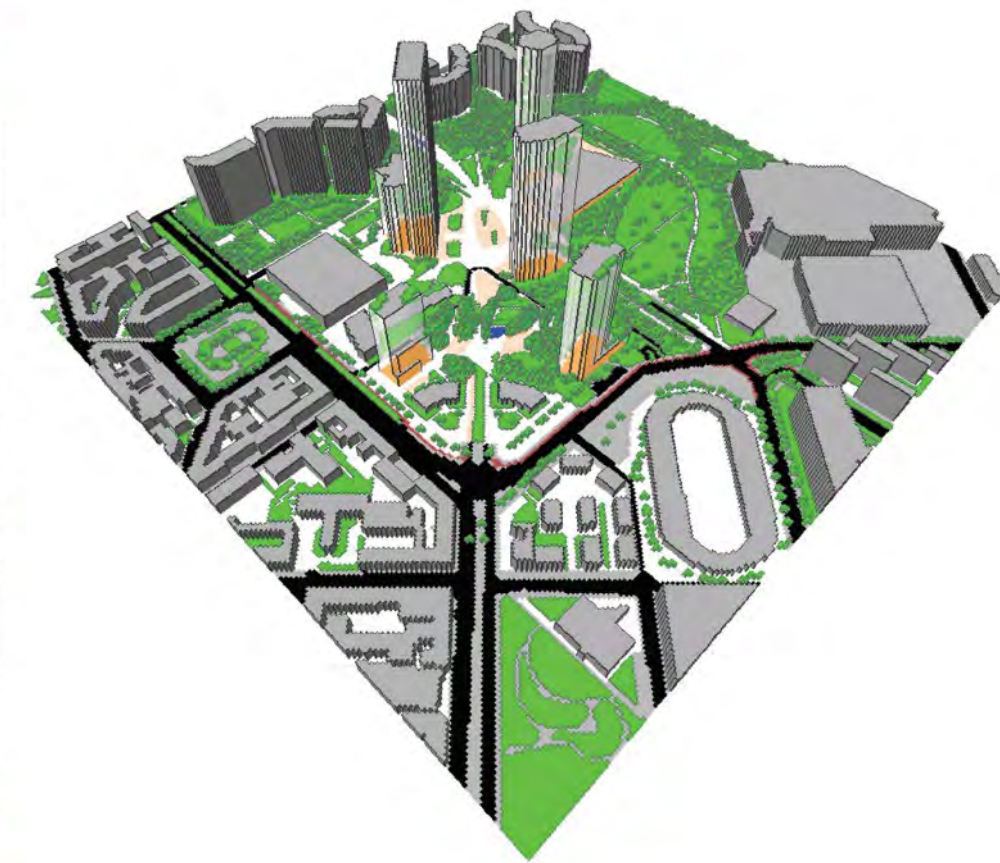
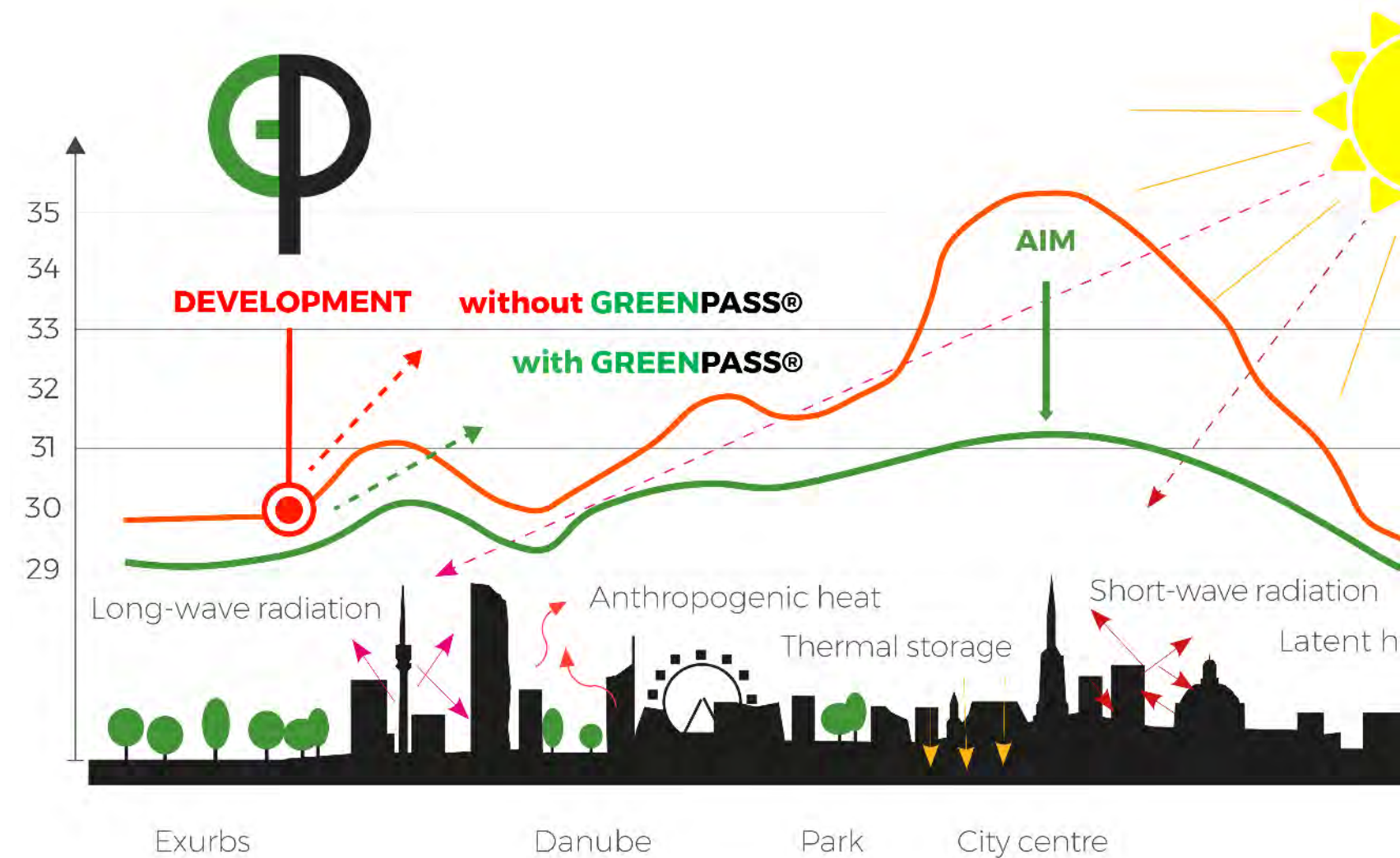


3 - integrazione e simulazione di NBS nel Real Estate



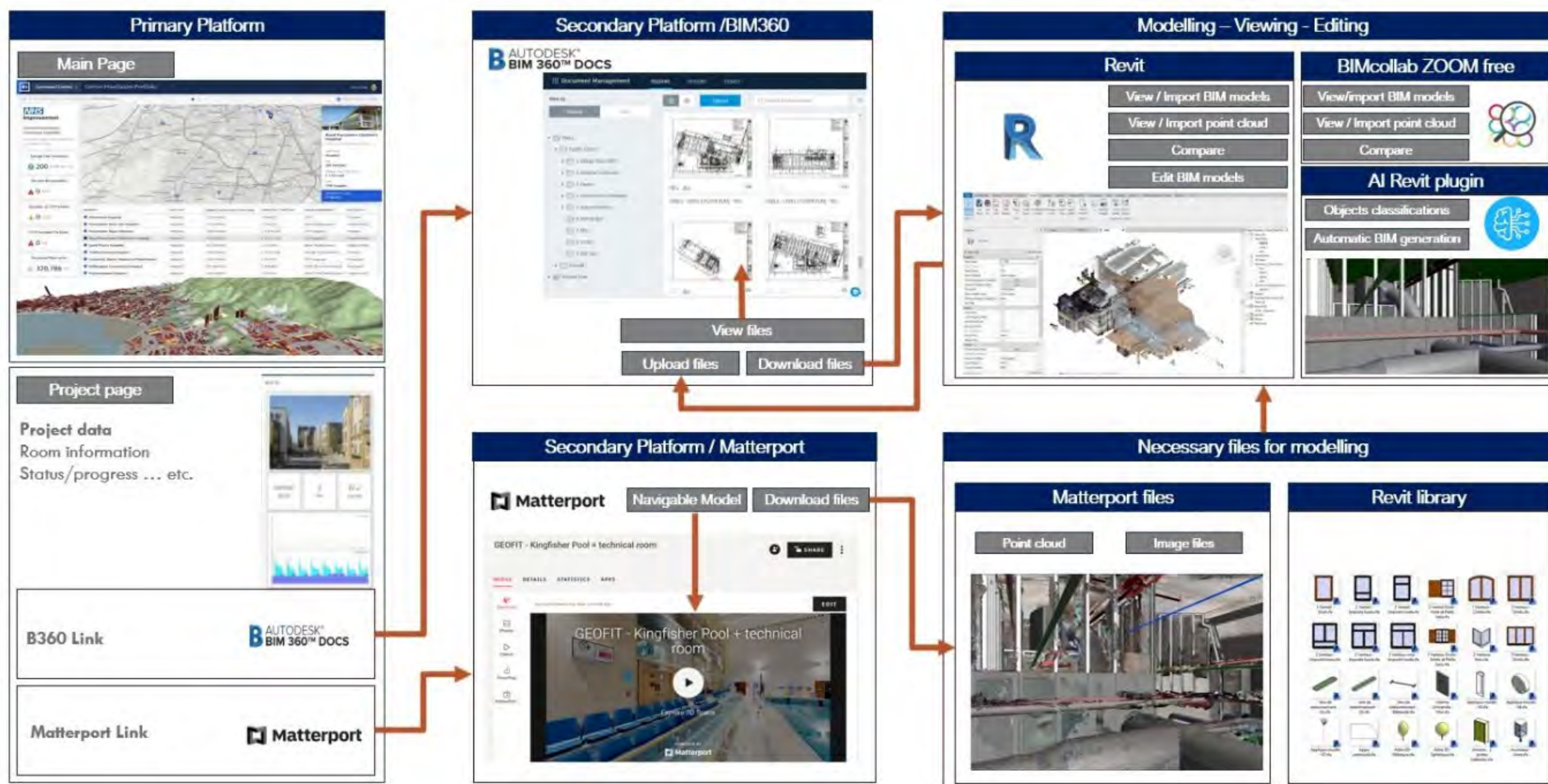
- CLIMA
- ACQUA
- ARIA
- BIODIVERSITÀ
- ENERGIA
- COSTO

CO2 SEQUESTRATA
QUALITA' ARIA
ACQUA INTERCETTATA
RISPOSTA AI
CAMBIAMENTI CLIMATICI



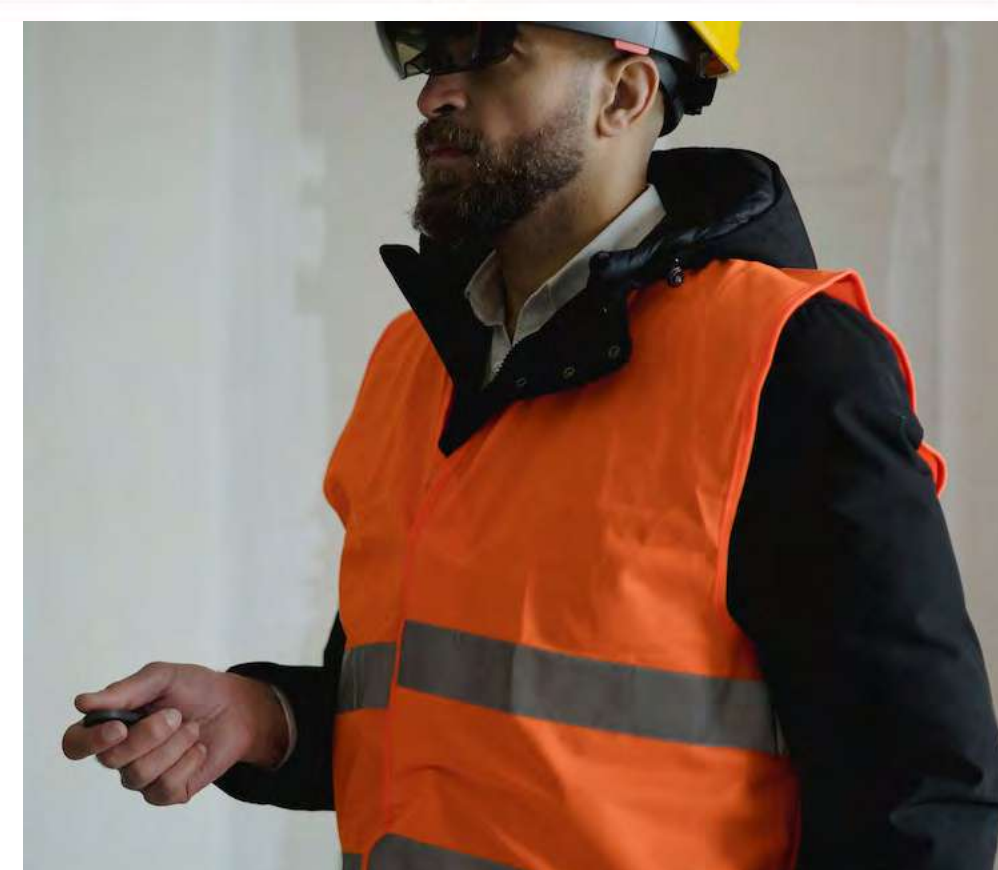
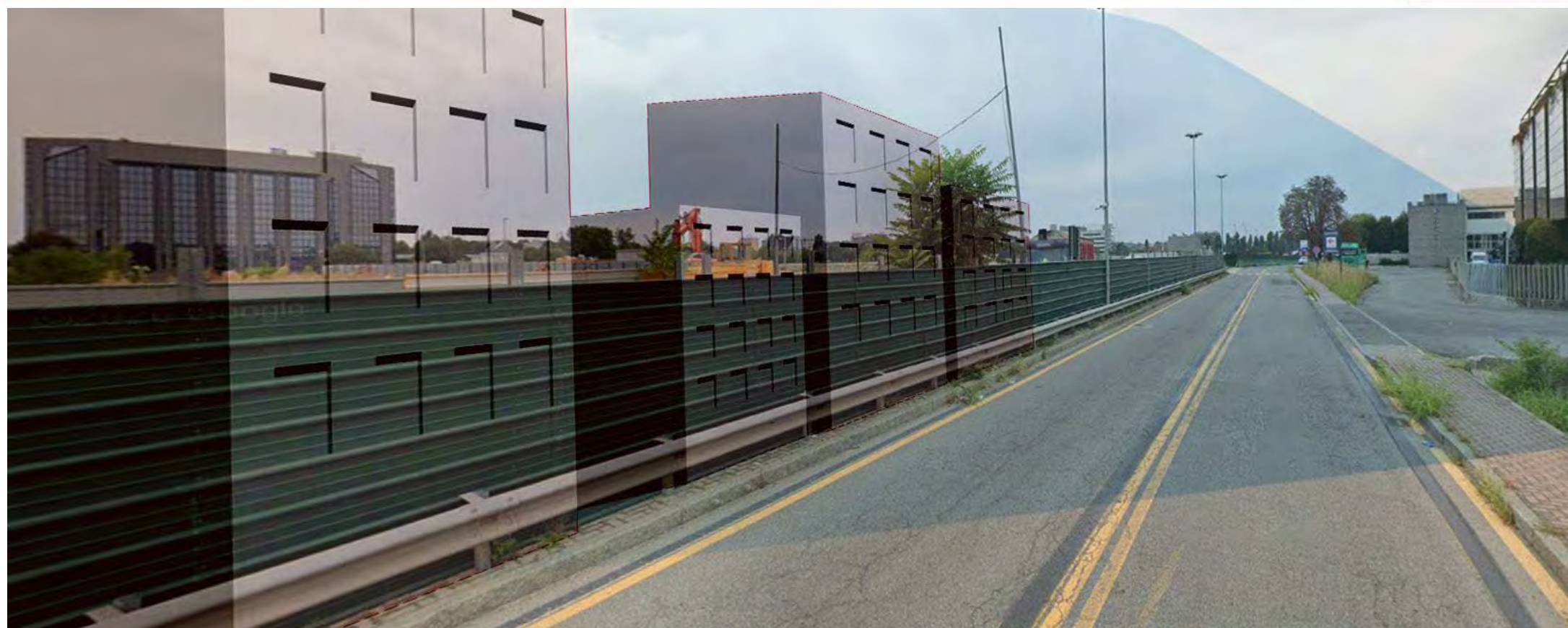
GREENPASS:
Misurare l'impatto
della vegetazione

4 - digitalizzazione di tutte le fasi del ciclo di vita edificio



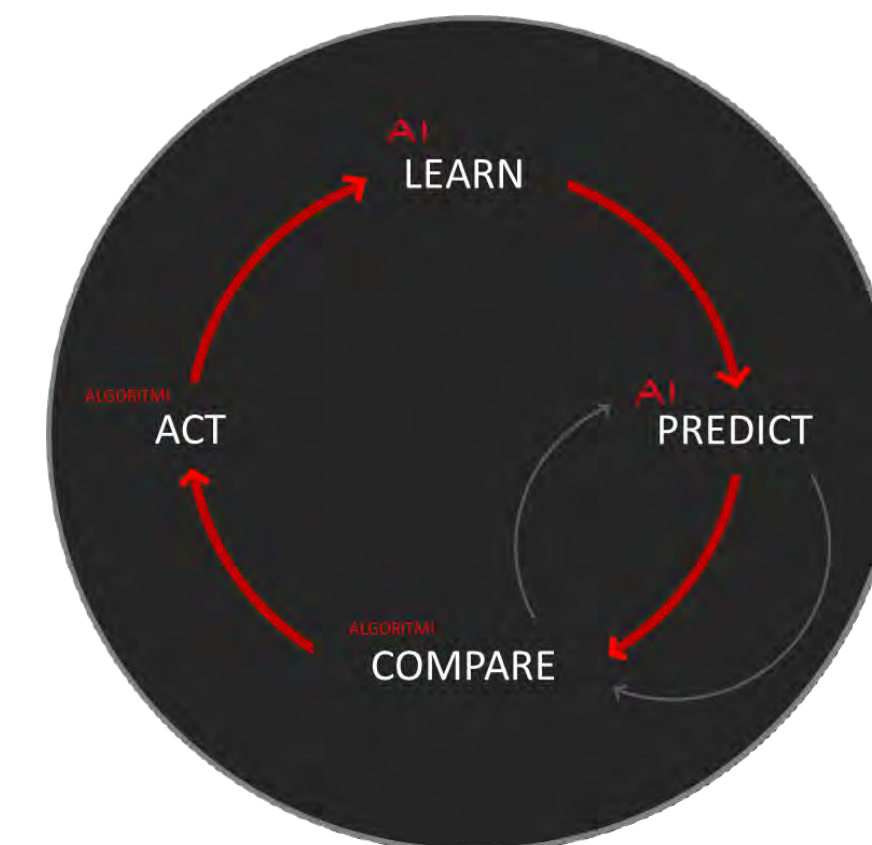
KEY - GBC ITALIA - R2M

44 R2M Solution



Zutec: Piattaforma per la gestione immobiliare

5 – Intelligenza Artificiale per ridurre consumi & emissioni



Utilizziamo **deep learning** e modelli d'intelligenza artificiale

Ci adattiamo al fabbisogno termico dell'edificio durante il "learning period"

Trasformiamo il sistema HVAC da reattivo a **predittivo** o "self-driving"

Utilizziamo **dati esistenti** provenienti dal sistema centralizzato (e.g. BMS) e altre fonti (e.g. meteo) per ottimizzare il «decision-making»

Controlliamo l'HVAC agendo direttamente sui controlli ogni **5 minuti**

La nostra tecnologia non richiede **l'intervento umano**

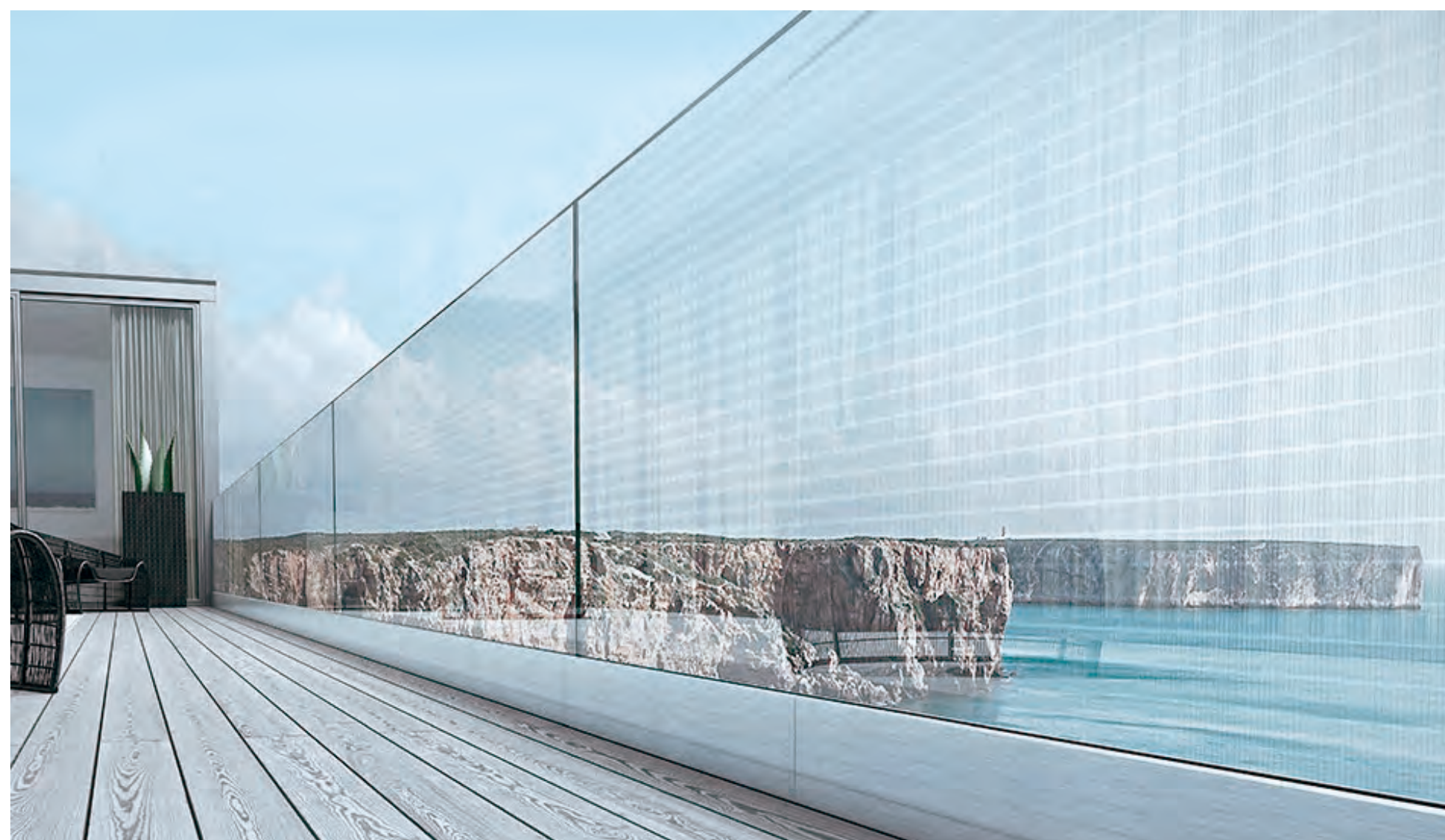
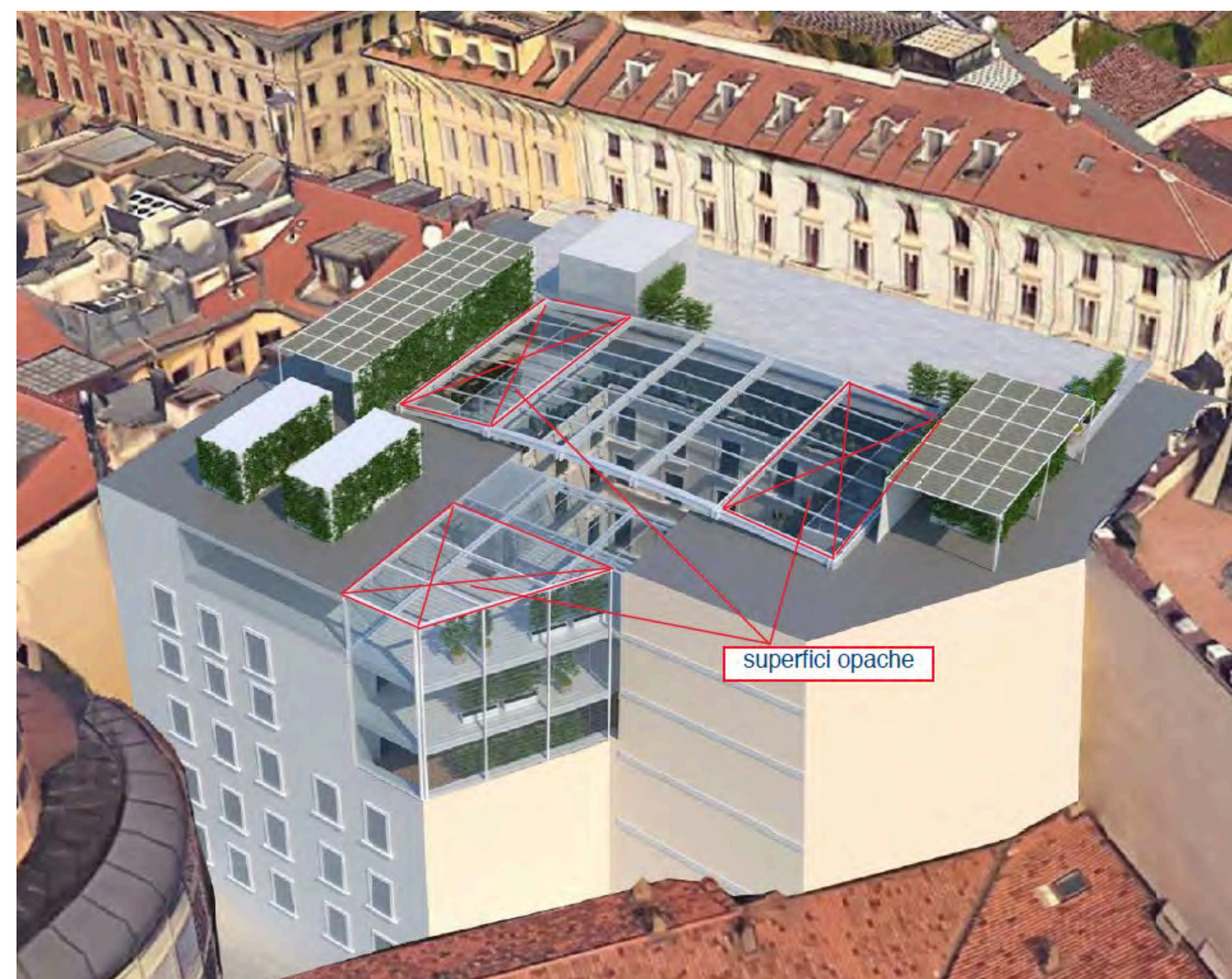
NO CAPEX DI INSTALLAZIONE
10 MILIONI DI MQ GESTITI
GENERAZIONE BUDGET ESG
BEST AI TECH «TIME 2020»
PREMIATA COP 26 SOLUZIONE
TRANSIZIONE ECOLOGICA

Fino a 25% Calo nei costi energetici totali	20-40% Riduzione in impronta ecologica	60% Miglioramento nel comfort degli utenti	Fino al 50% prolungamento della vita tecnica di servizio delle apparecchiature HVAC
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BRAINBOX AI

BrainBox AI:
Autonomous AI
HVAC technology

6 – Fotovoltaico integrato per ripensare il RE

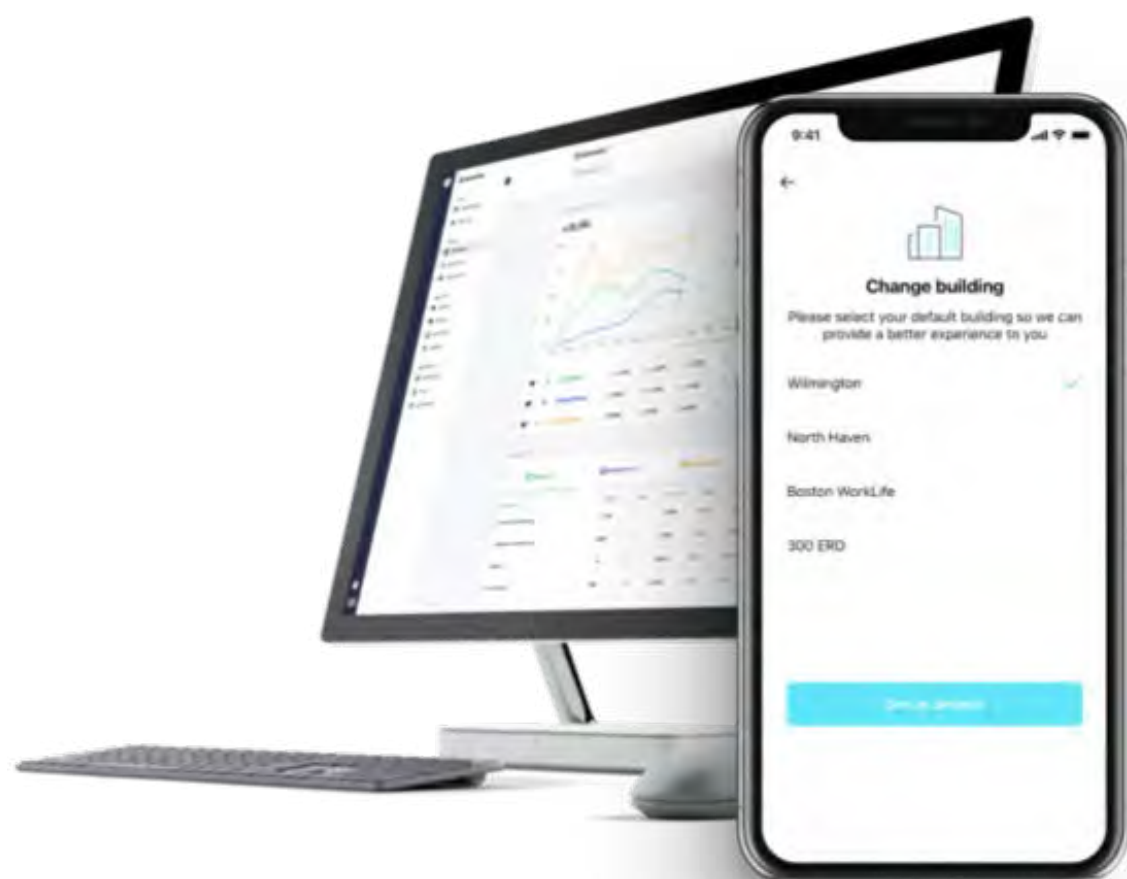


- > COMFORT INTERNO
- > IMPRONTA ECOLOGICA
- > VALORE DELL'EDIFICIO
- > TAXONOMY READY



Onyx Solar: Vetro fotovoltaico per edifici

7 – Indoor Air quality & IOT data



Base Experience Platform

- ✓ Prenotazione degli spazi (scrivanie, posti auto)
- ✓ Engagement (feed di notizie/eventi)
- ✓ Amministrazione e gestione di edifici/utenti
- ✓ Rapporti sulle strutture
- ✓ Servizi (menu del cibo, sconti, ecc.)



+Integrated Tech Modules



Analisi occupazione spazi



Gestione visitatori



Smart parking



Analisi qualità dell'aria & alerts

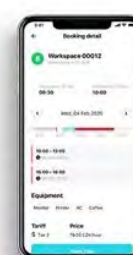


Smart Lockers & consegne



Accesso Touchless & controllo ascensori

Moduli software e i dispositivi compatibili dall'ecosistema del portfolio Spaceti.



Abbonamento Software



Abbonamento Hardware

- > CONTROLLO SUGLI SPAZI
- > CONTROLLO SULLA QUALITA' DELL'ARIA
- > SODDISFAZIONE UTENTE
- > COSTI DI GESTIONE



Piattaforma software per lavoro ibrido

7 – Piattaforma per il lavoro ibrido

Analisi qualità dell'aria: un ambiente di lavoro sicuro e produttivo



- Raccogli e valuta **dati in tempo reale** sulla CO2, temperatura, umidità
- Utilizza l'indice di benessere di Spaceti (**wellbeing index**) per allinearti agli standard (certificazioni WELL, FitWell).
- Esporta grafici e report
- Utilizza **APIs** per trasferire i dati

Monitora l'utilizzo dei tuoi spazi lavorativi e risparmia sui costi immobiliari

Valuta costantemente l'utilizzo dell'ufficio e scopri quali aree sono sovrautilizzate e quali sono vuote. Prendi decisioni basate sui dati per il tuo spazio lavorativo.

- **Analizza dati anonimi sull'utilizzo** degli spazi
- Utilizzo **dello spazio in tempo reale**
- Utilizza APIs per trasferire i dati a sistemi di terze parti.

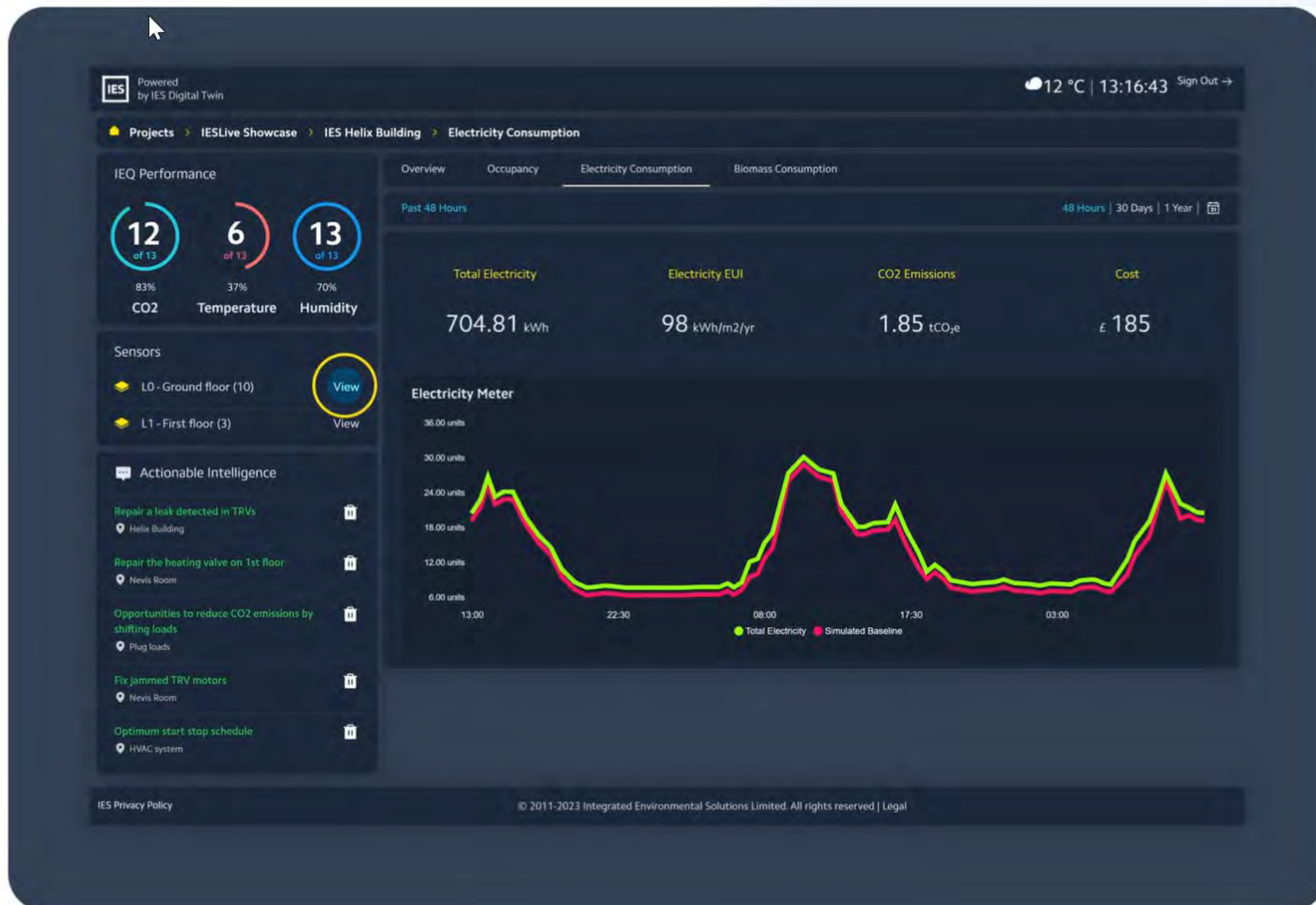


APPLICAZIONI IN ITALIA

Usare in fase operativa i modelli energetici dinamici calibrati



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Grazie

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