SEMINARIO

Sistemi energetici e risorse idriche:

integrazione sostenibile, strumenti di valutazione e casi studio

Indice di valutazione per edifici e complessi edilizi, Smart Readiness Indicator (SRI): peculiarità dell'indice e applicazione a un caso studio

Marco Pietrobon – R2M Solution

Progetto PRIN 2022YSR9LM - Water-collection and Improvement of Sustainability in the HVAC

Finanziato dall'Unione europea NextGenerationEU

Ministero dell'Università e della Ricerca

Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA

I nostri numeri

2012
Fondata nel

40%
Donne

146+
Progetti R&S

53+
Partner per la prima volta nei Progetti EU

143
Persone

24%
Ph.D.

640M
Fondi raccolti

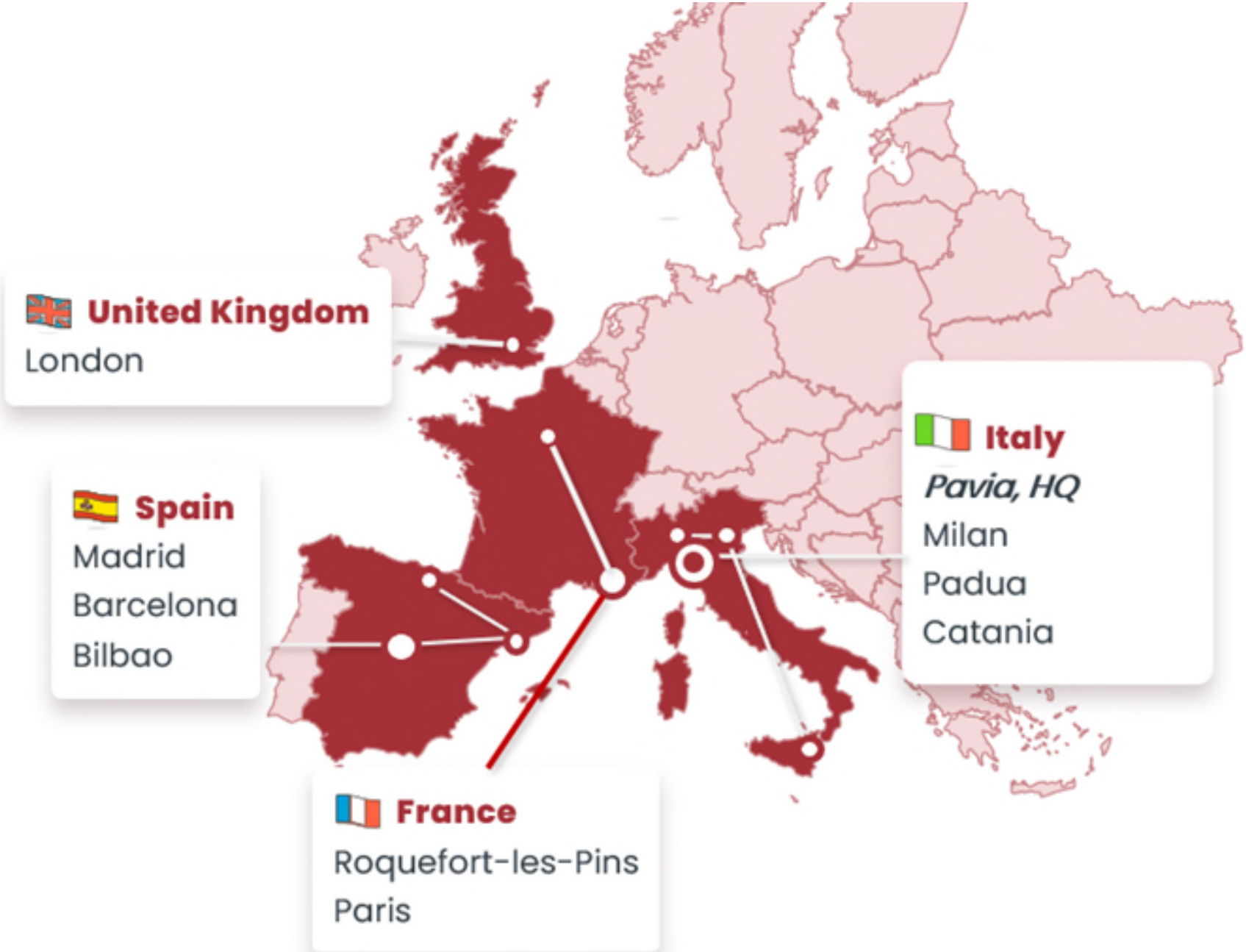
11.5M
Fatturato 2024

Le Nostre Sedi

10 Uffici

in

4 Paesi



Il Nostro Percorso

Consulenza sull'Innovazione

Prodotti Innovativi

Consulenza sulla Sostenibilità e Servizi Energetici

RESEARCH TO MARKET

Argomenti

- Cos’è SRI e perchè è utile
- Il contensto normativo
- Alcuni strumenti utili
- Esempio di applicazione / caso studio

SMART²

ENHANCING THE INTELLIGENCE OF BUILDINGS IN EUROPE

The project **Smart Square**, aims to develop and deliver the appropriate tools and applications, which will enable the promotion and establishment of intelligence assessment of buildings in Europe, through buildings **Smart Readiness Indicator (SRI)** scheme.

LIFE21
PROJECT

CONSORTIUM: 10 PARTNERS

8 EUROPEAN COUNTRIES INVOLVED

DURATION: 36 MONTHS

SMART² OBJECTIVES

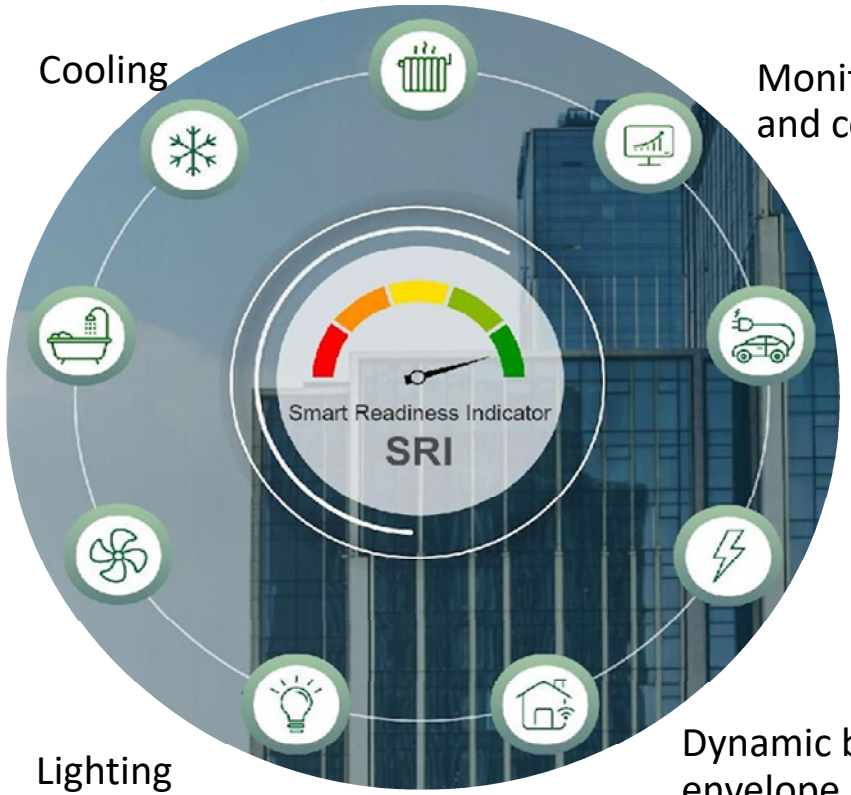
1. Development of tools & services that will boost the uptake of the SRI scheme among the EU member states
2. Roll out of ICT smart ready technologies including AI & IoT for smarter SRIs
3. Commissioning of a cloud based open platform for assessing the intelligence of buildings, tailored for building designers / owners & facility managers
4. Development of an SRI audit process, acting as the forerunner of a standardized procedure
5. Establishment of the required grounds for the integration of the SRI Ratings in building digital logbooks
6. Integration of the SRI calculation procedure into the EPC extraction processes.

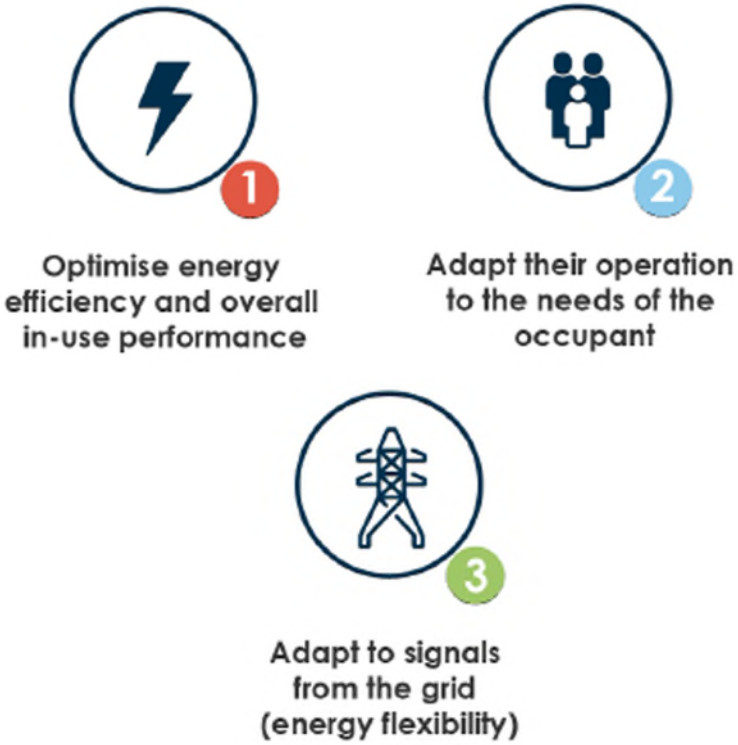
Cosa è lo Smart Readiness Indicator?

Lo Smart Readiness Indicator (SRI) è un indice e una metodologia utilizzati nell'Unione Europea per misurare il livello di funzionalità e lo tecnologie corrispondenti, riguardanti i controlli intelligenti negli edifici.
Valuta la capacità degli edifici di migliorare l'efficienza energetica, la gestione e l'interazione con gli occupanti, il rapporto con le reti di distribuzione dell'energia.

How is the SRI Calculated?

9 domains, 3 categories, > 60 services





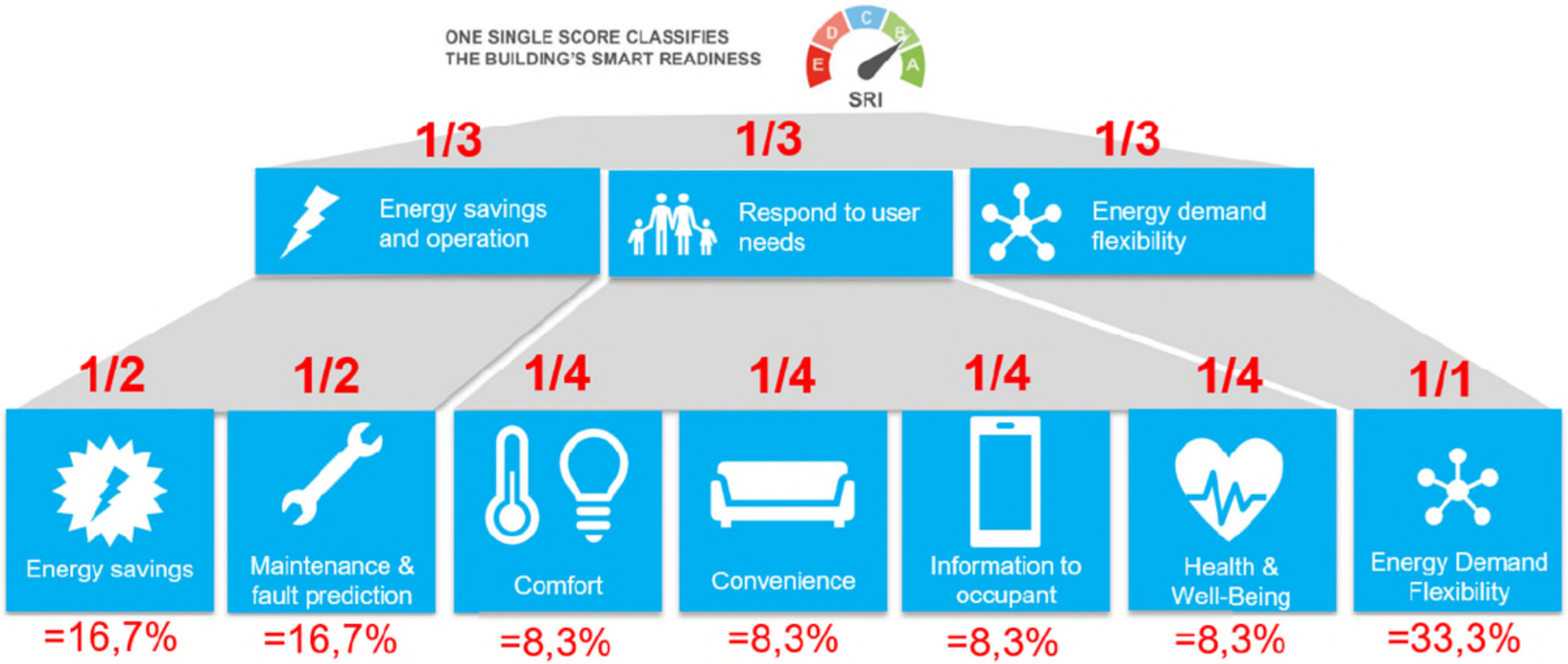
How is the SRI Calculated?

7 Impact Criteria

- The three key smart-readiness functionalities can be further detailed **into seven impact criteria:**

How is the SRI Calculated?

Weighting Factors



Results

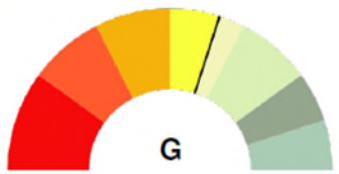
SMART READINESS INDICATOR - ASSESSMENT

Building ID Pilot Building Bucharest	**Date of Assessment** 11-05-2024	**Assesor Name** Paris Fokaides	**Building Type** residential
Building Usage residential - single-family house	**Location** Romania	**Net Floor Area** <200 m2	**Year Of Construction** >2010

Aggregated Scores

- Optimise energy efficiency and overall in-use performance — 54%
- Adapt its operation to the needs of the occupant — 67%
- Adapt to signals from the grid (energy flexibility) — 57%

SRI Score



59%

G F E D C B A

	Energy Efficiency	Maintenance & Fault Prediction	Comfort	Convenience	Health & Well-being	Information to Occupants	Energy Flexibility & Storage	SRI
Total	64%	44%	77%	54%	90%	47%	57%	59 %
Heating	87%	50%	100%	75%	100%	66%	60 %	
DHW	66%	50%	0%	60%	0%	33%	80 %	
Cooling	75%	50%	71%	57%	66%	66%	16 %	
Ventilation	100%	50%	100%	100%	100%	66%	0 %	
Lighting	0%	0%	0%	0%	0%	0%	0 %	
DE	0%	0%	0%	0%	0%	0%	0 %	
Electricity	40%	33%	0%	40%	0%	33%	100 %	
EV	0%	0%	0%	100%	0%	66%	25 %	
M&C	25%	50%	0%	28%	0%	33%	66 %	

Funded by the ©European Union, under the Grant Agreement Nº 101077241. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

Method A, Method B and Method C

A Simplified method	B Expert SRI assessment	C In-use smart building performance
Checklist approach with limited, simplified services list	Checklist approach, covering full catalogue of smart services	Measured / metered data (potentially restricted set of domains)
Online self-assessment by end-user (no certification) OR On-site inspection by third-party qualified expert (formal certification)	Online self-assessment by end-user (no certification) OR On-site inspection by third-party qualified expert (formal certification)	In-use buildings, metered data Part of the commissioning? TBS self-reporting their actual performance
Up to one hour	1/2 day to 1 day, depending on the complexity	Gather data over a long period (e.g. 1 year)
Residential buildings and small non-residential building (net surface floor area <500m²)	Non-residential buildings (and residential buildings if desired)	Residential and non-residential Restricted to occupied buildings (not in design phase)

What is the background of SRI Development

SRI technical study : definition of the SRI and draft methodology, intensive stakeholder consultation

2017
2018

2018

Introduction of the SRI in the **2018 revision of the EPBD** as an optional scheme

SRI technical study : finetuning of the definition and associated calculation methodology

2019
2020

2020

Delegated Act: Definition and calculation methodology of the SRI

Implementing Act: Technical modalities for the effective implementation

Set up of the SRI support team : Start of the testing phase at national level- technical assistance for MS & EC

2021 - 2023
2022

MS Test phases start

EPBD Recast with new provisions for SRI, i.e. article 15 & annex

2024

SMART2 ENHANCING THE INTELLIGENCE OF BUILDINGS IN EUROPE

Smart Ready GO!

R2M RESEARCH TO MARKET SOLUTION

The 2024/2175 directive – what is new?

Mandatory Implementation: Starting in June 2027, the SRI will become mandatory for all new and existing buildings with a heating capacity exceeding 290 kW. This aims to encourage the integration of smart technologies that enhance energy efficiency and operational performance.

Alignment with Energy Performance Certificates (EPCs): The SRI requirements are designed to align closely with those of Energy Performance Certificates, ensuring that assessments of smart readiness and energy performance are harmonized, providing a more comprehensive view of a building's efficiency.

The 2024/2175 directive – what is new?

Quality Control of Assessors: The directive introduces stricter quality control measures for assessors who evaluate the smart readiness of buildings. This includes enhanced training requirements, certification processes, and regular audits to maintain high standards of assessment.

Enhanced Registries: Under the new provisions, the registries that record SRI and EPC data will be upgraded to ensure better data accuracy, accessibility, and security. These improvements aim to facilitate better tracking of building performance and compliance with the directive.

What is the current status of the SRI?

Launch of test phases by voluntary countries

2022

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

National Testing Phase - ITALIA

In italia la fase ufficiale di test è iniziata a Febbraio 2025 e avrà durata di 12 mesi.

E’ gestita dal Ministero dell’Ambiente e della Sicurezza Energetica, tramite l’attività di ENEA.

National Testing Phase

Adaptation to Local Needs: Member States test the SRI catalogue to tailor it to specific national conditions, ensuring relevance and effectiveness.

Implementation Trial: This stage involves pilot testing the SRI framework to identify and resolve practical issues before full-scale implementation.

Feedback and Adjustment: Feedback from the testing phase is used to refine and adjust the SRI criteria, optimizing it for mandatory rollout.

Alcuni strumenti utili

- SmartReadyGo
  - la piattaforma web per il calcolo e la gestione degli assessment SRI
- Virtual Training Centre
  - la piattaforma web per la formazione sull'SRI
- SCAN2SRI
  - La realtà virtuale e la scansione 3D integrate con SRI
- Contatti per testare e approfondire

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Smart Ready Go!

Valutazioni SRI professionali

Piattaforma completa per l'SRI

Visualizzazione dei Risultati

Gestione del Portfolio

Esperienza, Supporto e Formazione

Smart Ready Go è il punto di riferimento per i Certificatori SRI

Un prodotto ideato e progettato da

EUPHYIA
www.euphyia-tech.com

Distributore ufficiale in Italia

R2M SOLUTION
RESEARCH TO MARKET

Report dei risultati

SMART READINESS INDICATOR - ASSESSMENT

Building's Name	Date of Assessment	Assessor's Name	Building's Type
Blocco EX1	28-03-2025	Marco Pietrobon, Milad Zoghi	Non Residential
Building's Usage	**Location**	**Building's Net Floor Area**	**Year of Construction**
Non-residential office	Italy	1588 m²	>2010

Aggregated Scores

- Optimise energy efficiency and overall in-use performance — 60.13%
- Adapt its operation to the needs of the occupant — 60.82%
- Adapt to signals from the grid (energy flexibility) — 7.53%

SRI Score

Class E

42.83%

G F E D C B A

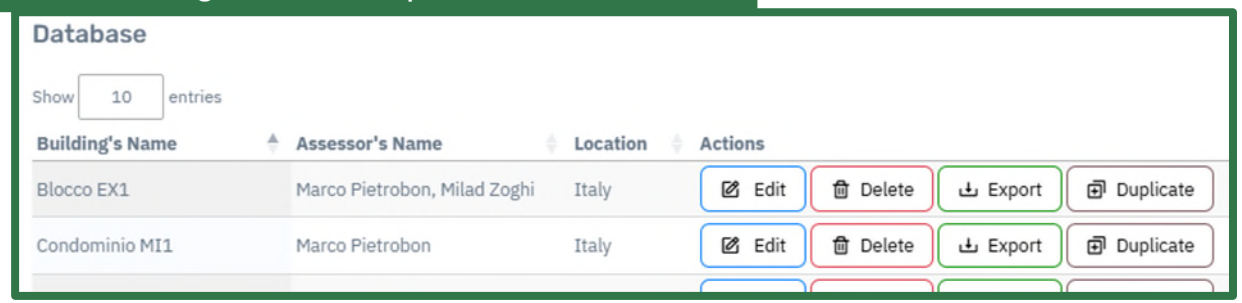
	Energy Efficiency	Maintenance & Fault Prediction	Comfort	Convenience	Health, Well-being and Accessibility	Information to Occupants	Energy Flexibility & Storage	SRI
Total	59.10%	7.53%	55.78%	55.21%	60.58%	61.17%	71.70%	42.83 %
Heating	53.33 %	0 %	62.50 %	62 %	66.67 %	49 %	100 %	
DHW	100 %	0 %	0 %	0 %	0 %	50 %	100 %	
Cooling	73.33 %	16.67 %	62.50 %	50 %	66.67 %	50 %	100 %	
Ventilation	54.55 %	0 %	42.86 %	50 %	62.50 %	100 %	100 %	
Lighting	100 %	0 %	100 %	100 %	100 %	0 %	0 %	
DE	0 %	0 %	0 %	0 %	0 %	0 %	0 %	
Electricity	75 %	0 %	0 %	0 %	0 %	50 %	100 %	
EV	0 %	25 %	0 %	83.33 %	0 %	0 %	0 %	
M&C	50 %	11.11 %	66.67 %	58.82 %	75 %	72.73 %	66.67 %	

File esportabili (PDF, JSON, XLSX, CSV, …)

SRI Assessment	Documento Adobe Acrobat
Building_815_Export	Cartella compressa
Building_815_Export	File JSON
detailed_scores	File JSON
domain_scores	Foglio di lavoro di Microsoft Excel
domain_scores	File con valori separati da virgola (CSV)

Inquadra il QR code per approfondire e testare gratuitamente

Database di gestione del portfolio



SMART READINESS

VIRTUAL TRAINING CENTRE

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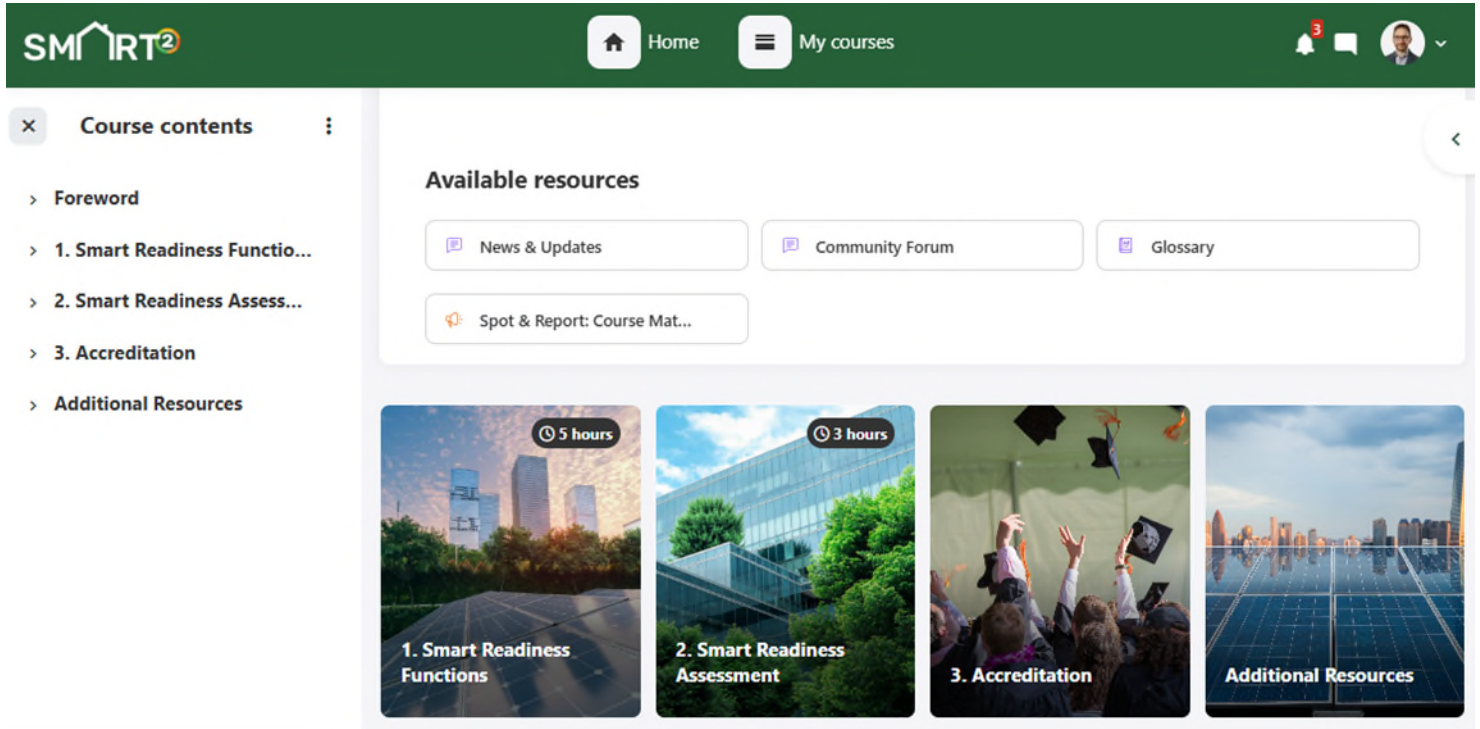
SMART READINESS
VIRTUAL TRAINING CENTRE



- Gratuito
- Completo e aggiornato
- Riferimenti di esempi pratici
- Quiz ed esercitazioni
- Community forum
- Presto disponibile anche in Italiano
- Diploma e riconoscimento visualizzabili anche su LinkedIn

Inquadra il QR code per approfondire gratuitamente

Smart Readiness Virtual Training Centre

This is to certify that

Milad Zoghi

has successfully completed the course

Smart Readiness of Buildings

with a grade of

7.37

The recognition of **Smart Readiness Specialist** is awarded

Issued on: 27/03/25

Credential ID: O3dmLXj3vk

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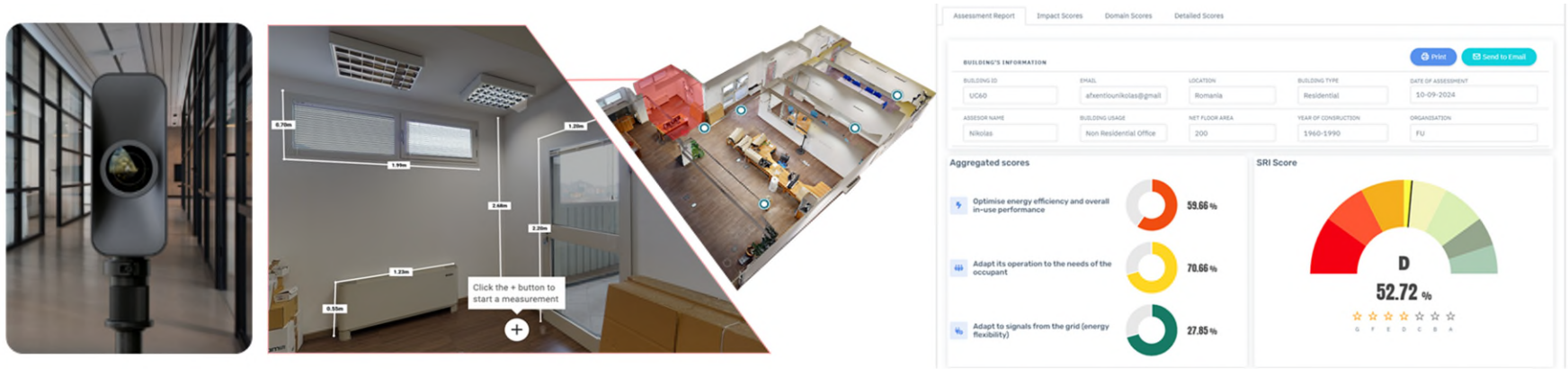
Congratulations!
Milad Zoghi

First REHVA certification in Italy



SCAN2SRI:
3D IMMERSIVE, SRI-ENABLED 3D NAVIGABLE MODELS

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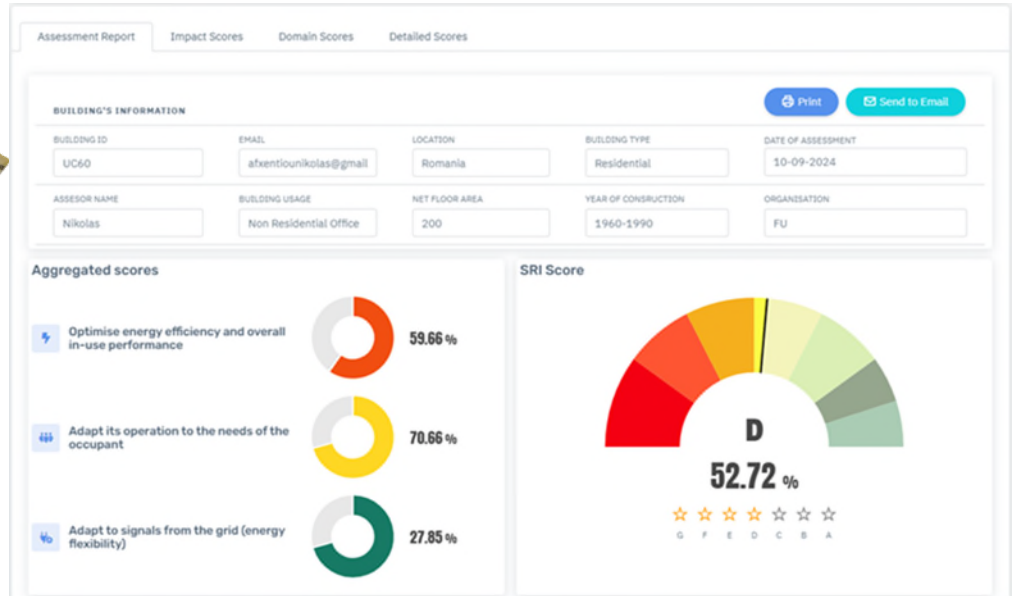
SCAN2SRI: 3D Immersive, SRI-Enabled 3D Navigable Models



MATTERPORT is a scanning technology to make point clouds and 3D Immersive Environments

Smart Ready Go! is a software tool for calculating the Smart Readiness Indicator – an indicated that assesses a buildings smartness with respect to people, technologies and the grid.

Building on work in the **Smart Square** Horizon Europe Life Project, and funded by the **SUSTAIN Eurocluster** Open Calls, **SCAN2SRI** brings the Smart Readiness Indicator to building stakeholders in new and intuitive ways. **From a 3D Navigable Model** – see SRI assessment data. **From SRI results**, see the relevant parts of the 3D navigable model.

SUSTAIN

Co-funded by the European Union

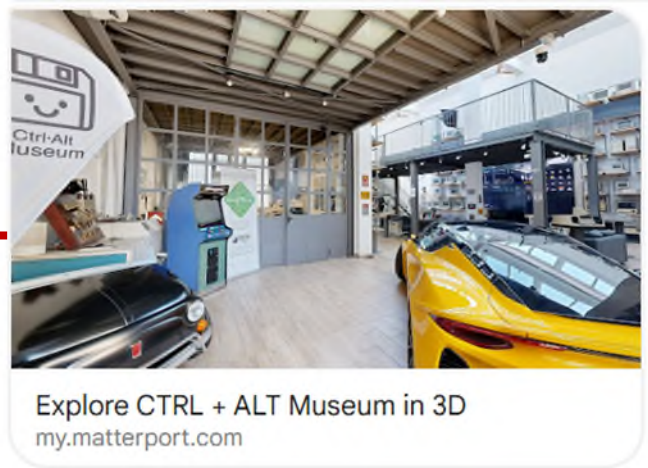
Smart Ready GO!

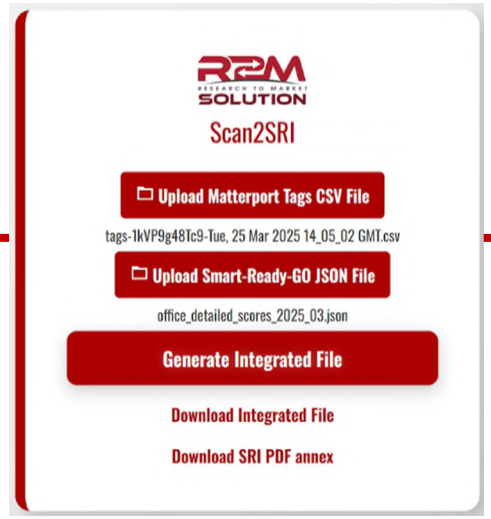
SMART2 ENHANCING THE INTELLIGENCE OF BUILDINGS IN EUROPE

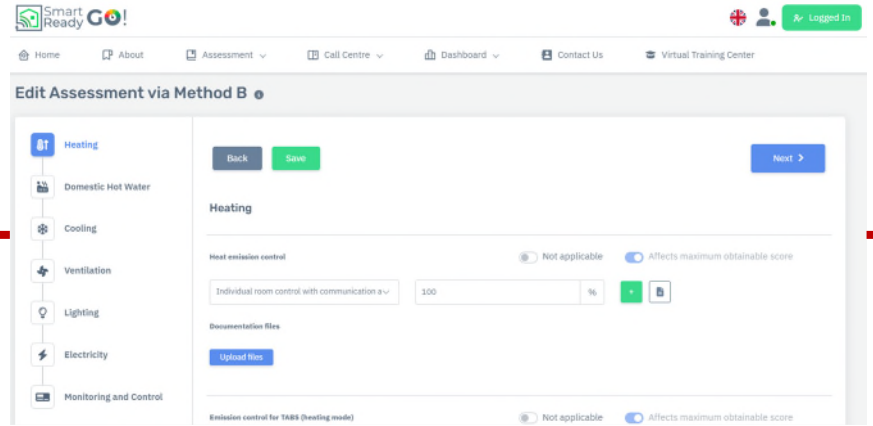
R2M RESEARCH TO MARKET SOLUTION


Presented by R2M Solution
Nuovi Uffici R2M - 10 Dicembre - Fase 7 Fi...
SRI
R2M
RESEARCH TO MARKET
SOLUTION
Help | Terms Matterport

CTRL ALT Museum - SRI Evaluation & Scan







CASO STUDIO
Due soluzioni innovative applicate in La Forgiatura

SRI Assessment Platform
for Building Assessors

Cloud-based HVAC
Optimization using AI

La Forgiatura: Pilota per Smart^2 con Smart Ready Go! e Brainbox AI

Indirizzo: Via Varesina 162, Milano
Superficie costruita: 20.813 m^2
Area lotto: 17.000 m^2
Esempio di riqualificazione urbana avvenuto tra 2013 e 2016

Campus formato da 10 edifici ad uso uffici.

Attualmente 9 sono controllati dall'intelligenza artificiale.

Ulteriori installazioni per espandere il perimetro di controllo sono previste per il 2025.

SMART2 ENHANCING THE INTELLIGENCE OF BUILDINGS IN EUROPE
Smart Ready GO!
R2M RESEARCH TO MARKET SOLUTION

La Forgiatura: Algoritmi IA

Algoritmi di BrainBox AI attualmente impiegati in La Forgiatura per gli impianti di riscaldamento, raffrescamento e ventilazione

OPTIMUS

L'obiettivo di Optimus è quello di risparmiare quanta più energia possibile gestendo l'avvio e l'arresto ottimali del sistema HVAC. Utilizza le previsioni di temperatura dell'AI e controlla le condizioni di temperatura dell'aria esterna e le condizioni dell'edificio per decidere quando è il momento ottimale per avviare e arrestare i sistemi.

WATERCLOCK

Questo algoritmo modulerà la temperatura di mandata dei refrigeratori e/o delle caldaie in base alla temperatura dell'aria esterna presente e prevista e al carico termico previsto dell'edificio. Ciò significa scrivere sui setpoint, che si tratti di refrigeratori e caldaie o di torri di raffreddamento con ventole a velocità variabile. Ha una relazione di lavoro con i seguenti algoritmi: Optimus, Parachute e Kalt.

\+

MONITORAGGIO continuo, individuazione delle soglie per rilevamento guasti

La Forgiatura: Efficientamento energetico con IA

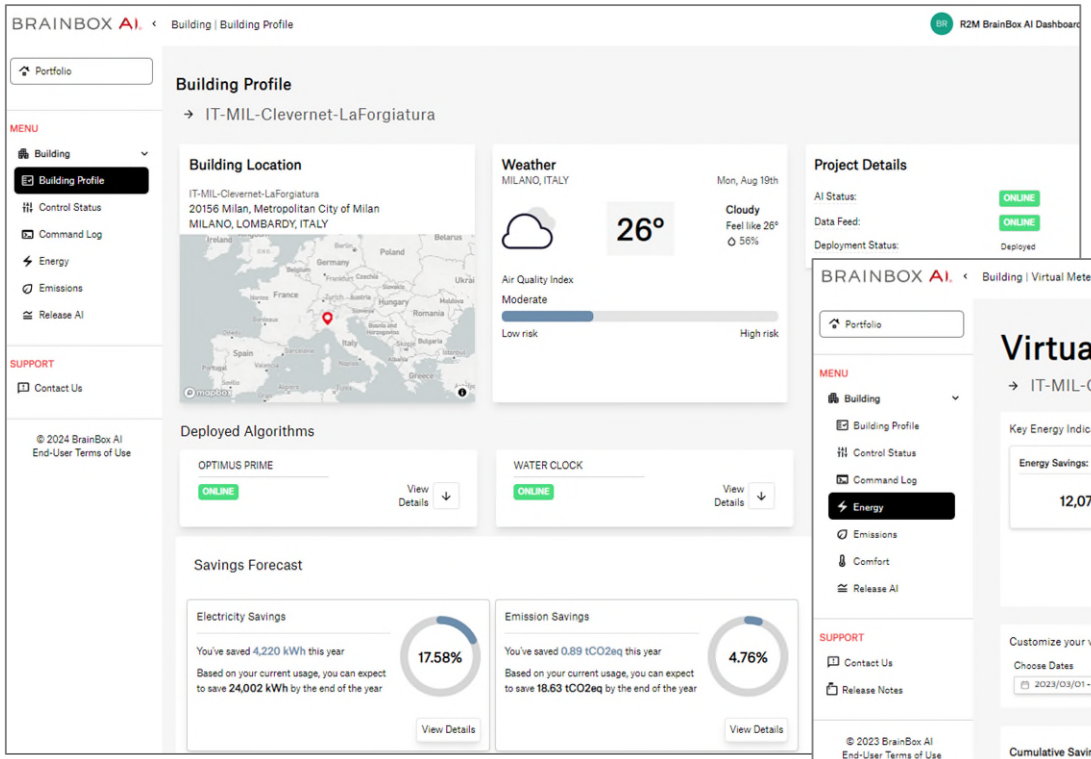
26% di risparmio di energia elettrica* da Feb-2022 ad Ago-2024
corrispondenti a 183.300 kWh di risparmio di energia elettrica e a **45.549 €*** di risparmi di costi per l'energia sui componenti di impianto controllati da BrainBox AI

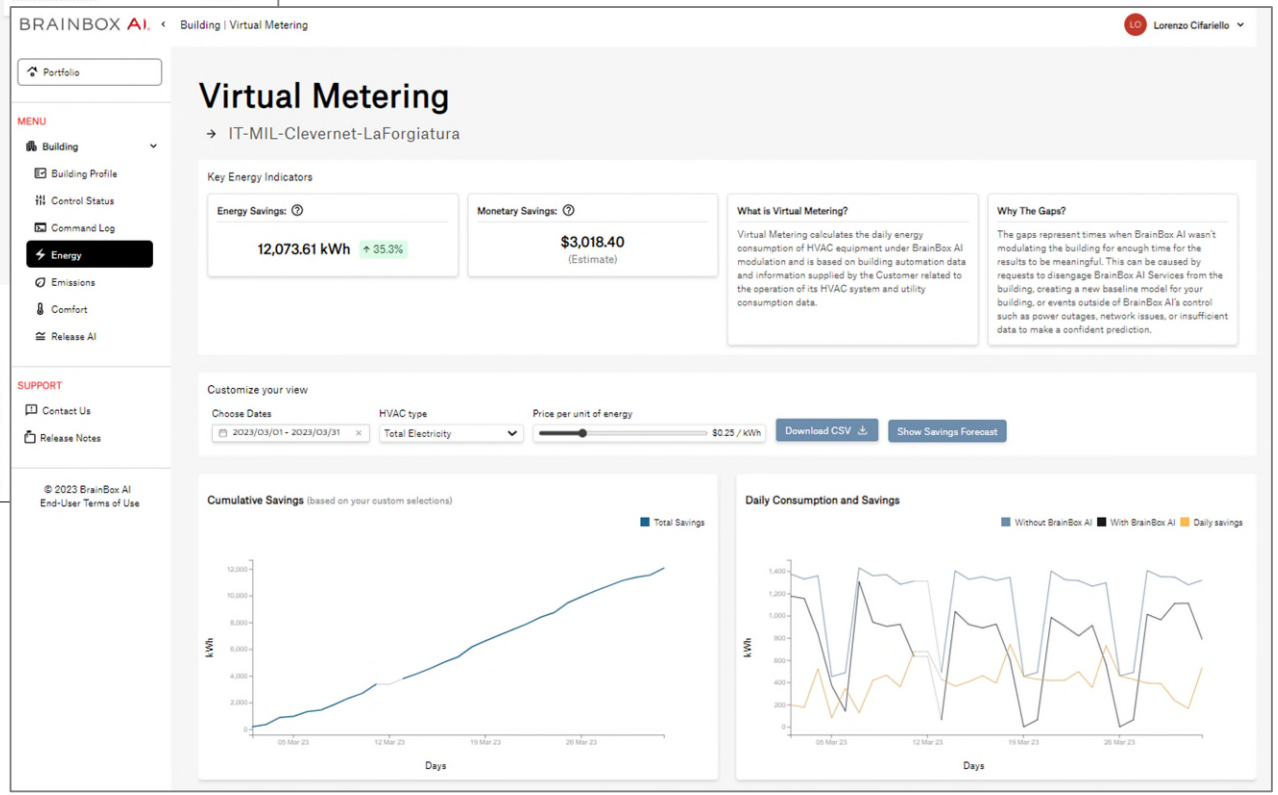
Year	Electricity (kWh)	% Savings	Total* (€)
2022	26.950	12,9%	6.697
2023	100.954	31,4%	25.087
2024 YTD	55.397	32,5%	13.766
TOTAL	**183.300**	**26,1%**	**45.549**

In aggiunta a questi, sono stati ottenuti ulteriori risparmi in termini di minore richiesta di energia termica per il riscaldamento e il raffreddamento delle pompe di calore polivalenti centrali, che non sono inclusi nei valori sopra indicati, ma sono stati ottenuti anche in termini di ulteriore risparmio di energia elettrica per le pompe di calore.

*Risparmio normalizzato in funzione delle condizioni climatiche, calcolato rispetto al 2021 anno pre-applicazione di AI, e prezzo medio dell'energia di 0,248 €/kWh

La Forgiatura: Dashboard di controllo e visualizzazione, in cloud





La Forgiatura: SRI ed impatti dell'IA

SRI assessment con Metodo B – per l'edificio Raimondi

Senza IA

SMART READINESS INDICATOR - ASSESSMENT

Building ID F11_Raimondi	**Date of Assessment** 14-02-2025	**Assesor Name** Milad Zoghi	**Building Type** Non Residential
Building Usage Non-residential educational	**Location** Italy	**Net Floor Area** 8403.84 m²	**Year Of Construction** >2010

Aggregated Scores

- Optimise energy efficiency and overall in-use performance — 34.95%
- Adapt its operation to the needs of the occupant — 30%
- Adapt to signals from the grid (energy flexibility) — 11.22%

SRI Score

Class F

25.39%

G F E D C B A

Apporto dell' IA su HVAC

Con IA

SMART READINESS INDICATOR - ASSESSMENT

Building ID F11_Raimondi - post AI	**Date of Assessment** 17-02-2025	**Assesor Name** Milad Zoghi	**Building Type** Non Residential
Building Usage Non-residential educational	**Location** Italy	**Net Floor Area** 8403.84 m²	**Year Of Construction** >2010

Aggregated Scores

- Optimise energy efficiency and overall in-use performance — 53.30%
- Adapt its operation to the needs of the occupant — 42.92%
- Adapt to signals from the grid (energy flexibility) — 21.77%

SRI Score

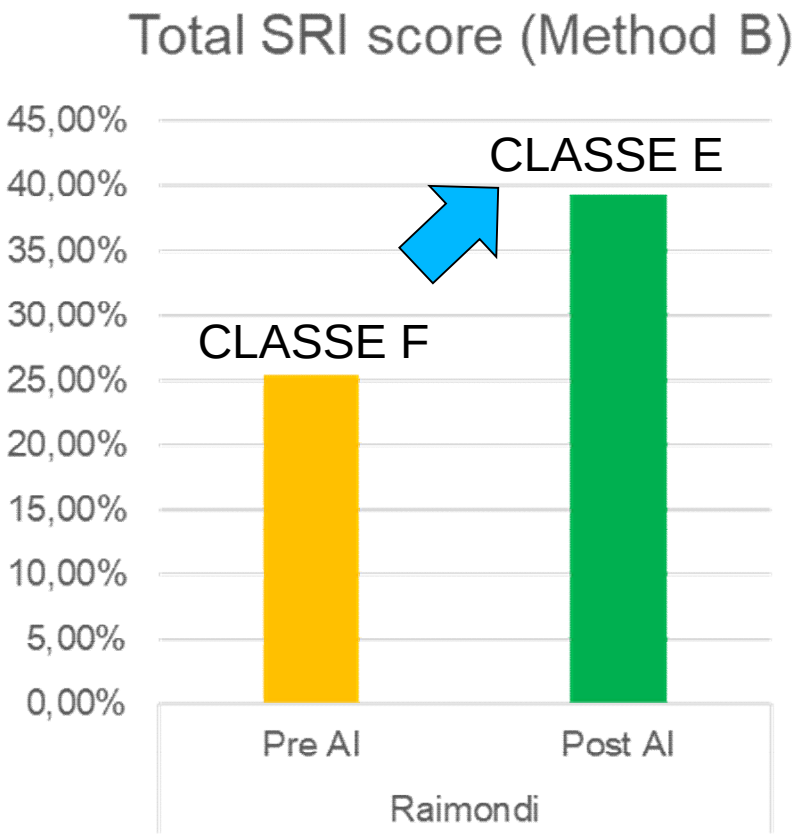
Class E

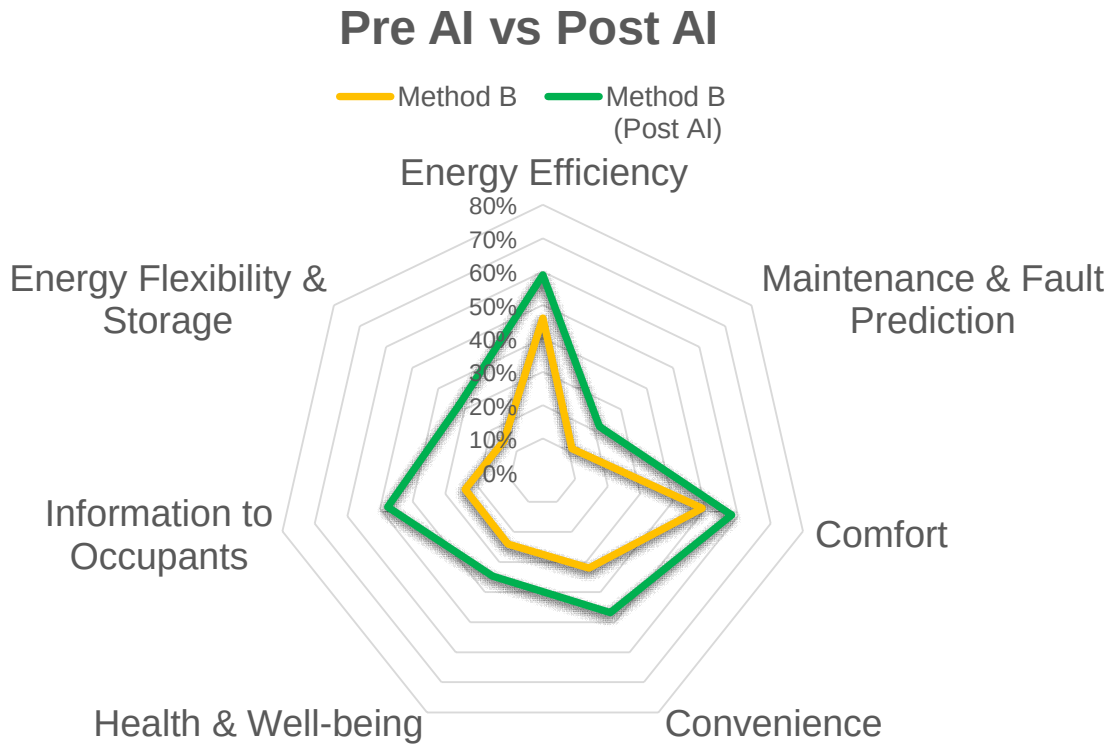
39.33%

G F E D C B A

La Forgiatura: SRI ed impatti dell'IA

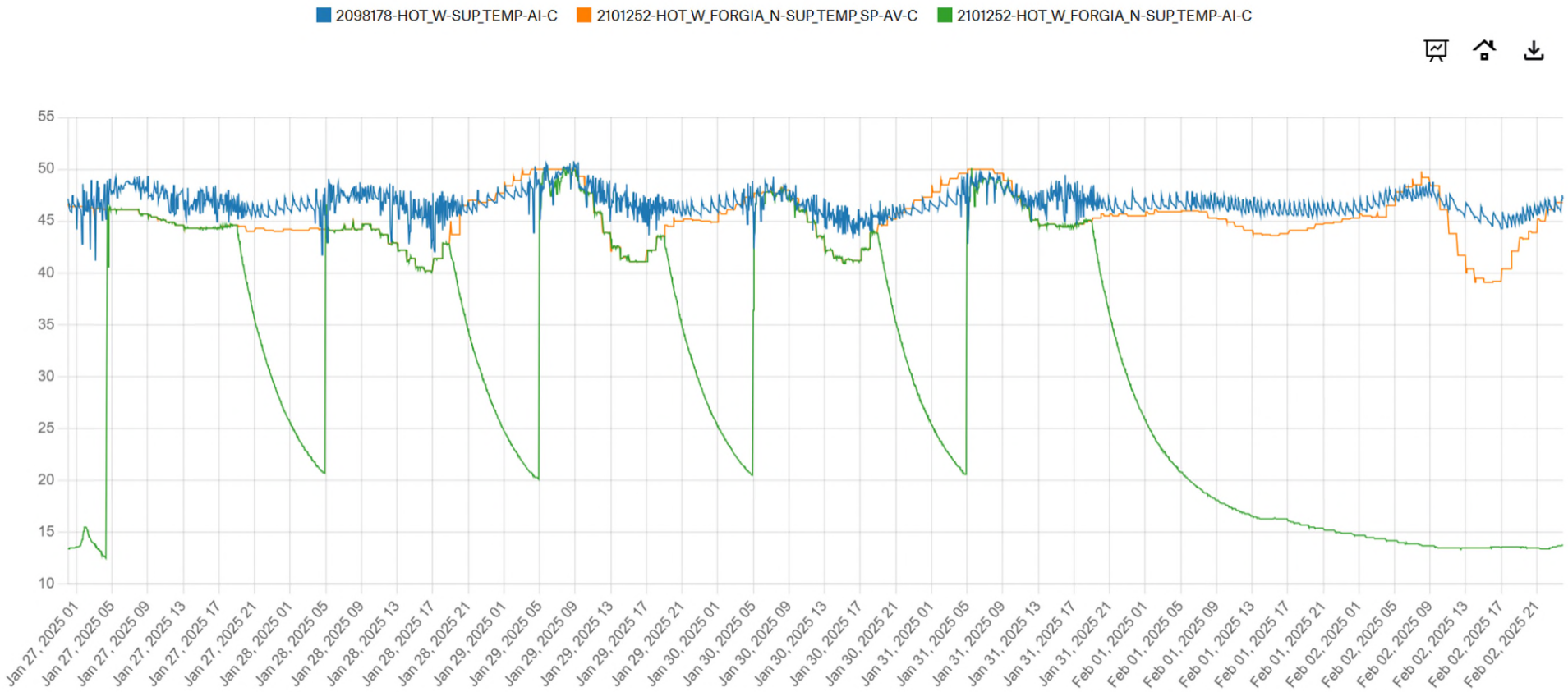
SRI assessment Metodo B – Edificio Raimondi





La Forgiatura: SRI ed impatti dell'IA

Analisi sui dati misurati dal pilota Forgiatura, un esempio



La Forgiatura: Livelli di funzionalità del SRI impattati dall'IA

Grazie all'intelligenza artificiale, livelli di funzionalità più elevati nei seguenti

- Reportistica dei KPI e delle performance agli utenti
- Gestione predittiva e rilevamento guasti
- Flessibilità mediante controllo ottimale da auto-apprendimento
- Controllo delle temperature del fluido di distribuzione, basato sulla domanda
- Gestione del tempo di funzionamento dei sistemi HVAC, mediante controllo predittivo
- Rilevamento dei guasti in maniera automatica
- Un'unica piattaforma per il controllo, il coordinamento e l'ottimizzazione automatizzati, attraverso predizione delle condizioni meteorologiche

+

Altre possibilità con l'implementazione di ulteriori algoritmi di intelligenza artificiale (ad esempio per quanto riguarda la gestione della domanda e l'interazione con la rete, o il freecooling, ecc.)

Grazie

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r2msolution.com