



CiM:



The Circularity Module

Transforming Building Infrastructure Through
Verifiable Sustainability (*Hospital Proof of Concept*)

Strategic Imperatives

Digital Transformation

Over 80% of hospitals have adopted cybersecurity and digitalisation. Digital solutions deliver positive ROI through streamlined workflows, reduced operational costs, and fewer process' errors.

CiM bridges both imperatives: transforming dispersed data into verifiable evidence that enables comparison, prioritisation, and audit-ready compliance under the European LEVEL(s) framework.

Environmental Accountability

Buildings consume half of all extracted materials and energy in Europe. Leading hospitals have achieved 20% water reduction and 60% emissions cuts, turning sustainability into competitive advantage.



COGNITIVE HOSPITAL (PoC Project)



Led by SACYR

€6.1M total budget, €2.9M grant from Community of Madrid, co-funded by EU Funds



Expert Consortium

Cuatro Digital, Sener, Fractal, Aptica and OpenIngenius collaborate on R&D developments



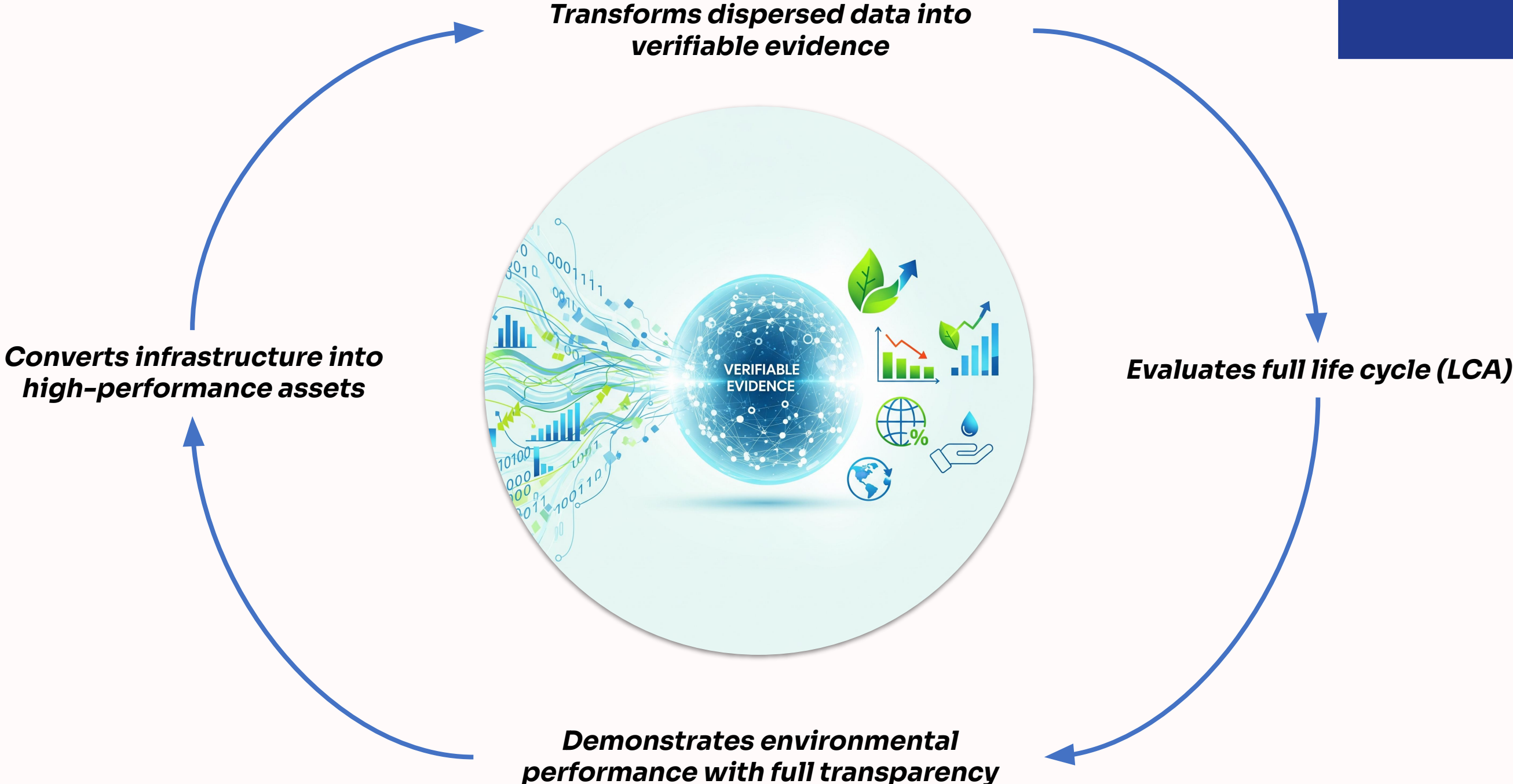
CUATRO DIGITAL's CiM

Integrates with Central platform, consuming data from BMS/SCADA, IoT, CMMS, procurement, waste, and BIM

CiM generates the Digital Building Passport (DBP) and projects Life Cycle Assessment indicators—embodied and operational—aligned with LEVEL(s) framework covering design, construction, operation, and deconstruction.



Circularity Module advantages



How CiM Works: Technology Foundation



Data Integration

Consumes data from BMS/SCADA, IoT sensors, CMMS, procurement systems, waste tracking, and BIM models



Blockchain Notarisation

Time series, reports, EPDs, waste notes, and work orders receive cryptographic hash + timestamp for immutability



IPFS Storage

Distributed file system preserves content, identified by content hash for permanent accessibility



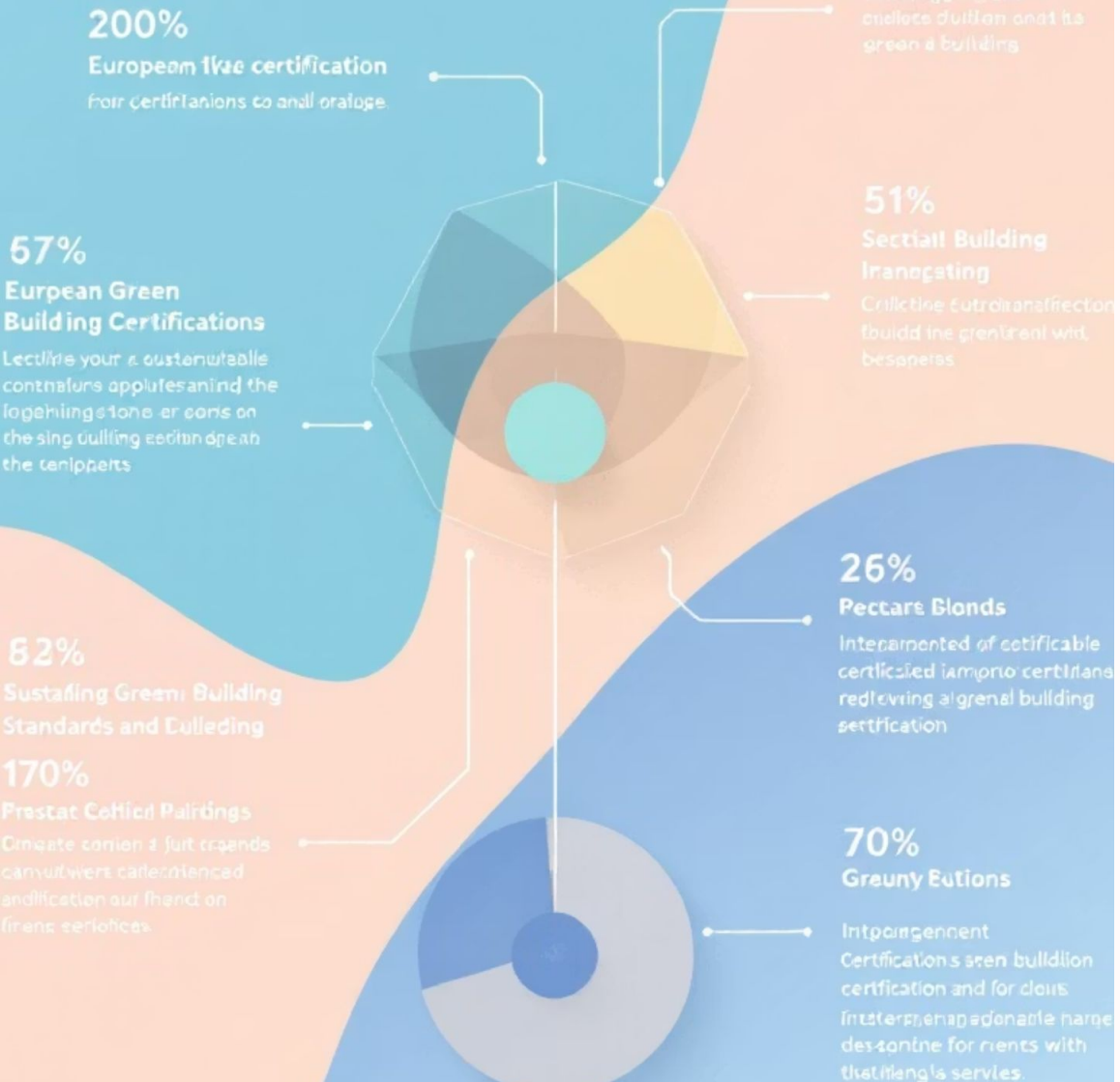
Digital Passport

Generates DBP with auditable KPIs aligned to LEVEL(s) framework for life cycle transparency

- ❑ **Blockchain Advantage:** Data immutability prevents manipulation, certification ensures authenticity, and traceability guarantees transparency—invaluable for green financing and strategic leadership.

Sustaining DurinerCed CERTIFICATION

The sustainable building industry certification certifications based on a number of European Green Building standards



LEVEL(s) Framework Alignment

CiM maps directly to European LEVEL(s) macro-objectives, providing a common language for comparing buildings and prioritising actions by life cycle impact.

- 1 GHG Emissions**
Notarises energy consumption indicators and material contribution to Global Warming Potential (kg eq. CO₂/m²/year)
- 2 Circular Economy**
Records construction materials, waste, Building LCA, and LCA-based evaluations for resource efficiency
- 3 Water Efficiency**
Monitors and notarises water consumption in facilities (m³/occupant/year)
- 4 Healthy Spaces**
Environmental quality module improves thermal comfort, air quality, lighting, and acoustic levels
- 5 Adaption and resilience to climate change**
Monitors building performance against a changing climate and extreme weather
- 6 Optimised life cycle cost and value**
Takes a long term view of the full life costs and market value

Ex. Greenhouse gas emissions

Some examples...

Ex. Healthy and comfortable spaces

Ex. Building overview

Hospital del Henares > Greenhouse gas emissions

Overview

Macro-objectives

- Greenhouse gas emissions
- Materials life cycle
- Efficient water usage
- Healthy and comfortable spaces

English

Energy efficiency in use phase

EPC rating

An action plan has been sent to improve the rating

CONSUMO DE ENERGÍA PRIMARIA NO RENOVABLE [kWh/m² año]	EMISIONES DE DIOXIDO DE CARBONO [kgCO2/m² año]
1246.8	223.4

Energy consumption graphic in kWh for the selected days.

01/09/2025 08/09/2025 [Get energy graphic](#)

Global warming potential

Greenhouse gas emissions generated by the different elements involved in construction.

- Electricity and Lighting
- Plumbing
- Civil Works
- Insulation
- Masonry (partitions)
- Architecture
- Exterior Carpentry
- Interior Carpentry
- Foundations and Retaining
- Roofing
- Structure
- False Ceiling
- Artificial Stone
- Painting and Coating
- Sewerage and Rainwater
- Flooring
- Urbanization
- Glazing

Hospital Cognitivo Digital Building Passport

Hospital del Henares > Healthy and comfortable spaces

General view

Overview

Macro-objectives

- Greenhouse gas emissions
- Materials life cycle
- Efficient water usage
- Healthy and comfortable spaces

English

Light

Exit fullscreen

Indoor air quality

Indoor air quality metrics

Average time of acceptable air quality

Lighting and visual comfort

Lighting and visual comfort metrics

Time outside thermal comfort range

Time outside thermal comfort range metrics

Average time of acceptable temperature

Acoustics and noise protection

Acoustics and noise protection metrics

Hospital Cognitivo Digital Building Passport

Hospital del Henares > Overview

Overview

General information about the element

General information

Identifier: Hospital del Henares

Use/element: Building

Description: Healthcare center built by the Community of Madrid that opened its doors on February 11, 2008 to provide specialized, close and highest quality care to the residents of Coslada, San Fernando de Henares, Mejorada del Campo, Loeches and Velilla de San Antonio.

Geographic location: [View on map](#)

Available certifications: [Download](#)

Blockchain Information: [Block Explorer](#)

Technical Details

Dimensions: Total built surface of 75,800.05 m²

Construction year: 2008

Transformative Benefits

Strategic

Prioritisation

LCA identifies real impact concentration. Technical management prioritises by life cycle impact—repair vs. replace, EPD procurement—reducing operational costs.

Green Financing

Access

DBP provides "due-diligence ready" package with verifiable evidence, accelerating audits and tenders whilst improving access to preferential ESG financing.

Real Comparability

LEVEL(s) alignment enables objective comparison between hospitals and time periods, identifying benchmarks for strategic capital allocation.

Competitive Edge

Verifiable ESG leadership strengthens reputation, attracts top talent, and grants strategic advantage in tenders demanding sustainability criteria.

Return on Investment: Dual Value Creation

For Operators/Owners

Operational ROI: Reduced O&M costs through predictive LCA-based management

Financial Optimisation: Access to green financing at preferential rates lowers capital cost

Portfolio ROI: LEVEL(s) benchmarking enables strategic allocation across multiple facilities

Human Capital: Improved work environment attracts high-level professionals

Future of Asset Management

CiM converts dispersed data into verifiable evidence, enabling operators and/or owners to demonstrate environmental performance with unprecedented transparency.

1

Maintenance Integration

API evolution captures detailed operations from CMMS, calculating sustainability indicators with precision

2

BIM as Living Database

Spatial analysis by floor, department, or zone enables hyper-contextualised sustainability management

3

Complementary KPIs

Smart Readiness Indicator (SRI) and custom metrics enrich Digital Passport beyond mandatory compliance

CiM is not just a technical layer—it's a strategic investment that transforms hospital infrastructure into high-performing, verifiable, and future-ready assets.



THANK YOU



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