NEW DIGITAL TOOLS

FOR THE BUILDING SECTOR

CHRONICLE

Research and Innovation

Results from the EU-funded CHRONICLE project

New Digital Tools for the Building Sector

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www.chronicle-project.eu

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CHRONICLE

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Innovative Tools for the Building Sector

The EU-funded CHRONICLE project has developed a set of tools to support digitalisation of the building sector. The tools serve to:

- improve building performance
- monitor energy consumption
- develop more cost-effective, long-term maintenance and renovation plans

The goal is to meet sustainability targets while ensuring adequate comfort for residents by considering environmental, technical, financial and social aspects.

In this brochure, you can explore our cutting-edge innovations to optimise building performance and stay ahead in the industry. Discover our tools to support you to take the next step towards sustainability in construction.

Solutions for Building Professionals

The CHRONICLE solutions encompass two back-end components for the operation of the apps: **Common Data Environment** (tool 1) and **Digital Twin Framework** (tool 2 and 3).

The apps will benefit the following professionals in the building sector:

Facility Managers (FM):	ChroViewREN (tool 4) ChroViewFM (tool 7) ChroViewPlus (tool 8)
Energy Service Companies (ESCO):	ChroViewPlus (tool 8)
Architecture, Engineering & Construction (AEC):	ChroViewREN (tool 4 + 5) ChroViewPlus (tool 8)
Building Owners and Investors:	ChroViewREN (tool 4 + 5) ChroViewDBL (tool 6) ChroViewPlus (tool 8)
Building Residents:	ChroViewREN (tool 4) ChroViewOcc (tool 9)

Purpose of the CHRONICLE Solutions

CHRONICLE has developed a holistic building performance assessment framework extending throughout all building phases. The project promotes the transformation of existing and new buildings into highly efficient and fully digitalised buildings of the future.

Dynamic and fully digitalised processes

CHRONICLE has developed a powerful Digital Twin mechanism, accurately simulating building performance based on static building information and real-life data collected through a smart device network installed on site for the continuous monitoring of building operations.

Performance assessment beyond energy

The building performance evaluation in CHRONICLE is based primarily on its energy consumption, but investigates a wide selection of environmental, financial, comfort and well-being parameters throughout the building's lifetime.

Building digitalisation through a data governance framework

The CHRONICLE Common Data Environment and Dynamic Building Logbook provide a robust framework for secure and interoperable governance of building data and milestone information throughout the building's lifetime.

Efficient and targeted building maintenance & renovation

CHRONICLE delivers a suite of tools which will enable different stakeholders to monitor and maintain their building in a proactive manner and create a renovation roadmap tailored to their building's needs, increasing the effectiveness of the selected interventions while reducing financial risks.

Performance assessment beyond energy

On top of its powerful tools and calculation mechanisms, CHRONICLE has developed comprehensive user interfaces aimed at a wide list of stakeholders.

Innovative business models

To evaluate the technological solutions and advanced services, CHRONICLE has investigated a number of use cases and applications towards defining innovative business models for the relevant stakeholders.

TOOL 1

TO ENSURE THE EFFICIENT MANAGEMENT OF BOTH STATIC AND DYNAMIC BUILDING INFORMATION

CHRONICLE Common Data Environment

Description

The Common Data Environment (CDE) is a cloudbased data management framework that enables secure, consistent and interoperable data exchange among project components and stakeholders.

Designed around principles of semantic interoperability, it supports the integration of static BIM (Building Information Modeling) data, dynamic IoT data from diverse sources, performance analytics and renovation scenario modelling into a unified digital environment.

Features & Benefits

Serving as the central hub for digital twin operations, the CDE ensures that heterogeneous data is harmonised, accessible and meaningful. It facilitates real-time data ingestion, long-term storage and structured querying to support use cases such as monitoring, performance assessment and certification.

It ensures that authorised stakeholders – including facility managers, ESCOs, AEC professionals, building owners, investors, and building residents – can access consistent, reliable and up-to-date project information throughout the building's lifecycle via ChroViewFM (tool 7), the CDE's front-end UI, exposed API calls, or complementary components and systems that function as part of the same solution.

Developer

QUE Technologies
www.que-tech.com

TOOL 2

A MODEL AND SIMULATION OF THE BUILDING'S PROCESSES BASED ON REAL LIFE DATA

Digital Twin Framework: Data-Driven Digital Twin

Description

The Data-Driven Digital Twin leverages real-life data collected from pilot sites to learn, model and predict energy-related building operations and occupant behaviour, particularly when detailed information is unavailable from static sources like BIM (Building Information Modeling) files.

Based on machine learning algorithms, it simulates the usage patterns of building systems – such as HVAC and electric water heaters – and generates dynamic behavioural profiles including occupancy and comfort preferences. It also supports human-centric KPI calculation and predictive maintenance, complementing and enhancing the accuracy of the simulations produced by the Physics-Based Digital Twin (tool 3).

Features & Benefits

Includes four core subcomponents:

1. ML-Based Asset Profiling Engine
2. Occupancy & Comfort Profiling Engine
3. Human-centric KPI Calculator
4. Predictive Maintenance Analytics module

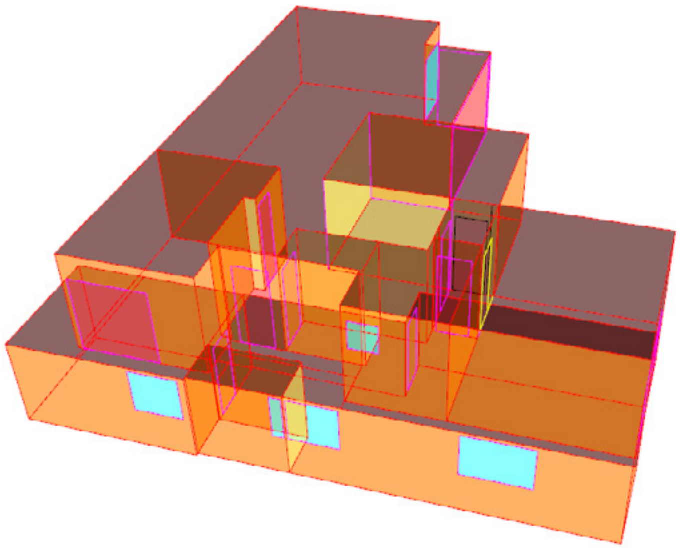
These components enable continuous learning from actual energy consumption and environmental data, allowing for precise profiling of loads and occupant behaviour. This results in improved simulation accuracy, enhanced comfort modelling and early detection of HVAC faults for proactive maintenance. Facility managers, ESCOs and researchers benefit from its ability to provide actionable insights without relying solely on detailed technical documentation – making it ideal for retrofitting scenarios or incomplete digital models.

Developer

Hypertech
Sustainability Research
& Technology Center
www.hsrt.eu

TOOL 3

INTEGRATING ADVANCED DYNAMICS SIMULATION WITH THERMAL MODELLING FOR BUILDING PERFORMANCE



Digital Twin Framework: Physics-Based Digital Twin

Description

The Physics-Based Digital Twin provides a high-fidelity, physics-driven simulation environment for building design and energy performance analysis. It combines advanced simulation techniques with Building Information Modelling (BIM) to create detailed 3D digital replicas of pilot buildings.

This module is the backbone of the CHRONICLE Renovation Planner, using advanced simulations to deliver detailed predictions that support and validate renovation planning results, confirming expected benefits before implementation. Acting as a powerful decision-support tool, it enables dynamic energy modelling for lifecycle planning, while also predicting long-term performance to anticipate maintenance needs and maximise efficiency.

Features & Benefits

The advanced building performance simulation software empowers users to create detailed physics-based digital twins for comprehensive energy and sustainability analysis. Its robust features provide:

- Accurate modelling of building behaviour and system interactions, capturing complex interactions between building elements, systems and environmental conditions.

- Reliable predictions of long-term operational performance.

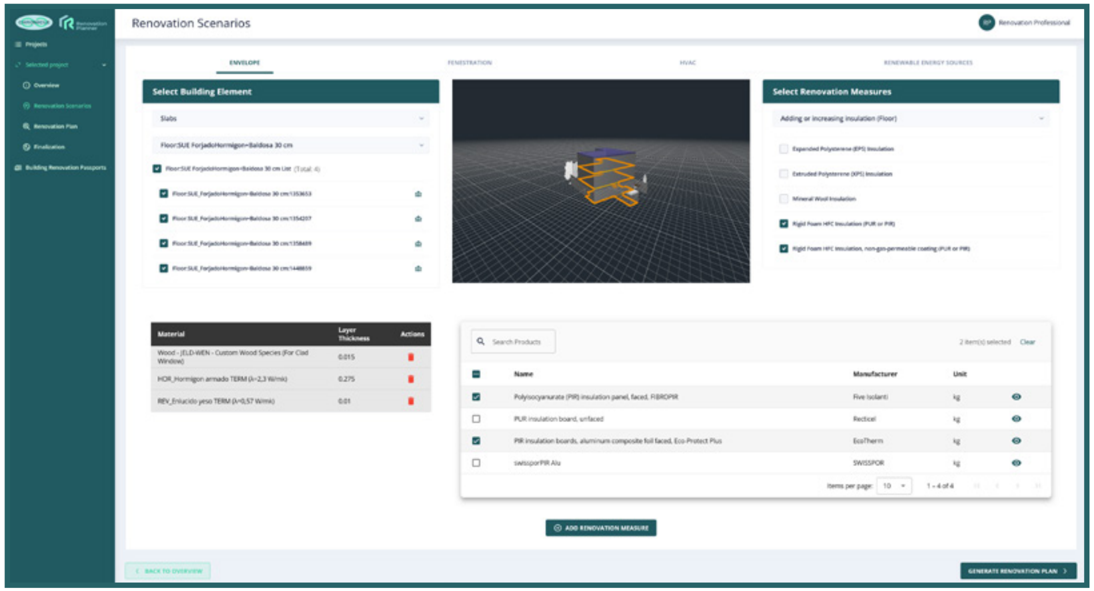
- Comprehensive evaluation of renovation and optimisation scenarios before implementation.

Developer

Integrated Environmental Solutions (IES)
www.iesve.com

TOOL 4

ASSESSMENT OF VARIOUS RENOVATION SCENARIOS OF THE BUILDING, FOCUSED ON OPTIMISING ENERGY PERFORMANCE



ChroViewREN
CHRONICLE Renovation Planner

Description

The Renovation Planner is an application that provides the end-users a customised long-term renovation roadmap tailored to a specific building. It considers the unique characteristics of the building and how these may change over its lifetime.

Furthermore, the generated renovation plans are evaluated through KPIs and the user may select their preferred plan based on the KPIs of greatest significance.

Finally, the Renovation Planner provides a complete Building Renovation Passport including the generated and selected renovation roadmap along with other relevant information like maintenance details, contractor details and public and/or private renovation grants.

The Facility Managers and tenants of the buildings – to be renovated – can inspect the generated Building Renovation Passport and study every detail regarding their building's scheduled renovation.

Features & Benefits

• (Semi-) Automated building renovation planning.

• Prioritisation on improving the building's Energy Consumption and Cost, Whole Life-Cycle Carbon, and Comfort KPIs.

• Complete Building Renovation Passport generation.

• Extensive database of renovation materials, products and systems.

• User friendliness and adaptability to the renovation professionals' standards.

Users

Architecture, Engineering & Construction professionals

Building Owners & Investors

Facility Managers

Building Residents

Developer

Pragma-IoT
www1.pragma-iot.com

CIRCE
www.fcirce.es

TOOL 5

TO FORECAST VALUE AND LIABILITIES RELATED TO BUILDINGS' PERFORMANCE AS WELL AS ENERGY SAVING INVESTMENTS

ChroViewREN
CHRONICLE Investment Appraiser

Description

The Investment Appraiser is an innovative tool designed to analyse buildings' energy-saving investments. It is designed for all stakeholders in the Architecture, Engineering and Construction (AEC) sector – planners, designers and contractors – as well as building owners and investors.

First, the Investment Appraiser focuses on property valuation through Life Cycle Cost (LCC) analysis. This backend solution utilises proven cost KPIs to assess the financial aspects of building performance and renovation scenarios.

Second, the Investment Appraiser calculates the Carbon Bill – a standardised cost metric for building-related emissions – supporting compliance and investment planning.

Features & Benefits

- Accurate Property Valuation: Utilises advanced LCC analysis to provide precise financial assessments.

- Environmental Impact Assessment: Calculates the Carbon Bill to measure and manage emissions related costs.

- Integrated support for renovation planning, investment analysis, and data-driven decisionmaking – powered by CHRONICLE services.

- Informed Decision-Making: Empowers stakeholders with detailed insights into both financial and environmental aspects of building performance.

Users

Architecture, Engineering & Construction professionals

Building Owners & Investors

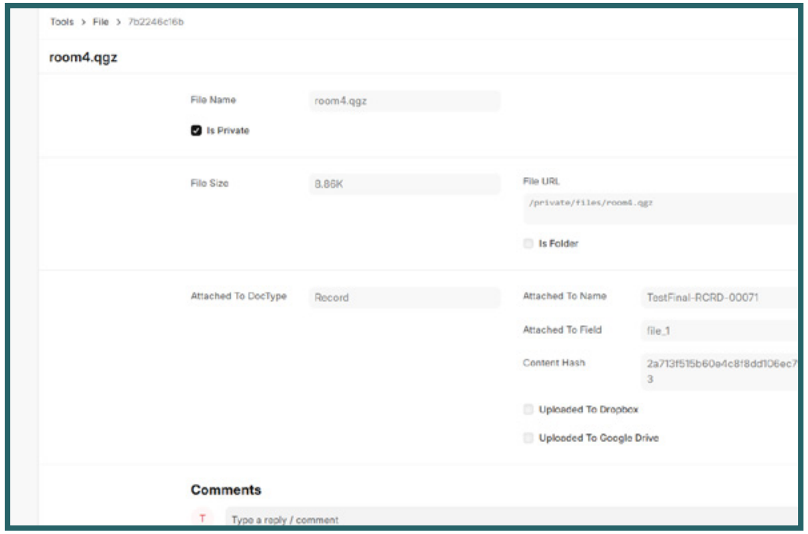
Developer

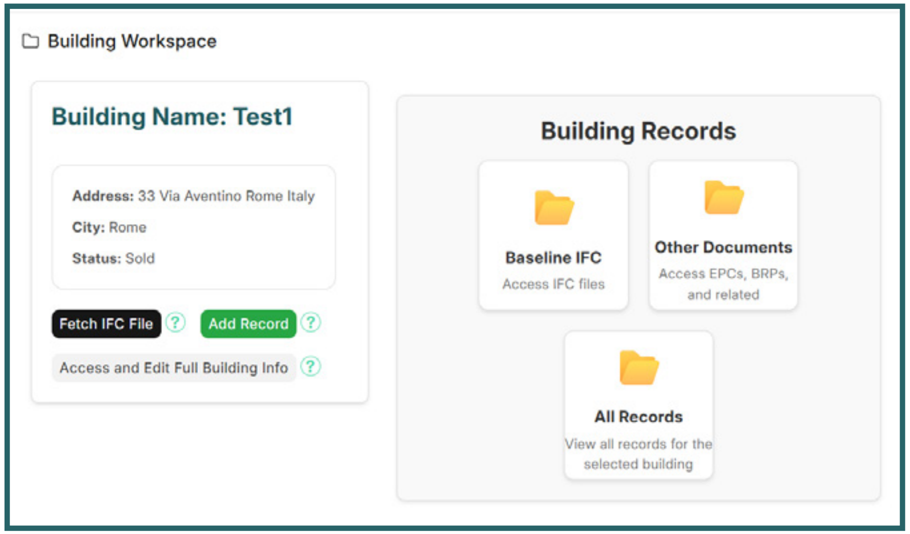
Pragma-IoT
www1.pragma-iot.com

CIRCE
www.fcirce.es

TOOL 6

AN INFORMATION REPOSITORY FOR ALL RELEVANT BUILDING DATA





ChroViewDBL
CHRONICLE Dynamic Building Logbook

Description

ChroViewDBL is a dynamic, BIM-based Digital Building Logbook - a repository for storing the enhanced building information related to performance, renovation advice, housing quality and other building aspects.

A Digital Building Logbook (DBL) is a comprehensive digital repository that serves as a central hub for capturing, storing and managing a wealth of data, documents, and information related to a building's entire lifecycle.

This dynamic tool ensures that valuable insights and records, from construction to ongoing operations, are accessible, shareable and easily comprehensible for stakeholders.

Features & Benefits

ChroViewDBL is a trusted archive of relevant building data, aligned with the rest of the CHRONICLE project tools, by:

• Facilitating access to information, rather than confusing the user with hundreds of disorganised documents.

• Differentiating itself from other construction software solutions by addressing data integrity and traceability in archiving and preserving events, assets, and documents for future use.

ChroViewDBL has a user-friendly design and is fully oriented to interconnectivity, integrity and traceability of the building documentation.

Users

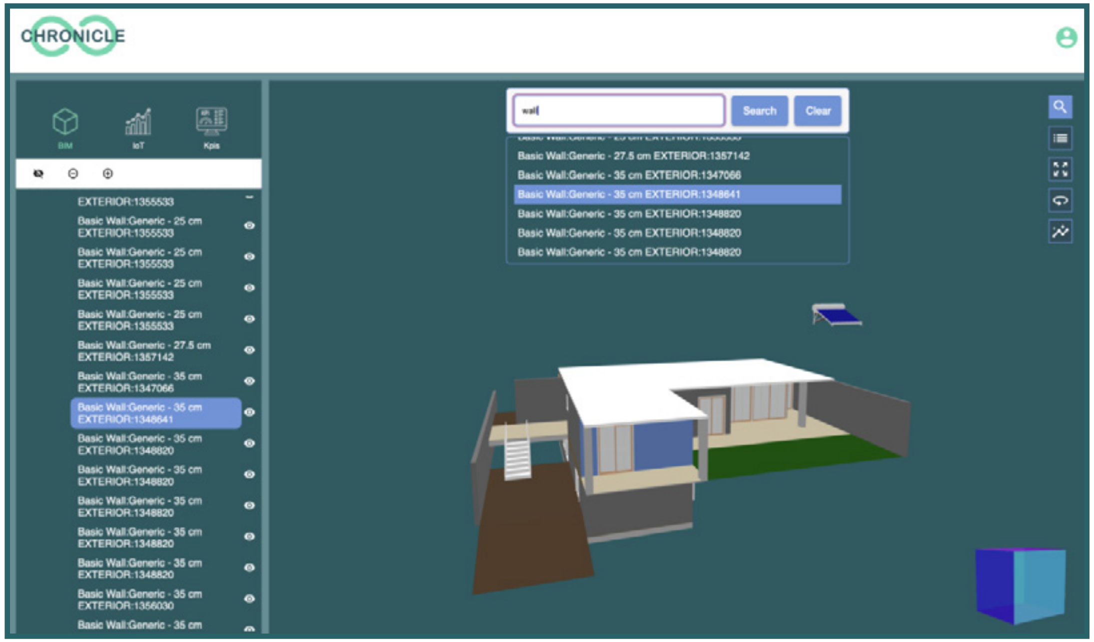
Building Owners

Developer

R2M Solution SRL
www.r2msolution.com

TOOL 7

A DASHBOARD THAT ALLOWS THE USER TO TRACK THE BUILDING'S ENERGY USE AND COMFORT LEVELS



ChroViewFM

3D Visualisation & Monitoring Platform for Facility Managers

Description

An online BIM-based tool that combines 3D visualisation with near-real-time monitoring of building data from smart equipment, including energy use, environmental conditions and key performance indicators such as costs, CO_2 emissions and indoor air quality – supporting data-driven facility management and performance optimisation.

Features & Benefits

With a user-friendly interface, ChroViewFM enables facility managers, architects and BIM modelers to upload and explore IFC files, monitor energy use and comfort levels, and receive alerts for maintenance needs or abnormal equipment behaviour – enhancing operational awareness and proactive decision-making.

Users

Facility Managers

Developer

QUE Technologies
www.que-tech.com

TOOL 8

EXPERT RECOMMENDATIONS AND INDEPTH INSIGHTS TO EFFECTIVELY REDUCE ENERGY CONSUMPTION

ChroViewPlus
Building Operations Insights for Professional Users

Description

ChroViewPlus is a dashboard designed for building operation insights and recommendations on strategies for optimising energy usage. The interface allows users to visualise monitoring live data such as energy consumption per source, as well as sensor readings and location (i.e. temperature, CO_2). Additionally, it provides actionable recommendations for energy performance improvements.

Features & Benefits

The problem we are addressing with ChroViewPlus is helping commercially operated buildings with recommendations and insights on how to improve energy use. The dashboard will assist those who need to identify performance gaps, reduce energy inefficiencies, address carbon emission targets and finally, make data-driven decisions on building performance.

Users

Energy Service Companies

Building Owners & Investors

Facility Managers

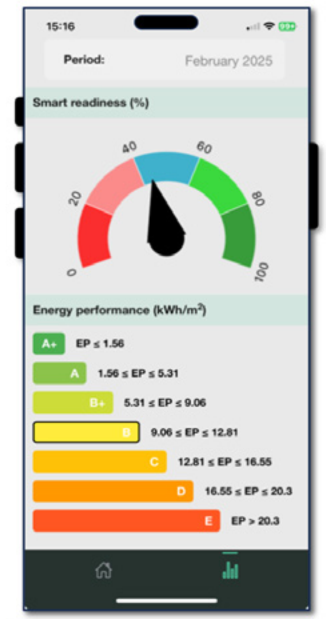
Architecture, Engineering & Construction professionals

Developer

Integrated Environmental Solutions (IES)
www.iesve.com

TOOL 9

ENABLING BUILDING RESIDENTS TO UNDERSTAND AND IMPROVE THEIR ENERGY CONSUMPTION



ChroViewOcc
App for Residents

Description

ChroViewOcc is a mobile application designed for residential users to understand and improve their household's energy performance in a simple and accessible way. It transforms building performance data – traditionally locked in administrative reports – into meaningful, real-time insights for everyday occupants. Drawing from IoT devices installed on site, the app visualises current indoor conditions (e.g. temperature and air quality) and monthly energy usage analytics.

Developed through user-centred design based on feedback from CHRONICLE pilot sites, ChroViewOcc focuses on clarity and usability, helping tenants interpret their energy behaviour, comfort levels, and environmental impact, without the need for technical expertise.

Features & Benefits

ChroViewOcc features a minimal and intuitive interface tailored for users with limited technical background. It offers real-time feedback on energy consumption, indoor air quality and comfort conditions, while providing actionable suggestions for energy efficiency, such as adjusting HVAC setpoints or aligning usage with renewable energy production.

Unlike more advanced CHRONICLE tools, ChroViewOcc prioritises ease of use and digestible insights over raw data, making it ideal for non-expert building residents. By promoting awareness and behavioural change, the app empowers tenants to actively reduce energy use, improve comfort and lower utility costs – placing residents at the centre of the energy transition.

Users

Building Residents

Developer

Hypertech
Sustainability Research
& Technology Center
www.hsrt.eu

About the CHRONICLE Project

CHRONICLE is a Horizon Europe project (2022-2025) that aims to improve building performance towards energy efficiency, comfort and well-being.

We have delivered a holistic framework for assessing the life-cycle performance for different building variants. We support the sustainable design of new and existing construction projects by focusing on efficient renovation procedures and investment decision-making processes.

18
partners

8
contries

5
pilot sites

42
months

Project Partners

The CHRONICLE project is a collaboration between 18 partners in 8 countries across Europe. We are a group of companies, NGO's, universities and associations that work in technological development, innovation and housing-related fields. We have 5 pilot sites (Spain, Ireland, Denmark, Greece and Switzerland) which served as locations to test, demonstrate and validate the developed framework and toolset.

CHRONICLE

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chronicle-project.eu