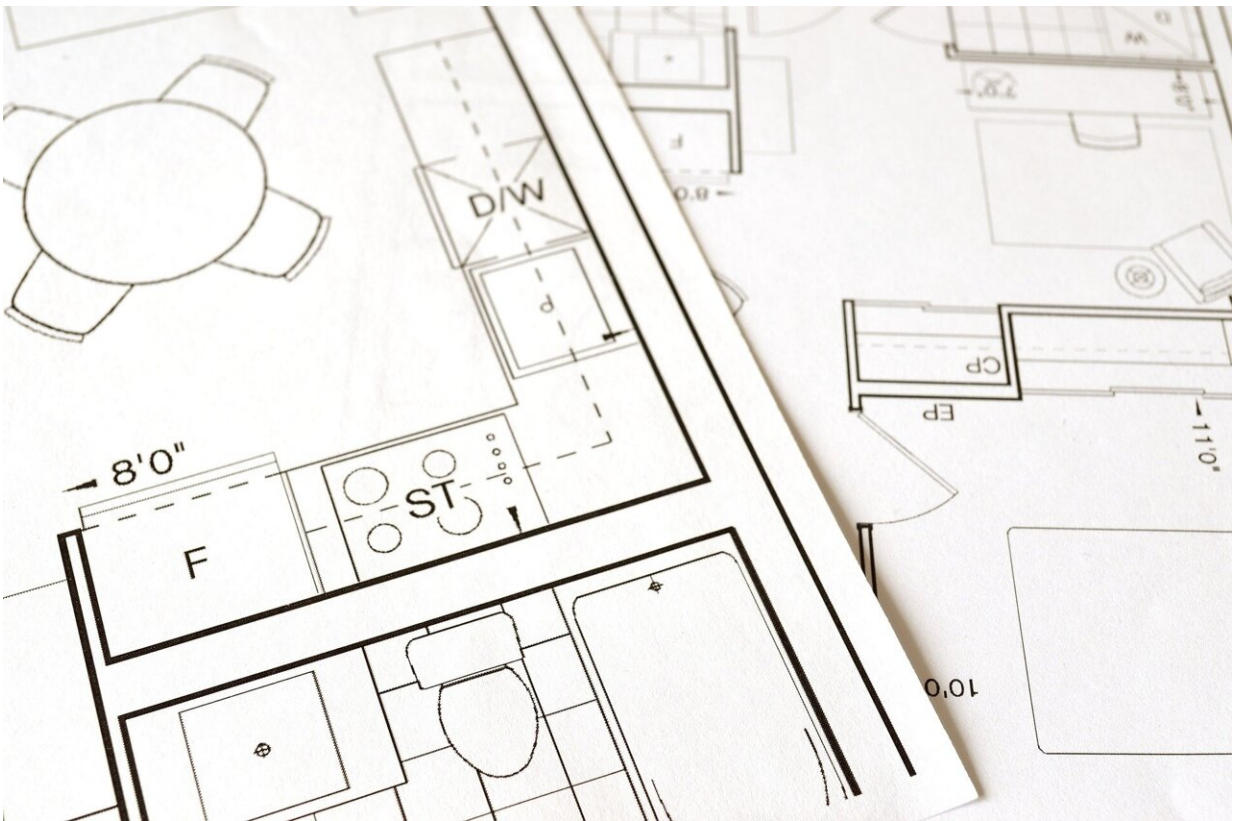


Digital records can help make European homes and offices greener and healthier

May 14 2024, by Anthony King



Credit: Pixabay/CC0 Public Domain

In the southern Italian town of Ruvo di Puglia, a school that opened in 1924 is getting a 21st century upgrade.

The building is being digitally scanned and fitted with sensors. They count people, measure ambient temperature and detect levels of carbon dioxide (CO₂) inside.

Dashboard designs

From his desk in Brindisi about 200 kilometers farther south, Italo Spada can open a file on his computer to monitor the air quality of the school and its energy consumption.

"Our system can give those who run buildings a simple dashboard so that they can see what energy is being consumed or inspect the facilities or see when routine maintenance is due," said Spada, head of the new technologies and design department of the European Research Center for Technologies, Design and Materials, or CETMA.

The activity is part of a project that received EU funding to move from what have traditionally been paper files containing the technical specifications of buildings to a dynamic 3D picture of them. Called [openDBL](#), the project runs for three years until the end of 2025.

Moving to "digital building logbooks," or DBLs, for new or old buildings will help Europe's planned transition to climate neutrality by mid-century.

More than four-fifths of EU buildings date from before 2000 and three-quarters of them have poor energy performance.

Collectively, buildings are responsible for 40% of the EU's [energy consumption](#) and more than a third of its greenhouse-gas emissions. Building emissions stem mainly from construction, usage, renovation and demolition.

3D scanning

Architects and building managers moved away from books and blueprints to using 2D plans and computer-aided design—CAD—software in the 20th century.

But the future lies in an approach known as Building Information Modeling, or BIM. This is easier to use and more dynamic, according to Spada.

As part of openDBL, a cultural and sports center in the Spanish city of Mislata and two buildings—the town hall and a kindergarten—in the Greek municipality of Kifissia north of Athens will also be scanned in 3D. All relevant information will be compiled in one file that can be updated whenever something is done to the building, with DBL blockchain used for [data security](#).

The cost of installing sensors at each of the three pilot sites including Ruvo di Puglia is around €10,000, according to Spada.

The DBL becomes a living record that gets updated over time, just as historically a ship's logbook recorded important changes and other events when the vessel was at sea.

"Each part of a building, in a 3D view—maybe a pillar or a door—is enriched with information," said Spada. "If I click on the pillar in my 3D model of the building, I can see its shape, but also the material it is made of and any maintenance activity."

For the Italian school in Ruvo di Puglia today, if the air quality deteriorates to a certain level, a building manager receives a warning.

For example, people breathe out CO₂ and it can build up in rooms that

are poorly ventilated. Teachers and students can suffer from fatigue, headache or difficulty concentrating when CO₂ levels rise.

Now that the school is equipped with sensors, it has even been [referred to](#) by the project as the "talking building."

Competitive edge

In openDBL, Spada and his team are also working on a web-based software module that will allow users to inspect a building in virtual reality, or VR. The module will be integrated into the openDBL platform and support users through immersive navigation.

Similarly, one day someone interested in buying or renting a home or an office could put on a VR headset and walk around virtually in a building and find out about insulation or energy use without visiting in person.

The project's ultimate goal is to make a basic online logbook available for free to builders and building managers. The logbook would cover the 3D layout of a building in digital form.

Because such advancements are crucial for building maintenance and energy-savings upgrades such as better insulation, the industry as a whole needs to anticipate greater use of digital information, according to Spada.

"If you work in this sector, you must digitize," he said. "Otherwise you will be left behind."

Logbook lift

DBLs are being introduced across Europe as part of a European

[renovation wave](#) to accelerate energy upgrades of buildings.

Recent EU [legislation](#) aims for a fully decarbonized building stock by 2050.

European [policy](#) is pushing EU countries to have some form of DBL for all buildings, according to Henk Visscher, a professor of housing and director of the Urban Energy Institute at Delft University of Technology in the Netherlands.

The lack of a common repository of data on buildings in Europe makes designing, constructing, operating and financing them slower and costlier.

In addition, the transparency and ready access to information resulting from DBLs are critical to ensuring that building renovations occur at the pace needed to achieve a climate-neutral building stock by mid-century.

System upgrades

Visscher leads an EU-funded project to extend existing DBLs in Belgium, France, Germany, the Netherlands and the UK. Called [Demo-BLog](#), the four-year project runs until the end of 2026.

The DBLs in the five countries cover 4.5 million buildings in total, supporting the push to make the structures more sustainable. Basic features of these DBLs include information on construction materials and energy performance.

The Demo-BLog team is experimenting with extra features for all five DBLs and planning to test their appeal.

These additions are designed for a range of users including the

homeowners, municipalities, builders and architects.

The additions include user-centric automated renovation advice and a decarbonization roadmap for each building. Also planned are a platform for community-driven decarbonization projects and standards that will allow for easier and safe reuse of building materials.

The idea is that digital logbooks will help with maintenance and repair as well as with renovations such as improving insulation and prolonging the life of older buildings.

"If you have all this digital data and you give it to homeowners, they can easily make a start with renovations of their home," said Visscher. "And if you sell your home, the next homeowner will know everything about the [building](#)."

He said that, even with new and stricter EU energy-performance standards for buildings, most in Europe urgently need improved insulation and other upgrades that DBLs can facilitate.

"Part of the energy transition is changing the way we operate our existing buildings," said Visscher.

More information:

- [openDBL](#)
- [Demo-BLog](#)
- [European Green Deal](#)
- [Renovation Wave](#)

Provided by Horizon: The EU Research & Innovation Magazine

Citation: Digital records can help make European homes and offices greener and healthier (2024, May 14) retrieved 16 August 2024 from <https://techxplore.com/news/2024-05-digital-european-homes-offices-greener.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.