



Module 16

Introduction to Digital Passports

Digitalisation in Construction



24
partners

12
countries

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To equip the learner with the basic knowledge and skills required to understand and know the principles of Digital Passports and how they can benefit the Renovation of buildings



Introduction to Digital Passports | Objectives



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1. Identify and outline the key terms and definitions associated with digital passports for buildings.
2. Outline the key drivers and opportunities for digital passports
3. Identify and outline the social and economic benefits of digital passports
4. Outline the principles of the Digital Building Passport and Digital Log Books
5. Understand what relevant data and information should be transferred into the Digital Building Passports
6. Outline the principles of the Digital Building Renovation Passport
7. Demonstrate what relevant data and information should be transferred for the Digital Building Renovation Passports.



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Introduction to Digital Passports

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Topic 1 – Digital Log Books

Topic 2 – Digital Building Passports

Topic 3 – Digital Renovation Building Passports



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1. Digital Log Books



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EU framework for digital building logbooks

A digital building logbook is a common repository for 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.

Information obtained from construction products is only part of the data expected to be archived in the building logbook and be interoperable with other sources of information.



9 principles to be used as guidance for the development of building logbooks are:

1. They need to be technology neutral to avoid market distortions and outdated results.
2. Information from construction products should be aligned to the construction products regulation CPR and should not create barriers to trade.
3. Digitalisation must be implemented according to a harmonised approach but shall not steer the development but the opposite.
4. In addition to the developments in the field of circular economy (demolition and waste) building logbooks should include REACH/CLP information.
5. Implementation by Member States need to keep basic principles of interoperability and the possibility to deliver aggregated European data.



9 principles to be used as guidance for the development of building logbooks are:

6. Sustainability should be one of the key topics to be addressed under a construction specific approach compatible with the delivery of information by manufacturers (EPD information), but focused on building assessment according to the reference European methodology Level(s).
7. Data ownership needs to be properly addressed together with the responsibility of the relevant stakeholder e.g. manufacturers responsible of the declared performance in their DoP but once the product is delivered information is owned by the following stakeholders in the construction chain.
8. Consistency with legislative frameworks need to be addressed and updated in case of regulatory changes.
9. Information should be kept by a dedicated body and bear the responsibility of store, keep and allow access to the information when needed.



Who uses the building logbook?

Stakeholders/ benefits	Access to information	Reduced risk	Trust, reliability, accountability	Better decision-making	Reduced administrative burden	Operation, use & maintenance	Resource optimisation, circularity	Regulatory compliance	Innovation	Value chain integration	Benchmarking
Landlords and owner-occupiers											
Tenants											
Designers											
Developers											
Construction contractors											
Investors											
Banks and insurers											
Material suppliers											
Facility and building managers											

Mapping of stakeholder – specific benefits

(green = very relevant benefit, yellow = less relevant benefit)



Who uses the building logbook?

Stakeholders/ benefits	Access to information	Reduced risk	Trust, reliability, accountability	Better decision-making	Reduced administrative burden	Operation, use & maintenance	Resource optimisation, circularity	Regulatory compliance	Innovation	Value chain integration	Benchmarking
Demolition contractors											
Utilities											
Real estate agents											
Lawyers, solicitors, conveyancers											
Valuers											
Certifiers											
Research											
Public authorities & policy makers											

Mapping of stakeholder – specific benefits

(green = very relevant benefit, yellow = less relevant benefit)



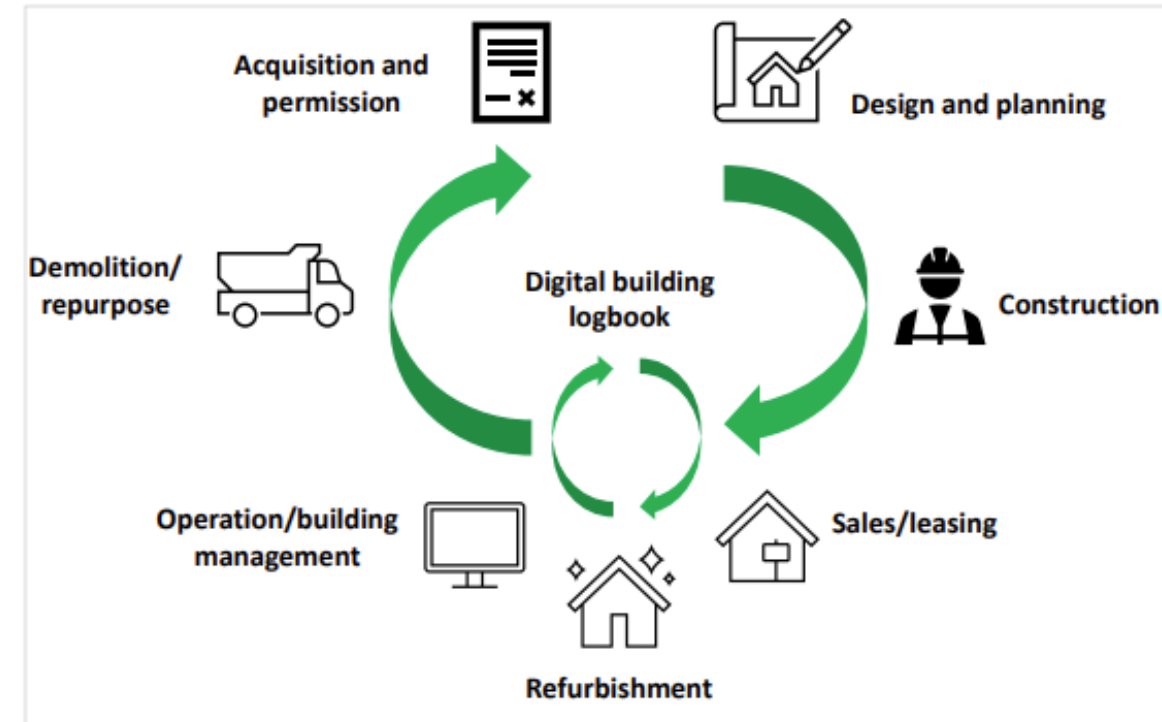
Life Cycle of a Building

The design, planning and construction phases are the best stages to gather data on the building's physical characteristics, including information on materials in the building and where they are located. In addition, a building information model (BIM) or digital twin of the building can be developed in this phase, while the review of existing cases shows that this could be useful and improve collaboration and liability of works.

A construction project management function of the digital logbooks can simplify the information sharing between different actors.

The collected data can also be used to prove compliance with certain building regulations or certification schemes.

The main actors in this phase are designers, architects, developers, contractors and material suppliers.



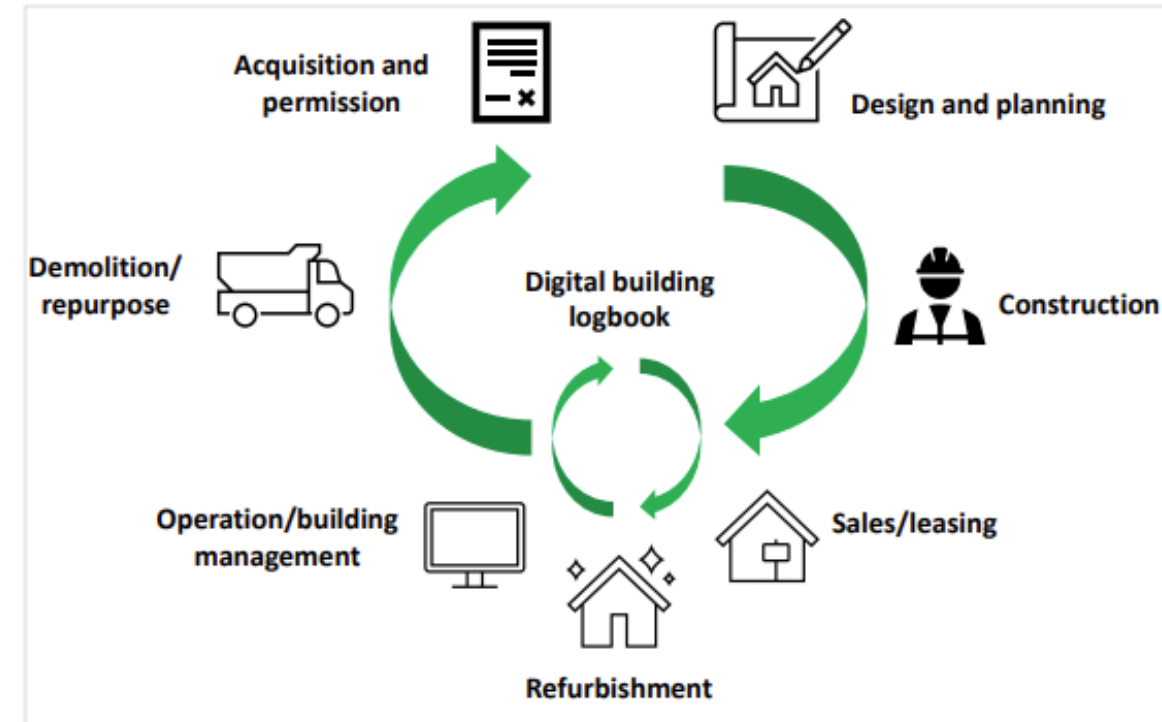
Life Cycle of a Building

In the sales/leasing, operation and property management phases, data can be gathered on the building's operation, use and performance (maintenance, ownership transfer, change of use etc.).

The information can, for example, be used to identify maintenance and renovation needs, adapt behaviour and/or fulfil administrative requirements.

The data is also critical for financing and transaction underwriting and execution.

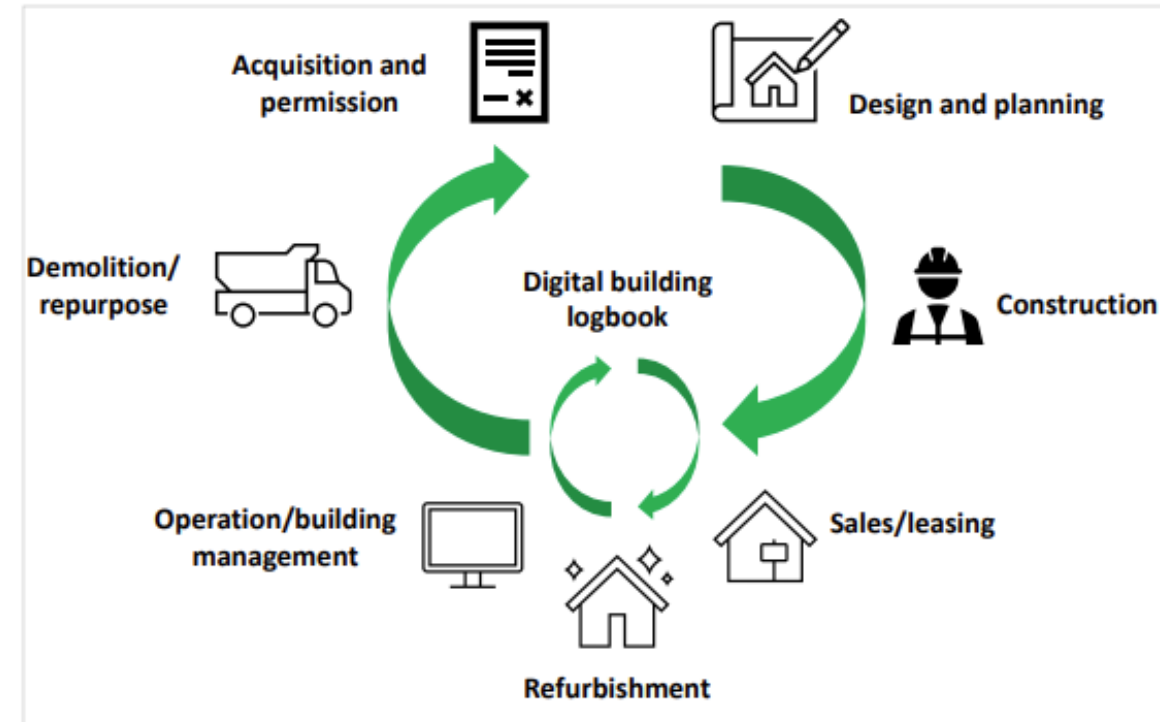
The main users include building owner, tenants, facility managers, utility companies, real estate service providers, energy auditors, contractors and the financial sector.



Life Cycle of a Building

In the repurpose or demolition phase, the gathered data on the building, its composition and materials can be used to support decision making whether to refurbish, repurpose, demolish or to optimise, extract the most value from the recycling of materials.

The main users include building owners, demolition companies, product maintenance service companies and recycling companies.





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2. Digital Building Passports



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Why have Digital Building Passports?

EU Directive - According to The Energy Performance of Building Directive (EPBD) member states have to establish stronger long-term renovation strategies, aiming at decarbonising the national building stocks by 2050. Digitising and, when possible, automating data entry and processing can help to speed up the planning review process, freeing up time and resources for planning teams.

What is Digital Building Passport all about?

Digital Building Passport allows you to efficiently manage and control your buildings: plan renovations, optimize costs related to the maintenance of individual buildings and manage energy consumption. Everything is in one place, with access at any time!

The information in the Building Log Book should be part of the Digital Building Passport to ensure all up to date information is passed on to the next building owner or occupier

The Digital Building Passport is a “living document”.

It is extensive, continuously updated building information repository that accompanies the whole building life cycle and allows data and information sharing with value chain stakeholders.





Technology for buildings

Machine learning technology will help you predict future renovations and thus plan your expenses accurately.



Insight into building data

Detailed data of individual buildings in one place –
You have access to all statistics and current data on media consumption.



Buildings self-regulation

Manage media consumption directly from the app –
You have a real influence on e.g. energy consumption.



Responsibility

Who is responsible in creating, maintaining, and handing over information regarding a building's design, construction, and management?

Client, principal designers, and principal contractors involved in its development.

Digital Building Passport is not a single dataset

It is an extensive, continuously updated property information repository that accompanies the whole building life cycle and allows data and information sharing with value chain stakeholders.

Digitisation of information should begin in the early planning stages, starting with single lines representing the boundary of the planning application. This information will grow throughout the planning stage as the building's targets and requirements take shape, and will be used to create a Building Information Model (BIM) during the construction phase. By ensuring building data is collected and stored, it would prove easier to evaluate the impact that a building has over time.

With the introduction of digital building passports, valuable data will be maintained for “decades into the future”, creating long-term value.





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3. Digital Renovation Building Passports



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A Digital Building Renovation Passport (BRP) is defined as a digital document outlining a long-term (up to 15 or 20 years) step-by-step renovation roadmap for a specific building.

Information resulting from an on-site energy audit following specific quality criteria and indicators, established during the design phase and in dialogue with building owners.

Benefits of a BRP:

- reduced heating bills,
- comfort improvement and
- CO2 reduction
- user-friendly communication

The renovation roadmap can be combined with a repository of building-related information (logbook) on aspects such the energy consumption and production, executed maintenance and building plans.

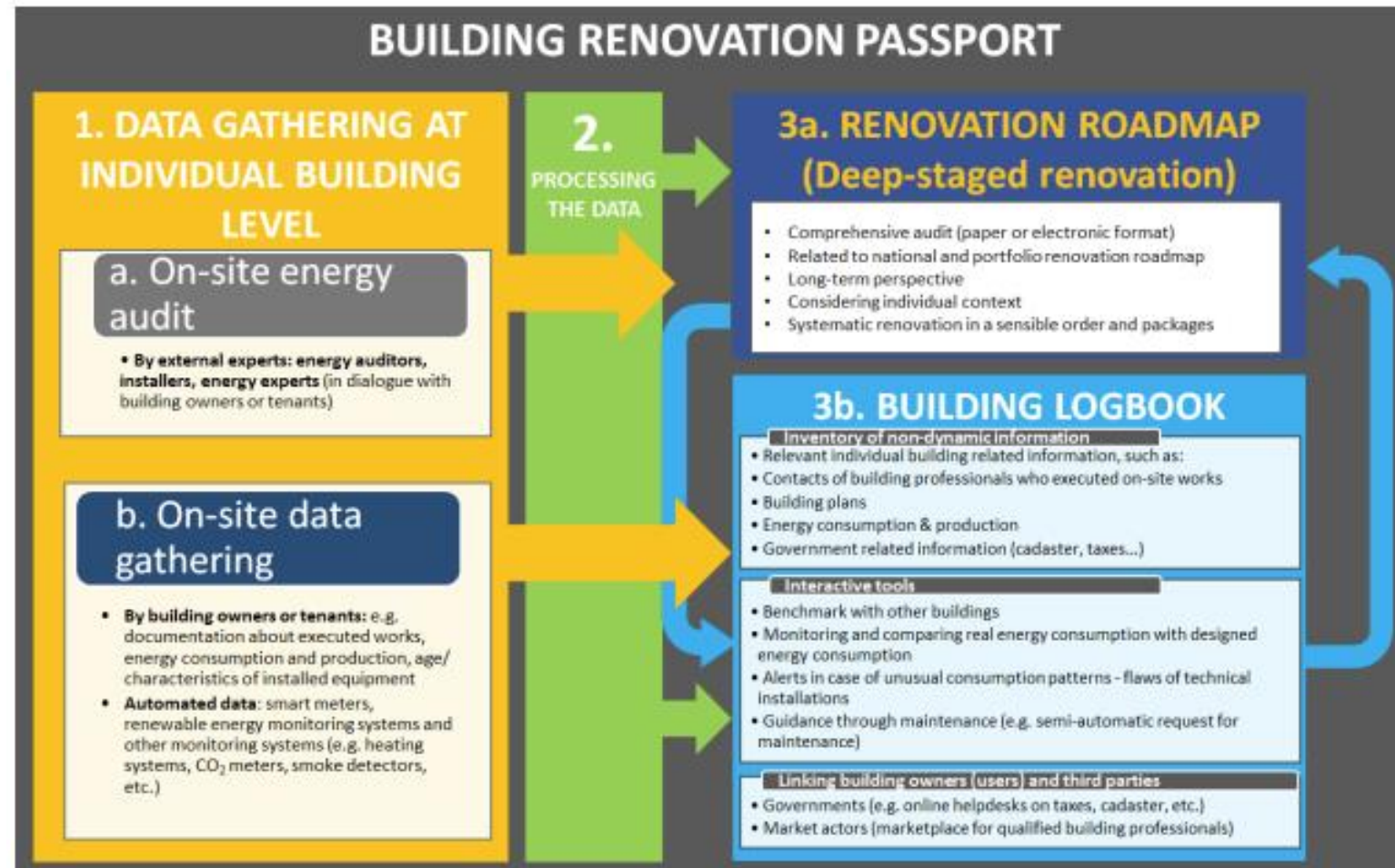


Digital Renovation Building Passports



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Building Renovation Passport –
Overview of its component
(Source: BPIE)



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Step by Step Renovation Roadmap (or staged renovation)

Installation of selected measures in a certain order to avoid that at any stage of renovation the installation of additional measures is precluded. Outlining each renovation step and the links between all measure implemented, presenting the renovation as a home-improvement plan (not just a technical intervention) and helping to avoid lock-in effects¹.

Depth of Renovation (Deep, Medium or shallow renovation)

Decide on the level of ambition for achieved energy performance, to ensure consistency between short and long term measures and to align the target for the performance of individual buildings with the long-term target for the entire building stock.

Renovation Information

Financing options available in the area for renovation projects (e.g. green loans, incentives, tax credits) as well as energy bills, equipment maintenance recommendations as well as insurance and property obligations.

Lock-In - The energy savings which are not going to be realised due to un-ambitious and insufficiently stringent energy requirement targets for buildings, building element and equipment



List of performance indicators that could potentially be included in the Building Renovation Passport

Energy consumption

- Primary energy consumption kWh/m²year (heating, DHW, cooling, fans, pumps, control)
- Final energy consumption kWh/m²year (heating, DHW, cooling, fans, pumps, control)
- Net energy consumption kWh/m²year (heating, DHW, cooling)
- Energy need for heating & cooling kWh/m².year
- Energy consumption of lighting system kWh/m².year
- Building heat transfer coefficient (U value)

Indoor climate

- Indoor air temperature °C
- Indoor air relative humidity %

Airtightness and ventilation

- Type of ventilation system
- Air exchanges rate (ACH)
- Efficiency of heat recovery (if available OR applicable)
- Building airtightness by 50Pa (ventilation)
- Building airtightness by 50Pa 1/h (infiltration)

Indoor air quality

- Indoor air quality (IAQ) indicator: ACH or CO₂ concentration in indoor air above outdoor concentration in PPM, for different categories in accordance with EN 15251 "Indoor environmental input parameters for design and assessment of energy performance of buildings- addressing indoor air quality, thermal environment, lighting and acoustics"
- CO₂ concentration in indoor air in PPM
- PM and TVOC content in indoor air

Noise insulation

- Sound pressure level dB(A) in living room and bed room

Artificial lighting

- Type of lighting
- Power of lighting W/m²
- Spatial light distribution

Daylight

- Daylight factor
- Daylight autonomy
- Useful daylight illuminance

CO₂ emissions

- Equivalent CO₂ emission in kg per year per m², kg CO₂/m²year (heating, DHW, cooling, fans, pumps, controls)

Thermal comfort - Qualitative

- Use of scale/colour code to express: Cold - extremely uncomfortable, Cool - uncomfortable, Slightly cool- slightly uncomfortable, Neutral - Comfortable, Slightly warm - slightly uncomfortable, Warm - uncomfortable, Hot - extremely uncomfortable

Thermal comfort - Quantitative

- With the use of PPD and PMV (EN ISO 7730) for four different categories of comfort levels in accordance with EN 15251 standard







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