

**īBRoad: BIM και η σύνδεση
τους με τα Διαβατήρια
Ανακαίνισης Κτιρίων
Εξοικονόμηση ενέργειας στα
κτίρια- εφαρμογές, έργα και
το BIM ως εργαλείο**

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Introduction

DIRECTIVE (EU) 2018/844, Article 2a

Long-term renovation strategy

1. Each Member State shall establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings. Each long-term renovation strategy shall be submitted in accordance with the applicable planning and reporting obligations and shall encompass:

*[...] (c) policies and actions to stimulate cost-effective deep renovation of buildings, including **staged deep renovation**, and to support targeted cost-effective measures and renovation for example by introducing an optional scheme for **building renovation passports**; [...]*

DIRECTIVE (EU) 2018/844, Article 19a

Feasibility study

*The Commission shall, before 2020, conclude a feasibility study, clarifying the possibilities and timeline to introduce the inspection of stand-alone ventilation systems and an optional **building renovation passport** that is complementary to the energy performance certificates, in order to provide a **long-term, step-by-step renovation roadmap** for a specific building based on quality criteria, following an energy audit, and outlining relevant measures and renovations that could improve the energy performance.*

PROPOSED SOLUTION – iBRoad

iBRoad works on lifting barriers to renovation by developing an Individual Building Renovation Roadmap for single-family houses. This tool looks at the building as a whole, and provides a customised step-by-step renovation plan (iBRoad-Plan) over a long-term horizon (15-20 years).

The plan is supported by a logbook (iBRoad-Log), a repository of all information available about the building.

THE BUILDING RENOVATION PASSPORT CONCEPT

INFORMATION AT INDIVIDUAL BUILDING LEVEL

EXISTING ENERGY PERFORMANCE CERTIFICATE (EPC)

ON-SITE GATHERED INFORMATION

- Energy audit
- Building professionals, e.g. construction plan, info installations, BIM, etc.
- Building owner or tenant
- Public authorities

AUTOMATED DATA

- Smart meters
- Monitoring systems, e.g. RES, heating, CO₂ meters, etc.

BUILDING RENOVATION PASSPORT

RENOVATION ROADMAP

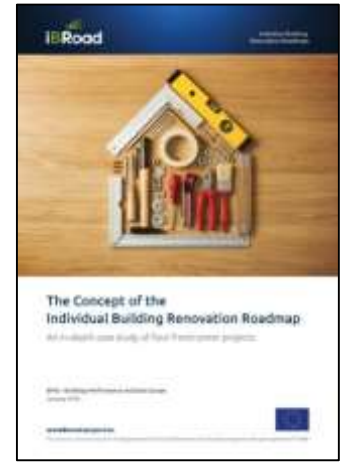
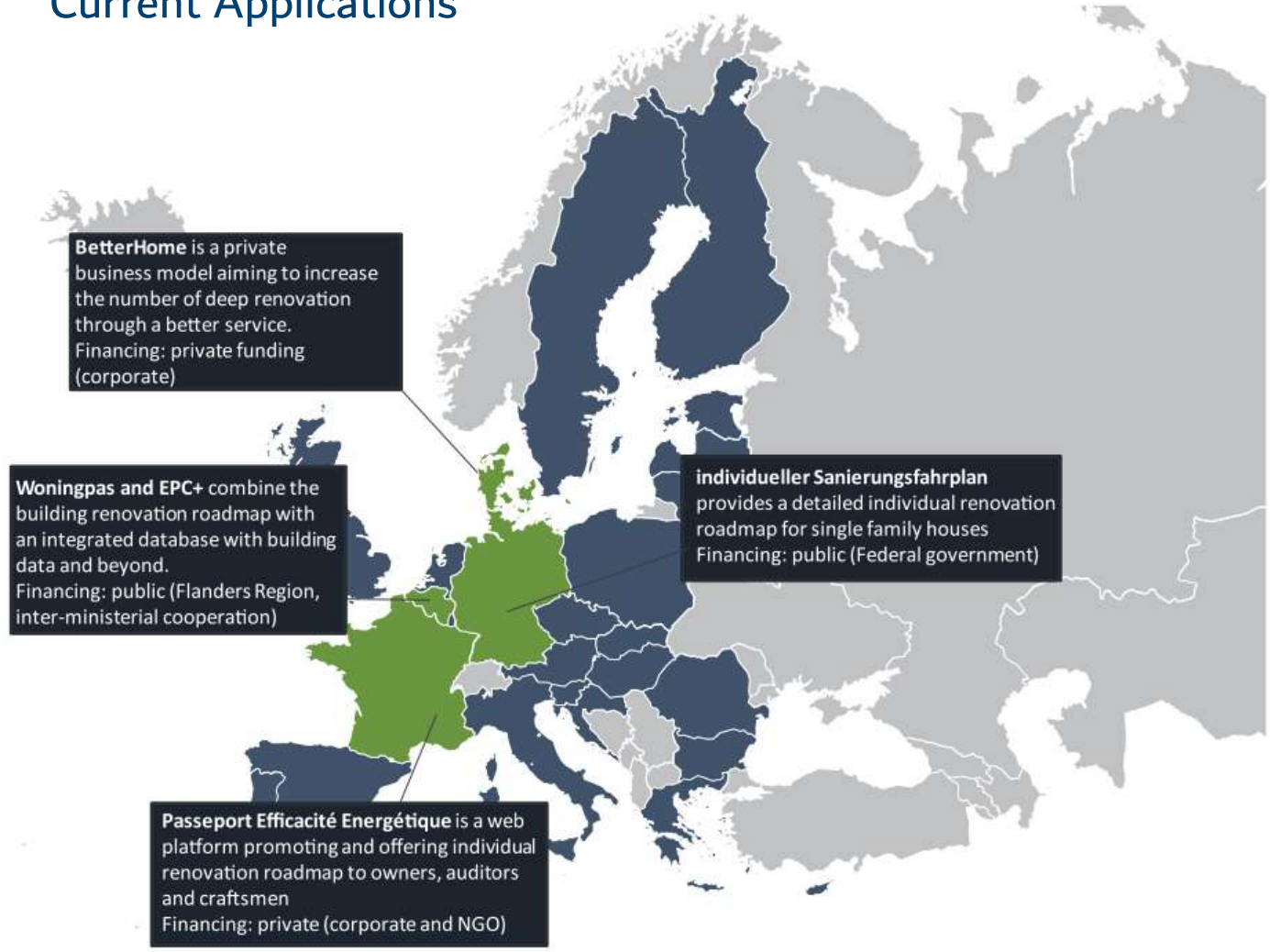
- Comprehensive audit
- Systematic renovation in a sensible order and packages
- Considers individual context
- Long-term perspective

LOGBOOK

- Inventory of building-related information
- Functionalities for users
- Beyond energy
- Linking building owners and users to third parties

Source: iBRoad project

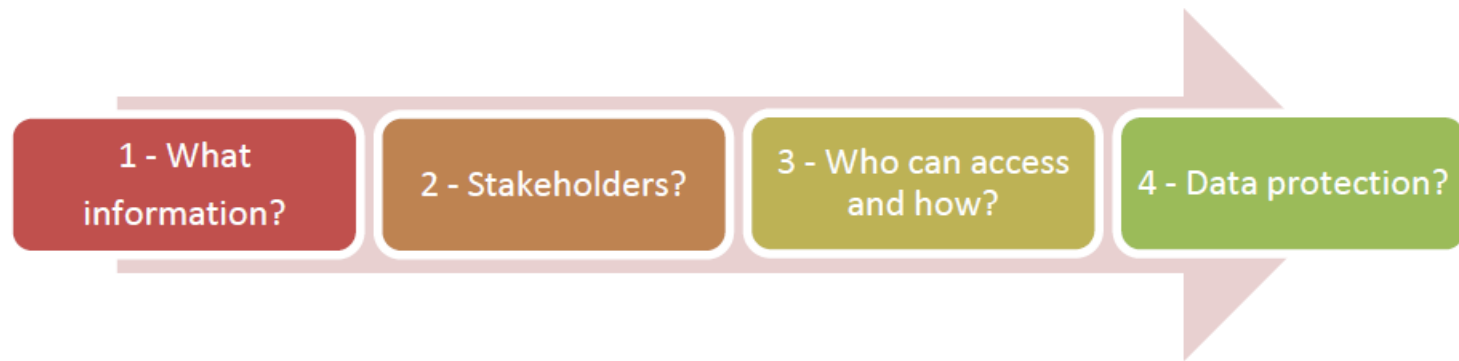
Current Applications



Source: iBRoad project report "The Concept of the Individual Building Renovation Roadmap"
<https://ibroad-project.eu/news/the-concept-of-the-individual-building-renovation-roadmap/>

Map © Copyright Showet.com

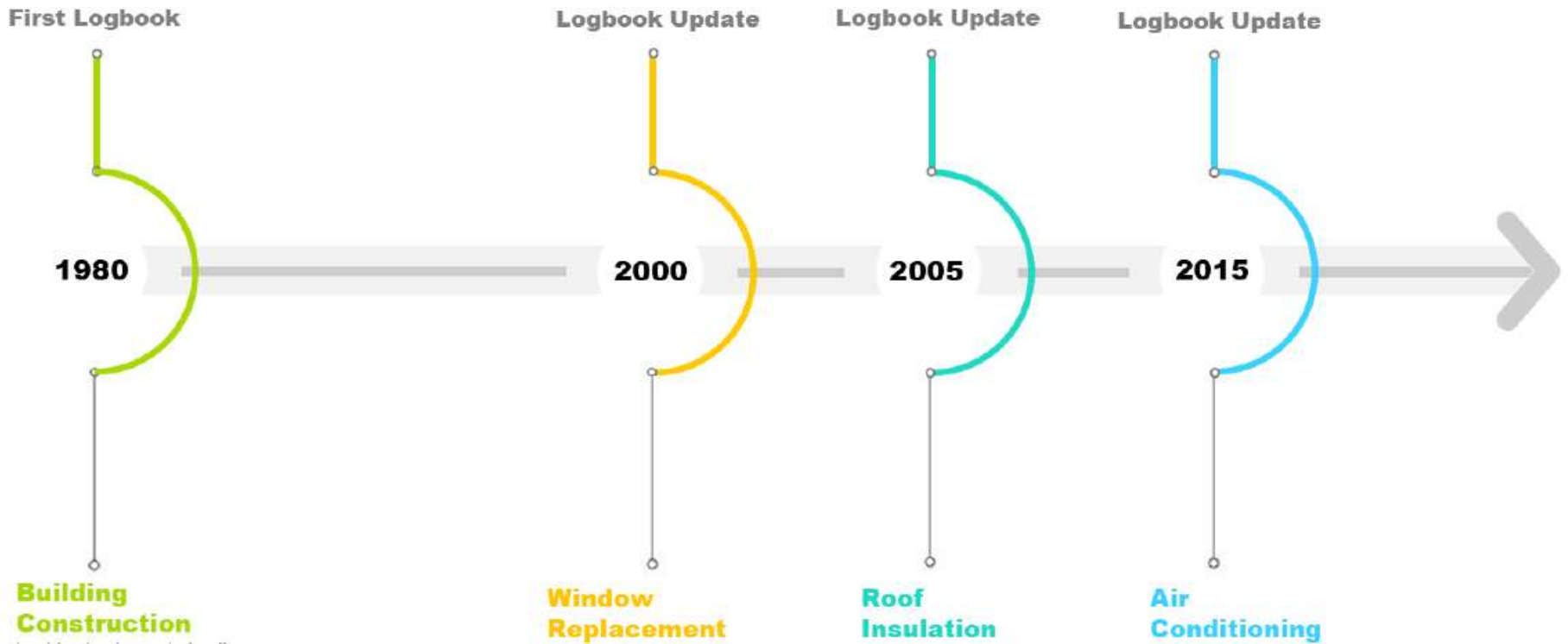
Aim: providing guidance on setting up a logbook to support the implementation of an Individual Building Renovation Roadmap.



Kick-off questions when setting up an iBRoad-log



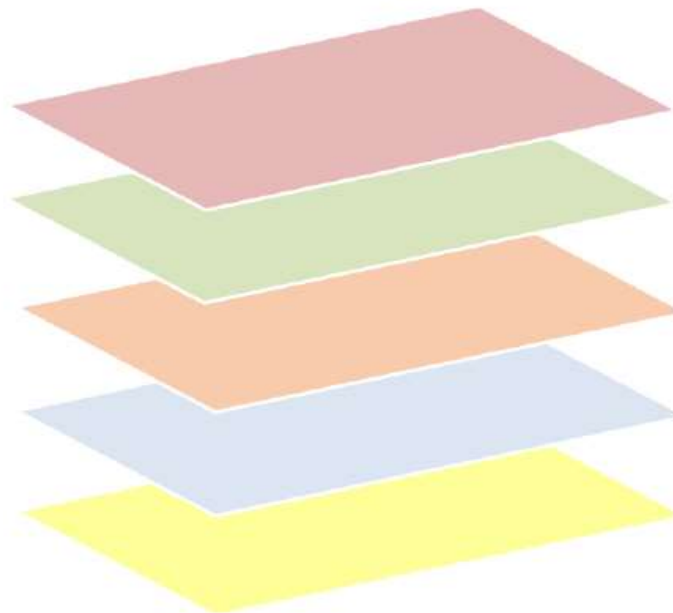
Interaction between the renovation roadmap and the logbook



An example of a building logbook timeline

Logbook model

iBRoad Logbook



A - GENERAL AND ADMINISTRATIVE INFORMATION

General and **administrative Information** related to the **building/unit** characterization and its **user**



B - BUILDING CONSTRUCTION INFORMATION

Technical information and data related to the **building construction**



C - BUILDING ENERGY PERFORMANCE

Energy Information based on **EPC information** or other energy assessments



D - BUILDING OPERATION AND USE

Data and information on how the **building is operated**



E - SMART INFORMATION

Smart information related to the building



Level 0	Level 1	Level 2	CORE	COMP
A- GENERAL AND ADMINISTRATIVE INFORMATION	1. Building ID	1. National code	✓	
		2. Inspire ID	✓	
		3. Energy suppliers ID	✓	
	2. Address	1. Geo Coordinates	✓	
		2. Address data	✓	
	3. Property ID	1. Legal registration	✓	
		2. Fiscal registration	✓	
	4. Building general features	1. Building	✓	
		2. Building Unit	✓	✓
	5. Licences and Plans	1. Urban Licenses		✓
		2. Design Plans and Designers		✓
	6. Conservation Status	1. Evaluation of the conservation status		✓
	7. Building User	1. Building user information		✓
		2. User profile		✓
	8. Other building information	1. Governmental taxes and incentives		✓
		2. Financial Programs		✓
3. Real estate information			✓	
4. Energy and Construction market			✓	

Core Information (CORE); Complementary Information (COMP)

Logbook Module A topics and subtopics



Level 0	Level 1	Level 2	CORE	COMP
B - BUILDINGS CONSTRUCTION INFORMATION	1. Envelope	1. Walls	✓	
		2. Roofs	✓	
		3. Floors	✓	
		4. Thermal bridges	✓	
		5. Doors	✓	
		6. Windows	✓	
	2. Technical Building Systems (TBS)	1. Ventilation systems	✓	
		2. Heating systems	✓	
		3. Cooling systems	✓	
		4. DHW systems	✓	
		5. Lighting systems	✓	
		6. Building automation & control (BAC)	✓	

Core Information (CORE); Complementary Information (COMP)

Logbook Module B topics and subtopics

A+				
Level 0	Level 1	Level 2	CORE	COMP
C- BUILDING ENERGY PERFORMANCE	1. EPC General information	1. Expert name	✓	
		2. Expert ID	✓	
		3. Type of EPC	✓	
		4. EPC Number	✓	
		5. Energy label	✓	
		6. Issue date	✓	
		7. Term date	✓	
		8. Photograph report	✓	
		9. EPC support documentation	✓	
	2. Audit General information	1. Expert name	✓	
		2. Professional order	✓	
		3. Audit date	✓	
		4. Energy label	✓	
		5. Photograph report	✓	
		6. Energy audit support documentation	✓	
	3. Energy and other indicators	1. Energy use	✓	
		2. Delivered energy	✓	
		3. Primary energy	✓	
		4. Environmental and energy indicators	✓	
		5. Other indicators		✓
6. Comfort level			✓	
4. Recommendations	1. Individual impact	✓		
	2. Collective impact	✓		

Core Information (CORE); Complementary Information (COMP)



Level 0	Level 1	Level 2	CORE	COMP
D- BUILDING OPERATION AND USE	1. Energy consumption	1. Energy source	✓	
		2. Metering system information	✓	
	2. Energy generation	1. Renewable energy source	✓	
		2. Metering system information	✓	
	3. Energy suppliers	1. Energy source		✓
		2. Metering system information		✓
	4. Inspections	1. Building element		✓
		2. Inspection information		✓
	5. Maintenance	1. Building element		✓
		2. Maintenance information		✓
	6. Climate data	1. Weather data		✓

Core Information (CORE); Complementary Information (COMP)

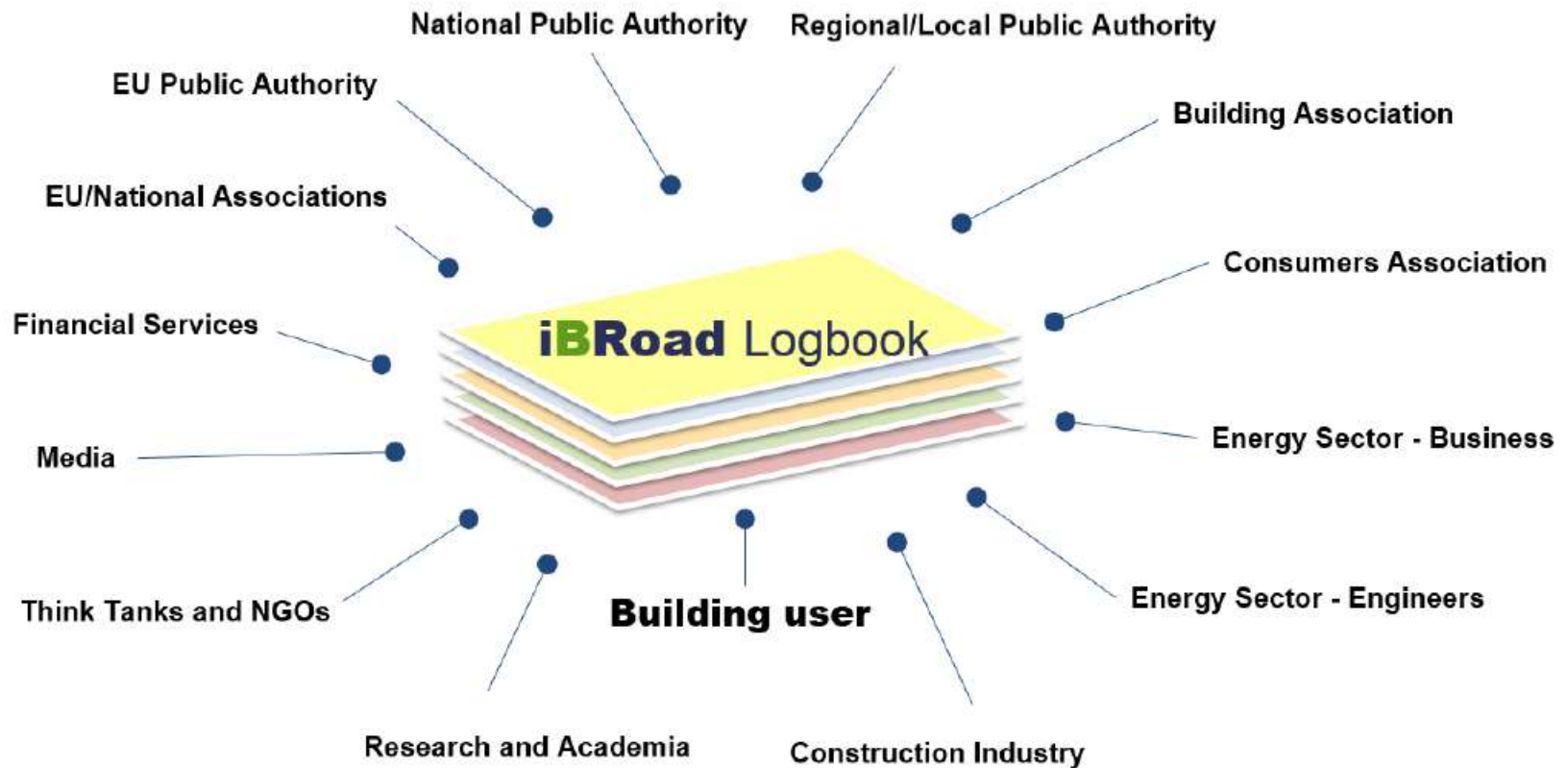


Level 0	Level 1	Level 2	CORE	COMP
E – SMART INFORMATION	1. Smart Indicator	1. SRI – Smart Readiness Indicator		✓
		2. Other smart indicators		✓
	2. E-mobility	1. EV Charging points		✓
	3. Smart district	1. Smart district indicators		✓

Core Information (CORE); Complementary Information (COMP)

Logbook Module E topics and subtopics

Setting up a logbook database



Type of Stakeholders interacting with the iBRoad-log

Source of information for...

<i>Type of stakeholder</i>	
<i>EU public authorities</i>	<ul style="list-style-type: none"> • EU spatial data infrastructure, like the INSPIRE ID, for the purposes of EU environmental policies or activities enabling the sharing of environmental spatial information among public sector organisations, facilitate public access to spatial information across Europe and assist in policy-making across boundaries • EU statistical data for comparison purposes
<i>National/Regional/Local Public Authorities</i>	<ul style="list-style-type: none"> • Statistical data for comparison purposes • Spatial data infrastructure • Buildings addresses and identification • Fiscal and cadastre identification of buildings • Buildings categorisation • Buildings design plans • Existing taxation and incentives related with building renovation • Energy performance certificates and associated data • Buildings energy consumption • Buildings energy production • Energy efficiency schemes/incentives
<i>Energy sector - Engineers</i>	<ul style="list-style-type: none"> • Energy audits
<i>Financial services</i>	<ul style="list-style-type: none"> • Existing financing schemes
<i>Construction Industry</i> <i>Energy sector - Business</i>	<ul style="list-style-type: none"> • Existing construction solutions to renovate buildings • List of companies or installers to implement solutions to renovate buildings
<i>Research and Academia</i>	<ul style="list-style-type: none"> • State of the art solutions that can guide the level of ambition established in the buildings renovation
<i>Building user</i>	<ul style="list-style-type: none"> • Buildings user information • Buildings user profile and patterns • Buildings energy consumption • Buildings energy production • Improvements implemented in the buildings (including all relevant data) and stakeholders involved • Energy suppliers contracted • Type and characteristics of the energy supply contracted • Inspections performed in the building • Maintenance performed in the building • Relevant documentation and evidences of performed actions in the building
<i>Real estate market</i>	<ul style="list-style-type: none"> • Market price of the building • Benchmark/statistical data for comparison purposes
<i>Utility companies</i>	<ul style="list-style-type: none"> • Real consumption data / energy bills

Type of stakeholders and information they provided



A- GENERAL AND ADMINISTRATIVE INFORMATION

EU Information level ID		Pilot countries (national Levels)			
<i>Type of data</i>		<i>Who owns the data (HOLDER)</i>			
Level 0 (L0)	CODE (L0.L1.L2)	PORTUGAL	BULGARIA	GERMANY	POLAND
A- GENERAL AND ADMINISTRATIVE INFORMATION	A.1.1	NPA	NPA		
	A.1.2	NPA	-		
	A.1.3	ESB	ESB	ESB	
	A.2.1	NPA			NPA/BU
	A.2.2	NPA	NPA	BU	NPA/BU
	A.3.1	NPA			
	A.3.2	NPA		NPA	
	A.4.1	NPA/LPA	NPA/LPA	BU	LPA/BU
	A.4.2	NPA/LPA	EA/NPA	BU	LPA/BU
	A.5.1	LPA	LPA		
	A.5.2	LPA	LPA	LPA	
	A.6.1	LPA		LPA	
	A.7.1	BU	LPA/BU	BU	NPA
	A.7.2	BU		BU	BU
	A.8.1	NPA/LPA	LPA/BU	LPA	NPA/LPA
	A.8.2	FS/NPA	LPA/BU	NPA/LPA/ESB/CAss	FS/NPA/BU
	A.8.3	ONAss		LPA	FS/BU
	A.8.4	NPA/ESB/ESEng/CI		CI/ESB	EA

Legend: National Public Authority (NPA); Energy Sector - Business (ESB); Building User (BU); Regional/Local Public Authority (LPA); Financial Services (FS) Consumers Association (CAss); Other National Association (ONAss); Energy Sector - Engineers (ESEng) Construction Industry (CI);

Information currently not available

Holders of general and administrative information in 4 pilot countries, Module A



B – BUILDING CONSTRUCTION INFORMATION

EU Information level ID		Pilot countrys (national Levels)			
<i>Type of data</i>		<i>Who owns the data (HOLDER)</i>			
Level 0 (L0)	CODE (L0.L1.L2)	PORTUGAL	BULGARIA	GERMANY	POLAND
B – BUILDING CONSTRUCTION INFORMATION	A.1.1	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	A.1.2	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	A.1.3	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	A.1.4	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	A.1.5	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	A.1.6	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	A.2.1	QE/EA/NPA	EA/NPA	QE/EA	EA
	A.2.2	QE/EA/NPA	EA/NPA	QE/EA	EA
	A.2.3	QE/EA/NPA	EA/NPA	QE/EA	EA
	A.2.4	QE/EA/NPA	EA/NPA	QE/EA	EA
	A.2.5		EA/NPA	QE/EA	BU/EA
	A.2.6			QE/EA	BU/EA

Legend: Qualified Experts (QE); Energy Auditors (EA); National Public Authority (NPA);

Information currently not available

Holders of general and administrative information in 4 pilot countries, Module B

EU Information level ID		Pilot countrys (national Levels)			
Type of data		Who owns the data (HOLDER)			
Level 0 (LO)	CODE (LO.L1.L2)	PORTUGAL	BULGARIA	GERMANY	POLAND
C – BUILDING ENERGY PERFORMANCE	C.1.1	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.1.2	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.1.3	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.1.4	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.1.5	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.1.6	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.1.7	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.1.8	QE/EA/NPA	EA/NPA	QE/EA	QE/EA/BU
	C.1.9	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.2.1	QE/EA/NPA	EA/NPA	QE/EA	EA
	C.2.2	QE/EA/NPA	EA/NPA	QE/EA	EA
	C.2.3	QE/EA/NPA	EA/NPA	QE/EA	EA
	C.2.4	QE/EA/NPA	EA/NPA	QE/EA	EA
	C.2.5	QE/EA/NPA	EA/NPA	QE/EA	EA
	C.2.6	QE/EA/NPA	EA/NPA	QE/EA	EA
	C.3.1	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.3.2	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.3.3	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.3.4	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.3.5	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.3.6	QE/EA/NPA	EA/NPA	QE/EA	QE/EA
	C.4.1	QE/EA/NPA	EA/NPA	QE/EA	EA
C.4.2	QE/EA/NPA	EA/NPA	QE/EA	EA	

Holders of general and administrative information in 4 pilot countries, Module C



D – BUILDING OPERATION AND USE

EU Information level ID		Pilot countries (national Levels)			
Type of data		Who owns the data (HOLDER)			
Level 0 (LO)	CODE (LO.L1.L2)	PORTUGAL	BULGARIA	GERMANY	POLAND
D – BUILDING OPERATION AND USE	D.1.1	BU	EA/BU	ESB/BU	QE/EA/BU
	D.1.2	BU	EA/BU	ESB/BU	QE/EA/BU
	D.2.1	BU	EA/BU	BU	QE/EA/BU
	D.2.2	BU	EA/BU	ESB/BU	QE/EA/BU
	D.3.1	ESB/BU	EA/BU	ESB/BU	QE/EA/BU
	D.3.2	ESB/BU	EA/BU	ESB/BU	QE/EA/BU
	D.4.1	BU		BU	QE/BU
	D.4.2	BU		BU	QE/BU
	D.5.1	BU		BU	QE/BU
	D.5.2	BU		BU	QE/BU
	D.6.1	NPA	NPA/EA	R&A	BU

Legend: Qualified Experts (QE); Energy Auditors (EA); Building User (BU); Energy Sector - Business (ESB); National Public Authority (NPA); Research and Academia(R&A)

Holders of general and administrative information in 4 pilot countries, Module D and E

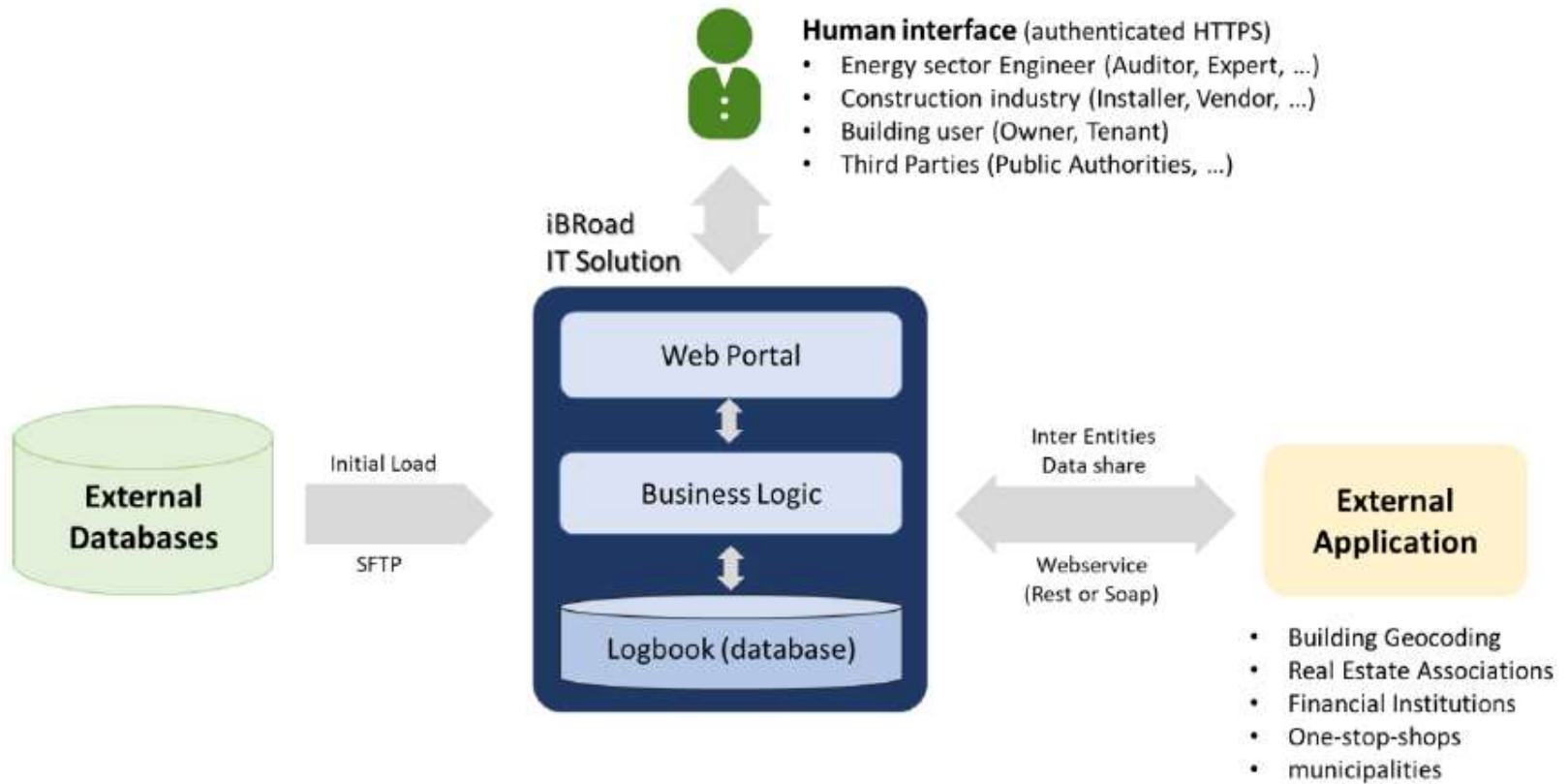


E – SMART INFORMATION

EU Information level ID		Pilot countries (national Levels)			
Type of data		Who owns the data (HOLDER)			
Level 0 (LO)	CODE (LO.L1.L2)	PORTUGAL	BULGARIA	GERMANY	POLAND
E – SMART INFORMATION	E.1.1				
	E.1.2				
	E.2.1				
	E.3.1				

Legend: Qualified Experts (QE); Energy Auditors (EA); Building User (BU); Energy Sector - Business (ESB)

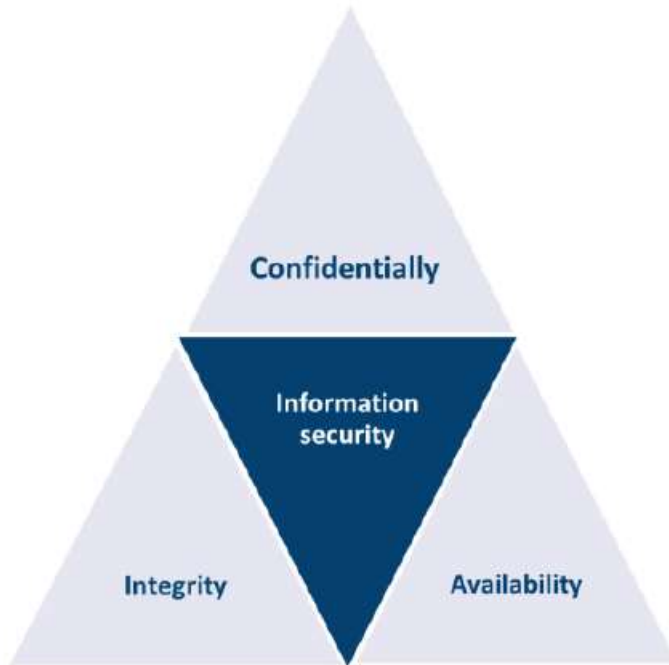
Information currently not available



Integration with external data sources



Data protection and the rights of EU citizens (GDPR compliance)



Confidentiality, Integrity and Availability (CIA) model



Principles to address when dealing with personal data

DATABASE

	1 2 3 4 5 6 7 8 9 10										
Actions	by Design	by Default	Controller/DPO	Policy Privacy	Users profiles	Consent of PD	Purpose of PD	Accuracy of PD	Storage limitation	Security of PD	PD Breach
Data gathering	X	X									
Database			X	X	X	X	X	X	X	X	X

An example of the different actions to take into consideration when considering personal data protections within the iBRoad project

Lessons learnt

CASA+ Morada fiscal -

Início A minha casa Melhorar a minha casa Consumos

Início

Inicio

Morada fiscal

MORADA
R. BENEFICENCIA 1242

CONSTRUÇÃO	TIPOLOGIA	PERFIL
1959	T2	Eco

TIPO	CERTIFICADO
Habitada em Permanência	SCE0000031983024

Faturação anual

- Eletricidade
342,00 €/ano
- Gás
93,00 €/ano
- Água
95,16 €/ano

Notificações

Não existem novas notificações para esta casa.

Melhorar a minha casa

CLASSE ENERGÉTICA ATUAL (C) → Isolamento térmico em paredes exteriores → CLASSE ENERGÉTICA APÓS CONJUNTO DE MEDIDAS (B)

Incentivos

Não existem novos incentivos.

The portal casA+ (Portugal) is a digital platform that offers a public area for homeowners to know more about the building's energy efficiency.

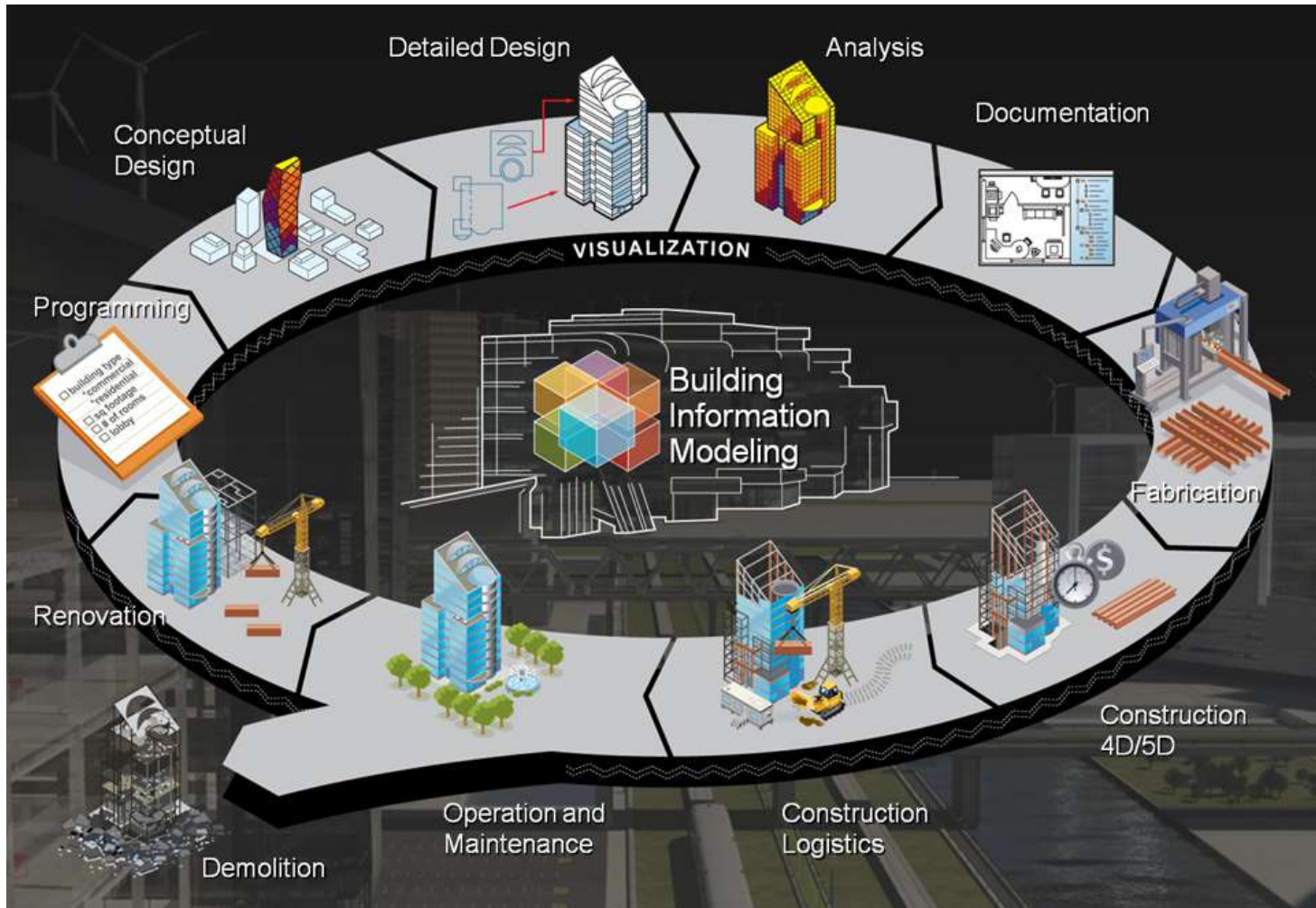
Central message

Woningpas

A personal view on your dwelling, ground & surroundings.



The Woningpas (Flanders region) is a digital passport, available for every dwelling, accessible by the homeowner and other authorised persons.



πηγή: <http://buildipedia.com/aec-pros/design-news/the-daily-life-of-building-information-modeling-bim?print=1&tmpl=component>

ΟΦΕΛΗ

- Βελτιωμένη αποδοτικότητα στη μελέτη και τη κατασκευή εξαιτίας της εύκολης διάθεσης πληροφοριών.
- Άμεση ανανέωση και μεγαλύτερη ακρίβεια σχεδίων.
- Μεγαλύτερη ακρίβεια μετρήσεων, κόστους και καλύτερης ποιότητας μελέτη.
- Μελέτη ενεργειακής απόδοσης πολύ γρήγορα και πολύ νωρίς στη μελετητική διαδικασία.
- Γρηγορότερη παράδοση έργου.
- Έλεγχος κατασκευασιμότητας που οδηγούν σε μείωση του ρίσκου και του κόστους.

Thank you



iBRoad

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°754045