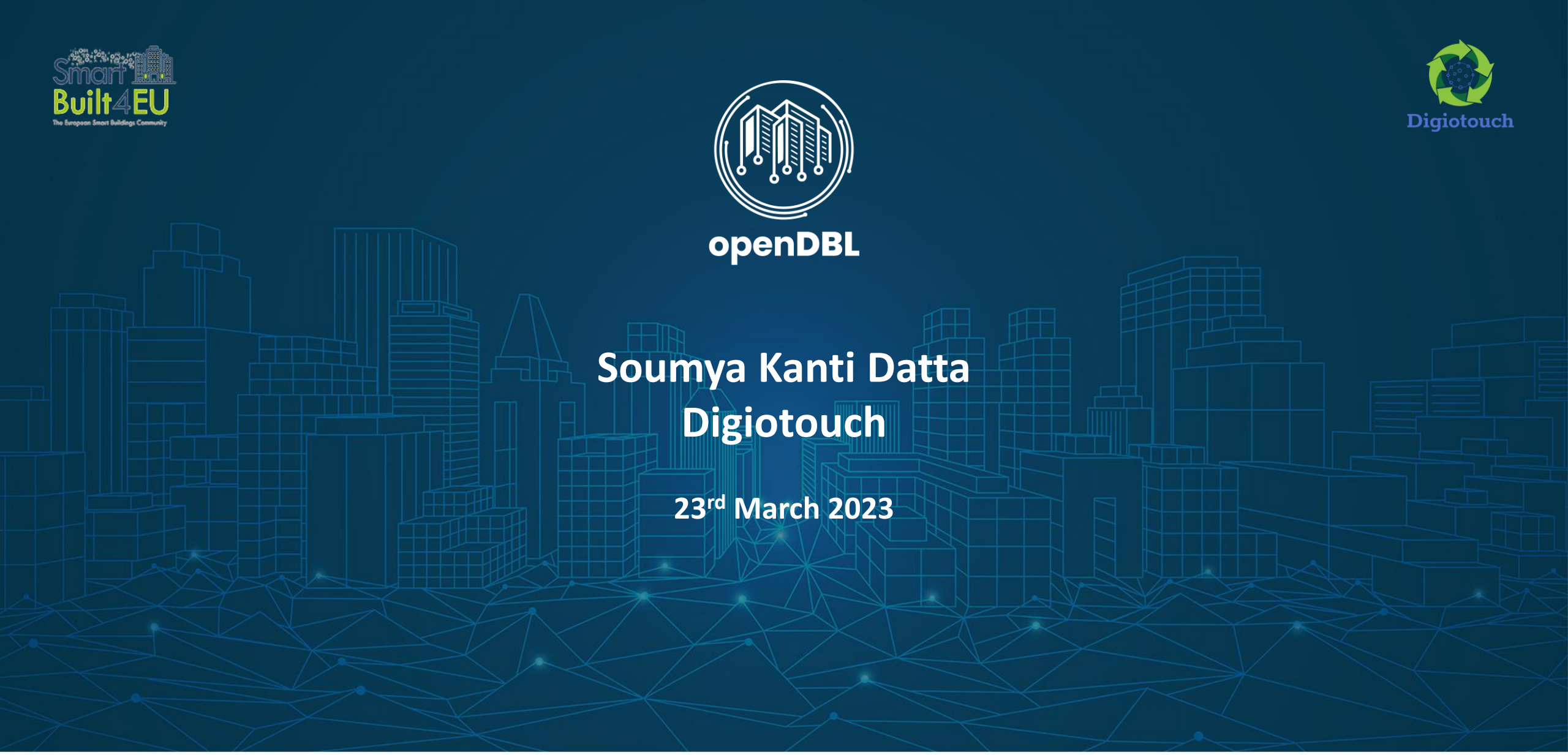


Soumya Kanti Datta
Digiotouch

23rd March 2023

This project is funded by the European Union
under Grant Agreement no. 101092161

Funded by
the European Union

- Type of action: IA
- Project period: 36 months
- Project consortium: 13 partners from 8 countries
- Funded call: HORIZON-CL4-2022-TWIN-TRANSITION-01-09
- Grant agreement no: 101092161

openDBL

Funded by
the European Union

Current state

- Scarce, unreliable and limited accessibility of building related data.
- Poor management of available data.
- Lack of uniform technical and information requirements leading to poor control of the costs of the works and of the impact on the environment.

openDBL

Funded by
the European Union

Ineffective Asset Management

openDBL

Funded by the European Union

openDBL - One Stop DBL Platform

Project objectives and ambition

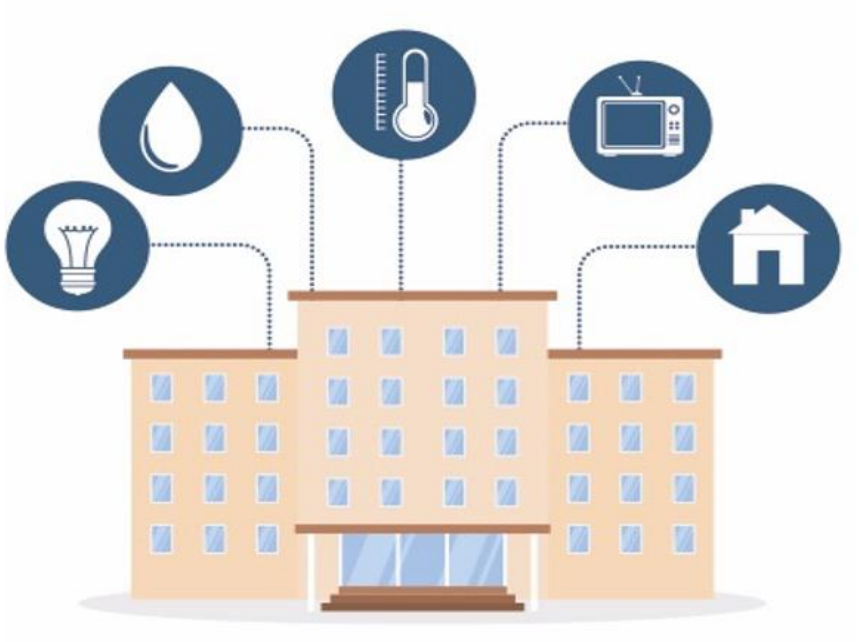
- Offer an integrated solution to simplify the workload of the AECO supply chain.
- Ensure DBL usability to facilitate usage and gain wide adoption.
- Economic viability through value propositions and market relevant pricing.

openDBL

Funded by the European Union

Ambition

Data Generation

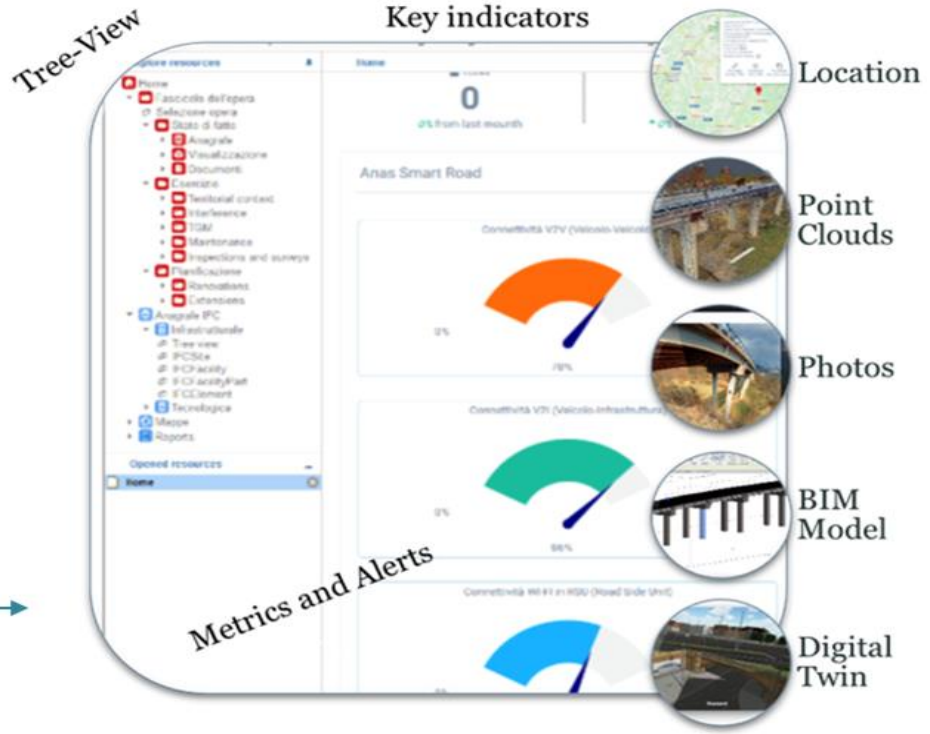


Technology Development

OpenDBL

ARTIFICIAL INTELLIGENCE · BLOCKCHAIN · CLOUD · GIS · OBJECTS LIBRARIES · RFID · SENSORS · VIRTUAL REALITY

OpenDBL Dashboard



Funded by the European Union

openDBL

Contracting Authorities

Owners, Investors , Government Agencies

OpenDBL

MANAGEMENT PLAYERS

Service Providers / Suppliers

Designers, Constructors & Manufacturers, FM Managers & Recyclers

PROCESSES

IDM – Workflows and Information Requirements

DESIGN

Surveys & Planning, BIM Authoring, EIR Procurement

BUILD

BIM to Filed, Site Management & Investigations, Quality Control, Testing & Approval

OPERATE & MAINTAIN

Inspections, Repairs, Substitutions, Disposals

DATA

DATA MODEL (with AI Components)

EU & National Standards and Classifications

Geometric and Visual Data
3D models, photos, Point clouds, Digital Twins

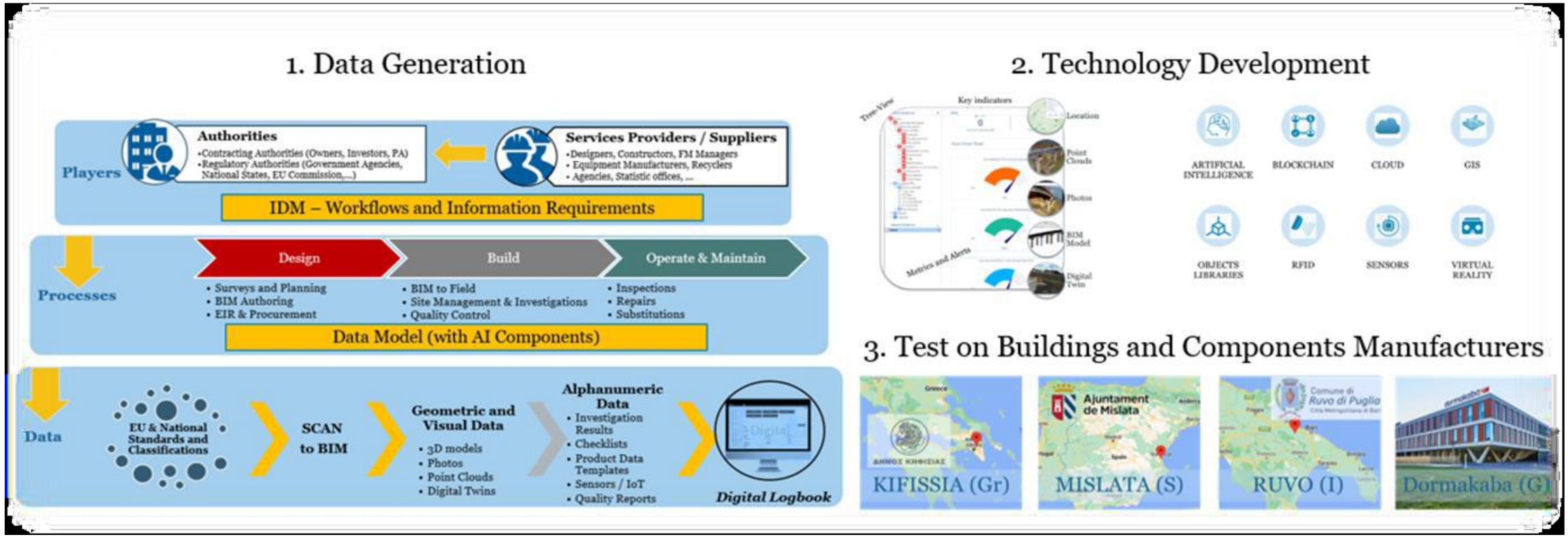
Alphanumeric Data
Investigation results, Checklists, Product Data, templates, IOT Sensors, Quality Reports

Digital Logbook

openDBL

Funded by the European Union

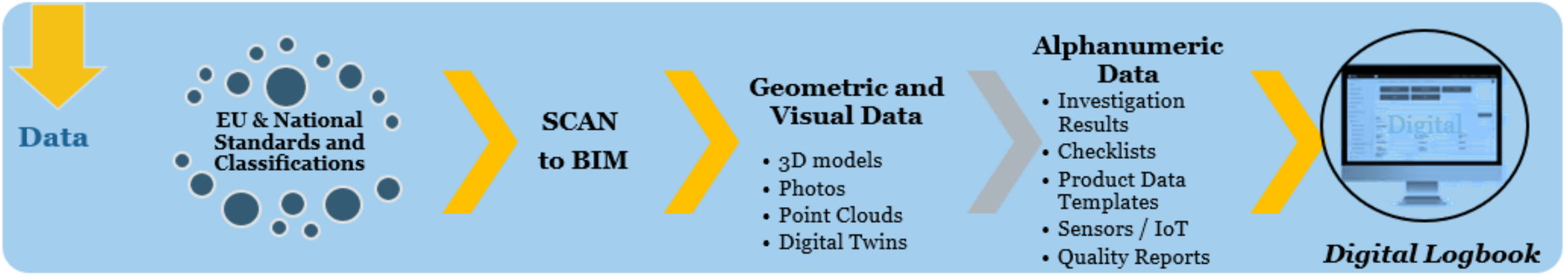
openDBL Methodology



openDBL

Funded by the European Union

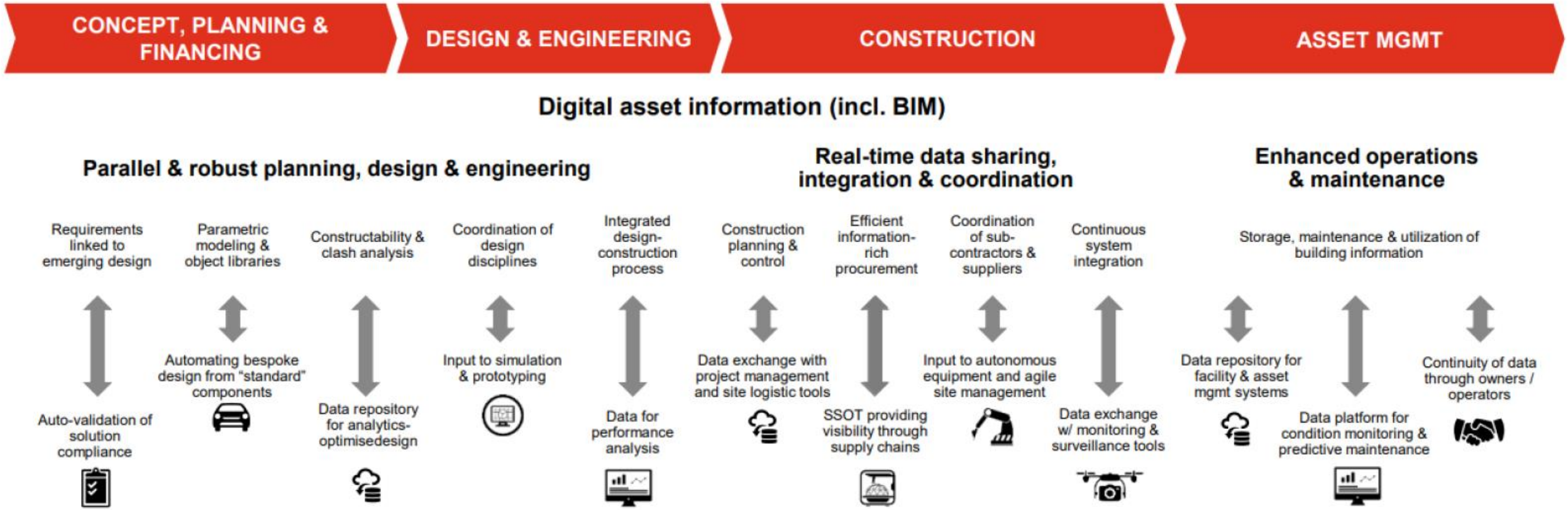
Data Life Cycle



openDBL

Funded by the European Union

Disrupting the AECO Value Chain



openDBL

Funded by the European Union

openDBL Pilot Sites

Town Hall, KHFISSIA, GREECE

KINDERGARTEN VILLA MICHL, KHFISSIA, GREECE

SCHOOL GIOVANNI BOVIO
Ruvo Di Puglia, 70037, Italy

CASA CONSISTORIAL, Mislata, Spain

openDBL

Funded by
the European Union

Consortium

openDBL

CETMA

asro
ORGANISMUL NAȚIONAL DE STANDARDIZARE

cemosa
Ingeniería y Control

metodi

MISLATA és EUROPA

iabi

in2it

Digiotouch

amtrans OCHRONA ŚRODOWISKA progres

dormakaba

Ajuntament de Mislata

ELEKTRONIKAS UN DATORZINĀTNU INSTITŪTS
INSTITUTE OF ELECTRONICS AND COMPUTER SCIENCE

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under the grant agreement No.101092161

Email
contact@opendbl.eu

Website
www.opendbl.eu

Social Media

Thank You

European Commission

Technical study for the development and implementation of digital building logbooks

23 March 2023, Michael Flickenschild

Final Conference *“Smart buildings in Europe: Strategic Research & Innovation Agenda, Policy recommendations, and the Smart Readiness Indicator development”*

DBL
DIGITAL BUILDING LOGBOOK

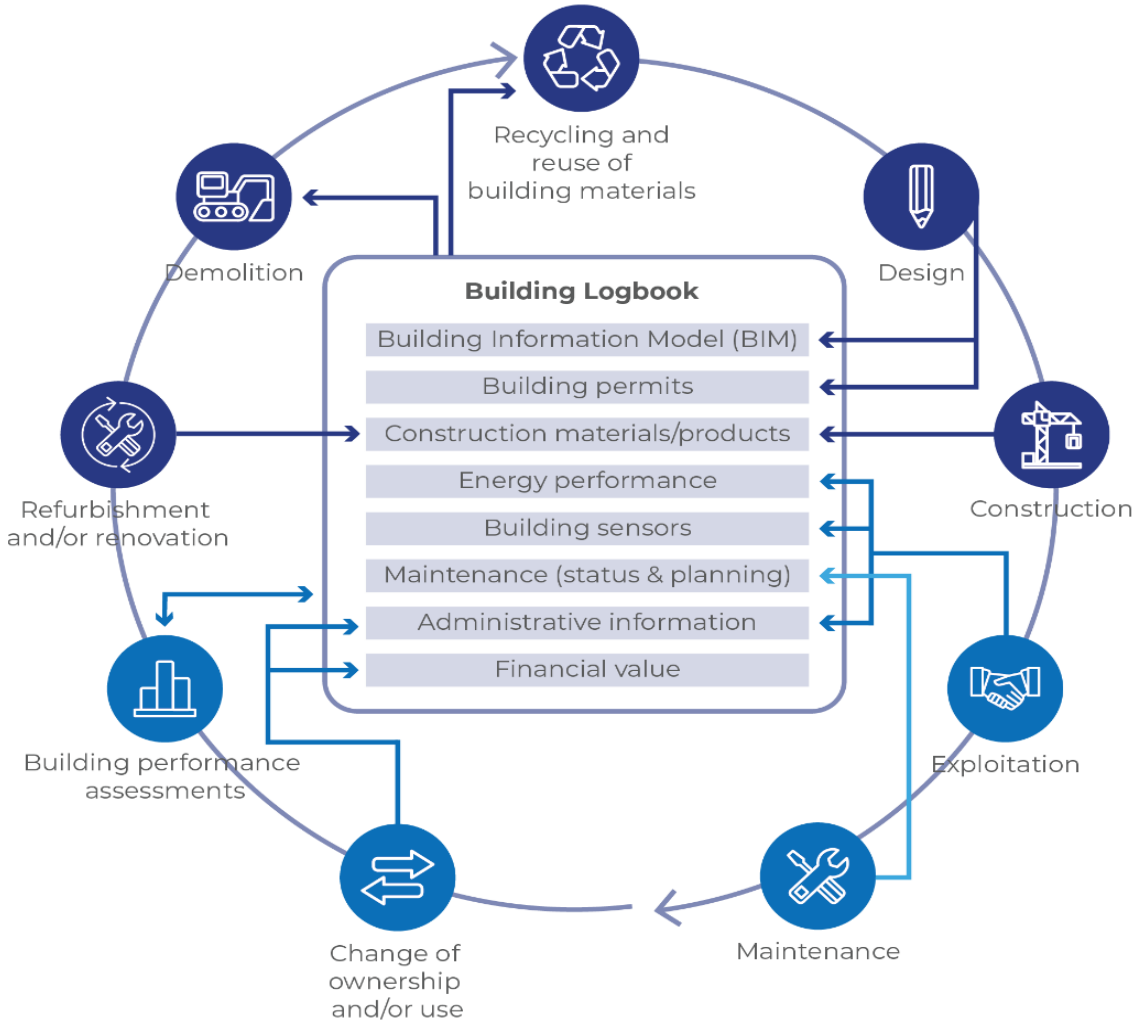
Technical study for the development and implementation of DBLs

Aim: development of a European model for digital building logbooks (DBLs).

With the purpose of:

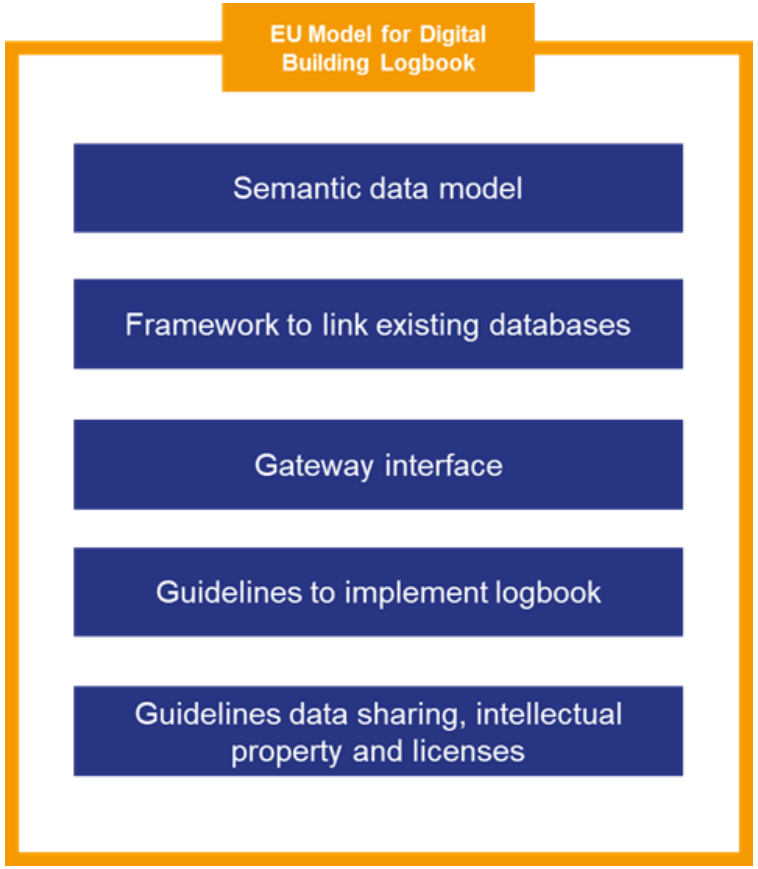
- Providing a common EU Framework to improve harmonisation, efficiency & effectiveness
- Improving data sharing, use and organisation in the built environment
- Supporting stakeholders and end-users through reuse of the framework for various use cases (e.g. energy efficiency)

Central idea: DBL is not a self-contained library but links existing databases

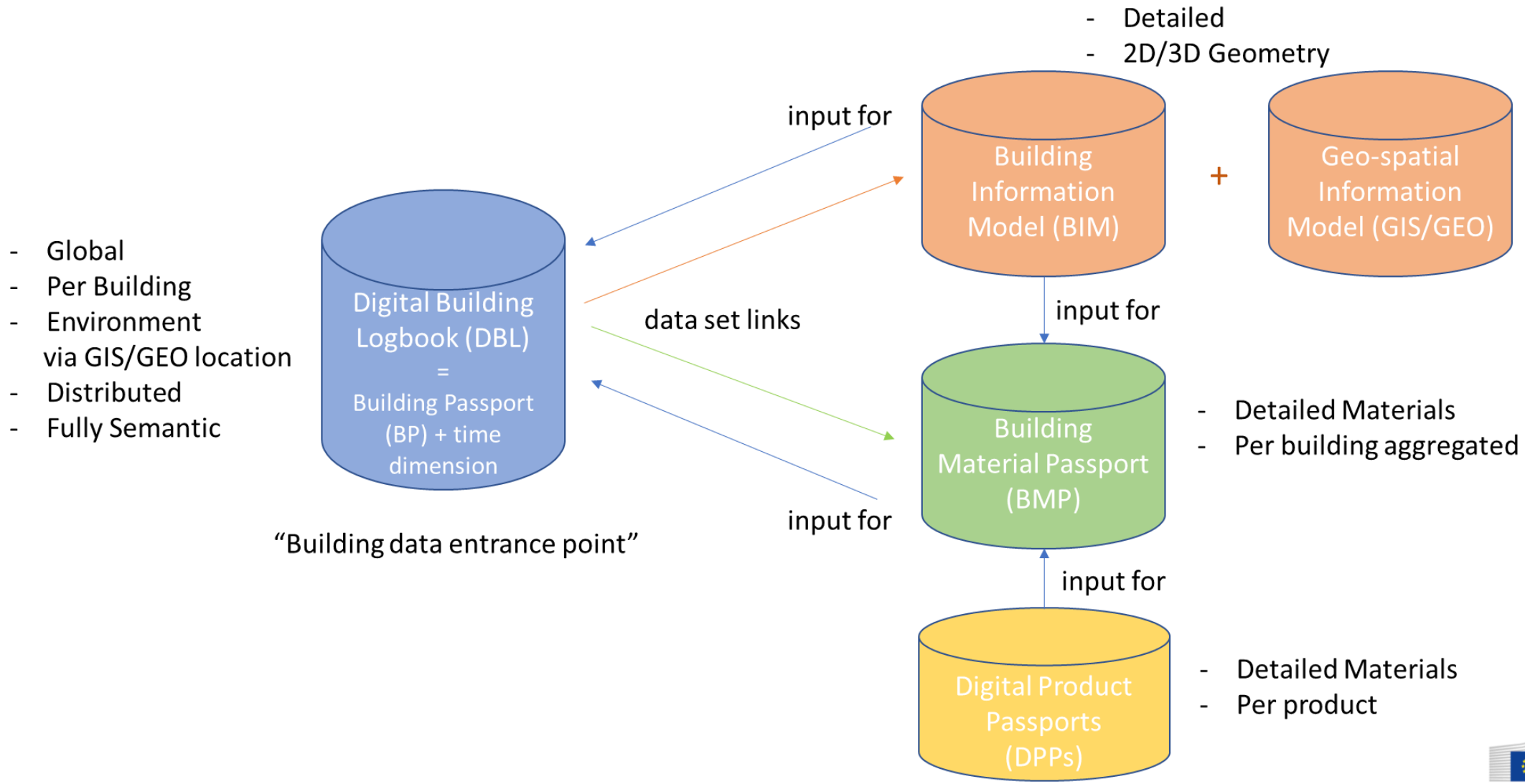


Towards an EU Model for Digital Building Logbooks

- **Main outputs**: an EU semantic data model for DBLs) as well as technical guidelines for its implementation at Member State level.
  - Overview of existing databases
  - Definition of essential elements to enable interoperability between existing data sets
  - The logbook as a gateway: linking existing data sets
  - Guidelines on data sharing, intellectual property and licensing models
  - Guidelines on the implementation of logbooks at Member State level



Context of the Digital Building Logbook



Introducing the DBL Semantic Data Model

"According to the experts, the main purpose of an EU harmonisation or standardisation process for a digital building logbook should be to establish a semantic data model of the core digital building logbook elements" [1].

A **semantic data model** is a data specification that provides meaning and structure to data. It defines the possibilities and impossibilities in the data

Two parts:

1. **Ontology** specifies the relevant concepts and their attributes and interrelationships
2. **Dictionary** the multi-lingual terms with definitions used as names for elements in the ontology

D2.1 defines the **DBL Semantic Data Model** and its underlying principles and technologies:

- It is proposed as an EU 'core model' for EU Member States and related data providers.
- It provides agreed common meaning and terminology for the various relevant logbook data sets.
- It reuses existing semantics from INSPIRE, on buildings, building units, cadastral parcels and addresses.
- It makes technological choices (W3C Linked Data / Semantic Web) on format, access method and language.

[1] European Commission, EISMEA, Dourlens-Quaranta, S., Carbonar, G., De Groote, M., et al., Study on the development of a European Union framework for digital building logbooks

Introducing the DBL Semantic Data Model

DBL Semantic Data Model

Providing standard form and meaning to digital building logbook data.

Authors: Michel Böhms (TNO), Ed.
Martin van der Ende, Michael Flickenschild (Ecorys)
Tom Borst, Niko Raes, Amy Cai, Yvon Gankema,
Robbin Schinkel (Arcadis)

16. March 2023 (final)

DG GROW

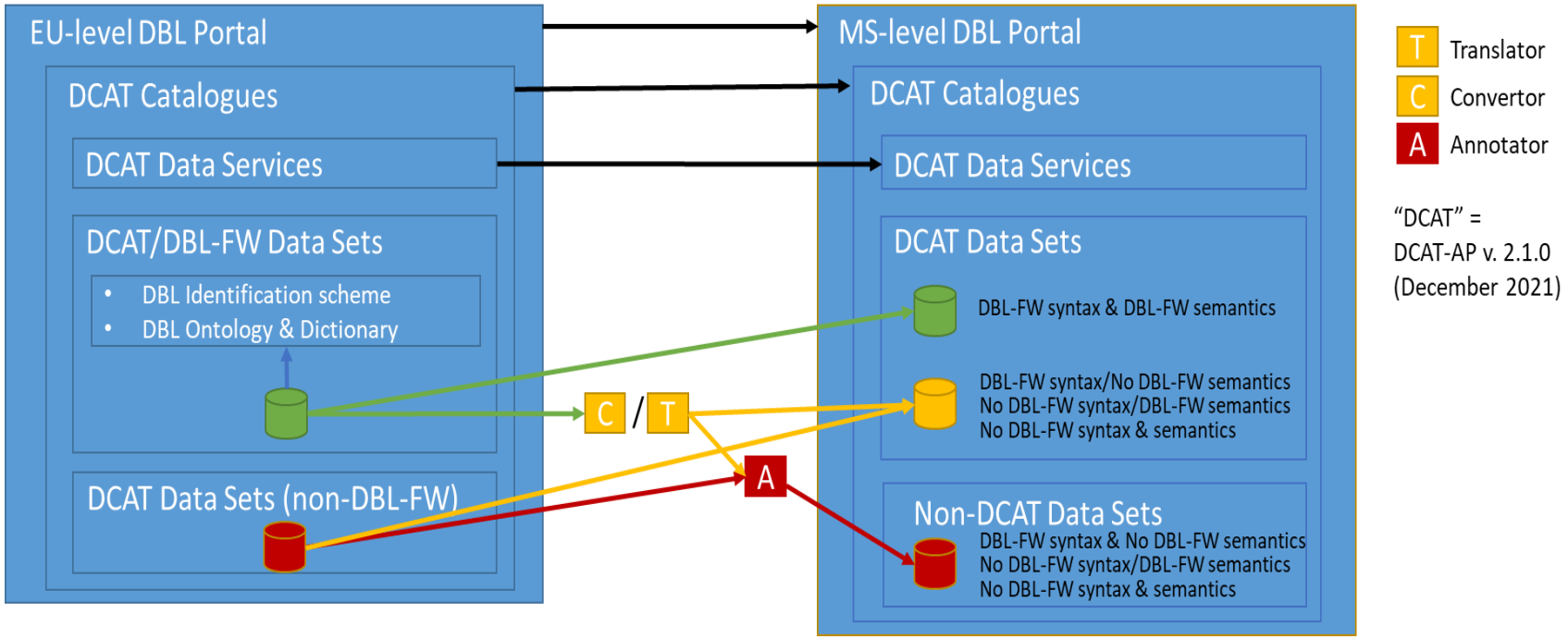
Contents

Generic use case types for an EU DBL model

The generic use case types are the data exchange and/or data sharing and the subsequent integration of building-related data between different stakeholder types:

- The EC at the EU level;
- The national agencies at the Member State level; and
- The actual data providers like building owners and construction professionals.

Modes of interaction between building data portals example of EU and MS level



Ongoing work

Upcoming deliverables

The team is currently preparing and finalising the following deliverables

- **D2.3 - Key data sets and functionalities**: Building on the semantic data model (2.1) and its coding (2.2) the DBL model is confronted with some key available (public) building data sets and their related software functionalities.
    - The focus is on the most basic data that is in principle relevant for all EU Member States. That is, the bare minimum a DBL should have content for.
- **D.2.4 - Use cases**: To showcase how the DBL would work in practice and show potential advantages of the DBL.
    - The focus is on construction, financial institutions and public authorities
- **D2.5 - Essential elements for interoperability**: To elaborate on technical, syntactic and semantic interoperability for interactions between the EU level, Member State level and the level of actual building-related data providers

Timeline

Month	Activity	Aim	Aspect
Jun	Workshop	Start	Announcement of the study
Aug-Sep	Survey	Scoping	Database coverage
Oct	Workshop	Discussion	Linking data & gateway approach
7 Feb	Workshop	Discussion	Semantic data model approach
Mar-Apr	Survey	Feedback	Semantic data model, costs
Apr/May	Workshop	Discussion	Data sharing, costs, enforcement
May-Jun	Survey	Validation	Costs and benefits, technical guidelines inputs
Jun	Workshop	Validation	Discussion on technical guidelines
Sep	Final event	Next steps	Technical guidelines and final results

Stay up-to-date and register to our mailing list:
https://ec.europa.eu/eusurvey/runner/DBLsurvey2022

Contact:
buildinglogbook@ecorys.com

DBL

DIGITAL BUILDING LOGBOOK

European Commission

BuiltHub

The BuiltHub project

Pitch at Final SmartBuilt4EU Conference 23/03/2023 in Brussels

Federico Garzia, Eurac Research (presenter)

Ulrich Filippi Oberegger, Eurac Research (slides, BuiltHub project coordinator)

This project has received funding from the EU's Horizon 2020 program under grant agreement no 957026.

BuiltHub consortium

BPIE

CARTIF

everis
an NTT DATA Company

eurac research

ICLEI
Local Governments for Sustainability
EUROPE

RI.SE

TEAM sympraxis

TU WIEN
TECHNISCHE UNIVERSITÄT WIEN
Vienna | Austria

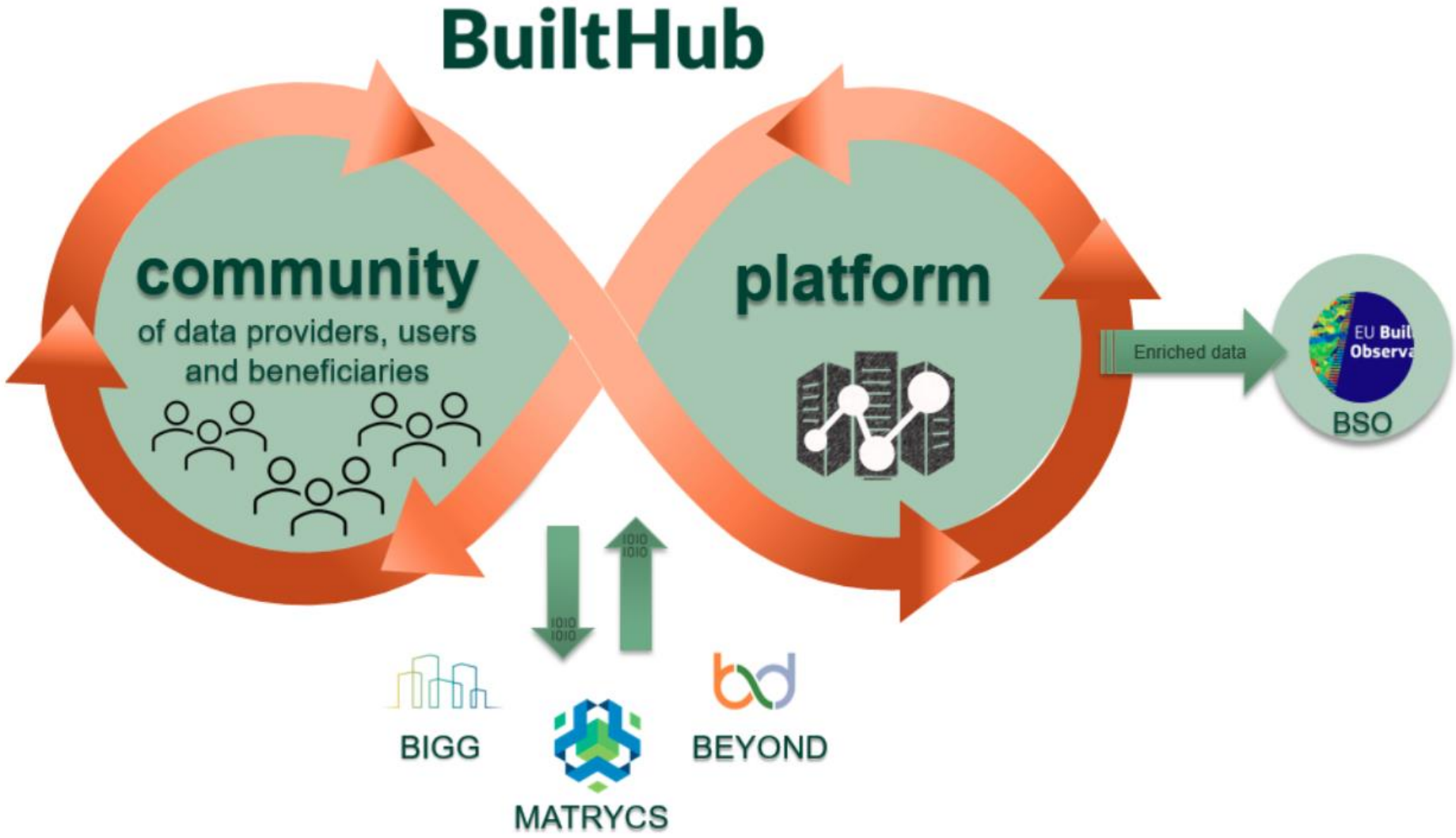
BuiltHub in brief

Coordination and Support Action (CSA)

4 year-project, October 2020 - September 2024

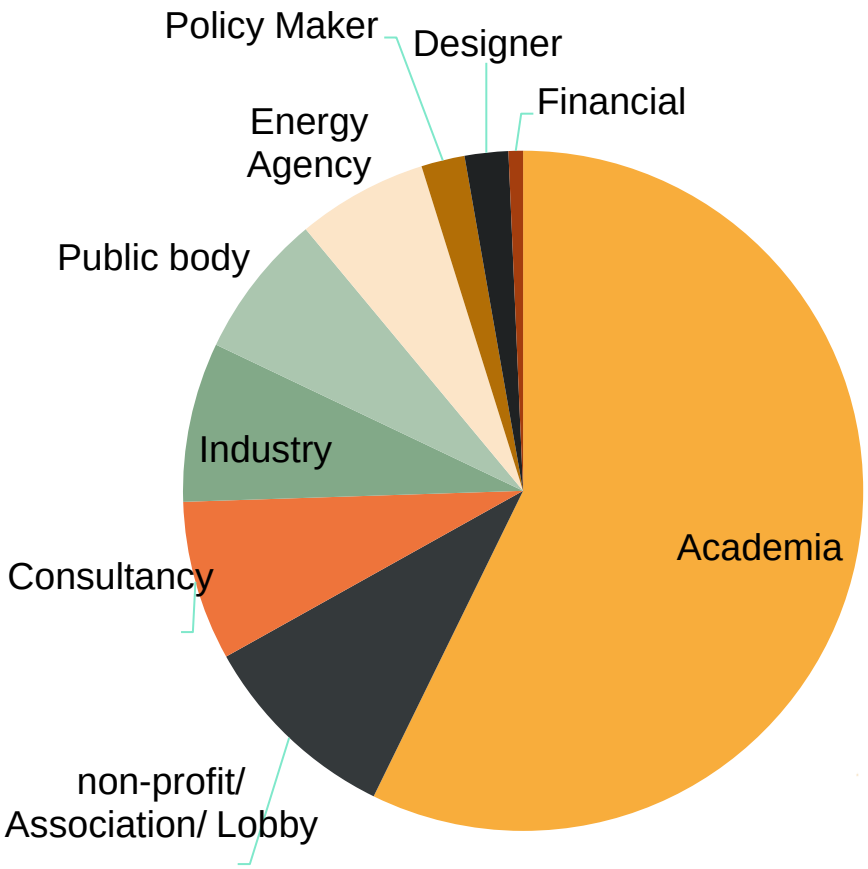
BuiltHub's main goals

- **Develop roadmap for constant data flow** to EU Building Stock Observatory (BSO)
- **Create and engage community** for data collection, exchanges, data-to-knowledge processes
- **Standardize data governance and services** – offered, tested, demonstrated **through web-based BuiltHub platform**
- **Coordinated action** among associated projects

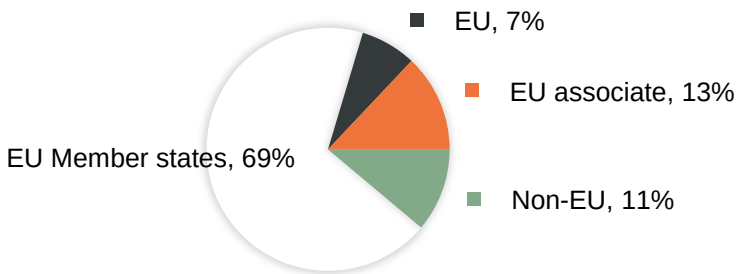

BuiltHub
community
of data providers, users and beneficiaries
platform
Enriched data
BSO
BIGG
MATRYCS
BEYOND

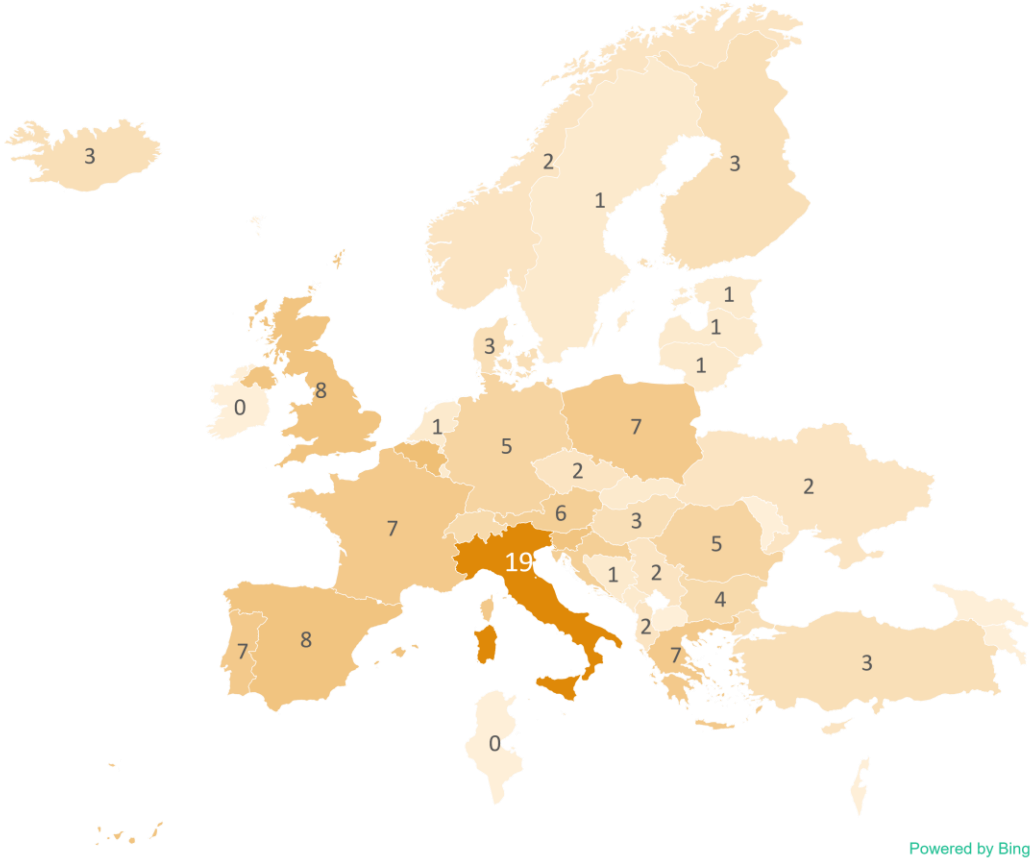
BuiltHub community

Per organisation type



By geography





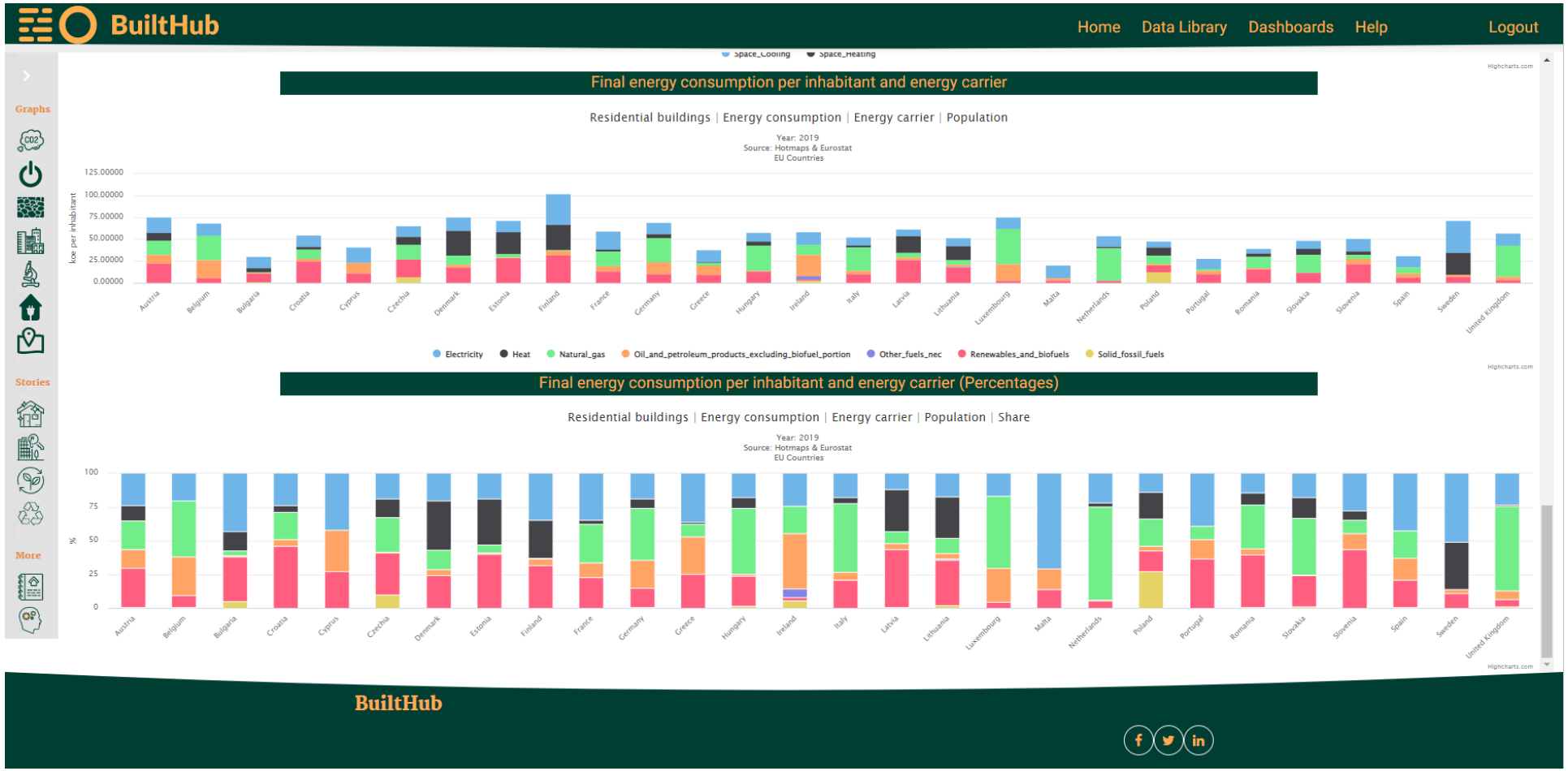
BuiltHub data sources

Legend	
A	Building stock related datasets
B	Socio-economic datasets
C	Climatic datasets

Dataset number	Topic type	Name	Content
1	A	Horizon 2020 HotMaps project: Building stock analysis	Complete building stock analysis for the EU27+UK. Values related to final energy consumption and useful energy demand for space heating, space cooling and domestic hot water, construction materials and methodologies, technologies used and building stock data/information (thermal transmittancy, building stock vintages and characteristics, household occupancy related data, etc.) can be found both for the residential and the non-residential sectors per building types and construction vintages.
2	A	IEE TABULA project: Typology Approach for Building Stock Energy Assessment	Building stock data and data focused on technical systems for heating, cooling and domestic hot water production in different buildings types are the main outputs of this dataset. Final energy consumption and envelope performance data are available as well.
…	…	…	…
28	C	EDGAR (Emissions Database for Global Atmospheric Research) CO2 Emissions	Carbon Dioxide (CO_2) emissions by country and sector (Buildings, Transport, Other industrial combustion, Power Industry and other sectors) have been collected for the years between 1970 and 2018 and are reported expressed in $MtCO_2$/year.
29	C	CORDEX - Regional climate model data on single levels for Europe	Climatic data for Europe expressed in daily, monthly and seasonal mean values as well as 3 or 6 hours resolution. Data for air temperature at 2 m, wind speed, atmospheric pressure and hum idity can be found.
30	C	PVGIS - Photovoltaic Geographical Information System	This GIS dataset contains data related to the solar radiation. It takes into account both day and night-time periodsexpressing the solar radiation raster map in W/m2.
…	…	…	…

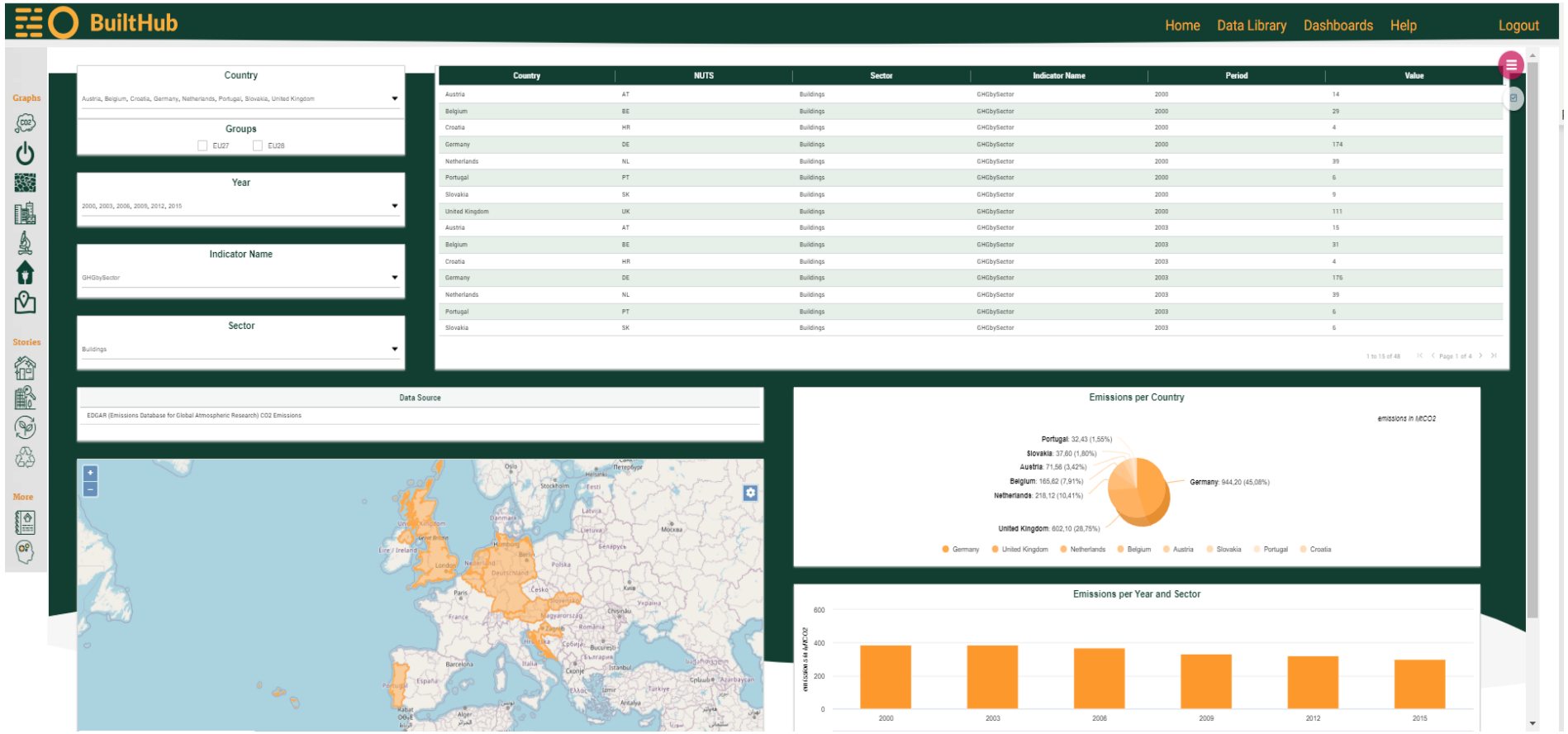
Key results & value proposition

- **Website**: https://builthub.eu/
- **Data platform** with interactive services: https://platform.builthub.eu/
- **Roadmap** for data collection and sharing (not yet public)



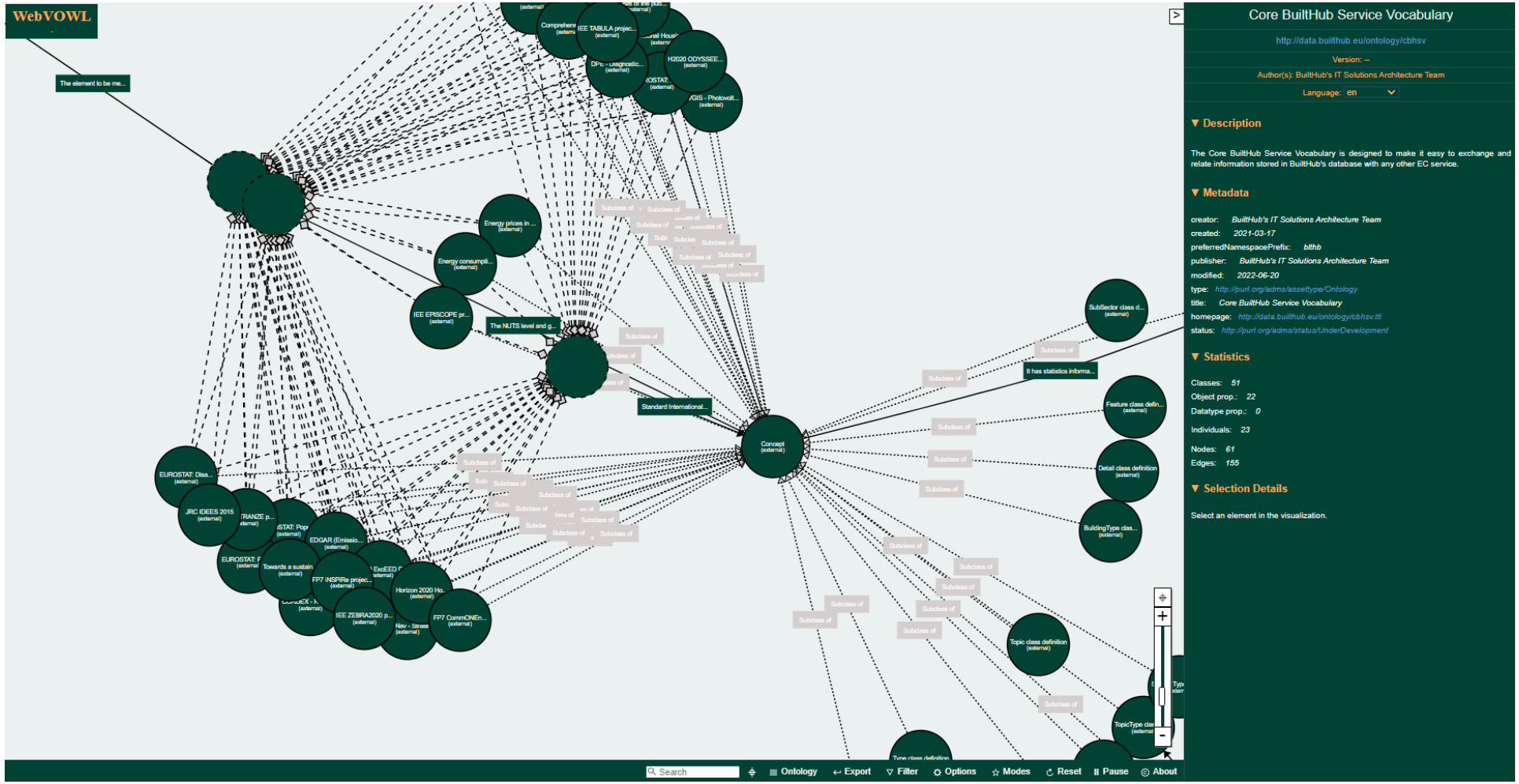
BuiltHub building data platform

Interactive material for stakeholders, e.g., comparison of datasets, storylines, and guidance on ML models



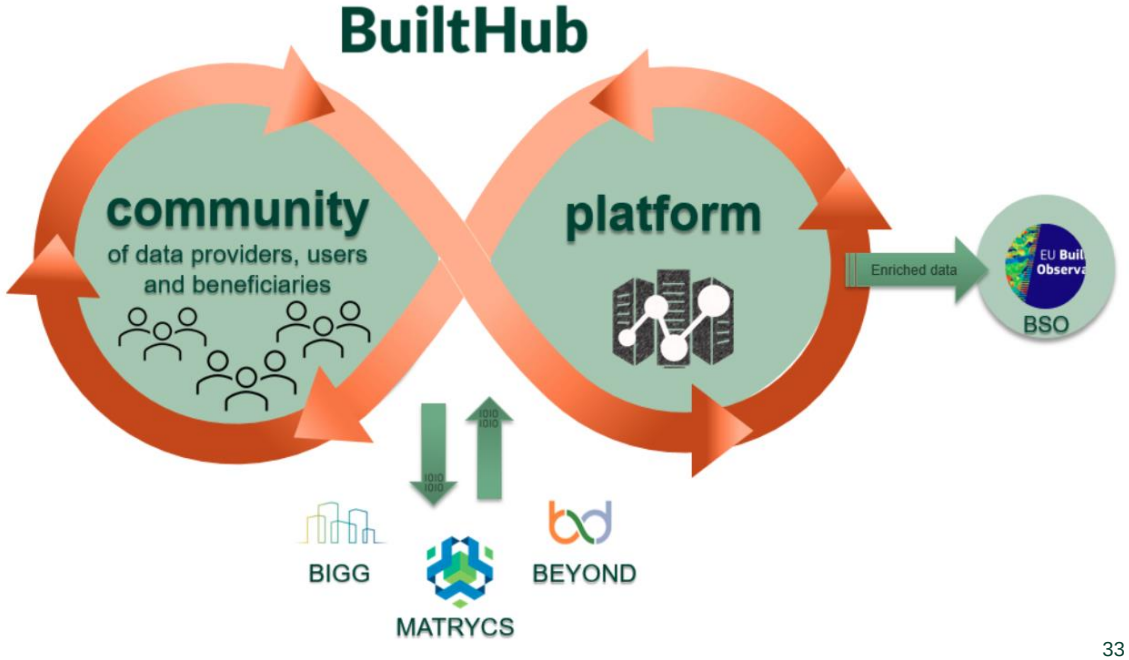
BuiltHub building data platform

Standardised ontology (controlled vocabulary) and viewer



Expected impact

- **Better knowledge** about EU building stock
- **Monitoring** of policies
- **Revision** of energy efficiency and decarbonisation targets
- **Renovation plan** development
- **FAIR data collection & sharing**



Lessons learnt & good practices

- **Data to insight services very expensive & highly valued** on the market
- **Primary data on building stock transformation** at required granularity **scarce or difficult to access**
- **Data frequently modelled and highly uncertain** – commonly, uncertainty of 20-100% and more for even basic indicators
- **Data quality control** of primary concern
- **Official reports** (e.g., LTRS, Long-Term Renovation Strategies) incomplete, inconsistent, incomparable – commonly, pdfs in different formats, with different indicators
- **Standardised data models under development** – no official standard yet

BuiltHub contributions

- **Standardised indicators & reporting** about the EU building stock
- **Tables, charts, stories**
- **Data quality checks**
- **Data model & IT infrastructure**
- Guidance on **ML techniques**

Smart Built4EU
The European Smart Buildings Community

Elaboration of the Strategic Research & Innovation Agenda (SRIA) for smart buildings

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 956936.

SRIA

- The SmartBuilt4EU project consortium is tasked with drafting a European **Strategic Research & Innovation Agenda** (SRIA) for smart buildings for the European Commission.
- Starting from a longlist of R&I gaps and possible areas for improvement, **ten concrete key priorities for EU** were derived in order to support to research, innovation and market uptake in the field of smart buildings.

Topics covered

PRIO6: Advances in products, services and decision support methods to improve Life Cycle Environmental Impacts of Smart Buildings

1. Further development of common Life Cycle Assessment methods and indicators
2. Streamline the use of dynamic data in Life Cycle Assessment approaches
3. Develop methods to assess and limit the impacts of the ‘smart’ devices
4. Investigate performance gap and rebound effects

PRIO7: Making better use of the data

1

Expand the data collection (amount/type)

(aiming at TRL 4-5) RIA

2

Strive for multi-use data possibilities

(aiming at TRL 8-9) RIA

3

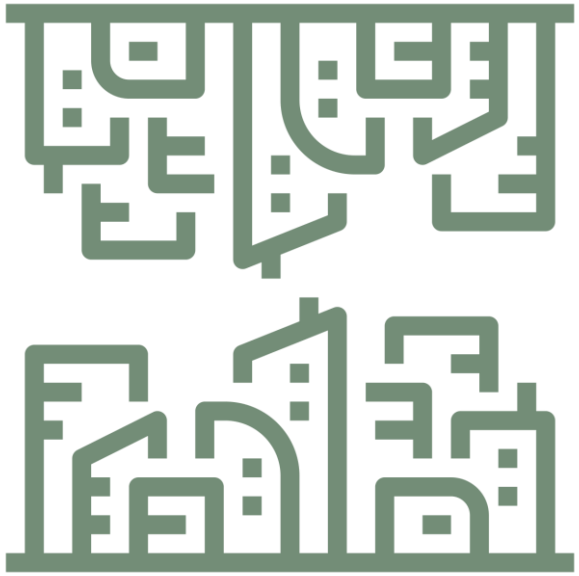
Expand the Digital Twin Concept

(aiming at TRL 6-7)

4

Encourage/showcase testing of data collecting/usage

(aiming at TRL 7-8)



Smart Built4EU
The European Smart Buildings Community

Panel discussion

openDBL

DBL
DIGITAL BUILDING LOGBOOK

BuiltHub

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 956936.

BuiltHub web-based building data platform

Metadata and database predicates for each dataset

PVGIS – Photovoltaic Geographical Information System

This GIS dataset contains data related to the solar radiation. It takes into account both day and night-time periodsexpressing the solar radiation raster map in W/m2.

Dataset metadata

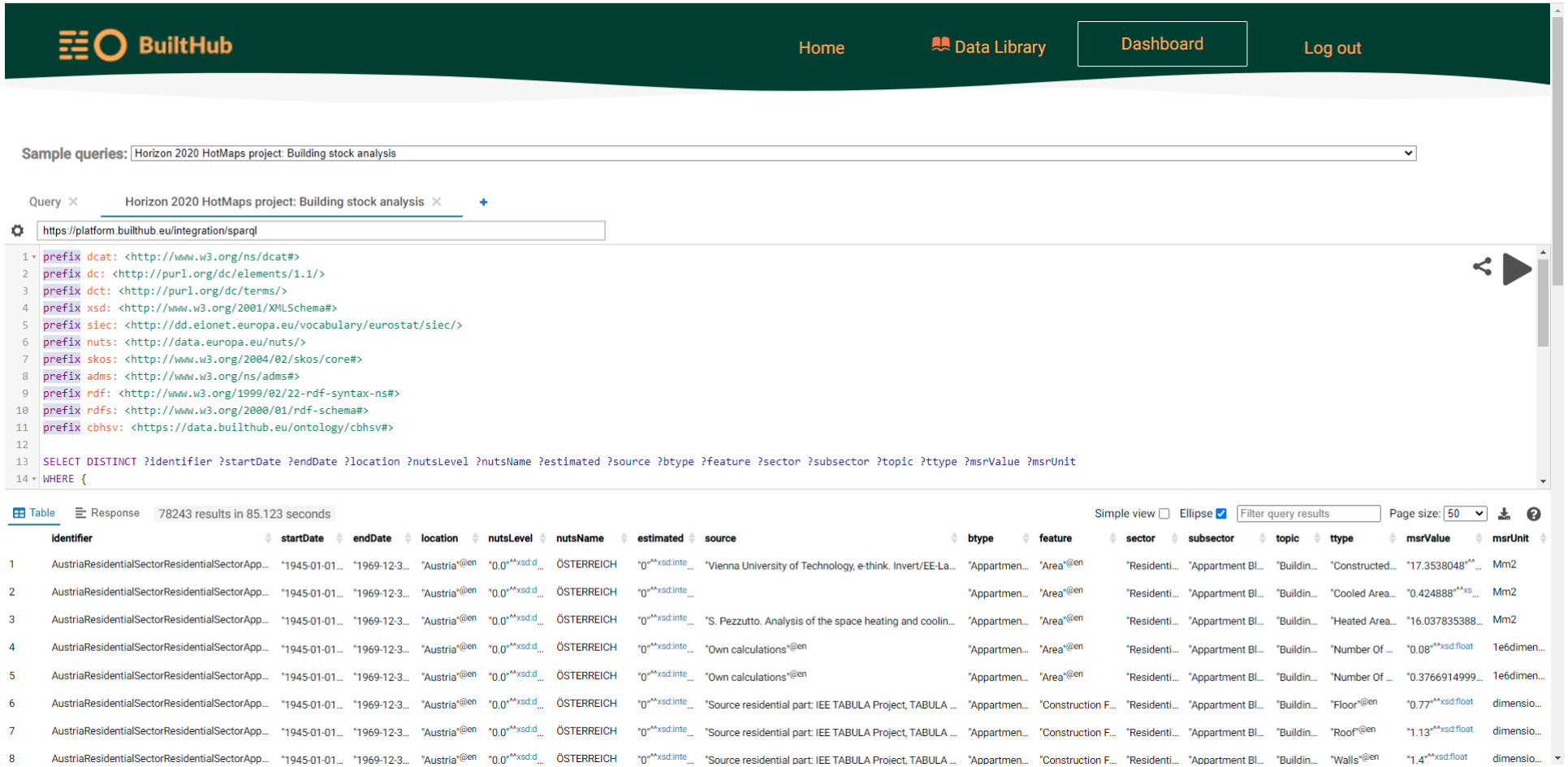
Geo Info	NUTS	Measured Elements	Units	Time Ranges
Countries European Union	NUTS 0 Level	Average global irradiance on a horizontal surface	W/m2	Period from 2005 to 2015

Dataset database predicates

Title	Description	Predicate (Fields' name)	Range/Data Type	Cardinality	Content
Record Type	Defines the type of the record. This type must be defined in a known ontology. Usually, the ontology is specified with a prefix.	rdf:type	IRI	1..1	blthb:Dataset030
Record Key	The primary key of the record.	dc:identifier / skos:notation	rdfs:Literal (xsd:string)	1..1	"al4averageglobalirradianceonahorizontalsurfacewm200114bd98ab3bb6ab20e23197c9e750b"
Frecuency	This property refers to the frequency at which the Dataset is updated.	dct:accrualPeriodicity	dct:Frequency	1..1	http://purl.org/cld/freq/monthly
Temporal Coverage	Refers to a temporal period that the Dataset covers. It is defined as an interval of time that is defined by its start and end dates.	dcterms:temporal	dcterms:PeriodOfTime	1..n	
	This property contains the start of the period.	dcat:startDate	rdfs:Literal (xsd:date)	1..n	"2015-04-01"^^xsd:date
	This property contains the end of the period.	dcat:endDate	rdfs:Literal (xsd:date)	1..n	"2015-04-30"^^xsd:date
Belongs to Dataset	The dataset of this record	skos:broader	IRI	1..1	https://data.builthub.eu/resource/Dataset/30
Spatial Coverage	This property refers to a geographic region that is covered by the Dataset. The EU Vocabularies Name Authority Lists must be used for continents, countries and places that are in those lists.	dcat:spatial	geo:hasGeometry geo:asWKT	1..1	"POLYGON ((19.6 42.325,19.6 42.3,19.625 42.3,19.625 42.325,19.6 42.325))"^^geo:wktLiteral
Inside NUTS boundaries	Indicates if the information is inside a NUTS boundaries.	blthb:hasNUTS	skos:Concept / co:Set (A group of NUTSs)	0..1	https://data.builthub.eu/resource/nuts/NAP
Measured Element	The element/indicator which has been measured.	blthb:measuredElement	rdfs:Literal (xsd:string)	1..1	"Average global irradiance on a horizontal surface"^^xsd:string
QUDT Measurement	The magnitude and kind of the measurement expressed using the QUDT specification.	blthb:measurementQUDT	qudt:QuantityValue	1..1	
	The magnitude of the measurement expressed using a decimal number.	qudt:numericValue	rdfs:Literal (xsd:float)	1..1	"183.0"^^xsd:float
	The kind of the measurement (measurement unit) expressed using the QUDT specification.	qudt:unit	qudt:unit	0..1	
UCUM Measurement	The magnitude and kind of the measurement expressed using the UCUM specification.	blthb:measurementUCUM	rdfs:Literal (ucum:ucum)	1..1	"183.0 "^^cdt:ucum
Literal Measurement Unit	The kind of measurement expressed using natural language.	blthb:measurementUnit	rdfs:Literal (xsd:string)	1..1	"W/m2"^^xsd:string
Literal Measurement					

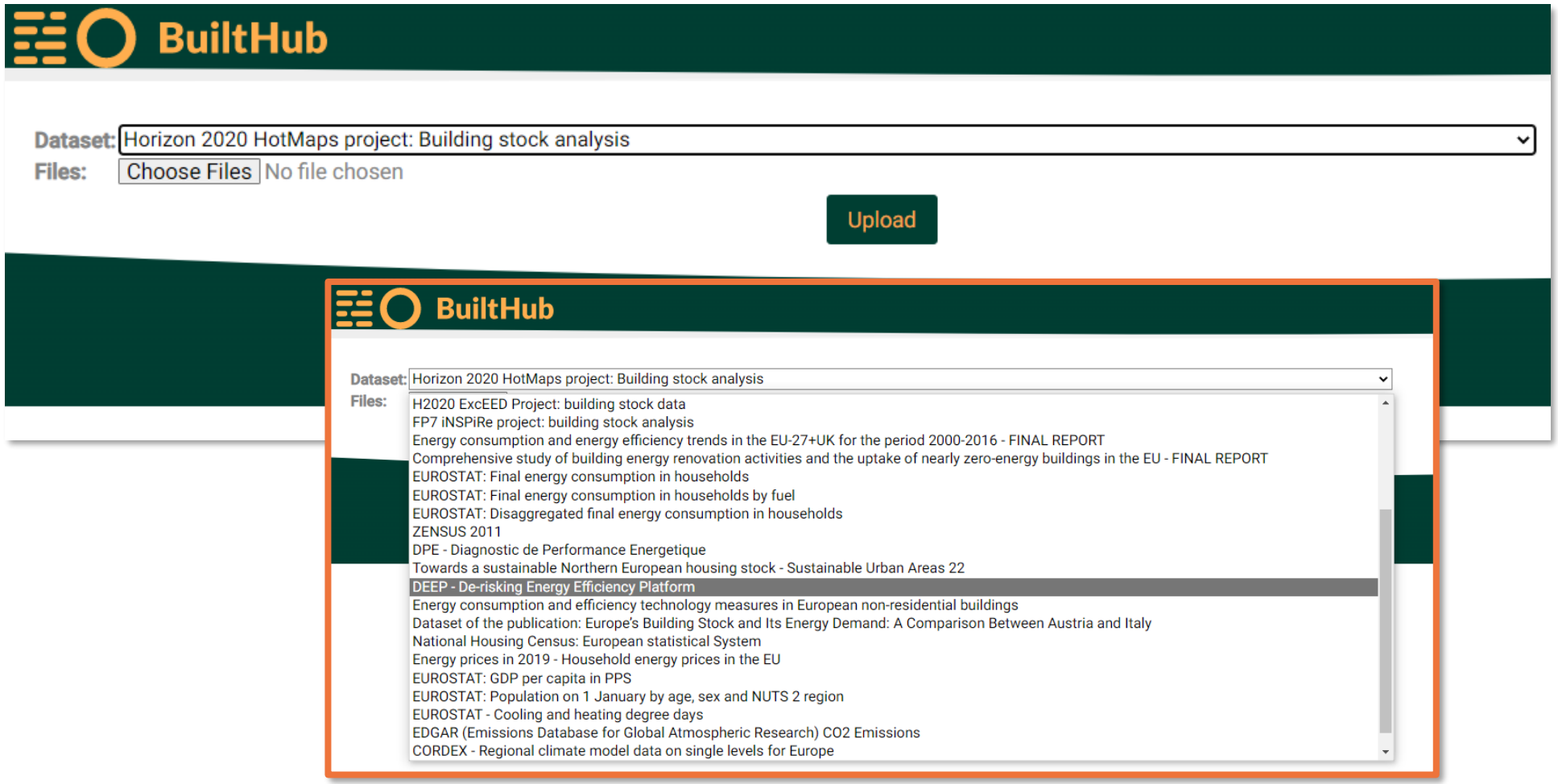
BuiltHub web-based building data platform

SPARQL editor with sample queries



BuiltHub web-based building data platform

Dataset upload facility



BuiltHub

Roadmap for a living Building Stock Observatory

Political
- Mandate & directive for data collection and sharing
- Trading & financial instruments, regulation
- Foster technical infrastructure expansion

Economic
- Mutually beneficial use cases
- Central data & services marketplace
- Data services rollout

Social
- Education and training
- Collaborative networks & initiatives
- Consultations & debates on future actions

Techno-logical
- Digitalisation & automation
- FAIR data & metadata standardisation
- Quality control procedures
- Visualisation & user experience

Legal
- Privacy, data ownership, IP protection & licensing framework
- Model agreements
- Guidelines & best practices

Environ-mental
- Decarbonisation targets & scenarios
- Implementation plans
- Control & enforcement mechanisms
- Solution packages & showcases