BuiltHub

The BuiltHub project and relevance to public sector buildings

Building a sustainable and meaningful data flow of the EU Building stock

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Working Group 10.4 The role of databases in supporting the role MS play in demonstrating Article 5 EED.

10th Plenary Meeting Concerted Action for the Energy Efficiency Directive, Lisbon

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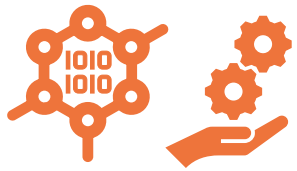
BuiltHub in a nutshell

Coordination and Support Action (CSA)

4 year-project, October 2020 - September 2024

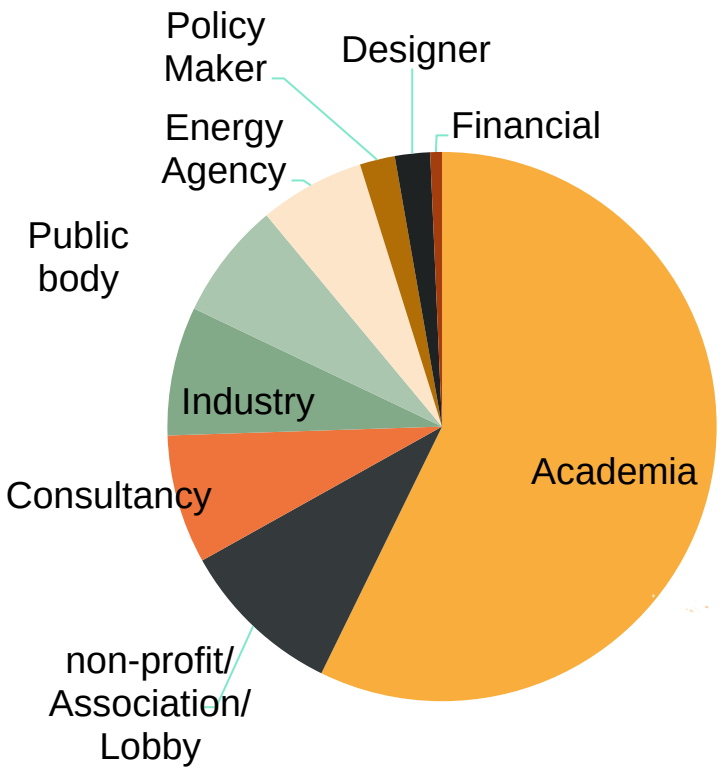
BuiltHub's main goals

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

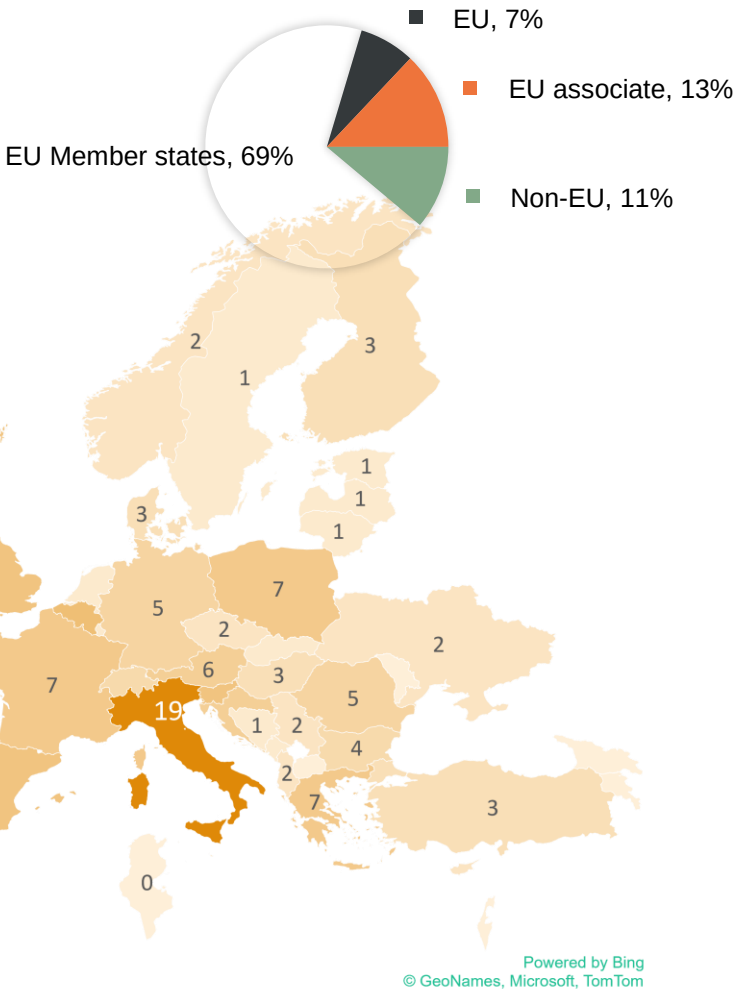


BuiltHub community overview

Per organisation type



By geography



Survey results – stakeholder needs

Highest importance

- Access to **more data**
- **Comparable data** for other countries/cities/municipalities
- Access to **benchmarks, scenarios, plans and goals**

High importance

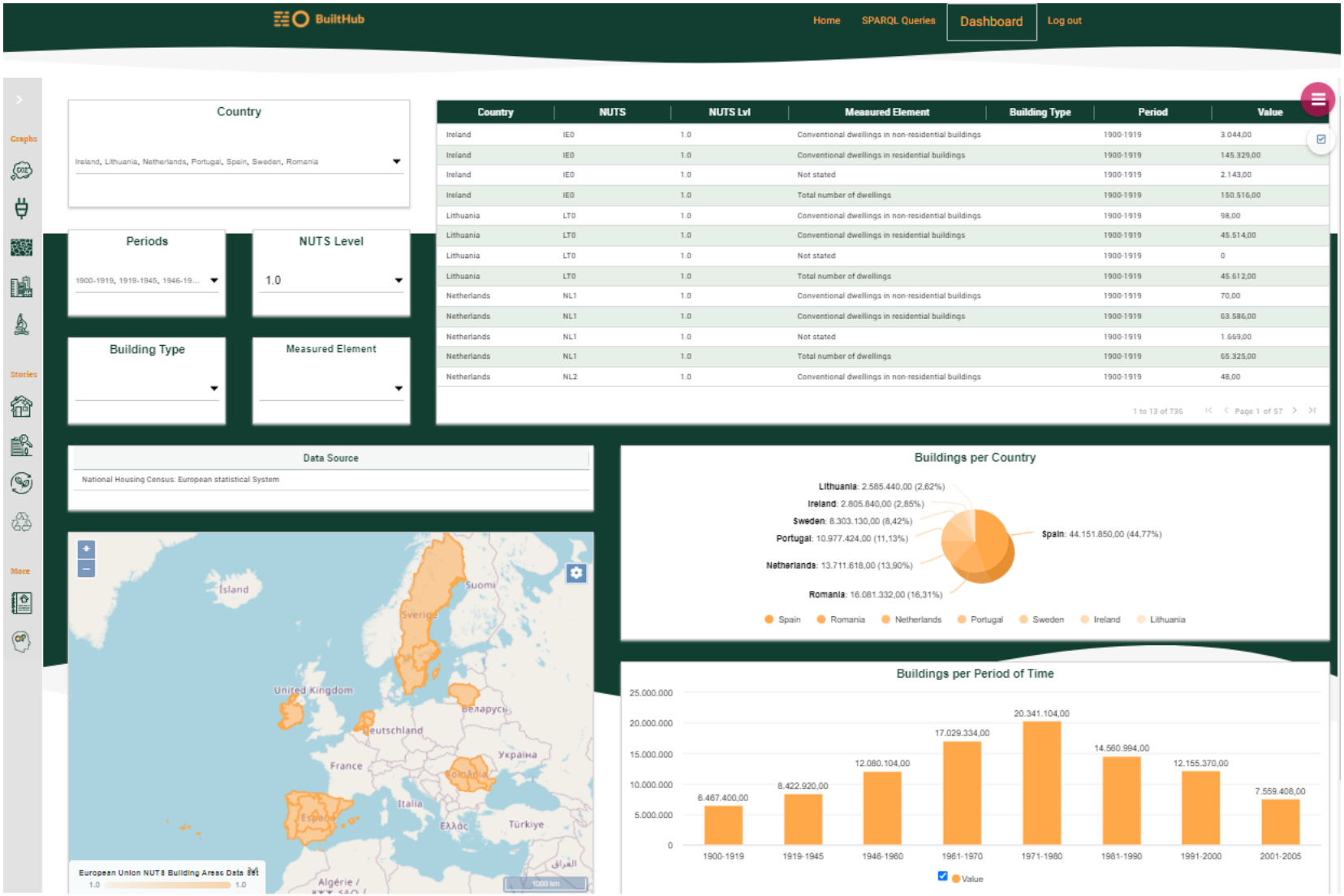
- Data **collection**/storage
- Data **analysis**/processing
- Data **community building**/exchange with community/data **sharing**
- Complementary **data from other sectors** that interact with buildings (e.g. energy, manufacturing industry)
- Cross sector analysis that BuiltHub will provide based on the size of database
- Comparison tools for your dataset with other datasets
- Quality analysis of data
- Check/clean data
- Import/integrate data into other platforms
- Validation tools for your dataset, for example across different time periods
- **Privileged access to a live data-sharing community**

BuiltHub platform datasets

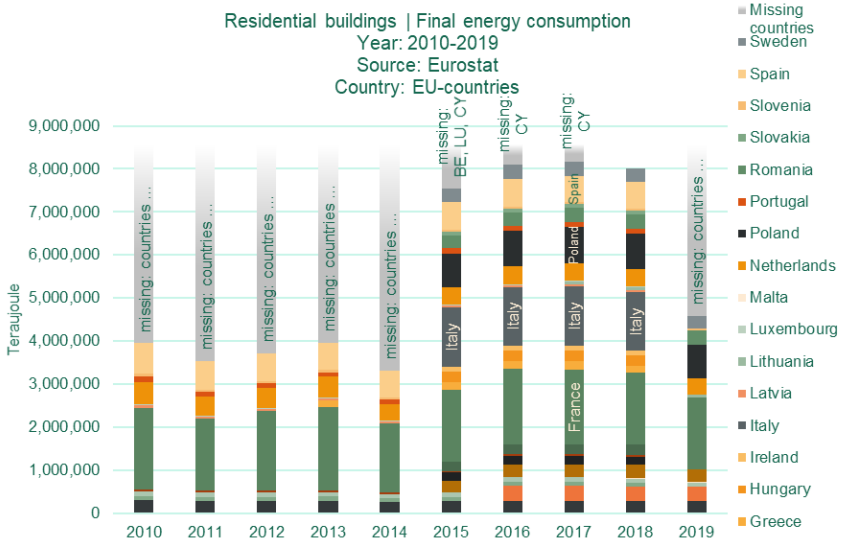
Legend	
A	Building stock related datasets
B	Socio-economic datasets
C	Climatic datasets

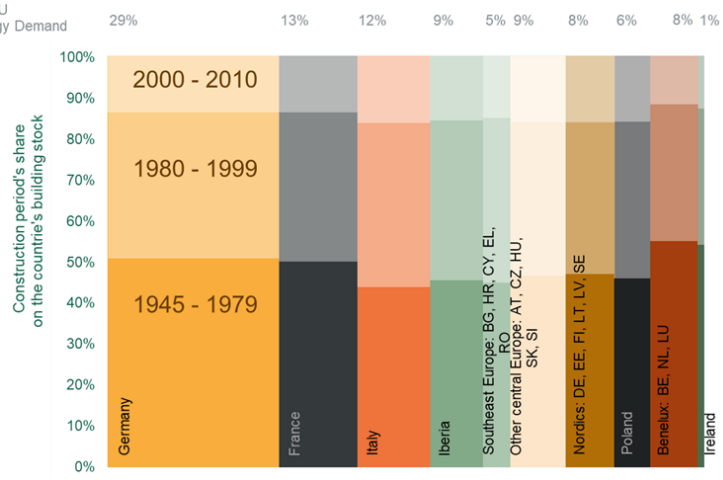
Dataset number	Topic type	Name	Content
1	A	Horizon 2020 HotMaps project: Building stock analysis	Complete building stock analysis for the EU27+UK. Values related to final energy consumption and useful energy demand for space heating, space cooling and domestic hot water, construction materials and methodologies, 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.
…	…	…	…

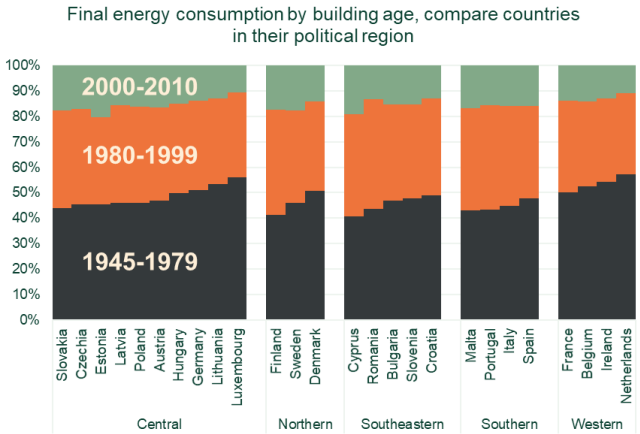
BuiltHub web-based platform

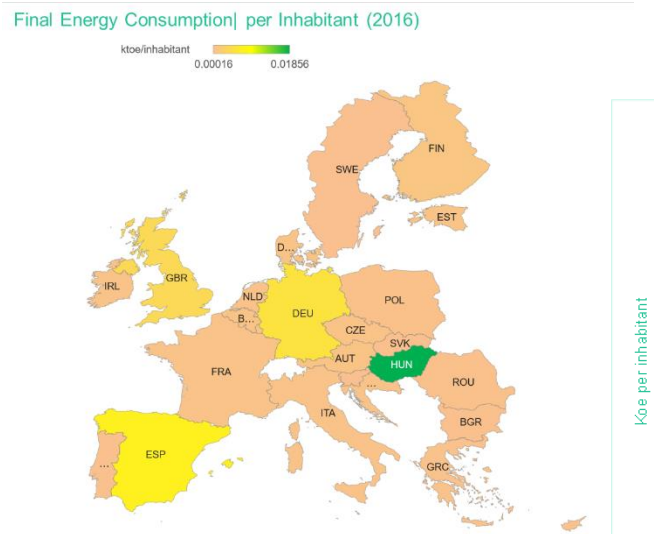


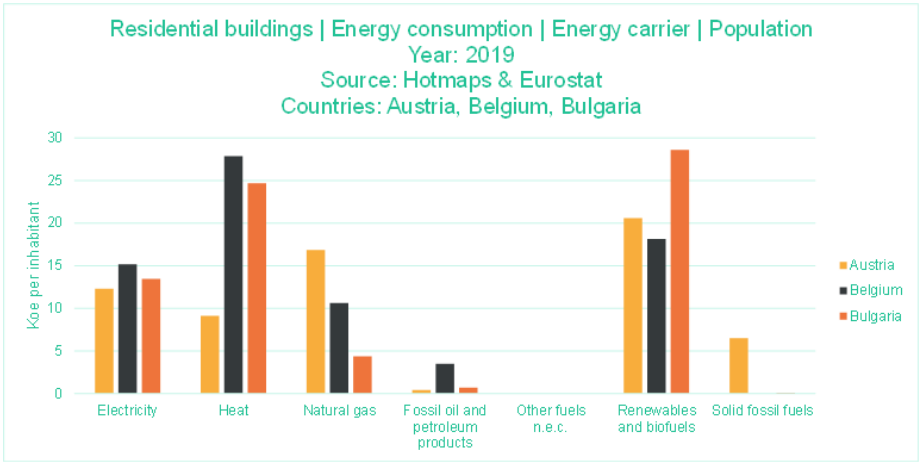
First data visualisation ideas











Networking and outreach

Collaboration for next-generation building data collection and sharing

Surveys, interviews, one-to-one calls, webinars, workshops, stakeholder dialogues

- Eurostat, JRC, CA EPBD, CA EED
- H2020 big data projects BEYOND, BIGG, MATRYCS
- Other H2020 projects
- Initiatives, associations, institutions, companies

BIGG
MATRYCS
BEYOND
X-tendo
enefirst.
Smart Built4EU
CONCERTED ACTION ENERGY PERFORMANCE OF BUILDINGS
CONCERTED ACTION ENERGY EFFICIENCY DIRECTIVE
BEreel!
Joint Research Centre JRC
eurostat
EUREC
CLAIRE
DLR
AIVC
TightVent Europe
BUILDING AND DUCTWORK AIRTIGHTNESS PLATFORM
UNIVERSITAT POLITÈCNICA DE VALÈNCIA
Future²
IBPDI
EERA data
URBS Urban Retrofit Business Services

BuiltHub

BuiltHub roadmap outline

Present

Optimally in the next three years

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
- 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

Challenges

- **Why** share data?
- **How** to encourage data sharing?
- How to **exploit** available data?
- Data **FAIR**ification (Findable, Accessible, Interoperable, Reusable)
- Data **quality** and reliability
- What **standards** to follow?
- How to bridge the **micro and macro data gap**?
- Establish construction/buildings **dataspace**
- GDPR, IP protection, **security**
- Data provision agreements, **licensing**
- Digitalisation, automation, **interoperability**

Why share data?

Stakeholders **highly request more data**.

However...

Our BuiltHub community has reported a **lack of knowledge on benefits, risks, efforts, and costs** associated with data collection and sharing.

A **quantitative, credible, and reliable demonstration** of the above factors is lacking.

Further, there is a **lack of readily accessible resources supporting data sharing**.

- Guidelines
- Training
- Platforms
- Tools
- Model agreements
- Best practices

How to encourage data collection and sharing?

➔ **Demonstration of added value**

➔ **Quantitative cost-benefit analysis**

➔ **Demonstration of risk management**

➔ **Public entities** – legitimacy, resources, clear view of advantages

➔ **Private entities** – resources, sound business models

➔ **Enablers**

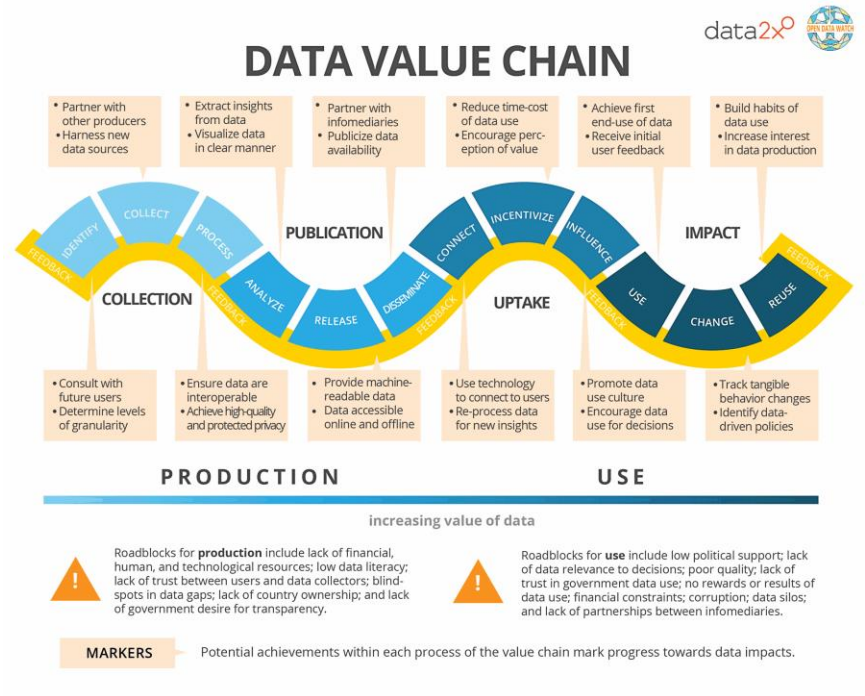
- Mandate
- Directives
- Guidelines
- Training
- Best practices
- Financing
- Dissemination and communication
- **Suitable business models**

How to exploit available data?

„I have collected data – what should I do with it?“

➔High effort required to plan and execute excellent data value chain, from data collection and analysis to providing services

➔Establish guidelines and learn from best practices



https://7wdata.be/open-data/the-data-value-chain-moving-from-production-to-impact/

Data quality

➔**Automated** pre- and post-**processing**

➔Complete, standardised, FAIR **metadata**

- DataCite, schema.org, Zenodo
- Author(s), title, DOI, publisher, publication year, resource type, link, content, origin, geographical extension, spatial and temporal granularity, access, terms of use

➔**Comparability of indicators**

- Built, gross, net, commercial, rentable, useful, usable, treated, ... square meters
- Primary, final, delivered, useful, ... energy

➔Complete, transparent description of collection/measurement/calculation methods

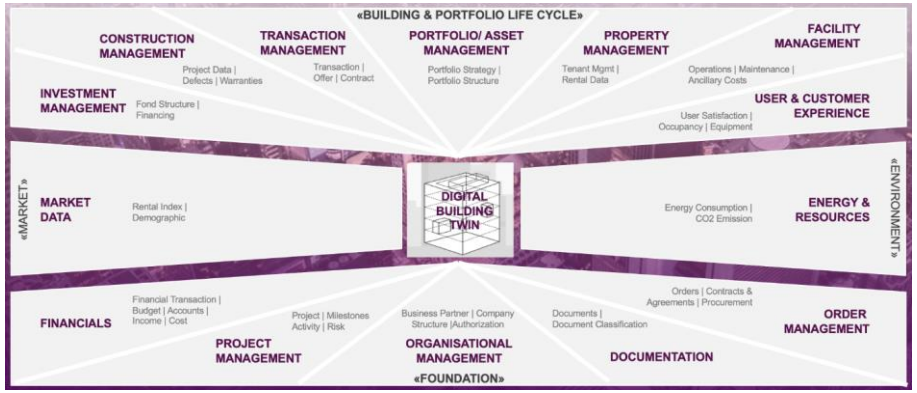
➔**Data inspection and quality assessment services**

➔**Open community discussions on data quality and reliability**

What standards to follow?

Data Spaces Business Alliance

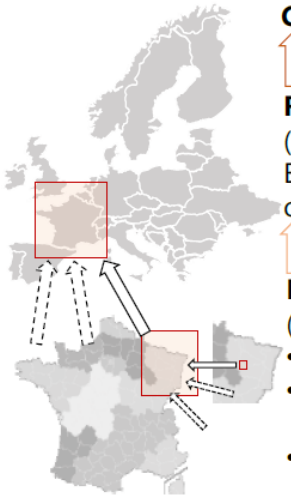
https://internationaldataspaces.org/bdva-fiware-gaia-x-and-idsa-launch-alliance-to-accelerate-business-transformation-in-the-data-economy/



IBPDI real estate Common Data Model

https://github.com/ibpdi/cdm/blob/main/README.md

How to bridge micro and macro data gap?



Country

Region (NUTS3) Building cadaster

Municipality (LAU2)
- EPCs
- Building permissions
- ...

Stakeholders: data provision to BuiltHub

DATASETS: Data assembly and validation (WP3)

Top down *with suitable licence*:
+ available bld info from municipality (LAU2) to country domain
+ national/EU statistic agencies
+ geomatic open data
+ any via webservice

Bottom up *informed consent*:
+ smart meters
+ open street map
+ crowd data collection (by citizen)
+ any spot providing

BuiltHub IT infrastructure (WP5) Metrics and Analytics (WP4)

BuiltHub: services delivered to the stakeholders

SERVICE: Stakeholders map and needs (WP2)

SERVICE 1 – Researchers (Lead User)
Standardised building stock indicators

SERVICE 2 – Facility Managers. (Lead User)
Benchmark and building O&M strategies

SERVICE 3 – Real estate devel. (Lead User)
Bld. stock monitor and benchmarks

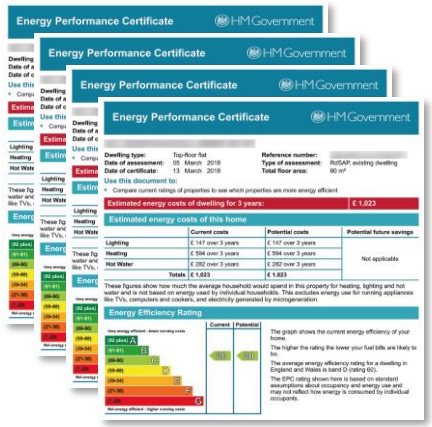
SERVICE 4 – Utilities (Lead User)
Geo-spatialized building load profiles

SERVICE 5 – Policy makers (End User)
Bld. stock progress towards carbon neutrality

SERVICE 6 – Designers (End User)
Benchmarks and technologies tracker

SERVICE 7 – Local authorities (End User)
Urban renovation scenarios and plans

SERVICE 8 – Citizens (End User)
Renovation goals and investment benchmarks



Clustering

Individual building's
- Energy performance
- Potential energy savings
- Energy refurbishment cost

against **benchmarks**

Public sector buildings data value chain

- **Technological, social, and environmental challenges and opportunities largely similar to the ones for private sector buildings**

Possibly...

  - Easier integration with public infrastructure
  - Easier disclosure of performance data
  - Easier to obtain comprehensive data coverage
  - Improved guaranty of continuity
  - Less dynamic
  - Less cutting-edge

- **Different political, economic, and legal mechanisms**

  - Security/privacy strategies
  - Drivers
  - Financing
  - Business models

Public sector buildings data availability

BuiltHub datasets containing data for public sector buildings

- Hotmaps: offices, educational buildings (education), hospitals (health), sport facilities (other non-residential buildings)
- IEE ENTRANZE: offices
- FP7 iNSPiRe: offices
- Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU – Final Report: offices, educational buildings, hospitals, sport facilities
- Energy consumption and efficiency technology measures in European non-residential buildings: offices, educational buildings, hospitals, sport facilities
- Dataset of the publication “Europe’s Building Stock and Its Energy Demand: A Comparison Between Austria and Italy”: offices

! However, **private share** is largely unknown.
➔Required to assess annual renovated floor area of publicly owned buildings. !

BuiltHub resources

20 December 2021

BuiltHub publishes new book: European Building Stock Analysis

In advance of the holiday season, the BuiltHub project has published a book analysing the European building stock. Authored by experts from EURAC, Technische Universität Wien, and e-think, the...

1 October 2021

BuiltHub Introduction video premieres on YouTube and social media

The long-awaited video "BuiltHub project: an introduction" has finally gone public! On Friday 1 October, the first project video was published online and shared with interested stakeholders on social...

Get involved!

Be proactive by becoming a...

- **Pilot user** of our building data platform
- **Data provider** in exchange of services
- **Ambassador**, promoting responsible data sharing and collection
- **Networker**, interacting with our stakeholder community

Or simply follow us:

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