



SUSTAINABLE PLACES 2020

October 27-30, 2020

Digital Event

Digitalization of the construction sector



BIM based tools for fast & efficient renovation

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Nobatek/INEF4



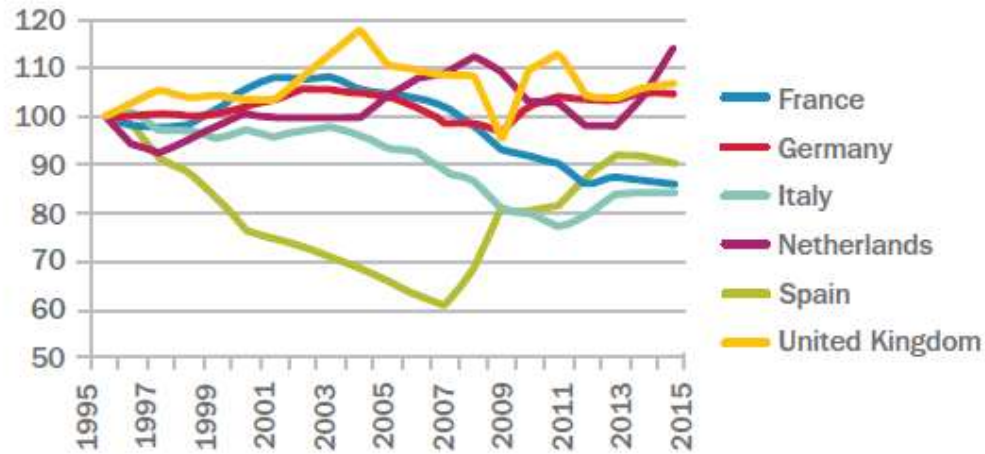
This project has received funding from the H2020 programme under Grant Agreement No. 820773

CONSTRUCTION SECTOR LANDSCAPE



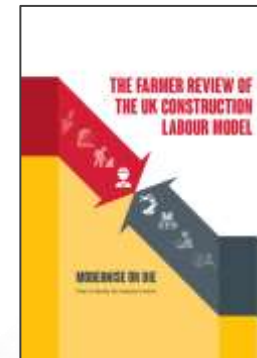
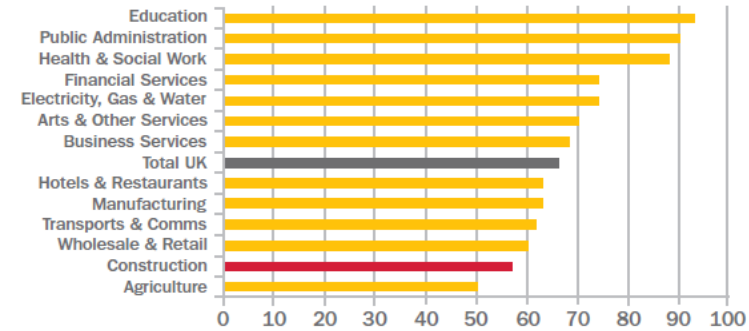
Productivity has declined and is not keeping up with other sectors

Construction productivity comparisons across Europe (% change single 1995)

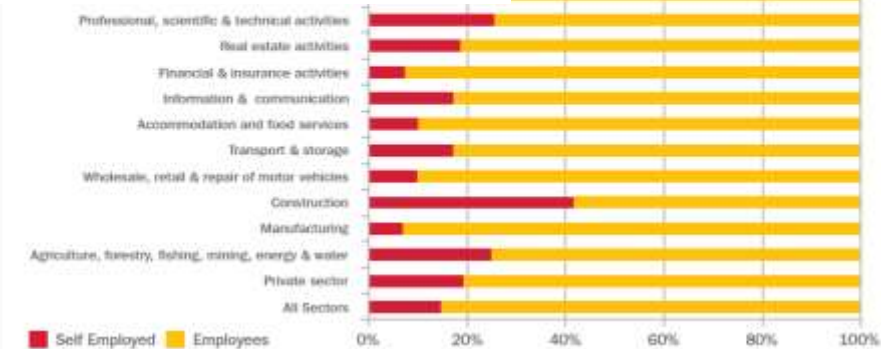


Labor force: most self-employed, most SMEs, nearly least trained

Proportion of employers providing training, by sector (2015)



Farmer Review



R&D budget: <1% of global revenue

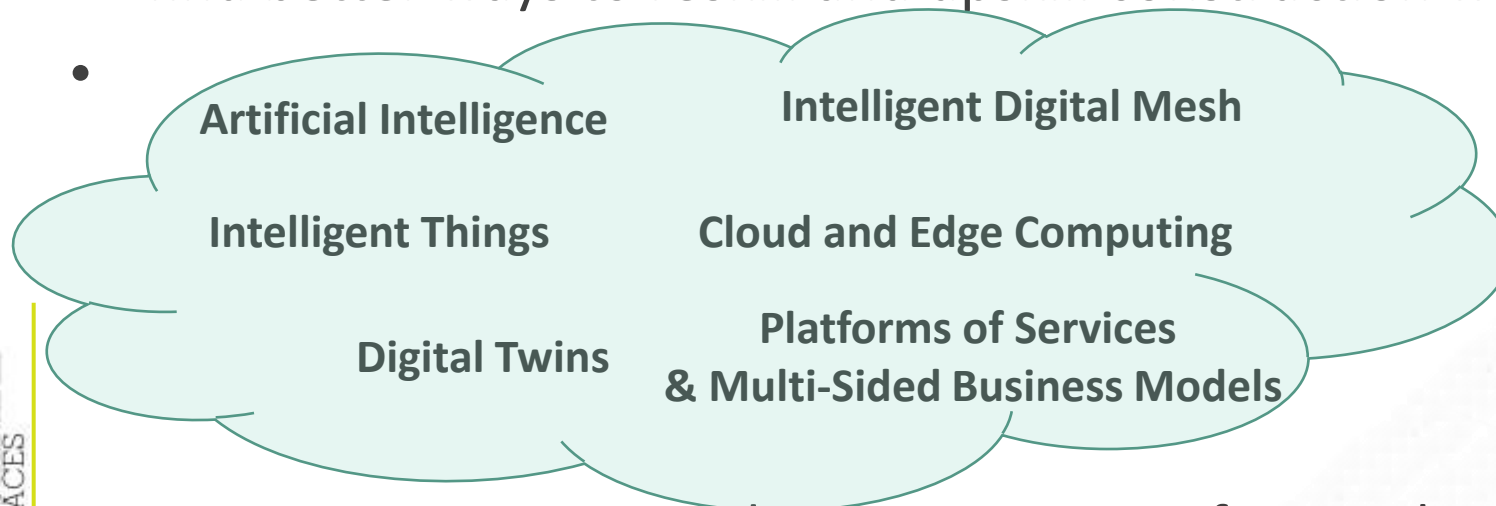
→ A sick patient.

How to reanimate the construction sector?

CONSTRUCTION SECTOR LANDSCAPE



- Benefits of digitalization already proved:
 - Improve efficiency and added value
 - Improve the energy and environmental performance + help reduce the energy gap
- Technologies exist, but we do not use to its full potential due to low access
- find better ways to reskill and upskill construction workforce



→ Huge potential to explore:
increase R&D

- 2 options: anticipate and progress or wait for it to be required

Modernize or die ?

CONSTRUCTION SECTOR LANDSCAPE



Existing buildings are responsible for 40% of the total energy consumption and 38% of GHG emissions

We need to increase the renovation level of the existing building stock from 1% to 3% !

The construction sector:



- Has a very low productivity
- Has a very low use of digital tools

99.9% of the sector is made up of SMEs with less than 10 employees

60% of the sector production is done by SME (less than 50 employees) while employing 70% of the sector working population (Eurostat 2011)

Digital Transformation is not easily accessible to SMEs and handcrafters.



We need to put adapted tools in the hands of every kind of construction actor.

BIM AS A TRIGGER FOR THE DIGITAL REVOLUTION



BIM is both:

- A collaborative process involving the generation and management of a digital representation of a building
- A semantically enriched model to describe a building, covering its lifecycle.

It allows for a more efficient, collective and integrated design among all stakeholders.



The BIM revolution needs to be available for all the construction value-chain.

BIM has strong potential to improve information management during a renovation and help overcome process fragmentation and communication problems between stakeholders.

BIM4Ren CONCEPT

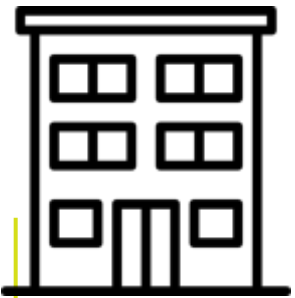


Data Management



Data collection

WHAT IS THE EXISTING DATA ?

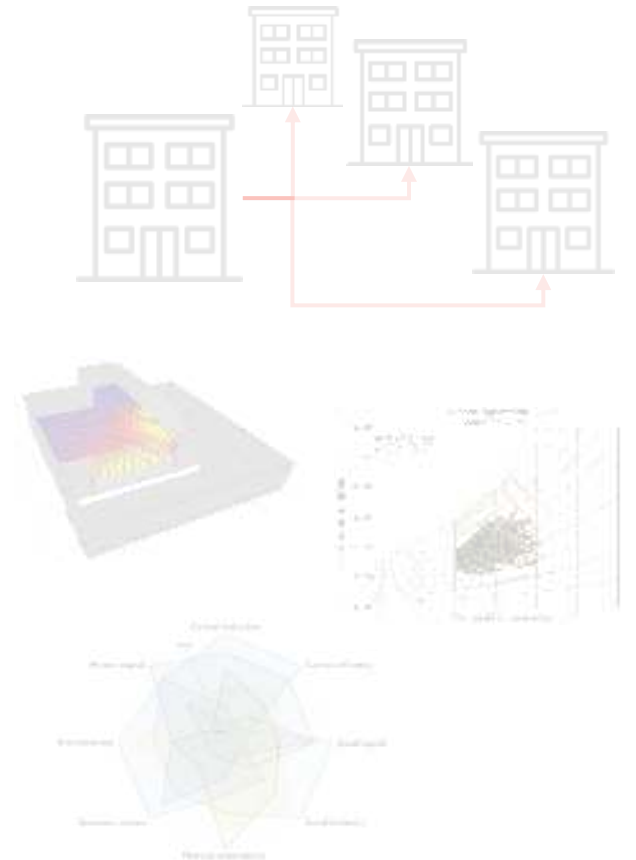


Year?
Local regulation?
Cost € ?
Energy performance?
Geometry?
Stakeholders expectations?
Type of occupants ?
Renovation potential ?
State of the existing infrastructure ?



Stakeholders involved in the renovation

Data-driven design



BIM4Ren CONCEPT



Digital inputs

Data Management

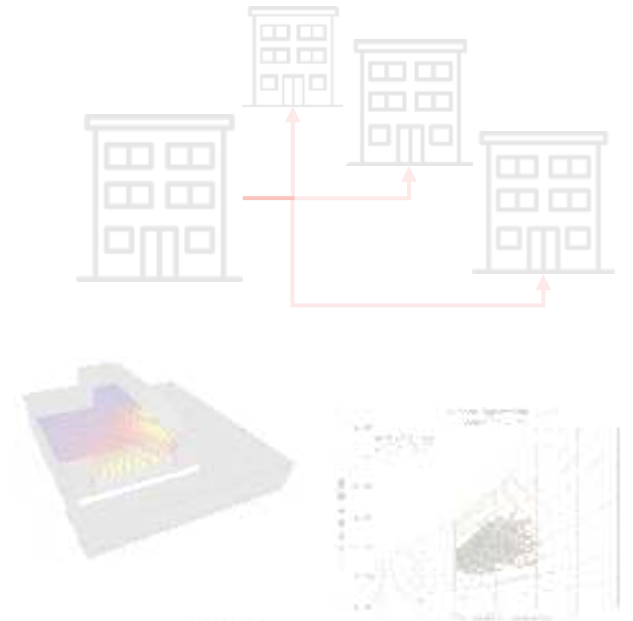
Data collection



WHAT IS THE
EXISTING DATA ?

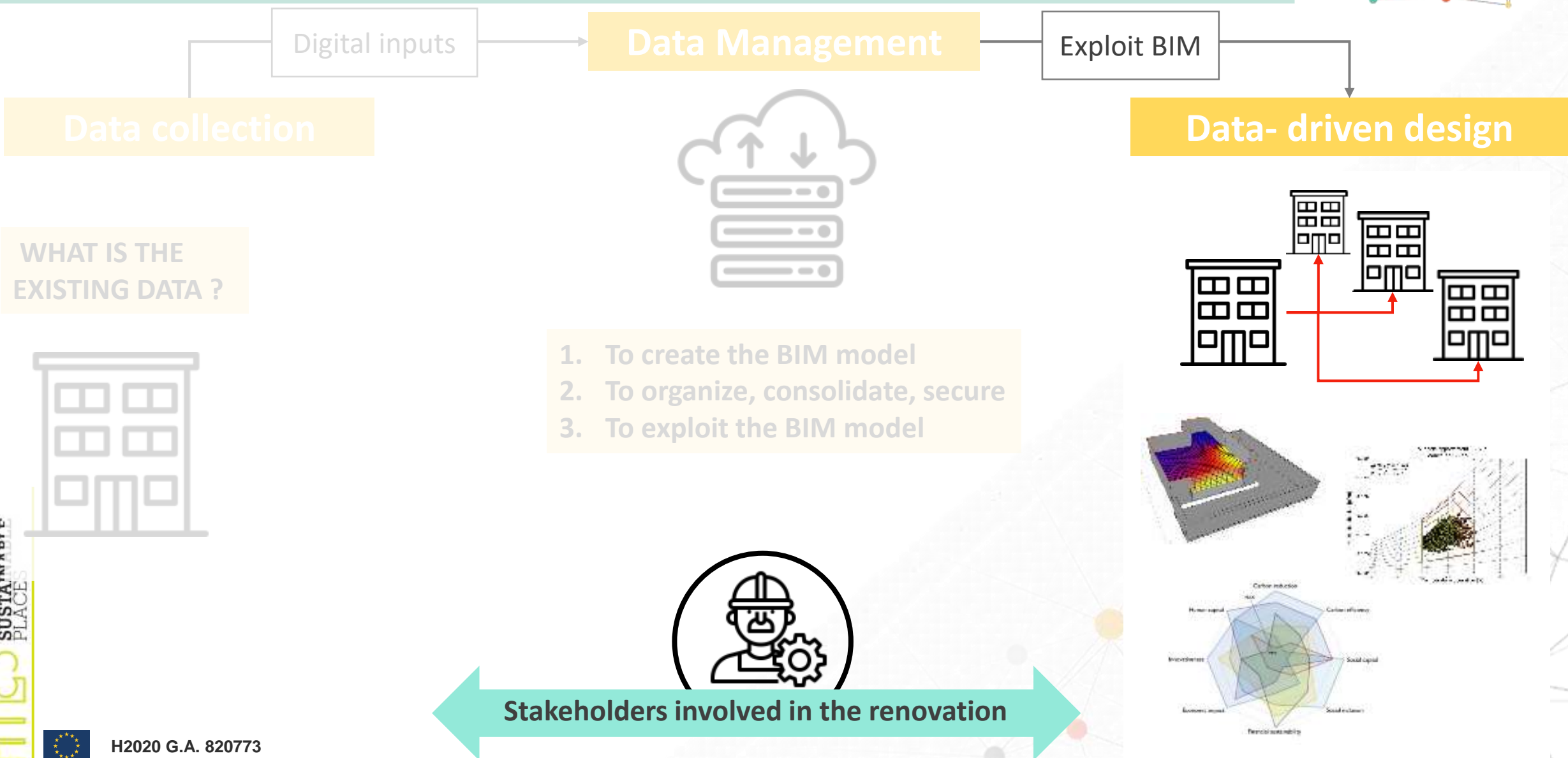
1. To create the BIM model
2. To organize, consolidate, secure
3. To exploit the BIM model

Data-driven design

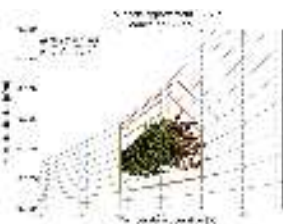
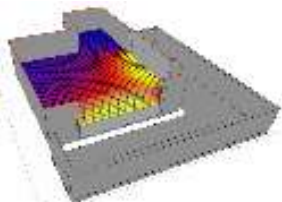


Stakeholders involved in the renovation

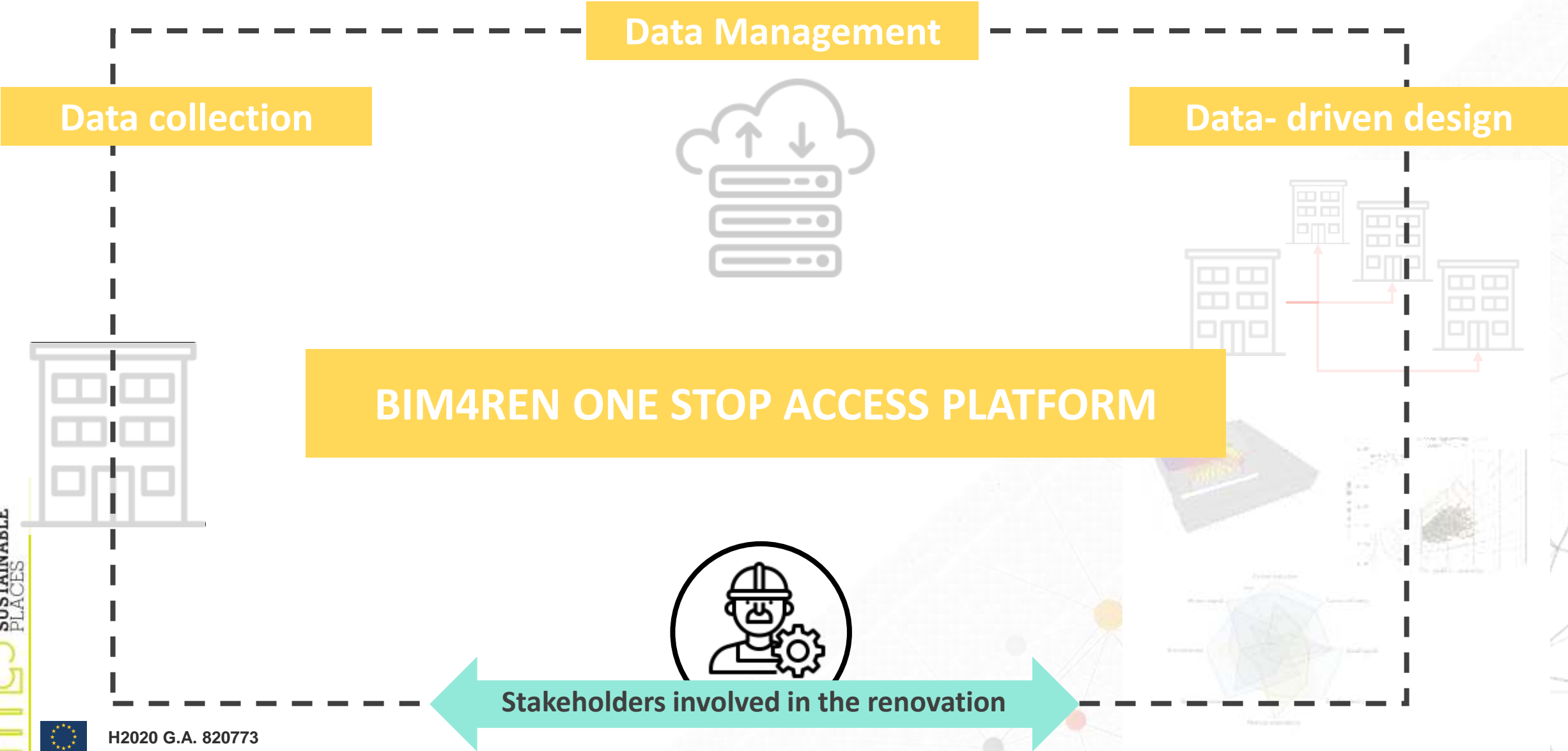
BIM4Ren CONCEPT



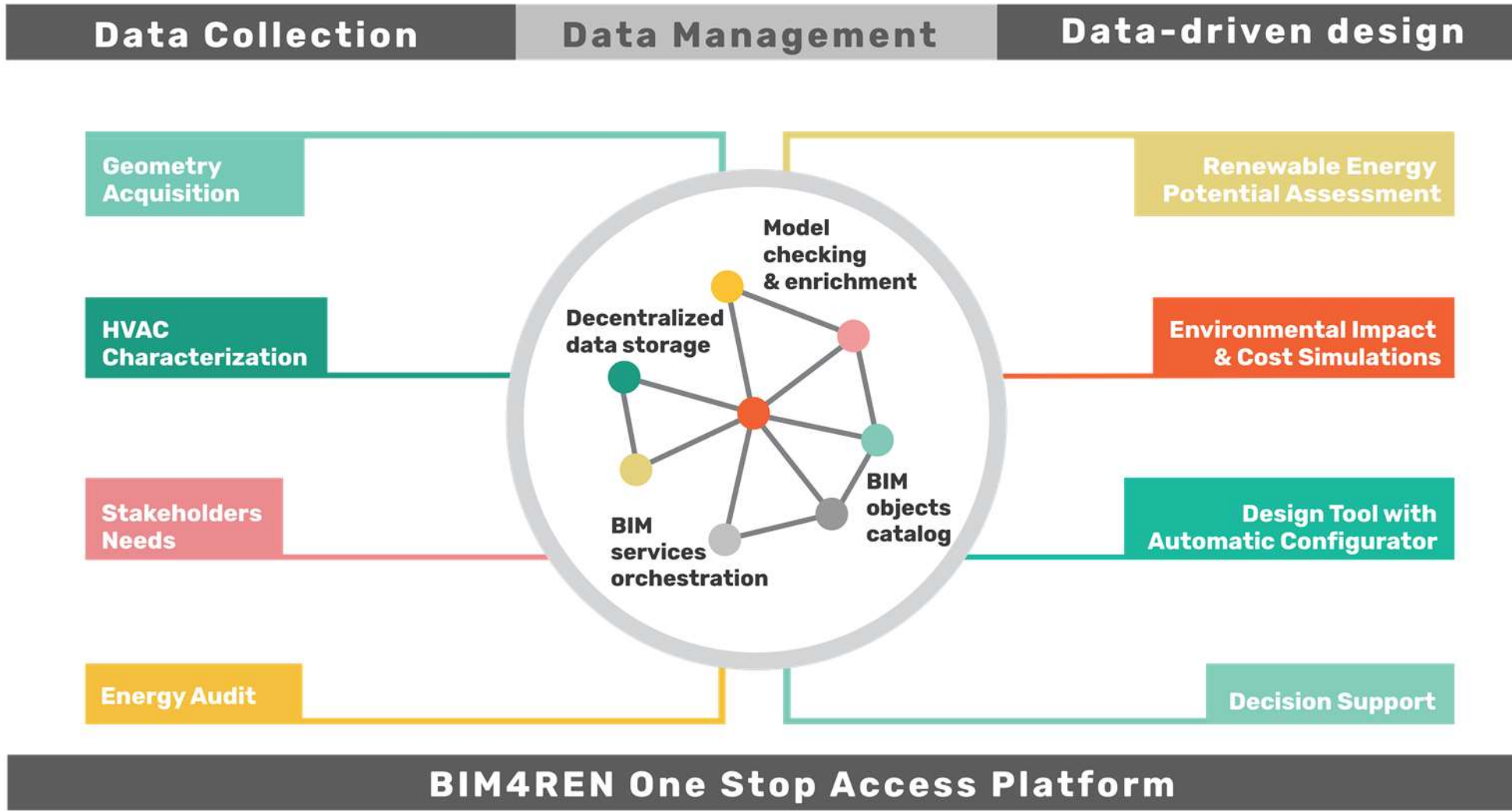
WHAT IS THE EXISTING DATA ?



BIM4Ren CONCEPT



BIM4Ren set of tools: 32 developments



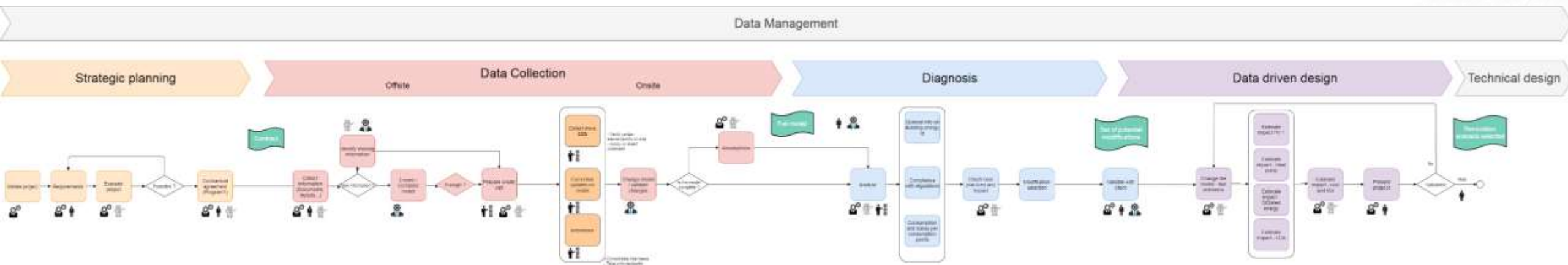
32 tools being developed organized into categories. Per services. Per business models.



BIM4Ren workflow and use cases



- We developed a generic workflow:



BIM4Ren workflow and use cases



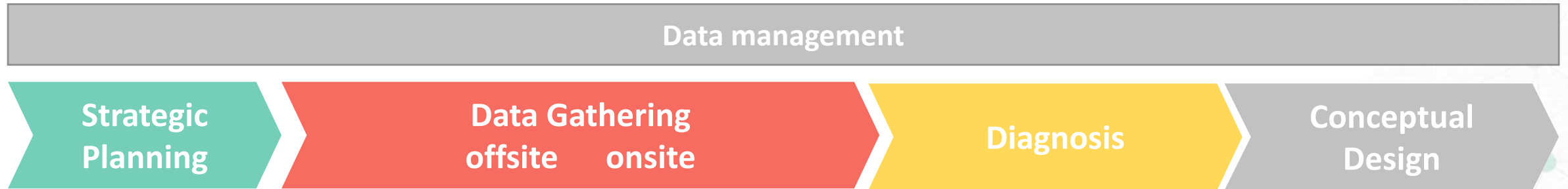
- Developed a generic workflow:



BIM4Ren workflow and use cases



- Developed a generic workflow:



- With three specific use cases:

	SPAIN Residential (private) 20 – 400 m ² Multi owner private property KURSAL: SME Façade renovation		FRANCE Residential (social housing) 4000 m ² POLYLOGIS: SHO Full renovation focusing on energy		ITALY Shopping Mall 2000 m ² CMB: gen. comp. ATI: architects In depth renovation
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Example of France use case



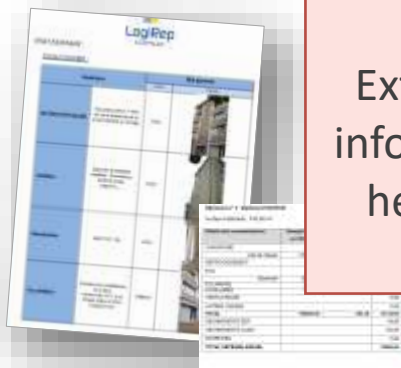
Strategic
Planning

Data Gathering
offsite onsite

Diagnosis

Conceptual
Design

Portfolio
building
manageme
nt solution



MassDOC:
Extract/organize
information out of
heterogeneous
documents



Other initial
situation
data



Automatically
“elevate” a 2D
layout into a
BIM model

Example of France use case



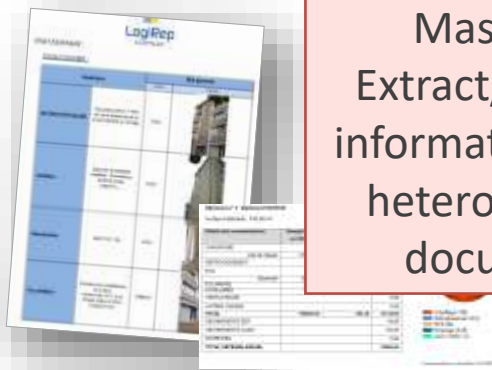
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Other initial
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Automatically
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LODLifter:
Manage data (triple store)
Allow the update of the
BIM model



BIM2BEM



Existing state

Example of France use case



Strategic
Planning

Data Gathering
offsite onsite

Diagnosis

Conceptual Design



BIM2BEM

EnerBIM



Existing state

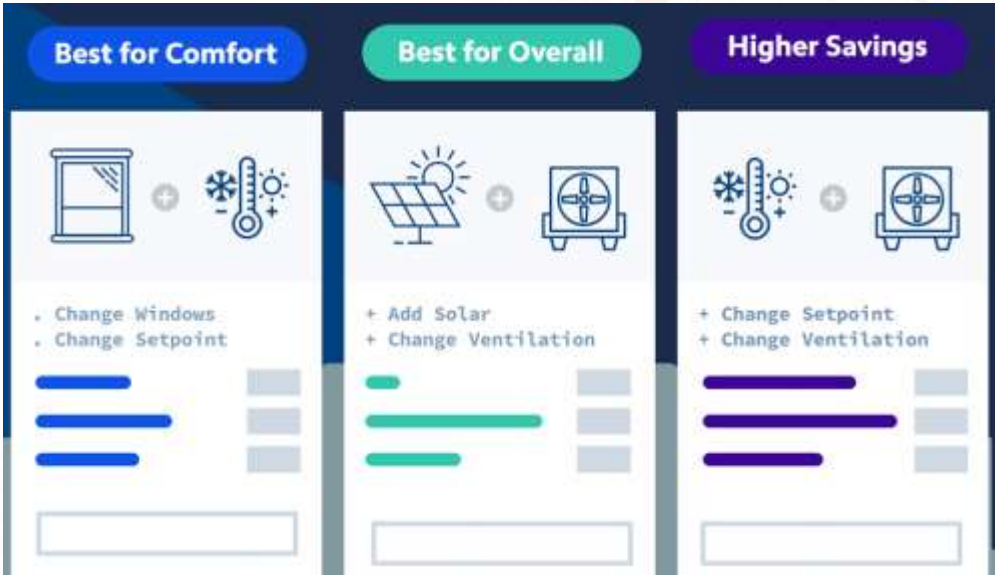
Example of France use case



BIM2BEM



Existing state



Main barriers



- IFC extension: how to store all energy related information (extension, Linked Data)
- BIM2BEM: How to extract information from a BIM model (contextual, geometry, materials and systems)
- Standardization: how to share common framework
- The never ending pursue of the perfect solution:
 - Single platform: too complex ?!
 - Network (fractal?) of solutions: too complex ?!

BIM4Ren

Thank you

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INSTITUT POUR LA TRANSITION ENERGETIQUE



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