How Building Information Modelling (BIM) and competences recognition can ensure the RoI

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Energy Performance Contracting feasibility

It is possible to recover the invested capital in 10-20 years

Reliable estimate of investment and savings

The refurbishment design has to consider several aspects

Energy Performance Contracting

Issued when

Based on

Compliance with the rules of urban planning, safety and security

Compliance to functional needs for use of the spaces

Feasibility of energy requalification works

Guarantee of thermal and lighting comfort
The evaluation of the benefits

Energy, environmental and economic savings

Lower consumption
Lower maintenance costs
Lower management costs
How to build a trustful financial-economic plan

- Financial economic plan
- Achievable saving
- Investment value
- Evaluation of different scenario
- Computation of quantities based on reliable information

BIM Energy Model: BEM
Point of cloud
When the BIM model is convenient?

For simple house, **under 100 k euro works**, the BIM modelling it is not economically convenient and the use of CAD and usual metric calculation evaluations are used.

For a more complex building, **over 100k euro works**, the BIM modelling is economically convenient. Besides the values are more reliable as they are based on real geometry.

For work **over 1 million euro**, it is cheaper to use BIM.
... but energy issues evaluation are important throughout the life cycle of a building

Building sector has one of the highest impact on the environment

Continuous use of the soil

Emissions deriving by the materials used

Emissions during the construction

Emissions during the use

Riduce the impact of the built environment

Refurbishing more than building ex novo

Reuse and recycling or innovative low impact materials

Logistic optimization & reduction of waste in building sites

Build and restore to obtain ZEB
Life Cycle Cost (LCC)

- Use: 73%
- Construction: 18%
- Design: 5%
- Demolition: 4%
The highest costs during the use of a building
Why BIM is always important for owners

Information system of Common Data Environment

The 3D model of the building
The point of cloud of S.Maria Novella
The point of cloud of S.Maria Novella
Change of use in a historical building: Forte Bravetta
Why BIM is considered a transparent tool: McLeamy curve

The McLeamy curve: taking advantage of the speed of creating and exchanging information digitally, anticipate the moment of choices, before the curves soar.

High capacity to make changes at low cost

Low capacity to make changes at very high cost

Building lifecycle:
- Plan
- Preliminary design
- Technical design
- Execution
- Delivery
- Legal disputes
The BEEP project: BIM for Energy Efficiency of Public historical buildings in the Med area

• The project is under way with pilot activities in 7 countries (Italy, Spain, Cyprus, Lebanon, Jordan, Palestine, Egypt)

• One of the output of the project is to realize a guideline to use BIM for Energy Performance Contracting (EPC) to refurbish public historical buildings (due by the end of this year)

• At least three types of intervention at short, medium and long term, will be presented with three BIM models “as it will be” to allow the evaluation of the return of investment and take informed decisions.

• The owner of the buildings will receive the BIM model to be used for the public tender and, afterwards, for O&M.
For any use of BIM it is necessary:

• Define the **objectives of the model**
• Identify the **elements** needed to build the model
• Identify the **exchange of information** required among the different actors
• Identify the performance objectives to be used to measure or **pre-qualify the skills of the project team**
• Assign responsibilities to the design team
• Fill the semantic gaps between the companies working on the project
The problem of the “energy gap” between what has been designed and what is in O&M.
An example: the exchange of information during preliminary analysis with BIM

Authorization body

Owner

Architect

BEM consultant

ESCo/Financial institution

MEP engineer
The recognition of skills and competences: the European ARISE project (starting in September and lasting 30 months)

Revolutionizing the learning process by changing the face of delivery and recognition of sustainable energy skills in the construction sector by working on:

1) Skills delivery method
2) Learning accounts transaction and recognition
3) Matrix of skills maturity, leading to new qualifications and jobs
4) Task–based learning content
5) Impacts of skills on buildings’ energy performance
6) New market and regulatory models of skills demand
7) Stimulation of investments in high energy performance buildings
The roadmap for the digitalization of the authorization process: BIM maturity level of the public administration to speed up procedures

**Communication by mail or e-mail. Data exchange by forms, drawings and maps. Digital (e.g. pdf), paper or combined.**

Key word describing the stage: Digital communication, reuse of public data, 3D models for visual use, xml, partly automated, open BIM, existing legislation

**Interoperable data exchange with CDE and relevant private and public databases**

**Automated regulatory control and permit.**

Key word describing the stage: Integrated, BIM, automated, robot, machine readable and interpretable regulations, open standards, digital friendly legislation

**Hybrid**

Current pilot projects in a few countries

**Advanced BIM**

Current implementation in some countries

**Low hanging fruits**

Current implementation in most countries worldwide

**Manual**

Current implementation in most countries worldwide

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Key word describing the stage: Integrated, BIM, automated, robot, machine readable and interpretable regulations, open standards, digital friendly legislation

**Long term ambitions**

**A few research projects**
Conclusions: the opportunity for EEMI to increase the financial impact by increasing the demand for the use of BIM and the use of qualified personnel

- Produce a **list of requirements** to finance an energy requalification intervention especially for "listed" buildings to be introduced in the “BIM use”
- Participate to the BEEP working group to develop a **guideline** for the use of BIM for the refurbishment of historical buildings
- Establish the requirements for the working team to guarantee the quality of the work and therefore the RoI
- Become an associated partner of ARISE to contribute to increase the demand for **qualified personnel** needed to correctly intervene on energy requalification
- Participate in the regulatory room, or, at least, identify big players capable of speeding up the digitization of authorization processes
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