BIMEET Project

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SUSTAINABLE PLACES

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY | LIST

PRESENTATION OUTLINE

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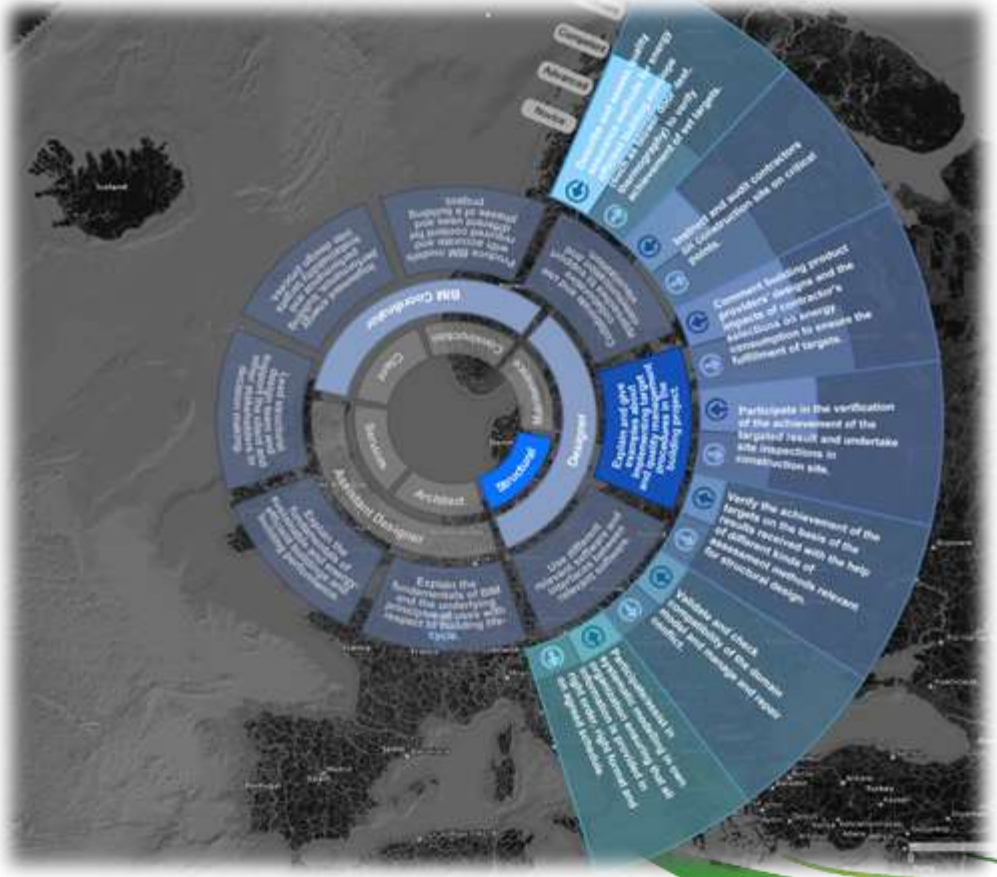
1. Introduction
2. BIMEET Training
3. Qualification framework and training modules
4. BIMEET Tools



Introduction

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BIMEET

Project

ID Card BIMEET

- H2020 / EE14 / 753994
- 01/09/2017 > 29/02/2020 (2,5 years)
- Website: http://www.bimeet.eu
- Twitter: @bimeetEU

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BIM-BASED EU-WIDE STANDARDIZED QUALIFICATION FRAMEWORK FOR ACHIEVING ENERGY EFFICIENCY TRAINING

BIMEET Training

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POLICIES AND REGULATIONS

Energy Efficiency in Buildings

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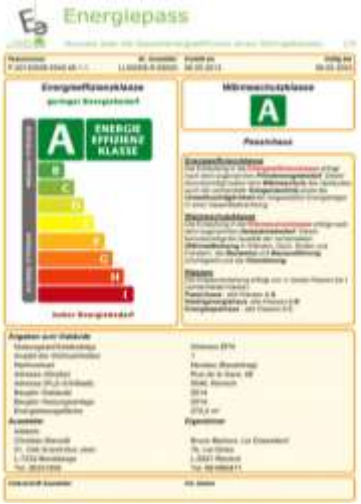
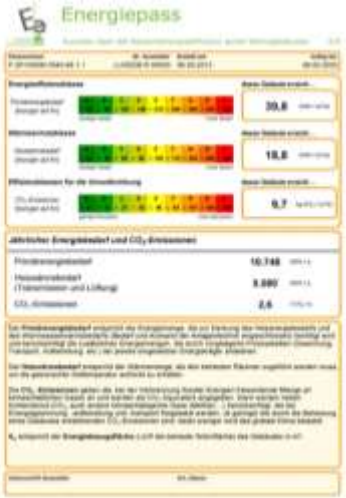
Energy Performance Building Directive (EPBD)

- Certification: Energy Performance Certificate, sustainability assessment
- NZEB, Renovation: novel materials, design principles, construction techniques





Revision of the EPBD (June 2018)

- **Digital & ICT** to play a major role in new generation **EPCs and smarter buildings**

CLEAN ENERGY FOR ALL EUROPEANS

Main outcomes of the revision

A STRENGTHENED DIRECTIVE

- Stronger **long term renovation strategies** for Member States, aiming at decarbonisation by 2050 and with a solid financial component.
- A **Smart Readiness Indicator** for buildings.
- Targeted support to **e-mobility** infrastructure deployment in buildings' car parks.
- Enhanced **transparency** of national building energy performance calculation methodologies.
- Reinforcement of **building automation**: additional requirements on room temperature level controls, building automation and controls and enhanced consideration of typical operating conditions.

European Commission

EE SKILL NEEDS ACROSS CONSTRUCTION PROCESS

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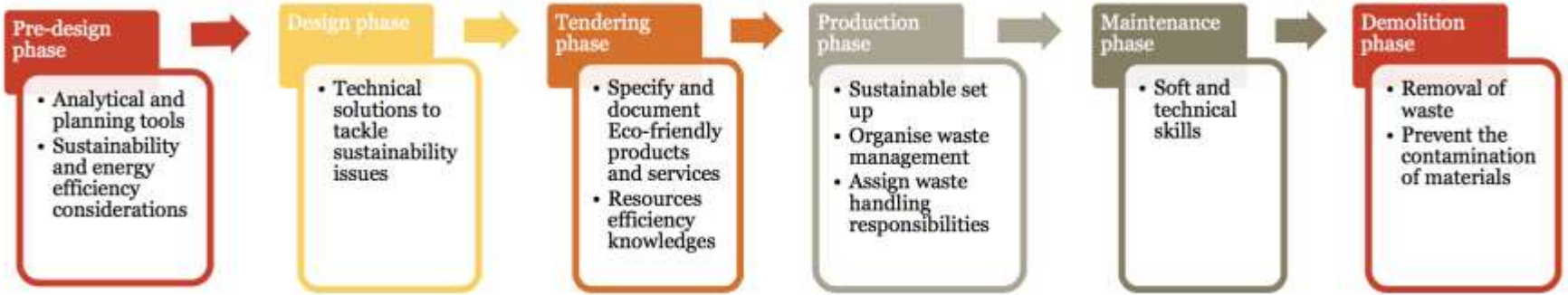
- Sustainable construction and energy efficiency open up significant market opportunities for EU construction companies



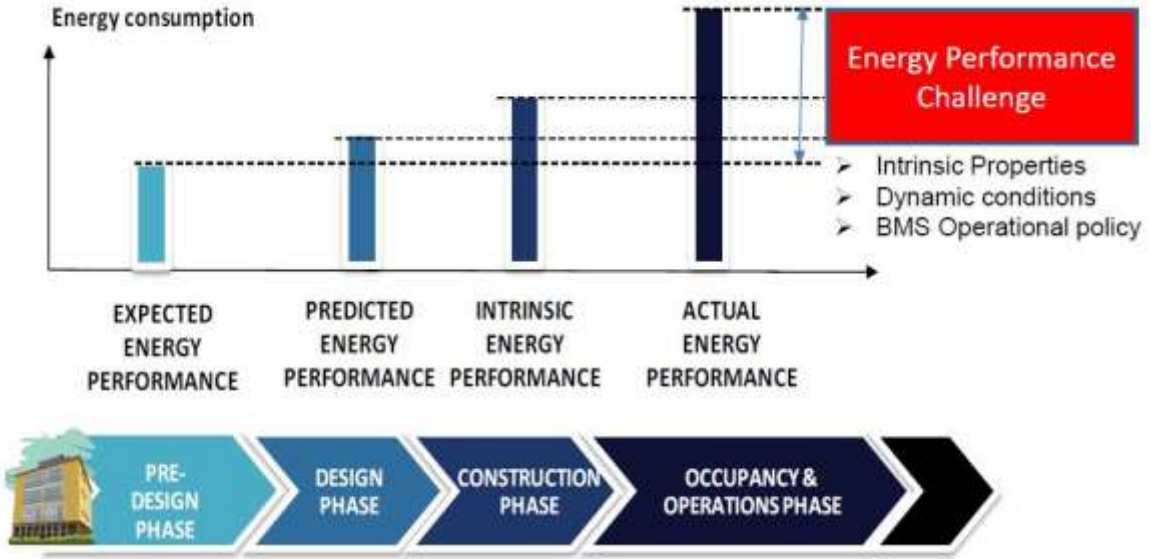
Source: PwC analysis.

CHALLENGES

The "energy gap"

Energy use **predicted in the design** stage of buildings vs. the energy use of those buildings **in operation**

- Intrinsic properties
- Dynamic conditions
- Environmental uncertainties
- *Workmanship*
- *Occupants* behaviour
- BMS Operational Policy
- …



Extract from: Prof. Yacine Rezgui. Cardiff University. *Sustainable Places A Multi-disciplinary Perspective to Built and Natural Environment Challenges in the 21st Century*. Presentation. LIST Seminar. August 2016.

https://en.wikipedia.org/wiki/Performance_gap

BUILDING INFORMATION MODEL(S)

Authoring

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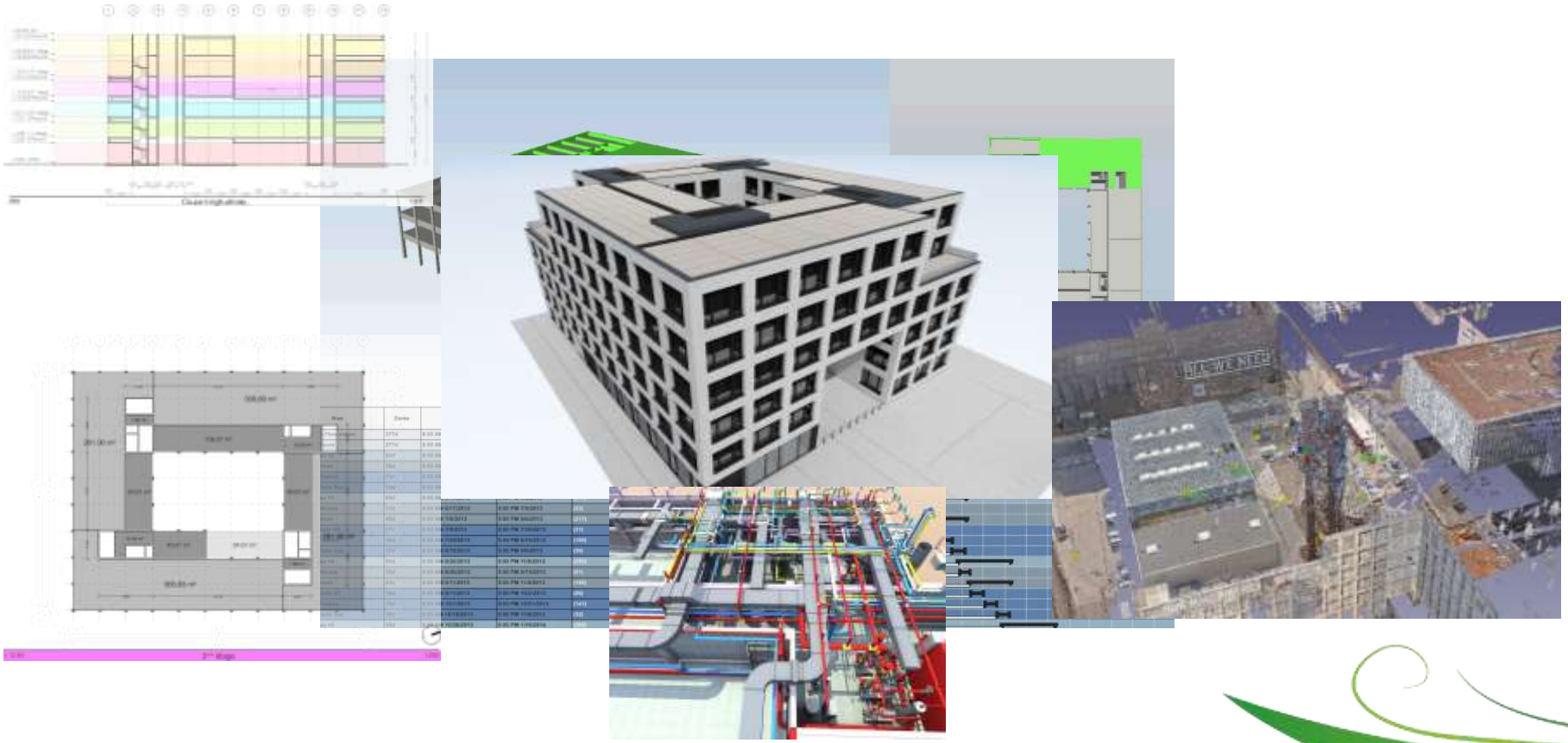

BUILDING INFORMATION MODELING

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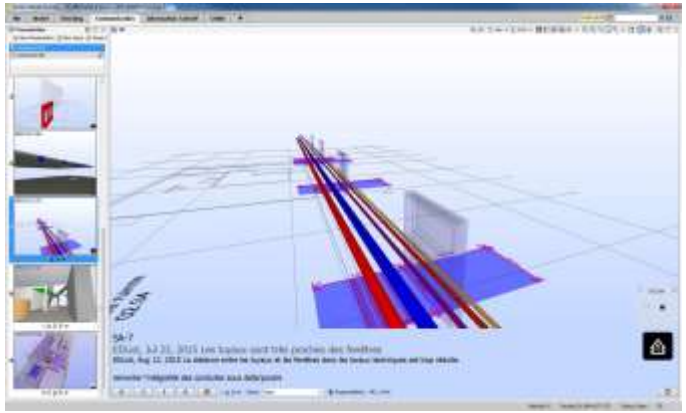
Improved coordination process

- **Lean design and construction**
  - Quality control
  - Issues management
- Embodied **energy and carbon** reduction
  - Simulation capabilities
- **Digital Twin**
  - Build virtually before building physically
  - Operation and management support



BUILDING INFORMATION MODELING

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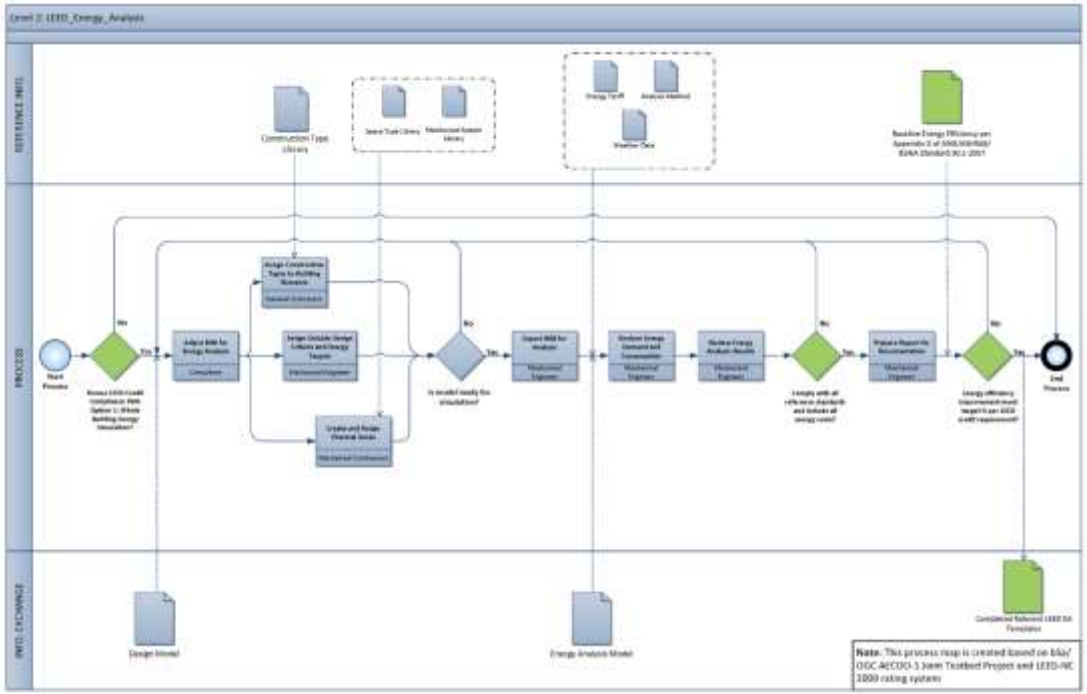
Management of BIM Processes

- Management of **Information Exchanges**
  - Project BIM Requirements
  - Follow-up and control
- **Challenges** to integrate the whole **value chain**
  - Contractual implications, **regulatory** framework
  - New **roles** and missions
  - **Technology maturity**
- **…White collar** professionals **& blue collar** workers



Integrated Process Mapping For BIM Implementation In Green Building Project Delivery. Wu, W. & Issa, R. (2013). 13th International Conference on Construction Applications of Virtual Reality.

BIM SKILLS

Outcome of BIM4VET EARSMUS+ project (2015-2018)

BIM4VET

Erasmus+ 2015-1-LU01-KA202-001353

- Erasmus+ BIM4VET
  - Key action 2: coopération pour l'innovation et l'échange de bonnes pratiques
  - 2,5 years / 272 872€
- Partners
  - LIST, Luxembourg Institute of Science and Technology (LU)
  - Cardiff University (UK)
  - CEA LIST, Commissariat à l'Energie Atomique et aux Energies Alternatives (FR)

BIMEET, THE CONCEPT

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FOR THE WHOLE CONSTRUCTION LIFE CYCLE

BIMEET, THE CONCEPT

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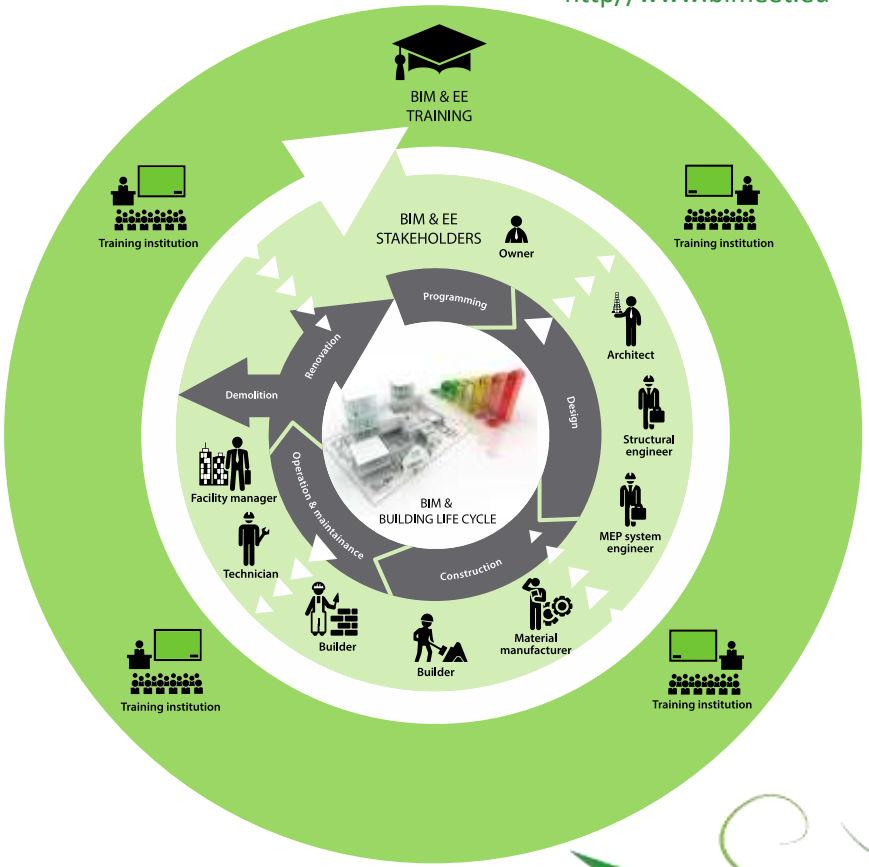
- BIMEET considers
  - **Each stage** of building's life-cycle
  - **All actors** involved
- To highlight specific skills required
  - For a global BIM approach
  - Enabling **achieving EE in buildings**

- BIM as a tool for improved multi-disciplinary approach across trades
- BIM-based material for enhanced learning



STATUS OF BIM & BIM/EE TRAINING

	BIM training	Clients	Facility and asset management	Design consultants (inc. technicians)	Contractors (inc. site managers)	Sub-contractors (inc. blue collar workers)	Students
	Awareness						
RIBA stage	0. Definition						
	1. Brief						
	2. Concept						
	3. Design						
	4. Technical						
	5. Construction						
	6. Handover						
	7. In use						
	Demolition						

	Integrated BIM and energy efficiency training	Clients	Facility and asset management	Design consultants (inc. technicians)	Contractors (inc. site managers)	Sub-contractors (inc. blue collar workers)	Students
	Awareness						
RIBA stage	0. Definition						
	1. Brief						
	2. Concept						
	3. Design						
	4. Technical						
	5. Construction						
	6. Handover						
	7. In use						
	Demolition						

Not relevant
Reasonable
Limited
Poor

Figure 20. Traffic light summary of BIM and energy efficiency training (Top: BIM training, Bottom: BIM and energy efficiency training)

BIM for Energy Efficiency

Qualification framework & Training modules

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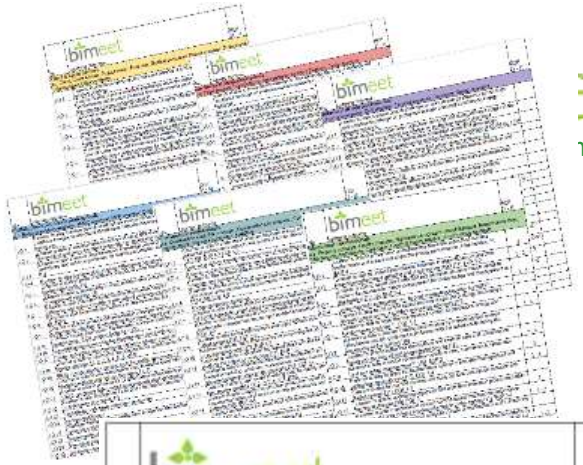
QUALIFICATION FRAMEWORK

- Disciplines & Learning Outcomes

Stakeholders					
D3.1	Finland	France	Luxemburg	Greece	UK
Client	Owner Client Project manager BIM coordinator BIM manager	Owner Final user Project manager / owner BIM coordinator / BIM manager	Manager Owner advisor BIM coordinator BIM manager	Owner Client Project manager	Client Client Advisor Project Lead
Design consultant	Chief designer Designer / architect Structural engineer Building services engineer Design consultant	Architect Structural engineer Construction engineer Geometer	Architect Structural engineer Energy Engineer Construction engineer Geometer	Designer / architect Structural engineer Building services engineer	Lead Designer Architect Civil & Structural Engineer Building Services Engineer
Contractor/Sub-contractor	Construction site manager Construction site engineer Construction site workers	Site work supervisor Site workers	Site work supervisor Site workers	Site manager Construction site workers	Construction Lead Contract Administrator Building services installer
Facility / Asset management	Property manager Maintenance operator Maintenance man Care taker	Facility manager Maintenance technicians Asset Manager	Facility manager Maintenance technicians Asset Manager	Property manager Maintenance operator	Health & Safety Advisor Junior energy manager



No	Learning outcome	EQF level		
Architectural design roles Architectural design and BIM Coordinator (arch), Chief designer (CD), Architect (ARCH), Assistant designer (ASS)		CD	ARCH	ASS
LO1	**Learner is able to explain the fundamentals of BIM and the underlying principles of uses with respect to building life-cycle.**	**6**	**6**	**3**
1.1	Recall essential contents, summarize and give examples of BIM terminologies, definitions and standards.	6	6	3
1.2	Recall essential contents, summarize and give examples of overall BIM process for a building's life cycle.	6	6	3
1.3	Explain and use standard information exchange processes for different design domains in general and especially in detailed technical design.	5	5	2
1.4	Explain the essential issues related to information management, data transfer and sharing.	5	5	2
1.5	Explain the added value of using open file formats (i.e. IFC) to ensure interoperability.	5	5	2
1.6	Recall, summarize and explain essential contents and relevant parts of national BIM guidelines.	6	6	3
LO2	**Learner is able to explain the fundamentals of sustainable and energy-efficient buildings and building performance.**	**4**	**6**	**2**
2.1	Explain and give examples of aspects and terminologies of energy and building performance.	6	6	2
2.2	Describe the financial and environmental aspects and related indicators, benchmarks and certification systems of energy and building performance.	2	6	2
2.3	Explain the issues that affect energy performance of buildings and demonstrate competence in domain specific solutions.	4	6	1
2.4	Explain relations between life-cycle costs, energy performance and building performance.	4	6	2

BIMEET TRAINING #1

BIM for Energy Efficiency - Basics

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Position oneself at the

Global level

Placement test

E-learning 1:
Introduction to BIM

E-learning 2:
Introduction to energy efficiency of buildings

Fundamentals of BIM and energy efficiency
Theoritical contents

E-learning 3:
BIM for energy efficiency

In-class:
Case study: simulate energy efficiency of the use case using the BIM model

Software skills using 3D modeling/thermal software

Validate achievements/

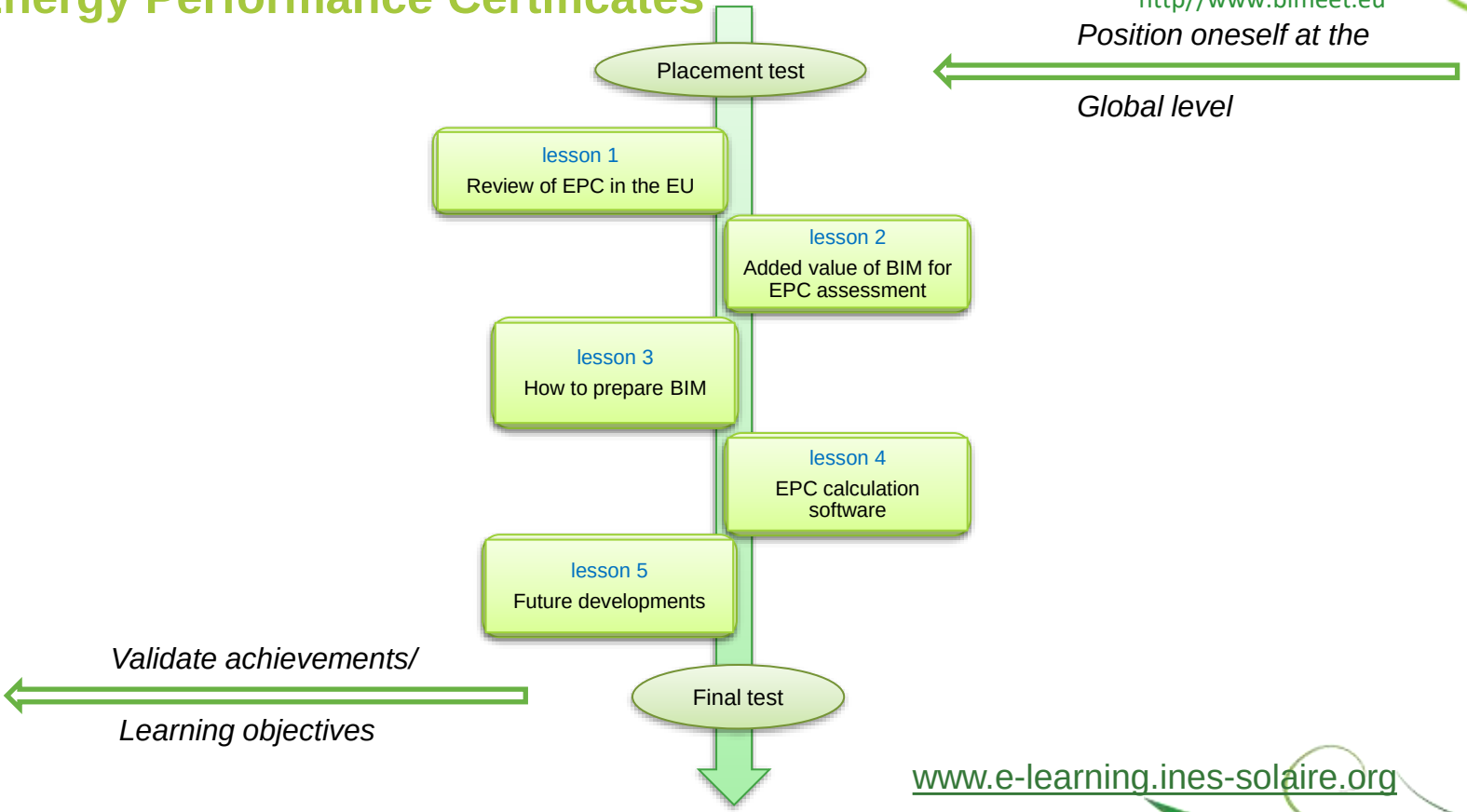
Learning objectives

Final test

www.e-learning.ines-solaire.org

BIMEET TRAINING #2

BIM for Energy Performance Certificates



www.e-learning.ines-solaire.org

BIMEET Tools

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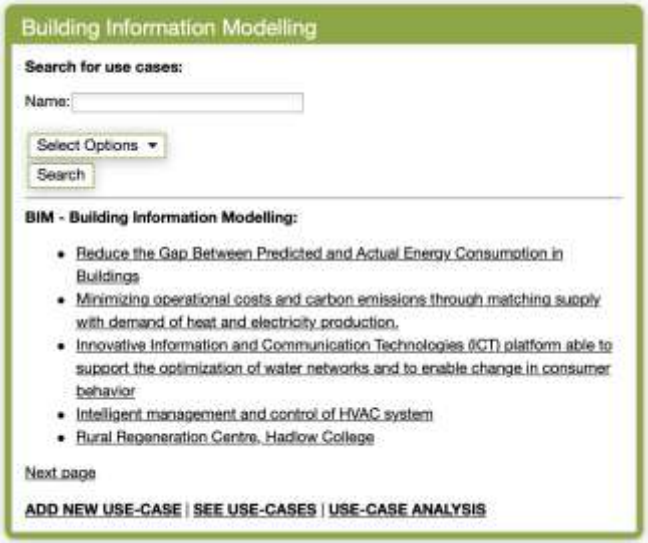
BIMEET VIRTUAL COLLABORATIVE PLATFORM

www.energy-bim.com

http//www.bimeet.eu



TANGIBLE INTERFACE

Thank you for your attention

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