BIM-based EU -wide Standardized Qualification Framework for achieving Energy Efficiency Training

D5.1 – BIMEET External Expert Advisory Board

WP 5	**Leader: BRE**
Task 5.1	**Leader: BRE**
Prepared by	Richard Hartless, Sylvain Kubicki
Date	February 2020
Partners involved	BRE, LIST

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Abbreviations

ALO	Achieved Learning Outcomes
BEM	Building Energy Model
BIM	Building Information Modelling
CA	Consortium Agreement
DoA	Description of the Action
EE	Energy Efficiency
EPBD	Energy Performance Buildings Directive
EPC	Energy Performance Certificate
EQF	European Qualification Framework
GA	Grant Agreement
HOTS	High Level Thinking Skills
ICT	Information and Communication Technologies
ILO	Intended Learning Outcomes
KSC	Knowledge – Skills – Competencies
LO	Learning Outcomes
LOTS	Low Level Thinking Skills
Mx	Milestone date designating the start of a given task
My	Milestone date designating the end of a given document delivery deadline
PC	Project Coordinator
PSC	Project Steering Committee
QA	Quality Assurance
RIBA	Royal Institute of British Architects
RTO	Research and Technology Organisation
ToC	Table of Content
UAS	Universities of Applied Sciences
WP	Work Package
WPL	Work Package Leader

1 Executive Summary

The aims of the BIMEET project are: (a) pave the way to a fundamental step change in delivering systematic, measurable and effective energy efficient buildings through BIM training with a view to effectively address European energy and carbon reduction targets; (b) promote a well-trained world leading generation of decision makers, practitioners, and blue collar workers in BIM for energy efficiency; (c) establish a world-leading platform for BIM for energy efficiency training nurtured by an established community of interest.

An External Expert Advisory Board (EEAB) involving representatives from key influential groups / institutions in the BIM domain across Europe was formed to support the strategy and subsequent development within BIMEET, help anticipate business trends and support valorisation and take up of results.

The BIMEET project partners engaged the EEAB members at three workshops, the first near the start of the project and the other towards the end. The structure of each workshop was similar with project partners presenting results and this being used as a springboard for facilitated groups to provide feedback on a range of key issues.

The BIMEET EEAB has provided a helpful sounding board and been a useful source of suggestions to help steer BIMEET over the duration of the project. At the start it helped the partners to identify new use cases and to improve the structure of the database to increase its usefulness as well as advise on the content and audiences of the learning outcome framework for BIM and energy efficiency training.

Towards the end of the project the EEAB gave further guidance on the scope of the BIMEET learning outcomes framework with suggestions for new areas to consider. It also gave a helpful steer on the BIMEET label in respect of its scope and audiences which are being integrated into the associated BIMEET label business plan.

Following completion of BIMEET, members of the EEAB and the wider community of interest will be approached concerning the development and delivery of BIM and energy efficiency training using the BIMEET learning outcomes framework and adopting the BIMEET label.

The BIMEET project partners pass on their thanks to the EEAB members for giving up their time and providing valuable input to BIMEET.

2 The BIMEET project

The aim of BIMEET is many-fold: (a) pave the way to a fundamental step change in delivering systematic, measurable and effective energy efficient buildings through BIM training with a view to effectively address European energy and carbon reduction targets; (b) promote a well-trained world leading generation of decision makers, practitioners, and blue collar workers in BIM for energy efficiency; (c) establish a world-leading platform for BIM for energy efficiency training nurtured by an established community of interest. These general aims translate into the following strategic objectives (STO):

- STO1: Screen and synthesize past and ongoing European, as well as national, initiatives and projects with a focus on assembling evidence-based quantitative / measurable scenarios and use cases that demonstrate the role of BIM in achieving energy efficiency in buildings across the whole value chain.

- STO2: Benchmark existing Europe-wide BIM trainings across the building value chain (including lifecycle and supply chain), highlighting energy efficiency linkages, as well as qualification targets, delivery channels, skills, accreditation mechanisms, while highlighting training gaps and enhancement potential.
  - ✓ This will include: (a) better determination of future capability needs; (b) clear routes of entry and clear career progression pathways; (c) clear, standard means of recognising competence; (d) exploring the scope to make apprenticeships more flexible; (e) an industry review of the current skills and capability delivery mechanisms; (f) review of approaches to career planning, training and development with a commitment to rationalise.

- STO3: Harmonize energy related BIM qualification and skills frameworks available across Europe (Objective 1) with a view of reaching a global consensus through our BIM for energy efficiency expert panel.
  - ✓ The focus is on setting up a mutual recognition scheme of qualifications and certifications among different Member States supported by an effective strategy to ensure that qualification and training schemes are sustained after the end of the project.

- STO4: Map identified skills, qualifications, and accreditation into a BIM for energy efficiency overlay with a total lifecycle and supply chain (including blue collar) perspective.
  - ✓ There are country specific delivery and process variations that will be considered to ensure successful take-up of the BIMEET training program at a national level.

- STO5: Adapt the BIM4VET platform (delivered in the context of a related ERASMUS+ ongoing project) to provide a robust computer-based online and open-access environment for BIMEET.
  - ✓ The BIM4VET platform is already providing: (a) BIM stakeholder competence matrix, (b) classification of BIM training curriculums in Europe, (c) BIM qualification maturity assessment method, and (d) recommender system for BIM training selection.
  - ✓ The resulting BIMEET platform will be available on-line on an open-access mode, nurtured by an established community of interest underpinned by an adapted business model.

- STO6: Establish a governance, policy, and regulatory framework as well as adapted business models to ensure the long-term sustainability of the proposed BIMEET training agenda.
  - ✓ The consortium will be supported by a 200+ members of the BIMEET community of interest and a panel of experts (around 20 members).
  - ✓ The consortium members will adopt an incremental and participative approach engaging effectively all the above stakeholders.

- STO7: Disseminate within and beyond Europe the resulting BIMEET platform and training program.

BIMEET endeavours to enhance the skills, qualifications and capabilities of construction practitioners (from high professionals to blue collar workers), thus increasing market penetration and adoption of key technological development in BIM, given the timeliness of the need for training in combined green and functional performance engineering. There are several areas that are key to the potential growth of BIM for energy efficiency and its impact on the green building marketplace:

- Multi-disciplinary integrative capacity of BIM: BIM provides a unique opportunity to integrate data, information and underpinning processes across lifecycle and supply chains. This will promote informed and energy efficient design interventions.
- Informed sustainability design: BIM contributes to sustainable lifecycle decisions and processes as it leverages on the capability of the complete construction value chain thus optimizing design decisions on complex issues such as energy efficiency.
- Modelling standards: BIM is currently promoting the development and adoption of a wide range of standards and best practice guide as evidenced by BIM adoption dynamics in Europe.
- Increase of BIM use for retrofit: there is an increasing trend for use of BIM in large as well as smaller projects with a sought benefit of maximizing energy efficiency and sustainable outcomes. Recognition of the appropriateness of BIM for small retrofit projects is also critical given the dynamic growth anticipated in the green retrofit market in the existing domestic stock across Europe.
- Using BIM for building performance monitoring: there is an increasing evidence of the value BIM tools during the operations and maintenance phase of a project, with the view of reducing the endemic gap between predicated and actual energy consumption in buildings.
- Training support & communication tool: As BIM embraces building products and processes, it constitutes a useful support for training, and to communicate the best practices for energy efficient and high-quality construction, in particular to on site staff.

This report focuses specifically on objective nos. #3 and #6.

3 BIMEET External Expert Advisory Board

3.1 Role and establishment of the Board

An External Expert Advisory Board (EEAB) involving representatives from key influential groups / institutions in the BIM domain across Europe, including BuildingSmart International was formed to support the strategy and subsequent development within BIMEET, help anticipate business trends and support valorisation and take up of results. Its role in the broader delivery and management of the project is shown in Figure 1 below.

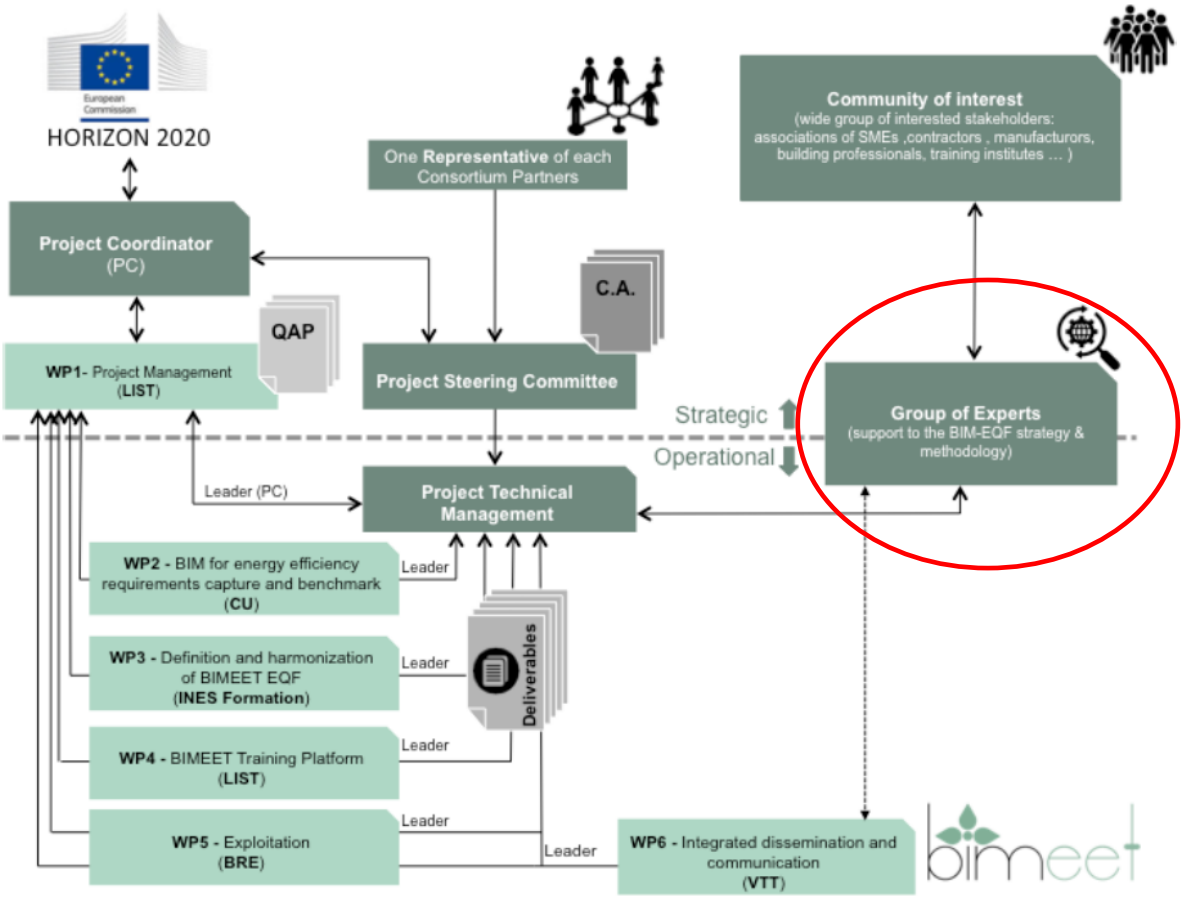

Figure 1: BIMEET management structure highlighting role of EEAB

As part of the development of the BIMEET proposal numerous relevant organisations were approached to secure their support for the project and to invite them to be part of the EEAB. Specifically, 26 experts/organizations committed to participate and sent letters of support which were included in the BIMEET proposal.

Figure 2: Principal members of the BIMEET EEAB

The EEAB formed a sub-set of the wider Community of Interest (see Figure 2) which consists of SMEs, contractors, manufacturers, building professionals, training institutes etc. The idea is that the EEAB facilitates engagement and dissemination of the project with the BIMEET platform (https://www.energy-bim.com/) providing a vehicle for this:

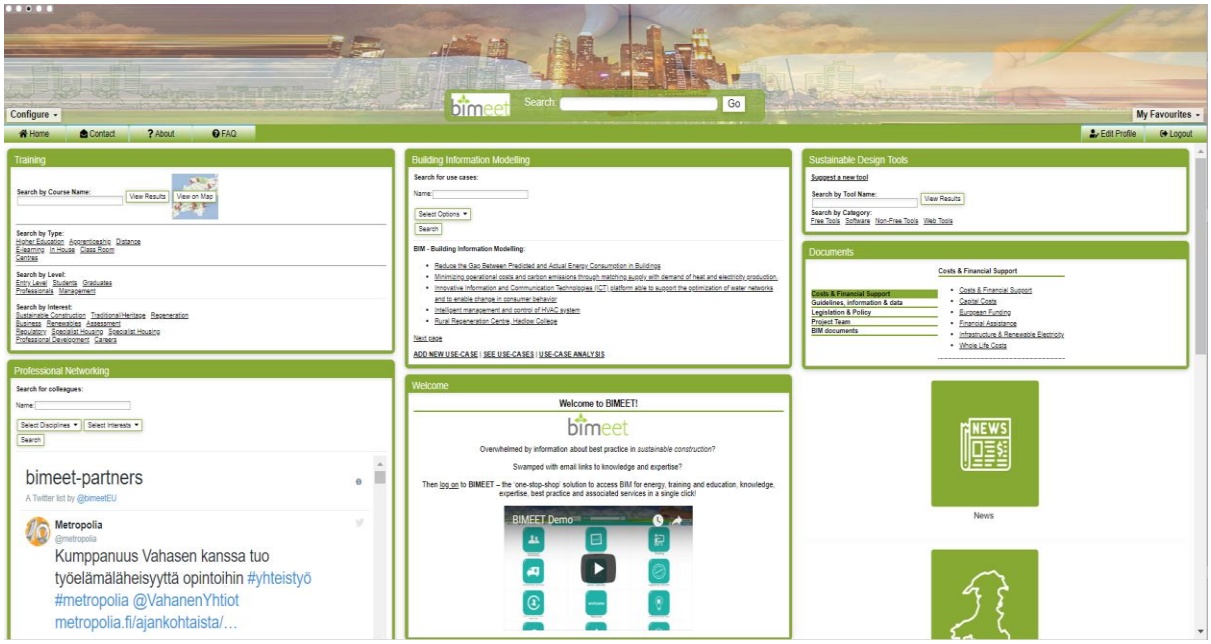

Figure 3: BIMEET platform

The project partners engaged with the EEAB at three key workshops:

i. near the start of the project to provide an initial steer on the project's direction and to give feedback on the first set of outputs; and;
ii. at the project's end to validate the remaining outputs and to advise on the partners' proposals for the future direction of the project, with a focus on the BIM and energy efficiency training developed and ideas for a BIMEET label.
iii. At the end of the project, a final seminar aimed at presenting results produced within BIMEET while widening their dissemination and learning from others, including BIMEET sister projects.

3.2 Management of the Board

The BIMEET project commenced in September 2017 and the experts were invited to the first workshop in Brussels in February 2018.

The experts who had been approached during the proposal preparation were contacted again and project partners suggested additional experts who could usefully contribute to the objectives of BIMEET. All were invited to the Brussels workshop.

The terms of reference of the EEAB were set out in a short agreement drawn up by the project partners and signed by Board members and covered key issues such as:

- Commitment and impartiality
- Confidentiality
- Publicity
- Reimbursement – *EEAB members' expenses were covered by the project budget*

A copy of the agreement is given in Appendix A.

With agreement of the Commission the 2-year timescale of BIMEET was extended by 6 months so that its completion date became February 2020.

The second EEAB workshop was in November 2019 and was again held in Brussels. There was a final seminar in February 2020 in Chambery, France, were EEAB members and those from the wider community were invited to see training materials that had been prepared during the project and to present findings from their own BIM/energy efficiency related projects and activities.

Further details of these workshops are given in the next section.

4 External Expert Advisory Board workshops

4.1 Brussels, February 2018

There were 19 EEAB members in attendance: 16 in person and 3 connected remotely. As noted above, the purpose of this workshop was to provide an initial steer on the project's direction and to give feedback on the first set of outputs.

Following a welcome by the project coordinator and a brief introduction by each of the experts the structure of the day was:

- **Review of BIM & Energy Efficiency (EE) requirements and use cases**
  Project partners gave a summary of the database of BIM & EE case studies identified by the project which was presented together with the key themes that had been identified in terms of savings, types of projects covered etc. Feedback from the experts was gathered.

- **Workshop A – BIM & EE use cases**
  EEAB members and project partners grouped into 4 small teams each with a facilitator to identify new projects and to collectively fill-in/discuss the objectives, impacts and target disciplines of BIM & EE and to better understand the actors involved, the information exchanged, the modelling and simulations performed as well as the software tools used. Findings were reported back and discussed.

- **BIMEET portal and BIM & EE training**
  Project partners introduced the energy-bim.com portal and summarised the current status of BIM & EE training

- **Workshop B – BIM & EE training**
  EEAB members and project partners grouped into 4 small teams each with a facilitator to identify the skills required (categorised by key RIBA construction stage lifecycle and stakeholder), the barriers, the required levels, the delivery mechanism and scope for assessment/certification. Findings were reported back and discussed.

Appendix B contains the meeting minutes which includes three Annexes: (i) instructions on how to register on the BIMEET portal, (ii) instructions on adding new use cases on the portal and (iii) a list of the EEAB members attending.

A list of potential new use cases was prepared and followed up, and EEAB members were contacted after the meeting with a standard e-mail/letter asking them if they could provide further examples and directing them towards the BIMEET portal. The number of use cases has continued to grow throughout the project following input from both the EEAB members and the project partners. Feedback from the members on the database enabled the project team to refine the format to improve its usefulness.

In terms of BIM & EE skill gaps and training needs, the workshop identified some key issues:

- Challenges were highlighted across all RIBA stages, but particularly at design and construction

- At the briefing stage clients had limited awareness of the benefits of BIM and energy efficiency

- Architects and engineers were hampered by lack of integrated tools and inexperience in using tools at the design phase. There was also a general lack of leadership and team working

- At construction and maintenance blue collar workers had little experience of BIM and tools. Product manufacturers also need training.

Encouragingly, these EEAB observations were echoed by surveys of construction professionals in the wider community of interest undertaken by the project partners and so were used to refine the project's methodology in terms of the development of the learning outcomes (LOs) framework and the types of BIM & EE training required.

Further specific details are given in Appendix B.

4.2 Brussels, November 2019

There were 8 EEAB members in attendance. As noted above, the purpose of this workshop was to validate the outputs with BIMEET coming to a conclusion, and to advise on the partners' proposals for the future direction of the project, with a focus on the BIM & EE training developed and ideas for a BIMEET label.

Following a welcome by the project coordinator and a brief introduction by each of the experts the structure of the day was structured around two brainstorming sessions each preceded by a series of short project related presentations to help act as a springboard for discussion. In particular, the presentations covered the project's learning outcomes framework, the BIMEET label and examples of BIM & EE training.

The meeting attendees (EEAB members and project partners) were split into 3 groups each with a facilitator.

- **1st Brainstorm – New use cases and BIMEET's Learning Outcomes framework**
  Following the presentations each group was asked to address two issues:

  a) *Suggest ways in which the use cases repository could be boosted by new projects and the evidence of savings related to the integration of BIM & EE*
  b) *Provide feedback on the project's BIM & EE LOs and give any insight from countries' national strategies.*

- **2nd Brainstorm – BIMEET label and feedback on BIM & EE training**
  Following the presentations each group was asked to address two issues:

  a) *Provide feedback on the BIMEET labelling approach, including: criteria, process, tools (database, energy-bim.com portal, tangible application), owner, willingness to pay, marketplace (EU vs. national level)*

b) *Feedback and advice on training schemes TS1 (BIM & EE basics), TS2 (BIM to EPC) and TS3 (BIM for blue collar workers), including: audience (disciplines, transversal vs. organization focused), method of delivery, content vs. country-specific needs, assessment of learners and of compliance to the label*

Appendix C contains the minutes of the meeting which includes two Annexes: (i) a list of the EEAB members attending, and (ii) instructions on adding new use cases on the BIMEET portal.

Examples of new use cases suggested by the EAB were collected including those from EU and other funded research projects; specific flagship projects and examples from countries' national initiatives, schemes and programmes. In terms of the LO framework, the EEAB's feedback focussed on limitations on development of BIM models, e.g. providing tailored information to stakeholders, encouraging greater collaboration, performing thermal bridge calculations and monitoring of buildings. EEAB members also suggested new technical areas to extend the LO framework to including resilience and offsite construction.

The proposals for a BIMEET label generated a lot of discussion and two headline issues were raised: certification and finance. Although the intention is for a label and not formal certification, the EEAB stressed the need to manage customers' expectations but also the importance of exercising due diligence to ensure the label was not diluted. A 'light touch' labelling approach was agreed to help promote e-learning courses in particular. There was also discussion around the need to develop a robust finance model where training organisations would pay to have their courses labelled and could see the value of it. This information was used in the development of the business plan for the BIMEET label.

Further specific details are given in Appendix C.

4.3 Chambery, February 2020

A final interaction with members of the EEAB as well as the wider community of interest was at BIM & EE workshop in Chambery, France in February 2020. The workshop was hosted by one of the project partners, INES, with support from industry partners. The aim of the workshop was to review the national and international experience of the use of BIM to facilitate the numerical and environmental transition of buildings.

The agenda of the meeting is given in Appendix D.

The morning session consisted of EU experience of this with contributions from BIMEET project partners and a similar EU-funded project, BIMplement. This session also included presentations from three members of the EEAB outlining their national and international experience.

The afternoon session focussed on interoperability in BIM, specifically how to study the energy and environmental behaviour on a BIM model. This was followed by a practical session on how to include energy and environmental computing in a BIM workflow.

All the workshop presentations are provided on the BIMEET project cloud.

4.4 List of EEAB members attending BIMEET workshops

Although EEAB members attending the workshops are contained in the appendices these have been integrated into Table 1 below.

Table 1: EEAB members attending BIMEET workshops

Workshop	Country	Name of expert	Organisation	Expertise
Brussels 2018	Belgium	Alain Zarli	ECTP	Secretary General of the European Construction Technology Platform (ECTP). Expert in Construction IT, BIM and European Policies towards sustainable buildings.
Brussels 2018	Belgium	François Snoeck	BESIX	Engineer and BIM Project manager. Member of IFMA.
Brussels 2018	Cyprus	Anthi Charalambous	Cyprus Employers and Industrialists Federation	Director of Energy & Environment at Cyprus Employers & Industrialists Federation (OEB). Specialist in Vocational Training engineering.
Brussels 2018	Finland	Irmeli Mikkonen	Motiva Services Oy	Senior Expert and group leader in Motiva Oy. Expert in Energy efficiency.
Brussels 2018	Finland	Vishal Singh	Aalto University	Assistance Professor in Aalto University, department of civil engineering.
Brussels 2018	France	Guersendre Nagy	Mediaconstruct (BuildingSmart Chapter)	Responsible for public relations and communication at Mediaconstruct – BuildingSmart France. Expert in BIM and Vocational Training engineering
Brussels 2018	France	Gilles Charbonnel	ADN Construction	President of ADN Construction Professional Association (Association pour le Développement du Numérique dans la Construction)
Brussels 2018	France	Henri Le Marois	Alliance Ville Emploi	Expert in Vocational Training. Representant for the EU sister project BIMplement.
Brussels 2018	Greece	Nicoleta Panagiotidou	Break with an architect	Architecture and Vocational Training engineering. Autodesk Certified Instructor.
Brussels 2018	Ireland	Elisabeth O'Brien	Limerick Institute of Technology	Expert in Vocational Training engineering for building sector.
Brussels 2018	Italy	Anna Moreno	Institute for BIM Italy	Coordinator of Net-Ubiep EU sister project. Expert in BIM and Vocational Training engineering.
Brussels 2018	Luxembourg	Marcel Deravet	IFSB	Responsible for training development in Institut de Formation Sectoriel du Bâtiment. Expert in Vocational Training engineering for the building sector.

Brussels 2018	Luxembourg	Moreno Viola	CRTI-B	In charge of missions for the Resource Centre for Innovation in Building, Luxembourg. CRTI-B is a professional association in charge of developing the BIM strategy in Luxembourg.
Brussels 2018	NL	Arjan Schrauwen	ISSO	Expert in Building Energy Efficiency and Vocational education. Specilist of the Dutch input to EPBD.
Brussels 2018	Norway	Eilif Hjelseth	Norwegian University of Science & Technology	Adjunct Associate Professor at Norwegian Research Center for Computers and Law. Expert in BIM and Vocational Training engineering
Brussels 2018	Switzerland	Simon Ashworth	ZHAW (Zurich Hochschule für Angewandte Wissenschaften)	Lecturer at ZHAW, expert in BIM and Facility Managament. IFMA Member
Brussels 2018	UK	David Comiskey	Chartered Institute of Architectural Technologists	Senior Lecturer Ulster University. Expert in Architecture, BIM and Vocational Training engineering
Brussels 2018	UK	Mervyn Richards	BuildingSmart UK. Avanti Partnership	Director BuildingSMART UK. Expert in BIM, Vocational Training engineering
Brussels 2018	UK	Alexi Marmot	University College London	Professor of Facility and Environment Management at UCL / IFMA Member.
Brussels 2019	Belgium	François Snoeck	BESIX	Engineer and BIM Project manager. Member of IFMA.
Brussels 2019	Belgium	Cléo Wiseman	BESIX	Engineer and expert in BIM. Member of IFMA.
Brussels 2019	Canada	Jean Carriere	Trailloop	Managing Director at Trailloop. Expert in BIM to Building Energ Modeling software workflows. BIM and EE trainer.
Brussels 2019	Finland	Maaria Laukannen	Eksergia	Expert in BIM and energy simulations. BIM/EE trainer.
Brussels 2019	Greece	Nicoleta Panagiotidou	Break with an architect	Architecture and Vocational Training engineering. Autodesk Certified Instructor.
Brussels 2019	Italy	Anna Moreno	Institute for BIM Italy	Coordinator of Net-Ubiep EU sister project. Expert in BIM and Vocational Training engineering.
Brussels 2019	Luxembourg	Guillaume Karman	IFSB	Expert in Vocational Training engineering for the construction sector.
Brussels 2019	New Zealand	Robert Amor	University of Auckland	Professor at The University of Auckland, Expert in Computer Science and BIM in AEC
Chambery 2020	France	Luc Floissac	EcoEtudes, Toulouse	Engineer and expert in energy simulations. Trainer in environmental aspects of buildings.

Chambery 2020	Ireland	Gordon Chisholm	Department of Architecture, Waterford Institute of Technology	Architect. Lecturer at Waterford Institute of Technology.
Chambery 2020	Italy	Letizia Martinelli	PhD in Environmental Design Research fellow at ISPC-CNR	Post-Doctoral Research Fellowship at the Institute of Heritage Science of Consiglio Nazionale delle Ricerche. Expert in BIM for heritage buildings.

5 Conclusions

The BIMEET External Expert Advisory Board (EEAB) has provided a helpful sounding board and been a useful source of suggestions to help steer BIMEET over the duration of the project. At the start it helped the partners to identify new use cases and to improve the structure of the database to increase its usefulness as well as advise on the content and audiences of the learning outcome framework for BIM and energy efficiency training.

Towards the end of the project the EEAB gave further guidance on the scope of the BIMEET learning outcomes framework with suggestions for new areas to consider. It also gave a helpful steer on the BIMEET label in respect of its scope and audiences which are being integrated into the associated BIMEET label business plan.

Following completion of BIMEET, members of the EEAB and the wider community of interest will be approached concerning the development and delivery of BIM and energy efficiency training using the BIMEET learning outcomes framework and adopting the BIMEET label.

The BIMEET project partners pass on their thanks to the EEAB members for giving up their time and providing valuable input to BIMEET.

Appendix A. BIMEET Expert Expert Advisory Board – Agreement template

EXPERT AGREEMENT related to the participation of the Expert in the "BIM-based EU-wide Standardize Qualification for achieving Energy Efficiency Training" External Expert Advisory Board

Between

Luxembourg Institute of Science and Technology (LIST) which has its headquarters at 5, avenue des Hauts Fourneaux, L-1362 Esch-sur-Alzette, Grand Duchy of Luxembourg, licensed by the Trade and Companies Register of Luxembourg under No.J53, hereinafter called "LIST" and represented by…..

And

Mr/ Mrs…… domiciled at…….. and employed by…….. as,…… (hereinafter referred to as "the Expert".

Preamble

In the framework of the project entitled "BIM-based EU-wide Standardize Qualification for achieving Energy Efficiency Training" (hereinafter "Project") funded by the EU Commission, coordinated by the Luxembourg Institute of Science and Technology and carried out by the partners of the Project:

- LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY (hereinafter referred as to "LIST"- the coordinator)
- CARDIFF UNIVERSITY
- CENTRE SCIENTIFIQUE ET TECHNIQUE DU BATIMENT
- BUILDING RESEARCH ESTABLISHMENT LTD
- INES PLATFORME FORMATION & EVALUATION
- TEKNOLOGIAN TUTKIMUSKESKUS VTT OY
- HOUSE OF TRAINING
- METROPOLIA AMMATTIKORKEAKOULU OY
- CENTRE FOR RENEWABLE ENERGY SOURCES AND SAVING,

the partners of the project have appointed an External Expert Advisory Board (EEAB) which shall assist and facilitate the decisions made by the Project Steering Committee.

Article 1- Purpose of the Agreement

The purpose of the present agreement is to establish a basic code of good conduct to be followed by the expert and certain terms and conditions of the participation of the expert.

Article 2- Commitment of the expert- impartiality

The Expert commits himself/herself to provide his/her expertise in the framework of the EEAB of the Project ("the Purpose"). In doing so, the Expert agrees to acquaint herself/himself with the Project. He/she commits himself/herself in declaring any conflict of interest with the Project at any moment it may arise, as well as any interest in its success, that could influence his/her impartiality.

The Expert will be asked to participate in two meetings.
Moreover, the Expert acknowledges that besides the two meetings he will be asked to attend, he might be asked to provide advice regarding the Project. In particular, should the Expert not be able to attend one of the meetings, the Expert commits himself/ herself to provide his/her Expertise, through the completion of questionnaires, the participation in phone conference or through other means which will be indicated by LIST.

Article 3- Confidentiality

3.1.The Expert recognizes that, as part of and in the execution of this Agreement, and due to its participation to the EEAB, information and material of any kind, including but not limited to ideas, methods, procedures, processes, scientific and/or technical knowledge, tests, functional and technical specifications, computer programs, strategies, financial information, information related to accounting, business or personnel, partners or customers (hereinafter referred to as "Confidential Information") may be disclosed to him/her by LIST or one Partners of the project (hereinafter referred to as "Disclosing Party").

“Confidential Information” shall not, however, include any information which the Expert can establish

a. was publicly known and made generally available in the public domain prior to the time of disclosure;
b. becomes publicly known and made generally available after disclosure through no action or inaction of the Expert; or
c. is in the possession of the Expert, without confidentiality restrictions, at the time of disclosure by the Partners or the LIST as shown by the Expert’s files and records prior to the time of disclosure.

3.2. The Expert shall

a. not communicate, not disclose nor make available all or any part of the Confidential Information to any third party;
b. not directly or indirectly use the Confidential Information other than for the Purpose;
c. not make any announcement or disclosure in connection with the Confidential Information or the Purpose without the prior written consent of the LIST;
d. inform the LIST of any other special circumstances which are apt to impair confidence in his/her impartiality.

3.3. The confidentiality commitment, as defined in this article “Confidentiality” is valid for the duration of this Agreement and shall continue in force for a period of five (5) years after this Agreement expiration or termination as defined in Article 7.

3.4. The Expert agrees that he/she shall take all reasonable measures to protect the secrecy of and avoid disclosure and unauthorized use of the Confidential Information.
The Expert shall immediately notify the LIST in the event of any unauthorized use or disclosure of the Confidential Information.

3.5. All documents and other tangible objects containing or representing Confidential Information and all copies thereof which are in the possession of the Expert shall be and remain the property of the LIST or of the Partners and shall be promptly deleted, destroyed or returned to the LIST or to the Partners as soon as the participation of the Expert in the EEAB is ended and at the latest at the end of the Project as defined hereunder.

Article 4- “Publicity”

The Expert agrees that his/her name, the name and the logo of his/her institution as well as the website of his/her institution may appear on the website related to the Project.

Article 5 - Reimbursement

As member of the EEAB, the Expert will be asked to participate in two meetings. Should the attendance in both meetings not be possible, the Expert will be allowed to participate in a single meeting only. In such case, a written or oral contribution will be expected from the Expert regarding the meeting he/she cannot attend, as explained in Article 2.

The LIST shall reimburse the Expert for his travel costs related to the round trips between the place where the meeting of the EEAB is held and his/her home or work country, based on real costs (as proven with proof of expenses) with a maximum amount of 500 Euros (five hundred euros) per meeting.

To obtain the reimbursement of the costs, the Expert will have to complete the "Claim for expenses" form annexed to the present agreement (see annex 1) and send it, with the original documentary evidence, to the LIST. The LIST will reimburse the Expert within a reasonable timeframe.

Article 6 – Publications

The LIST may publish the findings of the Project. Authorship for publication will be based on having made a substantial, direct, intellectual contribution to the results, including conception, design, data collection, analysis and/or interpretation of data.

Article 6 – Applicable Law – Jurisdiction

This agreement is subject to the laws of Luxembourg. In case of disputes, the Parties shall do their utmost to come to an amicable agreement.

Article 7 – Duration of the Agreement

This Agreement shall be effective from the date of signature of the Agreement and will expire on August 31st, 2019. The Article "Confidentiality commitment" and "Applicable Law-Jurisdiction" shall remain in force and survive the termination or expiration of this Agreement for an unlimited duration or the duration defined expressly in those articles.

This Agreement may be terminated earlier:

a) By common agreement of the Parties
b) By LIST at any time upon (1) month written notice to the Expert
c) By either Party with a 2 (two) months' notice to the other Party by registered letter where there is a breach by this other Party of any of its obligations under the Agreement, unless the defaulting Party – within such a two (2) months period- has satisfied its obligation under the Agreement or has demonstrated that the breach resulted from force majeure. Such notice shall be sent by the plaintiff Party by registered letter with acknowledgement of receipt explaining the reasons of the complaint.

Article 8- Annexes

- Annex 1 Claim for Expenses

Done in 2 original copies executed by the duly authorised representative of each Party.

For LIST	For the Expert
Date:	Date:
Place:	Place:
Signature:	Signature:
Name:	Name:
Title:	

Appendix B. Minutes of BIMEET External Expert Advisory Board workshop, Brussels, 6th February 2018

BIMEET Workshop
External Expert Advisory Board
Minutes

February 06th 2018
Neth-ER - Brussels meeting room

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Document

Version	Changes	Author	Date
V0.2	Initial version	Sylvain Kubicki, Josée Thyes	23/02/2018
V0.3	Additions in the tables, proofreading	Efi Mavrou, Maaria Laukkanen, Richard Hartless	01/03/2018
V0.4	Additions in the tables	Sylvain Kubicki	05/03/2018
V1.0	Final Version, reviewed by all partners	Sylvain Kubicki	07/03/2018
V1.1	Additions by François Snoeck	Sylvain Kubicki	08/03/2018

Diffusion

Version	Date	Receiver(s)
0.2	23/02/2018	Project team (bimeetcloud)
0.3	01/03/2018	Project team (bimeetcloud)
0.4	05/03/2018	Project team (bimeetcloud)
1.0	07/03/2018	Project team (bimeetcloud) & All BIMEET experts (mail)

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Acknowledgements

BIMEET has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 753994.
The partners of the project are:

1. Luxembourg Institute Of Science And Technology (LIST),
2. Cardiff University (CU),
3. Centre Scientifique Et Technique Du Batiment (CSTB),
4. Building Research Establishment LTD (BRE),
5. INES Plateforme Formation & Evaluation (INES),
6. Teknologian tutkimuskeskus VTT Oy (VTT),
7. House of Training (HoT),
8. METROPOLIA AMMATTIKORKEAKOULU OY (METRO),
9. Centre For Renewable Energy Sources And Saving Fondation (CRES).

Document summary

BIMEET aims to broaden the BIM training agenda to support the European union building energy efficiency policy. This requires broad awareness and expertise in BIM practice across different asset types and different roles in the industry. The innovation relies on a combination of BIM and energy efficiency. To achieve this aim, the project partners rely on an External Expert Advisory Board, comprising experienced people providing advice, reviewing results and potentially using it.
19 experts agreed to be part of this Advisory Board (see the list of experts in annex 1). The first workshop took place in Brussels, on February the 6th, 2018. 16 experts participated physically, and 3 others joined remotely.
This document summarizes the minutes of this meeting.

1. Project presentation and BIM/EE use cases

Project presentation

The meeting starts with a presentation of BIMEET project scope and objective.
Note: all the workshop's presentations are provided on the workshop's cloud folder:

https://bimeetcloud.list.lu/index.php/s/c30uauSwAkthgVK

Presentation of the experts

The invited experts each briefly introduced themselves. They described the type of BIM activity they are involved with and the level of BIM maturity in their country with a focus on BIM and energy efficiency activities.

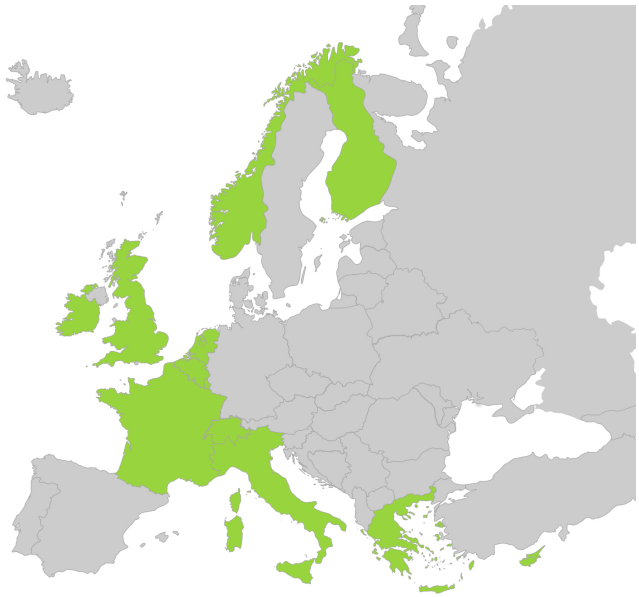


Figure 1: Europe coverage of BIMEET's experts

Review of BIM & Energy Efficiency requirements and use cases

Presentation of use cases: European projects, real construction projects

Definition of "Use case": a project where BIM was used and/or a best practice extracted from a research project and linked to EE

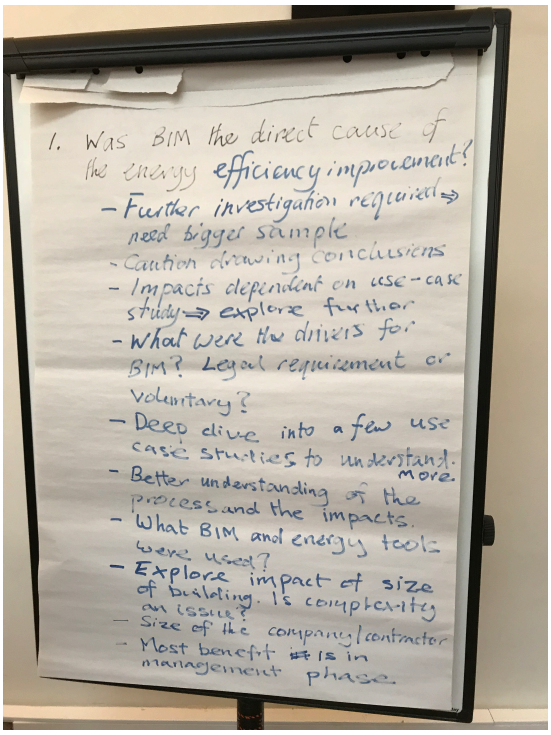
Ideas for the future:

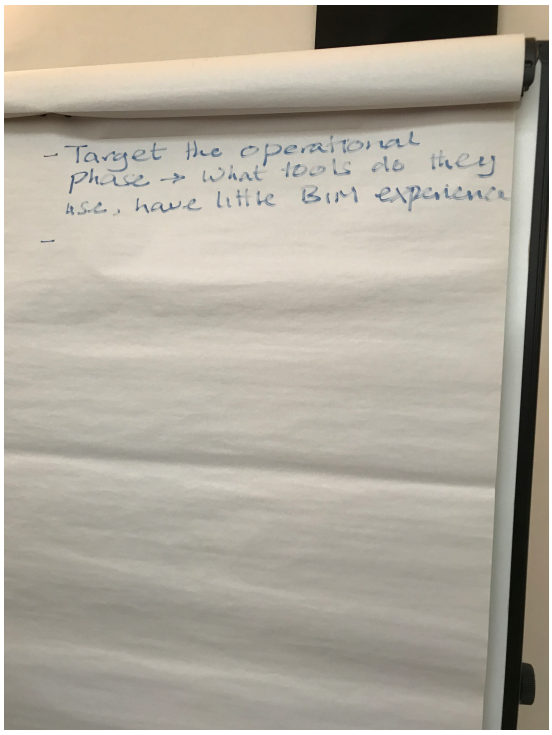
- To extend to more use cases, more parameter drives types of analysis (energy_bim.com)
- To see the training requirements to fill the gaps….

2. Comments and discussions by the experts

The analysis needs to clarify whether BIM was the direct cause of energy savings? Did BIM just lead to a process efficiency improvement?

- Further investigation is required – need a bigger sample and then repeat the analysis
- In light of current small sample we should be cautious in drawing conclusions
- Impacts dependent on type of use-case
- What were the drivers for BIM? For example, was it a legal requirement or was it a voluntary initiative?
- Perform deep dive into a few use cases studies to understand more
- Obtain better understanding of the process and the impacts
- What BIM and energy tools were used?
- Explore impact at size of building. Is complexity an issue?
- Explore size of the company/contractor
- Examine the operational phase in particular – what tools do they use, how much BIM experience do stakeholders have?





Thanks to these remarks, the project's partners will update the methodology description, and consider further analyses of the use cases.
Regarding the BIM and EE tools, a specific section is available on the energy-bim.com platform, so that each partner and expert can describe the tools he knows.

3. Brainstorming on BIM+EE use cases

"Most problems appear between construction and the FMA … need to have a good database on carbon use. "
"Different sorts of building – need to have a good matrix."

"Many buildings shows that the predicted Carbon usage and the real one – always worse – why is there this gap? What happened? – bad construction, not being operated correctly on a daily basis."
"Those who want to save E, what business model? How to achieve the target fixed."

"We have some databases – but not use cases. "World green building data" ? Example: use Cloud and use BIM – photographs being taken. Multi-purpose tool."

"To prepare a standard email which can be send to the experts present here to open the doors to more use cases."
"François Snoeck, BESIX, Belgium, knows about a tool to share that evaluates the success of BIM implementation. Idea: to develop a tool for EE to measure the EE in projects."
Update from François: "the university of Twente developed a tool generating charts as the one below. Since most of the documents are in dutch, if you are interested, you can take direct contact with Ir. Sander Siebelink (s.siebelink@utwente.nl)."

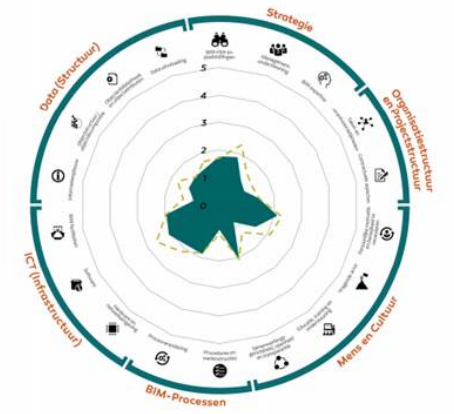


Figure 2: BIM Maturity tool developed in NL

Table 2 provides the list of use cases identified by experts, and which could be used by the project team. Further contacts and details will be required.

Table 1: BIMEET Use cases provided by EEAB

N	Name	Targeted phase	Location	Expert providing details	BIMEET partner in charge
1	Vinci (Construction and Facility) (Thalès) Office Building	OM	FR	Guersendre Nagy	Emilie Suire
2	EE Construction ESCO model and use of BIM Better info about possibilities	OM	?	Passiv Haus Institute	TBD
3	Carte vitale du bâtiment (Healthy card of buildings) Working group within PTNB France	OM	FR	Guersendre Nagy	Emilie Suire
4	Energy modelling with FinGreen (BIM Software) Annual consumption of buildings	OM	? (aecbytes.com)		TBD
5	Property management Luxembourg government BIM for maintenance	OM	LU	Moreno Viola	Josée Thyes
6	BIMplement case	CO	Dijon FR	Henri Le Marois	CSTB/INES

7	BIMplement case	CO	Grenoble FR	Henri Le Marois	CSTB/INES
8	D Colas (confidential?) Sustainability, depollution petrol site	CO	Dunkerque France	Guersendre Nagy	CSTB/INES
9	Stugalux BIM Internally Obj: efficiency, planning	CO	LU	Marcel Deravet	Josée Thyes
10	Tool to evaluate the success of BIM implementation	NA	BE	François Snoeck	TBD

BRE team prepares a standard email to send to industrials for getting additional use cases through the experts.

Presentation of energy-bim.com, the BIMEET portal

See the energy-bim.com registration procedure in Annex 1 and a manual to add new use cases in Annex 2.
Please remind that this platform will continuously evolve and new content will be added.

4. Towards BIM&EE Training

There was a presentation by BRE and INES outlining the status of BIM training offerings with a focus on BIM and EE in the UK and France.

Summary of key points:
UK experience:
- There is a need for change in light of big data and the data revolution
- BIM: Model/Modelling – how it is produced- more the software side/Management – delivery cycle
- BIM level 3 – a skilled digitally enabled workforce/ effective education and change management

Roles vs. prof. Qualification - The idea is that a practitioner bolts on BIM to their existing skills to become a 'T-shape professional'
Benchmarks to use are:
- BIM4VET BIM matrix– will help us to identify the training needs – good place to start
- EQF

BIM related asset life-cycle (plan, design construct, operate) courses:
- Undergraduate level - BRE BIM approved graduate (AG) course
- There are MSc courses on BIM (at various universities) but there is little focus on EE
- General CPD training for professionals provided by various bodies which can lead to certification, e.g. BRE, BSI etc.)

INES – France experience:
- More than 230 BIM training/ 20 certified training courses, 5 long training courses
- 50% only 1 day trainings
- Not yet EE related training

General trainings outside UK & France:
Software solutions: Training to integrate IES – Virtual environment with REVIT to reduce duplication of software modelling

Brainstorming BIM&EE Skills

Table 3 summarizes the gaps identified by each group, while Table 4 suggests training to be developed.

Table 2: Skills gaps

RIBA stage	Owners, Decision makers, Clients	Engineers, Architects	Workers, Management	Utility managers, Users
Brief	General lack of legislation (or other drivers, e.g. financial incentives) requiring (or encouraging) the use of BIM (and associated training) Lack of strategical thinking in BIM and Energy at this stage			
	Owners and (financial) decision makers lack awareness of what BIM is and what it can provide At the moment there is more management of files than of people.			
Design	Softskills: Communication, Leadership, working in teams BIM training at all levels, not just Masters			
		Designers have better background for EE than architects Energy and BIM tools integration Lack of BIM - Energy workflows lack of software interoperability lack of training Designers have better background for EE than architects Some companies want BIM but do not want their competitors to have it so they can have a market advantage Incompatibility between BIM models and energy performance models leading to duplication of effort and increased risk of performance gap.		

Construction			Also trainers need training! Skills gap of construction managers in BIM – Energy Consider the Impact of size of the buildings Little experience of complex buildings Little or no experience of blue collar workers Lack of knowledge within blue collars + lack of collaboration Product manufacturers: BIM characteristics Training of staff of product manufacturers	BIM training at all levels, not just Masters
Operation	Litlle experience on BIM tools in this phase - few case studies to showcase			

Table 3: Training to be developed (target, topic, delivery)

Brief	Design	Construction	Operation
Transversal Softskills, limitations (what is not possible), knowing the consequences, system thinking,			
Include the significance of early design decisions in Energy BIM workflow	Universities BIM training - combine Energy and BIM training	BIM Vocational Training for construction managers to enhance ability to implement BIM with Energy specs.	Facilities manager to be trained in Energy and BIM facilities management
Final-users should be involved. Good to keep in that health, thermal comfort, productivity and operational costs are more relevant to them than energy and energy-efficiency. These things are connected, so it is ok.	Vocational training for engineers	On-site training blue collar workers for accurate implementation.	Use real case studies, on-site training
Owner, decision maker, should provide requirements and strategy to all.	Architects need to be educated what is zero energy building and how BIM and EE can help to provide	Training for the owners to enhance the ability to participate in decisions.	Provision of tools and training on them to enable managers and users to interact with BIM model.

Facility managers should specify their requirements so need to be involved at an early stage of a project	Soft Skills also important, people should come out of silos: Communication, Leadership + working in teams should also be in training courses	BIM Vocational Training for construction managers to enhance ability to implement BIM with Energy specs.	
ESCOs can be involved in large projects. They set up rules for business model, maintenance provision for 10 years so are another audience for BIM and EE training	Modelling skills Processing skills Technical skills EE skills Knowledge about information exchanges (standardization) Legal skills	BIM should be implemented in all teaching levels, not only Masters degree.	
	Integrating BIM and EP models	Blue collars, construction managers need education on how to use BIM-model. Young people know how to use, but older people can be reluctant (the construction industry can be resistant to change). Even most trainers don't.	
		Example in France: BIMPLEMENT: Case Studies, Free providers, Obligatory training…	
		Successful cases: how they have been managed with BIM	
		Understand BIM model view (to read and use it)	
		Updating the construction model	
		Fullfill info's product + create objects	
		Cleaning phase to simplify the BIM model	
		HVAC: vocational short blended learning for all construction workers Very short Visual on-site	
		Provision of tools (e.g. tablets) and training on them to enable blue collar workers and managers to interact with BIM models.	
		This may be best delivered on site or in the classroom.	

5. Wrap-up of group discussions

"We need a paradigm shift and new approaches. We should think what the future will be like. Construction field still relies too much old ways, new thinking is needed." (Eilif Hjelseth)

LEAN projects was mentioned as a good approach. Buildings achieve good performance.

With BIM-software for energy calculations we have to keep in mind that often a lot of default values are used which are not correct to the specific case. It is like a black box. We need to know what the calculator is calculating, so it matches with the reality. But very simple tools are important that give some kind of idea. Tools that give some numbers and trends to "normal architects" [who often don't know much of energy calculations]. Simple assessment tools that everyone can use for rough evaluations are good in that sense.

"A reference BIM project is needed, from end-to-end (design to operation), to serve for education purposes" (Eilif Hjelseth).

"If designers knew energy efficiency factors, they could work on them. (So lack of basic knowledge of energy efficiency can also be a factor?)" (François Snoeck, BESIX, Belgium)

"Future of BIM looks like MOBO, generic design and mobile apps. There is accurate visual model of buildings. If chair is moved in building, it also moves in the model." (Vishal Singh, Aalto University, Finland).

"Very little BIM activity in Greece, and very few actors. Other national problems are slowing down the process." (Nicoleta Panagiotidou, Break with an architect, Greece).

"BIM is very new for in use (operational) phase. But if BIM and EE-tools are used only in design phase, only a fraction can be done of what is possible. Facility managers should be part of the design process so they can tell which program they will be using and what they are going to do with BIM." (Guersendre Nagy, BuildingSmart France)

"Long term or short term BIM-teaching? Basically all good. Online or classroom? Basically all good. If education done in training center and not on construction site participants are more focused. In France mobile schools with demonstration equipment going from construction site to another are now not used anymore... A lot of money was wasted. Education must come from neutral partner, otherwise it is not so reliable." (Henry Le Marois, (BIMplement project) France)

Also from France: "Companies may decide to adapt BIM practices, but dot want others to use BIM. Then their advantage of knowing something good others don't, would go away. A lot of lobbying is going on so that government would not make BIM compulsory to everyone. So field is very Conservative, and change in legislation would be the first gap."

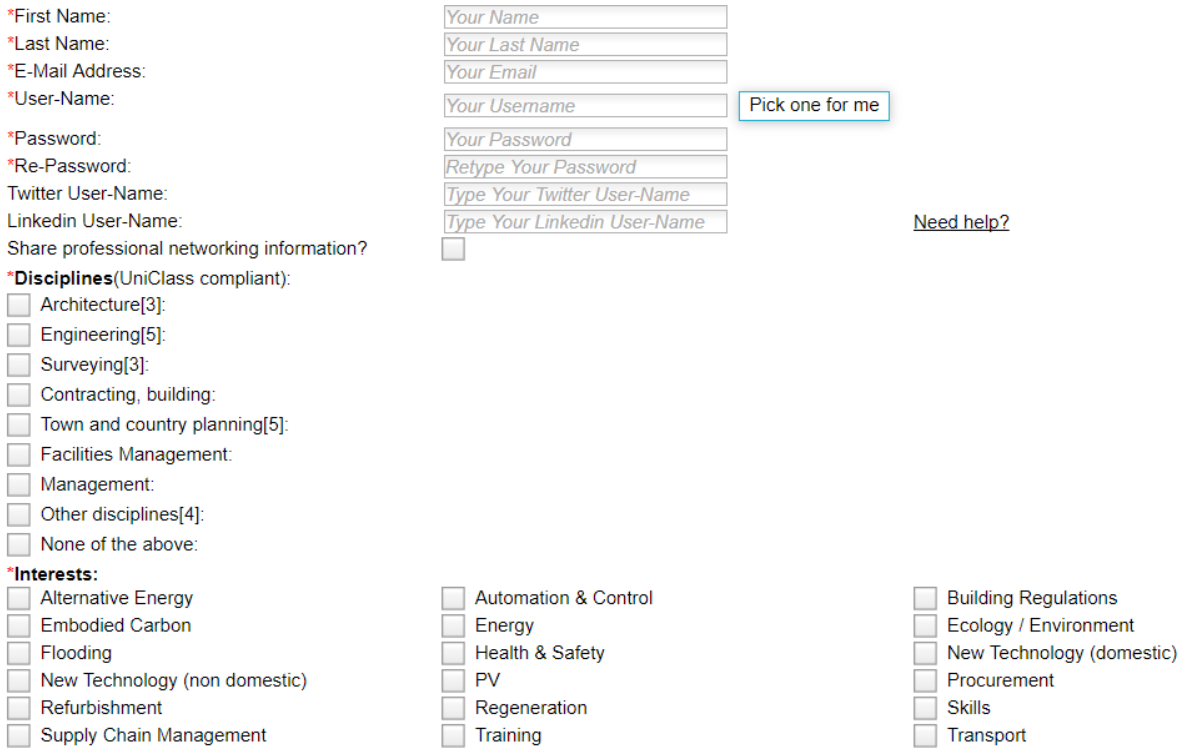
6. Conclusion

The whole BIMEET thanks the experts for their time and fruitful suggestions. This document summarizes the findings, and will lead to improvements in our methodology.
Further communications will be addressed to the experts directly, and/or via the energy-bim.com platform.
Moreover, it is expected to have specific synchronisation with BIMplement, Net-UBIEP and BIMcert H2020 funded projects.

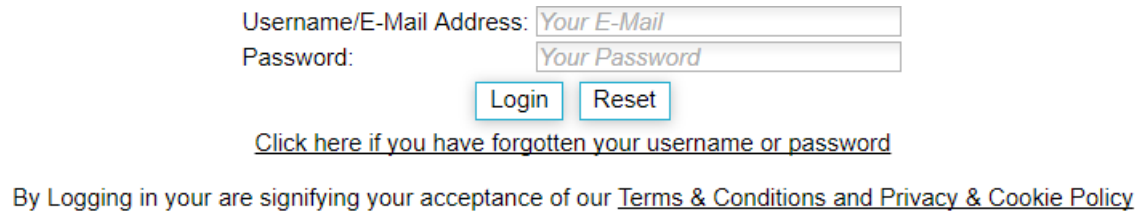
Annex 1: energy-bim.com platform registration process

This annex explains how to access, use and configure the BIMEET aggregator platform for conduction searching and validation of relevant BIM energy online data sources.

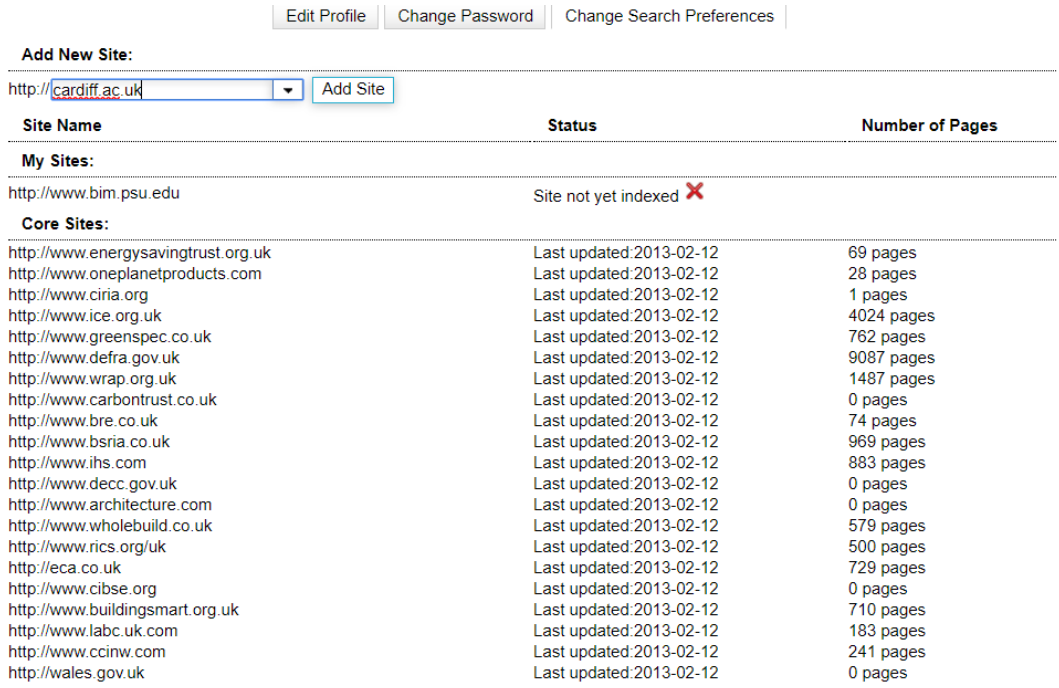
Step 1: Please type the url: www.energy-bim.com to access the BIMEET platform aggregator.
Step 2: Please click on "**Create Account**" and fill in the form to create an account



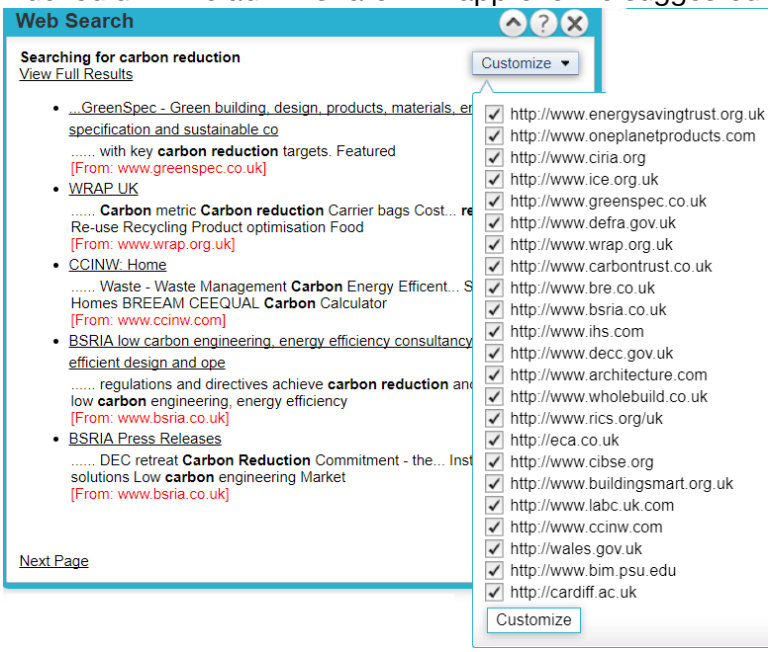
Step 3: After creating the account please click "**Login**" in order to login with corresponding credentials



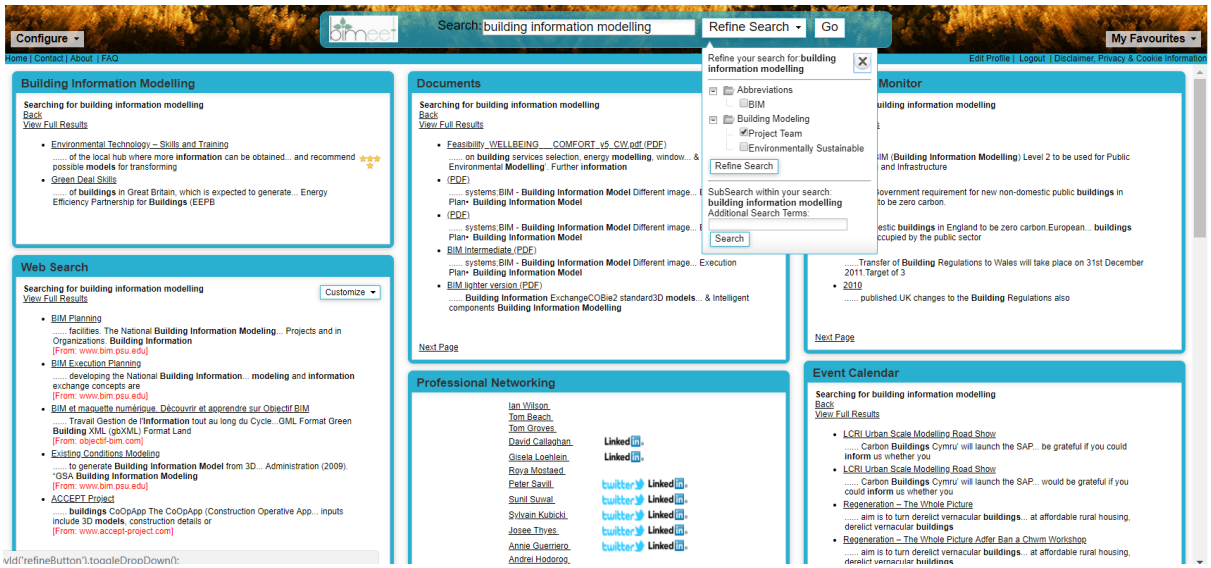
Step 4: After login, click on "*Edit Profile*" going to the "Change Search Preferences" tab. In the "Add New Site" textbox please type the URI of the proposed web source to be indexed and crawled. Click "Add Site" and the site will be listed under section "My Sites" in the same page awaiting for approval from the BIMEET administrators.



Step 5: The newly added URI will appear under "Configure" button in "Search" widget at each search conducted within the BIMEET aggregator platform. However, pages will not be indexed until the administrator will approve the suggested URIs.



Step 6: Once all the partners have provided suggestion for indexed URIs, a decision will be taken by the consortium of the primary URIs that need to be kept as part of the crawling module.


Configure
Search: building information modelling
Refine Search
Go
My Favourites
Home | Contact | About | FAQ
Edit Profile | Logout | Disclaimer, Privacy & Cookie Information
Building Information Modelling
Searching for building information modelling
Back
View Full Results
Environmental Technology – Skills and Training
Green Deal Skills
Documents
Searching for building information modelling
Back
View Full Results
Feasibility_WELLBEING___COMFORT_v5_CW.pdf (PDF)
(PDF)
BIM Intermediate (PDF)
BIM lighter version (PDF)
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Refine your search for building information modelling
Abbreviations
BIM
Building Modeling
Project Team
Environmentally Sustainable
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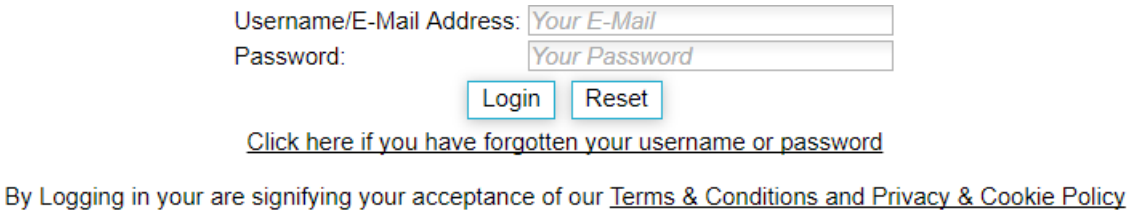
building information modelling
Additional Search Terms:
Search
Monitor
Next Page
Web Search
Searching for building information modelling
View Full Results
Customize
BIM Planning
BIM Execution Planning
BIM et maquette numérique. Découvrir et apprendre sur Objectif BIM
Existing Conditions Modeling
ACCEPT Project
Professional Networking
Ian Wilson
Tom Beach
Tom Groves
David Callaghan
Gisela Loehlein
Roya Mostaed
Peter Savill
Sunil Suwal
Sylvain Kubicki
Josee Thyes
Annie Guerriero
Andrei Hodorog
Event Calendar
Searching for building information modelling
Back
View Full Results
LCRI Urban Scale Modelling Road Show
Regeneration – The Whole Picture
Regeneration – The Whole Picture Adfer Ban a Chwm Workshop

Annex 2: energy-bim.com platform adding a new use case

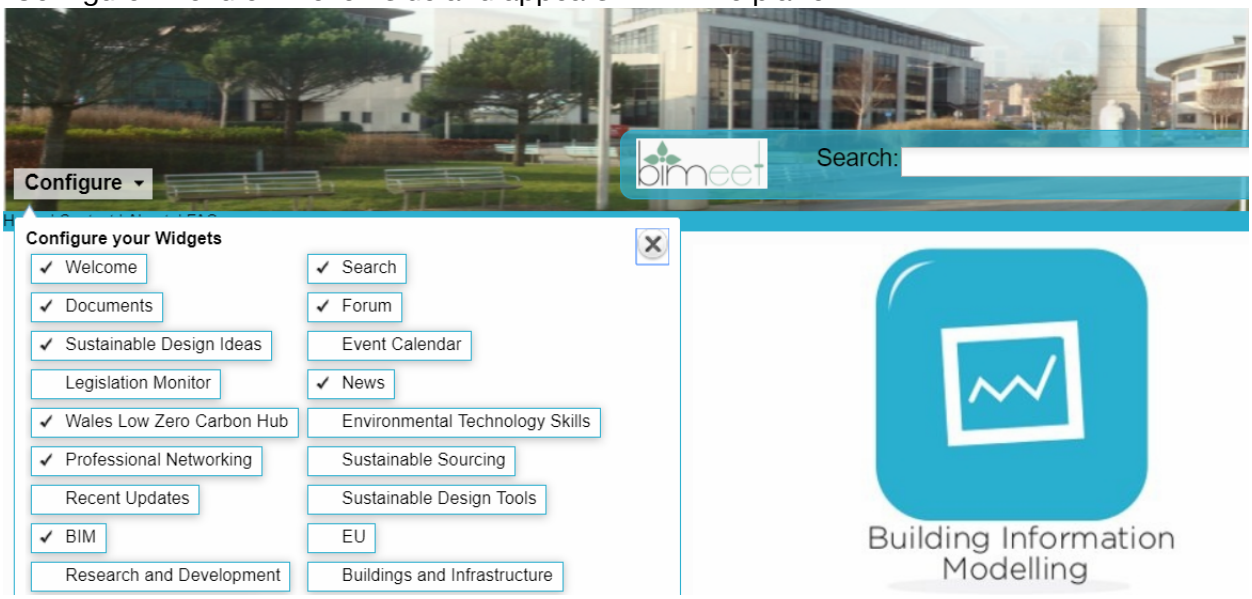
This document explains how to input a new use-case study within the BIMEET platform.

Step 1: Please type the url: www.energy-bim.com to access the BIMEET platform aggregator.

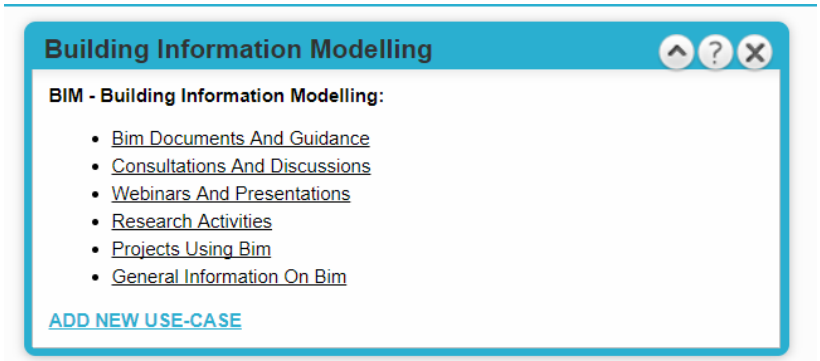
Step 2: After creating the account please click "**Login**" in order to login with corresponding credentials



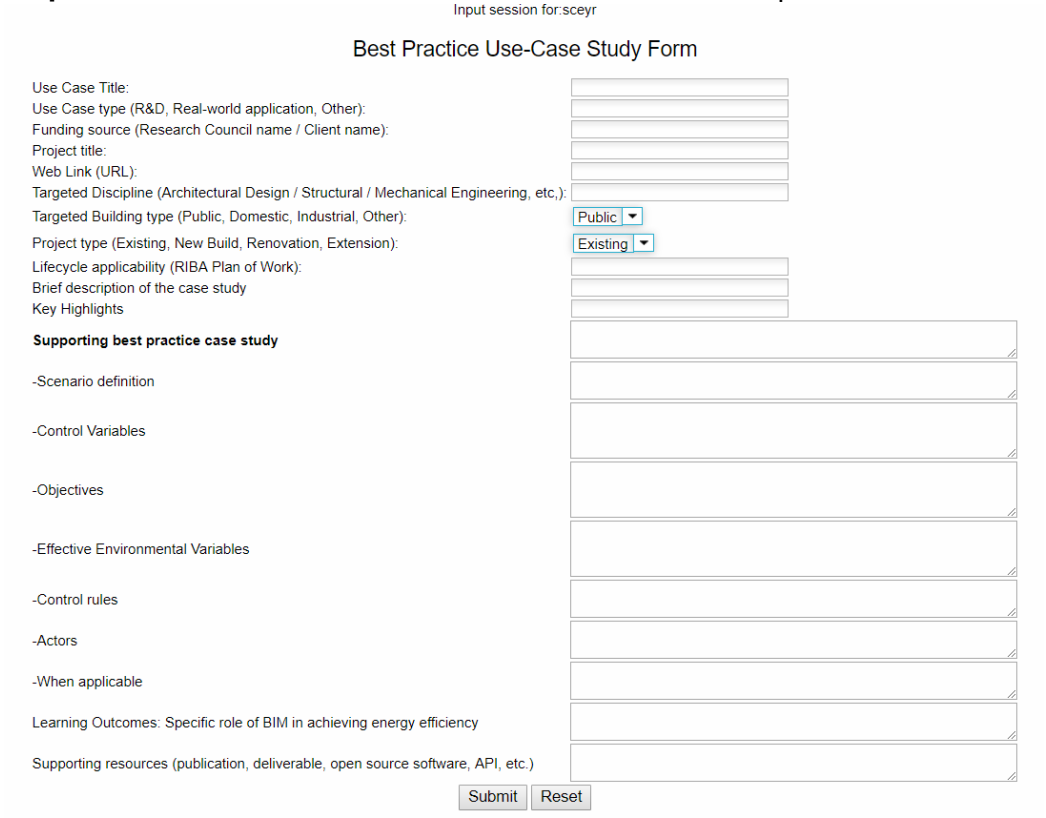
Step 3: After login, please make sure the BIM widget has been activated form the "Configure" menu on the left side and appears within the platform.



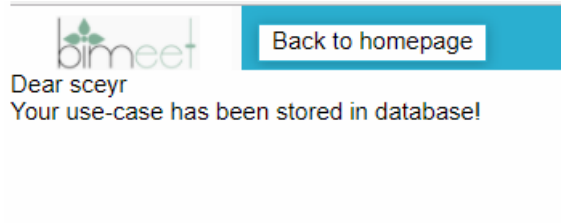
Step 4: Please expand the BIM widget and click on "ADD NEW USE-CASE" link. A form will be displayed for recording your selected use-case.



Step 5: Please fill all the fields in the "Best practices use-case form".



Step 6: Once provided all the fields please click submit and a confirmation page will appear. Then click on "Back to homepage" to continue with the platform.



Annex 3: List of BIMEET EEAB experts

BIMEET First Workshop - External Expert Advisory Board

	Country	Name of expert	Organisation	Principal expertise area	e-mail
1	Luxembourg	Marcel Deravet	IFSB	Vocational Training engineering	m.deravet@ifsb.lu
2	Luxembourg	Moreno Viola	CRTI-B	Professional association	moreno.viola@crtib.lu
3	Cyprus	Anthi Charalambous	Cyprus Employers and Industrialists Federation	Vocational Training engineering	acharalambous@oeb.org.cy
4	Finland	Irmeli Mikkonen	Motiva Services Oy	Vocational Training engineering	irmeli.mikkonen@motiva.fi
5	Ireland	Elisabeth O'Brien	Limerick Institute of Technology	Vocational Training engineering	elisabeth.obrien@lit.ie
6	Italy	Anna Moreno	Institute for BIM Italy	Vocational Training engineering	anna.moreno@enea.it
7	Norway	Eilif Hjelseth	Norwegian University of Science and Technology	Initial & Vocational Training engineering	eilif.hjelseth@ntnu.no
8	France	Guersendre Nagy	Mediaconstruct (BuildingSmart Chapter)	BIM, Vocational Training engineering	guersendre.nagy@mediaconstruct.fr
9	Belgium	Alain Zarli	ECTP	European platform	alain.zarli@cstb.fr
10	United Kingdom	David Comiskey	Chartered Institute of Architectural Technologists	Architecture, Vocational Training	da.comiskey@ulster.ac.uk
11	France	Gilles Charbonnel	Président d'ADN Construction	Professional Association	gilles.charbonnel@altais-ingenierie.fr
12	United Kingdom	Mervyn Richards	Avanti Partnership	BIM, Vocational Training engineering	mervyn.richards1@ntlworld.com
13	Greece	Nicoleta Panagiotidou	Break with an architect	Architecture, Vocational Training	info@breakwithanarchitect.com
14	NL	Arjan Schrauwen	ISSO	EU project BIMplement	a.schrauwen@isso.nl
15	Finland	Vishal Singh	Aalto University	Academic	vishal.singh@aalto.fi
16	United Kingdom	Alexi Marmot	University College London	Academic / IFMA Member	alexi@aleximarmot.com
17	Switzerland	Simon Ashworth	ZHAW Zürcher Hochschule für Angewandte Wissenschaften	IFMA Member	ashw@zhaw.ch
18	Belgium	François Snoeck	BESIX	IFMA Member	Snoeck,François <FSnoeck@besix.com>
19	France	Henri Le Marois	Alliance Ville Emploi	Coordinator EU project BIMplement	henri@lemarois.org

Joining remotely via webex

Confirmed

Appendix C. Minutes of BIMEET External Expert Advisory Board workshop, Brussels, 26th November 2019

BIMEET Workshop
External Expert Advisory Board
Minutes

November 26th 2019
Science 14, Brussels

Table of contents

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6. Teknologian tutkimuskeskus VTT Oy (VTT),
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Document summary

BIMEET aims to broaden the BIM training agenda to support the European union building energy efficiency policy. This requires broad awareness and expertise in BIM practice across different asset types and different roles in the industry. The innovation relies on a combination of BIM and energy efficiency. To achieve this aim, the project partners rely on an External Expert Advisory Board, comprising experienced people providing advice, reviewing results and potentially using it.
28 experts agreed to be part of this Advisory Board (see the list of experts in Annex 1).

The first workshop took place in Brussels on 6th February 2018.

A second workshop took place in Brussels on 26th November 2019 at which 8 experts participated physically.

This document summarizes the minutes of this second meeting.

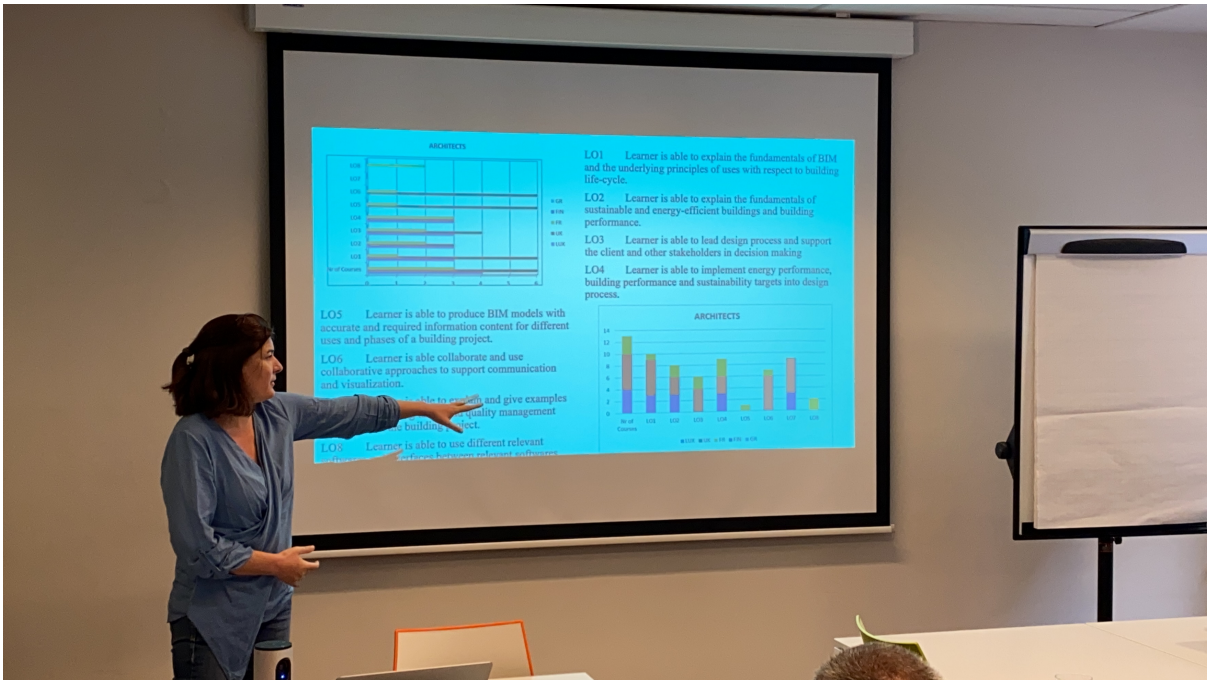
1. Project presentation, BIM/EE use cases and BIMEET outputs

Project presentation

The meeting started with a presentation of BIMEET project scope and objective and overview of agenda. Each of the experts then briefly introduced themselves.

To set the scene for the first brainstorming session there were a series of short presentations covering:

- The requirements for BIM and energy efficiency (EE) illustrated by the use cases that the project partners have collected to date,
- current status of BIM/EE training,
- definition of BIM/EE Learning Outcomes (LOs) by the BIMEET project, and,
- deployment and mapping of skills to national overlay.



Note: all the workshop presentations are provided on the workshop's cloud folder.

Brainstorm 1

The participants (experts and project partners) grouped into 3 small teams each with a BIMEET facilitator to address two issues:

a) Suggest ways in which the use cases repository could be boosted by new projects and the evidence of savings related to the integration of BIM and EE
b) Provide feedback on the project's BIM and EE LOs and give any insight from countries' national strategies.

Following the brainstorm session each facilitator reported back to the whole group.

(a) Augment BIM/EE use cases

Overall the groups provided a helpful steer towards sources of additional use cases which can be categorised in broad terms as:

- **EU and other funded research projects**
  - Guarantee ER (H2020 funded project). Example where EP contractor used BIM used on existing building to compile data for management by an ESCO
  - Noouabat project where industrial buildings change their architectural aspect

- **Flagship projects**
  - School refurbishment following Naples earthquake (which involved comprehensive data collection activities)
  - Finnish example where BIM was used on a wooden structure for LCA purposes
  - Kinetic Architecture project in China

- Ames research centre in Silicon Valley with a particular focus on the PV façade and the use of BIM at the early design stage with Archicad
- Projects using Modern Methods of Construction (Off-site) in the UK (Bryden Wood)

- **National initiatives, schemes and programmes**
  - New Zealand Acceleration Committee case studies
  - BREEAM case studies, particularly those using innovation credits
  - Case studies from Centre for Digital Built Britain (CDBB)
  - Canadian Green Building Council (GBC) case studies (specifically building permits)

  There may be other national repositories of relevant projects. The challenge will be compatibility of the information with the current BIMEET database structure at a detailed level, although at the headline level there will be similarities.

A manual to add new use cases is given in Annex 2.

(b) Feedback on LOs

The key areas of feedback were to focus on model limitations (model preparation, LO5), specifically:

- Providing tailored information for the key stakeholders and integrating feedback from them
- Should there be greater emphasis on collaboration (soft skills) LO6 to help promote dialogue between end users and designers, as well as dialogue between modeller, architect and engineer?
- Thermal bridge calculations – should they be specific LOs for this?
- Monitoring and management of buildings (e.g. data from sensors) need to be better integrated into models

The groups also suggested two new technical areas to consider extending the LOs to:

- Resilience and adaptation of buildings
- Off-site and pre-fabrication methods in new and existing buildings

2. BIMEET outputs and towards BIM/EE training

Project presentation

The workshop continued in the afternoon with further presentations of BIMEET outputs to again act as a springboard for a brainstorm. In relation to the BIMEET project these were:

- The BIMEET labelling approach
- energy-bim.com, the BIMEET portal
- BIMEET tangible application

This was followed by examples of current BIM&EE training:

- TS1: BIM/EE Basics training scheme
- TS2: BIMtoEPC training scheme
- TS3: BIMEE for blue collar workers

Brainstorm 2

Based on the presented material, the participants again grouped into 3 small teams each with a BIMEET facilitator to address two further issues:

a) Provide feedback on the BIMEET labelling approach, including: criteria, process, tools (database, energy-bim.com portal, tangible application), owner, willingness to pay, marketplace (EU vs. national level)
b) Feedback and advice on training schemes TS1, TS2, TS3, including: audience (disciplines, transversal vs. organization focused), method of delivery, content vs. country-specific needs, assessment of learners and of compliance to the label

(a) BIMEET labelling approach

Two headline issues were raised: certification and finance.

In respect of certification it was made clear that the BIMEET label was not intended to be certification of the training organisations delivering courses developed using the BIMEET LOs or certification of the courses themselves. It is also not intended to be certification of individuals taking the courses. The issue of compliance was also raised, i.e. being clear

whether taking labelled courses meant compliance with, for example, BIM or energy performance requirements. How did this link to the BIM model?

In this respect the experts stressed the need to manage customers' expectations but also the importance of exercising due diligence to ensure the label was not diluted. A 'light touch' labelling approach was agreed to help promote e-learning courses in particular. Establishing links to BuildingSmart was also suggested.

There was discussion around the need to develop a robust finance model where training organisations would pay to have their courses labelled and could see the value of it. Targeting those already experienced with certification of training courses could be an option.

(b) Feedback on current BIM&EE training

Feedback and ideas were structured around key construction stages/activities:

- Design:
  - Define when BIM technology is to be used and be clear on audience
  - Include an LO about interoperability
  - Target information requirements and end users' needs
- EPCs:
  - Define and provide information that cannot easily be found online
  - Provide detail on national status of EPCs and give learners choice as to what they learn
  - Training should be both transversal or organisational based
  - Can be delivered either online or in the classroom
  - Online assessment can be through a series of multiple-choice questions whereas classroom assessment can be more complex and challenging.
- Site workers:
  - Possibility for specialised courses but need for skilled/experienced technical trainers – potentially could require train the trainer
  - Will have to be both practical and visual
  - Training to be functional and linked to a clear impact
  - Linkage of EE dimensions to their activities
  - Trainer may need to go on site – 'Toolbox talks'
- Site managers
  - Basic 'What is BIM?' course
  - What is the relevance of BIM to my job?
  - How to use the right information
  - Linkage with supporting tools (phone and tablets)
  - Managing waste and resources (e.g. water and energy) on site
  - Use BIM to manage quality and risk on site

In addition, a number of generic points were made:

- As the training is currently in a niche area it was suggested that delivery in the classroom in the first instance was a better option
- Linkage with professional institutes and/or universities was proposed to help validate courses
- Integration with delivery of Passivhaus training

3. Conclusion

The whole BIMEET thanks the experts for their time and fruitful suggestions. This document summarizes the findings, and will lead to improvements in our outputs.

Further communications will be addressed to the experts directly, and/or via the energy-bim.com platform.

Annex 1: List of BIMEET EEAB experts

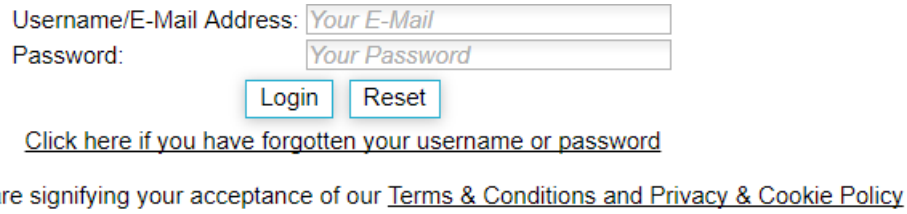
Country	Name of expert	Organisation
Italy	Anna Moreno	Institute for BIM Italy
Belgium	François Snoeck	BESIX
Greece	Nicoleta Panagiotidou	Break with an architect
Finland	Maaria Laukannen	Eksergia
New Zealand	Robert Amor	University of Auckland
Luxembourg	Guillaume Karman	IFSB
Belgium	Cléo Wiseman	BESIX
Canada	Jean Carriere	Trailloop

Annex 2: energy-bim.com platform adding a new use case

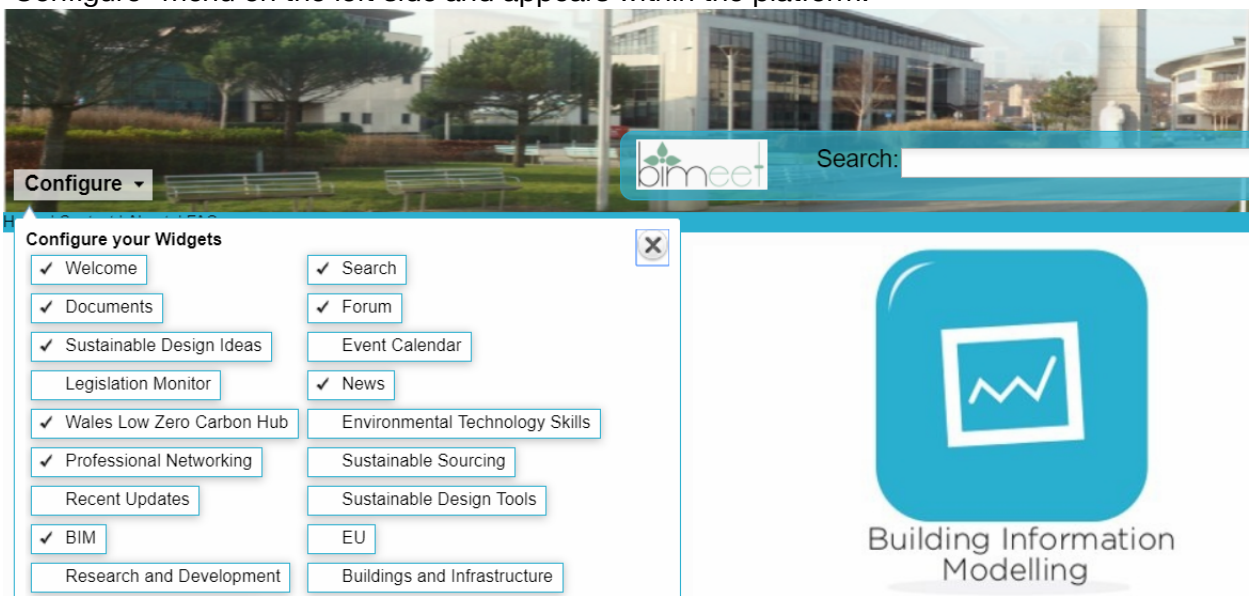
This document explains how to input a new use-case study within the BIMEET platform.

Step 1: Please type the url: www.energy-bim.com to access the BIMEET platform aggregator.

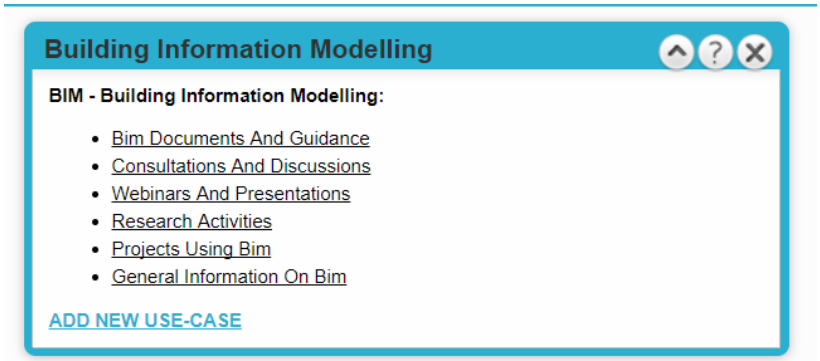
Step 2: After creating the account please click "**Login**" in order to login with corresponding credentials



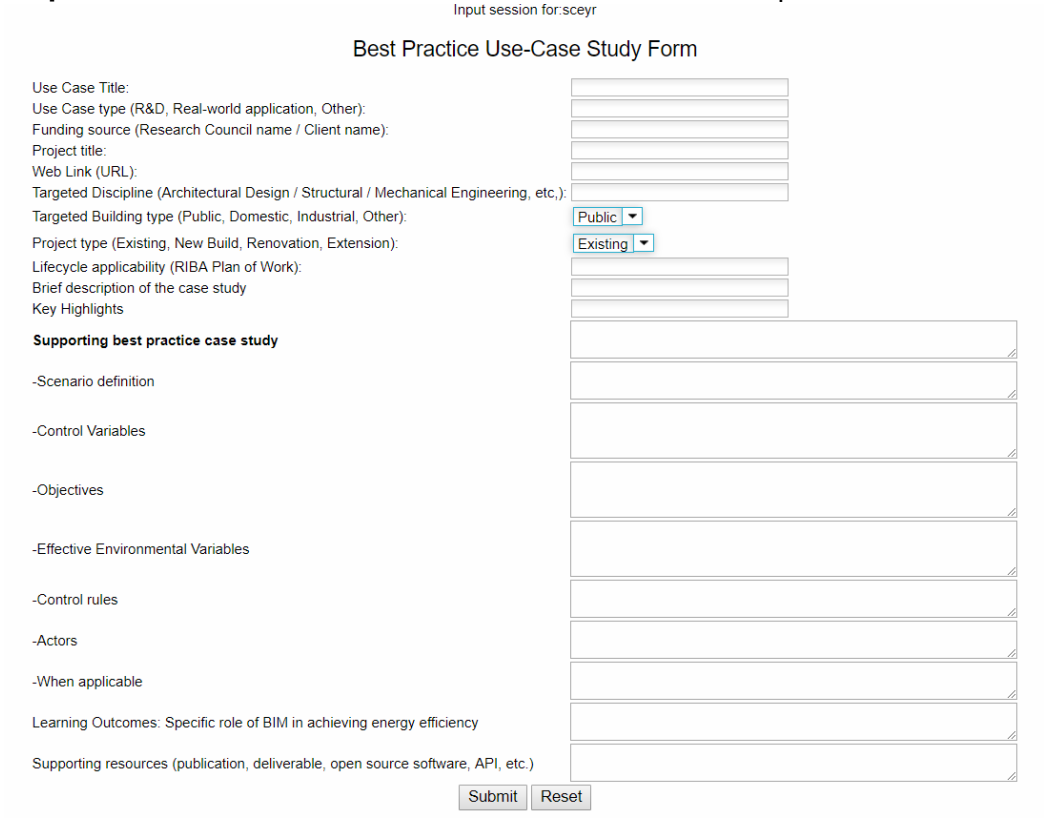
Step 3: After login, please make sure the BIM widget has been activated form the "Configure" menu on the left side and appears within the platform.



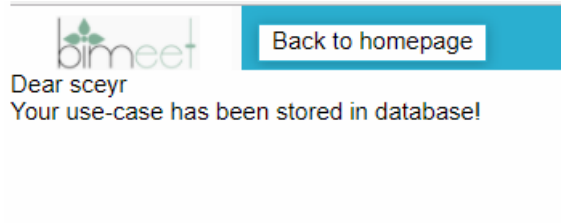
Step 4: Please expand the BIM widget and click on "ADD NEW USE-CASE" link. A form will be displayed for recording your selected use-case.



Step 5: Please fill all the fields in the "Best practices use-case form".



Step 6: Once provided all the fields please click submit and a confirmation page will appear. Then click on "Back to homepage" to continue with the platform.



Appendix D. Agenda of BIM workshop, Chambery 20th February 2020