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

D6.7 – BIMEET Workshops

WP 6  Leader: VTT
Task 6.7  Leader: VTT
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Partners involved  VTT, LIST

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Table of Content

Table of Content ........................................................................................................................................... 2
Executive Summary ...................................................................................................................................... 4
1 Workshops as dissemination & communication activities ........................................................................ 6
2 Introduction of BIMEET workshops ........................................................................................................ 7
   2.1 Workshop on BIM and EE adaptation ................................................................................................. 7
      2.1.1 Goal of workshop ............................................................................................................................ 7
      2.1.2 Outcome .......................................................................................................................................... 7
      2.1.3 Brainstorming as working method ................................................................................................. 8
    2.2 Workshops1 with External Experts Advisory Board ......................................................................... 9
       2.2.1 Organization of the first seminar with the BIMEET EEAB .......................................................... 10
       2.2.2 Outcome ...................................................................................................................................... 12
    2.3 EASME workshop - Contractors workshop ...................................................................................... 12
    2.4 BIM Skills for energy knowledge management ............................................................................... 13
    2.5 Workshop 2 with External Experts Advisory Board ........................................................................ 16
       2.5.1 Outcome ...................................................................................................................................... 18
    2.6 BIMEET info material used in workshops ....................................................................................... 18
       2.6.1 BIMEET Leaflet and Roll up ......................................................................................................... 18
    2.7 Plan for further workshop .................................................................................................................. 21
List of figures

Figure 1: Geographical coverage of the BIMEET EEAB, External Expert Advisory Board .......................... 6
Figure 2: First BIMEET training delivered in Luxembourg with brainstorming workshop .............................................. 7
Figure 3: Brainstorming on BIMEET eLearning modules during partner meeting in Finland October 2019 ................................................................. 8
Figure 4: Examples of quick collaborative idea drafting in ConstrumatBNC conference in May 2018 (at left) and during BIMEET partners’ meeting in Finland October 2019 (at right) ........................................... 8
Figure 5: Agenda of first Expert panel meeting ............................................................................................................. 10
Figure 6: The First Expert panel meeting in Brussels ................................................................................................. 11
Figure 7: Four project joined development and dissemination forces for building up BIM EE skills .............................. 12
Figure 8: Pictures from project collaboration workshop ............................................................................................. 13
Figure 9: Info sheet of the workshops on BIM Skills for energy knowledge management ................................. 14
Figure 10: Workshop provided a general picture about Skills, Knowledge and Competences (S-K-C) by roles and developed Learning Outcomes (LOs). ................................................................. 15
Figure 11: Presentations of the key BIMEET outcomes to expert panel members ........................................... 16
Figure 12: Agenda of second Expert panel meeting ........................................................................................................ 17
Figure 13: Group work during the second Expert Panel meeting ................................................................................ 18
Figure 14: BIMEET leaflet for general information .................................................................................................. 19
Figure 15: BIMEET roll-up ........................................................................................................................................... 20
Figure 16: Draft of invitation for BIM EE software developers .................................................................................. 21

List of tables

Table 1: Workshop topics and participants ................................................................................................................. 7
Table 2: List of the EEAB members (as of August, 2018) and additional members 2019 (marked in yellow) .................. 9
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>Consortium Agreement</td>
</tr>
<tr>
<td>DoA</td>
<td>Description of the Action</td>
</tr>
<tr>
<td>GA</td>
<td>Grant Agreement</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technologies</td>
</tr>
<tr>
<td>PC</td>
<td>Project Coordinator</td>
</tr>
<tr>
<td>PSC</td>
<td>Project Steering Committee</td>
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<td>QA</td>
<td>Quality Assurance</td>
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<td>WP</td>
<td>Work Package</td>
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<td>WPL</td>
<td>Work Package Leader</td>
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<tr>
<td>BIM</td>
<td>Building Information Modelling</td>
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<tr>
<td>EE</td>
<td>Energy Efficiency</td>
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<tr>
<td>EQF</td>
<td>European Qualification Framework</td>
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<tr>
<td>ToC</td>
<td>Table of Content</td>
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<tr>
<td>Mx</td>
<td>Milestone date designating the start of a given task</td>
</tr>
<tr>
<td>My</td>
<td>Milestone date designating the end of a given document delivery deadline</td>
</tr>
<tr>
<td>BEM</td>
<td>Building Energy Model</td>
</tr>
<tr>
<td>BIM</td>
<td>Building Information Modelling</td>
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<td>CA</td>
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<td>Description of the Action</td>
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<tr>
<td>EE</td>
<td>Energy Efficiency</td>
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<tr>
<td>EPBD</td>
<td>Energy Performance Buildings Directive</td>
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<tr>
<td>EPC</td>
<td>Energy Performance Certificate</td>
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<td>EQF</td>
<td>European Qualification Framework</td>
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<td>GA</td>
<td>Grant Agreement</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technologies</td>
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<tr>
<td>KSC</td>
<td>Knowledge – Skills – Competencies</td>
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1 Executive Summary

As part of Dissemination and Communication activities the BIMEET project partners have been participated or run five workshops. They have been provided valuable insight, common understanding and feedback for project results.

This report introduces the workshops discussing the national approaches on the themes of (1) adapting and implementing BIM enables energy performance analyses and (2) BIM learning outcome framework.

The main BIMEET workshops have been the Expert Panel workshops. Face- to face- BIMEET Expert Panel was organised two times. At the start the experts helped the partners with work connector to WP2: to identify new use cases and to improve the structure of the database to increase its usefulness. Further it gave as well as advice on the content and key stakeholders who could make use the learning outcome framework for BIM and energy efficiency training.

Towards the end of the project the Expert Panel 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.
2 Workshops as dissemination & communication activities

Dissemination activities focus on providing information about the project to various target groups. Organising and participating workshops has been one way for BIMEET project partner to disseminate project outcomes and collecting feedback during development processes. The main forum has been planned in DoW, BIMEET EEAB, External Expert Advisory Board, which has met twice. The both workshops were held in Brussels, the first WS in.. and the second WS in November 2019.

The other workshops are:
- Workshop on BIM and EE adaptation in Luxembourg, held in October 2018
- EASME workshop - Contractors workshop in Brussels, held in June 2018
- BIM Skills for energy knowledge management, held in Helsinki in connection of Sustainable Building 19 Conference in May 2019

Figure 1: Geographical coverage of the BIMEET EEAB, External Expert Advisory Board
3 Introduction of BIMEET workshops

3.1 Workshop on BIM and EE adaptation

3.1.1 Goal of workshop

The goal of this workshop was to provide an understanding of maturity of BIM enabled EE tools for energy analyses and simulation processes as part of design practices in Luxembourg. A training day was organised for professionals (Table 1). After the lectures, the researchers from LIST and INES could outline the potential of BIM EE process adaption and implementation of tools by asking the opinions from the audience.

Table 1: Workshop topics and participants

| Luxembourg | The use of Building Information Modelling (BIM) for energy efficiency in building | - Energy context in France  
- Introduction to BIM fundamentals  
- French and Luxembourg thermal regulation  
- How BIM can optimise the energy efficiency at different stages of a construction project  
- Presentation of BIM to BEM workflows and new responsibilities in the domain.  
- Elaborate a BIM model in Revit, export it to gbXML, import it to Pléiades and do some thermal simulations. | Architects, thermal engineers, BIM coordinator, BIM manager, researchers |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12/10/2018</td>
<td>One day</td>
<td>14 participants</td>
</tr>
</tbody>
</table>

Figure 2: First BIMEET training delivered in Luxembourg with brainstorming workshop

3.1.2 Outcome

In addition to training day a workshop was held on the future of BIM based energy efficiency. The respondent provided interesting ideas and workflows to use BIM for EE in Luxembourg. It appears BIM is not enough developed to be efficiently used in relationship with Energy Efficiency (simulation, energy performance certificates) now.
3.1.3 Brainstorming as working method

Small brainstorming sessions and idea sharing have been part of dialogue in other events and seminars, and during BIMEET partner meetings. Examples provided in Figure 3 and Figure 4.

Figure 3: Brainstorming on BIMEET eLearning modules during partner meeting in Finland October 2019.

Figure 4: Examples of quick collaborative idea drafting in ConstrumatBNC conference in May 2018 (at left) and during BIMEET partners’ meeting in Finland October 2019 (at right).
3.2 Workshops1 with External Experts Advisory Board

BIMEET has established its External Experts Advisory Board. The panel includes stakeholders from different EU countries. The experts are supposed to participate in two BIMEET meetings. Experts take part in the orientation of the activities, by providing advice and suggestions. The expert panel is as follows:

Table 2: List of the EEAB members (as of August, 2018) and additional members 2019 (marked in yellow).

<table>
<thead>
<tr>
<th>Country</th>
<th>Name of expert</th>
<th>Organisation</th>
<th>Principal expertise area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>Anna Moreno</td>
<td>Institute for BIM Italy</td>
<td>Vocational Training engineering</td>
</tr>
<tr>
<td>Belgium</td>
<td>Alain Zarli</td>
<td>ECTP</td>
<td>European platform</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Alexi Marmot</td>
<td>University College London</td>
<td>Academic / IFMA Member</td>
</tr>
<tr>
<td>Cyprus</td>
<td>Anthi Charalambous</td>
<td>Cyprus Employers and Industrialists Federation</td>
<td>Vocational Training engineering</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Arjan Schrauwen</td>
<td>ISSO</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>David Comiskey</td>
<td>Chartered Institute of Architectural Technologists</td>
<td>Architecture, Vocational Training engineering</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>David Determe</td>
<td>OAI</td>
<td>Professional association</td>
</tr>
<tr>
<td>Norway</td>
<td>Eilif Hjelseth</td>
<td>Norwegian University of Science and Technology (NTNU)</td>
<td>Vocational Training engineering</td>
</tr>
<tr>
<td>Ireland</td>
<td>Elisabeth O’Brien</td>
<td>Limerick Institute of Technology</td>
<td>Vocational Training engineering</td>
</tr>
<tr>
<td>Belgium</td>
<td>François Snoeck</td>
<td>BESIX</td>
<td>IFMA Member</td>
</tr>
<tr>
<td>France</td>
<td>Gilles Charbonnel</td>
<td>Président d’ADN Construction</td>
<td>Professional Association</td>
</tr>
<tr>
<td>France</td>
<td>Guersendre Nagy</td>
<td>Mediaconstruct (BuildingSmart Chapter)</td>
<td>BIM, Vocational Training engineering</td>
</tr>
<tr>
<td>France</td>
<td>Henri Le Marois</td>
<td>Alliance Ville Emploi</td>
<td>Coordinator EU project BIMplement</td>
</tr>
<tr>
<td>Finland</td>
<td>Irmeli Mikkonen</td>
<td>Motiva Services Oy</td>
<td>Vocational Training engineering</td>
</tr>
<tr>
<td>Finland</td>
<td>Maaria Laukkanen</td>
<td>Eksergia</td>
<td>Learning material and Training developer</td>
</tr>
<tr>
<td>Finland</td>
<td>Vishal Singh</td>
<td>Aalto University</td>
<td>Academic</td>
</tr>
</tbody>
</table>
3.2.1 Organization of the first seminar with the BIMEET EEAB

Experts were invited to the first workshop in Brussels in February 2018.

![Figure 5: Agenda of first Expert panel meeting](image-url)
There were 19 Expert Panel 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**
  
  *Panel 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**
  
  *Panel 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.*

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**Figure 6:** The First Expert panel meeting in Brussels
3.2.2 Outcome

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

3.3 EASME workshop - Contractors workshop

Collaboration between research projects BIMEET, BIMcert, BIMplement and NetUIEP started during an intensive one-day workshop in June 2018 organised and facilitated by EASME. Topic of the workshop was “Building Information Modelling skills and qualifications development” and issues were tackled from many viewpoints. Partial solutions, approaches and development steps were drafted in four project teams and presented. The 4 projects have continued collaboration under a common statements and plan for BIMalliance group (Figure 8).

Figure 7: Four project joined development and dissemination forces for building up BIM EE skills
3.4 BIM Skills for energy knowledge management

2.3.1 Target

The main target of the workshop, in connection of Sustainable Building 19 Finland Conference, was to collect feedback on BIMEET S-K-C and LO tables. Required knowledge, skills and competences for the different roles in design, building and maintenance processes - with relevant learning outcomes - is an outcome of on-going BIMEET project, BIM-based EU-wide standardized qualification framework for achieving energy efficiency training.

Six main categories of roles was studied (Client & Clients advisors, Architectural design roles, Structural design roles, Building services design roles, Construction work roles, Maintenance work roles) in order to define the European wide learning outcomes related to BIM and energy-efficient for building life cycle processes.
The workshop “BIM skills for energy knowledge management” uses the results of BIMEET project (EU Horizon 2020 project grant agreement No 753994), which emphasizes Energy-efficiency management of buildings with the help of improved BIM skills.

The workshop was organised as three group discussion around BIMEET S-K-C table and LO tables (Figure 10). The groups discussed following themes:
- Key learning outcomes for training and education of BIM enabled energy management for each stakeholders (six categories based on main roles)
- Common substances for competence building
- Online Energy BIM portal https://www.energy-bim.com/

2.3.2 Questions and Feedback from the group works

Q1 First impressions on BIMEET Learning outcome tables
- The participants were positive, some of drilled, the about the learning outcomes and praised the big effort done in BIMEET. The work was said to be a much needed work from the perspective of companies. Back in the days, anyone who had experience of BIM was taken in, today companies need skilled workforce.

Q2 Do you find the LOs clear and understandable? Is something missing?
- All: YES. Good and generic. Nothing was noticed missing at this short period. (No time to have a closer look at Maintenance work roles. Only Construction work roles were somewhat examined.)
- The Knowledge, Skills and Competences tables was seen as direct “job descriptions” for them. “Very good job”. Wants to use right away.
- not sure if the roles picked to the LO-matrix was most optimal (site manager and construction site worker and installer). Also upper management is very important. Project manager (construction site manager ) is very critical due to its position (a glue) between back office and construction site. Also Site Engineer was mentioned as critical person in BIM implementation, as they makes all the schedules etc.
- Workers were not seen as a critical group for the LO’s because resources are limited, education is an investment. Workers need to know the specs.

Q3: Would it help if workers did understand the impact of the quality of work to the energy efficiency and sustainability?
- For example if workers knew the importance of air-tightness and careful installation of insulation materials compared to rushed outcome. yes was given as answer , especially in the generic level.
- It would be good they workers have the big picture. For example how fitting a window or air-tightness effect the whole.

Q4: How BIM is used at building site? What is usually the background of workers
- construction workers are currently using their phones for browsing BIM model. The model acts like a training tool. It educates worker how buildings are build. Worker takes a picture of the job task done and can compare if it is done according to the BIM model or not. Head of the working team usually carry tablet, not everyone need to have it.
- Vocational education, but also certification by working (apprenticeship) is happening.

Q5 Challenges
- A lot of discussion about the difficulty to find right roles and their Learning Outcomes.
- Competence requirements by role varies by company to company and especially between countries, according to all group participants.
- Would it help if sub-roles were put aside, and there was only the umbrella role: Construction work roles. Then different parties could pick the LOs relevant in their case or institution or culture. Idea of using tables that way was taken very well.

Q6: Do you think LOs can support planning of training and education? Do you think LOs can support continuous education in companies and learning by doing in building projects?
- All: YES. teh whole LO tables system should implement by FISE, as modules for example.
- LOs should be made more concrete, for instance adding examples from in real-life BIM and BIM EE modelling and analysing process, and examples of models and information content

Figure 10: Workshop provided a general picture about Skills, Knowledge and Competences (S-K-C) by roles and developed Learning Outcomes (LOs).
3.5 Workshop 2 with External Experts Advisory Board

The second Expert panel workshop was held in November 2019, when most of the project outcomes were ready. Presentations were given by all partners of BIMEET. One of the target of the workshop was to get feedback on BIM EE eLearning schemes under development.

There were 8 Expert Panel members attending the second Expert panel organised in November 2019. As noted above, the purpose of this workshop was to validate the outputs with BIMEET, and to advise on the partners’ proposals for the future direction of the project, with a focus on the BIMEET LOs, Knowledge services, BIM & EE trainings developed and ideas for a BIMEET label.

The meeting attendees (Expert Panel 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

Figure 12: Agenda of second Expert panel meeting
3.5.1 Outcome

Examples of new use cases suggested by the Experts 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 Panel’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. Panel 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 Panel 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.

3.6 BIMEET info material used in workshops

3.6.1 BIMEET Leaflet and Roll up

Main material used for distributing general information on BIMEET project have been the leaflet and BIMEET roll up

![Figure 13: Group work during the second Expert Panel meeting.](image-url)
BIMEET promotes Building Information Modelling (BIM) training to enhance energy efficiency of buildings. BIM is paving the way to more effective multi-disciplinary collaborations through the entire lifecycle and through the overall supply chain. As defined by buildingSMART alliance Building Information Modeling (BIM) is a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life cycle, defined as existing from earliest conception to demolition.

On 13-14 September 2017, the official launch of the BIMEET “BIM-based EU-wide Standardized Qualification Framework for achieving Energy Efficiency Training” project was held at the UST. The project focuses on creation and implementation qualification and training schemes for building professionals and blue collar workers. Running for two years, this initiative brings together partners from the UK, France, Finland, Greece and Luxembourg, and numerous European experts.

BIMEET aims to broaden the BIM training agenda to support the European Union building energy efficiency agenda. This requires broad awareness and expertise in BIM practice across different asset types and across different roles in the industry.

The BIMEET consortium is drawing on 1) the engagement of internationally leading industry best practice, as well as vocational training, delivered by CPD through an established training value chain, 2) the educational excellence of leading institutions in Europe, 3) the robust experience of accrediting bodies in the construction domain, and the breadth of required industry-led research excellence.

BIMEET holds the critical key to revolutionize the construction industry, which is forecasted to reach over $1.1 trillion global yearly spending by 2020. BIM is helping the sustainability agenda as the digitalisation of product and process information provides a unique opportunity.

The Luxembourg Institute of Science and Technology (LIST) is coordinating BIMEET, new European project bringing together 8 partners around BIM technology as a key digital support for the energy efficiency of the built environment. The partners are UST, Cardiff University, CSTB, BRE, La plateforme Formation & Évaluation de PINES, VTT, House of Training, Metropolia University of Applied Sciences and CRES.

The BIMEET consortium argues that this approach of engaging providers in the development and delivery of the material and standards will not only accelerate competency and adoption, but also align the level and calibration of existing workforce and future industry professionals, thus providing a structure for lifelong development learning around BIM for energy efficiency.

Website of the project: www.vtt.fi/sites/bimet

Figure 14: BIMEET leaflet for general information (version 1)
Expected results

1. Requirements and use cases for achieving EE through BIM
2. A skills matrix related to BIM and energy efficiency
3. Benchmarks of existing training and schemes for developing new modules
4. A training platform continuing to widely disseminate the BIMEET results

Check out the BIMEET platform

The BIMEET platform is a web-based platform that provides integrated access to BIM and EE resources:
- Use cases demonstrating the use of BIM for achieving energy efficiency
- Training modules
- E-resorts etc.

BIMEET in figures

Website: www.bimeet.eu
Duration: 24 months (2017-2019)
EU Grant: EUR 1 MILLION
Program: Secure, Clean and Efficient Energy
Call: Energy Efficiency / Construction Skills

Figure 15: BIMEET roll-up.
3.7 Plan for further workshops

The workshops in near future are going to be virtual workshops. The workshops could be organised for members of BIMEET platform, for the existing registers users and new users to come. This could activate the Community of Knowledge. Another plan is to invite BIM EE software vendors, with their trainings about the applications, to join the platform and share training offerings. Draft for invitation in Figure 16.

![Draft of invitation for BIM EE software developers.](image)

Figure 16: Draft of invitation for BIM EE software developers.