

DELIVERABLE: D27 - D4.7

Survey and or interview among all different Targets

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Network for Using BIM to Increase the Energy Performance

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A. Deliverable Details					
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B. Short description

This report presents the results of a survey and/or interview conducted among all different target groups to validate the list of competences needed to work with BIM on NZEB (Nearly Zero Energy Building).

The report contains 4 different questionnaires tailored specifically for each of the 4 target groups (**stakeholders**) of the Net-UBIEP project. **Decision makers** of different stakeholders were asked to complete respective questionnaires **before the training courses begun**. The purpose of the questionnaires tailored for specific stakeholders was to determine the level of knowledge and experience regarding BIM, identify current practices of BIM in the projects related to energy efficiency and asses their views on the training needs and importance of training.

On the other hand, questionnaires tailored for **training participants** were prepared in order to validate defined competence lists for all the different targets groups as well as trainee satisfaction with course and instructor (trainer) effectiveness. **Training participants**, professionals and workers belonging to the different target groups were asked to judge on their competences **before the training as well as after the training**. The purpose of the "Pre training questionnaire" was to assess initial level of knowledge, experience and current practices regarding BIM. "Post training questionnaire" contains the same or similar questions as a "Pre training questionnaire" which serve to determine in simple ways the progress training participants have made during the courses and efficiency of the courses. Questions about the completeness or redundancy of the foreseen schemes and training courses were also included in the "Post training questionnaire".

Finally, this report contains the results of the survey among all stakeholders involved in the validation process and feedback analysis.

The report does not contain sensitive information and the collected data is being treated confidentially following the rules of General Data Protection Regulation 2016/679.



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C. Results of the survey among all <u>training participants</u> involved in the validation process and feedback analysis

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C.1 Short description

This chapter will present results of the survey among all training participants and will analyse their feedback about the courses organised within the project Net-UBIEP.

Validation of BIM Qualification Models and training materials was implemented in each partner country by the partners with more experience in training activities such as Universities and Training Centres. Mainly one partner per country organised and performed training, and these were as follows: ENEA (IT), FLC (ES), TUT (EE), FCE (HR), Dig.Con. (LT), ISSO (NL), ViaEU (SK).

Classroom Courses for Professionals, Public administration, Tenants, Owners and Building administrators were conducted in national languages Croatian, Dutch, Estonian, Italian, Latvian, Slovak, Spanish. Validation of training material and assessment for the target groups mentioned above on how to use BIM for the energy performance was conducted during these classroom courses using questionnaires.

The results presented in this chapter were gathered using the questionnaires tailored for training participants and shown in chapter "G. Pre training questionnaire" and chapter "H. Post training questionnaire" of this deliverable.

Questionnaire tailored for **training participants** were prepared with the goal of validation of defined competence lists as well as trainee satisfaction with course and instructor (trainer) effectiveness. **Training participants** were asked to judge on their competences **before the training as well as after the training**.

Good quality practices of education are based on three pillars:

- clear definitions of learning outcomes,
- design and structure of the programme course,
- evaluation and monitoring of the learning outcomes

Two types of questionnaires were used to cover these three pillars of good education and to simultaneously perform a self-assessment of competences gained by the participants during the course. The purpose of the "<u>Pre training questionnaire</u>" was to assess initial level of knowledge, experience and current practices regarding BIM. "<u>Post training questionnaire</u>" contains the same or similar questions as a "Pre training questionnaire" which serve to determine in simple ways the progress training participants have made during the courses and efficiency of the courses. Questions about the completeness or redundancy of the foreseen schemes and training courses were also included in the "Post training questionnaires".

The main goal of the survey results is to provide information for future activities, based on the experience during the Net-UBIEP project. Therefore, this survey will set guidelines for the project deliverable *D4.8 Review of the three dimensional matrix*, as well as the overall evaluation of the courses conducted within the Net-UBIEP project.

The report does not contain sensitive information and the collected data is being treated confidentially following the rules of General Data Protection Regulation 2016/679.





C.2 Learning outcomes and training programme

Both learning outcomes and training programme were explored and defined in details in previous project activities. All the partners followed the learning outcomes defined in deliverables *D14* - *D3.1* Threedimensional Matrix and *D15* - *D3.2* Requirement for learning outcomes as well as the training materials developed as deliverables *D16* - *D3.3* Multimedia Handbook for Public Administration on BIM; D17 - D3.4 Multimedia Handbook for Owners, Tenants and Building Administrators; *D18* - *D3.5* Contents for Professionals (Engineers and Architects) on BIM competences and D19 - D3.6 Guideline for Professionals on BIM competences.

Therefore, in this chapter a summary of the main information is presented, as detailed information can be found in the respective Deliverables.

The classroom courses followed somewhat different structure in every partner country but as mentioned before have always included all the learning outcomes and training content defined in respective deliverables. Additionally, each respective partner developed their own training aids (i.e. power point presentations,) which then followed their course structure.

Partners used different systems for validation of training courses, but all using the questionnaires developed for this purpose in *D27-D4.7 Survey and or interview among all different Targets*. Some countries used GoogleForms, other partners used free web based voting solution (VoxVote) for interactive presentations and real time feedback from the course participants, BIMSync (CDE) platform was also used to evaluate training, while the fourth option was to use hardcopy questionnaires. The participants filled questionnaires anonymously during classroom courses in order to get their honest opinion and validation.

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Table 1 Overview of the number of training participants

		No. of participants	Total per country
	1 st classroom course for professionals	21	
	2 nd classroom course for professionals	34	
Croatia	3 rd classroom course for professionals	37	148
	1 st classroom course for PA Owner Tenant BA	42	
	2 nd classroom course for PA Owner Tenant BA	14	
	1 st classroom course for professionals	50	
	2 nd classroom course for professionals	-	
Estonia	3 rd classroom course for professionals	-	219
	1 st classroom course for PA Owner Tenant BA	95	
	2 nd classroom course for PA Owner Tenant BA	74	
	1 st classroom course for professionals	41	
	2 nd classroom course for professionals	19	
Italy	3 rd classroom course for professionals	42	247
	1 st classroom course for PA Owner Tenant BA	107	
	2 nd classroom course for PA Owner Tenant BA	38	
	1 st classroom course for professionals	24	
	2 nd classroom course for professionals	19	
Lithuania	3 rd classroom course for professionals	17	132
	1 st classroom course for PA Owner Tenant BA	34	
	2 nd classroom course for PA Owner Tenant BA	38	
	1 st classroom course for professionals	15	
	2 nd classroom course for professionals	13	
Slovakia	3 rd classroom course for professionals	12	89
	1 st classroom course for PA Owner Tenant BA	36	
	2 nd classroom course for PA Owner Tenant BA	13	
	1 st classroom course for professionals	54	
	2 nd classroom course for professionals	-	
Spain	3 rd classroom course for professionals	-	101
	1 st classroom course for PA Owner Tenant BA	23	
	2 nd classroom course for PA Owner Tenant BA	24	
	1 st classroom course for professionals	9	
	2 nd classroom course for professionals	7	
The Netherlands	3 rd classroom course for professionals	14	57
	1 st classroom course for PA Owner Tenant BA	17	
	2 nd classroom course for PA Owner Tenant BA	10	
		IN TOTAL	993

It has to be said that not all training participants were willing to participate the validation surveys and also that for different reasons not all training participants answered all the questions from the questionnaires.





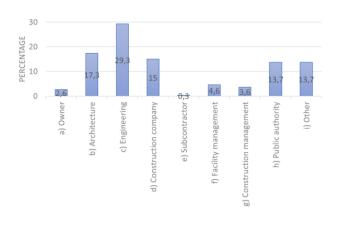
All in all, total number of training participants who answered both Pre training questionnaire and Post training questionnaire is sufficient to draw reliable conclusions about the developed training materials and training courses within the Net-UBIEP project.

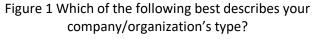
	No. of participants surveyed			
Partners' country	Pre training questionnaire	Post training questionnaire		
Croatia	93	64		
Estonia	44	75		
Italy	50	21		
Lithuania	57	45		
Slovakia	47	46		
Spain	0	11		
The Netherlands	16	7		
IN TOTAL	307	269		

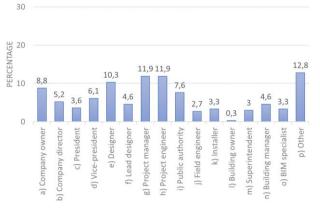
Table 2 Overview of the number of training participants surveyed

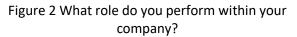
C.3 An overview of the training participants surveyed

From the surveyed trainees, the largest share were architects, engineers and people from construction companies (Figure 1), while their role in their respective companies was quite spread and covered roles like project managers, project engineers, designers, company owners etc., which means higher level personal (Figure 2). This indicates that the companies and institutions found Net-UBIEP courses on BIM to be an opportunity for decision makers and leading personal to get a valuable BIM training or insight on BIM.









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If one looks at the experience of training participants, 35 % had less than 5 years of working experience, 20 % had 5 – 10 years of experience, 28% had 10 – 20 years of experience, while 17 % had more than 20 years of work experience (Figure 3). This data shows that BIM interests primarily younger population (up to approx. 35 years old) but also significant number of more experienced people are interested in BIM training. Vast majority of trainees' companies/organizations are focused on residential and commercial buildings (Figure 4).

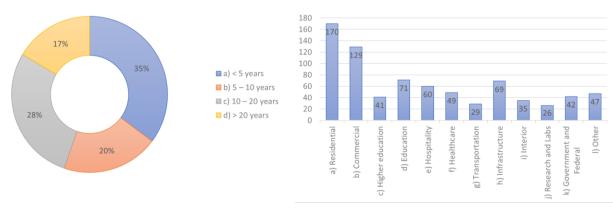


Figure 3 How many years have you been working as a professional in your discipline?

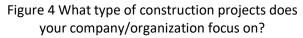
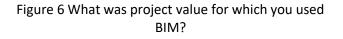


Figure 5 and Figure 6 show that majority of trainees use BIM in their typical projects, no matter if they typically work on smaller projects (less than 50,000 EUR) or large projects (more than 10,000,000 EUR). This results are contrary to the usual belief that BIM is used primarily for large projects and shows that BIM implementation is slowly succeeding and due to its benefits is being used for all project sizes.



Figure 5 What is the typical project value range your company/ organization is involved in?



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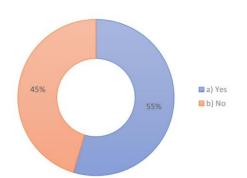
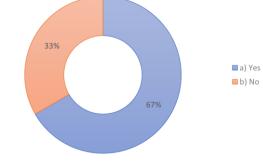


Figure 7 Do You or Your company/organization currently use BIM, or is it intending to use BIM in the near future? If one looks at the BIM experience of classroom course participants, 45 % of them have declared that they or their company/organization currently doesn't use BIM (Figure 7) while a slight majority currently uses BIM. This means that validation of training materials developed through the Net-UBIEP project was performed by approximately equal number of BIM users and BIM novices. Consequently, a good overview about the complexity and usefulness of the training materials could be acquired. Looking at the trainees who never used BIM before the course, as much as 33 % said they are not aware of the BIM approach, while 67 % are aware of the BIM approach (Figure 8). And finally, even though they participated BIM courses, 11 % of training participants feel it's not likely at all that they will be using BIM in future (Figure 9).

7%

17%



 30%

 a) Very likely

 a) Very likely

 b) Extremely likely

 a) Extremely likely

Figure 8 * If you have not had experience with BIM, are you aware of the BIM approach?

Figure 9 * If your company/organization does not currently use BIM, how likely your company/organization will use BIM in future?

Out of training participants who have3 BIM experience they use BIM relatively equally for creating BIM models and using BIM tools for analysis without any model creation as well as for both BIM model creation and analysis of BIM models created by others (Figure 10). A significant number of training participants (42 %) have had less than 1 year of BIM experience at the moment of training, 17 % had 2-3 years of experience and 24 % had 4-5 years of experience while only 17% had more than 6 years of BIM experience (Figure 11). Figure 12 shows an astonishing fact that among those who use BIM, as much as 47 % used it in less than 10 % of their projects within last 5 years, while only 26 % of training participants used BIM in more than 50 % of their projects in the last 5 years. These numbers lead to the conclusion that many companies are still inexperienced in using BIM, don't exploit all of its advantages and could be in a stage where they realized that BIM training is essential and needed for better implementation of BIM.

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a) Not likely at all
 b) Somewhat likely

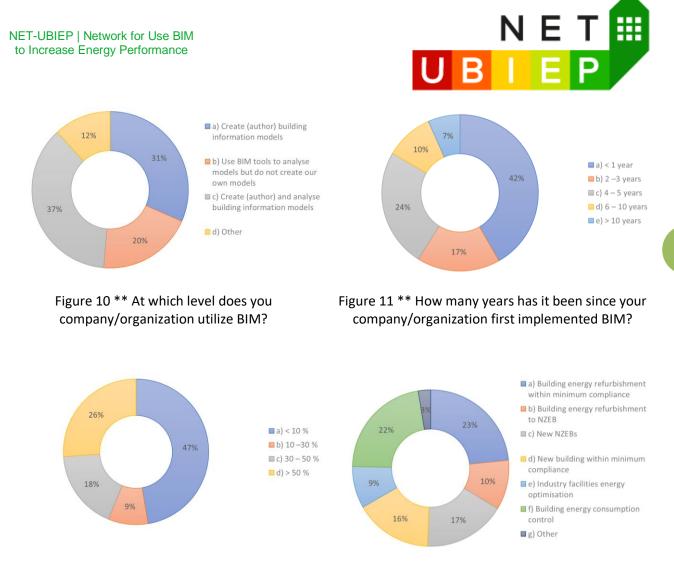
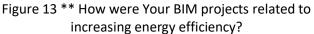


Figure 12 ** What percentage of the projects that your company/organization executed has utilized BIM within the past 5 years?



Training participants also used BIM in relation with increasing energy efficiency in buildings where in most cases BIM was used for building energy refurbishment within minimum compliance (23 %) and building energy consumption control (22 %). This result is reasonable since energy audits and energy renovation of buildings are quite common tasks of engineers to date, while it is expected that using BIM as an optimization tool for new NZEBs will increase in the following years.

C.4 Validation results

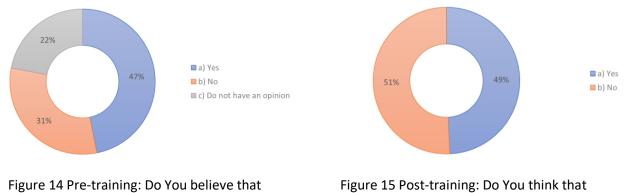
Figure 14 and Figure 15 show the difference in trainees view on their belief about the implementation costs associated with BIM. It is evident that before the Net-UBIEP classroom courses only 31 % of training participants think that it is worth investing in BIM and that investment pays off while 22 % did not have an

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opinion before the course. The same question asked to the training participants after the Net-UBIEP classroom courses throughout Europe shows that now in total 51% of training participants believe that BIM investment is worth. The rise of 20 % in favor of BIM can thus definitely be associated with Net-UBIEP classroom courses and insight that training participants gained on BIM. If this result is compared with the number of trainees which currently use BIM (Figure 7) it can be concluded that 22 % who don't have an opinion are not BIM users while even some BIM users are still BIM sceptics.



implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM? Figure 15 Post-training: Do You think that implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM?

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As shown in Figure 16, this could be connected with the lack of BIM-knowledgeable design professionals on the project (associates who do not use BIM), the cost of implementation (software, hardware and training costs), reluctance to change business as usual thinking (also, 47 % of trainees use BIM in less than 10 % of their projects - Figure 12). Other possible barriers for BIM implementation as trainees see them are knowledge gaps in the fundamental understanding of BIM's advantages, while lack of BIM interoperability which still exists is perceived as a barrier but with less intensity compared to other suggested barriers.



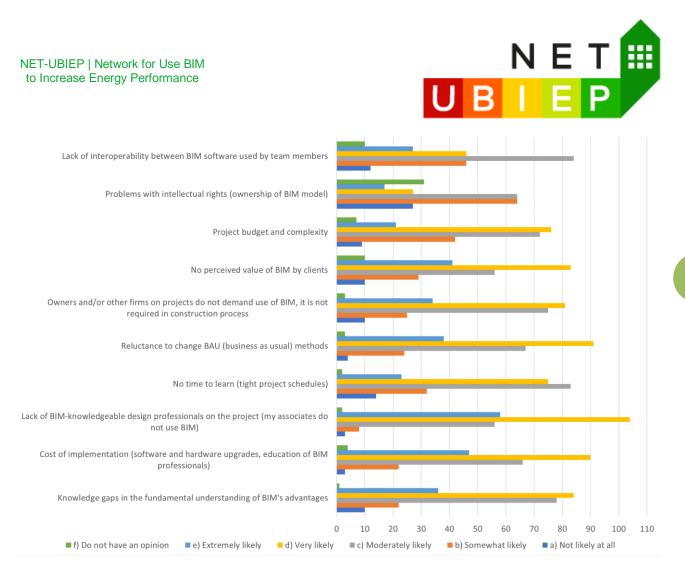






Figure 17 Pre-training: In your opinion, how likely is it that your company/organization will require (be required) to apply BIM on energy efficiency related projects? Pre-training questionnaire was asking training participants what is their opinion on how likely is it that your company or organization will require or be required to apply BIM on energy efficiency related projects. The answers of training participants (Figure 17) leads to a conclusion that just a small portion (21 %) saw the full potential of using BIM in energy efficiency and are convinced that this potential will be used in future. Other training participants were more or less skeptical, while 10 % of participants thought it's not likely at all to interconnect BIM and energy efficiency.

On the other hand, post training questionnaire showed that trainees now recognize the need to utilize BIM in order to design, check compliance, construct, use and manage NZEBs in future (Figure 18), where as





much as 47 % feel the need for both large and small buildings, while only 5 % & 11 % of trainees respectively, are still convinced that business as usual methods will be enough or don't know after the full session of Net-UBIEP classroom courses.

Additionally, training participants think that key tasks related to energy efficiency which will be the most affected by implementation of BIM are Energy performance modeling, Cost analysis and lifecycle costing (Figure 19). On the other hand, it is deemed by Net-UBIEP classroom course participants that identifying as built situation using BIM, valuing completed work and compliance checking, storage of documentation and information about the building are not as important. This could indicate that respective chapters in training materials should be amended with more useful information, more practical examples etc. to make BIM users appreciate the value of accurate and digitized information in as-built BIM model.

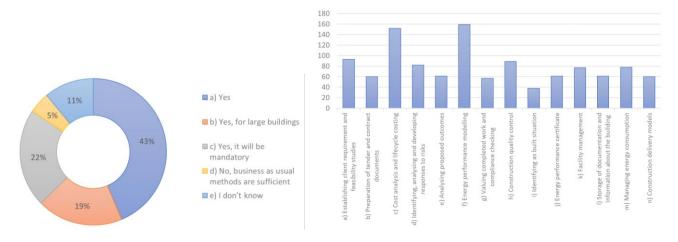


Figure 18 Post-training: In Your opinion, will You need to utilize BIM in order to design/ check compliance/ construct/ use/manage nZEBs in future?

Figure 19 Post-training: What do You think are key tasks related to energy efficiency which will be the most affected by implementation of BIM?

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Classroom course attendants were then asked to rate the business benefits that their company and/or organization could have due to the use of BIM on energy efficiency related projects (Figure 20). As the most business benefits offered were recognized as very beneficial, it can be concluded that training participants recognized the messages which were conveyed to them through courses. Mostly they would like to advance the quality of their projects, increase the accuracy of cost estimations and increase the productivity and efficiency.



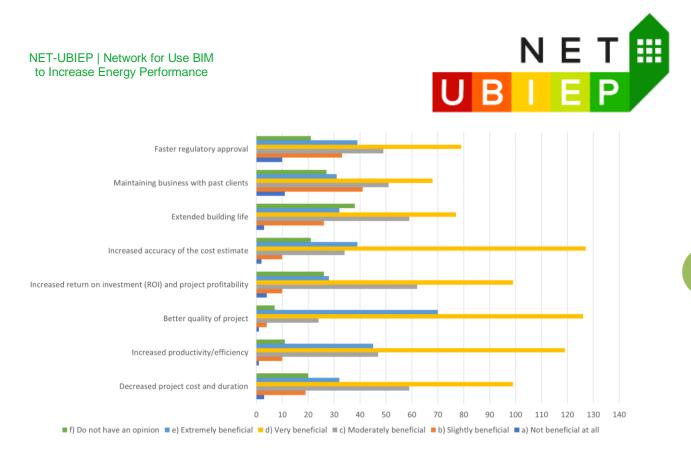


Figure 20 Post-training: Rate the business benefits that Your company/organization could have due to the use of BIM on energy efficiency related projects.

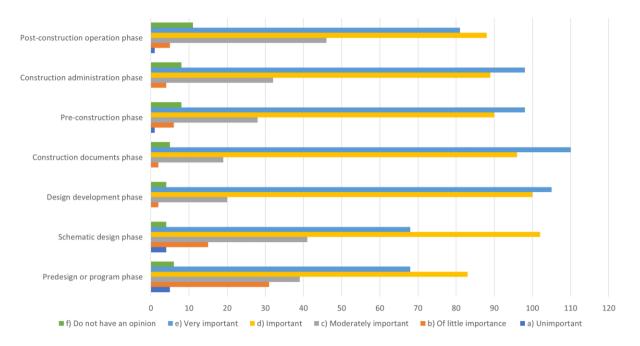


Figure 21 Post-training: In Your opinion, how important would it be to use BIM in different phases of future energy efficiency related projects?

When asked about the importance of BIM use in different phases of energy efficiency related projects, as very important and important, phases following and including the design development phase were emphasized (Figure 21). Here, one can conclude that Net-UBIEP training materials could be additionally

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amended in order to better describe the advantages and benefits of using BIM in predesign and schematic design phase where decisions making process could be verified using BIM tools.

When comparing Figure 22 and Figure 23, it is evident that training participants correlate their energy savings due to applying their newly gained BIM competences with increased productivity due to the use of BIM.

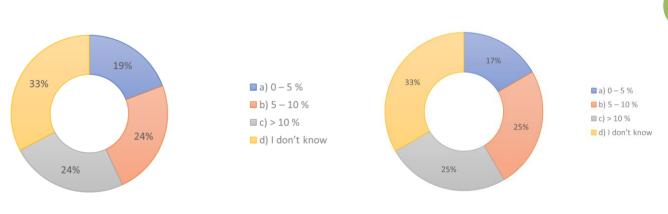


Figure 22 Post-training: Please assess, how much energy do You expect to save by applying knowledge gained during this BIM training How much would Your design/execution/compliance check/building use be improved compared to the standard practice? Figure 23 Post-training: Please assess, how much can You increase your productivity by using BIM, after this training course?

It is evident from the training validation results that 82 % of participants feel BIM certification, support or training would absolutely (46 %) or likely (36 %) be beneficial to their colleagues which is a good indication of their view about the necessity of certification courses (Figure 24). When asked about learning BIM processes without using software, 26 % of Net-UBIEP classroom course participants say this kind of training on BIM and advantages of BIM would be useful, while as much as 45 % of training participants are finding it useful but they seek for more training on specific BIM software (Figure 25).

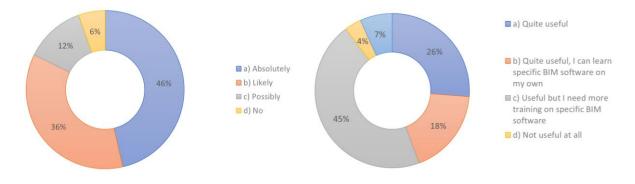


Figure 24 Post-training: Would BIM certification, support or training, benefit Your colleagues?

Figure 25 Post-training: What do You think about formal education about BIM, advantages of BIM and BIM processes (without using specific





software)?

Since 66 % of course participants are already using BIM (or intends to use it in near future) the overall rating of the course as good (33 %), very good (41 %) and excellent (21 %) is very encouraging and positive for the developed training materials and classroom courses held within the Net-UBIEP project (Figure 26). Trainers received positive overall rating of very good (41%) and excellent (39%) (Figure 27).

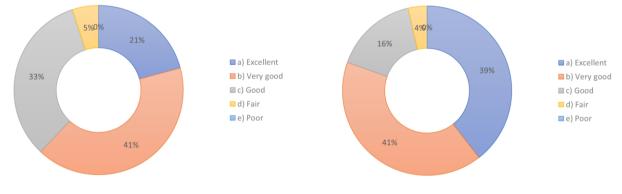


Figure 26 Post-training: What overall rating would You give the course?

Figure 27 Post-training: What overall rating would you give the trainer(s)?

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The majority of training participants agree and strongly agree that the course corresponded to their expectations, and especially that the course increased their interest in BIM and energy efficiency (Figure 28). Additionally, the coursework and assignments were designed appropriately and in respect to prior competences for the majority of training participants and with relevant topics which were deemed as useful. The general opinion is that Net-UBIEP training materials contain sufficient number of images and videos containing course content and that Net-UBIEP course materials were clear and well written. A strong agreement is also evident with the statement that the Net-UBIEP courses were clear and course content was organized and easy to follow.



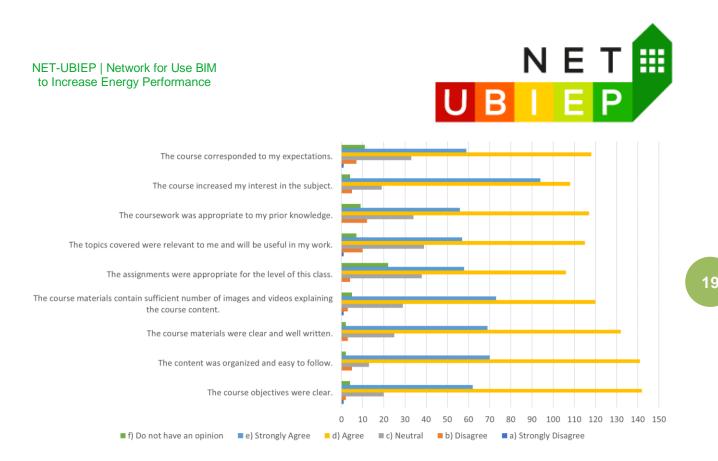


Figure 28 Post-training: Please indicate your level of agreement with the following statements

As evident from Figure 29, the trainers giving the lectures used interactive tools during training courses, encouraged feedback, were competent in the subject matter and were effective in communicating the content of the course.

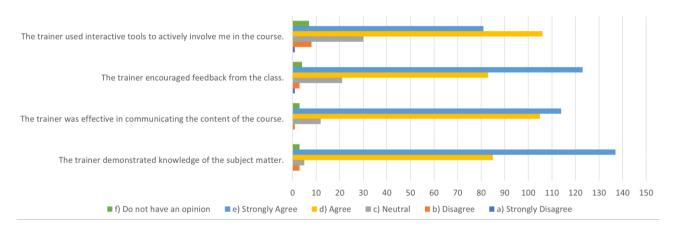


Figure 29 Post-training: Please indicate your level of agreement with the following statements

From Figure 30 it is evident that classroom course participants feel they gained new competences on BIM and energy efficiency but there are also areas which received a significant number of neutral responses. These neutral responses mean that Net-UBIEP training materials should be amended in these areas, i.e. BIM for handover and maintenance, supervision of construction works, quality management, procurement management etc.



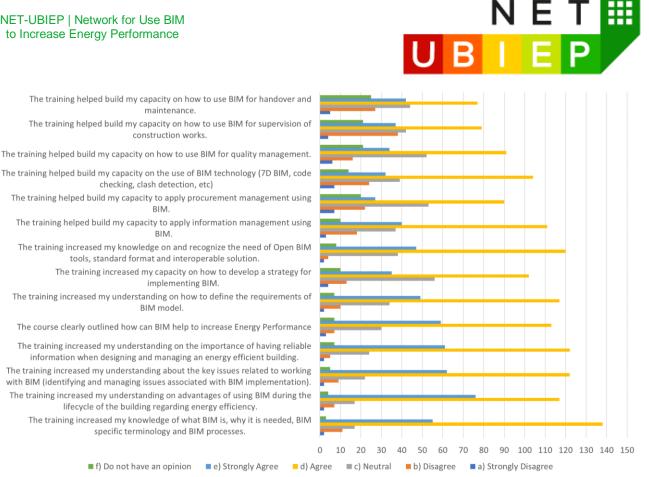


Figure 30 Post-training: Please indicate your level of agreement with the following statements

When getting more in depth and looking for their opinion on each of the training modules (Figure 31), participants feel that Introductory module is useful and requires no changes, while 5 modules developed are useful but significant number of course participants also feel that these modules should be amended with additional content to make it better. Additionally, there are a lot of training participants who have no opinion on training materials developed under the Net-UBIEP project which could indicate that developed training modules could be better communicated during classroom courses.



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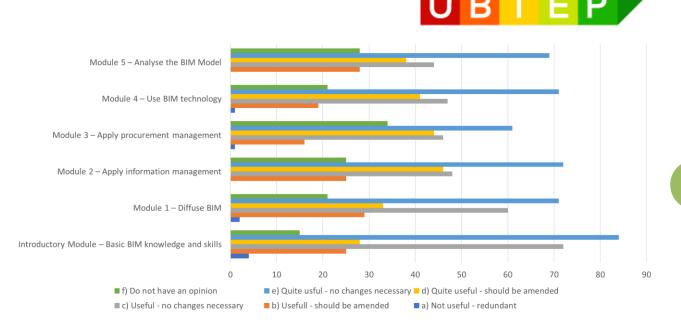


Figure 31 Post-training: Please rate the following BIM course modules based on how they are useful and interesting to you

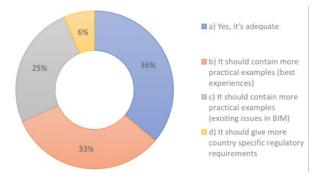


Figure 32 Post-training: What do You feel, is the training material comprehensive enough?

Specifically, approximately a third of course participants (36 %) feel the training material is adequate and comprehensive enough, while the almost all the rest think that training materials should contain more practical examples (best experiences and existing issues in BIM), 33 % and 25 % respectively which is a significant number and should be respected.

It has to be said here that in more BIM advanced countries higher number training participants demand more practical examples while on the other hand in training in less BIM developed countries the developed materials are deemed adequate.

Regarding the length of training, 70 % of training participants said that their respective training course duration was adequate (Figure 33), while 17 % think it should be longer and 13 % think the course should be shorter. This means that the training course providers had a good understanding on the type of the group on the course, since there were groups with 4 hours, 8 hours, 16 hours and 32 hour courses and that course duration was adapted according to groups pre-course competences while at the same time remaining course intensity and trainee's attention. It has to be enhanced that 81 % of course participants prefer to take this courses in the classroom while only 19 % of people would prefer to take it on-line.



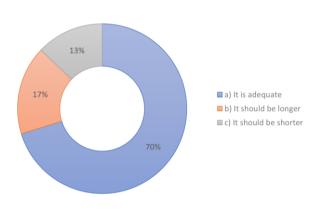
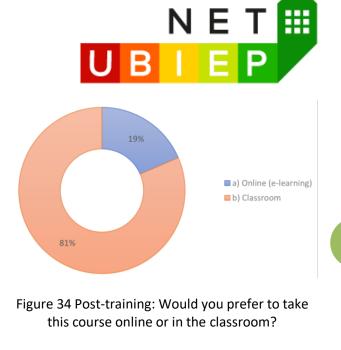


Figure 33 Post-training: What do You feel about the duration of the training?

The quality of the course is best rated if training participants disseminated and recommend the course to their colleagues, friends and associates, and in the case of Net-UBIEP classroom courses, participants have declared that they would definitely (55 %) and probably (37 %) be willing to disseminate the BIM training courses among their contacts.



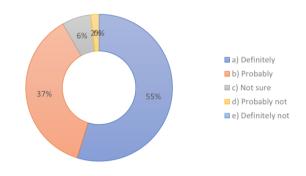


Figure 35 Post-training: Would You be willing to disseminate the BIM training courses among Your contacts and associates?

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Training participants were asked to make a self-evaluation of their BIM competences (knowledge, skills, responsibility and autonomy) (Figure 36) and the results showed that actually BIM users have little competences and on the other hand they cannot not compare their competences to any reference point. After the course, training participants were asked to repeat the exercise and assess BIM competences they had before the course (Figure 37) where it was confirmed little competences of training participants (53 %). and this is understandable if compared with the number of participants who never used BIM (as shown in Figure 7). On the other hand, more important data is that very low percentage of training participants rate their competences as excellent and very good (1 % and 9 % respectively) and 31 % as good (Figure 37).

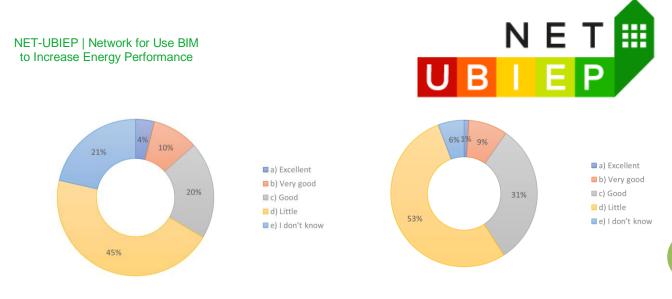


Figure 36 Pre-training: How do You rate Your competences in BIM?

Figure 37 Post-training: In retrospective, how do You rate Your competences before this BIM course?

This data can be read as an indication that even experienced BIM users recognized areas (or modules) in the Net-UBIEP classroom courses or (Net-UBIEP training materials) which could be useful for them to learn. In other words, Net-UBIEP training materials and training courses developed in different partner countries seem to have sufficient complexity and could be also used by people with some BIM experience to advance their competences, and not only by the novice BIM users.

When asked about the quantity of new information they received during the Net-UBIEP training course, it was shown that majority of training participants received new information out of which 24 % received a lot of new information, 34 % received much, 31 % received some new information, while 9 % and 2 % received little and no new information, respectively (Figure 38).

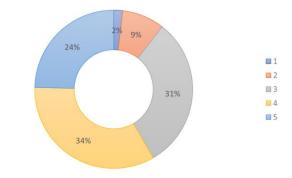


Figure 38 Post-training: How much new information did you receive in the training course?

C.5 Conclusions

The post training survey used for validation of the Net-UBIEP training courses was performed on 269 training participants. The survey results showed that trainees have positive opinion on developed training courses and training materials within the Net-UBIEP project and would be willing to recommend the course to their colleagues.





The main suggestions which arose during the training courses from training participants and trainers are the following. The practical work is deemed both by the trainers and course participants as necessary for classroom courses where more practical lessons and tasks, more examples of good practice could be performed, analyzed and discussed.

The main goal to gather data for validation of classroom courses was achieved and the survey results have provided information for future activities and the experiences of training participants across partner countries. Therefore, this survey has set guidelines for the project deliverable *D4.8 Review of the three dimensional matrix*, as well as for the overall evaluation of the courses conducted within the Net-UBIEP project.





D. Public Administration (The questionnaire tailored for stakeholders)



www.net-ubiep.eu - netubiep.project@net-ubiep.eu.it



D. The questionnaire tailored for stakeholders (Public Administration)

D.1 Foreword to the survey

Dear Madam/Sir,

You are invited to participate in Survey about using BIM to increase energy performance of buildings. The purpose of this survey is to assess the implementation of building information modelling (BIM) as a tool and a process for energy efficiency application among key stakeholders of the **Net-UBIEP project (Horizon 2020)** in order to understand the current use of BIM, benefits of using BIM, obstacles to using BIM as well as possible future use.

Net-UBIEP (Network for Using BIM to Increase the Energy Performance of Buildings) aims at increasing energy performance of buildings by <u>wide spreading and strengthening the use of BIM</u>, during the life cycle of the building. For more information about the project please visit <u>www.net-ubiep.eu</u>.

This survey will address all stakeholders of construction project: Public administration, Professionals (designers, constructors, supervising engineers), Technicians (installers/maintainers), Tenants/Owners, Building Administrator (facility managers, etc.) and other stakeholders involved in energy efficiency projects in general.

This questionnaire is tailored for Public Administration

The questionnaire for public administration is sent under the "Freedom of information act" (Italy: Decreto Legislative Recante Revisione e Semplificazione Delle Disposizioni in Materia di Prevenzione Della Corruzione Pubblicita' e Trasparenza Correttivo Della Legge 6 Novembre 2012, n. 190 e del Decreto Legislativo 14 marzo 2013, n. 33, ai Sensi Dell'articolo 7 Della Legge 7 Agosto 2015, n. 124, in Materia di Riorganizzazione Delle Amministrazioni Pubbliche; **Spain**; **The Netherlands**: Government Information (Public Access) Act (WOB), 1991 (Wet Openbaarheid van Bestuur); **Slovakia**: Act No. 211/2000 Coll. on Free Access to Information and on amendments of certain acts (Zákon o slobodnom prístupe k informáciám ao zmene niektorých zákonov); **Estonia**: "Parliament of Estonia, Public Information Act Passed 15 November 2000". Legaltext.ee. 2000-11-15. Archived from the original on 23 November 2009. Retrieved 2010-11-29.; **Lithuania**: "Lietuvos Respublikos teisės gauti informaciją iš valstybės ir savivaldybių institucijų ir įstaigų įstatymas", TAR 2016-10-17, i. k. 2016-25262; **Croatia**: Zakon o pravu na pristup informacijama, NN 25/13, 85/15) which gives the legal or private person the right to ask any public body for all the information they have on any subject he chooses.

If you have not had experience with BIM yet, feel free to answer the questions to the best of your ability or you can forward the link of this survey to another person in your company/organization who would be better able to answer questions about the current use of building information modelling (BIM) on energy efficiency projects.

All of the information collected will remain confidential. Anonymous answers will be used for research purposes only. Results will be shared with those who participate, if a registration is performed on the web page: http://www.net-ubiep.eu/registration/

Thank you for your participation!

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D.2 Intervi	ew with Public Administration stakeholders		
Obligatory question	Question	Possible answers	
Yes	 Which of the following best describes Your company/organization's type? (Please mark one answer). 	 a) Ministry b) Province c) Municipality d) Other public bodies e) Other, please specify 	
Yes	 What role do You perform within Your company? (Please mark one answer). 	 a) Department head b) Senior clerk c) Clerk d) Other, please specify 	
Yes	3. Projects You work on are?	a) Mainly Publicb) Mainly Privatec) Equally public and private	
Yes	4. What type of construction projects does Your company/organization focus on?(Please select all that apply).	 a) Residential b) Commercial c) Higher education d) Education e) Hospitality f) Healthcare g) Transportation h) Infrastructure i) Public Assembly j) Interior k) Research and Labs l) Government and Federal m) Other, please specify 	
Yes	5. What is the typical project value range Your company/ organization is involved in?	 a) < 50,000 EUR b) 50,000 - 250,000 EUR c) 250,000 - 500,000 EUR d) 500,000 - 1,000,000 EUR e) 1,000,000 - 5,000,000 EUR f) 5,000,000 - 10,000,000 EUR g) > 10,000,000 EUR 	
Yes	 Are you aware of the Directive (2018/844/EU) amending the Energy Performance of Buildings Directive (EPBD)? 	a) Yes b) No	



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Yes	 7. Are you aware that the European Public Procurement Directive includes encouragement for BIM in the procurement of public works? (Article 22 paragraph 4 of Directive 2014/24/UE on public procurement: For public works contracts and design contests, Member States <u>may require</u> the use of specific electronic tools, such as of <u>building</u> <u>information electronic modelling</u> tools or similar) 	a) b)	Yes No
Yes	 8. Does Your company/organization currently use BIM on any level, or is it intending to use BIM in the near future? * If your answer to Question 8 is NO, please complete Questions 9-10 ** If your answer to Question 8 is YES answer Questions 11-22 	a) b)	Yes No
Yes	9. * If you have not had experience with BIM, are you	a)	Yes
(If *) Yes (If *)	 aware of the BIM approach? 10. * If your company/organization does not currently use BIM, how likely your company/organization will use BIM in future? (Please mark one answer). 	b) a) b) c) d) e)	No Not likely at all Somewhat likely Moderately likely Very likely Extremely likely
Yes (If **)	11. ** What was project value for which you used BIM?	a) b) c) d) e) f)	< 50,000 EUR 50,000 – 250,000 EUR 250,000 – 500,000 EUR 500,000 – 1,000,000 EUR 1,000,000 – 5,000,000 EUR 5,000,000 – 10,000,000 EUR > 10,000,000 EUR
Yes (If **)	12. ** How many professionals with working knowledge of BIM are employed by your company/ organization?		
Yes (If **)	 13. ** In your opinion, who derives benefits from using BIM on energy efficiency related projects? (Please select all that apply). 	a) b) c) d) e) f) g) h) i)	Public Authorities Owner Architect Engineer General contractor Construction manager Installer Facility manager Building manager Other (please specify)





				Create (author) building
			a)	, , ,
		ΨΨ A. Ι'ΙΙ ΙΙ		information models
	14.	** At which level does you	b)	Use BIM tools to analyse models
Yes		company/organization utilize BIM?		but do not create our own models
(If **)			c)	Create (author) and analyse
	(Please mark one answer).	ease mark one answer).		building information models
			d)	Other (Please specify)
Yes	15.	** How many years has it been since your		
(If **)		company/organization first implemented BIM?		
	10	** What parcentage of the projects that your	a)	< 10 %
Yes	16.	** What percentage of the projects that your	b)	10-30 %
(If **)		company/organization executed has utilized BIM	c)	30 – 50 %
		within the past 5 years?	d)	> 50 %
			a)	Building energy refurbishment
				within minimum compliance
			b)	
			,	NZEB
		7. ** How were Your BIM projects related to increasing energy efficiency?	c)	New NZEBs
	17.		d)	New building within minimum
Yes			,	compliance
(If **)	*)		e)	Industry facilities energy
		(Please select all that apply).	-,	optimisation
			f)	Building energy consumption
			.,	control
			g)	Other (Please specify)
			67	
	18	** Do You believe that implementation costs	a)	 Yes
Yes	10.	associated with BIM (e.g. hardware, software	b)	No
(If **)		and staff training) outweigh benefits from BIM?	c)	Do not have an opinion
			a)	Yes
Yes	19.	** Do you believe that implementation of BIM	b)	No
(If **)		results in productivity gains?		Do not have an opinion
	20	** The general opinion is that widespread	C)	
Voc	20.	** The general opinion is that <u>widespread</u> adoption of BIM will facilitate a reduction of	a)	Agree
Yes		_	b)	Disagree
(If **)	**)	costs and opportunity for error. Do You agree or	c)	Do not have an opinion
	24	disagree with this statement?		-
Maa	21.	,	a)	Yes
Yes		collaborative way of working and sharing of	b)	No
(If **)	*)	information is expected. From Your experience,	c)	Do not have an opinion
		or in Your opinion, will this be achieved?	-1	



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Yes (If **)	 22. ** As a client, what are Your reBIM? (*** BIM Level 2 maturity model – with other disciplines on the basis of 5D information)) (Please mark one answer). 	we work	together	 we cor pro pro pro of o cor of o cor cor cor cor d) We 2** but imp e) We reo 	ask for BIN share betw itractual rec jects ask for BIN tractual rec our projects recommen el 2*** but tractual rec would like * as a contr do not kno olement do not mak uirement of nough team	een expert quirement of l Level 2** quirement of not as a quirement to ask for E ractual requ w how to ce BIM a n our proje	s as a on all our * as a on some of BIM BIM Level uirement
Yes	23. What do you consider as barrie Knowledge gaps in the fundamental understanding of BIM's advantages Cost of implementation (software and hardware upgrades, education of BIM professionals) Lack of BIM-knowledgeable design professionals on the project (my associates do not use BIM) No time to learn (tight project schedules) Reluctance to change BAU (business as usual) methods Owners and/or other firms on projects do not demand use of BIM, it is not required in construction process No perceived value of BIM by clients Project budget and complexity Problems with intellectual rights (ownership of BIM model) Lack of interoperability between BIM software used by team members Other, please specify	not likely at all	somewhat likely		ly very likely very likely	extremely likely	do not have opinion
Yes	24. Do You forecast companies wil and/or struggle to survive if the BIM quickly enough?			a) b) c)	Yes No Do not hav	e an opinio	n
Yes	25. In Your opinion, how will the ir BIM affect the role You are hav company/ organization?	•		a) b) c) d)	No effect Redefined Extinct Do not have	e an opinio	'n







			a)	Not likely at all
	26. In Your opinion, how	v likely is it that Your	, b)	Somewhat likely
N	-	company/organization will require (be required) to apply BIM on energy efficiency related	c)	Moderately likely
Yes			d)	Very likely
	projects?		e)	Extremely likely
			f)	Do not have an opinion
	27. In Your opinion, how	v important is it that specific	a)	unimportant
	departments and/or		b)	of little importance
N	responsible for ener	gy efficiency in buildings)	c)	moderately important
Yes	mandate the use of	BIM in order to encourage its	d)	important
	implementation on	energy efficiency related	e)	very important
	projects?		f)	Do not have an opinion
			a)	Absolutely
Vac	28. Would BIM certifica	tion, support or training,	b)	Likely
Yes	benefit your colleag	ues?	c)	Possibly
			d)	No
			a)	Yes
	20 Are Veu readu to tel	Are You ready to take a course in BIM or send Your employees on a course in BIM?	b)	Not at the moment, in one
Yes				year
	four employees on		c)	Not at the moment, in 2 years
				or more
			a)	Yes
		 If there would be formal education for certain BIM profiles, about BIM, advantages of BIM and 	b)	Yes, if needed to advance in
	30. If there would be fo			BIM levels or recertification
	BIM profiles, about		c)	No, I believe that I can learn
	-	out using specific software),		enough in my work
Yes		would You be willing to educate Yourself (Your employees) in such courses?		environment
	employees) in such		d)	No, I believe that training
				provided by BIM software
	(Please mark one answe	r).		vendors is sufficient
			e)	It depends on the price and
				the duration of such training
	31. Do You believe "BIM	1" is currently a requirement	a)	Yes
Yes	in Your country?		b)	No
			c)	I don't know
	32. Would You be willin	g to disseminate the BIM	a)	Yes, if I find them useful and of
		-		good quality
Yes	associates?	training courses among Your contacts and associates?	b)	No, probably not (after all,
	Without any obligation to do so!			they are my competitors)
			c)	I don't know
No		vill be shared with You if a		register: <u>http://www.net-</u>
	registration is perfo	rmed on the web page:	ubiep.e	eu/registration/





E. Professionals (The questionnaire tailored for stakeholders)



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E. The questionnaire tailored for stakeholders (Professionals)

E.1 Foreword to the survey

Dear Madam/Sir,

You are invited to participate in Survey about using BIM to increase energy performance of buildings. The purpose of this survey is to assess the implementation of building information modelling (BIM) as a tool and a process for energy efficiency application among key stakeholders of the **Net-UBIEP project (Horizon 2020)** in order to understand the current use of BIM, benefits of using BIM, obstacles to using BIM as well as possible future use.

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This survey will address all stakeholders of construction project: Public administration, Professionals (designers, constructors, supervising engineers), Technicians (installers/maintainers), Tenants/Owners, Building Administrator (facility managers, etc.) and other stakeholders involved in energy efficiency projects in general.

This questionnaire is tailored for **Professionals**

If you have not had experience with BIM yet, feel free to answer the questions to the best of your ability or you can forward the link of this survey to another person in your company/organization who would be better able to answer questions about the current use of building information modelling (BIM) on energy efficiency projects.

All of the information collected will remain confidential. Anonymous answers will be used for research purposes only. Results will be shared with those who participate, if an email is provided within the survey.

Thank you for your participation!





Obligatory question	Question	Possible answers
Yes	 Which of the following best describes Your company/organization's type? (Please mark multiple answers if applicable). 	 a) Architecture b) Civil Engineering c) Mechanical Engineering d) Electrical Engineering e) Construction company f) Subcontractor g) Construction management h) Construction products manufacturer i) Association, please specify j) Other, please specify
Yes	2. What role do You perform within Your company? (Please mark multiple answers if applicable).	 a) Company owner b) Company director c) President d) Vice-president e) Designer f) Lead designer g) Project manager h) Project engineer i) Field engineer j) BIM specialist k) Other, please specify
Yes	3. Who do You work on behalf of?	 a) Public clients b) Private clients c) Both public and private clients d) As a subcontractor e) I'm a developer f) Other, please specify
Yes	4. How many years have You been working as a professional in Your discipline?	 a) < 5 years b) 5 - 10 years c) 10 - 20 years d) > 20 years
Yes	5. Projects You work on are?	a) Mainly Publicb) Mainly Privatec) Both public and private





Yes	 What type of construction projects does Your company/organization focus on? (Please select all that apply). 	a) b) c) d) e) f) g) h) i) j) k) l) m)	Higher education Education Hospitality Healthcare Transportation
Yes	7. What is the typical project value range Your company/ organization is involved in?	-	< 50,000 EUR 50,000 – 250,000 EUR 250,000 – 500,000 EUR 500,000 – 1,000,000 EUR 1,000,000 – 5,000,000 EUR 5,000,000 – 10,000,000 EUR > 10,000,000 EUR
Yes	 Are you aware of the Directive (2018/844/EU) amending the Energy Performance of Buildings Directive (EPBD)? 	-	Yes No
Yes	 9. Are you aware that the European Public Procurement Directive includes encouragement for BIM in the procurement of public works? (Article 22 paragraph 4 of Directive 2014/24/UE on public procurement: For public works contracts and design contests, Member States <u>may require</u> the use of specific electronic tools, such as of <u>building information electronic modelling</u> tools or similar) 	a) b)	Yes No
Yes	 10. Does Your company/organization currently use BIM on any level, or is it intending to use BIM in the near future? * If your answer to Question 10 is NO, please complete Questions 11-12 ** If your answer to Question 10 is YES answer Questions 13-23 		Yes No
Yes (If *)	11.* If you have not had experience with BIM, are you aware of the BIM approach?	a) b)	Yes No
Yes (If *)	 12. * If your company/organization does not currently use BIM, how likely your company/organization will use BIM in future? (Please mark one answer). 	a) b) c) d) e)	Not likely at all Somewhat likely Moderately likely Very likely Extremely likely





Yes (If **)	13. ** What was project value for which you used BIM?	 a) < 50,000 EUR b) 50,000 - 250,000 EUR c) 250,000 - 500,000 EUR d) 500,000 - 1,000,000 EUR e) 1,000,000 - 5,000,000 EUR f) 5,000,000 - 10,000,000 EUR g) > 10,000,000 EUR
Yes (If **)	14. ** How many professionals with working knowledge of BIM are employed by your company/ organization?	
Yes (If **)	 15. ** In your opinion, who derives benefits from using BIM on energy efficiency related projects? (Please select all that apply). 	 a) Public Authorities b) Owner c) Architect d) Engineer e) General contractor f) Construction manager g) Installer h) Facility manager i) Building manager j) Other (please specify)
Yes (If **)	16. ** At which level does you company/organization utilize BIM?(Please mark one answer).	 a) Create (author) building information models b) Use BIM tools to analyse models but do not create our own models c) Create (author) and analyse building information models d) Other (Please specify)
Yes (If **)	17. ** How many years has it been since your company/organization first implemented BIM?	
Yes (If **)	18. ** What percentage of the projects that your company/organization executed has utilized BIM within the past 5 years?	a) < 10 % b) 10 -30 % c) 30 - 50 % d) > 50 %
Yes (If **)	19. ** How were Your BIM projects related to increasing energy efficiency?(Please select all that apply).	 a) Building energy refurbishment within minimum compliance b) Building energy refurbishment to NZEB c) New NZEBs d) New building within minimum compliance e) Industry facilities energy optimisation f) Building energy consumption control g) Other (Please specify)





Yes 20. ** What project delivery method was used on energy efficiency related projects that use BIM? a) Design-build (If **) (Please select all that apply). b) Design-Build-Gonstruction management at risk BUR? (If **) (Please select all that apply). b) Design-Build-Ginance-operate (DBFO) Yes 21. ** Do You believe that implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM? a) Yes Yes 22. ** Do you believe that implementation of BIM results in productivity gains? a) Yes Yes 23. ** The general opinion is that widespread adoption of BIM will facilitate a reduction of costs and opportunity for error. Do You agree or disagree with this statement? a) Agree Yes b) Disagree c) Do not have an opinion Xinweldge gaps in the fundamental understanding of BIM sill 's advantages a) Agree Ves b) Disagree c) Do not have an opinion Yes Nat do you consider as barriers for BIM implementation? a) Agree Yes b) Lack of BIM-knowledgeable design profesionals on the project (my associates do not use BIM) a) a land and and and and and and advantages a) a land advantages Yes No time to leave the fundamental understanding of BIM si advantages a) a land advantages a) a land advantages					- 1	. .			
Yes 20. *** What project delivery method was used on energy efficiency related projects that use BIM? c) Construction management d) Integrated project delivery (IPD) e) (If **) (Please select all that apply). build-operate-transfer (BOT) g) Design- Build-finance-operate (DBFO) h) Yes 21. ** Do You believe that implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM? a) Yes Yes 22. ** Do you believe that implementation of BIM results in productivity gains? a) Yes Yes 23. ** The general opinion is that widespread adoption of BIM will facilitate a reduction of costs and opportunity for error. Do You agree or disagree with this statement? a) Yes Yes 24. What do you consider as barriers for BIM implementation? a) Agree b) Disagree c) Yes ikely for ont have an opinion a) Agree b) Disagree c) a) Yes ikely somewhat moderately ikely wery likely extremely have an opinion b) b) Yes ikely somewhat moderately ikely wery likely extremely have an opinion a) Yes ikely somewhat moderately ikely wery likely extremely have an opinion b) <td< td=""><td></td><td></td><td></td><td></td><td>a)</td><td>Desig</td><td>n-bid-buil</td><td>d</td><td></td></td<>					a)	Desig	n-bid-buil	d	
Yes 20. ** What project delivery method was used on energy efficiency related projects that use BIM? d) Integrated project delivery (IPD) (If **) (Please select all that apply). (Please select all that apply). (Please select all that apply). (D) Yes 21. ** Do You believe that implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM? a) Yes Yes 22. ** Do you believe that implementation of BIM (if **) a) Yes b) No Yes 23. ** The general opinion is that widespread adoption of BIM will facilitate a reduction of costs and opportunity for error. Do You agree or disagree with this statement? a) Agree b) No Yes 24. What do you consider as barriers for BIM inkely somewhat an opinion a) Agree b) D) on thave an opinion Yes 1 not likely somewhat ikely moderately wery likely extremely do not have an opinion Yes 1 No a) a) Agree b) D) on thave an opinion Yes 23. ** The general opinion is that widespread ad adoption of BIM will facilitate a reduction of Costs and opportunity for error. Do You agree or disagree or disagree unth this statement? Do not have an opinion					b)	Desig	n-build		
Yes 20. ** What project delivery method was used on energy efficiency related projects that use BIM? d) Integrated project delivery (IPD) (If **) (Please select all that apply). (Please select all that apply). (Please select all that apply). (D) Yes 21. ** Do You believe that implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM? a) Yes Yes 22. ** Do you believe that implementation of BIM (if **) a) Yes b) No Yes 23. ** The general opinion is that widespread adoption of BIM will facilitate a reduction of costs and opportunity for error. Do You agree or disagree with this statement? a) Agree b) No Yes 24. What do you consider as barriers for BIM inkely somewhat an opinion a) Agree b) D) on thave an opinion Yes 1 not likely somewhat ikely moderately wery likely extremely do not have an opinion Yes 1 No a) a) Agree b) D) on thave an opinion Yes 23. ** The general opinion is that widespread ad adoption of BIM will facilitate a reduction of Costs and opportunity for error. Do You agree or disagree or disagree unth this statement? Do not have an opinion					c)	Const	ruction m	anagemen	t
Yes (If **) 20. ** What project delivery method was used on energy efficiency related projects that use BIM? (Please select all that apply). e) Construction management at risk f) Build-operate-transfer (BOT) g) Design- Build-finance-operate (DBFO) Yes 21. ** Do You believe that implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM? a) Yes Yes 22. ** Do you believe that implementation of BIM (If **) b) No Yes 23. ** The general opinion is that widespread adoption of BIM will facilitate a reduction of costs and opportunity for error. Do You agree or disagree with this statement? a) Agree b) Disagree c) Do not have an opinion 24. What do you consider as barriers for BIM implementation? moderately likely wery likely extremely extremely likely do not have opinion Yes No cost of BIM sidvantages Lack of BIM-knowledgeable design professionals) moderately likely wery likely extremely likely do not have opinion Yes No time to learn tight project schedules) iikely iikely iikely iikely iikely iikely Yes No time to learn tight project schedules) iikely iikely iikely iikely iikely								•	
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Project budget and complexity		Project budget and complexity							
Problems with intellectual rights									
(ownership of BIM model)									
Lack of interoperability between BIM									
software used by team members									
			f DINA a m	014					
25. With the successful adoption of BIM, a new a) Yes		-			а) Yes			
	Yes			-		•			
Ves collaborative way of working and sharing of b) No		information is expected. From					not have a	an opinion	
Yes information is expected. From Your experience, b) No		or in Your opinion, will this be achieved?							





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Do you forecast companies will be left behind and/or struggle to survive if they do not adopt BIM quickly enough?	a) b) c)	Yes No Do not have an opinion
In Your opinion, how will the implementation of BIM affect the role You are having in Your company/ organization?	a) b) c) d)	No affect Redefined Extinct Do not have an opinion
In your opinion, how likely is it that your company/organization will be required to apply BIM on energy efficiency related projects?	a) b) c) d) e) f)	Not likely at all Somewhat likely Moderately likely Very likely Extremely likely Do not have an opinion
In Your opinion, how important is it that specific departments and/or Ministries (those responsible for energy efficiency in buildings) mandate the use of BIM in order to encourage its implementation on energy efficiency related projects?	a) b) c) d) e) f)	unimportant of little importance moderately important important very important Do not have an opinion
Would BIM certification, support or training, benefit your colleagues?	a) b) c) d)	Absolutely Likely Possibly No
Are you ready to take a course in BIM or send Your employees on a course in BIM?	a) b) c)	Yes Not at the moment, in one year Not at the moment, in 2 years or more
If there would be formal education for certain BIM profiles, about BIM, advantages of BIM and BIM processes (<u>without using specific</u> <u>software</u>), would You be willing to educate Yourself (Your employees) in such courses? ase mark one answer)	b) c) d)	Yes Yes, if needed to advance in BIM levels or recertification No, I believe that I can learn enough in my work environment No, I believe that training provided by BIM software vendors is sufficient It depends on the price and the duration of such training
Do You believe "BIM" is currently a requirement in Your country?	a) b) c)	Yes No I don't know
Would You be willing to disseminate the BIM training courses among Your contacts and associates? nout any obligation to do so!	a) b) c)	Yes, if I find them useful and of good quality No, probably not (after all, they are my competitors) I don't know
	and/or struggle to survive if they do not adopt BIM quickly enough? In Your opinion, how will the implementation of BIM affect the role You are having in Your company/ organization? In your opinion, how likely is it that your company/organization will be required to apply BIM on energy efficiency related projects? In Your opinion, how important is it that specific departments and/or Ministries (those responsible for energy efficiency in buildings) mandate the use of BIM in order to encourage its implementation on energy efficiency related projects? Would BIM certification, support or training, benefit your colleagues? Are you ready to take a course in BIM or send Your employees on a course in BIM? If there would be formal education for certain BIM profiles, about BIM, advantages of BIM and BIM processes (without using specific software), would You be willing to educate Yourself (Your employees) in such courses? ase mark one answer) Do You believe "BIM" is currently a requirement in Your country? Would You be willing to disseminate the BIM training courses among Your contacts and associates?	and/or struggle to survive if they do not adopt BIM quickly enough?b)BIM quickly enough?c)In Your opinion, how will the implementation of BIM affect the role You are having in Your company/organization?a) b) c)In your opinion, how likely is it that your company/organization will be required to apply BIM on energy efficiency related projects?a) b) c)In Your opinion, how important is it that specific departments and/or Ministries (those responsible for energy efficiency in buildings) c) mandate the use of BIM in order to encourage d) its implementation on energy efficiency related e) projects?a) c)Would BIM certification, support or training, benefit your colleagues?a) c)If there would be formal education for certain BIM profiles, about BIM, advantages of BIM and BIM processes (without using specific software), would You be willing to educate Yourself (Your employees) in such courses?a) b) c)Do You believe "BIM" is currently a requirement in Your country?a) c)Would You be willing to disseminate the BIM training courses among Your contacts and associates?a) b) b) c)







Yes	35.	What do You feel would be the most suitable duration of BIM certification course?	a) < 8 hours b) 8 – 16 hours c) 16 – 32 hours d) > 32 hours
Yes	36.	When would You prefer to have the BIM training courses?	 a) During working hours b) After working hours c) During weekends d) No preferences
No	37.	The survey results will be shared with You if a registration is performed on the web page:	Please register: <u>http://www.net-</u> ubiep.eu/registration/



NET-UBIEP | Network for Use BIM to Increase Energy Performance



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F. Technicians (The questionnaire tailored for stakeholders)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement *No.754016*



www.net-ubiep.eu - netubiep.project@net-ubiep.eu.it



F. The questionnaire tailored for stakeholders (Technicians)

F.1 Foreword to the survey

Dear Madam/Sir,

You are invited to participate in Survey about using BIM to increase energy performance of buildings. The purpose of this survey is to assess the implementation of building information modelling (BIM) as a tool and a process for energy efficiency application among key stakeholders of the **Net-UBIEP project (Horizon 2020)** in order to understand the current use of BIM, benefits of using BIM, obstacles to using BIM as well as possible future use.

Net-UBIEP (Network for Using BIM to Increase the Energy Performance of Buildings) aims at increasing energy performance of buildings by <u>wide spreading and strengthening the use of BIM</u>, during the life cycle of the building. For more information about the project please visit <u>www.net-ubiep.eu</u>.

This survey will address all stakeholders of construction project: Public administration, Professionals (designers, constructors, supervising engineers), Technicians (installers/maintainers), Tenants/Owners, Building Administrator (facility managers, etc.) and other stakeholders involved in energy efficiency projects in general.

This questionnaire is tailored for Technicians

If you have not had experience with BIM yet, feel free to answer the questions to the best of your ability or you can forward the link of this survey to another person in your company/organization who would be better able to answer questions about the current use of building information modelling (BIM) on energy efficiency projects.

All of the information collected will remain confidential. Anonymous answers will be used for research purposes only. Results will be shared with those who participate, if an email is provided within the survey.

Thank you for your participation!





F.2 Intervi	ew with Technicians	
Obligatory question	Question	Possible answers
Yes	 Which of the following best describes your company/organization's type? (Please mark multiple answers if applicable). 	 a) Building envelope systems installer/maintainer (walls, roofs, windows, etc.) b) RES system installer/maintainer c) HVAC system installer/maintainer d) Electrical installer/maintainer e) Automation system installer/maintainer f) Association, please specify g) Other, please specify
Yes	 What role do you perform within your company? (Please mark multiple answers if applicable). 	 a) Company owner b) Company director c) Field engineer d) Installer (insulation, technical systems, automation, other) e) Other, please specify
Yes	3. Who do you work on behalf of?	 a) Public clients b) Private clients c) Both public and private clients d) As a subcontractor e) Other, please specify
Yes	4. How many years have you been working as a professional in your discipline?	a) < 5 years b) 5 – 10 years c) 10 – 20 years d) > 20 years
Yes	5. Projects You work on are?	a) Mainly Publicb) Mainly Privatec) Both public and private



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under grant agreement No.754016



Yes	 What type of construction projects does your company/organization focus on? (Please select all that apply). 	 a) Residential b) Commercial c) Higher education d) Education e) Hospitality f) Healthcare g) Transportation h) Infrastructure i) Public Assembly j) Interior k) Research and Labs l) Government and Federal m) Other, please specify
Yes	7. What is the typical project value range your company/ organization is involved in?	 a) < 50,000 EUR b) 50,000 - 250,000 EUR c) 250,000 - 500,000 EUR d) 500,000 - 1,000,000 EUR e) 1,000,000 - 5,000,000 EUR f) 5,000,000 - 10,000,000 EUR g) > 10,000,000 EUR
Yes	 Are you aware of the Directive (2018/844/EU) amending the Energy Performance of Buildings Directive (EPBD)? 	a) Yes b) No
Yes	 9. Are you aware that the European Public Procurement Directive includes encouragement for BIM in the procurement of public works? (Article 22 paragraph 4 of Directive 2014/24/UE on public procurement: For public works contracts and design contests, Member States <u>may require</u> the use of specific electronic tools, such as of <u>building information electronic modelling</u> tools or similar) 	a) Yes b) No
Yes	 10. Does Your company/organization currently use BIM on any level, or is it intending to use BIM in the near future? * If your answer to Question 10 is NO, please complete Questions 11- 12 ** If your answer to Question 10 is YES answer Questions 13-23 	a) Yes b) No
Yes (If *)	11.* If you have not had experience with BIM, are you aware of the BIM?	a) Yes b) No
Yes (If *)	 12. * If your company/organization does not currently use BIM, how likely your company/organization will use BIM in future? (Please mark one answer). 	 a) Not likely at all b) Somewhat likely c) Moderately likely d) Very likely e) Extremely likely





		a)	< 50,000 EUR
		b)	50,000 – 250,000 EUR
		c)	250,000 – 500,000 EUR
Yes	13. ** What was project value for which you used	d)	500,000 – 1,000,000 EUR
(If **)	BIM?	e)	1,000,000 – 5,000,000 EUR
		c) f)	5,000,000 – 10,000,000 EUR
		•	> 10,000,000 EUR
		g)	> 10,000,000 EUR
Yes (If **)	14. ** How many professionals with working knowledge of BIM are employed by your company/ organization?		
		a)	Public Authorities
		b)	Owner
		c)	Architect
	15. ** In your opinion, who derives benefits from	d)	Engineer
Yes	using BIM on energy efficiency related	e)	General contractor
(If **)	projects?	c) f)	Construction manager
(11 * *)		g)	Installer
	(Please select all that apply).	8) h)	
			Facility manager
		i)	Building manager
		j)	Other (please specify)
		a)	, , ,
			information models
Yes	16. ** At which level does you	b)	,
(If **)	company/organization utilize BIM? (Please		but do not create our own models
()	mark one answer).	c)	Create (author) and analyse
			building information models
		d)	Other (Please specify)
Yes (If **)	17. ** How many years has it been since your company/organization first implemented BIM?		
	18. ** What percentage of the projects that your	a)	< 10 %
Yes		b)	10 –30 %
(If **)	company/organization executed has utilized	c)	30 – 50 %
	BIM within the past 5 years?	d)	> 50 %
		a)	Building energy refurbishment
			within minimum compliance
			•
		b)	Building energy refurbishment to
		b)	Building energy refurbishment to NZFB
			NZEB
	19. ** How were Your BIM projects related to	c)	NZEB New NZEBs
Yes	19. ** How were Your BIM projects related to increasing energy efficiency?		NZEB New NZEBs New building within minimum
Yes (If **)		c) d)	NZEB New NZEBs New building within minimum compliance
		c)	NZEB New NZEBs New building within minimum compliance Industry facilities energy
	increasing energy efficiency?	c) d) e)	NZEB New NZEBs New building within minimum compliance Industry facilities energy optimisation
	increasing energy efficiency?	c) d)	NZEB New NZEBs New building within minimum compliance Industry facilities energy optimisation Building energy consumption
	increasing energy efficiency?	c) d) e)	NZEB New NZEBs New building within minimum compliance Industry facilities energy optimisation





Yes (If **)	20. ** Do You believe that implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM?				s not have a	in opinion	
Yes (If **)	21. ** Do you believe that impler results in productivity gains?	nentation	of BIM	a) Ye b) No c) Do		in opinion	
Yes (If **)	22. ** The general opinion is that adoption of BIM will facilitate costs and opportunity for erro or disagree with this statemen	a reductio r. Do You a	n of	b) Dis	ree sagree not have a	in opinion	
Yes (If **)	23. ** With the successful adoptic collaborative way of working a information is expected. From experience, or in Your opinion achieved?	ind sharin Your , will this b	g of De	-		in opinion	
	24. What do you consider as barri	ers for BIN not likely at all	A impleme somewhat likely		y very likely	extremely likely	do not have opinion
Yes	Knowledge gaps in the fundamental understanding of BIM's advantages Cost of implementation (software and hardware upgrades, education of BIM professionals) Lack of BIM-knowledgeable design professionals on the project (my associates do not use BIM) No time to learn (tight project schedules) Reluctance to change BAU (business as usual) methods Owners and/or other firms on projects do not demand use of BIM, it is not required in construction process No perceived value of BIM by clients Project budget and complexity						
	Problems with intellectual rights (ownership of BIM model) Lack of interoperability between BIM software used by team members Other, please specify						
Yes	25. Do you forecast companies will be left behind and/or struggle to survive if they do not adopt BIM quickly enough?				not have a	in opinion	
Yes	BIM quickly enough?26. In Your opinion, how will the implementation of BIM affect the role You are having in Your company/ organization?			b) Re c) Ext	effect defined tinct not have a	n opinion	



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			a)	Not likely at all
	77	In your opinion, how likely is it that your	a) b)	Somewhat likely
	27.	In your opinion, how likely is it that your company/organization will be required to		Moderately likely
Yes			c)	
		apply BIM on energy efficiency related projects?	d)	Very likely Extremely likely
		projects?	e)	Extremely likely
			f)	Do not have an opinion
			a)	Absolutely
Yes	28.	Would BIM certification, support or training,	b)	Likely
		benefit your colleagues?	c)	Possibly
			d)	No
			a)	Yes
Yes	29.	Are you ready to take a course in BIM or send	b)	Not at the moment, in one year
		Your employees on a course in BIM?	c)	Not at the moment, in 2 years or
				more
			a)	Yes
	30.	If there would be formal education for certain	b)	Yes, if needed to advance in BIM
		BIM profiles, about BIM, advantages of BIM		levels or recertification
		and BIM processes (without using specific	c)	,
Yes		<u>software</u>), would You be willing to educate Yourself (Your employees) in such courses?		enough in my work environment
100			d)	No, I believe that training
		(Please mark one answer)		provided by BIM software
	(Ple			vendors is sufficient
	(1.10		e)	· · ·
				duration of such training
	31	Do You believe "BIM" is currently a	a)	Yes
Yes	51.	requirement in Your country?	b)	No
			c)	I don't know
	22	Would You be willing to disseminate the BIM	a)	Yes, if I find them useful and of
	52.	training courses among Your contacts and		good quality
Yes		associates?		No, probably not (after all, they
	\\/it	hout any obligation to do so!		are my competitors)
	vvit		c)	I don't know
			a)	< 8 hours
Yes	33.	What do You feel would be the most suitable	b)	8 – 16 hours
162		duration of BIM certification course?	c)	16 – 32 hours
			d)	> 32 hours
			a)	During working hours
Vee	34.	When would You prefer to have the BIM	b)	After working hours
Yes		training courses?	c)	During weekends
		-	d)	No preferences
	35.	The survey results will be shared with You if a	Please	register: http://www.net-
No		registration is performed on the web page:		eu/registration/
		-0		



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G. Tenants/Owners/Building Administrators (The questionnaire tailored for stakeholders)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement *No.754016*



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G. The questionnaire tailored for stakeholders (Tenants/Owners/Building Administrators)

G.1 Foreword to the survey

Dear Madam/Sir,

You are invited to participate in Survey about using BIM to increase energy performance of buildings. The purpose of this survey is to assess the implementation of building information modelling (BIM) as a tool and a process for energy efficiency application among key stakeholders of the Net-UBIEP project (Horizon **2020)** in order to understand the current use of BIM, benefits of using BIM, obstacles to using BIM as well as possible future use.

Net-UBIEP (Network for Using BIM to Increase the Energy Performance of Buildings) aims at increasing energy performance of buildings by wide spreading and strengthening the use of BIM, during the life cycle of the building. For more information about the project please visit www.net-ubiep.eu.

This survey will address all stakeholders of construction project: Public administration, Professionals (designers, constructors, supervising engineers), Technicians (installers/maintainers), Tenants/Owners, Building Administrator (facility managers, etc.) and other stakeholders involved in energy efficiency projects in general.

This questionnaire is tailored for Tenants/Owners/Building Administrators

If you have not had experience with BIM yet, feel free to answer the questions to the best of your ability or you can forward the link of this survey to another person in your company/organization who would be better able to answer questions about the current use of building information modelling (BIM) on energy efficiency projects.

All of the information collected will remain confidential. Anonymous answers will be used for research purposes only. Results will be shared with those who participate, if an email is provided within the survey.

Thank you for your participation!



This project has received funding from



Obligatory question	Question	Possible answers
Yes	 Which of the following best describes You/Your company/organization's type? (Please mark multiple answers if applicable). 	 a) Tenant b) Owner c) Building administrator d) Facility manager e) Public body (government departments, local government, schools, universities, etc.) f) Publicly owned company g) Private company h) Association i) Other, please specify
Yes	 What role do You perform within Your company? (Please mark multiple answers if applicable). 	 a) Company owner b) Company director c) Department head d) Engineer e) Building (part of building) owner f) Superintendent g) Building manager h) BIM specialist i) Other, please specify
Yes (except for tenants)	3. How many years have you been working as a professional in Your discipline?	a) < 5 years b) 5 – 10 years c) 10 – 20 years d) > 20 years
Yes (except for tenants)	4. Buildings You work on are?	a) Mainly Publicb) Mainly Privatec) Both public and private
Yes (except for tenants)	 What type of construction projects does Your company/organization focus on? (Please select all that apply). 	 a) Residential b) Commercial (offices, etc.) c) Higher education, Education d) Hospitality (hotels, etc.) e) Healthcare f) Transportation g) Infrastructure h) Interior i) Research and Labs j) Other, please specify





Yes (except for tenants) Yes	 6. What is the typical project value range Your company/ organization is involved in? 7. Are you aware of the Directive (2018/844/EU) amending the Energy Performance of Buildings 	 a) < 50,000 EUR b) 50,000 - 250,000 EUR c) 250,000 - 500,000 EUR d) 500,000 - 1,000,000 EUR e) 1,000,000 - 5,000,000 EUR f) 5,000,000 - 10,000,000 EUR g) > 10,000,000 EUR a) Yes b) No
Yes	 Directive (EPBD)? 8. Are you aware that the European Public Procurement Directive includes encouragement for BIM in the procurement of public works? (Article 22 paragraph 4 of Directive 2014/24/UE on public procurement: For public works contracts and design contests, Member States <u>may require</u> the use of specific electronic tools, such as of <u>building information electronic modelling</u> tools or similar.) 	a) Yes b) No
Yes	9. How accurate is Your current data about buildings (parts of buildings) You own/manage/use?	 a) Very accurate. b) Moderately accurate. c) Very inaccurate d) Do not know
Yes	10. Does your current organization have a dedicated individual within either the operation or management groups update and maintain this archived data?	a) Yes b) No c) Do not know
Yes	11.Do you currently use BIM for tracking data?	 a) Currently do not use. b) Currently use. c) Plan to use. d) Think it is a good idea to pursue further.
Yes	12. Have you heard about COBie (Construction Operations Building information exchange)?	a) Yes b) No
Yes	13. Do You or Your company/organization currently use BIM (other applications than tracking data), or is it intending to use BIM in the near future? *If your answer to Question 13 is NO, please complete Questions 14- 15 ** If your answer to Question 12 is YES answer Questions 16-28	a) Yes b) No
Yes (If *) Yes (If *)	 14.* If you have not had experience with BIM, are you aware of the BIM approach? 15.* If your company/organization does not currently use BIM, how likely your company/organization will use BIM in future? (Please mark one answer). 	 a) Yes b) No a) Not likely at all b) Somewhat likely c) Moderately likely d) Very likely e) Extremely likely





			a)	< 50,000 EUR
			b)	50,000 – 250,000 EUR
		** What was project value for which you used	c)	250,000 – 500,000 EUR
Yes	16.		d)	500,000 – 1,000,000 EUR
(If **)		BIM?	e)	1,000,000 – 5,000,000 EUR
			c) f)	5,000,000 – 10,000,000 EUR
			g)	> 10,000,000 EUR
Yes (If **)	17.	** How many professionals with working knowledge of BIM are employed by your company/ organization?	87	
			a)	Public Authorities
			b)	Owner
			c)	Architect
	18.	** In your opinion, who derives benefits from	d)	Engineer
Vee		using BIM on energy efficiency related	e)	General contractor
Yes		projects?	f)	Construction manager
(If **)			g)	Installer
	(Ple	ease select all that apply).	h)	Facility manager
	-		i)	Building manager
			j)	Other (please specify)
			a)	Create (author) BIM models
	10	** At which lovel do so you	b)	Use BIM tools to analyse models but
Vee	19.	. ** At which level does you company/organization utilize BIM?		do not create our own models
Yes			c)	Create (author) and analyse building
(If **)	(5)	· · · · · · · · · · · · · · · · · · ·		information models
	(PIE	ease mark one answer).	d)	Other (Please specify)
Yes (If **)	20.	** How many years has it been since your company/organization first implemented BIM?		
	24		a)	< 10 %
Yes	21.	** What percentage of the projects that your	b)	10-30 %
(If **)		company/organization executed has utilized	c)	30 – 50 %
· /		BIM within the past 5 years?	d)	
			a)	Building energy refurbishment within minimum compliance
			b)	Building energy refurbishment to NZEB
	22.	** How were Your BIM projects related to	c)	New NZEBs
Yes		increasing energy efficiency?	d)	New building within minimum
(If **)			u)	compliance
	(Ple	ease select all that apply).	e)	
			e) f)	Building energy consumption control
			r) g)	Other (Please specify)
			67	





Yes (If **)	 23. ** What project delivery method was used on energy efficiency related projects that use BIM? (Please select all that apply). 	 a) Design-bid-build b) Design-build c) Construction management d) Integrated project delivery (IPD) e) Construction management at risk f) Build-operate-transfer (BOT) g) Design- Build-finance-operate (DBFO) h) ESCO model i) Other (Please specify)
Yes (If **)	24. ** Do You believe that implementation costs associated with BIM (e.g. hardware, software and staff training) outweigh benefits from BIM?	a) Yes b) No c) Do not have an opinion
Yes (If **)	25. ** Do you think believe that implementation of BIM results in productivity gains?	a) Yes b) No c) Do not have an opinion
Yes (If **)	26. ** The general opinion is that <u>widespread</u> <u>adoption</u> of BIM will facilitate a reduction of costs and opportunity for error. Do You agree or disagree with this statement?	a) Agree b) Disagree c) Do not have an opinion
Yes (If **)	27. ** With the successful adoption of BIM, a new collaborative way of working and sharing of information is expected. From Your experience, or in Your opinion, will this be achieved?	a) Yes b) No c) Do not have an opinion
Yes (If **)	 28. ** As a client, what are Your requirements on BIM? (*** BIM Level 2 maturity model – we work together with other disciplines on the basis of models (4D and 5D information)) (Please mark one answer) 	 a) We ask for BIM Level 2*** which we share between experts as a contractual requirement on all our projects b) We ask for BIM Level 2*** as a contractual requirement on some of our projects c) We recommend the use of BIM Level 2*** but not as a contractual requirement d) We would like to ask for BIM Level 2*** as a contractual requirement d) We would like to ask for BIM Level 2*** as a contractual requirement e) We do not make BIM a requirement on our projects, although teams are free to use it



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Notime to learn (tight project schedules)not likelysomewhat not likelymoderately likelyvery likelyextremely likelydo not have opinionKnowledge gaps in the fundamental understanding of BIM's advantagesImage: Cost of implementation (software and hardware upgrades, education of BIM professionals)Image: Cost of implementation (software and hardware upgrades, education of BIM professionals)Image: Cost of BIM professionalsImage: Cost of BIM professionalsLack of BIM-knowledgeable design professionals on the project (my associates do not use BIM)Image: Cost of BIM professionalsImage: Cost of BIM professional	
understanding of BIM's advantages	
Cost of implementation (software and hardware upgrades, education of BIM professionals) Image: Cost of implementation (software and hardware upgrades, education of BIM professionals) Lack of BIM-knowledgeable design professionals on the project (my associates do not use BIM) Image: Cost of the project (my associates do not use BIM) Yes No time to learn (tight project schedules) Image: Cost of the project (my associates do not use BIM) Reluctance to change BAU (business as Image: Cost of the project (my associates do not use BIM) Image: Cost of the project (my associates do not use BIM)	
hardware upgrades, education of BIM professionals) Image: Constraint of BIM Lack of BIM-knowledgeable design professionals on the project (my Image: Constraint of BIM professionals on the project (my associates do not use BIM) Image: Constraint of BIM Yes No time to learn (tight project schedules) Image: Constraint of BIM Image: Constraint of BIM Reluctance to change BAU (business as Image: Constraint of BAU Image: Constraint of BAU Image: Constraint of BAU	
professionals)	
Professionals on the project (my associates do not use BIM) Image: Constraint of the project schedules) Yes No time to learn (tight project schedules) Reluctance to change BAU (business as Image: Constraint of the project schedules)	
Yes associates do not use BIM)	
Yes No time to learn (tight project schedules) Reluctance to change BAU (business as	_
Reluctance to change BAU (business as	
	_
usual) methods	
Owners and/or other firms on projects do	
not demand use of BIM, it is not required	
in construction process	
No perceived value of BIM by clients	
Project budget and complexity	
Problems with intellectual rights	
(ownership of BIM model) Lack of interoperability between BIM	_
software used by team members	
Other, please specify	
30. Do you forecast companies/organizations will a) Yes	
Yes be left behind and/or struggle to survive if b) No	
they do not adopt BIM quickly enough? c) Do not have an opinion	
a) No effect	
31. In Your opinion, how will the implementation b) Redefined	
Yes of BIM affect the role You are having in Your	
c) Extinct	
d) Do not have an opinion	
a) Not likely at all	
32. In your opinion, how likely is it that your b) Somewhat likely	
company/organization will be required to c) Moderately likely	
Yes apply BIM on energy efficiency related d) Very likely	
projects? e) Extremely likely	
f) Do not have an opinion	
33. In Your opinion, how important is it that a) unimportant	
specific departments and/or Ministries (those b) of little importance	
responsible for energy efficiency in buildings) c) moderately important	
Yes mandate the use of BIM in order to encourage d) important	
its implementation on energy efficiency e) very important	
related projects? f) Do not have an opinion	
a) Absolutely	
Yes 34. Would BIM certification, support or training, b) Likely	
benefit Your colleagues? c) Possibly	
d) No	





Yes	35.	Are you ready to take a course in BIM or send Your employees on a course in BIM?	a) Yesb) Not at the moment, in one yearc) Not at the moment, in 2 years or more
Yes	36.	If there would be formal education for certain BIM profiles, about BIM, advantages of BIM and BIM processes (<u>without using specific</u> <u>software</u>), would You be willing to educate Yourself (Your employees) in such courses?	 a) Yes b) Yes, if needed to advance in BIM levels or recertification c) No, I believe that I can learn enough in my work environment d) No, I believe that training provided by BIM software vendors is sufficient e) It depends on the price and the duration of such training
Yes	37.	Do You believe "BIM" is currently a requirement in Your country?	a) Yes b) No c) I don't know
Yes		Would You be willing to disseminate the BIM training courses among Your contacts and associates? thout any obligation to do so!	 a) Yes, if I find them useful and of good quality b) No, probably not (after all, they are my competitors) c) I don't know
Yes	39.	What do You feel would be the most suitable duration of BIM certification course?	 a) < 8 hours b) 8 - 16 hours c) 16 - 32 hours d) > 32 hours
Yes	40.	When would You prefer to have the BIM training courses?	 a) During working hours b) After working hours c) During weekends d) No preferences
No	41.	The survey results will be shared with You if a registration is performed on the web page:	Please register: <u>http://www.net-</u> ubiep.eu/registration/



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H. Pre training questionnaire The questionnaire tailored for training participants



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H. The questionnaire tailored for training participants

H.1 Foreword to the survey

Dear Madam/Sir,

You are invited to participate in Survey about using BIM to increase energy performance of buildings. The purpose of this survey is to assess the implementation of building information modelling (BIM) as a tool and a process for energy efficiency application among key stakeholders of the **Net-UBIEP project (Horizon 2020)** in order to understand the current use of BIM, benefits of using BIM, obstacles to using BIM as well as possible future use.

Net-UBIEP (Network for Using BIM to Increase the Energy Performance of Buildings) aims at increasing energy performance of buildings by <u>wide spreading and strengthening the use of BIM</u>, during the life cycle of the building. For more information about the project please visit <u>www.net-ubiep.eu</u>.

This survey will address all stakeholders of construction project: Public administration, Professionals (designers, constructors, supervising engineers), Technicians (installers/maintainers), Tenants/Owners, Building Administrator (facility managers, etc.) and other stakeholders involved in energy efficiency projects in general.

This questionnaire is tailored for **Training participants** as a **Pre training questionnaire**.

If you have not had experience with BIM yet, feel free to answer the questions to the best of your ability or you can forward the link of this survey to another person in your company/organization who would be better able to answer questions about the current use of building information modelling (BIM) on energy efficiency projects.

We will ask you to complete the questionnaire again at the end of the workshop so that we can assess what you have learned and how the trainers have done at conveying the main points.

All of the information collected will remain confidential. Anonymous answers will be used for research purposes only. Results will be shared with those who participate, if an email is provided within the survey.

Thank you for your participation!





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Obligator y question	Question	Possible answers	
		a) Owner	
		b) Architecture	
	1 Milligh of the following best describes your	c) Engineering	
	1. Which of the following best describes your	d) Construction company	,
Yes	company/organization's type?	e) Subcontractor	
	(Plaase merk one ensurer)	f) Facility management	
	(Please mark one answer).	g) Construction managen	nent
		h) Public authority	
		i) Other, please specify	
		a) Company owner	
		b) Company director	
		c) President	
		d) Vice-president	
		e) Designer	
		f) Lead designer	
		g) Project manager	
		h) Project engineer	
	2. What role do you perform within your	i) Public authority (depar	rtment
Yes		head, senior clerk, cler	
	company?	j) Field engineer	
		k) Installer (insulation, te	chnical
		systems, automation, o	
		I) Building (part of building	
		m) Superintendent	0.
		n) Building manager	
		o) BIM specialist	
		p) Other, please specify	
Yes		a) < 5 years	
(except	3. How many years have you been working as a	b) 5 – 10 years	
for	professional in your discipline?	c) 10 – 20 years	
tenants)	•	d) > 20 years	
		a) Residential	
		b) Commercial	
Mar		c) Higher education	
Yes	4. What type of construction projects does your	d) Education	
(except	company/organization focus on?	e) Hospitality	
for		f) Healthcare	
tenants)	(Please select all that apply).	g) Transportation	
		h) Infrastructure	
		i) Interior	





		j)	Research and Labs
		k)	Government and Federal
		I)	Other, please specify
		a)	< 50,000 EUR
		a) b)	< 50,000 – 250,000 EUR
Yes		c)	
(except	5. What is the typical project value range your	d)	500,000 – 1,000,000 EUR
for tenants)	company/ organization is involved in?	e)	1,000,000 – 5,000,000 EUR
tenantsy		f)	5,000,000 – 10,000,000 EUR
		g)	> 10,000,000 EUR
	6. Do You or Your company/organization currently		
Yes	use BIM, or is it intending to use BIM in the near future?	a)	Yes
	* If your answer to Question 6 is NO, please complete Questions 7-8.	b)	No
	** If your answer to Question 6 is YES answer Questions 9-21		
Yes	7. * If you have not had experience with BIM, are	a)	Yes
(lf *)	you aware of the BIM approach?	b) a)	No Not likely at all
	8. * If your company/organization does not	a) b)	Somewhat likely
Yes	currently use BIM, how likely your	c)	Moderately likely
(If *)	company/organization will use BIM in future?	d)	Very likely
	(Please mark one answer).	e)	Extremely likely
		a)	< 50,000 EUR
		b)	
Yes	9. ** What was project value for which you used	c)	250,000 – 500,000 EUR
(If **)	BIM?	d)	500,000 – 1,000,000 EUR
		e) f)	1,000,000 – 5,000,000 EUR 5,000,000 – 10,000,000 EUR
		g)	> 10,000,000 EUR
	10. ** How many professionals with working	87	
Yes	knowledge of BIM are employed by your		
(If **)	company/ organization?		
		a)	Public Authorities
		b)	Owner
		c)	Architect
	11. ** In your opinion, who derives benefits from	d)	Engineer
Yes	using BIM on energy efficiency related	e)	General contractor
(If **)	projects?	f)	Construction manager
	(Please select all that apply).	g)	Installer
		h)	Facility manager
		i)	Building manager
		j)	Other (please specify)
Yes	12. ** At which level does you	a)	Create (author) building



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(If **)	company/organization utilize BIM? (Please	information models
	mark one answer).	b) Use BIM tools to analyse models
		but do not create our own
		models
		c) Create (author) and analyse
		building information models
		d) Other (Please specify)
		a) < 1 year
	13. ** How many years has it been since your	b) 2–3 years
Yes	company/organization first implemented	c) 4 – 5 years
(If **)	BIM?	d) 6 – 10 years
		e) > 10 years
		a) < 1 year
		b) 2–3 years
Yes	14. ** Indicate in years your experience in BIM?	c) 4 – 5 years
(If **)	, , ,	d) 6 – 10 years
		e) > 10 years
		a) < 10 %
Yes	15. ** What percentage of the projects that your	b) 10–30 %
(If **)	company/organization executed has utilized	c) 30 – 50 %
、 ,	BIM within the past 5 years?	d) > 50 %
		a) Building energy refurbishment
		within minimum compliance
		b) Building energy refurbishment to
		NZEB
		c) New NZEBs
	16. ** How were Your BIM projects related to	d) New building within minimum
Yes	increasing energy efficiency?	compliance
(If **)		e) Industry facilities energy
	(Please select all that apply).	optimisation
		f) Building energy consumption
		control
		g) Other (Please specify)
		a) Design-bid-build
		b) Design-build
		c) Construction management
	17. ** What project delivery method was used on	d) Integrated project delivery (IPD)
Vee	energy efficiency related projects that use	e) Construction management at risk
Yes	BIM?	f) Build-operate-transfer (BOT)
(If **)		g) Design- Build-finance-operate
	(Please select all that apply).	(DBFO)
		h) ESCO model
		i) Other (Please specify)





Yes (If **)	18.	** Do You believe that implem associated with BIM (e.g. hardw and staff training) outweigh be BIM?	ware, soft	ware	b)	Yes No Do n	ot have a	n opinion		
Yes (If **)	19. ** Do you believe that implementation of BIM results in productivity gains?					Yes No Do not have an opinion				
Yes (If **)	20. ** The general opinion is that <u>widespread</u> <u>adoption</u> of BIM will facilitate a reduction of costs and opportunity for error. Do You agree or disagree with this statement?					a) Agreeb) Disagreec) Do not have an opinion				
Yes (If **)	21. ** With the successful adoption of BIM, a new collaborative way of working and sharing of information is expected. From Your experience, or in Your opinion, will this be achieved?					Yes No Do n	ot have a	n opinion		
Yes	22. How do You rate Your competences (knowledge, skills, responsibility and autonomy) in BIM?				 a) Excellent b) Very good c) Good d) Little e) I don't know 					
			,		d)	Little	2			
	23.			rongly do `	d) e)	Little I don	e n't know	ee with the		
		autonomy) in BIM? From Your understanding of BI following statements?		rongly do Y Disagree	d) e)	Little I don gree	e n't know	ee with the Strongly Agree	do not have opinion	
	The i	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is.	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
	The i what BIM	autonomy) in BIM? From Your understanding of BI following statements?	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
Yes	The i what BIM BIM	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is. is all about real time collaboration.	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
Yes	The i what BIM BIM BIM BIM	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is. is all about real time collaboration. is all about software. is only for new build, not renovation. doesn't facilitate modified design or	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
Yes	The i what BIM BIM BIM BIM cons	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is. is all about real time collaboration. is all about software. is only for new build, not renovation. doesn't facilitate modified design or truction method.	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
Yes	The i what BIM BIM BIM cons BIM	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is. is all about real time collaboration. is all about software. is only for new build, not renovation. doesn't facilitate modified design or truction method. is just a synonym for 3D CAD	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
Yes	The i what BIM BIM BIM cons BIM draw	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is. is all about real time collaboration. is all about software. is only for new build, not renovation. doesn't facilitate modified design or truction method.	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
Yes	The i what BIM BIM BIM cons BIM draw BIM big b	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is. is all about real time collaboration. is all about software. is only for new build, not renovation. doesn't facilitate modified design or truction method. is just a synonym for 3D CAD <i>rings.</i> s just for the 'big' - big companies, buildings, big (government) projects.	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
Yes	The i what BIM BIM BIM Cons BIM draw BIM' big b BIM	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is. is all about real time collaboration. is all about software. is only for new build, not renovation. doesn't facilitate modified design or truction method. is just a synonym for 3D CAD rings. s just for the 'big' - big companies, buildings, big (government) projects. only benefits those involved in	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	
Yes	The i what BIM BIM BIM Cons BIM draw BIM big b BIM desig	autonomy) in BIM? From Your understanding of BI following statements? industry is yet not clear enough on t BIM really is. is all about real time collaboration. is all about software. is only for new build, not renovation. doesn't facilitate modified design or truction method. is just a synonym for 3D CAD <i>rings.</i> s just for the 'big' - big companies, buildings, big (government) projects.	M, how st		d) e) You a	Little I don gree	e i't know or disagre	Strongly	do not have	



	not likely at all	somewhat likely	moderately likely	very likely	extremely likely	do not have opinion
Knowledge gaps in the fundamental understanding of BIM's advantages						
Cost of implementation (software and hardware upgrades, education of BIM professionals)						
Lack of BIM-knowledgeable design professionals on the project (my associates do not use BIM)						
No time to learn (tight project schedules)						
Reluctance to change BAU (business as usual) methods						
Owners and/or other firms on projects do not demand use of BIM, it is not required in construction process						
No perceived value of BIM by clients						
Project budget and complexity						
Problems with intellectual rights (ownership of BIM model)						
Lack of interoperability between BIM software used by team members						

25. In Your opinion, how important would it be to use BIM in different phases of future energy efficiency related projects?

		unimportant	of little importance	moderately important	important	very important	do not have opinion
Yes	Predesign or program phase						
103	Schematic design phase						
	Design development phase						
	Construction documents phase						
	Pre-construction phase						
	Construction administration phase						
	Post-construction operation phase						

26. In your opinion, how likely is it that your company/organization

Yes will require (be required) to apply BIM on energy efficiency related projects?

- a) Not likely at all
- b) Somewhat likely
- c) Moderately likely
- d) Very likely
- e) Extremely likely
- f) Do not have an opinion





Yes	27.	In your opinion, how important is it that specific departments and/or Ministries (those responsible for energy efficiency in buildings) mandate the use of BIM in order to encourage its implementation on energy efficiency related projects?	c) d)	unimportant of little importance moderately important important very important Do not have an opinion
Yes	28.	Do You believe "BIM" is currently a requirement in Your country?	a) b) c)	Yes No I don't know
No	29.	The survey results will be shared with You if a registration is performed on the web page:	<u> http://</u>	register: <u>www.net-</u> eu/registration/



research and innovation programme

under grant agreement No.754016



I. Post training questionnaire The questionnaire tailored for training participants



www.net-ubiep.eu - netubiep.project@net-ubiep.eu.it



I. The questionnaire tailored for training participants

I.1 Foreword to the survey

Thank you for attending **Net-UBIEP** training course.

Net-UBIEP (Network for Using BIM to Increase the Energy Performance of Buildings) aims at increasing energy performance of buildings by <u>wide spreading and strengthening the use of BIM</u>, during the life cycle of the building. For more information about the project please visit <u>www.net-ubiep.eu</u>.

Your experience at the training is very important to us as we continue to look for ways to improve our capacity-building activities.

The **purpose of this survey** is to help us determine the extent to which the training met its goals and to identify ways to improve future training events.

This questionnaire is tailored for **Training participants** as a **Post training questionnaire**.

We invite you take a few minutes to complete this short survey and provide your feedback. The survey should take **less than 15 minutes**.

Your **participation is voluntary, anonymous and confidential**, we will use the findings only to improve future trainings.

All of the information collected will remain confidential. Anonymous answers will be used for research purposes only. Results will be shared with those who participate, if an email is provided within the survey.

Thank you for your participation!





I.2 Intervie	w with Training participants										
Obligator y question	Question			Possik	ole answe	rs					
Yes	 Do You or Your company/organ BIM, or is it intending to use BIN 	1 in the ne	ear future?								
	2. What do you consider as barriers for BIM implementation?										
		not likely at all	somewhat likely	moderately likely	very likely	extremely likely	do not have opinion				
	Knowledge gaps in the fundamental understanding of BIM's advantages Cost of implementation (software and										
	hardware upgrades, education of BIM professionals)										
	Lack of BIM-knowledgeable design professionals on the project (my associates do not use BIM)										
Yes	No time to learn (tight project schedules) Reluctance to change BAU (business as usual) methods										
	Owners and/or other firms on projects do not demand use of BIM, it is not required in construction process										
	No perceived value of BIM by clients										
	Project budget and complexity Problems with intellectual rights (ownership of BIM model)										
	Lack of interoperability between BIM software used by team members										
	Other, please specify										
Yes	 In Your opinion, will You need to design/ check compliance/ nZEBs in future? 	nı	Yes, it wi No, busir	arge buildi Il be mand ness as usu	atory al						
	(Please select all that apply).	e)	methods I don't kr	are sufficionow	ent						
Yes	4. Do You think that implementa with BIM (e.g. hardware, softwork outweigh benefits from BIM?			21	Yes No						
Yes	5. Do you forecast companies/or behind and/or struggle to surv adopt BIM quickly enough?	-		eft a) b)	Yes No						



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Yes	6.	In Your opinion, how will the ir affect the role You are having i organization?	•		M a) b) c)	No affect Redefined Extinct		
Yes	7. (Ple	What do You think are key tasl efficiency which will be the mo implementation of BIM? ease select 5 key tasks that will b	ost affected	d by	 c) d) e) f) g) h) i) k) l) 	Establishing and feasibil Preparation contract do Cost analysi costing Identifying, developing Analysing p Energy perf Valuing com compliance Constructio Identifying a Energy perf Facility man Storage of co information Managing e Constructio	ity studies of tender a cuments s and lifecy analysing a responses t roposed ou ormance m pleted wo checking n quality co as built situ ormance ce agement locumentat about the nergy cons	and rcle nd co risks tcomes odelling rk and ontrol ation ertificate cion and building umption
	8.	Rate the <u>business benefits</u> that BIM on energy efficiency relate			anizatio	n could have	due to the	use of
			not beneficial at all	slightly beneficial	moderat benefic		extremely beneficial	do not have opinion
		reased project cost and duration						
Yes		eased productivity/efficiency						
-	-	ter quality of project					<u> </u>	
	Incr	eased return on investment (ROI) and						



Increased accuracy of the cost estimate

Maintaining business with past clients

project profitability

Extended building life

Faster regulatory approval



Yes



9. Rate the <u>project benefits</u> specific to energy efficiency that Your company/organization could achieve as a result of using BIM. not slightly moderately very extremely do not

	not beneficial at all	slightly beneficial	moderately beneficial	very beneficial	extremely beneficial	do not have opinion
Better-designed and performing building						
Improved collective understanding of design intent						
Lower risk and better predictability of outcomes (more accurate project documentation, less field coordination problems						
Greater professional satisfaction with project outcomes, reduced claims, disputes and conflicts						
Individual participant productivity						
Lower construction costs, faster project delivery and higher profitability of participating companies						
Enhanced operations, maintenance and facility management						
Improved review and approval cycles						

10. In Your opinion, how important would it be to use BIM in different phases of future energy efficiency related projects?

		unimportant	of little importance	moderately important	important	very important	do not have opinion
Yes	Predesign or program phase						
	Schematic design phase						
	Design development phase						
	Construction documents phase						
	Pre-construction phase						
	Construction administration phase						
	Post-construction operation phase						
Yes	 Please assess, how much ca productivity by using BIM, a 		•	e? c) >	– 10 % 10 % Jon't know	,	
Yes	 Please assess, how much en save by applying knowledge training How much would Your desig 	gained duri	ng this BIN	a) 0 b) 5 c) >	– 5 % – 10 % 10 %		





Yes	13. In your opinion, how likely is it that your company/organization will require (be required) to apply BIM on energy efficiency related projects?	 a) Not likely at all b) Somewhat likely c) Moderately likely d) Very likely e) Extremely likely f) Do not have an opinion
Yes	14. In your opinion, how important is it that specific departments and/or Ministries (those responsible f energy efficiency in buildings) mandate the use of BIM in order to encourage its implementation on energy efficiency related projects?	 a) unimportant b) of little importance or c) moderately important d) important e) very important f) Do not have an opinion
Yes	15. Would BIM certification, support or training, benefi Your colleagues?	 a) Absolutely t b) Likely c) Possibly d) No
Yes	16. What do You think about formal education about BIM, advantages of BIM and BIM processes (<u>withou</u> <u>using specific software</u>)? (Please mark one answer)	 a) Quite useful b) Quite useful, I can learn specific BIM software on my own c) Useful but I need more training on specific BIM software d) Not useful at all e) It depends on the price and the duration of such training
Yes	17. Do You believe "BIM" is currently a requirement in Your country?	a) Yes b) No c) I don't know
Yes	 In retrospective, how do You rate Your competence (knowledge, skills, responsibility and autonomy) <u>before</u> this BIM course? 	 a) Excellent s b) Very good c) Good d) Little e) I don't know
Yes	19. What overall rating would You give the course?	 a) Excellent b) Very good c) Good d) Fair e) Poor



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	20. Please indicate your level of agreement with the following statements:							
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	do not have opinion	
	The course objectives were clear.							
	The content was organized and easy to follow.							
	The course materials were clear and well written.							
Yes	The course materials contain sufficient number of images and videos explaining the course content.							
	The assignments were appropriate for the level of this class.							
	The topics covered were relevant to me and will be useful in my work.							
	The coursework was appropriate to my prior knowledge.							
	The course increased my interest in the subject.							
	The course corresponded to my expectations.							
				a)	Excelle	nt		
	21. What overall rating would you give the trainer(s)?			b)	b) Very good			
Yes				c)	Good			
					Fair			
				d) e)	Poor			
				C)	1001			
	22. Please indicate your level of agreement with the following statements:							
							do not	
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	have opinion	
Yes	The trainer demonstrated knowledge of the subject matter.							
100	The trainer was effective in							
	communicating the content of the course. The trainer encouraged feedback from							
	the class.							
	The trainer used interactive tools to actively involve me in the course.							
				- 1	1			

Yes

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24. Please indicate your level of agreement with the following statements: do not Strongly Strongly Disagree Neutral Agree have Disagree Agree opinion The training increased my knowledge of what BIM is, why it is needed, BIM specific terminology and BIM processes. The training increased my understanding on advantages of using BIM during the lifecycle of the building regarding energy efficiency. The training increased my understanding about the key issues related to working with BIM (identifying and managing issues associated with BIM implementation). The training increased my understanding on the importance of having reliable information when designing and managing an energy efficient building. The course clearly outlined how can BIM help to increase Energy Performance Yes The training increased my understanding on how to define the requirements of BIM model. The training increased my capacity on how to develop a strategy for implementing BIM. The training increased my knowledge on and recognize the need of Open BIM tools, standard format and interoperable solution. The training helped build my capacity to apply information management using BIM. The training helped build my capacity to apply procurement management using BIM. The training helped build my capacity on the use of BIM technology (7D BIM, code checking, clash detection, etc) The training helped build my capacity on how to use BIM for quality management. The training helped build my capacity on how to use BIM for supervision of construction works. The training helped build my capacity on how to use BIM for handover and maintenance.

25. Please rate the following BIM course modules based on how they are useful and interesting to You.

		Not useful - redundant	Useful – should be amended	Useful – no changes necessary	Quite useful – should be amended	Quite useful – no changes necessary	Do not have opinion
Introductory I knowledge an	Module – Basic BIM Id skills						
Module 1 – D	iffuse BIM						
Module 2 – A management	oply information						
Module 3 – A management	oply procurement						
Module 4 – U	se BIM technology						
Module 5 – A	nalyse the BIM Model						



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Yes	26. What do You feel, is the training material comprehensive enough?(Please mark all that apply)	 a) Yes, it's adequate b) It should contain more practical examples (best experiences) c) It should contain more practical examples (existing issues in BIM) d) It should give more country specific regulatory requirements
Yes	27. What do You feel about the duration of the training?	a) It is adequateb) It should be longerc) It should be shorter
Yes	28. Would You be willing to disseminate the BIM training courses among Your contacts and associates? Without any obligation to do so!	 a) Definitely b) Probably c) Not sure d) Probably not e) Definitely not
Yes	29. Would you prefer to take this course online or in the classroom?	a) Online (e-learning) b) Classroom
No	30. Please provide any comments or suggestions that might help improve this course in the future.	
No	31. The survey results will be shared with You if a registration is performed on the web page:	Please register: <u>http://www.net-</u> ubiep.eu/registration/





This deliverable reflects only the author's view. The Agency is not responsible for any use that may be made of the information it contains.

The present deliverable will be update during the project in order to align the outcome to the market needs as well as to other BIM related projects realized within Horizon 2020 program.

The updated version of the deliverable will be only available in the website of the project www.net-ubiep.eu.

Some deliverables could also be translated in partners national languages and could be find in the respective national web pages. Click on the flags to open the correspondence pages:





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