



# BIMplement

Towards a learning building sector by setting up a large-scale and flexible qualification methodology integrating technical, cross-craft and BIM related skills and competences.

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Report:	<b>D3.2 Inventory of available content, training and exercises connected with the Matrices, implemented in the five national frameworks</b>
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## Executive summary

This report (D3.2) presents an overview of available educational material, content, training and exercises that can be used to upskill and improve the competences of the identified actors in report D3.1. The objective of the task T3.2 was to map:

- Knowledge sources: available design guidelines, e-learning material (videos), pedagogical documents available on local/national level that can provide training and upskilling of blue/white collars and deal with the topic of air-tightness, ventilation, nZEB;
- Available training programmes: relevant training programmes available on local/national level that provide training and upskilling for a specific target group (blue/white collars) dealing with the topic of air-tightness, ventilation, nZEB.

It should be noted that the work is still ongoing. With the fast development of the new publications and guidelines in the area of nZEB it can be expected that certain new suitable knowledge sources will be mapped during the implementation of the BIMplement in the demonstration countries: France, Poland, the Netherlands, Lithuania and Spain.

The mapped knowledge sources and training material reported in this deliverable will serve as a basis when linking the useful content and education material with the qualification framework and brining it into BIM based construction projects for the identified experimental sites. The mapped knowledge sources having an open access are available online in the PROF/TRAC repository database:

<http://profrac.eu/training-material/search-training-material.html>

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## 1. Mapping of knowledge sources and training material on EU level

This chapter introduces the knowledge sources and results from different European umbrella organization as from the European (research) projects. Different European umbrella organizations were contacted, and their education material repositories are beneficial knowledge sources to be used for BIMplement (in the field of air-tightness and ventilation):

- REHVA guidebooks – REHVA Federation of European Heating, Ventilation and Air-Conditioning Associations <http://www.rehva.eu/>;
- AIVC publications – Air Infiltration and Ventilation Centre: <https://www.aivc.org/resources>;
- EVIA repository - European Ventilation Industry Association: <http://www.evia.eu/en/>;
- INIVE library – International Network for Information on Ventilation and Energy performance: <http://www.inive.org/library/>.

Knowledge repositories and results of several EU projects were studied and used as references for the BIMplement work:

- QUALICHECK platform: <http://www.qualicheck-platform.eu/>;
- PROF/TRAC knowledge database: <http://www.profrac.eu/>;
- EUROVENT certification schemes: [http://www.eurovent-certification.com/en/Eurovent\\_Certification/](http://www.eurovent-certification.com/en/Eurovent_Certification/).

Furthermore, several other H2020 BIMplement sister projects were contacted and their approaches and knowledge sources were analyzed:

- NEWCOM project: [https://cordis.europa.eu/project/rcn/210092\\_en.html](https://cordis.europa.eu/project/rcn/210092_en.html);
- BIMEET project: <https://www.list.lu/en/research/project/bimeet/>;
- Net-UBIEP project: <http://www.net-ubiep.eu/>;
- Fit-to-nZEB project: <http://www.fit-to-nzeb.com/>;
- BIMcert: [https://cordis.europa.eu/project/rcn/213583\\_fr.html](https://cordis.europa.eu/project/rcn/213583_fr.html).

More detailed information about the applicable and suitable training and education material from the different projects that can be used on EU level is presented in the table below.

Name/Website/partners	Topic	Type of training material	Notes (What relevant for BIMplement)	Applicability (country/EU)/languages
PROF/TRAC <a href="http://www.profrac.eu">www.profrac.eu</a>	Training on energy efficiency and RES	A database of training materials developed by EU projects and other sources	A Horizon 2020 Construction Skills project; opportunities to use the platform and the repository (PROF/TRAC data base <a href="http://profrac.eu/training-material/search-training-material.html">http://profrac.eu/training-material/search-training-material.html</a> ) for BIMplement	EN/Eng
IEE IDES-EDU (website content migrated to PROF/TRAC)	Master and Post Graduate education and training in multidisciplinary teams	Lectures (ppt sheets), formats for workshop, professional level	Educational Package on Ventilation (10 lectures), Lecture Sustainable Building 7: Quality Control and Commissioning Educational Package on Whole Building and Renewable Energy Concepts (7 lectures on holistic understanding of building design)	EU/Eng
Towards improved compliance and quality of the works for better performing buildings (QUALICHECK) <a href="http://www.qualicheck-platform.eu">http://www.qualicheck-platform.eu</a>	Quality assurance Energy Performance Certificates (EPC)	Transmission characteristics (opaque & transparent components, as well as the handling of e.g. thermal bridges). Ventilation and airtightness.	Webinars, Workshops Short university courses Webinars, Workshops Short university courses Fact sheets on ventilation: 3, 6, 10, 18, 50, 55, mostly on national situations, (3 and 6 for France) Fact sheets on air tightness: 1 and 7 (France), 21, webinar 3	EU/Eng
TightVent Europe <a href="http://tightvent.eu/events/webinars">http://tightvent.eu/events/webinars</a>	Building and ductwork airtightness platform	Ventilation and airtightness	Webinars, workshops <a href="http://tightvent.eu/events/webinars">http://tightvent.eu/events/webinars</a>	EU/Eng
Training for Rebuilding Europe (TRAINREBUILD) <a href="http://www.trainrebuild.eu">www.trainrebuild.eu</a>	Trainings for renovation	Training materials for owners, financiers, municipalities	<a href="http://trainrebuild.eu/project-results">trainrebuild.eu/project-results</a>	EU/Eng
QualiBuild <a href="http://www.qualibuild.ie">www.qualibuild.ie</a>	Introduction to low energy building construction	Training programme with a manual and six fully-elaborated units	Unit 5 on ventilation <a href="#">Useful-links/unit-5/</a> Free e-book describing why airtightness and ventilation are important <a href="#">Quality-Building-EBook.pdf</a>	EU/Eng
MEnS - Meeting of Energy Professional Skills, towards NZEB <a href="http://www.mens-nzeb.eu">www.mens-nzeb.eu</a>	Training programs for building professionals in	Training courses related to NZEB to empower professionals with	Webinar Ventilation inputs for the retrofit Case Study building in the Passive House Planning Package (PHPP)	EU/Eng

	11 EU countries provide NZEB skills of building managers such as engineers and architects through a series of accredited training activities	energy efficiency and renewable's integration skills		
Affordable and Adaptable Public Buildings through Energy Efficient Retrofitting <a href="http://www.a2pbeer.eu/">http://www.a2pbeer.eu/</a>	Energy Efficient Retrofits	Retrofitting strategies, technologies reviews, online training after registration (restricted)	<a href="#">D2-2 Technologies-and-strategies</a>	EU/Eng
Development and implementation of multi-lingual educational video clips applied by craftsmen and site supervisors to gain further skills for the construction of passive houses / ConClip <a href="http://www.conclip.eu">www.conclip.eu</a>	Videos for training construction workers for passive buildings		<a href="#">Airtightness – window installation in exterior brick wall with insulation</a> <a href="#">Airtightness – sealing around cables, ducts</a>  <a href="#">Airtightness- sealing of threshold area</a>	EU/Eng
Skills Alliance Energy Saving and Sustainable Construction in Baltic Sea Region <a href="http://www.skills-energy.eu">www.skills-energy.eu</a>	Innovative training programmes	<a href="#">Curriculum Advanced Training for SMEs Energy efficiency</a>  <a href="#">Curriculum Advanced Training for SMEs Energy Efficient Construction</a>	<a href="http://www.skills-energy.eu/material/">http://www.skills-energy.eu/material/</a>	Baltic countries/Eng
ISO 17024:2003 certification: Qualified Construction Worker ISO 17024:2003 <a href="http://www.iso-construct.eu">www.iso-construct.eu</a>	Validation of competences of unskilled workers in the construction sector applying ISO 17024 standards	Checklists, appraisal sheets, examination programmes, certification schemes, etc.	Qualification level 1 and 2	EU/Eng

## 2. Mapping of knowledge sources and training material on a national level

### 2.1 Mapping of knowledge sources and training material in France

This chapter introduces the nZEB status in France where the subchapters 3.1.1 and 3.1.2 present the mapped useful knowledge sources and available training programmes for the topic of air-tightness and ventilation.

The table below presents the knowledge sources and regulations in the area of nZEB in France.

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
RT2012 <a href="https://www.rt-batiment.fr/batiments-neufs/reglementation-thermique-2012/presentation.html">https://www.rt-batiment.fr/batiments-neufs/reglementation-thermique-2012/presentation.html</a>	French thermal regulation	Presentation of the French thermal regulation, that correspond to the nZEB building definition
Evolution entre norme NF EN ISO 9972, et la norme européenne NF EN 13 829 <a href="https://www.rt-batiment.fr/fileadmin/documents/RT2005/labels_HPE/specificites_BBC/PJ3/Informations-et_doc_ressources/Cerema_comparaison_NFEN13829_NFENISO9972.pdf">https://www.rt-batiment.fr/fileadmin/documents/RT2005/labels_HPE/specificites_BBC/PJ3/Informations-et_doc_ressources/Cerema_comparaison_NFEN13829_NFENISO9972.pdf</a>		Comparison and evolution between former thermal regulation and present nZEB RT2012 regulation

#### 2.1.1 Mapping of knowledge sources and training material in the area of ventilation

Knowledge sources: The information below is mainly related to dwellings (individual housing and collective dwellings).

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
VIA-Qualité Guide pratique à destination des constructeurs de maisons individuelles Mettre en œuvre une démarche pour améliorer la qualité de l'air intérieur en maisons individuelles – démarche qualité <a href="https://www.cerema.fr/system/files/documents/2018/03/VIA-QUALITE_Tache5_Guide_20160614_V01.pdf">https://www.cerema.fr/system/files/documents/2018/03/VIA-QUALITE_Tache5_Guide_20160614_V01.pdf</a>	Quality approach on ventilation for companies	Design and on-site implementation of a Quality Approach on ventilation for building companies
VIA-Qualité Analyse détaillée du site _MI <a href="https://www.cerema.fr/system/files/documents/2018/03/VIA-QUALITE_Tache5_Guide_20160614_V01.pdf">https://www.cerema.fr/system/files/documents/2018/03/VIA-QUALITE_Tache5_Guide_20160614_V01.pdf</a>	IAQ	Site environmental analysis at the design phase in order to check the possible future IAQ problems
VIA-Qualité Livret d'installation à destination des professionnels du bâtiment _ MI <a href="https://www.cerema.fr/system/files/documents/2018/03/Guide%20Installation_v1-Nov2016-web.pdf">https://www.cerema.fr/system/files/documents/2018/03/Guide%20Installation_v1-Nov2016-web.pdf</a>	On-site Implementation guide for ventilation systems	Technical and practical guide for ventilation system installers (mechanical and balanced ventilation systems) in order to avoid implementation errors
VIA-Qualité GUIDE GRAND AIR <a href="http://www.cerema.fr/system/files/documents/2018/03/MEDIECO_GUIDE_GRAND_AIR-Avril_2016.pdf">http://www.cerema.fr/system/files/documents/2018/03/MEDIECO_GUIDE_GRAND_AIR-Avril_2016.pdf</a>	Guide for users	Guide that explains to end-users why and how to keep a good IAQ in dwellings

VENTIL'acteurs <a href="http://www.cerema.fr/system/files/documents/2018/10/C17LP0032_ADEME_Ventilacteurs_RapportIntermediaire_VF_WE_B.pdf">http://www.cerema.fr/system/files/documents/2018/10/C17LP0032_ADEME_Ventilacteurs_RapportIntermediaire_VF_WE_B.pdf</a>	Roles and responsibilities of ventilation stakeholders	Program to be completed in 2019 aim at involving all ventilation stakeholders, from initial design to end-users, including building and maintenance companies, in a better dwelling ventilation
AIVC data base <a href="https://www.aivc.org/resources/airbase">https://www.aivc.org/resources/airbase</a>	Ventilation European network	Access to AIVC database, including conference papers and reports
PROMEVENT	Ventilation protocol for dwellings	Different documents and guide to help perform the tests see - § protocols
PromevenT Tertiaire	Ventilation protocol for office and public buildings	New project objective is to set a new protocol for ventilation quality testing in office and public buildings
<a href="http://www.ville-amenagement-durable.org/IMG/pdf/meeddm-ademe-edf-gdf-suez_guide-ventilation-naturelle-et-hybride-vnhy_2010.pdf">http://www.ville-amenagement-durable.org/IMG/pdf/meeddm-ademe-edf-gdf-suez_guide-ventilation-naturelle-et-hybride-vnhy_2010.pdf</a>	Natural and hybrid ventilation	explanatory document on natural and hybrid ventilation
<a href="http://www.ville-amenagement-durable.org/IMG/pdf/arene-iceb_ventilation-naturelle-et-mecanique_2012.pdf">http://www.ville-amenagement-durable.org/IMG/pdf/arene-iceb_ventilation-naturelle-et-mecanique_2012.pdf</a>	Natural and hybrid ventilation	explanatory document on natural and hybrid ventilation

Training material:

Title of the training module (website link)	Target group	Short description of the content (why relevant for BIMplement)	Other information
See AVE document on Dropbox: <a href="#">LINK</a>			

In France, training content belongs to the organization who gives the training program.

## 2.1.2 Mapping of knowledge sources and training material in the area of air-tightness

Knowledge sources:

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
guides MININFIL for building airtightness <a href="https://www.rt-batiment.fr/batiments-neufs/etancheite-a-lair/information-et-documents-ressources.html">https://www.rt-batiment.fr/batiments-neufs/etancheite-a-lair/information-et-documents-ressources.html</a>	Technical guide for designers and installers	3 guides on line on how to design and implement airtightness for heavy structures, including, either internal, external or distributed insulation
Ventilation network airtightness		



Training material:

<b>Title of the training module (website link)</b>	<b>Target group</b>	<b>Short description of the content (why relevant for BIMplement)</b>	<b>Other information</b>
Ventilation network airtightness	All		MOOC coming soon (CEREMA)

## 2.2 Mapping of knowledge sources and training material from The Netherlands

### 2.2.1 Mapping of knowledge sources and training material in the area of ventilation

Knowledge sources:

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
Dutch standardization institute <a href="https://www.nen.nl">https://www.nen.nl</a>	Database of standards	<u>Examples of useful standards for BIMplement</u> <ul style="list-style-type: none"> <li>- NEN 1087:2001 nl – Ventilation in Buildings</li> <li>- ASTM E1827 – 11(2017) en – Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower.</li> <li>- NEN 7120:2011 nl – Energy Performance of Buildings – Determination Method</li> </ul> <p>* This source contains all kinds of standards including standards concerning the design of buildings and installation to maintaining them.</p>
Educational institute <a href="https://avansplus.nl">https://avansplus.nl</a>	Course / training programme related to BIM and ventilation	<u>Useful courses for BIMplement</u> <ul style="list-style-type: none"> <li>- Higher installation technology for mechanical installations</li> <li>- BIM engineer</li> </ul> <p>Maintenance Management Installation Technology *This institute provide several training programmes in the field of design and service of installations.</p>
<a href="https://www.bouwbesluitonline.nl/">https://www.bouwbesluitonline.nl/</a>	Database of building regulations	Chapter 3.6 of this online document is about the dutch regulations concerning the ventilation quality in building
<a href="https://www.sbrcurnet.nl">https://www.sbrcurnet.nl</a>	Database of information sheets and papers in the field of building technology	<u>Useful practical Information sheets on ventilation:</u> <a href="https://www.sbrcurnet.nl/producten/infobladen">https://www.sbrcurnet.nl/producten/infobladen</a> Info sheets 1, 2, 3, 4, 5 <ul style="list-style-type: none"> <li>- Points of attention when assembling a ventilation system;</li> <li>- Designing ventilation system;</li> <li>- Adjusting ventilation systems.</li> </ul> <p>And more.</p>
<a href="https://kennisbank.isso.nl">https://kennisbank.isso.nl</a>	Database with (links to) ISSO publications and BRL's	ISSO publications: 61: Domestic ventilation systems; system selection and design 62: Domestic MVHR systems 63: Domestic ventilation systems – management and maintenance 91: Domestic decentral MVHR systems 92: Domestic decentral supply and central exhaust systems BRL 8010: Ventilation Performance Assessment
<a href="http://www.aeneas.nl/toolkit">www.aeneas.nl/toolkit</a>	Toolkit Duuzame woning bouw (Toolkit sustainable building)	Chapters 10: Health, 11: Comfort Theme sheets: Ventilation; Maintenance of building services

Klimapedia	Reference book	<a href="https://klimapedia.nl/publicaties/energievademecum/?part=6">https://klimapedia.nl/publicaties/energievademecum/?part=6</a>
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Training material:

Title of the training module (website link)	Target group	Short description of the content (why relevant for BIMplement)	Other information
Educational institution specialized in installation technology <a href="https://www.tvvl.nl">https://www.tvvl.nl</a>	White collar	Training programmes about: the physics of ventilation in buildings Commissioning Acoustics in buildings services	Course / training programme related to ventilation and commissioning/quality control
VLA/FME Mijn balansventilatie – Gezonde binnenlucht <a href="http://www.mijnbalansventilatie.nl">www.mijnbalansventilatie.nl</a>	White collar	Education for specialists	
VLA	Blue Collar	Module on mounting of ventilation systems; including unit of learning outcomes	Also an exam is available
Educational institution specialized in installation technology <a href="https://www.rovc.nl/">https://www.rovc.nl/</a>	Blue collar	The working of, construction, installation and maintenance of air treatment installation	Course / training programme related to ventilation
Modular course on ventilation	White and blue collars	5 modules & a formal exam  1. Basis ventilatie techniek 2. Ontwerpen ventilatiesystemen 3. Installeren en opleveren ventilatiesystemen 4. Beheer en onderhoud ventilatiesystemen 5. Module Systeemmontage	<a href="https://www.cito.nl/organisaties/examenkandidaten/isso-ventilatie-woningen">https://www.cito.nl/organisaties/examenkandidaten/isso-ventilatie-woningen</a>  Incl example exams <a href="https://www.cito.nl/organisaties/examenkandidaten/isso-ventilatie-woningen/voorbeeldexamens">https://www.cito.nl/organisaties/examenkandidaten/isso-ventilatie-woningen/voorbeeldexamens</a>

## 2.2.2 Mapping of knowledge sources and training material in the area of air-tightness

Knowledge sources:

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
Dutch standardization institute <a href="https://www.nen.nl">https://www.nen.nl</a>	Database of standards	<a href="#">Examples of useful standards for BIMplement</a> NEN8088 – Ventilation and Air-Tightness of buildings.
Dutch trade association	measuring	The latest facts concerning measuring methods for air-

concerning measuring methods for air-tightness of building <a href="http://www.nbvl.nl">http://www.nbvl.nl</a>	methods for air-tightness of building	tightness are described on this site.
Organisation that facilitates and promotes passive house <a href="https://www.passiefbouwen.nl/">https://www.passiefbouwen.nl/</a> <a href="https://www.sbrcurnet.nl">https://www.sbrcurnet.nl</a>	Passive House	A good knowledge for passive house, a method for building houses such that the air-tightness is so low that the heat demand is almost neglectable. This organization also provides courses in this field.
	Database of information sheets and papers in the field of building technology	Information sheets air tightness: <a href="https://www.sbrcurnet.nl/producten/infobladen">https://www.sbrcurnet.nl/producten/infobladen</a> Info sheets 8, 12, 14, 22, 24, 25, 29, 30, 31 <ul style="list-style-type: none"> <li>- Connect wooden façade elements in airtight manner;</li> <li>- Air-tight connection of window frames;</li> <li>- Air-tight building;</li> <li>- Make apertures and crawl spaces airtight.</li> </ul> SBR Publication 360: Air Tight Building
<a href="http://www.aeneas.nl/toolkit">www.aeneas.nl/toolkit</a>	Toolkit Duurzame woningbouw (Toolkit sustainable building)	Theme sheet: Air tightness
Klimapedia	Reference book	<a href="https://klimapedia.nl/publicaties/energievademecum/?part=5">https://klimapedia.nl/publicaties/energievademecum/?part=5</a>

#### Training material:

Title of the training module (website link)	Target group	Short description of the content (why relevant for BIMplement)	Other information
Educational institute that provides training programmes in the field of building construction <a href="https://www.bouwradius.nl/">https://www.bouwradius.nl/</a>	Blue & white collars	Provides course about airtight construction of buildings	Course / training program related to air-tightness
Educational institute that provides training programmes in the field of building construction <a href="https://www.bouwforum.nl/">https://www.bouwforum.nl/</a>	White collar	Provides training programmes about energy-efficient building	Course / training program related to air-tightness and nZEB
Educational institute that provides training programmes and workshops in the field of sustainable building <a href="https://www.greenworksacademy.nl">https://www.greenworksacademy.nl</a>	White collar	Provides training programmes about energy-efficient buildig	Course / training program related to air-tightness and nZEB
A consultancy firm that conducts air-tightness	Blue collar	Provides training programmes about conducting air-tightness measurements on buildings	Course / training

measurements of buildings and also provides training programmes <a href="https://www.woningborggroep.nl">https://www.woningborggroep.nl</a>			program related to air-tightness
BUILD UP Skills e-learning modules	Blue and white collars	<p>Energie neutraal bouwen gebouwschil <a href="https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=131">https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=131</a></p> <p>Energie neutraal bouwen voor installateurs <a href="https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=132">https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=132</a></p> <p>Luchtdicht bouwen <a href="https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=19">https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=19</a></p> <p>Kwaliteitsborging <a href="https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=45">https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=45</a></p> <p>Thermografie <a href="https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=29">https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=29</a></p> <p>Ultrasoon en ultragrafie <a href="https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=146">https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=146</a></p> <p>Ventilatie woningbouw <a href="https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=33">https://buildupskillsnl.anewspring.com/do?action=viewProduct&amp;id=33</a></p>	Short e-learning modules

## 2.3 Mapping of knowledge sources and training material from Poland

### 2.3.1 Mapping of knowledge sources and training material in the area of ventilation and air-tightness

Knowledge sources:

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
PN-EN ISO 52000-1:2017-10 Energy performance of buildings – Parent evaluation of the EPB	Parent evaluation of the EPB	This document establishes a systematic, extensive and modular structure for assessing the energy performance of new and existing buildings (ERA) in a holistic approach.
PN-EN ISO 9972:2015-10 Thermal properties of buildings - Determination of air permeability of buildings - Pressure measurement method with the use of a fan	Mechanical pressure system, measure air stream	The application of mechanical pressure generation in a building or in a building component has been determined. Techniques of measuring the created air stream with the stated difference of static pressure outside and inside the building are described; from the dependence of air flow and differential pressure, it is possible to determine the characteristics of air leakage through the building envelope.
Buildings with almost zero energy consumption – Collective work edited by Jezry Sowa, Warsaw, 2017	Zero-emission buildings	The book presents the current state of knowledge about zero-emission buildings, BIM and energy consumption.
Tomana A. "BIM. Innovative technology in buldings. Basics, standards and methodology"	Basics, standards and methodology	The book allows us to look at this topic extensively, from the historical introduction, through the standards and issues of cooperation of industries, issues related to implementation to examples of applications taken from Polish construction companies. In addition, the author has made a broad review of the state of implementation of BIM in many countries.
Kasznia D., Magiera J., Wierzowiecki P. "BIM in practice"	Standards, implementation, case study	The book is an accessible guide for people practically functioning in the BIM environment. The guidelines described in the book are an original adaptation to the conditions of Polish foreign standards, together with a comprehensive commentary and case study of the main problems encountered in practice in the implementation of BIM.

Training material:

Title of the training module (website link)	Target group	Short description of the content (why relevant for BIMplement)	Other information
Conferences f.e.: Building in the cloud – cooperation in planning, designing and management	White collar	Organizers: Autodesk	E-mail: budowawchmurze@communication.pl
Trainings conducted by experts	Blue collar	Organizers e.g.: WILO, systemair, Daikin, VTS,	Information is in manufacturer's webside
E-learnings, trainings of software	White collar	Organizers e.g.: AEC Design, Procad	Information is in manufacturer's webside

## 2.4 Mapping of knowledge sources and training material from Spain

This chapter introduces the nZEB status in Spain where the subchapters 2.4.1 and 2.4.2 present the mapped useful knowledge sources and available training programmes for the topic of air-tightness and ventilation. The table below presents the knowledge sources and regulations in the area of nZEB in Spain.

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
<p>Technical Building Code modification - draft</p> <p><a href="https://www.codigotecnico.org/images/stories/pdf/realDecreto/proyecto_julio_2018/Proyecto_RD_Modificacion_CTE.pdf">https://www.codigotecnico.org/images/stories/pdf/realDecreto/proyecto_julio_2018/Proyecto_RD_Modificacion_CTE.pdf</a></p> <p>Technical Building Code – Annex I Basic Energy Saving Document</p> <p><a href="https://www.codigotecnico.org/images/stories/pdf/ahorroEnergia/Proyecto_RD_ANEJO_I-DBHE.pdf">https://www.codigotecnico.org/images/stories/pdf/ahorroEnergia/Proyecto_RD_ANEJO_I-DBHE.pdf</a></p>	nZEB	<p>The Technical Building Code, promulgated by Royal Decree 314/2006, is the regulatory framework governing the basic quality requirements that must be met by buildings. This Code applies to new constructions, but also to the extension, modification, alteration or renovation works that are carried out on existing buildings. The Code includes a set of Basic Documents, one of them, the Basic Energy Saving Document, aims to obtain a rational use of energy required for buildings, reducing their consumption to sustainable limits, and ensuring that part of this consumption comes from renewable sources of energy, thanks to their design, construction, use and maintenance characteristics. This is the draft and will be applicable in 2019 (foreseen).</p> <p>So far, the Technical Building Code has not defined the concept nZEB. However, this Code is in the process of modification and the new draft underlines that a building will be considered nZEB if it complies with all the requirements established in this modified Technical Building Code.</p> <p>This modification is now in the process of hearing and public information and is foreseen to be in force in 2019.</p>
<p>Title: Estrategias para edificios de energía casi nula (Strategies for nearly zero energy buildings)</p> <p>Publisher: AEICE Cluster Hábitat Eficiente (Cluster Efficient Habitat)</p> <p>Year of publication: 2018</p> <p>Link:</p> <p><a href="https://www.asociacion3e.org/descargar.php?s=biblioteca&amp;file=archivos/biblioteca/estrategias-para-edificios-de-energia-casi-nula.pdf">https://www.asociacion3e.org/descargar.php?s=biblioteca&amp;file=archivos/biblioteca/estrategias-para-edificios-de-energia-casi-nula.pdf</a></p>	nZEB	<p>This manual (350 pages) responds to the demands of a sector that must be adapted to European regulations.</p> <p>The publication deals with regulations related to nearly zero energy buildings; practical design solutions; the construction phase including critical points, on site control and tests; and success stories from Spain and other countries.</p>

<p>Title: Guía del estándar Passivhaus – Edificios de consumo energético casi nulo (en: Guide on Passive House – Nearly Zero Energy Buildings)  Publisher: FENERCOM, Community of Madrid Energy Foundation  Year of publication: 2011  Link:  <a href="https://www.fenercom.com/pdf/publicaciones/Guia-del-Estandar-Passivhaus-fenercom-2011.pdf">https://www.fenercom.com/pdf/publicaciones/Guia-del-Estandar-Passivhaus-fenercom-2011.pdf</a></p>	nZEB	<p>This guide aims to raise awareness about the concept of passivhaus which represents the future in the development of nZEB.</p> <p>Chapter 7 is focused on airtightness while Chapter 9 is focused on ventilation.</p>
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**Training material:** Below is listed relevant training programmes available on local/national level that provides training and upskilling for a specific target group (blue/white collars) dealing with nZEB in Spain.

Title of the training module (website link)	Target group	Short description of the content (why relevant for BIMplement)	Other information
<p>Curso sobre cómo diseñar un edificio de consumo casi nulo (en: How to design a nearly zero energy building?)  <a href="https://www.fenercom.com/pages/informacion/evento.php?id=524">https://www.fenercom.com/pages/informacion/evento.php?id=524</a></p>	White collar	<p>Organizers: The General Directorate of Industry, Energy and Mines and the Energy Foundation of the Community of Madrid through the Energy Foundation of the Community of Madrid (FENERCOM) in collaboration with ATECYR (Spanish Technical Association of Air Conditioning and Refrigeration).</p> <p>Description: Through innovative training techniques, participants acquire knowledge on how to meet the new requirements of the regulations in the building sector: NZEB</p> <p>Dates: September 25 and 26, October 2, 3, 9, 16 and 23; and November 6.</p> <p>Cost: 670€</p> <p>Duration: 37 hours</p> <p>Method: Face-to-face</p> <p>Editions: 1</p>	E-mail: secretary@fenercom.com
<p>ESPECIALISTA EN AUDITORÍAS ENERGÉTICAS Y EDIFICIOS DE CONSUMO DE ENERGÍA CASI NULO (en: Specialist in energy audits and NZEB)  <a href="https://deu.ua.es/es/titulos-propios/especialista-en-auditorias-energeticas-y-edificios-de-consumo-de-energia-casi-nulo-30-ects.html">https://deu.ua.es/es/titulos-propios/especialista-en-auditorias-energeticas-y-edificios-de-consumo-de-energia-casi-nulo-30-ects.html</a></p>	White collar	<p>Organizers: Universidad de Alicante (en: Alicante University)</p> <p>Description: The objective is to provide the students with the necessary training to be able to design, execute and evaluate the buildings according to the new demands in terms of energy efficiency derived from the European directives.</p> <p>Cost: 1710€</p> <p>Duration: 300 hours</p> <p>Method: Blended</p> <p>Editions: ?</p>	<p>The course will not be taught during 2018/19 academic year</p> <p>Email: efienzeb@ua.es</p> <p>Phone: +34 96 590 36 52</p>
<p>EL EDIFICIO DE CONSUMO CASI NULO: ESTRATEGIAS DE DISEÑO (en: NZEB: DESIGN STRATEGIES)  <a href="http://www.arquitectosdecadiz.com/wp-content/uploads/2017/12/AUA04.18_CFP.EDIFICIO-DE-CONSUMO-CASI-">http://www.arquitectosdecadiz.com/wp-content/uploads/2017/12/AUA04.18_CFP.EDIFICIO-DE-CONSUMO-CASI-</a></p>	White collar	<p>Organizers: Colegio oficial de Arquitectos de cádiz (en: Cádiz Architects Association)</p> <p>Description: The course seeks to provide a vision of the energy efficiency associated with the architecture project, its regulatory requirements and its specific demands, in order to define strategies and concrete solutions that allow meeting the objectives and guarantee the architectural quality</p>	Email: formacion@arquitectosdecadiz.com



<a href="#">NULO.pdf</a>		Cost: 200-290€ Duration: 100 Method: Blended Editions: ?	
EDIFICIO CERO-BALANCE CERO: METODOLOGÍA DE ACTUACIÓN (en: CERO-BALANCE ZERO BUILDING: METHODOLOGY OF ACTION) <a href="http://www.coam.org/es/curso/2616/2580">http://www.coam.org/es/curso/2616/2580</a>	White collar	Organizers: Colegio Oficial Arquitectos Madrid (en: Official Architects Association Madrid) Description: In order to achieve the objectives, set out in the regulations, it is necessary to know the regulatory framework, design passive strategies, select the most efficient systems, use renewable sources, and finally, generate energy in situ from renewable sources. In this way, by demanding the minimum, with minimum consumption, minimum emissions, and generating energy from renewable sources, we can achieve "the zero balance" in our buildings. Cost: 385€ Duration: 20 hours Method: Face-to-face Editions: 1	<a href="mailto:cursos@coam.org">cursos@coam.org</a>
EL CAMINO HACIA LOS EDIFICIOS DE OFICINAS DE CONSUMO CASI NULO: HORIZONTE 2020-2050. (en: THE PATH TOWARDS NEARLY ZERO ENERGY OFFICE BUILDINGS HORIZON 2020-2050.) <a href="http://www.coam.org/es/curso/2638/2605">http://www.coam.org/es/curso/2638/2605</a>	White collar	Organizers: Colegio Oficial Arquitectos Madrid (en: Official Architects Association Madrid) Description: In order to achieve the objectives set out in the regulations, it is necessary to know the regulatory framework, design passive strategies, select the most efficient systems, use renewable sources, and finally, generate energy in situ from renewable sources. In this way, by demanding the minimum, with minimum consumption, minimum emissions, and generating energy from renewable sources, we can achieve "the zero balance" in our buildings. Cost: 385€ Duration: 20 hours Method: Face-to-face Editions: 1	<a href="mailto:cursos@coam.org">cursos@coam.org</a>
REHABILITACIÓN ENERGÉTICA Y DE ACCESIBILIDAD DE EDIFICACIONES (EN: Energy rehabilitation and accessibility of buildings <a href="http://www.servef.gva.es/documents/164200219/164200548/EOCB06EXP+REHABILITACION%CC%81N+ENERGIA%CC%81TICA+Y+DE+ACCESIBILIDAD+DE+EDIFICACIONES">http://www.servef.gva.es/documents/164200219/164200548/EOCB06EXP+REHABILITACION%CC%81N+ENERGIA%CC%81TICA+Y+DE+ACCESIBILIDAD+DE+EDIFICACIONES</a>	Blue collar	Organizers: SERVEF Servicio valenciano de ocupación y formación (en: valencian occupation and training service) Description: The student will be able to know, interpret the project documents, correctly execute the solutions and constructive systems and innovative equipment's destined to improve the thermal envelope and maintenance tasks of the buildings as well as eliminate architectural barriers of the buildings and public spaces, respecting building	

<a href="#">CIONES-1.pdf/84e0b2df-eea6-4b6f-a1fa-9d8d7eb28ff4</a>		regulations, safety and health at work and environmental. Cost: 0€ Duration: 170 hours Method: Face-to-face Editions: 1	
Eficiencia energética. Edificios de consumo casi nulo (en: Energy efficiency. Nearly zero consumption Buildings) <a href="http://eventos.arquitectosgrancanaria.es/2018/01/18/180118_consumo_casi_nulo/">http://eventos.arquitectosgrancanaria.es/2018/01/18/180118_consumo_casi_nulo/</a>	White collar	Organizers: Colegio de Arquitectos de Gran Canaria (en: Association of Architects of Gran Canaria) Description: Through the realization of a practical example of a single-family home with the use of CYPE software, the Spanish energy saving standard and its basic requirements CTE DB-HE 2013 will be announced, and how it applies to any project and the repercussions on work at the level of design, execution and costs, whether adaptation of premises, reform and expansion or new plant. Cost: 150€-200€ Duration: 16 hours Method: Face-to-face Editions: ?	Colegio de Arquitectos de Gran Canaria C/ Luis Doreste Silva 3, Planta 1ª 35004 Las Palmas de Gran Canaria T. (+34) 928 24 88 44 F. (+34) 928 24 52 46 E. formacion@arquitectosgrancanaria.es
Estrategias para el diseño de edificios de consumo energético casi nulo (en: Strategies for the design of NZEB) <a href="http://www.coaalmeria.com/2017/02/07/curso-estrategias-diseno-edificios-consumo-energetico-casi-nulo-fecha-pendiente-confirmacion/">http://www.coaalmeria.com/2017/02/07/curso-estrategias-diseno-edificios-consumo-energetico-casi-nulo-fecha-pendiente-confirmacion/</a>	White collar	Organizers: Colegio de arquitectos de Almería (Architects Association Almeria) Description: In this technical conference new solutions will be presented that allow the designer to achieve the design of nZEB buildings. Cost: 0€ Duration: 3 hours Method: Face-to-Face Editions: 1	cat@coaalmeria.com
Curso de introducción nZEB (en: nZEB Introduction course) <a href="http://icaen.gencat.cat/es/detalls/noticia/20171024_Curs_nZEB">http://icaen.gencat.cat/es/detalls/noticia/20171024_Curs_nZEB</a>	White collar	Organizers: Instituto Catalán de Energía (en: Catalan Energy Institute) Description: In this course, the factors that influence the design and construction of buildings with almost zero energy consumption are exposed. Organized in 6 sessions, the regulatory framework will be explained, what factors must be taken into account when designing the enveloping of a building with high energy efficiency, which are the most appropriate conventional and renewable energy facilities, and what role plays the energy management for which these buildings, once built, really consume little energy. Cost: 0€ Duration: 24 hours Method: face-to-face Editions: 3	
RENTABILIDAD DE LAS	White collar	Organizers: Fundación laboral de la	cursos@fundacio

<p>ACTUACIONES DE REHABILITACIÓN Y EFICIENCIA ENERGÉTICA EN EDIFICACIÓN (en: PROFITABILITY OF REHABILITATION AND ENERGY EFFICIENCY IN BUILDING)</p> <p><a href="http://compas.fundacionlaboral.org/fichas_prod/ficha_actual.php?id_c=36093079-5944-16ea-9952-56d96ac733ca">http://compas.fundacionlaboral.org/fichas_prod/ficha_actual.php?id_c=36093079-5944-16ea-9952-56d96ac733ca</a></p>		<p>construcción (en: Construction Labour Foundation)</p> <p>Description: Acquire knowledge about the economic profitability that will be obtained when undertaking energy efficiency measures in the rehabilitation of buildings.</p> <p>Cost: ?</p> <p>Duration: 20 hours</p> <p>Method: On-Line</p> <p>Editions: ?</p>	nlaboral.org
<p>EXPERTO UNIVERSITARIO EN REHABILITACIÓN ENERGÉTICA EN EDIFICACIÓN (en: UNIVERSITY EXPERT IN BUILDING ENERGY REHABILITATION)</p> <p><a href="https://www.cfp.upv.es/formacion-permanente/cursos/experto-universitario-en-rehabilitacion-energetica-en-edificacion_idiomaes-cid63690.html">https://www.cfp.upv.es/formacion-permanente/cursos/experto-universitario-en-rehabilitacion-energetica-en-edificacion_idiomaes-cid63690.html</a></p>	White collar	<p>Organizers: Universidad Politécnica de Valencia en colaboración con el Instituto Valenciano de la Edificación (Polytechnic University of Valencia in collaboration with the Valencian Institute of Building)</p> <p>Description: The purpose is to facilitate the adaptation of technicians linked to the construction sector, working for both public and private sectors, to the administrative and technical requirements of the rehabilitation processes of collective housing buildings, in different degrees and levels of complexity.</p> <p>Cost: 1500-1750€</p> <p>Duration: 220 hours</p> <p>Method: Blended / online</p> <p>Editions: 3</p>	reru@reru.es
<p>Rehabilitación energética en edificios (en: Energy rehabilitation in buildings )</p> <p><a href="http://www.five.es/intensificaciones/ene/">http://www.five.es/intensificaciones/ene/</a></p>	White collar	<p>Organizers: Instituto Valenciano de la Edificación (en: Valencian Institute of Building)</p> <p>Description: Obtain a reliable knowledge of energy consumption and its associated economic and environmental cost. Identify and characterize the factors that affect the consumption of energy. Know the different energy improvement strategies.</p> <p>Take into account the human scale in the different types of interventions.</p> <p>Know the legal framework in which energy rehabilitation is framed.</p> <p>Acquire cross-disciplinary skills applied to the field of rehabilitation.</p> <p>Cost: 220€</p> <p>Duration: 55 hours</p> <p>Method: Blended / online</p> <p>Editions: 3</p>	
<p>Rehabilitación energética de la envolvente (en: Energetic rehabilitation of</p>	White collar	<p>Organizers: Instituto Valenciano de la Edificación (en: Valencian Institute of Building)</p>	

<p>the envelope )</p> <p><a href="http://www.five.es/events/rehabilitacion-energetica-de-la-envolvente-2018/var/ri-1.l-l1/">http://www.five.es/events/rehabilitacion-energetica-de-la-envolvente-2018/var/ri-1.l-l1/</a></p>		<p>Description: In this course the foundations are presented for technicians who have to face the energy rehabilitation of buildings. It focuses on the development of intervention proposals, within the scope of passive measures, affecting the constructive elements that make up the thermal envelope of the building. Practical cases will be presented.</p> <p>Cost: 100€</p> <p>Duration: 10 hours</p> <p>Method: face-to-face / online</p> <p>Editions: 3</p>	
<p>Título propio en Eficiencia Energética y Sostenibilidad en la Edificación (en: degree in Energy Efficiency and Sustainability in Building)</p> <p><a href="https://www.uspceu.com/es/oferta-academica/titulo-propio/eficiencia-energetica-sostenibilidad/index.aspx">https://www.uspceu.com/es/oferta-academica/titulo-propio/eficiencia-energetica-sostenibilidad/index.aspx</a></p>	White collar	<p>Organizers: Universidad CEU San Pablo (en: CEU San Pablo University)</p> <p>Description: The objectives are:</p> <p>Acquire the ability to define and evaluate sustainability strategies in buildings, associated with energy, water, materials, recyclability, interior comfort, bioclimates, etc.</p> <p>Deepen the knowledge of the energetic aspects of the building.</p> <p>Provide criteria to develop projects and choose building design strategies and adequate equipment to ensure the energy efficiency of a building.</p> <p>Train the student to perform energy certification of buildings.</p> <p>Accredit the student as a Sustainability Evaluator by the GREEN seal of the GBCe</p> <p>Cost: 400€</p> <p>Duration: 400 hours</p> <p>Method: face-to-face</p> <p>Editions: 1</p>	
<p>CURSO PASSIVHAUS DESIGNER</p> <p><a href="https://www.passivhaus.es/curso-passivhaus-designer.php">https://www.passivhaus.es/curso-passivhaus-designer.php</a></p>	White collar	<p>Organizers: Passive House Institute</p> <p>Description: The Passivhaus Designer CPD course trains professionals in the construction sector (architects, surveyors, engineers, promoters) to design, calculate and rehabilitate buildings according to the PASSIVHAUS standard.</p> <p>Cost: 1600€</p> <p>Duration: 100 hours</p> <p>Method: Blended</p> <p>Editions: 5</p>	
<p>CURSO PASSIVHAUS TRADESPERSON</p> <p><a href="https://www.passivhaus.es/curso-passivhaus-tradesperson.php">https://www.passivhaus.es/curso-passivhaus-tradesperson.php</a></p>	Blue collar	<p>Organizers: Passive House Institute</p> <p>Description: With the Passivhaus Tradesperson Course, professionals from the construction sector (Execution Directors, Construction Managers and construction contractors) are trained to execute buildings with almost zero energy</p>	

		consumption under the PASSIVHAUS standard. Cost: 600€ Duration: 24 hours Method: Blended Editions: 8	
Máster en Rehabilitación y Ahorro Energético en Edificación (en: Master in Rehabilitation and Energy Saving in Building) <a href="http://www.upm.es/Estudios/Estudios_Titulaciones/EstudiosPosgrado/master?id=864&amp;fmt=detail">http://www.upm.es/Estudios/Estudios_Titulaciones/EstudiosPosgrado/master?id=864&amp;fmt=detail</a>	White collar	Organizers: Universidad Politécnica de Madrid (en: Polytechnic University of Madrid) Description: The objectives are to train technicians who are able to face the intervention in the buildings to recover their integrity, their functionality and their architectural value, as well as to realize or supervise an optimal and sustainable energy management in their facilities, with the consequent impact positive in your income statement. Cost: 4200€ Duration: 600 hours Method: on-line Editions: 3	info@structuralia.com
MÁSTER EN DISEÑO Y REHABILITACIÓN DE EDIFICIOS DE CONSUMO DE ENERGÍA CASI NULO <a href="https://www.seas.es/energias-renovables/master-diseno-rehabilitacion-edificios-consumo-energia-casi-nulo">https://www.seas.es/energias-renovables/master-diseno-rehabilitacion-edificios-consumo-energia-casi-nulo</a>	White collar	Organizers: SEAS (private training company) Description: Learn to evaluate and size design strategies for the construction and rehabilitation of passive houses NZEB Cost: ? Duration: 1500 hours Method: Online Editions: ?	
EDIFICIOS DE CONSUMO CASI NULO (NZEB)- <a href="https://www.baxi.es/area-profesional/formacion/edificios-consumo-casi-nulo">https://www.baxi.es/area-profesional/formacion/edificios-consumo-casi-nulo</a>	Blue collar	Organizers: BAXI (HVAC private company) Description: This course aims to analyze the content of the new basic document of the CTE, which introduces the concept of Near-zero Consumption Buildings (nZEB) in new construction facilities. Through the analysis and study of this new regulation, we will determine what type of facilities are best suited to this new regulatory framework and that, therefore, they will be used in new buildings over the next few years. Cost: 0€ Duration: 8 hours Method: face-to-face Editions: 4	+34 902 89 80 00

## 2.4.1 Mapping of knowledge sources and training material in the area of ventilation

### Knowledge sources:

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
Technical Building Code –Health Basic Document <a href="https://www.codigotecnico.org/images/stories/pdf/salubridad/DBHS.pdf">https://www.codigotecnico.org/images/stories/pdf/salubridad/DBHS.pdf</a>	Ventilation – Indoor air quality	The Technical Building Code, promulgated by Royal Decree 314/2006, is the regulatory framework governing the basic quality requirements that must be met by buildings. This Code applies to new constructions, but also to the extension, modification, alteration or renovation works that are carried out on existing buildings. The Code includes a set of Basic Documents, one of them, the Health Basic Document, recognizes the importance of good ventilation and binds to establish natural ventilation systems, hybrid or mechanical in all buildings. It establishes minimum ventilation flow rates for the different rooms of residential buildings and the design criteria for ventilation systems, the terms of sizing of the different construction elements, as well as the technical characteristics required to products and conditions of maintenance and preservation.
Title: RITE – Reglamento de Instalaciones Térmicas en Edificios (en: Spanish Thermal Building Regulations) <a href="https://www.mincotur.gob.es/energia/desarrollo/EficienciaEnergetica/RITE/Reglamento/RDecreto-1027-2007-Consolidado-9092013.pdf">https://www.mincotur.gob.es/energia/desarrollo/EficienciaEnergetica/RITE/Reglamento/RDecreto-1027-2007-Consolidado-9092013.pdf</a>	Ventilation	The RITE promulgated by the Royal Decree 1027/2007 and updated by the Royal Decree 238/2013, establishes the national regulatory framework for requirement of energy efficiency and safety with which the thermal installations in buildings must comply in order to meet the demand for the wellbeing and hygiene of people. <b>This only applies to non-residential buildings.</b>
Title: Guía de renovación de aire eficiente en el sector residencial (en: Guidelines on efficient air renewal in the residential sector) Publisher: FENERCOM, Community of Madrid Energy Foundation Year of publication: 2014 Link: <a href="https://www.fenercom.com/pdf/publicaciones/Guia-de-renovacion-de-aire-eficiente-en-el-sector-residencial-fenercom-2014.pdf">https://www.fenercom.com/pdf/publicaciones/Guia-de-renovacion-de-aire-eficiente-en-el-sector-residencial-fenercom-2014.pdf</a>	Ventilation	This manual includes information to facilitate the selection among the different types of ventilation systems in residential buildings, its design, installation and procedures for maintenance and control.
Title: Guía de calidad del aire interior (en: Guidelines on indoor air quality) Publisher: Community of Madrid Year of publication: 2016	Ventilation (indoor air quality)	These guidelines analyzes the main pollutants that are present in the air and in construction materials, as well as how to measure indoor air quality, possible

Link: <a href="http://www.madrid.org/bvirtual/BVCM015715.pdf">http://www.madrid.org/bvirtual/BVCM015715.pdf</a>		solutions to improve indoor air quality through ventilation systems and other aspects such as regulations. Specifically, the chapter 6 is focused on ventilation systems in residential buildings: air flows measurement, weak points, main types of ventilation systems including an energy performance comparative, fundamental parameters when selecting a ventilation system.
Title: Guía de Sistemas de Ventilación y Tratamiento de Aire Siber (en: Guidelines on ventilation systems and air treatment) Publisher: Siber Year of publication: Link: <a href="https://www.siberzone.es/download/2970/">https://www.siberzone.es/download/2970/</a>	Ventilation	This document is a catalogue of the different energy-efficient ventilation systems provided by the company Siber.
Title: Manual Práctico de Ventilación Soler & Palau (en: Practical Manual on Ventilation Soler & Palau) Publisher: Soler & Palau Year of Publication: Link: No specific link. Link to the website – section resources: <a href="https://www.solerpalau.com/es-es/recursos/">https://www.solerpalau.com/es-es/recursos/</a> It is needed to be re in the website to download resources.	Ventilation	This document is a catalogue of the different energy-efficient ventilation systems provided by the company Soler & Palau.
Links to open videos on the topic: building ventilation: 1. <a href="https://www.youtube.com/watch?v=gT-q3gjEhRE">https://www.youtube.com/watch?v=gT-q3gjEhRE</a> 2. <a href="https://www.youtube.com/watch?v=gT-q3gjEhRE">https://www.youtube.com/watch?v=gT-q3gjEhRE</a> 3. <a href="https://www.youtube.com/user/SiberZoneSL/videos">https://www.youtube.com/user/SiberZoneSL/videos</a>	Ventilation	<ol style="list-style-type: none"> <li>1. Video on mechanical ventilation (3 min) – Burgos University</li> <li>2. Soler &amp; Palau Ventilation Group platform in youtube</li> <li>3. Siber platform in youtube</li> </ol>

#### Training material:

Title of the training module (website link)	Target group	Short description of the content (why relevant for BIMplement)	Other information
INSTALACIONES TÉRMICAS Y DE VENTILACIÓN EN EDIFICIOS DE CONSUMO DE ENERGÍA CASI NULO (en: THERMAL AND VENTILATION INSTALLATIONS IN NZEB) <a href="http://www.coaatbi.org/actividades-formativas-2/instalaciones-termicas-y-ventilacion-en-edificios-consumo-energia-casi-nulo-2">http://www.coaatbi.org/actividades-formativas-2/instalaciones-termicas-y-ventilacion-en-edificios-consumo-energia-casi-nulo-2</a>	White collars	Organizers: Colegio oficial de aparejadores y arquitectos técnicos de bizkaia (Official association of technical architects of Bizkaia) Description: The definition proposed by the Energy Efficiency Directive for the EECN is analyzed and a comparison is made with the positive energy buildings. The course highlights the importance of the factors of conversion of final energy to primary energy in the choice of systems of thermal and ventilation systems, as well as the transcendence of the energy balance of the building in the design of the facilities. In addition, a set of high efficiency thermal and	info@coaatbi.org



		<p>ventilation installations is analyzed.</p> <p>Cost: 50-150€</p> <p>Duration: 8 hours</p> <p>Method: face-to-face</p> <p>Editions: 2 (Last edition 2016)</p>	
<p>LA VENTILACIÓN EFICIENTE EN EDIFICIOS DE ALTO RENDIMIENTO (en: EFFICIENT VENTILATION IN HIGH PERFORMANCE BUILDINGS )</p> <p><a href="https://vimeo.com/123006774">https://vimeo.com/123006774</a></p> <p><a href="https://www.coam.org/es/actualidad/agenda/agenda-coam/ventilacion-eficiente-edificios-alto-rendimiento">https://www.coam.org/es/actualidad/agenda/agenda-coam/ventilacion-eficiente-edificios-alto-rendimiento</a></p>	White collars	<p>Organizers: Colegio Oficial de Arquitectos de Madrid (Official association of architects)</p> <p>Description: In this day will be oriented to the technicians in the exercise of the ventilation of our buildings.</p> <p>Cost: 0€</p> <p>Duration: 4 hours</p> <p>Method: face-to-face / online</p> <p>Editions: 36 (last edition 2015)</p>	
<p>Soluciones de ventilación y los edificios de energía casi nula 2018 Normativa/soluciones/caso de éxito en la Comunidad Valenciana (en: Ventilation solutions and NZEB 2018 Regulations / solutions / success case in the Valencian Community</p> <p><a href="http://www.arquitectosdevalencia.es/agenda-de-eventos/jornadas-de-materiales/jornada-siber-soluciones-de-ventilacion-y-los-edificios-0">http://www.arquitectosdevalencia.es/agenda-de-eventos/jornadas-de-materiales/jornada-siber-soluciones-de-ventilacion-y-los-edificios-0</a></p>	White collars	<p>Organizers: Siber (private ventilation company) in collaboration with Architects and technical architects associations of Comunitat Valenciana</p> <p>Description: The objective of the training, is to show on the one hand from the conceptual / theoretical point of view and on the other hand a practical case of a building built in the Valencian Community of a residential building of Nearly Null / Passive Energy Consumption, highlighting the effect positive of the ventilation system, both from the point of view of the health of people and energy efficiency.</p> <p>Cost: 0€</p> <p>Duration: 2 hours</p> <p>Method: face-to-face</p> <p>Editions: 4</p>	
<p>VENTILACIÓN Y CALIDAD DE AIRE EN INTERIORES (En: VENTILATION AND AIR QUALITY IN INTERIORS)</p> <p><a href="http://www.coitivigo.es/gl/component/jdownloads/send/10-circulares-publicas/1751-circular-93-2015">http://www.coitivigo.es/gl/component/jdownloads/send/10-circulares-publicas/1751-circular-93-2015</a></p>	White collars	<p>Organizers: Colegio oficial de ingenieros técnicos industriales de Vigo (Official Association of Industrial Technical Engineers of Vigo)</p> <p>Description: Acquire, expand and update the knowledge and concepts of ventilation of those professionals who have to carry out a study or a project, or work in the Maintenance of an environment, in which the quality of indoor air is a fundamental part</p> <p>Cost: 220€-330€</p> <p>Duration: 110 hours</p> <p>Method: online</p> <p>Editions: 5</p>	secretaria@cogitiformacion.es
<p>TÉCNICO SUPERIOR EN CALIDAD DE AMBIENTE INTERIOR (en: SUPERIOR TECHNICIAN IN QUALITY OF INTERIOR ENVIRONMENT)</p> <p><a href="https://www.cedesamformacion.es/esp/oferta_formativa/dir_25_1.htm?action=courseInfo&amp;programId=7">https://www.cedesamformacion.es/esp/oferta_formativa/dir_25_1.htm?action=courseInfo&amp;programId=7</a></p>	White collars	<p>Organizers: CEDESAM Centro de estudios de sanidad ambiental (en: Center for studies of environmental health)</p> <p>Description: Specialization course that allows students to obtain the qualification of Accredited Superior Technician (UNE 171330-2: 2014) to coordinate, supervise and take responsibility for the proper execution of the environmental quality inspection work in interiors, in compliance with RD 238 / 2013. Annual renewals to maintain the validity of the</p>	



		<p>title.</p> <p>Cost: 375-500€</p> <p>Duration: 40 hours</p> <p>Method: blended</p> <p>Editions: ?</p>	
<p>Técnico Superior y medio de Calidad Ambiental en Interiores (Superior and medium Technician of Environmental Quality in Interiors )</p> <p><a href="http://www.avemcai.com/servicios-formacion/">http://www.avemcai.com/servicios-formacion/</a></p>	White collars	<p>Organizers: Asociación valenciana de empresas de calidad ambiental de interiores (en: Valencian association of indoor environmental quality companies)</p> <p>Description:</p> <p>Cost: 400-1200€ Superior 300-900€ Medium</p> <p>Duration: 29 hours Superior 23 medium</p> <p>Method: face-to-face</p> <p>Editions: ?</p>	
<p>Mejora de la calidad ambiental en el edificio y la vivienda 2018</p> <p><a href="http://www.five.es/tienda-five/ticket-mejora-de-la-calidad-ambiental-en-el-edificio-y-la-vivienda-2018/">http://www.five.es/tienda-five/ticket-mejora-de-la-calidad-ambiental-en-el-edificio-y-la-vivienda-2018/</a></p>		<p>Organizers: Instituto Valenciano de la Edificación (Valencia Institute of Building)</p> <p>Description: This course aims to provide the student with the necessary knowledge to evaluate and improve the environmental quality in the building and the home. For this purpose, the basic health requirement will be disclosed in such a way that the risk that users, within buildings and under normal conditions of use, suffer from discomfort or illness, as well as the risk that buildings will be reduced to acceptable limits deteriorate and deteriorate the environment in their immediate environment.</p> <p>Cost: 50€</p> <p>Duration: 5 hours</p> <p>Method: face-to-face / online</p> <p>Editions: 3</p>	ive@five.es

## 2.4.2 Mapping of knowledge sources and training material in the area of air-tightness

### Knowledge sources:

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
<p>Title: Análisis de pérdidas energéticas por infiltración de aire APEIA (en: Analysis of energy losses due to air leakage)</p> <p>Publisher: IES Universidad Laboral de Culleredo</p> <p>Year of publication: 2016</p> <p>Link: <a href="http://www.termagraf.com/wp-content/uploads/2016/04/APEIA_espa%C3%B1ol.pdf">http://www.termagraf.com/wp-content/uploads/2016/04/APEIA_espa%C3%B1ol.pdf</a></p>	Importance of the control of air leakages in buildings' envelopes and its impact on the energy demand.	This documents deals with the importance of the control of air infiltrations in buildings' envelopes and its impact on the energy demand. It is subdivided into different sections: air leakages in buildings, air-tightness, strategies for air-tightness, air infiltrations' characterization and test Blower Door.
<p>Title: Guía básica para el control térmico en la edificación (Basic guidelines on thermal control in buildings)</p> <p>Publisher: Gobierno Vasco</p> <p>Year of publication: 2016</p> <p>Link: <a href="http://www.euskadi.eus/contenidos/informac">http://www.euskadi.eus/contenidos/informac</a></p>	Thermal control in buildings	This guide is conceived as a support tool for the quality control of the thermal aspects of buildings during all the construction stages. The guide collects support information to carry out a control during the building construction, focused on the achievement of the objectives of thermal and energetic

<a href="#">ion/area_termica/es_atlcce/adjuntos/GB_con_trol_termico.pdf</a>		<p>performance; as well as a proposal for the verification of the main thermal parameters of the buildings' components.</p> <p>It also includes information about the control of the main weak points in the ventilation systems as well as the main weak points of airtightness.</p>
<p>Title: Instalación de ventanas (en: Windows' installation)</p> <p>Publisher: Fundación Laboral de la Construcción</p> <p>Year of publication: 2016</p> <p>Link: <a href="http://construye2020.eu/plataforma-sobre-formacion-profesional/recurso-de-formacion/instalacion-ventandas/descarga">http://construye2020.eu/plataforma-sobre-formacion-profesional/recurso-de-formacion/instalacion-ventandas/descarga</a></p>	Air-tightness – Windows' installation	<p>This manual focuses on the efficient implementation of windows and aims to raise awareness of the importance of carrying out a proper installation of glazing (frame and glass), ensuring that the windows' performance does not decrease during the installation process and that no thermal bridges or air leakages are produced.</p> <p>This document has been developed in the framework of Construye 2020+ Project (Build Up Skills Spain continuation)</p>
<p>Title: Guía de Ventanas Eficientes y Sistemas de Regulación y Control Solar (en: Guide on Efficient Windows and Systems of solar control and regulation)</p> <p>Publisher: FENERCOM, Community of Madrid Energy Foundation</p> <p>Year of Publication: 2016</p> <p>Link: <a href="https://www.fenercom.com/pdf/publicaciones/Guia-de-Ventanas-Eficientes-y-Sistemas-de-Regulacion-y-Control-Solar-fenercom-2016.pdf">https://www.fenercom.com/pdf/publicaciones/Guia-de-Ventanas-Eficientes-y-Sistemas-de-Regulacion-y-Control-Solar-fenercom-2016.pdf</a></p>	Air-tightness - Efficient windows (sealing, installation and inspection) (Chapters 8, 10 and 11)	Specifically, the chapter 8 is focused on windows' sealing, the chapter 10 on windows' installation and the chapter 11 on the inspection of windows through infrared thermography and the air-tightness test "Blower door".
<p>Title: Soluciones Sika para la instalación de ventanas (en: Sika solutions for windows' installation)</p> <p>Publisher: SIKA</p> <p>Year of Publication:</p> <p>Link: <a href="https://esp.sika.com/dms/getdocument.get/15dee928-87c5-31fe-bbfa-1b3427a3bb10/Soluciones%20Sika%20para%200Instalacion%20de%20Ventanas.pdf">https://esp.sika.com/dms/getdocument.get/15dee928-87c5-31fe-bbfa-1b3427a3bb10/Soluciones%20Sika%20para%200Instalacion%20de%20Ventanas.pdf</a></p>	Air-tightness – windows' sealing	This document is a catalogue of the sealing solutions provided by the company Sika for windows' installation. It includes technical details for the installation.
<p>Links to open videos on the topic airtightness:</p> <ol style="list-style-type: none"> <li><a href="https://www.youtube.com/watch?v=WgglyfL8Hlo">https://www.youtube.com/watch?v=WgglyfL8Hlo</a></li> <li><a href="https://www.youtube.com/watch?v=L0wLTtJ19qE">https://www.youtube.com/watch?v=L0wLTtJ19qE</a></li> </ol>	Airtightness	<ol style="list-style-type: none"> <li>Video on walls' air-tightness – Burgos University</li> <li>Video on blower door test – Burgos University</li> </ol>
Colaborar con SIKA		

Training material:

Title of the training module (website link)	Target group	Short description of the content (why relevant for BIMplement)	Other information
<p>La estanqueidad en los edificios (air-tightness in buildings)</p> <p><a href="http://www.coaatnavarra.org/images/circular/2017/17/blowerdoor3fechas.pdf">http://www.coaatnavarra.org/images/circular/2017/17/blowerdoor3fechas.pdf</a></p>	White collars	<p>Organizers: Arquitectura técnica de Navarra (Technical architects association of Navarra)</p> <p>Description: A. General objectives:</p> <p>I. Learn to perform a Blower door test according to the UNE EN 13829 standard</p> <p>II. Learn to write an essay report</p> <p>Cost: 10-120€</p> <p>Duration: 4,5 hours</p> <p>Method: Face-to-face</p> <p>Editions: 3</p>	gabinete@coaat navarra.org
<p>Curso Oficial de Introducción al Ensayo BlowerDoor (en: Official Course of Introduction to the BlowerDoor Trial)</p> <p><a href="https://www.hobeki.es/servicios/formacion/">https://www.hobeki.es/servicios/formacion/</a></p>	Blue collar	<p>Organizers: Honeki Ingenieria (consulting)</p> <p>Description: The course consists of two phases: a theoretical and a practical one. The practical session includes the necessary concepts to be able to perform an assay in accordance with the UNE-EN 13829: 2002 standard and the new ISO 9972: 2015.</p> <p>Cost: 198€</p> <p>Duration: 6 hours</p> <p>Method: face-to-face</p> <p>Editions: ?</p>	
<p>Cursos de Minneapolis BlowerDoor</p> <p><a href="https://www.aislayahorra.es/curso-blowerdoor/">https://www.aislayahorra.es/curso-blowerdoor/</a></p>	Blue collars	<p>Organizers: Aísla&amp;Ahorra</p> <p>Description: original course of Minneapolis Blower Door, written and taught by the company Minneapolis Blower GmbH, Germany, so that you can already participate in a course with the level and quality of the German distribution company in your country originally.</p> <p>Cost: 250€</p> <p>Duration: 4 hours</p> <p>Method: face-to-face</p> <p>Editions: ?</p>	+34 91 842 35 55
<p>Blower Door Test Ensayo de estanqueidad al aire según UNE-EN 13829 (en: Blower Door Test Air tightness test according to UNE-EN 13829)</p> <p><a href="http://apliter.com/es/noticia/curso-para-realizar-un-test-blower-door-1">http://apliter.com/es/noticia/curso-para-realizar-un-test-blower-door-1</a></p>	Blue collars	<p>Organizers: APLITER Tech Partners (Private company)</p> <p>Description: With the Blower Door Test course for homes and small volumes you learn the basics of infiltration tests or air tightness to perform tests in different buildings.</p> <p>Cost: 295€</p> <p>Duration: 8 hours</p> <p>Method: face-to-face</p> <p>Editions: ?</p>	
<p>Curso oficial BlowerDoor en grandes edificios (en: Official course BlowerDoor in large buildings)</p>	Blue collars	<p>Organizers: eBuilding</p> <p>Description: Course on BlowerDoor with MultipleFan for the measurement of tightness in large buildings to be able to start in the TECLOG measurement software.</p>	nfo@ebuilding.es

<a href="https://ebuilding.es/curso-blowerdoor-para-grandes-edificios/">https://ebuilding.es/curso-blowerdoor-para-grandes-edificios/</a>		Cost: ? Duration: ? Method: face-to-face Editions: ?	
Curso de Introducción a la nueva construcción Passivhaus (en: Introduction to the new Passivhaus construction course) <a href="http://www.plataforma-pep.org/noticias/511-curso-de-introduccion-a-la-nueva-construccion-passivhaus">http://www.plataforma-pep.org/noticias/511-curso-de-introduccion-a-la-nueva-construccion-passivhaus</a>	White collars	Organizers: Onhaus Description: 4 training days • Introduction to the Blower Door trial • Infrared thermography applied to construction • air-tightness applied to the construction Cost: 877-1095€ Duration: 16 hours Method: face-to-face Editions: Last edition found in 2015	
Jornada práctica gratuita sobre estanqueidad en los edificios y eficiencia energética. Ensayo blower door y su aplicación al estándar passivhaus (en : Free practical day on sealing in buildings and energy efficiency. Blower door test and its application to the passivhaus standard) <a href="https://www.activatie.org/curso.php?id=1444096">https://www.activatie.org/curso.php?id=1444096</a>	White collars	Organizers: Activatie (association of technical architects) Description: Free practical day on sealing in buildings and energy efficiency. Blower door test and its application to the passivhaus standard Cost: 0€ Duration: 3.5 hours Method: face-to-face / online Editions: ?	
INSPECCIONES TERMOGRÁFICAS EN EDIFICACIÓN Y ENSAYOS DE ESTANQUEIDAD (BLOWERDOOR). EDIFICIOS SANOS (en: THERMOGRAPHIC INSPECTIONS IN BUILDING AND SEALING TESTS (BLOWERDOOR). HEALTHY BUILDINGS ) <a href="https://www.coam.org/es/curso/2744/2757">https://www.coam.org/es/curso/2744/2757</a>	White collars	Organizers: Colegio Oficial de arquitectos de Madrid (Oficial association architects of Madrid) Description: In this workshop we will learn how to operate a thermal imaging camera and interpret the information it offers us. Insulation defects, hidden structures, humidity, air intakes and many other construction defects that are easily revealed through thermography. In addition, we will discuss the sealing of the building and the Blowerdoor test. Knowing the degree of tightness of the building, whether large or small, a house or offices, is essential to reduce energy consumption and ensure the comfort of its occupants. Cost: 0€ Duration: 1,5 hours Method: Face-to-face Editions: 1 (2017)	
Equipos de medida y toma de datos (en: Measuring equipment and data collection ) <a href="http://www.five.es/events">http://www.five.es/events</a>	White collars	Organizers: Instituto Valenciano de la Edificación (valencia institute of building) Description: With this course the knowledge is acquired so that, in a planning phase, it is analyzed what is to be measured and	ive@five.es

<a href="#">/equipos-de-medida-y-toma-de-datos-2018/var/ri-1.l-L1/</a>		<p>therefore what technical devices must be used. Each device will have associated a record of measured data that will later be used in the analysis phase. The most usual and recommended equipment for the field of residential buildings will be treated.</p> <p>Cost: 100 €</p> <p>Duration: 10 hours</p> <p>Method: face-to-face / online</p> <p>Editions: 3</p>	
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## 2.5 Mapping of knowledge sources and training material from Lithuania

### 2.5.1 Mapping of knowledge sources and training material in the area of ventilation

Knowledge sources:

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
Construction Technical Regulation STR 2.09.02: 2005 "Heating, ventilation and air conditioning" <a href="https://www.e-tar.lt/portal/lt/legalAct/TAR.1F3FB56815CB/ceqlwKNcLd">https://www.e-tar.lt/portal/lt/legalAct/TAR.1F3FB56815CB/ceqlwKNcLd</a>	Heating, ventilation and air conditioning	This Technical Specification for Construction applies to the design, construction and installation of heating, ventilation and air conditioning systems for building and civil engineering works

Training material:

Title of the training module (website link)	Target group	Short description of the content (why relevant for BIMplement)	Other information
Installer of mechanical cooling systems in A class and higher energy class buildings <a href="http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos">http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos</a>	Blue collar	The purpose of the program is to provide the installers of mechanical ventilation systems with additional competencies for the installation of mechanical ventilation systems for buildings of Class A and higher. Duration 28 hours, based on the needs the program can be shortened or extended.	Installer of mechanical cooling systems in A class and higher energy class buildings <a href="http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos">http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos</a>

### 2.5.2 Mapping of knowledge sources and training material in the area of air-tightness

Knowledge sources:

Name of the material, publisher, year of publication (link if available on the web)	Topic	Short description of the content (why relevant for BIMplement)
Construction Technical Regulation STR 1.04.04: 2017 "Construction Design, Project Examination" Link: <a href="https://www.e-tar.lt/portal/lt/legalAct/ad75ac40a7dd11e69ad4c8713b612d0f/FrCfriHdmz">https://www.e-tar.lt/portal/lt/legalAct/ad75ac40a7dd11e69ad4c8713b612d0f/FrCfriHdmz</a>  Description of the Special Requirements, Specific Architectural Requirements, Structure and Issue of Special	nZEB (Design of the building, project expertise)	Regulation is obligatory for all construction actors, public administration entities, owners or users of engineering networks and communications, other legal and natural persons operating in the field of construction. The regulation states the requirements for: 1. the construction project (construction project, reconstruction project, renovation of the building, modernization project, overhaul project, repair project, simplified construction project, simplified reconstruction project, overhaul description, repairs description, demolition project, demolition inventory, building (premises, premises) or engineering design change project); 2. project components; 3. the procedure for approving the project and the typical

Requirements for the Management and Protection of Protected Territories Link: <a href="https://www.e-tar.it/portal/lt/legalAct/1a1cd7a0d67e11e68d79c2033f194657/SqDXmfMtPt">https://www.e-tar.it/portal/lt/legalAct/1a1cd7a0d67e11e68d79c2033f194657/SqDXmfMtPt</a>		building design; 4. a list of the structures and structures of public importance (indicating the purpose), information and public participation in the consideration of design proposals for structures and parts of buildings; 5. the functions of the head of the construction project and the head of the structural part of the project; 6. mandatory cases of examination of a project or its parts; 7. the type and procedure of the expert examination of the building; 8. general requirements for costing inventory compilation.
Construction Technical Regulation STR 2.01.02: 2016 "Design and Certification of Energy Performance of Buildings" Link: <a href="https://www.e-tar.it/portal/lt/legalAct/2c182f10b6bf11e6aae49c0b9525cbbb/vUIAHduDvW">https://www.e-tar.it/portal/lt/legalAct/2c182f10b6bf11e6aae49c0b9525cbbb/vUIAHduDvW</a>	nZEB (Design and certification of energy performance of buildings)	This Technical Regulation for Construction applies to the design of the energy performance of heated residential and non-residential buildings, in the certification of the energy performance of buildings, calculating the planned power of the heat source of buildings (their parts) in the heating system
Technical Regulation STR 2.01.10: 2007 "External Plastering Composite Thermal Insulation Systems" <a href="https://www.e-tar.it/portal/lt/legalAct/TAR.F55FF128BFA9/TgEwyKueVY">https://www.e-tar.it/portal/lt/legalAct/TAR.F55FF128BFA9/TgEwyKueVY</a>	nZEB (External plaster composite thermal insulation systems)	The Regulation applies to the design and construction of partition walls of residential and non-residential buildings with external plaster composite thermal insulation systems.
Construction Technical Regulation STR 2.01.11: 2012 "External Ventilation Thermal Insulation Systems" <a href="https://www.e-tar.it/portal/lt/legalAct/TAR.52328F44CAB5/zPMpTCJLqs">https://www.e-tar.it/portal/lt/legalAct/TAR.52328F44CAB5/zPMpTCJLqs</a>	nZEB (External ventilated thermal insulation systems)	The regulation applies to the design and construction of enclosures for residential and non-residential buildings with external thermal insulation systems.
Construction Technical Regulation STR 2.05.02: 2008 "Construction Constructions. Roofs " <a href="https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.330693/cxPaSbAUZR">https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.330693/cxPaSbAUZR</a>	nZEB (Structural constructions. Roofs)	This Technical Regulation for Construction applies to flat and sloping roofs of residential and non-residential buildings. The regulation sets out the design and construction requirements for roofs of new, reconstructed and capital-renovated buildings.
Construction Technical Regulation STR 2.05.20: 2006 "Windows and External Entrance Doors" <a href="https://www.e-tar.it/portal/lt/legalAct/TAR.EDCB2EFBBA20/gADapwHXFg">https://www.e-tar.it/portal/lt/legalAct/TAR.EDCB2EFBBA20/gADapwHXFg</a>	Windows and external entrance doors	The Regulation applies to: - residential and non-residential buildings window frames, roof windows, glazed and non-glazed balcony doors, external entrance doors, shop windows; - the conformity of the characteristics of windows installed in buildings with the established requirements according to the methodology
A Guide for customers regarding requirements for architects, planners, and	nZEB	A Guide for customers regarding requirements for architects, planners, and contractors, while planning nZEB



contractors <a href="http://energinisefektyvumas.lt/gidas-vartotojams/?lang=en">http://energinisefektyvumas.lt/gidas-vartotojams/?lang=en</a>		
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Training material:

<b>Title of the training module (website link)</b>	<b>Target group</b>	<b>Short description of the content (why relevant for BIMplement)</b>
M-074-14-LSIS  Link: <a href="http://www.kvc.vgtu.lt/">http://www.kvc.vgtu.lt/</a>	White collars (Site Project Managers, Project Supervisors, Site project expert examination managers, Site expert examination managers)	<p>The Vilniaus Gedimino Technical University Quality Management Center carries out the training for the improvement of the qualification of the key areas of construction technical activities in accordance with the harmonized programs of the Ministry of Environment of the Republic of Lithuania. Persons who have improved their qualifications shall be issued a qualification improvement document in accordance with the established procedure, the necessary (qualification) for the qualification certificate to change or confirm the validity of the qualification already held.</p> <p>Improvement of the supervision of the design and execution of construction projects (problems and practical solutions to them)</p> <p>Self-assessment of professional achievements and implementation of changes in personal effectiveness</p> <p>Application of the BIM model to ensure the design, construction and operation of buildings</p> <p>Duration – 8 hours.</p>
M-075-12-LSIS  Link: <a href="http://www.kvc.vgtu.lt/">http://www.kvc.vgtu.lt/</a>	White collars (Construction site managers, managers of building maintenance supervisors)	<p>Improvement of building construction managers and construction maintenance activities: changes, problems and practical ways of their solution is coordinated</p> <p>Building Renovation: Present and Vision</p> <p>Improvement of the quality of construction (errors in concrete technological processes of construction and measures to avoid them)</p> <p>Acquisition and improvement of the knowledge and experience necessary for the management and maintenance of construction of buildings in accordance with the provisions of the FIDIC contracts.</p> <p>Self-assessment of professional achievements</p>



		<p>and implementation of changes in personal effectiveness</p> <p>Application of the BIM model to ensure the design, construction and operation of buildings</p> <p>Duration - 24 hours.</p>
<p>M-076-12-LSIS, M-077-12-LSIS</p> <p>Link: <a href="http://www.kvc.vgtu.lt/">http://www.kvc.vgtu.lt/</a></p>	<p>White collars (Managers of special construction works, maintenance managers of special construction works)</p>	<p>Complex maintenance training for managers of special construction works, maintenance managers of special construction works.</p> <p>Improvement of the practical skills of building maintenance managers and building maintenance managers for optimal technical and economic performance.</p> <p>Self-assessment of professional achievements and implementation of changes in personal effectiveness.</p> <p>Heating and ventilation of buildings: technological innovations and systems efficiency</p> <p>Plumbing and wastewater treatment: technological innovation and system efficiency</p> <p>Electrical works: technological innovations and system reliability</p> <p>Technological innovations and reliability of telecommunication (telecommunication), security and fire safety engineering systems</p> <p>Duration – 24 hours.</p>
<p>M-079-12-LSIS</p> <p>Link: <a href="http://www.kvc.vgtu.lt/">http://www.kvc.vgtu.lt/</a></p>	<p>White collars</p> <p>Managers of structural design part (constructions)</p> <p>Supervisors of the execution of the structural design part (constructions)</p> <p>Managers of expert examination of structural design parts (constructions)</p> <p>Managers of expert examination of constructions</p>	<p>Design features of modern building structures.</p> <p>Improvement of the supervision of the design and execution of construction projects (problems and practical solutions to them).</p> <p>Self-assessment of professional achievements and implementation of changes in personal effectiveness.</p> <p>Application of the BIM model to ensure the design, construction and operation of buildings.</p> <p>Duration – 24 hours.</p>
<p>M-084-12-LSIS</p> <p>Link: <a href="http://www.kvc.vgtu.lt/">http://www.kvc.vgtu.lt/</a></p>	<p>White collars</p> <p>Managers of structural</p>	<p>Training course for the implementation of the design part of the construction project (building cost estimation) and the part of the construction</p>

	<p>design part (construction cost calculation)</p> <p>Supervisors of the execution of the structural design part (construction cost calculation)</p> <p>Managers of expert examination of structural design parts (construction cost calculation)</p>	<p>project (construction price calculation).</p> <p>Improvement of the supervision of the design and execution of construction projects (problems and practical solutions to them).</p> <p>Self-assessment of professional achievements and implementation of changes in personal effectiveness.</p>
<p>M-078-12-LSIS, M-080-12-LSIS, M-081-12-LSIS, M-082-12-LSIS, M-083-12-LSIS</p> <p>Link: <a href="http://www.kvc.vgtu.lt/">http://www.kvc.vgtu.lt/</a></p>	<p>White collars</p> <p>Managers of parts of the design of the building (site management (plot); communication; electrical engineering (up to 10 kV); electronic communications (telecommunications); security alarms; fire alarms; process control and automation; plumbing and wastewater disposal; heating, ventilation and air conditioning)</p> <p>supervisors of the implementation of these parts of the project and experts in the field of expertise.</p>	<p>Improvement of the supervision of the design and execution of construction projects (problems and practical solutions to them)</p> <p>Self-assessment of professional achievements and implementation of changes in personal effectiveness.</p>
<p>Program for construction engineers seeking to undertake a special building supervisor and / or a special building maintenance supervisor role</p> <p>Link: <a href="https://www.e-tar.lt/portal/lt/legalAct/1f0ae450ef3911e58deaf0783ebf65b">https://www.e-tar.lt/portal/lt/legalAct/1f0ae450ef3911e58deaf0783ebf65b</a></p>	<p>White collars (Construction engineers)</p>	<p>According to this program, the Lithuanian Union of Civil Engineers carries out professional knowledge testing of construction engineers seeking to undertake a special building supervisor and / or a special building maintenance supervisor role in the Republic of Lithuania.</p> <p>Professional preparation of applicants for the planning, organization, execution, control and supervision of special (electrical engineering) construction works taking into account:</p> <ul style="list-style-type: none"> <li>- essential requirements for construction works and construction products as well as functional, technological, technical, economic, quality requirements and other indicators of building construction;</li> </ul>

		- the protection of the environment, fire safety, health, landscape, immovable cultural heritage values and protection of the interests of third parties.
<p>Training of experts of certification of energy efficiency in buildings</p> <p>Link: <a href="http://www.kvc.vgtu.lt/">http://www.kvc.vgtu.lt/</a></p>	White collars (Experts of certification of energy efficiency in buildings)	<p>Program goals:</p> <ul style="list-style-type: none"> <li>- to develop certification of building energy certification experts for building certification with the NRG-sert 4th edition (NRG4) computer program "STRG 2.01.02: 2016" Design and Certification of Buildings Energy, to deepen their knowledge and practical skills;</li> <li>- respond to expert questions related to the certification of the energy performance of buildings and the application of Building Regulations TW 2.01.02: 2016 "Design and Certification of Energy Performance of Buildings".</li> </ul> <p>Duration - 7 hours.</p>
<p>Installer of rendered facade systems in A class and higher energy class buildings</p> <p><a href="http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos">http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos</a></p>	Blue collar	The purpose of the program is to provide the installer of custom-made facades with additional competencies for the installation of facade fittings of energy efficiency Class A and higher buildings. Duration 28 hours, based on the needs the program can be shortened or extended.
<p>Installer of ventilated facade systems in A class and higher energy class buildings</p> <p><a href="http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos">http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos</a></p>	Blue collar	The purpose of the program is to provide ventilating facade installers with additional competencies for the installation of ventilated facades of energy efficiency Class A and higher buildings. Duration 28 hours, based on the needs the program can be shortened or extended.
<p>Installer of aluminium glass facade systems in A class and higher energy class buildings</p> <p><a href="http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos">http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos</a></p>	Blue collar	The purpose of the program is to provide the installers of aluminum glass facades with additional competencies for the installation of aluminum facade fixtures for energy efficiency Class A and higher buildings. Duration 28 hours, based on the needs the program can be shortened or extended.
<p>Installer of windows and doors in A class and higher energy class buildings</p> <p><a href="http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos">http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos</a></p>	Blue collar	The purpose of the program is to provide windows and door installers with additional competencies for the installation of windows and doors for energy efficiency Class A and higher buildings. Duration 28 hours, based on the needs the program can be shortened or extended.
<p>Installer of pitched roofing in A class and higher energy class buildings</p> <p><a href="http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos">http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos</a></p>	Blue collar	The purpose of the program is to provide the roof builder with additional competencies for the construction, upgrading and repair of roof tiles for the roofing of A and higher class of energy efficiency buildings. Duration 28 hours, based on the needs the program can be shortened or

		extended.
<p>Installer of flat roofing (operated and non-operated) in A class and higher energy class buildings</p> <p><a href="http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos">http://www.statybostaisykles.lt/katalogas/darbu_sauga/visos</a></p>	Blue collar	<p>The purpose of the program is to provide the roof master with additional competencies for the installation and repair of a flat roofs of the A and higher class of energy-efficient buildings.</p> <p>Duration 28 hours, based on the needs the program can be shortened or extended.</p>
<p>Certified passive house developer training</p> <p><a href="http://pasyvuspastatai.lt/lt/mokymai/sertifikuoto-pasyvaus-namo-vystytojo-mokymai-0">http://pasyvuspastatai.lt/lt/mokymai/sertifikuoto-pasyvaus-namo-vystytojo-mokymai-0</a></p>	White collar	<p>The National Association of Passive House carries out trainings by the German Passive House Institute for Certified Passive House Tradesperson, dedicated to project promoters, contractors, engineers, managers and other professionals involved in the development of buildings.</p> <p>The purpose of the "Certified Passive House Tradesperson" training is to convey the overall passive (energy-efficient) building concept, theoretical knowledge, illustrating practical examples. After attending a two-day course, the participant has the opportunity to hold an internationally recognized exam in writing and obtain a passive home builder / developer qualification.</p> <p>After passing the exam, an international certificate of Certified Passive House Tradesperson is issued.</p> <p>Duration of training: 2 days.</p>
<p>Certified PASYVAUS HOUSE designer training</p> <p><a href="http://pasyvuspastatai.lt/lt/mokymai/sertifikuoto-pasyvaus-namo-projektuotojo-mokymai">http://pasyvuspastatai.lt/lt/mokymai/sertifikuoto-pasyvaus-namo-projektuotojo-mokymai</a></p>	White collar	<p>The Certified Passive House Designer's 7 day course is an excellent opportunity for architects, designers, engineers and other professionals to improve their knowledge of the planning, design and implementation of energy efficient buildings. During the training, you will be introduced to the most recent Passive Design / Computing (PHPP9) program, which will master the Passive House design principles.</p>
<p>Seminars for architects</p> <p><a href="http://pasyvuspastatai.lt/lt/mokymai/seminarai-architektams">http://pasyvuspastatai.lt/lt/mokymai/seminarai-architektams</a></p>	White collar	<p>The National Association of Passive Houses together with the Lithuanian Chamber of Architects organizes seminars in Vilnius, Kaunas and Klaipėda for architects and designers. All workshops will be considered as qualification improvement. Workshops on "Energy efficient buildings: engineering and construction solutions".</p>
<p>Training for designers and specialists in energy efficient buildings (A +, A ++ classes)</p> <p><a href="http://www.spsc.lt/cms/index.php?option=com_content&amp;view=article&amp;id=1234">http://www.spsc.lt/cms/index.php?option=com_content&amp;view=article&amp;id=1234</a></p>	White collar	<p>Centre for certification of building products delivers the one-day program designed to meet the requirements of A and higher energy class buildings and existing practices. This program is useful for a very wide range of specialists -</p>

<p>ew=article&amp;id=323%3Aamoky mai-energiskai-efektyviu- pastatu- projektuotojams&amp;catid=80%3 Apen- projektavimas&amp;Itemid=438&amp;la ng=lt</p>		<p>clients, architects, designers, municipality specialists, and ministry staff. The audiences are introduced to information that will help them to issue requirements for all participants in the construction process.</p> <p>There is also the four-day program designed for professionals who want to design their own buildings of A and higher. The program is of informational nature and is useful for managers of the structural design parts, constructions, heating, ventilation and air conditioning parts, experts in the design of architectural, construction, heating, ventilation and air conditioning components of the construction project, useful for project managers and project design experts. The training program contains recommendations for solution of thermal bridges, training with specialized computer programs.</p>
<p>BIM I <a href="https://skaitmeninestatyba.lt/wp-content/uploads/2017/12/Mokymo20programa20BIM20I20Ilygis1.pdf">https://skaitmeninestatyba.lt/wp-content/uploads/2017/12/Mokymo20programa20BIM20I20Ilygis1.pdf</a></p>	<p>Managers of key technical activities of construction</p>	<p>The aim of the module is to provide qualified managers with general digitization of the construction process and building information modeling (BIM) knowledge and to develop the business skills to apply them in order to master, use and develop the special knowledge, methods and technologies in the field of engineering information modeling as well as their practical use.</p>
<p>BIM II <a href="https://skaitmeninestatyba.lt/wp-content/uploads/2017/12/Mokymo20programa20BIM20II20Ilygis1.pdf">https://skaitmeninestatyba.lt/wp-content/uploads/2017/12/Mokymo20programa20BIM20II20Ilygis1.pdf</a></p>		<p>The aim of the module is to provide certified managers with knowledge of the essence of BIM methodology and its application in the construction process; to develop the general abilities to apply this knowledge in order to use and develop specialist knowledge, methods and technologies in the field of information modeling in the practical activity; to provide the knowledge and skills necessary for starting to work with tools used in the BIM process, to understand the general principles of storage and management of information.</p>
<p>BIM III <a href="https://skaitmeninestatyba.lt/wp-content/uploads/2017/12/Mokymo20programa20BIM20III20Ilygis1.pdf">https://skaitmeninestatyba.lt/wp-content/uploads/2017/12/Mokymo20programa20BIM20III20Ilygis1.pdf</a></p>		<p>A certified manager, depending on his or her already existing knowledge and skills, chooses one or more modules to enable qualification improvement.</p> <p>Each participant who has completed one, two or three selected modules is issued a certificate confirming 14 hours of qualification improvement.</p>

### **3. Further implementation of the mapped knowledge sources in BIMplement**

In order to link appropriate learning and training modules with the experimental sites and pilot field labs, the needs of each project were identified. In parallel to the work reported in this deliverable an identification of the experimental sites is done which includes also the identification of the BIMplement QF application area together with the preparation of the suitable and beneficial existing upskilling sources, knowledge and training modules.

In practice, it appeared that in many cases the use of all available knowledge and training modules were limited, due to specific training needs. This differs to a large extent from field labs and experimental sites. For example, in the Netherlands there was not such a specific skills gap but rather a need for tuning and the use of correct detail levels in the BIM model. In general, the focus was mainly on (the lack of) BIM maturity and solving BIM skills. Craftmanship and skills, for example in air tightness, were very well in place. This is further reported in D4.6 'Review and report of the qualification scheme on the pilot field labs, the experimental sites and realization of the BIMplement-guide'.

## COLOFON

BIMplement



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