

2021-1-FR01-KA220-VET-000025876

Green Insulation Skills for Construction Workers



RESEARCH METHODOLOGY

R1-T1, Tools and guidelines for green insulation skills gathering activities

JANUARY 1, 2022

PROMEIA



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1 INTRODUCTION

Green insulation is an environmentally responsible and resource-efficient process that has become increasingly relevant for the building sector; it is a major part of the European strategy to fulfil the targets set by the European Green Deal for a climate neutral EU by 2050 in the domain of Built Environment. Despite that the use of green insulation methods and materials¹ such as sheep's wool and hemp guarantees energy savings and efficiency, the mainstream construction sector has not been applying such materials extensively, due to several barriers including the associated up-front costs, the lack of consumer information, and most importantly deficiencies in the supply of available skills and training, leading to skills gaps and labor shortages. These skills deficits are exacerbated by the rapid greening of the construction sector and the advances in techniques and methods, changing skill requirements faster than the education and training systems have been able to respond. To move towards the widespread application of green insulation materials and techniques, it is essential to train construction workers to meet current market needs, boosting thus their employability within a green economy.

GRINSCO is an Erasmus+ KA2 project, which aims to tackle this skills deficit and work for construction workers' development, making them part of a green skills response strategy, and equip them with resources and materials covering the topics pertaining to green insulation.

The first result of the project comprises tasks that work towards defining the specifications (basis) for a joint VET curriculum on WBL green insulation. This report is the outcome of R1-T1, namely **"Tools & guidelines for green insulation skills needs in the construction sector"**.

This methodology seeks to provide GRINSCO partners with appropriate tools & guidelines for mapping the current and future workplace requirements and skills needs in the construction/ green insulation field. In particular, the methodology will guide R1 skills needs gathering activities, setting the ground for the identification of green insulation skills supply and shortages in the labour market. It will deliver step-by-step instructions to partners on how to contribute to gathering and documenting green insulation skills evidence, addressing:

- Data collection methods
- Information collection tools
- Target groups
- Sampling & data sources

¹ Green insulation methods and materials: All those that permit reduction in CO² emission from buildings and sites.



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- Data collection targets
- Implementation steps and timeline

The methodology will also provide guidelines on how to formulate learning outcomes, more specifically concerning what a learner knows, understands and is able to do upon the completion of learning process, and how to link learning outcomes with teaching & assessment methods and material.

The report is structured as follows. Section 2 lays out the methodological approach and defines research objectives. Sections 3 and 4 details the research methods and provides the information collection tools to be used by partners for gathering green insulation relevant skills and training evidence. Section 5 prescribes the research stages and implementation steps. Section 6 sets data collection targets (i.e. KPIs) per project partner. Section 7 provides instructions on how to formulate learning outcomes, and section 8 presents an action plan for the implementation of the first Result (R1).



2 METHODOLOGICAL APPROACH

2.1 Research questions

The purpose of GRINSCO green insulation skills needs gathering activities (R1-T1) is to help define the actual workplace requirements with regards to green and sustainable insulation techniques and methods thus providing an informed basis for the formulation of up-to-date, tailor-suited to sector specific needs, green insulation related learning outcomes. The formulation of evidence-based learning outcomes, in turn, will set the basis for the development of a comprehensive green insulation curriculum, suitable to be provided as a training offering in the construction field.

This report seeks to address the following main questions:

- Which are the current and future green insulation skill needs and training requirements?
- How tailored to the sectoral needs of the construction labour market is the current supply of green insulation skills, as evidenced by existing formal (Higher Education, Vocational Education & Training) and non-formal (online courses, seminars) green insulation related educational and training provision?
- Does the demand for green insulation specialised professionals and relevant skills outpaces supply in the labour market?

2.2 Research methods

Information collection on green insulation skills and training requirements will be a combination of desk and field research.

1. **Desk research.** It will be the primary activity for gathering evidence on workplace requirements for construction professionals to define the current skills demand and will revolve around three (3) axes: a) green insulation skills needs evidence from the EU Skills Panorama, relevant Sector Skills Alliances (SSAs) and EU funded projects, b) contemporary green insulation skills requirements as evidenced from online job vacancies, and c) green insulation use cases and relevant studies and experts' opinion on the issue. Further to the above, secondary research will be also employed to collect information on existing formal and non-formal green insulation training provision. Dedicated desk research reporting forms will be used to facilitate the documentation of evidence.
2. **Field research.** Field research will be implemented through an online survey on construction skills needs, actual green skills of insulation workers, and future tendencies in the field, primarily



addressed to employers and field experts. In addition, semi-structured interviews with selected target groups representatives be also optionally be carried out to provide complementary insights into the green insulation and construction labour market.

Figure 1: Progression of tasks leading to the production of the first result





3 DESK RESEARCH

3.1 Existing construction related education and training provision (skills supply)

Desk research will be carried out to collect information/evidence on existing formal (HE, VET) construction related education and training provision. The purpose is to identify trends in skills supply as regards the construction field. This research will enable the partnership to define the current level of green insulation related skills and competences within the labour market, and compare it with the sum of skills and attributes needed in typical construction jobs (skill demand) so as to determine the skills mismatch.

The rationale is that existing training provision can act as a proxy measure of skill supply in the labour market. However, courses can only “signal” skills and competences, which does not necessarily mean that graduates do actually possess these skills or this is the only way to acquire green insulation skills and competences, as the latter can be acquired in different ways. Nevertheless, given the complexity of innovation landscape and the dynamics in the labour market, information on existing academic and commercial curricula can provide valuable insights (further to those provided by employers and field experts) into the available skill supply whilst revealing potential labour market mismatches and imbalances.

The skill supply depends upon both the availability of qualified new recruits and the current skills of existing construction workers. To this end, this activity includes:

- a) Reviewing the availability and content of existing educational and VET courses (formal educational provision), incl. also broader construction courses currently offered in the EU to identify green insulation components and evaluate whether they have the potential to equip new recruits with the relevant skills to support the construction sector.
- b) Reviewing non formal training provision such as commercial, online courses, seminars, workshops to evaluate their effectiveness in addressing existing construction workers’ skills needs as regards insulation.

The data will be gathered from secondary sources of information such as academic and online course directories (e.g. academiccourses.com), academic publications, study guides, learning materials, and university brochures. **All partners will contribute with evidence from own country while VSRC will explore the availability of construction training offerings I-VET & C-VET with green insulation**



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components across the EU area. Similar to the research on skills requirements, a common approach will be employed for documenting information on existing training programs. The reporting form is presented in the following page.

Project partners should collect, analyse and present the outcomes of the data analysis for its own country, before forwarding country-specific data and outcomes to the Task Leader (VSRC) In exact, it is anticipated each partner will present in a short country –specific report an overview of existing training programmes and educational initiatives focused green insulation related skills. Meaning, an analysis including qualitative and quantitative results i.e. descriptive analysis by profile of providers, discipline, course level, type of qualification, type of learning, type of qualification awarded , green insulation components etc.



Table 1: Desk research reporting form for presenting information gathered on existing construction training provision for insulation workers

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Course title:	
Qualification / Accreditation / Certificate	
Institution / Provider	
Provider's legal status	<input type="checkbox"/> Public <input type="checkbox"/> Private
Country	
Type of learning	<input type="checkbox"/> Higher Education <input type="checkbox"/> Vocational and Education Training (VET) <input type="checkbox"/> Online course (e.g. MOOC) <input type="checkbox"/> Seminar <input type="checkbox"/> Workshop <input type="checkbox"/> Other (please specify)
Mode of study (check all that apply, e.g. in case of blended learning)	<input type="checkbox"/> Classroom-based learning <input type="checkbox"/> Distance learning <input type="checkbox"/> Blended (classroom and distance learning) <input type="checkbox"/> Combined (classroom-based and apprenticeship) <input type="checkbox"/> Work-based learning <input type="checkbox"/> Other (please specify)
Duration	
Scope of course	
Target audience	
Core Modules / Topics addressed	(please fill in all information available)



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Knowledge/skills/competences (to be) obtained upon the completion of training	(please fill in all information available)
Source	(link)

(Please copy the table as many times as needed)



Example: “Vocational training and validation of knowledge and competences in insulation sector”

Course title: Vocational training and validation of knowledge and competences in insulation sector	
Qualification / Accreditation / Certificate	Evaluation and Validation of competences according to Validation framework ISO/IEC 17024
Institution / Provider	Hellenic Association of Insulating Material Companies HAIC
Country	GREECE
Type of course	Formal
Mode of study (check all that apply, e.g. in case of blended learning)	<input type="checkbox"/> Class-based learning <input type="checkbox"/> Work place-based learning <input type="checkbox"/> Online course (e.g. MOOC) <input checked="" type="checkbox"/> Other type of distance learning
Duration	90 hrs. (72 hrs. theory & 18hrs. case study practice in class)
Scope of course	Obtain certification and validation of competences, boosting job employability opportunities
Target audience information	Construction workers with fixed-term contract in the private section
Core Modules / Topics addressed	<ul style="list-style-type: none"> – Organization of installing synthetic insulation systems in buildings and other construction sites – Energy efficient waterproofing heating installation techniques in buildings – Installation of contemporary insulation methods practices on sites – Planning of insulation applications regarding waterproof synthetic problems for buildings’ energy efficiency.
Knowledge/skills/competences (to be) obtained upon the completion of training	<p><u>Knowledge</u></p> <p>Upon successful completion of the program, learners will know/be familiar with:</p> <ul style="list-style-type: none"> - Fundamentals of national legislative frameworks for: Labour, Health and Safety, Buildings’ insulation, - Types and methods of synthetic insulation application techniques in buildings,



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	<p>-Categories and properties of insulation materials.</p> <p><u>Skills / Competences</u></p> <p>Upon successful completion of the program, learners will be able to:</p> <ul style="list-style-type: none">-Use software packages in relation to time and cost management of insulation projects,-Read construction plans,-Order appropriate insulation materials for energy efficiency-Prepare and apply insulation materials-Complete, control and deliver insulation application.
Source	https://katartisipsem.gr/



4 FIELD RESEARCH

Field research will be carried out to describe the current and future construction industry training requirements on the application of green insulation materials. This research activity has a threefold purpose: a) to determine the most valued and needed vertical and transversal skills in the construction field, b) to highlight existing skill imbalances in the labour market, and c) to pinpoint green insulation training realities & recruitment difficulties in the construction sector. Field research will comprise an online survey and interviews (optional) with construction and insulation employers and knowledgeable experts.

4.1 Online survey (skills demand and supply)

A structured questionnaire (Annex A) will be the main instrument for gathering survey data. The questionnaire will be used to establish a structured, organised and well documented way to collect insights on actual workplace requirements, difficulties to recruit and retain staff and future priorities/tendencies in the green insulation field.

A web-based approach (in EU survey) will be employed for reasons of practicality, and to facilitate data collection, coding, and analysis process. The questionnaire is structured in a clear and simple manner to encourage participation and facilitate communication with target groups. Direct communication (by e-mail or phone) with survey respondents shall take place to establish an initial contact, allowing also to ask for additional evidence or clarifications on certain aspects concerning the set of skills and competences that construction workers need to possess to work as green insulation or manage green insulation related projects.

The survey questionnaire comprises mostly closed-ended questions as they are easier and quicker for respondents to answer; offer better coding, analysis and comparison possibilities; and can clarify question meaning for respondents through response choices. Open questions are included, so as to let respondents to locate skills that are not covered in built-in questionnaire and pre-defined statements. To ensure consistency and facilitate data analysis, the questionnaire will be developed, communicated and completed in English. Where feasible, and in cases where communication can only be established in national language(s), project partners may translate both the questionnaire and responses (in case of additional comments, communication, etc.).

The questionnaire consists of 6 sections:

A. RESPONDENTS PROFILE



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- B. FAMILIARITY
- C. KNOWLEDGE / SKILLS REQUIREMENTS
- D. CURRENT SUPPLY (SKILLS & KNOWLEDGE)
- E. RECRUITMENT CHALLENGES
- F. TRAINING / WORKFORCE DEVELOPMENT

IMPORTANT NOTICE: Partners shall protect personal data and respect privacy, in full compliance with the provisions of the applicable EU legislation (“General Data Protection Regulation”). This means that the survey shall be communicated to target groups and stakeholders through emails to those subscribed in partners’ contact lists, emails to generic business email addresses (e.g. enquiry@ or info@), and posts in project’s, partner organisations’ (incl. affiliates) and third parties’ social media and websites.

4.1.1 TARGET GROUPS OF THE SURVEY

According to the scope and objectives of the survey (as defined in the Application Form), the questionnaire was designed to be addressed to a) all types of employers of construction workers with insulation knowledge & skills, and b) individuals with substantial experience in insulation application and materials (field experts). Considering the very nature of green insulation, which is a newly technological innovation that has only recently gained significant prominence and popularity, it is particularly important to identify respondents that are aware of the latest green insulation developments and are quite familiar with the different green insulation techniques and materials. Thus, the main groups that should comprise the target population of the survey are the following:



Table 2: Target groups of the survey

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Construction industry executives	VET and WBL providers	Field experts	Other construction sectors employees
<ul style="list-style-type: none"> • Construction site managers • Head of training departments or workplace trainers • Mentors of construction workers • Team-leaders • Experienced construction executives 	<ul style="list-style-type: none"> • Providers of training of construction apprenticeships/training programmes specializing in insulation • Designers/coordinators of apprenticeship programmes and work-based learning in the construction sector • Providers of training programmes in the construction sector • Providers of apprenticeships and work-based learning in related sectors 	<ul style="list-style-type: none"> • Experienced in insulation workers • Civil engineers • Construction companies • Organisations/ Bodies of energy-efficiency and sustainability in construction sector 	<ul style="list-style-type: none"> • Architects • Carpenters • Electricians • Mechanical Engineers • Insulation machinists/technicians • Roof tillers • Site managers

Finally, other construction sector agencies and organisations, academics, researchers, as well as professional associations at the national and European level.

4.1.2 SAMPLING

According to the GRINSCO Application Form, the sample shall be primarily drawn from the countries represented in the project consortium (France, Germany, Greece, Italy, Romania), and secondarily from the rest EU countries.

The minimum number of responses to be collected must be no less than 150, in order to reach the Key Performance Indicator (KPI) prescribed in the Application Form, and meet project expectations. To this end, the methodology foresees two scenarios about data collection: a baseline and a good (more ambitious) scenario. In the baseline scenario, the target number of completed questionnaires is 125.



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The distribution of answers among the project partners will be based on:

- a) Partners' type of organisation (e.g. university, association, educational authority VET provider)
- b) Partnership countries' population
- c) Partners' capacity to reach stakeholders, as demonstrated from their participation/access to relevant networks and associations
- d) Construction sector's share in country's GDP.



Table 3: Factors that determine answers' distribution among project partners

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Partner	Type of organisation	Country	Population	Construction industry GDP share % (2020)	Networks
ENEFA	VET & adult training organisation	France	67,390,000	5,2	AIFST, National Federation of Training Organisms
PABM	Qualification and certification body	Poland	37,950,000	7,2	AEEBC, CIOB
VSRC	Vocational and training institution	Lithuania	2,800,00	7,3	Nafi Bud
AEACC	Research and innovation energy efficiency centre	Italy	59,550,000	4,4	Environmental Agency of the Autonomous Province of Bolzano, LVH/APA
PROMEA	Research institution/ Non-Profit association	Greece	10,720,000	1,9	Hellenic association of insulating material companies
INNOVELA	Consulting services in environmental and circular economy	Belgium	11,560,000	5,3	-



Taking into consideration the above factors (i.e. construction industry share in GDP, population distribution, type of organisation, partners' access to stakeholders) an indicative target number of answers per consortium country and project partner is presented in the following table.

Table 4: Target number of answers per consortium country and project partner

Partner	Country	Target number
ENEFA	France	22
PABM	Poland	25
VSRC	Lithuania	23
AEACC	Italy	25
PROMEA	Greece	15
INNOVELA	Belgium	15
TOTAL		125

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4.2 Interviews

An interview-based research on how the construction sector recognises/handles green insulation skills requirements will be optionally launched in case that desk research and online survey fail to provide adequate evidence, or in case partners already have existing contacts with construction/ green insulation knowledgeable experts/professionals that could easily and fast provide valuable input.

The rationale is that interviews can help to collect in-depth qualitative information, providing increased flexibility and allowing for more detailed answers from respondents. This activity includes the collection of experience-based views and perceptions from construction actors, particularly referring to the type of green insulation skills and attributes that are in high demand in the labour market, as well as the profile of construction professionals who work with and manage green insulation materials.

Executives from construction companies working on green insulation materials will be contacted to provide through semi-structured interviews additional insights, in a manner not possible through desk research and online questionnaire.

Construction/ Green insulation companies' representatives will be asked to contribute to the research by reporting their experiences in recruiting candidates with the skillset required to deal with green insulation or/and assessing the effectiveness of existing training offerings to address green insulation related workplace requirements. As already mentioned, their extended knowledge on the matter will be recorded through a purpose made questionnaire (Annex B), addressing a number of issues such as a) the job profile of construction related professionals in green insulation, b) the identification of the most valued skills to work with green insulation materials, c) evaluating available training provision and its effectiveness to address skill shortages, and d) discussing the importance of soft/transversal skills in delivering green insulation materials.

4.2.1 TARGET RESPONDENTS

The target audience to get involved in semi-structured interviews are exclusively employers.

- Construction/ Green insulation sector employees
- VET providers
- Construction/ Green insulation experts
- Construction/ Green insulation representatives



4.2.2 SEMI-STRUCTURED QUESTIONNAIRE

A semi-structured questionnaire (Annex B) will be employed for interviewing target respondents. The questionnaire will be used to establish a structured way to gather evidence and personal views on construction skills and training requirements on applying green insulation materials.

First contact will be established with interviewees through email or phone (in line with GDPR provisions), to introduce the topic under investigation and proceed with the face to face interview. The questionnaire will begin with a short introduction that will include: a) the background and objectives of the GRINSCO project, as well as the purpose of the collection of evidence on green insulation skills requirements, b) assurances regarding anonymity, information disclosure and use of collected data, and c) the benefits of providing information; participants will have early access to GRINSCO learning outcomes and the online course.

The process will be short (not exceeding 10-15 minutes duration), mainly providing the opportunity for interviewees to express their opinions and views by including open-ended questions.

4.2.3 GUIDELINES FOR CONDUCTING THE INTERVIEWS

1. Get prepared for the interview. Be sure about the type of information you want to obtain through the interview and to whom you are going to speak. Before the interviews, partners should gather basic facts about the interviewee's professional profile.
2. Inform the interviewee about the scope of the survey and the means you will use to record his/her views.
3. Choose the most appropriate methods to record interviewees' answers. Recording answers can be done by taking notes, audio or video recording. Taking notes allows the interviewer to record the most critical points from the discussion, whilst making the production of the final report easier as there is no need to go through large files of transcripts.
4. Build a rapport with the interviewee. It is important to use words and actions that will make the respondent feel welcome and give him the desire to commit to the discussion, in order to gain the interviewee's confidence and get useful insights about the topic under investigation. To build a rapport, you can also conduct the interview in a comfortable and open space, offer amenities to the interviewee, and inform the interviewee when the results will be published and how he/she can have access to them.



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5. Ask questions that lead to targeted answers. Phrase questions in a way that you will receive detailed answers rather than simple “Yes” or “No”. It is recommended that you should focus on the aspects that you have not managed to retrieve sufficient information during the stage of desk research. Keep in mind that the purpose of the interviews is to find out AI skills and training requirements.
6. Time to end the interview. It is important to know when you must end the interview. This may occur the time you understand that the interviewer feels tired with the process or he/she does not provide any new information. A good practice is to summarise the key points and provide the respondent with a last opportunity to complement/expand or clarify any already mentioned points.

**** Upon the completion of interviews, project partners need to prepare a summary report, presenting the answers provided by respondents and highlighting the main conclusions drawn from the discussion.***



5 RESEARCH STAGES AND IMPLEMENTATION STEPS

Research will be implemented in 3 stages to guarantee the collection of adequate VET and occupational evidence that will provide an informed basis for the formulation of the GRINSCO learning outcomes.

Stage A: Desk research on existing construction education and green insulation training provision

- Identify relevant sources of information
- Literature review
- Fill in reporting form

Stage B: Online survey

- Create a list of relevant stakeholders to take part in the survey
- Select promotional channels to reach target respondents
- Contact stakeholders to communicate the nature of survey
- Collect completed questionnaires

Stage D: Interviews (*optional)

- Identify potential interviewees
- Communication with representatives of construction/ green insulation companies and VET institutes
- Carry out interviews
- Prepare summary reports



6 DATA COLLECTION TARGETS AND KPI

To ensure the quality of data collection and results, it is pertinent for all partners to have a clear perception of research objectives. To this end, a series of quantitative data collection targets have been set to guide green insulation skills gathering activities, and evaluate the achievement of activity goals against the defined Key Performance Indicators (KPIs) in the GRINSCO Application Form.

Table 5: Key Performance Indicators (KPIs) per partner

Partner	Desk research on educational & training offerings	Online Questionnaire	Interviews
ENEFA	5-10 training offerings	22-25 completed questionnaires	*Optional
PABM	5-10 training offerings	25-30 completed questionnaires	*Optional
VSRC	5-10 training offerings	23-25 completed questionnaires	*Optional
AEACC	5-10 training offerings	25-30 completed questionnaires	*Optional
PROMEA	5-10 training offerings	15-20 completed questionnaires	*Optional
INNOVELA	5-10 training offerings	15-20 completed questionnaires	*Optional
TOTAL	30-60 training offerings	125-150 completed questionnaires	*Optional
KPI in AF		125 completed questionnaires	

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7 ELABORATING THE GRINSCO LEARNING OUTCOMES

7.1 Learning outcomes based on the European Qualifications Framework

The **European Qualification Framework (EQF)** is the common European reference framework, which connects countries' qualifications systems increasing the transparency of qualifications throughout Europe. It acts as a translation device to make national qualifications more readable and comparable across Europe, aiming to promote workers' and learners' mobility between countries and facilitate their lifelong learning.

In particular, the EQF relates different countries' national qualifications systems and frameworks together around a common European reference – its eight reference levels based on “**learning outcomes**” (defined in terms of knowledge, skills and competences). This approach shifts the emphasis from input (type and duration of learning experience) to actual learning i.e. to what a person is able to do upon the completion of a learning process. By shifting the focus to learning outcomes, the EQF manages to:

- Match the needs of the labour market with education and training offerings;
- Facilitate the transfer and use of qualifications across different countries and education and training systems;
- Enable the validation of non-formal and informal education;
- Transfer units of learning outcome, based on a credit system (ECVET).

The development of national qualifications frameworks with descriptors based on learning outcomes is a step towards making qualifications and levels of learning explicit for all users. According to the EQF, “*learning outcome*” is defined as a statement of what a learner knows, understands and is able to do upon the completion of a learning process. Furthermore, learning outcomes are used as a basis for credit transfer and accumulation (ECVET) and are specified in three categories dimensions (descriptors) – as knowledge, skills and competence, which can be described as follows:

- **Knowledge:** The outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices related to a field of work or study. According to the EQF, knowledge is described as theoretical and/or factual.
- **Skill:** The ability to apply knowledge and use know-how to accomplish tasks and resolve problems. According to the EQF, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical skills (involving manual dexterity and the use of methods, material tools and instruments).



- **Competence:** The proven ability to use knowledge, skills and attitudes, in work in study situations and in professional and personal development. According to the EQF, competence is described in terms of responsibility and autonomy.

7.2 Practical instructions on how to formulate the GRINSCO learning outcomes

The following instructions are intended to support project partners in applying the learning outcomes-oriented EQF - ECVET approach for the design of the GRINSCO curriculum. The EU Competence Framework for Green Skills² is a well-defined reference framework for green skills that can be used as a reference for the development of the GRINSCO learning outcomes.

What are the key characteristics of learning outcomes?

When formulating learning outcomes, a number of important aspects should be considered to ensure that the developed learning outcomes are understandable and consistent with the EQF standards.

1. Learning outcomes should refer to qualifications, not to individual learners' specific development of skills and competence. This is because learning achievements may vary from learner to learner considering the different levels of progress and skill development. Consequently, when learning outcomes are to be described, they should refer on the learning achievements of an average learner.
2. Learning outcomes should be student-centred. Learning outcomes need to be described in such a way that their focus is on the onus of the learner and not on the teacher or the objectives that the curriculum needs to achieve.
3. All learning outcomes should be externally verifiable and measurable. They should be formulated in such a way that an evaluation process can be employed to determine whether the learner has actually achieved the learning outcomes. Moreover, orienting learning outcomes towards occupational activities and tasks makes it easier to determine assessment criteria.
4. Learning outcomes should refer to what the student knows and is able to do at the end of the learning process. In other words, learning outcomes should not describe the learning path or activity but the outcome following the completion of a learning process.
5. The type of learning methods and processes used to accomplish specific learning outcomes are not relevant with the description of learning outcomes.

² https://www.cedefop.europa.eu/files/3078_en.pdf



6. There should be as many learning outcomes as needed to clearly reflect what students will learn from the course.
7. Each learning outcome statement should have a single primary purpose rather than a dual or compound purpose. A dual outcome may be problematic if a student demonstrates achievement in one area but not in another. In such a case, it is better to formulate two distinct learning outcomes.

How are good learning outcomes formulated?

- **Use active, clearly comprehensible verbs:** It should be ensured that active verbs (e.g. “explain”, “develop”, “select”, “analyse”) will be used in the formulation of learning outcomes. Such verbs should describe measurable and observable actions and tasks and can be supplemented and combined with sector specific verbs. Ambiguous verbs such as “to be familiar with” should be avoided. Table 7 provides a list of active verbs that can be used for the descriptors of knowledge, skills and competence.
- **Specify and contextualise the active verb:** Learning outcomes should be specified and contextualized in terms of what the knowledge and ability refer to. The formulation of learning outcomes should consist of a verb and the related object as well as an additional sentence describing the context.
- **Avoid vague and indefinite formulation:** Learning outcomes should be neither too general that they become indistinct nor too concrete so that modules becoming inflexible. Simple and unambiguous terminology that is easily comprehensible to learners should be used. Academic jargon should be avoided. Last, learning outcomes should not contain evaluating words such as “good”, “simple”, “efficient”, “successful” etc.
- **Set minimum requirements** for achieving learning outcomes: Learning outcomes should comprehensibly describe the minimum demands for achieving/validating a unit of learning outcomes, i.e. all learning outcomes which are necessary for fulfilling the tasks in the sense of a complete vocational activity should be listed.



Table 6: List of active verbs

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List of active verbs	
Knowledge	Arrange, define, describe, duplicate, identify, label, list, name, match, memorise, outline, order, select, determine, present, have knowledge of, gather, classify, explain, write, recognise, measure, emphasise, repeat, report, know, state, reproduce, recall, relate, recognize, etc.
Skills	Draft, infer, analyse, alter, apply, argue, assemble, itemise, split, demonstrate, express, choose, influence, substantiate, provide examples, name, report, describe, designate, judge, assess, present, diagnose, discuss, illustrate by example, conduct, classify, categorise, assign, discover, design, develop, elucidate, recognise, explain, calculate, compile, expand, tell, manufacture, evaluate, produce, find, conclude, formulate, contrast, devise, generate, question, indicate, identify, illustrate, integrate, interpret, clarify, criticise, teach, praise, solve, modify, rearrange, recreate, rewrite, use, arrange, organise, plan, practice, justify, regulate, represent, collect, create, appreciate, deduce, write, refer to, structure, synthesise, divide, separate, test, translate, shape, rephrase, outline, paraphrase, differentiate, investigate, subdivide, transform, visualise, connect, compare, verify, defend, utilise, predict, prepare, display, project, suggest, select, appraise, show, summarise, etc.
Competence	Lead a team, instruct trainees, act independently, monitor work processes, assume responsibility, etc.

How should the learning outcomes and units be described in GRINSCO?

To ensure compatibility with EQF standards, the GRINSCO learning outcomes should be described **“holistically”** in the context of a coherent description as a matrix, subdivided into individual elements of knowledge, skills and competence. This description mode is clearly structured as regards the subsequent assessment of learning outcomes and enables the comparison with the respective national curricula. The title of the unit of learning outcomes should be clear and comprehensible and reflects the content of the unit. The following table gives an example of how learning outcomes should be described following the above instructions.



Table 7: GRINSCO learning outcome mode of description (Example)

Deleted: 11

UNIT OF LEARNING OUTCOMES (i.e. LEARNING UNIT)	APPLICATION DESIGN		
EQF LEVEL 4	EXPECTED LEARNING OUTCOMES		
	KNOWLEDGE	SKILLS	COMPETENCES
	Knows / Aware of: - Requirements modelling and need analysis techniques - Metrics related to application development - User interface design principles - Existing applications and related architecture	Be able to: - Identify customers, users and stakeholders - Collect, formalise and validate functional and non-functional requirements - Evaluate the use of prototypes to support requirements validation	Be able to: - Account for own and others actions in ensuring that the application is correctly integrated within a complex environment and complies with user/customer needs



8 TIME-PLAN FOR RESULT 1

CHART OF IMPLEMENTATION FOR RESULT 1 (R1)					
	Partners / Months	JAN 22	FEB 22	MARCH 22	APRIL 21
R1: GRINSCO learning outcomes					
Preparation of research methodology and data collection tools (R1-T1)	PROMEA				
Translations of data collection tools into national language (if needed) (R1-T1)	All partners				
Desk research on existing construction education and training provision (R1-T2)	All partners				
Explore I-VET & C-VET with green insulation components from EU-27 (R1-T2)	VSRC				
Preparation of country-specific analysis report for training offerings and deliver to VSRC (R1-T2)	All partners				
Online survey on construction training requirements on application of green insulation materials (R1-T3)	All partners				
Conduction of interviews (if needed) (R1-T3)	All partners				
Data compilation and analysis from online survey & interviews findings (R1-T3)	PROMEA				



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Analysis of evidence and drafting of R1 report	PABM				
Formulation of learning outcomes (R1-T4)	PABM/ VSRC & ENEFA contr.				



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9 ANNEX A: QUESTIONNAIRE

SURVEY ON GREEN INSULATION SKILLS

What is the purpose of this survey?

The purpose of this survey is to determine the set of skills, knowledge and competences required by construction sector workers to perform green efficient insulation applications and materials. Your input will aid the GRINSCO partnership to design a comprehensive and up-to-date training content and develop freely available online training scenarios on energy efficient insulation methods and applications, to be embedded in existing WBL provisions. Your input will support the GRINSCO partnership to design a comprehensive and up-to-date training course in construction for construction workers.

Who should participate?

VET providers, construction managers, employers and employees, head of trainer departments and workplace trainers, construction and insulation sector representatives, as well as field experts (architects, site managers etc.), academics, and researchers

How long does it take?

Approximately 10 minutes.

Thank you very much in advance for your participation and valuable contribution!

All participants (by providing their email) will have early access to GRINSCO learning outcomes and the online course!



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A. RESPONDENT PROFILE

1. Country

2. Email *(Optional, provide in case you want to have early access to GRINSCO learning materials and the online course)

3. What is your job function?

- Construction employer / company owner
- Insulation employer/ company owner
- Executive officer / manager in a construction company
- Executive officer/ manager in an insulation company
- Executive / member of a sectoral organisation (e.g. professional union, trade association)
- Academic / Researcher in construction/ insulation field
- Field expert / Consultant in construction/ insulation
- Construction employee/ worker
- Insulation employee/ worker
- Construction site manager
- Architect
- Civil/ Mechanic engineer
- Other



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4. What is the type of your organisation?

- Construction company
- Insulation company
- Public administration Education/Training provider
- Sectoral association
- Professional union
- Other (please specify)

5. If you are an employer or executive officer or HR manager, how many construction professionals (employees) working on insulation application/services does your company have?

- None
- 1-4 employees
- 5-9 employees
- 10-20 employees
- 21-49 employees
- More than 50 employees
- Do not know / Do not want to answer

B. FAMILIARITY

6. How familiar are you with green insulation application?

- Very familiar
- Somehow familiar
- Slightly familiar
- Not at all familiar



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7. Have you ever worked on green insulation application or related services?

- Yes
- No

8. How many years of work or research experience do you have in green insulation-related projects/application?

- No experience
- < 1 year
- 1-2 years
- 3-4 years
- 5-6 years
- > 6 years



C. KNOWLEDGE / SKILL REQUIREMENTS

9. In your experience, to what extent do insulation professionals need to be knowledgeable on the following topics?

	Very high	High	Average	Low	Very low
- Properties of different types/categories of green used in insulation materials (e.g. sheep's wool material cork, hemp, eco wood wool, sheep wool, cellulose)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Benefits of using green insulation materials as environmental friendly construction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Limitations of using green insulation materials (e.g. absorption, dampness)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Be aware of how green materials behave & react to weather conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Suitability of selection green insulation materials according to construction requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Application methods for each green insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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- Familiarity with national safety regulations & restrictions/ communicate the effects of various application of insulation techniques	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Familiarity with EU & national construction regulations & legislation (e.g. Construction Products' Directive)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. In your experience, what additional knowledge (other than those discussed above) is required for green insulation application, techniques and methods?



11. In your experience, to what extent do insulation professionals need to have the skills to:

	Very high	High	Average	Low	Very low
- Determine the amount and type(s) of insulation needed, based on factors such as location, surface shape and equipment use, energy efficiency etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Select appropriate providers for green insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Ability to read and comprehend construction plans/ blueprints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Ability to communicate effectively with construction manager/ engineer/ site managers/ owner insulation properties and installation methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Measure and cut insulation materials to adhere to specifications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Understand the properties and technical specifications of green materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Very high	High	Average	Low	Very low
- Execute installation of green insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Follow safety guidelines when installing green insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Suitability of selection of recycled old insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Interact and communicate with owner about the use of eco-friendly products being installed and discuss benefits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Perform quality assurance on site after finalized installation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. In your experience, what additional skills (other than those discussed above) insulation professionals need to have/acquire to work with green insulation application?



D. CURRENT SUPPLY (KNOWLEDGE AND SKILLS)

13. In your experience, to what extent do insulation professionals are knowledgeable on the following topics?

	Very low	Low	Average	High	Very high
- Types/categories of green materials used in insulation (e.g. sheep's wool material, cork, hemp, eco wood wool, sheep wool, cellulose)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Benefits of using green insulation materials as environmental friendly construction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Limitations of using green insulation materials (e.g. absorption, dampness)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Be aware of how green materials behave & react to weather conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Suitability of selection green insulation materials according to construction requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Application methods for each green insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



- Familiarity with national safety regulations & restrictions/ communicate the effects of insulation techniques	○	○	○	○	○
- Familiarity with EU & national construction regulations & legislation (e.g. Construction Products' Directive)	○	○	○	○	○



14. In your experience, to what extent do insulation professionals have the following skills?

	Very low	Low	Average	High	Very high
- Determine amounts and types of insulation needed, based on factors such as location, surface shape and equipment use, energy efficiency etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Select appropriate providers for green insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Ability to read and comprehend construction plans/ blueprints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Ability to communicate effectively with construction manager/ engineer/ site managers/ owner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Measure and cut insulation materials to adhere to specifications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Acknowledge properties and technical specifications of each green material to be installed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Execute installation of green insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Very low	Low	Average	High	Very high
- Follow safety guidelines when installing green insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Suitability of selection of recycled old insulation materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Interact and communicate with owner about eco-friendly products being installed and discuss benefits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- Perform quality assurance on site after finalized installation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

E. RECRUITMENT CHALLENGES

15. Has your company encountered any difficulties in recruiting construction staff to carry out green insulation related tasks?

- Yes
- No
- Not applicable

16. If yes, what were the main recruitment difficulties? *(select all that apply)*

- Low number of applicants in general
- Low number of applicants with the required insulation technical skills



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- Low number of applicants with the required non-technical / transversal skills
- Low number of applicants with the required attitude and motivation
- Too much competition from other employers in the construction sector
- Lack of the level of work experience expected by the organisation
- Lack of qualifications expected by the organisation
- Language barriers
- Other, please explain further
- Not applicable

F. TRAINING / WORKFORCE DEVELOPMENT

17. If an employer or executive officer / manager, how regularly do you review the skills and training needs of your insulation staff team?

- Every three months
- Every six months
- Annually
- 2-yearly
- Not at all
- Not applicable

18. What are the main barriers to providing green insulation specialised training to your workforce?
(select all that apply)

- Lack of appropriate training offerings in the green insulation field
- Lack of flexible, convenient training offerings in the green field
- Training is too expensive
- Employees are too busy to undertake any training and development
- Training is not a priority for our organisation



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- No difficulties in providing training to our workforce
- Language
- Other , please explain further
- Not applicable



10 ANNEX B: INTERVIEW GUIDE

Instructions: Let the interviewee tell his/her story in each section and use the follow-up questions below as probes³. Upon the completion of interviews, prepare a summary report presenting the answers provided by interviewees and highlighting the main conclusions drawn from the discussion, as regards green insulation skills and training requirements.

QUESTIONS

1. When you think of environmental friendly construction, what kind of jobs come to mind?

Probe: Construction engineer?

Site manager?

Insulation professional?

Architect?

2. Do you think that the demand for insulation professionals outpaces supply in the labour market?

Probe: Why does this happen?

- Recent technology development?

- Complexity?

- Limited training provision?

3. Can you describe the usual job profile of an insulation professional independently working?

4. Can you describe the usual job profile of an insulation professional in a construction company?

³ Interview probes: An important part of interviewing is following up on things people tell you. Your initial question opens the door to an issue, and your interviewee's response is a first draft of an answer to your question. One that draft is on the table, you need to ask more questions to get the full story (Source: <https://msu.edu/>).



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5. What kind of insulation skills and competences are in high demand today?

Probe: How important is the use of green insulation applications?

How significant are the difference between green and conventional insulation materials?

6. Which are the main factors hindering the use of green insulation materials in the construction sector, leading to an overall limit to its use in buildings?

Probe: - High financial cost

- Availability/access to resources
- Lack of sufficient training in green insulation methods

7. Is there enough training supply for green insulation related skills? Who should be responsible for offering training in this field?

Probe: Higher Education Institutions?

Vocational Education & Training (IVET & CVET)?

Commercial courses?

MOOCs or/and online courses?

In-house training?

Thank you for your time. Do you have any questions that you would like to ask of me?



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11 ANNEX C: INVITATION EMAIL

Subject: GRINSCO project – Invitation to participate in a survey on green insulation skills

Dear Sir/Madame,

We would like to invite you to take part in a survey on the most needed skills to work on green insulation, and labour market realities.

Green insulation is an environmentally responsible and resource-efficient process that has become increasingly relevant for the building sector; it is a major part of the European strategy to fulfil the targets set by the European Green Deal for a climate neutral EU by 2050 in the domain of Built Environment. Despite that the use of green insulation methods and materials⁴ guarantees energy savings and efficiency, the mainstream construction sector has not been applying such materials extensively, due to several barriers including deficiencies in the supply of available skills and training, leading to skills gaps and labor shortages. These skills deficits are exacerbated by the rapid greening of the construction sector and the advances in techniques and methods, changing skill requirements faster than the education and training systems have been able to respond. To move towards the widespread application of green insulation materials and techniques, it is essential to train construction workers to meet current market needs, boosting thus their employability within a green economy.

We consider your help, as an employer or field expert, vital in identifying the most valued skills related to construction and green insulation. Your contribution will assist us to develop a comprehensive and up-to-date training course in green insulation that will be made freely available to the public in 2022.

The survey takes around 15 minutes to complete and will be open until 31 March 2022.

Click here to participate {Insert the link of the online questionnaire}

Thank you very much for your contribution.

Signature

⁴ Green insulation methods and materials: All those that permit reduction in CO² emission from buildings and sites.



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The GRINSCO project aims to deliver a joint curriculum and Open Educational Resources (OERs) on green insulation, seeking to facilitate the acquisition by construction workers of skills and competences required to understand, work with and manage insulation related projects. The GRINSCO project is being funded under Erasmus+.

If you do not wish to participate in this survey and don't want to receive any more invitations please send an e-mail with subject "Unsubscribe from GRINSCO list" to {email account to be used by each partner – e.g. PROMEA@gmail.com}