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GRINSCO GREEN INSULATION SKILLS FOR CONSTRUCTION WORKERS

PROMEA

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GRINSCO-Green Insulation Skills for Construction Workers

R1-T3 Compilation of data from online survey

PROMEA

July 2022

Contents

Introduction

This report presents the main findings from the online survey carried out by GRINSCO consortium in the context of the Erasmus+ project GRINSCO Green insulation skills for construction workers, R1-T3 .

Purpose

The purpose of this report is to provide input so as to facilitate PABM, VSRC, ENEFA defining the GRINSCO learning outcomes for construction sector WBL schemes during R1-T4 task.

Survey identity

The survey was carried out from April 2022 to June 2022. Partners collected mainly numerical data from six countries: France, Italy, Lithuania, Poland, Belgium, and Greece.

Following instructions from the ''R1-T1 Research methodology'', data collection was Gachieved using a questionnaire with closed-ended and open-ended questions in Google form format addressed to partners' national contacts and project's associated partners. In exact, target group recipients are presented in table below.

Construction industry executives	VET and WBL providers	Field experts	Other construction sectors employees
• Construction site managers • Head of training departments or workplace trainers • Mentors of construction workers • Team-leaders • Experienced construction executives	• 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	• Experienced in insulation workers • Civil engineers • Construction companies • Organisations/ Bodies of energy-efficiency and sustainability in construction sector	• Architects • Carpenters • Electricians • Mechanical Engineers • Insulation machinists/technicians • Roof tillers • Site managers

Construction industry executives	VET and WBL providers	Field experts	Other construction sectors employees
	• Providers of apprenticeships and work-based learning in related sectors		

Moreover, the R1-T1 research methodology has established a target number of responses per partner based upon a sampling process taking into account certain factors, such as:

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.

Eventually, partners managed to reach the following responses compared to initial target.

Partner	Country	Initial target number	Achieved target number
ENEFA	France	22	23+2 interviews
PABM	Poland	25	29
VSRC	Lithuania	23	24
AEACC	Italy	25	32
PROMEA	Greece	15	11
INNOVELA	Belgium	15	5
TOTAL		**125**	**124+2 interviews**

Method of Analysis

All numerical data have been analysed using IBM SPSS software and are presented in questionnaire's order.

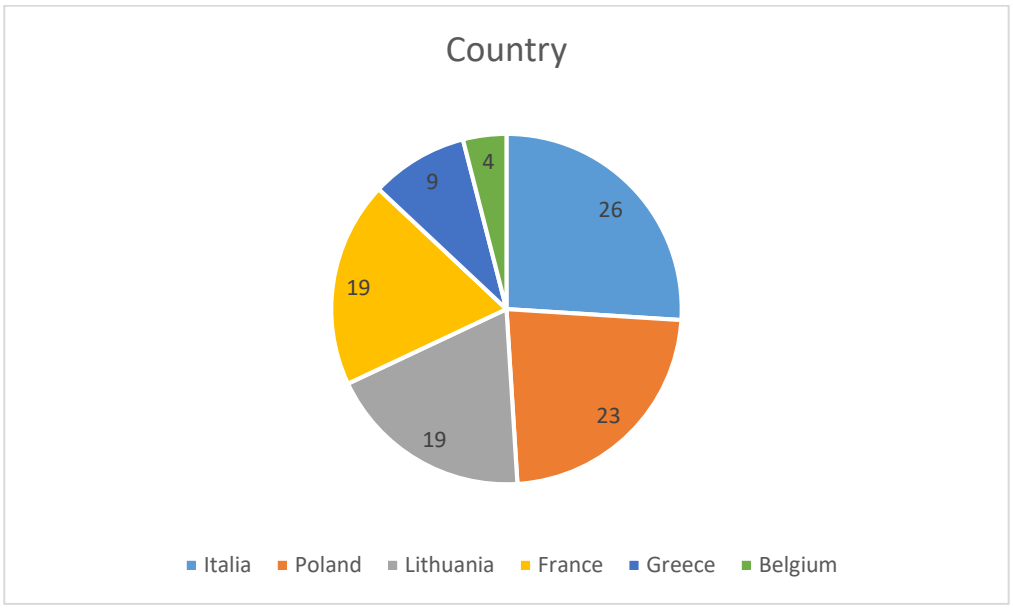
All data are presented in % unless otherwise noted.

Answers from 2 open-ended questions were coded and grouped upon common characteristics and formed new categories.

At the end of the report indicative observations, comments and conclusions are discussed.

Findings

Respondent profile



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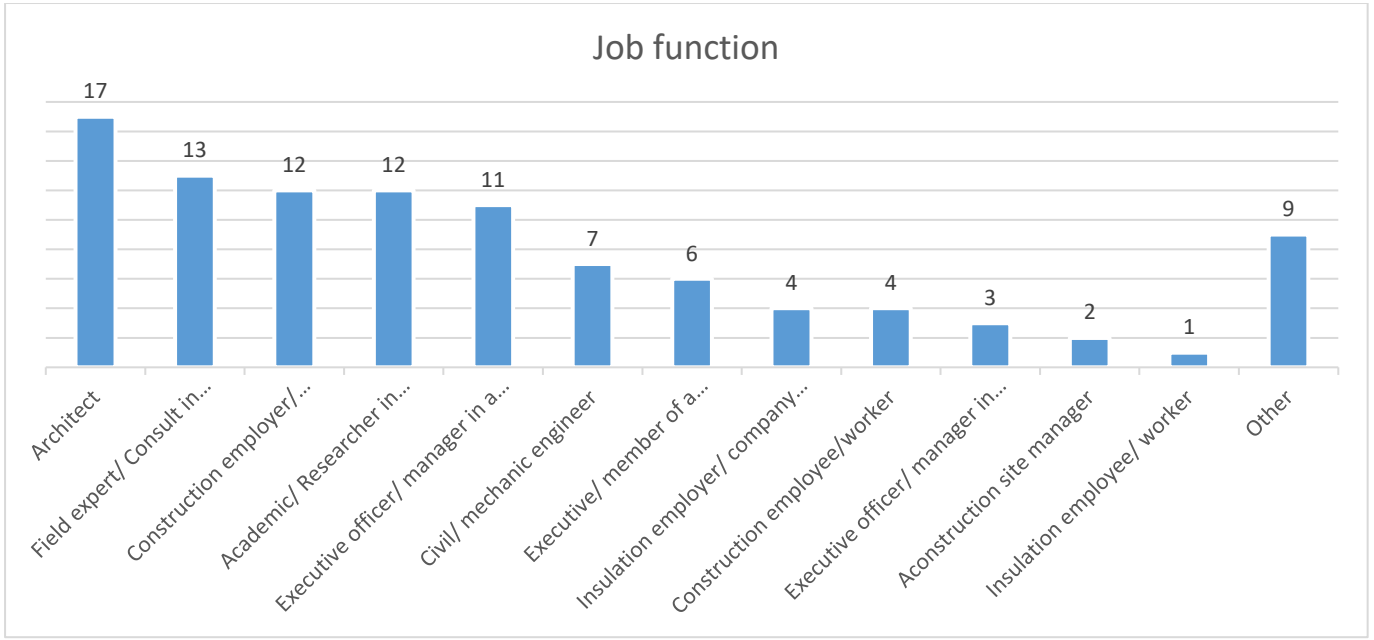
Question 3: What is your job function?



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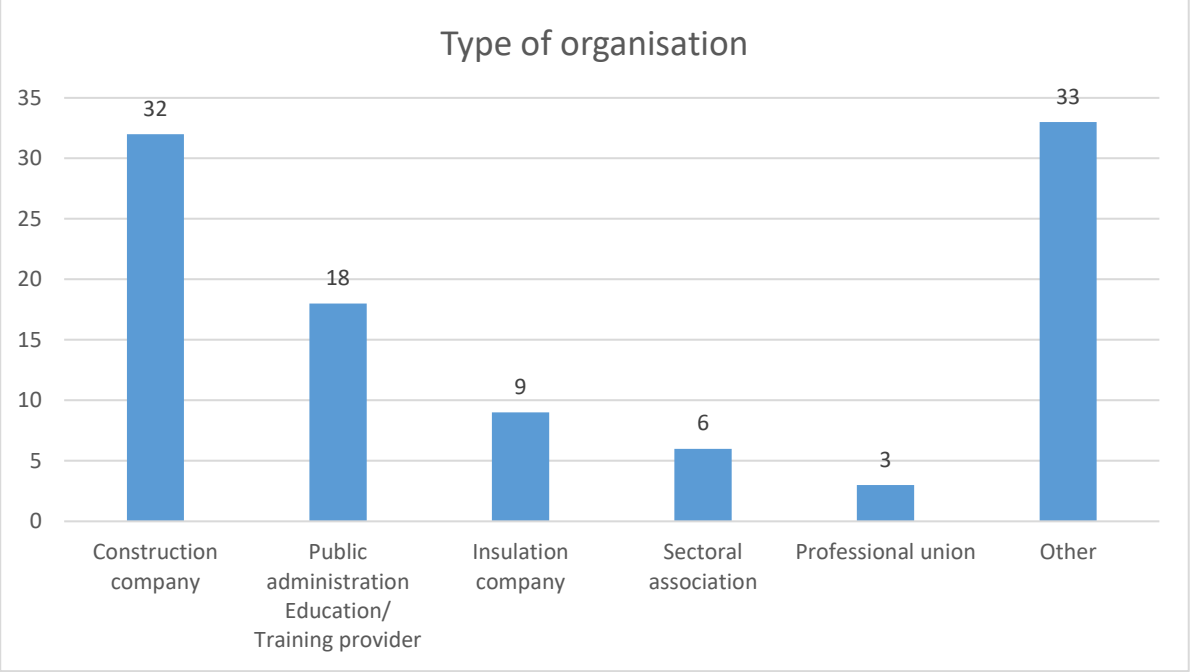
**No explanations given from respondents for other.*

Question 4: What is the type of your organisation?



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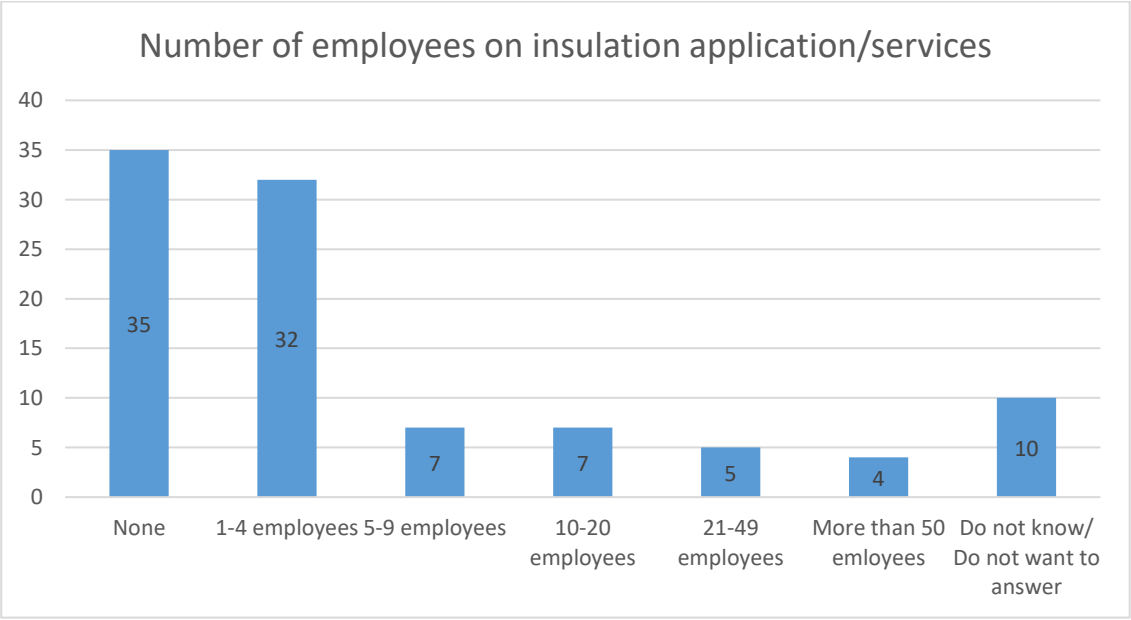
**Other: professional firm, studio, office, firm, freelancer, manufacturer, consulting company, engineer office etc*

Question 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?



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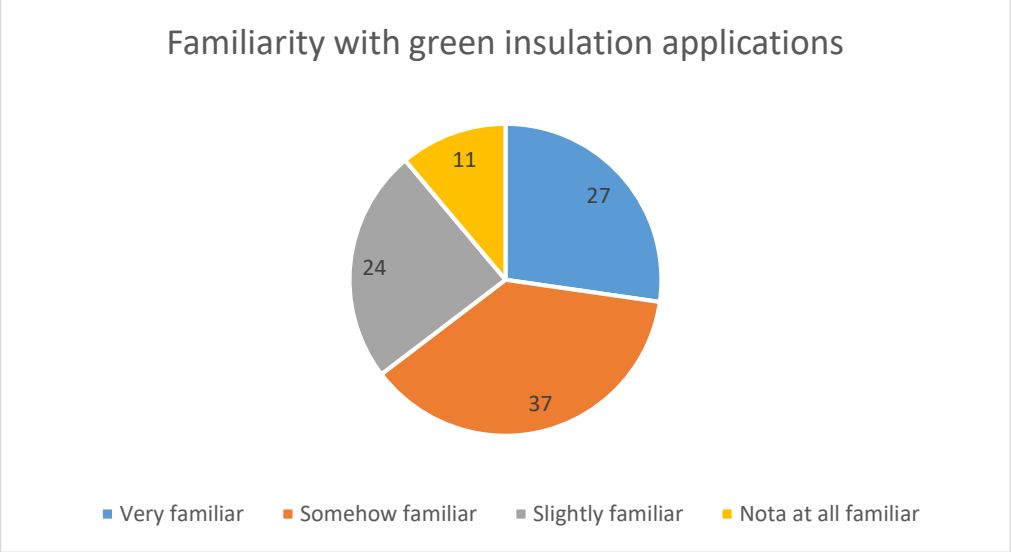
Familiarity with green insulation applications/services

Question 6: How familiar are you with green insulation applications?



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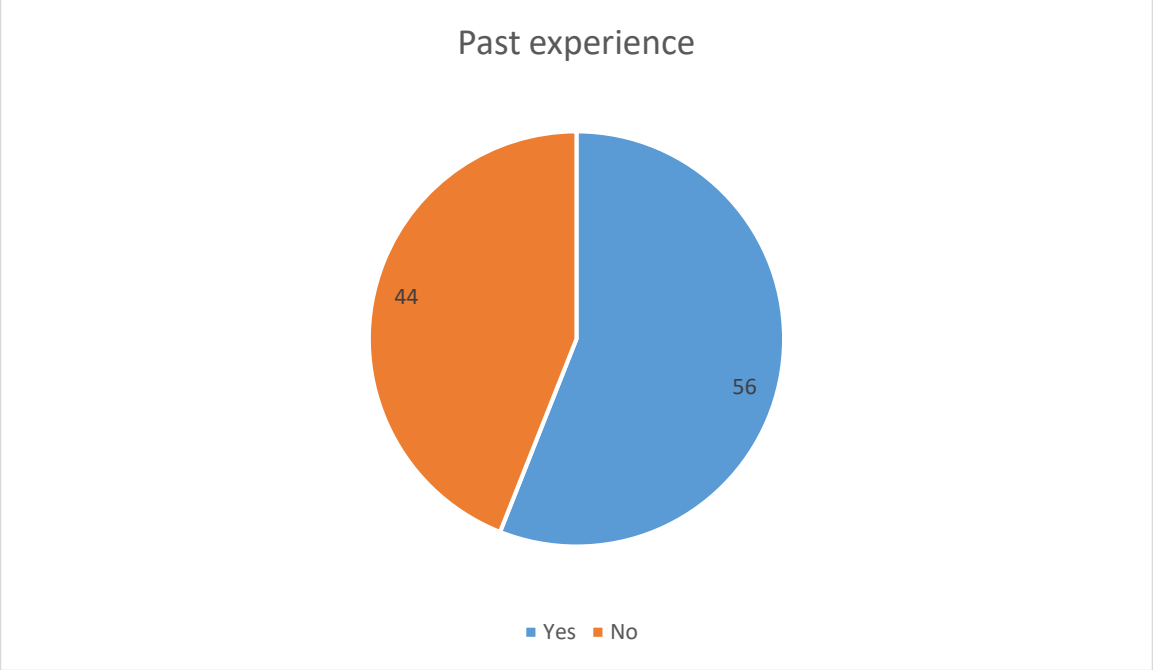
Question 7: Have you ever worked on green insulation application or related services?



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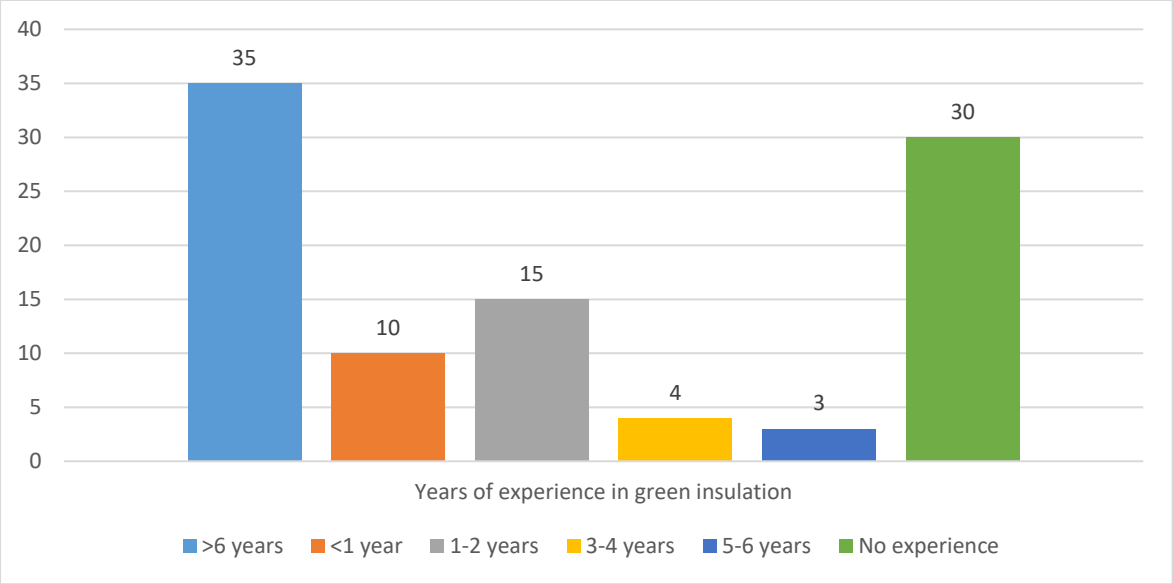
Question 8: How many years of work or research experience do you have in green insulation-related projects/application?



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Demand vs supply of skills in green insulation applications

Question 9-*knowledge/skills requirements* vs question 13-*current supply*

Q9. In your experience, to what extent do insulation professionals need to be knowledgeable on the following topics?

Q13. In your experience, to what extent do insulation professionals are knowledgeable on the following topics?

	Q9	Q13	Q9	Q13	Q9	Q13	Q9	Q13	Q9	Q13	Q9	Q13
	Very high (%)		High (%)		Average (%)		Low (%)		Very low (%)		means	
Be aware of how green materials behave & react to weather conditions	68	6	28	16	2	37	2	30	-	11	*4.61*	*2.75*
Limitations of using green insulation materials (e.g. absorption, dampness)	64	5	27	15	4	44	5	27	-	10	*4.50*	*2.78*
Application methods for each ggreen insulation materials	56	6	35	16	6	35	4	33	-	11	*4.42*	*2.73*
Suitability of selection green insulation materials according to construction requirements	53	4	30	13	16	36	3	34	1	13	*4.31*	*2.61*
Benefits of using green insulation materials as environmental friendly construction	47	10	36	8	13	36	5	34	-	12	*4.24*	*2.69*

Familiarity with national safety regulations & restrictions/ communicate the effects of various application of insulation techniques	44	6	36	18	14	36	5	27	1	14	*4.19*	*2.74*
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)	35	7	44	13	15	36	7	35	-	9	*4.06*	*2.75*
Familiarity with EU & national construction regulations & legislation (e.g. Construction Products' Directive)	36	6	34	16	22	35	7	23	2	20	*3.94*	*2.64*

Question 11-*knowledge/skills requirements* vs question 14-*current supply*

Q11. In your experience, to what extent do insulation professionals need to have the skills to:

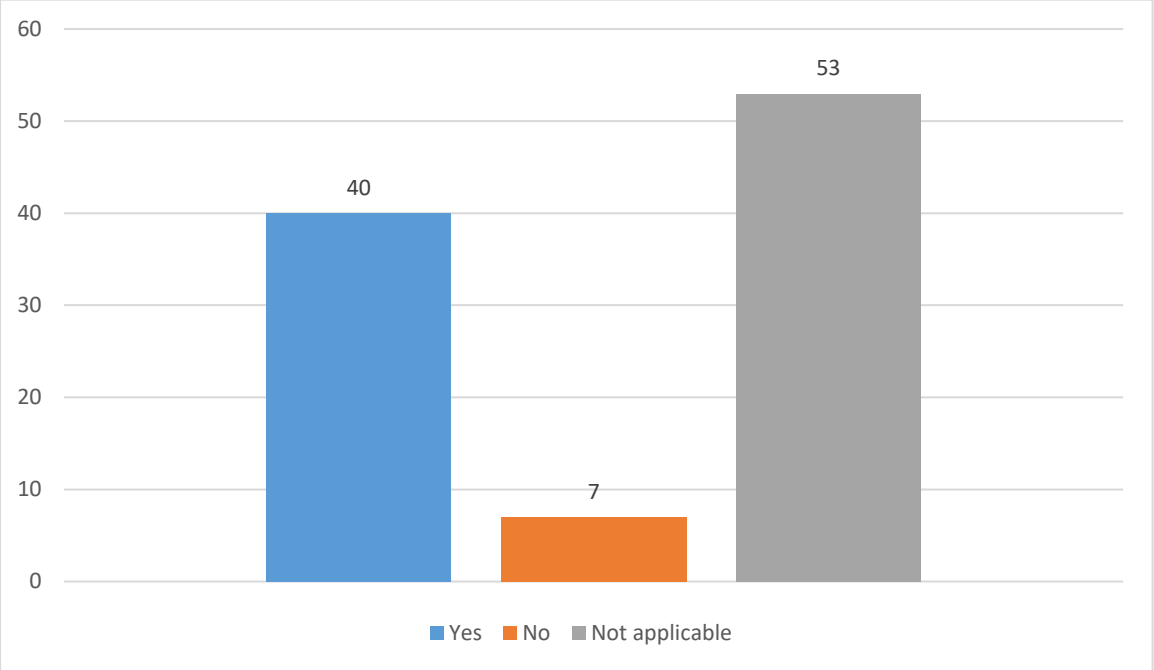
Q14 In your experience, to what extent do insulation professionals have the following skills?

	Q11	Q14	Q11	Q14	Q11	Q14	Q11	Q14	Q11	Q14	Q11	Q14
	Very high (%)		High (%)		Average (%)		Low (%)		Very low (%)		means	
Measure and cut insulation materials to adhere to specifications	71	19	22	32	7	31	12	12	-	6	*4.64*	*3.48*
Ability to read and comprehend construction plans/ blueprints	65	13	29	39	5	36	1	10	1	2	*4.56*	*3.50*
Follow safety guidelines when installing green insulation materials	65	13	26	25	8	40		14	1	9	*4.55*	*3.19*
Perform quality assurance on site after finalized installation	58	5	32	17	8	49	1	20	1	9	*4.46*	*2.89*
Execute installation of green insulation materials	57	7	27	16	13	44	2	20	-	13	*4.40*	*2.83*
Ability to communicate effectively with construction manager/ engineer/ site managers/ owner	48	3	44	32	7	48	1	14	-	2	*4.40*	*3.19*
Determine amounts and types of insulation needed, based on	51	10	37	38	11	33	1	12	-	7	*4.38*	*3.31*

factors such as location, surface shape and equipment use, energy efficiency etc.												
Understand properties and technical specifications of each green material to be installed	46	6	35	19	18	39	1	26	1	11	*4.24*	*2.84*
Select appropriate providers for green insulation materials	32	5	45	20	20	46	3	25	-	4	*4.05*	*2.97*
Suitability of selection of recycled old insulation materials	39	4	28	11	24	32	6	33	3	20	*3.93*	*2.46*
Interact and communicate with owner about eco-friendly products being installed and discuss benefits	34	5	31	9	31	39	3	36	2	11	*3.92*	*2.60*

Recruitment challenges

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



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Question 16: If yes, what were the main recruitment difficulties?

Table presenting list of combinations of difficulties and corresponding number of appearance (in absolute numbers)

	Frequency
Low number of applicants in general , Low number of applicants with the required insulation technical skills , Lack of the level of work experience expected by the organisation, Lack of skills	1
Low number of applicants in general , Low number of applicants with the required insulation technical skills , Low number of applicants with the required non-technical / transversal skills Low number of applicants with the required attitude and motivation, Lack of skills, Language barriers	2
Low number of applicants with the required attitude and motivation	3
Low number of applicants with the required attitude and motivation, Low number of applicants with the required insulation technical skills, Lack of skills	1
Low number of applicants with the required insulation technical skills	2
Low number of applicants with the required insulation technical skills , Low number of applicants with the required attitude and motivation, Lack of the level of work experience expected by the organisation	2
Low number of applicants with the required insulation technical skills , low number of applicants with the required attitude and motivation, Lack of the level of work experience expected by the organisation, Language barriers	2
Low number of applicants in general	5
Low number of applicants in general, Low number of applicants with the required insulation technical skills,	1

Low number of applicants in general, Low number of applicants with the required insulation technical skills, Low number of applicants with the required non-technical / transversal skills, Low number of applicants with the required attitude and motivation, Lack of the level of work experience expected by the organisation, Lack of qualifications expected by the organisation	1
Low number of applicants in general, Lack of qualifications expected by the organisation	1
Low number of applicants with the required insulation technical skills , Low number of applicants with the required non-technical / transversal skills , Lack of the level of work experience expected by the organisation, Lack of skills	2
Low number of applicants with the required insulation technical skills , Low number of applicants with the required non-technical / transversal skills , Lack of skills	4
Low number of applicants with the required insulation technical skills, Low number of applicants with the required attitude and motivation	1
Low number of applicants with the required insulation technical skills, Low number of applicants with the required non-technical / transversal skills, Lack of the level of work experience expected by the organisation, Lack of qualifications expected by the organisation	1
Low number of applicants with the required insulation technical skills, Lack of skills	1
Low number of applicants with the required non-technical / transversal skills	1
Low number of candidates in general	2

Low number of candidates in general, Low number of candidates with the required aptitude and motivation	1
Low number of candidates in general, Low number of candidates with the required aptitude and motivation, Lack of the level of work experience required by the organisation, Lack of the qualifications required by the organisation	1
Low number of candidates in general, Low number of candidates with the required non-technical/transversal skills	1
Low number of candidates in general, Low number of candidates with the required non-technical/transversal skills, Low number of candidates with the required aptitude and motivation, Lack of the level of work experience required by the organisation	1
Low number of candidates in general, Low number of candidates with the required non-technical/transversal skills, Lack of the level of work experience required by the organisation, Lack of the qualifications expected by the organisation	1
Low number of candidates with the required aptitude and motivation	2
Low number of candidates with the required non-technical/transversal skills, Low number of candidates with the required aptitude and motivation, Lack of the level of work experience required by the organisation	1
Low number of candidates with the required non-technical/transversal skills, Lack of qualifications expected by the organisation	1
Low number of candidates with the required non-technical/transversal skills, Lack of qualifications expected by the organisation, Language barriers	1

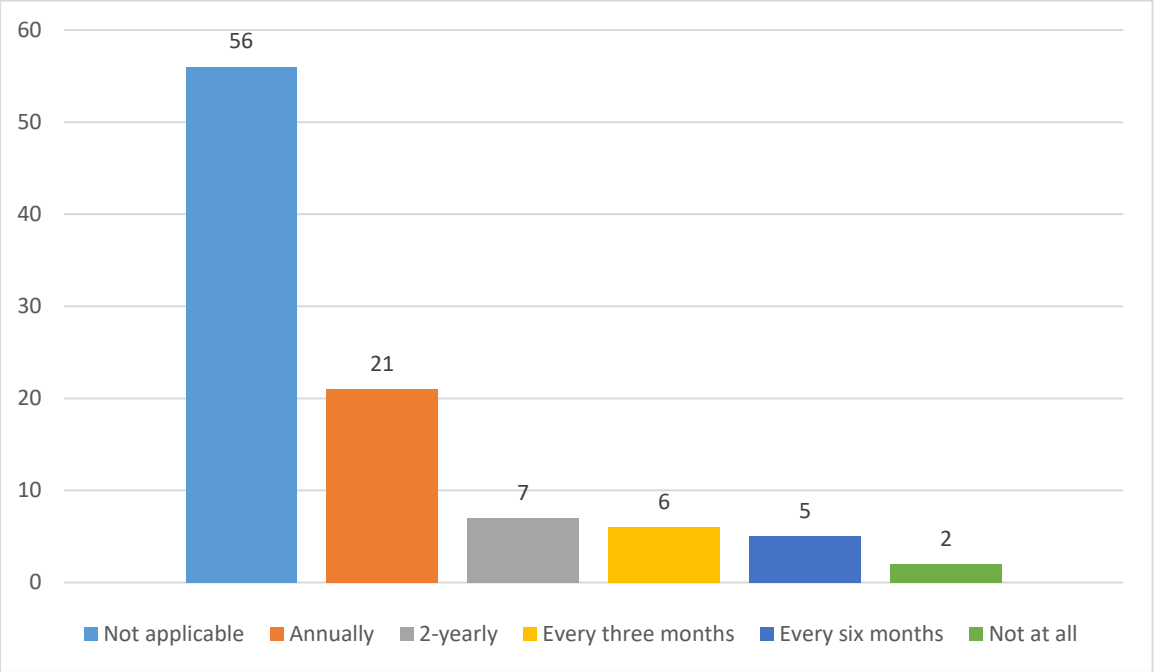
Low number of candidates with the required non-technical/transversal skills, Lack of the level of work experience required by the organisation	2
Low number of candidates with the required non-technical/transversal skills, Too much competition from employers in the construction sector	1
Lack of qualifications expected by the organisation	1
Lack of skills	2
Lack of the level of work experience expected by the organisation	1
Lack of the level of work experience required by the organisation, Lack of the qualifications expected by the organisation	1
Not applicable	62

List of recruiting difficulties in ranking of references:

Not applicable	62
Low number of applicants with the required insulation technical skills	21
Low number of applicants with the required non-technical / transversal skills	19
Low number of applicants with the required attitude and motivation	18
Low number of applicants in general	17
Lack of the level of work experience expected by the organisation	17
Lack of skills	11
Lack of the qualifications required by the organisation	9
Language barriers	5
Too much competition from employers in the construction sector	1

Training / workforce development

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



40% of the sample is reviewing the skills and the training needs of their staff at least once a year.

Question 18: What are the main barriers to providing green insulation specialised training to your workforce?

	Frequency
Employees are too busy to undertake any training and development	7
No difficulties in providing training to our workforce	1
Lack of appropriate training offerings in the green insulation field	2
Lack of appropriate training offerings in the green insulation field, Lack of flexible, convenient training offerings in the green field	6

Lack of appropriate training offerings in the green insulation field, Lack of flexible, convenient training offerings in the green field, Employees are too busy to undertake any training and development, Language	2
Lack of appropriate training offerings in the green insulation field, Lack of flexible, convenient training offerings in the green field, Training is not a priority for our organisation	2
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	2
Lack of flexible, convenient training offerings in the green field, Employees are too busy to undertake any training and development	2
No difficulties in providing training to our workforce	3
Employees are too busy to undertake any training and development	3
Employees are too busy to undertake training and development activities	2
Lack of adequate training offers in the green insulation sector	2
Lack of adequate training offers in the green insulation sector, Employees are too busy to undertake training and development activities	1
Lack of adequate training offers in the green insulation sector, Lack of flexible and affordable training offers in the green insulation sector	1
Lack of adequate training offers in the green insulation sector, Lack of flexible and affordable training offers in the green insulation sector, Language	1
Lack of adequate training offers in the green insulation sector, Lack of flexible and cost-effective training offers in the green insulation sector	1

Lack of adequate training offers in the green insulation sector, Language	1
Lack of appropriate training offerings in the green insulation field	3
Lack of appropriate training offerings in the green insulation field, Constantly changing law	1
Lack of appropriate training offerings in the green insulation field, Employees are too busy to undertake any training and development	1
Lack of appropriate training offerings in the green insulation field, Lack of flexible, convenient training offerings in the green field	1
Lack of appropriate training offerings in the green insulation field, Lack of flexible, convenient training offerings in the green field, Employees are too busy to undertake any training and development	2
Lack of appropriate training offerings in the green insulation field, Lack of flexible, convenient training offerings in the green field, Training is too expensive	1
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	2
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, Language	1
Lack of appropriate training offerings in the green insulation field, Lack of flexible, convenient training offerings in the green field, Training is too expensive, Language	1

Lack of appropriate training offerings in the green insulation field, Language	1
Lack of appropriate training offerings in the green insulation field, Training is not a priority for our organisation	1
Lack of flexible and affordable training offers in the green insulation sector	2
Lack of flexible and affordable training offers in the green insulation sector, Employees are too busy to undertake training and development activities	1
Lack of flexible and affordable training offers in the green insulation sector, Language	1
Lack of flexible and convenient training offers in the green insulation sector	1
Lack of flexible and cost-effective training offers in the area of green insulation	1
Lack of flexible, convenient training offerings in the green field	3
Lack of flexible, convenient training offerings in the green field, Language	1
Lack of suitable training offers in the area of green insulation Lack of flexible and cost-effective training offers in the area of green insulation	1
Less demand for green products both in public tenders as a requirement and in private jobs	1
No difficulties in providing training for our workforce	10
Not applicable	43
Training is not a priority for our organisation	3
Training is too expensive, Training is not a priority for our organisation	1
Total	

List of barriers in order of references (in absolute numbers):

Not applicable	43
Lack of appropriate training offerings in the green insulation field	29
Employees are too busy to undertake training and development activities	24
Lack of flexible and convenient training offers in the green insulation sector	23
Training is too expensive	8
Training is not a priority for our organisation	7
No difficulties in providing training for our workforce	13
Language	8
Lack of flexible and affordable training offers in the green insulation sector	4

Open-ended questions

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

The following list presents list of additional topics required for green insulation applications proposed by respondents and grouped by common characteristics:

1. Materials:

   "Manufacturer's technological information"

   "behaviour of the material throughout its life cycle / recyclability / quantity calculation and assembly in such a way as to avoid the generation of waste"

   "Advantages over traditional materials - general economic and environmental elements resulting from green insulation"

   "YES , INFORMATION ON THE DETERIORATION OF MATERIALS OF NATURAL ORIGIN"

   "To talk about all these knowledges, designers should include such materials in the design of the project, as it is difficult to replace the material specified in the design."

   "Start using these materials first, as they are now used very rarely and only by private customers"

   "We only had to deal with eco-wool, but in our projects (Facade Insulation) we do not use such materials due to their unsuitability for our climate."

   "I think that the knowledges listed above is not necessary for the simple construction worker, moreover as these listed materials are not suitable for our conditions"

2. Impact:

   "Advantages over traditional materials - general economic and environmental elements resulting from green insulation"

"The functional results from the use of materials in terms of energy protection, fire protection, sound insulation, management of hygrometric load , seismic protection, etc."

"behaviour of the material throughout its life cycle / recyclability / quantity calculation and assembly in such a way as to avoid the generation of waste"

"Human health and environmental cost-benefit ratio, LCA"

"Awareness of substrate suitability and contribution in terms of reducing the ecological footprint"

"Information on the importance of environmental impact and increased critical ecological awareness."

3. Practicality/ functionality:

"Knowledge for the proper storage of materials at the construction site and the appropriate choice of support / installation"

"Basics of building skills"

"Experience, knowledge of defects and repairs"

"Ability to carry out any insulation"

"General experience with thermal barriers in construction"

"For the application of ecological insulation, it is very important to know the appropriate support which guarantees the absence of thermal bridges and to judge the disadvantages that may arise during application such as: heavy pollution by fine dust, risks of fire during the construction phase."

"Insulation against heat, phase shift, breathability"

"Measuring and fitting materials correctly is very important."

"Standardised procedures for laying and storing materials on site"

"Application technique"

"cycle of materials to be combined with the specific insulation"

"Installation experience with specialised companies"

4. Building pathology:

"The correct stratification of materials in the structural elements to avoid problems of building pathology"

"Knowledge building pathology"

"the pathology of buildings"

5. Costs:

"Cost estimation"

"Costs"

"Cost estimation"

6. Trainings:

   "High training for applicators therefore recognised professional specialisation"

   "adequate preparation of installers"

7. OSHA:

   "OSHA at work during façade installation and related health risks"

   "OSHA knowledge"

8. General:

   "Most of the knowledge listed is not relevant to employees as it is more the responsibility of the designers. The persons performing the work fol2 the project and not select / calculate the materials. These materials are generally not used in the construction of large facilities (rarely in the construction of individual houses), so we do not see the need to have workers in such a narrow area."

   "I think some points of this survey is more for designers not for installers"

9. No need:

   "List is complete."

   "The issue is exhausted in item No 9."

   "There is no need to expand the volume of knowledge"

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

The following list presents lists of additional skills proposed by respondents and grouped by common characteristics:

1. Training:

   "Certified continuous specific training"

   "High training for applicators therefore recognised professional specialisation"

   "hold professional laying courses"

2. Practicality/functionality:

   "to comprehend the language/ coding of the construction manager in charge"

   "Know how to calculate the thermal resistance of a wall or roof!"

"Knowledge of PEB requirements and demystifying the implementation"

"use specialised mechanical equipment to execute applications"

"Correct application"

3. Quality assurance process:

   "use original equipment in order to evaluate the quality of the construction before and after the installation"

   "Means of observation and possible interventions to prevent damages, defects"

   "keep the insulation in proper condition"

   "scheduling of works"

   "continue to monitor the work already carried out, to check its goodness and effectiveness"

4. Safety:

   "Fire resistance of materials"

   "Use of clothing/safety items"

5. Precision/ Order:

   "Be precise"

   "The precision"

   "Ensure order in construction site"

   "Ensuring workplace order (Work culture)"

6. Holistic perspective/ general:

   "To cooperate and comprehend the rest of the technical world of constructions"

   "Costs, duration"

   "To have a global view of the whole construction process"

   "RESPECT DESIGNERS AND DO NOT OVERLAP ROLES"

7. Materials:

   "Differences resulting from installation and maintenance of ecological insulation (vs normal insulation)"

   "Knowing properties of materials to choose correctly."

   "Knowledge of the production origin of the material they are laying"

   "knowledge of the production process and components."

   "These are more managerial level skills and knowledge. The installer does not need to know everything, especially since the projects do not specify such materials and it is not profitable for our company to use them."

"It is not a popular material so more general skills are needed. Communicating with managers or the properties of materials is the responsibility of managers and designers."

"There is a need for greater use of such materials and their adaptation to our conditions"

Interviews

2 personal interviews were carried out from one partner in addition to the online survey performed nationally.

Both interviews took place in France with company owners in construction sector with more than 16 employees.

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

Both interviewees presented a very large range of jobs noting that there are no boundaries in environmental friendly construction related professions and jobs. To be precise, one interviewee answered giving technical job titles from the construction sector (building energy performance team leader, sealing, waterproof roofer) and the other presented jobs within his cooperative environment.

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

The first interviewee believes that the demand for insulation professionals does not outpace the supply in the labor market. In fact, he stated that "We have reviewed our hiring conditions and are now ignoring many criteria, simply to meet the demand."

The second interviewee is discussing about skills and states that basic skills are enough in order to excel them. In exact, he noted that "so what we need is less skills than potential ones who simply master the basics of the trade and to whom we will bring expertise in various ways".

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

One interviewee answered this question and described the job profile of Energy Renovation Consulant. This job profile, according to the respondent, has to have good knowledge of the building (TCE) and the renovation techniques following environmental standards. Regarding his technical skills are required to be related to "constructive and energetic devices".

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

One interviewee answered this question and stated that the professional should be :

- Rigorous

- Methodical,
- Know how to handle stress,
- Excellent physical condition,
- Know how to evaluate the construction/ insulation site
- Determine materials and tools to use
- Fabricate support elements
- Prime surfaces
- Install insulation materials on hot, cold, steam or wall lines, floors, roofs to protect them from
- heat, cold, frost and moisture.
- Remove and reinstall insulation for maintenance work performed by other technicians.

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?

One interviewee who answered this question noted that

- "high financial cost"
- "access to resources"

Are the two main factors hindering the use of green insulation materials. Later on, the interviewee compared glass wool and flax materials, stressing that he aims to focus on exploring the opportunity to use flax as it is produced locally and he is looking for alternative natural insulation resources.

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

One interviewee answered this question describing that it preferable according to his opinion, for insulation materials providers to offer such trainings because

- it enhances the B2B relationship,
- are performed onsite,
- are short
- are delivered by technicians and not trainers.

Conclusions

Respondent profile

GRISNCO online survey reached mainly:

- architects, field experts in the construction/ insulation area, constructions employers, academic researcher in corresponding fields,
- working in various type of organisations primarily from construction companies and from other professionals firms (office, firm, studio, freelancers, manufactures, consulting company etc.

The majority of the respondents who are employers have no employees and in case they employ it will be up to 4 persons.

Familiarity with green insulation applications/services

- 64% of respondents are "very" and "somehow" familiar with green insulation applications,
- 56% of respondents have prior working experience on green insulation applications
- 32% of respondents have 1 to 6 years of experience on green insulation applications
- 35% of respondents have more than 6 years of experience on green insulation applications

Demand vs supply of skills in green insulation applications

Knowledge of topics

Comparing statistical means per topic of knowledge in order from higher to lowest means values.

- Be aware of how green materials behave and react to weather conditions
  Need to know 4.61 vs are knowledgeable 2.75
- Limitations of using green insulation materials
  Need to know 4.50 vs are knowledgeable 2.78
- Application methods for each green insulation materials
  Need to know 4.42 vs are knowledgeable 2.73
- Suitability of selection green insulation materials according to construction requirements
  Need to know 4.31 vs are knowledgeable 2.61
- Benefits of using green insulation materials as environmental friendly construction
  Need to know 4.24 vs are knowledgeable 2.69

- Familiarity with national safety regulations & restrictions/ communicate the effects of various application of insulation techniques
  Need to know 4.19 vs are knowledgeable 2.74
- Properties of different types/ categories of green used in insulation materials
  Need to know 4.06 vs are knowledgeable 2.75
- Familiarity with EU & national construction regulations & legislation
  Need to know 3.94 vs are knowledgeable 2.64

✓ **Topic <u>need to know</u> with highest score: "*Be aware of how green materials behave and react to weather conditions*"**

✓ **Topic that <u>actual know</u> with lowest score: "*Suitability of selection green insulation materials according to construction requirements*"**

<u>Knowledge of skills requirements</u>

Comparing statistical means per skill requirement in order from higher to lowest means values.

- Measure and cut insulation materials to adhere to specifications
  Need to have 4.64 vs actually have 3.48
- Ability to read and comprehend construction plans/ blueprints
  Need to have 4.56 vs actually have 3.50
- Follow safety guidelines when installing green insulation materials
  Need to have 4.55 vs actually have 3.19
- Perform quality assurance on site after finalized installation
  Need to have 4.46 vs actually have 2.89
- Execute installation of green insulation materials
  Need to have 4.40 vs actually have 2.83
- Ability to communicate effectively with construction manager/ engineer/ site managers/ owner
  Need to have 40 vs actually have 3.19
- Determine amounts and types of insulation needed, based on factors such as location, surface shape and equipment use, energy efficiency etc.
  Need to have 4.38 vs actually have 3.31
- Understand properties and technical specifications of each green material to be installed
  Need to have 4.24 vs actually have 2.84

- Select appropriate providers for green insulation materials

  Need to have 4.05 vs actually have 2.97
- Suitability of selection of recycled old insulation materials

  Need to have 3.93 vs actually have 2.46
- Interact and communicate with owner about eco-friendly products being installed and discuss benefits

  Need to have 3.92 vs actually have 2.60

✓ **Skill <u>need to have</u> with highest score: "*Measure and cut insulation materials to adhere to specifications*"**

✓ **Skill <u>actually have</u> with lowest score: "*Suitability of selection of recycled old insulation materials*"**

Recruitment challenges

Companies reached by our consortium seem do not encounter any difficulties while recruiting construction staff mainly because 53% of our sample do not hire employees presumably. On the contrary, 40% of our sample actually admit they face difficulties in recruiting construction staff to carry out green insulation related tasks.

Main recruitment difficulties in order of references:

- Low number of applicants with the required insulation technical skills
- Low number of applicants with the required non-technical / transversal skills
- Low number of applicants with the required attitude and motivation
- Low number of applicants in general
- Lack of the level of work experience expected by the organisation
- Lack of skills
- Lack of the qualifications required by the organisation
- Language barriers

Training / workforce development

40% of the sample is reviewing the skills and the training needs of their staff at least once a year while 56% seem not follow such practice (see answer not applicable).

- Main barriers in providing specialised training in order of references:

- Lack of appropriate training offerings in the green insulation field
- Employees are too busy to undertake training and development activities
- Lack of flexible and convenient training offers in the green insulation sector
- Training is too expensive
- Training is not a priority for our organisation
- No difficulties in providing training for our workforce
- Language
- Lack of flexible and affordable training offers in the green insulation sector