Project number: 600885-EPP-1-2018-1-ES-EPPKA2-SSA-B

Co-funded by the Erasmus+ Programme of the European Union

Sectoral Skills Alliance

Results of the questionnaire on skills needs of construction companies in: digitalisation, energy efficiency and circular economy

Transnational analysis

Methodology

The design of the questionnaire on skills begun in October 2020, after 10 months of Preliminary Research with the project partners. WP4 co-pilots (French CCCA-BTP and Belgian Centre IFAPME Liège-Huy-Verviers) as well as French FFB concerted together on the general design of the questionnaire. After consultation with national experts, Belgian partners proposed a first draft, which was then amended by pedagogical experts of CCCA-BTP in November and December 2020.

WP4 co-pilots decided to use the online tool *Déclic*, used by CCCA-BTP, to disseminate the questionnaire and collect the data. Once the French version finalised and integrated to *Déclic*, they translated it in English and the Irish LIT revised it before presentation of both the questionnaire and the data collecting tool to the project partners for validation in February 2021.

The leading partner of the project, Spanish FLC, as well as representatives of DG Growth and EACEA (European Commission) revised the validated version of the questionnaire, and this final version was sent to the project partners for translation in their national language in May 2021. Beside English and French, the questionnaire was translated in Spanish, Portuguese, Italian, Dutch, German, Polish, Greek, Slovenian, Lithuanian and Finnish.

As specified in the application, the aim was to collect a minimum of 2000 answers among the 12 European countries of the consortium. Each country was addressed with a minimal number of answers to reach, depending on their respective number of construction companies (*please see the table on the right*).

The questionnaire was launched on **June 7th**, 2021 and was closed on **September 17th**, 2021. The consortium succeeded to collect **a total of 1715 answers**.

	Number of construction companies (1)	Minimal number of answers required (2)	Minimal number of construction companies to reach (Answer rate = 10%)
Italy	1 044 531	300	3 000
France	804 420	300	3 000
Spain	698 086	300	3 000
Germany	655 109	180	1 800
Poland	522 283	180	1 800
Belgium	204 476	120	1 200
Greece	168 233	120	1 200
Portugal	167 584	120	1 200
Ireland	95 781	120	1 200
Finland	84 392	120	1 200
Lithuania	68 074	90	900
Slovenia	36 257	90	900
Total	4 549 226	**2 040**	20 400

(1) Source: ECSO (EU)

(2) National partners can decide to raise this minimum in their country.

Methodology

The **1715 answers collected by the Construction Blueprint consortium** are distributed according to *the table on the left*.

Before any analysis, a statistical expert of CCCA-BTP weighted the collected results based on the ratio between the number collected by each country and their respective number of construction companies, in relation with the total number of answers collected by the consortium, in order to determine the **adjustment coefficients** for each country (*please see the table on the left*).

It is interpreted as follow: for example, as the number of answers in Italy is largely superior to other countries, in order avoid the Italian results to be overrepresented in the analysis, 2 Italian answers will count for 1.

In the same logic, if the transnational analysis is carried out with the Polish answers, each one of the 12 answers will count for 16, which will overrepresents the Polish results in the transnational consolidation. It explains why the Polish answers will not be taken into account for the transnational analysis and will be used only for a national interpretation.

	Minimal number of answers required	Total of answers collected	Distribution of results, Poland included	Adjustment coefficient, Poland included	Distribution of results, Poland excluded	Adjustment coefficient, Poland excluded
Italy	300	750	43,7%	0,525	44,0%	0,589
France	300	230	13,4%	1,319	13,5%	1,479
Spain	300	163	9,5%	1,615	9,6%	1,811
Germany	180	64	3,7%	3,859	3,8%	4,329
Poland	180	12	0,7%	16,408		
Belgium	120	151	8,8%	0,510	8,9%	0,573
Greece	120	121	7,1%	0,524	7,1%	0,588
Portugal	120	61	3,6%	1,036	3,6%	1,162
Ireland	120	55	3,2%	0,657	3,2%	0,736
Finland	120	20	1,2%	1,591	1,2%	1,784
Lithuania	90	30	1,7%	0,855	1,8%	0,960
Slovenia	90	58	3,4%	0,236	3,4%	0,264
Total	2 040	1715	100,0%		100,0%	

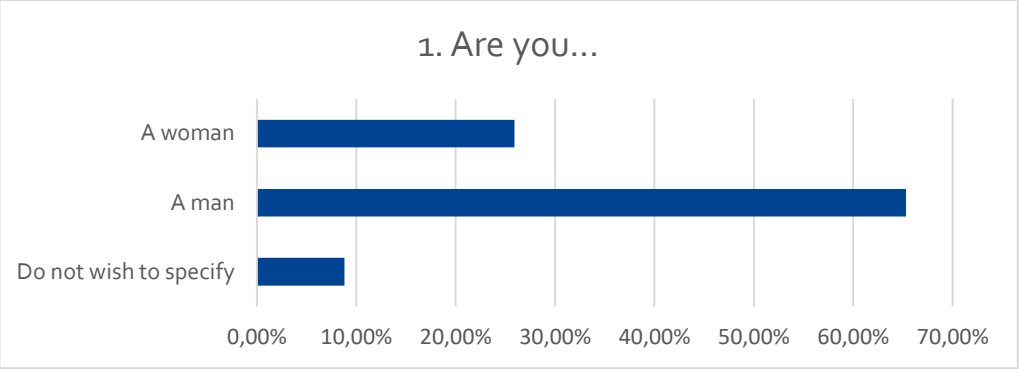
As the goal of 2000 answers was not reached for the consortium and most of the project partners did not succeed to reach their national goals, a workshop will be organised before the 2nd edition of the survey to identify the difficulties and obstacles met by the partners as well as the best practices implemented by them for the collect of answers.

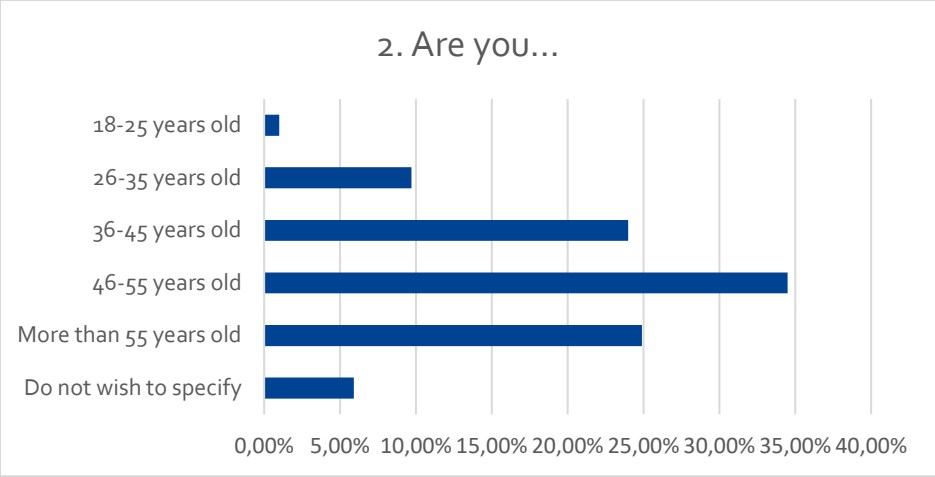
Profile of the respondents

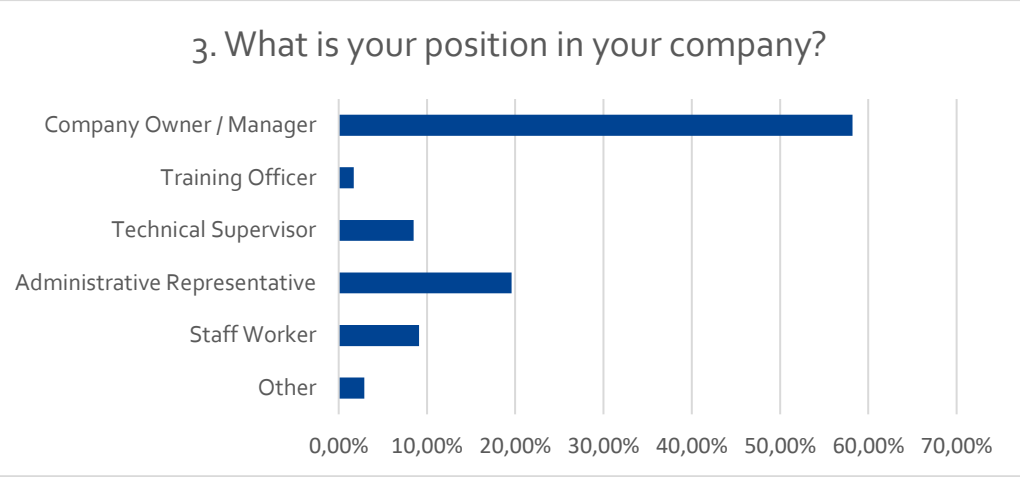
Most of or all the questionnaire was completed by **1715 respondents from the construction sector** in the 12 European countries of the consortium.

65,3% of them are men and 25,9% are women (8,8% do not wish to specify). Most of them are between 46 and 55 years old (34,5%), more than 55 years old (24,9%) and between 36 and 45 years old (24%).

A large majority of the respondents is company owner / manager (58,2%) and administrative representative (19,6%).







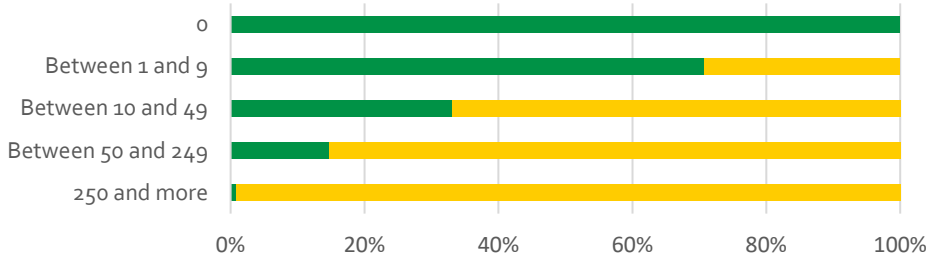
Profile of the companies

25,9% of the companies where the respondents work are located in Italy, 20% in France, 17,3% in Spain and 16,3% in Germany.

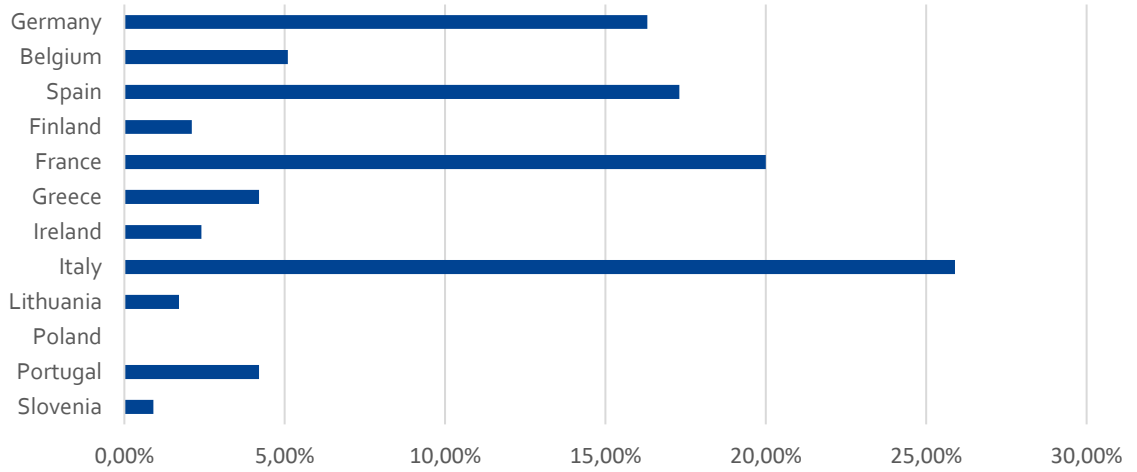
Almost a half of these companies (47,2%) have between 1 and 9 employees, 31,1% of them have between 10 and 49 companies and 12,1% have between 50 and 249 companies.

The proportion of the size of the respondents' companies vary significantly between the partner countries. For example, in Italy 77,1% of the respondents' companies have 9 employees and less, whereas in Germany 71,9% of them have 10 employees and more.

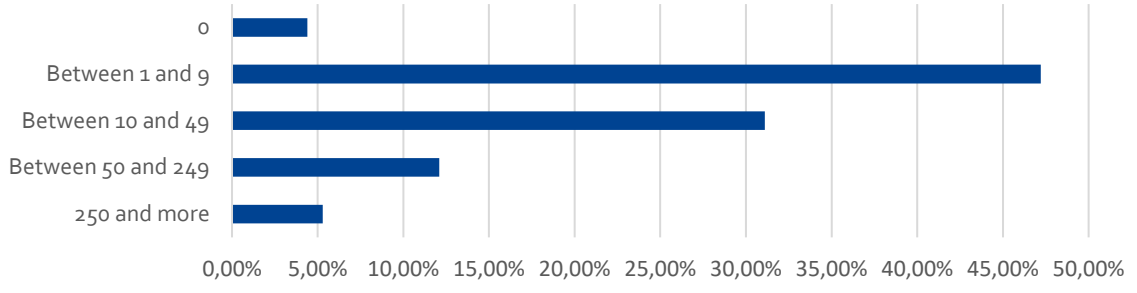
6. Example: difference of size of the respondents' construction companies between **Italy** and **Germany**



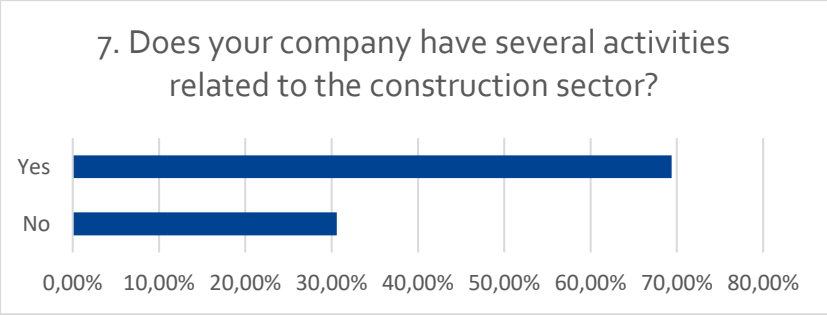
4. In which country are the headquarters of your company located?

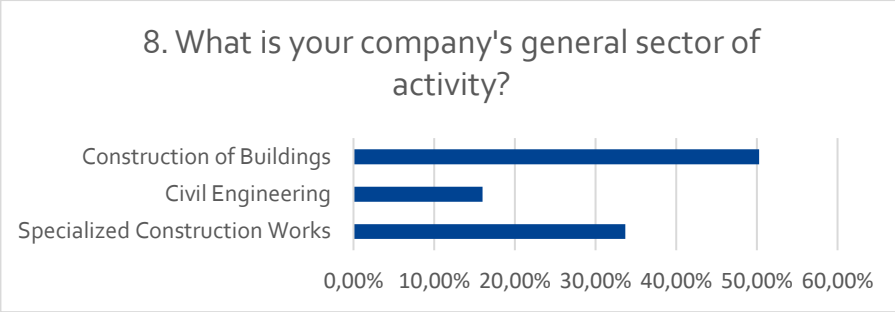


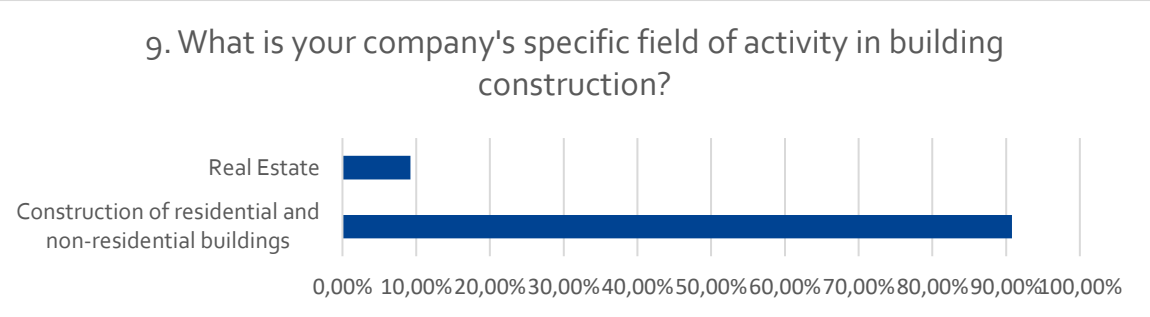
5. How many employees are there in your company?



Profile of the companies





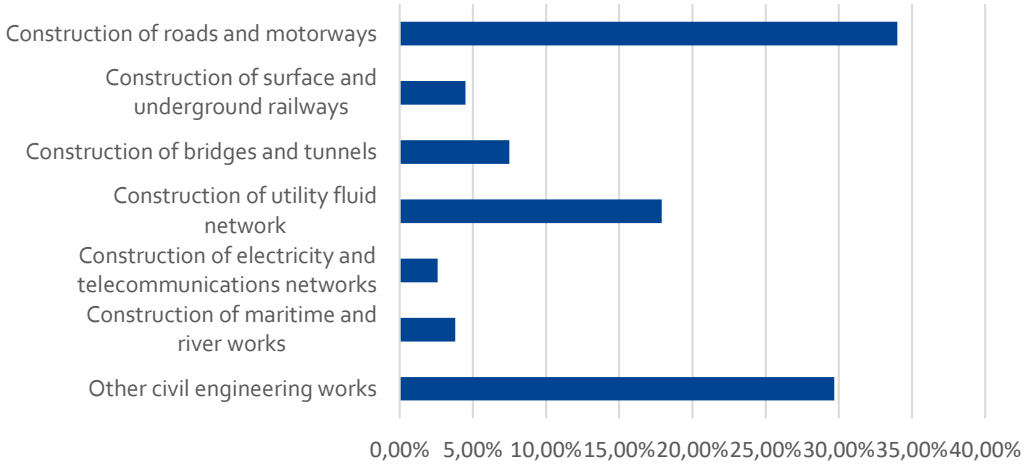


69,4% of the respondents indicated that their companies have several activities related to the construction sector, and this figure varies between 50% for Germany and 100% for Greece.

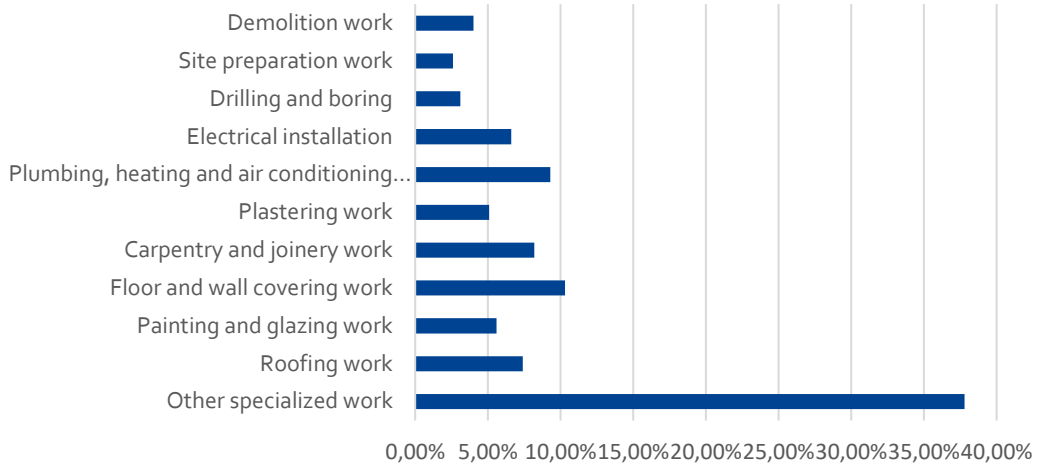
Half of these companies' general sector of activity is the construction of buildings (50,3%), and this figure varies between 40% for Germany and Lithuania, and 68% for Ireland. 9 over 10 of them are into the construction of residential and non-residential buildings.

Profile of the companies

10. What is your company's main specific field of activity in civil engineering?



11. What is your company's main specific field of activity in specialized construction works?

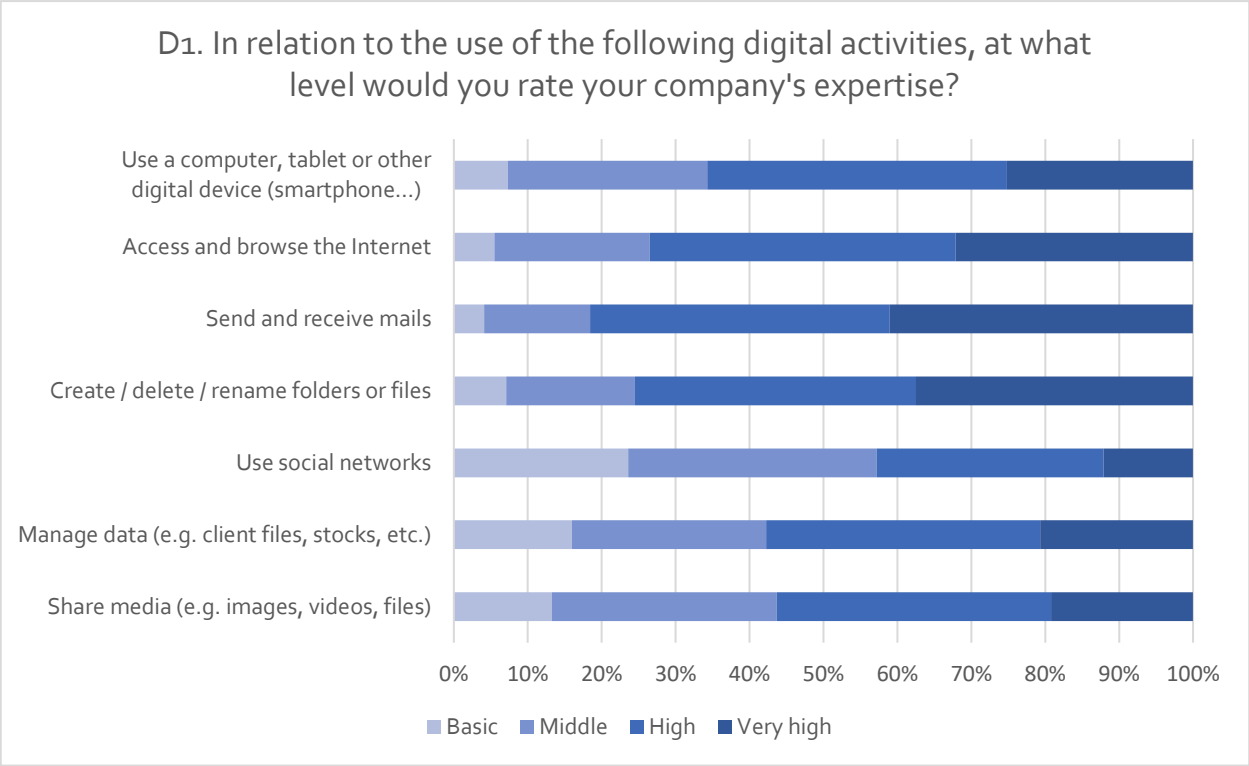


34% of the respondent construction companies in civil engineering operate in the construction of roads and motorways (a common characteristic to almost all the countries of the partnership) and 17,9% of them in the construction of utility fluid network.

10,3% of the respondent construction companies in specialized construction works operate in roofing work, 9,3% in plumbing, heating and air conditioning installation work and 8,2% in carpentry and joinery work. It must be taken into account that most of the respondent construction companies have several activities related to the construction sector, and most of them operate in specialized construction works.

Given the proportion of other civil engineering works (29,7%) and other specialized construction works (37,8%), the answers will be further analysed to propose a more complete list of trades for the 2nd edition of the questionnaire.

Digitalisation – introduction

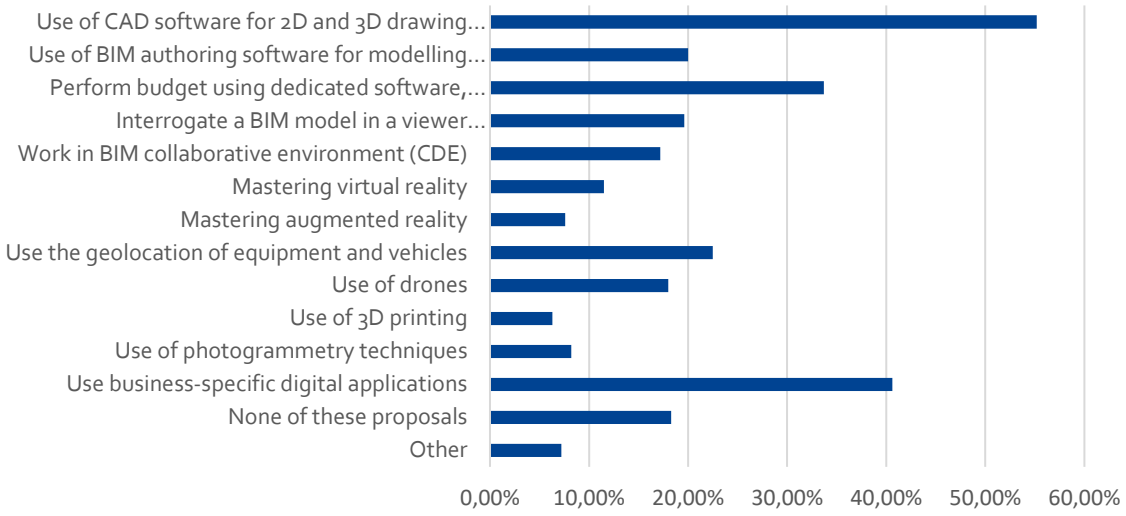


Before addressing the digital skills related specifically to the construction sector, an introductive question was added on general digital skills. Indeed, the use of digital tools and software strongly depends on the activity and the size of the company. Plus, it is relevant to identify if a basic digital upskilling is needed before going further.

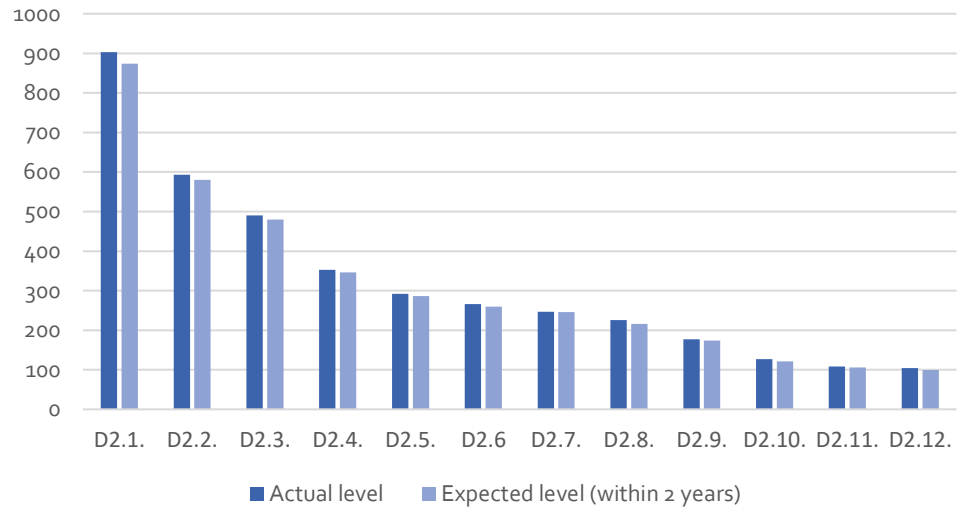
At least half of the respondent construction companies show a high or very high level in the digital activities addressed, except for the use of social networks; 57,2% of them evaluate their skill level for this activity between basic and middle. This figure varies between 36,3% in Ireland and 65% in Italy and Germany.

Digitalisation – preliminary question

D2. Regarding digitalisation, which skills does your company need to fulfil its activities?



D3. Number of answers for each digital skill (sample)



This preliminary question aims to interrogate the construction companies only on the skills that concern them.

912 (55,2%) respondent companies need to be skilled in the use of CAD software for 2D and 3D drawing production and updating (AutoCAD, Sketch UP, Rhinoceros 3D, etc.), 592 (40,6%) in the use of business-specific digital applications and 496 (33,7%) in the design of a budget using dedicated software, including BIM. 351 (18,3%) respondent companies need none of the digital construction-related skills addressed above.

14,6% of the 120 respondent companies which selected "other" indicated a need for the use of the ERP (Enterprise Resource Planning) software and 10,1% for the use of Excel.

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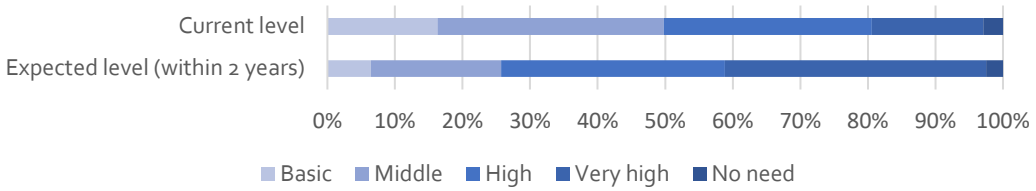
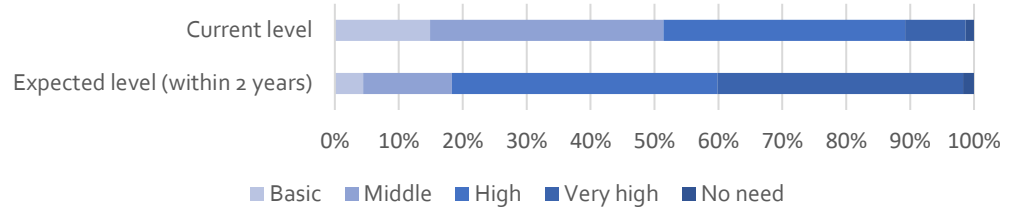
Digitalisation – focus on skills

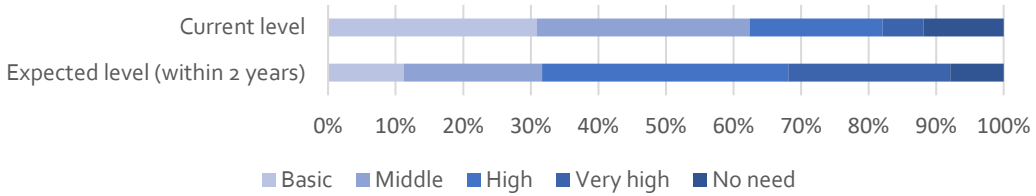
D2.1. What is the level of competence within your company regarding the **use of CAD software** for 2D and 3D drawing production and updating (AutoCAD, Sketch UP, Rhinoceros 3D, etc.)?



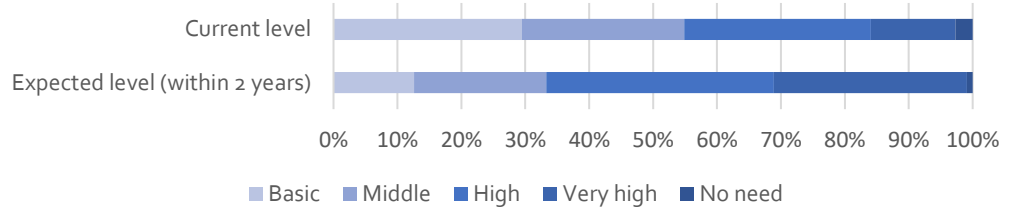
D2.2. What is the level of competence within your company regarding **digital applications specific to your business**?



D2.3. What is the level of competence within your company regarding the **preparation of budgets** using a dedicated software, including BIM?



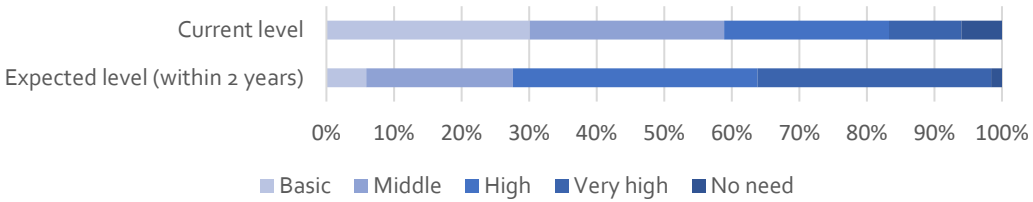
D2.4. What is the level of competence within your company regarding **the geolocation of equipment and vehicles**?



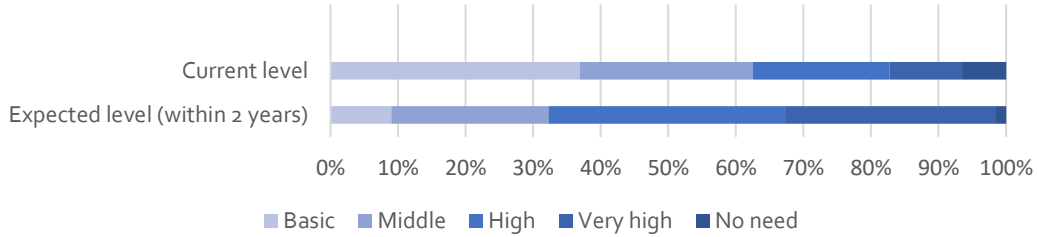
According to the D3 sample table, these are the 4 skills which concern the respondent construction companies the most. The use of CAD software (D2.1) concern more than the half of the 1715 respondent companies with a current skill level between high and very high for 47,3% of them. Within 2 years, a rise of 24,4% of this figure is expected, which represent a need for 213 construction companies to be upskilled in the use of CAD software in the next 2 years. For D2.2, it represents 189 companies (32,6%), 138 companies (28,8%) for D2.3 and 81 companies (23,4%) for D2.4.

Digitalisation – focus on skills

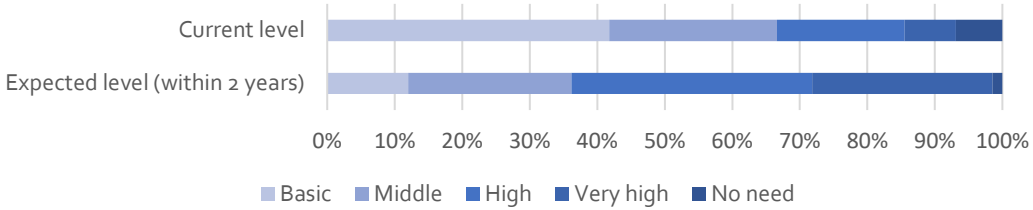
D2.5. What is the level of competence within your company regarding the **use of BIM authoring software** for modelling and models updating (Revit, ArchiCAD, Tekla, etc.)?



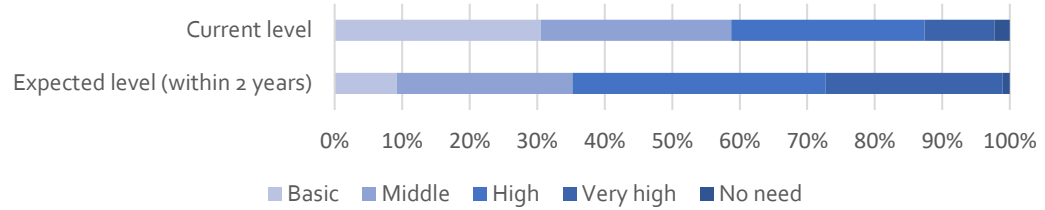
D2.6. What is the level of competence within your company regarding **interrogating a BIM model in a viewer** (naviagate and read parameters)?



D2.7. What is the level of competence within your company regarding the work in **BIM collaborative platforms** (CDE)?



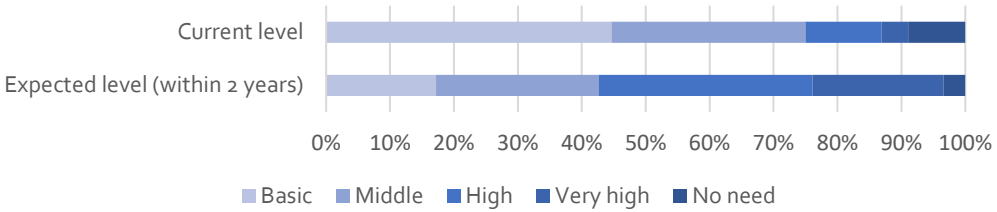
D2.8. What is the level of competence within your company regarding the **use of drones**?



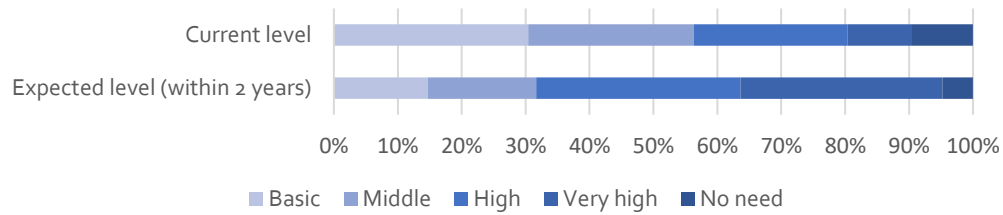
Even if more respondents indicated being concerned by the geolocation of equipment and vehicles (D2.4), actually more respondent construction companies need to be upskilled in the use of BIM authoring software (D2.5) in the next 2 years: they are indeed 102 companies (35,7%). For D2.6, It represents 92 companies (35,4%), 88 companies (35,9%) for D2.7 and 54 companies (24,8%) for D2.8.

Digitalisation – focus on skills

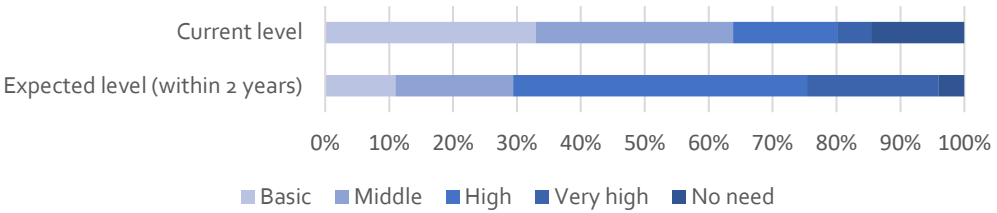
D2.9. What is the level of competence within your company regarding **virtual reality**?



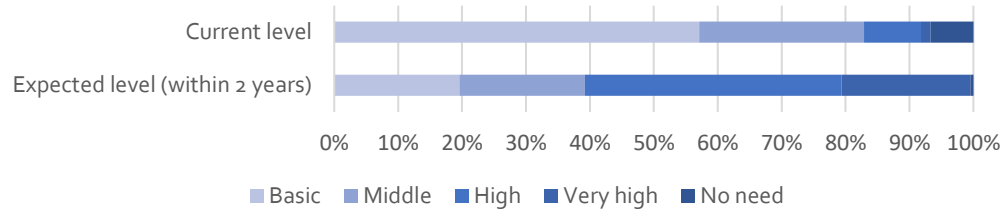
D2.10. What is the level of competence within your company regarding the **photogrammetry techniques**?



D2.11. What is the level of competence within your company regarding the **use of 3D printing**?

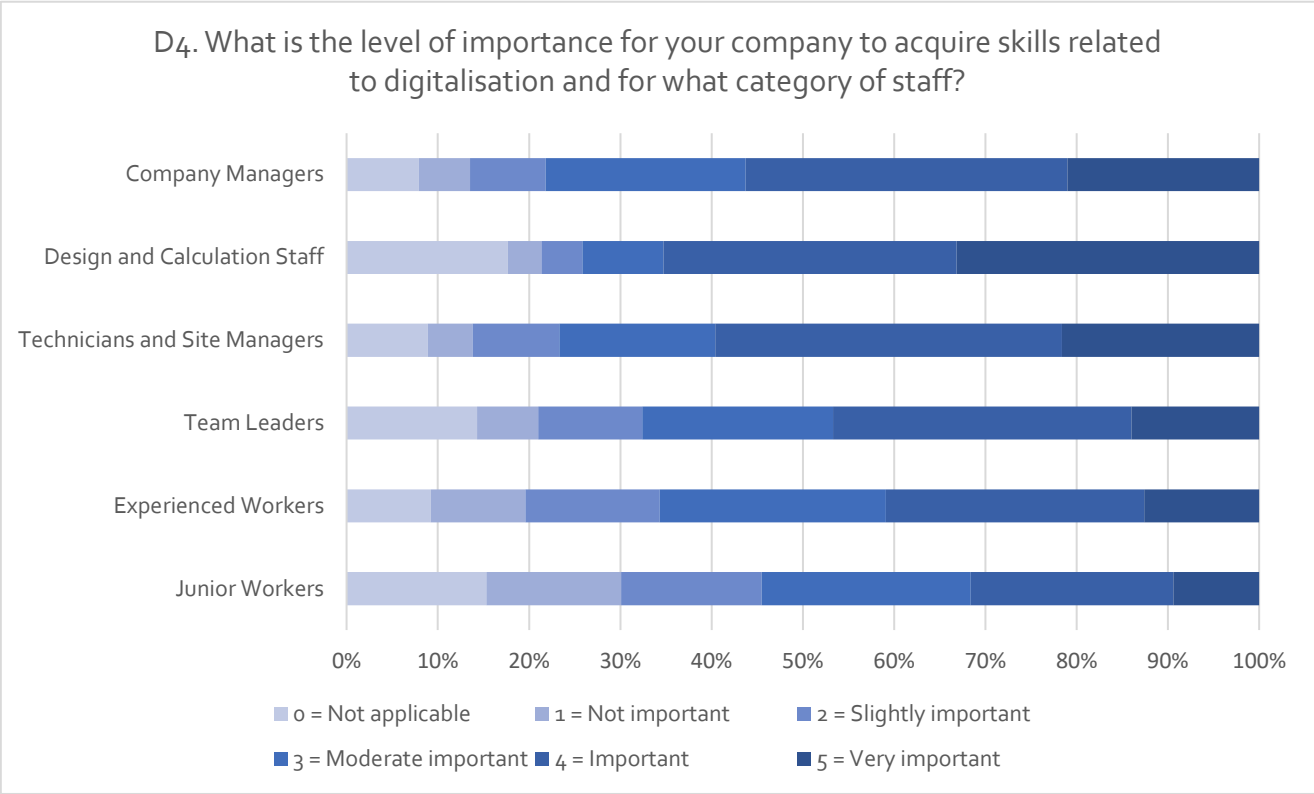


D2.12. What is the level of competence within your company regarding **augmented reality**?



Regarding virtual reality (D2.9), 66 respondent construction companies (37,8%) expect an upskilling within the next 2 years. For D2.10, it represents 36 construction companies (29,6%), 48 companies (44,9%) for D2.11 and 49 companies (49,9%) for D2.12.

Digitalisation – training needs

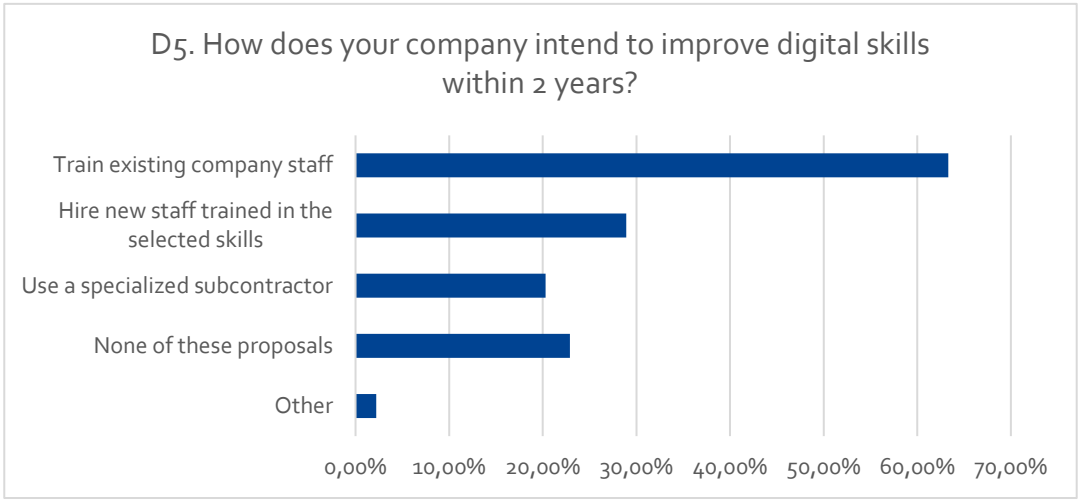


For 973 of respondent construction companies (65,4%), digital skills are between important and very important to master for design and calculation staff. 917 of them (59,6%) consider digital skills being between important and very important for technicians and site managers as well.

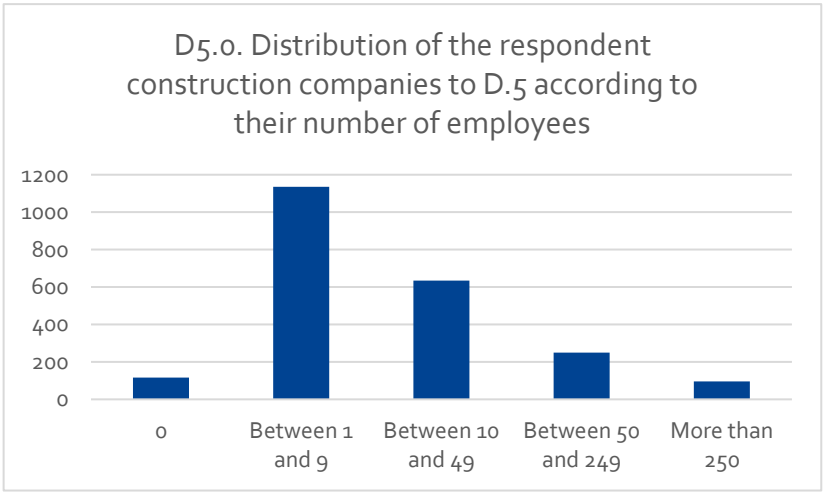
At the same time, 281 respondent construction companies (17,7%) consider digital skills being not applicable for design and calculation staff (the higher rate for the not applicable category).

Digital skills are considered to be moderate important and less for junior workers according to 802 respondent construction companies (53,1%) and 243 (15,3%) of them even consider it is not applicable for this category of staff.

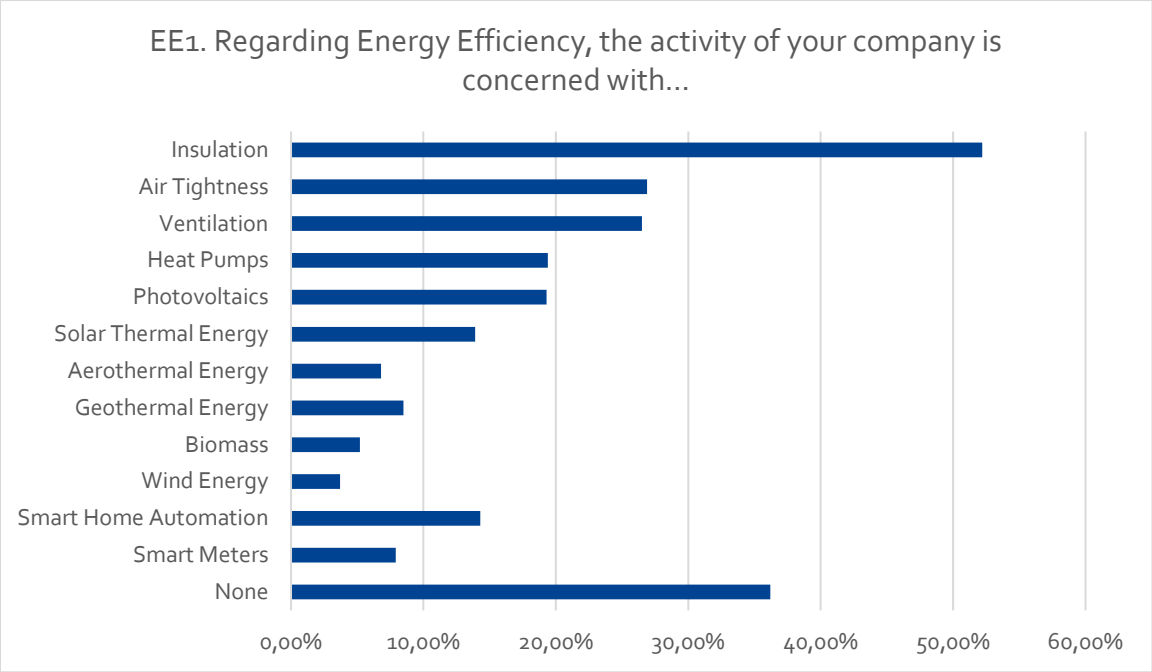
Digitalisation – training needs



1013 respondent construction companies (63,3%) plan to train their existing staff to reach the expected digital skill level winthin the next 2 years.
471 (28,9%) plan to hire new staff trained in the selected digital skills and 324 (20,3%) plan to use a specialised subcontractor.
As 397 respondent construction companies (22,9%) indicated they do not plan to use one of the 3 proposals of the questionnaire, a further research might have to be conducted with construction companies to identify other existing possibilities they can use for the improvement of their staff's digital skills.



Energy Efficiency – introduction



593 respondents (36,2%) indicated not being concerned by energy efficiency over a sample of 1658 respondent construction companies, which means 1065 respondent companies are at least concerned by one of the branches of energy efficiency.

On one hand, 892 companies (52,2%) indicated having to deal with insulation, 389 (26,9%) with air tightness, 419 (26,5%) with ventilation, 356 (19,4%) with heat pumps, 329 with photovoltaics (19,3%) and 234 with smart home automation (14,3%).

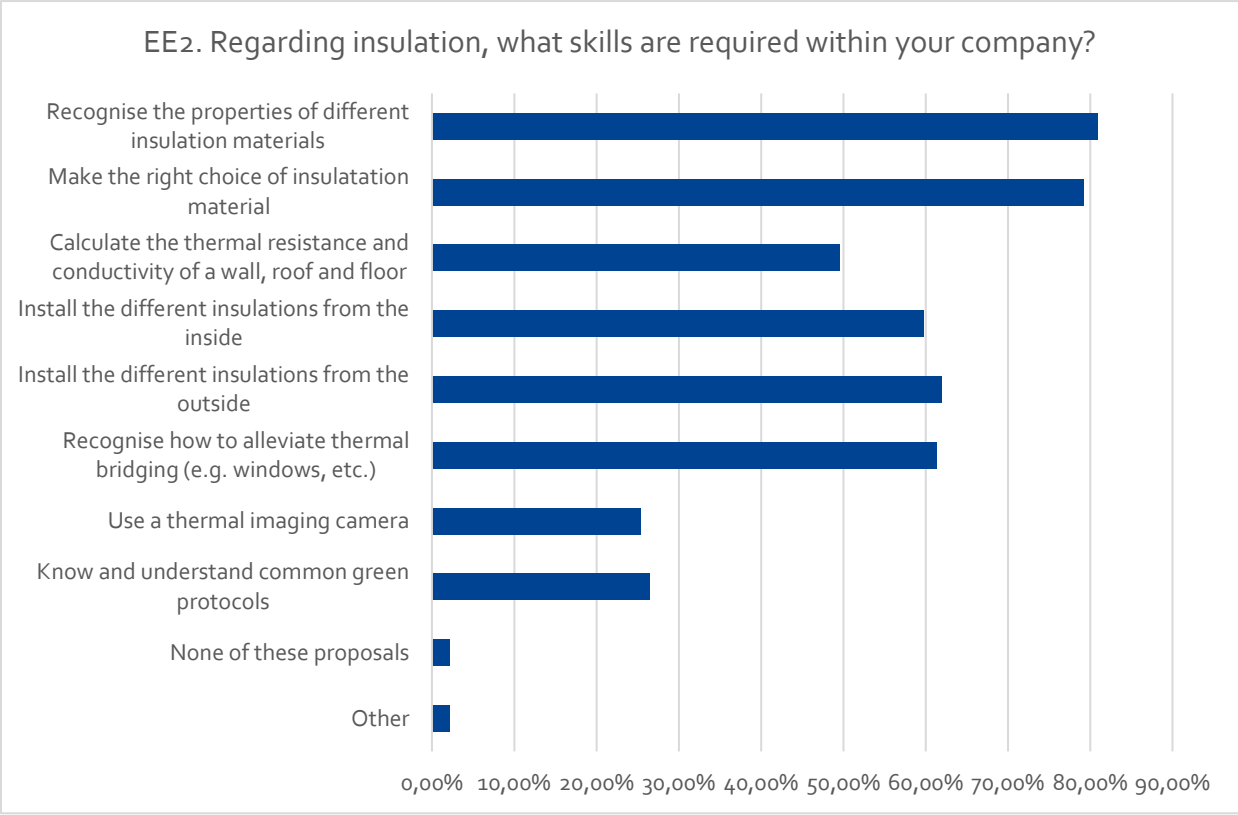
On the other hand, 51 companies (3,7%) indicated being concerned by wind energy, 82 (5,2%) with biomass, 89 (6,8%) with aerothermal energy, 124 (7,9%) with smart meters and 124 (8,5%) with geothermal energy.

Energy Efficiency - insulation

At EE1 question, 892 respondent construction companies indicated being concerned by insulation.

It represents 56 construction companies with 0 employees, 505 construction companies with between 1 and 9 employees, 237 construction companies with between 10 and 49 employees, 67 construction companies with between 50 and 249 employees and 26 construction companies with more than 250 employees.

Energy Efficiency - insulation



Respectively 719 (80,9%) and 707 (79,2%) companies indicated that recognising the properties of different insulation materials and making the right choice of insulation material are required skills for their staff.

They are 571 (61,9%) and 521 (59,7%) concerning the installation of the different insulations from the outside and the inside.

525 (61,3%) companies also indicated that recognising how to alleviate thermal bridging (e.g. windows, etc.) is a required skill for their staff. They are 412 (49,5%) regarding the calculation of the thermal resistance and conductivity of a wall, roof and floor.

For respectively 221 (26,4%) and 206 (25,3%) companies, knowing and understanding common green protocols and using a thermal imaging camera are required skills for their staff.

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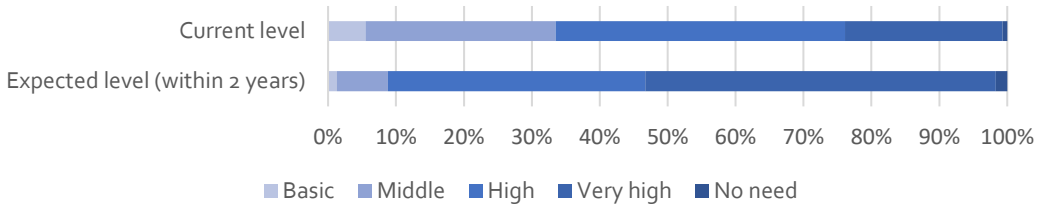
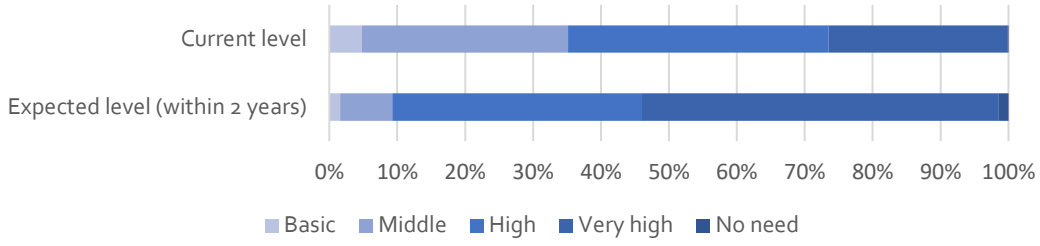
Energy Efficiency - insulation

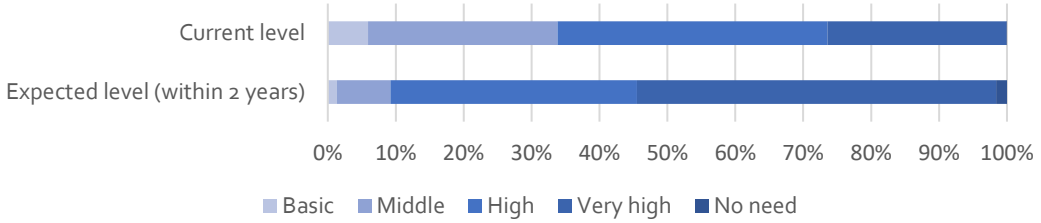
EE2.1. What is the level of competence within your company regarding the **recognition of the properties of different insulation materials**?



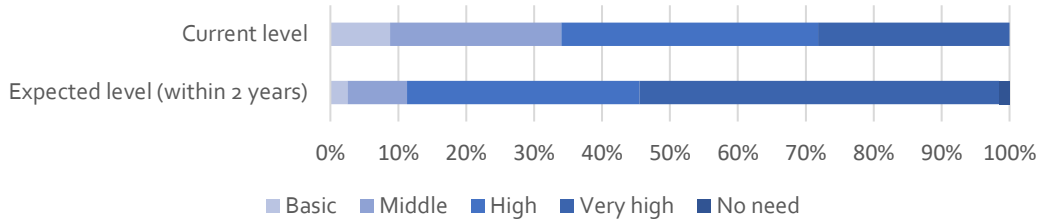
EE2.2. What is the level of competence within your company regarding the **right selection of insulation materials**?



EE2.3. What is the level of competence within your company regarding the **installation of different insulations by the outside**?



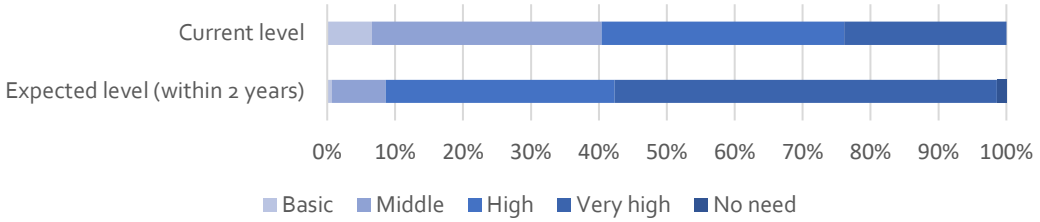
EE2.4. What is the level of competence within your company regarding the **installation of different insulations by the inside**?



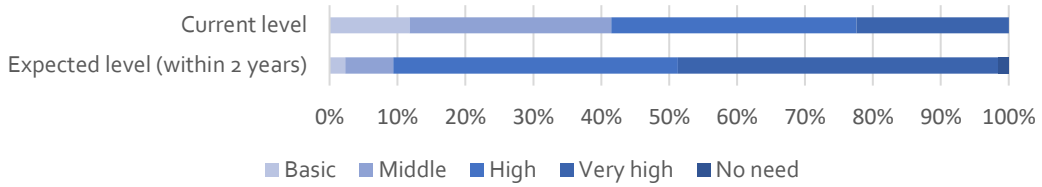
Concerning the recognition of the properties of different insulation materials, 65,9% of the companies over 713 respondents estimate their skill level between high and very high and this figure is expected to reach 89,5% within 2 years, which represents an upskilling perspective for 169 construction companies. Regarding EE2.2, the skill level is expected to rise from 64,7% (over 702 respondents) to 89,3%, which represents an upskilling perspective for 173 companies. For the installation of different insulations by the outside and the inside, it represents respectively an upskilling perspective for 132 and 109 construction companies, over 567 and 515 respondents.

Energy Efficiency - insulation

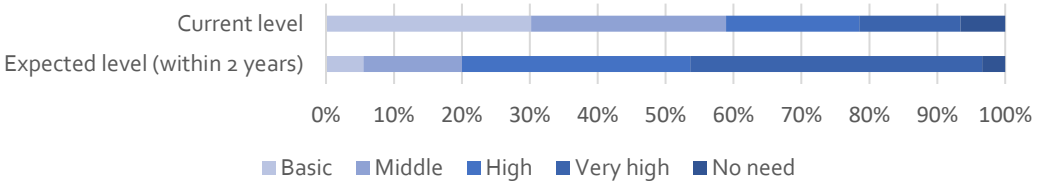
EE2.5. What is the level of competence within your company regarding the **alleviation of thermal bridging** (e.g. windows, etc.)?



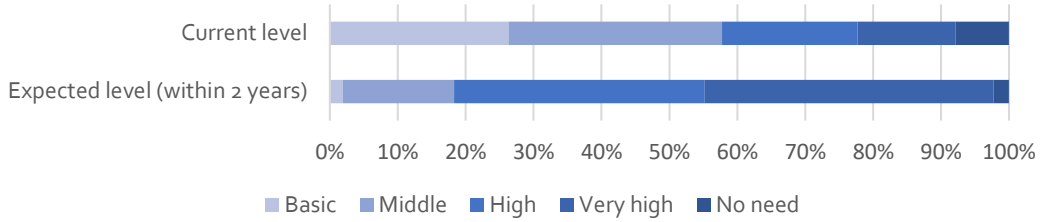
EE2.6. What is the level of competence within your company regarding the **calculation of resistance and thermal conductivity** of a wall, roof and floor?



EE2.7. What is the level of competence within your company regarding the **knowing and understanding of common green protocols**?

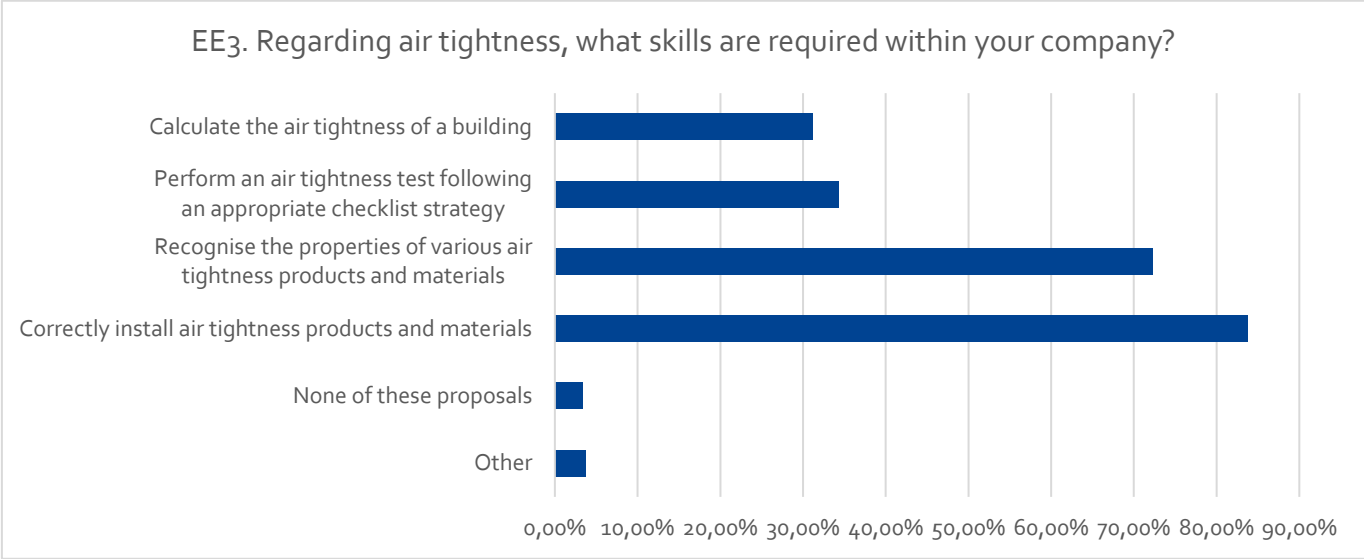


EE2.8. What is the level of competence within your company regarding the **use of a thermal imaging camera**?



Regarding the alleviation of thermal bridging, 59,6% of the companies over 520 respondents estimated their current skill level between high and very high, and this figure is expected to reach 89,9% within 2 years, which represents an upskilling perspective for 158 companies. For EE2.6, the skill level is expected to rise from 58,5% (over 410 respondents) to 89,1% within 2 years, which represents an upskilling perspective for 125 companies. Concerning the common green protocols, it is expected to rise from 34,2% (over 215 respondents) to 76,6%, which represents an upskilling wish for 91 companies. For EE2.8, the skill level is expected to rise from 34,3% (over 204 respondents) to 79,4%, which represents an upskilling perspective for 204 companies.

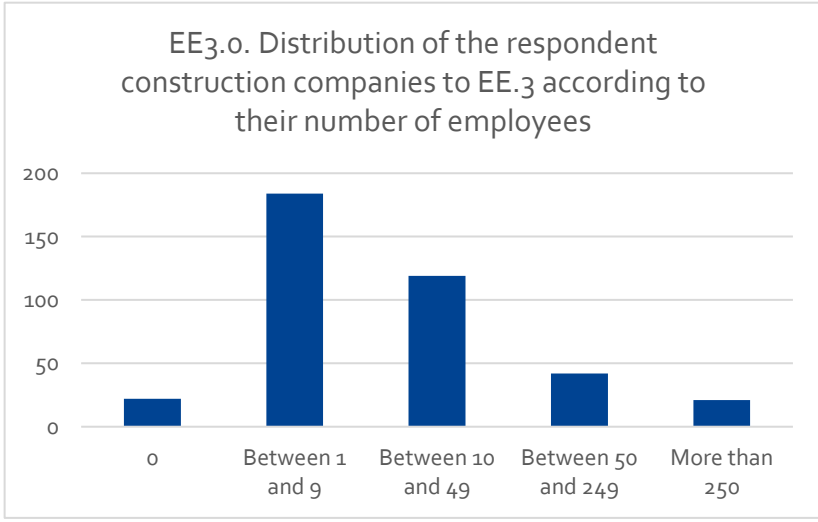
Energy Efficiency – air tightness



250 employees.

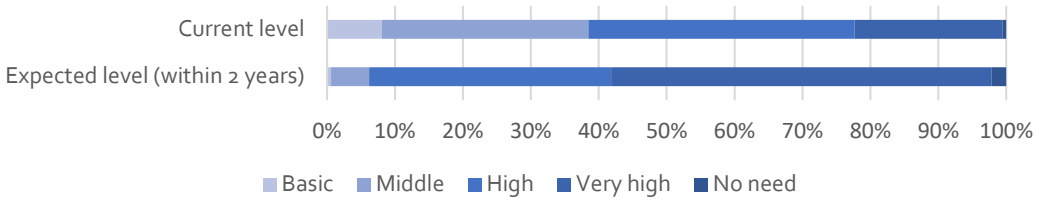
Respectively 313 (83,8%) and 275 (72,3%) companies indicated that installing air tightness products and materials and recognising the properties of various air tightness products and materials are required skills for their staff. They are 118 (34,3%) and 125 (31,2%) regarding the performing of an air tightness test following an appropriate checklist strategy and calculating the air tightness of a building.

At EE1 question, 389 respondents indicated being concerned by air tightness. It represents 22 construction companies with 0 employees, 184 construction companies with between 1 and 9 employees, 119 construction companies with between 10 and 49 employees, 42 construction companies with between 50 and 249 employees and 21 construction companies with more than

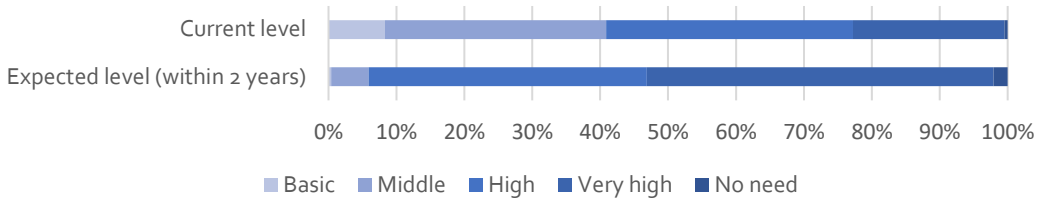


Energy Efficiency – air tightness

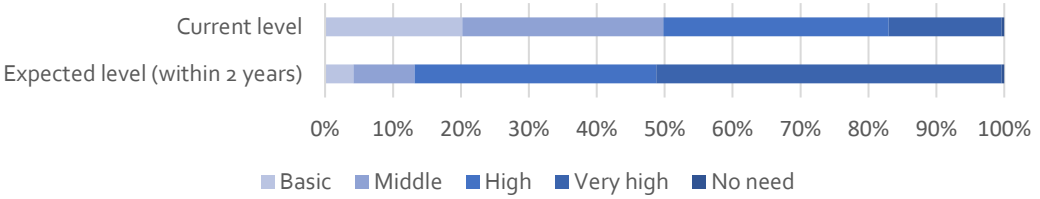
EE3.1. What is the level of competence within your company regarding the **correct installation of air tightness products and materials**?



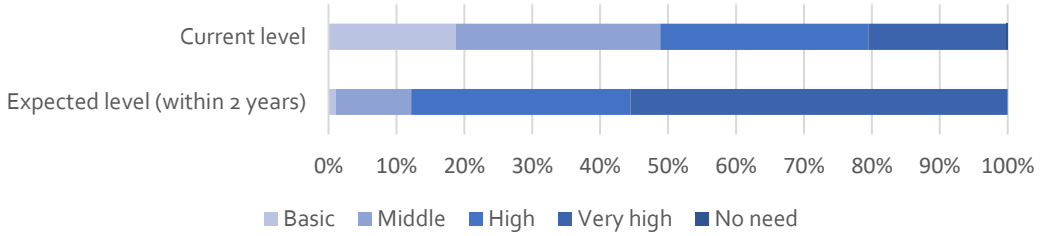
EE3.2. What is the level of competence within your company regarding the **recognition of the properties of various air tightness products and materials**?



EE3.3. What is the level of competence within your company regarding the **completion of leak test air following an appropriate checklist strategy**?

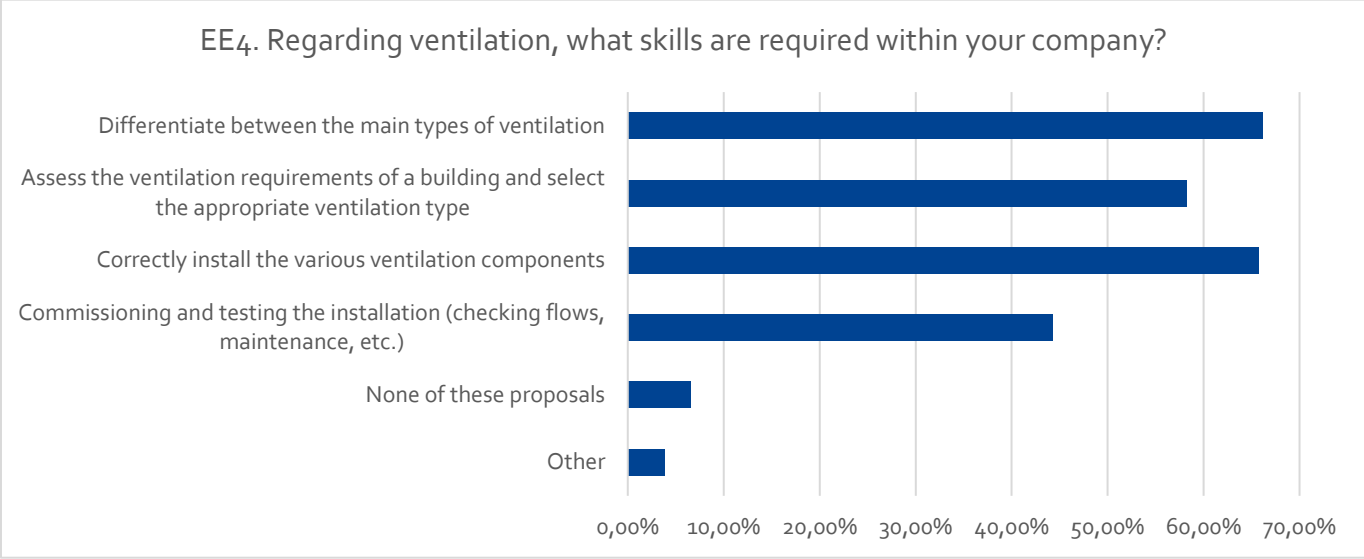


EE3.4. What is the level of competence within your company regarding the **calculation of the air tightness of a building**?



Regarding the correct installation of air tightness products and materials, 61% of the companies over 309 respondents estimated their current skill level between high and very high, and this figure is expected to reach 91,5% within 2 years, which represents an upskilling perspective for 95 companies. For EE3.2, it represents 92 companies (33,4%), 43 companies for EE3.3 (36,7%) and 46 companies for EE3.4 (37%).
Around 9 over 10 respondent companies expect to be high and very high skilled in the 4 air tightness skills above within the next 2 years.

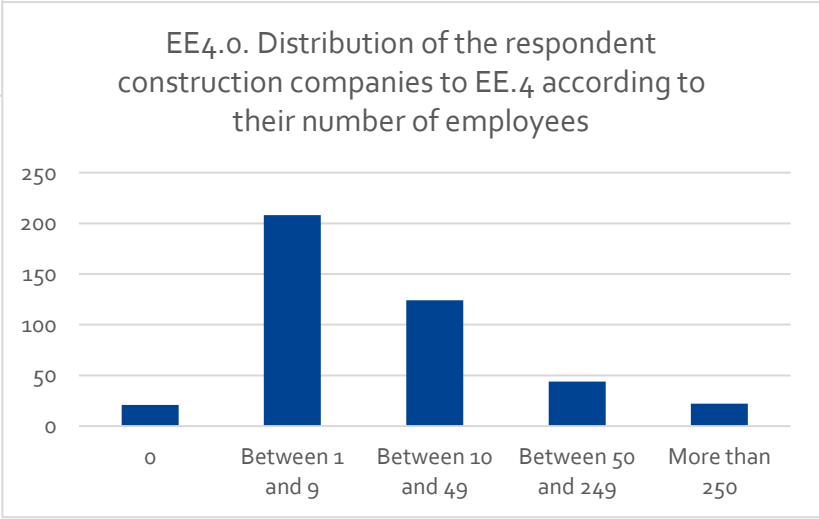
Energy Efficiency – ventilation



Respectively 276 (66,2%) and 274 (65,7%) companies indicated that differentiating between the main types of ventilation and correctly installing the various ventilation components are required skills for their staff.
They are 221 (58,2%) and 190 (44,3%) regarding the assessment of ventilation requirements of a building (and the selection of the appropriate ventilation type) and the commissioning and testing the installation.

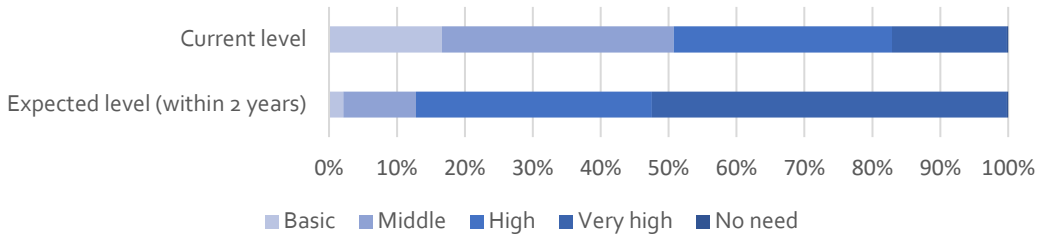
At EE1 question, 419 respondent construction companies indicated being concerned by ventilation.

It represents 21 construction companies with 0 employees, 208 construction companies with between 1 and 9 employees, 124 construction companies with between 10 and 49 employees, 44 construction companies with between 50 and 249 employees and 22 construction companies with more than 250 employees.

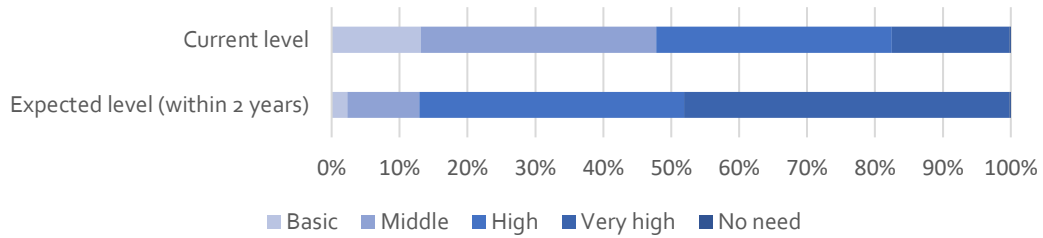


Energy Efficiency – ventilation

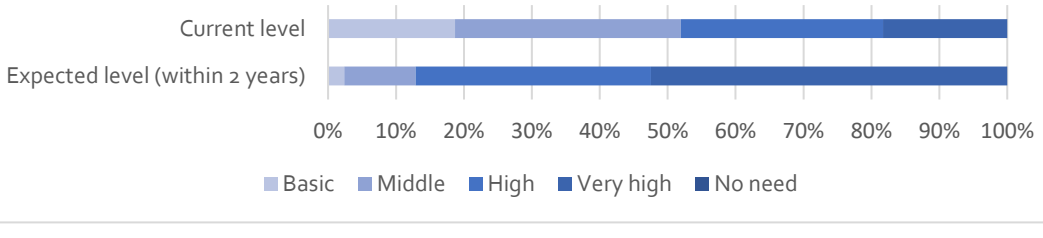
EE4.1. What is the level of competence within your company regarding the **distinction between the main types of ventilation**?



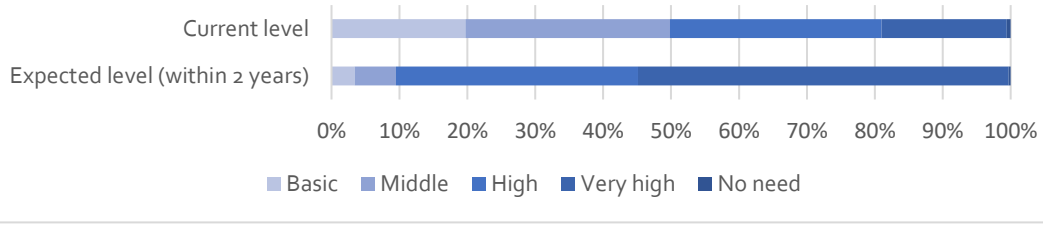
EE4.2. What is the level of competence within your company regarding the **installation of different ventilation components**?



EE4.3. What is the level of competence within your company regarding the **assessment of the ventilation requirements of a building**?



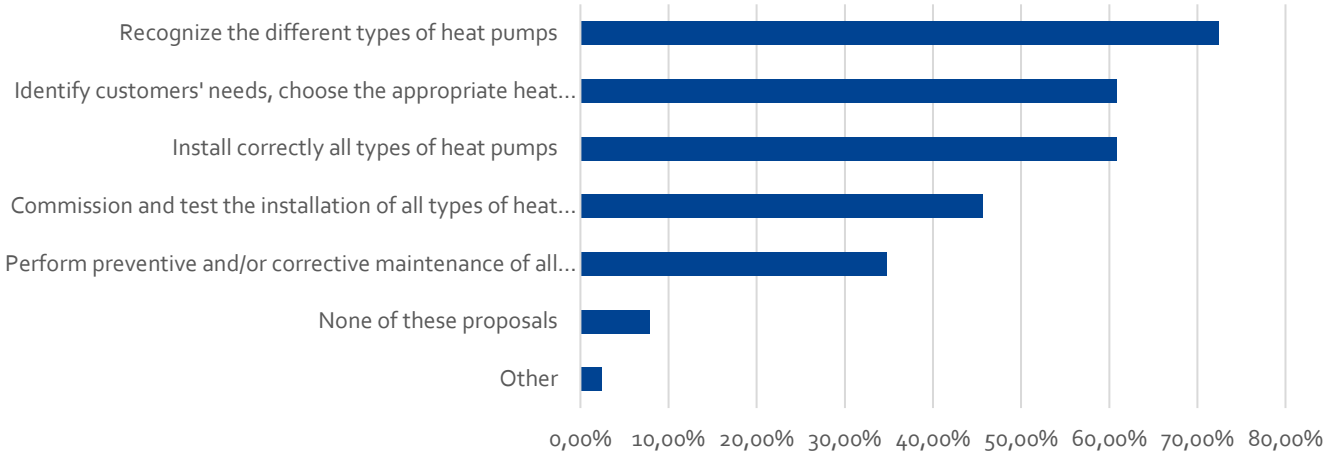
EE4.4. What is the level of competence within your company regarding the **commissioning and testing the installation** (checking the flow rates, maintenance, etc.)?



Regarding the correct distinction between the main types of ventilation, 49% of the companies over 272 respondents estimated their current skill level between high and very high, and this figure is expected to reach 86,5% within 2 years, which represents an upskilling perspective for 103 companies. For EE4.2, it represents 95 companies (34,9%), 86 companies for EE4.3 (38,9%) and 76 companies for EE4.4 (40,7%).
Around 85% of the respondent companies expect to be high and very high skilled in the 4 ventilation skills above within the next 2 years.

Energy Efficiency – heat pumps

EE5. Regarding heat pumps, what skills are required within your company?

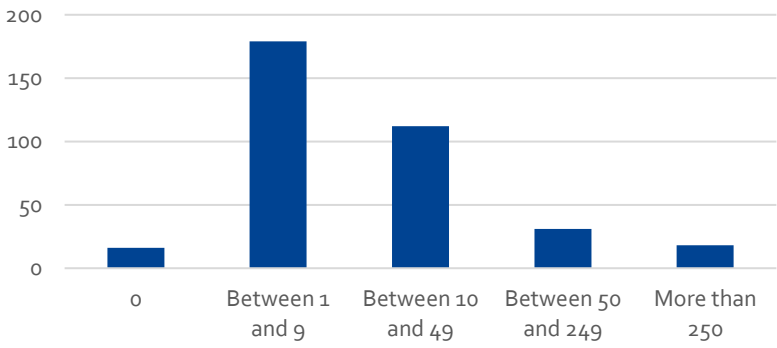


Respectively 256 (72,5%) and 217 (60,9%) companies indicated that recognizing the different types of heat pumps and identifying the customers' needs in order to choose the appropriate heat pump are required skills for their staff.
They are 221 (60,9%) and 154 (45,7%) regarding the correct installation of all types of heat pumps and the commissioning and testing their installation. For 135 respondent construction companies (34,8%), performing preventive and/or corrective maintenance of all types of heat pumps is a required skill.

At EE1 question, 356 respondent construction companies indicated being concerned by heat pumps.

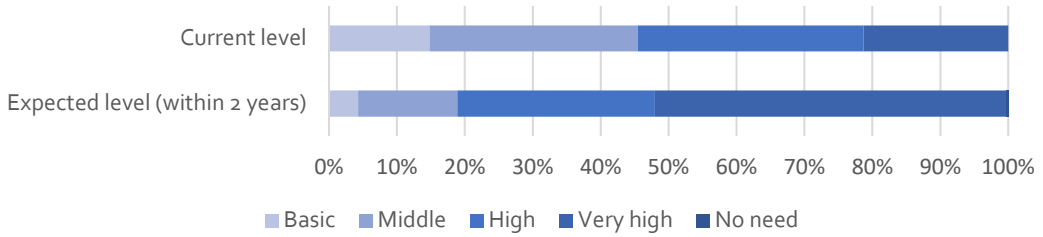
It represents 16 construction companies with 0 employees, 179 construction companies with between 1 and 9 employees, 112 construction companies with between 10 and 49 employees, 31 construction companies with between 50 and 249 employees and 18 construction companies with more than 250 employees.

EE5.0. Distribution of the respondent construction companies to EE.5 according to their number of employees

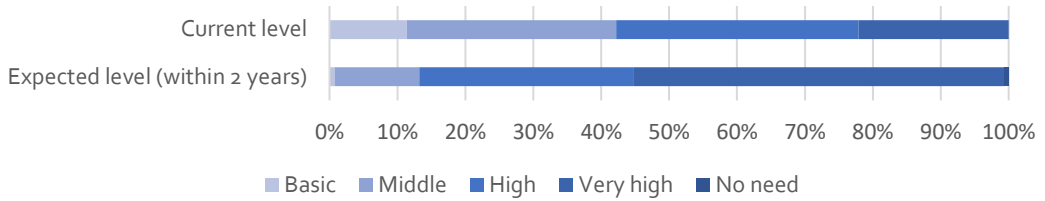


Energy Efficiency – heat pumps

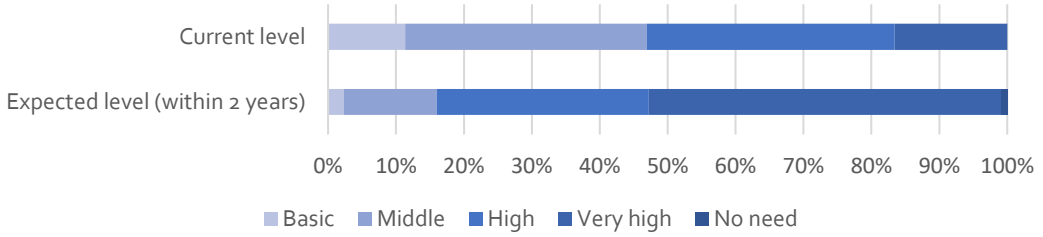
EE5.1. What is the level of competence within your company regarding the **recognition of different types of heat pumps**?



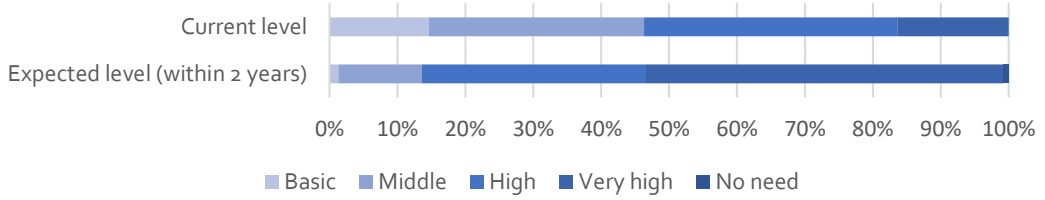
EE5.2. What is the level of competence within your company regarding the **identification of a client's needs, the choice of the appropriate heat pump and its design**?



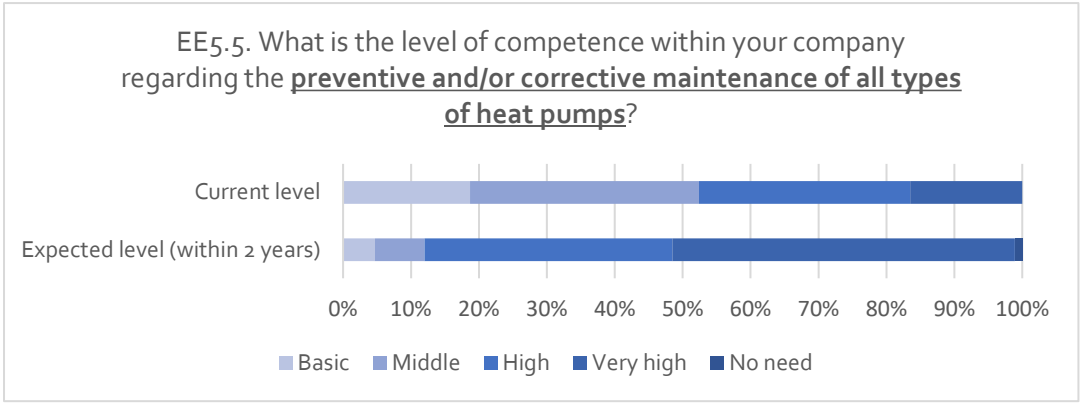
EE5.3. What is the level of competence within your company regarding the **installation of all types of heat pumps**?



EE5.4. What is the level of competence within your company regarding the **commissioning and installing all types of heat pumps**?



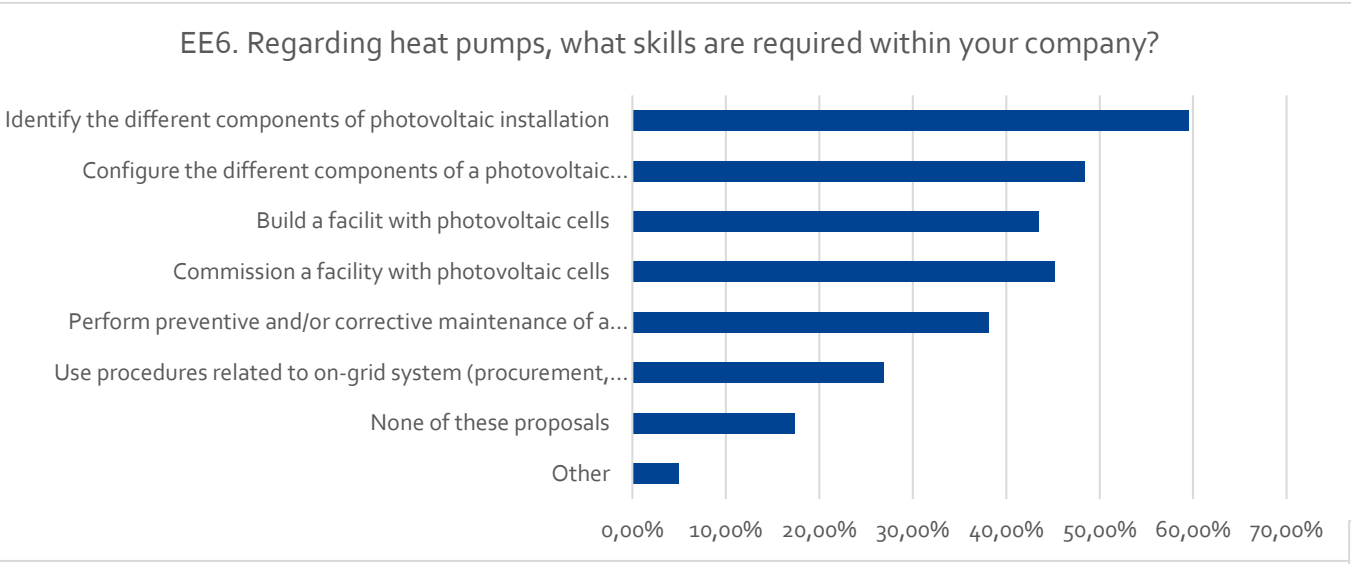
Energy Efficiency – heat pumps



Regarding the correct recognition of the different types of heat pumps, 54,1% of the companies over 253 respondents estimated their current skill level between high and very high, and this figure is expected to reach 80,8% within 2 years, which represents an upskilling perspective for 68 companies.

For EE5.2, it represents 61 companies (28,4%), 66 companies for EE5.3 (30,3%) and 49 companies for EE5.4 (31,9%).
Concerning the preventive and/or corrective maintenance of all types of heat pumps, 47,5% companies over 134 respondents estimated their current skills level between high and very high, and this figure is expected to reach 86,9% within 2 years, which represents an upskilling perspective for 53 companies.

Energy Efficiency – photovoltaics



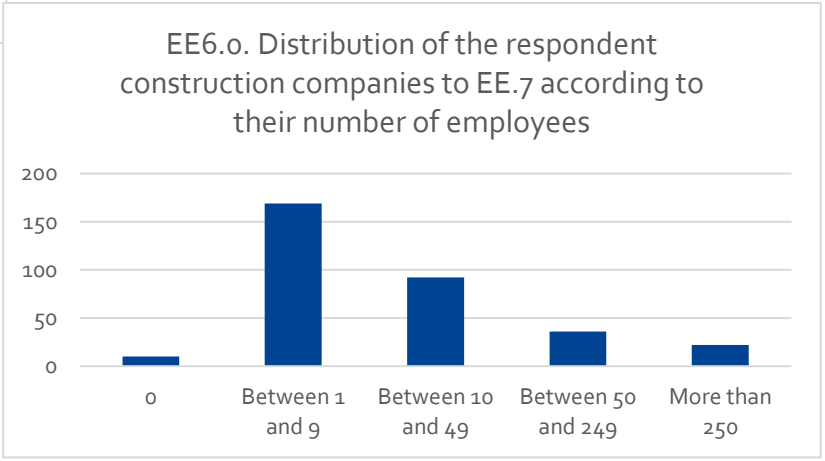
Respectively 201 (59,5%) and 159 (48,4%) companies indicated that identifying the different components of a photovoltaic installation and configuring these components are required skills for their staff.

They are 148 (45,2%) and 143 (43,5%) regarding the commissioning of a facility with photovoltaic cells and the building of one.

For 120 respondent construction companies (38,2%), performing preventive and/or corrective maintenance of a facility with photovoltaic cells is a required skill, and for 85 26,9%), using procedures related to on-grid system is required.

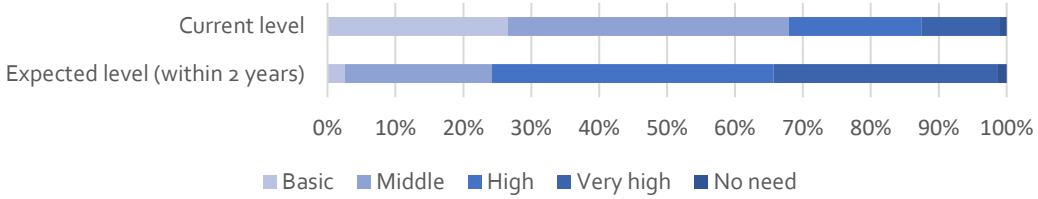
At EE1 question, 329 respondent construction companies indicated being concerned by heat pumps.

It represents 10 construction companies with 0 employees, 169 construction companies with between 1 and 9 employees, 92 construction companies with between 10 and 49 employees, 36 construction companies with between 50 and 249 employees and 22 construction companies with more than 250 employees.

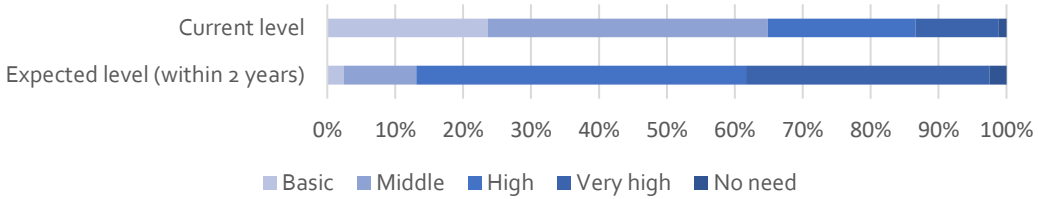


Energy Efficiency – photovoltaics

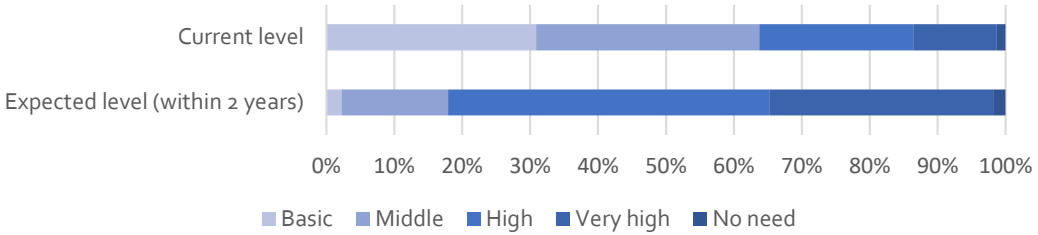
EE6.1. What is the level of competence within your company regarding the **identification of the different components of a photovoltaic facility**?



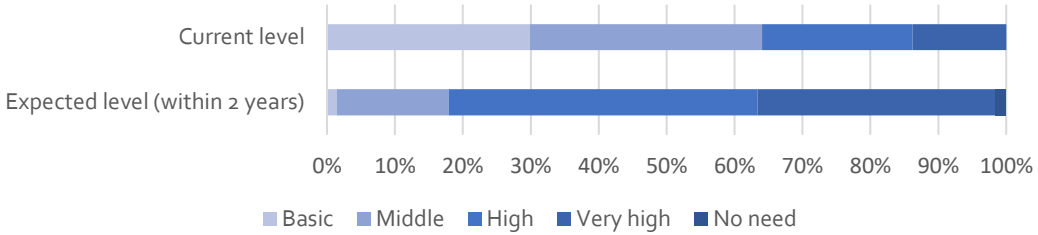
EE6.2. What is the level of competence within your company regarding **configuration of the different components of a photovoltaic facility**?



EE6.3. What is the level of competence within your company regarding the **commission of a photovoltaic facility**?

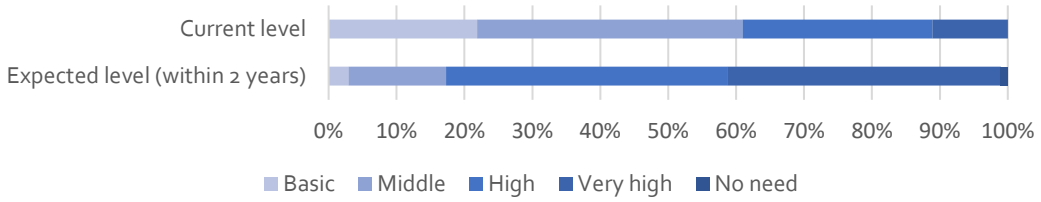


EE6.4. What is the level of competence within your company regarding the **building of a photovoltaic facility**?

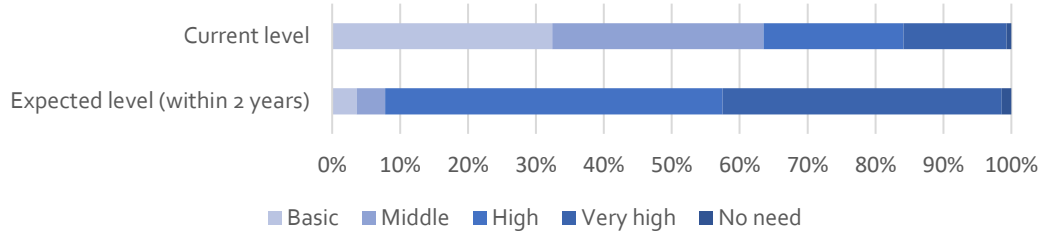


Energy Efficiency – photovoltaics

EE6.5. What is the level of competence within your company regarding the **performance of a preventive and/or corrective maintenance of a photovoltaic facility**?



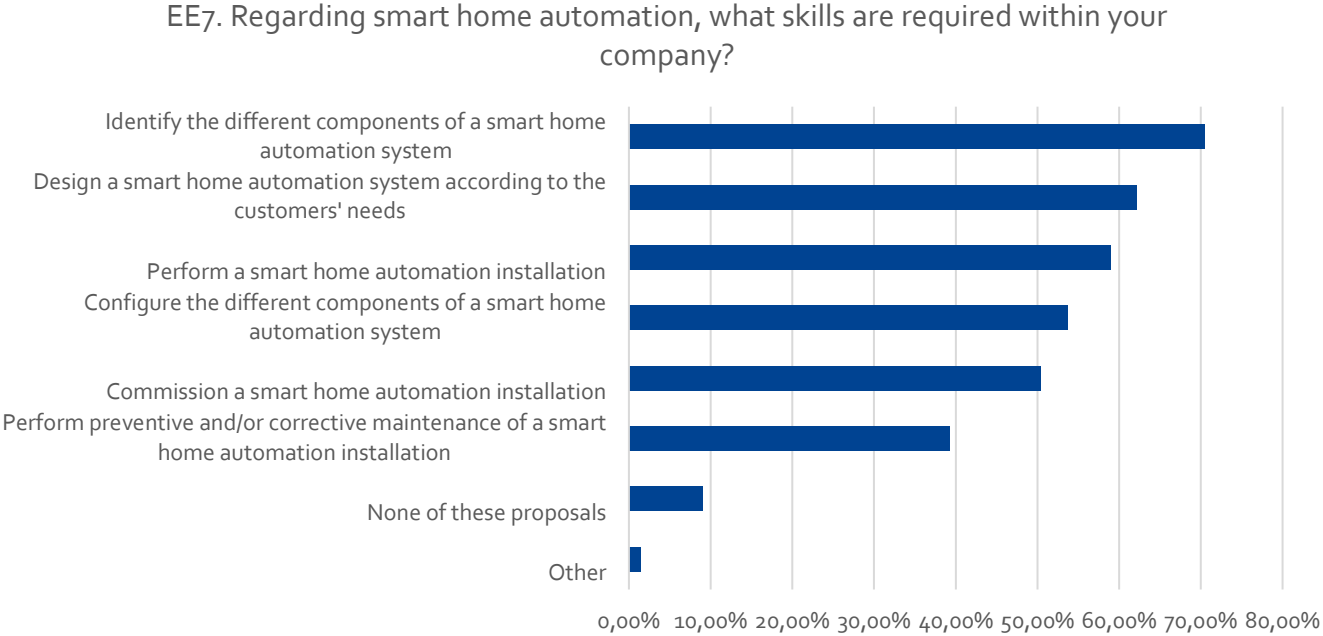
EE6.6. What is the level of competence within your company regarding the **use of procedures related to on-grid system**?



Regarding the identification of the different components of a photovoltaic facility, 31% of the companies over 201 respondents estimated their current skill level between high and very high, and this figure is expected to reach 74,4% within 2 years, which represents an upskilling perspective for 87 companies.

For EE6.2, it represents 80 companies (50,6%), 67 companies for EE6.3 (45,4%) and 64 companies for EE6.4 (44,6%).
Concerning the preventive and/or corrective maintenance of all types of photovoltaic facilities, 39,1% companies over 120 respondents estimated their current skills level between high and very high, and this figure is expected to reach 81,7% within 2 years, which represents an upskilling perspective for 51 companies. For EE6.6, it represents 47 companies (54,9%).

Energy Efficiency – smart home automation



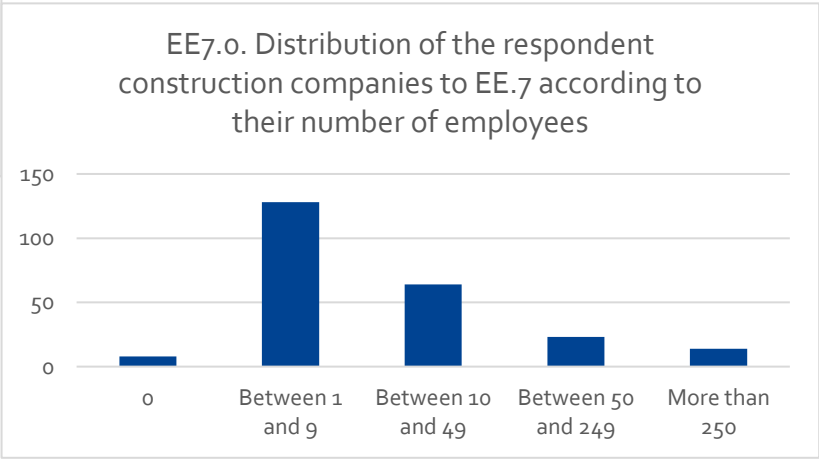
Respectively 76 (59,5%) and 67 (53,1%) companies indicated that identifying the different components of a geothermal energy facility and carrying out one are required skills for their staff.

They are 60 (48,3%) and 54 (43,7%) regarding the configuration of the different components of a facility using geothermal energy.

For 39 respondent construction companies (33,6%), performing preventive and/or corrective maintenance of a facility functioning with geothermal energy is a required skill.

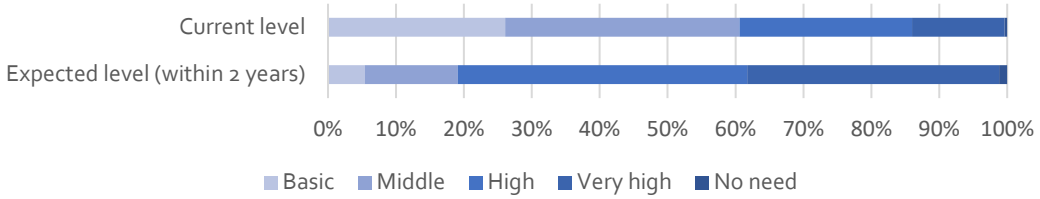
At EE1 question, 234 respondent construction companies indicated being concerned by smart home automation.

It represents 8 construction companies with 0 employees, 128 construction companies with between 1 and 9 employees, 64 construction companies with between 10 and 49 employees, 23 construction companies with between 50 and 249 employees and 14 construction companies with more than 250 employees.

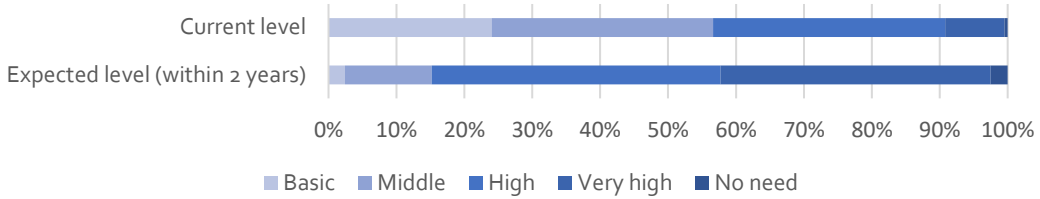


Energy Efficiency – smart home automation

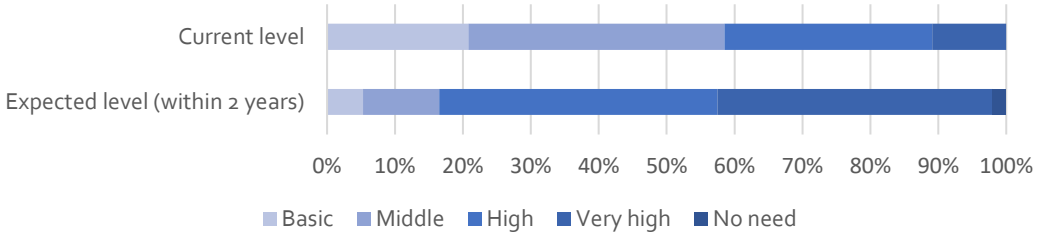
EE7.1. What is the level of competence within your company regarding the **identification of the different components of a smart home automation system**?



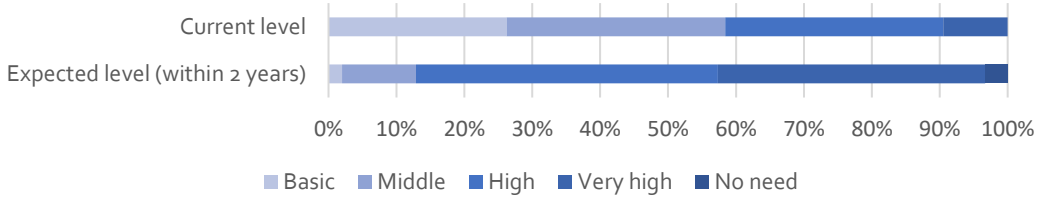
EE7.2. What is the level of competence within your company regarding the **design a smart home automation system according the customers' needs**?



EE7.3. What is the level of competence within your company regarding the **installation of a smart home automation system**?

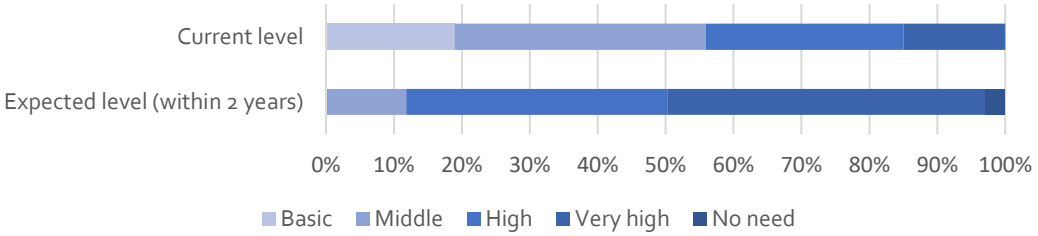


EE7.4. What is the level of competence within your company regarding the **configuration of the different components of a smart home automation system**?

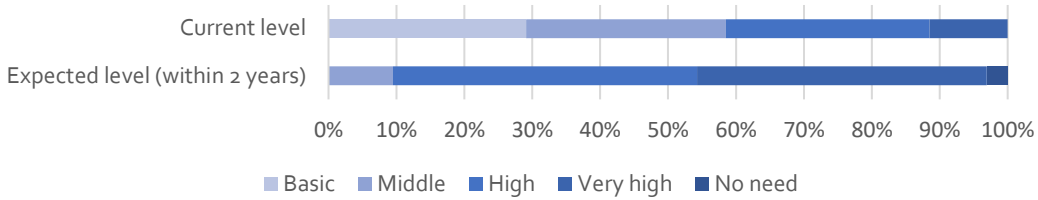


Energy Efficiency – smart home automation

EE7.5. What is the level of competence within your company regarding the **commission of a smart home automation system**?



EE7.6. What is the level of competence within your company regarding the **performance of preventive and/or corrective maintenance of a smart home automation system**?

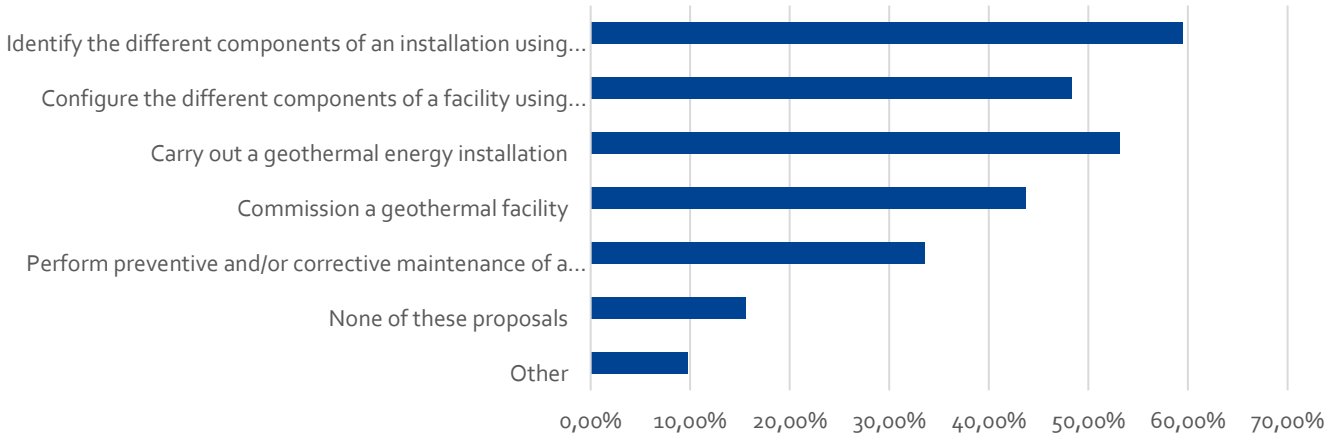


Regarding the identification of the different components of a smart homme automation system, 39% of the companies over 167 respondents estimated their current skill level between high and very high, and this figure is expected to reach 79,7% within 2 years, which represents an upskilling perspective for 68 companies.

For EE7.2, it represents 54 companies (39,4%), 55 companies for EE7.3 (39,9%) and 48 companies for EE7.4 (42,3%).
Concerning the commission of a smart home automation system, 44,1% of the companies over 118 respondents estimated their current skills level between high and very high, and this figure is expected to reach 85,3% within 2 years, which represents an upskilling perspective for 49 companies. For EE7.6, it represents 41 companies (46%).

Energy Efficiency – geothermal energy

EE8. Regarding geothermal energy, what skills are required within your company?



Respectively 76 (59,5%) and 67 (53,1%) companies indicated that identifying the different components of a geothermal energy facility and carrying out one are required skills for their staff.

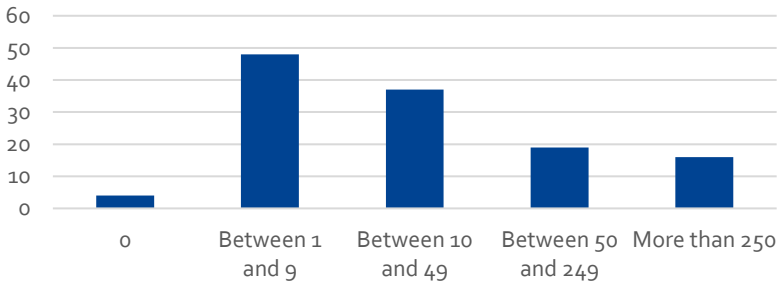
They are 60 (48,3%) and 54 (43,7%) regarding the configuration of the different components of a facility using geothermal energy.

For 39 respondent construction companies (33,6%), performing preventive and/or corrective maintenance of a facility functioning with geothermal energy is a required skill.

At EE1 question, 124 respondent construction companies indicated being concerned by geothermal energy.

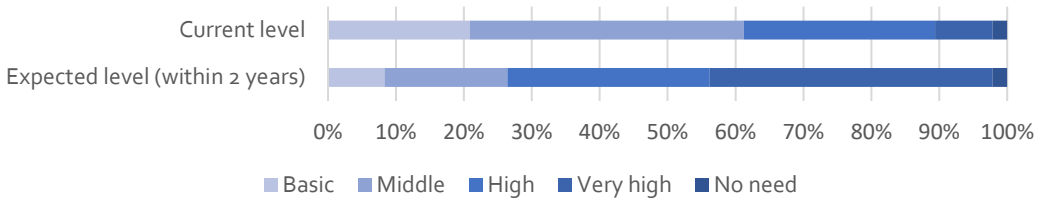
It represents 4 construction companies with 0 employees, 48 construction companies with between 1 and 9 employees, 37 construction companies with between 10 and 49 employees, 19 construction companies with between 50 and 249 employees and 16 construction companies with more than 250 employees.

EE8.0. Distribution of the respondent construction companies to EE.8 according to their number of employees

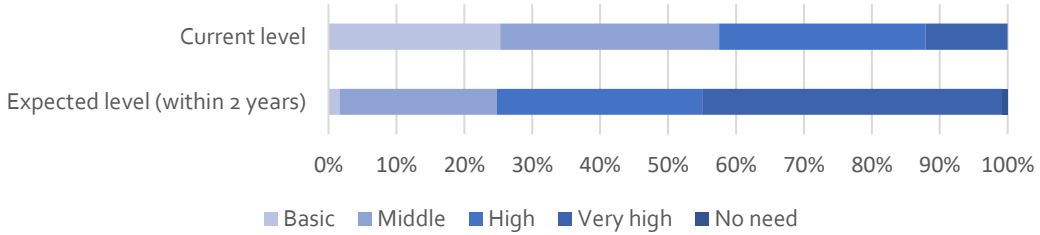


Energy Efficiency – geothermal energy

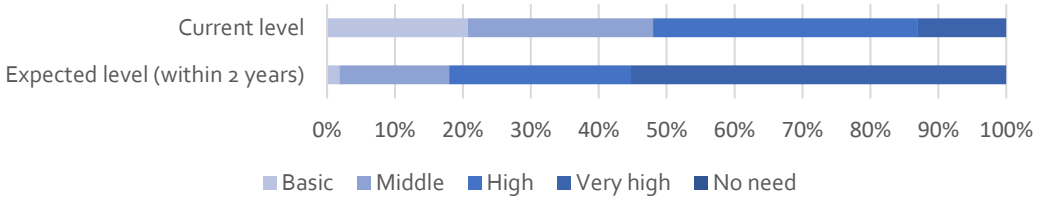
EE8.1. What is the level of competence within your company regarding the **identification of the different components of a geothermal energy facility**?



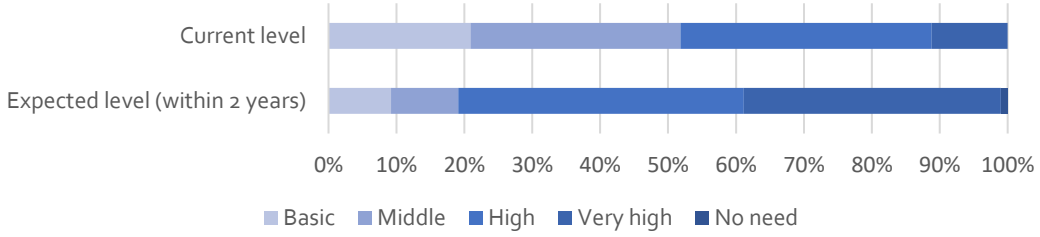
EE8.2. What is the level of competence within your company regarding **carrying out a geothermal energy facility**?



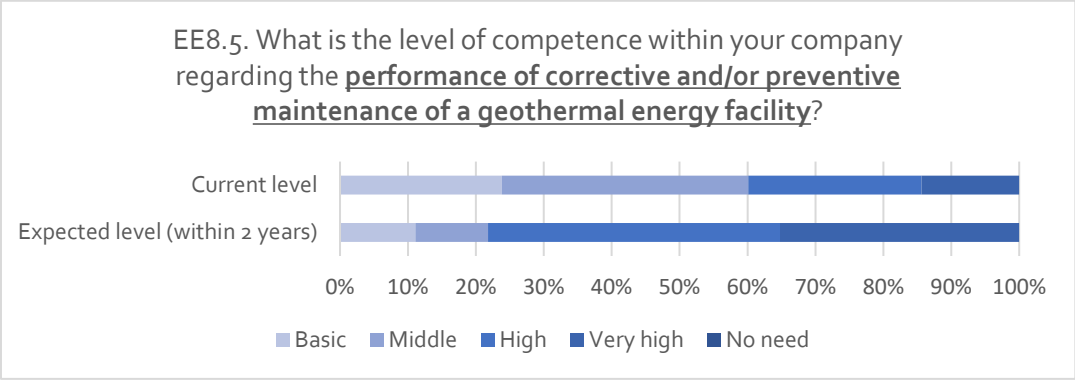
EE8.3. What is the level of competence within your company regarding the **configuration of the different components of a geothermal energy facility**?



EE8.4. What is the level of competence within your company regarding the **commission of a geothermal energy facility**?



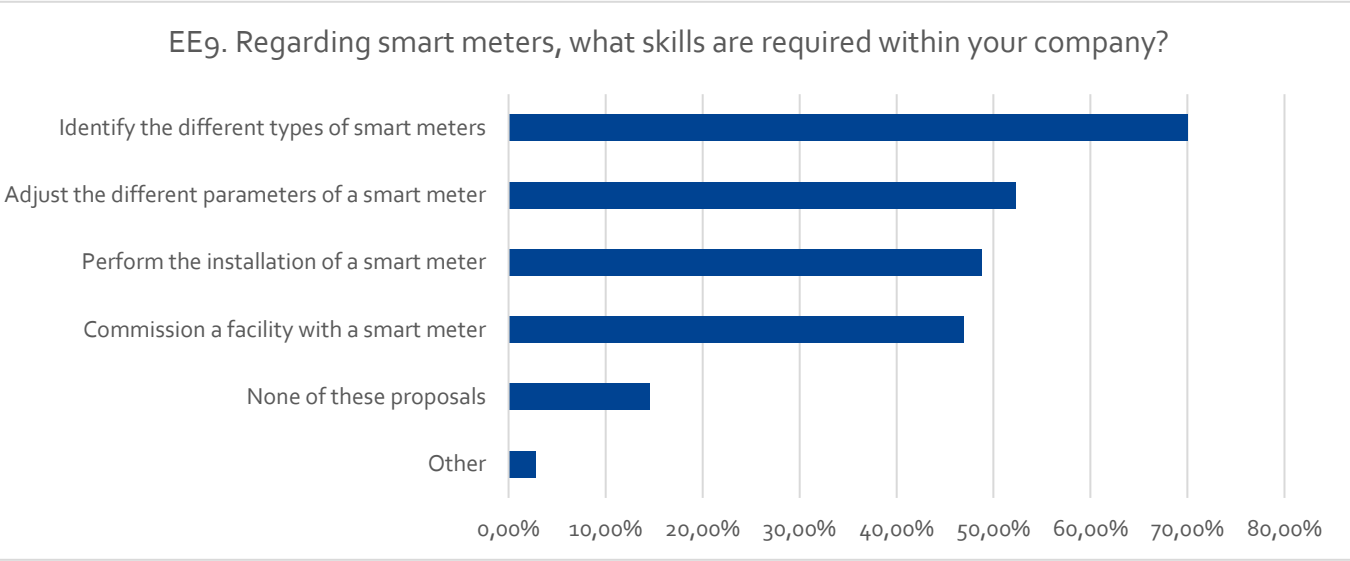
Energy Efficiency – geothermal energy



Regarding the identification of the different components of a geothermal energy facility, 36,6% of the companies over 76 respondents estimated their current skill level between high and very high, and this figure is expected to reach 71,4% within 2 years, which represents an upskilling perspective for 26 companies.

For EE8.2, it represents 21 companies (31,9%), 18 companies for EE8.3 (30,2%) and 17 companies for EE8.4 (31,6%).
Concerning the preventive and/or corrective maintenance of all types of geothermal energy facilities, 39,9% companies over 39 respondents estimated their current skills level between high and very high, and this figure is expected to reach 78,2% within 2 years, which represents an upskilling perspective for 15 companies.

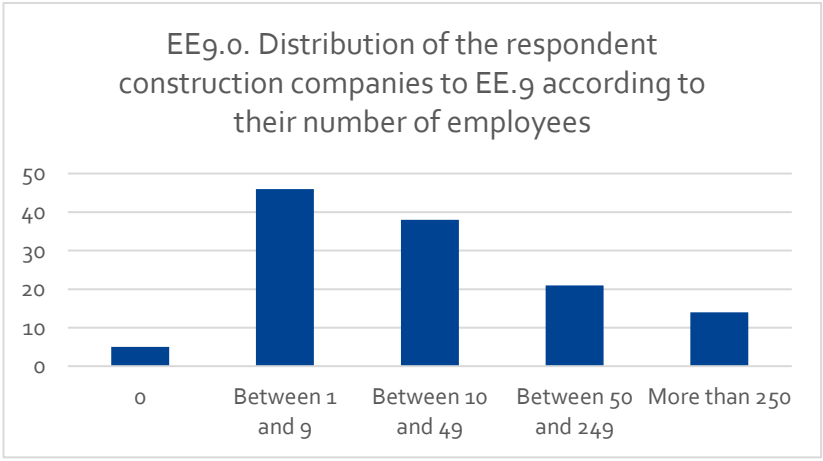
Energy Efficiency – smart meters



At EE1 question, 124 respondent construction companies indicated being concerned by smart meters.

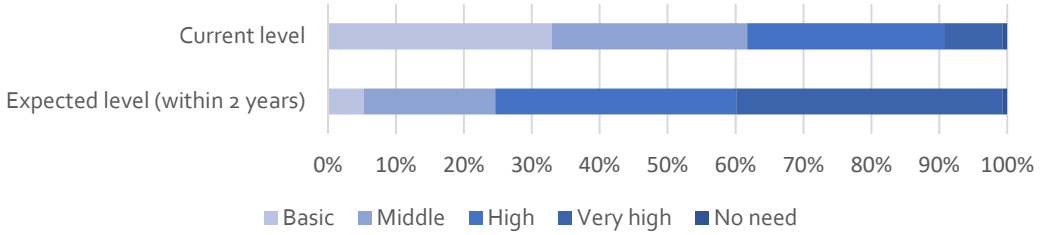
It represents 5 construction companies with 0 employees, 46 construction companies with between 1 and 9 employees, 38 construction companies with between 10 and 49 employees, 21 construction companies with between 50 and 249 employees and 14 construction companies with more than 250 employees.

Respectively 87 (70%) and 62 (52,3%) companies indicated that identifying the different types of smart meters and adjust the different parameters of a smart meter are required skills for their staff.
They are 55 (48,8%) and 53 (47%) regarding the performance of the installation of a smart meter and the commission of a facility with a smart meter.

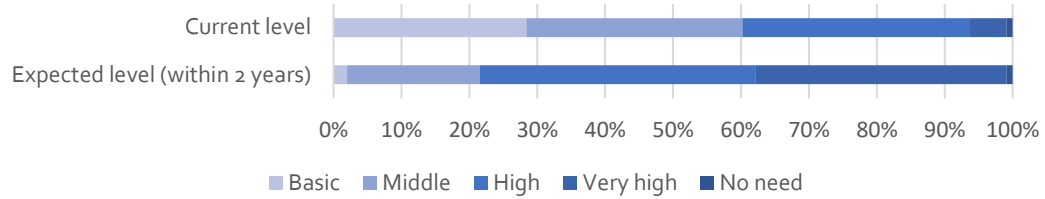


Energy Efficiency – smart meters

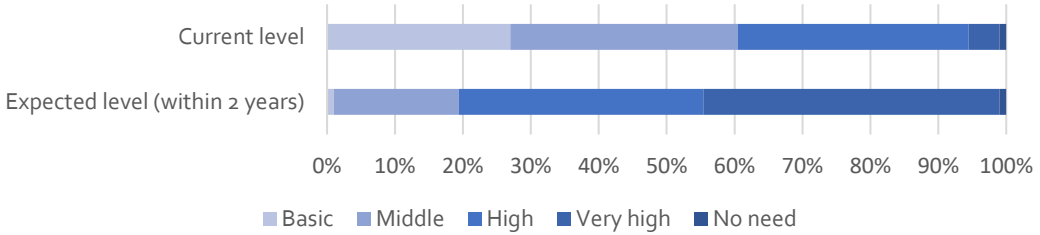
EE9.1. What is the level of competence within your company regarding the **identification of the different types of smart meters**?



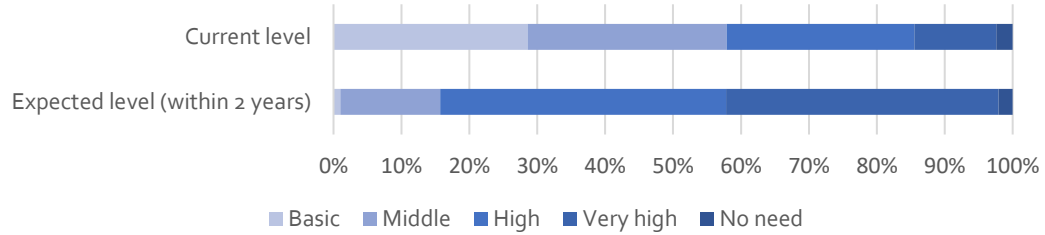
EE9.2. What is the level of competence within your company regarding the **adjustment of the different parameters of a smart meter**?



EE9.3. What is the level of competence within your company regarding the **installation of a smart meter**?

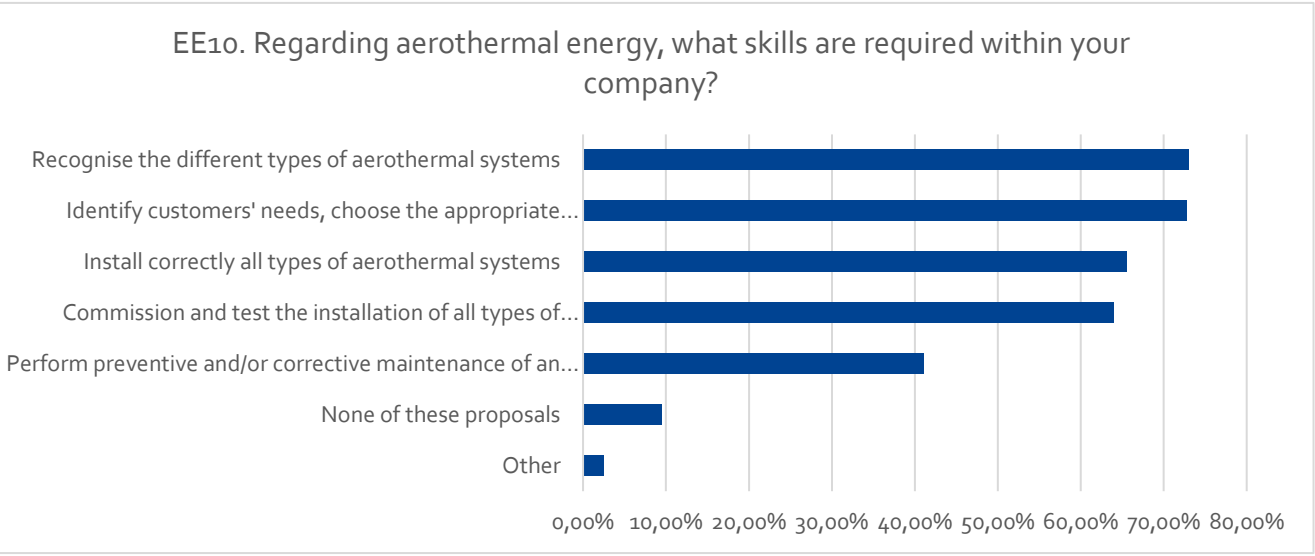


EE9.4. What is the level of competence within your company regarding the **commission of a facility with a smart meter**?



Regarding the correct distinction between the main types of ventilation, 49% of the companies over 272 respondents estimated their current skill level between high and very high, and this figure is expected to reach 86,5% within 2 years, which represents an upskilling perspective for 103 companies. For EE4.2, it represents 95 companies (34,9%), 86 companies for EE4.3 (38,9%) and 76 companies for EE4.4 (40,7%).
Around 85% of the respondent companies expect to be high and very high skilled in the 4 ventilation skills above within the next 2 years.

Energy Efficiency – aerothermal energy



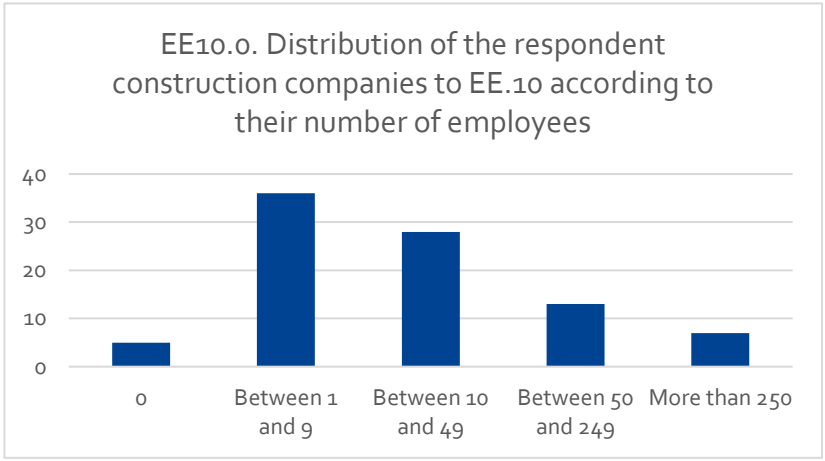
At EE1 question, 89 respondent construction companies indicated being concerned by aerothermal energy.

It represents 5 construction companies with 0 employees, 36 construction companies with between 1 and 9 employees, 28 construction companies with between 10 and 49 employees, 13 construction companies with between 50 and 249 employees and 7 construction companies with more than 250 employees.

Respectively 63 (73%) and 62 (72,8%) companies indicated that recognising the different types of aerothermal systems and identifying the customers' needs are required skills for their staff.

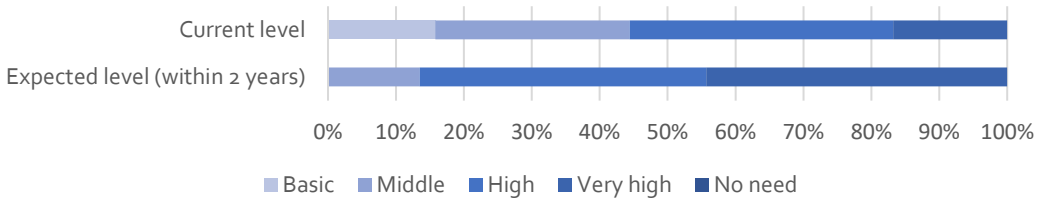
They are 57 (65,5%) and 53 (64%) regarding the correct installation of all types of aerothermal systems and the commission and test their installation.

There are 37 respondent construction companies (41%) indicating their staff needs to master preventive and/or corrective maintenance of an aerothermal energy facility.

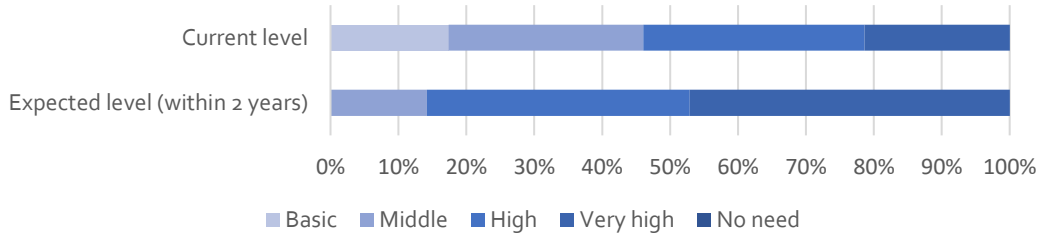


Energy Efficiency – aerothermal energy

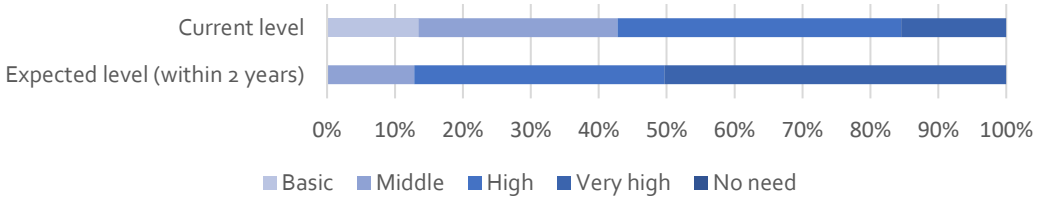
EE10.1. What is the level of competence within your company regarding the **recognition of the different types of aerothermal systems**?



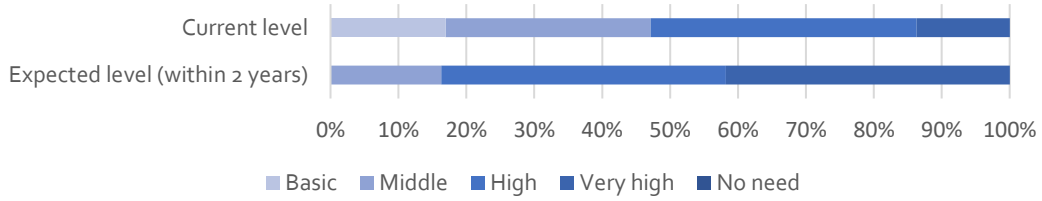
EE10.2. What is the level of competence within your company regarding **the identification of the customers' needs**?



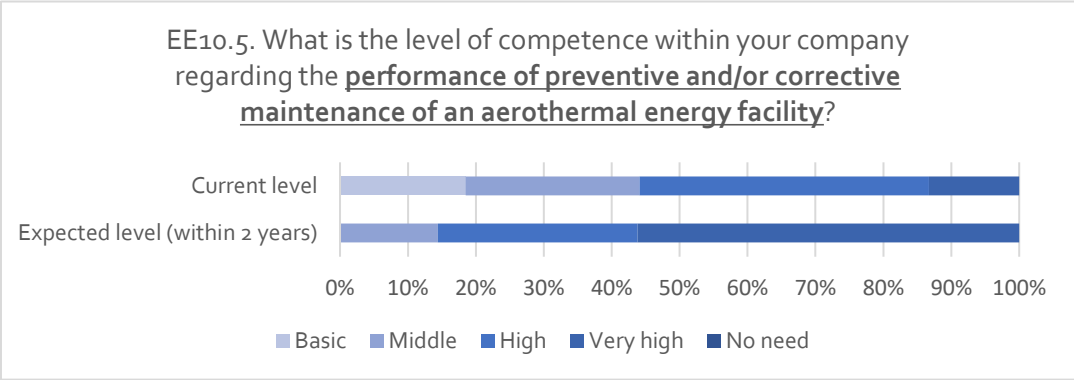
EE10.3. What is the level of competence within your company regarding the **correct installation of all types of aerothermal systems**?



EE10.4. What is the level of competence within your company regarding the **commision and testing of installation including aerothermal energy**?



Energy Efficiency – aerothermal energy

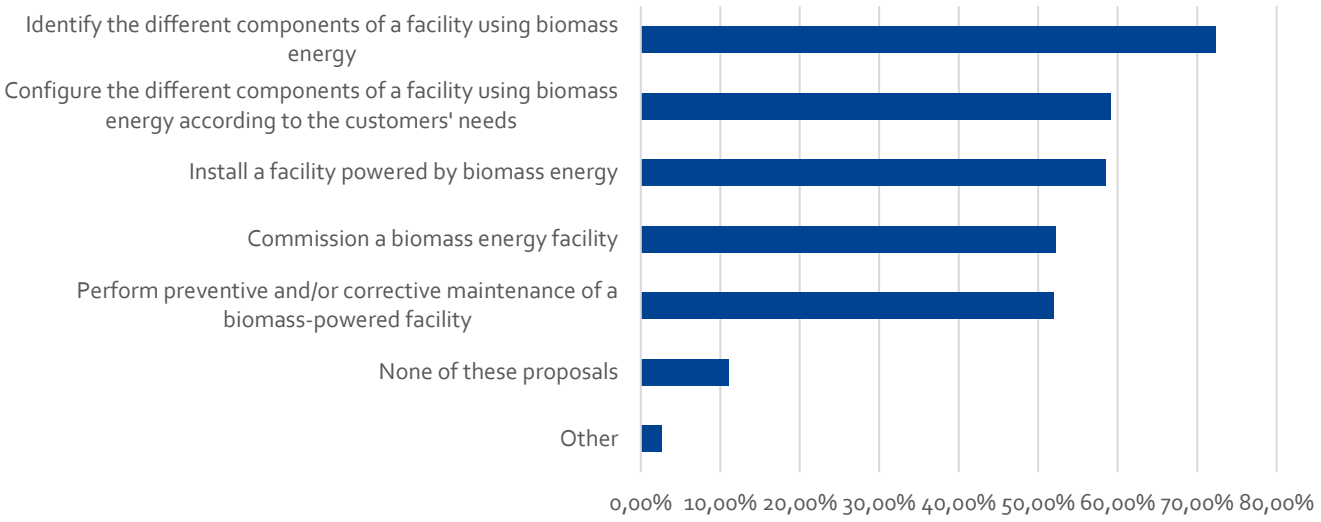


Regarding the recognition of the different types of aerothermal systems, 55,6% of the companies over 63 respondents estimated their current skill level between high and very high, and this figure is expected to reach 86,5% within 2 years, which represents an upskilling perspective for 19 companies.

For EE10.2, it represents 20 companies (31,8%), 19 companies for EE10.3 (33,4%) and 16 companies for EE10.4 (30,9%).
Concerning the preventive and/or corrective maintenance of all types of aerothermal energy facilities, 55,9% companies over 37 respondents estimated their current skills level between high and very high, and this figure is expected to reach 85,6% within 2 years, which represents an upskilling perspective for 11 companies.

Energy Efficiency – biomass

EE11. Regarding biomass, what skills are required within your company?

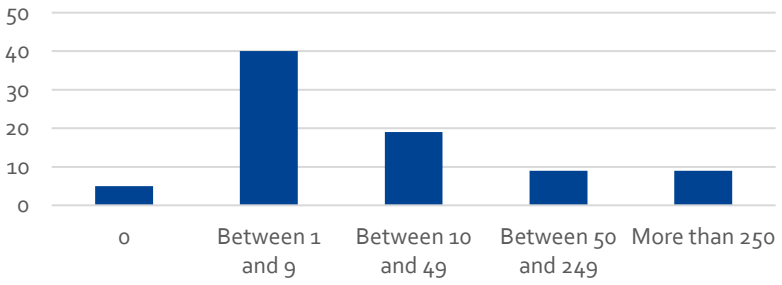


At EE1 question, 82 respondent construction companies indicated being concerned by biomass.

It represents 5 construction companies with 0 employees, 40 construction companies with between 1 and 9 employees, 19 construction companies with between 10 and 49 employees, 9 construction companies with between 50 and 249 employees and 9 construction companies with more than 250 employees.

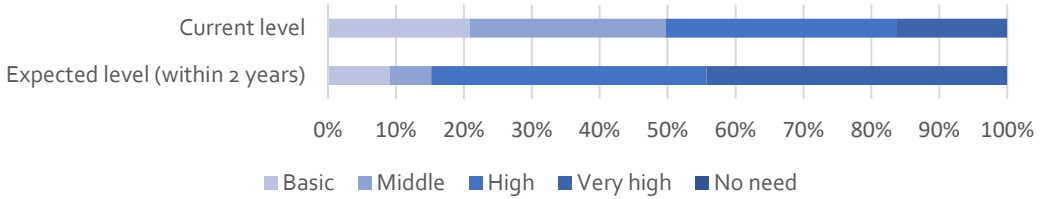
Respectively 59 (72,3%) and 47 (59,1%) companies indicated that identifying the different components of a facility using biomass energy and configuring the different components for such facility are required skills for their staff.
They are 45 (58,5%) and 40 (52,2%) regarding the installation of a facility powered by biomass energy and the commission of such facility.
There are 39 respondent construction companies (51,9%) indicating their staff needs to master preventive and/or corrective maintenance of a biomass-powered facility.

EE11.0. Distribution of the respondent construction companies to EE.11 according to their number of employees

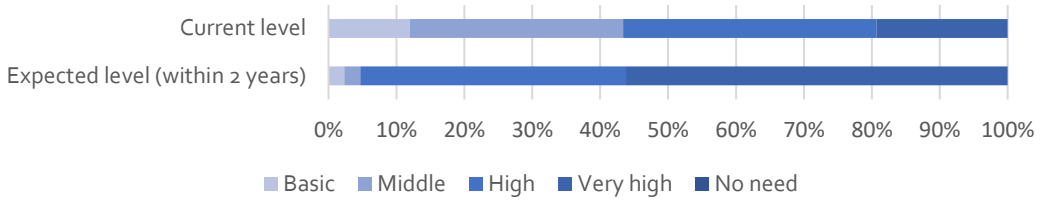


Energy Efficiency – biomass

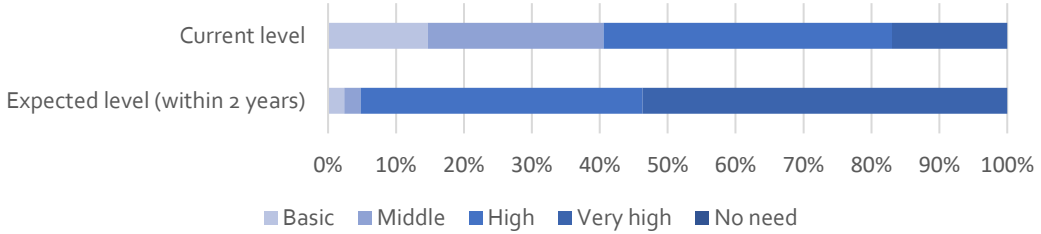
EE11.1. What is the level of competence within your company regarding the **identification of the different components of a facility using biomass energy**?



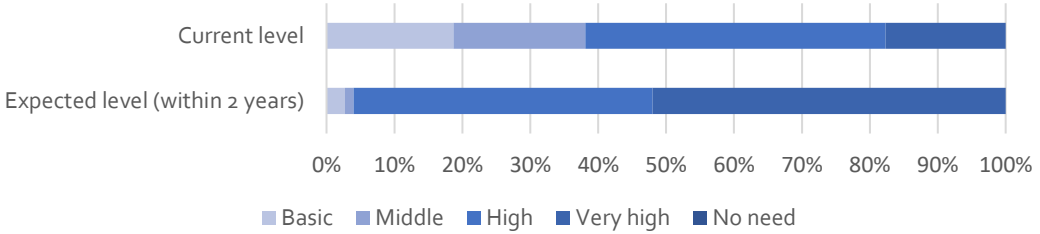
EE11.2. What is the level of competence within your company regarding the **configuration of the different components of a biomass-powered facility**?



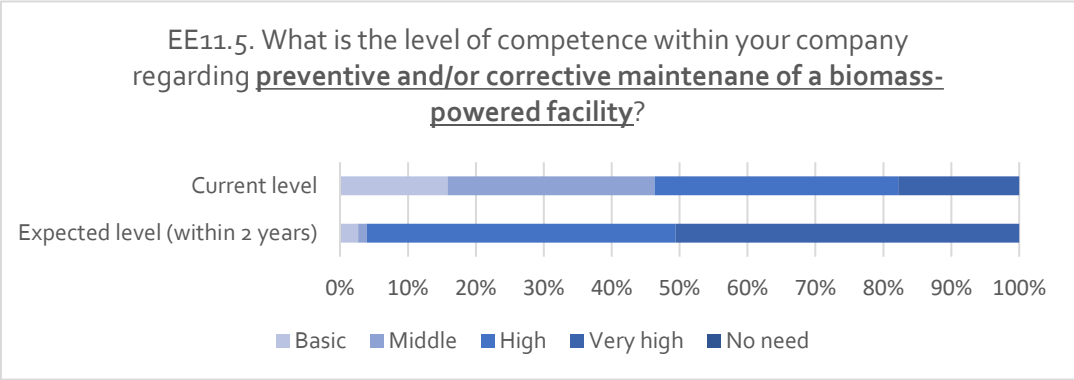
EE11.3. What is the level of competence within your company regarding the **installation of a biomass-powered facility**?



EE11.4. What is the level of competence within your company regarding the **commission of a biomass-powered facility**?



Energy Efficiency – biomass

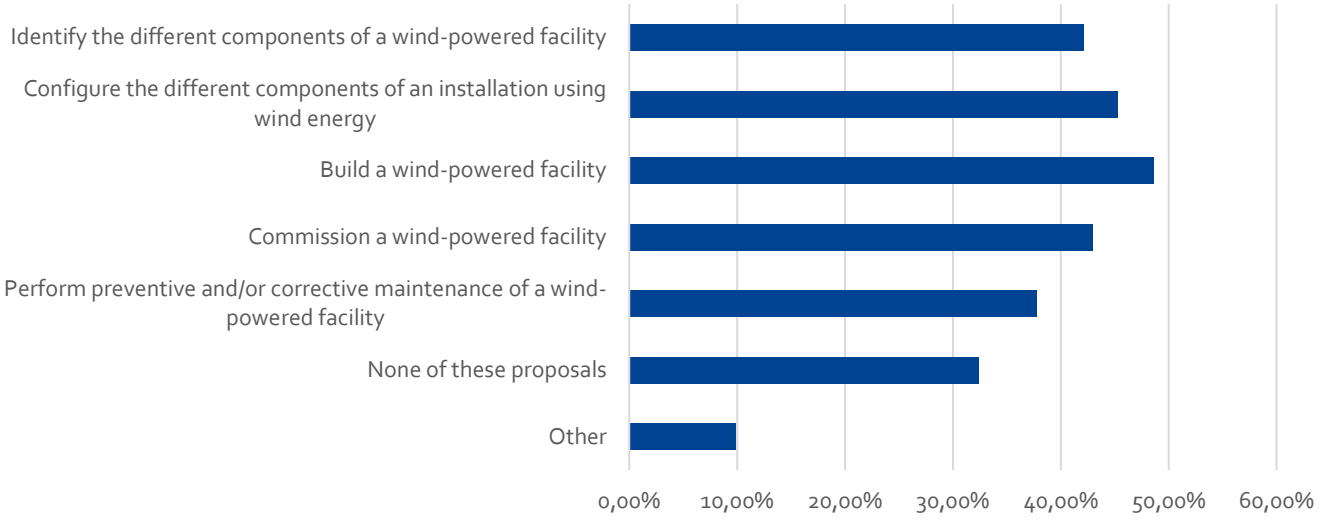


Regarding the recognition of the different components of a biomass-powered facility, 50,3% of the companies over 59 respondents estimated their current skill level between high and very high, and this figure is expected to reach 84,9% within 2 years, which represents an upskilling perspective for 20 companies.

For EE11.2, it represents 18 companies (38,7%), 16 companies for EE11.3 (35,7%) and 14 companies for EE11.4 (34,1%).
Concerning the preventive and/or corrective maintenance of all types of biomass-powered facilities, 53,7% of the companies over 39 respondents estimated their current skills level between high and very high, and this figure is expected to reach 97,3% within 2 years, which represents an upskilling perspective for 17 companies.

Energy Efficiency – wind energy

EE12. Regarding wind energy, what skills are required within your company?



Respectively 25 (48,6%) and 22 (45,3%) companies indicated that building a wind-powered facility and configuring the different components for such facility are required skills for their staff.

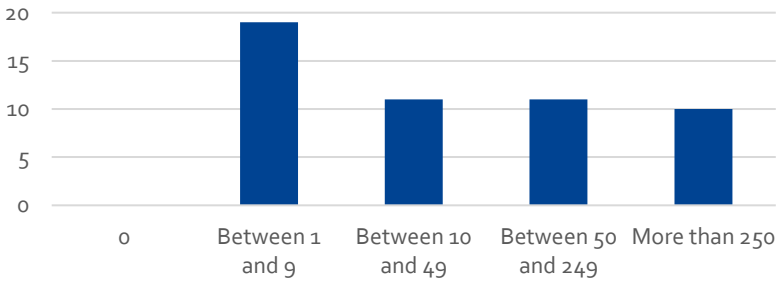
They are 21 (43%) and 23 (42,1%) regarding the commission of a wind-powered facility and the identification of its components.

There are 19 respondent construction companies (37,8%) indicating their staff needs to master preventive and/or corrective maintenance of a wind-powered facility.

At EE1 question, 51 respondent construction companies indicated being concerned by wind energy.

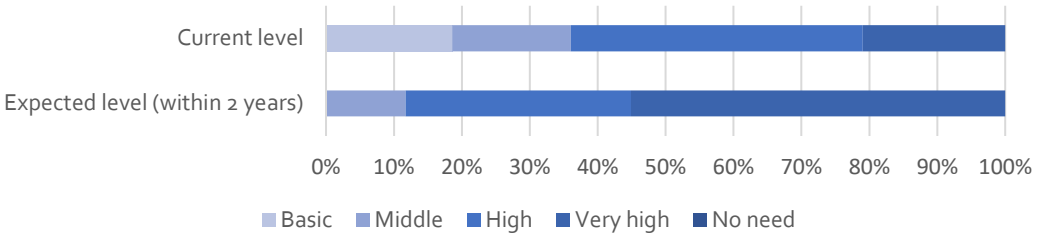
It represents 0 construction companies with 0 employees, 19 construction companies with between 1 and 9 employees, 11 construction companies with between 10 and 49 employees, 11 construction companies with between 50 and 249 employees and 10 construction companies with more than 250 employees.

EE12.0. Distribution of the respondent construction companies to EE.12 according to their number of employees

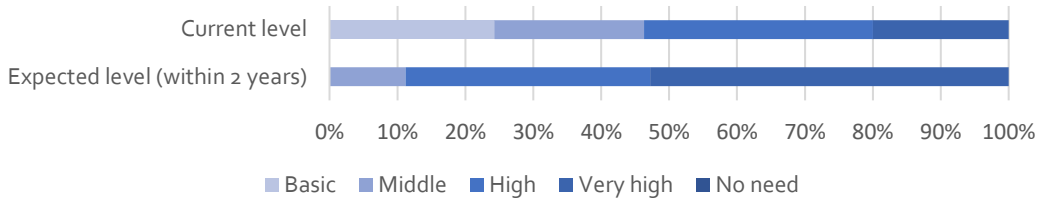


Energy Efficiency – wind energy

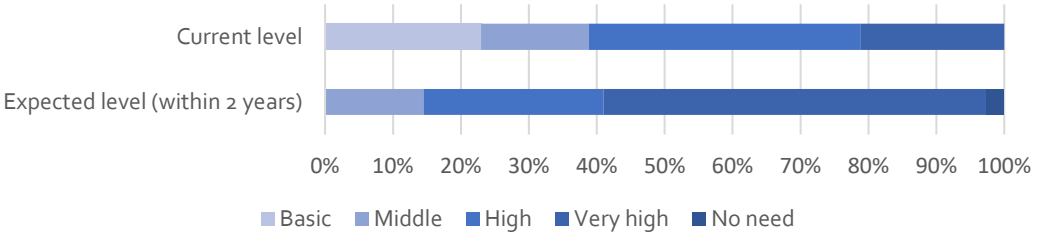
EE12.1. What is the level of competence within your company regarding the **building of a wind-powered facility**?



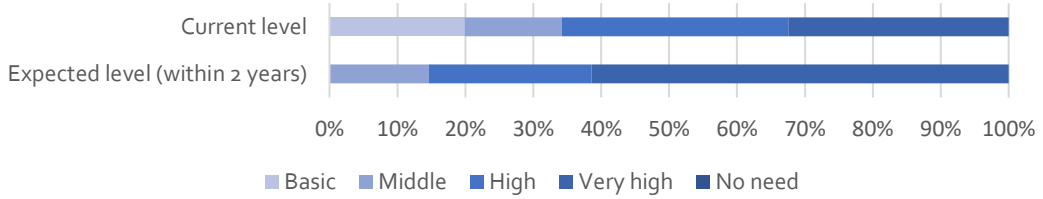
EE12.2. What is the level of competence within your company regarding the **configuration of the different components of a wind-energy facility**?



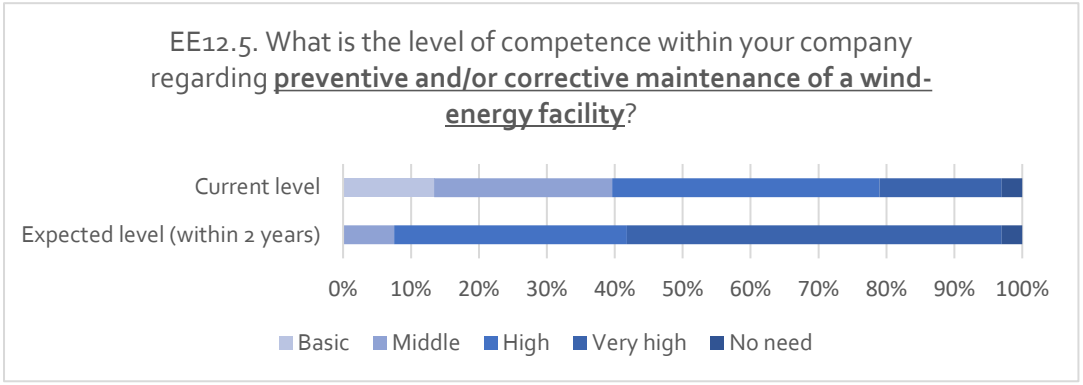
EE12.3. What is the level of competence within your company regarding the **commission of a wind-energy facility**?



EE12.4. What is the level of competence within your company regarding the **identification of the components of a wind-energy facility**?



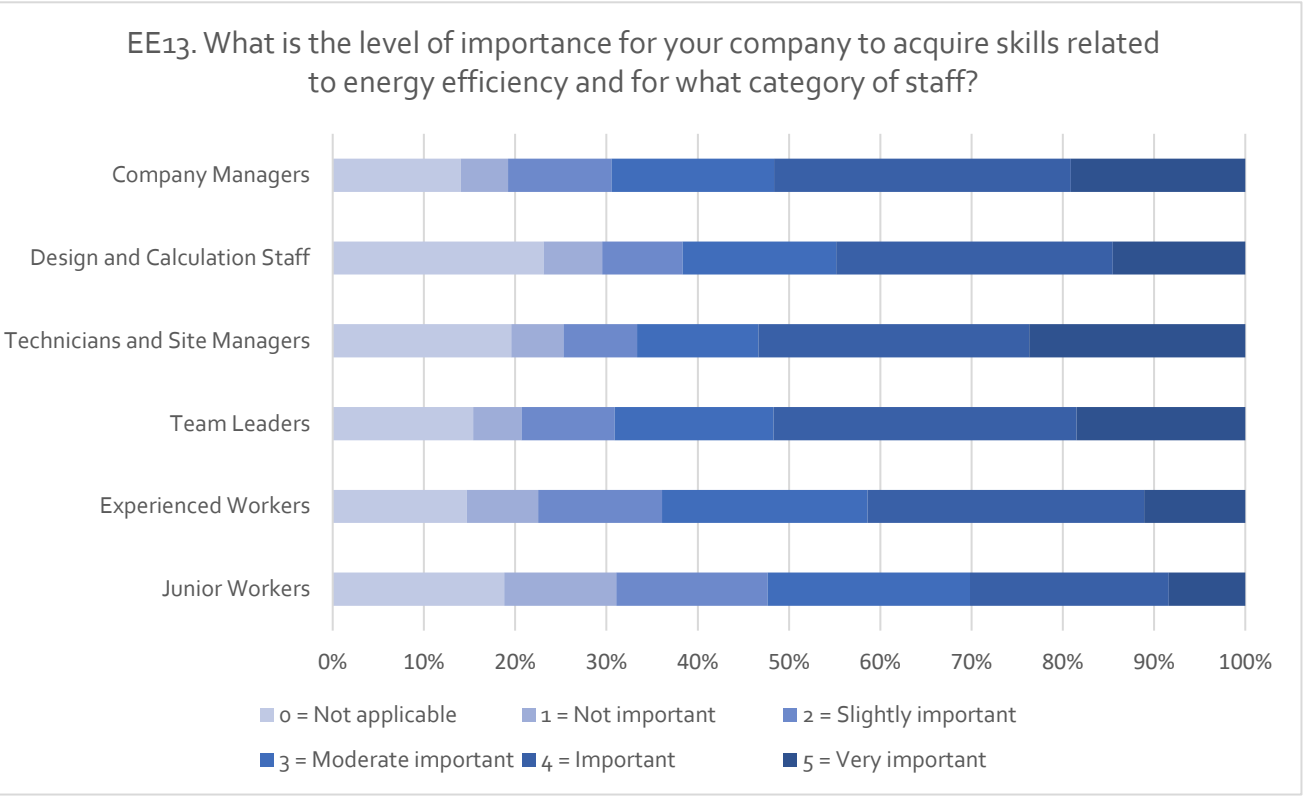
Energy Efficiency – wind energy



Regarding the building of a wind-powered facility, 64% of the companies over 25 respondents estimated their current skill level between high and very high, and this figure is expected to reach 88,3% within 2 years, which represents an upskilling perspective for 6 companies.
For EE12.2, it represents 8 companies (35,1%), 5 companies for EE12.3 (21,7%) and 5 companies for EE12.4 (19,6%).

Concerning the preventive and/or corrective maintenance of all types of wind-powered facilities, 57,4% of the companies over 19 respondents estimated their current skills level between high and very high, and this figure is expected to reach 89,5% within 2 years, which represents an upskilling perspective for 6 companies.

Energy Efficiency – training needs

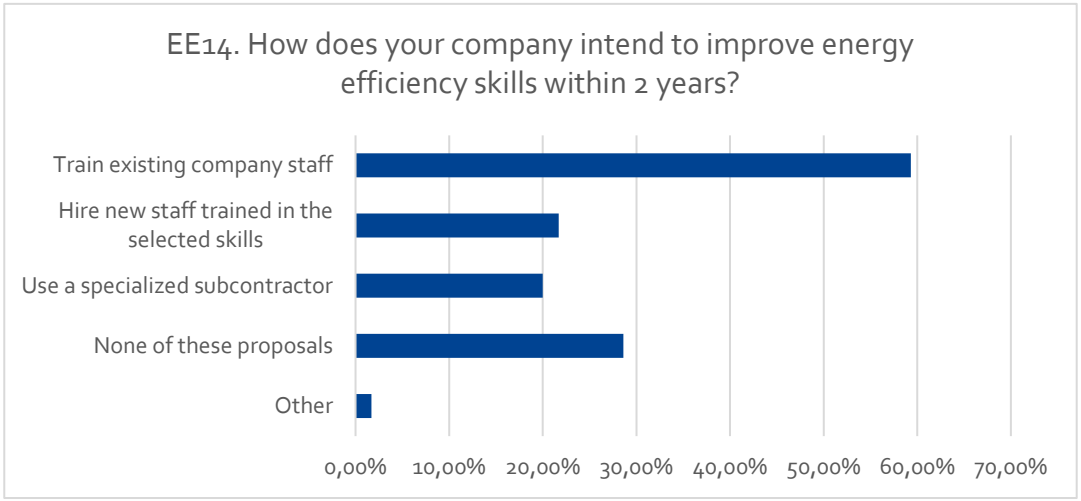


For 792 of respondent construction companies (52,2%), energy efficiency skills are between important and very important to master for team leaders. 768 of them (51,5%) consider energy efficiency skills being between important and very important for company managers as well.

At the same time, 319 respondent construction companies (23,1%) consider energy efficiency skills being not applicable for design and calculation staff (the higher rate for the not applicable category).

Energy efficiency skills are considered to be moderate important and less for junior workers according to 726 respondent construction companies (51,1%) and 286 (18,8%) of them even consider it is not applicable for this category of staff.

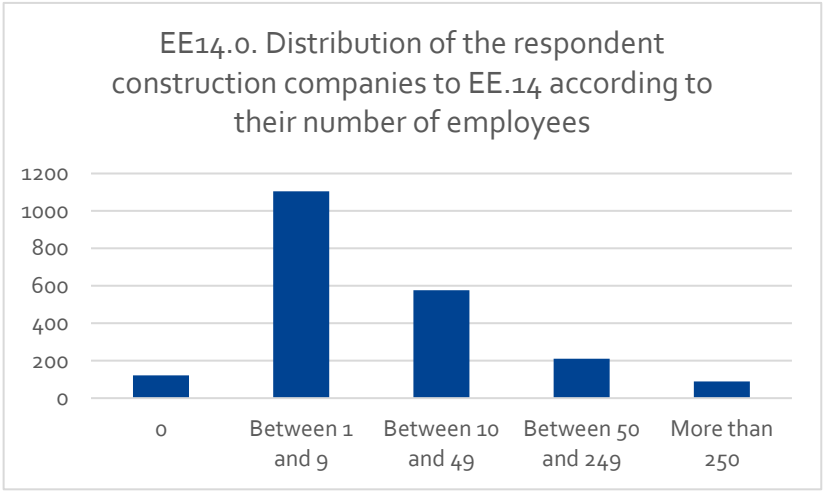
Energy Efficiency – training needs



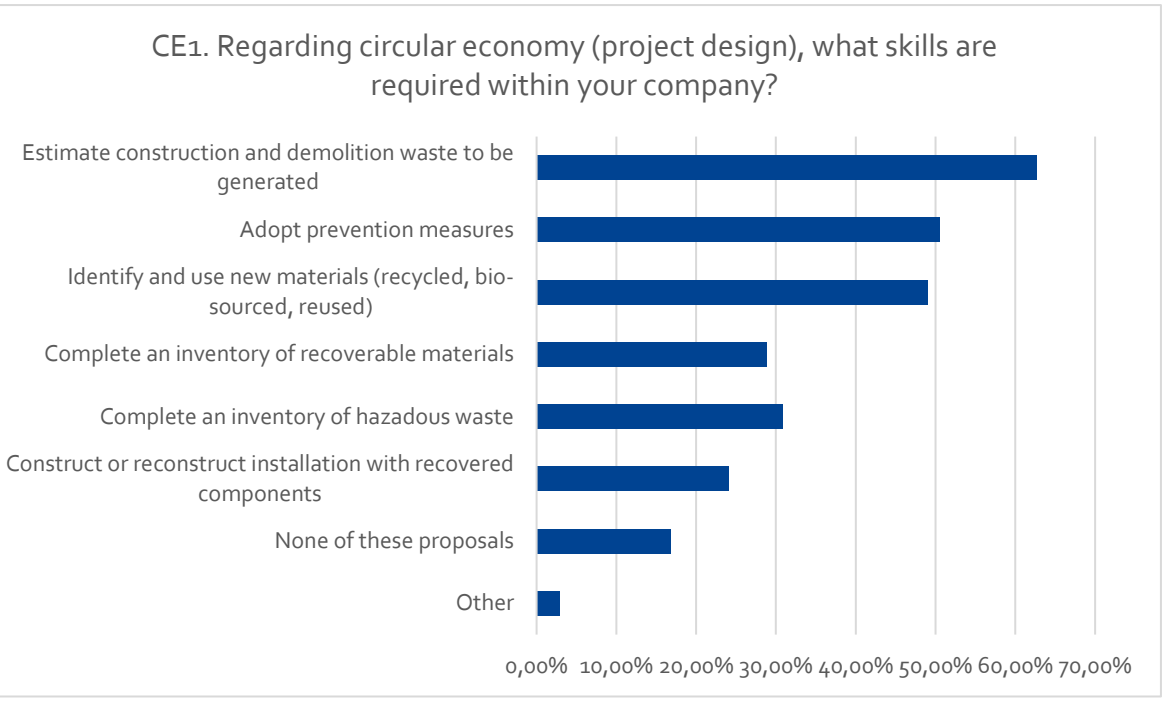
956 respondent construction companies (59,3%) plan to train their existing staff to reach the expected energy efficiency skill level winthin the next 2 years.

350 (21,7%) plan to hire new staff trained in the selected energy efficiency skills and 336 (20%) plan to use a specialised subcontractor.

As 429 respondent construction companies (28,6%) indicated they do not plan to use one of the 3 proposals of the questionnaire, a further research will have to be conducted with construction companies to identify other existing possibilities they can use for the improvement of their staff's energy efficiency skills.



Circular Economy – project design



1648 construction companies over the 1715 respondents answered the CE1 question related to circular economy during the project design phase.

1030 (62,7%) respondent construction companies estimated they need to know how to estimate construction and demolition waste to be generated.

785 (49,1%) and 769 (50,5%) respondent construction companies respectively indicated that identifying as well as using new materials and adopting prevention measures are required skills for their staff.

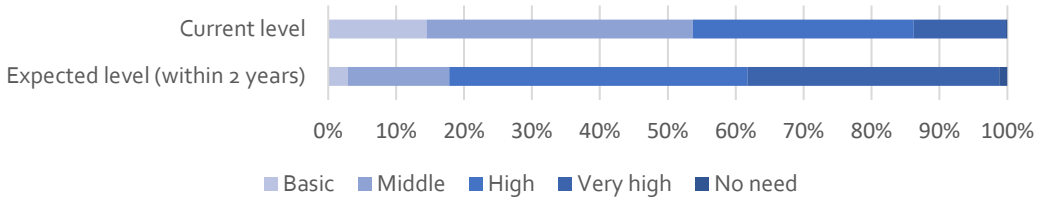
474 (30,9%) and 451 (28,9%) respondent construction companies respectively specified that completing an inventory of hazardous waste as well as of recoverable materials are required skills for their staff.

360 (24,1%) of them estimated their staff needs to be skilled in the construction and reconstruction of installations with recovered components.

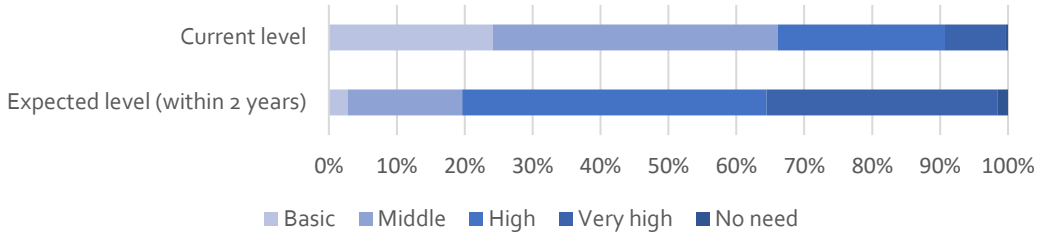
To finish, 294 (16,8%) indicated these circular economy skills are not required for their staff.

Circular Economy – project design

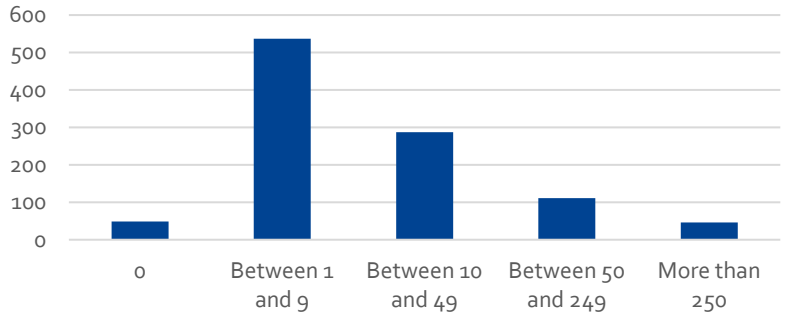
CE2.1 What is the level of competence within your company regarding the **estimation of construction and destruction waste to be generated**?



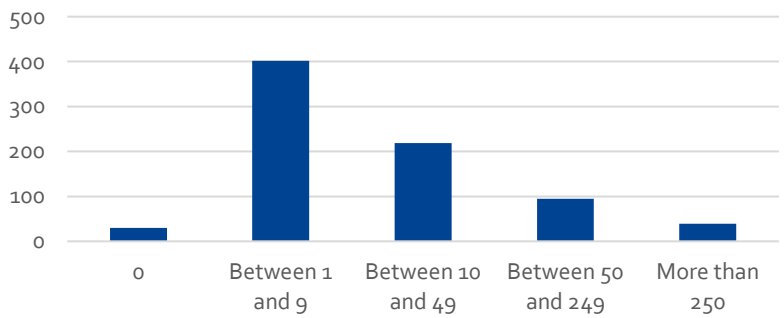
CE3.1 What is the level of competence within your company regarding the **identification and use of new materials**?



CE2.2. Distribution of the respondent construction companies to CE2.1 according to their number of employees



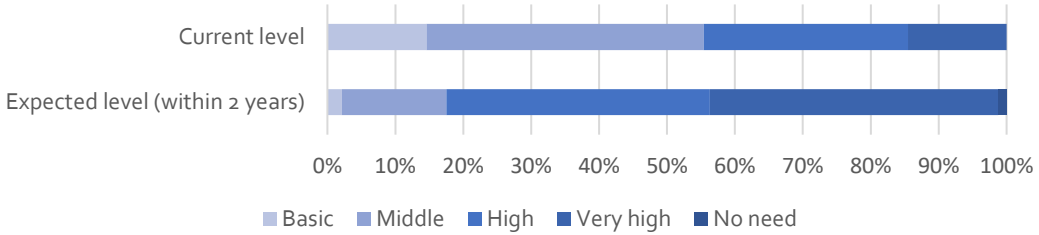
CE3.2. Distribution of the respondent construction companies to CE3.1 according to their number of employees



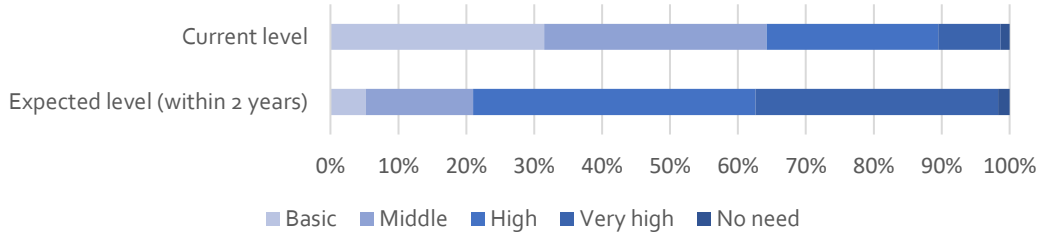
It represents an upskilling perspective for 359 respondent construction companies (34,9%) regarding the estimation of construction and destruction waste to be generated, and for 356 (45,3%) concerning the identification and use of new materials (recycled, bio-sourced, reused).

Circular Economy – project design

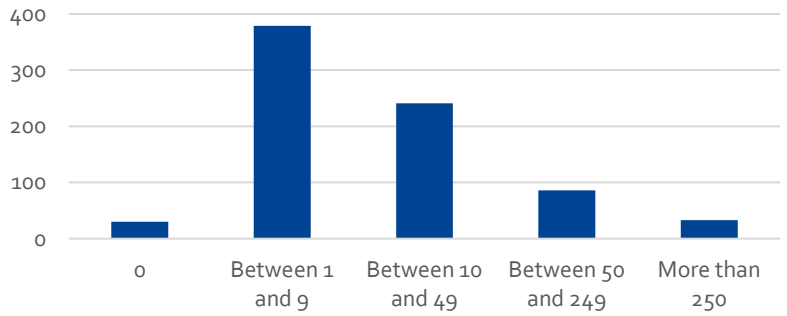
CE4.1 What is the level of competence within your company regarding the **adoption of prevention measures**?



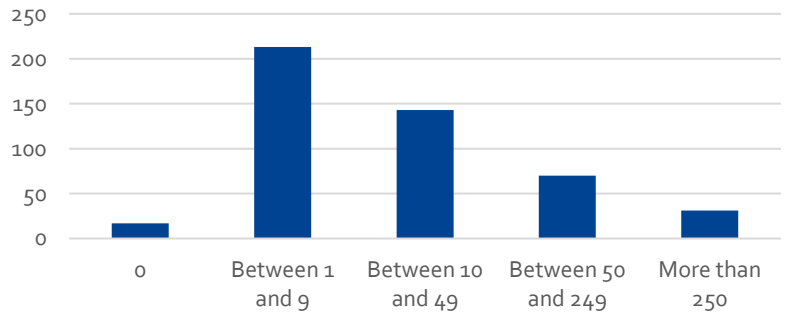
CE5.1 What is the level of competence within your company regarding the **completion of an inventory of hazardous waste**?



CE4.2. Distribution of the respondent construction companies to CE4.1 according to their number of employees



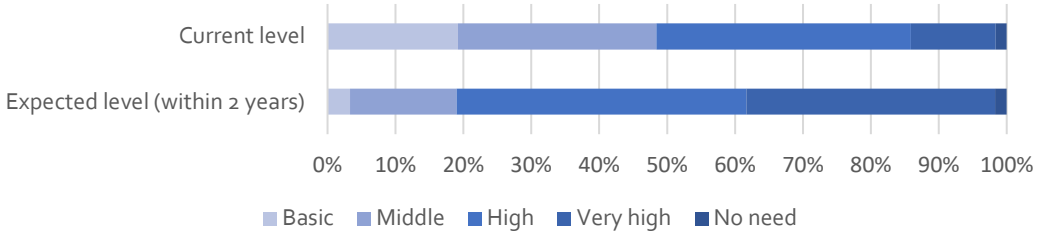
CE5.2. Distribution of the respondent construction companies to CE5.1 according to their number of employees



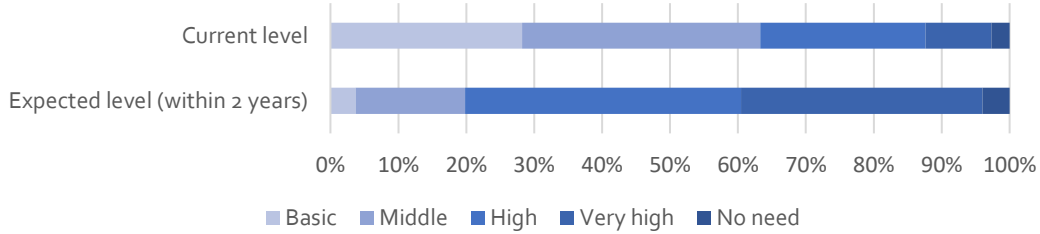
It represents an upskilling perspective for 282 respondent construction companies (36,7%) regarding the adoption of prevention measures, and for 202 of them (42,7%) concerning the completion of an inventory of hazardous waste.

Circular Economy – project design

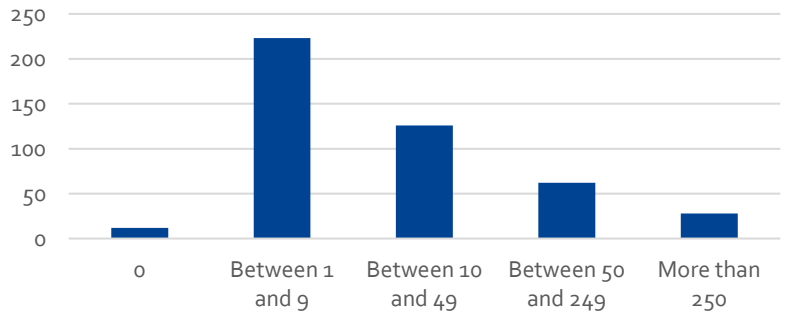
CE6.1 What is the level of competence within your company regarding the **completion of an inventory of recoverable materials**?



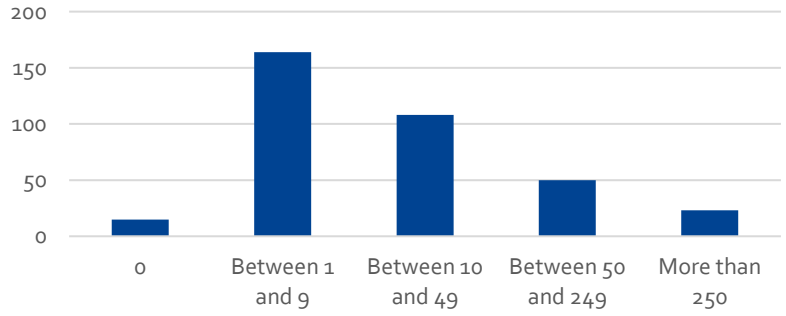
CE7.1 What is the level of competence within your company regarding the **(re)construction of installations with recovered components**?



CE6.2. Distribution of the respondent construction companies to CE6.1 according to their number of employees

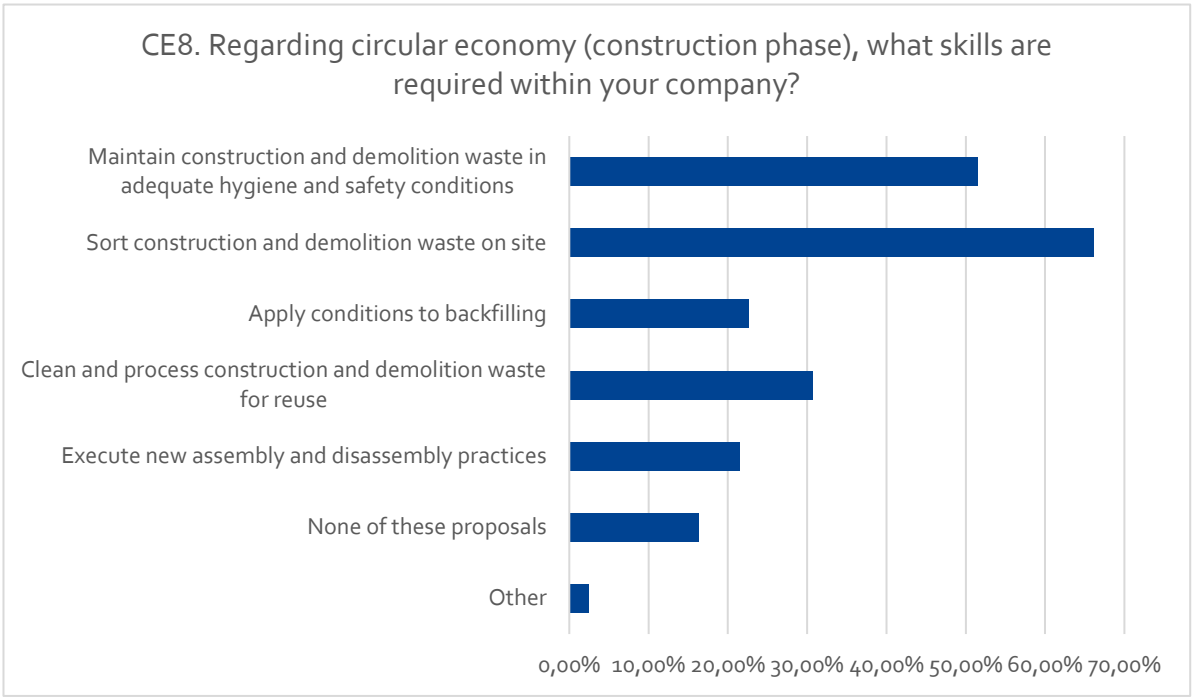


CE7.2. Distribution of the respondent construction companies to CE7.1 according to their number of employees



It represents an upskilling perspective for 177 respondent construction companies (39,2%) regarding the completion of an inventory of recoverable materials, and for 152 of them (42,1%) concerning the (re)construction of installations with recovered components.

Circular Economy – construction phase



1642 construction companies over the 1715 respondents answered the CE8 question related to circular economy during the construction phase.

1034 (66,2%) respondent construction companies estimated they need to know how to sort construction and demolition waste on site.

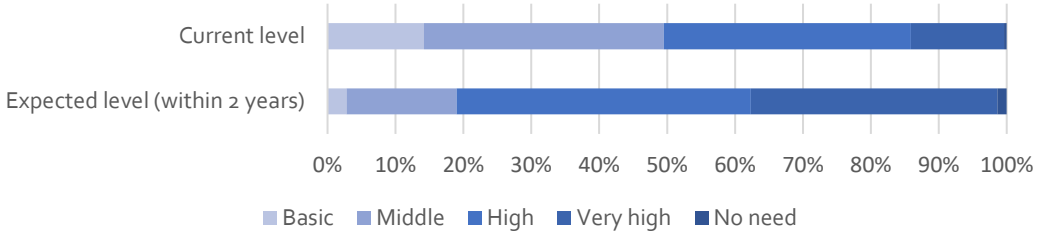
862 (51,5%) and 483 (30,7%) respondent construction companies respectively indicated that maintaining construction and demolition waste (CDW) in adequate hygiene and safety conditions as well as cleaning and processing CDW for reuse are required skills for their staff.

326 (22,6%) and 302 (21,5%) respondent construction companies respectively specified that applying conditions to backfilling and executing new assembly and disassembly practices are required skills for their staff.

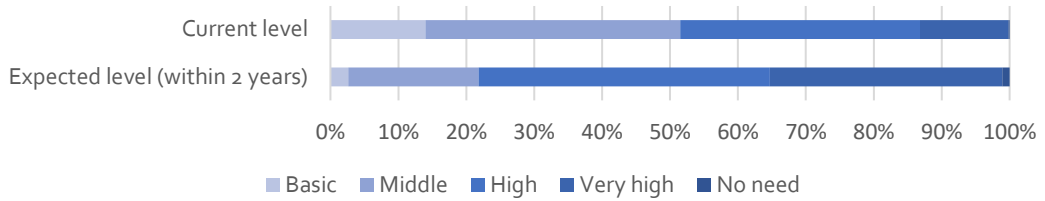
To finish, 297 (16,3%) indicated these circular economy skills are not required for their staff.

Circular Economy – construction phase

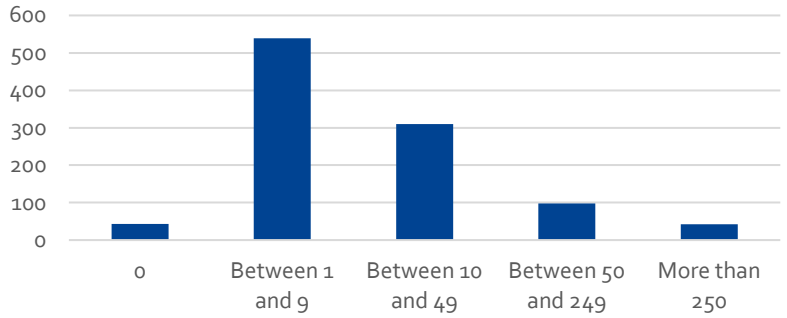
CE9.1 What is the level of competence within your company regarding the **sorting of CDW on site**?



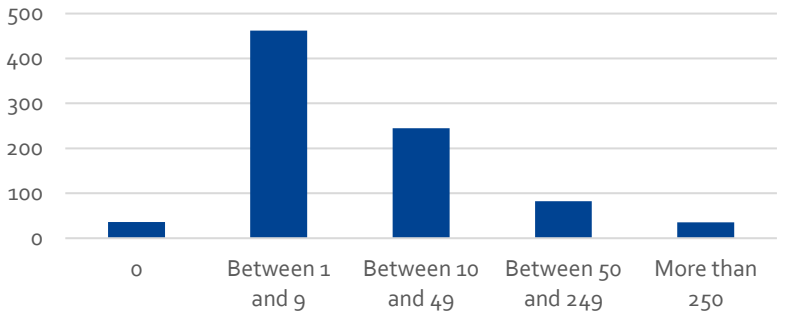
CE10.1 What is the level of competence within your company regarding the **maintaining of CDW in adequate hygiene and safety conditions**?



CE9.2. Distribution of the respondent construction companies to CE9.1 according to their number of employees



CE10.2. Distribution of the respondent construction companies to CE10.1 according to their number of employees



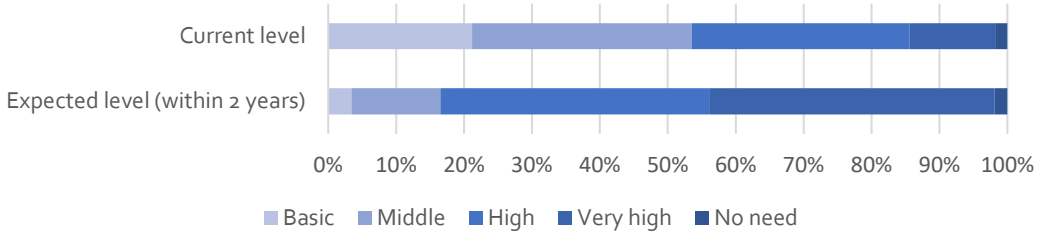
It represents an upskilling perspective for 305 respondent construction companies (29,5%) regarding the sorting of CDW on site, and for 248 of them (28,8%) concerning the maintaining of CDW in adequate hygiene and safety conditions.

Project number: 600885-EPP-1-2018-1-ES-EPPKA2-SSA-B

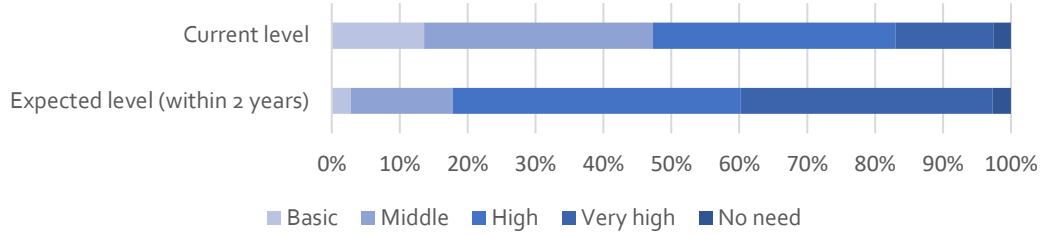
Co-funded by the Erasmus+ Programme of the European Union

Circular Economy – construction phase

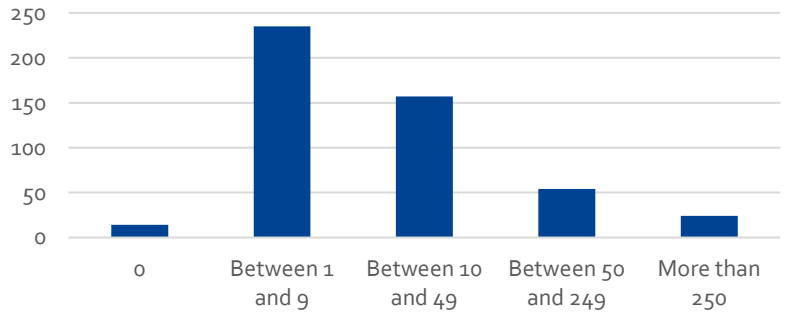
CE11.1 What is the level of competence within your company regarding the **cleaning and processing of CDW for reuse**?



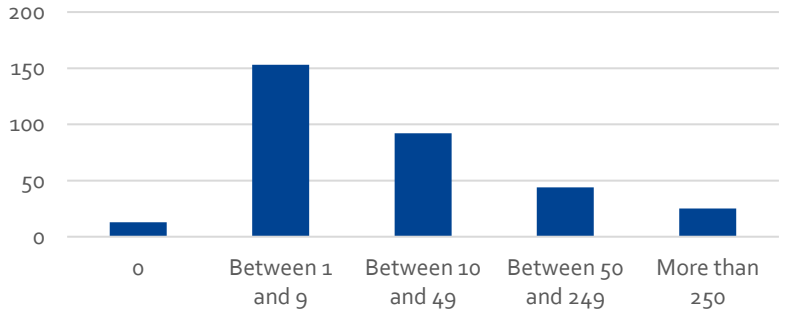
CE12.1 What is the level of competence within your company regarding the **application of conditions to backfilling**?



CE11.2. Distribution of the respondent construction companies to CE11.1 according to their number of employees



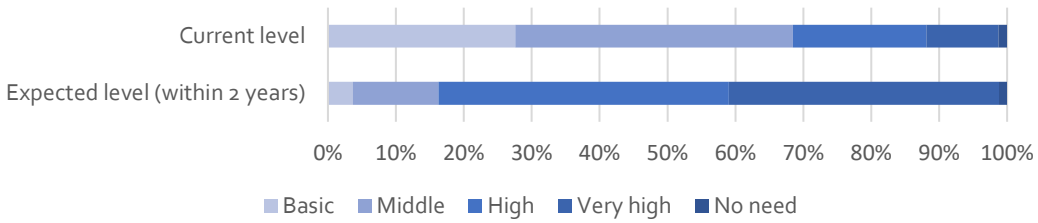
CE12.2. Distribution of the respondent construction companies to CE12.1 according to their number of employees



It represents an upskilling perspective for 178 respondent construction companies (36,9%) regarding the cleaning and processing of CDW for reuse, and for 96 of them (29,3%) concerning the application of conditions to backfilling.

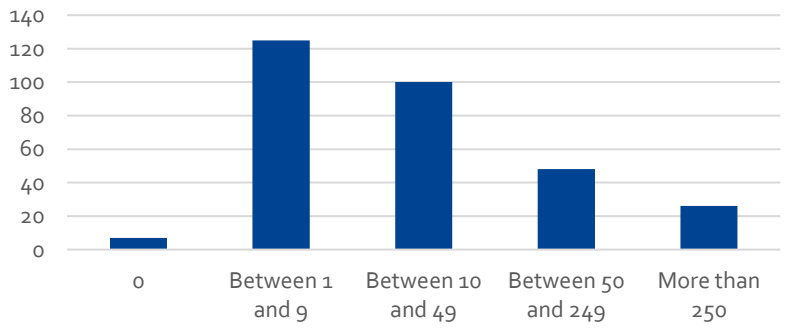
Circular Economy – construction phase

CE13.1 What is the level of competence within your company regarding the **execution of new assembly and disassembly practices**?



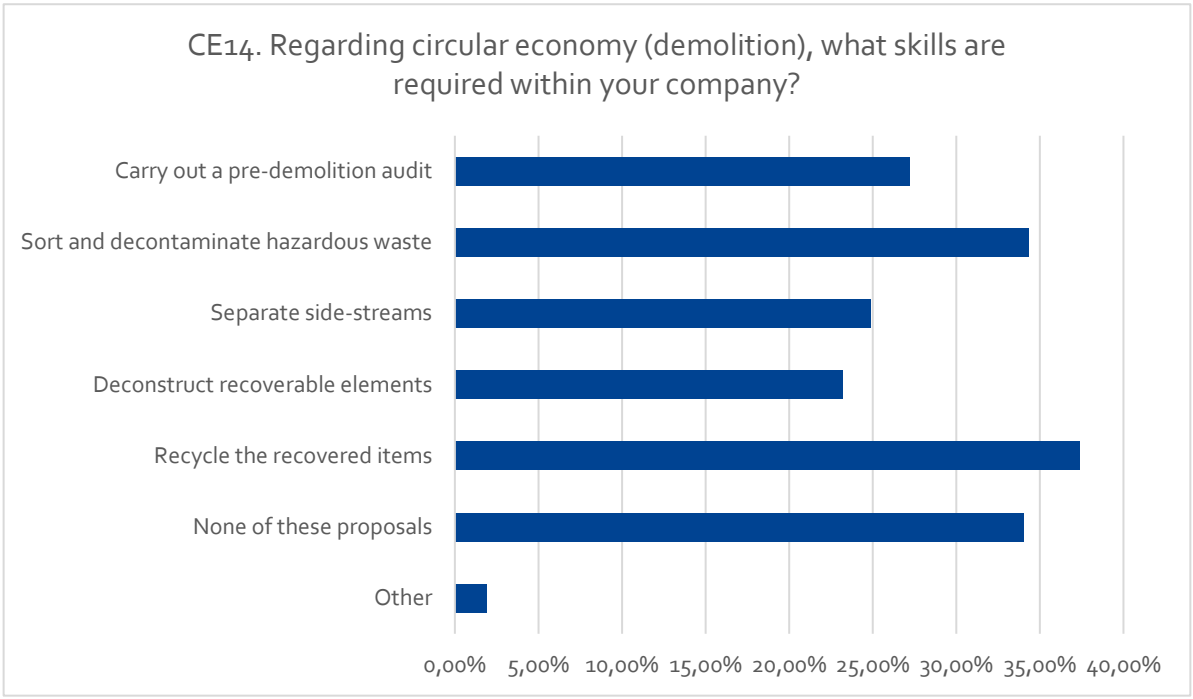
Concerning the execution of new assembly and disassembly practices, 30,3% of the companies over 302 respondents estimated their current skills level between high and very high, and this figure is expected to reach 82,6% within 2 years, which represents an upskilling perspective for 158 companies.

CE13.2. Distribution of the respondent construction companies to CE13.1 according to their number of employees



It represents 7 construction companies with 0 employees, 125 construction companies with between 1 and 9 employees, 100 construction companies with between 10 and 49 employees, 48 construction companies with between 50 and 249 employees and 26 construction companies with more than 250 employees.

Circular Economy – demolition



1607 construction companies over the 1715 respondents answered the CE14 question related to circular economy on demolition sites.

582 (37,4%) respondent construction companies estimated they need to know how to recycle recovered items.

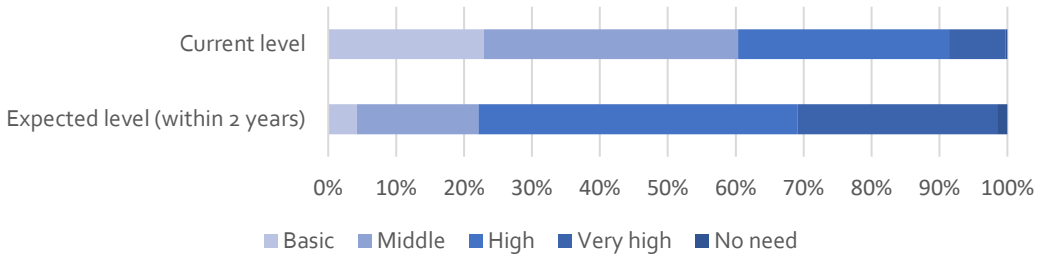
536 (34,3%) and 517 (27,2%) respondent construction companies respectively indicated that sorting and decontaminating hazardous waste as well as carrying out a pre-demolition audit are required skills for their staff.

484 (24,9%) and 369 (23,2%) respondent construction companies respectively specified that separating side-streams and deconstructing recoverable elements are required skills for their staff.

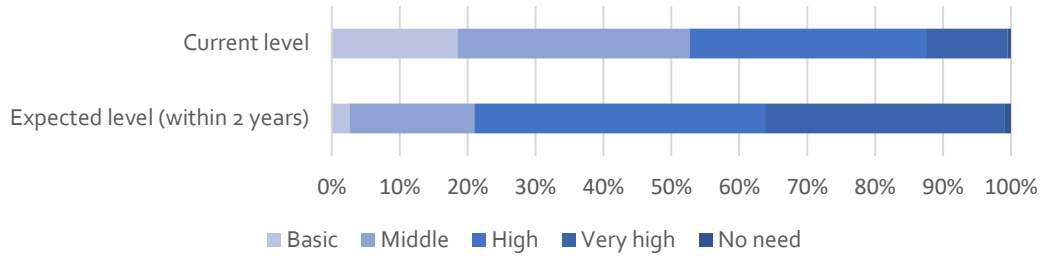
To finish, 497 (34%) indicated these circular economy skills are not required for their staff.

Circular Economy – demolition

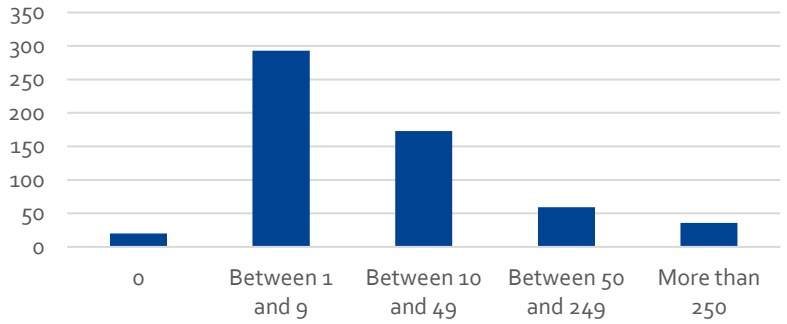
CE15.1 What is the level of competence within your company regarding the **recycling of recovered items**?



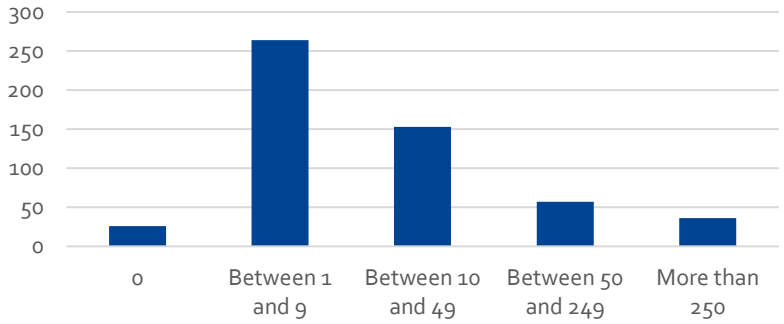
CE16.1 What is the level of competence within your company regarding the **sorting and decontaminating of hazardous waste**?



CE15.2. Distribution of the respondent construction companies to CE15.1 according to their number of employees



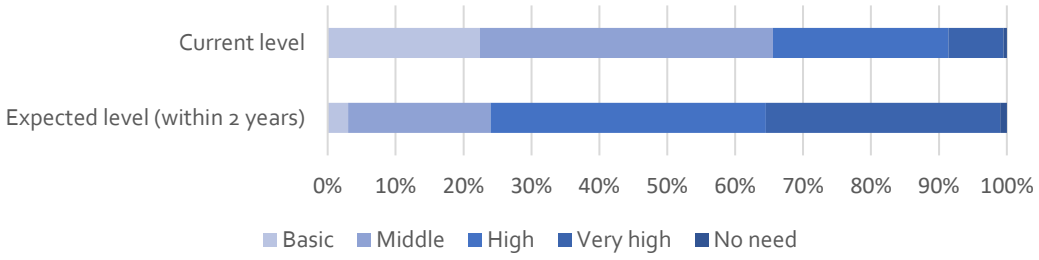
CE16.2. Distribution of the respondent construction companies to CE16.1 according to their number of employees



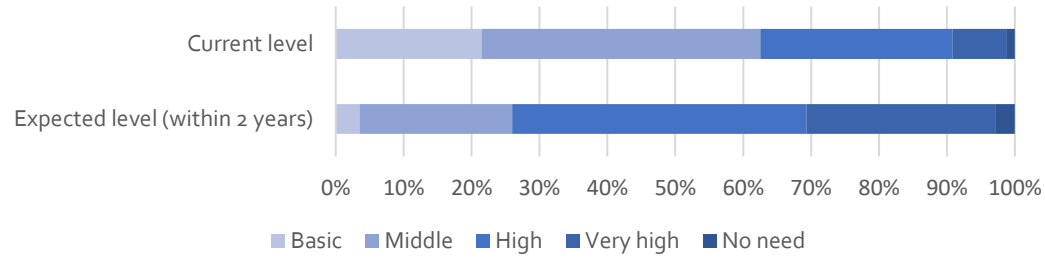
It represents an upskilling perspective for 215 respondent construction companies (36,9%) regarding the recycling of recovered items, and for 167 of them (31,2%) concerning the sorting and decontaminating of hazardous waste.

Circular Economy – demolition

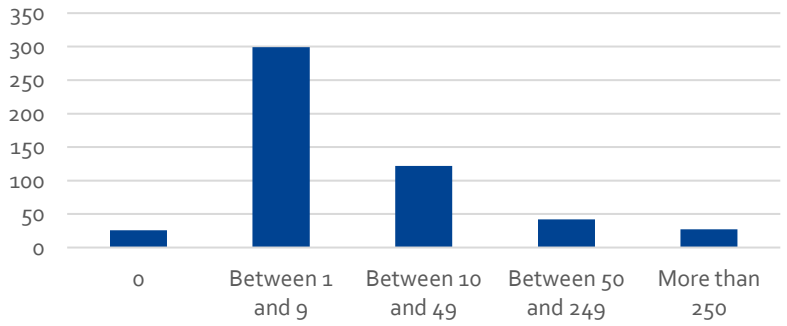
CE17.1 What is the level of competence within your company regarding the **realisation of a pre-demolition audit**?



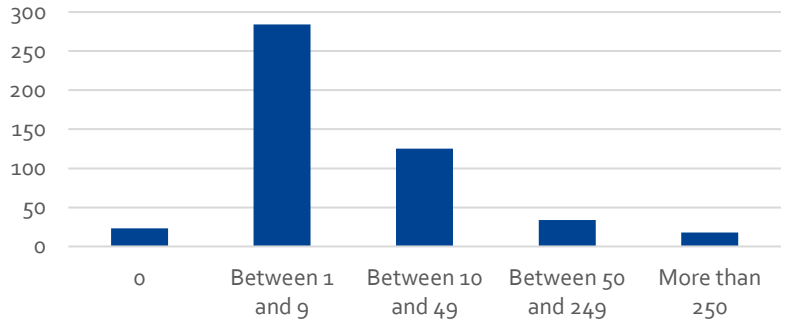
CE18.1 What is the level of competence within your company regarding the **separation of side-streams**?



CE17.2. Distribution of the respondent construction companies to CE17.1 according to their number of employees

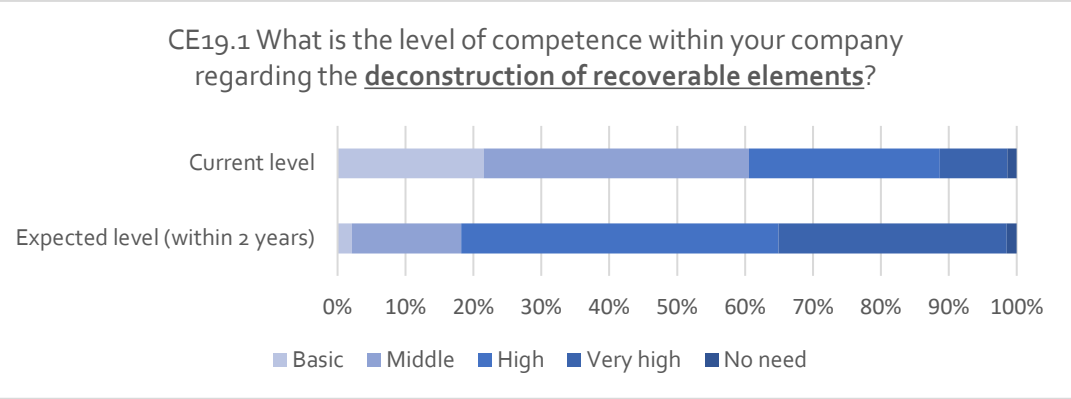


CE18.2. Distribution of the respondent construction companies to CE18.1 according to their number of employees

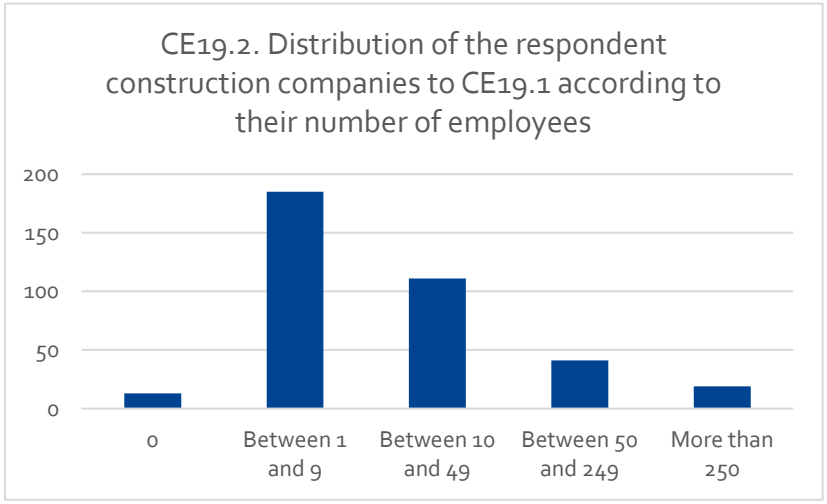


It represents an upskilling perspective for 212 respondent construction companies (41,1%) regarding the realisation of a pre-demolition audit, and for 169 of them (35%) concerning the separation of side-streams.

Circular Economy – demolition

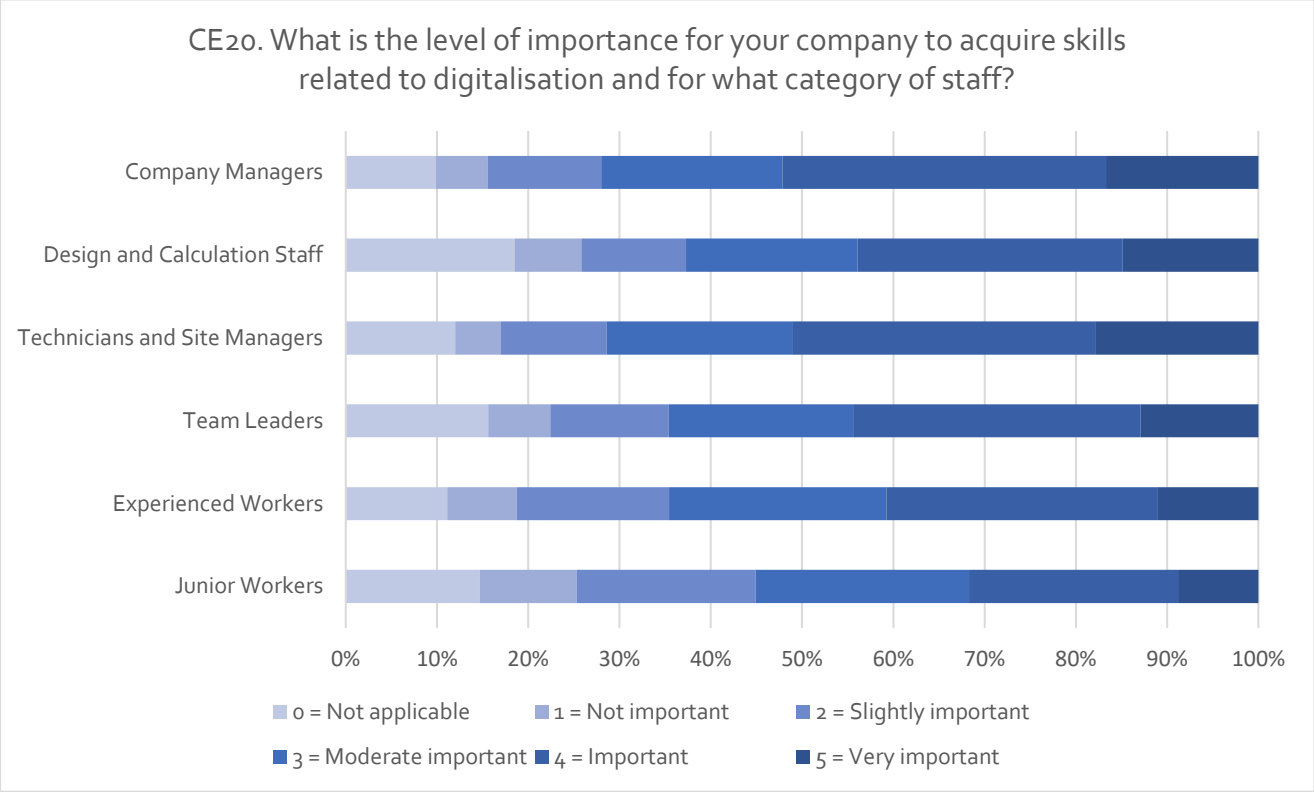


Concerning deconstruction of recoverable elements, 38% of the companies over 369 respondents estimated their current skills level between high and very high, and this figure is expected to reach 80,3% within 2 years, which represents an upskilling perspective for 156 companies.



It represents 13 construction companies with 0 employees, 185 construction companies with between 1 and 9 employees, 111 construction companies with between 10 and 49 employees, 41 construction companies with between 50 and 249 employees and 19 construction companies with more than 250 employees.

Circular Economy – training needs

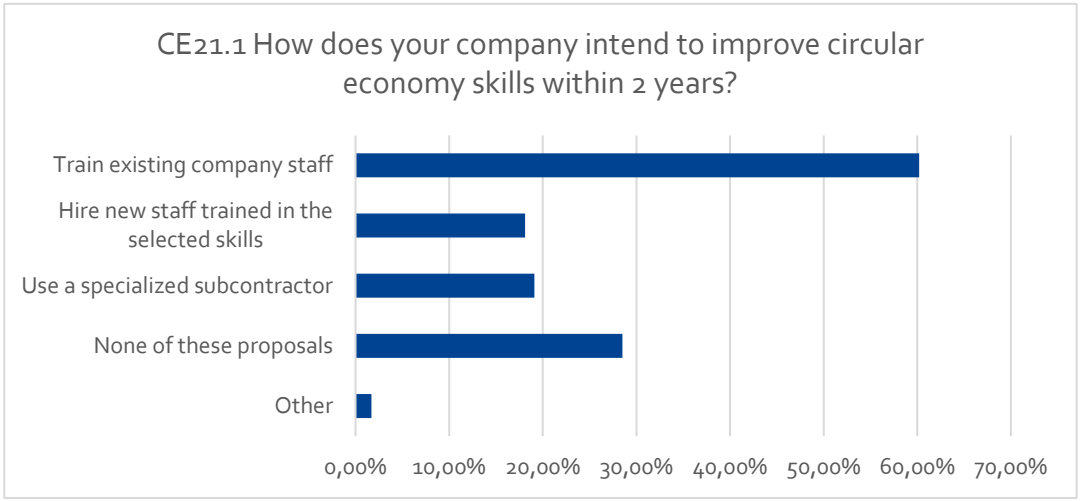


For 824 of respondent construction companies (52,5%), circular economy skills are between important and very important to master for company managers. 781 of them (50,9%) consider circular economy skills being between important and very important for technicians and site managers as well.

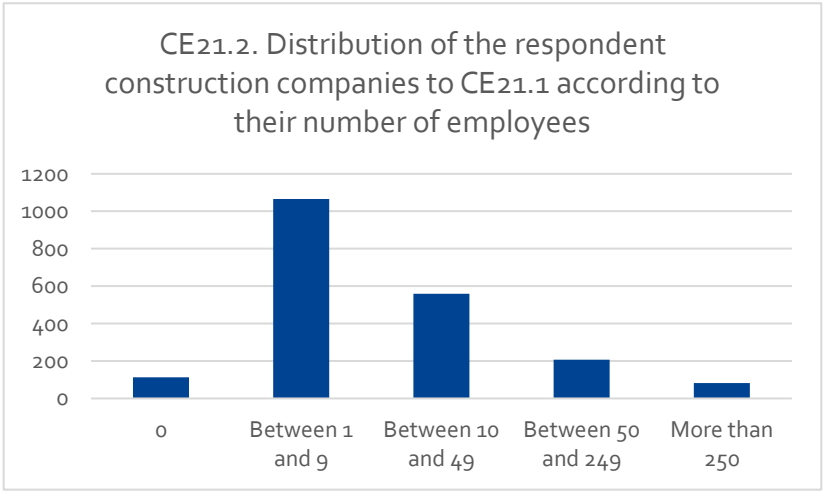
At the same time, 280 respondent construction companies (18,5%) consider circular economy skills being not applicable for design and calculation staff (the higher rate for the not applicable category).

Circular economy skills are considered to be moderate important and less for junior workers according to 792 respondent construction companies (53,6%) and 217 (14,7%) of them even consider it is not applicable for this category of staff.

Circular Economy – training needs



964 respondent construction companies (60,2%) plan to train their existing staff to reach the expected circular economy skill level winthin the next 2 years.
313 (19,1%) plan to use a specialised subcontractor and 303 (18,1%) plan to hire new staff trained in the selected circular economy skills.
As 419 respondent construction companies (28,5%) indicated they do not plan to use one of the 3 proposals of the questionnaire, a further research will have to be conducted with construction companies to identify other existing possibilities they can use for the improvement of their staff's circular economy skills.



Conclusion

This document presented you the weighted results for all partner countries, except Poland, as explained in the methodology. To access to the results for each country separated, please follow this link : Construction Blueprint - Discover the First Results of the Skills questionnaire! - REFORME

The WP4 leaders are now working on the 2nd edition of the questionnaire. It is intended to present their ideas during the January Monthly meeting to the project partners, on January 31st, 2022. Indeed, it will be suggested to focus on construction transversal skills applied to the construction sector and to identify if they are more required for workers, team leaders or site managers within construction companies, taking into account their diversity of intern organisation according to their size.

It would allow the Construction Blueprint project to also tackle the issue of transversal skills, within the paradigm of the construction sector. Plus, the questionnaire would be way shorter than the 1st one, which would normally allow the WP4 leaders to collect more answers from companies as well as facilitate the dissemination for project partners. Finally, on the statistical aspect, as the 1st edition of the questionnaire asked construction companies to identify their skills needs within two years, questioning them again on energy efficiency, circular economy and digitalisation less than one year after they responded would lead the results to be statistically irrelevant and not comparable.

It is planned to propose a first version of the 2nd edition of the questionnaire by the end of February, in order to let between two to three weeks for the project partners to give their feedback. In March, FLC and WP4 leaders would work on the communication strategy to adopt for the dissemination of this 2nd edition, as it has been noted it was lacking for the last edition. By the end of March, project partners would receive the final version of the questionnaire for translation, in order to be able to launch it among the countries of the consortium by the end of April. It would be closed at the end of June.