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ANALYSIS OF THE VALUE OF ENERGY SKILLS IN SOME OF THE EUROPEAN COUNTRIES

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ORIGINAL SCIENTIFIC ARTICLE

ABSTRACT

Europe today faces the challenge of energy efficient construction of new and renovation of existing buildings. However, it is closely linked and dependent on the readiness of workers who participate in individual construction activities, but also those who participate in the preparation of project documentation, including all professions. It is therefore appropriate to act on the construction market to stimulate demand for new or improved skills in renewable energy and energy efficiency in construction.

In order to assess the need, survey was conducted focusing on the area of increasing the value of energy skills, which is closely linked to increasing the energy efficiency of buildings. The survey includes following European countries - Netherlands, North Macedonia, Slovakia, Slovenia, and Spain. The output data will result in better understanding how the energy skills are perceived by the industry stakeholders and defining the state-of-art. It will be used as a source for decision making process to better aim the stimulation strategy.

Key words: *energy efficiency; BIM; EE skills; energy performance; digitalization*

1 INTRODUCTION

Reducing energy consumption is closely linked and dependent on the readiness of workers who participate in individual construction activities, but also those who participate in the preparation of project documentation, including all professions. In the construction market, it is therefore essential to stimulate demand for new or increased skills in the use of renewable energy and energy efficiency (EE) in construction.

The expected European wave of renovations alone could help in the economic recovery of individual countries by creating jobs at the local level, increasing the skills of workers and building resilient communities. Investments in energy efficiency can help ensure quality buildings with lower energy bills. Which is more than a hot topic these days. Last but not least, they can improve the health of our communities and make our contribution to climate change.

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2 MEASURING THE VALUE OF ENERGY SKILLS

2.1 Preparation of the Survey

Europe today faces the challenge of energy efficient construction of new and renovation of existing buildings. Today, buildings consume around 40% of the EU's energy and produce 36% of CO2 emissions. However, almost 75% of the total number of buildings are energy inefficient.

Reducing energy demand is closely linked and dependent on the readiness of workers who participate in individual construction activities, but also those who participate in the preparation of project documentation, including all professions. It is therefore appropriate to act on the construction market to stimulate demand for new or improved skills in renewable energy and energy efficiency in construction.

Skilled professionals con contribute, but they need to be recognized and their skills needs to be not only visible but also appreciated.

2.2 Methodology

The methodology of prospective survey is prepared focusing on all aspects of systematic approach to determine “WHO?”, “HOW?”, “WHAT?” and “WHEN?”. When working on international survey, precise strategy needs to be determined to harvest desired number of respondents. All covered aspects of the strategy are explained further within this chapter.

2.2.1 *Who?*

First of all, target groups are identified, and strategy is discussed. Target groups are defined as construction workers, whose value of energy skills will be most explicitly expressed. In general, target group shall be covering, besides mentioned construction workers, also middle and senior level engineers and other construction professionals such:

- Investor / Developer (small private investments vs. Residential or Office buildings – sustainability, processes to maintain quality (or price / budget reasons)
- Civil Engineer / Architect / Planner
- Assessors of the Achieved Energy Efficiency of the Buildings / Energy Counsellor
- Contractor / Site Manager / Construction Site Supervisor / Craftsman
- Facility manager
- Decision bodies / Legal authorities / Public bodies

After a discussion, boundary conditions are set to leave some particular groups out of scope, such:

- Teachers / Researchers / Educators / Students
- Product / Software and System suppliers
- Land Surveyors
- Tenants

No concrete measures had been taken in order to avoid receiving answers from mentioned groups, but the aim is not to directly approach them and motivate them to participate at this survey.

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2.2.2 *How?*

In this part, approach is established including the form of distribution.

Selecting appropriate distribution channels is always challenging. Aiming and targeting to the right audience is crucial, especially, when a certain level of expertise is expected or when the target group is specific, having in mind that we shell keep focusing to value of energy skills. This approach varies a lot from those that are aiming to the general audience.

Using the previous experience, survey needs to meet following criteria:

- Simple while explicit
- When possible, using logic jumps
- Short duration
- Anonymous
- On-line data collection
- Multi-lingual

First three bullet points are partially covered in the part, where the content of the survey is being described. Anonymous and short survey allows to engage more respondents. The prospective duration of the survey was set to 5 minutes maximum. According to this criterion, content was adapted to fit within desired timeframe. The strategy also promotes in communication with prospective respondents, that this survey will not consume much of their time. Using response-based logic jumps also allows personalize the content and skip irrelevant questions.

2.2.3 *What?*

This chapter is the key part of the survey – the content of the survey is prepared; questions are precisely selected to maintain international understanding. Formulating short and concise questions allows higher engagement of prospective respondents, allowing them to answer in a shorter time, which will increase the number of submitted questionnaires as a result.

Incorporating logic in the questionnaire make the questions more targeted and contribute to higher rate of completement. Logic is the ability of the system to respond to participant´s answers and reduce the number of skipped questions, due to its irrelevance. Based on a number of questions and agreed allocated time per response, the logic was not used to divide respondents and lead them via different branches.

The on-line questionnaire is divided into three main parts (see Figure 1) and it consists of 12 questions.

2.2.4 *When?*

Execution of the survey was scheduled for autumn 2022. The data collection was open 4 weeks during months October and November. All the activities were planned accordingly. First, the questionary in English was composed. The content of the questionnaire was translated to multiple languages in order to allow better engagement by respondents in each country.

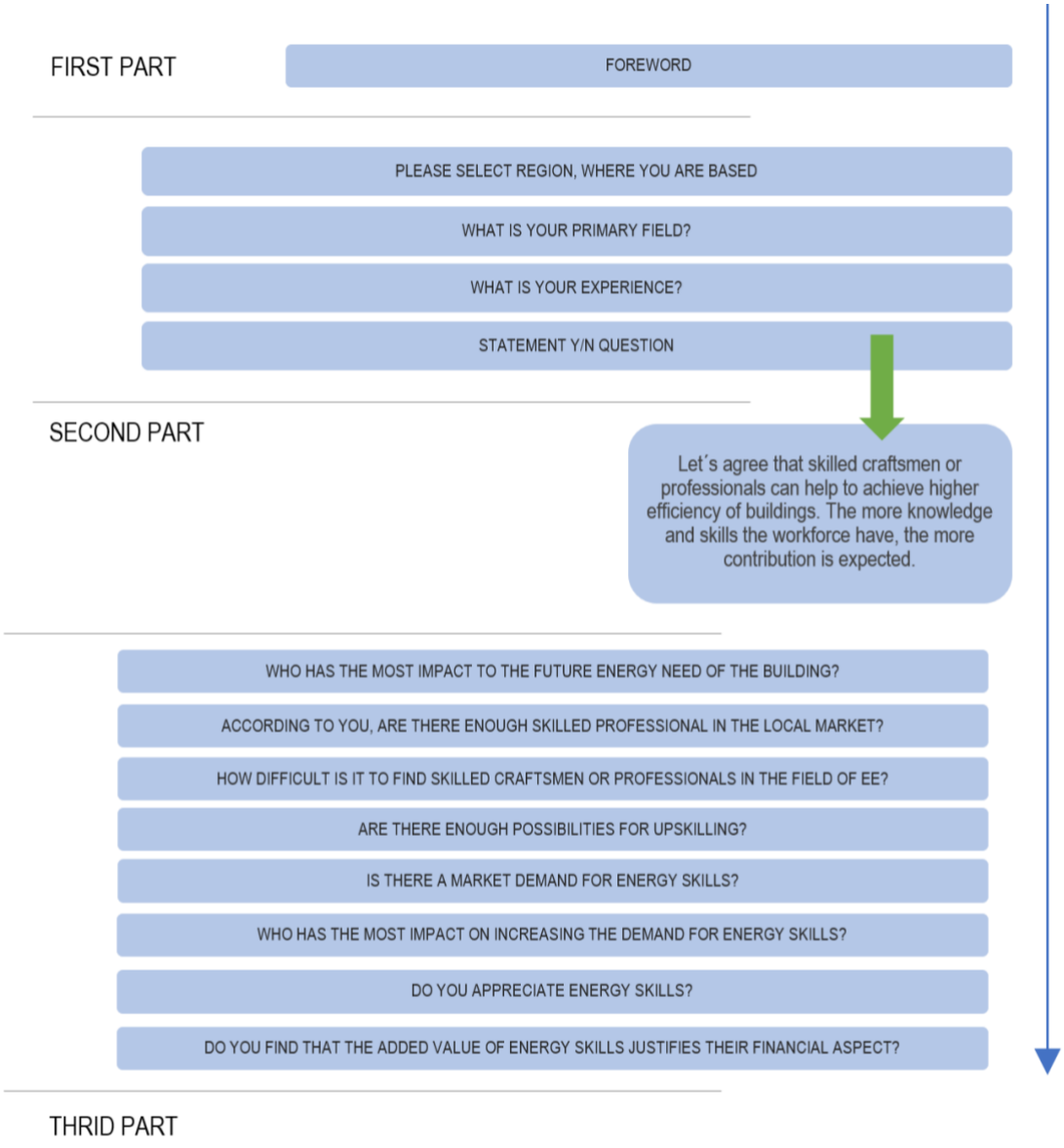

Figure 1 Overview of the survey questions.

3 RESULTS

Survey was executed in the form of an anonymous online questionnaire. Target group aimed to cover all important stakeholders of the construction industry in a whole project lifecycle – for more info about target groups, see Chapter 2.2.1

Public professional portals in the AEC (architecture, engineering, construction, including facility management) and internal databases of professional and professional associations were chosen as distribution channels for survey dissemination.

Survey covers the partner countries of the Consortium – Netherlands, North Macedonia, Slovakia, Slovenia, Spain. All language mutations have been merged into one dataset, providing general overview of whole area. In the graphs bellow, percentile is used to provide overview of the responses. In total 788 responses have been collected and evaluated.

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First question – regional distribution of participants has not been included in this report as all countries have different number of regions and for the report is based on country level, not going deeper into the regions. The data can be used at national level, within the country of origin.

Most of the respondents are Architects and Engineers (50,63%) and Construction management personnel (31,73%). Other professions in the order sorted from most represented to lowest percentile are presented at Figure 2.

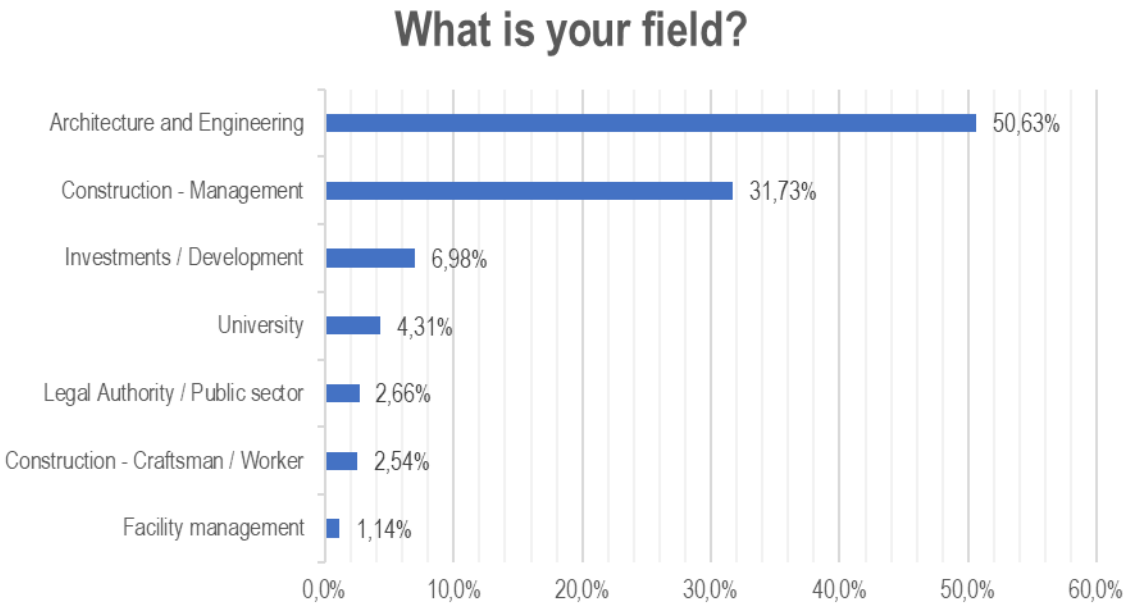

Figure 2 What is your field? Proportional representation is calculated out of 788 responses.

Third question covers the information about the experience. Almost 75% of respondents have at least 10 years of the experience, so that means the survey has greater value. Those professionals have already a solid experience and know the market at necessary level.

Over 95 % of respondents agree with the statement that skilled craftsman or professional can help to higher efficiency of buildings. The more knowledge and skills this person have, the more contribution is expected. Little less than 5% disagree.

In the question No. 5, respondents should identify, who has according to them the most impact to the future energy need of the building. Three levels of the impact were available – lowest, middle, and highest for each provided category. Most respondents have identified that Architect/Engineer (78,2% indicated the highest impact) has the highest impact and can significantly influence the future need of the building within his responsibility. Second most important are Engineering professions (MEP, HVAC,…) during the project delivery with the indicated highest impact category 73,9%. All the data is presented on Figure 3.

Respondents see a problem at availability of the skilled professionals. Only a little over 11% believes that the local market has enough capacities of skilled workers. Majority (51,5%) believes that the market needs more professionals at the moment. 37,4% stated, that the market lacks significant number of professionals (see Figure 4).

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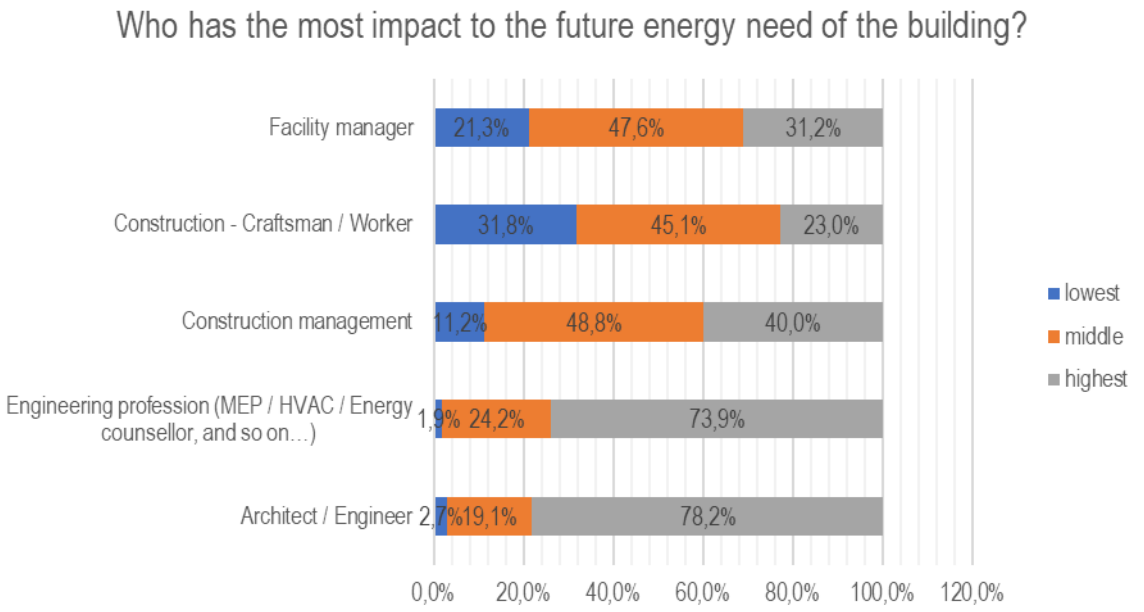

Figure 3 The impact on the future energy need of the building. Proportional representation is calculated out of 788 responses.

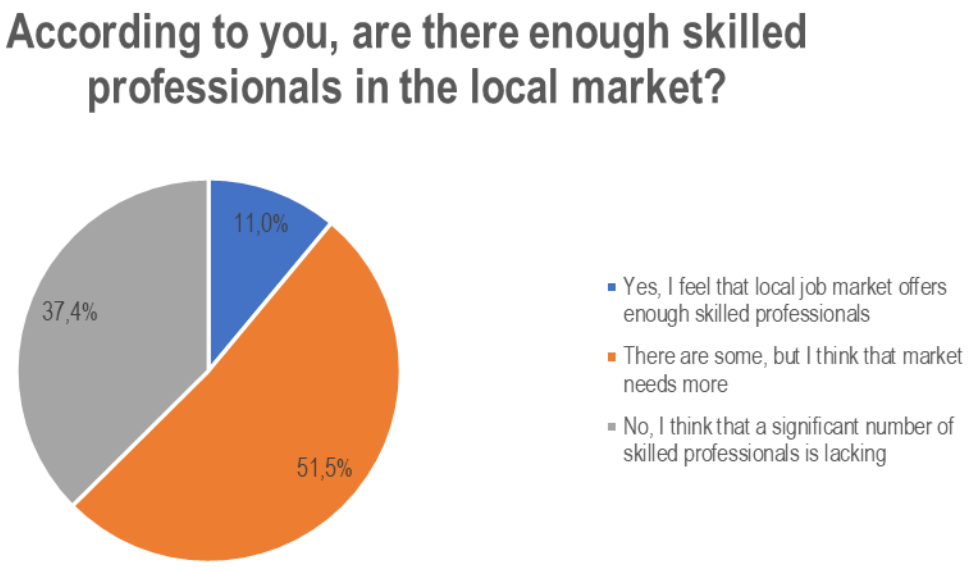

Figure 4 Number of skilled professional on the local market. Proportional representation is calculated out of 788 responses.

Question No. 7 further discuss the availability of skilled craftsmen or professional on the market. Respondents indicated the availability on a scale 0-10. (1 means very difficult and 10 means a very easy). Most of respondents marked values 0 to 5, that means finding a professional on a market is rather difficult.

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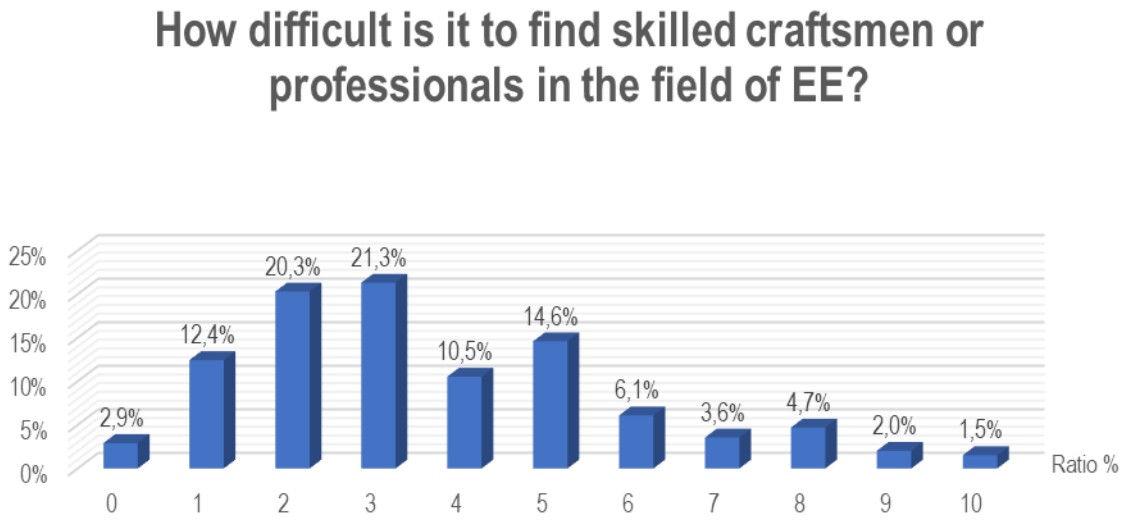

Figure 5 How difficult is to find skilled professional? Proportional representation is calculated out of 788 responses.

Since it is obvious, and survey underline this as well, that market lacks skilled professionals, we question possibilities for market. Whether they are available. Almost 11% are not aware of any trainings.

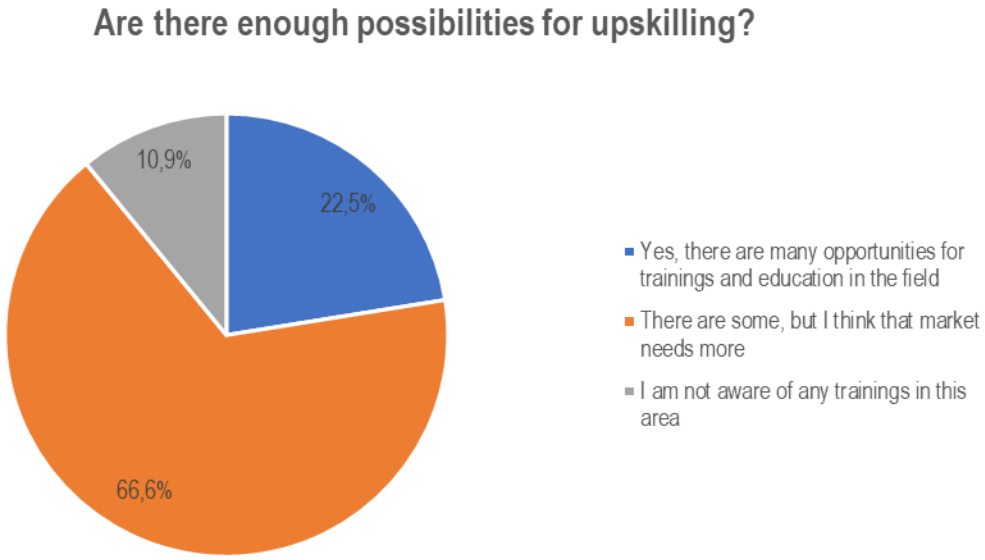

Figure 6 Possibilities for upskilling. Proportional representation is calculated out of 788 responses.

Majority (66,6%) state, there are some, but market needs more. Little less than a quarter (22,5%) believes, that there are enough opportunities for specialized trainings and education.

The question No. 9 assesses the market demand. Demand from a client is a key motivator for upskilling. In this question, respondents may indicate on a scale (1 means no demand and 10 means a very high demand). Most of respondents (73%) indicated that there is rather higher demand for energy skills at the market (see Figure 7).

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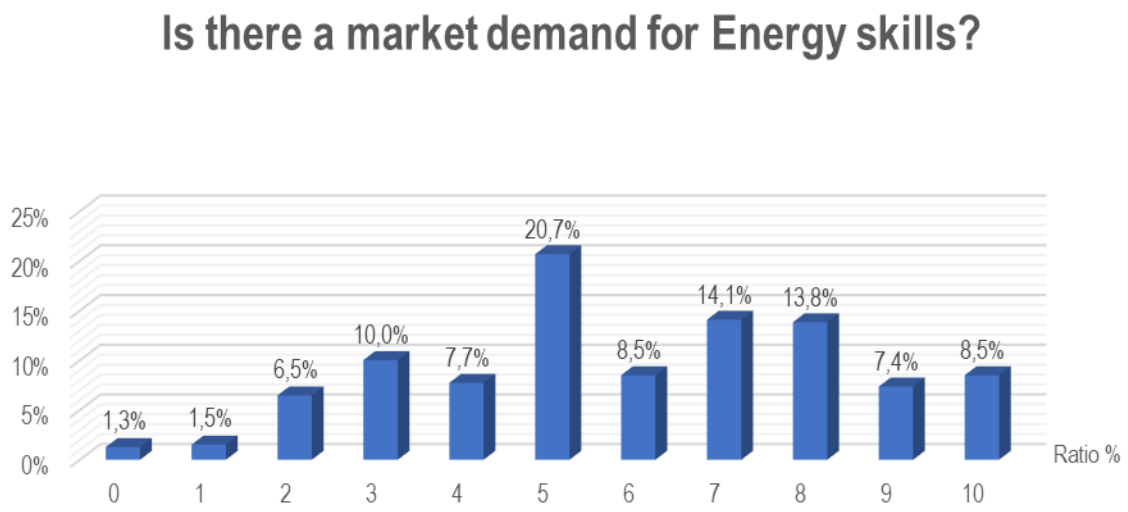

Figure 7 Demand for energy skills. Proportional representation is calculated out of 788 responses.

Even though public believes that the demand exists on the local market, the professional community feels that demand shall be even more driven. The question No. 10 assesses this aspect. Respondents should make an order 1-4 based on an impact the category has on overall demand for energy skills. Evaluations is presented on a Figure 8.

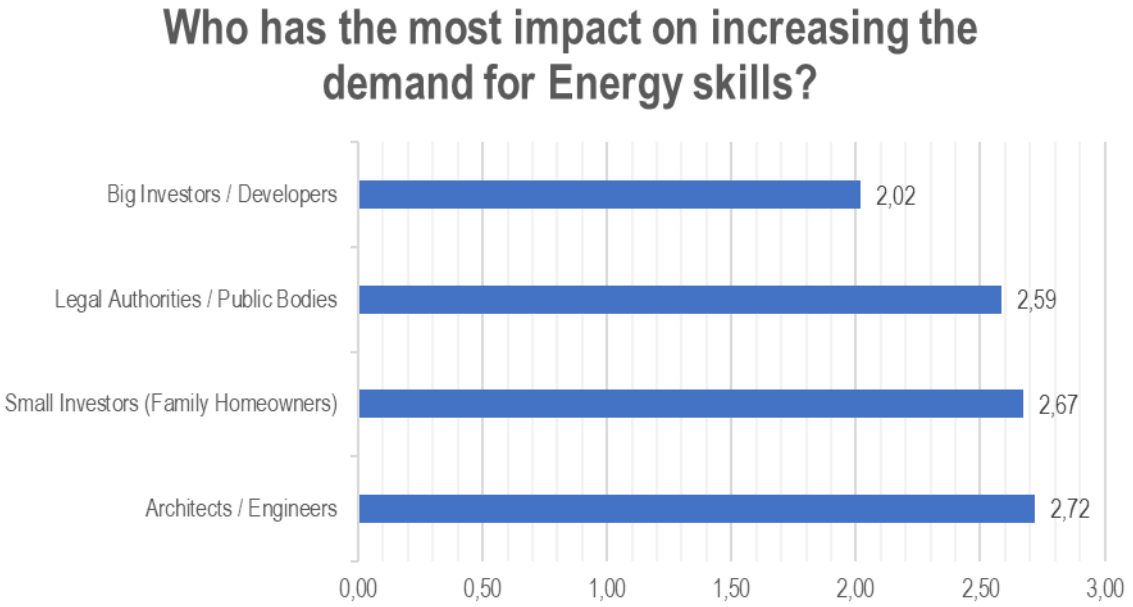

Figure 8 Impact to demand. Proportional representation is calculated out of 788 responses.

The question No. 11 aims to consider the value of energy skills if the skills are being recognized and valued by stakeholders. Vast majority (83,5%) of respondents stated that they consider energy skills valuable. However, 6,9% believes that there is no added value of energy skills. Other categories and evaluation are presented on Figure 9. In this question, respondents may select more than one choice. Multiple choice selection is allowed.

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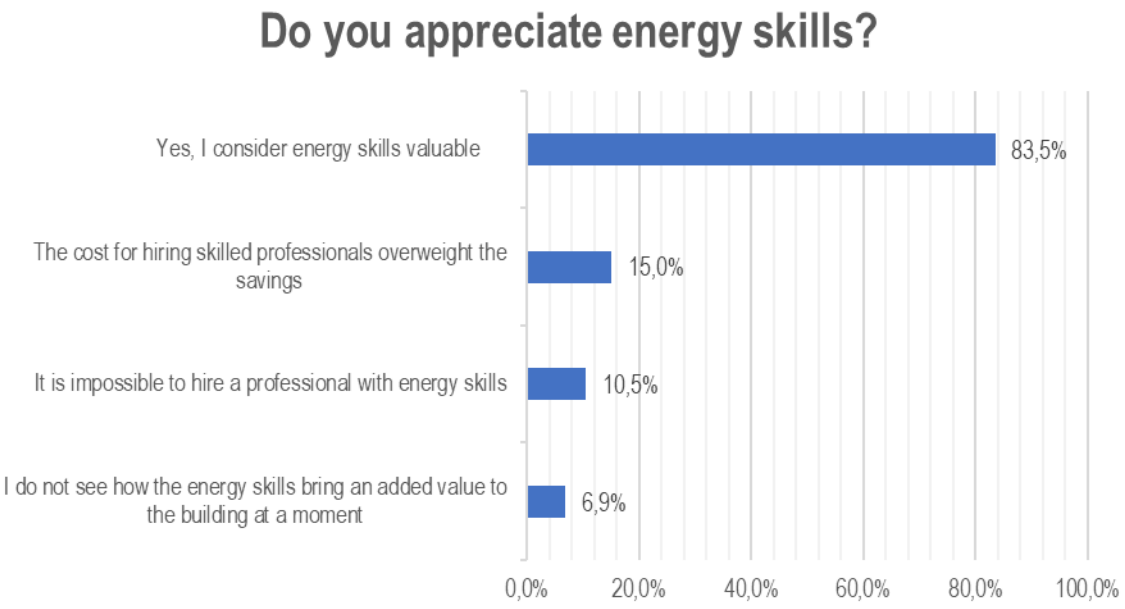

Figure 9 Appreciation of the energy skills. Proportional representation is calculated out of 788 responses.

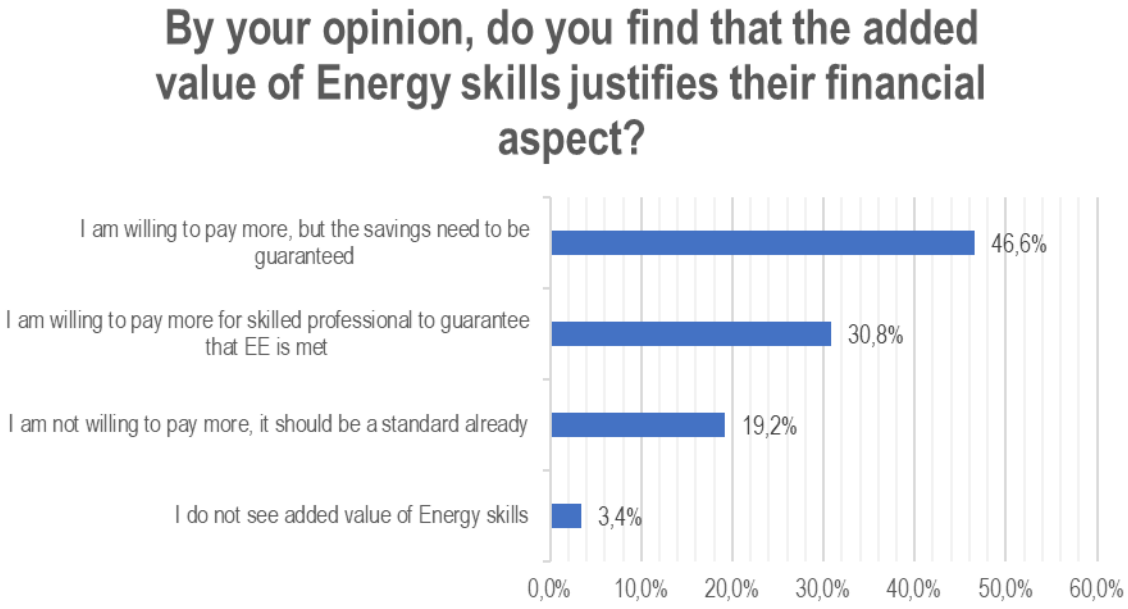

Figure 10 Added value of energy skills. Proportional representation is calculated out of 788 responses.

The value of energy skills is evaluated in the question No. 12, which is the final question of the survey. Individual stakeholders indicate the value for money in the field of energy efficiency and skills. The question offers quantification of added value of Energy skills in the contrast to the financial aspect. Almost 50% of respondents stated that they are willing to pay more, but savings need to be guaranteed. Positive is that 30,8% is aware of the value of the skills and they are willing to contribute. Little less than 20% believes that this should be standard service delivery, so no extra expenses should be included.

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4 CONCLUSION

The survey aims to the value of energy skills by expressing the benefits, both for certified professionals and for the companies that employ skilled workforce and enabling direct communication with demand side on energy skills. Showing how valuable energy skills are, will stimulate market demand of energy skills which as a result will raise the value of the skills and tackle their market demand, initiated by expressing the benefits of using energy skills in achieving sustainability of construction.

This survey was prepared in order to obtain relevant data on the current level of awareness on energy skills within wider range of countries. Reducing energy demand is closely linked and dependent on the readiness of workers who participate in individual construction activities, but also those who participate in the preparation of project documentation, including all professions. It is therefore appropriate to act on the construction market to stimulate demand for new or improved skills in renewable energy and energy efficiency in construction. Skilled professionals con contribute only when they are recognized, and their skills are visible and appreciated. Based on the survey, we can conclude that there is a demand on the market for skilled professionals, but it is difficult to find them, because there is not enough capacity on the market, and we assume that the visibility can be improved too. Building Information Modelling creates an opportunity for whole construction sector to achieve higher efficiency by adapting to the technologies of the 21st century. BIM is not only a key tool for the digitization of the construction industry, but also a cornerstone for increasing energy-efficient construction and renovation, contributing to sectors´ sustainability. It is necessary to stimulate the market to rise a demand for digital skills and appropriately associated them with the quality and added value for construction projects.

Over 95 % of respondents agree with the statement that skilled craftsman or professional can help to higher efficiency of buildings. Using BIM can speed up the process of upskilling with aim to the Architects, as they have been identified (78,2%) as those with the highest impact and they can significantly influence the future need of the building together with other professions such Engineering professions (MEP, HVAC,…), indicated as the highest impact category by 73,9%. The future work should be aiming on the increasing the quality of the education and trainings for mentioned profession

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