Update of the **Status Quo Analysis - section 7**

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Croatian Chamber of Trades and Crafts

EU exchange meeting, session 2

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Methodology and goals – Chapter 7

Big picture

- Analysis of data and key indicators of the construction sector
- EU and national data (Eurostat & National Burau for Statistics, Ministry of Economy, Entrepreneurship and Environmental Protection, Croatian Chamber of Trades and Crafts, Croatian Employment Service and the Croatian Pension Insurance)
- Anual trends regarding number of trades and companies, workers, foreing workers etc.
- Specific data & trends (average number of construction workers on construction sites, completed construction works, share of construction in GDP by year, volume of construction works etc.)
- Building permits, data on funds spent on the reconstruction of public sector buildings and infrastructure (earthquake aftermath)
- Economic trends for adequate context and clarification.

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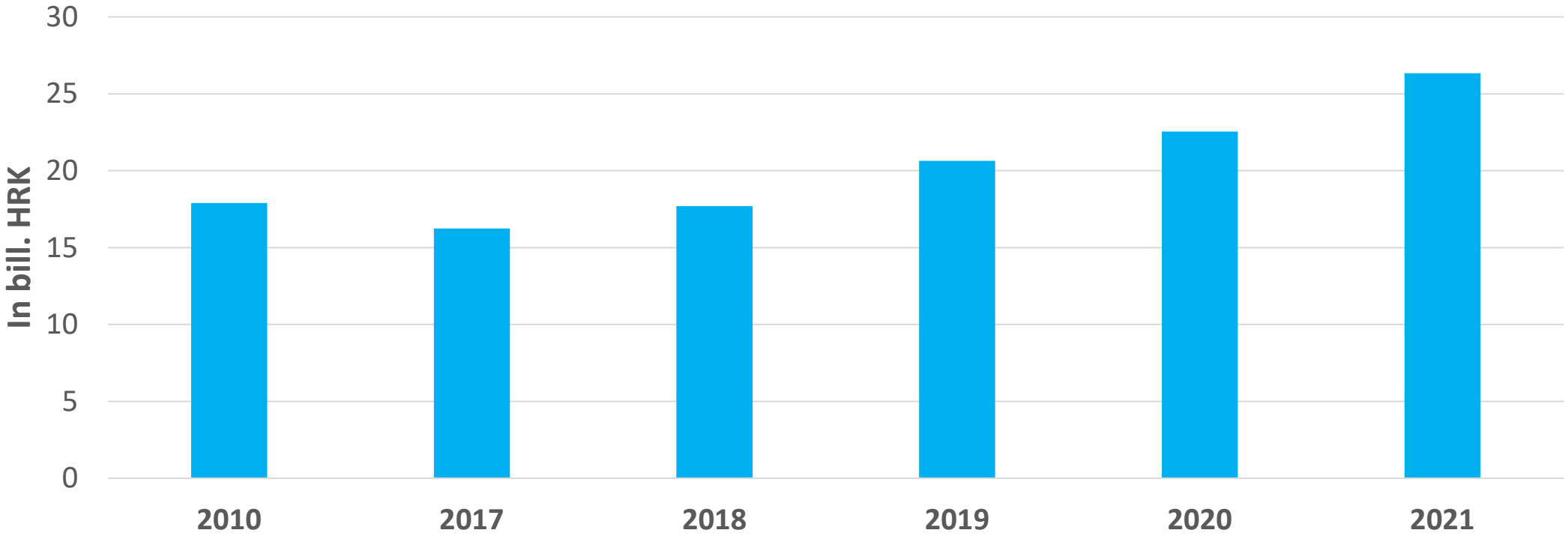
Value of completed construction works



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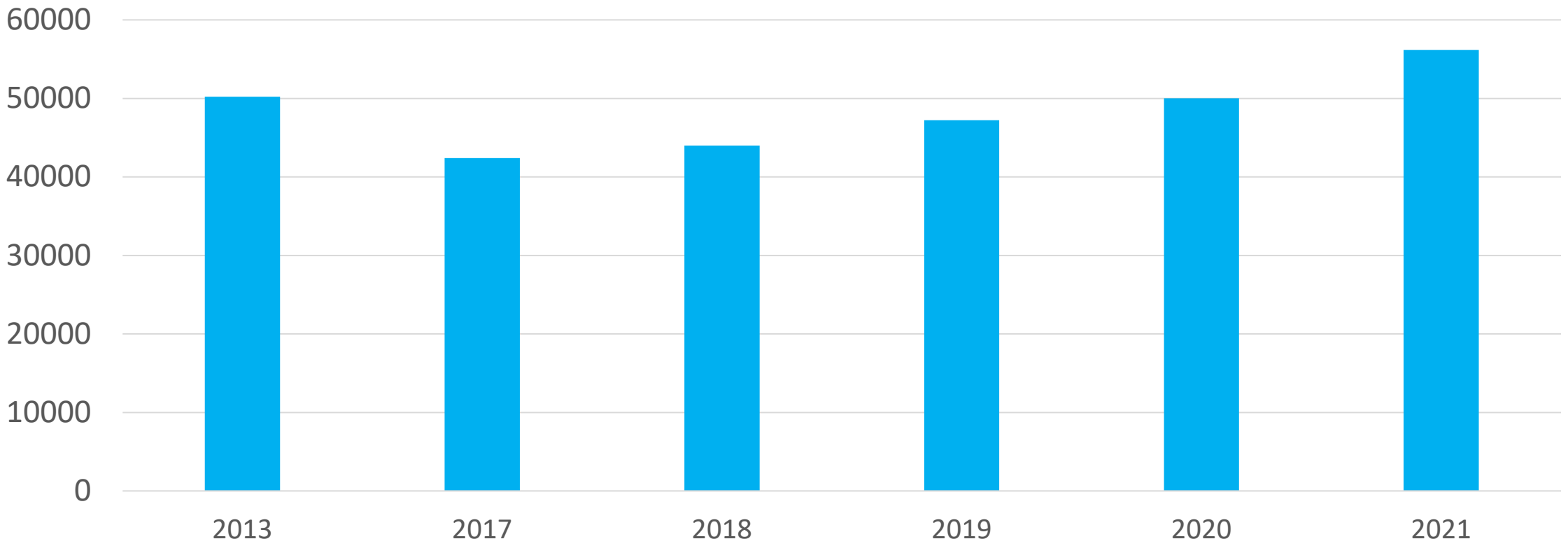
Average number of construction workers on construction sites



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Methodology and goals

Analysis of workforce development

- Trends in labor force movements & the reasons for such movements
- Employees in the construction sector, wage growth & data on the need for deficit occupations
- Added value of construction - per worker - productivity
- Emphasis placed on the analysis of foreign workforce entering labor market, particularly on construction
- Interview with agencies that intermediate between employers and workers

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Methodology and goals

Estimated number of workers required

- Estimation of the number of workers required to achieve 2030 goals
- Analysis was made based on methodology from the first Status quo
- The objective laid out in National strategy was to renovate 30.84 million m^2 of buildings by 2030.
- Complete change of external thermal insulation for an envelope area of 1000 m^2 typically requires 8 trained workers and 5 working days (to obtain the surface of the envelope, the floor area was increased by 33% with an assumed opening area of 30%).
- For an estimate of number of engineers needed for the renovation and construction of buildings, two separate calculations were made:
    - one for those involved in designing
    - one for those involved in construction

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Knowledge of workers and craftsmen

- Goal is to determine gaps and key needs for further training based on the current situation
- Questionnaires with questions cover different areas, but generally consist of two types: general and detailed
- Status Quo analysis that was carried out in 2012/2013 (exactly ten years ago) was frequently consulted
- Self-assesment of knowledge analysis
- Certain questions were repeated in order to analyze changes in the observed ten-year cycle and progress in attitudes and knowledge about energy-efficient technologies.
- Questionnaires were delivered to craftsmen directly with a link to Google Forms.

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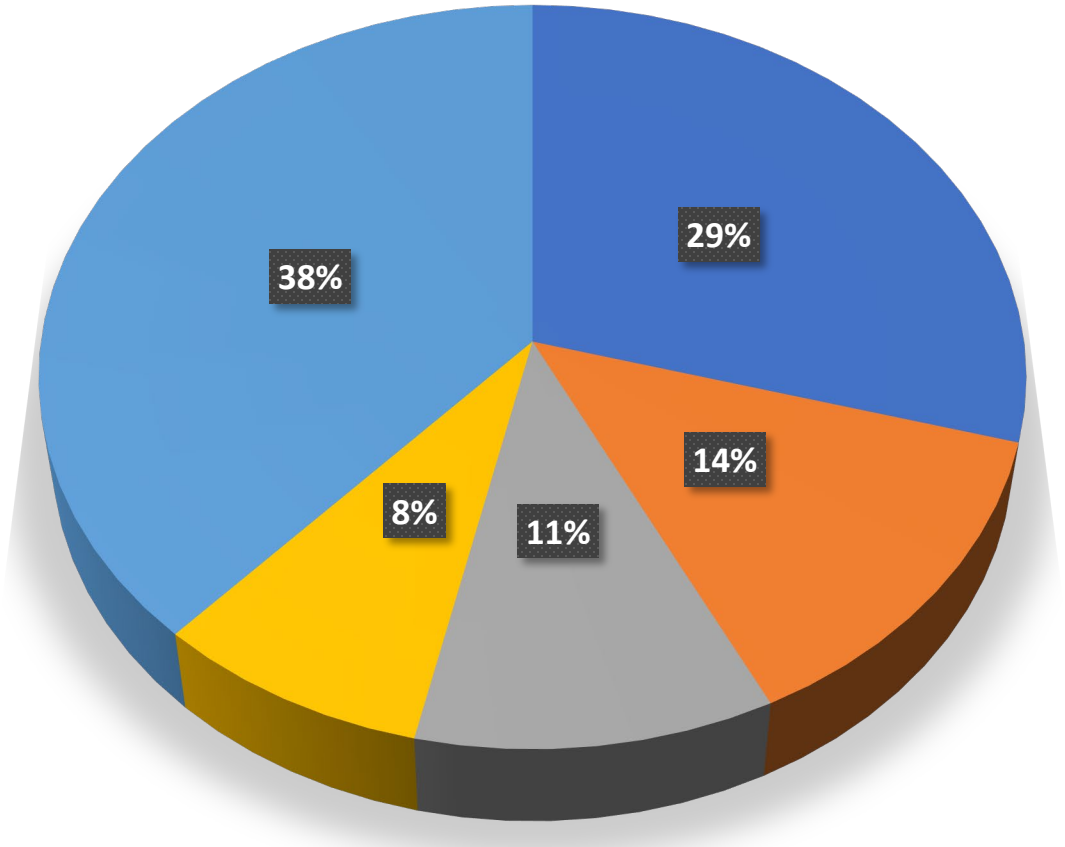
What types of work does your craft/company deal with?



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Questionaries - methodology

Data collected

1. General: types of crafts/companies (bricklayers, insulators, electricians..), number of workers employed, longevity of crafts/companies.
2. Specific – 10 year comparison: familiarity with energy-efficient technologies, level of usage of EE technologies, attitudes towards EE technologies
3. Specific for 2023 edition - EE technologies: digitalization – familiarity and attitudes, types of EE technologies used on construction sites, key features for usage of EE technologies
4. Specific for 2023 edition – workforce: lack of qualified workforce, assessment on potential reason for lack of qualified workforce, employment of foreign workers, possible solutions for lack of qualified workforce - policies

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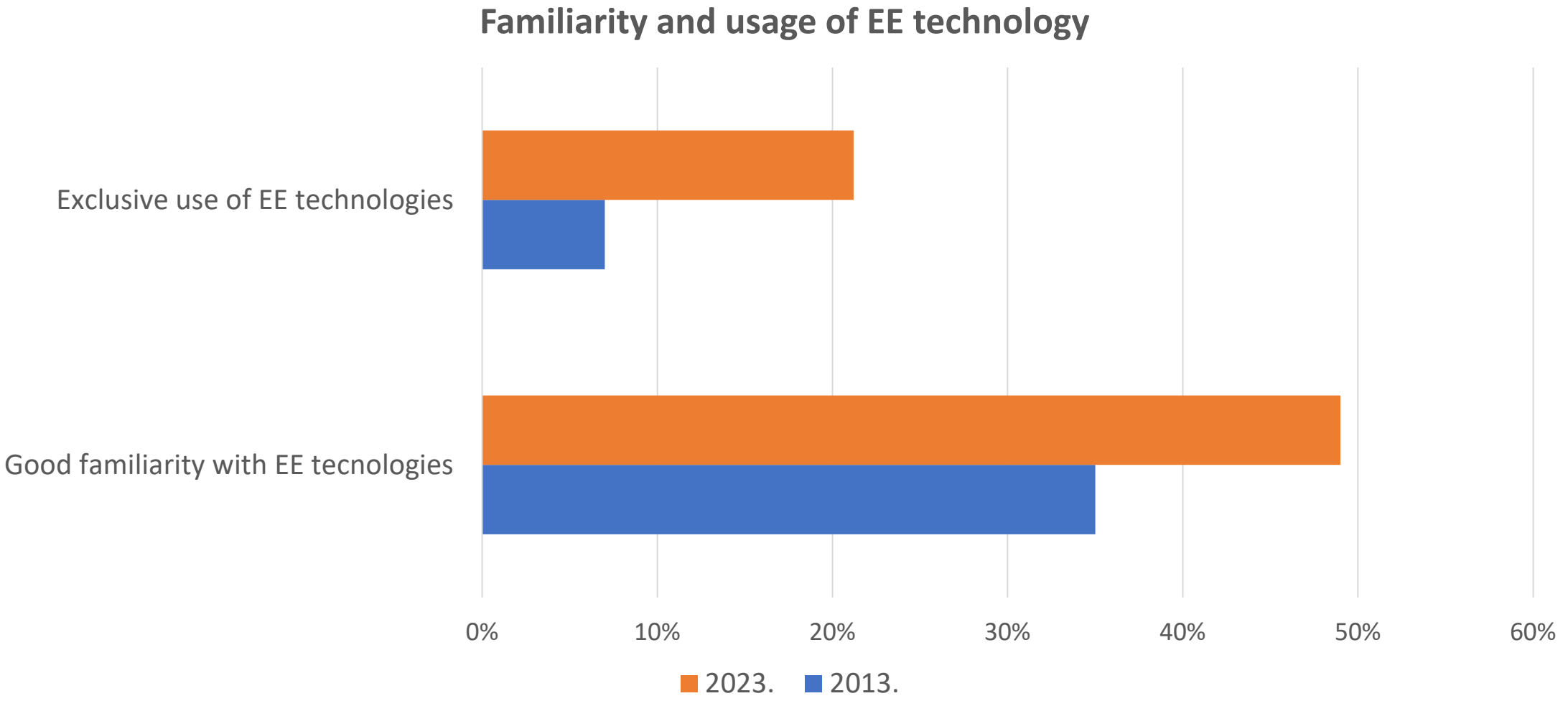

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How were the results from questionaries used?

- Questionaries provided self-assesment of EE technology knowledge
- Almost 200 unique answers
- Assessment of the number of necessary additional education and qualification needs for workers is based on the answers of respondents (works regarding envelope, roof, etc) compared with the estimated number of workers needed to achieve the energy goals by 2030.
- Analysis of information about the knowledge and skills of tradesmen and their workers: depending on the work they perform - between 40% and 60% of tradesmen believe that they do not know enough about energy-efficient technologies and would like to would know more.
- Based on the type of work they perform on construction sites and how specific questions were answered - assessment was made about the approximate workers needed to be trained in terms of energy-efficient technologies.

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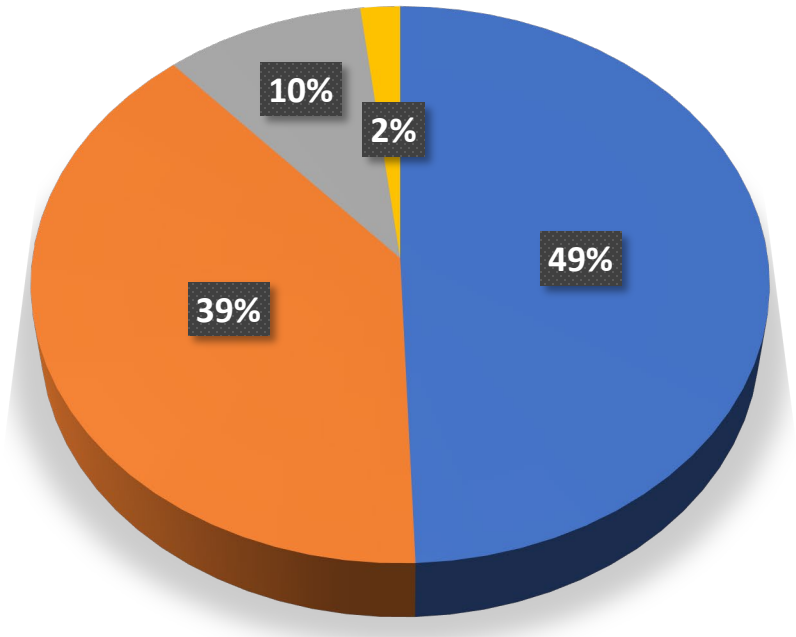
How familiar are you with energy efficient systems and technologies?



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Questionaries' based conclusions

- 28% of answers are from craftsmen and entrepreneurs that perform work on the outer envelope of the building.
- Largest percentage claim to be well acquainted with energy-efficient systems and technologies (60%), moderately familiar and would like to know more (36%) and 4% considers to have a poor knowledge and would like to know more
- 40% workers on the outer envelope need to be tranied
- Necessary additional education and qualification needs for workers on the outer envelope of the building was based od the questionaire answers compared with the estimated number of workers needed to achieve the energy goals by 2030.
- Additional education and qualifications are needed for 40% of the estimated number of workers (renovation and construction of the envelopes)
- 3,760 workers need to be further educated and trained in order to contribute their knowledge and skills to efforts to achieve energy goals by 2030

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Estimated number of workers required

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Table 50 Estimated workforce needed until 2030

	Type of works	Estimated workforce needed	European qualification framework level
VET workers (blue collar workers)	Wall insulation	9.400	Level 4. and 5.
	Roof insulation/ replacement	6.000	
	Carpentry replacement	6.600	
	Solar thermal systems for heating	150	
	Biomass boilers and furnaces for heating all types of buildings	600	
	Shallow and deep heat pumps for heating and cooling	250	
	Above-ground heat pumps for heating and cooling	430	
	Integrated photovoltaic power plants in buildings (electricity)	1100	
	VET total	**24.530**	

Table 53 Qualification needs per year

	Type of works	Estimation	Qualification needs per year	European qualification framework level
VET workers (blue collar workers)	Wall insulation	3.760	Min 500 Max 1200	Level 4. and 5.
	Roof insulation / replacement	3.420		
	Carpentry replacement	2.470		
	RES	2.530	500	

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Estimations

	Planned annual building reconstruction per year until 2030	No of workers per 1000 m²	Reconstruction duration per unit (of wall, system of 1000 m²)	Total No of workers required for annual building reconstruction	Effective days per year	Average No of renovated units yearly per team	No of workers require for reconstruction/ renovation	Total number of workers needed per year
	m²/year	-	days	-	days	-	-	
	2596888	8	5	20775	220	5	4155	~9400
	1333750	8	5	10670	220	5	2134	
	309000	8	5	2472	220	5	494	
	1200000	8	5	9600	220	5	1920	
	408750	8	5	3270	220	5	654	

Skills gaps between the current situation and the needs for 2030

Table 47 Estimated number of RES workers (level 4 and 5 according to European qualification framework)

RES technology	Installed power until 2022 MW)	Expected installed capacity in 2030 (MW)	Energy production capacity in 2022 (GWh)	Expected energy production capacity in 2030 (GWh)	Average energy production (MWh per installed MW)	Average working life of equipment (years)	Average annual employment, workforce GWh	Required number of workers for RES per year
Solar thermal systems for heating	209,15	317,01	259,35	393,09	1240	25	0,23	150
Biomass boilers and furnaces for heating all types of buildings	7242,26	7591,81	13036,07	13665,25	1500	30	0,21	600
Shallow and deep heat pumps for heating and cooling	27,96	70,08	174,45	437,29	5000	25	0,25	250

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Estimations

Table 48 Estimated required number of engineers for renovation/ construction per year (design process) (level 6 and 7 according to European qualification framework)

Type of work	Type of building	Total lay-out sur-face area	Average surface area	Average number of build-ing	Number of engineers needed per building (1 team)	Average No of renovat-ed units yearly per team	Required number of teams for re-construction / renovation / new con-struction	Required number of engineers for reconstruc-tion / reno-vation / new construction	Total number of engineers needed per year
	m²	m²/year	m²	-	-	-		-	
Renovation of residen-tial buildings	20170000	2521250	955	2640	4	8	330	1320	

ent situation and the needs for 2030

Table 49 Estimated required number of engineers for renovation/ construction per year (construction process) (level 6 and 7 according to European qualification framework)

Type of work	Type of building	Total lay-out sur-face area	Average surface area	Average number of build-ings	Number of engineers needed per building (1 team)	Average No of renovat-ed units yearly per team	Required number of teams for re-construction / renovation / new con-struction	Required number of engineers for reconstruction / renovation / new construc-tion	Total number of engineers needed per year
	m²	m²/year	m²	-	-	-		-	
Renovation of residen-tial buildings	20170000	2521250	955	2640	1	1,5	1760	1760	

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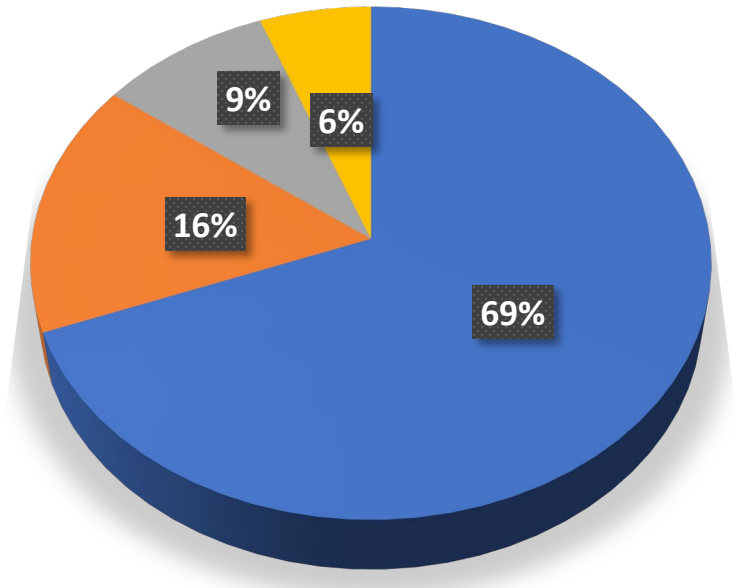
Is there a lack of qualified workers in your trade/company?



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Thank you!

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