Update of the Status Quo Analysis
- section 7

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Croatian Chamber of Trades and Crafts

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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 Bureau for Statistics, Ministry of Economy, Entrepreneurship and Environmental Protection, Croatian Chamber of Trades and Crafts, Croatian Employment Service and the Croatian Pension Insurance)
• Annual trends regarding number of trades and companies, workers, foreign 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.
Value of completed construction works

<table>
<thead>
<tr>
<th>Year</th>
<th>Value (in bill. HRK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>17</td>
</tr>
<tr>
<td>2017</td>
<td>16</td>
</tr>
<tr>
<td>2018</td>
<td>17</td>
</tr>
<tr>
<td>2019</td>
<td>20</td>
</tr>
<tr>
<td>2020</td>
<td>22</td>
</tr>
<tr>
<td>2021</td>
<td>26</td>
</tr>
</tbody>
</table>
Average number of construction workers on construction sites

- 2013
- 2017
- 2018
- 2019
- 2020
- 2021

Number of workers: 40000, 41000, 42000, 43000, 44000, 55000
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
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 m² of buildings by 2030.
- Complete change of external thermal insulation for an envelope area of 1000 m² 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
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-assessment 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.
What types of work does your craft/company deal with?

- Works on the outer envelope of the building: 38%
- Plumbing works: gas, water, heating, air conditioning: 29%
- Carpentry and/or glass works: 14%
- Electrical works: 11%
- Other works: 8%
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

Familiarity and usage of EE technology

Exclusive use of EE technologies

Good familiarity with EE technologies

How were the results from questionnaires used?

• Questionaries provided self-assessment 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.
How familiar are you with energy efficient systems and technologies?

- 49% I'm entirely familiar
- 39% I'm familiar with it but I would like to know more
- 10% I'm not very familiar, I would like to know more
- 2% Not familiar with it
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 on the questionnaire 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.
### Estimated number of workers required

#### Table 50 Estimated workforce needed until 2030

<table>
<thead>
<tr>
<th>Type of works</th>
<th>Estimated workforce needed</th>
<th>European qualification framework level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall insulation</td>
<td>9,400</td>
<td></td>
</tr>
<tr>
<td>Roof insulation/ replacement</td>
<td>6,000</td>
<td></td>
</tr>
<tr>
<td>Carpentry replacement</td>
<td>6,600</td>
<td></td>
</tr>
<tr>
<td>Solar thermal systems for heating</td>
<td>150</td>
<td>Level 4. and 5.</td>
</tr>
<tr>
<td>Biomass boilers and furnaces for heating all types of buildings</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>Shallow and deep heat pumps for heating and cooling</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Above-ground heat pumps for heating and cooling</td>
<td>430</td>
<td></td>
</tr>
<tr>
<td>Integrated photovoltaic power plants in buildings (electricity)</td>
<td>1,100</td>
<td></td>
</tr>
<tr>
<td><strong>VET total</strong></td>
<td><strong>24,530</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Table 53 Qualification needs per year

<table>
<thead>
<tr>
<th>Type of works</th>
<th>Estimation</th>
<th>Qualification needs per year</th>
<th>European qualification framework level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall insulation</td>
<td>3,760</td>
<td>Min 500 Max 1,200</td>
<td>Level 4. and 5.</td>
</tr>
<tr>
<td>Roof insulation/ replacement</td>
<td>3,420</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpentry replacement</td>
<td>2,470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RES</td>
<td>2,530</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>
## Estimations

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

<table>
<thead>
<tr>
<th>RES Technology</th>
<th>Installed power until 2022 (MW)</th>
<th>Expected installed capacity in 2030 (MW)</th>
<th>Energy production capacity in 2022 (GWh)</th>
<th>Expected energy production capacity in 2030 (GWh)</th>
<th>Average energy production (MWh per installed MW)</th>
<th>Average working life of equipment (years)</th>
<th>Average annual employment, workforce (GWh)</th>
<th>Required number of workers for RES per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar thermal systems for heating</td>
<td>209,15</td>
<td>317,01</td>
<td>269,35</td>
<td>393,09</td>
<td>1240</td>
<td>25</td>
<td>0,23</td>
<td>150</td>
</tr>
<tr>
<td>Biomass boilers and furnaces for heating all types of buildings</td>
<td>7212,26</td>
<td>7591,81</td>
<td>13036,07</td>
<td>13685,25</td>
<td>1500</td>
<td>30</td>
<td>0,21</td>
<td>600</td>
</tr>
<tr>
<td>Shallow and deep heat pumps for heating and cooling</td>
<td>27,86</td>
<td>70,08</td>
<td>174,46</td>
<td>437,29</td>
<td>5000</td>
<td>25</td>
<td>0,25</td>
<td>250</td>
</tr>
</tbody>
</table>

Skills gap between the current situation and the needs for 2030.
## Estimations

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

<table>
<thead>
<tr>
<th>Type of work</th>
<th>Type of building</th>
<th>Total layout surface area</th>
<th>Average surface area</th>
<th>Number of engineers needed per building (1 team)</th>
<th>Average No of renovated units yearly per team</th>
<th>Required number of teams for reconstruction / renovation / new construction</th>
<th>Required number of engineers for recreation / renovation / new construction</th>
<th>Total number of engineers needed per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renovation of residential buildings</td>
<td></td>
<td>20170000</td>
<td>2521250</td>
<td>955</td>
<td>2640</td>
<td>4</td>
<td>8</td>
<td>330</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Type of work</th>
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<th>Total layout surface area</th>
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<th>Total number of engineers needed per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renovation of residential buildings</td>
<td></td>
<td>20170000</td>
<td>2521250</td>
<td>955</td>
<td>2640</td>
<td>1</td>
<td>1,5</td>
<td>1760</td>
</tr>
</tbody>
</table>
Is there a lack of qualified workers in your trade/company?

- Yes, absolutely missing: 69%
- Partially: 16%
- I'm satisfied with the number of qualified workers in company: 9%
- No, all my workers are qualified: 6%
Thank you!

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