ECOLOGICA, Vol. 32, No 117 (2025), 75-80
https://doi.org/10.18485/ecologica.2025.32.117.9
Originalni naučni rad
UDC: 621.7.019.73
551.583

Recognizability importance of decarbonization of the construction sector through the aspect of climate change

Prepoznatljivost značaja dekarbonizacije građevinskog sektora kroz aspekt klimatskih promena

Ivana Šekler[1], Mirjana Bartula[2], Tanja Cupać[3], Vladimir Janković[4]*

[1,2,3]University Metropolitan, Faculty of Applied Ecology Futura, Belgrade, Serbia /
Univerzitet Metropolitan, Fakultet za primenjenu ekologiju Futura, Beograd, Srbija

[4]NGO UNEKOOP, Serbia / NVO UNEKOOP, Srbija

* Corresponding author / Autor za prepisku

Received / Rad primljen: 25.02.2025, Accepted / Rad prihvaćen: 14.03.2025.

Abstract: Due to the increase in the global population, and thus the rapid increase in urbanization, the needs for living space and all resources are constantly growing. The construction of new buildings should primarily provide a safe and healthy space, but also meet the criteria of sustainable development through the reduction of negative impacts on the environment and climate change that the construction sector is experiencing. It is estimated that more than a third of carbon dioxide emissions come from the construction sector, either as emissions from the process of material production and construction of buildings, or as gas emissions that occur during the operational work of the building (heat and electricity). By reducing those emissions, it would contribute to mitigating the impact on climate change, as well as the entire environment. In addition, the obligations of all signatory countries of the Green European Agreement, as well as the Green Agenda for the Western Balkans, among which Serbia is, are to significantly reduce their greenhouse gas emissions in all sectors that contribute to this. According to the Directives of the European Union, the facilities will have to meet certain criteria, all with a deadline of 2030. This paper deals with the analysis of attitudes and recognition of the importance of decarbonization of the construction sector of the population of Serbia, giving opinions on who is most responsible for its implementation.

Keywords: decarbonization, construction objects, climate change, environmental protection.

Sažetak: Povećanjem globalne populacije, a time i rapidnim porastom urbanizacije, potrebe za životnim prostorom ali i svim resursima konstantno rastu. Izgradnja novih objekata treba da obezbedi prvenstveno bezbedan i zdrav prostor, ali i da zadovolji kriterijume održivog razvoja kroz smanjenje negativnih uticaja na životnu sredinu i klimatske promene koji građevinski sektor beleži. Procenjeno je da više od trećine emisija ugljen-dioksida upravo dolazi iz građevinskog sektora, bilo kao emisije iz procesa proizvodnje materijala i izgradnje objekata, ili kao emisije gasova koje nastaju prilikom operativnog rada objekta (toplotna i električna energija). Redukovanjem tih emisija, doprinelo bi se ublažavanju uticaja na klimatske promene, ali i celokupnu životnu sredinu. Osim toga, obaveze svih zemalja potpisnica Zelenog evropskog dogovora, kao i Zelene agende za Zapadni Balkan, među kojima je i Srbija, jesu da značajno redukuju svoje emisije gasova sa efektom staklene bašte u svim sektorima koji tome doprinose. Objekti će, prema Direktivama Evropske unije, morati da ispunjavaju određene kriterijume, a sve sa rokom od 2030. godine. Ovaj rad se bavi analizom stavova i prepoznavanja značaja dekarbonizacije građevinskog sektora stanovništva Srbije, dajući mišljenja o tome ko je najodgovorniji za njeno sprovođenje.

Ključne reči: dekarbonizacija, građevinski objekti, klimatske promene, zaštita životne sredine.

[1]*orcid.org/0000-0003-2701-6355, e-mail: ivana.sekler@futura.edu.rs*
[2]*orcid.org/0000-0003-0100-5260, e-mail: mirjana.bartula@futura.edu.rs*
[3]*e-mai: tanja.cupac@futura.edu.rs*
[4]*e-mail:v.jankovic.p@gmail.com*

INTRODUCTION

The European Union has established a clear legally binding framework for achieving the goals of the Paris Agreement from 2015, and ambitious goals for 2030 have been established in terms of renewable energy sources, energy efficiency and the reduction of greenhouse gas emissions. The European Green Deal (EU Green Deal), through the *Fit to 55%* strategic goal, is part of the EU sustainable development strategy for the 21st century (Agenda 2030) and primarily deals with environmental and climate change issues - how to develop the EU economy without accelerating climate change. The European Commission defines this strategy as a new growth strategy with the aim of transforming the EU into a fair and wealthy society, with a modern and competitive economy that uses resources efficiently, with net zero greenhouse gas emissions by 2050, and economic growth that is separated from resource exploitation.

Decarbonization in the construction sector implies the reduction or complete elimination of greenhouse gas emissions that occur in the process of material production, transportation, construction of buildings, but also during the lifetime of the building. This refers to carbon dioxide emissions as the most dominant. The building sector emits 37% of all greenhouse gas emissions, of which two-thirds are generated by the use of energy for heating, cooling and lighting of buildings (operational emissions), and the remaining one-third is generated during the life cycle of buildings, from the extraction and production of materials, construction and all to demolition (built-in emissions), activities that will contribute to increasing the energy efficiency of buildings are very important, which is also an important goal of the United Nations (Mijatović et al., 2023).

According to the Green European Agreement, all new public buildings from 2028 and all new other buildings from 2030 must have zero emissions, while all existing residential buildings must reach the "D" level of energy efficiency by 2033. Greenhouse gas emissions will need to be more accurately predicted and assessed using Life Cycle Analysis (LCA) of any future building (Stojkov Pavlović, 2023). Manufacturers will be required to indicate how much the "carbon footprint" of each construction product is more favorable than a conventional product. The question arises as to how much the public is aware of these obligations and goals and whether there are capacities for implementation.

The problem of climate change also requires an accelerated change and harmonization of regulations related to the production and use of construction materials, because everyday innovations in this area many times exceed the existing legal solutions and represent an obstacle to the development of innovative solutions.

Green building is in great expansion, therefore there is a need for innovative building materials whose production and application require minimal CO_2 emissions. Numerous health problems (allergies, asthma) have caused an increasing interest in the use of natural building materials for the construction of residential and recreational facilities (ecotourism).

In the Republic of Serbia, several decades-old legislation regarding the construction and production of construction materials is still in force, and the topic of low-carbon materials has only recently become relevant in Europe and the world, while it is very little mentioned in Serbia. The most important legal act that regulates this area is the Law on construction materials ("Official Gazette of RS", No. 83/2018).

1. MATERIALS AND METHODS

During the preparation of the paper, available literature was collected and analyzed in the field of regulations of the European Union and the Republic of Serbia, especially in the field of the environment, climate change and the construction sector.

An analysis of the questionnaire carried out by the authors of the work through the project activities of the network of civil society organizations "Blue-green Network Futura" was also carried out as part of the ECO-SYSTEM program implemented by the Young Researchers of Serbia and under the auspices of Sweden at the end of 2023. The online questionnaire included a survey of the views of the civil sector, representatives of public institutions, the educational sector and young people about awareness, knowledge and the importance of decarbonisation of the construction sector in Serbia. The results of the analysis will be presented in the next chapter of this paper.

2. RESULTS AND DISCUSSION

The Republic of Serbia adopted the Declaration from Sofia on the Green Agenda for the Western Balkans in October 2020 and undertook to implement its actions through the Regional Action Plan. On the international level, Serbia has signed and ratified all important international environmental agreements, including the 2030 Agenda for Sustainable Development, the UN Framework Convention on Climate Change, and the Paris Agreement. In March 2021, the Government of the Republic of Serbia adopted the Law on Climate Change, which establishes the main policies and principles

related to climate change, with the aim of establishing a system that leads to the reduction of greenhouse gas emissions, based on which the Government of the Republic of Serbia is adopted the Low Carbon Development Strategy for the period 2023-2030. with projections until 2050. The Law on Climate Change influenced the adoption of the first Program of Adaptation to Changed Climate Conditions for the period from 2023 to 2030 with an Action Plan for its implementation. With the revised Nationally Determined Contribution (NDC), adopted by the Government in August 2022, Serbia increased its climate ambitions three times and thereby contributed to the achievement of the global goal of reducing greenhouse gas emissions (33.3% compared to the level of emissions in 1990, in all relevant sectors). In April 2021, Serbia adopted a package of important energy laws, including new laws on renewable energy sources and energy efficiency. At the beginning of 2024, Serbia adopted the Integrated National Energy and Climate Plan (INECP).

The results of a survey in which 44 respondents participated speak about the state of awareness and attitudes of citizens of Serbia in the area of the importance of decarbonization of the construction sector.

The largest number of those who agreed to answer the requested questions are representatives of the civil sector (29.5%), the education sector (27.3%) and in third place students (25%) (Figure 1). And if the questionnaire was intended for the general public, we assume that ignorance of the topic was the most important reason for refusing to participate in it, as indicated by the answer of 63.6% of survey participants who answered affirmatively to the question about whether they were familiar with the concept of decarbonization in the context construction sector.

When self-assessing their own knowledge and understanding of the importance of decarbonization of the construction sector, on a scale from 1 to 5, where grade 1 represented the lowest grade and knowledge, and grade 5 the highest, the largest number of responses (34.1%) were graded 3, while the grade 5 given to themselves by 27.3% of respondents (Figure 1).

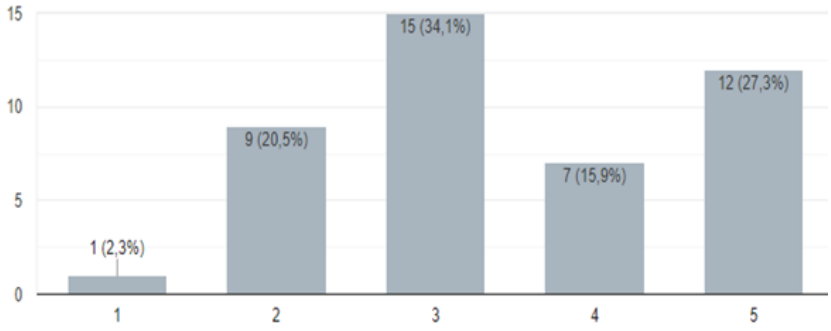

Figure 1. Self-assessment of knowledge and understanding of the concept of decarbonization (grade 1 is the lowest and grade 5 is the highest)

Based on the answers offered about what contributes to the decarbonization of the construction sector, the largest number of answers included all the above answers (use of recycled materials, renewable energy sources, energy efficiency, etc.), while several respondents wrote answers such as, for example: Fiscal decentralization, return to the countryside, return to traditional values of life (Figure 2).

Figure 2. Answers to the question about what contributes to the decarbonization of the construction sector

That the visible activities of state institutions in the field of decarbonization of the construction sector are not known to the majority of the population or they think that they do not exist at all, answered 75% of respondents, of which 43.2% of respondents gave a rating of 2 and 31.8% a rating of 1 (Figure 3).

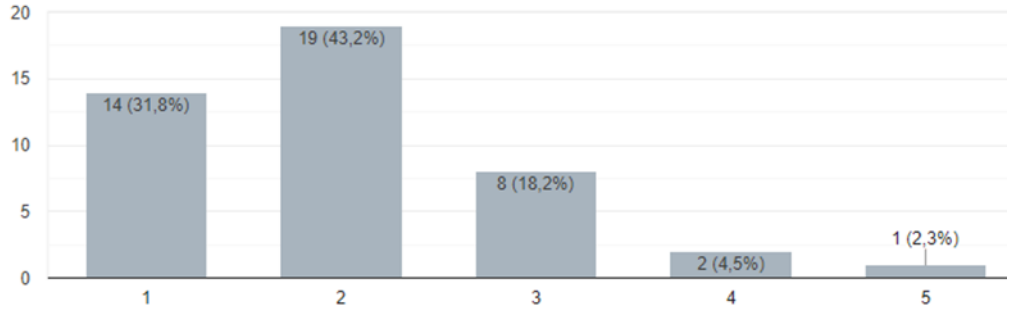

Figure 3. Evaluation of the involvement of state institutions in the matter of building decanonization (grade 1 is the lowest and grade 5 is the highest)

The efficiency of the Government of Serbia in solving the needs of decarbonization was not rated any better, so an equal number of responses were for ratings 1 and 2 (34.1%), rating 3 was given by 27.3% of respondents, while 4.5% gave a rating of 5 as an excellent rating in the engagement regarding the decarbonization of the building (Figure 4).

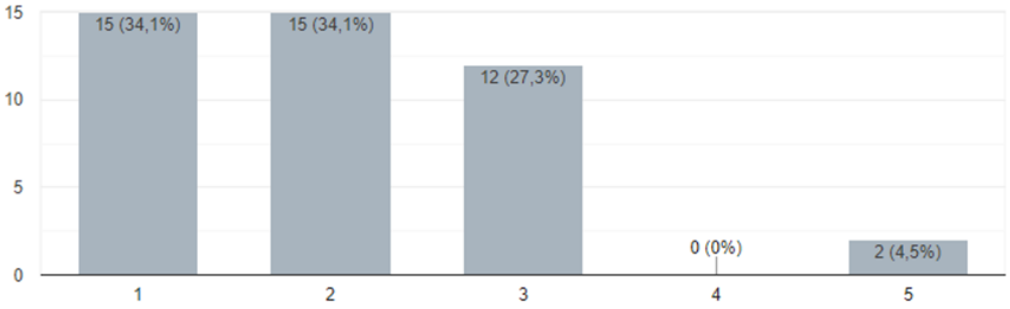

Figure 4. Evaluation of the efficiency of the Government of Serbia regarding the decarbonization of the construction sector (grade 1 is the lowest and grade 5 is the highest)

When asked whether the respondents are familiar with any concrete policies of the Government of the Republic of Serbia or initiatives related to sustainable and low-carbon practices in the construction industry in Serbia, more than half of the respondents (28) answered in the affirmative, citing as answers:

- Energy rehabilitation of family houses (replacement of joinery, boilers, thermal insulation, subsidies for solar energy...);
- Law on rational use of energy;
- Public calls for improving energy efficiency;
- Energy passports for new buildings;
- Agreements between foreign companies and the Ministry of Mining and Energy in the field of renewable energy sources;
- Low-carbon development strategy.

Comparing the answers to the previous two questions, where initially the respondents declare that the Government is not working efficiently enough on the issue of decarbonization of the construction sector, and on the other hand, most of them know certain activities of the Government in this matter, it gives indications that something, although very slow and unknown enough to the public, works in that field in the Republic of Serbia. This is also indicated by the answers to the question whether public awareness and participation should be increased in promoting decarbonization practices in the construction sector, where the largest number of respondents answered that it is "very necessary" to increase public awareness and participation in the field of decarbonization, giving a score of 5 (Figure 5).

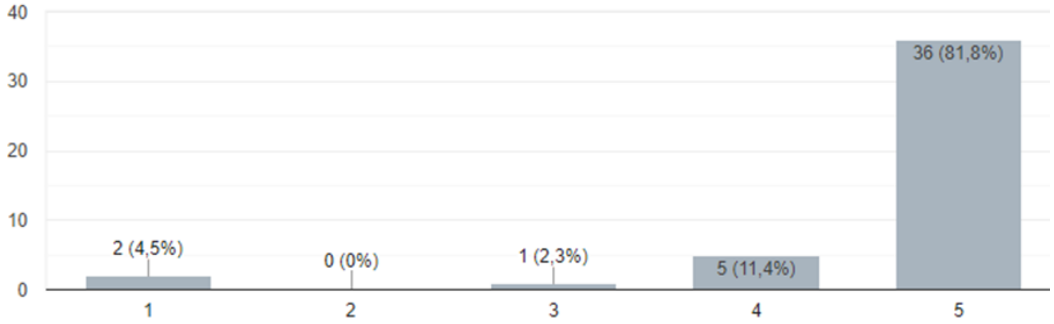

Figure 5. Assessing the need for public participation in promoting decarbonization (grade 1 is the lowest and grade 5 is the highest)

When asked whether the Government should provide incentives to individuals or companies that adopt decarbonization practices in the construction sector, 95.5% answered "YES", while 6.8% of respondents did not have a sure answer to that question. In the next question, the respondents were asked to determine from the offered answers what are the biggest challenges that the public sector can face in promoting and implementing decarbonization practices in the construction industry, with the possibility of adding another answer if not offered. The largest number of responses (51.2%) believe that the public does not recognize the importance, while 30.2% believe that the biggest challenge is that the business sector is obstructing. A smaller number of comments considered some other challenges more significant (Figure 6).

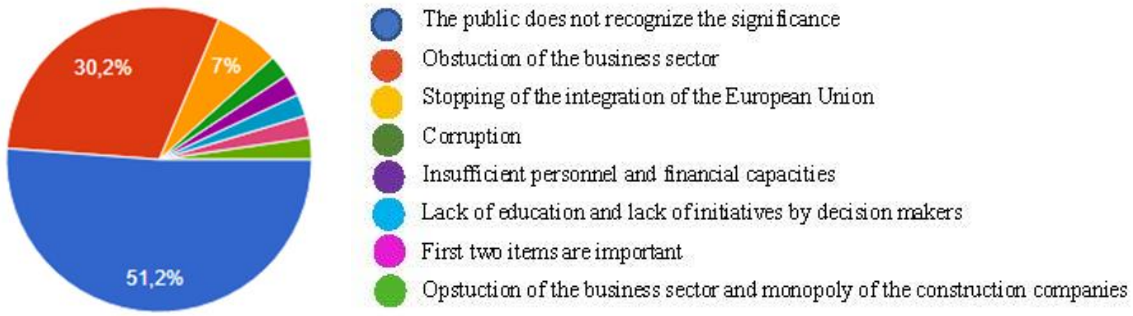

Figure 6. Challenges that the public sector may face in promoting and implementing decarbonization practices (grade 1 is the lowest and grade 5 is the highest)

Respondents did not show significant optimism regarding the future of low-carbon construction in Serbia, evaluating it as moderately optimistic (52.2%), while 29.5% of respondents answered that they were quite pessimistic about this issue (Figure 7).

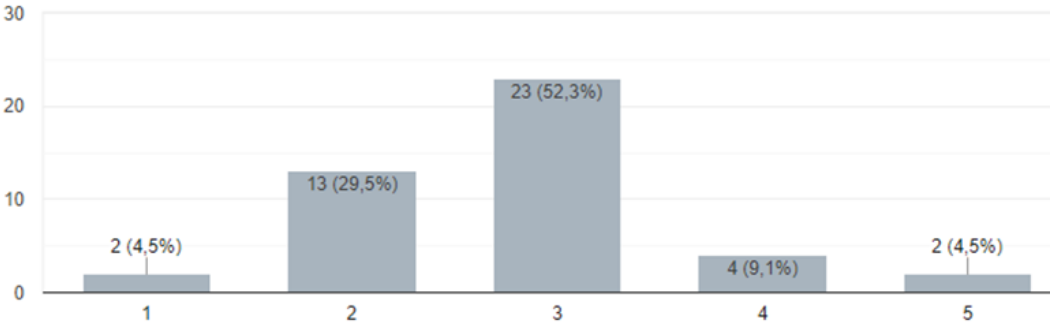

Figure 7. Optimism regarding the future of decarbonization of buildings in Serbia (grade 1 is the lowest and grade 5 is the highest)

At the end, the respondents were supposed to give a proposal of concrete measures or actions that they think the Government should take in order to speed up the adoption of decarbonization practices in the construction sector, where the answers were:

- Introduction of a mandatory minimum percentage of use of bioconcrete, bio-building material in the construction of new or renovation of existing buildings.
- Education, promotion, marketing, development of plans in accordance with this area and public discussion at the level of the public sector or LGU.
- Adoption and application of procedures in new construction, adaptation and rehabilitation of energy inefficient buildings.
- Raising awareness and stimulating the private sector through subsidies.
- Adoption of standards that have the force of law. Implementation of a penal policy for companies that comply with the legislation.
- Changes in public policies through public dialogue with the scientific, economic, civil and media sectors.
- Information, education, action.
- Simpler procedures, incentive measures, greater application of the ESCO model.
- Defining incentive measures in that area.
- Pressure from the Ministry of Construction and Energy on the business sector. Subsidies.
- No preferential and no exceptions policy.
- Fight against corruption.
- Insisting on the implementation of current measures and solutions in capital projects financed by the Government - with an accompanying information campaign about them!
- To get closer to European integration, to work on raising the awareness of enterprises and companies engaged in construction.
- Subsidies as a positive link, fees for investors who do not respect the principles of decarbonization as a negative link.

CONCLUSION

Based on the survey conducted and the answers we received, we believe that there is a certain awareness of decarbonization, that the respondents are informed about the basic activities and improvement opportunities in the field of decarbonization of the construction sector, but that work must be done on the implementation of concrete measures by the state, decision makers and individuals , as well as promoting the concept to the general public.

The obligations that Serbia assumed by signing the Green Agenda for the Western Balkans and the Paris Agreement impose responsibility in the implementation of the same in a very short time frame. And if Serbia has made great progress by adopting a number of legal and by-laws, the speed of implementation of action plans must be at a higher level in order to achieve not only the goals of the European Union in the carbon neutrality of the continent, but also its own tendency to preserve natural resources, protect, preserve and improve the environment and all individual media (water, air and soil) which will contribute to the benefits of all residents.

REFERENCES

[1] Behrens, A. (2021). Scaling-Up Green Finance for the Private Sector in Serbia in the Post-Pandemic World, UNDP. Available at: https://www.undp.org/sites/g/files/zskgke326/files/migration/rs/Scaling-Up-Green-Finance-for-the-Private-Sector-in-Serbia-in-the-Post-Pandemic-World.pdf. Acessed: Avgust 20th 2024

[2] European Commission (2019). European Green Deal, Brisel 2019. Available at: https://www.pregovarackagrupa27.gov.rs/wp-content/uploads/2021/06/Evropski-zeleni-dogovor-finalni-SRP.pdf. Accessed: August 21st, 2024.

[3] Mijatović, M., Gajinov, T., Uzelac, O. (2023). Planirana dotrajalost kao korporativna strategija proizvođača: pojmovno određenje, posledice primene i pravna regulacija. E*cologica*, 30(110), 173-179, doi:10.18485/ecologica.2023.30.110.1.

[4] Stojkov Pavlović A. (2023). Perspektive razvoja pametnih gradova u Srbiji. *Ecologica*, 30(110), 269-277, doi: 10.18485/ecologica.2023.30.110.14.

[5] United Nations Environment Programme and Yale Center for Ecosystems + Architecture: Building Materials and the Climate: Constructing a New Future. Available at: https://wedocs.unep.org/20.500.11822/43293. Accessed: August 20th, 2024.