

Integrating the People Dimension in the Climate Agenda (P180443)

Education and Skills within the Green Transition in Serbia



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Abbreviations

ALMPs	Active labor market policies
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EC	European Commission
ECEC	Early Childhood Education and Care
ESCO	European classification of skills, competences and occupations
ETF	European Training Foundation
EU	European Union
EUA	European University Association
EUR	Euro
GEF	Global Environmental Fund
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HCI	Human Capital Index
IPA	Instrument for Pre-accession Assistance
KfW	Kreditanstalt für Wiederaufbau
LITS IV	Life in Transition Survey (the fourth round)
MEP	Ministry of Environmental Protection of the Republic of Serbia
MSMEs	Micro, small and medium-sized enterprises
NGOs	Non-governmental organizations
OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment
R&D	Research and Development
RCC	Regional Cooperation Council
SMEs	Small and medium-sized enterprises
SSC	Stromspar Check
STEM	Science, technology, engineering, and mathematics
TVET	Technical and Vocational Education and Training
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USD	United States dollar
UNEP	United Nations Environment Programme
VET	Vocational Education and Training

Executive Summary

This study analyzes the education and skills systems in Serbia in the context of the green transition and provides recommendations for future development. Education is a crucial component of climate change adaptation and mitigation, specifically with a focus on foundational, cognitive, socio-emotional, and technical skills development. Education can play an important role in reducing the negative impacts of extreme climate events in direct and indirect ways. Directly, formal education is considered a primary way individuals acquire knowledge, skills, and competencies that can influence their climate risk perception and adaptive capacity. Education may also indirectly reduce climate-related vulnerability through other means, including better socioeconomic status, access to information, and social capital.

Human capital policies and programs can help protect people from the impacts of climate change and empower them to build and use their human capital for climate action. Green transition requires a comprehensive reform of education and training systems, leading to strong initial skills endowments and commitment to lifelong learning. The demand for workers with green skills is expected to significantly surpass supply in the next five years. It is estimated that as much as a 66% increase in green roles will be needed to progress the green and energy transitions by 2030. Without urgent action to boost skills, the green transition could deepen inequalities and threaten progress towards 2050 net-zero goals. The green transition exacerbates skills imbalances; thus, adequate reskilling and upskilling measures are required to foster climate change adaptation and mitigation, especially in vulnerable communities.

The national policy response to climate change in Serbia needs to be aligned with the international policy framework, as well as with the green transition challenges and opportunities. The following sections of the analysis summarize Serbia's commitments and achievements related to the international climate change policies and the European Union (EU) accession process. In both cases, there is progress, but there are also challenges to be addressed in the future. In particular, the issues of education and skills should be more closely aligned with the response to climate change. There is a need to update the strategic and legislative frameworks to support the green transition, also through research, innovations, and education development, as well as to develop a more systematic intersectoral and interministerial collaboration, leading to a more strategic focus on green skills and green jobs. Neither a strategic focus nor concrete plans in relation to the promotion of green jobs have been developed in Serbia. The actual functioning of the labor market in Serbia barely reflects the need for climate action and green transition.

The human capital in Serbia will be critical for the green transition, but its development faces significant challenges. Current numbers for the Human Capital Index 2020 (HCI) show that almost a third of the human potential in the country is not utilized¹. The recently released results for Serbia of the OECD's Programme for International Student Assessment (PISA) 2022 assessment² showed a stagnant performance with below-average learning outcomes. Moreover, inequalities in human capital outcomes persist in Serbia, too. Education and science play an important role in adaptation to climate change, but more attention is required at the country level, as the education systems place insufficient emphasis on environmental sustainability issues. These deficits in foundational skills and environmental awareness hinder the development of green skills throughout one's education and working life, making it more challenging to address skills imbalances later on. To address these gaps, Serbia has set up its National Qualifications Framework, labor market monitoring and skills intelligence

¹ Gatti, Roberta V.; Corral Rodas, Paul Andres; Dehnen, Nicola Anna Pascale; Dsouza, Ritika; Mejalenko, Juan Elias; Pennings, Steven Michael. The Human Capital Index 2020 Update : Human Capital in the Time of COVID-19 (English). Washington, D.C. : World Bank Group. <http://documents.worldbank.org/curated/en/456901600111156873/The-Human-Capital-Index-2020-Update-Human-Capital-in-the-Time-of-COVID-19>

² OECD.2023a. PISA 2022 Results: Factsheets – Serbia, OECD, <https://www.oecd.org/publication/pisa-2022-results/country-notes/serbia-961b99f9>

mechanisms, but they need to be better aligned with the green transition and more strongly supported by the active labor market policies (ALMPs).

There are numerous curricula and government programs on climate change and green transition, which contribute to climate change mitigation and the development of green skills and attitudes; however, key challenges remain significant. These initiatives include both top-down and bottom-up approaches, which adapt international good practices and/or provide customized local responses to the issue of climate change and environmental sustainability. Such initiatives are analyzed in the following sections of the document with subsections on (i) primary and secondary schools, in which foundational skills and behaviors tend to be developed; (ii) technical and vocational education and training, which primarily focus on technical and specialized green skills; (iii) higher education and research & innovation system, which develop advanced green skills and technologies; and (iv) green education infrastructures, which exemplify a sustainable approach to buildings throughout their lifecycle. Despite these efforts, key education system issues to be tackled in Serbia include the quality of teaching³, digitalization and digital skills, the quality and relevance of vocational education and training, curricula modernization, access and equity, financing, governance, and early childhood education⁴. According to the World Bank (2024)⁵ estimates, education improvement will require preparing all teachers in Serbia for green education and may cost from EUR 9.1 to 27.2 million.

To conclude the analysis, several recommendations are provided, aiming to systematically embed green skills and attitudes within lifelong learning processes and education and training systems. Green skills need to be developed within national education/training and skills strategies, in cooperation with relevant actors and through an effective social dialogue at national and sectoral levels. Building strong endowments of foundational skills at an early age is critical for future skills acquisition and utilization. Skills anticipation and matching system involving all relevant stakeholders should become a basis for the development of curricula, quota setting, financing, and delivery of adequate education and training on green skills. Identification and development of green skills through vocational education and training should be comprehensive, rather than restricted to a few “green occupations”. The focus should initially be on the development of additional green skills within existing occupations and the provision of training that will add green components to existing qualifications or programs. Higher education plays an important role in complex green skills development, but its involvement needs to be strengthened through policies and collaborations with partners in Serbia and abroad. ALMPs should be utilized to facilitate green transition; employers should be involved in ALMPs’ design and can also play a role in developing green skills in disadvantaged groups, sectors, and regions.

³ Almeida, R., Avitabile, C. and Shmis, T. 2023. *World Bank*, 14 December 2023, <https://blogs.worldbank.org/education/beyond-learning-drop-why-countries-eastern-europe-and-central-asia-should-act-now-avoid>

⁴ OECD. 2022. Multi-dimensional Review of the Western Balkans: From Analysis to Action. Paris: OECD, , <https://www.oecd.org/publications/multi-dimensional-review-of-the-western-balkans-8824c5db-en.htm>

⁵ World Bank (2024). *Western Balkans 6 Country Climate and Development Report*. Washington, DC: The World Bank. <https://hdl.handle.net/10986/41881>

Introduction

Climate change will potentially undermine the progress that has been made in human capital, in low-and middle-income countries, mainly by the efforts of the countries themselves. We need ingenuity to find solutions.

Esther Duflo (2019) Nobel Laureate in Economics and Poverty Alleviation and Development Professor at the Massachusetts Institute of Technology

This study provides a detailed analysis of the education and skills systems in Serbia in the context of the green transition and gives some recommendations for their future development. The document comprises five chapters, starting with this introduction into the effects of climate change on human capital and the crucial role played by human capital in the green transition. The second part provides an overview of the perception of climate change among Serbians, as well as a review of the skills and education policies for climate action in Serbia, including both the position of Serbia within the international climate change policy framework and the national policies for green transition. The third chapter analyzes the performance of the education and training system in Serbia and tackles the challenges and opportunities related to the development of skills and jobs for the green transition. The fourth part reviews curriculum and government programs on climate change and green transition in Serbia, with specific sections devoted to primary and secondary schools, technical and vocational education and training, higher education and research and innovation system, and green education infrastructure. The final section provides conclusions, recommendations, and good practices that can be used for further development of relevant policies and projects.

This note builds on the findings of the Western Balkans Climate Change and Development Report (CCDR), expanding the narrative on education and providing a focused, country-level analysis to guide Serbia's education and training system in supporting a green and climate-resilient transition. It is intended as a practical tool for national and sectoral policymakers involved in education, labor market reform, and climate strategy. This note focuses on education and skills for both the green transition and climate-resilient development. The green transition refers to the shift toward a low-carbon, environmentally sustainable economy, while climate-resilient development includes building adaptive capacity to climate risks. These concepts are deeply interconnected, and both require a strong and adaptable education and training system. Throughout the report, the term 'green skills' is used broadly to include technical, cognitive, and socio-emotional competencies relevant to both transitions.

Climate change is harmful to human systems, while a stronger human capital is needed for climate change adaptation and creating a resilient, inclusive society. The key areas of climate change impact on human capital include health, education, livelihoods, migration, and marginalization (Qaisrani, 2015)⁶. A systematic approach to human capital development may include establishing mechanisms co-led by the private sector (for example, skills development funds) to expand workforce reskilling and upskilling efforts. Additionally, it is important to develop tools for tracking changes in skills demand due to the transition to a greener economy, invest in labor mobility schemes to facilitate better job and worker relocation, and improve training systems by enhancing curricula, teachers, infrastructure, and equipment to better align with labor market needs.

Overall analyses of climate change in the Western Balkans recognize human health, safety, and life quality as highly vulnerable to natural hazards and weather-related economic losses. Major human health risks include an increase in frequency and intensity of heat waves, drinking water quality

⁶ Qaisrani, A. 2015. *Connecting the dots: Linking climate change resilience to human capital*. Islamabad: SDPI, <https://sdpi.org/sdpiweb/publications/files/Connecting-the-dots-linking-climate-change-resilience-to-human-capital.pdf>

reduction, and wider spreading and intrusion of new vector-borne diseases⁷ (Vuković and Vujadinović Mandić, 2018)⁸. Additionally, many economic activities are closely related to ecosystems. Both climate change and the policies addressing its impact affect the economy and the availability of jobs in specific sectors and regions. Rural, poor, and marginalized communities are particularly affected, often facing economic disadvantages that may lead to migration. Strengthened human capital can facilitate climate change adaptation and mitigation in the transition to a green economy.

Human capital policies and programs can help protect people from the impacts of climate change and empower them to build and use their human capital for climate action. The research undertaken by the World Bank (2023)⁹ outlined a comprehensive policy framework for protecting, building, and using human capital in order to deliver more sustainable and inclusive development in the context of climate change (Figure 2). Policies to protect human capital, such as social safety nets, disaster risk management, and resilient education and health systems, minimize impacts across all age groups by addressing both the short-term shocks from climate events and promoting resilience to longer-term climate change impacts. Furthermore, “build” and “use” policies primarily focus on students and working-age people, and are essential to prepare them to cope with climate shocks and climate change. “Build” policies include curricular reform and reskilling and upskilling focused on transversal and green skills, as well as climate-resilient nutrition. Finally, “use” policies and programs focus on economic and social inclusion, ALMPs, gender issues, and creation of other enabling conditions for the green transition.

Figure 2: Human capital and climate policy and program framework



Source: World Bank (2023)

Climate challenges impact learning outcomes for both children and adults. Several education-related risk factors contribute to this impact, including teacher shortages in certain areas, inadequate teacher training, outdated curricula, poor school infrastructure and damage to educational facilities caused by extreme weather. Additionally, health issues and poverty caused or exacerbated¹⁰ can increase absenteeism and dropout rates (cf. UNICEF, 2019). Climate-related challenges may accelerate urbanization, reducing access to quality education in rural areas. This may lower the quality of life and increase the incentives to relocate for the rural population.

There is a triple dividend resulting from putting education and human capital as a critical element of the green transition in Western Balkan countries (Figure 3). The education sector plays a role across

⁷ Vector-borne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by vectors.

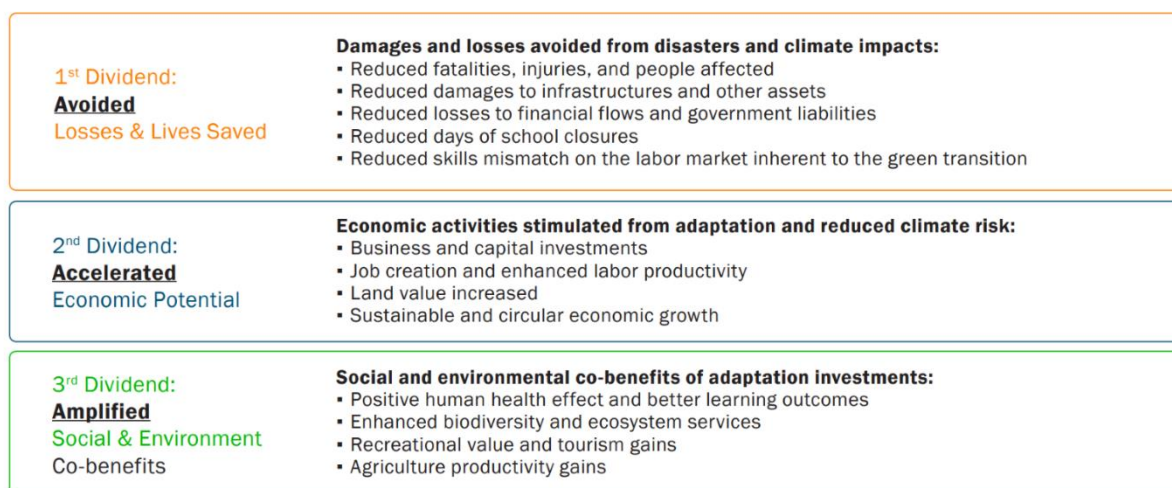
⁸ Vuković, A. and Vujadinović Mandić, M. 2018. *Study on Climate Change in the Western Balkans Region*. Sarajevo: Regional Cooperation Council, <https://www.rcc.int/download/docs/2018-05-Study-on-Climate-Change-in-WB-2a-lowres.pdf/06af8f7432484a6ce384ebcb8c05e8d7.pdf>

⁹ World Bank. 2023. *How to protect, build, and use human capital to address climate change*. Washington, DC: The World Bank, <https://thedocs.worldbank.org/en/doc/cc99b238fa9a0f266579d49dc591b2d4-0140062023/original/HCP-Climate-Policy-Brief.pdf>

¹⁰ UNICEF. 2019. *It is Getting Hot: Call for Education Systems to Respond to the Climate Crisis. Perspectives from the East Asia and the Pacific*. Bangkok: UNICEF East Asia and Pacific Regional Office, <https://www.unicef.org/eap/reports/it-getting-hot>

loss aversion, economic acceleration, and amplification of social benefits. In order to reap those benefits, education and training systems will need to adapt to the skills required by ongoing green investments.¹¹ Some jobs will also be lost in the process, but the net effect is expected to be positive. The green transition will also change the nature of many jobs, which are expected to require additional green and other skills.¹² Increased retraining and overall improvement in education may also benefit the country's economy. According to a recent study, a year of education increases pro-climate beliefs, behaviors, most policy preferences, and green voting, with voting gains equivalent to a substantial 35 percent increase.¹³

Figure 3. The “Triple-A Dividend of Resilience” Framework



Source: Western Balkans 6 Climate Change and Development Report

Education is a crucial as well as costly component of climate change adaptation and mitigation. Education can play an important role in reducing the negative impacts of extreme climate events in direct and indirect ways (Muttarak and Lutz, 2014). Directly, formal education is considered a primary way individuals acquire knowledge, skills, and competencies that can influence their climate risk perception and adaptive capacity. Education may also indirectly reduce climate-related vulnerability through other means, including better socioeconomic status, access to information, and social capital. The green transition requires a comprehensive reform of education and training systems to develop the population's ability to adapt to changing conditions and new opportunities. ALMPs play a crucial role in supporting reskilling and upskilling for those affected by the green transition. The key education system issues to be tackled in the Western Balkans region include quality of teaching, digitalization and digital skills, the quality and relevance of vocational education and training, curricula modernization, access and equity, financing, governance, and early childhood education (OECD, 2022)¹⁴. Reforming education should be a multi-stakeholder effort, implemented through strategic collaboration with various partners. Building climate-resilient societies will require large investments. Serbia will need to consider the total cost of proposed policy actions and investments for adaptation of the education system, skills, and labor market development of approximately EUR166.75 million.¹⁵

A green skills shortage across the Organization for Economic Co-operation and Development (OECD) countries is slowing the growth of sustainable jobs and could hinder the goal of reaching net zero by

¹¹ Gajšak, Marijan, Lili Ilieva, Miodrag Grujić, Tamara Trumbić, and Dragan Blažev. 2022. *Study on the Climate-Resilient Infrastructure in North Macedonia*. Consultant report, E Co., Chislehurst.

¹² Sanchez-Reaza, Javier, Diego Ambasz, Predrag Djukic, and Karla McEvoy. 2022. *Making the European Green Deal Work for People: The Role of Human Development in the Green Transition*. Washington, DC: World Bank.

¹³ Angrist, Noam, Kevin Winseck, Harry A. Patrinos, and Joshua S. Graff Zivin. 2023. "Human Capital and Climate Change." Working Paper no. 31000, National Bureau Of Economic Research, Cambridge.

¹⁴ OECD. 2022. *Multi-dimensional Review of the Western Balkans: From Analysis to Action*. Paris: OECD, <https://www.oecd.org/publications/multi-dimensional-review-of-the-western-balkans-8824c5db-en.htm>

¹⁵ World Bank (2024). Western Balkans 6 Country Climate and Development Report. Washington, DC: The World Bank. <https://hdl.handle.net/10986/41881>

2050. The share of workers in green-task jobs grew just by 2 percentage points across 30 OECD countries over the last decade (from 16% in 2011 to 18% in 2021), with significant differences within countries (OECD, 2023). Without urgent action, this skills gap could deepen inequalities and stall progress. In the next five years, skills gap and an inability to attract talent will be major barriers to industry transformation (World Economic Forum, 2023)¹⁶. Moreover, demand for workers with green skills is expected to outpace supply in the next five years, with a projected 66% increase in green roles needed by 2030. Research conducted in Central Asia and Europe¹⁷ shows that only 8.9% of respondents are considering a career in “green jobs” (ETF and UNICEF, 2021)¹⁸. Focus group participants suggested integrating green topics and skills in the curriculum at an early age, using more experiential teaching methods, such as trips into nature or workshops. Some recognized that their teachers lack this knowledge and could benefit from partnerships with green non-governmental organizations (NGOs).

The green transition will exacerbate skills imbalances, making reskilling and upskilling essential, particularly for vulnerable communities. Climate change adaptation and mitigation are coupled with important distributional implications for jobs and the workforce at the sectoral and regional levels. The green transition will also change the nature of many jobs, which are expected to require additional green and other skills.¹⁹ Whereas the costs of low-carbon policies may be visible after such policies are introduced, the benefits of green policies and investments take time to materialize and are not evenly distributed. Green transition not only changes the demand for skills but also exacerbates current and expected skills shortages and mismatches. In the case of Serbia (Vasić, 2019), when analyzing the school-to-work transition, it was observed that students often enter the workforce with inadequate skills due to outdated curricula, insufficient practical training, and a lack of support prior to and during the transition. On the other hand, the low skills level among unemployed and inactive adults hinders their employment opportunities, career prospects, and participation in lifelong learning. Vulnerable groups, including ethnic minorities, persons with disabilities, and people living in rural, remote, or declining areas, would particularly benefit from reskilling and upskilling programs, which are also crucial for the green transition.

Green skills help workers identify, absorb, use, adapt, and develop green technologies. Such skills also normally involve more non-routine skills. The European Training Foundation (ETF, 2023a) proposed a broad classification of skills for the green transition, which distinguishes sustainability mindset, technical skills, and enabling transversal skills (Figure 1). Taking advantage of green growth opportunities should lead to widespread greening of occupational standards. Green skills, environmental responsibility, and sustainable development should be integrated within the learning outcomes of the formal, informal, and non-formal learning of all age learners (EESC, 2021). Identification and development of the necessary skills should tackle key sectors of the economy, rather than just a few selected new ‘green occupations’ (cf. Sanchez-Reaza et al., 2022)²⁰. It's essential to identify labor market skill demands and integrate these into various Technical and Vocational Education and Training (TVET) qualifications and programs. This includes recognizing new skill requirements impacting current occupations, as well as skills needed for emerging roles. Initial focus should thus be

¹⁶ World Economic Forum. 2023. *Future of Jobs Report 2023: Insights Report May 2023*. Cologny/Geneva: World Economic Forum, https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf.

¹⁷ The report covers 23 countries and territories in Europe and Central Asia: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Greece, Italy, Kazakhstan, Kosovo, Kyrgyzstan, Moldova, Montenegro, North Macedonia, Romania, Serbia, Tajikistan, Türkiye, Turkmenistan, Ukraine, and Uzbekistan.

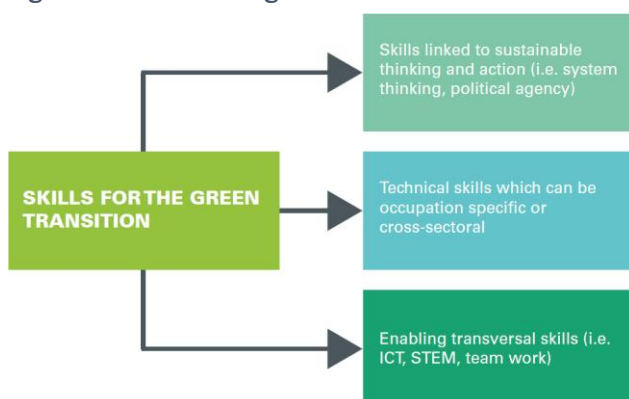
¹⁸ ETF-UNICEF. 2021. *Building a resilient generation in Central Asia and Europe: Youth views on lifelong learning, inclusion, and the green transition*. Geneva: United Nations Children’s Fund Regional Office for Europe and Central Asia (UNICEF) & Torino: European Training Foundation (ETF), https://www.etf.europa.eu/sites/default/files/2021-06/resilient_generation_central_asia_europe.pdf

¹⁹ Sanchez-Reaza, Javier, Diego Ambasz, Predrag Djukic, and Karla McEvoy. 2022. *Making the European Green Deal Work for People: The Role of Human Development in the Green Transition*. Washington, DC: World Bank.

²⁰ Sanchez-Reaza, J., Ambasz, D., Djukic, P. and McEvoy, K. 2022. *Making the European Green Deal Work for People: The Role of Human Development in the Green Transition*. Washington DC: World Bank, <https://openknowledge.worldbank.org/entities/publication/7b1fcc3c-f44f-4a11-9828-9ae191a746c6>

on the acquisition of additional green skills within existing occupations and on the provision of related training opportunities.

Figure 1: Skills for the green transition



Source: ETF (2023a)

To transform attitudes towards sustainability, green skills need to be developed within national education/training and skills strategies, in cooperation with relevant actors and through an effective social dialogue (cf. EESC, 2021). A more complex skills framework can be developed on the basis of the European classification of skills, competences, and occupations (ESCO).²¹ Environmental awareness is included as a core skill that should be developed from an early age, preferably in the context of real-world problem solving and creative thinking. Building strong endowments of foundational skills at an early age is critical for future skills acquisition and utilization, which subsequently follow specific trajectories aligned with individual, organizational, sectoral, and regional needs and opportunities.

Since climate change affects existing social facilities, infrastructure solutions are required to increase resiliency. Without adequate reconstruction and maintenance efforts, which are costly and need to be optimized, climate change will negatively affect the existing education facilities, leading to their deterioration. Extreme weather events, which are becoming more frequent and severe, cause costly damage to these facilities and disrupt essential services, particularly education. Key strategies to strengthen resilience include retrofitting infrastructure, utilizing alternative or temporary learning spaces during reconstruction, implementing remote education, and promoting environmental education and child-led climate adaptation (cf. UNICEF, 2019)²². In 2022 Serbia adopted its Long-Term Strategy for Encouraging Investment in the Renovation of the National Buildings Fund of the Republic of Serbia until 2050, providing a framework to retrofit educational infrastructure and mainstream green building principles, and create modern learning environments across the country.

Perceptions and Awareness of Climate Change

Most citizens in Serbia acknowledge that climate change is real, man-made, and that it can seriously affect them. Serbians are concerned about climate change and its related risks. Data from the fourth round of the Life in Transition Survey (LITS IV)²³ shows that a majority of Serbians are either entirely or quite convinced that climate change is a reality (57%), and most are convinced that climate change is man-made (64%). These figures align with the Western Balkans' average of 58% and 63%, respectively. Their concern is higher when questioned about specific risks related to climate change: 74% of Serbians

²¹ <https://esco.ec.europa.eu/en>

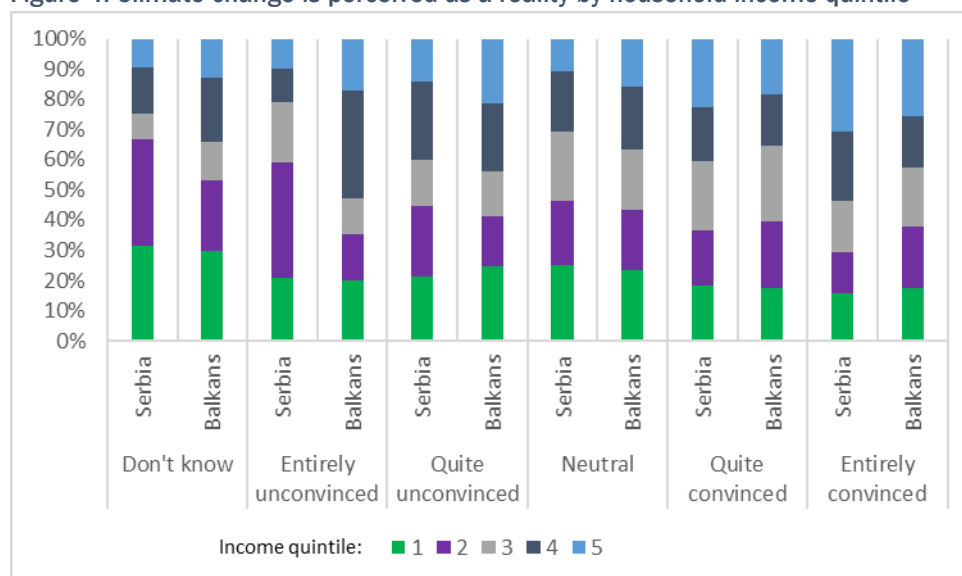
²² UNICEF. 2019. *It is Getting Hot: Call for Education Systems to Respond to the Climate Crisis. Perspectives from the East Asia and the Pacific*. Bangkok: UNICEF East Asia and Pacific Regional Office, <https://www.unicef.org/eap/reports/it-getting-hot>

²³ The Life in Transition Survey IV was conducted in 29 European, Asian, and African countries by the European Bank for Reconstruction and Development and the World Bank in 2023. The analysis and graphs presented in this section are based on the data collected during Life in Transition Survey IV.

are concerned or very concerned about air pollution, 69.5% about waste disposal, 69% about the loss of biodiversity, 74% about rising temperatures (especially in the summer), and 76% about natural disasters and extreme weather events. All of these are above the regional average, where the highest concern was regarding natural disasters at 72%. Moreover, when considering the impact of climate change, 67.5% of Serbians are concerned that it will have a serious impact within their lifetime, and even more, 84%, are worried about the impact on today's children. This is despite the fact that only 15% of Serbians have been directly impacted by disruptions or damages due to climate disasters, 9% below the regional average,

Several factors influence how Serbians perceive climate change, with household income levels having a significant impact on this perception. Individuals within higher-income households are more likely to be convinced about the reality and human influence on climate change (Figure 4). These factors are also significant in the wider Western Balkan region. Household income seems to play a larger role in Serbia. For example, income quintiles 4 and 5 in Serbia are convinced that climate change is real by 57.6% and 75%, respectively, compared to 60% and 67% in the Western Balkans average, making this trend even more marked at the Serbian levels. Similar perceptions are observed regarding whether climate change is man-made, with wealth correlating with higher concern in Serbia than in the rest of the region.

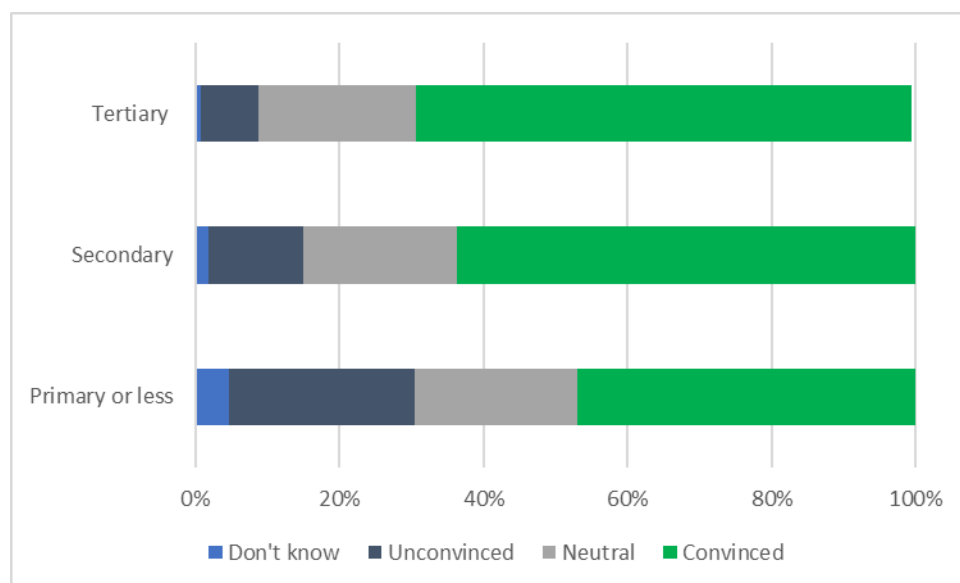
Figure 4. Climate change is perceived as a reality by household income quintile



Source: LITS IV

Higher educational levels also increase the likelihood of being convinced that climate change is man-made. In Serbia, those with higher education levels are 20% more likely to be entirely convinced of climate change being man-made, compared to those with one lower educational degree (Figure 5). Gender and age do not significantly influence these general perceptions, although older individuals are slightly less likely to be convinced or are unsure about climate change. Similar trends are observed across the region, where higher education correlates with a stronger belief in the reality of climate change and human involvement.

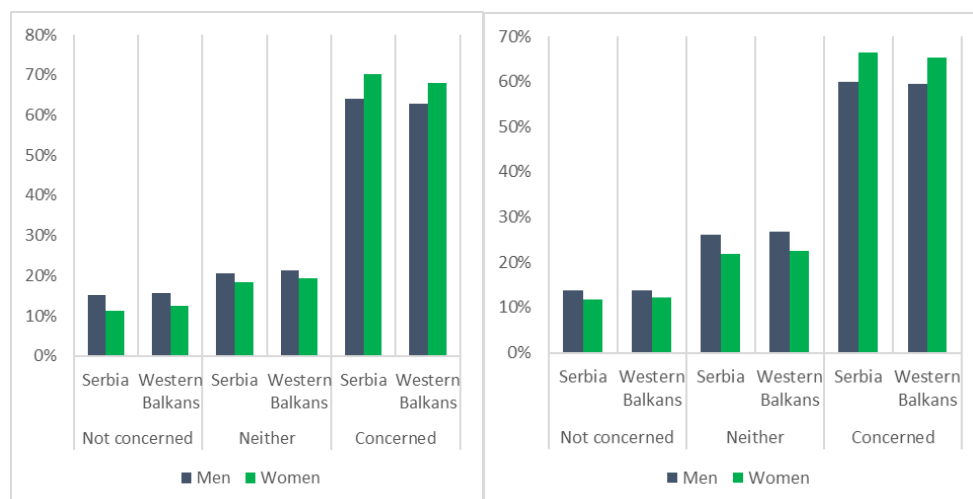
Figure 5. Climate change perceived as man-made by educational level in Serbia



Source: LITS IV

Concerns about specific climate-related events also vary across different demographics, with gender playing a larger role. Women consistently show higher levels of concern about various climate-related issues compared to men (Figure 6). For instance, Serbian women are 20% more likely to be very concerned about pollution, far above the regional estimate of 15%. This heightened concern extends to other areas as well. Serbian women show greater concern about waste management (17% more likely to be concerned than men), biodiversity loss (20% more), rising temperatures (22%), and natural disasters (15%). These perceptions reflect that women have a heightened sense of vulnerability and urgency in addressing these catastrophic events. Similarly, those with higher educational degrees also express sizable concerns regarding specific climate-related shocks.

Figure 6. Concerns about rising temperatures (left) and biodiversity losses (right)

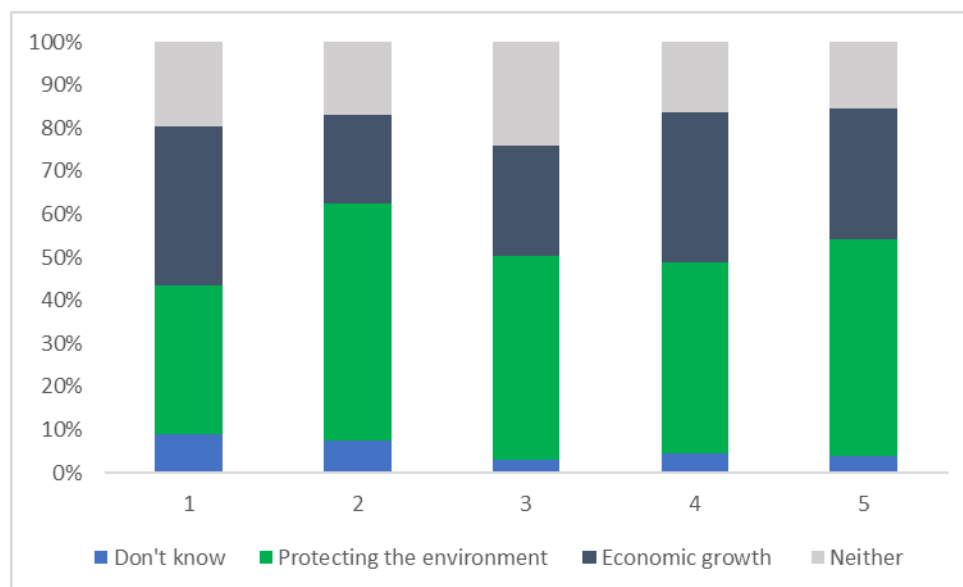


Source: LITS IV

Additionally, a large number of Serbian citizens see climate action as a priority, even more so than economic growth: 45% of Serbians believe that protecting the environment should come first, compared to 36% who believe economic growth should be prioritized (Figure 7). These opinions are much more in Serbia than in the rest of the Western Balkans, where only 39% favor protecting the environment over

economic growth. Income levels also play a crucial role in the prioritization of the environment above economic growth in Serbia, with the lowest income quintile prioritizing economic growth (37%), and the wealthiest quintiles highly prioritize the environment (45%). Interestingly, though, the second income quintile prioritizes the environment the most, both in Serbia and in the region. The distribution across genders and ages is similar, with the majority agreeing that environmental protection should come before economic growth.

Figure 7. Prioritization of policies by household income quintile in Serbia



Source: LITS IV

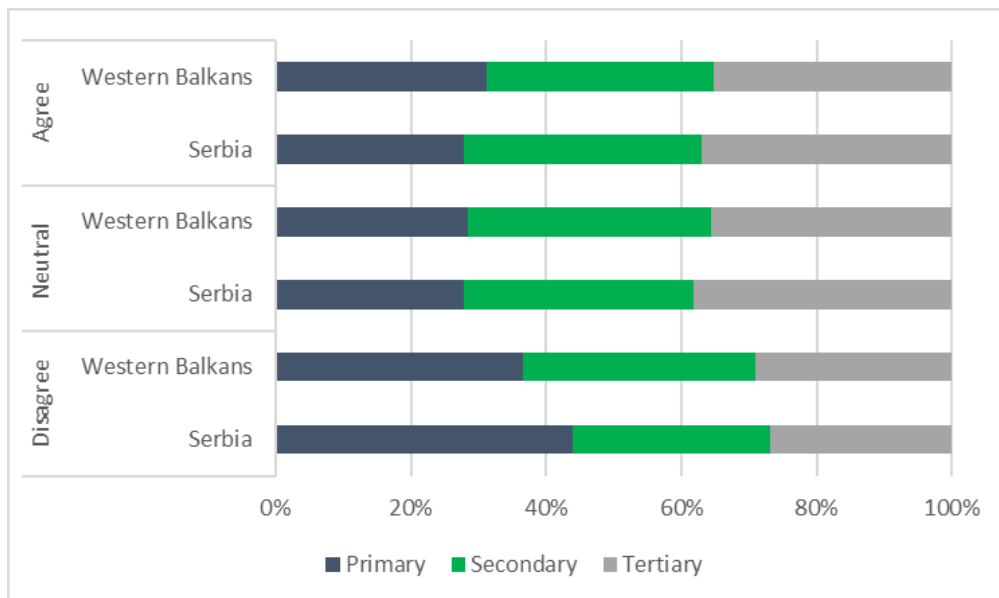
However, most believe that climate change can be reconciled with economic development, and there is a strong preference for a gradual green transition. A second survey conducted by the Friedrich-Ebert-Stiftung (FES)²⁴ shows that 83% of the respondents in Serbia believe that a consistent policy to protect the environment will have a positive impact on the competitiveness of businesses in the future. Most respondents (74%) also claim that jobs affected by structural change should be preserved as long as possible if there are no suitable alternatives, and almost half (45%) support the view that structural change measures should be enforced even if jobs are lost as a result. Moreover, the study finds that 97% of respondents in Serbia believe that we all have to become active ourselves and start changing the way we live in order to maintain a livable environment for us and the generations that follow.

Despite recognizing the need for action against climate change, the majority of Serbians are generally not willing to pay more taxes to fund prevention and mitigation efforts against climate disasters and climate change. According to the LITS IV survey, only 8% of Serbians strongly agree with the premise of paying more taxes to prevent environmental pollution, with 33% agreeing. Similarly, only 6.6% strongly agree to pay more taxes to fight climate change, with 27% agreeing, and only 8% strongly agree to pay more taxes to reduce biodiversity loss, with 31% agreeing. These are around the regional average of 11% strongly agreeing to pay more taxes against pollution, 9% to pay more to fight climate change, and 10% to prevent biodiversity loss. This is further supported by the FES survey, which finds that about 61% of Serbians say they are only willing to do something to protect the environment if it does not affect their own standard of living; a similar share of respondents (60%) say they lack the financial means to do something for climate protection.

²⁴ SINUS Study for the Friedrich Ebert Foundation Social-ecological transformation, 2023. <https://library.fes.de/pdf-files/bueros/bruessel/20868.pdf>

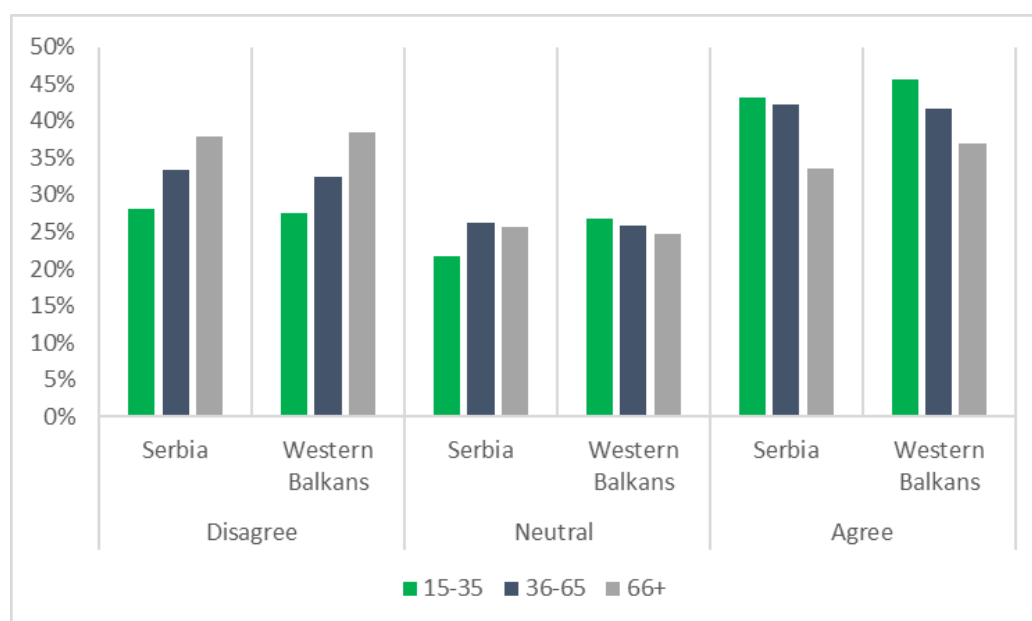
However, those with higher education levels and younger individuals are more willing to pay more taxes to fight climate change. This is visible both in Serbia and in the broader Western Balkan region and aligns with the higher concerns for climate change that this group expresses, as per the LITS IV survey (Figure 8). The highly educated in Serbia are willing to pay 15% more for these types of taxes, on average, than their counterparts with lower educational degrees across all tax-related questions. Although more variable, this trend is the same at the regional level, with the more educated being 9% more likely to want to pay taxes for various climate-related expenses. Moreover, older individuals in Serbia are also less willing to pay more taxes for environmental causes, making them 14% less likely to pay for additional taxes to reduce pollution, and 9% less likely to pay to protect biodiversity (Figure 9). These are in line with the regional range of older individuals being 7-11% less likely to be willing to pay more taxes to increase climate-related expenditures, which is perhaps due to present value bias or generational differences. Interestingly, households with higher income levels are less willing to pay additional taxes to fight climate change, despite often being more concerned about climate-related events. This is observable both in Serbia and the broader Western Balkans region.

Figure 8. Willingness to pay more taxes to fight climate change by educational level



Source: LITS IV

Figure 9. Willingness to pay more taxes to prevent pollution by age category



Source: LITS IV

These responses might also be related to citizens in Serbia attributing the primary responsibility for climate action to the government, but do not feel adequately informed or engaged when it comes to the policy response (FES, 2023). When it comes to addressing the climate and environmental crisis, the national government (64%) is by far the most frequently cited as one of the three most influential actors. However, the citizens do not seem to be adequately informed about the relevant policies. Only 4% of respondents feel "very well" informed about policies for a change towards a more climate and environmentally friendly economy. 30% feel "rather well" informed. 84% of respondents think that policies for a change towards a more climate and environmentally friendly economy are insufficiently explained and clarified (FES, 2023). This also partly explains why responders of the LITS IV who have the highest levels of trust in institutions and government are not significantly more inclined to pay taxes than those with lower trust levels. This trend is evident at both the Serbian and regional levels. It is not necessarily about a lack of trust in the government, but rather lack of clarity about how additional funds will be spent.

Overall, surveys indicate that the Serbian population is highly concerned about climate change, especially among those with higher education. However, despite this widespread concern, few are willing to pay higher taxes or take action, with the highly educated and young people showing a greater willingness than others. The willingness of the highly educated to contribute financially towards climate action likely reflects their greater access to information and a deeper understanding of the severe consequences that climate change can have. This presents a valuable opportunity for the education sector to leverage this trend. By integrating comprehensive climate education into primary and secondary curricula, educators can enhance awareness and understanding of climate issues among the broader population. It is also likely that these initiatives will be well received as FES (2023) shows that there is a strong support for education and skills development related to the green transition, with 97% of the respondents supporting an improvement of school education in the field of environmental and climate protection, and 92% supporting training for the green transition.

Serbia and the international climate change policy framework

Serbia has signed several international climate action agreements, but its national policies and incentives remain misaligned with these commitments. While Serbia has ratified most major international environmental agreements²⁵ and made commitments related to its EU accession process, their implementation is lagging²⁶. Serbia's policies follow the *EU 2030 Climate and Energy Framework* (EC, 2020)²⁷, which set three key targets to be achieved by 2030: at least 40% cuts in greenhouse gas emissions (from 1990 levels); at least 32% share for renewable energy; and at least 32,5% improvement in energy efficiency. Moreover, Serbia is a signatory to the *2030 Agenda for Sustainable Development* and is thus formally committed to the achievement of the Sustainable Development Goals (SDGs). Serbia has also made regional commitments under *the Green Agenda for the Western Balkans* (RCC, 2020)²⁸, like the *Sofia Declaration* (RCC, 2020a)²⁹, which goes beyond decarbonization and highlights the importance of depollution, the circular economy, biodiversity, and sustainable food systems, as well as the reforms of the education systems. Serbia has committed to working to achieve the 2050 target of transforming into a carbon-neutral zone. However, its internal economic incentives and policies do not fully support these goals. To align with EU-oriented green growth, Serbia should modernize and structurally transform its economy, including reforms in education to support this transition.

The EU supports the overall socio-economic development of the Western Balkans and its rapprochement with EU through various initiatives, of which Serbia is also a beneficiary. In October 2020 the European Commission (EC) adopted *the Economic and Investment Plan for the Western Balkans*³⁰, which aims to encourage a long-term economic recovery of the Western Balkans region, supporting the green and digital transition, regional cooperation, and rapprochement with the European Union. In accordance with the adoption of the next *Multiannual Financial Framework* and related legal bases, the Commission proposed the mobilization of up to EUR 9 billion for financing to the region from the *Instrument for Pre-accession Assistance (IPA) III*³¹ program for the period 2021-2027 in order to support economic rapprochement with the EU, primarily through investments and support for competitiveness and inclusive growth, sustainable connectivity, and dual green and digital transition. Serbia is also part of the *Youth Guarantee program to the Western Balkans*, an activation program that ensures that all young people receive a quality offer of employment, continuing education, an apprenticeship or a traineeship within four months of becoming unemployed or leaving formal education. Furthermore, there are several programs that enable participation of young Serbian persons and organizations in knowledge sharing with partners from the EU. *The Erasmus+ program*³², of which Serbia has been a member since 2019, is one of the largest EU programs funding mobility and cooperation projects in the fields of education, youth training, and sport. Lastly, Serbia also participates in *Horizon Europe*³³, the EU's key funding program for research and innovation, which supports research and innovation projects, including mobility.

²⁵ Serbia is a signatory to the UN Framework Convention on Climate Change and its associated Paris Agreement (2015).

²⁶ World Bank. 2022. *Supporting Serbia's Transition to Greener and More Resilient Growth: Policy and Institutional Reforms*. Washington, DC: The World Bank, <http://hdl.handle.net/10986/38271>

²⁷ EC. 2020. 2030 climate targets, Brussels: European Commission, https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-energy-framework_en

²⁸ RCC. 2020. *Green Agenda for the Western Balkans*. Sarajevo: Regional Cooperation Council, <https://www.rcc.int/greenagenda>

²⁹ RCC. 2020a. *Sofia Declaration on the Green Agenda for the Western Balkans*. Sarajevo: Regional Cooperation Council, <https://www.rcc.int/docs/546/sofia-declaration-on-the-green-agenda-for-the-western-balkans-rn>

³⁰ EC. 2020c. *An Economic and Investment Plan for the Western Balkans*. COM(2020) 641 final. Brussels: European Commission, https://neighbourhood-enlargement.ec.europa.eu/document/download/30108255-efa8-4274-962a-c24faee32734_en?filename=communication_on_wb_economic_and_investment_plan_october_2020_en.pdf

³¹ EC. 2024. COMMISSION IMPLEMENTING DECISION of 2.4.2024 on the financing of the multi-country multiannual action plan in support of the Western Balkans Investment Framework in favour of the Western Balkans for 2024-2027 and provisioning of the Common Provisioning Fund for 2024-2027. Brussels: European Commission, https://neighbourhood-enlargement.ec.europa.eu/document/download/00e031e5-7101-4bf6-923b-7ec08a9d6b75_en?filename=CID%20-%20WBIF%202024-2027-FINAL.pdf

³² <https://erasmusplus.rs/>

³³ https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

Moreover, the EU provides financing and guidelines for the green transition, including incentives for green skills development, but the progress in Serbia seems to be slow. *The European Green Deal* (EC, 2019) and the “Fit for 55” (EC, 2021)³⁴ package proposal to revise and update EU legislation, create strong disincentives for emission-intensive activities, shaping the economic context in which Serbia will interact within the global economy for decades to come³⁵. *The European Commission’s Guidelines for the Implementation of the Green Agenda for the Western Balkans* (October 2020)³⁶ state that “education is key to positively affect behaviors regarding the environment, starting from an early age as well as to reskill workers from transition industries”. The declaration suggested updating curricula and including key competences and skills necessary to perform in the green economy and advised reforming the education systems in the Western Balkan countries in order to successfully implement the Green Agenda and ensure that citizens are equipped and prepared for the labor market. With proper information and education, the youth of the region can contribute decisively to the implementation of the Green Agenda. The European Green Deal should also be included in the different components of Erasmus+, the EU flagship program for education available in the region. *The EU4Green project*³⁷ is supporting the Western Balkans region across the pillars of the Green Agenda and focusing on improving awareness and communication, strategies to finance the green transition, and fostering green skills. The recent EU recommendation to Serbia in the new *Growth Plan for the Western Balkans for 2024-2027* states that even though Serbia had prioritized the Green Agenda, the regulatory and green transition reforms are progressing slowly. In the area of education, Serbia has yet to incorporate green and environmental topics into its curricula (EC, 2023).³⁸

The World Bank has recently linked its support to Serbia to the green transition agenda. The World Bank (2022) highlighted that Serbia needs to transition to a greener growth model for internal and external reasons. Internally, Serbia’s economy is still characterized by low energy and resource productivity, with significant impacts on health and the environment. As a candidate country for EU membership, Serbia also needs to react to external influences by aligning domestic policies with the EU’s energy, environment, and climate legislation, while avoiding the negative impacts of the EU’s planned Carbon Border Adjustment Mechanism. *The First Serbia Green Transition Programmatic Development Policy Loan* was approved in 2023, and the associated project, *Improving Public Financial Management for the Green Transition*, supports policy and institutional reforms to better align fiscal management with the green agenda by increasing the transparency of budgetary spending on climate-related activities and on the environment. The operation will help Serbia make the next reform steps in a feasible and results-oriented manner in two results areas: (a) strengthen fiscal resilience, transparency, and spending effectiveness; and (b) green the expenditure cycle and monitor greenhouse gas (GHG) emissions for Serbia’s green transition.³⁹

As the EU candidate country, Serbia is making an effort to align its education and science with the EU policies; however, further improvements in education quality are needed to enhance human capital development. The process of the accession of the Republic of Serbia to the European Union (till 2020) included EU assistance in the areas of education, employment, and social policies (EC, 2018).⁴⁰ Nonetheless, many reforms are still to be fully or properly implemented, in addition to the ongoing alignment of higher education to the Bologna process. The national recommendations in the area of

³⁴ EC. 2021. *Fit for 55*, Brussels: European Commission, <https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55/>

³⁵ Fit for 55 has the goal of cutting emissions of GHG by at least 55 percent by the year 2030 compared with 1990 levels.

³⁶ European Commission. Commission Staff Working Document: Guidelines for the Implementation of the Green Agenda for the Western Balkans, 2020, URL: https://neighbourhood-enlargement.ec.europa.eu/system/files/2020-10/green_agenda_for_the_western_balkans_en.pdf

³⁷ EU4GREEN, <https://eu4green.eu/>

³⁸ EC. 2023. *Commission staff working document: 2023 Country Report – Serbia*. SWD(2023) 695 final. Brussels: European Commission, https://neighbourhood-enlargement.ec.europa.eu/system/files/2023-11/SWD_2023_695_Serbia.pdf

³⁹ World Bank. 2023a. *Improving Public Financial Management for the Green Transition*, Washington, DC: The World Bank, <https://projects.worldbank.org/en/projects-operations/project-detail/P175655>

⁴⁰ EC. 2018. *Annex to the Commission Implementing Decision amending Commission Decision C(2014)5872 of 19.8.2014 adopting the Indicative Strategy Paper for Serbia for the period 2014-2020*. C(2018) 5064 final. Brussels: European Commission, <https://neighbourhood-enlargement.ec.europa.eu/system/files/2018-12/20180817-revised-indicative-strategy-paper-2014-2020-for-serbia.pdf>

curricula modernization, recognition of academic qualifications, human resource management, link with the world of work, strengthening research, and the role of higher education in society should be implemented, in accordance with the commitment under *the Western Balkans Platform on Education and Training*⁴¹. *The Western Balkans agenda on innovation, research, education, culture, youth & sport* adopted in 2021, outlines a comprehensive, long-term strategy for EU cooperation with the region and promotes scientific excellence as well as reform of the region's education systems, including promoting the implementation of the EU Green Deal in the Western Balkans.

National policies for green transition

Serbia is updating its strategic and legislative frameworks to support the green transition through research, innovation, education, and youth policy. Efforts to integrate green skills into national policy date back to *the National Strategy of Sustainable Development*⁴² (2008), which focused on achieving a knowledge-based economy and emphasized that new skills and education system reforms were necessary for its implementation. More recently, the Ministry of Environmental Protection of the Republic of Serbia (MEP) has developed a *Roadmap for the circular economy in Serbia*⁴³ (2020), highlighting the necessity of raising awareness, improving education and multistakeholder cooperation, and securing stronger institutional support of circular economy development. Further key legislative measures included the adoption of the *Law on Climate Change in March 2021* and the *Law on Use of Renewable Energy Sources* in April 2021, aligning with the EU standards. In 2023, Serbia adopted the *Low-Carbon Development Strategy*⁴⁴, aiming to cut greenhouse gas emissions by 33% by 2030 and up to 76% by 2050, with the *National Adaptation Program* in progress. Furthermore, the recent *Integrated National Energy and Climate Plan of the Republic of Serbia for the period 2030, with the projections up to 2050*⁴⁵. Research and innovation will enhance energy security and clean technologies, with goals such as increasing innovative start-ups and high-tech sectors, improving research effectiveness, and strengthening collaboration between institutes and businesses⁴⁶. Universities are encouraged to promote student-led eco-innovative products for national and European markets. Furthermore, *the Youth Strategy in the Republic of Serbia for the period from 2023 to 2030*⁴⁷ emphasizes youth engagement in environmental protection, sustainable development, and the green economy. It aims to build young people's capacity for climate action, decision-making, and participation in environmental initiatives. Measures include youth programs to raise awareness of pollution, climate change, and afforestation while strengthening resilience to crises and natural disasters.

The green transition in Serbia requires intersectoral and interministerial collaboration, as it involves reforms across various ministries and stakeholders with differing interests. Green transition entails reforms and investments in various but interrelated fields, which are usually under the jurisdiction of different ministries and agencies. Although silo mentality often remains a challenge, positive initiatives exist, such as the 2023 Dialogue on Climate Change, where the MEP engaged stakeholders and

⁴¹ In cooperation with the Ministries of Education of the Western Balkans Six, the European Commission launched the Western Balkans Platform on Education and Training on 7 March 2012. Its objectives are to support the transition for the candidate countries and to better prepare the potential candidates in the region for their eventual participation in European Union policies and programs on education and training.

⁴² Government of Serbia. 2008. *National Sustainable Development Strategy*. Belgrade: Government of Serbia, <https://www.oneplanetnetwork.org/sites/default/files/nationalsustainabledevelopmentstrategyserbia2008.pdf>

⁴³ Ministry of Environmental Protection. 2020. *Roadmap for Circular Economy in Serbia*, Belgrade: Ministry of Environmental Protection, <https://circulareconomy.europa.eu/platform/sites/default/files/roadmap-for-circular-economy-in-serbia.pdf>

⁴⁴ Government of Serbia. 2023. *Low Carbon Development Strategy of the Republic of Serbia for the Period 2023-2039 with Projections*, Belgrade: Government of Serbia, https://unfccc.int/sites/default/files/resource/Low_Carbon_Development_Strategy_Serbia_2023-2030_with_2050_Projections.pdf

⁴⁵ Government of Serbia. 2020. *Integrated National Energy and Climate Plan of the Republic of Serbia for the period 2030 with the projections up to 2050*, Belgrade: Government of Serbia, https://www.energy-community.org/dam/jcr:01992fc5-4981-4ee3-84f8-f1f96830b4ba/INECP_Serbia_ENG_13.06.23%20.pdf

⁴⁶ Government of Serbia. 2020a. *Smart Specialization Strategy of the Republic of Serbia for the period 2020-2027*, Belgrade: Government of Serbia, https://pametnaspecializacija.mpn.gov.rs/wp-content/uploads/2021/06/Strategija-pametne-specijalizacije_EN_WEB.pdf

⁴⁷ Government of Serbia. 2023a. *Youth Strategy in the Republic of Serbia for the Period from 2023 to 2030*, Belgrade: Government of Serbia, <https://mto.gov.rs/extfile/sr/1828/EN%20Youth%20Strategy%20in%20the%20Republic%20of%20Serbia%20for%20the%20period%20from%202023%20to%202030.pdf>

showcased over 60 eco-innovations in circular economy, energy efficiency, and environmental protection..

Despite growing recognition in strategic documents, Serbia still lacks a formal definition of green jobs and a strategic focus on green job promotion. *The Employment Strategy of the Republic of Serbia 2021-2026*⁴⁸ calls for adopting the UNEP/ILO definition⁴⁹ to encourage job creation and statistical tracking. It should be noted that green jobs must meet decent work criteria, i.e., workers doing these jobs must have access to health and social insurance, have adequate training and equipment, and work in safe and healthy conditions. Efforts should also focus on formalizing undeclared work in waste management to boost employment. Furthermore, neither a strategic focus nor concrete plans in relation to the promotion of green jobs have been developed in Serbia. Serbia's *National Strategy of Sustainable Development* does not mention green or environmental jobs, and the National Employment Action Plan for 2020 omits green employment opportunities. There is no official monitoring of green jobs in the country, and only recently (2019), the government sponsored a project to create a methodology for data collection on green jobs through the Ministry of Trade, Tourism, and Telecommunication⁵⁰.

Committed to EU integration, Serbia has developed a relevant legislative, policy, and institutional framework to improve the quality and inclusiveness of education while incorporating green and digital skills. Several important laws have been adopted in recent years to promote reforms in the education sector, with the laws on higher education (2017), adult development (2017), dual education (2017), national qualifications framework (2018), and student organization (2021). *The Strategy for Education and Upbringing Development in Serbia by 2030*⁵¹ adopted in June 2021 aligns policies with labor market trends and EU standards, supporting green and digital transitions. It also plans to introduce environmental education as an extracurricular activity within formal education at different levels. Serbia has improved its skills framework, adopting *the National Qualifications Framework for Serbia*⁵² (NQFS) in 2018, and aligning qualifications with the demands of the labor market, lifelong learning, science, and society.

⁴⁸ Government of Serbia 2021. *Employment Strategy of the Republic of Serbia 2021-2026*. Belgrade: Government of Serbia,

https://socioalnoukljucivanje.gov.rs/wp-content/uploads/2021/08/Strategija_zaposljavanja_u_Republici_Srbiji_2021-2026_engleski.pdf

⁴⁹ According to this definition, green jobs include work in agriculture, manufacturing, research and development, administration and services that considerably contribute to preserving or restoring the quality of the environment.

⁵⁰ Green Economy Coalition. 2024. *Green Economy Tracker, Serbia: Early steps on a green accession path*, London: Green Economy Coalition, <https://greeneconomytracker.org/country/serbia>

⁵¹ Government of Serbia. 2021a. *Strategy for the development of education and upbringing in the Republic of Serbia until 2030*, Belgrade: Government of Serbia, <https://dualnok.gov.rs/en/dokumenta/strategy-for-the-development-of-education-and-upbringing-in-the-republic-of-serbia-until-2030-official-gazette-of-rs-no-63-2021/>

⁵² ETF. 2021. *National Qualifications Framework – Serbia*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/document/Serbia.pdf>

Developing the skills and jobs for the green transition: challenges and opportunities

In this part of the analysis, the focus is on the performance of the education and training system in Serbia, which affects the development of skills and jobs for the green transition. The overall development of human capital, measured by the OECD's Programme for International Student Assessment (PISA) seems to be stagnant. Furthermore, there is insufficient emphasis on environmental sustainability issues in the education system. Weak foundational skills and low environmental awareness hinder the development of green skills throughout education and employment, exacerbating skill imbalances. Given the sizeable proportion of the labor force at risk and with significant needs for retraining, it becomes critical for Serbia to start adapting its education system from early learning to the technical and vocational education and training and higher education levels to equip graduates with green skills ready for the new economy. While Serbia has set up its National Qualifications Framework and labor market monitoring and skills intelligence mechanisms, these need stronger alignment with the green transition and better support from ALMPs.

The current ALMPs in Serbia target the disadvantaged labor market participants and, due to limited resources, mostly produce insufficient results. Defining the goals and more specific priorities of the active labor market policy in Serbia takes place within the framework of the Employment Strategy of the Republic of Serbia 2021-2026, which defines long-term general and specific objectives of the active employment policy. Its focus is on disadvantaged groups, with a particular emphasis on the youth, due to the implementation of the Youth Guarantee. The cycle and procedure of ALMPs planning make it difficult to implement ad hoc interventions in case of sudden shocks, such as the Covid-19 pandemic (Arandarenko, 2021). In general, there are four large groups of ALMP services and measures: (i) active job search, (ii) reskilling and upskilling, (iii) employment subsidies, and (iv) public works. The largest number of beneficiaries can be observed within public works, (self)-employment subsidies, and internship programs. The limitations regarding financial resources constrain the effects of the active employment policy, but positive labor market trends reduce the burden related to youth unemployment.

Serbia struggles with underutilized human potential, below-average PISA scores, and persistent educational inequalities. The Human Capital Index 2020 score⁵³ is currently at 0.68, which means that almost a third of the human potential in the country is not utilized. Moreover, the recently released results for Serbia of the PISA 2022 assessment⁵⁴ showed a stagnant performance with below-average learning outcomes. In mathematics, 15-year-olds in Serbia scored 440 points compared to an average of 472 points in OECD countries, and in reading, 15-year-olds in Serbia scored 440 points compared to an average of 476 points in OECD countries. Lastly, the average performance in science of 15-year-olds was 447 points, compared to an average of 485 points in OECD countries. Serbia also showed a low composite index of imagination and adventurousness, i.e., -0.2 PISA Index, rank 53/57 (average=0, standard deviation of the OECD average=1).⁵⁵ Moreover, inequalities in human capital outcomes persist in Serbia, too. In Serbia, socio-economically advantaged students (the top 25% in terms of socio-economic status) outperformed disadvantaged students (the bottom 25%) by 81 score points in mathematics. This is similar to the average difference between the two groups (93 score points) across OECD countries.⁵⁶

⁵³ This index is a summary measure of the amount of human capital that a child born today can expect to acquire by age 18, given the risks of inadequate health and inadequate education that occur in the country where she lives.

Gatti, Roberta V.; Corral Rodas, Paul Andres; Dehnen, Nicola Anna Pascale; Dsouza, Ritika; Mejalenko, Juan Elias; Pennings, Steven Michael.

The Human Capital Index 2020 Update : Human Capital in the Time of COVID-19 (English). Washington, D.C. : World Bank Group.

<http://documents.worldbank.org/curated/en/456901600111156873/The-Human-Capital-Index-2020-Update-Human-Capital-in-the-Time-of-COVID-19>

⁵⁴ OECD.2023a. PISA 2022 Results: Factsheets – Serbia, OECD, <https://www.oecd.org/publication/pisa-2022-results/country-notes/serbia-961b99f9>

⁵⁵ <https://gpseducation.oecd.org/CountryProfile?primaryCountry=SRB&treshold=10&topic=PI>

⁵⁶ OECD.2023a. PISA 2022 Results: Factsheets – Serbia, OECD, <https://www.oecd.org/publication/pisa-2022-results/country-notes/serbia-961b99f9>

Serbia lacks a systematic approach to education reform for the green transition. The response to the challenges that the green transition puts in front of the education system in Serbia is not optimal. While various initiatives are underway, there is no comprehensive strategy for systemic reform. Experts emphasize the need to focus more on new programs that would improve skills output and decrease occupations with low to no demand in the transformed market.⁵⁷ Key education system issues to be tackled in Serbia include the quality of teaching⁵⁸, digitalization and digital skills, the quality and relevance of vocational education and training, curricula modernization, access and equity, financing, governance, and early childhood education⁵⁹. The PISA 2022 assessment results⁶⁰ showed that significant work should be implemented in Serbia to improve the stagnant and below-average performance in learning outcomes and mitigate the consequences of the pandemic. According to the World Bank (2024)⁶¹ estimates, education improvement will require preparing all teachers in Serbia for green education and may cost from EUR 9.8 to 29.6 million.

As in other countries across the world, Serbian students need stronger scientific knowledge and skills in environmental sustainability. According to *PISA 2018* (OECD, 2022a)⁶² there are many students who reported that looking after the global environment is not important for them (more than 30% of students in Austria, Bosnia and Herzegovina, Germany, Serbia, the Slovak Republic, and Ukraine). The percentage of Serbian students who correctly answered environmental sustainability items across test units is below OECD average. *The European Training Foundation*⁶³ (ETF, 2023a) analyzed skills required for the green transition in EU and neighboring countries, including Serbia. Only six out of 28 countries⁶⁴ that participated in the research, namely Albania, Egypt, Georgia, Israel, Morocco, and Serbia, have reported the existence of regular skills monitoring mechanisms. However, these systems focus on general labor trends rather than green skills.⁶⁵

The Serbian education system should be more aligned with the EU sustainable development agenda. According to the *Voluntary National Review of The Republic of Serbia on the Implementation of the 2030 Agenda for Sustainable Development (2019)*⁶⁶ calls for education reforms to integrate contemporary topics and all 17 SDGs, fostering creativity, critical thinking, and innovation. Youth consultations highlight great interest in raising awareness on climate change, advocating for its inclusion both across the curriculum and as a mandatory subject in primary and secondary schools. *The Serbia and 2030 agenda: Mapping the National Strategic Framework vis-a-vis the Sustainable Development Goals November (2021)*⁶⁷ also identified gaps related to skills and education system development. However, the target to improve knowledge and skills for sustainable development is covered by the national

⁵⁷ World Bank (2024). *Western Balkans 6 Climate Change and Development Report*. Washington, DC: The World Bank. <https://hdl.handle.net/10986/41881>

⁵⁸ Almeida, R., Avitabile, C. and Shmis, T. 2023. *World Bank*, 14 December 2023, <https://blogs.worldbank.org/education/beyond-learning-drop-why-countries-eastern-europe-and-central-asia-should-act-now-avoid>

⁵⁹ OECD. 2022. Multi-dimensional Review of the Western Balkans: From Analysis to Action. Paris: OECD, <https://www.oecd.org/publications/multi-dimensional-review-of-the-western-balkans-8824c5db-en.htm>

⁶⁰ OECD. 2023a. PISA 2022 Results: Factsheets – Serbia, OECD, <https://www.oecd.org/publication/pisa-2022-results/country-notes/serbia-961b99f9>

⁶¹ World Bank (2024). *Western Balkans 6 Climate Change and Development Report*. Washington, DC: The World Bank, <https://hdl.handle.net/10986/41881>

⁶² OECD. 2022a. *Are Students Ready to Take on Environmental Challenges?*, PISA, Paris: OECD Publishing, https://www.oecd-ilibrary.org/education/are-students-ready-to-take-on-environmental-challenges_8abe655c-en, <https://doi.org/10.1787/8abe655c-en>.

⁶³ ETF. 2023a. *Skills for the Green Transition: Evidence from the EU Neighborhood*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/2023-11/Skills%20for%20the%20green%20transition.pdf>

⁶⁴ Research has been conducted in the following countries: Albania, Algeria, Armenia, Azerbaijan, Bosnia and Herzegovina, Egypt, Georgia, Israel, Jordan, Kazakhstan, Kosovo, Kyrgyzstan, Lebanon, Moldova, Montenegro, Morocco, North Macedonia, West Bank and Gaza, Serbia, Tajikistan, Tunisia, Türkiye, Turkmenistan, Ukraine and Uzbekistan.

⁶⁵ World Bank. 2022. *Supporting Serbia's Transition to Greener and More Resilient Growth: Policy and Institutional Reforms*. Washington, DC: The World Bank, <http://hdl.handle.net/10986/38271>

⁶⁶ Government of the Republic of Serbia. 2019. *Voluntary National Review of the Republic of Serbia on the Implementation of the 2030 Agenda for Sustainable Development: Towards Equality of Sustainable Opportunities for Everyone and Everywhere in Serbia through Growing into Sustainability*, URL: <https://serbia.un.org/sites/default/files/2019-08/VNR%2C%20eng.pdf>

⁶⁷ Government of the Republic of Serbia. Republic Secretariat for Public Policies. 2021. *Serbia and 2030 Agenda: Mapping the National Strategic Framework vis-a-vis the Sustainable Development Goals*, Belgrade, 2021, URL: https://rsjp.gov.rs/wp-content/uploads/Serbia-and-2030-Agenda_November-2021.pdf

regulatory framework⁶⁸, additional activities that are carried out are not systematic but are rather reduced to the activities of individual schools, often with donor support⁶⁹.

In Serbia, the green transition demands workforce reskilling and better labor market matching to manage job shifts. Labor market performance is influenced more by structural factors than climate and energy policies, particularly in matching labor supply with demand and aligning education with skill needs. However, the green transition will bring major shifts in employment across sectors, requiring workers to adapt to new roles with different skill sets. The challenges also relate to the ability of the labor market to match labor demand and labor supply, and the ability of the education and vocational training systems to train or re-train workers, which would call for significant investment in human capital by individuals, firms and the public sector.

Skills shortages and mismatches are widespread in Serbia's labor market, and the education system cannot deliver in-demand skills, including green skills. The *Second European Skills and Jobs Survey in ETF partner countries*⁷⁰ (2023) identified that 29% of Serbian workers have high unmet learning needs. 9 in 10 Serbian workers holding elementary jobs lack awareness of the new realities in the world of work. According to the *Serbian Association of Employers*⁷¹ (2022) skills shortages are an increasing obstacle to doing business in Serbia, with over 70 per cent of enterprises reporting a negative impact on development. Despite recent reforms, including the development of the national qualifications framework, the education system fails to deliver the skills the labor market needs. More than half of surveyed enterprises (53%) perceive graduates from vocational and higher education institutions as partly or completely unprepared, and approximately 45 per cent struggle to recruit workers with the right skills, especially highly skilled ones. The survey also concluded that adult professional development remains low, with a participation rate below 20 per cent, and that life-long learning opportunities are still underdeveloped. Enterprises that have made a technology-related innovation in the past three years tend to have higher growth prospects and are more likely to hire, but more of them cite the lack of skills among applicants as a problem. *The EU and the United Nations Development Programme (UNDP) report* (2021) on green finance for the private sector in Serbia highlighted an important role of micro, small, and medium-sized enterprises (MSMEs) in the economic transition to a more energy-efficient and environmentally friendly economy. However, Serbian MSMEs face barriers to green investments, exacerbated by the COVID-19 pandemic, including a lack of capital, insufficient skills and information about green technologies and financial products, and inadequate support from the regulatory environment.

Serbia has set up its National Qualifications Framework, labor market monitoring, and skills intelligence mechanisms, but they need to be more closely aligned with the green transition. Given the technological and market dynamism of the green transition, green skills tend to be a 'moving target'. The demand for specific green skills evolves over time, which makes it increasingly important to implement efficient labor market monitoring and skills intelligence mechanisms. Serbia has implemented labor market monitoring mechanisms, but they mostly capture overall trends rather than specialized green economy skills (ETF, 2023a)⁷². Furthermore, sector skills councils, which have been set up within the National

⁶⁸ The existing Strategy for the Development of Education and Upbringing recognizes the importance of improving environmental education for the needs of sustainable development. The Action Plan defines activities for the attainment of this goal (accreditation of trainings related to sustainable development, training of teaching staff on sustainable development, development and implementation of trainings to strengthen students' capacity to carry out activities related to sustainable development, collective well-being and democratic culture).

⁶⁹ During the academic year 2019/20 high school students of I and II grade had the opportunity to study the elective program Education for Sustainable Development. In the next two academic years, within the offer for III and IV grade, with two hours a week, a number of new elective programs will be introduced into the educational practice, including Education for Sustainable Development.

⁷⁰ ETF. 2023. *European Skills and Jobs Survey: Statistical Profile, Serbia*. Torino: European Training Foundation, https://www.etf.europa.eu/sites/default/files/2023-11/Statistical%20profile_RS_EN_edited.pdf

⁷¹ Serbian Association of Employers. 2022. *Enabling Environment for Sustainable Enterprises in Serbia*. Belgrade: Serbian Association of Employers, <https://www.poslodavci.rs/wp-content/uploads/2021/12/esse-eng.pdf>

⁷² ETF. 2023a. *Skills for the Green Transition: Evidence from the EU Neighborhood*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/2023-11/Skills%20for%20the%20green%20transition.pdf>

Qualifications Framework (ETF, 2021)⁷³, define the needs for qualifications in the labor market, and can play a crucial role in the identification and acquisition of green skills in Serbia.

There are widespread opportunities for green job creation in Serbia, but reaping them requires a reform of the education and training system and acquisition of the relevant skills. *The United Nations Environment Programme* (UNEP, 2013)⁷⁴ identified three promising areas for the creation of green jobs: (i) Energy demand, with emphasis on energy efficiency in buildings (including residential, commercial, and services energy use), industry, and transport; (ii) Energy supply, with emphasis on power generation, including the use of renewable energy, and (iii) Agriculture⁷⁵. Moreover, the study highlighted that education and raising public awareness about the benefits of a green economy could motivate the workforce to improve their green skills and seek employment in green sectors. Later on, *the Green European Foundation* (GrEF, 2017) conducted a study in the Balkans and identified the following sectors as potential generators of new green jobs in Serbia: green public procurement, green energy, green construction, waste management, sustainable transport, water resources management, sustainable agriculture, land management, and sustainable tourism. The report revealed a lack of relevant education to prepare a specialized, skilled, and creative workforce as a challenge across the Balkans and stated that Serbia needs a comprehensive plan for keeping young, educated people in the country and developing more programs for innovation and science exchange in both the region and the EU.⁷⁶ Lastly, the German Development Cooperation Project conducted a survey (Filipović, 2022)⁷⁷ on the main green skills needed in the country and found that the largest percentage of respondents believe that knowledge in Serbian secondary schools should be improved, primarily in the field of waste reduction and management (85%), followed by renewable energy sources (80%), energy efficiency (73%), water conservation (58%), circular economy (50%) and regulatory framework and standards (50%).

The skills' impact on the Serbian economy will go beyond just brown industries⁷⁸, with 16.5 percent of the workforce requiring upskilling or retraining in the medium run. Addressing the skills gaps for workers in occupations “at risk” will require large investments. About 5.5 percent of jobs in Serbia are in the brown industry, but the green transition will impact approximately one out of six workers in the entire labor force due to changes in technology or business models. Currently, 223 thousand workers are employed in occupations for which a high percentage of jobs will need retraining and for which the skills gap is large, and are therefore most at risk.⁷⁹ The most affected occupations in Serbia are heavy truck and bus drivers and manufacturing laborers. Missing the required investments in retraining and upskilling will put individuals at risk of unemployment and firms at risk of missing growth opportunities due to a lack of an adequate workforce (Figure 10). The transition costs in each occupation “at risk” depend on the size of the skills gap—how similar their skills are to the ones required in the closest occupation in terms of skill set. On average, workers in affected occupations will need to acquire about one-quarter of the total skills required to transition to a green occupation. At the same time, they may transition to safe occupations that aren't green but will remain relevant for the economy.

⁷³ ETF. 2021. *National Qualifications Framework – Serbia*, Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/document/Serbia.pdf>

⁷⁴ UNEP. 2013. *Green Economy Scoping Study: Serbia*, United Nations Environment Programme, Geneva: UNEP, <https://wedocs.unep.org/20.500.11822/32515>

⁷⁵ Ibid.

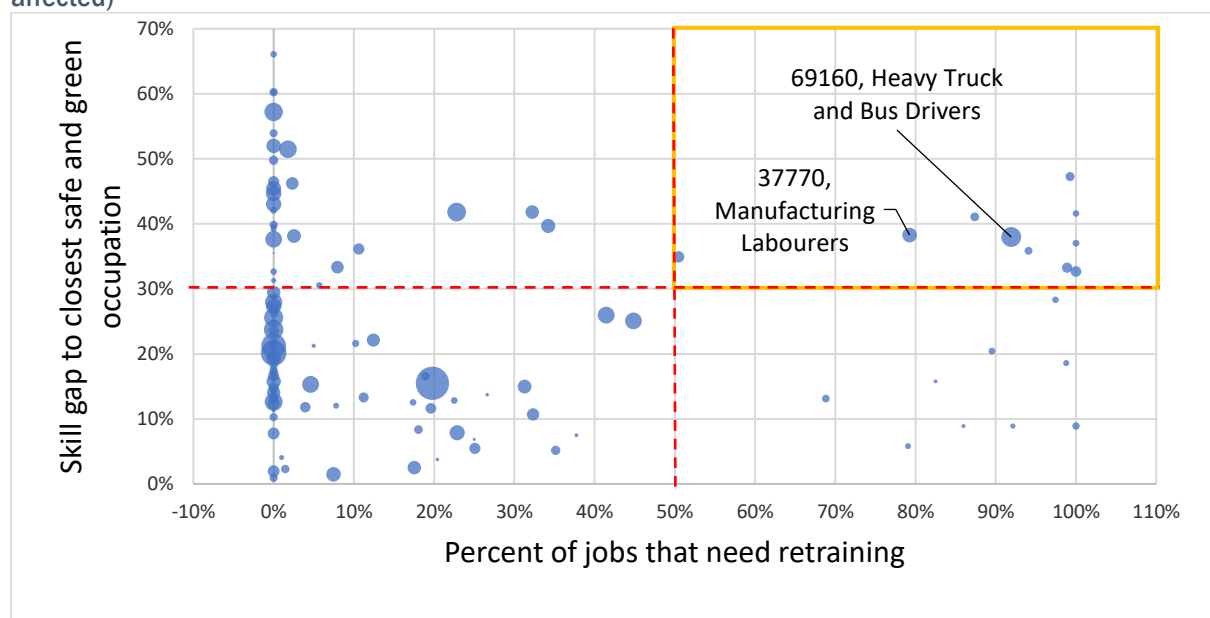
⁷⁶ GrEF. 2017. *Revision of the Economy in the Balkans: Change Policy Not Climate!* Brussels & Sofia: Green European Foundation and BlueLink Foundation, https://gef.eu/wp-content/uploads/2018/02/WEB-Version-GEF_Balkans_2017.pdf

⁷⁷ Filipovic. F. 2022. *Green Transition in Economy and Effects on Education System in Serbia*, Belgrade, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), <https://decideprojekat.org/wp-content/uploads/2022/07/lzvestaj-ZP-A4-eng-0407.pdf>.

⁷⁸ Brown industries are high carbon emitting industries (for example, mining or fossil fuel powered electricity plants).

⁷⁹ These occupations are classified in the O*Net model and include: wood treaters, cabinet-makers, and related trades workers; other craft and related workers; metal processing and finishing plant operators; rubber, plastic, and paper products machine operators; food and related products machine operators; wood processing and papermaking plant operators; other stationary plant and machine operators; heavy truck and bus drivers; manufacturing laborers; and other elementary workers. World Bank (2024). *Western Balkans 6 Country Climate and Development Report*. Washington, DC: The World Bank. <https://hdl.handle.net/10986/41881>

Figure 10. Occupations and number of workers that need retraining (the yellow area shows the most affected)



Source: Serbia Country Compendium Note CCDR, <https://www.worldbank.org/en/country/serbia/publication/serbia-country-climate-and-development-report>

The most important skills needed for the transition surround cognitive abilities and knowledge in STEM—science, technology, engineering, and mathematics. Developing these skills takes longer than acquiring physical, psychomotor, or sensory abilities. Other skills, such as complex problem solving, critical thinking, or equipment maintenance, are also needed, while gaps in social skills are less critical. To facilitate this change, ALMPs supporting on-the-job training or upskilling for unemployed people will not be sufficient and need to be complemented with long-term education and training reforms. This also requires adjustments on the supply side of training provision, including training for adult workers, with an increasing role for the private sector to play. The World Bank estimates show that the cost of retraining and reskilling the most “at risk” workers for Serbia may reach up to EUR507 million if they are retrained into safe occupations, and up to EUR⁸⁰.

For climate change mitigation, green technologies must be absorbed, adapted, and developed to the local needs and circumstances. Catching-up growth by advancing their institutions and technology to close the gap with more developed nations.⁸¹ Technology absorption refers to the acquisition, development, assimilation, and utilization of technological knowledge and capability by firms and other entities from external sources. Successful technology absorption entails mastering specific technologies, adjusting them to local needs, and creating rich knowledge spillovers, which can then lead to further innovations. Development and deployment of green technologies requires skills acquisition to be complemented with other relevant resources and cross-sectoral partnerships. Collaboration between public and private sectors in research, development, and innovation should be promoted and co-financed.

⁸⁰ Ibid.

⁸¹ Lee, Jeong-Dong, Keun Lee, Dirk Meissner, Slavo Radosevic, and Nicholas S. Vonortas. 2021. “Technology Upgrading and Economic Catch-Up Context, Overview, and Conclusions.” In *The Challenges of Technology and Economic Catch-up in Emerging Economies*, edited by Jeong-Dong Lee, Keun Lee, Dirk Meissner, Slavo Radosevic, and Nicholas S. Vonortas, 1–34. Oxford: Oxford University Press.

Curriculum and government programs on climate change and green transition

While Serbia's educational curriculum still needs improvement, numerous government programs already address climate change and the green transition, helping to mitigate climate impact and develop green skills and attitudes. These initiatives include both top-down and bottom-up approaches which adapt international good practices and/or provide customized local response to the issue of climate change and environmental sustainability. The following sections analyze these initiatives across four key areas: (i) primary and secondary schools, where foundational green skills and behaviors develop; (ii) technical and vocational education and training (TVET), which focuses on technical and specialized green skills; (iii) higher education and research & innovation system, which develop advanced green skills and technologies; and (iv) green education infrastructure, which promotes sustainable building practices.

Pre-primary, primary and secondary schools

The topics related to the environment and sustainability are integrated into various subjects in Serbian schools with an objective to build foundational knowledge and of environmental awareness. Education policy in Serbia envisages that environmental and health education should be implemented through curricular, extracurricular, and after-school activities at the level of primary education⁸². Environmental content is intertwined through many subjects and there is continuity in its study from the pre-school age (Lenhardt, Smederevac-Lalić and Radović, 2019).⁸³ The preparatory preschool program, which is part of a compulsory nine-year education in Serbia, includes the topics from the area of environmental protection, such as food chains and pollution. Starting at first grade (age 7) with the subjects called “The world around us” and “Nature and society” children learn about ecology and human impact on nature. The main objective is to create the foundations of environmental issues, develop awareness about the environment, and build the capacity for responsible living. Ecological content in higher elementary education (grades 5 to 8) is represented through teaching subjects of natural sciences (biology, geography, chemistry and physics), which is later continued with more complex topics at the secondary level of education. Students develop a sense of responsibility towards the state of the environment and ecosystem and its vulnerability. Geography classes help children to understand the importance of protecting the Earth’s spheres, and chemistry classes support children in developing awareness of the importance of responsible and rational use and disposal of the various substances in everyday life. Lastly, the physics curriculum is designed to teach pupils the connection between physical phenomena and ecology and develop awareness of the needs to protect, restore and improve the environment. There are also several elective courses related to environmental education, such as Nature safeguards, Hand in Dough and National Tradition. Moreover, Serbian schools establish environmental clubs where students can deepen their knowledge on environmental topics, organize awareness campaigns, and participate in eco-friendly projects.

Environmental education plays a vital role in promoting sustainability and conservation efforts in Serbia, but learning processes should be improved and implemented in a more systematic way. In recent years, Serbia has achieved notable progress in environmental education initiatives, which focus on the areas such as biodiversity conservation, waste management and recycling, energy efficiency, and water conservation. Schools and educational institutions have integrated ecological subjects into their curricula, ensuring that young individuals grasp the importance of safeguarding the environment. Developing awareness of sustainability, preservation of nature and the environment, and ecology-

⁸² Stanišić J. and Maksić S. 2014. Environmental Education in Serbian Primary Schools: Challenges and Changes in Curriculum, Pedagogy, and Teacher Training, *The Journal of Environmental Education*, 45(2): 118-131, <https://doi.org/10.1080/00958964.2013.829019>

⁸³ Lenhardt, M., Smederevac-Lalić, M. and Radović, V. 2019. Short Country Report SERBIA: SWOT Analysis of Education for Environmental Citizenship. In: Hadjichambis, A. Ch., Reis, P. & Paraskeva-Hadjichambi, D. (Eds.). 2019. *European SWOT Analysis on Education for Environmental Citizenship*. ENEC Cost Action. Lisbon: Institute of Education – University of Lisbon, Cyprus Centre for Environmental Research and Education & European Network for Environmental Citizenship, 207-217, https://enec-cost.eu/wp-content/uploads/2020/04/Country-Report_SERBIA.pdf

related ethics are mandatory. Some of the environmental education projects in primary and secondary schools are described in Table 1. A Green Pack⁸⁴ of dedicated teaching and learning materials is provided to schools of all types and education levels. Additionally, collaboration between schools and environmental NGOs is common. NGOs often provide educational resources, organize workshops for teachers, and support schools in implementing sustainable practices and awareness campaigns to involve the broader public (Dimitrijević, 2023).⁸⁵ However, the challenges observed by Stanišić and Maksić (2014)⁸⁶ still seem to be pertinent. Namely, the expected learning outcomes are ambitious and demanding. The curriculum contains too many overlapping topics without clear connections, leading to inefficient learning. Furthermore, learning should be more project- and practice-oriented, and teacher training should be provided more broadly.

Table 1: Selected environmental education projects in primary and secondary schools

Initiative	Type	Description
Preschool Curriculum Framework	World Bank “Inclusive Early Childhood Education and Care (ECEC)” investment project	One of the pillars of the ongoing World Bank “Inclusive Early Childhood Education and Care (ECEC)” Project is strengthening the quality of preschool services. New innovative ECEC centers will serve as laboratory preschools for training and knowledge-sharing purposes. These centers will share best practices in developing child-centered curriculum and modern teaching approaches. New manuals, guides and literature for preschool education and care will be developed and teachers will be trained on how to implement new curriculum.
Eco-schools⁸⁷	Environmental Ambassadors for Sustainable Development ⁸⁸	The program aims to raise students' awareness of environmental and sustainable issues development, through curricular and extracurricular activities, as well as through school and community actions ⁸⁹ . In Serbia, 130 schools have an eco-school label and have fulfilled the requirements ⁹⁰ .
Climate box⁹¹	An integrated climate education program developed by UNDP, together with the Global Environmental Fund (GEF), the “Coca-Cola” company, and with the financial support of the Russian Federation.	The program uses an interactive learning toolkit on climate change, which contains materials for students and teachers. It is focused on school children, civil society organizations, as well as parents and the general public. The climate box can be implemented in formal education, extracurricular activities, and projects on climate change.

⁸⁴ ETF. 2021a. Leading by example - Education, training and skills for Europe's green future, 31 March 2021, European Training Foundation, <https://www.etf.europa.eu/en/news-and-events/news/leading-example-education-training-and-skills-europes-green-future>

⁸⁵ Dimitrijević, K. 2023. Environmental Education in Serbia: Learning to Protect the Environment, *Green Scent*, <https://www.green-scent.eu/environmental-education-in-serbia-learning-to-protect-the-environment/>

⁸⁶ Stanišić J. and Maksić S. 2014. Environmental Education in Serbian Primary Schools: Challenges and Changes in Curriculum, Pedagogy, and Teacher Training, *The Journal of Environmental Education*, 45(2): 118-131, <https://doi.org/10.1080/00958964.2013.829019>

⁸⁷ Eco-Schools is a global sustainable schools program, which starts in the classroom and expands to the community by engaging the next generation in action-based learning. Eco-school campaign initiated by the Foundation for Environmental Education (FEE) whose goal is to encourage and involve people in the preservation and development of our natural environment through educational activities. Eco-Schools is implemented in 73 countries by FEE member organizations and in 26 countries through International Schools.

⁸⁸ Environmental Ambassadors for Sustainable Development (EASD) is a non-for-profit professional association focusing work on education, as well as the research and science (professional and citizens) promotion, in the areas of sustainable development and environment/climate change.

⁸⁹ EASD. 2020. *Priručnik za eko-škole*. Belgrade: Environmental Ambassadors for Sustainable Development, <https://ambassadors-env.com/wp-content/uploads/Uputstvo-1.pdf>

⁹⁰ Kovách, I., Megyesi, B.G., Barthes, A., Oral, H.V. and Smederevac-Lalic, M. 2021. Knowledge Use in Education for Environmental Citizenship—Results of Four Case Studies in Europe (France, Hungary, Serbia, Türkiye), *Sustainability*, 13 (19), 11118, <https://www.mdpi.com/2071-1050/13/19/11118>, <https://doi.org/10.3390/su131911118>

⁹¹ UNDP. 2021. *Climate Box*, *United Nations Development Programme*, <https://climate-box.com/about-us/>

Informal Curriculum ⁹²	An interdisciplinary educational program developed by the Green School, an initiative of organizations from Croatia, Serbia, and Slovakia	The program is intended for elementary school students, which integrates scientific knowledge from different scientific fields and was created through experiential learning. It is based on a personalized approach to teaching and learning, with determination of topics in line with specific needs of students. It is implemented in the form of educational nature trips, different activities in nature and processing the findings in the classroom.
European Climate Change Curriculum ⁹³	Erasmus+ project implemented by the consortium of four secondary schools and five NGOs from Denmark, Serbia, the Netherlands, and Spain	The main project result is a new educational approach to climate change, intended for high school students and to be used inside and outside the classrooms throughout Europe. Developed e-book presents the overview of the main perspectives, challenges and opportunities related to the climate change in participating countries and in the context of the European Union.
Green Education for Primary Education Teachers ⁹⁴	Framework for incorporating sustainable practices and environmental awareness into the classroom.	Publication which offers an innovative theoretical and practical model to promote green education in primary schools, focusing on inspiring teachers to design and execute effective green education activities. This model was pilot-tested with over 60 teachers in Bulgaria, Romania, and Serbia.
Sunny Schools in the Western Balkans ⁹⁵	A part of the multi-year regional initiative implemented by the Foundation for an Open Society of the Western Balkans.	The regional initiative involves the installation of solar panels in selected schools in the Western Balkans, research on the green transition at the level of the countries involved, and an educational component that includes work with elementary school students in the field of environmental protection, fair energy transition, sustainable development, green skills, and education. In Serbia, project activities were implemented in the territory of Kragujevac, in six elementary schools: "Stanislav Sremčević", "Sveti Sava", "Miloje Simović" Dragobrača, "Natalija Nana Nedeljković" Veliko Polje, "Dositelj Obradović" Erdeč, "Sreten Mladenović" Desimirovac

Sources: various (please see footnotes)

Technical and vocational education and training (TVET)

The scope, content, and purpose of environmental education in secondary schools depends on the type of program in which the students are enrolled, but it is mainly related to the natural sciences subjects. According to Lenhardt et al. (2019)⁹⁶, in general and language education programs, the environmental content is only studied in the context of physics, chemistry, biology, and geography. The expected learning outcomes focus not only on knowledge acquisition but also on developing skills and attitudes. In TVET, in addition to the natural sciences subjects, specific environmental topics are covered within vocational subjects, where appropriate, e.g., in the programs focused on engineering and environmental protection. However, to further strengthen this, environmental content should ensure that the students

⁹² Green School. 2022. *Green School*, <https://www.digitalherbarium.eu/>

⁹³ ECCC. 2024. *E-book: Questions and exercises for the Serbian chapter*, European Climate Change Curriculum, <https://climateperspectives.eu/serbian-perspectives/ebook/>

⁹⁴ Afrikanov, L. 2023. *Green Education for Primary Teachers in Bulgaria, Romania and Serbia. Theoretical and practical model*, Sofia: Bulgarian Union of Teachers, <https://files.eric.ed.gov/fulltext/ED628525.pdf>

⁹⁵ Belgrade Open School (BOS). *Green Generation – Schools Engaged for Climate Action*. Available at: <https://www.bos.rs/en/ongoing-project/99/1266/green-generation--schools-engaged-for-climate-action.html> [Accessed 13 March 2025].

⁹⁶ Lenhardt, M., Smederevac-Lalić, M. and Radović, V. 2019. Short Country Report SERBIA: SWOT Analysis of Education for Environmental Citizenship. In: Hadjichambis, A. Ch., Reis, P. & Paraskeva-Hadjichambi, D. (Eds.). 2019. *European SWOT Analysis on Education for Environmental Citizenship*. ENEC Cost Action. Lisbon: Institute of Education – University of Lisbon, Cyprus Centre for Environmental Research and Education & European Network for Environmental Citizenship, 207-217, https://enec-cost.eu/wp-content/uploads/2020/04/Country-Report_SERBIA.pdf

gain practical, occupation-specific green skills relevant to their professions. Ecology has only recently been introduced as a dedicated subject in specific secondary vocational schools.

There is a need for a systematic reform of the TVET system in Serbia in order to train students and the workforce for the green transition. Serbia's vocational training system is not yet equipped to train enough specialists in green skills and is slow to adapt to the country's climate-focused and digital transformation. Changes in labor demand driven by foreign direct investment in manufacturing companies and the growth of the ICT sector require educational institutions to respond accordingly and address the need to incorporate green skills into their programs. GIZ⁹⁷ has recently launched a project to incorporate green skills in vocational training and employment. This initiative aims to facilitate the teaching of green skills and accelerate the green transformation in companies, and thus increase the competitiveness of the Serbian economy. The project is implemented in collaboration with the Serbian Chamber of Commerce and involves other key TVET stakeholders – such as the Ministry of Education of the Republic of Serbia, the Office for Dual Education and the National Qualifications Framework of the Republic of Serbia, and vocational schools, whose awareness and capacities are being built. Moreover, the project entails a revision of the existing vocational training programs by adding green skills to them, as well as the development of new green training programs.

Higher education and research & innovation system

Serbian university students support education for sustainable development, highlighting the need for broader integration into higher education and stronger societal promotion. Nikolić et al. (2020)⁹⁸ analyzed university students' attitudes in Serbia towards sustainable development and its integration into higher education, finding generally positive views. However, they also identified a number of obstacles and uncertainties – students did not see higher education institutions as responsible for promoting sustainability and felt marginalized in their ability to influence society. The study indicates the demand for a broader inclusion of sustainable development topics and programs into university education and stronger promotion of sustainability within the Serbian economy and society to enhance the relevance and impact of students' knowledge and skills in their future careers.

Environmental protection programs exist in many Serbian universities, but broader integration of sustainability education remains limited, with interdisciplinary programs still rare. Study programs in the field of environmental protection are represented at many universities in the Republic of Serbia, whereas several faculties have departments that are specialized in providing higher education in eco-safety and environmental protection, e.g. Faculty of Physical Chemistry, Faculty of Biology, and the Military Academy (Lenhardt et al, 2019)⁹⁹ According to Nikolić, Milutinović, and Ranitović (2015)¹⁰⁰, most of the activities for the implementation of education for sustainable development were implemented in terms of education for environmental protection. Special courses related to environmental protection have been introduced in the curricula of different universities. However, broader greening of higher education was limited. Interdisciplinary and multidisciplinary environmental and sustainable development programs that would serve the needs of both students and their employers were still rare at the time, and the situation is similar today.

Green transformation of Serbian universities is facilitated through their collaboration with European peer institutions. Two large Serbian universities (University of Belgrade and University of Novi Sad) and

⁹⁷ GIZ. 2024. *Teaching Skills for Green Transformation: Vocational Education and Youth Employment in Serbia*. <https://www.giz.de/en/worldwide/123790.html>

⁹⁸ Nikolić, V., Vukić, T., Maletaski, T. and Andevski, M. 2020. Students' Attitudes towards Sustainable Development in Serbia, *International Journal of Sustainability in Higher Education*, 21(4): 733-755.

⁹⁹ Lenhardt, M., Smederevac-Lalić, M. and Radović, V. 2019. Short Country Report SERBIA: SWOT Analysis of Education for Environmental Citizenship. In: Hadjichambis, A. Ch., Reis, P. & Paraskeva-Hadjichambi, D. (Eds.). 2019. *European SWOT Analysis on Education for Environmental Citizenship*. ENEC Cost Action. Lisbon: Institute of Education – University of Lisbon, Cyprus Centre for Environmental Research and Education & European Network for Environmental Citizenship, 207-217. https://enec-cost.eu/wp-content/uploads/2020/04/Country-Report_SERBIA.pdf

¹⁰⁰ Nikolić, V. Milutinović, S. and Ranitović, J. 2015. Greening of higher education in the Republic of Serbia, *Envigogika*, 10 (1), doi: 10.14712/18023061.453

the Conference of the Universities of Serbia¹⁰¹, which gathers 17 Serbian universities, are members of the European University Association (EUA). EUA recognizes higher education institutions as critical stakeholders in the green transition and developed a Green Deal roadmap for universities¹⁰², which contains recommendations and good practices for its members on supporting the green transition through research and innovation, education, university governance and public engagement. The University of Belgrade is also a member of CIRCLE.U¹⁰³, a European university alliance focused on higher education, research, and innovation in the areas of global health, climate and democracy. The latter has also recently introduced an interdisciplinary master's course on Climate Change and Adaptation, which integrates the knowledge and perspectives of natural, technical and social sciences (Luković, 2023)¹⁰⁴, and has created the Centre for Ecological Policies and Sustainable Development.

Serbia has established research and innovation activities for the green transition, but stronger science-industry collaboration and better technology transfer mechanisms are needed. Research and innovation activities, which should lead to green innovation and support the green transition, are relatively well-established in the country. However, science-industry linkages and technology transfer activities should be improved through already established policy instruments which provide such support (cf. Račić, 2024¹⁰⁵ and below). A good practice example is the University of Novi Sad - Faculty of Technical Sciences, which has successfully created numerous spin-off companies and demonstrated the importance of intellectual property creation as a precondition for foreign investments in research and development and employment of high-tech staff¹⁰⁶. Their research tackles relevant green transition topics such as smart networks, integration of renewable energy sources, advanced systems for storage and distribution of energy, monitoring energy efficiency, development of smart cities, and sustainable biomass production. Another notable example is the Center of Excellence for Green Technologies at the University of Belgrade - Institute for Multidisciplinary Research. Its seven laboratories conduct research on renewable energy, sustainable agriculture, protection, control and purification of water, soil and air, new technologies that reduce energy consumption, and reduce the use and production of toxic substances.¹⁰⁷

Green innovation in Serbia is prioritized and supported both by national policymakers and international organizations. At the national level, the *Smart Specialization Strategy in the Republic of Serbia 2020-2027*¹⁰⁸ prioritizes environmental protection and energy efficiency across all innovation sectors. To receive support, energy-efficient and eco-smart solutions must be integrated into priority areas. National policymakers, along with international organizations like UNDP and the EU, have implemented specific policy instruments for green research and innovation (see Table 2). These programs have fostered green innovation development, where commercialization could strongly facilitate the green transition and economic development in Serbia. However, expanding and scaling these initiatives—both nationally and internationally—will require additional support and funding.

¹⁰¹ Conference of the Universities of Serbia (CONUS) was founded in 2005. It gathers 17 accredited universities from Serbia that host around 250.000 students and more than 20.000 professors and researchers. The aim of the CONUS is to coordinate the activities of all accredited universities, both public and private, by creating common policies and enabling realization of shared interests.

¹⁰² EUA. 2023. *A Green Deal Roadmap for Universities*, Brussels: European University Association, <https://eua.eu/downloads/publications/eua%20green%20deal%20roadmap.pdf>

¹⁰³ <https://www.circle-u.eu/>

¹⁰⁴ An interview with Professor Jelena Luković from the University of Belgrade was held by Domagoj Račić and Tigran Shims on 14 November 2023.

¹⁰⁵ Račić, D. (ed.). 2024. *ERA Country Reports: Serbia*. Brussels: European Commission. <https://european-research-area.ec.europa.eu/sites/default/files/documents/2024-05/ERA%20Country%20Report%202023%20Serbia.pdf>

¹⁰⁶ Government of Serbia. 2020a. *Smart Specialization Strategy of the Republic of Serbia for the period 2020-2027*, Belgrade: Government of Serbia, https://pametnaspjecijalizacija.mpn.gov.rs/wp-content/uploads/2021/06/Strategija-pametne-specijalizacije_EN_WEB.pdf

¹⁰⁷ University of Belgrade. 2024. *Center for Green Technologies*, <https://www.imsi.bg.ac.rs/en/center-for-green-technologies/>

¹⁰⁸ Government of Serbia. 2020a. *Smart Specialization Strategy of the Republic of Serbia for the period 2020-2027*, Belgrade: Government of Serbia, https://pametnaspjecijalizacija.mpn.gov.rs/wp-content/uploads/2021/06/Strategija-pametne-specijalizacije_EN_WEB.pdf

Table 2: Selected green innovation policy instruments and initiatives

Policy instrument / Initiative	Implementing organization	Description
Green Innovation Vouchers ¹⁰⁹	European Bank for Reconstruction and Development (EBRD)	Green Innovation Vouchers were designed as an instrument to support the development and implementation of innovative green technologies and boost innovation capacity, university-industry collaboration, and the formation of longer-term, more in-depth relationships. Green technology SMEs (suppliers or end-users) interested in developing a resource-friendly product/service/process received grants of up to EUR 50k for businesses to cover up to 90% of external R&D service costs. 44 projects were supported, and the total value of the awarded vouchers was EUR 770k. Innovation vouchers ¹¹⁰ with a broader purpose were subsequently introduced by the Innovation Fund of the Republic of Serbia.
Innovation Challenge Calls ¹¹¹	UNDP Serbia Resilience Team	69 green initiatives which were supported (from 2017 to 2023) with EUR 3.8 million in co-financing and EUR 42.8 million mobilized for their implementation. These green innovations came from private and public companies, research and civil society organizations, and local governments. After the first round of evaluation, the selected solutions enter the acceleration phase, where they receive mentorship and training to turn their ideas into viable business plans or deployable green investments. Those who successfully completed the acceleration process received co-funding for implementation.
Circular economy innovation competition ¹¹²	MEP and UNDP, supported by the Global Environmental Fund (GEF)	21 best innovative ideas for the further development of the circular economy in Serbia were awarded and received financial support. The awarded innovations come from public and private companies, local self-governments, civil society organizations, and scientific institutions and have been selected through previously organized public calls. The competition was organized within the project Reducing the carbon footprint of local communities by applying the principles of the circular economy in the Republic of Serbia – Circular Communities.
Green Program of Cooperation Between Science and Industry ¹¹³	Science Fund of the Republic of Serbia	The Program supports cooperation between science and industry in applied research projects in all fields of science that tackle issues related to climate change, environmental pollution, biodiversity, and use of natural resources, enabling better monitoring, reporting, and prevention of pollution of air, water, soil, and consumer products. The total budget of the Program was EUR 3,5

¹⁰⁹ Gajić, D. 2019. *Green Innovation Vouchers*. Presentation given at the JRC Conference on "Unveiling Serbia's Smart Specialization Strategy and exploring the role of incubators, accelerators and S&T Parks in delivering sector specific support in the Western Balkans and South-East Europe", Belgrade, 16 October 2019, https://joint-research-centre.ec.europa.eu/system/files/2019-10/20191016-s3tt_serbia-dgajic_en.pdf

¹¹⁰ Innovation Fund. 2023. *Innovation vouchers*. Belgrade: Innovation Fund of the Republic of Serbia, <https://www.inovacionifond.rs/en/programs/innovation-vouchers>

¹¹¹ Tadić, M., Drašković, D and Chomich, L. 2023. Catalyzing Serbia's Green Transformation: How UNDP Serbia Innovation Challenge Calls turn green ideas into reality, November 2023, *United Nations Development Programme*, <https://www.undp.org/serbia/blog/catalyzing-serbias-green-transformation>

¹¹² Circular communities. 2023. *Circular Communities*, 8 December 2023, <https://www.cirkularnezajednice.rs/en/the-best-innovations-in-the-field-of-circular-economy-in-serbia-rewarded>

¹¹³ Science Fund. 2024. *Green Program of Cooperation Between Science and Industry*. Belgrade: Science Fund of the Republic of Serbia, <https://fondzanauku.gov.rs/green-program-of-cooperation-between-science-and-industry/?lang=en>

million, and 20 projects have been selected and implemented so far.

Sources: various (please see footnotes)

Green education infrastructure

Serbian educational facilities are vulnerable to climate hazards, requiring interventions to minimize disruptions to local communities. Matching the geolocation of primary and secondary schools with their localized exposure to hazards suggests that around 12 percent are highly exposed to floods.¹¹⁴ Similarly, 10 percent of schools have medium or higher exposure to landslides, with 1.5 percent of those being highly exposed. Exposure to wildfires is lower, possibly due to schools being more often located in urban areas further away from forests where wildfire risk is higher. Only 0.3 percent of schools are highly exposed to wildfires, while around 1.3 percent display medium or higher exposure. School closures caused by disaster events significantly impact student outcomes, as recently confirmed by Jakubowski, Gajderowicz, and Patrinos (2024).¹¹⁵ As part of the adaptation, Serbia will need to consider greening schools.¹¹⁶

Adequate educational infrastructure promotes adaptation to climate change while also facilitating the acquisition of skills, knowledge, and attitudes by the students and the wider community, thereby fostering a green transition. Although educational institutions may not be a major contributor to climate change, they can serve as models for the deployment of environmental protection and energy efficiency measures, renewable energy and overall decarbonization. Implementing sustainable practices in school and university complements the changes in the curriculum, reinforcing their impact. In Serbia, such green initiatives are becoming more common in educational and research institutions (see Table 3 for examples).

Table 3: Selected green infrastructure initiatives in education and research

Policy instrument / Initiative	Implementing organizations	Description
ECEC centers	World Bank and the Ministry of Science Education and Technological Development	The €47 million ECEC project will support an increase in preschool facilities through new construction, repurposing, and upgrading public buildings, providing space for an additional 17,000 preschoolers spaces. The project supports 22 construction projects, adding a total of 3,300 new spaces for children at preschool institutions. 5 innovative ECEC centers will serve as a Moreover, the Project includes training and capacity building for local architects and engineers, focusing on contemporary architecture and cost and energy-efficient construction approaches. The project aims to improve preschool architecture in Serbia to increase efficiency in the supply of preschool places, aligning with contemporary practices and child-centered pedagogy. This includes regulatory reforms that favor innovative approaches to energy-efficient building design.

¹¹⁴ High exposure is defined as a 1 percent yearly probability of a flood, either fluvial or surface water, with depth over half a meter.

¹¹⁵ Jakubowski, Maciej, Tomasz Gajderowicz, and Harry A. Patrinos. 2024. "Covid-19, School Closures, and Student Learning Outcomes: New Global Evidence from PISA." Discussion Paper No. 16731, Institute of Labor Economics, Bonn.

¹¹⁶ Dozol, Adrien, Diego Ambasz, and Tigran Shmis. 2023. "Greening Public Human Development Buildings in Croatia: Support for the Implementation of the European Green Deal in the Croatian Health and Education Sectors." Policy Note, World Bank, Washington, DC.

Serbian Education Infrastructure ¹¹⁷	Government of Serbia European Investment Bank (EIB)	The project supports the implementation of the Strategy for Education Development by 2030. By contributing to the modernization of education facilities, particularly of the regional training centers, the project is expected to improve the quality of education in Serbia and its alignment with the labor market needs, especially for TVET studies. The project also includes energy efficiency measures to significantly improve the energy performance of the education facilities and provision of new equipment to support new pedagogical methods.
Energy Efficiency in Public Buildings ¹¹⁸	Ministry of Mining and Energy GIZ KfW	The project was implemented from October 2015 to December 2019. It was focused on improving energy efficiency in the country's 6,500 schools and kindergartens by improving the legal framework, introducing instruments to estimate the scope for saving costs and energy, setting up an advisory and information platform and training janitors and craftsmen. In parallel, Kreditanstalt für Wiederaufbau (KfW) provided funding to rehabilitate selected schools and improve their energy performance. Another new project financed by the EBRD is starting in 2024 to support energy efficiency measures in Serbian schools ¹¹⁹ .
Solar power plants at the University of Novi Sad ¹²⁰	Government of the Autonomous Province of Vojvodina University of Novi Sad	The Autonomous Province of Vojvodina in Serbia has secured financing for the installation of solar power plants on the roofs of 19 faculties and colleges at the University of Novi Sad in 2023 and 2024. A public call for funds for educational institutions to purchase and install photovoltaic systems was launched by the regional government.
BIO4 Campus ¹²¹	Government of Serbia	Serbia is building the multidisciplinary BIO4 Campus for research and development of life sciences within four themes: biomedicine, biotechnology, bioinformatics, and biodiversity. The campus will be built on the principles of green and energy-efficient construction. ¹²²

Sources: various (please see footnotes)

¹¹⁷ EIB. 2022. Serbian Education Infrastructure, *European Investment Bank*, <https://www.eib.org/en/projects/pipelines/all/20210535>

¹¹⁸ GIZ. 2015. Energy efficiency in public buildings, *GIZ*, <https://www.giz.de/en/worldwide/38300.html>

¹¹⁹ EBRD <https://www.ebrd.com/work-with-us/projects/psd/55483.html>

¹²⁰ Spasić, V. 2023. All faculties in Novi Sad will start producing electricity in rooftop PV plants, *Balkan Green Energy News*, 10 November 2023, <https://balkangreenenergynews.com/all-faculties-in-novi-sad-will-start-producing-electricity-in-rooftop-pv-plants/>

¹²¹ Baletić, K. 2023. Serbia Launches Start of Work on Biotech Campus, *Balkan Insight*, 27 December 2023, <https://balkaninsight.com/2023/12/27/serbia-launches-start-of-work-on-biotech-campus/>

¹²² UN. 2023. Serbia Reaffirms its Commitment to Agenda 2030 at the SDG Summit in New York, 27 September 2023, *United Nations*, <https://serbia.un.org/en/247531-serbia-reaffirms-its-commitment-agenda-2030-sdg-summit-new-york>

Conclusions and Recommendations

Serbia's education and training system should be designed to systematically integrate green skills and attitudes into lifelong learning. The following conclusions and recommendations wrap up the analysis and indicate the way forward around four key areas:

- i. Strategic approach: a clear strategy for green skills should guide specific interventions.
- ii. Foundational skills: strengthening basic skills is essential for Serbian students to match international peers and develop lifelong learning abilities, including green skills.
- iii. Skills anticipation and matching: a stakeholder-driven system should align education with labor market needs, helping to green occupational standards and enhance TVET, adult education, and ALMPs.
- iv. Advanced green skills: higher education should play a stronger role in fostering green research and innovation to develop complex green skills.

Strategic Approach to Green Skills

Serbia faces persistent skills shortages and mismatches that predate the green transition. Strengthening foundational skills, reskilling systems, and labor market matching is critical to improving overall productivity and equity. These system-wide reforms will also support the transition to a greener economy. In addition, Serbia must address new and specific demands for green skills, such as knowledge of sustainability, technical training for green sectors, and investment in green R&D.

Green skills need to be developed within national education skills strategies, in cooperation with relevant actors, and through an effective social dialogue at national and sectoral levels (cf. EESC, 2021).

National policies, laws, and regulations related to the green transition in Serbia revolve around sustainable and low-carbon development, climate change, and environmental protection, whereas separate strategies tackle education and skills. The existing strategic documents, such as the *Employment Strategy of the Republic of Serbia 2021-2026*¹²³, the *Strategy for Education and Upbringing Development in Serbia by 2030*¹²⁴, and the *Youth Strategy in the Republic of Serbia for the period from 2023 to 2030*¹²⁵ should be a basis for identifying a skills strategy. The strategy must align with broader development plans, such as the *Smart Specialization Strategy in the Republic of Serbia 2020-2027*¹²⁶, and the *Low-Carbon Development Strategy*¹²⁷, ensuring that future skill demands reflect Serbia's economic and environmental priorities. Policymakers need to consider the impacts of selected development objectives, priorities, instruments, and measures on the workforce and provide frameworks and funding for training, reskilling, and upskilling of workers. A cohesive strategy can be formed by updating the objectives, priorities, and instruments from the existing strategies and action plans. A clear focus on skills in key strategic documents would facilitate the implementation of targeted policies designed to support the acquisition of skills for the green transition (cf. ETF, 2023a).¹²⁸ A more specific focus on green jobs and skills needs to be sought at the level of specific sectors or regions, which may be directly affected by inadequate skills and whose stakeholders envisage opportunities from collaboration on green skills development. National plans for fostering green values, attitudes, and behaviors from an early age and throughout the education and training system should be developed,

¹²³ Government of Serbia 2021. *Employment Strategy of the Republic of Serbia 2021-2026*, Belgrade: Government of Serbia, https://sociojalnoukljucivanje.gov.rs/wp-content/uploads/2021/08/Strategija_zaposljavanja_u_Republici_Srbiji_2021-2026_engleski.pdf

¹²⁴ Government of Serbia. 2021a. *Strategy for the development of education and upbringing in the Republic of Serbia until 2030*, Belgrade: Government of Serbia, <https://dualnok.gov.rs/en/dokumenta/strategy-for-the-development-of-education-and-upbringing-in-the-republic-of-serbia-until-2030-official-gazette-of-rs-no-63-2021/>

¹²⁵ Government of Serbia. 2023a. *Youth Strategy in the Republic of Serbia for the Period from 2023 to 2030*, Belgrade: Government of Serbia, <https://mto.gov.rs/extfile/sr/1828/EN%20Youth%20Strategy%20in%20the%20Republic%20of%20Serbia%20for%20the%20period%20from%202023%20to%202030.pdf>

¹²⁶ Government of Serbia. 2020a. *Smart Specialization Strategy of the Republic of Serbia for the period 2020-2027*, Belgrade: Government of Serbia, https://pametnaspecijalizacija.mpn.gov.rs/wp-content/uploads/2021/06/Strategija-pametne-specijalizacije_EN_WEB.pdf

¹²⁷ Government of Serbia. 2023. *Low Carbon Development Strategy of the Republic of Serbia for the Period 2023-2039 with Projections*, Belgrade: Government of Serbia, https://unfccc.int/sites/default/files/resource/Low_Carbon_Development_Strategy_Serbia_2023-2030_with_2050_Projections.pdf

¹²⁸ ETF. 2023a. *Skills for the Green Transition: Evidence from the EU Neighborhood*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/2023-11/Skills%20for%20the%20green%20transition.pdf>

and the existing regulatory framework, financing, and the design of upskilling and reskilling programs should be reformed to expand the opportunities for lifelong learning, including on-the-job.

All the efforts on the mitigation and adaptation aspects of green education will require financing mobilization. Financing Serbia's green education and skilling reforms will require a mix of international support (e.g., EU IPA III, climate finance mechanisms), domestic budget reallocations, and innovative instruments such as green bonds or levies on pollution. Efficiency gains can also be realized by mainstreaming climate content into existing teacher training and curricula reform programs.

Key Recommendations:

- Develop a unified intersectoral approach to identify, develop, anticipate, and monitor green skills, e.g. by creating an interministerial green skills council or a taskforce.
- Update the regulatory framework, including *Strategy for Education and Upbringing Development in Serbia by 2030*¹²⁹ and *Employment Strategy of the Republic of Serbia 2021-2026*¹³⁰, for the green transition by explicitly including a focus on green skills.
- Identify policy measures at national and regional levels and sources of funding across national strategies and international funding providers that can foster the acquisition of green skills.
- Engage employers, trade unions and educational institutions in the identification of strategic priorities in green skills development, development of action plans and monitoring of policy outcomes at national and sectoral levels.

Figure 13: Good Practice Example – United Kingdom's Green Jobs Taskforce ¹³¹

The Taskforce was formed in 2020 by the Department for Business, Energy and Industrial Strategy and Department for Education, and is made up of members from industry, trade unions, the skills sector. The group was asked to look at the following challenges and advise government, industry and the skills sector on how to realize the United Kingdom's ambitions for green jobs: (i) the skills needed to drive a green recovery from the Covid-19 pandemic; (ii) the skills needed to reach net zero greenhouse gas emissions by 2050; (iii) how the United Kingdom can ensure green jobs are good jobs, and open to all; and (iv) how workers in high carbon-sectors can be supported to transition to the new green economy. The taskforce used a literature review and stakeholder workshops to develop policy recommendations, which were presented to the stakeholders and published in a report in 2021.

Source: GJT (2021)

Development of Foundational Skills and Attitudes as a Basis for Green Skills Acquisition

Building strong endowments of foundational skills at an early age is critical for future skills acquisition and utilization. Reforming the education system for acquisition of foundational skills requires a nearly universal access to early childhood education, curricular reform, improvements in teacher education and training and access to new technologies. Such reform should be supported by creating modern learning environments, decarbonizing education delivery, and adapting school infrastructure to climate change. Early childhood education, which sets up foundations for future learning and facilitates social integration, has been identified as one of the key educational challenges in the Western Balkans region

¹²⁹ Government of Serbia. 2021a. *Strategy for the development of education and upbringing in the Republic of Serbia until 2030*, Belgrade: Government of Serbia, <https://dualnok.gov.rs/en/dokumenta/strategy-for-the-development-of-education-and-upbringing-in-the-republic-of-serbia-until-2030-official-gazette-of-rs-no-63-2021/>

¹³⁰ Government of Serbia 2021. *Employment Strategy of the Republic of Serbia 2021-2026*, Belgrade: Government of Serbia, https://sociojalnoukljucivanje.gov.rs/wp-content/uploads/2021/08/Strategija_zaposljavanja_u_Republici_Srbiji_2021-2026_engleski.pdf

¹³¹ GJT. 2021. *Green Jobs Taskforce: Report to Government, Industry and the Skills Sector*, <https://www.gov.uk/government/publications/green-jobs-taskforce-report>

(OECD, 2022)¹³². Moreover, the 2022 PISA¹³³ showed a stagnant performance of Serbia with below-average learning outcomes, as well as the persistence of socio-economic inequalities in human capital outcomes. Environmental awareness and digital skills are also being included in core skills, which should be developed from an early age, preferably in the context of real-world problem solving and creative thinking. In the future, the Serbian education system needs to provide strong foundations in initial training for young people, to increase their foundational skills and potential occupational mobility throughout their working lives, as well as flexible and comprehensive training for green jobs to address the different learning stages during one's working life. Core skills such as decision-making, effective communication, leadership, and ability to learn throughout one's life course will remain essential and continue to underpin occupational ¹³⁴ To do so, teachers will need to assume a central role in the education system reform, which needs to be supported by their education, training, and mentorship during one's career, as well as by social status. The World Bank assumes all teachers from primary to tertiary level in the country should receive additional qualification improvement packages, which will potentially require an overall budget of EUR 9.8 million to EUR 29.6 million for the retraining of nearly one hundred thousand teachers¹³⁵ in Serbia.

The recent World Bank report on Education for Climate Action¹³⁶, emphasizes that governments can focus on improving foundational and STEM skills while enhancing climate education by using climate topics to teach literacy, numeracy, and STEM concepts. This can make green education a cross-cutting topic of education delivery. Central to this approach is the continuous professional development of educators to incorporate climate-relevant content effectively.

Key recommendations:

- Provide universal access to pre-primary education.
- Improve foundational and transversal skills, including early STEM skills critical for the green transition.
- Green-specific actions that directly respond to new demands from climate goals and sustainability transitions (Develop national green skills strategy; Integrate climate/sustainability into curricula; Train for green occupations; Boost investment in green innovation and R&D)
- Implement curricular and textbook reform and improve teachers' education, training, and professional development in the areas of behavioral change and green education.
- Fill in COVID-19 pandemic-related learning gaps (identified in PISA 2022 assessment) faced by primary and secondary school students and address socio-economic inequalities.
- Invest in green and digital school infrastructure that is energy-efficient buildings and compact structures—and embed energy-efficient technology in the curriculum to foster climate education¹³⁷.

¹³² OECD. 2022. *Multi-dimensional Review of the Western Balkans: From Analysis to Action*. Paris: OECD, <https://www.oecd.org/publications/multi-dimensional-review-of-the-western-balkans-8824c5db-en.htm>

¹³³ OECD. 2023a. PISA 2022 Results: Factsheets – Serbia, OECD, <https://www.oecd.org/publication/pisa-2022-results/country-notes/serbia-961b99f9>

¹³⁴ ILO. 2013. *Meeting skill needs for green jobs: Policy recommendations*. Geneva: International Labour Office, <https://www.ilo.org/publications/meeting-skills-needs-green-jobs-policy-recommendations>

¹³⁵ Data extracted on 18 Jan 2024 21:33 UTC (GMT) from UIS.Stat.

¹³⁶ Sabarwal, Shwetlena; Venegas Marin, Sergio; Spivack, Marla; Ambasz, Diego. 2024. *Choosing Our Future: Education for Climate Action*. World Bank. <http://hdl.handle.net/10986/42098>

¹³⁷ Alasino, Enrique; Martinez, Angeles; Barrett, Peter; Ramirez, Fernando; Shmis, Tigran; Texeira, Janssen. 2024. "RIGHT+ Framework for Physical Learning Environments (PLEs): Guidance for Resilient, Inclusive, Green, Healthy, and Teaching- & Learning-Conducive (RIGHT) PLEs Effectively Implemented (+)" World Bank, Washington, DC. License: Creative Commons Attribution CC BY 4.0 IGO. (upcoming)

Figure 14: Good Practice Example - Strengthening the Development of Foundational Skills: Education System Reform in Estonia

Key education reforms in the Republic of Estonia have included development of a new national curriculum and ongoing adaptation of that curriculum to the needs of a new economy, improved status of teachers and reformed teacher education and training to require master's degree, incorporate innovative practices and provide mentorships; guaranteed all children access to early childhood programs; and strengthened vocational education and training. Estonia emerged as a top performer on PISA 2012, ranking in the top tier in science and close to the top in reading and mathematics among all participating countries and regions. By 2018, Estonia had become a top performer globally in all three subjects and the highest performer in Europe. In addition, Estonian performance is relatively equitable with respect to socioeconomic background. Among OECD nations, Estonia has the highest percentage of resilient students, defined as those in the lowest quartile of socioeconomic status who perform in the highest quartile on PISA within their own country. The share of low-performing Estonian students in reading on PISA 2018 was less than half the OECD average.

Source: Lees (2016), <https://ncee.org/country/estonia/>

Skills Anticipation through Stakeholder Collaboration

Skills anticipation and matching system involving all relevant stakeholders should become a basis for the development of curricula, quota setting, financing, and delivery of adequate education and training on green skills. Serbia has implemented labor monitoring mechanisms, but they capture overall trends rather than specialized green economy skills. Limited skills and employment data impede precise planning and adjustments in accordance with labor market needs (ETF, 2023a)¹³⁸. In order to utilize the opportunities related to the green transition, it is necessary to strengthen skills intelligence systems for monitoring skills demands and deployment, with a focus on green skills. Sectoral skills councils¹³⁹ are appointed and monitored by the Council for the National Qualifications Framework, which also receives their advice on enrollment policy in secondary schools and higher education institutions, defines qualification standards, and recommends measures that should improve linkages between education and the labor market (EC, 2024a).¹⁴⁰ The work of the existing sectoral skills councils should be analyzed and improved on the basis of dialogue involving the representatives of employers, trade unions, educational institutions, government, etc.

Developing green skills requires flexible and inclusive learning pathways that enable individuals to reskill and upskill throughout their lives through micro-credentials, digital platforms, and modular training programs accessible across all regions and groups. Serbia can explore modular and stackable credentials in collaboration with private and international providers, enabling learners, particularly from remote and marginalized areas, to access green skills training flexibly and affordably.

Key recommendations:

- Improve the work of sectoral skills councils with representatives of employers, trade unions, educational institutions, and national/regional government by providing evidence and establishing a clear division of responsibilities, autonomy, transparency, and accountability.

¹³⁸ ETF. 2023a. *Skills for the Green Transition: Evidence from the EU Neighborhood*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/2023-11/Skills%20for%20the%20green%20transition.pdf>

¹³⁹ <http://noks.mpn.gov.rs/en/sector-skills-councils/>

¹⁴⁰ EC. 2024a. *Eurydice*. Brussels: European Commission, <https://eurydice.eacea.ec.europa.eu/national-education-systems/serbia/national-reforms-related-transversal-skills-and-employability>

- Develop skills anticipation methods by strengthening data coordination, investing in the analytical capacity of relevant national and regional authorities, systematically undertaking tracer studies, and mapping employers' skills needs.
- Develop micro-credentials for green jobs (e.g., solar technician, eco-auditor), utilize digital platforms and MOOCs, in partnerships with private providers and NGOs.

Figure 15: Good Practice Example - Shared Engagement Model for Skills Development in France

The French National Observatory for Jobs and Occupations of the Green Economy - Onemev was created in 2010 by the Ministry of Environment with the aim of analyzing employment shifts in the green economy and producing relevant methodologies and statistics. It brings together a broad range of institutions including relevant national ministries and agencies, key public employment service organizations, the main VET association, the national statistical institute, research bodies, and regional employment and training observatories. Since 2015, Onemev has comprised two groups: Observation, methods, and quantifications, which deals with quantitative data and statistics; and 'Analysis capitalization and sharing, which focuses on green employment, skills, and training issues. It has devised the approaches now used to assess the development of 'eco-activities' and green jobs and occupations.

Source: Cedefop (2018)

Greening of occupational standards and provision of skills and retraining opportunities through the tertiary education system.

Significant investment should be made in retraining current workers to support the green transition. The World Bank estimates show that the cost of retraining and reskilling of the most "at risk" workers in Serbia may reach up to EUR 507 million if they are retrained into safe occupations and up to EUR 1.77 billion if they are retrained into green occupations. Education and training systems need to prepare the flow and stock of workers with skills needed for new jobs, therefore the links between the education and training system and the labor market, including through more private sector involvement, should be increased, and mechanisms (for example, skills development funds) co-led by the private sector to support reskilling and upskilling at a larger scale should be strengthened. It is advised that tools be developed for a labor market observatory to periodically identify changes in skills demand associated with the greening of the labor market and invest in labor mobility schemes to support the geographical reallocation of jobs and workers.

Identification and development of green skills through TVET should be comprehensive rather than restricted to a few "green occupations". *The Employment Strategy of the Republic of Serbia 2021-2026*¹⁴¹ emphasizes that Serbia does not have a national definition of green jobs, which should be rectified in the future. However, it is even more important that qualifications and training programs reflect the requirements and opportunities related to green jobs. The relevant green skills encompass the sustainability mindset, technical skills, and enabling transversal skills (ETF, 2023a)¹⁴², but an actual skills framework should be developed based on the European classification of skills, competences, and occupations (ESCO).¹⁴³ Some countries, such as the United Kingdom, define and measure green jobs, whereas others opt for a horizontal approach to green skills. Namely, green skills are not restricted to a few selected new 'green occupations', as transversal green skills are more sought by employers than

¹⁴¹ Government of Serbia 2021. *Employment Strategy of the Republic of Serbia 2021-2026*, Belgrade: Government of Serbia, https://sociojalnoukljucivanje.gov.rs/wp-content/uploads/2021/08/Strategija_zaposljavanja_u_Republici_Srbiji_2021-2026_engleski.pdf

¹⁴² ETF. 2023a. *Skills for the Green Transition: Evidence from the EU Neighborhood*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/2023-11/Skills%20for%20the%20green%20transition.pdf>

¹⁴³ <https://esco.ec.europa.eu/en>

specific green skills related to green jobs narrowly defined (ILO, 2013).¹⁴⁴ The best approach, which is in line with the experiences of more advanced economies, relies on the common processes to identify skills demanded by the labor market and then applied to different TVET qualifications and programs, including new skill demands that affect existing occupations, as well as the new or emerging ones.

The focus should initially be on the development of additional green skills within existing occupations and the provision of training that will add green components to existing qualifications or programs (cf. Cedefop, 2019).¹⁴⁵ TVET curricula in general and adult education programs should be adjusted in accordance with the needs of current and prospective employers in specific sectors and regions; a practical guide can be found in UNESCO-UNEVOC (2017)¹⁴⁶. Moreover, as a participant of the ETF Network of Excellence on Greening Responses to Excellence through Thematic Actions (GRETA), Serbia has access to the newly developed comprehensive (whole institutional) approach to the greening of TVET (cf. ETF, 2023b), which interlinks the following components: (i) training (greening the curricula and training programs); (ii) teachers (professional development and training for teachers, including knowledge sharing); (iii) stakeholders (partnerships between TVET providers and parents, government officials, knowledge institutions and the business sector); (iv) funding (availability of resources); and (v) strategies (defining priorities, objectives, and timelines in regard to greening their campus or addressing the four greening dimensions).¹⁴⁷

Key recommendations:

- Identify green skills demanded by the labor market and apply them in different VET qualifications and programs, related to both existing and new or emerging occupations.
- Support training of trainers that will disseminate relevant knowledge and skills.
- Support the provision of training that will add green components to existing qualifications or programs.

Figure 16: Good Practice Example - Understanding Skills Mismatch and Invest in Schools to fill Gaps and Plan for the Future: Improving Secondary Vocational Education project, within the Slovakia Catching-Up Initiative

The catalyst for the project was the significant challenge to regional development in Prešov, Banská Bystrica, and Košice regions caused by the misalignment between VET schools' outcomes and the labor market's needs. The main objective was to assess employers and secondary VET schools and work with the regions Education Departments to more effectively pursue EU structural funds to implement needed changes in line with study findings. The Project consists of activities such as : in-depth interviews and focus group sessions with a representational group of business stakeholders to assess the potential mismatch ; an assessment of secondary VET schools to identify gaps between the existing curriculum and demanded skills and producing a final report with recommendations for altering course offerings to match the labor market; and an examination of several prioritized secondary VET schools leading to recommendations of the needs and costs to implement major changes and improvements required of the curriculum and infrastructure to meet market needs. Such a project can become a foundation for change towards regional involvement in the green transformation in jobs and equity.

Source: World Bank (2020)

¹⁴⁴ ILO. 2013. *Meeting skill needs for green jobs: Policy recommendations*. Geneva: International Labour Office, <https://www.ilo.org/publications/meeting-skills-needs-green-jobs-policy-recommendations>

¹⁴⁵ Cedefop. 2019. *Skills for green jobs: 2018 update: European synthesis report*. Luxembourg: Publications Office of the European Union, https://www.cedefop.europa.eu/files/3078_en.pdf

¹⁴⁶ UNESCO-UNEVOC. 2017. *Greening Technical and Vocational Education and Training: A practical guide for institutions*. Paris & Bonn: United Nations Educational, Scientific and Cultural Organization & UNESCO-UNEVOC International Centre, <https://unevoc.unesco.org/up/gtg.pdf>

¹⁴⁷ ETF. 2023b. *Greening of Vocational Education and Training: Processes, Practices, and Policies*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/2023-05/GRETA%20report.pdf>

Strengthening the role of higher education in the provision of skills and undertaking green research and innovation

Higher education plays an important role in complex green skills development, but its involvement needs to be strengthened through policies and collaborations with partners in Serbia and abroad. Universities and other tertiary education institutions are involved in the provision of study programs that contribute to green skills. Higher education institutions should receive support for knowledge enhancement (updating the curricula in the context of the green economy), skills and competency development of teachers and students, provision of job opportunities in partnership with potential employers, and research and innovation projects that address sustainability issues. Given the increasing role of higher education institutions in adult learning, there is also a wide scope to enhance shorter programs addressing specific issues or providing skills to specific target groups related to the green economy (e.g., specific professions, companies, or industries). Any investment into tertiary education facilities should be aligned with the green building principles and include green infrastructure. Supporting mitigation studies and research activities, including scientific research on decarbonization and absorption (forestry, nature preservation, and so on) is also important. We assume that Serbia would need to increase investments in green R&D by 0.1% to 0.2% of GDP. Higher education institutions should also engage with their communities and regions in the area of sustainability, including public outreach programs, pilot projects and living labs, professional development programs for local and regional employers, as well as by setting an example of best sustainability practices on the campus and in their relationships with their major stakeholders (HEA, 2012).¹⁴⁸

Key recommendations:

- Reform university governance and introduce performance agreements, which may also include targets related to green skills development.
- Consolidate and concentrate teaching, research, and innovation capacities at higher education institutions and public research organizations based on excellence.
- Invest in universities as vehicles of regional development (e.g., in research capacities and infrastructures) and develop applied research and innovation ecosystems around them.

¹⁴⁸ HEA (2012). *Universities and the green economy: graduates for the future*. Higher Education Academy policy think tank report 2012. Written by Heather Luna, Stephen Martin, William Scott, Simon Kemp, Alastair Robertson. York: The Higher Education Academy, <https://www.advance-he.ac.uk/knowledge-hub/universities-and-green-economy-graduates-future-higher-education-academy-policy-think>

Figure 17: Good Practice Example: Green University Strategy of the Estonian Life Sciences University Tartu

In 2017, the Estonian University of Life Sciences (Eesti Maaülikool) in Tartu adopted the Green University Strategy. It defined its mission as fostering sustainable use of natural resources through knowledge-based education. Its vision is a green university with smallest possible ecological footprint, with healthy and good working and learning environment, university that takes into account the principles of sustainable development in all decision-making processes and sets example in society. In its research, development and teaching activities the Estonian University of Life Sciences as a Green University focuses on the areas supporting sustainable development. It also aims to fulfil its strategic objectives in the following areas:

- designer of knowledge-based Estonia – promote sustainable development through research and development activities
- recognized provider of university education – integrate the principles of sustainable development into teaching process and study outcomes
- modern compact campus with well-established infrastructure – create a healthy learning, working and recreational environment, considering the principles of reducing the ecological footprint
- promoter in society – raise the environmental awareness of the employees and students of the university and the society and enhance collaboration with the society in the course of performing the aims related with sustainable development.

Source: EMU (2024)

Using adult education and ALMPs to facilitate green transition

ALMPs should be utilized to facilitate the green transition. Changing demand for skills over one's life course creates both challenges and opportunities, which are addressed by lifelong learning. Such learning may take place in the context of adult (or further) education and training, which is often supported by ALMPs. ALMPs aim to assist job seekers in finding employment, keep workers employed, increase their productivity and earnings, and improve the functioning of labor markets. ALMPs are usually not specifically focused on developing skills for green employment (Cedefop, 2019)¹⁴⁹, but that should change over time, as the demand for such skills grows. In addition to counseling and job search assistance, the focus of future ALMPs should be on the provision of training (which usually produces strongest long-term effects), which can be occasionally coupled with some subsidies to employers (in the case of the most disadvantaged groups) or direct job-creation schemes (when benefits clearly outweigh the costs, please see the example below). Improved provision of training on green skills and skills for green jobs should benefit workers at any skills level and in any size of company, regardless of the sector and the geographical area they work in (EESC, 2021). This horizontal approach should be complemented by prioritizing the needs and interests of disadvantaged individuals and groups in the labor market, whose skills endowments may be insufficient to secure current and/or future employability, and who may otherwise be unable to meet the skills challenges of the green transition.

Employers should be involved in ALMPs' design and can also play a role in developing green skills in disadvantaged groups, sectors, and regions. (Re)training needs of employers related to the green transition vary across sectors, regions, and organizations, whereas ALMPs target groups that have different needs and skills. Matching these two sides may involve communication and facilitation by policymakers and education providers, e.g., through sectoral or regional partnerships that will participate in the design of training programs. Moreover, incentives should be put in place to provide additional impetus to both individuals and enterprises to engage in green skills development, whereas training providers that receive public support should be required to embed green skills within their education

¹⁴⁹ Cedefop. 2019. *Skills for green jobs: 2018 update: European synthesis report*. Luxembourg: Publications Office of the European Union, https://www.cedefop.europa.eu/files/3078_en.pdf

and training programs (as is the case in Ireland – cf. SOLAS, 2022¹⁵⁰). Furthermore, green skills can be acquired in different contexts, including public and civil sector employment, project work, and volunteering. Where possible, opportunities should be created and utilized to enable persons whose employability is (or will be) at risk to obtain valuable skills that will improve their future skillset and employability in the context of green jobs. Workers in environmental protection and in utilities will be affected due to decarbonization and greening of their industries; therefore, they could receive training that will enable them to obtain jobs related to climate change response, renewable energy, or new requirements in environmental regulation.¹⁵¹

Key recommendations:

- Focus the future ALMPs on the provision of counseling, training, and job search assistance, with a limited role for wage subsidies to employers and job-creation schemes.
- Develop and implement programs focused specifically on green jobs within existing general ALMP frameworks and align them with the overall provision of training opportunities related to green jobs in VET and adult education.
- Increase inclusivity of the ALMPs through providing: (i) subsidized green skills training for low-income and rural populations, (ii) outreach programs through municipal job centers or Roma community organizations, (iii) gender-responsive skilling approaches in emerging green sectors, etc.
- Involve employers (including those in public and civil sectors) in program design and provide financial and other incentives for their participation in implementation.

Figure 18: Good practice example - Developing green skills among disadvantaged groups, sectors, and regions: Stromspar Check (SSC) advisers in Germany

Stromspar Check (SSC) advisers consult low-income households in their homes all over Germany free of charge on how to save energy and water and on further issues like heating and how to include climate protection actions in their everyday life. Participating households not only save money but also contribute to climate protection and the energy transition. Each intervention starts with diagnosis, which is followed by planning, implementation, and impact assessment. SSC advisers are formerly long-term unemployed people, who completed extensive training; they fully understand the difficult financial and social situation of the clients and can credibly advise them as equals. More than 382,000 households in 150 local communities have been advised since 2008. The cost savings per household are between 100 and 250 euros per year.

Source: Cedefop (2018a)

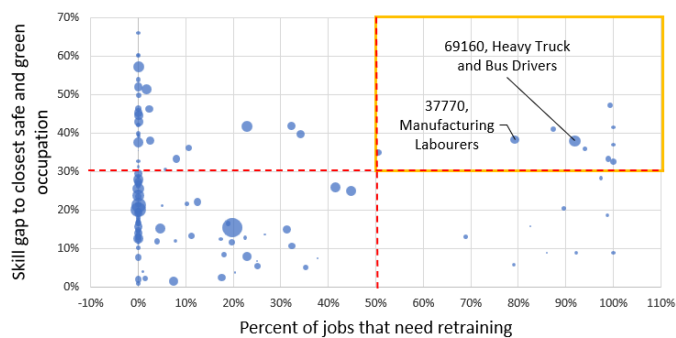
¹⁵⁰ SOLAS. 2022. *Transforming Learning Strategic Performance Agreements: The Further Education and Training System 2022-2024*. Dublin: SOLAS – The Further Education and Training Authority, <https://www.solas.ie/f/70398/x/807fb6e096/fet-system-report.pdf>

¹⁵¹ EPAH. 2021. *Tackling energy poverty through local actions – Inspiring cases from across Europe*. Paris: Energy Poverty Advisory Hub & European Commission, https://energy-poverty.ec.europa.eu/discover/publications/publications/epah-report-tackling-energy-poverty-through-local-actions-inspiring-cases-across-europe_en

Annex A. Methodology used to calculate the cost of mitigation and adaptation measures.

The Table A.1 provides assumptions used for some of the measures discussed across this report and that are needed for greening the education system in Serbia.

Table A.1: Description of the assumptions used for recommended measures

Policy investment	Underlying costing	Description of the assumptions used
Invest in the conditions needed for more labor-market-responsive and larger-scale training (curricula, teachers/instructors, infrastructure, equipment).	Updating the knowledge packages and training of all teachers from primary to tertiary level in countries. We assume all teachers will receive additional qualification improvement packages in the amount of EUR 100 per teacher (lower estimate) and 300 per teacher (higher estimate).	<p>A simple assumption per country: we take all teachers from primary to tertiary and multiply the number by EUR 100 as the lower estimated cost and by EUR 300 as the higher estimated cost of training one teacher in World Bank projects.</p> <p>We assume that training costs per teacher will include the preparation of necessary materials, provision of consultancy, and delivery of training.</p> <p>Costs are not inclusive of any infrastructure as the governments will be using the existing teacher training systems.</p>
Invest in R&D and innovation to facilitate adaptation to green economy	Investment in R&D as part of GDP. We assume that the share of GDP investment in green adaptation would need to be increase to the level of EU/high-income countries	We assume that Serbia would need to increase investments in green R&D by 0.1% to 0.2% of GDP.
Invest in upskilling and reskilling to improve employability of the labor force and mitigate climate change in key sectors of the economy and retrain the most vulnerable occupations towards safe occupations	Cost of retraining	<p>Cost of reskilling/Upskilling</p>  <p>The graph above shows occupations and number of workers that need retraining in Serbia. The upper Right corner represents the most vulnerable specializations (each number is occupation, e.g., 833 is Heavy Truck and Bus Drivers). Bubble size represents how many of these people are employed.</p> <p>We calculate the cost of the transition based on these assumptions: for each occupation, we have the closest occupation, which is safe, and the occupation, which is green. The distance to safe and green is represented by a %point of reskilling need. Say, for Heavy Truck and Bus Drivers (833), the closest safe occupation is Mobile Plant Operators (834), and the closest green occupation is Physical and Engineering science technicians (311).</p>

		<p>So, in the model, we assume that all these people will need some retraining in the short term to achieve safe occupation and more advanced retraining in the long term to achieve green occupation.</p> <p>For the basis cost of retraining, we assume the cost of preparing a BA level specialist for the government in Serbia.</p> <p>To get to the estimate we are factoring in the number of people, the size of the retraining need, and the percentage of training needed to achieve safe and green occupation. These define our lower and upper bound.</p> <p>The occupations and their classification against brown, safe, and green is informed by the O*Net model (https://www.onetcenter.org/)</p>
Invest in research and development in the area of mitigation.	<p>Investment in R&D as part of GDP.</p> <p>We assume that the share of GDP investment in mitigation would need to be increase to the level of EU/high-income countries</p>	We assume that Serbia would need to increase investments in green R&D by 0.1% to 0.2% of GDP.

References

- Abdul-Hamid, H. and Ambasz, D. 2023. *Human Development Strategy for a Sustainable Green Economy in the Slovak Republic: Enhancing the Skills and Behavioral Change Agenda*, Washington, DC: The World Bank, <https://elibrary.worldbank.org/doi/abs/10.1596/39823>
- Adamović, L.J. 2009. *Ecological education in function of protection and improvement of life environment*. Presentation at the *1st International Conference - Ecological safety in post-modern environment*, Banja Luka, 26-27 June.
- Afrikanov, L. 2023. *Green Education for Primary Teachers in Bulgaria, Romania and Serbia. Theoretical and practical model*. Sofia: Bulgarian Union of Teachers, <https://files.eric.ed.gov/fulltext/ED628525.pdf>
- Almeida, R., Avitabile, C. and Shmis, T. 2023. *World Bank*, 14 December 2023, <https://blogs.worldbank.org/education/beyond-learning-drop-why-countries-eastern-europe-and-central-asia-should-act-now-avoid>
- Arandarenko, M. 2021. *Analytical report on the situation in the labour market of Serbia in the context of the economic crisis caused by the COVID-19 pandemic*. Sarajevo: Regional Cooperation Council, <https://www.esap.online/observatory/docs/165/analytical-report-on-the-situation-in-the-labour-market-of-serbia-in-the-context-of-the-economic-crisis-caused-by-the-covid-19-pandemic>
- Baletić, K. 2023. *Serbia Launches Start of Work on Biotech Campus*, *Balkan Insight*, 27 December 2023, <https://balkaninsight.com/2023/12/27/serbia-launches-start-of-work-on-biotech-campus/>
- Cedefop. 2018. *Skills for green jobs in France: an update*. Thermi: European Centre for the Development of Vocational Training, <http://www.cedefop.europa.eu/en/uploads/dfu/countryreportfrance>
- Cedefop (2018a). *Skills for green jobs in Germany: an update*. Thermi: European Centre for the Development of Vocational Training, https://www.cedefop.europa.eu/files/country_report_germany.pdf
- Cedefop. 2019. *Skills for green jobs: 2018 update: European synthesis report*. Luxembourg: Publications Office of the European Union, https://www.cedefop.europa.eu/files/3078_en.pdf
- CEU. 2022. *Proposal for a Council Recommendation on learning for environmental sustainability*. Interinstitutional File:2022/0004(NLE) Brussels: Council of the European Union, <https://data.consilium.europa.eu/doc/document/ST-9242-2022-INIT/en/pdf>
- Circular communities. 2023. *Circular Communities*, 8 December 2023, <https://www.cirkularnezajednice.rs/en/the-best-innovations-in-the-field-of-circular-economy-in-serbia-rewarded>
- Copernicus 1994. *Copernicus – The University Charter for Sustainable Development*, Geneva, May 1994, <https://www.iau-hesd.net/sites/default/files/documents/copernicus.pdf>
- COPERNICUS-CAMPUS. 2005. *COPERNICUS Guidelines for Sustainable Development in the European Higher Education Area*, Oldenburg: COPERNICUS-CAMPUS Sustainability Center, <https://unece.org/fileadmin/DAM/env/esd/information/COPERNICUS%20Guidelines.pdf>
- DES. 2016. *Ireland's National Skills Strategy 2025*. Dublin: Department of Education and Skills, <https://www.gov.ie/pdf/?file=https://assets.gov.ie/137349/3b66360a-64f4-45db-881f-eb326950051e.pdf#page=null>
- Dimitrijević, K. 2023. *Environmental Education in Serbia: Learning to Protect the Environment*, *Green Scent*, <https://www.green-scent.eu/environmental-education-in-serbia-learning-to-protect-the-environment/>

- EASD. 2020. *Priručnik za eko-škole*. Belgrade: Environmental Ambassadors for Sustainable Development, <https://ambassadors-env.com/wp-content/uploads/Uputstvo-1.pdf>
- EBRD. 2023. *Transition Report 2023-24: Transitions big and small*. London: European Bank for Reconstruction and Development. <https://www.ebrd.com/news/publications/transition-report/transition-report-202324.html>
- EC. 2018. *Annex to the Commission Implementing Decision amending Commission Decision C(2014)5872 of 19.8.2014 adopting the Indicative Strategy Paper for Serbia for the period 2014-2020*. C(2018) 5064 final. Brussels: European Commission, <https://neighbourhood-enlargement.ec.europa.eu/system/files/2018-12/20180817-revised-indicative-strategy-paper-2014-2020-for-serbia.pdf>
- EC. (2019). *The European Green Deal*. COM/2019/640 final. Brussels: European Commission, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019DC0640&from=EN>
- EC. 2020. *2030 climate targets*. Brussels: European Commission, https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-energy-framework_en
- EC. 2020a. *European Skills Agenda*, Brussels: European Commission, <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>
- EC. 2020b. *Youth Employment Support: a Bridge to Jobs for the Next Generation*. COM(2020) 276 final. Brussels: European Commission, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0276>
- EC. 2020c. *An Economic and Investment Plan for the Western Balkans*. COM(2020) 641 final. Brussels: European Commission, https://neighbourhood-enlargement.ec.europa.eu/document/download/30108255-efa8-4274-962a-c24faee32734_en?filename=communication_on_wb_economic_and_investment_plan_october_2_020_en.pdf
- EC. 2021. *Fit for 55*, Brussels: European Commission, <https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55/>
- EC. 2021a. *Western Balkans*. Brussels: European Commission, DG for Research and Innovation, https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/regional-dialogues-and-international-organisations/western-balkans_en
- EC. 2023. *Commission staff working document: 2023 Country Report – Serbia*. SWD(2023) 695 final. Brussels: European Commission, https://neighbourhood-enlargement.ec.europa.eu/system/files/2023-11/SWD_2023_695_Serbia.pdf
- EC. 2024. COMMISSION IMPLEMENTING DECISION of 2.4.2024 on the financing of the multi-country multiannual action plan in support of the Western Balkans Investment Framework in favour of the Western Balkans for 2024–2027 and provisioning of the Common Provisioning Fund for 2024–2027. Brussels: European Commission, https://neighbourhood-enlargement.ec.europa.eu/document/download/00e031e5-7101-4bf6-923b-7ec08a9d6b75_en?filename=CID%20-%20WBIF%202024-2027-FINAL.pdf
- EC. 2024a. *Eurydice*. Brussels: European Commission, <https://eurydice.eacea.ec.europa.eu/national-education-systems/serbia/national-reforms-related-transversal-skills-and-employability>
- ECCC. 2024. *E-book: Questions and exercises for the Serbian chapter*, European Climate Change Curriculum, <https://climateperspectives.eu/serbian-perspectives/ebook/>
- EE Knowledge Hub. 2019. *Energy Efficiency Knowledge Hub*, <http://eeplatforma.arh.bg.ac.rs/en>

- EESC (2021). Towards an EU strategy for enhancing green skills and competences for all. Own-initiative opinion. SOC 636. Brussels: European Economic and Social Committee, <https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/towards-eu-strategy-enhancing-green-skills-and-competences-all-own-initiative-opinion>
- EIB. 2022. Serbian Education Infrastructure, *European Investment Bank*, <https://www.eib.org/en/projects/pipelines/all/20210535>
- EMU. 2024. *Green University Initiative*. Tartu: Estonian University of Life Sciences, <https://www.emu.ee/en/about-the-university/green-university/>
- EPAH. 2021. *Tackling energy poverty through local actions – Inspiring cases from across Europe*. Paris: Energy Poverty Advisory Hub & European Commission, https://energy-poverty.ec.europa.eu/discover/publications/publications/epah-report-tackling-energy-poverty-through-local-actions-inspiring-cases-across-europe_en
- ETF. 2021. *National Qualifications Framework – Serbia*, Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/document/Serbia.pdf>
- ETF. 2021a. *Leading by example - Education, training and skills for Europe’s green future*, 31 March 2021, European Training Foundation, <https://www.etf.europa.eu/en/news-and-events/news/leading-example-education-training-and-skills-europes-green-future>
- ETF. 2023. *European Skills and Jobs Survey: Statistical Profile, Serbia*. Torino: European Training Foundation, https://www.etf.europa.eu/sites/default/files/2023-11/Statistical%20profile_RS_EN_edited.pdf
- ETF. 2023a. *Skills for the Green Transition: Evidence from the EU Neighborhood*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/2023-11/Skills%20for%20the%20green%20transition.pdf>
- ETF. 2023b. *Greening of Vocational Education and Training: Processes, Practices and Policies*. Torino: European Training Foundation, <https://www.etf.europa.eu/sites/default/files/2023-05/GRETA%20report.pdf>
- ETF-UNICEF. 2021. *Building a resilient generation in Central Asia and Europe: Youth views on lifelong learning, inclusion, and the green transition*. Geneva: United Nations Children’s Fund Regional Office for Europa and Central Asia (UNICEF) & Torino: European Training Foundation (ETF), https://www.etf.europa.eu/sites/default/files/2021-06/resilient_generation_central_asia_europe.pdf.
- EU. 2020. *Osnabrück Declaration on vocational education and training as an enabler of recovery and just transitions to digital and green economies*, https://www.cedefop.europa.eu/files/osnabrueck_declaration_eu2020.pdf
- EUA. 2023. *A Green Deal Roadmap for Universities*. Brussels: European University Association, <https://eua.eu/downloads/publications/eua%20green%20deal%20roadmap.pdf>.
- FES. 2023. *Social-ecological transformation: Country Report Serbia*. SINUS Study for the Friedrich-Ebert-Stiftung. Heidelberg: Friedrich-Ebert-Stiftung & SINUS.
- Filipović, S. *Green Transition in Economy and Effects on Education System in Serbia*, Belgrade: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), <https://decideprojekat.org/wp-content/uploads/2022/07/Izvestaj-ZP-A4-eng-0407.pdf>
- Gatti, Roberta V.; Corral Rodas, Paul Andres; Dehnen, Nicola Anna Pascale; Dsouza, Ritika; Mejalenko, Juan Elias; Pennings, Steven Michael. *The Human Capital Index 2020 Update : Human Capital in the Time of COVID-19 (English)*. Washington, D.C. : World Bank Group.

<http://documents.worldbank.org/curated/en/456901600111156873/The-Human-Capital-Index-2020-Update-Human-Capital-in-the-Time-of-COVID-19>

- Gajić, D. 2019. *Green Innovation Vouchers*. Presentation given at the JRC Conference on "Unveiling Serbia's Smart Specialisation Strategy and exploring the role of incubators, accelerators and S&T Parks in delivering sector specific support in the Western Balkans and South-East Europe", Belgrade, 16 October 2019, https://joint-research-centre.ec.europa.eu/system/files/2019-10/20191016-s3tt_serbia-dgajic_en.pdf
- GIZ. 2015. Energy efficiency in public buildings, GIZ, <https://www.giz.de/en/worldwide/38300.html>
- GJT. 2021. *Green Jobs Taskforce: Report to Government, Industry and the Skills Sector*, <https://www.gov.uk/government/publications/green-jobs-taskforce-report>
- Government of Serbia. 2008. *National Sustainable Development Strategy*. Belgrade: Government of Serbia, <https://www.oneplanetnetwork.org/sites/default/files/nationalsustainabledevelopmentstrategyserbia2008.pdf>
- Government of Serbia. 2020. *Integrated National Energy and Climate Plan of the Republic of Serbia for the period 2030 with the projections up to 2050*, Belgrade: Government of Serbia, https://www.energy-community.org/dam/jcr:01992fc5-4981-4ee3-84f8-f1f96830b4ba/INECP_Serbia_ENG_13.06.23%20.pdf
- Government of Serbia. 2020a. *Smart Specialization Strategy of the Republic of Serbia for the period 2020-2027*, Belgrade: Government of Serbia, https://pametnaspecijalizacija.mpn.gov.rs/wp-content/uploads/2021/06/Strategija-pametne-specijalizacije_EN_WEB.pdf
- Government of Serbia 2021. *Employment Strategy of the Republic of Serbia 2021-2026*, Belgrade: Government of Serbia, https://sociojalnouljucivanje.gov.rs/wp-content/uploads/2021/08/Strategija_zaposljavanja_u_Republici_Srbiji_2021-2026_engleski.pdf
- Government of Serbia. 2021a. *Strategy for the development of education and upbringing in the Republic of Serbia until 2030*, Belgrade: Government of Serbia, <https://dualnok.gov.rs/en/dokumenta/strategy-for-the-development-of-education-and-upbringing-in-the-republic-of-serbia-until-2030-official-gazette-of-rs-no-63-2021/>
- Government of Serbia. 2023. *Low Carbon Development Strategy of the Republic of Serbia for the Period 2023-2039 with Projections*, Belgrade: Government of Serbia, https://unfccc.int/sites/default/files/resource/Low_Carbon_Development_Strategy_Serbia_2023-2030_with_2050_Projections.pdf
- Government of Serbia. 2023a. *Youth Strategy in the Republic of Serbia for the Period from 2023 to 2030*, Belgrade: Government of Serbia, <https://mto.gov.rs/extfile/sr/1828/EN%20Youth%20Strategy%20in%20the%20Republic%20of%20Serbia%20for%20the%20period%20from%202023%20to%202030.pdf>
- Green Economy Coalition. 2024. *Green Economy Tracker, Serbia: Early steps on a green accession path*, London: Green Economy Coalition, <https://greeneconomytracker.org/country/serbia>
- Green Erasmus. 2023. *Higher Education on the Journey towards Sustainable Development in Curricula*, Brussels: Green Erasmus Partnership, https://project.greenerasmus.org/documents/GE-educational_framework.pdf
- Green School. 2022. *Green School*, <https://www.digitalherbarium.eu/>

- GrEF. 2017. *Revision of the Economy in the Balkans: Change Policy Not Climate!* Brussels & Sofia: Green European Foundation and BlueLink Foundation, https://gef.eu/wp-content/uploads/2018/02/WEB-Version-GEF_Balkans_2017.pdf
- HEA (2012). *Universities and the green economy: graduates for the future*. Higher Education Academy policy think tank report 2012. Written by Heather Luna, Stephen Martin, William Scott, Simon Kemp, Alastair Robertson. York: The Higher Education Academy, <https://www.advance-he.ac.uk/knowledge-hub/universities-and-green-economy-graduates-future-higher-education-academy-policy-think>
- ILO. 2013. *Meeting skill needs for green jobs: Policy recommendations*. Geneva: International Labour Office, <https://www.ilo.org/publications/meeting-skills-needs-green-jobs-policy-recommendations>
- Innovation Fund. 2023. *Innovation vouchers*. Belgrade: Innovation Fund of the Republic of Serbia, <https://www.inovacionifond.rs/en/programs/innovation-vouchers>
- Jakubowski, Maciej, Tomasz Gajderowicz, and Harry A. Patrinos. 2024. "Covid-19, School Closures, and Student Learning Outcomes: New Global Evidence from PISA." Discussion Paper No. 16731, Institute of Labor Economics, Bonn.
- Jovanović, L. and Radović V. 2018. Dealing with the past in the context of joint environmental emergency management in the cross border region overview of Serbian experience. *Fundamental and applied researches in practice of leading scientific schools*, 28 (4): 39-45.
- Kováč, I., Megyesi, B.G., Barthes, A., Oral, H.V. and Smederevac-Lalic, M. 2021. Knowledge Use in Education for Environmental Citizenship—Results of Four Case Studies in Europe (France, Hungary, Serbia, Türkiye), *Sustainability*, 13 (19), 11118, <https://www.mdpi.com/2071-1050/13/19/11118>, <https://doi.org/10.3390/su131911118>
- Lee, Jeong-Dong, Keun Lee, Dirk Meissner, Slavo Radosevic, and Nicholas S. Vonortas. 2021. "Technology Upgrading and Economic Catch-Up Context, Overview, and Conclusions." In *The Challenges of Technology and Economic Catch-up in Emerging Economies*, edited by Jeong-Dong Lee, Keun Lee, Dirk Meissner, Slavo Radosevic, and Nicholas S. Vonortas, 1–34. Oxford: Oxford University Press.
- Lees, M. 2016. *Estonian education system 1990-2016: Reforms and their impact*, http://4liberty.eu/wp-content/uploads/2016/08/Estonian-Education-System_1990-2016.pdf
- Lenhardt, M., Smederevac-Lalić, M. and Radović, V. 2019. Short Country Report SERBIA: SWOT Analysis of Education for Environmental Citizenship. In: Hadjichambis, A. Ch., Reis, P. & Paraskeva-Hadjichambi, D. (Eds.). 2019. *European SWOT Analysis on Education for Environmental Citizenship*. ENEC Cost Action. Lisbon: Institute of Education – University of Lisbon, Cyprus Centre for Environmental Research and Education & European Network for Environmental Citizenship, 207-217, https://enec-cost.eu/wp-content/uploads/2020/04/Country-Report_-SERBIA.pdf
- MCM. 2020. Magna Carta Universitarum – MCU 2020, <https://www.magna-charta.org/magna-charta-universitatum/mcu2020>
- Mihajlov A., A.Mladenović and Jovanović, F. 2019. *Circular Economy in Serbia: The Process Started*, Belgrade: Environmental Ambassadors for Sustainable Development, <https://ambassadors-env.com/en/files/Publikacija-ENG.pdf>.
- Muttarak, R. and Lutz, W. 2014. Is Education a Key to Reducing Vulnerability to Natural Disasters and hence Unavoidable Climate Change?, *Ecology and Society*, 19(1): 42, <https://www.jstor.org/stable/26269470>
- Nikolić, V. Milutinović, S. and Ranitović, J. 2015. Greening of higher education in the Republic of Serbia, *Envigogika*, 10 (1), doi: 10.14712/18023061.453

- Nikolić, V., Vukić, T., Maletaski, T. and Andevski, M. 2020. Students' Attitudes towards Sustainable Development in Serbia, *International Journal of Sustainability in Higher Education*, 21(4): 733-755.
- OECD. 2022. *Multi-dimensional Review of the Western Balkans: From Analysis to Action*. Paris: OECD, <https://www.oecd.org/publications/multi-dimensional-review-of-the-western-balkans-8824c5db-en.htm>
- OECD. 2022a, *Are Students Ready to Take on Environmental Challenges?*, PISA, Paris: OECD Publishing, https://www.oecd-ilibrary.org/education/are-students-ready-to-take-on-environmental-challenges_8abe655c-en, <https://doi.org/10.1787/8abe655c-en>.
- OECD. 2023, *Job Creation and Local Economic Development 2023: Bridging the Great Green Divide*, Paris: OECD Publishing, <https://www.oecd.org/cfe/job-creation-and-local-economic-development-26174979.htm>, <https://doi.org/10.1787/21db61c1-en>.
- OECD.2023a. PISA 2022 Results: Factsheets – Serbia, OECD, <https://www.oecd.org/publication/pisa-2022-results/country-notes/serbia-961b99f9>
- ONS. 2024. *Developing estimates of green jobs in the UK*. London: Office for National Statistics, <https://www.ons.gov.uk/economy/environmentalaccounts/methodologies/developingestimatesofgreenjobsintheuk>
- Qaisrani, A. 2015. *Connecting the dots: Linking climate change resilience to human capital*. Islamabad: SDPI, <https://sdpi.org/sdpiweb/publications/files/Connecting-the-dots-linking-climate-change-resilience-to-human-capital.pdf>
- Račić, D. (ed.). 2024. *ERA Country Reports: Serbia*. Brussels: European Commission. <https://european-research-area.ec.europa.eu/sites/default/files/documents/2024-05/ERA%20Country%20Report%202023%20Serbia.pdf>
- RCC. 2020. *Green Agenda for the Western Balkans*. Sarajevo: Regional Cooperation Council, <https://www.rcc.int/greenagenda>
- RCC. 2020a. *Sofia Declaration on the Green Agenda for the Western Balkans*. Sarajevo: Regional Cooperation Council, <https://www.rcc.int/docs/546/sofia-declaration-on-the-green-agenda-for-the-western-balkans-rn>
- RCC. 2021. *Youth Guarantee in the Western Balkans*. Sarajevo: Regional Cooperation Council, <https://www.rcc.int/download/docs/Youth-Employment-leaflet.pdf/4c5269263e746ff7c596eeb9861fde2e.pdf>
- Republic of Serbia. 2021. *Nationally Determined Contribution (NDC) of the Republic of Serbia for the 2021–2030 period*, https://unfccc.int/sites/default/files/NDC/2022-08/NDC%20Final_Serbia%20english.pdf
- Sabarwal, Shwetlena; Venegas Marin, Sergio; Spivack, Marla; Ambasz, Diego. 2024. *Choosing Our Future: Education for Climate Action*. Washington, DC: World Bank. <http://hdl.handle.net/10986/42098>
- Sanchez-Reaza, J., Ambasz, D., Djukic, P. and McEvoy, K. 2022. *Making the European Green Deal Work for People: The Role of Human Development in the Green Transition*. Washington DC: World Bank, <https://openknowledge.worldbank.org/entities/publication/7b1fcc3c-f44f-4a11-9828-9ae191a746c6>
- Science Fund. 2024. *Green Program of Cooperation Between Science and Industry*. Belgrade: Science Fund of the Republic of Serbia, <https://fondzanauku.gov.rs/green-program-of-cooperation-between-science-and-industry/?lang=en>

- Serbian Association of Employers. 2022. *Enabling Environment for Sustainable Enterprises in Serbia*. Belgrade: Serbian Association of Employers, <https://www.poslodavci.rs/wp-content/uploads/2021/12/esse-eng.pdf>
- SOLAS. 2022. *Transforming Learning Strategic Performance Agreements: The Further Education and Training System 2022-2024*. Dublin: SOLAS – The Further Education and Training Authority, <https://www.solas.ie/f/70398/x/807fb6e096/fet-system-report.pdf>
- Spasić, V. 2023. All faculties in Novi Sad will start producing electricity in rooftop PV plants, *Balkan Green Energy News*, 10 November 2023, <https://balkangreenenergynews.com/all-faculties-in-novi-sad-will-start-producing-electricity-in-rooftop-pv-plants/>
- Stanišić J. and Maksić S. 2014. Environmental Education in Serbian Primary Schools: Challenges and Changes in Curriculum, Pedagogy, and Teacher Training, *The Journal of Environmental Education*, 45(2): 118-131, <https://doi.org/10.1080/00958964.2013.829019>
- Tadić, M., Drašković, D and Chomich, L. 2023. Catalysing Serbia's Green Transformation: How UNDP Serbia Innovation Challenge Calls turn green ideas into reality, November 2023, *United Nations Development Programme*, <https://www.undp.org/serbia/blog/catalysing-serbias-green-transformation>
- UN. 2023. Serbia Reaffirms its Commitment to Agenda 2030 at the SDG Summit in New York, 27 September 2023, *United Nations*, <https://serbia.un.org/en/247531-serbia-reaffirms-its-commitment-agenda-2030-sdg-summit-new-york>
- UNDP. 2019. Circular Economy for Sustainable Development in Serbia, March 2019, *United Nations Development Programme*, <https://www.undp.org/serbia/news/circular-economy-sustainable-development-serbia>
- UNDP. 2021. *Climate Box*, *United Nations Development Programme*, <https://climate-box.com/about-us/>
- UNEP. 2013. *Green Economy Scoping Study: Serbia*, Geneva: United Nations Environment Programme, <https://wedocs.unep.org/20.500.11822/32515>.
- UNESCO-UNEVOC. 2017. *Greening Technical and Vocational Education and Training: A practical guide for institutions*. Paris & Bonn: United Nations Educational, Scientific and Cultural Organization & UNESCO-UNEVOC International Centre, <https://unevoc.unesco.org/up/gtg.pdf>
- UNICEF. 2019. *It is Getting Hot: Call for Education Systems to Respond to the Climate Crisis. Perspectives from the East Asia and the Pacific*. Bangkok: UNICEF East Asia and Pacific Regional Office, <https://www.unicef.org/eap/reports/it-getting-hot>
- United Nations. 2015. *Paris Agreement*, https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf
- Vasić, V. 2019. *Skills Mismatch Measurement in Serbia*. Torino: European Training Foundation, https://www.etf.europa.eu/sites/default/files/2019-07/Skills%20mismatch%20measurement_Serbia_0.pdf
- Vuković, A. and Vujadinović Mandić, M. 2018. *Study on Climate Change in the Western Balkans Region*. Sarajevo: Regional Cooperation Council, <https://www.rcc.int/download/docs/2018-05-Study-on-Climate-Change-in-WB-2a-lowres.pdf/06af8f7432484a6ce384ebcb8c05e8d7.pdf>
- World Bank. 2020. *Slovakia Catching-Up Regions. Vocational Education and Training. Toward an Integrated and High-Performing VET System: Ensuring Quality Education and Service Delivery in the Prešov Region*. Summary Report - Year 2. Washington, DC: The World Bank,

<https://documents1.worldbank.org/curated/en/099040001252241349/pdf/P17343700ac6f60b60ba2604aad2d8c8897.pdf>

World Bank. 2022. *Supporting Serbia's Transition to Greener and More Resilient Growth: Policy and Institutional Reforms*. Washington, DC: The World Bank, <http://hdl.handle.net/10986/38271>

World Bank. 2023. *How to protect, build, and use human capital to address climate change*. Washington, DC: The World Bank, <https://thedocs.worldbank.org/en/doc/cc99b238fa9a0f266579d49dc591b2d4-0140062023/original/HCP-Climate-Policy-Brief.pdf>

World Bank. 2023a. *Improving Public Financial Management for the Green Transition*, Washington, DC: The World Bank, <https://projects.worldbank.org/en/projects-operations/project-detail/P175655>

World Bank (2024). *Western Balkans 6 Country Climate and Development Report*. Washington, DC: The World Bank. <https://hdl.handle.net/10986/41881>

World Economic Forum. 2023. *Future of Jobs Report 2023: Insights Report May 2023*, Cologne/Geneva: World Economic Forum, https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf.