

Report

Serbia Green Bond Reporting



Electronic Submission – 22 December 2022

Prepared for UNDP Serbia

Disclaimer

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Purpose

The main purpose of the report is to report on the allocation and impact of funds received under Serbia's 2021 Green Bond, and to fulfil the commitment of the Green Bond Framework (GBF). Beyond the compliance objective, the report is aimed to put Serbia into the position to build trust with investors and to encourage them to invest in future issuances. In addition, the publication of the Green Bond Report is a good opportunity to engage with investors on Serbia's ESG strategy.

The report also aims to enable investors to see the underlying logic for project selection and how it is driven by e.g., Serbia's commitments, such as Paris Agreement compliance, and long-term development at sector level. It will ensure that investors have full insight and confidence into the project selection/use-of-proceeds.

Content and Structure

This report on the allocation and impact of the proceeds of Serbia's Green Bond is at the sector/sub-sector and not at the project level. Where available, the report covers (co-)financing, to demonstrate to investors how they stimulated investment in Serbia and/or how the Serbian government contributed to the achievement of impacts.

In each section, the report covers a case study, to provide insight into the projects that were financed.

Annex I features a short section outlining the approach to ensuring materiality of reporting, a note on the overall methodology for reporting, and the full Second Party Opinion.

Within these sectors, the eligible expenditures to be financed by the proceeds of Serbia's Green Bond include capital expenditures, operational expenditures, tax expenditures and transfers, and are focused on addressing the material climate-related risks and opportunities in the areas of renewable energy (with emissions of up to 100 grams of carbon dioxide equivalent per kilowatt-hour), energy efficiency, sustainable water and wastewater management, pollution prevention and control and circular economy, protection of the environment and biodiversity and sustainable agriculture.

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Abbreviations and Glossary

CBAM	Carbon Border Adjustment Mechanism
CBI	Climate Bonds Initiative
CH ₄	Methane
CO _{2e}	Carbon Dioxide Equivalent
CSO	Civil Society Organization
EFRAG	European Financial Reporting Advisory Group
EIB	European Investment Bank
EMU	Electric Multiple Unit (train set)
ESG	Environmental, Social and Governance
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
GBF	Serbia's Green Bonds Framework
GBP	Green Bond Principles
GCF	Green Climate Fund
GHG	Greenhouse Gases
GRI	Global Reporting Initiative
H1, H2	First, second half of the year (01 Jan to 30 June and 01 July to 31 December).
NBS	Nature-based Solution
PDA	Public Debt Management Agency
PEBSA	Protection of the Environment and Sustainable Agriculture
Q1, Q2, Q3, Q4	First, second, third, fourth quarter of the year
REDD+	Reducing emissions from deforestation and forest degradation
RS	Republic of Serbia
SASB	Sustainability Accounting Standards Board
SFM	Sustainable Forest Management
SPO	Second Party Opinion
SWWM	Sustainable Water and Water Management
UNDP	United Nations Development Programme

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1. Executive Summary

Serbia's Green Bond Allocation

In August 2021, the Serbian Government reached a milestone in the joint fight against climate change by adopting its first sovereign green bond framework. The framework outlines how eligible green expenditures are defined, selected, and reported, while also describing the government's holistic vision of a sustainable Serbian economy and society.

In September 2021, for the first time in its history, the Government of the Republic of Serbia issued a green bond in the international markets. The EUR 1 billion, seven-year securities have a 1% annual coupon rate and generate a 1.26% yield. The issuance was oversubscribed by more than three times. The issuance of a green bond is a significant milestone, allowing the Republic of Serbia to scale up public and private investment to unlock opportunities for sustainable growth and facilitate the financing of national and local climate mitigation and adaptation priorities.

Figure 1: Timeline of Serbia's Green Bond – 2021 to 2022



The net proceeds of the green bond's issuance are aimed at promoting Serbia's transition to a low-carbon, climate-resilient and environmentally friendly economy as well as contributing to United Nations Sustainable Development Goals. The overall objectives and commitments of the government are set out in the Serbian Green Bond Framework (GBF)¹ which was confirmed by a Second Party Opinion (SPO)². Serbia's GBF is designed to capture the material economic, social, and environmental risks and opportunities, in the Serbian government context, from both a financial and broader societal perspective. The GBF, therefore, defines six sectors for investment of the proceeds.

1 [Government of Serbia Green Bond Framework](#)

2 [ISS ESG Second Party Opinion \(SPO\): Republic of Serbia 2 September 2021](#)



- 1) Renewable Energy
- 2) Energy Efficiency
- 3) Transport
- 4) Sustainable Water and Wastewater Management
- 5) Environment, Pollution Prevention and Control
- 6) Protection of the Environment, Biodiversity and Sustainable Agriculture

Figure 2: Allocation by year and cumulatively in EUR 2018 to Q3/2022

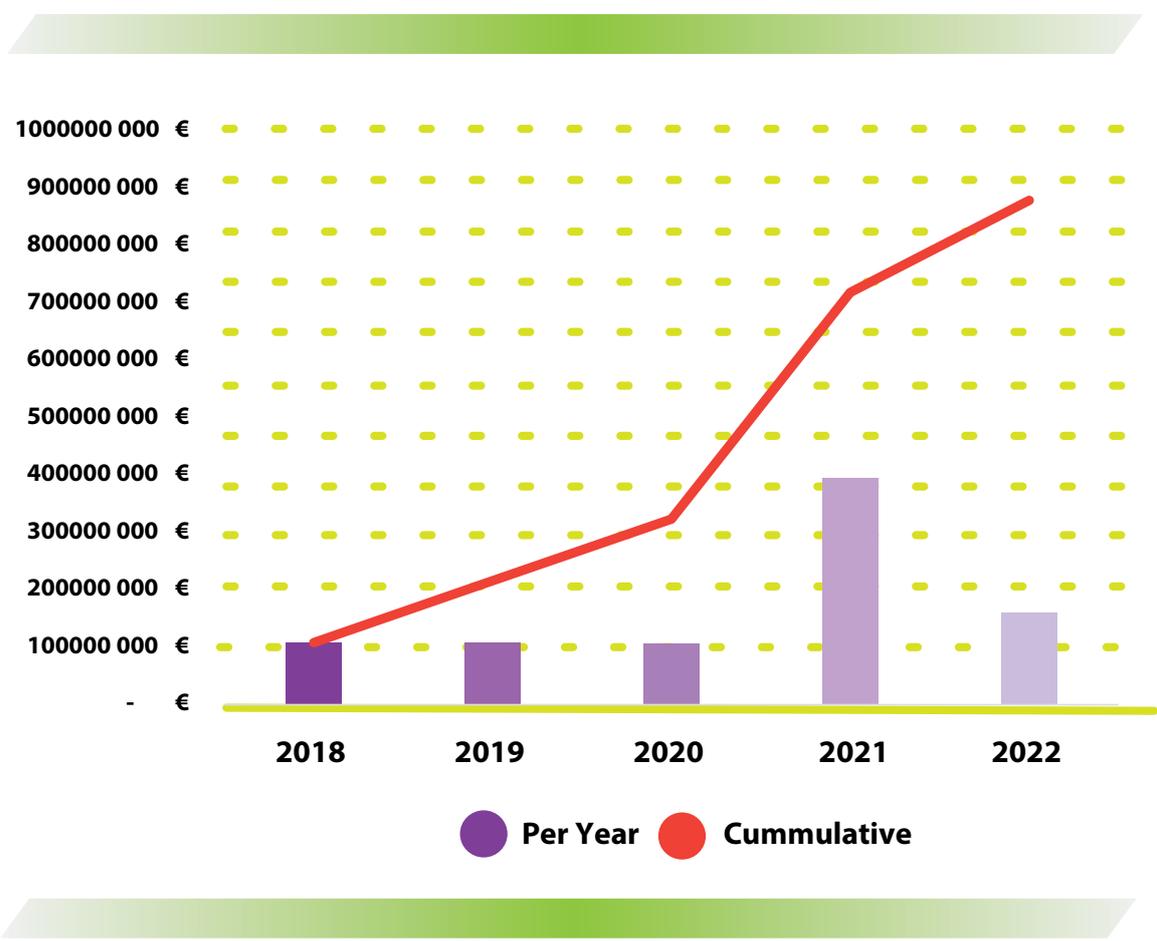
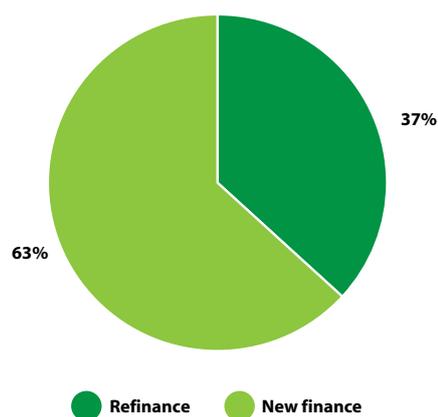


Table 1: Funding by sector and Year, 2018 to Q3/2022³

Sector/Year	2018	2019	2020	2021	To Q3/2022	Total	Share of Proceeds
Energy efficiency	179,659	911,261	2,601,704	3,677,041	8,732,982	16,102,647	2%
Transport	42,988,540	19,765,944	21,405,383	166,339,965	92,479,725	342,979,557	39%
Sustainable water and wastewater management	23,172,644	30,997,538	34,572,716	135,855,167	20,354,651	244,952,716	28%
Pollution prevention and control and circular economy	21,391,006	31,547,727	24,632,698	58,981,046	33,892,992	170,445,469	19%
Protection of the environment and biodiversity and sustainable agriculture	20,664,043	24,867,138	24,230,372	30,398,253	5,099,289	105,259,095	12%
Total	108,395,892	108,089,608	107,442,873	395,251,472	160,559,639	879,741,504	100%

Figure 3: Breakdown of use of proceeds between refinance and new finance up to Q3/2022



³ The allocation data is based on varying exchange rates over the course of the allocation of Green Bond proceeds, where EUR were converted to RSD. There maybe variations, depending on which exchange rate would be applied, but it is not expected that these conversion rate divergences have a material impact on the allocation report as the overall band in which the Serbian Dinar fluctuated during the period was about $\pm 1\%$ with only occasional short-term fluctuations outside this limit. For 2022, a conversion rate of EUR1: RSD 117.570 was applied.



Serbia's Green Bond Impacts

The republic of Serbia's Green Bond Issue in 2021 has been a success in many regards. Financially, it enabled the government to access large volumes of finance at low cost with a dedicated focus on green and sustainable investments. In terms of impact, it allowed the government to scale up urgently needed ongoing sustainable investment, e.g., the construction of forests roads that enhance biodiversity protection, or the expansion of wastewater infrastructure. Crucially, it also enabled large-scale projects, such as Clean Serbia, and the Budapest – Belgrade railroad connection to go ahead, by providing high volumes of funding enabling the financial contribution of the government to these important sustainable projects.

The success of the Bond can be seen in the high volume of funding allocated to projects, which reached 70% within a year, and the expectation that the proceeds from the bond will be fully allocated in the near future. This shows real demand for dedicated sustainability finance in the context of a country undergoing a transition to a green, sustainable development path.

Institutionally and from a governance perspective, the Green Bond has created a new mode of cross-departmental co-operation, focused on sustainable development and a more holistic understanding of the needs of the country in the future. This will be a lasting impact, as the Green Bond Working Group has created new and important relationships between ministries.

Serbia's experience with the Green Bond has been very positive, transcending the mere financial considerations of financing cost and interest rates, into how the country can reinvent itself in the eyes of international financiers, to lead what will hopefully become a wave of Green Bond issuances from middle-income countries who are at a crucial stage of their development.



Table 2: Summary Impact Overview by Sector

Category	No. of project	Share of projects	Green Bond Proceeds Impact	SDG Link
Energy Efficiency	2	2.2%	<p>Support of 4 calls for EE improvements in public, and 2 calls for private buildings.</p> <p>Enabled refurbishment of 70,664m² in public buildings</p> <p>Enabled refurbishment in 68 public and 4,720 private buildings</p> <p>Generated 19,208tCO₂ savings over the lifetime of the measures of which 5,051tCO₂ public and 14,157tCO₂ private</p>	
Transport	11	12.1%	<p>Support of 4 projects in the railway, 5 projects in the waterway and 2 projects in the vehicle sector.</p> <p>Total of 190km of railways to be or already constructed and modernized (ca 85.4 km undertaken and ca. 106.5 km to be done).</p> <p>Purchase of 3 state-of-art electric motor units (EMU) - trains (SOKO)</p> <p>Enabled the replacement of 2,312 taxi vehicles</p> <p>Supported the purchase of 55% of all green (electric, hybrid) vehicles sold in Serbia in 2022, through subsidizing 431 vehicles</p>	
Sustainable Water and Wastewater Management (SWWM)	28	30.8%	<p>Funded 28 projects in SWWM, of which 4 related to drinking water, 11 to wastewater and 3 to irrigation. These delivered 110 subprojects.</p> <p>Funded 61 interventions on reservoirs and water supply systems</p> <p>Constructed or restored 79 mcm of reservoir/storage capacity</p> <p>Installed or maintained 163.4km of wastewater networks</p>	
Pollution Prevention and Control and Circular Economy	16	17.6%	<p>Funded 13 projects in support of the Circular Economy</p> <p>Enabled 2 polluted sites to be put into remediation</p>	
Protection of Environment, Biodiversity and Sustainable Agriculture (PEBSA)	34	37.4%	<p>Funded 34 projects in SWWM, of which 8 related to sustainable forest management, 7 to environmental protection, 3 to biodiversity preservation and 16 to sustainable agriculture.</p> <p>Funded (improved) sustainable forest management on 241,000 ha of forest, protected /restored /maintained 16,277 ha of land.</p>	



2. Serbia's Green Bond

Serbia's Green Bond in Context

Serbia's Green Bond was issued at a crucial time. The Gross Domestic Product (GDP) of Serbia grew by an estimated 7.4 per cent in 2021, outperforming expectations, and the economy is expected to continue growing, albeit at a reduced rate of 3.3 per cent in 2022, with the same rate forecasted for 2023⁴. At the same time, the impact of climate change on Serbian society and economy is significant. Total material damages caused by extreme climate and weather conditions in Serbia exceeded 5 billion EUR in the 2000-2015 period alone, and more than 70% of losses were caused by drought and high temperatures. In 2014, flooding caused vast economic damages and the full recovery required an estimated EUR 1.35 billion⁵.

Limiting the increase of mean global temperature by the end of the century within the scope set by the Paris Agreement (2°C) would lead to a loss of Serbia's GDP of 4.53% by the mid-21st century, while a minimal increase in the mean global temperature of 1°C could result in a drop in labour productivity of USD 171 million by 2040⁶. Given the considerable economic, social, and environmental externalities of climate change in Serbia, the issuance of Serbia's first green bond demonstrates the Government's commitment to accelerating the green transition.

According to Serbia's 2nd Biennial Update Report to the UNFCCC (draft, 2021)⁷, financing the greenhouse gas (GHG) emission reduction targets, from 2020 to 2030, will require more than USD 6,5 billion taking the most optimal scenario of 33,3% of GHG emissions reduction by 2030 compared to 1990 levels. A robust process of identifying climate mitigation and adaptation projects has been undertaken to prioritise those investments which will deliver material social and environmental benefits for the people of Serbia. The above figure of USD 6,5 billion includes the green transformation and reduction of GHG emissions in energy sector, industrial production, agriculture and forestry (including carbon sequestration). However, these costs of economy decarbonization and green business transformation at the same time represent the investment into competitiveness of Serbian companies at the European and global markets. This is particularly important in the context of the EU's plan for green transition reflected through new climate-energy-transport legislation "Fit for 55"⁸, targeting climate neutrality by mid of the Century, and the accompanying Carbon Border Adjustment Mechanism (carbon border tax)⁹.

4 [European Bank for Reconstruction and Development: Serbia Overview](#)

5 [Božanić and Mitrović \(2019\): Study on the Socio-economic Aspects of Climate Change in the Republic of Serbia. Publisher: United Nations Development Programme](#)

6 [Ibid.](#)

7 [Ministry of Environmental Protection \(2017\): Second National Communication of the Republic of Serbia under the United Nations Framework Convention on Climate Change. Belgrade](#)

8 [European Commission \(2021\), 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality](#)

9 [Council of the European union \(2021\), Regulation of the European Parliament and of the Council establishing a carbon border adjustment mechanism](#)

3. Serbia's national sustainability strategy

Serbia's Green Bond and the 2030 Agenda

The Republic of Serbia is firmly committed to promoting an accelerated implementation of the sustainability objectives within the 2030 Agenda. The attainment of lasting prosperity for everyone everywhere within planetary boundaries by growing into sustainability is a clear, strategic, long-term national vision of the implementation of the 2030 Agenda in Serbia. This is based on the clear message received from its citizens that Serbia is a country committed to intra- and inter-generational. Within the scope of the National Sustainable Development Strategy (2009-2017) and pursuant to the EU accession negotiation process started in 2014, Serbia participated actively in the work of the OWG on Sustainable Development Goals (SDGs) and the Intergovernmental Committee of Experts on Sustainable Development Financing.

To implement this, in 2015, an integrated, networking institutional mechanism was established to build innovative practices in balancing all dimensions of sustainable development in the form of the Inter-Ministerial Working Group for the Implementation of the 2030 Agenda (IMWG), which now coordinates the work of all Ministries and State institutions.

Advancing sustainability and contributing to regional and global transformation by finding solutions to national sustainable development challenges is a critical element of Serbia's strategy. Cohesive with the international agenda for sustainability transformation, the Serbian Government established six strategic pathways for the growing into sustainability for everyone everywhere:

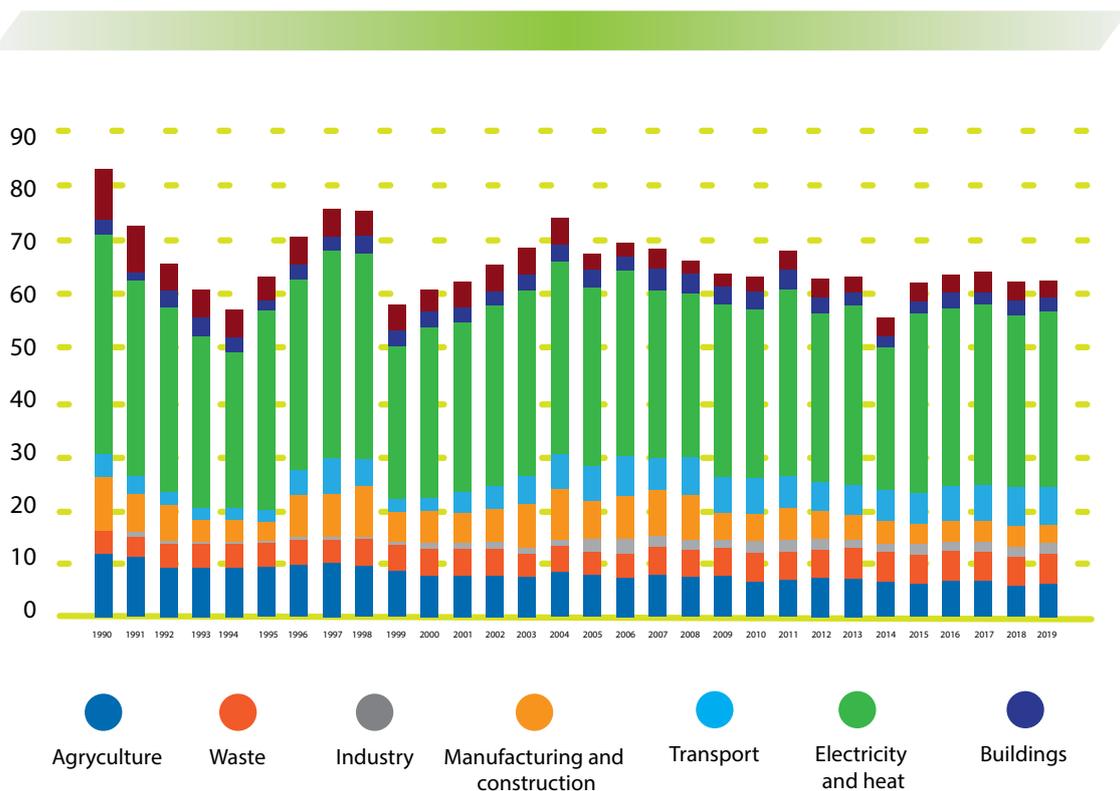
- Connect, partner and integrate Serbia in Europe and the world;
- Achieve a faster, inclusive and sustainable growth, based on economic, scientific and innovation resources;
- Render efficient and effective public services;
- Promote human rights and security;
- Education for the twenty-first century;
- Transformative digitalization.

Serbia is striving to make the transition to a carbon-neutral circular economy to meet the objectives of the Nationally Determined Contribution under the Paris Agreement, while also enhancing social and economic outcomes, and strategically investing in climate-resilient infrastructure. The issuance of the Green Bond provided important finance for the Republic of Serbia, enabling the government to create sustainable possibilities for everyone, everywhere.

Legal Framework and International Commitments

The Serbian Government has acknowledged the material adverse impacts climate change presents now and in the future through the adoption of the Law on Climate Change by the National Assembly of Serbia in March 2021. The commitment to environmental protection and climate change issues are high on the Government's priority list, demonstrated by the updated Nationally Determined Contribution (NDC) in accordance with the obligations under the Paris Agreement in August 2022, enhancing the ambition for climate mitigation more than three times compared to the previous NDC, equating a 13.2% cut compared to 2010, and a 33.3% reduction compared to 1990, by 2030.

Figure 4: Greenhouse gas emission in Serbia in MtCO₂ equivalent by sector, 1990 to 2019¹⁰



The revised NDC for 2030 is an economy wide GHG reduction target focused on reducing GHG emissions in the energy, industrial processes and product use (IPPU), agriculture, and waste sectors. Energy is one of the largest sectors of the Serbian economy, with most electricity produced in thermoelectric power plants (about 70%) using domestic low-calorific lignite¹¹. Electricity consumption is likewise high, primarily due to the use of electricity for heating and low levels of energy efficiency¹², thus decarbonization of the energy sector is a strategic priority given its significant environmental impact.

¹⁰ <https://ourworldindata.org/grapher/co-emissions-by-sector?country=~SRB>

¹¹ Nationally Determined Contribution (NDC) of the Republic of Serbia for the 2021–2030 period

¹² Ibid.

The NDC further elaborates mitigation co-benefits resulting from adaptation actions which will be further detailed in the National Adaptation Programme (NAP), which is under development, with climate targets focused on achieving economy-wide impacts in key economic sectors such as energy production and consumption, agriculture, transport, industry, waste management, and forestry¹³. Working closely with key partners and stakeholders, such as the UNDP and relevant Development Finance Institutions (DFIs), the Serbian government is strongly committed to strengthening legal and institutional frameworks for climate change adaptation (CCA), assessing and addressing immediate national and subnational CCA policy and institutional capacity gaps, and continually improving the NDC to ensure climate-related decision making and investment planning are effectively aligned with national and subnational climate change mitigation and adaptation goals¹⁴.

Serbia's Gender Equality Strategy is likewise highlighted in the revised NDC, which envisages the mainstreaming of the gender perspective in the field of environmental protection, circular and green economy and information technologies/digital economy.

13 [UNDP \(2022\): Climate Promise - Serbia](#)

14 [UNDP \(2022\): Advancing Medium and Long-Term Adaptation Planning in The Republic of Serbia](#)



4. Allocation Report

Overview

In accordance with the selection process described in the GBF, the net proceeds of the green bond have been allocated to expenditures in the Government Budget that contributes to Serbia's climate and environmental objectives, the UN Sustainable Development Goals (SDGs) and the Paris Agreement. This report presents how the proceeds are distributed among the different sectors of expenditure.

The Green Bond issued by the Government of Serbia intends to exclusively finance or refinance, in whole or in part, expenditures which are part of the Government Budget aimed at promoting Serbia's transition to a low-carbon, climate resilient and ecological economy as well as contributing to United Nations Sustainable Development Goals. In the GBF six Green Categories are indicated that can be used for the allocation of Green Bond proceeds. Specific expenditure items of the Government Budget have been identified in the GBF that meet the criteria of the Eligible Green Expenditures.

Rationale and process for project selection

A robust process of identifying climate mitigation and adaptation projects has been undertaken to prioritise those investments which will deliver material social and environmental benefits for the people of Serbia. The Serbian Government has acknowledged the material adverse impacts climate change presents now and in the future through the adoption of the Law on Climate Change by the National Assembly of Serbia in March 2021.

An intergovernmental Green Bond Working Group ("GBWG") was established on 11 June 2021 to oversee the process, the selection of Eligible Green Expenditures, the allocation of funds received and the delivery of the allocation and impact reporting to investors and the public. Under the responsibility of the Ministry of Finance, the GBWG will pool all the expertise needed for a thorough and robust evaluation and selection of Eligible Green Expenditures. The GBWG consists of members from:

- Prime Minister's Office
- Ministry of Finance
- Ministry of Environmental Protection
- Ministry of Construction, Transport and Infrastructure
- Ministry of Mining and Energy
- Ministry of European Integrations
- Ministry of Agriculture, Forestry and Water Management



The use of a cross-governmental working group ensures that a 'whole government' approach is taken, and that a holistic conceptualization of sustainability and sustainable development governs the allocation of Green Bond proceeds. It also allows for the working group to follow up on success and lessons learned from the investment of Green Bond proceeds, enabling cross-departmental knowledge generation and exchange.

The Government of Serbia established an evaluation and selection process to determine the eligibility of specific expenditures as part of the Green Bond Framework. The GBWG was established to oversee the process, as well as the selection of Eligible Green Expenditures, the allocation of funds received, and the delivery of the allocation and impact reporting to investors and the public.

The process for the evaluation and selection of Eligible Green Expenditures is performed on a regular basis, ensuring that only qualified Eligible Green Expenditures is selected based on the criteria determined in this Framework. Relevant ministries are involved in the evaluation and selection process and are requested to provide the necessary level of information to demonstrate alignment with the eligibility criteria for Eligible Green Expenditures, as well as reporting information.

The GBFW explicitly excludes the following activities (negative list):

- exploration and production of fossil fuels
- energy power generation using fossil fuels as feed stock
- manufacturing and production of armaments
- defence
- tobacco and alcoholic products, and activities related to gambling,
- deforestation and degradation of forest and
- any expenditures that violate the Constitution of Serbia, the EU Charter of Fundamental Rights, or other national laws or regulations.

Expenditures which do not comply with the eligibility criteria are excluded from being eligible. The GBWG managed ESG risks and considered project categories which are in compliance with the national legislation such as in the fields of environmental protection (e.g., the *Law on Nature Protection of the Republic of Serbia* regulates the production, collecting, and trade of protected species and establishes measures to ensure species' protection; or the laws on Energy Efficiency, Law on Environmental Protection, Law on Air Protection, Law on Noise Protection), and social and labour law (e.g Employment act, Law on Safety and Health at Work). For relevant expenditures categories, environmental impact assessment is carried out for all eligible expenditures. All eligible expenditures under the Framework and allocation are subject to high standards regarding labour and health and safety defined by national legislation.

For a majority of eligible expenditures, the issuer has implemented due diligence processes to ensure that enterprises managing projects have received certifications such as ISO 14001 and ISO 9001 or have implemented measures, policies and control mechanisms reflecting high standards on waste management and pollution prevention. For the remaining expenditures public enterprises have set business strategy to implement such measures and/or obtain such certificates, but no evidence is available on whether those are implemented.



Sectoral Allocation

In accordance with the criteria set out in the framework, the Eligible Green Expenditure has been selected from the previous budget years realised expenditure and expenditure for the current budget year in the Government Budget. By the end of Q3/2022, over 87% of the proceeds of the Green Bond had been allocated, and invested in targeted climate- and environment-related priorities in a total of 91 projects in five key economic sectors, as set out in Table 1 below. About 30% of the volume of Green Bond proceeds was allocated retroactively, to projects in the years 2018 to 2020.

These allocations reflect the socio-economic and environmental priorities of Serbia's development agenda. On the whole, the investments are balanced across four sectors, transport, sustainable water and wastewater management, pollution prevention and control and circular economy, protection of the environment and biodiversity and sustainable agriculture, while the energy and energy efficiency sector is only lightly represented, with no allocation at all to renewable energy.

The largest number of projects were in the area of PEBSA, which also included SFM, with sustainable water and wastewater management seeing the second-largest number of projects. In this sector, however, individual projects cover a potentially wide scope with a wide range of investments in the maintenance and modernisation of water and wastewater systems.

Retroactive Allocation

The GBF allowed for the retroactive allocation of proceeds. The government chose to take advantage of this and went back to 2018 projects to allocate proceeds against them. Nevertheless, the projects were chosen and analysed in close co-operation with the relevant line ministries and agencies, and fully conformed to the requirements of the GBF. As a consequence, the allocation across sectors and time saw substantial fluctuation over the five years during which the proceeds were allocated. This effect is even more notable when considering the relative, rather than the absolute shares, where e.g., transport accounted for just over 42% of the funding allocated in 2021, around double the share in the previous two years. This is likely related to major capital expenditure for specific projects.



Figure 5: Investment Evolution by Sector 2018 to Q3/2022 in EUR

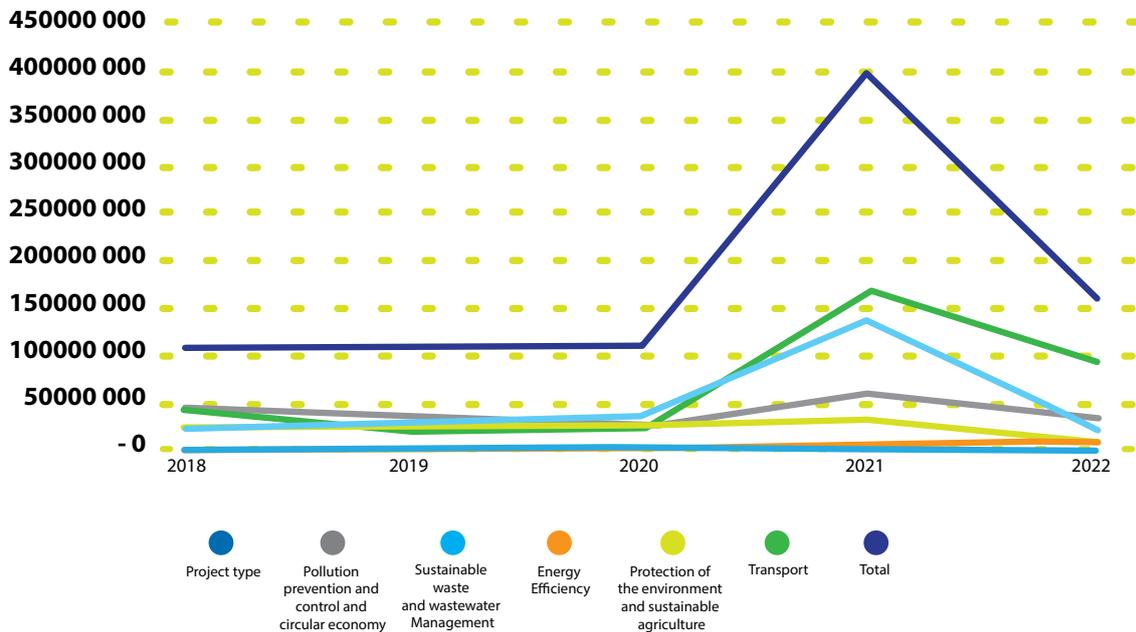
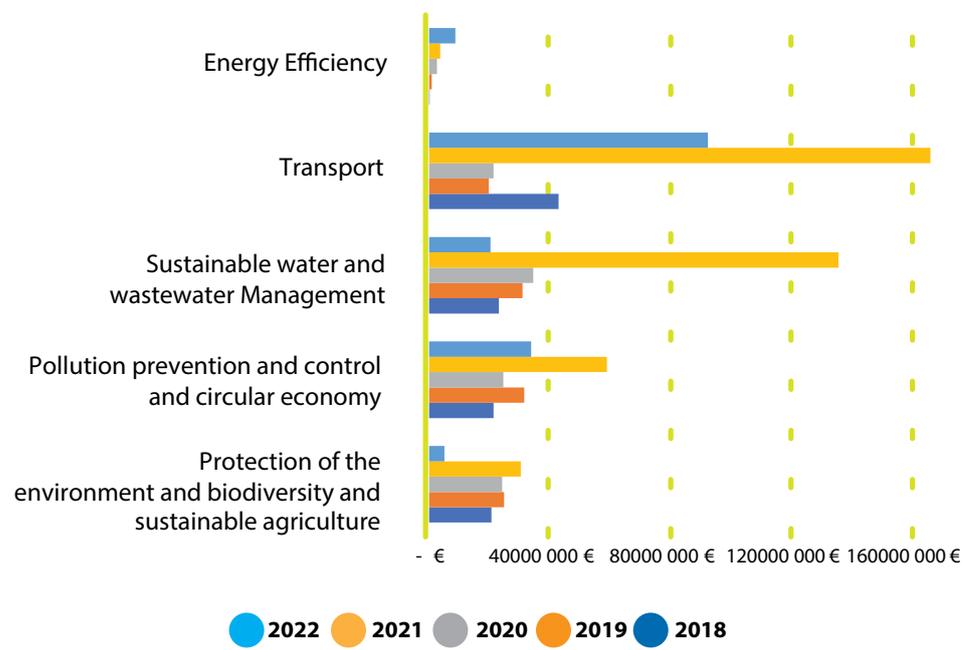


Figure 5 shows the development of investment allocations over time by volume. There has been a notable shift in these, with all sectors receiving substantial funding volumes in 2021, with the bulk going to transport. For the years 2018 to 2020, the sectoral spread of investments was instead relatively steady.

Figure 6 shows the development of investment allocations over time by sector. There has been a notable shift in these, with all sectors receiving substantial funding volumes in 2021, with the bulk going to transport. For the years 2018 to 2020, the sectoral spread of investments was instead relatively steady.

All sectors, except for energy efficiency, saw substantial allocation increases in 2021, reflecting the increased activity in capital investment as the economy came out of the COVID-19 pandemic. This is also indicative of the relatively lower importance of retroactive allocations, as almost 51% of the allocated proceeds thus far were allocated to projects in 2021. Once the full allocation of the proceeds has been achieved, it is likely that close to 2/3rds of them have gone to new investments and expenditures, assuring a high level of additionality of impact achieved due to the use of green bond. proceeds.

Figure 6: Sectoral funding breakdown by year in EUR



Future Allocation

At the end of Q3/2022, almost EUR 880 million had been allocated, and only EUR 120 million remained, amounting to 12% of the issuance volume. It is expected that by the end of H1/2023 these remaining proceeds will have been fully allocated and that the 2023 allocation and impact report will be able to provide a full picture of this allocation as well as of the impact that Serbia's Green Bond has had in advancing the Republic of Serbia's sustainable development.

5. Impact Report

Interpreting reported results

Clearly outlining the key aspects of the approach to select the indicators provides investors and other key stakeholders in Serbia's Green Bond with relevant and material information which will enable them to reasonably assess the economic, social, and environmental impacts of the proposed and implemented investments utilising the proceeds of Serbia's Green Bond.

The methodology for tracking the Green Bond impacts aims to achieve balance across four elements:

- The commitments made by the Government of Serbia within the Green Bond Framework.
- Achieving transparency for investors and other stakeholders regarding the use of proceeds.
- Ensuring a comprehensive assessment of materiality is undertaken in reporting on the use of the proceeds and broader societal impacts of eligible green bond investments.
- Maintaining an implementable and practical approach to data collection for indicator reporting within National capabilities.

Materiality

Materiality is a fundamental concept which underpins financial accounting and sustainability reporting frameworks and ESG rating methodologies. Sustainability-related financial information is material if omitting, misstating, or obscuring that information could reasonably be expected to influence decisions that the primary users of general-purpose financial reports make on the basis of those reports¹⁵. Sustainability materiality is intended to increase transparency and accountability by making sustainability reports focus more on "what matters", whether it be from a financial perspective or from the broader perspective of how the reporting entity impacts society and the environment.

The materiality of a given sustainability risk or opportunity becomes a critical source of information used by investors to inform their decision-making process. The concept of materiality also has a broader societal impact¹⁶ as it informs other key stakeholders, such as government agencies, NGO's, regulatory authorities, of how the reporting entity contributes to sustainable development goals within the regional, national, and international context.

The Serbian government follows a combined approach to materiality assessment which incorporates the notions of double and dynamic materiality and follows the guidance issued by the Sustainability Accountability Standards Board (SASB) and the Global Reporting Initiative (GRI) to assess the disclosure of material topics. Material topics represent the most significant impacts, both positive and negative, on the economy, environment, and people, including human rights. Further details of the materiality assessment process are outlined in the Green Bond Impact Reporting Methodology.

Several key indicators have been selected and quantified where possible, but it is important to take into account the inherent limitations of the data reported. The main considerations applied to adequately interpret the results are as follows:

15 [IFRS \(2021\). General Requirements for Disclosure of Sustainability-related Financial Information Prototype: Technical Readiness Working Group \(TRWG\) for consideration by the International Sustainability Standards Board \(ISSB\)](#)

16 [Puroila, J., & Mäkelä, H. \(2019\). Matter of opinion: Exploring the socio-political nature of materiality disclosures in sustainability reporting. ACCOUNTING, AUDITING AND ACCOUNTABILITY JOURNAL, 32\(4\), 1043-1072](#)



Sector 1 – Renewable Energy

No Green Bond proceeds were allocated to this sector.

Sector 2 - Energy Efficiency

The Republic of Serbia has a comprehensive approach to improving energy efficiency, laid out in the Energy Efficiency Action Plans, the fourth of which is now guiding the implementation of additional measures. While previous plans have generally overachieved their objectives, the overall potential for energy efficiency remains high in all sectors of the economy, and in particular in housing. Recognising this, financing improvements in the housing sector is one of the key areas where the Republic of Serbia has allocated Green Bond Proceeds (Table 5).

While other funds are being allocated to central government buildings, the proceeds from the Green Bond have enabled Serbia to hold four calls for public buildings under the control of other authorities, and two for residential buildings.¹⁷

Based on a review of the performance of the 3rd National Energy Efficiency Action Plan against its targets, it is evident that the building sector overperforms, and the allocation of Green Bond proceeds, therefore, further strengthens the momentum of delivering tangible energy savings in the sector, by providing further encouragement to building- and home-owners, at relatively low cost.

In public buildings, the projects primarily included measures to improve energy efficiency of the building's thermal envelope (replacement of carpentry and installation of thermal insulation) and measures to improve thermal systems (installation of biomass boilers, installation of thermostatic valves, electronically regulated circulation pumps and devices for measuring the amount of heat transferred). Projects are most often implemented in public facilities such as: preschools, health centres, primary and secondary schools and administrative buildings of the LSGUs.

In the private sector, measures cover replacing exterior windows and doors and/or other elements of the thermal envelope of the building, in particular by adding thermal insulation, as well as active measures reducing the energy consumption in the building's heating/ventilation system by improving HVAC equipment, installing high-efficiency biomass combustion boilers, solar collectors or heat pumps.

While energy efficiency is an important policy objective, only a small amount of the Green Bonds proceeds has been allocated to it. This is likely to reflect the challenges of establishing large-scale programmes in supporting building refurbishment. At present, energy efficiency accounts for just 1% of the proceeds across two projects.

17 [The calls are made available at the web page of the Ministry of Mining and Energy.](#)



Table 3: Energy Efficiency Impacts

Indicator/Data	Unit of Measurement	Value
1. Number of calls issued for energy efficiency enhancement.	Calls for proposals (7 calls from 2014 to 2021)	4 calls (public buildings) 2 calls (private buildings)
2. Number of buildings to be refurbished to at least the threshold defined under Serbian building standards under the calls.	a. Square meter floor area of buildings to be refurbished (public buildings only).	70.664
	b. Number of public/private buildings to be refurbished under the call.	68 public buildings 4,720 private buildings
3. Estimated CO2 savings	CO2 savings by sector and total in tCO2 lifetime	5.051,157tCO2 (public) 14,157tCO2 (private)
4. Estimated energy savings	Energy savings by sector and total in GWh (lifetime)	12 GWh (public) 41 GWh (private)

Only expenditure and results from 2018 was considered for the purposes of the Green Bond. Calls prior to 2018 are however noted for contextual purposes.

Sector 3 - Transport

The transport sector plays an important role in the Serbian economy and has a pronounced impact on all segments of life in the Republic of Serbia. Its performance, technology, quality, costs and impact on quality of life represent one of the important factors affecting the functioning of the state, its economy, social relationships, quality of life, etc. The sector plays a crucial role in the economy, as an enabler of trade and commerce, and thereby economic growth and resilience, as well as an important sector in its own right. In 2021, despite pandemic impacts, it contributed 3.6% to GDP and employing almost 106,000 people, 4.8% of the workforce.¹⁸

In the last five years, the focus has been on the improvement and development of the key elements of the structure of the transport system (primarily infrastructure) to increase the system efficiency, productivity and quality. A key objective is to create a sustainable transport system.

The objectives for the improvement and development of the transport sector are defined in the basic national strategic documents of the Republic of Serbia, to ensure the modernisation and growth of the sector, as this is recognized as one of the key elements of the country's development policy. These strategies establish the concept of infrastructure and transport development, define long-term goals for the development of the transport system, as well as action plans for their realization by transport mode. The guidelines for such development are set at the level of the entire transport system and are based on the principles of safety, intermodality, application of modern technologies, complimentary use of all transport modes, rational use of available capacities and resources (especially energy) for the benefit of all citizens of the Republic of Serbia.

In this regard, the improvement and development of the transport-infrastructure elements of the system enable more goods and services to be produced, consumed and exported, increasing economic growth potential. Transport infrastructure is also seen as an instrument for balanced regional development, local and regional connectivity, strengthening territorial integrity and preserving the integrity of the state.

¹⁸ Association of Transport – Chamber of Commerce Republic of Serbia



Targeted financing of the development and improvement of the transport sector is one of the key areas in which the Republic of Serbia has allocated revenues from green bonds (Table 1), and proceeds from green bonds in synergy with other financial means (primarily credit lines) should enable real, stronger and faster development of the transport sector and maintain continuous and technical-technological development of transport-infrastructure elements of the system in the coming period and enable the renewal, reconstruction, modernization and construction of key elements of the system. The speed of realization of these projects depends on political and financial support by the European Union and other members of the international community, international financial institutions, and the financial capacity of the state.

In the current phase of improvement and development, supported by the Green Bond proceeds, the primary goal is for the Serbian transport system to be compatible with the transport system of the European Union achieving integration into the Single European Transport Area. This will be leading to further integration of all modes of transport and the establishment of a transport system that will increase mobility, remove the main obstacles in key areas, maintain the growth of the transport sector and increase the employment rate.

After the Implementation of this phase, the Republic of Serbia will be ready to comply with most of the standards of the European Union in the field of transport, transport chains will be established, and the transport market of the Republic of Serbia will be competitive.

The financing of this phase will be largely carried out from the funds generated from green bonds. Currently, 11 projects in the transport sector are financed from the Green Bonds, of which 4 projects are in the railway sector (infrastructure construction and reconstruction and rolling stock modernisation) and 5 in the waterway sector. Two projects are in the road transport sector, where GB proceeds are used for subsidising green vehicles and also taxi vehicles, and aim at local air quality improvement and supporting enhancements in service quality. Overall, at present, transport accounts for 39% of the total GB proceeds which have been allocated across these projects.



Table 4: Transport Impact Data

Indicator/Data	Unit of Measurements	Value
1. Number of calls issued for transport enhancement.	Number of projects	11 projects (4 in the railway sector and 5 in the waterway sector) (12.1% of the total number of projects in all areas)
2. Total length of constructed and modernised railways	Total km of railways constructed and modernised	ca 85.4 km (ca 106.5 km to be done)
3. Number of EMUs	Number of state-of-art electric motor units (EMU) - trains (SOKO)	3 EMUs
4. Total number of subsidised taxi vehicles	Total number of taxi vehicles subsidised from GB	2,312 vehicles (mixed fleet EURO6/hybrid)
5. Total Number of subsidized green vehicles	Total number of vehicles (electric, hybrids, etc.) financed from GB proceeds	431 vehicles (175 private persons and 256 for legal entities) for I-VI 2022 (55% of all green vehicles sold)
6. Total funding from GB	Total GB investments in all transport projects	276,663,881 EUR (39% of total GB investments in all sectors allocated thus far) 272.484.788 EUR spent on 6 projects included in the top 16 (49% of total investments for top 16 projects allocated thus far)
7. Baseline data		
a. Overall electrified railway length in 2022	Total km of electrified railways	1,273.7 km (out of 3,348.1 km of railways)
b. Transport performance in 2021	Rail freight transport Rail passenger transport Road freight transport Road passenger transport	10.8m tons 2.8m passengers 23.4m tons 44 million passengers
c. Total number of railway vehicles in 2020	Total number of locomotives, passenger and freight trains in 2020	Locomotives - 255 Passenger trains - 464 Freight trains - 4.789
d. Number of taxi vehicles registered (cumulative from 2019-H1/2022)	Total number of registered taxi vehicles	ca. 17,000 vehicles (estimate)
e. Total number of green vehicles registered (cumulative from 2019-H1/2022)	Total number of registered electric, hybrid and other green vehicles	9,811 vehicles
f. Total number of green vehicles sold (cumulative from 2019-H1/2022)	Total number of sold electric, hybrid and other green vehicles	5,264 since 2019 (778 sold in I-VI 2022)



Sector 4 – Sustainable Water and Wastewater Management

The Sustainable Water and Wastewater Management (SWMM) sector impacts in urban development, public health, agriculture and environmental protection, and thus plays a crucial role in the Serbia economy. In Serbia, SWMM investments are a strategic priority, and have focused on establishing new facilities as well as the maintenance and improvement of existing water systems, much of which was constructed several decades ago. For example, a large number of water reservoirs have been constructed, which support hydro-power, regulation of water supply, flood defense, agricultural irrigation needs, as well as soil erosion control and maintaining river flows during droughts. Serbia has transposed a majority of EU regulations related to water and wastewater management into national regulations. In line with the requirements of these regulations, in recent years investment in wastewater collection and treatment has been accelerated. The sector is heavily exposed to climate risk, as seen during the catastrophic floods in 2014, which have required significant investment in the rehabilitation and improvement of flood defenses across the country. Total damages caused by the 2014 floods were estimated at over EUR 1.35 billion¹⁹, or around 3 % of Serbia's total annual gross domestic product in 2013.

Underpinning the sector is the Water Management Strategy of the Republic of Serbia, which to large extent aligns with EU Water Framework Directive (WFD). This defines the scope for water management based on the natural conditions within the boundaries of the Republic of Serbia, specifically addressing a range of objectives. Based on the existing situation of water bodies and water management, it establishes as objectives the necessity of servicing water demands, while reducing of water pollution, and fulfilling the requirements for flood defense. The long-term objective of the strategy, in line with WFD requirements, is to achieve a good ecological status/potential of all surface water bodies and maintain good status of groundwater bodies in Serbia.

The adopted Water Management Strategy estimated total needed investments in water sector until year 2034 to over EUR 8.5 billion (2014 prices) and the investment needs are further increased by the expected impacts of future climate change. To support these strategic investments the Republic of Serbia has allocated Green Bond proceeds (see Table 4), which, together with investment from other sources, such as DFIs, users and the national budget, enable the rapid modernisation and expansion of the water and wastewater sector and contribute to the delivery of the sector's input towards achieving Serbia's climate change mitigation and adaptation goals.

Between 2018 and the end of Q3/2022, 28 projects within SWMM sector were financed from the Green Bonds proceeds, 4 of which are in the drinking water supply sub-sector with additional 3 projects related to the construction of water reservoirs, 11 in the wastewater collection and treatment sub-sector, 3 belonging to irrigation infrastructure and 7 within river courses regulation and flood defense sub-sector. Overall, SWMM sector projects accounts for 28% of the total SGB proceeds that have been allocated thus far, highlighting the economic, social, and environmental significance of the sector in achieving Serbia's climate change mitigation and adaptation goals. The proceeds cover four distinct sub-sectors, as set out below.

- 1) Drinking water is the most developed sub-sector, with around 87% of the population connected to public water supply systems.²⁰ However, these systems require long term gradual and continuous improvements to efficiency and reduction in water losses (non-revenue water accounts for ~40%). Green Bond proceeds (10% of the Sector's total) are therefore invested in the maintenance and further expansion of water supply systems, improvement of drinking water quality, and the construction of two reservoirs, thus contributing to more reliable and efficient supply of better-quality drinking water. These investments have addressed water quality and supply issues especially in central and western parts of the country, where high seasonal and spatial variability in domestic water resources require complex regional water supply schemes with water reservoirs as key elements for balancing water availability and demands.

19 [Božanić and Mitrović \(2019\): Study on the Socio-economic Aspects of Climate Change in the Republic of Serbia. Publisher: United Nations Development Programme](#)

20 [Danube Facts and Figures – Serbia \(2017\)](#)



- 2) The wastewater collection and treatment sub-sector is very high on Serbia's development agenda and requires significant investments to meet the social and environmental policy objectives aimed at meeting the Republic of Serbia's EU agenda, as well as climate change mitigation and adaptation objectives. In that context, the Green Bonds proceeds provided significant investment (47.9 % of the Sector's total) to projects related to expansion of the sewer network as well as the design, planning, and construction of wastewater treatment plants.
- 3) Irrigation infrastructure is another vital investment priority in Serbia, with a high potential for sustained impact. However, small percentage of Green Bond proceeds (2.3% of the Sector's total) was allocated to this sub-sector, directed to projects related to the establishment of new irrigation systems and the on-going maintenance and improvement of existing systems.
- 4) Finally, significant funds (39.8% of the Sector's total) from the Green Bonds were allocated to projects undertaking the maintenance and improvement of flood defence and drainage facilities, aimed at protecting urban, rural, agriculture and industrial areas from flooding events, and the reduction of flood risks for population and property.

Table 5: Sustainable Water and Wastewater Management - Projects and Impacts

Indicator/Data	Question / Unit of Measurement	Value of Measurement
1. Number of projects funded	1. Total for SWWM sector	28
	1.1 Subsector: Drinking water supply systems	4
	1.2 Subsector: Wastewater collection and treatment	11
	1.3 Subsector: Irrigation infrastructure	3
	1.4 Subsector: Regulation of watercourses and flood defense	7
	1.5 Subsector: Water reservoirs	3
	Number of sub-projects implemented - total for SWWM sector	110
2. Number of interventions on reservoirs and water supply systems	Number of interventions	61
3. Construction and restoration of reservoirs storage capacity	Storage capacity - in million cubic meters (10 ⁶ m ³)	79 × 10 ⁶ m ³
4. Length of wastewater networks installed / maintained	Length - in kilometers (km)	163.4 km
Baseline data (2019)	Unit of Measurement	Value
a. Drinking water supply systems	- Population connected to public water supply (%)	87%
	- Total length of water supply network (km)	46,419 km
	- Non-revenue water - NRW (%)	40%
b. Water Reservoirs	- Number of reservoirs*	28
	- Total volume (10 ⁶ m ³)*	5,991
c. Wastewater collection and treatment	- Population connected to public sewers (%)	60%
	- Total length of sewer network (km)	16,880 km
	- Percentage of collected wastewater treated (%)	17%
d. Irrigation	- Total area irrigated (ha)	105,000
e. Flood defense and drainage	- Total lengths of protective dykes (km)	3,550
	- Total area drained (ha)	2,100,000

* excluding reservoirs with volume below 10 × 10⁶m³

Sector 5 - Pollution Prevention and Control Circular Economy

The circular economy as a concept is now driven by substantial support in Serbia, with e.g., several support agencies, governmental and industrial bodies active in formulating the policy framework required to develop circularity within the economy. The results from this work include an initial Roadmap for Circular Economy in Serbia developed in 2020, a new Industrial Policy Strategy from 2021 to 2030, the Strategy of Sustainable Urban Development of Serbia until 2030, both incorporating circularity, and the ongoing development of a new Waste strategy under and a dedicated Programme for the circular economy. These documents focus on the circular economy either as a key strategic pillar of continued economic development or reference circularity in the context of strategic areas of development, such as refurbishment or renovation.

A recognised key barrier to circularity development is the lack of comprehensive knowledge about business circularity, which leads to an interpretation of circularity in business and public sectors as a form of recycling, and a focus on waste management and treatment options and/or energy and material efficiency measures, rather than creating or securing value through circularity. Another barrier to widespread adoption of circularity is intrinsically linked to this, in the form of a lack of market demand from the end users. Finally, the regulatory system does not have defined procedures for return industry loops and lacks standards or procedures for product development integrating circularity.

The immediate opportunities for enhanced circularity lay in reprocessing of materials, enabling return loops of materials into production, facilitation of rudimentary industrial symbiosis practices, and further strengthening energy and material efficiency measures. These opportunities are further enhanced by the application of a range of, predominantly EU, foreign standards and procedures. These cover a wide range of related issues, including strengthened reporting under the new CSRD, financial incentives for GHG reductions in selected sectors through the CBAM, and ratcheted performance standards that require the inclusion of circular economy approaches in products, through e.g., the Ecodesign directives and the Sustainable product initiative. With the EU accounting for 2/3rds of exports of the Republic of Serbia in 2021, failing to adhere to the requirements set by this market would risk the threat of higher costs of Serbian products on the EU market, and/or the non-compliance of products effectively closing the market to some Serbian exports.

The Green Bond proceeds of the Republic of Serbia were used in 13 projects in the circular economy sector. The main use of green bond proceeds in this area was retroactive cost allocation for waste management, waste management system modernization, with 3% used for air quality improvement and 1% of proceeds used for soil pollution minimisation. 79% of allocations in this area flowing to a solid waste separation project in four regions, Duboko, Pančevo, Srem-Mačva and Pirot, to co-finance an IPA2017 project valued thus far at EUR812,130,027. This project attracted substantial co-finance from the EU-IPA programme of EUR700,019,070 while the national budget allocated EUR112,110,957.

None of the proceeds supported waste incineration, although a smaller project is utilising wood waste recovered from rivers to support the fueling of a waste-to-energy plant. A smaller project funded by Green Bonds Proceeds enabled the government to financially support the procurement, replacement, reconstruction and rehabilitation of heating boilers in public buildings, reducing air pollution.

Table 6: Pollution Prevention and Control and Circular Economy Key Indicators

Indicator/Baseline ¹	Units
Number of projects funded	13
Number of polluted sites under remediation	2
Size of polluted sites under remediation in km ²	Total: 0.021km ² Site 1: 0.02 Km ² Site 2: 0.001km ² At Site 2 also 1,000m ³ removals and 5,000m ³ excavation
Share of remediated sites redeveloped for same or other uses ²	TBD %

¹ As there was no baseline, the reported numbers here will become the baseline.

² This indicator will only be reported upon at the end of the project, when the full extent of the remediation and potential future use are known.

The major impacts achieved through the allocation of the Green Bond proceeds are an increase in the rate of waste collection, and the ability to permanently treat hazardous and non-hazardous waste on polluted sites. The proceeds also enabled the preparation of draft proposals for a Sludge Management Strategy and a Waste Management Strategy to be prepared, the latter with specific implementation plans. Other impacts cover the construction of a hall for waste separation, soil remediation activities in two projects, prevention of illegal waste disposal, and the reduction of emissions of pollutants from individual sources into the environment in order to implement measures to improve air quality.

Sector 6 – Protection of Environment and Biodiversity and Sustainable Agriculture (PEBSA)

Traditionally, forestry and agriculture are important economic sectors for Serbia, with share in country's GDP of 1.4% and 6.5% respectively. In recent years, their role in enhancing the protection of the environment has also become increasingly important on Serbia's development agenda, as it has been recognised that sustainable forest management, sustainable agriculture, protection of environment and biodiversity preservation are intrinsically interconnected. At the same time, Serbia has made good progress in the process of harmonizing national with EU regulations and has adopted numerous international and bilateral agreements aiming at improving forestry and agriculture sustainability and protection of environment, biodiversity and natural heritage, including the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) or the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Forests cover around 30% of Serbia's land area, which is similar to the world average but is slightly below the average forest land coverage in Europe. Forestry sector objectives in Serbia include the development and expansion of forestry areas, enhancing forest protection and preservation of healthy forests, enabling the multi-purpose use of forests and maintaining the hunting potential. These objectives are to be pursued while ensuring sustainable forest management, improvement of habitats and biological diversity.

The Green Bond proceeds are invested in sustainable forestry projects (15 % of the Sector's total), supporting the planning, construction and maintenance of forest roads and fire lines. These investments are strategically vital in promoting the protection of forests from fire, deforestation from illegal logging, and enabling the tending and protection of forests from pests and diseases, as well as afforestation efforts.

The Green Bond proceeds (21.3 % of the Sector's total) are used for financing of environmental protection and preservation of biodiversity projects. These projects are related to preservation and protection of land as a natural resource, sustainable managing of all protected areas of national interest including enhanced environmental monitoring, maintenance and improvements of the state of protected areas and sustainable use of natural resources (parks, forests, etc.). To improve the protection of the environment and support the establishment of a network of ecologically significant areas and corridors, Green Bond proceeds facilitated preparatory activities for the identification and nomination of the first potential Natura 2000 sites in Serbia. Also, the proceeds supported a range of educational, research and development studies and civil society projects related to environmental protection and preservation of biodiversity.

Developing the agriculture sector remains very high on Serbia's development agenda, with the aim of shifting development priorities to increasing the efficiency of land and other resource use in agricultural production, as well as towards the introduction and strengthening of sustainable agricultural practices and organic agricultural production.

Significant Green Bond funds (63.7 % of the Sector's total) are invested in sustainable agriculture projects which cover a wide range of measures, including the improvement of hail protection systems, the provision of contemporary irrigation equipment, subsidies for organic agriculture production, animal farming, the insurance of agricultural and livestock production, and the development of certification systems for organic products and indication of geographic protection.

Indicators and baseline data for PEBSA subsector are provided in Table 6. Between 2018 and the end of Q3/2022, 34 projects within PEBSA sector were financed from the Green Bonds, of which 8 projects are in the sustainable forest management, 7 in protection of environment subsector, 3 in preservation of biodiversity and 16 are in sustainable agriculture subsector. Overall, PEBSA sector projects accounts for 13% of the total GB proceeds which have been allocated thus far.

Table 7: Protection of Environment and Biodiversity and Sustainable Agriculture - Questions and Impacts

Indicator/Data	Question / Unit of Measurement	Value of Measurement
1. Number of projects funded	1. Total for PEBSA sector	34
	1.1 Subsector: Sustainable forest management	8
	1.2 Subsector: Protection of Environment	7
	1.3 Subsector: Preservation of Biodiversity	3
	1.4 Subsector: Sustainable Agriculture	16
2. Number of Natura 2000 sites	Number of designated projects/sites	0 (only potential sites are selected)
3. Area of (improved) sustainable forest management	Area in hectares (ha) (2018 - 2021)	241,000 ha
4. Area protected /restored /maintained	Area in hectares (ha) (2019 - 2022)	16,277 ha
a. Forest management	- National forest land area (ha) (2008)	2,250,000 ha
	- Forest area % of national land area (%)	29.1 %
	- Forrest area under protection (% of forest area)	18.5 %
b. Protection of environment	- Number of protected areas (2019)	427
	- National protected land area (ha) (2019)	654,957 ha
	- Percentage of national territory protected (%) (2019)	7.40 %
c. Protection of biodiversity	- Total area declared as ecologically significant area or corridor (ha) (2020)	2,131,160 ha
	- Total number of ecologically significant areas and corridors of which:	107
	- number of Emerald network sites	61
	- number of Natura 2000 sites	-
	- number of Ramsar sites	11
d. Agriculture	- Agricultural land (ha) (2018)	3,765,847 ha
	- Agricultural land % of national land area (%)	48.5 %
	- Organic agriculture area (ha) (2021)	23,527 ha
	- Number of agricultural farms (2018)	631,552

6. Serbia Green Bond 2021 Case Studies

Energy Efficiency

Energy consumption of Serbia's public and residential buildings is a significant contributor to GHG emissions, with 36 percent of all CO₂ emissions in the region estimated to come from public and private buildings²¹. Energy efficiency improvements of the building stock are therefore a strategic policy priority for the Government of the Republic of Serbia. They lead to significant energy savings and contribute to several environmental, social, and economic benefits, including the reduction of air pollution and GHG emissions, enhanced productivity and comfort levels of building occupants, as well as increased employment and capacity in the construction industry, while reducing the need for fuel imports, thus preserving foreign exchange reserves.

The Government of the Republic of Serbia is working closely with numerous key stakeholders, including the EBRD, to harmonize and achieve higher building codes and standards, improve knowledge, innovation, and capacity building within the building sector. Investments in public and private building energy efficiency improvements are most effective when they occur simultaneously with enhancements in building energy codes and standards, which are the most widely recognized, scalable, and effective policy instruments for building decarbonization²². Proper building design and the selection of high-performance building elements and materials is likewise vital, given the long lifetime of buildings and the associated cost of utilising them²³.

The proceeds from Serbia's Green Bond are strategically invested in projects aimed at enhancing buildings energy efficiency. They complement existing national and development partner programs, including the Serbia Energy Efficiency Framework in Buildings (SEEF), which consists of a facility of up to EUR 40 million provided by the European Bank for Reconstruction and Development (EBRD), to support investments in energy efficiency improvements in public and residential buildings connected to district heating systems²⁴. For now, guarantees for 20 million have been provided in the Budget. EUR EBRD loan. The EBRD plans to provide a 5 million EUR donation. It is expected that the loan will be increased. Another EUR40 million are being provided by the Council of Europe Development Bank to finance central government building refurbishments. These strategic investments will help create a resilient public and private building sector, capable of adapting to the challenges of climate change. There are also a number of projects going on that support overall energy efficiency and work in concert with the utilisation of the Green Bond's proceeds.

- Energy Efficiency in Public Buildings and Renewable Energy in the District Heating Sector (Greening the Public Sector) consisting of a 1st phase with a KfW loan of EUR50 million and grant support of EUR5 million. The overall project value is EUR200 million. The project will focus on rehabilitation of the MMA (VMA) hospital.
- The Municipal Energy Efficiency and Management Project (MEEMP) in Serbia project is financing the rehabilitation of 14 public buildings in 4 municipalities. It is supported by Switzerland – SECO with EUR10.95 million. Of this, EUR9.7 million come as a donation by the Swiss government, while participating municipalities provided the equivalent of EUR1.25 million.

21 [UNDP - Serbia \(2021\). The Ministry of Mining and Energy of Serbia is introducing energy efficiency in central government buildings](#)

22 [IEA \(2022\), Building Envelopes, IEA, Paris](#)

23 [Ibid.](#)

24 [EBRD \(2021\). Serbia Energy Efficiency Framework in Buildings \(SEEF\)](#)

- Scaling Up Residential Clean Energy (SURCE) is a project financed by a World Bank loan of USD50 million which was negotiated in February 2022. This project which will provide incentives to the residential sector to improve energy efficiency and install PV-a with special attention to the energy vulnerable categories.

Programme to Improve Energy Efficiency of Residential Building, Family Homes and Apartments Implemented by Local Governments

The underlying rationale of the programme is that integrating high-performing building envelopes with up-graded heating systems is vital to improving overall building energy efficiency performance, while building envelope design is critical in defining the service demand for heating and cooling, and to guarantee comfort, indoor environmental quality and safety²⁵. The programme covers 67 local governments and has directly financed improvements in 4,000 households, including improving the thermal envelope of buildings (substitution of exterior walls and windows, installation of thermal insulation for walls, roof, ceilings above open passages, walls, floors on the ground), improving the heating systems (substitution of existing boilers with more efficient ones, installation of heat pumps, installation of electronically regulated circular pumps) and/or installing solar collectors into the installation for central preparation of utility hot water.

Improvements financed by the programme are expected to generate energy savings of 38 MWh/year, and an estimated CO2 emissions reduction of 12,452 tCO2/year, while saving households 118 million Serbian Dinar per year.

Picture 1: Window Replacements under the Programme



Before



After

Programme to Improve Energy Efficiency of Residential Building, Family Homes and Apartments Implemented by Local Governments

Building envelope performance improvements are critical to getting on track with the majority of the Net Zero Scenario milestones in heating and cooling intensity (energy use per total m²)²⁶, thus the emphasis on decarbonisation of the public and private building stock in Serbia will materially contribute to achieving climate mitigation and adaptation goals at the local, national and international level.

25 IEA (2022), *Building Envelopes*, IEA, Paris

26 IEA (2022), *Building Envelopes*, IEA, Paris

The programme covers 151 local governments and finances improvements to the thermal envelope of buildings (including the substitution of exterior walls and windows, installation of thermal insulation for walls, roof, ceilings above open passages, walls, floors on the ground), improving the heating systems (substitution of existing boilers with more efficient ones, installation of heat pumps, installation of electronically regulated circular pumps, equipping the heating systems with facilities for regulation and measurement of delivered heat to the building), and/or installation of solar collectors into the installation for central preparation of utility hot water and installation of solar panels. The energy efficiency investments are expected to result in energy savings of 196GWh/year, generating RSD 1 billion in savings, and lead to a reduction in CO₂ emissions of 88ktCO₂/year.

Picture 2: One of 4,000 households where works have been completed under the programme



Before



After

Programme to Improve Energy Efficiency of Family Homes by Installing Solar Panels

Developing new solar capacity on building rooftops, especially for households, will contribute decisively to decarbonise the Serbian electricity sector. The programme covers 37 local governments and finances the improvement of family homes by installing solar panels for production of electricity for own use. As households increasingly shift to electricity for heating and cooling and begin to transition to electric mobility, the need for local embedded electricity production will increase²⁷. The green bond investment in residential solar production is expected to have lasting impacts toward climate adaptation, by equipping local households and communities with energy efficient power sources capable of meeting the energy demands of related household energy efficiency systems. The expected impacts of the green bond investment are the production of almost 2GWh of electricity per year, leading to savings of 15.7 million Serbian Dinar, and an estimated CO₂ emissions reduction of over 1ktCO₂/year.

27 IEA (2022), *Approximately 100 million households rely on rooftop solar PV by 2030*, IEA, Paris

Picture 3: Solar roof installed through the programme



Hungary-Serbia Railway (Project 0702-5015)

Serbia's Vision for the Rail Sector

Railways are critically important for the economy and environment, as highly efficient at transporting people and freight, but suffer from consumer demand. Modernization is therefore a condition for fully restoring confidence in railway traffic, and this can be achieved through the systematic reconstruction and modernization of the entire railway infrastructure, including tracks, trains and stations. In Serbia, the plans by the government, working together with neighbouring countries and the EU, funded in part by the Green Bond, are on track to achieve this modernisation. The proceeds from Serbia's Green Bond have been critical in enabling the government to put in place a new rail infrastructure project that will benefit the economy, the environment, and Serbia's integration with its neighbours.

Picture 4: Modern EMU railsets for the Serbia-Hungary Railway Project



The construction of a new, modern rail transport systems, as well as the refurbishment of existing rail transportation infrastructure reduces the negative impacts of outdated rail transport systems, such as air and noise pollution, while increasing comfort and efficiency, thus promoting modal shift. Increasing the volumes of passenger and goods transported by environmentally friendly and energy-efficient rail transport reduces road congestion and environmental impacts, both globally and locally.

The Hungary-Serbia Railway Project

Under the direction of the Ministry of Construction, Transport and Infrastructure and Serbian Railways Infrastructure, the Serbian element of the Belgrade – Budapest railway line, running from Beograd Centar – Stara Pazova – Novi Sad – Subotica and then the State border (Kelebija) is being implemented. The project will make a significant contribution to the development of sustainable mobility in the region and increase Serbia's ecological performance, cutting travel time from the current eight to 3.5 hours, making train travel between Budapest and Belgrade more attractive than air travel.

Map 1: The Belgrade – Budapest railway



References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

The project is considered of strategic significance, from an economic, social, and environmental perspective. In addition to providing speed and thus time savings, the new infrastructure will also provide a high level of reliability, safety, capacity and comfort, which will contribute to the competitiveness of the railway, reduce transport costs and increase the level of environmental suitability of the transport system. It is expected to play a vital role in the decarbonization of the transport system

The total cost of the project in Serbia alone is expected to reach over EUR2.3 billion equivalent, of which ca. 15% are co-financed by the China Import-Export Bank, and up to 10% from proceeds of the Green Bond, almost all of which had been allocated by the end of Q3/2022. Beyond the direct impacts on the transport sector, the project also has important economic aspects by supporting domestic suppliers. For example, more than 170 Serbian subcontractors and suppliers of equipment are contributing to its successful completion.

Once completed, forecasts estimate that ca. 550,000 passengers will switch from road to rail traffic per year, while for freight traffic, it is assumed that by 2030 a total of 25.3 million tons of goods will be re-distributed from road to rail in the period to 2030, rising to 48.1 million tons by 2040, and a total of 64.8 million tons by 2050.

Technical Aspects

The project includes the reconstruction and modernisation of existing single tracks and the design and construction of new double track for mixed passenger and goods transport at speeds up to 200 km/h. The first section from Beograd Centar via Stara Pazova to Novi Sad was completed in March 2022 and the track opened for commercial transport on March 19th 2022, while the section from Novi Sad via Subotica to the state border (Kelebija) is under construction.

The construction of the Serbian section raised a number of complex technical challenges, requiring engineering structures including bridges, viaducts, underpasses, overpasses, pedestrian and bicycle underpasses, to be constructed to complement the installation of the new rail sections. For example, the "Čortanovci" tunnel, designed with two separate single-track tunnel tubes and of 1,150m in length, was built in terrain with complex geotechnical conditions, including areas under threat of –landslides. Further [north/east/south/west] a three km long viaduct was required to cross the geotechnically complex terrain from the tunnel to the Danube alluvium.

Throughout its length, high environmental standards were applied in line with the requirements for the protection of cultural and natural monuments were adhered to, while modern noise protection measures were implemented to reduce environmental impacts further. In order to maintain existing service levels, the construction of the new infrastructure was planned to be carried out with the minimal service interruptions necessary, allowing the continued functioning of the existing rail transport systems.

Picture 7: Leskovac WWTP

Construction of main wastewater collector and wastewater treatment plant in Leskovac



Water-related investments contribute to the momentum towards achieving SDG 6, as they can be used to support sustainable water resources management and safe wastewater strategies that are both needed to ensure access to water and sanitation for all by 2030²⁸. Investment in wastewater infrastructure can bring co-benefits such as job creation, improved public health, poverty reduction, promotion of gender equality and improved livelihoods, further enhancing their attractiveness to green bond investors. The Republic of Serbia recognises this, and pursues a clear strategy of treating and utilising waste water.

Safe delivery of waste water as a resource requires effective monitoring of wastewater treatment. Water pollution is caused by the discharge of pollution such as municipal sewage and industrial wastewater, runoff from agricultural areas, or wet and dry transfer of atmospheric pollutants to water bodies and river basin drainage areas²⁹. Maintaining quality and up-to-date wastewater statistics is a key strategic priority for the Government of the Republic of Serbia, as high-quality data aides' policymakers at all levels of government to identify challenges and opportunities, to set priorities for more effective and efficient implementation, to communicate progress and ensure accountability, and to generate political, public and private sector support for further investment³⁰.

Safely managed wastewater becomes an affordable and sustainable source of water, energy, nutrients and other recoverable materials³¹, which will become of considerable importance with increasing pressure on fresh water supplies. The utilisation of treated water resources will support the shift towards a circular economy, in which wastewater is considered a valuable resource³². Nevertheless, it is important to note that wastewater treatment contributes to climate change as it is energy intensive, generating GHG emissions from both the energy and biochemical processes used for wastewater treatment, while untreated wastewater represents a major source of methane, a powerful greenhouse gas³³.

28 [UN Habitat and WHO, 2021. Progress on wastewater treatment – Global status and acceleration needs for SDG indicator 6.3.1. United Nations Human Settlements Programme \(UN-Habitat\) and World Health Organization \(WHO\), Geneva](#)

29 [Ibid.](#)

30 https://www.unwater.org/sites/default/files/app/uploads/2021/09/SDG6_Indicator_Report_631_Progress-on-Wastewater-Treatment_2021_EN.pdf

31 [UN Water \(2022\). Water and Climate Change](#)

32 https://www.unwater.org/sites/default/files/app/uploads/2021/09/SDG6_Indicator_Report_631_Progress-on-Wastewater-Treatment_2021_EN.pdf

33 [UN Water \(2020\). UN World Water Development Report 2020 'Water and Climate Change'. Paris/Geneva.](#)

In Serbia, the total quantity of urban wastewater in 2021 increased by 2.7%, with households discharging 0.3% more wastewater, wastewater discharged from the industrial sector experienced a decrease of 0.8%, while other users; including agriculture, forestry and fishing, construction and services discharged 3.1% more wastewater, relative to the referent period in 2020³⁴. In the same year, Serbia's treated wastewater volume increased by 3.8% compared to 2020 and the most frequently applied method was secondary treatment³⁵.

In the SWWWM sector, green bond proceeds have contributed 7.95 mil EUR (11.26 mil EUR planned or 30.8% of total costs) towards the construction of the 36.6 mil EUR wastewater collector and wastewater treatment plant in the City of Leskovac³⁶ (southern Serbia) with total capacity of serving the needs of 129,000 inhabitants³⁷. The project was selected through the Municipal Infrastructure Structure Program (MISP), an EU supported funding initiative focused on supporting environmental and economic infrastructure projects in Serbian municipalities. It has economic, social and environmental strategic importance for the Republic of Serbia given significant adverse impacts of untreated wastewater to local watercourses in the river Veternica and Southern Morava. The project will also contribute to the reduction of discharge of organics and nutrients into the Danube river basin, which is sensitive to pollution.

The wastewater treatment process at Leskovac is based on activated sludge technology with biological nutrient removal, which is a robust and proven technology that aligns with EU and international standards. Odour treatment was prioritized to reduce nuisance from the plant and mitigate health impacts for surrounding communities. The sludge treatment facility includes digestion, biogas production and utilization for production of thermal and electrical energy, which enable partial energy recovery from the wastewater. This investment in modern wastewater treatment technologies which allow for the extraction of methane from organic matter and then use this biogas to generate the energy needed to run the process³⁸ significantly reduced the GHG emissions impacts of the new facility, thus significantly improving the project's sustainable development impacts.

Picture 8: Leskovac WWTP



34 [Statistical Release | Statistical Office of the Republic of Serbia](#)

35 [Ibid.](#)

36 [Serbia has received grant funding under the Netherlands' ORIO programme for the implementation of a wastewater treatment project in the City of Leskovac. The Leskovac project has also received funding from the EU for the Design and Construction of the WWTP Leskovac \("waterline" contract\).](#)

37 This is measured in Population Equivalents (PE)

38 [UN Water \(2020\). UN World Water Development Report 2020 'Water and Climate Change'. Paris/Geneva](#)

Under the guidance of the Ministry of Environmental Protection, the project comprises three phases and includes expansion of the existing sewer network, construction of the main collector and establishment of wastewater treatment plant (WWTP) for the city of Leskovac. As of July 2022, the second phase has been completed, adding capacity to service 86,000 inhabitants to the wastewater treatment system, and the existing wastewater network has been reconstructed and extended to enable the initial serving of 60,000 people already connected to the system, covering 95% of the urban, and 45% of the total population in the municipality. The capacity of the first phase is for 86,000 connections, serving 80,000 inhabitants in the region and business clients. The second phase will have capacity for 129,000 connections.

The main sewer was constructed with a total length of 5,150 m from the city to the location of the WWTP, with further expansion and additional phosphorus removal capacity planned in the future. The WWTP comprises two parallel wastewater treatment lines and a sludge treatment line, with first testing results demonstrating compliance with national and EU regulations. Improved sanitation and public health conditions are the primary results of the project, which provides efficient collection, transport and treatment of wastewater for the inhabitants of the City of Leskovac and surrounding settlements. The project also provides collection and treatment of wastewater from industrial facilities in the area. Upon completion of the project, the Leskovac WWTP will process 1.7% of the total municipal wastewater collection and treatment in Serbia.

Picture 9: Leskovac WWTP



Implementation of wastewater collection and treatment projects are a very complex and challenging task. Low-lying terrain and high groundwater levels were the main challenges during construction of main sewer collector and the WWTP. The scale and complexity of the project underlines necessity of collaboration and

synergy between international institutions, including the EU, funding organizations such as UNDP, local and national government agencies. The example of Leskovac WWTP shows that this can be achieved by bringing all parties together, and providing finance from capital markets through the Green Bond.

PEBSA Case Study - Construction and reconstruction of forest roads

Forests are an important source of biological diversity and have a key role in the ecological processes and ecological balance at the local, national, regional and global levels by protecting vulnerable ecosystems, water catchments and springs, and are a valuable nature-based solution in the fight against climate change through carbon sequestration³⁹.

The Republic of Serbia is very rich in biological diversity in its forest ecosystems, which cover approximately 29% of the territory of Serbia⁴⁰. The main tree groups of Serbian natural forests are beech (40%), oak (30%) and other broadleaves. Forests offer multiple benefits by providing raw materials for renewable and ecologically sound products; maintaining biological diversity and contributing to global carbon cycling and a sound water balance. The Republic of Serbia rightly considers its forests as pillars of sustainable development⁴¹.

Picture 10: Tree plantation



39 [The Republic of Serbia \(fao.org\)](https://www.fao.org/)

40 [The Republic of Serbia \(fao.org\)](https://www.fao.org/)

41 [The Republic of Serbia \(fao.org\)](https://www.fao.org/)

Picture 11: Tree Nursery



The forestry sector's share in Serbia's GDP is 1.4%. The sector is an important source of foreign income, with the wood processing industry's contribution to total export amounting to 5.7%, with continuing growth⁴². Ecology and economy are closely intertwined, and 1,194,123 hectares of state forests are certified to FSC standard⁴³. Total damages in state forests in 2021, expressed in timber volume, amounted to almost 200,000 m³, out of which, 60% were caused by adverse weather events, 20% by human influence, and the remainder by disease and fire⁴⁴.

One of the main challenges for the Republic of Serbia's forestry sector is poor road infrastructure, as road access is a precondition for sustainable forestry management practices in managed forests⁴⁵. Well established forest road networks is a precondition for implementing other projects which generate significant environmental benefits, including the protection of forests from abiotic and biotic factors, restoration, preservation and improvement of habitats and biological diversity, and the afforestation of bare lands.

For example, in Serbia, maximum daily temperatures have risen as a result of climate change, which increases the likelihood of the occurrence and intensity of forest fires, with recent events causing enormous material damages. Thus, wide network of forest roads is essential for fighting forest fires from the ground. Additionally, forestry road construction and maintenance affect the economic and social development of settlements in rural and mountainous regions of Serbia, which promotes rural economic development and educational opportunities on sustainable forestry management practices for local communities.

42 [Forest Based Industry \(ras.gov.rs\)](https://ras.gov.rs)

43 [Forest Based Industry \(ras.gov.rs\)](https://ras.gov.rs)

44 [G20221138.pdf \(stat.gov.rs\)](https://stat.gov.rs)

45 [Serbia - China and CEEC Forestry \(china-ceecforestry.org\)](https://china-ceecforestry.org)

The Government of the Republic of Serbia is firmly committed to protecting its forest resources through sustainable forestry management practices and has therefore strategically allocated a portion of the green bond proceeds to the construction and reconstruction of forest roads in state and private-owned forests throughout the Republic of Serbia. Under the strategic direction of the MAFWM – Directorate for Forests and in accordance with the GBF, green bond proceeds contributed 83% (15,069,235 EUR) of the total project costs (18,246,506 EUR) for the construction and reconstruction of forest roads between 2018 and 2021. The average annual construction and reconstruction of forest roads, including bridge construction, under the project was approximately 200 km, which will materially contribute to the Republic of Serbia's sustainable forestry management practices. It is estimated that 1 km of roads enables the management of 100 to 150 ha of forest, indicating that about 20,000 to 30,000 ha of additional forestland were made accessible, protected and managed during each year of the project. The total length of built and reconstructed forest roads amounts to 855 km, with 304 m of bridges constructed on forest roads. Well-engineered bridge infrastructure helps to maintain ecological diversity and protect valuable water resources.

Table 8: Length of roads constructed/reconstructed and lengths of bridges on forest roads:

	Roads built and reconstructed (km)	Bridges on forest roads (m)
2018	239.51	60.90
2019	264.98	94.35
2020	179.25	100.80
2021	171.25	48.05
Total:	854.99	304.10

The implementation of the forestry road construction and reconstruction projects did not come without challenges. Natural disasters (windstorms, snowstorms, fires, and floods), challenges in project management and execution, uncertain financial conditions of SME's managing and executing the projects, and the poor condition of private forests are factors which collectively contributed to delays in project timelines. Despite these challenges, the Government of the Republic of Serbia remains committed to strategically investing in sustainable forestry management practices and recognises the vital importance forests have in materially contributing to local, national, and the global efforts in the fight against climate change and promoting sustainable development.

Picture 14: Nursery under watering



Despite these challenges, the MAFWM – Directorate for Forests estimates the total project contribution towards enabling sustainable management of Serbia's forests is 60,000 ha per annum. Proper planning of forest roads is essential for increasing accessibility to forests in regions with insufficient forest road networks. State and private-owned forests in the Vojvodina region (131.5 m/ha), Šumadija and Western Serbia (2.8 m/ha), Southern and Eastern Serbia (1.8 m/ha) regions materially benefited from the forestry road construction and reconstruction green bond investment proceeds.

Annex I: Impact Measurement Methodology and Indicators

Methodology

Scope of results

Reporting is based on “ex-ante” estimates of climate and environmental impacts at the time of project appraisal.

Uncertainty

Existing historical data sources of sufficient quality are used to determine baseline values. If historical data does not exist to create the baseline, peer-reviewed sources or reports published by international institutions and economic and engineering analyses and models are utilised. Where this is not possible, the baseline is established by this report.

Comparability

Reported results are at the portfolio level, thus no comparison at the project level has been undertaken. Case studies are detailed for most investment categories in this first green bond impact report.

Omissions

Where quantitative data is unavailable, qualitative factors have been included to illustrate benefits.

Sources of data

All reported results are derived from the Government of Serbia’s internal data as well as publicly available sources.

Materiality

For the first reporting of Serbia’s Green Bond, at least one project per sector will be discussed in detail to provide qualitative insight into project selection and impacts. This narrative will help provide clarification and validation of the chosen approaches at the sector level and enable investors to better understand the processes and decision-making underlying the allocation decisions, as well as provide impact information on the specific projects. Where this is the case, qualitative information can provide investors and other key stakeholders with a meaningful context of the baseline situation and the economic, social, and environmental improvements resulting from the proposed and implemented projects⁴⁶.

To provide investors and other key stakeholders with useful information, it must be comparable, verifiable, timely and understandable; thus, the impact reporting must justify how the reported green bond investments clearly meet the Serbian government’s predefined project eligibility requirements and materially contribute to Serbia’s economic, social, and environmental climate mitigation and adaptation policies. In the absence of quantitative impact data, qualitative information can provide investors and other key stake-

46 [The Green Bond Principles \(2019\). The GBP Impact Reporting Working Group: Suggested Impact Reporting Metrics for Green Building Projects](#)



holders with a meaningful contextualisation of the baseline situation and the economic, social, and environmental improvements resulting from the proposed and implemented green bond investments⁴⁷.

Developing a plausible and comprehensive baseline analysis facilitates the comparison of credible alternative scenarios to account for impacts “without” the project, which can then be compared to the “with” project scenarios, to determine how the proposed and implemented projects perform and assists investors in making informed decisions of whether the green bond investments are delivering the proposed economic, social, and environmental benefits over time. ESG and green bond investors derive higher levels of social utility by sacrificing financial utility for a given level of risk⁴⁸. Non-financial sustainability-related information, including comprehensive baseline analysis, which qualitatively disseminates the material economic, social, and environmental impacts of the reporting entity thus becomes an equally important source of information for these investors.

Impact reporting results have been measured on a portfolio basis in accordance with the criteria established in the Green Bond Framework issued by the Government of Serbia and fulfil the impact reporting requirements outlined in the ICMA Green Bond Reporting Guidelines. To report on a portfolio basis, it is necessary to aggregate the impacts of the individual funded projects within each impact reporting category, rather than directly reporting on the corresponding impacts of individual funded projects during a specific year. The rationale for the allocation of green bond proceeds is clarified to make certain the reported information can inform investors regarding the materiality of Green Bond investments from an economic, social, and environmental perspective. Care and due diligence have been prioritised to ensure both financial and non-financial materiality is given equal consideration in the materiality assessment process to ensure the broader social and environmental impacts on key stakeholder groups affected by the green bond investments and related government policy interventions.

Eligible expenditures include, capital expenditures, operational expenditures, tax expenditures and transfers, and are focused on addressing the material climate-related risks and opportunities in the areas of Transport; Sustainable Water and Wastewater Management; Pollution Prevention and Control and Circular Economy; Protection of the Environment and Biodiversity, and Sustainable Agriculture; and Energy Efficiency.

The Ministry of Environmental Protection Is In charge of Integration of environment and climate change considerations Into other sectorial policies. It also chairs the EU Accession Negotiation Chapter 27 (environment and climate change) and thus is In charge of coordination of Inputs of other sectorial Institutions

The Ministry of Environmental Protection is main Government institution in charge of integration of environment and climate change considerations into other sectorial policies. It also chairs the Negotiating Group for the EU accession negotiation chapter 27 (environment and climate change) and thus it is in charge of coordination of inputs of other sectorial Institutions for the purpose of programming and reporting.

Also, the Ministry of Environmental Protection is coordinating regular reporting under different multilateral environmental agreements, including UNFCCC. In line with the transparency requirements, the Minsitry regularly prepares and submits national communications, biennial update reports and now biennial transparency reports, as well as the Nationally Determined Contribution of the Republic of Serbia to the Paris Agreement. For the purpose of enhanced transparency under the Paris Agreement, the Minsitry developed rules of procedures and system for monitoring, reporting and verification of the climate change related data and information. This new system improves the quality and quantity of the sectorial climate-related data and information for the purpose of regular reportings, update of NDC and also for development and monitoring of implementation of national policies and measures.

UNDP provides technical assistance to the Government in establishment of regular reporting cycles under the enhanced transparency framework, as well as the development of the MRV climate change system.

47 [The Green Bond Principles \(2019\). The GBP Impact Reporting Working Group: Suggested Impact Reporting Metrics for Green Building Projects](#)

48 Auer and Schuhmacher (2016); Pedersen et al, (2020); Pastor et al. (2020); Boffo and Patalano (2020); and Cornell (2021).



Thanks to this support, Serbia improved the quality of the climate change related policies and measures and increased the efficiency of their implementation, as well as monitoring of impacts. The SDGs are the common currency of development action, and as such the SDG Agenda provides an important guide for investors on the impacts of their investments. For all six investment areas, the number of projects and the financial flows will be reported and mapped against the SDGs.

Indicators by Sector

Renewable Energy

While no renewable energy projects have received Green Bond proceeds in this reporting period, the methodology for reporting on these projects is presented for future reference.

The overall results of the portfolio and the individual categories of renewable energy projects are likewise reported by type, i.e., hydro, solar, wind, biomass, and geothermal, to ensure investors can align the renewable energy green bond portfolio proposed and the implemented renewable energy projects with Serbia's existing renewable energy capacity and generation data. The number of projects funded indicator, while quantitatively a rather simple impact reporting metric, is accompanied by an explanation of how the projects funded by the Green Bond meet the Serbian government's predefined project eligibility requirements. The renewable energy capacity installed indicator provides scale information, enabling a comparison of the Green Bond impact to the current make-up of Serbia's power generation portfolio. It provides investors with an indication of the potential scale of reduction of GHG emissions, and thus lay out how the renewable energy investments materially contribute to the achievement of Serbia's climate change mitigation strategies and objectives. To complement this impact reporting metric, the impact reporting provides an indication of the percentage of renewable capacity connected to the electricity grid, at the system level, and how this has and is expected to change as a consequence of the Green Bond-supported investments. These additional disclosures further increase transparency for investors and indicate of how these renewable energy investments are expected to materially impact Serbia's overall energy capacity, supply, and consumption.

To measure the contribution of the renewable energy capacity installed the following calculation will be performed using national data:

$$\begin{aligned} & \textit{Contribution of the renewable energy capacity installed} \\ & = \\ & \textit{Renewable energy capacity installed / total system capacity of Serbia's electricity system} \end{aligned}$$

Energy Efficiency

The number of projects funded and public calls implemented, while quantitatively straightforward impact reporting metrics, qualitatively justify how the reported energy efficiency investments meet the Serbian government's predefined project eligibility requirements in accordance with the Green Bond Framework. As the energy efficiency investments mature and quantitative data becomes available, GHG emission accounting methodologies for GHG emissions reduced/avoided and the applicable governmental agencies responsible for such calculations will be communicated, to ensure investors and other key stakeholders are provided with full transparency on the accounting methodologies selected and assumptions used to calculate GHG emissions reduced/avoided. Future impact reports will provide ex-post results will be reported to facilitate a retrospective assessment of the qualitative and quantitative impacts of the overall energy efficiency portfolio and individual energy efficiency investment categories.

Energy Efficiency savings are calculated in accordance with the BU methodology given in appropriate Rule-book and developed by GIZ project Preparation of Bottom-Up M&V Methodology within the Project 'Capac-



ity building for M&V&E' of the EE Policy. The Rulebook prescribes lifetime of each EE measure in compliance with the EC recommendations. The new Rulebook on the methodology, developed by the REEP+ Policy Dialogue Window 1, prescribes both the methodology for calculation of energy savings as well as lifetime of measures and calculations of CO2 savings in accordance with IPCC methodology (regarding CO2 emissions from different energy source). Estimation is that lifetime of saving emission is the same as lifetime of energy savings. The new Rulebook is in the process of adoption by Ministry.

Energy efficiency investments focus on reduction in energy intensity and consumption induced by investments in the rehabilitation, retrofitting and/or replacement of existing technologies with more energy-efficient and low carbon technologies, such as in new or refurbished buildings^{49,50}. For green building projects, regional, national or internationally recognised green building standards or certifications (i.e., LEED) provide baselines against which green building projects are benchmarked⁵¹. Internationally recognised green building standards may go beyond the "business as usual" national standards and policy interventions, in such cases, the impact reporting targets exceed performance benchmarks which have been established within the local context. Aligning impact reporting with internationally recognised green building standards and existing Serbian government building standards and certifications provides insights to investors and other key stakeholders as to how the green building investments contribute to current economic and social policy interventions within the local, regional, or national context and provide the opportunity to compare local, regional, or national results with international certification schemes. Consistency in the methods to establish baselines and benchmarks ensures impact reporting metrics are presented in a reliable, complete, and transparent manner.

The number of buildings from the public and private sectors with improved energy efficiency levels to the threshold defined in national legislation is a meaningful indicator of impact level, if put into the context of the overall population of buildings in Serbia. Where possible, data on the gross building area (also called gross floor area) will be provided, as this information is an important input in calculating the core green building indicators, including energy performance, carbon performance, and water efficiency and savings.⁵² In the absence of more detailed impact indicators such as temperature-corrected before/after energy consumption, gross building area provides a useful indicator of impacts. The methodology of calculation⁵³ and thresholds are publicly available⁵⁴. Both documents are now under revision, and under competence of Ministry of Construction.

To measure the contribution of the number of buildings from the public and private sectors with improved energy efficiency levels to the threshold defined in national legislation the following calculation will be performed using national data:

$$\begin{aligned} & \textit{Contribution of the number of buildings from the public and private sectors with improved} \\ & \textit{energy efficiency levels to the threshold defined in national legislation} \\ & = \\ & \textit{number of buildings from the public and private sectors with improved energy efficiency levels} \\ & \textit{to the threshold defined in national legislation / total number of buildings in Serbia's (public/} \\ & \textit{private)} \end{aligned}$$

49 [EIB \(2015\). IFI Approach to GHG Accounting for Energy Efficiency Projects](#)

50 [The Green Bond Principles \(2019\). The GBP Impact Reporting Working Group: Suggested Impact Reporting Metrics for Green Building Projects](#)

51 [Ibid.](#)

52 [Ibid.](#)

53 [Methodology](#)

54 [Thresholds](#)



Transport

The overarching aim of utilizing the Green Bond proceeds for transport investments is to achieve three key outcomes.

- ◆ Avoid/reduce the need to travel or length of travel
- ◆ Shift/maintain transportation systems and people to a more sustainable or less polluting means of transportation
- ◆ Improve existing transportation systems through operations that reduce GHG emissions of vehicles or the transport system

Impact reporting clearly disseminates how the length of infrastructure constructed and/or maintained materially contributes to Serbia's climate mitigation and adaptation goals.

The guidance in the EU Sustainable Finance Taxonomy technical annex⁵⁵ is used to guide the impact reporting narrative. The narrative describes how the investments enable an increase in the number of low- and zero-emission fleets, improve fleet efficiency or improve the overall transport/mobility system.

A key indicator is the length of infrastructure constructed and/or maintained. Well-maintained and/or modernized rail tracks are the foundation for reliable and comfortable rail traffic and as such are key to achieving modal shift.

To measure the contribution of the length of infrastructure constructed and/or maintained the following calculation is performed using national data:

$$\begin{aligned} & \textit{Contribution of the length of infrastructure constructed and/or maintained} \\ & = \\ & \textit{length of infrastructure constructed and/or maintained / total track length of Serbia's railways} \\ & \textit{(electrified/non-electrified)} \end{aligned}$$

The narrative places the number of charging stations for electric vehicles constructed and/or maintained indicator into the context of the category of vehicle impacted by the investments in charging infrastructure, (cars, light-duty or heavy-duty vehicles), where the charging will happen (homes, workplaces, roadside), the geographic location (inside or outside urban areas) including a map, the percentage of fast-charging stations amongst the investments, and whether the investments impact other policy interventions (e.g. links to the promotion of park and ride schemes).⁵⁶

The number of vehicles subsidized impact indicator narratively describes the materiality of taxation schemes to make electric vehicles more affordable and disclosure of the potential financial savings realized by citizens due to the lower total cost of ownership (savings on fuel, maintenance, insurance). Identifying the types of vehicles subsidized similarly provides material information to investors, as it indicates the types of fossil fuel-burning vehicles that will hypothetically be removed from the transportation system. The overall context is supported by providing information on electric vehicle market share, where this is available, and also to provide a baseline for future reports.

To measure the contribution of the number of vehicles subsidized the following calculation is performed using national data:

⁵⁵ [EU Taxonomy Report: Technical Annex \(2020\). Updated Methodology & Updated Technical Screening Criteria](#)

⁵⁶ [Transport & Environment: Electric cars](#)



$$\begin{aligned} & \textit{Contribution of the number of vehicles subsidized} \\ & = \\ & \textit{number of vehicles subsidized / total track number of vehicles registered in Serbia} \end{aligned}$$

Sustainable Water and Wastewater Management

The overall results of the portfolio are reported, and a qualitative narrative is provided to verify the materiality in terms of economic, social, and environmental impacts of the sustainable water and wastewater management green bond investments. For a meaningful aggregation of indicators across projects, consistency in the methods of calculation, baselines and benchmarks is applied, which is facilitated through the water governance arrangements in the Republic of Serbia. In the absence of quality data at the local, regional, or national levels, internationally recognised standards and certification scheme are referenced, such as the International Benchmarking Network for Water and Sanitation Utilities⁵⁷ (IBNET), to obtain water and sanitation utilities performance data.

The number of projects funded and the number of interventions on reservoirs and water supply systems provides investors and other key stakeholders with relevant and material information to reasonably assess the economic, social, and environmental impacts of the proposed and implemented sustainable water and wastewater management investments.

The construction and restoration of reservoir storage capacity provide an impact indicator. In support of it, the qualitative narrative describes how the investments improve access to clean drinking water for local, regional, or national populations, and a description of how the increased reservoir storage capacity meets local, regional, national, or international safe drinking water standards. This will provide investors with information to assess the materiality of the investments and it can facilitate universal comparisons to other sovereign green bond issuers reporting under similar green bond reporting frameworks.

To measure the contribution of the construction and restoration of reservoir storage capacity the following calculation is performed using national data:

$$\begin{aligned} & \textit{Contribution of the construction and restoration of reservoir storage capacity} \\ & = \\ & \textit{construction and restoration of reservoir storage capacity / total capacity of reservoirs in Serbia} \end{aligned}$$

The length of wastewater network installed/maintained is another impact indicator that is supported through a qualitative description of how these improvements help in domestic water pollution abatement and the prevention of long-lasting environmental damage to the aquifers.⁵⁸ Where possible, this indicator is enhanced by incorporating information on the number of connections to the new/maintained pipes.

To measure the contribution of the length of wastewater network installed/maintained the following calculation is performed using national data:

57 [IBNET](#)
58 [ICMA group: Handbook Harmonised Framework for Impact Reporting](#)



$$\frac{\text{Contribution of the length of wastewater network installed/maintained}}{\text{length of wastewater network installed/maintained / total length of wastewater networks in Serbia}}$$

Pollution Prevention and Control and Circular Economy

Given the overall scope of the sector, the complexity of some of the indicators and the requirement to rely on multiple complex methodologies, the reporting indicators are restricted to those that can be easily collected and where international comparisons of impact are possible. In the absence of quality data at the local, regional, or national levels, internationally recognised benchmark standards for waste management and internationally recognised tools for calculating GHG emissions in solid waste management⁵⁹ have been applied. The overall results of the portfolio will be reported; however, for meaningful aggregation of indicators across projects, consistency in the methods of calculation, baselines and benchmarks has been enforced, to ensure investors and other key stakeholders are provided with relevant and material information to reasonably assess the economic, social, and environmental impacts of the proposed and implemented pollution prevention and control and circular economy investments.

Impact reporting focuses on qualitatively disseminating how the reported sustainable water and wastewater management investments clearly meet the Serbian government's predefined green bond framework project eligibility requirements. The material impacts of the pollution prevention and control and circular economy projects focus on describing how the investments contribute to improving the following key waste management activities⁶⁰:

- Waste prevention – how the project reduces waste at source before recycling, composting, energy recover and landfilling
- Waste minimisation – how the project reduces the quantity of material in production processes or increases efficiency in production processes
- Waste reuse – how the project reuses products or components for the same purpose for which they were conceived
- Waste recycling – how the project recovers or reprocesses waste materials
- Energy recovery – how the project converts non-recyclable waste into usable heat, electricity, or fuel
- Waste disposal – how the project improves the efficiency of existing waste disposal processes or services

The overall results of the portfolio will be reported through two indicators. The *number of projects* indicator will provide an overview of the scale of effort and assets invested. A qualitative narrative will discuss how the efforts interlink with the waste hierarchy⁶¹. Projects will be reported by sector and type, as far as possible (e.g., recycling, energy-from-waste) to allow an assessment of the individual categories of pollution prevention and control and circular economy investments to be reported.

59 [ibid.](#)

60 [ICMA group: Handbook Harmonised Framework for Impact Reporting](#)

61 [ISM Waste & Recycling: What Is the waste hierarchy ?](#)



The number of *polluted sites under remediation* impact indicator provides scale information on the activity to address historic pollution in the Republic of Serbia. Baseline data for identified polluted sites is accompanied by a case study which will allow a comprehensive analysis of the local, regional, or national impacts of polluted site remediation to provide investors and other key stakeholders with the meaningful context of the economic, social, and environmental improvements resulting from the green bond investments.

These two indicators will be scaled for impact by providing information, based on project-level reporting, on the *Size of Polluted Sites under Remediation* in km², in line with ICMA indicator tables⁶². In addition, as available, the projects will report on the *Volume of Removals* and the *Volume of Excavations*, again providing a scale indicator. Following closure of the underlying projects, the report will also provide information, in line with ICMA indicator suggestions⁶³, on the *Share of remediated sites redeveloped for same or other uses* as follows:

$$\begin{aligned} & \textit{Share of remediated sites redeveloped for same or other uses in km}^2 \\ & = \textit{Size of redeveloped remediated sites / total size of remediated sites} \end{aligned}$$

Protection of the Environment and Biodiversity and Sustainable Agriculture

The overall results of the portfolio are reported in accordance with the Green Bond Framework. Given the overall scope of the sector, the complexity of some of the indicators and the requirement to rely on multiple complex methodologies, the reporting indicators are restricted to those that can be easily collected and where international comparisons of impact are possible.

The number of projects funded and the number of Natura 2000⁶⁴ sites indicators provide investors and other key stakeholders with relevant and material information to reasonably assess the economic, social, and environmental impacts of the Green Bond investments in pollution prevention and control and the circular economy. As much as possible, the second indicator will be broken down by type of site (e.g., Emerald Network, Protected Area) and provide information about species. For the 2022 report, no Natura 2000 sites were allocated Green Bond proceeds.

The indicators area of (improved) sustainable forest management and area protected/restored/maintained are accompanied by a definition of what constitutes sustainable forest management and forest protection/restoration/maintenance to enable investors and other key stakeholders can adequately assess the material impacts of the proposed and implemented green bond investments within the context of local, regional, and national context and circumstances

To measure the area of (improved) sustainable forest management the following calculation is performed using national data:

$$\begin{aligned} & \textit{Area of (improved) sustainable forest management} \\ & = \\ & \textit{Area under productive and sustainable forestry (ha) / National forestry land area (ha)} \end{aligned}$$

To measure the total area protected/restored/maintained the following calculation is performed using national data:

62 [ICMA group: Handbook Harmonised Framework for Impact Reporting](#)
63 [ICMA group: Handbook Harmonised Framework for Impact Reporting](#)
64 [Ministry of Environmental Protection, Natura 2000](#)



$$\text{Area protected/restored/maintained} = \frac{\text{Area of forests protected/restored/maintained (ha)}}{\text{National forestry land area (ha)}}$$

The area of sustainable agriculture impact indicator aligns with the UN Sustainable Development Goal 2 - End hunger; achieve food security and improved nutrition and promote sustainable agriculture. It specifically meets Target 2.4, which states that:

By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

Linking this indicator to SDG indicator 2.4.1 provides investors with a comparable measurement to assess the project impacts against other sovereign green bond issuances. The United Nations is working closely with the Government of the Republic of Serbia to strengthen Serbia's Agriculture, Forestry and Other Land Uses (AFOLU) sector capacities to access climate finance for priority investments, specifically working to support institutional and technical capacities in the AFOLU sector, contribute to the ongoing process of development of Climate Change Strategy and strengthening capacities of Ministry of Agriculture, Forestry and Water Management. A key priority outcome is the establishment of a solid baseline for the identification and development of bankable funding proposals for larger investments, particularly in irrigation management in Serbia, which is one of the main priorities for the country⁶⁵.

Box 4. FAO's methodology for agricultural land use calculation⁶⁶

The FAO provides detailed methodological notes to measure the proportion of agricultural area under productive and sustainable agriculture. To establish the boundary of agricultural lands included in the measurement of area for sustainable agriculture, the FOA stipulates the following aspects be included/excluded within the boundary scope:

Included within scope:

- Intensive and extensive crop and livestock production systems
- Subsistence agriculture
- State and common land when used exclusively and managed by the farm holding
- Food and non-food crops and livestock products (e.g., tobacco, cotton, sheep wool)
- Crops grown for fodder or for energy purposes
- Agro-forestry (trees on the agricultural land area of the farm)
- Aquaculture, to the extent that it takes place within the agricultural land area. For example, rice-fish farming and similar systems

Excluded from scope:

- State and common land not used exclusively by the farm holding
- Nomadic pastoralism
- Production from gardens and backyards. Production from hobby farms
- Holdings focusing exclusively on aquaculture
- Holdings focusing exclusively on forestry
- Food harvested from the wild

65 [United Nations Serbia, SDG 2 Zero Hunger](#)

66 [FAO: SDG Indicator 2.4.1](#)

The proportion of agricultural area under productive and sustainable agriculture indicator is calculated in accordance with the Food and Agriculture Organization of the United Nations (FAO) methodology, set out in Box 4 below. To then measure the area of sustainable agriculture, the following calculation is performed using national data:

$$\begin{aligned} & \text{Area of sustainable agriculture} \\ & = \\ & \text{Area of sustainable agriculture (ha) / total area of agriculture (ha)} \end{aligned}$$

Contract No.	
Deliverable	Draft Report
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Report Reviewer	n/a
Report Verifier	n/a
Government of Serbia / Green Bond Working Group Clearance Date	
Submission Date	22 December 2022
Notes	Final

