

Integrated Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2022



December 2023

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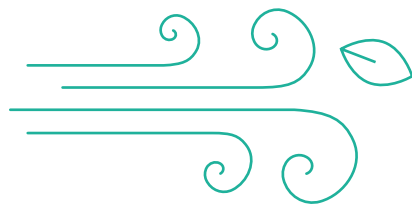
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Foreword



Dear Readers,

We are pleased to share our second Integrated Green Bond Report of Hungary ('The Report') that covers green bonds (GB) issued between 1 January 2022 - 31 May 2023. Since our first issuance in 2020, the reports play an important role in updating investors and providing transparent and credible information on the allocation and impacts of the investments.

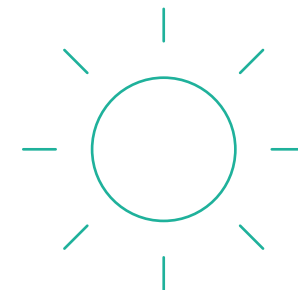
The Report systematically explains how Hungary uses the green bonds to support its climate targets and objectives and what progresses have been achieved within a timeframe.

Hungary remains strongly committed to fight climate change and biodiversity loss in line with the international efforts. Financing and refinancing projects that are mitigating against and adapting to climate change through six expenditure categories are the key focus areas of the green bond issuances. This Report showcases the achieved outcomes and impacts of these supported projects with primary focus on the clean and low-carbon transportation, efficient energy use and sustainable land management.

The Green Bond Proceeds have a significant part in the required funding and ensure the diversification of Hungary's international investor base through international and domestic capital markets transactions.

We believe that transparent and continuous disclosures are crucial and, to this end, this Report provides a comprehensive picture of the progress made through the national environmental actions and measures supported by the green bonds.

We would like to acknowledge the contributions and achievements of the numerous stakeholders who foster Hungary's climate commitments and have supported the preparation of this Report.

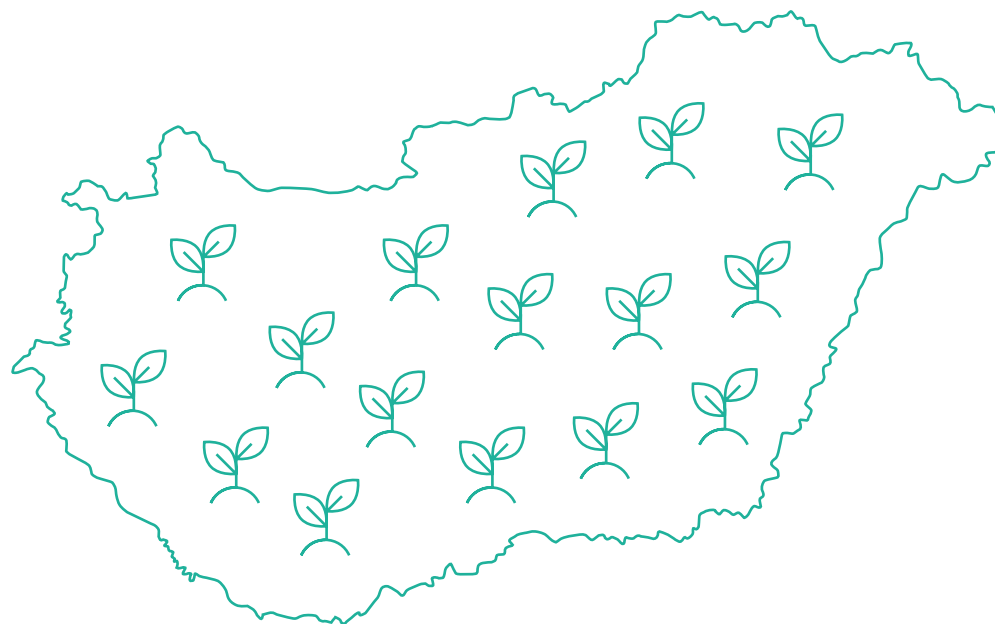


Tibor Tóth

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and Climate
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I. Executive Summary

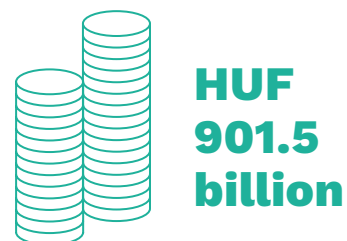


I. Executive Summary

Key facts of the Integrated Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2022

- The Report provides an overview of the key environmental impacts between 2020-2022, covering the allocation of budget years 2020 and 2021 (see Figure 1).
- The green bond issuances between 1 January 2022 - 31 May 2023 were taken into account, until the expiration of the Second Party Opinion (SPO) on the Hungary's Green Bond Framework (2020).
- The selection of Eligible Green Expenditures and the allocation of Green Bond Proceeds were prepared by the Ministry of Finance (MoF) and the Government Debt Management Agency Pte Ltd. (ÁKK), following the International Capital Market Association's (ICMA) Green Bond Principles (GBP) referred in the Hungary's Green Bond Framework (2020).
- The assessment follows the recommendations of the ICMA Harmonized Framework for Impact Reporting Handbook (June 2023 edition). The results are interpreted on a project-by-project basis.
- The Report covers 53 indicators, including core, exemplary and other sector specific ICMA indicators and own KPIs by the end of the budget year 2022. The majority of the impacts are linked to Clean Transportation (see Figure 2 and Figure 3).
- The Report maps the environmental impacts with the United Nation's Sustainable Development Goals (SDGs) and to the EU Taxonomy objectives (see Figure 3).
- The results are also grouped as per the Eligible Green Sectors (see details in Appendix 4 – Summary of Results) that emphasise the great contribution towards the reduction of greenhouse gas (GHG) emissions. As one of the key achievements of the issuance covered by this Report, a total of 1,813 kilotons of CO₂-equivalent GHG emission was avoided (see Figure 4).

Eligible Green Expenditures for 2020* and 2021 amounted to:



*(not allocated per the 2021 issuances)

Green Bond Proceeds between 1 January 2022-31 May 2023, amounting to



was allocated to the remaining amount of 2020, and part of the 2021 Eligible Green Expenditures.

Figure 1. Allocation of proceeds from green bond issuances – main figures. Source: MoF, ÁKK

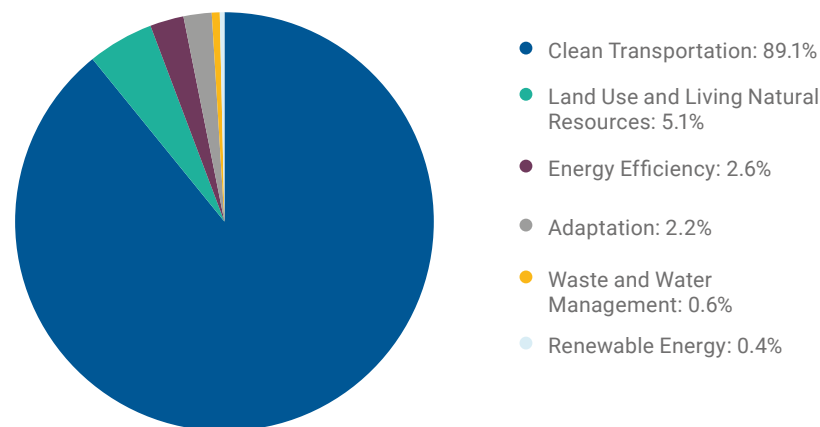


Figure 2. Allocation of the Green Bond Proceeds, Source: MoF, ÁKK

Green Sector

UN SDGs

EU Taxonomy objectives

Positive impacts on the environment

Clean Transportation	HUF 790.6 billion	  	Climate Change Mitigation	1,745 Kilotons of CO ₂ eq saved
Land Use and Living Natural Resources	HUF 45.2 billion	 	Climate Change Mitigation; Climate Change Adaptation; The protection and restoration of biodiversity and ecosystem	1.3 million hectares of forest and agricultural areas under Natura 2000 supported by compensation payments
Adaptation	HUF 19.3 billion	 	Climate Change Adaptation	85 million m ³ of additional water stored
Energy Efficiency	HUF 23.1 billion		Climate Change Mitigation	66.2 Kilotons of CO ₂ eq saved
Waste and Water Management	HUF 5.4 billion	 	The sustainable use and protection of water and marine resources; The transition to a circular economy Pollution prevention and control	787 Meters per kilometers increase in length of sewage system of drinking water system
Renewable Energy	HUF 3.2 billion		Climate Change Mitigation	1.8 Kilotons of CO ₂ saved

Figure 3. Key impacts results by Eligible Green Sectors. Source: ÁKK and relevant Ministries

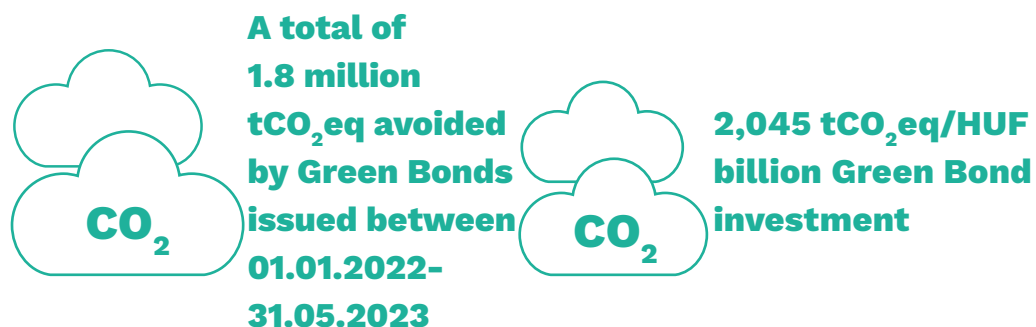


Figure 4. GHG emission avoidance due to the allocation of green bonds issued between 01.01. 2022 and 31.05.2023 to Eligible Green Expenditures

ÁKK maintained its market presence on all of four markets (EUR, HUF, JPY and CNY) where it has previously issued by new issuances in the period between 1 January 2022 - 31 May 2023. The proceeds from these issuances – also considering the pricing of the related swap instruments – reached HUF 886.8 billion in this period. ÁKK is continuously exploring new markets for ESG-themed bonds¹ to meet the increasing market demand for these instruments and provide favourable financing conditions for Hungary's sustainable expenditures.

¹See the financing plan for 2023 here:
<https://akk.hu/content/path=financingplan2023>



Hungarian flag on the Hungarian Parliament Building

II. Overview of the Integrated Green Bond Report

The Report includes outcomes and impacts of the eligible projects according to Hungary's Green Bond Framework (2020). Green bonds play an important role in funding Hungary's ambitious climate targets in different areas (see Figure 3). The aim of this Report is to provide an overview of the environmental performance of the projects financed and refinanced through the allocation of Green Bond Proceeds.

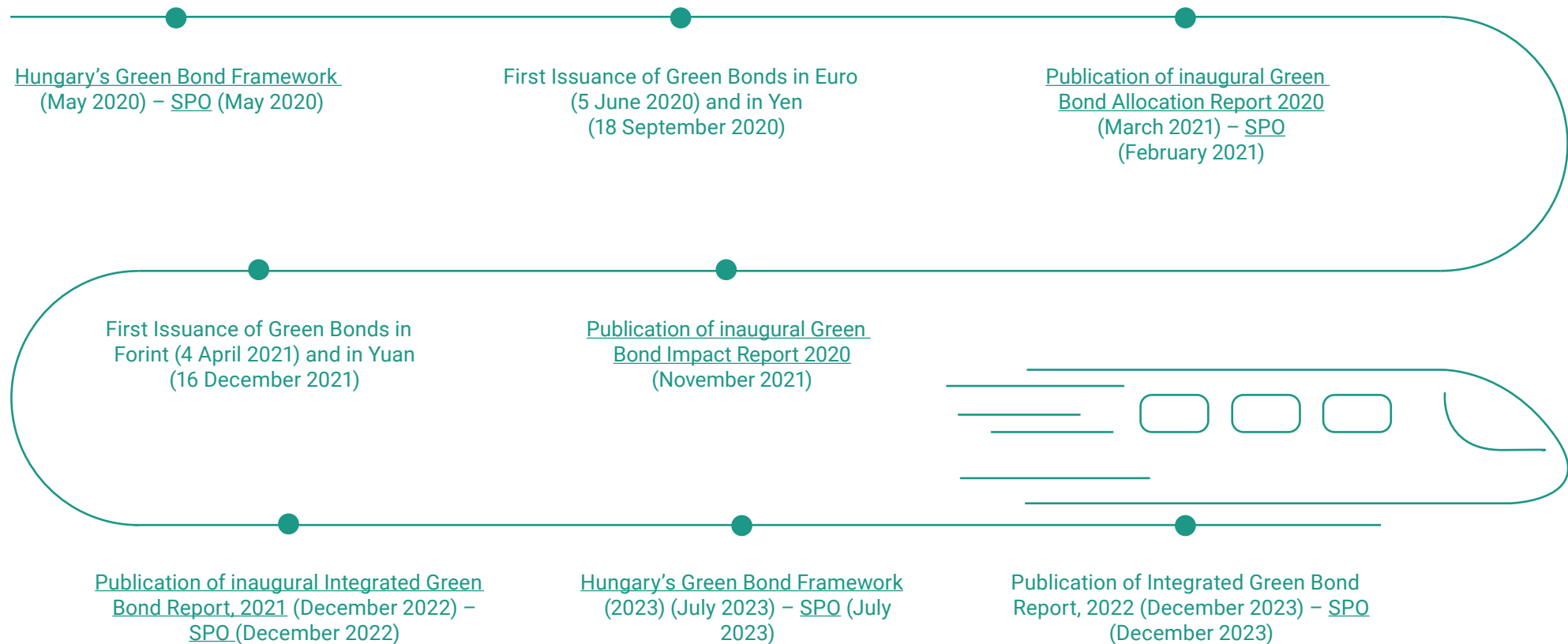


 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	 11 SUSTAINABLE CITIES AND COMMUNITIES	 13 CLIMATE ACTION	 13 CLIMATE ACTION	 15 LIFE ON LAND	 6 CLEAN WATER AND SANITATION	 13 CLIMATE ACTION	 7 AFFORDABLE AND CLEAN ENERGY	 6 CLEAN WATER AND SANITATION	 11 SUSTAINABLE CITIES AND COMMUNITIES	 7 AFFORDABLE AND CLEAN ENERGY
Clean Transportation			Land use and living natural resources		Adaptation		Energy efficiency	Waste and water management		Renewable energy

II.1 Reporting Practice

The Report summarizes the allocation of Green Bond Proceeds towards Eligible Green Expenditures and their associated environmental and social outcomes and impacts.

Timing and Scope



III. Methodologies Applied



III.1 Allocation Methodology

Eligible Green Expenditures falling under the six green sectors promote transition to low carbon and environmentally sustainable economy. These expenditures can include investment, intervention, tax and selected operating expenditures. Budget expenditures, which already obtained dedicated funding (e.g. EU funding, proceeds from the sale of EU ETS allowances, a dedicated tax, or EIB and/or other supranational entities' loans) have been excluded to avoid double counting. The allocation of Green Bond proceeds is determined based on the value of the bonds deducted by redemptions².

The MoF, along with the other relevant Ministries and the Prime Minister's Office are responsible for regularly reviewing the expenditures and the relevance of the associated information. In the allocation process the MoF recommends a list of projects, which are reviewed and verified on project level by the responsible Ministries to ensure that each budget line complies with the green eligibility criteria defined in Hungary's Green Bond Framework (2020). Expenditures linked to nuclear power, the armament and defence industry, fossil fuel production and related power generation are excluded.

The green bond allocation methodology follows the ICMA Green Bond Principles (2018 edition) included in the Hungary's Green Bond Framework (2020). In addition, it considers other relevant guidelines and regulations, such as the EU Taxonomy, the EU Green Bond Standard on a best effort basis, as well as the most recent market practices to ensure project eligibility.

² The principles of managing redemptions of Green Bonds:

- It is not allowed to deduct redemptions carried out in a given time period from proceeds already allocated in the previous time period;
- The allocable value of the bonds for a given time period (i.e. non-allocated proceeds from the preceding time period and additional issuances of the given time period), deducting redemptions, cannot be less than 0.



Woman holding paper carbon footprint

III.2 Impact Methodology

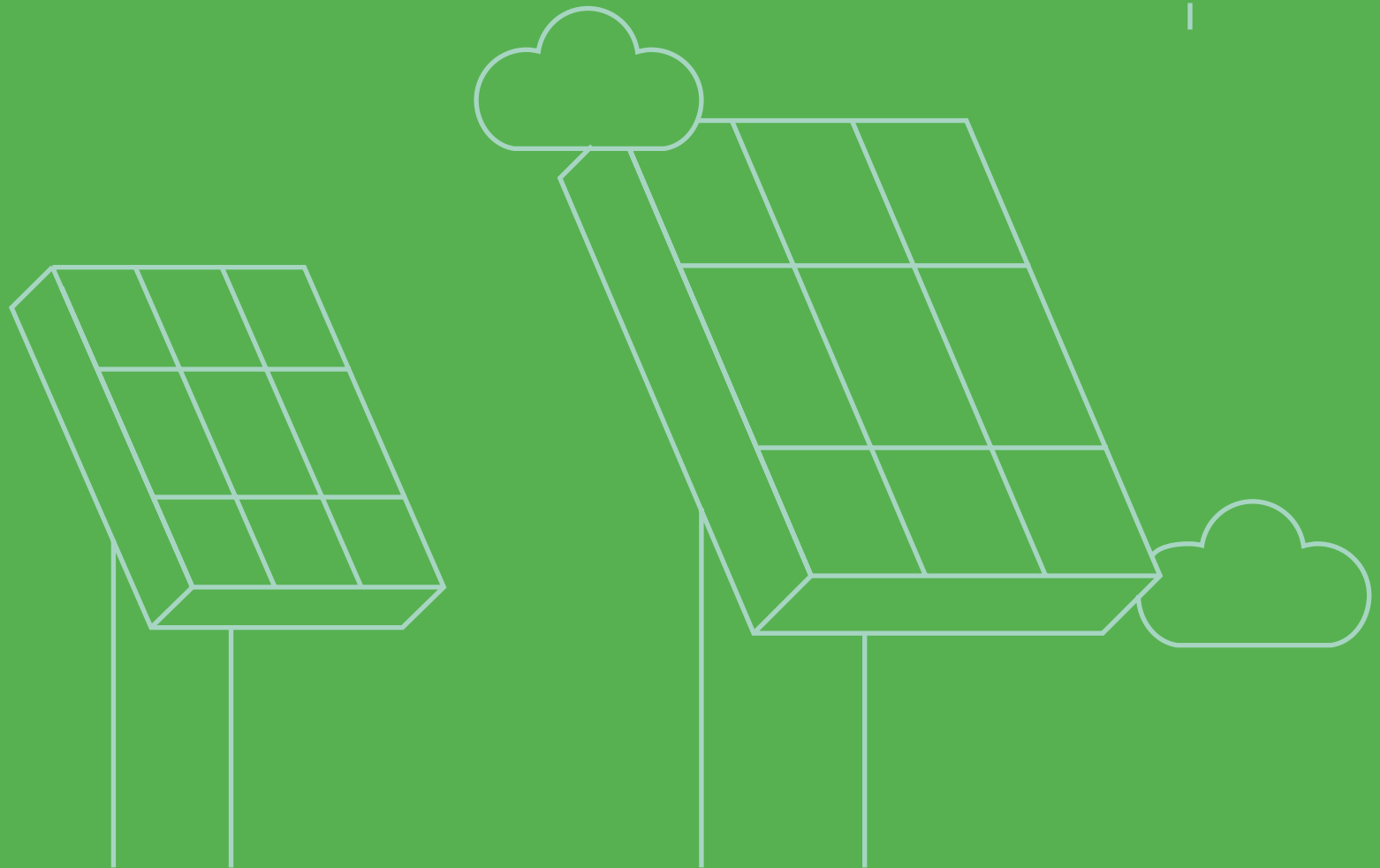
For the impact assessment of the Eligible Green Expenditures the ICMA Harmonized Framework for Impact Reporting (June 2023 edition) was primarily used. The report includes the ex-ante and ex-post impact data of eligible green projects financed by green bonds in an annual breakdown per green bond main programme. The impacts are calculated based on various methodologies that may be adjusted due to data updates and data collection developments considering the features of the projects. A detailed compilation of outputs and impacts is available in [Appendix 2 – Other Information Related to the Green Bond Integrated Report](#). In case of the adjustments, the areas and projects concerned are indicated with the details of the restatements.

This Report presents information on 15 core, 2 exemplary, 28 other indicators in line with the principles and recommendations of the ICMA Harmonized Framework for Impact Reporting (June 2023 edition), and 8 own indicators within the six expenditure categories. The impact results are showcased with a project-by-project approach on a three-year time horizon from the year of allocation. In case of projects removed from the green bond allocation in 2020 and 2021, associated impacts have been excluded.



Wetland habitat at the river Danube

IV. Allocation of the Green Bond Proceeds



IV.1 Main Items of Green Bond Allocation

Market	ISIN	Issue date	Maturity date	Maturity (years)	Face value (million) ³	FX rate to HUF ⁴	Total Green Bond Proceeds (in HUF) ⁵	FX rate to EUR ⁶	Total Green Bond Proceeds (in EUR) ⁷
HUF	HU0000404991	28/04/2021 ⁸	28/04/2051	30	HUF 46,164	-	25,099	394.8	63.6
HUF	HU0000405535	26/01/2022 ⁹	27/05/2032	10	HUF 216,282	-	179,546	382.8	469
JPY	JP534800BN26	25/02/2022	25/02/2027	5	JPY 46,800	272.8/JPY 100	127,684	356.6	358.1
JPY	JP534800DN24	25/02/2022	22/02/2029	7	JPY 4,700	272.8/JPY 100	12,823	356.6	36
JPY	JP534800CN25	25/02/2022	25/02/2032	10	JPY 7,800	272.8/JPY 100	21,281	356.6	59.7
CNY	CND10005WTB0	17/11/2022	17/11/2025	3	CNY 2,000 ⁹	55.4	110,880	405.8	273.2
EUR	XS2558594391	21/11/2022	22/02/2027	4	EUR 1,000	410.5	405,467	-	987.7

Table 1: Details of the Value of Green Bonds on Issue. Source: ÁKK

³ÁKK converts non-euro bonds into euro liabilities through swap transactions. Further details are in Table 4.

⁴The Hungarian National Bank ("MNB") exchange rate one working day before the date of issuance of Euro Bond (18 November 2022):

HUF 410.5 = EUR 1.00

MNB exchange rate two working days before the day of issuance of Samurai Bonds (23 February 2022):

HUF 272.58=JPY 100.00 and HUF 356.55=EUR 1.00

MNB specific exchange rate two working days before the day of issuance of Panda Bonds (15 November 2022):

HUF 55.44=CNH and HUF 405.80=EUR 1.00

⁵Actual proceeds received at issuance, at market price. In case of HUF bonds, additional sales from

ÁKK's own portfolio, redemptions of outstanding bonds prior to maturity are also included.

⁶The date of the FX rate to EUR is the same as that of the FX rate to HUF. In case of HUF bonds, due to the multiple auctions, the exchange rate is calculated with respect to each transaction by the exchange rate on the date of issuance of the Green Bonds.

⁷Actual proceeds received at issuance, at market price. In case of HUF bonds, additional sales from ÁKK's own portfolio, redemptions of outstanding bonds prior to maturity are also included.

⁸Date of first issuance is in 2021. Between 1 January 2022 - 31 May 2023, there were auctions on 06/23/2022, 09/15/2022 and 11/05/2023.

⁹Date of first issuance. Between 1 January 2022 - 31 May 2023 there were auctions on 20/01/2022, 17/02/2022, 17/03/2022, 14/04/2022, 12/05/2022, 09/06/2022, 07/07/2022, 04/08/2022, 01/09/2022, 09/29/2022, 27/10/2022 and 16/03/2023.

Market	ISIN	Trade date	Maturity date	Maturity (years)	Face value (million)	Total Amount Booked (million HUF)	FX rate to EUR	Total Amount Booked (million EUR)
JPY-EUR CCIRS	JP534800BN26	28/02/2022	25/02/2027	5	JPY 46,800	131,630	368.2	357.5
JPY-EUR CCIRS	JP534800DN24	28/02/2022	22/02/2029	7	JPY 4,700	13,219	368.2	35.9
JPY-EUR CCIRS	JP534800CN25	28/02/2022	25/02/2032	10	JPY 7,800	21,938	368.2	59.6
CNH-EUR CCIRS	CND10005WTB0	17/11/2022	17/11/2025	3	CNY 2,000	109,887	407.1	269.9

Table 2. Details of the CNH-EUR and JPY-EUR cross-currency swap used to convert the FX risk of the Green Panda Bond and Green Samurai Bond

In total, Hungary issued HUF 886,786 million equivalent green bonds between 1 January 2022 - 31 May 2023 (*Table 1*).

To hedge the JPY and CNY currency risk of the Green Samurai Bond and the Green Panda Bond, ÁKK entered JPY-EUR and CNH-EUR cross-currency swap agreements. In these hedges the terms and conditions of the swap confirmation included the purpose of the instrument to hedge currency risk of a specific Green Bond. The details of the corresponding swap transactions are shown in *Table 2*. Given that the contractual purpose of the swap was to hedge a Green Bond's currency risk, the amount of green bond proceeds obtained were adjusted in case of the Panda and Samurai Bonds. ÁKK will perform similar Green Bond specific swap transactions in the future non-EUR Green Bond issuances.

In accordance with the strategy of ÁKK and benchmarks, all non-euro bonds must be converted into euro liabilities through swap transactions. To reduce counterparty risk associated with the swap transactions so-called marked-to-market deposits are being placed as collateral covering the net value of their swap positions. Such deposits placed with ÁKK are shown as part of the government debt among 'other obligations'. In recent years, some currencies have appreciated compared to some currencies, but the resulting additional debt can be eliminated with the swap transactions.

A CNY-EUR cross-currency swap was concluded by ÁKK with CNY 2,000 million swapped to EUR 269.9 million. The volume of outstanding foreign currency bonds after the swap is HUF 109,887 million. The JPY-EUR swaps included JPY 59,300 million swapped to EUR 453 million resulting in HUF 166,787 million outstanding bonds. The term of the swaps is identical to the maturity of the bonds.

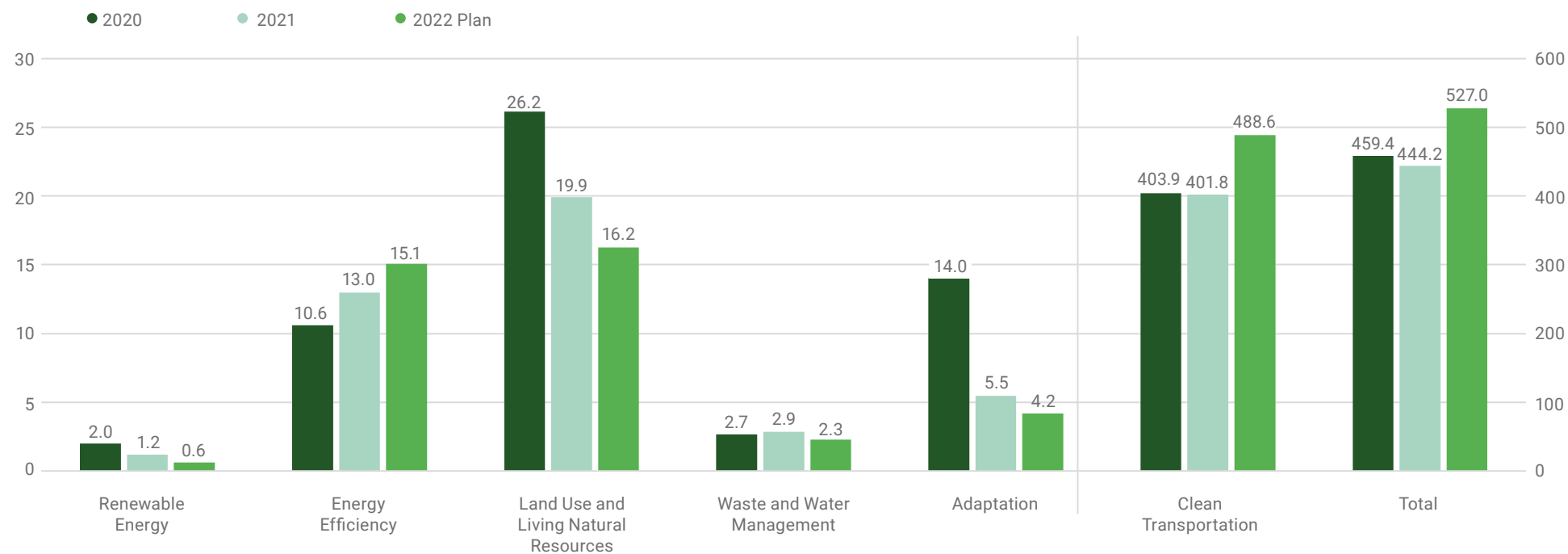


Figure 5. Eligible Green Expenditures per sector and budget years (in HUF billion). Source: MoF

The allocated amounts are equal to the total net proceeds raised from the issuance under Hungary's Green Bond Framework (2020) during the reporting period that cover a certain share of the total Eligible Green Expenditures. For any given year, the amount of Green Bonds issued (or tapped) in that year is allocated in priority to eligible expenditures within the 2 previous budget years preceding the year of the issuance and to eligible expenditures made in the same year as the issuance. *Figure 5* shows the Eligible Green Expenditures between 2020-2022.



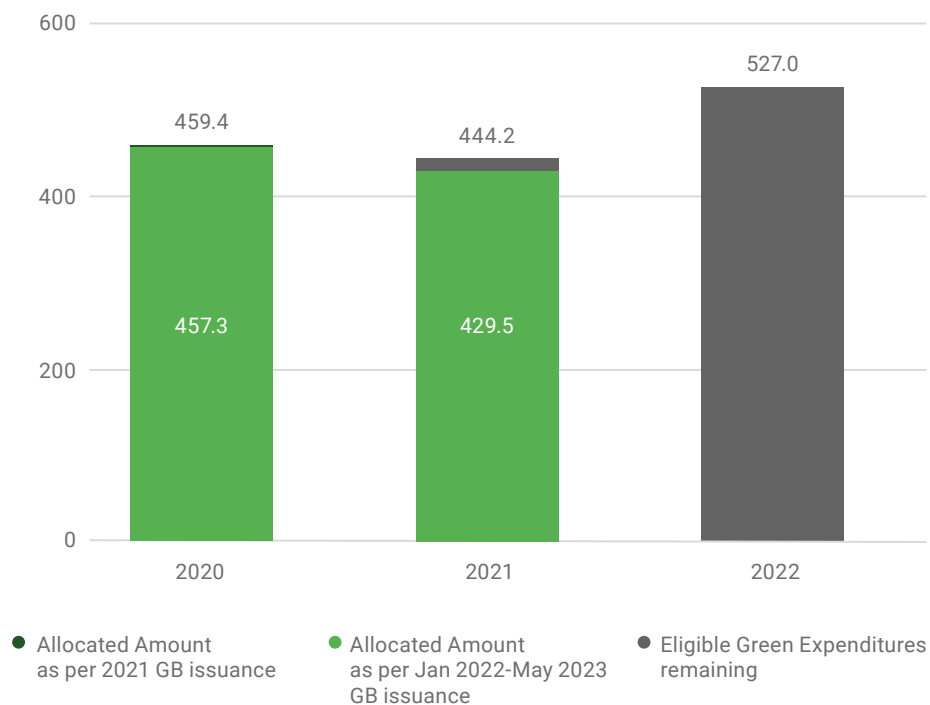
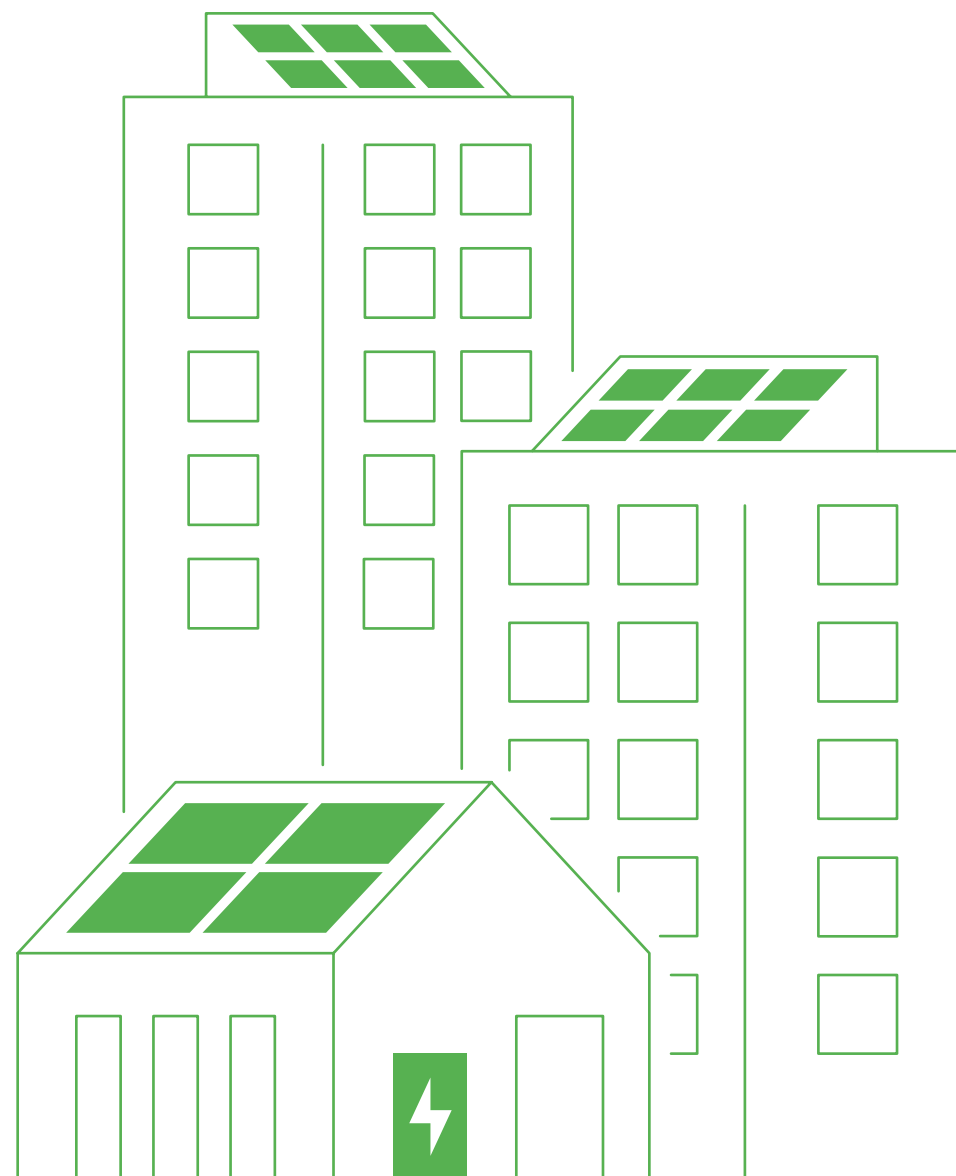


Figure 6. Breakdown of Eligible Green Expenditures, allocated amounts and green bond issuances. Source: ÁKK, MoF (in HUF billion).

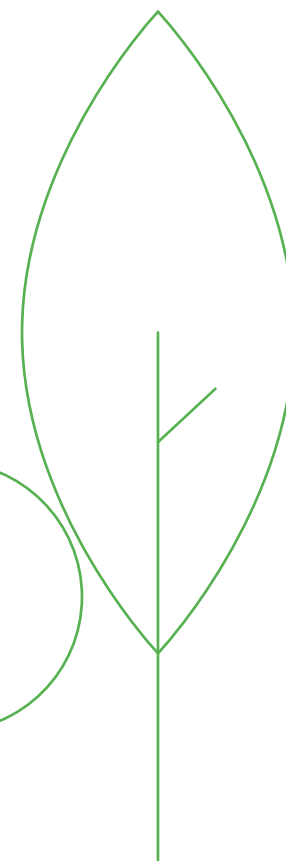
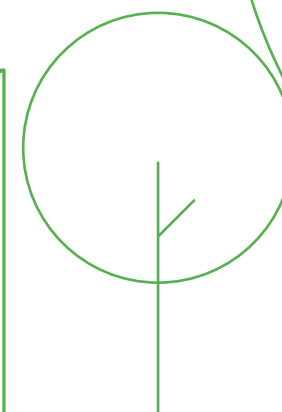
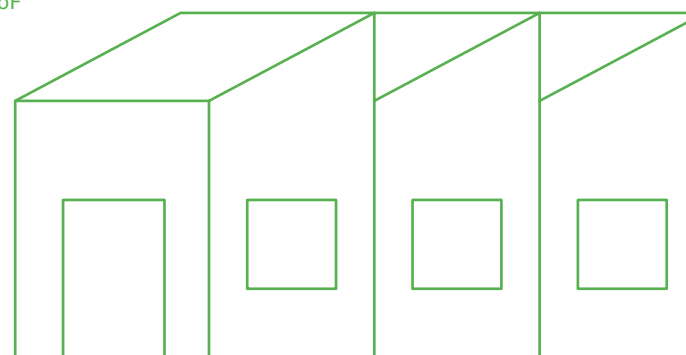
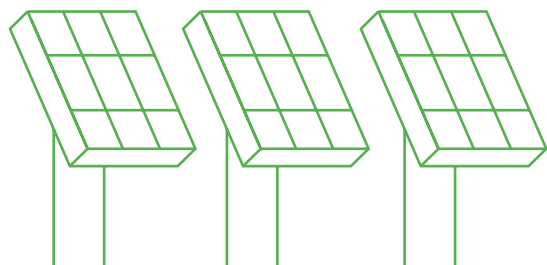
The allocation of the green bonds issued in 2022 are summarized in [Figure 6](#) and [Table 3](#). Eligible Green Expenditures identified but not allocated amount to HUF 14.7 billion in 2021 and HUF 527 billion in 2022.



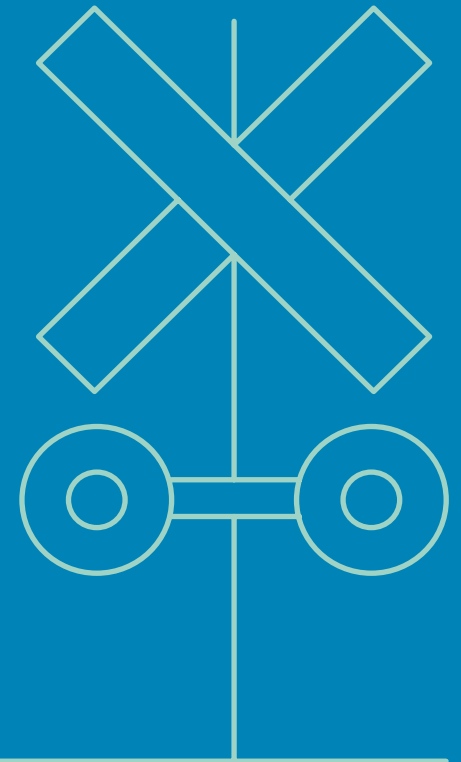
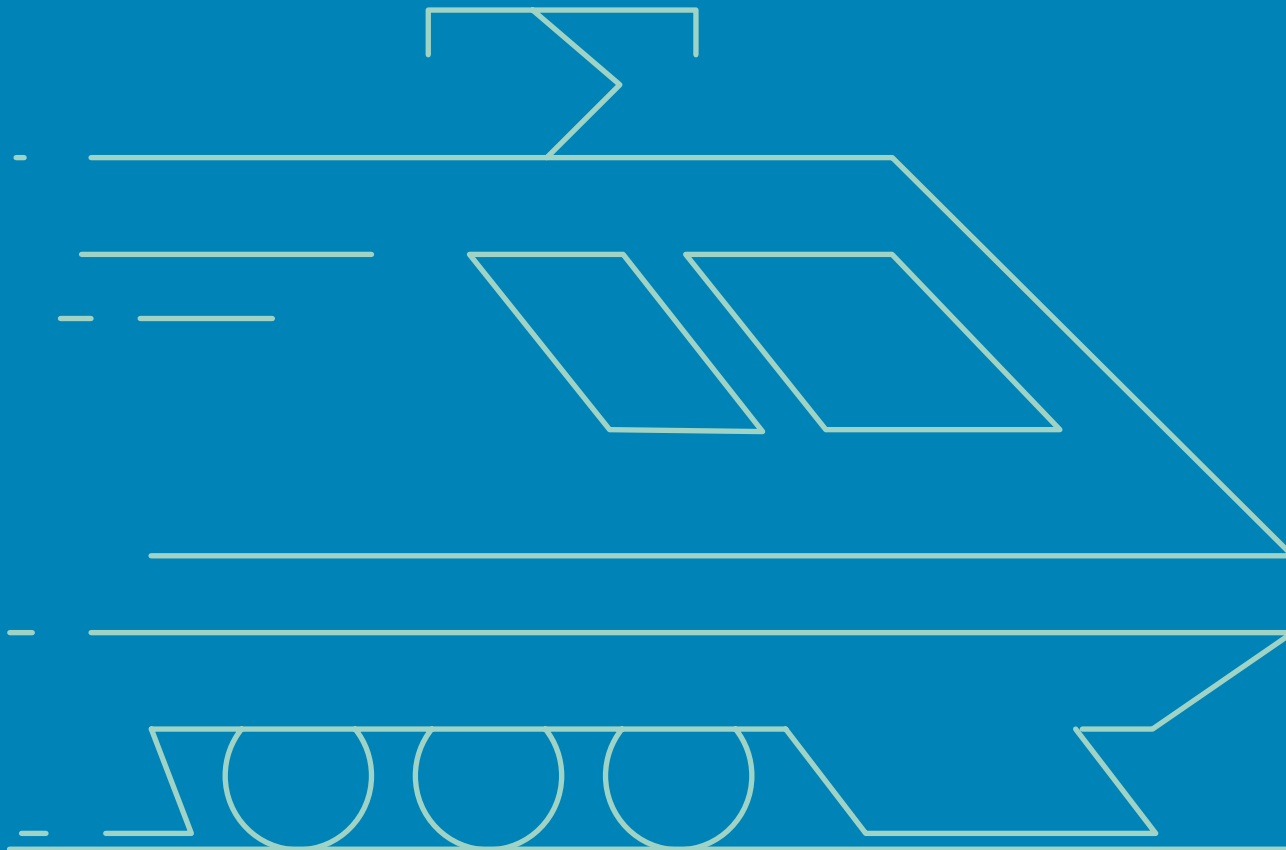
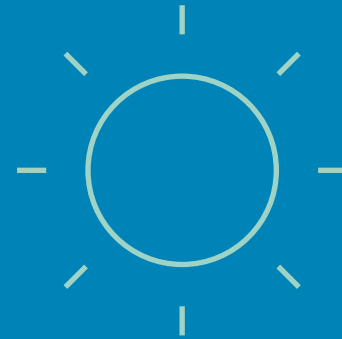
ISIN Code	Amt issued. (million EUR)	Renewable Energy	Energy Efficiency	Land Use and Living Natural Resources	Waste and Water Management	Clean Transportation	Adaptation
HU0000404991	63.6	0.4%	2.6%	5.1%	0.6%	89.1%	2.2%
HU0000405535	469	0.4%	2.6%	5.1%	0.6%	89.1%	2.2%
JP534800BN26	357.5*	0.4%	2.6%	5.1%	0.6%	89.1%	2.2%
JP534800DN24	35.9*	0.4%	2.6%	5.1%	0.6%	89.1%	2.2%
JP534800CN25	59.6*	0.4%	2.6%	5.1%	0.6%	89.1%	2.2%
CND10005WTB0	269.9*	0.4%	2.6%	5.1%	0.6%	89.1%	2.2%
XS2558594391	987.7	0.4%	2.6%	5.1%	0.6%	89.1%	2.2%

*after FX swap to EUR

Table 3. Breakdown of allocation of green bond proceeds per issuances. Source: ÁKK, MoF



V. Impact of the Financed Projects



V.1. Clean Transportation

Clean Transportation is the largest (89.1% of the total Green Bond Proceeds) expense category within the Eligible Green Expenditures. The main goal of clean transportation expenditures is to modernize and make public transportation more efficient and therefore attract more people. By doing so, people may choose it over less environmentally friendly alternatives such as passenger cars and thus avoid GHG emission. To support the development of rail transportation future developments and grants are crucial.

This chapter introduces the railway expenditures allocated to main programme schemes, the cumulated impact of these railway expenditures on GHG emission figures, and two other expenditure groups related to road and urban transportation. A summary of avoided CO₂ (where measurable) due to Clean Transportation projects can be seen on *Figure 7*.

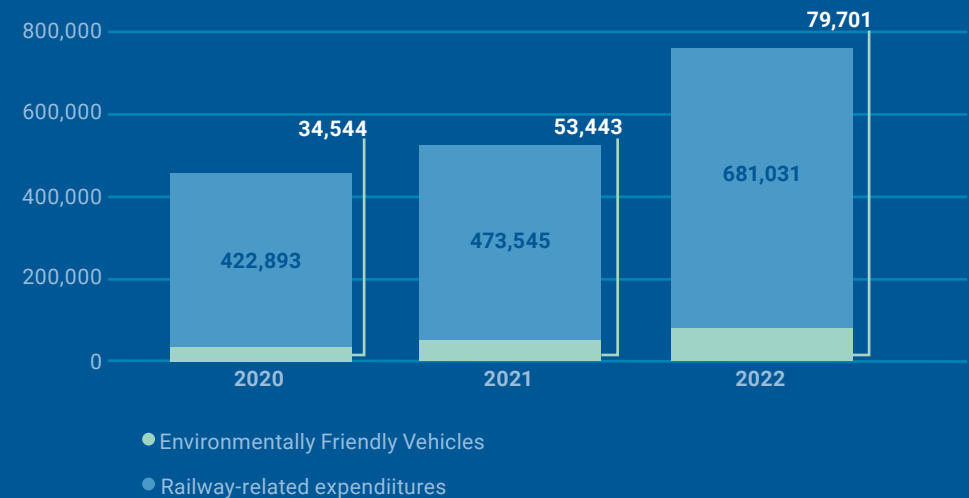


Figure 7. Avoided GHG emissions related to Green Bond Proceeds (tCO₂eq).
Source: Hungarian Central Statistical Office (KSH), MoF, OPTEN¹⁰, MÁV Ltd.

¹⁰Hungarian business and company information database provider.

9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



11 SUSTAINABLE CITIES
AND COMMUNITIES



13 CLIMATE
ACTION



V.1.1. Reimbursement of the Operation of the Railway Network

Costs related to the reimbursement of the operation of the railway network comprise expenses such as buying auxiliary devices and other devices to enhance the comfort of wagons, operating expenses like procurement of special services, and the personnel costs of railway infrastructure companies. The expenditures do not contain cost elements related to fossil fuels. (e.g.: buying oil for the maintenance of machines and units)

The indicator used to showcase the outcome of the expenditures is the length of operated lines on a greater regional level¹¹ (*Appendix 3 – Key Figures: Figure 28*). The figure shows the increasing length of the railway network between 2020-2022. The operation of the continuously developing railway network is important to ensure the accessibility and interoperability of the railway system.

V.1.2. Reimbursement of Uncovered Costs of Railway Passenger Traffic

Passenger transportation in Hungary is mainly associated with cars followed by other road transport modes¹² and then trains.¹³ This means that promoting rail transportation has an essential role in the transition to a more sustainable commuting. Between 2020-2022, the share of rail transportation has increased significantly (*Figure 29 and Figure 30*) mostly due to the rebound from Covid-19 related restrictions affecting railway transportation disproportionately in 2020 and 2021. Comparing metrics for 2022 with pre-Covid years, the share of railway transportation was slightly higher.

**In 2021
the share of
rail transportation
in inland passenger
transport for Hungary
was the seventh
highest in the EU**

¹¹Data source: KSH (rolling stock of public railway; length of railway lines by count and region).

¹²Other road transport describes motor coaches, buses and trolley buses.

¹³Source of data is Eurostat: modal split of passenger transport

The indicators outline the results of the modal shift to railway transportation. According to the Hungarian Central Statistical Office (KSH), 345.9 million passengers (18,106 million passenger-kilometres) were carried by rail between 2020-2022, as shown on *Figure 8*.

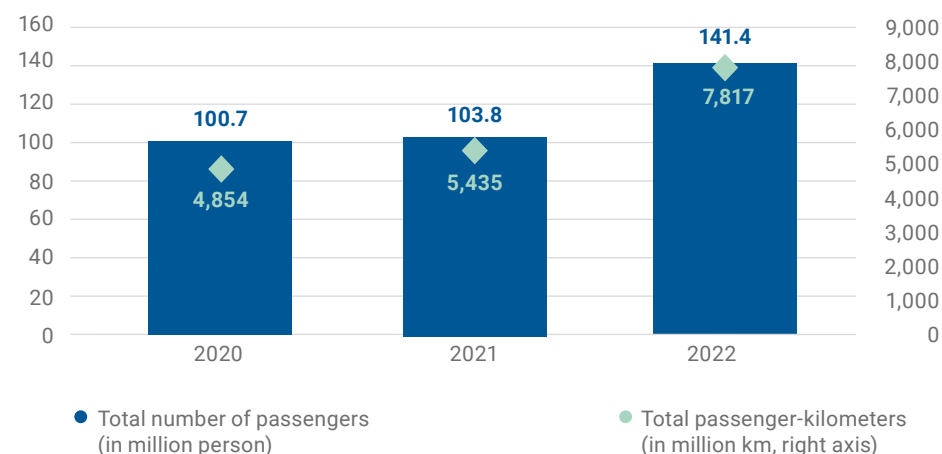
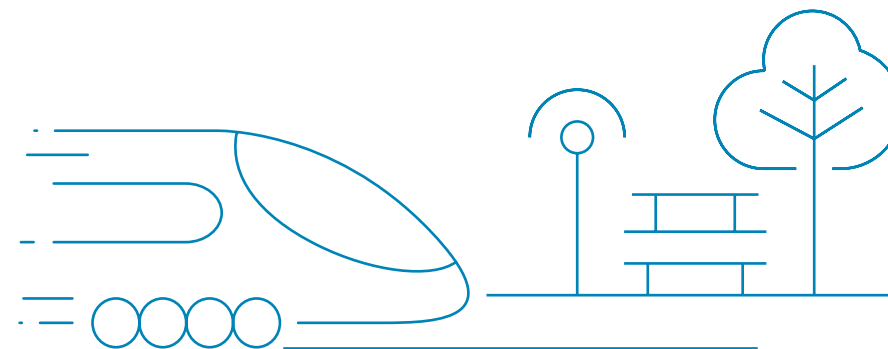


Figure 8. Passenger-kilometres and number of passengers using railway transportation (including domestic and international passengers). Source: KSH.



V.1.3. Modernization of Rail Transport

The objective of the rail modernization projects – introduced at [Table 4](#) – is to promote safe and efficient operation of the railway transport system and to upgrade the quality of services. The aim of these modernization initiatives includes reduced travel time in the Trans-European Transport Network (TEN-T); high-quality urban-suburban community transport performance and a reduction in particulate matter (PM₁₀) and nitrogen oxides (NO_x) emissions in the urban community transport sector.

In the framework of these modernization projects, the Connecting Europe Facility (CEF) had a major role as a funding instrument (it is co-financed from the Green Bond proceeds), aiming to build and upgrade the European transport infrastructure. The main transport infrastructure programme (Integrated Transport OP) focuses on developing railway, highways, improving public transportation, and regional accessibility.

ETCS2 development	Bridge upgrades	Railway crossing upgrades
The development of the European Train Control System (ETCS) increases the reliability, safety and efficiency of international and high-speed railway transportation, and supports significant automation of the train control and management system. The ETCS2 development for the Sopron - Szentgotthárd line was completed for 117.4 km.	The Stage I. of the bridge upgrade programme covered the modernization of 3 bridges in 2020 (0.17 km) in the national public railway network of MÁV Ltd. aimed to eliminate bottlenecks on the affected routes and to ensure uniform technical parameters. The bridges upgraded in the project are so old that, despite regular maintenance, their complete renovation was necessary to reduce congestion and increase speed on the lines concerned.	The upgrade of four MÁV Ltd. railway crossings in 2020 served a similar purpose. The lack of a straight section between opposing connections, visibility problems and crossed tracks at different crossings elevations all increased the risk of an accident and were proving costly to maintain. Their renovation improved the safety and reliability of the railway network.
Railway line upgrades		
In the 2020 – 2022 period two railway line section upgrade was completed in the length of 56.3 km. The modernization of railway line Szombathely - Kőszeg covered a 17 km railway section, while in the Püspökladány - Debrecen line a 39.3 km section was upgraded.		

Table 4. Railway modernization projects financed under the Green Bond Framework. Source: Prime Minister's Office

Due to further technical design and construction work, the railway modernization projects are either ongoing or will commence after 2022, therefore, further impacts can be captured later.

These modernization projects contribute to the upgrading of railway lines to further encourage the shift to rail transportation as a means of carrying passengers and goods.

V.1.4. Electrification of Railway Lines

The electrification of railway lines is a key pillar for a transition to a low carbon railway transportation. Some of the main projects are related to the development of the Trans-European Transport Network (TEN-T) and the broader provision of electric railway lines in Hungary. The programme is applied nationwide on different lines, including mainlines and branch lines.

Rail transportation accounts for a smaller amount of air pollution than road transportation. To this end, electrification process is needed to eliminate emissions and particulates. Besides the less environmentally harmful power supply, electrified rail lines may increase the speed of rail transportation, thereby further reducing environmental load and GHG emissions. Moreover, reduced travel times can help to attract new passengers.

Between 2020 and 2022, there was one newly constructed electrification project completed, covering the Szabadbattyán–Balatonfüred line in the length of 55 km.



Electrified railway lines

V.1.5. Rolling Stock Development

A modern and environmentally friendly railway rolling stock can reduce energy consumption and associated GHG emissions as well as improving passenger comfort, thus competitiveness of public transport. Due to the new financial investments, electric multiple unit carriages (EMUs), tram-train vehicles and intercity carriages were purchased. The bimodal trainsets ensure a more environmentally friendly mode of transport. The Green Bond Proceeds were used directly in the purchase of environmentally friendly vehicles, or indirectly to support services or additional costs related to the vehicles.

As a result of the projects, 28 new InterCity cars were deployed in 2020, 19 InterCity cars and 19 high-capacity EMUs were deployed in 2021; and further 23 Intercity cars and 12 tram-trains were deployed in 2022.



High-capacity EMU

V.1.6. Cumulated Effects of the Railway Transportation Projects

The five main projects presented in the previous chapters all contribute to a more sustainable and a low-carbon means of transport. The operation, modernization, expansion, upgrades, and maintenance of railway system and related assets (including rolling stocks) are all essential to lower energy consumption and related emissions while shifting the passengers or freight to a more sustainable and environmentally-friendly means of transportation. For demonstrating the impacts associated with these projects, aggregated environmental impacts and benefits (e.g. reduction of the emissions of both GHG and air pollutants) are presented in [Figure 9](#) and calculation details in [Appendix 2 – Other Information Related to the Green Bond Integrated Report](#).

As a main element of the impact assessment, a calculation for GHG emission avoidance was based on the length of passenger journey (passenger-kilometres) when using rail transport instead of a passenger car.

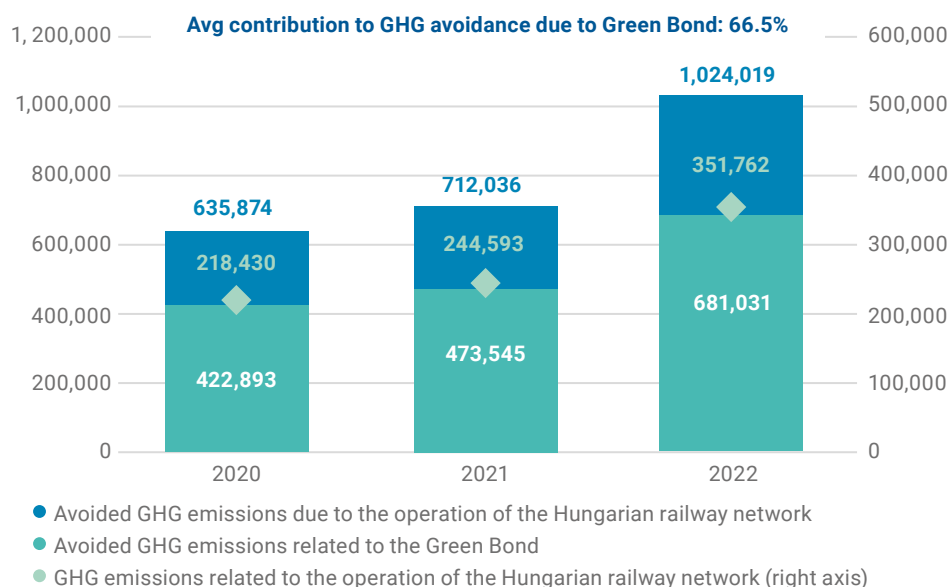


Figure 9. GHG Emission Avoidance (in tCO₂eq) due to the operation of the railway network with respect to the 2022 Green Bond Issuance. Source: KSH, OPTEN Ltd. and MÁV Ltd.

Overall, the GHG emissions avoided due to the Green Bond Expenditures allocated to the Hungarian railway network operation between 2020-2022 were estimated at 1.6 million tCO₂eq, as shown in [Figure 9](#). Average contribution to GHG emission avoidance related to the Hungarian railway network due to the Green Bond expenditures is estimated at 66.5%¹⁴ between 2020-2022.

Railway transportation involves various stationary activities that are also main sources of atmospheric pollution. Therefore, atmospheric pollutants such as sulphur oxides (SO_x), nitrogen oxides (NO_x), and particulate matter emissions (PM₁₀ and PM_{2.5}), could also be used as indicators of transport developments which might adversely impact human health. Based on a year-over-year comparison, railway transportation reduced its emissions of air pollutants, particularly NO_x, PM₁₀, and PM_{2.5} by 6-14% between 2019 and 2021¹⁵ showcased on [Figure 10](#). Due to this decrease, air quality could improve, and the associated negative effects of air pollution could be somewhat eliminated.

Reduction compared to 2019

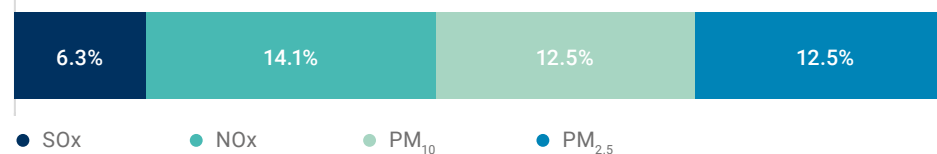


Figure 10. The reduction in emission of certain air pollutants and particulate matter arising from railways transportation. Source: KSH, 2019-2021 values introduced at Appendix 3 – Key Figures

¹⁴ The ratio was affected by several externalities that are detailed in [Appendix 2 - Other Information Related to the Green Bond Integrated Report](#).

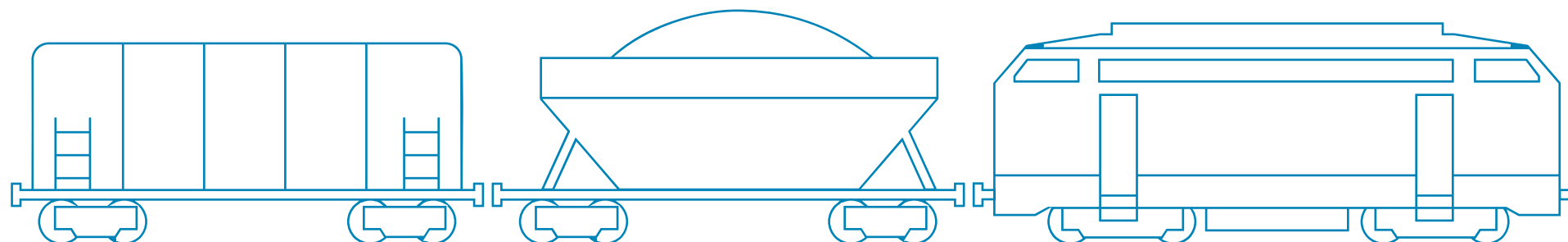
¹⁵ Data source: https://cdr.eionet.europa.eu/hu/eu/nec_revised/inventories/envzbhczw/HU_NFR_1990_2021_v2.xlsx/manage_document

Endeavors towards the EU Taxonomy alignment

The Hungarian Government is committed to be in line with the market practice and therefore considers the EU Taxonomy (EU Taxonomy: Regulation (EU) 2020/852) through its project selections. The Climate Delegated Act of the EU Taxonomy considers trains and passenger coaches with zero direct (tailpipe) CO₂ emission and related infrastructure substantially contributing to climate change mitigation. Hungary's rolling stock development and electrification projects seek to align with this criteria, and the Hungarian railway companies (MÁV and GYSEV) intend to develop their data collection and environmental practices to align with the Delegated Act's "Do No Significantly Harm" and criteria for other environmental objectives to ensure alignment. The current phase of compliance for railway infrastructure developments summarized as:

- *Climate Change Mitigation*: the railway line electrification and upgrade projects are aligned with the substantial contribution criteria as electrified trackside infrastructure and associated subsystems.

- *Climate Change Adaptation*: the infrastructure developments for rail transport requires Environmental Impact Assessment to identify climate risk assessment, ensuring compliance with Adaptation criteria.
- *The Sustainable Use and Protection of Water and Marine Resources*: compliance with the water management part is covered by the Environmental Impact Assessment, whereas the good water status part with document on ISO 140001 or EMS (Environmental Management System).
- *The Transition to a Circular Economy*: the Hungarian Central Statistical Office collects data on waste statistics covering the volume of each type of waste by method and treatment, treatment of construction and demolition waste.
- *Pollution Prevention and Control*: the Environmental Impact Assessment requires to have a plan for reducing noise and vibrations.
- *Protection and Restoration of Biodiversity and Ecosystems*: Environmental Impact Assessment requires to have the mitigation measures required by the criteria.



V.1. 7. Tax Exemptions of Environmentally-friendly Vehicles

The tax exemptions introduced by the Jedlik Ányos Plan aimed to lower the cost of environmentally friendly vehicles in four categories: purely electric cars, extended-range externally chargeable hybrid electric cars, externally chargeable hybrid electric cars or plug-in hybrid cars, and zero-emission cars, which do not emit pollutants listed in the regulation.

The increased assessment results arose from the changes occurred in the methodology (see [Appendix 2 – Other Information Related to the Green Bond Integrated Report](#)) that focused on the larger categories of battery-powered and plug-in hybrid vehicles. The number of battery-powered and plug-in hybrid environmentally friendly vehicles increased by 134% between 2020 and 2022, from 20,075 to 46,918. However, in 2022 these vehicles were still only a very small (~1.1%) share of the 4.1 million passenger cars in Hungary¹⁶ giving more space for future developments in the area.

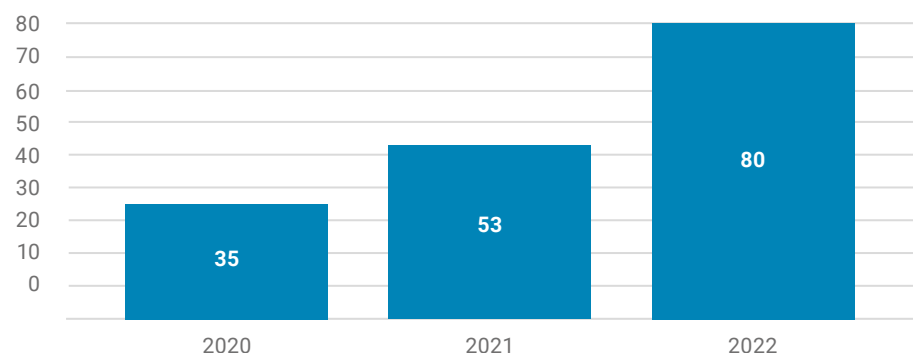


Figure 11. Reduction of GHG emissions for environmentally friendly vehicles (in ktCO₂eq). Source: MoF

¹⁶ Data source: KSH - road vehicle fleet by county and region.

Figure 11 shows the estimated GHG emission reduction impact of the tax exemption programme compared to the baseline was 35, 53 and 80 thousand tons of CO₂ in 2020, 2021 and 2022, respectively. The reduction of CO emissions compared to baseline were as follows: 193 tons (2020); 302 tons (2021); 456 tons (2022). NO_x emissions were as follows: 11 tons (2020); 18 tons (2021); 27 tons (2022). Table 5 contains the details of emission avoidance.

	2020	2021	2022
Number of battery-powered electric vehicles (cumulated)	8,831	14,950	24,369
Number of plug-in hybrid electric vehicles (cumulated)	11,244	16,237	22,550
Ratio of electric vehicle kms – private ¹⁷	56%	60%	63%
Ratio of electric vehicles kms – company ¹⁷	44%	44%	45%
Total GHG emissions (in tCO ₂ eq) ¹⁸	38,503	56,820	81,176
Total GHG emissions avoided (in tCO ₂ eq)	34,544	53,443	79,701
Total CO avoided (in tons)	193	302.2	455.6
Total NO _x avoided (in tons)	11.6	18.1	27.3

Table 5. Number and ratio of environmentally friendly vehicles and CO₂ emissions avoided. Source: MoF, International Council on Clean Transportation (ICCT), European Environmental Agency (EEA)

¹⁷Weighted average for battery-powered electric and hybrid electric vehicles. Assumptions for the electric vehicle kms ratio of plug-in hybrid electric vehicles based on ICCT (2020): 43% (private), 18% (company).

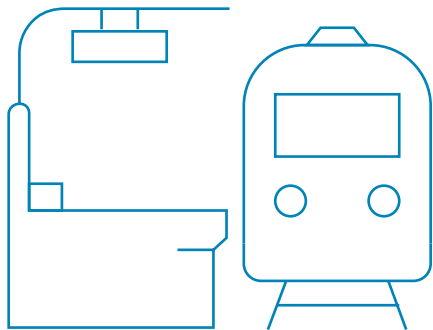
¹⁸GHG emissions related to the operation of the vehicles based on average CO₂ emissions from electricity generation for electric vehicles and fuel combustion for plug-in hybrid electric vehicles.

V.1.8. Modernization of Urban Public Transport

Initiatives to boost environmentally friendly public transportation is important in reducing GHG emissions of the local transportation. Investments in vehicles such as trams, electric buses, trolleybuses, or CNG (compressed natural gas) vehicles support the low-carbon mobility and increase the public use of the railway system as introduced in [Table 6](#).

Subway upgrade	Tram line extension	New vehicles
Upgrading the metro line M3 in Budapest was a major public transport development project finished in 2023, introduced in detail in Appendix 1 – Case Studies . The upgrade was completed for 11.3 km metro line by 2022.	In Budapest, Tram 1 line was extended by total 3.3 km to effectively connect the Etele square junction with the Kelenföld district and South Pest. With the extension of the tram line, it is expected that air pollution and noise pollution on Etele street will decrease.	In Paks municipality, 10 new electric buses entered into services in 2020 to provide zero-carbon mobility option for local public transport.

Table 6. Urban public transport projects. Source: Prime Minister’s Office



Subway station after renovation

V.2. Land Use and Living Natural Resources

The Land Use and Living Natural Resources programme scheme focuses on nature conservation and the preservation of the ecosystems and biodiversity. The supported projects seek to have a positive effect on protected areas, including Natura 2000 sites, forests, national parks, natural habitats, and agricultural areas. The number of Natura 2000 sites in Hungary remained at 525, meanwhile the protected areas increased to 2,176 in 2022. The main programme schemes can be distributed into three different focus areas as: Rural Development¹⁹, Forest Management and Biodiversity.

¹⁹ List of rural development measures:

- M01 Knowledge transfer and information;
- M02 Advisory services, farm management and relief services;
- M04 Investments in physical assets;
- M05 Natural disasters: restoring production potential and preventing damage;
- M08 Investments in forest area development and improvement of the viability of forests (Focus areas: 4A, 4B, 4C, 5C, 5E);
- M10 Agri-environment-climate;
- M11 Organic farming;
- M12 Natura 2000 and Water Framework Directive payments;
- M13 Payments to areas facing natural or other specific constraints;
- M15 Forest-environmental and climate services and forest conservation.



13 CLIMATE ACTION



15 LIFE ON LAND



V.2.1. Nature Protection and Biodiversity

Various projects focus on improving the conservation status of species and habitats, the protection and conservation of genetic resources (e.g. indigenous species), and promotion of the sustainable utilization of preserved genetic resources. Projects that are part of Operational Programmes are financially supported by the state budget (15%) and the European Regional Development Fund (85%). Other projects under the scope of the programme were also co-financed by the green bonds.

Support for Gene Conservation Tasks

The Gene Conservation Strategy²⁰ implemented by the Hungarian government aims to preserve rare genetic values that can still be found in the Carpathian Basin. For this purpose, several sample programs are being implemented among others:

- Carpathian “borzderes” type bovine sample programme;
- Hungarian cold-blooded breed “Muraköz” type horse programme;
- Hungarian “parlagi” donkey sample programme;
- Plant gene conservation model programme on the on-farm maintenance of arable and vegetable plants;
- Sample programme related to vine and fruit-producing plants;
- Model programme for the creation demonstration gardens for church, municipality and school gardens.

The results of these gene conservation programmes are presented in [Table 7](#) below.



Plant varieties at the Hungarian National Gene Bank in Tápiószele

As for the number of samples of agricultural plant varieties available, the number of items on the tender list available for publication has decreased, as the aim was to increase the number of samples available for publication and focus on seed items of high demand. The National Centre for Biodiversity and Gene Conservation (NGBK) institution conducts the relevant research, developments and innovation as well as rural development, education and awareness raising activities related to its gene bank collection. The institution is considered as the eighth largest gene bank in Europe which preserve 50% of our plant genetic resources in a unique way. The green bonds also support these wide range of activities to ensure the operation of the institution.



²⁰Government Decision No. 1049/2018 (II.20).

		2020	2021	2022
The number of samples of agricultural plant varieties available in Hungarian gene banks	number	433	364	310
Number of seed sample requests recorded	number	1,411	2,434	2,340
The number of seed samples transferred	number	14,209	22,068	21,369

Table 7. Results of gene conservation programmes by 2022. Source: Ministry of Agriculture

Support for Nature Conservation Projects

The conservation status of the habitats and species of community interest is measured by conducting national-scale assessments, which follow a common methodology used by each EU member state, in line with the EU's Habitats Directive and Birds Directive.

The main purpose of nature conservation projects is to group nature conservation tasks with the same objectives, which are mainly governmental in nature. Several projects, with the goal of improving biodiversity status in multiple aspects, are managed under this programme group, which were funded by the EU and green bonds.

On the other hand, the programme included the Hortobágy Nature Reserve and Gene Preservation conservation areas. The project contributes to the state gene conservation tasks by maintaining the population of native domestic species and breeds, while it also performs land management tasks for nature conservation purposes. Its main tasks include the conservation, presentation and, where necessary, restoration. Besides that, it is responsible for the in-situ conservation of the gene bank of protected indigenous domestic animals threatened with extinction, the protection, exploration and conservation of cultural heritage and pastoral traditions, and the development and promotion of farming methods that are compatible with



nature conservation. In 2022, the preserve provided for more than 3,600 specimens of cattle, buffalo, sheep and horse.

Concerning compensations connected to Natura 2000 and protected areas and species, based on Act LIII of 1996 on the protection of nature, in protected natural areas and beyond these areas, in the event of a restriction or prohibition of farming, the proprietor or possessor shall be compensated for the expenditure suffered. The activities connected to this law can be supported through the following projects:

- demands and tasks related to official restrictions imposed on a case-by-case basis in the interest of nature conservation, or to protected animals or their protection (such as payment of compensations, fulfilment of damage prevention claims), as well as the financing of the administrative costs arising in connection with these activities;
- financing of data collection and data management costs related to the condition assessment of protected and protected natural areas and protected values;
- financing the costs necessary for establishing and implementing measures related to nature conservation management and tasks related to the implementation of nature conservation development goals, priorities, and development directions.



Sustainable management by grazing at a national park area

Operational Programmes for Nature Protection



The Competitive Central-Hungary Operational Programme (Versenyképes Közép-Magyarország Operatív Programme - VEKOP) and the Environmental and Energy Efficiency Operational Programme (Környezeti és Energiahatékonysági Operatív Program - KEHOP) are very similar in terms of technical content or so-called "mirror calls", given their similar goals focusing on different territorial parts of Hungary. The distribution of funds for both Operative Programmes were 15% from national funds, 85% from European Union funds. In the framework of the operational programmes, by the end of 2022, a total of 69 projects were completed among which 49 projects were targeting the improvement of the conservation status of habitats and endangered species through interventions such as the restoration of degraded habitats, or the development of nature management infrastructure. These projects covered a total target area of 162,000 hectares. By the end of 2023 the extent of the areas targeted by such interventions is expected to reach 185,000 hectares.

Under the VEKOP, the calls for proposals cover a total of 8 priority nature conservation projects, seven of which were implemented by the Danube-Ipoly National Park Directorate, and one by the Kiskunság National Park Directorate. The results of the projects are presented in [Table 8](#).

Focus area: Central Hungary		
Development of infrastructure aimed at presenting natural values and related awareness-raising actions	Number of projects	4
Nature restoration measures aimed at improving the condition of degraded habitats and preserving the population of some species protected by law or species of community importance	Number of projects	1
Investments aimed at preserving and presenting the geological values and wildlife of caves	Number of projects	3

Table 8. Details of the ongoing projects under the operational programmes in Central Hungary between 2020-2022. Source: Ministry of Agriculture



Nature trail at the Duna-Ipoly National Park

As for the KEHOP, a total of 4 calls for proposals were announced, in the framework of which there was an opportunity to implement 101 priority nature conservation projects. The results of the projects are presented in [Table 9](#).

Focus area: Hungarian Regions excluding Central Hungary		
Nature restoration measures aimed at improving the condition of degraded habitats and preserving populations of some species protected by law or species of community importance	Number of projects	34
Development of the infrastructure necessary areas under nature conservation asset management	Number of projects	10
Inanimate natural values – caves, geological base sections, etc. – and developments aimed at preserving and presenting the natural values associated with them	Number of projects	4
Development of infrastructure aimed at presenting natural values and related awareness-raising actions	Number of projects	8
Development of the office network of the Nature Conservation Service and the special toolkit for field mobility	Number of projects	6
The strategic studies that form the basis of sectoral planning	Number of projects	1
Preparation of nature conservation investments to be implemented between 2021-2027 (planning, acquisition of permits, etc.)	Number of projects	20

Table 9. Details of the ongoing projects under the operational programmes in Hungarian regions other than Central Hungary between 2020-2022. Source: Ministry of Agriculture

[Table 10](#) shows the detailed results and targets of the conservation programmes under the operational programmes scope.

		2020	2021	2022	2023 Goal
Habitats of community interest with an improving conservation status	%	7	9	16	10
	cumulated number	3	4	7	5
Species of community interest with an improving conservation status	%	5	7	11	10
	cumulated number	10	15	23	21
Number of completed projects, supporting the improvement of the conservation status of habitats and species	number (cumulated)	17	32	48	63

Table 10. Results of conservation programmes by 2022 and goals of 2023 targets. Source: Ministry of Agriculture

Ecological Monitoring of Szigetköz

The ecological monitoring of Szigetköz was one of the main projects, which is a joint Hungarian and Slovakian initiative that focuses on the monitoring and evaluation of changes in the environmental and ecological condition of the Bős (Gabčíkovo) hydropower plant's impact area. During the project, the main drivers and trends that influence the environmental and ecological status of Szigetköz were identified. An overview of the status of surface and groundwater resources, riverbed characteristics, forests, and bioindicator species was also completed.



Research & Development and Knowledge Transfer



As a result of climate change, monitoring and modelling the changes that occur in forests are fundamentally necessary to make appropriate decisions, preserve and expand future forestry resources. Forest management projects grouped into two major topics. The first group of projects were included in the 'Forests in a Changing Climate' framework. The aim of these projects was to provide support for research-oriented projects, including for budgetary bodies, like large-scale forest inventory and monitoring, supporting R&D initiatives for universities and activities of the Forestry Science Institute. For the results of these projects see [Table 11](#).

	2020	2021	2022
Preparation of scientific background material, technical material, textbooks (pcs)	2	4	3
R&D development projects (number)	3	7	3

Table 11. Results of research and developments initiatives. Source: Ministry of Agriculture

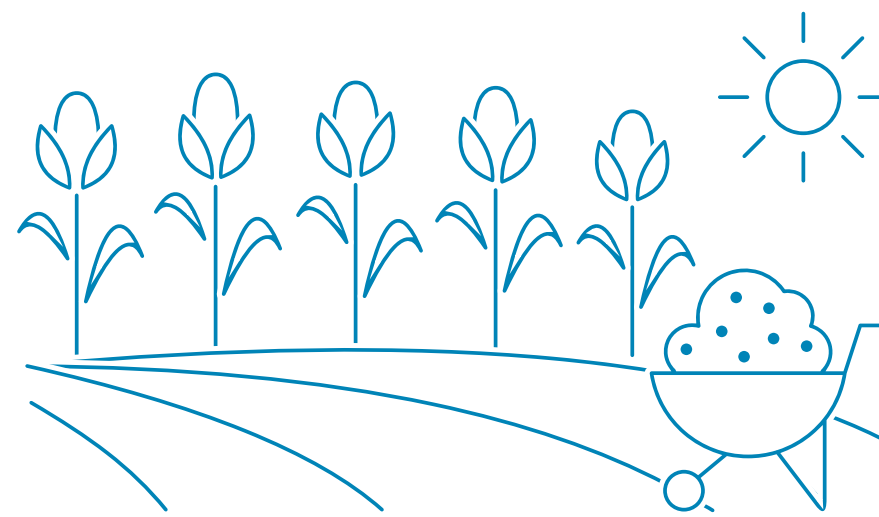
The second major topic focused on the utilization of Energy and climate policy modernization scheme financial resources. As part of the Climate Change Action Plan, the related activities are inclusive of development of effective carbon sequestration capacity and related scientific developments, knowledge development and transfer; however, these activities are not the area of responsibility of the Ministry of Agriculture and are only linked to them through R&D projects.

Conservation of Forest and Agricultural areas



Under the Rural Development Programme the primary undertakings in regard to nature protection were activities connected to agri-environmental management, gene conservation, forest area development and improvement of the viability of forests. The domestic part from the co-financing of relevant measures have been financed entirely from green bonds.

Projects connected to M10 measures focus on the conservation of genetic resources of rare and endangered plant species, conservation of genetic resources of protected indigenous and endangered agricultural animal species. Furthermore, the projects provide financial support for agri-environmental activities. The total number of supported species, items and activities in the 2020-2022 period for agri-environmental compensation payments and gene conservation under measure M10 was 2,642,704 through 46,688 beneficiaries. [Table 12](#) provides an overview of the results of M10 measures.



			2020	2021	2022
M10	Agri-environmental payments	Number of beneficiaries	13,165	12,001	16,913
		Item supported	601,186	522,564	1,156,613
	Ex situ conservation of genetic resources of rare and endangered plant species and micro-organisms	Number of beneficiaries	25	31	39
		Item supported	64,781	79,820	82,692
	In situ conservation of genetic resources of protected indigenous and endangered agricultural animal species	Number of beneficiaries	1,442	1,328	1,154
		Species supported	55,592	43,171	31,050
	Support for the ex-situ or in vitro conservation of genetic resources of protected indigenous and endangered agricultural animal breeds and advisory activities to prevent the depletion of the gene pool	Number of beneficiaries	207	201	182
		Species / Items / Activity supported	1,877	1,701	1,657

Table 12. Results of the projects related to M10 measures. Source: Ministry of Agriculture

The nature protection and biodiversity related M08 measure projects aim for gene conservation in forestry areas through focus areas 4A, 4B, 4C²¹. The detailed breakdown of data for these projects and for measure M08 focusing more on forestry areas is provided in [Table 13](#). below.

²¹M08 focus areas related to nature protection and biodiversity:

- 4A: Restoring, preserving and enhancing biodiversity, including in Natura 2000 areas, and in areas facing natural or other specific constraints and high nature value farming, as well as the state of European landscapes;
- 4B: Improving water management, including fertilizer and pesticide management;
- 4C: Preventing soil erosion and improving soil management.

			2020	2021	2022
M08	Investment expenditures in forest area development and improvement of the viability of forests	Number of beneficiaries and projects	992	1,961	2,464

Table 13. Results of projects connected to M08 measures. Source: Ministry of Agriculture

Compensation Payment Projects



M12 and M13 normative measures include projects that aim to provide compensatory payments. The idea of compensatory payments is that certain activities cannot be carried out in Natura 2000 and other areas, so that the area suffers an economic loss. Compensatory payments replace these losses, while the area is upgraded to a higher nature value. The projects concern forests and grassland areas as well and their results are presented in [Table 14](#) below.

			2020	2021	2022
M12	Natura 2000 and Water Framework Directive compensation payments (agricultural areas)	Number of beneficiaries	10,289	10,271	10,264
		Area supported (ha)	304,406	306,281	346,813
	Natura 2000 and Water Framework Directive compensation payments (forest areas)	Number of beneficiaries	3,491	3,547	3,306
		Area supported (ha)	115,992	124,946	111,692

Table 14. Results of projects connected to M12 measures. Source: Ministry of Agriculture

For the M13 measure one call for proposal was published over the whole period, under which 32,254 beneficiaries were eligible to receive financial support to areas facing natural or other specific constraints.

V.2.2. Education and Awareness-Raising

Raising awareness among society and professionals is important to educate people about forest management and land use related topics and issues.

Knowledge Transfer on Sustainable Forest Management

Promoting sustainable forest management and the role of forests in CO₂ sequestration is essential, as well as raising awareness among both society and professionals. Thus, awareness-raising tools, scientific development and the transfer of knowledge from field experience can be achieved through both professional study tours and the publication of specialized publications. Throughout the projects, 16-20 beneficiaries were supported, inter alia, foundations, nature/environmental associations, vocational school foundations supporting forestry vocational schools, and National Forestry Association. [Table 15.](#) showcases the results of the forest management related projects.

	2020	2021	2022
Awareness raising through professional and other publications (number)	4	8	7
Study visits, field knowledge transfer events (number)	7	6	8

Table 15. Results of awareness raising and education projects related to forest management.
Source: Ministry of Agriculture

Information Actions and Advisory Services



The measures focusing on knowledge transfer and information actions (M01) and Advisory services, farm management and farm relief services (M02) in relation to the Rural Development Programme focused on two main types of projects, namely increasing efficiency in energy use in agriculture and food processing (5B) and fostering carbon conservation and sequestration in agriculture and forestry (5E). The results of training and advisory activities are presented in [Figure 12.](#)

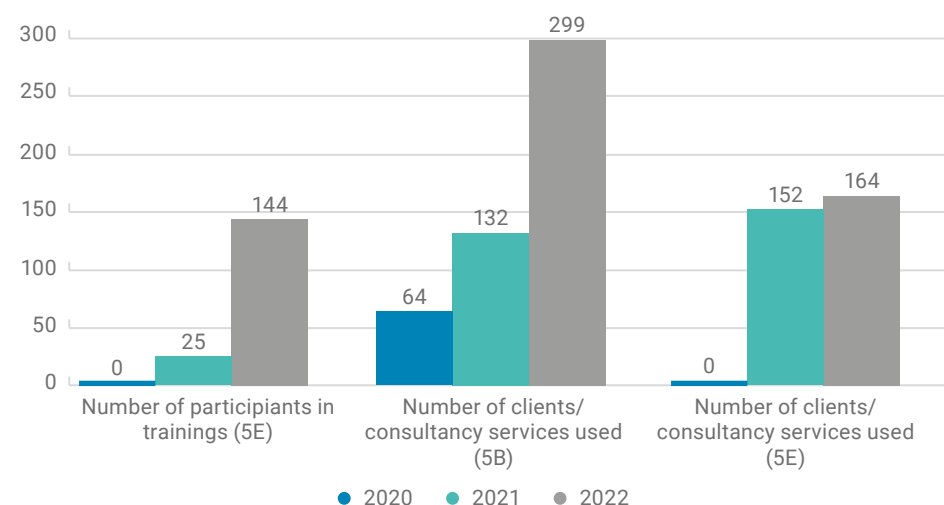


Figure 12. The yearly results of knowledge transfer trainings and advisory service projects.
Source: Ministry of Agriculture

Environmental Awareness Raising Actions

Other programmes aim to support the implementation of environmental awareness-raising and knowledge sharing on topics such as sustainable agriculture and food production, nature conservation and protection, and sustainable forestry through communication actions and the support for non-governmental organizations (NGOs). These projects have been financed from the Green Spring tender to a greater extent in previous years. However, the amount of funding has been decreasing significantly and expected to continue to do so as the budget for Green Spring funds was also split between the two ministries, thus the number of projects supporting NGOs is expected to decrease as showcased in [Table 16](#).



Communication actions		2020	2021	2022
Communication actions related to nature interpretation measures promoting Natura 2000	The number of Hungarian citizens that actively took part in communication actions	6,700	8,750	5,750
Goal for 2023		total 30,000		
Supporting NGOs		2020	2021	2022
The project supported NGOs concerned with climate protection education, environmental issues and sustainability. (A total of 203 projects)	Supported NGOs	102	61	40
Other environmental educational programmes		2020	2021	2022
Among the programmes supported under the Green Spring tender, the most significant are the Green Kindergarten Network and the National School Garden Development Programme, and other connecting initiatives aiming to support foundations and associations to organize environmental programmes in kindergartens and primary schools.	Agricultural directorates, museums, schools and associations	5	5	8

Table 16. Results of environmental awareness programmes and support projects for NGOs.
Source: Ministry of Agriculture and Ministry of Energy

V.2.3. Sustainable Agriculture

Sustainable Development of Rural Areas

The Hungarian Rural Development Programme aims to assist the sustainable development of rural areas and promote the sustainable utilization of the environment, its natural resources and landscape, as well as the promotion of preserving genetic resources and ecological farming.

In case of M08 measures the domestic part from the co-financing of relevant measures have been financed entirely from green bonds, except for M08 measures with 5C and 5E focus areas²², where that ratio was 50%. The condition of financial support is the continuation of farming in accordance with the certification requirements for organic farming during the entire duration of the commitment.

Results of projects belonging to measure M15 – which targets admin focus areas like forestry gene preservation and compensation – are presented in [Table 17](#). below.

			2020	2021	2022
M15	Forest environmental and climate services and forest conservation (art 34)	Number of beneficiaries	244	277	355
		Number of projects	245	277	355

Table 17. Results of sustainable forestry development projects. Source: Ministry of Agriculture

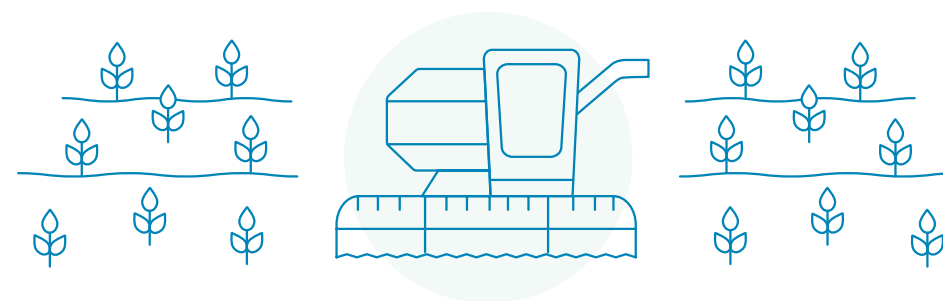
²²M08 focus areas related to sustainable agriculture:

- 5C Facilitating the supply and use of renewable sources of energy, of by products, wastes, residues and other non-food raw material for the purposes of the bio-economy
- 5E Fostering carbon conservation and sequestration in agriculture and forestry

M11 measure projects for sustainable, organic farming are re-advertised every 3 years, but they are similar in all respects, thus the impacts of the same projects can be examined together. The results of these projects are presented below in [Table 18](#).

			2020	2021	2022
M11	Conversion to organic farming, maintaining organic farming	Number of beneficiaries	4,090	3,705	5,831
		Number of projects	101,795	182,371	243,689

Table 18. Results of projects aiming to develop organic farming. Source: Ministry of Agriculture



V.2.4. Other Land Use and Living Natural Resources Projects

REMEDIATION PROJECTS

Remediation projects are focused on the removal of dangerous and poisonous substances from contaminated land and groundwater and the protection of air, water, soil and wildlife. The projects are financed with 85% intensity by the Environmental and Energy Efficiency Operational Programme (Környezeti és Energiahatékonysági Operatív Program – KEHOP) and with 15% state support. Eleven projects were still in progress in 2022 with the goal of remediating more than 50 hectares of contaminated water, land or wildlife. Remediated areas include Esztergom Strázsa-hegy, the Szekszárd Lőtéri water base, Peremarton, Berhida, Gyálai Holt-Tisza, Taszár, Mezőkövesd, Kaposvár, Ócsa, Berhida and the Szentendre South water base. The number of remediation projects between 2020 and 2022 is shown in *Figure 13*.

Number of official remediation projects



Figure 13. Cumulated number of official remediation projects. Source: Prime Minister's Office

Remediation of Water – Contamination reduction

The Gyálai-Holt Tisza is one of Hungary's largest estuaries. Its primary function is to retain inland water, to collect storm water from the city of Szeged and to store irrigation water. Siltation and contaminated sludge have a negative impact on all its functions. The water quality is poor, and the estuary is characterized by extremely poor and highly degraded conditions. The natural structure of the habitat has become homogenized which has decreased the favourable condition of animal communities. However, significant animal communities have survived despite the human presence, but they are expected to continue to decline without interventions. Due to the proximity of the residential area, the environmental conditions are of high importance to the local population.

The aim of the project is to reduce the contamination of surface water and sediments by remediation of the contaminated areas, by carrying out technical intervention in accordance with the relevant official regulations. The remediation ensures that the contamination is not transferred to other environmental elements. As a result of the project, the environmental and human health risks caused by the contamination can be reduced, the adverse health effects on the local population can be eliminated while the quality of life of the local population is improved. The project will be finished in 2023, therefore impact results can be recorded later. The project is partially funded by the green bonds with 15% financing intensity.



LIFE PROJECTS

LIFE (*L'Instrument Financier pour l'Environnement*) is the EU's financial instrument supporting environmental, nature conservation and climate action projects. The financial support is available for 2 type of main projects, the so-called traditional and integrated LIFE projects that contribute to achieving local environmental objectives on a regional level, as well as across borders. Since 2021, LIFE program has 4 sub-programmes under its two main project types. The sub-programs named "Nature and biodiversity" and "Economy and Circular economy and quality of life" relate to environmental topic while the "Climate change mitigation" and "Transition to clean energy" sub-programmes are financed under the theme called climate policy.

Projects with environmental theme may include:

- developing, demonstrating and promoting innovative techniques, methods and approaches;
- contributing to the development of knowledge bases and the application of best practices;
- supporting the development, implementation and monitoring of EU legislation and policies;
- accelerating the widespread uptake of successful technical and policy solutions by replicating results, integrating related objectives into other policies and the public and private sectors.

Meanwhile several projects focus on environmental governance:

- supporting public policy and voluntary approaches;
- ensuring environmental compliance and access to justice;
- behaviour change and awareness raising initiatives.

The number of supported traditional projects are detailed in [Table 19](#). For the 2022 EU LIFE call, 6 projects are eligible for EU funding from which 5 projects are supported from the green bonds. The green bonds support the level of own contribution of the applicants.

2020	• 1 prevention of environmental damage project • 1 nature and health project • 1 validation of innovative environmental technologies project
2021	• 1 protection and sustainable use of soil project • 1 prevention of environmental damage project • 1 eco-innovation project • 1 improving resource efficiency and savings project • 1 reducing the environmental impact of consumption project
2022	• 1 protection and sustainable use of soil project • 1 validation of innovative environmental technologies project • 1 improving resource efficiency and savings project • 2 reducing the environmental impact of consumption project

Table 19. Number and nature of supported traditional LIFE projects. Source: Ministry of Energy

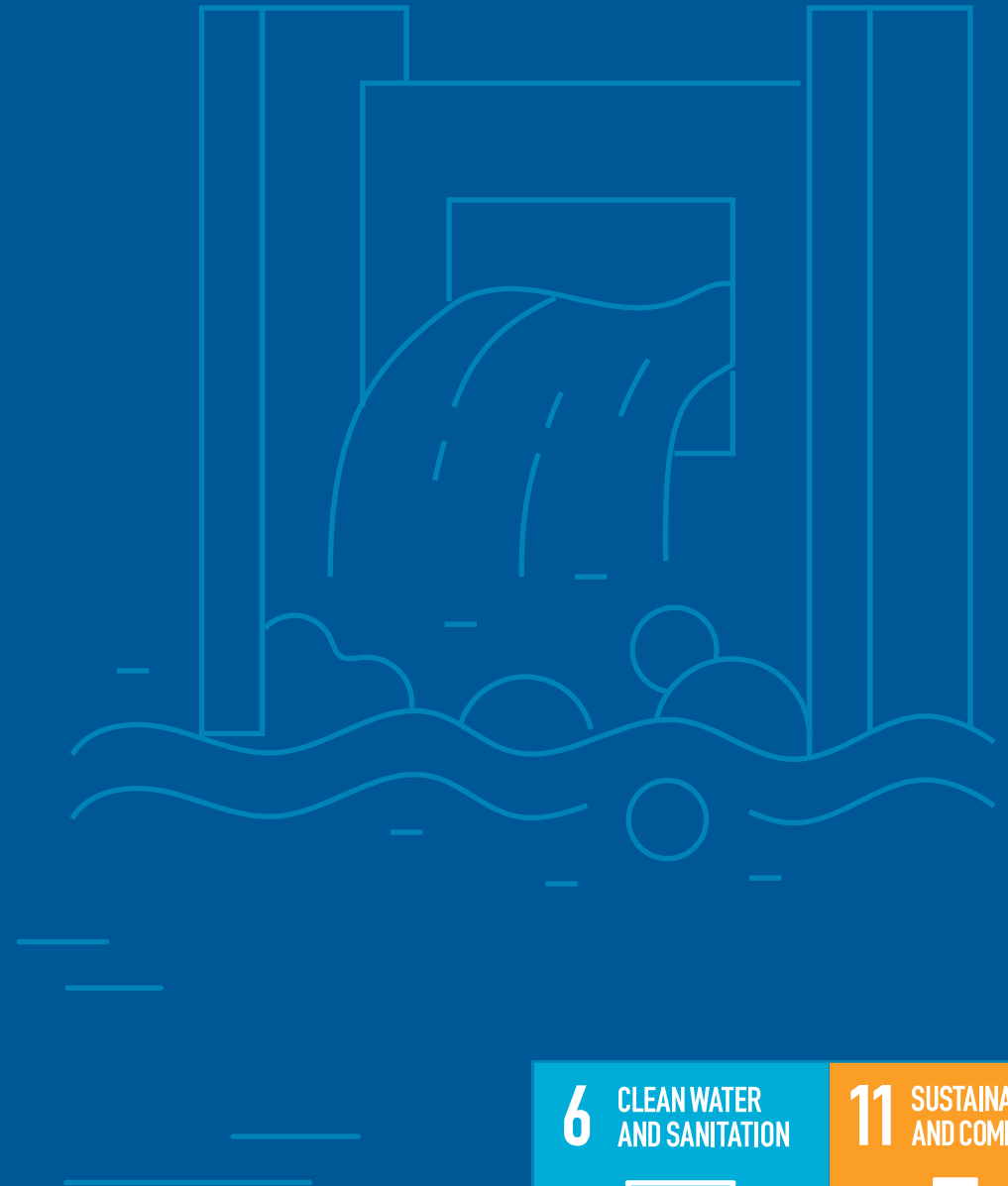
The LIFE HungAIRy is the most significant integrated project based on the amount of support received. HungAIRy runs between 2019 and 2026 and aims to improve air quality in 10 Hungarian municipalities within 8 Hungarian regions through 18 project elements with 19 consortium partners.²³



²³Data source: European Council- LIFE Public Database (Reference: LIFE17 IPE/HU/000017), HungAIRy website.

V.3. Waste and Water Management

The aim of the projects under Waste and Water Management is to deploy innovative solutions, to provide everyone with adequate infrastructure and strengthen the circular economy. Both waste and water management are a matter of cherishing the environment and maintaining human health.



6 CLEAN WATER
AND SANITATION



11 SUSTAINABLE CITIES
AND COMMUNITIES



V.3.1. State Reconstruction Fund for Water Utilities

The Rolling Development Plan defines a 15-year planning phase for local governments and water utility companies for the renovation or replacement of equipment in the water utility system. The implementation of various projects has started with an aim of developing technical conditions and expanding the availability of services. The projects are partially financed by the green bonds. [Table 20](#) provides an overview of the Hungarian water utility system.

	2020	2021/Latest available data/	2022
Lengths of the drinking water system (in kilometres)	67,149	67,553	70,014
The number of households connected to the drinking water system	4,295,998	4,319,143	4,317,612
Percentage of households connected to the drinking water system	95.4%	95.6%	²⁴
Lengths of the sewage system (in kilometres)	52,499	53,015	55,631
The number of households connected to the sewage system	3,734,329	3,774,456	3,667,969
Percentage of households connected to the sewage system	83.0%	83.5%	²⁵
The length of the sewage system per kilometres of the drinking water system (in metres)	782	785	794
The number of breaks per 10 kilometres of drinking water pipelines	4.2	3.7	4.1
The number of breaks per 10 kilometres of sewage pipelines	12.5	4.1	3.3
Wastewater also treated with tertiary treatment (in thousand m ³)	511,425	493,000	509,659

Table 20. Overview of the Hungarian water utility system. Source: KSH, Hungarian Energy and Public Utility Regulatory Office (MEKH)

²⁴2022 data for percentage of households connected to the drinking water system is not yet available.

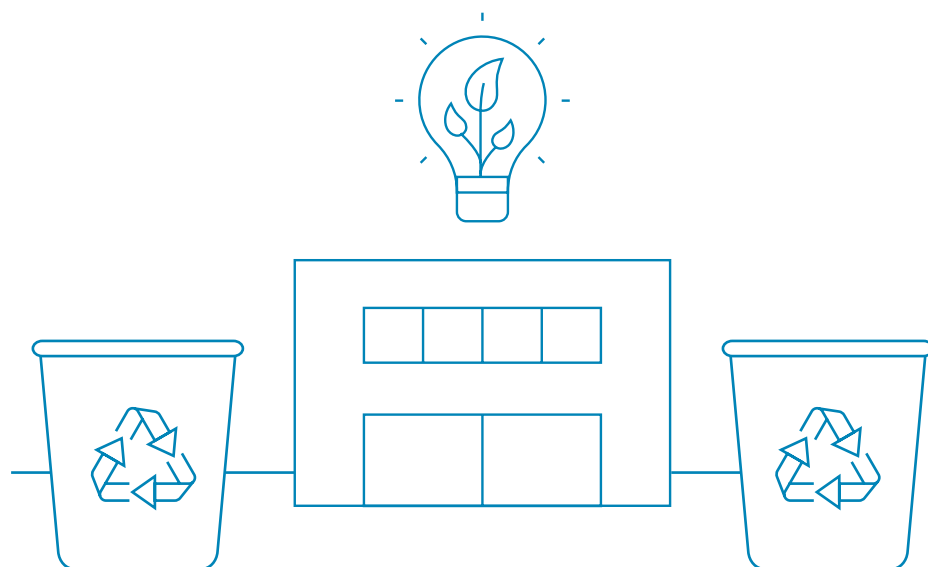
²⁵2022 data for percentage of households connected to the sewage system is not yet available.

In the reporting period the length of the sewage system per kilometres of the drinking water system has steadily increased, providing adequate utility infrastructure for more people than before. At the same time, the number of breaks per 10 kilometres of both drinking water and sewage system has decreased as a result of renovations. In 2022, more detailed information was available as data was not sourced from public information but from the Hungarian Energy and Public Utility Regulatory Office that caused some changes in the 2020-2021 data shown previously.



V.3.2. Subvention for Waste Separation and Reutilization as an Energy Resource

In 2016, the Hungarian Government adopted the Irinyi Plan to support small- and medium-sized enterprises (SMEs) with the development and commercialization of state-of-the-art technologies and services, with a special focus on green technologies. The projects that received grants under the Irinyi Plan are associated with the development and optimization of technologies related to waste management, the utilization of different waste items to generate valuable products, and the design and development of reusable packaging materials. The supported projects were still ongoing in 2022, the results will be available upon completion. No additional projects were supported in 2021 or 2022.



V.3.3. Supporting Waste Management Tasks

To follow the waste management and recycling targets set by the European Union and to aid the development of the circular economy in Hungary, SMEs received funding to increase their waste processing capacity. The project supports corporations dealing with collection, pre-treatment, and recycling of the following waste categories:

- Packaging waste;
- Waste electrical/electronic equipment;
- Waste batteries;
- Waste tyres.

The projects are supported with different financing intensity and are subject to a selection of a company specific Key Performance Indicator (KPI). The projects are partially funded by the green bonds. No projects were supported in 2020. In 2021 13 projects, while in 2022 17 projects received support.

Plastic waste and its processing for further usage are crucial for developing the circular economy that uses resources more sustainably by recycling and reusing materials. One of the projects that was co-financed by the green bonds focused on increasing the production capacity of secondary raw materials by recycling of plastic packaging waste. To enable this increased volume of production, a new washing and regranulating line has been installed, to produce and regranulate from the managed packaging waste. As a result of the upgrade, the additional processing of 2,703 tons of packaging waste and the production of 2,304 additional tons of secondary raw material is enabled annually.

V.3.4. Other Waste and Water Related Projects

Remediation technology for chlorinated hydrocarbons project

The project focuses on the development of innovative technologies which can support remediation activities at the former "Magyar Optikai Művek" factory in Mátészalka, a site polluted with volatile chlorinated hydrocarbons. The research consortium studies the most effective remediation technology for the site and the contamination, which will also be suitable for the protection of the local water base. The project will be completed in 2023, therefore impact results can be recorded later.

Remediation of Water – Waste collection

In the Upper Tisza region, large quantities of municipal waste and PET bottles are regularly discharged from the bordering areas, which after crossing the border, spread into the floodplain and/or accumulate at the first barrier, the water steps of Kisköre. It is crucial to clear the affected area as it is a major element of the surrounding ecosystem. The polluting plastics are an important part of developing the circular economy as processing the collected waste materials can be recycled and used further, lowering the resource needs of the economy. This state damage control plan aims to collect, sort, recycle, or dispose of this floating waste. More detailed information about the project is in [Appendix 1 – Case Studies](#). The project is financed fully by the green bonds.

Efficient Water Use in Agriculture

This project element focuses on efficient water use in agriculture, including water-saving irrigation methods, climate-resilient production methods and sustainable land use as part of the Rural Development Programme. 725 projects were supported between 2020 and 2022. Developments²⁶ achieved by the projects are detailed in [Table 21](#).

Number of projects	2020	2021	2022
Support for the construction of water reservoirs	4	3	6
Establishment of natural filtration fields before discharging the collected water into catchment	0	0	1
Construction of land reclamation roads	3	2	1
Improving the water efficiency of existing irrigation equipment	35	53	34
Purchase of new irrigation equipment	82	103	95
Improving the energy efficiency of irrigation equipment	39	35	29
Number of new projects relating to new irrigated orchards	102	55	43

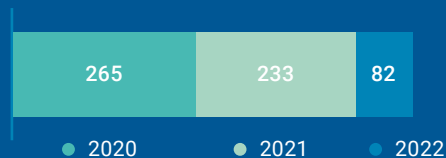
Table 21. Number and nature of the supported projects. Source: Ministry of Agriculture

²⁶For some KPIs, new target areas were defined, therefore data collection methodology has been reviewed and data from previous years have been updated compared to previous year's results.

V.4. Renewable energy

Incentivising renewable energy projects leads to increased installed capacity and renewable production and can minimize GHG emissions. The purpose of these projects is to provide subsidized loans for the use of decentralized, renewable energy sources in Hungary among residents and SMEs to avert emissions from fossil fuels and increase energy efficiency and improve the thermal properties of buildings through modernization of heating, cooling, ventilation. Avoided GHG emissions are shown in *Figure 14*.

Subsidized Loan for Renewable Energy Use in Buildings



Subsidized Loan for Increased Energy Efficiency and Renewable Energy Use in Residential Buildings



Figure 14. Annual GHG emission avoidance (in tCO₂eq)²⁷ related to the green bonds.
Source: Prime Minister's Office

²⁷ The GHG emission avoidance is estimated based on the difference between the building's emission after the renewable asset installation and the baseline value before the project using the dataset of the official Energy Certifications.



V.4.1. Subsidized Loan for Renewable Energy Use in Buildings

A substantial share of the national energy consumption in Hungary originates from non-residential buildings which also have a very small fraction (5%) of their energy consumption from renewable energy.²⁸ In Hungary, the overall proportion of renewable energy from the total gross final energy consumption reached 14%²⁹ in 2021 and is intended to be increased to a minimum of 29% by 2030³⁰.

This financial support programme provides combined loan and non-refundable support for micro, small and medium-sized enterprises located in Pest County and Budapest and aims to reduce their primary energy use while increasing the use of renewable energy in buildings. To generate energy consumption from renewable resources most of the beneficiaries installed solar panel systems, modernized their non-productive heating systems or lighting systems, introduced renewable electricity generation, or developed their domestic cooling or hot water systems. The programme was partially (50%) financed from the Green Bond Proceeds to complement the European Union funds.

Table 22 shows indicators such as the number and capacity of the installed renewable assets and annual energy production, along with the estimated amount of annual avoided GHG emissions. The main results related to the green bonds are detailed in *Figure 15*.

²⁸EBRD Hungary: Modernization of Public and Residential Buildings - Identification and Elaboration of Support Programmes.

²⁹KSH: share of use of renewable energy sources in gross final energy consumption (2000-2021) as per the latest data available.

³⁰National Energy and Climate Plan of Hungary (Revised version 2023).

	2020	2021	2022	Total
Number of projects (pcs)	20	10	6	36
Installed capacity (in MW)	0.4	0.3	0.2	0.9
Annual energy production (in MWh/year)	708.4	354.7	383.4	1,447
Annual avoided greenhouse gas emissions (tCO ₂ eq)	530.2	465.8	163.7	1,160

Table 22. Number and nature of supported projects. Source: Prime Minister's Office

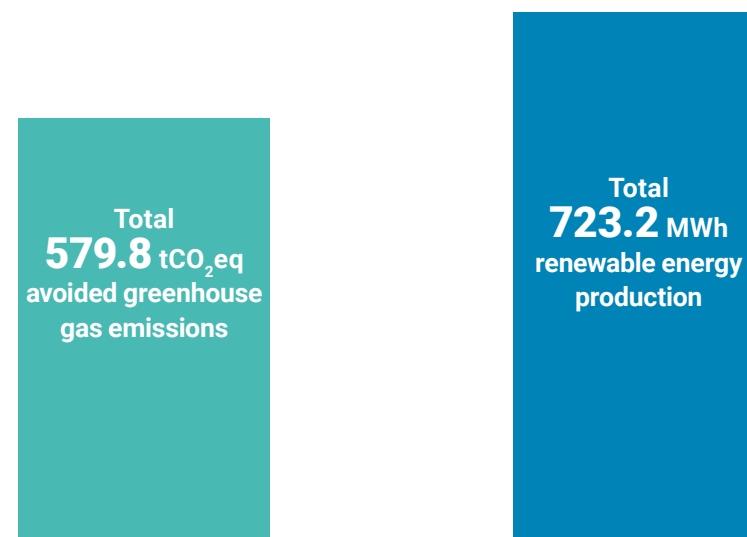


Figure 15. Main details related to the green bonds. Source: Prime Minister's Office

V.4.2. Subsidized Loan for Increased Energy Efficiency and Renewable Energy Use in Residential Buildings

Accelerating the renewable energy capacity among the residential sector is essential for the wider application of alternative and low carbon technologies. According to the National Energy and Climate Plan, the aim is to increase the proportion of renewables from the current 5-year average of 19% to 29.5% by 2030³¹.

This loan programme's main objective is to subsidize the installation of renewable energy production systems or energy efficiency initiatives in residential buildings. This includes private individuals, condominiums and housing associations. The loans provided to residents were mainly solar photovoltaic systems, geothermal water, water-to-water- and air-to-water heat pump systems. In other cases, loans were provided for the construction of new boiler systems utilising briquettes, pellets or wood chips.

The programme was partially (50%) financed from Green Bond Proceeds completing the European Union funds.

Indicators in [Table 23](#) show the number and capacity of installed renewable assets in the 2020-2022 period, along with their produced electricity. The GHG emission avoidance estimate is based on the electricity generating capacity of the building after the renewable asset installation, with the baseline value before the project.³² The main results related to the green bonds are detailed in [Figure 16](#).

³¹National Energy and Climate Plan of Hungary (Revised version 2023)

³²Official Energy Certification data was used in the compilation.

	2020	2021	2022	Total
Number of projects (pcs)	1,040	147	289	1,476
Installed capacity (in MW)	3.1	0.5	1.1	4.7
Annual energy production (in MWh/year)	4,061	665	1,409	6,135
Annual avoided greenhouse gas emissions (tCO ₂ eq)	1,646	332	530	2,508

Table 23. Results of the programme. Source: Prime Minister's Office

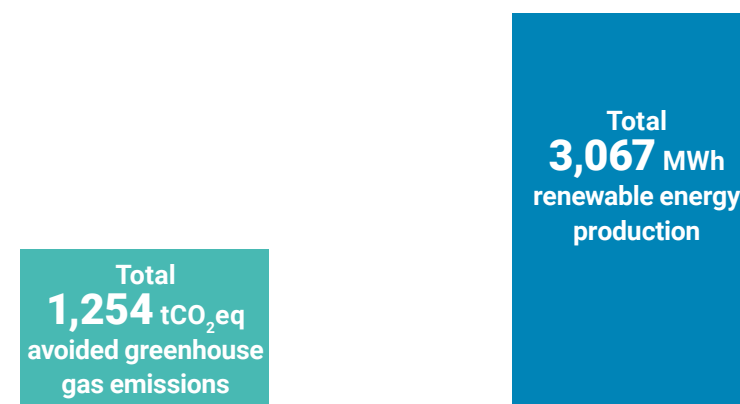
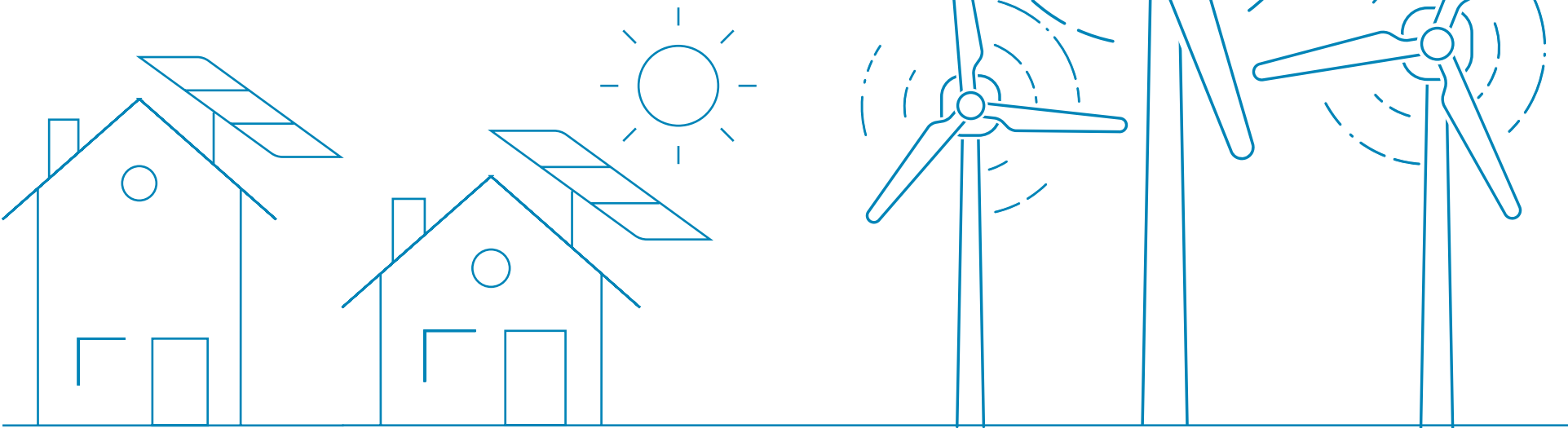


Figure 16. Main results related to the green bonds. Source: Prime Minister's Office

It is essential from the perspective of the development of energy efficiency that the energy classification of residential buildings improve as well, therefore, the classifications of nearly a thousand households have been improved under the project between 2020-2022, detailed in [Table 24](#).

	2020	2021	2022
Number of households with improved energy classification (number of households)	593	414	132

Table 24. Results of the energy classification improvement projects. Source: Prime Minister’s Office



V.5. Adaptation

Adaptation projects support activities related to the anticipation of the adverse effects of climate change and natural disasters and take action to strengthen the resilience and adaptive capacity of the country.



6 CLEAN WATER
AND SANITATION



13 CLIMATE
ACTION



V.5.1. Development of the Monitoring Station for the Implementation of the Water Framework Directive

Examination of the Effects of Climate Change on the Water Resource and Flow Conditions of Lake Balaton and the Impact of These Factors on Wildlife

The project aims to understand the relationship between water level regulation and climate by studying water volume and level variations. It will also assess the quality of sediment in Lake Balaton and examine the environmental impact of changing water patterns. The project will analyse interventions in the river basin and the effects of global climate change, with the goal of using the lake basin surplus effectively. This may involve supporting a more stable recreational use of the lake. As a result of the project the water level of Lake Balaton has risen by 10 cm, achieving an additional 60 million m³ of water stored. The impact of increased maximum water levels on shorelines, structures, and the lake's ecosystem will be evaluated. Additionally, the project will investigate the parameters required for maintaining a constant water level in Lake Balaton, as well as the economic implications. The General Directorate of Water Management is the beneficiary of this project, which is partially financed by the green bonds.

Preventive Measures for the Long-Term Sustainable Management of Water Quality Problems affecting Lake Balaton

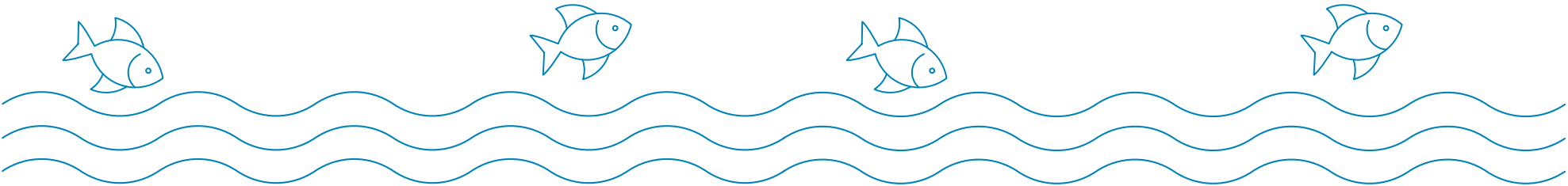
During the implementation of the project, various interventions will be carried out on 11 watercourses of Lake Balaton:

- Renovation of existing sediment traps;
- Construction of new structures;
- Reconstruction of the embankment.

Reactivation of the reed filter fields at the Lovasi reservoir and Lesence filter field are going to be carried out, which will restore the water quality protection function of the filter fields and thus improve the nutrient retention efficiency. The major artifact of the Kis-Balaton Water Protection System – the largest water quality protection facility on Lake Balaton – is going to be renovated as well. Water quantity and water quality monitoring stations are going to be set up to continuously monitor nutrient loads into Lake Balaton and the effectiveness of the water quality protection facilities. The project works started in 2021. The estimated impacts for 2021-2022 are summarized in the [Table 25](#). There was no separate data available for 2022.

	Reduced water loss (m³)	Dredging (m³)	Insulation (m³)	Hydro-mechanical dredging (m³)
2021-2022	16,175	88,800	88,800	29,772

Table 25. Summary of estimated results of the project between 2021-2022. Source: General Directorate of Water Management (OVF)



V.5.2. Water Management Developments for Sustainability

Water Level Rehabilitation of the Mosoni-Danube

The natural state of the Mosoni-Danube has changed due to natural processes and human intervention, resulting in dried-up tributaries, decreased wetlands, and declined ecological diversity. To rehabilitate the river and regulate the water level, a weir/floodgate has been built at the mouth of the Mosoni-Danube, allowing for the restoration of the ecosystem in the Szigetköz region by improving water quality, and for protecting the population and property in the area by regulating water level fluctuations. The project is partially financed by the green bonds. The main developments and their expected ecological, social, and economic impacts are presented in [Table 26](#) and [Table 27](#).

	Details	Status (2022)
Construction of weir/floodgate	Weir is equipped with movable closure mechanisms which are used to raise the water level in mid and low-water situations while the floodgate function is used to protect 660 hectares from inundation.	✓
Flood bank	Flood banks were built in Vének and Gönyű to guarantee the continuity of safety against significant flood levels.	✓
Related projects	Necessary alteration of the riverbed. The operating building, service road, five monitoring wells, and utilities have been installed.	✓

✓ completed

Table 26. Main developments and their status by the end of 2022. Source: Ministry of Interior



Estuary water level control structure and lock

Ecological impacts	Social impacts	Economic impacts
• Mitigate the effects of the diversion of the Danube main branch • Retain water in the Szigetköz area • Restore the natural ecosystem of the Mosoni-Danube tributary • Mitigation of the effects of climate change on surface water and groundwater • Regulate the water level of the branches • Reduction of flooding • Affect the microclimate by increasing evapotranspiration, leading to lower ambient temperatures • Increase the proportion of water bodies in good status according to the Water Framework Directive (WFD)	• Less reduction in tourist arrivals following climate-related hazardous events • Less damage to natural heritage and sites of tourist interest • Lessened reduction in direct economic loss to cultural heritage damaged or destroyed by disasters • Contribution to people's well-being through developed tourism • Contribution to nourishment by better soil conditions • Contribution of nourishment by improved ecosystem services like more and healthier fishes and forest	• Reduction of port dredging cost at Gönyű • Economic development of the region by creating recreational opportunities • Water damage becomes less significant

Table 27. Expected ecological, social and economic impacts. Source: Ministry of Interior

Thorough Environment Monitoring and Information System on Lake Balaton

Lake Balaton is a crucial social, ecological, economic and infrastructure element of Hungary. Adapting to climate change is key to protecting Lake Balaton as an ecosystem and to safeguarding its economic potential. This project aims to monitor the effects of the changing climate on the water quality and quantity of Lake Balaton, and its ecological condition. To achieve this goal, more up-to-date systems are developed to provide thorough environmental data. [Table 28](#) shows the main developments of the projects.



Monitoring platform

	Details	Status (2022)
Monitoring system	Development of a monitoring system that ensures the quantitative and qualitative monitoring of water bodies to satisfy information needs.	
Reduction in data loss	Reduction of identified data gaps for the ecological and chemical status assessment of Lake Balaton and its sub-basins in terms of the areas of biological elements and hazardous substances.	
Data assimilation system	Development of a data assimilation system of meteorological equipment covering Lake Balaton and its catchment area, which can provide a high-resolution spatial and temporal grid. This will provide basic information for all further environmental modelling, calculations, and decision support.	
Build a unified system	Building of a unified information and decision-support system by connecting subsystems belonging to several organizational units to facilitate decision support.	



Table 28. Main developments and their status by the end of 2022. Source: Ministry of Interior

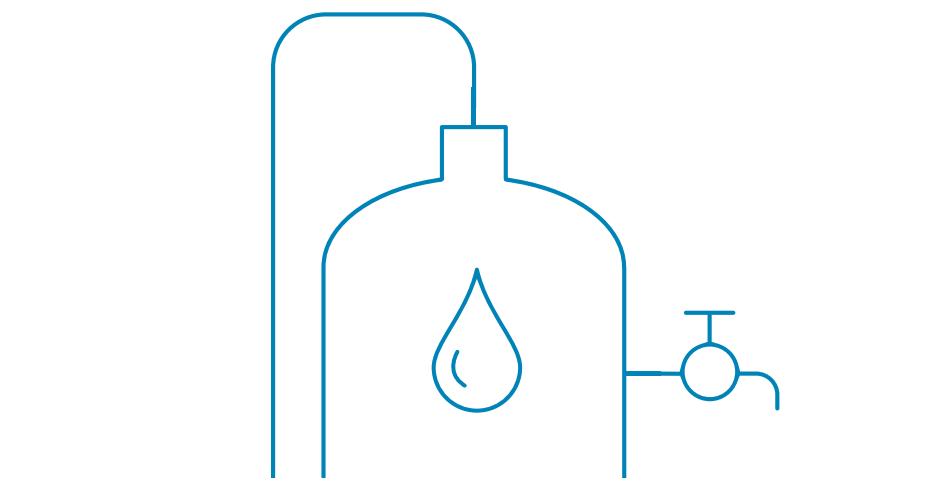
Seven external monitoring tables are going to be installed which will provide up to date information for the public. The tables will be able to display a combined volume of 429,240 data annually in case of hourly updates, contributing to the constant information of the population. The project was partially financed by the green bonds.

Planning for Water Retention and Land Use Change in the Ancient Drava Programme

The project aims to improve the infrastructural conditions in the region of the ancient Drava Programme by implementing a sustainable water management system that supports water retention and conservation and the protection of water quantity and quality. This will be delivered through the following planned activities:

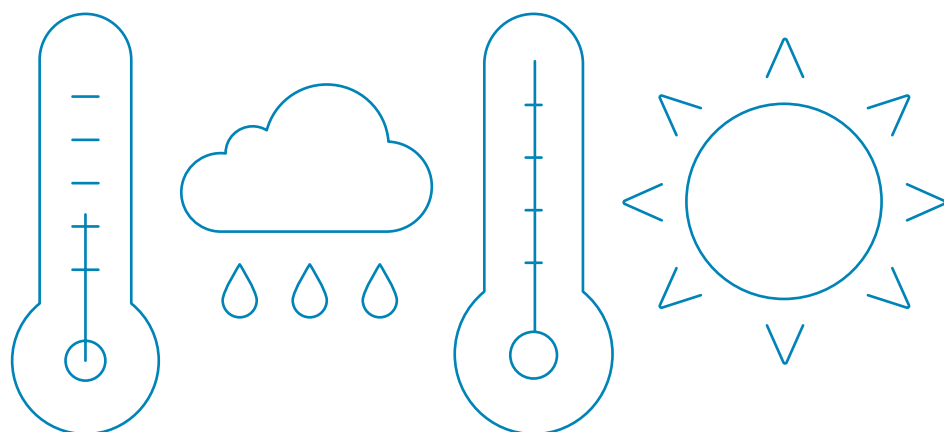
- Renovation and construction of reservoirs and other water facilities for inland water protection and local water damage control;
- Establishing of reservoirs to provide water for the summer dry season;
- Provision of water recharge to tributaries, oxbows, and other water bodies;
- Preserving wetlands/water-related natural habitats;
- Design and installation of water pump stations;
- Implementation of deep-water retention options.

The system was set in 2020 and constructed in 2021. The test operation was released in 2022. The project has reduced water loss by 2,449 thousand m³ and has managed to increase the amount of additionally available water by 25 million m³ in 2022.



V.5.3. Hungarian Meteorological Service

The key aspect of this programme is to support the operation of the Hungarian Meteorological Service (OMSZ), which collects, processes, and provides meteorological data and information as well as to promote innovative, climate adaptation projects. In the reporting period 10 projects were supported with different financing intensity. The developments are mainly focused on air pollution, climate change, weather forecasting and droughts. The projects, their details and status are summarized in [Table 29](#). These projects further support the OMSZ in fulfilling its duties to a high standard.



³³More detailed information is in [Appendix 1 – Case Studies](#).

	Detailed information	Status (2022)
Development of an air pollution forecasting system	Development of a mesoscale model and predict the formation of air pollution. Understand the interaction between aerosol particles and atmospheric water.	✓
Mapping the effects of climate change in Hungary	Conduct regional climate model simulations. Carry out sensitivity studies, validation experiments, and projection simulations. Develop a representative database. Three new climate data and knowledge bases.	✓
Electronic General Aviation Forecast	Cooperation of meteorological service providers in Central and Southeastern Europe. Develop a system for low-level flights.	✓
Interreg Romanian-Hungarian cross-border	Construction of a hail-suppression system with a soil generator in the territory of Szatmár (Satu Mare) County, Romania. Mitigate the negative effects of hail.	⚙️
LIFE-IP HungAiry 2016	Improve air quality at the most relevant Hungarian municipalities. Implement air quality plans and measures. Set up a national network of experts and consultants.	⚙️
Special products developed for the energy sector	Modification and development of a weather forecasting system serving the needs of the energy sector.	✓
Establishment of a weather radar	Part of the national ice damage prevention system. Reduce the most significant damage caused by hail. ³³	✓
WASTE_Service Contract	Analyse the effect of residential solid waste burning on ambient air quality in central and eastern Europe and potential mitigation measures.	✓
Participation in the work of the National Laboratory for Water Science and Water Security	Provide data and expertise for climate change-related studies in the project. Develop warning systems based on short-term and ultra-short-term models. Participate in the installation of meteorological instruments.	⚙️
Participation in the work of the Climate Change Multidisciplinary National Laboratory	Production of climate data sets necessary for examining the effects of climate change. Development of an information system supporting the complex examination of the effects of climate change. Participate in the installation of meteorological instruments.	⚙️

Table 29. Developments supporting the OMSZ and their status by the end of 2022. Source: Ministry of Energy



completed



ongoing

V.6. Energy Efficiency

Energy efficient solutions are financially more viable in the long-term and reduce energy consumption, ultimately leading to lower GHG emissions. The following projects aim to support developments that lead to a more efficient use of energy.



7 AFFORDABLE AND
CLEAN ENERGY



V.6.1. Energy Efficiency Grant Scheme

The Energy Efficiency Grant Scheme covers three areas in the topic. The programmes are related to green building and awareness-raising measures, investments enabling SMEs' energy management, and energy efficient investments for the agricultural sector.

Development of a Green Campus at the University of Pannonia

The funding was spent on the energy efficient renovation of building "I" of the University of Pannonia's Campus in Veszprém. This development enabled the energy consumption of the university to be annually reduced by 10.3 MWh in 2021 since the year of the renovation. The modernized, renovated structure serves as a demonstration area for research, development and infrastructure related to sustainability, environmental awareness, and energy efficiency.

As a result of the Green Campus project, the annual energy consumption is reduced by

10.3 MWh

since the year of the renovation.

In the first half of 2020

6,395

energy certificates were assessed.

Auditing Energy Certificates

The Budapest and Pest County Chamber of Engineers verified energy certificates issued in the first half of 2020. Until that, 6,395 energy certificates were assessed. Additionally, the verifiers found that establishing mandatory training for energy auditors could lead to performance improvements.

"Green National Champions Programme"

The economic development programme called Green National Champions intends to encourage technological development and the improvement of energy-efficient investments among SMEs. As part of the programme, the acquisition of new equipment, machinery, and technological systems and the development of production technologies and intelligent manufacturing solutions was supported. The project design and implementation must meet the environmental and equality legislation requirements, including the conservation of protected natural and cultural values, inclusion, and equality between men and women. The projects receive partial funding from the green bonds, with a financing intensity of 15%. The number of beneficiaries is shown in [Table 30](#).

Number of beneficiaries		
2020	2021	2022
15	12	64

Table 30. Indicators for the Future Hungarian Multinationals - IV "Green National Champions" Project. Source: Ministry for Economic Development



Supporting Energy Efficiency Improvements of SMEs

The Economic Development and Innovation Operational Programme Plus (Gazdaságfejlesztési és Innovációs Operatív Program Plusz - GINOP Plusz) started in 2021 with a target of providing financial support to SMEs operating in the green economy. The operative programme supports enterprises that invest in technological advancement. Eligible projects supported by the green bonds focused on renewable energy technologies and on the use of renewable energy sources. The financing intensity of the green bonds is 15% of the total support. A total of 1,233 beneficiaries were supported in 2021. [Figure 17](#) shows the geographical distribution of the delivered support by region for 2021.

There were 6 beneficiaries in 2022. The regional distribution is shown in [Table 31](#).

Bács-Kiskun	Békés	Borsod-Abaúj-Zemplén	Fejér	Pest
2	1	1	1	1

Table 31. Number and distribution of beneficiaries in 2022. Source: Ministry for Economic Development

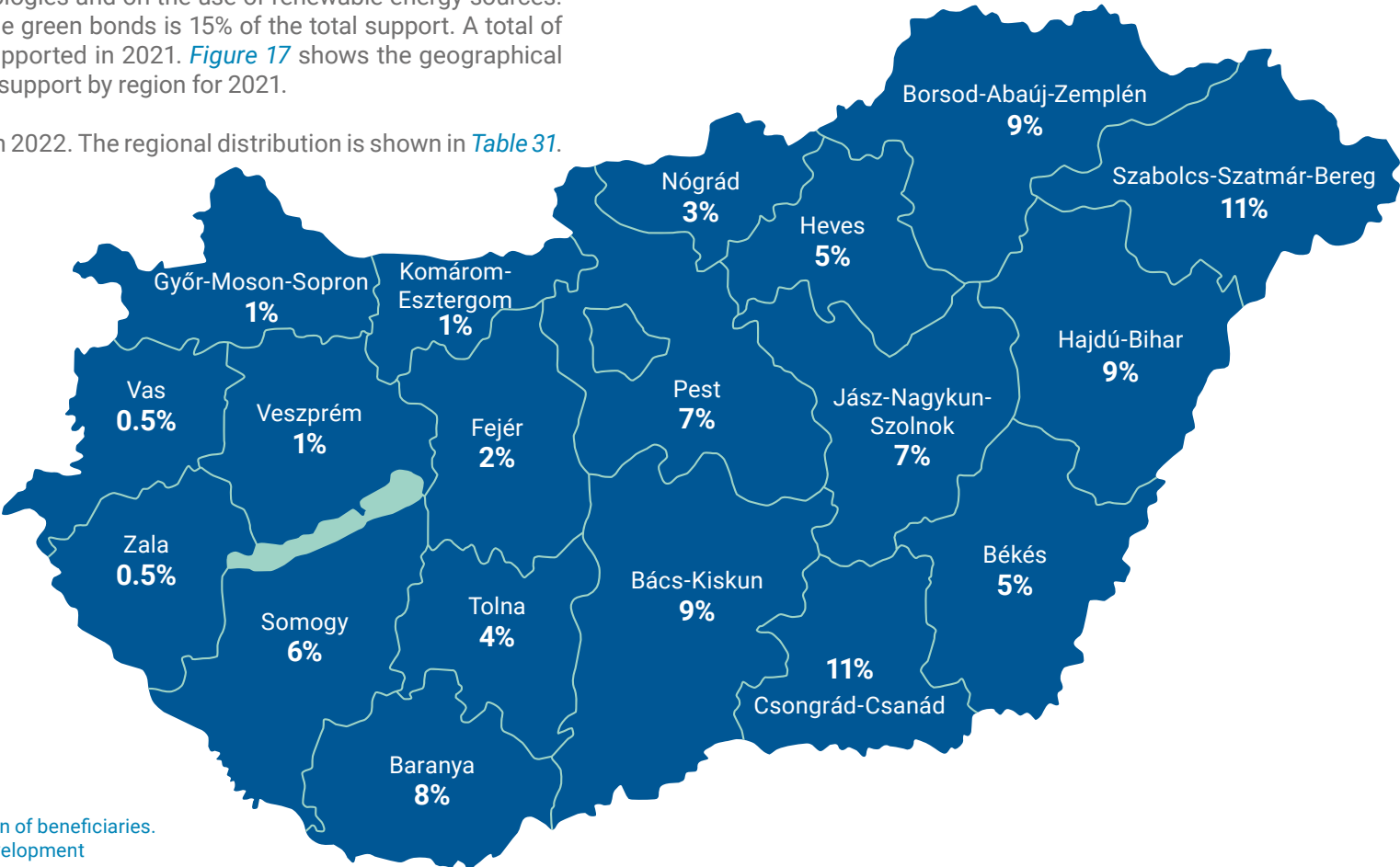


Figure 17. Geographical distribution of beneficiaries. Source: Ministry for Economic Development

V.6.2. Tax Allowance for Energy Efficiency Improvement

To incentivise companies and energy suppliers to improve their energy efficiency, tax allowances for Corporate Income Tax and Income Tax of Energy Suppliers were financed, using funds entirely from the proceeds of the Green Bond.

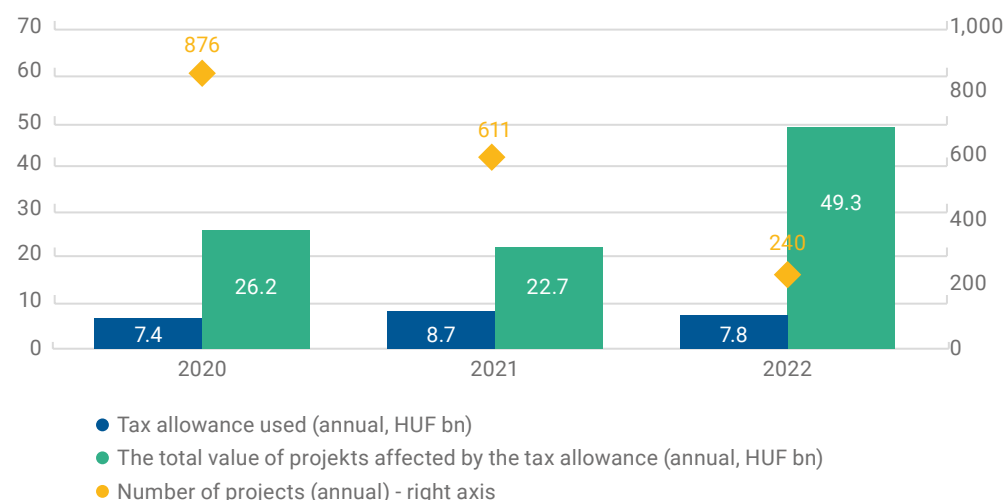


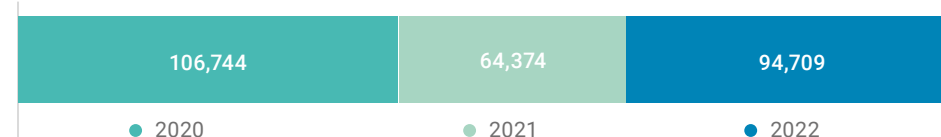
Figure 18. Results of the programme. Source: MoF

Part of the corporate income tax due from the company can be claimed as a tax allowance in the tax year following the commissioning of the investment by taxpayers who undertake renovation work or make an investment resulting in the reduction of their final energy consumption. A total of 688 projects related to building energy reduction, heating reconstruction, renewables and heat reclaim projects took place between 2020 and 2022, along with the purchase of 802 electric vehicles. Other investments³⁴ (237 projects) were also implemented in this period. Details are summarized on [Figure 18](#).

³⁴ Investments with audited energy efficiency improvements, typically related to electric vehicles, building energy reduction, heating reconstruction, renewables and heat reclaim, geothermal energy, renewables, plastic production, etc.

[Figure 19](#) shows the annual energy savings and avoided CO₂eq emissions based on tax returns of eligible companies. [Figure 20](#) and [Figure 21](#) displays the number and nature of companies benefiting from the scheme, the number of projects financed, their geographical distribution, and the total value invested in the tax allowance scheme. Overall results can be observed in [Figure 22](#).

Annual energy savings (in MWh)



Annual emission avoidance (in tCO₂eq)

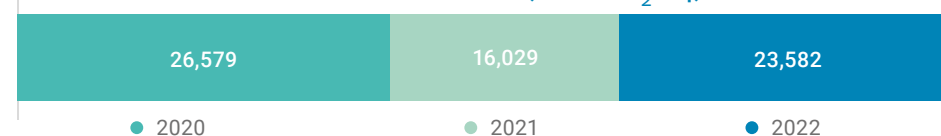


Figure 19. Energy savings and emission avoidance due to the tax allowance scheme. Source: MoF

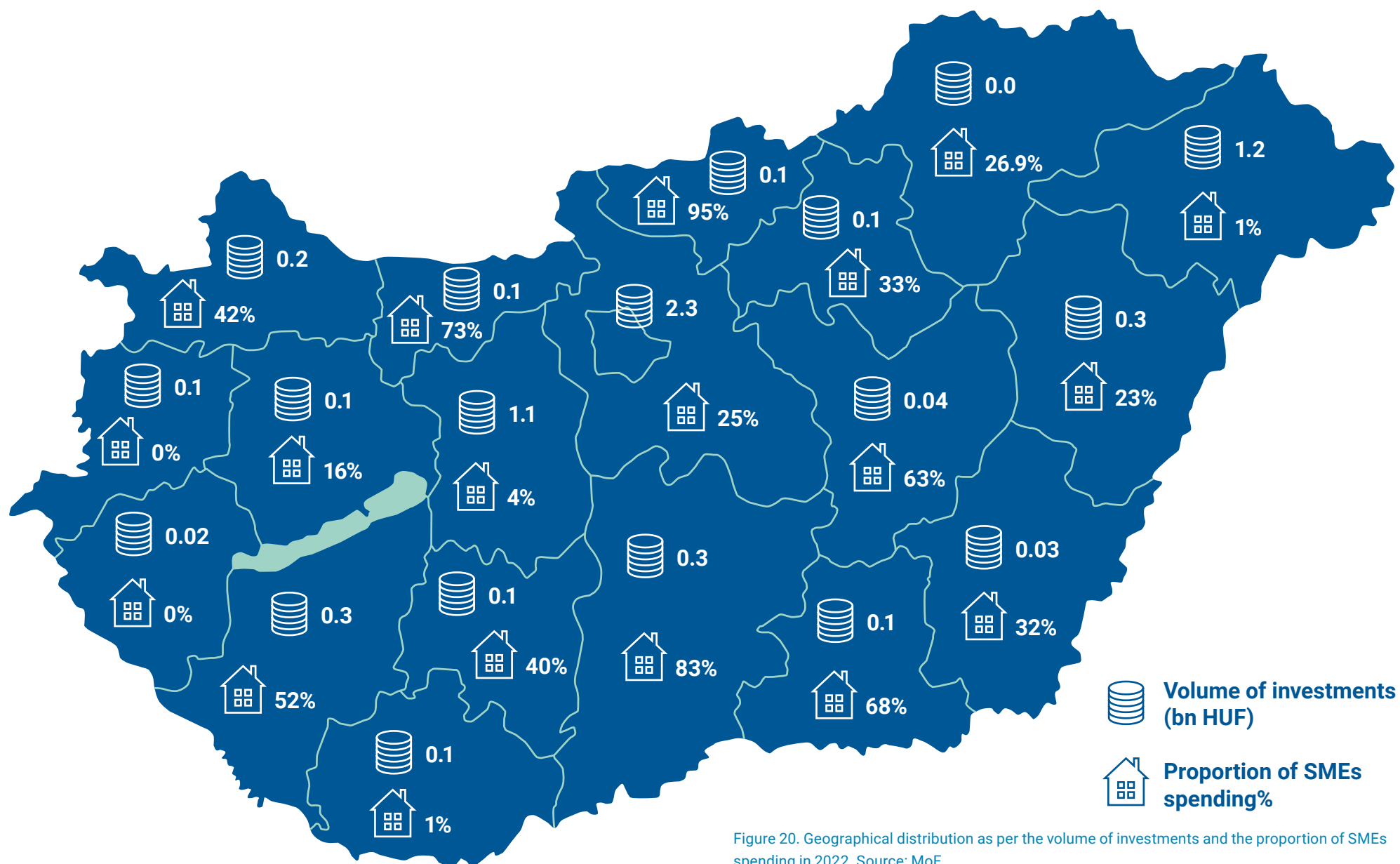
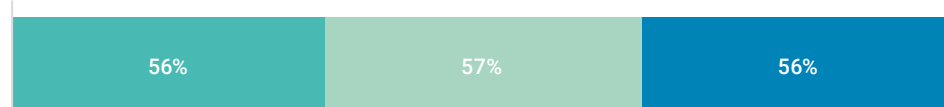
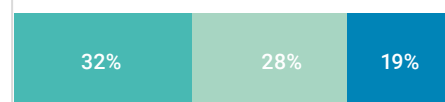
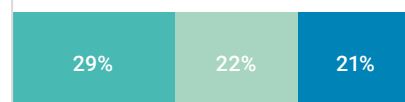


Figure 20. Geographical distribution as per the volume of investments and the proportion of SMEs spending in 2022. Source: MoF

Number of projects (cumulated)**Total value of projects affected by the tax allowance** (cumulated)**Tax allowance used** (cumulated)

● 2020 ● 2021 ● 2022

Figure 21. The proportion of SMEs in the beneficiaries. Source: MoF



Figure 22. Results of the programme between 2020-2022. Source: MoF

V.6.3. Investment Expenditures for Agriculture

To enhance the energy efficiency of the agricultural sector, proceeds from the Green Bond were used to finance focus area 5B (agriculture and food processing) of the Hungarian Rural Development Programme, aiming to improve the energy efficiency of livestock farming. The focus area increased the energy efficiency of agriculture and food processing industry and facilitated the transfer to and use of various renewable energy technologies and resources through reusing its by-products, waste, residues and other non-food raw materials for organic farming.

The investments were partially financed by domestic funding, that was covered by the proceeds of the Green Bond. The percentage of the green bond financing was 25% in 2020, 2021 and 2022 that were applied for the calculation of the final results. The annual energy savings and the annual renewable energy productions are estimated through data reporting by beneficiaries in all relevant projects. The collected data is validated and the incorrect data is filtered out by third-party professionals. Based on the results, the ratio between nominal and actual data is also calculated. Since 2021, a new and more sophisticated method has been used to calculate the ratio. The energy saving and energy production data for the previous years was revised³⁵ and it is shown in [Figure 23](#) and [Figure 24](#). Overall results of the programmes are in [Figure 25](#).



³⁵ This year's methodology follows the Integrated report, 2021 published in 2022 in terms of filtering methods for which projects to include, however new projects were also supplemented for the period examined, hence the discrepancies from the data in the Integrated report, 2021 published in 2022.

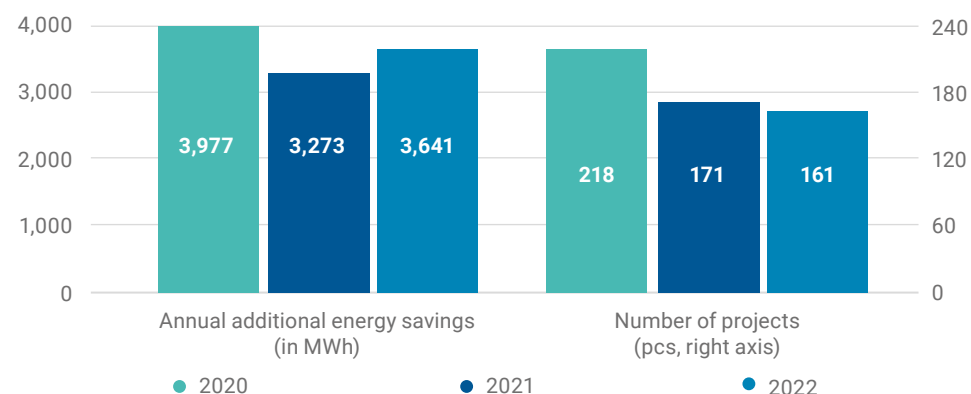


Figure 23. Energy savings due to the Hungarian Rural Development Programme focus area 5B. Source: Ministry of Agriculture³⁶

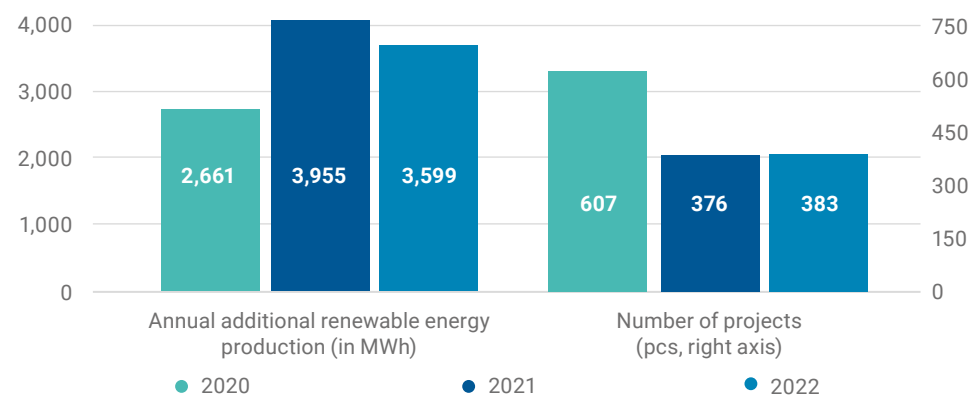


Figure 24. Renewable energy production due to the Hungarian Rural Development Programme focus area 5B. Source: Ministry of Agriculture³⁷

³⁶ The number of supported projects is not prorated with the percentage of national funding, as most projects received both EU and national funding.

³⁷ The number of supported projects is not prorated with the percentage of national funding, as most projects received both EU and national funding.

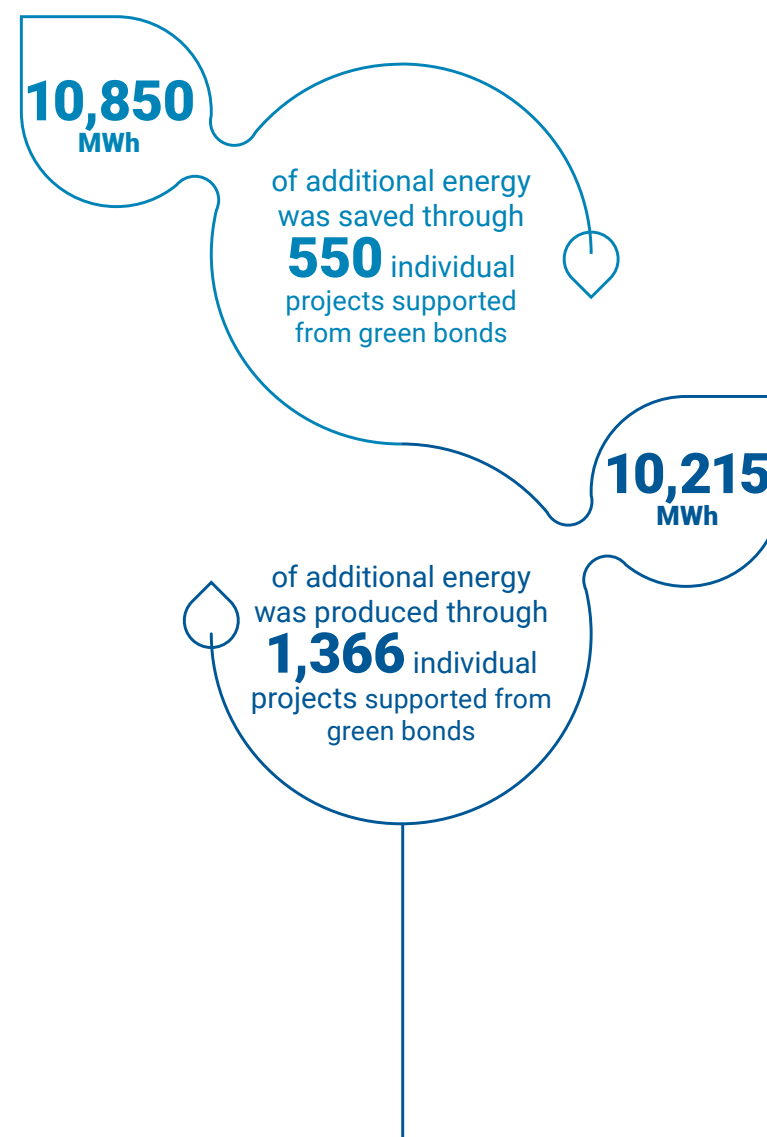
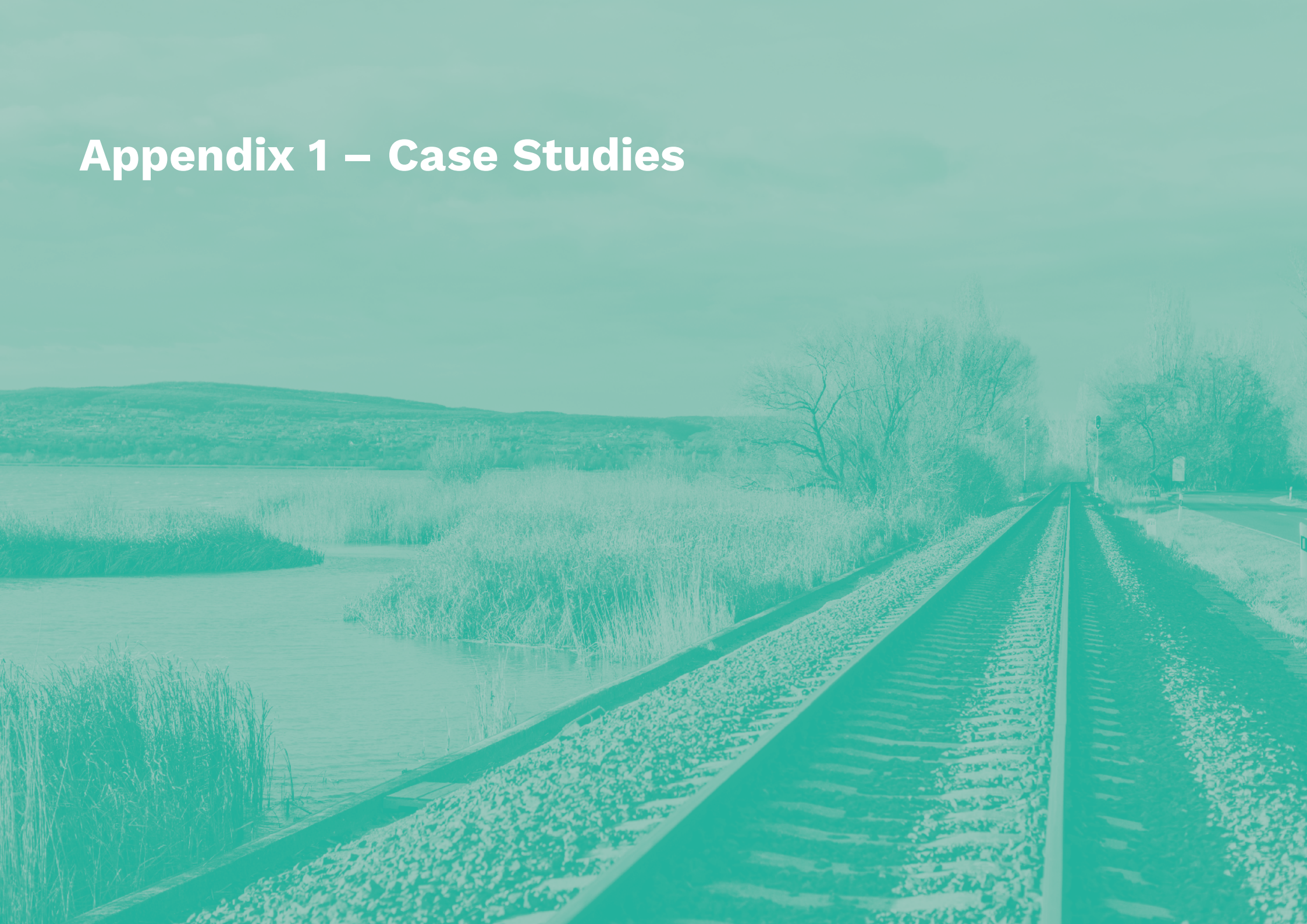


Figure 25. Results of the investment expenditures for agricultural projects supported by the green bonds (2020-2022). Source: Ministry of Agriculture

Appendices



Appendix 1 – Case Studies



Case Study 1 – Establishment of a Weather Radar to Reduce the Significant Damage Caused by Hail

Objective:

The aim of the project is to establish a modern weather radar system that is capable of precise monitoring of weather conditions to mitigate the significant damage that is caused by hail to the national economy. By installing this new system in the Southern region of Hungary, land can be protected by the efficient and precise use of the national soil hail damage mitigation system.

Description:

The Hungarian government considers climate change as a priority issue and therefore established a national ground-based hail damage mitigation system. The purpose of the mitigation system was to avoid significant damage caused by hail to the national economy. To ensure the meteorological service support of the system, a new and modern weather radar was installed in the Southern region of Hungary. The project includes the renovation of the radar tower in Hármashegy, Baranya County and the installation of an American-made, C-band, pulse powered, simultaneous dual-polarization Doppler precipitation radar, that is capable of measuring precipitation intensity, cumulative state, and radial wind speed. The equipment



Weather radar tower

provides 3D precipitation information and has a nominal range of 240 km, making it one of the most modern weather radar systems in Europe. As a result, dangerous weather events from the South can be detected quickly and accurately, enabling the efficient use of the ground-based hail mitigation system. The image from the radar is included in National Composite Radar Image³⁸ and in the National Meteorological Data Repository³⁹. The project was completed in 2021 with a total budget of HUF 600 million, that was financed by the green bonds. *Figure 26* shows the hail damage on a yearly basis. 2017 is the basis year for this project, the last year when the national ground-based hail mitigation system was not used. Since the basis year, due to the precision of the radar system the annual hail damage has been significantly reduced.

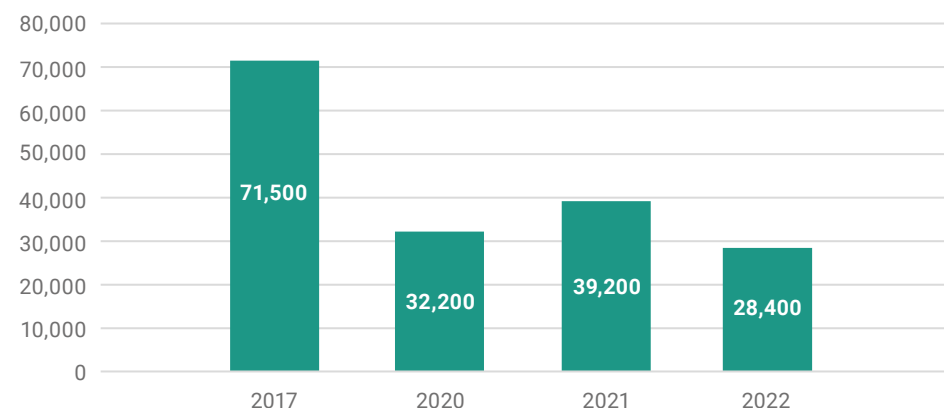


Figure 26. Annual hail data in hectares. Source: Hungarian Chamber of Agriculture (NAK)

³⁸The image is available on the National Meteorological Service's website (www.met.hu).

³⁹The image is available on the National Meteorological Data Repository's website (<https://odp.met.hu/weather/radar/>).

Case Study 2 - Upgrading Metro Line M3

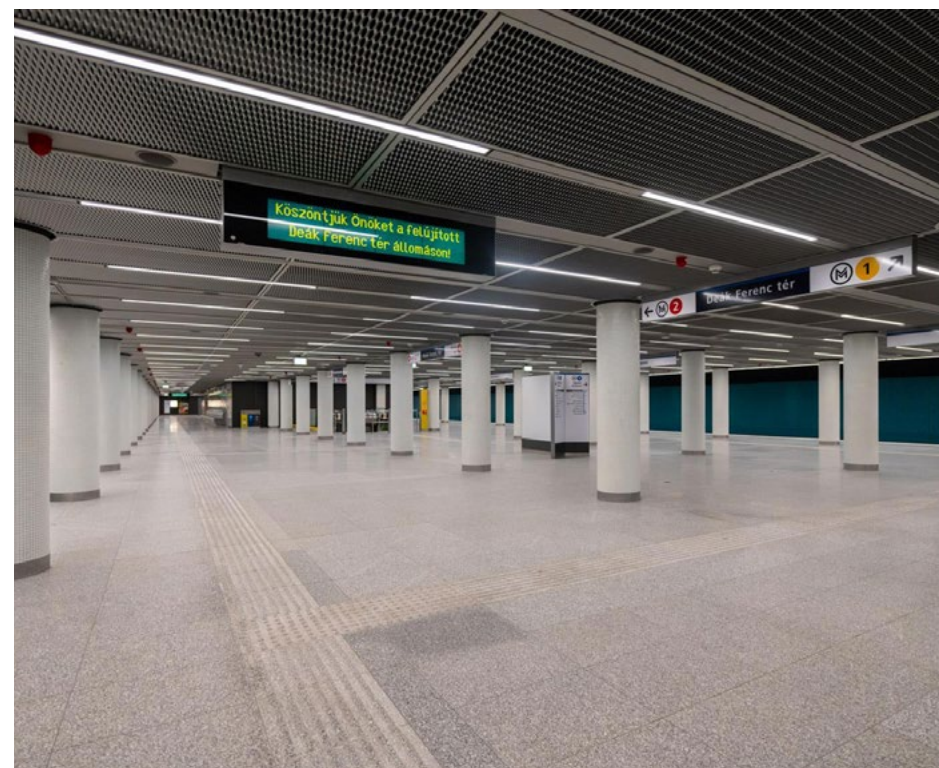
Objective:

As part of the Europe 2020 strategy – which aims to increase the sustainable use of transport infrastructure and urban-suburban public transport – the upgrading of Metro Line M3 is a multi-year public transport development project. Completing the project can encourage modal shift for environmentally friendly transport modes, leading to lower emission levels.

Description:

The Government has set itself the objective of promoting sustainable transport and removing bottlenecks in the main network infrastructures, including the development of suburban rail and urban passenger transport in the Central Hungary region, reducing the emissions from urban public transport. To achieve this goal, the Government has adopted the Integrated Transport Operational Programme (ITOP).

The upgrading of Metro Line M3 is part of this objective. The line supports the travel of over 500 thousand passengers daily, making it the busiest public transport line of the capital city. By developing and strengthening its capacity, more travellers will be able to use it with improved accessibility and in a higher level of comfort. During the upgrade, the stops and metro carriages are renovated, cables and rails are replaced and safety features, such as cameras are installed with an emphasis on passenger safety and accessibility. Due to the project implementation the service level will increase, therefore the project encourages the modal shift for environmentally friendly transport modes. In the 2020-2022 period 11.32 km metro line upgrade was completed of the 17.3 km total length of the metro line.



Subway station after renovation

Case Study 3 – Collection, Sorting and Disposal of Waste in the Upper Tisza Region and at the Water Steps of Kisköre

Objective:

The remediation project aims to collect, sort, recycle, or dispose of this floating waste. The organic, degradable composites will be recycled, sold unchanged, or processed as a soil improvement material, this way contributing to the remediation of waterways and to the development of the circular economy.

Description:

In the Upper Tisza region, large quantities of floating waste mixed with municipal waste and PET bottles are regularly discharged from areas bordering the country during the formation of tidal waves. Due to the flatter terrain of Hungary, this waste partially spreads into the floodplain after crossing the border and/or accumulates at the first barrier at the Water Steps of Kisköre on the major watercourses.

In the Upper Tisza debris removal sites have been set up to remove the accumulated waste. This is done through partial or complete bank closures during which waste is removed as the tidal waves recede. Once the watercourse has been cleared, the waste is sorted manually and mechanically at the intervention sites on the banks and, where possible, transferred for processing and recycling. The quantities of waste that pass through the bank closure are captured at the Water Steps of Kisköre, collected from the water body, and unloaded and sorted at the manipulation site at the Winter Harbor. The project is supported by the Plastic Cup (PET Kupa) in sorting and recycling plastic waste. Depending on its form, the organic, degradable waste is recycled or sold in an unchanged form or processed as a soil amendment material. [Figure 27](#) shows amount of waste captured and treated or disposed of in the reporting period at the two locations of the project.

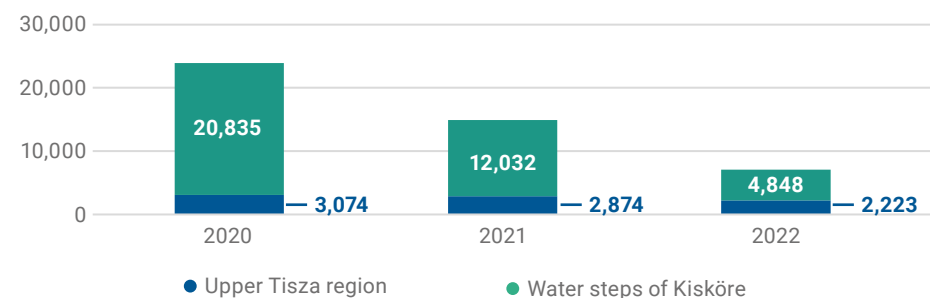
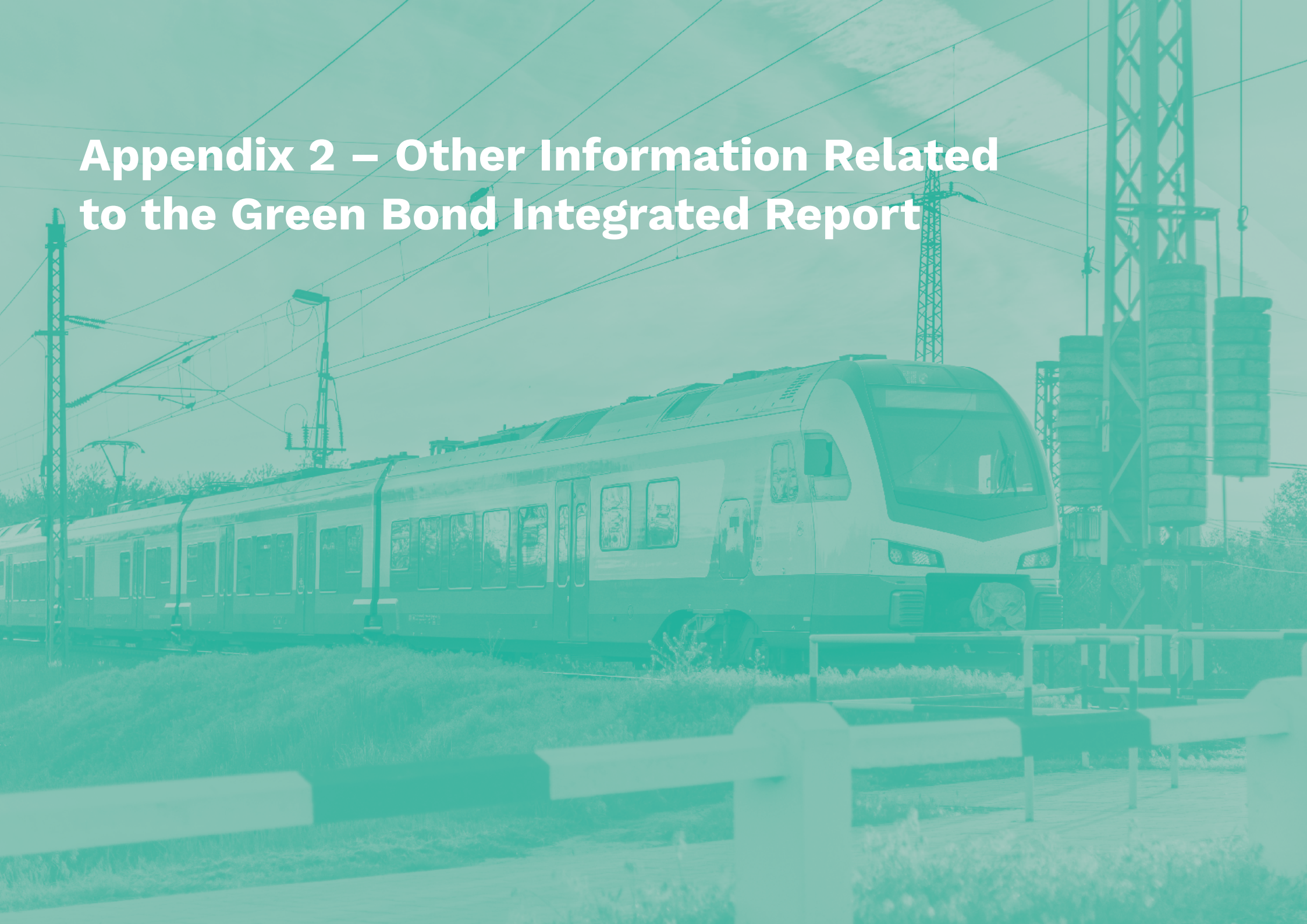


Figure 27. Annual gross amount of waste collected and treated or disposed of (in m³).
Source: OVF



PET and municipal waste collection

Appendix 2 – Other Information Related to the Green Bond Integrated Report

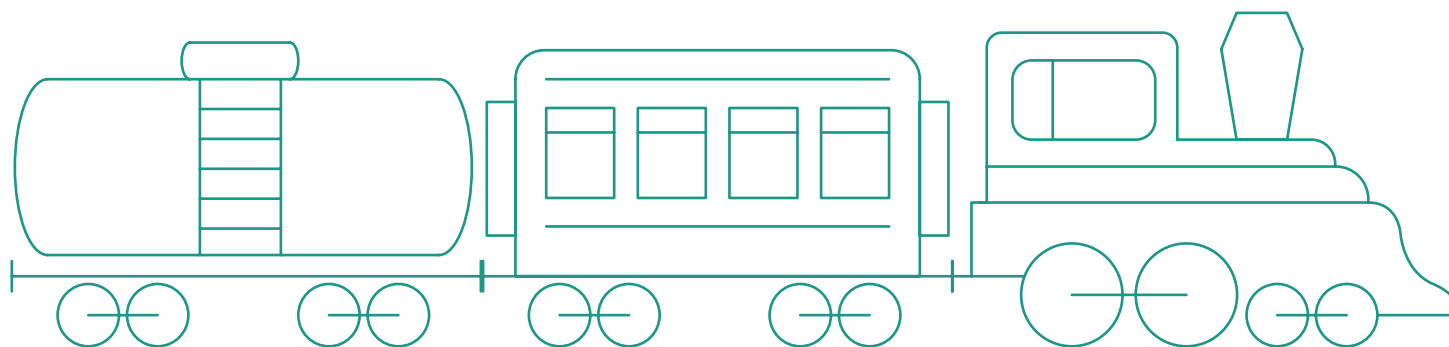


Methodology for GHG Emission Avoidance in terms of Modal Shift to Railway Transportation

The GHG emissions avoided as a result of the cumulated effects of the railway transportation projects was determined as following:

- GHG emissions avoidance is based on the assumption that those passengers who use rail transportation shifted from using passenger cars. Therefore, the calculation is based on a method of carbon foot printing of rail passengers who use trains instead of motor vehicles.
- The calculation method determines specific GHG emissions from rail passenger transport per passenger-kilometre (average value), specific GHG emissions from road transport per passenger-kilometre (average value), and the difference between rail and road journey GHG emissions (in passenger-kilometres) determined as an average value.⁴⁰
- For determining the carbon footprint of rail passenger transport, data on traction energy (diesel and electricity) was considered, therefore GHG emission avoidance for electrification projects is not indicated separately to prevent double counting.

The contribution of Green Bond expenditure to emission avoidance is based on the assessment of the two beneficiaries' (MÁV-Start Ltd. and GYSEV Ltd.) main expenses (e.g. material expenses, personnel expenses and other expenses of their profit and loss [P&L] statement) which the Green Bond could cover. The share of the Green Bond expenditures to cover these expenses is, on average, approximately 66.5% for 2020-2022. To illustrate the environmental and sustainability benefits of clean transportation projects, the GHG emission avoidance calculation relied on the methodology applied by the main national railway company. This methodology focused on the projection of the carbon emissions avoided by choosing rail transport over private passenger vehicles. Accordingly, the difference between GHG emissions on a passenger rail journey (in terms of passenger kilometres) instead of a car journey, was determined⁴¹. The calculation provides the value of saved emissions in CO₂ equivalent (CO₂eq), as a converted indicator of the considered greenhouse gases (CO₂–carbon dioxide, CH₄–methane, N₂O–dinitrogen monoxide). Thus, the final results were summarized in emission savings (in CO₂eq) as a passenger/km comparison of rail travel versus car travel. In calculating the impact of fuels used by rail and cars, the internationally accepted Wheel-To-Wheel (WTW methodology was applied, which only takes into consideration the direct GHG emissions of fuel production and vehicle operation.



⁴⁰Data Source: https://www.mavcsoport.hu/sites/default/files/upload/page/denkstatt_szakertoi_velemen.pdf

⁴¹The emissions are determined as an average of the years 2016-2020.

Methodology for GHG Emission Avoidance in term of Modal Shift for Environmentally Friendly Passenger Vehicles

Regarding tax exemptions for environmentally friendly vehicles, another approach was used when calculating GHG emissions⁴². Based on the estimation methodology of the MoF, baseline emissions rely on yearly petrol sale data, the number of passenger cars and their mileage in the 2020-2022 period. The emissions were determined according to the European Environmental Agency (EEA) estimation of GHG emissions for electricity production and electric and petrol/diesel consumption. The calculation follows WLTP standards and was based on the number and mileage of environmentally friendly vehicles.

The impact of the GHG emission tax exemption programme was determined by the MoF by the following indicators:

- The number and average annual mileage of environmentally friendly vehicles per year in the 2020-2022 period. The MoF estimated the approximate mileage data based on the vehicle's roadworthiness test mileage data.
- The electric mileage ratio for the hybrid vehicles – determined to be equal to the estimated ratio for Germany by the International Council on Clean Transportation (ICCT) (2020)⁴³.
- GHG emission from electricity production – determined based on the EEA emission report (2022)⁴⁴.

⁴² In 2021, the experts of the MoF published an analysis of the Hungarian passenger vehicles and their tax treatment: https://ngmszakmaiteruletek.kormany.hu/download/7/f8/c2000/gepjarmu_elemzes_210604.pdf

⁴³ ICCT White Paper (September, 2020): Real-world usage of plug-in hybrid electric vehicles.

⁴⁴ Data source: European Environment Agency—GHG emission intensity of electricity generation.

- Electricity and fuel (petrol, diesel) consumption of environmentally friendly vehicles and internal combustion engine-based vehicles. For environmentally friendly vehicles these values are determined based on WLTP standards. Consumption values for vehicles with internal combustion engines were determined based on petrol sale volumes, mileage, and the number of petrol-based vehicles⁴⁵.

The GHG emissions resulted in 47 g/km CO₂ for electric cars and 111-139 g/km CO₂ for plug-in hybrid cars. The avoided emission estimations for carbon monoxide (CO) and nitrogen oxides (NO_x) were calculated based on the Euro 6 emission standards for passenger vehicles⁴⁶.

Methodology for Energy Savings and Renewable Energy Production related to the Hungarian Rural Development Programme

The amount of saved energy and renewable energy produced in all relevant projects is collected by the Hungarian State Treasury via data reporting by the beneficiaries. The projects that are supported by the Hungarian Rural Development Programme Focus Area 5B (agriculture and food processing) provide information on the annual energy savings achieved and/or energy produced by the investments. The criterion for the selection of projects to be taken into account for the calculations was to include only those projects with a valid grant contract and not under suspension of any kind. The data must be based on appropriate energy calculation (in kWh). To filter out incorrect information, collected data and associated supporting documents (e.g. energy performance certificate, energy bills) are reviewed and validated by spot-checking by third-party professionals. The information collected

⁴⁵ The fuel consumption of vehicles with internal combustion engines was estimated by the MoF to be around 8.1 liters per 100km, based on petrol consumption in Hungary and the number of vehicles running on petrol. This methodology resulted in 190g/km CO₂ emissions for petrol cars. This “baseline” indicator, used to determine the GHG emission reduction from the tax exemption offered by the MoF, is relatively high compared to other approaches, as the methodology includes all internal combustion vehicles in Hungary with an average age of 15 years.

⁴⁶ Data source: European Environment Agency (2016): Explaining road transport emissions – A non-technical guide.

is used to determine whether the magnitude of energy savings and/or energy produced is consistent with the reported value. If not, either an estimate is made (if the data allows) or the project is removed from the sample. Based on the results, the ratio between reported and actual data is also calculated. The ratio for the energy savings projects is 43%, while for the renewable energy production projects this ratio is 48% over the entire period of the programme. The data that is presented in the Report is also proportionated with the percentage of national funding received from the proceeds of the Green Bond.

The supported investments have continuous effects since energy savings and renewable energy production are also realized after in the years after the project's implementation. Therefore, in the Report only the annual additional energy savings and energy production are shown, which are the result of the new investments.

Advancing the UN Sustainable Development Goals

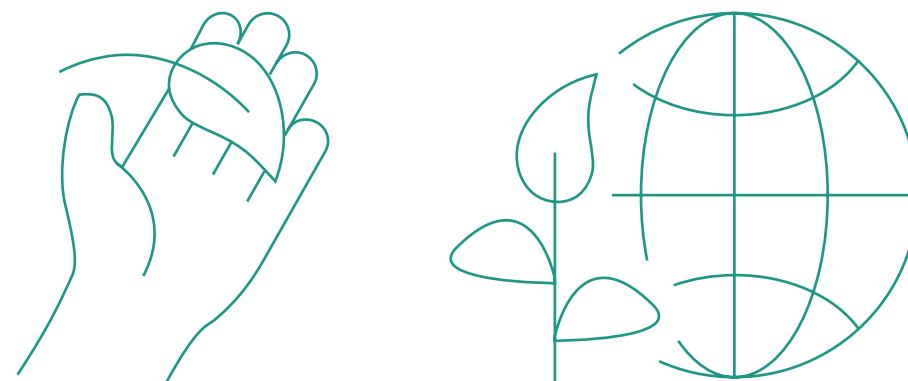
All projects financed by Green Bonds are reviewed individually for alignment with the Sustainable Development Goals (SDGs) on a target level. All projects financed under the Green Bond scheme are reviewed individually to ensure that they are on track to achieve their targets. The report considers other materials, such as the "Green, Social and Sustainability Bonds: A High-Level Mapping to the Sustainable Development Goals" document (published in June 2023).

With the allocated Green Bond Proceeds, progress towards the UN Sustainable Development Goals #6 on Clean Water and Sanitation, #7 on Affordable and Clean Energy, #9 on Industry, innovation, and infrastructure, #11 on Sustainable Cities and Communities, #13 on Climate Action and #15 on Life on Land were further strengthened.

Contribution of the Green Sectors to the EU Taxonomy Environmental Objectives

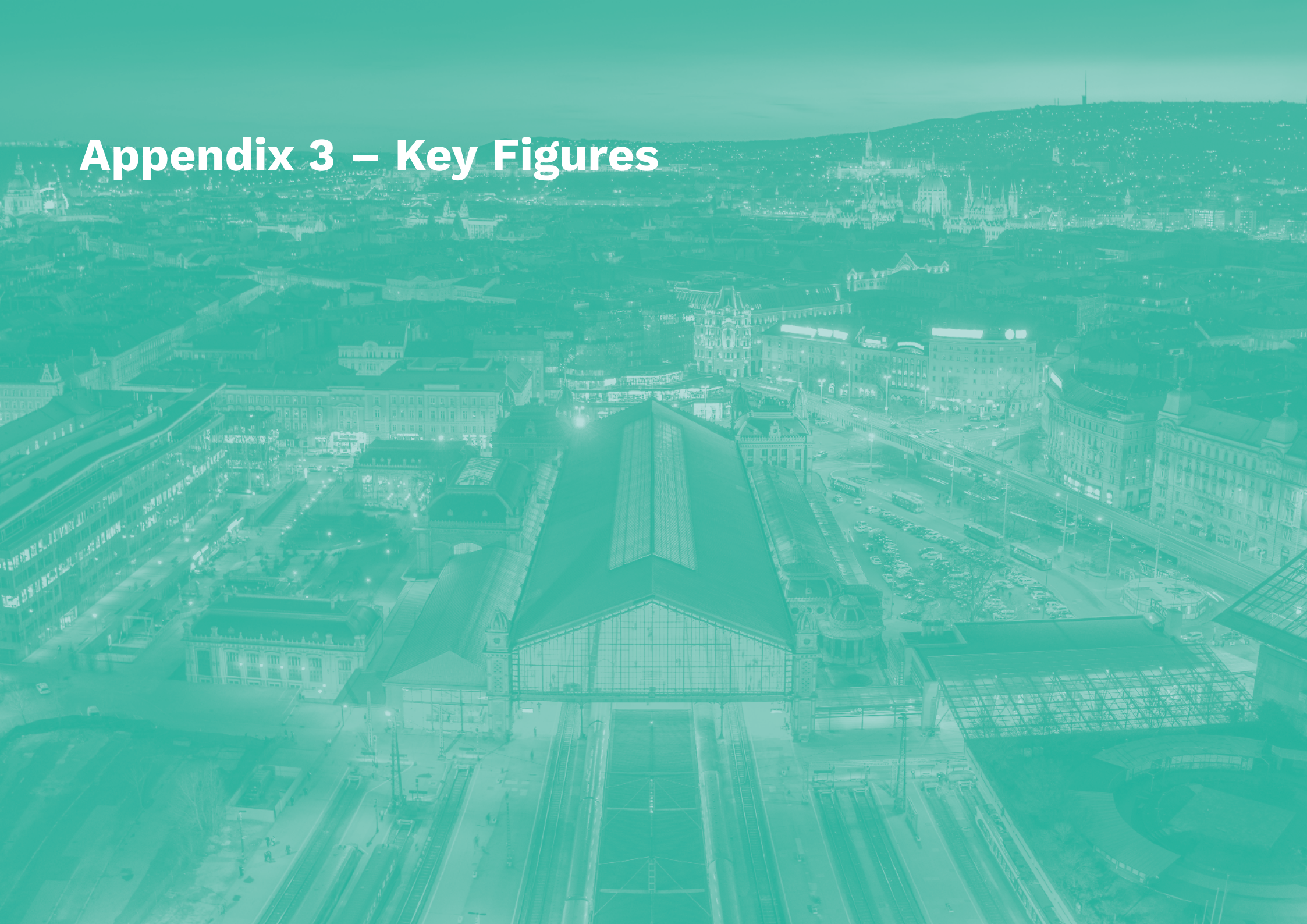
With the official publication of the first delegated regulation on climate change mitigation and adaptation under the EU Taxonomy, green financing now for the first time has a uniform set of screening criteria set by a regulating body. We are closely monitoring the development of the practical application of the EU Taxonomy. As a first step, the contribution of the 6 green sectors to the EU Taxonomy Environmental Objectives was assessed. The assessment is based on the comparison of the main programmes, the GBP and the description of the economic activities that can be found in the EU Taxonomy Climate Delegated Act and EU Taxonomy Environmental Delegated Act⁴⁷. There is a general summary about the contribution to the EU Taxonomy Climate Delegated Act of the railway activities under the Clean Transportation category (which takes currently the highest share of allocation) at the end of Chapter 5.1.6.

Some of the main programmes cannot be mapped to an activity in the EU Taxonomy, as some activities are not yet covered by the EU Taxonomy or some categories which are traditionally included in green bonds may not be associated with a specific economic activity. The report considers other documents, such as the ICMA Green Project Mapping Document.



⁴⁷ Refers to the version published by the EU Commission in June 2023.

Appendix 3 – Key Figures



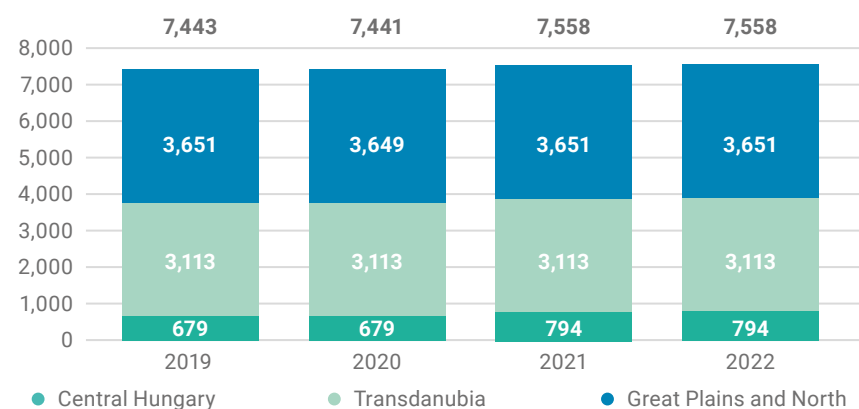


Figure 28. Length of railway lines by Greater Regions in Hungary. Source: KSH

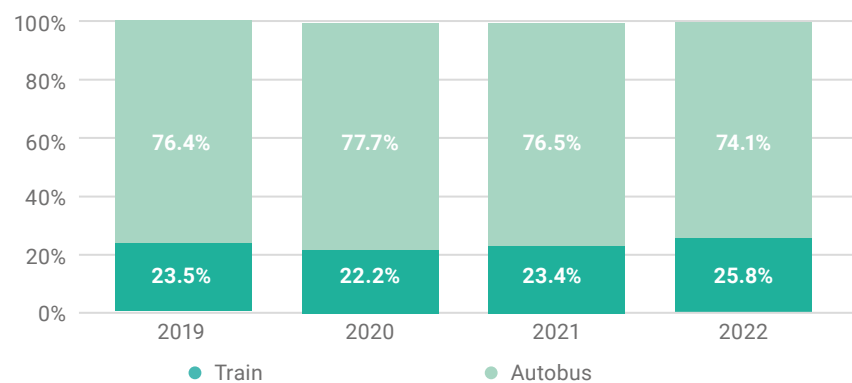


Figure 29. National interurban passenger transport by mode (passengers carried). Source: KSH

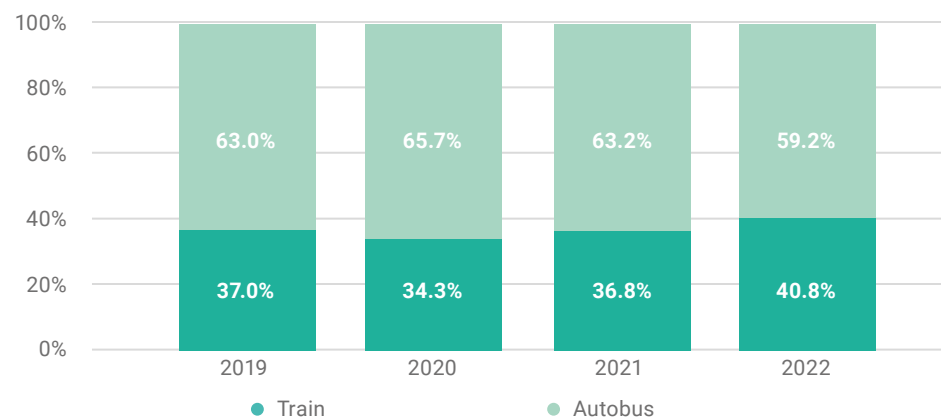


Figure 30. National interurban passenger transport by mode (passenger-kilometres). Source: KSH

Air pollutants	Emissions (thousand tons)		
	2019	2020	2021 /Latest available data/
SO _x	0.0020	0.0019	0.0019
NO _x	1.9836	1.6937	1.7042
PM ₁₀	0.0474	0.0408	0.0415
PM _{2,5}	0.0436	0.0374	0.0381

Table 32. The emission of certain air pollutants and particulate matter arising from railways transportation. Source: EIONET

Appendix 4 – Summary of Results



The results of eligible green projects, their main input and output, and impact indicators between 2020-2022 are summarized in the following tables. The impact indicators can be linked to the Green Bonds issued between 1 January 2022 – 31 May 2023 as per their share in the total issuance (by the total amount of

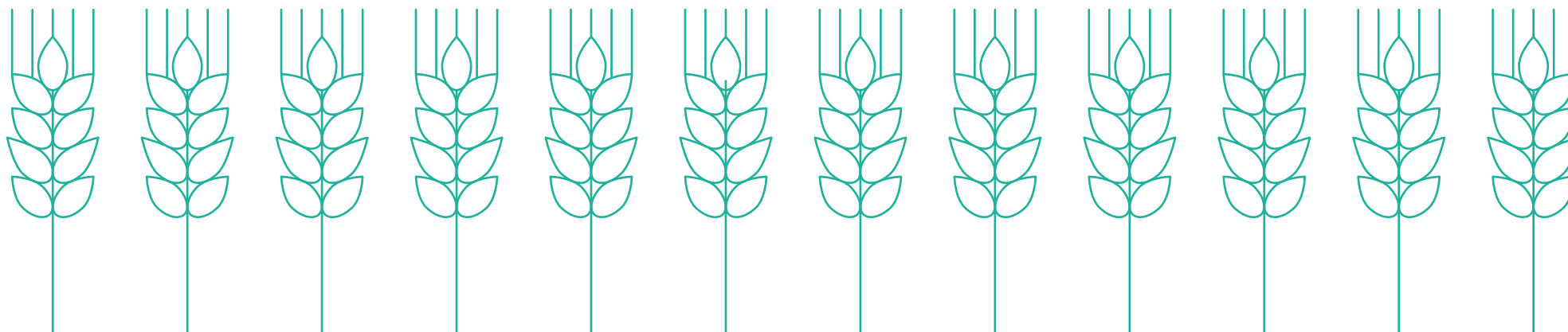
proceeds). The impacts are summarising the annual data and where possible, the cumulated results as well. The contribution ratio is 23.1% for Domestic Green Bonds; 18.8% for Samurai Green Bonds; 12.4% for the Panda Green Bond and 45.7% for the Euro Green Bond.

Clean Transportation	Allocated amount with respect to the 2022 Green Bond issuance		Passenger-kilometers and passengers		Total length of reconstructed or upgraded railway, metro, or tram lines	Number of upgraded key railway infrastructure elements	Total length of electrified railway lines	Total GHG emissions	Total GHG emissions avoided	Number of new carriages, vehicles deployed and environmentally friendly vehicle stock with tax exemptions
	2020	2021	2020-2022							
	HUF (bn)	HUF (bn)	Passenger kilometers (million km)	Number of passengers (million)	km	Number of up-graded bridges, crossings	km	tCO ₂ eq	tCO ₂ eq	pcs
Reimbursement of the operation of the railway network	101.7	118.8						814,785	1,577,469	
Reimbursement of uncovered costs of railway passenger traffic	245.3	233.2	18,106	346						
Modernization of rail transportation	4.8	2.6			56.5	7				
Electrification of railway lines	1.0	1.4					55.0			
Rolling stock development	25.3	22.1								101
Tax exemptions of environmentally friendly vehicles	3.1	4.8						176,499	167,688	46,918
Modernization of urban public transport	20.9	5.5			14.6					10

Table 33. Results of Eligible Green Projects - Clean Transportation

Land Use and Living Natural Resources	Allocated Amount		Habitats of community interest with an improving conservation status		Species of community interest with an improving conservation status		Number of projects and measures	Number of beneficiaries	Number of participants in trainings or consultancy services
	2020	2021	2020–2022						
	HUF (bn)	HUF (bn)	proportion (%)	pcs	proportion (%)	pcs	pcs	pcs	pcs
Nature protection and biodiversity	6.6	6.9	32	14	23	48	5,417 rural development; 91 biodiversity; 49 biodiversity (cumulated)	93,273	
Education and awareness-raising	0.4	0.5						221	980
Sustainable agriculture	18.6	10.6					528,732	14,502	
Others (remediation, environmental projects)	0.4	1.3					14; 11 (cumulated)		

Table 34. Results of Eligible Green Projects - Land Use and Living Natural Resources



Waste and Water Management	Allocated Amount		Average households connected to the drinking water system	Average households connected to the sewage system	Average length of sewage system per kilometres of the drinking water system	Number of supported projects	Annual gross amount of waste collected and treated or disposed of
	2020	2021	2020–2022				
	HUF (bn)	HUF (bn)	proportion (%)	proportion (%)	meters	pcs	m³
State reconstruction fund for water utilities	1.5	-	95.5	83.3	787		
Subvention for waste separation and reutilization as energy resource	0.3	-				3	
Supporting waste management tasks	-	1.7				30	
Others (monitoring, remediation, efficient water use in agriculture)	0.9	1.0				2 remediation; 725 agricultural	45,886

Table 35. Results of Eligible Green Projects - Waste and Water Management

Renewable Energy	Allocated Amount		Total electricity generation	Total installed renewable energy capacity	Total GHG emissions avoided	Number of projects
	2020	2021	2020–2022			
	HUF (bn)	HUF (bn)	MWh	MW	tCO ₂ eq	pcs
Subsidized loan for renewable energy use in buildings	0.2	0.2	732.2 (cumulated 1,609)	0.430	579.8 (cumulated 1,343)	36
Subsidized loan for increase energy efficiency and renewable energy use in residential buildings	1.8	0.9	3,067 (cumulated 7,461)	2.335	1,254 (cumulated 3,067)	1,476

Table 36. Results of Eligible Green Projects - Renewable Energy

Adaptation	Allocated Amount		Number of supported projects and development	Additional water stored	Reduced water loss	Hail damage
	2020	2021	2020–2022			
	HUF (bn)	HUF (bn)	pcs	m ³	m ³	ha
Development of monitoring stations for the implementation of the Water Framework Directive	0.4	0.2	2	60,000,000	16,175	
Water management developments for sustainability	11.4	2.8	3	25,000,000	2,448,500	
Hungarian Meteorological Service	2.1	2.4	10			99,800

Table 37. Results of Eligible Green Projects – Adaptation

Energy Efficiency	Allocated Amount		Total energy savings	Total renewable energy production	Total GHG emissions avoided	Number of environmentally friendly vehicles deployed	Number of beneficiaries	Number of projects
	2020	2021	2020–2022					
	HUF (bn)	HUF (bn)	MWh	MWh	tCO ₂ eq		pcs	pcs
Energy Efficiency Grant Scheme	1.2	1.1	10.3 (cumulated 20.6)				1,330	
Tax allowance for energy efficiency improvement	7.4	8.6	265,826 (cumulated 1,151,612)		66,191 (cumulated 286,751)			1,727
Investment expenditures for agriculture	1.9	2.8	10,850 (cumulated 22,077)	10,215 (cumulated 19,491)				1,916

Table 38. Results of Eligible Green Projects - Energy Efficiency

Appendix 5 – Overview of Hungary's Green Bond Issuances (May 2020 – May 2023)



Hungary successfully issued green bonds between May 2020 (the first green bond issuance) and May 2023 on the domestic (HUF) and international (EUR, JPY, CNY) markets (see Table 39).

ISIN	Currency	Issue Date	Tenor (year)	Amount (bn EUR)
XS2181689659	EUR	05/06/2020	15	1.5
JP534800CL92	JPY	18/09/2020	7	0.1
JP534800DL91	JPY	18/09/2020	10	0.03
HU0000404991	HUF	28/04/2021	30	0.4
CND10004QFJ7	CNY	16/12/2021	3	0.1
HU0000405535	HUF	26/01/2022	10	0.6
JP534800BN26	JPY	25/02/2022	5	0.3
JP534800DN24	JPY	25/02/2022	7	0.03
JP534800CN25	JPY	25/02/2022	10	0.1
CND10005WTB0	CNY	17/11/2022	3	0.3
XS2558594391	EUR	21/11/2022	4	1.0

Table 39. Details of issued Green Bonds. Source: ÁKK

The total issuance in this period reached EUR 4.4 bn, 57% of these issuances were denominated in EUR and 89% of the proceeds were allocated to Clean Transportation.

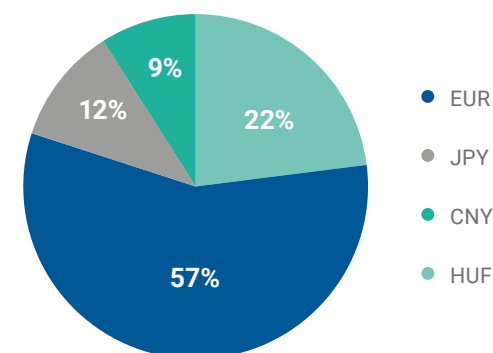


Figure 31. Share of proceeds from green instruments by currency (%). Source: ÁKK

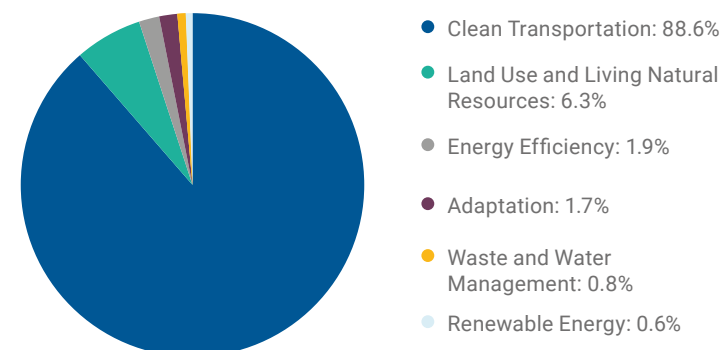


Figure 32. Share of allocated amounts by green category between 2018-2021 (%). Source: ÁKK

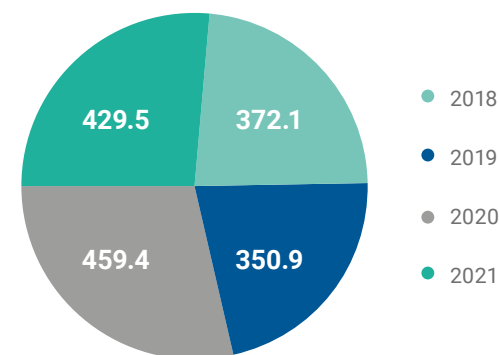


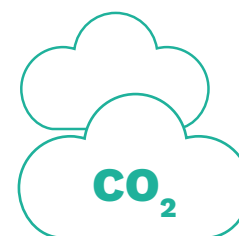
Figure 33. Allocated Amount of GB Proceeds 2018-2021. Source: ÁKK (in HUF billion).

The key environmental impacts⁴⁸ deriving from projects financed by green bonds issued between May 2020 – May 2023 are summarized in [Table 40](#).

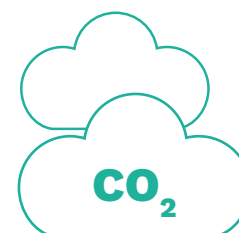
Indicators	Achieved Results	Unit of Measures
Energy saved	1,492	GWh
Avoided emission	3,480	ktCO ₂ eq
Renewable energy production	58.2	GWh
Installed renewable capacity	5.1	MW
Upgraded railway lines	166.4	km
Electrified railway lines	149.6	km
Number of environmentally friendly public transport vehicles	209	pcs

Table 40. Key results of the green bond issuances

⁴⁸The results of energy saving, emission avoided, and renewable energy production are cumulated since as per the projects baseline. The baseline is determined as the year of financing granted and investments occurred. In case of the tax exemption projects, data is summarized based on the year that beneficiaries use the tax exemptions. Where the ratio of the green bond support was clearly determined, the impact results were adjusted as per their share.



A total of 3,480 ktCO₂eq avoided by the green bonds issued between 2020-2023.



796.4 tCO₂eq/EUR million green bond investments.



