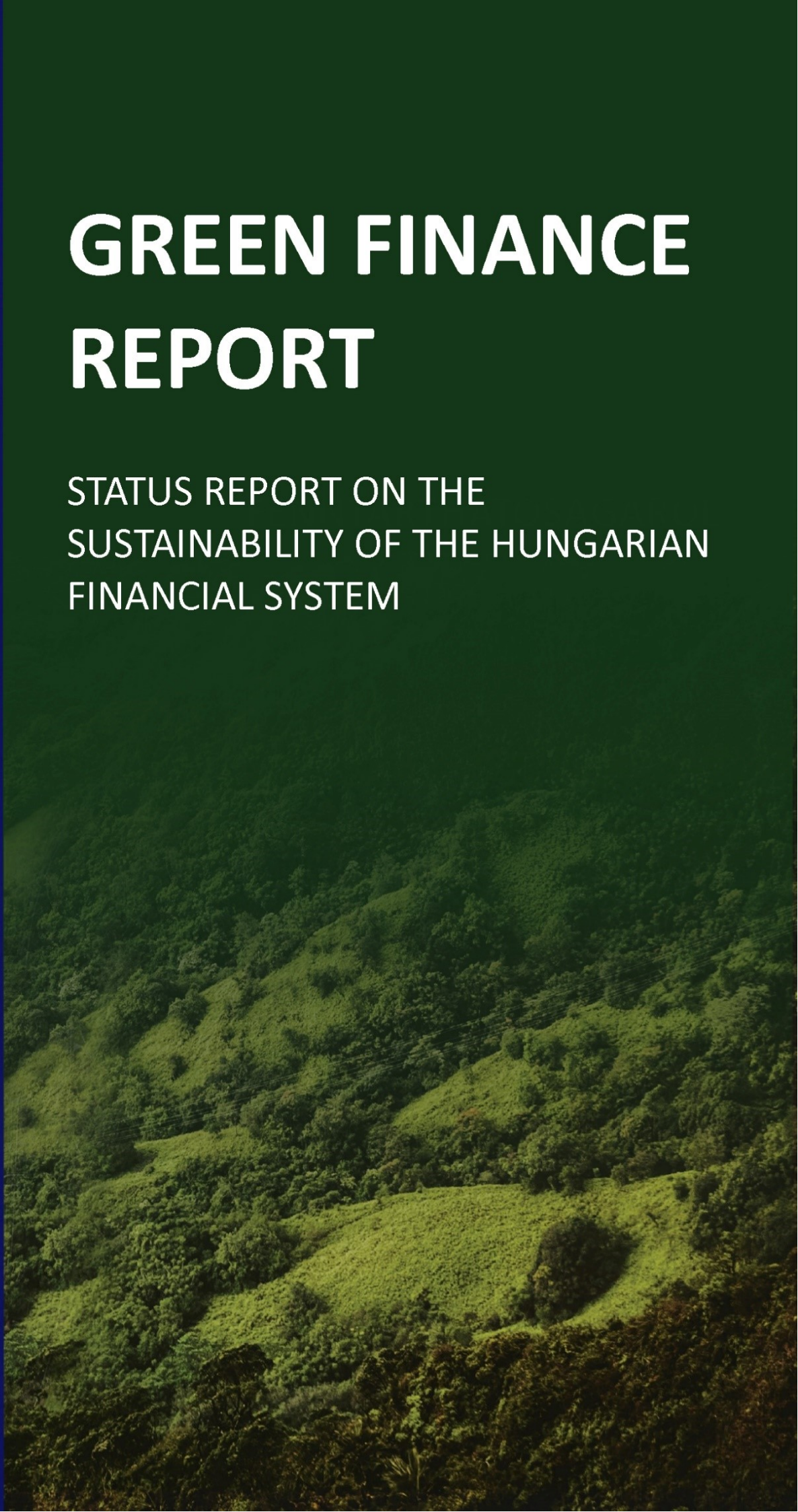




# GREEN FINANCE REPORT

STATUS REPORT ON THE  
SUSTAINABILITY OF THE HUNGARIAN  
FINANCIAL SYSTEM

MARCH 2021



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*“Scientists have a moral obligation to clearly warn humanity of any catastrophic threat and to ‘tell it like it is’. On the basis of this obligation, we declare, with more than 11,000 scientist signatories from around the world, clearly and unequivocally that planet Earth is facing a climate emergency.”*

*Warning of scientists around the world about the crisis caused by the climate change, 2020<sup>1</sup>*

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<sup>1</sup> William J Ripple, Christopher Wolf, Thomas M Newsome, Phoebe Barnard, William R Moomaw, World Scientists’ Warning of a Climate Emergency, BioScience, Volume 70, Issue 1, January 2020, Pages 8–12, <https://doi.org/10.1093/biosci/biz088>

# FOREWORD

*Within the framework of its Green Programme, Magyar Nemzeti Bank (MNB) has been paying special attention to issues related to environmental sustainability since 2019, which, in addition to launching specific measures and programmes, is embodied in the publication of reports and studies. This publication also fits into the series of the latter: by preparing a new type of analysis, the MNB intends to make the magnitude of the challenges as well as its progress in overcoming them measurable and quantifiable.*

*Namely, the risks posed by climate change and environmental degradation affect our society and our economy, and within that, the financial system. In recent years, it has become clear that it is the responsibility of central banks and financial supervisors to ensure that the financial system is able to address and mitigate these. In addition to prudent management of climate risks, the financial system also has a key role to play in enabling the economy's transition to carbon-neutrality, which can contribute to long-term, sustainable economic growth.*

*For decades, climate change has been the problem of the future. Today, we see that it was the challenge of the present even then, and by now we reached the verge of our last chance to address the climate emergency.*

*As a result, in recent years both internationally and in Hungary a significant turn has taken place and gained further momentum in the wake of COVID-19. The social attitude and regulatory approach are capable of a relatively rapid turnaround; however, the financial-economic system needs time for its transformation to become visible. The financial decisions made today will yield results in our physical environment years later, and they could improve (or worsen) the planet's ecosystems and liveability only decades later.*

*Although the MNB, as central bank and financial regulator, is not responsible for climate policy, its role is of great importance since it can exert an impact on the environmental sustainability of the real economy by adjusting the "rules of the game" of the financial intermediary system. To what extent does the Hungarian economic system operate in an environmentally sustainable manner, and to what extent does the Hungarian financial system contribute to this? How does the banking system address climate risks and what is the extent of these exposures? What regulatory steps is the MNB taking to mobilise private resources and improve risk management? How does the MNB contribute to international legislation on green finance? Among other things, these issues are addressed in the new report of the MNB.*

**György Matolcsy**  
Governor  
Magyar Nemzeti Bank

**Dr Csaba Kandrács**  
Deputy Governor  
Magyar Nemzeti Bank

# EXECUTIVE SUMMARY

**Hungary is lagging behind in achieving the Sustainable Development Goals (SDGs), especially in terms of environmental goals.** Hungary ranks 19<sup>th</sup> in Europe overall in terms of SDGs and faces significant challenges in terms of affordable and clean energy (Goal 7), climate protection (Goal 13) and the protection of terrestrial ecosystems (Goal 15). These not only threaten the quality of life of the population, the liveability of our planet and our country, but also have a negative effect on long-term economic performance and, through this, on the financial system.

**Indicators describing the environmental sustainability of the Hungarian economy also paint an unfavourable picture.** The steps taken by humanity to green the economy and reduce climate risks are globally far from being sufficient, and although the European Union has acquired a leading role in the fight against climate change, the real results are not satisfactory on the continent either. Hungary lags far behind the EU and somewhat compared to the V3 too, while its environmental vulnerability is substantial.

**All this underline the urgent need for economic transformation, in which the financial system that allows financing to happen can play a key role also in Hungary.** On the one hand, greater mobilisation of private investments is needed to finance the mitigation of the effects of climate change and environmental degradation and the adaptation of the economy. On the other hand, mainly through improved risk quantification and management, the financial system needs to devote less resources to activities that are environmentally harmful or raise concerns in terms of climate protection.

**Until now, the financial system has only marginally integrated environmental sustainability aspects into its operation, which also means that we still have little data on “green finance” today.** Relying on the available data, it can be shown that only a few percent of domestic financial capital can be considered green, while achieving our international and national objectives requires the mobilisation of much more environmentally sustainable private funds. The regulation facilitates the turn with a unified green definition in the EU, on the basis of which it may gradually become possible to classify the financed economic activities or even actors in terms of sustainability. In the coming years, all these will enable a more precise exploration and analysis of the Hungarian green finance market, which may also catalyse the regulatory measures developing the market.

**Climate-related and environmental risks pose a serious challenge to the financial system. A survey conducted by the MNB suggests that although the green aspects have clearly strengthened in case of banks last year, the Hungarian banking sector is still at a serious disadvantage compared to euro area institutions.** Hungarian banks are generally unaware of the

extent of their climate risk exposures and are therefore unable to properly manage or mitigate them. For the first time, the “Bank Carbon-Risk Index” developed by the MNB provides an insight into the Hungarian banking sector's exposure to transition risks and shows a negative trend and a strong risk concentration. The share of environmentally sustainable economic activities financed by the banking sector cannot be quantified at present, but based on MNB estimates, excluding the energy sector, it is presumably very modest.

**In the capital markets, the 2020 launch of the green bond market in Hungary is an important milestone, which may be accompanied by the market penetration of ESG-based investment products.** Despite the coronavirus epidemic, two green government securities and three green corporate bond issues were successfully carried out in 2020 (the corporate bonds are all under the MNB's Bond Funding for Growth Scheme). This is a particularly important development because previously there was essentially no supply of Hungarian green securities complying with international standards. The expansion of domestically issued green assets may also help the development of investment products using the ESG approach, the share of which is, however, negligible for the time being.

**In addition to the measures of MNB to promote green finance, EU and global initiatives can also quickly transform the Hungarian and European financial markets.** The introduction of new EU rules applicable to large companies, banks and institutional investors only started in 2018, but its provision on sustainable investments will be applicable in the Hungarian market already from March 2021, followed by a new set of banking regulations from 2022.

Category	Indicator	Unit	Hungary	EU
Real economy	Share of area under organic farming within the agricultural area	%	5.71	8.49
	Share of the protected land areas	%	22.24	26.00
	Internal renewable water resources per capita	<i>m<sup>3</sup>/inhab./year</i>	617.20	3 065.00
	Share of renewable energy sources in total final energy consumption	%	12.61	19.73
	Energy intensity of the economy	<i>Oil equivalent (kg)/€ thousand</i>	206.09	119.64
	Net energy import	%	69.70	60.60
	Percentage of newly registered plug-in electric vehicles	%	0.11	0.75
	Recycling rate of municipal waste	%	35.94	47.60
	Change in greenhouse gas emissions since 1990	%	- 32.18	- 20.74
	CO <sub>2</sub> emissions per unit of production	<i>Thousand tons CO<sub>2</sub>/ \$ million</i>	0.17	0.16
	Share of GHG emissions under the scope of EU ETS in Hungary	%	29.04	40.00
	EU ETS CO <sub>2</sub> market price	<i>EUR/tCO<sub>2</sub>e</i>	32.71	32.71
	Fossil fuel subsidies	<i>GDP %</i>	0.19	0.40
	Environmental tax revenues	<i>GDP %</i>	2.37	2.40
	Environmental Performance Index (EPI)	<i>index</i>	63.70	70.67
	Adjusted net savings (ANS)	<i>GNI %</i>	14.53	11.50
Adjusted national net income (ANNI) growth rate (2009-2018 average)	%	1.75	1.00	
Risk	Natural resources rents	<i>GDP %</i>	0.38	0.20
	ND-GAIN vulnerability	<i>index</i>	0.36	0.34
	ND-GAIN change in vulnerability between 1995 and 2018	%	- 3.43	- 2.57
	ND-GAIN readiness	<i>index</i>	0.50	0.61
	ND-GAIN change in readiness between 1995 and 2018	%	- 8.01	7.44
	Ecological deficit (biocapacity – ecological footprint)	<i>Million global hectares / capita</i>	1.16	2.53
	Ratio of banks where the highest decision making body does not discuss climate risks.	%	68.00	25.00
	Ratio of banks with no person or team dedicated to climate risks.	%	58.00	n/a
	Ratio of banks where the probability and effect of climate risks have not been analysed.	%	81.00	48.00
	Bank Carbon Risk Index (Linear)	<i>index</i>	0.08	n/a
	Bank Carbon Risk Index (Gompertz)	<i>index</i>	0.15	n/a

Category	Indicator	Unit	Hungary	EU
<b>Mobilisation</b>	Ratio of green bonds – central government - stock	%	1.90	0.95
	Ratio of green bonds – central government - 2020	%	3.90	n/a
	Ratio of green bonds – companies - stock	%	5.60	5.00
	Ratio of green bonds – companies - 2020	%	11.40	n/a
	Ratio of green bonds – MNB FX reserve - stock	%	1.00	n/a
	Ratio of green corporate loans (solar PV only)	%	2.50	n/a
	Ratio of energy efficient residential buildings	%	3.00	9.80
	Green/ESG based investment funds – stock	%	0.50	15.10
	Insurance sector – ratio of green unit-linked funds	%	1.70	n/a
	Green/ESG based voluntary pension funds	%	0.90	n/a
<b>Reporting</b>	Ratio of banks where no information is disclosed on sustainability.	%	45.00	14.00
	Ratio of banks where no metrics on sustainability are disclosed.	%	68.00	50.00
	Ratio of banks where disclosures are fully in line with the TCFD recommendations.	%	-	3.00
<b>Global Initiatives</b>	Ratio of banks joining global initiatives on sustainability.	%	35.00	n/a

**Table 1:**  
Key indicators in the Green Finance Report<sup>2</sup>

<sup>2</sup>These indicators are explained in detail throughout the report.

Based on the draft dashboard of the Network for Greening the Financial System (NGFS): <https://www.ngfs.net/en/about-us/governance/workstream-scaling-green-finance>

# 1. INTRODUCTION

Climate change and environmental degradation pose unprecedented challenges to global socio-economic and financial systems. Our current production and consumption patterns result in unsustainable levels of greenhouse gas (GHG) emissions and other environmental effects that exceed the absorption and recycling capacity of our ecosystems.

Changes in our ecosystems and socio-economic systems have already started in various parts of the world, mainly due to the constant rise in temperature and the decline and weakening of biodiversity. Nevertheless, alarmingly, scientific reports on climate change<sup>3</sup> indicate that the most severe effects are yet to come: rising sea levels, rising weather extremities and worsening of droughts and floods. Related impacts may include the mass extinction of wildlife and a sharp increase in human migration, social conflicts, poverty and inequality.

Today, the scientific community is proposing primarily an immediate and lasting reduction in GHG emissions, as they make a major contribution to the rise in global temperatures. In this respect, the Paris Climate Agreement concluded by and between 196 countries in 2015 is a major political achievement. Under the Paris Agreement, the signatories agreed to keep the global average annual temperature increase well below 2°C of pre-industrial levels with a view to limiting the increase to 1.5 °C.

However, global emissions have been rising steadily since then, and no force other than a pandemic has been able to reverse the trend, not even temporarily. By 2020, the rate of warming is likely to have reached 1.25°C<sup>4</sup> and there is a 20% chance that it will reach 1.5°C as soon as 2024.<sup>5</sup> Although the estimated reduction in GHG emissions caused by the COVID-19 induced economic lockdown in 2020 is broadly in line with the original international targets adopted under the Paris Agreement, emissions remain on an unsustainable path.

In order to put GHG reductions on a conscious, sustainable path, thus potentially avoiding the catastrophic effects of climate change, a coordinated cooperation is needed at both global and national levels. Although the primary responsibility rests with governments around the world, there is a growing recognition that central banks and financial institutions can also play a significant role in mitigating environmental anomalies and, in particular, climate change.

The primary objective of the Magyar Nemzeti Bank (hereinafter: the MNB) is to achieve and maintain price stability and, without jeopardising this, to support the maintenance of the stability

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<sup>3</sup> IPCC: Global Warming of 1,5°C, 2018. [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15\\_Full\\_Report\\_High\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf)

<sup>4</sup> Copernicus Climate Change Service/ECMWF: Copernicus: 2020 warmest year on record for Europe; globally, 2020 ties with 2016 for warmest year recorded, 2021. <https://climate.copernicus.eu/copernicus-2020-warmest-year-record-europe-globally-2020-ties-2016-warmest-year-recorded>

<sup>5</sup> UN News: 2020 may be third hottest year on record, world could hit climate change milestone by 2024, 2020. <https://news.un.org/en/story/2020/12/1079042>

of the financial intermediary system.<sup>6</sup> As the effects of climate change also take the form of financial risks, it is the responsibility of central banks and financial supervisors to ensure that the financial system has the ability to address and mitigate these risks. Furthermore, sustainable or environmentally beneficial economic activities financed by the financial system can reduce the risks posed by climate change and environmental degradation, thereby weakening the negative effects on the stability of financial system as well as on economic growth.

Following the announcement of the MNB's *Green Programme*<sup>7</sup> in 2019, a consultation document entitled *Green Finances in Hungary*<sup>8</sup> detailed its views, principles, and possible instruments on greening the financial system. The latter publication already contained a brief status report of green finance products on the Hungarian market. The Green Finance Report fits closely into the series of these publications by providing a more complete picture of the environmental sustainability of the Hungarian economy and, above all, the financial system. A detailed situation analysis and the presentation of the relevant related indicators are of critical importance to develop a more accurate knowledge of where the Hungarian financial system is on its way to achieving its objectives and the goals set by the MNB's Green Programme.

A strategy is based on the accurate understanding of the status quo. However, due to the lack of data and universally accepted indicators, only a few central banks have so far attempted to quantify the environmental sustainability of a jurisdiction's financial system. In this report, the MNB seeks to use the most relevant and available information and to compile a set of indicators in line with international efforts to monitor the ability of the financial system to support the environmental sustainability of the economy. The indicator set presented in the report builds to a large extent on the dashboard developed by the Network for Greening the Financial System (NGFS).

It is important to discuss this information in context, but the indicators should not only be placed in space and time, but they must also be linked to the framework in which their usefulness becomes apparent. Therefore, the first chapter briefly presents the sustainable development framework, including the aspects most relevant to Hungary. Then the Report presents the environmental sustainability characteristics of the Hungarian economy. The latter is intended to show the challenges faced by the real economy in becoming sustainable. This leads to the part of the Report related to the financial system, i.e. the subsystem that enables the financing of the required investments.

The aim of the Green Finance Report is therefore to increase transparency and thereby strengthen market awareness, and to contribute to a more accurate understanding of the financial aspects of climate change by the actors of the financial system and economy, as well as by the Hungarian

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<sup>6</sup> MNB: Bank Act, 2013. <https://www.mnb.hu/a-jegybank/kozerdeku-adatak/tevekenysegre-mukodesre-vonatkozo-adatak/a-szerv-alaptevenysege-feladata-es-hataskore/jegybanktorveny> (available only in Hungarian)

<sup>7</sup> MNB: MNB Green Program, 2019. <https://www.mnb.hu/letoltes/mnb-green-program-en.pdf>

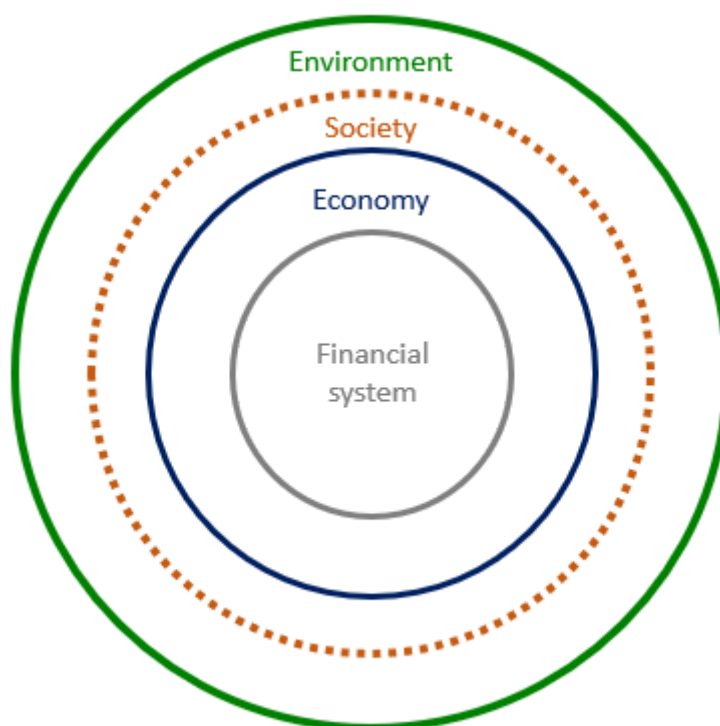
<sup>8</sup> MNB: Green Finance in Hungary, 2019. <https://www.mnb.hu/letoltes/green-finance-in-hungary-consultation-paper.pdf>

public. All these can indirectly help mitigate and adapt to climate change and additional environmental anomalies.

## 2. ENVIRONMENTAL SUSTAINABILITY IN HUNGARY

The environment is not only an “input” to the economic system, but it is also its boundary. Society exists in the physical, natural environment, and as part of that society determines the framework of the economy. The purpose of the financial system is, through its basic functions, to serve as the “circulatory system” of the economy, thus, it is considered to be a subset of the economy. As the chart shows below, if we are to achieve sustainability, the constraints of all social, economic, and financial decisions must be set by the existing environmental limits.

**Chart 1: Sustainability in a system perspective**



*Source: Plotted by the MNB*

### 2.1. Sustainable Development Goals

In 2015, the United Nations (UN) adopted the Agenda for Sustainable Development. In cooperation with governments, scientists and the civil society, 17 Sustainable Development Goals (SDGs) and 169 related tasks have been developed. At the UN General Assembly, 193 countries committed to these objectives, and they undertook to implement the plan by 2030. The goals cover a wide range of development areas, from eradicating hunger through reducing the risks of climate change to the access to education and health care. In addition to being comprehensive, the goals are closely interlinked.

Achieving these requires a huge social and economic transformation, and on a global level, the pace of progress has not been sufficient so far. The report of the Organisation for Economic Co-operation and Development (OECD)<sup>9</sup> and the progress reports published by the United Nations<sup>10</sup> suggest that it is becoming increasingly difficult to achieve the goals in time. Despite the fact that Hungary's performance is ranking in the middle when compared to the region, according to the assessment published by the UN in 2020, Hungary also faces significant challenges in achieving the sustainable development goals (Chart 2).

**Chart 2: Hungary's status in terms of Sustainable Development Goals**



Source: UN<sup>11</sup>

Achieving sustainability goals is made globally difficult by the fact that financial conditions for the required economic transformation are not met. The total cost of meeting the goals is estimated at US \$ 5-7 trillion per year globally. According to some estimates an annual US \$ 2.5 trillion is permanently missing from this amount.<sup>12</sup>

There are no reliable estimates of the investment needs to achieve the SDGs in Hungary, but it is obvious that it requires significant resources also in Hungary. As a comparison, the investment needs to achieve climate neutrality amounts to an average of USD 3 trillion per year globally, while in the case of Hungary, it will amount to tens of thousands of billion forints over the next 30 years, i.e., 2–2.5 percent of GDP per year.<sup>13</sup> Therefore, even twice as much may be required, if the country wants to achieve sustainability in the broadest sense.

The financial system has a key role to play in mobilising these amounts. In most countries budgetary constraints allow financing the necessary investments by governments only to a limited extent. Therefore, it is essential to mobilise the private financial sector. Thus, in order to achieve the strategic objectives, it is necessary to ensure adequate funding and investment. In order to align the financial system with sustainability goals, the system needs to change in two directions. It needs to allocate more resources to finance economic activities that help mitigate the

<sup>9</sup> OECD: Development Co-operation Report, 2019. <https://doi.org/10.1787/9a58c83f-en>

<sup>10</sup> UN: The Sustainable Development Goals Report, 2020. <https://unstats.un.org/sdgs/report/2020/>

<sup>11</sup> UN: Hungary, 2020. <https://eu-dashboards.sdgindex.org/profiles/hungary>

<sup>12</sup> UN Conference on Trade and Development: World Investment Report, 2014. [https://unctad.org/system/files/official-document/wir2014\\_overview\\_en.pdf](https://unctad.org/system/files/official-document/wir2014_overview_en.pdf)

<sup>13</sup> ITM: National Clean Development Strategy – Draft, 2020. [https://ec.europa.eu/clima/sites/its/its\\_hu\\_hu.pdf](https://ec.europa.eu/clima/sites/its/its_hu_hu.pdf) (available only in Hungarian)

consequences of climate change and the adaptation of economies. On the other hand, less resources should be devoted to activities that are environmentally harmful or of raise concerns in terms of climate protection.

## **2.2. Environmental sustainability**

As pointed out earlier, there is an important difference between SDGs and environmental sustainability. In addition to environmental sustainability, SDGs also include social and responsible governance and corporate governance components. The Green Finance Report focuses on environmental sustainability: it examines whether the financial system is able to support the environmental sustainability of the real economy.

Of the 17 SDGs, 14 include environmental indicators, thus, they directly affect almost all objectives. This report is not intended to present in detail the state of Hungary's natural capital and environmental resources, as a number of assessments on such topics are available. For example, the series on the State of the environment in Hungary published by the Herman Ottó Institute<sup>14</sup> or the collection of the HCSO entitled Indicators of Sustainable Development in Hungary.<sup>15</sup>

Their conclusion is that the Hungarian situation is differentiated, i.e., the situation is adequate in terms of certain indicators and it can be said to be average in many respects; however, in many other aspects the state of the environment is critical. It is also worth mentioning the Natura 2000 barometer issued by the European Environment Agency,<sup>16</sup> the important conclusion of which is that the condition of the environment is changing unfavourably in Hungary.

By way of illustration, we present the indicators of the level of environmental sustainability in Hungary through a brief examination of some indicators that are considered important at the Hungarian and European level.

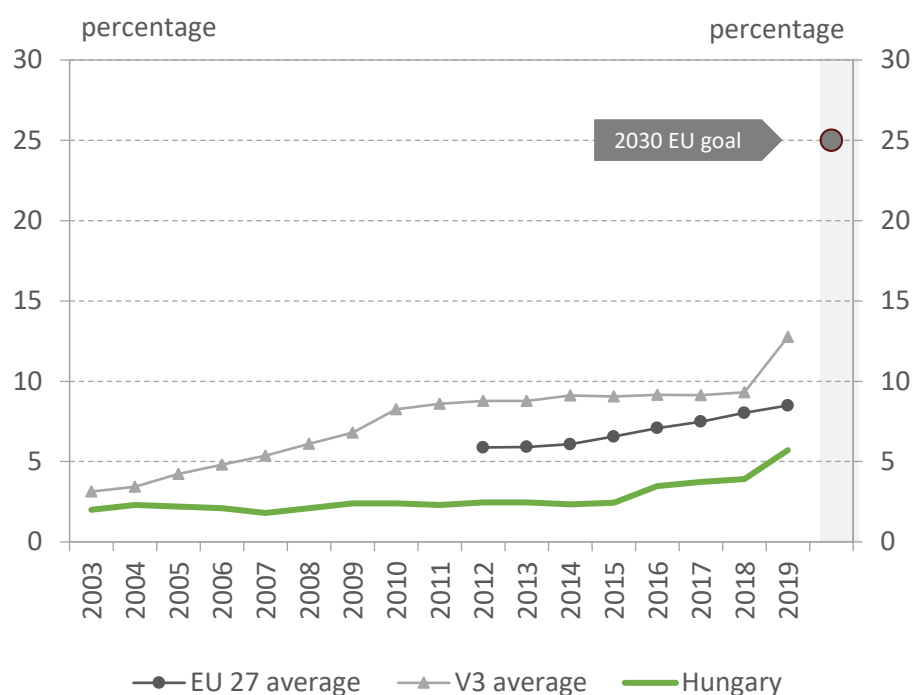
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<sup>14</sup> Holes A. (eds): Magyarország környezeti állapota, 2017 <http://www.hermanottointezet.hu/mka-2017> (available only in Hungarian)

<sup>15</sup> HCSO: Indicators of sustainable development for Hungary, 2018. <http://www.ksh.hu/docs/eng/xftp/idoszaki/fenntartfejl/efenntartfejl18.pdf>

<sup>16</sup> EEA: National summary dashboards – Habitats Directive Art.17., 2019. <https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-national-summary-dashboards>

**Chart 3: Share of the area under organic farming within the agricultural area**



Source: Eurostat

As Chart 3 shows, despite the strong growth in recent years, the proportion of areas involved in organic farming within agriculture<sup>17</sup> is still relatively low in Hungary. According to a Eurostat<sup>18</sup> survey, in 2018 the proportion of areas involved in organic farming was on average only 7.5% at EU level. In the same year, the proportion of areas involved in organic farming in Hungary was 3.9%, which increased to 5.7% by 2019. The objective of the European Union is to reach 25% at EU level by 2030, which justifies further serious actions at both national and EU level.

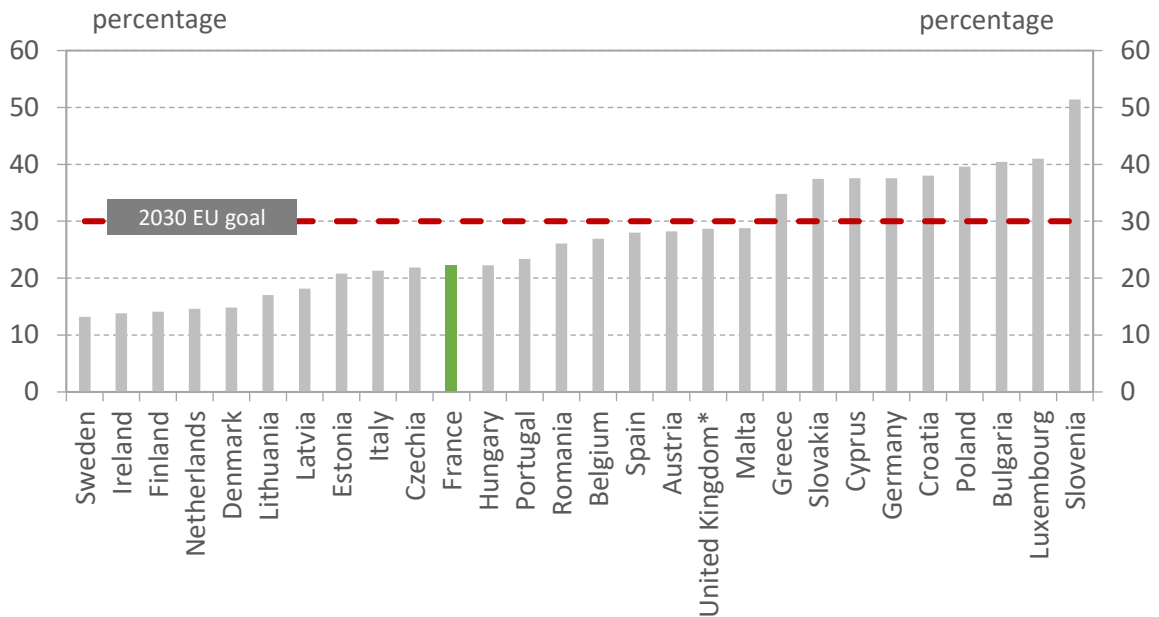
In addition to organic production, it is important to increase the proportion of protected areas rich in biodiversity. 26% of the EU's land area is classified as protected in 2020, which contributes to the conservation of biodiversity, thereby generating difficult-to-measure but indispensable economic, social and cultural value.<sup>19</sup> However, the size of protected land areas depends on many factors: the size of the country's territory, population density, the proportion of the already built environment of the given country, and most importantly the size of its agricultural areas.

<sup>17</sup>Organic farming partially ignores industrialism and seeks to restore natural processes and the cycle of organic substances through the use renewable sources of energy. Organic farmers select the cultivated species / varieties (landscape varieties, native species) according to the local conditions, as the key objective is to maintain or increase biodiversity. Biological pesticides are used for plant protection, no hormonal, pharmacological treatments are used in animal breeding and genetic modification is rejected. (HCSO)

<sup>18</sup> Eurostat: Area under organic farming, Eurostat, 2020. [https://ec.europa.eu/eurostat/databrowser/view/sdg\\_02\\_40/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/sdg_02_40/default/table?lang=en)

<sup>19</sup> EEA: Nationally designated terrestrial protected areas in Europe, 2020. <https://www.eea.europa.eu/data-and-maps/indicators/nationally-designated-protected-areas-1/assessment>

**Chart 4: Share of the protected land areas in 2020**



*Source: European Environment Agency*

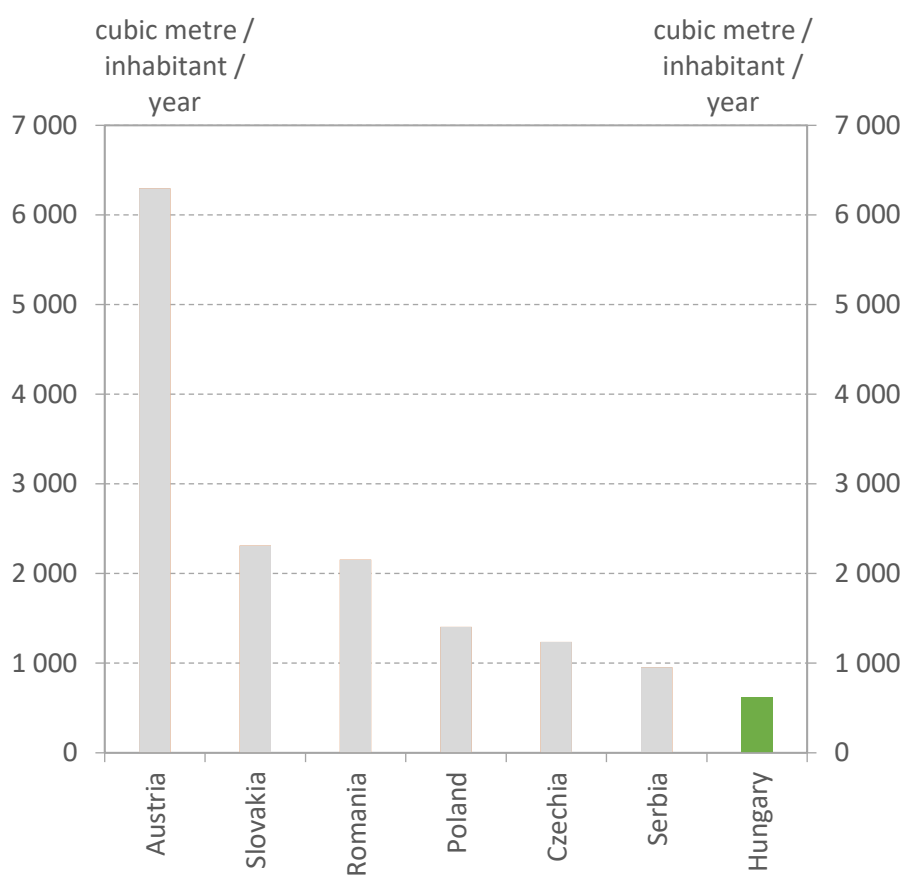
The EU's biodiversity strategy for 2030<sup>20</sup> aims to designate at least 30% of Europe's land and maritime areas protected. Although this is a pan-European target, all countries must take steps to ensure that the EU as a whole achieves this goal, which will contribute to the restoration of the continent's biodiversity. In Hungary, the proportion of protected land areas is 22%, with which it is middle ranking, falling short of the EU target for the time being.

In addition to our land areas, the protection of our waters is also critical. Due to the fact that it has a large quantity of groundwater, Hungary is considered a “water superpower”. Per capita water resources are high by international standards, and total per capita renewable water resources also position the country as relatively good. Nevertheless, it is also one of the most vulnerable nations in the world according to one of the key indicators, as it ranks 149<sup>th</sup> out of 182 countries in the World Bank’s database in terms of per capita internal renewable water resources<sup>21</sup>.

<sup>20</sup> European Commission: EU Biodiversity Strategy for 2030, 2020. [https://eur-lex.europa.eu/resource.html?uri=cellar:a3c806a6-9ab3-11ea-9d2d-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:a3c806a6-9ab3-11ea-9d2d-01aa75ed71a1.0001.02/DOC_1&format=PDF)

<sup>21</sup> The internal renewable water resources are the difference between the amount of precipitation and evaporation (the sum of water evaporation and transpiration from soil and vegetation, the so-called evapotranspiration).

**Chart 5: Internal renewable water resources per capita in 2017**



*Source: World Bank, Food and Agriculture Organization of the United Nations (FAO)*

The reason for this is that 95% of Hungarian water resources come to Hungary from outside its borders. Thus, in Hungary, water abundance only applies to areas in the immediate vicinity of our large rivers, other parts of the country are water-scarce, with some areas officially considered even to be semi-arid (such as Homokhátság).<sup>22</sup> Furthermore, this feature makes it difficult to monitor and control the quality and pollution of Hungarian rivers. As Chart 5 shows, based on this indicator, Hungary is in the bottom 20%, with which it ranks among the nations with water scarcity. The Hungarian value is only 617 m<sup>3</sup>, which is slightly more than 0.1% of the best, the Icelandic value (507 thousand m<sup>3</sup>). V3 countries with more similar conditions also fall into the range of 1000–2300 m<sup>3</sup>.

According to the World Resource Institute's<sup>23</sup> data, Hungary is the 16<sup>th</sup> most threatened country in the world in terms of the expected frequency of droughts. Thus, it is a strategically important task to efficiently manage water resources arriving to Hungary by using the available tools and taking

<sup>22</sup> HAO: Magyarország vízgazdálkodása: helyzetkép és stratégiai feladatok (Water management of Hungary: Status and Strategic tasks), Budapest, 2011 [http://old.mta.hu/data/Strategiai\\_konyvek/viz/viz\\_net.pdf](http://old.mta.hu/data/Strategiai_konyvek/viz/viz_net.pdf) (available only in Hungarian)

<sup>23</sup> Water Risk Atlas: Overall Water Risk, 2021. <https://www.wri.org/applications/aqueduct/water-risk-atlas/>

into account the external conditions, and to optimise our water management, for example by making use of our water storage capacities.

The environmental indicators presented in this chapter provide a glimpse only into our cultivated and protected areas, as well as the state of our water resources. Our researchers and experts investigating the living environment have a detailed and accurate picture of a wider set of environmental indicators. For example, for the reference period of 2013-2018, the aforementioned Natura 2000 barometer sets out in detail the state of natural ecosystems and biodiversity, their protection, vulnerabilities and changing tendencies. Even though half a decade has since passed, the conclusions drawn from data are still in line with the statement made in 2015 in the strategy<sup>24</sup> report for maintaining Hungary's biodiversity 2015-2020: "Hungary has outstanding environmental values in European comparison, although the global tendency holds for our country, too, that drivers of biodiversity loss have been taking their toll in greater extent and pace than how environmental policy could address those".

Protecting the environment and environmental restoration does not solely lie in narrowly defined stand-alone environmental policy interventions. Without the transformation of the economy, long term results are not attainable. The following chapters therefore focus on the environmental sustainability of the economy, or in many instances the lack thereof. Furthermore, attention is devoted to the financial system, which enable the mobilization of resources to this end.

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<sup>24</sup> 28/2015. (VI.17.) OGY határozata: a biológiai sokféleség megőrzésének 2015-2020 közötti időszakra szóló nemzeti stratégiájáról (National Strategy on Biodiversity Conservation 2015-2020), Magyar Közlöny, 83. szám, 2015. [http://www.termeszetvedelem.hu/\\_user/browser/File/Stragegia/MK15083\\_NBS.pdf](http://www.termeszetvedelem.hu/_user/browser/File/Stragegia/MK15083_NBS.pdf) (available only in Hungarian)

# 3. ENVIRONMENTAL SUSTAINABILITY OF THE HUNGARIAN ECONOMY

As the previous chapter already suggested, the transformation of the economic system is necessary in order to achieve international and domestic climate and sustainability goals. For this to be successful, we need to define which features of the economic system need to be transformed and to what extent. This chapter attempts to present – in a non-exhaustive manner – a set of indicators as signalling system, with which the process of green transformation of the economy can be measured.

The environment and the economy are interconnected and interact in numerous ways. The environment provides resources to the economy and absorbs emissions, pollution and waste. Excessive GHG emissions, pollution and waste generation lead to a degradation of the environment, which has a negative impact on economic growth and economic and social wellbeing.

At a theoretical level these mechanisms are mapped in detail, in practice, however, often reliable data is insufficiently available to accurately understand and influence these processes. For example, it is difficult to quantify the value of ecosystem services or the long-term economic effects of their decline.

Despite these challenges, there are indicators that are based on widely available data and have a well-developed theoretical background – this sub-chapter of the Report is also based on these.

## 3.1. Green economic indicators

### 3.1.1. The share of renewable energy in total final energy use

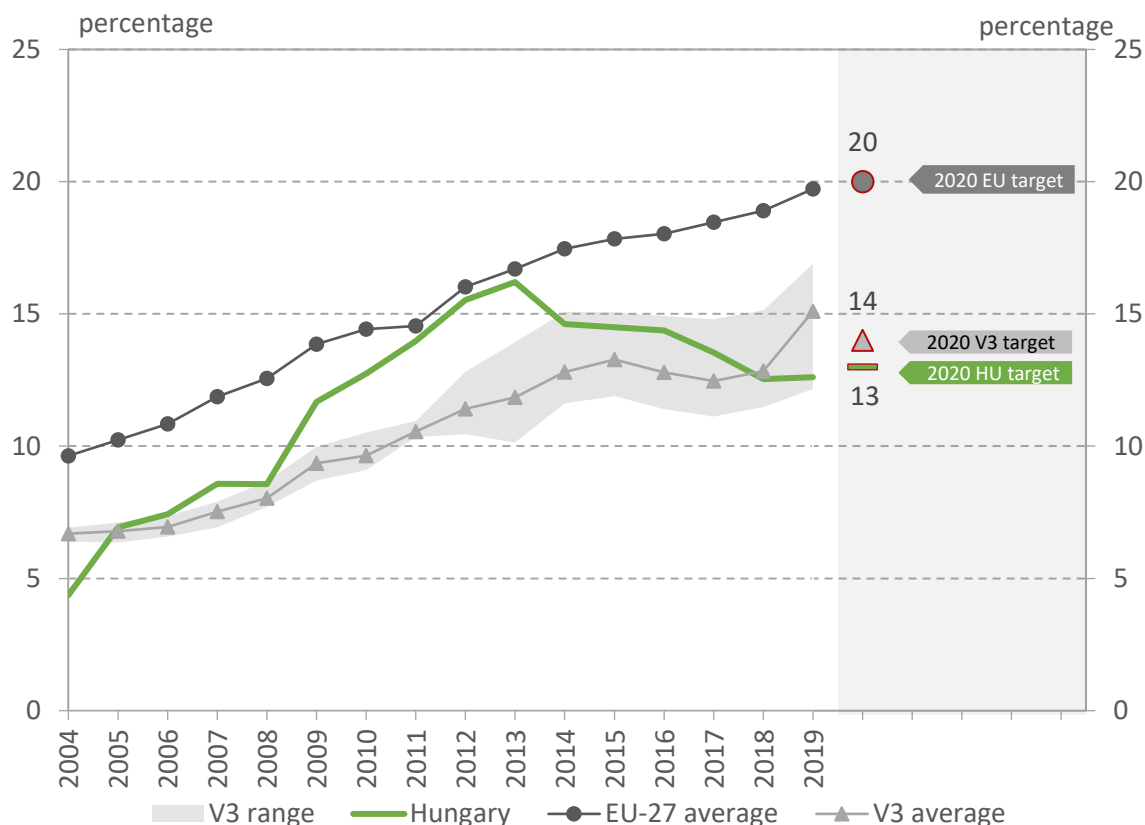
The purpose of the indicator is to measure how widespread the renewable energy sources have become and the extent to which fossil fuels have been replaced considering the total energy use. In the European Union, the share of renewable energy has been steadily increasing since at least 2004,<sup>25</sup> while in the Visegrad countries the value increased until 2015, then after a few years of stagnation it increased again in 2019. In Hungary, between 2004 and 2013, a stronger growth even compared to the Visegrad countries could be observed, then between 2014 and 2018, a declining trend that was almost unique in Europe, and the ratio stabilised in 2019. Biomass constitutes the largest share of renewable energy use of Hungarian households, exceeding solar and wind energy by a large margin. Fuelwood itself as a renewable energy source is problematic: considering

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<sup>25</sup> Eurostat: Share of renewable energy in gross final energy consumption by sector, 2020 [https://ec.europa.eu/eurostat/data-browser/view/sdg\\_07\\_40/default/table?lang=en](https://ec.europa.eu/eurostat/data-browser/view/sdg_07_40/default/table?lang=en)

domestic use, a number of analyses have already shown that its heating efficiency is weak, it is highly polluting and a great proportion of it comes from an illegal source.<sup>26</sup>

**Chart 6: Share of renewable energy sources in total final energy consumption**



Source: Eurostat

The goal set by the European Union<sup>27</sup> was to achieve an average of 20% share of renewable energy in the total final energy use by 2020, while the goal to be achieved by 2030 is 32% on average in the member states. In Hungary, the renewable energy source contribution (RES contribution) in gross final energy consumption should have reached 13% by 2020 under the Renewable Energy Directive (RED 9),<sup>28</sup> Hungary has voluntarily increased this commitment to 14.65% in its Renewable Energy Utilisation Action Plan. In the EU, the share of renewables grew to 19.7% with which it approximated the 2020 goal. Hungary’s 2019 data (12.6%) also came close to the original target, but it falls short from the increase target, implying that further actions are needed to increase the renewables’ share as part of the green transition.

<sup>26</sup> Greenpeace Hungary: Greenpeace climate protection recommendations for Hungary, 2018. <https://www.greenpeace.org/hungary/cikkek/3070/a-greenpeace-magyarorszag-eghajlatvedelmi-javaslatcsomagja/> (available only in Hungarian)

<sup>27</sup> Eurostat news release: Renewable energy in the EU in 2018, 2020. <https://ec.europa.eu/eurostat/documents/2995521/10335438/8-23012020-AP-EN.pdf/292cf2e5-8870-4525-7ad7-188864ba0c29>

<sup>28</sup> ITM: National Energy and Climate Plan, 2020. [https://ec.europa.eu/energy/sites/ener/files/documents/hu\\_fi-nal\\_necp\\_main\\_en.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/hu_fi-nal_necp_main_en.pdf)

According to Hungary's National Energy and Climate Plan for the period 2020-2030, the government would set the RES contribution at 21% by 2030.<sup>29</sup> In 2019 the installed solar capacity reached 1,400 MW from 35 MW in 2013. Installed capacity increased further close to 2,000 MW in 2020.<sup>30</sup> The government aims reach 6,000 MW by 2030. In addition to the use of solar energy, the Hungarian renewable energy policy is based on the use of non-fuelwood-based biomass and the utilisation of geothermal energy; the expansion of such capacities may become visible in the value of the indicator over time.

### 3.1.2. Energy intensity of the economy

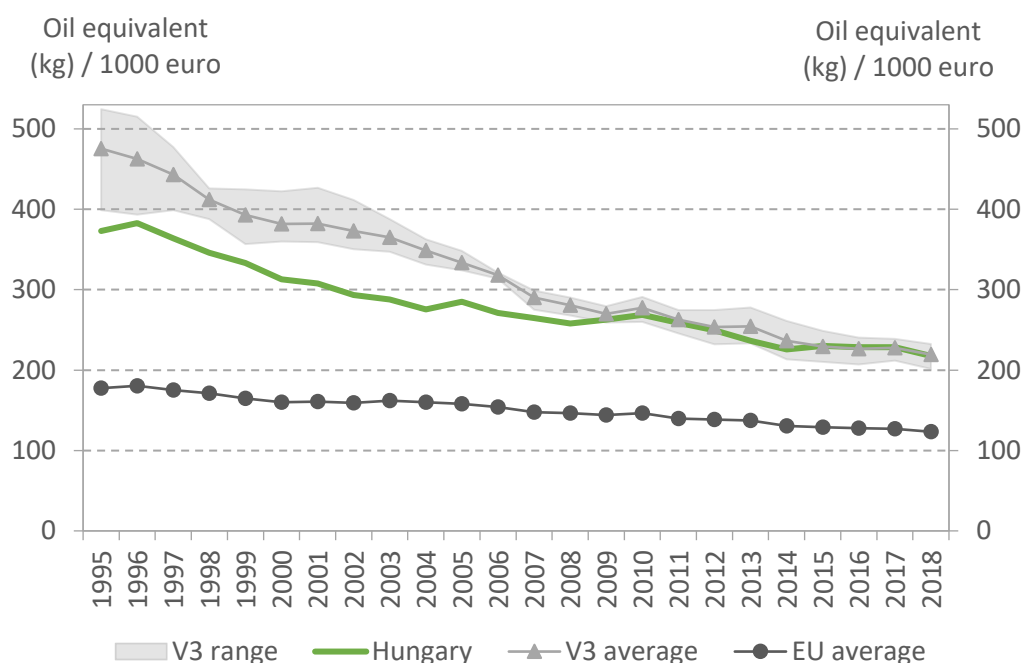
The energy intensity of an economy shows how much energy is used per unit of economic output. This indicator can be used to characterise the energy efficiency of a country. Between 1995 and 2019, Hungary's energy intensity decreased by 45% mainly due to the transformation of the country's economic structure and industry, which is 12 percentage points higher than the decrease in energy intensity of the European Union during this period. The energy intensity of Hungary correlated with the regional average in the last decade. However, the energy intensity of the Hungarian and Visegrad regions is still almost double the EU average. Based on purchasing power parity, the difference in energy efficiency between Hungary and the European Union is substantially more moderate (12 percent), however, the more energy-inefficient Hungarian economy compared to the EU average becomes obvious also by examining this indicator.

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<sup>29</sup> Based on Q3 2020 data of the Hungarian Energy and Public Utility Regulatory Authority and the Mavir Hungarian Transmission System Operator Company Ltd.

<sup>30</sup> Wind Europe: National Energy & Climate Plans, 2020. <https://windeurope.org/2030plans/>

**Chart 7: Energy intensity of the economy**



Source: Eurostat

Lower energy intensity offers cost efficiency gains in the economy, and it also provides more environmentally friendly conditions for long-term convergence in economic development. In all segments of the economy, energy use per unit of value added or per living space is 1.4-2.2 times the EU average. In the services sector, this gap narrowed, but in the industrial sector and residential real estate, the gap widened between 2005 and 2015.<sup>31</sup> Based on international examples, more efficient energy use among companies can be promoted primarily by increasing corporate tax advantages for environmental purposes and by supporting the introduction of energy audits. In the case of households, raising state subsidies for the renovation of residential real estate can prove to be an effective instrument. Transforming and maintaining the regulatory framework that prioritises energy efficiency, as well as the education of companies and consumer can contribute to the energy-friendly transformation of the economy as a whole.<sup>32</sup> In addition to legislation, the focus has recently been on reducing the over-consumption of environmental resources through taxes<sup>33</sup> or the extension of the Emissions Trading Scheme (ETS) already in place in the European Union to new sectors.

<sup>31</sup> European Commission: Energy Union Factsheet Hungary, 2017. [https://ec.europa.eu/info/sites/info/files/energy-union-factsheet-hungary\\_en.pdf](https://ec.europa.eu/info/sites/info/files/energy-union-factsheet-hungary_en.pdf)

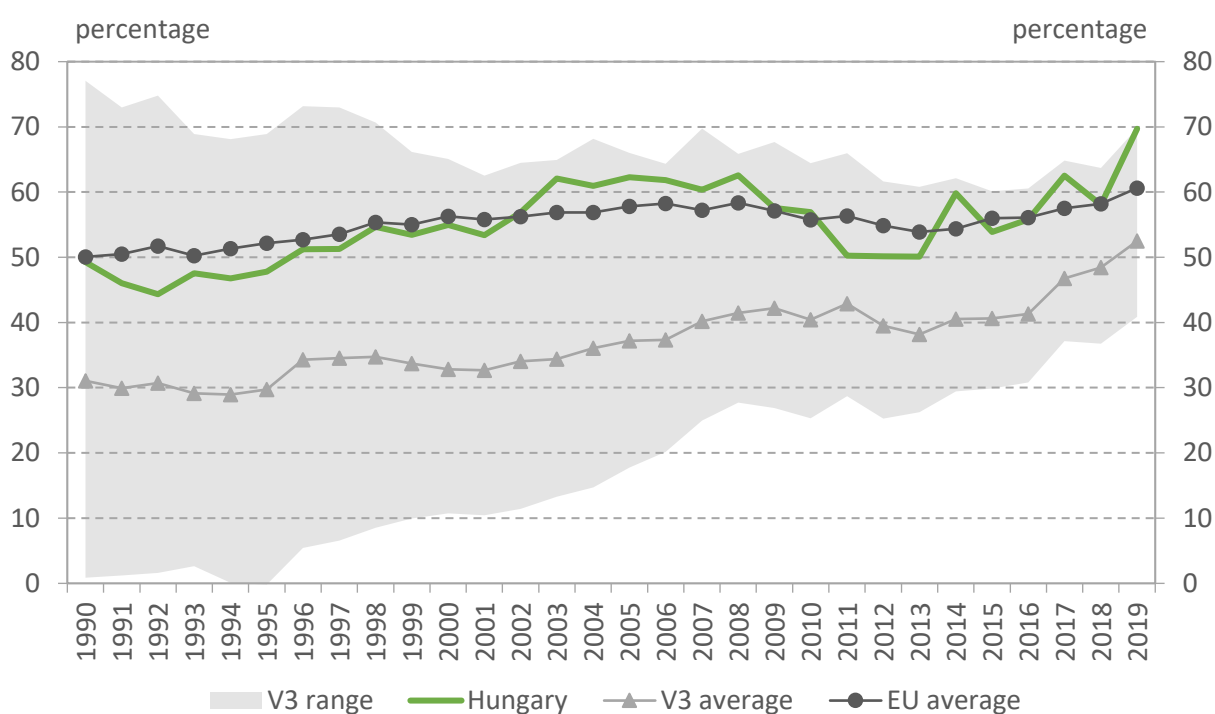
<sup>32</sup> MNB: Competitiveness Programme in 330 points, 2019. <https://www.mnb.hu/letoltes/competitiveness-programme-in-330-points.pdf>

<sup>33</sup> Hausmann, R. – Kolok, A. B.: Terjedőfélben a zöld adózás. (Green taxation is spreading.) In: Virág, B. (eds.): A jövő fenntartható közgazdaságtana (Sustainable economics of the future), Magyar Nemzeti Bank, 2019, pp.143–165. (available only in Hungarian)

### 3.1.3. Net energy imports

Net energy imports as a proportion of total energy use is a measure of a country's energy dependence. The share of Hungarian energy imports is approximately 60 percent. It increased by the mid-2000s from 45-50 percent typical for the early 1990s to over 60 percent, and the global financial and economic crisis that began in 2008 temporarily reduced it to 50 percent. However, the dynamic growth of the economy since 2013 has boosted total energy use, thus, our net energy imports rose again to close to 60 percent, and in 2019 – with a slight increase in the EU and V3 countries – to close to 70 percent. The ratio of Hungarian net energy imports was about 10 percentage points higher than the average of the Visegrad region between 2009 and 2019 and by less than one percentage point higher than the EU average.<sup>34</sup>

**Chart 8: Net energy imports**



Source: Eurostat

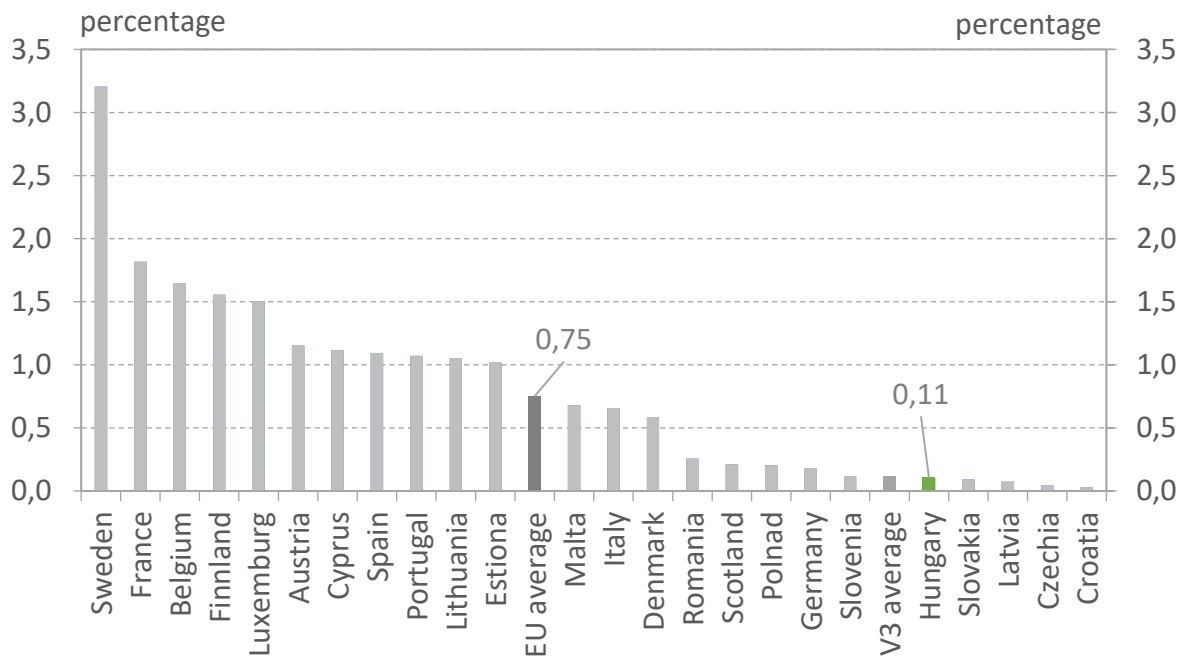
The goal of the central bank's Competitiveness Program is to reduce the share of net energy imports to below 50% by 2030, which is attainable by increasing energy efficiency and increasing domestic – especially environment friendly – energy production capacities. With the reduction of the net energy imports, a given country's energy dependence will also decrease, which in turn improves its economic independence and competitiveness. Primarily, a further reduction of energy dependence, and secondarily, the diversification of energy suppliers could improve Hungary's energy security.

<sup>34</sup> MNB: Competitiveness Report, 2020. <https://www.mnb.hu/letoltes/mnb-competitiveness-report-2020-final.pdf>

### 3.1.4. Share of electric and hybrid electric cars in EU

In 2018, the stock of registered motor vehicles was 231 million in the Member States of the European Union.<sup>35</sup> Of these, about 1.7 million (0.75%) were classified as electric or hybrid electric cars, of which the latter can be operated in combination with a petrol or diesel engine.

**Chart 9: Percentage of newly registered plug-in electric vehicles (PEV) in 2018**



*Note: No data are available for Bulgaria, Greece and the Netherlands.*

*Source: Eurostat, European Alternative Fuels Observatory (EAFO)*

The number of registered electric and hybrid electric cars in the EU has steadily increased in recent years. In particular, the stock of hybrid electric-petrol cars grew: their number in 2018 (1.2 million) was almost six times higher than in 2013 (0.2 million). In 2018, the share of electric and hybrid cars had reached 1% already in eleven countries, while in 2017 there were only four such countries. The share of alternative-powered cars in Hungary is 0.1%, which, similarly to the regional situation, is lower than the EU average.

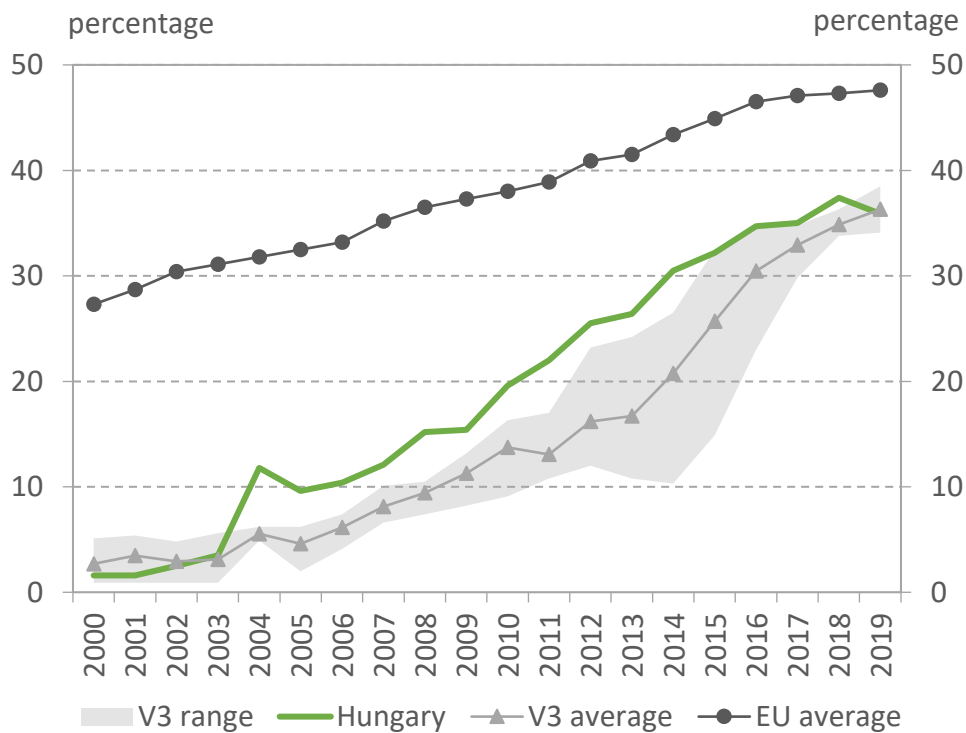
### 3.1.5. Municipal waste-recycling ratio

Waste management plays an important role in the efficient use of resources and the reduction of resource intensity. Significant progress could be observed in the field of recycling or reprocessing of municipal waste in the last ten years. Hungary has been able to reduce its backlog in recycling compared to the EU average by about half. The recycling ratio of 36% in 2019 corresponds to the Visegrad average, although that year we saw a decrease of 1.5% in contrast to the preceding

<sup>35</sup> Eurostat: Number of electric cars is on the rise, 2019. <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190507-1>

increasing tendency. By further increasing this ratio, resource wastage, adverse environmental effects, and the need for primary natural resources can be reduced.

**Chart 10: Recycling rate of municipal waste**

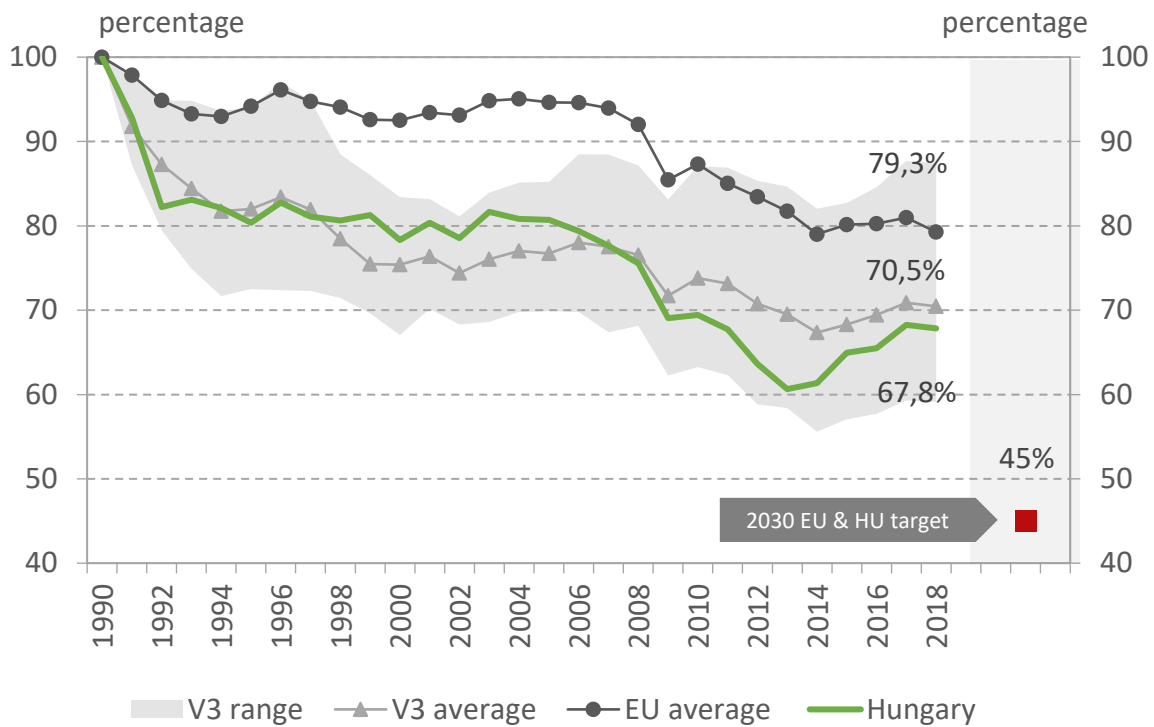


Source: Eurostat

### 3.1.6. Greenhouse gas emissions

Under the 2015 Paris Climate Agreement, for the first time, Hungary, together with the EU member states, undertook to reduce greenhouse gas emissions by 40% by 2030 compared to 1990 levels. Then the latest 2030 target was set at the European Council’s meeting on 11 December 2020, where the 2030 greenhouse gas reduction target was raised from 40% to at least 55%. For 2050, the European Green Deal (2019) set a long-term goal for the European Union to achieve climate neutrality by 2050, to which Hungary also committed.

**Chart 11: Change in greenhouse gas emissions since 1990**



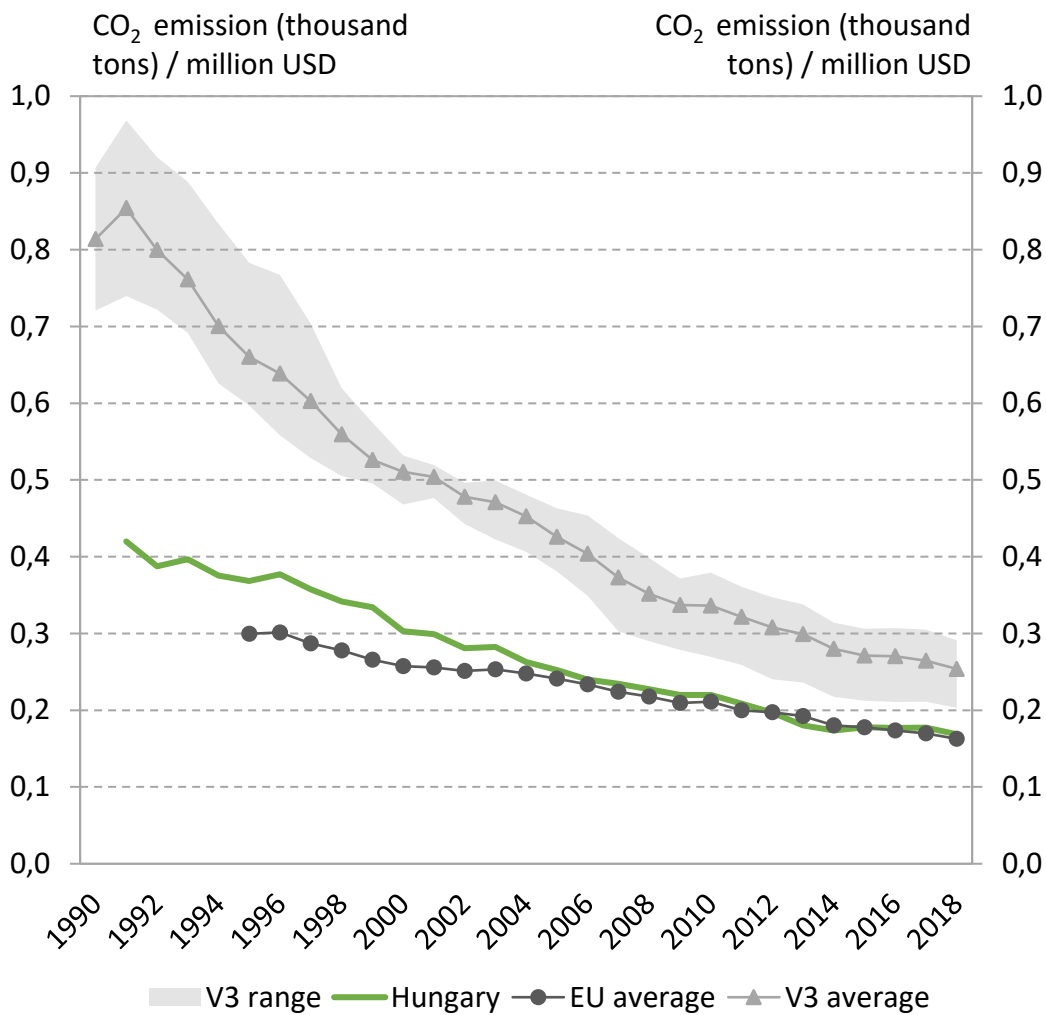
*Source: Eurostat*

EU greenhouse gas emissions fell by 2018 by about 21% from the 1990 levels. In order to meet the 2030 climate targets and for the EU to achieve climate neutrality by 2050, the implementation of green transitional measures needs to be significantly accelerated. Hungary's emission level increased substantially with the booming economy after 2013. Although its value in 2018 (68%) is still low in relation to the EU, this is largely due to the fact that the 1990 level provides a completely different benchmark for post-socialist countries than for other EU Member States. In Hungary, the structural restructuring of heavy industry, the modernisation of buildings and the lower use of fossil fuels contributed to the reduction of greenhouse gas emissions since 1990. By 2030, Hungary must achieve a 55% reduction (i.e., 45% on Chart 11) and a complete carbon neutrality by 2050, which cannot be achieved without a green transition.

### 3.1.7. CO<sub>2</sub> emissions per unit of value added in the economy

This indicator is an important measure of ecological efficiency, which means the use of environmental resources per value-added. For this indicator, the proxy for the use of the environmental resource is CO<sub>2</sub> emissions. The lower this indicator, the more efficient the economy in terms of CO<sub>2</sub> intensity, that is the use of environmental resources.

**Chart 12: CO2 emissions per unit of production**



Source: OECD

Note: for this chart, the EU average refers to the EU28 subject to available data, with GDP calculated at constant prices and measured at purchasing power parity (PPP).

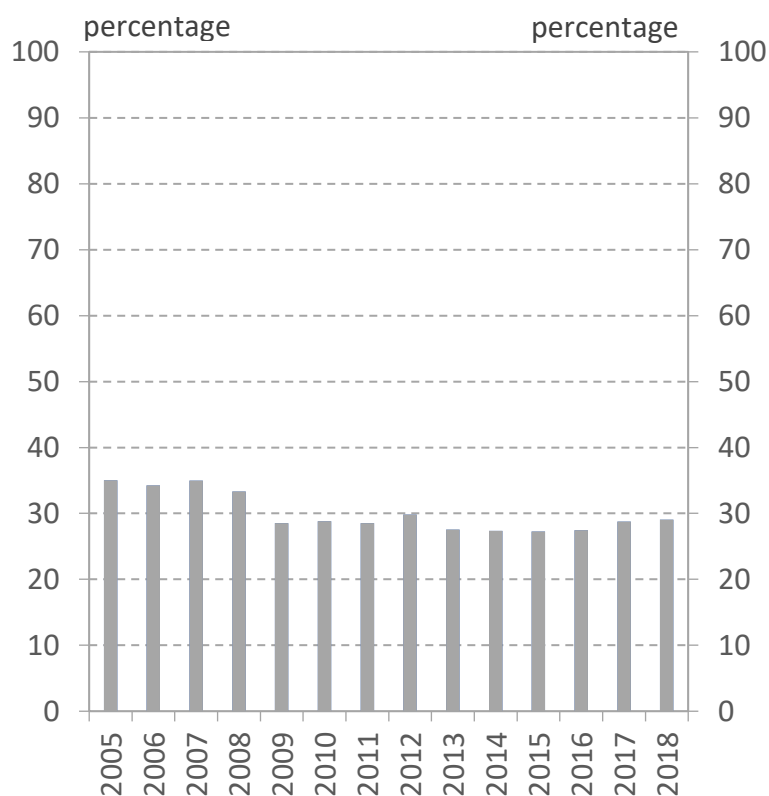
Before and during the change of the political and economic system from socialism to capitalism, the CO2 intensity of the Hungarian economy was higher than the EU average (albeit it was significantly lower than the average of the V4s). This can be explained by the structural differences, as in the former socialist countries the weight of industries with higher emission was larger than in other European countries. Over the past 30 years, the CO2 intensity of Hungary's economy has been steadily declining: by 2018, 60% decrease took place as compared to the 1990 levels. This is a larger decline than the 46% reduction of the aggregate EU CO2 intensity, but slightly below the 69% reduction of the V3 countries. However, the current Hungarian CO2 intensity is on par with the EU average and remains lower than in the V3 countries. The economies of Czechia and Poland generate higher CO2 emissions. Sweden at the top of the EU ranking, emits less than half as much carbon dioxide as Hungary. In recent years, economic production has grown faster than the reduction in CO2 emissions per unit of product, thus, our total CO2 emissions have risen. With the

transition to an intensive growth model, the economy would be able to achieve a high sustainable growth rate as well as low emissions.

### 3.1.8. The coverage Hungary’s industry under the EU GHG emissions trading scheme

The EU's Emissions Trading System (ETS) is a key instrument for the European Union to combat climate change. The essence of this is that a cap is set for the emissions in sectors that are important in terms of greenhouse gas emissions, i.e., every economic organisation that meets certain criteria must have a certain number of allowances. These units are allocated (initial allocation) to companies directly (power plants, airlines, and operators of other energy-intensive industries) as well as sold in auctions. Unused allowances can be sold later on the market, encouraging cost-effective operation and low-carbon innovation for emitters who are interested in reducing their quota spending. An important feature of the system is that over the years, less and less carbon allowances are planned to be made available to the emitters of the industries concerned, thus gradually and predictably curbing the EU’s emissions.

**Charts 13: Share of GHG emissions under the scope of EU ETS in Hungary**



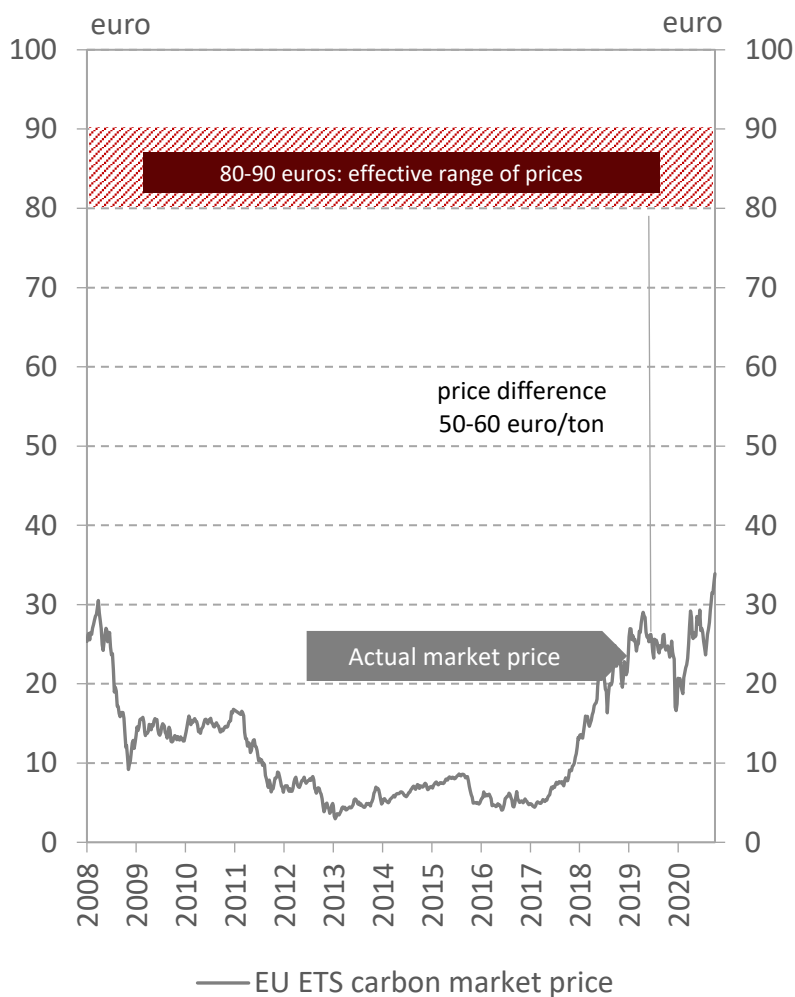
Source: *European Environment Agency, Intercontinental Exchange*

These sectors account for a significant share of the EU's CO2 emissions, however far not for the whole – experts estimate the share of this to be around 40%.<sup>36</sup> In the case of Hungary, when the quotas were introduced, the emissions covered by the system covered 35% of the total emissions,

<sup>36</sup> European Commission: EU Emission Trading System, 2015. [https://ec.europa.eu/clima/policies/ets\\_en](https://ec.europa.eu/clima/policies/ets_en)

and this ratio has decreased to around 30% in recent years. The decline in coverage is due to the reduction in emissions from sectors operating under the quota system, but this also entails that an increasingly substantial proportion of the country's emissions remain unregulated. Emissions outside the ETS have not changed significantly during this period, which may suggest that there are still significant reserves in terms of cost-effective emission reductions.

**Charts 14: EU ETS carbon-dioxide market price**



Source: *European Environment Agency, Intercontinental Exchange*

The most important incentive of this system is the price of allowances. In 2008, the price of allowances began to fall from EUR 25-30 to EUR 10-15 and then to EUR 5-10. This fall in prices was due to the economic crisis and the euro crisis. Market participants' expectations regarding energy demand fell sharply, as a consequence the price of allowances also fell. The price of allowances has not increased significantly for ten years. During these periods, the ETS was not able to promote green innovation due to the low price of emission allowances. In response to this problem, the Market Stability Reserve was established in 2015.<sup>37</sup> This means that, if demand is low for

<sup>37</sup> European Commission: Market Stability Reserve, 2021. [https://ec.europa.eu/clima/policies/ets/reform\\_en](https://ec.europa.eu/clima/policies/ets/reform_en)

allowances, less allowances are placed on the market, thus reallocating the surplus for later. In this way, the allowances market can function properly and fulfil its innovation stimulating function through prices. The allowance price started to increase only in 2018 and then it reached the range of 20-30 euros. It is worth mentioning that, according to an IMF study, achieving the 2 °C scenario under the Paris Agreement would require globally a carbon allowance price of USD 50-100 (i.e., EUR 40-80 price at the end of 2020) by 2030.<sup>38</sup> Other research,<sup>39</sup> including the IPCC conclusions<sup>40</sup>, point out that USD 100 (EUR 80 CO<sub>2</sub> price at the end of 2020) would be needed from 2020 onwards.

### 3.1.9. Environmental tax revenue

A possible solution to the problem of environmental externalities, in addition to the allowance system, is the introduction of environmental pollution taxes, also known as environmental green taxes. Green taxes are continually getting more and more widespread, however, the ratio of green tax revenues to GDP is still low globally and also in Hungary. Hungary's environmental tax revenues increased overall in nominal terms between 2005 and 2018, but declined slightly, from 2.7% to 2.4%, as a proportion of GDP. In 2017, the total environmental taxes collected by the 28 member states of the European Union also accounted for 2.4% of the EU's GDP, thus, the Hungarian ratio was in line with the EU average. The highest rates of green taxation in the EU were applied by Greece (4% of GDP), Denmark and Slovenia (3.7-3.7% of GDP).

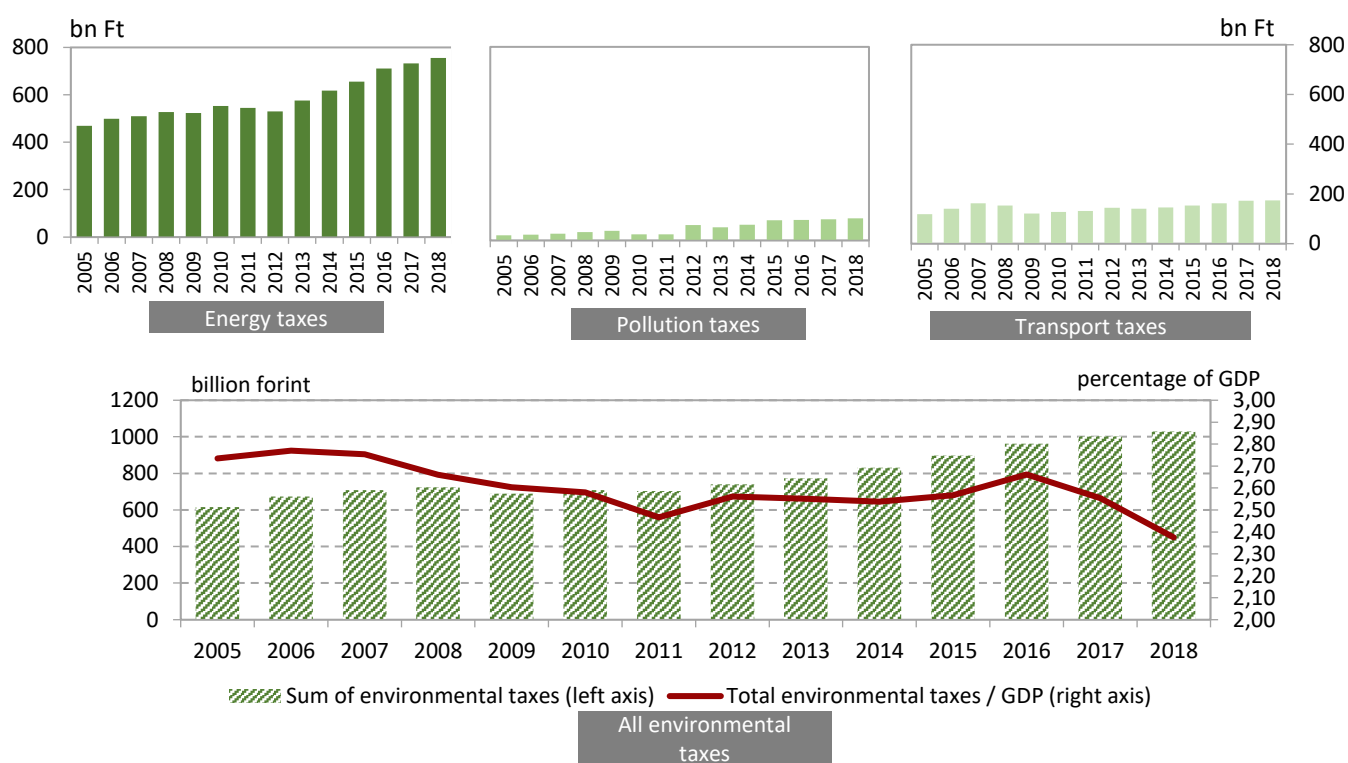
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<sup>38</sup> IMF: Fiscal Policies for Paris Climate Strategies—from Principle to Practice, 2019. <https://www.imf.org/en/Publications/Policy-Papers/Issues/2019/05/01/Fiscal-Policies-for-Paris-Climate-Strategies-from-Principle-to-Practice-46826>

<sup>39</sup> IPCC: Global Warming of 1,5 °C – Mitigation pathways compatible with 1.5°C in the context of sustainable development, 2018. <https://www.ipcc.ch/sr15/chapter/chapter-2/>

<sup>40</sup> Annual Reviews: The Economics of 1,5 °C Climate Change, 2018. <https://doi.org/10.1146/annurev-environ-102017-025817>

**Chart 15: Environmental tax revenues in Hungary**



Source: HCSO

*Note: The environmental tax consists of the sum of energy, pollution, resource and transport taxes. In the case of Hungary, resource taxes are negligible, thus, they have not been illustrated.*

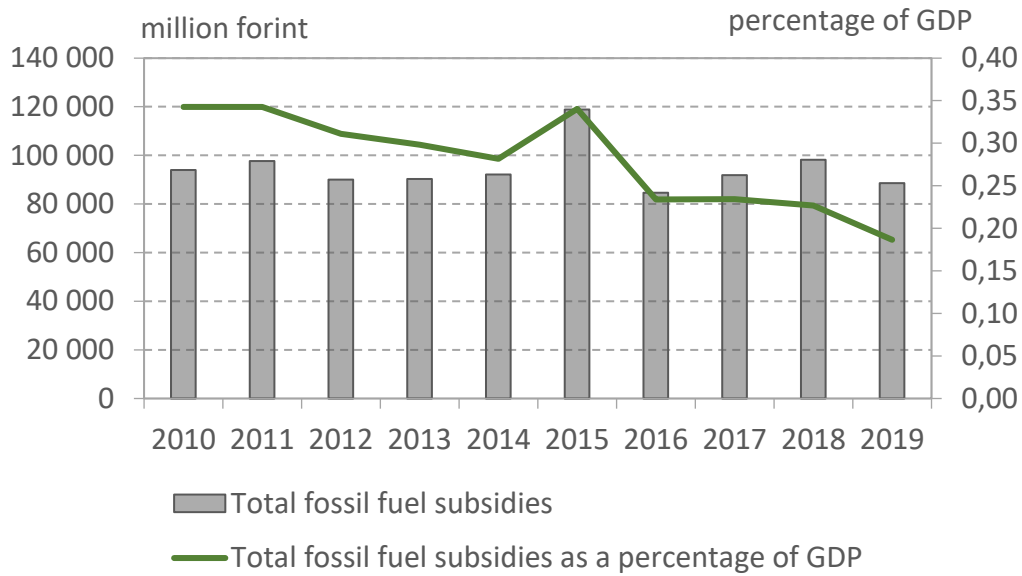
There is still a considerable room for raising environmental taxes, which have both a diverting effect from harmful environmental activity and a revenue effect. The latter effect can be used for tax structure rearrangement, i.e., to change the weight of tax types within the tax system.<sup>41</sup>

### 3.1.10. Fossil fuel subsidies

The use of fossil fuels increases greenhouse gas emissions, which contributes to an increase in the pace of global warming. In Hungary, fossil fuels receive significant subsidies, amounting to between HUF 80 billion and HUF 120 billion annually since 2010. Although stagnant in terms of amount, a significant decline can be observed considering the subsidies' proportion to GDP. The further reduction of the role of fossil fuels in the Hungarian energy mix may be facilitated by the expansion of renewable energy production capacities and the strengthening of energy efficiency.

<sup>41</sup> Hausmann, R. – Kolok, A.B.: Terjedőfélben a zöld adózás. (Green taxation is spreading.) In: Virág, B. (eds.): A jövő fenntartható közgazdaságtana (Sustainable economics of the future), Magyar Nemzeti Bank, 2019, pp.143–165. (available only in Hungarian)

**Chart 16: Fossil fuel subsidies in Hungary**

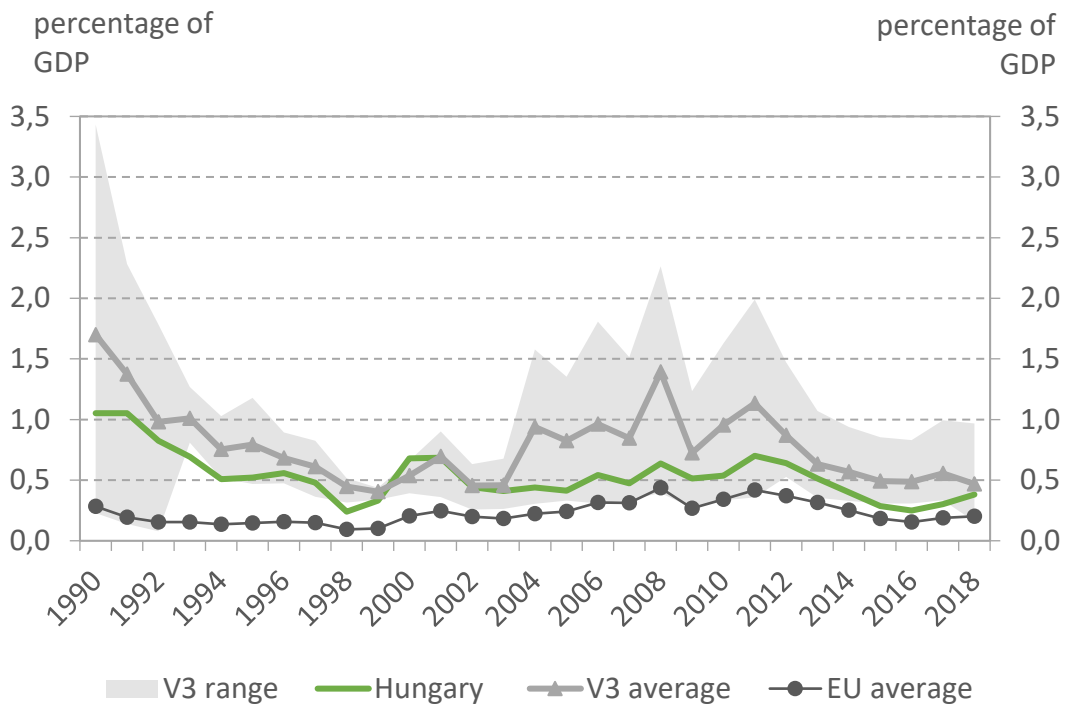


*Source: OECD*

### 3.1.11. Natural resources rents

The natural resources rents indicator is calculated as the difference between the revenue and expenditure associated with the exploitation of oil, natural gas, coal, minerals and timber. Thus, it measures profits from the sale of non-renewable natural resources, which are difficult to reconcile with long-term sustainable growth. compatible. It is important to note that this indicator does not take into account indirect costs, such as environmental pollution costs.

**Chart 17: Natural resources rents**



Source: World Bank

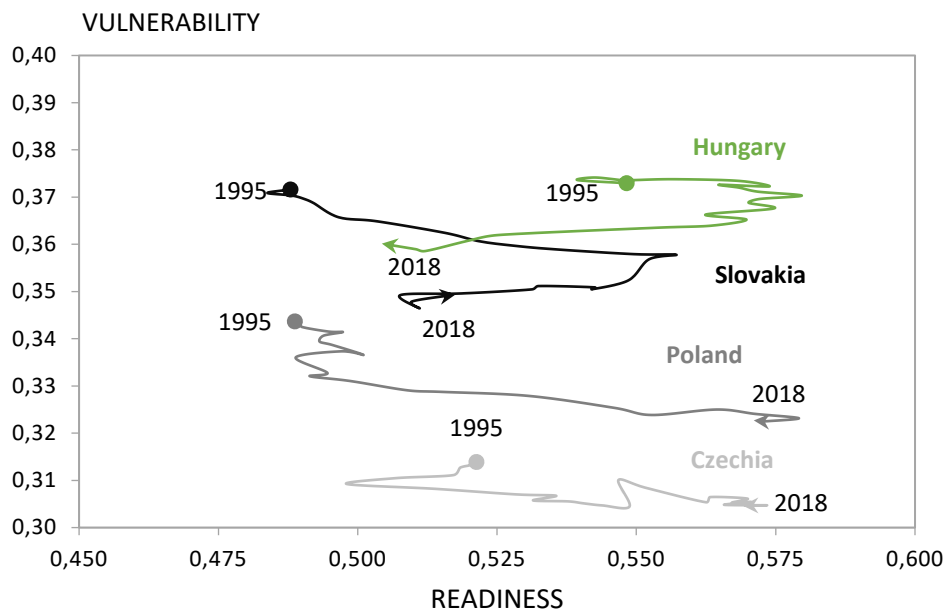
In Hungary, the rate of return on natural resources began to decline sharply from 1% of GDP at the time of the political-economic transition in 1990, and in the 2000s it fluctuated around 0.5% of gross domestic product. In 2011, Hungary's indicator reached a historic high in the range observed in the 21st century, then decreased to 0.25% of GDP between 2012 and 2016. However, after the decrease in the natural resources rents, the value of the indicator unfavourably increased from 2017. Since the mid-2000s, the value of the Hungarian rents has been permanently lower than the values of the Visegrad competitors, however, the EU average has been lower than the values observed in our region since the existence of the available data (1991).

### 3.1.12. The Notre Dame Global Adaptation Initiative (ND-GAIN) index

The index developed by ND-GAIN<sup>42</sup> is designed to quantify how vulnerable a country is to the consequences of climate change and how prepared it is for such consequences. The vulnerability index is made up of components such as the country's exposure due to its geographical location or its dependence on sectors negatively affected by climate change. The preparedness indicator consists of economic- and governance-related, and social adaptation indicators. Both indicators range from 0 to 1, with low values considered good for vulnerability and high for readiness.

<sup>42</sup> Notre Dame Global Adaptation Initiative. <https://gain.nd.edu/about/>

**Chart 18: Notre Dame Global Adaptation Initiative Index - Climate Change Vulnerability and Readiness (1995-2018)**



*Source: University of Notre Dame, Notre Dame Global Adaptation Initiative (ND-GAIN)*

Compared to the other Visegrad countries, Hungary can be considered more vulnerable according to the index. No country in the region was able to significantly reduce its vulnerability between 1995 and 2018, however, there were substantial changes in the preparedness indicator. In terms of preparedness, Hungary shows a decrease compared to 1995. This decline was not typical for the EU as a whole nor for the other Visegrad countries, as they were able to achieve a 5-15% increase in this indicator compared to Hungary's 8% decrease.

### 3.2. Composite green economic and welfare indicators

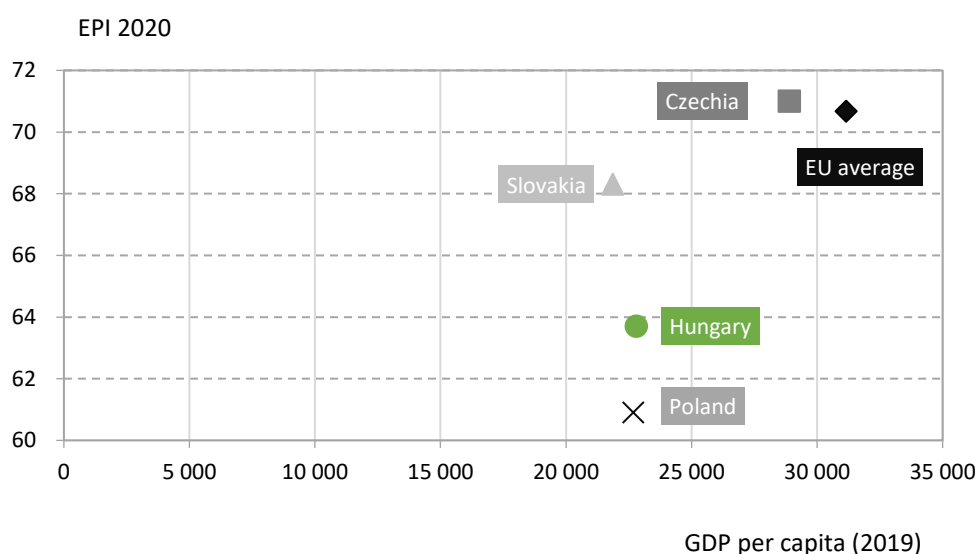
Both the GDP, that is, gross domestic product, and GNI, that is, gross national income, are fundamental as regards designing our economic policies. These indicators however ignore environmental health and social wellbeing almost completely.

To remedy this, a number of alternative indicators have been developed that complement GDP and GNI to show whether economic development is indeed sustainable. In this subsection, we present alternative measures covering the economy as a whole and compare them with changes in GDP and GNI.

#### 3.2.1. Environmental Performance Indicator and GDP per capita

The Environmental Performance Indicator (EPI) is a composite index showing the performance of the countries surveyed in terms of certain environmental aspects against the United Nations Sustainable Development Goals. The indicator consists of 32 indicators, which can be divided into two major groups, i.e., the environment and the ecosystem. Countries can even be ranked relative to one another using the index, with a higher EPI indicating better environmental performance.

**Chart 19: Environmental Performance Index and GDP per capita**



Source: Yale, Eurostat

Note: The EPI index ranges from 0 to 100, with a higher value for better environmental performance.

Chart 19 shows, in addition to the Visegrad Four, the average statistic of the EU countries based on their environmental performance and GDP per capita data. The countries of the Visegrad region have a poorer environmental performance than the EU average, with the exception of the Czech Republic, where the EPI indicator is roughly the same as the EU average. Slovakia lags only slightly behind the EU average in terms of the EPI indicator; however, Hungary and Poland are considered to have low performance in the region. In an EU comparison, Poland is the penultimate country in the ranking based on the EPI index, surpassing only Bulgaria. The change in the EPI indicator between 2010 and 2019 suggests that only 6 of the EU27 countries, including Poland, developed less than Hungary.

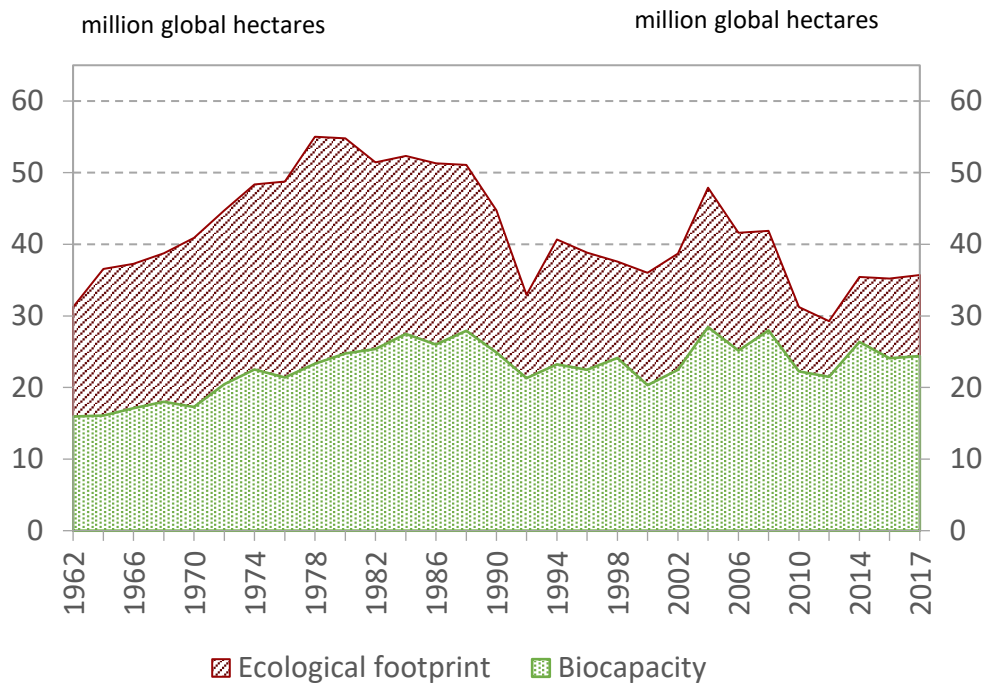
### 3.2.2. The ecological footprint and the human development index

Chart 20 compares Hungary's biocapacity and ecological footprint <sup>43</sup> over the period between 1962 and 2017. Biocapacity captures the maximum of resource supply available in the entire fertile area of the country that can be sustainably produced with the available technology and governance systems. In contrast, the ecological footprint expresses the annual renewable capacity of the biosphere per hectare, that is, the mass of natural capital needed to reproduce the resource needs of a given population in a given year, taking into account technological opportunities and resource management. Thus, based on the comparison of ecological footprint and biocapacity, we are able

<sup>43</sup> Global Footprint Network: Country Trend -- Hungary, 2020. <https://data.footprintnetwork.org/#/countryTrends?cn=97&type=BCtot,EFctot>

to determine whether the country's natural capital is sufficient to sustain consumption and production activities.<sup>44</sup> Over the last 50 years, Hungary, like most countries on the planet, has constantly exceeded the carrying capacity of the land at its disposal, i.e., the country suffers from a permanent ecological deficit. In terms of figures, in 2017, Hungary overused its environmental assets by 11 million hectares. On the positive side, however, the extent of Hungary's ecological deficit has decreased compared to the decades before the political-economic transition.

**Chart 20: Evolution of the ecological footprint and biocapacity in Hungary**

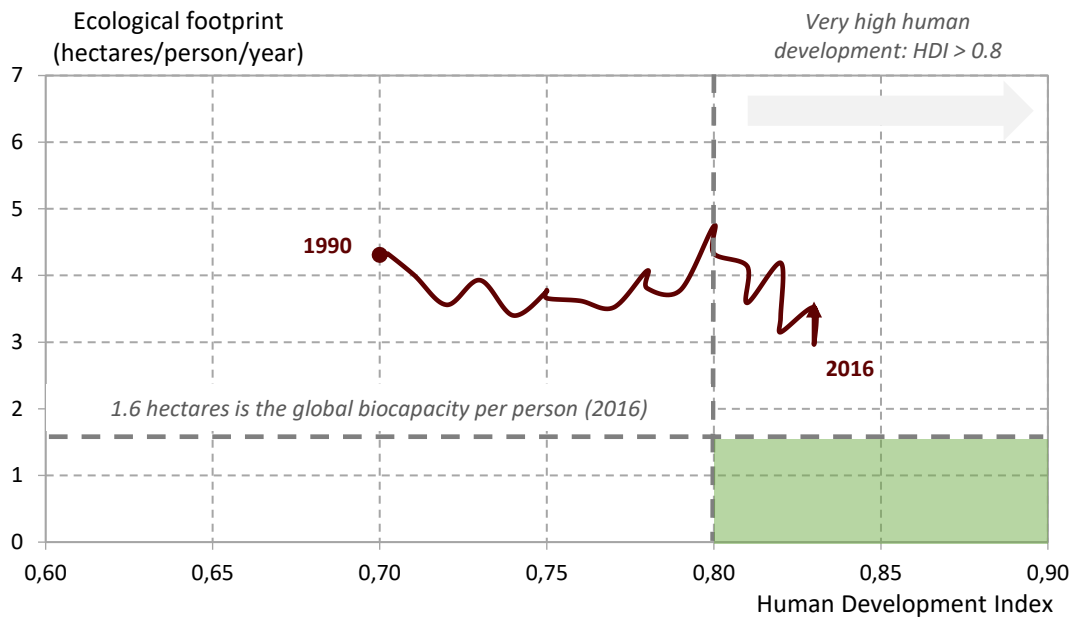


*Source: Global Footprint Network*

Chart 21 shows the relationship between the above presented ecological footprint (in this case the per capita indicator) and the Human Development Index (HDI) from year to year. In addition to the ecological footprint measuring the utilisation of environmental resources, the other indicator is the HDI, which aims to measure a country's development based on the life expectancy, education and living standards of its population. The green box illustrated on the chart indicates the ideal domain of human development and environmentally sustainability in a socio-economic system.

<sup>44</sup> Tenk A.: Természeti erőforrás és környezetgazdálkodás 6., 6 KÖRNYEZETSZABÁLYOZÁS GAZDASÁGI ÉS JOGI ESZKÖZEI Környezet szabályozás gazdasági és jogi eszközei (Natural resources and environmental management 6., 6 ECONOMIC AND LEGAL INSTRUMENTS OF ENVIRONMENTAL CONTROL Economic and legal instruments of environmental control), 2010. (available only in Hungarian)

**Chart 21: Evolution of ecological footprint per capita and Human Development Index in Hungary**



Source: Global Footprint Network, UN

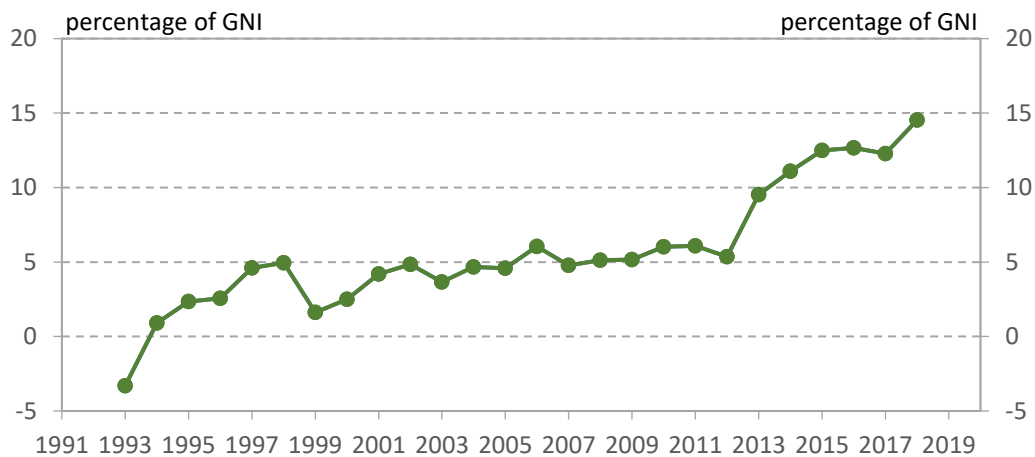
In 1990, the country had a particularly high ecological footprint of 4.3 per capita and a low human development index of 0.7. From these unfavourable values, the Hungarian HDI indicator started to develop rapidly, but the ecological footprint started to decrease only slowly. The level of human development has continued uninterruptedly, and in recent years Hungary has already belonged to the countries with high human development, although by the 2000s this growth had slowed down and has stagnated in recent years. With regard to the ecological footprint, the initial decline soon stopped despite the transformation of the economy after the political transition, and as a result, Hungary has still not approached the value of 1.6, below which the ecological footprint would be sustainable. This means that while Hungary has successfully achieved a higher level of human capital development since the political transition, this development has not been accompanied by a sustainable environmental dimension.

### 3.2.3. Sustainability indicators based on wealth accounting system

Indicators developed as part of the wealth accounting system of the World Bank's Global Program on Sustainability, Adjusted Net National Income (ANNI) and Adjusted Net Saving (ANS) support the analysis of the long-term sustainability of economic performance.

One of the indicators for measuring sustainable development is the adjusted net savings, which adjusts the net national savings indicator by investing in human capital, the use of natural resources and the level of environmental pollution. If the adjusted net savings are negative over a period, the given economy consumed more than it produced, thus, this is not sustainable in the long run. The adjusted indicator is often prorated to gross national income in order to get an accurate picture of a country's savings rate.

**Chart 22: Adjusted net savings in Hungary**

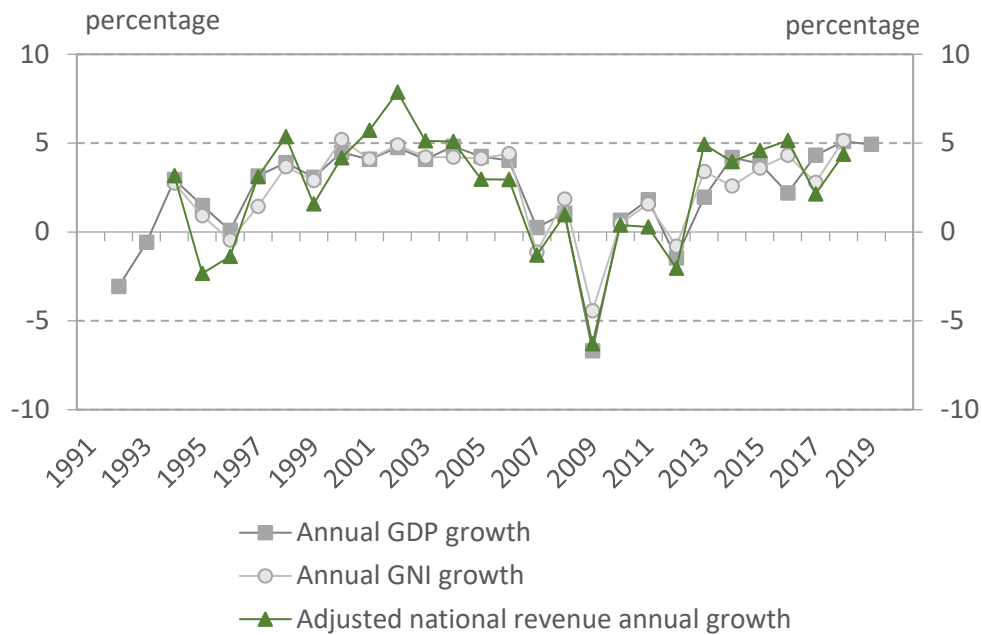


*Source: World Bank*

Hungary's adjusted net savings started to grow strongly in the early 1990s, from particularly unsustainable, negative levels. Subsequently, the adjusted indicator stabilised at a lower savings level of around 6% over a longer period of time. The indicator started to grow significantly in 2012 and it has reached even a level of 15% by 2018. It is important to emphasise that these indicators not only examine environmental sustainability, but also, more broadly, include social dimensions.

The Adjusted Net National Income (ANNI) indicator, also used by the World Bank, aims to measure sustainable economic growth. ANNI is expressed as gross national income (GNI) less the value of natural resources used and capital used in production. If the growth rate of adjusted net national income in an economy is lower than the growth rate of gross national income or gross domestic product, economic growth is not sustainable in the long run. This is when growth is based on the increasing depletion and amortisation of natural resources or the capital used in production. Conversely, if the growth rate of adjusted net national income is higher, the economy is on an increasingly sustainable growth path.

**Chart 23: Annual growth of adjusted net national income in Hungary**



*Source: World Bank*

Based on Chart 23, the periods followed one another in which the growth of ANNI and the change in closely correlating GDP and GNI were higher in the Hungarian economy. Thus, while in the early 2000s and between 2013 and 2016, Hungarian economic growth was sustainable, in other periods it was unsustainable. It is also interesting to note that for economic downturns, the change in adjusted net national income shows a stronger decline. The growth rate of adjusted national income over the entire period is lower than the other indicators. This shows that there has been no turnaround in terms of sustainability in the Hungarian economy.

### 3.3. Summary and conclusions

There is no single composite indicator for assessing the environmental sustainability of the Hungarian economy that would sufficiently capture all important aspects. However, several of the above indicators alone show a realistic picture of an individual area. Overall, most of the indicators paint a rather unfavourable picture: Hungary lags behind the EU average and the V3 countries in several respects, while the EU as a whole also lags behind the fulfilment of sustainable development goals.

**Table 2. Figures on the green financial system**

Indicator	Unit	Hungary	EU
Share of renewable energy sources in total final energy consumption	%	12.61	19.73
Energy intensity of the economy	<i>Oil equivalent (kg)/€ thousand</i>	206.09	119.64
Net energy import	%	69.70	60.60
Percentage of newly registered plug-in electric vehicles	%	0.11	0.75
Recycling rate of municipal waste	%	35.94	47.60
Change in greenhouse gas emissions since 1990	%	- 32.18	- 20.74
CO2 emissions per unit of production	<i>Thousand tons CO2/ \$ million</i>	0.17	0.16
Share of GHG emissions under the scope of EU ETS in Hungary	%	29.04	40.00
EU ETS CO <sub>2</sub> market price	<i>EUR/tCO<sub>2</sub>e</i>	32.71	32.71
Fossil fuel subsidies	<i>GDP %</i>	0.19	0.40
Environmental tax revenues	<i>GDP %</i>	2.37	2.40
Environmental Performance Index (EPI)	<i>index</i>	63.70	70.67
Adjusted net savings	<i>GNI %</i>	14.53	11.50
Adjusted national net income growth rate (2009-2018 average)	%	1.75	1.00
Natural resource rents	<i>GDP %</i>	0.38	0.20
ND-GAIN vulnerability	<i>index</i>	0.36	0.34
ND-GAIN vulnerability change between 1995 and 2018	%	- 3.43	- 2.57
ND-GAIN readiness	<i>index</i>	0.50	0.61
ND-GAIN readiness change between 1995 and 2018	%	- 8.01	7.44
Ecological deficit (biocapacity - ecological footprint)	<i>Million global hectare / capita</i>	1.16	2.53

The values that fall short of the goals also illustrate the importance of the green transition of the economy, which requires investments designed to make production and services, technological solutions, equipment, and consumer good environmentally more sustainable. Regarding green investments, a key question is whether the financial system, as a financier, can support this.

# 4. ENVIRONMENTAL SUSTAINABILITY OF THE HUNGARIAN FINANCIAL SYSTEM

## 4.1. Theoretical considerations

There is currently no widely accepted definition and set of indicators describing whether a financial system is “green”, i.e., how it supports environmental sustainability. However, due to its critical role in achieving environmentally sustainable economy, it is still worth examining the level of environmental development of financial systems based on certain indicators.

Although the definition used by the United Nations Environment Programme <sup>45</sup> interprets sustainability broadly, it could be a good starting point: a sustainable financial system performs its basic functions, such as providing savings and capital allocation, by considering the needs of the economy, society, and the environment.

Within this, focusing on the needs of the environment, we can observe two interrelated problems in the current, presumably unsustainable financial system: the prices of financial assets do not reflect real costs (including environmental externalities), and there is imperfect connection between short-term decisions and long-term consequences. That is, business planning and decision-making in the financial market, which typically focuses on a few years, does not take into account adverse, even irreversible, effects beyond the time horizon.

Numerous studies have pointed out<sup>46</sup> that climate-related and environmental risks are incorrectly priced in financial markets. This is caused by at least two factors collectively: on one hand, information asymmetry results in erroneous pricing, mainly due to the lack of clear, consistent and transparent, globally accepted green taxonomy and disclosure requirements; on the other hand, externalities not accurately and fully priced by market participants cause discrepancies,<sup>47</sup> which is exacerbated by disregarding the events of low probability but of extreme strength (tail events).

Furthermore, traditional risk management, and in particular risk assessment, determines the extent of risks based on historical data. Due to the specific features of climate risks<sup>48</sup>, there is insufficient historical data, therefore, new methodologies such as scenario analysis or stress tests are needed to quantify risk exposures. For the time being, the methodologies are in an initial stage of development and their use has spread only narrowly. Thus, climate risks are difficult to measure

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<sup>45</sup> UN Environment Programme: Creating sustainable Financial System, 2015. [https://wedocs.unep.org/bitstream/handle/20.500.11822/9830/-\\_Creating\\_a\\_Sustainable\\_Financial\\_System\\_a\\_Role\\_for\\_Finance\\_Ministries-2015Creating\\_a\\_Sustainable\\_Financial\\_System.pdf.pdf?sequence=3&BisAllowed=](https://wedocs.unep.org/bitstream/handle/20.500.11822/9830/-_Creating_a_Sustainable_Financial_System_a_Role_for_Finance_Ministries-2015Creating_a_Sustainable_Financial_System.pdf.pdf?sequence=3&BisAllowed=)

<sup>46</sup> Oomen M.: Climate change risk yet to be priced in, say investors, Environmental Finance, 2019. <https://www.environmental-finance.com/content/news/climate-change-risk-yet-to-be-priced-in-say-investors.html>

<sup>47</sup> Hong et al.: “Climate risks and market efficiency,” Journal of Econometrics, Vol. 208(1), pp. 265–281. 2019

<sup>48</sup> BIS: The Green Swan, 2020 <https://www.bis.org/publ/othp31.pdf>

and only materialise over a long period of time, therefore, they are most often not taken into account in today's decisions.

Mitigating these problems can put the financial system on a more sustainable path. So, an environmentally sustainable financial system can bring about positive change in the above problems in two ways:

1. It can assess, manage and mitigate the financial risks posed by climate change and environmental degradation. By improving risk management in this way, financial decisions could be made on the basis of full costs to society. This aspect focuses on the conscious reduction of funding for unsustainable economic activities.
2. It is able to assess the effects caused by the financial system on the environment and the aggravation of climate change, and take steps to increase positive effects, for example by prioritising long-term strategic decisions. This, in turn, helps financing environmentally sustainable economic activities thus mobilising the private financial system for objectives such as climate neutrality.

This chapter discusses and breaks down these two objectives in detail, presenting the current situation through various indicators. In addition, it examines a third, also important aspect, which is an essential precondition for the other two: the presence or absence of data and information reporting.

In this chapter, we devote special attention to the credit institution sector, which accounts for more than three quarters of the Hungarian financial system.

## **4.2. Mobilising financial resources for environmental sustainability**

The financial system has an important role to play in greening the economy. As the transition to carbon neutrality and the circular economy can mostly be financed only from private sources, the mobilisation of private capital is critical.

A greener financial system does not mean a change in its original functions, but it expresses that these basic functions get in line with environmental sustainability. Just as traditional financial products and services are diverse, their green counterparts also take different forms while serving the same purpose in terms of economics. The “only” difference between a green financial instrument and a traditional one is that, in the case of a green product, the amount mobilised is used in a form that can be considered environmentally sustainable.

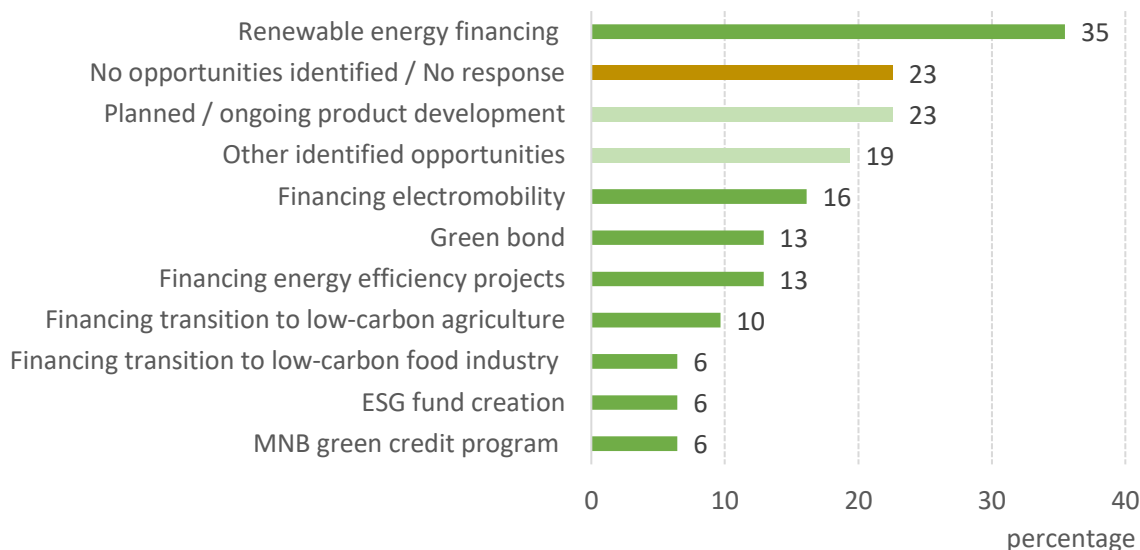
### **4.2.1. Lending**

The most important financial instruments of the Hungarian economy are loans. For the time being, both at the international level and in Hungary, it is difficult to quantify the share of the green portfolio. This is because, as will be explained in more detail below, there has not been any unified green definition so far. This problem is partly addressed by the EU's Green Taxonomy, which

became available in 2020, however, the Taxonomy Regulation<sup>49</sup> is applied to lending so far only on a voluntary basis. On the other hand, Hungarian banks themselves do not typically “label” their loans in terms of sustainability. So, in the case of loans, we can estimate only a part of the real green portfolio.

Mitigating the effects of climate change and preparing for climate change can carry a great deal of economic potential. According to a survey conducted by the MNB in the autumn of 2020, the majority of the credit institution sector sees the greatest business potential in financing renewable energy production, with 35% of credit institutions likely to see an increase in these projects. Other financing options supporting the achievement of sustainability goals have also emerged, such as electromobility (pointed out by 16% of banks), energy efficiency projects (13%) and the transition to climate neutrality in agriculture (10%) and the food industry (6%). In addition to lending, institutions also see a potential also in capital market products: 13% see a potential in green bonds issue and 6% in the establishment of a dedicated fund that takes into account environmental and social aspects (ESG)<sup>50</sup>. In addition, 19% identified other “greening” opportunities, such as setting climate-focused industry limits, reforestation programmes, and financing water management. 23% of the sector indicated that they are planning or are already in the process of product development related to green financing, while 23% stated that they had not identified any economic opportunity related to climate change.

**Chart 24: Identified opportunities by credit institution on climate change**



*Source: MNB questionnaire*

<sup>49</sup> Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0852&from=EN>

<sup>50</sup> ESG stands for the environmental-, social sustainability and corporate governance characteristics as a set of criteria.

#### 4.2.1.1. Corporate lending

##### **Methodological background**

The Taxonomy Regulation sets out an EU-wide framework according to which investors and businesses can assess whether certain economic activities are “sustainable”. The sectors defined so far by the Taxonomy Regulation cover at least 93% of European GHG emissions, but in the future additional sectors will be identified in the manufacturing industry, furthermore air- and water-transportation.

If we compare the distribution of the Hungarian corporate loan portfolio by sectoral, sub-sectoral and sub-subsectoral NACE codes<sup>51</sup> (Nomenclature of Economic Activities) and the economic activities covered by the Taxonomy Regulation, we find that 6.5% of the Hungarian corporate loan portfolio belongs to sectors, for which – if customer-related data are available – sustainability can be determined in accordance with the Taxonomy Regulation. However, this figure does not show the proportion of loans that finance green economic activities, but rather the percentage of financed economic activities for which a sustainability assessment can be made based on sub-subsectoral level.

Thus, the 6.5% can be considered as the maximum of the green ratio in the corporate loan portfolio, the real green ratio is presumably lower than this. There may be additional green activities in 43% of the loan portfolio, the sustainability of which can be determined on the basis of Taxonomy at sectoral or sub-sectoral level. The remaining 50.5% is currently not sufficiently covered by the Taxonomy, thus, even if there is any activity among these that can be considered green, its sustainability cannot be evaluated yet.

Due to the above limitations, within the Hungarian corporate loan portfolio we only have a relatively reliable picture on the stock of green loans related to energy production. The outstanding solar power plant financing bank loan portfolio can be estimated to amount to at least HUF 237 billion at the end of 2019. Taking into account and correcting for data gaps, the real exposure value may be between HUF 250-270 billion.<sup>52</sup> This is approximately 2.5% of the total Hungarian corporate loan portfolio.

The MNB intends to gradually implement the green (Taxonomy-based) classification of loans in additional sectors in the coming period, for which it will also provide regulatory incentives. It should also be seen that, under EU requirements, from the summer of 2022, large credit institutions with publicly issued securities will be required to disclose to the public the proportion of their green loans. Due to all these, we will have more and more information about the sustainability of Hungarian bank lending in the coming years.

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<sup>51</sup> HCSO: Classification - FEOR'08, 2008. [http://www.ksh.hu/feor\\_eng\\_menu?lang=en](http://www.ksh.hu/feor_eng_menu?lang=en)

<sup>52</sup> MNB: Financing the Hungarian renewable energy sector – Challenges and Opportunities, 2021. <https://mnbb.hu/le-toltes/20210121-financing-the-hungarian-renewable-energy-sector.pdf>

#### 4.2.1.2. Retail lending

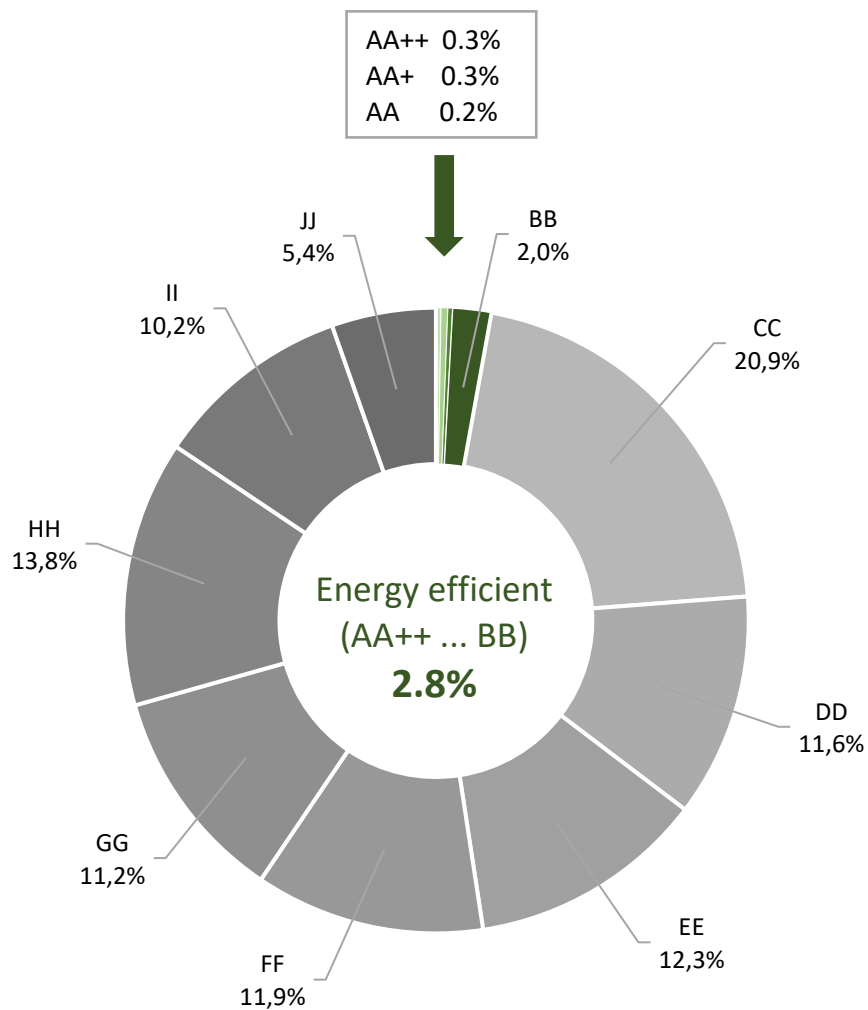
In terms of environmental sustainability, housing loans in the residential segment deserves the highest attention, as energy efficient properties massively contribute to reducing GHG emissions and energy consumption. In Hungary, one third of total energy consumption and 36% of CO<sub>2</sub> emissions may be attributed to residential properties.<sup>53</sup> Thus, one of the main challenges of carbon neutralisation of the Hungarian economy is the renovation of the existing, outdated real estate portfolio in terms of energy efficiency.

The energy rating of residential buildings and the existing bank loan portfolio cannot yet be linked; therefore, accurate data are not available. Nevertheless, it can be seen that, in the period 2016–2020, less than 3% of energy-certified properties can be considered energy efficient (residential buildings with AA ++, AA +, AA and BB ratings). It is important to note in this context that about 160,000 certifications are issued each year, thus, in 5 years only 18% of the total 4.39 million Hungarian housing stock has received an energy certificate. Assuming that the energy rating of loan-financed properties is the same as the distribution of certificates, a green rate is estimated around 3%.

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<sup>53</sup> OCSH: Emission of carbon-dioxide (CO<sub>2</sub>) by industries and households (1985-2017), 2019. [http://www.ksh.hu/docs/eng/xstadat/xstadat\\_annual/i\\_ua026d.html](http://www.ksh.hu/docs/eng/xstadat/xstadat_annual/i_ua026d.html)

**Chart 25: Energy performance of residential buildings certified between 2016 and 2020**



*Source: European Environment Agency*

There has been a clear improvement as regards energy ratings in recent years. The above referred data also show that while less than 1% of properties certified in 2016 were energy efficient, this figure rose to over 5% by 2020.

In its 2017 analysis, the Buildings Performance Institute Europe<sup>54</sup>, based on data covering 66% of the total floor area of real estate in the EU, arrived at the conclusion that the share of energy efficient real estate was 9.8%, and 97% of the total real estate portfolio needs renovation by 2050. The difference is because properties with a 'B' certificate are still considered green today, but later only properties with an 'A' rating will become acceptable. This will require at the same time faster and deeper renovation of properties in the next decades.

#### **Plans of Hungarian banks on green mortgages**

<sup>54</sup> BPIE: 97% of buildings in the EU need to be upgraded, 2017. [https://www.bpie.eu/wp-content/uploads/2017/12/State-of-the-building-stock-briefing\\_Dic6.pdf](https://www.bpie.eu/wp-content/uploads/2017/12/State-of-the-building-stock-briefing_Dic6.pdf)

In the first months of 2021, the MNB collected information in the form of a questionnaire survey about the plans of Hungarian credit institutions concerning green mortgages and the reception of the Green Preferential Capital Requirement Programme for energy efficient mortgages. For renovation measures designed to improve energy efficiency as well as the sale and purchase of newly built properties, more than half of the respondents plan to provide a product considered to be green loan. Almost all of those who plan to introduce such a product would like to take advantage of the preferential capital requirement provided by the MNB, although it is important to see that the MNB has imposed several conditions on the use of this preferential requirement by banks.

One of the aims of the survey for the MNB was to obtain a more accurate picture of the factors hindering the development of green loan products. Half of the banks filling in the questionnaire mentioned the difficulties of developing their database, while two thirds of the respondents do not see sufficient capacity or resources for product development. Also, two-thirds of respondents indicated as discouraging that providing clients with the APR and / or interest rebate included in the terms of the Green Preferential Capital Requirement Programme for energy efficient mortgages could jeopardize the profitability of the given product for the bank.

#### 4.2.2. Bond market

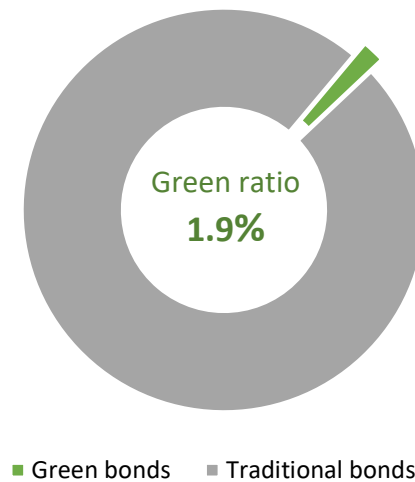
Globally, one of the best known and most widespread green financial instruments is the green bond, although there are large differences in its regional spreading. In Hungary, the first green bond was issued by the Hungarian State in 2020, followed by several corporate issues.

In June 2020, green bonds were issued first in euros and then in September in Japanese yen, the total market value of which reached HUF 671 billion at the end of 2020.<sup>55</sup>The proceeds from the issue of green bonds will be used by the Hungarian State to finance and refinance certain green expenditures of the central budget in accordance with the Sovereign Green Bonds Framework of Hungary. This amount, dedicated to finance green investments, is a negligible part, only 1.9% of the stock of debt securities issued by the central government outstanding at the end of December 2020 and amounting to some HUF 36,000 billion.

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<sup>55</sup> ÁKK: Green Bond, 2020. <https://akk.hu/green-bond>

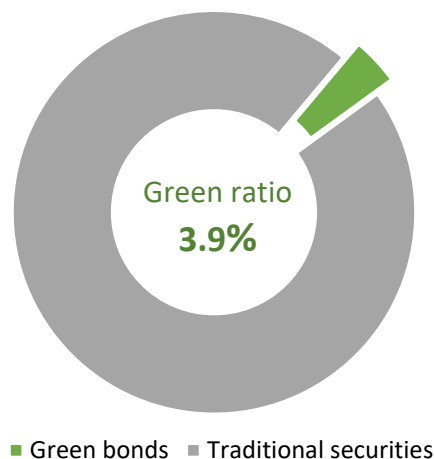
**Chart 26: Stock of debt securities issued by the central government at market value on 31 December 2020**



*Source: MNB*

However, if we look at the issuances made only in 2020, this rate shows a more favourable value. So, in line with international experience, it can be seen that the stock of green bonds is still low as a proportion of the total bond stock, but the growth rate is much higher than that of traditional bonds. Looking ahead, the Government Debt Management Agency announced that in 2021 it plans to issue also 30-year HUF green bonds,<sup>56</sup> i.e. the Hungarian green government securities market will continue to expand both in terms of amount and currency.

**Chart 27: Flow of debt securities issued by the central government at nominal value in 2020**



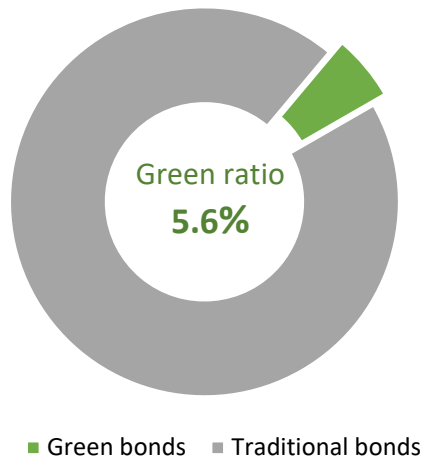
*Source: MNB*

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<sup>56</sup> ÁKK: ÁKK published Hungary' 2021 Financing Plan, 2020. <https://akk.hu/content/path=FinPlan2021>

The first corporate green bond issuance also took place in the summer of 2020 under the MNB's Bond Funding for Growth Scheme by real estate developer CPI Hungary Investments Kft.<sup>57</sup> With this issue of HUF 30 billion, the corporate green bond market has been launched in Hungary. Comparing to the total corporate bonds outstanding at the end of December (HUF 1,525 billion), the share of corporate green bonds issued is also low for the time being, only 5.6%.

**Chart 28: Stock of debt securities issued by non-financial corporations at market value on 31 December 2020**



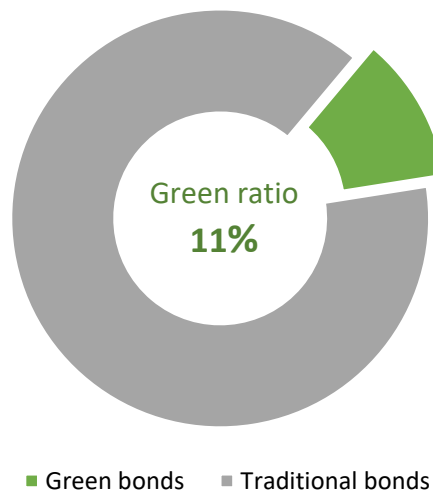
*Source: MNB*

Given that this issue also took place in the year 2020, we also get a more favourable value compared only to the 2020 corporate bond issues. 11% of corporate bond issues realised in 2020 were green bonds.

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<sup>57</sup> CPI Property Group: Green Bond Offering in Hungary, 2020. <https://www.cpigroup.hu/en/news/cpi-property-group-green-bond-offering-in-hungary>

**Chart 29: Other bonds issued by non-financial corporations in 2020 at nominal value**



*Source: MNB*

The MNB aims to further expand the green bond market. In the spirit of this, the creation of a National Strategy for Sustainable Capital Market was launched, the objectives of which is to develop the Hungarian market of green bonds and green mortgage bonds, and to support investments serving sustainability through the capital market (see Chapter 6 for more details). The MNB itself is also present in the green bond market as an investor (see box).

#### **Green bond portfolio in MNB's foreign exchange reserves**

Based on the decision of the Monetary Council, building a dedicated green bond portfolio started in 2019, making the MNB one of the first central banks even globally to demonstrate its commitment to green goals also in foreign exchange reserve management. The size of the green bond portfolio within the reserve reflects roughly the size of the global green bond market, which is currently around 1% of the size of the total bond market. The risk-reward profile of the portfolio does not differ significantly from similar investments. The slightly longer maturity profile compared to MNB's other portfolios supports the long-term approach to green finance.

The management of the green bond portfolio is not different from the management of other portfolios in financial terms: risk-yield considerations are prioritized in investment decisions, which also reflects the general fact that green financing targets projects that are both commercially and environmentally sustainable. Compliance with environmental objectives is ensured by MNB with an easy-to-manage but sufficiently stringent set of conditions that is in line with international best practice. Accordingly, green bonds must comply with the Green Bond Principle required by the International Capital Market Association (ICMA), have a green rating from an external independent partner, and once adopted, compliance with the EU Green Bond Standard and Taxonomy may also become a requirement. In addition, the MNB examines the

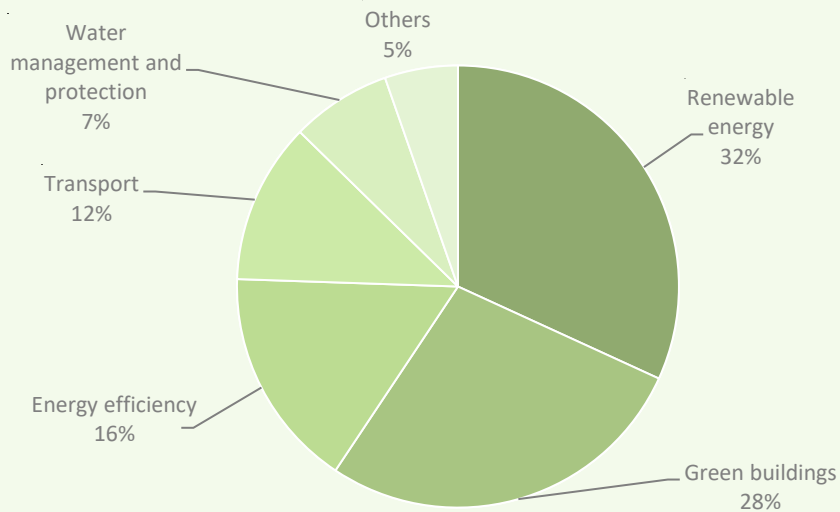
commitment of bond issuers to sustainable development, thereby reducing the so-called “greenwashing” risk. If subsequently the bonds do not meet the expectations from a green point of view, for example, the environmental impact of the projects is lower than the commitment, or the issuer's general activities show a “green default”, then the MNB may decide to sell the bonds. The latter measure is essential for all market participants to preserve the integrity of the green market.

The green bond portfolio includes euro-denominated bonds, but the geographical exposure is well diversified, with securities from many countries and regions. The backbone of investments is predominantly provided by supranational institutions and issuers from EU countries, which well reflects the composition of the investment universe. The portfolio includes a number of different types of bonds in accordance with the MNB's general framework: the investments include government bonds with high credit rating, supranational issuers, bank and corporate bonds, as well as covered bonds.

The wide horizon of purchased bonds allows for covering the green targets as wide as possible. A special feature of green bonds is the mandatory publication of the type and effects of financed green projects. Thus, an important aspect is added to the management of the portfolio: the monitoring of project objectives and environmental impacts (e.g.: quantification of CO2 emission reductions, quantification of energy savings in GWh, etc.). However, experience to date has shown that one of the biggest challenges for the green bond market is to standardise these reports and to aggregate positive effects at portfolio level.

The green goals financed by the green bond portfolio cover a very wide spectrum, of which investments related to renewable energy, energy efficiency projects and the construction of green buildings can be highlighted, but realised investments include also, for example, battery production capacity building. The projects have a global coverage, mainly due to supranational issuers, and bonds finance activities also in many developing regions (e.g., Africa, Asia), thus providing an even more effective overall green “pay-off” due to green investments that replace operations in these countries that are in many cases more polluting. It is also important to emphasize here that, even in this case, MNB does not run the risk of specific projects, but the credit risk of highly – in many cases ‘AAA’ – rated issuers, while the positive environmental effects still become available.

**Chart 30: Distribution of green targets financed by the green bond portfolio**



*Source: MNB*

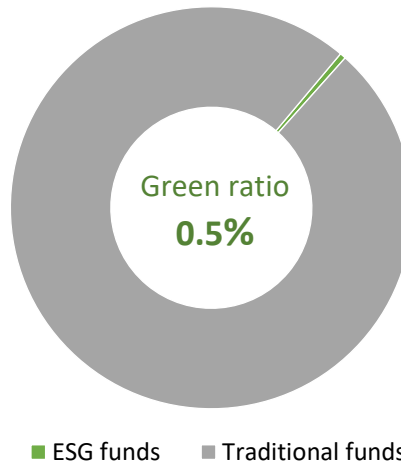
The market for green bonds and other bonds with dedicated objectives is facing start-up phase, and the MNB is actively participating in the global launch of market segments supporting sustainable growth, keeping in mind also its primary tasks of foreign exchange reserve management (liquidity, security, yield).

#### 4.2.3. Investment funds

In the Hungarian market, the share of investment funds related to environmental or social sustainability is still low, about 0.5%, accounting for only HUF 27 billion within the total portfolio of investment funds of about HUF 5,500 billion. This figure mainly includes investment funds managed on the basis of ESG, for which the management policy takes, to some extent, into account explicitly the environmental (“E”), social (“S”) sustainability and responsible corporate governance (“G”) characteristics of the investments. This is therefore an extremely broad definition, i.e., the Hungarian investment funds provide green financing (promoting environmental sustainability) actually to an even lesser extent than the above ratio. This rate is low even internationally, as has reached 15% in Europe.<sup>58</sup>

<sup>58</sup> PWC: 2022: The growth opportunity of the century, 2020. <https://www.pwc.lu/en/sustainable-finance/docs/pwc-esg-report-the-growth-opportunity-of-the-century.pdf>

**Chart 31: Share of assets managed in ESG mutual funds in Hungary**



*Source: MNB/BAMOSZ*

In the segment, the entry into force of the EU Sustainable Finance Disclosure Regulation (SFDR)<sup>59</sup> on 10 March 2021 is a significant milestone, as it will channel ESG and sustainable investment products, which are currently largely unregulated, based on market conventions and self-ratings, into a more regulated and transparent system.

#### 4.2.4. Insurance companies

In the insurance sector, unit-linked funds provide an opportunity to serve the investment needs of clients that also take green considerations into account. These investments are not yet “labelled” at present, i.e., there is no official data on their share associated with green financing. In the absence of an official classification, the MNB was able to identify such (named) asset funds in the case of 5 insurance companies by searching in the names of the asset funds for keywords (e.g.: ESG, green, environment, climate, sustainable). Funds dedicatedly taking into account ESG aspects can only be found among the products of two insurance companies, one of which launched six ESG asset funds after the end of Q3 2020. Thus, in 2020, there was an improvement in the insurance companies’ asset funds with green and sustainable features, as several new portfolios were established. There was also an insurance company that transformed an existing asset fund into an investment that takes into account also ESG considerations. Others have launched new assets funds linked to sustainable development or environmentally conscious asset funds.

At the end of Q3 2020, the assets of these funds already exceeded HUF 22 billion<sup>60</sup>, which is 1.7% of the assets of unit-linked funds totalling to HUF 1,300 billion. Compared to the 1.5% ratio at the end of 2018, some expansion can be observed in green type asset funds, given that the projection base also increased during this period. However, it is still not possible to report that they represent a significant segment of the market. In terms of the composition of asset funds, they are typically

<sup>59</sup> Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02019R2088-20200712>

<sup>60</sup> Of which approx. HUF 1.3 billion of capital is invested in Hungarian investment funds.

backed by the Hungarian and foreign investment funds of the related institutions, they do not make individual direct investments. ESG and green unit-linked funds on the Hungarian market are not yet widespread in insurance asset management.

In the insurance segment, the “data coverage” of products will also improve significantly due to the imminent entry into force of the SFDR.

#### 4.2.5. Pension funds

In the voluntary pension fund market, clients have currently quite limited opportunities to enforce green considerations in their investment decisions. In 2020, however, there was some expansion also in the voluntary pension fund sector.

Currently, the only eligible pension fund portfolio managed in its name explicitly on ESG basis was launched after reaching the minimum initial capital of HUF 1 billion, and already at the end of Q3 2020 its value was close to HUF 1.4 billion. However, the portfolio accounts for only 0.93% of the total assets under management at the pension fund. According to the investment policy, long-term sustainability aspects, primarily environmental and social aspects, play a privileged role in investment decisions. In addition, the investment manager makes at least 80% of its investments based on the ESG criteria. A connection to green finance is reflected in the investment policy of another portfolio in a less declared manner. According to their description, they aim to realise high returns by making use of trends and long-term processes that affect the whole world, including even the field of renewable energy sources. Investment funds with ESG or green theme offered in the Hungarian market can be found in only 3 portfolios of 2 pension funds, to a minimum extent. The SFDR must also be applied to voluntary pension funds, thus, the “data coverage” of products is expected to improve significantly also in this sector.

#### 4.2.6. Venture capital

In the United States, China and Western Europe, the number of green venture capital funds and investors, as well as the volume of invested capital has grown dynamically in recent years. The driver of growth is provided by companies that are still in the initial stages of growth and that develop and apply climate-friendly, clean technologies. Globally, in 2019, venture capital transactions targeting climate-friendly technologies were concluded in total amount of over USD 36 billion (appr. HUF 10 000 billion)<sup>61</sup> To a much smaller scale, but green venture capital funds also operate and are under preparation in Hungary, which aim to invest capital into local start-ups or growing companies that apply a business model based on environmental sustainability and circular economy, typically in the field of water management, waste management and circular manufacturing technologies and renewable energy. The capital managed by such Hungarian (already started or ready to start) venture capital funds can be estimated at HUF 30-35 billion.

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<sup>61</sup> The Economist: Climate-conscious venture capitalists are back, 2020. <https://www.economist.com/business/2020/10/29/climate-conscious-venture-capitalists-are-back>

#### 4.2.7. Stock market

Unlike debt type financial instruments, such as a loan or bond, where the green feature is usually provided by the financing objective, equity shares are considered green if the core business of the company issuing the share serves environmental sustainability. There is currently no generally accepted definition for this either, although listed companies will also have to report their compliance with the EU Taxonomy from 2022 on, which will essentially be the main regulatory measure of “being green”. According to the current practice, shares of companies operating in certain green industries (e.g., “cleantech”) and shares of issuers included in some kind of sustainability stock index are considered green shares. In Hungary, among the companies listed on the Budapest Stock Exchange one or two companies may be said to carry out their core business considered to be green.

Nevertheless, significant progress can be observed in the field of environmental sustainability in Hungarian joint-stock companies as well: corporate governance systems taking into account also ESG aspects are spreading, especially in the case of large cap companies. There are also good examples among medium-sized companies. This endeavour is supported by the ESG Action Plan of the Budapest Stock Exchange (for more details see Section 7.2).

### 4.3. Climate-related and environmental risks

A mechanism that indirectly facilitates green mobilisation is the more prudent management of risks, which means that funding may be cut off and withdrawn from unsustainably operating and therefore riskier companies or sectors, thus increasing the proportion of green activities funded.

In recent years, the MNB has used two tools to assess banks’ exposures and preparedness related to climate change and environmental risks<sup>62</sup>. On the one hand, it collected information on the attitudes and preparedness of the entire Hungarian credit institution sector by means of a questionnaire survey, and on the other hand, it assessed the level of transition risk of the entire banking system through a detailed concentration analysis.

The MNB assessed for the first time the preparedness of the credit institution sector for climate change and sustainable financing in 2019, in which 71% of the credit institutions participated. In 2020, the MNB conducted a survey on the topic again with the involvement of the entire credit institution sector, thus gaining an insight into the institutions' attitude towards climate change. Institutions had the opportunity to complete the questionnaire between September and October 2020. The MNB grouped the survey questions around five main topics, which sought to assess the institutional practices related to climate risks from different perspectives.

#### 4.3.1. Banking attitude and preparedness

##### 4.3.1.1. Internal governance

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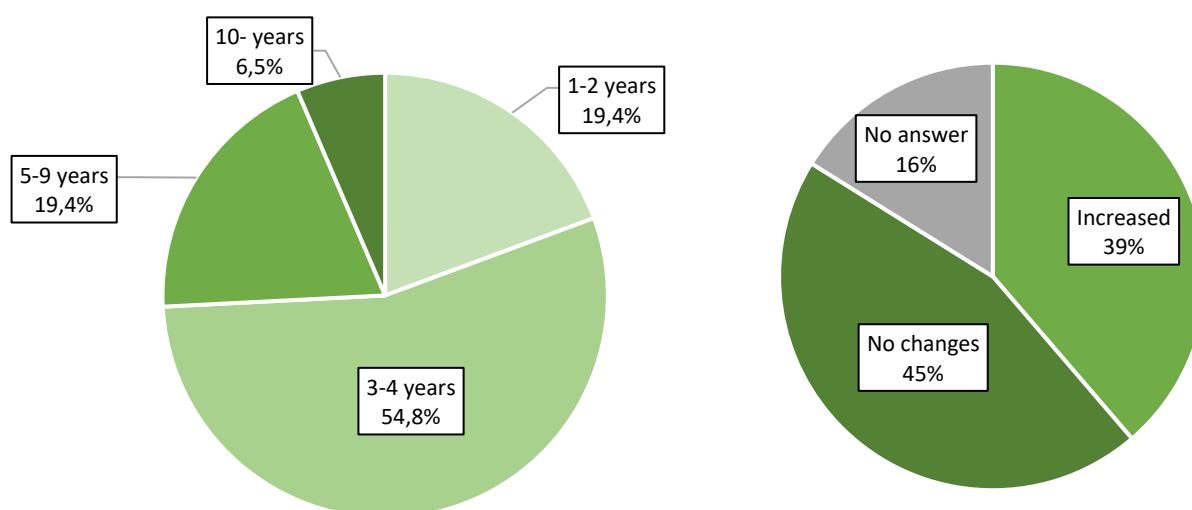
<sup>62</sup> Climate-related and environmental risks affecting the financial performance of the clients of financial institutions can be classified as transition or physical risks. Transition risks are risks to financial institutions arising from the transition to a low-carbon and climate-resilient economy. Physical risks are risks to the financial institutions that arise from the physical impacts of climatic change and environmental degradation.

In the field of internal governance and corporate structure, the questionnaire focused on how the individual institutions relate to the risks caused and opportunities provided by climate change at an organisational level, and to what extent additional tasks related to climate change appear in the structure of institutions.

In general, the lack of prudent management of the risks posed by climate change can be attributed to the mistake of short-termism. More than half of the institutions have a 3–4-year business planning time horizon, which in itself is not problematic, but can prove to be very short in terms of managing climate risks in time. However, only 6% of institutions have a business planning time horizon of or over 10 years, in which risks due to climate change could already be reflected.

The 2019 report<sup>63</sup> of the European Banking Authority although focused primarily on Eurozone banks, came to the same conclusion. The average time horizon of banks in terms of business planning and strategy framing is 3-5 years, which makes it difficult to incorporate sustainability principles into corporate governance and business policy.

**Charts 32-33: Time horizon of credit institutions in business planning (left chart) and changes in the importance of sustainability and climate protection (right chart) in the strategy between 2019 and 2020**



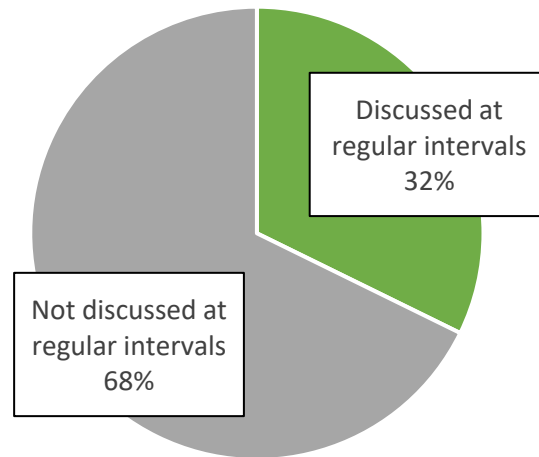
*Source: MNB questionnaire*

One of the big threats of the COVID-19 pandemic, in addition to the loss of human lives and declining economic performance, is that efforts to achieve sustainability are pushed into the background. Such fears (based on institutions’ responses) seem unfounded in the banking sector. 39% of respondents stated that the weight of climate protection issues increased within the institution’s strategy in 2020, while no institution indicated a decrease in the importance of climate issues.

<sup>63</sup> EBA: Report on undue short-term pressure from the financial sector on corporations, 2019. <https://eba.europa.eu/file/461440/download>

A key measure of priorities in the operation of an organisation is the frequency with which certain questions and tasks are discussed at the top management level, and the responsibility of decision-makers in the organisation for a given topic. Only one-third of credit institutions responded that sustainability and climate change risks are discussed by decision-makers at regular intervals, while 68% responded that they are not discussed at all by the executive body with governance powers.

**Chart 34: Decision makers and climate risks**



*Source: MNB survey*

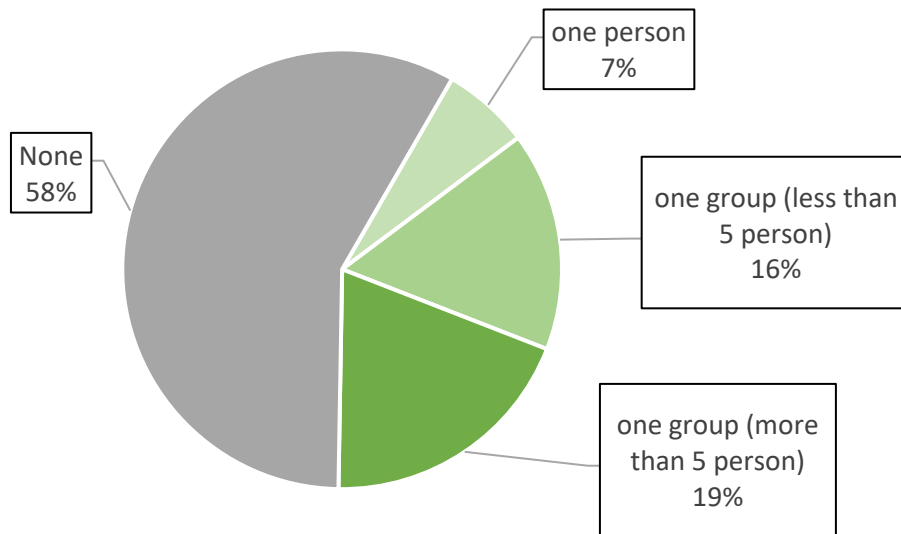
This is a particularly low level in an international context. A 2020 survey by the GARP Global Association of Risk Professionals, which surveyed 71 financial institutions globally, found that nearly 85% of them control these risks and 75% even discuss them.<sup>64</sup>

More than half of the Hungarian institutions do not have a dedicated sustainability staff, while only 19% have an organisational unit or working group of more than five people.

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<sup>64</sup> GARP: GRI Climate Survey, 2020. [https://climate.garp.org/wp-content/uploads/2020/05/GRI\\_ClimateSurvey\\_051320.pdf](https://climate.garp.org/wp-content/uploads/2020/05/GRI_ClimateSurvey_051320.pdf)

**Chart 35: Sustainability-related responsibilities within the institution**



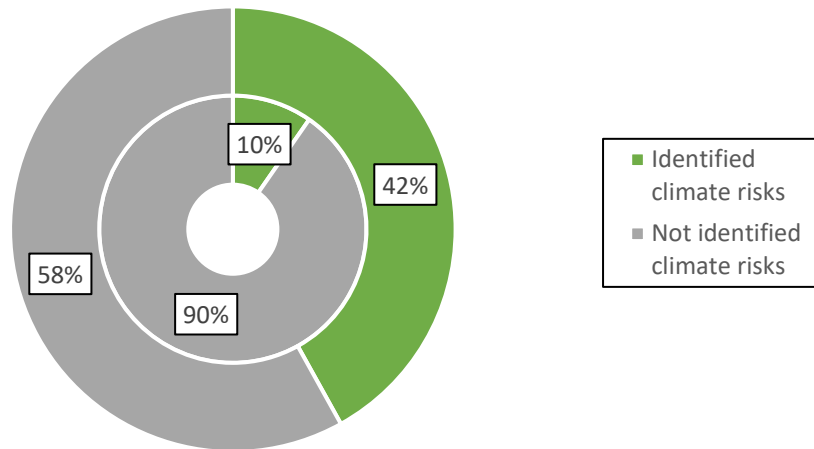
*Source: MNB questionnaire*

Several institutions indicated that there is a sustainability working group only at the banking group level, which competencies are available at group level. It is worth mentioning that it seems to be a good practice that one of the credit institutions has formed a green working group of leaders from different areas, where the colleagues deal with the management of the risks arising from climate change in addition to the existing tasks.

#### 4.3.1.2. Risk identification

The second major topic of the survey was the identification of risks related to climate change. Within the business planning time horizon, the proportion of institutions identifying climate change-related risks has increased (somewhat perhaps surprisingly) from 10% to 42% over the course of a year. Several institutions indicated that not yet in the current planning time horizon, but in the next planning cycle, climate change-related risks appear to be outlined. Some institutions indicated that they explicitly avoid transactions involving climate exposure, thus, they have identified climate risks not directly (within the portfolio) but indirectly (conscious avoidance of transactions implying climate risk).

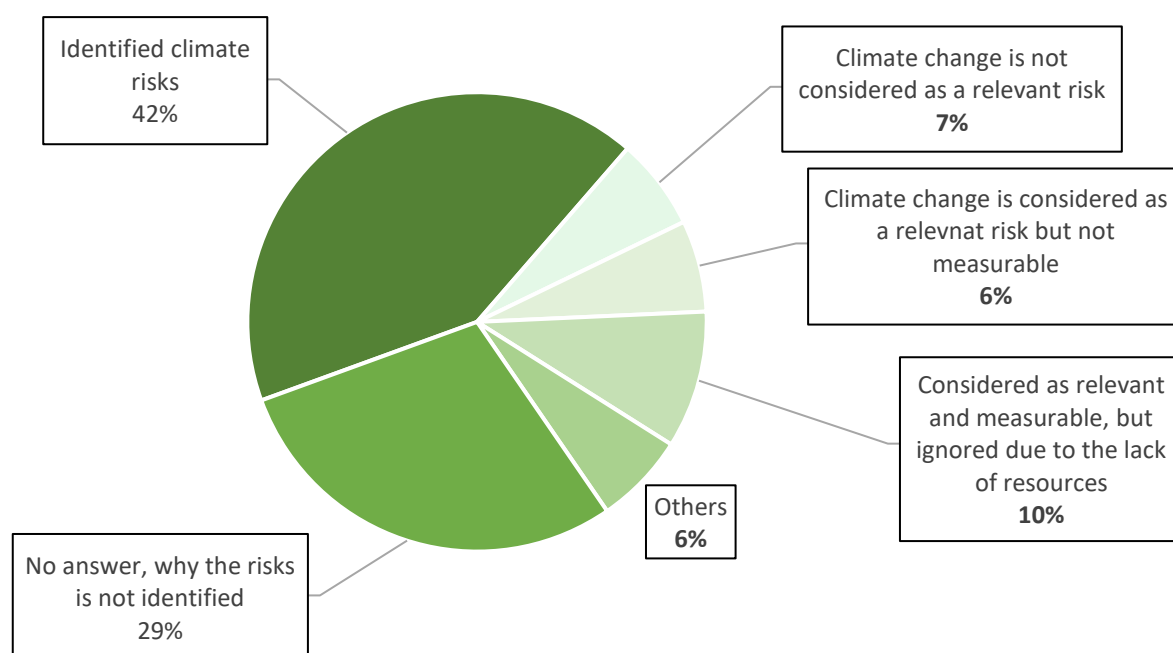
**Chart 36: Identification of climate risks (outer ring year 2020, inner ring year 2019)**



*Source: MNB questionnaire*

Despite the strong increase, it should be noted that more than half of the institutions still did not identify such risks. The reasons given by respondents in this group vary: although a third of institutions did not explain why they did not identify climate risks, 7% of banks did not consider them relevant. Another 16% consider it relevant, but either do not consider it measurable, or even if they consider these factors measurable, due to lack of resources, they have so far ignored them. The lack of necessary competence and expertise may be behind both responses, due to which the risk type that is otherwise considered relevant cannot be integrated into the risk management systems.

**Chart 37: Reasons for not identifying climate risks**



*Source: MNB questionnaire*

Institutions that have identified risks arising from climate change have “discovered” them in several risk types. From among the credit institutions, 32% identified risks related to climate change as credit risk, 23% as reputational risk, 19% as operational risk, 16% as market risk, 10% as other risk and 6% as liquidity risk. This is an interesting result in that respect that the report published by GARP, based on the responses of non-Hungarian banks, also highlighted credit risks as the most significant, but there are large differences in the other risk categories. While market risks proved to be the second most important in internationally context, it is preceded by reputation and operational risks in Hungary. This can be explained by the fact that the development of the Hungarian capital market is lower than in other Western European or North American states. Reputational risks rank penultimate according to the GARP survey; this type of risk received the second highest value in Hungary. From this, we can conclude that for the time being, Hungarian banks deem climate risks to be a corporate social responsibility (CSR) problem rather than as financial risks.

Institutions that have identified the consequences of climate change as a financial risk see the greatest risk in the possible default in their existing exposure due to climate change, with several respondents indicating that defaults may be concentrated in one sector rather than the entire portfolio. Several responses focused on operational risks arising due to the physical effects of climate change. According to one respondent, the effects of climate change appear across the entire risk spectrum, while two institutions highlighted the social risks posed by climate change.

The survey shows that the COVID-19 epidemic may have had a major impact on the perception and identification of environmental risks other than climate change. Namely, between 2019 and

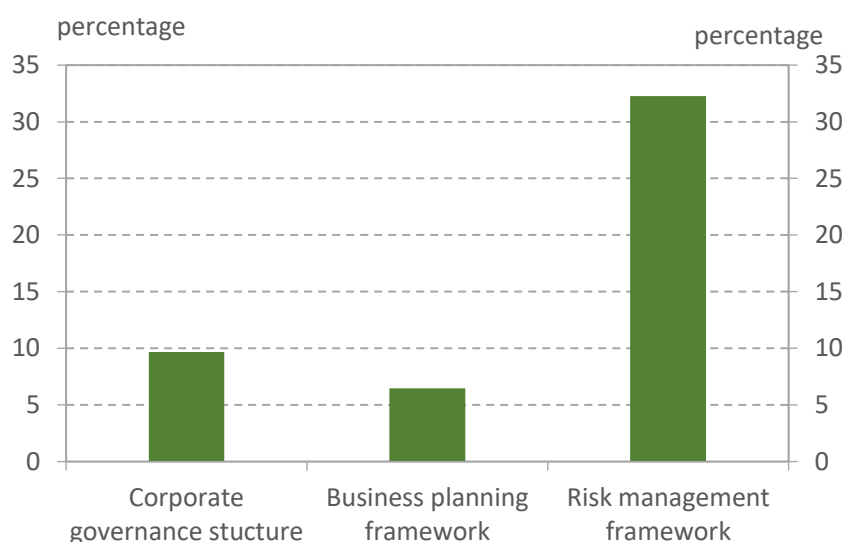
2020, the proportion of credit institutions that identified such risks increased from 19% to 55%. Most respondents mentioned the emergence of pandemic risk among other environmental risks, while the second most mentioned were the exposure of agriculture to extreme weather conditions (erosion, price, drought, environmental disasters) and several indicated negative environmental impacts due to biodiversity loss as risk factor.<sup>65</sup>The sustainable management of water resources, the need for transition to a circular economy and the risk of social impacts arising from the general deterioration of the environment were also mentioned.

#### 4.3.1.3. Risk management and quantification

A number of questions in the questionnaire addressed to what scale institutions took specific actions to integrate risk management into their organisational operations. Institutions that did not identify climate risks were automatically “given” a negative response.

32% of institutions responded that climate risks are reflected in some way in their current corporate governance framework or their business planning and risk management framework. Risks were most integrated (32%) into risk management frameworks, while 10% of credit institutions indicated corporate governance frameworks, 6% indicated also business planning frameworks, and one institution indicated that it had integrated climate change risks into all three frameworks. Thus, integration into the risk management framework seems to be the first step in integrating climate change risks – about a third of the institutions have already come this far, but there are far fewer banks that have gone further and would have “introduced” the new approach into corporate governance and business planning.

**Chart 38: Integration of climate risks into frameworks**



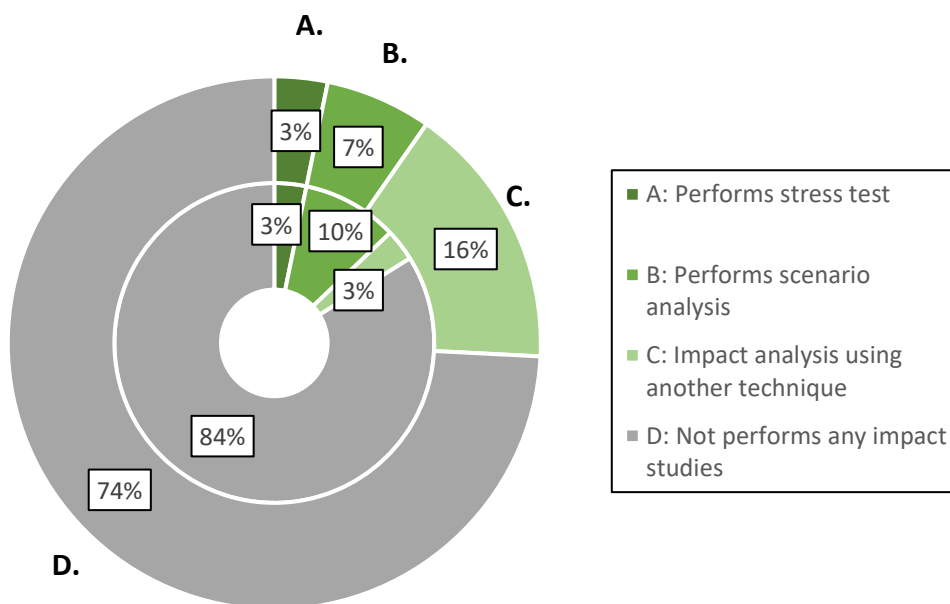
*Source: MNB questionnaire*

<sup>65</sup> Although banks referred to these in the survey as environmental risks other than climate change, *mutatis mutandis*, the mentioned factors are associated with climate change.

The number of institutions examining the impact analysis and the likelihood of occurrence of climate risks is stagnant. In both 2019 and 2020, 19% of institutions conducted some kind of an impact study on the risks of climate change and the likelihood of its occurrence. One institution indicated that although the effects of climate change on the portfolio had been analysed, a likelihood for its occurrence could not be assigned to this.

In the case of the two sub-categories of climate risks, however, there is an increase in the proportion of banks performing an analysis. In 2019, the effects of transition risks on the portfolio were examined by only 3% of institutions, and in 2020, already 16% of the sector addressed the problem. Physical risks were more widely addressed by credit institutions in both years, with 6% in 2019 and 26% in 2020 analysing these risks in some way. Regarding the methods for the quantification of impact assessments, in 2020 3% of institutions performed a stress test to quantify physical and the same proportion to quantify transition risks, while 6% (physical risks) and 10% (transition risks), respectively, of respondents indicated the use of the scenario analysis. However, despite the low number of institutions quantifying risks, it is encouraging that 77% of credit institutions plan to further analyse and integrate risks more widely into their risk management systems.

**Chart 39: Impact studies (outer ring shows transition risks, inner ring shows physical risks) in 2020**



Source: MNB questionnaire

It is a remarkable result that Hungarian banks focus on physical rather than transition risks. Based on GARP results and ECB conclusions, banks are globally focusing on transition risks. If a bank perceives the transition risks to be higher, it indicates that it perceives the environmental policy changes to mitigate climate change as strong. In contrast, the prioritisation of physical risks focuses

on adaptation, quasi considering it inevitable that climate risks would manifest much stronger than at present.

58% of the institutions indicated that environmental considerations appear in some way in the structure of the applied rating / scoring models. Most indicated that environmental considerations (energy performance certificate, exposure to environmental and physical risks from climate change) are taken into account to a varying extent in the inclusion of real estate collateral, but several mentioned also the priority given to financing renewable energy production and the financing of environmentally friendlier vehicles.

#### 4.3.1.4. Sustainable operations

The aim of the MNB survey was also to explore the green features of the day-to-day operations of Hungarian credit institutions. One of our questions was whether the institutions were following the legislative changes developed at EU level in the field of sustainable finances and whether they had identified any tasks in this regard. 77% of institutions follow developments at EU level and 48% have identified specific tasks in this regard. Interestingly, not the Taxonomy promoted in the international economic press facilitating the identification of green activities was mentioned the most, but the EBA/GL/2020/06 guidelines on loan origination and monitoring, published by the European Banking Authority. One institution indicated that it would like to develop its green lending specifically based on the EU Taxonomy, while another institution mentioned the planned introduction of the EU Green Bond rating in Hungary. Several credit institutions are examining the possibilities of following EU developments more closely, and there was also a feedback where it has been explicitly emphasised that they are informed about EU level developments only through the MNB communication.

In a separate question, we asked the institutions for their views on the impact that digitalisation could have on the achievement of environmental objectives. 94% of the institutions answered that digitalisation processes help achieving environmental goals, while according to 6% they have a neutral effect on achieving these goals. Among the positive effects, several highlighted the reduction in environmental load due to paperless operation (production-, warehousing- and transportation-related burdens), but the possibility of the reduction in branch network and in emissions from travel to work due to online banking were also mentioned. Several respondents mentioned the positive environmental effects of declining cash use. According to the credit institution sector, the spread of home office can have a positive effect on emission reductions, thus the environmental load due to the travel, operating office buildings may be reduced, and channelling meetings (both external and internal) to the online space may also help achieve the set environmental goals. However, the additional electronic device requirements associated with digitalisation, their operation, and the increase in capacity required for total online operation may result in additional resources that may slightly overshadow the clear positive impact on environmental goals.

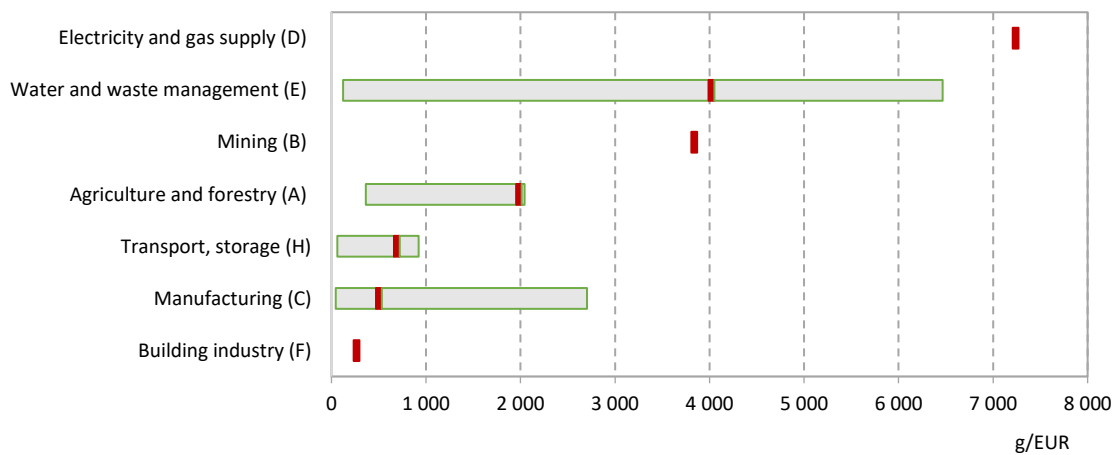
#### 4.4. Quantitative Analysis: Bank Carbon Risk Index (“BCRI”)

In addition to the qualitative survey based on self-reporting, MNB also strives to be able to assess climate exposures quantitatively based on bank data reporting. In the spirit of the latter, the climate stress test of the MNB planned for 2021 is being prepared, which allows primarily for a more accurate assessment of the transition risks, but it partially also takes into account the physical risks. However, until the climate stress test is completed, it is possible to quantify exposures using simpler methods, based on the specific greenhouse gas emissions typical for the sectoral classification of debtors. In the following, we present in detail the methodological background of our index, the conclusions that can be drawn from its development over time, and the dilemmas that arose.

##### 4.4.1. Greenhouse gas intensity

An important indicator of the environmental burden of certain economic activities is the so-called GHG intensity, i.e., greenhouse gas emissions per unit of value added. Given that the global warming potential per unit mass of each gas can be several orders of magnitude larger than that of carbon dioxide, the relevant statistics is the so-called CO<sub>2</sub>-equivalent, i.e., the volumes are multiplied by the ratio of the heating potential of the gas to carbon dioxide over 100 years. Intensity statistics are provided by Eurostat in an annual breakdown, with a lag of 2-3 years, for each country, including almost all sections of the national economy (A, B,... T), and a broad but non exhaustive range of sectors (A01, A02,... T98). Chart 40 shows the sections with the highest specific carbon intensity in Hungary for 2017.

**Chart 40: National economy sectors with the highest carbon intensity in Hungary for 2017**



**Note:** The bars show the scatter of sectoral values. No sectoral statistics are produced for B and F of the sections of the national economy shown in the chart. Activity D covers a single sector in terms of classification.

Own chart. Data source: Eurostat

For example, GHG intensity of section “A”, which also includes agriculture, is by order of magnitude higher than that for construction but is only a fraction of that for mining or electricity generation.

However, the differences within the individual sections can be similarly large. Within section A, for example, agriculture and fisheries represent the two extremes in terms of carbon intensity, which is a good example of the importance of sectoral subdivision.

#### 4.4.2. The carbon risk indicator

The transition risk of financial institutions is higher if their lending leans more towards intensive GHG-emitters. The question, of course, is how much higher the risk is, that is, what is the relationship between intensity and risk. We reckoned with two scenarios. In the one, we assumed that the price of GHG would develop sector-neutral, thus, the risk was directly proportional to the intensity. In the other, we assumed that the measures would basically hit the larger polluters, i.e., the relationship is not linear. This is in fact also true of the current situation, as the ETS covers, at least for the time being, large polluters. Here, to describe the connection, we assumed a sigmoid (Gompertz) curve, which - with the applied parameterisation - bisects the density with some exaggeration, as – below and above a certain emission level – it assigns similarly small and high weights to each activity, separating the extremely intensive emitters from the rest. It comes from all these that while, for example, mining with linear weighting is only moderately risky, with Gompertz weighting, it is maximally risky similarly to electricity generation and waste management.

In creating the indicator, we started from the end-of-month transaction-level outstanding principal data on on-balance sheet, off-balance sheet, HUF and FX credits, loans, credit-type agreements, financial leasing (henceforth simply 'loans') provided by other monetary financial institutions to non-financial corporations with a Hungarian tax number.<sup>66</sup> These were multiplied by the risk weights assigned to the debtor's sectoral classification and the result was divided by the total amount of outstanding principal, i.e.

$$\text{Bank Carbon Risk Index (BCRI)} = \frac{\sum \text{outstanding principal}_i \cdot f(\text{GHG intensity}_i)}{\sum \text{outstanding principal}_i}$$

where  $i$  is the individual credit transaction<sup>67</sup>,  $\text{GHG\_intensity}_i$  denotes GHG intensity typical for the sectoral classification (core activity) of the debtor of transaction  $i$ , and  $f$  denotes the above-mentioned functions normalised to (0.1).<sup>68</sup> Thus, if all loans were granted in the most polluting

<sup>66</sup> Data of the Central Credit Register (KHR). In the case of loans granted to companies, sole entrepreneurs, sole proprietors not having a Hungarian tax number, the debtor's sectoral classification is not available or only to a limited extent, therefore we could not calculate with these items. Excluded items account for a quarter of the stock analysed (on average, considering the entire period), i.e. the coverage is 80%.

<sup>67</sup> Credit transaction means the relationship between a financial institution and a debtor, i.e. a credit agreement listing several debtors shall mean here several credit transactions. It also means that more than one sectoral classification may be linked to a credit agreement. In the case of several debtors, the principal debt under the contract was divided equally.

<sup>68</sup>The index, described with the traditional risk concepts (PD - probability of default, EAD - exposure at default, LGD - loss given default), is as follows: According to our initial hypothesis,  $PD = g(\text{GHG\_intensity})$ , where  $g$  function is unknown – except for  $g' > 0$  attribute. Let  $EAD_i = \text{principal debt}_i$  and  $LGD_i = 1$ , thus  $BCRI = \frac{\sum EAD_i \cdot f(g^{-1}(PD_i))}{\sum EAD_i}$ .

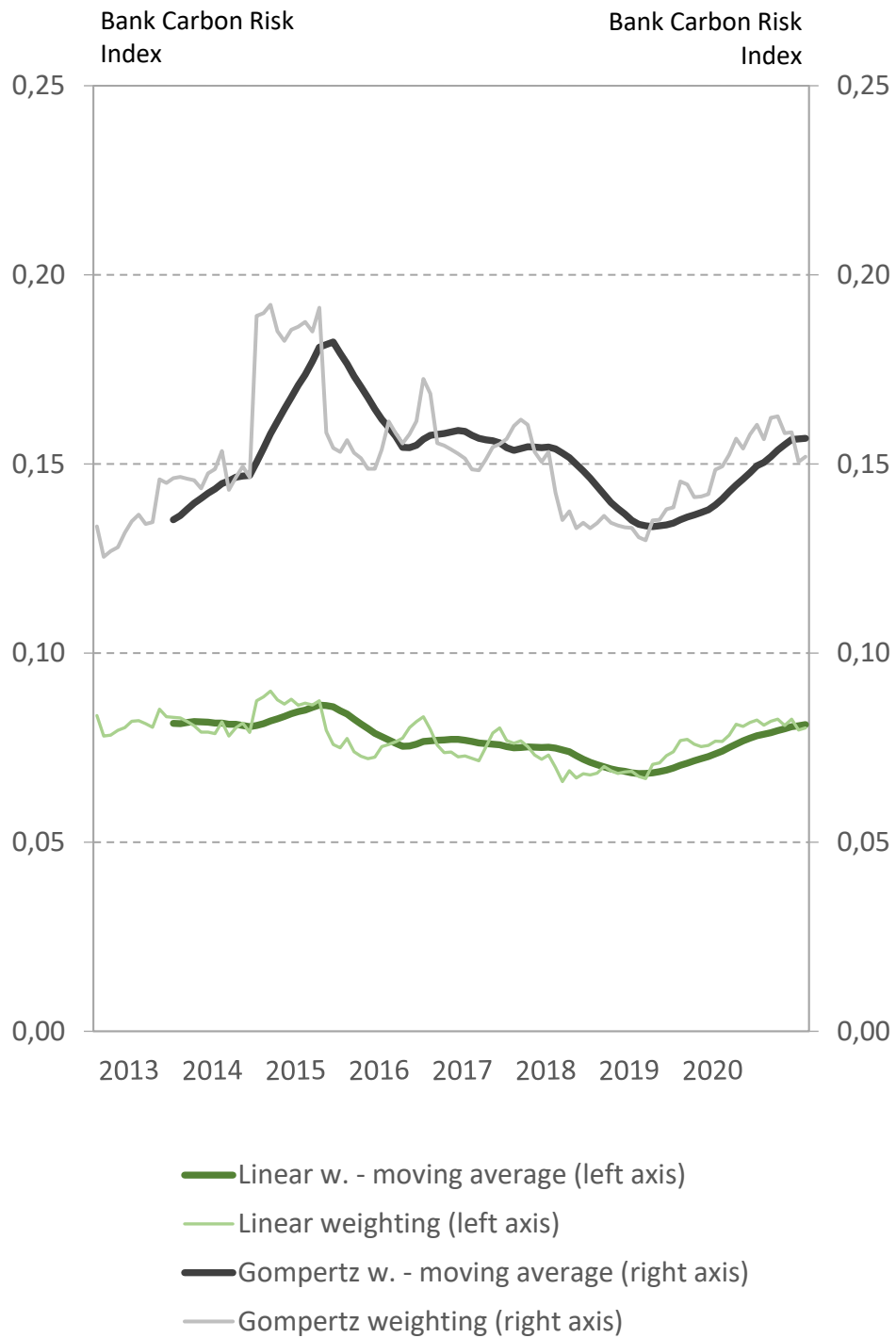
sector (in the sigmoidal case to sectors), the value of the indicator would be 1 (in the sigmoidal case close to 1), if in the least polluting sector, then close to 0. It could only be zero if there is no lending, as there is no economic activity with zero GHG intensity, i.e., with zero carbon risk weight.

#### 4.4.3. Results

Considering that our aim is to analyse the impact of banking decisions, and not to analyse stacking layers of several related trends (e.g., technological development, exchange rate change, etc.), meaning a less informative resultant, we controlled two components influencing the result. On the one hand, we fixed carbon intensity values at the most recent actual data, at the 2017 level, as some sectoral values have also declined significantly over the past ten years. On the other hand, we did the same with the forint exchange rate, and when converting foreign currency-denominated loans, we calculated their value at the end of 2019. However, in contrast to fixing the intensity, the fixing of the exchange rate is of little importance, as the weight of forint loans is dominant, thus, the same amount of movement of the numerator and denominator does not substantially change the value of the index (quotient).

The indicator can be created not only at the level of the banking system as a whole, but also at the level of individual banks (banking groups), however, for data protection reasons we only review the system level here. It is also important to note that due to the arbitrariness of function forms, the level of the index is less relevant than its variation. Chart 41 shows the evolution of our carbon risk indicator over time.

**Chart 41: Monthly values and annual moving average of banking system BCRI**

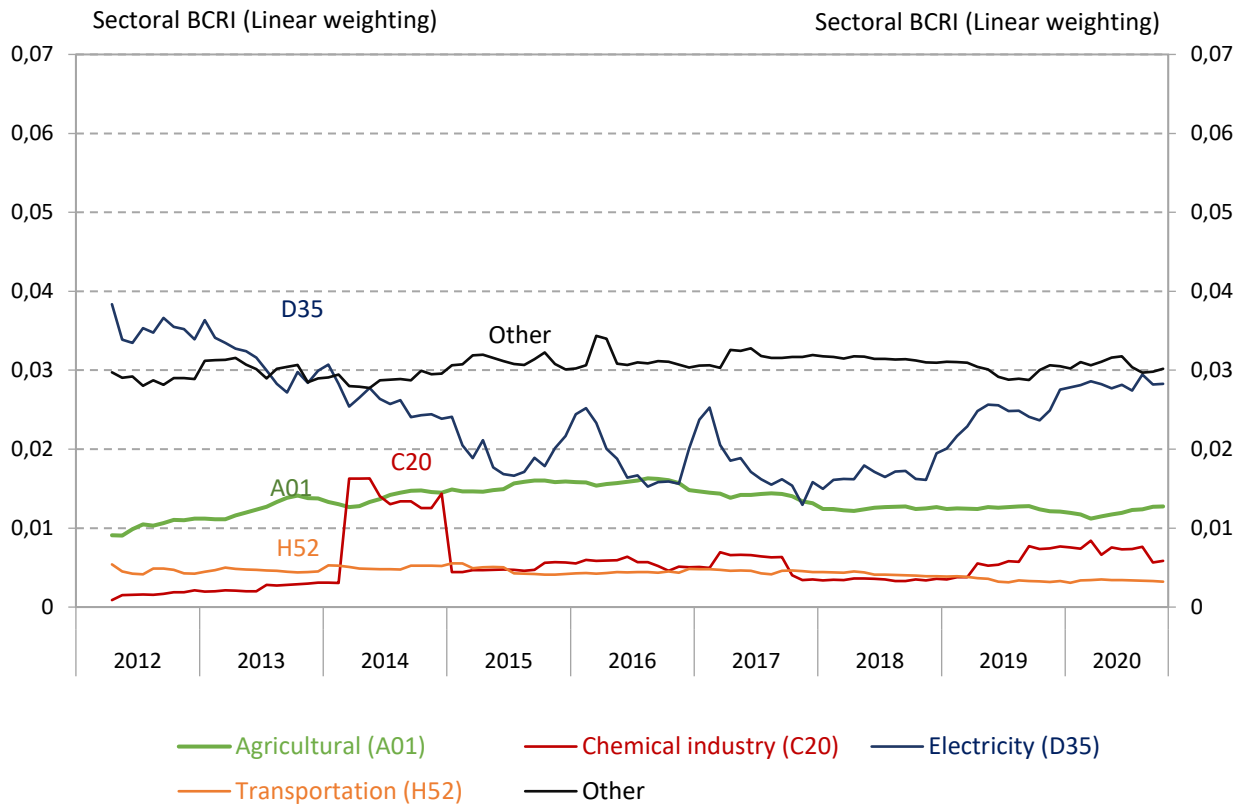


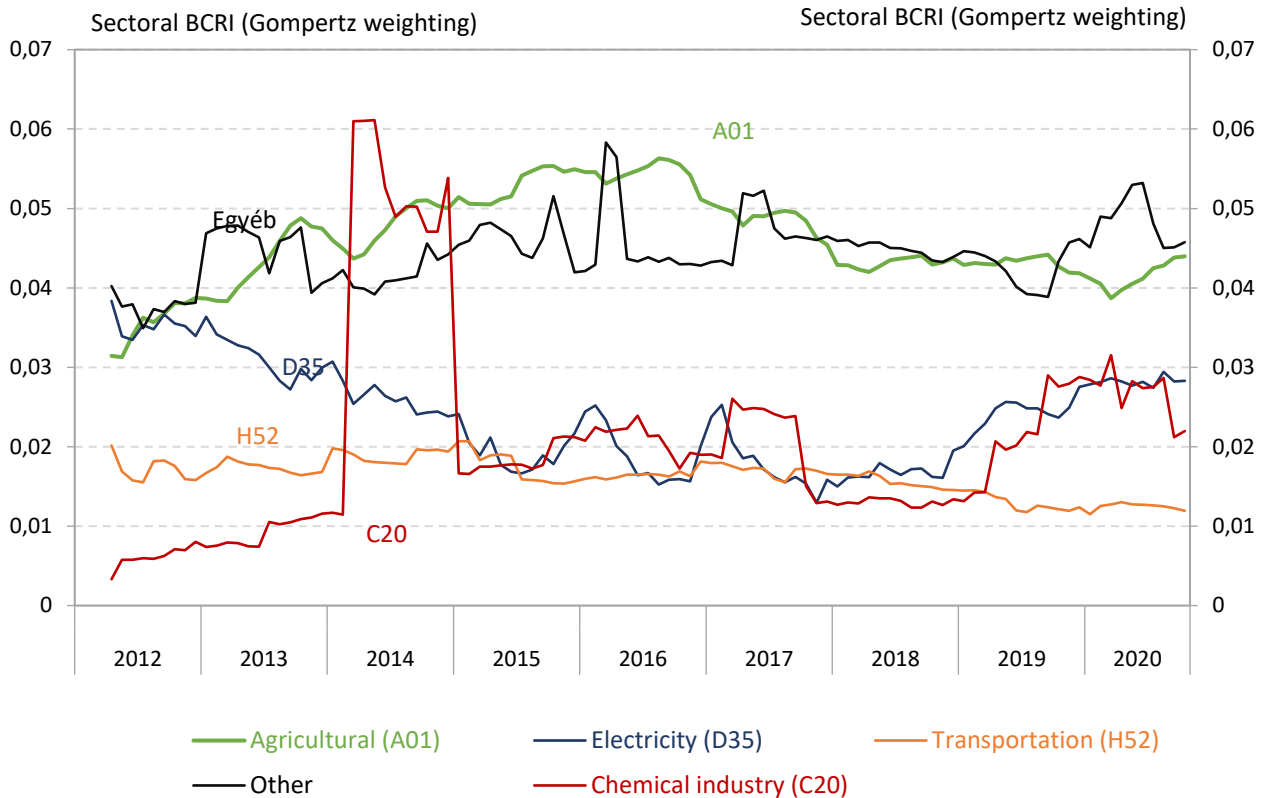
**Note:** Transaction level outstanding principal data are available as of April 2012.

Own chart. Data source: MNB/KHR (credit data as of 20 November 2020), Eurostat (GHG intensity)

It can be clearly seen from the data that although the risk has significantly decreased since the mid-decade, in 2018 it rather moved sideways, and from 2019 it "skyrocketed", thanks to which the annual moving average turned to a growth not seen for a long time. The reversal was mainly due to loans to some companies operating in leading carbon-intensive sectors and partly belonging to the same group of companies. This can be clearly seen on Charts 42-43, which show the evolution of the index of the sectors implying the most serious risks.

**Chart 42-43: Monthly values of sectoral BCRI**





**Note:** The denominator is still equal to the credit stock of the entire banking system, i.e., the sectoral values are additive (the sum of all sectoral BCRI is equal to the total banking system BCRI).

The decline in the index in the middle of the decade was primarily driven by shrinking agricultural exposures. Recently, risks have risen sharply mainly driven by loans financing energy-related and chemical activities (just like driven by the chemical industry in 2014, or electricity in the middle of the decade), but an upward pressure is perceivable also in other sectors. All this is a good example of the fact that the carbon risk of the banking system – due to the relatively small size of the Hungarian loan market – can be fundamentally influenced by the decision of a single large company, especially if it operates in a risky sector. Overall, as several factors point towards a deteriorating situation, this is in any case a warning moment.

The clear advantage of the indicator is that it reflects a methodologically simple, completely transparent and “up-to-date” state with credit data updated on a monthly basis. Its disadvantage stems from the deficiencies of some statistics. On the one hand, from the undivided character of GHG intensities in each section of the national economy. Considering, for example, of section “D” (electricity, etc.), and within that a photovoltaic and a coal-fired power plant. Based on undivided statistics, only the same intensity value can be assigned to them, while their actual (at least direct) gas emissions and thus their carbon risk cannot be compared. On the other hand, from the possible heterogeneity of debtors' activities: if the debtor's borrowing finances its core activity, the risk weight assigned on the basis of GHG intensity is adequate. However, if this is not the case, for

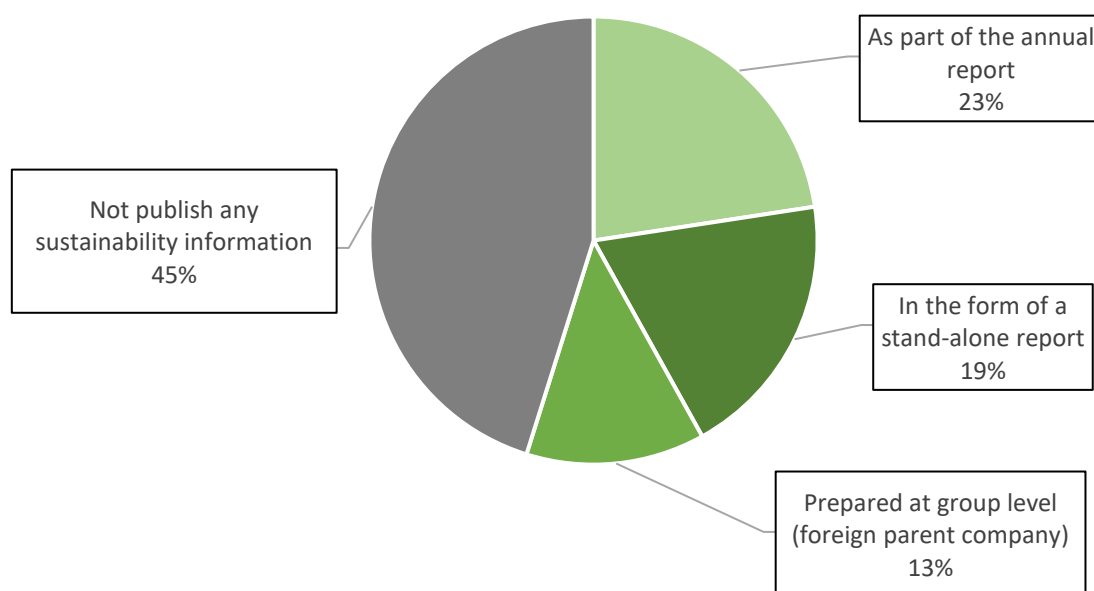
example, an oil company takes out a loan to build a solar park, it will *mutatis mutandis* complicate the interpretation of risks.

#### 4.5. Transparency and participation in international initiatives

##### 4.5.1. Transparency

Sustainability reports, their usability, transparency and interpretability in terms of content are playing an increasingly important role, both internationally and in Hungary. 45% of institutions did not share any sustainability information with the public in 2020, while 19% of institutions even prepare a dedicated report on the topic. A European Central Bank (ECB) survey in 2020 shows that only 14% of eurozone banks do not publicly disclose any information on climate risks. Hungarian banks are also in this context a substantially lagging behind.

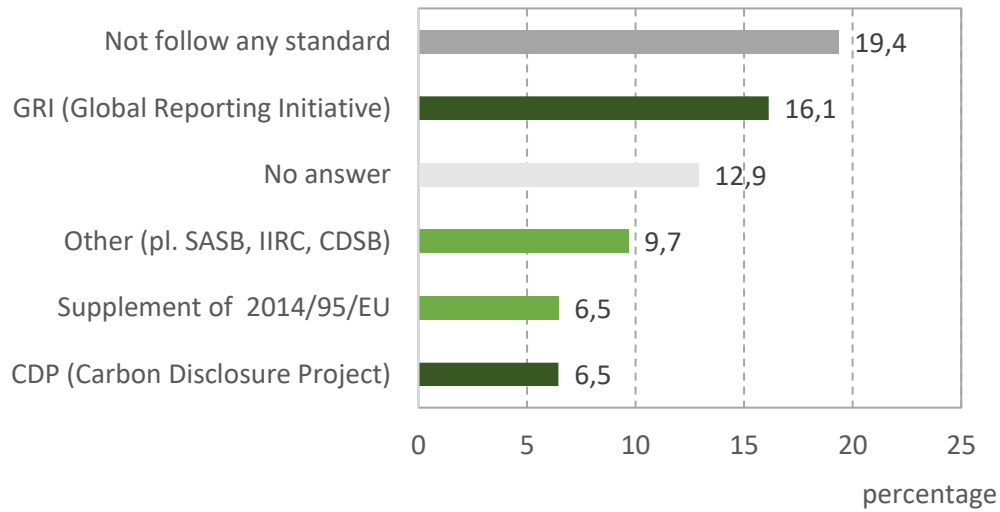
**Chart 44: Sustainability-related disclosure practices**



Source: MNB survey

Different standards/norms can be used when preparing reports, and these can also be combined, so that an institution may develop its sustainability report concurrently on the basis of several guidelines. 16% of credit institutions follow the Global Reporting Initiative (GRI) and 6% follow the Carbon Disclosure Project (CDP) standard, while the supplement of 2014/95/EU on the reporting of climate-related information is also followed by 6% of institutions, and 10% of institutions use some other standard. 32% of institutions do not follow any standards/norm or did not respond.

**Chart 45: International standards used by institutions**



*Source: MNB survey*

The usability and usefulness of sustainability reports has raised many questions since their emergence, among other things, basis for criticism is provided by unverifiability, variability in the calculation methodologies of each indicator, and the resulting incomparability. Taking all these into account, we can say that the most widely reported (29%) indicator is the Scope 1 and Scope 2 indices measuring greenhouse gas emissions (emissions from own operation and purchased energy production). An important industry feedback is that the lack of well-defined standards keep several institutions from calculating different indicators, and the data requirements of such calculations and the additional burden of producing them continue to be a problem.

When examining these data, it is important to emphasise that the questions focus only on the existence of certain indicators, therefore, it is not yet possible to demonstrate whether the information disclosed is appropriate in terms of quality. The analysis of the ECB found that while there is a positive trend in the public disclosures of climate risks, almost none of the Eurozone banks comply with international best practice in terms of the quality of disclosures. We assume that this is not different in Hungary, as no bank follows the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).<sup>69</sup>

#### 4.5.2. Participation in international initiatives

The MNB itself is committed to several green international initiatives, such as the UN Principles for Responsible Banking or the Energy Efficient Mortgages Initiative, joining which the MNB encourages the entire financial sector. In 2020, 35% of institutions responded that they had joined a green initiative. The UN Global Compact, the Green Bond Principles,<sup>70</sup> the UN Principles for

<sup>69</sup> TCFD: Final Report - Recommendations of the Task Force on Climate-related Financial Disclosures, 2017. <https://www.fsb-tcfd.org/recommendations/>

<sup>70</sup> UN Global Compact: The power of principles, 2021. <https://www.unglobalcompact.org/what-is-gc/mission/principles>

Responsible Banking,<sup>71</sup> and the Equator Principles were mentioned (among others) more.<sup>72</sup> While all of the aforementioned international initiatives are valuable, the real picture is that Hungarian banks typically do not join or participate in them by themselves, but only at the group level (through a foreign parent company).

#### 4.6. Summary and conclusions

The environmental sustainability of the Hungarian financial system is not yet measurable in due detail, still the MNB is in possession of exact data on its certain aspects, Following the identification of the most urgent data deficiencies the MNB aims at building a more complete green financial database through several measures: the analysis and the carbon index detailed in this section are two examples for that.

**Table 3. Figures on the green financial system**

Ratio	Unit	Hungary	EU
Ratio of banks where the highest decision making body does not discuss climate risks.	%	68.00	25.00
Ratio of banks with no person or team dedicated to climate risks.	%	58.00	n/a
Ratio of banks where the probability and effect of climate risks have not been analysed.	%	81.00	48.00
Bank Carbon Risk Index (Linear)	index	0.08	n/a
Bank Carbon Risk Index (Gompertz)	index	0.15	n/a
Ratio of green bonds – central government - stock	%	1.90	0.95
Ratio of green bonds – central government - 2020	%	3.90	n/a
Ratio of green bonds – companies - stock	%	5.60	5.00
Ratio of green bonds – companies - 2020	%	11.40	n/a
Ratio of green bonds – MNB FX reserve - stock	%	1.00	n/a
Ratio of green corporate loans (solar PV only)	%	2.50	n/a
Ratio of energy efficient residential buildings	%	3.00	9.80
Green/ESG based investment funds – stock	%	0.50	15.10
Insurance sector – ratio of green unit-linked funds	%	1.70	n/a
Green/ESG based voluntary pension funds	%	0.90	n/a
Ratio of banks where no information is disclosed on sustainability.	%	45.00	14.00
Ratio of banks where no metrics on sustainability are disclosed.	%	68.00	50.00
Ratio of banks where disclosures are fully in line with the TCFD recommendations.	%	-	3.00
Ratio of banks joining global initiatives on sustainability.	%	35.00	n/a

<sup>71</sup> ICMA: The Green Bond Principles (GBP), 2018. <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/>

<sup>72</sup> Equator principles. <https://equator-principles.com/>

The available data suggest insufficient preparedness and attitude of the local financial organizations, and the volume of transition risks shows a negative trend. This conclusion means that serious improvement is needed for the Hungarian banks to be able to assess the volume and quality of their exposures, and to be able to take effective risk mitigation steps and prioritize sustainable financing.

On top of the data collected through the obligatory data supply of the preferential capital requirement programs, the climate stress test planned for 2021 may provide further insight to the climate risks of the Hungarian financial system.

# 5. INTERNATIONAL DEVELOPMENTS IN GREEN FINANCE

Understanding the international context is instrumental to assess the situation of green finance in Hungary and its development prospects. Not only due to the fact that the Hungarian financial system is internationally integrated, but also because the global and EU regulatory bodies work intensively on greening the money-, capital- and insurance markets.

## 5.1. Global developments

### 5.1.1. Network for Greening the Financial System (NGFS)

Established in 2017, the Network for Greening the Financial System (NGFS) is a network of 83 members and 13 observers<sup>73</sup> whose members are developing climate-related risk management tools for the financial sector through the sharing of their expertise and best practices. The MNB joined the organisation in early 2019. In order to ensure a smooth green transition, NGFS remained committed to its mission also in 2020, as, like the COVID-19 epidemic, climate change is a global phenomenon that knows no borders.<sup>74</sup> The NGFS published its first report in May 2020,<sup>75</sup> which provides guidance for supervisory authorities on how to integrate these risks into prudential supervision.

The network conducted a survey of 49 banks (including a supranational organisation) from 18 countries on the experience of financial institutions regarding their activities with green and brown financial instruments and their risks, the results of which were published in a progress report.<sup>76</sup> In its guidance published in June 2020<sup>77</sup>, NGFS pointed out that it is recommended to perform a scenario analysis to assess the potential impacts of climate change, for which it has also developed reference scenarios. The international network has conducted various studies on the possible effects of climate change on monetary policy as well as financial stability,<sup>78,79,80</sup> while it also published a summary on the experience of financial institutions with the environmental risk

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<sup>73</sup> NGFS: Membership. <https://www.ngfs.net/en/about-us/membership>

<sup>74</sup> NGFS: Statement on the need for a green recovery out of the Covid-19 crisis, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/green\\_recovery\\_statement\\_-\\_june\\_2020.pdf](https://www.ngfs.net/sites/default/files/medias/documents/green_recovery_statement_-_june_2020.pdf)

<sup>75</sup> NGFS: Guide for Supervisors Integrating climate-related and environmental risks into prudential supervision, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/ngfs\\_guide\\_for\\_supervisors.pdf](https://www.ngfs.net/sites/default/files/medias/documents/ngfs_guide_for_supervisors.pdf)

<sup>76</sup> NGFS: A Status Report on Financial Institutions' Experiences from working with green, non green and brown financial assets and a potential risk differential, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/ngfs\\_status\\_report.pdf](https://www.ngfs.net/sites/default/files/medias/documents/ngfs_status_report.pdf)

<sup>77</sup> NGFS: Guide to climate scenario analysis for central banks and supervisors, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/ngfs\\_guide\\_scenario\\_analysis\\_final.pdf](https://www.ngfs.net/sites/default/files/medias/documents/ngfs_guide_scenario_analysis_final.pdf)

<sup>78</sup> NGFS: Climate Change and Monetary Policy Initial takeaways, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/climate\\_change\\_and\\_monetary\\_policy\\_final.pdf](https://www.ngfs.net/sites/default/files/medias/documents/climate_change_and_monetary_policy_final.pdf)

<sup>79</sup> NGFS: The Macroeconomic and Financial Stability Impacts of Climate Change Research Priorities, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/ngfs\\_research\\_priorities\\_final.pdf](https://www.ngfs.net/sites/default/files/medias/documents/ngfs_research_priorities_final.pdf)

<sup>80</sup> NGFS: Survey on monetary policy operations and climate change: key lessons for further analyses, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/survey\\_on\\_monetary\\_policy\\_operations\\_and\\_climate\\_change.pdf](https://www.ngfs.net/sites/default/files/medias/documents/survey_on_monetary_policy_operations_and_climate_change.pdf)

analysis (Overview of Environmental Risk Analysis).<sup>81</sup> In December, the NGFS prepared a status report on the implementation of sustainable and responsible investment practices in central bank portfolio management.<sup>82</sup>

The NGFS report containing proposals for action<sup>83</sup> formulates six recommendations for central banks and financial supervisory authorities, which has also been considered in the development of MNB's Green Program. Accordingly, a number of MNB measures can be matched with the NGFS recommendations (Table 4).

**Table 4: NGFS recommendations and MNB measures**

#	NGFS recommendation	MNB measures
1	Integrating climate-related risks into financial stability monitoring and micro-supervision	Issued the Guide on climate-related and environmental risks (draft) that is aimed at laying the groundwork for integrating climate-related and environmental risks into micro-prudential supervision.  Launched green preferential capital treatment programmes that will contribute to the mitigation of transition risks.
2	Integrating sustainability factors into own-portfolio management	Constructed a dedicated green portfolio.  Initiated the Green Mortgage Purchase Programme (under planning).
3	Bridging the data gaps	As part of the green preferential capital treatment programmes, data reporting on green exposures is required.
4	Building awareness and intellectual capacity and encouraging technical assistance and knowledge sharing	Signed the UN Principles for Responsible Banking.  Launched university education and research programs, banking and capital markets courses.  Publication of reports on green finance, articles and studies.  Organisation of international green conferences.  Organisation of green finance workshop for central banks and supervisory authorities in Central and Eastern Europe.
5	Achieving robust and internationally consistent climate and environment-related disclosure	Issued the Guide on climate-related and environmental risks (draft), in which a chapter entirely focuses on disclosures.  Supported disclosure obligations under the SFDR by means of a MNB management circular.
6	Supporting the development of a taxonomy of economic activities	Simplified application of EU green taxonomy under preferential capital treatment programmes.

*Source: NGFS, MNB*

<sup>81</sup> NGFS: Overview of Environmental Risk Analysis by Financial Institutions, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/overview\\_of\\_environmental\\_risk\\_analysis\\_by\\_financial\\_institutions.pdf](https://www.ngfs.net/sites/default/files/medias/documents/overview_of_environmental_risk_analysis_by_financial_institutions.pdf)

<sup>82</sup> NGFS: Progress report on the implementation of sustainable and responsible investment practices in central banks' portfolio management, 2020. [https://www.ngfs.net/sites/default/files/medias/documents/sri\\_progress\\_report\\_2020.pdf](https://www.ngfs.net/sites/default/files/medias/documents/sri_progress_report_2020.pdf)

<sup>83</sup> NGFS: A call for action Climate change as a source of financial risk, 2019. [https://www.banque-france.fr/sites/default/files/media/2019/04/17/ngfs\\_first\\_comprehensive\\_report\\_-\\_17042019\\_0.pdf](https://www.banque-france.fr/sites/default/files/media/2019/04/17/ngfs_first_comprehensive_report_-_17042019_0.pdf)

### 5.1.2. Financial Stability Board (FSB)

The FSB plays an important role in examining the financial stability implications of climate risks. The Task Force on Climate-related Financial Disclosures (TCFD), set up in 2015, aims to encourage financial and non-financial institutions to publish information on climate-related risks and opportunities. More and more institutions around the world started to implement the recommendations formulated in 2017, with the latest status report in October 2020 reporting that the number of institutions supporting the TCFD goals increased by over 85% in a single year, and thus, the guidelines reached already financial institutions responsible for a total asset of USD 150 trillion.

### 5.1.3. Finance Initiative of UN Environment Programme (UNEP FI)

In 2019 and 2020, the UNEP FI, based on the recommendations of the TCFD Working Group of the FSB, supported 39 banks on 6 continents with the aim of expanding their climate-related toolbox and climate risk disclosures.<sup>84</sup> In a report issued on 13 October 2020, the international organisation examined the financing of the circular economy (Financing Circularity: Demystifying Finance for the Circular Economy), which shows that the transition to a circular economy could increase economic output by yearly 4.5 trillion by 2030, and would also contribute to the achievement of the UN Sustainable Development Goals.<sup>85</sup> Their joint project with the EBA was also launched to formulate recommendations on the applicability of EU green taxonomy regulation to basic banking products.<sup>86</sup>

### 5.1.4. The International Monetary Fund (IMF)

The IMF considers it a priority for decision-makers to do their utmost for a green recovery in the recovery from the coronavirus crisis. To facilitate this, it has been providing guidance to member countries in crisis management since the outbreak of the crisis.<sup>87</sup> In addition, utilising its knowledge on central banks, financial supervisory authorities and capital markets, it also helps national decision-makers to make forward-looking decisions that can catalyse green investment and contribute to the “greening” of the financial system in order to facilitate recovery and reduce the likelihood of a climate catastrophe. Nothing proves these aspirations better than it joining the NGFS network as an observer in autumn 2019.<sup>88</sup>

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<sup>84</sup> Finance Initiative of UN Environment Programme: TCFD for Banks, 2021. <https://www.unepfi.org/climate-change/tcfd/tcfd-for-banks/>

<sup>85</sup> Finance Initiative of UN Environment Programme: New UNEP report lights the way for financial institutions to shift to more sustainable circular economies, 2020. <https://www.unenvironment.org/news-and-stories/press-release/new-unep-report-lights-way-financial-institutions-shift-more>

<sup>86</sup> Finance Initiative of UN Environment Programme: EU Taxonomy Recommendation, 2021. <https://www.unepfi.org/banking/high-level-recommendations-on-the-voluntary-application-of-the-eu-taxonomy-to-core-banking-products/>

<sup>87</sup> IMF: Special Series on Fiscal Policies to Respond to COVID-19, 2020. <https://www.imf.org/en/Topics/climate-change/green-recovery>

<sup>88</sup> IMF: IMF Joins Global Network of Central Banks and Supervisors as an Observer, Aiming to ‘Green the Financial System’, 2019. <https://www.imf.org/en/News/Articles/2019/09/26/pr19354-imf-joins-global-network-cen-banks-and-supervisors-as-observer-aim-to-green-financial-system>

### 5.1.5. The World Bank Group (WBG)

Similar to the IMF, the WBG encourages policymakers around the world to consider long-term environmental impacts in government action plans and programs adopted in order to recover from the crisis caused by the coronavirus. Building on the work of the G20 Green Finance Study Group, the Climate Change Policy Team of the International Finance Corporation (IFC), part of the WBG, has developed a new approach for the banking sector to assess and monitor green finance, aimed at better understanding the current state of green lending and issue recommendations in order to better coordinate the different approaches to measuring green finance. This will allow for the production of more comprehensive analyses that could lead to better policies to mobilise further green financing.<sup>89</sup>

### 5.1.6. Organisation for Economic Co-operation and Development (OECD)

In line with the UN SDGs adopted in 2015, the OECD gives priority to the implementation of these goals and the development of related policies of the Member States. The international organisation has launched a number of green growth programmes in the past decade. These include the OECD Action Plan on SDGs<sup>90</sup> supporting the achievement of the objective to the Agenda for Sustainable Development, the Green Growth Strategy<sup>91</sup>, which focuses on increasing productivity and green and inclusive growth, and the Green Growth Indicators, which focus on the development of Green Growth Indicators Database<sup>92</sup>, the Green Growth Partnership network<sup>93</sup> of international organisations and experts examining green growth theories, and the Green Growth and Sustainable Development (GGSD) Forum, a forum for multidisciplinary dialogue on green growth and sustainable development.

#### **Outlook: Steps taken by Asian central banks in green finance**

Many Asian central banks have taken early, innovative steps in recent years to green the financial system and national economies. Mainly the central banks of China, Singapore, Indonesia and Malaysia adopted sustainability measures in 2020.

In June 2020, the People's Bank of China (PBOC), the China Securities Regulatory Commission (CSRC), and the National Development and Reform Commission (NDRC) updated the Green Bonds Endorsed Project Catalogue in a manner that it removed fossil fuel production and so-called 'clean coal'-related projects from its list. Regarding Green Finance Pilot Zones, in July 2020,

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<sup>89</sup> IFC: Green Finance: A Bottom-up Approach to Track Existing Flows, 2017. [https://www.ifc.org/wps/wcm/connect/12ebe660-9cad-4946-825f-66ce1e0ce147/IFC\\_Green+Finance+-+A+Bottom-up+Approach+to+Track+Existing+Flows+2017.pdf?MOD=AJPE-RES&CVID=IKMn-t](https://www.ifc.org/wps/wcm/connect/12ebe660-9cad-4946-825f-66ce1e0ce147/IFC_Green+Finance+-+A+Bottom-up+Approach+to+Track+Existing+Flows+2017.pdf?MOD=AJPE-RES&CVID=IKMn-t)

<sup>90</sup> OECD: Better Policies for 2030: An OECD Action Plan on the Sustainable Development Goals, 2016. <http://www.oecd.org/dac/OECD-action-plan-on-the-sustainable-development-goals-2016.pdf>

<sup>91</sup> OECD: Towards Green Growth, 2011. <http://www.oecd.org/greengrowth/towards-green-growth-9789264111318-en.htm>

<sup>92</sup> OECD: Green growth indicators framework, 2020. <http://www.oecd.org/greengrowth/green-growth-indicators/>

<sup>93</sup> OECD: Green Growth and Sustainable Development Forum, 2021. <https://www.oecd.org/greengrowth/greengrowthknowledge-platform.htm>

Gansu Province issued an action plan to develop financial instruments in the newly established pilot zone in Lanzhou City. Following Chinese President Xi Jinping's announcing the Chinese carbon neutrality target 2060 in September, on 21 October, five government agencies, including the central bank, issued guidelines on the activities of institutions involved in financing green investments. In addition, Chinese Federal Reserve Chairman Yi Gang spoke in December 2020 about four new priorities in order to encourage green development: developing new standards on green finance to achieve carbon neutrality; requiring financial institutions to disclose data on environmental burden; enhancing the capacities to analyse and manage environmental risks; and providing easier access to the green finance market for international investors.

On 13 October 2020, the Monetary Authority of Singapore (MAS), together with several institutions, set up the Singapore Green Finance Centre (SGFC) with the aim to support green finance research, manage talent, improve the efficiency of green markets and to encourage green financial solutions. As part of the Green Finance Action Plan established in 2019, the central bank also developed Guidelines on Environmental Risk Management for banks in the autumn 2020, which includes the development of a framework for environmental risks, monitoring of environmental risks, and the annual public disclosure of institutions' positions concerning environmental risks. On November 24, 2020, MAS was the first in the world to launch its Green and Sustainability-Linked Loan Grant Scheme (GSLs) to make accessing green loans easier for banks and businesses through a support mechanism for certain costs. In addition, the central bank also announced at the end of 2020 that it would conduct climate stress tests over the next 2 years.

Bank Indonesia (BI) announced in November 2020 that it will support the spread of electric vehicles through financial incentives, such as an easing of the loan-to-value ratio. The institution also sought to promote the expertise of financial professionals in the topic in 2020: its education centre, the Bank Indonesia Institute, tackled the issues of sustainable and inclusive growth in an international online seminar.

The Central Bank of Malaysia (Bank Negara Malaysia - BNM) is currently working towards integrating climate risks into the risk management practices of financial institutions by 2022 (in risk measurement, mitigation and capital buffers). To this end, a green taxonomy was launched on a pilot basis in September 2020 to better delimit economic activities in terms of climate change. Since 2019, BNM has operated a Joint Committee on Climate Change with the financial sector to gain a deeper understanding of climate risks and to develop appropriate risk management practices and disclosure requirements.

## 5.2. Developments in the European Union

The European Union is a key player in sustainable finance globally. Initiatives such as the proposal for a European Climate Act<sup>94</sup> or the Green Deal<sup>95</sup> set the “direction”, highlight the need for public and private sector mobilization for green investments.

The EU Sustainable Finance Strategy<sup>96</sup> aims to provide the framework of and incentives for private financing. This is based on the report of the High-Level Expert Group on Sustainable Finance<sup>97</sup>, the Financing Sustainable Growth Action Plan<sup>98</sup>, and although it has only recently been set up, its review is already under way.

Three main directions define the strategy, and each of them contains tasks to which the MNB actively contributes to. We present some of the key measures in more detail, which may have a significant impact also on the development of the Hungarian financial system, but it is important to emphasise that EU regulatory changes go far beyond the instruments detailed here.

On the one hand, the funding pillar of the EU's strategy is the need to redirect capital flows towards sustainable investment in order to achieve sustainable and inclusive growth. The current level of investment is not sufficient to create a sustainable economy, one of the main reasons for which is that it is not clear to investors what is considered a sustainable investment.

The European Union intends to achieve this by introducing the following measures:

- Unified classification system for sustainable activities
- Standards and labels for sustainable financial products
- Fostering investment in sustainable projects
- Sustainability considerations in financial advice
- Sustainability benchmarks

On the other hand, addressing the financial risks posed by climate change, resource depletion, environmental degradation and social problems is essential. Purpose of the integration of sustainability goals into financial decision-making is to reduce the financial impact of the risks involved. As explained earlier, the financial sector currently does not take sufficiently into account the climate and environmental risks.

There are several instruments that can help improve this:

- Sustainability in market analysis and credit ratings

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<sup>94</sup> European Commission: Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law), 2022. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0080>

<sup>95</sup> European Commission: The European Green Deal. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640>

<sup>96</sup> European Commission: Consultation on the renewed sustainable finance strategy, 2021. [https://ec.europa.eu/info/consultations/finance-2020-sustainable-finance-strategy\\_en](https://ec.europa.eu/info/consultations/finance-2020-sustainable-finance-strategy_en)

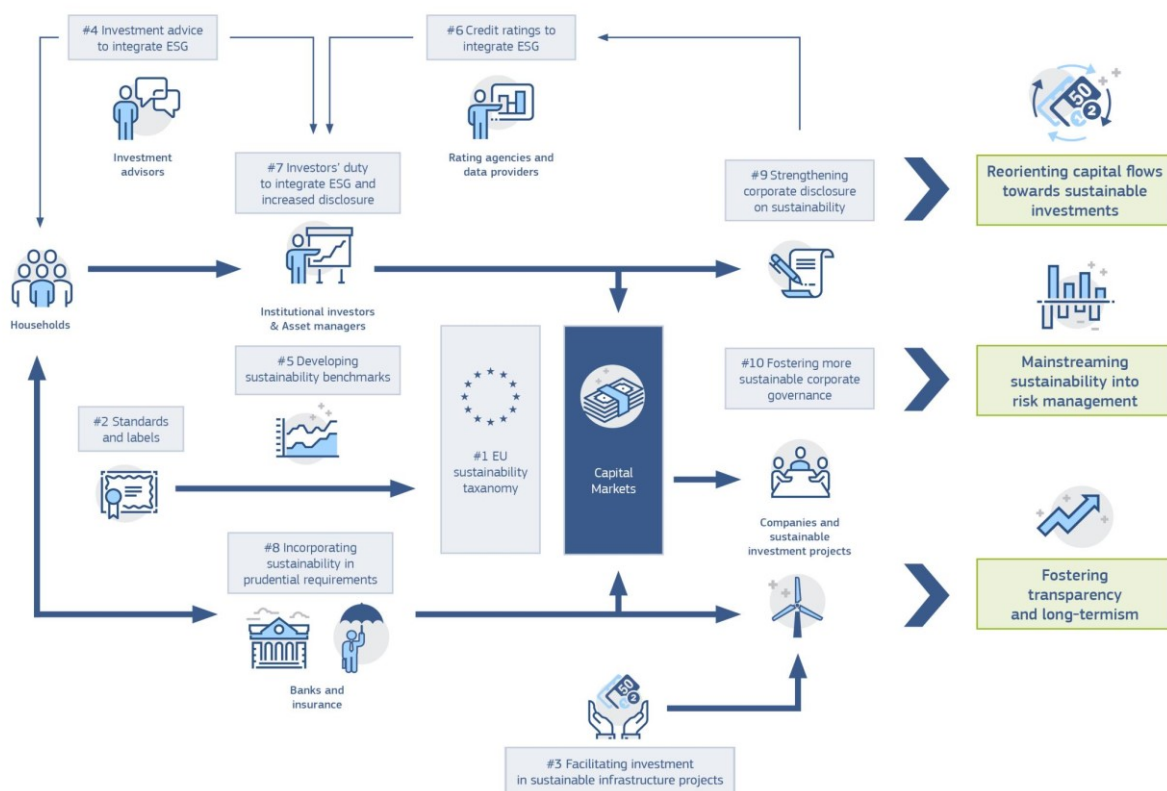
<sup>97</sup> European Commission: High-Level Expert Group on sustainable finance (HLEG), 2016. [https://ec.europa.eu/info/publications/sustainable-finance-high-level-expert-group\\_en](https://ec.europa.eu/info/publications/sustainable-finance-high-level-expert-group_en)

<sup>98</sup> European Commission: Action Plan: Financing Sustainable Growth, 2018. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0097>

- Institutional investors' and asset managers' sustainability duties
- Prudential requirements for banks and insurance companies

Thirdly, the promotion of transparency in and a long-term approach to financial and economic activity is inevitable. Transparency is essential for the proper functioning of the financial system, without which economic operators will not be able to properly assess the long-term value creation of companies and how they manage sustainability risks. The main steps to reduce information asymmetries are to improve disclosure and accounting, as well as to improve corporate governance and remedy undue capital market short-termism.

**Chart 46: Action Plan: Financing Sustainable Growth**



*Source: European Commission*

As part of the action plan, the European Commission invited the European Supervisory Authorities (ESAs) to identify gaps in the sustainability of financial services regulation and make proposals to address them. ESAs have been given additional assignments to integrate sustainability considerations into regulation and supervision.

Without the intention of being exhaustive, focusing primarily on the banking sector, the following current EU regulatory topics should be highlighted:

### 5.2.1. Risk differential between green and brown assets<sup>99</sup>

The amended Capital Requirements Regulation<sup>100</sup> mandates the European Banking Authority (EBA) with the task of assessing the justification for introducing targeted prudential instruments for exposures that are related to material environmental or social objectives.

Thus, EBA is looking for the answer to whether the assets and activities that promote environmental sustainability are less risky. Are environmentally harmful assets riskier? If proven, financial regulators could use additional instruments to improve the risk profile of the banking system.

According to the original plans, this report would have been completed by June 28, 2025, but according to the accelerated schedule, the first discussion paper may be published by the end of 2021.

### 5.2.2. ESG considerations in banking supervision

The Capital Requirements Directive<sup>101</sup> mandates the EBA to assess the potential incorporation of ESG risks into the Supervisory Review and Evaluation Process conducted by competent authorities.

Credit institutions are subject to supervisory review at regular intervals. It is therefore up to the EBA to determine how the relevant ESG considerations should be integrated into this process. This could encourage banks to pay more attention to this in their operations.

The final report is scheduled to be completed by June 28, 2021. The discussion paper<sup>102</sup> was published on October 30, 2020. As a consequence of the final report, from 2022, ESG risks may be an integral part of supervisory activities.

### 5.2.3. Bank disclosures on sustainability

The purpose of disclosures is to provide transparency to market participants, to facilitate accurate risk assessment and a fair pricing mechanism.

The amended Capital Requirements Regulation<sup>103</sup> requires the institutions subject to it to disclose supervisory information on ESG risks. It is up to the EBA to draw up detailed rules for this. Planned entry into force of this is June 2022.

The Taxonomy Regulation<sup>104</sup>, which aims to incorporate a unified classification system for sustainable activities into the financial regulatory system, requires companies that are subject to the NFRD to disclose the proportion of their activities (in terms of turnover, capital expenditure)

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<sup>99</sup> While green assets contribute to sustainability (e.g., renewable energy production), brown assets are environmentally harmful (e.g., coal-based energy production).

<sup>100</sup> (EU) No. 575/2013 (CRR) Article 501c.

<sup>101</sup> Article 98 (8)

<sup>102</sup>EBA: EBA Discussion paper on management and supervision of ESG risks for credit institutions and investment firms, 2020. [https://eba.europa.eu/sites/default/documents/files/document\\_library/Publications/Discussions/2021/Discussion%20Paper%20on%20management%20and%20supervision%20of%20ESG%20risks%20for%20credit%20institutions%20and%20investment%20firms/935496/2020-11-02%20ESG%20Discussion%20Paper.pdf](https://eba.europa.eu/sites/default/documents/files/document_library/Publications/Discussions/2021/Discussion%20Paper%20on%20management%20and%20supervision%20of%20ESG%20risks%20for%20credit%20institutions%20and%20investment%20firms/935496/2020-11-02%20ESG%20Discussion%20Paper.pdf)

<sup>103</sup> (EU) No. 575/2013 (CRR) Article 449a.

<sup>104</sup> (EU) 2020/852 Article 8

that comply with the EU Taxonomy. The role of the ESAs is to advise the European Commission on this, which is expected in the first quarter of 2021.

#### 5.2.4. Financial service providers' mandatory disclosures on sustainability

Under (EU) 2019/2088 Regulation, from March 2021, financial service providers (such as mutual funds, credit institutions engaged in portfolio management) and advisers will be required to publicly disclose information and data on sustainability. Disclosures should be made at two levels: organisational and product level.

- Organisational-level disclosures address how an organisation integrates sustainability risks and potential adverse effects into investment decision-making, the operation of the organisation, and its remuneration policy.
- Product-level disclosures should address, on one hand, how sustainability risks and potential adverse effects are taken into account in investment decision-making related to the product offered and how these risks may affect return on the product. On the other hand, if a product has a positive sustainability characteristic or pursues a sustainability objective, its method, evaluation and measurement methodology should be disclosed. The extent to which the objectives have been achieved must be described in interim reports.

The MNB actively contributes to the development of all these EU rules, primarily through the ESAs, and regularly consults with Hungarian market participants. Nevertheless, it is important that Hungarian financial actors themselves monitor EU initiatives, as they require profound changes and compliance associated with these will be a major challenge. For example, the disclosure of a "green asset ratio" that has not yet been fully elaborated will require the collection of a large amount of not yet existing data on clients who received a loan.

## 6. GREEN REGULATORY MEASURES IN HUNGARY IN 2020

The spread of green finance, both internationally and in Hungary, is a result of the cooperation of many stakeholders (market participants, regulators, scientific and civil society, etc.). The main regulatory developments in Hungary in 2020 can be summarised as follows.

### 6.1. Central Bank of Hungary

During 2020, under its Green Program the MNB introduced and launched several measures in the banking sector and on the capital markets which were designed to reduce the climate-related and environmental risks and the expansion of green finance.

In order to encourage green lending in the banking sector, the green preferential capital treatment for energy efficient mortgages came into force at the beginning of 2020, the conditionality of which was also refined by the MNB during the year due to the COVID-19 crisis.<sup>105</sup> Under the new rules, banks can apply a significantly reduced capital requirement for loans financing the purchase and construction of energy-efficient properties and also the energy efficiency modernisation. In exchange, they must offer the clients reduced interest or fee and record energy efficiency characteristics for new loans. Based on market feedback, after the 2020 preparation period, banks will launch the first energy-efficient mortgage product in 2021. A positive, relevant development is that two Hungarian institutions have joined the European Energy Efficient Mortgage Lending Initiative.<sup>106</sup> The green mortgage purchase program that is currently under development will also provide an incentive for green mortgage lending.

In the corporate segment, the MNB has focused primarily on renewable energy production until now. On this note, in consultation with the Hungarian Banking Association and industry, civil society experts, it developed its comprehensive analysis of the financing market of renewable energy, one of the main “outcomes” of which was the MNB’s introduction of preferential capital treatment for loans financing renewable energy.<sup>107</sup> The preferential capital treatment also covers corporate green bonds, and in 2021 the MNB plans to include additional sectors and investment areas complying with the EU Taxonomy (such as sustainable agriculture, energy efficiency of non-residential properties, etc.). Green Corporate Lending is also facilitated by the MNB's Executive

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<sup>105</sup> MNB: Facilitation, extension of the deadline for the Preferential Green Capital Treatment for energy efficient mortgages, 2020. <https://www.mnb.hu/sajtoszoba/sajtokozlomenyek/2020-evi-sajtokozlomenyek/konnyites-hatarido-hosszabbitas-a-lakasceluzold-tokekovetelmeny-kedvezmeny-programnal> (available only in Hungarian)

<sup>106</sup> MNB: Energy Efficient Mortgage Initiative: the MNB welcomes the participation of the first Hungarian financial institution, 2020. <https://www.mnb.hu/sajtoszoba/sajtokozlomenyek/2020-evi-sajtokozlomenyek/energiyahatekony-jelzalog-kezdemenyezes-az-mnb-udvozli-az-első-hazai-bankot> (available only in Hungarian)

<sup>107</sup> MNB: MNB introduces a Green Preferential Capital Requirement Programme, 2019. <https://www.mnb.hu/en/pressroom/press-releases/press-releases-2019/mnb-introduces-a-green-preferential-capital-requirement-programme>

Circular on the application of the infrastructure supporting factor, which was published in December 2020.<sup>108</sup>

In terms of risk management, the Bank's Guide on climate-related and environmental risks will outline the MNB's expectations and recommended best practices. The MNB drafted the latter recommendation during 2020, and the final recommendation will be published in spring 2021, following a public consultation in early 2021.

Regarding the capital markets, in addition to the preferential capital treatment applicable to green bonds, the commencement of the preparation of the National Strategy for Sustainable Capital Market in autumn 2020 should also be highlighted.<sup>109</sup> With the support of the European Commission's Structural Reform Support Service, within the scope of a project with the participation of the European Bank for Reconstruction and Development (EBRD), proposals will be developed in cooperation by the MNB, ministries, the BSE and market participants. This can help to improve the Hungarian capital market to better support the financing of environmental sustainability. In this sense, green bonds represent an important focus point, for which the MNB also published a dedicated analysis in the autumn 2020.<sup>110</sup>

In the field of green mortgage bonds issued by banks, specific measures are also planned by the MNB, and in the future it plans to specifically purchase mortgage bonds with a green rating.<sup>111</sup> Also related to green mortgage bonds, the MNB facilitated the formulation and acceptance of the definition of green residential real estate applicable to Hungary in line with one of the globally most important green bond standards, the Climate Bonds Standard.<sup>112</sup>

Looking ahead, the entry into force of the EU Regulation (2019/2088) on Sustainability Disclosures (SFDR) in March 2021 represents the most important “green” challenge in the capital markets, in connection with which the MNB is working on measures facilitating the implementation, *inter alia* in the form of an executive circular.

In addition to regulatory measures and analysis, it is important to also highlight capacity building in the field of green finance. Under the Green Program, MNB explicitly strives to ensure that market participants have the appropriate professional staff and expertise. To this end, the MNB, in cooperation with the Budapest Institute of Banking (BIB) and other organisations, facilitated the provision of several Hungarian and international trainings. Furthermore, green finance subjects are now offered at four universities with the professional support of the MNB.<sup>113</sup>

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<sup>108</sup> MNB: Executive circular on the application of ISF, 2020. <https://mnb.hu/letoltes/isf-vezetoi-korlevel.pdf> (available only in Hungarian)

<sup>109</sup> MNB: Planning of Hungary's Sustainable Capital Market Strategy to start soon, 2020. <https://www.mnb.hu/en/pressroom/press-releases/press-releases-2020/planning-of-hungary-s-sustainable-capital-market-strategy-to-start-soon>

<sup>110</sup> MNB: MNB intends to jump-start the green bond market in Hungary, 2020. <https://www.mnb.hu/en/pressroom/press-releases/press-releases-2020/mnb-intends-to-jump-start-the-green-bond-market-in-hungary>

<sup>111</sup> MNB: Magyar Nemzeti Bank prepares for purchases of green mortgage bonds, 2020. <https://www.mnb.hu/en/pressroom/press-releases/press-releases-2020/magyar-nemzeti-bank-prepares-for-purchases-of-green-mortgage-bonds>

<sup>112</sup> CBS: Eligible Residential Building – Hungary, 2021. <https://www.climatebonds.net/files/files/Residential%20Proxy%20-%20Hungary%20-%20January%202021%20%281%29.pdf>

<sup>113</sup> More information on <https://www.mnb.hu/greenfinance/kepzesek> (available only in Hungarian)

## 6.2. Market initiatives, self-regulation

### 6.2.1. Budapest Stock Exchange

In November 2020, the Budapest Stock Exchange published a draft ESG Reporting Guide,<sup>114</sup> which sets out guidelines and recommendations for the sustainability reports of listed companies. In addition to presenting the standards used in international practice in terms of content and format, the ESG Reporting Guide provides also useful help to practical issues in preparing ESG reports. The final version of the recommendation is expected in Q1 2021, once the current consultation process is completed.

### 6.2.2. Association of Hungarian Investment Fund and Asset Management Companies

In October 2020, the Association of Hungarian Investment Fund and Asset Management Companies (BAMOSZ) supplemented the categorisation rules of investment funds with sustainability (ESG) aspects. From 1 January 2021, the ESG classification of investment funds managed by the member organisations of the association will be available to investors on the BAMOSZ website,<sup>115</sup> which distinguishes three categories: ESG-rated, ESG-Plus and ESG-Impact. An ESG-rated fund is characterised by the fund manager filtering the fund's investments based on ESG criteria and excluding investments in assets that are not eligible in terms of ESG. In the ESG-Plus category, in addition to meeting the above conditions, in their investment decisions, the fund managers over-weight assets with a positive ESG rating. Finally, the ESG-Impact fund classification may be granted to such a thematic fund that invests exclusively in sectors that primarily serve sustainable economic development (such as the renewable energy sector). BAMOSZ's move is an important milestone in the development of the Hungarian sustainable finance segment, however, it should be noted that these categories may need to be revised due to SFDR.

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<sup>114</sup> BSE: ESG Guide, 2020. <https://bet.hu/site/Angol/Contents/Issuers/corporate-governance-recommendations/bse-esg/esg-guide>

<sup>115</sup> More information on [https://www.bamosz.hu/hu/c/document\\_library/get\\_file?uuid=06a9fb03-833d-43fa-8b2e-14f2c6ae5c90&groupId=10157](https://www.bamosz.hu/hu/c/document_library/get_file?uuid=06a9fb03-833d-43fa-8b2e-14f2c6ae5c90&groupId=10157) (available only in Hungarian)

## 7. OUTLOOK

The purpose of the Green Finance Report is to provide a detailed picture of the environmental sustainability of the Hungarian economic and financial systems and to contribute to increasing transparency for market participants and the wider society, as well as to provide an opportunity to plan evidence-based, well-considered green regulatory or business development measures. In light of this, the MNB considers it important to actively contribute to EU and global initiatives in addition to introducing informed measures, thereby improving the preparedness and resilience of the Hungarian financial system.

Despite the fact that this publication extensively presents and analyses the available data, MNB faced significant challenges in preparing the Report due to the lack of detailed and informative data. Data gaps can result in, among other things, incorrect pricing of climate risks, which undermine prudent risk management. Overcoming this problem is a clear priority of EU legislation, and the MNB attempts to improve it through several existing and planned measures.

As an example, the condition for applying the MNB's green preferential capital treatment is to provide detailed data to the MNB on green exposures. The MNB aims to expand the programme in 2021, which will facilitate the collection of additional information and help reduce the transition risks in the financial system. Among other things, the aim of the MNB's Guide on climate-related and environmental risks is to fill data gaps, and as such the implementation and preparation for the expectations set out therein will play a key role in 2021. In addition to banks, the expansion of available data will also be a key challenge in the capital market: the MNB expects the volume of ESG-based investments to grow strongly in Hungary too, but the availability of environmental and other sustainability-related data in case of Hungarian companies must also improve significantly.

It is important to note, however, that perfect and complete data is not required for financial institutions and central banks to make informed decisions. As a result of decades of inaction, the consequences of climate change are already being felt today and are set to become more severe over time. Passivity must therefore be replaced by decisive action, even if we face an unprecedented, as William Nordhaus, Nobel laureate in economics put it, "ultimate challenge".

The transition to a carbon neutral economy will require serious sacrifices for many companies and industries, but, in the long run, it may lead to sustainable economic growth. However, a failed transition will have an impact greater by orders of magnitude on financial, economic, and social systems, potentially making the functioning of a modern, technological society impossible. The choice is therefore clear from both a financial-economic and a socio-political point of view.

The MNB is committed to taking the necessary actions, even through the introduction of innovative measures, to enable the Hungarian economic and financial systems to contribute to Hungary's environmental sustainability and climate neutrality.

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