°CICERO Shades of Green

Hungary
Green Bond Second Opinion

May 25, 2020

Hungary is a country in Central Europe and member of the European Union. Hungary has approximately 9.8 million citizens, an area of 93,000 square kilometers and a GDP of USD 170 billion constituting the 54th largest economy globally according to the IMF. The issuer currently plans to reduce GHG emissions by 95% until 2050 compared to 1990 levels and compensate the remaining 5% by enlarging sink capacities, mainly by afforestation. Hungary's GHG emissions decreased by 33% compared to 1990% levels, but have mostly increased since 2013 while the share of renewable energy has decreased since 2013.

Considering that Hungary's emissions result by 21% from transportation which have more than doubled in significance since 1990, we are encouraged to see approximately 90% of proceeds being designated to this sector. Approximately 1/3 of total proceeds fund electric railway, subway, trolley or tram. Rail-guided vehicles financed under this framework will all be electric. While direct investments in diesel related rail infrastructure is excluded from the framework, all other railway related expenditures include fossil fuel elements as they support diesel fueled transportation, e.g., operations of the railway network, construction and upgrade of tracks and reimbursements of uncovered costs of railway passenger traffic. According to Hungary, 41% of the Hungarian open-access railway network is currently electrified.

The sovereign also includes the project categories renewable energy, energy efficiency, land use and living natural resources, waste & water management as well as adaption in its framework. Some of the potential projects include support for fossil fuels and do not necessarily generate positive climate impact and require additional evaluation procedures, e.g., in the area of building refurbishments, sustainable agriculture, forestry, organic farming and operation of national parks. Life-cycle and supply chain assessment requirements would improve the framework. Eligible expenditures will to a large extent include funding operating expenses, e.g., for national parks where more than 60% will cover personnel costs and as well as for railway operation. Hungary also anticipates including, e.g., support of environmental NGOs without further selection criteria**.**

Hungary will obtain an external review of its reporting and expects to report impacts according to current market practices. As the selection criteria are in part broad and include fossil fuel aspects as well as administration costs the issuer is encouraged to provide transparency on these aspects in its reporting.

Based on an assessment of the framework's alignment with the Green Bond Principles, the project categories and Hungary's governance, Hungary's green bond framework receives the overall **CICERO Medium Green** shading and a governance score of **Good**. This shading reflects the framework's strength focusing on electric railway expenditures, but also Light Green elements such as improved fossil fuel related assets and investments without clearly defined eligibility criteria or thresholds.

SHADES OF GREEN

Based on our review, we rate the Hungary's green bond framework **CICERO Medium Green.**

Included in the overall shading is an assessment of the governance structure of the green bond framework. CICERO Shades of Green finds the governance procedures in Hungary's framework to be **Good**.

GREEN BOND PRINCIPLES

Based on this review, this Framework is found in alignment with the principles.

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1 Terms and methodology

This note provides CICERO Shades of Green's (CICERO Green) second opinion of the client's framework dated May 2020**.** This second opinion remains relevant to all green bonds and/or loans issued under this framework for the duration of three years from publication of this second opinion, as long as the framework remains unchanged. Any amendments or updates to the framework require a revised second opinion. CICERO Green encourages the client to make this second opinion publicly available. If any part of the second opinion is quoted, the full report must be made available.

The second opinion is based on a review of the framework and documentation of the client's policies and processes, as well as information gathered during meetings, teleconferences and email correspondence.

Expressing concerns with 'shades of green'

CICERO Green second opinions are graded dark green, medium green or light green, reflecting a broad, qualitative review of the climate and environmental risks and ambitions. The shading methodology aims to provide transparency to investors that seek to understand and act upon potential exposure to climate risks and impacts. Investments in all shades of green projects are necessary in order to successfully implement the ambition of the Paris agreement. The shades are intended to communicate the following:

CICERO Shades of Green	Examples
Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Ideally, exposure to transitional and physical climate risk is considered or mitigated.	Wind energy projects with a strong governance structure that integrates environmental concerns
Medium green is allocated to projects and solutions that represent steps towards the long-term vision, but are not quite there yet. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Physical and transition climate risks might be considered.	Bridging technologies such as plug-in hybrid buses
Light green is allocated to projects and solutions that are climate friendly but do not represent or contribute to the long-term vision. These represent necessary and potentially significant short-term GHG emission reductions, but need to be managed to avoid extension of equipment lifetime that can lock-in fossil fuel elements. Projects may be exposed to the physical and transitional climate risk without appropriate strategies in place to protect them.	Efficiency investments for fossil fuel technologies where clean alternatives are not available
Brown is allocated to projects and solutions that are in opposition to the long-term vision of a low carbon and climate resilient future.	New infrastructure for coal

Sound governance and transparency processes facilitate delivery of the client's climate and environmental ambitions laid out in the framework. Hence, the governance aspects are carefully considered and reflected in the overall shading of the green bond framework. CICERO Green considers four factors in its review of the client's governance processes: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify and approve eligible projects under the framework, 3) the management of proceeds and 4) the reporting on the projects to investors. Based on these factors, we assign an overall governance grade: Fair, Good or Excellent.

2 Brief description of Hungary's green bond framework and related policies

Hungary is a country in Central Europe and member of the European Union. Hungary has approximately 9.8 million citizens, an area of 93,000 square kilometers and a GDP of USD 170 billion constituting the 54th largest economy globally according to the IMF. The capital city is Budapest. Since 23 October 1989 Hungary is a democratic parliamentary republic with 199 Members of Parliament. Hungary has a multi-party system and the government is currently formed by an alliance of the Fidesz and KDNP parties led by the Prime Minister Viktor Orbán. Hungary is a unitary state nation divided into 19 counties and the capital, Budapest. These are subdivided into 174 districts as of January 2013. Hungary maintains a social security system, tuition free secondary education and a universal health care system and currently ranks 43rd on the global Human Development Index[1].

Hungary supports the EU climate neutrality target, the UN Sustainable Development Goals (SDGs) and is a signatory to the Paris Agreement.

Environmental Strategies and Policies

In 2008, the Hungarian Parliament approved the first National Climate Change Strategy ("NCCS") for 2008-2025, which was revised in 2015 and followed by the Second National Climate Change Strategy ("NCCS2") approved in 2018. Hungary has in place a National Energy and Climate Plan. A draft of the plan was assessed by the European Commission.

Hungary was the first EU member state to ratify the Paris Agreement in 2016 and committed to reduce its greenhouse gas (GHG) emissions by at least 40% in 2030 (compared to 1990 levels). The EU put forward a 50-55% reduction of GHG emissions by 2030 compared to 1990 levels and Hungary recently communicated that this new target is acceptable if all member states reduce their own emissions by 40% by 2030. Hungary anticipates keeping the -40% target for 2030 in place while committing to the EU's 2050 climate neutrality target. In the context of the European Green Deal of December 2019, the Hungarian Government committed to make the country climate-neutral by 2050 and to make climate neutrality the ultimate goal of the National Clean Development Strategy 2050, to be finalized by the end 2020. In order to achieve this, the country currently plans to reduce GHG emissions by 95% until 2050 compared to 1990 levels and compensate the remaining 5% by enlarging sink capacities, mainly by afforestation. The strategy will be finalized by the end of 2020. Currently 32% of Hungary's emissions are covered by the EU ETS and 68% by the ESD (Emission Sharing Decision) for non-trading sectors.[2] Hungary commits to reduce GHG emissions in non-ETS sectors by 7% in 2030 compared to 2005 and a 8-10% energy efficiency improvement compared to business-as-usual (BAU).

Hungary's GHG emissions have been reduced by 33% from 92 $MtCO_2$ in 1990 to 61.2 $MtCO_2$ in 2016.[3] After two rapid declines in emissions following the fall of the Soviet Union (1990) and the financial crisis (2007/2008), Hungary's emissions recently have been steadily increasing from 2013 to 2016 by 7.6% together with a growth in GDP. In 2016, Hungary's emissions resulted by 21% from transport, 21.2% each from buildings and industry,

[1] http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/HUN.pdf, Retrieved April 24, 2020
[2] https://ec.europa.eu/clima/sites/clima/files/strategies/progress/docs/hu_factsheet_en.pdf
[3] https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/submissions/national-inventory-submissions-2018

19.3% from electricity and heat, 11.2% from Agriculture and 5.7% from waste.[4] Compared to 1990, the transportation sector has grown in significance from 10.2% to 21%, while industry (1990: 30.9%) and buildings (24.2%) both have decreased. According to Hungary, drivers are, e.g., increased freight road transportation (+44% in ton-kilometers) and the increased stock of passenger cars (+87%), while fuel consumption and energy use of residential buildings has decreased by 20%.

Hungary aims to phase out lignite-burning units and stop coal-fired power generation after 2025 and commits to have at least 21% renewable energy share in the gross final energy consumption in 2030. However, the share of energy provided from renewable sources have steadily decreased from 16.2% since 2013 to 13.5% in 2017.[5] In 2017, the main supply of primary energy was provided by natural gas (33%), oil (29%), nuclear (17%) and coal (9%). While Hungary imports approximately 35% of its electricity (mainly from Slovak Republic, Ukraine, Austria and Croatia), own produced electricity resulted by 49.1% from nuclear, 23.8% from natural gas, 15.5% from coal, 7.1% from biofuels and waste and 4.4% from various renewable sources.[6] According to the OECD, approximately 90% of the coal used is produced domestically and, conversely, approximately 90% of oil and gas is imported, mainly from Russia.

According to the 2030 EU climate and energy framework, the land use and forestry sector (LULUCF) cannot be a net emitter. According to the Climate and Environmental Protection Action Plan adopted in 2020, Hungary plans to ban single-use plastics as of 2021 and have 90% of all plastic bottles recycled by 2028. From 2022 new buses in all settlements with a population of over 25,000 must be electric. By 2030, forest cover shall increase to 27%, solar energy production shall increase 6-foldt to a capacity of 6GW and 90% of the electricity production shall be carbon neutral and electric vehicle share of new fleet shall reach 13%.

Hungary is aware of climate risks and has in place a National Adaptation Strategy and a Rural Development Program that was adopted by the European Commission. According to the issuer, climate change impact on agriculture are of major concern. Hungary is implementing EU environmental policy and laws. Hungary is, e.g., planning to review the vulnerability of energy networks to extreme weather conditions and climate change and will ensure that weather-related risks are also taken into consideration in power generation and energy developments. In 2017, the main challenges identified by the European Commission were related to waste targets and circular economy, air quality limits, nature conservation management as well as green infrastructure and water management. Hungary's steering committee (s. Selection below) confirmed that this framework is partly dedicated to address these, e.g., with investments in railway infrastructure. The committee also confirmed that after consultation with relevant ministries, no potential environmental conflicts or controversies with the EU were encountered recently.

Use of proceeds

An amount equal to the net proceeds of Hungary's issuances under this framework is intended to finance or refinance expenditures within Hungary's central government budget. Hungary includes eligible green expenditures within the categories renewable energy, energy efficiency, living use and living natural resources, waste and water management, clean transportation as well as adaptation. Eligible green expenditures might include investment expenditures (investment expenditure of State and Public Bodies, Agencies and companies), intervention expenditures (includes transfers and subsidies to public agencies and to enterprises), tax expenditures (tax credits and tax incentives related to activities with environmental benefit, e.g. tax incentives for public mass transportation) and selected operating expenditures (operating expenditures of state bodies/ agencies dedicated to environmental issues, including salaries and other expenses needed for each day business operation). Eligible green

[4] https://www.transportenvironment.org/sites/te/files/publications/2018_11_HU_EUKI_report_FINAL_0.pdf
[5] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_ind_ren&lang=en
[6] https://www.iea.org/countries/hungary

expenditures may also include expenditures towards government agencies and other public sector entities, providing that these entities do not raise any green funding themselves. According to Hungary's preliminary eligible expenditure list including projects from 2017 to 2021, approximately 90% of the proceeds should go to clean transportation projects, 5% to land use & living resources and the remainder to the other three categories. For Hungary's issuance in 2020, most of the issuance is anticipated to be allocated to refinancing.

Budget expenditures which already obtain dedicated funding (e.g., a dedicated tax or EIB funding, expenditures financed by the EU or selling CO_2 quote under the EU ETS) are excluded from financing. In addition, expenditures related to nuclear power, waste to energy, armament and defense sector as well as fossil fuel production and power generation are excluded from financing under this framework.

Selection

The selection process is a key governance factor to consider in CICERO Green's assessment. CICERO Green typically looks at how climate and environmental considerations are considered when evaluating whether projects can qualify for green finance funding. The broader the project categories, the more importance CICERO Green places on the governance process.

For the governance of Hungary's Green Bond Framework, the Ministry of Finance in cooperation with the Government Debt Management Agency of Hungary ("ÁKK") has set-up a Steering Committee ("SC") with 1-2 persons from each relevant ministry and an Inter-Governmental Working Group ("IWG") composed a total of 20 members of senior officials, staff with operating and technical expertise and representatives respectively of the following Ministries:

- Ministry of Finance (Chair)
- Ministry of Innovation and Technology, responsible in particular for energy and transport policies
- Ministry of Agriculture
- Ministry of Interior
- ÁKK

Potential projects are identified by each relevant ministry based on their policy goals and, subsequently, evaluated and selected on an annual basis by the IWG and approved by the Steering Committee. Hungary informed us that the final decision of the Steering committee will be made in consensus. According to Hungary, no dedicated life cycle assessments, supply chain assessments or lock-in and rebound analyses are required, as decisions are based on knowledge and expertise of the departments. Hungary also informed us that projects that might likely face local resistance are unlikely to be selected by the IWG and would not pass the consensus decision threshold.

Management of proceeds

CICERO Green finds the management of proceeds of Hungary to be in accordance with the Green Bond Principles. The Ministry of Finance is in charge of green bonds proceeds management, which will be performed annually on a notional basis. Proceeds will be earmarked except for cases when local market regulations require to keep the proceeds on a separated account (i.e., in case of Green Panda bonds in The People's Republic of China) and allocated to a portfolio of disbursements. The IWG will collect the data and monitor the level of eligible green expenditures, which may include expenditures i) within the 2 budget years preceding the year of issuance, ii) made in the same year as the issuance and/or iii) future budget expenditures. Pending the full allocation of the proceeds of the newly-issued green bonds to eligible green expenditures, the Ministry of Finance will keep record of the unallocated proceeds. The participating ministries will define the procedures, responsibilities as well as the division and schedule of tasks in a Rules of Procedures document. Hungary does not anticipate having unallocated

proceeds and the issuer informed us that the amount of eligible expenditures is much higher than the planned size of the issuance of green bonds in the coming years.

In specific cases, such as the potential issuance of Green Panda Bonds, the green bond allocation process will be adjusted to satisfy the local reporting requirements.

Reporting

Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green finance programs. Procedures for reporting and disclosure of green finance investments are also vital to build confidence that green finance is contributing towards a sustainable and climate-friendly future, both among investors and in society.

Hungary will publish annual impact and allocation reporting. The annual green bond report will be published online in Q4 each year following the annual State Budget audit.

Relevant reporting data will be collected by each relevant ministry and draft corresponding sections in the report. The Ministry of Finance will be responsible for the coordination, the IWG will be responsible for data collection, reporting and review and the steering committee will be responsible to validate the green bond report.

In addition to basic information (e.g., ISIN references, reporting period, frequency of reporting and name of the external providers), the allocation reporting will include information on the green bonds, such as the total proceeds raised, the amount allocated to Eligible Green Expenditures as of the end of the reporting period and its breakdown by green sectors. The impact report will provide information on the eligible green expenditures, based on existing publicly available data and subject to the availability of the relevant information. According to Hungary, impact reporting is likely to be focused on project-by-project basis. Environmental impact indicators are expected to focus on carbon impact metrics (GHG emissions avoidance) where it can be quantified. In addition, the issuer has provided a list of impact metrics for all project categories. For clean transportation, these metrics include

- km of new public transport lines created / maintained
- Number of people in [new] environmentally friendly means of transportation
- Annual energy savings (in MWh)
- Annual GHG emission avoidance (in tonnes of eq. CO_2 per passenger/tonne-km)

Hungary may choose to report on allocation on more frequent basis to accommodate for specific regulatory requirements of local markets, e.g., in the case of the issuance of Green Panda Bonds in China.

CICERO Shades of Green has been mandated to provide an annual independent review on Hungary's green bond report including a review of the allocation of the green bond proceeds, its alignment with Hungary's green bond framework, and the methodologies and assumptions used to evaluate the green bond impacts if relevant.

3 Assessment of Hungary's green bond framework and policies

The framework and procedures for Hungary's green bond investments are assessed and their strengths and weaknesses are discussed in this section. The strengths of an investment framework with respect to environmental impact are areas where it clearly supports low-carbon projects; weaknesses are typically areas that are unclear or too general. Pitfalls are also raised in this section to note areas where Hungary should be aware of potential macro-level impacts of investment projects.

Overall shading

Based on the project category shadings detailed below, and consideration of environmental ambitions and governance structure reflected in Hungary's green bond framework, we rate the framework **CICERO Medium Green.**

Eligible projects under the Hungary's green bond framework

At the basic level, the selection of eligible project categories is the primary mechanism to ensure that projects deliver environmental benefits. Through selection of project categories with clear environmental benefits, green bonds aim to provide investors with certainty that their investments deliver environmental returns as well as financial returns. The Green Bonds Principles (GBP) state that the "overall environmental profile" of a project should be assessed and that the selection process should be "well defined".

Category	Eligible project types	Green Shading and some concerns
Renewable Energy	Expenditures to support the development of renewable energy generation, such as: • Solar • Wind • Geothermal [(with direct emissions ≤ 100g CO2e/kWh)] • Biomass, Biogas or Biofuels [(with direct emissions ≤ 100g CO2e/kWh)] • Other sources such as heat-pump • Excluding waste-to-energy	**Dark Green** ✓ This category supports SDG: 7 and EU Environmental Objective Climate Change Mitigation. ✓ Hungary currently aims at financing support schemes for solar PV and biomass related investment expenditures for private individuals as well as small and medium sized enterprises and other renewable energy subsidies for solar, biomass and geothermal energy. ✓ 100g CO_2e/kWh thresholds meet the proposed EU taxonomy standard for geothermal power generation. ✓ Biofuel origin has to be reported according to Hungary's legislation. Concerns arise regarding sourcing of biofuels and biomass such as potential impacts on deforestation and crop competition as well as methane slippage from biogas production. ✓ Hungary restricts the installation of wind power within 12km from residential areas which could lead to reduced installation

		capacity and adverse effects on its 330MW of wind capacity by 2030 target.
Energy Efficiency 	Expenditures to support energy efficiency improvement in the public and private sector	**Light to Medium Green** ✓ This category supports SDG 7 and SDG 11 and EU Environmental Objective Climate Change Mitigation. ✓ Hungary currently aims at financing various efficiency improvements related to agriculture, household appliance and renovations of public building and subsidies to environmentally relevant SMEs. ✓ Investors should be aware that SMEs supported could be involved with, e.g., fossil fuel efficiency, heat recovery and plastics. ✓ Refurbishments follow no additional requirements (e.g., energy efficiency) beyond regulation. Hungary informed us that they are currently developing a long-term Building Renovation Strategy.
Land Use and Living Natural Resources 	Expenditures to promote sustainable agriculture, biodiversity and preservation of living natural resources	**Medium Green** ✓ This category supports SDG 15 and EU Environmental Objective Climate Change Mitigation and Protection of Healthy Ecosystems. ✓ This category is anticipated to receive approximately 5% of all use of proceeds. The majority of this share will be allocated to projects related to biodiversity, soil and forestry. Operating expenditures include national parks (incl. salaries of park directorate), for the environmental agency for environmental and agricultural education programs, for the department of forest management and for the national land center. ✓ Operating expenditures can include operation and acquisition of, e.g., fossil fuel machinery. Hungary informed us that in 2020 around 2/3 is dedicated to personnel costs. ✓ Sustainable agriculture includes environment/climate-friendly land management practices, including organic farming. Organic farming has several positive environmental features, however the variety of different goals of organic farming (health, animal welfare, environment, climate) is too complex to allow an overarching scientific conclusion on the benefits for the climate of organic versus conventional farming. ✓ Among the main sources of greenhouse gas emissions in agriculture are land use change (esp. forests, wetlands) for cultivating new areas. The use of fossil fuels in machinery is another, albeit smaller source of emissions.

		✓ Hungary confirmed that meat production and livestock are excluded.
Waste & Water Management 	Expenditures to support waste management, water treatment and water supply	**Light to Medium Green** ✓ This category supports SDG 6 and EU Environmental Objective Sustainable use and protection of water and marine resources, Transition to a circular economy, Pollution prevention and control. ✓ Hungary currently mainly aims at financing projects related to recycling and reutilization of SMEs, local governments' and commercial waste management services, environmental remediation, water quality and water efficiency. ✓ Waste to energy is excluded under this framework. ✓ Hungary informed us that waste treatment and recycling is typically based on the use of electricity, but some technologies use natural gas, e.g., for heating.
Clean Transportation 	Expenditures to promote clean transport services and modal shift towards public transportation	**Light to Dark Green** ✓ This category supports SDG 11 and EU Environmental Objective: Climate Change Mitigation. ✓ This category is anticipated to receive approximately 90% of the all use of proceeds. ✓ Approximately 28% of total proceeds are dedicated to investment expenditures related to electric railway, subway, trolley or tram. All rail guided vehicles financed in this category will be electric and investments into fossil fuel carrying freight trains are not eligible. ✓ While direct investments in Diesel related rail infrastructure is excluded from the framework, all other railway related expenditures include fossil fuel elements as they support diesel fueled transportation. ✓ Approximately 26% of total proceeds will be allocated to operating expenditures for railway network (e.g., personnel costs, cleaning, guarding, maintenance, tools and other general company costs) and approximately 20% of total proceeds will be allocated to intervention expenditures for the reimbursement of uncovered costs of railway passenger traffic based on EU directive (reimbursements which are uncovered by the income through the public transport services). Hungary confirmed that operating expenditures include diesel fuel which will not be covered through green bond proceeds. ✓ In addition to electric charging facilities, Hungary anticipates including a small share for refinancing of procurement of CNG based busses and related public transport infrastructure

		and refueling stations dedicated to public service busses. Hungary informed us that no new systems will be financed in future budget years. ✓ Hungary anticipates including tax credits for electric and plug-in hybrid cars (e.g., registration tax, motor vehicles tax and motor vehicle duty) as well as a newly announced subsidy scheme for purely electric vehicles with a value of less than 15 million forint. Hybrid vehicles are required to have a minimum pure electric range of 25km according to Hungary. ✓ Investments in diesel vehicles, shipping and heavy duty road transportation vehicles are excluded from financing. ✓ Hungary informed us that railway bridges will only be used by trains. ✓ While train station buildings financed in this category can be used for other economic activities (restaurants, gift shops) the funds for reconstructing station building cover only the area of the building used by passengers, e.g., waiting room, toilets, ticket office. ✓ The issuer informed us that Chinese Belt and Road related co-financing is not expected for any of the currently planned projects.
Adaptation	Expenditures to develop climate change extreme weather events observation systems and support adaptation related infrastructure	**Medium to Dark Green** ✓ This category supports SDG 13 and EU Environmental Objective: Climate Change Adaptation. ✓ Hungary currently mainly aims at financing investments expenditures in adaptation to anticipated changes in the hydrological cycles as well as operating and investment expenditures in air quality improvements. This includes examinations, preventive measures, water level rehabilitation of the Danube, water retention, land use change and monitoring. ✓ Equipment used will largely be based on electricity, e.g., monitoring as well as ship gateways and flood gates. However, fossil fuel machinery will be used for construction projects. ✓ The issuer is required by legislation to conduct impact assessments that include environmental, economic and social investigation to find the best and most sustainable solution. ✓ The issuer is aware of potential conflicts with local landowners and other stakeholders. ✓ Hungary informed us that no conflicts are expected with neighboring countries regarding alteration/rehabilitation projects of the Danube river and no large damns are included under this framework.

Table 1. Eligible project categories

Background

Hungary's per capita greenhouse gas emissions in 2017 amounted to 6.6 tCO_2/capita, which is the 6th lowest value in the European Union. Hungary's neighboring EU countries have emissions of 5.8 (Romania), 6.1 (Croatia), 8.0 (Slovakia), 8.5 (Slovenia) and 9.6 (Austria).[7]

To meet the 2°C target goals, direct transport emissions must peak around 2020 and then fall by more than 10% by 2030.[8] The largest amount of carbon savings come from switching from inefficient modes of transport (e.g., private cars) to mass transit.[9] While electric modes of transportation are preferable both when it comes to reducing carbon emissions and local pollution to those that directly use fossil fuels, we should nevertheless be aware of the indirect GHG emissions stemming from the production of transport vehicles and must strive to keep increasing their efficiency.[10]

Approximately 21% of Hungary's emissions result from the transportation sector. The main objective of this framework are investments in the transportation sector with rail related expenditures (train, tram, subway). According to Hungary, the Hungarian open-access railway network is 7712km long of which 41% is electrified. In terms of the railway network's share of energy consumption, 65% was based on electricity as highly utilized lines have already been electrified. The government also informed us that the railway network is used for 18.2% of transported goods in terms of ton-kilometers and for 25% of all public transport-kilometers (not including private cars).

The framework also aims at improving waste management in Hungary. According to the issuer, Hungary has lower recycling rates compared to EU average, e.g., municipal solid waste (2018) with 37.2% (EU: 47%), glass packaging waste (2017) with 34.2% (EU: 74.4%) and wooden packaging waste (2017) 24.1% (EU: 40%).

EU Taxonomy and Green Bond Standards

Hungary is aiming to align its framework with the emerging EU taxonomy and the EU Environmental Objectives. While this not necessarily safeguards against financing potentially climate adverse projects, it provides investors with an additional baseline regarding the screening requirements of some of Hungary's projects.

Hungary, e.g., specifies a limit for direct emissions ≤ 100g CO_2e/kWh for biomass and geothermal projects. The issuer's renewable energy project category as well as electrifying rail bound infrastructure, projects related to trams, subways, trolleys are likely to be in line with the EU taxonomy. The EU taxonomy specifies, e.g., for interurban transport "zero direct emissions trains are eligible" and "other trains are eligible if direct emissions (TTW) are below 50g CO2e emissions per passenger kilometre (gCO2e/pkm) until 2025".[11] In addition, it allows for investments into "construction and operation of transport infrastructure" that is "predominantly used for low-carbon transport if the fleet that uses the infrastructure meets the thresholds for direct emissions". In addition, "non-electrified rail infrastructure with an existing plan for electrification or use of alternatively powered trains".

For other potential investments it remains unclear if, e.g., tax credits for plug-in hybrid vehicles would comply with the EU taxonomy's threshold of 50gCO_2/pkm and /km, respectively. Refurbishments would only qualify if

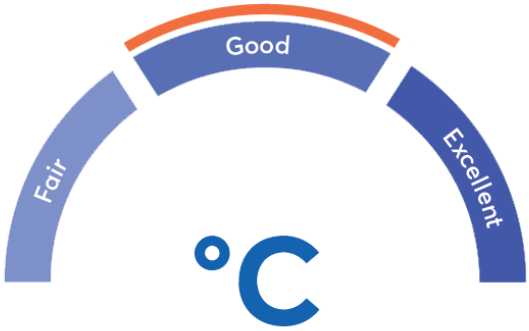
[7] https://www.statista.com/statistics/986392/co2-emissions-per-cap-by-country-eu/
[8] http://www.iea.org/tcep/transport/
[9] https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter8.pdf
[10] https://www.sciencedirect.com/science/article/pii/S030626192030533X
[11] https://ec.europa.eu/knowledge4policy/publication/sustainable-finance-teg-final-report-eu-taxonomy_en

they constitute "major renovation" according to the Energy Performance of Buildings Directive (EPBD) or if "the renovation achieves savings in net Primary Energy Demand of at least 30% in comparison to the baseline performance of the building before the renovation". In order to assess alignment of all categories, more information regarding projects' eligibility criteria will be needed with regards to the EU taxonomy's "Mitigation criteria" and "Do no significant harm assessment".

Governance Assessment

Four aspects are studied when assessing the Hungary's governance procedures: 1) the policies and goals of relevance to the green bond framework; 2) the selection process used to identify eligible projects under the framework; 3) the management of proceeds; and 4) the reporting on the projects to investors. Based on these aspects, an overall grading is given on governance strength falling into one of three classes: Fair, Good or Excellent.

Hungary has in place a sound management and governance structure, as well as regular and transparent reporting about green bond project achievements to investors and the public. Hungary has relevant environmental and climate strategies as well as specific climate targets in place. However, the issuer has no comprehensive emissions reduction targets for all of Hungary's sectors. The issuer has a selection process that includes a steering committee and an additional working group evaluating projects but has selection criteria that are in part broad. Hungary will report annually, has put forward a list of impact metrics and will obtain an external review of its annual impact reporting. The overall assessment of Hungary's governance structure and processes gives it a rating of **Good**.



Strengths

Hungary has well established climate targets and ambitions regarding environmental improvements across a variety of sectors. This framework is dedicated to a variety of areas where Hungary is aiming to improve in order to achieve its goal of climate neutrality in 2050.

It is a strength that Hungary is focusing the majority of the framework's proceeds on the railway sector and public transportation. Considering that Hungary's emissions result by 21% from transportation which have more than doubled in significance since 1990, CICERO Shades of Green is encouraged to see approximately 90% of proceeds being designated this sector.

It is a strength that Hungary will obtain a science-based external review of its green bond impact reporting. Hungary is likely to focus on a project-by-project basis in its impact reporting.

It is a strength that Hungary recognizes climate risks as a vital and includes adaption projects into its framework that target, e.g., anticipated changes in the hydrological cycle.

Weaknesses

It constitutes a weakness that some categories could include fossil fuel elements where the extend of the positive climate impact depends on the actual implementation of the project. This may include, e.g., refinancing of natural gas fueling stations for public busses and water treatment facilities. Hungary informed us that it will only refinance natural gas based bus systems and will not allocate proceeds to financing of new natural gas based bus systems. In

addition, non-green elements could be included in general operating expenses, e.g., for national parks and forestry management incl. acquisition of new fossil fuel machinery.

Pitfalls

Environmental impact indicators are expected to focus on carbon impact metrics (GHG emissions avoidance) where it can be quantified. However, choosing only these indicators can fall short to showcasing actual positive (or negative) project impacts. We note the inclusion of administrative costs, operating expenditures, support to NGOs in the eligible categories under this framework. The impact of these expenditures may be difficult to assess, and Hungary does not include specific impact metrics in its impact report. We encourage Hungary, to follow market best practices and report meaningful impact indicators for all of its projects and incl. respective assessment methodologies. In particular we encourage Hungary to make transparent in the reporting to what extent the expenditures include fossil fuel elements, the share between expenditures that cover the governments administration costs (including salary to government officials) versus allocations to green projects.

The selection criteria are in part broad and include fossil fuel aspects as well as administration costs. The issuer is encouraged to provide transparency on these aspects in its reporting. Considering Hungary's ambition to align with the EU taxonomy we encourage Hungary to screen projects according to the EU taxonomy and to additionally report metrics that are relevant for determining eligibility according to the EU taxonomy.

It is a pitfall that Hungary includes tax breaks for plug-in hybrids in the framework with a minimum battery range of only 25km, and no emission limit. We consider clean transport projects that include fossil fuel elements such as plug-in hybrid cars with significant electric range as bridging technologies as these can contribute to the development of a charging infrastructure. However, to avoid locking in emissions by incentivizing purchasing hybrid models that do not necessarily increase ambition to transition toward a low-carbon, climate resilient future we encourage the issuer to follow the latest research of plug-in hybrids impacts on the environment and include up-to-date screening of hybrids.

While Hungary confirmed that financing of meat and livestock are excluded under this framework, it nevertheless includes sustainable agriculture projects in its Land Use and Living Natural Resources category. Research findings on the environmental impact of organic and sustainable agriculture are constantly evolving. The relationship between farming practices and GHG emissions are of particular interest to green bond investors and the climate change community at large. Hungary should be mindful of staying abreast of new developments in the agro-scientific community, of deploying the best available technologies and practices, and of communicating changes and results transparently and honestly to its investors.

Hungary also includes forestry projects incl. management in its framework. However, CO_2 emission reduction calculations can be complicated in the land-use and forestry sector. In order to provide transparency to investors and for these to be able to compare like-for-like with other issuers, we encourage Hungary to publish the methodology used alongside any results in its impact reporting.

The issuer can finance refurbishment of public buildings as well as, e.g., railway stations under this framework. It constitutes a pitfall that the issuer has not outlined clear eligibility criteria for investments in buildings regarding energy efficiency (e.g., the IEA suggests improvement of buildings' energy efficiency by at least 30%), public transportation solutions, climate resilience screenings, building materials and building certifications that go beyond regulation. Without additional requirements, the refurbishment would not qualify under the EU taxonomy.

The equipment used for operation of Hungary's adaptation projects will largely be based on electricity, e.g., monitoring and flood gates. However, fossil fuel machinery will be used for the construction projects. CICERO

Shades of Green encourages the issuer to consider low-carbon solutions for new machines purchased and to implement low-carbon requirements for subcontractors for all of Hungary's larger construction projects.

It is a pitfall that Hungary does not generally apply and conduct life-cycle assessments or supply chain assessments for all of its major projects. We encourage the issuer to include this into their standard decision making processes in order to avoid the risk of rebound effects.

Efficiency improvements may lead to rebound effects. When the cost of an activity is reduced there will be incentives to do more of the same activity. From the project categories in Table 1, an example is energy efficiency. With Hungary's emissions having increased by a total of 7.6% between 2013 and 2016, we encourage Hungary to vigilantly assess potential rebound effects to avoids green bond funding of projects where the risk of rebound effects is particularly high.

Appendix 1:
Referenced Documents List

Document Number	Document Name	Description
1	Hungary's Green Bond Framework, 2020	
2	Background Information on Hungary	Background document on Hungary's Climate Change and Environmental strategies
3	Eligible Green Expenditures	Excel file with all anticipated expenditures anticipated by Hungary
4	Hungarian Energy and Climate Strategy	Presentation describing Hungary's Energy and Climate Strategy
5	Factsheet on 2014-2020 Rural Development Programme for Hungary	Overview of the rural development program adopted by the European Commission
6	New Hungary Rural Development Programme NHRDP, May 2014	Description of the rural development program in Hungary
7	National Energy Strategy 2030, 2012	National Energy Strategy for the long-term sustainability, security and economic competitiveness of energy supply in Hungary.
8	Second National Climate Change Strategy for the period between 2018 and 2030, 2018	Hungarian Decarbonization Roadmap, National Adaptation Strategy and "Partnership for Climate" Awareness-Raising Plan
9	EU The Environmental Implementation Review 2019	Review of Hungary's implementation of EU environmental policy and law
10	Hungarian Energy and Climate Strategy – Extract	Extract of the Hungarian Energy and Climate Strategy submitted to the EU Commissions in January 2020
11	2020 Climate and Environmental Protection Action Plan	Summary of Hungary's action plan fir climate change
12	National Water Strategy and the Green Deal in Hungary	Summary of Hungary's approach towards water sector

Appendix 2:
About CICERO Shades of Green

CICERO Green is a subsidiary of the climate research institute CICERO. CICERO is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen international cooperation. CICERO has garnered attention for its work on the effects of manmade emissions on the climate and has played an active role in the UN's IPCC since 1995. CICERO staff provide quality control and methodological development for CICERO Green.

CICERO Green provides second opinions on institutions' frameworks and guidance for assessing and selecting eligible projects for green bond investments. CICERO Green is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO Green is independent of the entity issuing the bond, its directors, senior management and advisers, and is remunerated in a way that prevents any conflicts of interests arising as a result of the fee structure. CICERO Green operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

We work with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions (ENSO). Led by CICERO Green, ENSO contributes expertise to the second opinions, and is comprised of a network of trusted, independent research institutions and reputable experts on climate change and other environmental issues, including the Basque Center for Climate Change (BC3), the Stockholm Environment Institute, the Institute of Energy, Environment and Economy at Tsinghua University and the International Institute for Sustainable Development (IISD).