



The City of Gothenburg Green Bond Second Opinion

7 September 2019

The City of Gothenburg is Sweden's second largest city, with a population of just over half a million. The city is strategically located between Oslo and Copenhagen, and is the heart and the growth engine of the Gothenburg region and Västra Götaland County. It is home to a variety of strong industries and Scandinavia's largest port. The city is growing strongly to make space for 700,000 residents by the year 2035 – 130,000 more than at present.

Green project categories include: Renewable energy; Green buildings; Energy efficiency; Clean transport; Waste management; Water and wastewater management; Sustainable land use and environmental management; and Climate adaptation. Net proceeds will only finance capital expenditures and can finance both existing and new green projects. Green bond net proceeds will not be allocated to projects for which the main purpose of the project is fossil energy production, and other potentially environmentally harmful activities.

The climate and environmental targets of the City of Gothenburg are progressive and very ambitious. On the other hand, emission of greenhouse gases was in 2017 only some 7% below 1990 level, which indicates that Gothenburg may have difficulties in reaching all its shorter term targets when it comes to climate change, despite a reduction in emission per capita of 30% over the same period.

The selection process for determining eligible projects is solid, as is the management of proceeds. The reporting is also very good at a portfolio level, including climate impacts from production, processing and transport.

The City of Gothenburg's green bond framework describes a very wide set of eligible green projects. Mostly these are described in good detail and with proper green safeguards. The City of Gothenburg's overall management of environmental, social, governance and financial risks is integrated in the strategies and is a core component of the decision-making processes of the City. Clear guidelines exist on procurements, underlining the need to minimize the climate footprint and other sustainability and ethical concerns.

Based on an assessment of the governance structure of the City of Gothenburg and the eligible projects under the green bond framework, we rate the framework to be **Medium Green**. The majority of the proceeds are expected to go to the Green building category. The issuer has a sustainable building programme which

SHADES OF GREEN

Based on our review, we rate the the City of Gothenburg'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 thw City of Gothenburg's framework to be **Excellent**.



GREEN BOND PRINCIPLES

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





considers important factors such as minimal negative environmental impact from a lifecycle perspective, promotion of sustainable transport, integrating green spaces, stormwater collection, preserving/enhancing biodiversity, and minimal resource use and waste during the life of the building. In a low carbon 2050 perspective, however, the energy performance of buildings is expected to be improved, with passive house technology becoming mainstream and the energy performance of existing buildings being greatly improved through refurbishments. The issuer is taking steps in this direction with energy efficiency criteria for both new buildings and by renovating existing buildings. To obtain a dark green shading, best environmental technologies would have to be required in eligible green bond building projects.



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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 August 2019. 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
 <p>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.</p>	 <p>Wind energy projects with a strong governance structure that integrates environmental concerns</p>
 <p>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.</p>	 <p>Bridging technologies such as plug-in hybrid buses</p>
 <p>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.</p>	 <p>Efficiency investments for fossil fuel technologies where clean alternatives are not available</p>
 <p>Brown is allocated to projects and solutions that are in opposition to the long-term vision of a low carbon and climate resilient future.</p>	 <p>New infrastructure for coal</p>

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 the City of Gothenburg's green bond framework and related policies

The City of Gothenburg is Sweden's second largest city, with a population of just over half a million. The city is strategically located between Oslo and Copenhagen, and is the heart and the growth engine of the Gothenburg region and Västra Götaland County. It is home to a variety of strong industries and Scandinavia's largest port. Gothenburg is currently on the cusp of a major development boom. The city is growing strongly to make space for 700,000 residents by the year 2035 – 130,000 more than at present.

Sweden's municipalities are responsible by law for a number of areas that are vital to the public good. The City of Gothenburg issued their inaugural green bond in 2013 as the first city in the world and launched its previous framework in 2015.

Environmental Strategies and Policies

The City Council has adopted 12 local environmental quality objectives with associated intermediate objectives. When it comes to climate change, the targets are very ambitious: 40% reduction in CO₂ emissions from the non-trading sectors (i.e. sectors not covered by the EU carbon trading system) in 2020 relative to 1990 level; maximum 2 tonnes CO₂e per capita from territorial activities and maximum 3.5 CO₂e per capita when including embedded emissions in consumption activities within 2035¹ and reduced energy use in housing amounting to a 30% reduction in 2020 relative to 1995 levels and a 20% reduction in the use of electricity within the same period. Other issues like air and water pollution, ocean, biodiversity, etc. has mostly similar quantified targets. The Climate Programme adopted by the city demonstrates how the city will succeed in achieving these specific objectives. Climate resilience is always assessed in relation to decisions concerning urban planning, and risks in other municipality activities are assessed when "risk and vulnerability analysis" is carried out. Thus, Gothenburg is quite well prepared for inevitable climate change.

The companies owned by the City of Gothenburg works according to the EU directive on sustainability reporting, which means that companies must include sustainability factors as part of their annual financial reporting. In brief this involves measuring, following up, describing and communicating an organisation's influence on sustainable development.

The latest emission statistics (2017) show that approximately half of the greenhouse gases emitted in the City of Gothenburg (2.2 million tCO₂e²) is from industrial processes (including refineries). Two other substantial sources are electricity production and district heating as well as transport. Progress on the environmental targets are reported annually. Emissions are reported according to the "Global compact of mayors"

Use of proceeds

All green projects will take place in the City of Gothenburg or the nearby municipalities. Green projects form a portfolio of assets eligible for financing and refinancing by green bonds. Green project categories include:

¹In 2012, Gothenburg released more than 8 tonnes greenhouse gases per capita. The goal is to reduce emissions to 3.5 tonnes by 2035 and 1.9 tonnes by 2050.

² <http://www.airviro.smhi.se/RUS/emistrend.htm>



Renewable energy; Green buildings; Energy efficiency; Clean transport; Waste management; Water and wastewater management; Sustainable land use and environmental management; and Climate adaptation. The majority of the proceeds are expected to go to the Green building category.

Net proceeds will finance capital expenditures and can finance both existing and new green projects. Refinancing is defined as financing for green projects completed more than 12 months prior to the Green Bond Committee's approval. The distribution between new financing and refinancing will be reported on in the City of Gothenburg's annual green bond reporting.

Green bond net proceeds will not be allocated to projects for which the main purpose of the project is fossil energy production, nuclear energy generation, weapons and defence, potentially environmentally harmful resource extraction (such as rare-earth elements or fossil fuels), gambling or tobacco.

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.

The City of Gothenburg's overall management of environmental, social, governance and financial risks is integrated in the strategies and is therefore a core component of the decision-making processes of the City, including the evaluation and selection of green projects. Clear guidelines exist on procurements, underlining the need to minimize the climate footprint and other sustainability and ethical concerns.

Green projects shall comply with the eligibility criteria defined under the Green Project Categories in table 1. There will be a screening for potential controversial projects, and external environmental impact assessments will be carried out when necessary (typical in connection to wind and solar power projects). The process to evaluate, select and allocate green bond proceeds to eligible green projects comprise the following steps: 1) Relevant Project Manager evaluates potential green projects and present them to the Green Bond Committee; 2) The Green Bond Committee approves the potential green projects based on adherence to the green bond framework and register them as approved green projects in the City's internal system. A decision to allocate net proceeds will require a consensus decision by the Green Bond Committee. Approved green projects will be included in the City of Gothenburg's pool of approved green projects; 3) Decisions are documented and filed.

The Green Bond Committee is chaired by the Head of Treasury and includes members from the City Planning & Development Office and the Environmental Office.

The Green Bond Committee holds the right to exclude any Green Project already funded by green bond net proceeds. In the event a Green Project is sold, or for other reasons loses its eligibility, funds will follow the procedure under Management of Proceeds until reallocated to other eligible green projects.

Management of proceeds

CICERO Green finds the management of proceeds of the City of Gothenburg to be in accordance with the Green Bond Principles.

An amount equal to the green bond net proceeds will be credited to a "Green Account". The Green Account ensures that the green bond net proceeds only support green projects, or to repay green bonds. As long as the green bonds



are outstanding and the Green Account has a positive balance, funds will be deducted when relevant or at least annually from the Green Account in an amount equal to all disbursements made during such year in respect of eligible green projects. All transfers from the Green Account will be documented to ensure a full audit trail and to simplify the green bond reporting. The allocation will be to a portfolio of disbursements.

While any green bond net proceeds remain unallocated, the City of Gothenburg will temporarily place funds in the liquidity reserve and manage them accordingly. However, unallocated proceeds may not be invested in fossil fuel related assets. The maximum period that net proceeds may be unallocated is 12 months. The issuer will disclose the portfolio balance of unallocated proceeds in the annual green bond report.

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.

The City of Gothenburg will annually and until maturity of the green bonds issued, provide to investors on its website (<http://finans.goteborg.se/en/greenbonds/>) reporting on allocation of proceeds and environmental impact of the green projects at a portfolio level. The Head of Treasury will be responsible for the reporting. Presently, the City of Gothenburg have not implemented TCFD recommendations when it comes to reporting.



3 Assessment of the City of Gothenburg’s green bond framework and policies


The framework and procedures for the City of Gothenburg’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 the City of Gothenburg should be aware of potential macro-level impacts of investment projects.

Overall shading

Based on the project category shadings detailed below, the expected distribution of proceeds among the categories, and consideration of environmental ambitions and governance structure reflected in the City of Gothenburg’s green bond framework, we rate the framework **CICERO Medium Green**.

Eligible projects under the the City of Gothenburg’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 	<p>The financing or refinancing of the production, appliances, establishment, acquisition, expansions, upgrades/modifications, and products of renewable energy, as well as related Research and Development programmes and/or the associated infrastructure.</p> <p>Wind energy: Onshore and offshore wind energy generation facilities and other emerging technologies, such as wind tunnels and cubes.</p> <p>Solar energy: Solar energy technologies such as Photovoltaic (PV) systems, Concentrated Solar Power (CSP) and solar thermal facilities.</p>	<p>Dark Green</p> <p>✓ While renewable energy is generally low-carbon, local environmental impacts such as on biodiversity and landscape, and lifecycle emissions from construction and operation are concerns for these projects. Projects are local only, and the City of Gothenburg has good procedures for handling potential controversial projects. Environmental and social impacts are assessed when one of the municipality owned companies are to invest in the construction of a project, such as a wind or solar project.</p>



Thermal energy: Water-thermal heating/cooling systems, including storage facilities in e.g. caverns, and geothermal heating/cooling systems.³

Bioenergy: Facilities producing biofuel, biochar and/or biomass such as biofuel preparation, pre-treatment, bio-refinery and pyrolysis facilities. Facilities for electricity generation or district heating/cooling, as well as the combination (CHP), that use biofuel or biomass as fuel.⁴ Facilities often use a mix of different sustainable energy sources such as biomass/fuel, waste⁵, water-thermal and recovered energy. Rail and shipping related infrastructure needed for the transport, loading, off-loading and storage of biomass to production plants.

Transmission: Transmission of electricity produced out of renewable sources from its production site to the electricity grid. Infrastructure related to distribution of biofuels (in particular biogas).

- ✓ Biomass/fuel deriving from sources of high biodiversity that competes with food sources is excluded. Sustainability of the supply chain is preferably proven by a certification like the Roundtable on Sustainable Biomass (RSB), Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC).
- ✓ Rail and shipping related infrastructure will only be used by the biomass facility.
- ✓ Transmission only cover transmission to connect renewable energy production to distribution networks.
- ✓ Beware of a small amount of fossil fuel use in district heating. The political ambition is to have fossil free district heating by 2030 (excluding plastics).

Green buildings



The financing or refinancing of the establishment, acquisition, expansion and upgrade of buildings that fulfil, or are designed and intended to fulfil once completed, one of the following requirements:

- Commercial or Public buildings with an energy performance of no more than 50kWh/m²
- Residential buildings with an energy performance of no more than 60kWh/m²
- Buildings with a Swedish Energy Performance Certificate (EPC) with energy class A or B
- Buildings that have, or are designed and intended to receive, (i) a design stage certification, (ii) a post-construction certification or (iii) an in-use certification in any of the following building certification schemes at the defined threshold level or better:
 - LEED “Gold”,

Medium Green

- ✓ Passive or plus house technologies should become mainstream and the energy performance of existing buildings greatly improved. Gothenburg is taking steps towards this long-term vision with energy efficiency targets.
- ✓ Construction projects can have potential negative local environmental impacts.
- ✓ For new buildings, access to public transport should be considered, as well as bicycle parking and charging facilities for electric cars.
- ✓ The City of Gothenburg has good procedures for addressing resiliency concerns.

³ Facilities should operate at life cycle emissions lower than 100gCO_{2e}/kWh.

⁴ The City of Gothenburg does not classify peat as a renewable energy source.

⁵ Less than 10 per cent fossil or plastic in the mix.



- BREEAM “Very Good”,
- Miljöbyggnad “Silver”, or
- The Nordic Swan Ecolabel certification.

- ✓ Life cycle assessment is an increasing ambition for the issuer.

Energy efficient retrofit or renovation of existing buildings, reducing energy use (kWh/m²/year) per heated square meter per year by at least 30 per cent.

Energy efficiency



The financing or refinancing of the establishment, acquisition, expansion and upgrade of energy systems, as well as their associated infrastructure.

Energy: Energy system efficiency, such as electric transmission and district heating distribution, with the aim to increase system security and to reduce energy losses. Smart distribution systems, storage facilities, metering systems and other intelligent energy systems managing the intermittency of renewable energy.

Buildings: Direct costs (e.g. material, installation and labour) for installing energy efficient technologies such as heat pumps, smart control systems, new windows, energy efficient lighting, or costs for enabling renewable energy sources. Investments should improve energy efficiency in the respective area by at least 30 per cent.

Municipal activities: Energy efficiency measures in various municipal activities and operations, such as exchanging traffic lights to LED. Investments should improve energy efficiency in the respective area by at least 30 per cent.

Medium to Dark Green

- ✓ Energy efficiency investments, such as smart technology aimed at reducing energy consumption, are key to reducing emissions. Smart grids and grid upgrades are necessary to manage and increase the share of intermittent and decentralized renewable energy.
- ✓ Upgrades of the district heating network is essential, given the population growth of the city. The political ambition is to have fossil free district heating by 2030 (excluding plastics). The issuer informs that the CO₂ grid factor for district heating in Gothenburg was 65 g CO₂/kWh in 2018.
- ✓ Be aware of possible rebound effects and lock-in of fossil fuel infrastructure when upgrading buildings.
- ✓ Take care to avoid investments in fossil fuel related grid infrastructure.

Clean

transportation



The financing or refinancing of the production, establishment, acquisition, expansion and upgrades of low carbon vehicles and their related infrastructure (excluding rolling stocks and related infrastructure dedicated to the transport of fossil fuels).

Medium Green

- ✓ Potential for emission reduction depends on area planning and degree of urbanization, introduction of new vehicle technologies for passenger and goods transportation, and fuel



Low carbon public transportation: Public transport systems such as trains, trams, buses, ferries and cableway transportation systems, with no direct emissions (electric or hydrogen) or associated with a low carbon footprint (biofuel⁶ or hybrid electric⁷).

Low carbon vehicles: Fully electrified, biofuel, plug-in hybrid electric⁸, or hydrogen passenger and freight vehicles⁹.

Low carbon transportation infrastructure: Infrastructure supporting electrified/hydrogen and low carbon passenger and freight transport, such as the following:

- dedicated charging and alternative fuel infrastructure¹⁰,
- bus rapid transit systems, bus lanes and electrified railways, that support modal shift from private to public transportation¹⁰
- infrastructure for bicycles and pedestrians
- cross cutting solutions¹¹ such as digital solutions supporting improved flow and transport modal shift (e.g. road charging systems, systems for autonomous vehicles, car-sharing schemes) and sustainable freight solutions (e.g. electrified city delivery solutions or deliveries by bike, and terminals enabling reloading to and from rail or other sustainable transport modes).

types. The vehicles belonging to the City of Gothenburg should be fossil free by 2023.

- ✓ Plug-in hybrid cars can have tail pipe emissions of up to 50g CO₂/km. There may also be CO₂ emissions associated with bus rapid transit system and car sharing schemes..
- ✓ While electric modes of transportation are preferable to those that directly use fossil fuels, we should nevertheless be aware of the indirect GHG emissions stemming from the production and use of new vehicles.
- ✓ There are no plans for hydrogen vehicles at the moment, but LCA will be applied if such investment would be relevant. Most likely zero emission solutions will be used for future hydrogen production.

Waste management



The financing or refinancing of the establishment, acquisition, expansion and upgrades of waste and emissions to air, water and land, as well as the associated infrastructure.

Technologies to facilitate carbon sinks: Bio energy carbon capture and storage (BECCS) facilities to produce biochar or other carbon sinks.

Medium to Dark Green

- ✓ Good that the waste hierarchy is followed.
- ✓ It is very good that Gotheburg will experiment with technologies for BECCS. Beware that the climate impacts of biochar depend on production method.

⁶ Sustainability in the biogas production supply chain is evaluated, preferably proven by certifications, as described under the Renewable Energy category.

⁷ With emissions below 50 grams CO₂ equivalent emissions per passenger km, according to the EU Taxonomy's threshold for public transport.

⁸ With tailpipe emission intensity of max 50g CO₂/km (WLTP)

⁹ Low-emission heavy-duty vehicles with specific direct CO₂ emissions of less than 50% of the reference CO₂ emissions of all vehicles in the same sub-group are eligible.

¹⁰ If separate from fossil fuel filling stations and garages.

¹¹ Should contribute to significant GHG emission savings on either a passenger/km or a tonne/km basis.



Recycling: Recycling facilities and related infrastructure, including treatment and processing of all types of waste, for the purpose of minimizing the amount of waste to landfill and bring back valuable raw material to the market.

Pollution prevention: Projects for better waste management supporting pollution prevention, such as discharges of pollutants into water.

Waste-to-energy: Waste-based energy facilities, where energy recovery from waste follows a waste hierarchy to ensure that as much of the waste as possible is reused and recycled before being converted into energy. Sustainability aspects of waste transportation will be accounted for.

- ✓ Waste to energy projects will have some emissions from unavoidable fossil fractions in the waste stream. In 2018 the grid factor for district heating was 65 gCO₂/kWh.
- ✓ The total waste produced per capita and year in Gothenburg was 378kg in 2018, of which about half is recycled and half is used for waste-to-energy. The average number for Sweden is 466 kg per capita.

Water and wastewater management



The financing or refinancing of the establishment, acquisition, capacity expansion and upgrade of sustainable freshwater supply and wastewater treatment facilities, the associated infrastructure and water efficiency measures.

- Facilities and technologies to ensure a safe and sustainable freshwater supply.
- Wastewater treatment facilities and technologies.
- Protection of freshwater sources, such as measures to secure groundwater levels and to prevent the discharging of pollutants into water and land.
- Improvement of water-use efficiency, such as re-use of water and to reduce leakage in networks.

Dark Green

- ✓ The City of Gothenburg has good procedures in place to secure resilience of infrastructure against e.g. flooding.
- ✓ Consider environmental impacts of projects involving large construction projects, including use of emissions intensive materials and/or fossil-fueled equipment.
- ✓ Be aware of possible lock-in emissions from operation, and consider emissions from CH₄ and N₂O.
- ✓ Careful consideration should be taken in assessing projects to exclude fossil fuel elements (e.g. water pipelines to fossil based plants).

Sustainable land use and environmental management

The financing or refinancing of projects targeting the sustainable use and management of environmental resources, to ensure the long-term sustainability of ecosystems and livelihoods.

Dark Green

- ✓ Be aware of potential conflicts with climate change concerns.



- Organic farming, certified in compliance with the EU and national regulations.
- Forest land certified in accordance with the Forest Stewardship Council (FSC) standards and/or the Programme for the Endorsement of Forest Certification (PEFC).
- Protect, restore and enhance ecosystems and biodiversity (aquatic as well as on land), such as nature conservation, soil restoration, urban parks and vegetation (e.g. green roofs and walls), the integration of urban ‘blue spaces’ (streams, lakes, wetlands, and ponds).
- Technologies and systems to reduce emissions to air, such as nitrogen oxides, sulphur, particle pollution and other toxic pollutants.

Climate change adaptation



The financing and refinancing of integrating climate change adaptation and resilience measures in infrastructure, such as:

- Investments to reduce the vulnerability of infrastructure to climate change, including infrastructure such as energy, water and other urban infrastructure as well as public transport systems and buildings.
- Investments in extreme weather research and monitoring systems.

Investments will strive to:

- Reduce all material physical climate risks to the extent possible and on a best effort basis, by assessing risks posed by both current weather variability and future climate change,
- not adversely affect adaptation efforts by other sectors or activities, and
- when possible, adaptation-related outcomes will be monitored and measured against adequate indicators to evaluate adaptation results

Dark Green

- ✓ Adaptation projects may require construction, which can introduce greenhouse gas emissions onsite and from the supply chain. Beware of locked in emissions.
- ✓ As the climate is changing, adaptation measures become more urgent and necessary. According to the EU Commission global losses from extreme weather rose by 86% from 2007 to 2017.

Table 1. Eligible project categories

Background

Reaching net-zero emissions of greenhouse gases (GHG) by 2050 is necessary in order to reach a globally sustainable and equitable development. This is one of the goals in the City’s environmental programme and they



have also adopted related sub-targets, being: territorial GHG emissions within the city shall not exceed 2 tonnes per capita and, consumption-based GHG emissions shall not exceed 3.5 tonnes per capita by 2035. Key in achieving these goals will be to invest substantially in renewable energy. The target for 2030 is to produce 500 GWh of renewable energy. Both small-scale production, by installing e.g. solar cells on the roofs of new buildings or when refurbishing buildings, and investments in larger projects are promoted. As an example, the construction of Sweden's largest solar park at present - 'Nya Solevi' - was completed in 2018 by one of the City's municipal companies Göteborg Energi.

Emission of greenhouse gases was in 2017 some 7% below 1990 level, which indicates that Gothenburg may have difficulties in reaching its shorter term targets when it comes to climate change¹². On the other hand, emission per capita has been reduced by 30% over the same period, which is impressive.

Governance Assessment

Four aspects are studied when assessing the City of Gothenburg'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.

The selection process for determining eligible projects is solid, as is the management of proceeds. The reporting is also very good at a portfolio level, including climate impacts from production, processing and transport. Allocation reporting will include i) A summary of green bond developments; ii) The outstanding amount of issued green bonds issued; iii) The balance of the Green Account (including any temporary investments and green bond repayments) and the available headroom in the value of the green projects (if any); iv) The total proportion of green bond net proceeds used to finance new green projects (ongoing or taken into operation less than 12 months prior to the approval by the City of Gothenburg's Green Bond Committee) and the proportion of green bond net proceeds used to refinance green projects finalized earlier than that; and v) The total aggregated proportion of green bond net proceeds used per Green Project Category.

The impact reporting aims at disclosing the environmental impact of the investments in green projects made under this framework, based on the City of Gothenburg's green bond financing share of each project. As the City of Gothenburg can have a large number of green projects in the same Green Project Category, impact reporting will, to some extent, be aggregated. The impact assessment is provided with the reservation that not all related data can be covered and that calculations therefore will be on a best intention basis.

An independent external auditor appointed by the City of Gothenburg will provide, on an annual basis, limited assurance that an amount equal to the green bond net proceeds has been allocated to green projects. The green bond framework, the second party opinion, the limited assurance and the annual green bond report will all be publicly available on the City of Gothenburg's website for financial activities: <http://finans.goteborg.se/en/greenbonds/>.

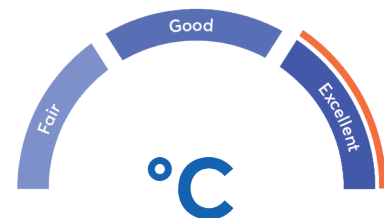
¹² See https://goteborg.se/wps/portal/start/miljo/goteborgs-tolv-miljomal/detta-kravs-for-att-na-miljomalen!/ut/p/z1/04_Sj9CPyKssy0xPLMnMz0vMAfljo8ziTYzcDQy9TAy9LXwDzQ0cfc29LQ2MPAzdvU3IwwkpiAJKG-AAjgb6BbmhigBjUfkm/dz/d5/L2dBISEvZ0FBIS9nQSEh/#htoc-4 for a recent assessment.



Central for the City of Gothenburg is its Climate Programme and Environmental Programme. Gothenburg has also a number of other policy documents, projects and processes which, either wholly or in part, impact on climate and which affect or will be affected by these programmes. The Environmental Programme includes a concrete action plan that describes the measures the City of Gothenburg needs to implement within the next few years if the objectives are to be achieved. An annual follow-up of the environmental status in Gothenburg is carried out in order to determine the local environmental quality objectives are achieved. The results are included in the Environmental Report published by the Environmental and Climate Committee.

Resilience assessments are carried out based on the IPCC RCP 8.5 scenario (a worst case scenario). Presently, the City of Gothenburg have not implemented TCFD recommendations when it comes to reporting.

The overall assessment of the City of Gothenburg's governance structure and processes gives it a rating of Excellent.



Strengths

The City of Gothenburg's green bond framework describes a very wide set of eligible projects (green projects). Mostly these are described in good detail and with proper green safeguards. The majority of the proceeds from the green bonds is expected to go to the category Green buildings.

The City of Gothenburg's overall management of environmental, social, governance and financial risks is integrated in the strategies and is therefore a core component of the decision-making processes of the City, including the evaluation and selection of green projects. Clear guidelines exist on procurements, underlining the need to minimize the climate footprint and other sustainability and ethical concerns.

In 2016, the building and real estate sector accounted for 21 per cent of Sweden's total GHG emissions. The City's programme for environmentally adapted construction is an important instrument and tool for reducing the sector's environmental impact and contributing to achieving both our national environmental goals and the City's own local environmental goals. Life cycle assessment of building projects is an increasing ambition for the City of Gothenburg.

The City's approach to sustainable building is governed in the Programme for environmentally adapted buildings. The programme is a framework with requirements on construction made on land owned by the City, including requirements to account for durability in the construction, high quality indoor environment, minimal negative environmental impact from a lifecycle perspective, minimal energy use, integrating green spaces and vegetation, stormwater collection, and preserving/enhancing biodiversity, minimal resource use and waste during the life of the building, promotion of sustainable transport, and establishment of an environmental plan for both the construction and operational phase of the building. The City account for the consequences of climate change such as higher water levels, more rain and warmer temperatures. When the City plans for new construction they consider these issues, including sustainable urban drainage systems and by 2030-2040, more comprehensive protection against higher water levels will be in place.

The City also work with a model that connects land surface, pipes below ground, sea level, and streams in watercourses to a large system. The model enables simulations of elevated levels in the sea, lakes and watercourses, and heavy rain.



Weaknesses

We find no material weaknesses in the green bond framework of the City of Gothenburg.

Pitfalls

The Green building criteria allow for either a comprehensive certification (through Miljöbyggnad, Svanen, BREEAM or LEED) *or* a pure energy improvement requirement. In the latter case, other environmental concerns like material use, etc., is not binding. However, all new buildings must follow the requirements in the City's sustainable building programme which do consider other environmental concerns than pure energy improvements. The City has had this programme in place since 2009.

In a low carbon 2050 perspective, the energy performance of buildings is expected to be improved, with passive house technology becoming mainstream and the energy performance of existing buildings greatly improved through refurbishments. According to IEA¹³, efficiency of building envelopes needs to improve by 30% by 2025 to keep pace with increased building size and energy demand – in addition to improvements in lighting and appliances and increased renewable heat sources. The issuer is taking a step in this direction with the energy efficiency criteria. In order to achieve a dark green shading, the green bond framework would need a clearer requirement that best environmental technology is used in eligible green bond building projects. Voluntary certifications could be required and the classification level of projects could be increased to reflect best available technology in Sweden. For instance, the Swan labeling only requires 15% lower energy use than the current building standard. On the other hand, the label includes life cycle assessment and use of material in the building phase. In Sweden, with low CO₂ in the energy mix, this may be as relevant as energy efficiency.

Waste incineration with energy recovery is a sound environmental and climate friendly option to divert waste away from landfilling. Impressively, less than one per cent of household waste now ends up at landfills in Sweden. Waste incineration is, however, best combined with ambitious recycling policies. When the capacity of waste incineration is high it might be an incentive to burn waste for energy purposes instead of material recycling. A Swedish study suggests that imports of waste for energy recovery in Sweden lead to a combination of reduced landfill of both treated and untreated waste and reduced domestic waste incineration in the exporting countries studied. The knowledge that emerged from this study and in previous studies suggests that the effects of Swedish waste imports on recycling are small in practice, but the knowledge still needs to be deepened. Hence there is a need to continue to recycle more fossil fuel waste such as plastic into new materials.

Biogas vehicles can potentially run on natural gas.

The City of Gothenburg will make effort to follow the impact reporting principles stated in the “Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting”. The European grid factor recommended by the Nordic Public Sector Issuers in their Position Paper on Green bond Impact Reporting based on the methodology outlined in the Harmonized Framework for Impact Reporting developed by a group of multilateral development banks. This grid factor is constructed by developing a Combined Margin, comprised of an Operating Margin that represents the marginal generating capacity in the existing dispatch hierarchy that will most likely be displaced by the project, and a Build Margin which represents future, less fossil-intensive, generating capacity. Investors should be aware that this factor is higher than the European average grid factor. There are harmonization reasons for presenting such a common European emission factor if applied to all European green bond projects, but in order not to overestimate the total benefit of European projects this presupposes that other European emitters also use

¹³ <http://www.iea.org/tcep>



similar emission factors based on interconnection between EU26+Norway, and not individual national production margin baselines that are higher than this average.

A macro-level concern is the potential for rebound effects. For example, energy efficiency improvements that lower energy costs, inducing more energy use and partially offsetting energy savings. This can have the result of lower reduction in GHG emissions than anticipated. While these effects can never be entirely avoided, it is recommended to be aware of possible rebound effects and avoid investing in projects where the risk of such effects is particularly high.



Appendix 1: Referenced Documents List

Document Number	Document Name	Description
1	Green Bond Flagship Framework - 2019-08-27_Clean	The City of Gothenburg's Green Bond Framework
2	Climate Programme	
3	Göteborgs Stads miljöprogram 2013-2020	Gothenburg's environmental plan 2013-2020. Updated 2018
4	Tematiskt tillägg Översvämningsrisker	Plan for adaptation to and mitigation of flooding risk, https://goteborg.se/wps/wcm/connect/505ba586-d99d-4abc-8bc8-3473dd28002a/Tematisk+tillagg+OP+oversvamningsrisk.pdf?MOD=AJPERES
5	Förslag till beslut angående budget 2019 och flerårsplaner 2020-2021	Proposed budget 2019 and plans for 2020-2021
6	Annual report 2018	
7	https://goteborg.se/wps/portal?uri=gbglnk%3agbg.page.869f6082-eb26-4a7b-a744-76a5773b465b	Web site with comprehensive information on the environmental plans and efforts of the City of Gothenburg
8	Uppföljning av Göteborgs lokala miljömål 2017	Report on status with respect to the environmental targets of the City of Gothenburg, https://goteborg.se/wps/wcm/connect/c7301090-a5f3-4d2d-88e5-bf3238422ba3/Uppfoljning_av_stadens_lokala_miljomal_2017_R_201809.pdf?MOD=AJPERES
9	Risk- och sårbarhetsanalys, 2015	Risk and vulnerability report, 2015, https://goteborg.se/wps/wcm/connect/9d5515ab-f4d7-4e38-baba-1a2f40d59658/Risk+och+sarbarhetsanalys+2015+broschyrformat.pdf?MOD=AJPERES



10	Green bond impact report 2018	https://finans.goteborg.se/wpui/wp-content/uploads/2019/06/Green-Bond-Impact-Report-2018-City-of-Gothenburg.pdf
11	Göteborgs Stads riktlinje för inköp och upphandling	Procurement guidelines for the City of Gothenburg, https://www5.goteborg.se/prod/Stadsledningskontoret/LIS/Verksamhetshandbok/Forfattn.nsf/68970EDC61EF1189C1257AD4004A54EF/\$File/WEBVBDB22L.pdf?OpenElement



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).

