

‘Second Opinion’ on Örebro Municipality’s Green Bond Framework

November 2nd, 2018

Summary

Overall, Örebro municipality's Green Bond Framework (GBF) provides a progressive, clear and sound framework for investments into projects that well align with the Green Bond Principles. The green bond framework lists eligible projects which promote the transition to low carbon, climate resilient growth and a sustainable development. Proceeds will not be used to finance investments in fossil fuels or nuclear power.

Örebro Municipality has solid management and governance structures, as well as regular and transparent reporting about green bond project achievements to investors and the public. The overall assessment of the governance structure of Örebro municipality gives it a rating of Excellent. Örebro has in place strong environmental goals and targets, good mitigation plans, a sound selection process and comprehensive and transparent reporting. Nevertheless, we note that Örebro does not seem to carry out climate scenario analysis or risk assessment in alignment with the methodology recommended by TCFD. Also, we do not find much on resilience and adaptation needs in current plans and strategies.

Örebro plans to report the impacts of its green bond investments according to the Joint Position Paper on Green Bonds Impact Reporting of the Nordic Public Sector Issuers. We are encouraged to see that, as a contributor to this paper, Örebro Municipality is actively pursuing efforts to improve reporting on the impacts of green bond. Green bond proceeds can be used to finance both new projects as well as refinance existing eligible projects. To date only new projects have been proposed for green funding. In the case that there will be refinancing in the future, this will be reported in the yearly investor letter.

Based on the overall assessment of the project types that will be financed by the green bonds and governance and transparency considerations, Örebro's Green Bond Framework receives a Medium Green shading. The majority of the green bond categories in the green bond framework is rated dark green. According to the issuer it is however likely that the category "green buildings and energy efficiency" which we rate medium green, will cover the majority of projects. In our assessments, we have recently increased our attention on the importance of a balanced implementation of green bond frameworks with more than one project category. 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, or that the issuer would apply its framework to ensure that a balance of project types is implemented to fulfill an overall dark green ambition of the framework.



°CICERO
Medium Green

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1 Introduction and background

The global Expert Network on Second Opinions (ENSO), a network of independent non-profit research institutions on climate change and other environmental issues, was established by CICERO (Center for International Climate and Environmental Research – Oslo) to broaden the technical expertise and regional experience for second opinions. CICERO works confidentially with other members in the network to enhance the links to climate and environmental science, building upon the CICERO model for second opinions. In addition to CICERO, ENSO members include Basque Center for Climate Change (BC3), International Institute for Sustainable Development (IISD), Stockholm Environment Institute (SEI), and Tsinghua University's Institute of Energy, Environment and Economy.

This Second opinion was produced by SEI and CICERO on behalf of ENSO. SEI is an independent international research institute that has been engaged in environment and development issues at local, national, regional and global policy levels for more than 25 years. CICERO is an independent, not-for-profit, research institute, focused on providing reliable and comprehensive knowledge about all aspects of the climate change problem. A more detailed description of each of these institutions can be found at the end of this report. SEI and CICERO are both 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.

The CICERO-led ENSO provides second opinions on institutions' framework and guidance for assessing and selecting eligible projects for green bond investments, and assesses the framework's robustness in meeting the institutions' environmental objectives. The second opinion is based on documentation of rules and frameworks provided by the institution themselves (the client) and information gathered during meetings, teleconferences and email correspondence with the client. ENSO 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.

ENSO's Second Opinions are normally restricted to an evaluation of the mechanisms or framework for selecting eligible projects at a general level. ENSO network members do not validate or certify the climate effects of single projects, and thus, has no conflict of interest in regard to single projects. Network members are neither responsible for how the framework or mechanisms are implemented and followed up by the institutions, nor the outcome of investments in eligible projects.

This note provides a Second Opinion of Örebro Green Bonds Framework and policies for considering the environmental impacts of their projects. The aim is to assess the Örebro Green Bonds Framework as to its ability to support Örebro's stated objective of promoting the transition to low-carbon and climate resilient growth.

This Second Opinion is based on the green bond framework presented to ENSO by the issuer. Any amendments or updates to the framework require that ENSO undertake a new assessment. ENSO takes a long-term view on activities that support a low-carbon climate resilient society. In some cases, activities or technologies that reduce near-term emissions result in net emissions or prolonged use of high-emitting infrastructure in the long-run. ENSO strives to avoid locking-in of emissions through careful infrastructure investments, and moving towards low- or zero-emitting infrastructure in the long run. Proceeds from green bonds may be used for financing, including refinancing, new or existing green projects as defined under the mechanisms or framework. ENSO assesses in this Second Opinion the likeliness that the issuer's categories of projects will meet expectations for a low carbon and climate resilient future.

Expressing concerns with ‘shades of green’

CICERO/ENSO Second Opinions are graded dark green, medium green or light green, reflecting the climate and environmental ambitions of the bonds and the robustness of the governance structure of the Green Bond Framework. The grading is based on a broad qualitative assessment of each project type, according to what extent it contributes to building a low-carbon and climate resilient society. The shading methodology also aims at providing transparency to investors when comparing green bond frameworks exposure to climate risks. A dark green project is less exposed to climate risks than a lighter green investment.

This Second Opinion will allocate a ‘shade of green’ to the green bond framework of Örebro:

- **Dark green** for projects and solutions that are realizations today of the long-term vision of a low carbon and climate resilient future. Typically, this will entail zero emission solutions and governance structures that integrate environmental concerns into all activities.
- **Medium green** for projects and solutions that represent steps towards the long-term vision, but are not quite there yet.
- **Light green** for projects and solutions that are environmentally friendly but do not by themselves represent or is part of the long-term vision (e.g. energy efficiency in fossil-based processes).
- **Brown** for projects that are irrelevant or in opposition to the long-term vision of a low carbon and climate resilient future.

Assessing governance

In assessing the governance quality of the issuer, four aspects are studied: The policies and goals of relevance to the green bond framework; the selection process used to identify eligible projects under the framework, the management of proceeds and 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.

Overall shading

The project types that will be financed by the green bond primarily define the overall grading. However, governance and transparency considerations are also important because they give an indication whether the institution that issues the green bond will be able to fulfil the climate and environmental ambitions of the investment framework. Hence, the governance assessment plays a role in the overall shading of the framework. Investments in all shades of green projects are necessary in order to successfully implement the ambition of the Paris agreement. The overall shading reflects an ambition of having the majority of the project types well represented in the future portfolio, unless otherwise expressed by the issuer.

2 Brief Description of Örebro's Green Bond Framework and rules and procedures for climate-related activities

Örebro Municipality is a Swedish municipality located 200 km from the capital Stockholm. In 2016, Örebro had 150.000 inhabitants, making it the seventh largest municipality in Sweden. Tax revenue has been rising, and is expected to continue to grow due to economic growth and continuing strong international and domestic immigration.

Örebro Municipality has set itself ambitious long and near-term mitigation targets. According to its climate strategy, Örebro aims to reduce greenhouse gas emissions by 40%, 70% and 100% per inhabitant by 2020, 2030 and 2045 respectively. Örebro's emission reduction goals align with the EU pledges to the Paris Agreement and Sweden's newly adopted Climate Policy Framework which sets out to achieve net-zero emissions by 2045. Already today, electricity in Örebro comes from fossil free sources (hydro, nuclear and to a small part from wind and solar). District heating connects 98% of all houses in Örebro.

According to the issuer, Örebro Municipality (the organisation) is already self-sufficient regarding renewable electricity, due to investments in their energy company Kumbro Vind (renewable energy financed with their first green bond back in 2014). Most measures set out in Örebro Municipality's climate strategy focus on energy efficiency, decarbonization of the transport sector, in particular through biogas production, reduction in consumption and public outreach.

In addition to its climate strategy, Örebro also has a comprehensive environmental management and policy program. The issuer came 1 in 2015 and 6 in 2017, in the ranking of best municipalities in Sweden on environmental issues. There are 290 municipalities in Sweden.

Use of proceeds:

Projects eligible under Örebro Municipality's Green Bond Framework include projects that target either climate change or other environmental issues:

- a) mitigation of climate change, including investments in low-carbon and clean technologies, such as energy efficiency and renewable energy programs and projects (Mitigation Projects)
- b) adaptation to climate change, including investments in climate-resilient infrastructure (Adaptation Projects) or
- c) to a smaller extent (max 20%) projects which are related to environmental management in other areas than climate change (Environmental Management).

Green bonds can be used to finance both new projects as well as refinance existing eligible projects. The ambition is to use the majority of the green bond proceeds to finance new projects. The issuer has informed us that so far, exclusively new projects have been proposed for green funding. In the case that there will be refinancing in the future, this will be reported in the yearly investor letter/report. New projects are defined as projects that have been finalized within the last year before issuance of the Green Bond and forward. Green bonds will not finance nuclear or fossil fuel power generation projects.

Selection:

Örebro Kommun has in place a detailed, rigid and transparent selection procedure in accordance to the Green bond principles. According to Örebro Municipality's Green Bond Framework, the Head of the Department of Treasury is leading the selection process of eligible projects with support from the Department for Sustainable Development. Furthermore, from the Örebro Municipality Corporate Group (Örebro Rådhus AB), a board of climate and environmental experts and Örebro Municipality's Finance Committee are also involved in the selection process. The Finance Committee consists of the CFO of Örebro Municipality, and CEOs of the Municipality corporate group.

Loan application are jointly processed and recommended for approval in consensus by the Department for Sustainable Development and the Treasury Department. Eligible projects require approval from Örebro Municipality's Finance Committee. Each project will be evaluated at least on an annual basis to ensure compliance with the eligibility criteria. If, for any reason, an eligible project ceases to meet the environmental criteria in the Green Bond Framework, the project will be replaced with an eligible project. Subcontractors (e.g. in construction companies) are contracted to effectuate the adopted requirements, including LCC. The issuer's procurement policy includes a lifecycle perspective. In addition to selecting eligible projects, the above functions will throughout the business year follow the Green Bond market development and evaluate needs for and possibilities to refine the Green Bond Framework and the processes for monitoring and reporting.

Management of proceeds:

Örebro Municipality will in accordance with the Green Bond Principles (GBP) credit an amount equal to the net proceeds of the issue of the Green Bonds to a special account that will support Örebro municipality's eligible projects. Until disbursement to eligible projects, the special account balance will be placed in liquidity reserves. As long as the Green Bonds are outstanding and the special account has a positive balance, funds will be deducted from the special account and added to Örebro municipality's lending pool in an amount equal to all disbursements from that pool made in respect of eligible projects.

Transparency and Accountability:

Örebro municipality will provide an annual letter to investors which will include a list of all projects exceeding SEK 25 million and a brief description of the projects and the amounts allocated and their expected impact, a selection of project examples with impact reporting, the distribution between new and refinanced Eligible Projects and a summary of Örebro Municipality's green bond development. The issuer has informed us that so far only 1 of 30 approved projects is smaller than 25 million SEK.

The investor letter will be made publicly available on Örebro Municipality's web page. The management of proceeds, tracking and management of funds will be assured by Örebro Municipality's yearly internal control. Furthermore, the principle of free access to public records is applied. Furthermore, Örebro Municipality's Green Bond Framework and the Second Opinion will also be made publicly available.

Information to investors and the public will include statistics on green project portfolio with reporting on expected impact. It is Örebro Municipality's ambition is to provide actual impacts when feasible and relevant, according to the Joint Position Paper on Green Bonds Impact Reporting of the Nordic Public Sector Issuers.

The table below lists the documents that formed the basis for this Second Opinion:

Document Number	Document Name	Description
1	Örebro's Green Bonds Framework 6. September 2018	This document comprises Örebro Municipality's Green Bonds Framework and how it intends to use proceeds, how it plans to evaluate and select eligible projects, manages the proceeds and reports to investors.
2	Örebro's Climate Strategy (Klimatstrategi för Örebro Municipality) 10.06.2016	This strategy outlines mitigation targets and milestones for 2020, 2030 and 2045. It does not include adaptation measures.
3	Miljöprogram Örebro Municipality 02.02.2017	Örebro Municipality's environmental management and policy program stipulates the municipalities targets and priorities
4	Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting 24.10.2017	Practical guide on green bonds impact reporting for Nordic public sector issuers.
5	Örebro's väg mot en hållbar samhällsutveckling. 31.08.2018	Document describe Örebro's view on sustainable development and summary of the municipality's planned action to achieve sustainable development.
6	Kommunledningen i Örebro's övergripande strategi og budget 2018 med plan för 2019-2020, 25-26 oktober 2017	This document contains Örebro Municipality's overall strategy and budget 2018 and plan for 2019 – 2020
7	Årsredovisning 2017. Örebro Municipality.	Annual report 2017 of Örebro Municipality

8	Placeringspolicy för Örebro Municipality 25.01.2017	The policy includes a focus on sustainable investment. It also stipulates how Örebro Municipality's invests its liquidity reserves and pension system
9	Second opinion of Örebro Municipality's green bond framework 29.08.2014	Second opinion of Örebro Municipality's first GBF.
10	Tjänsteskrivelse igångsättningsbeslut Ks 1401-2018-02-21	Decision to develop a sustainability plan for Örebro before end 2019
11	Uppdragsdirektiv	Description of the task of developing a sustainability plan for Örebro Municipality
12	Impact report 2017-1	Green Bond Impact Report for 2017

Table 1. Documents reviewed

3 Assessment of Örebro’s Green bond framework and environmental policies

Overall, the Örebro green bond framework provides a detailed and sound framework for climate-friendly investments.


The framework and procedures for Örebro’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, whereas the weaknesses are typically areas that are unclear or too general. Pitfalls are also raised in this section to note areas where issuers should be aware of potential macro-level impacts of investment projects.




Overall shading

Based on the project category shadings detailed below, and consideration of the issuer’s systematic sustainability work, governance structure and transparency considerations, we rate the framework **CICERO Medium Green**. The majority of the green bond categories in the green bond framework is rated dark green. However, according to the issuer it is likely that the category “green buildings and energy efficiency” which we rate medium green, will cover the majority of projects. 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, or that the issuer would apply its framework to ensure that a balance of project types is implemented to fulfill an overall dark green ambition of the framework. The issuer has in place an excellent governance structure and process, but lack scenario analysis, independent verification of impacts and adaptation plans. The issuer has informed us that they are currently working on an adaptation program for the municipality.

Eligible projects under the 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 certainty to investors 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 	<ul style="list-style-type: none"> Production and supply of renewable energy and related infrastructure (e.g. wind, solar and biogas) – or conversion from fossil to renewable energy. 	Dark green <ul style="list-style-type: none"> ✓ Only biogas from food waste, energy crops and manure will be funded, not from peat. ✓ Consider local environmental impacts.

		<ul style="list-style-type: none"> ✓ Avoid negative impacts on biodiversity.
<p>Energy efficiency in energy systems</p> 	<ul style="list-style-type: none"> • Energy efficiency in energy systems, such as district heating/cooling, energy recovery and storage and smart grids, leading to a reduced energy use of at least 25%. 	<p>Dark green</p> <ul style="list-style-type: none"> ✓ Be aware of possible lock-in of pipes and infrastructure supporting fossil fuel related infrastructure. ✓ Green bonds will not finance district heating owned and run by E.ON, only investments linking the buildings to the district heating network.
<p>Energy efficiency in activities and operations</p> 	<ul style="list-style-type: none"> • Energy efficiency in activities and operations other than energy systems and buildings, e.g. community planning, drinking water, hot water and sewage water, leading to a reduced energy use of at least 25%. 	<p>Dark green</p> <ul style="list-style-type: none"> ✓ Be aware of rebound effects.
<p>Green buildings and energy efficiency</p> 	<ul style="list-style-type: none"> • Residential multi-family buildings: New or existing buildings fulfilling the requirements in “Miljöbyggnad silver”, a certification-model developed by the Sweden Green Building Council, including at least 20% less energy use per square meter and year than the requirement set by applicable building regulations (Boverkets byggregler, BBR) as in force at the time of approval. • Non-residential buildings: New or existing buildings fulfilling the requirements in “Miljöbyggnad silver”, including at least 30% less energy use per square meter and year than the requirement set by applicable building regulations (BBR) as in force at the time of approval. • Major renovation of buildings leading to a reduced energy use per square meter of at least 30% or compliance with applicable regulations for new buildings. • Energy efficiency measures in partial systems of existing buildings leading to at least 30% less energy use. 	<p>Medium green</p> <ul style="list-style-type: none"> ✓ For investments into energy efficiency: Should consider the potential of rebound effects for energy consumption. ✓ A dark green shading would require passive or plus house technologies. ✓ Construction projects can have potential negative local environmental impacts.

Clean transportation

- Public non-fossil transportation infrastructures and systems supporting sustainable transportation - such as infrastructures for bicycles, pedestrians, electrical vehicles and logistic solutions with reduced environmental impact for transportation of people and cargo.

Dark 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 types.
- ✓ No vehicles will be financed. Focus is on infrastructure and logistic solutions, e.g. sharing pools and urban planning.
- ✓ The county council (not the issuer) is responsible for public transportation.

Waste management

- Reducing the amount and harmful impact of waste, increasing re-use and recovery of material and energy.

Dark green

- ✓ Waste to energy is best combined with ambitious recycling policies. There is a particular need to continue to improve in particular to recycle more fossil fuel waste such as plastics into new materials. No incineration projects will directly be funded. According to Avfall Sverige the issuer has an above average recycling rate (43 percent) among municipalities in Sweden.
- ✓ Trucks are used in collecting waste. According to the issuer 20 percent of the fleet is fueled by biogas. No plans to finance new trucks.

Water and waste water management

- Water management such as water infrastructure and systems, waste water management and cleaning facilities.

Dark green

- ✓ Consider negative impacts on wildlife, nature and lifecycle pollution. Avoid negative impacts on biodiversity

Climate change adaptation

- Including information support systems, such as climate observation and early warning systems.

Dark green

- ✓ For investments into climate change adaptation: Should consider the implications of climate change on developments along lakefronts, waterfronts and other locations at risk of climate impacts and natural hazards.
- ✓ Potential projects are urban planning including rain gardens,

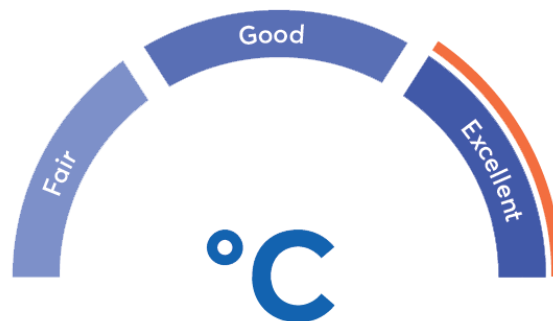
		trenches, etc., e.g. systems to balance water and drought.
		✓ Fossil fuel related projects should be avoided. The issuer has informed that there are no plans to include road projects.
Environmentally management	<ul style="list-style-type: none"> Improving eco-systems services e.g. nature conservation by means of protecting, restoring, and creating valuable milieus and rich biodiversity in plants and animal life. Development of non-toxic environments (reduced use of harmful material, dangerous chemicals, toxic pollution). Sustainable buildings with densification, health promoting accommodation and surroundings, increasing green values. 	<p>Dark green</p> <p>✓ Maximum 20% of proceeds will go towards this category.</p>



Table 2. Eligible project categories

Governance assessment

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



The overall assessment of the governance structure of Örebro municipality gives it a rating of Excellent. Örebro has in place strong environmental goals and targets, good mitigation plans, a sound selection process and comprehensive and transparent reporting. Nevertheless, we note that Örebro does not seem to carry out climate scenario analysis or risk assessment in alignment with the methodology recommended by TCFD. Also, we do not find much on resilience and adaptation needs in current plans and strategies.

Strengths

Governance

Örebro Municipality has a comprehensive environmental management, governance and reporting structure indicated by their climate and environmental policy, as well as their past experiences with green bond investments. Örebro Municipality has also a policy in place to invest its liquidity reserves and pension system in sustainable and accountable businesses.

It's a strength that the decision to develop application for funding for eligible projects are jointly developed by the Treasury Department and the Department for Sustainable Development. It is also positive that eligible projects are selected by climate and environmental experts in the Örebro Municipality Corporate Group. Örebro municipality has a good structure for approval of projects in place that ensure environmental integrity.

Örebro has overall a good track record on reporting on its finance, and progress on environmental and climate policies. Örebro Municipality is currently in the process of reviewing how it is reporting on its climate and environmental policy. Örebro plans to report the impacts of its green bond investments on a project by project basis according to the Joint Position Paper on Green Bonds Impact Reporting of the Nordic Public Sector Issuers. We are encouraged to see that, as a contributor to this paper, Örebro Municipality is actively pursuing efforts to improve reporting on the impacts of green bond.

Örebro Municipality recognizes the need for a climate adaptation program and is planning to develop such a program as a part of the risk and vulnerability analysis. The process of adopting a climate adaptation program will be initiated in 2018.

Project categories

It is a strength that Örebro Municipality takes a holistic, scientifically informed approach to sustainable development and has set itself ambitious emission reduction goals that align with Sweden net-zero emission target by 2045. CICERO/ENSO takes a long-term view on climate change, and thus recommends excluding projects that support prolonged use of fossil fuel-based infrastructure that will contribute to emissions in the long run. Örebro municipality has explicitly stated in their green bond framework that they will not finance nuclear power or fossil fuel based projects.

Projects eligible under Örebro Municipality are diverse and reflect the various areas in which municipalities can make effective use of green investments. It is very positive that Örebro Municipality's Green Bond Framework, as well as its climate and environmental policy includes quantified and measurable short and long term targets for emission reduction and efficiency standards in buildings.

Weaknesses

We find no substantial weaknesses in Örebro's Green Bond Framework. However, Örebro lack climate scenario analysis to expose potential risks and also an adaptation plan over and above an early warning system that they have, for meeting coming climate change challenges.

Pitfalls

Governance

CICERO very much welcomes the development and use of a common methodology in impact reporting, and sees it as a clear strength that Örebro Municipality commits adherence to the "Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting" in their Green Bond Framework. The green bond market has evolved by some issuers taking the lead. CICERO is encouraged that not only emissions reductions, but also other indicators that measure the transition to a low carbon and climate resilient society are reported. We are also encouraged to see that the position paper is based on the principle of transparency regarding choice of methodology.

Investors should however be aware of the different approaches commonly applied in calculating emissions from production and use of electricity. These differences can be summarized in terms of the geographic boundaries of

the electricity grid, emissions based on production average vs. production margin and present vs. future fuel mix. Estimating the actual marginal emission impact of electricity in the Nordic grid is an extremely complex task, and different analyses may produce results varying from nearly zero to almost 1000 gCO₂/ kWh, depending on assumptions and project-specific conditions. The European grid factor recommended by the Nordic Public Sector Issuers is 380 g CO₂/kWh, and 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, which was 350 g CO₂/kWh in 2015 (International Energy Agency).

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 similar emission factors based on interconnection between EU26+Norway, and not individual national production margin baselines that are higher than this average. A high CO₂-emission baseline for electricity creates incentives for energy efficiency and renewable energy production. If other safeguards are not applied when adding new capacity to the grid, a high baseline for electricity could potentially encourage investments in projects that lock-in investments that increase emissions in the long-run and that increase the average emissions from the grid (such as electricity production from fossil gas CHP and bioenergy projects with deforestation impacts). The issuer has however confirmed that this grid factor is being used for impact reporting purposes.

Örebro Municipality's Green Bond Framework have eligibility criteria that mitigate these lock-in risks. The Nordic Public Sector Issuers have chosen the geographic area comprising EU26+Norway because the Nordic energy system is more and more connected to other European countries facilitating export and import of electricity. Using this methodology, but confining it to electricity production in only Sweden, Norway, Finland and Denmark, would give a baseline Combined Margin of 126 g CO₂/kWh. National agencies in Norway and Sweden tend to prefer using factors representing a national or Nordic production mix. Using such a mix would be more favourable for electrification solutions such as electric vehicles. The average grid factor for production in the Nordic countries today according to the European Environmental Agency amounts to 83 g CO₂/kWh².

Project categories

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. The issuer is taking a step in this direction with energy efficiency criteria for both new buildings and in renovation of existing buildings. 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. It is however encouraging to CICERO that the politicians of Örebro Municipality have unanimously decided that all investments in buildings by Örebro Municipality Corporate Group (both new and existing ones that are in need of restoration) should fulfill the requirements in "Miljöbyggnad silver".

District heating is owned and run by the energy company E.ON. Örebro Municipality's green bonds will not finance district heating owned and run by E.ON, only investments linking the buildings to the district heating network. Åbyverket which deliver 98 percent of district heating in the area had a fossil fuel share of their energy mix of 7% in 2014 and 4,5% in 2015. Due to problems with one of the bio boilers, that had to be substituted with oil, the fossil fuel share increased to 17,7% in 2016. E.ON will by 2025 produce all their electricity, district heating/cooling and gas from renewable and recycled energy.

Impacts beyond the project boundary

Due to the complexity of how socio-economic activities impact the climate, a specific project is likely to have interactions with the broader community beyond the project borders. These interactions may or may not be climate-friendly, and thus need to be considered with regards to the net impact of climate-related investments.

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 2, an example is green buildings. Örebro should be aware of such effects and possibly avoid Green Bond funding of projects where the risk of rebound effects is particularly high.

Appendix:

About CICERO and SEI

CICERO Center for International Climate Research is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen international climate cooperation. We collaborate with top researchers from around the world and publish in recognized international journals, reports, books and periodicals. CICERO has garnered particular attention for its work on the effects of manmade emissions on the climate and the formulation of international agreements and has played an active role in the UN's IPCC since 1995.

CICERO is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO received a Green Bond Award from Climate Bonds Initiative for being the biggest second opinion provider in 2016 and from Environmental Finance for being the best external review provider (2017).

CICERO Second Opinions are graded dark green, medium green and light green to offer investors better insight in the environmental quality of green bonds. The shading, introduced in spring 2015, reflects the climate and environmental ambitions of the bonds in the light of the transition to a low-carbon society.

CICERO works with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions. Led by CICERO, ENSO is comprised of trusted 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). ENSO operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

cicero.oslo.no/greenbonds

SEI is an independent international research institute that undertakes policy oriented and applied research on environment and development issues. Our innovative, integrated systems research forms the basis for our work on policy advice, capacity development, decision support and implementation of policy and practice. Our mission is to support decision-making and induce change towards sustainable development around the world by providing integrative knowledge that bridges science and policy in the field of environment and development.

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