Nordic Public Sector Issuers:

Position Paper on Green Bonds Impact Reporting

January

2019

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Introduction and purpose

This document has been developed as a practical guide on impact reporting for Nordic public sector green bond issuers. For this reason, a certain level of technical detail cannot be avoided. This version, dated January 2019, is the second edition of the Position Paper, following the inaugural edition published in 2017. The material changes between the two editions are introduced on page 6.

The document primarily targets persons engaged in impact reporting in issuer organisations, such as environmental officers, sustainability analysts and investor relations specialists. We trust it is of interest and value to investors, as it gives an overview of the reporting commitments made by this group of green bond issuers.

We recognize the need to strike a balance between
a) a commitment to deliver impact reporting at a certain, manageable level and
b) absolute, detailed and fully verifiable numbers on project level and in the local context.

Notwithstanding the technical necessities involved in reporting adequately on impact from projects financed with green bonds, issuers should strive to report project information also in the context of how they contribute to the transformation to a low-carbon and resilient future, and other important environmental challenges.

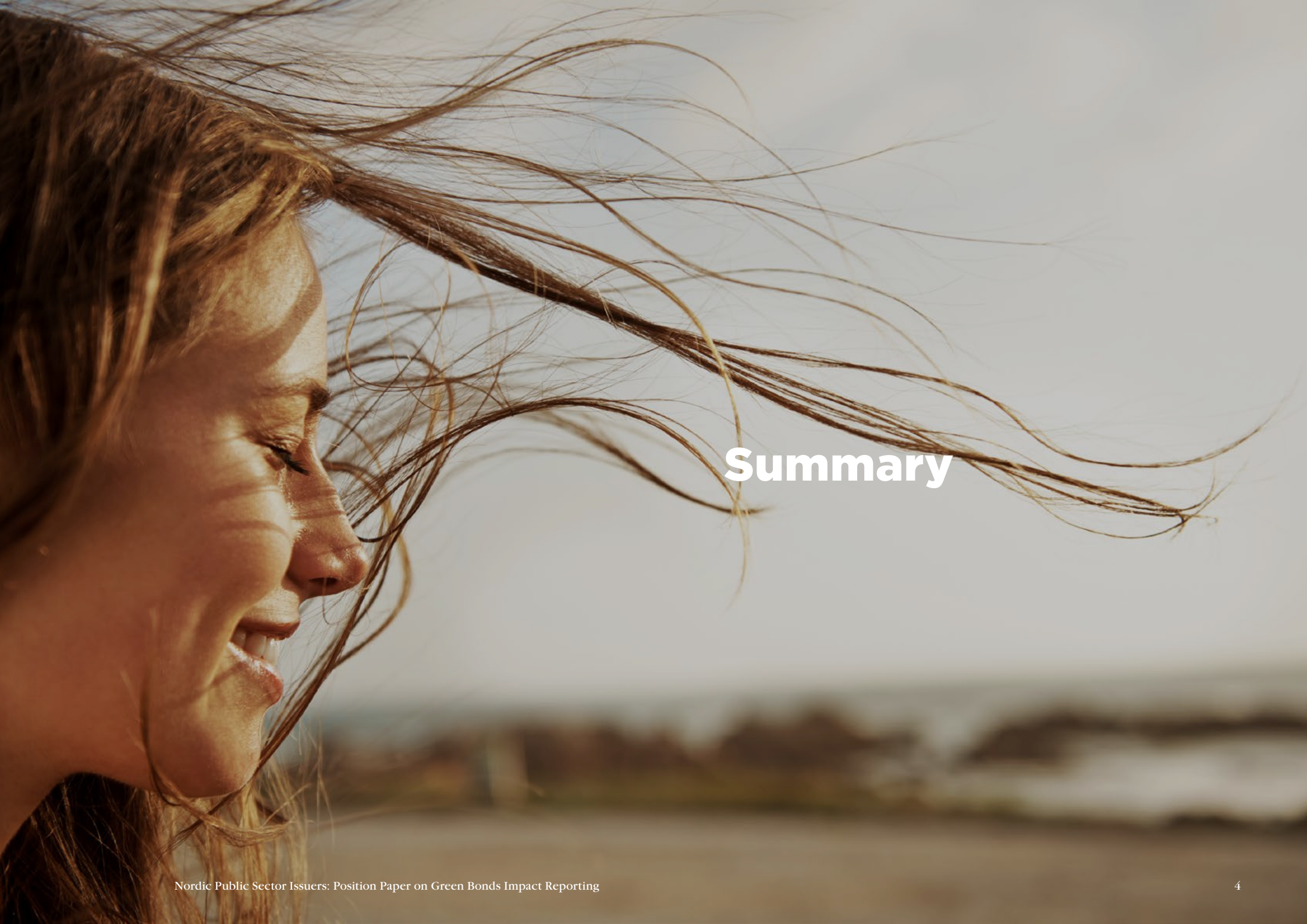
Issuers are encouraged to position the information within the context of the issuer's overarching objectives and/or processes relating to environmental sustainability and to the Sustainable Development Goals (SDGs)[1]. We advise issuers to consult the Green Bond Principles, which capture the spirit of green bonds issuance and which also provides guidance on green bonds impact reporting[2].

To date, mitigation projects dominate the green bond portfolios of Nordic public sector issuers. The structure of this document is influenced by this fact. However, an integrated approach towards adaptation and mitigation is encouraged.

We advise readers that this position paper is a work in progress, and that it can be expected to develop over time. We encourage feedback and will seek to develop our methodology to provide as relevant and appropriate impact reporting as possible.

[1] "Transforming our world: the 2030 Agenda for Sustainable Development", http://www.un.org/sustainabledevelopment/sustainable-development-goals/

[2] The Green Bond Principles are available at www.icmagroup.org



Summary

Summary

The key impact reporting principles regarding financial, environmental and procedural aspects are:

Key financial aspects

Reporting the share financed

- Report on the basis of the share of the project's total investment cost that the issuer has financed with green bonds.
- Report impact based on amounts disbursed and outstanding to a project (as opposed to amounts committed).

Reporting impact in relation to invested monetary unit

- Report CO_2-reduction and other impact per invested monetary unit solely for investments made in projects or project categories where such impact is quantifiable and relevant.

Bond-by-bond vs bond-programme reporting

- Issuers shall report on impact as long as they have green bonds outstanding.
- For non-dynamic portfolios, impact should be reported in relation to the respective green bond which has financed them.
- For dynamic portfolios, issuers shall provide a breakdown of impact attributable to each bond, typically using a simple pro-rata allocation. A template is found in Appendix D.

Key environmental aspects

Reporting environmental impact

- Issuers shall report on direct environmental impacts such as renewable energy production, energy savings, reduced emissions (prioritizing a reduction of CO_2-equivalents), increased resilience, environmental operations and infrastructure etc.
- Issuers may choose to add social and/or economic impacts when deemed feasible and relevant.
- Issuers shall commit to report on expected impact (ex-ante) and strive to report on actual impact (ex-post).
- Reporting should target net benefits.
- Issuers shall highlight methodologies used and the potential uncertainty of environmental data to readers.

CO_2-baseline for electricity

- European mainland mix including Norway is recommended as the default baseline emission factor for electricity, for projects located in the European Union and Norway.
- Factor calculated as Combined Margin according to IFI Harmonized Framework methodology[3], combining a Build Margin and Operating Margin. Same combination of Build Margin (50%) and Operating Margin (50%) used for all electricity projects.
- Combined Margin to be applied: 380 g CO_2/kWh. This baseline is to be updated regularly, subject to availability of data.

[3] International Financial Institution Framework for a Harmonised Approach to Greenhouse Gas Accounting, November 2015

CO_2-baseline for district heating

- Issuers shall choose a baseline that is relevant and that reflects the national/local situation.
- Swedish issuers may draw on the methodology as outlined in Appendix C.

Green buildings: use national building standards as baseline

- Disclose the energy savings from green buildings as a net value in relation to national building requirements. Alternatively, report performance in comparison to a reference building.
- Include information about the building area, in square meters.
- Refurbishments and retrofits are to be compared against status pre-investment.
- Energy produced on-site may be subtracted from the energy use of the building.

Key procedural aspects

Annual reporting

- Annual reporting recommended for dynamic portfolios.
- Disclose reporting period and process for project inclusion.
- For non-dynamic portfolios, issuers are also encouraged to report annually, but may elect a simplified approach (for instance, a confirmation of status quo).
- Report on impact as long as there are green bonds outstanding.

Executive summary

- In their impact reporting, issuers are recommended to include a summary of their green bond and green investment activities. An executive summary template is available in Appendix D.

Project information in spreadsheet format

- Issuers are recommended to publish the project information presented in or used for the impact report also in spreadsheet format, which can be downloaded by interested parties from the issuer's website.

Report at geography and sector level

- For issuers with projects located in multiple jurisdictions, it is recommended that disbursements and impacts are reported both at geography and sector level, e.g. geographical distribution of wind sector investments.

Material changes to the 2017 version

- A quick guide to the report has been developed, see page 8
- Suggested indicators for reporting have been integrated into the core document, whereas previously they were placed in appendix.
- Recommendations regarding reporting on a bond-by-bond or bond-programme reporting have been introduced, see page 17.
- Recommendations regarding the reporting of climate-related physical risk and the Sustainable Development Goals have been introduced, see pages 18 and 19.
- Clarification on the meaning of energy savings vs. energy reduced and energy avoided, see page 23.
- An Executive Summary template has been included as Appendix D, see page 39.

Quick guide to this report

Quick guide to this report

This report outlines 31 positions that a group of Nordic public sector issuers have agreed upon with regards to green bonds impact reporting. An index of these positions is outlined below, along with reference to the relevant page of the document

Principles of reporting

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Background

In October 2017, a group of Nordic public sector issuers of green bonds[4] published an inaugural Nordic Position Paper on Green Bonds Impact Reporting. Our efforts to establish a joint common approach to green bonds impact reporting complements the work by a group of international financial institutions, as documented in the IFI Harmonized Framework for Impact Reporting[5] (IFI Harmonized Framework). We have continued to co-operate on green bonds impact reporting topics and the result of these discussions are reflected in this second edition. During the development of the position paper the Nordic Investment Bank and two investment banks[6] have acted as advisors to the group.

We, the signatory issuers, believe that a common Nordic position to the issues discussed may be beneficial to other public sector issuers as well as the investor community. We are confident that by sharing experiences and know-how we can all benefit as individual issuers.

Relation to other guidelines

This impact reporting guide complements similar initiatives, such as the IFI Harmonized Framework (for renewable energy and energy efficiency) and impact reporting recommendations developed by working groups of the Green Bond Principles (GBP). These can be found at the GBP Resource Centre for impact reporting at icmagroup.org

[4] Participants (DK=Denmark, FI=Finland, NO=Norway, SE=Sweden): City of Gothenburg (SE), Kommunalbanken (NO), Kommuninvest (SE), Municipality Finance (FI), Municipality of Lund (SE), Municipality of Norrköping (SE), Municipality of Örebro (SE), Region Skåne (SE), Region Stockholm (SE), Swedish Export Credit Corporation, SEK (SE). Kommunekredit (DK) and Municipality of Västerås (SE) participates in the group observers, with the intention to comply with the positions of this paper at a later stage. In addition, Municipality of Borås and Swedish Association of Local Authorities and Regions (SALAR) have participated in the development work, as representatives of the Kommuninvest Green Bonds Environmental Committee.

[5] International Financial Institutions (IFIs): Green Bonds, Working Towards a Harmonized Framework for Impact Reporting, December 2015

[6] Crédit Agricole CIB and SEB.

Caveats

The objective of green bonds impact reporting is to provide transparent insight into the environmental performance of projects financed through green bonds. While we strive to deliver reporting that is possible to compare and aggregate between issuers, we recognize the challenges related to different methodologies and metrics being used. Hence, we suggest caution to be exercised when such comparison or aggregation is undertaken.

This document is focused on the environmental benefits associated with investment projects financed through green bond proceeds, notwithstanding the potential social co-benefits that such projects may bring. This reflects our view regarding the need for a harmonisation of market practices for green reporting, however, as this paper outlines, issuers may choose to add social impacts in their reporting if feasible and relevant.

Contacts

The joint harmonization work on impact reporting among Nordic public sector issuers has been coordinated by Kommuninvest. Parties interested in supplying comments or questions to the signatories are invited to contact Kommuninvest at: ir@kommuninvest.se

The green transition in the Nordics

The Nordic countries have undertaken ambitious climate action for several decades. Having decarbonised parts of their energy systems, the Nordic countries have decoupled CO_2 emissions from GDP growth since many years. The transition has mainly taken place in electricity and heating, and the share of renewable energy is continuing to grow.

The energy grids of two Nordic countries, Norway and Sweden, are among the least CO_2 intensive in the world. In Sweden, more than 50 percent of the heating demand is covered by district heating systems which to more than 90 percent utilise renewable energy sources, residual heat and waste-to-energy technologies. Norway has been leading the way in electrifying its transport sector, notably with strong incentives for purchasing electric vehicles which resulted in more than half of new car sales in 2017 being electric or hybrid. Sweden and Finland have the highest shares of renewable energy in the transport sector in the EU, and Denmark the world's highest wind power penetration.

Moreover, the unified Nordic electricity market is increasingly interconnected with the continental Europe and the UK, allowing green Nordic electricity to flow into the veins of major European energy markets. Given the interconnectivity of the grids, energy saved and additional capacity created in the Nordic countries, allows for crowding out of more CO_2-intensive energy production elsewhere (see Appendix B).

In addition, the Nordic countries often serve as test-beds for new technology and services. A study[7] commissioned by the Nordic Council of Ministers and published in connection with COP22 in Marrakech, showed that scaling up 15 existing and proven-to-work Nordic low-carbon solutions could cut global emissions by 4.1 gigatonnes ($GtCO_2e$) by 2030, roughly equivalent to the total CO_2 emissions of the European Union.

Based on broad political and popular support for reducing greenhouse gas emissions, the Nordic countries have set ambitious environmental targets from a UNFCCC producer perspective[8]:

- Denmark has pledged to reduce greenhouse gas emissions by 40 percent by 2020, compared with 1990 levels. Furthermore, Denmark aims to convert the energy and transportation sector to run on 100 percent renewable energy by 2050.
- Finland is committed to reduce greenhouse gas emissions by at least 80 percent by 2050, compared to 1990 levels.
- Norway has pledged to reduce emissions by 40 percent by 2030, through a combination of accelerated emissions cuts and carbon offsetting.
- By 2030, Sweden aims to have reduced its emissions by 63 percent compared with 1990. As a long-term climate goal, Sweden will have no net emissions of greenhouse gases into the atmosphere by 2045.

[7] Nordic Green to Scale, Nordic climate solutions can help other countries cut emissions, (PDF: ISBN 978-92-893-4735-8) www.greentoscale.net

[8] UNFCCC = United Nations Framework Convention on Climate Change. Production-based emissions take place within national territory and offshore areas over which the country has jurisdiction. Consumption-based emissions encompass emissions from domestic final consumption and the production of imports.

Reporting principles

Reporting principles

This section outlines some of the main principles we have agreed on. Unless otherwise indicated, they will be in alignment with the core principles and recommendations as outlined in the IFI Harmonized Framework and with the voluntary guidelines for green bonds, the Green Bond Principles[9].

Our work has included the identification of a number of considerations relevant to impact reporting on environmental investments financed with green bonds. When mapping against the IFI Harmonized Framework we believe that items #12 (comparing projects), #13 (complex calculations) and #16 (different currencies) are of less relevance to Nordic public sector issuers and will therefore not be treated in this position paper.

We have concluded the following:

1. Expected impact, with actual impact as an ambition

- Report on expected impact, and strive to report on actual impact
- Reporting should include the estimated reduction in greenhouse gases, as well as other green indicators appropriate to describe environmental impact and performance
- Distinguish between reduced and avoided CO_2 emissions.
- Target net benefits
- Highlight methodologies used and the uncertainty of environmental data to readers

We undertake our impact reporting based on the expected environmental impact (ex-ante) from the projects we finance or co-finance[10]. Issuers that have the ability to provide impact reporting based on actual (ex-post) impacts, are encouraged to do so.

In their reporting, issuers should distinguish between impacts based on ex-ante and ex-post calculations.

Reporting should include both green indicators (which the project owner has control over) and resulting emissions reductions (which require certain assumptions). Green indicators, such as renewable energy produced or electricity saved, should be easy to report on with good quality. Emissions reductions should be reported if calculations can be made with satisfactory quality. If emission reductions are indirect and/or outside the scope of the project(s) financed, they should not be included. Generally, a conservative approach is recommended.

For practical reasons, issuers are, at least initially, recommended to target net benefits rather than disclosing gross emissions before and after project completion. Disclosing the full carbon intensity of portfolios, as well as the net CO_2 reduction, may be a future development.

[9] Green Bond Principles 2018, Voluntary Process Guidelines for Issuing Green Bonds, June 2018. Available at www.icmagroup.org

[10] A significant share of the use-of-proceeds from green bonds are typically directed at investment projects that are either planned or in the process of completion. Therefore, actual impact data is typically not available to issuers in the project selection and verification phase.

Issuers are recommended to be transparent about estimations and assumptions that may need to be made as part of the impact reporting. The report should include information about the precision of environmental data, attributable to the scientific uncertainty regarding the measurement methods, as well as uncertainties regarding the data that the measurement methods are applied to.

2. Annual impact

We commit to report impact on the projects we finance based on annual impact (as opposed to life time results). Issuers may choose to add life-time perspective when relevant.

Where projects are constructed during a prolonged time period and where expected impacts are not to be realized until far out in the future, issuers may elect to disclose the expected future timing of impact. However, this is only recommended if the project/projects are material to the green bonds issuance.

When possible, reporting should be normalized to reflect a representative year. In the case of renewable energy and green buildings normalization includes the consideration of weather-related irregularities in energy consumption or production. Normalization should be conducted in accordance with established national or international practice.

Normalization may not be applicable for all project categories, and in the case of clean transportation may be complicated, see position #27 on page 29.

3. Annual reporting

- Annual reporting recommended for both dynamic and non-dynamic portfolios
- Issuers should report on impact as long as there are green bonds outstanding.
- Disclose reporting period and process for project inclusion
- For non-dynamic portfolios, issuers may elect more simplified approach

We undertake to report on impact as long as we have green bonds outstanding.

For dynamic portfolios, i.e. where the composition of assets financed by green bonds change on a regular basis through addition or removal of assets, reporting will be annual.

Issuers are recommended to define and disclose the period and process for including projects in their report, and to explain the key characteristics of the approach for approving projects that meet the issuer's predefined eligibility criteria.

Reporting may nonetheless consist of e.g. a list of projects on the issuer's webpage, which may not need amendments for several years unless input variables change (e.g. disbursements / repayments / baselines / estimates vs actual etc.).

For non-dynamic portfolios or projects where allocation is complete and no new additional information has arisen since previous reporting, it is recommended to provide annual reporting. Issuers may however elect a simplified approach (for instance, a confirmation of status quo; an update on the progress of project implementation; or a recalculation on impact due to updated baseline emissions factors).

4. Quantitative and qualitative reporting
Recognising the wishes of the investor community for relevant quantitative information, issuers are encouraged to provide quantitative reporting as far as possible. However, both qualitative and quantitative perspectives may be appropriate and should be reported upon depending on the type of project financed and the availability of information.

Suggested core indicators can be found in the eight respective project categories, starting on page 26.

5. Focus on environmental impact
This position paper deals with reporting environmental impact related to projects financed through green bond issuance. We have attempted to include recommendations regarding a range of project categories, including renewable energy, green buildings, energy efficiency, clean transportation, waste management, water and wastewater management, and sustainable land use/environmental management.

We commit to reporting on environmental impacts in our annual green bond investor reporting.

However, individual issuers may choose to add social and/or economic impacts when deemed feasible and relevant. These may include, for example:

- number of jobs created and/or preserved;
- number of dwellings and/or beneficiaries for green buildings;
- number of students for green school buildings.

6. Both project-by-project and portfolio basis
Issuers are encouraged to report on a project-by-project basis, where feasible. We encourage aggregating to portfolio level reporting for individual project categories. However, we also recognize that some issuers for confidentiality reasons, competition considerations, a large number of underlying projects, or other may have to limit the amount of detail that can be made available on a project-by-project basis, and may thus be restricted to reporting on a portfolio basis. In these cases, issuers may want to reference an external review, which can potentially increase transparency. For green bond frameworks where no commitment is made to reporting on smaller projects, i.e. projects below a defined investment size, project-by-project reporting is not required.

7. Reporting the share financed
- Report impact attributable to the share of the project's total investment cost that the issuer has financed with green bonds
- Report impact based on amounts disbursed and outstanding to a project (as opposed to amounts committed).

The impact report should account for the expected annual environmental impact realised through projects to which green bond proceeds have been allocated and disbursed. The reported impact of a project should reflect the share of the total investment cost the issuer has financed through the green bond issuance. The total investment cost may be subject to change but should be reported as accurately as possible. Generally, a conservative approach to impact calculation is recommended.

In some cases, it may be relevant to take into account the full environmental benefit of an investment, even though additional investments by other parties are required to reap such benefits. One relevant example is an investment in infrastructure to support electrical vehicle transports, such as electrical charging posts, where the full environmental benefit requires investments also by vehicle owners. Another example is additional production of renewable energy, where additional grid investments may be required.

In such cases, issuers should strive to ensure that double-counting of environmental benefits is avoided. This also underlines the importance of including in the reporting not only emissions reductions, but also the project-specific green indicators.

For conservative purposes, it is recommended to report impact based on amounts disbursed to a project (as opposed to amounts committed). If disbursements are made gradually, environmental impact will also be taken into account gradually. The same logic applies for amortisations. Amortisations will gradually reduce the issuer's reported environmental impact of a project, while at the same time freeing up capacity to finance new projects with potential for incremental impact to the portfolio. In other words, projects to which funds are no longer outstanding should not be included in the impact reporting, even if the project is still operating.

8. Reporting impact in relation to invested monetary unit

- Report CO_2-reduction and other impact per invested monetary unit solely for investments made in projects or project categories where such impact is quantifiable and relevant.

We recognize the desire of the investor community for clear and simple metrics to evaluate green bonds.

One such measure is the CO_2 impact of an investment in relation to the invested monetary unit, i.e. X kg of CO_2 avoided annually per invested USD (or other relevant currency). While this measure makes it easy to compare green bond issues against each other, it may create a false sense of quantitative rigor, as such an approach puts faith in the precision of numbers related to uncertain environmental calculations, which in many cases are performed ex-ante.

Such an approach may also fail to recognize that some green bond frameworks are broad in scope, targeting environmental project categories that do not provide impacts measurable in CO_2. This could, for instance, be climate change adaptation and water management projects or sustainable buildings that have other significant environmental values apart from the CO_2 reduced/avoided. For certain projects, the major efficiency-enhancing investments may have been made already, thus increasing the marginal cost for additional improvements.

Issuers are therefore recommended to report CO_2 impact per invested monetary unit solely for the share of investments in projects or project categories where such impact is quantifiable and relevant. The share of total investments for which this reporting is made should be clearly stated. If an issuer's entire portfolio consists of projects where the CO_2 impact is measurable, the issuer may communicate impact per monetary unit in relation to all portfolio investments. When relevant, other metrics can be reported on in relation to invested monetary unit such as added capacity of renewable energy or energy savings in kWh per invested USD.

9. Reporting impact on bond-by-bond or bond-programme basis

All projects to which funds are outstanding should be included in the reporting regardless of whether the funds were disbursed during the year of reporting or at a prior date.

For non-dynamic portfolios where allocation is complete, each outstanding green bond will finance a designated sub-portfolio of projects. In such cases, the impact report should clearly state the estimated impact of each sub-portfolio/bond. Reported impact data should preferably and if feasible also be aggregated for all outstanding green bonds, so that is possible to associate all bonds from the same issuer with one aggregated set of impact results. Using the aforementioned approaches should serve to meet reporting demands both from investors which prefer impact reporting data relevant to the specific bond that they have purchased as well as from investors who prefer an aggregated approach.

For dynamic portfolios where the composition of projects financed by the outstanding green bonds changes on a regular basis through addition or removal of assets, issuers may instead choose to report impact on a portfolio basis. Such reporting can either assess the impact of the green projects to which disbursements have been made during the reporting year, or the impact of the aggregate portfolio of eligible assets as of the reporting date.

For such dynamic portfolios, issuers shall provide a breakdown of impact attributable to each bond, typically using a simple pro-rata allocation of aggregated impact to each outstanding bond. A template for reporting specific bond impact is found in Appendix D.

10. Executive summary and project spreadsheet
In their impact reporting, issuers are recommended to include a summary of their green bond and green investment activities. An executive summary template is available in Appendix D. Issuers are also recommended to publish the project information presented in or used for the impact report in spreadsheet format, which can be downloaded by interested parties from the issuer's website.

11. Report at geography and sector level
It is recommended that disbursements and impacts are reported at geography and sector level. For issuers with projects located in multiple jurisdictions, reporting should be done at geography and sector level combined.

12. Climate-related physical risk
Whereas green bond investments are inherently opportunity-oriented, we recognise that green investments are also subject to risks, including physical risks related to climate change. Such risks can be related to increased severity of extreme weather events or longer-term shifts in precipitation and temperature and increased variability in weather patterns, such as sea level rise. The financial implications of physical risks on organizations may be related both to direct damage to assets and indirect impacts from supply chain disruption. Organisations' financial performance may also be affected by changes in water availability, sourcing, and quality; food security; and extreme temperature changes affecting organizations' premises, operations, supply chain, transport needs, and employee safety.

Normally, green bond investors are not directly exposed to the physical risk of projects financed by green bonds, since the majority of green bonds issued are standard recourse-to-the-issuer debt obligations. However, we still deem physical risk of projects financed by green bonds to be a topic that deserves attention from issuers.

As described in the TCFD recommendations[11] on page 27, "Physical climate-related scenarios are particularly relevant for organizations exposed to acute or chronic climate change, such as those with long-lived, fixed assets; locations or operations in climate-sensitive regions (e.g., coastal and flood zones); reliance on availability of water; and value chains exposed to the above."

[11] Task-Force on Climate-Related Financial Disclosures: "Recommendations of the Task-Force on Climate-Related Financial Disclosures, June 2017"

Issuers are encouraged to be transparent about climate-related physical risk of projects or portfolios, where these are identified. In such cases, issuers should be transparent about how these risks will be mitigated.

In addition to the TCFD guidance, issuers are also recommended to consult a report[12] published by EBRD (the European Bank for Reconstruction and Development) and the Global Centre of Excellence on Climate Adaptation.

13. Energy units: kWh or appropriate multiples
In the Nordic countries, the most commonly used energy unit is kilowatt-hours (kWh). We therefore intend to use kWh or appropriate multiples as the energy unit in our impact reporting (i.e. MWh, GWh etc. along with installed effects in kw, MW and GW, etc.).

However, issuers are recommended to include a Joule (J) conversion factor, where 1 kWh represents 3.6 MJ and 1 MWh represents 3.6 GJ. Issuers may also choose to report aggregate energy savings or added capacity in Joules, alongside Wh.

14. Sustainable Development Goals (SDGs)
We recognise that the Sustainable Development Goals adopted by the United Nations in 2015 are a blueprint for sustainable development globally, and serve as a universal benchmark when developing methodologies to assess and report sustainability performance. We also acknowledge growing demand from investors to map their green bond investments to the UN SDGs.

The project categories referenced in this position paper have been mapped against the relevant SDGs, see page 20. This mapping, which is inspired by the GBP/ICMA mapping[13] and the existing practises of Nordic issuers, relates to the specific context of projects in the Nordic countries. It may be used as a generic reference for Nordic issuers to map their Green Bond project categories to the UN SDGs. Issuers are nevertheless encouraged to adapt the mapping to their specific portfolio of assets, in the context of their overall sustainability strategy, and to include their mapping in the impact report.

[12] European Bank for Reconstruction and Development & Global Centre of Excellence on Climate Adaptation: "Advancing TCFD Guidance on Physical Climate Risks and Opportunities", May 2018

[13] Green and Social Bonds: A High-level Mapping to the Sustainable Development Goals", June 2018

SDG mapping

Nordic position paper categories

This suggested mapping may be adapted by individual issuers, to reflect their specific portfolio of assets and their overall sustainability strategy.

Renewable energy

Green buildings

Energy efficiency

Clean transportation

Waste management

Water and wastewater management

Sustainable land use / environmental management

Climate change adaptation

Environmental impact methodology

Reporting benefits and comparing with relevant baselines

Environmental impact methodology

Reporting benefits and comparing with relevant baselines

In this section we describe the methodological choices we have made for environmental impact and the reasoning behind them, with the ambition of meeting high standards of transparency.

15. Core indicators
Issuers should strive to calculate and aggregate the impact of individual projects and project categories where this is feasible. A number of suggested impact indicators are listed in the Project category recommendations section, see below. We recognise that other indicators may be of relevance for certain projects; in such cases issuers are encouraged to use these as a complement or even substitution.

16. Baselines
Deciding upon a baseline against which the environmental impact can be measured is important, as the chosen baseline will determine the calculated environmental benefits.

This paper outlines recommended baseline approaches for certain project categories and for electricity. Issuers may choose to disclose impact relative to other relevant baselines, additionally or instead of the suggested baselines. For instance, this may be relevant for projects located outside the European Union. Issuers are recommended to be transparent about the choice of baselines, and to stay true to the general principle of conservative impact calculations.

Whenever feasible and relevant we base the suggested baselines on the IFI Harmonized Framework, including their established methodology for Greenhouse Gas Accounting (IFI Harmonized Approach).

17. Calculating greenhouse gas emissions
In the absence of one single commonly-used standard for the calculation of GHG emissions reduced/ avoided, issuers may follow their own methodologies while making these available to investors. Issuers are encouraged to report GHG emissions data only when they can provide full transparency on the applicable GHG accounting methodology and assumptions, which can be referenced.

18. Project boundary and scope of emissions
The project boundary for greenhouse gas (GHG) calculations should include all activities, facilities or infrastructure that the issuer is financing. The Nordic issuers at this stage commit to report on Scope 1 and Scope 2 emission reductions as defined by the Greenhouse Gas Protocol[14].

Reporting projects' impact on other indirect emissions, defined as Scope 3, is a desirable future development and may be considered once more widely accepted life cycle analysis methodology is available. Issuers should clarify which Scope is used for the impact report.

19. Energy savings vs energy reduced and energy avoided
The IFI Harmonized Framework highlights "energy savings" as a core indicator in impact reporting. We recommend further granulating this indicator into reduced and avoided energy use and CO_2 emissions. We view reduced energy use as a direct or absolute reduction in operation; avoided energy use refers to a baseline/alternative reference scenario.

When we refer to energy savings we mean both energy reduced and energy avoided and the sum of the two. When presenting aggregated impact results, issuers are encouraged to report the total energy savings, with a break-down on energy reduced and energy avoided.

20. CO_2 baseline for electricity
- European mainland mix including Norway is recommended as the default baseline emission factor for electricity
- Factor calculated as Combined Margin according to IFI Harmonized Framework methodology, combining a Build Margin and Operating Margin. Same combination of build margin (50%) and operating margin (50%) used for all electricity-related projects
- Combined Margin to be applied: 380 g CO_2/kWh

A baseline emission factor for Nordic green bond issuers could be chosen from several, geographically different, grid factors: project specific, local, national, Nordic or European. Emission factors could also take into account certificates of origin and residual mix. Factors can reflect current or future situation and average or marginal mix.

This position paper suggests an EU Mainland grid factor including Norway as the default baseline for accounting and disclosure of electricity. We have chosen this grid factor as the relevant baseline because the Nordic electricity market is already characterised by interconnection and export surplus. Furthermore, the integration of European electricity markets is planned to increase in the coming years and decades, which is the relevant time perspective for most investments (see Appendix A).

This CO_2 baseline has been calculated based on grid factors in a dataset (IFI Interim Dataset of Harmonized Grid Factors v 1.0) provided by Nordic Investments Bank, one of the signatories to the IFI Harmonized Framework. Available figures are generally Scope 2.

[14] The Greenhouse Gas Protocol, a widely used accounting tool for greenhouse gas emissions, differentiates between direct and indirect emissions: Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity. Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but which occur at sources owned or controlled by another entity. The GHG Protocol categorizes these direct and indirect emissions into three broad scopes: Scope 1: All direct GHG emissions; Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat, cooling or steam; and Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. transmission & distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc.. See the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standards, revised edition, chapter 4: "Setting Operational Boundaries" as well as the additional Scope 2 Guidance. Available from: https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf and https://ghgprotocol.org/scope_2_guidance

The baseline emission factor is constructed using a Combined Margin (CM) for the grid, comprised of an existing Operating Margin (OM) and a future Build Margin (BM)[15]. The OM represents the marginal generating capacity in the existing dispatch hierarchy that will most likely be displaced by the project. The BM is calculated based on the prospective power plants whose construction and operation would be affected by the project, based on an assessment of planned and expected new generation capacity in the grid. When adding new generation capacity to a grid it is likely to partly replace existing generation capacity on the margin (OM). In addition, it is also likely that in the absence of the project implementation, other generation projects would be implemented to meet the demand for power (BM).

Our ambition is to review this baseline emission factor on a regular basis, subject to availability of new data. Due to unavailability of updated data in the underlying dataset, the emission factor used in this Position Paper, originally calculated in 2017, remains unchanged.

Issuers are recommended to use the following baseline emission factor for electricity:
Combined Margin: 380 g CO_2/kWh

We recommend using the same Combined Margin factor for all electricity-based projects, including renewable energy (RE) energy efficiency/saved energy (EE), and electrification projects that lead to an increased use of electricity, e.g. transportation projects.

With this approach we partly deviate (in the conservative direction) from the IFI Harmonized Framework, in order to better reflect the Nordic context. We believe the IFI assumption that variable renewable energy production replaces more fossil energy production than firm renewable energy production, does not reflect the general Nordic context. Furthermore, we use the same factor for electrification projects as for increased energy production, in order to simplify reporting requirements. A comparison between the Nordic issuers' approach and the IFI approach is available in Appendix B.

Issuers may choose another baseline, for example from a relevant local or national context, if and when this is relevant, for example if financed projects are located outside of the European Union. Issuers may also use additional baselines (such as local, Nordic and European) for informational purposes.

21. Certificates of origin
Issuers are recommended not to use certificates of origin as the basis for CO_2 values. The principal reason is that we do not consider such certificates to be a main driving force for deployment of more renewable energy, in comparison with more substantial market setting policy measures such as the EU emissions trading system (EU-ETS), CO_2-taxation and the Swedish-Norwegian Green electricity certificates.

22. The EU emissions trading system (EU-ETS)
With the EU emissions trading system in place, it could be argued that all investments covered by the system contribute to achieving the overall target and that additional reduction from one investment may effectively be levelled out by increased emissions from other projects and in other member states. However, the total quotas and mechanisms of the EU-ETS is a political issue influenced by the actual performance of emissions reductions. We have therefore not made any distinctions between investments and emissions inside and outside the EU-ETS.

[15] International Financial Institution Framework for a Harmonised Approach to Greenhouse Gas Accounting, November 2015

23. CO_2 emission baseline for district heating[16]

- No common baseline emission factor for district heating has been established
- The baseline selected should reflect the national/local situation, including the situation prior to the investment
- Swedish issuers may draw on the methodology as outlined in Appendix C

The district heating and district cooling systems are fundamentally local/regional and not interconnected on a national or Nordic basis even though the fuels used (bio, solid waste, fossil) may be often traded over long distances. Local mixes for both direct and avoided emissions are considered most relevant in impact reporting, however, issuers may choose to use a national mix to simplify reporting. One such national calculation (from Sweden) is presented in Appendix C. Please note that there is not yet any IFI harmonised approach for investments related to district heating.

One crucial question is which alternative situation to compare a district heating investment to. Issuers may consider applying a "no project" scenario as baseline when financing new district heating systems, and "the actual situation before project implementation" for investments related to expanding or improving existing systems.

The chosen baseline should reflect national/local circumstances and regulations. The calculation method should consider both emissions caused by the production of district heating, cooling, steam or combined heat and power (CHP) (including Scope 2), as well as avoided emissions from alternative sources of energy.

[16] District heating is a system for distributing heat generated in a centralized location for residential and commercial heating requirements. In the Nordic countries, the heat is often obtained from a cogeneration plant burning principally renewable energy sources, including biomass, but plants also use waste, excess heat, and, to a minor extent, fossil fuels. District heating plants may also be used to produce electricity (combined power and heating plants, CHP), and cooling. Depending on the characteristics of the project financed by green bonds, it may fall under different project categories, such as renewable energy and energy efficiency.

Project category recommendations

This chapter presents impact reporting recommendations specifically relevant to eight project categories that typically dominate Nordic public sector green bonds frameworks:

- Renewable energy (incl. wind, solar, hydro, wave, bioenergy, geothermal, excess heat)
- Green buildings
- Energy efficiency
- Clean transportation
- Waste management
- Water and wastewater management
- Sustainable land use / environmental management
- Climate change adaptation

This list may be updated as the universe of projects eligible for green bond funding by Nordic issuers evolves.

24. Renewable energy

Issuers are encouraged to report the impact from renewable energy investments (wind, solar, hydro, bio energy, etc.) in terms of capacity added and estimated annual production, as well as the associated amount of CO_2 avoided, according to the guidelines established by the IFIs[17]. We however recommend using the same Combined Margin for electricity for all types of projects (see section 20: "CO_2 baseline for electricity" above).

The emission factor to be applied when calculating CO_2 avoided depends on the type of energy replaced. 1 kWh of renewable electricity production may be reported as replacing 1 kWh of electricity from the grid, applying the grid factor suggested in section 20 (assuming zero (0) emissions net in scope 1 and 2 from renewable energy production). If the renewable energy produced replaces other forms of energy than electricity, e.g. fossil heating oil, a relevant emission factor for the substituted energy source may be applied. In such cases, issuers should be transparent about their choice of emission factor.

Issuers may also elect to report other greenhouse gas emissions that have been reduced or avoided, where relevant and applicable.

Suggested indicators

- Capacity of energy generation of plant (MW)
- Annual renewable energy generation in MWh or GWh
- Annual GHG emissions reduced/avoided, in tonnes of CO_2-equivalent

[17] IFI Approach to GHG Accounting for Renewable Energy Projects, November 2015

25. Green buildings

- Disclose energy savings from green buildings as a net value compared to national building requirements. Alternatively, performance can be reported in comparison to a relevant reference building.
- Issuers are encouraged to disclose the building area, in square meters.
- Refurbishments and retrofits are to be compared against status pre-investment.
- Energy produced on-site may be subtracted from the energy use of the building if this is clarified in the report.
- Issuers are encouraged also to include information about materials used, the location of the building, and other features that may contribute to the environmental benefits of the project.

Energy savings from green buildings should be disclosed as a net value, based on energy use per square meter and per year, and compared to a baseline scenario in which the building complies with applicable national regulations for the respective Nordic country[18]. Standards and methods for calculating energy use differ by country and are not easy to compare. Regarding use of baselines for savings in electricity and in district heating, see above positions #20 and #23.

Issuers are encouraged to disclose the building area, in square meters. As additional information, issuers may choose to report a green building's performance in comparison to a reference building based on e.g. the average energy performance of the national building stock, considering relevant type of building and climate zone. Reporting in relation to averages should solely be for informational purposes (not to be used in aggregation) and where relevant (for instance refurbishments of existing buildings).

Energy produced on-site (behind the meter) that is used in the building may be subtracted from the reported energy performance of the building, if this is in line with national building regulations. (A house with an energy use of 45 kWh per sq.m. with solar panels producing 5 kWh per sq.m. may be reported as having an energy performance of 40 kWh per sq.m. considering an energy production of 5 kWh per sq.m.) Issuers are in that case encouraged to separately report the energy produced on-site (that is subtracted from the energy use of the building), as well as additional energy produced on-site and exported to the grid.

In their reporting, issuers should distinguish between new buildings and major refurbishments, where the former should be compared to national building standards and the latter to the status pre-investment.

In addition to information about the energy performance and -production of a building, issuers may elect to describe other environmentally relevant features of the building, if feasible. This information may include the main material groups used in the construction, the location of the building, water intensity, waste management, any use of fossil-free construction machinery and equipment, waste management policies on the construction site, mitigation efforts related to physical climate risks, etc. Issuers are not required to calculate CO_2 impact of building materials at this stage, as these emissions are outside scopes 1 and 2.

Suggested indicators

- Avoided kWh/sq m, or in percentage terms (%) below national building standards
- Annual energy avoided in MWh or GWh compared to the relevant building code (for new buildings)
- Annual energy reduced in MWh or GWh compared to the pre-investment situation (for refurbishments)
- Annual energy production on-site, in MWh or GWh
- Annual GHG emissions reduced/avoided, in tonnes of CO_2-equivalents

[18] Calculating impact based on buildings standards, as opposed to comparing against the average for the national building stock, represents a more conservative approach to impact reporting.

26. Energy efficiency

We encourage issuers to apply the IFI Harmonized Framework approach for GHG accounting for energy efficiency projects[19]. So far we do not commit to using the IFI method for differentiating effects during remaining and prolonged lifetime for a project. We deem this a reasonable approach, given that we are committed to annual reporting and do not report on life-time effects.

Issuers should report on both the absolute reduction (in kWh or other metric) and the percentage reduction in energy use for the same output/ service. Regarding use of baselines for savings in electricity and in district heating, see above sections #20 and #23.

For energy efficiency project that are part of a larger retrofitting or refurbishing project, where parts of the project cost is not directly linked to a reduction in energy use, we recommend a cautious approach. This means reporting impact (such as energy reduced) in relation to the entire project cost. An example is the refurbishment of a building that involves both energy efficiency components such as improved insulation and ventilation systems, as well as purely esthetical components such as a façade upgrade.

Suggested indicators

- Annual energy reduced/avoided in MWh or GWh (electricity) and MWh or GWh (other energy savings)
- Annual GHG emissions reduced/avoided, in tonnes of CO_2-equivalent

[19] IFI Approach to GHG Accounting for Energy Efficiency Projects, November 2015

27. Clean transportation
While clean transportation projects may differ in character, the primary objective from an impact reporting perspective is to report on avoided emissions of CO_2, in comparison with an alternative scenario. What represents the most relevant alternative scenario, is likely to vary greatly depending on the local context of the project as well as the type of transport mode to be invested in.

For larger investments in transportation systems, a pre-study of the mobility situation and the related energy consumption/emissions can be helpful in order to measure the impact of the investment. Another resource to issuers may be the cost/benefit assumptions used in the project's "business case" evaluation. We do however recognize that many smaller projects may not be backed up by pre-studies and other analysis and therefore such reporting cannot always be required from issuers.

For projects involving the purchase of low-carbon vehicles, issuers are recommended to compare the emissions of the acquired vehicles with those of a comparable conventional new alternative, such as a modern fossil-fuel driven car. Calculations should be based on the same emission factor for electricity as applied e.g. to added renewable energy and energy efficiency projects, see positions #24 and #26.

Whenever possible, issuers may include reporting on other avoided GHG emissions, such as NOx. If relevant, reporting may also include other benefits, such as noise reductions.

Issuers are encouraged to select and report on indicators that are relevant and feasible for each individual project and for their portfolio of transport investments as a whole, including but not limited to those mentioned below. These include suggested reporting metrics as outlined in a paper produced by the impact reporting working group of the Green Bond Principles, which issuers are encouraged to consult[20].

Suggested indicators

- Annual GHG emissions reduced/avoided, from cars and other vehicles, due to the investment (by comparison to average emissions by km for alternative transportation)
- Number of km of new train lines, bicycle lanes etc. created
- Passenger-kilometres in new means of transportation
- Estimated reduction in car use and car kilometres the project will replace
- Project's effect on increased resilience to climate change

[20] See Resource Centre for Green Bond Principles at www.icmagroup.org: "The GBP Impact Reporting Working Group – Suggested Impact Reporting Metrics for Clean Transportation Projects", June 2018

28. Waste management

A number of quantitative and qualitative indicators may be relevant for impact reporting on waste management projects. Issuers are encouraged to select and report on indicators that are relevant and feasible for each individual project and for their portfolio of waste management investments as a whole, including but not limited to those mentioned below. These include metrics outlined in a paper produced by the impact reporting working group of the Green Bond Principles, which issuers are encouraged to consult[21].

Suggested indicators

- Estimate of the reduction in greenhouse gas emissions avoided as a result of the investment (See also Appendix C for an example methodology on district heating and waste treatment).
- Waste that is prevented, minimised, reused or recycled before and after the project in % of total waste and/or in absolute amount in tonnes per year.
- Annual absolute (gross) amount of waste that is separated and/or collected and treated (including composted) or disposed of (in tonnes per year. and in % of total waste)
- Number of metric tons processed in the facility
- Material recovery rate, in %
- Expected improvement in material recovery rate or other target for improved resource use
- Number of households delivering to the facility
- Energy produced (in case of biogas/waste-to-energy plant)
- Energy saving attributable to the investment
- Project's effect on increased resilience to climate change

[21] See Resource Centre for Green Bond Principles at www.icmagroup.org: "The GBP Impact Reporting Working Group – Suggested Impact Reporting Metrics for Waste Management and Resource-Efficiency Projects", February 2018

29. Water and wastewater management

A number of quantitative and qualitative indicators may be relevant for impact reporting on water and wastewater management projects. Issuers are encouraged to select and report on indicators that are relevant and feasible for each individual project and for their portfolio of water and wastewater management investments as a whole, including but not limited to those mentioned below. These include suggested reporting metrics as outlined in a paper produced by the impact reporting working group of the Green Bond Principles, which issuers are encouraged to consult[22].

Suggested indicators

- Annual water savings
- Annual volume of wastewater treated or avoided
- Capacity of plants being built
- Number of meters of piping/conduit laid, upgraded or replaced
- Number of person equivalents (PE) of water or wastewater the plant processes, identifying any increase that can be attributed to the investment
- Reduction of emissions into the local environment (nitrogen and phosphorous, Biochemical Oxygen Demand, etc)
- Where relevant, amount of electricity, biogas or other energy carrier expected to be produced each year, along with avoided CO_2 emissions (see above sections on electricity and district heating)
- Health metrics (such as air and water quality)
- Biological metrics: biological diversity, wildlife
- Project's effect on increased resilience to climate change

[22] See Resource Centre for Green Bond Principles at www.icmagroup.org: "The GBP Impact Reporting Working Group – Suggested Impact Reporting Metrics for Sustainable Water and Wastewater Management Projects, June 2017

30. Sustainable land use / environmental management
Projects in this category are primarily intended to focus on environmental management in areas other than climate change. They may include nature conservation, biodiversity measures, sustainable agriculture, improving eco-systems, converting land from industrial/business use to wild life reserves/recreational areas etc.

For these types of projects, issuers are recommended to identify both qualitative and quantitative indicators, where qualitative measures may be of particular relevance. These may include i) surface area of the land converted (measured in square meters or square kilometers), ii) area under conversation or preservation, iii) area under certified land management (ideally with breakdown, FSC, PEFC, Rainforest Alliance), iv) monitoring of chemical use, v) biological diversity and vi) air quality. If annual energy savings and/or reduction in greenhouse gas emissions or other emissions are relevant for the project, issuers are encouraged to report on such measures as well.

31. Climate change adaptation
The objective of projects in this category is to improve local communities' resilience in the face of a changing climate. Projects in this category may include facilities and installations to manage urban runoff, floods, landslides, avalanches, rising sea levels etc. This list is not comprehensive, as there is considerable local variance in the types of measures needed.

The resilience-enhancing qualities of a project are preferably documented through quantitative indicators, if feasible. Quantitative indicators can be complemented by qualitative descriptions of the project's characteristics and the weather-related and climate-related effects it seeks to address.

Appendices

Appendix A

Report: Nordic Energy Technology Perspectives 2016

Generally speaking, a local or national mix for electricity does not exist today in the Nordic countries, since electricity is widely traded cross-border with neighboring countries. Since the mid-1990s, all Nordic countries have liberalized their electricity markets, opening up both electricity trading and electricity production to competition. The highly interconnected market is the cornerstone of the Nordic energy system and is expected to serve as a key enabler for further emission reductions towards 2050.

According to a report published in 2016 by the Nordic Council of Ministers and the International Energy Agency (IEA)[23], the Nordic electricity system had net exports of almost 15 TWh in 2015. Some of the report findings regarding expected supply and demand as well as trade patterns are outlined in graphs below:

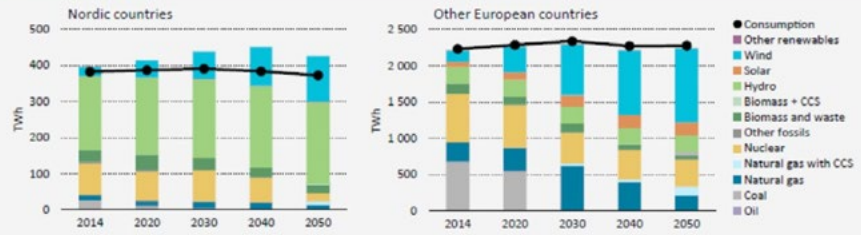
- Energy production in the Nordic countries is expected to increase, while demand for energy is expected to decrease.
- Anticipated electricity demand from continental Europe could significantly expand the market for low-carbon electricity generated in the Nordic countries, allowing the Nordic region as a whole to become a major net exporter of clean energy. Seizing this opportunity depends on: a) build-out of wind capacity and necessary flexibility to handle variability; b) reducing Nordic demand through energy efficiency; and c) setting up the necessary inter-connectors and domestic grid strengthening to enable trade.

Please note that the rationale for applying a mainland Europe + Norway baseline is due to i) the increased interconnectedness between the Nordic and European energy markets and ii) the Nordic issuer position that a margin approach should be applied when assessing the environmental benefits of investment projects. Added renewable energy capacity and reductions in energy use in the Nordic region translate into the crowding out of "dirtier" energy production elsewhere, regardless of whether the current energy balance is characterised by an export surplus or a need for imported electricity.

[23] Nordic Energy Technology Perspectives 2016 – Cities, flexibility and pathways to carbon-neutrality", Nordic Energy Research/Nordic Council of Ministers & International Energy Agency

Appendix A

Figure 3.12 Development of power generation in the overall system, CNS-B

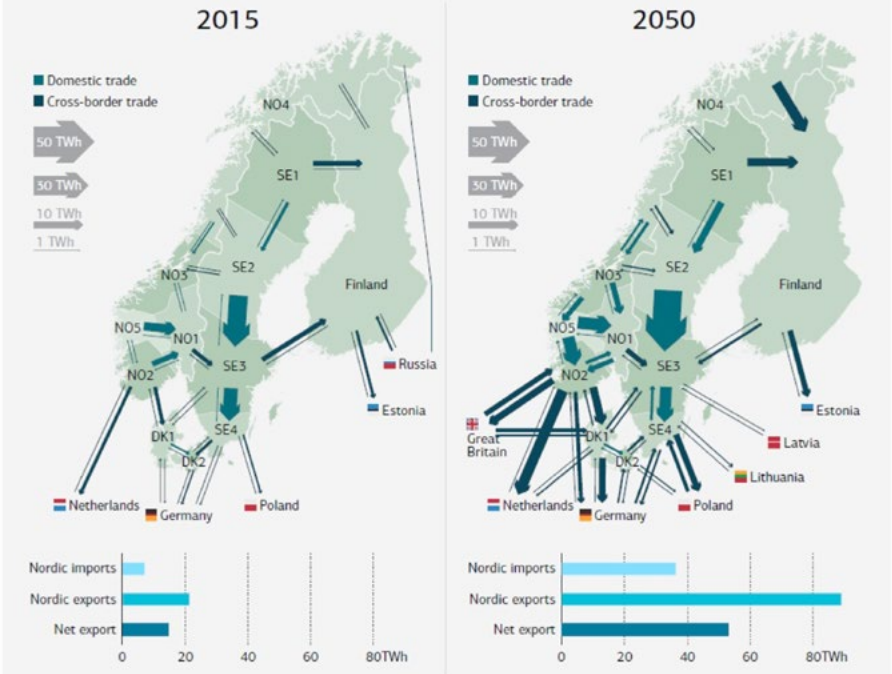


Figures and data in this report can be downloaded at www.iea.org/etp/nordic.

Key point *By 2050 about 30% of electricity generation is based on VRE and more than 50% on hydropower in the Nordic countries. In the other European countries, almost 60% of electricity is generated from VRE.*

Note: CNS = Nordic Carbon-Neutral Scenario;
Source: Nordic Energy Technology Perspectives (NETP) 2016

Figure ES.5 Nordic electricity trade in 2015 (left) and 2050 in the CNS (right)



Notes: Trade with Russia is assumed to fall to zero in 2050. Iceland is not included in the figure as it is not yet connected with any other electricity system and the potential for Icelandic interconnectors was not modelled. This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.
Figures and data in this report can be downloaded at www.iea.org/etp/nordic.

Key point *Anticipation that electricity prices in Europe will be higher than in the Nordic region in the CNS creates an attractive trade opportunity; expansion of variable renewables and interconnector capacity could lead to net Nordic exports of over 50 TWh in 2050.*

Note: CNS = Nordic Carbon-Neutral Scenario;
VRE=Variable Renewable Energy; CCS=Carbon Capture and Storage
Source: Nordic Energy Technology Perspectives (NETP) 2016

Appendix B

Baseline emission factors for the electricity grid

IFI HARMONIZED FRAMEWORK APPROACH[24] / NORDIC ISSUERS' APPROACH

Type	IFI Approach	Nordic issuers' approach
Firm generation (e.g. hydropower, geothermal and biomass)	Combined Margin = 50% Operating Margin + 50% Build Margin	Combined Margin = 50% Operating Margin + 50% Build Margin
Variable generation (wind and solar)	Combined Margin = 75% Operating Margin + 25% Build Margin	Combined Margin = 50% Operating Margin + 50% Build Margin
Electricity consumption from the grid, e.g. green buildings and energy efficiency projects	Combined Margin = 50% Operating Margin + 50% Build Margin	Combined Margin = 50% Operating Margin + 50% Build Margin
Electrification projects	N/A	Combined Margin = 50% Operating Margin + 50% Build Margin

[24] See International Financial Institution Framework for a Harmonised Approach to Greenhouse Gas Accounting, November 2015

Appendix B

COMBINED MARGIN APPLIED BY THE NORDIC ISSUERS
For now, we apply the following baseline emission factor for electricity:

Combined Margin: 380 g CO_2/kWh
→ = 50% Operating Margin (483 g CO_2e/kWh) + 50% Build Margin (277 g CO_2e/kWh)[25]

This baseline emission factor is to be updated on a regular basis (subject to availability of data), reflecting new grid factors and other relevant changes in conditions and assumptions.

[25] Calculation by Kommuninvest in March 2017, based on IFI Interim Dataset of Harmonized Grid Factors v 1.0, as provided by Nordic Investment Bank

Appendix C

Calculating impact from district heating projects – an example from Sweden

In 2017, the Swedish local government debt office Kommuninvest commissioned Profu[26], an envirotech consultancy, to develop a calculation method for the net CO_2-effect for district heating in Sweden to be used in Kommuninvest's first green bonds impact report, published in March 2017.

This resulted in the development of a national-average-baseline emission factor for district heating, representing the avoided emissions from alternative heating sources. The baseline was established at 117 g CO_2/kWh (Scope 2), being a mix of avoided alternative individual heating sources using current technologies for wood pellet boilers and various types of heat pumps (20% pellet-fired boilers, 45% geothermal heat pumps/ground source heat pumps, 28% air/water heat pumps and 7% air/air heat pumps).

Since waste burning typically forms part of the energy mix in Swedish district heating plants, additional environmental benefit is ascribed to the project due to the avoidance of land fill and methane leakage.

This corresponds to 41 g CO_2/kWh as a national average for solid waste in district heating, based on a baseline emission factor of 170 g CO_2e/kWh for waste. The total baseline emission factor applied for the majority of Kommuninvest's district heating projects is therefore 158 g CO_2e/kWh.

Direct emissions are calculated from national average emissions for district heating in Sweden (which could be substituted with a factor for the local energy mix). The average 2017 was 58 g CO_2/kWh (scope 2, including 4 % fossil fuels).

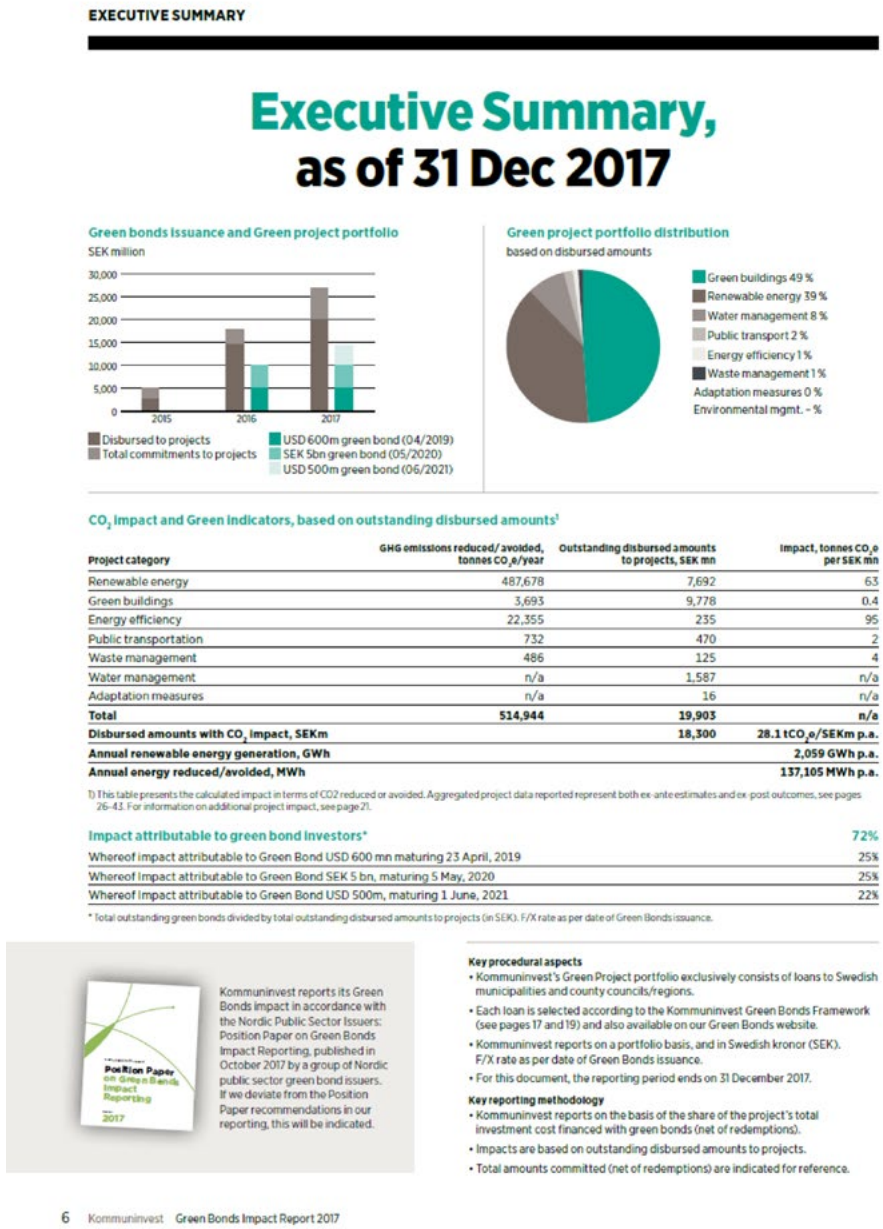
Using a national average as a baseline factor for district heating is feasible for a portfolio of investment projects and expansion of production and supply, but local circumstances and actual changes in production mix need to be considered for projects such as energy efficiency, increased interconnection and other changes in the production mix.

[26] Profu report (in Swedish only): "Stöd till klimatutvärdering av gröna investeringar inom fjärrvärmeområdet", February 2017.

Appendix D

Executive summary template

Issuers are recommended to include an executive summary early on in their impact report. A template can be found to the right. An Excel-version of the graphs and tables of the template is available for download at the impact reporting section of Kommuninvest's website: kommuninvest.se



EXECUTIVE SUMMARY

Executive Summary, as of 31 Dec 2017

Green bonds issuance and Green project portfolio

SEK million

Green project portfolio distribution

based on disbursed amounts

CO_2 impact and Green indicators, based on outstanding disbursed amounts[1]

Project category	GHG emissions reduced/ avoided, tonnes CO_2e/year	Outstanding disbursed amounts to projects, SEK mn	Impact, tonnes CO_2e per SEK mn
Renewable energy	487,678	7,692	63
Green buildings	3,693	9,778	0.4
Energy efficiency	22,355	235	95
Public transportation	732	470	2
Waste management	486	125	4
Water management	n/a	1,587	n/a
Adaptation measures	n/a	16	n/a
Total	**514,944**	**19,903**	**n/a**
Disbursed amounts with CO_2 impact, SEKm		**18,300**	**28.1 tCO_2e/SEKm p.a.**
Annual renewable energy generation, GWh			**2,059 GWh p.a.**
Annual energy reduced/avoided, MWh			**137,105 MWh p.a.**

1) This table presents the calculated impact in terms of CO2 reduced or avoided. Aggregated project data reported represent both ex-ante estimates and ex-post outcomes, see pages 26–43. For information on additional project impact, see page 21.

Impact attributable to green bond investors*	72%
Whereof impact attributable to Green Bond USD 600 mn maturing 23 April, 2019	25%
Whereof impact attributable to Green Bond SEK 5 bn, maturing 5 May, 2020	25%
Whereof impact attributable to Green Bond USD 500m, maturing 1 June, 2021	22%

* Total outstanding green bonds divided by total outstanding disbursed amounts to projects (in SEK). F/X rate as per date of Green Bonds issuance.

Kommuninvest reports its Green Bonds impact in accordance with the Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting, published in October 2017 by a group of Nordic public sector green bond issuers. If we deviate from the Position Paper recommendations in our reporting, this will be indicated.

Key procedural aspects

- Kommuninvest's Green Project portfolio exclusively consists of loans to Swedish municipalities and county councils/regions.
- Each loan is selected according to the Kommuninvest Green Bonds Framework (see pages 17 and 19) and also available on our Green Bonds website.
- Kommuninvest reports on a portfolio basis, and in Swedish kronor (SEK). F/X rate as per date of Green Bonds issuance.
- For this document, the reporting period ends on 31 December 2017.

Key reporting methodology

- Kommuninvest reports on the basis of the share of the project's total investment cost financed with green bonds (net of redemptions).
- Impacts are based on outstanding disbursed amounts to projects.
- Total amounts committed (net of redemptions) are indicated for reference.

Appendix E

A visualized summary of the Nordic issuers' position on impact reporting for green bonds

Project category	Project examples (non-exhaustive)	Document reference	Indicators	Unit	Mandatory	Baseline / benchmark	General principles for all categories
Renewable energy GBP category for reference: Renewable energy	• Wind power generation • Solar power plants • Geothermal energy • Bio-energy	#24	Capacity of energy generation of plant Annual renewable energy generation Annual GHG emissions reduced/avoided	MW MWh or GWh Tonnes CO_2e	Y Y Y	Emission factor for electricity: European mainland mix including Norway, 380g CO_2 per kWh (or detailed approach), see apendix B. Emission factor for district heating: Swedish issuers may apply 158 g CO_2 per kWh, see Appendix C.	1. Reporting on expected impact, with actual impact as an ambition 2. Reporting annual impact 3. Reporting annually 4. Quantitative and qualitative reporting 5. Focusing on environmental impact 6. Project-by-project or portfolio basis 7. Reporting the share financed 8. Reporting impact in relation to invested monetary unit 9. Reporting impact on bond-by-bond or bond-programme basis 10. Considering climate-related physical risk 11. Considering the Sustainable Development Goals (SDGs) 12. Scope 1 and 2 are mandatory to report and Scope 3 is voluntary.
Energy efficiency GBP category for reference: Energy efficiency	• Retrofitting of existing buildings or installations • Smart technology aimed at reducing energy consumption	#26	Annual energy reduced/avoided (electricity and other energy savings) Reduction in energy use Annual GHG emissions reduced/avoided	MWh or GWh Percentage Tonnes CO_2e	Y Y Y		
Green buildings GBP category for reference: Green Buildings	New or retrofitted buildings satisfying the issuer's energy and /or building standard requirements	#25	Energy avoided below national building standards Annual energy avoided compared to the relevant building code (for new buildings) Annual energy reduced compared to the pre-investment situation (for refurbishments) Annual energy production on-site Annual GHG emissions reduced/avoided	kWh/m^2, or percentage (%) MWh or GWh MWh or GWh MWh or GWh Tonnes CO_2e	 Y Y Y	National building codes or standards National building codes or standards	
Clean transportation GBP Category for reference: Clean transportation	• Non-fossil public transportation systems • Infrastructure for bicycles and pedestriants • Infrastructure for electric vehicles	#27	Annual GHG emissions reduced/avoided, from cars and other vehicles, due to the investment Number of km of new train lines, bicycle lanes etc. created Passenger-kilometres in new means of transportation Estimated reduction in car use and car kilometres the project will replace Project's effect on increased resilience to climate change	Tonnes CO_2e Km Km Km	Y	Average emissions by km for alternative transportation. N/A	
Waste management GBP category for reference: Pollution prevention and control	• Energy efficient and resource-preserving waste treatment • Biogas production from organic waste	#28	Reduced/avoided GHG emissions as a result of the investment (See also Appendix C) Amount or share of waste that is prevented, minimised, reused or recycled before and after the project Amount of waste that is separated and/or collected and treated (including composted) or disposed of Number of tonnes processed in the facility Material recovery rate Expected imiprovement in material recovery rate or other target for improved resource use Number of households delivering to the facility Energy produced (in case of biogas/waste-to-energy plant) Energy saving attributable to the investment Project's effect on increased resilience to climate change	Tonnes CO_2e Tonnes, Percentage (of total waste) Tonnes, Percentage (of total waste) Metric tonnes Percent Percent Number of households kWh/MWh/GWh kWh/MWh/GWh Tonnes CO_2e		N/A	
Water and wastewater management GBP category for reference: Pollution prevention and control	• Energy-/ emission efficient water and wastewater management • Biogas production from wastewater	#29	Annual water savings Annual volume of wastewater treated or avoided Capacity of plants being built Number of metres of piping/conduit laid, upgraded, replaced Number of person equivalents (PE) of water or wastewater the plant processes, identifying any increase that can be attributed to the investment Reduction of emissions into the local environment (nitrogen and phosphorous, Biochemical Oxygen Demand, etc) Amount of electricity, biogas or other energy carrier produced annually expected to be produced each year, if relevant. Include avoided CO_2 emissions Health metrics (such as air and water quality) Biological metrics: biological diversity, wildlife Project's effect on increased resilience to climate change	m^3 m^3 m^3 or litres/m^3 per minute/hour/day or year Metres Number of people or PE Kilos/tonnes or litres/m^3 kWH or MWh, tonnes Co2e		N/A	
Sustainable land use / environmental management GBP categories for reference: Terrestrial and aquatic biodiversity conservation; Environmentally sustainable management of living natural resources and land use	• Biodiversity conservation • Reforestation • Restoration of wetlands	#30	A number of qualitative and quantitative indicators may be relevant, see section #28 Number of species Number of individuals in target population Area reforested or converted Area of habitat or wetland restored	 Number Number m^2 or hectares m^2 or hectares		N/A	
Climate change adaptation GBP category for reference: Climate change adaptation	Climate change adaptation measures such as: • Heat protection • Storm protection • Systems for enhanced resilience • Water management systems (to prevent or mitigate flooding)	#31	A number of qualitative and quantitative indicators may be relevant, see section #29 Areas protected (such as building fasades) or number of heat shields etc Areas protected (building fasades or land such as school yards, hospital facilities, city centres) Capacity of system or area covered	 m^2 or number of items m^2 or number of items m^3 or drainage areas covered in km^2 or hectares		N/A