



City of
Gothenburg

Green Bond IMPACT REPORT 2017



Foto: Lo Birgersson



“As the first city in the world, the City of Gothenburg issued a green bond in fall 2013. Interest in these green investments has been strong and continues to grow. In 2017 the city’s fifth green bond was issued.”

City of Gothenburg- sustainable city open to the world

Gothenburg is a port city with a strategic location between Oslo and Copenhagen. It has a population of around 564,000 (2017) and is Sweden’s second largest city. Gothenburg is the core and growth engine of the Gothenburg region and Region Västra Götaland. It is home to a variety of strong industries and Scandinavia’s largest port.

A green, interconnected, open, vibrant city where it’s easy for people to move about, be visible and meet up. A city where there’s also room for flora and fauna, and eco-system services. A city we can pass on to future generations with pride.

Ecological sustainability means we must not exhaust and/or destroy the climate and environment. Social sustainability means that society should exist for, and work for, all individuals. That no one is excluded on grounds of gender, ethnicity, sexuality, faith, disability or anything else. In a socially sustainable city, everyone must be included. Economic sustainability refers to a dynamic business sector with room for businesses of all shapes and sizes.

Gothenburg was in 2013 the first city in the world to issue green bonds to finance sustainability projects. Since, London, Paris and Johannesburg amongst others have followed in Gothenburg’s footsteps. In 2016 the city was awarded the United Nation’s climate award Momentum for Change. Other awards to Gothenburg recently include Fairtrade City, Access City Award 2014 and Sweden’s climate city 2015. Gothenburg also took 1st place in the Global destination sustainability index (visitor’s industry).

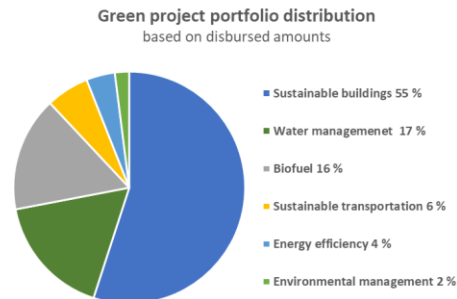
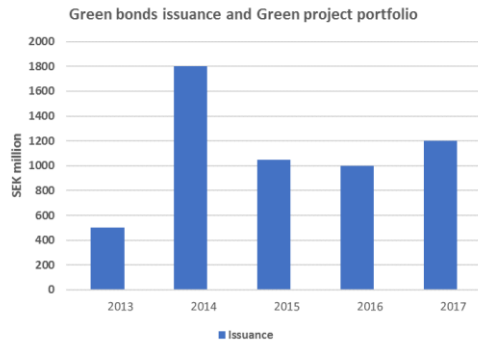


Photo: Peter Svenson

City of Gothenburg 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.



Executive Summary, as of 31 Dec 2017



CO2 impact and Green indicators, based on outstanding disbursed amounts*			
Project category	GHG emissions reduced/avoided, tonnes CO2e/year	Outstanding disbursed amounts to projects, SEK mn	Impact, tonnes CO2e per SEK mn
Sustainable buildings	1354	1359	1,00
Water management	n/a	-	-
Biofuel	1435	920	1,56
Sustainable transportation	413	340	1,21
Energy efficiency	1100	134	8,21
Environmental management	n/a	-	-
Total	4302	2753	
Disbursed amounts with CO2 impact, SEKm			1,6 tCO2e/SEKm p.a.
Annual renewable energy generation, GWh			7,25 GWh p.a.
Annual energy reduced/avoided, MWh			4074 MWh p.a.

* 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. For information on additional project impact, see page 12-14

Impact attributable to green bond investors*	97%
* Total outstanding green bonds divided by total outstanding disbursed amounts to projects (in SEK)	
Whereof impact attributable to Green Bond SEK 250 mn maturing 3 October, 2019	4,4%
Whereof impact attributable to Green Bond SEK 250 mn maturing 3 October, 2019	4,4%
Whereof Impact attributable to Green Bond SEK 1500 mn, maturing 3 June, 2020	26%
Whereof Impact attributable to Green Bond SEK 300 mn, maturing 3 June, 2020	5,3%
Whereof Impact attributable to Green Bond SEK 1050 mn, maturing 3 June, 2021	18%
Whereof Impact attributable to Green Bond SEK 1000 mn, maturing 15 June, 2022	18%
Whereof Impact attributable to Green Bond SEK 1200 mn, maturing 14 June, 2023	21%

Key procedural aspects

- The City of Gothenburg's Green Project portfolio exclusively consists of loans to the administration and companies within the municipality.
- Each loan is selected according to the Green Bonds framework available at <http://finans.goteborg.se/en/greenbonds/green-bond-framework/>
- The City of Gothenburg reports on a portfolio basis, and in Swedish kronor (SEK)
- For this document, the reporting period ends on 31 December 2017

United Nations global goals for sustainable development

All the 17 global sustainable goals are relevant to the City of Gothenburg, but not all the 169 targets. The city has local goals and strategic documents that address the most important areas in the relevant targets. In the case of the project financed by the green bonds they primarily address goal: 3 Good health and well-being, 4 Quality education, 6 Clean water and sanitation, 7 Affordable and clean energy, 9 Industry, innovation and infrastructure, 11 Sustainable cities and communities, 13 Climate action and 14 Life below water.



City of Gothenburg’s Green projects

The City of Gothenburg’s Green Bond eligible projects promote the transition to a low-carbon and climate resilient society. Some project examples include:

Denitrification at the regional sewage treatment plant Ryaverket, Gryaab AB



Photo: Emelie Asplund

The nutrient nitrogen is of great importance for the eutrophication of the North Sea. Gryaab AB has invested in an expansion of existing denitrification facilities. The nitrogen removal is done in

two steps. In the first step transforms bacteria ammonium into nitrate and in the other nitrate to nitrogen gas. The nitrogen then ends up in the air rather than the sea. The new extension will increase capacity in the first stage.

The energy efficient preschool "Krumeluren"



Photo: Lo Birgersson

This is an example of one of new preschools built by the City Premises Administration. They only build energy efficient buildings and often in line with passive house standard. In addition, they make very high demands on the energy performance of the components that affect the energy consumption, such as energy saving light and energy-efficient appliances. As children are more sensitive to exposure to hazardous materials there are no plastic carpets with hormone-altering plasticizers and no materials with high emissions. Several projects also have green roofs to add more green in the urban environment, reduce storm water flows, creating better microclimate and promote noise reduction.

Sketch of pump station, Kodammarna



The purpose of the investment is to secure the operation of Kodammarna pump station and reduce the overflow to the river Göta älv. The pump station drains sewage from 160,000 people, and it is crucial that it is in continuous operation. The pump station will be more energy efficient and measures to adapt the station to higher water levels will be made. The roof is prepared for installation of solar panels. The work is expected to be completed in 2022.

Green Bond Issuances

Since October 3, 2013, the City of Gothenburg has issued Green Bonds on five occasions raising a total of SEK 5 550 million of funding supporting the transition to a low-carbon and climate resilient society. At the time of publication approximately 14 percent of the city’s debt consists of Green Bonds.

The City of Gothenburg’s responsibilities, including its climate and environmental work, spans many different areas. This diversity is reflected in the city's portfolio of Green Bond eligible projects. In accordance with the city’s extensive and ambitious Environmental and Climate Programs the Green Bonds are emitted, aimed at financing projects in fields such as renewable energy, energy efficiency, public transportation, waste management and sustainable housing.

On June 14th, 2017 the city issued its fifth green bond and the transaction amounted to SEK 1,2 billion. The funds from the Green Bonds are earmarked and dedicated to finance green projects defined within the city's framework for green bonds. The interest from the market has been strong.

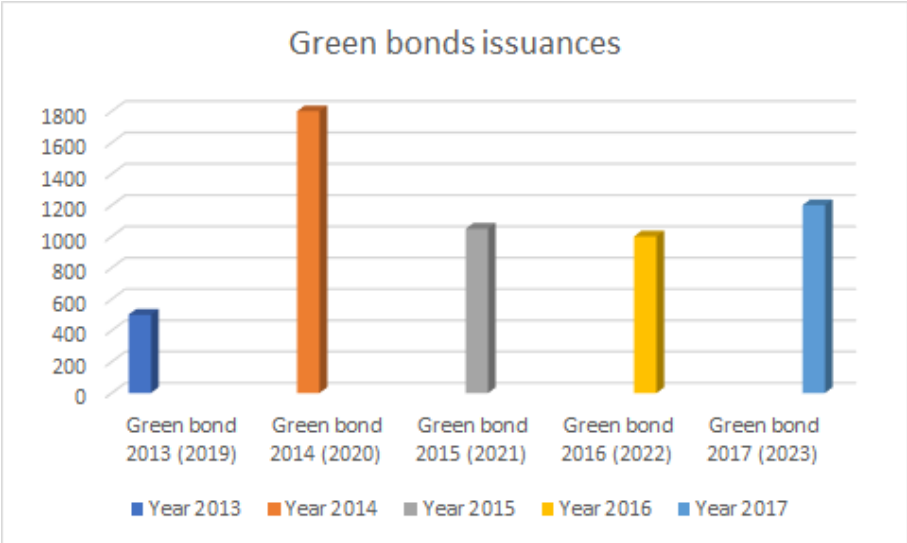


Chart: Yearly bonds issuance

<i>SEK (bn)</i>	<i>Share of total outstanding green bonds (5 550)</i>	<i>Issuance</i>	<i>Maturity</i>	<i>XS no</i>
0,25	4,5 %	13-10-03	19-10-03	XS0976165828
0,25	4,5 %	13-10-03	19-10-03	XS0976166719
1,5	27 %	14-06-03	20-06-03	XS1073521988
0,3	5,4 %	14-06-03	20-06-03	XS1073488675
1,05	19 %	15-06-30	21-06-03	XS1253847815
1	18 %	16-06-15	22-06-15	XS1433082861
1,2	22 %	17-06-14	23-06-14	XS1627778316

Table: Outstanding green bonds

High credit ratings

City of Gothenburg continues to receive high credit ratings for the green bonds, GB1 from Moody's (excellent, the highest rating possible) and E2 from Standard and Poor's (the second highest rating).



The city's rigorous review and decisionmaking process, second party review, methods and criteria for calculating



performance against targeted environmental results, audit by external party and ongoing annual reporting of all bonds is among other factors highlighted by Moody's.

Standard and Poor's underline the city's transparent reporting, the use of a variety of key performance indicators for selected projects, transparency of project impact and special accounts for greens funds as being of substantial weight when assessing the rating.



E1	E2	E3	E4
100	67		0

Please read more at: <http://finans.goteborg.se>

Second opinion

On March 12 2015, CICERO, an independent research institute at the University of Oslo, issued a second opinion regarding the city's framework for green bonds. In the evaluation published by CICERO it is concluded that the City of Gothenburg is taking important steps to reduce the city's carbon and environmental footprint. The city's framework and supporting environmental policies are described as transparent, comprehensive, long-term



and robust. CICERO's previous evaluation of the city's work with green bonds was published in July 2013. Please read more at: (<http://finans.goteborg.se/greenbonds/second-opinion/>)

Position paper on Green Bonds Impact Reporting

City of Gothenburg released together with a group of ten Nordic public-sector issuers a joint position paper on green bonds impact reporting. The position paper was launched at the OECD Green Investment Financing Forum in Paris on 24 October 2017.

The paper proposes an outline for reporting environmental benefits of green bond investments. It provides guidance on general matters such as to report on actual impact when feasible, to distinguish between reduced and avoided emissions, and to report impact in relation to the share financed by green bonds. The paper also recommends issuers to report impact in relation to amounts disbursed and outstanding, as opposed to amounts committed.



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

Key financial aspects

- Reporting the shared finance
- Reporting impact in relation to invested monetary unit

Key environmental aspects

- Reporting environmental impact
- CO2-baseline for electricity
- Baseline CO2-emission calculation for district heating
- Use national building standards as baseline for measuring impact of green buildings

Key procedural aspects

- Annual reporting

The objective of green bonds impact reporting is to provide transparent insight into the environmental performance of projects financed through green bonds. The 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.

The following principles and guidelines have been considered when creating this impact report:

- The Green Bond Principles (March 2015)
- Green Bonds Harmonized Framework for Impact Reporting (December 2015)
- Investor Network on Climate Risk: Statement of Investor Expectations for the Green Bond Market (February 2015)
- Position paper on green bonds impact reporting (2017, see further below)

The City of Gothenburg is continuously working on developing and improving the methods of reporting the climate and environmental impacts of its Green Bond eligible projects to its investors. The City is also actively contributing to harmonization efforts regarding impact reporting of green bonds.

Green Bond eligible projects

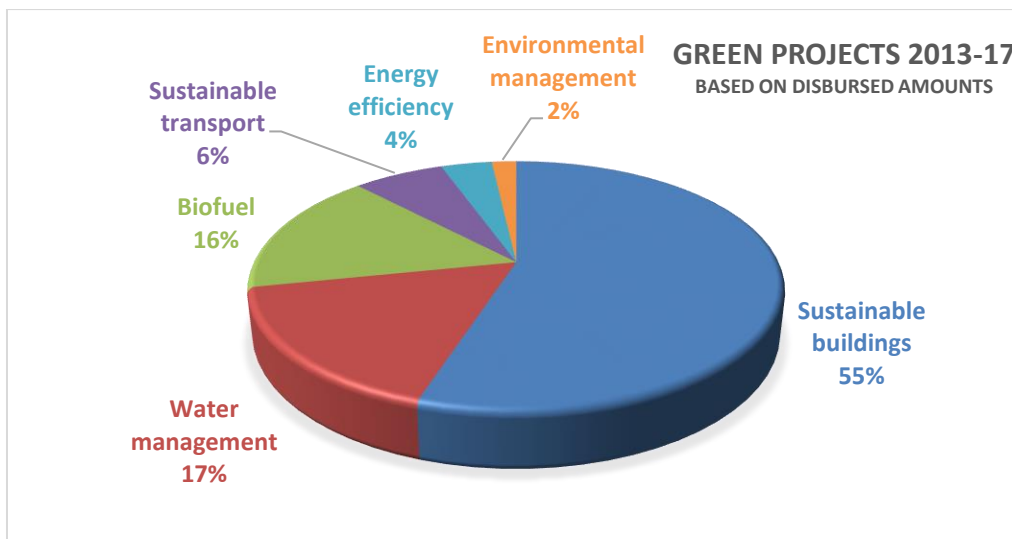
The proceeds from the Green Bonds are used to finance projects defined within the city's framework for green bonds. Eligible projects can be fully or partially funded by the city. Eligible Projects may include projects that target:

Mitigation	Adaption	Environment
Mitigation of climate change, including investments in low-carbon and clean technologies, such as energy efficiency and renewable energy programs and projects.	Adaptation to climate change, including investments in climate-resilient growth	To a smaller extent (max 20%), projects which are related to a sustainable environment rather than directly climate related can be included.

The framework established by the City of Gothenburg constitutes the basis for city's work with green bonds. In 2015, the requirements for projects financed within the framework for green bonds were specified even further. This was done to assure that there are clear and concrete requirements placed upon the projects. Projects within the following sectors are included within the framework. If a project covers multiple sectors, the project is included in the main sector only, but target results will include all components of the project.

Sectors
Renewable energy (solar, wind, wave, bio, waste and hydro)
Energy efficiency
Waste management
Water management
Biofuel
Smart grids
Sustainable transportation (e.g. public transport, cycle and shipping infrastructure)
Sustainable housing (e.g. infrastructure and construction)
Environmental (max 20%) <ul style="list-style-type: none"> • Biodiversity • Water clearing facilities • Air pollution • Chemicals

Use of proceeds are allocated by sectors as shown in chart below.

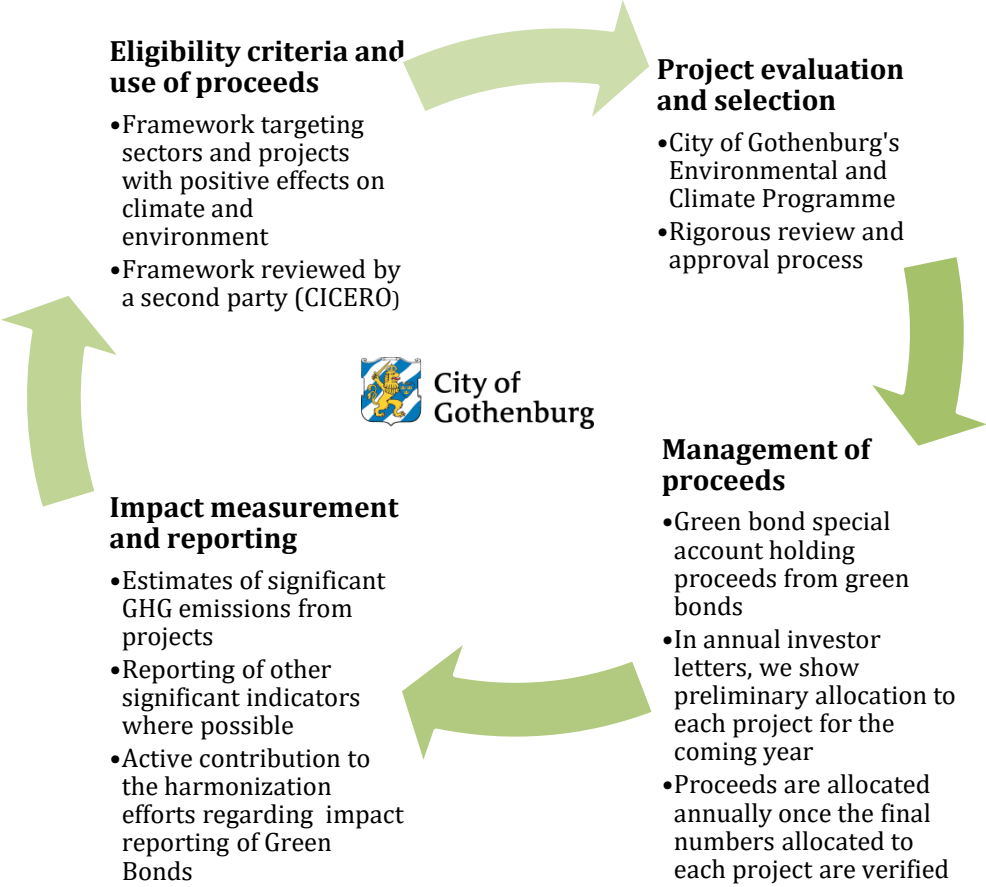


Selection process

To identify Green Bond eligible projects, a rigorous review and approval process is in place to ensure that the projects are in line with the city's framework for green bonds and thus targeting mitigation of and adaptation to the effects of climate change and other important environmental aspects. In the City of Gothenburg experts regarding climate change and environmental work as well as financial expertise are involved in the selection process ensuring both green and secure investments.

Following dialogue with administrations and municipal companies within the city, the City Executive Office selects projects in accordance with the city's Environmental and Climate

Programs and the city's framework for Green Bonds. The city's Environment Department provides environmental expertise and verifies the selections made by the City Executive Office. The City Executive Office then presents the final selection of projects eligible for funding with green bonds to the City Executive Board.



Reporting approach and how to interpret the results

The City of Gothenburg is committed to transparent reporting of the projects financed within the city's framework for green bonds. The purpose of this impact report is to provide a more detailed understanding of the climate and environmental impacts that can be expected or are projected to result from the Green Bond eligible projects. Gothenburg has been a progressive stakeholder of developing the green bond market and investor reporting as an important part of that process. The city aims to follow all the key aspects of the Position Paper from the Nordic Public sector but it will be a continuing process and this year's report is one important step in that direction.

Estimations of impact indicators and projections of impacts are based on certain assumptions. The City of Gothenburg aims to make sound and conservative assumptions that are reasonably based on information available at the time. However, actual environmental impacts of projects may diverge from initial projections. Examples of this can be changes in law requirements, baseline conditions, behavior and slow start-up periods. Because of this, calculation methods and baseline assumptions may vary.

1. Renewable energy, energy efficiency, GHG reduction focused projects

Impacts and allocated amounts

Name of Project	Administration/ Municipal company	Project start	Adaption/ Mitigation/ Environment	Sector	UN global goals	Annual energy savings MWh	Annual energy produced MWh	Renewable capacity added MW	Annual GHG emissions avoided tons of CO2 eq.	Project	Allocated amounts (msek)
GoBiGas	Göteborg Energi AB	2013	M	Biofuel	7	n/a	7250	160 000	1435	<ul style="list-style-type: none"> Due to Göteborg Energi's decision to discontinue its operations in GoBiGas, the 920 MSEK invested through green bonds will in 2018 be reallocated to other green loan-financed projects. 	920 ¹
Electric cars	Gatubolaget AB	2013	M	Sustainable transportation	11	n/a	n/a	n/a	182	<ul style="list-style-type: none"> 246 electric cars in the city carpool 85 new cars in 2017 346 tons of CO2 eqv saved, Swedish energy mix 	79
Celsius	Göteborg Energi AB	2014	M	Energy efficiency	9, 11	1015	n/a	n/a	386	<ul style="list-style-type: none"> District heating to ship and to white gods. Better air quality (ship) Less noise (ship) Project promotes the use and optimization of district heating technology in Europe 	5
Traffic lights energy efficiency	Road Traffic administration	2015	M	Energy efficiency	9, 11	1 720	n/a	n/a	714	<ul style="list-style-type: none"> Replacements of ineffective fittings have resulted in energy savings of over 60 %. 	129
Sustainable buildings	City premises administration	2014	M	Sustainable housing	11	30 %	n/a	n/a	- ²	<ul style="list-style-type: none"> Portfolio of new, energy efficient preschools, schools and retirement homes. Less than 60 kWh/kvm The buildings use green electricity 	1 782

Sustainable housing	Förvaltnings AB Framtiden	2015	M	Sustainable housing	11	1354 ³	n/a	n/a	234* ⁴	<ul style="list-style-type: none"> • Portfolio of new, energy efficient apartment buildings. • The buildings use green electricity from wind and water 	1 359
Trams	Göteborgs kommunleasing AB/Road Traffic administration		M	Sustainable transportation	9, 11	72	n/a	n/a	27*	<ul style="list-style-type: none"> • The ordered new trams are more energy efficient and can load more passengers. • Calculated to be 30 % more energy efficient. • Less noise 	261

* Projected results

na = Not applicable

- = No information

1. About 20% national financing not included here.

2. Will be updated later.

3. Electricity and district heating

4. Impact from some projects still unaccounted for.

2. Other categories
Impacts and allocated amounts

Name of Project	Administration/ company	Project start	Adaption/ Mitigation/ Environment	Sector	UN global goals	Project	Allocated amounts (msek)
Ultrafilter	Department of sustainable waste and water	2013	A	Water management	3	<ul style="list-style-type: none"> • Making the production of drinking water more resilient to climate change. • Prevented sick days which also entails lower social costs. 	570
Denitrification	Gryaab	2014	E	Environment	6, 14	<ul style="list-style-type: none"> • Expansion of a water treatment plant to reach a higher denitrification rate. • Estimated reduction of nitrogen emissions is 700 tonnes/year 	353
Tree planting	Parks and landscape administration	2014	E (A/M)	Environment	11	<ul style="list-style-type: none"> • Trees are planted in the city annually. • The project improves biodiversity, promotes a green cityscape and has a positive effect on urban air quality. 	25
The Pedestrian City	Road traffic administration	2015	M	Sustainable transportation	9	<ul style="list-style-type: none"> • Improved conditions for pedestrians traveling in urban areas • Examples include: improved traffic security and accessibility for pedestrians traveling in the city 	77
The Bicycle City	Road traffic administration	2015	M	Sustainable transportation	9, 11	<ul style="list-style-type: none"> • Project includes several improvements to the city's bicycle infrastructure 	116
Sewage pump station, Kodammarna	Eco-cycle and water administration	2017	M/A/E	Water Management	6	<ul style="list-style-type: none"> • Decrease energy consumption by 30 % approx 0,5 GW/year. * • Decrease the overflow of sewage to the river Göta älv. * • Making the plant resilient to climate change, higher water levels. * • Possible to install solar cells on the roof. * 	34

*Projected results

Collected data and baselines

Electricity: 380 g CO₂/kWh (Position paper on Green Bonds Impact Reporting)

District heating: 53 g CO₂ ekv/kWh (Environmental values for district heating delivered 2017, Göteborg Energi AB,

https://www.goteborgenergi.se/Foretag/Fjarrvarme_kyla/Varfor_fjarrvarme)

Cars: Baseline emission 150 g CO₂/km

<https://www.anskaffelser.no/verktoy/effektkalkulator-varebiler>), milage per car average 10000 km/year and 0,2 kWh/km

Biogas: 74 % reduction of CO₂ from transportation,

<http://www.energigas.se/publikationer/haallbarhetskriterier-foer-biodrivmedel/>