



# **Kommuninvest Green Bonds Impact Report, December 2019**



KOMMUNINVEST

## Report on 329 Swedish local government investment projects financed by Kommuninvest Green Bonds as of year-end 2019

At 31 December 2019, Kommuninvest had disbursed a total of SEK 40.3 (25.8) billion, equivalent to USD 4.3/EUR 3.9 billion, in Green Loans to investment projects aligned with our Green Bond Framework.

This report presents the expected impacts of these projects, the governance process to verify and select them and the impact reporting methodology we apply. Unless otherwise indicated, the reported impact is Scope 1 and 2 according to the Greenhouse Gas Protocol. Impact is reported for the aggregated portfolio of eligible assets as of 31 December 2019.

### GREEN LOANS

**40.3**  
SEK bn

Green Loan Ratio<sup>1</sup>:

**9.9 %**

### GREEN BONDS

**36.6**  
SEK bn

Green Bond Ratio<sup>2</sup>:

**8.1 %**

Annual greenhouse gas (GHG) emissions savings

**610,596** tCO<sub>2</sub>

**572,901 tCO<sub>2</sub>**  
avoided annual emissions<sup>3</sup>

**37,695 tCO<sub>2</sub>**  
reduced annual emissions<sup>4</sup>

**17.8**  
tCO<sub>2</sub> per SEK mn

Impact, tonnes CO<sub>2</sub>e per SEK mn  
(relevant to 85 % of Green  
Loan disbursements)

**349,727**

Increase in person equivalents (p.e.)  
supplied by water and wastewater  
facilities (reported share). Total p.e.  
supplied by projects: 1,030,686

**110.8** GWh

Energy savings from  
energy efficiency projects

Energy savings in green buildings

**40.5** GWh

Whereof avoided energy use<sup>3</sup>  
**33.6 GWh**

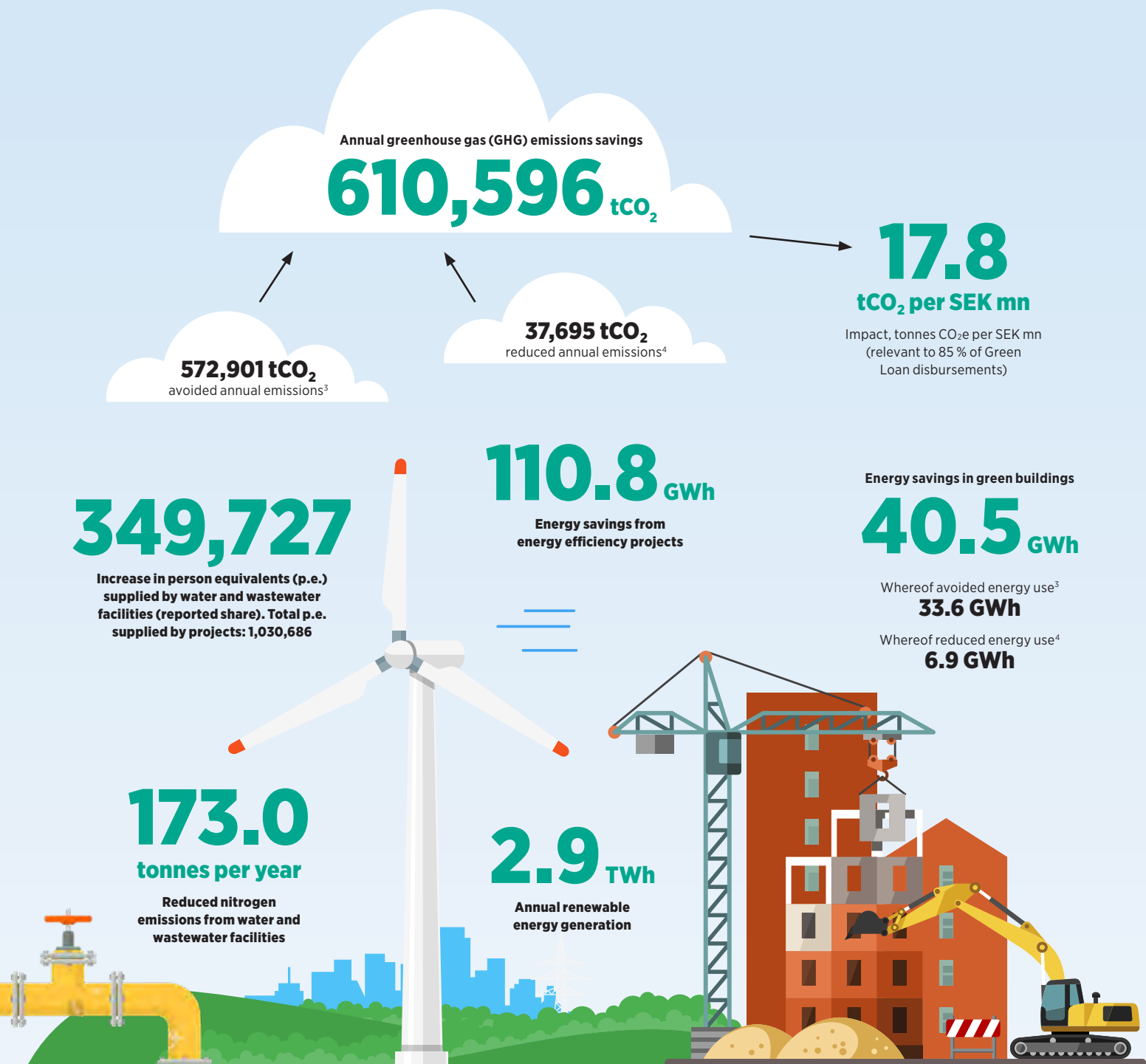
Whereof reduced energy use<sup>4</sup>  
**6.9 GWh**

**173.0**  
tonnes per year

Reduced nitrogen  
emissions from water and  
wastewater facilities

**2.9** TWh

Annual renewable  
energy generation



1) Total amount of Green Loans divided by total loan portfolio.

2) Total amount of Green Bonds outstanding divided by total amount of debt outstanding.

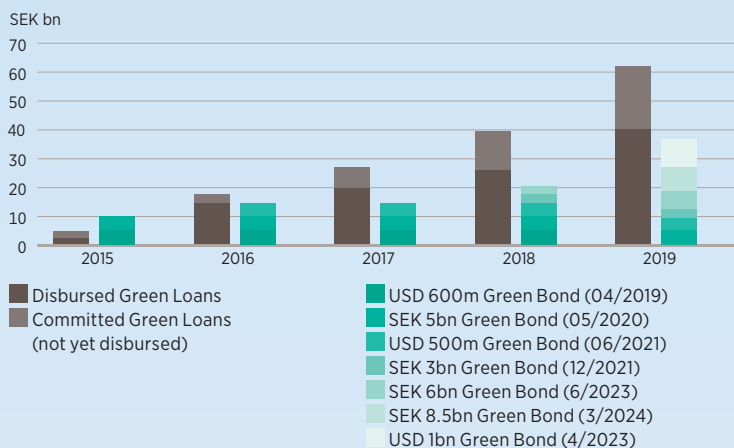
3) Refers to a baseline/alternative reference scenario.

4) Refers to a direct or absolute reduction in operation.

# Executive Summary

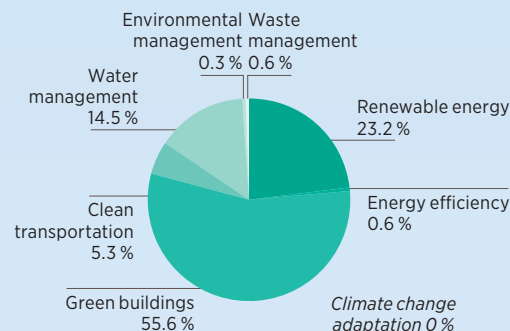
AS OF 31 DEC 2019

## GREEN BONDS ISSUANCE AND GREEN PROJECT PORTFOLIO



## GREEN PROJECT PORTFOLIO DISTRIBUTION

based on disbursed amounts



## CO<sub>2</sub> IMPACT AND GREEN INDICATORS

based on outstanding disbursed amounts<sup>1</sup>

Project category	GHG emissions reduced/ avoided, tonnes CO <sub>2</sub> e/year	Outstanding disbursed amounts to projects, SEK mn	Impact, tonnes CO <sub>2</sub> e per SEK mn
Renewable energy	566,161	9,330	61
Green buildings	6,045	22,376	0
Energy efficiency	26,409	235	112
Clean transportation	10,501	2,121	5
Waste management	1,479	229	6
Water management	n/a	5,848	n/a
Climate change adaptation	n/a	16	n/a
Environmental management	n/a	129	n/a
<b>Total</b>	<b>610,596</b>	<b>40,283</b>	<b>n/a</b>
<b>Disbursed amounts with CO<sub>2</sub> impact</b>		<b>34,291</b>	
<b>Impact, tonnes CO<sub>2</sub>e per SEK mn</b>			<b>17.8</b>
<b>Annual renewable energy generation, GWh</b>		<b>2,903,322 MWh p.a.</b>	
<b>Annual energy reduced/avoided, MWh</b>		<b>151 389 MWh p.a.</b>	

<sup>1</sup>) This table presents the calculated impact in terms of CO<sub>2</sub> reduced or avoided. Aggregated project data reported represent both ex-ante estimates and ex-post outcomes. Reporting methodology presented on pages 41-49. The complete project-by-project-reporting is available in spreadsheet format at [kommuninvest.se](http://kommuninvest.se) ==> For investors ==> Green Bonds ==> Impact Reporting.

### Impact attributable to green bond investors<sup>1</sup>

Whereof impact attributable to Green Bond 5bn, maturing 5 May, 2020	12%
Whereof impact attributable to Green Bond USD 500m, maturing 1 June, 2021	11%
Whereof impact attributable to Green Bond SEK 3bn, maturing 15 December, 2021	7%
Whereof impact attributable to Green Bond USD 1bn, maturing 24 April, 2023	24%
Whereof impact attributable to Green Bond SEK 3 bn, maturing 1 June, 2023	7%
Whereof impact attributable to Green Bond SEK 8,5bn, maturing 27 Mars, 2024	21%

<sup>1</sup>) Total amount of outstanding green bonds divided by total outstanding disbursed amounts to projects (in SEK).

### Basic information

Green Bond Frameworks applied	Report comprises projects financed under GB frameworks dated March 2018, January 2016 and May 2015
Related Green Bond ISIN(s)	XS1383831648 (RegS) / US50046PAU93 (144A); XS1508534861; XS1618289802 (RegS) / US50049GAB86 (144A); XS1897258098; XS1814404577
External verifier of allocation report	KPMG
Reporting period	Reporting for calendar year 2019. Comprises all eligible projects financed from GB programme start in 2015 until year-end 2019.
Report publication date	March 30, 2020
Frequency of reporting	Annual
Next reporting planned for	March/April 2021
Reporting approach	Portfolio-based and project-by-project reporting

### KEY FACTS

- The Green Project Portfolio consists of Green Loans to Swedish municipalities and regions. Each Green Loan is selected according to the Kommuninvest Green Bonds Framework (see pages 16-18). The complete framework is available online.
- Kommuninvest reports on a portfolio basis in Swedish kronor (SEK). F/X rate as per the date of Green Bonds issuance.
- Kommuninvest reports impact based on the share of the project's total investment cost financed with Green Bonds. Impacts are based on outstanding disbursed amounts to projects (net of redemptions).
- Reporting is undertaken in accordance with recommendations outlined in the *Nordic Public Sector Issuers: Position Paper on Green Bonds Impact Reporting*.



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## About Kommuninvest

Kommuninvest is a Swedish municipal cooperation set up in 1986 to provide cost-efficient and sustainable financing for local government investments in housing, infrastructure, schools, hospitals etc. The cooperation comprises 290 out of Sweden's 310 local governments, of which 278 municipalities and 12 county councils/regions. Kommuninvest is the largest lender to the Swedish local government sector and the sixth largest credit institution in Sweden. At year-end 2019, total assets were SEK 471 billion (USD 50.6 billion<sup>1</sup>), with a loan portfolio of SEK 408 billion (USD 43.8 billion). The head office is located in Örebro.

<sup>1</sup>) USD/SEK=9.3171 as of 31 Dec, 2019

## About this report

This report was written and compiled by:  
• **Björn Bergstrand**, Head of Sustainability  
• **Jens Enocsson**, Sustainability Analyst  
• **Erik Törnblom**, Analyst

Any errors, omissions or otherwise are our responsibility. Project impact reporting is based on data collected from financed projects during Q1-2020. The data has been reviewed by Kommuninvest however their accuracy has not been verified by neither Kommuninvest nor a third party. Climate impact calculations have been made by Kommuninvest, and their accuracy has not been verified by a third party. The information has been reviewed and approved for publication by the Kommuninvest Environmental Committee, whose members are presented on page 18.

# Green finance

## Building resilience

**Preparing societies for the increased risks posed by climate change and other externalities is more important than ever. Green bonds may play a critical role in the transition.**

IN 2020, KOMMUNINVEST celebrates the five-year anniversary of its Green Bonds and Green Loans Programme, which has been well received by Kommuninvest members and clients. In 2019 alone, approved lending to finance green investments in cities and regions grew by 60 percent. Some 330 green investment projects across Sweden are now financed with Green Loans, resulting as this report shows in significant benefits to the environment and to the climate. This is of course much needed.

It is imperative that green investments are multiplied at all levels of society, and that such investments are facilitated by a supportive regulatory framework. As has been shown during 2019, with the EU Action Plan on Financing Sustainable Growth as a shining example, it seems we are moving closer to the day when investments aligned with planetary needs are the norm. Green bonds have a potentially critical role to play in the transition.

Kommuninvest has decided to take an active role in market development, seeking to contribute where relevant to promote credibility in market practices.



The Kommuninvest Green Bonds Environmental Committee: Susanne Arneborg, Municipality of Borås; Patrik Stenman, Kommuninvest; Marta Fallgren, Region Uppsala; Björn Söderlundh, Kommuninvest; Ann Sörman, Kommuninvest; Andreas Hagnell, Swedish Association of Local Authorities and Regions; Hanna Ryman, Municipality of Örebro; Lisa Järner, City of Mölndal.

As the coordinator of the Nordic co-operation on impact reporting, Kommuninvest has been involved in bringing the Nordic Position Paper on Green Bonds Impact Reporting to market. Kommuninvest is also engaged in a Swedish collaborative endeavor seeking to foster increased use of life cycle analysis in property construction.

As an independent committee assigned with specific duties in relation to the governance of the Programme, we are pleased to see that Kommuninvest for this year's report has evolved its analysis of water-related projects. The results, presented on pages 19 and 37, highlight the wide range of green benefits associated with these types of projects. It also signals Kommuninvest's

ambition to provide robust, conservative and comprehensive impact reporting.

Again, we want to thank green bond investors for your continued support of the green transition in Swedish local governments. First and foremost, it is the strong demand for funding green investments at the local level which has resulted in Programme growth. This has enabled the issuance of nine Green Bonds since inception and the Green Loan Ratio to grow to 10 percent at year-end 2019. In the process, Kommuninvest has become Sweden's largest issuer of Green Bonds.

We welcome your feedback, please send an e-mail to [sustainability@kommuninvest.se](mailto:sustainability@kommuninvest.se)



# The role of Swedish local governments

**Sweden aims to be one of the world's first fossil fuel-free welfare nations, and a leading contributor to implementing the global Sustainable Development Goals. Sweden's cities and regions play a key role.**

**WHILE THE GREEN CHALLENGES** are often global, the solutions are usually local and regional. It is at the local and regional level that global commitments must be put into practical action.

Swedish municipalities and regions are responsible for many of the welfare services Swedish citizens encounter daily, including education, childcare, healthcare, water management, waste management, local transport, etc. They are thus responsible for many of the decisions and actions needed to implement the 2030 Agenda for Sustainable Development (the SDGs).

By 2030, Sweden aims to have reduced its carbon emissions by 63 percent compared with 1990; by 2045 Sweden should have no net emissions of greenhouse gases into the atmosphere.

Sweden's environmental policy objective is to hand over to the next generation a society in which our country's major environmental challenges have been solved, without increasing negative environmental and health effects outside Sweden.

The municipalities and regions are strongly committed to work with green and other sustainability objectives. Almost half use the SDGs as a tool in their work. More than 90 percent of the municipalities have set out own environmental targets or adopted national or regional goals.

Incorporating the SDGs into existing structures is now underway in municipalities and regions throughout Sweden. Surveys by the Swedish Association of Local Authorities and Regions demon-

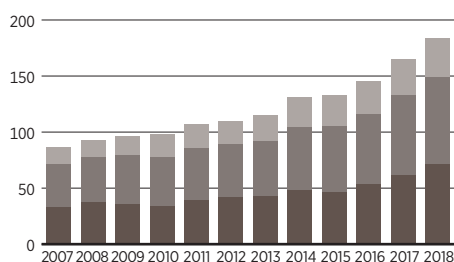
strate that the SDGs are incorporated into multi-annual plans and budgets and that the work has been anchored, among other things, through workshops with young people, business, civil society, municipal management and employees.

In March 2019, the Swedish Delegation for the 2030 Agenda presented its proposals and assessments for Sweden's continued implementation of the SDGs. The Delegation concluded that Sweden has a favorable starting point but also faces challenges.

One priority is for municipalities and regions to place high demands on sustainability in procurement. This is important, given the size of the municipal sector in Sweden and its investments.

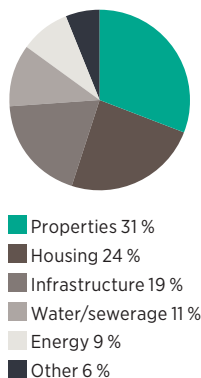
## Local government investment volumes, total

SEK bn

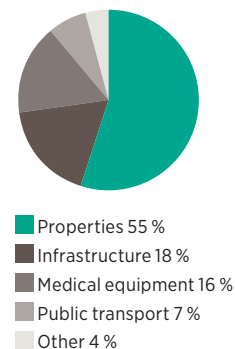


■ Municipalities  
■ Municipal companies  
■ County councils/regions and their companies

## Municipal investments, distribution (2018)



## Regional investments, distribution (2018)





## Green hospitals Achieving efficiency through multifaceted approach

Green Loans are funding the construction of new highly energy-efficient hospital buildings across Sweden. In many cases, the new buildings consume less than half of the stipulated energy performance requirements. This is often accomplished through a multifaceted approach that addresses the building envelopes, the building automation systems as well as the heating and cooling systems.

For example, at project #729, the new psychiatric ward at the Norrland University Hospital (pictured), 44 boreholes will be used to

provide the house with both heating and cooling, and solar water heaters are installed on the roof. At the Nyköping Hospital, projects #399 and #659, the geothermal energy layer comprises 48 boreholes.

Other solutions include sedum roofs, to limit the load on stormwater systems in case of heavy rainfall, and solar rooftop installations, to reduce electricity demand from the grid. In several projects, stringent demands are placed on building materials in order to limit chemical content and life cycle impact.

Project #	Borrower	Investment cost, SEK mn	Green Loans, SEK mn*	Description	Surface area, Atemp, m²	Completed (year)	Energy performance (legal requirement) / year	Est. CO <sub>2</sub> savings**
31	Region Värmland	1,050	960	New surgery center, Karlstad Hospital	23,336	2016	62 (158) kWh/m²	251 tonnes CO <sub>2</sub> e
32	Region Värmland	724	320	New care building, Karlstad Hospital	23,360	2011	73 (179) kWh/m²	211 tonnes CO <sub>2</sub> e
399	Region Sörmland	538	0	N54, Nyköping Hospital	7,980	2024	55 (111) kWh/m²	0 tonnes CO <sub>2</sub> e
625	Region Örebro	1,762	900	H house, Örebro University Hospital	32,960	2020	67 (107) kWh/m²	96 tonnes CO <sub>2</sub> e
658	Region Sörmland	297	0	K21, Kullbergsska Hospital, Katrineholm	4,410	2024	53 (109) kWh/m²	0 tonnes CO <sub>2</sub> e
659	Region Sörmland	675	0	N55, Nyköping Hospital	9,795	2024	30 (108) kWh/m²	0 tonnes CO <sub>2</sub> e
660	Region Sörmland	3,061	1,570	E62, Mälar Hospital, Eskilstuna	44,200	2024	47 (105) kWh/m²	344 tonnes CO <sub>2</sub> e
729	Region Västerbotten	1,118	200	New psychiatric ward, Norrland University Hospital	30,597	2022	33 (126) kWh/m²	160 tonnes CO <sub>2</sub> e
734	Region Blekinge	523	0	Building 46, Blekinge Hospital	11,203	2020	52 (126) kWh/m²	0 tonnes CO <sub>2</sub> e
<b>Total</b>		<b>9,748</b>	<b>3,950</b>		<b>187,841</b>			<b>1,062 tonnes CO<sub>2</sub>e</b>

\* Disbursed amount \*\* Avoided emissions

# Kommuninvest – a provider of sustainable finance

**Kommuninvest is the largest provider of credit to Swedish local governments and offers both labelled green financing and traditional balance sheet financing. The Green Loan ratio amounted to 9.9 (7.4) percent on 31 December 2019.**

The role of Kommuninvest, a credit institution owned by 290 out of Sweden's 310 local governments, is to provide stable and cost-efficient funding for local government investments. 56 (54) percent of the external financing undertaken by Swedish local governments at year-end 2019 was through Kommuninvest.

Our intermediary role between local governments and capital markets makes it possible to finance all the welfare investments carried out among members and customers – in new schools and housing, in energy production and other infrastructure – in an economically sustainable fashion. In spite of substantial growth in local government borrowing, their debt levels are low and stable, at between 11–14 percent of GDP over the past ten-year period.

Kommuninvest's own funding takes the form of both labelled green financing, ie. Green Loans for green investment projects, and non-labelled financing, for traditional balance sheet financing. From its start in 2015, Green Loans have grown




increasingly popular. At year-end 2019, Green Loans represented 9.9 (7.4) percent of Kommuninvest's total lending.

Green Loans are important tools as Kommuninvest supports its clients' efforts to transform the Swedish society to a low-carbon and resilient future, and other important environmental challenges. We fund the Green Loans by issuing Green Bonds in national and international capital markets. By year-end 2019, SEK 36.6 (20.4) billion was outstanding in six Green Bonds, see page 14.

Behaving ethically and taking responsibility for economic, environmental and long-term sustainable social development are fundamental elements of Kommuninvest's sustainability efforts.

We also seek to promote a dynamic dialogue and communication with stakeholders. Key performance indicators related to sustainability are presented on the following pages. Additional information can be found in the Sustainability Report, see pages 14–23 of the Annual Report 2019.

## ESG Ratings: Ranked among the top public credit institutions

	Rating	Rating Category	Peer Group Comparison
	B-	Prime	Top 5 out of 78 issuers rated
	AA	n/a	Maintained 2nd highest rating since 2017
	9.1	Negligible ESG risk	Top 12 out of 74 peers



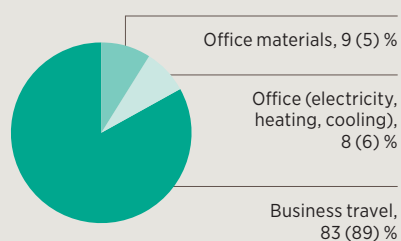


## Kommuninvest Reducing impact from business travel

Business travel, particularly by air, accounts for the majority of Kommuninvest's climate impact. The objective is to reduce business travel, provided this can be achieved without foregoing operational targets. Conducting roadshows online or through conference calls is

one example. In 2019, business travel by air, measured in kilometres, decreased by 6 (9) percent. Train travel increased by 3 (4) percent over the year. The total carbon footprint continued to decline, amounting to 3.6 (3.9) tonnes CO<sub>2</sub> per employee in 2019.

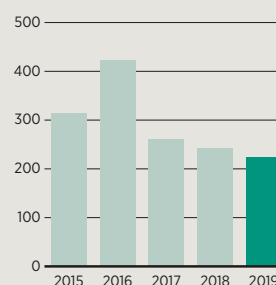
### Distribution of total climate impact



Compared with the preceding analysis, carried out for 2017, the impact of business travel has decreased. This is mainly due to an adjustment of the high-altitude factor, the so-called RFI factor, to 1.9 (2.7).

Source: Tricorona Climate Partner

### CO<sub>2</sub> emissions from business travel, tonnes



Source: Big Travel, with processing by Kommuninvest (emission values have been multiplied by a so-called RFI factor of 1.9 for the aviation industry's high altitude effects).

## INTRODUCTION

# Environmental indicators – Kommuninvest Group

Energy consumption	Unit	2019	2018	2017
Total energy consumption (in buildings) <sup>1</sup>	kWh	616,853	620,069	586,071
– of which, electricity	kWh	385,980	368,596	333,603
– of which, heating	kWh	230,873	251,473	252,468
Total CO <sub>2</sub> impact of energy consumption (in buildings)	Tonnes	142	138	127
– of which, electricity consumption <sup>2</sup>	Tonnes	122	116	105
– of which, heating <sup>3</sup>	Tonnes	20	22	22
Proportion of renewable energy in energy consumption, electricity <sup>4</sup>	%	56	56	58
Change in electricity consumption compared to the preceding year	%	5	10	7
Proportion of renewable energy in energy consumption, heating <sup>5</sup>	%	95	95	96
Total office space	m <sup>2</sup>	2,217	2,217	2,217
Total energy consumption per square metre	kWh/m <sup>2</sup>	278	280	264
Total energy consumption per employee	kWh	6,107	6,392	6,440
Purchased office paper	Tonnes	0.45	0.50	0.50
– of which sustainability labelled paper (PEFC)	Tonnes	0.45	0.50	0.50
Proportion of sustainability labelled office paper, of total purchases	%	100	100	100
Total paper consumption per employee	Kg	4.5	5.2	5.5
Paper recycling, incl. purchased and delivered paper	Tonnes	2.0	2.0	2.5
Total business travel <sup>6</sup>	Km	911,699	948,470	975,489
Total business travel per employee	Km	9,027	9,778	10,720
Total air travel	Km	493,063	521,771	571,379
Rail travel in Sweden	Km	364,616	353,914	341,741
Total CO <sub>2</sub> emissions from business travel <sup>7</sup>	Tonnes	225	242	260
CO <sub>2</sub> emissions from business travel, per employee	Tonnes	2.2	2.5	2.9
Total climate footprint of the operations <sup>8</sup>	Tonnes	367	380	387
Total climate footprint per employee, CO <sub>2</sub> e	Tonnes	3.6	3.9	4.2

1) Previously reported values for the breakdown between electricity and heating have been corrected as one of the measurements had been incorrectly categorised. The correction has led to an increase in electricity consumption and a decrease in heat consumption.

2) The climate impact from electricity consumption is calculated applying an emissions factor for electricity of 315 g CO<sub>2</sub>e/kWh, in accordance with the principles for impact reporting applied by Kommuninvest for Green Bonds (Nordic Position Paper on Green Bonds Impact Reporting). The reported values are Scope 2, in accordance with the Greenhouse Gas Protocol.

3) The climate impact from heating, calculated applying an emission factor for district heating in the Municipality of Örebro of 87 g CO<sub>2</sub>e/kWh, in accordance with the principles for impact reporting applied by Kommuninvest for Green Bonds (Nordic Position Paper on Green Bonds Impact Reporting). The reported values are Scope 2, in accordance with the Greenhouse Gas Protocol.

4) In this year's report, the percentage is based on the national average (source: Swedish Energy Agency and Statistics Sweden), as an agreement regarding 100-percent renewable electricity was found to be missing. Data for 2019 are preliminary and are based on data for 2018.

5) In this year's report, the percentage is based on the national average (source: Swedenergy), as an agreement regarding 100-percent renewable district heating was found to be missing. 2019 are preliminary and comprise data for 2018.

6) An in-depth analysis of business travel was conducted in 2019. The identification of erroneous data from suppliers and the inclusion of business travel by car has led to previously reported outcomes for 2018 and 2017 being adjusted upwards.

7) As of 2019, Kommuninvest takes into account a so-called RFI factor of 1.9 in emissions calculations regarding the high altitude effects of air travel, in accordance with Tricorona's calculation method and based on research at the Chalmers University of Technology (Kamb et al, 2018). Previously published emission values have been adjusted.

8) Includes CO<sub>2</sub> emissions from energy consumption, resource consumption and business travel. Calculation by Tricorona Climate Partner in January 2020. All emissions are Scope 1 and Scope 2 according to the Greenhouse Gas Protocol; emissions from business travel are Scope 3.



*Ann Sörman,  
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Manager*



*Björn Söderlundh,  
Head of Lending*



*Daniel Nykvist,  
Deputy Head of Lending*



*Erik Törnblom,  
Analyst*



*Patrik Stenman,  
Customer Relationship  
Manager*



*Theodora Batan,  
Business Control Manager*



*Björn Bergstrand,  
Head of Sustainability*



*Jens Enocsson,  
Sustainability Analyst*

## Kommuninvest Green Team

The Kommuninvest Green Bonds and Green Loans Programme engages numerous staff across company functions, including lending, debt management, investor relations, sustainability, communications, IT, and research.

The smaller group of people presented here are more deeply involved in the Programme. The Programme is co-led by Björn Söderlundh, Head of Lending and Björn Bergstrand, Head of Sustainability.





## Electrifying bus fleets Grid factor choice matters

Increased electrification of the transport fleet is a prerequisite to reach Sweden's environmental objectives. The municipalities are on board, introducing for example fully electric buses to an increasing degree.

The city of Umeå, a multiple finalist of the European Green Capital award and Sweden's winner in WWF's Global Earth Hour City Challenge in 2016, is one example. In recent years, the city has replaced 31 diesel buses with 34 fully electric buses in its public transport system.

As expected, this results in substantial climate benefits. However, as illustrated by the calculation below, the size of the benefit is dependent on the choice of baseline emission factor for the grid.

Kommuninvest reports impact according to the Nordic Position Paper recommendations, in which calculations are based on a consequential assessment, "on the margin". The same emission factor is used both for added supply to the grid and for incremental demand from the grid.

It is not uncommon for municipalities to base investment decisions on an attributional or accounting assessment, based on average data. This results in higher calculated climate benefit, due to the high degree of renewables in Swedish local energy grids.

The table below outlines the differences in calculated environmental benefits associated with the investment in electrical buses in the city of Umeå.

## Calculation projects #16 and #777

Annual km traveled	2,304,000 km
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### Baseline emissions

CO <sub>2</sub> emissions per km for diesel buses	1.16 kg CO <sub>2</sub> per km
Emissions from alternative bus transports, per year	2,677 tCO <sub>2</sub>

### Project emissions

Total consumption of electricity, 34 electrical buses	4,042 MWh
Emission factor for electricity consumption, Nordic Position Paper approach	315 g CO <sub>2</sub> /kWh
Emission factor for electricity consumption, local grid	0 g CO <sub>2</sub> /kWh

Emissions for project bus fleet, Nordic Position Paper approach	1,273 tCO <sub>2</sub> e per year
Emissions for project bus fleet, based on local grid average	0 tCO <sub>2</sub> e

<b>Total GHG emissions avoided from the project, per year, Nordic Position Paper approach (reported)</b>	<b>1,404 CO<sub>2</sub>e</b>
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For reference: GHG emissions avoided per year if calculation is based on a local (average) approach	2,677 tCO <sub>2</sub> e
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# Kommuninvest Green Bonds

**KOMMUNINVEST ISSUED** its inaugural Green Bond in March 2016 and by year-end 2019 had issued nine Green Bonds in total, of which two were taps. Six Green Bonds were outstanding at year-end 2019, for a total amount of SEK 36.6 (20.4) billion, equivalent to USD 3.9/EUR 3.5 billion. This made Kommuninvest the largest Swedish issuer of Green Bonds.

Kommuninvest's Green Bond Framework was reviewed by the international research institute CICERO in 2018. The project categories have been awarded either a Dark Green or Medium Green shading, and the overall Green Bond Framework a Medium Green shading.

## BOND RATINGS

Standard & Poor's **AAA** stable

Moody's **Aaa** stable

*Ratings updates as of June and March 2018.*

## OUTSTANDING GREEN BONDS

Issue date	Amount issued	Maturity	Coupon	Coupon
25 October, 2016	SEK 5 billion	5 May, 2020	0.00% (annually)	XS1508534861
23 May, 2017	USD 500 million	1 June, 2021	1.875% (semi-annually)	XS1618289802 (RegS) US50049GAB86 (144A)
30 April, 2018	SEK 3 billion	15 December, 2021	0.125% (annually)	XS1814404577
23 October, 2018	SEK 3 billion	1 June, 2023	0.625% (annually)	XS1897258098
27 May, 2019	SEK 3.5 billion	27 May, 2024	0.375% (annually)	XS1968465572
20 November, 2019	USD 1 billion	24 April, 2024	1.625% (semi-annually)	XS2081157401 (RegS) US50046PBL85 (144A)

### CICERO SHADES OF GREEN

<b>DARK GREEN</b>	Projects and solutions that correspond to the long-term vision of a low-carbon and climate-resilient future.
<b>MEDIUM GREEN</b>	Projects and solutions that represent steps towards the long-term vision but are not quite there yet.
<b>LIGHT GREEN</b>	Projects and solutions that are environmentally friendly but do not by themselves represent or contribute to the long-term vision.
<b>BROWN</b>	Projects that are in opposition to the long-term vision of a low-carbon and climate-resilient future.

### KOMMUNINVEST PROJECT CATEGORIES

<b>Renewable energy<sup>1</sup></b>	<b>Green buildings</b>
<b>Water management</b>	<b>Energy efficiency</b>
<b>Climate change adaptation</b>	<b>Clean transportation</b>
<b>Environmental management</b>	<b>Waste management</b>

*1) Bioenergy and biogas from waste is Medium green.*



# Key reporting methodology

**Kommuninvest reports impact from financed green investment projects based on jointly established Nordic guidelines, which build on and complement international recommendations.**

**SINCE 2016**, a group of Nordic public sector green bond issuers cooperate on impact reporting topics, with the aim of harmonising and advancing reporting practices across the Nordic region. The results of this work have been published in a Position Paper on Green Bonds Impact Reporting, launched in October 2017 and most recently updated in February 2020. These Nordic reporting guidelines build on and complement international recommendations, as outlined by the Green Bond Principles.

## KEY REPORTING PRINCIPLES

- A project's impact is quantified based on the share of the investment cost that has been financed by Kommuninvest and on Green Loans disbursed and outstanding.
- Calculations are based on projected (ex-ante) values; unless actual outcomes (ex-post) are available.
- CO<sub>2</sub> emissions and emissions reductions are reported as scopes 1 and 2 as defined by the Greenhouse Gas Protocol, ie. direct emissions from projects and indirect emissions from the production of electricity and/or district heating.
- Energy production, energy savings and other sustainable activities are converted into greenhouse gas emissions savings using an emission factor for electricity production in mainland EU and Norway of 315 CO<sub>2</sub>/kWh. Please see page 46 for further information about baseline choices.
- We report impact from activities financed by green bonds on a yearly basis.



Kommuninvest's impact reporting is carried out in accordance with the principles and methodology presented in the Position Paper on Green Bonds Impact Reporting. The Position paper has been developed by a group of Nordic public sector green bond issuers, initiated and led by Kommuninvest.

# Project categories

**Kommuninvest Green Bonds finance investment projects undertaken by our member municipalities and regions. We offer Green Loans to projects which meet pre-determined sustainability criteria and within eight areas of investment.**

## ALL PROJECTS MUST

- Promote the transition to a low-carbon and climate-resilient society
- Be part of the systematic environmental work in the applicant municipality or region
- Be related to Sweden's national environmental objectives, or to regional environmental goals
- Target either mitigation of climate change, adaptation to climate change, or be a project related to environmental management in other areas than climate change



## RENEWABLE ENERGY

Investments in this category aim to reap the energy potential of the wind, the sun, the ground, the sea, biomaterials and other renewable energy carriers, and to replace non-sustainable energy sources. Projects include production and distribution of renewable energy including wind, wave, solar, hydro, geothermal, bioenergy, biogas and excess heat.

## ENERGY EFFICIENCY IN ENERGY SYSTEMS

Projects within this category reduce the energy requirements in existing energy systems and phase out the use of fossil energy sources. Projects may be related to district heating/cooling, electricity grids/smart grids, energy recovery and storage.



## GREEN BUILDINGS AND ENERGY EFFICIENCY

New or existing residential (multi-family) or non-residential buildings. Residential buildings must have an energy performance per sq.m. of at least 15 percent below the Swedish building code; for non-residential buildings this requirement is at least 20 percent. Major renovations of buildings must lead to at least 30 percent less energy use per sq.m. per year (or to compliance with the Swedish building code); energy efficiency measures in partial systems to at least 30 percent less energy use.

## CLEAN TRANSPORTATION

Transport solutions that result in minimal or zero emissions. Project examples may include trains, underground, trams and hybrid buses. Also infrastructure supporting public transportation and other sustainable transportation, such as pedestrian- and cycle paths, charging points for electric vehicles and fueling stations for renewable fuels.



## WASTE MANAGEMENT

Investments are intended to ensure sustainable, energy efficient and resource-saving waste management. Eligible projects include the construction of new waste management facilities, upgrades/expansion of existing ones; waste collection systems that minimise transport requirements and increase recycling scope, etc.

## WATER AND WASTEWATER MANAGEMENT

Construction and upgrading of freshwater and wastewater systems to accommodate population growth and higher precipitation levels and to meet environmental regulations. Project that apply innovative technologies to reduce levels of harmful substances and make good use of the resources contained in wastewater. Examples: water and wastewater networks, water treatment plants, treatment of discharges to watercourses, and investment in energy and heat recovery from water and wastewater networks.



## CLIMATE CHANGE ADAPTATION

Investments in this category are intended to improve local adaptation to climate change. This includes facilities and installations to manage urban runoff, floods, landslides, avalanches, rising sea levels, and other challenges due to changed weather and climate conditions. Measures undertaken may be related to buildings, infrastructure and sensitive surroundings.

## ENVIRONMENTAL MANAGEMENT

This category covers a range of projects that intend to ensure sustainable use of land. This may include projects such as restoration of biodiversity, planting forests, cleaning up of harmful substances, developing land into recreational space, facilitating walking, cycling and public transportation solutions. Measures may include nature conservation and improving eco-system services.





# Process for project evaluation and selection

**Green Loan applications are reviewed and finally approved by an advisory committee – the Kommuninvest Green Bonds Environmental Committee – comprising Swedish local government climate specialists.**

**INVESTMENT PROJECTS** are initially identified, verified and selected by the environmental functions and treasury departments in Kommuninvest's member municipalities and regions. Eligible projects are then screened by Kommuninvest's Lending department, and, on at least a quarterly basis, reviewed and finally approved by consensus vote in the Kommuninvest Green Bonds Environmental Committee.

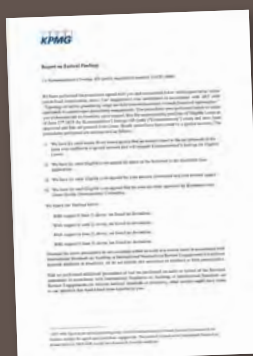
The Committee consists of representatives from the environmental function of at least two member municipalities and regions, environmental experts from other relevant public sector organisations or academia/non-governmental organization, and from Kommuninvest's management and lending group.

## COMMITTEE MEMBERS

- **Andreas Hagnell**, Senior Advisor Environment and Energy, Swedish Association of Local Authorities and Regions (SALAR)
- **Susanne Arneborg**, Strategic Urban Planner, Municipality of Borås
- **Marta Fallgren**, Environmental Manager, Uppsala County Council
- **Hanna Ryman**, Sustainability Manager, Municipality of Örebro
- **Lisa Järner**, Environmental Coordinator, City of Mölndal
- **Björn Söderlundh**, Head of Lending, Kommuninvest
- **Patrik Stenman**, Client Relationship Manager, Kommuninvest
- **Ann Sörman**, Client Relationship Manager, Kommuninvest



From left to right: Susanne Arneborg, Municipality of Borås; Patrik Stenman, Kommuninvest; Marta Fallgren, Region Uppsala; Björn Söderlundh, Kommuninvest; Ann Sörman, Kommuninvest; Andreas Hagnell, Swedish Association of Local Authorities and Regions; Hanna Ryman, Municipality of Örebro; Lisa Järner, City of Mölndal.



## ASSURANCE REPORT PUBLISHED ANNUALLY

Kommuninvest regularly publishes an external assurance report regarding its Green Bonds Framework, in line with the recommendations of the Green Bond Principles. The report, performed by our external auditor, provides assurance on the management of proceeds obtained from the issuance of green bonds. Green Bond proceeds and disbursements to Green Loans are tracked by Kommuninvest according to internal instructions.





## Water projects Analysis shows breadth of impact

During 2019, Kommuninvest resolved to conduct an in-depth analysis of the climate and environmental benefits associated with projects financed in the Water and Wastewater Management project category. This was the result of a gradual realization about the wide range of impacts associated with such projects.

Projects in this category have grown to represent -15 percent of disbursements to Kommuninvest Green Loans and are expected to

increase in importance given the large-scale investment needs in Swedish waterworks.

In order to be able to perform the more complete analysis and aggregate impact results, a model was developed with support from the Swedish Water & Wastewater Association. The results, which are summarized here, are presented in full on page 37.

	BEFORE investment	AFTER investment	INCREASE (+) DECREASE (-)	CHANGE (%)
Number of person equivalents supplied by the facility, p.e.	1,030,686	1,380,413	349,727	+34%
<b>FRESH WATER</b>				
Annual volume of freshwater treated, million m <sup>3</sup>	38.6	50.8	12.2	+32%
Energy consumption per m <sup>3</sup> of freshwater supplied, kWh*	0.38	0.62	0.24	+63%
Electricity production on-site, kWh per year	777,250	941,400	164,150	+21%
<b>WASTE WATER</b>				
Nitrogen, emissions of, tonnes per year	1,012.1	761.7	-250.4	-25%
Phosphorus, emissions of, tonnes per year	26.4	18.8	-7.6	-29%
Oxygen-consuming substances, BOD, tonnes per year	579.1	453.3	-125.8	-22%
Production of biogas, million m <sup>3</sup> per year	3.9	4.7	0.8	+22%

\* Gross, excluding electricity production on-site





## Municipal energy efficiency Showcase Kalmar

The City of Kalmar is home to one of Sweden's most ambitious energy efficiency initiatives. Focusing on around half (175,000 sq.m) of the City's property portfolio, the initiative has involved some 600 measures, including replacement of ventilation systems, switch to LED lighting, additional insulation of winds, water savings measures and the scrapping of end-of-life technology.























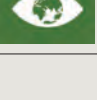
In total, 2,300 thermostats, 1,500 valves, 150 water pumps, 80 air handling units and 250 presence detectors have been installed. The objective: rapid and smooth implementation of profitable measures; to raise awareness about energy efficiency among staff; to promote good indoor environments, and, not least, to showcase Kalmar as an ecologically sustainable municipality.

Six of the projects meet Green Loan requirements, meaning that a minimum 30 percent improvement in energy efficiency has been realized.



# Mapping vs the EU Environmental Objectives and the SDGs

**This mapping outlines how projects financed under the Kommuninvest Green Bonds framework is aligned with i) the EU Environmental Objectives and ii) the UN Sustainable Development Goals. It conforms with the suggested mapping outlined in the Nordic Position Paper on Green Bonds Impact Reporting (2020 version).**

Project Category	Primary EU Environmental Objective	Secondary EU Environmental Objective(s)	Relevant SDGs
Renewable energy	Climate change mitigation	n/a	 
Green buildings	Climate change mitigation	Climate change adaptation	   
Energy efficiency	Climate change mitigation	n/a	   
Clean transportation	Climate change mitigation	Pollution prevention and control	  
Waste management	Transition to a circular economy, waste prevention, and recycling	Pollution prevention and control Climate change mitigation	 
Water and wastewater management	Sustainable use and protection of water and marine resources	Climate change adaptation Pollution prevention and control Climate change mitigation	 
Environmental management	Protection of healthy ecosystems	Climate change adaptation Climate change mitigation	  
Climate change adaptation	Climate change adaptation	n/a	  

# Green Loan portfolio

**The portfolio of eligible green investment projects numbered 329 (227) as of year-end 2019, across 148 (109) Swedish municipalities and regions. Total Green Loan disbursements amounted to SEK 40.3 (25.8) billion.**

**PROJECTS IN THE** categories Green buildings and Renewable energy accounted for 56 (52) percent and 23 (30) percent of disbursements, respectively. Water management accounted for 15 (14) percent of disbursements, while Clean transportation accounted for 5 (3) percent. The remaining four project categories, Climate change adaptation, Energy efficiency, Environmental management and Waste management each accounted for less than 1 (1) percent of disbursements.

Project in all eight framework categories had been approved. Total committed Green Loan funding amounted to SEK 61.8 (39.7) billion.

During the reporting back period in Q1-2020, a number of projects were excluded from the Green Loan portfolio, due to non-compliance with reporting requirements or failure to comply with the requirements of the Green Bonds Framework. Certain projects also refer to the same overarching investment project and have been combined to one for the purposes of this reporting. This explains why data on the Green Loan portfolio in this report differs from Kom-

muninvest's Annual Report 2019, which states 346 financed green projects and SEK 63.1 billion in Green Loan commitments.

## NEW AND REFINANCED PROJECTS

Kommuninvest deploys a bottom-up approach to green financing, whereby Eligible Projects are identified and pre-financed first, and Green Bonds are issued as the second step. This approach has a number of distinct advantages:

- i) It enables Kommuninvest to manage its green framework in a conservative manner, with the size of the portfolio of approved Eligible Projects guiding the volume of Green Bonds issuance. As a rule, Kommuninvest aims for aggregated Green Bond Proceeds not to exceed total disbursements to Green Loans.
- ii) It provides investors with transparency regarding which Eligible Projects the Green Bonds will finance, including the composition of green assets, as well as assurance that Green Bond proceeds will be matched to actual Green Loan disbursements.

## COMMITMENTS BY CATEGORY

31 December 2019

Project category	Disbursed Green Loans, SEK mn	Committed Green Loans, SEK mn	# projects
Renewable energy	9,330	13,299	49
Energy efficiency	235	302	8
Green buildings	22,376	34,822	203
Clean transportation	2,121	3,194	13
Waste management	229	274	6
Water management	5,848	9,565	42
Climate change adaptation	16	16	1
Environmental management	129	369	7
<b>Total</b>	<b>40,283</b>	<b>61,841</b>	<b>329</b>

## SHARE OF FINANCING AND REFINANCING: EU GBS APPROACH &amp; NORDIC POSITION PAPER APPROACH

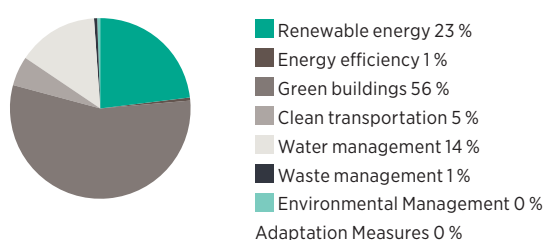
	2015	2016	2017	2018	2019
<b>Kommuninvest Green Bonds Framework</b>					
Status per end of reporting year					
Committed amount in Green Loans, SEK billion	5.0	17.8	26.6	39.7	61.8
Disbursed amount in Green Loans, SEK billion	2.6	14.5	19.9	25.8	40.3
<b>Share of financing/refinancing: EU Green Bond Standard approach</b>					
Share of financing (allocated amount to projects financed after bond issuance)*		0%	0%	0%	0%
Share of refinancing (allocated amount to projects financed before bond issuance)		100%	100%	100%	100%
<b>Share of financing/refinancing: alternative Nordic Position Paper approach</b>					
Share of financing (committed amount** to projects during the year of reporting)		72%	33%	33%	36%
Share of refinancing (committed amount** to projects before the year of reporting)		28%	67%	67%	64%

\* Share of financing will always be 0%, given Kommuninvest's Green Bonds issuance model, whereby green bonds are issued in relation to the total volume of outstanding disbursed/allocated Green Loans.

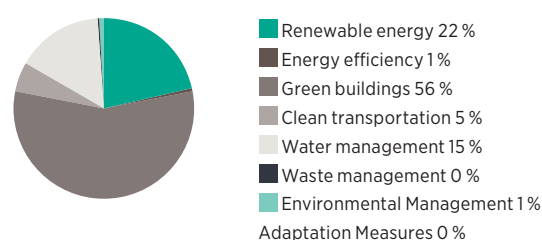
\*\* Committed amount is chosen over allocated/disbursed amount, as the committed amount also captures disbursements that will be made in the future.

DISBURSED GREEN LOANS  
SEK 40.3 bn

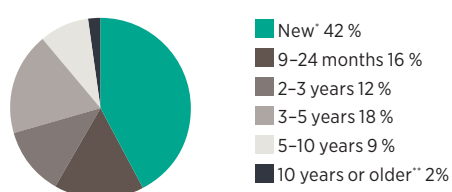
as of 31 Dec 2019

COMMITTED GREEN LOANS  
SEK 61.8 bn

as of 31 Dec 2019

AGE DISTRIBUTION OF  
ELIGIBLE PROJECTS

as of 31 Dec 2019

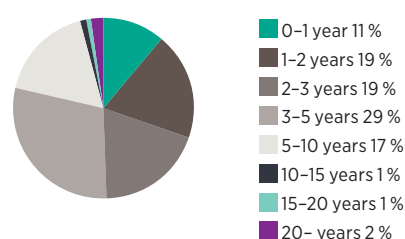
based on project completion date and disbursed  
outstanding amounts

\*) Planned, on-going or a maximum of nine months has passed since completion

\*\*) Adjusted to include projects where project completion date refers to date of transaction (#12, #51, #144 - acquisition finance for hydro power stations).

MATURITY PROFILE  
GREEN LOANS

as of 31 Dec 2019







## Renewable energy

Investments in this category aim to reap the energy potential of the wind, the sun, the ground, the sea, biomaterials and other renewable energy carriers, and to replace non-sustainable energy sources. Projects include production and distribution of renewable energy including wind, wave, solar, hydro, geothermal, bioenergy, biogas and excess heat.

### KOMMUNINVEST GREEN LOANS TO RENEWABLE ENERGY

Total amounts disbursed and outstanding

**9,330** MSEK

Total number of projects

**49**

### ESTIMATED ANNUAL IMPACT OF GREEN LOANS<sup>1</sup>

Estimated annual energy production

**2,903,322** MWh

GHG emissions avoided

**566,161** tonnes CO<sub>2</sub>e

<sup>1</sup>) Refers to the Green Loan share of project impacts. The impact attributable to Green Bond investors is presented on page 3.

## Complete project-by-project-reporting in spreadsheet format at [kommuninvest.se](https://kommuninvest.se)

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### #37 BIOMASS TORREFICATION FACILITY

Industrial development facility for industrial torrefication of biomasses.

#### Borrower

Umeå municipality

#### Project completion

2016

#### KI share of financing

44 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

54 million

#### Disbursed amount, SEK

24 million

#### Estimated impact attributable to green loans

Energy savings

**41,333 MWh**

GHG-emissions reduced/avoided

**10,196 tonnes**

### #103 CONSTRUCTION OF HEATING PLANT

Two new boilers for district heating, equipped with flue gas condensor and a storage tank. Solar panels were also installed on the facility.

#### Borrower

Varberg municipality

#### Project completion

2013

#### KI share of financing

89 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

252 million

#### Disbursed amount, SEK

225 million

#### Estimated impact attributable to green loans

Energy savings

**18,304 MWh**

GHG-emissions reduced/avoided

**4,183 tonnes**

### #144 ACQUISITION OF SOLLEFTEÅFORSEN AB

The project involved the acquisition of the entire Sollefteåforsens AB power plant, where the municipality previously owned half.

#### Borrower

Sollefteå municipality

#### Project completion

2016

#### KI share of financing

100 %

#### Expected or Actual impact

Actual

#### Total investment, SEK

400 million

#### Disbursed amount, SEK

400 million

#### Estimated impact attributable to green loan

Renewable energy generation

**286,100 MWh**

GHG-emissions reduced/avoided

**90,122 tonnes**

### #558 NEW WIND POWER TURBINES

Investment in two new wind power turbines located in Spjutåsberget, Härnösand.

#### Borrower

Härnösand Energi & Miljö Aktiebolag

#### Project completion

2020

#### KI share of financing

52 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

76.4 million

#### Disbursed amount, SEK

39.5 million

#### Estimated impact attributable to green loans

Renewable energy generation

**12,412 MWh**

GHG-emissions reduced/avoided

**3,910 tonnes**

### All borrowers | Renewable energy

Arjeplog Municipality  
Arvika Fjärrvärme AB  
(Arvika District Heating Company)  
Arvika Kraft AB (Arvika Power Company)  
Biogasbolaget i Mellansverige AB  
(Biogas Company of Mid Sweden)  
City of Borås  
Botkyrka Municipality  
C-4 Energi AB (Kristianstad Energy Company)  
Emåbygdens Vind AB  
(Mönsterås Wind power Company)  
Eskilstuna Municipality  
Falun Energi och Vatten AB  
(Falun Energy and Water Company)  
Forshaga Energi AB  
(Forshaga Energy Company)  
Gävle Municipality  
Hedemora Kommunfastigheter AB  
(Hedemora Municipal Housing Company)

Huddinge Municipality  
Härnösand Energi & Miljö AB (Härnösand Energy and Environment Company)  
Kalmar Municipality  
Karlskoga Energi och Miljö AB (Karlskoga Energy and Environment Company)  
Karlstad Municipality  
Kopparstaden AB (Kopparstaden Company)  
Kumbro Vind AB  
(Örebro Windpower Company)  
Lessebo Fjärrvärme AB  
(Lessebo District Heating Company)  
Mjölby Svartådalens Energi AB  
(Mjölby Svartådalens Energy Company)  
Norrenergi AB (Norrenergi Company)  
Nässjö Affärsverk AB  
(Nässjö Energy and Environment Company)  
Region Jämtland Härjedalen

SEVAB Strängnäs Energi AB  
(Strängnäs Energy Company)  
Skellefteå Stadshus AB  
(Skellefteå Municipal Holding Company)  
Skövde Municipality  
Sollefteå Municipality  
Tanums Bostäder AB  
(Tanum Municipal Housing Company)  
Tanum Municipality  
Tekniska Verken i Linköping AB  
(Linköping Technical Facilities Company)  
Umeå Municipality  
Varberg Municipality  
Vimmerby Energi & Miljö AB (Vimmerby Energy and Environment Company)  
Vimmerby Municipality  
Ålem Energi AB (Ålem Energy Company)  
Ånge Energi AB (Ånge Energy Company)



## Energy efficiency in energy systems

Projects within this category reduce the energy requirements in existing (predominantly fossil-free) energy systems and phase out the use of fossil energy sources. Projects may be related to district heating/cooling, electricity grids/smart grids, energy recovery and storage.

### KOMMUNINVEST GREEN LOANS TO ENERGY EFFICIENCY

Total amounts disbursed and outstanding

**235** MSEK

Total number of projects

**8**

### ESTIMATED ANNUAL IMPACT OF GREEN LOANS<sup>1</sup>

Energy savings

**110,845** MWh

Whereof avoided energy use<sup>2</sup> 0 MWh

Whereof reduced energy use<sup>3</sup> 110,845 MWh

GHG emissions reduced

**26,409** tonnes CO<sub>2</sub>e

1) Refers to the Green Loan share of project impacts. The impact attributable to Green Bond investors is presented on page 3.

2) Avoided energy use refers to a baseline/alternative reference scenario.

3) Reduced energy use refers to a direct or absolute reduction in operation.



## Complete project-by-project-reporting in spreadsheet format at [kommuninvest.se](https://kommuninvest.se)

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### #44 DISTRICT HEATING PIPELINE

Linking together the district heating networks of Falun and Borlänge which leads to increased utilization of surplus heat.

#### Borrower

Falu Energi & Vatten AB  
(Falun Energy & Water Company)

**Project completion**  
2014

**KI share of financing**  
50 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
128 million

**Disbursed amount, SEK**  
64 million

#### Estimated impact attributable to green loan

Energy savings

**25,000 MWh**

GHG-emissions reduced/avoided

**1,322 tCO<sub>2</sub>e/year**

### #66 FLUE GAS CONDENSATION

Flue gas condensation investment at the Hedensbyn bioenergy production plant.

#### Borrower

Skelefteå Stadshus AB  
(Skelefteå Municipal Holding Company)

**Project completion**  
2016

**KI share of financing**  
86 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
83 million

**Disbursed amount, SEK**  
71 million

#### Estimated impact attributable to green loan

Energy savings

**85,542 MWh**

GHG-emissions reduced/avoided

**17,859 tCO<sub>2</sub>e/year**

### #82 TRANSIT PIPE

Connecting the Köping and Arboga district heating grids and increasing the use of surplus heat recovery.

#### Borrower

Västra Mälardalens Energi och Miljö AB (Arboga and Köping Municipal Energy Company)

**Project completion**  
2017

**KI share of financing**  
30 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
330 million

**Disbursed amount, SEK**  
100 million

#### Estimated impact attributable to green loan

Energy savings

**303 MWh**

GHG-emissions reduced/avoided

**2,615 tCO<sub>2</sub>e/year**

## All borrowers | Energy efficiency in energy systems

Falu Energi och Vatten AB  
(Falun Energy and Water Company)  
Oxelösund Municipality

Region Uppsala  
Skelefteå Stadshus AB (Skelefteå  
Municipal Holding Company)

Västra Mälardalens Energi och Miljö AB  
(Arboga and Köping Municipal Energy  
Company)



## Green buildings

New or existing residential (multi-family) or non-residential buildings. Residential buildings must have an energy performance per sq.m. of at least 15 percent below the Swedish building code; for non-residential buildings this requirement is at least 20 percent. Major renovations of buildings must lead to at least 30 percent less energy use per sq.m. per year (or to compliance with the Swedish building code); energy efficiency measures in partial systems to at least 30 percent less energy use.

### KOMMUNINVEST GREEN LOANS TO GREEN BUILDINGS

Total amounts disbursed and outstanding

**22,376 MSEK**

Total number of projects

**203**

### ESTIMATED ANNUAL IMPACT OF GREEN LOANS<sup>1</sup>

Energy savings

**40,547 MWh**

Whereof avoided energy use<sup>2</sup> **33,601 MWh**

Whereof reduced energy use<sup>3</sup> **6,946 MWh**

Energy production in green buildings **2,705 MWh**

GHG emissions avoided/reduced

**6,045 tonnes CO<sub>2</sub>e**

1) Refers to the Green Loan share of project impacts. The impact attributable to Green Bond investors is presented on page 3.

2) Avoided energy use refers to a baseline/alternative reference scenario. Net value, inclusive of energy production in green buildings.

3) Reduced energy use refers to a direct or absolute reduction in operation.



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### #750 NEW VENTILATIONS SYSTEM

A new exhaust- and supply ventilation system with heat recovery for a residential apartment building.

**Borrower**  
Uddevalla municipality

**Project completion**  
2018

**KI share of financing**  
96 %

**Expected or Actual impact**  
Actual

**Total investment, SEK**  
209 million

**Disbursed amount, SEK**  
200 million

**Estimated impact attributable to green loans**

Energy savings

**150 MWh**

GHG-emissions reduced/avoided

**16 tonnes**

### ##727 GREEN RESIDENTIAL APARTMENTS

New energy-optimized apartment buildings containing 44 apartments and solar panels on the roof.

**Borrower**  
Skövde municipality

**Project completion**  
2019

**KI share of financing**  
100 %

**Expected or Actual impact**  
Actual

**Total investment, SEK**  
70 million

**Disbursed amount, SEK**  
70 million

**Estimated impact attributable to green loans**

Energy savings

**164 MWh**

GHG-emissions reduced/avoided

**31 tonnes**

### #724 REPLACEMENT OF FOSSIL FUELS

Phasing out fossil fuel-based heating systems with new technology and upgrading to a modern ventilation system.

**Borrower**  
Kalmar municipality

**Project completion**  
2015

**KI share of financing**  
0 %

**Expected or Actual impact**  
Actual

**Total investment, SEK**  
2.1 million

**Disbursed amount, SEK**  
0 million

**Estimated impact attributable to green loans**

Energy savings

**0 MWh**

GHG-emissions reduced/avoided

**0 tonnes**

### #340 SELF-SUFFICIENT APARTMENTS

In connection with extensive renovations and expansion of apartments, solar panels and an energy storage system will be installed in order to drastically lower CO<sub>2</sub> emissions.

**Borrower**  
Vårgårda Bostäder Aktiebolag

**Project completion**  
2021

**KI share of financing**  
42 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
345 million

**Disbursed amount, SEK**  
145 million

**Estimated impact attributable to green loans**

Energy savings

**673 MWh**

GHG-emissions reduced/avoided

**59 tonnes**

## PROJECT CATEGORY REPORTING

### All borrowers | Green buildings

AB Edethus (Edet Municipal Housing Company)	Hörby Municipality	Robertsforsbostäder-Robo (Robertsfors Municipal Housing Company)
AB Eidar, Trollhättans Bostadsbolag (Trollhättan Municipal Housing Company)	Järfälla Municipality	Rättviks Fastigheter AB (Rättvik Municipal Housing Company)
AB Enköpings Hyresbostäder (Enköping Municipal Housing Company)	Jönköpings Rådhus AB (Jönköping Municipal Holding Company)	Skara Municipality
AB Kristianstadsbyggen (Kristianstad Municipal Housing Company)	Kalmar Municipality	Skellefteå Municipality
AB Lessebohus (Lessebo Municipal Housing Company)	Kalmarhem AB (Kalmar Municipal Housing Company)	Skellefteå Stadshus AB (Skellefteå Municipal Holding Company)
AB Timråbo (Timrå Municipal Housing Company)	Kommunfastigheter i Arboga AB (Arboga Municipal Housing Company)	Skövde Municipality
AB Älvkarlebyhus (Älvkarleby Municipal Housing Company)	Kommunfastigheter i Knivsta AB (Knivsta Municipal Housing Company)	Sollefteå Municipality
AB Härnösandshus (Härnösand Municipal Housing Company)	Kopparstaden AB (Falu Municipal Housing Company)	Stiftelsen Kindahus (Kinda Municipal Housing Company)
AB Karlsborgsbostäder (Karlsborg Municipal Housing Company)	Kraftstaden Fastigheter Trollhättan AB (Trollhättan Municipal Property Company)	Stiftelsen Östhammarshem (Östhammar Municipal Housing Company)
AB Sjöbohem (Sjöbo Municipal Housing Company)	Kristianstads Kommun (Kristianstad Municipality)	Säffle Municipality
AB Strömstadsbyggen (Strömstad Municipal Housing Company)	Kumla Municipality	Säter Municipality
AB Vingåkershem (Vingåker Municipal Property Company)	Köpings Bostads AB (Köping Municipal Housing Company)	Sävebo AB (Sävebo Municipal Housing Company)
AB Väsbyhem (Väsby Municipal Housing Company)	Lessebo Municipality	Tanums Bostäder AB (Tanum Municipal Housing Company)
AB Ängelholmshem (Ängelholm Municipal Housing Company)	Lidköping Municipality	Tibro Municipality
Ale Municipality	Lindesbergsbostäder AB (Lindesberg Municipal Housing Company)	Tierps Kommunfastigheter AB (Tierp Municipal Housing Company)
Avesta Municipality	Ludvika Municipality	Torsby Bostäder AB (Torsby Municipal Housing Company)
Bergs Hyreshus AB (Berg Municipal Housing Company)	Ludvikahem AB (Ludvika Municipal Housing Company)	Torsby Municipality
Bjuv Municipality	Malå Municipality	Trosabygdens Bostäder AB (Trosa Municipal Housing Company)
Bromölla Municipality	Mariehus AB (Mariehus Municipal Housing Company)	Uddevalla Municipality
Båstad Municipality	Mariestad Municipality	Ulricehamn Municipality
Eksta Bostads AB (Kungsbacka Municipal Housing Company)	Melleruds Municipality	Umeå Municipality
Enköping Municipality	Mönsterås Municipality	Uppsala Municipality
Falkenberg Municipality	Nordmalingshus AB (Nordmaling Municipal Housing Company)	Vaggeryd-Skillingaryds Bostads AB (Vaggeryd-Skillingaryd Municipal Housing Company)
Falköpings Hyresbostäder AB (Falköping Municipal Housing Company)	Norra Dalarnas Lokaler AB (Älvdalen Municipal Housing Company)	Vingåkers Kommunfastigheter AB (Vingåkers Municipal Holding Company)
Falköpings Kommun (Falköping Municipality)	Nykvarn Municipality	Vårgårda Bostäder AB (Vårgårda Municipal Housing Company)
Falu Municipality	Nyköping Municipality	Vårgårda Municipality
Finspång Municipality	Ockelbo Municipality	Vännäs Fastigheter AB (Vännäs Municipal Housing Company)
Grums Municipality	Olofström Municipality	Vännäs Municipality
Gällivare Municipality	Oxelösund Municipality	Växjö Kommunföretag AB (Växjö Municipalityföretag AB)
Gävle Municipality	Ramunderstaden AB (Söderköping Municipal Housing Company)	Årehus AB (Åre Municipal Housing Company)
Halmstads Rådhus AB (Halmstad Municipal Holding Company)	Region Blekinge	Älmhult Municipality
Hebygårdar AB (Heby Municipal Housing Company)	Region Gotland	Älvkarleby Municipality
Hällefors Bostads AB (Hällefors Municipal Housing Company)	Region Sörmland	Öckerö Fastighets AB (Öckerö Municipal Housing Company)
	Region Uppsala	
	Region Värmland	
	Region Västerbotten	
	Region Örebro Län	



## Project #748 Environmental remediation for new city district

**Client:** Trollhättan Exploatering AB  
(Trollhättan Development Company)

**Investment cost:** SEK 600 million

**Green loans from Kommuninvest  
(disbursed amounts):** SEK 0 million

**Completed (year):** 2032

**Impacts:** The City of Trollhättan is one of the first municipalities in Sweden to receive

green funding for an environmental clean-up project. Six similar projects received green funding from Kommuninvest in 2019.

As part of Trollhättan's growth plan, a former industrial heritage site is to form the new district of Värvik. First, however, the ground soil needs to be cleaned and the edge of the river secured against landslide risk. In addition to committed funding of SEK 123 million from Kommuninvest, a grant of SEK 52 million has

been received from the Swedish Environmental Protection Agency.

When everything is ready in 2030-2032, 1,600 to 1,800 apartments have been built, together with municipal services, commercial facilities and a preschool.

With some SEK [1.6] billion in Green Loans for eleven different projects, the City of Trollhättan is one of Sweden's largest green municipal borrowers.





## Clean transportation

Transport solutions that result in minimal or zero emissions. Project examples may include trains, underground, trams and hybrid buses. Also infrastructure supporting public transportation and other sustainable transportation, such as pedestrian and cycle paths, charging points for electric vehicles and fueling stations for renewable fuels.

### KOMMUNINVEST GREEN LOANS TO CLEAN TRANSPORTATION

Total amounts disbursed  
and outstanding

**2,121** MSEK

Total number  
of projects

**13**

### ESTIMATED ANNUAL IMPACT OF GREEN LOANS<sup>1</sup>

GHG emissions reduced

**10,501** tonnes CO<sub>2</sub>e

<sup>1</sup>) Refers to the Green Loan share of project impacts. The impact attributable to green bond investors is presented on page 3.

## Complete project-by-project-reporting in spreadsheet format at [kommuninvest.se](https://kommuninvest.se)

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### #8 CO-FINANCING OF TRELLEBORG C

Co-financing for regional train network Trelleborg-Malmö, including station and train network upgrades.

#### Borrower

Trelleborg municipality

#### Project completion

2015

#### KI share of financing

70 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

284 million

#### Disbursed amount, SEK

200 million

#### Estimated impact attributable to green loan

GHG-emissions reduced/avoided

**651 tonnes**

Other

**Reduced car travel: 6 million km/year; in 2016, increased use of public transport between Trelleborg-Malmö by 18% vs 2015.**

### #16 ELECTRIC BUSES FOR LOCAL PUBLIC TRANSPORT

The city of Umeå is investing in new ultrafast-charging electric buses, replacing buses run on diesel fuel. Thanks to high degree of renewables in local energy mix, the electric buses result in close to zero emissions of greenhouse gases.

#### Borrower

Umeå municipality

#### Project completion

2016

#### KI share of financing

100 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

76 million

#### Disbursed amount, SEK

76 million

#### Estimated impact attributable to green loan

GHG-emissions reduced/avoided

**154 tonnes**

Other

**Increased use of public transport by 5 % or 5,000 trips per year.**

### #58 RAILWAY MAINTENANCE DEPOT FREES UP CAPACITY

A new railway maintenance depot is going to reduce transport times compared with previous maintenance locations, freeing up more than 2,000 hours per year, which can be used for other rail traffic on a heavily utilized transport line.

#### Borrower

Kifab i Kalmar AB (Kalmar Municipal Industrial Property Company AB)

#### Project completion

2016

#### KI share of financing

95 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

105 million

#### Disbursed amount, SEK

100 million

#### Estimated impact attributable to green loan

GHG-emissions reduced/avoided

**n/a**

Other

**Frees up 2,000 hours of capacity per year on the intensely used Southern Main Line.**

### #404 NEW PUBLIC TRANSPORT BUS DEPOT

Construction of a city bus depot for buses that run on biogas, biodiesel and electricity. The project included construction of a biogas pipeline to enable refueling on site.

#### Borrower

Region Uppsala

#### Project completion

2019

#### KI share of financing

35 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

850 million

#### Disbursed amount, SEK

300 million

#### Estimated impact attributable to green loan

GHG-emissions reduced/avoided

**n/a tonnes**

Other

**City bus depot with biogas filling system.**

## All borrowers | Clean transportation

AB Transitio  
(Swedish Regional Train Company)

Fastighets AB Mösseberg  
(Falköping Municipal Property Company)

Inlandståget AB  
(Municipal Inland Train Company)

Kifab i Kalmar AB  
(Kalmar Municipal Property Company)

Kristianstad Municipality

Mönsterås Municipality

Osby Municipality

Region Uppsala

Svealandstrafiken AB  
(Västmanland Region Public Transportation Company)

Trelleborgs Municipality

Umeå Municipality

Åhus Hamn och Stuveri AB  
(Åhus Port Company)





## Waste management

Investments are intended to ensure sustainable, energy efficient and resource-saving waste management. Eligible projects include the construction of new waste management facilities, upgrades/expansion of existing ones; waste collection systems that minimise transport requirements and increase recycling scope, etc.

### KOMMUNINVEST GREEN LOANS TO WASTE MANAGEMENT

Total amounts disbursed and outstanding

**229** MSEK

Total number of projects

**6**

### ESTIMATED ANNUAL IMPACT OF GREEN LOANS<sup>1</sup>

Increase in capacity

**7,100** tonnes

GHG emissions (whereof reduced: 207 tCO<sub>2</sub>e; avoided 1,272 tCO<sub>2</sub>e)

**1,479** tonnes CO<sub>2</sub>e

1) Refers to the Green Loan share of project impacts. The impact attributable to green bond investors is presented on page 3.

## Complete project-by-project-reporting in spreadsheet format at [kommuninvest.se](https://kommuninvest.se)

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### #674 NEW RECYCLING STATION

Construction of a new recycling station located closer to users, ie. closer to the city. This will reduce transport distances and related CO<sub>2</sub> emissions. In addition, two old oil boilers are replaced with heat production from the local district heating plant. Installation of solar cells on the facility is also planned.

**Borrower**  
Smedjebacken municipality

**Project completion**  
2020

**KI share of financing**  
100 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
31 million

**Disbursed amount, SEK**  
31 million

**Estimated impact attributable to green loans**

GHG-emissions reduced/avoided

**63 tonnes**

### #169, 385 REMODELING WASTE COLLECTION AND SORTING

Multi-municipal collaboration for waste management involving four cities. The projects refer partly to the takeover of existing fixed assets but also investing in reloading stations and waste bins to enable segregation and collection of food waste and residual waste at source.

**Borrower**  
Kommunalförbundet Samverkan Återvinning och Miljö (Gislaved, Gnosjö, Vaggeryd and Värnamo Municipal Waste Management Cooperation)

**Project completion**  
2018–2019

**KI share of financing**  
73 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
100 million

**Disbursed amount, SEK**  
73 million

**Estimated impact attributable to green loans**

GHG-emissions reduced/avoided

**1,418 tonnes**

### All borrowers | Waste management

Barken Vatten och Återvinning AB  
(Ludvika Smedjebacken Municipal Water & Waste Management Company)

Halmstads Rådhus AB  
(Halmstad Municipal Holding Company)

Kommunalförbundet Samverkan  
Återvinning och Miljö (Gislaved, Gnosjö,  
Vaggeryd and Värnamo Municipal Waste  
Management Cooperation)

Region Uppsala  
Söderköping Municipality





## Water and wastewater management

Construction and upgrading of freshwater and wastewater systems to accommodate population growth and higher precipitation levels and to meet environmental regulations. Project that apply innovative technologies to reduce levels of harmful substances and make good use of the resources contained in wastewater. Examples: water and wastewater networks, water treatment plants, treatment of discharges to watercourses, and investment in energy and heat recovery from water and wastewater networks.

### KOMMUNINVEST GREEN LOANS TO WATER AND WASTEWATER MANAGEMENT

Total amounts disbursed and outstanding

**5,848** MSEK

Total number of projects

**42**

### ESTIMATED ANNUAL IMPACT OF GREEN LOANS<sup>1</sup>

Increase in capacity (population equivalents)

**349,727** p.e.

<sup>1)</sup> Refers to the overall impact of the financed projects, not the Green Loan share of project impacts. The impact attributable to Green Bond investors is presented on page 3.

## In-depth analysis into the green benefits of water projects

During 2019, Kommuninvest resolved to conduct an in-depth analysis of the climate and environmental benefits associated with all projects financed in the Water and Wastewater Management project category. This was the result of a gradual realization about the wide range of impacts associated with such projects. A more complete analysis was required, in order to be able to aggregate impact results from all projects.

A model for following up more closely on such projects was developed with support from the Swedish Water & Wastewater Association. Due to challenges for borrowers to complete

all input fields, the results presented here do not fully capture all projects. Reporting is confined to those projects which were capable of demonstrating quantitative data before and after the investment. 36 out of 41 projects had completed the survey by year-end 2019.

Project objective (multiple responses possible)	# of projects
Add capacity	24
Comply with new purification requirements	21
Replace individual drains	13

	BEFORE investment	AFTER investment	INCREASE (+) DECREASE (-)	%	Reported share of impact
Number of person equivalents supplied by the facility, p.e.	1,030,686	1,380,413	349,727	34%	134,077
<i>Number of projects included in this reporting</i>	29	29	29		29
<b>Freshwater production</b>					
Annual volume of freshwater treated, m <sup>3</sup> <sup>1</sup>	38,579,230	50,808,478	12,229,248	32%	7,343,637
Annual volume of freshwater treated per p.e., m <sup>3</sup>	93	111	18	19%	
<i>Number of projects included in this reporting (per p.e.)</i>	13 (10)	13 (10)	13 (10)		
Energy consumption per m <sup>3</sup> of freshwater supplied, kWh <sup>2</sup>	0.38	0.62	0.24	63%	0.14
<i>Number of projects included in this reporting</i>	13	13	13		
Electricity production on-site, kWh per year	777,250	941,400	164,150	21%	133,261
<i>Number of projects included in this reporting</i>	5	5	5		
<b>Sewage treatment and measures to reduce bridges/leaks</b>					
Nitrogen, emissions of, kg per year	1,012,057	761,674	-250,383	-25%	-172,975
<i>Number of projects included in this reporting</i>	17	17	17		
Phosphorus, emissions of, kg per year	26,363	18,776	-7,587	-29%	-2,289
<i>Number of projects included in this reporting</i>	16	16	16		
Oxygen-consuming substances, BOD, kg per year	579,129	453,300	-125,829	-22%	-60,439
<i>Number of projects included in this reporting</i>	16	16	16		
Annual volume of wastewater treated, m <sup>3</sup>	94,523,401	133,722,319	39,198,918	41%	8,436,093
Annual volume of wastewater treated per p.e., m <sup>3</sup>	109	95	-14	-13%	
<i>Number of projects included in this reporting (per p.e.)</i>	17 (15)	17 (15)	17 (15)		
Energy consumption per m <sup>3</sup> of wastewater treated, kWh <sup>3</sup>	0.68	0.77	0.09	13%	
<i>Number of projects included in this reporting</i>	12	12	12		
Electricity production on-site, kWh per year	0	111,967	111,967	n/a	24,645
<i>Number of projects included in this reporting</i>	3	3	3		
Production of biogas, m <sup>3</sup> per year	3,850,879	4,679,764	828,885	22%	784,470
(of which upgraded to vehicle fuel, m <sup>3</sup> per year)	1,107,056	1,240,273	133,217	12%	133,217
<i>Number of projects included in this reporting</i>	8 (2)	8 (2)	8 (2)		

1) Gross, excluding electricity production on-site.

2) Estimated as an average across 10 projects that reported both person equivalents and annual volume of freshwater treated.

3) Estimated as an average across 15 projects that reported both person equivalents and annual volume of wastewater treated.



## Complete project-by-project-reporting in spreadsheet format at [kommuninvest.se](https://kommuninvest.se)

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### #57 HIMMERFJÄRDSVERKET (WASTE WATER)

Reduction in chemical emissions by investing in new equipment for rough cleansing reject water treatment.

#### Borrower

Sydvästra  
Stockholmsregionens  
VA-verksaktiebolag SYVAB

#### Project completion

2021

#### KI share of financing

28 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

434 million

#### Disbursed amount, SEK

217 million

#### Estimated impact attributable to green loans

Population equivalent increase: 10,080

Nitrogen emissions reduced:

9,800 kg

Phosphorus emissions reduced:

2,100 kg

BOD emission emissions reduced:

25,200 kg

### #346 PÅLSLUNDS SEWAGE TREATMENT (WASTE WATER)

New waste water treatment plant built for increased capacity to manage a growing population and to meet EU requirements.

#### Borrower

Värnamo municipality

#### Project completion

2015

#### KI share of financing

83 %

#### Expected or Actual impact

Actual

#### Total investment, SEK

301 million

#### Disbursed amount, SEK

250 million

#### Estimated impact attributable to green loans

Population equivalent increase: 4,980

Nitrogen emissions reduced:

17,363 kg

Phosphorus emissions reduced:

-17 kg

BOD emissions reduced: 1,048 kg

### #281 ARTIFICIAL INFILTRATION (DRINKING WATER)

During the preparation of the drinking water, surface water is diverted from the Lule river, which through the infiltration basins is supplied to the groundwater source in Gäddvik.

#### Borrower

Luleå municipality

#### Project completion

2016

#### KI share of financing

41 %

#### Expected or Actual impact

Actual

#### Total investment, SEK

242 million

#### Disbursed amount, SEK

100 million

#### Estimated impact attributable to green loans

Population equivalent increase: 10,250

Amount of treated water increased:

6,560 m<sup>3</sup>

### #696 REBUILDING OF TREATMENT PLANT (WASTE WATER)

Capacity expansion of the treatment plant, including nitrogen purification process which was previously lacking, having a major impact on the eutrophication problem in the Baltic Sea.

#### Borrower

Söderköping municipality

#### Project completion

2019

#### KI share of financing

0 %

#### Expected or Actual impact

Expected

#### Total investment, SEK

10.5 million

#### Disbursed amount, SEK

0 million

#### Estimated impact attributable to green loans

Population equivalent increase: 0

Nitrogen emissions reduced: 0 kg

Phosphorus emissions reduced: 0 kg

BOD emission emissions reduced: 0 kg

## All borrowers | Water and wastewater management

City of Borås

Falu Energi och Vatten AB  
(Falu Energy and Water Company)

Härjedalens Municipality

Kalmar Vatten AB (Kalmar Water Company)

Karlskoga Energi och Miljö AB  
(Karlskoga Energy and Environment Company)

Kramfors Municipality

Laxå Vatten AB (Laxå Water Company)

Leksands Vatten AB  
(Leksand Water Company)

Lidköping Municipality

Luleå Municipality

Mönsterås Municipality

Mörbylånga Municipality

Nordanstig Vatten AB  
(Nordanstig Water Company)

Nyköping Municipality

Oskarshamn Municipality

Piteå Renhållning och Vatten AB (Piteå  
Water and Waste Management Company)

Region Gotland

Region Uppsala

Rättvik Vatten och Avfall AB  
(Rättvik Water and Wastewater  
Management Company)

Skellefteå Municipality

Skövde Municipality

Sollentuna Energi och Miljö AB (Sollentuna  
Energy and Environment Company)

Strömstad Municipality

Sydvästra Stockholmsregionens  
Va-verksaktiebolag SYVAB (Water  
Management Company of Southwest  
Stockholm Region)

Söderköping Municipality

Tanum Municipality

Vadstena Municipality

Vaggeryd Municipality

Varberg Municipality

Vatten & Avfall i Malung-Sälen AB  
(Malung-Sälen Water and Wastewater  
Management Company)

Värmdö Municipality

Värnamo Municipality

Ätvidabergs Vatten AB (Ätvidaberg  
Municipal Water Management Company)

Örnsköldsvik Municipality



## Climate change adaptation

Investments in this category are intended to improve local adaptation to climate change. This includes facilities and installations to manage urban runoff, floods, landslides, avalanches, rising sea levels, and other challenges due to changed weather and climate conditions. Measures undertaken may be related to buildings, infrastructure and sensitive surroundings.

### KOMMUNINVEST GREEN LOANS TO CLIMATE CHANGE ADAPTATION

Total amounts disbursed and outstanding

**16** MSEK

Total number of projects

**1**

### #90 FLOOD PROTECTION LEVEL

Construction of levee on the western embankment of Kristianstad, to protect the city from flooding.

**Borrower**  
Kristianstad municipality

**Project completion**  
2016

**KI share of financing**  
93 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
17.1 million

**Disbursed amount, SEK**  
16 million

**Estimated impact attributable to green loans**

-

Other

**Reduced risk of contamination of the Helgeå stream.**

### All borrowers | Climate change adaptation

Kristianstad Municipality



## Environmental management

This category covers a range of projects that intend to ensure sustainable use of land. This may include projects such as restoration of biodiversity, planting forests, cleaning up of harmful substances, developing land into recreational space, facilitating walking, cycling and public transportation solutions. Measures may include nature conservation and improving eco-system services.

### KOMMUNINVEST GREEN LOANS TO ENVIRONMENTAL MANAGEMENT

Total amounts disbursed and outstanding

**129** MSEK

Total number of projects

**7**

### #732, 770, 771 MINIMIZING DAMAGE FROM FORMER LANDFILLS

Measures to improve environmental performance of former landfills. These will include final coverage and building barriers, to reduce landfill leachate and methane gas leakage, and improve methane gas collection. Measures will reduce contamination of surface water and ground-water sources.

**Borrower**  
Kalmar municipality

**Project completion**  
2022–2029

**KI share of financing**  
79 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
163.5 million

**Disbursed amount, SEK**  
129 million

**Estimated impact attributable to green loans**

**The amount of leachate passing through the former Moskogen landfill (project #732) landfill will decrease by more than 85 percent.**

### #773, 774 DECONTAMINATION AND DISPOSAL OF HAZARDOUS WASTE

Handling and removal of hazardous chemicals from a defense heritage site and a former wood processing site.

**Borrower**  
Kalmar municipality

**Project completion**  
2021–2022

**KI share of financing**  
0 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
97.6 million

**Disbursed amount, SEK**  
0 million

**Estimated impact attributable to green loans**

**The actions carried out will reduce health risks, reduce risks to the soil environment and reduce the risk of water source contamination.**

### #772 TREATMENT OF DREDGE SPOILS

Treatment of approx. 60,000 m<sup>3</sup> (100,000 tonnes) in dredge spoils from the dredging of the Tegelviken area.

**Borrower**  
Kalmar municipality

**Project completion**  
2022

**KI share of financing**  
0 %

**Expected or Actual impact**  
Expected

**Total investment, SEK**  
13.5 million

**Disbursed amount, SEK**  
0 million

**Estimated impact attributable to green loans**

**Tests show that the leaching of heavy metals, mainly zinc, is relatively high in parts of the mud masses. An admixture of about 5% limestone stabilizes the pH of the dredge to about 7 and results in substantially less leaching of heavy metals.**

#### All borrowers | Environmental management

Kalmar Municipality; Trollhättan Development Company (Trollhättan Exploatering AB)



# Impact reporting methodology

## Introduction

The purpose of this impact report is to illustrate the climate and environmental impacts that have resulted or are projected to result from projects financed through the Kommuninvest Green Bonds Framework. Kommuninvest is committed to transparent reporting and conservative assessments when reporting these results.

As of 31 December 2019, Kommuninvest had financed Eligible Projects in eight out of eight project categories: Renewable energy; Energy efficiency in energy systems; Green buildings and energy efficiency; Clean transportation; Waste management; Water and wastewater management; Climate change adaptation and Environmental management.

Investments in these categories, save for adaptation measures and environmental management, typically lead to direct reductions in greenhouse gas emissions, primarily through energy savings, or reduce energy consumption and thereby indirectly reduce greenhouse gas emissions.

## Interpret results with caution

A number of key result indicators including indicators targeting renewable energy generation, energy savings and reduced and avoided GHG emissions have been selected and where possible quantified. However, it is important to consider the following aspects in order to adequately interpret the reported results:

- **Uncertainty and comparability:** Estimations of impact indicators and projections of impacts are based on certain assumptions. Kommuninvest aims to make sound, conservative and reasonable assumptions based on, inter alia, current information and data provided by its borrowers. Actual results may differ from initial projections as a result of unforeseen project outcomes, behavior and slow start-up periods.
- **Qualitative results:** The projects listed within this report may have impacts across a wider range of indicators than those included in this report. Where quantitative data is unavailable,

qualitative data, to the extent possible have been included to illustrate the type and direction of other beneficial impacts.

- **Ex-ante and ex-post:** Both impact analysis (ex-ante) and impact reporting (ex-post) will be used to report the impacts of a project. Kommuninvest aims to report actual results where feasible, and has included information to that effect in the project disclosures in this report and online. As required by the Kommuninvest Green Bonds Framework, all Eligible Projects must promote the transition to a low-carbon and climate-resilient society.

## Adhering to harmonised guidelines

The impact indicators summarized in this report focus on results deemed relevant to Green Bond investors, and seeks to be aligned with the recommendations outlined in the Nordic Position Paper<sup>1</sup> (see page 15). In many respects, this means alignment also with the IFI Harmonized Framework for Impact Reporting<sup>2</sup>, published by a group of international financial institutions, and with impact reporting recommendations as outlined by the Green Bond Principles<sup>3</sup>. The indicators are intended to illustrate the type and scale of expected results in a variety of projects. It is important to note that, because of the wide range of project categories, comparability between projects (and other project portfolios) may be limited.

## Calculation of climate impact

The environmental impact of Eligible Projects is calculated using actual or estimated annual impact, compared to an alternative base scenario where the investment has not taken place or where it has been completed solely meeting regulatory requirements.

The impact of reduction in greenhouse gas emissions is measured in CO<sub>2</sub>-equivalents (CO<sub>2</sub>e) while energy savings are measured in MWh. Other units of measurements may be used when appropriate. All project climate impact

1) Nordic Public Sector Issuers: Position Paper on Green Bonds impact reporting, February 2020

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

3) See "Handbook - Harmonized Framework for Impact Reporting, June 2019" at the Resource Centre for Green & Social Bonds at icmagroup.com

calculations are based on the share of financing provided by Kommuninvest and the actual disbursements to the project.

We report the impact of investments on an ex-ante basis, i.e. on the basis of estimates. If we have access to ex-post data, i.e. actual outcomes, we will report on these. The project-by-project disclosures indicate whether impact is reported based on estimates or actual outcomes.

### Approach

The impact of Eligible Projects funded by Kommuninvest can be calculated in a number of ways:

- by reference to the reduction in energy consumption or added renewable energy capacity, and thus the greenhouse gas emissions avoided as a result of energy savings or crowding out dirtier alternatives (mitigation projects).
- the contribution made to strengthening local adaptation to climate change (adaptation projects).
- the environmental benefits achieved in other ways than through mitigation or adaptation measures (environmental management projects).

### Green buildings and Renewable energy

As of 31 December 2019, 56 (52) percent of the disbursements were for Green building projects and 23 (31) percent for Renewable energy projects, project categories which are deemed greenhouse gas mitigation investments.

To calculate the climate and environmental impact, the completed project has to be compared with an alternative scenario. In some cases, it will be appropriate to consider the investment in relation to a baseline scenario – a reference scenario in which the investment does not exist. In such cases the calculation will be as follows:

*Annual climate impact = (emissions produced or energy consumed by the project in a baseline scenario) – (emissions produced or energy consumed by the project after the investment has been completed).*

In other cases, for example where the project financed is a new building, the approach is to assume that the investment will be undertaken regardless but that the borrower may choose to adhere to less strict climate standards. In such instances the climate impact is calculated on the basis of an alternative scenario in which the investment meets the minimum requirements

contained in the applicable building regulations. The calculation will then be as follows:

*Annual climate impact = (emissions produced or energy consumed by an equivalent investment if minimum standards were followed) – (emissions produced or energy consumed by the project after the investment has been completed).*

A detailed disclosure of the impact calculations deployed in this report is provided on pages 47–48.

### Scope

At this stage, Kommuninvest report impact on Scope 1 and Scope 2 emissions, ie. including all direct GHG emission as well as indirect GHG emissions from consumption of purchased electricity, heat, cooling or steam.

### Impact disclosed in relation to financed portion

This report illustrates the expected or realized environmental impact made possible as a result of projects to which Green Bond proceeds have been allocated. When we report impact, we do so in relation to the share of the project's total investment cost that Kommuninvest has financed, and to amounts disbursed and outstanding to the project.

### Impact per invested SEK

Measuring the impact of a green investment project in relation to the money that has been invested is a clear and simple metric to evaluate Green Bonds. While this 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<sub>2</sub>. This could, for instance, be adaptation and water management projects or sustainable buildings that have other significant environmental values apart from the CO<sub>2</sub> avoided/reduced. For Kommuninvest, this applies to the project categories Water and wastewater management, Climate change adaptation and Environmental management.

We therefore report impact per invested SEK for investment projects or project categories where the CO<sub>2</sub>-impact is quantifiable and relevant. For conservative purposes, we 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. In cases where no disbursements have been made to a project, the environmental benefit for that project will be recognised as zero.

A comparison of impact per invested SEK between the Renewable energy and Green building project categories indicate a considerably higher CO<sub>2</sub>e impact for the former vs. the latter. A couple of perspectives are relevant here.

Firstly, the primary purpose of a new building is to provide a specific function as a residential or non-residential building. Energy savings are important, however not the primary objective of the investment. This is in contrast to renewable energy investments, where the energy production is in focus. Secondly, the majority of green buildings financed by Kommuninvest are heated through district heating. This means that the major part of energy savings are calculated against a baseline of 63 kg CO<sub>2</sub> per MWh, instead of the 315 kg CO<sub>2</sub> per MWh used for electricity savings.

### About baselines for CO<sub>2</sub> emissions

Deciding upon a baseline emission factor against which the environmental impact can be measured is important, since the chosen baseline will determine the calculated environmental benefits. Kommuninvest's choice of baselines and methodology for calculation environmental impact are aligned with the recommendations of the Nordic Position Paper.

Outlined below are the baseline choices for the two largest project categories of the Kommuninvest Green Bonds Framework: Renewable energy and Green buildings and energy efficiency. The full disclosure of baselines used in this report is available on page 45.

For electricity, Kommuninvest uses an EU Mainland grid factor including the UK and Norway as the baseline. The rationale is that a non-negligible interconnection between the Nordic countries and European energy markets exist already today and is planned to increase in the coming decades.

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), as suggested by the IFR Framework for a Harmonized Approach to Greenhouse Gas Reporting<sup>3</sup>. However, Kommuninvest applies the same combination of the OM and BM for all projects, as recommended by the Nordic Position Paper.

<sup>3</sup> International Financial Institution (IFI) Framework for a Harmonized Approach to Greenhouse Gas Accounting, November 2015; Green Bonds, Working Towards a Harmonized Framework for Impact Reporting, December 2015.

## GHG EMISSIONS AND CO<sub>2</sub> IMPACT, BY PROJECT CATEGORIES

Project category	GHG emissions reduced/ avoided, tonnes CO <sub>2</sub> e/year	Disbursements, SEK mn	Impact, tonnes CO <sub>2</sub> e per SEK mn
Renewable energy	566,161	9,330	61
Energy efficiency	6,045	22,376	0
Green buildings and energy efficiency	26,409	235	112
Clean transportation	10,501	2,121	5
Waste management	1,479	229	6
Water management	n/a	5,848	n/a
Adaptation measures	n/a	16	n/a
Environmental management	n/a	129	n/a
<b>Total GHG emissions reduced/avoided, tonnes CO<sub>2</sub>e</b>			<b>610,596</b>
<b>Total disbursements, SEK million</b>			<b>40,283</b>
<b>Disbursements with quantified CO<sub>2</sub> impact, SEK million</b>			<b>34,291</b>
<b>% of disbursements with quantified CO<sub>2</sub> impact</b>			<b>85%</b>



For district heating<sup>4</sup> systems, which are fundamentally local/regional and not interconnected on a national or Nordic basis, Kommuninvest has commissioned an external advisor to develop a baseline emission factor for district heating for Sweden, based on avoided mix of best available alternative heating technologies<sup>5</sup>.

To calculate the impact and energy efficiency of buildings, the financed building is compared with the requirements of the Swedish national building code (Boverkets Byggregler, BBR).

### Energy efficiency in new Green Buildings

As per 31 December 2019, 203 (141) Green Building projects were financed, of which 184 (132) were new buildings (residential, non-residential and other), 5 (5) were energy efficiency projects in existing buildings and 14 (4) were major renovations of existing buildings.

Total energy use in the 74 (57) residential building projects, expected or actual, is 22,397 (17,187) MWh per annum, or on average 57 (57) kWh per sq.m and year. This equates to 38 (40) percent less than building requirements. Had these buildings solely been built to meet national building regulations, total energy consumption would have been 36,133 (28,503) MWh. The total heated surface area for these buildings is 391,742 (299,750) sq.m.

For the 97 (67) non-residential building projects, the total expected or actual energy use is 31,182 (22,776) MWh per annum, or on average 49 (51) kWh per sq.m and year. This equates to 52 (50) percent less than building requirements. Had these buildings solely been built to meet national building regulations, total energy consumption would have been 64,814 (45,971) MWh. The total heated surface area for these buildings is 635,468 (444,108) sq.m. Please note that data above refer to the total for the projects, irrespective of how much has been financed with Green Loans.

For both residential and non-residential building projects the reference to the Swedish building regulation is to the regulation in force upon approval of the project, either Boverket's Building Regulations BBR 21, until March 2018, or Boverket's Building Regulations BBR 25, from March 2018.

### Reduced and avoided emissions

Kommuninvest has applied the following approach to define whether a financed investment project results in reduced or avoided emissions. The climate benefit for all Renewable energy projects is regarded as avoided emissions, since the production of renewable energy is considered to displace alternative more carbon-intensive energy production. Also for Waste management projects, the climate benefit is regarded as avoided emissions, as most of the quantifiable climate benefit derives from more efficient waste management leading to increased production of biogas. Regarding Green buildings, Kommuninvest considers the climate benefit from new buildings as avoided emissions, as the alternative is that the building had been constructed in accordance with applicable legal requirements. Climate benefits from energy efficiency projects and major renovations within Green buildings, on the other hand, are regarded as reduced emissions. For the project categories Energy efficiency in energy systems and Clean transportation, the climate benefit is also regarded as reduced emissions, since the projects financed are mainly considered to result in the replacement of more carbon-intensive alternatives.

### Joule conversion

In this report we use watt-hours as the energy unit, with 1 Wh being the equivalent of one watt of power expended for one hour of time. The Joule (J) conversion factor is: 1 Wh = 3.6 kJ; 1 kWh = 3.6 MJ, 1 MWh = 3.6 GJ.

4) 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 and 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.

5) Profu memorandum (in Swedish only): "Stöd till klimatutvärdering av gröna investeringar inom fjärrvärmeområdet", February 2017. Interested parties can obtain this report by sending a request to: ir@kommuninvest.se

## Baselines for CO<sub>2</sub> emissions

The baseline emission factors (used to calculate emissions for the alternative scenario) and project emission factors (used to calculate emissions from actual projects) are presented on the next page. Below, the considerations for electricity and district heating project are outlined.

### Electricity

The highly interconnected regional electricity market is the cornerstone of the Nordic energy system, and it can serve as a key enabler for further emissions reductions in the decades ahead. It can also be expected that European energy markets will be increasingly interconnected, with energy traded cross-border to an increasing degree.

In line with the recommendations of the Nordic Position Paper, Kommuninvest has chosen an EU Mainland grid factor including the UK and Norway as the baseline as the relevant baseline for electricity. The rationale is that the Nordic electricity market is already characterised by a high level of interconnection, also with neighboring countries in the Northern European region. 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. Regardless of whether the energy balance is characterised by an export surplus or a need for imported electricity, added renewable energy capacity and reductions in energy use in the Nordic region translate into the crowding out of more carbon-intensive energy production elsewhere. Using a

marginal approach for assessing the environmental benefit, rather than an average approach, is in accordance with a consequential perspective for investments.

In line with IFI recommendations<sup>1</sup>, the Nordic Position Paper recommends the use of a Combined Margin (CM) for the grid that is comprised of an Operating Margin (OM) and a Build Margin (BM). However, for simplicity and relevance to the Nordic context, we apply a CM of 50 per cent OM and 50 per cent BM for all relevant projects, as opposed to the IFIs which apply different combinations of the OM and BM depending on the type of project financed. The CM used in this report is 315 kg CO<sub>2</sub>e per MWh.

### District heating

In the Nordic countries, district heating<sup>2</sup> has successfully enabled the transition from fossil fuel based heating systems to heating systems based primarily on renewable energy sources. Remaining fossil fuel use is today being gradually substituted and phased out.

The systems of district heating (and district cooling) are fundamentally local/regional and not interconnected on a national or Nordic basis. Kommuninvest has commissioned an external advisor (Profu) to develop a baseline emission factor for district heating for Sweden, based on avoided mix of alternative heating technologies. This estimated baseline figure for district heating in Sweden amounts to 117 kg/MWh, representing an avoided alter-

native heating mix of 20 per cent wood pellet boilers, 45 per cent geothermal heat pumps, 28 per cent air/water heat pumps and 7 per cent air to air heat pumps.

Readers are advised that this figure represents a national average for what are essentially locally based energy systems, in order to facilitate calculations. Using national averages is feasible for most investment projects financed by Kommuninvest, but local circumstances and actual changes in production mix are considered for certain projects related to increased interconnection, energy efficiency and other changes in the production mix.

For the calculation of impact, Kommuninvest compares baseline emissions with actual or expected project emissions. For district heating projects in the renewable energy category, Kommuninvest seeks to calculate project emissions based on the national average emission factor for district heating in Sweden. An additional environmental benefit of 41 kg/MWh, as a national average, is ascribed due to avoided alternative waste treatment (land fill and methane leakage). In certain cases, where financed projects target a change in fuel mix, Kommuninvest calculates impact based on local data.

For district heating projects in the energy efficiency category, Kommuninvest calculates project emissions based on local emissions. No additional benefit for avoided alternative waste treatment is applied.

1) International Financial Institution (IFI) Framework for a Harmonized Approach to Greenhouse Gas Accounting, November 2015.

2) District heating is a system for distributing heat generated in a centralized location for residential and commercial heating requirements. In Sweden, the heat is often obtained from a cogeneration plant burning principally renewable energy sources, including biomass, but plants also use waste and 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.

## REPORTING METHODOLOGY & BASELINES

### Baseline emission factors (used to calculate alternative emissions scenario), Scope 1 and 2

Type	Emission factor	Comment
Variable electricity generation, e.g. wind and solar power projects	315 kg CO <sub>2</sub> e/MWh	EU25+UK&Norway: Combined Margin (50% Operating Margin (OM) 476 kg CO <sub>2</sub> e/MWh + 50% Build Margin (BM) 154 kg CO <sub>2</sub> e/MWh) <sup>1</sup>
Firm electricity generation e.g. hydropower projects	315 kg CO <sub>2</sub> e/MWh	See above
Electricity consumption from the grid, e.g. green buildings and energy efficiency projects	315 kg CO <sub>2</sub> e/MWh	See above
Electricity generation in district heating projects	315 kg CO <sub>2</sub> e/MWh	See above
Heat consumption from the grid, e.g. green building and energy efficiency projects	63 kg CO <sub>2</sub> e/MWh	Swedish average for heating production from district heating, 2018 <sup>2</sup>
Heat generation in district heating projects	117 kg CO <sub>2</sub> e/MWh	Estimated national Swedish average for avoided alternative heating <sup>3</sup>
Waste incineration in district heating projects	41 kg CO <sub>2</sub> e/MWh	Estimated national Swedish average for avoided alternative waste treatment <sup>4</sup>
Biogas generation projects	247 kg CO <sub>2</sub> e/MWh	Diesel (fossil) <sup>5</sup>

1) Calculation by Kommuninvest in November 2019, based on IFI Interim Dataset of Harmonized Grid Factors 11.05.2019, as provided by Nordic Investment Bank.

2) Swedenergy

3) Profu, 2017

4) Swedenergy (calculations by Profu)

5) Swedish Petroleum & Biofuels Institute

### Project emission factors (used to calculate actual project emissions), Scope 1 and 2

Type	Emission factor	Comment
Variable electricity generation, e.g. wind and solar power projects	0 kg CO <sub>2</sub> e/MWh	–
Firm electricity generation, e.g. hydropower projects	0 kg CO <sub>2</sub> e/MWh	–
Electricity generation in district heating projects	97 kg CO <sub>2</sub> e/MWh	Swedish average for electricity production from district heating, 2015 <sup>1</sup>
Heating generation in district heating projects	63 kg CO <sub>2</sub> e/MWh	Swedish average for heating production from district heating, 2018 <sup>1</sup>
Biogas generation projects	0 kg CO <sub>2</sub> e/MWh	–

1) Swedenergy



## Collected data and Climate impact calculation

Collected data represents the information that Kommuninvest asks borrowers to provide in Green Loan applications and annual follow-up reporting. Not all projects have provided all of the information indicated in this section.

### RENEWABLE ENERGY

Eligible Projects in the Renewable energy category exploit or intend to

exploit various types of renewable energy sources, in order to expand capacity or replace or offset existing or planned fossil fuel-based energy production and supply.

Renewable energy sources that can be approved for Kommuninvest financing include solar and wind power, geothermal energy, bioenergy, bioenergy and biogas from waste, as well as small-scale

hydro power. The maximum share of fossil fuels in district heating projects is 10 percent (peat is treated as a fossil energy source). If fossil waste fractions are used for energy extraction the share of fossil energy is a maximum 20 percent.

The table below outlines the data input collected from Eligible Projects as well as the methodology applied when calculating the environmental impact.

Sub-category	Collected data	Climate impact calculation
Bioenergy	<ul style="list-style-type: none"> <li>Annual production of bioenergy (biodiesel, bioethanol, biogas, CNG<sup>1</sup> and other biofuels), measured in MWh.</li> <li>Annual delivery of specific bioenergy measured in MWh.</li> </ul>	<p>Annual climate impact (CO<sub>2</sub>e) =</p> <p>Annual production of renewable energy in MWh* baseline emissions factor - Annual production of renewable energy (MWh)* project emission factor.</p> <p>Note: Different baseline emission factors and project emission factors are applied to different sub-categories. These are presented on the preceding page.</p>
Wind, wave, solar and geothermal	<ul style="list-style-type: none"> <li>Installed capacity, in MW.</li> <li>Estimated annual production of electricity, in MWh.</li> </ul>	See above
District heating	<ul style="list-style-type: none"> <li>Estimated or actual annual output of heating and electricity, in MWh.</li> </ul>	See above

### ENERGY EFFICIENCY IN ENERGY SYSTEMS

Eligible Projects in this category are intended to improve energy efficiency

in predominantly fossil-free energy systems, resulting in either a reduction in energy use or the increased delivery of energy to end users.

Sub-category	Collected data	Climate impact calculation
District heating systems	See Renewable energy	See Renewable energy

<sup>1</sup>) Compressed Natural Gas (Sw: "fordonsgas") from bioenergy plants

## REPORTING METHODOLOGY & BASELINES

### GREEN BUILDINGS

Eligible Projects in this category are intended to reduce energy usage in new or existing buildings, resulting in a reduction in net external energy demand and a reduction in CO<sub>2</sub> emissions.

Impact is reported in relation to the building regulation in force upon launch of the Kommuninvest Green Bonds Framework (Boverkets Building Regulations BBR 21). The regulation has since

been revised and the regulation in force upon publication of this document is Boverket's Building Regulations BBR 25.

Sub-category	Collected data	Climate impact calculation
New buildings	<ul style="list-style-type: none"> <li>• Heated surface area in square metres (Atemp).</li> <li>• Estimated annual heating consumption of the building, measured in kWh/Atemp in accordance with applicable Swedish regulations.</li> <li>• Estimated annual electricity consumption of the building, measured in kWh/Atemp.</li> <li>• Required maximum energy consumption of the building, measured in kWh/Atemp.</li> <li>• Annual production of installed solar panels, measured in kWh/ Atemp.</li> </ul>	<p>Annual climate impact (CO<sub>2</sub>e) =</p> <p>((Heat consumption of reference building in MWh* baseline emissions factor for heat consumption + electricity consumption of reference building in MWh* baseline emissions factor for electricity consumption) - (Heat consumption of project building in MWh* baseline emissions factor for heat consumption + electricity consumption of the project building in MWh* baseline emissions factor for electricity consumption))</p> <p>Note: The relationship between heat and electricity consumption of the reference building may differ from the project building.</p>
Energy efficiency	<ul style="list-style-type: none"> <li>• Heated surface area square metres (Atemp),</li> <li>• Annual energy use before the investment, in MWh.</li> <li>• Annual energy use after the investment, in MWh.</li> </ul>	<p>Annual climate impact (CO<sub>2</sub>e) =</p> <p>((Heat consumption of building pre investment in MWh* baseline emissions factor for heat consumption + Electricity consumption of building pre investment in MWh* baseline emissions factor for electricity consumption) - (Heat consumption of building post investment in MWh* baseline emissions factor for heat consumption + electricity consumption of building post investment in MWh* baseline emissions factor for electricity consumption))</p> <p>Note: The relationship between heat and electricity consumption of the building pre investment may differ from that of the building post investment.</p>
Major renovations	<ul style="list-style-type: none"> <li>• Heated surface area in square metres (Atemp).</li> <li>• Estimated annual heating consumption of the building before/after renovation, measured in kWh/Atemp in accordance with applicable Swedish regulations.</li> <li>• Estimated annual electricity consumption of the building before/after renovation, measured in kWh/Atemp.</li> <li>• Required maximum energy consumption of the building, measured in kWh/Atemp.</li> <li>• Annual production of installed solar panels, measured in kWh/ Atemp.</li> </ul>	<p>Annual climate impact (CO<sub>2</sub>e) =</p> <p>((Heat consumption of building pre investment in MWh* baseline emissions factor for heat consumption + Electricity consumption of building pre investment in MWh* baseline emissions factor for electricity consumption) - (Heat consumption of building post investment in MWh* baseline emissions factor for heat consumption + electricity consumption of building post investment in MWh* baseline emissions factor for electricity consumption))</p> <p>Note: The relationship between heat and electricity consumption of the building pre-investment may differ from that of the building post investment.</p>

## OTHER PROJECT CATEGORIES

For project categories outlined below, no generally applicable calculation model is used, Kommuninvest relies on reported data from projects. More elaborate impact analysis is possible to undertake in relation to these projects, and we aim to develop our reporting in the future. The choice of indicators can also be expected to undergo revision as more knowledge is gathered and best practices are developed.

### Public transportation

Eligible Projects are intended to increase transportation of goods and passengers while consuming a minimal or zero amount of fossil fuels, resulting in a reduction of GHG emissions.

#### Collected data

- Number of kilometres per year with clean transport solutions.
- Number of people the project will affect each year.
- An estimate of the number of cars/road kilometres the project will replace.
- If feasible: Annual energy savings, reduction in greenhouse gas emissions and/or local emissions, or amount of greenhouse gas emissions and/or local emissions that will be avoided as a result of the investment.

### Waste management

Eligible Projects are intended to either increase recycled waste capacity,

improve energy efficiency, reduce the amount of release of harmful substances or meet other appropriate conditions set by Kommuninvest.

#### Collected data

- Number of tonnes of waste expected to be processed by the facility each year.
- An estimate of the reduction in greenhouse gas emissions/the amount of greenhouse gas emissions that will be avoided as a result of the investment, in tonnes of CO<sub>2</sub>e.
- If feasible: Estimate annual energy savings attributable to the investment, in kWh.
- Expected improvement in material recovery rate or other target for improved resource use.
- For biogas plants: Expected annual production volume.

### Water and wastewater management

Eligible Projects are intended to reduce leakage or improve filtration of harmful substances in the water purification process, increase output measured in person equivalents (PE) or meet other appropriate conditions set by Kommuninvest.

#### Collected data

- Number of person equivalents (PE) of water or wastewater the plant processes, identifying any increase that can be attributed to the investment.
- Volume of freshwater and wastewater treated.

- Reductions in emissions of nitrogen, phosphorus and oxygen-consuming substances (BOD).
- Qualitative indicators/targets for adaptation to climate change (managing urban runoff etc.), with a description of weather-related or climate-related problems that will be mitigated by the investment.
- Where relevant, amount of electricity, biogas or other energy carrier expected to be produced each year.

### Adaptation measures

This category is dedicated towards adaptation measures to new environmental conditions, due to inter alia anticipated increasing rainfall, rising sea levels, or increased drought. Projects deemed eligible on a case by case basis. Relevant indicators are dependent on the characteristics of the project, and determined by Kommuninvest in consultation with the borrower.

### Environmental management

Eligible Projects are intended to promote sustainable environment development in areas other than climate change. Measures include preserving biodiversity, sustainable agriculture and improvement of eco-systems. Projects are deemed eligible on a case by case basis. Relevant indicators are dependent on the characteristics of the project, and determined by Kommuninvest in consultation with the borrower.

## DEFINITIONS USED IN THIS DOCUMENT

Atemp	All internal area of a building which is heated to more than 10 °C in sq.m. Atemp is the area which energy consumption in Sweden is calculated.
CO <sub>2</sub> e	Carbon dioxide equivalent
kWh, MWh and GWh	Kilowatthour, Megawatthour and Gigawatthour
PE	Population equivalent



**Kommuninvest is a Swedish municipal cooperation set up in 1986 to provide cost-efficient and sustainable financing for local government investments in housing, infrastructure, schools, hospitals etc. The cooperation comprises 290 out of Sweden's 310 local governments, of which 278 municipalities and 12 regions. Kommuninvest is the largest lender to the Swedish local government sector and one of the largest credit institutions in Sweden.**

**At year-end 2019, total assets were SEK 471 billion (USD 50.6 billion), with a loan portfolio of SEK 408 billion (USD 43.8 billion). The head office is located in Örebro.**



**KOMMUNINVEST**