City of Gothenburg

Green Bond Impact Report 2024

Sustainable city – open to the world

Contents

Stadsledningskontoret
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Title: Green Bond Impact Report 2024

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Executive Summary as of 31 Dec 2024

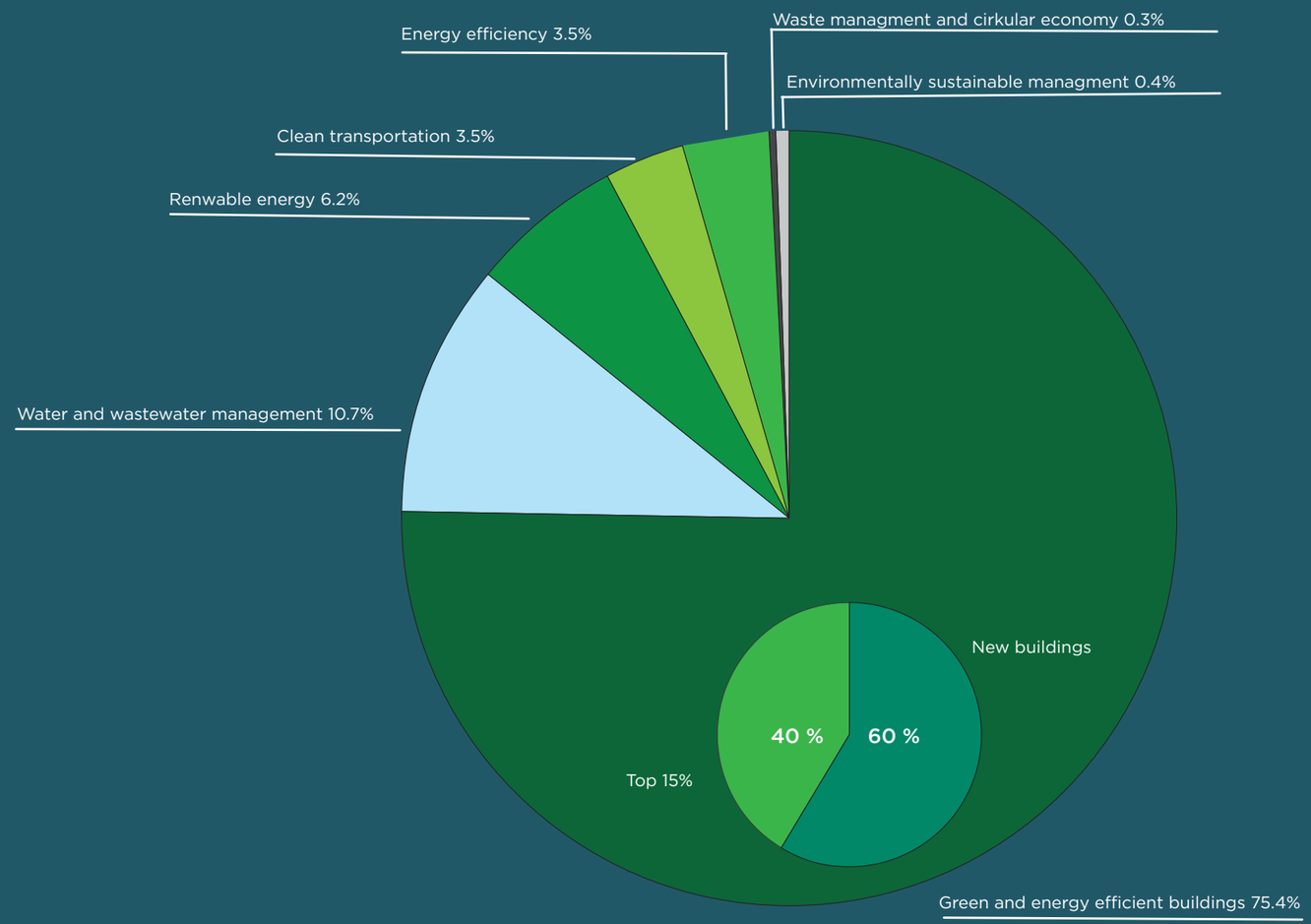
The City of Gothenburg reports in accordance with the recommendations in the Nordic Position Paper on Green Bonds Impact Reporting and will explain any deviations from them as needed.

Impact attribuatable to green bond investors	91%
Green Bonds SEK 1500 mn maturing 24 September, 2025	4,2%
Green Bonds SEK 300 mn maturing 24 september, 2025	0,8%
Green Bonds SEK 1000 mn maturing 27 November, 2025	2,8%
Green Bonds SEK 1000 mn maturing 27 November, 2025	2,8%
Green Bonds SEK 1000 mn maturing 3 June, 2026	2,8%
Green Bonds SEK 500 mn maturing 3 June, 2026	1,4%
Green Bonds SEK 1000 mn maturing 18 November, 2026	2,8%
Green Bonds SEK 1000 mn maturing 16 Mars, 2027	2,8%
Green Bonds SEK 1000 mn maturing 16 Mars, 2027	2,8%
Green Bonds SEK 500 mn maturing 17 June, 2027	1,4%
Green Bonds SEK 1250 mn maturing 17 June, 2027	3,5%
Green Bonds SEK 1500 mn maturing 21 October, 2027	4,2%
Green Bonds SEK 1500 mn maturing 29 Mars, 2028	4,2%
Green Bonds SEK 500 mn maturing 29 Mars, 2028	1,4%
Green Bonds SEK 1250 mn maturing 12 June, 2028	3,5%
Green Bonds SEK 850 mn maturing 12 June, 2028	2,4%
Green Bonds SEK 1350 mn maturing 04 October, 2028	3,8%
Green Bonds SEK 650 mn maturing 04 October, 2028	1,8%
Green Bonds SEK 1850 mn maturing 12 December, 2028	5,1%
Green Bonds SEK 250 mn maturing 26 January, 2029	0,7%
Green Bonds SEK 1400 mn maturing 26 January, 2029	3,9%
Green Bonds SEK 500 mn maturing 03 April, 2029	1,4%
Green Bonds SEK 1800 mn maturing 10 October, 2029	5,0%
Green Bonds SEK 1000 mn maturing 6 Februari, 2030	2,8%
Green Bonds SEK 416 mn maturing 6 februari, 2030	1,2%
Green Bonds SEK 1950 mn maturing 27 Mars, 2029	5,4%
Green Bonds SEK 200 mn maturing 27 Mars, 2029	0,6%
Green Bonds SEK 1900 mn maturing 30 May, 2029	5,3%
Green Bonds SEK 1500 mn maturing 24 June, 2030	4,2%
Green Bonds SEK 750 mn maturing 5 September, 2029	2,1%
Green Bonds SEK 1400 mn maturing 5 September, 2029	3,9%

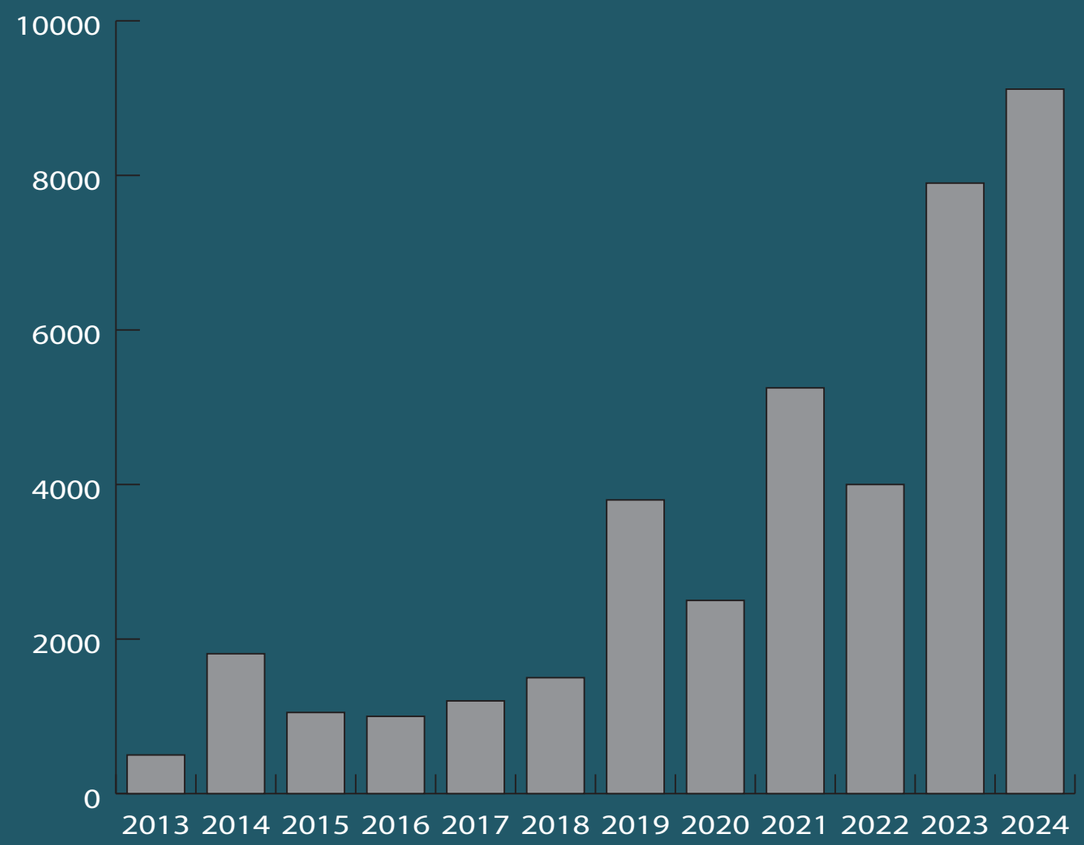
CO2 impact Green indicators, based on outstanding disbursed amount			
Project category	**GHG emissions reduced/ avoided, tonnes CO2e/ year**	**Outstanding disbursed amount to projects, SEK mn**	**Impact, tonnes CO2e per SEK mn**
Renewable energy	40 748	2 219	18.4
Green and energy efficient buildings	1 594	27 141	0.06
Energy efficiency	86	1 261	0.07
Clean transportation	891	1 257	0.71
Waste management and circular economy	N/A	115	N/A
Water and Wastewater Management	N/A	3 850	N/A
Sustainable Land Use and Environmental Management	N/A	139	N/A
Total	**43 319**	**35 982**	
Disbursed amounts with CO2 impact, SEKm		**31 878**	
Impact, tonnes CO2e per SEK mn			**1.36**
Annual renewable energy generation, MWh			**209 430**
Annual energy reduced/avoided MWh			**16 258**

Basic information	
Green Bond Framework applied	Report comprices projects financed under Green Bond Framework dated September 2022
Related Green Bond ISIN(s)	Please see list in the report
Extemal verifier of allocation report	EY
Reporting period	Reporting for calender year 2024. Comprises all eligible projects financed from GB programme start in 2013 until year-end 2024
Report publication date	June 2025
Frequency of reporting	Annual
Next reporting planned for	June 2026
Reporting approach	Portfolio and project-by-project reporting

Green Investment Portfolio 36 Billion SEK



Green Bond Issuances

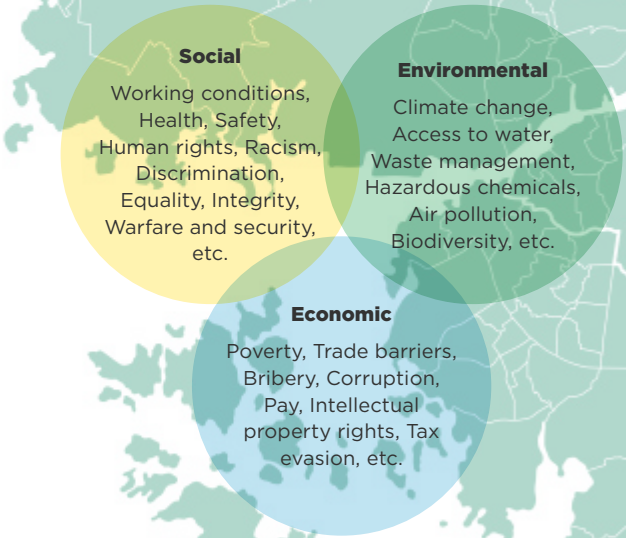


Sustainable City – Open to the World

The City of Gothenburg is a municipality on the west coast of Sweden, strategically located between Oslo and Copenhagen. With a population of just over half a million, Gothenburg is Sweden's second largest city and home to Scandinavia's largest port and a variety of strong industries. Swedish municipalities enjoy extensive fiscal autonomy and can issue bonds to fund the delivery of public services. The City is responsible for providing services such as education, social care, planning and building, health and environmental protection, waste collection, water supply and purification, energy supply and public transport.

Gothenburg´s governance is based on three sustainability dimensions: social, environmental and economic sustainability - all of which are mutually dependent on one another.

Gothenburg's governance is based on three sustainability dimensions: social, environmental and economic sustainability - all of which are mutually dependent on one another. Collaboration for achieving our sustainability objectives spans the entire organization and includes both the municipal and the company sector. As for economic sustainability, anti-corruption is a key priority for the City. We work actively to combat corruption and irregularities by continuously strengthening governance, control and transparency across all operations. In terms of social sustainability, our long-term goal is to reduce gaps in living conditions and health and ensure that the city develops in a way that is equal and socially sustainable.



The ecological dimension of the sustainable development of Gothenburg is presented in our environment and climate programme. The starting point of the programme is the UN Sustainable Development Goals Agenda 2030, Sweden's national environmental goals system, and the Paris Agreement. It also considers the challenges that Gothenburg as a community and the City of Gothenburg as an organization face in order to make the transition to an environmentally sustainable society. The objective of the programme is to transition Gothenburg to an environmentally sustainable city by 2030. It focuses on the greatest challenges for an environmentally sustainable Gothenburg, and it contains three environmental goals that addresses nature, climate and people. The three environmental goals cover the whole of Gothenburg, and the goals include twelve sub-goals that

focus on the City of Gothenburg's own organization. The programme is valid until 2030 and the indicators for the three environmental goals and most of the sub-goals also have 2030 as the target year. Some of the indicators for the sub-goals have 2023[1] and 2025 as target years. This is because these are considered to be easier to achieve. Additionally, the transition in these areas needs to be accelerated, or the target value needs to be reached in order for another indicator's target value to be reached by 2030. We are determined to be one of the world's most progressive cities when it comes to tackling environmental issues and climate change.

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Gothenburg was the first city in the world to issue a green bond back in 2013 and the instrument has become an important tool to reach the City's climate and environmental goals. Additionally, in March 2022 Gothenburg became the first municipality in Sweden coupling its borrowing to the City's sustainability goals. The sustainability-linked RCF is coupled to four ambitious goals, three climate goals and one social goal. The first goal addresses energy usage improvement in buildings owned by the City premises administration. The second goal is connected to Göteborg Energi's own ambitious goal of achieving a production of district heating from fossil free sources by 2025. The third goal is tied to the City's goal of achieving a fossil free vehicle fleet by 2023. And the last goal, the social goal, is aiming at achieving the City's ambition of having zero areas classified as "highly vulnerable" in accordance with the Swedish Police definition. All goals will be followed up on a yearly basis. And if the target goals are met the City will receive an interest discount, if not the City will pay an interest penalty. Furthermore, the City's environmental efforts have been recognized several times over the years. In April 2022 the City was selected by the EU Commission as one of the 100 EU cities that will participate in the EU Mission for 100 climate-neutral and smart cities by 2030, the so-called Cities Mission. Other credits include a number one ranking in the Global Destination Sustainability Index for seven consecutive years, from 2016 to 2023, and a second-place ranking in 2024. The award goes to the top performer amongst participating destinations in order to highlight the destination's exemplary commitment and efforts to becoming as sustainable as possible.

[1]The outcome for the goal regarding the proportion of Gothenburg City's vehicles that are fossil-free ended up at 82% for the year 2023.

The Global Goals for Sustainable Development

All the 17 global sustainable goals are relevant to the City of Gothenburg, but not all the 169 targets. The city has local goals and strategic documents that address the most important areas in the relevant targets. In the Green Bond Framework, you will find how the city's project categories are connected to the SDGs. The current portfolio primarily addresses the following goals: 3 Good Health and Well-being, 6 Clean Water and Sanitation, 7 Affordable and Clean Energy, 9 Industry, Innovation and Infrastructure, 11 Sustainable Cities and Communities, 12 Responsible Consumption and Production, 13 Climate Action, 14 Life Below Water, and 15 Life on Land.

All the 17 global sustainable goals are relevant to the City of Gothenburg, but not all the 169 targets.

Green Bond Framework

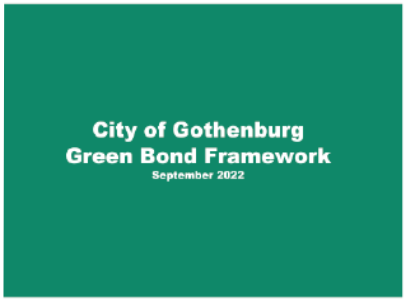
The City of Gothenburg updated the Green Bond Framework in September 2022, another significant step forward in our work with Green Bonds.

The City of Gothenburg has been committed to sustainable finance for a long time and was the first city in the world to issue a green bond in 2013. The City's previous green bond framework was updated in September 2019. However, the sustainable finance market continues to evolve with new standards and regulations such as the updated versions of the Green Bond Principles, published by the International Capital Market Association (ICMA), and the EU Taxonomy Regulation. The City of Gothenburg strives to follow best market practice and updated its Green Bond Framework in September 2022. Projects financed under this Framework will strive to contribute to at least one of the six environmental goals of the EU Taxonomy. The Framework has also been developed to align with ICMA's Green Bond Principles published in 2021

By setting up this Green Bond Framework, the City of Gothenburg offers investors the opportunity to further support the transition towards a low-carbon, climate change-resilient and ecologically sustainable society.

This Framework defines the projects and investments eligible for financing by green bonds issued by the City of Gothenburg. In addition, the Framework outlines the process used to identify, evaluate, select and report on eligible projects and the set-up for managing the Green Bond proceeds.

Projects financed under this Framework will strive to contribute to at least one of the six environmental goals of the EU Taxonomy.



Second Opinion and EU Taxonomy Assessment

In September 2022, CICERO, an independent research institute at the University of Oslo, issued a second opinion regarding the City's new framework. The framework was rated Medium Green and the governance procedures Excellent. Furthermore, it was found to be in alignment with the Green Bond Principles. Based on information provided by the City of Gothenburg, it was also found to be likely aligned with the taxonomy mitigation criteria for most relevant taxonomy activities. An assessment of Do No Significant Harm and Social Safeguards was not conducted. Please read more in the full report.

However, Sweden annually enters into a large number of international agreements, including international treaties and conventions. The country has signed conventions on human rights, the ILO Conventions, international environmental conventions, as well as conventions against bribery and corruption. Municipal activities in Sweden are regulated by various laws, including the Constitution, the Local Government Act, and several special statutes. Rules of procedure, regulations, and other governing documents of the municipality complement the legislation. Since the City Council is the highest decision-making body in the City of Gothenburg, committees and boards of municipal companies must follow and implement the decisions of the City Council.

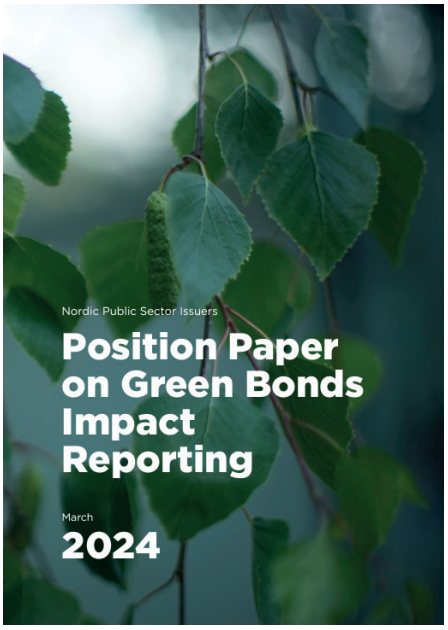
Position Paper on Green Bonds Impact Reporting

The Position Paper on Green Bonds Impact Reporting, first released in October 2017, was updated and republished in Mars 2024.

The Nordic Position Paper proposes an outline for reporting the environmental benefits of green bond investments. It also provides guidance on general matters, such as distinguishing between reduced and avoided emissions, as well as reporting impact in relation to disbursed green bond allocations.

Moreover, the Paper provides suggestions for metrics and indicators relevant to eight different project categories. This effort builds upon reporting approaches suggested by the Green Bond Principles and multilateral development banks, as outlined in the GBP Handbook – Harmonized Framework for Impact Reporting. The City of Gothenburg aims to follow all key aspects in accordance with the recommendations in the Nordic Position Paper on Green Bonds Impact Reporting and will explain any deviations from them accordingly.

Please read more in the full report.



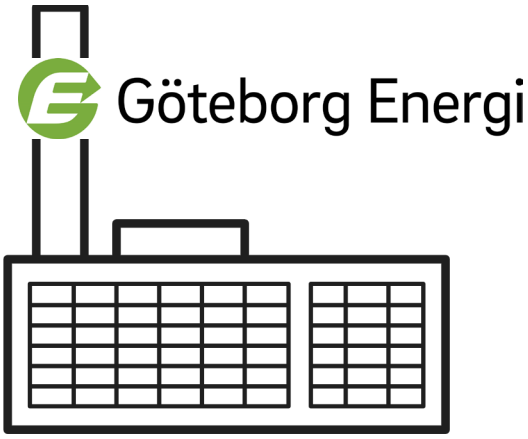
Project Categories and Use of Proceeds

The City of Gothenburg finance projects whitin eight project categories outlined below:

Green Project Categories	Share allocated
Renewable Energy	6.2%
Green and energy efficient buildings	75.4%
Energy efficiency	3.5%
Clean transportation	3.5%
Waste management and circular economy	0.3%
Water and wastewater management	10.7%
Environmentally sustainable managment	0.4%
Climate change adaptation	0%

City of Gothenburg's New Green Projects

A complete list of projects can be found in the appendix. Below, a selection of new projects in the investment portfolio is presented.



Rya Heat Pumps (Rya VP), heat recovery from the wastewater treatment plant

Göteborg Energi AB

Category: Renewable energi

Rya VP, with its four heat pumps, plays an important role in Gothenburg's district heating system by recovering heat from the wastewater at the Rya wastewater treatment plant. Before Rya VP was built, the warm (treated) wastewater from the city's treatment plant was discharged directly into the Göta River. With the introduction of Rya VP, the water instead passed through Göteborg Energi and the heat pumps, where the heat was extracted and used for district heating. What was then released into the river was cooled water.

The heat pumps offer clear economies of scale and are highly efficient, with the use of waste heat from the wastewater contributing to their high performance. Each megawatt of electricity used to operate the pumps generates just over three megawatts of district heating.

The facility currently consists of four heat pumps: VP1 and VP2 each deliver 30 MW of heat, while VP3 and VP4 deliver 50 MW each. VP1 and VP2 will now be replaced with a larger unit of approximately 50 MW. The new machine will have a higher efficiency—known as a COP value—and the capability to deliver 90-degree heat to the district heating network. The refrigerant in the new unit will be R600a (isobutane), a so-called natural refrigerant that has significantly lower climate impact compared to the current refrigerant, R134a. As a result, the GWP value will be reduced from 1430 to 3, which in turn leads to a reduction in the facility's direct CO_2-equivalent emissions from refrigerant leakag.

The investment cost is estimated to amount to SEK 498 million.

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Riskulla - Investment in heating plant

Göteborg Energi AB

Category: Renewable energi

At Riskulla in Mölndal, a new pellet boiler is currently under construction for renewable district heating production . The project is being financed by Göteborg Energi, which will also own the facility, while Mölndal Energi will be responsible for its day-to-day operations.

The boiler will be fueled by pellets, a renewable energy source. In addition, it will have the flexibility to run on bio-oil (RME) as a start-up and backup fuel. The pellet boiler is expected to operate for 1,500–2,000 hours per year and has a capacity of 50 MW of heat. Hence, the operating time using pellets as fuel in the district heating system will increase, thereby replacing the use of natural gas combustion. This will lead to an overall reduction in CO_2 emissions from district heating production.

It is expected to be commissioned at the end of 2026 and the total cost is expected to amount to SEK 852 million.

Göteborg Energi works at a group-wide level and in collaboration with the City of Gothenburg on physical climate adaptation. Ongoing work includes climate risk and vulnerability analyses for all of the Group's facilities and infrastructure, as well as the development of action plans and measures for physical climate adaptation.

The pellet boiler is expected to operate for 1,500–2,000 hours per year and has a capacity of 50 MW of heat. It is expected to be commissioned at the end of 2026.

Measures for Cleaner Water, Enhanced Biodiversity, and Increased Climate Resilience

Sustainable Waste and Water Committee

The Department of Sustainable Waste and Water is responsible for the city's two water treatment plants, where drinking water is purified and produced around the clock, all year round, for the residents of Gothenburg. Several of the city's neighboring municipalities also receive their drinking water from these facilities. In addition to water production, the department manages Gothenburg's 1,760-kilometre-long drinking water pipeline network, including the installation of new pipes, replacement of old ones, and repair of water leaks.

Beneath the streets of Gothenburg lies a 2,560-kilometre-long sewage pipeline network. The department ensures the maintenance of these sewage pipes and that wastewater is directed to the treatment plant. The treatment plant, operated by Gryaab, purifies the wastewater before it is released into the Göta River estuary.

The Department of Sustainable Waste and Water also coordinates the City of Gothenburg's cloudburst management efforts, which aim to ensure the city can handle heavy rainfall. The department is also responsible for managing and treating stormwater, including rain and meltwater.

In order to address climate change, reduce emissions, and ensure long-term resource efficiency, a series of projects is being implemented by the Department of Sustainable Waste and Water. These initiatives aim to protect both the city's residents and natural ecosystems, while also reducing the load on the wastewater treatment plant. Below is a description of these projects:

Construction of Stormwater Ponds

The purpose of the stormwater pond is to enable the purification of polluted stormwater from Hjällbo through sedimentation before it is released into the Lärje River (Lärjeån). This process improves water quality and contributes to biodiversity in the area. During periods of high water flow, such as after heavy rainfall, the pond also delays the stormwater flow to the river.

Establishment of OpenTreatment and Retention Facilities

The project involves constructing open treatment and detention facilities to reduce pollutant levels and regulate water flow, thereby decreasing the risk of flooding during heavy rainfall. These efforts are ongoing, recurring annually, and carried out through multiple work initiatives across the city.

Pipe Separation

In certain areas of the city, the sewer network is combined, meaning that stormwater is connected to the wastewater pipes. This causes problems during heavy rainfall when the capacity of the sewer system reaches its maximum, leading to the need for overflow. Furthermore, separation means that a smaller amount of stormwater reaches Gryaab, resulting in more efficient resourcemanagement of energy and chemicals.

Flood Mitigation Efforts

As is well known, flooding poses a risk to both the environment and public safety. Consequently, preventive flood mitigation measures will be implemented on an ongoing basis, distributed across multiple initiatives throughout the city

Reduced Inflow and Infiltration

Certain parts of the sewer network are continuously affected by infiltration water seeping in and mixing with wastewater. Reducing the amount of infiltration water reaching Gryaab — the regional wastewater treatment plant serving the Gothenburg area — improves the efficiency of energy and chemical use. This is achieved through measures such as reinforcing several meters of sewer pipes, renovating manholes, and correcting misconnections.

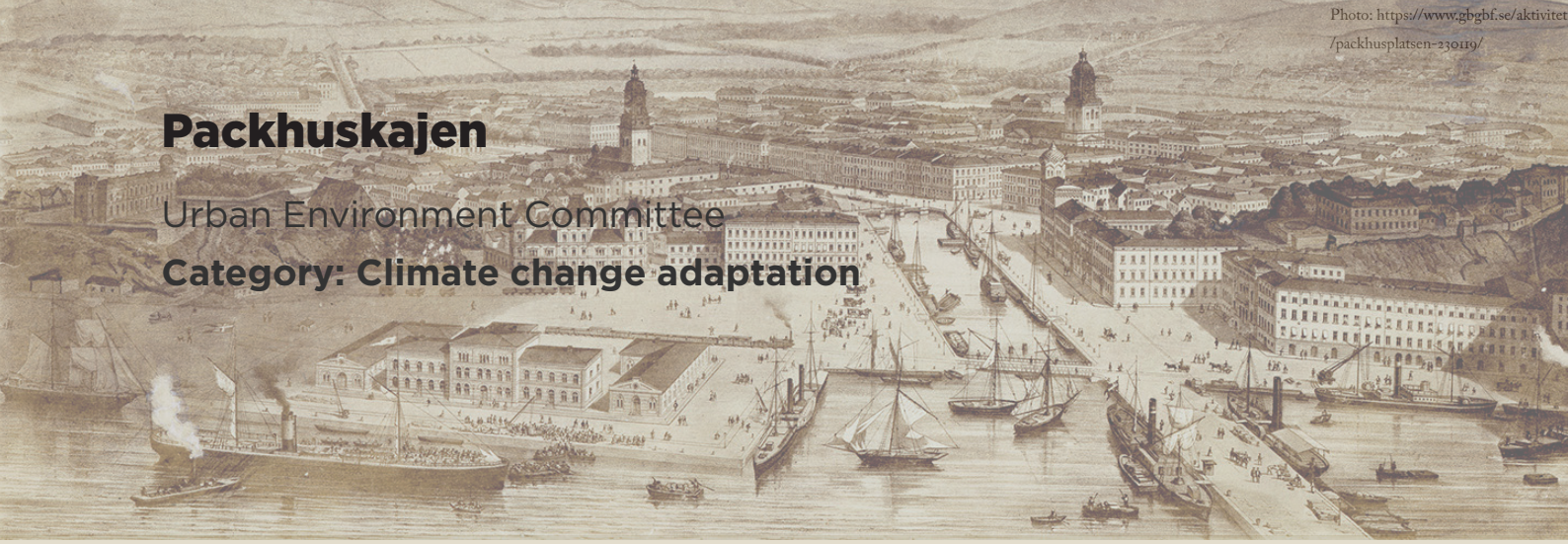


Photo: https://www.gbgbf.se/aktiviteter/packhusplatsen-230119/

Packhuskajen

Urban Environment Committee

Category: Climate change adaptation

Packhuskajen, an important cultural-historical site in Gothenburg stretches from Stora Bommen, eastward towards Jussi Björlings Plats, by the Gothenburg Opera. Part of the fortifications around old Gothenburg were located at the edge of Packhuskajen. The America ships sailed from here, and subsequently, Packhuskajen was crucial for the industrial city of Gothenburg as part of the historic harbor strip, which extends from Rosenlund via Stora Bommen to Lilla Bommen's harbor basin. The strip's historical focal point lies in the area around Stora Bommen–Packhusplatsen–Skeppsbroplatsen, which was originally the main entrance to the city from the river.

The project has several key objectives. The quay's original poor foundation is being replaced with a more stable and robust construction. The quay itself will be restored to 2 meters above mean water level, with the new construction designed to last at least 100 years. By simultaneously integrating a river-edge protection/flood barrier extending at least an additional 70 centimeters, the climatic risk of high water levels and flooding in the area/city will be significantly reduced. Furthermore, accessibility to and along the promenade areas will be improved.

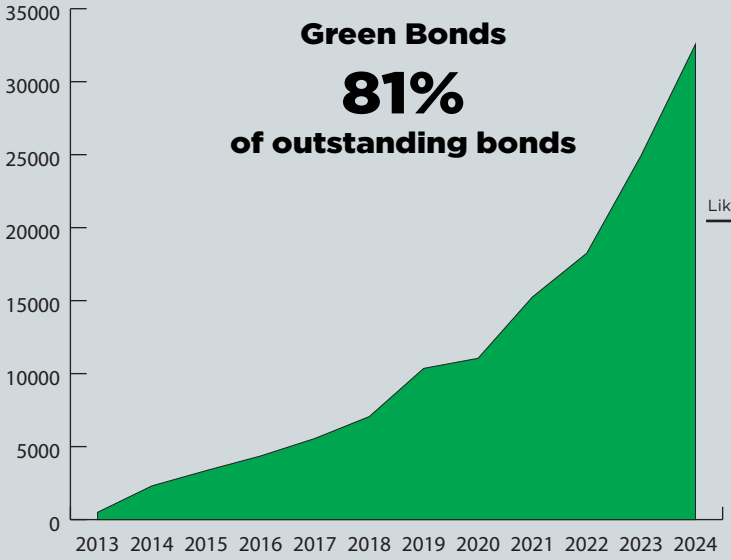
The work is being carried out in four phases. The first phase began construction in 2019 (with design starting in 2017), and the final phase is planned for completion in 2029.

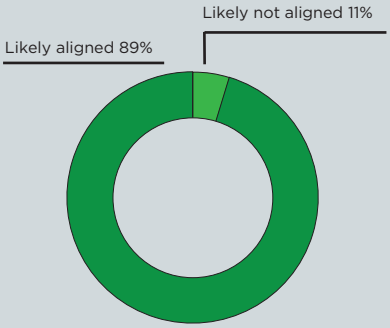
The construction work is being conducted with a strong focus on climate smart practices, including several initiatives to reduce the carbon footprint of the operations. The project has received recognition on multiple occasions for its climate-conscious approach. In 2021, the project was awarded second prize in the Sustainable Infrastructure category at the Sweden Green Building Award.

The total estimated cost of the project, including completed phases, amounts to SEK 503 million.
Further information about the project is available via the following link

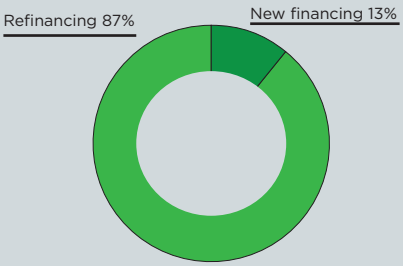
The City of Gothenburg strives to follow best market practices and updated its Green Bond Framework in September 2019 and again in September 2022. Hence, projects in the city's asset pool have been approved under different frameworks. However, since 2022, projects have solely been included in the portfolio based on the most recent framework. Consequently, 53 percent of the aggregated bond issuance has been allocated to the most recent framework, whereas 47 percent has been allocated to the previous ones.

Green Bond Portfolio Growth





Proportion of green projects that are likely aligned with the taxonomy mitigation criteria.



The distribution between new financing and refinancing: New financing is defined as allocated amounts to capital expenditures in green projects financed within the reporting year. Refinancing is defined as allocated amounts to capital expenditures in green projects financed prior to the reporting year. A Look-back period is not deployed for the capital expenditures.

Green Bond Issuances, Green Account Balance and Proportion of Refinancing

In 2024, the City of Gothenburg issued eight green bonds earmarked for financing green projects, as defined within the city's framework for green bonds. The bonds were issued on five occasions. The first issuance took place on February 6th with two green bonds, totaling 1.416 billion SEK. The second issuance occurred on March 27th, comprising two bonds with a total value of 2.15 billion SEK. The third issuance, on May 30th, involved one bond of 1.9 billion SEK. On June 24th, another green bond was issued for 1.5 billion SEK. Finally, the year concluded with two green bonds on November 5th, totaling 2.15 billion SEK. Altogether, the City of Gothenburg issued green bonds amounting to 9.116 billion SEK in 2024 – the largest amount ever issued by the city in a single year.

However, two green bond with a maturity date of November 6th, 2024, and with a principal amount of 1.5 billion SEK, was paid in full. Since the City of Gothenburg issued its inaugural green bond in 2013, the issuance has experienced consistent growth. As of December 31, 2024, the total amount outstanding was 32.56 billion SEK, representing 81 percent of the City's outstanding bond volume.

The balance of the Green Account was, at year-end, a deficit of 3.418 billion SEK. The total proportion of net proceeds used to finance new projects is estimated at 13 percent. The proportion of refinancing is therefore estimated at 87 percent.

Since the city of Gothenburg issued its inaugural green bond in 2013 the issuance has experienced consistent growth.

Outstanding Green Bonds

SEK (bn)	Share of total outstanding green bonds as of 31 Dec 2024	Issuance date	Maturity date	XS no
1.5	4,6%	2019-09-24	2025-09-24	XS2054601369
0.3	0,9%	2019-09-24	2025-09-24	XS2054601443
1	3,1%	2019-11-27	2025-11-27	XS2084421986
1	3,1%	2019-11-27	2025-11-27	XS2084423925
1	3,1%	2020-06-03	2026-06-03	XS2180083136
0.5	1,5%	2020-06-03	2026-06-03	XS2180083052
1	3,1%	2020-11-18	2026-11-18	XS2259797079
1	3,1%	2021-03-16	2027-03-16	XS2317293053
1	3,1%	2021-03-16	2027-03-16	XS2317289291
0.5	1,5%	2021-06-17	2027-06-17	XS2355244653
1.25	3,8%	2021-06-17	2027-06-17	XS2355549333
1.5	4,6%	2021-10-21	2027-10-21	XS2400595687
1.5	4,6%	2022-03-29	2028-03-29	XS2463122577
0.5	1,5%	2022-03-29	2028-03-29	XS2463121769
1.25	3,8%	2023-06-12	2028-06-12	XS2634077841
0.85	2,6%	2023-06-12	2028-06-12	XS2634361567
1.35	4,1%	2022-10-04	2028-10-04	XS2541621673
0.65	2,0%	2022-10-04	2028-10-04	XS2541621756
1.85	5,7%	2023-12-05	2028-12-05	XS2729726211
0.25	0,8%	2023-01-26	2029-01-26	XS2580731771
1.4	4,3%	2023-01-26	2029-01-26	XS2580731938
0.5	1,5%	2023-03-04	2029-04-03	XS2607194599
1.8	5,5%	2023-10-25	2029-10-25	XS2708698746
1	3,1%	2024-02-06	2030-02-06	XS2761233191
0.416	1,3%	2024-02-06	2030-02-06	XS2761232979
1.95	6,0%	2024-03-27	2029-03-27	XS2793259230
0.2	0,6%	2024-03-27	2029-03-27	XS2793259313
1.9	5,8%	2024-05-30	2029-05-30	XS2831727750
1.5	4,6%	2024-06-24	2030-06-24	XS2847986788
0.75	2,3%	2024-11-05	2029-09-05	XS2932947984
1.4	4,3%	2024-11-05	2029-09-05	XS2932948792

Green Account Audit

According to the City of Gothenburg's Green Bond Framework, an independent external auditor shall be appointed to annually provide a limited assurance that an amount equal to the Green Bond net proceeds has been allocated to Green Projects. During the spring of 2025, EY was appointed auditor, and their "Agreed-Upon Procedures Report on the City of Gothenburg's Green Bond" can be found in the link below.

For more information please visit: Limited assurence green

Reporting Approach and How to Interpret the Results

The City of Gothenburg is committed to transparent reporting of the projects financed within the City's framework for green bonds. The purpose of this impact report is to provide a more detailed understanding of the climate and environmental impacts that can be expected or are projected to result from the Green Bond eligible projects. Gothenburg has been a progressive stakeholder in developing the green bond market, and investor reporting is an important part of that process. Estimations of impact indicators and projections of impacts are based on certain assumptions. The City of Gothenburg aims to make sound and conservative assumptions that are reasonably based on information available at the time. However, the actual environmental impacts of projects may diverge from initial projections. Examples of this can include changes in legal requirements, baseline conditions, behavior, and slow start-up periods. Because of this, calculation methods and baseline assumptions may vary.

Collected Data and Baselines

Project Type	Emission Factor	Source
Electricity consumption in Green Buildings	191 g CO2/kWh	Position paper on Green Bonds Impact Reporting 2024
District Heating consumption in Green Buildings	46 g CO2/kWh	Environmental values for district heating 2024 Göteborg Energi AB
Distric heating projects, biofuel	205.7 g CO2/kWh	The Swedish Environmental Protection Agency
Electricity generation, solar power	191 g CO2/kWh	Position paper on Green Bonds Impact Reporting 2024
Cars	139.64 g CO2/km	Weighted average emission for registered passenger cars in 2023-2024, Transportstyrelsen

[2]Preliminary environmental values from Göteborg Energi AB

Contact

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Appendix: Impacts and Allocated

The City of Gothenburg reports in accordance with the recommendations in the Nordic Position Paper on Green Bonds Impact Reporting and will explain any deviations from them as needed.

Name of Project	Administration/ Municipal company	Project start/included	Adaption/ Mitigation/ Environment	Project Category	SDG	Annual energy savings Reduced/Avoided MWh	Annual energy produced MWh	Renewable capacity added MW	Annual GHG emissions Reduced/ Avoided tons of CO2 eq.	Project information	Allocated amounts (msek)
Electric cars	Göteborgs Stads Leasing AB	2013	M	Clean transportation	9, 11, 13	n/a	n/a	n/a	891[1] Reduced	»879[1] electric cars in the city carpool »170 new cars in 2024	436
Traffic lights energy efficiency	Urban Environment Committee	2015	M	Energy efficiency	7, 9, 11, 13	453 Reduced	n/a	n/a	86 Reduced	»Replacements of ineffective fittings have resulted in energy savings of 31 percent in 2024 »Increased urban safety.	402
Energy efficient schools and preschools	Urban Environment Committee	2014	M	Green and energy efficient buildings	7, 11, 12, 13	5175** Avoided	n/a	n/a	660** Avoided	»Portfolio of new, energy efficient preschools, schools and retirement homes. »The buildings use green electricity	6034
Energy efficient housing	Förvaltnings AB Framtiden	2015	M	Green and energy efficient buildings	7, 11, 12, 13	3603** Avoided	n/a	n/a	301** Avoided	»Portfolio of new, energy efficient apartment buildings. »The buildings use green electricity. »Some buildings labeled Svanen and Miljöbyggnad Silver	8871
Energy efficient commercial buildings - Alelyckan	Higab AB	2019	M	Green and energy efficient buildings	7, 11, 12, 13	161* Avoided	n/a	n/a	30* Avoided	»New energy efficient office building. »Miljöbyggnad Guld	250
Energy efficient commercial buildings – Hotel	AB Liseberg Skår	2019	M	Green and energy efficient buildings	7, 11, 12, 13	1396* Avoided	n/a	n/a	151* Avoided	»New energy efficient hotel »Liseberg Grand Curiosa Hotel is certified according to BREEAM and meets the EXCELLENT level. »Part of Lisebergs investment for Gothenburg's 400th anniversary.	1223
Nya Solevi/Solar Panels & Solavium (Utby solcellspark)/Solar Panels	Göteborg Energi AB	2018	M	Renewable energy	7, 13	n/a	10 200	11	1 948 Avoided	»Gothenburg's first solar park(Nya Solevi). »Situated on an old airport. »When installed, Sweden's largest solar park. »Gothenburg's second solar park built by Göteborg Energi (Solavium) »Smaller in size than Gothenburg first solar park but with the same capacity	89
Solar panels on roofs	City Property Committee[1]	2019	M	Renewable energy	7, 13	n/a	9 876	n/a	n/a*** Avoided	»Solar panels installed on roofs of existing schools and preschools. »Of the 9,876 MWh generated, 3,827 MWh were sold, while the remaining energy was utilized by buildings owned by the City Property Committee.	203
New bio boiler – Rya HVC	Göteborg Energi AB	2018	M	Renewable energy	7, 13	n/a	99 000	30	20 300 Avoided	»Replacement of two existing boilers which have reached the end of their technical service life »Installed capacity increased from 100 MW to 130 MW »Delivered approximately 221 000 MWh of bio-based heat in 2024. »In 2020 and 2021, Rya HVC delivered approximately 100–120 GWh of bio-based heat. Thus, the 2024 delivery reflects an increase of about 100 GWh	510

[1] Based on an assumed electricity consumption of 2 kWh per 10 km and an annual driving distance of 10,000 km
* Projected results
** Projected and actual results
***Since the electricity produced is used by the 'Energy-efficient schools and preschools', and the avoided emissions are already accounted for in the calculations for those buildings, we want to avoid double counting and therefore choose not to report the impact of the solar panels separately

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Name of Project	Administration/ Municipal company	Project start/inclu-ded	Adaption/ Mitigation/ Environment	Project Category	SDG	Annual energy savings Reduced/Avoided MWh	Annual energy produced MWh	Renewable capacity added MW	Annual GHG emissions Reduced/ Avoided tons of CO_2 eq.	Project information	Allocated amounts (msek)
BKV Rya - bio cogenera-tion plant	Göteborg Energi AB	2019	M	Renewable energy	7, 13	n/a	90 700**	n/a	18 500** Avoided	»The biofuel-fired steam boiler will be integrated with Göteborg Energi's existing Rya cogeneration plant. The boiler is expec-ted to contribute 156 megawatts of heat and 39 megawatts of electricity to the local energy system. The plant is flexible and can operate on several different types of biofuels. Primarily, forest residues (GROT) and recycled wood (RT chips) from the region will be used.	1267
Energy efficient housing - existing buildings	Förvaltnings AB Framtiden	2023	M	Green and energy efficient buildings	7, 11, 12, 13	5497 Avoided	n/a	n/a	452** Avoided	»Residential buildings and premises (completed before January 1, 2021) qualifying within the top 15% most energy-efficient buil-dings of the national building stock in terms of Primary Energy Demand. » The City of Gothenburg's approach to assessing this criterion is based on a study by Fastighetsägarna (via consultancy CIT energy management), which has interpreted the EU Taxonomy's 15% most energy-efficient buildings criterion in the Swedish context in terms of energy use thresholds for different building categories. »The market value of projects as of 2024 is 10 762 MSEK.	10 762[2]
Riskulla - heating plant	Göteborg Energi AB	2021	M	Renewable energy	7, 13	n/a	n/a	n/a	n/a	»A new 50 MW pellet boiler for renewable district heating is un-der construction at Riskulla in Mölndal. Göteborg Energi finances and owns the facility, while Mölndal Energi will handle daily ope-rations. The boiler will primarily run on pellets and can use bio-oil (RME) as start-up and backup fuel. Planned operating time is 1,500–2,000 hours per year, with com-missioning scheduled for the end of 2026. The project increases renewable heat production and reduces CO_2 emissions by repla-cing natural gas	Presen-ted in the 2025 report
Rya Heat Pumps, VP1–2 (heat recovery from the wastewater treatment plant)	Göteborg Energi AB	2022	M	Renewable energy	7, 13	n/a	n/a	n/a	n/a	»The facility currently consists of four heat pumps: VP1 and VP2 deliver 30 MW each, and VP3 and VP4 deliver 50 MW each. VP1 and VP2 will be replaced by a single, more efficient 50 MW unit with a higher COP value and the capacity to supply 90°C heat to the district heating network. The new unit will use R600a (isobu-tane), a natural refrigerant with significantly lower climate impact than the current R134a. This change reduces the GWP value from 1430 to 3, which in turn leads to lower direct CO_2-equivalent emissions from refrigerant leakage.	Presen-ted in the 2025 report
Packhuskajen	Urban Environment Committee	2017	A	Climate change adaptation	9, 11, 13	n/a	n/a	n/a	n/a	»The project has several key objectives. The quay's original poor foundation is being replaced with a more stable and robust construction. The quay itself will be restored to 2 meters above mean water level. This new structure is designed to last for 100 years. By simultaneously integrating a river-edge protection/ flood barrier extending at least an additional 70 centimeters, the climatic risk of high water levels and flooding in the area/city will be significantly reduced. Furthermore, accessibility to and along the promenade areas will be improved.	Presen-ted in the 2025 report

* Projected results
** Projected and actual results

[2] Refers to the market value of the buildings as of 2024.

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Name of Project	Administration/company	Project start/ included	Adaption/Mitigation/Environment	Project Category	SDG	Project information	Allocated amounts (msek)
Ultrafilter Alelyckan and Lackarebäck	Sustainable Waste and Water Committee	2013	A	Water and wastewater management	3, 14	»Making the production of drinking water more resilient to climate change. »Prevented sick days which also entails lower social costs.	1103
Denitrification	Gryaab AB	2014	E	Water and wastewater management	6, 14	»Expansion of water treatment plant to reach a higher denitrification rate. »Increased capacity by approximately 1300 tons/year »Reduction of nitrogen emissions by 580 tons in 2024	356
Tree planting	Urban Environment Committee/ Parks and landscape administration[1]	2014	E (A/M)	Environmentally sustainable management of living natural resources and land use	11, 14, 15	»Trees are planted in the city annually. »The project improves biodiversity, promotes a green cityscape and has a positive effect on urban air quality.	92
Pedestrian and bicycle traffic	Urban Environment Committee/ Road traffic administration[1]	2015	M	Clean transportation	9, 11, 13	»Examples include improved traffic security and accessibility for pedestrians and bicycle traveling in the city. »During 2024, bicycle parking has been constructed at 40 locations with a capacity for approximately 440 lockable parking spaces and 200 non-lockable parking spaces. »Cycling network: Total area of improved bicycle lanes (in square meters): approx. 56,000 m^2 in 2024 »Bicycle network: 6.5 km of new bicycle lanes in 2024 »Total area of improved pedestrian paths (in square meters): approx. 68,000 m^2 in 2024	803
Sewage pump station, Kodammarna	Sustainable Waste and Water Committee	2017	M/A/E	Water and wastewater management	6, 14	»Replacing Gothenburg's largest pump station. »Decrease energy consumption at the pump station by 30 %, approx. 0,5 GWh/year. Outcome for 2024: 36 percent decrease in energy consumption. »Decrease the overflow of sewage to the river Göta älv. »Making the plant resilient to climate change, higher water levels. »Possible to install solar cells on the roof.	522
Water management	Sustainable Waste and Water Committee	2019	A/E	Water and wastewater management	6, 14	»Water pipes: 660 meters in 2024 »Increase resilience of drinking water supply.	377
Stormwater management	Sustainable Waste and Water Committee	2019	A/E	Water and wastewater management	6, 14	»Installations for handling stormwater »Improved resilience to handling increased rainfall.	66
Brudaremossen landfill	Sustainable Waste and Water Committee	2019	E	Water and wastewater management	11, 14	»Reduce emissions to recipients from old landfill. »Approximately 215 262 cubic meters of treated effluent water in 2024.	63
Wetland at Torsviken	Port of Gothenburg	2019	E	Environmentally sustainable management of living natural resources and land use	15	»Cover of contaminated dredged material in Torsviken near the port at Hisingen »As much as possible, restore the area to its original character, rich with diverse wildlife and birdlife.	47
500 new public charging stations for electric cars	Göteborg Energi AB	2020	M	Clean transportation	9, 11, 13	»500 new charging stations will be available around the city »Normal charger up to 22 kW	19
Pump station – Björlanda pumpkedja	Sustainable Waste and Water Committee	2019	A/E	Water and wastewater management	6, 14	»Reconstruction of two wastewater pump stations and one water pump station »Extension of about six km of wastewater and water pipes between Skra bro and Kärrdalen. »Reduced risk of overflow of sewage to the watercourse Osbäcken	268

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Name of Project	Administration/company	Project start/ included	Adaption/Mitigation/Environment	Project Category	SDG	Project information	Allocated amounts (msek)
Renewal of water pipeline	Sustainable Waste and Water Committee	2021	A/E	Water and wastewater management	6, 14	»Pipeline renewal aimed at reducing the number of operational disruptions and minimizing leakage. »A water supply pipeline designed to last approximately 100 years, ensuring reliable delivery and sustainable water supply	715
Recovery of Zn(OH)2	Renova AB	2020	E	Waste management and circular economy	11, 12	»Plant for recovery of Zn(OH)2 from municipal and industrial solid waste incineration fly ash. »As of 2024, In total 1 450 tons of zinc hydroxide cake produced. The zinc content in this cake is around 30%. »The zinc hydroxide cake is stored at the Fläskebo landfill.	115
Flue gas cleaning	Renova AB	2022	E	Water and wastewater management	6, 14	»The purpose of project is to cost-effectively modernize the flue gas cleaning on line 1 at the Sävenäs plant in order to reduce nitrogen emission to air and water. »Nitrogen oxide emissions have decreased significantly—adjusting for the amount of waste burned, the emission rate per tonne was six times higher in 2022 compared to 2024. »Regarding emissions to water, it is not possible to distinguish water specifically originating from the combustion process in line 1.	289
Distric cooling	Göteborg Energi AB	2022	M	Energy efficiency	7, 9, 11, 13	»District cooling is one of Gothenburg Energy's products and is based on the same idea as district heating – that it is better to have a central, environmentally adapted facility do the work, rather than having many small cooling installations and air conditioning units. In the district cooling network, it is cold, instead of hot water, that circulates in the pipeline system. Delivered district cooling 89 GWh distributed by production method as follows[3]: »Free Cooling (Free cooling from the Göta River and cooling towers) : 20% »Absorption Cooling (Heat-driven cooling with recovered energy): 58% »Electrically driven cooling production: 22% »COP value of the district cooling system: 8.9	139
Accumulator tank	Göteborg Energi AB	2018	M	Renewable energy	7, 13	»The accumulator tank functions as a thermal storage unit. During periods of reduced heat demand, excess heat is stored within the tank. Subsequently, this stored heat is utilized when demand increases, effectively reducing the reliance on fossil fuel-based facilities. Maximal effect 130 MW.	149
Connection Pipeline for Mölndalsån	Gryaab AB	2021	A/E	Water and wastewater management	6, 14	»Sewage water from Lerum, Partille, Härryda, and Mölndal is led to Gryaab through a tunnel system that passes under Mölndalsån. Under Mölndalsån, sewage water is directed through a connection pipeline. The pipeline lacks redundancy and is highly capacity-loaded. By adding two new pipelines, emergency release of untreated sewage water to sensitive recipients during high flows or maintenance can be avoided. Operational availability is ensured, and redundancy is created. The measure is also a prerequisite for being able to receive wastewater from Bollebygd according to Gryaab's environmental permit.	91
District heating distribution	Göteborg Energi AB	2023	M	Energy efficiency	7, 9, 11, 13	»Refers to investments in Göteborg Energi's district heating network. The distribution network for district heating is a prerequisite for the benefits of district heating such as resource-efficient heating of homes and business premises »Delivered district heating 2 988 GWh. Distribution of supplied energy for district heating production[3]: Recovered energy 75%, renewable energy 11%, fossil-free energy 5%, fossil energy 9%	715

[3] Preliminary environmental values from Göteborg Energi AB

Name of Project	Administration/company	Project start/ included	Adaption/Mitigation/Environment	Project Category	SDG	Project information	Allocated amounts (msek)
Separation	Sustainable Waste and Water Committee	2025	A/E	Climate change adaptation	6, 12, 13	»In certain areas of the city, the sewer network is combined, meaning that stormwater is connected to the wastewater pipes. This causes problems during heavy rainfall when the capacity of the sewer system reaches its maximum, leading to the need for overflow. Furthermore, separation means that a smaller amount of stormwater reaches Gryaab, resulting in more efficient resource management of energy and chemicals.	Presented in the 2025 report
Open treatment and detention facilities	Sustainable Waste and Water Committee	2025	A	Climate change adaptation	6, 11, 13	»The project involves constructing open treatment and detention facilities to reduce pollutant levels and regulate water flow, thereby decreasing the risk of flooding during heavy rainfall. These efforts are ongoing, recurring annually, and carried out through multiple work initiatives across the city.	Presented in the 2025 report
Reduced infiltration and inflow	Sustainable Waste and Water Committee	2025	A	Climate change adaptation	6, 12, 13	»Certain parts of the sewer network are continuously affected by infiltration water seeping in and mixing with wastewater. Reducing the amount of infiltration water reaching Gryaab — the regional wastewater treatment plant serving the Gothenburg area — improves the efficiency of energy and chemical use. This is achieved through measures such as reinforcing several meters of sewer pipes, renovating manholes, and correcting misconnections.	Presented in the 2025 report
Lärje stormwater ponds	Sustainable Waste and Water Committee	2022	A/E	Environmentally sustainable management of living natural resources and land use	6, 13, 14, 15	»The construction of stormwater ponds enables the purification of polluted stormwater through sedimentation. This contributes to biodiversity by improving the water quality in the Lärje River (Lärjeån). During periods of high water flow, such as after heavy rainfall, the flow to the river is delayed. One measurable outcome is the number of kilograms of excavated, contaminated sediment.	Presented in the 2025 report
Flooding Sewerage	Sustainable Waste and Water Committee	2025	A	Climate change adaption	11, 13, 15	»Flood prevention measures aimed at avoiding a scenario in which damage to humans and nature could be caused by flooding	Presented in the 2025 report
Refurbishment and upgrading of equipment in Gryaab's activated sludge facility	Gryaab AB	2024	M/E	Water and wastewater management	6, 7, 13	»The investments concern the refurbishment and upgrading of equipment in Gryaab's activated sludge facility. By replacing older, technically obsolete equipment, the project not only enables more efficient treatment of BOD and nitrogen but also significantly reduces energy consumption. The investment is being carried out in three phases, with one line already equipped with newly installed equipment. Over the next two years, the remaining lines will be upgraded—one per year. The forecast indicates that the investment will lead to up to a 30% reduction in energy consumption. The baseline is based on the energy consumption in 2020, which was 6.9 kWh per person per year for this part of the facility. With the reconstruction of the aeration system and the installation of fewer but more efficient mixers, energy use is expected to decrease to 4.8 kWh per person per year.	Presented in the 2025 report