Stockholms stad

Environment programme

2020–2023

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Environment programme 2020–2023

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Foreword

The City of Stockholm has been a leading environmental city for decades. The first environment programme was produced in 1976 and in 2010 Stockholm was chosen as the first European Green Capital. With the Environment Programme 2020–2023, the City of Stockholm is consolidating and developing its role as an international role model in global environmental and climate activities.

Successful environmental and climate activities lay the foundation for creating a city with a high quality of life for Stockholmers, where air and water are made cleaner and our natural areas more varied, while our impact on the climate decreases. **We wish to make Stockholm an attractive city with dynamic industry and commerce that combines high and sustainable growth, good habitats and minimal environmental impact. This provides the conditions for continued good welfare and a good life for Stockholm's residents. Successful environmental and climate activities are based both on long-term and coordinated planning of the city and on technological and innovative development.**

The City of Stockholm's Environment Programme 2020–2023 is structured according to the most highly prioritised long-term goals. The 17 sustainable development goals of Agenda 2030 and the limits set in the Paris Agreement have given guidance, together with national environmental goals and the local environmental situation. We have raised our ambitions, particularly in terms of the climate. It is important for us that the City of Stockholm's own operations should take the lead and show the way forward in the work for a sustainable city.

In the new environment programme, we develop new ways of working so that we can more effectively meet the environmental challenges. Collaboration with other parties is central to the implementation of the programme. Key target groups are mobilised in partnership by means of active communication work. We also put further focus on how we can influence suppliers by using procurement as a tool for becoming more sustainable. Technical and organisational innovations contribute to business development that makes the City of Stockholm better equipped to achieve the priority environmental goals while at the same time becoming better equipped for the future.

We want the City of Stockholm to continue to be a world leader in the environmental field as we aim for a city with a low carbon footprint, a sound and healthy local environment and a high quality of life. At the same time, through the clear and ambitious environmental goals of the Environment Programme 2020–2023, we are unleashing the power that lies in companies, the public sector and the residents of Stockholm.

Anna König Jerlmyr

Mayor of Stockholm

Katarina Luhr

Vice Mayor for Environment and Climate

Introduction

Stockholm became the first European Green Capital in 2010 thanks to sustained and successful environmental work characterised by early efforts in district heating and a well-developed system of public transport. As early as 1976, the City adopted its first comprehensive environment programme. Since then, a number of programmes have been put forward with continued high ambitions and new challenges. The Environment Programme 2020–2023 is the City's tenth such programme.

The programme has been developed by broad-based groups from different parts of the City of Stockholm under the direction of the City Executive Board. Extensive work has been performed by experts in various focus areas that are relevant to Stockholm's environment, and within this framework Stockholm's highest priority environmental challenges and objectives have been identified. In parallel with this, *the Climate Action Plan 2020–2023 for a fossil-free and climate-positive Stockholm 2040* has been prepared.

Stockholm shall be a world leader in work on sustainable development

Stockholm shall be a world leader in the global efforts to realise the goals of the Paris Agreement, where the city takes on the role of an international role model in global environmental and climatework. Work on the environment and climate shall make a clear impression and the city's own operations shall go forward and show the way in work on a climate-smart and sustainable city.

The goals of the environment programme are set high, but the City of Stockholm shall always strive even more to be at the forefront. The short- and long-term goals may be reviewed on an ongoing basis and can be further strengthened as instruments and technologies evolve. The goal of fossil freedom is one of the biggest challenges and the City of Stockholm has the goal of being fossil-free by 2040. However, the focus is to work towards the city becoming climate-positive by 2040. To achieve this, technology and business models need to be developed. The City cannot achieve such an ambitious goal by itself and we therefore need to join forces with industry, the region, the government and the EU.

Cities have a key position in environmental and climate work and it is Stockholm's ambition to consolidate a leading position in sustainable development. The Environment Programme sets out the way forward for Stockholm's environment in both the long and short term. The City operates in a world with ever higher requirements and ambitions. The UN Agenda 2030, the Paris Agreement and the EU framework programme have been taken into account in the programme, as has the development of national environmental goals in Sweden.

The programme is based on the challenges that exist today for Stockholm's living environment. It focuses on the challenges that lie within the City of Stockholm's area of responsibility, but also includes goals that require the efforts of parties outside the City's mandate. The Environment Programme therefore covers both the direct impact that the city has through its own activities in the form of its own personnel and buildings, and also what the city indirectly controls, such as Stockholm residents' greenhouse gas emissions. Achieving many of the goals will be a major challenge.

In September 2015, UN Member States adopted Agenda 2030, an ambitious and comprehensive development agenda with 17 global Sustainable Development Goals. The Sustainable Development Goals are integrated and indivisible and several of the goals are interdependent and directly linked, which means that success in one of the goals has positive effects for other goals. The implementation of the Environment Programme shall take different groups into account. Elderly and children are particularly sensitive to environmental problems and it is important to analyse measures from a gender perspective. By taking into account different aspects of implementation, social and environmental sustainability are brought together.

Agenda 2030 will support and contribute to the development of the City's sustainability activities, including by stimulating collaboration and bridging pitfalls and organisational boundaries in the city's operations.

Stockholm – a city of sustainable growth

The programme focuses on the main environmental challenges during the period. Greenhouse gas emissions are falling nationally but not at the rate required according to the latest analytical results from research and expert authorities. For the next programme period, the City has therefore raised its ambition for climate activities, partly with a higher emission reduction target and partly by taking measures aimed at reducing the climate impact of consumption. As a major procuring authority, the City can set a good example and inspire others.

But the City cannot achieve the goals by itself: the work needs to be done in close cooperation with others and through technological development. The programme has therefore been designed in such a way as to stimulate and strengthen collaboration and innovation. The role of commerce and industry in environmental work is clarified and forms of collaboration are developed.

Successful climate and environment work requires Stockholm to be an attractive city with a dynamic commerce and industry that creates high and sustainable growth and provides conditions for continuing good welfare and a good life in all parts of a Stockholm that shall continue to grow. The extensive urban construction that Stockholm is facing represents a unique opportunity for improvement and development. Stockholm will be a dense and interconnected city where buildings and green structure interact and provide the conditions for creating good habitats. The dense city has many advantages from a sustainability perspective and urban construction is a powerful tool that can help steer development in a sustainable direction. In a growing city, satisfying all interests can be a challenge. In each area and in each project, it will therefore be necessary to make trade-offs. The environment programme shall be able to contribute to sensible ones.

Clear goals and developed ways of working

The programme is structured based on the highest priority goals for Stockholm's environment in the long term, i.e. until 2030 or longer:

- A fossil-free and climate-positive Stockholm by 2040
- A fossil-free organisation by 2030
- A climate-adapted Stockholm
- A resource-smart Stockholm
- A Stockholm with biodiversity in well-functioning and cohesive ecosystems
- A Stockholm with clean air and a good sound environment
- A toxin-free Stockholm

The priority goals individually include a number of milestones for the 2020–2023 programme period. Overall, the Environment Programme sets out seven priority goals for Stockholm's living environment, 16 milestones and proposals for indicators. This clarification of the long- and short-term goals is intended to give a clear picture of how the city ensures long-term sustainable development. The programme's goal descriptions make it clear how each goal contributes to national and global objectives.

The Environment Programme is a city-wide governing document and the starting point for action plans and guidelines that detail implementation in order to achieve the goals. However, many of the goals present major challenges, which is why new and further developed ways of working become central and important for goal fulfilment. The use of collaboration, innovation, purchasing and procurement and communication as strategic tools for the implementation of the programme will therefore be crucial for achieving the highest goals that constitute the City's ambition for climate and environment work.

Implementation and follow-up of Stockholm's Environment Programme

The City Council sets the budget for the City of Stockholm annually. The budget is superordinate and governs all the City's activities. The other governing documents decided by the City Council must relate to this. Based on the goals set by the City Council in the budget, there are supplementary governing documents for different areas. In the city budget, the City Council sets orientation goals, goals for the areas of activity, indicators that measure goal fulfilment and activities that will contribute to the fulfilment of the goals.

Programmes are goal documents that are long-term and city-wide. It therefore follows that the overall goals set out in the programmes may extend over mandate periods, but that activities and indicators may be changed if there are changes in the orientation of the budget. Programmes do not aim to define detailed measures, but may include proposals for activities and indicators, as well as methods for achieving the programme's goals. The City's committees and company boards shall follow the programmes that are found in each area of activity.

The Environment Programme has been adopted by the City Council. The City's environment programme is integrated into the City's superordinate system for the management and monitoring of all operations and finances, ILS, which means that in their business plans the committees or company boards shall report how they intend to contribute to the city's attaining these goals and report how the work is going through the follow-up of goals and indicators.

The Environment Programme also establishes committees and company boards with responsibility for implementation and follow-up.

The Environment Programme does not define the concrete measures to be implemented within the activities or their costs. The committee or company board with identified implementation responsibility for a milestone is responsible for formulating goals in its business plan, as well as indicators and activities aimed at fulfilling the Environment Programme's goals and deciding on the most cost-effective measures. In this way, the indicators established by the City Council are complemented by indicators formulated by committees and company boards.

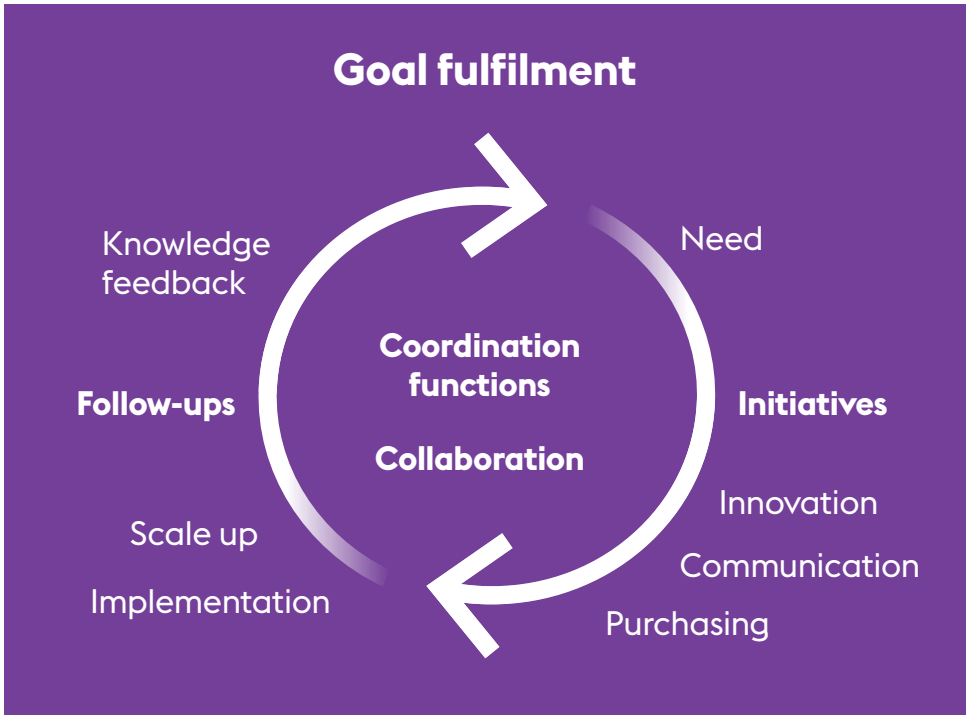
The Environment Programme's proposal for indicators (appendix) is determined in connection with the City Council's budget at City Council level. At committee and company level, these are determined in the business plans. The indicators shall be continuously evaluated and supplemented and revised in the budget process if they are not deemed to be adequate and effective for the follow-up.

The environmental goals, which are broken down into business plans and related indicators and activities, are followed up in connection with four-monthly reports and activity reports, exactly as with other monitoring of operations and budgets. If necessary, the City Executive Board may call on and urge committees and company boards to take steps to achieve the goals.

The respective committee and company board shall, based on *the Environment Programme* and *the Climate Action Plan,* formulate an environmental and climate action plan for their activities in addition to the business plan. The work of each committee and company board can be detailed based on the overall approaches.

Developed working methods

Committees and company boards responsible for the implementation of milestones shall clarify in their business plans how developed working methods for collaboration, innovation, purchasing and procurement and communication can be used as strategic tools for increased goal fulfilment. This shall be part of the ongoing follow-up and shall lead to a higher degree of goal fulfilment. Technological development and digitalisation are also crucial tools for achieving the goals of the Environment Programme.



Collaboration

There are a number of goals in the Environment Programme that the city is not able to achieve on its own. Collaboration with other parties is therefore absolutely essential for the implementation of the programme. This applies to both state and municipal actors in the region as well as commerce and industry, academia and the civil society and not least the residents of Stockholm.

Commerce and industry, the civil society and the NGO sector are important parties both for implementation and for bringing together social and environmental sustainability.

In the City's collaboration with external parties, the City can take a coordinating role in driving different types of collaborative processes that are necessary to achieve the goals. Collaboration with the region's actors is crucial to reducing greenhouse gas emissions and creating a better resilience to climate change. In addition to synergies in environmental effects, coordination of work also provides an opportunity for cost-effectiveness and co-financing models.

In order for internal collaboration within and between committees and company boards to be effective, it needs to be clearly organised. A good form of working is collaborative groups that bring together the relevant parts of the city's activities and are given a mandate to act city-wide. This work can continue to be developed through the establishment of coordinating functions/networks in order to ensure implementation, continuous follow-up and competence development and to stimulate collaboration that bridges organisational boundaries in the City's operations. The work initiated within the framework of the City's work on Agenda 2030 can also be used to stimulate collaboration and bridge the pitfalls and organisational boundaries in the City's operations.

Purchasing

Approximately two-thirds of the City's total turnover consists of purchasing expenses for goods, services and contracts. In other words, the city has considerable scope for influencing the long- and short-term goals of the Environment Programme in its capacity of requirement-setting purchaser. In addition, in several categories of purchases, the City is such a large purchaser that there are good opportunities to influence the supplier market in a certain direction, which also benefits Stockholmers as consumers.

Through its own purchasing work, the City can contribute to the fulfilment of many of the goals of the Environment Programme. According to the City's *Programme for purchasing 2020–2023*, environmental requirements must always be imposed where justified and should aim to achieve

the goals of the Environment Programme. For example, the City shall impose requirements for work machinery, its own vehicles, choice of tyres, transport, white goods, electricity, food, plastic products etc., but also strengthen the conditions for minimising waste and unnecessary material consumption.

In order to achieve more of the ambitious milestones in the programme, it is important that the City uses clear, relevant and uniform requirements and contractual terms in connection with purchasing. By means of category-based purchasing, internal collaboration and knowledge of the supplier market's opportunities will be increased in order to further strengthen the City's ability to achieve the sustainability goals. Clarity for suppliers can be further increased through interaction with other public actors.

Communication and influence

The City's communication, both with external parties and internally, is key to being able to implement the programme. Communication efforts aimed at target groups and parties that can contribute to achieving the goals of the Environment Programme, such as the environmental impact of consumption and climate-friendly transport options, are particularly important. In other respects, it is more about internal communication about the City's own working methods, for example in terms of reduced consumption of products containing environmental pollutants and reduced food waste in the City's operations.

The City cannot achieve the ambitious goals by itself and also lacks resources in several areas. Active influence is therefore needed to promote the strengthening of national instruments and to amend obstructive laws. The City also needs to be actively involved in the EU so as to exert influence on the work of the European Commission and the European Parliament.

Knowledge needs to be increased about the City's climate and environment activities and about innovative ideas and solutions to meet the climate challenges that must be addressed. Communication about climate and environment activities in Stockholm is important, so as to create interest in the City's work and commitment to collaboration and contribution to reducing climate and environmental impact, as well as to share knowledge and find new, innovative solutions. Acceptance and understanding need to be created for the changes and priorities that must be made, as well as understanding of what the City's operations and their target groups need to do themselves to reduce their climate and environmental impact. It is also necessary to put the City's efforts into a global perspective and create international interest in the City's work and Stockholm as a place. These include efforts to increase the collection of food waste, the choice of sustainable modes of transport and conscious consumption choices.

Innovation

In order to achieve the goals defined in the Environment Programme, the City's committees and company boards also need to work on business development in different ways. According to the *Innovation Strategy for the City of Stockholm,* the City's committees and company boards shall work to develop new or significantly improved services and processes. They shall also find new ways of organising activities for the purpose of involving their employees, users or customers as well as various external parties in the development work. The high goals that have been defined for Stockholm's environment make this a central theme of the Environment Programme.

According to the *Innovation Strategy for the City of Stockholm,* a number of areas are key to the City's work on research and innovation. In order to be able to contribute to the development of municipal activities with the support of research and technological excellence, academia and industry need to be given a good picture of the City's needs. The City shall therefore actively participate in various research initiatives with a focus on relevant development areas for the City. The City shall also actively evaluate the need for external expert support in the form of research efforts and evaluate existing working methods with a focus on resource effectiveness. Technological and organisational development should always go hand in hand. In development, research and innovation efforts, the City shall have a plan for how positive results can be scaled up so as to benefit the entire organisation.

Seven priority goals for Stockholm's environment

1. A fossil-free and climate-positive Stockholm by 2040

The goal is that the City of Stockholm and its residents will have reorganised their energy use so as to be fossil-free by 2040. This means that energy used for heating, as well as transport, electricity and gas use in Stockholm, do not generate any net greenhouse gas emissions and also that the City works to ensure that the global climate impact of its consumption is sharply reduced. The City shall be at the forefront, which is why the City is working with the goal that Stockholm shall be climate positive by 2040. To achieve this, technology and business models need to be developed.

The goal of a fossil-free and climate-positive Stockholm by 2040 includes two milestones for the programme period

- Reduced greenhouse gas emissions — maximum 1.5 tonnes CO_2e per resident
- Reduced climate impact from consumption

Under the Paris Agreement, most of the world's countries have agreed to limit global warming to well below 2 degrees, with the goal of not exceeding 1.5 degrees. The Paris Agreement calls on the parties to the agreement to develop long-term strategies to reduce greenhouse gas emissions by 2020. The EU has adopted climate goals for 2020 and 2030. Greenhouse gas emissions in the EU shall be reduced by 20 per cent by 2020 and by 40 per cent by 2030 compared to 1990. The European Commission has recently presented its long-term strategy, which includes the ambition to achieve zero net emissions by 2050.

Sweden's overall climate goal is to achieve zero net greenhouse gas emissions by 2045 at the latest, and then have negative net emissions. In this case, not having any net greenhouse gas emissions means that greenhouse gas emissions from activities in Sweden shall be at least 85 per cent lower by 2045 than emissions in 1990. We can compensate the remaining emissions to zero by means of complementary measures. This long-term goal is complemented by a number of milestones. The climate goals and the planning and follow-up system regulated by the Climate Act (2017:720) represent, together with the Climate Policy Council, Sweden's climate policy framework.

The City's goal of a fossil-free and climate-positive Stockholm by 2040 is thus more ambitious than the national goals, which testifies to the City's ambition to take the lead and be a role model in the climate change transition.

The system limits for the greenhouse gas emissions that are calculated consist of energy use for heating and transport, as well as electricity and gas use within the geographical municipal boundary.

Among other things, the Climate Policy Council has identified the transport sector as particularly critical for achieving the Swedish goals. For transport, the national interim milestone is to reduce greenhouse gas emissions by at least 70 per cent by 2030 compared to 2010. Transport accounts for about half of the calculated greenhouse gas emissions in Stockholm. Of these emissions, road traffic accounts for about 80 per cent, the rest consisting of shipping within the municipal

The goal of a fossil-free and climate-positive Stockholm contributes in particular to global goals number **7 Affordable and clean energy**, number **12 Responsible consumption and production** and number **13 Climate action**.

Among the national environmental goals, the goal of a fossil-free and climate-positive Stockholm 2040 contributes primarily to the goal **Reduced climate impact**, but through energy efficiency and sustainable transport also contributes to the goals **Good built environment** and **Clean air**.

boundary, take-offs and landings at Bromma Airport and work machinery. As road traffic presents particular challenges, an action plan to reduce carbon dioxide emissions from road traffic by 2030 will be developed.

In order to achieve the goal of a fossil-free Stockholm by 2040, the City of Stockholm is highly dependent on other parties and therefore needs to collaborate with academia, industry and others on measures to reduce emissions. New and innovative mobility services are one example of how the City's development towards reducing the use of resources and climate impact can be made possible in collaboration with other parties. The City is conducting a large number of development projects in collaboration with partners from academia, industry and other cities/regions in the field of efficiency and conversion to renewable fuels and to reduce the climate impact of consumption. These projects are an important part of achieving the City's climate goals, but also to help innovative, climate-smart methods and technologies to enter the market on a larger scale, so as to also reduce climate impact outside Stockholm.

In addition to participating in large-scale projects, the City needs to function as a testbed for industry's climate-smart solutions more than it does at present, and also take into account the opportunities that digitalisation and artificial intelligence (AI) can bring in improving the efficiency of energy use and traffic systems with the potential to reduce the use of resources and greenhouse gas emissions. In addition, by setting clear, relevant and long-term requirements in the purchasing process, the city can work with commerce and industry to develop goods and services with reduced climate impact. An important factor for commerce and industry is that different parties set similar requirements. One of the most important areas for collaboration in the region, and also in the country as a whole, is the development of similar requirements in public purchasing.

The goal of a fossil-free Stockholm by 2040 is also very much dependent on Stockholm's residents. This is therefore an area where communication with the people of Stockholm about the climate impact of consumption becomes central to the chances of achieving the goal. For this purpose, the City has an established function for climate communication, Climate-Smart Stockholmers, but external communication must occur simultaneously through several channels, including social media, the Stockholm Room and in dialogue with relevant parties. The City needs to intensify cooperation with other parties in urban planning on innovative solutions for climate-smart transport alternatives and to facilitate and create incentives for residents to live in a transport-efficient way.

How the City intends to achieve the goal of a fossil-free and climate-positive Stockholm by 2040 is detailed in *the Climate Action Plan 2020–2023 – For a fossil-free and climate-positive Stockholm 2040.*

1.1 Reduced greenhouse gas emissions — maximum 1.5 tonnes CO_2e per resident

The milestone means that by 2023, total greenhouse gas emissions in a growing Stockholm shall have been reduced to a maximum of 1.5 tonnes of CO_2e per resident. With more national instruments, the level of ambition can be further raised.

The City of Stockholm's systematic climate work of setting goals, identifying and implementing emission reduction measures and following up on the measures started as early as the mid-1990s.

The greenhouse gas emissions included in the calculations are those caused by all energy use within the City of Stockholm's geographical boundary. This means emissions from road transport, rail traffic, shipping, work machinery, take-offs and landings at Bromma Airport, heating, domestic hot water, cooling and the use of electricity and gas. What is not included are the emissions caused by Stockholm residents' travel outside the municipal boundary and emissions from the production of goods or services manufactured outside the municipal boundary. In addition to direct emissions, the calculations also include emissions related to fuel production, known as

LCA[1] additions, and emissions of methane and nitrous gases from all combustion. Also the combustion of biofuels. This means that the calculations will cover certain greenhouse gas emissions even when the use of fossil fuels has ceased.

Since 1990, the estimated greenhouse gas emissions for the whole population have fallen by around 40 per cent, and the reduction per resident has been close to 60 per cent.

For transport, the national interim milestone is to reduce greenhouse gas emissions by at least 70 per cent by 2030 compared to 2010. Transport accounts for about half of the calculated greenhouse gas emissions in Stockholm. Of these emissions, road traffic accounts for about 80 per cent, the rest consisting of shipping within the municipal boundary, take-offs and landings at Bromma Airport and work machinery.

Road transport vehicles are becoming more energy-efficient and the share of biofuels has increased to around 30 per cent. At the same time, road traffic work is increasing, which means that total emissions from road traffic are not reduced. Through technological developments such as electrification of the transport sector, expanded public transport and reduced car traffic, emissions from road traffic shall be reduced. The major challenges to the transition to a fossil-free Stockholm are electrification and access to renewable fuels. Therefore, with more electrification and greater availability of renewable fuels, road traffic need not be reduced to the same extent. The charging infrastructure needs to be expanded and new biofuel production methods need to be developed, for example from forest raw materials, and new production facilities need to be added in the country to provide the transport sector with renewable fuels if the City is to become fossil-free.

The transition to a fossil-free Stockholm has come furthest in the heating sector. The change from fossil fuels to renewable fuels in the heating sector has been the predominant reason for emission reductions. The largest remaining point source in the sector is the Värtaverket coal-fired heat and power plant. Stockholm Exergi intends to phase out the plant within the programme period. The remaining fossil fuels are found in the form of fossil plastics in waste incineration and between 1,000 and 1,500 mixed-use oil-fired boilers, partly as the sole form of heating and partly as heat for heat pumps. Sorting facilities for sorting plastics from Högdalen and Bristas waste incineration plants are being built during the programme period. As regards oil use, the City has set a goal of ending all fossil oil combustion by 2025.

With about ten per cent of existing property and as owners of technical infrastructure for water purification, road lighting etc., the City can develop into a unique test bed for climate-smart solutions.

Examples of measures to achieve this milestone during the programme period:

- Promote stronger state governance in the field of climate change through, for example, the development of the reduction obligation and the congestion tax to stimulate technological change.
- Contribute through urban planning to transport efficiency and increased use of public transport and of bicycles.
- Work for fossil-free shipping through, for example, electrical power connections for ships at the quayside.
- Further develop biogas as a transport fuel.
- Phase out fossil fuel in district heating and reduce energy recovery from fossil plastics through the construction of sorting facilities.
- Increase negative emissions by scaling up biochar production and examining the possibilities for carbon capture and storage (BECCS).
- Stimulate the sharing economy, for example by promoting car sharing.
- Work for fossil-free excavators and other machines on construction sites, for example through purchasing requirements and innovation projects.
- Develop an action plan to reduce carbon dioxide emissions from road traffic by 2030.

1 LCA, life cycle analysis

The City Executive Board, the City Development Committee, the Real Estate Committee, the Environment and Health Committee, the Service Committee, the City Planning Committee, the District Councils, the Transport Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB, SISAB, Stockholm Exergi, Stockholms Hamn AB, Stockholms Stads Parkering AB and Stockholm Vatten och Avfall AB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the City Executive Board together with the Environment and Health Committee.

1.2 Reduced climate impact from consumption

This milestone means that consumption-based greenhouse gas emissions need to be reduced. The City is a procuring authority that can influence the climate impact of consumption through requirements in the purchasing process. In this work, the City can take the lead and inspire. During the programme period, the climate impact of the City of Stockholm's purchased food and meals shall be reduced by one fifth and emissions from the City of Stockholm's own business travel by air shall be reduced.

At a national level, Statistics Sweden calculates Sweden's greenhouse gas emissions from a consumption perspective on behalf of the Swedish Environmental Protection Agency. In Sweden, greenhouse gas emissions were estimated at around 10 tonnes per inhabitant from a consumption perspective in 2016. About 60 per cent of these emissions occur abroad.

At regional and municipal level, there are no statistics to calculate and monitor the climate impact of consumption. The possibility of further developing statistics is considered to exist only in the longer term, but in some thematic areas statistics are available, for example on emissions from air travel.

According to the Swedish Environmental Protection Agency, food consumption accounts for around 20 per cent of the national climate impact calculated from a consumption perspective. The City defines requirements for organic food as well as an increased range of vegetarian foods and products produced in line with Swedish animal welfare rules in its purchases, so as to move towards more sustainable food production. During the programme period, the city will introduce tools to calculate, monitor and reduce the climate impact of food and meal purchasing. Construction and operation of buildings has shown that the climate impact of the construction process including the production of building materials is about the same as that from the operational stage of a low-energy building for 50 years (source: Erlandsson, M. et al. (2105) IVL B 2217 – The climate impact of construction — Life cycle calculation of climate impact and energy use for a newly produced energy-efficient concrete apartment building.)

The City has a relatively large capacity to influence consumption-based emissions, as about 40 per cent of total emissions in Sweden come from public consumption and investments.

Examples of measures to achieve this milestone during the programme period:

- Develop climate calculations for newly produced buildings at the city's companies and of the City Development Committee. In the longer term, the City shall be able to set climate requirements for new construction of buildings and infrastructure.
- Minimise business travel by air
- Develop climate requirements for the purchase of food and meals in the City's operations.

The City Executive Board, the City Development Committee, the Real Estate Committee, the Environment and Health Committee, the Service Committee, the City Planning Committee, the District Councils, the Transport Board, the Education Committee, the Elderly Services Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB, SISAB, Stockholm Exergi, Stockholms Hamn AB and Stockholm Vatten och Avfall AB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the City Executive Board together with the Environment and Health Committee.

2. A fossil-free organisation by 2030

The goal is for the City of Stockholm's organisation to be fossil-free by 2030 within the same system limits as the City's other emission goals. For the City taking the lead and becoming fossil-free as early as 2030, greenhouse gas emissions from energy use in the City's organisation need to be reduced at a faster rate than the corresponding emissions in the geographical city.

The goal of a fossil-free organisation includes two milestones for the programme period

- Reduced greenhouse gas emissions — maximum 105,000 tonnes CO_2e from the City's operations
- Effective energy consumption

The City has come a long way in the process of phasing out fossil fuels within its own organisation. A major player like the City of Stockholm should and can be an inspiration and forerunner for other parties both public and private. The City of Stockholm is well placed to become fossil-free by 2030 by taking advantage of the opportunities available and exploiting them as far as possible. However, the City of Stockholm is dependent on external developments in order to achieve its goal. As regards work machinery, technological developments towards fossil freedom have not taken place at the required rate for goal fulfilment by 2030.

How far technological development will have progressed by 2030 is difficult to determine today. However, the outlook looks increasingly favourable. Prices for renewable energy such as solar and wind are falling, electrification is going faster than forecast, legislation and incentives are being introduced and are driving the transition and creating the conditions for increased production of renewable fuels.

It is important that the city's activities have active external monitoring so as to be able to take into account the development of, for example, the potential of digitalisation to reduce the need for fossil fuels, especially in the transport sector.

As a major public purchaser, the City has a great opportunity to influence development towards the goal of reducing greenhouse gas emissions from the City's operations. The purchasing process is a strategically very important tool for the City to set requirements and through this requirements can be defined for fossil freedom for vehicles, transport and machinery, for example. This applies equally to light vehicles, heavy goods transport and machines for park management and snow removal. The City also purchases considerable quantities of food and meals, where climate requirements shall also to be imposed. Systematic work on the development of environment and climate requirements is ongoing in priority purchasing categories.

Measures to achieve the goal of a fossil-free organisation by 2030 can be found in *the Climate Action Plan 2020–2023 – For a fossil-free and climate-positive Stockholm 2040* and in the action plan for a *Fossil Fuel-free organisation 2030.*

The goal of a fossil-free organisation contributes in particular to global goals number **7 Affordable and clean energy**, number **12 Responsible consumption and production** and number **13 Climate action.**

Among the national environmental goals, the goal of a fossil-free organisation 2030 contributes primarily to the goal **Reduced climate impact**, but through energy efficiency and sustainable transport also contributes to the goals **Good built environment** and **Clean air.**

2.1 Reduced greenhouse gas emissions — maximum 105,000 tonnes CO_2e from the City's operations

The interim milestone is to reduce greenhouse gas emissions from the City's activities by 30 per cent during the programme period, in order to achieve the overall goal of a fossil-free organisation.

The City's own vehicle fleet today consists of environmental vehicles and a change to fossil-free vehicles is continuously carried out within the framework of the City's own vehicle purchasing. In several of the City's activities, electric bicycles are being tested instead of cars, which also has health benefits.

The last remnants of direct fossil energy use in the City's operations shall be phased out. Remaining fossil oil heating has been identified and is being replaced with renewable alternatives.

Green lease agreements can be a tool to drive environmental and climate work forward and can be tested on a smaller scale. There is a link to fossil freedom, but other environmental aspects can also be taken into account.

The City buys goods and services for approximately SEK 35 billion per year. The City thus has a major influence in reducing climate impact by setting requirements in its purchasing of, for example, work machines, its own vehicles, electricity, food, plastic products, white goods etc. Systematic work on purchasing requirements is ongoing within the City, with environmental and climate requirements in category purchasing. Climate requirements shall be further developed within the framework of category management of purchasing.

Climate requirements are set and shall continue to be set for purchased transport within the Service Committee's procurements. Purchasing of services where transport is included outside the Service Committee's procurements, for example for home care and work machines, needs to be examined in order for purchasing requirements to be imposed on these transports as well.

Examples of measures to achieve this milestone during the programme period:

- Expand our own electricity or heat production based on solar energy and investigate the conditions for increasing the share of electricity from wind power.
- Continue efforts to phase out fossil oil use, so as to ensure that smaller plants are also captured and phased out.
- Identify properties with special needs for investment in equipment to enable the phasing out of fossil oil, including in buildings rented exclusive of heating and hot water.
- Introduce a procedure to evaluate a transition to fossil-free oil for all buildings intended to be in operation for more than three years after the City acquired them.
- Identify which lease agreements within the City's committees and company boards are best suited to be green lease agreements and initiate pilot projects.
- Continue the work to phase out fossil gas use and ensure a high proportion of biogas in purchasing.
- Set requirements for fossil-free transport services and also adopt a final date for new agreements that go beyond 2030 when fossil fuel transport services are no longer accepted.
- Require fossil freedom for vehicles, transport and work machinery, with local rentals and for purchasing and procurement.

The City Executive Board, the City Development Committee, the Real Estate Committee, the Environment and Health Committee, the Service Committee, the City Planning Committee, the District Councils, the Transport Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB, SISAB, Stockholm Exergi, Stockholms Hamn AB, Stockholms Stads Parkering AB and Stockholm Vatten och Avfall AB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the City Executive Board with the support of the Environment and Health Committee.

2.2 Effective energy consumption

The total energy purchased in the City's operations is maintained at the same level during the programme period. This milestone means that the City will make its energy use 5 per cent more efficient relative to the activities carried out[1]. Far-reaching energy efficiency shall be carried out in large-scale rebuilding work. In large-scale rebuilding work, the purchased energy shall be reduced by at least 30 per cent. In this way, energy use in the growing city will be more efficient. The production of electricity and heat from solar energy will increase by 100 per cent compared to the corresponding production in 2018.

1 The indicator for relative energy use is not affected by the growth of the city and the sell-off of property. In the property portfolio, energy consumption can be related to kWh/m^2 A temp. For the Transport Committee, energy use can be related to kWh/lighting point and for Stockholm Vatten och Avfall AB to kWh/m^3 treated waste water and kWh/m^3 drinking water.

From a resource-management perspective, energy efficiency, especially among the city's property-owning operations, will remain a priority area during the programme period. The City of Stockholm has implemented energy efficiency programmes since the 1990s, but there is still potential for further efficiency improvements. Through the statutory energy surveys, new efficiency measures will be identified for the companies reviewed.

As the climate footprint of heat production decreases with an increasing proportion of biofuels, the climate impact of energy efficiency improvements in buildings will be less. Demand for biofuels from forest raw materials is expected to increase in the future as other sectors, nationally and internationally, will need to use the raw material for the production of textiles, plastics and liquid biofuels, for example for aviation and shipping. Energy efficiency is therefore important both from a resource management perspective and from a cost perspective.

Examples of measures to achieve this milestone during the programme period:

- In large-scale rebuilding work, the goal shall be to reduce the purchased energy for heating, cooling, property electricity and hot tap water by at least 30 per cent.
- Where possible, more far-reaching energy efficiency shall be sought with a view to halving the energy purchased.
- Conduct pilot projects that achieve 10 per cent energy efficiency improvement in existing properties that are not being rebuilt by developing new innovative methods and ways of working, with a view in the long term to developing methods, technologies and ways of working to enable more comprehensive measures.
- Continue to prioritise improved efficiency of energy use through operational optimisation, improved climate shells, energy efficient lighting (LED), replacement of white goods and drying cabinets in pre-schools and installation of solar cells.
- In the case of new construction on land allocated by the city and where municipal activities build on their own land, the requirement shall be an energy use of not more than 55 kWh/m^2 per year with the aim of 45 kWh/m^2 per year.
- Continued work to enable City staff to make environmentally friendly business travel.
- In the case of renovation of, for example, swimming pools, a greater grip is taken on energy use, for example through heat recovery, optimised control and LED lighting.
- Continue the process of centralising electricity agreements to ensure that even smaller electricity consumers are captured and included in the central agreement.

All committees and company boards are responsible for carrying out activities aimed at achieving this milestone.

The follow-up responsibility for this milestone lies with the Environment and Health Committee.

3. A climate-adapted Stockholm

The goal is that Stockholm has developed into a city that is well prepared to handle the consequences of a changing climate. Stockholm shall have a high capacity to handle both direct and indirect effects of, for example, high water levels and flows, torrential rain, heat waves and prolonged drought. In the long term, the city shall have good planning to cope with rising sea levels.

The goal of a climate-adapted Stockholm includes two milestones for the programme period

- Improved ability to cope with effects of torrential rain
- Improved ability to cope with effects of heat waves

The goal of a climate-oriented Stockholm contributes in particular to the global objectives number **11 Sustainable cities and communities** and number **13 Climate action**.

Among the national environmental goals, the goal of a climate-adapted Stockholm contributes primarily to the goals **Reduced climate impact** and **Good built environment**.

The increasing concentrations of greenhouse gases in the atmosphere, mainly carbon dioxide as a result of human emissions, affect the earth's radiation balance and are the main cause of rapid warming. In order to create a sustainable future, society must work both to reduce greenhouse gas emissions and to continuously adapt to the changing climate.

A changing climate with rising average temperatures,increased and more intense precipitation, raised water levels in lakes and the sea and changes in flows in watercourses will have negative effects for Stockholm. These will involve an increased risk of flooding and landslides, as well as heat waves and droughts. Buildings, infrastructure and technical supply systems must therefore be adapted to cope with both today's extreme weather events and the climate change and weather events to come. The work to adapt Stockholm to climate change should primarily focus on minimising the risk to people's lives and health, preventing serious disruptions to societally important activities and activities that are important for the city's functionality and reducing the risk of serious material damage and serious impact on the environment. Long-term urban planning is very central to this issue.

In order to adapt Stockholm to climate change, the City's committees and company boards must work together internally so that the work is coordinated and effective. It is important to cooperate not only on urban development but also on existing city property and the administration and management of measures taken.

Climate adaptation as a subject area spans organisational and geographical boundaries and is a relatively new issue for the city and therefore challenges the existing structures. Internal collaboration is therefore of great importance. At the same time, the city is not solely responsible for climate adaptation and interaction with external parties also needs to be developed. A continuous exchange of information and experience needs to be ensured and the City of Stockholm as an organisation has a key role in this work based on its geographical responsibility.

In addition to collaboration on preventive work, it is also important that the City of Stockholm has a focus on communication with parties responsible for societally important activities, such as Region Stockholm, Storstockholms lokaltrafik (SL) and the Swedish Transport Administration. It is important that collaboration with these is developed and that there is a continuous exchange of information and experience.

In order to achieve the goal of a climate-adapted Stockholm, innovation is a prerequisite. The City can promote innovative technical solutions by developing and ensuring the use of existing platforms for innovation of various kinds, such as the Innovation platform sustainable Stockholm (IPHS), experience of projects in Norra Djurgårdsstaden and Gröna Solberga, part of GrönBoStad etc.

The work on the city's climate adaptation is process-oriented and is led by the City Executive Board in accordance with the City's climate adaptation plan. Action plans for torrential rain and heat waves need to be drawn up and shall serve as a basis for prioritising measures. A number of governing documents for the City of Stockholm also deal with the goal of a climate-adapted Stockholm, including *the Stockholm City Plan, Stormwater Strategy – Stockholm's Path*

to Sustainable Stormwater Management and Greener Stockholm – Guidelines for planning, implementation and management of the city's parks and natural areas.

3.1 Improved ability to cope with effects of torrential rain

This milestone means that the ability to prevent disturbances both in the existing urban environment and in urban development needs to be built up during the programme period. The City's properties and operations that are at risk of critical effects of torrential rain shall have established a preventive action plan.

Global sea levels are rising due to the expansion of water at higher temperatures and to melting glaciers and inland ice. A warmer climate means that the evaporation of water from lakes and the sea increases. The atmosphere will then contain more water vapour, which will lead to increased rainfall.

Torrential rain means that there is a large amount of precipitation in a short time, which leads to flooding on the ground surface, as the water does not have time to drain away. The City's sewer network is not designed to deal with these extreme situations. All in all, this increases the risk of flooding with negative consequences for, for example, accessibility, water damage to buildings and increased levels of pollution in drinking water. The effects of torrential rain are worsened by hard ground surfaces, such as roads, car parks and roofs.

To achieve this goal, the City needs to have a clear risk picture of the types of negative consequences torrential rain can involve for the City's own operations and the built-up environment. What is required to ensure the City's functionality must be in focus, as well as the ability to create synergies between urban development projects and action needs in existing environments. The City also needs to promote the work of societally important parties in relation to torrential rain by identifying potential risk areas. Ongoing climate and vulnerability analyses with a City development perspective need to be a starting point for this work. Torrential rain solutions should be integrated into urban planning. Multifunctional solutions can also help strengthen urban ecosystem services and an attractive urban environment. For existing buildings, identification and impact assessment of vulnerable sites is an important part of the City's work on climate adaptation. On this basis, the city needs to choose a reasonable level of protection against expected flood risks.

Examples of measures to achieve this milestone during the programme period:

- Develop and detail risk and vulnerability analysis for heat wave and torrential rain for operations and properties and draw up action plans where the impact could be critical.
- Assess the risk of flooding with a once in 100 years rainfall in the zoning plan and ensure possible protective measures.
- Provide a higher level of safety for societally important activities so that the function can be maintained in the event of a flood.
- Build multifunctional surfaces that help deal with torrential rain.
- Ensure sustainable stormwater management through, for example, green roofs and permeable coverings, as well as plant beds and skeletal soils with trees in the urban environment.
- Safeguard the proper functioning of the systems for the operation and maintenance of stormwater installations.
- Identify particularly flood-prone geographical areas and investigate proposed measures.
- Weigh climate adaptation measures into investment decisions with the perspective that these can contribute to added value that brings other benefits to society, such as an attractive city for residents, visitors and commerce and industry.

The City Executive Board, the City Development Committee, the Real Estate Committee, the Environment and Health Committee, the City Planning Committee, the District Councils, the Transport Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB and SISAB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the Transport Committee.

3.2 Improved ability to cope with effects of heat waves

This milestone means that measures are directed towards making Stockholm better prepared to handle high temperatures during heat waves, so that the risk of negative impact on people's lives and health is reduced.

Climate statistics show that there have been major changes in the average temperature in Stockholm since the beginning of the 20th century. 2014 and 2018 are the warmest years recorded in Stockholm so far. The average annual temperature was then 8.8 degrees, which is just over two degrees warmer than normal (the average for the reference period 1961–1990 was 6.6 degrees).

A changing climate increases the risk of heat waves, which in turn increases the risk of health problems. This is especially true during the periods when the heat is high throughout the day and night. When the nights are warm, the body does not have time to recover.

Another effect of climate change is drought. For Stockholm, drought poses several challenges such as increased fire risk, impact on soil stability and negative impact on biodiversity. To prevent the effects of heat waves, the City needs to conserve water and find innovative ways to collect and retain water from precipitation that can be used in periods of drought.

A clear risk picture is needed of the negative consequences that a heat wave could have for residents, the city's businesses and properties, but the city also needs to promote the work of societally important parties by identifying potential risk areas. The city needs to develop principles for the management of heat waves as a starting point and guidelines on how and according to what priorities the goal shall be achieved.

Examples of measures to achieve this milestone during the programme period:

- Perform risk and vulnerability analyses for the City's operations.
- Expand the urban environment with more green areas, water and vegetation that provides shade.
- Carry out temperature lowering measures on and adjacent to buildings to ensure a good indoor environment.
- Arrange cool environments, such as cool rooms in homes.
- Build multifunctional, cooling outdoor environments.
- Identify solutions for collecting rainwater that can be reused during drought periods.

The City Executive Board, the City Development Committee, the Real Estate Committee, the Environment and Health Committee, the City Planning Committee, the District Councils, the Transport Committee, the Education Committee, the Elderly Services Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB and SISAB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the City Executive Board and Stockholms Stadshus AB.

4. A resource-smart Stockholm

The goal is that the City of Stockholm has developed into a city where resources are used efficiently and in accordance with the EU waste hierarchy. This means that the City has identified and mapped major resource flows and has a developed strategy to create circularity for these. Stockholm has adapted to resources being finite by developing and adopting new technologies, new business models and new lifestyles.

The goal of a resource-smart Stockholm includes three milestones for the programme period

- Reduced use of resources and more sensible consumption
- Increased recirculation of material resources within the city
- Increased resource efficiency in connection with the construction process

Today, 60 per cent of the world's ecosystems are exploited in an unsustainable way. The pressure on resources will be further increased by increasing population and living standards. Sweden's ecological footprint is about four times larger than what is considered sustainable in the long term. The resource challenge is primarily not about raw materials that "run out" but about valuable resources being wasted or distributed into nature, losing their economic value and adversely affecting the earth's life support system.

A circular economy retains the value of products, materials and resources for as long as possible, while minimising waste generation. Sustainable consumption and production and measures for waste prevention and more circular flows can reduce both resource consumption and climate-impacting emissions. Changing to a more sustainable and resource-efficient society, a circular economy, is a major challenge, both globally and locally.

The goal of a resource-smart Stockholm requires greater collaboration both within the City's own operations and with other parties. In connection with planning, good coordination between different parties is required in order to allow space for recirculation, such as the need of waste management and infrastructure for space and the establishment of spoil handling areas. The promotion of resource management through co-use is an area that can be developed. For example, the possibility of collaboration between treatment facilities and sorting facilities in the region, in order to maximise their overall capacity, has been highlighted as an area to study more closely.

Developing collaboration with commerce and industry is needed to achieve the goal of a resource-smart Stockholm. The work of the Climate Pact and collaborative platforms can be developed to become more needs-driven and operational based on environmental and climate challenges faced by society. Commerce and industry in the City of Stockholm, in close contact with relevant committees and company boards, should be invited into networks where goals and action plans/working groups are jointly set up on how the City of Stockholm and commerce and industry can voluntarily and jointly gather forces to find circular and waste prevention solutions. Examples of areas for external collaboration could be the possibility of increasing the reuse of clothing through collaborations with non-profit organisations that today run much of the textile collection in the city. Through collaboration and innovation, a future circular flow of sewage sludge can be developed that meets expected new requirements for the recirculation of phosphorus.

Public purchasing can be used as a strategic tool to move towards circularity in the economy and the national procurement strategy indicates precisely this.

Since 2017, there has been a new approach, using category management for the entire Municipal Group's procurement and purchasing organisation. Category management of purchasing means that purchases in different areas (categories) are planned and carried out based on analysis of needs, purchasing patterns and business and market conditions. The work is done in a fact-based and group-wide manner, so as to create efficiency in the purchases within each category. The new approach has just begun and the focus is currently on vehicles, food and meals, electrical power, white goods and furniture. Further development of category management and expansion to other purchasing areas will allow for synergies and higher resource efficiency within the City.

The goal of a resource-smart Stockholm contributes in particular to the global objectives number **11 Sustainable cities and communities** and number **12 Responsible consumption and production**.

Among the national environmental goals, the goal of a resource-smart Stockholm contributes primarily to the goals **Reduced climate impact** and **Good built environment**.

A number of governing documents for the City of Stockholm cover the goal of a resource-smart Stockholm: *Stockholm City Waste Plan, Waste Plan for Stockholm 2017–2020, Climate Action Plan2020–2023 – For a fossil-free and climate-positive Stockholm 2040, Action Plan for reducing the spread of microplastics, Waste management programme in the public domain, Action plan for increased food waste collection in the City of Stockholm for biological treatment and Sludge strategy for Stockholm Vatten och Avfall AB.*

4.1 Reduced use of resources and more sensible consumption

This milestone means reduced use of resources and a more sensible choice of products and services. During the programme period, reuse in Stockholm shall increase significantly and within the City's operations it shall multiply. Both drinking water consumption and food waste shall be reduced within the City's operations by 2023.

Reduced use of resources and more sensible consumption with regard to product choice are the basis for a circular economy and good resource management. Reducing resource use requires reprioritisation. Making more sensible choices is about choosing products that can be recirculated and that do not contain harmful substances or are difficult to recycle. More sensible consumption may also be about choosing recycled or used products, the materials of which, or even the whole product, have already been recirculated. There is great potential in waste prevention efforts, not least through reducing food waste in the City's operations and in collaboration between the City of Stockholm and commerce and industry. Such collaboration may involve circular and waste prevention solutions relating, for example, to reuse and developing sharing services.

In a circular economy, the aim is for products to be made of bio-based or recycled materials. The products must also be designed to be used for as long as possible, repaired and eventually recycled in an efficient and safe manner. One principle of the circular economy is that the longer products and components can be used and reused, the greater the economic value they can create. Procurement can be used as an instrument to impose requirements as detailed above, together with requirements for waste prevention measures when purchasing goods, services and building contracts.

Drinking water has been regarded as an infinite resource in Sweden until just a few years ago. Water shortages and contamination of drinking water have become more apparent in recent years around the country, which has affected the perception of access to clean tap water. Since Stockholm is a city with access to large volumes of raw water, the focus of the City's own consumption should primarily be on thrift and the management of the water. How the infrastructure is used is an important aspect for the use of drinking water. It is therefore essential to ensure that the water produced is also used appropriately. Another important issue is how the plant is maintained. With optimised preventive operation and maintenance work, less rerouting is needed, especially in acute cases. There are great resource savings to be made, as well as savings for other environmental reasons.

Examples of measures to achieve this milestone during the programme period:

- Minimise food waste in the City's operations.
- Minimise unnecessary material consumption through well-planned procurements in the City's operations.
- Facilitate increased recycling through, for example, more pop-up recycling, stationary recycling, improvement of recycling centres and measures to increase the recycling of textiles.
- Use the City's internal recycling centre, Stocket, as a first-choice option in connection with the purchase of furniture and fittings for the City's operations.
- Strengthen planning of multifunctional spaces and the creation of places, spaces, and infrastructure that enable circular management of the City's resource flows.
- Stimulate a sharing economy, for example by promoting car pools and other sharing services.
- Further develop the city's environmental protection requirements in the city's procurement and purchasing programmes and sharpen the focus on the circular economy and waste prevention.

All the City's committees and company boards are responsible for implementing measures that contribute to the achievement of this milestone by using them in their own use of resources and consumption, as well as in their role as public purchasers.

The follow-up responsibility for this milestone lies with Stockholm Vatten och Avfall AB.

4.2 Increased recirculation of material resources

This milestone involves greater recycling of materials rather than combustion and converting materials to district heating where possible. By 2023, the amount of plastic used in energy recovery shall be reduced to less than one third compared to 2019 levels, and both the amount of food waste going to biogas production and the amount of phosphorus returned to the cycle will almost triple during the programme period.

The earth's resources are finite and the recirculation of resources that are already depleted is therefore central to sustainable development. A fundamental principle of the City's work for a resource-smart Stockholm is the ambition to prevent the generation of waste and to promote recycling in accordance with the EU waste hierarchy. Sorting at source and other measures to promote a high level of recycling therefore need to be seen as a key prerequisite for reducing resource use.

Plastic is a material where the recycling level has so far been generally low. Products and packaging that are found on the market today consist of many different types of plastic and contain substances that cannot be mixed for recycling. Plastic that comes from consumption is often severely contaminated. There has been a particular focus on plastic in the latest update of the City's programme for waste management in the public domain with effect from 2018. Because plastic is a priority area, there is a need to further develop the City's strategic work on plastic, including an analysis of how, where and what type of plastic is used in the City's operations and how it is recirculated.

For food waste, there is a national milestone in 2020, whereby at least 50 per cent of the food waste from households, caterers, shops and restaurants is sorted out and treated biologically so that plant nutrients are taken care of. The City of Stockholm has a higher level of ambition with the goal of 60 per cent by 2020, increasing to 70 per cent by 2021.

The City shall set an example by seeking a high level of reuse in the first instance and recycling of materials in the second instance for the waste generated in its own operations, regardless of whether it is operational waste or household waste.

In November 2019, the City Council decided on mandatory food waste collection through a new provision in Stockholm's regulations on waste management.

In addition to plastic and food waste, waste water and its energy content is an area where the City's recirculation needs to be further developed. Waste water, for example, is highlighted in the national objective of returning phosphorus from sewage as plant nutrients to arable land. In order to meet the requirements expected to result from ongoing investigations into recycling, collaboration and innovation will be important in the development of a future circular flow of sewage sludge.

Examples of measures to achieve this milestone during the programme period:

- The sorting plant in Högdalen is being commissioned in order to increase the sorting of the clean food waste fraction for biogas production and at the same time reduce the amount of plastic going to energy recovery.
- Develop the City's waste management with regard to waste prevention measures and better opportunities to deliver waste, with a focus on plastics and food waste.
- Promote the scaling up of current pilot activities where garden waste becomes biochar and district heating, either in-house or by an external party in a regional facility.
- Develop opportunities to dispose of waste in public environments in order to reduce littering and the spread of microplastics, but also to increase the quantity of waste receiving a circular flow.

- Promote continued sludge return to arable land in the near future through active upstream work. The future return of phosphorus to arable land should be a priority during the programme period.
- Work towards the resource-efficient reuse of gravel used for sanding streets and cycle paths during the winter months.
- Integrate waste issues into the planning processes at an early stage.
- Increase the opportunities for the city's businesses and tenants to sort out food waste as well as other waste fractions.
- Work to ensure that textiles are taken care of in a resource-effective way, so that the quantity of textiles going to combustion is reduced.
- Perform information initiatives so as to improve knowledge among the general public and companies about what is classified as hazardous waste, how it is sorted and where it should be left.
- Allow for space for recirculation, such as the need for space for waste management and infrastructure.
- Develop handling areas for building spoil, as well as a methodology for spoil handling, in order to achieve increased recirculation.

All the City's committees and company boards are responsible for implementing measures that contribute to the achievement of this milestone by using them in their own waste management, sorting at source and facilitation of recirculation, as well as in their role as public purchasers.

The follow-up responsibility for this milestone lies with Stockholm Vatten och Avfall AB.

4.3 Increased resource efficiency in connection with the construction process

The growing city generates large streams of materials in both buildings and infrastructure, as well as a large amount of waste associated with demolition, new builds and rebuilding. This milestone means that by means of correct handling the City generates a higher level of circulation of excavation spoil and other materials within the construction process.

The City's goal of building 140,000 homes in the city between 2010 and 2030 represents a high pace of construction.

The construction process has been estimated to account for more than half of an energy-efficient building's total climate impact over 50 years. When houses and streets are built, rock needs to be blasted out and soil and filling materials moved. It is therefore important to consider the environmental impact of the construction process from a life cycle perspective.

Of the excavated material that arises in connection with the rebuilding of Stockholm, a large part is classified as non-hazardous waste. This is not currently taken care of in a resource-efficient way, but is instead transported far away, often to a landfill. The reasons are many: lack of space for storage for reuse, lack of planning, cheap new materials that provide less incentive for recycling, a cumbersome permit process for recycling materials etc. Good planning at an early stage with an action plan for how excavated material is to be handled within each development project is therefore one of the keys to enabling resource-efficient handling of materials.

Examples of measures to achieve this milestone during the programme period:
- Use the Building Material Assessment system (BVB) and equivalent tools with regard to resource management in material selection and continue to impose requirements that building materials are environmentally assessed and documented in a digital logbook.
- Facilitate opportunities for reusing both excavated materials and crushed materials from contract rock arising in connection with development/rebuilding on public land and in site areas.
- Work to minimise waste materials in construction production.
- Investigate the conditions for fossil-free construction sites.

The City Development Committee, the Real Estate Committee, the City Planning Committee, the Transport Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB, Stockholm Vatten och Avfall AB and SISAB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the City Development Committee.

5. A Stockholm with biodiversity in well-functioning and cohesive ecosystems

The goal of a Stockholm with biodiversity in well-functioning and coherent ecosystems contributes in particular to the global goals number **6 Clean water and sanitation**, number **14 Life below water** and number **15 Life on land**.

Among the national environmental goals, the goal of a Stockholm with biodiversity and cohesive ecosystems contributes primarily to the goals **A rich diversity of plant and animal life** and **Flourishing lakes and streams**.

This goal means that biodiversity in Stockholm is high and resistant to change and that it contributes with many different ecosystem services. Future building will contribute to strengthening ecosystem services and increasing biodiversity. A coherent blue and green structure creates value for people, biodiversity and society at large. By creating multifunctional green solutions in the city while the city is growing, we obtain more ecosystem services that contribute to a sustainable, resilient and attractive city.

The goal of a Stockholm with biodiversity in well-functioning and cohesive ecosystems includes four milestones for the programme period

- Maintained functions and connections for biodiversity in the city's blue and green infrastructure
- Increased implementation of reinforcement measures, ecological compensation and conservation
- Increased proportion of food and goods that promote biodiversity in City purchasing
- Improved water quality in the City's lakes, waterways and coastal waters

Stockholm continues to grow strongly and there is a great need for housing, as well as public and commercial services, expanded infrastructure and a number of other functions. The Environment Programme contributes to the best possible design of new neighbourhoods for residents and minimises intervention and impact on the ecosystem's functions for plant and animal life.

The blue-green infrastructure represents the basis for ecosystems and for the ecosystem services the city needs. Ecosystems create healthy urban environments with cleaner water and air and less noise.

Biodiversity, i.e. *the variety* of genes, species, habitat types and ecological functions, is crucial for ecosystems to be resilient to change and to contribute many different ecosystem services. Together with habitats and ecological links, biodiversity constitutes so-called supporting ecosystem services. Without them, many of the plant and animal species that provide adjusting or cultural ecosystem services cannot survive. From an ecological point of view, a natural area is more stable the larger, more varied and more interconnected it is with other natural areas. Stable ecosystems can better withstand stress, such as extreme weather and disease, and are better able to survive in the long term.

The impact on biodiversity is one of the most serious environmental problems at a global level. The fact that the planet's limits are being exceeded in terms of loss of species and habitats is increasingly highlighted internationally. At the same time, awareness of the benefits we gain from nature that are known as ecosystem services is increasing.

By means of a broad planning process in urban development, knowledge of the different needs can be clarified and weighed up together. By developing green qualities that can respond to several needs at the same time, the City can conserve the land. The management of natural areas is important for the conservation of biodiversity. Stockholm's carbon footprint decreases when the city builds high and densely where this suits the urban environment. Building in a way that makes efficient use of space makes it possible to be able to use the land better, for parks and other green recreational areas for example.

In order to achieve the goal of a Stockholm with biodiversity in well-functioning and cohesive ecosystems, it is important that the City ensures the continuous exchange of knowledge and learning from good examples such as in Norra Djurgårdsstaden and Albano. External interaction is also of great importance to achieve the goal. For example, the City can promote greater collaboration over the green wedges that affect the City of Stockholm and better exchanges

between existing networks and fora, for example by the coordination group for Greener Stockholm and the steering group for *Good Water Status* holding joint planning meetings. The city can also use purchasing and procurement as a means of setting requirements for biodiversity and ecologically adapted management, for example in the management of land and water.

Guidelines for the planning, implementation and management of the city's parks and natural areas are set out in *Greener Stockholm – Guidelines for the planning, implementation and management of the city's parks and natural areas*, and the overall physical green structure is described in the *Stockholm City Plan*. Also relevant to the goal are *the City of Stockholm's Action Plan for Good Water Status, Stormwater Strategy – Stockholm's Path to Sustainable Stormwater Management, the City of Stockholm's Chemical Plan, the Action Plan for Reducing the Spread of Microplastics* and the *Strategy for Good, Healthy and Climate Smart Food.*

5.1 Maintained functions and connections for biodiversity in the city's blue and green infrastructure

This milestone means that measures are being taken to maintain biodiversity in the city and that the city can grow while habitats for plants and animals are not fragmented or contaminated.

A viable biodiversity in the city brings benefits, among other things, by preserving Stockholm's strategically and ecologically most functional natural areas through the establishment of nature reserves. Species-rich natural environments take a long time to establish and are often very difficult to replace, which means that deterioration of natural environments with high biological values can become irreversible. As the city grows, vital functions in ecosystems are retained or replaced. The green and blue infrastructure, with its ecosystem services, is of great importance to the residents of Stockholm. There are therefore good reasons to preserve the unique natural qualities that exist in Stockholm. Fragmentation of habitats can be avoided through sensible planning in the growing city.

Adapted conservation management is a very important part of the work to achieve this goal, as well as greater protection in the form of nature reserves, biotope protection etc. Goal fulfilment requires that the city has a blue and green infrastructure with ecologically functional networks of core areas, distribution zones and habitats. The City needs to safeguard, design, manage and develop these in order to promote biodiversity, in particular the specially protected species and their habitats.

The district councils' park plans give an overall description of each city district's ecological infrastructure and provide guidelines for management and how to safeguard biodiversity. For each park and natural area that is inventoried, strategies for content development and management are also specified. In addition to park plans, there are management plans for the city's nature and cultural reserves. According to the City Council's 2019 budget, a city-wide strategy (action plan) shall be prepared to develop the city's biodiversity so that the City, together with residents and property owners and managers, can contribute to the development of the blue-green infrastructure.

Examples of measures to achieve this milestone during the programme period:

- Protect nature reserves and natural areas where incursions could cause irreversible losses, for example those areas that have taken a very long time to establish or areas in a strategic location in the blue-green infrastructure.
- Create new blue and green environments that contribute to the area's ecological resilience and robustness with new buildings.
- Promote conservation-adapted care in both newly created and existing natural environments, such as landscaped frog ponds, old oak environments and other species-rich features of the cultural landscape that have given rise to Stockholm's special natural qualities.
- Improve the physical conditions for fish, bottom-dwelling fauna, amphibians, seabirds etc. in the city's aquatic ecosystem by removing migration barriers, recreating vegetation in shoreline environments and increasing variation in water levels and flows.
- Participate in innovative collaborations in which Stockholm's green areas can represent test beds in various pilot projects (such as Vårbergstoppen and Fokus Skärholmen).

The City Development Committee, the Real Estate Committee, the Sports Committee, the Environment and Health Committee, the City Planning Committee, the District Councils, the Transport Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB, SISAB, Stockholms Hamn AB and Stockholm Vatten och Avfall AB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the Environment and Health Committee.

5.2 Increased implementation of reinforcement measures, ecological compensation and conservation

This milestone is to strengthen the City's ability to implement measures that benefit biodiversity.

The city's rapid growth and expansion means that it is important to increase knowledge about nature conservation and management efforts to preserve and develop environments that have the potential to house many species, such as valuable oak environments, beaches or frog ponds, so that they do not become overgrown or lose ecological quality in any other way.

Efforts need to be made to improve quality and increase interconnection within the remaining green and blue infrastructure. In natural and park areas and water areas, weak connections need to be strengthened, deterioration of ecological functions compensated for and continuous conservation performed. To a great extent, it is a matter of building up knowledge and competence of nature conservation within the City and strengthening priority weak connections by means of additional new buildings.

Tools and channels can be developed and applied to facilitate communication on nature conservation matters. Analyses are needed on what approaches should be prioritised for different green and blue spaces. Supporting ecosystem services such as biodiversity can sometimes conflict with stormwater treatment, torrential rain management or recreational activity areas. The challenge is to develop multifunctional measures where the functions of the areas can be integrated in a sustainable way.

Examples of measures to achieve this milestone during the programme period:

- Extend follow-up of environmental monitoring and follow-up of measures.
- Implement specific initiatives for priority species and environments, in terms of management, restoration and reinforcement measures.
- Develop internal IT tools for conservation management.
- Further develop Stockholm's biotope database in order to be able to work further on landscape analyses as a basis for knowledge for physical planning.
- Facilitate the use of the biotope database and digital maps for City offices and companies through innovative development of web-based tools.
- Develop processes and tools such as the green space factor for working with biodiversity in urban planning.

The City Development Committee, the Real Estate Committee, the Sports Committee, the Environment and Health Committee, the City Planning Committee, the District Councils, the Transport Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB, SISAB, Stockholms Hamn AB and Stockholm Vatten och Avfall AB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the Environment and Health Committee.

5.3 Increased proportion of food and goods that promote biodiversity in City purchasing

This milestone means that in procurement and purchasing the City increasingly consumes goods with eco-labelling and based on the ambition that the food should be good, nutritious, sustainable, integrated, pleasant and safe in accordance with the City's Strategy for good, healthy and climate-smart food. During the programme period, the proportion of organic food in purchased meals and food for the City's activities will increase from half to just over two-thirds.

The consumption of food is a factor affecting biodiversity, as the production of goods and products contributes to the increased spread of environmentally harmful chemicals and greater quantities of waste (including plastics and microplastics in our lakes and seas), as well as production taking up land and water areas. The City's procurement requirements are also an important tool for working towards good animal husbandry. According to the Swedish Board of Agriculture's report 2019:9, Swedish food production is relatively resource-efficient and environmentally- and climate-friendly compared to the production of corresponding food in other countries. Increasing the share of Swedish food to replace imported food, as part of the work to choose food produced with high environmental and climate considerations, can therefore contribute to lower climate impact.

In order to achieve the goal of increasing the proportion of food and goods in the city's purchases that benefits biodiversity, the City shall work to increase internal knowledge and awareness of the importance of reducing food waste and of consuming foods that are locally grown, support natural grazing and/or are eco-labelled. These internal communication efforts are also about reducing the consumption of products containing environmentally hazardous substances.

The Strategy for good, healthy and climate-smart food clarifies the National Food Administration's recommendations and proposes, among other things, that the City's operations should endeavour to serve good, healthy food that is also good for the climate. Several of these measures also have a positive impact on biodiversity. For example, pesticides are not used in the production of organically produced food. In order to maintain viable stocks of pollinators, it is important that pesticide use is reduced.

Sweden is among the best in the world at using few antibiotics in animal production and at the same time having healthy animals, which means a lower risk of development of antibiotic resistance and fewer emissions of antibiotics into the environment. Replacing imported food with a higher impact on the climate and environment with food produced with a high regard for the environment and climate and that delivers ecosystem services is an important way for Stockholm to take global responsibility. The City of Stockholm's activities shall have a high level of ambition when it comes to restrictive requirements for antibiotic use and animal welfare. The City shall develop its work of imposing such requirements and, in line with this work, products that do not comply with these requirements shall be phased out.

Examples of measures to achieve this milestone during the programme period:

- Increase the share of organically produced goods in the city's purchases as well as an increased range of vegetarian foods and goods produced in line with Swedish animal welfare rules.
- In purchasing and procurement, set requirements for good animal husbandry.
- In purchasing and procurement, use the World Wide Fund for Nature's meat guide and consumer guide for fish, in order to contribute to biodiversity and to the fish stocks in the seas.

All procuring committees and company boards, in particular the Service Committee, the Social Services Committee, the Environment and Health Committee, the District Councils and the Education Committee, are responsible for carrying out activities that contribute to the achieving this milestone.

The follow-up responsibility for this milestone lies with the Service Committee.

5.4 Improved water quality in the City's lakes, waterways and coastal waters

This milestone means that the City actively works to ensure that Stockholm's bodies of water achieve good ecological and chemical status, according to the EU Water Directive. Urban waters of good quality are one of Stockholm's trade marks and contribute to a vibrant and resilient city. By 2023, water quality in Stockholm's bodies of water will be significantly improved and the quantity of microplastics reduced.

Under the EU Water Directive, all bodies of water must have achieved good ecological and chemical status, or other status if provided for by an exemption, by 2021 or 2027. In the Swedish administration, the goals are expressed as legally binding environmental quality standards (MKN) that apply to municipalities and authorities. This means that the City of Stockholm and the municipalities with which the city shares water, as well as other authorities, are responsible for ensuring that environmental quality standards can be complied with in the city's bodies of water.

The main environmental problems in Stockholm's lakes, waterways and coastal waters are eutrophication, environmental toxins and physical interventions in the aquatic environment. Currently, about 25 per cent of Stockholm's bodies of water achieve good ecological status and about 15 per cent good chemical status.

Microplastics in aquatic environments are a new and potentially serious problem that has received increasing attention due to the increased load on the environment and slow degradation. Studies have shown that microplastics are found in Lake Mälaren, among others, and are thus not only an environmental problem in our seas. Measures to combat the spread of microplastics need to be incorporated into the work for better water status.

The City of Stockholm has adopted *the City of Stockholm's Action Plan for Good Water Status,the Stormwater Strategy –Stockholm's path to sustainable stormwater management including action level and guidelines and the City of Stockholm's chemical plan* and is currently developing local action programmes for all priority bodies of water in the city. In combination with *the Action Plan for reducing the spread of microplastics*, the City's action plans and action programmes indicate both upstream and downstream measures to reduce the spread of nutrients, microplastics and environmental toxins, as well as the need for improvement of the physical habitats in our waters. Measures include, for example, the purification of contaminated stormwater, improvement of breeding and spawning grounds for fish in the urban environment and addressing problems arising from old discharges and contaminated areas.

Examples of measures to achieve this milestone during the programme period:

- Intensify operational action in the existing environment, as well as in developments and major rebuilding, according to the local action programmes in order to comply with the environmental quality standards by the deadline.
- Actively work towards the effective implementation of water-related measures, such as the purification of contaminated stormwater, improvement of physical habitats in urban aquatic environments, action on problems arising from old discharges and contaminated areas, as well as upstream work to reduce the use and dispersion of substances and materials that affect aquatic environments.
- Ensure that the long-term environmental monitoring of the city's bodies of water continues so that the effects of the implementation of the measures can be monitored and the basis for status classification and standard setting can be constantly improved.
- Actively promote a holistic perspective and create multifunctional plants that create added value from more perspectives than just storm water treatment.

The City Development Committee, the Real Estate Committee, the Sports Committee, the Environment and Health Committee, the City Planning Committee, the District Councils, the Transport Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB, SISAB, Stockholms Hamn AB, Stockholm Stads Parkerings AB and Stockholm Vatten och Avfall AB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the Environment and Health Committee.

6. A Stockholm with clean air and a good auditory environment

The goal is that Stockholm has developed into a city whose residents are not exposed to harmful noise or air pollution. The air shall be so clean that human health, as well as animals, plants and cultural values, are not damaged and the noise levels in the city shall provide conditions for well-being and recreation and not adversely affect human health.

The goal of a Stockholm with clean air and a good auditory environment includes two milestones for the programme period

- Reduced exposure to nitrogen dioxide and particulate matter for the city's residents
- Reduced environmental noise

Air pollution causes respiratory problems and increases the risk of morbidity and mortality from lung diseases and cardiovascular diseases. The source of air pollution is, above all, road traffic. The blue-green infrastructure represents the basis for ecosystems and for the ecosystem services the city needs. Ecosystems create healthy urban environments with cleaner water and air and less noise.

In order to protect human health, there are environmental quality standards (MKN) for outdoor air for about ten air pollution components. The concentrations of particulate matter (PM10) and nitrogen dioxide (NO2) are the most critical in the Stockholm region for environmental quality standards, and this is mainly about emissions from vehicular traffic in street environments in Stockholm city centre. Air pollutants which were a major problem in Stockholm over 50 years ago – sulphur dioxide, lead, carbon monoxide, benzene and others – have been greatly reduced and environmental qualitystandards for these substances are now being met by a wide margin.

Nitrogen dioxide levels have decreased since the early 1990s, mainly due to cleaner vehicles and fuels. However, the reduction has not been sufficient to reach the environmental quality standard. The concentrations of particles have also been reduced thanks to extensive measures in the form of dust bonding and reduced use of studded tyres and the environmental quality standard for PM10 is now being met in the city.

In order to meet the environmental quality standard for nitrogen dioxide and, in the long term, environmental goals throughout the city, emissions from road traffic must be further reduced. Particulate matter (PM10) levels must also be reduced in order to achieve the national environmental goal. In order to ensure continued compliance with the environmental quality standard for particulate matter (PM10), development depends mainly on how the use of studded tyres changes and the extent of the City's measures such as dust-binding and street cleaning.

Noise is a major problem area that affects many Stockholmers and whose harmful effects on human health are to be limited in accordance with the environmental quality standard for environmental noise. The dominant sources of noise in Stockholm are environmental noise from the various modes of road, rail and air traffic.

In order to achieve the goal of a Stockholm with clean air and a good auditory environment, the city has an important role in expanding contacts with external parties, such as academia and private industry, in order to participate in project applications linked to innovation for air quality and sound environment issues. The City can also promote the implementation of innovative test beds to improve air quality, through increased interaction with academia, as well as regional and municipal parties. The City can also promote the creation of an organisation that can be the test bed for innovative environmental solutions and which facilitates for parties that have proposed projects to improve sound and air quality. The City can also continue to evaluate environmental sensors as a method of dynamic traffic management based on air quality and explore the possibilities of using digital technology and artificial intelligence (AI) to control traffic according to air quality or to facilitate compliance with environmental zone rules. The City also has a responsibility to increase knowledge about the health effects of using studded tyres and driving style through, for example, information campaigns.

The goal of a Stockholm with clean air and a good auditory environment contributes in particular to global goals number **3 Good health and well-being** and number **11 Sustainable cities and communities**.

Among the national environmental goals, the goal of a Stockholm with clean air and a good auditory environment contributes primarily to the goals **Good built environment** and **Clean air**.

The Action programme against noise in accordance with the Regulation (SFS 2004:675) on environmental noise and action programmes for nitrogen dioxide and particulate matter in Stockholm County address the goal of a Stockholm with clean air and a good auditory environment.

6.1 Reduced exposure to nitrogen dioxide and particulate matter for the city's residents

This milestone means that exposure to harmful levels of nitrogen oxides in the air shall decrease during the programme period. In order to reduce nitrogen dioxide levels, emissions from road traffic must be further reduced and the City has an important role to play in limiting the type of traffic that generates emissions.

Although heavy goods vehicles make up a small part of the traffic flow, heavy goods vehicles account for a relatively large proportion of nitrogen dioxide emissions. Stockholm's inner city is an environmental zone with a prohibition on heavy goods vehicles that do not fulfil the requirements for the Euro V emission class. After 2020, the requirements for the Euro VI emission class must be complied with by heavy goods vehicles in the environmental zone. More controls and better compliance with the prohibition would lead to a reduction in emissions.

On 1 July 2018, a bonus-malus system for new vehicles came into force in Sweden, by which vehicles with low greenhouse gas emissions are rewarded with a bonus while vehicles with higher emissions have a higher vehicle tax. The hope with the new system is a cleaner vehicle fleet, which is also positive in terms of nitrogen dioxide levels in Stockholm's air.

An action programme to meet environmental quality standards for nitrogen dioxide and particulate matter (PM10) in Stockholm was established by the Stockholm County Administrative Board in December 2012, *The action programme for nitrogen dioxide and particulate matter in Stockholm County.* According to Chapter 5, Section 6 of the Environmental Code, an action programme must be reviewed, if necessary, at least every six years. The County Administrative Board of Stockholm County has decided that *the Action Programme for Nitrogen Dioxide and Particulate matter in Stockholm County* will continue to apply from 1 January 2019.

Examples of measures to achieve this milestone during the programme period:

- Promote the renewal of the vehicle fleet and increased electrification.
- Promote greater compliance with environmental zone rules for heavy goods vehicles.
- Carry out measures such as dust binding, hosing and cleaning of streets.
- Work to achieve optimised construction traffic and goods traffic, for example through construction logistics and requirements for work machines and groupage.
- Continue evaluating environmental sensors as a method for dynamic traffic management based on air quality.
- Follow up and evaluate the environmental zone on Hornsgatan.
- In consultation with the City Executive Board, continuously monitor whether other individual streets exceed the environmental quality standards. Dynamic environmental zones can then become relevant.
- Promote instruments to reduce the number of vehicles with studded tyres.

The Transport Committee is responsible for carrying out activities that contribute to achieving this milestone.

The follow-up responsibility for this milestone lies with the Transport Committee with the support of the Environment and Health Committee.

6.2 Reduced environmental noise

This milestone means that Stockholm's residents are less exposed to harmful levels of noise. Based on its area of responsibility, the City shall work to limit noise at source and annually implement noise measures for housing, recreational areas, school playgrounds and other public spaces.

The environmental quality standard for environmental noise is a target standard which seeks to ensure that environmental noise does not have harmful effects on human health. In order to achieve urban density in an appropriate way, it is therefore necessary to give great consideration to environmental noise and its impact on human health.

Since 1985, the City of Stockholm has been implementing ongoing action programmes against noise so as to create a good sound environment for residents and others visiting Stockholm. The most recent action programme applies to the years 2019–2023.

The City has been working on limiting environmental noise for a long time. A working model for the measures has been developed and refined over time. The model follows a coherent chain from producing basic data, programmes for implementation of measures and follow-up to reporting and documentation. Some of the most important initiatives taken since the work began in the 1970s are safeguards for the most vulnerable residents. These have mainly been façade measures and most of the most vulnerable homes have by now been addressed. However, in order to move towards the defined goals, a change in the way of working is necessary. Now the noise needs to be limited at source.

Examples of measures to achieve this milestone during the programme period:

- Use sound-absorbing architecture in urban building
- Provide grants for noise-reducing façade measures
- Improve existing noise protection screens
- Increase focus on action at source
- Work on traffic management and speed reduction
- Electrification of the transport sector
- Impose procurement requirements for stud-free and low-noise tyres, for example

The City Development Committee, the Environment and Health Committee, the City Planning Committee, the Transport Committee, AB Familjebostäder, AB Stockholmshem, AB Svenska Bostäder, Micasa Fastigheter i Stockholm AB and SISAB are responsible for performing activities aimed at achieving the milestone.

The follow-up responsibility for this milestone lies with the Transport Committee with the support of the Environment and Health Committee.

7. A toxin-free Stockholm

The goal, in accordance with the national environmental quality goal A toxin-free environment, is that the presence of substances in the environment that have been created in or extracted by society shall not threaten human health or biodiversity. The levels of non-natural substances are close to zero and their impact on human health and ecosystems is too negligible. The levels of naturally occurring substances are close to background levels.

The goal of a toxin-free Stockholm includes three milestones for the programme period

- Reduced levels of harmful substances in goods and chemical products

The goal of a toxin-free Stockholm contributes in particular to global goals number **3 Good health and well-being** and number **12 Responsible consumption and production**.

Among the national environmental goals, the goal of a toxin-free Stockholm contributes primarily to the goal **A non-toxic environment**.

Chemicals play an important role in today's society. Global production of chemicals increased between the 1930s and 2010 from one million tonnes per year to over 600 million tonnes per year, and continues to grow by around three per cent every year, so that it is now approaching one billion tonnes per year. In recent years, much attention has also been given to the problem of microplastic dispersion, i.e. plastic particles in the size range of 1 µm-5 mm.

Chemical products are used in many contexts, such as pharmaceuticals, cosmetics, detergents and cleaning agents, pesticides and paints. There are also chemical substances in goods such as clothing, furniture, computers and building materials. The company's reports to the European chemicals agency show that around 30,000 chemical substances are used in quantities greater than one tonne per year. While chemicals have contributed to our prosperity, they have also, in many cases, caused health and environmental problems. It is important that we do not burden our environment with substances created or extracted by society at levels that may threaten our health or the environment.

In order to achieve the goal of a non-toxic Stockholm, it is important that the City works to raise awareness and knowledge among the City's employees, residents and commerce and industry about dangerous substances in everyday life, especially in children's everyday lives. The City can also perform knowledge-raising and guidance efforts about which materials can be recycled and recirculated. In its capacity as a procuring agency, the City has the opportunity to impose requirements for goods and materials which do not contain harmful substances. It is also important that the city monitors the requirements that are set in procurements and agreements.

The City of Stockholm's chemical plan and the Action plan for reducing the spread of microplastics cover the goal of a non-toxic Stockholm.

7.1 Reduced levels of harmful substances in goods and chemical products

This milestone means that the City is driving the development towards a reduction in the use of harmful chemicals by following its own organisation's related action plans and by working to promote increased awareness of chemicals among Stockholm residents. During the programme period, the number of chemical products containing phase-out substances in the City's operations shall be reduced by more than one third and the environmental assessment requirements for chemical products in construction projects shall be significantly increased.

Measurements in Stockholm show that the concentrations of many anthropogenic substances are high. The exposure limits for several substances in surface water, fish and sediment are exceeded in several cases, in some cases by a very wide margin.

Emissions of many substances have been reduced by means of legislation and substitution. The levels in sludge therefore show decreasing levels in many cases. On the other hand, levels in the environment often show more unclear trends, as many of the substances in question are persistent and therefore remain in the environment long after emissions have ceased. At the same time, chemical use in society is increasing, leading to the release of new, previously unknown substances.

The City of Stockholm's chemical plan has been created to specify and facilitate the work to achieve the milestones of previous environment programmes. It contains measures, times when these shall be implemented and the administration or company responsible. Some of the measures in *the City of Stockholm's chemical plan* are of limited duration and some have more the nature of continued application of ongoing working methods. Both types are important for the work to be done. To support responsible administrations and companies, a chemical centre was set up by the Environment and Health Department in 2014.

The City's Action plan for reducing the spread of microplastics includes both upstream measures (e.g. procurement requirements), which are largely similar to those in the *City of Stockholm's Chemical Plan*, and measures that are more site-specific and more downstream (e.g. storm-water purification) which are more closely related to *the City of Stockholm's action plan for good water status.*

This milestone can be achieved by implementing the measures in the *City of Stockholm's Chemical Plan* and the *Action Plan for reducing the spread of microplastics*. These contain 49 and 50 measures respectively, and also specify which committees and company boards shall be responsible.

Examples of measures to achieve this milestone during the programme period:

- Continue work on chemical-smart pre-schools and promote a toxin-free environment in pre-schools and schools.
- Replace products with undesirable content with better alternatives by means of purchasing and procurement.
- Document the chemical products and building and construction products used in the City's operations, using Chemsoft and the Building Material Assessment system.
- Continue to develop previously produced guidelines and training (including on Chemsoft and the Building Material Assessment system).
- Perform communication initiatives about chemical work both internally and externally, so as to inspire a reduction in the use of chemicals that are hazardous to the environment and health.

All committees and company boards are responsible for carrying out activities aimed at achieving this milestone.

The follow-up responsibility for this milestone lies with the Environment and Health Committee.

Appendix. Proposal for indicators

Priority goal	Milestone	Proposed indicators
A fossil-free and climate-positive Stockholm by 2040	Reducing greenhouse gas emissions – maximum 1.5 tonnes CO_2e per resident	Emissions, tonnes CO_2e per resident
		Emissions, tonnes CO_2e by 2040
		Emissions, tonnes CO_2e from transport
		Emissions, tonnes CO_2e from heating
		Emissions, tonnesCO_2e from use of electricity and gas
	Reduced climate impact from consumption	Climate impact from procured food and meals
		Proportion of LCA-calculated new construction projects
		Greenhouse gas emissions from the City of Stockholm's air travel
A fossil-free organisation by 2030	Reducing greenhouse gas emissions – maximum 105,000 tonnes CO_2e from the City's operations	Emissions, tonnes CO_2e in the heating, electricity and gas use sectors, as well as transport in the City's organisation
	Effective energy consumption	Total energy purchased in the City's operations
		Relative energy efficiency enhancement in the City's operations
		Proportion of large-scale rebuilding work where purchased energy decreased by at least 30 per cent
		Electricity and heat production based on solar energy
A climate-adapted Stockholm	Improved ability to cope with effects of torrential rain	
	Improved ability to cope with effects of heat waves	
A resource-smart Stockholm	Reduced use of resources and more sensible consumption	Reuse by local residents via the City's recycling sites
		Reuse within the City's own operations (Stocket)
		Drinking water consumption in the City's own operations
		Proportion of produced volume of drinking water charged to customers
		Food waste in the City's operations
	Increased recirculation of material resources within the city	Plastic to energy recovery
		Proportion of food waste to biological treatment
		Sorting at source in the City's own operations, plastic packaging
		Sorting at source in the City's own operations, food waste
		Proportion of phosphorus in sludge returned to agricultural land
	Increased resource efficiency in connection with the construction process	

Priority goal	Milestone	Proposed indicators
A Stockholm with biodiversity in well-functioning and cohesive ecosystems	Maintained functions and connections for biodiversity in the city's blue and green infrastructure	Proportion of individual development projects where ecological compensation measures are implemented
		Proportion of annual land allocations for the City's land where the green space factor for district land is a requirement
	Increased implementation of reinforcement measures, ecological compensation and conservation	
	Increased proportion of food and goods that promote biodiversity in City purchasing	Proportion of ecological meals and food purchased in the City in SEK out of the total value of purchased meals and food
	Improved water quality in the City's lakes, waterways and coastal waters	Proportion of water bodies that comply with environmental quality norms for ecological status
		Proportion of water bodies that comply with environmental quality norms for chemical status
		Proportion of water bodies with good or high status for nutrients
A Stockholm with clean air and a good sound environment	Reduced exposure to nitrogen dioxide and particulate matter for the city's residents	Number of days over the norm for nitrogen dioxide in air (existing)
		Number of days over the norm for particulate matter in air (existing)
		Fulfilment of environmental goal for hourly average nitrogen dioxide in air
		Fulfilment of environmental goal for annual average particulate matter in air
	Reduced environmental noise	Number of noise-actioned recreational areas during the year
		Number of noise-actioned school playgrounds during the year
		Number of noise protection screens actioned during the year
		Number of noise-exposed apartments where façade measures have been taken to reduce indoor noise during the year
A toxin-free Stockholm	Reduced levels of harmful substances in goods and chemical products	Number of chemical products in the City's operations that contain phase-out substances
		Number of 14 selected substances that show decreasing or unchanged levels in sludge
		Proportion of City procurements in priority agreement areas under the chemicals plan that have included relevant chemical requirements that have also been followed up
		Civil engineering: proportion of City administrations' and companies' new construction agreements with designer, contractor and materials supplier where requirements have been set in procurement that chemical products and goods shall be environmentally assessed and documented in the Building Material Assessment system
		Civil engineering: proportion of City administrations' and companies' refurbishment, renovation and management agreements with designer, contractor and materials supplier where requirements have been set in procurement that chemical products and goods shall be environmentally assessed and documented in the Building Material Assessment system
		Building: proportion of City administrations' and companies' completed new-build projects where goods and chemical products have been environmentally assessed and documented in the Building Material Assessment system
		Building: proportion of City administrations' and companies' completed rebuilding projects where goods and chemical products have been environmentally assessed and documented in the Building Material Assessment system
		Proportion of products with content information in the Building Material Assessment system in the City's projects
		Proportion of products with the assessment recommended, accepted and avoided respectively in the City's projects
		Proportion of hazardous waste in bin bags

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